HONDA

SHOP MANUAL

HONDA

HONDA

CB1100SFY

© HONDA MOTOR CO., LTD. 1999

IMPORTANT SAFETY NOTICE

⚠WARNING ***Indicates a strong possibility of severe personal injury or death if instructions are not followed.***

CAUTION: ***Indicates a possibility of equipment damage if instructions are not followed.***

NOTE: Gives helpful information.

Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. It is important to note that this manual contains some warnings and cautions against some specific service methods which could cause **PERSONAL INJURY** to service personnel or could damage a vehicle or render it unsafe. Please understand that those warnings could not cover all conceivable ways in which service, whether or not recommended by Honda, might be done or of the possibly hazardous consequences of each conceivable way, nor could Honda investigate all such ways. Anyone using service procedures or tools, whether or not recommended by Honda, *must satisfy himself thoroughly* that neither personal safety nor vehicle safety will be jeopardized by the service methods or tools selected.

TYPE CODE

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

CODE	AREA TYPE	CODE	AREA TYPE
ED	EUROPEAN DIRECT SALES (Austria, Netherlands, Spain, Switzerland, Portugal, Belgium, Canary ilands, Hungary, Sweden, Finland, Denmark, Norway)	E	U.K.
		F	FRANCE

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the CB1100SF.

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

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

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections. Sections 4 through 20 describe parts of the motorcycle, grouped according to location.

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

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

If you don't know the source of the trouble, go to section 22 Troubleshooting.

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

Date of Issue: June, 1999
© HONDA MOTOR CO., LTD.

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

GENERAL SAFETY	1-1	TOOLS	1-18
SERVICE RULES	1-2	LUBRICATION & SEAL POINTS	1-20
MODEL IDENTIFICATION	1-3	CABLE & HARNESS ROUTING	1-24
SPECIFICATIONS	1-4	EMISSION CONTROL SYSTEMS	1-36
TORQUE VALUES	1-13		

GENERAL SAFETY

CARBON MONOXIDE

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.

⚠WARNING

The exhaust contains poisonous carbon monoxide gas that can cause loss of consciousness and may lead to death.

Run the engine in an open area or with an exhaust evacuation system in an enclosed area.

GASOLINE

Work in a well ventilated area. Keep cigarettes, flames or sparks away from the work area or where gasoline is sotred.

⚠WARNING

Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.

HOT COMPONENTS

⚠WARNING

Engine and exhaust system parts become very hot and remain hot for some time after the engine is run. Wear insulated gloves or wait until the engine and exhaust system have cooled before handling these parts.

USED ENGINE OIL

⚠WARNING

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. KEEP OUT OF REACH OF CHILDREN.

BRAKE DUST

Never use an air hose or dry brush to clean the brake assemblies.

BRAKE FLUID

CAUTION:

Spilling fluid on painted, plastic or rubber parts will damage them. Place a clean shop towel over these parts whenever the system is serviced. KEEP OUT OF REACH OF CHILDREN.

COOLANT

Under some conditions, the ethylene glycol in engine coolant is combustible and its flame is not visible. If the ethylene glycol does ignite, you will not see any flame, but you can be burned.

⚠WARNING

- ***Avoid spilling engine coolant on the exhaust system or engine parts. They may be hot enough to cause the coolant to ignite and burn without a visible flame.***
- ***Coolant (ethylene glycol) can cause some skin irritation and is poisonous if swallowed. KEEP OUT OF REACH OF CHILDREN.***
- ***Do not remove the radiator cap when the engine is hot. The coolant is under pressure and could scald you.***
- ***Keep hands and clothing away from the cooling fan, as it starts automatically.***

CAUTION:

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

BATTERY HYDROGEN GAS & ELECTROLYTE

⚠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 follow with milk of magnesia or vegetable oil and call a physician. KEEP OUT OF REACH OF CHILDREN.***

SERVICE RULES

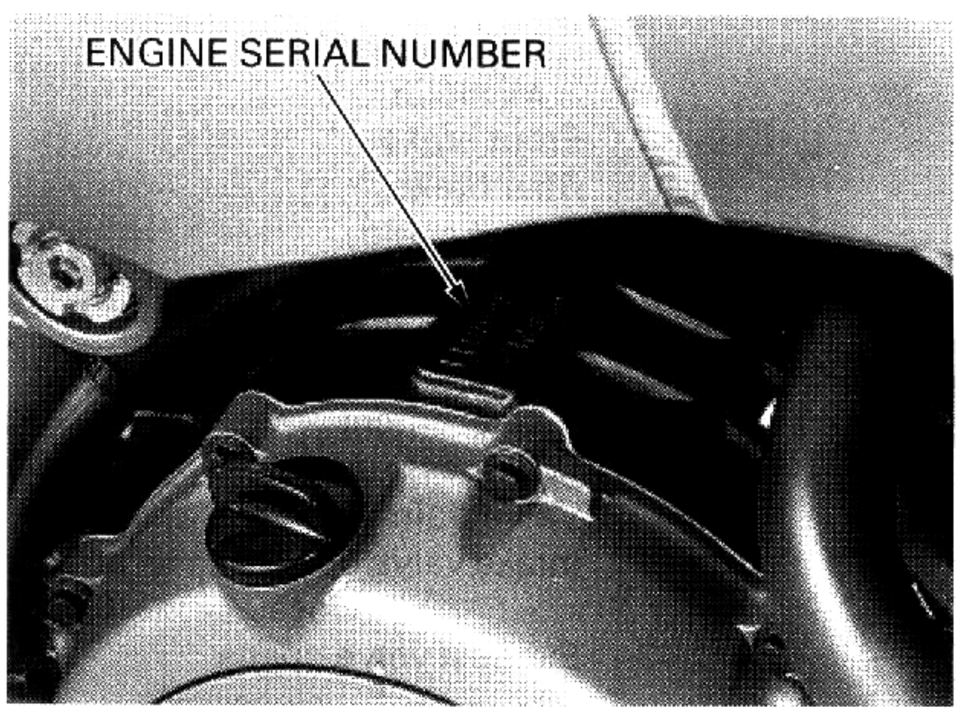
1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that don't meet HONDA's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as show on pages 1-24 through 1-35, Cable and Harness Routing.

MODEL IDENTIFICATION

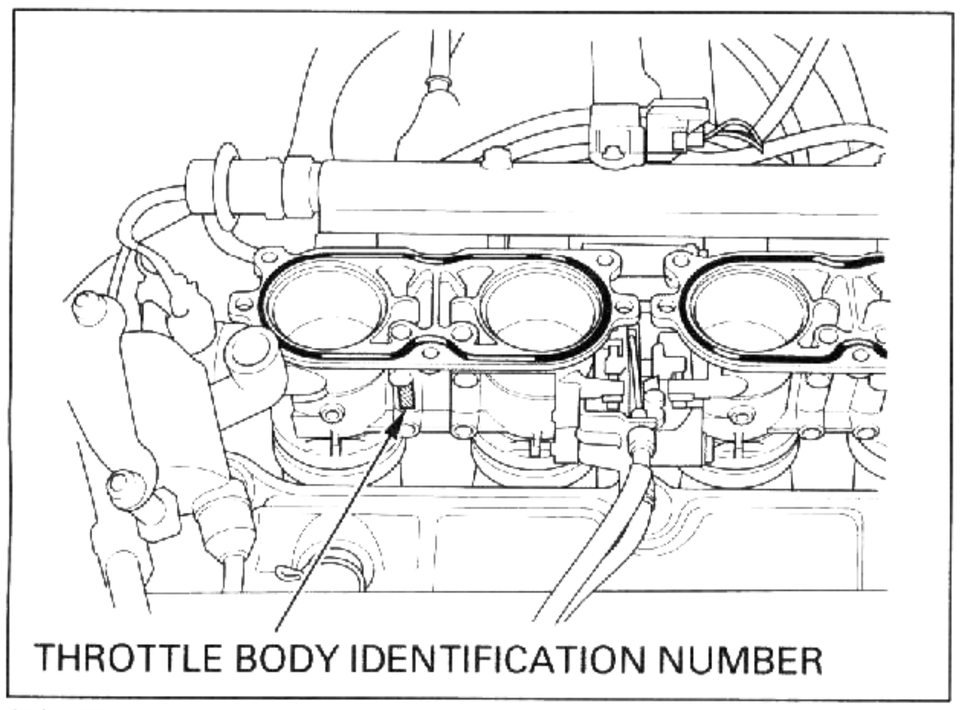




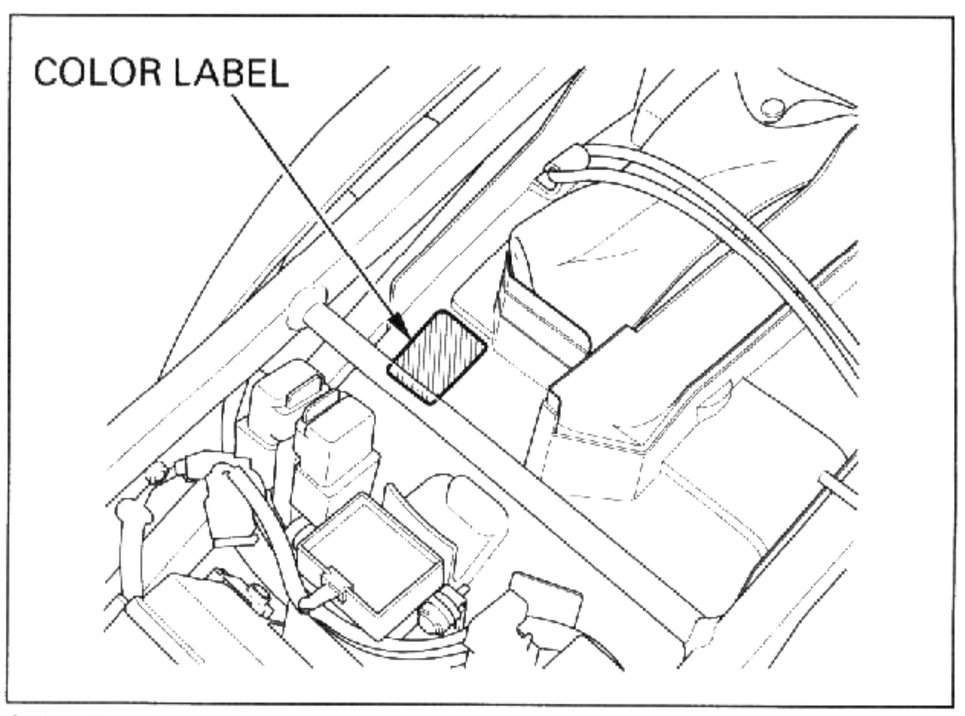
(1) The frame serial number is stamped on the right side of the steering head.



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



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



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

SPECIFICATIONS

GENERAL

ITEM		SPECIFICATIONS
DIMENSIONS	Overall length	2,145 mm (84.4 in)
	Overall width	750 mm (29.5 in)
	Overall height	1,115 mm (43.9 in)
	Wheelbase	1,500 mm (59.1 in)
	Seat height	795 mm (31.3 in)
	Footpeg height	383 mm (15.1 in)
	Ground clearance	140 mm (5.5 in)
	Dry weight	222 kg (489 lbs)
	Curb weight	254 kg (560 lbs)
	Maximum weight capacity	188 kg (415 lbs)
FRAME	Frame type	Diamond
	Front suspension	Telescopic fork
	Front wheel travel	108 mm (4.3 in)
	Rear suspension	Swingarm
	Rear wheel travel	140 mm (5.5 in)
	Rear damper	Nitrogen gas filled damper
	Front tire size	120/70 ZR17 (58W) /Radial
	Rear tire size	180/55 ZR17 (73W) /Radial
	Tire brand	
	Bridgestone	Front: BT57F RADIAL G /Rear: BT57R RADIAL F
	Michelin	Front: MACADAM 90X G /Rear: MACADAM 90X M
	Front brake	Hydraulic double disc brake with 3 pots caliper
	Rear brake	Hydraulic single disc brake with 3 pots caliper
	Caster angle	25.5°
	Trail length	102 mm (4.0 in)
	Fuel tank capacity	22 ℓ (5.8 US gal , 4.8 Imp gal)
ENGINE	Bore and stroke	79.0 × 58.0 mm (3.11 × 2.28 in)
	Displacement	1,137 cm³ (69.4 cu-in)
	Compression ratio	11.0 : 1
	Valve train	Chain drive and DOHC
	Intake valve opens (at 1 mm (0.04 in) lift)	15° BTDC
	Intake valve closes (at 1 mm (0.04 in) lift)	35° ABDC
	Exhaust valve opens (at 1 mm (0.04 in) lift)	40° BBDC
	Exhaust valve closes (at 1 mm (0.04 in) lift)	10° ATDC
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid/double rotor
	Cooling system	Liquid cooled
	Air filtration	Paper filter
	Crankshaft type	Unit type
	Engine dry weight	82.8 kg (182.5 lbs)
	Cylinder arrangement	Four cylinder, inline 30° inclinded from vertical

GENERAL (Cont'd)

ITEM			SPECIFICATIONS
CARBURETION	Type		PGM-FI (Programmed Fuel Injection)
	Throttle bore		42 mm (1.7 in)
DRIVE TRAIN	Clutch system		Multi-plate, wet
	Clutch operation system		Cable operated type
	Transmission		Constant mesh, 5-speed
	Primary reduction		1.571 (88/56)
	Final reduction		2.529 (43/17)
	Gear ratio	1st	2.769 (36/13)
		2nd	1.938 (31/16)
		3rd	1.556 (28/18)
		4th	1.316 (25/19)
		5th	1.167 (28/24)
	Gearshift pattern		Left foot operated return system, 1-N-2-3-4-5
ELECTRICAL	Ignition system		Computer-controlled digital transistorized with electric advance
	Starting system		Electric starter motor
	Charging system		Triple phase output alternator
	Regulator/rectifier		SCR shorted/triple phase, full wave rectification
	Lighting system		Battery

LUBRICATION SYSTEM

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Engine oil capacity		At draining	3.8 ℓ (4.0 US qt , 3.3 Imp qt)	———
		At disassembly	4.6 ℓ (4.9 US qt , 4.0 Imp qt)	———
		At oil filter change	3.9 ℓ (4.1 US qt , 3.4 Imp qt)	———
Recommended engine oil			HONDA 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-40	———
Oil pressure at oil pressure switch			490 kPa (5.0 kgf/cm², 71 psi) at 5,400 min⁻¹ (rpm)/(80 °C/176 °F)	———
Oil pump rotor	Feed pump	Tip clearance	0.15 (0.006) max.	0.20 (0.008)
		Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
		Side clearance	0.04 – 0.09 (0.002 – 0.004)	0.12 (0.005)
	Cooler pump	Tip clearance	0.15 (0.006) max.	0.20 (0.008)
		Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
		Side clearance	0.04 – 0.09 (0.002 – 0.004)	0.12 (0.005)

FUEL SYSTEM (Programmed Fuel Injection)

ITEM	SPECIFICATIONS
Throttle body identification number	GQ41A
Starter valve vacuum difference	20 mm Hg
Base throttle valve for synchronization	No. 3
Idle speed	1,100 ± 100 min⁻¹ (rpm)
Throttle grip free play	2 – 6 mm (1/16 – 1/4 in)
Intake air temperature sensor resistance (at 20 °C/68 °F)	1 – 4 kΩ
Engine coolant temperature sensor resistance (at 20 °C/68 °F)	2.3 – 2.6 kΩ
Fuel injector resistance (at 20 °C/68 °F)	13.0 – 14.4 kΩ
PAIR solenoid valve resistance (at 20 °C/68 °F)	20 – 24 Ω
Cam pulse generator peak voltage (at 20 °C/68 °F)	0.7 V minimum
Ignition pulse generator peak voltage (at 20 °C/68 °F)	0.7 V minimum
Manifold absolute pressure at idle	200 – 250 mm Hg
Fuel pressure at idle	294 kPa (3.0 kgf/cm², 43 psi)
Fuel pump flow (at 12 V)	220 cm³ (7.4 US oz , 7.7 Imp oz) minimum/10 seconds

COOLING SYSTEM

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	3.2 ℓ (3.4 US qt , 2.8 Imp qt)
	Reserve tank	0.5 ℓ (0.5 US qt , 0.4 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)
Thermostat	Begin to open	80 – 84 °C (176 – 183 °F)
	Fully open	95 °C (203 °F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		High quality ethylene glycol antifreeze containing corrosion protection inhibitors
Standard coolant concentration		50% mixture with soft water

CYLINDER HEAD/VALVES

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,275 kPa (13.0 kgf/cm², 185 psi) at 350 min⁻¹ (rpm)	———
Cylinder head warpage			———	0.10 (0.004)
Valve, valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	———
		EX	0.22 ± 0.03 (0.009 ± 0.001)	———
	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1955)
		EX	4.960 – 4.975 (0.1953 – 0.1959)	4.950 (0.1949)
	Valve guide I.D.	IN	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
		EX	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	———
		EX	0.025 – 0.052 (0.0010 – 0.0020)	———
	Valve guide projection above cylinder head	IN	16.3 – 16.5 (0.64 – 0.65)	———
		EX	16.3 – 16.5 (0.64 – 0.65)	———
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length	Inner	IN/EX	37.4 (1.47)	35.4 (1.39)
	Outer	IN/EX	40.6 (1.60)	38.6 (1.52)
Valve lifter	Valve lifter O.D.	IN/EX	25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.	IN/EX	26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Camshaft	Cam lobe height	IN	38.32 – 38.40 (1.509 – 1.512)	38.02 (1.497)
		EX	38.38 – 38.46 (1.511 – 1.514)	38.08 (1.499)
	Runout		———	0.05 (0.002)
	Oil clearance		0.020 – 0.074 (0.0008 – 0.0029)	0.10 (0.004)

CLUTCH/GEARSHIFT LINKAGE

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Clutch lever free play			10 – 20 (3/8 – 13/16)	———
Clutch spring free length			57.4 (2.26)	56.2 (2.21)
Clutch disc thickness		Blue color	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
		Brown color	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
Clutch plate warpage			———	0.30 (0.012)
Clutch outer guide		I.D.	28.000 – 28.021 (1.1024 – 1.1032)	28.031 (1.1036)
		O.D.	34.975 – 34.991 (1.3770 – 1.3776)	34.965 (1.3766)
Mainshaft O.D. at clutch outer guide			27.980 – 27.993 (1.1016 – 1.1021)	27.970 (1.1012)
Shift fork, fork shaft	Fork	I.D.	12.000 – 12.021 (0.4724 – 0.4733)	12.03 (0.474)
		Claw thickness	5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
	Fork shaft O.D.		11.957 – 11.968 (0.4707 – 0.4712)	11.95 (0.470)

ALTERNATOR/STARTER CLUTCH

Unit: mm (in)

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

CRANKCASE/PISTON/CYLINDER

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		79.000 – 79.015 (3.1102 – 3.1108)	79.10 (3.114)
	Out of round		———	0.10 (0.004)
	Taper		———	0.10 (0.004)
	Warpage		———	0.05 (0.002)
Piston, piston rings	Piston mark direction		"IN" mark facing toward the intake side	———
	Piston O.D.		78.970 – 78.990 (3.1090 – 3.1098)	78.90 (3.106)
	Piston O.D. measurement point		15 mm (0.6 in) from bottom of skirt	———
	Piston pin bore I.D.		19.002 – 19.008 (0.7481 – 0.7483)	19.03 (0.749)
	Piston pin O.D.		18.994 – 19.000 (0.7478 – 0.7480)	18.984 (0.7474)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	———
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.08 (0.003)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.06 (0.002)
	Piston ring end gap	Top	0.20 – 0.35 (0.008 – 0.014)	0.5 (0.02)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.7 (0.03)
		Oil (side rail)	0.2 – 0.8 (0.01 – 0.03)	1.0 (0.04)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	———
Connecting rod small end I.D.			19.030 – 19.051 (0.7492 – 0.7500)	19.061 (0.7504)
Connecting rod-to-piston pin clearance			0.030 – 0.057 (0.0012 – 0.0022)	———
Crankpin oil clearance			0.030 – 0.052 (0.0012 – 0.0020)	0.062 (0.0024)

CRANKSHAFT/TRANSMISSION/BALANCER

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Runout		———	0.30 (0.012)
	Main journal oil clearance		0.017 – 0.035 (0.0007 – 0.0014)	0.045 (0.0018)
Transmission	Gear I.D.	M4, M5	31.000 – 31.025 (1.2205 – 1.2215)	31.04 (1.222)
		C1	26.000 – 26.021 (1.0236 – 1.0244)	26.04 (1.025)
		C2, 3	33.000 – 33.025 (1.2992 – 1.3002)	33.04 (1.301)
	Bushing O.D.	M4, M5	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
		C2	32.955 – 32.980 (1.2974 – 1.2984)	32.93 (1.296)
		C3, distance collar	32.950 – 32.975 (1.2972 – 1.2982)	32.93 (1.296)
	Bushing I.D.	M4	27.985 – 28.006 (1.1018 – 1.1026)	28.02 (1.103)
		C2	29.985 – 30.006 (1.1805 – 1.1813)	30.02 (1.182)
	Gear-to-bushing clearance	M4, M5	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C2	0.020 – 0.070 (0.0008 – 0.0028)	0.11 (0.004)
		C3	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Mainshaft O.D.	M4	27.967 – 27.980 (1.1011 – 1.1016)	27.957 (1.1007)
		Clutch outer guide	27.980 – 27.993 (1.1016 – 1.1021)	27.970 (1.1012)
	Countershaft O.D.	C2	29.967 – 29.980 (1.1798 – 1.1803)	27.957 (1.1007)
	Bushing-to-shaft clearance	M4	0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)
		C2	0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)

FRONT WHEEL/SUSPENSION/STEERING

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		———	1.5 (0.06)
Cold tire pressure	Drive only	250 kPa (2.50 kgf/cm², 36 psi)	———
	Driver and passenger	250 kPa (2.50 kgf/cm², 36 psi)	———
Axle runout		———	0.20 (0.008)
Wheel rim runout	Radial	———	2.0 (0.08)
	Axial	———	2.0 (0.08)
Fork	Spring free length	320.5 (12.62)	314.1 (12.37)
	Spring direction	With the tapered end facing down	———
	Tube runout	———	0.20 (0.008)
	Recommended fork fluid	Fork fluid	———
	Fluid level	164 (6.5)	———
	Fluid capacity	446 ± 2.5 cm³ (15.1 ± 0.08 US oz, 15.7 ± 0.09 Imp oz)	———
Steering head bearing pre-load		10 – 15 N (1.0 – 1.5 kgf)	———

REAR WHEEL/SUSPENSION

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)
Drive chain	Size/link	DID	DID50ZV-110LE	———
		RK	RK50LFO-110LE	———
	Slack		25 – 35 (1.0 – 1.4)	50 (2.0)
Shock absorber	Spring adjuster standard position		3rd groove	———

HYDRAULIC BRAKE

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT
Front	Specified brake fluid			DOT 4	———
	Brake disc thickness			4.5 (0.18)	3.5 (0.14)
	Brake disc runout			———	0.30 (0.012)
	Master cylinder I.D.			12.700 – 12.743 (0.5000 – 0.5017)	12.76 (0.502)
	Master piston O.D.			12.657 – 12.684 (0.4983 – 0.4994)	12.65 (0.498)
	Secondary master cylinder I.D.			14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Secondary master piston O.D.			13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
	Caliper cylinder I.D.	Right	Upper	27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)
			Middle	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
			Lower	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
		Left	Upper	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
			Middle	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
			Lower	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
	Caliper piston O.D.	Right	Upper	26.916 – 26.968 (1.0597 – 1.0617)	26.910 (1.0594)
			Middle	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
			Lower	25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)
		Left	Upper	25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)
			Middle	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
			Lower	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
Rear	Specified brake fluid			DOT 4	———
	Brake pedal height			65 (2.6)	———
	Brake disc thickness			5.0 (0.20)	4.0 (0.16)
	Brake disc runout			———	0.30 (0.012)
	Master cylinder I.D.			17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)
	Master piston O.D.			17.417 – 17.444 (0.6857 – 0.6868)	17.405 (0.6852)
	Caliper cylinder I.D.		Front	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
			Center	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
			Rear	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
	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)

BATTERY/CHARGING SYSTEM

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 10 AH
	Current leakage		0.2 mA max.
	Voltage (20 °C/68 °F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A/5 – 10 h
		Quick	4.0 A/0.5 h
Alternator	Capacity		0.46 kW/5,000 min^{-1} (rpm)
	Charging coil resistance (20 °C/68 °F)		0.1 – 1.0 Ω

IGNITION SYSTEM

ITEM	SPECIFICATIONS
Spark plug	CR8EHVX−9 (NGK)
Spark plug gap	0.80−0.90 mm (0.031−0.035 in)
Ignition coil peak voltage	100 V minimum
Ignition pulse generator peak voltage	0.7 V minimum
Ignition timing (“F” mark)	12° BTDC at idle

Unit: mm (in)

ELECTRIC STARTER

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0−13.0 (0.47−0.51)	4.5 (0.18)

LIGHTS/METERS/SWITCHES

ITEM		SPECIFICATIONS
Bulbs	Headlight (Hi/Lo)	12V−60/55W
	Position light	12V−4W
	Brake/tail light	12V−21/5W × 2
	Front turn signal light	12V−21W × 2
	Rear turn signal light	12V−21W × 2
	Instrument light	12V−1.7W × 3
	Turn signal indicator	12V−3.4W × 2
	High beam indicator	12V−1.7W
	Neutral indicator	12V−1.7W
	Oil pressure indicator	12V−1.7W
	PGM-FI warning indicator	12V−1.7W
	Fuel reserve indicator	12V−1.7W
	Immobilizer indicator	12V−1.7W
Fuse	Main fuse	30A
	PGM-FI fuse	30A
	Sub fuse	10A ×6
Tachometer peak voltage		10.5 V minimum
Thermo sensor resistance	80 °C	47.5−56.8 kΩ
	120 °C	14.9−17.3 kΩ
Fan motor switch	Start to close (ON)	98−102 °C (208−216 °F)
	Stop to open	93−97 °C (199−207 °F)

TORQUE VALUES

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

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

NOTES:
1. Apply sealant to the threads.
2. Apply a locking agent to the threads.
3. Apply grease to the threads.
4. Stake.
5. Apply oil to the threads and flange surface.
6. Apply clean engine oil to the O-ring.
7. U-nut.
8. ALOC bolt: replace with a new one.
9. CT bolt.

ENGINE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
MAINTENANCE:				
Spark plug	4	10	12 (1.2 , 9)	
Timing hole cap	1	45	18 (1.8 , 13)	NOTE 3
LUBRICATION SYSTEM:				
Oil drain bolt	1	14	29 (3.0 , 22)	
Oil filter boss	1	20	18 (1.8 , 13)	NOTE 2
Oil pump assembly flange bolt	1	6	13 (1.3 , 9)	NOTE 9
Oil pump driven sprocket bolt	1	6	15 (1.5 , 11)	NOTE 2
Oil strainer nut	1	6	12 (1.2 , 9)	NOTE 7
Oil filter cartridge	1	20	10 (1.0 , 7)	NOTE 6
Oil pressure switch	1	PT 1/8	12 (1.2 , 9)	NOTE 1
Oil pressure switch wire terminal screw	1	4	2 (0.2 , 1.4)	
Oil pipe mounting bolt	2	6	12 (1.2 , 9)	NOTE 2
FUEL SYSTEM (Programmed Fuel Injection):				
ECT (Engine Coolant Temperature)/thermo sensor	1	12	23 (2.3 , 17)	NOTE 1
Knock sensor	1	12	31 (3.2 , 23)	
Throttle body insulator band screw	8	5	See page 1-15	
Throttle cable bracket mounting bolt	2	5	3 (0.35 , 2.5)	
Fuel pipe mounting nut	2	6	10 (1.0 , 7)	NOTE 7 Yellow paint
Fuel pipe setting bolt	2	8	22 (2.2 , 16)	Yellow paint
Pressure regulator lock nut	1	18	27 (2.8 , 20)	Yellow paint
Starter valve synchronization plate screw	4	3	1 (0.09 , 0.7)	
Starter valve lock nut	4	10	2 (0.18 , 1.3)	
Vacuum joint plug socket bolt for synchronization	4	5	3 (0.3 , 2.2)	
COOLING SYSTEM:				
Water pump cover bolt	3	6	13 (1.3 , 9)	NOTE 9

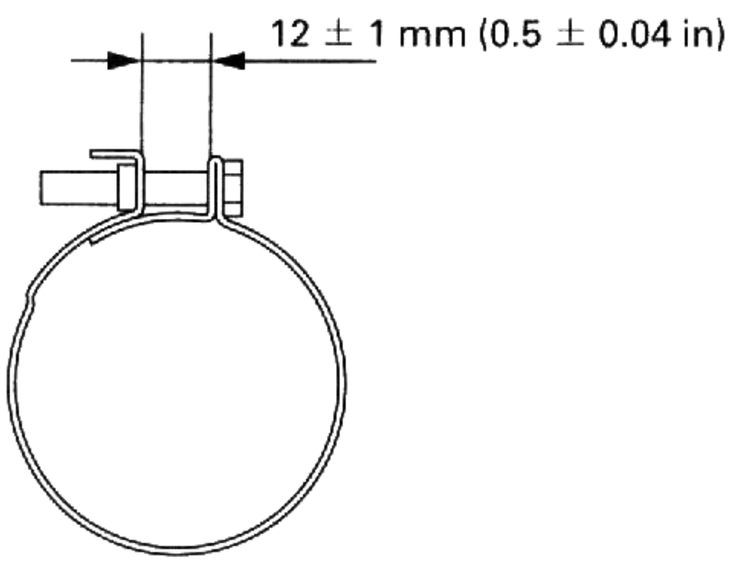
ENGINE (Cont'd)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
ENGINE MOUNTING:				
Drive sprocket cover bolt	2	6	12 (1.2 , 9)	
Drive sprocket special bolt	1	10	54 (5.5 , 40)	
CYLINDER HEAD/VALVES:				
Cylinder head cover bolt	6	6	10 (1.0 , 7)	
Breather plate flange bolt	5	6	12 (1.2 , 9)	NOTE 2, 9
Camshaft holder flange bolt	10	6	12 (1.2 , 9)	NOTE 5
Cylinder head sealing bolt	1	18	32 (3.3 , 24)	NOTE 2
Cylinder head SH bolt	2	6	10 (1.0 , 7)	
Cylinder head mounting bolt/washer	10	10	67 (6.8 , 49)	NOTE 5
Cam sprocket bolt	4	7	20 (2.0 , 14)	NOTE 2
Cam chain tensioner cap nut	1	6	12 (1.2 , 9)	
Cam chain tensioner lifter mounting bolt	2	6	10 (1.0 , 7)	
Cam chain guide A mounting bolt	1	6	12 (1.2 , 9)	
Cylinder head stud bolt (exhaust pipe stud bolt)	8	8	See page 1-15	
PAIR reed valve cover flange bolt	4	6	13 (1.3 , 9)	
Cam pulse generator cover SH bolt	3	6	12 (1.2 , 9)	
CLUTCH/GEARSHIFT LINKAGE:				
Clutch center lock nut	1	25	127 (13.0 , 94)	NOTE 4, 5
Clutch spring bolt/washer	5	6	12 (1.2 , 9)	
Right crankcase cover SH bolt	11	6	12 (1.2 , 9)	
Right crankcase cover center bolt	1	6	12 (1.2 , 9)	
Shift drum center socket bolt	1	8	23 (2.3 , 17)	NOTE 2
Shift drum stopper pivot bolt	1	6	12 (1.2 , 9)	
Gearshift return spring pin	1	8	23 (2.3 , 17)	
ALTERNATOR/STARTER CLUTCH:				
Alternator cover SH bolt	10	6	12 (1.2 , 9)	
Alternator wire clamp socket bolt	1	6	9 (0.9 , 6.5)	
Flywheel flange bolt	1	10	103 (10.5 , 76)	NOTE 5
Stator mounting socket bolt	4	6	12 (1.2 , 9)	
Stator one-way clutch socket bolt	6	6	16 (1.6 , 12)	NOTE 2
CRANKCASE/PISTON/CYLINDER:				
Crankcase bolt, 10 mm	1	10	39 (4.0 , 29)	
9 mm (main journal bolt)	10	9	37 (3.8 , 27)	NOTE 5
8 mm	10	8	25 (2.5 , 18)	
7 mm	7	7	18 (1.8 , 13)	
6 mm	6	6	12 (1.2 , 9)	
Connecting rod nut	8	8	41 (4.2 , 30)	NOTE 5
Lower crankcase flange bolt	1	10	29 (3.0 , 22)	NOTE 2
Lower crankcase sealing bolt, 20 mm	1	20	29 (3.0 , 22)	NOTE 2
8 mm	1	8	22 (2.2 , 16)	NOTE 2
CRANKSHAFT/TRANSMISSION/BALANCER:				
Mainshaft bearing set plate flange bolt	2	6	12 (1.2 , 9)	NOTE 2
Shift drum set plate flange bolt	2	6	12 (1.2 , 9)	NOTE 2
Balancer shaft holder flange bolt	2	8	27 (2.8 , 20)	
Balancer shaft pinch bolt	3	6	12 (1.2 , 9)	

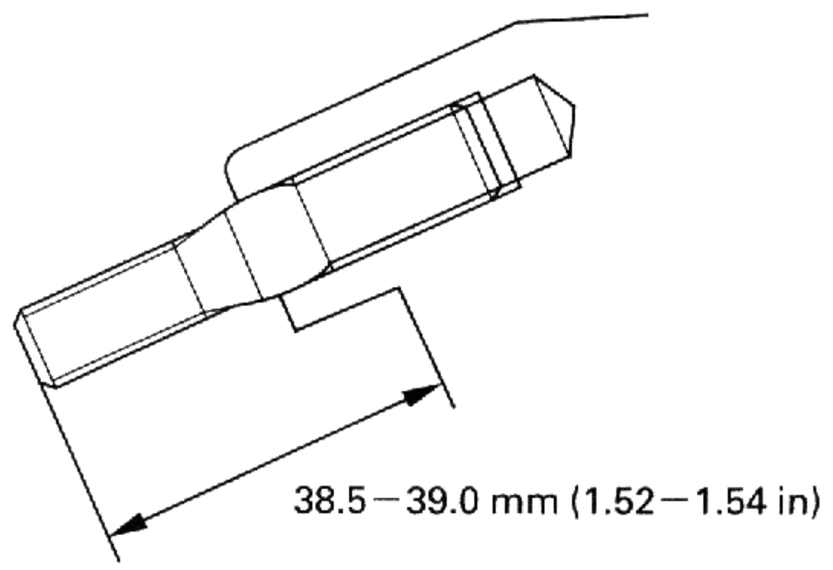
ENGINE (Cont'd)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
IGNITION SYSTEM:				
Ignition pulse generator cover SH bolt	8	6	12 (1.2 , 9)	NOTE 1 See page 1-20
Ignition pulse generator rotor special bolt	1	10	59 (6.0 , 43)	NOTE 5
LIGHT/METERS/SWITCHES:				
Neutral switch	1	10	12 (1.2 , 9)	

Throttle body insulator clamp:

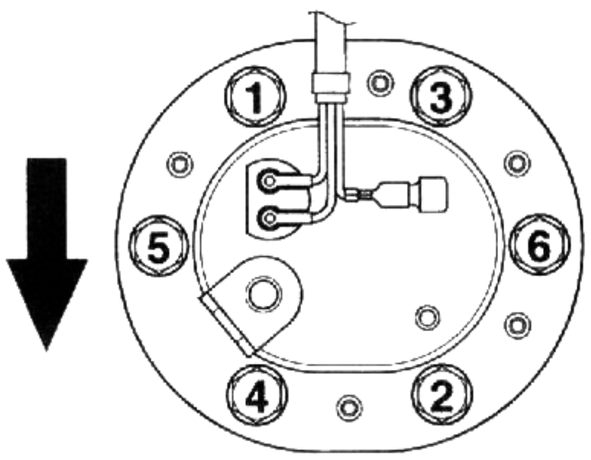


Exhaust pipe stud bolt:



FRAME

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
FRAME BODY PANELS/EXHAUST SYSTEM:				
Side stand pivot bolt	1	10	10 (1.0 , 7)	
Side stand pivot lock nut	1	10	29 (3.0 , 22)	
Main stand mounting bolt	1	10	54 (5.5 , 40)	NOTE 8
Main stand spring hook	1	8	26 (2.7 , 20)	
Bank sensor	2	8	22 (2.2 , 16)	
Exhaust pipe joint nut	8	7	21 (2.1 , 15)	
Muffler band bolt	4	8	18 (1.8 , 13)	
Muffler bracket bolt	2	8	26 (2.7 , 20)	
Seat rail mounting bolt	4	10	44 (4.5 , 33)	
FUEL SYSTEM (Programmed Fuel Injection):				
Fuel tube sealing nut (throttle body side)	1	12	22 (2.2 , 16)	
Fuel tube banjo bolt (fuel tank side)	1	12	22 (2.2 , 16)	
Service check bolt	1	6	15 (1.5 , 11)	
Fuel pump mounting nut	6	6	12 (1.2 , 9)	
Fuel filler cap bolt	3	4	2 (0.2 , 1.4)	
O_2 sensor	1	12	25 (2.5 , 18)	
Bank angle sensor mounting screw	2	4	2 (0.2 , 1.4)	
COOLING SYSTEM:				
Cooling fan nut	1	5	3 (0.27 , 2.0)	
Fan motor nut	3	6	5 (0.5 , 3.6)	
ENGINE MOUNTING:				
Side stand bracket bolt	2	10	54 (5.5 , 40)	
Engine hanger nut (rear/upper)	1	12	64 (6.5 , 47)	
Engine hanger nut (rear/lower)	1	12	64 (6.5 , 47)	
Engine hanger bolt	3	10	40 (4.1 , 30)	
Engine hanger adjusting bolt	2	22	11 (1.1 , 8)	
Engine hanger adjusting bolt lock nut	2	22	54 (5.5 , 40)	
CLUTCH/GEARSHIFT LINKAGE:				
Gearshift pedal bolt	1	6	10 (1.0 , 7)	
FRONT WHEEL/SUSPENSION/STEERING:				
Handlebar stopper bolt	2	8	25 (2.6 , 19)	
Handlebar weight mounting screw	2	6	10 (1.0 , 7)	NOTE 8
Steering stem nut	1	24	103 (10.5 , 76)	See page 13-33
Top thread A	1	26	26 (2.7 , 20)	
Top thread B	1	26	—	
Fork top bridge pinch bolt	2	8	23 (2.3 , 17)	
Fork bottom bridge pinch bolt	2	10	49 (5.0 , 36)	
Front axle bolt	1	14	59 (6.0 , 43)	
Front axle holder bolt	4	8	22 (2.2 , 16)	
Front brake disc mounting bolt	12	6	20 (2.0 , 14)	NOTE 8
Fork cap	2	37	23 (2.3 , 17)	
Fork socket bolt	2	8	20 (2.0 , 14)	NOTE 2
Fork damper lock nut	2	10	20 (2.0 , 14)	



FRAME (Cont'd)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
REAR WHEEL/SUSPENSION:				
Rear axle nut	1	18	118 (12.0 , 87)	NOTE 7
Rear brake disc mounting bolt	6	8	42 (4.3 , 31)	NOTE 8
Driven sprocket nut	5	12	108 (11.0 , 80)	NOTE 7
Rear shock absorber mounting nut	2	10	42 (4.3 , 31)	NOTE 7
Swingarm pivot nut	1	18	93 (9.5 , 69)	NOTE 7
Footpeg holder socket bolt	2	10	39 (4.0 , 29)	
Drive chain slider bolt	2	6	9 (0.9 , 6.5)	NOTE 8
HYDRAULIC BRAKE:				
Front brake master cylinder holder bolt	2	6	12 (1.2 , 9)	
Front brake master cylinder cap screw	2	4	1 (0.15 , 1.1)	
Brake lever pivot bolt	1	6	1 (0.1 , 0.7)	
Brake lever pivot nut	1	6	6 (0.6 , 4.3)	
Brake lever adjuster	1	5	4 (0.4 , 2.9)	
Front brake switch screw	1	4	1 (0.12 , 0.9)	
Right front brake caliper mounting bolt	2	8	31 (3.2 , 23)	NOTE 8
Left front brake caliper pivot bolt	1	8	31 (3.2 , 23)	NOTE 8
Left front brake caliper bolt (second master joint)	1	8	26 (2.7 , 20)	NOTE 8
Caliper body B bolt	9	8	32 (3.3 , 24)	NOTE 8
Front brake caliper slide pin (main)	3	12	23 (2.3 , 17)	NOTE 2
Front brake caliper slide pin (sub)	3	8	13 (1.3 , 9)	NOTE 2
Pad pin	3	10	18 (1.8 , 13)	
Brake caliper bleeder	6	8	6 (0.6 , 4.3)	
Second master cylinder mounting bolt	2	8	31 (3.2 , 23)	NOTE 8
Second master cylinder push rod nut	1	8	18 (1.8 , 13)	
Second master cylinder connector	2	6	10 (1.0 , 7)	
Rear master cylinder mounting bolt	2	6	12 (1.2 , 9)	
Rear master cylinder reservoir mounting bolt	1	6	12 (1.2 , 9)	
Rear master cylinder push rod nut	1	8	18 (1.8 , 13)	
Rear master cylinder hose joint screw	1	4	1 (0.15 , 1.1)	NOTE 2
Brake hose oil bolt	12	10	34 (3.5 , 25)	
Brake pipe joint	8	10	17 (1.7 , 12)	NOTE 5
Brake pipe 2/3 way joint	2	6	12 (1.2 , 9)	
Brake hose clamp bolt	2	6	12 (1.2 , 9)	
Delay valve mounting bolt	2	6	12 (1.2 , 9)	
PCV (Proportional Control Valve) mounting bolt	2	6	12 (1.2 , 9)	
Right front brake hose clamp bolt	1	6	12 (1.2 , 9)	
IGNITION SYSTEM:				
Ignition coil mounting nut	4	6	16 (1.6 , 12)	
Ignition coil mounting nut	2	6	10 (1.0 , 7)	
LIGHTS/METERS/SWITCHES:				
Tail/brake light mounting bolt	2	6	7 (0.7 , 5.1)	
Rear turn signal unit mounting nut	2	10	5 (0.5 , 3.6)	
Combination meter mounting bolt	2	4	2 (0.2 , 1.4)	
Fan motor switch	1	16	18 (1.8 , 13)	NOTE 1
Ignition switch mounting bolt	2	8	25 (2.5 , 18)	
Side stand switch mounting bolt	1	6	10 (1.0 , 7)	

TOOLS

NOTES: 1. Equivalent commercially available.
2. Alternative tool.
3. Newly provided tool.
4. Newly designed tool.

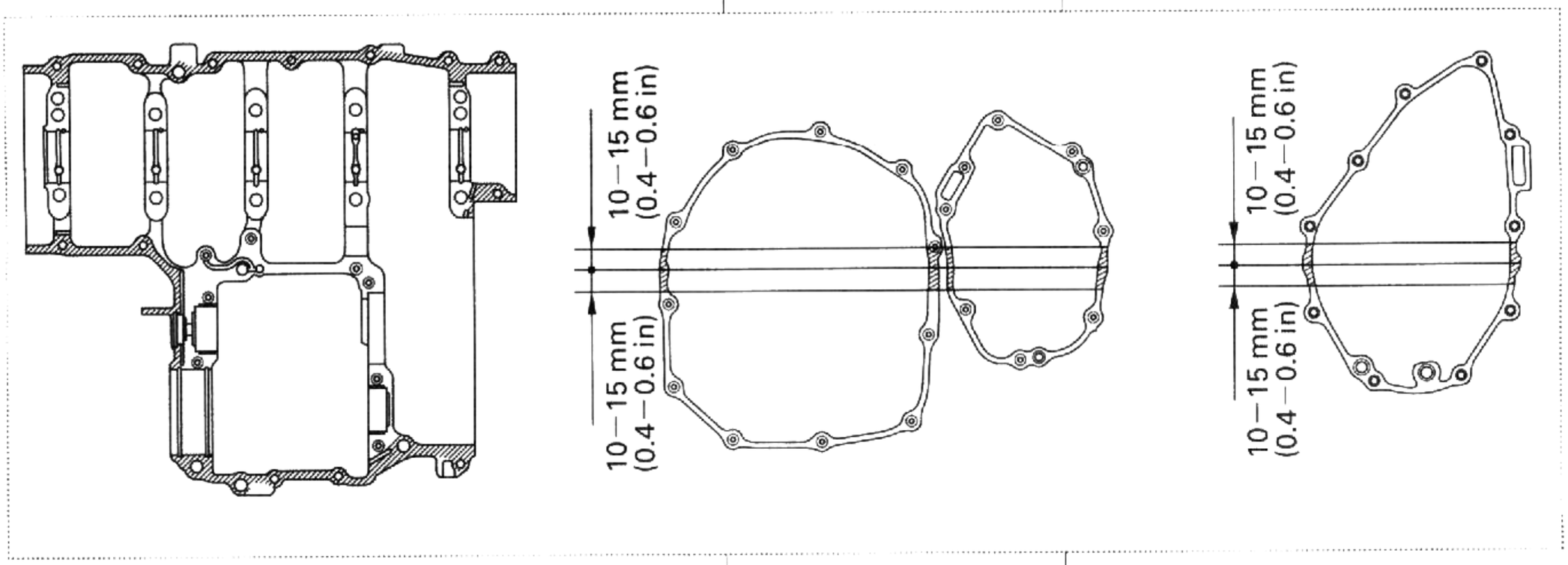
DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Fuel pressure gauge	07406-0040002		5
Oil pressure gauge set	07506-3000000		4
Oil pressure gauge attachment	07510-4220100		4
Clutch center holder	07724-0050002		9
Flywheel holder	07725-0040000	NOTE 1	10
Flywheel puller	07733-0020001		10
Attachment, 32 × 35 mm	07746-0010100		14
Attachment, 37 × 40 mm	07746-0010200		9
Attachment, 42 × 47 mm	07746-0010300		9, 13
Attachment, 52 × 55 mm	07746-0010400		14
Attachment, 62 × 68 mm	07746-0010500		14
Attachment, 22 × 24 mm	07746-0010800		14
Driver, 40 mm I.D.	07746-0030100		12
Attachment, 30 mm I.D.	07746-0030300		12
Pilot, 17 mm	07746-0040400		14
Pilot, 20 mm	07746-0040500		13, 14
Pilot, 35 mm	07746-0040800		9
Pilot, 28 mm	07746-0041100		14
Bearing remover shaft	07746-0050100		13, 14
Bearing remover head, 20 mm	07746-0050600		13, 14
Driver	07749-0010000		9, 13, 14
Valve spring compressor	07757-0010000		8
Valve seat cutter		NOTE 1	8
Seat cutter, 29 mm (45° EX)	07780-0010300		
Seat cutter, 33 mm (45° IN)	07780-0010800		
Flat cutter, 29 mm (32° EX)	07780-0013400	NOTE 4	
Flat cutter, 33 mm (32° IN)	07780-0012900		
Interior cutter, 30 mm (60° EX)	07780-0014000		
Interior cutter, 34 mm (60° IN)	07780-0014700		
Cutter holder, 5 mm	07781-0010400		
Snap ring pliers	07914-SA50001	NOTE 2: 07914-3230001	9, 15
Steering stem socket	07916-3710101		13
Valve guide driver, 5 mm	07942-MA60000		8
Attachment, 28 × 30 mm	07946-1870100		14
Needle bearing remover	07946-KA50000		13
Ball race remover set	07946-KM90001		13
—Driver attachment, A	07946-KM90100		
—Driver attachment, B	07946-KM90200		
—Driver shaft assembly	07946-KM90300		
—Bearing remover, A	07946-KM90401		
—Bearing remover, B	07946-KM90500		
—Assembly base	07946-KM90600		
Steering stem driver	07946-MB00000		13
Driver shaft	07946-MJ00100		14
Oil seal driver	07947-KA40200		13
Slider weight	07947-KA50100		13
Driver attachment handle	07949-3710001		14
Valve spring compressor attachment	07959-KM30101		8
Driver shaft	07964-MB00200		12
Valve guide reamer	07984-MA60001		8
Oil filter wrench	07HAA-PJ70100		3

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Peak voltage adaptor	07HGJ-0020100	NOTE 2: Imrie diagnostic tester (model 625)	5, 17, 19
Needle bearing remover, 28 mm	07HMC-MR70100		14
Tappet hole protector	07HMG-MR70002		8
Drive chain tool set	07HMH-MR10103		3
Compression gauge attachment	07RMJ-MY50100		8
Lock nut wrench	07VMA-MAT0100		7
Test pin box	07WGZ-0010100	NOTE 3	5
ECU test harness	07WMZ-MBG0100	NOTE 3	5
Test harness	07XMZ-MBN0100	NOTE 3	20

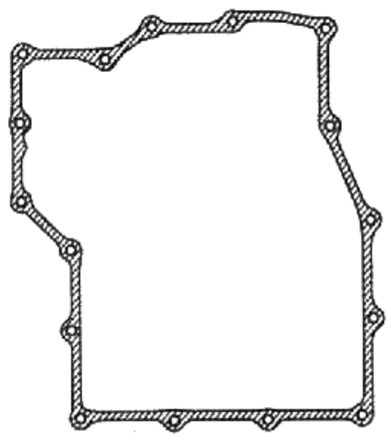
LUBRICATION & SEAL POINTS

ENGINE

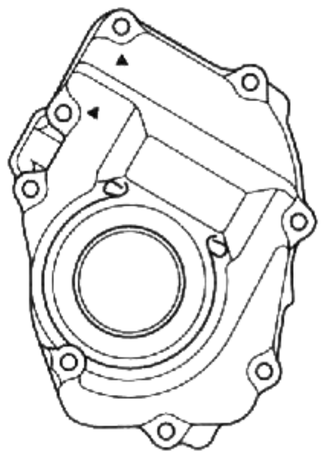
LOCATION	MATERIAL	REMARKS
Crankcase mating surface	Liquid sealant (Three Bond 1207B or equivalent)	



Oil pan mating surface

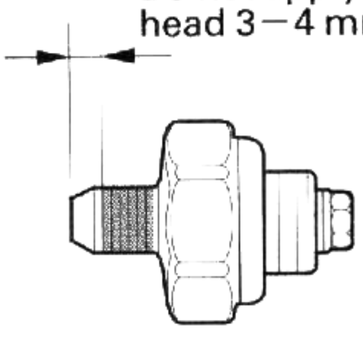


Ignition pulse generator cover bolt threads (marked "△")



Oil pressure switch threads

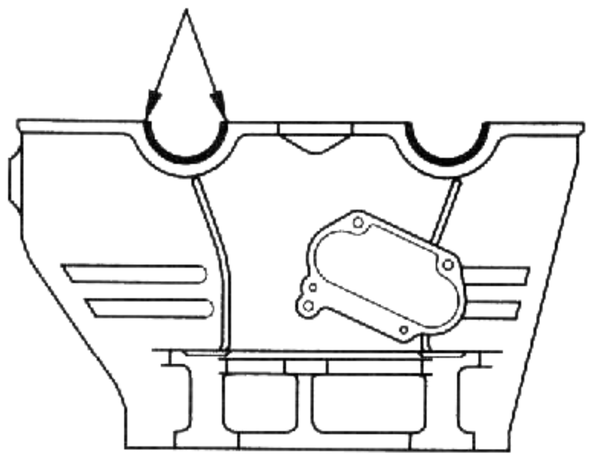
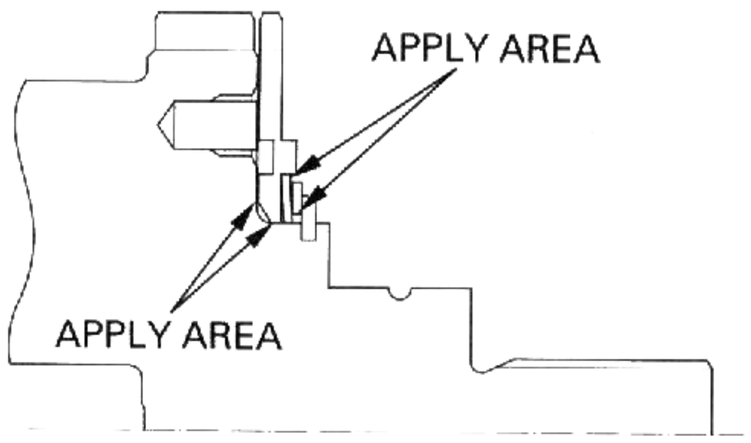
Do not apply sealant to the thread head 3—4 mm (0.1—0.2 in).



Thermo unit threads
Knock sensor threads

Coating width: 6.5 ± 1 mm

ENGINE (Cont'd)

LOCATION	MATERIAL	REMARKS
Cylinder head semi-circular cut-out 	Sealant	
Camshaft lobes/journals Valve lifter outer sliding surface Valve stem (valve guide sliding surface) Piston pin sliding surface Main journal bearing surface Connecting rod bearing surface Crankshaft journals M3,C4, C5 shifter gear (shift fork grooves) Clutch outer/primary driven gear sliding surface Clutch outer guide sliding surface Starter reduction gear outer surface Primary drive gear and sub gear sliding surface 	Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease	
Piston ring sliding area Main journal 9 mm bolt threads and seating surface (after removing anti-rust oil additive) Cylinder head special bolt (after removing anti-rust oil additive) Oil strainer packing Oil filter cartridge threads and O-ring Flywheel bolt threads and seating surface Starter one-way clutch sliding surface Connecting rod nut threads Clutch joint piece sliding surface Clutch lifter rod surface Clutch center lock nut threads Clutch disc surface Each gear teeth and rotating surface Each bearing Each O-ring Other rotating area and sliding surface	Engine oil	

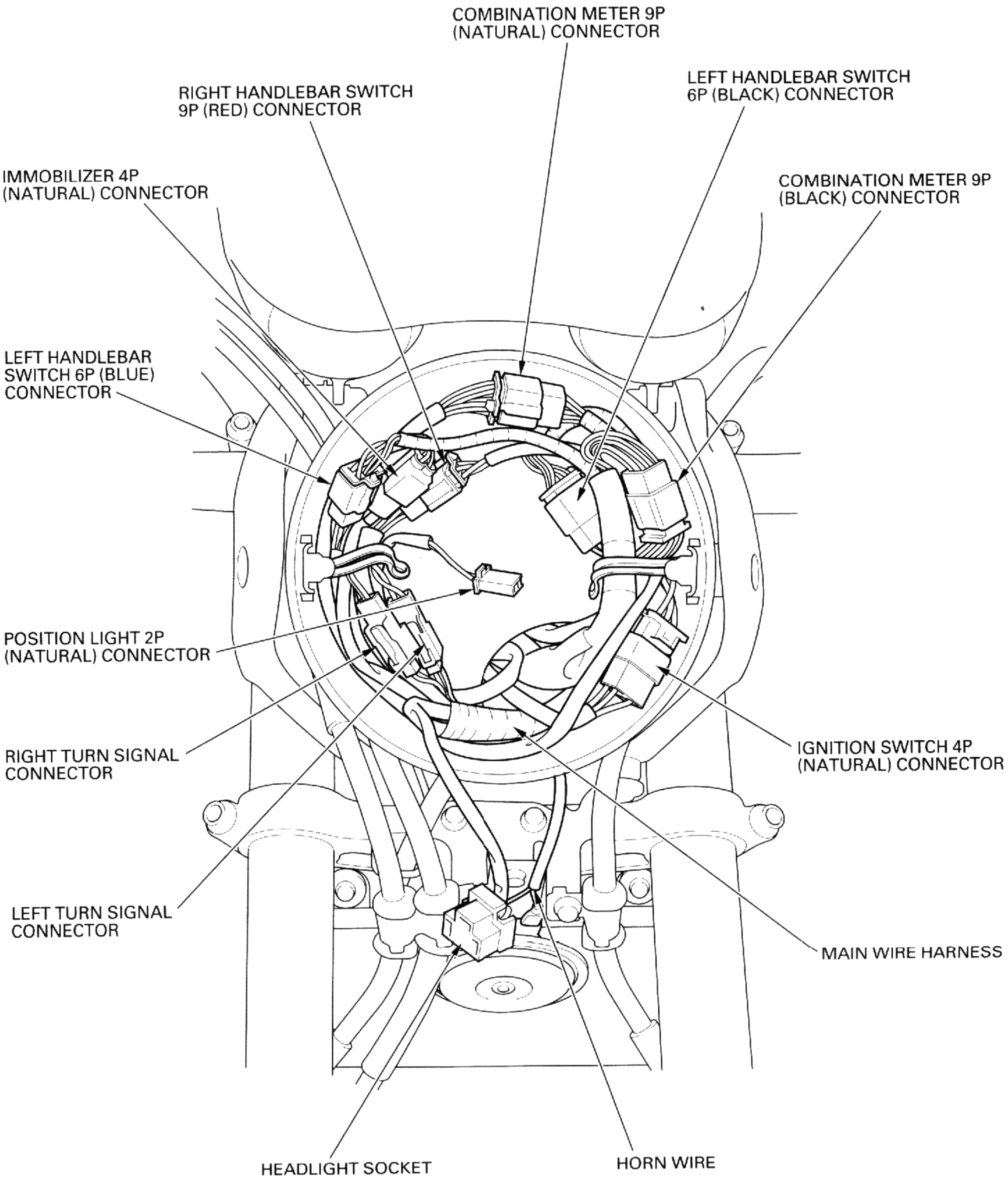
ENGINE (Cont'd)

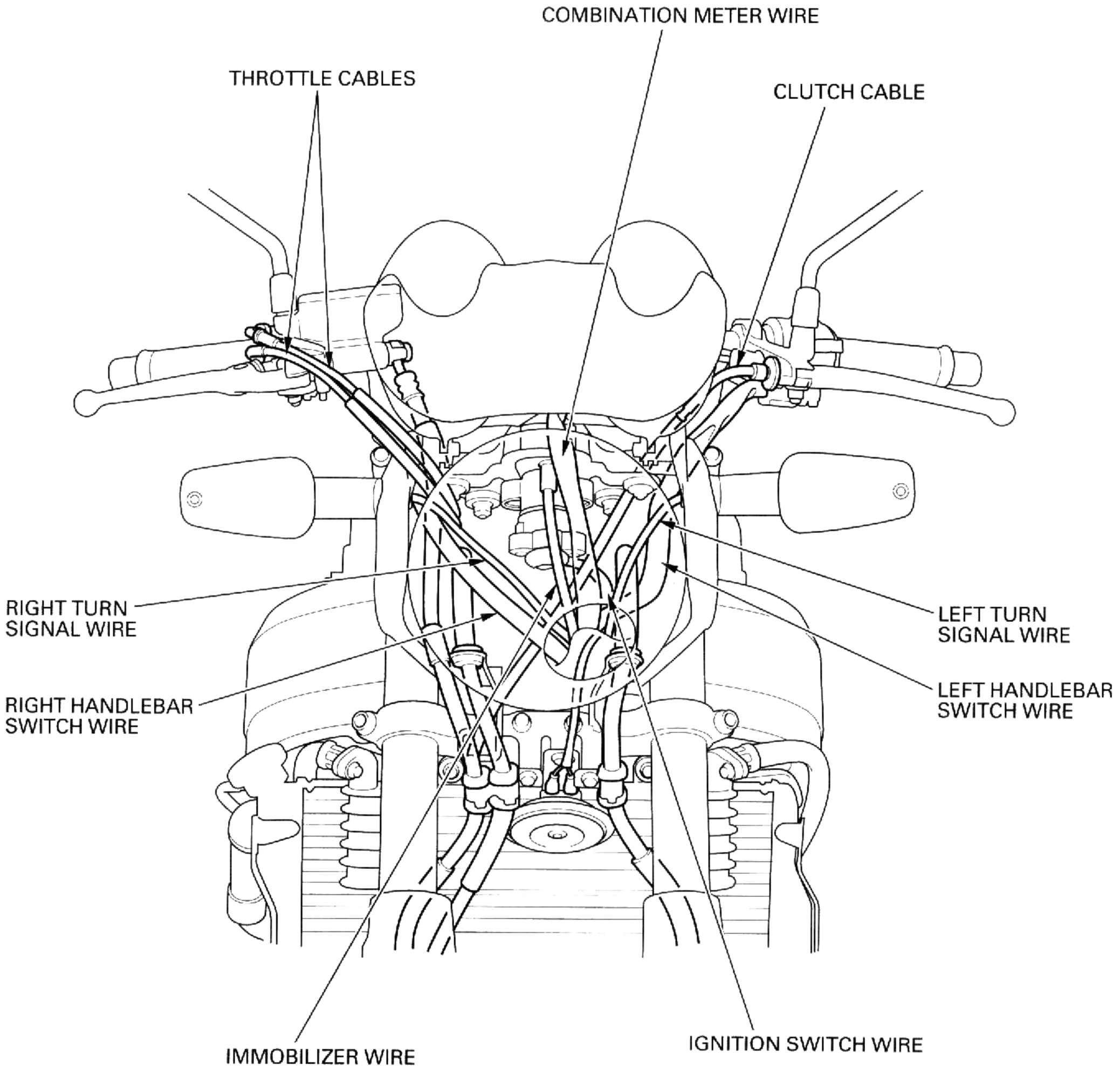
LOCATION	MATERIAL	REMARKS
Timing hole cap threads Balancer damper rubber fitting area Oil seal lips	Multi-purpose grease	
Cylinder head sealing bolt threads Cylinder head cover breather joint threads Lower crankcase sealing bolt threads Starter one-way clutch outer bolt threads Oil pump driven sprocket bolt threads Oil pipe mounting bolt threads Oil filter boss threads Shift drum set plate bolt threads Shift drum center bolt threads Mainshaft bearing set plate bolt threads Cam sprocket bolt threads Cylinder head cover breather plate bolt threads	Locking agent	Coating width: 6.5 ± 1 mm

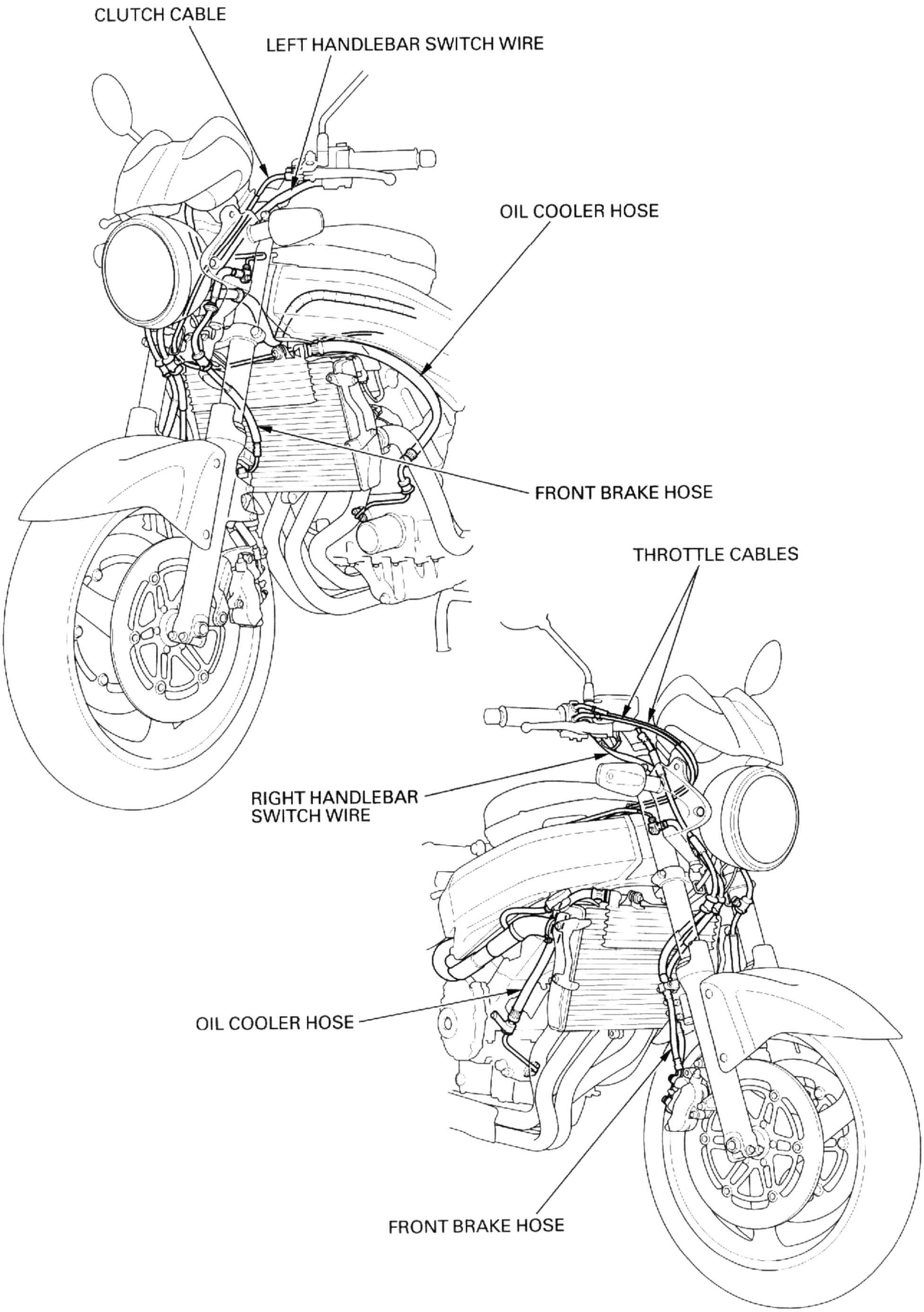
FRAME

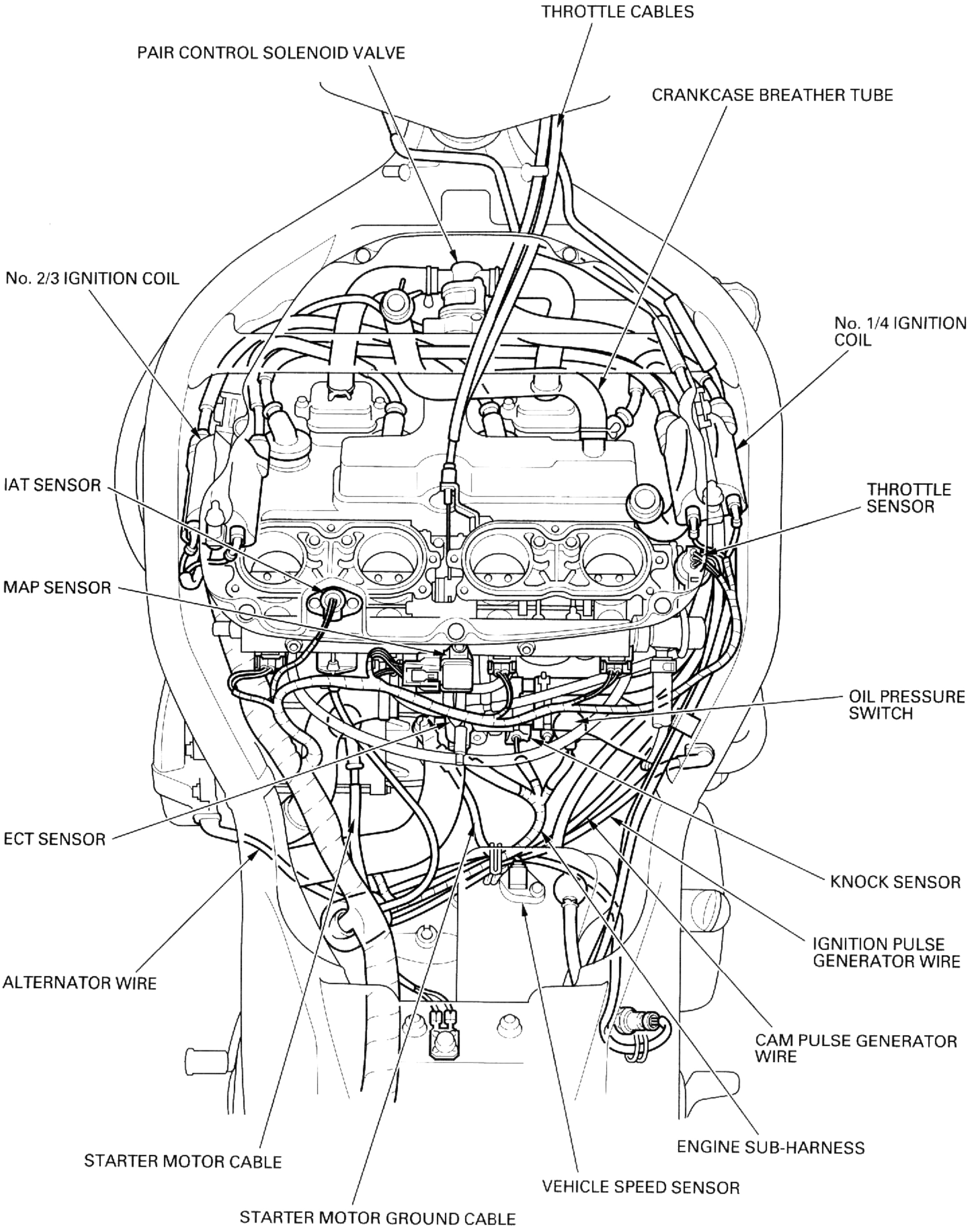
LOCATION	MATERIAL	REMARKS
Front wheel dust seal lips Rear wheel side collar inner surface Footpeg sliding area Passenger footpeg sliding area Rear brake pedal pivot sliding area Throttle pipe sliding area Seat catch hook	Multi-purpose grease	Rear wheel dust seal lips
Steering head bearing sliding surface Steering head dust seal lips Swingarm pivot bearing Swingarm pivot dust seal lips Shock absorber needle bearing Shock absorber dust seal lips Left front brake caliper pivot bearing sliding surface Left front brake caliper pivot oil seal sliding surface Left fork needle bearing sliding surface Left fork dust seal sliding surface	Multi-purpose grease (Shell Alvania EP2 or equivalent)	
Side stand pivot surface Main stand pivot surface Throttle pipe cable sliding surface	Molybdenum disulfide grease	
Shock absorber spring adjuster cam surface	Molybdenum paste	
Steering stem top thread Throttle cable casing inner Brake pipe joint threads	Engine oil	
Throttle cable A, B casing inner Choke cable casing inner Clutch cable casing inner	Cable lubricant	
Brake master cylinder cups Brake caliper piston seals	DOT 4 brake fluid	
Brake caliper dust seals Front brake lever pivot and piston tips Second master cylinder boot inside and push rod tips Rear master cylinder boot inside and push rod tips Brake caliper slide pin surface	Silicone grease	
Brake caliper slide pin threads Rear master cylinder hose joint screw threads Fork socket bolt threads Driven sprocket stud bolt threads	Locking agent	
Handle grip rubber inside	Honda Bond A	
Fork cap O-ring Fork oil seal lips	Fork fluid	

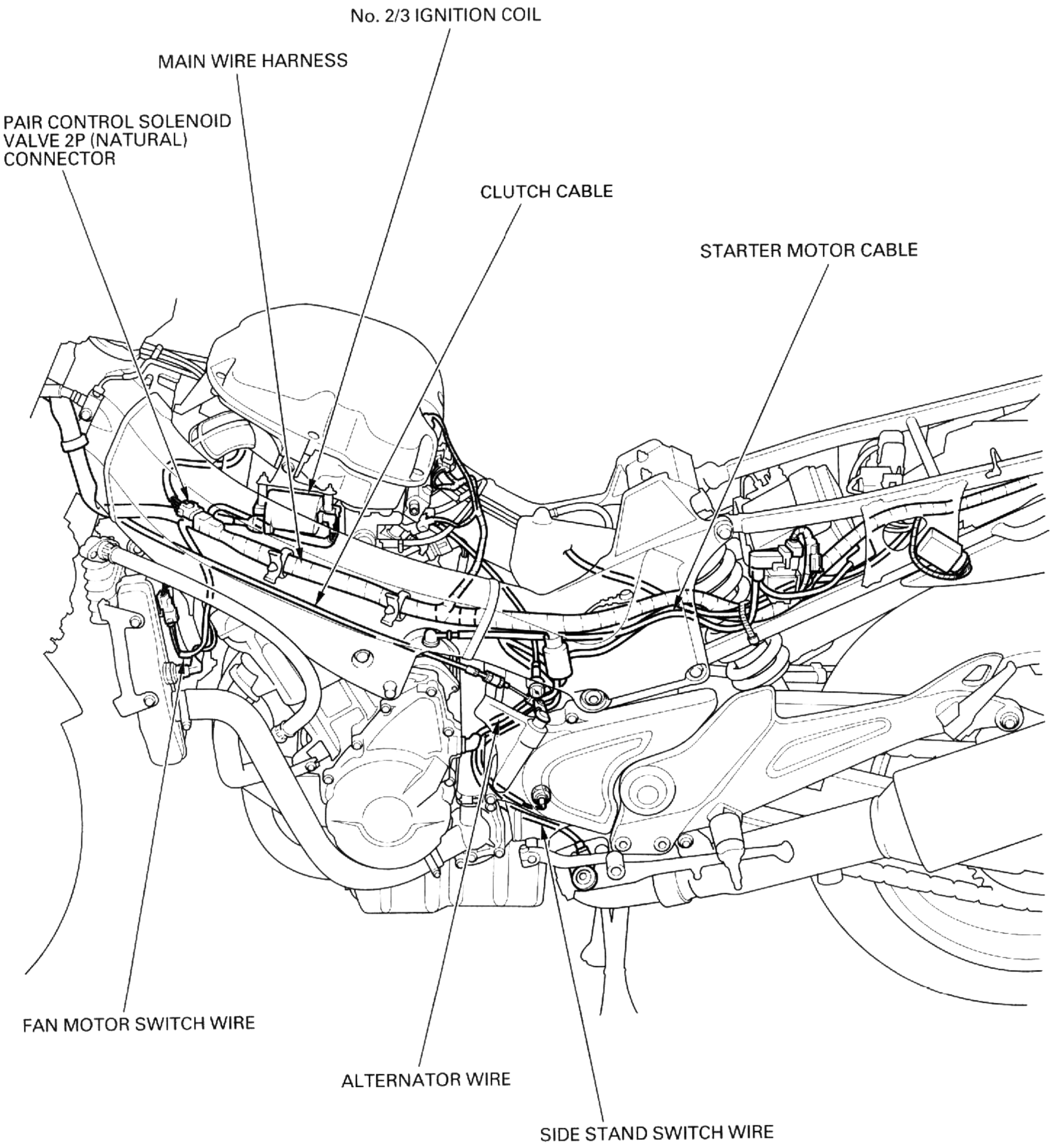
CABLE & HARNESS ROUTING

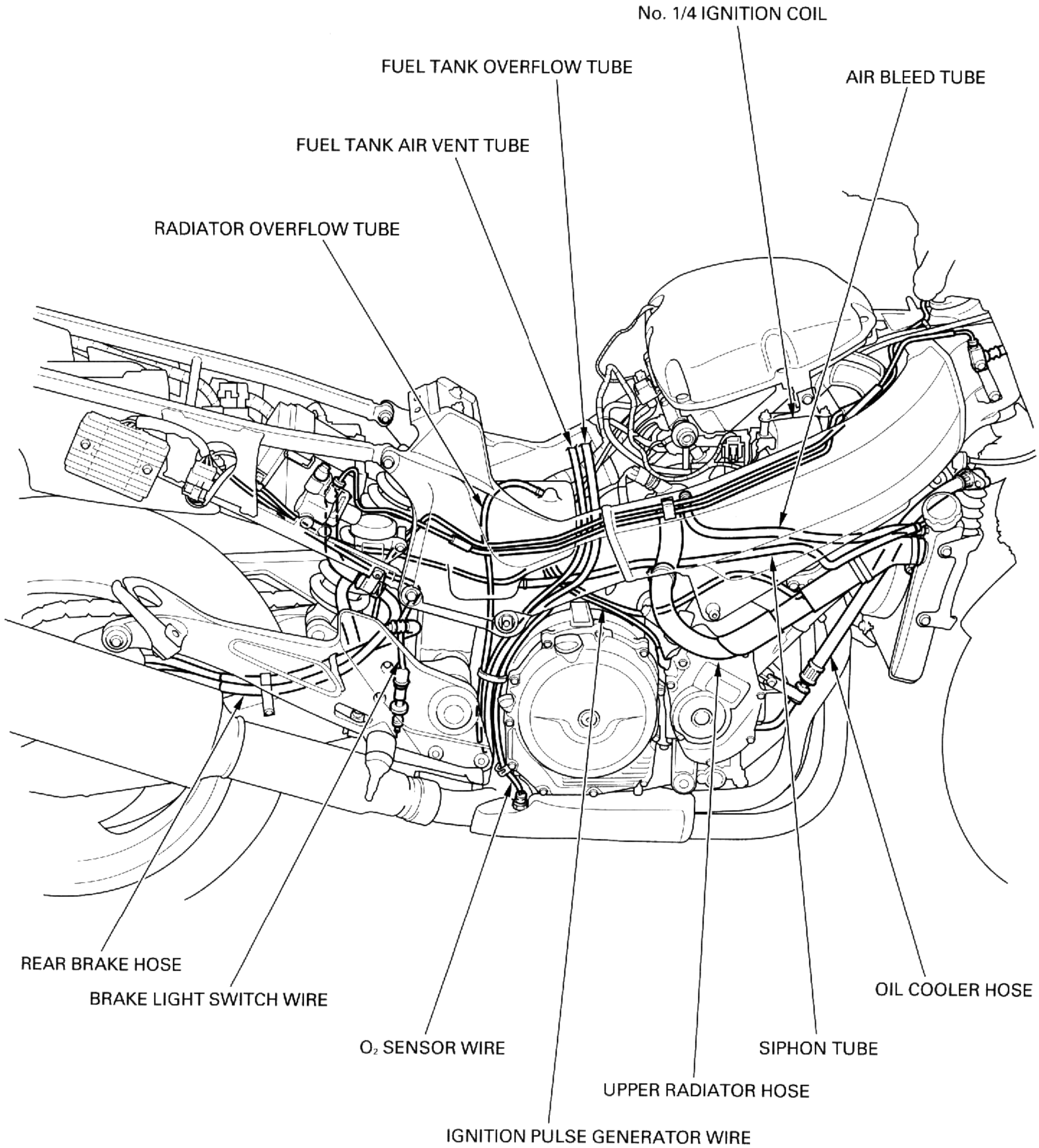


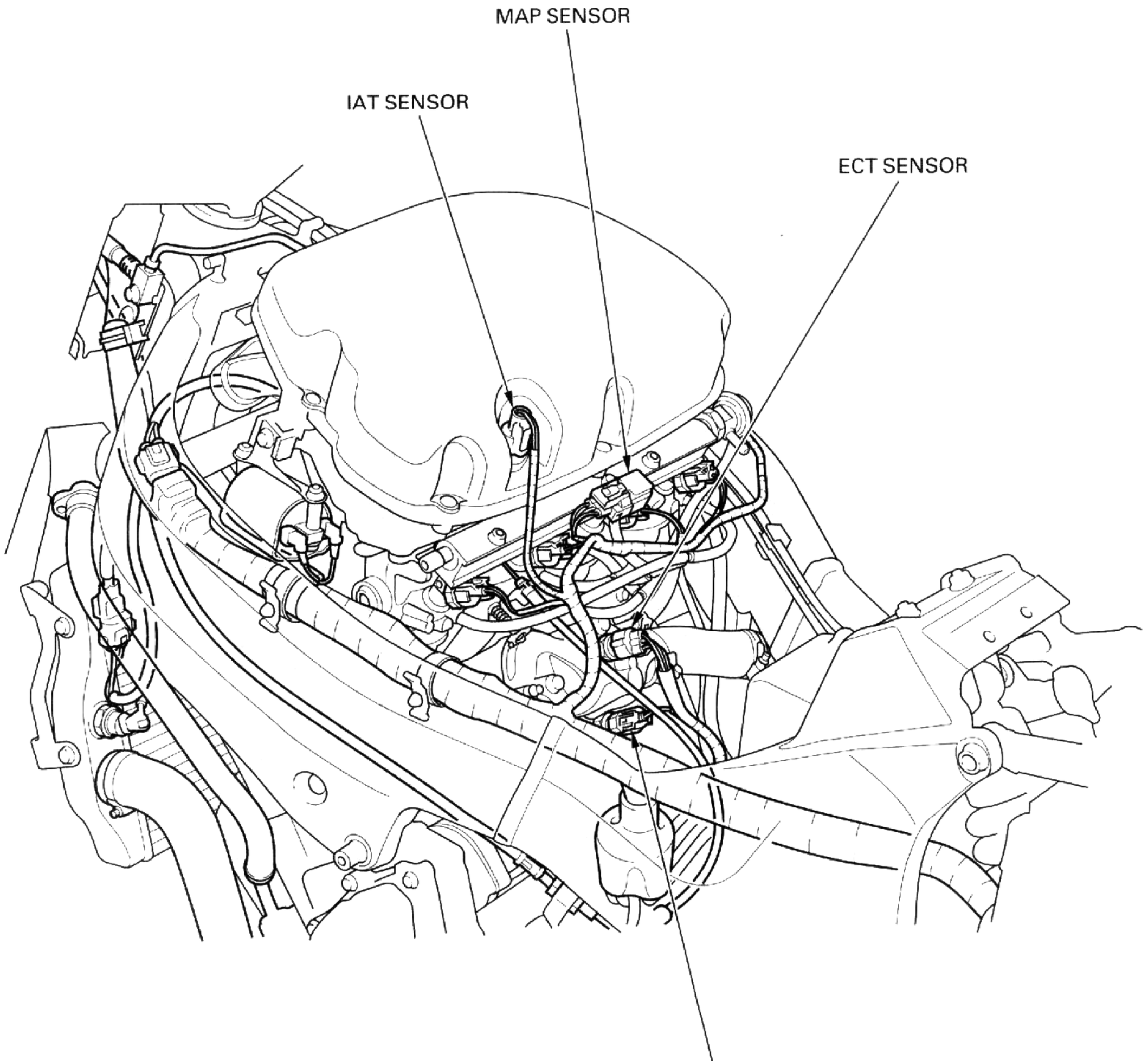

COMBINATION METER WIRE
THROTTLE CABLES
CLUTCH CABLE
RIGHT TURN SIGNAL WIRE
RIGHT HANDLEBAR SWITCH WIRE
LEFT TURN SIGNAL WIRE
LEFT HANDLEBAR SWITCH WIRE
IMMOBILIZER WIRE
IGNITION SWITCH WIRE

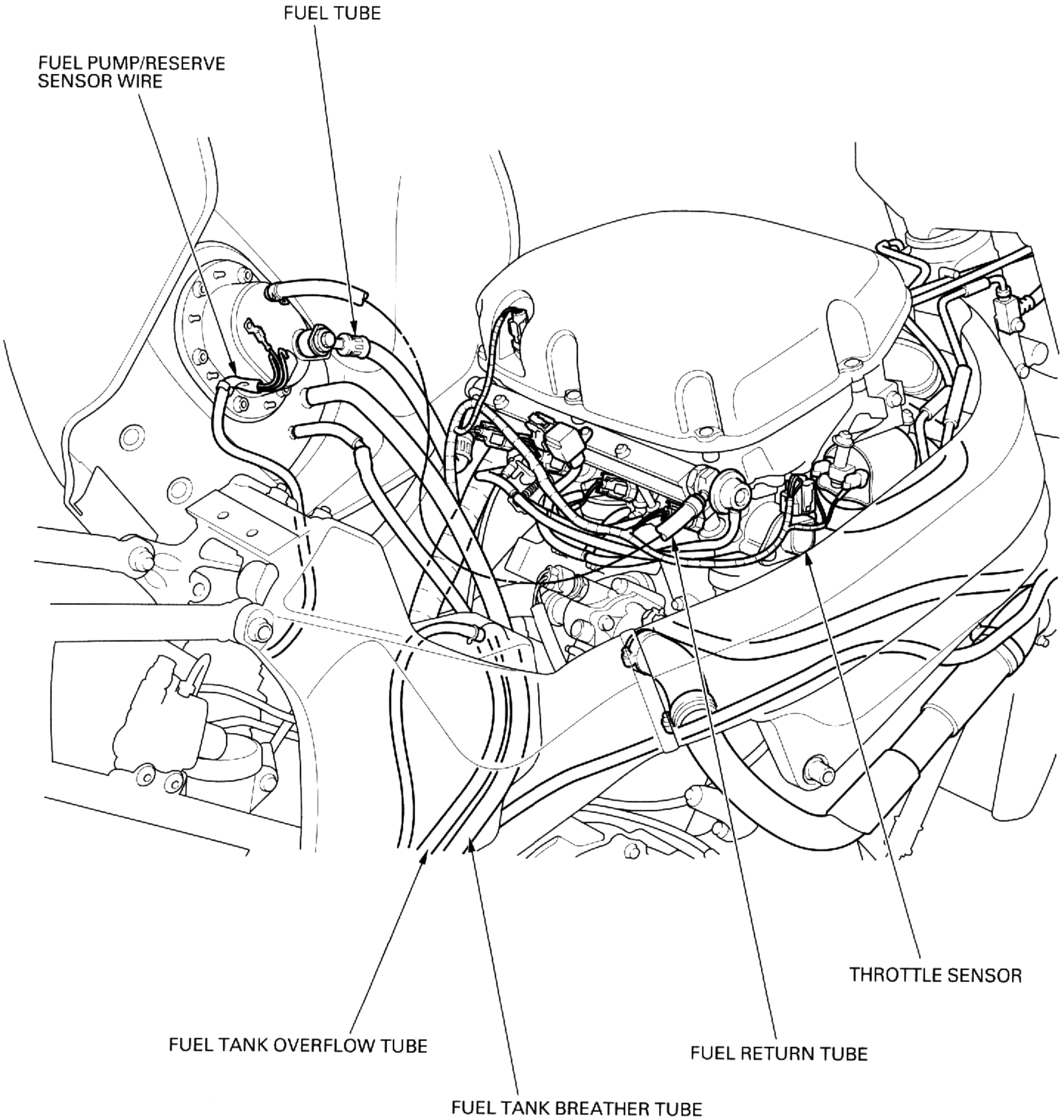

CLUTCH CABLE
LEFT HANDLEBAR SWITCH WIRE
OIL COOLER HOSE
FRONT BRAKE HOSE
THROTTLE CABLES
RIGHT HANDLEBAR SWITCH WIRE
OIL COOLER HOSE
FRONT BRAKE HOSE

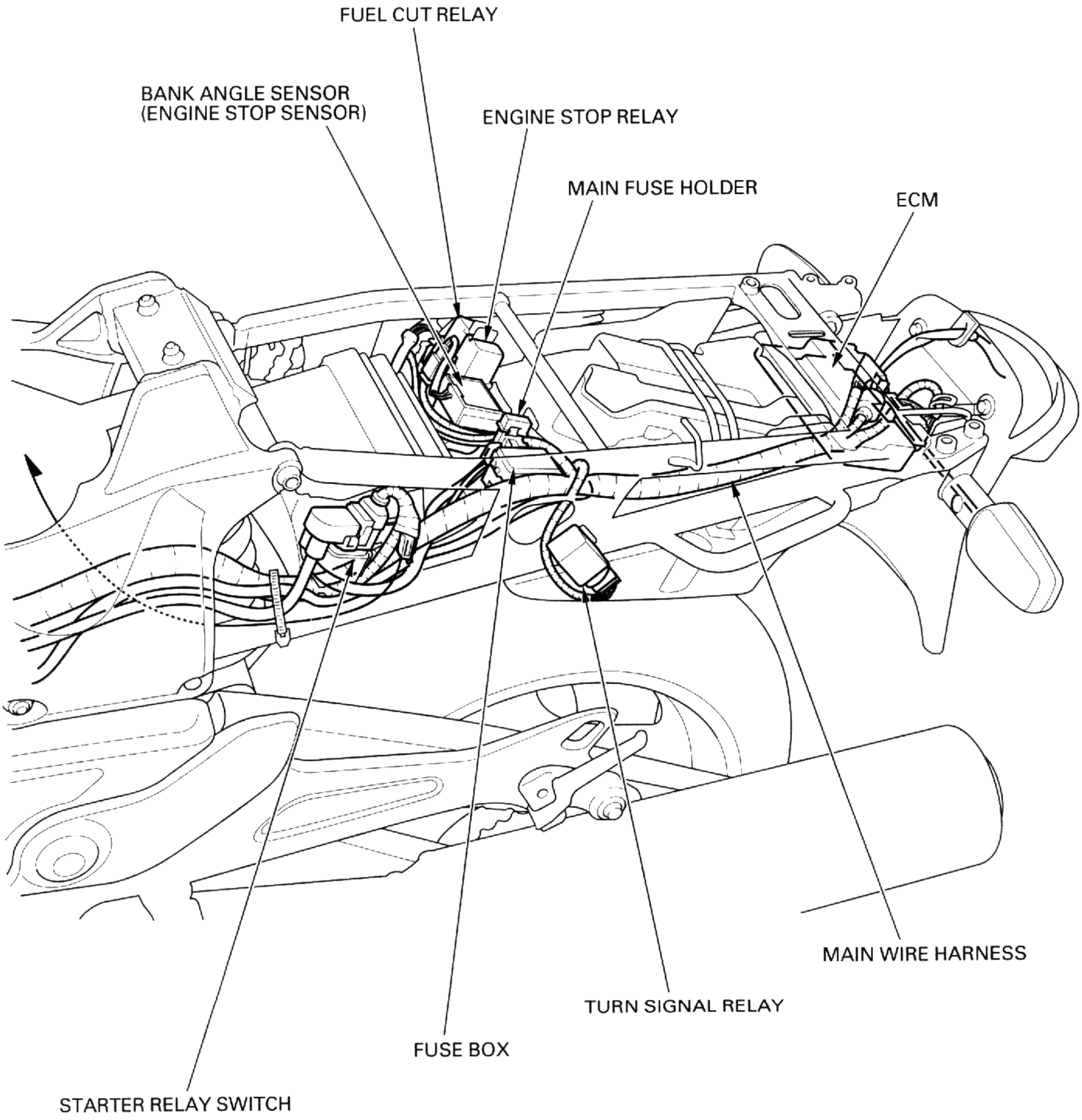

THROTTLE CABLES
PAIR CONTROL SOLENOID VALVE
CRANKCASE BREATHER TUBE
No. 2/3 IGNITION COIL
No. 1/4 IGNITION COIL
IAT SENSOR
THROTTLE SENSOR
MAP SENSOR
OIL PRESSURE SWITCH
ECT SENSOR
KNOCK SENSOR
IGNITION PULSE GENERATOR WIRE
ALTERNATOR WIRE
CAM PULSE GENERATOR WIRE
ENGINE SUB-HARNESS
STARTER MOTOR CABLE
VEHICLE SPEED SENSOR
STARTER MOTOR GROUND CABLE

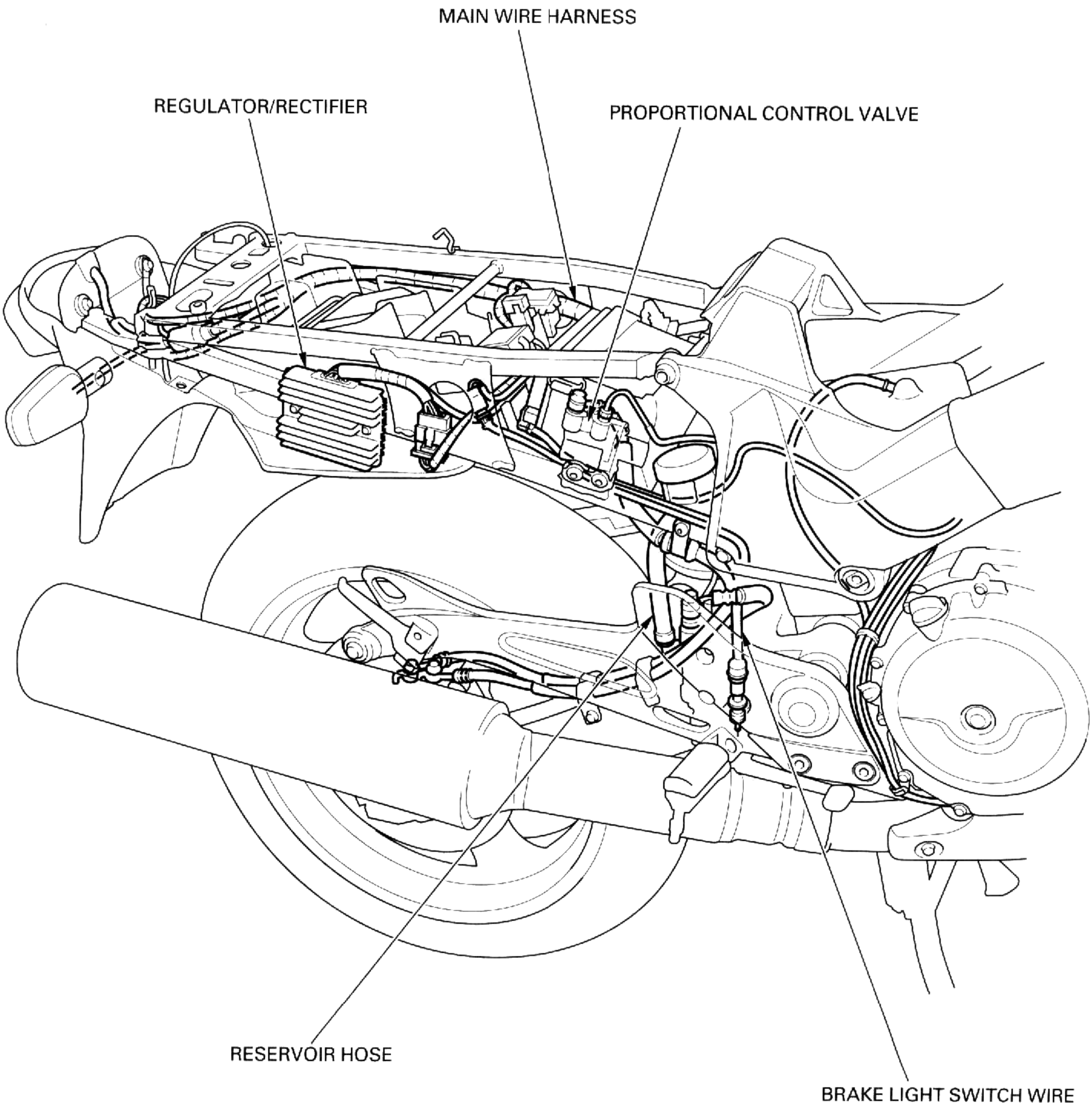

No. 2/3 IGNITION COIL
MAIN WIRE HARNESS
PAIR CONTROL SOLENOID VALVE 2P (NATURAL) CONNECTOR
CLUTCH CABLE
STARTER MOTOR CABLE
FAN MOTOR SWITCH WIRE
ALTERNATOR WIRE
SIDE STAND SWITCH WIRE

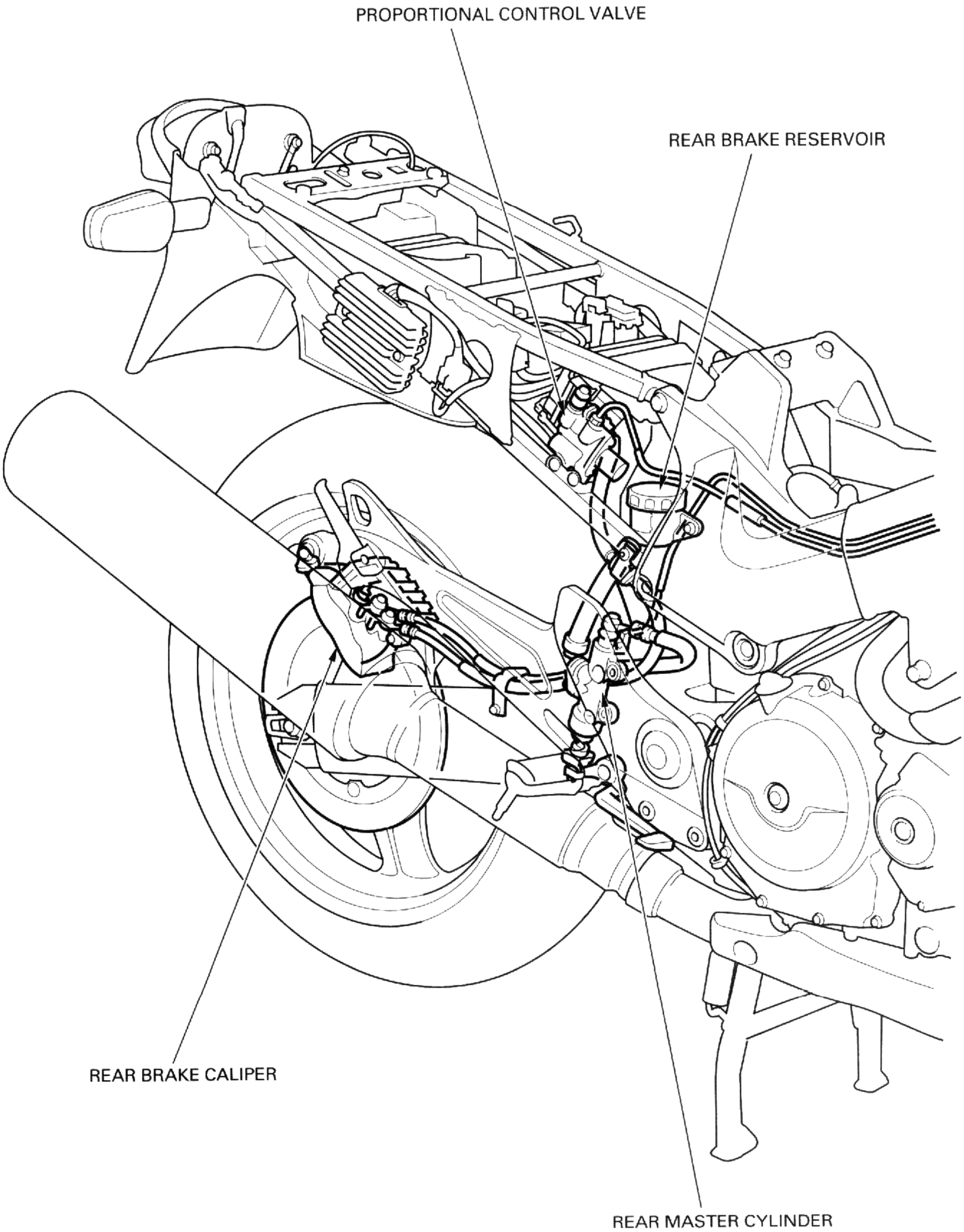

No. 1/4 IGNITION COIL
FUEL TANK OVERFLOW TUBE
AIR BLEED TUBE
FUEL TANK AIR VENT TUBE
RADIATOR OVERFLOW TUBE
REAR BRAKE HOSE
BRAKE LIGHT SWITCH WIRE
O2 SENSOR WIRE
IGNITION PULSE GENERATOR WIRE
UPPER RADIATOR HOSE
SIPHON TUBE
OIL COOLER HOSE

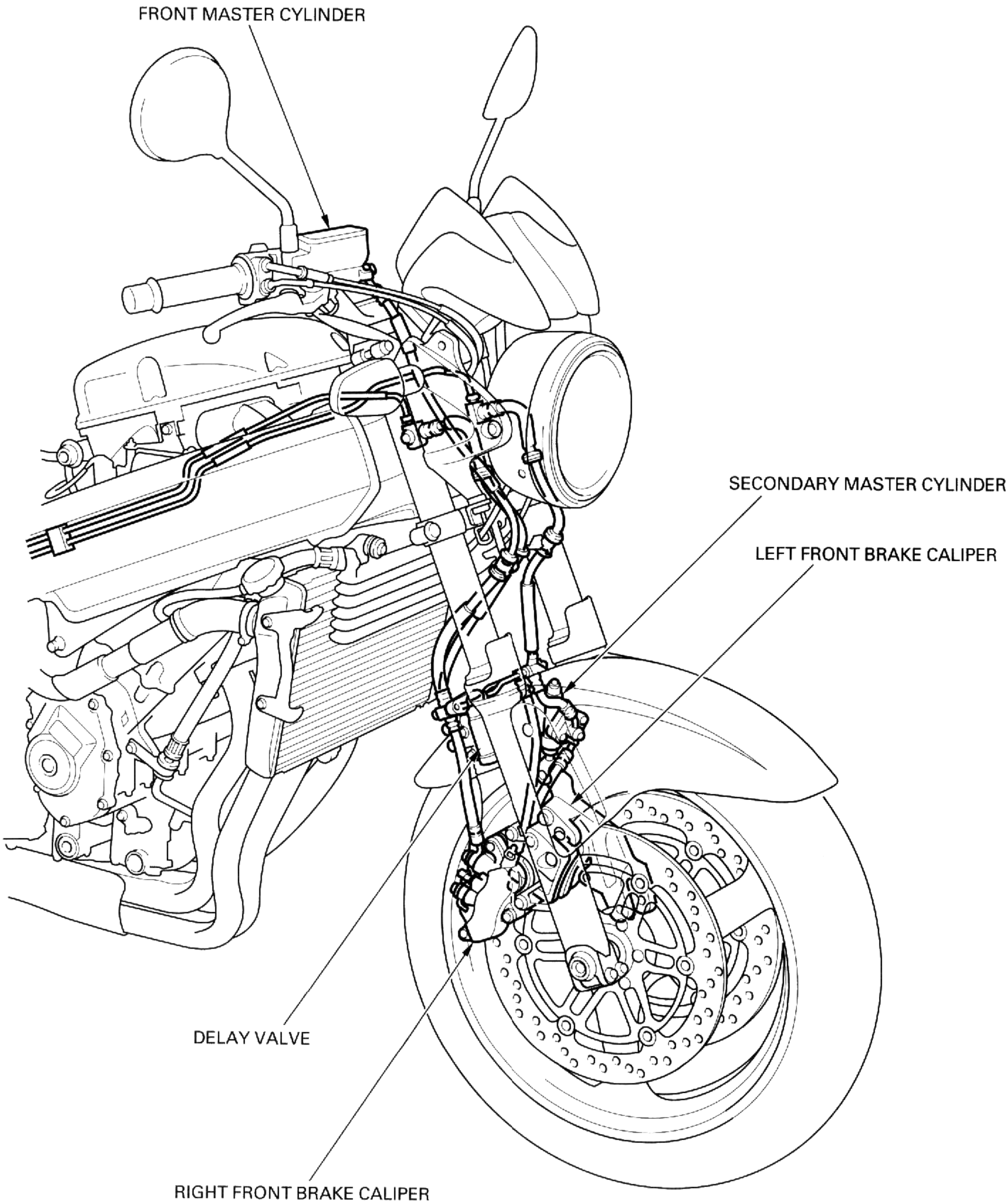

MAP SENSOR
IAT SENSOR
ECT SENSOR
KNOCK SENSOR


FUEL TUBE
FUEL PUMP/RESERVE SENSOR WIRE
THROTTLE SENSOR
FUEL TANK OVERFLOW TUBE
FUEL TANK BREATHER TUBE
FUEL RETURN TUBE


FUEL CUT RELAY
BANK ANGLE SENSOR
(ENGINE STOP SENSOR)
ENGINE STOP RELAY
MAIN FUSE HOLDER
ECM
MAIN WIRE HARNESS
TURN SIGNAL RELAY
FUSE BOX
STARTER RELAY SWITCH


MAIN WIRE HARNESS
REGULATOR/RECTIFIER
PROPORTIONAL CONTROL VALVE
RESERVOIR HOSE
BRAKE LIGHT SWITCH WIRE


PROPORTIONAL CONTROL VALVE
REAR BRAKE RESERVOIR
REAR BRAKE CALIPER
REAR MASTER CYLINDER


FRONT MASTER CYLINDER
SECONDARY MASTER CYLINDER
LEFT FRONT BRAKE CALIPER
DELAY VALVE
RIGHT FRONT BRAKE CALIPER

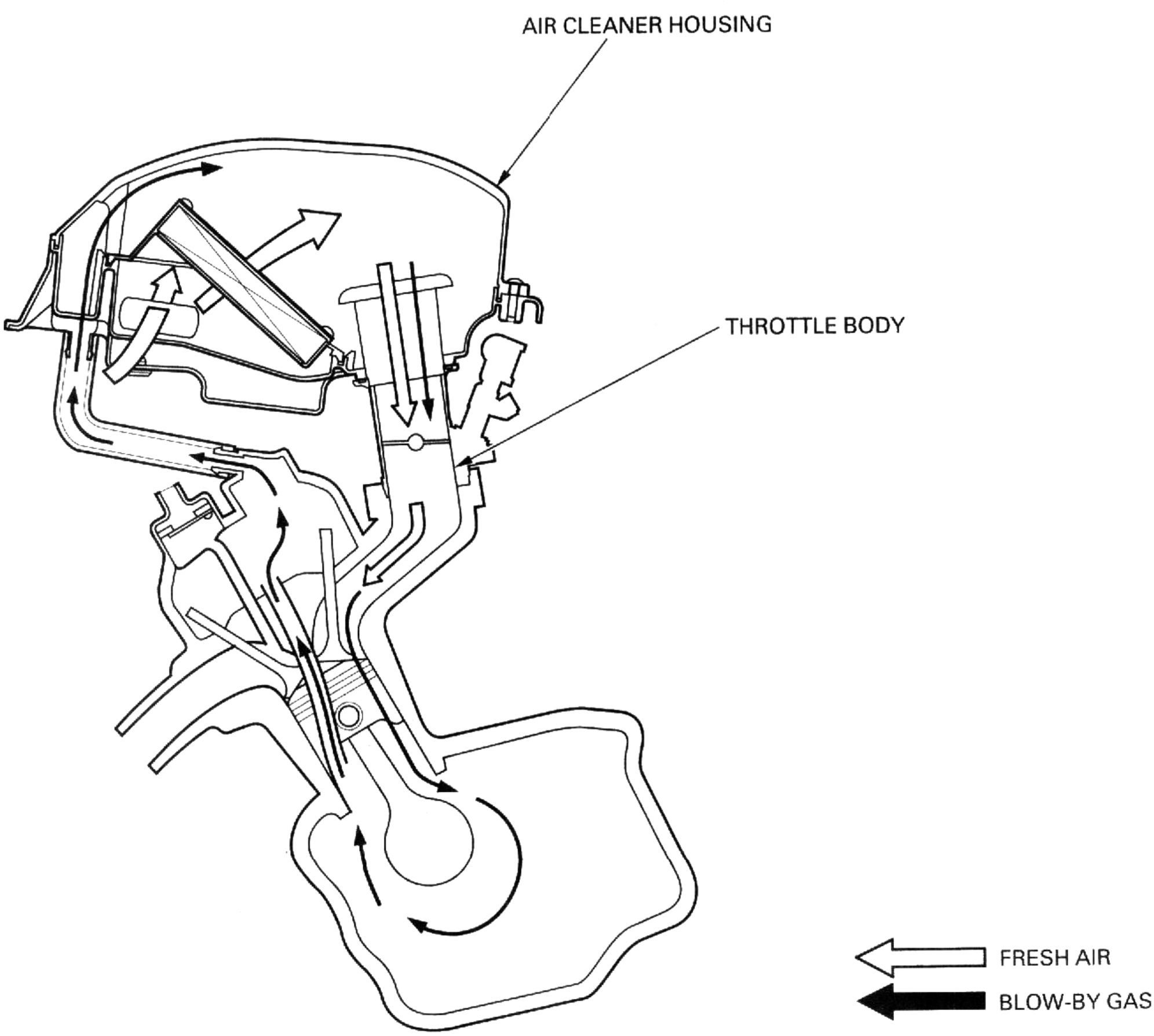
EMISSION CONTROL SYSTEMS

SOURCE OF EMISSIONS

The combustion process produces carbon monoxide and hydrocarbons. Control of hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic.
Honda Motor Co., Ltd. utilizes lean injection settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

CRANKCASE EMISSION CONTROL SYSTEM

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



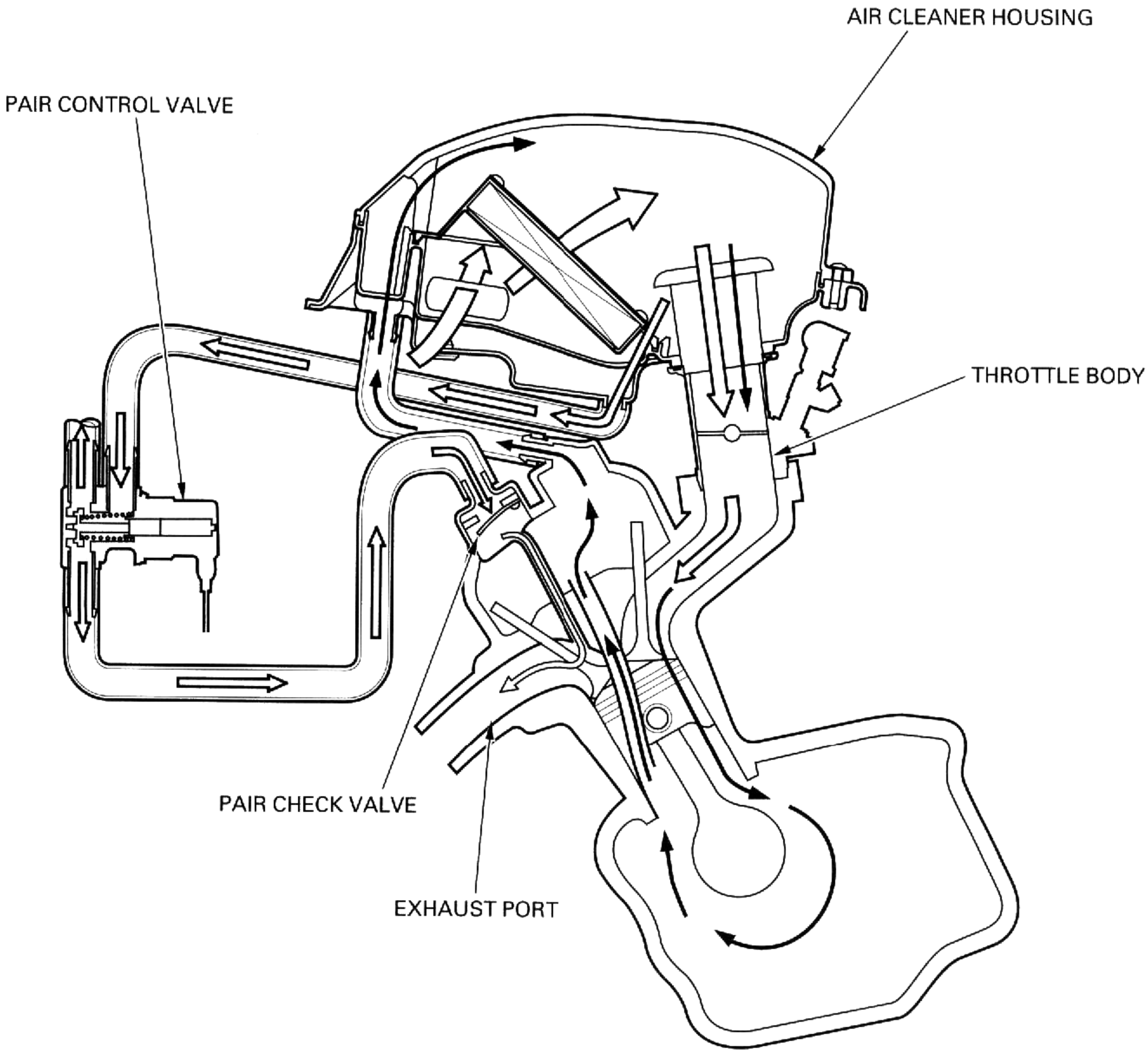
EXHAUST EMISSION CONTROL SYSTEM (SECONDARY AIR SUPPLY SYSTEM)

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

The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust port by the function of the PAIR (Pulse Secondary Air Injection) control valve.
This charge of fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor.

The reed valve prevent 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.



NOISE EMISSION CONTROL SYSTEM

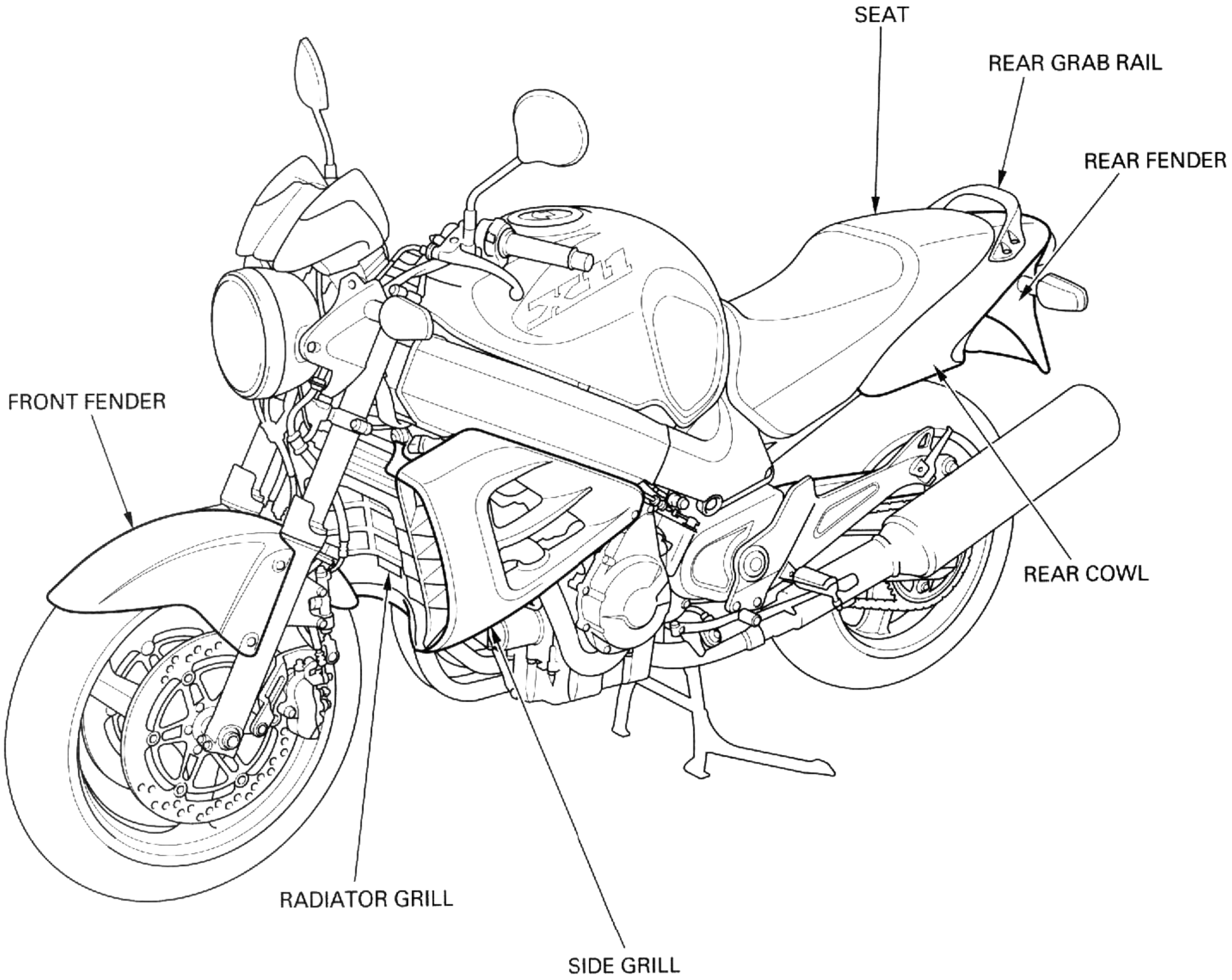
TEMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: Local law prohibits the following acts or the causing thereof: (1) The removal or rendering in operative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle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

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

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

MEMO

BODY PANEL LOCATIONS



2. FRAME/BODY PANELS/EXHAUST SYSTEM

BODY PANEL LOCATIONS	2-0	FRONT FENDER	2-5
SERVICE INFORMATION	2-1	REAR FENDER	2-5
TROUBLESHOOTING	2-1	SEAT RAIL	2-8
SEAT	2-2	MUFFLER/EXHAUST PIPE	2-10
REAR COWL	2-2	FOOTPEG	2-16
RADIATOR GRILL	2-4		

SERVICE INFORMATION

GENERAL

⚠WARNING

- ***Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.***
- ***Serious burns may result if the exhaust system is not allowed to cool before components are removed or serviced.***

- Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
- This section covers removal and installation of the body panels and exhaust system.
- Always replace the exhaust pipe gaskets after removing the exhaust pipe from the engine.
- When installing the exhaust system, loosely install all of the exhaust pipe fasteners. Always tighten the exhaust pipe clamps first, then tighten the mounting fasteners. If you tighten the mounting fasteners first, the exhaust pipe may not seat properly.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

Bank sensor	22 N·m (2.2 kgf·m , 16 lbf·ft)
Exhaust pipe joint nut	21 N·m (2.1 kgf·m , 15 lbf·ft)
Muffler band bolt	18 N·m (1.8 kgf·m , 13 lbf·ft)
Muffler bracket bolt	26 N·m (2.7 kgf·m , 20 lbf·ft)
Seat rail mounting bolt	44 N·m (4.5 kgf·m , 33 lbf·ft)

TROUBLESHOOTING

Excessive exhaust noise
- Broken exhaust system
- Exhaust gas leak

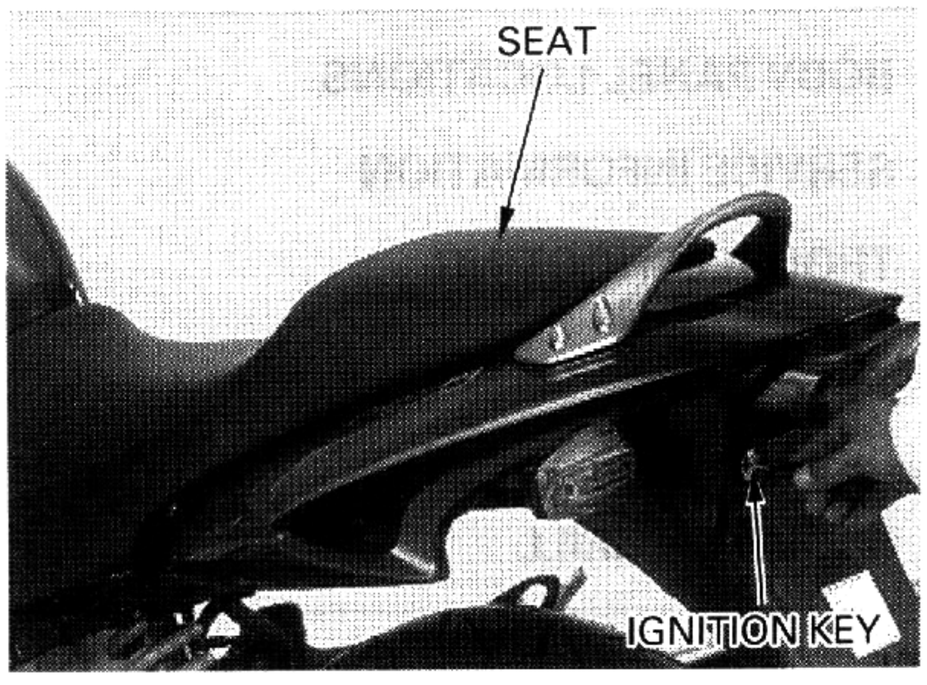
Poor performance
- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

SEAT

REMOVAL

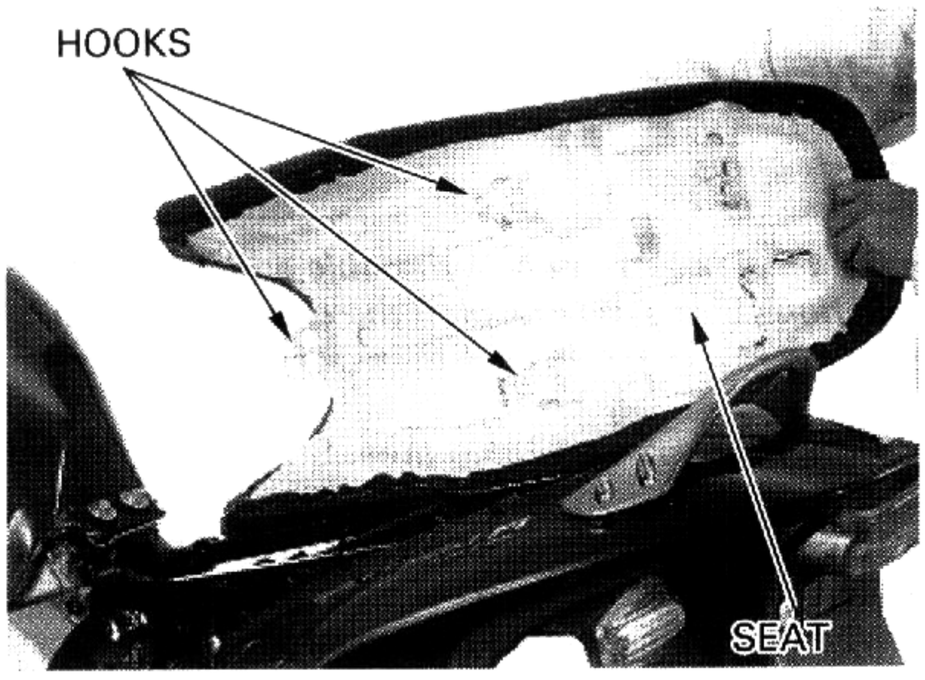
Unlock the seat using the ignition key.

Remove the seat backward.



INSTALLATION

Align the seat hooks with the frame brackets and install the seat.
Push the rear end of the seat and lock it.

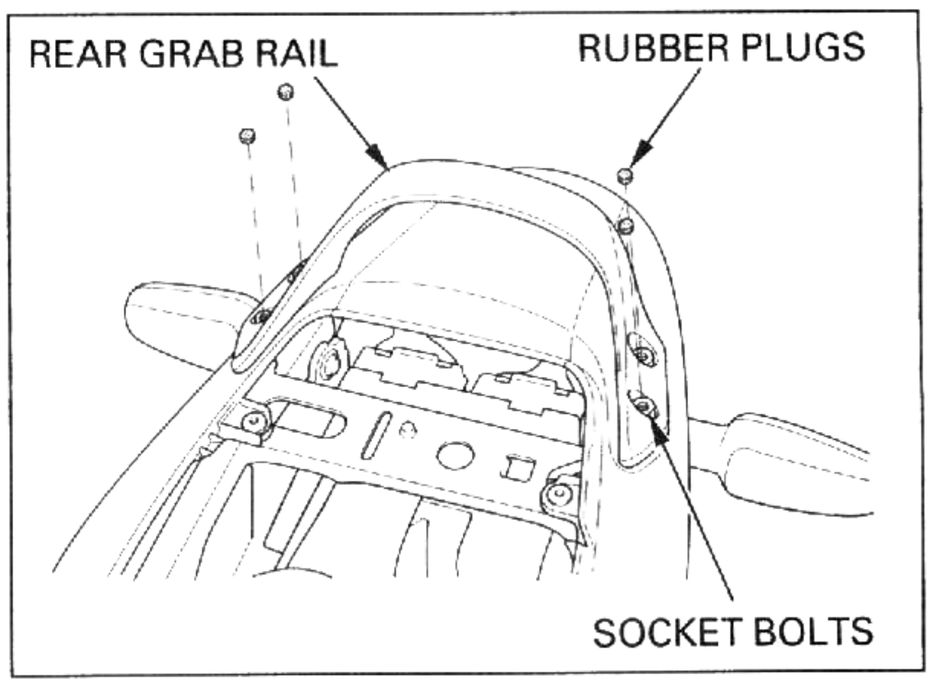


REAR COWL

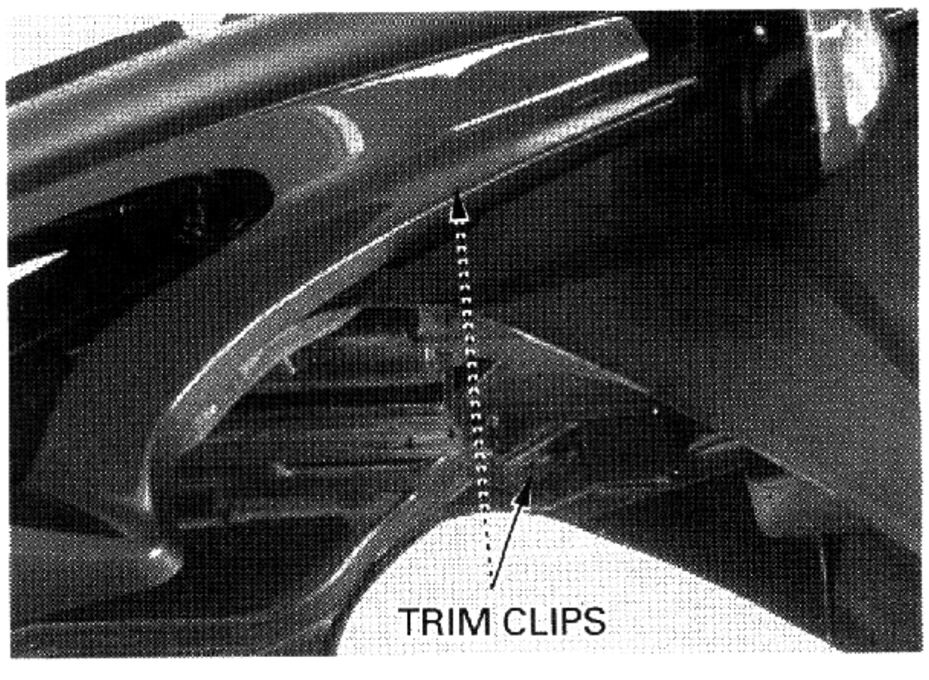
REMOVAL

Remove the seat (see above).

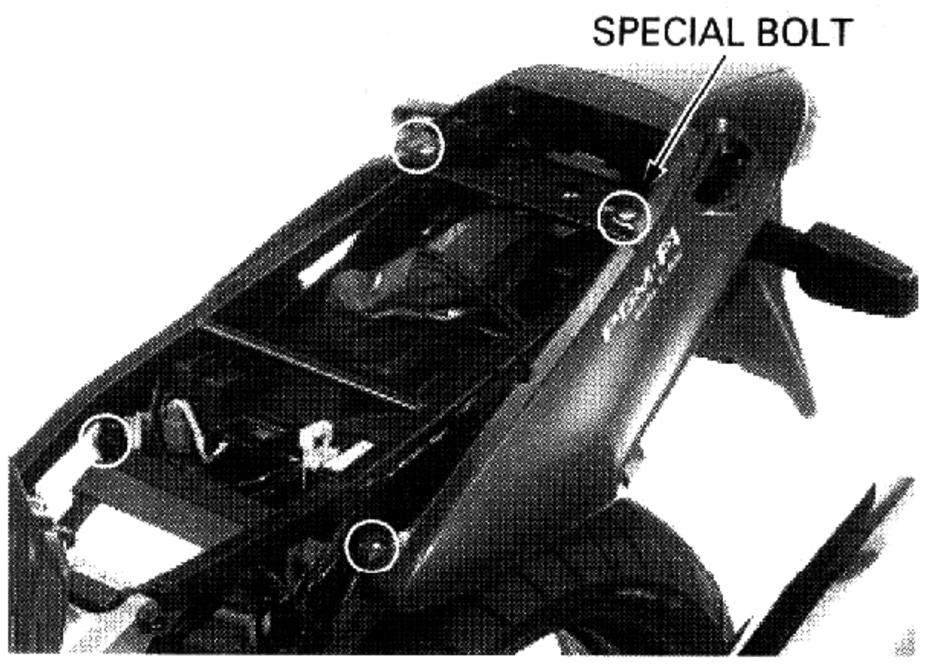
Remove the rear grab rail mounting bolt rubber plugs.
Remove the mounting bolts and rear grab rail.



Remove the two trim clips under the rear cowl.



Remove the four rear cowl mounting special bolts.

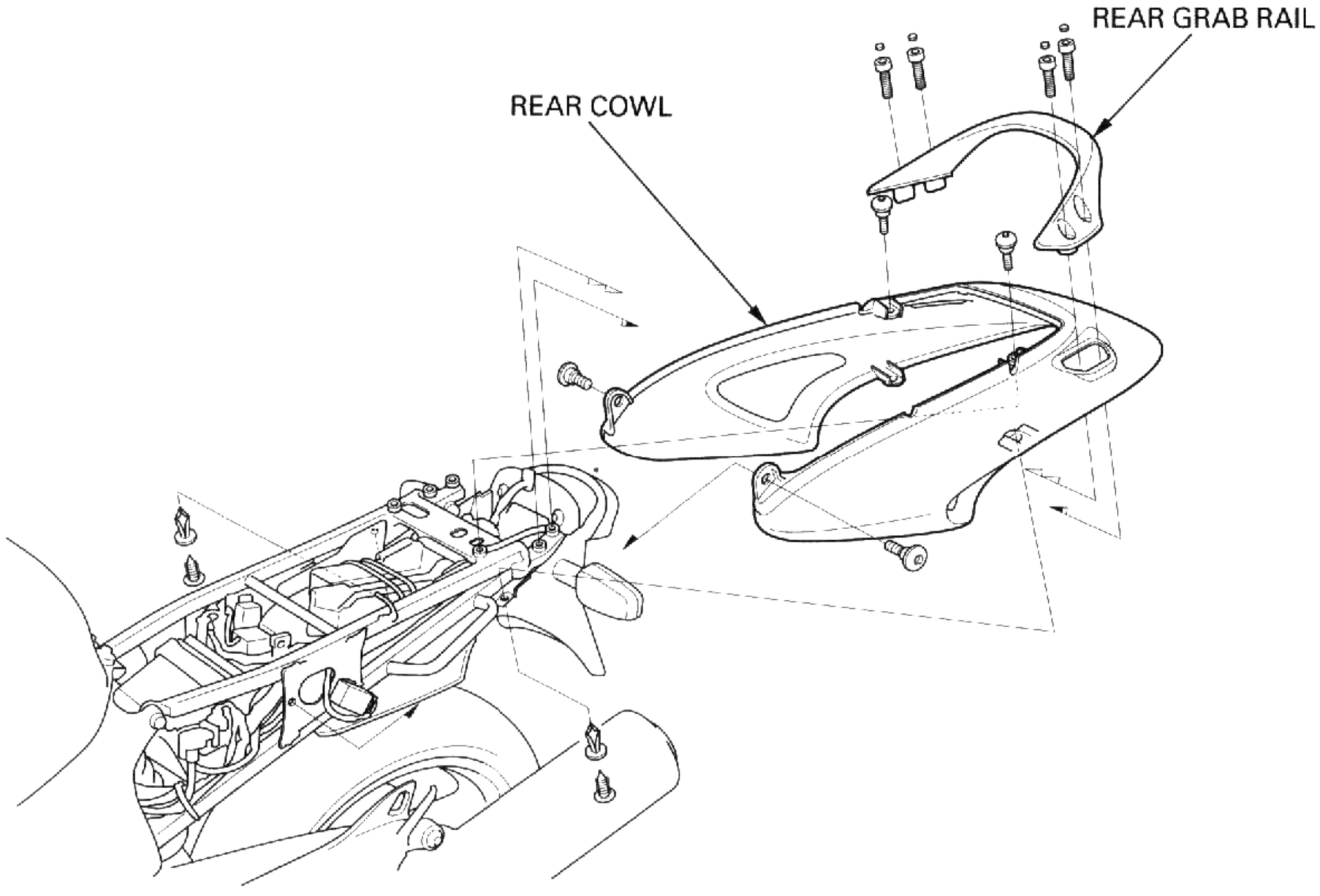


Remove the rear cowl backward.



INSTALLATION

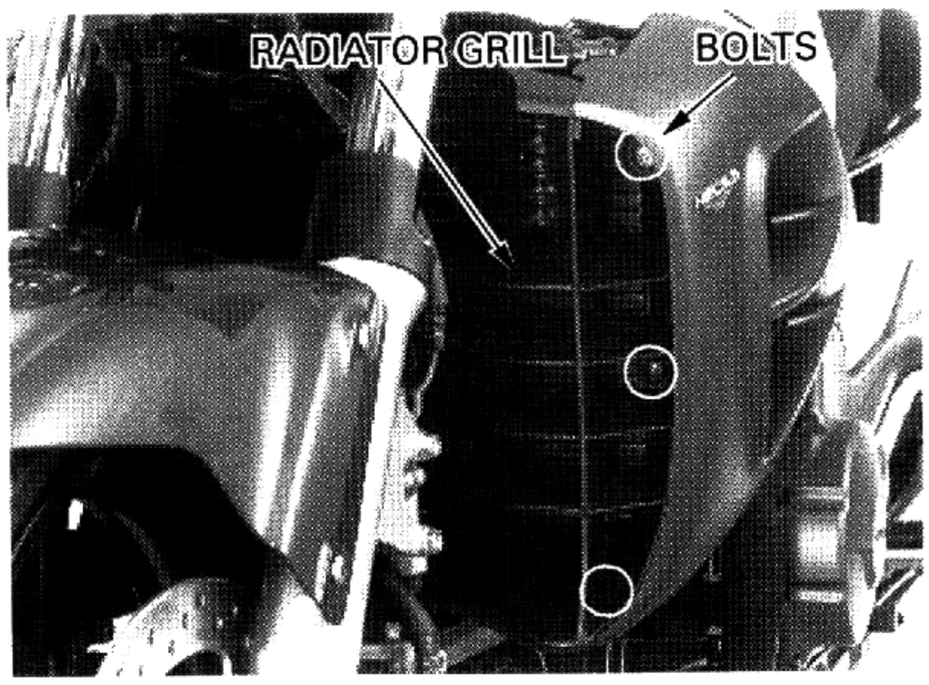
Installation is in the reverse order of removal.



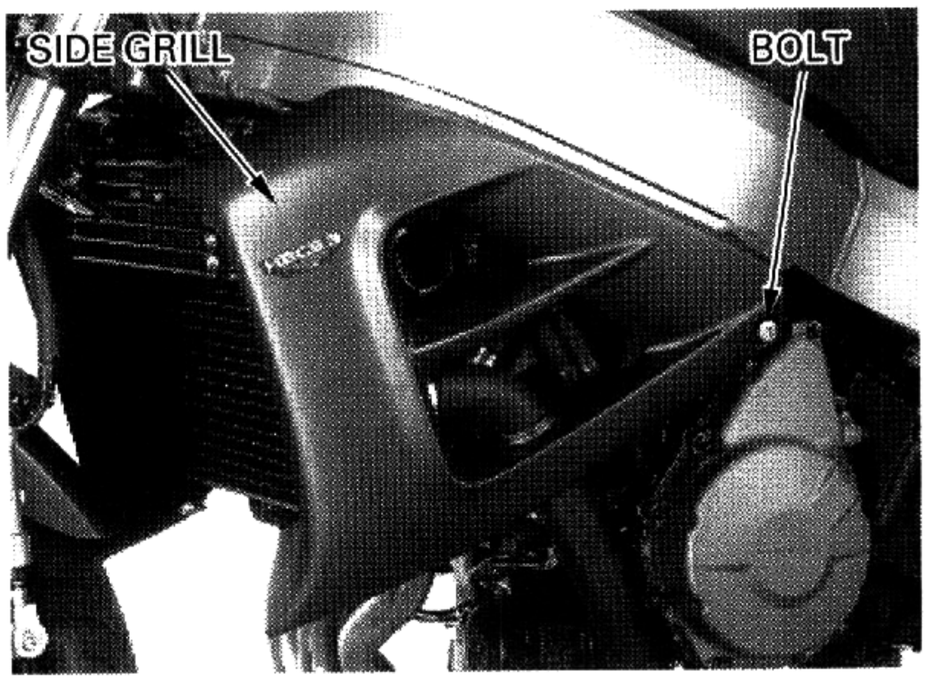
RADIATOR GRILL

REMOVAL

Remove the six radiator grill/side grill mounting special bolts.
Remove the radiator grill forward.

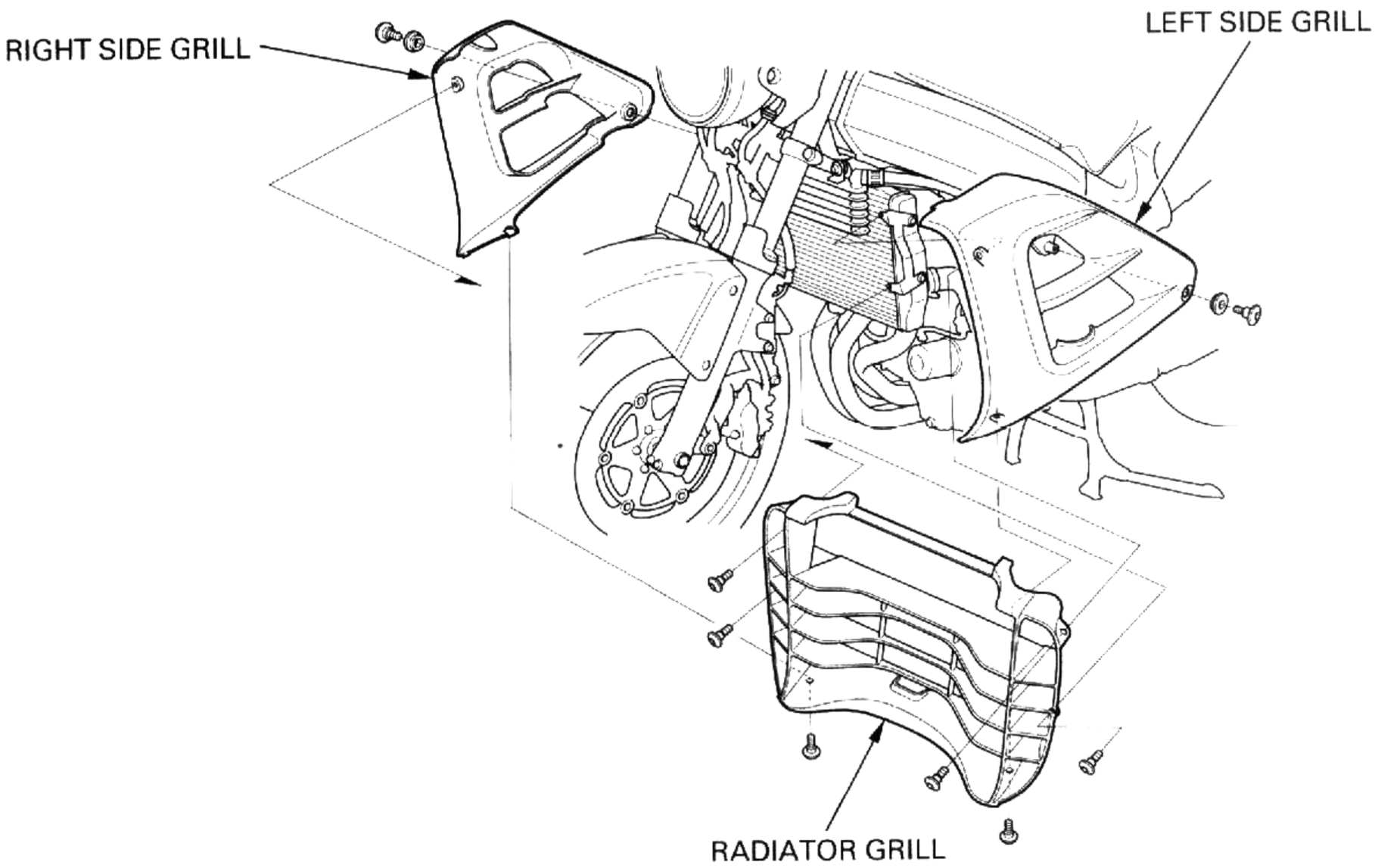


Remove the side grill mounting bolt and mounting rubber, then remove the side grill.



INSTALLATION

Installation is in the reverse order of removal.

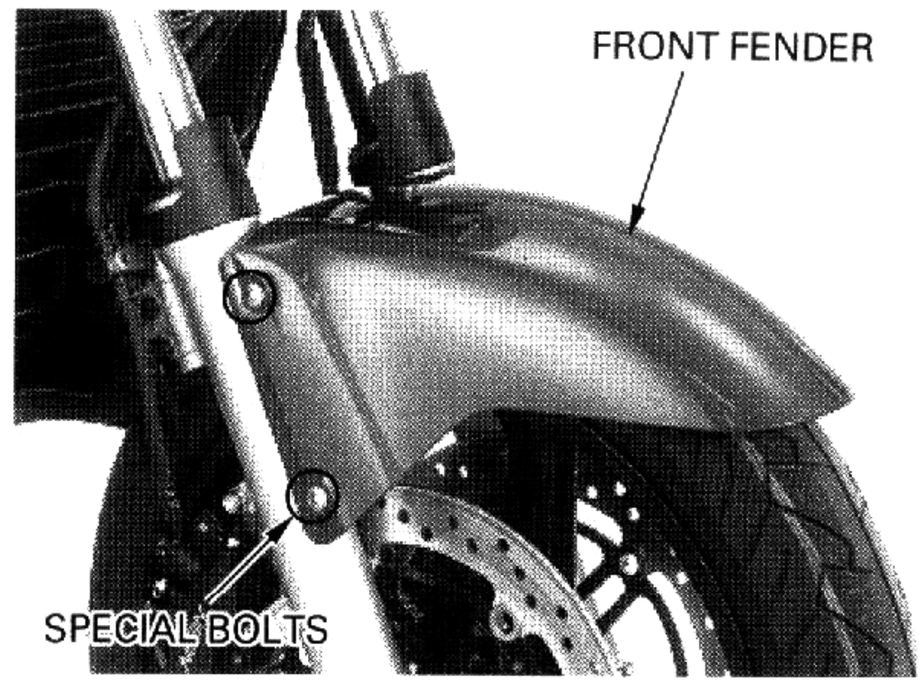


FRONT FENDER

REMOVAL

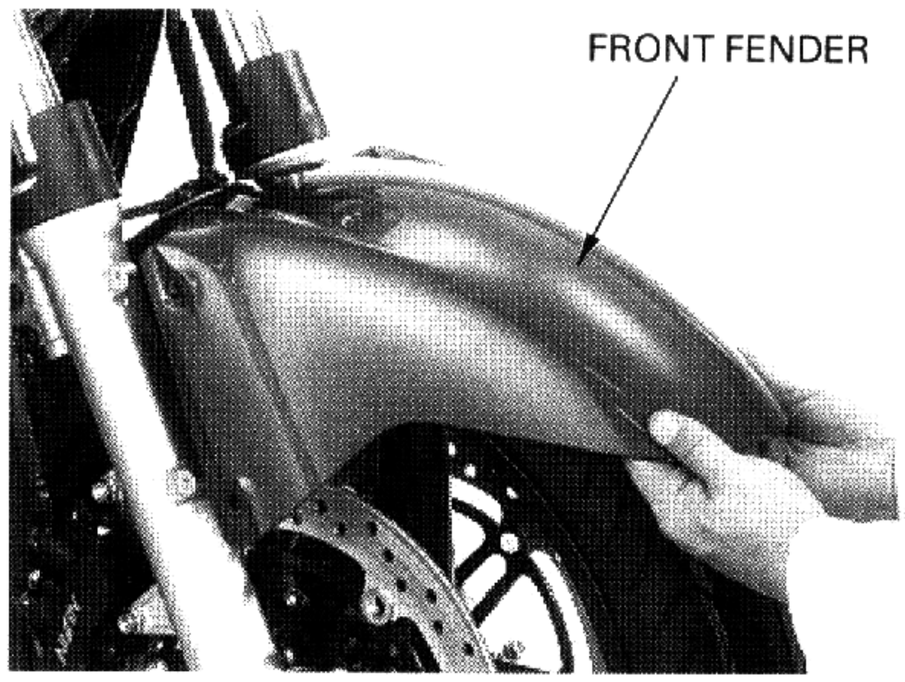
Remove the front fender mounting special bolts.

Remove the front fender forward.



INSTALLATION

Installation is in the reverse order of removal.

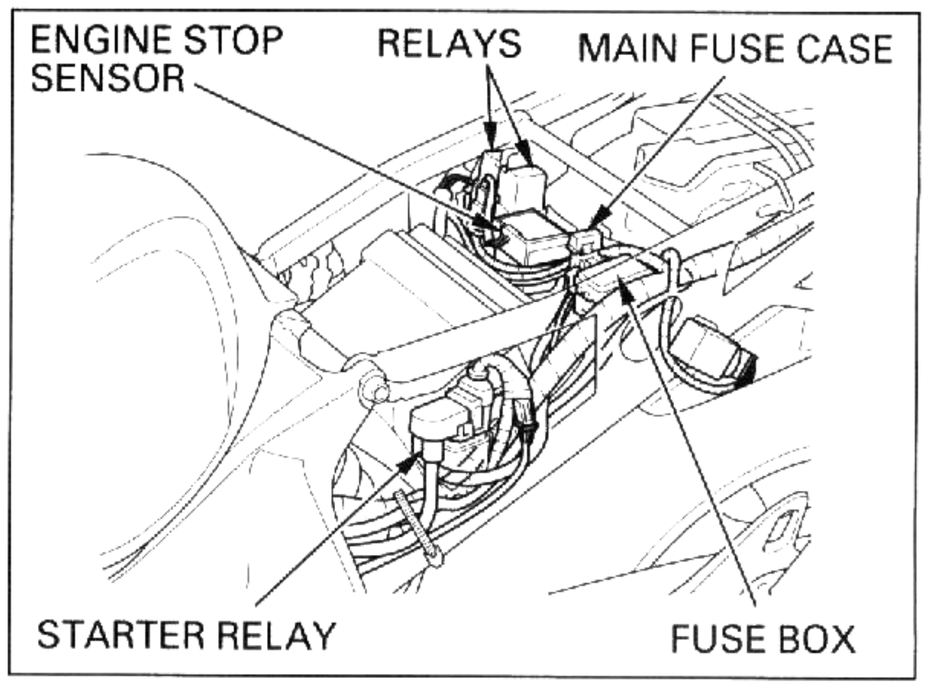


REAR FENDER

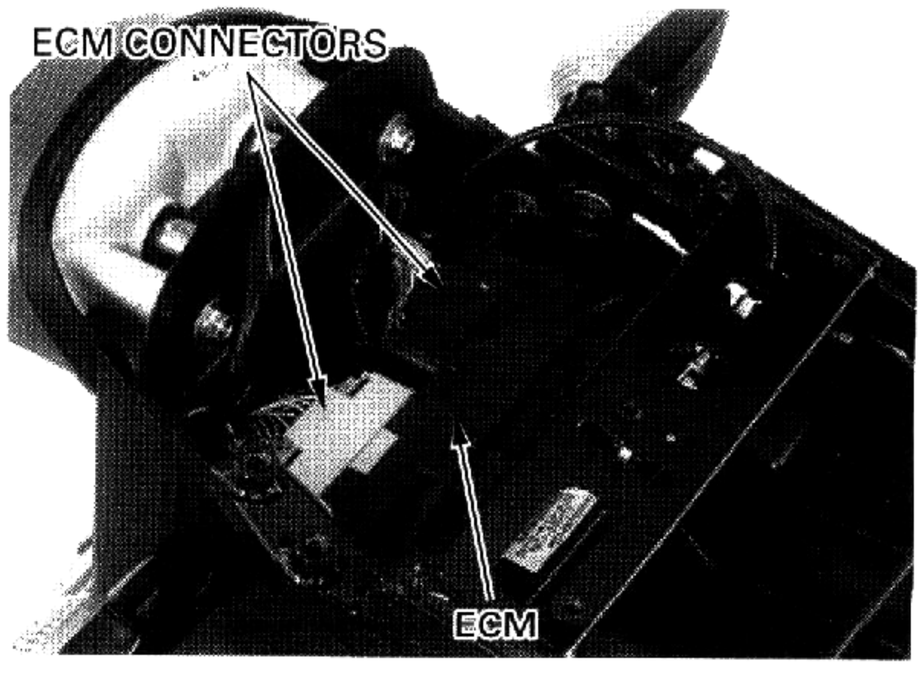
REMOVAL

Remove the following:
- Rear cowl (page 2-2)
- Battery (page 16-5)
- Fuel cut-off relay
- Engine stop relay
- Starter relay switch

Unhook the retaining tab and remove the fuse box.
Unhook the retaining tab and remove the main fuse case.
Disconnect the rear brake light switch connector and engine stop sensor connector.

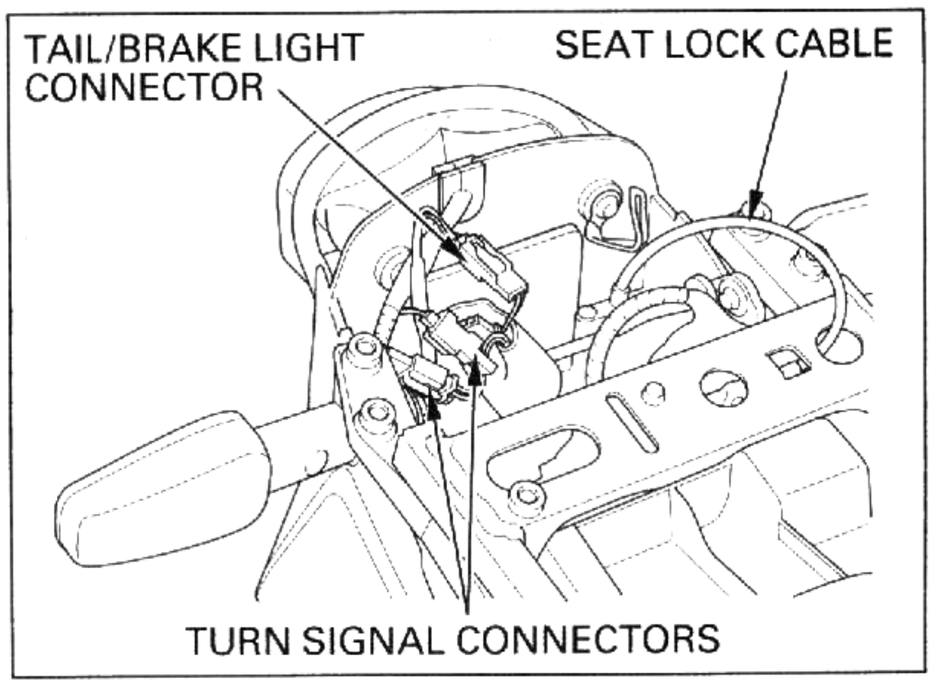


Remove the retaining band and ECM (Engine Control Module), then disconnect the multi-connectors.



Disconnect the seat lock cable.

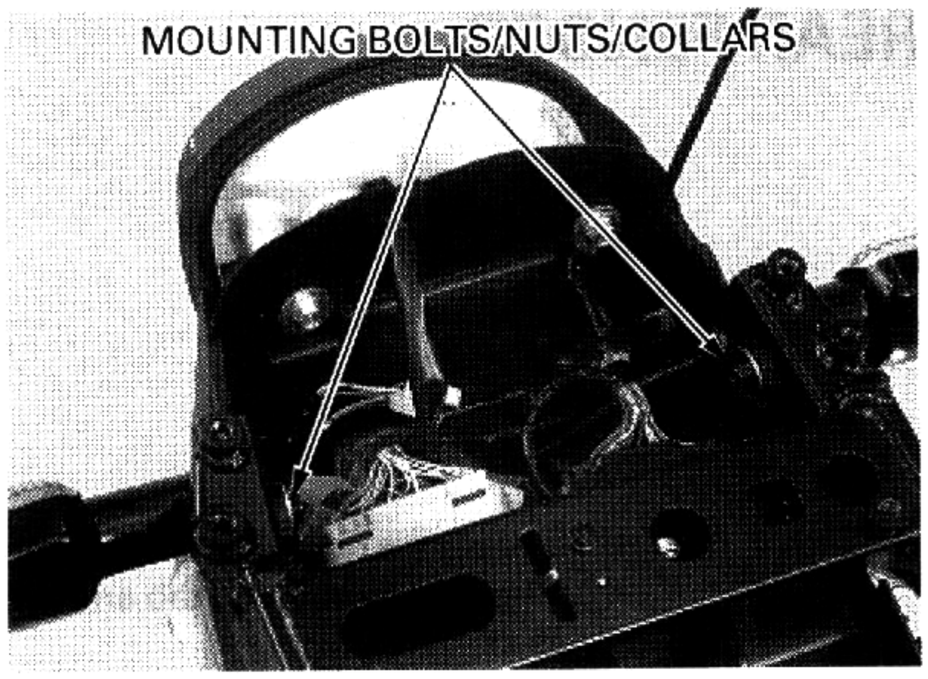
Disconnect the tail/brake light connector and rear turn signal connectors.



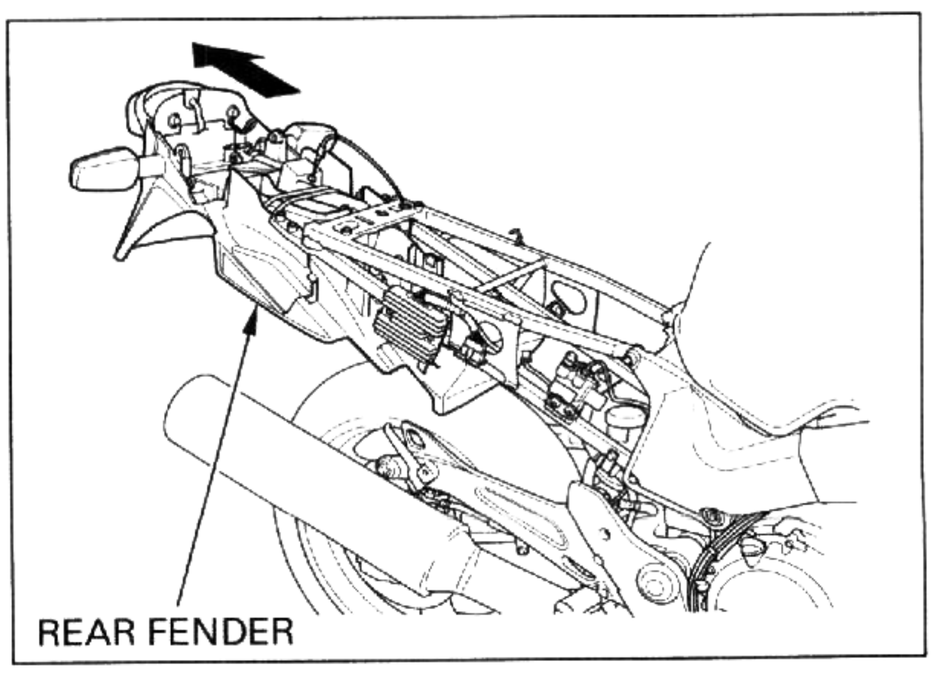
Remove the rear fender mounting special bolts.



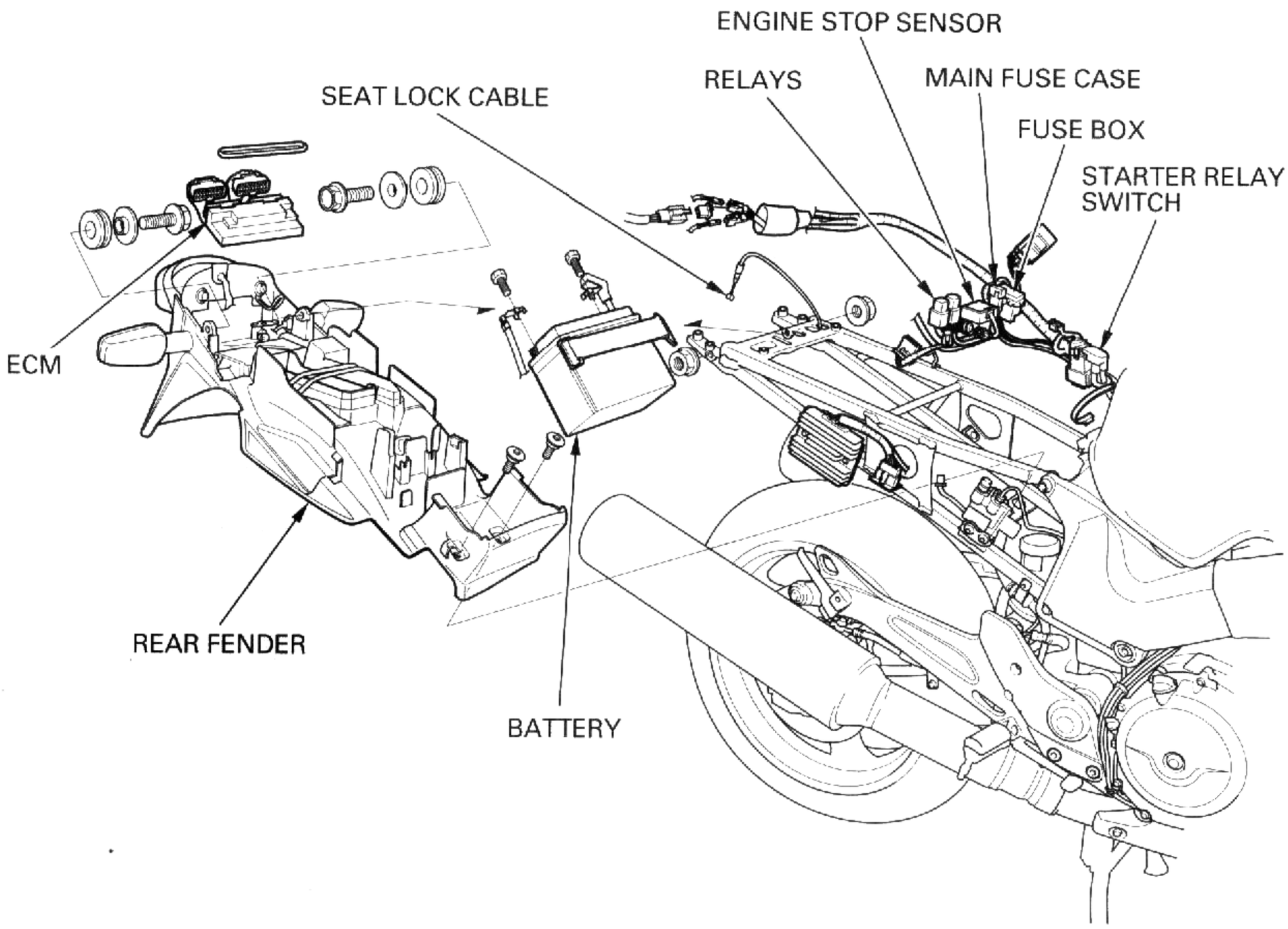
Remove the rear fender mounting bolts, nuts and collars.



Remove the rear fender backward.



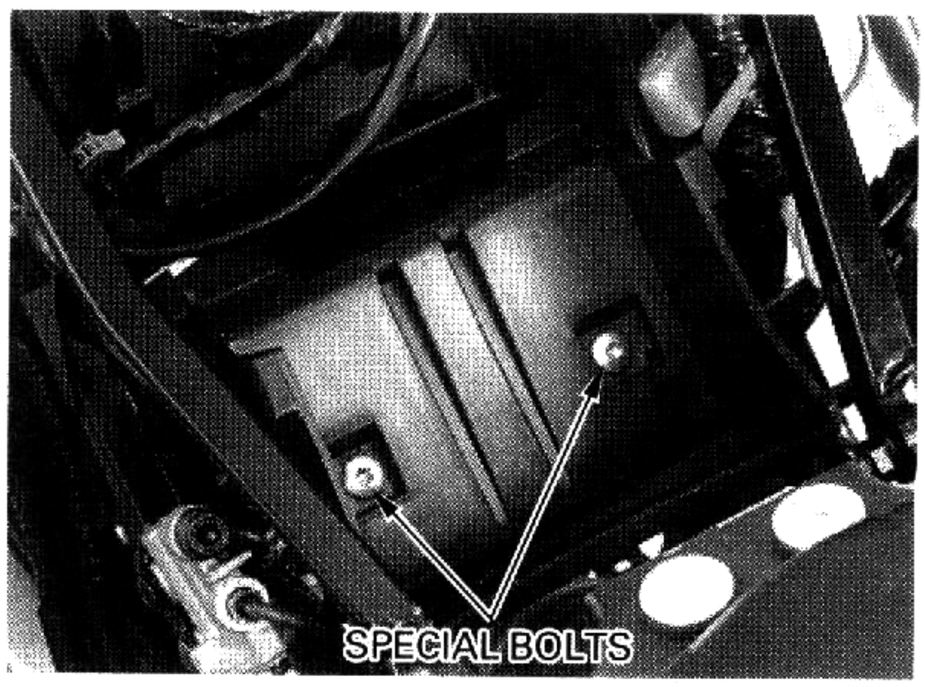
INSTALLATION



NOTE:

While installing the rear fender, route the wire harness properly (page 1-24).

Install and tighten the front side mounting special bolts securely.

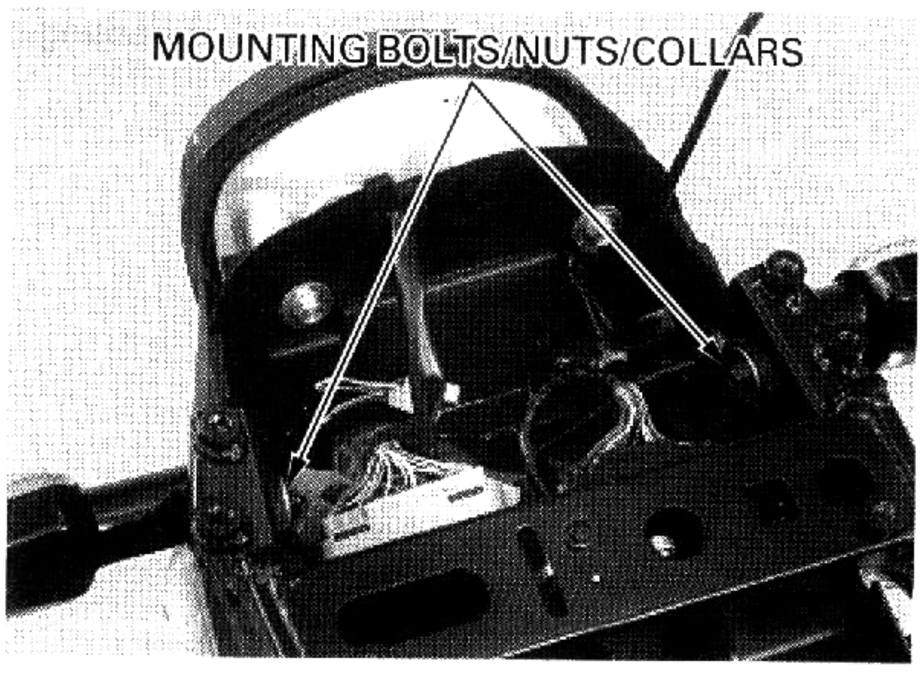


Install the rear mounting collar, bolt and nut. Tighten the nuts while holding the bolts.

Install the removed parts in the reverse order of removal.

NOTE:

Route the wires properly (page 1-24).

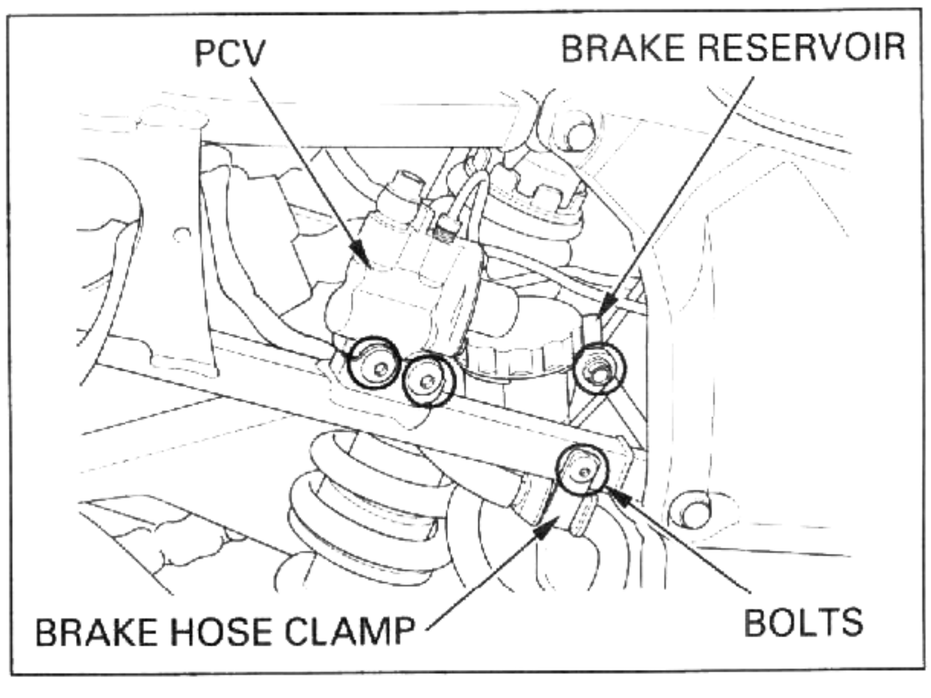


SEAT RAIL

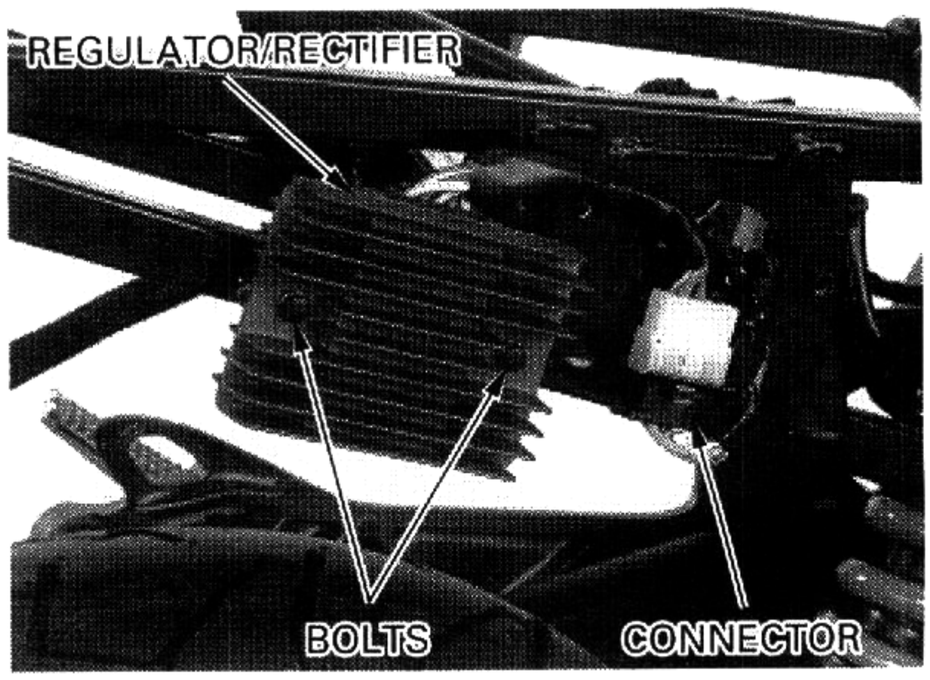
REMOVAL

Remove the rear fender (page 2-5).

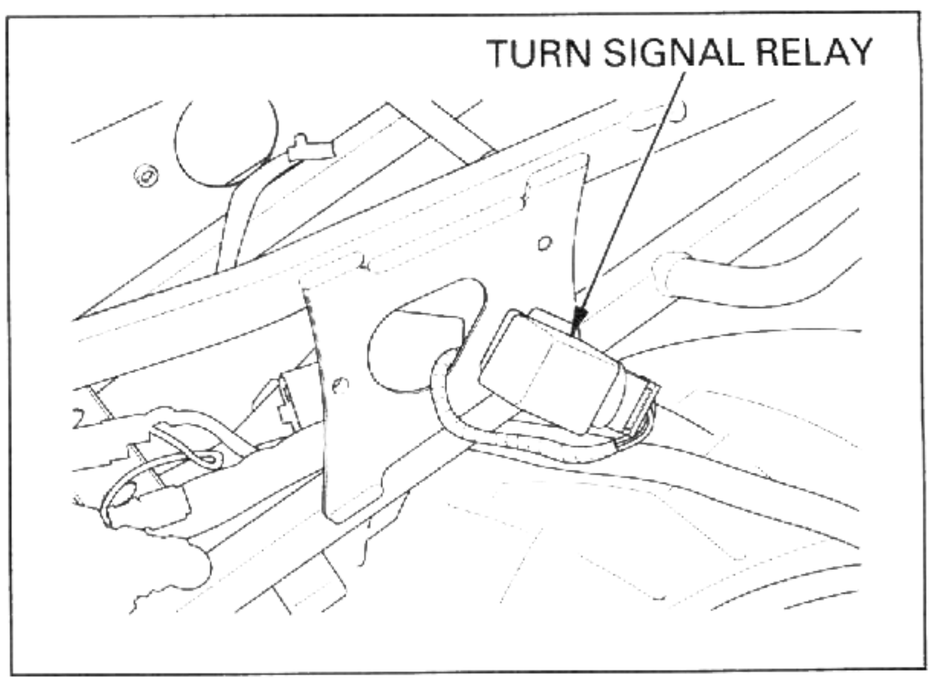
Remove the rear brake hose clamp bolt.
Remove the PCV (Proportional Control Valve) mounting bolts.
Remove the rear brake reservoir mounting bolt.



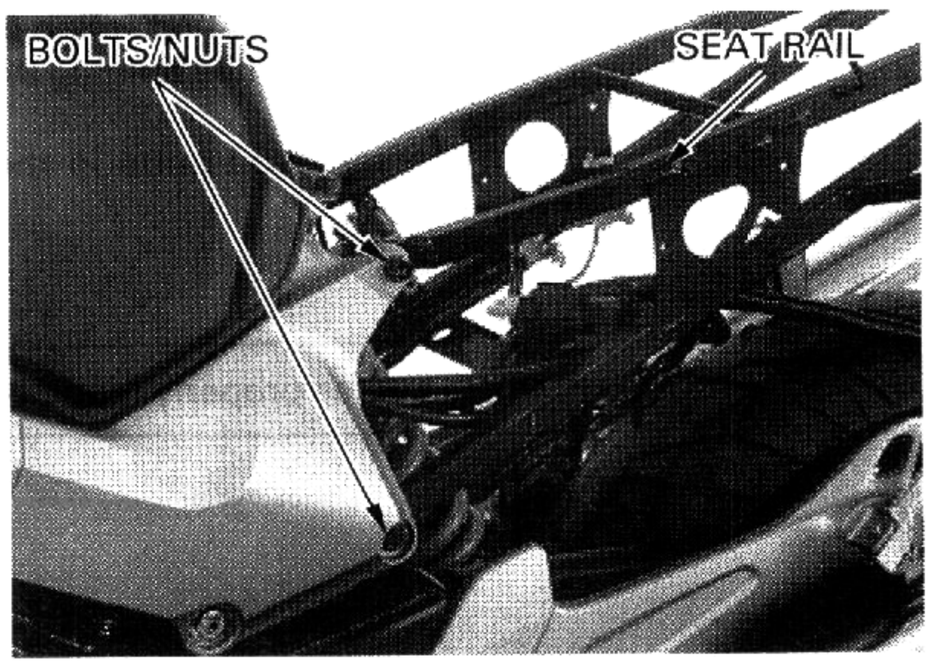
Disconnect the regulator/rectifier 6P (Black) connector.
Remove the bolts and regulator/rectifier.



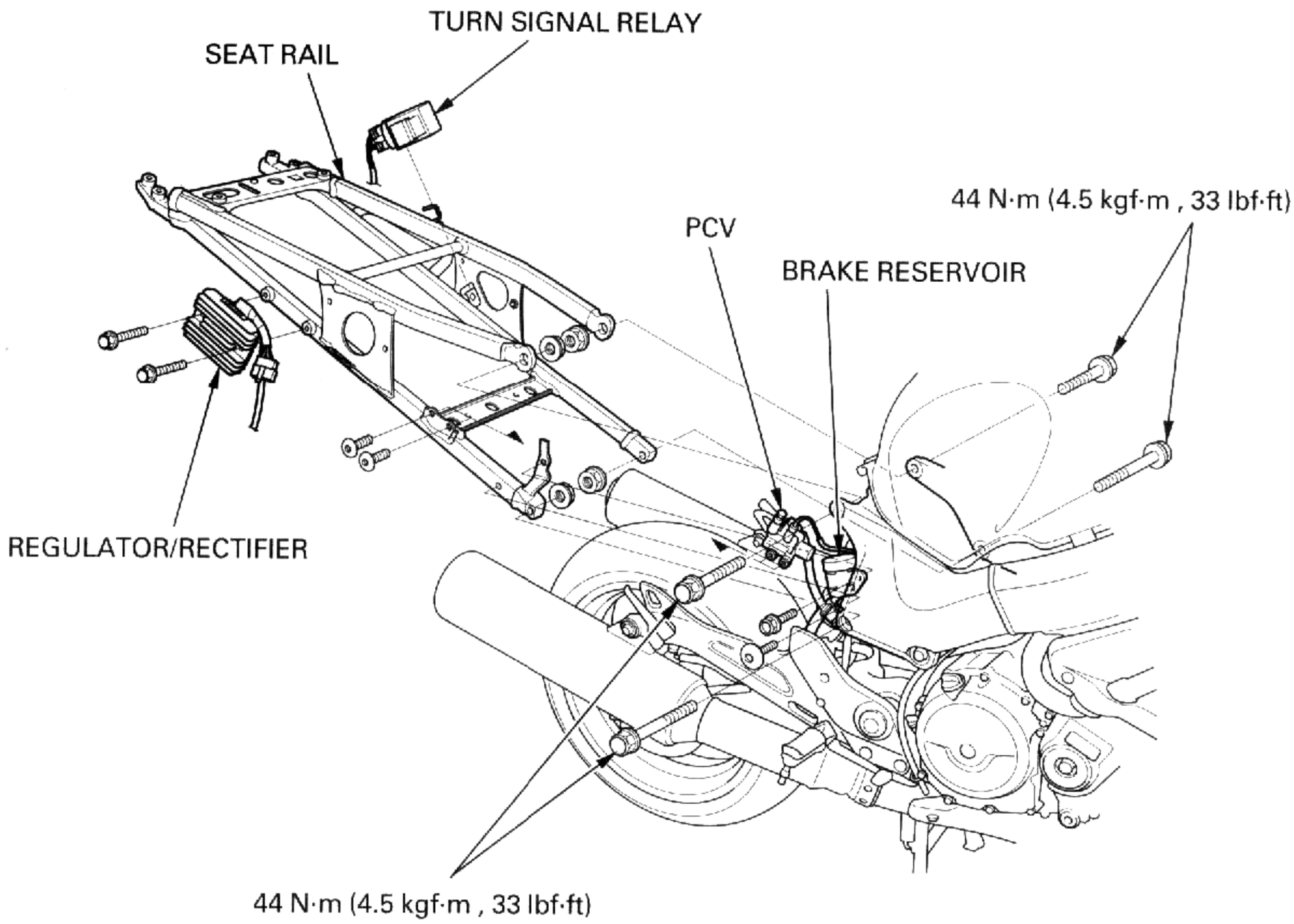
Remove the turn signal relay from the seal rail bracket.



Remove the seat rail mounting bolts, nuts and seat rail.

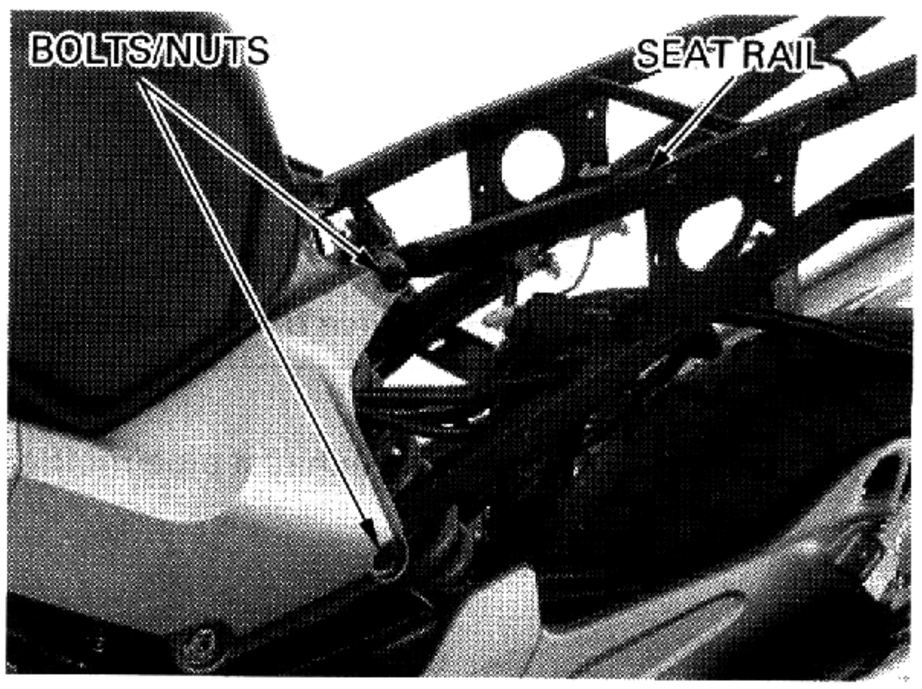


INSTALLATION

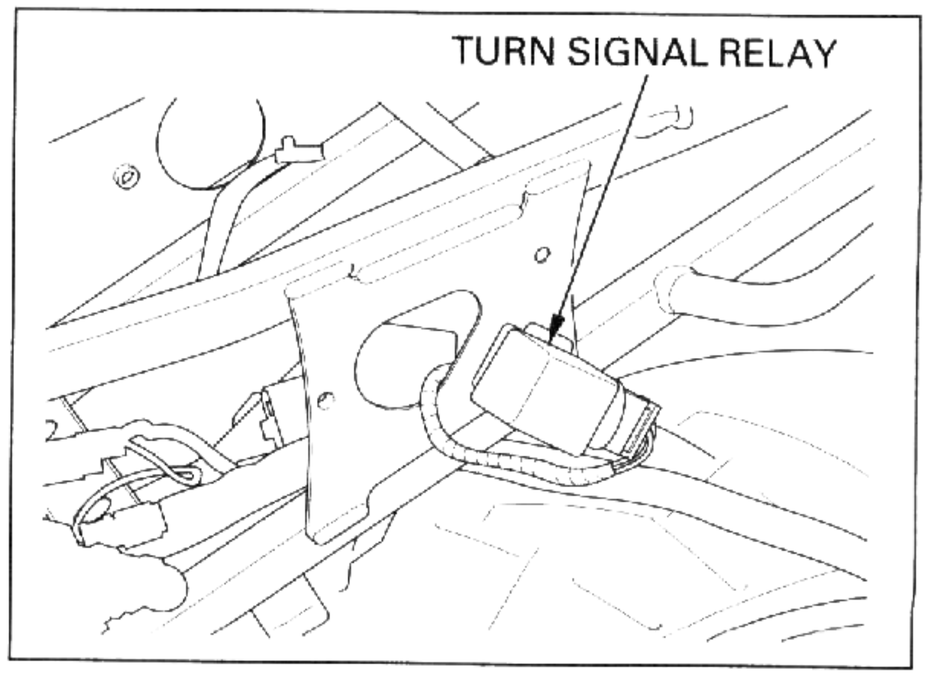


Install the seat rail and tighten the mounting bolts to the specified torque.

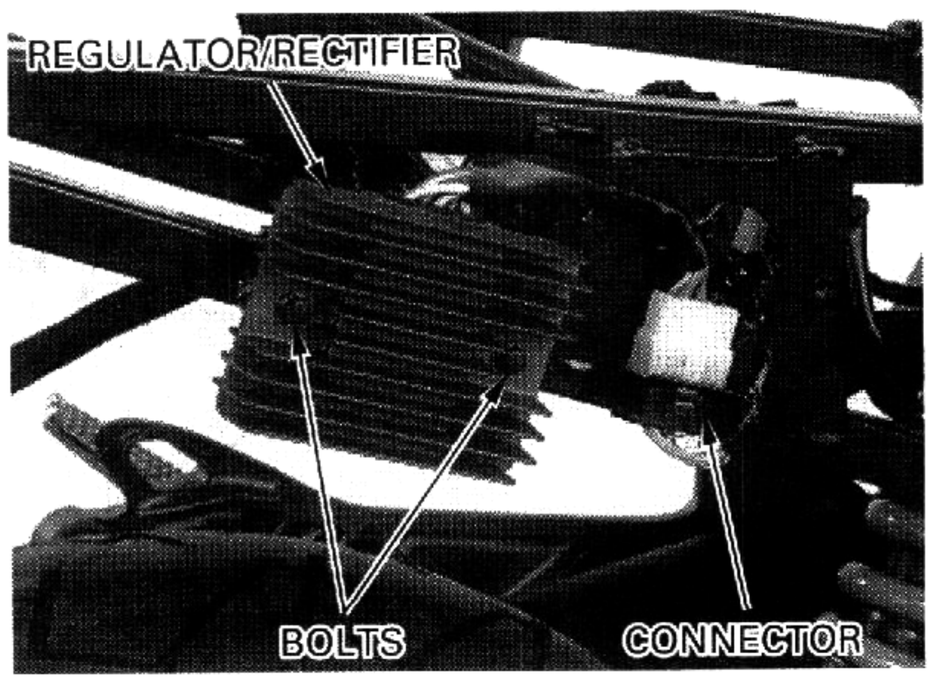
TORQUE: 44 N·m (4.5 kgf·m , 33 lbf·ft)



Install the turn signal relay onto the seat rail bracket.

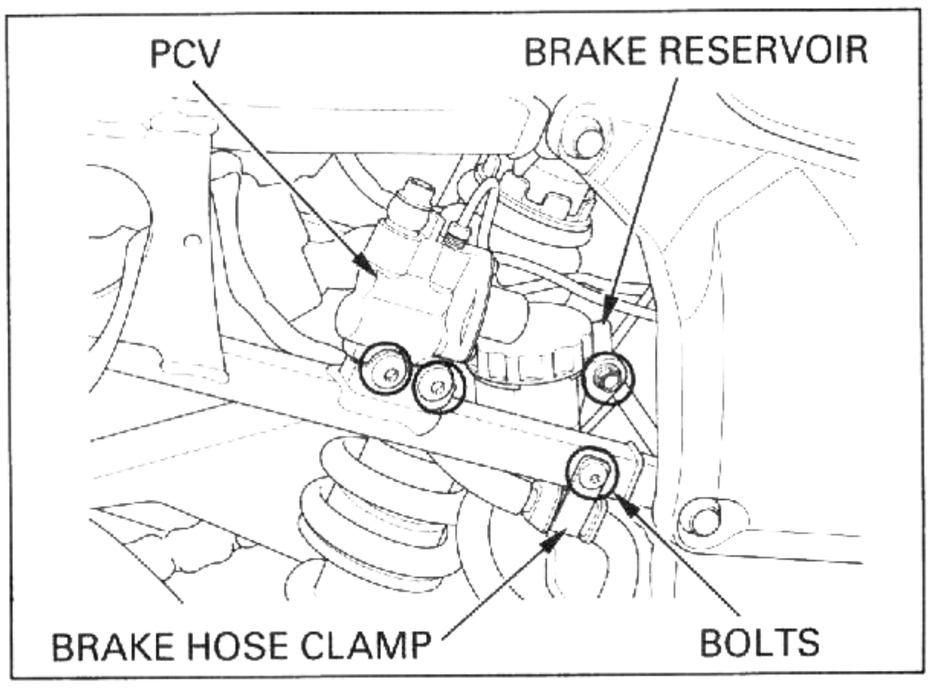


Install the regulator/rectifier, tighten the bolts.
Connect the regulator/rectifier 6P (Black) connector.



Install and tighten the PCV (Proportional Control Valve) mounting bolts.
Install and tighten the rear brake hose clamp bolt.
Install and tighten the rear brake reservoir tank mounting bolt.

Install the removed parts in the reverse order of removal.



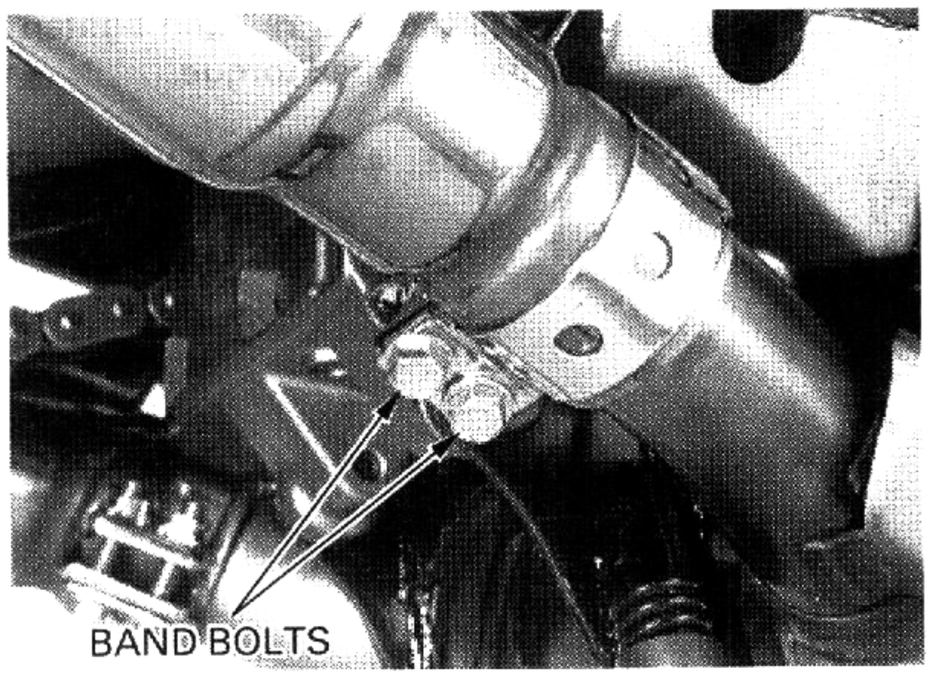
MUFFLER/EXHAUST PIPE

REMOVAL

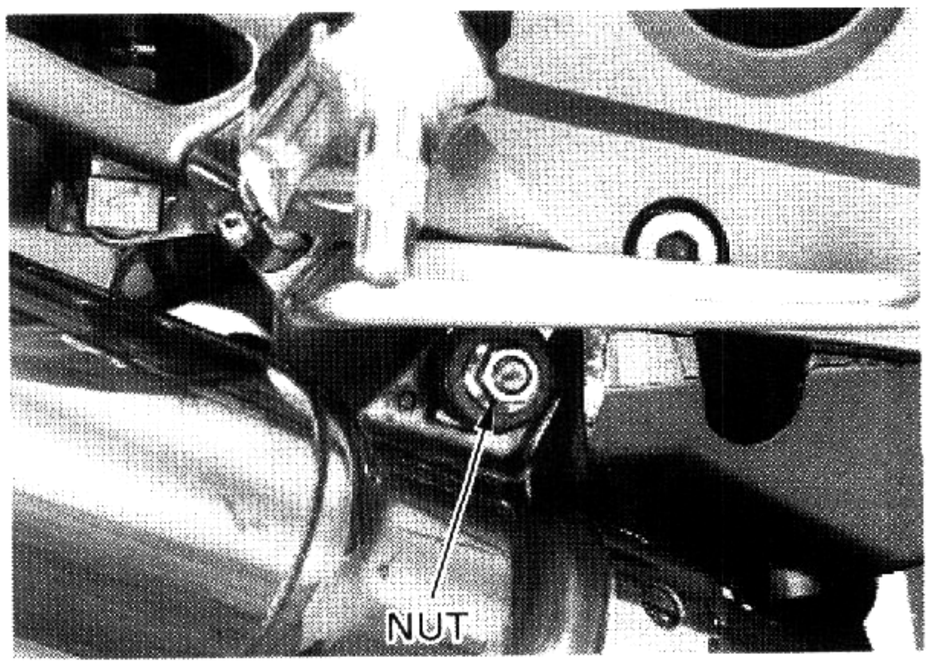
⚠WARNING

Do not service the exhaust system while it is hot.

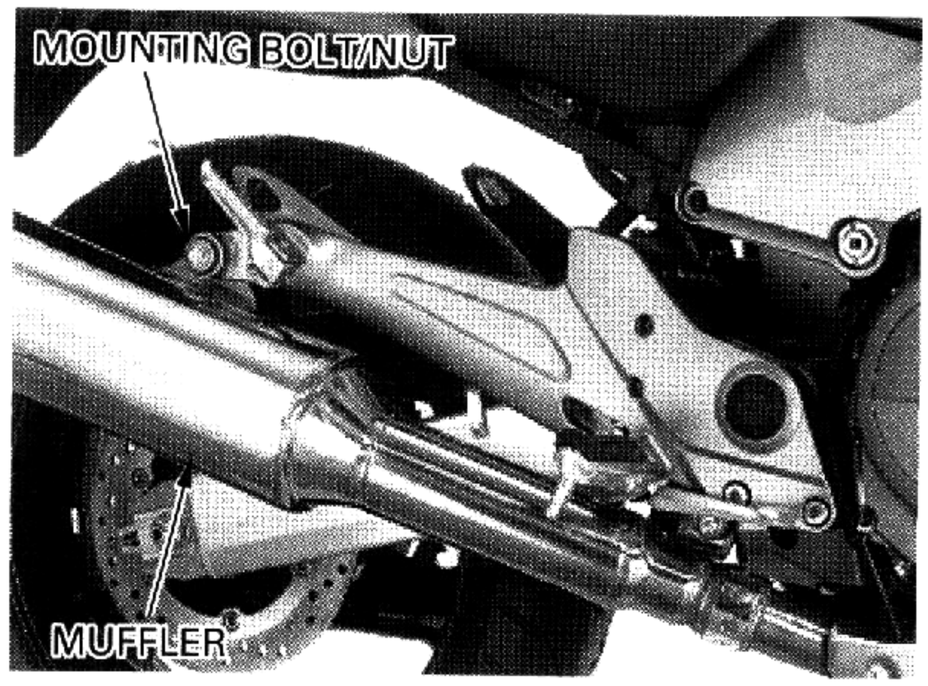
Loosen the exhaust pipe/muffler band bolts.



Loosen the muffler front mounting nut.

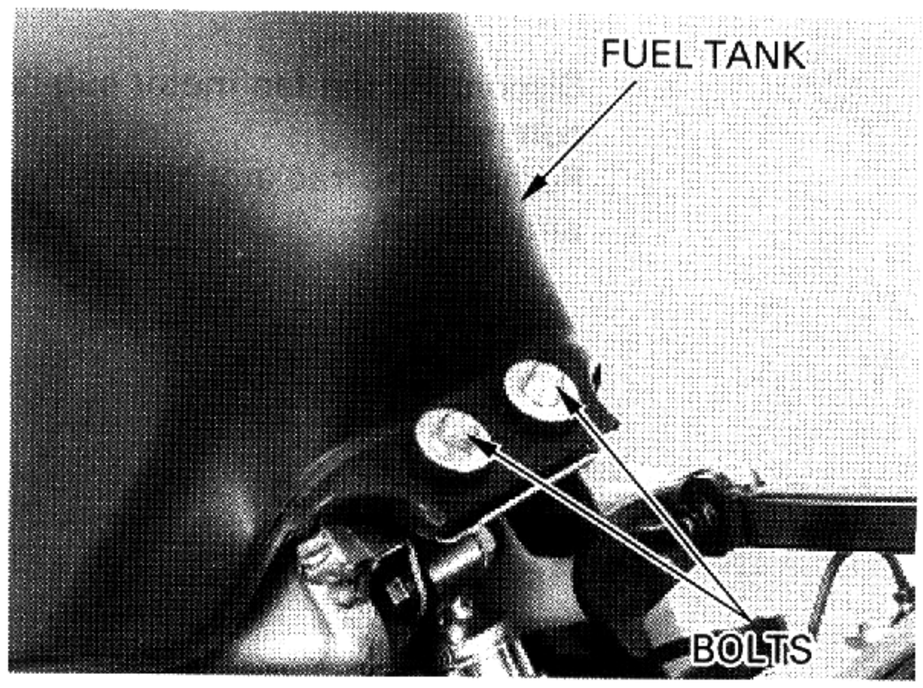


Remove the muffler rear mounting bolt/nut, then remove the muffler.
Remove the muffler gasket.

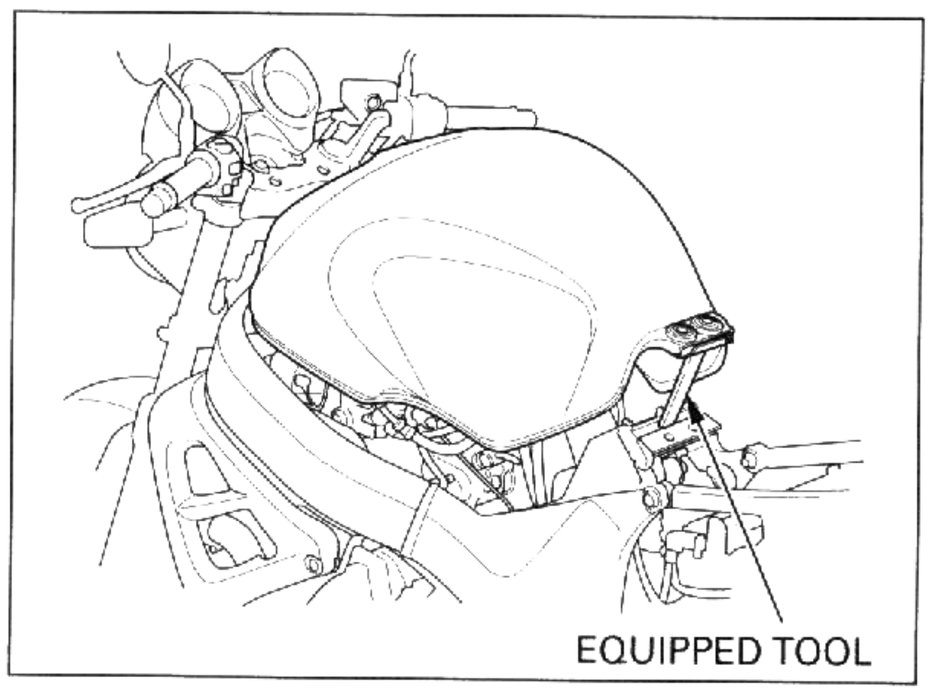


Remove the following:
– Seat (page 2-2)
– Radiator grill (page 2-4)

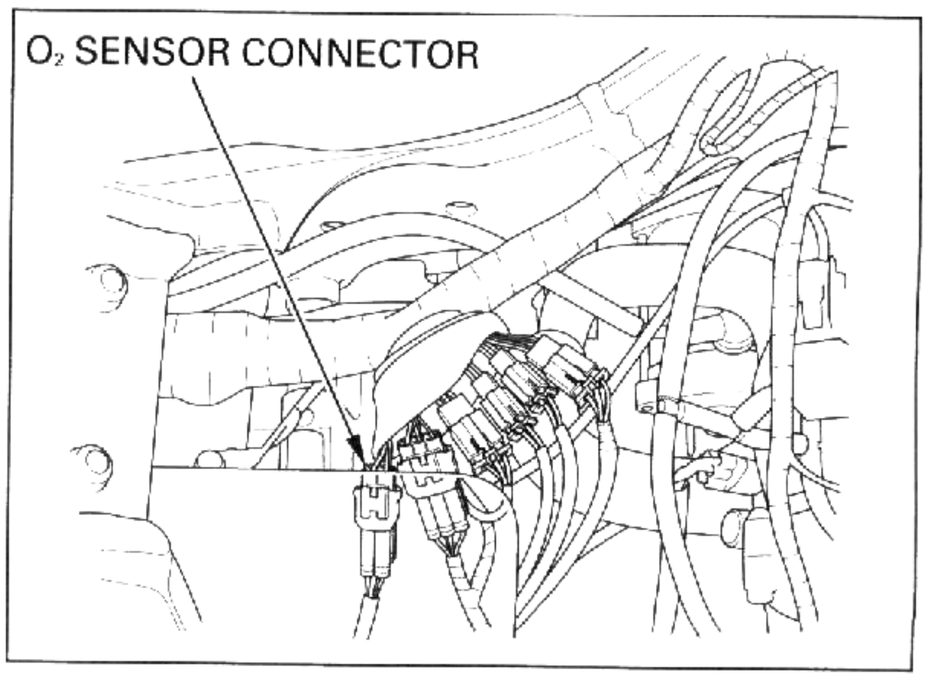
Remove the fuel tank mounting bolts.



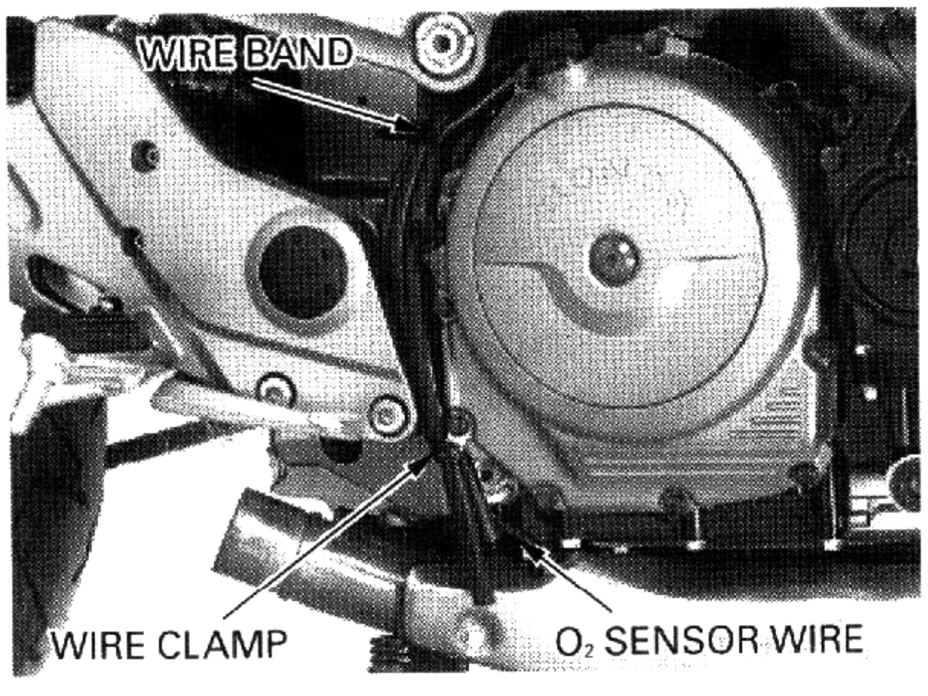
Support the rear end of the fuel tank using a equipped tool (extension).



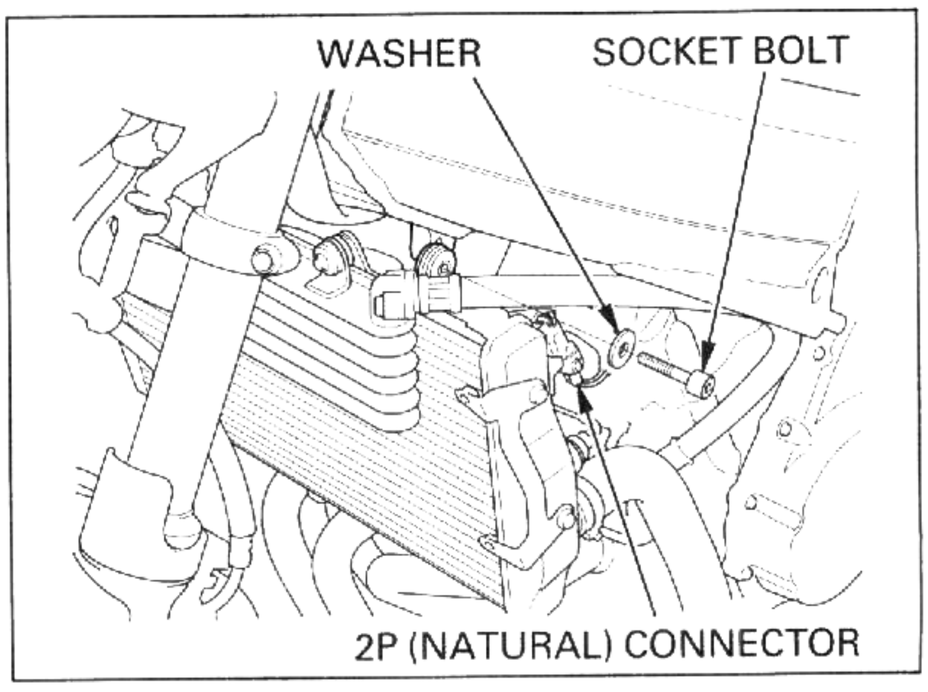
Disconnect the O_2 sensor 4P (Gray) connector.



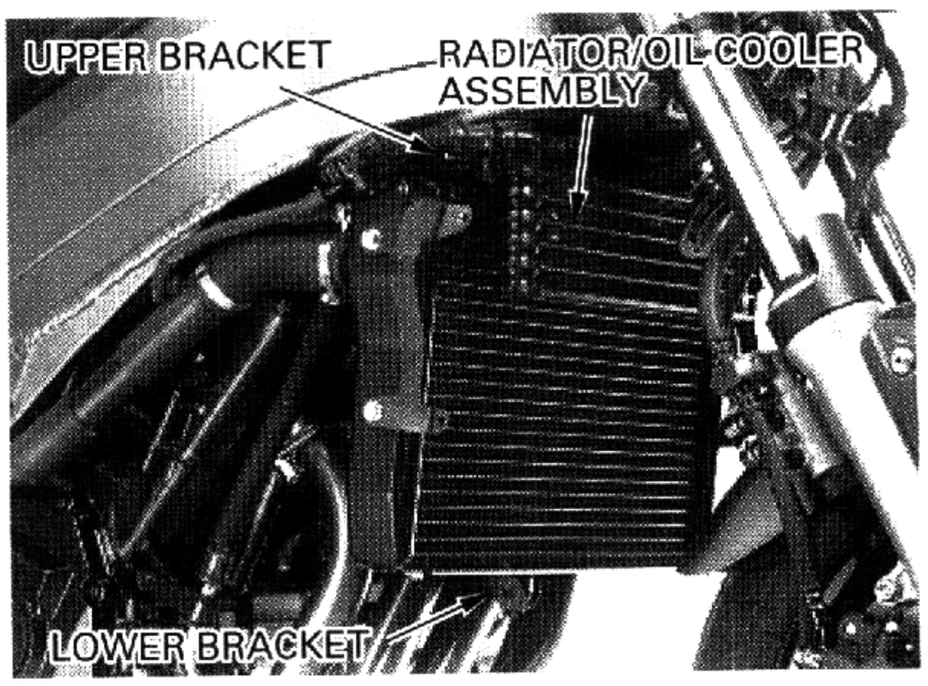
Unfasten the tube/wire band.
Release the O_2 sensor wire from the wire clamp.



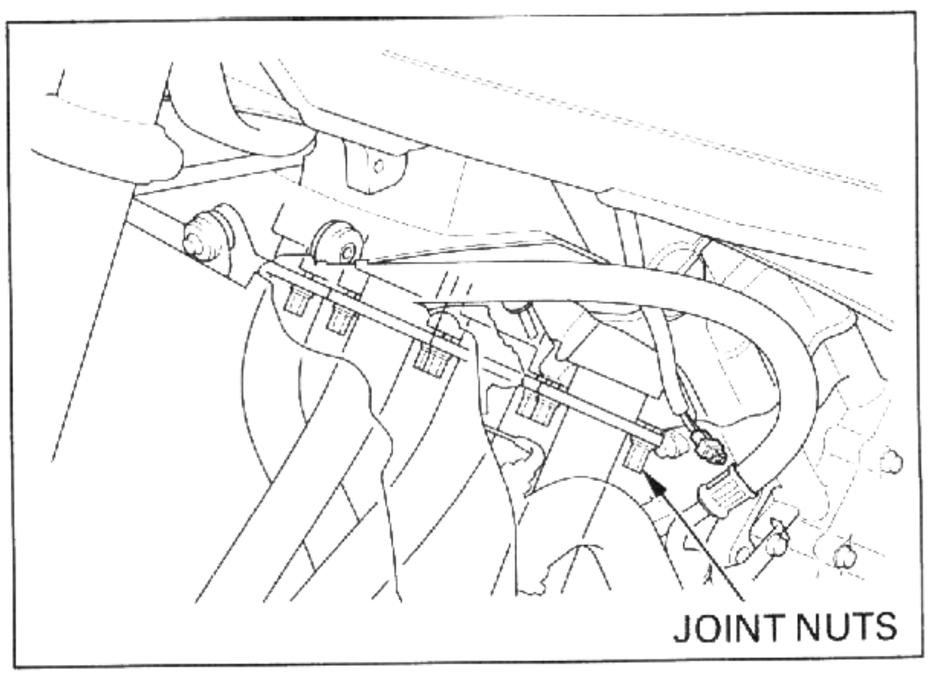
Disconnect the fan motor sub-harness 2P (Natural) connector.
Remove the radiator upper mounting socket bolt and washer.



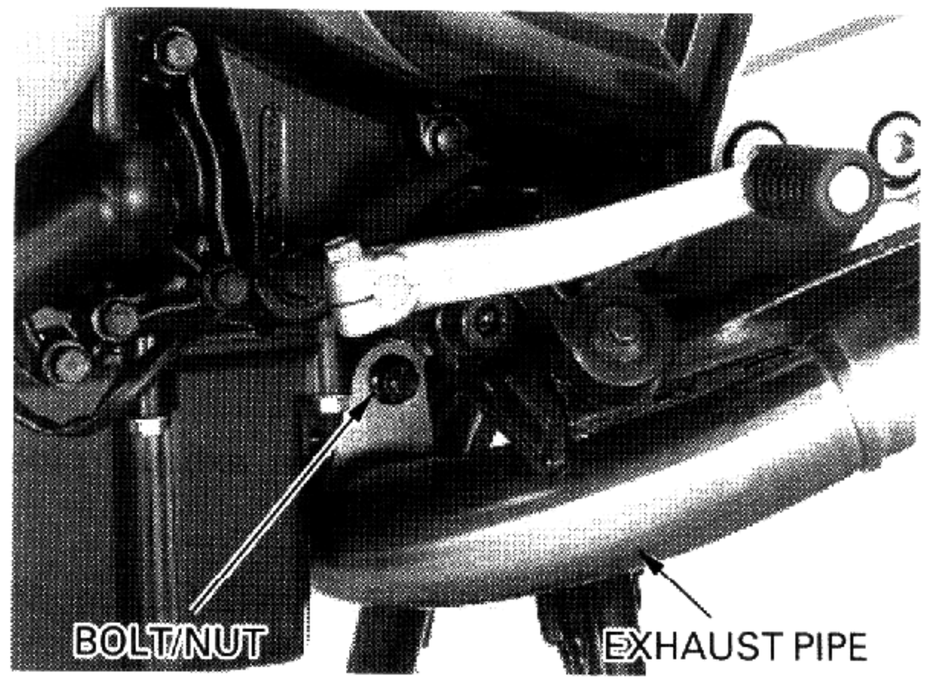
Remove the radiator from the upper and lower brackets by moving it to the right, then move the radiator/oil cooler forward as an assembly.



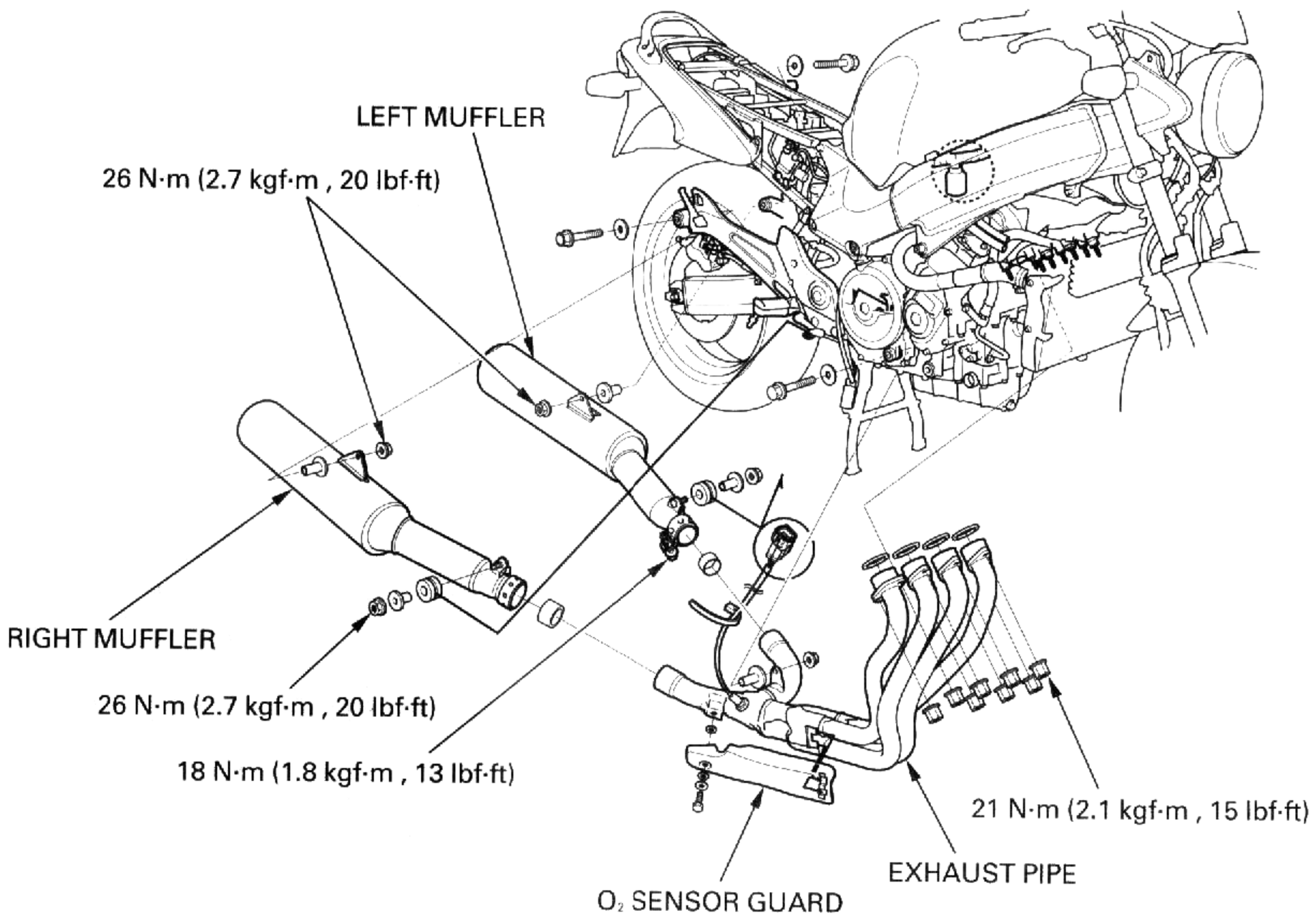
Remove the exhaust pipe joint nuts.



Remove the following:
- Exhaust pipe mounting bolt/nut
- Washer
- Collar
- Exhaust pipe
- Exhaust pipe gaskets



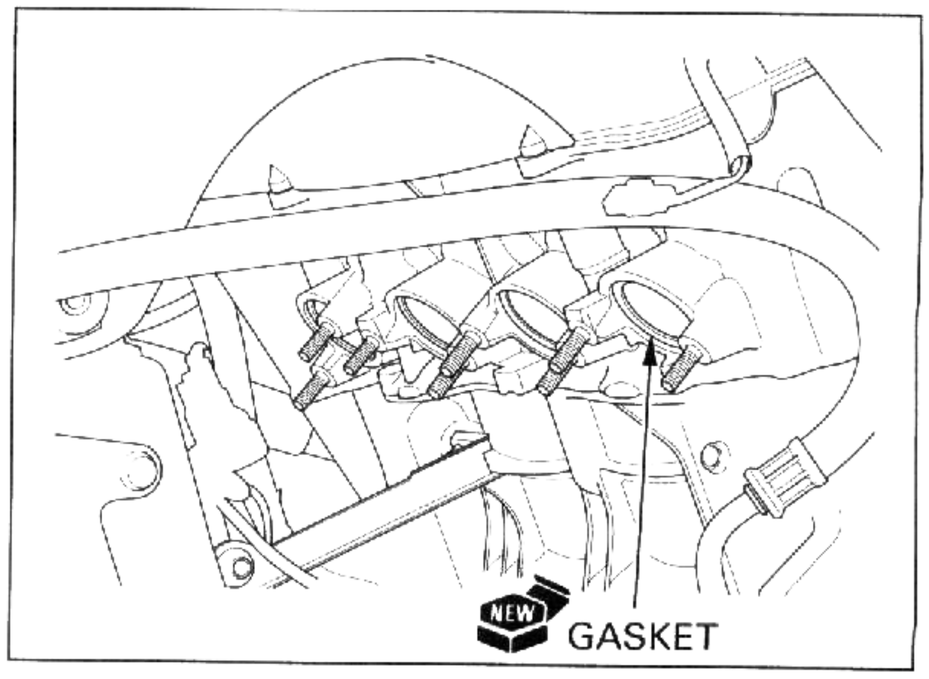
INSTALLATION



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

NOTE:

Always replace the exhaust pipe gaskets with new ones.



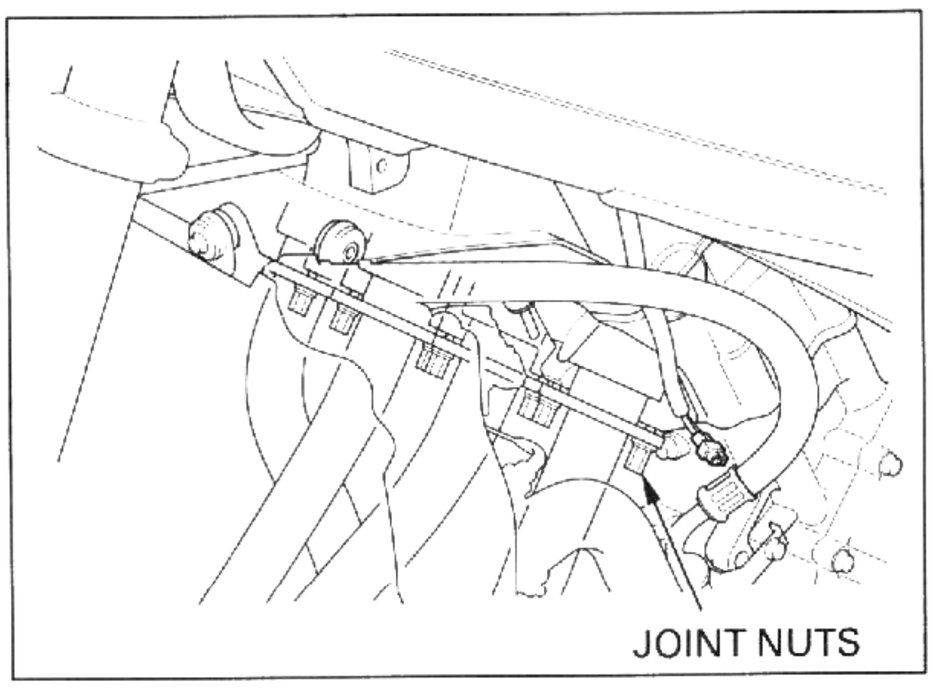
Install the exhaust pipe, temporarily install the exhaust pipe joint nuts and mounting bolt.

NOTE:

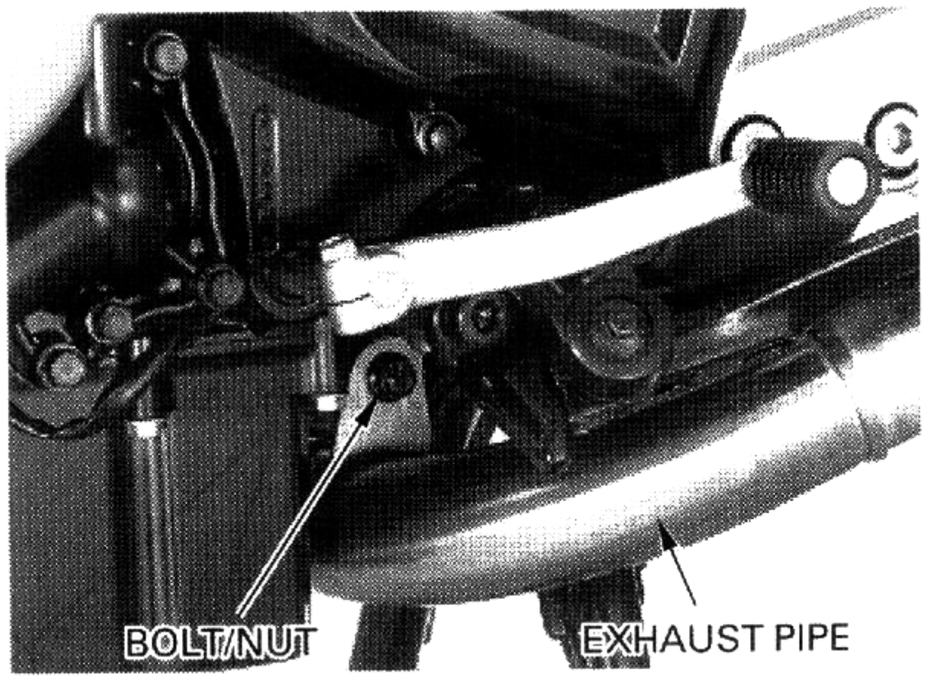
Install the mounting collars, washer, bolt and nut properly.

First tighten the exhaust pipe joint nuts to the specified torque.

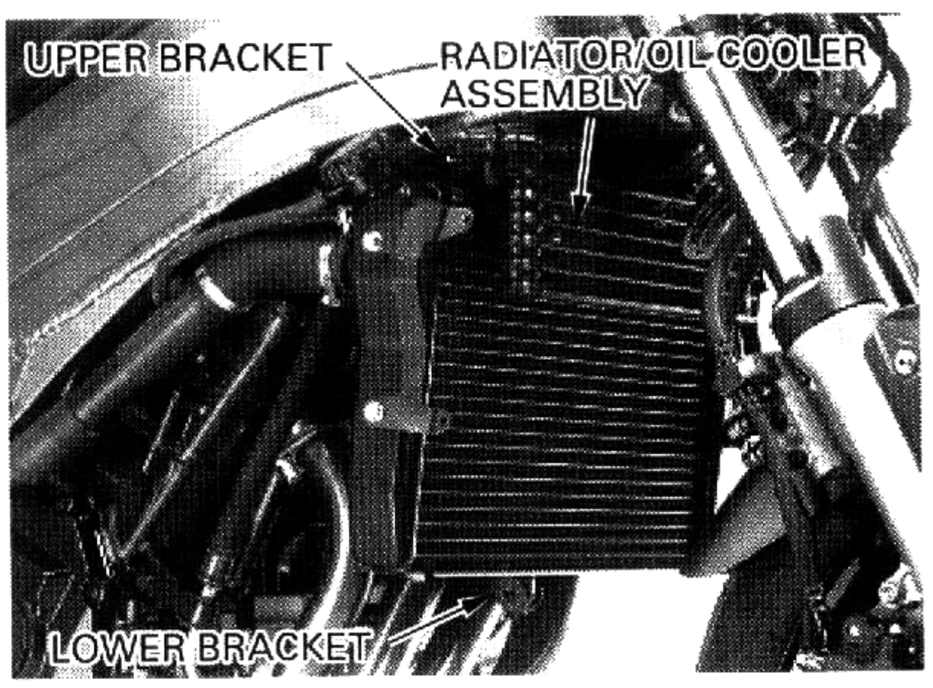
TORQUE: 21 N·m (2.1 kgf·m , 15 lbf·ft)



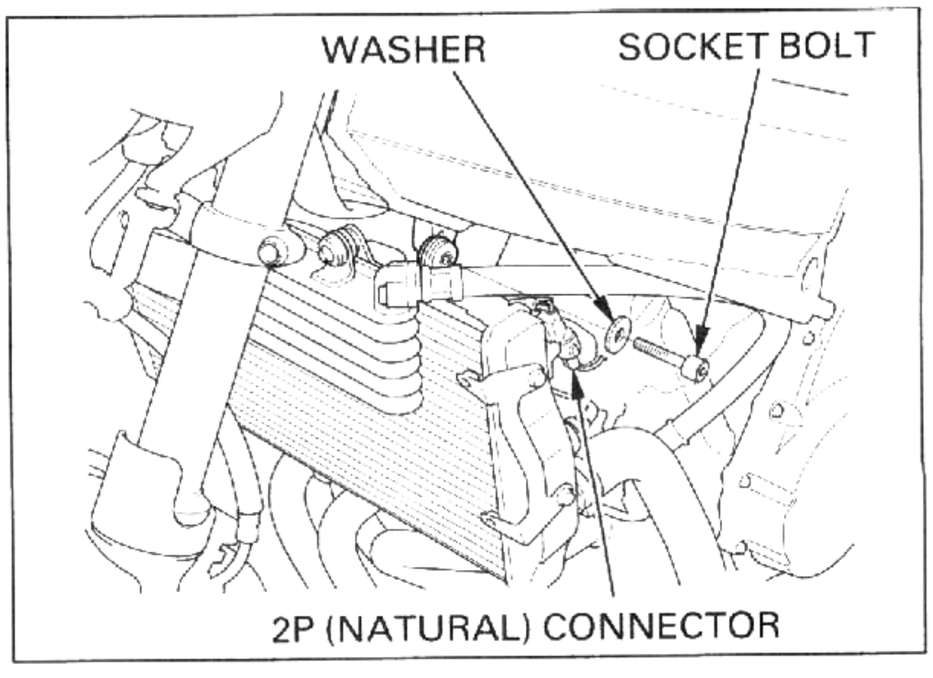
Tighten the exhaust pipe mounting bolt/nut.



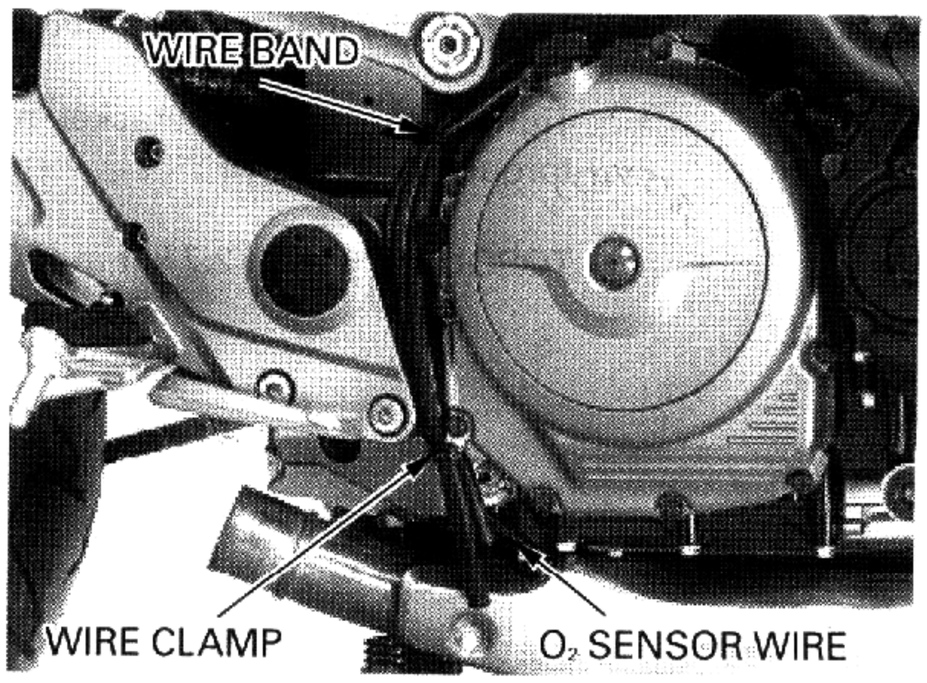
Install the radiator/oil cooler assembly aligning the radiator grommets with the upper and lower brackets.



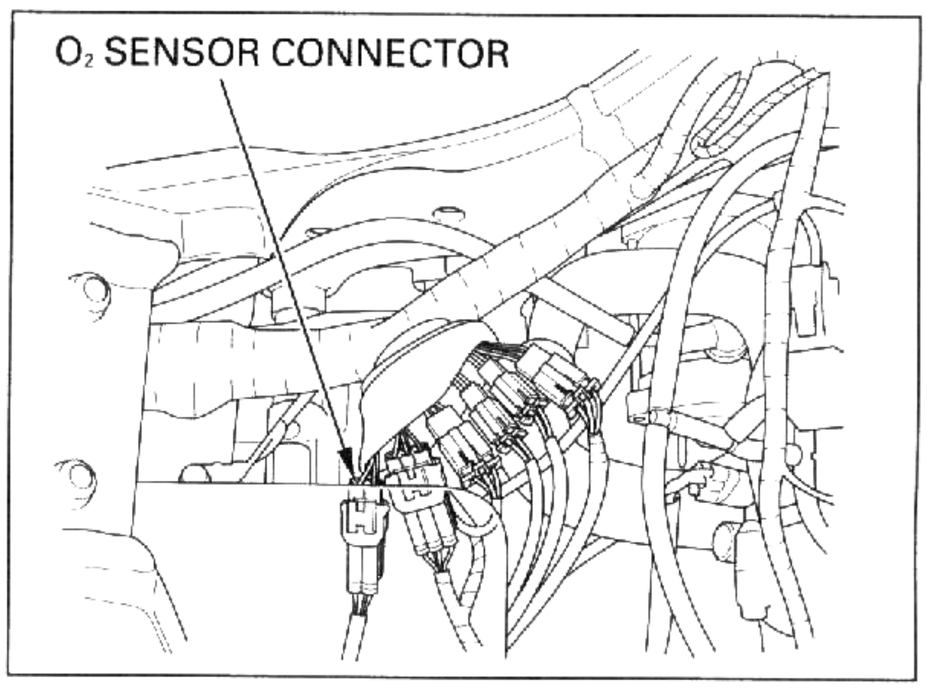
Install the washer and radiator mounting socket bolt, then tighten the socket bolt.
Connect the fan motor sub-harness 2P (Natural) connector.



Route the O_2 sensor wire and clamp it with a wire clamp.
Fasten the O_2 sensor wire and fuel tank breather tube and overflow tube with a wire band.

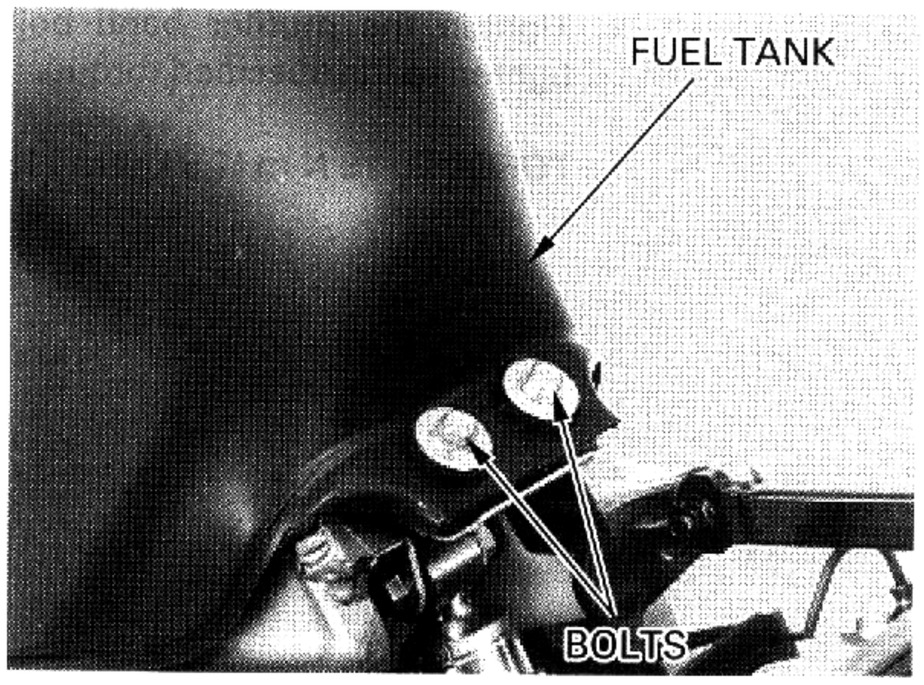


Connect the O_2 sensor 4P (Gray) connector.



Remove the fuel tank support tool and close the fuel tank.
Install and tighten the fuel tank mounting bolts/ washers.

Install the following:
– Seat (page 2-2)
– Radiator grill (page 2-4)

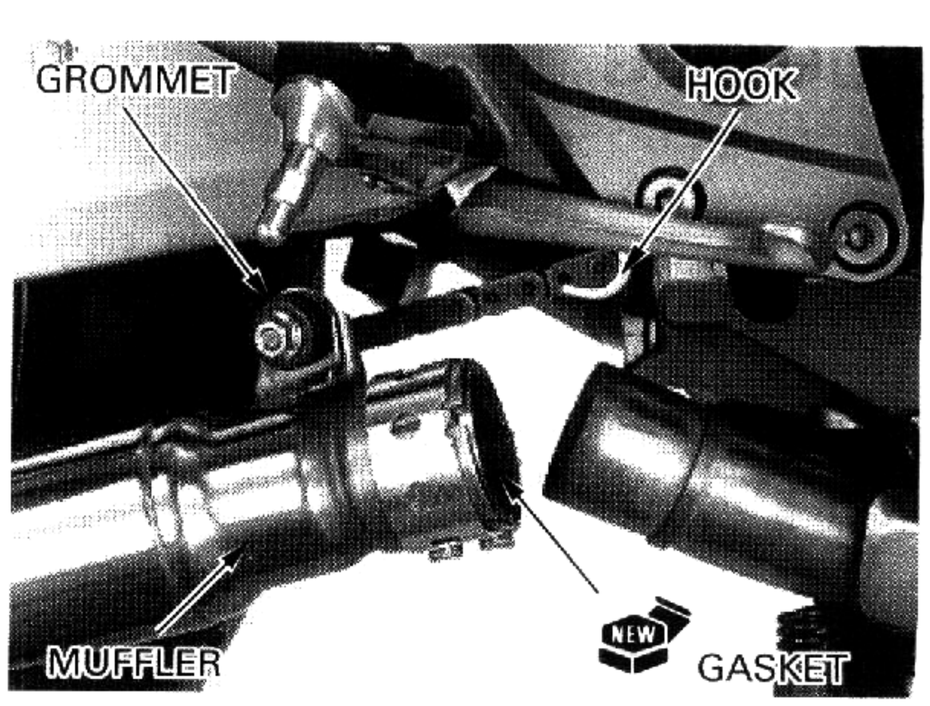


Install the new gasket into the muffler.

Install the mufflers.

NOTE:

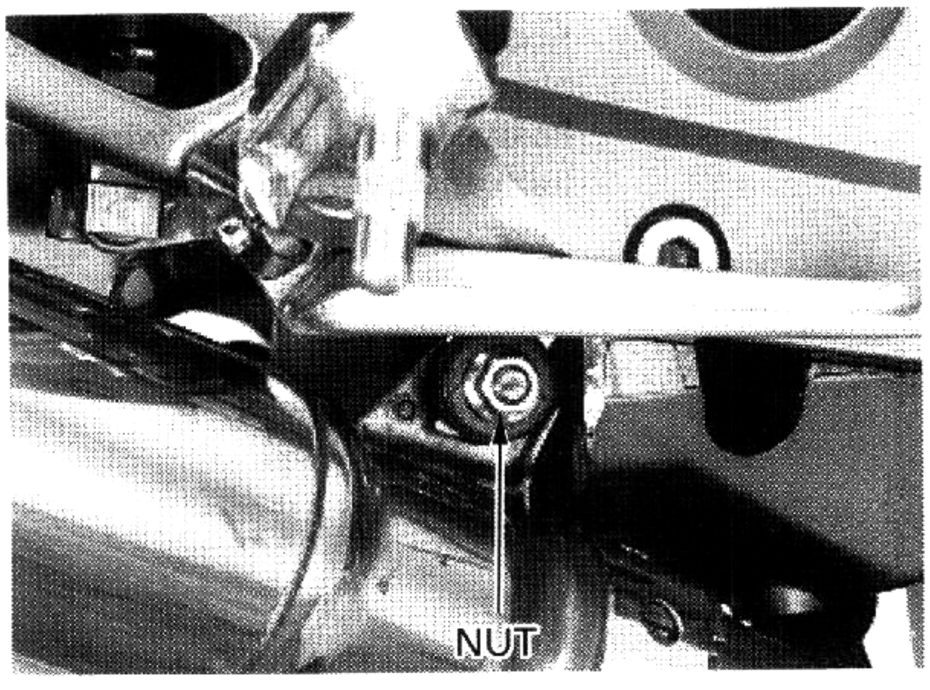
At muffler installation, align the grommet of the muffler with the hook of the muffler bracket as shown.



Temporarily install the muffler mounting bolt/nut.

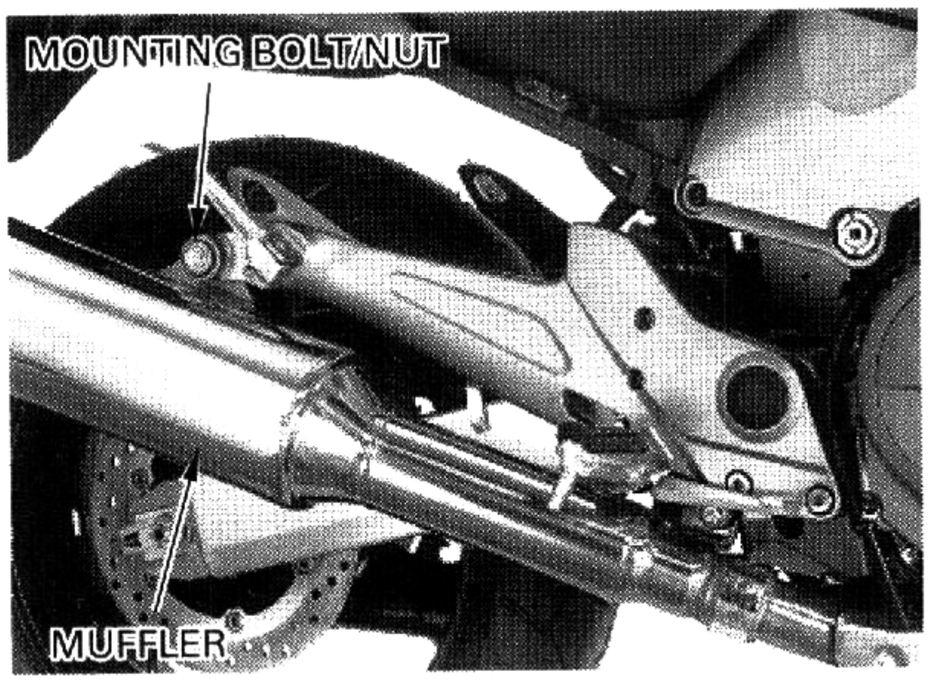
Tighten the muffler bracket nut to the specified torque.

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



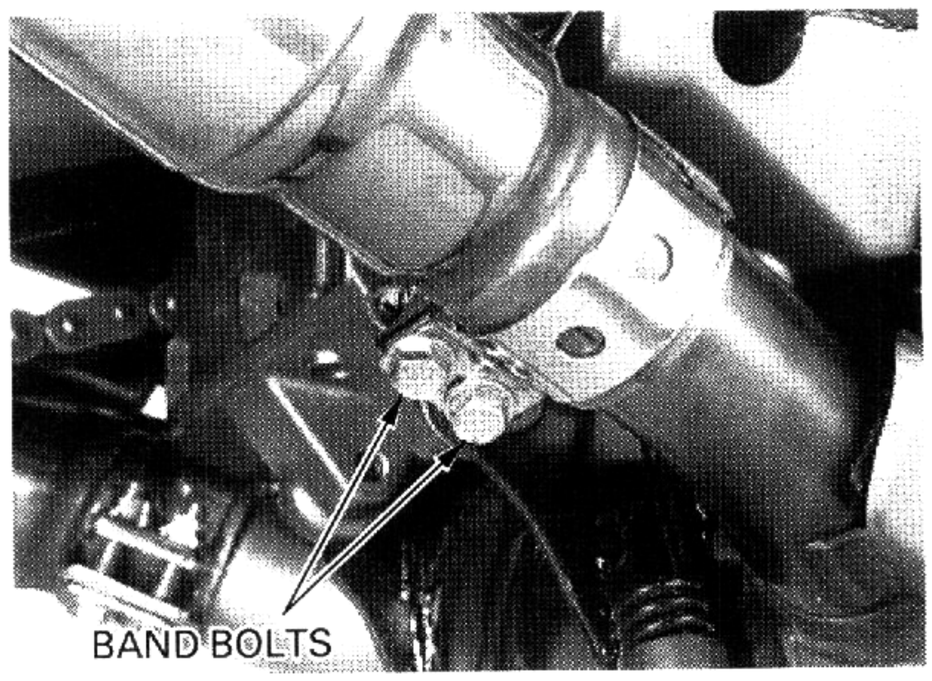
Tighten the muffler mounting bolt/nut to the specified torque.

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



Tighten the muffler band bolts alternately, then tighten to the specified torque.

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

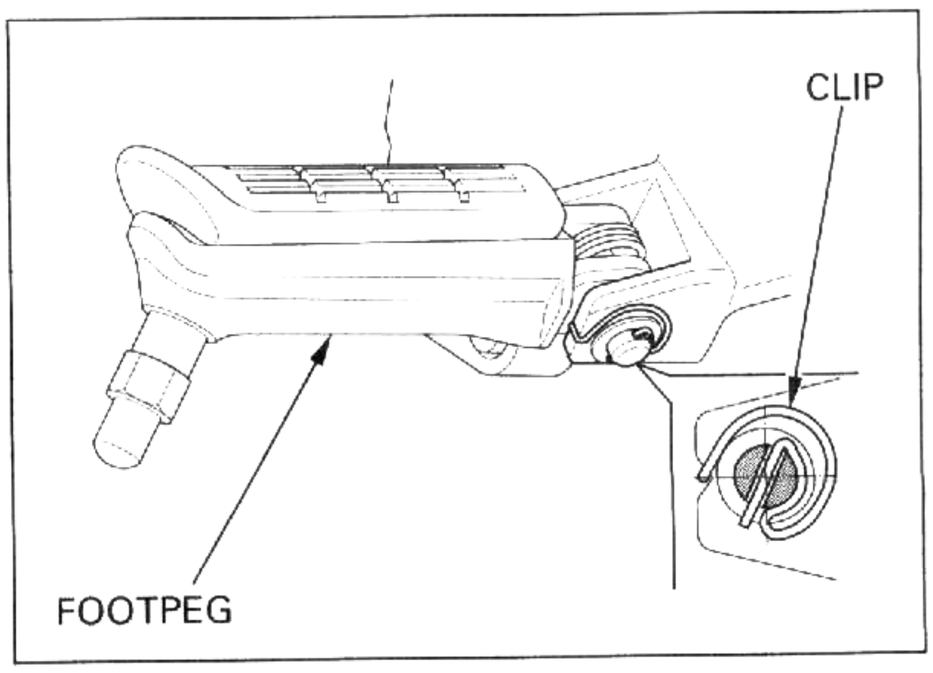


FOOTPEG

REMOVAL

Release the retaining clip end from the V-cut groove.

Pull out the clip from the footpeg joint pin hole. Remove the washer, joint pin and return spring, then remove the footpeg.

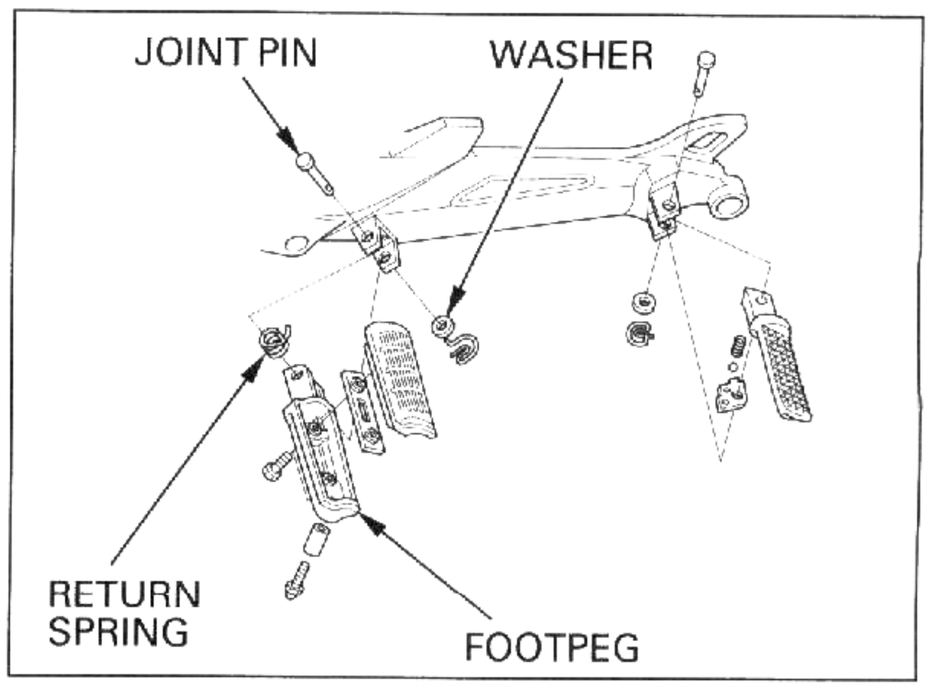


INSTALLATION

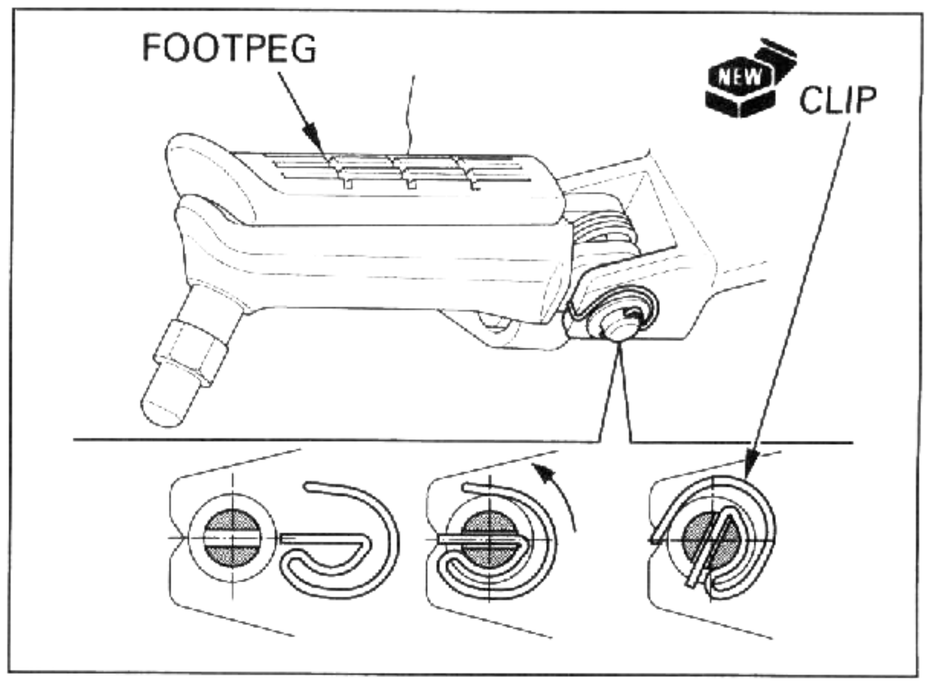
CAUTION:

Do not reuse the retaining clip.

Install the footpeg onto the holder, then install the return spring, joint pin and washer.



Push the new retaining clip into the joint pin hole. Turn the retaining clip with the joint pin, then hook the clip end into the V-cut groove of the footpeg holder.



MEMO

3. MAINTENANCE

SERVICE INFORMATION	3-1	DRIVE CHAIN	3-20
MAINTENANCE SCHEDULE	3-3	DRIVE CHAIN SLIDER	3-24
FUEL LINE	3-4	BRAKE FLUID	3-25
THROTTLE OPERATION	3-4	BRAKE PAD WEAR	3-25
CHOKE OPERATION	3-5	BRAKE SYSTEM	3-26
AIR CLEANER	3-5	BRAKE LIGHT SWITCH	3-27
SPARK PLUG	3-7	HEADLIGHT AIM	3-28
VALVE CLEARANCE	3-11	CLUTCH SYSTEM	3-28
ENGINE OIL/OIL FILTER	3-15	SIDE STAND	3-29
ENGINE IDLE SPEED	3-18	SUSPENSION	3-29
RADIATOR COOLANT	3-18	NUTS, BOLTS, FASTENERS	3-30
COOLING SYSTEM	3-19	WHEELS/TIRES	3-31
SECONDARY AIR SUPPLY SYSTEM	3-19	STEERING HEAD BEARINGS	3-31

SERVICE INFORMATION

GENERAL

⚠WARNING

- ***Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.***
- ***If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.***

- Place the motorcycle on a level ground before starting any work.

SPECIFICATIONS

Unit: mm (in)

ITEM		SPECIFICATIONS
Throttle grip free play		2 – 6 (1/16 – 1/4)
Spark plug		CR8EHVX – 9 (NGK)
Spark plug gap		0.80 – 0.90 (0.031 – 0.035)
Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)
	EX	0.22 ± 0.03 (0.009 ± 0.001)

ITEM			SPECIFICATIONS
Engine oil capacity	At draining		3.8 ℓ (4.0 US qt , 3.3 Imp qt)
	At oil filter change		3.9 ℓ (4.1 US qt , 3.4 Imp qt)
Recommended engine oil			HONDA 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W−40
Engine idle speed			1,100 ± 100 min^{-1} (rpm)
Drive chain slack			25−35 mm (1.0−1.4 in)
Recommended brake fluid			DOT 4
Tire size		Front	120/70 ZR17 (58W)/Radial
		Rear	180/55 ZR17 (73W)/Radial
Tire brand	Bridgestone	Front	BT57F RADIAL G
		Rear	BT57R RADIAL F
	Michelin	Front	MACADAM 90X G
		Rear	MACADAM 90X M
Tire air 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)
Minimum tire tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

TORQUE VALUES

Timing hole cap	18 N·m (1.8 kgf·m , 13 lbf·ft)	Apply grease to the threads
Spark plug	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Cylinder head cover bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Oil drain bolt	29 N·m (3.0 kgf·m , 22 lbf·ft)	
Oil filter cartridge	10 N·m (1.0 kgf·m , 7 lbf·ft)	Apply clean engine oil to the O-ring
Rear axle nut	118 N·m (12.0 kgf·m , 87 lbf·ft)	U-nut
Drive sprocket special bolt	54 N·m (5.5 kgf·m , 40 lbf·ft)	
Driven sprocket nut	108 N·m (11.0 kgf·m , 80 lbf·ft)	
Rear master cylinder push rod nut	18 N·m (1.8 kgf·m , 13 lbf·ft)	

TOOLS

Oil filter wrench	07HAA-PJ70100
Drive chain tool set	07HMH-MR10103

MAINTENANCE SCHEDULE

Perform the Pre-ride inspection in the Owner's Manual at each scheduled maintenance period.
I: Inspect and Clean, Adjust, Lubricate or Replace if necessary. C: Clean. R: Replace. A: Adjust. L: Lubricate.
The following items require some mechanical knowledge. Certain items (particularly those marked * and **) may require more technical information and tools. Consult their authorized HONDA dealer.

	ITEMS \ FREQUENCY	WHICHEVER COMES FIRST ⇩	⇨ ODOMETER READING (NOTE 1)							REFER TO PAGE
			X1,000 km	1	6	12	18	24	30	36	
			X1,000 mi	0.6	4	8	12	16	20	24	
			Months		6	12	18	24	30	36	
*	FUEL LINE					I		I		I	3-4
*	THROTTLE OPERATION					I		I		I	3-4
*	CHOKE OPERATION					I		I		I	3-5
*	AIR CLEANER	NOTE 2					R			R	3-5
	SPARK PLUG			EVERY 12,000 km (7,200 mi) I EVERY 24,000 km (14,400 mi) R							3-7
*	VALVE CLEARANCE							I			3-11
	ENGINE OIL			R		R		R		R	3-15
	ENGINE OIL FILTER			R		R		R		R	3-15
*	ENGINE IDLE SPEED			I	I	I	I	I	I	I	3-18
	RADIATOR COOLANT	NOTE 3				I		I		R	3-18
*	COOLING SYSTEM					I		I		I	3-19
*	SECONDARY AIR SUPPLY SYSTEM					I		I		I	3-19
	DRIVE CHAIN			EVERY 1,000 km (600 mi) I, L							3-20
	DRIVE CHAIN SLIDER					I		I		I	3-24
	BRAKE FLUID	NOTE 3			I	I	R	I	I	R	3-25
	BRAKE PAD WEAR				I	I	I	I	I	I	3-25
	BRAKE SYSTEM			I		I		I		I	3-26
*	BRAKE LIGHT SWITCH					I		I		I	3-27
*	HEADLIGHT AIM					I		I		I	3-28
	CLUTCH SYSTEM					I		I		I	3-28
	SIDE STAND			I	I	I	I	I	I	I	3-29
*	SUSPENSION					I		I		I	3-29
*	NUT, BOLTS FASTENERS			I		I		I		I	3-30
* *	WHEELS/TIRES					I		I		I	3-31
* *	STEERING HEAD BEARINGS			I		I		I		I	3-31

* Should be serviced by an authorized HONDA dealer, unless the owner has proper tools and service data and is mechanically qualified.
* * In the interest of safety, we recommend these items be serviced only by an authorized HONDA dealer.

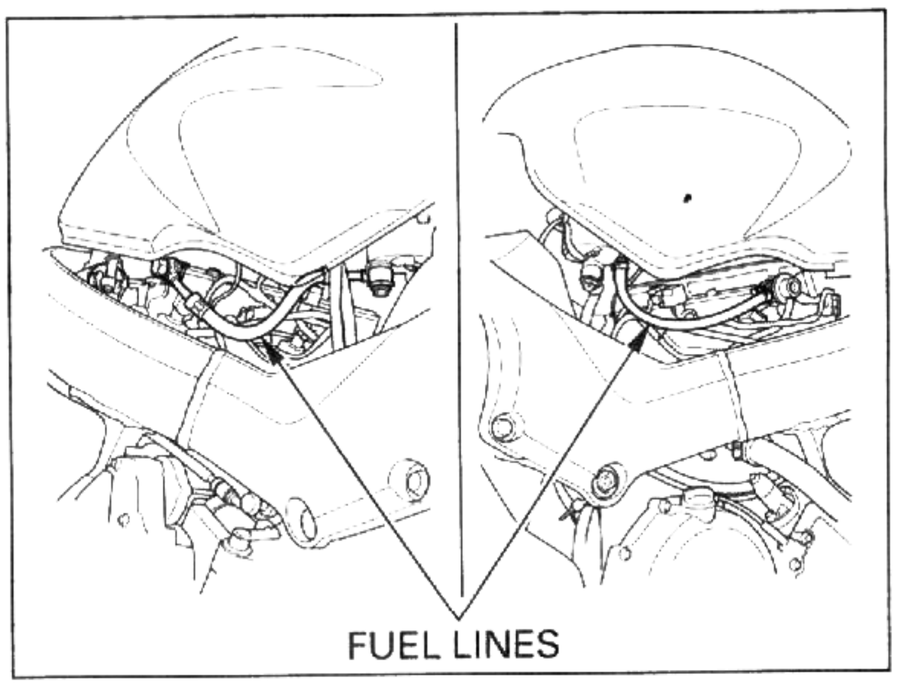
NOTES:
1. At higher odometer reading, repeat at the frequency interval established here.
2. Service more frequently if the motorcycle is ridden in unusually wet or dusty areas.
3. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.

FUEL LINE

Support the rear end of the fuel tank (page 2-11).

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

Install the fuel tank in the reverse order of removal.

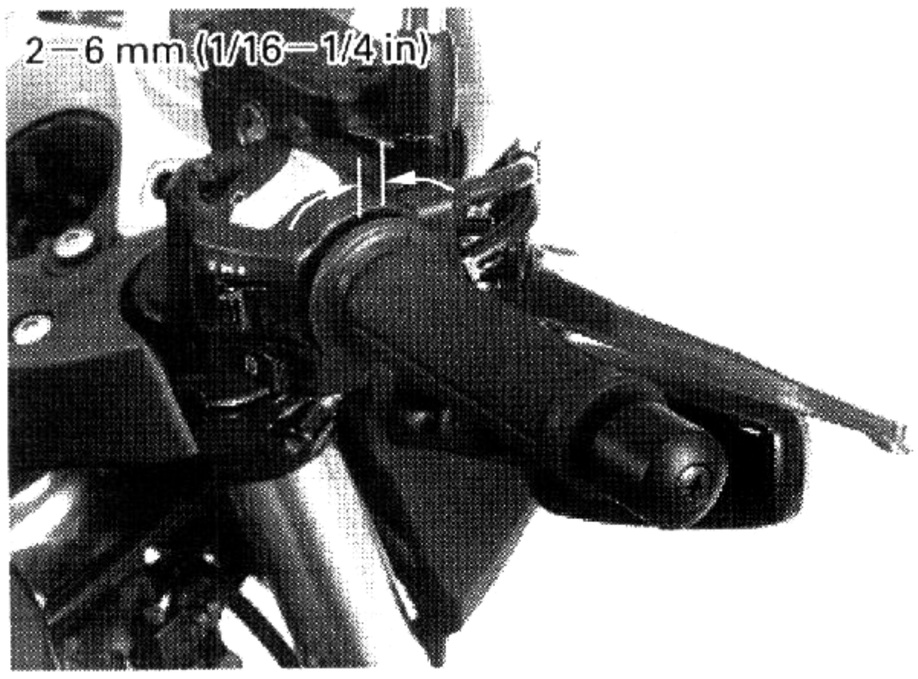


THROTTLE OPERATION

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

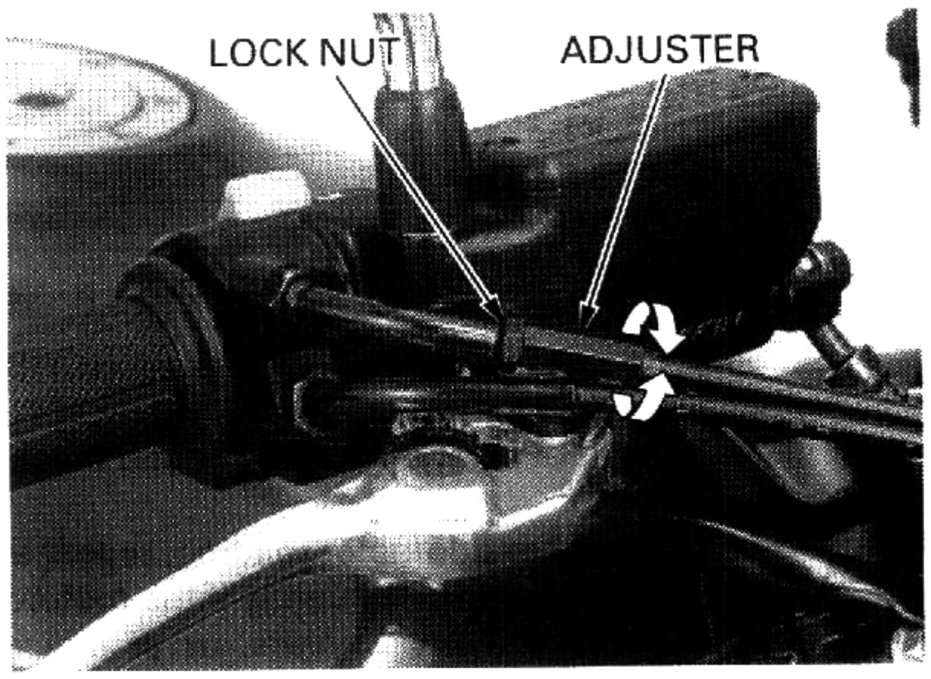
Measure the free play at the throttle grip flange.

FREE PLAY: 2—6 mm (1/16—1/4 in)



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

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



Major adjustments are made with the lower adjuster.

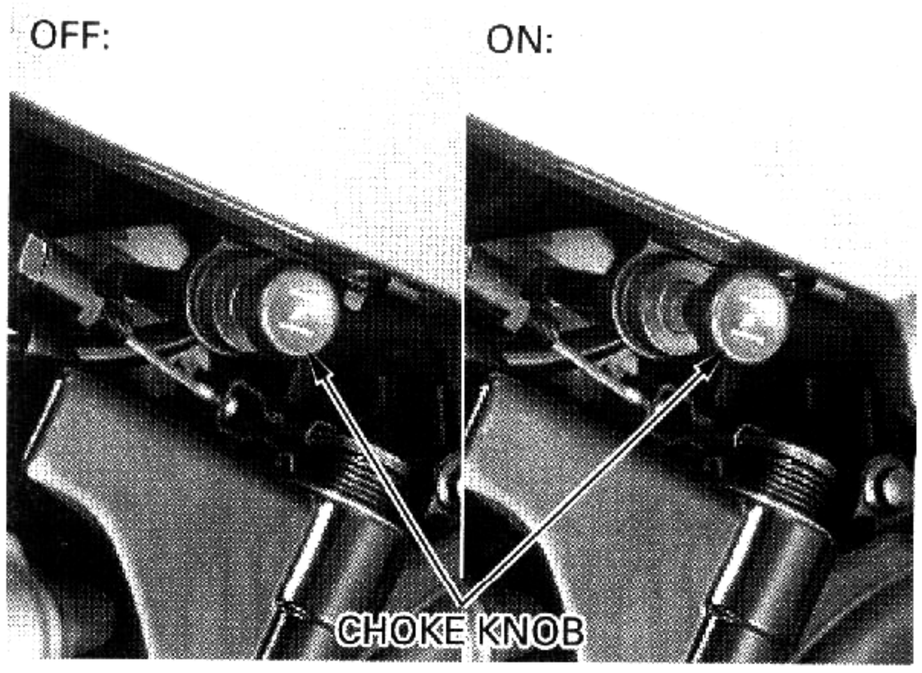
Remove the air cleaner housing (page 5-60).

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



CHOKE OPERATION

This motorcycle is equipped with a bypass air volume control choke system, controlled by the starter valve.
The starter valve opens a bypass air circuit when the choke knob under the left side of the main frame is pulled ON.



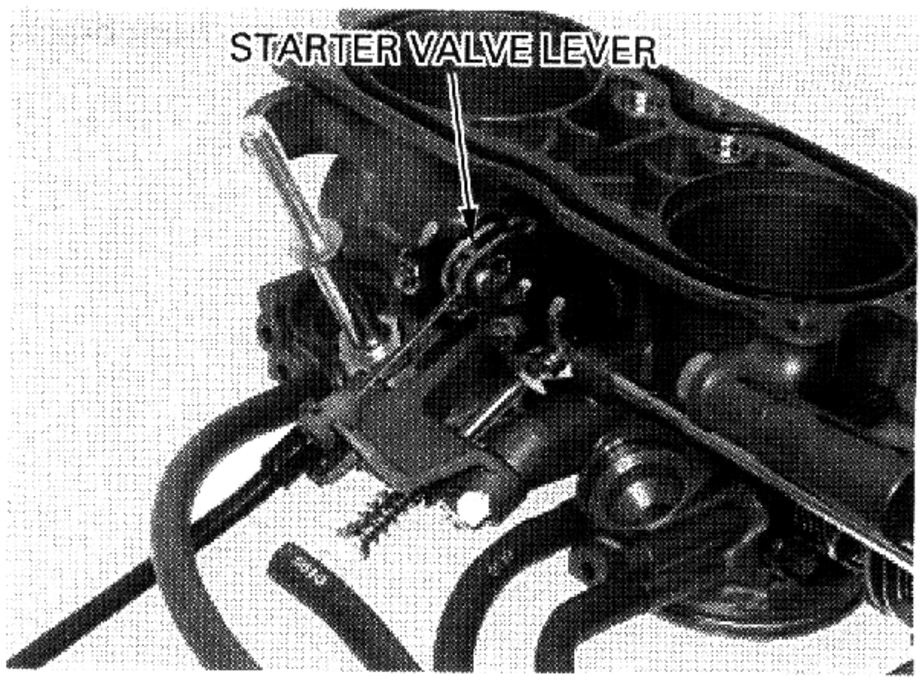
Choke lever operation

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

Starter valve lever operation

Open and support the rear end of the fuel tank (page 2-11).

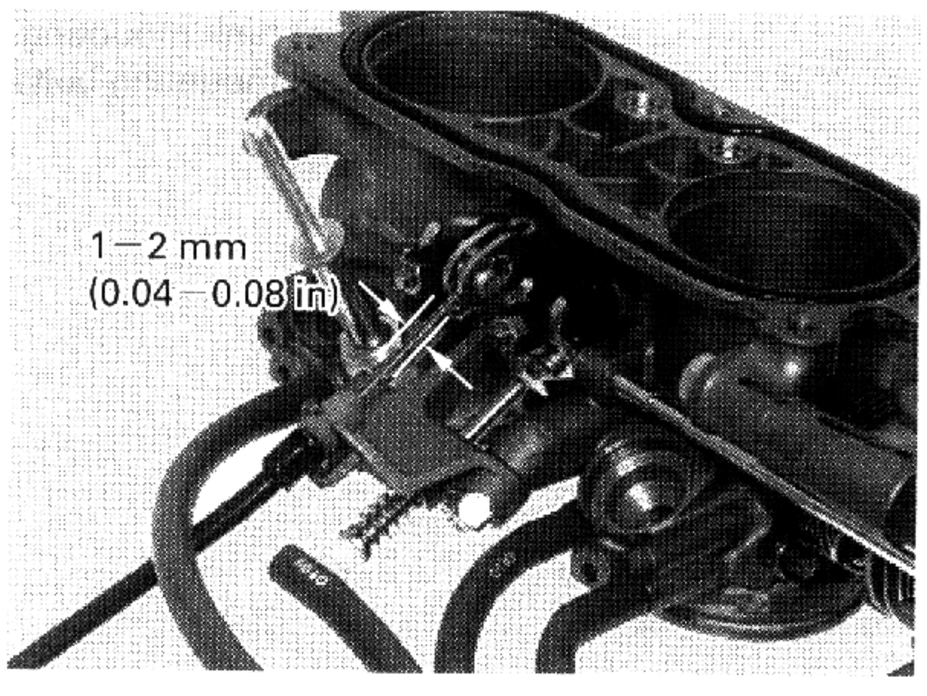
Check for smooth operation of the starter valve lever.
There should be no free play.



Set the starter valve lever to fully closed so that the lever contacts the throttle stop screw.

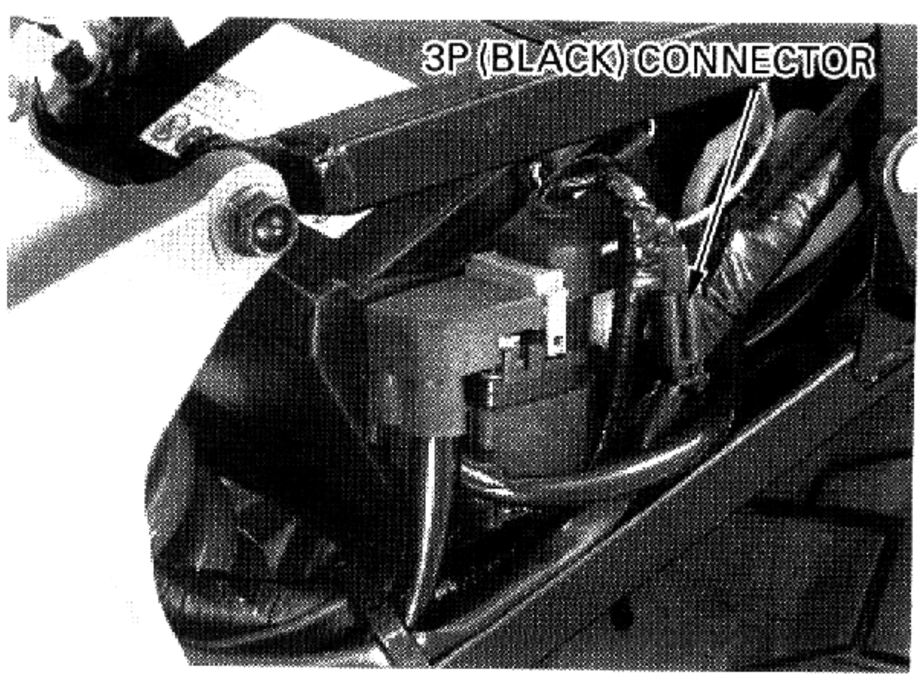
Check that there is a maximum of 1 — 2 mm (0.04 — 0.08 in) of free play in the inner choke cable with the choke knob set to fully OFF.
Replace the choke cable if the free play is out of specification.

Install the removed parts in the reverse order of removal.

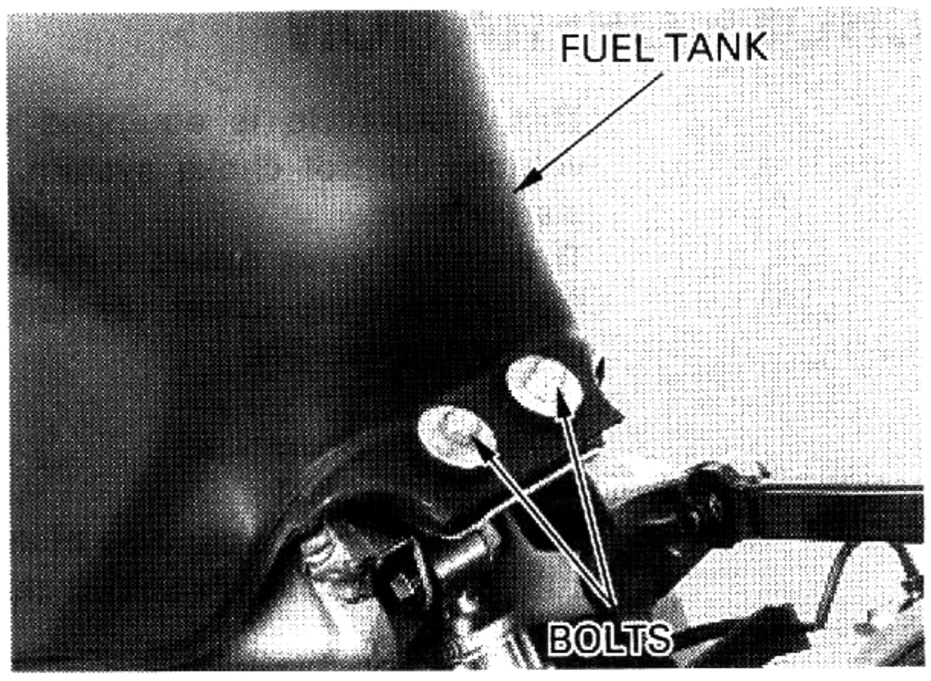


AIR CLEANER

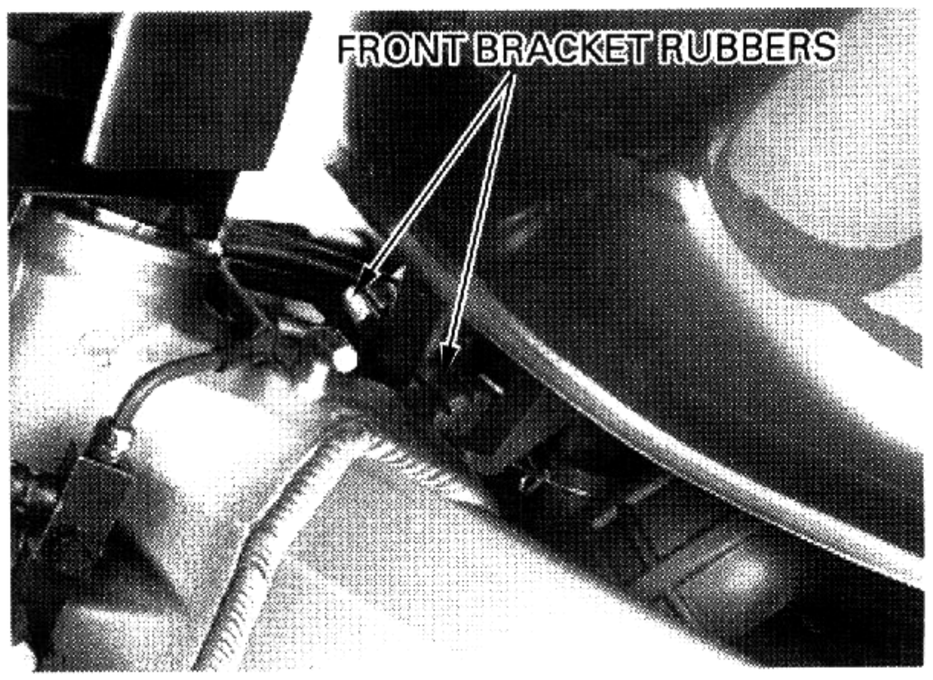
Disconnect the fuel pump/reserve sensor 3P (Black) connector.



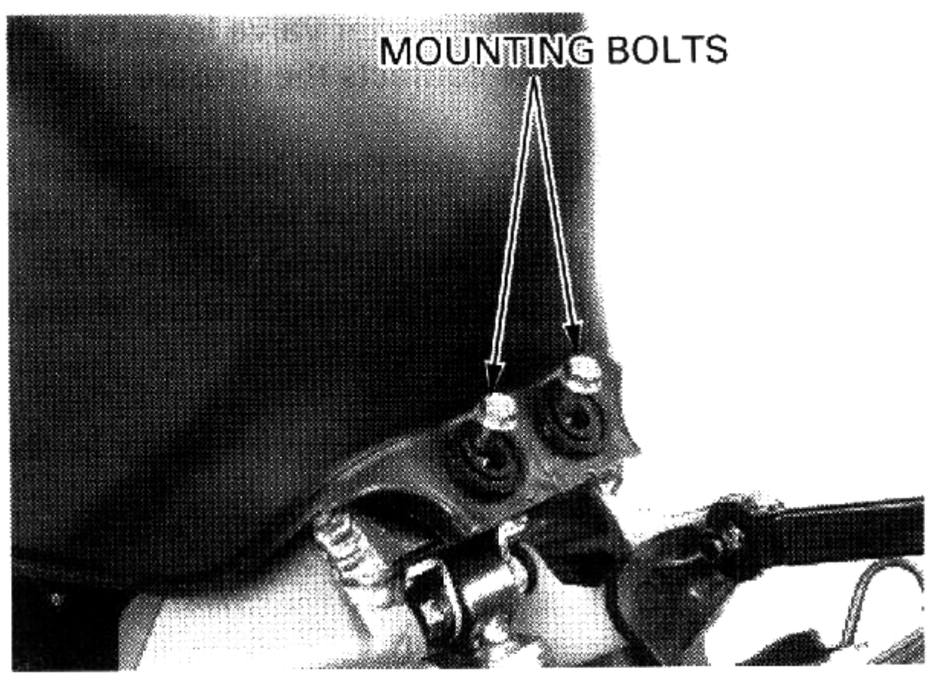
Remove the fuel tank rear mounting bolts.



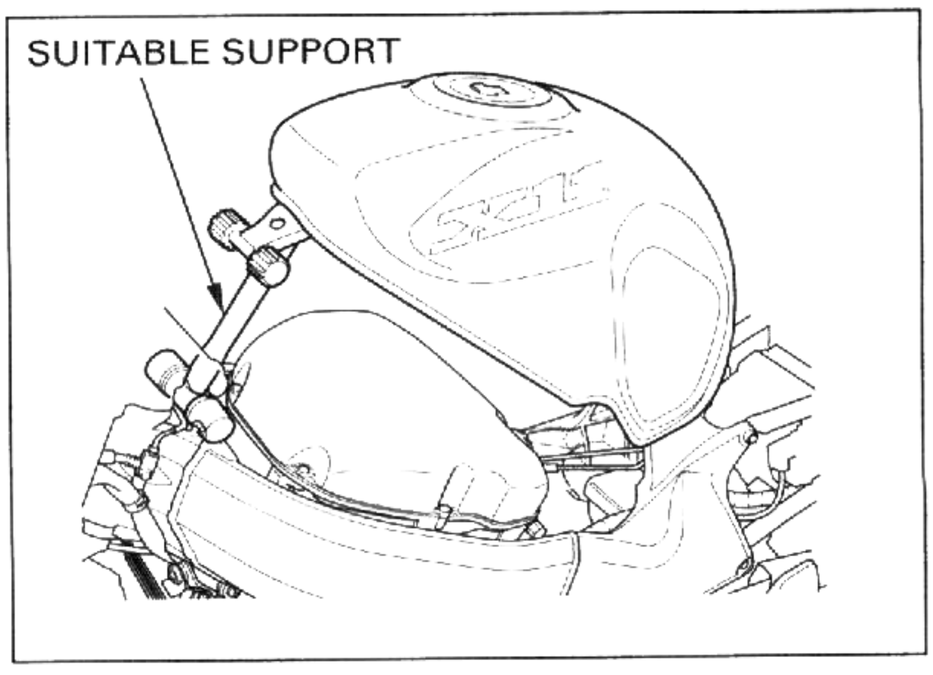
Pull out the fuel tank front bracket rubbers from the frame.



Remove the fuel tank mounting collar, temporarily install a fuel tank mounting bolts.

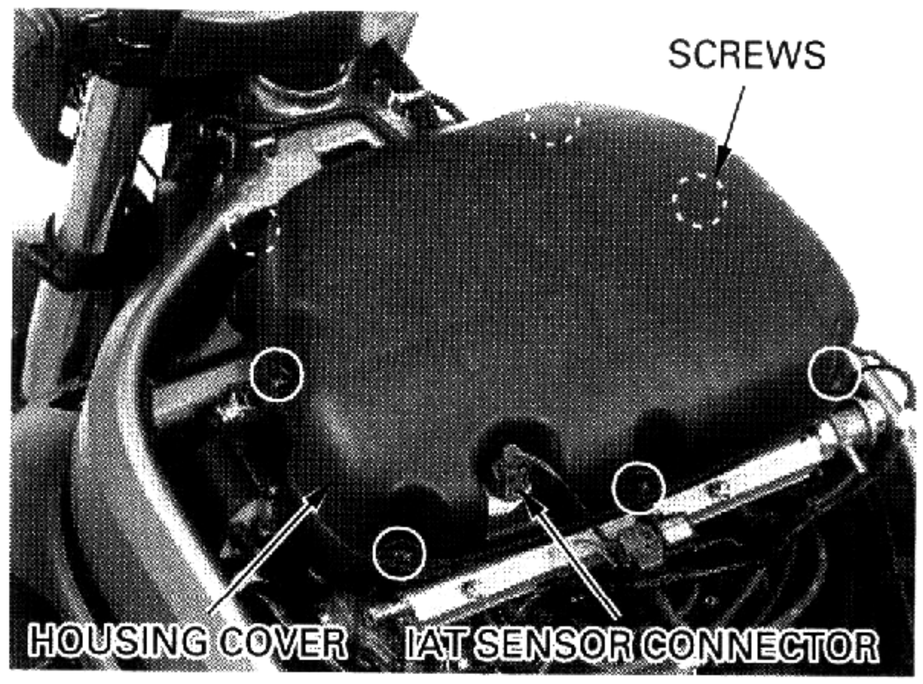


Support the front end of the fuel tank using a suitable support as shown.



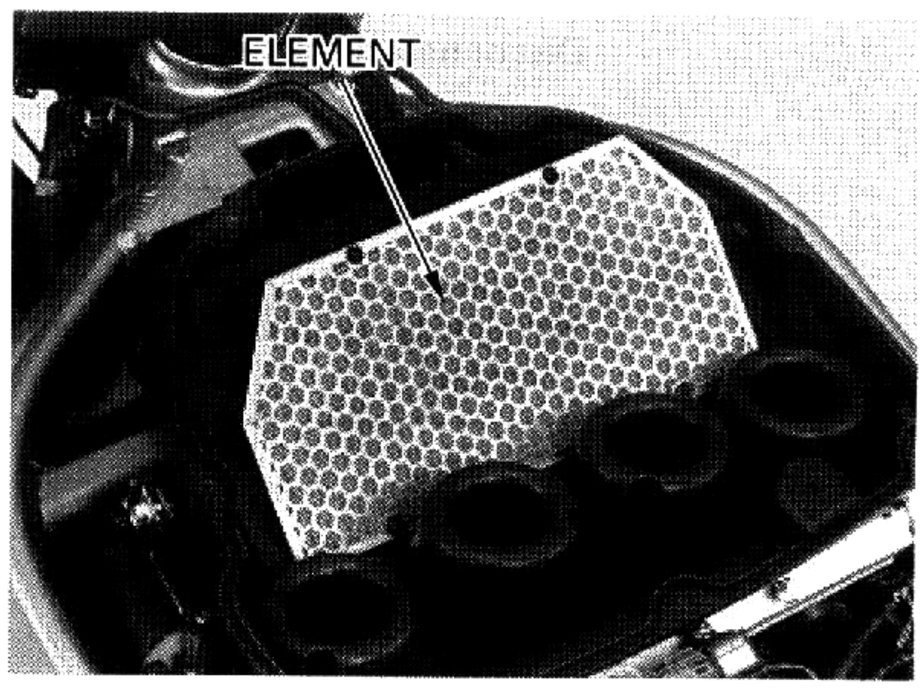
Disconnect the IAT (Intake Air Temperature) sensor connector.

Remove the screws and air cleaner housing cover.



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

Install the removed parts in the reverse order of removal.



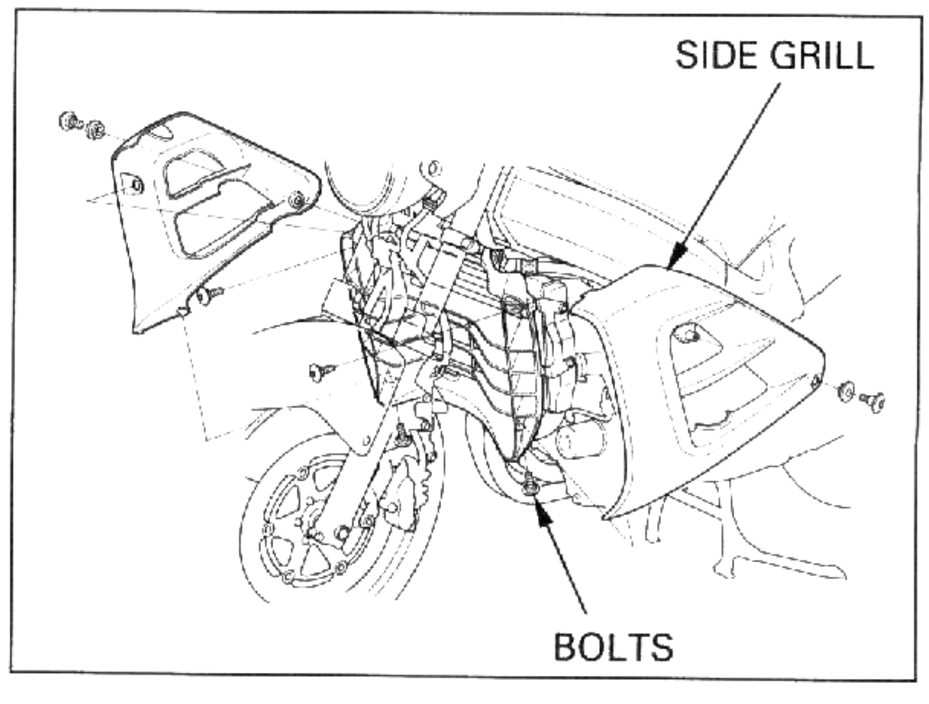
SPARK PLUG

REMOVAL

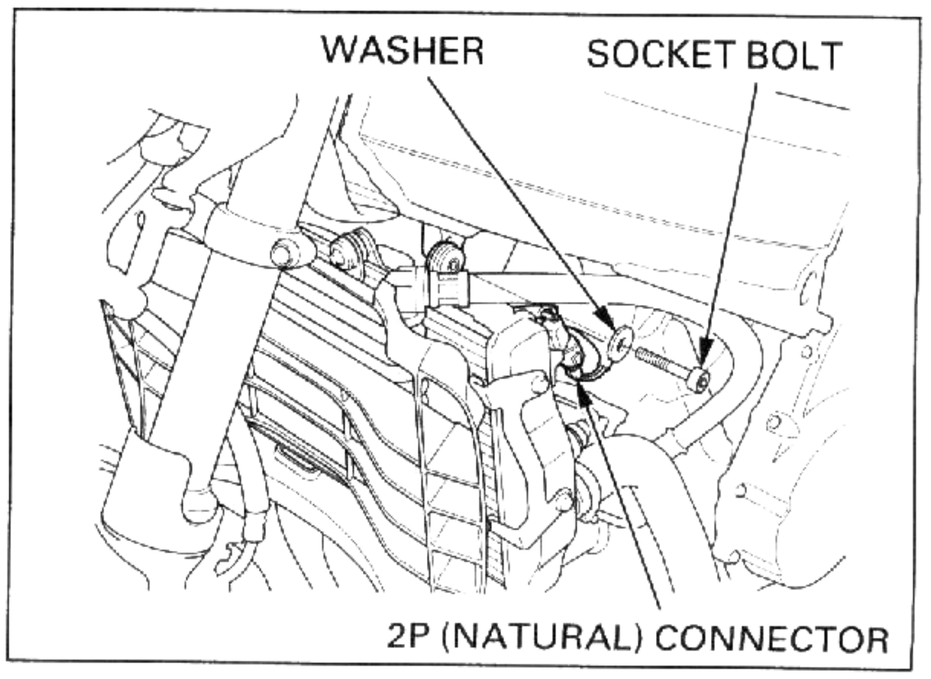
CAUTION:

Be careful not to damage the oil cooler and radiator fins.

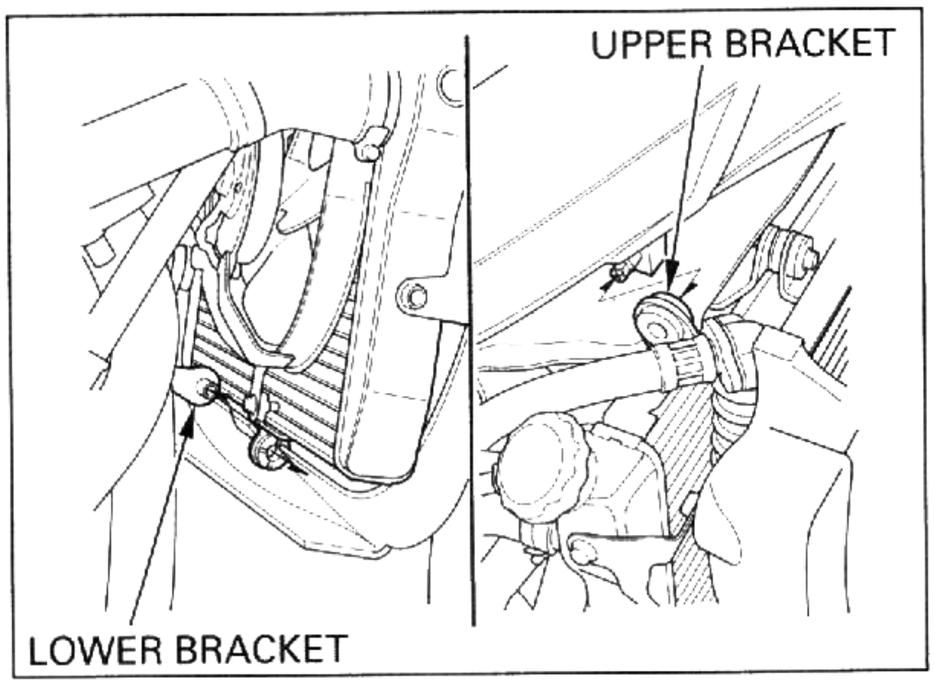
Remove the radiator grill/side grill mounting bolts and then remove both side grill.



Disconnect the fan motor sub-harness 2P (Natural) connector.
Remove the radiator mounting socket bolt and washer.



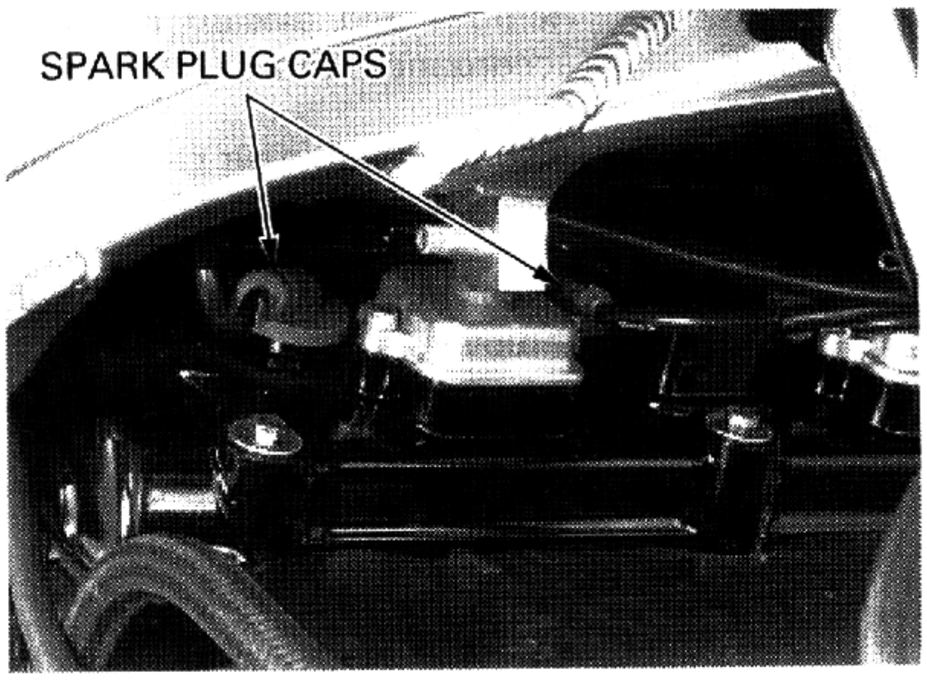
Remove the radiator from the upper and lower brackets by moving it to the right, then move the radiator/oil cooler forward as an assembly.



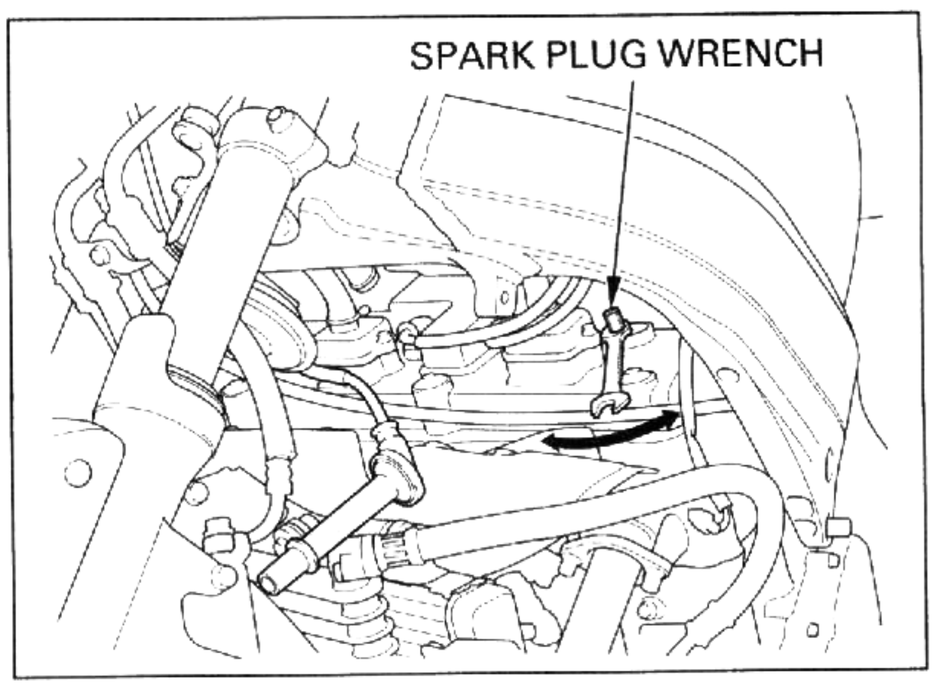
Disconnect the spark plug caps.

NOTE:

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



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



Inspect or replace as described in the maintenance schedule.

INSPECTION

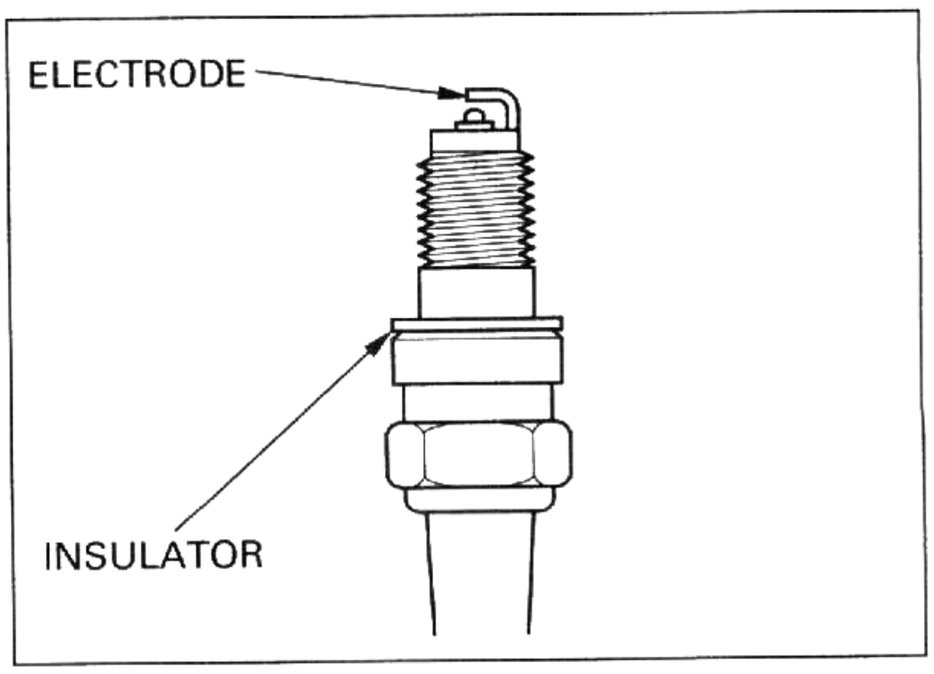
Check the following and replace if necessary (recommended spark plug: page 3-1)

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

If the electrodes is contaminated with accumulated objects or dirt, clean the electrode using the spark plug cleaner.

CAUTION:

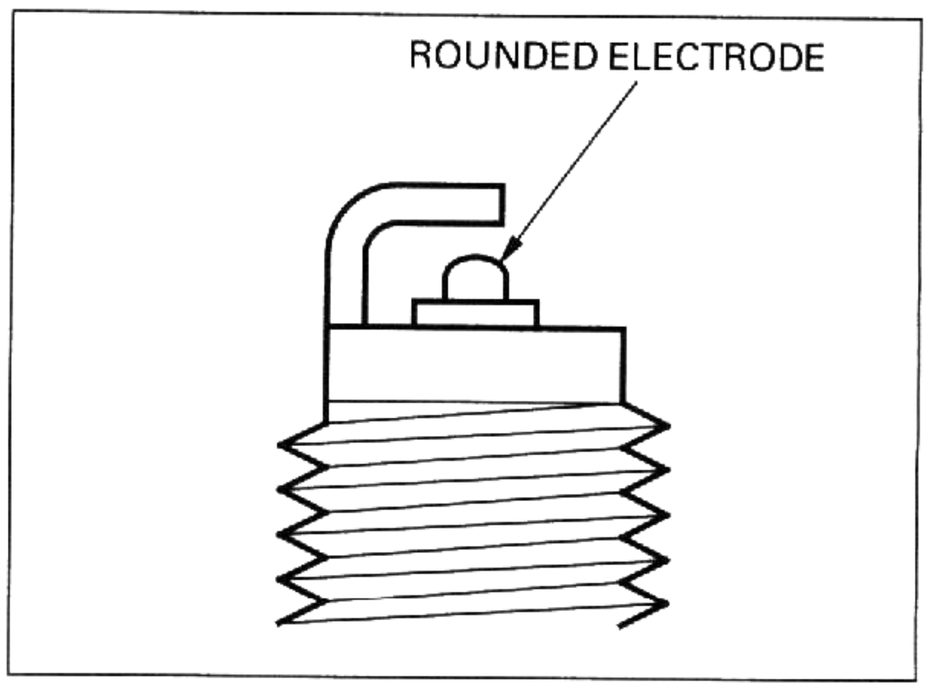
- ***This motorcycle's spark plug equipped with platinum type electrodes. Do not use wire brush to clean the electrodes.***
- ***The plug cleaner should be used with the air pressure of less than 6 kgf/cm² (85 psi) and for less than 20 seconds.***



Always use specified spark plugs on this motorcycle.

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

SPECIFIED SPARK PLUG: CR8EHVX−9 (NGK)

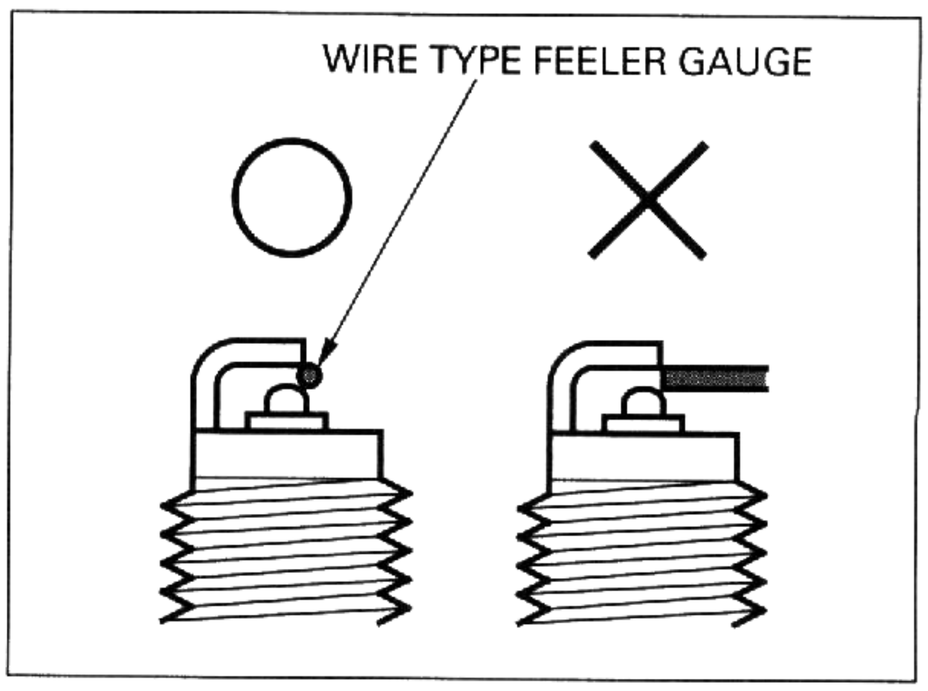


Check the gap between the center and side electrodes with a wire type feeler gauge.

CAUTION:

To prevent damaging the platinum coating of the center electrodes, use a wire type feeler gauge to check the spark plug gap.

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



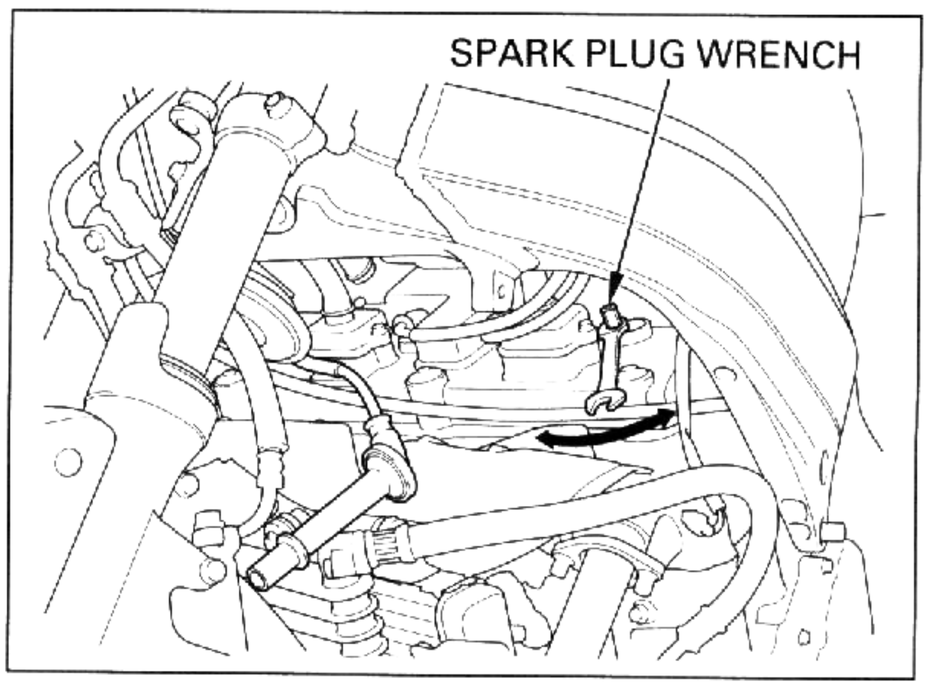
CAUTION:

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

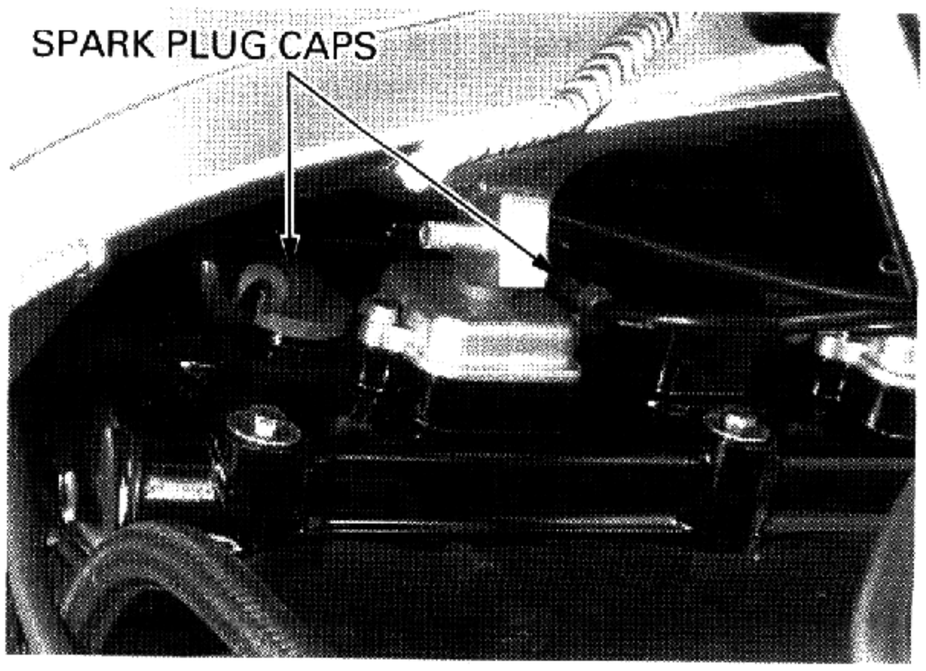
Reinstall the spark plug in the cylinder head and hand tighten, then torque to specification.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

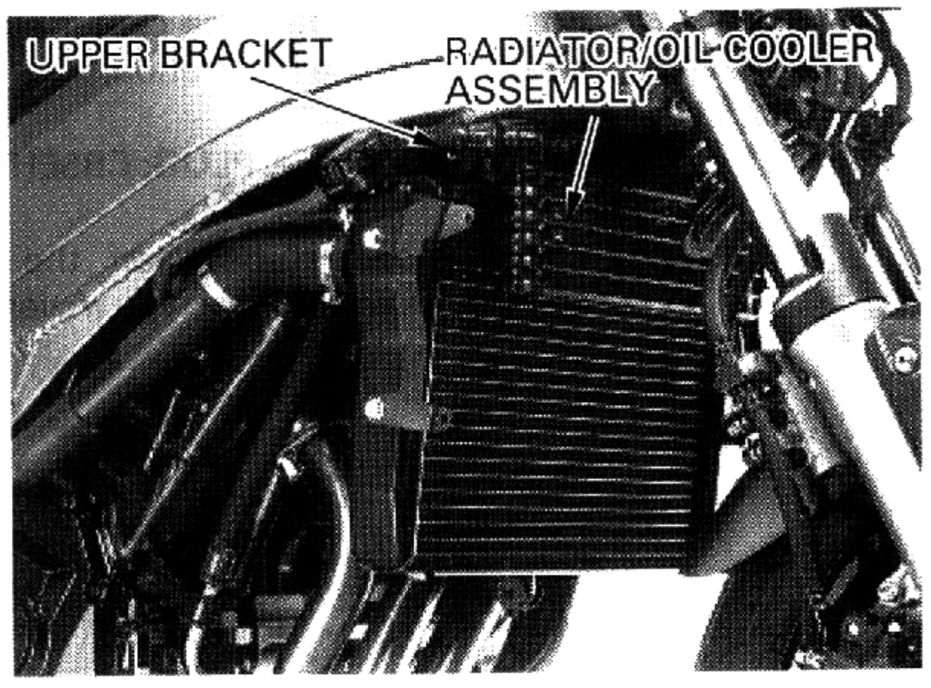
If using the new plug, install as follows:
Install and hand tighten the new spark plug, then tighten it about 1/2 turn after the sealing washer contacts the seat of the plug hole.



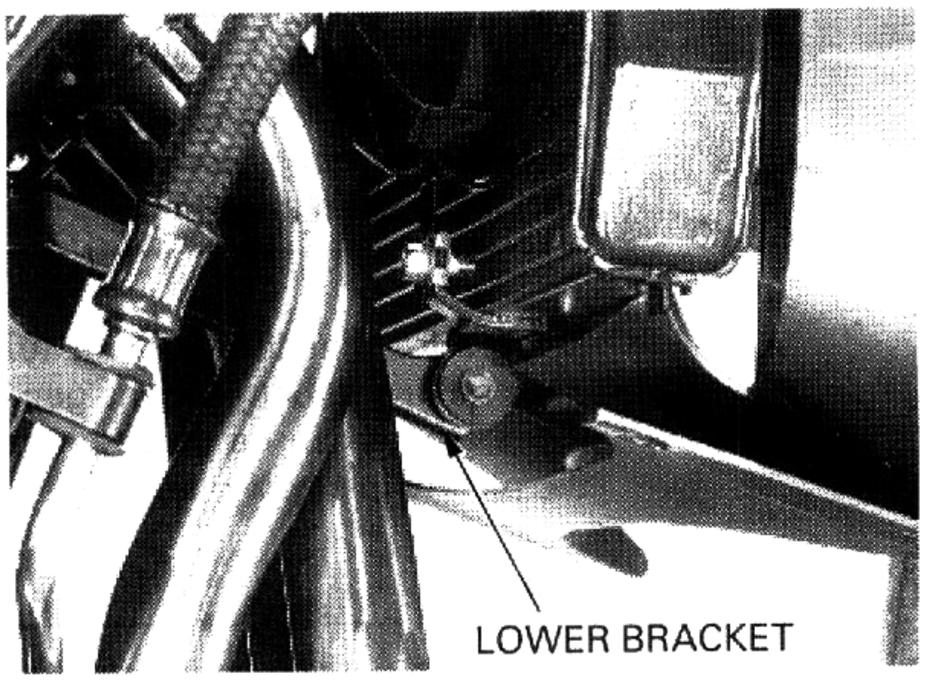
Install the spark plug caps.



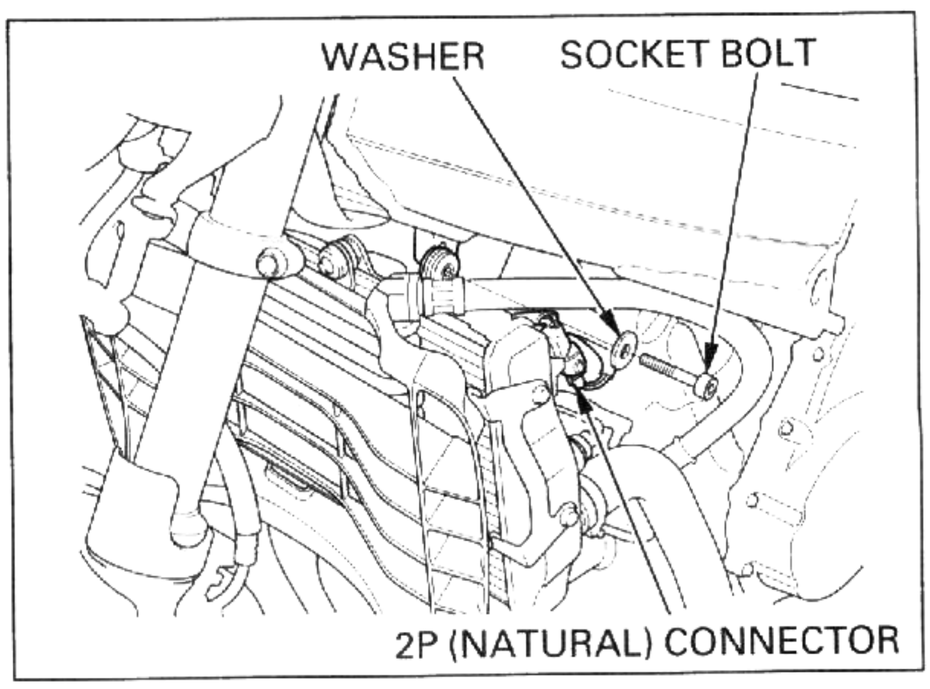
Install the radiator/oil cooler assembly onto the upper bracket.



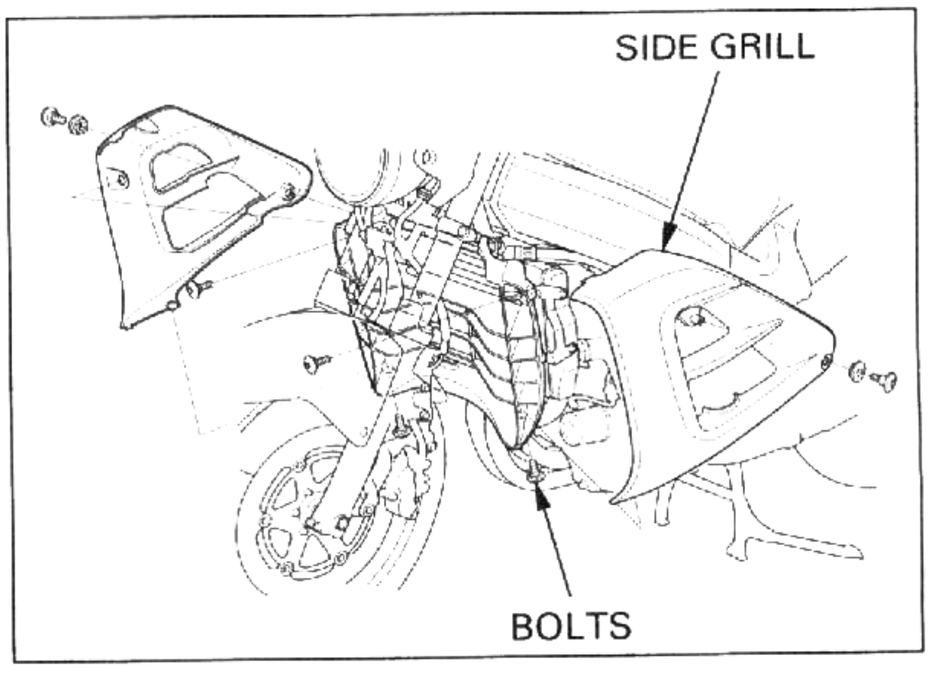
Install the radiator lower bracket boss to the radiator lower bracket.



Install the washer and radiator upper mounting socket bolt, then tighten the socket bolt.
Connect the fan motor sub-harness 2P (Natural) connector.



Install the both side grill, then tighten the radiator grill/side grill mounting bolts securely.



VALVE CLEARANCE

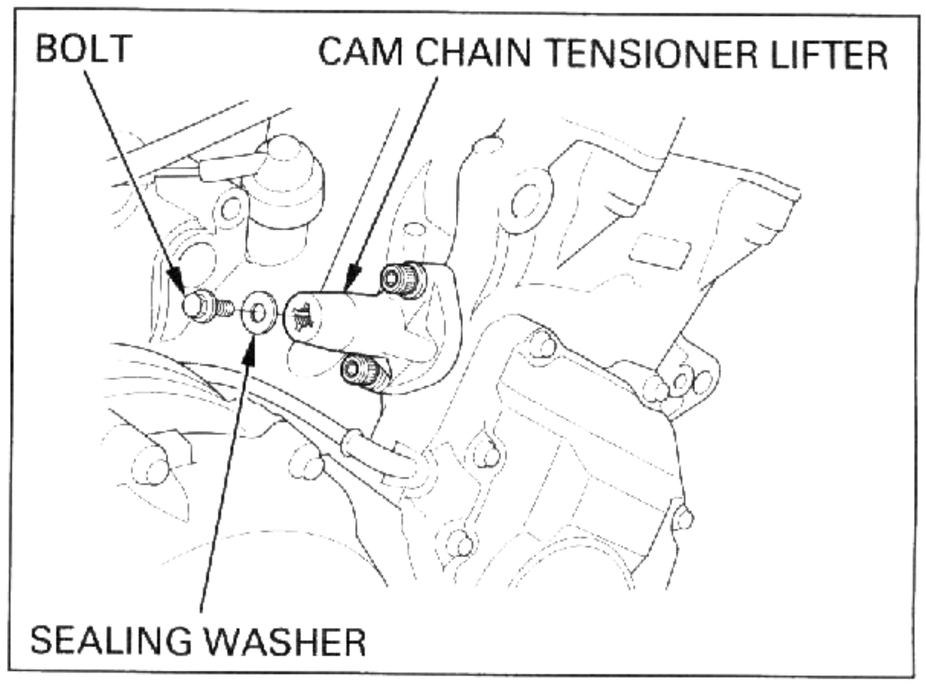
INSPECTION

NOTE:

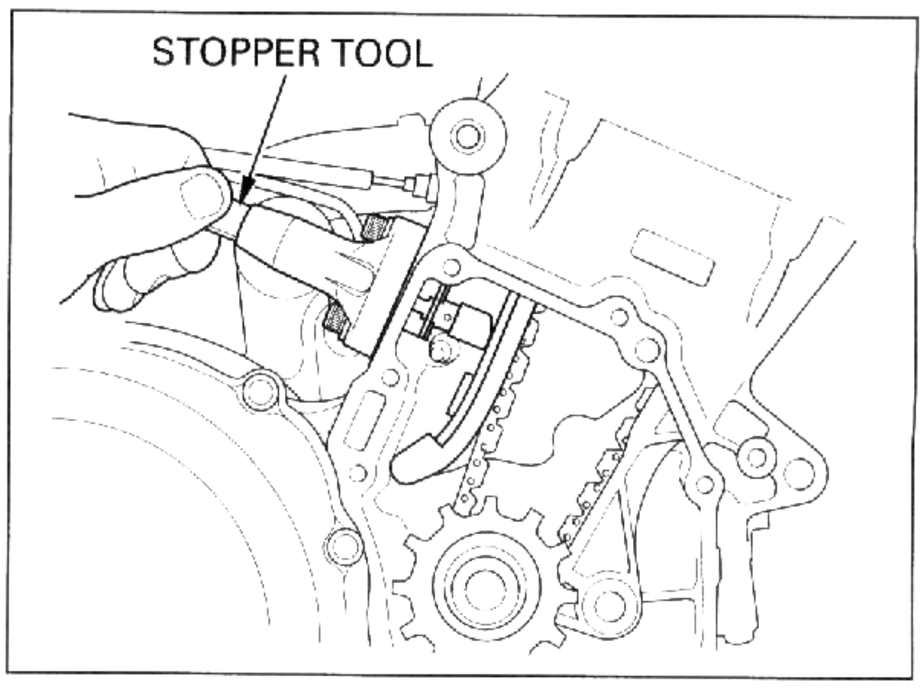
Inspect and adjust the valve clearance while the engine is cold (below 35 °C/95 °F).

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

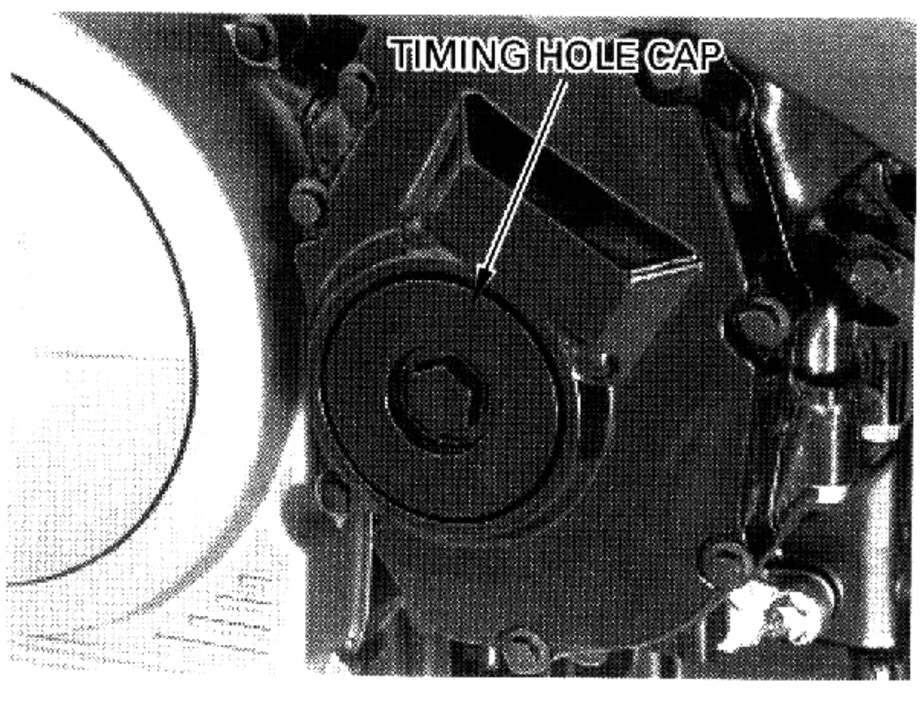
Remove the cam chain tensioner lifter sealing bolt and sealing washer.



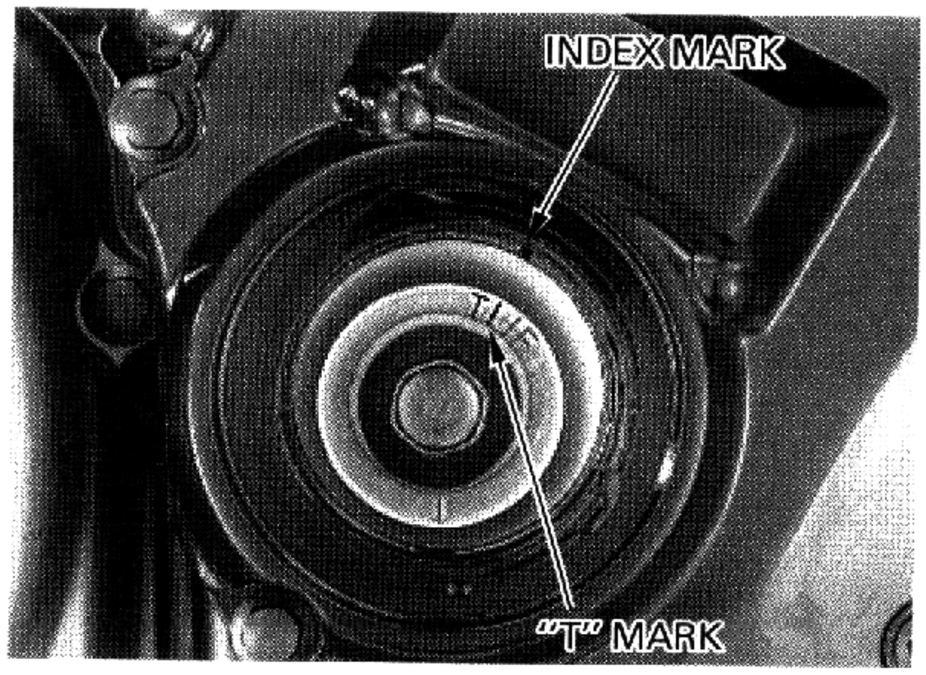
Turn the cam chain tensioner lifter shaft fully and secure it using the mechanic's tensioner stopper tool (page 8-6).



Remove the timing hole cap and O-ring.

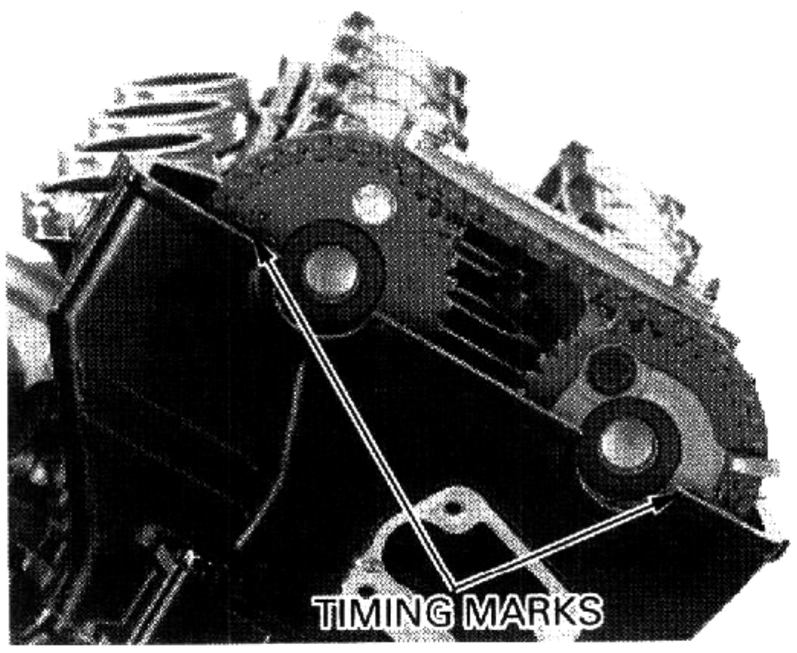


Turn the crankshaft clockwise, align the "T" mark on the ignition pulse generator rotor with the index mark on the ignition pulse generator rotor cover.



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

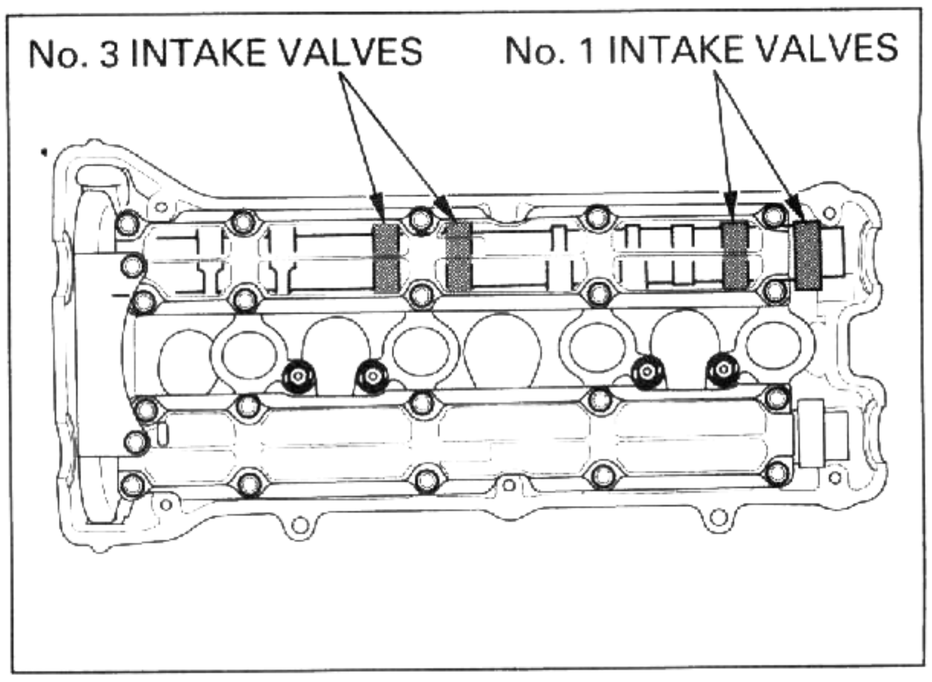
If the timing marks on the cam sprocket facing inward, turn the crankshaft clockwise one full turn (360°) and realign the timing marks with the cylinder head surface so they are facing outward.



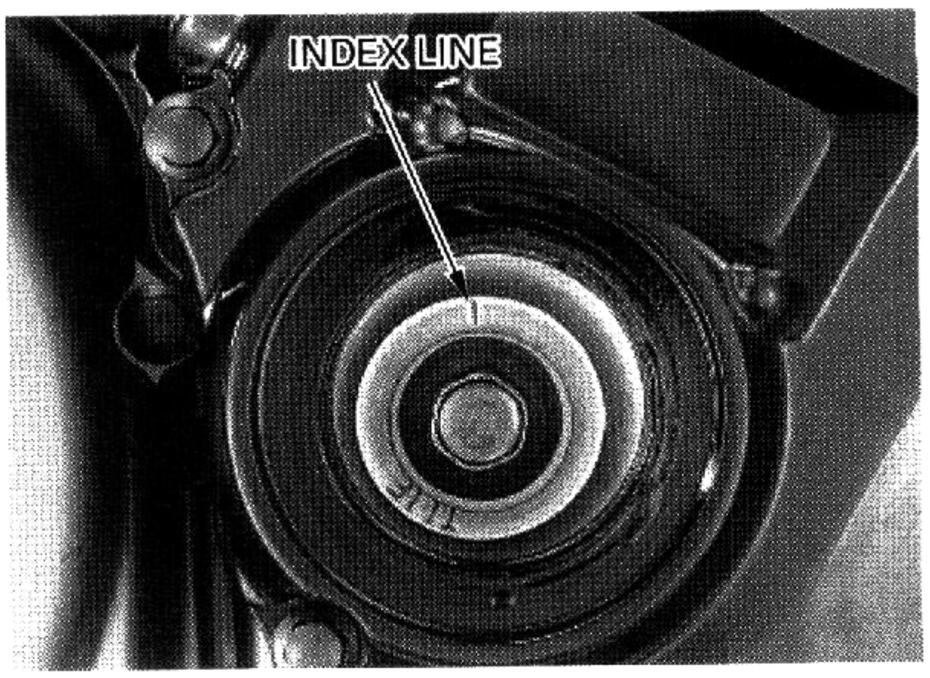
Record the clearance for each valve for reference in shim selection if adjustment is required.

Insert the feeler gauge between the valve lifter and the cam lobe.
Check the valve clearance for the No. 1 and No. 3 cylinder intake valves using a feeler gauge.

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



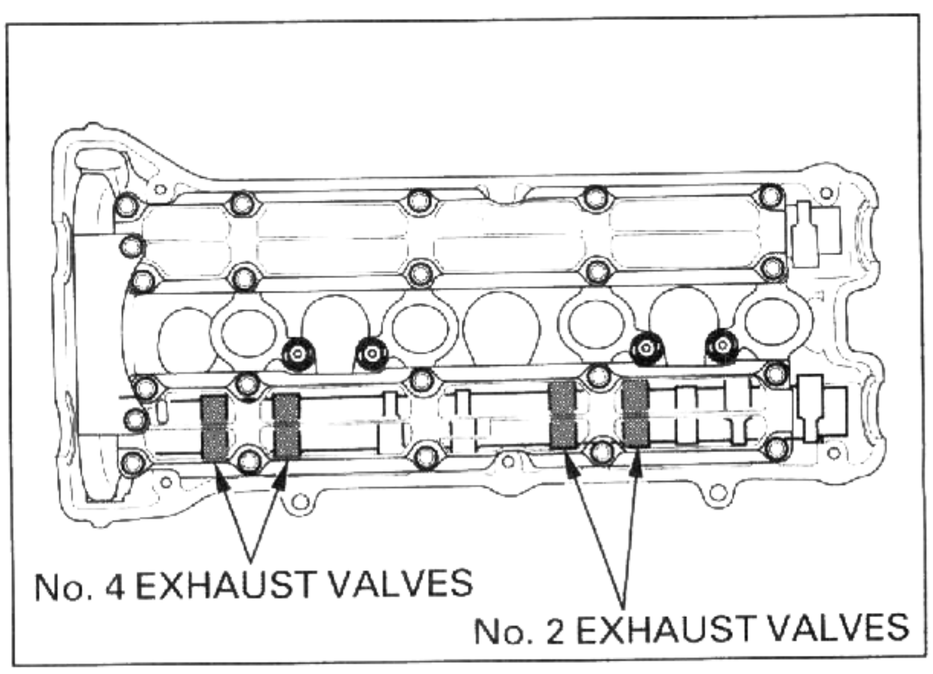
Turn the crankshaft clockwise 1/2 turn (180°), align the index line on the ignition pulse generator rotor so that it is facing up as shown.



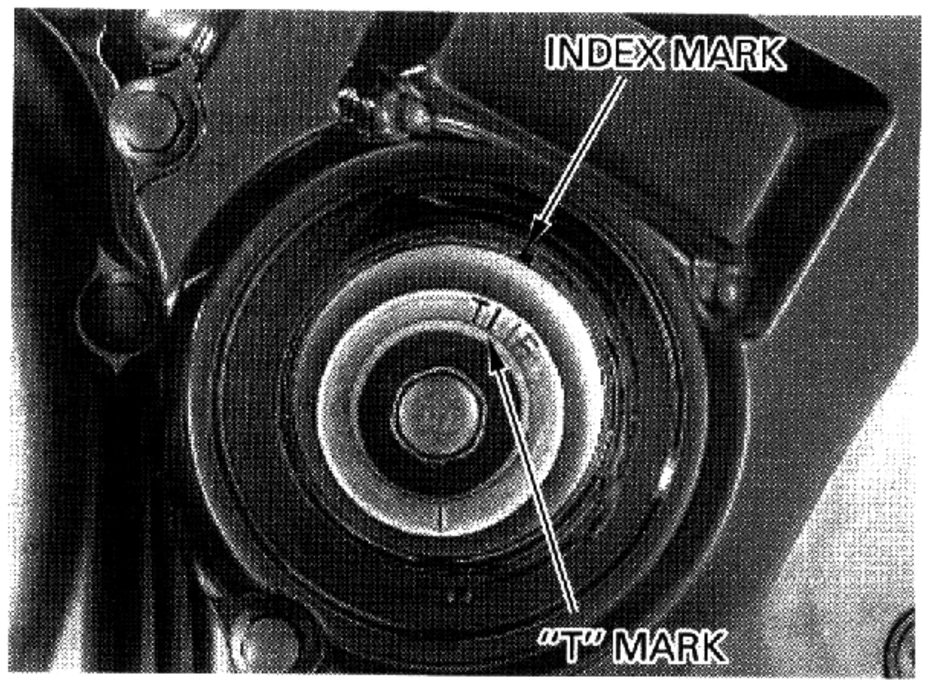
Record the clearance for each valve for reference in shim selection if adjustment is required.

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

VALVE CLEARANCE:
EX: 0.22 ± 0.03 mm (0.009 ± 0.001 in)



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

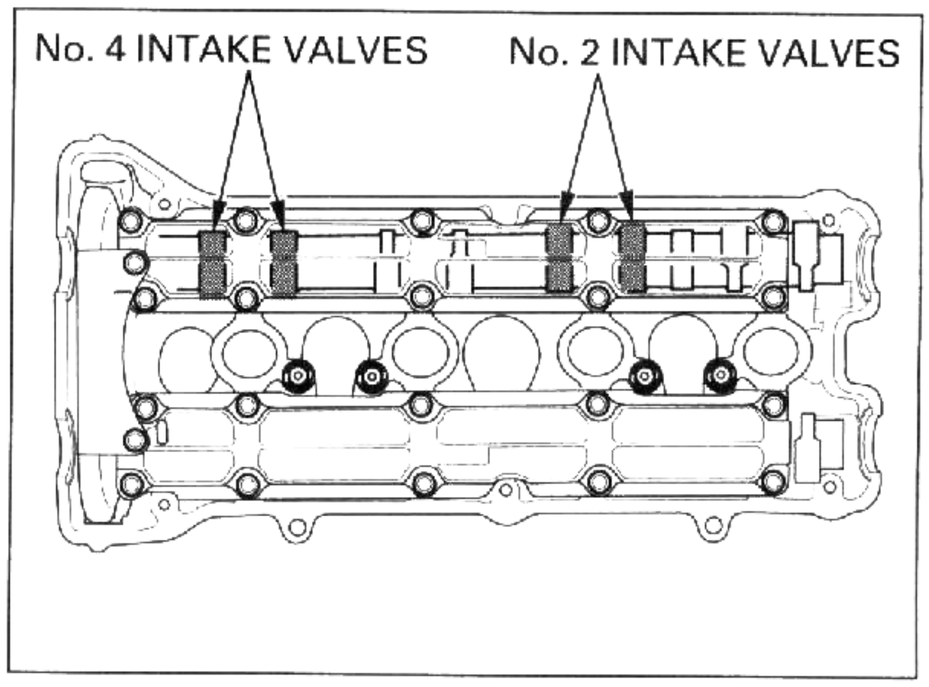


Record the clearance for each valve for reference in shim selection if adjustment is required.

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

VALVE CLEARANCE:

IN: 0.16 ± 0.03 mm (0.006 ± 0.001 in)



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



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

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

VALVE CLEARANCE:

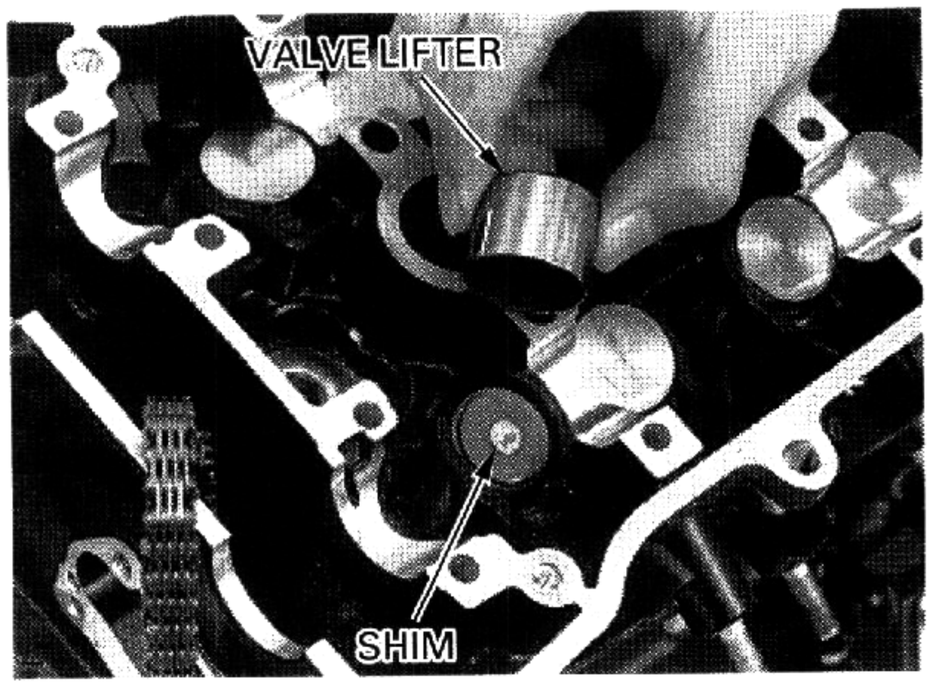
EX: 0.22 ± 0.03 mm (0.009 ± 0.001 in)

ADJUSTMENT

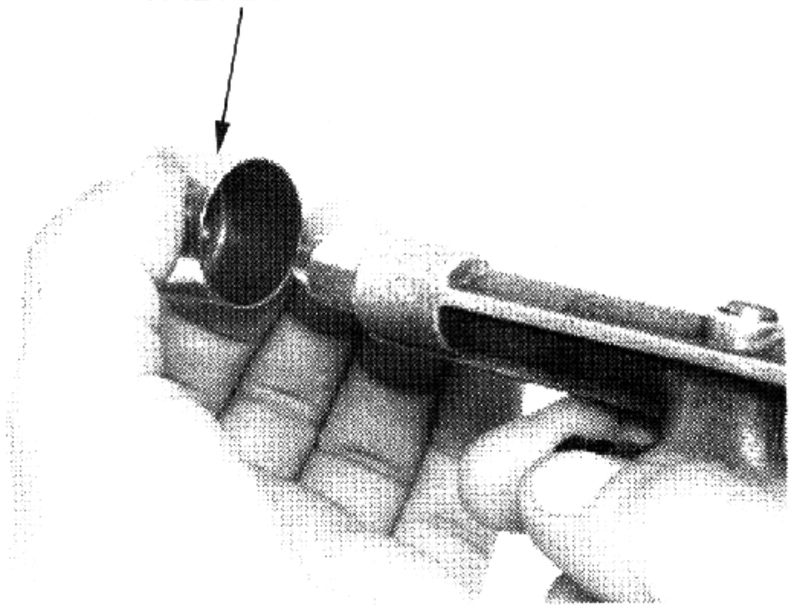
Remove the camshaft (page 8-7).
Remove the valve lifters and shims.

NOTE:

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



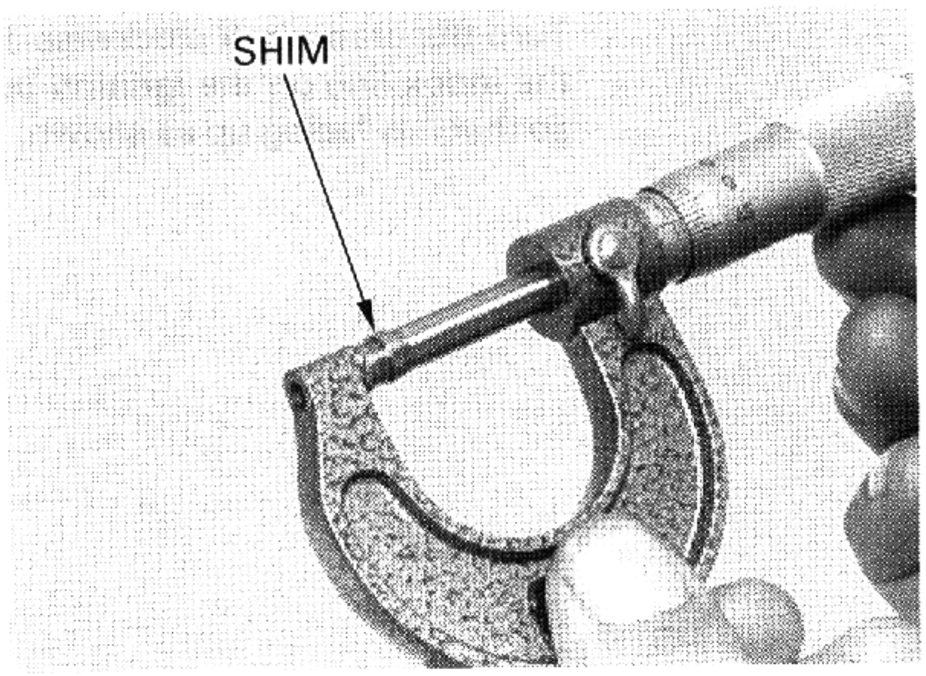
Clean the valve shim contact area in the valve lifter with compressed air.



Measure the shim thickness and record it.

NOTE:

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

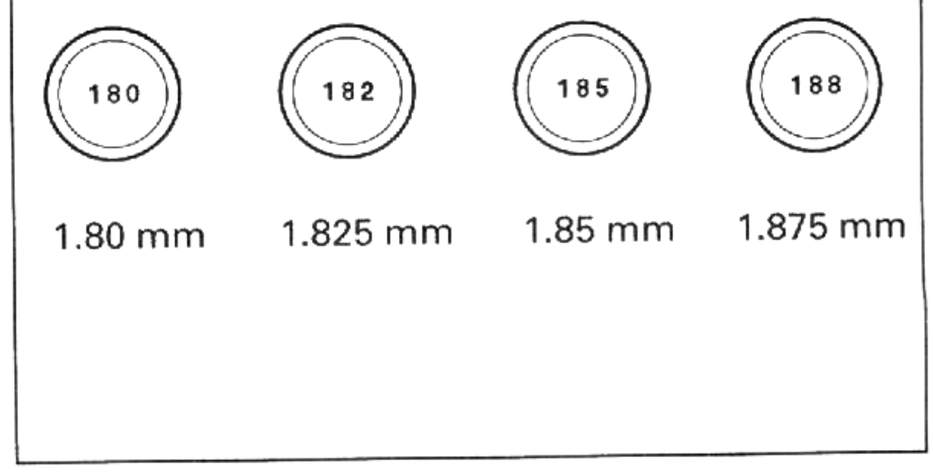


Calculate the new shim thickness using the equation below.
A = (B − C) + D

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

NOTE:

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



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

NOTE:

Install the shims and valve lifters in their original locations.

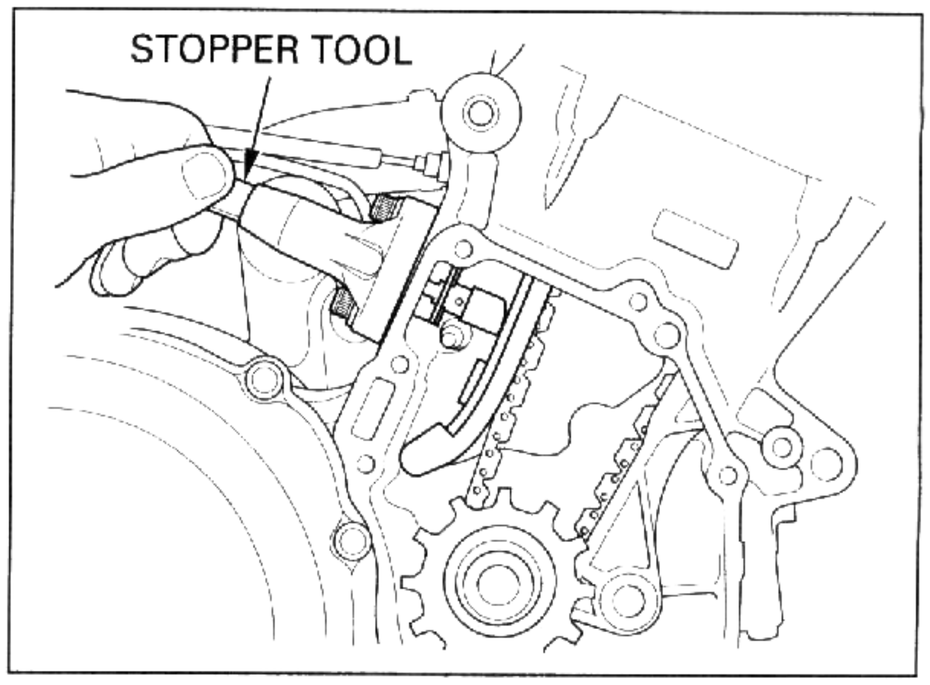
Install the camshaft (page 8-23).

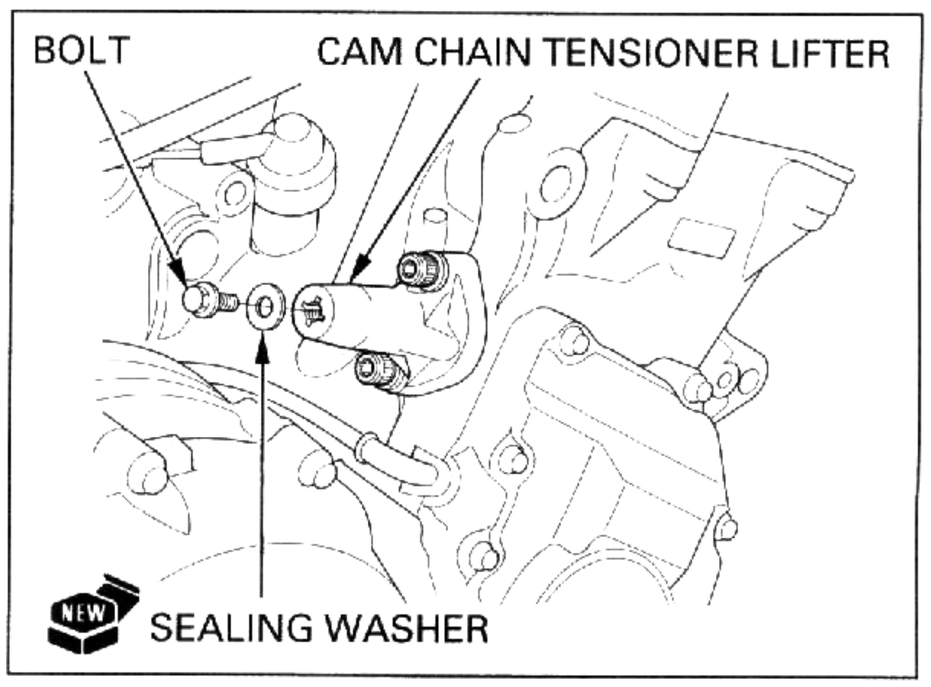
Rotate the camshafts by rotating the crankshaft clockwise several times.
Recheck the valve clearance.

Remove the cam chain tensioner stopper tool.

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

Install the removed parts in the reverse order of removal.





ENGINE OIL/OIL FILTER

OIL LEVEL INSPECTION

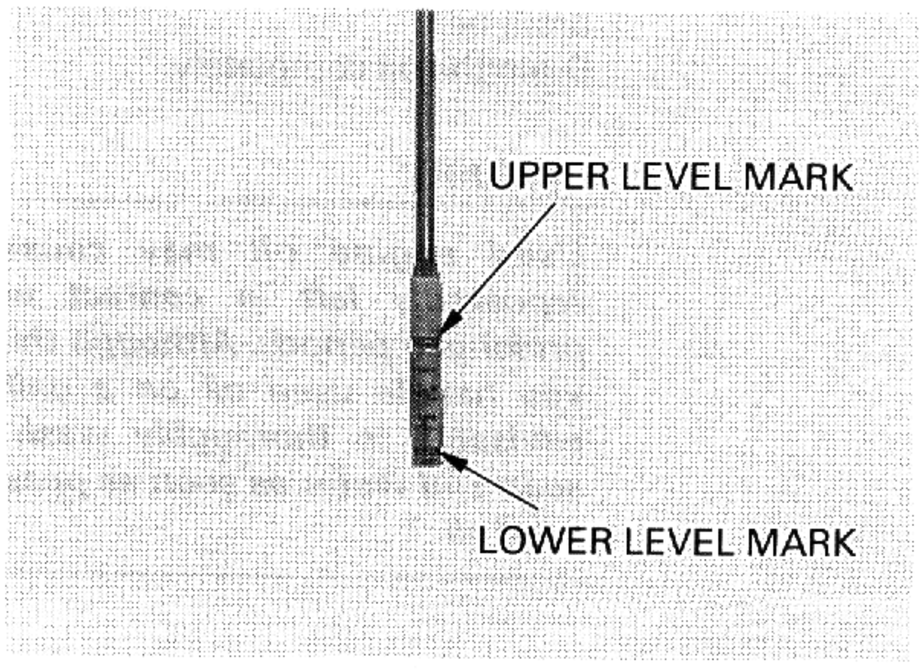
Start the engine and let it idle for 2 – 3 minutes.
Turn off the engine and support the motorcycle on its center stand.

Remove the oil level dipstick wipe it clean.
Reinstall the oil level dipstick, but do not screw it.



Remove the oil level dipstick and check the oil level.

If the level is below the lower mark on the dipstick, fill the crankcase with recommended oil.



Remove the oil filler cap.

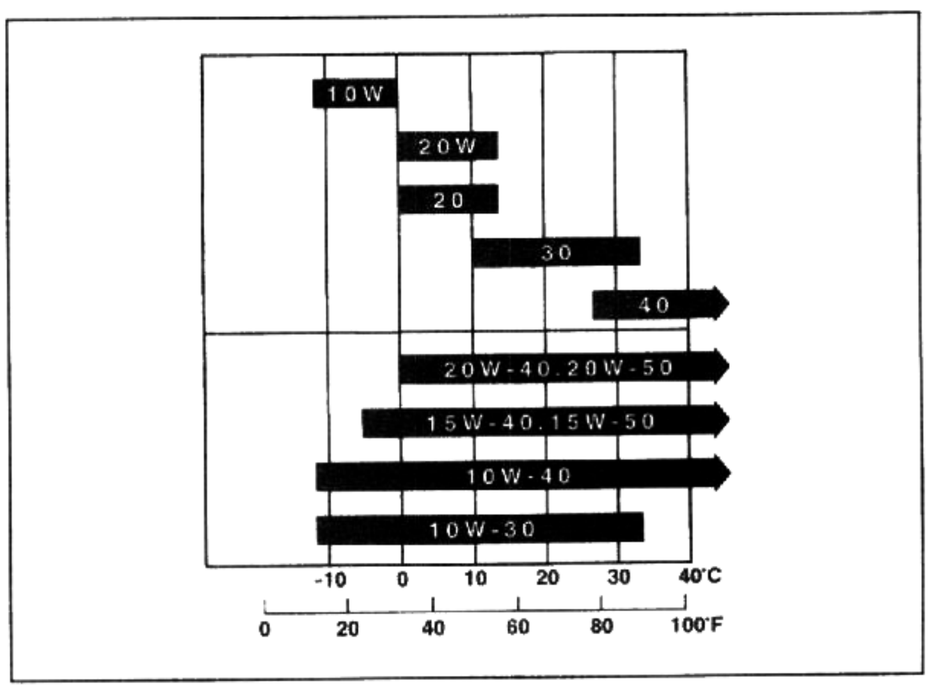


Fill the recommended engine oil up to the upper level mark.

RECOMMENDED ENGINE OIL:
HONDA 4-stroke oil or equivalent motor oil
API service classification: SE, SF or SG
Viscosity: 10W−40

NOTE:

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



Reinstall the filler cap and dipstick.

ENGINE OIL & FILTER CHANGE

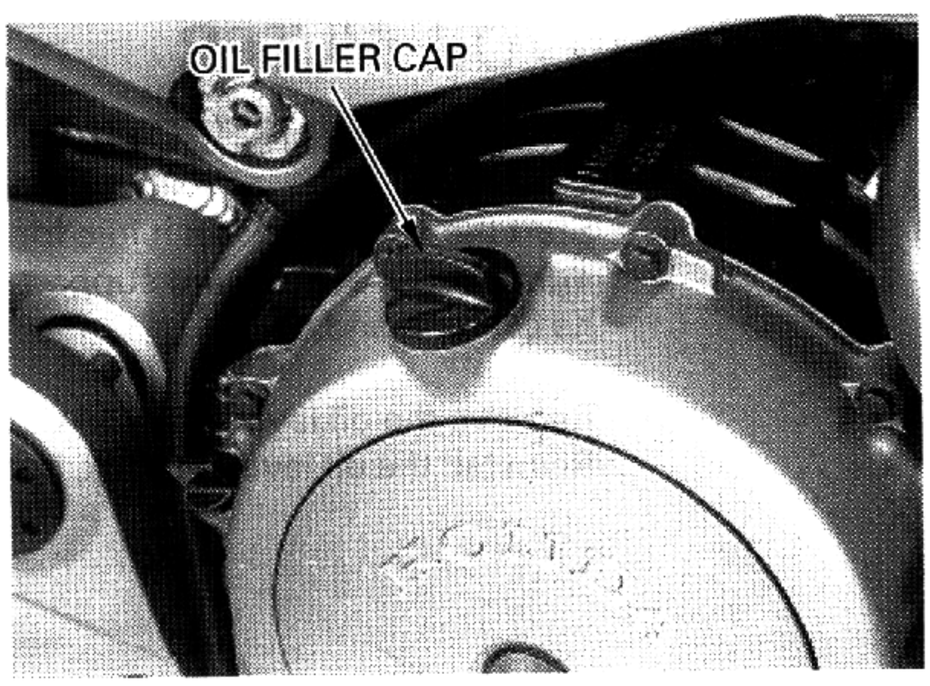
⚠WARNING

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

Warm up the engine.

NOTE:

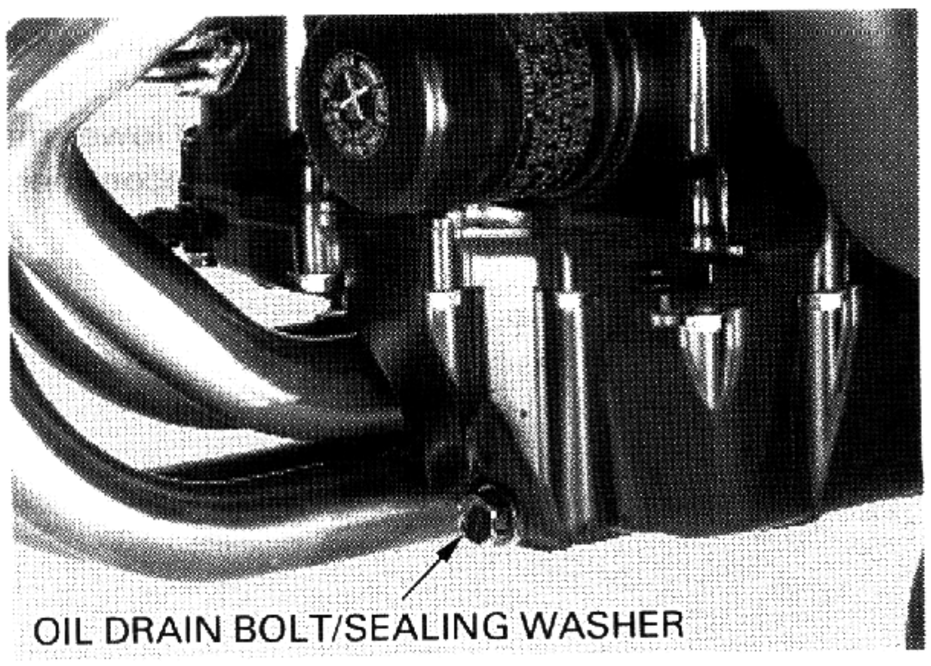
Change the engine oil with the engine warm and the motorcycle on level ground to assure complete draining.



Stop the engine and remove the oil filler cap and drain bolt.
Drain the oil completely.

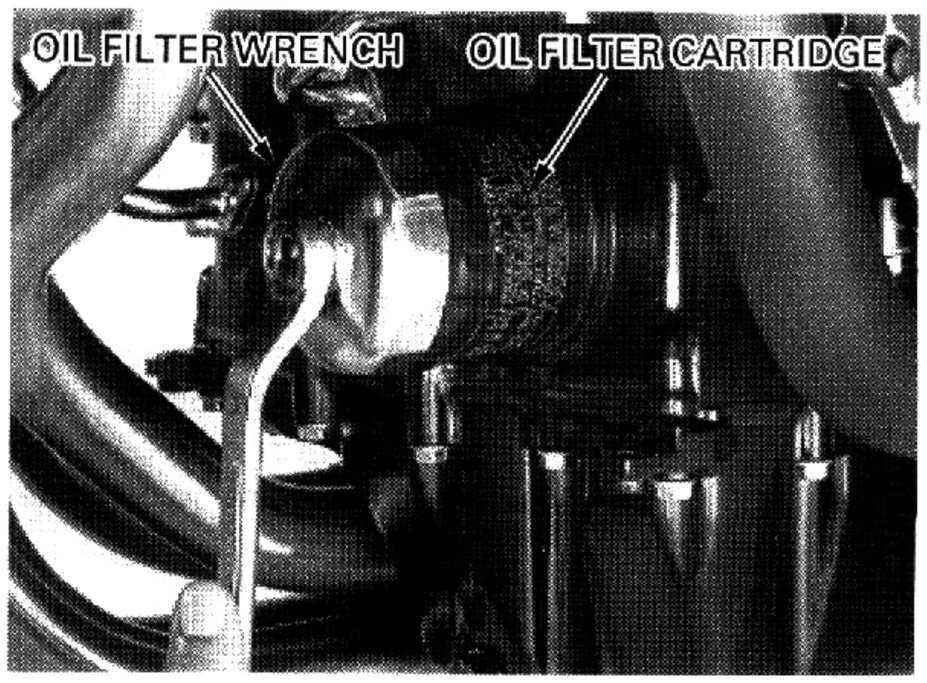
CAUTION:

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.



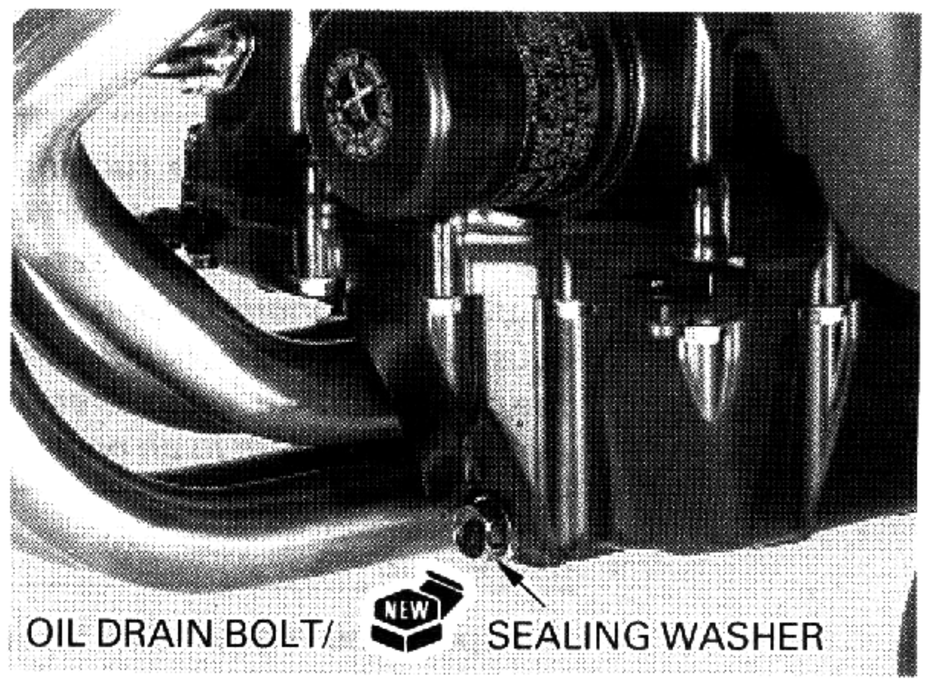
Remove and discard the oil filter cartridge using the special tool.

TOOL:
Oil filter wrench 07HAA-PJ70100

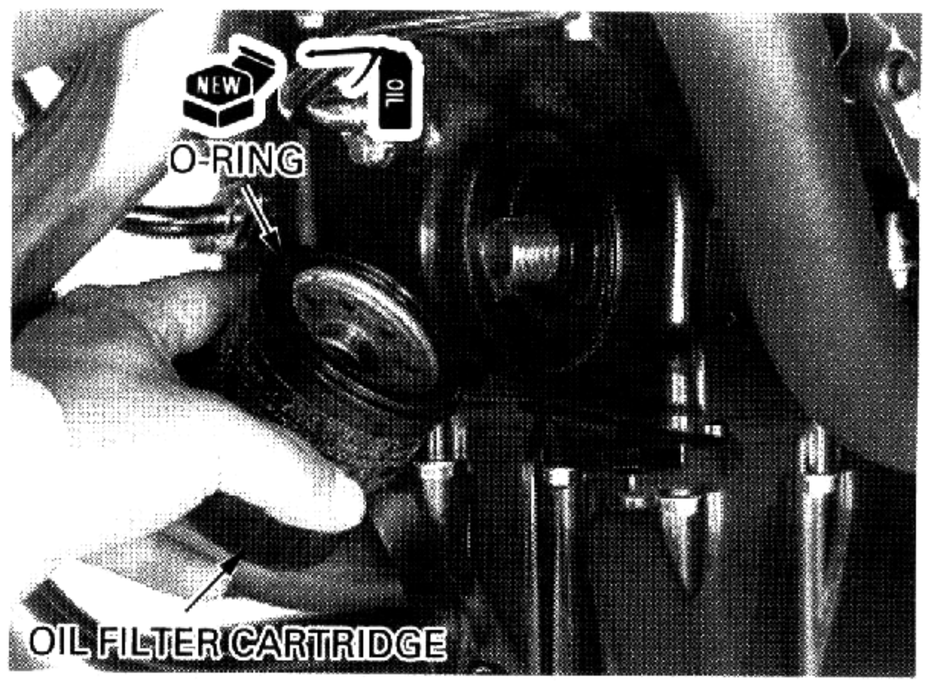


Check that the sealing washer on the drain bolt is in good condition, and replace if necessary.
Install and tighten the drain bolt.

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



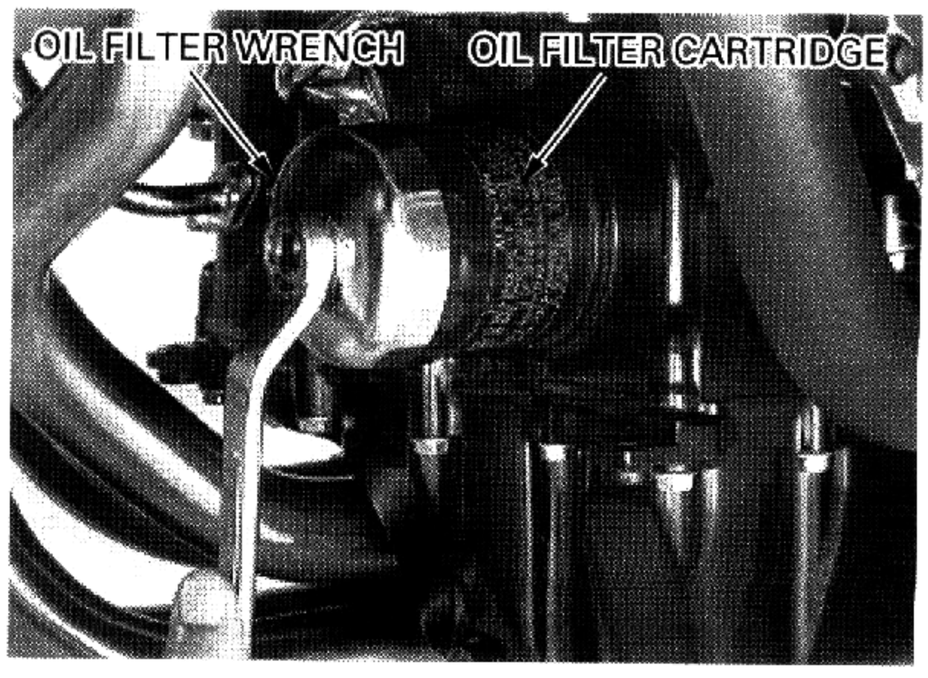
Apply oil to the new oil filter O-ring.



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

TOOL:
Oil filter wrench 07HAA-PJ70100

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)



Fill the crankcase with recommended engine oil.

OIL CAPACITY:
3.8 ℓ (4.0 US qt , 3.3 Imp qt) at draining
3.9 ℓ (4.1 US qt , 3.4 Imp qt) at oil filter change

Install the oil filler cap.

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



ENGINE IDLE SPEED

⚠WARNING

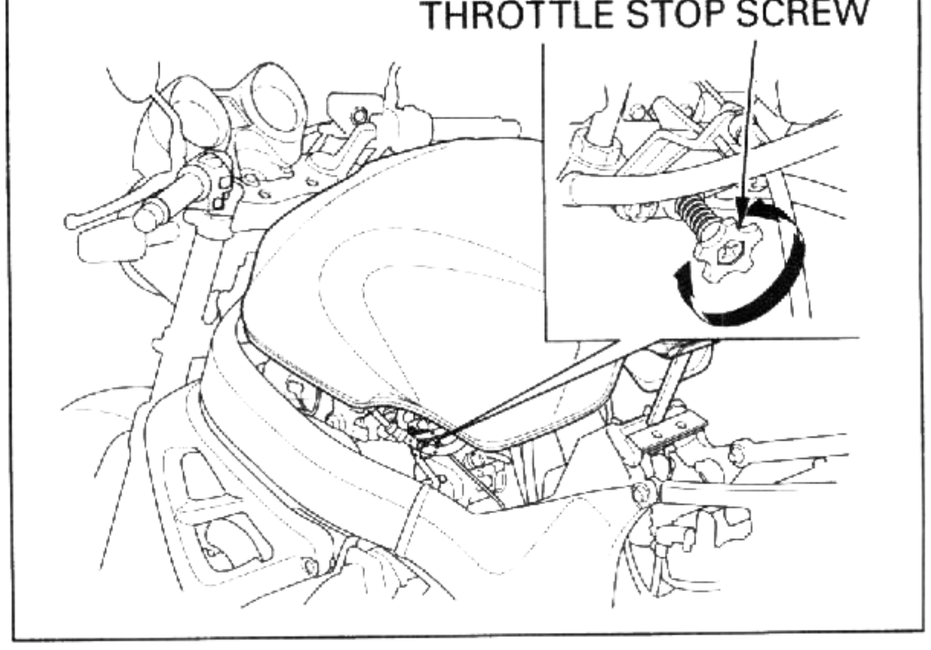
If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system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

NOTE:

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

Support the rear end of the fuel tank (page 2-11).
Warm up the engine for about ten minutes.
Turn the throttle stop screw as required to obtain the specified idle speed.

IDLE SPEED: 1,100 ± 100 min^{-1} (rpm)



RADIATOR COOLANT

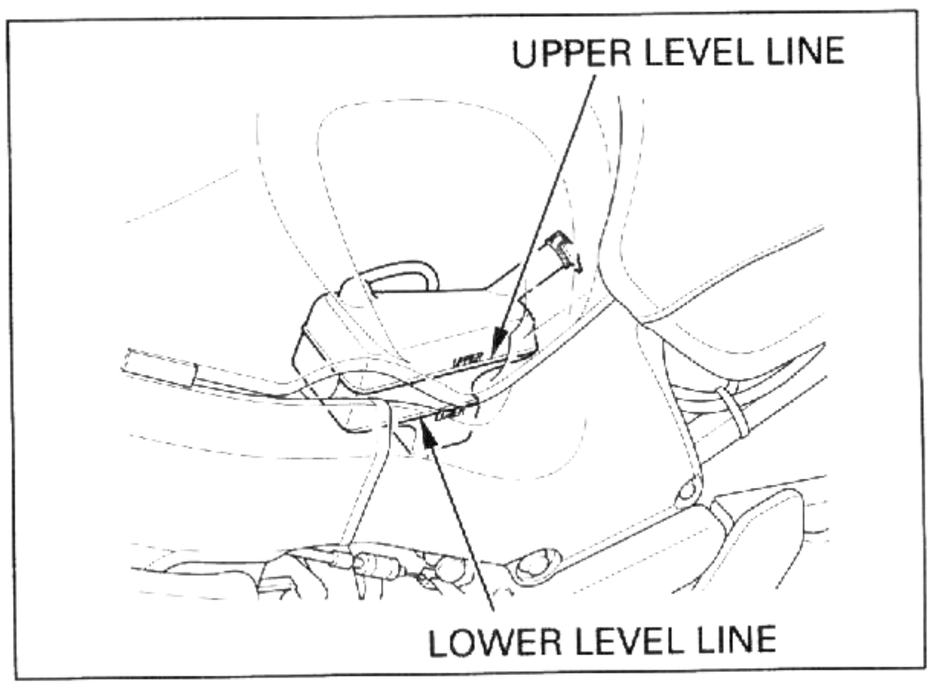
Check the coolant level of the reserve tank with the engine running at normal operating temperature.
The level should be between the "UPPER" and "LOWER" level lines.

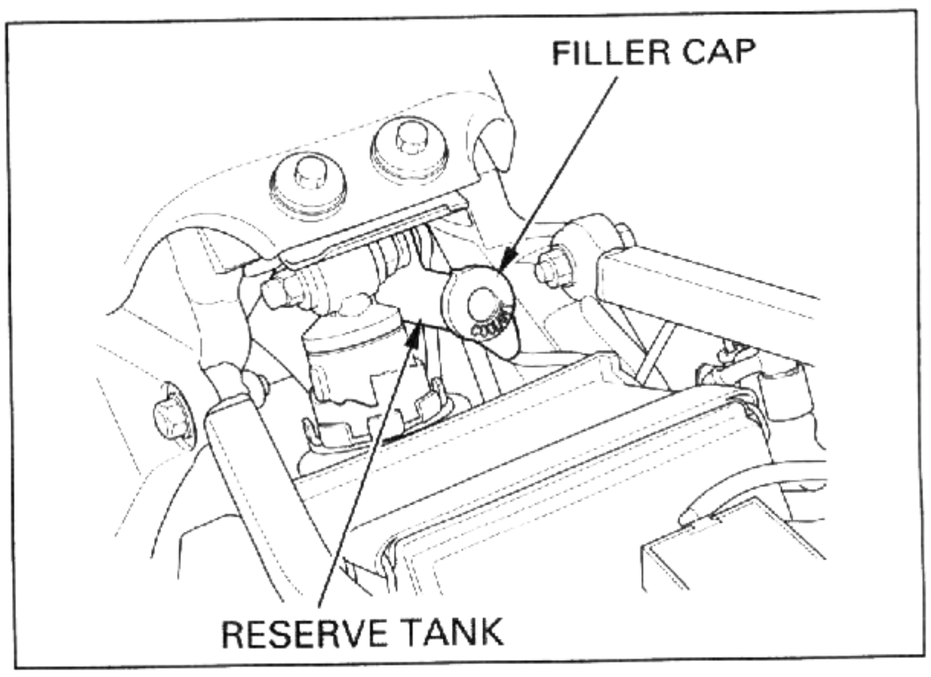
If necessary, add recommended coolant.

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

Remove the seat (page 2-2).

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

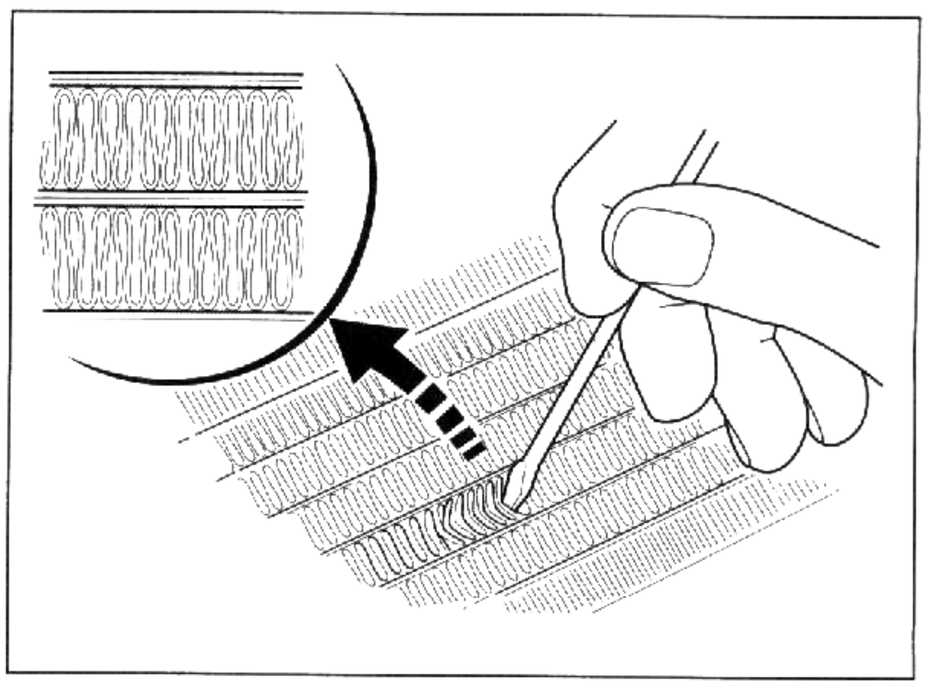




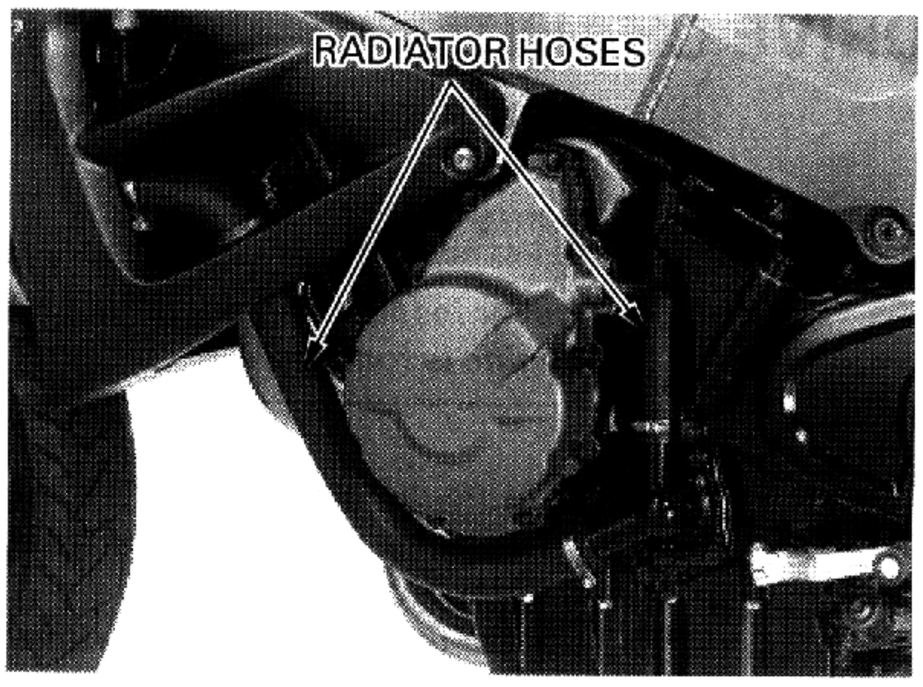
COOLING SYSTEM

Remove the radiator grill (page 2-4).

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



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



SECONDARY AIR SUPPLY SYSTEM

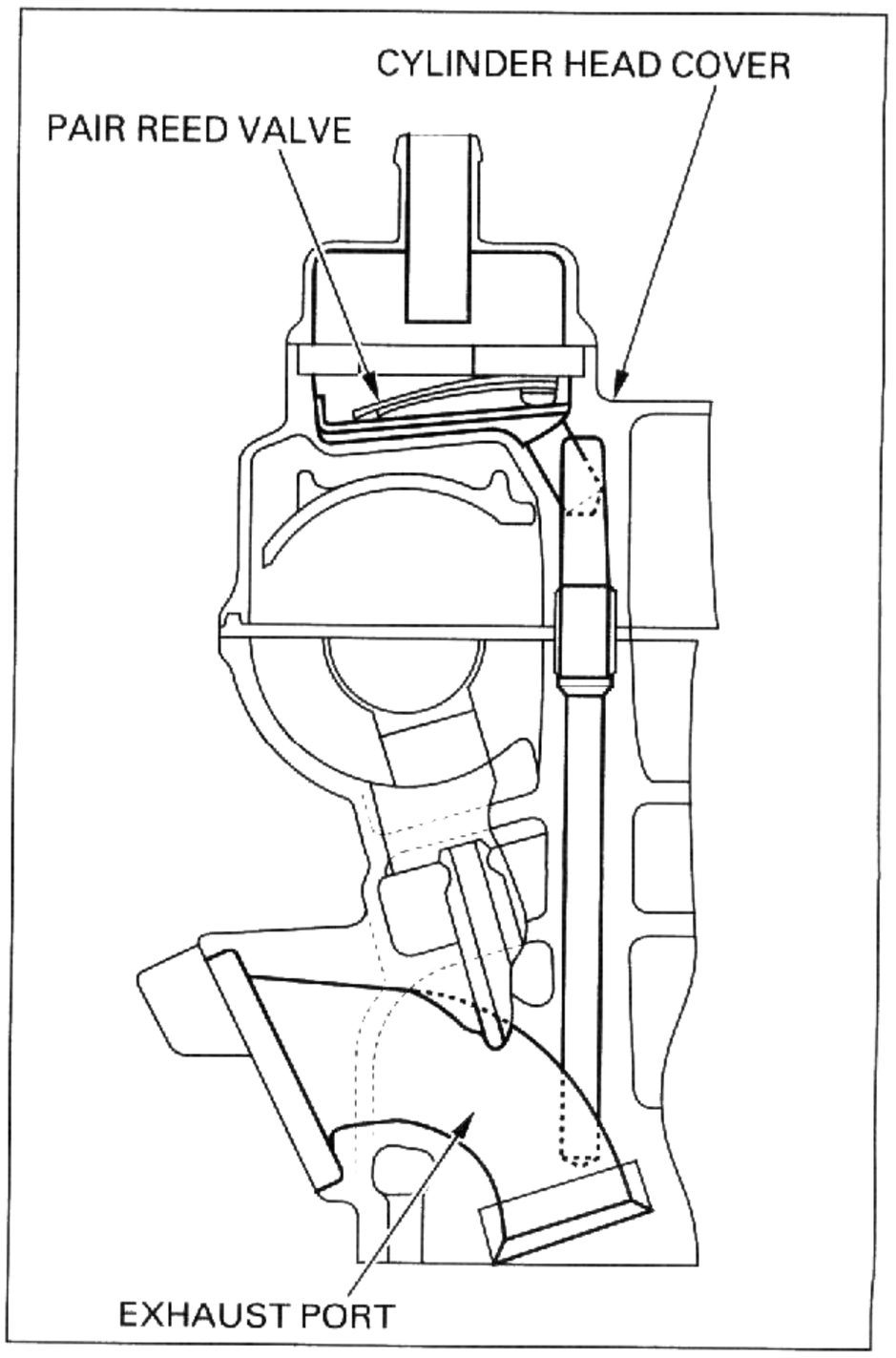
NOTE:

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

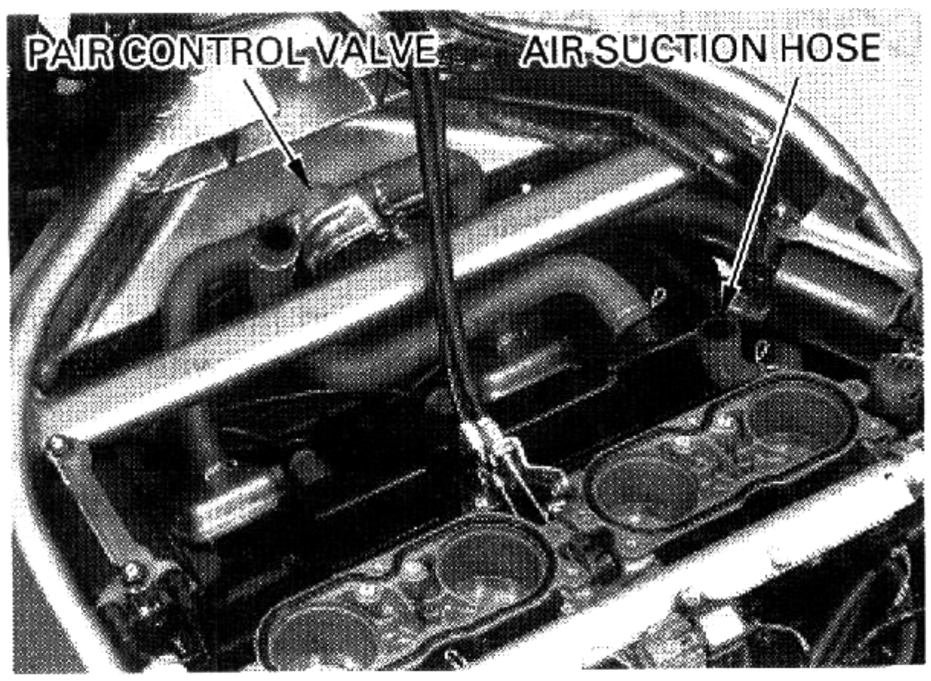
Check the PAIR (pulse secondary air injection) tubes between the PAIR control solenoid valve and cylinder head cover for deterioration, damage or loose connections. Make sure that the hoses are not cracked.

NOTE:

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



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



DRIVE CHAIN

DRIVE CHAIN SLACK INSPECTION

⚠WARNING

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

Turn the ignition switch OFF, place the motorcycle on its side stand and shift the transmission into neutral.
Check the slack in the drive chain lower run midway between the sprockets.



CHAIN SLACK: 25 – 35 mm (1.0 – 1.4 in)

CAUTION:

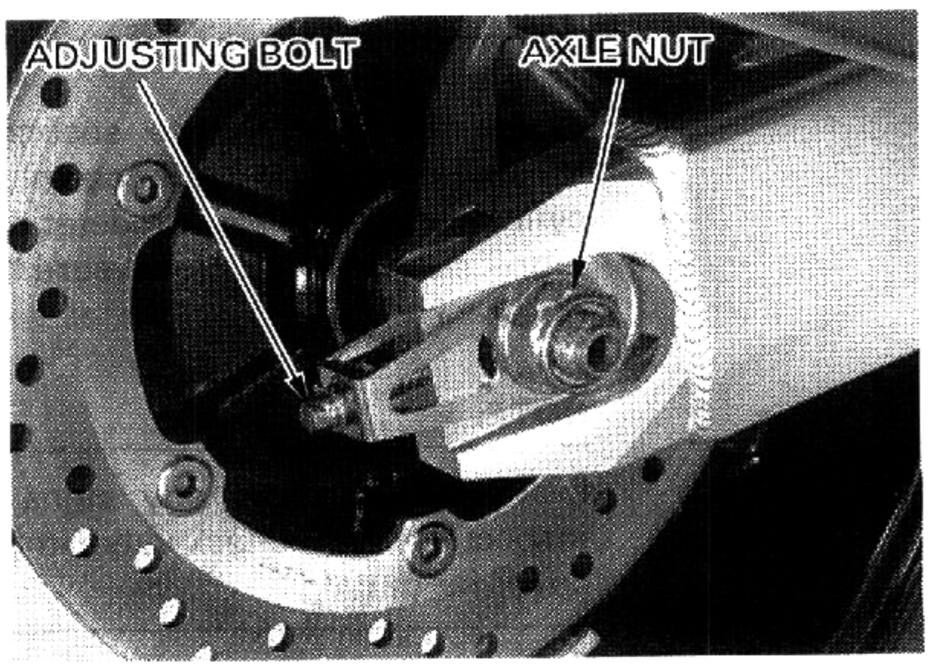
Excessive chain slack, 50 mm (2.0 in) or more, may damage the frame.

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

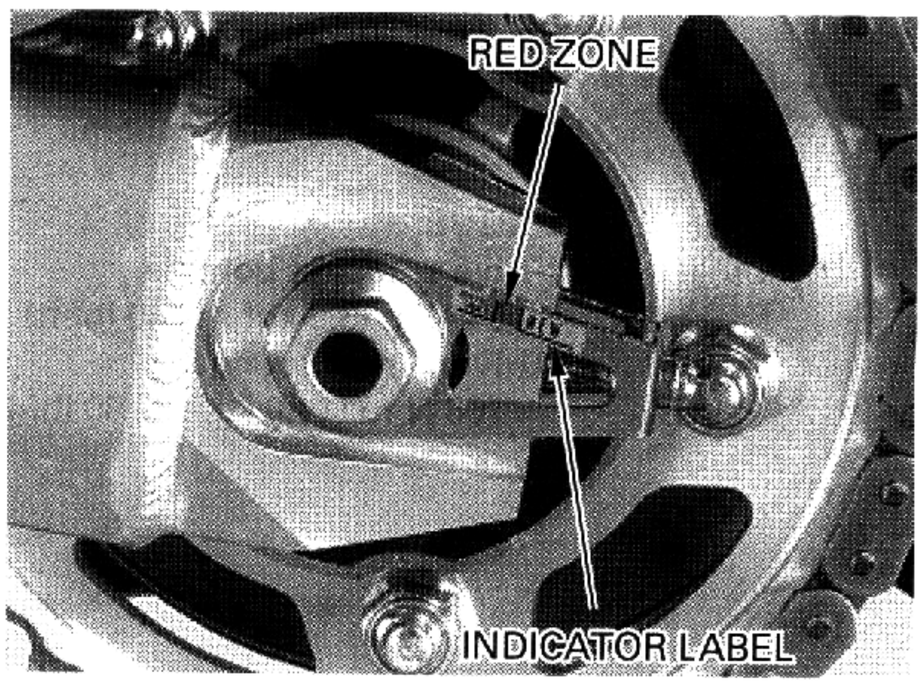
ADJUSTMENT

Loosen the rear axle nut.
Turn both adjusting bolts until the correct drive chain slack is obtained.
Make sure the index marks on the both adjusters are aligned with the rear end of the swingarm.
Tighten the rear axle nut to the specified torque.

TORQUE: 118 N·m (12.0 kgf·m , 87 lbf·ft)

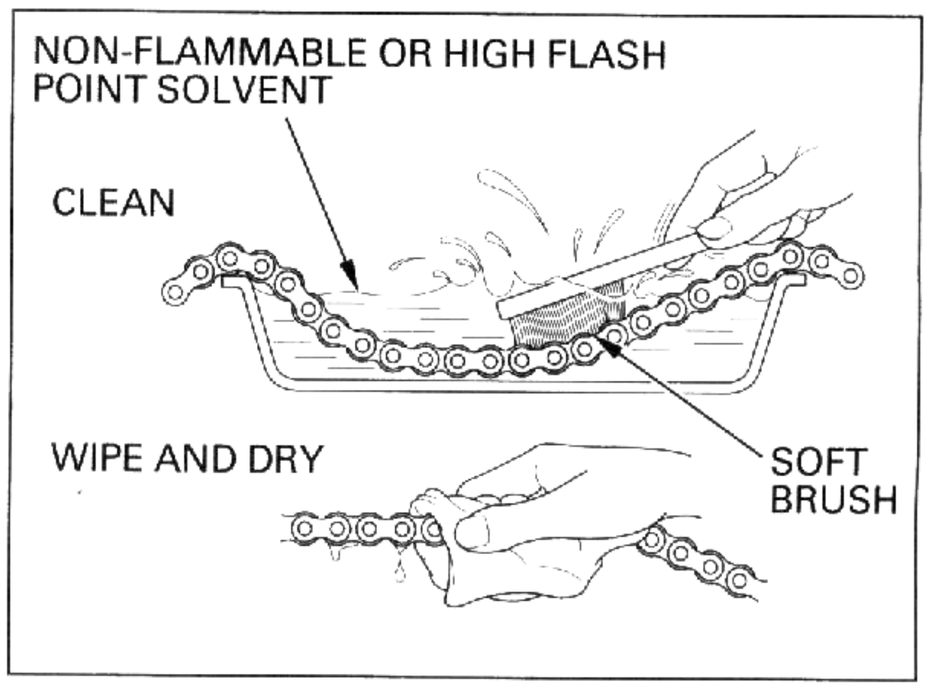


Recheck the drive chain slack and free wheel rotation.
Lubricate the drive chain with #80−90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.
Check the drive chain wear indicator label attached on the left drive chain adjuster.
If the red zone of the indicator label reaches the end of the swingarm, replace the drive chain with a new one (page 3-22).

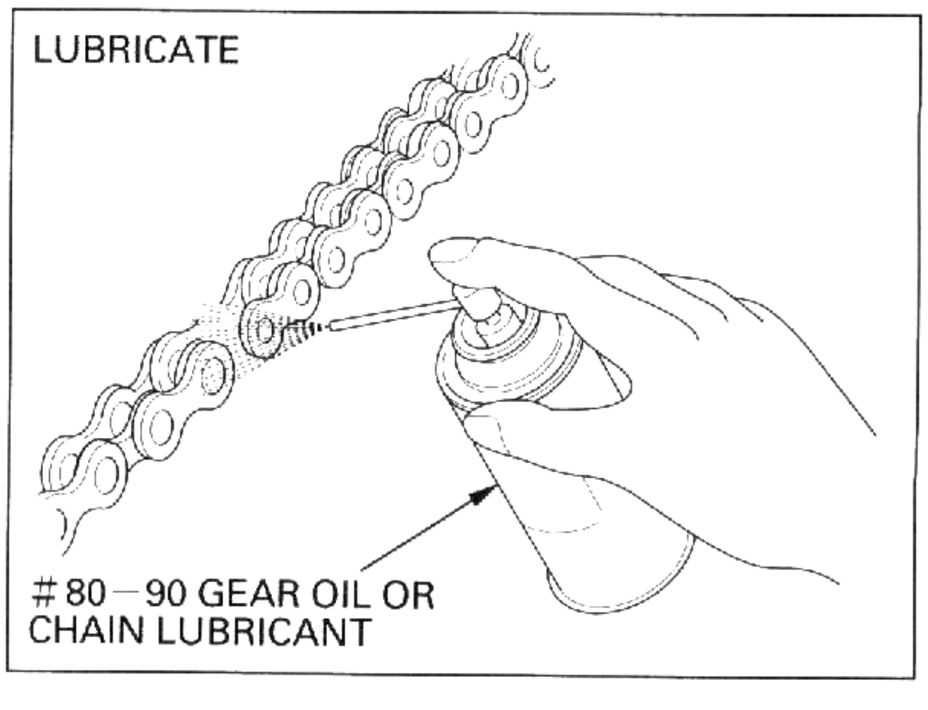


CLEANING AND LUBRICATION

Clean the chain with non-flammable or high flash point solvent and wipe it dry.
Be sure the chain has dried completely before lubricating.
Inspect the drive chain for possible damage or wear.
Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.
Installing a new chain on badly worn sprockets will cause the new chain to wear quickly.
Inspect and replace sprocket as necessary.

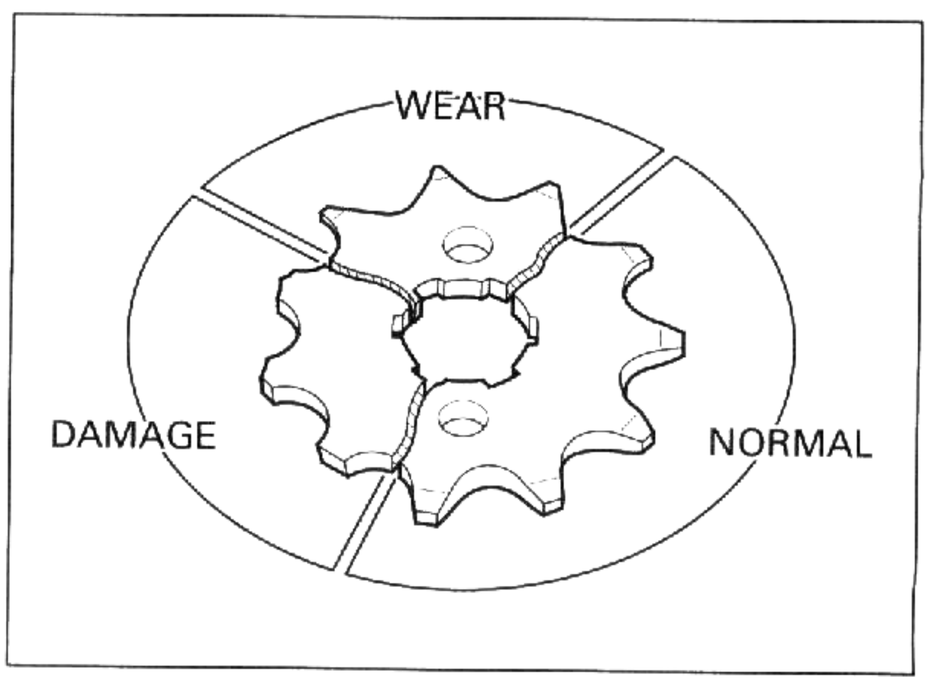


Lubricate the drive chain with #80−90 gear oil or drive chain lubricant designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.



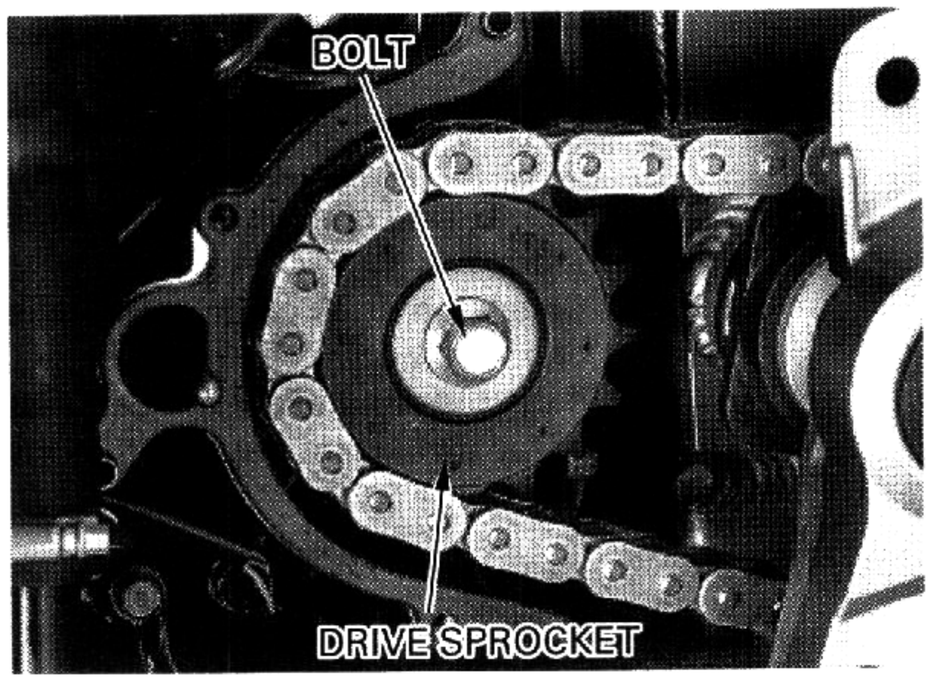
SPROCKETS INSPECTION

Inspect the drive and driven sprocket teeth for wear or damage, replace if necessary.
Never use a new drive chain on worn sprockets.
Both chain and sprockets must be in good condition, or the new replacement chain will wear rapidly.



Check the attaching bolts and nuts on the drive and driven sprockets.
If any are loose, torque them.

TORQUE:
Drive sprocket bolt:
54 N·m (5.5 kgf·m , 40 lbf·ft)
Driven sprocket nut:
108 N·m (11.0 kgf·m , 80 lbf·ft)



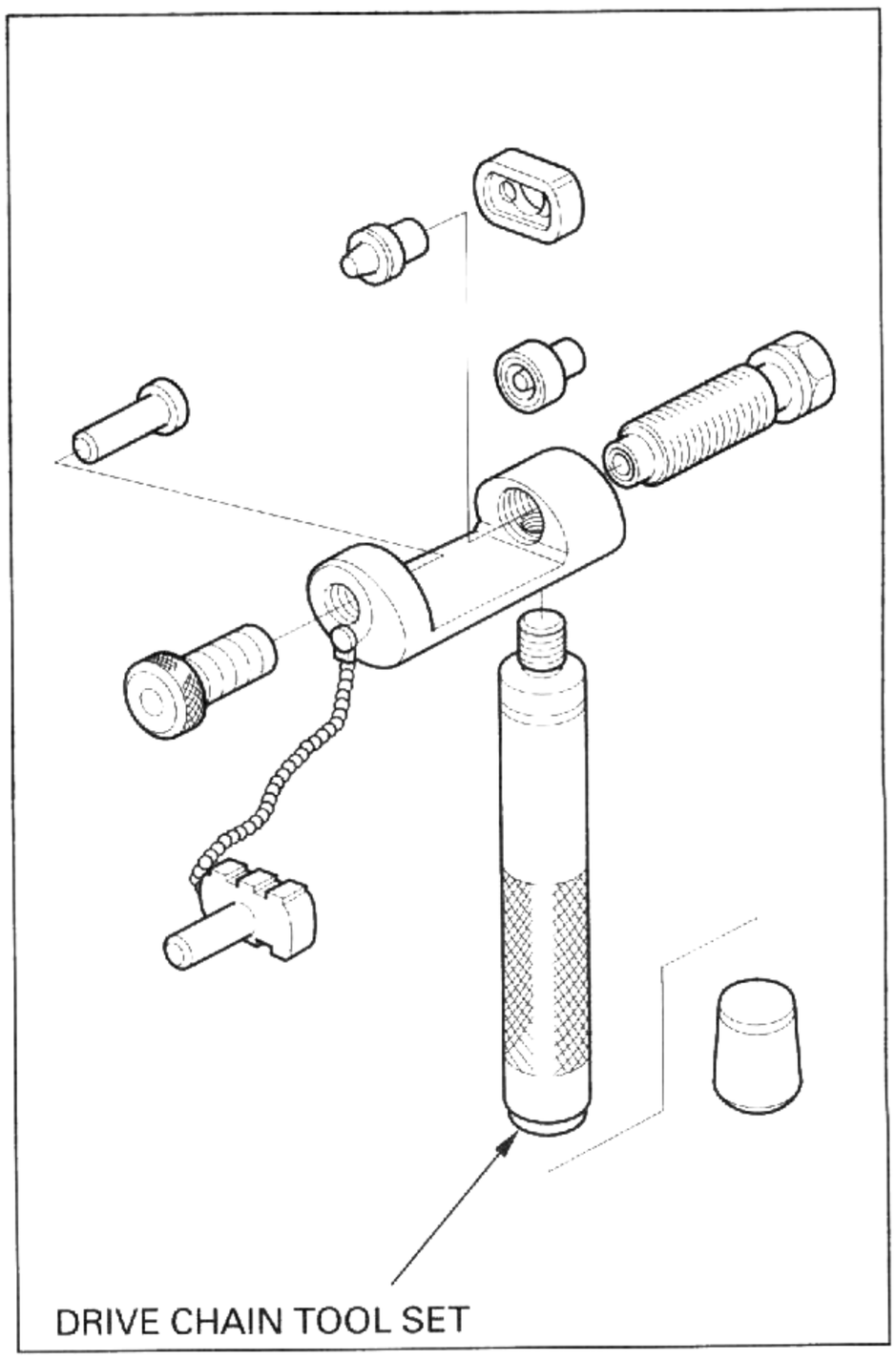
REPLACEMENT

This motorcycle uses a drive chain with a staked master link.
Loosen the drive chain (page 3-20).
Assemble the special tool as shown.

TOOL:
Drive chain tool set 07HMH-MR10103

NOTE:

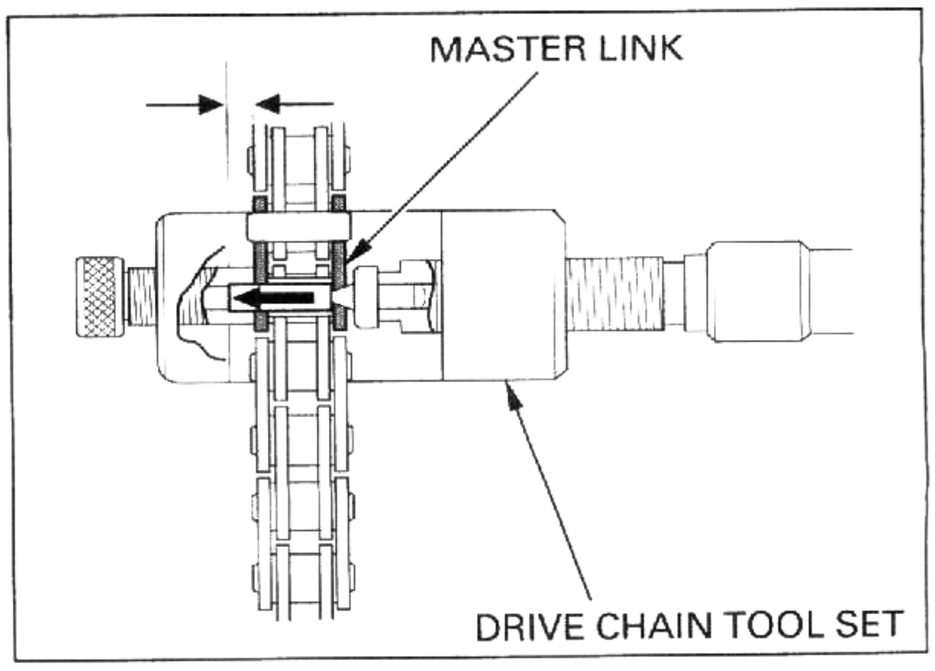
When using the special tool, follow the manufacturer's instruction.


DRIVE CHAIN TOOL SET

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

TOOL:
Drive chain tool set 07HMH-MR10103

Remove the drive chain.

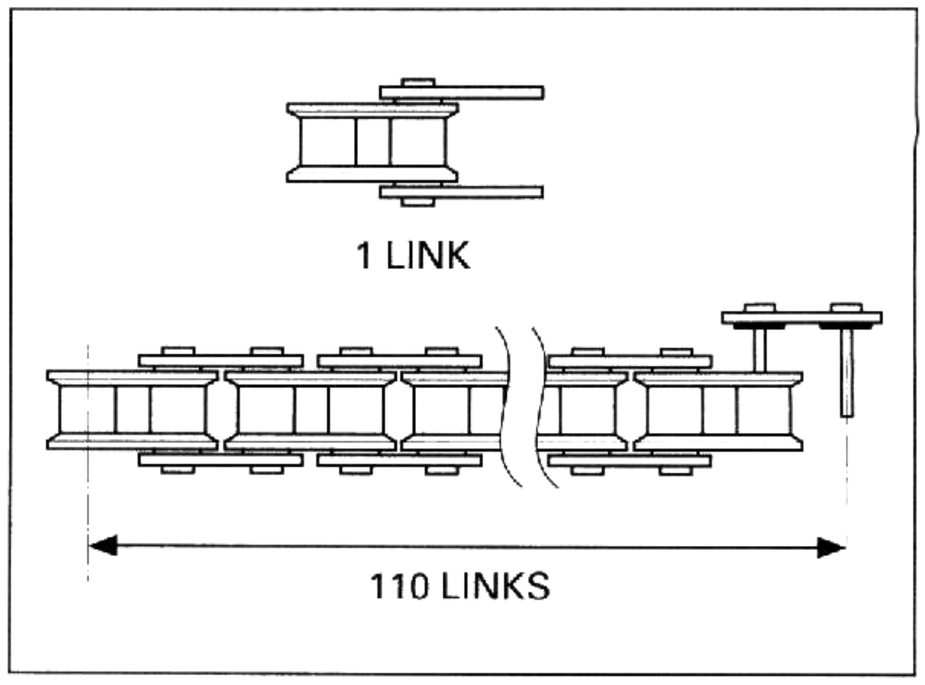


Remove the excess drive chain links from the new drive chain with the drive chain tool set.

NOTE:

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

STANDARD LINKS: 110 links
REPLACEMENT CHAIN:
DID: DID50ZV-120ZB
RK: RK50LFO-120LJ-FZ



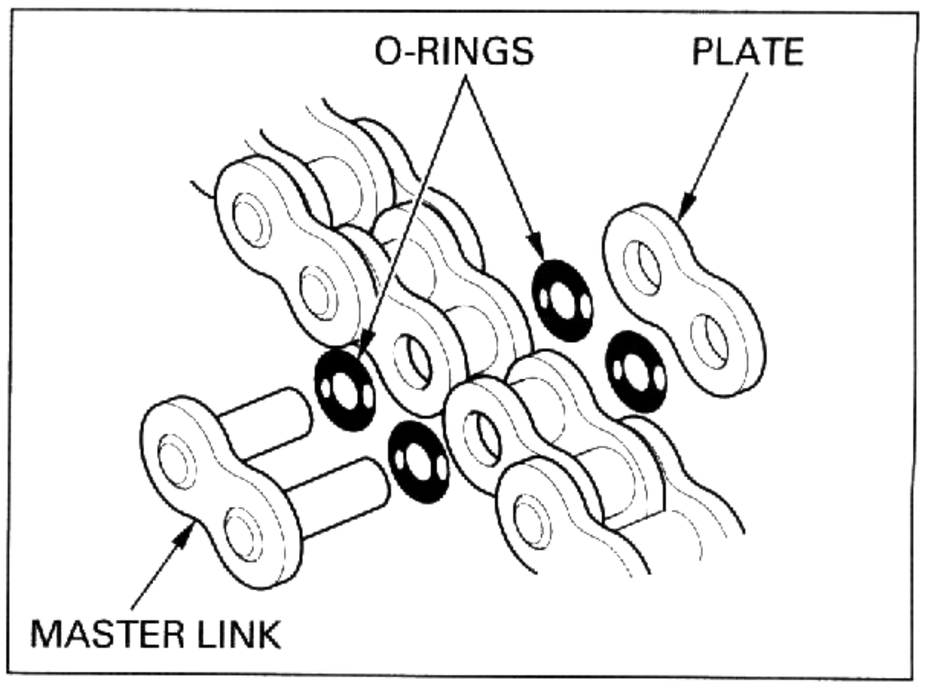
CAUTION:

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

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

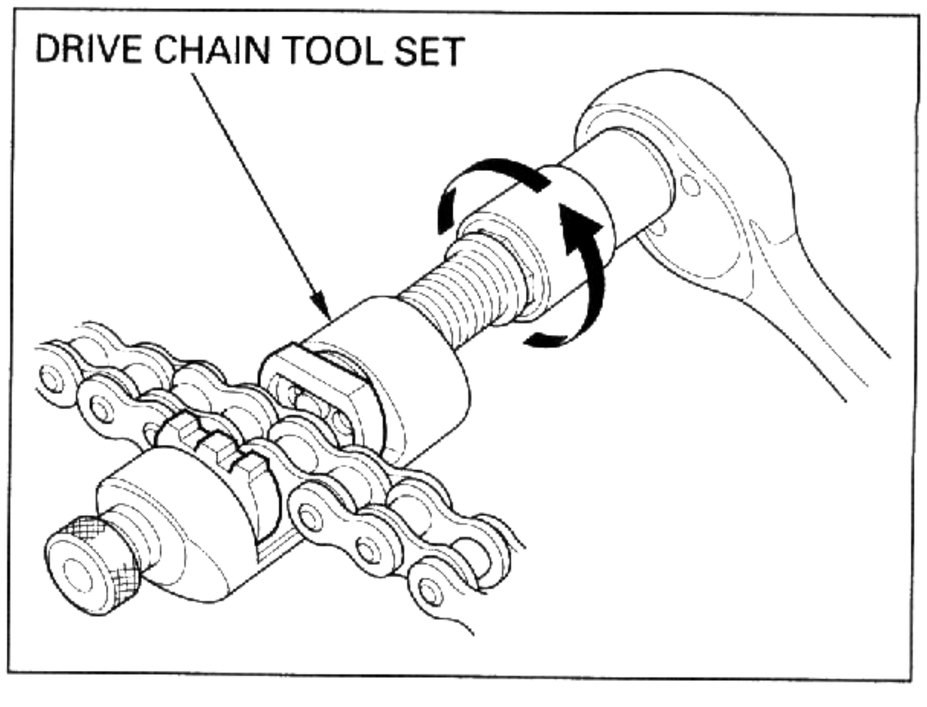
CAUTION:

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



Assemble and set the drive chain tool set.

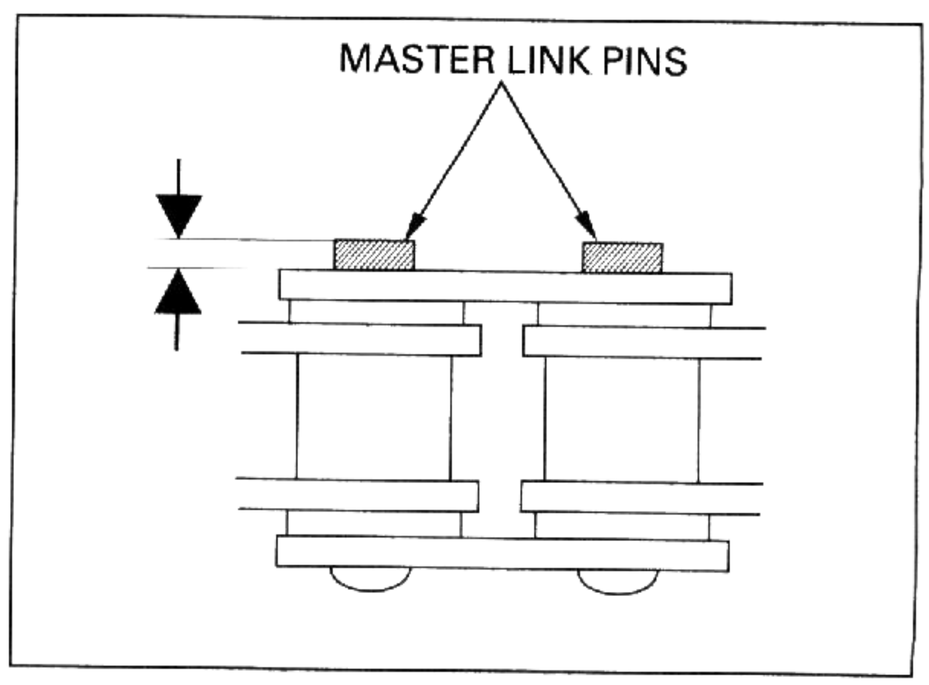
TOOL:
Drive chain tool set 07HMH-MR10103



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

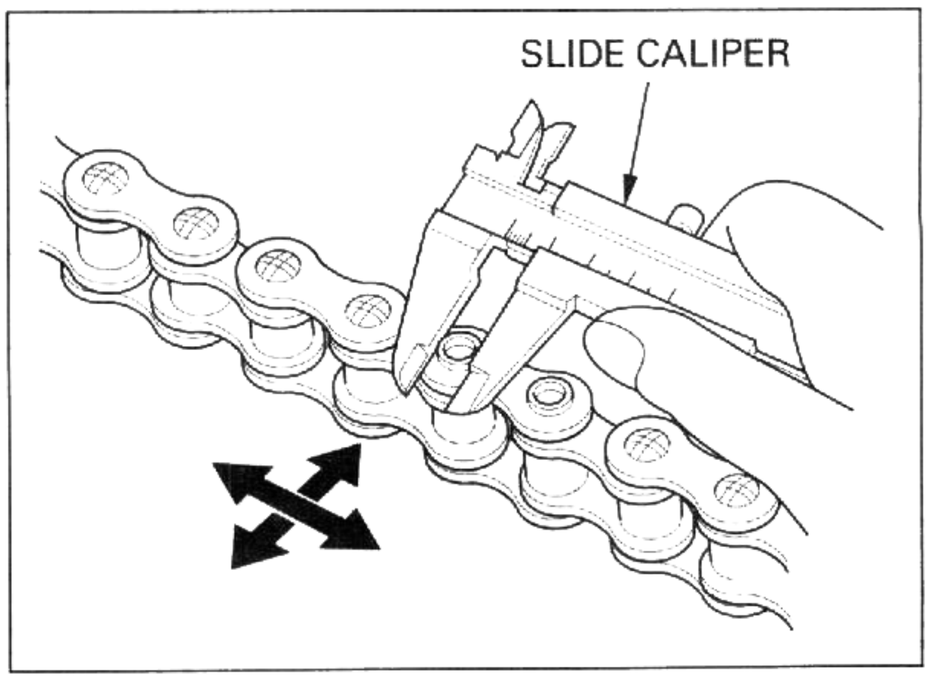
STANDARD LENGTH:
DID: 1.15—1.55 mm (0.045—0.061 in)
RK: 1.20—1.40 mm (0.047—0.055 in)

Stake the master link pins.



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

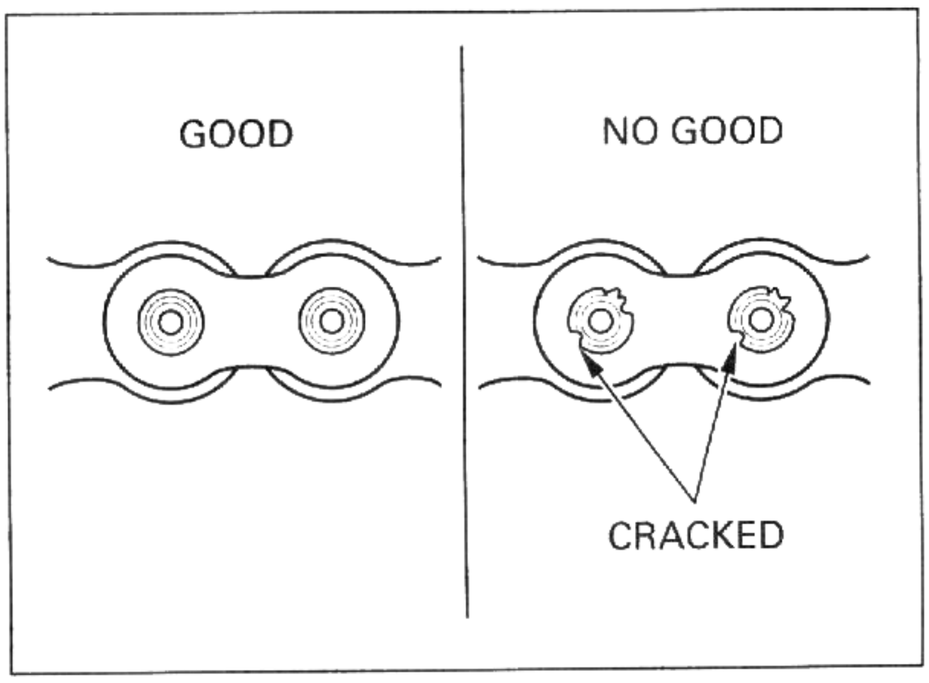
DIAMETER OF THE STAKED AREA:
DID: 5.50—5.80 mm (0.217—0.228 in)
RK: 5.55—5.85 mm (0.219—0.230 in)



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

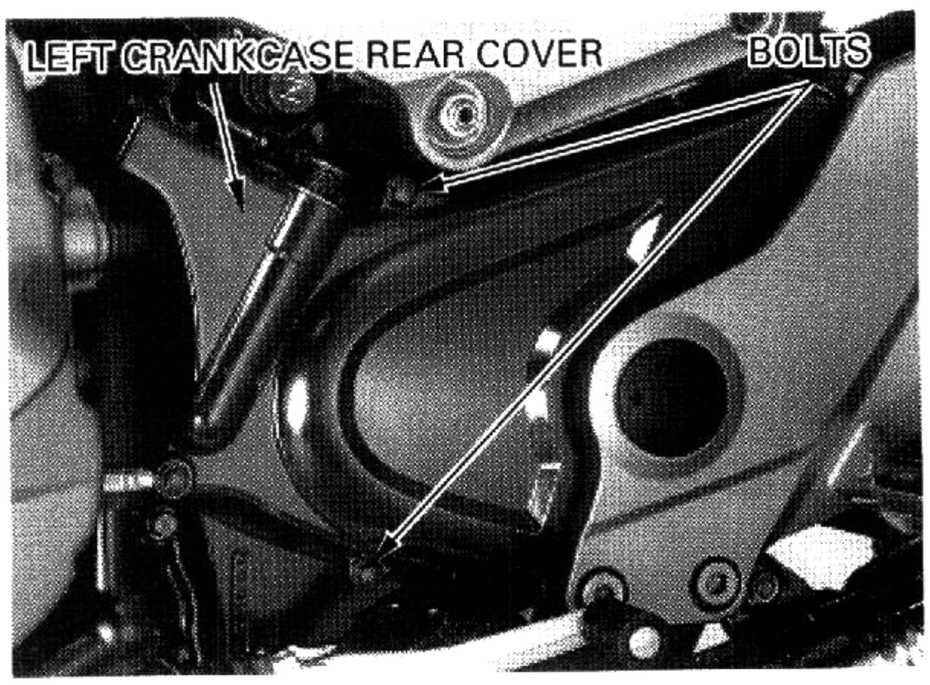
CAUTION:

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

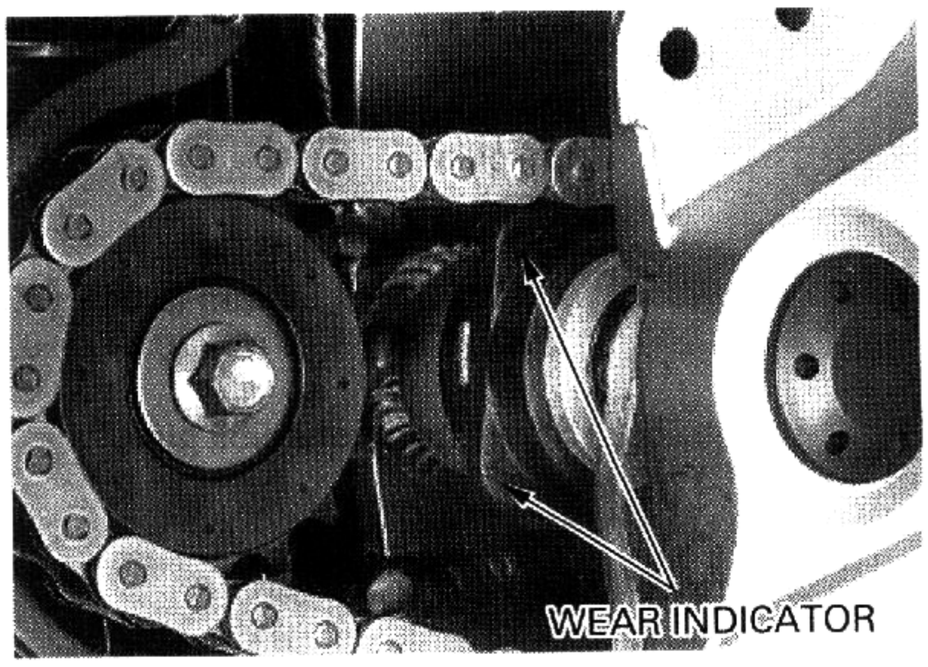


DRIVE CHAIN SLIDER

Remove the bolts and left crankcase rear cover.



Inspect the drive chain slider for excessive wear or damage.
If it is worn to the wear indicator, replace the drive chain slider.



BRAKE FLUID

CAUTION:

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

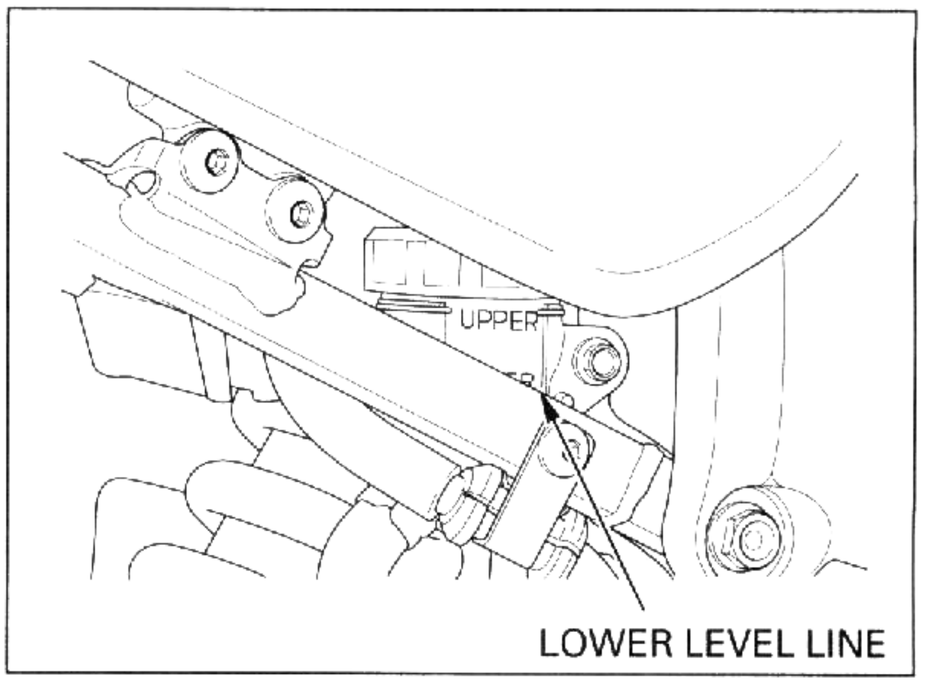
NOTE:

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



FRONT BRAKE

Turn the handlebar to the left so that the reservoir is level and check the front brake fluid reservoir level through the sight glass.
If the level is near the lower level line, check the brake pad wear (see below).



REAR BRAKE

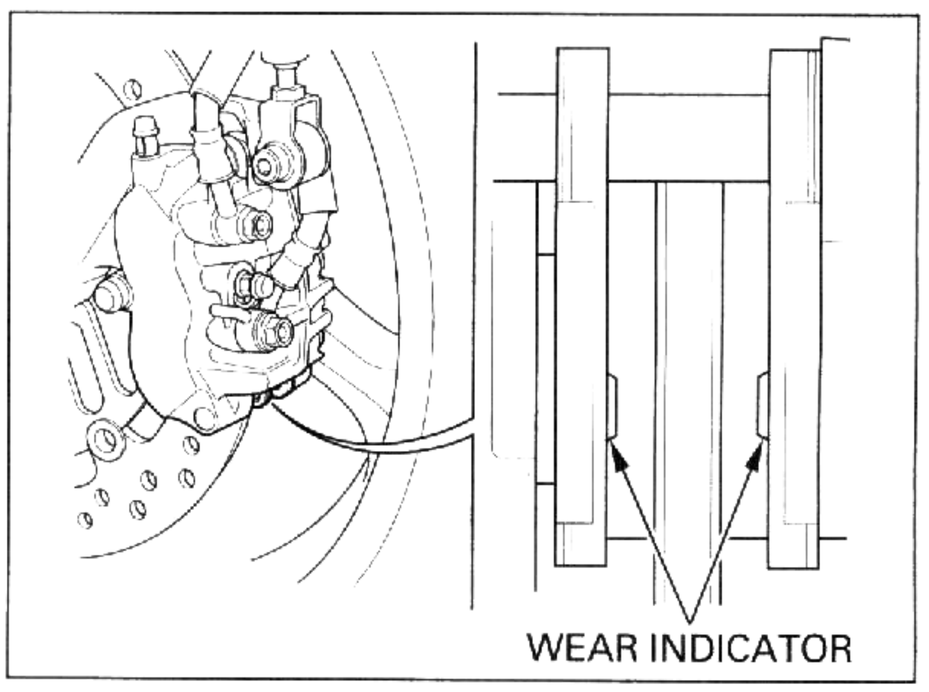
Place the motorcycle on a level surface, and support it upright position.
Check the rear brake fluid reservoir level.
If the level is near the lower level line, check the brake pad wear (see below).

BRAKE PAD WEAR

FRONT BRAKE PADS

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

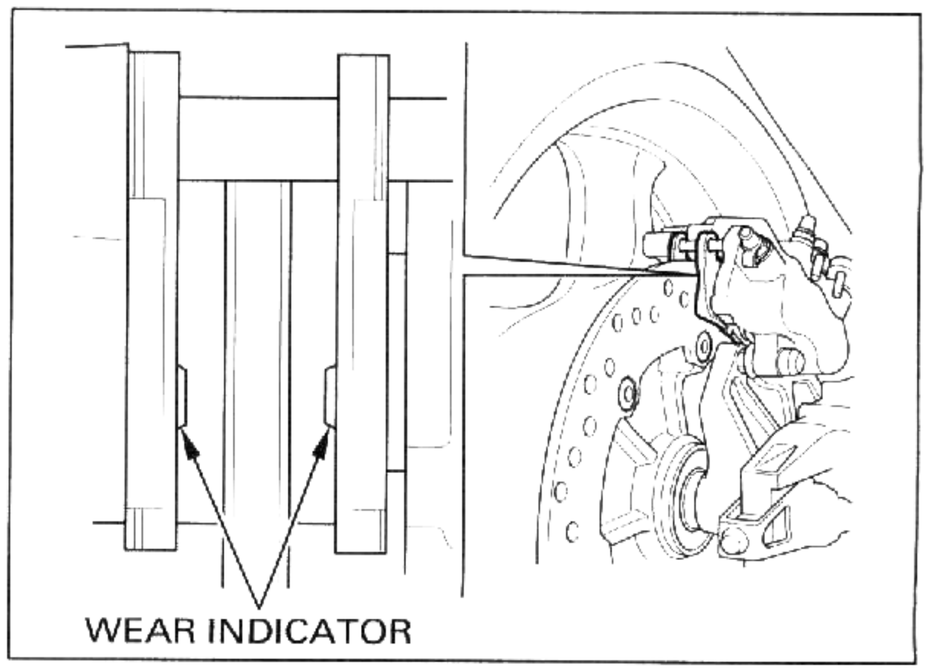
Refer to page 15-10 for brake pad replacement.



REAR BRAKE PADS

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

Refer to page 15-11 for brake pad replacement.

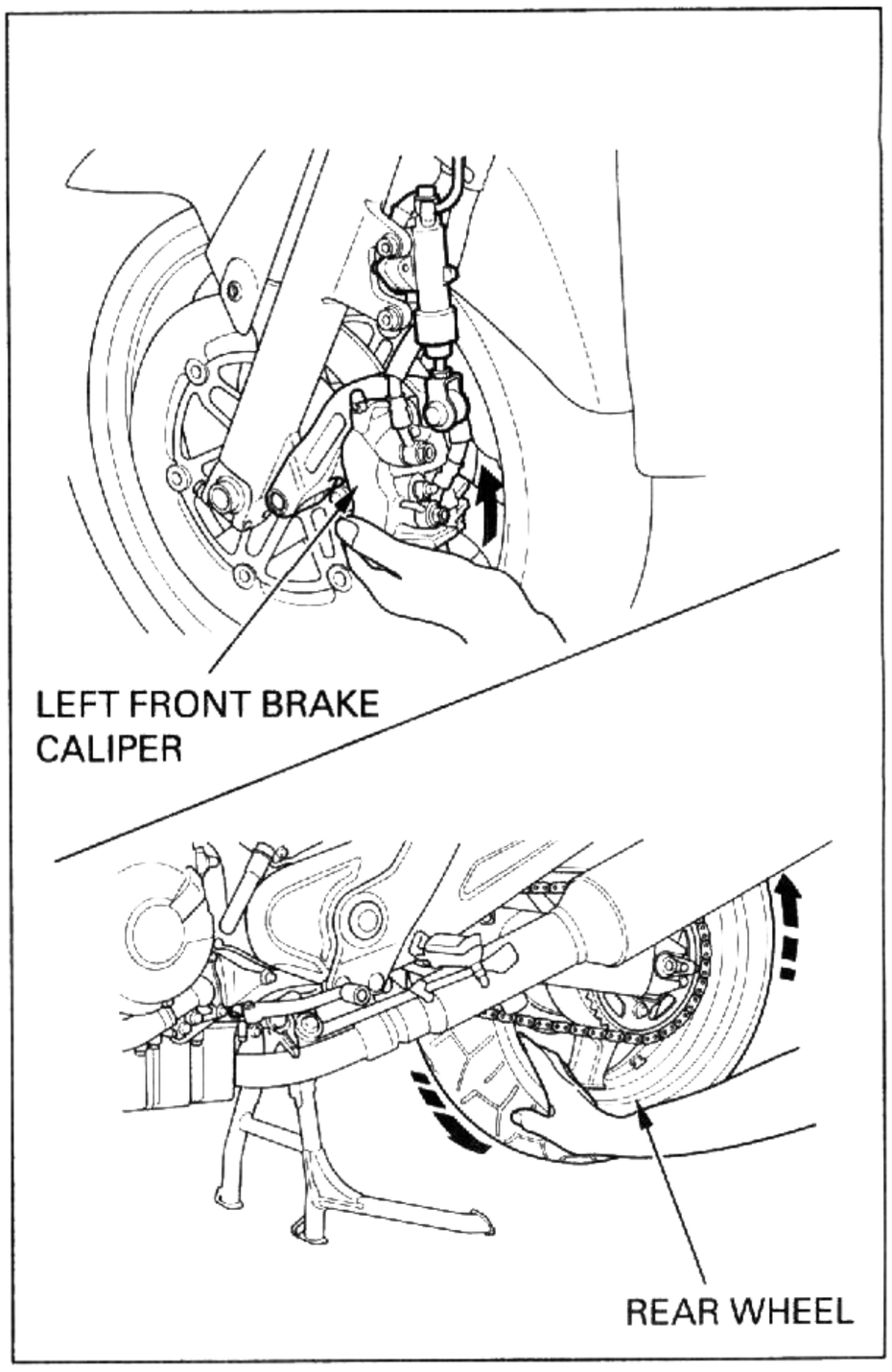


BRAKE SYSTEM

INSPECTION

This model is equipped with a Dual Combined Brake System. Check the front and rear brake operation as follows:
Place the motorcycle on its center stand and shift the transmission into neutral.

Push the left front brake caliper upward by hand.
Make sure the rear wheel does not turn while the left front brake caliper is pushed.

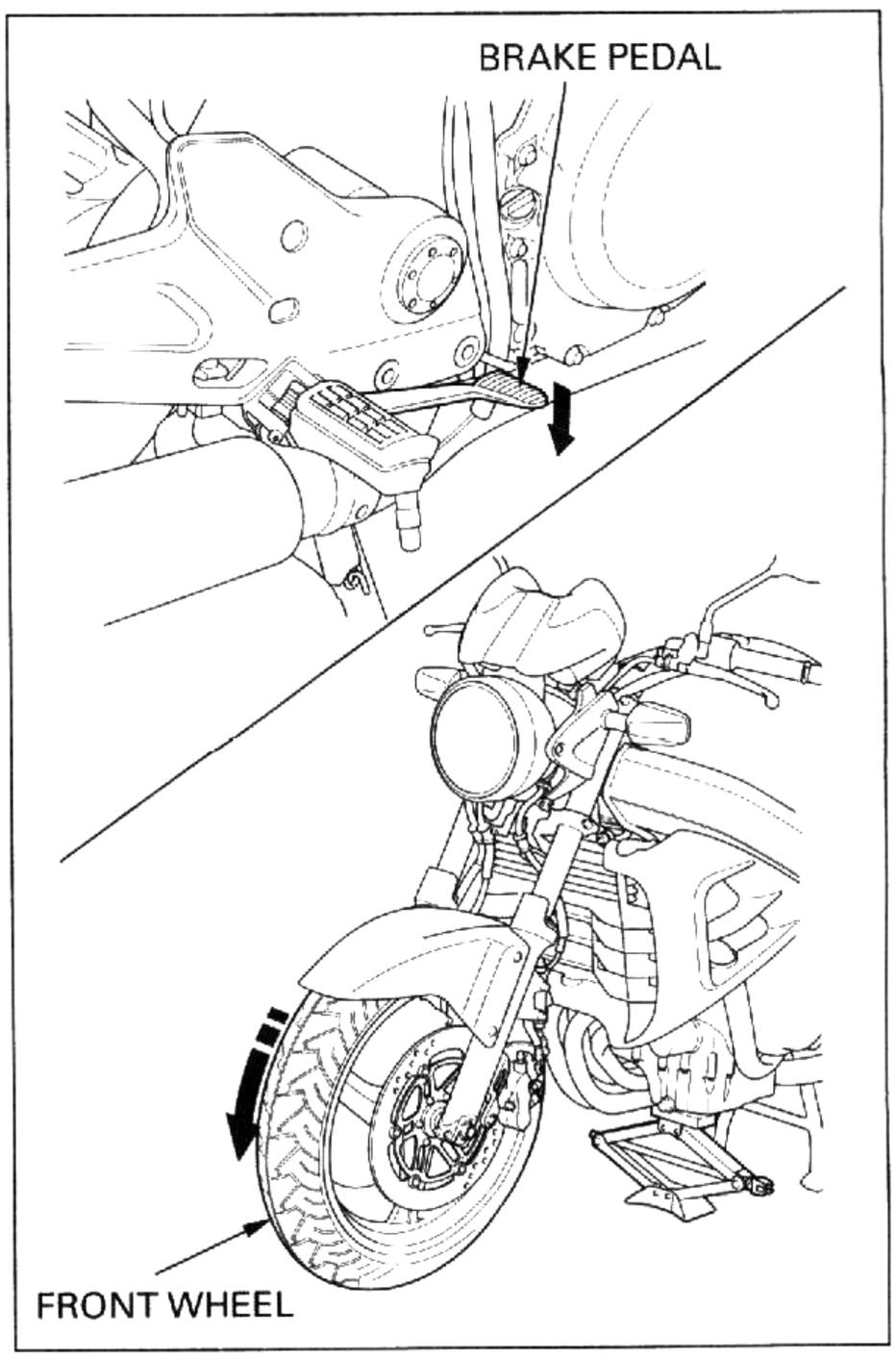


Jack-up the motorcycle to raise the front wheel off the ground.

CAUTION:

Do not use the oil filter as a jack point.

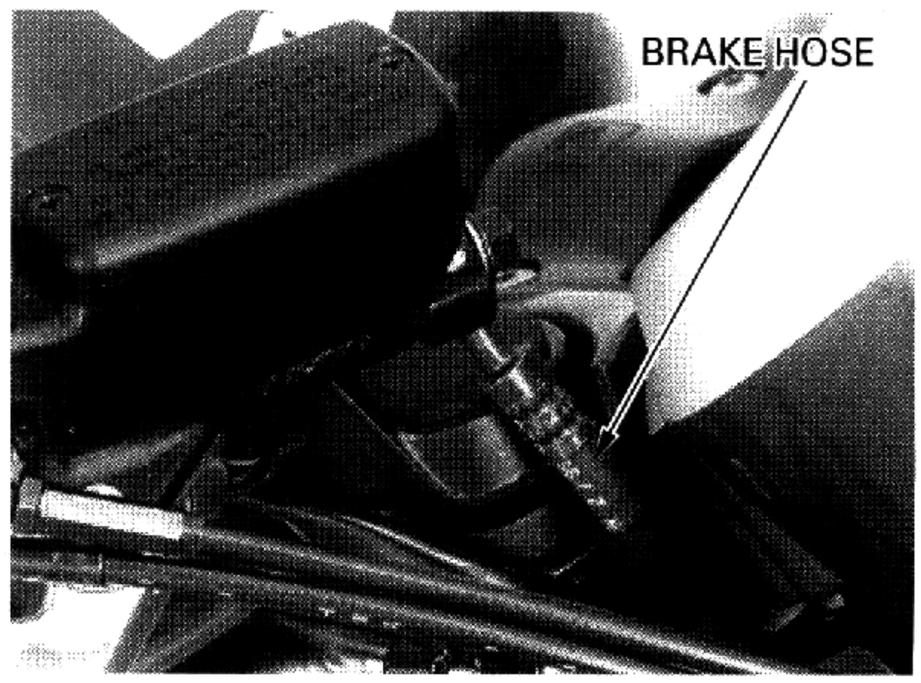
Apply the rear brake pedal.
Make sure the front wheel does not turn while the rear brake pedal is applied.



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

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

Refer to page 15-5 for brake bleeding procedures.



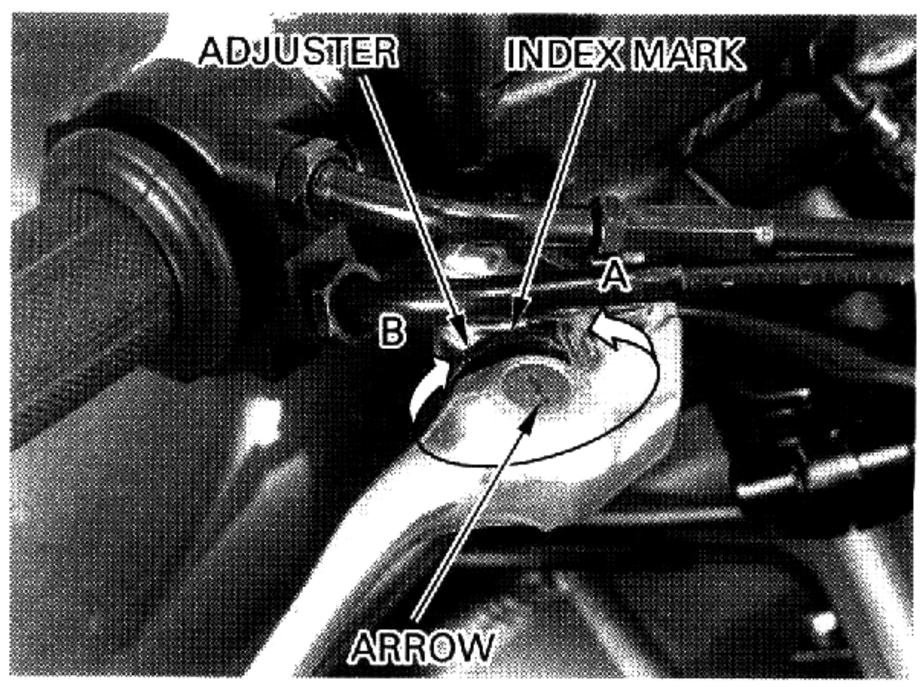
BRAKE LEVER ADJUSTMENT

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

DIRECTION A: Brake lever further away from the grip
DIRECTION B: Brake lever closer to the grip

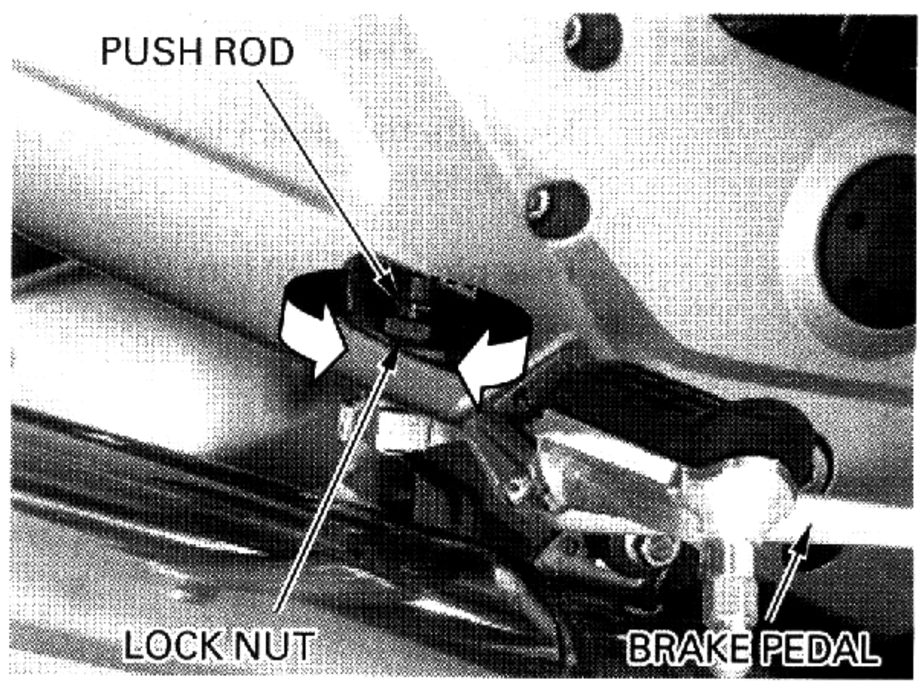
CAUTION:

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



BRAKE PEDAL HEIGHT ADJUSTMENT

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

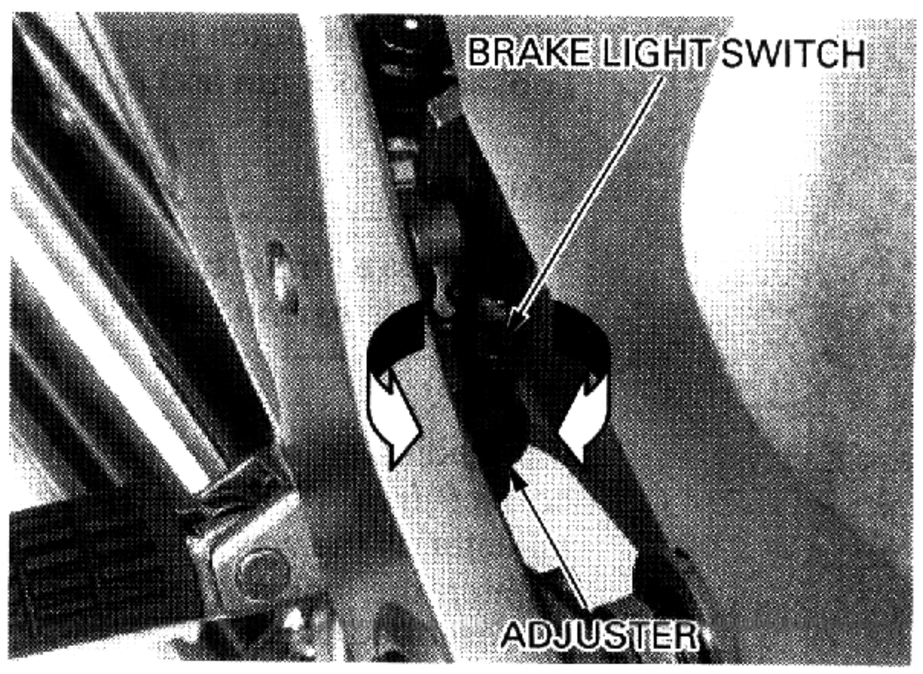


BRAKE LIGHT SWITCH

NOTE:

The front brake light switch does not require adjustment.

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



HEADLIGHT AIM

⚠WARNING

An improperly adjusted headlight may blind oncoming drivers, or it may fall to light the road for a safe distance.

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

Place the motorcycle on a level surface.

Adjust the headlight beam vertically by loosening the headlight case mounting bolts and move the headlight case .

Horizontally beam adjustment are made using the horizontal beam adjusting screw.
A clockwise rotation moves the beam toward the right side of the rider.

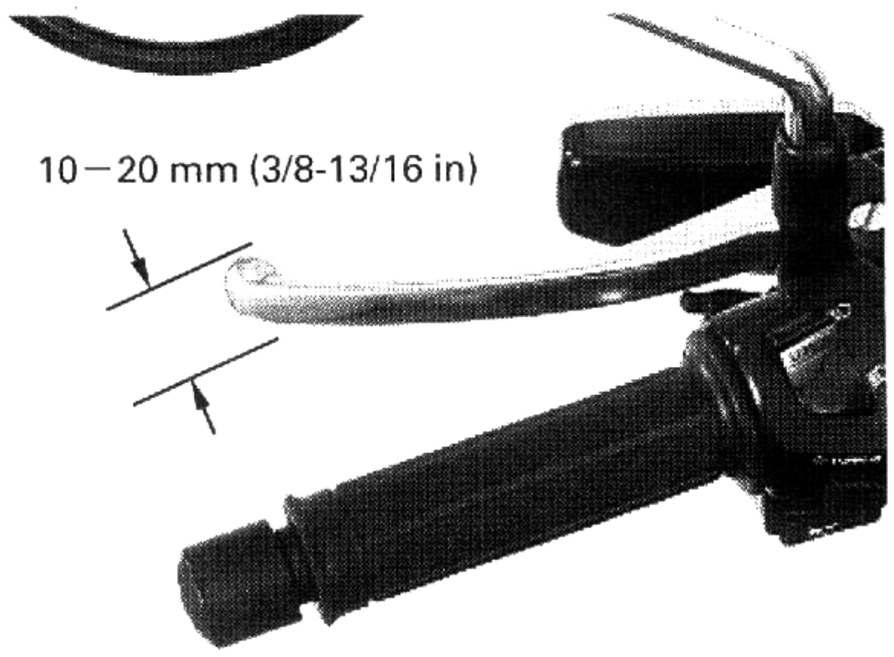




CLUTCH SYSTEM

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

Free play: 10—20 mm (3/8—13/16 in)

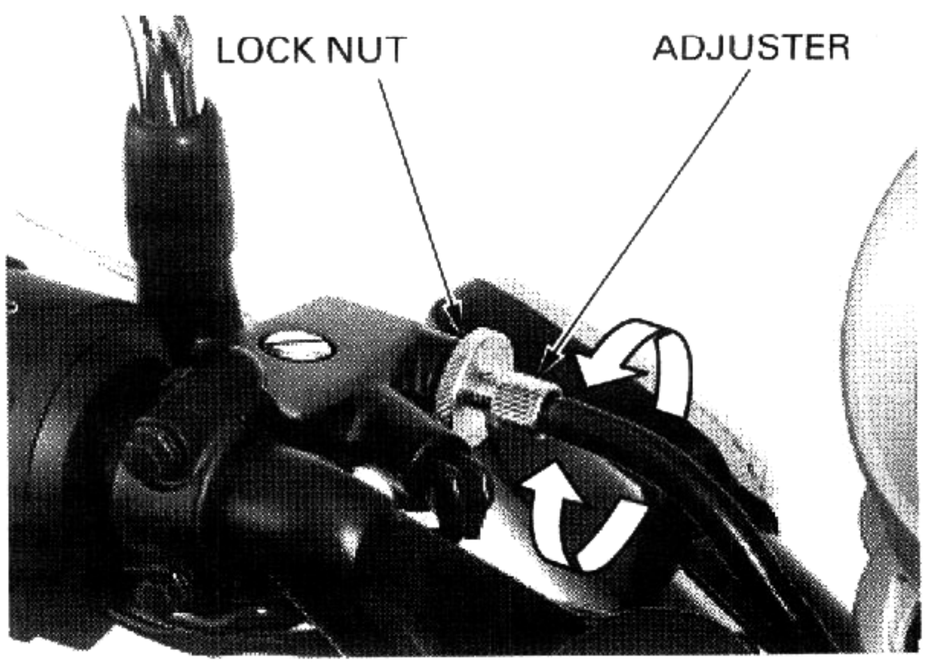


Minor adjustments are made using the upper adjuster at the clutch lever.
Loosen the lock nut and turn the adjuster.

CAUTION:

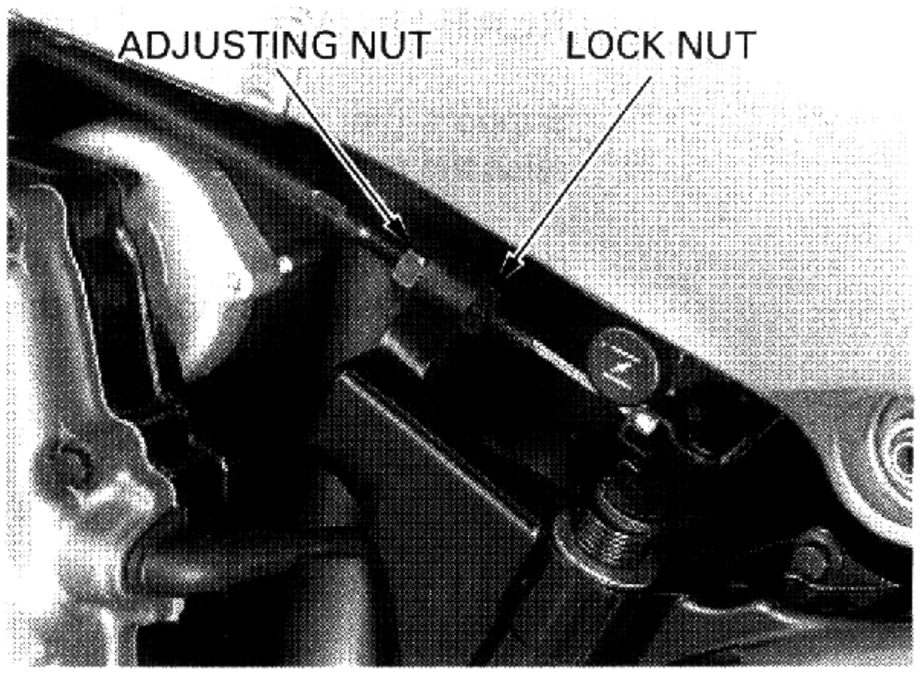
The adjuster may be damaged if it is positioned too far out, leaving minimal thread engagement.

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



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

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

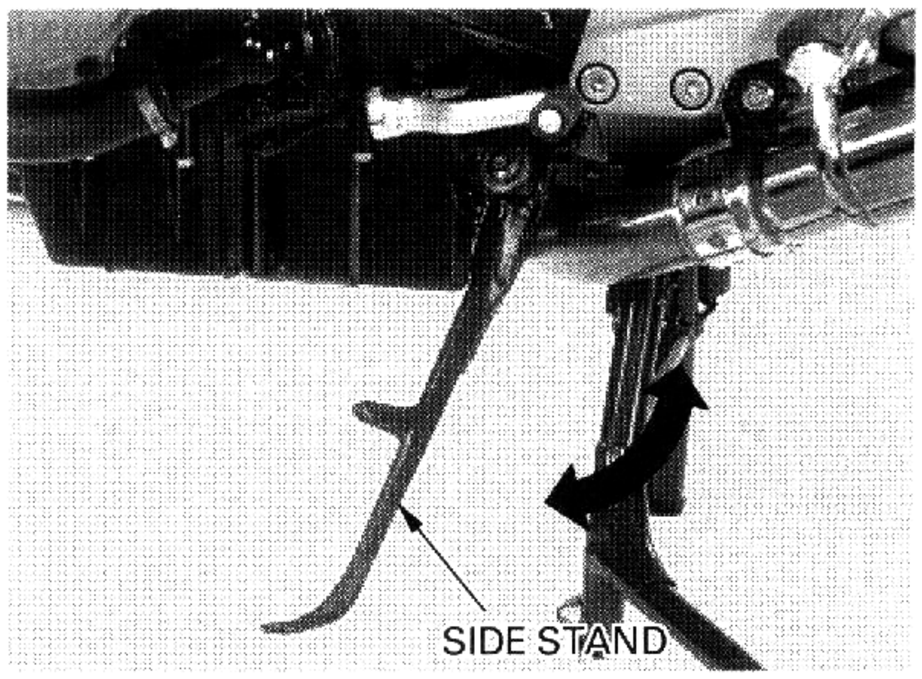


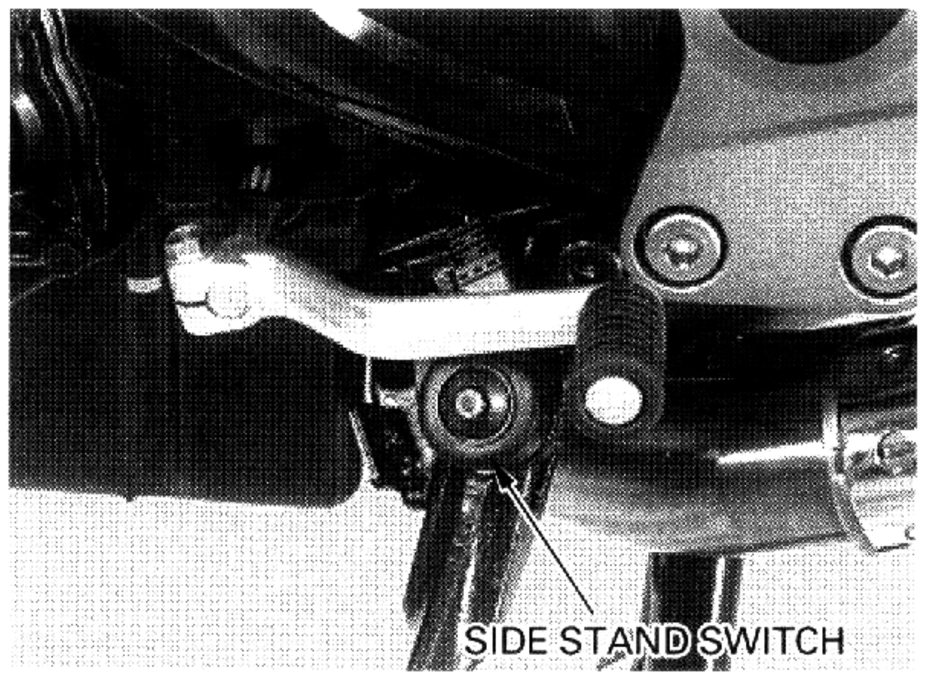
SIDE STAND

Support the motorcycle on a lever surface.

Check the side stand spring for damage or loss of tension.
Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.
Check the side stand ignition cut-off system:
- Sit astride the motorcycle and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, with the clutch lever squeezed.
- Move the side stand full down.
- The engine should stop as the side stand is lowered.

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





SUSPENSION

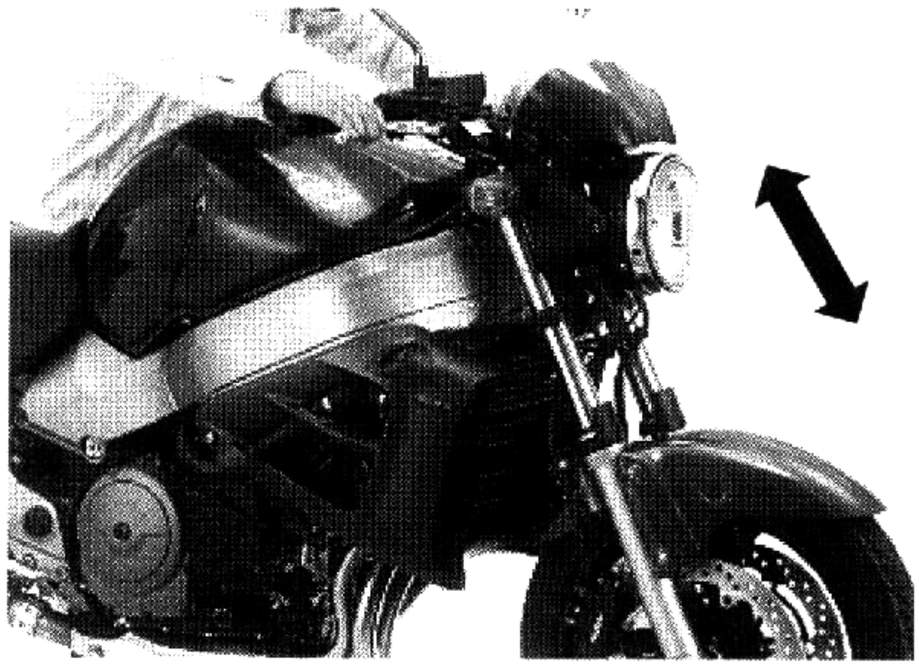
⚠WARNING

Loose, worn or damaged suspension parts impair motorcycle stability and control. Repair or replace any damaged components before riding. Riding a motorcycle with faulty suspension increases your risk of an accident and possible injury.

FRONT SUSPENSION INSPECTION

Check the action of the forks by operating the front brakes and compressing the front suspension several times.
Check the entire assembly for signs of leaks, damage or loose fasteners.
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.

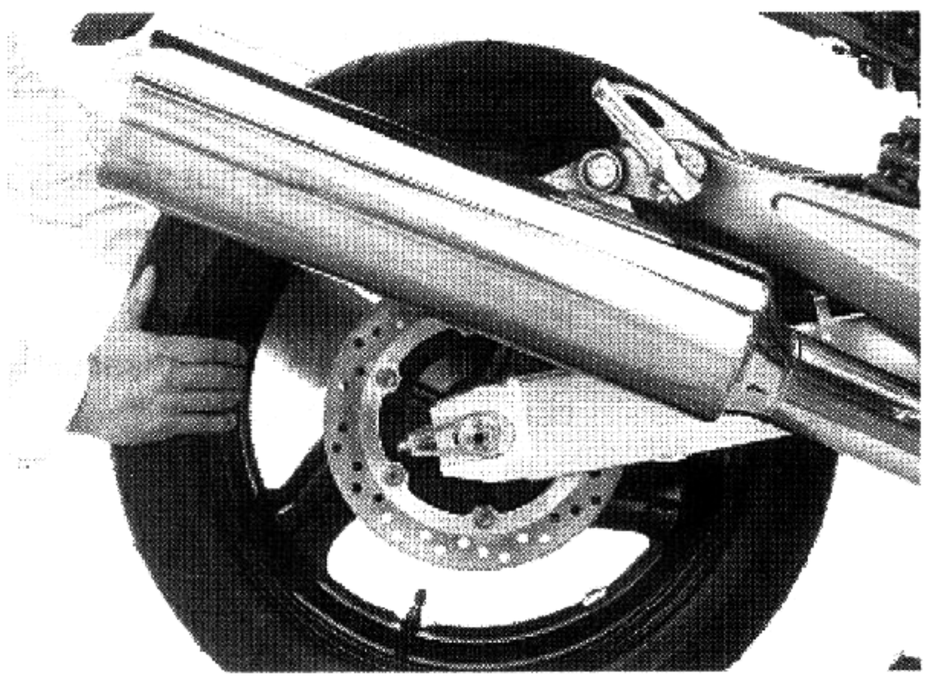
Refer to section 13 for fork service.



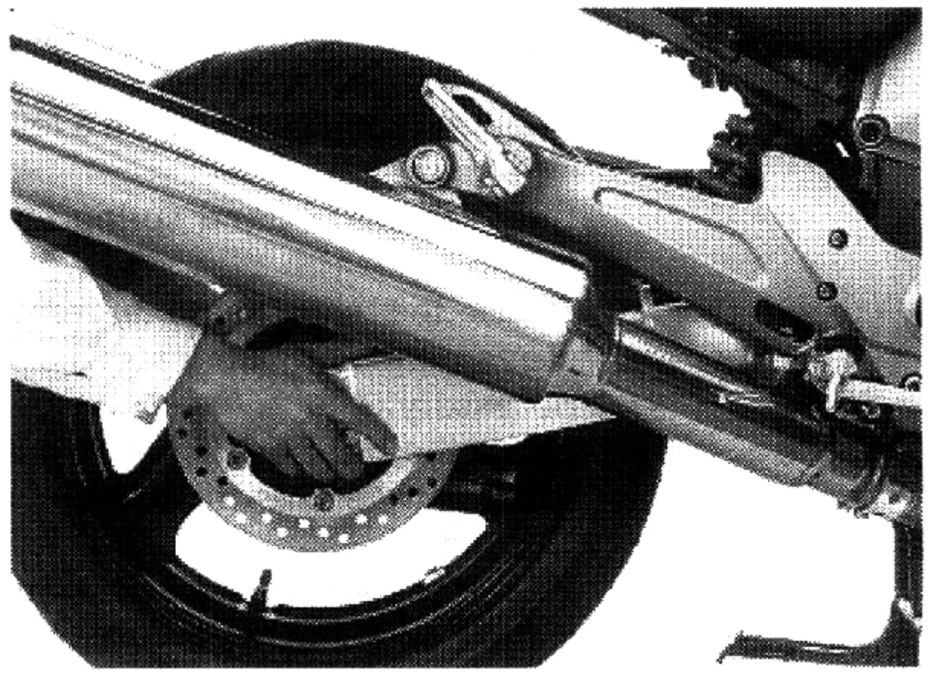
REAR SUSPENSION INSPECTION

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

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

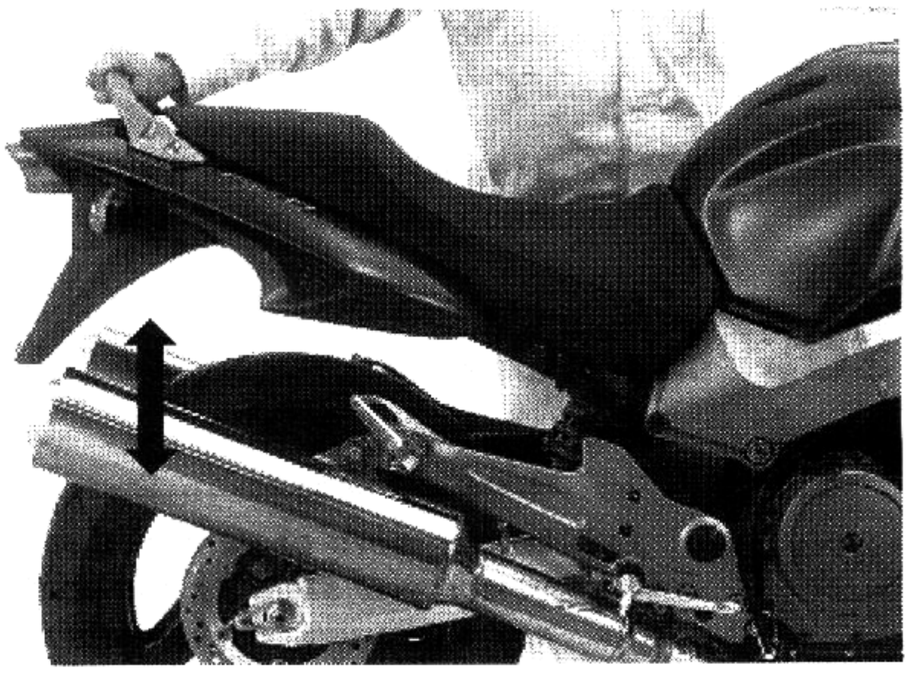


Check for worn swingarm bearings by grabbing the rear swingarm and attempting to move the swingarm side to side.
Replace the bearings if any are looseness is noted.



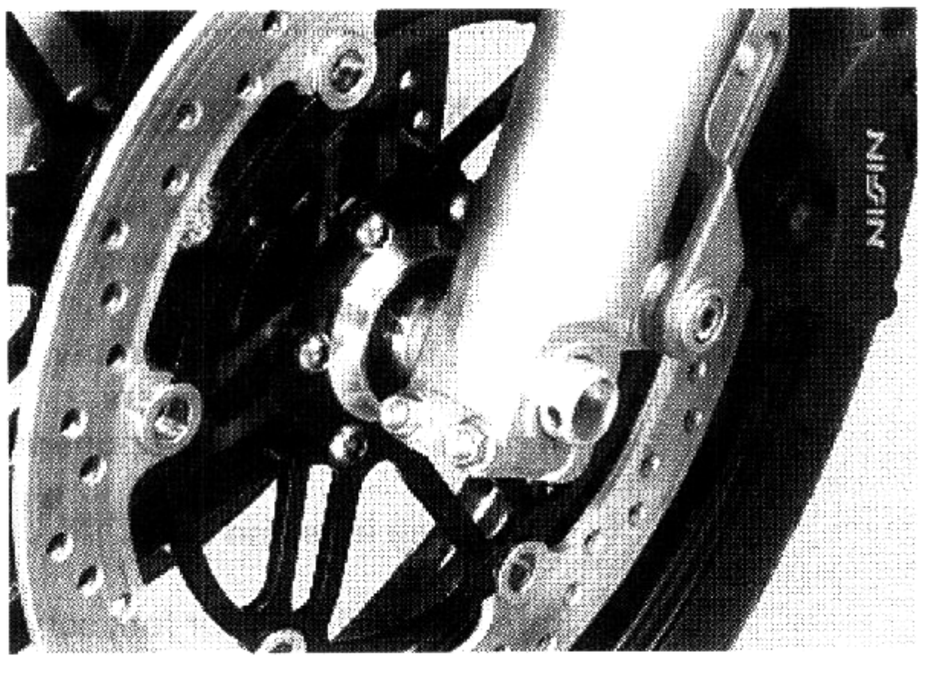
Check the action of the shock absorber by compressing it several times.
Check the entire shock absorber assembly for sings of leaks, damage or loose fasteners.
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.

Refer to section 14 for shock absorber service.

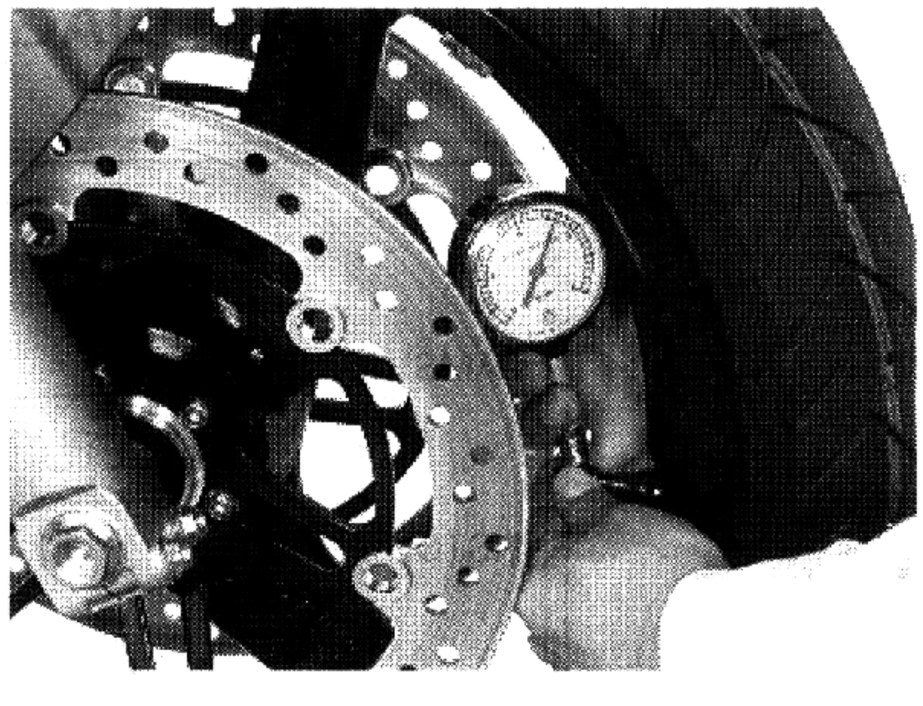


NUTS, BOLTS, FASTENERS

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



WHEELS/TIRES



NOTE:

Tire pressure should be checked when the tires are COLD.

RECOMMENDED TIRE PRESSURE AND TIRE SIZE:

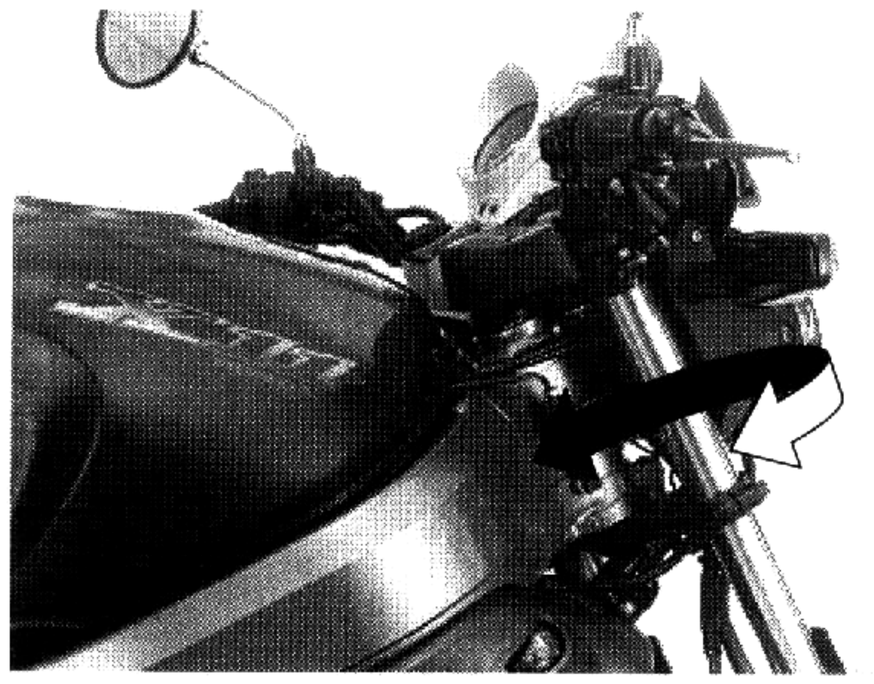
		FRONT	REAR
Tire pressure kPa (kgf/cm², psi)		250 (2.50 , 36)	290 (2.90 , 42)
Tire size		120/70 ZR17 (58W)	180/55 ZR17 (73W)
Tire bland	Bridgestone	BT57F RADIAL G	BT57R RADIAL F
	Michelin	MACADAM 90X G	MACADAM 90X M

Check the tires for cuts, embedded nails, or other damage.
Check the front and rear wheels for trueness (refer to section 13 and 14).

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

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

STEERING HEAD BEARINGS

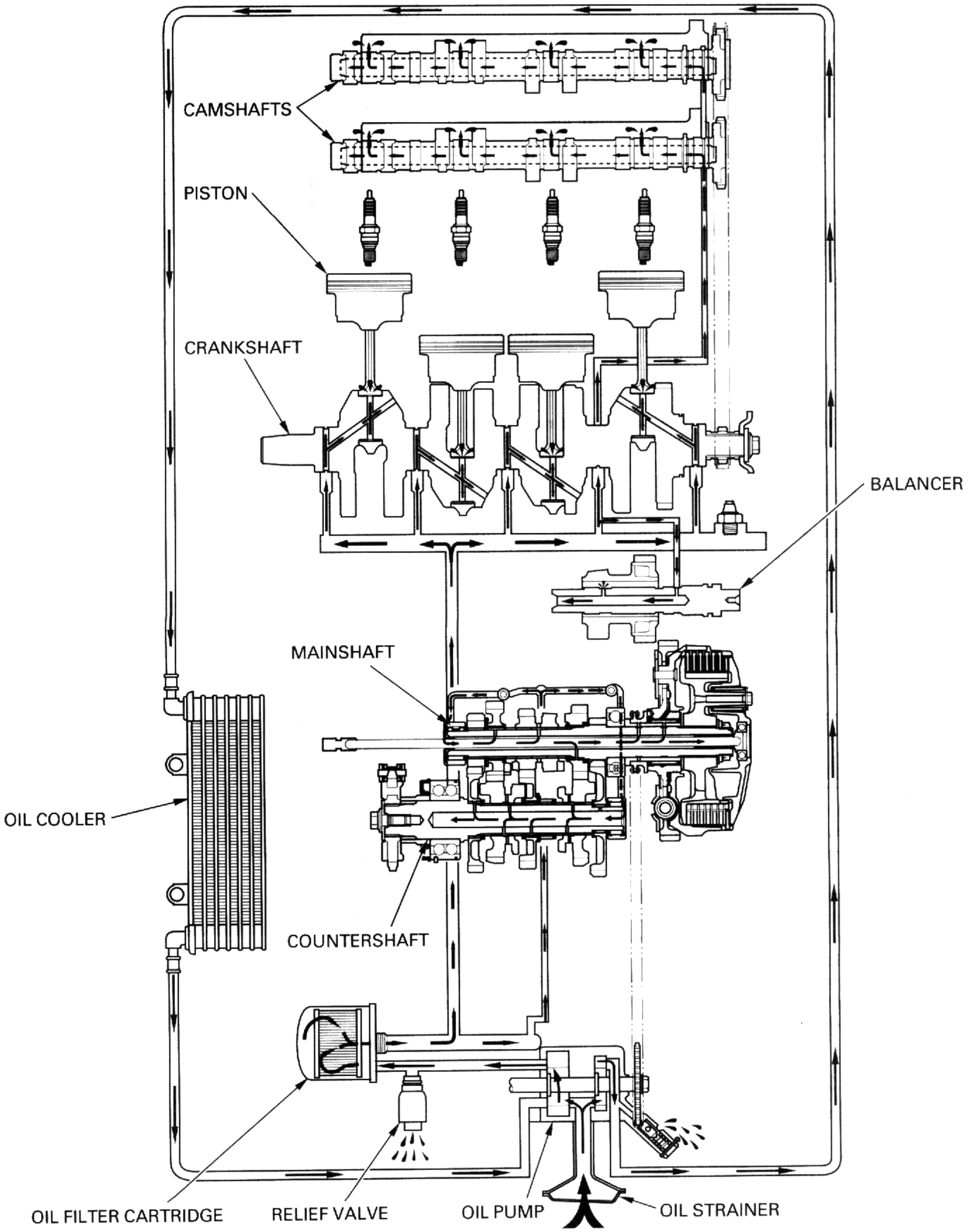


NOTE:

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

Support the motorcycle securely and raise the front wheel off the ground.
Check that the handlebar moves freely from side to side.
If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (Section 13).

LUBRICATION SYSTEM DIAGRAM



4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM	4-0	OIL STRAINER/PRESSURE RELIEF VALVE	4-4
SERVICE INFORMATION	4-1	OIL PUMP	4-7
TROUBLESHOOTING	4-2	OIL COOLER	4-12
OIL PRESSURE INSPECTION	4-3		

SERVICE INFORMATION

GENERAL

⚠WARNING

- ***When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.***
- ***Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil. KEEP OUT OF REACH OF CHILDREN.***

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

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Engine oil capacity		At draining	3.8 ℓ (4.0 US qt , 3.3 Imp qt)	————
		At disassembly	4.6 ℓ (4.9 US qt , 4.0 Imp qt)	————
		At oil filter change	3.9 ℓ (4.1 US qt , 3.4 Imp qt)	————
Recommended engine oil			HONDA 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W−40	————
Oil pressure at oil pressure switch			490 kPa (5.0 kgf/cm², 71 psi) at 5,400 min⁻¹ (rpm)/(80 °C/176 °F)	————
Oil pump rotor	Feed pump	Tip clearance	0.15 (0.006) max.	0.20 (0.008)
		Body clearance	0.15−0.21 (0.006−0.008)	0.35 (0.014)
		Side clearance	0.04−0.09 (0.002−0.004)	0.12 (0.005)
	Cooler pump	Tip clearance	0.15 (0.006) max.	0.20 (0.008)
		Body clearance	0.15−0.21 (0.006−0.008)	0.35 (0.014)
		Side clearance	0.04−0.09 (0.002−0.004)	0.12 (0.005)

TORQUE VALUES

Oil drain bolt	29 N·m (3.0 kgf·m , 22 lbf·ft)	
Oil filter boss	18 N·m (1.8 kgf·m , 13 lbf·ft)	Apply a locking agent to the threads
Oil pump assembly flange bolt	13 N·m (1.3 kgf·m , 9 lbf·ft)	CT bolt
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m , 11 lbf·ft)	Apply a locking agent to the threads
Oil strainer nut	12 N·m (1.2 kgf·m , 9 lbf·ft)	U-nut
Oil filter cartridge	10 N·m (1.0 kgf·m , 7 lbf·ft)	Apply clean engine oil to the O-ring
Oil pressure switch	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply sealant to the threads
Oil pressure switch wire terminal screw	2 N·m (0.2 kgf·m , 1.4 lbf·ft)	
Oil pipe mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply a locking agent to the threads

TOOLS

Oil pressure gauge	07506-3000000
Oil pressure gauge attachment	07510-4220100
Oil filter wrench	07HAA-PJ70100

TROUBLESHOOTING

Engine oil level too low
- Oil consumption
- External oil leak
- Worn piston ring or incorrect piston ring installation
- Worn valve guide or seal

Low or no oil pressure
- Clogged oil orifice
- Incorrect oil being used

No oil pressure
- Oil level too low
- Oil pump drive sprocket broken
- Oil pump damaged (pump shaft)
- Internal oil leak

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

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

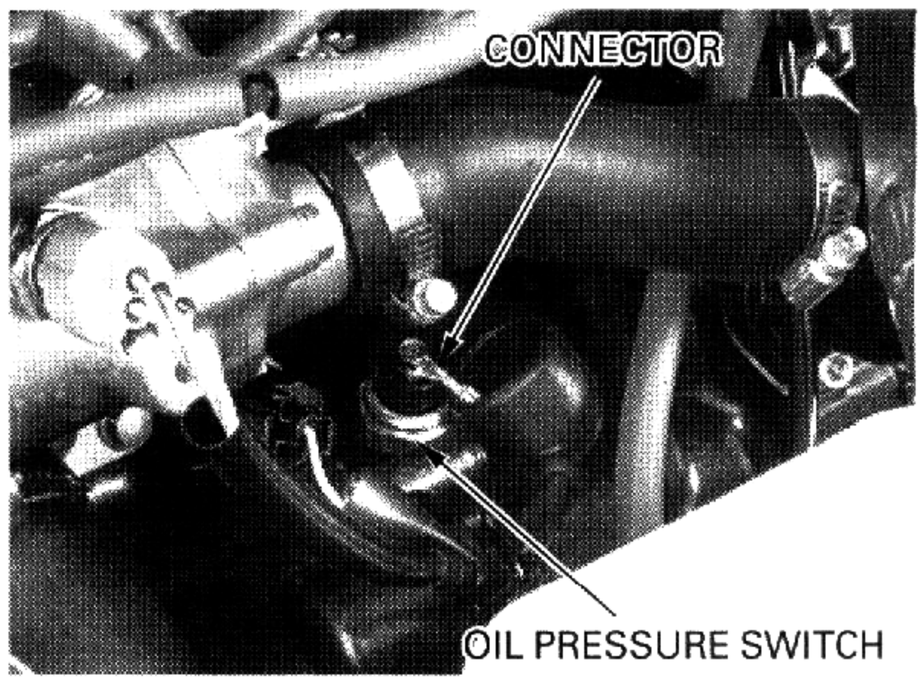
OIL PRESSURE INSPECTION

NOTE:

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

Check the oil level (page 3-15).

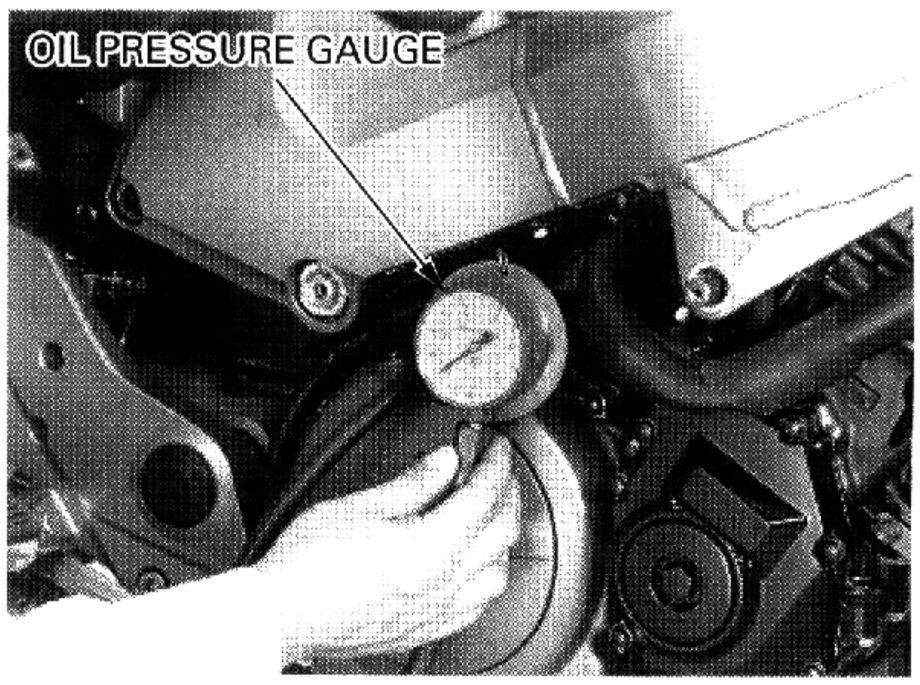
Warm up the engine to normal operating temperature (approximately 80 °C/176 °F).
Stop the engine and disconnect the oil pressure switch wire connector from the switch.



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

TOOLS:

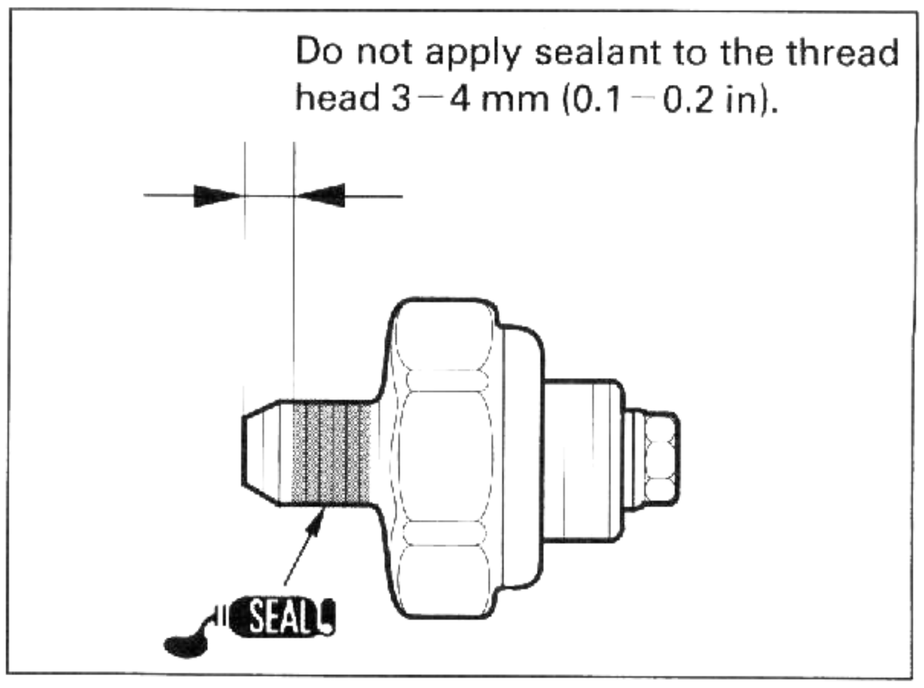
Oil pressure gauge	07506-3000000 (Equivalent commercially available)
Oil pressure gauge attachment	07510-4220100 (Equivalent commercially available)



Start the engine and increase the rpm to 5,400 min^{-1} (rpm) and read the oil pressure.

OIL PRESSURE:
490 kPa (5.0 kgf/cm^2 , 71 psi) at 5,400 min^{-1} (rpm)
(80 °C/176 °F)

Stop the engine and remove the tools.
Apply sealant to the threads of the oil pressure switch.



Install and tighten it to the specified torque.

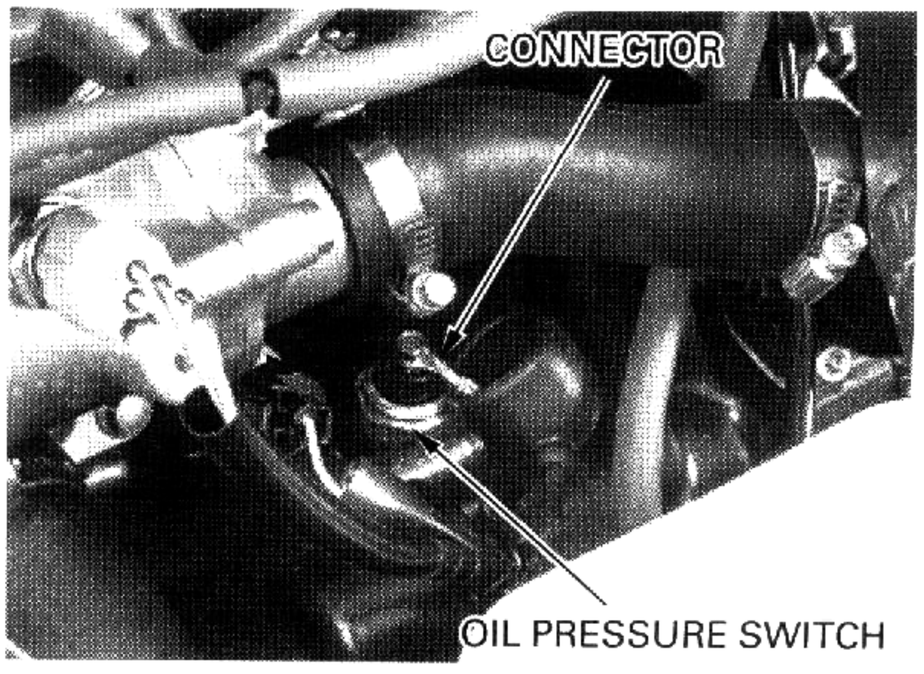
TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

CAUTION:

To prevent crankcase damage, do not overtighten the switch.

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

TORQUE: 2 N·m (0.2 kgf·m , 1.4 lbf·ft)

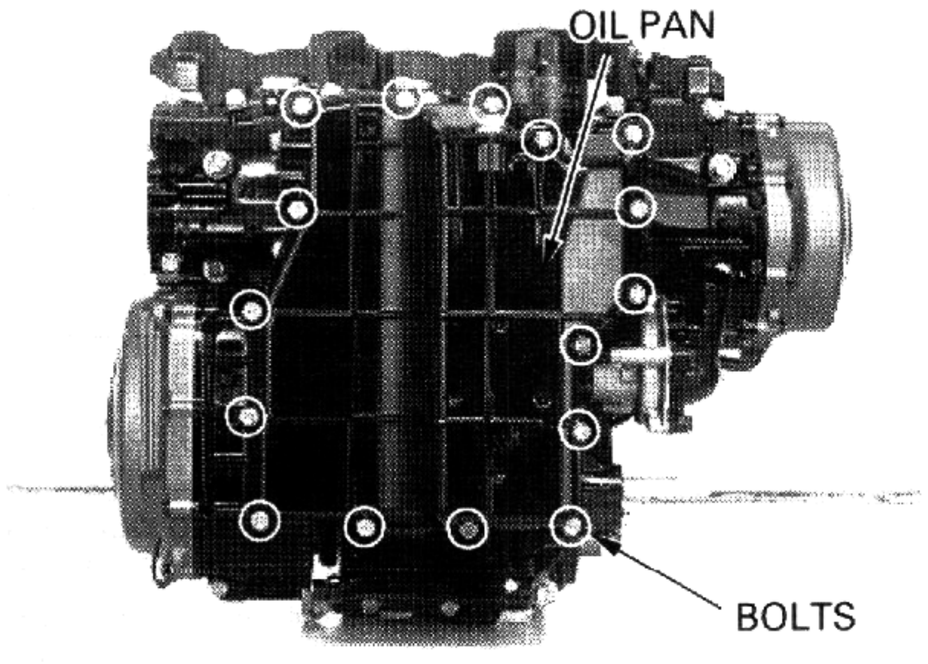


OIL STRAINER/PRESSURE RELIEF VALVE

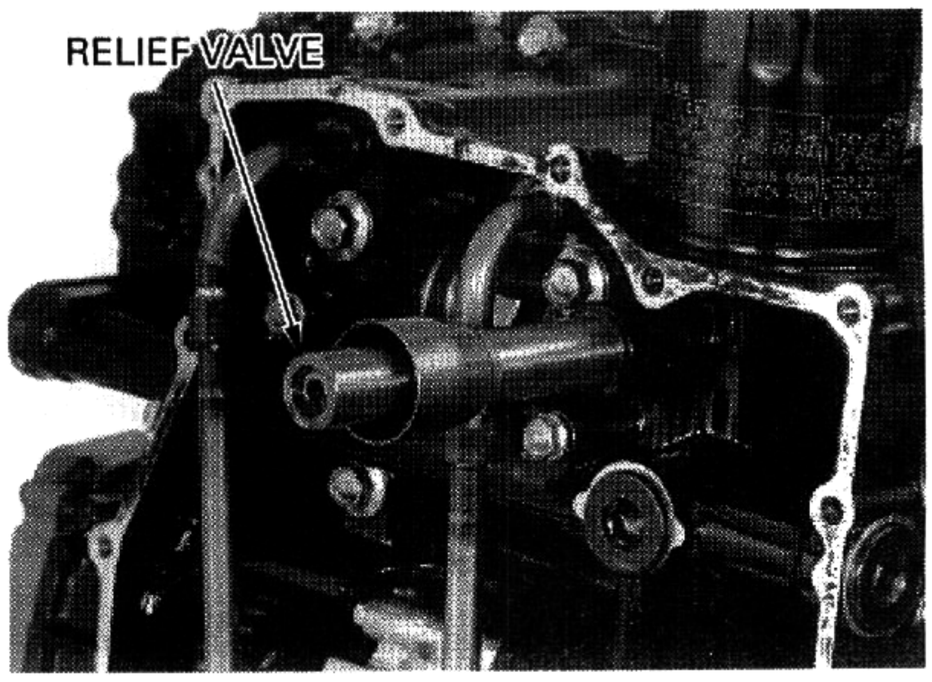
REMOVAL

Drain the engine oil (page 3-16).
Remove the exhaust pipe (page 2-10).

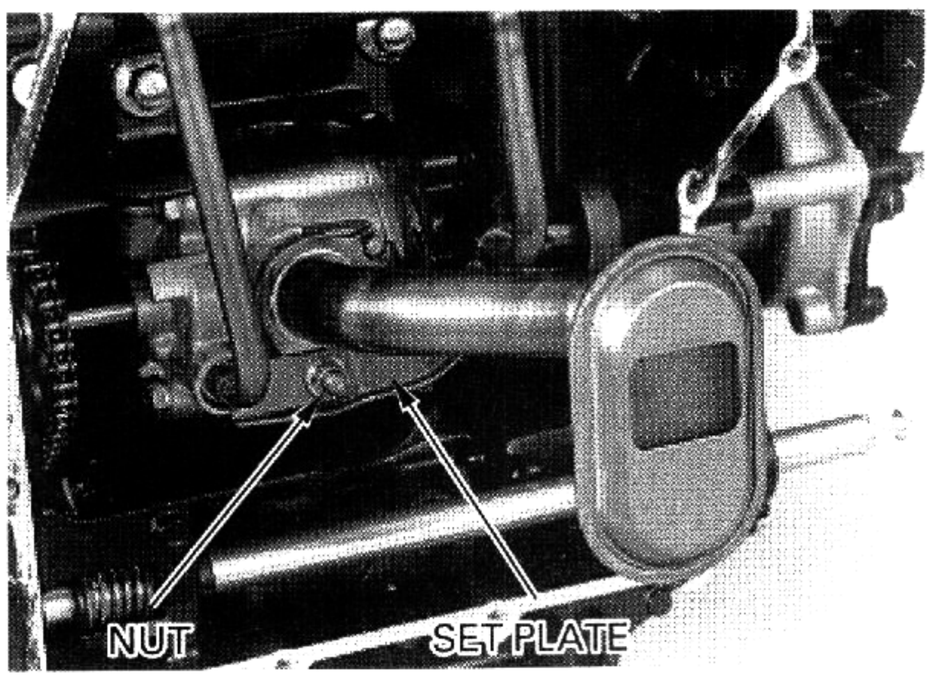
Remove the oil pan flange bolts.
Disconnect the oil return pipe from the lower crankcase and remove the oil pan.



Remove the pressure relief valve and O-ring.

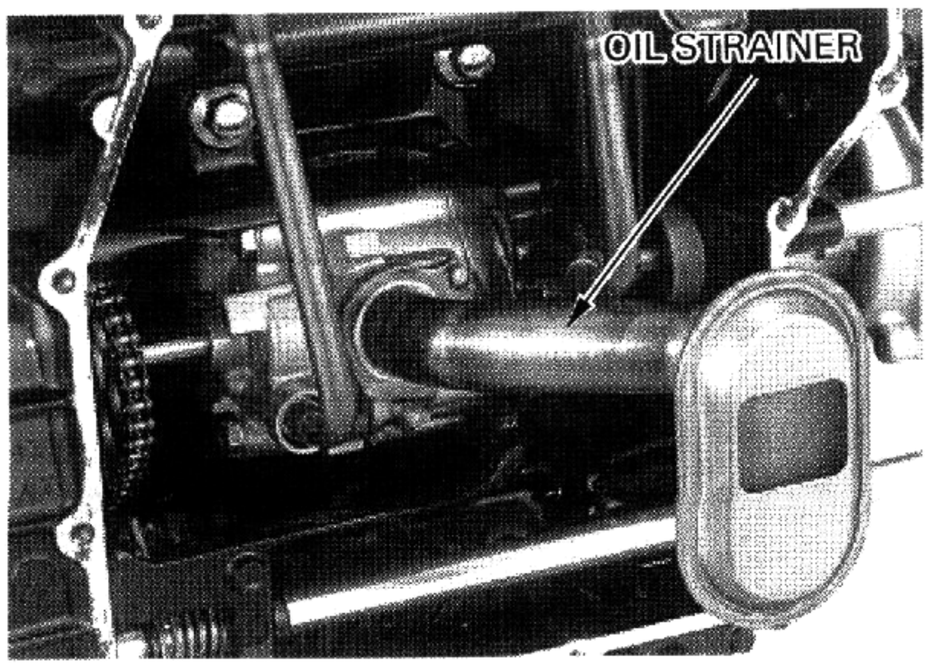


Remove the oil strainer and oil pipe set plate nut and plate.

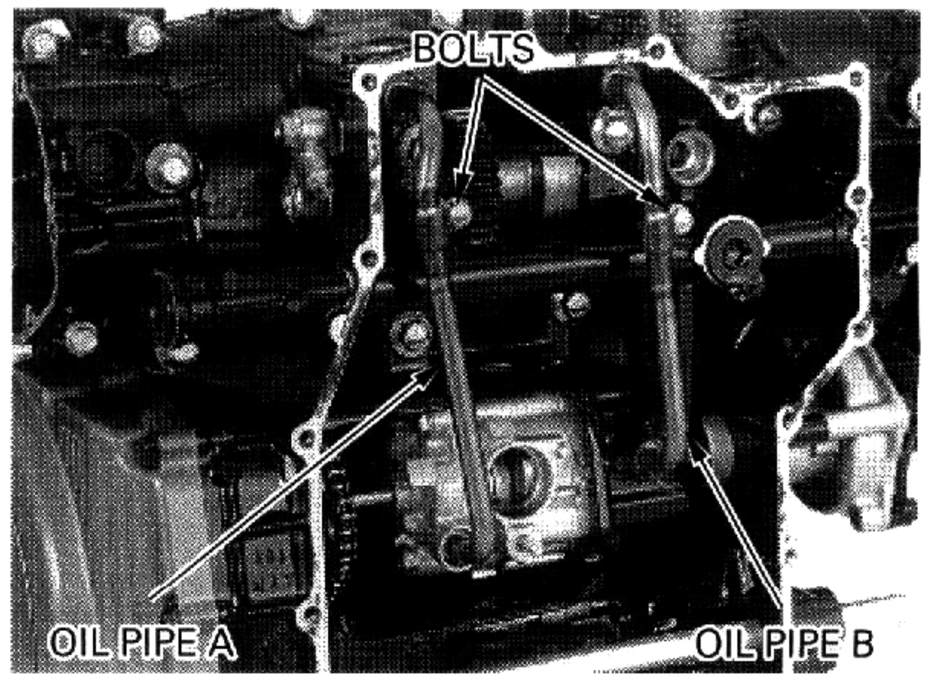


Remove the oil strainer and gasket.

Clean the oil strainer screen.



Remove the bolts, oil pipe A, B and O-rings.

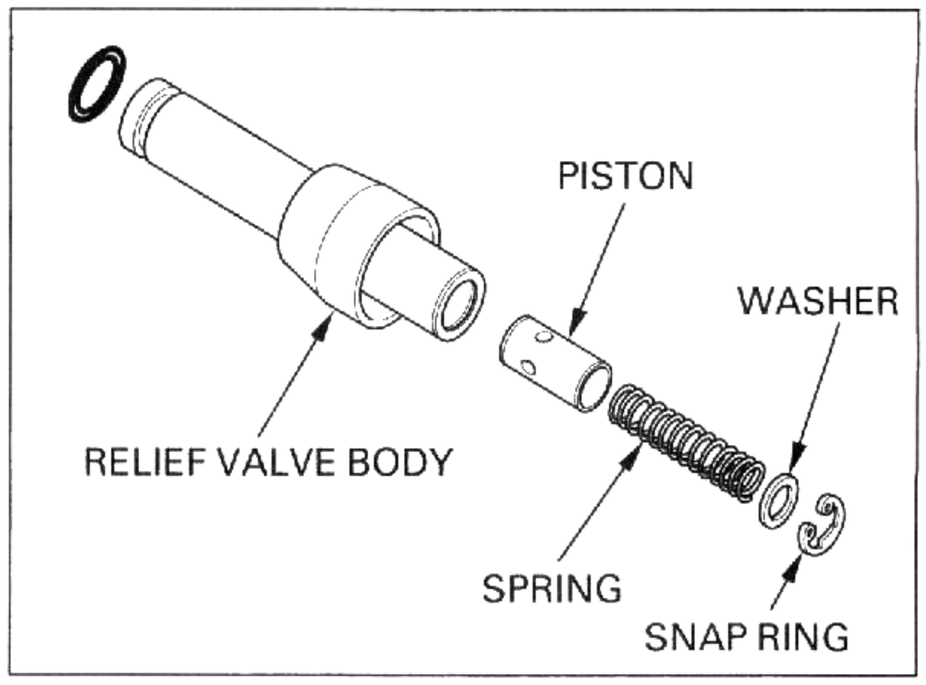


INSPECTION

Check the operation of the pressure relief valve by pushing on the piston.
Disassemble the relief valve by removing the snap ring.

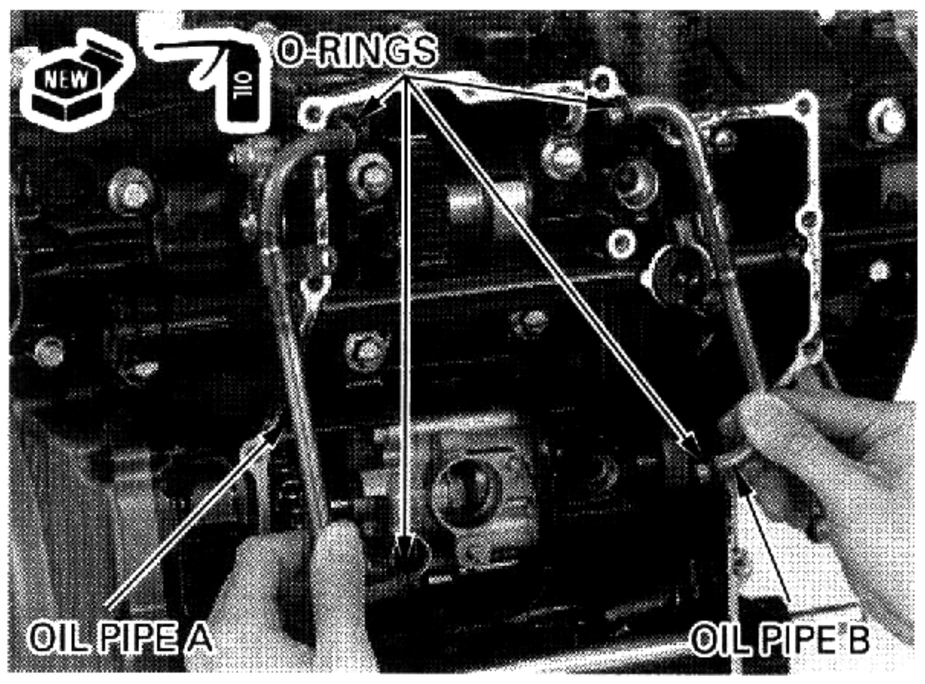
Inspect the piston for wear, sticking or damage.
Inspect the spring for weakness or damage.

Assemble the relief valve in the reverse order of disassembly.



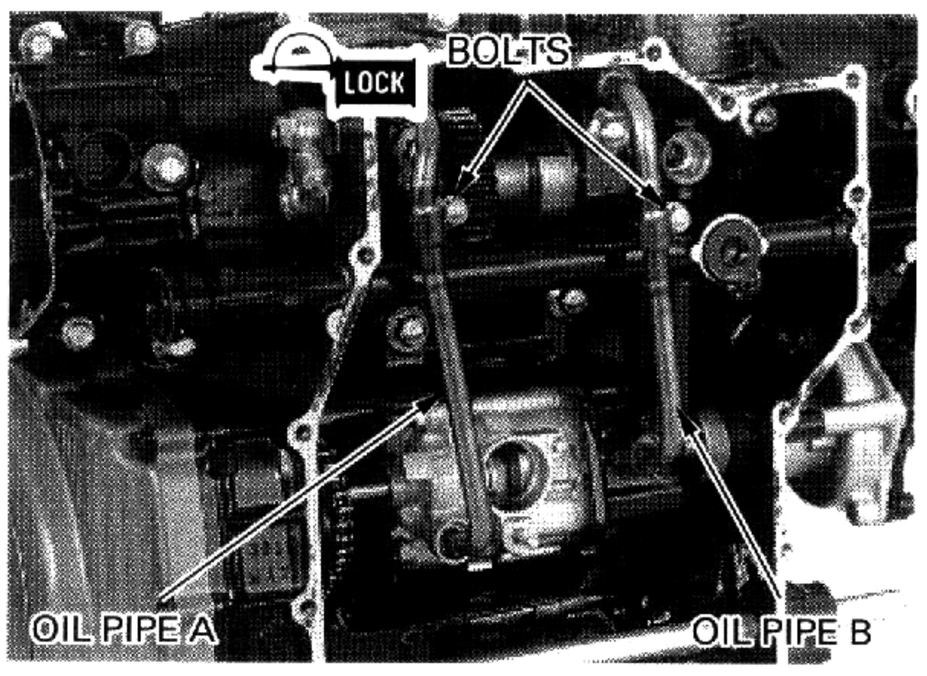
INSTALLATION

Apply oil to the new O-rings and install them onto the oil pipe A and B.
Install the oil pipe A and B into the crankcase.

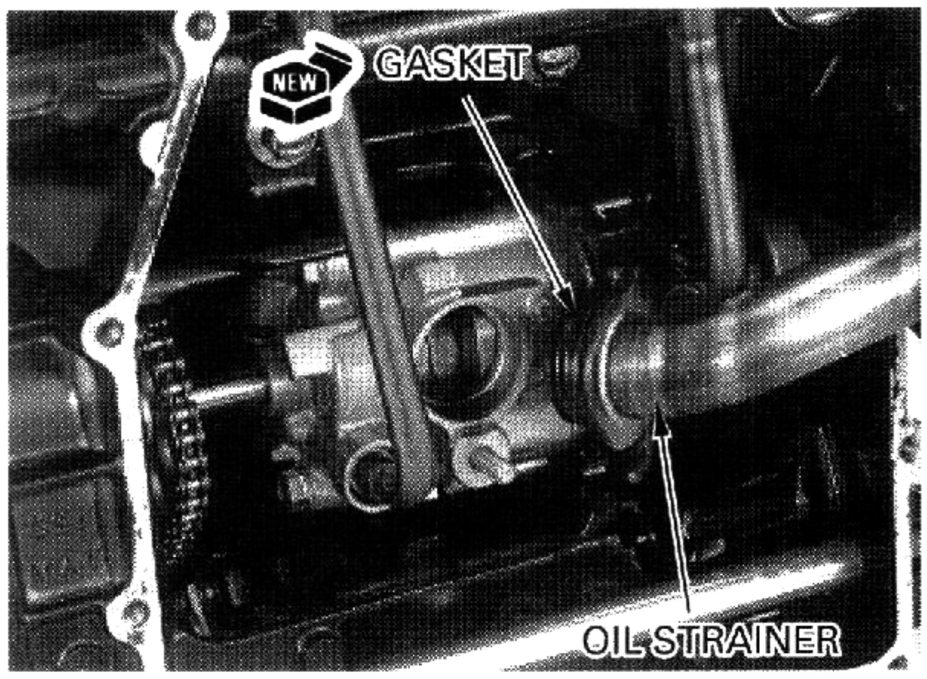


Apply a locking agent to the oil pipe mounting bolt threads.
Install and tighten the oil pipe mounting bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

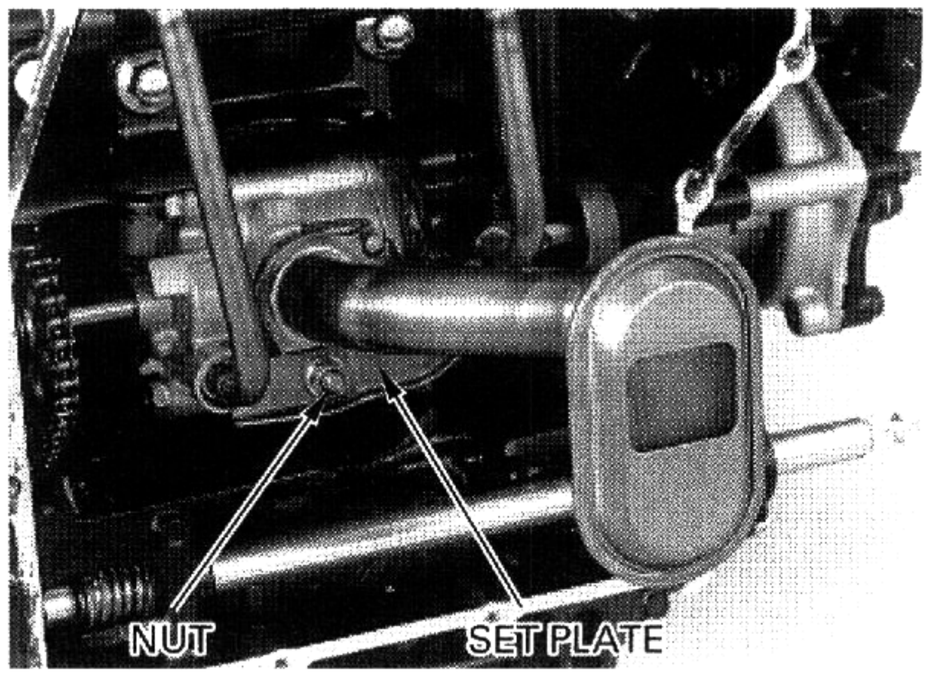


Apply oil to the new gasket and install it onto the oil strainer.
Install the oil strainer into the crankcase while aligning its grooves with the boss and stud bolt in the oil pump body.

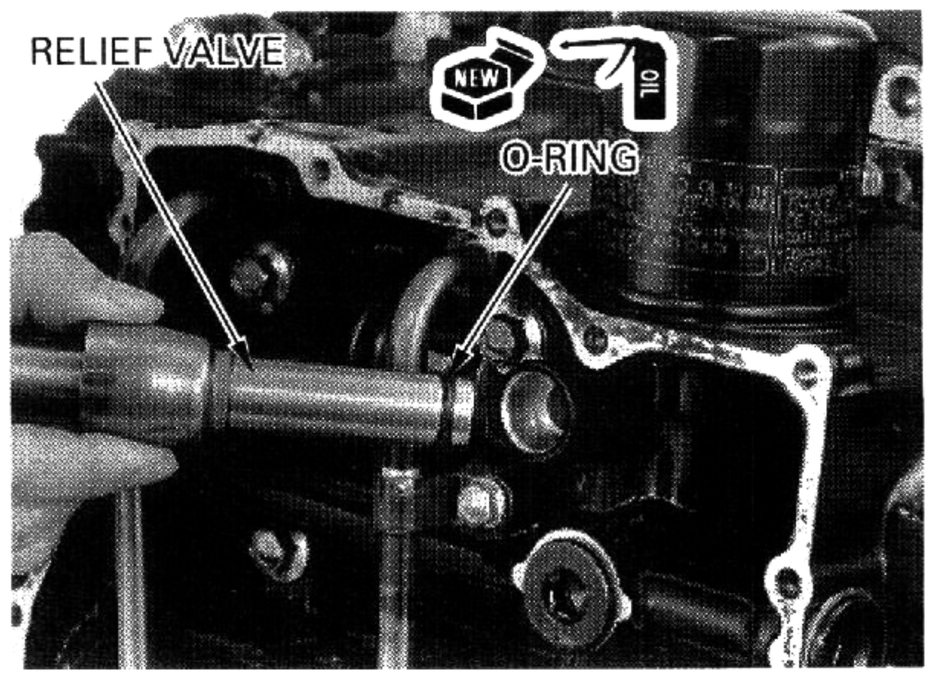


Install the oil strainer set plate aligning its cut-outs with the oil pipes.
Tighten the nut to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



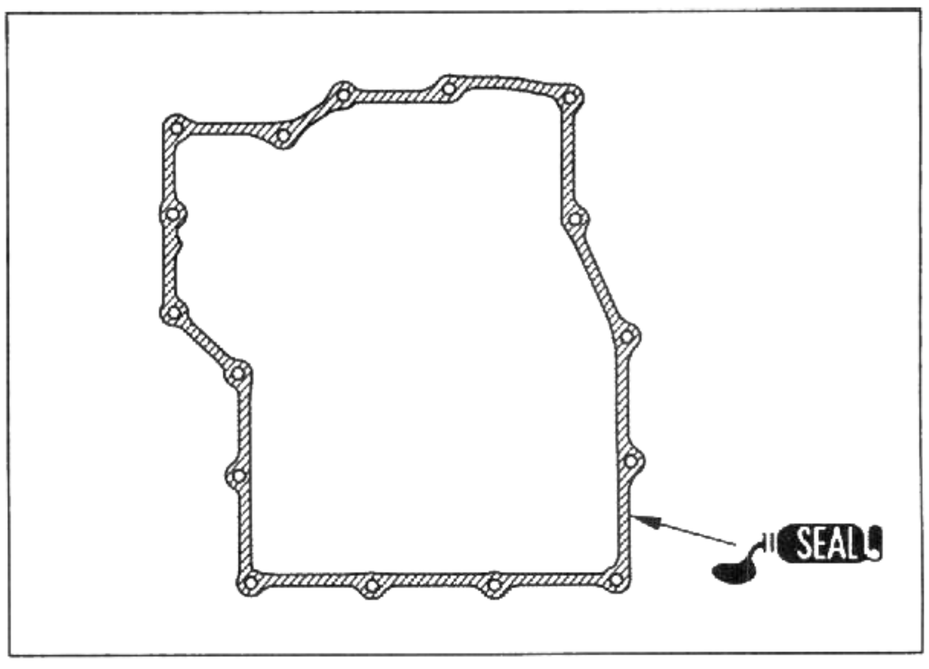
Apply oil to the new O-ring and install it onto the relief valve.
Install the relief valve into the crankcase.



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

CAUTION:

Do not apply sealant more than necessary.

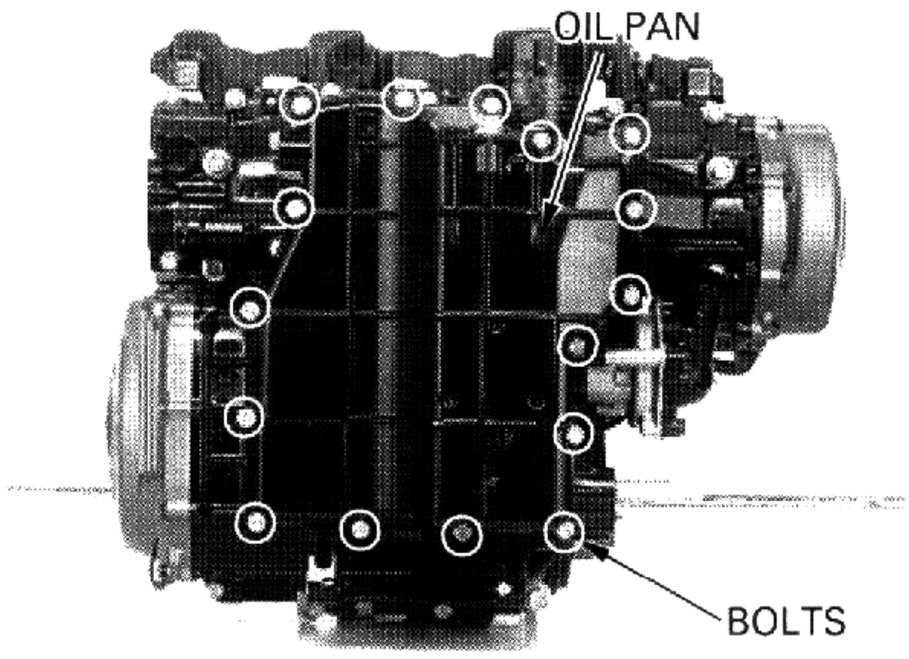


Install the oil pan onto the lower crankcase.
Temporarily tighten the two bolts first, then tighten the all bolts in a crisscross pattern in 2—3 steps.

Install the exhaust pipe (page 2-13).
Fill the crankcase with recommended oil (page 3-16).

NOTE:

After installation, check that there are no oil leaks.

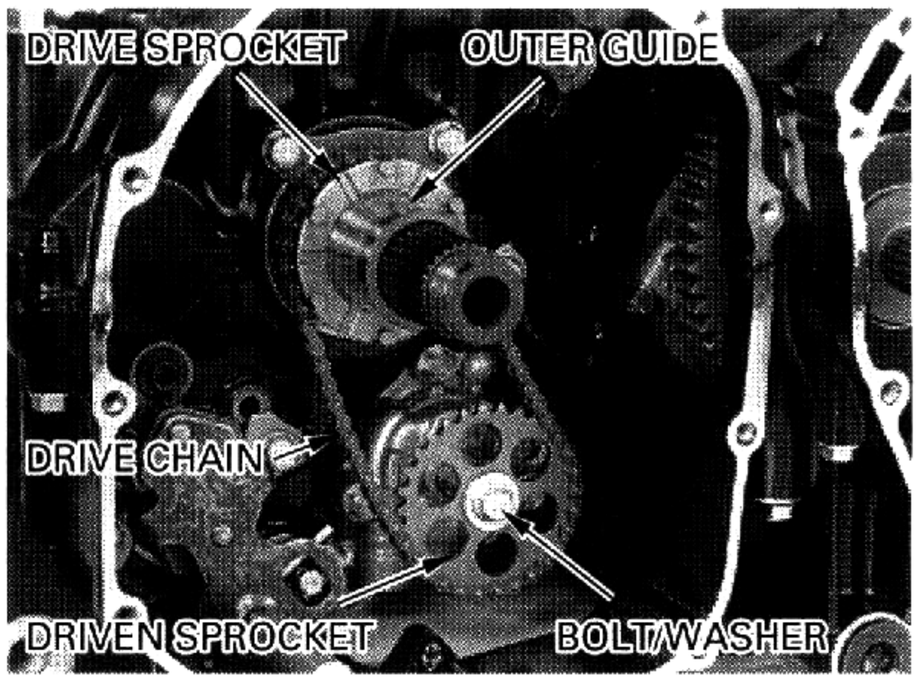


OIL PUMP

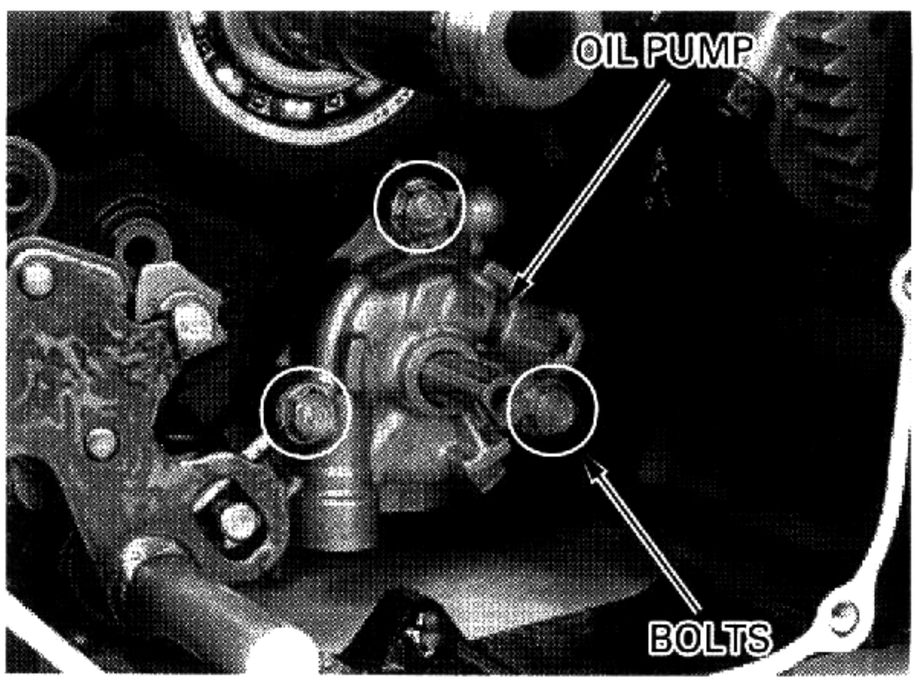
REMOVAL

Remove the following:
—Clutch assembly (page 9-4)
—Oil strainer and oil pipes (page 4-4)

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



Remove the three flange bolts and oil pump assembly.

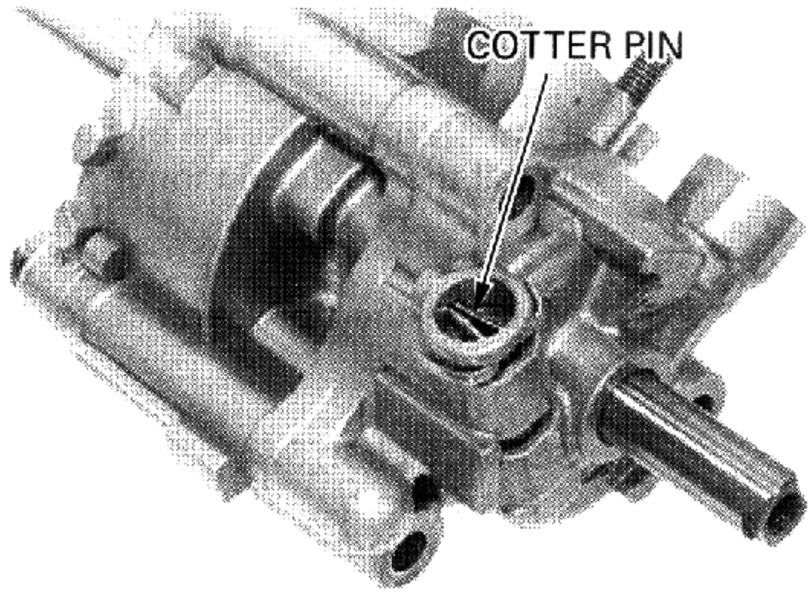


DISASSEMBLY

NOTE:

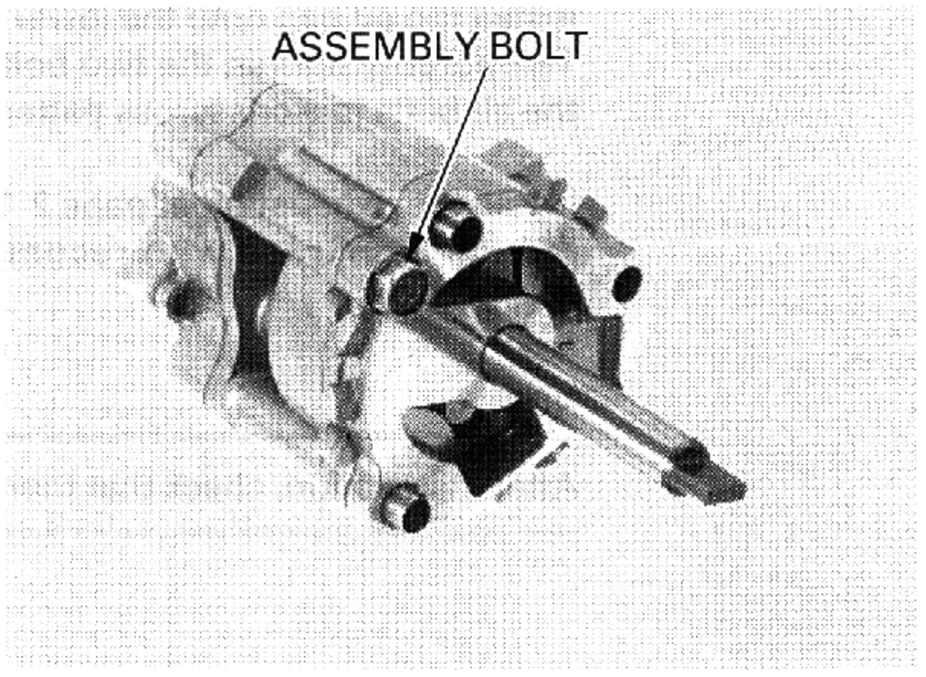
If any portion of the oil pump is worn beyond the specified service limit, replace the oil pump as an assembly.

Straighten and remove the cotter pin.
Remove the valve seat, spring and pressure relief valve.



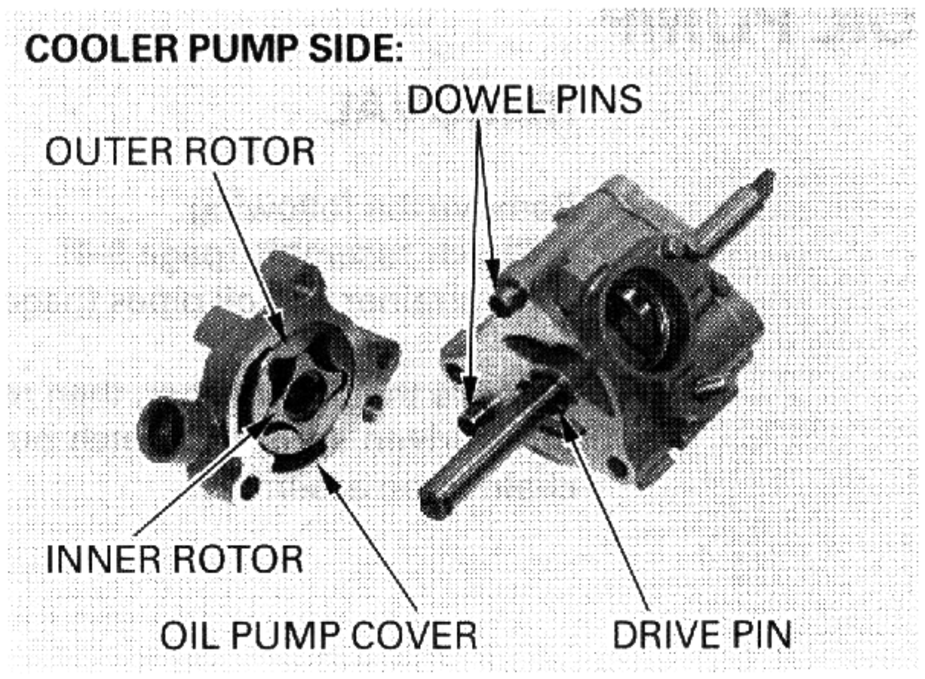
Check the pressure relief valve for wear or damage.

Remove the oil pump assembly bolt.



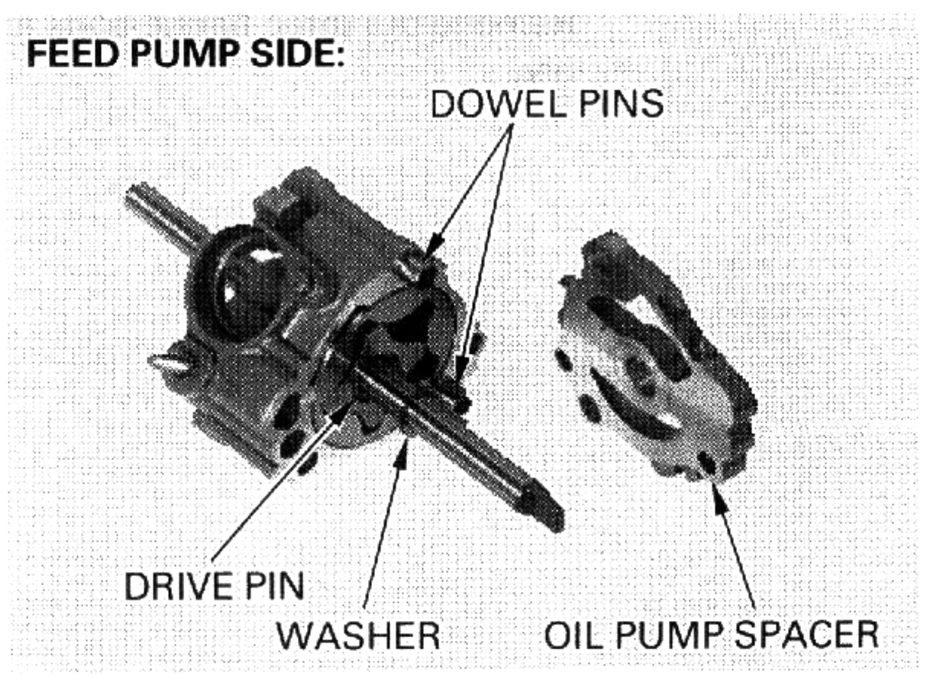
Remove the oil pump cover and dowel pins.

Remove the cooler pump outer rotor and inner rotor.
Remove the drive pin.



Remove the oil pump spacer and dowel pins.

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

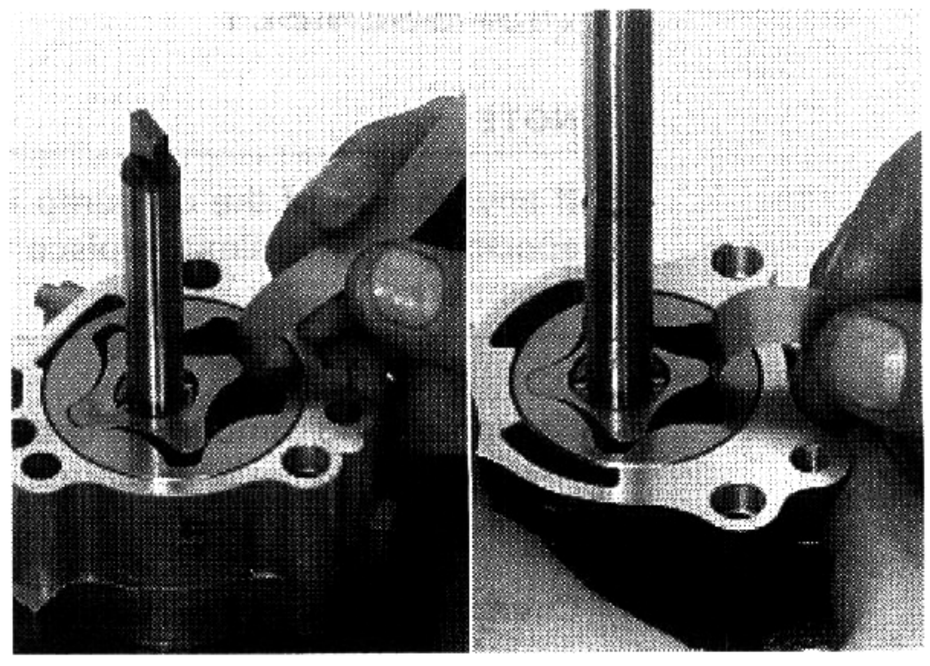


INSPECTION

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

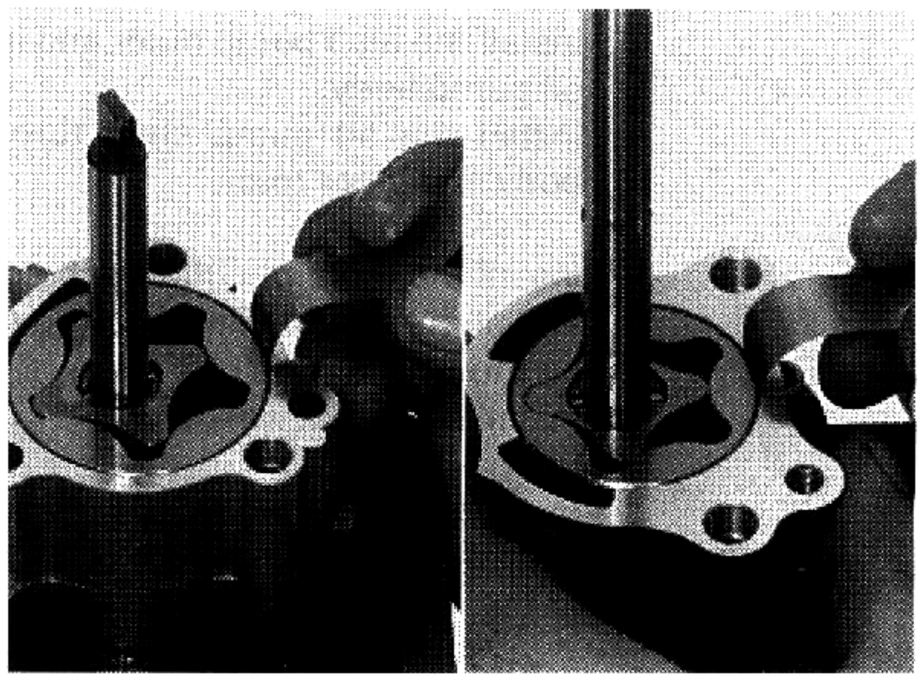
Measure the tip clearance for the feed and cooler pump.

SERVICE LIMITS:
Feed pump: 0.20 mm (0.008 in)
Cooler pump: 0.20 mm (0.008 in)



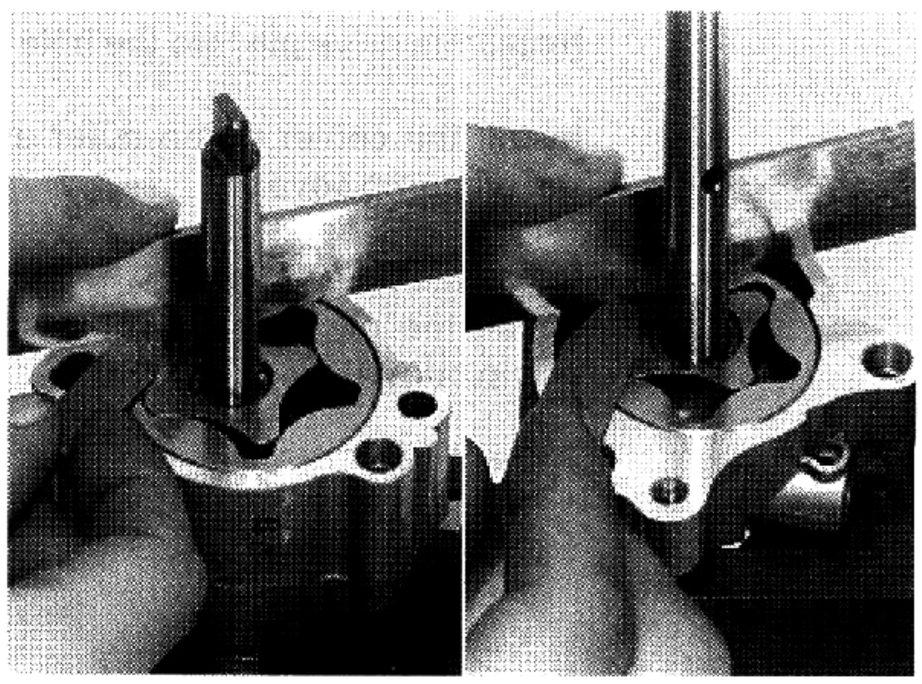
Measure the pump body clearance for the feed and cooler pump.

SERVICE LIMITS:
Feed pump: 0.35 mm (0.014 in)
Cooler pump: 0.35 mm (0.014 in)

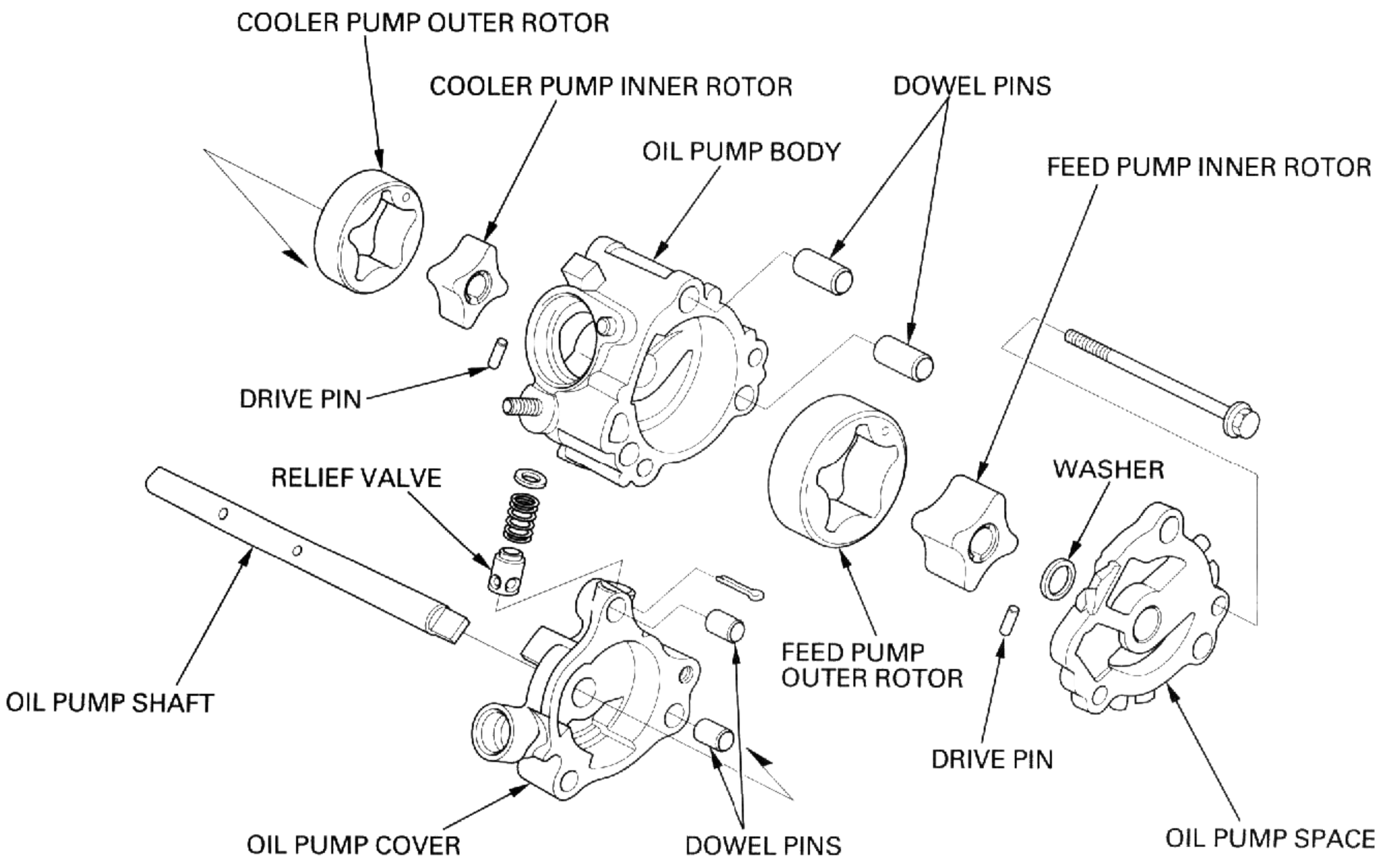


Measure the side clearance for the feed and cooler pump using a straight edge and feeler gauge.

SERVICE LIMITS:
Feed pump: 0.12 mm (0.005 in)
Cooler pump: 0.12 mm (0.005 in)



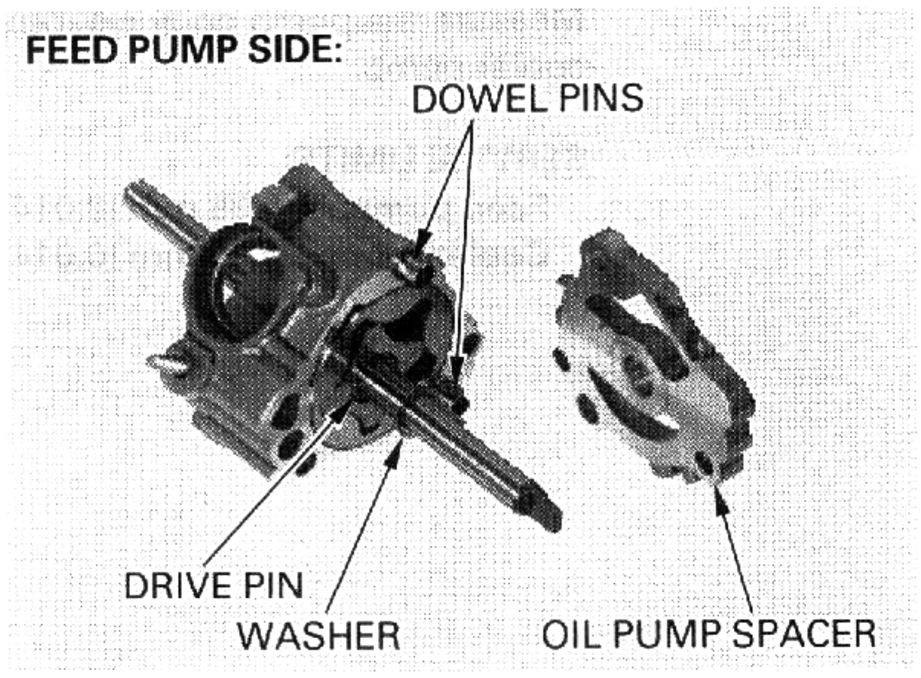
ASSEMBLY



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

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

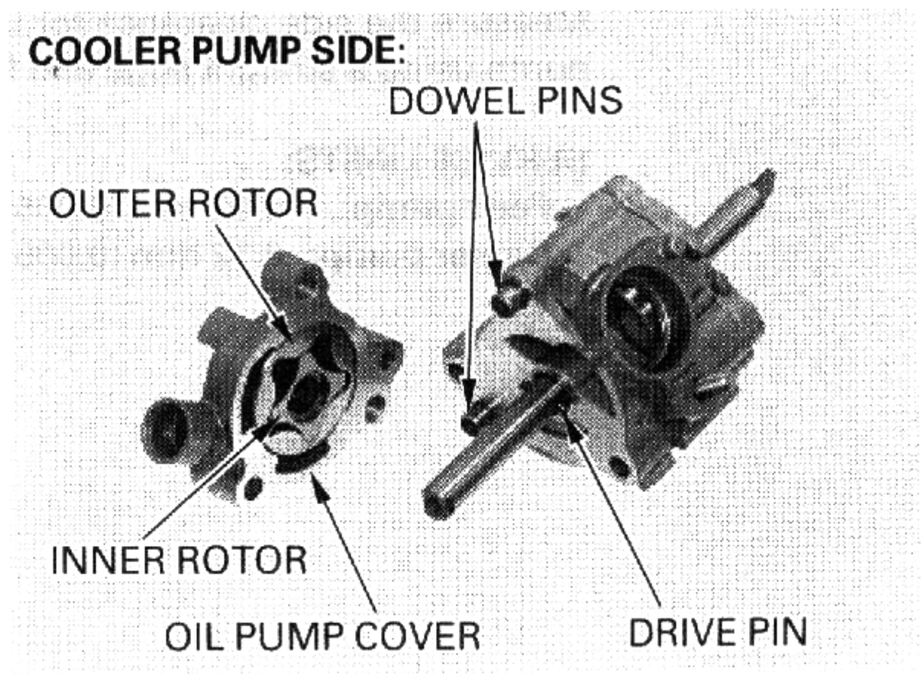
Install the dowel pins and oil pump spacer.



Install the drive pin into the hole in the pump shaft.

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

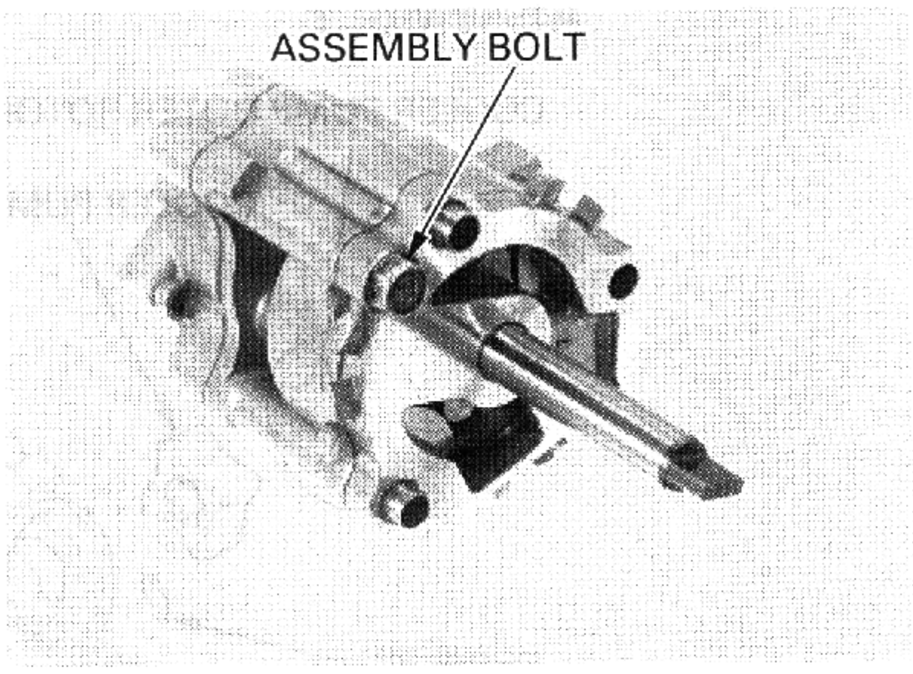
Install the dowel pins.
Install the oil pump cover assembly onto the oil pump body.



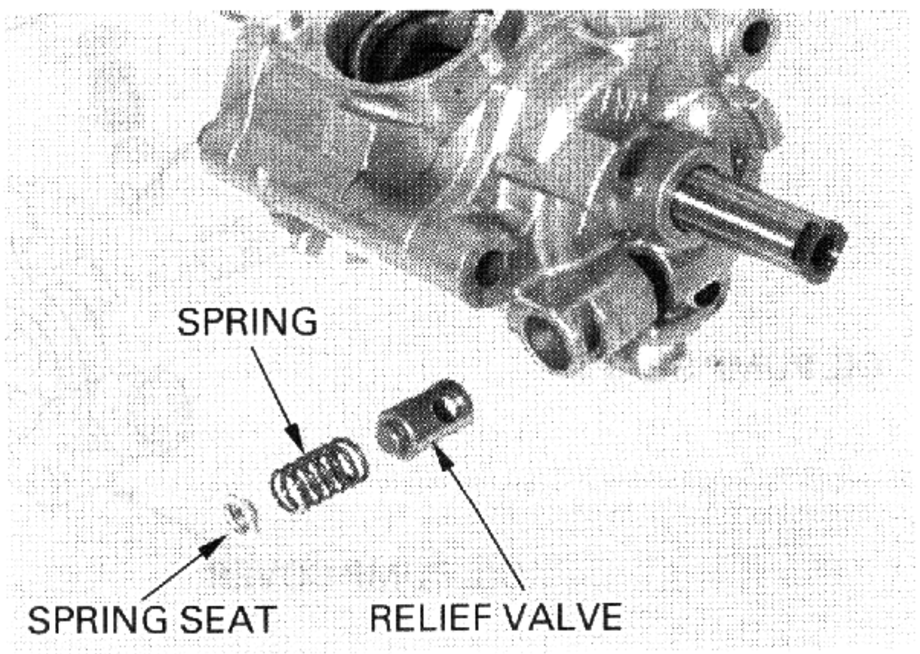
Install and tighten the assembly bolt to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m , 9 lbf·ft)

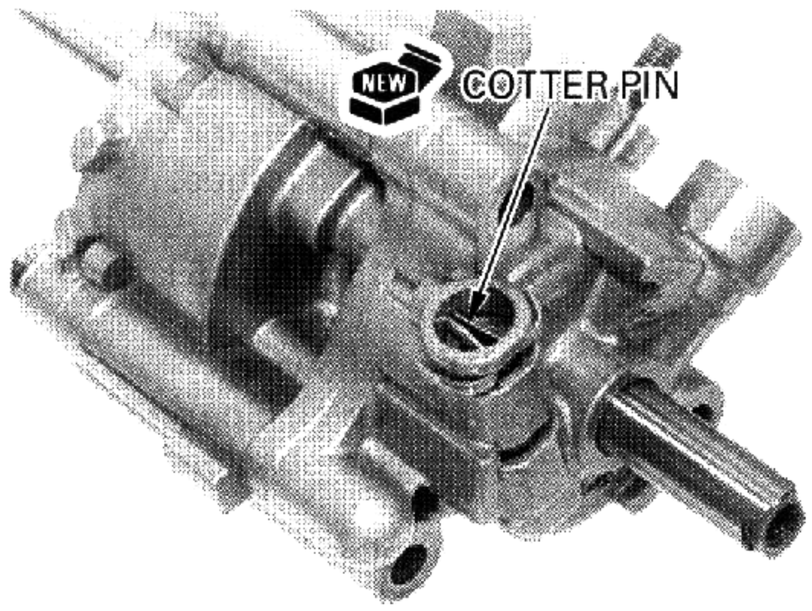
Check the oil pump operation by turning the pump shaft.
If necessary, reassemble the oil pump.



Install the oil pressure relief valve with its small O.D. side facing the spring.
Install the spring and spring seat.

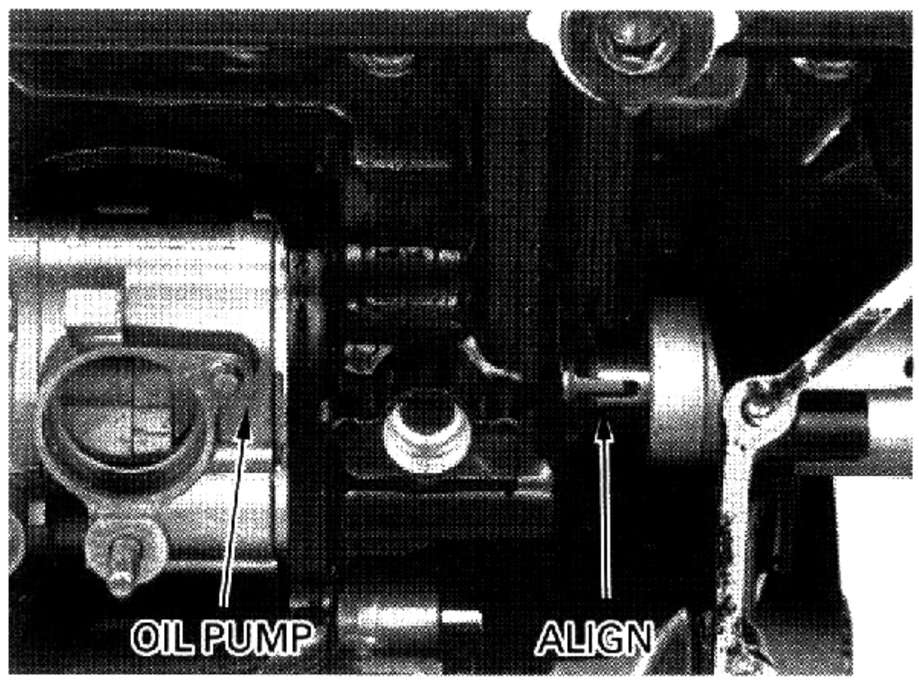


Hold the spring seat and install a new cotter pin. Bend the cotter pin securely as indicated in the illustration.

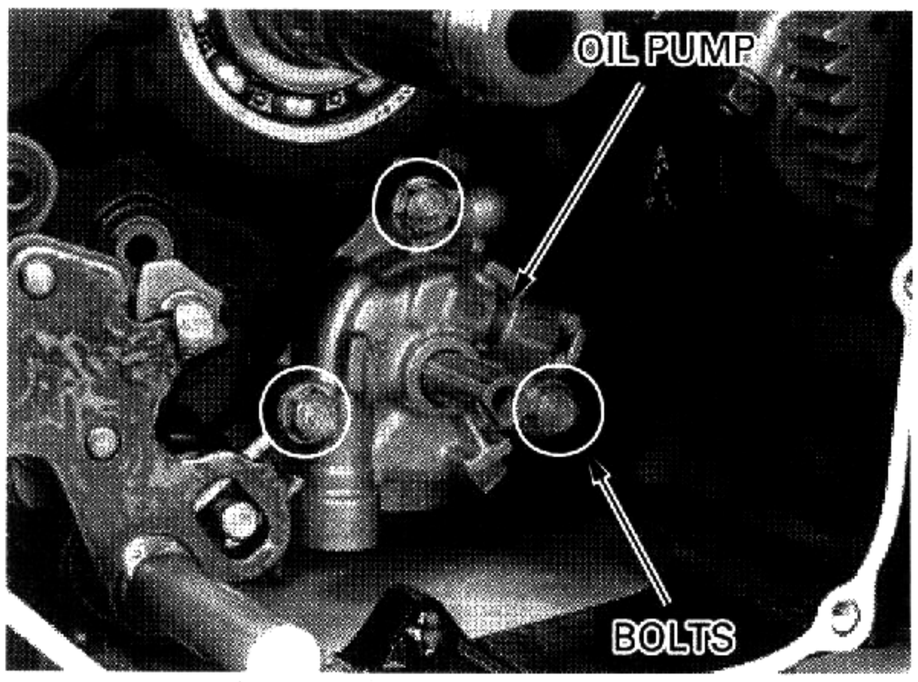


INSTALLATION

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



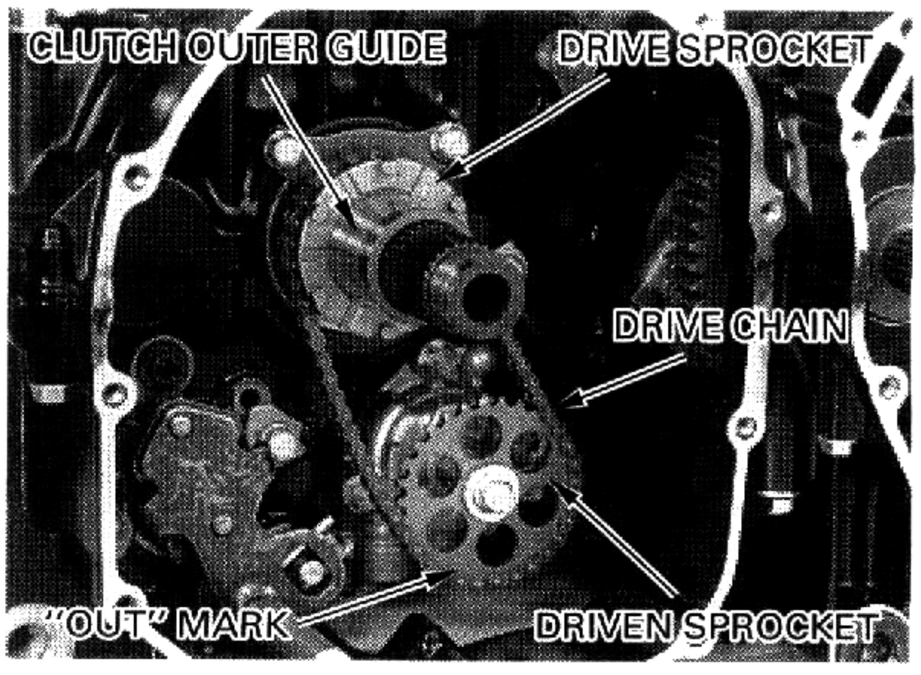
Install and tighten the three flange bolt securely.



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

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

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

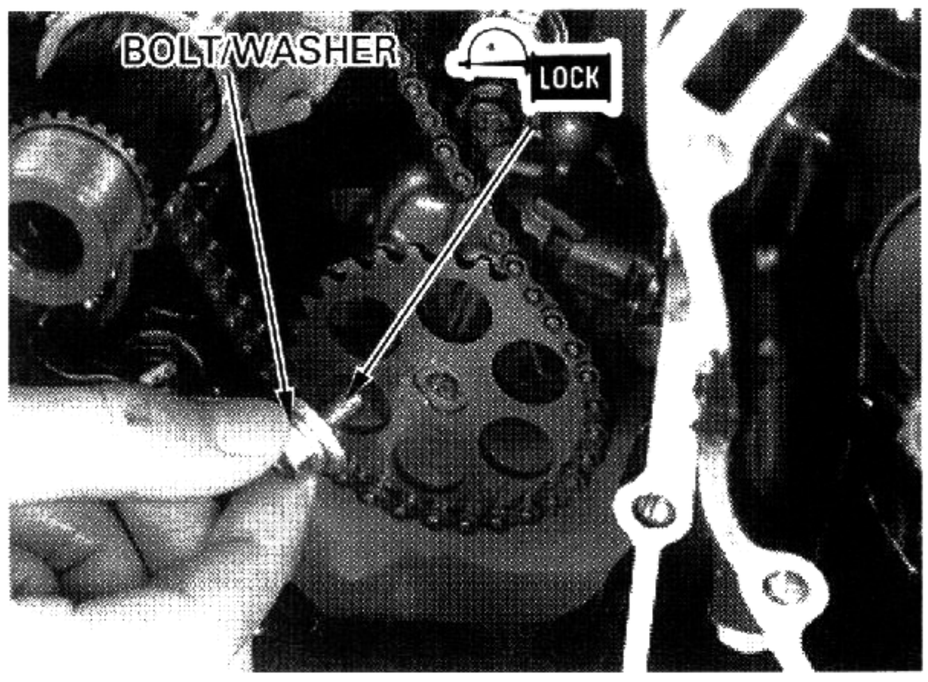


Apply a locking agent to the oil pump driven sprocket bolt threads.
Install and tighten the driven sprocket bolt/washer to the specified torque.

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

Install the following:
– Oil strainer/oil pipe and oil pan (page 4-5)
– Clutch assembly (page 9-9)

After installation, fill the crankcase with recommended oil and check that there is no oil leaks.
Check the oil pressure (page 4-3).

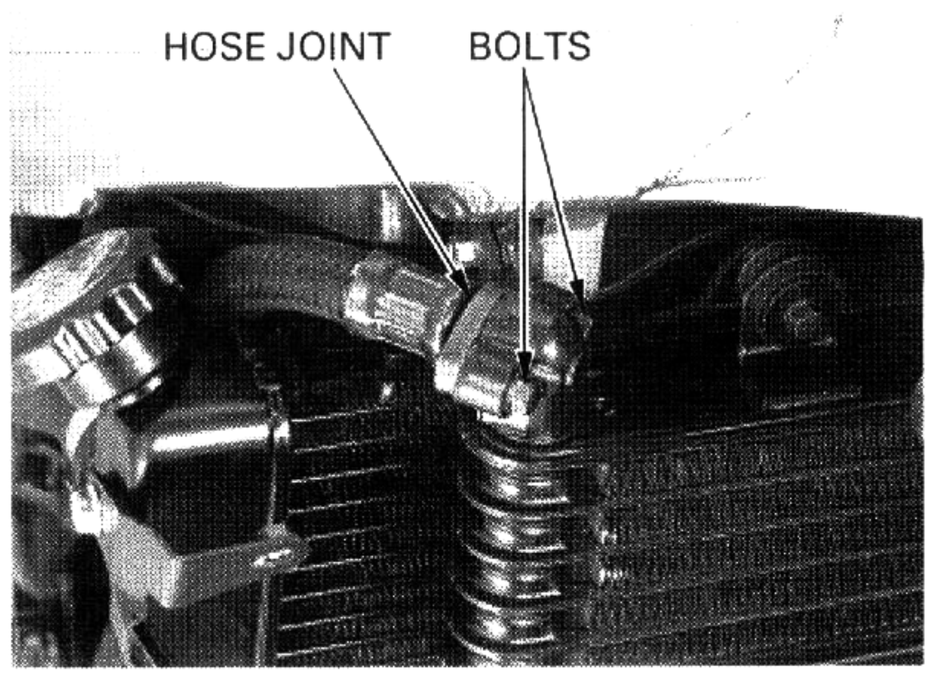


OIL COOLER

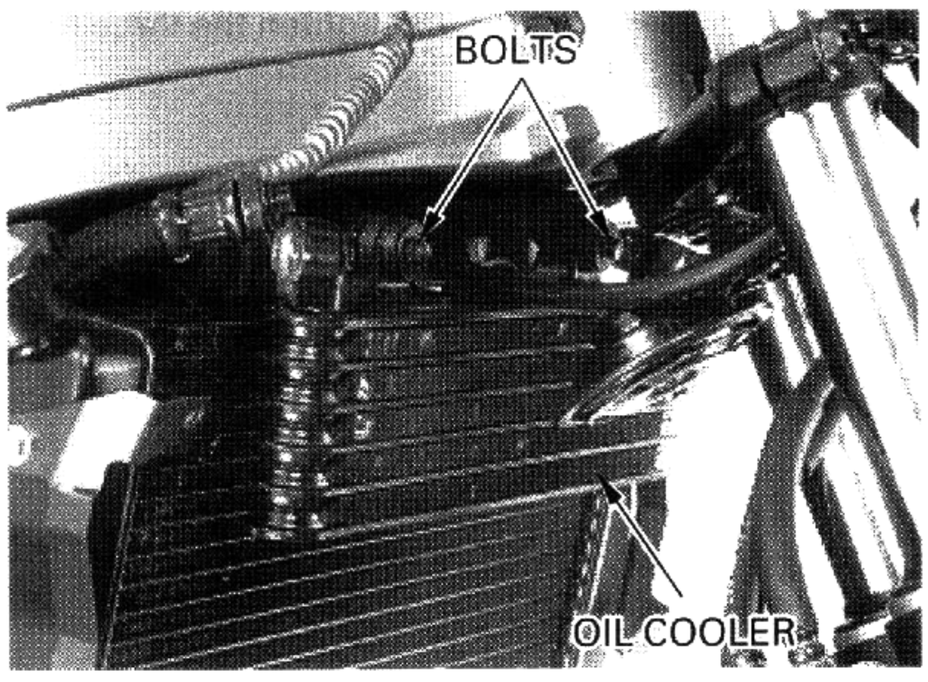
REMOVAL

Drain the engine oil (page 3-16).
Remove the radiator grill (page 2-4).

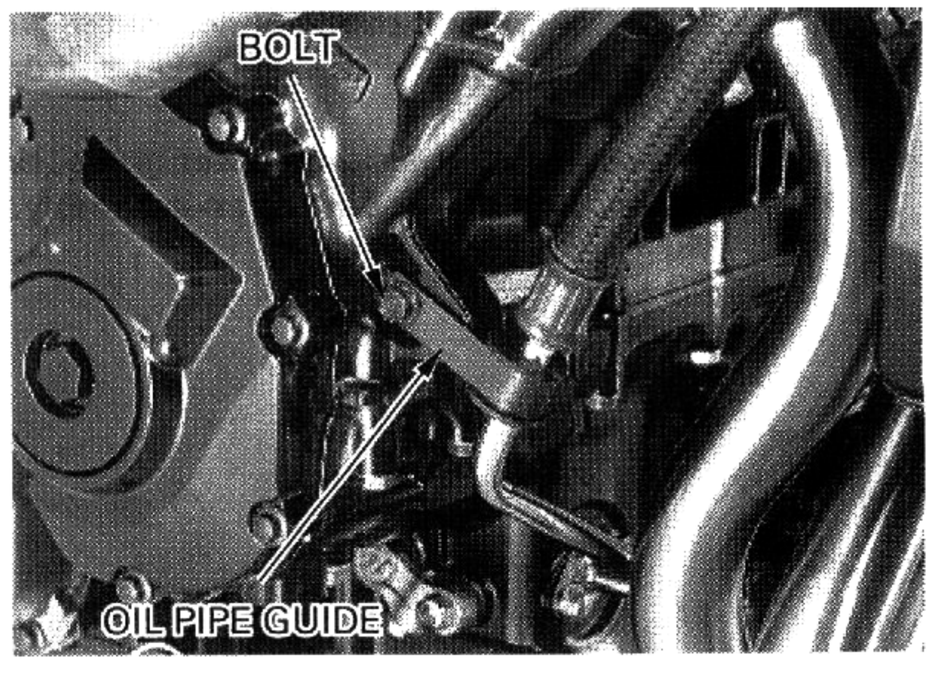
Remove the oil cooler hose joint mounting bolts and cooler hoses.



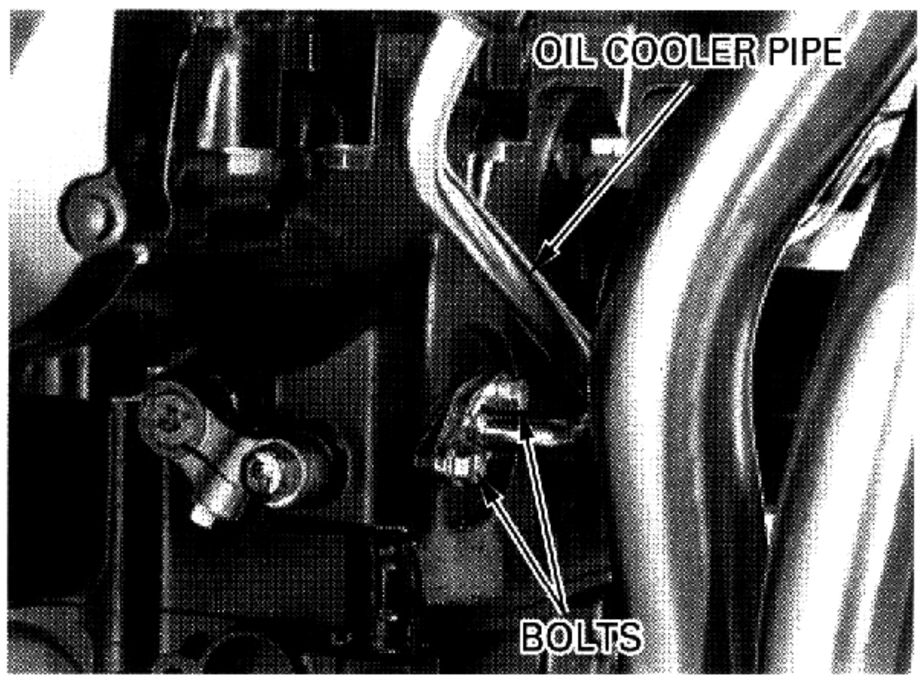
Remove the oil cooler mounting bolts and oil cooler.



Remove the oil pipe guide mounting bolt.



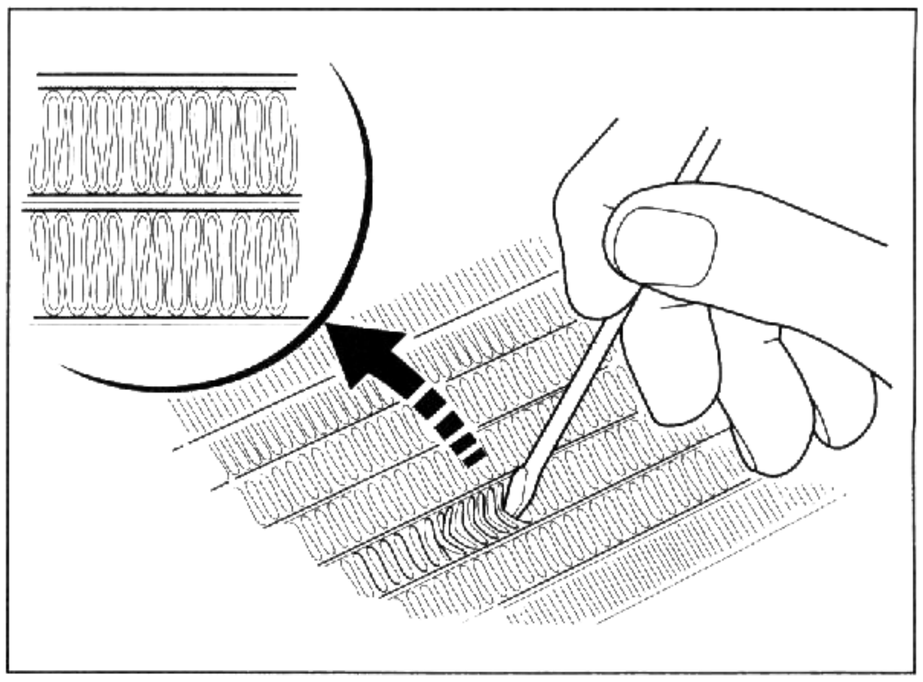
Remove the SH bolts and oil cooler pipes and O-rings.



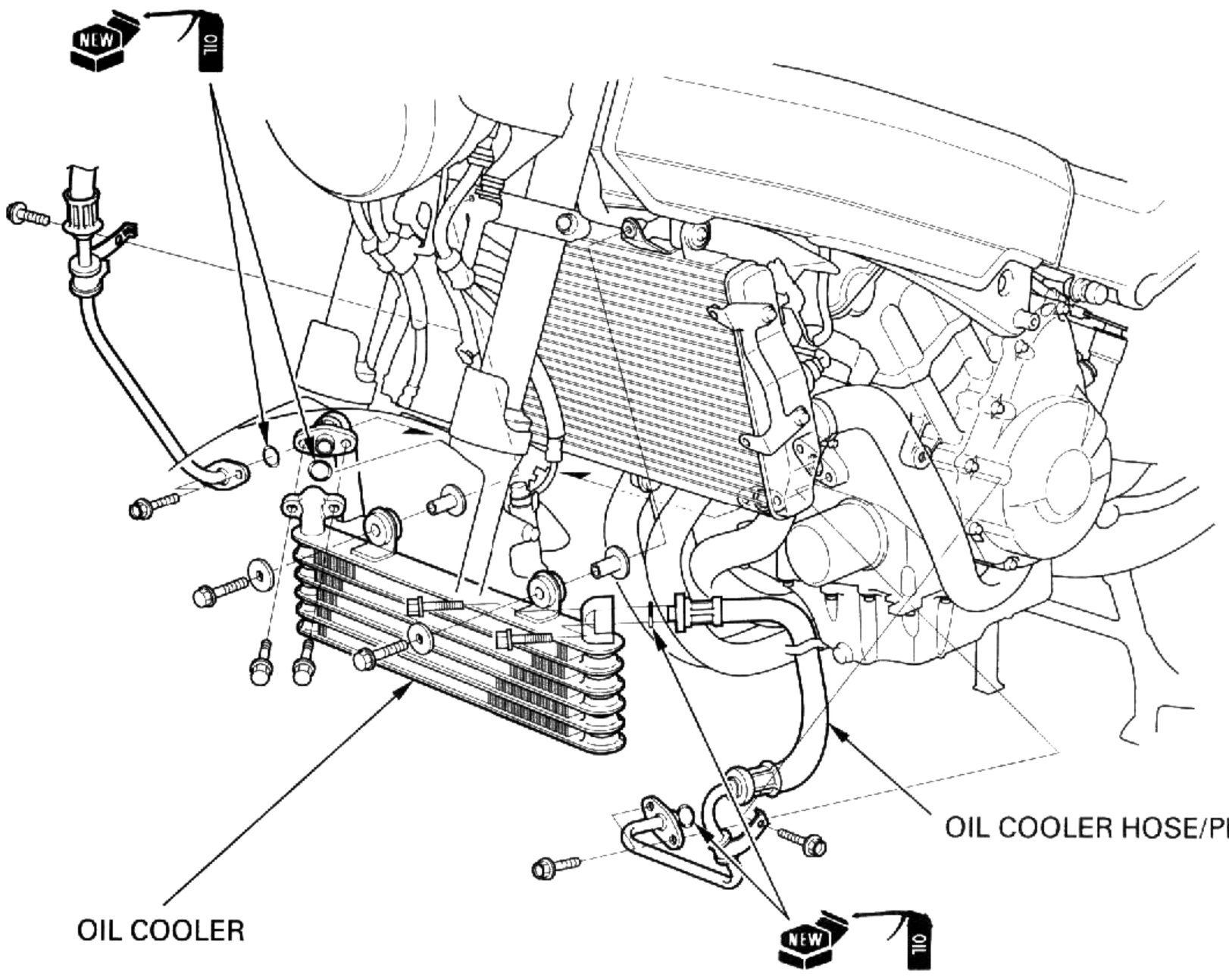
INSPECTION

Check the oil cooler air passage for clogging or damage.
Straighten bent fins with a small, flat blade screwdriver and remove insects, mud or other obstructions with compressed air.

Check for any oil leakage from the oil cooler and hose.



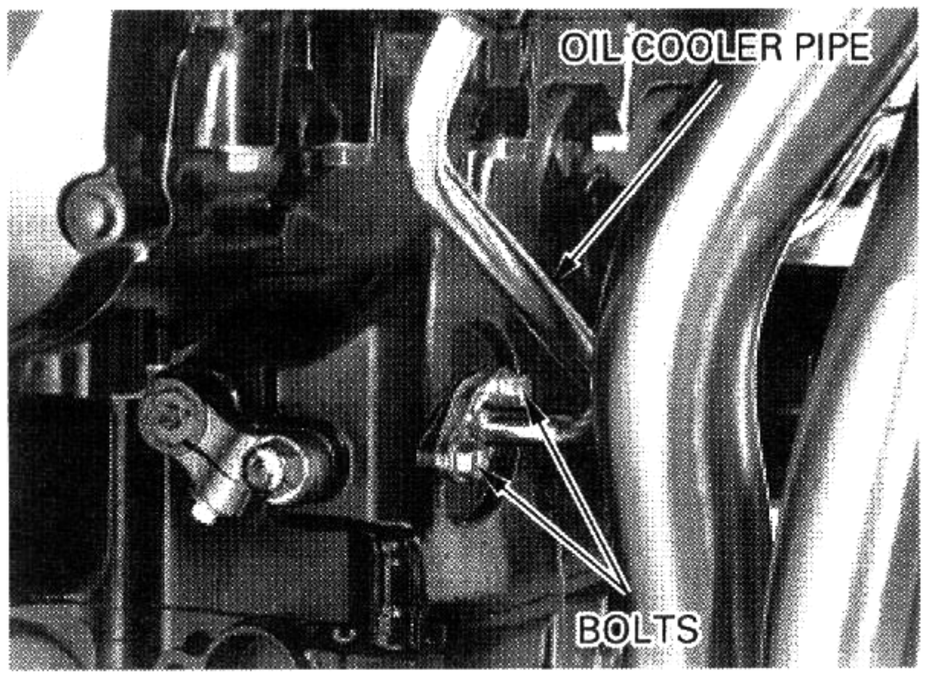
INSTALLATION



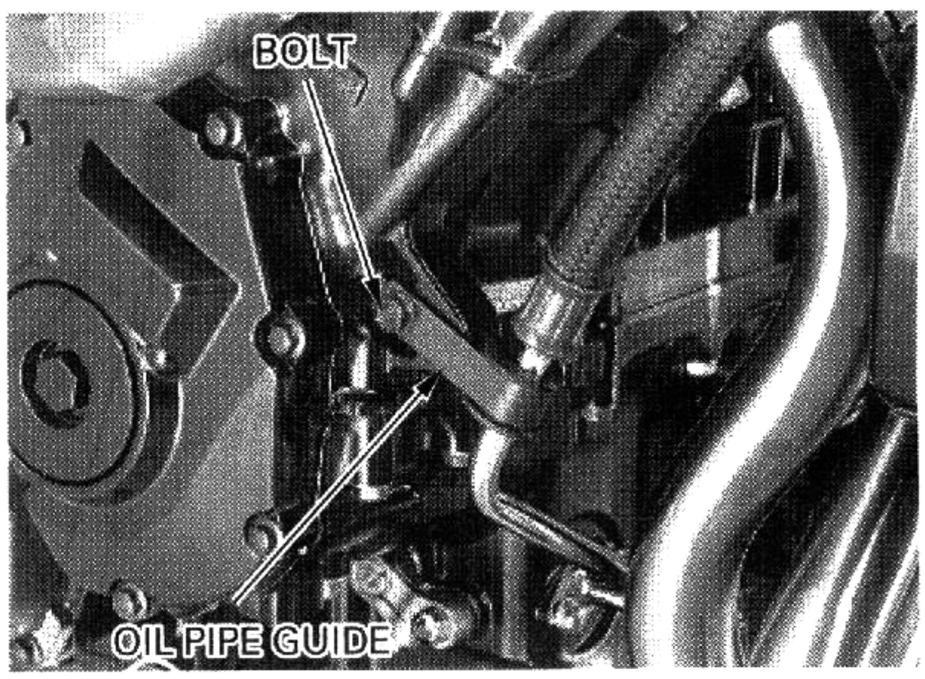
Apply clean engine oil to the new O-rings, and install them onto the oil cooler pipes.
Install the oil cooler pipes into the lower crankcase.



Install and tighten the SH bolts.



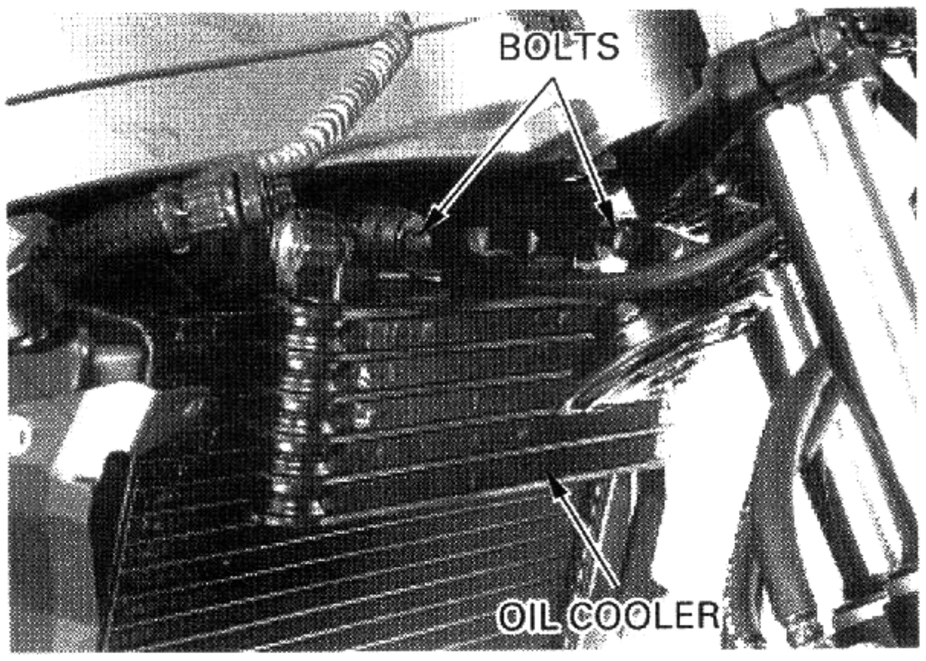
Install the oil pipe guide to the cylinder block, and tighten the bolt.



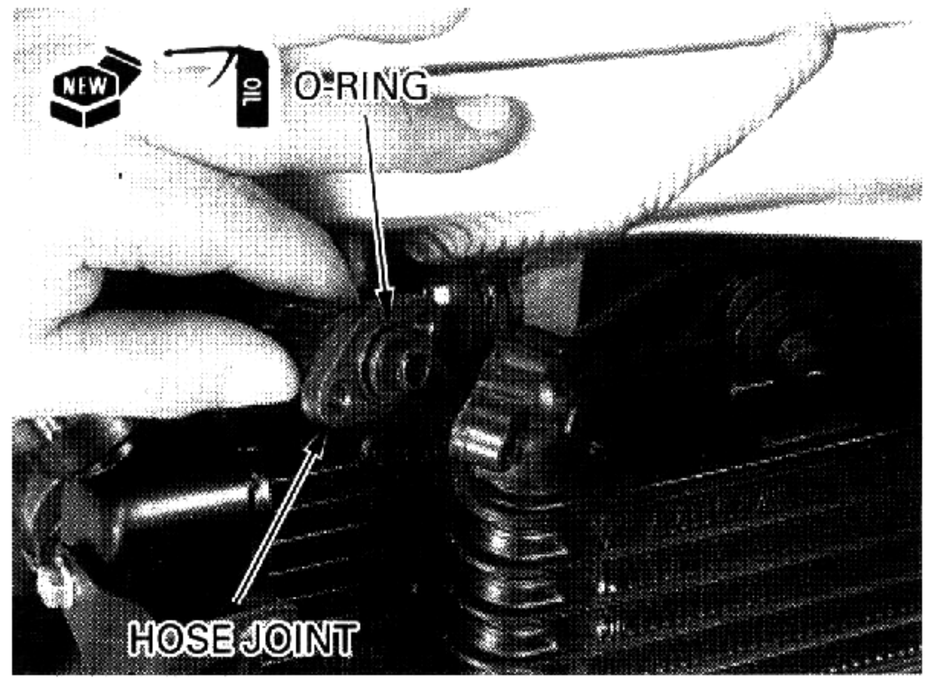
Install the oil cooler onto the radiator brackets.
Install and tighten the oil cooler mounting bolts.

CAUTION:

Do not cross thread or overtighten the oil cooler mounting bolts.

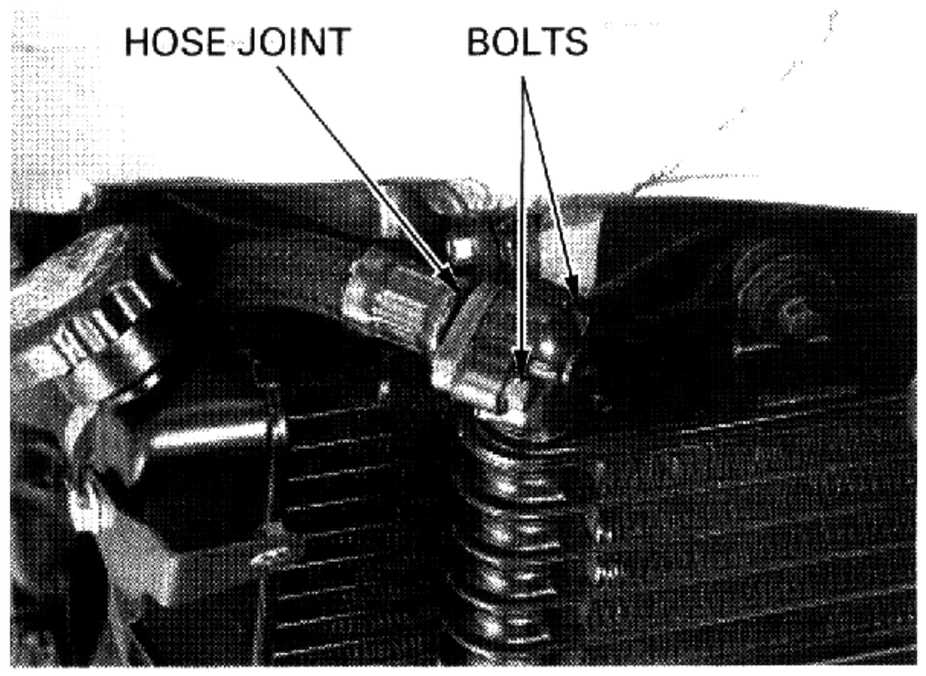


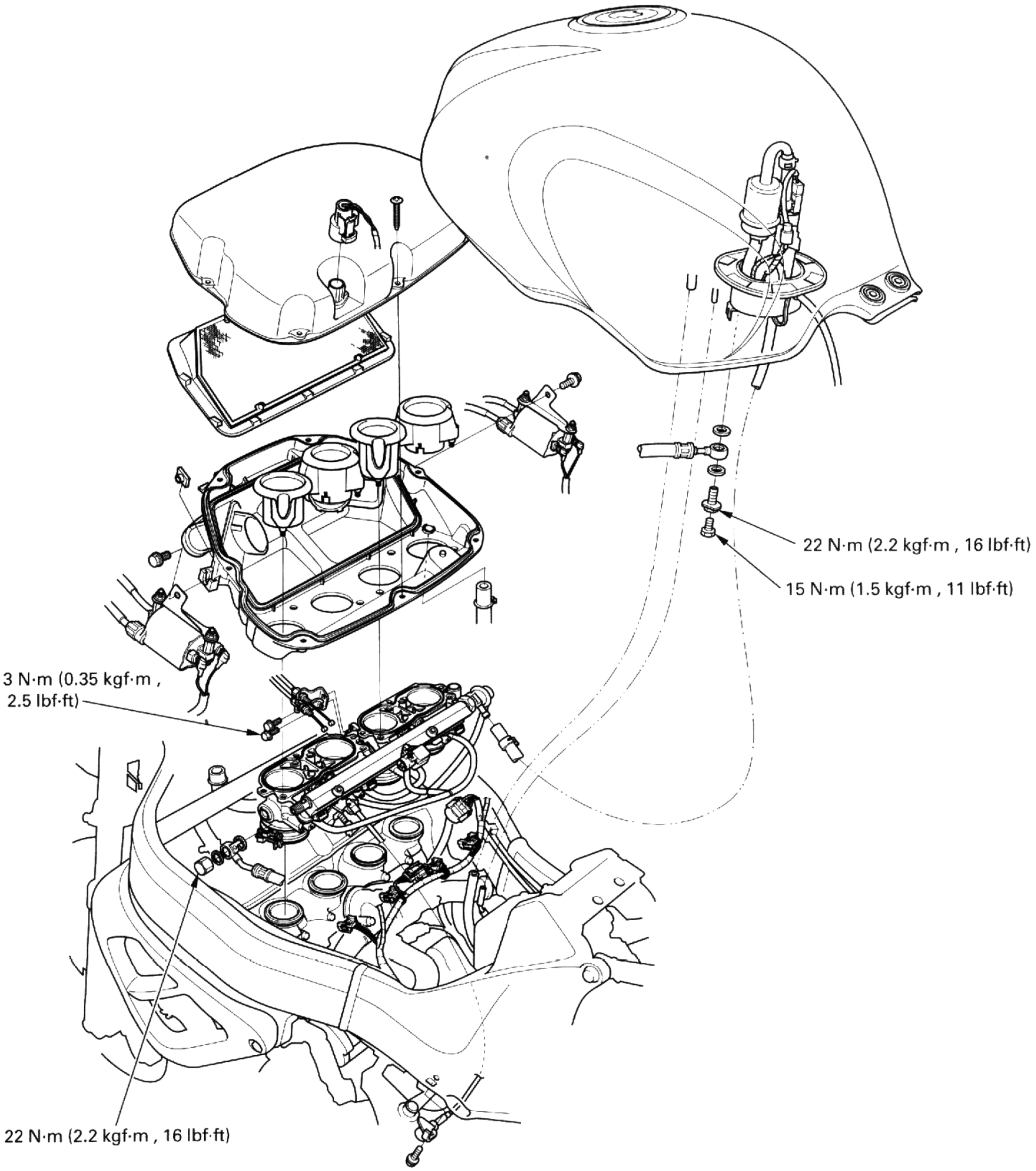
Apply clean engine oil to the new O-rings and install them onto the oil cooler hose joint flange.



Install the oil hose joints to the oil cooler and tighten the bolts securely.

Fill the crankcase with recommended engine oil (page 3-16), and check for oil leaks.
Install the radiator grill (page 2-4).




22 N·m (2.2 kgf·m , 16 lbf·ft)
15 N·m (1.5 kgf·m , 11 lbf·ft)
3 N·m (0.35 kgf·m , 2.5 lbf·ft)
22 N·m (2.2 kgf·m , 16 lbf·ft)

5.FUEL SYSTEM (Programmed Fuel Injection)

SERVICE INFORMATION	5-1
TROUBLESHOOTING	5-3
SYSTEM LOCATION	5-4
SYSTEM DIAGRAM	5-5
PGM-FI (PROGRAMMED FUEL INJECTION) SYSTEM	5-6
PGM-FI SELF-DIAGNOSIS MALFUNCTION INDICATOR FAILURE CODES	5-10
FUEL LINE INSPECTION	5-51
FUEL PUMP	5-54
FUEL CUT RELAY	5-55
FUEL TANK	5-56
AIR CLEANER HOUSING	5-60
THROTTLE BODY	5-63
INJECTOR	5-68
STARTER VALVE	5-70
STARTER VALVE SYNCHRONIZATION	5-75
MAP SENSOR	5-77
IAT SENSOR	5-77
ECT SENSOR	5-78
CAM PULSE GENERATOR	5-78
TP SENSOR	5-80
BANK ANGLE SENSOR	5-81
ENGINE STOP RELAY	5-82
KNOCK SENSOR	5-83
ECM (ENGINE CONTROL MODULE)	5-83
PAIR CONTROL SOLENOID VALVE	5-84
O_2 SENSOR	5-85

5

SERVICE INFORMATION

GENERAL

⚠WARNING

- ***Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.***
- ***Be sure to relieve the fuel pressure while the engine is OFF.***
- ***Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.***

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

CAUTION:

- ***Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.***
- ***Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.***
- ***Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.***
- ***Do not damage the throttle body. It may cause incorrect throttle and idle valve synchronization.***
- ***Prevent dirt and debris from entering the throttle bore, fuel tube and return tube, clean them using compressed air.***
- ***The throttle body is factory pre-set. Do not disassemble in a way other than shown in this manual.***
- ***Do not loosen or tighten the white painted bolts and screws of the throttle body. Loosening or tightening them can cause throttle and idle valve synchronization failure.***
- ***Tighten the yellow painted bolts and screw of the throttle body to the specified torque. Yellow painted parts of the throttle body not shown in this manual should not be disassembled.***
- ***Do not push the fuel pump base under the fuel tank when the fuel tank is stored.***
- ***Always replace the O-ring when the fuel pump is removed.***

FUEL SYSTEM (Programmed Fuel Injection)

NOTE:

- The programmed fuel injection system is equipped with the Self-Diagnostic System described on page 5-6. If the warning indicator blinks, follow the Self-Diagnostic Procedures to remedy the problem.
- When checking the PGM-FI, always follow the steps in the troubleshooting flow chart (page 5-10).
- The PGM-FI system is provided with fail-safe function to secure a minimum running capability even when there is any trouble in the system. When any abnormality is detected by the self-diagnosis function, running capability is secured by making use of the numerical values of a situation preset in advance in the simulated program map. It must be remembered, however, that when any abnormality is detected in four injectors and/or the ignition and cam pulse generator, the fail safe function stops the engine from the standpoint of protecting it.

- For PGM-FI system location, see page 5-4.
- A faulty PGM-FI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
- For fuel level sensor inspection, see section 19.
- The vehicle speed sensor sends digital pulse signal to the ECM (PGM-FI unit) and computation. For vehicle speed sensor inspection, see section 19.
- When disassembling the programmed fuel injection parts, note the location of the O-rings. Replace them with new ones upon reassembly.
- Before disconnecting the fuel tube, release the fuel pressure by loosening the service check bolt at the fuel tank.
- Always replace the sealing washers when the fuel tube banjo bolt is removed or loosened.
- Use a digital tester for PGM-FI system inspection.

SPECIFICATIONS

ITEM	SPECIFICATIONS
Throttle body identification number	GQ41A
Starter valve vacuum difference	20 mm Hg
Base throttle valve for synchronization	No. 3
Idle speed	1,100 ± 100 min^{-1} (rpm)
Throttle grip free play	2 – 6 mm (1/16 – 1/4 in)
Intake air temperature sensor resistance (at 20°C/68°F)	1 – 4 kΩ
Engine coolant temperature sensor resistance (at 20°C/68°F)	2.3 – 2.6 kΩ
Fuel injector resistance (at 20°C/68°F)	13.0 – 14.4 kΩ
PAIR solenoid valve resistance (at 20°C/68°F)	20 – 24 Ω
Cam pulse generator peak voltage (at 20°C/68°F)	0.7 V minimum
Ignition pulse generator peak voltage (at 20°C/68°F)	0.7 V minimum
Manifold absolute pressure at idle	200 – 250 mm Hg
Fuel pressure at idle	294 kPa (3.0 kgf/cm^2 , 43 psi)
Fuel pump flow (at 12 V)	220 cm^3 (7.4 US oz , 7.7 Imp oz) minimum/10 seconds

TORQUE VALUES

ECT (Engine Coolant Temperature)/thermo sensor	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Knock sensor	31 N·m (3.2 kgf·m , 23 lbf·ft)	
Throttle body insulator band screw	See page 1-15	
Throttle cable bracket mounting screw	3 N·m (0.35 kgf·m , 2.5 lbf·ft)	
Fuel pipe mounting nut	10 N·m (1.0 kgf·m , 7 lbf·ft)	U-nut, Yellow paint
Fuel pipe setting bolt	22 N·m (2.2 kgf·m , 16 lbf·ft)	Yellow paint
Pressure relief valve lock nut	27 N·m (2.8 kgf·m , 20 lbf·ft)	Yellow paint
Starter valve synchronization plate screw	1 N·m (0.09 kgf·m , 0.7 lbf·ft)	
Starter valve lock nut	2 N·m (0.18 kgf·m , 1.3 lbf·ft)	
Vacuum joint plug socket bolt for synchronization	3 N·m (0.3 kgf·m , 2.2 lbf·ft)	
Fuel tube sealing nut (throttle body side)	22 N·m (2.2 kgf·m , 16 lbf·ft)	
Fuel tube banjo bolt (fuel tank side)	22 N·m (2.2 kgf·m , 16 lbf·ft)	
Service check bolt	15 N·m (1.5 kgf·m , 11 lbf·ft)	
Fuel pump mounting nut	12 N·m (1.2 kgf·m , 9 lbf·ft)	See page 5-55 for tightening sequence
Fuel filler cap bolt	2 N·m (0.2 kgf·m , 1.4 lbf·ft)	
Cam pulse generator cover SH bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	

TOOLS

Peak voltage adaptor	07HGJ-0020100 with Commercially available digital multimeter (impedance 10 MΩ/DCV minimum)
ECU test harness	07WMZ-MBG0100
Test pin box	07WGZ-0010100

TROUBLESHOOTING

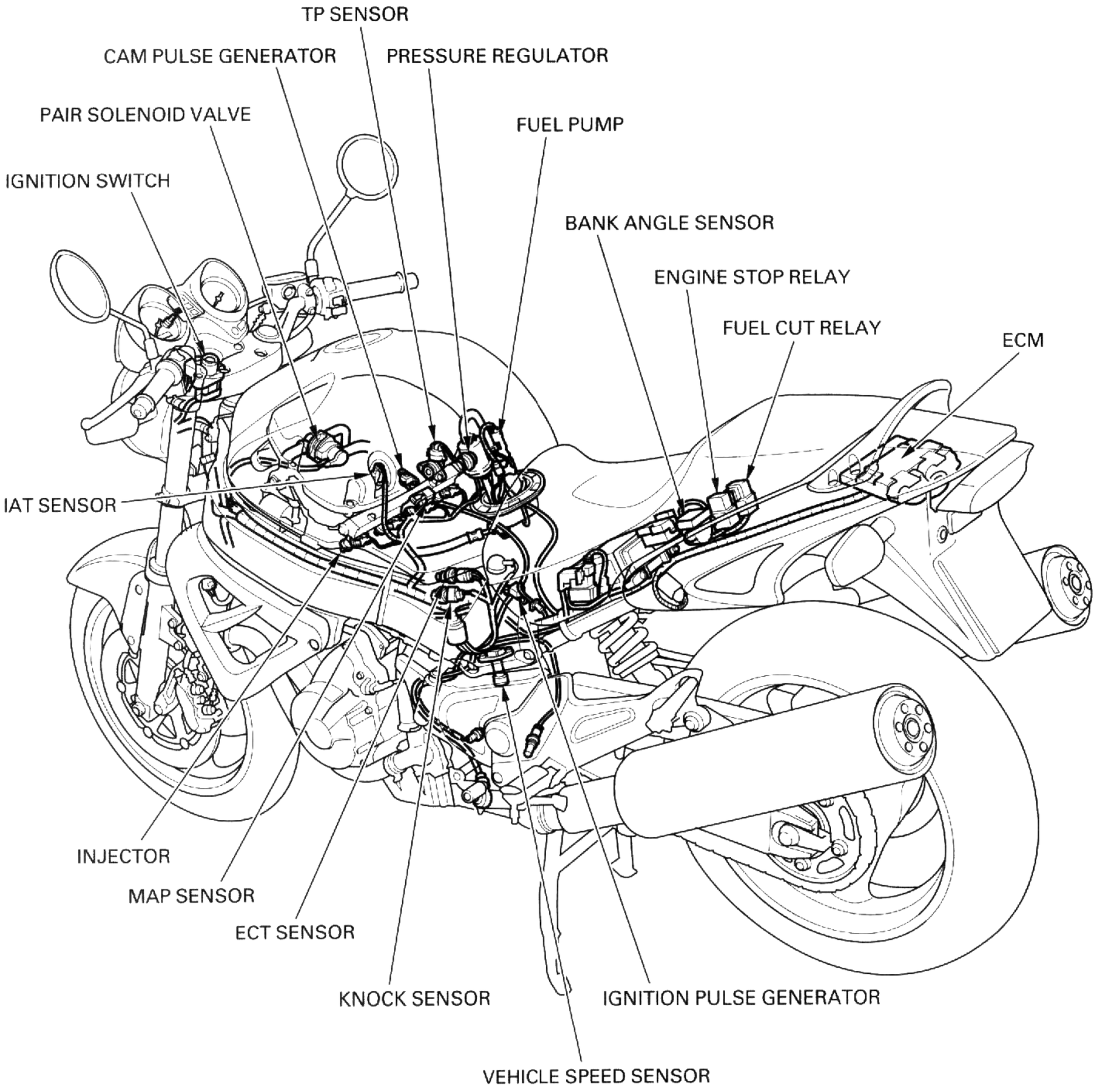
Engine won't to start
- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel tube
- Faulty fuel pump
- Clogged fuel filter
- Clogged fuel injector filter
- Sticking fuel injector needle
- Faulty fuel pump operating system

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

Backfiring or misfiring during acceleration
- Ignition system malfunction

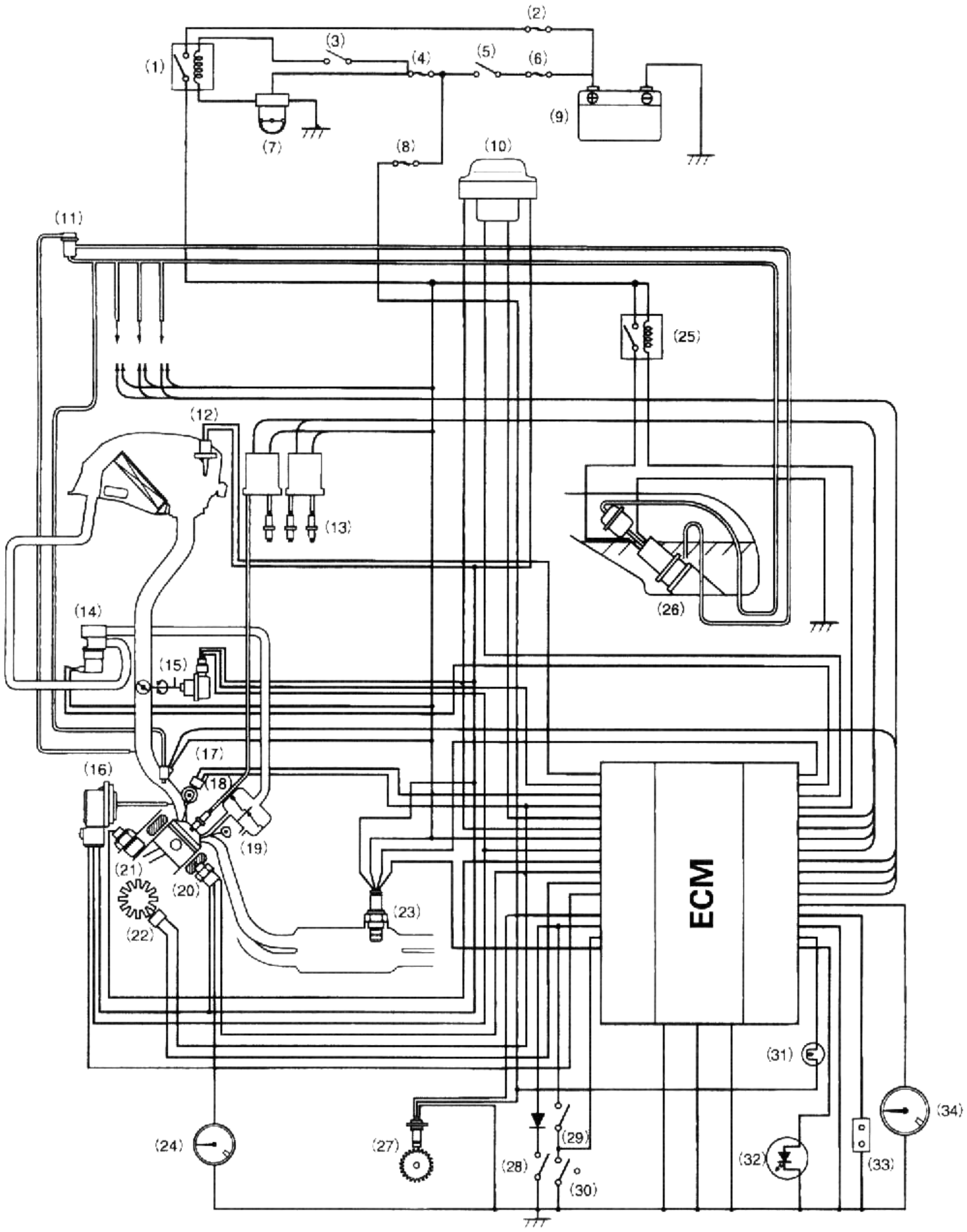
Poor performance (driveability) and poor fuel economy
- Pinched or clogged fuel tube
- Faulty pressure regulator

SYSTEM LOCATION



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

SYSTEM DIAGRAM



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

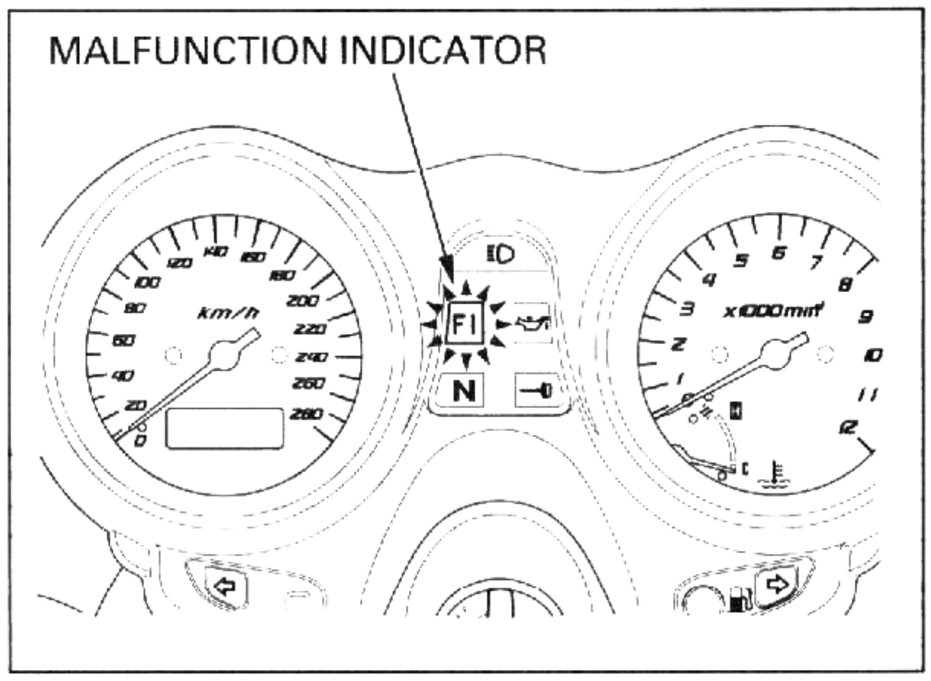
(18)	Cam pulse generator
(19)	PAIR check valve
(20)	ECT sensor
(21)	Knock sensor
(22)	Ignition pulse generator
(23)	O_2 sensor
(24)	Water temperature meter
(25)	Fuel cut relay
(26)	Fuel pump
(27)	Vehicle speed sensor
(28)	Neutral switch
(29)	Clutch switch
(30)	Side stand switch
(31)	Malfunction indicator
(32)	Immobilizer indicator
(33)	Service check connector
(34)	Tachometer

PGM-FI (PROGRAMMED FUEL INJECTION) SYSTEM

SELF-DIAGNOSTIC PROCEDURES

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

If the malfunction indicator does not light or blink, the system has no memory of problem data.
If the malfunction indicator blinks, note how many times the malfunction indicator blinks, and determine the cause of the problem (page 5-10 through 5-46).

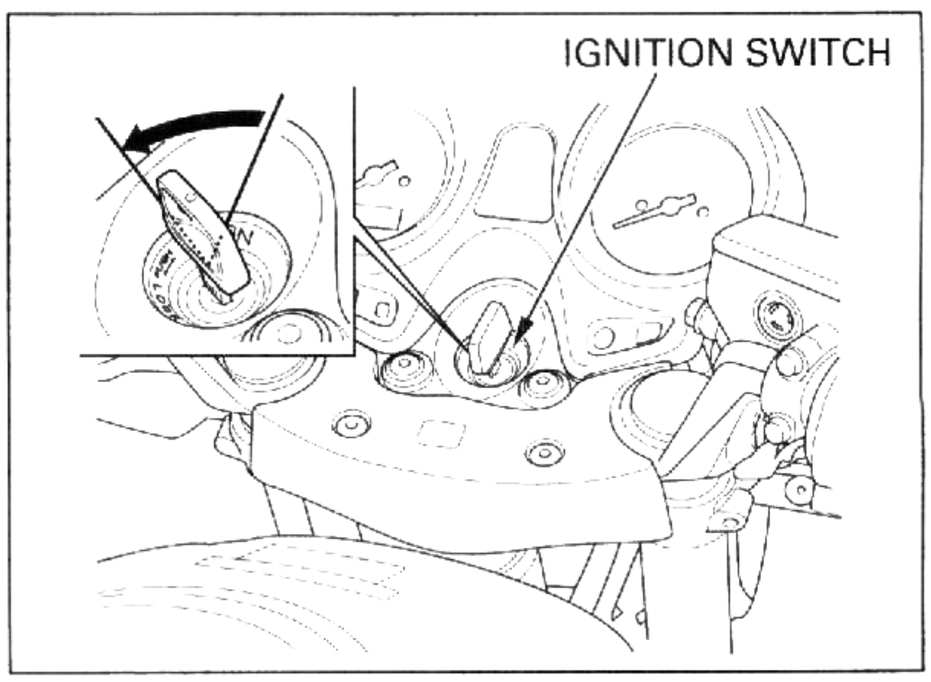


NOTE:

The malfunction indicator will start blinking only when the engine revs are below 5,000 min^{-1} (rpm) with the side stand down. In any other conditions, the malfunction indicator will illuminate and stay on.

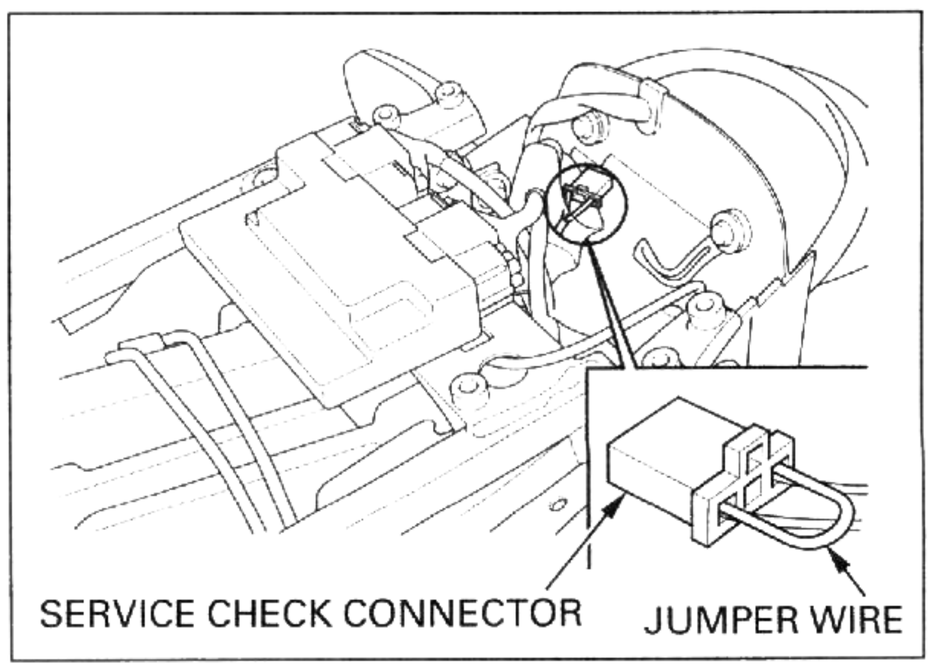
If you wish to read the PGM-FI memory for trouble data, perform the following:

Turn the ignition switch OFF.



Remove the seat (page 2-2).

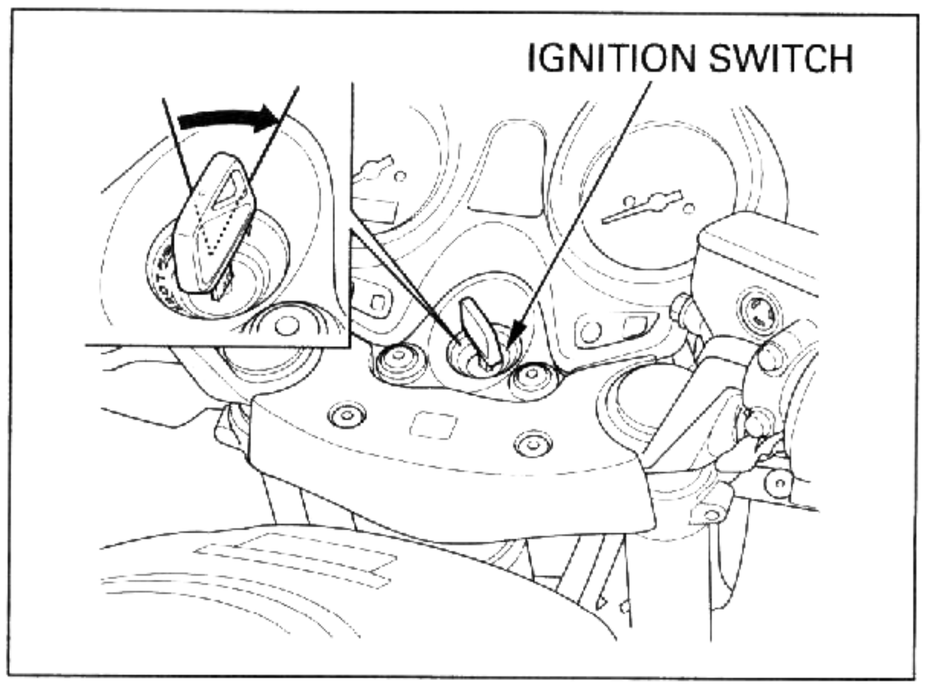
Short the PGM-FI system service check connector terminals using a jumper wire.



Turn the ignition switch ON.

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

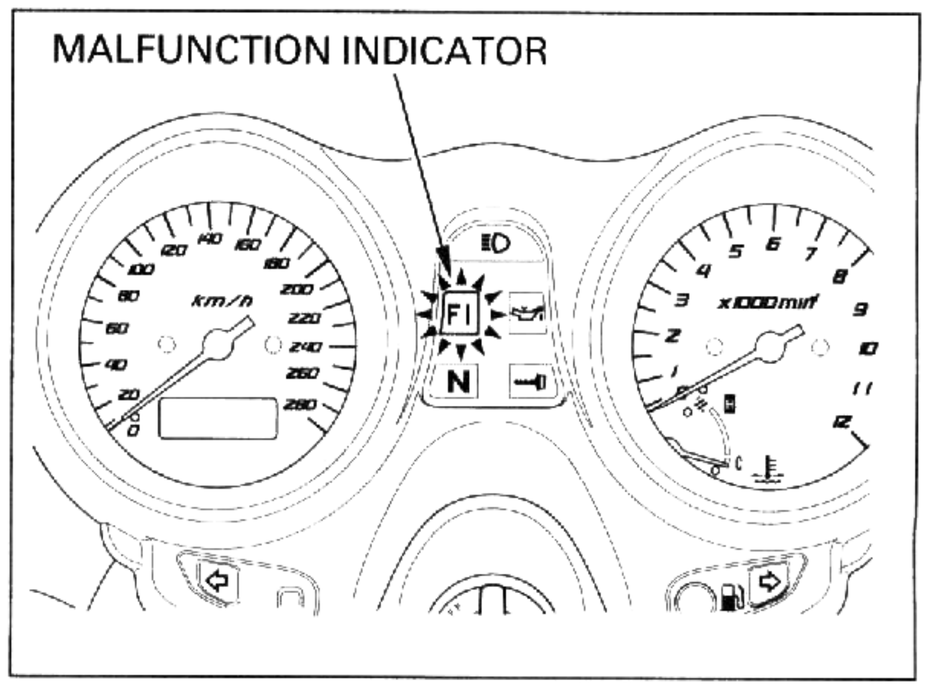
If the ECM has self diagnosis memory data, the malfunction indicator will start blinking when you turn the ignition switch ON.



NOTE:

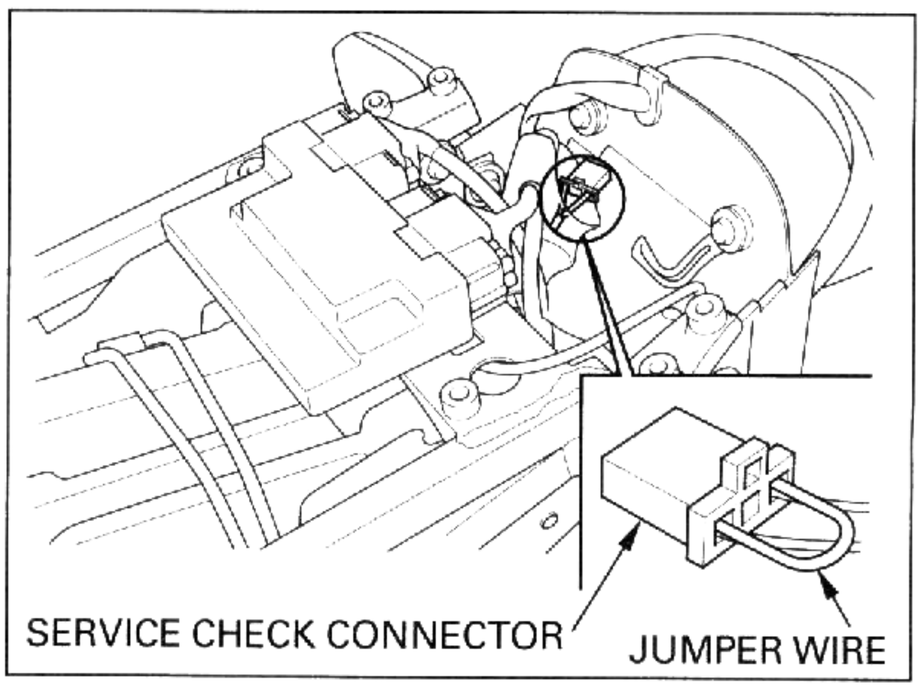
Even if the PGM-FI has memory data, the malfunction indicator only illuminates (no blinking) under engine running conditions (side stand up and revs above 5,000 min^{-1} (rpm)).

Note how many times the malfunction indicator blinks, and determine the cause of the problem (page 5-10 through 5-50).



SELF-DIAGNOSIS RESET PROCEDURE

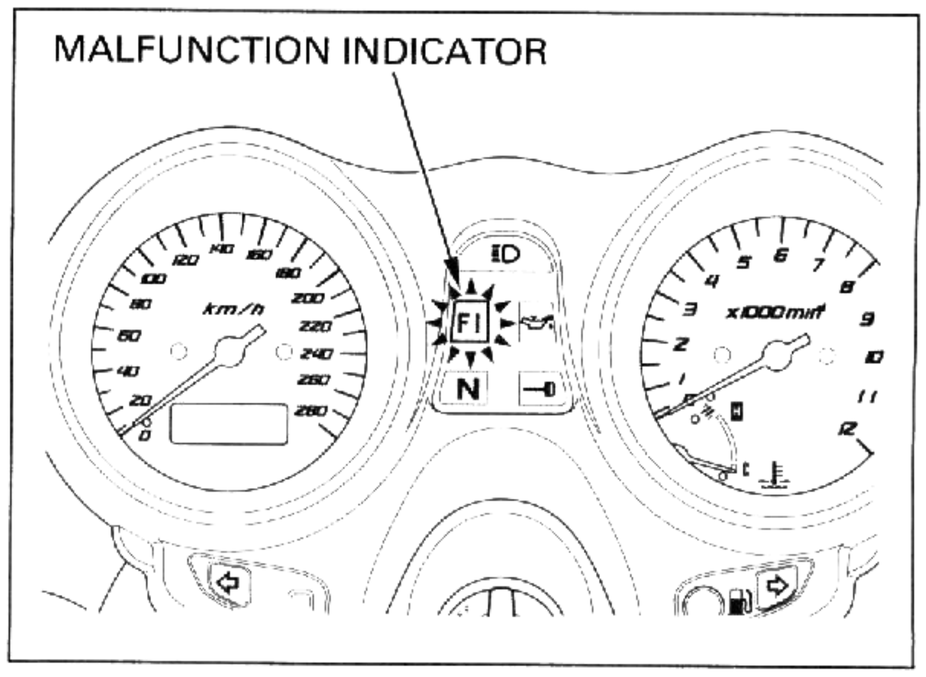
1. Turn the ignition switch OFF.
2. Short the service check connector of the PGM-FI system using a jumper wire.
3. Turn the ignition switch ON.
4. Remove the jumper wire from the service check connector.
5. The malfunction indicator lights about 5 seconds. While the indicator lights, short the service check connector again with the jumper wire.
   Self diagnosis memory data is erased, if the malfunction indicator turn off and start blinking.



NOTE:

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

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



PEAK VOLTAGE INSPECTION PROCEDURE

NOTE:

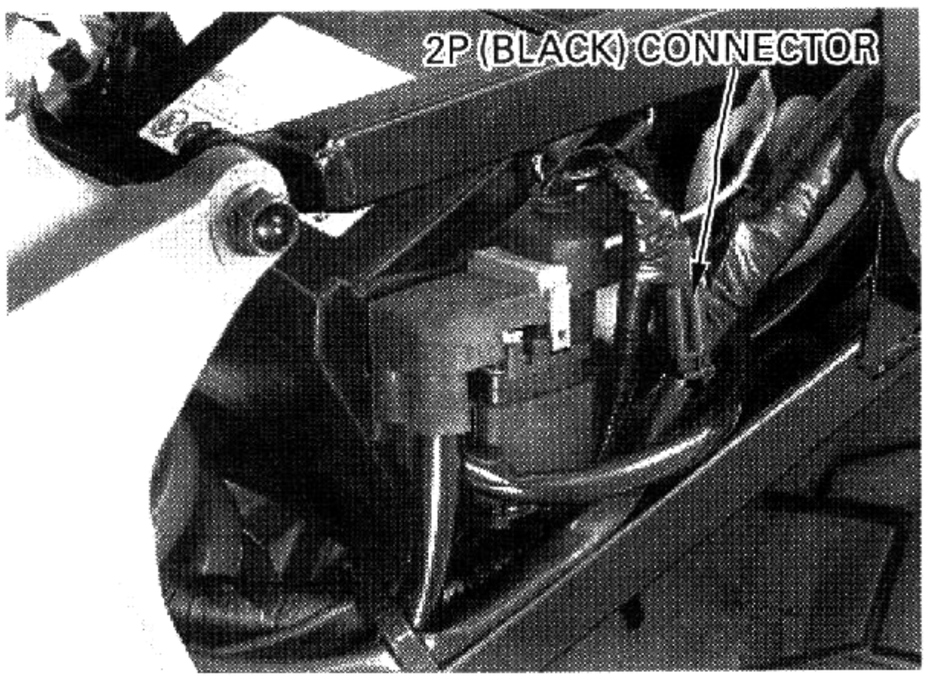
- Use this procedure for the ignition pulse generator and cam pulse generator inspection.
- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the all spark plugs are installed correctly.
- Use recommended digital multimeter or commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- Disconnect the fuel pump connector before checking the peak voltage.

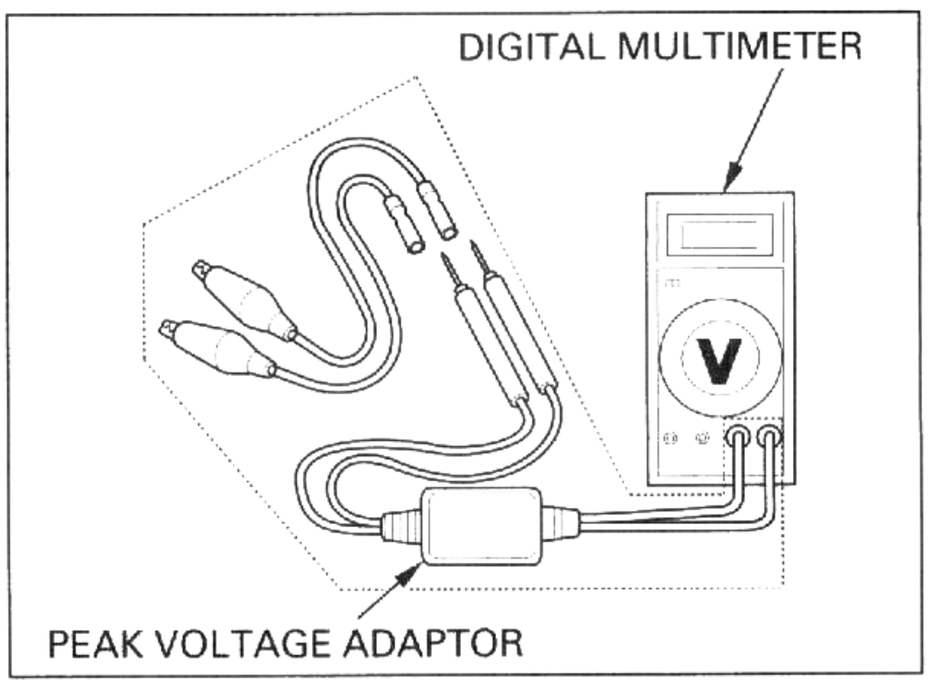
Support the rear end of the fuel tank (page 2-11).

Disconnect the fuel pump 2P (Black) connector.

Connect the peak voltage adaptor to the digital multimeter.

TOOLS:
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)





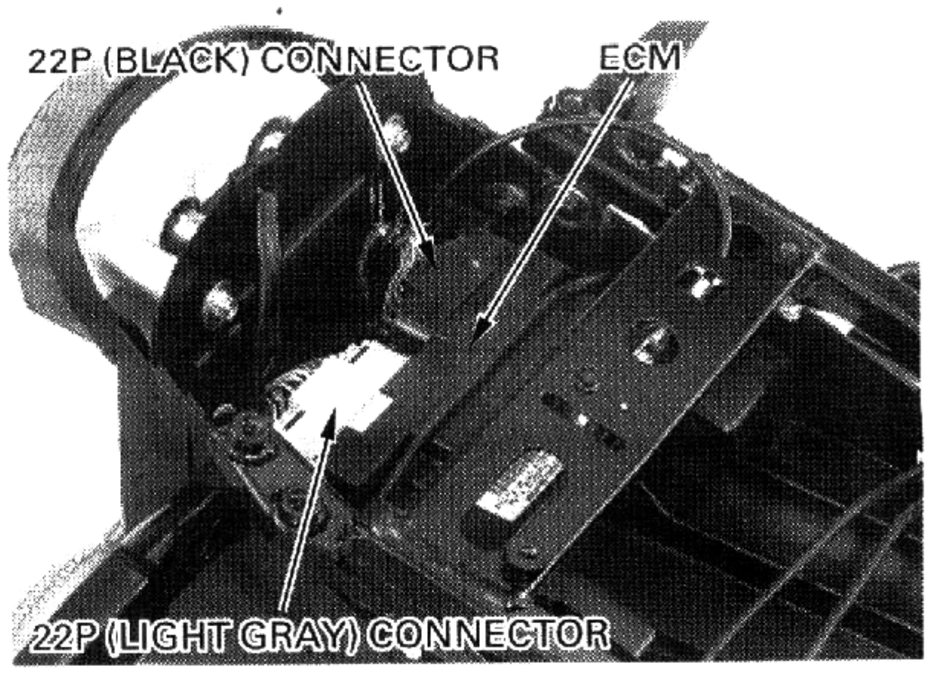
⚠WARNING

Avoid touching the tester probes to prevent electric shock.

TEST HARNESS CONNECTION

Remove the seat (page 2-2).

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



Connect the test harness to the test pin box.

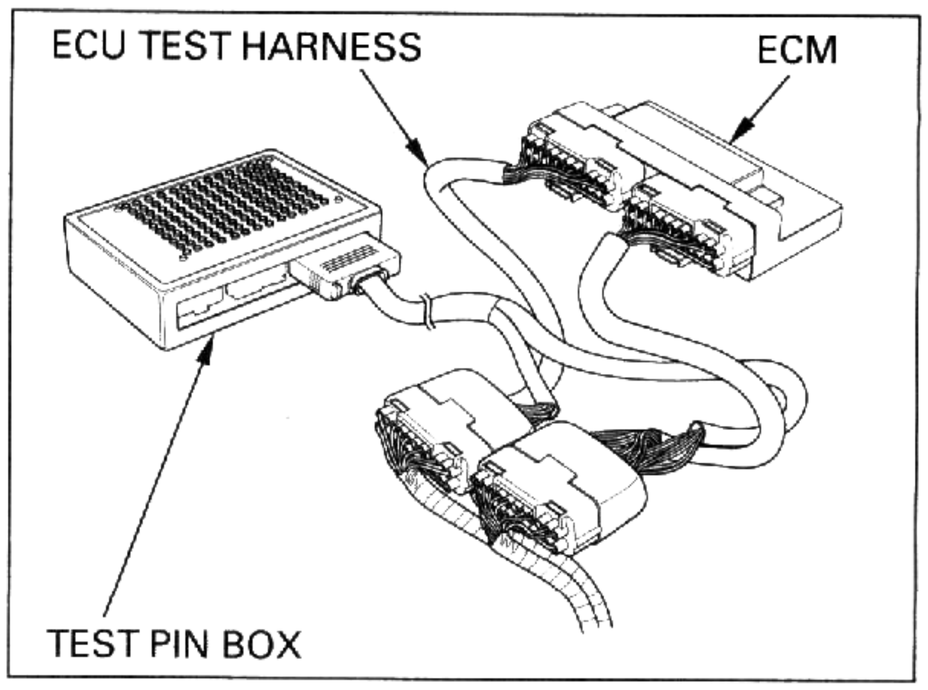
TOOLS:

ECU test harness	07WMZ-MBG0100
Test pin box	07WGZ-0010100

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

NOTE:

Match the connector colors between the main wire harness and test harness.



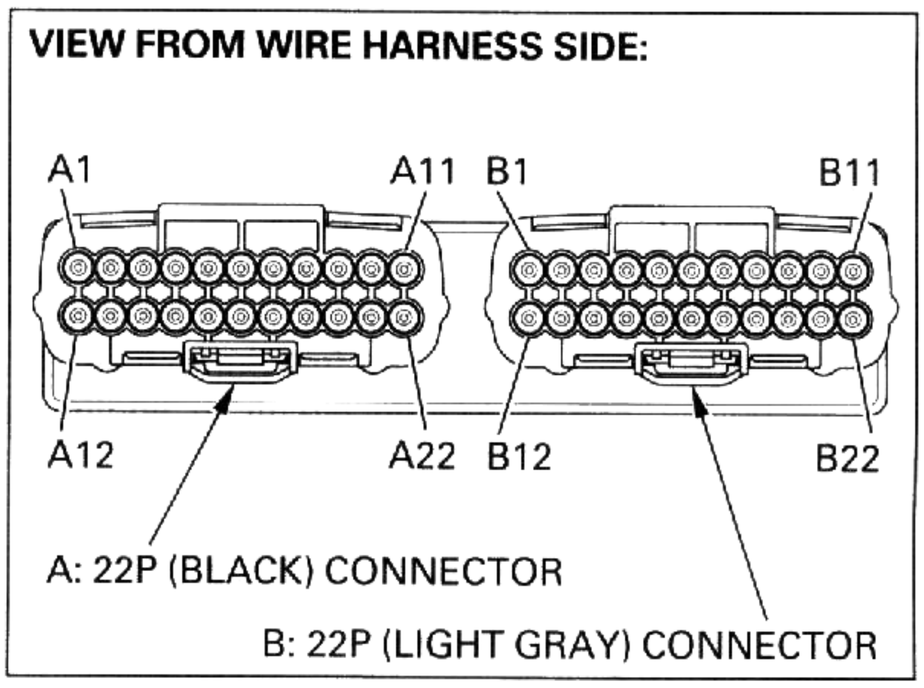
TEST PIN BOX TERMINAL LAYOUT

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

The test pin box No. 1 to No. 22 terminals are for the ECM 22P (Black) connector A1 to A22 terminals. The test pin box uses the No. 31 to No. 52 terminals for the ECM 22P (Light gray) connector B1 to B22 terminals.

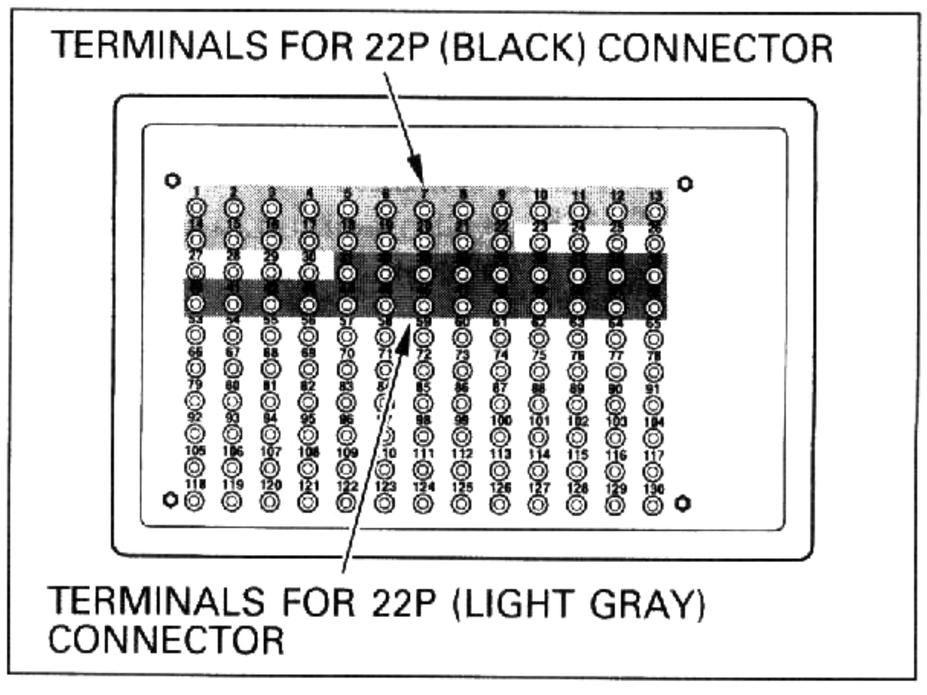
Example:

ECM terminals:	A4 (+) – A8 (–)
Test pin box terminals:	No. 4 (+) – No. 8 (–)



Terminal conversion chart

22P (Black) No.	Test pin box No.
A1	1
A2	2
⋮	⋮
A22	22
22P (Light gray) No.	**Test pin box No.**
B1	31
B2	32
⋮	⋮
B22	52



PGM-FI SELF-DIAGNOSIS MALFUNCTION INDICATOR FAILURE CODES

- The PGM-FI malfunction indicator denotes the failure codes (the number of blinks from 0 to 33). When the indicator lights for 1.3 seconds it is equivalent to ten blinks. For example, a 1.3 second illumination and two blinks (0.5 second × 2) of the indicator equals 12 blinks. Follow code 12 on page 5-26).
- When more than one failure occurs, the malfunction indicator shows the blinks in the order of lowest number to highest number. For example, if the indicator blinks once, then two times, two failures have occurred. Follow codes 1 and 2 on page 5-12).

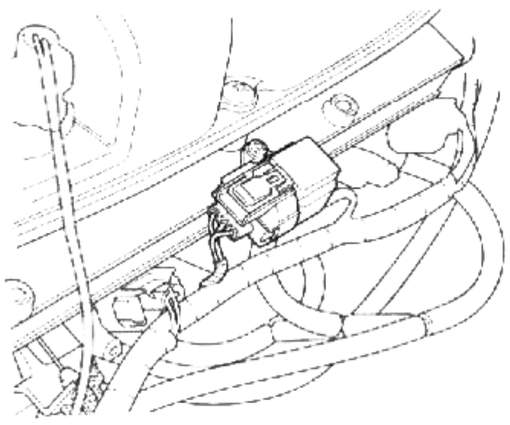
Number of PGM-FI malfunction indicator blinks		Causes	Symptoms (Fail-safe contents)	Refer to page
0	☼ Stays lit	• Open or short circuit at the input power line of the ECM • Faulty engine stop relay • Faulty engine stop switch • Faulty ignition switch • Faulty bank angle sensor • Faulty ECM • Blown main fuse B (30 A) • Blown engine stop fuse (10 A) • Blown fuel pump fuse (30 A) • Open circuit in engine stop switch ground wire	• Engine does not start	—
	○ No blinks	• Blown malfunction indicator bulb • Open circuit in malfunction indicator ground wire • Open or short circuit in malfunction indicator wire • Faulty ECM	• Engine operates normally	—
	☼ Continuing to light	• Short circuit in the malfunction indicator wire • Short circuit in service check connector wire • Faulty ECM	• Engine operates normally	—
1	☼ Blinks	• Loose or poor contacts on MAP sensor connector • Open or short circuit in MAP sensor wire • Faulty MAP sensor	• Engine operates normally	5-12
2	☼ Blinks	• Loose or poor connection of the MAP sensor vacuum tube • Faulty MAP sensor	• Engine operates normally	5-14
7	☼ Blinks	• Loose or poor contact on ECT sensor • Open or short circuit in ECT sensor wire • Faulty ECT sensor	• Hard start at a low temperature (Simulate using numerical values; 90 °C/194 °F)	5-16
8	☼ Blinks	• Loose or poor contact on TP sensor connector • Open or short circuit in TP sensor wire • Faulty TP sensor	• Poor engine response when operating the throttle quickly (Simulate using numerical values; Throttle opens 0°)	5-18
9	☼ Blinks	• Loose or poor contact on IAT sensor • Open or short circuit in IAT sensor wire • Faulty IAT sensor	• Engine operates normally (Simulate using numerical values; 25 °C/77 °F)	5-22

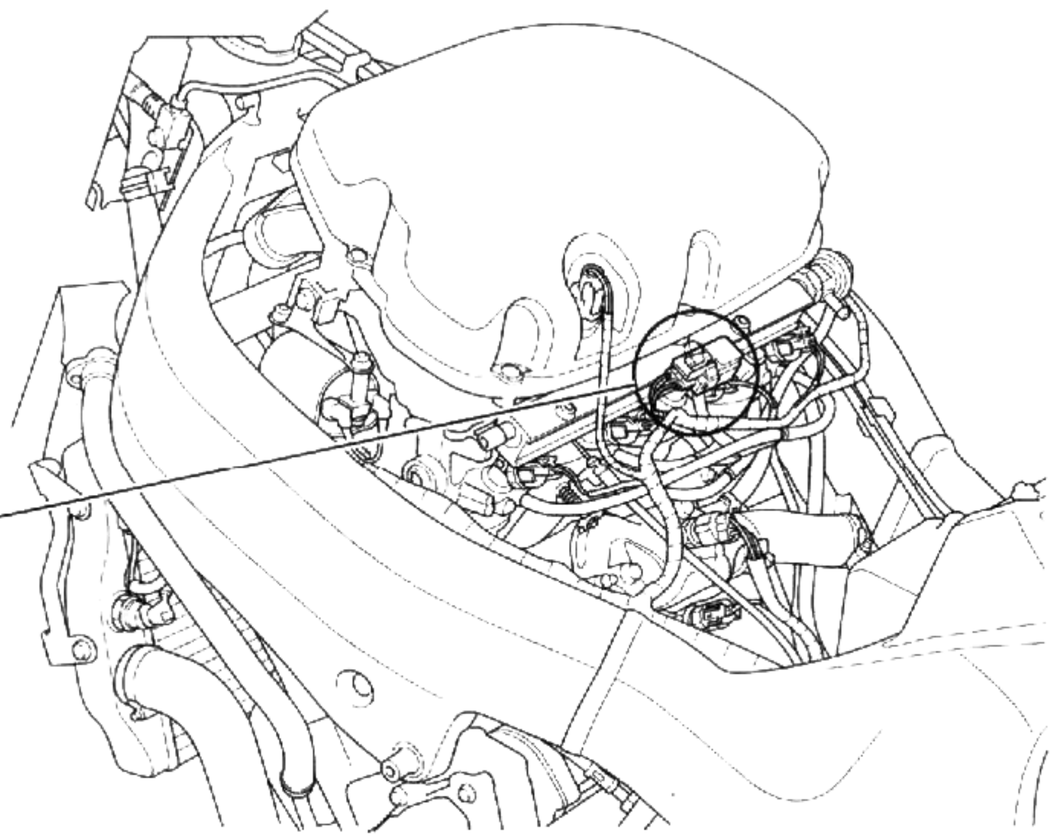
Number of PGM-FI malfunction indicator blinks		Causes	Symptoms (Fail-safe contents)	Refer to page
11	☼ Blinks	• Loose or poor contact on vehicle speed sensor connector • Open or short circuit in vehicle speed sensor connector • Faulty vehicle speed sensor	• Engine operates normally	5-24
12	☼ Blinks	• Loose or poor contact on No. 1 injector connector • Open or short circuit in No. 1 injector wire • Faulty No. 1 injector	• Engine does not start	5-26
13	☼ Blinks	• Loose or poor contact on No. 2 injector connector • Open or short circuit in No. 2 injector wire • Faulty No. 2 injector	• Engine does not start	5-29
14	☼ Blinks	• Loose or poor contact on No. 3 injector connector • Open or short circuit in No. 3 injector wire • Faulty No. 3 injector	• Engine does not start	5-32
15	☼ Blinks	• Loose or poor contact on No. 4 injector connector • Open or short circuit in No. 4 injector wire • Faulty No. 4 injector	• Engine does not start	5-35
18	☼ Blinks	• Loose or poor contact on cam pulse generator • Open or short circuit in cam pulse generator • Faulty cam pulse generator	• Engine does not start	5-38
19	☼ Blinks	• Loose or poor contact on ignition pulse generator connector • Open or short circuit in ignition pulse generator • Faulty ignition pulse generator	• Engine does not start	5-40
21	☼ Blinks	• Faulty O_2 sensor	• Engine operates normally	5-42
23	☼ Blinks	• Faulty O_2 sensor heater	• Engine operates normally	5-44
25	☼ Blinks	• Loose or poor contacts on knock sensor connector • Open or short circuit in knock sensor wire • Faulty knock sensor	• Engine operates normally	5-48
33	☼ Blinks	• Faulty E^2 -PROM in ECM	• Engine operates normally • Does not hold the self-diagnosis data	5-49

PGM-FI MALFUNCTION INDICATOR 1 BLINK (MAP SENSOR)

Turn the ignition switch OFF.

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





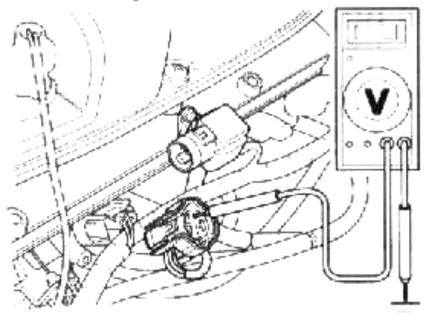
Connect the MAP sensor connector.
Place the motorcycle on its side stand.
Start the engine and check the malfunction indicator blinks.

No blinks → • Loose or poor contacts on the MAP sensor connector

1 blinks

Turn the ignition switch OFF.

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

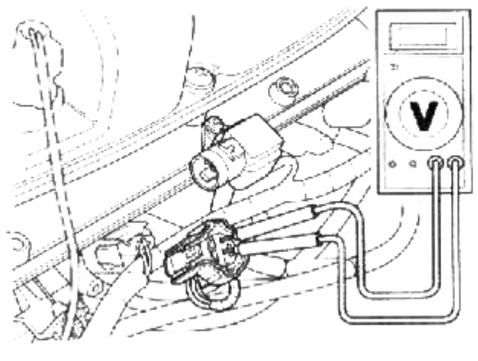


Connection: Yellow/Red (+) – Ground (–)
Standard: 4.75 – 5.25 V

Out of range → • Open or short circuit in Yellow/Red wire
• Loose or poor contact on the ECM connectors

Voltage exists

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

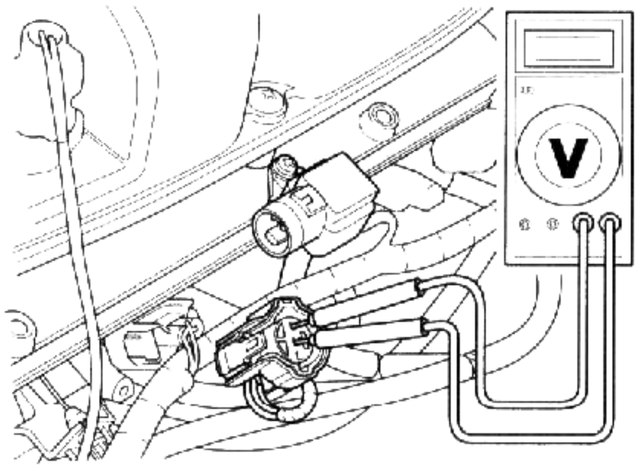


Connection: Yellow/Red (+) – Green/Orange (–)
Standard: 4.75 – 5.25 V

Out of range → • Open or short circuit in Green/Orange wire
• Loose or poor contact on the ECM connectors

Voltage exists

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

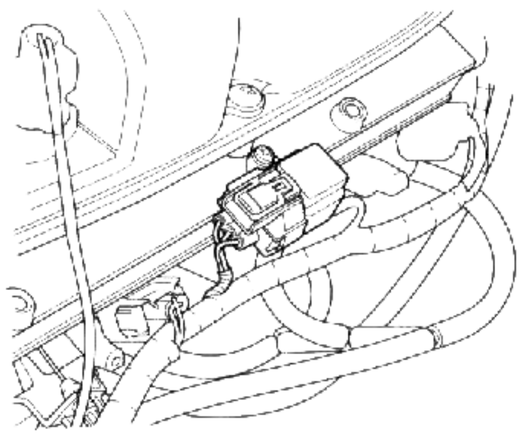


Connection:
Light green/Yellow (+) – Green/Orange (–)
Standard: 4.75 – 5.25 V

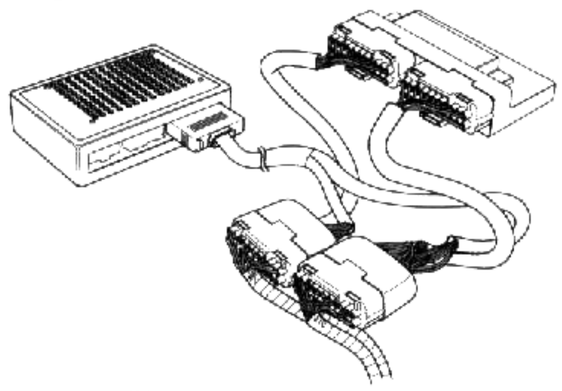
Out of range → • Open or short circuit in Light green/Yellow wire
• Loose or poor contact on the ECM connectors

↓ Voltage exists

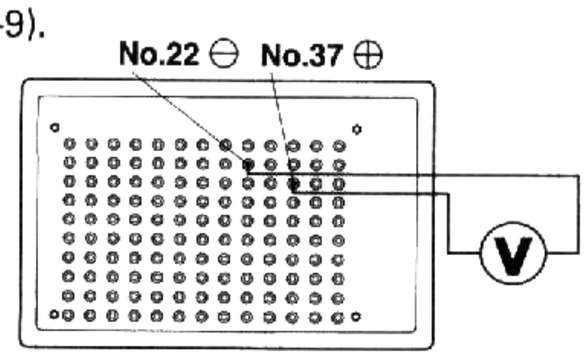
Turn the ignition switch OFF.
Connect the MAP sensor 3P connector.



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



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



Connection: No. 37 (+) – No. 22 (–)
Standard: 2.7 – 3.1 V (760 mm Hg/1,013 kPa)

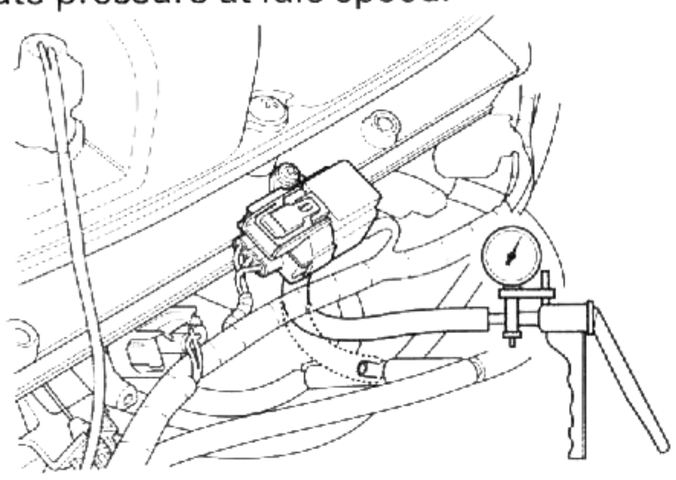
Out of range → • Faulty MAP sensor

Voltage exists → • Replace the ECM with a new one, and inspect it again

PGM-FI MALFUNCTION INDICATOR 2 BLINKS (MAP SENSOR)

Turn the ignition switch OFF.

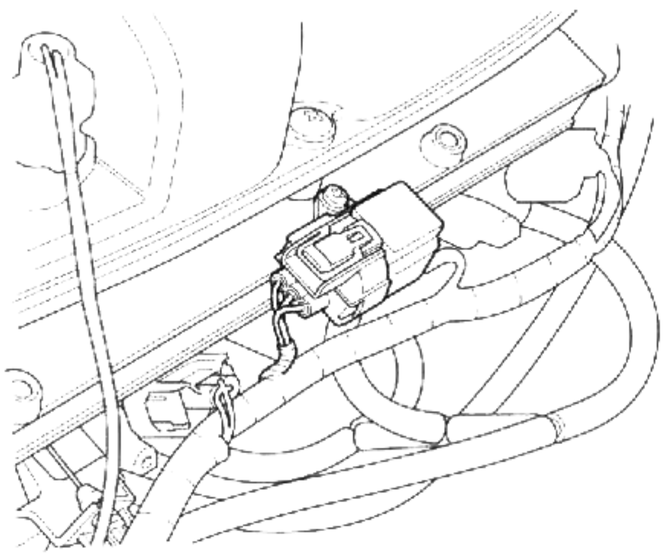
Disconnect the tube from the MAP sensor.
Connect the vacuum gauge between the throttle body and the MAP sensor using a 3-way joint.
Start the engine and measure the manifold absolute pressure at idle speed.



Standard: 140 – 190 mm Hg

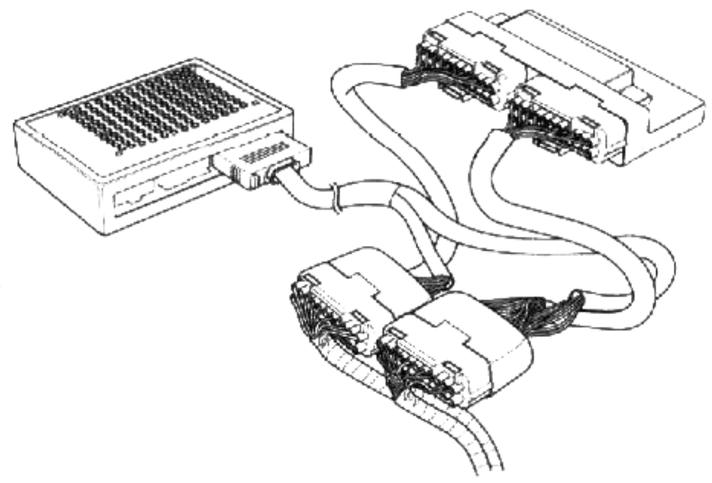
Out of range → • Check the tube installation

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

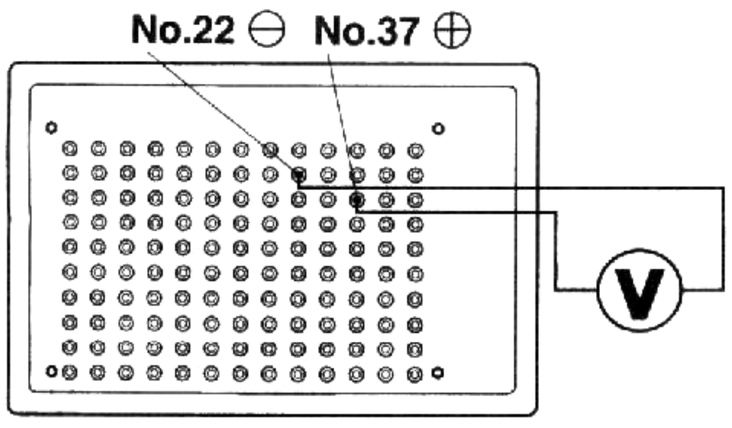


Normal

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



Turn the ignition switch ON.
Measure the voltage at the test pin box terminals (page 5-9).

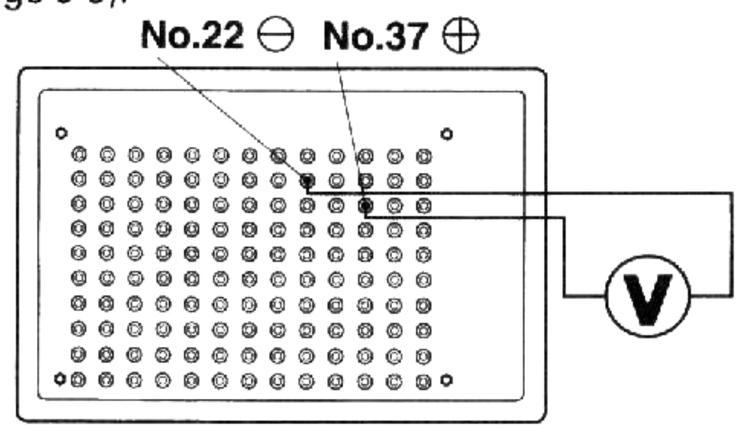


Connection: No. 37 (+) – No. 22 (–)
Standard: 2.7 – 3.1 V (760 mm Hg/1,013 kPa)

Out of range → • Faulty MAP sensor

Voltage exists ↓

Start the engine.
Measure the voltage at the test pin box terminals (page 5-9).



Connection: No. 37 (+) – No. 22 (–)
Standard: 2.7 V maximum

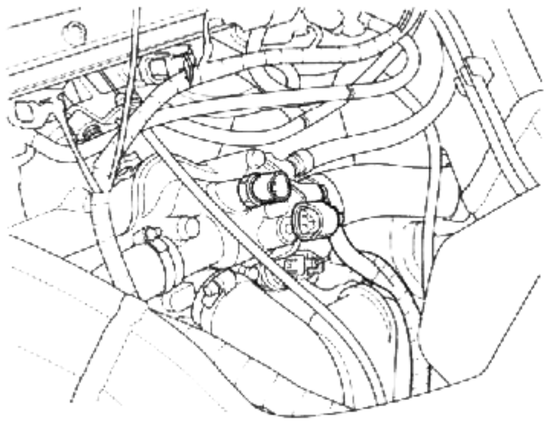
Out of range → • Faulty MAP sensor

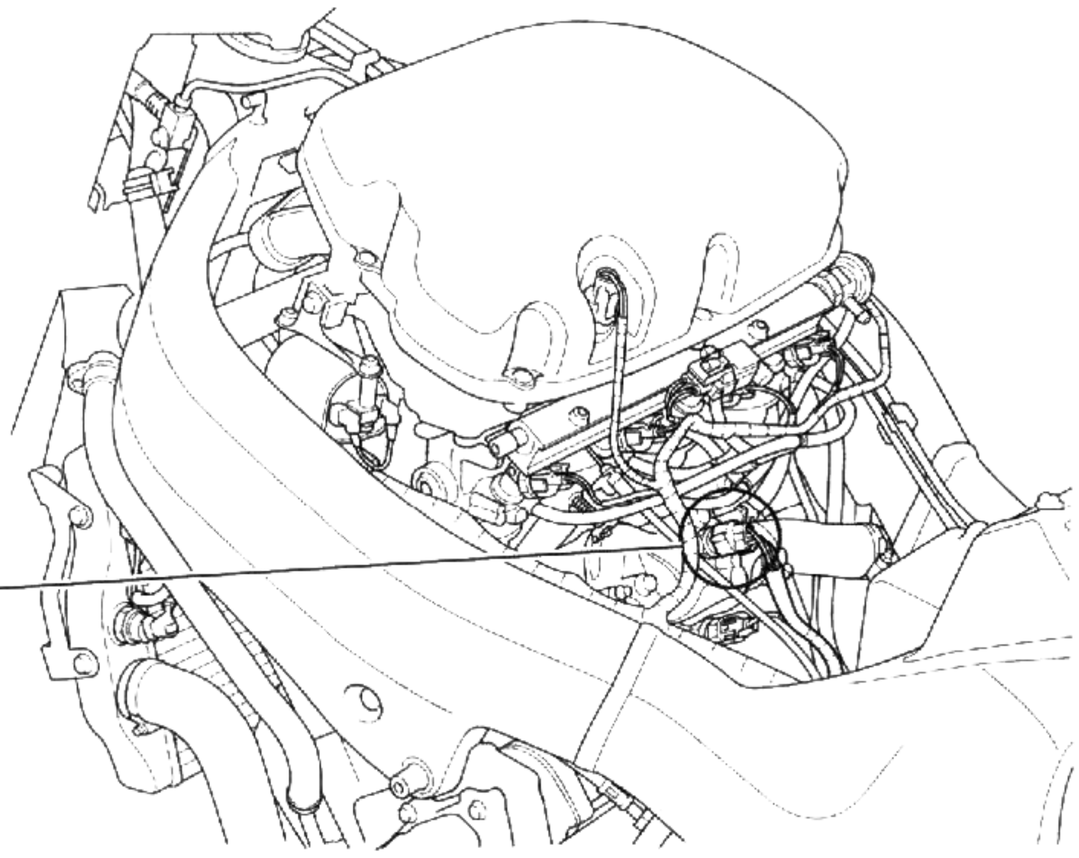
Voltage exists → • Replace the ECM with a new one, and inspect it again

PGM-FI MALFUNCTION INDICATOR 7 BLINKS (ECT SENSOR)

Turn the ignition switch OFF.

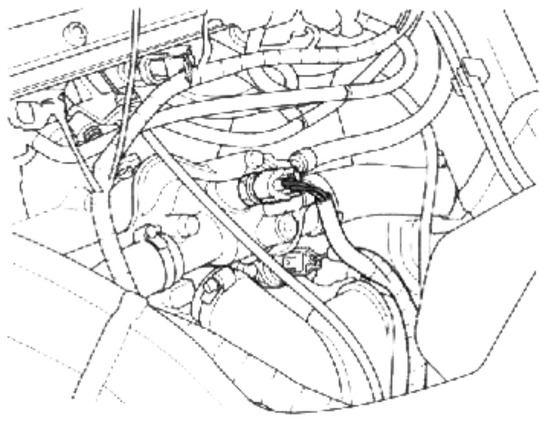
Disconnect the ECT sensor 3P connector.
Check for loose or poor contact on the ECT sensor connector.





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

No blinks → • Loose or poor contacts on the ECT sensor connector

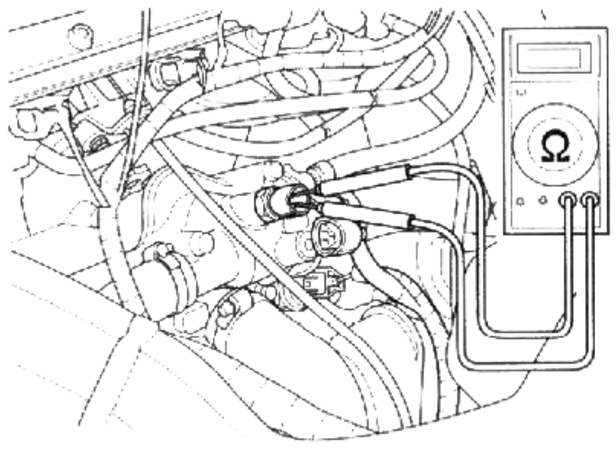


Check the malfunction indicator blinks.

7 blinks

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

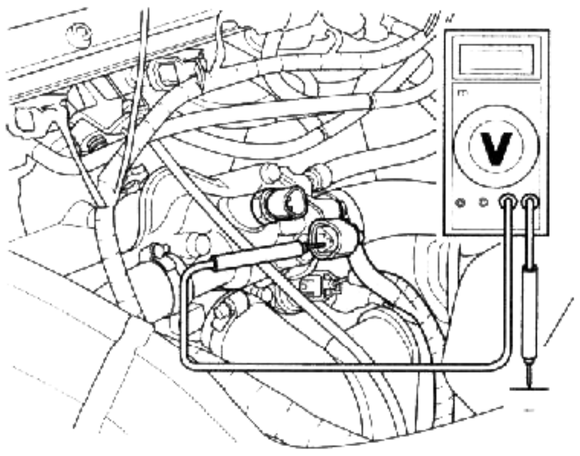
Abnormal → • Faulty ECT sensor



Connection: Pink/white (+) – Green/Orange (–) (sensor side terminals)
Standard: 2.2 – 2.7 kΩ (20 °C/68 °F)

Normal

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

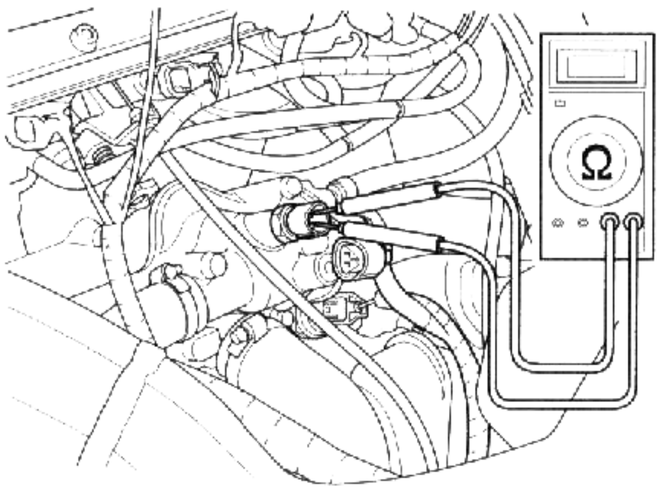


Connection: Pink/white (+) – Ground (–)
Standard: 4.75 – 5.25 V

Out of range → • Open or short circuit in Pink and Pink/White wire
• Loose or poor contacts on the ECM connector

Voltage exists ↓

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



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

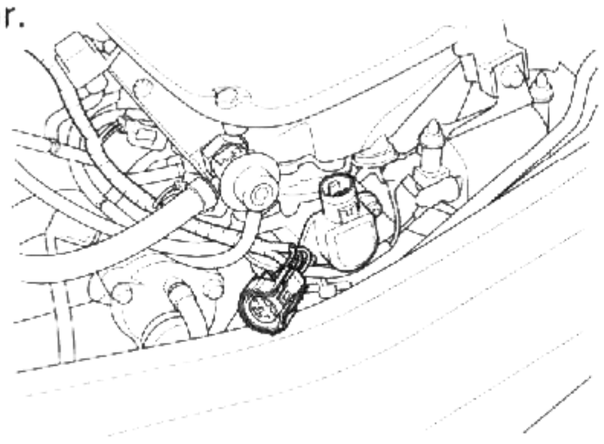
Out of range → • Open or short circuit in Green/Orange wire
• Loose or poor contacts on the ECM connector

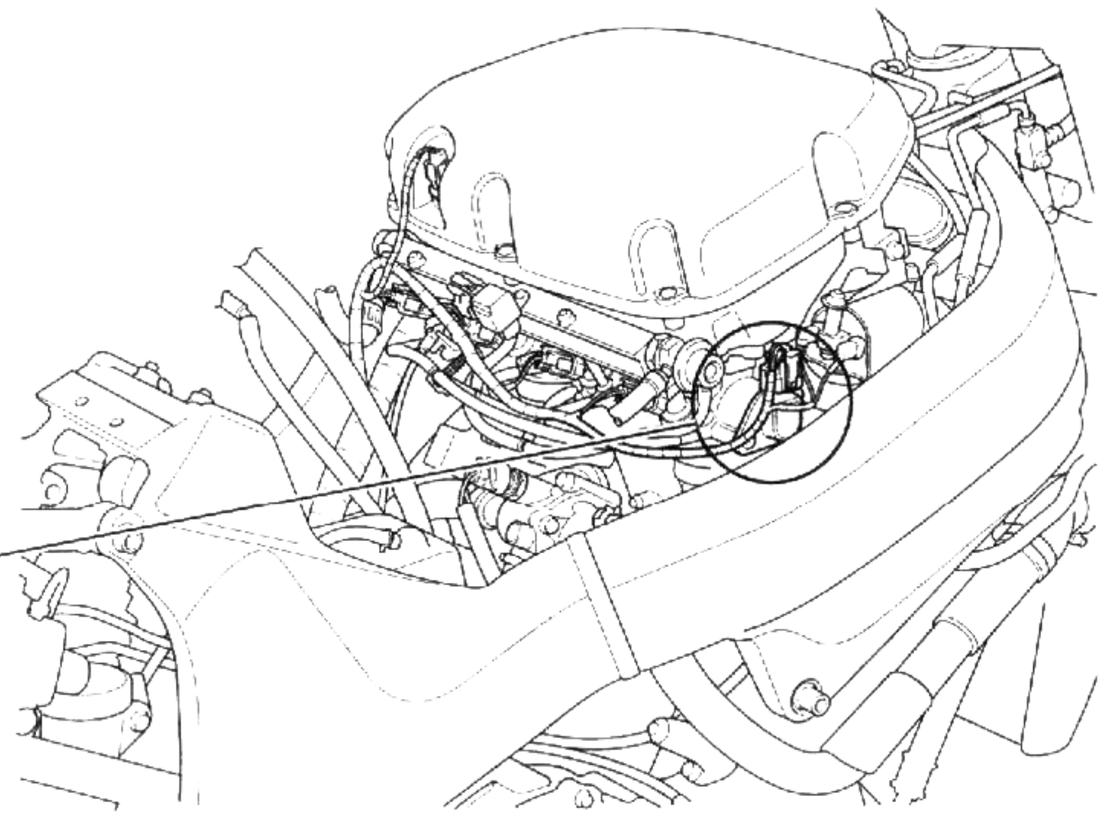
Voltage exists → • Replace the ECM with a new one, and inspect it again

PGM-FI MALFUNCTION INDICATOR 8 BLINKS (TP SENSOR)

Turn the ignition switch OFF.

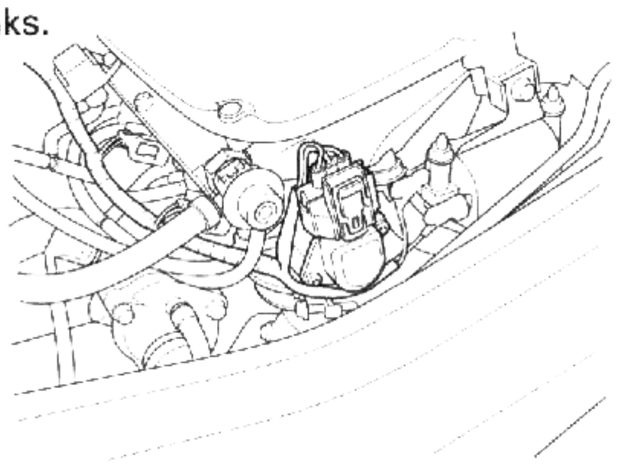
Disconnect the TP sensor 3P connector.
Check for loose or poor contact on the TP sensor connector.





Connect the TP sensor connector.
Place the motorcycle on its side stand.
Start the engine and check the malfunction indicator blinks.

No blinks → • Loose or poor contacts on the TP sensor connector

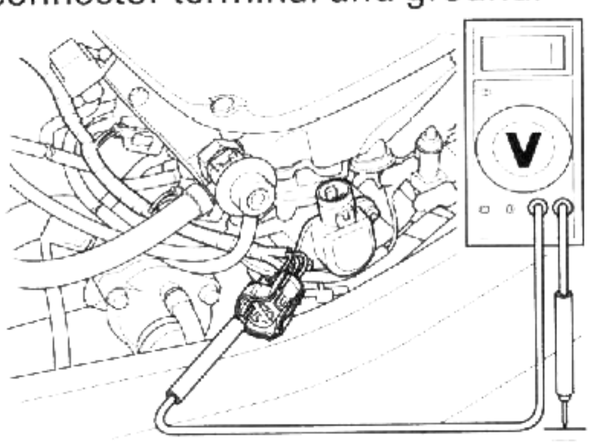


8 blinks

Turn the ignition switch OFF.

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

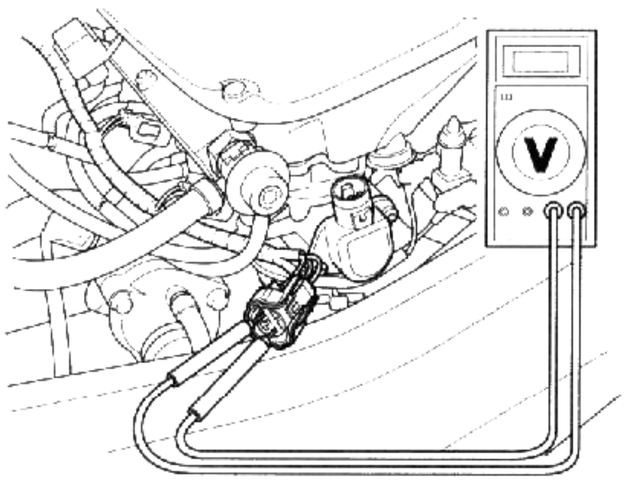
Out of range → • Open or short circuit in the Yellow/Red wire
• Loose or poor contact on the ECM connector



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

Voltage exists

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

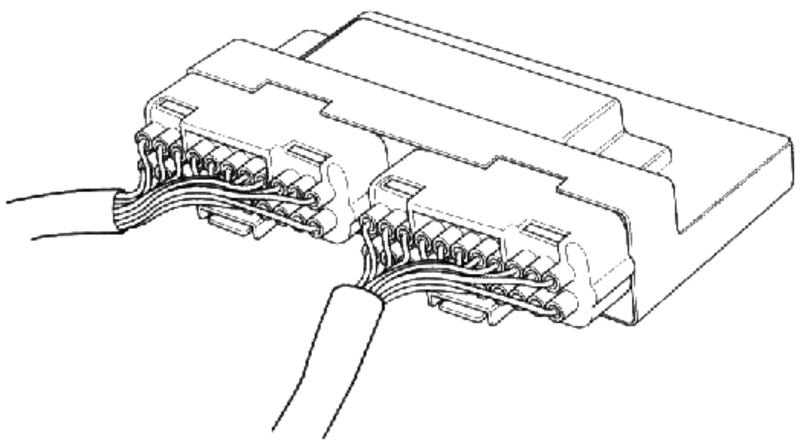


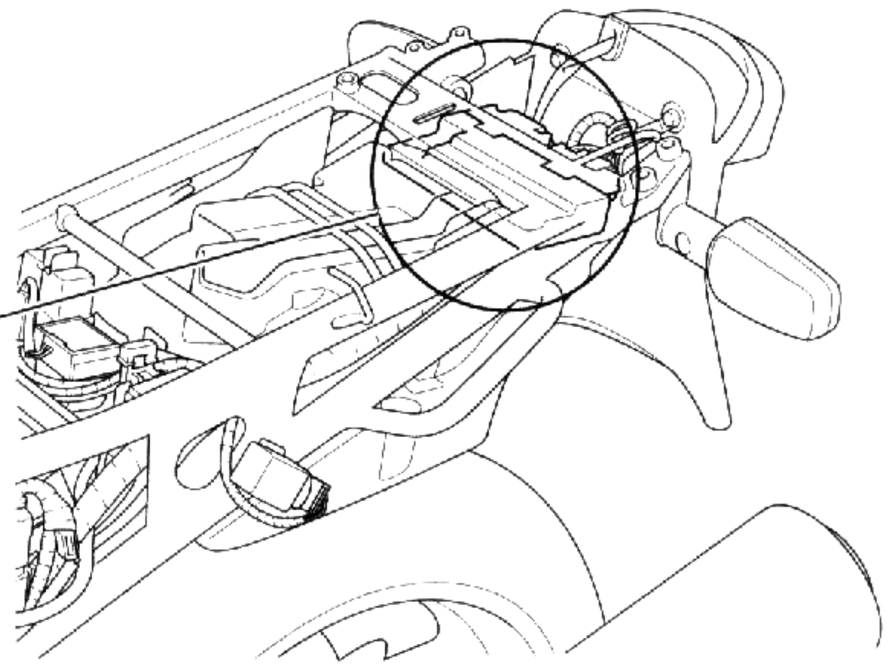
Connection: Yellow/Red (+)—Green/Orange (−)
Standard: 4.75—5.25 V

Out of range → • Open or short circuit in Green/Orange wire
• Loose or poor contact on the ECM connectors

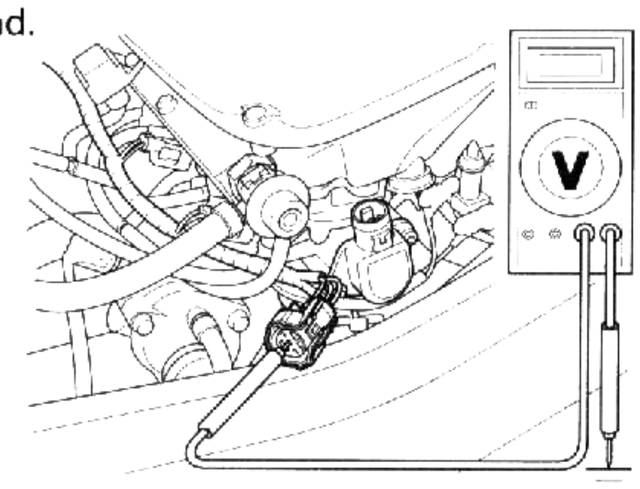
Voltage exists ↓

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





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

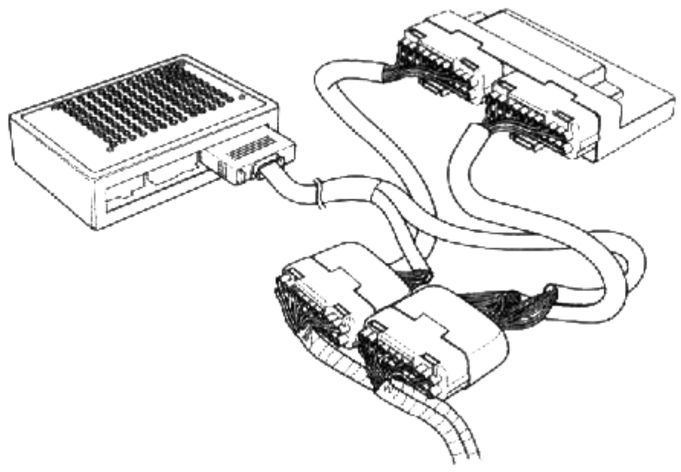


Connection: Red/Yellow (+)—Ground (−)
Standard: No continuity

Continuity → • Short circuit in Red/Yellow wire

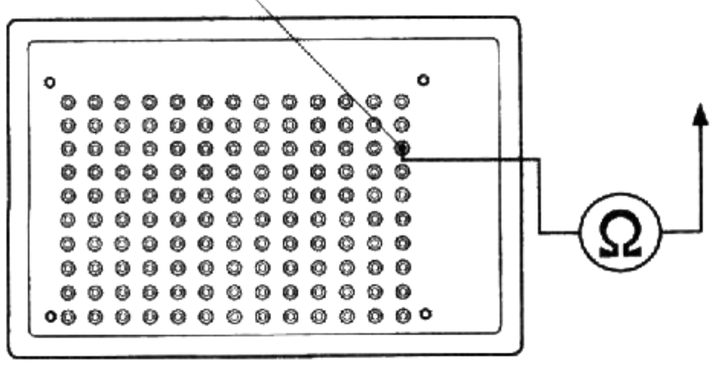
No continuity ↓

Connect the test harness to the ECM connectors.



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

No.39

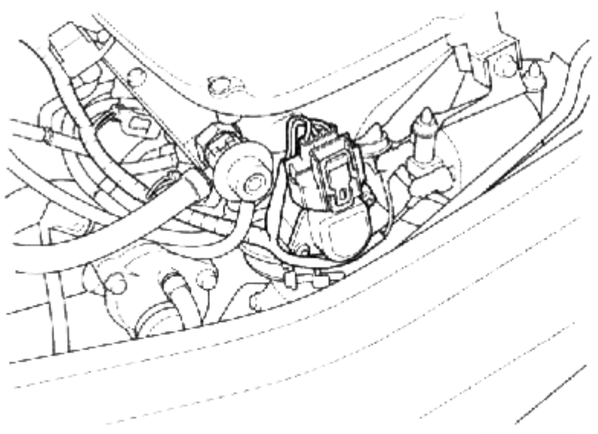


Connection: Red/Yellow—No. 39
Standard: Continuity

No continuity → • Open or short circuit in Red/Yellow wire

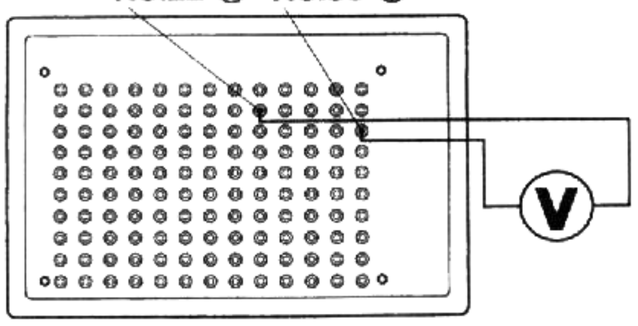
Continuity

Connect the TP sensor 3P connector.



Turn the ignition switch ON.
Measure the voltage at the test pin box terminals.

No.22 ⊖ No.39 ⊕



Connection: No. 39 (+)—No. 22 (—)
Standard: *0.4—0.6 V (throttle fully closed)
*4.2—4.8 V (throttle fully open)

Normal → • Replace the ECM with a new one, and inspect it again

Out of range → • Faulty TP sensor

A voltage marked* refers to the value when the voltage reading at the TP sensor 3P connector (page 5-19) shows 5V. When the reading shows other than 5 V, derive a voltage at the test harness as follows:

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

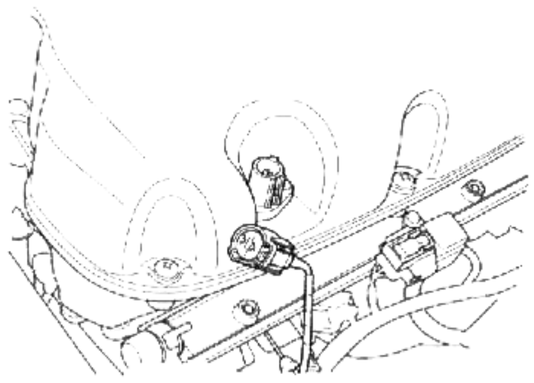
$0.4 \times 4.75/5.0 = 0.38$ V
$0.6 \times 4.75/5.0 = 0.57$ V

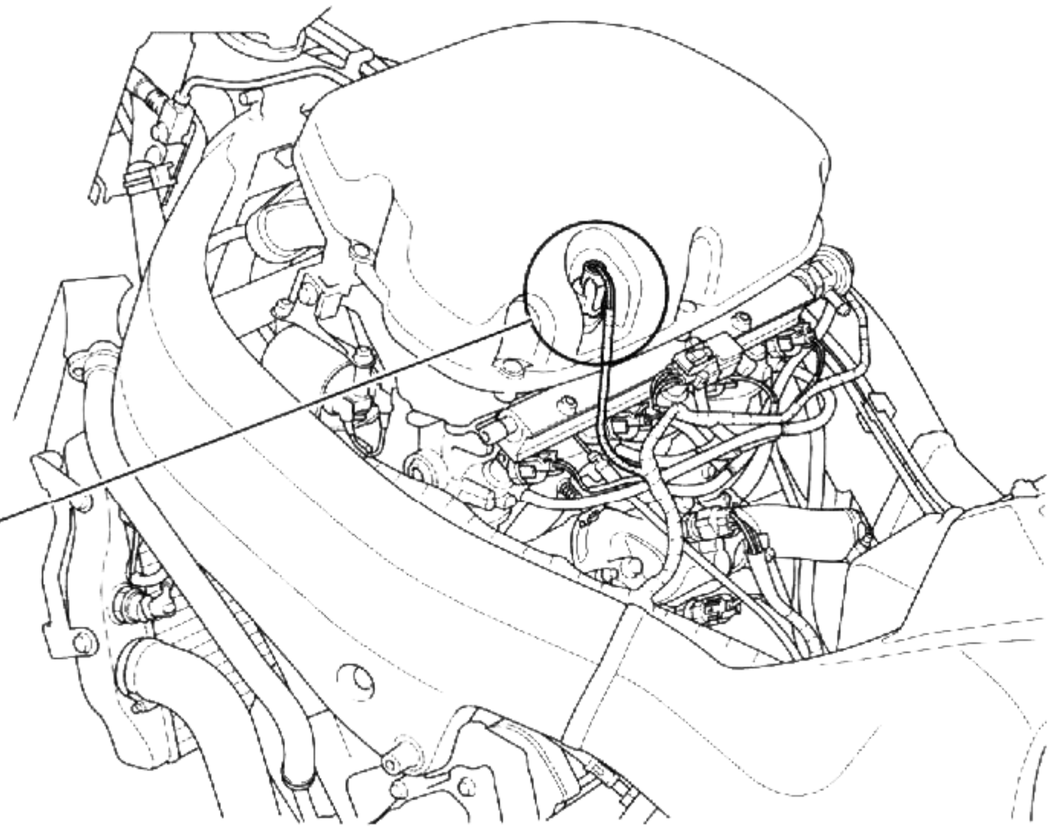
Thus, the solution is "0.38—0.57 V"

PGM-FI MALFUNCTION INDICATOR 9 BLINKS (IAT SENSOR)

Turn the ignition switch OFF.

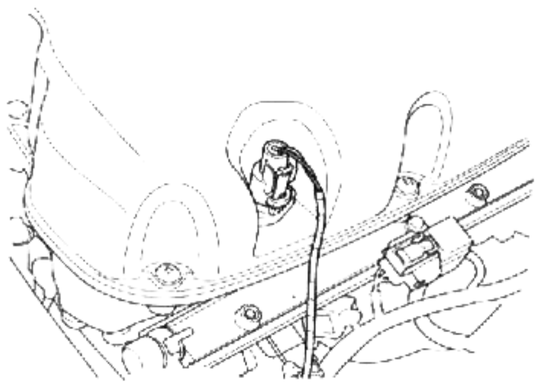
Disconnect the IAT sensor 2P connector.
Check for loose or poor contact on the IAT sensor connector.





Connect the IAT sensor 2P connector.
Place the motorcycle on its side stand.
Turn the ignition switch ON.
Check the malfunction indicator blinks.

No blinks → • Loose or poor contacts on the IAT sensor connector



9 blinks

Turn the ignition switch OFF.

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

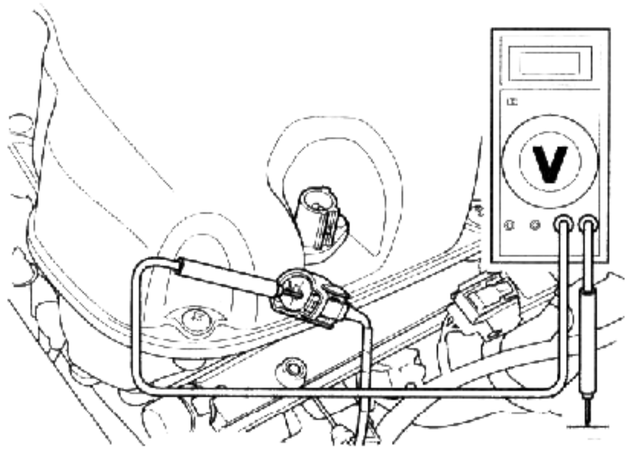
Abnormal → • Faulty IAT sensor

Standard: 1 – 4 kΩ

Normal

Turn the ignition switch ON.

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

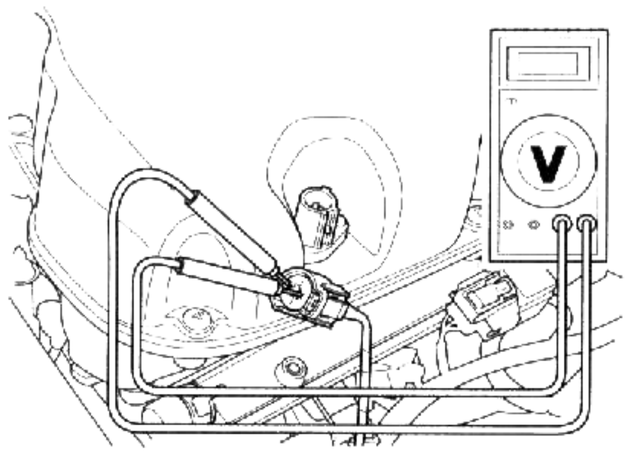


Connection:
Gray/Blue (+) – Ground (–)
Standard: 4.75 – 5.25 V

Out of range → • Open or short circuit in Gray/Blue wire
• Loose or poor contact on the ECM connectors

Voltage exists ↓

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



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

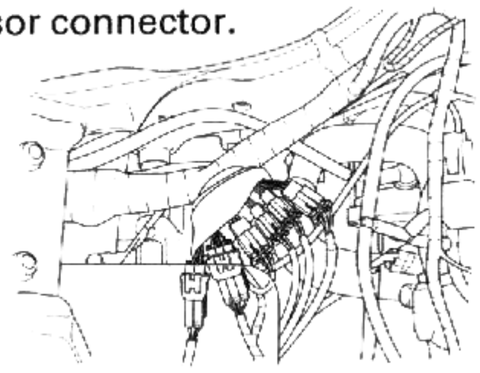
Out of range → • Open or short circuit in Green/Orange wire
• Loose or poor contact on the ECM connectors

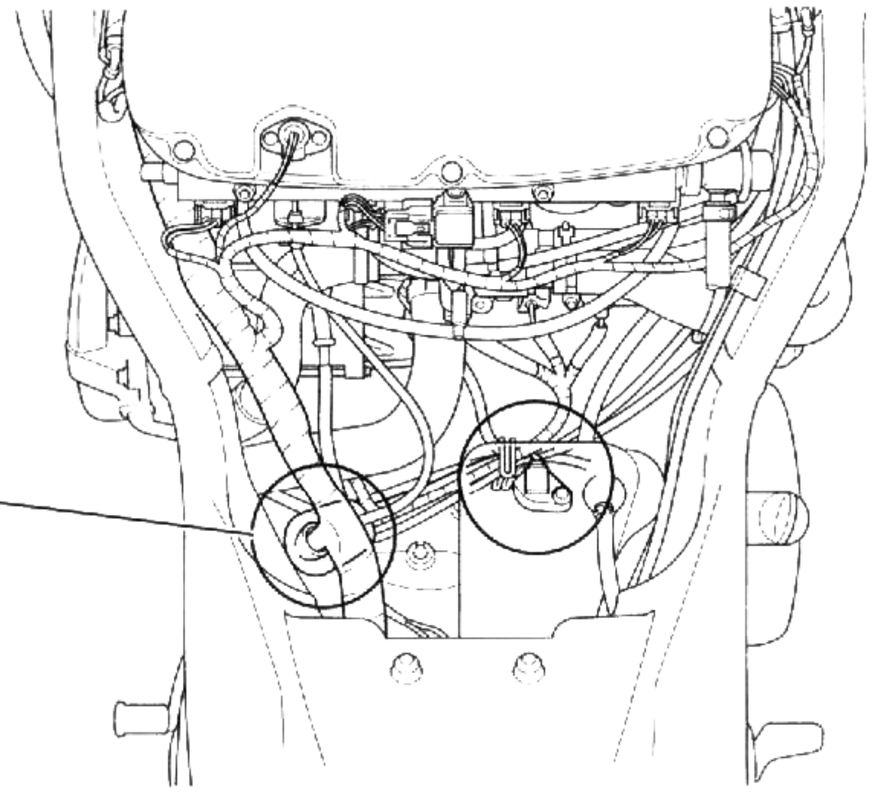
Voltage exists → • Replace the ECM with a new one, and inspect it again

PGM-FI MALFUNCTION INDICATOR 11 BLINKS (VEHICLE SPEED SENSOR)

Turn the ignition switch OFF.

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





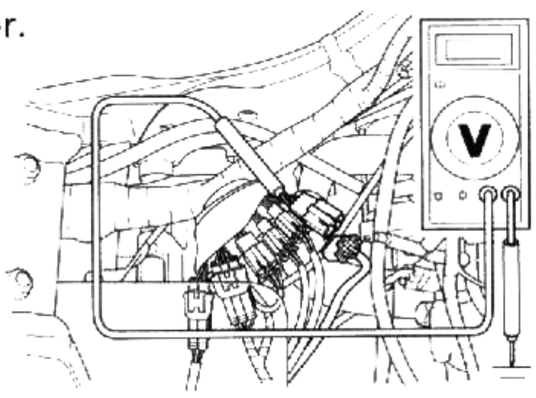
Connect the vehicle speed sensor 3P connector.
Start the engine.
With the side stand UP and keep the engine rev more than 5,000 min^{-1} (rpm) about 20 seconds or more.
Check the malfunction indicator blinks.

No blinks → • Loose or poor contacts on the vehicle speed sensor connector

11 blinks

Turn the ignition switch OFF.

Disconnect the vehicle speed sensor 3P connector.
Turn the ignition switch ON.
Measure the voltage at the wire harness side connector.

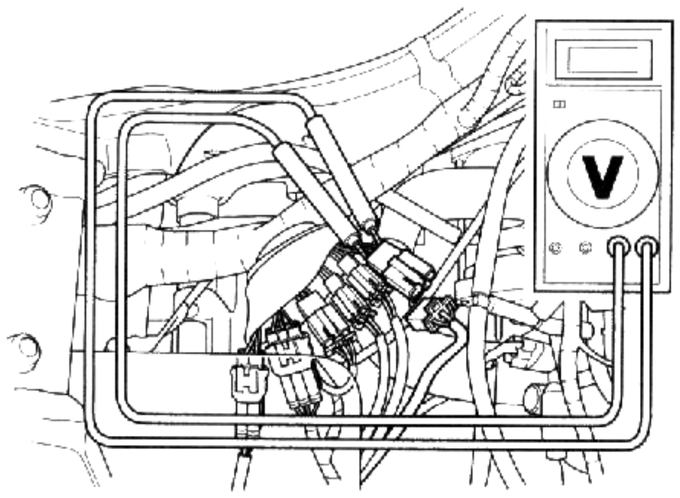


Connection: Black/Brown (+) – Ground (–)
Standard: 12 V

Out of range → • Open or short circuit in Black/Brown wire

Voltage exists

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

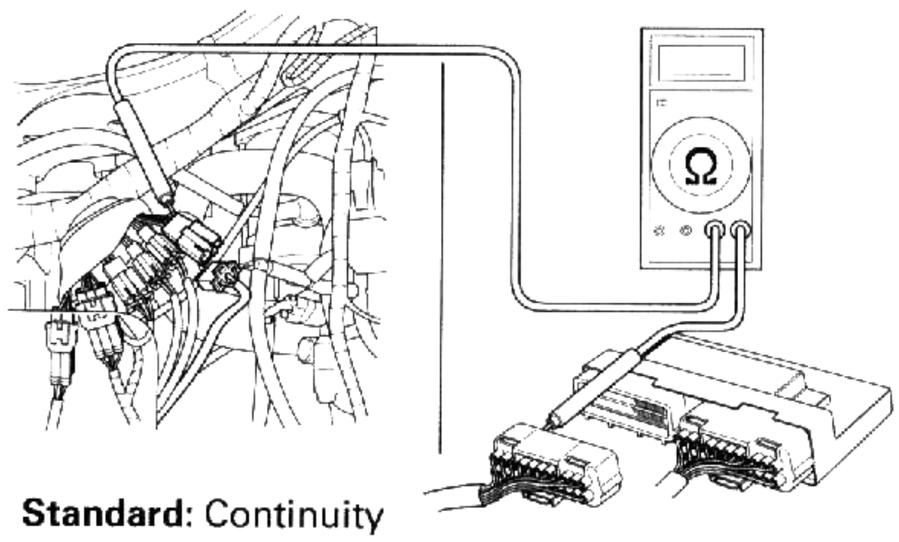


Connection: Black/Brown (+) – Green/Black (–)
Standard: 12 V

Out of range → • Open or short circuit in Green/Black wire

Voltage exists ↓

Check for continuity of the Pink/Green wire between vehicle speed sensor connector and ECM connector.



Standard: Continuity

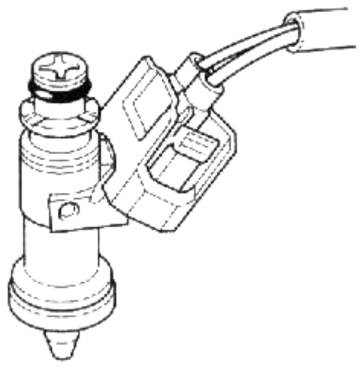
No continuity → • Open or short circuit in Pink/Green wire

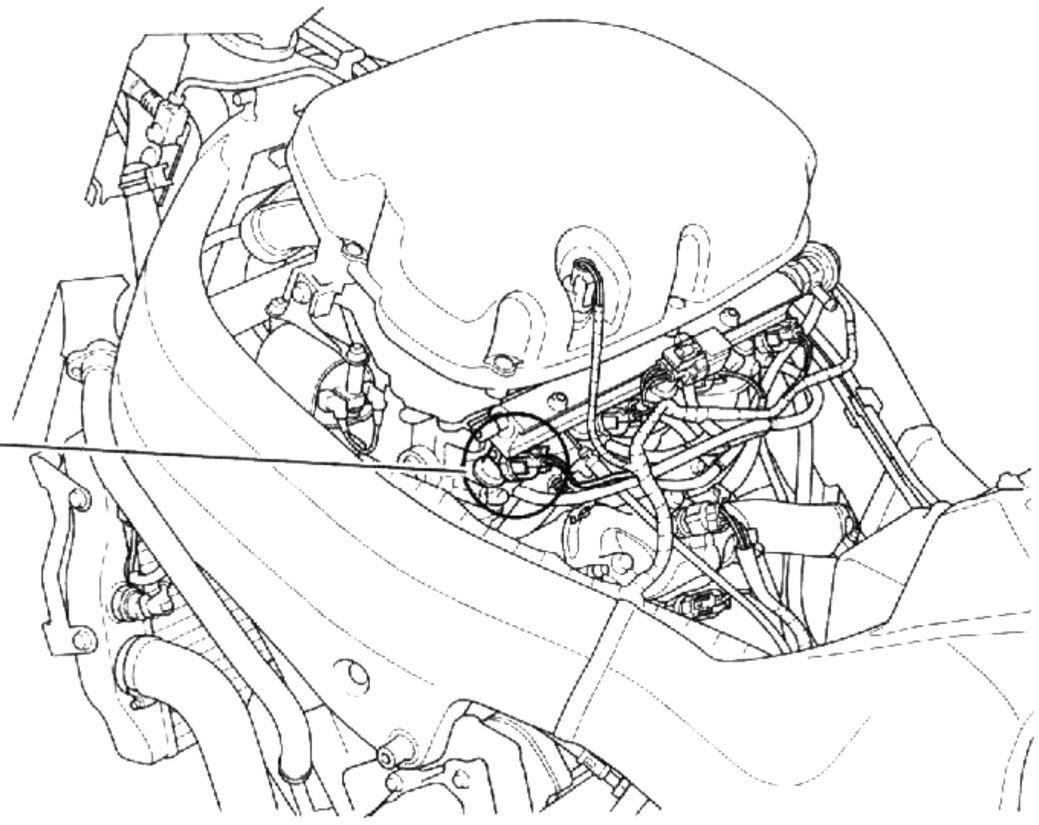
Continuity → • Replace the ECM with a new one, and inspect it again.

PGM-FI WARNING INDICATOR 12 BLINKS (NO.1 INJECTOR)

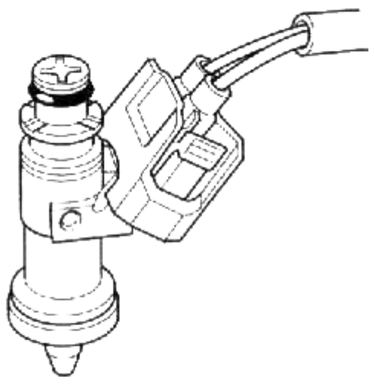
Turn the ignition switch OFF.

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





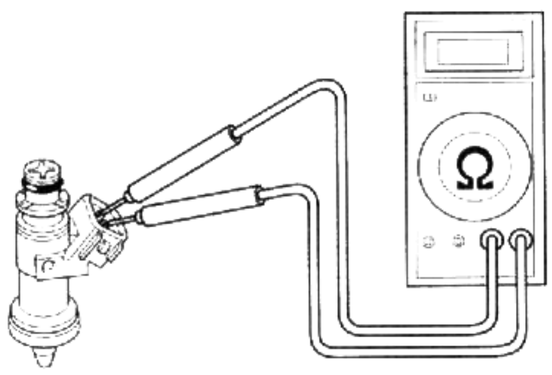
Connect the No. 1 injector 2P connector.
Place the motorcycle on its side stand.
Turn the ignition switch ON.
Check the malfunction indicator blinks.



No blinks → • Loose or poor contacts on the No. 1 injector connector

12 blinks

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

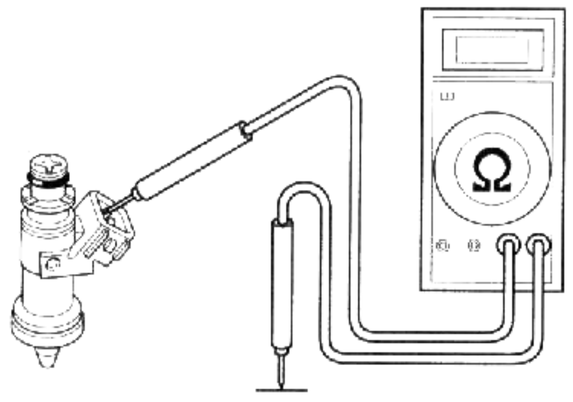


Connection:
Black/White (+) – Pink/Yellow (–)
Standard: 13.0 – 14.4 kΩ (20 °C/68 °F)

Abnormal → • Faulty No. 1 injector

Normal

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

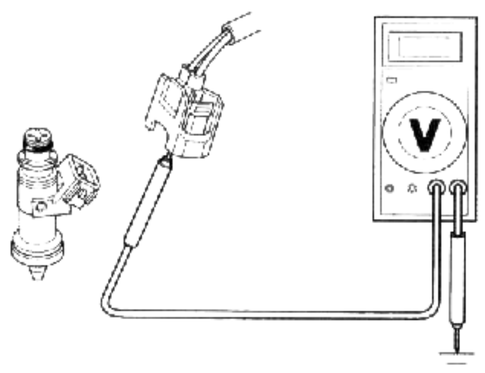


Connection:
Black/White (+) – Ground (–)
Standard: No continuity

Continuity → • Faulty No. 1 injector

No continuity ↓

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

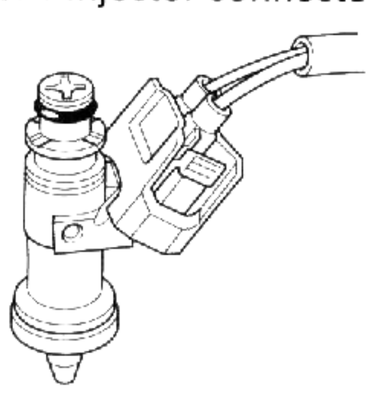


Connection:
Black/White (+) – Ground (–)
Standard: Battery voltage

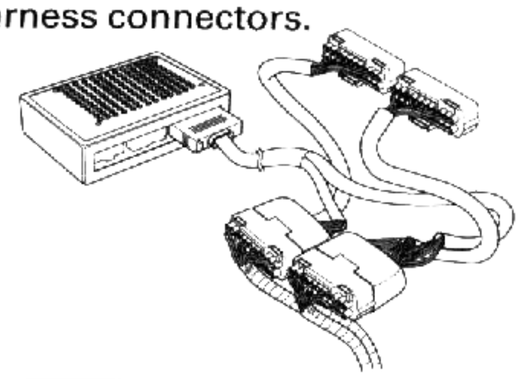
Out of range → • Open or short circuit in Black/White wire

Voltage exists ↓

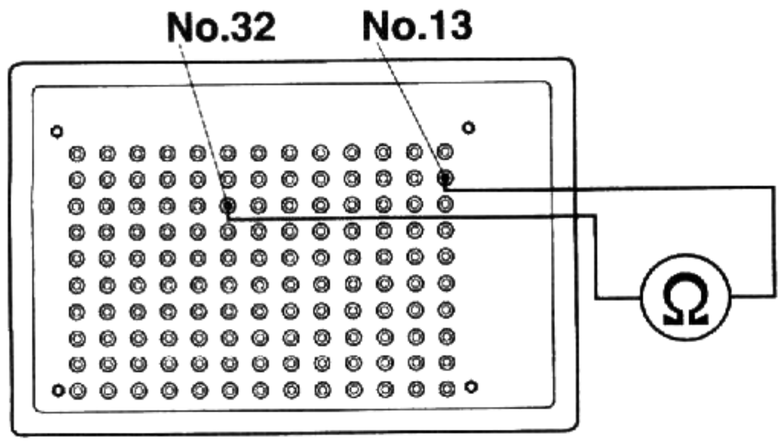
Turn the ignition switch OFF.
Connect the No. 1 injector connector.



Disconnect the ECM connectors.
Connect the test harness and test pin box to the wire harness connectors.



Measure the resistance at the test pin box terminals.

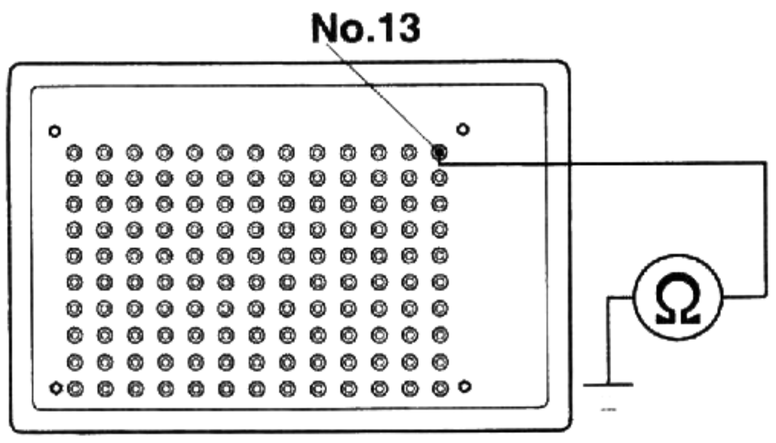


Connection: No. 13 — No. 32
Standard: 9 — 15 Ω (20 °C/68 °F)

Out of range → • Open circuit in Black/White and/or Pink/Yellow wire

Normal ↓

Check for continuity between the test pin box terminal and ground.



Connection: No. 13 — Ground
Standard: No continuity

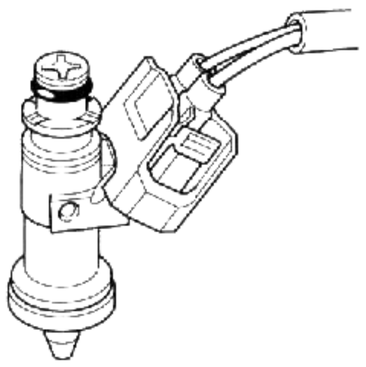
Continuity → • Short circuit in Pink/Yellow wire

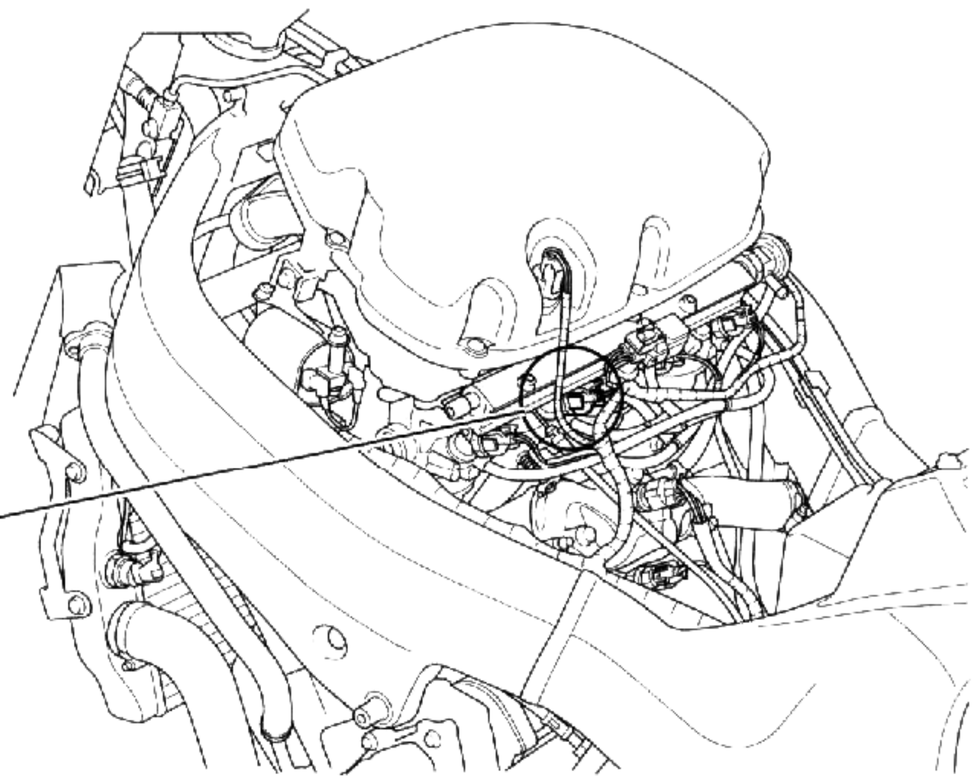
No continuity → • Replace the ECM with a new one, and inspect it again.

PGM-FI MALFUNCTION INDICATOR 13 BLINKS (NO. 2 INJECTOR)

Turn the ignition switch OFF.

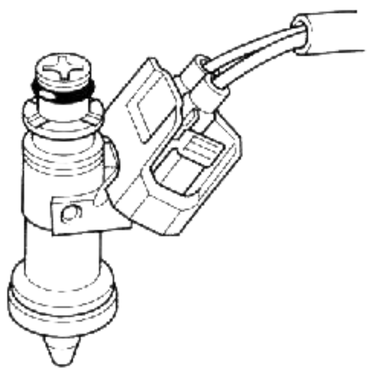
Disconnect the No. 2 injector 2P connector.
Check for loose or poor contact on the No. 2 injector 2P connector.





Connect the No. 2 injector 2P connector.
Place the motorcycle on its side stand.
Turn the ignition switch ON.
Check the malfunction indicator blinks.

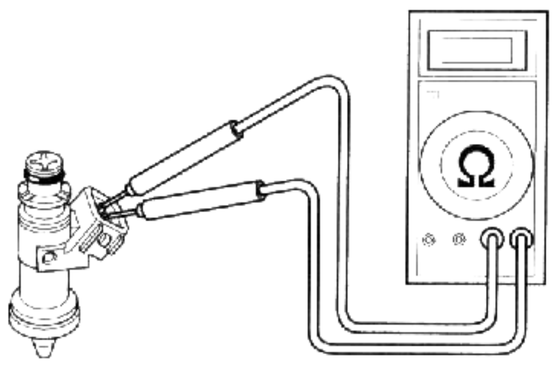
No blinks → • Loose or poor contacts on the No. 2 injector connector



13 blinks

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

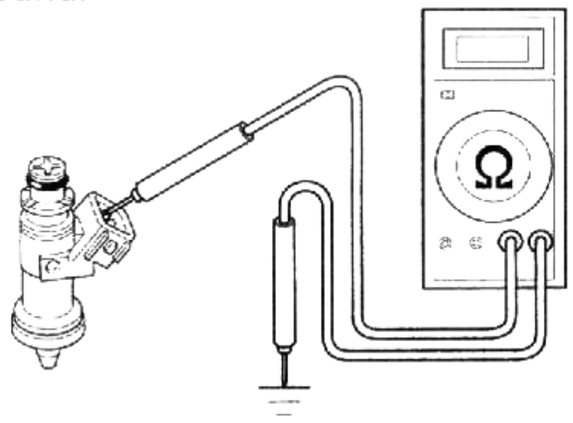
Abnormal → • Faulty No. 2 injector



Connection:
Black/White (+) — Pink/Blue (−)
Standard: 13.0 — 14.4 kΩ (20 °C/68 °F)

Normal

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

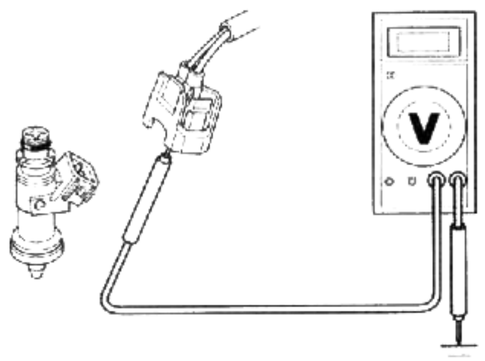


Connection:
Black/White (+) – Ground (–)
Standard: No continuity

Continuity → • Faulty No. 2 injector

No continuity

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

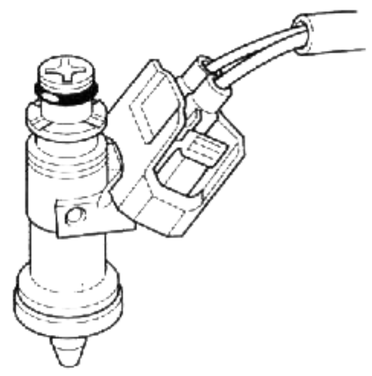


Connection:
Black/White (+) – Ground (–)
Standard: Battery voltage

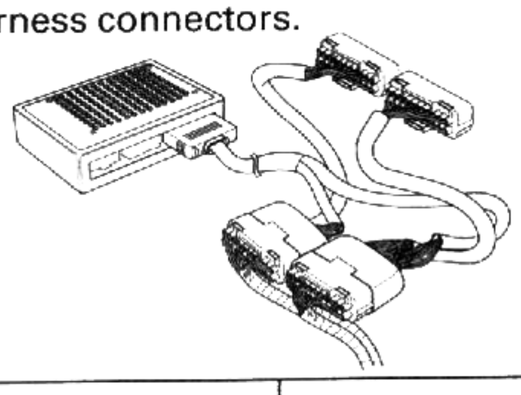
Out of range → • Open or short circuit in Black/White wire

Voltage exists

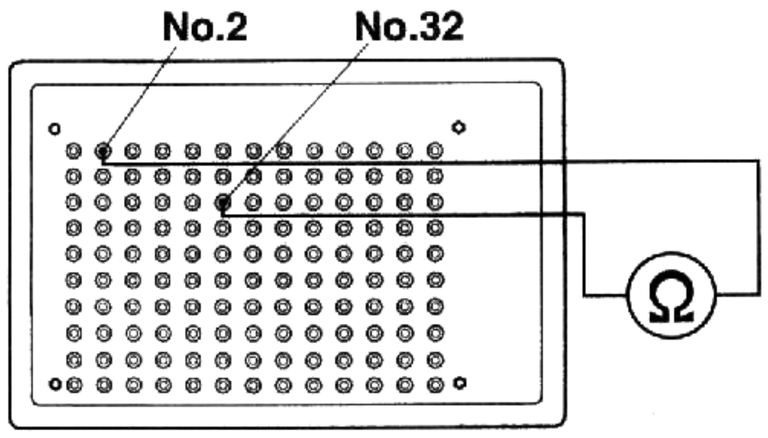
Turn the ignition switch OFF.
Connect the No. 2 injector connector.



Disconnect the ECM connectors.
Connect the test harness and test pin box to the wire harness connectors.



Measure the resistance at the test pin box terminals.

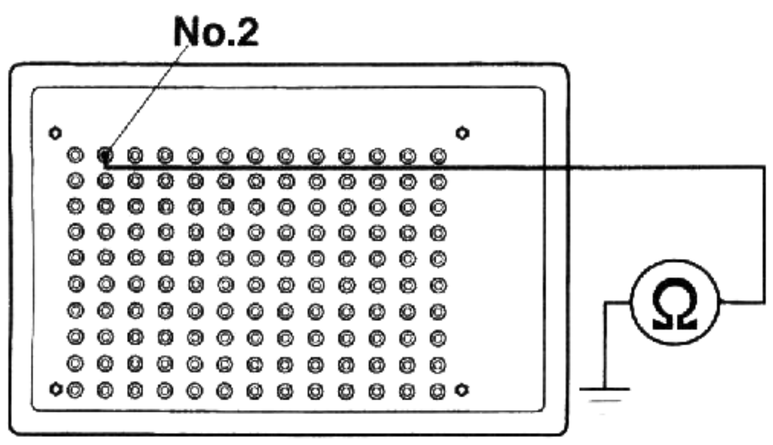


Connection: No. 2 — No. 32
Standard: 9 — 15 Ω (20 °C/68 °F)

Out of range → • Open circuit in Black/White and/or Pink/Blue wire

Normal ↓

Check for continuity between the test pin box terminal and ground.



Connection: No. 2 — Ground
Standard: No continuity

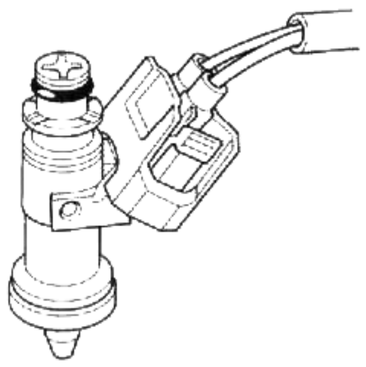
Continuity → • Short circuit in Pink/Blue wire

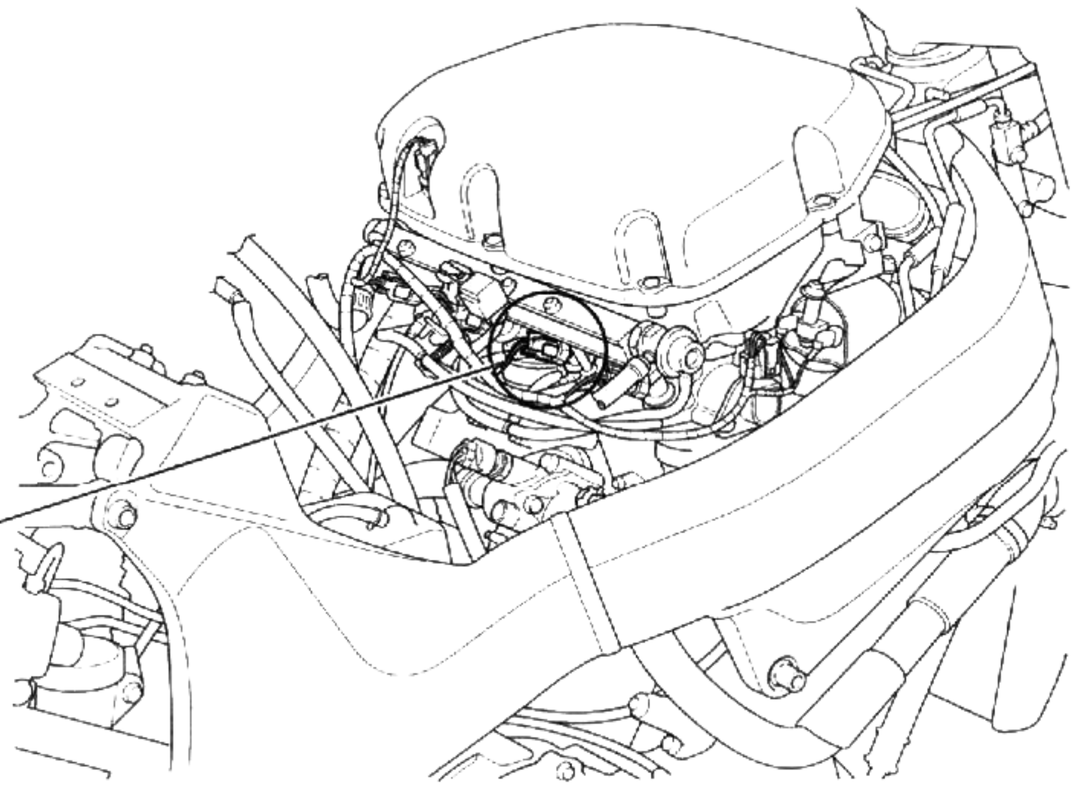
No continuity → • Replace the ECM with a new one, and inspect it again.

PGM-FI MALFUNCTION INDICATOR 14 BLINKS (NO. 3 INJECTOR)

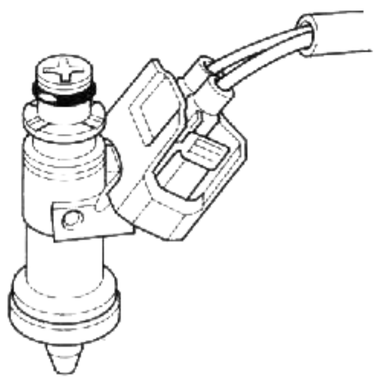
Turn the ignition switch OFF.

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





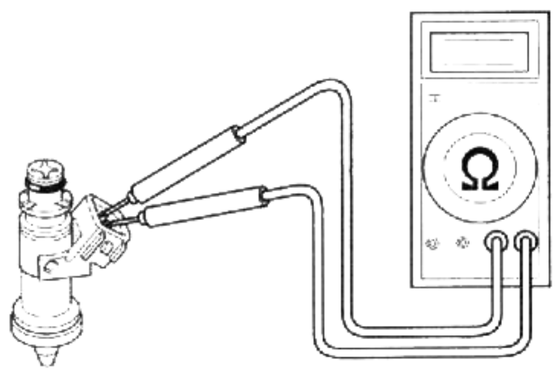
Connect the No. 3 injector 2P connector.
Place the motorcycle on its side stand.
Turn the ignition switch ON.
Check the malfunction indicator blinks.



No blinks → • Loose or poor contacts on the No. 3 injector connector

14 blinks

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

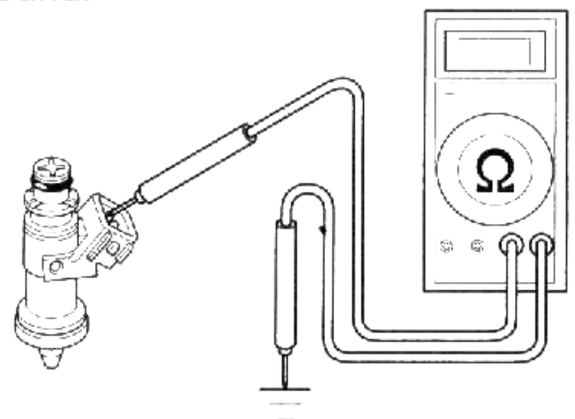


Connection:
Black/White (+) – Pink/Green (–)
Standard: 13.0 – 14.4 kΩ (20 °C/68 °F)

Abnormal → • Faulty No. 3 injector

Normal

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

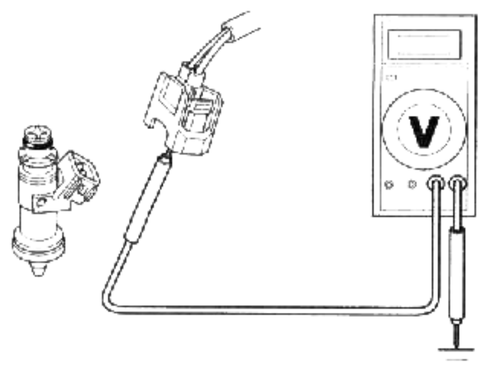


Connection:
Black/White (+) – Ground (–)
Standard: No continuity

Continuity → • Faulty No. 3 injector

No continuity ↓

Turn the ignition switch ON.
Measure the voltage between the No. 3 injector connector of the wire harness side and ground.

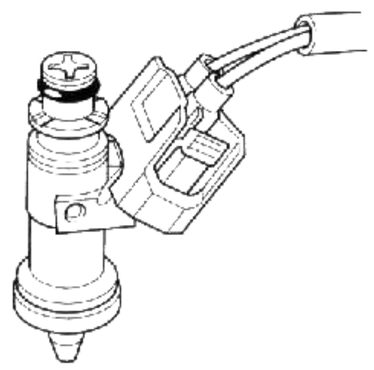


Connection:
Black/White (+) – Ground (–)
Standard: Battery voltage

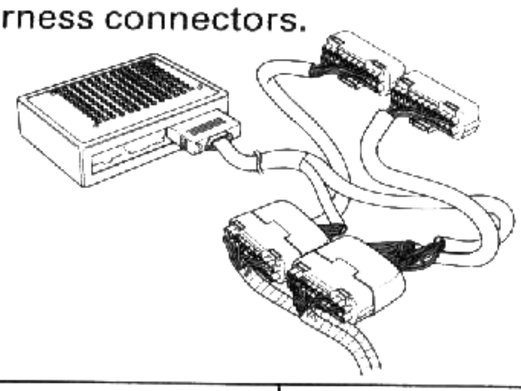
Out of range → • Open or short circuit in Black/White wire

Voltage exists ↓

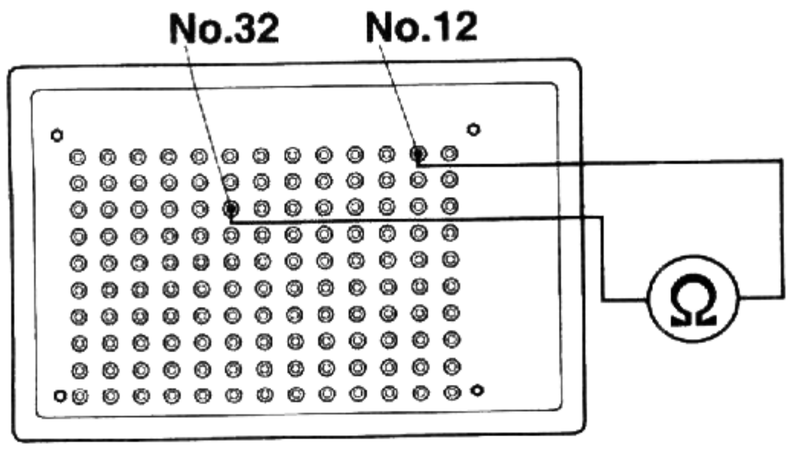
Turn the ignition switch OFF.
Connect the No. 3 injector connector.



Disconnect the ECM connectors.
Connect the test harness and test pin box to the wire harness connectors.



Measure the resistance at the test pin box terminals.

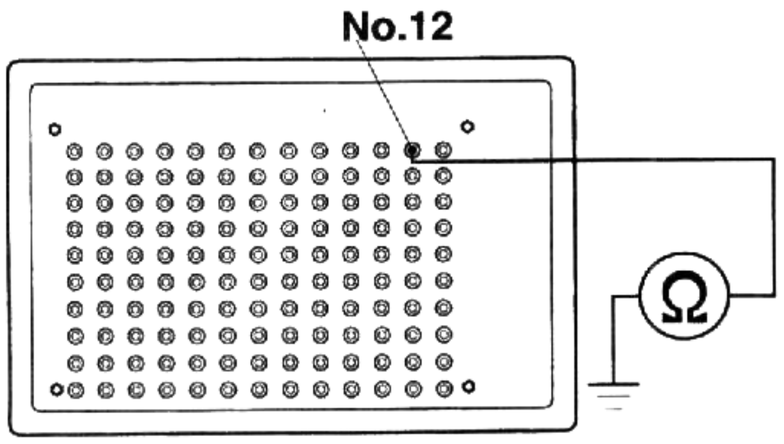


Connection: No. 12 — No. 32
Standard: 9 — 15 Ω (20 °C/68 °F)

Out of range → • Open circuit in Black/White and/or Pink/Green wire

Normal ↓

Check for continuity between the test pin box terminal and ground.



Connection: No. 12 — Ground
Standard: No continuity

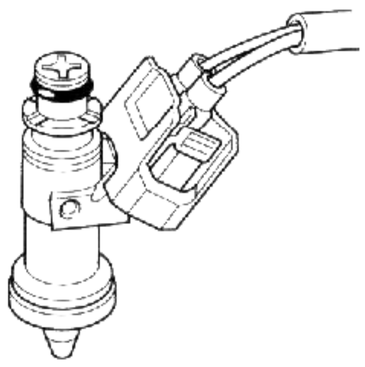
Continuity → • Short circuit in Pink/Green wire

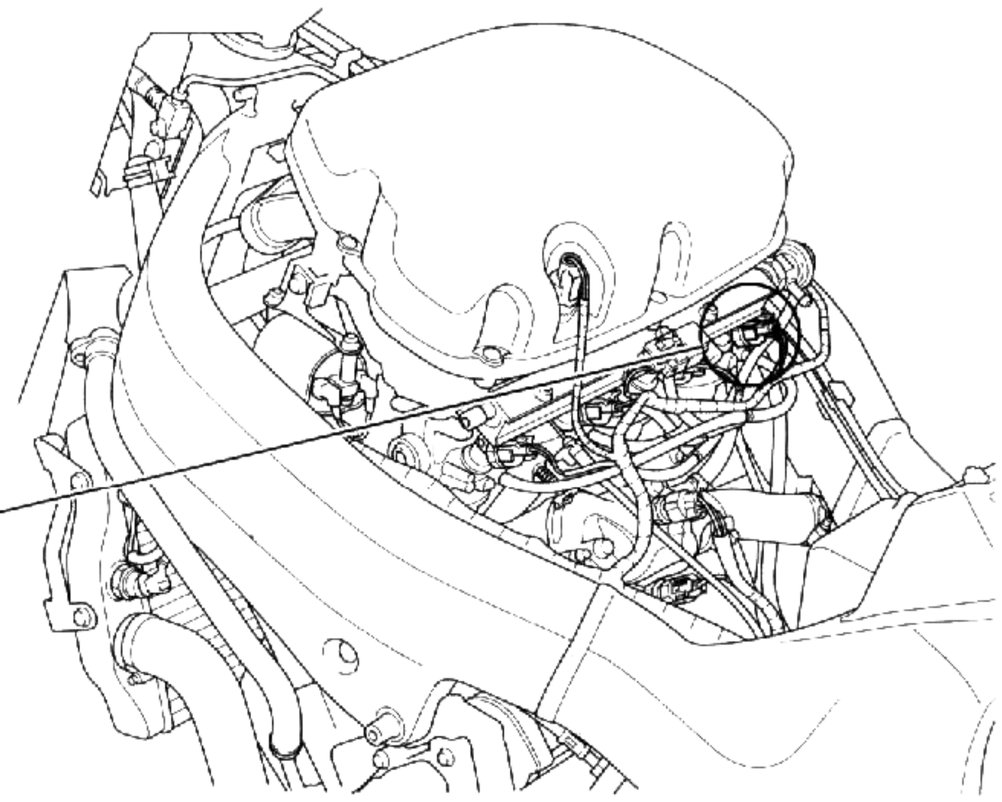
No continuity → • Replace the ECM with a new one, and inspect it again

PGM-FI MALFUNCTION INDICATOR 15 BLINKS (NO. 4 INJECTOR)

Turn the ignition switch OFF.

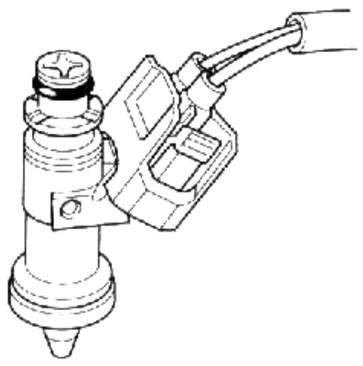
Disconnect the No. 4 injector 2P connector.
Check for loose or poor contact on the No. 4 injector 2P connector.





Connect the No. 4 injector 2P connector.
Place the motorcycle on its side stand.
Turn the ignition switch ON.
Check the malfunction indicator blinks.

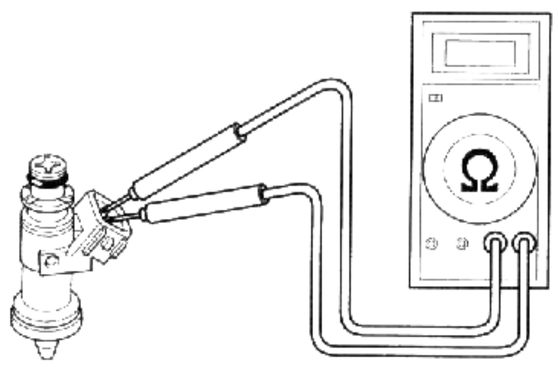
No blinks → • Loose or poor contacts on the No. 4 injector connector



15 blinks

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

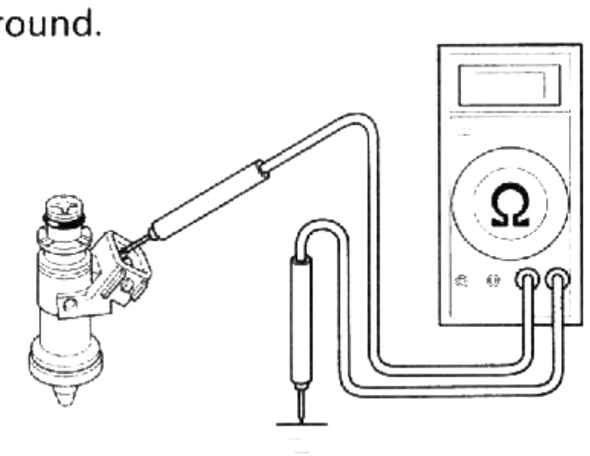
Abnormal → • Faulty No. 4 injector



Connection:
Black/White (+) – Pink/Black (–)
Standard: 13.0 – 14.4 kΩ (20 °C/68 °F)

Normal

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

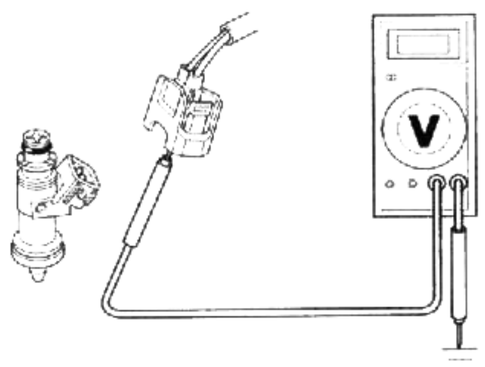


Connection:
Black/White (+) – Ground (–)
Standard: No continuity

Continuity → • Faulty No. 4 injector

No continuity ↓

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

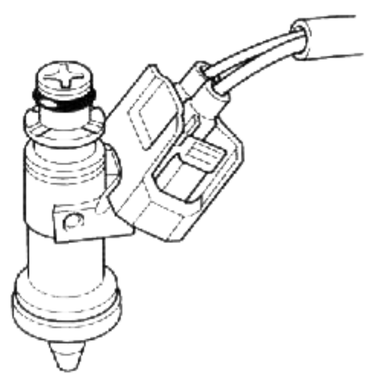


Connection:
Black/White (+) – Ground (–)
Standard: Battery voltage

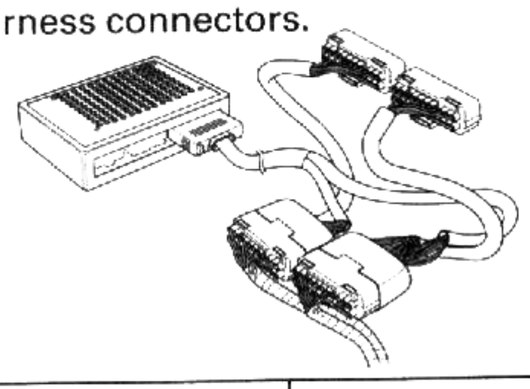
Out of range → • Open or short circuit in Black/White wire

Voltage exists ↓

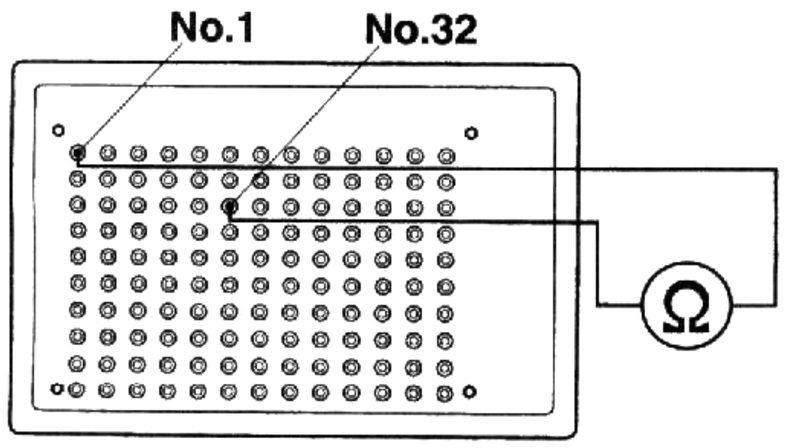
Turn the ignition switch OFF.
Connect the No. 4 injector connector.



Disconnect the ECM connectors.
Connect the test harness and test pin box to the wire harness connectors.



Measure the resistance at the test pin box terminals.

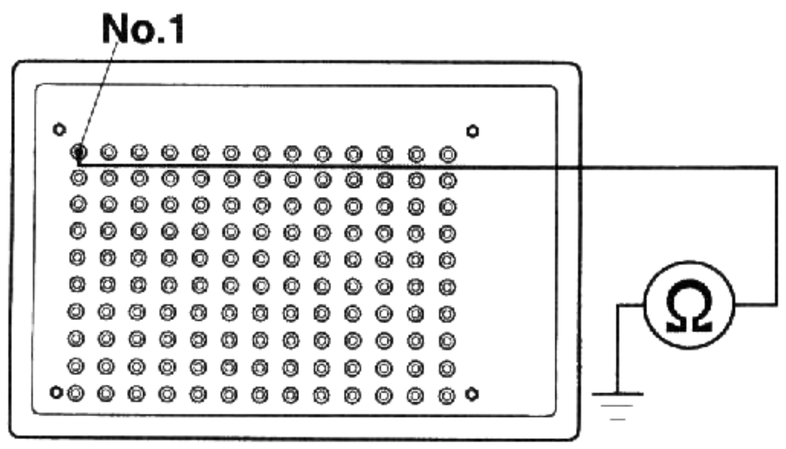


Connection: No. 1 — No. 32
Standard: 9 — 15 Ω (20 °C/68 °F)

Out of range → • Open circuit in Black/White and/or *Pink/Black* wire

Normal ↓

Check for continuity between the test pin box terminal and ground.



Connection: No. 1 — Ground
Standard: No continuity

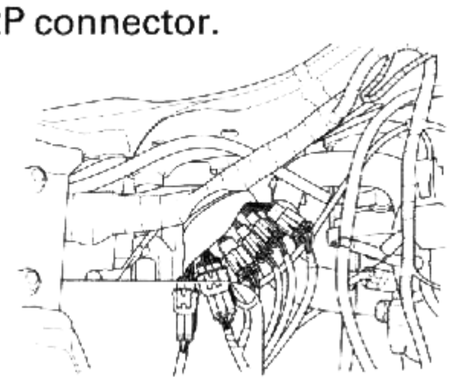
Continuity → • Short circuit in Pink/Black wire

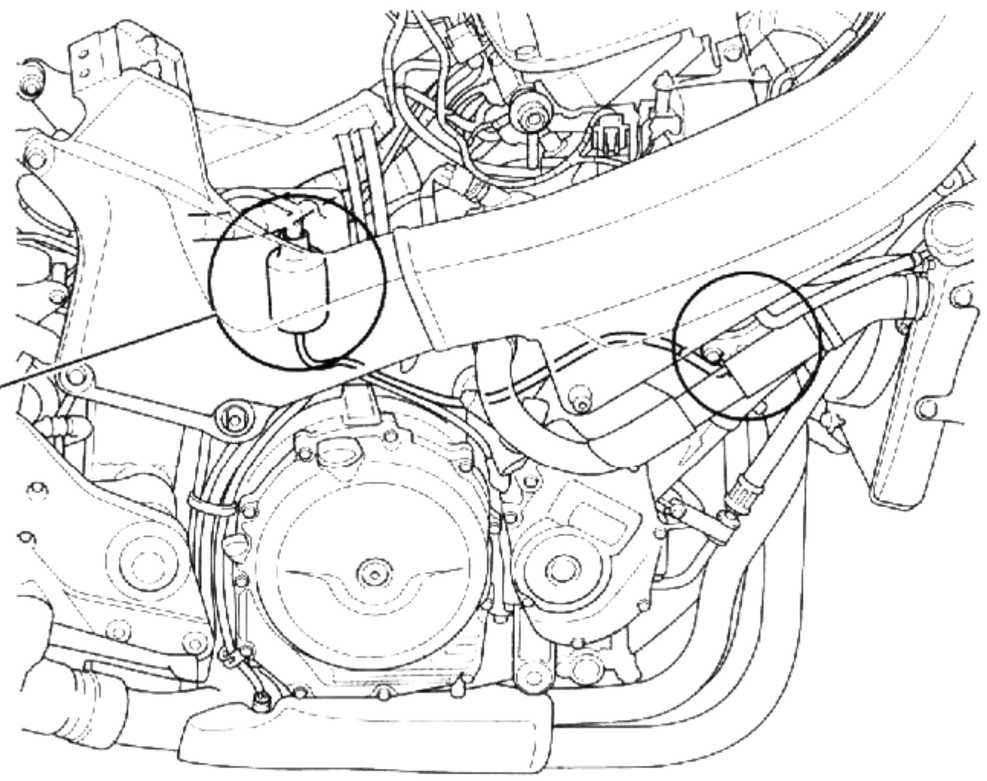
No Continuity → • Replace the ECM with a new one, and inspect it again

PGM-FI MALFUNCTION INDICATOR 18 BLINKS (CAM PULSE GENERATOR)

Turn the ignition switch OFF.

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



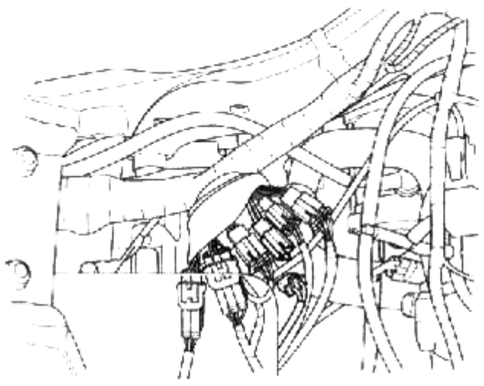


Connect the cam pulse generator 2P connector.
Place the motorcycle on its side stand.
Turn the ignition switch ON and check the malfunction indicator blinks.

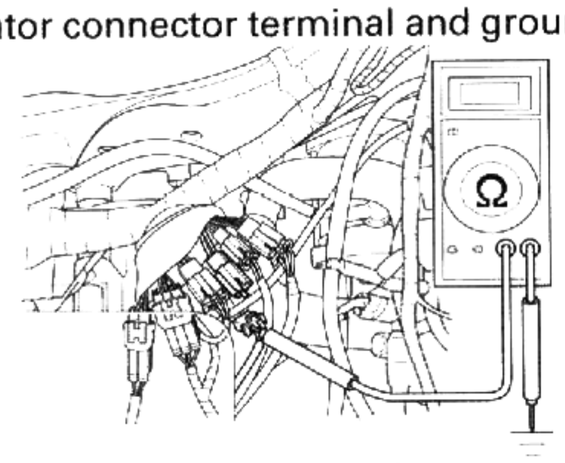
No blinks → • Loose or poor contacts on the cam pulse generator 2P connector

18 blinks

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



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

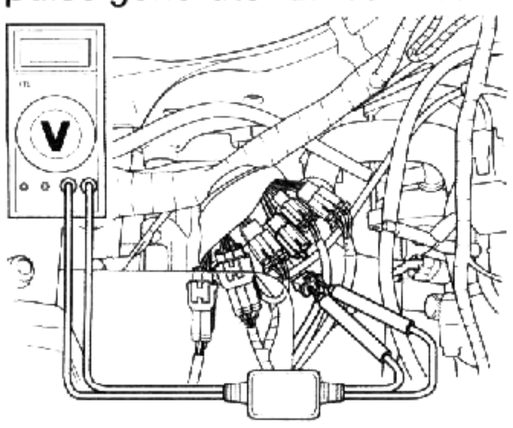


Connection: White/Yellow — Ground
Gray — Ground
Standard: No continuity

Continuity → • Faulty cam pulse generator

No continuity

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

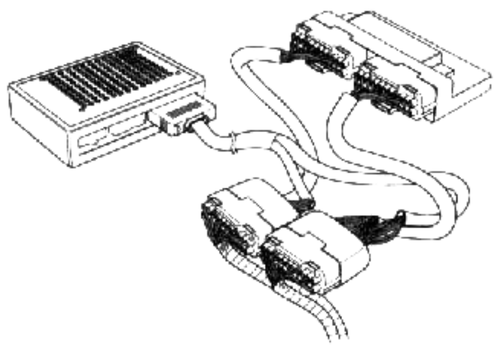


Connection: Gray (+)—White/Yellow (−)
Standard: 0.7 V minimum (20 °C/68 °F)

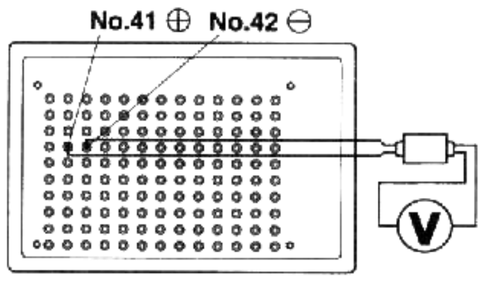
Out of range → • Faulty cam pulse generator

Normal ↓

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



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

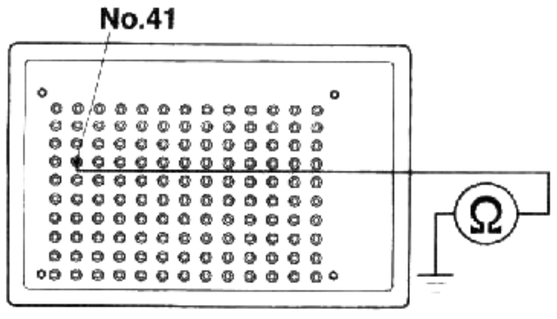


Connection: No. 41 (+)—No. 42 (−)
Standard: 0.7 V minimum (20 °C/68 °F)

Out of range → • Open circuit in White/Yellow and/or Gray wire

Normal ↓

Check for continuity between the test pin box terminal and ground.



Connection: No. 41—Ground
Standard: No continuity

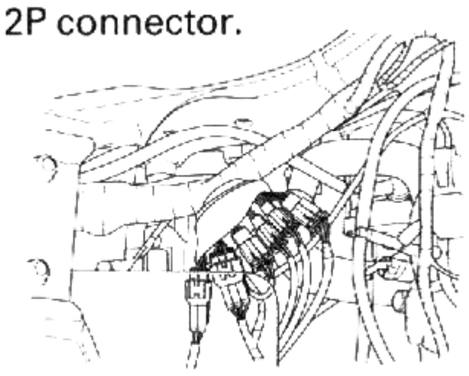
Continuity → • Short circuit in Gray wire

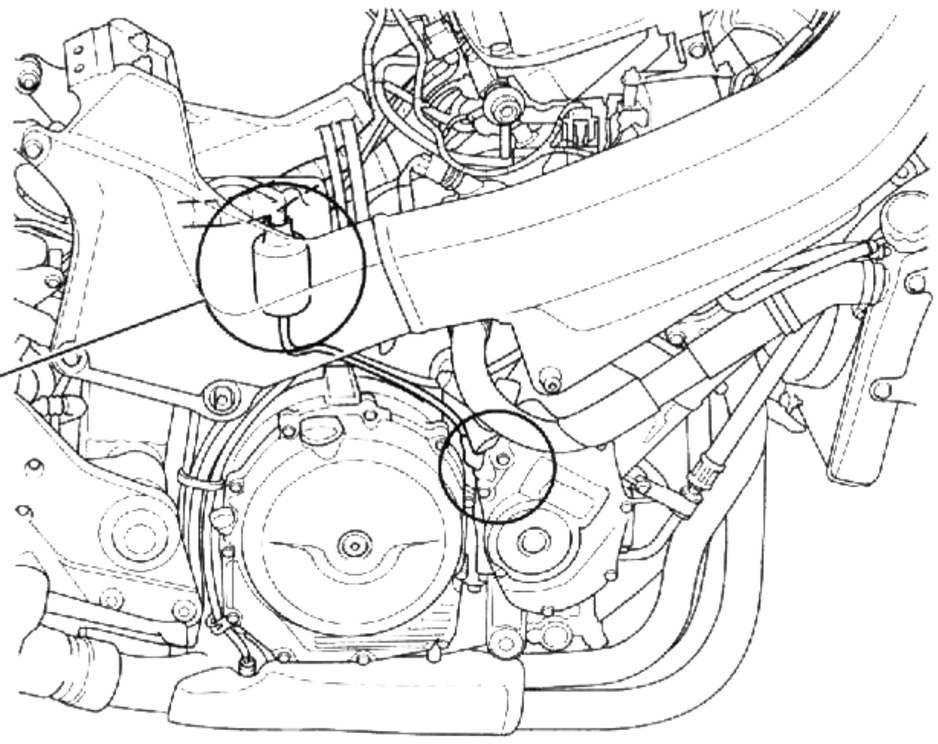
No continuity → • Replace the ECM with a new one, and inspect it again.

PGM-FI MALFUNCTION INDICATOR 19 BLINKS (IGNITION PULSE GENERATOR)

Turn the ignition switch OFF.

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



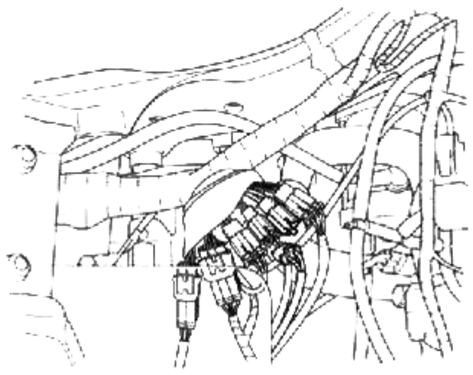


No blinks → • Loose or poor contacts on the ignition pulse generator 2P connector

Connect the ignition pulse generator 2P connector.
Place the motorcycle on its side stand.
Turn the ignition switch ON and check the malfunction indicator blinks.

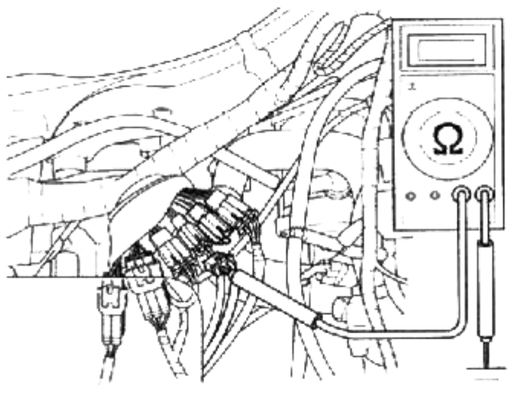
19 blinks

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



Continuity → • Faulty ignition pulse generator

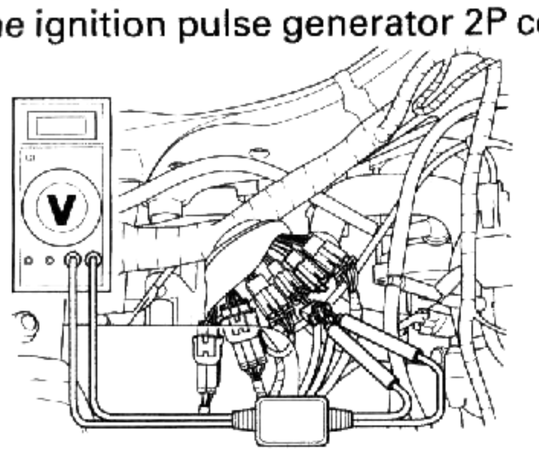
Turn the ignition switch OFF.
Check the continuity between the ignition pulse generator connector terminal and ground.



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

No continuity

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

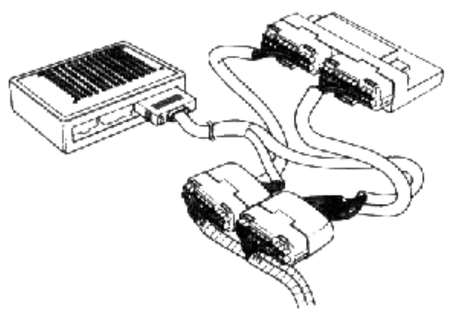


Connection: Yellow (+) – White/Yellow (–)
Standard: 0.7 V minimum (20 °C/68 °F)

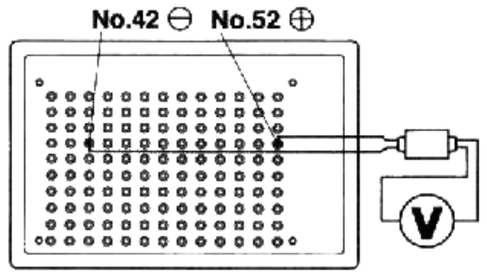
Out of range → • Faulty ignition pulse generator

Normal ↓

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



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

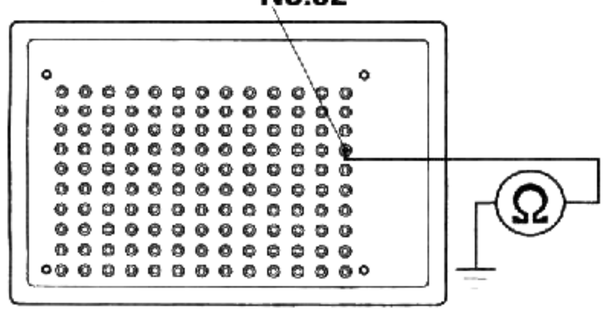


Connection: No. 52 (+) – No. 42 (–)
Standard: 0.7 V minimum (20 °C/68 °F)

Out of range → • Open circuit in White/Yellow wire
• Open circuit in Yellow wire

Normal ↓

Check for continuity between the test pin box terminal and ground.



Connection: No. 52 – Ground
Standard: No continuity

Continuity → • Short circuit in Yellow wire

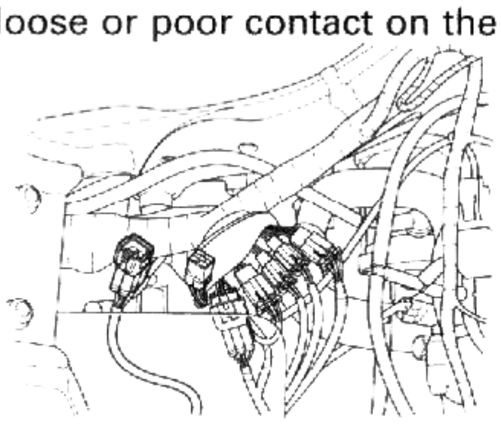
No continuity → • Replace the ECM with a new one, and inspect it again

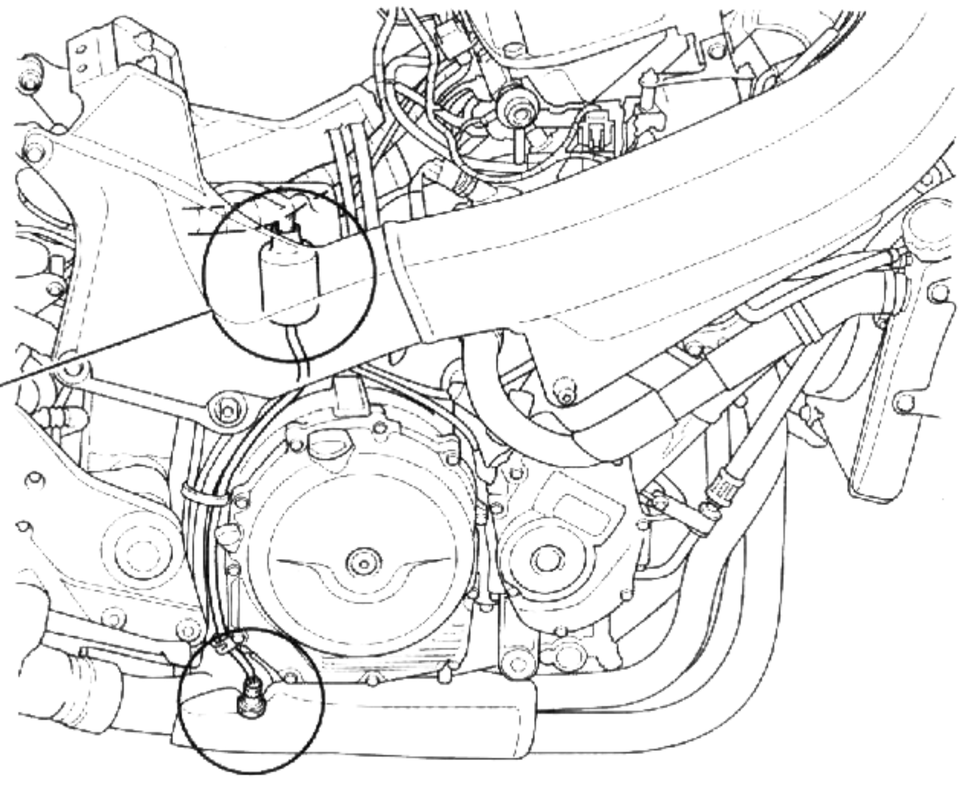
PGM-FI WARNING INDICATOR 21 BLINKS (O_2 SENSOR)

Turn the ignition switch OFF.

↓

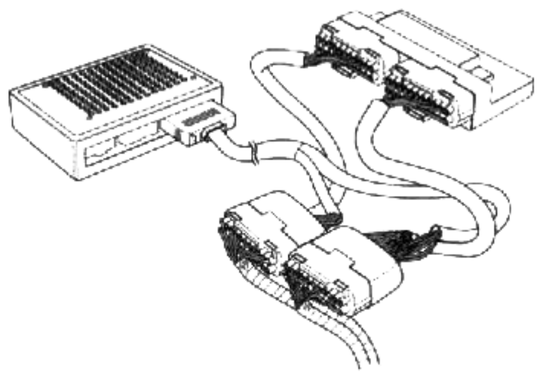
Disconnect the O_2 sensor connector.
Check for loose or poor contact on the O_2 sensor connector.





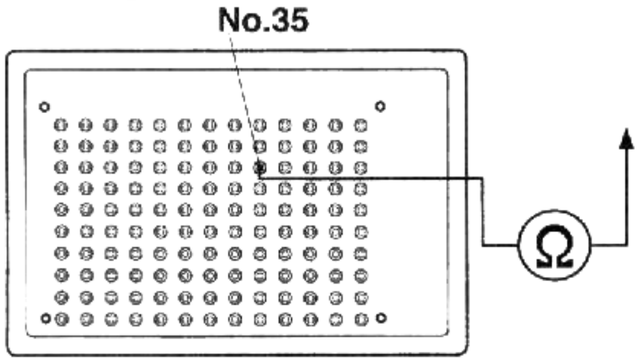
↓

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



↓

Check the continuity between the test pin box terminal and O_2 sensor connector terminal.

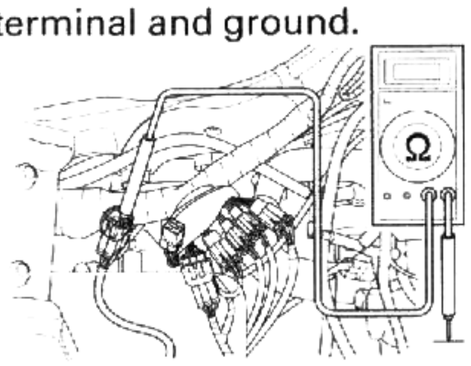


Connection: White/Orange – No. 35
Standard: Continuity

No continuity → • Open circuit in O_2 sensor White/Orange wire

↓ Continuity

Check the continuity between the O_2 sensor connector terminal and ground.

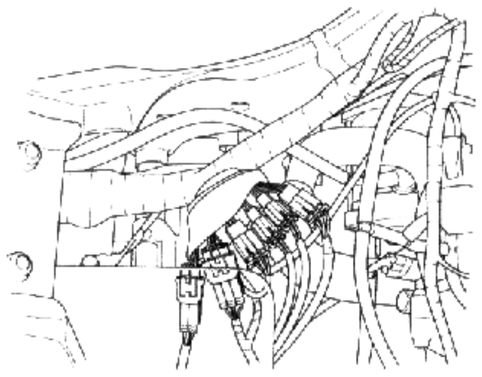


Connection: Green/Orange – Ground
Standard: No continuity

Continuity → • Short circuit in O_2 sensor Green/Orange wire

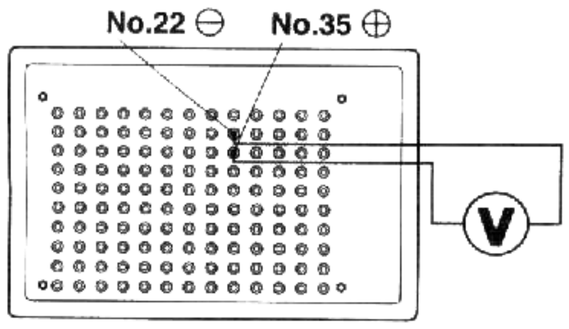
↓ No continuity

Connect the O_2 sensor connector.
Turn the ignition switch ON and warm up the engine up to coolant temperature is 85 °C (185 °F).



Operate the throttle grip and snap the engine speed from idle to 5,000 min^{-1} (rpm).

Check the voltage between the test pin box terminals.



Connection: No.35 (+) – No.22 (–)
Standard:
With the throttle fully open:
0.6 V minimum
With the throttle quickly closed:
0.4 V minimum

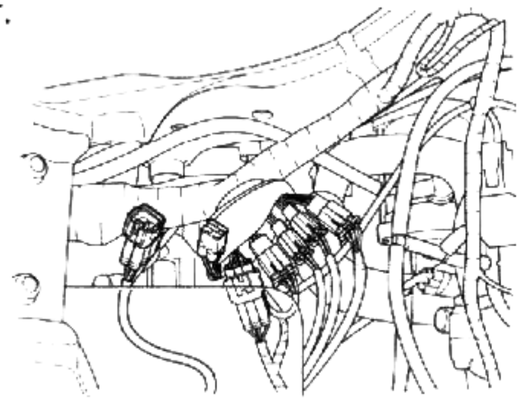
Out of range → • Faulty O_2 sensor

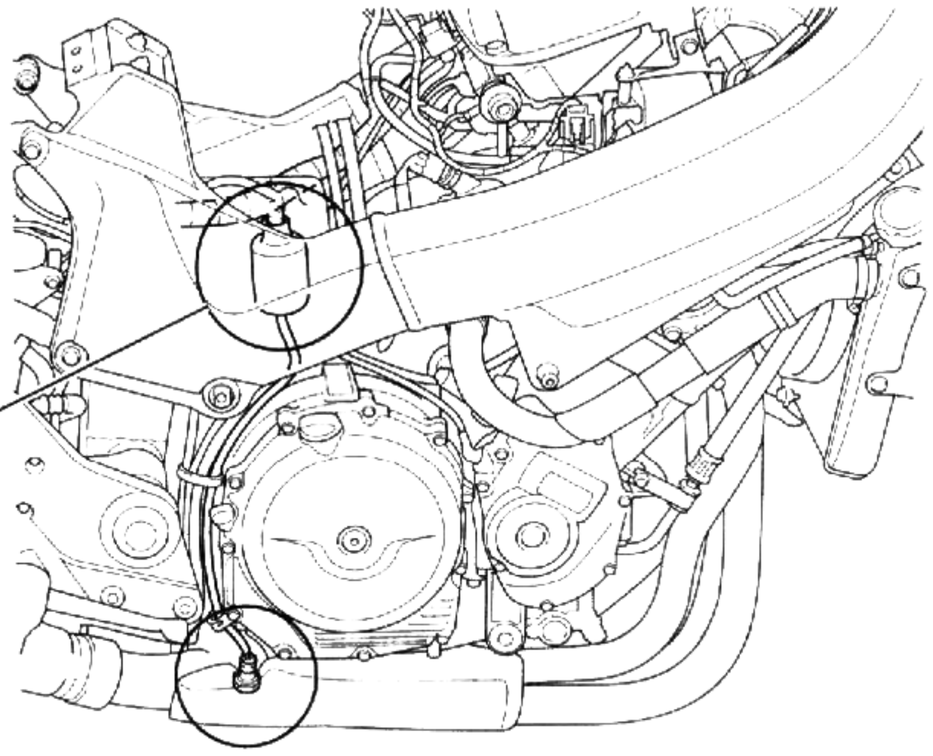
Normal → • Check the fuel supply system, if the system is correct, replace the ECM and inspect again.

PGM-FI WARNING INDICATOR 23 BLINKS (O_2 SENSOR HEATER)

Turn the ignition switch OFF.

Disconnect the O_2 sensor connector.
Check for loose or poor contact on the O_2 sensor connector.





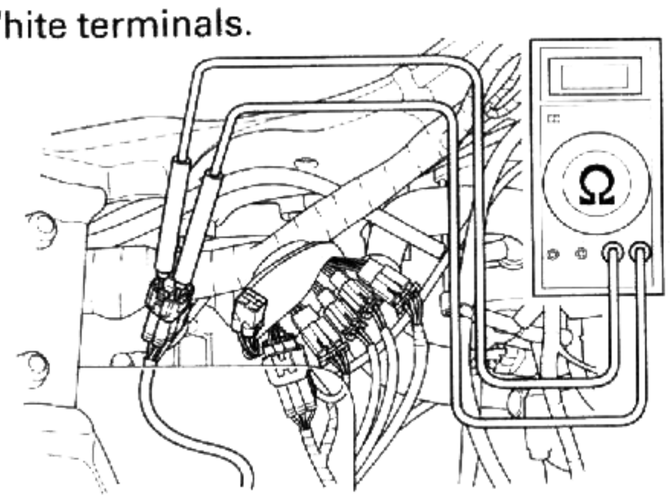
Connect the O_2 sensor connector.
Place the motorcycle on its side stand.
Start the engine and check the PGM-FI warning indicator blinks.

No blinks → • Loose or poor contacts on the O_2 sensor connector

23 blinks

Turn the ignition switch OFF.

Disconnect the O_2 sensor 4P connector.
Measure the resistance at the sensor side connector White terminals.

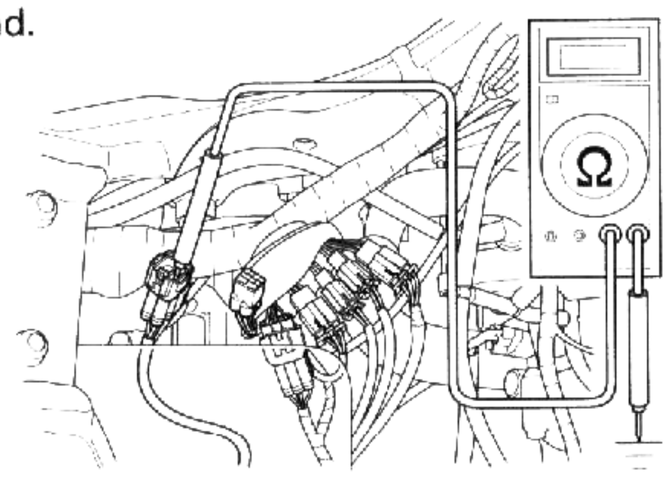


Connection: White — White
Standard: 10 — 40 Ω

Out of range → • Faulty O_2 sensor

Normal

Check for continuity each White terminal and ground.

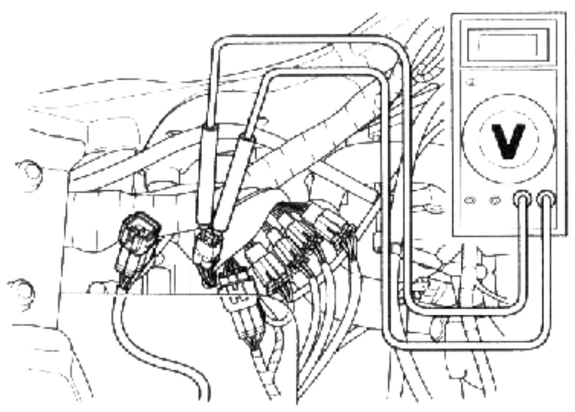


Connection: White—Ground
Standard: No continuity

Continuity → • Faulty O_2 sensor

No continuity ↓

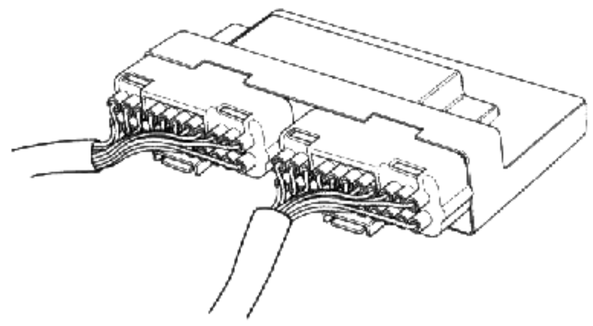
Turn the ignition switch ON.
Measure the voltage at the O_2 sensor wire harness side connector terminals.



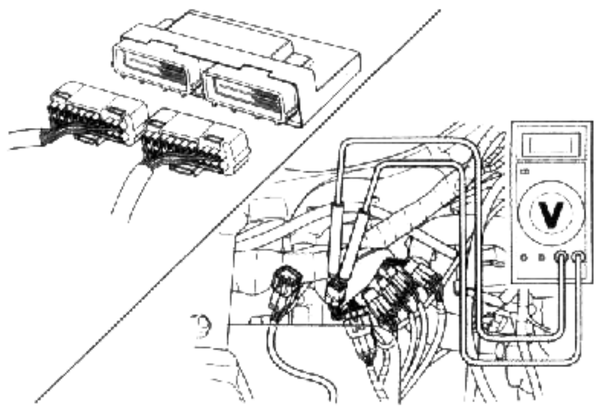
Connection: Black/White (+)—Black/Green (−)
Standard: Battery voltage

Normal →

Turn the ignition switch OFF.
Disconnect the ECM 22P connector.



Turn the ignition switch ON.
Measure the voltage at the O_2 sensor wire harness side connector terminals.



Connection: Black/White (+)—Black/Green (−)
Standard: Battery voltage

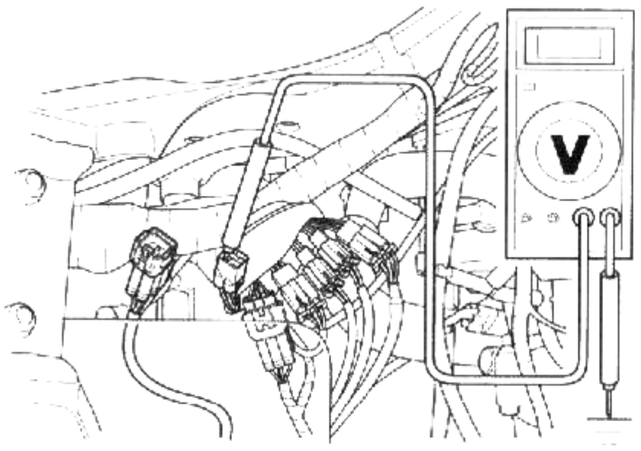
Battery voltage ↓

• Open circuit in O_2 sensor Black/Green wires

No voltage ↓

• Replace the ECM and inspect again

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



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

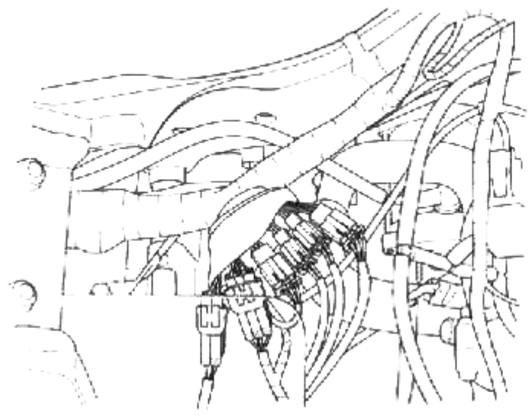
No voltage → • Open circuit in Black/White wire between the O_2 sensor and engine stop relay

Battery voltage ↓

Turn the ignition switch OFF.

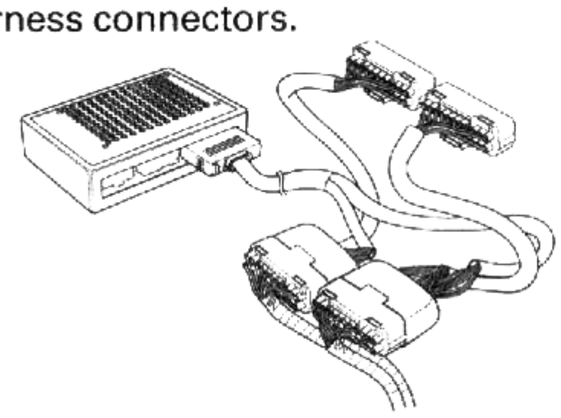
↓

Connect the O_2 sensor 4P connectors.



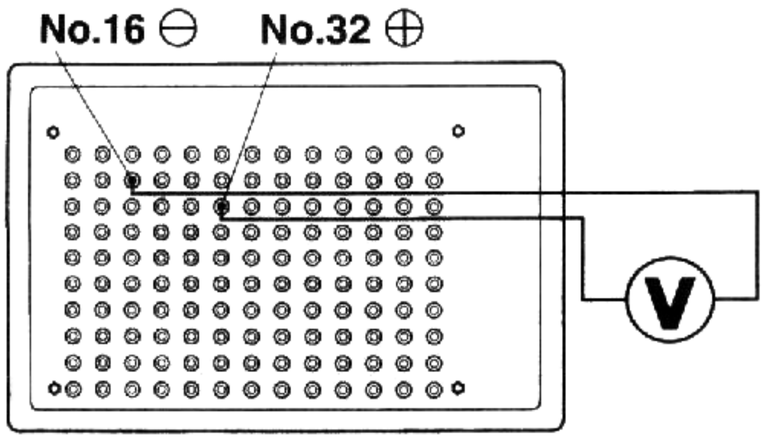
↓

Disconnect the ECM connectors.
Connect the test harness and test pin box to the wire harness connectors.



↓

Measure the voltage at the test pin box terminals.



Connection: No. 32 (+) – No. 16 (–)
Standard: Battery voltage

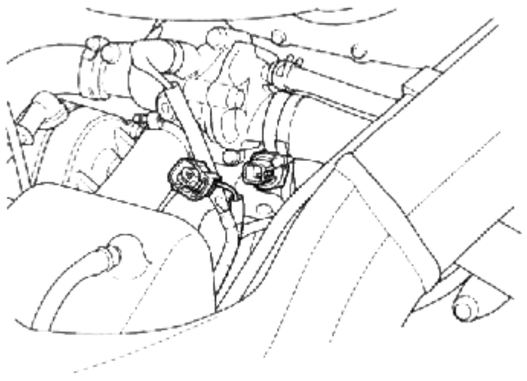
No voltage → • Open circuit in Black/Green wire *between the* ECM connector and O_2 sensor 4P connectors

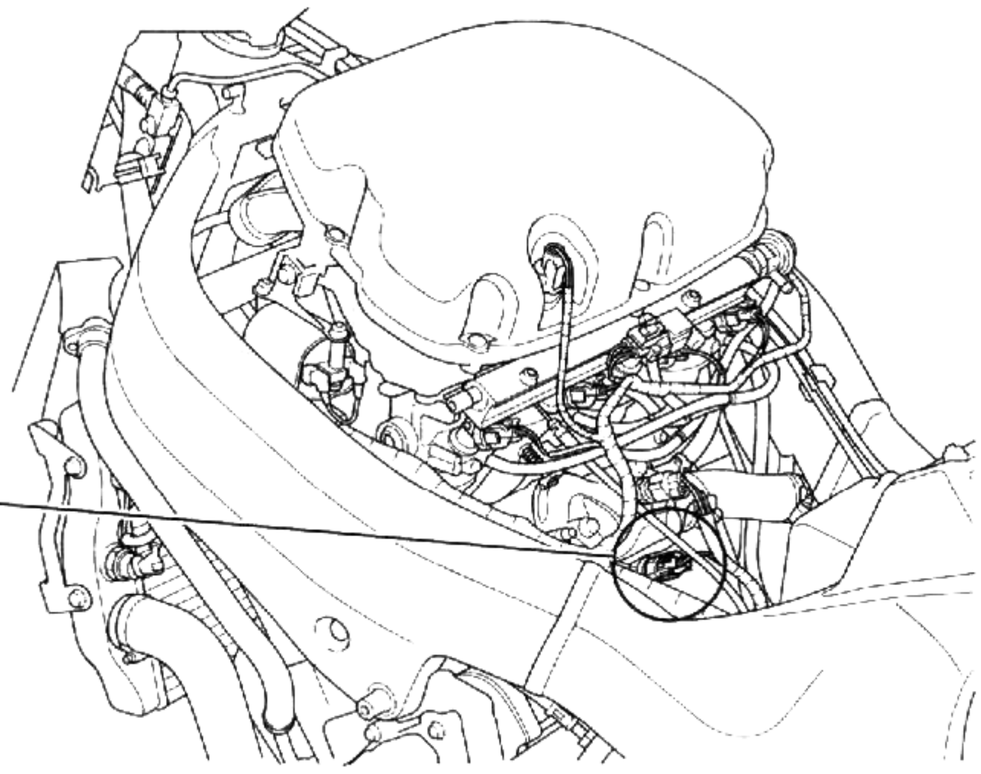
Battery voltage → • Replace the ECM and inspect again

PGM-FI MALFUNCTION INDICATOR 25 BLINK (KNOCK SENSOR)

Turn the ignition switch OFF.

Disconnect the knock sensor connector.
Check for loose or poor contact on the knock sensor connector.





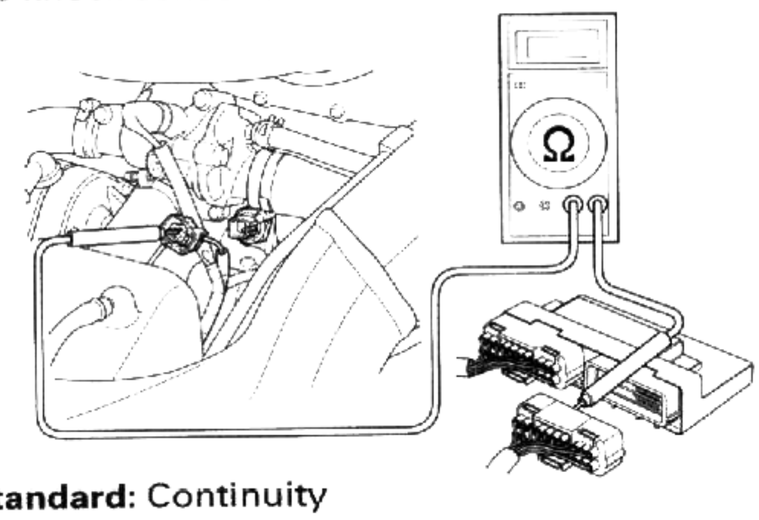
Connect the knock sensor connector.
Place the motorcycle on its side stand.
Start the engine and hold the engine rev above 2,500 min^{-1} (rpm) 10 seconds or more.
Check the malfunction indicator blinks.

No blinks → • Loose or poor contacts on the knock sensor connector

25 blinks

Turn the ignition switch OFF.

Disconnect the knock sensor connector.
Disconnect the ECM 22P (Light gray) connector.
Turn the ignition switch ON.
Check for continuity Blue wire terminals between the knock sensor and ECM connector.



Standard: Continuity

No Continuity → • Open or short circuit in Blue wire
• Loose or poor contact on the ECM connectors

Replace the knock sensor with a new one (page 5-81).
Short the service check connector (page 5-6).
Start the engine and check the malfunction indicator blinks.

No blinks → • Replaced knock sensor is faulty

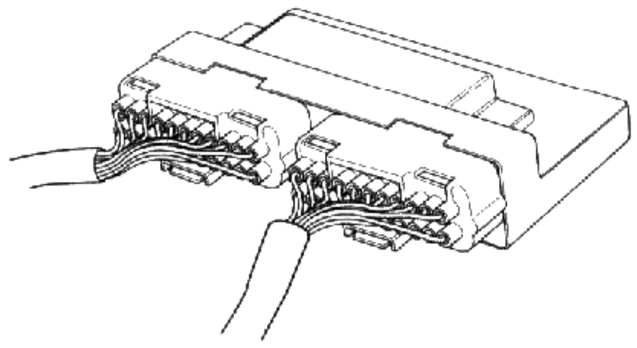
25 blinks → • Replace the ECM with a new one, and inspect it again

PGM-FI MALFUNCTION INDICATOR 33 BLINKS (E^2-PROM)

Turn the ignition switch OFF.

↓

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



↓

Connect the ECM connectors.
Short the service check connector with a jumper wire (page 5-6).
Turn the ignition switch ON and check the malfunction indicator blinks.

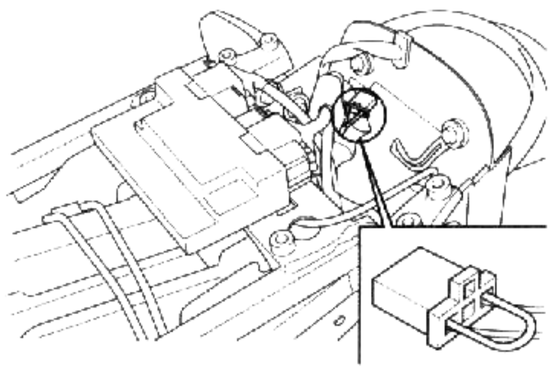
33 blinks → Reset the self-diagnosis memory data (page 5-7).
Turn the ignition switch ON and check the malfunction indicator blinks.

33 blinks → • Replace the ECM

Blinks → (to Except 33 blinks)

↓ Except 33 blinks

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



↓

Turn the ignition switch ON and check the malfunction indicator blinks.

Except 33 blinks → • No problem

↓ 33 blinks

Turn the ignition switch OFF.
Short the service check connector with a jumper wire (page 5-6).
Turn the ignition switch ON and check the malfunction indicator blinks.
Except 33 blinks
• No problem
33 blinks
Reset the self-diagnosis memory data (page 5-7).
Turn the ignition switch ON and check the malfunction indicator blinks.
Except 33 blinks
• No problem
33 blinks
• Replace the ECM

FUEL LINE INSPECTION

FUEL PRESSURE INSPECTION

⚠WARNING

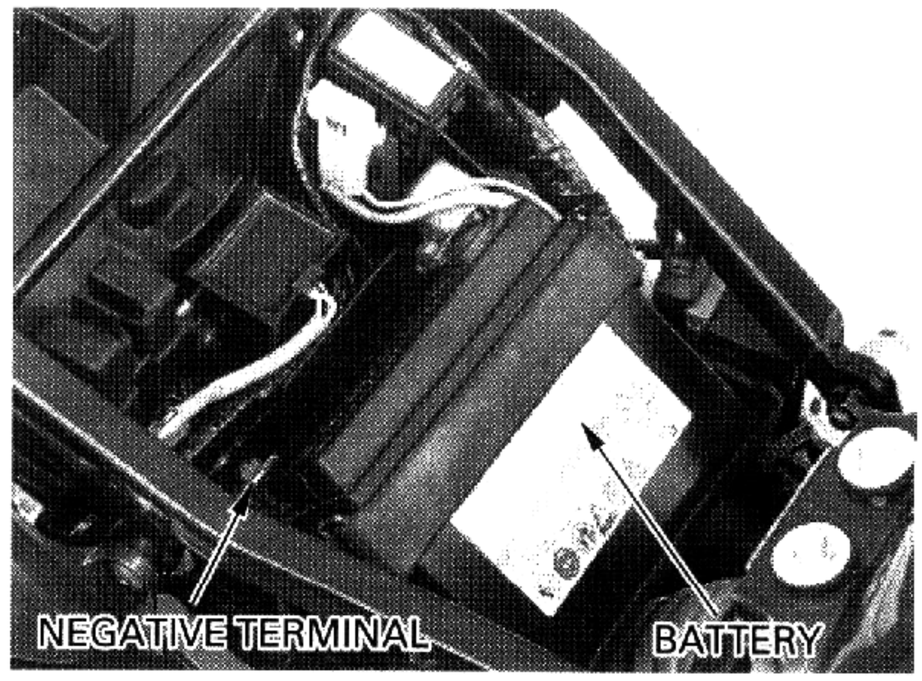
- ***Gasoline is extremely flammable and is explosive under certain conditions.***
- ***Be sure to relieve fuel pressure while the engine is OFF.***
- ***If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death.***

CAUTION:

- ***Before disconnecting fuel tubes, release the fuel pressure by loosening the service check bolt at the fuel tank.***
- ***Always replace the sealing washer when the service check bolt is removed or loosened.***

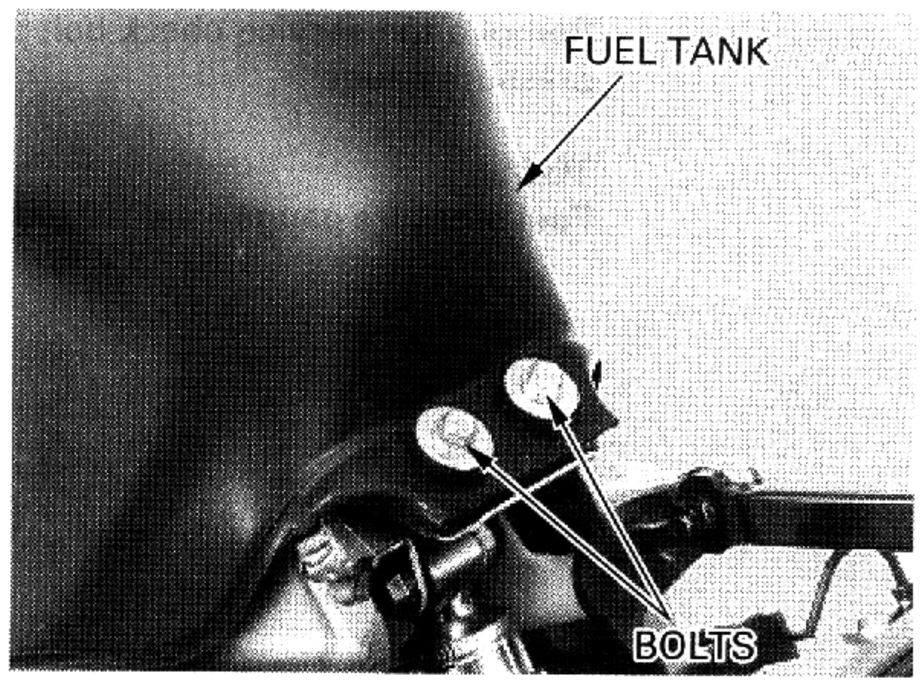
Remove the seat (page 2-2).

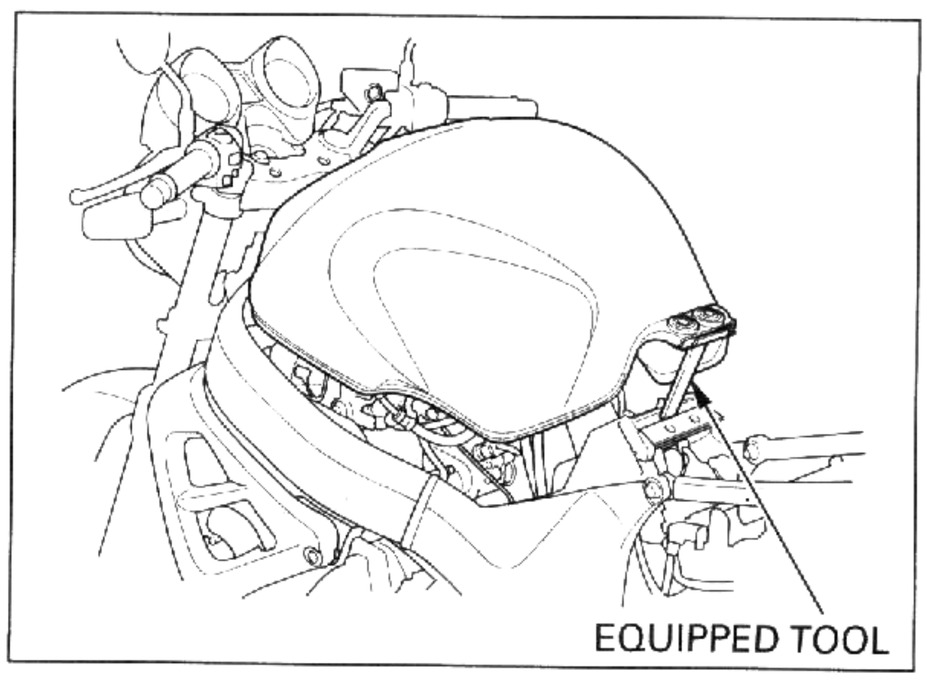
Unfasten the battery holder band and disconnect the battery negative cable from the battery terminal.



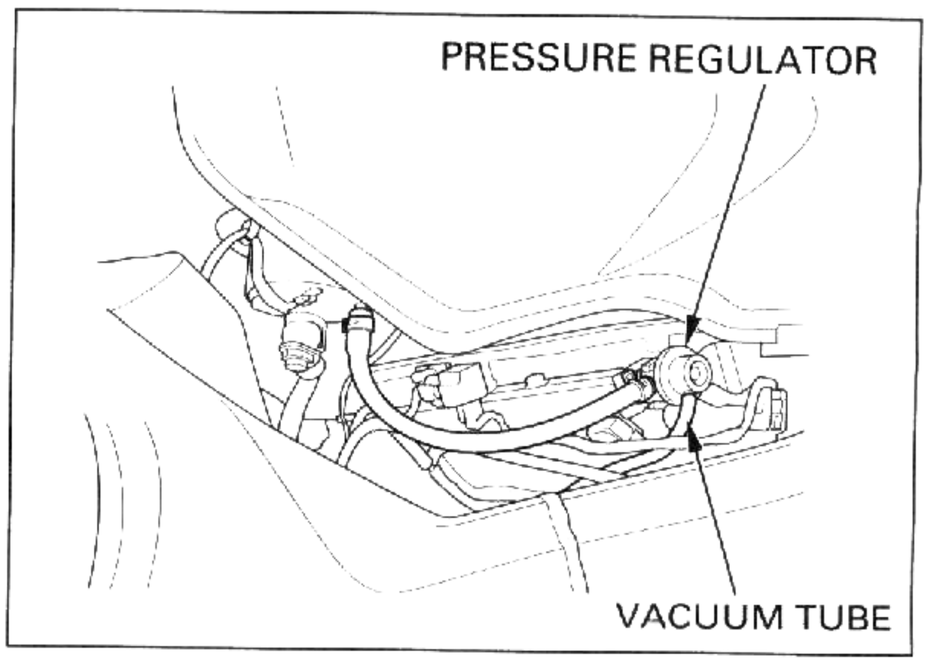
Remove the fuel tank mounting bolts.

Lift the rear end of the fuel tank and support it using a equipped tool (rear axle wrench extension) as shown.



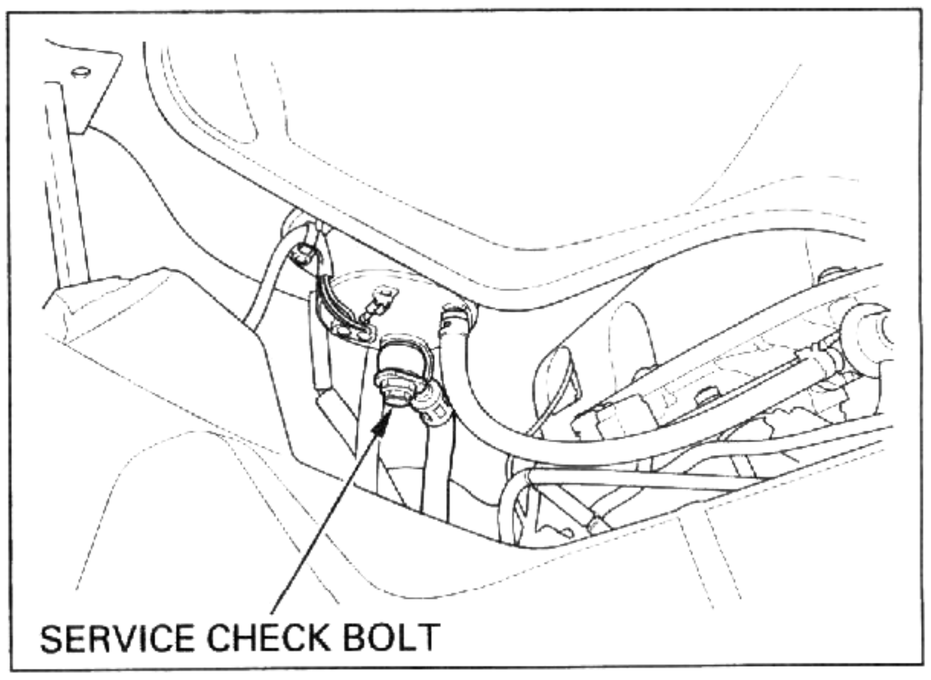


Disconnect the pressure regulator vacuum tube and plug the vacuum tube.



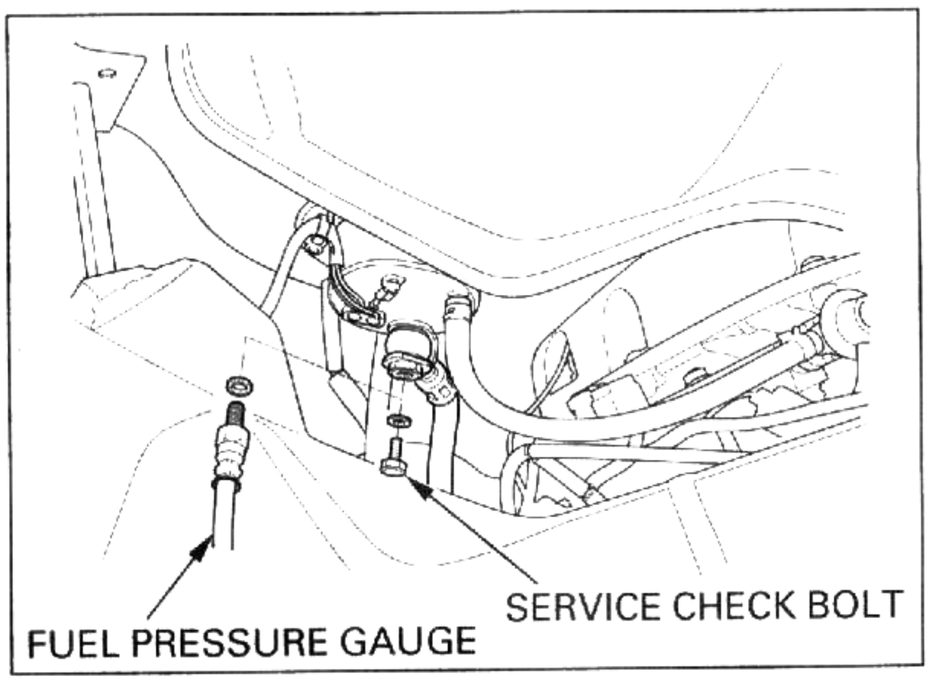
Cover the service check bolt with a rag or shop towel.

Slowly loosen the service check bolt and catch the remaining fuel using a approved gasoline container.



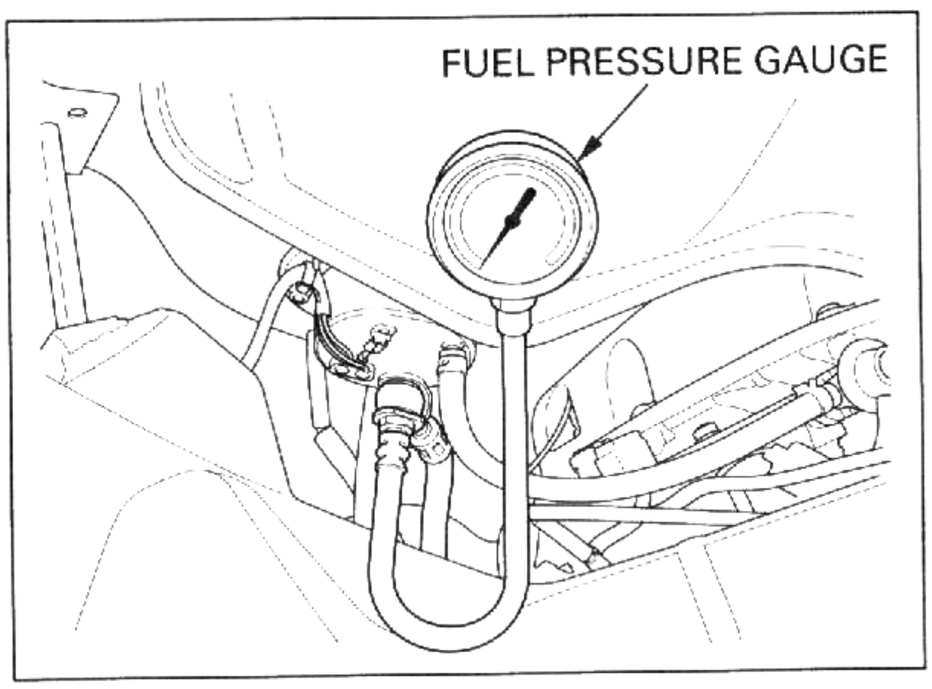
Remove the service check bolt and attach the fuel pressure gauge.

TOOL:
Fuel pressure gauge 07406-0040002



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

IDLE SPEED: 1,100 ± 100 min^{-1} (rpm)
STANDARD: 294 kPa (3.0 kgf/cm^2 , 43 psi)



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

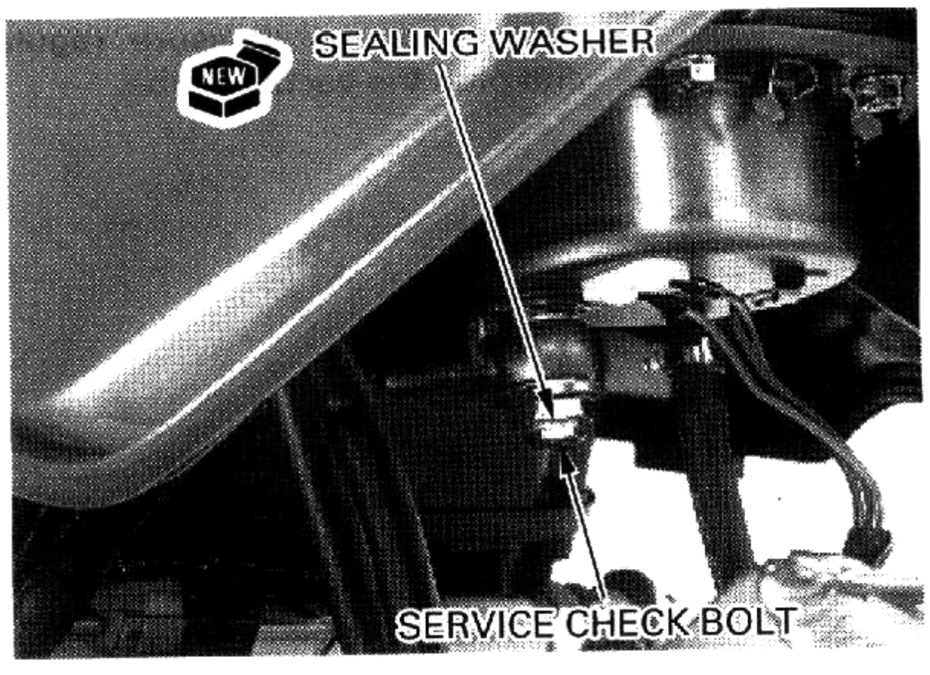
If the fuel pressure is lower than specified, inspect the following:
— Fuel line leaking
— Clogged fuel filter
— Pressure regulator
— Fuel pump (page 5-54)

After inspection, install the and tighten the service check bolt using the new sealing washer.

CAUTION:

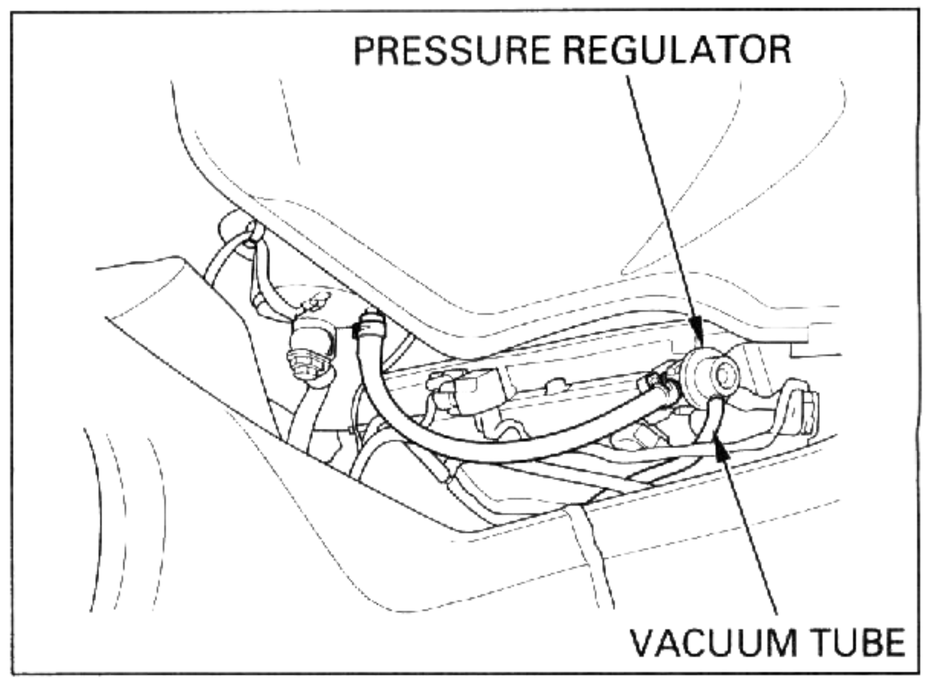
Always replace the sealing washer when the service check bolt is removed or loosened.

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



Connect the pressure regulator vacuum tube.

Install the removed parts in the reverse order of removal.



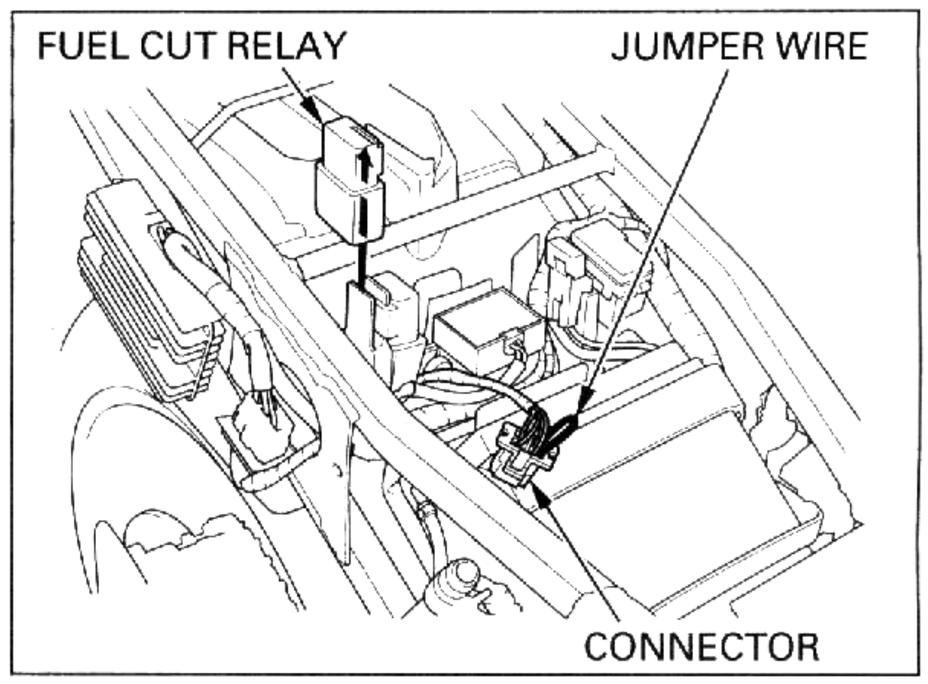
FUEL FLOW INSPECTION

⚠WARNING

Gasoline is extremely flammable and is explosive under certain conditions.

Remove the seat (page 2-2).
Support the rear end of the fuel tank (page 2-11).

Disconnect the fuel cut relay connector.
Jump the Brown and Black/White wire terminals of the wire harness side using a jumper wire.



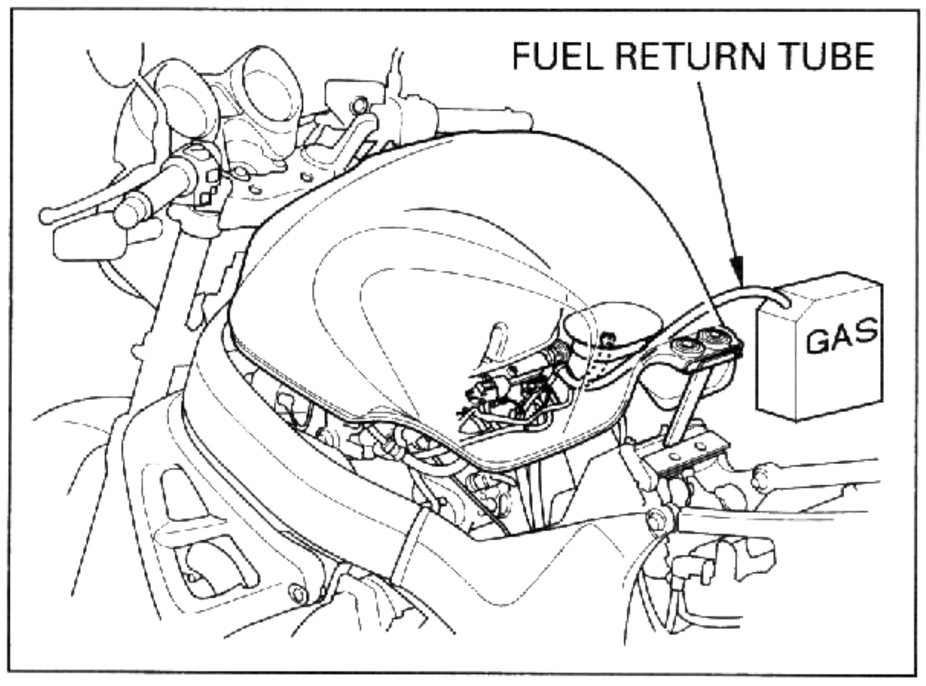
NOTE:

- When the fuel return tube is disconnected, gasoline spill out from the tube. Place a approved gasoline container and drain the gasoline.
- Wipe off spilled out gasoline.

Disconnect the fuel return tube at the fuel tank, plug the fuel tank inlet joint.

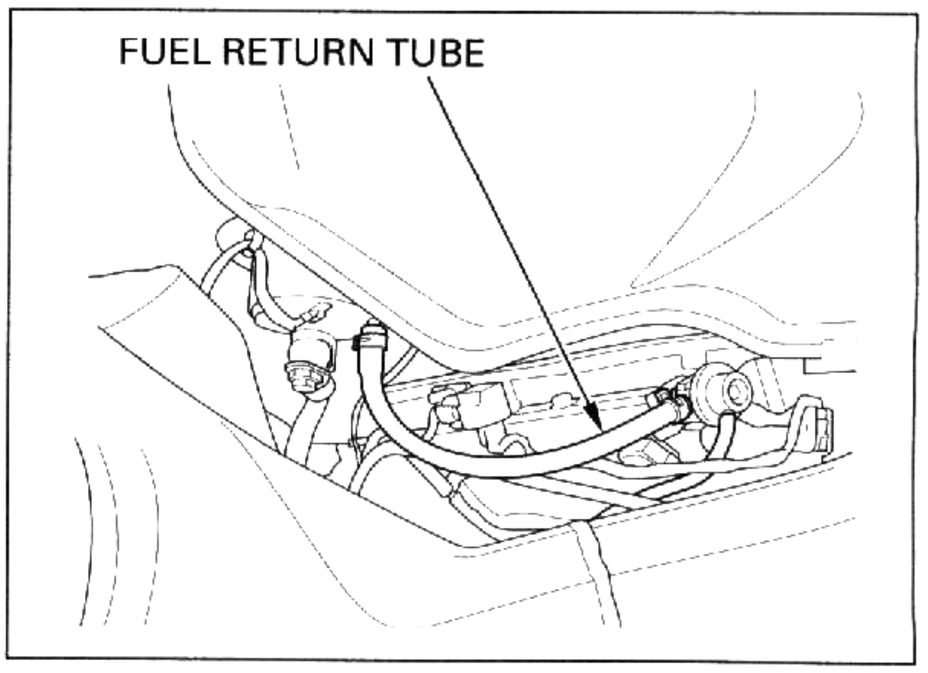
Turn the ignition switch ON for 10 seconds.
Measure the amount of fuel flow.

Amount of fuel flow:
220 cm³ (7.4 US oz , 7.7 Imp oz) minimum/10 seconds



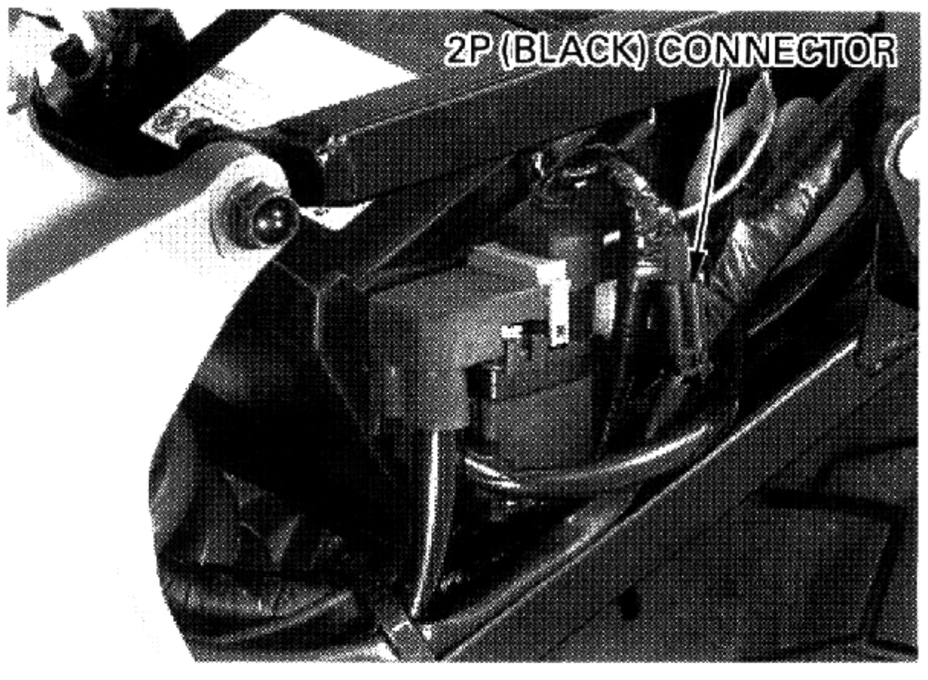
If the fuel flow is less than specified, inspect the following:
– Pinched or clogged fuel tube and fuel return tube
– Clogged fuel filter
– Pressure regulator
– Fuel pump (page 5-54)

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



FUEL PUMP

INSPECTION



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

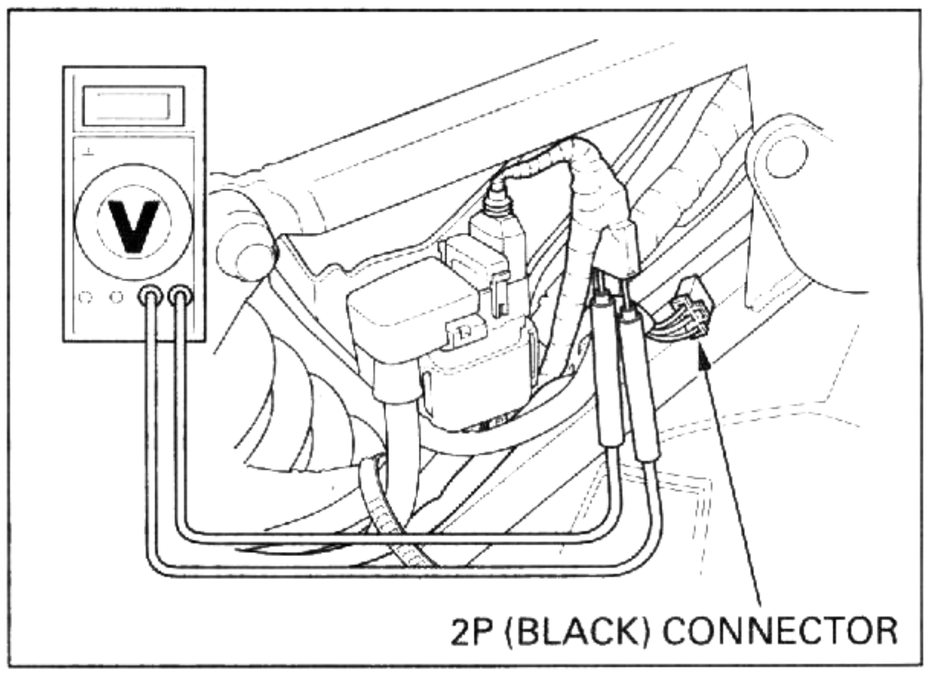
Support the rear end of the fuel tank (page 5-47).

Disconnect the fuel pump 2P (Black) connector from the fuel pump.
Turn the ignition switch ON and measure the voltage between the terminals.

Connection: Brown (+) – Green (–)

There should be battery voltage for a few seconds.

If there is battery voltage, replace the fuel pump.
If there is no battery voltage, inspect the following:
– Main fuel 30A
– Sub fuse 10A, 20A
– Engine stop switch (page 19-20)
– Fuel cut relay (page 5-55)
– Engine stop relay (page 5-82)
– Bank angle sensor (page 5-81)
– ECM (page 5-83)



REMOVAL

⚠WARNING

- ***Gasoline is extremely flammable and is explosive under certain conditions.***
- ***Be sure to relieve fuel pressure while the engine is OFF.***

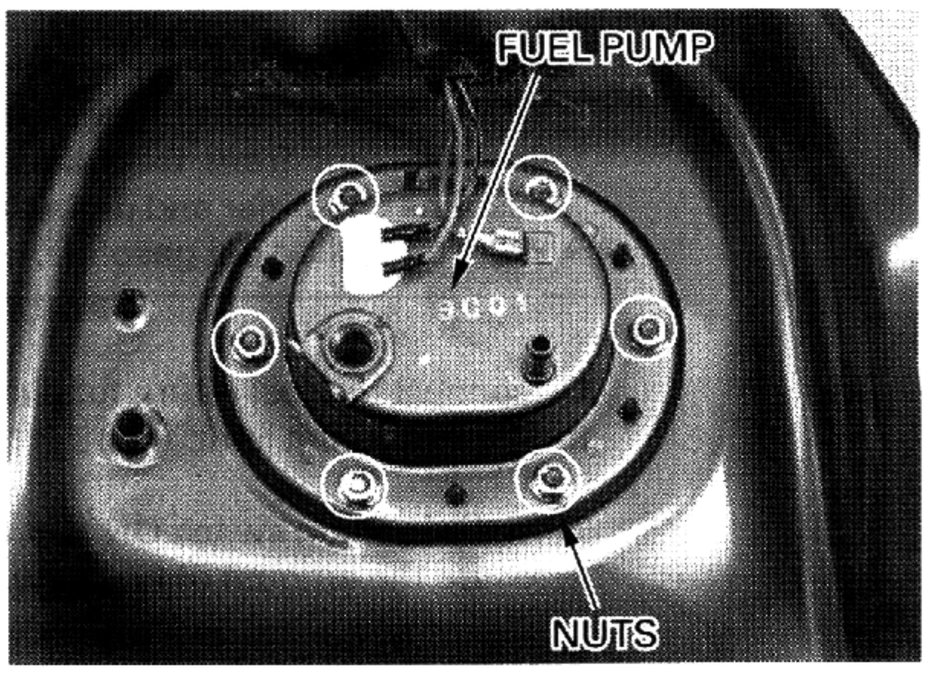
CAUTION:

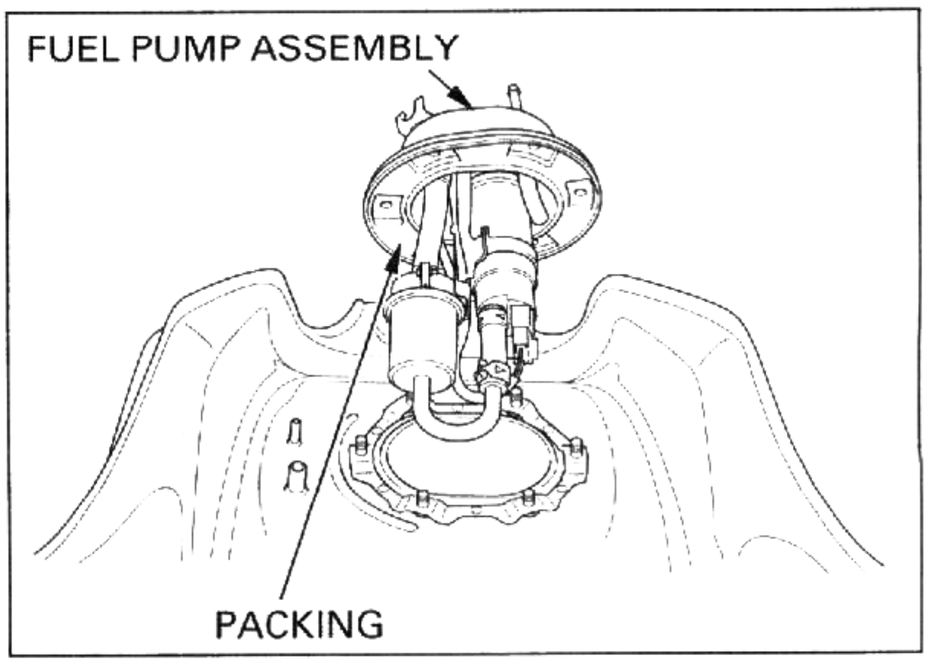
- ***Before disconnecting the fuel tube, release the fuel pressure by loosening the service check bolt at the fuel tank.***
- ***Always replace the sealing washer when the fuel tube banjo bolt is removed or loosened.***

Remove the fuel tank (page 5-56).

Remove the fuel pump mounting nuts.

Remove the fuel pump assembly and packing.





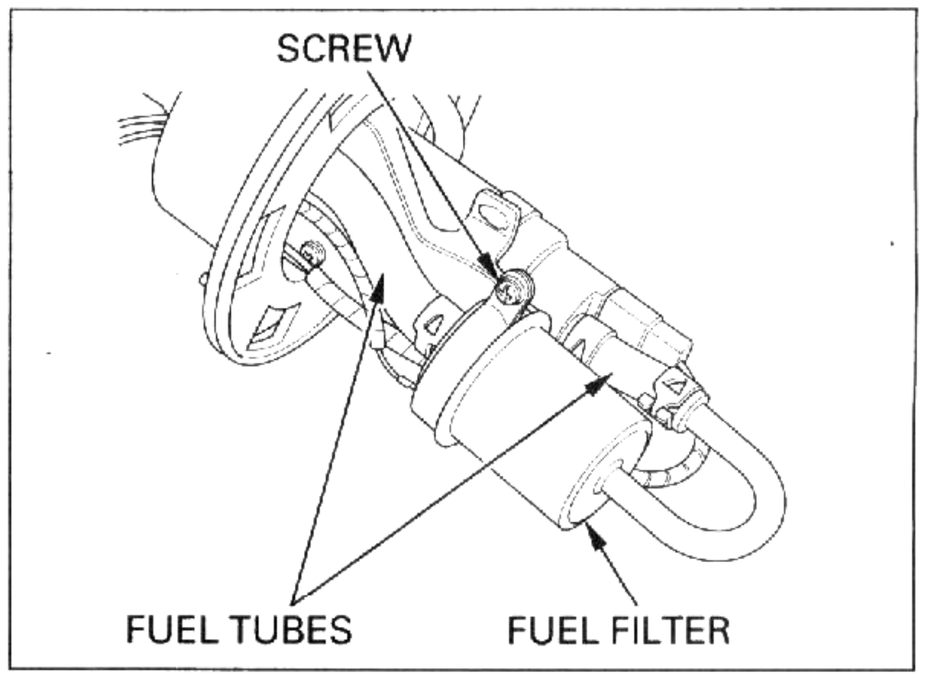
FUEL FILTER REPLACEMENT

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

Install the fuel filter in the reverse order of removal.

NOTE:

Note the direction of the fuel filter.



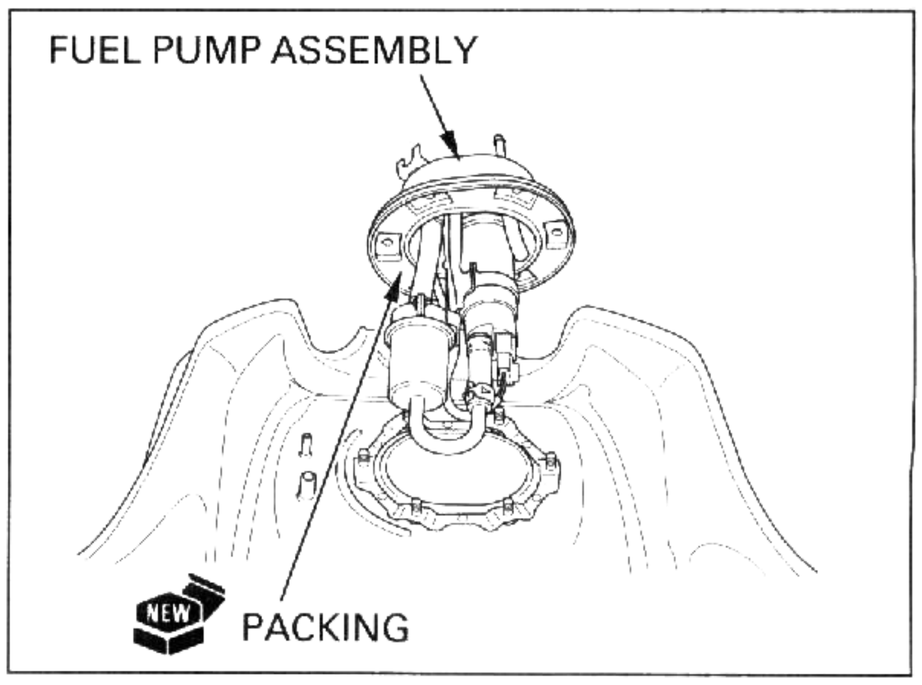
INSTALLATION

Place a new packing onto the fuel tank.

NOTE:

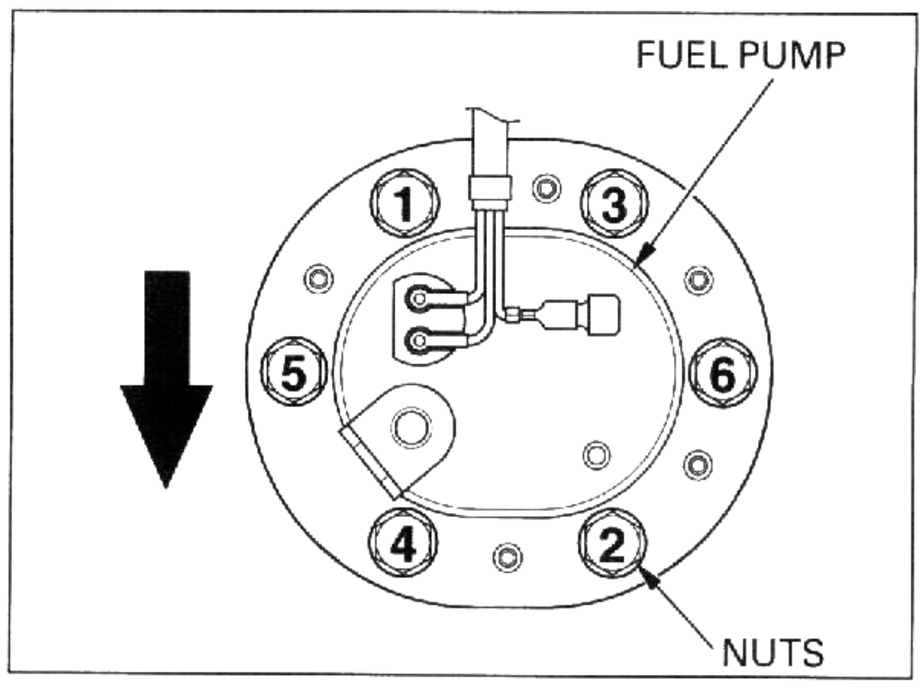
Always replace packing with a new one.

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



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

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

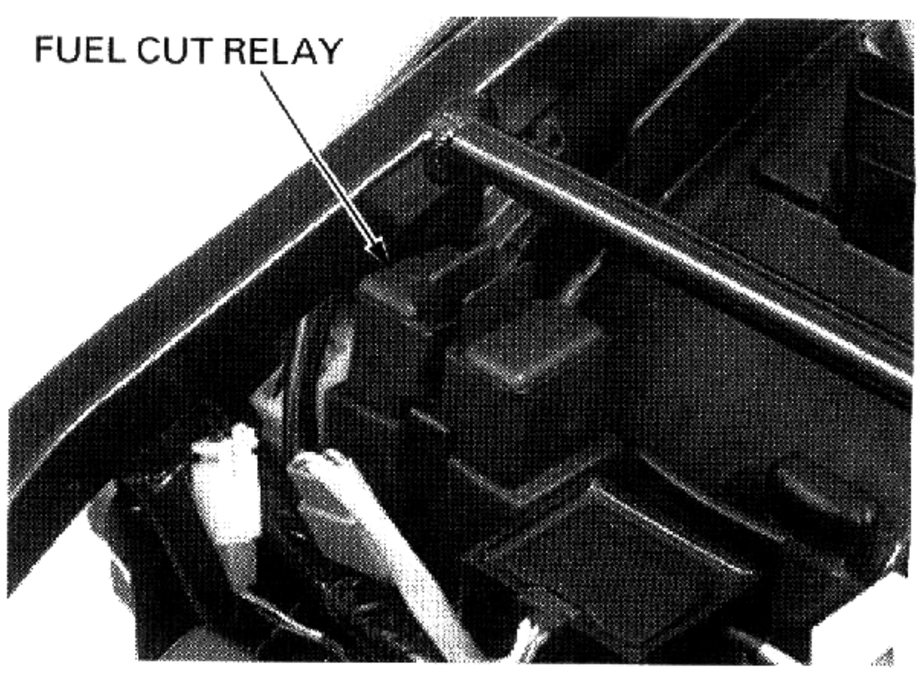


FUEL CUT RELAY

INSPECTION

Remove the seat (page 2-2).

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



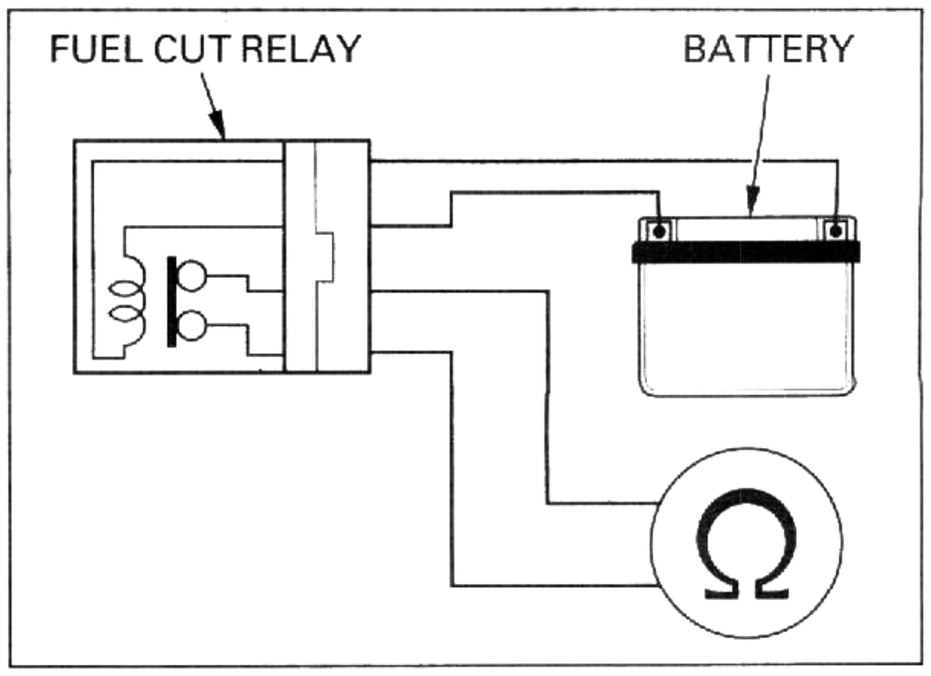
Connect the ohmmeter to the fuel cut relay connector terminals.

CONNECTION: Black/White – Brown

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

CONNECTION: Brown/Black – Black/White

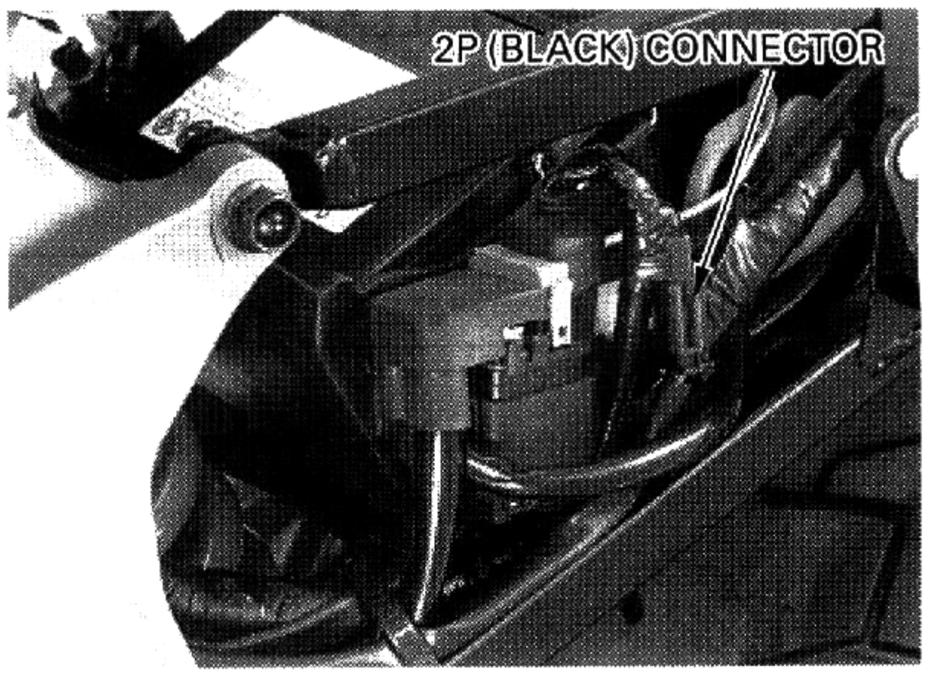
There should be continuity only when the 12V battery is connected.
If there is no continuity when the 12V battery is connected, replace the fuel cut relay.



FUEL TANK

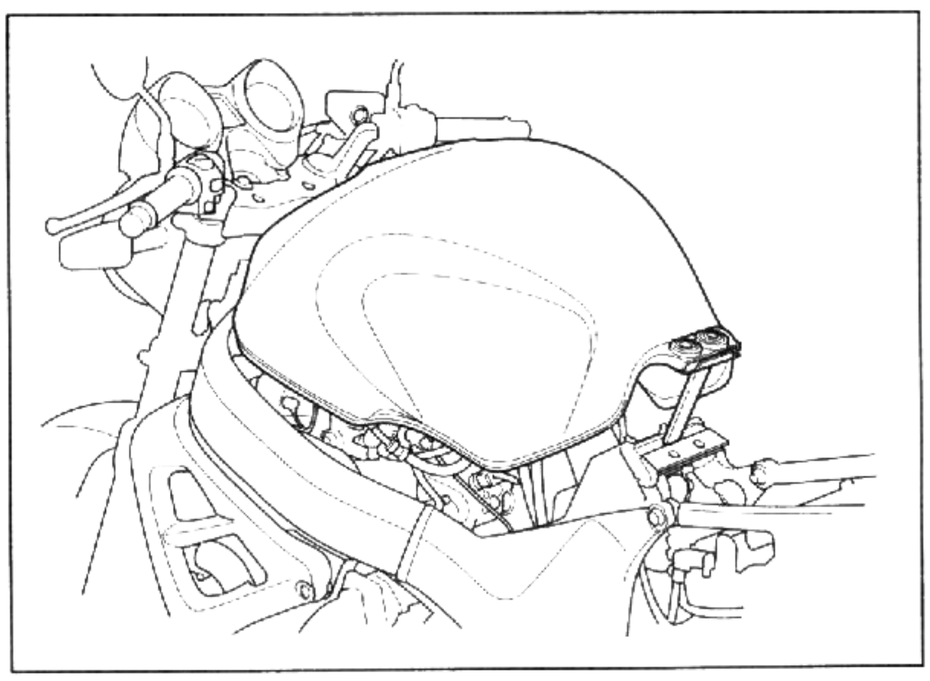
REMOVAL

Disconnect the fuel level/reserve sensor 2P (Black) connector.

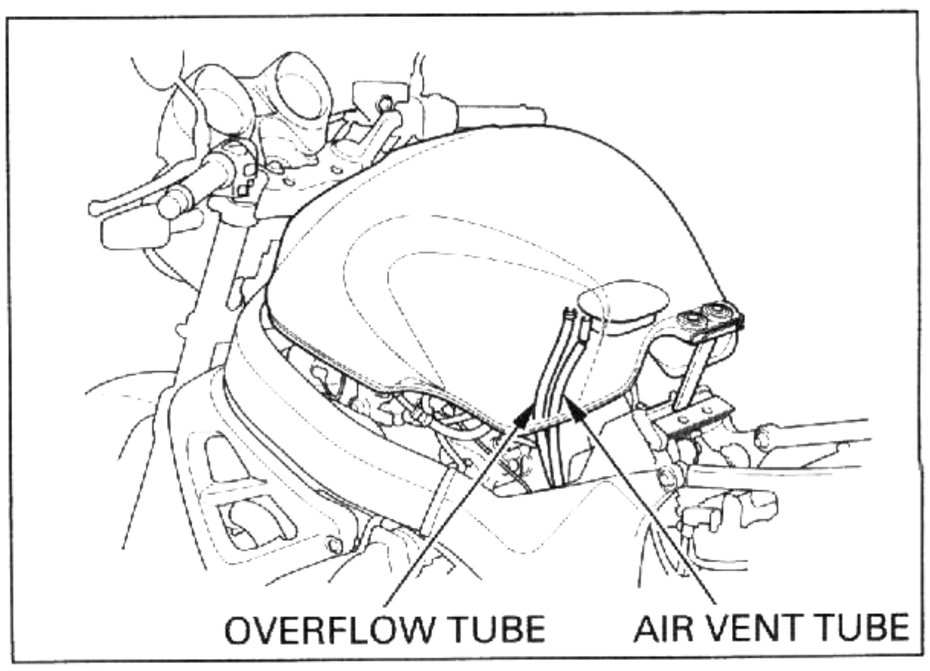


Support the rear end of the fuel tank.

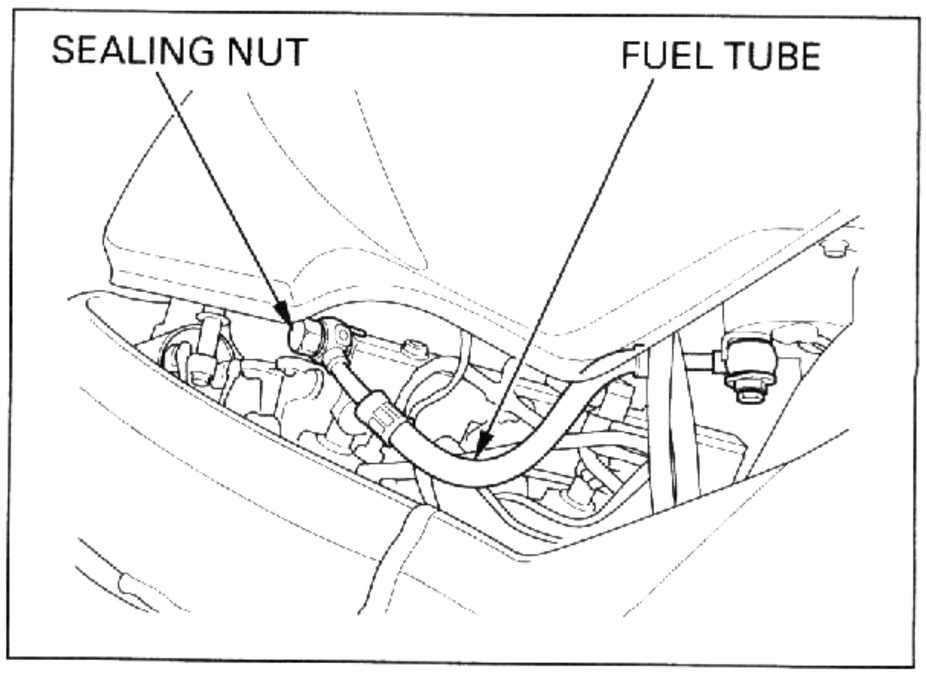
Release the fuel pressure (page 5-51).



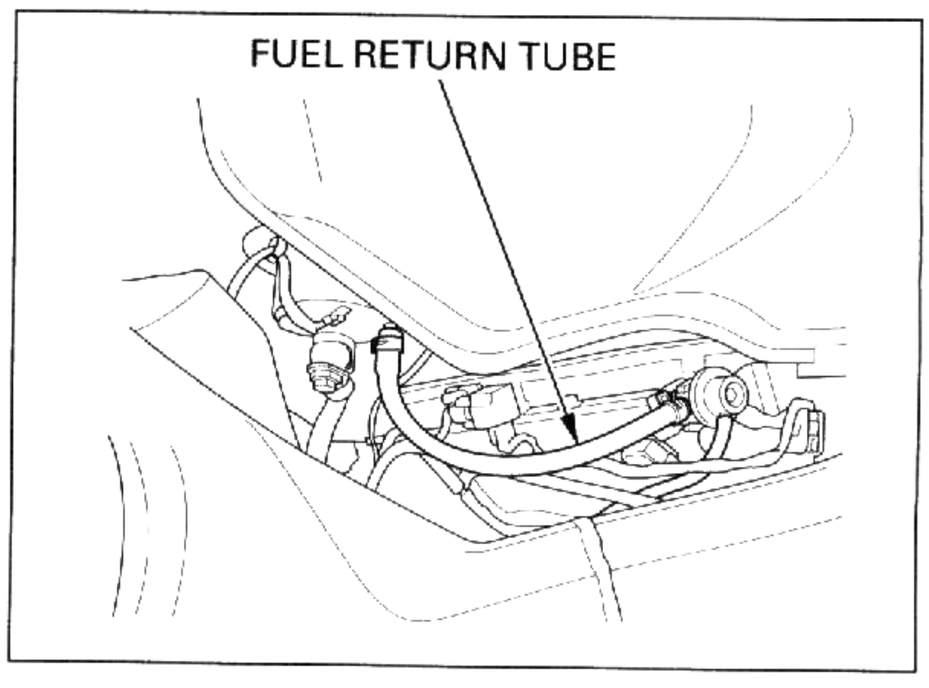
Disconnect the fuel tank air vent tube and overflow tube.



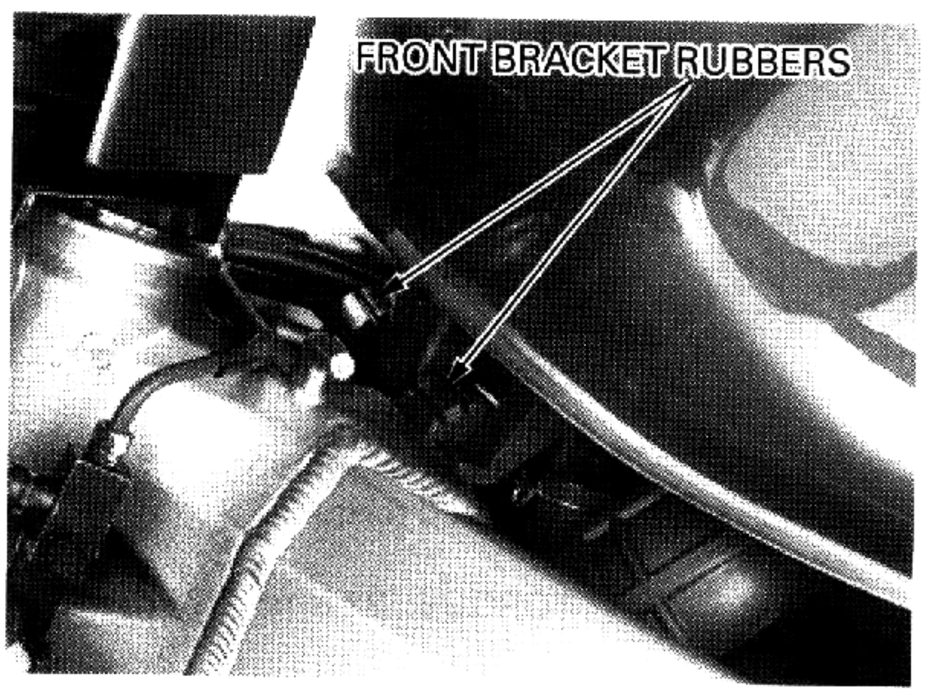
Disconnect the fuel tube sealing nut and sealing washers.
Temporarily install the 12 × 30 mm bolt (pitch 1.75) and sealing washers to the fuel tube banjo, then tighten the sealing nut.



Disconnect the fuel return tube at the throttle body.



Pull the fuel tank backward and release the front bracket rubbers from the frame.



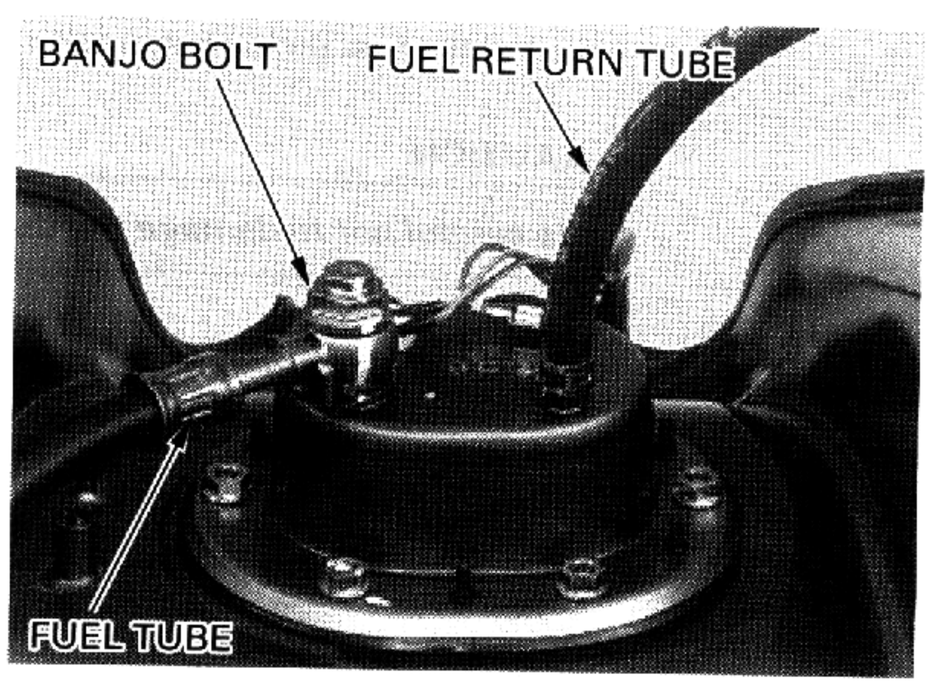
Place the fuel tank upside down.

CAUTION:

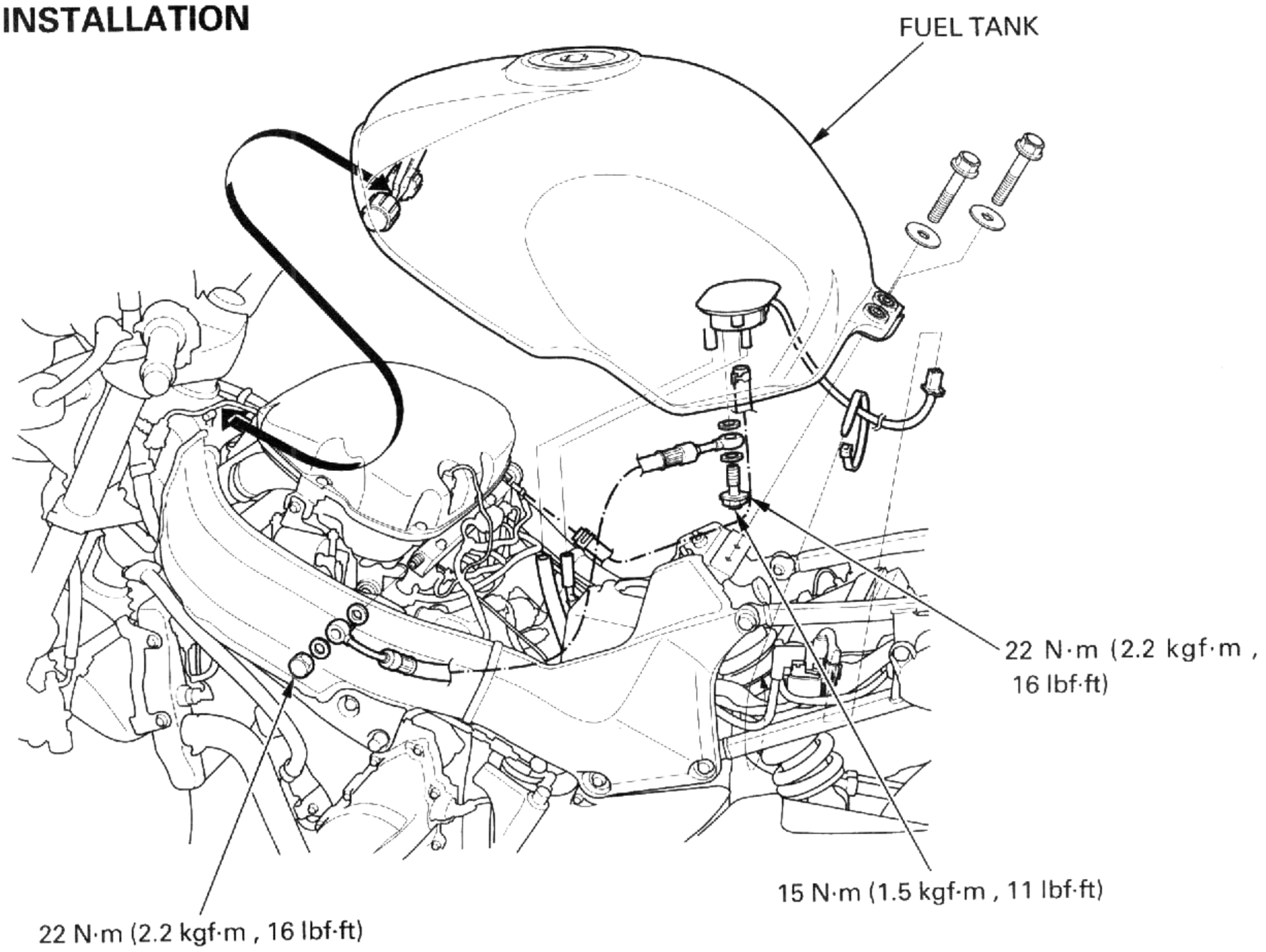
Be careful not to damage the fuel tank.

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

Refer to page 5-54 for fuel pump removal.



INSTALLATION



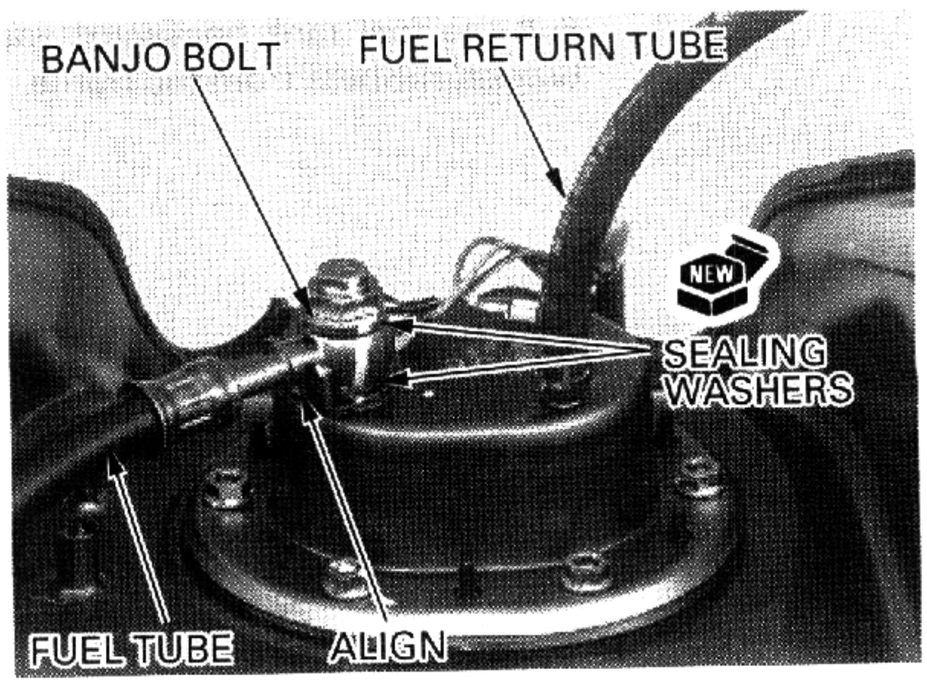
Connect the fuel tube to the fuel pump with new sealing washers.

NOTE:

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

Install and tighten the fuel tube banjo bolt to the specified torque.

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



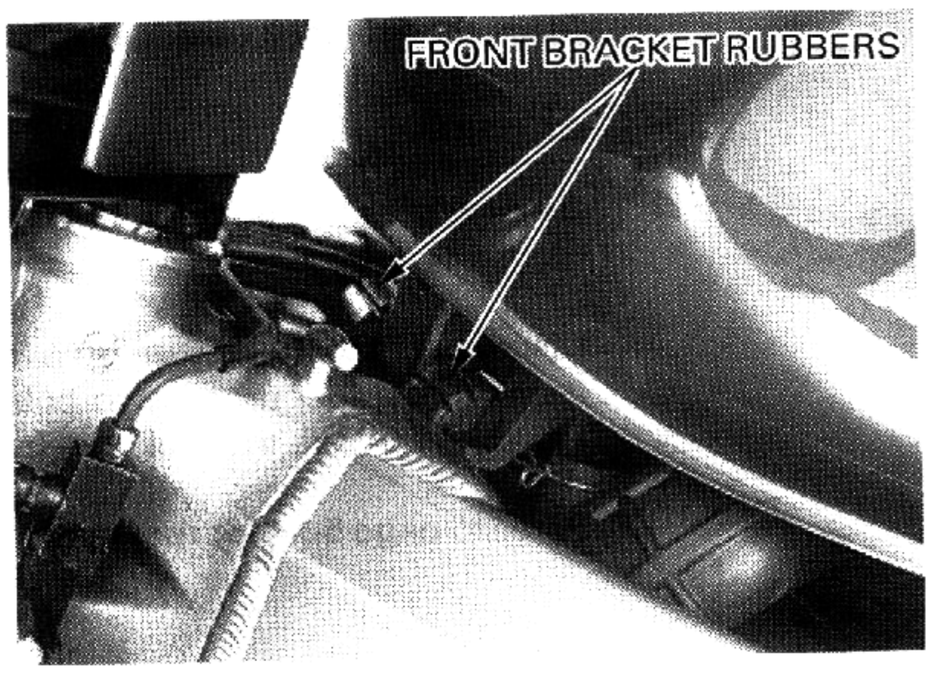
Connect the fuel return tube to the fuel pump.

Install the fuel tank front bracket into the frame.

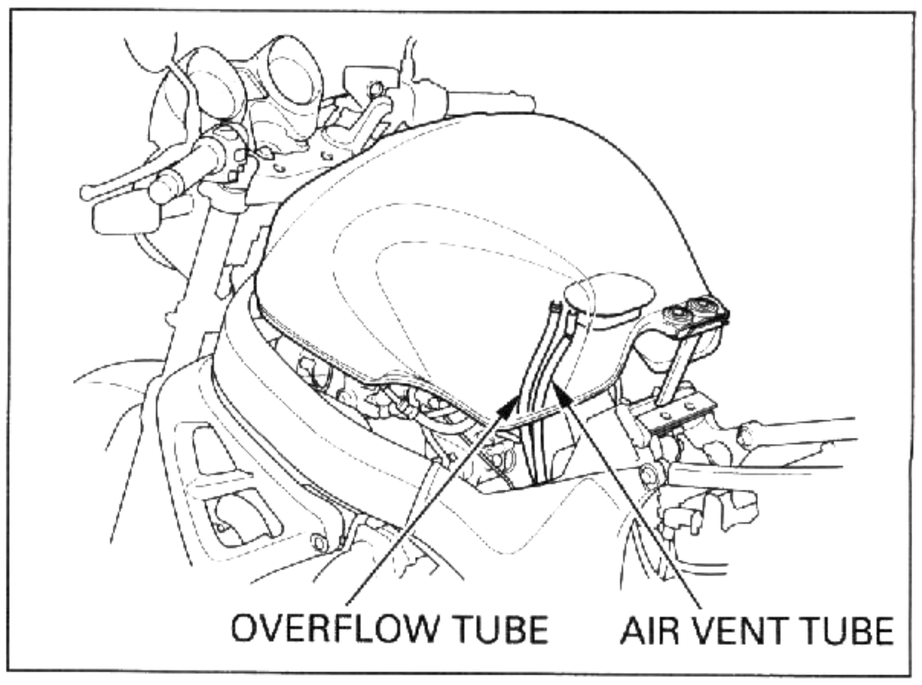
CAUTION:

Be careful not to damage the throttle cables.

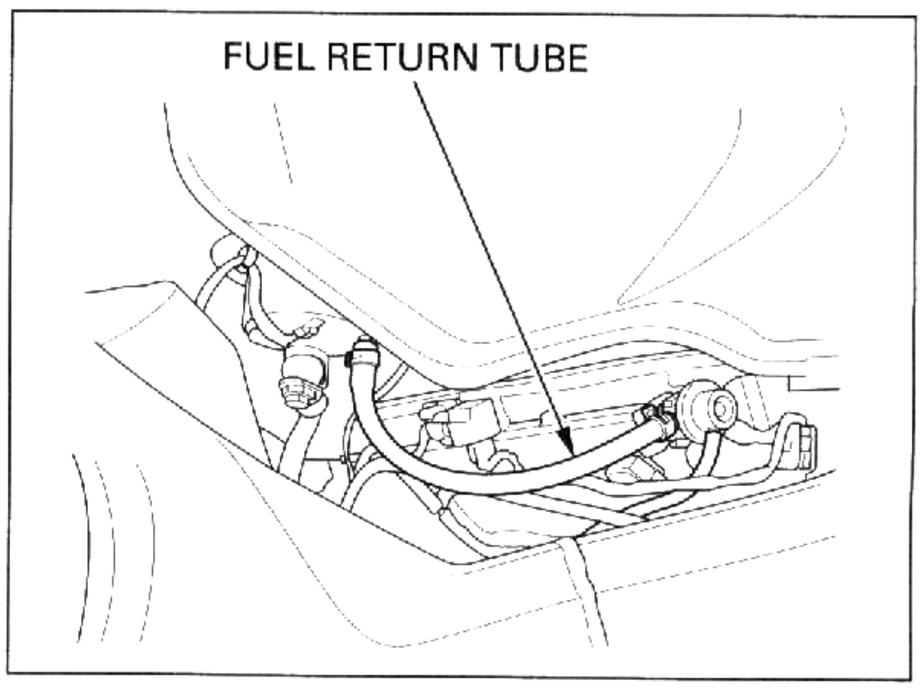
Support the rear end of the fuel tank (page 5-56).



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

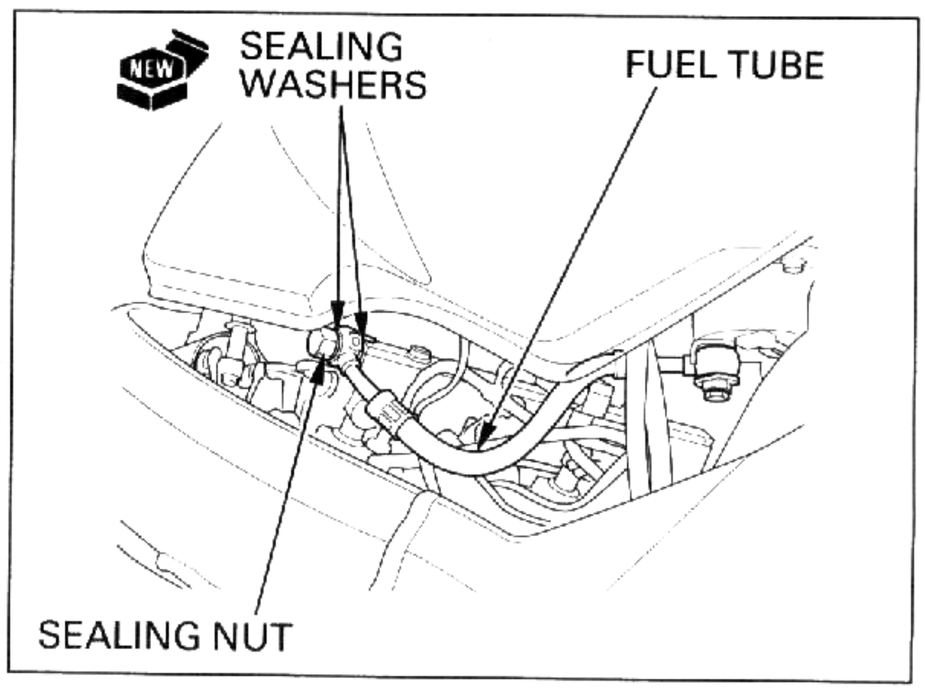


Connect the fuel return tube to the throttle body.

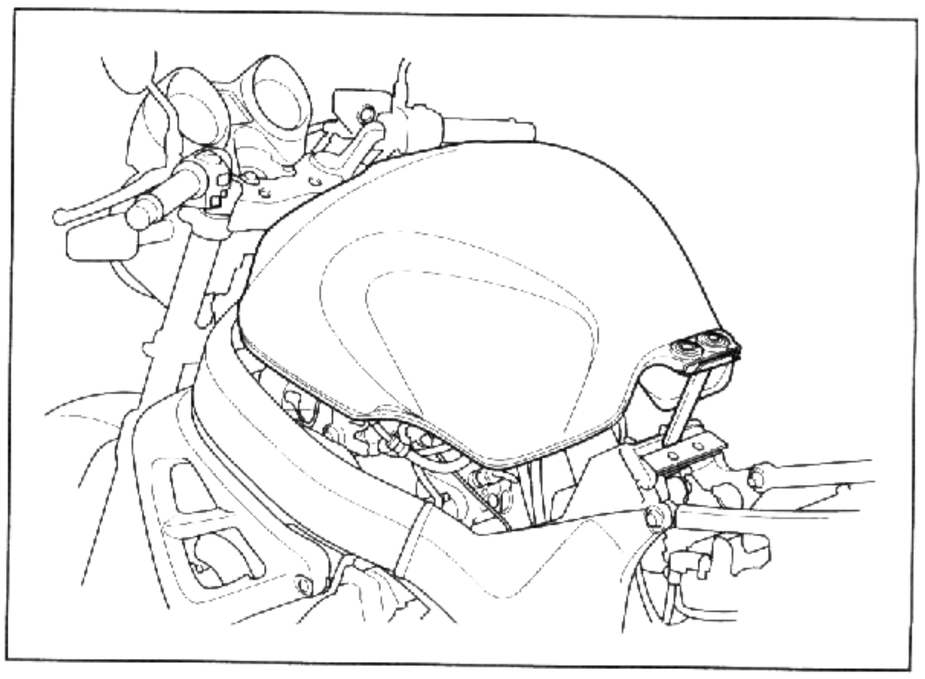


Connect the fuel tube banjo to the throttle body with new sealing washers.
While pushing the fuel tube banjo stopper to the throttle body, install and tighten the sealing nut to the specified torque.

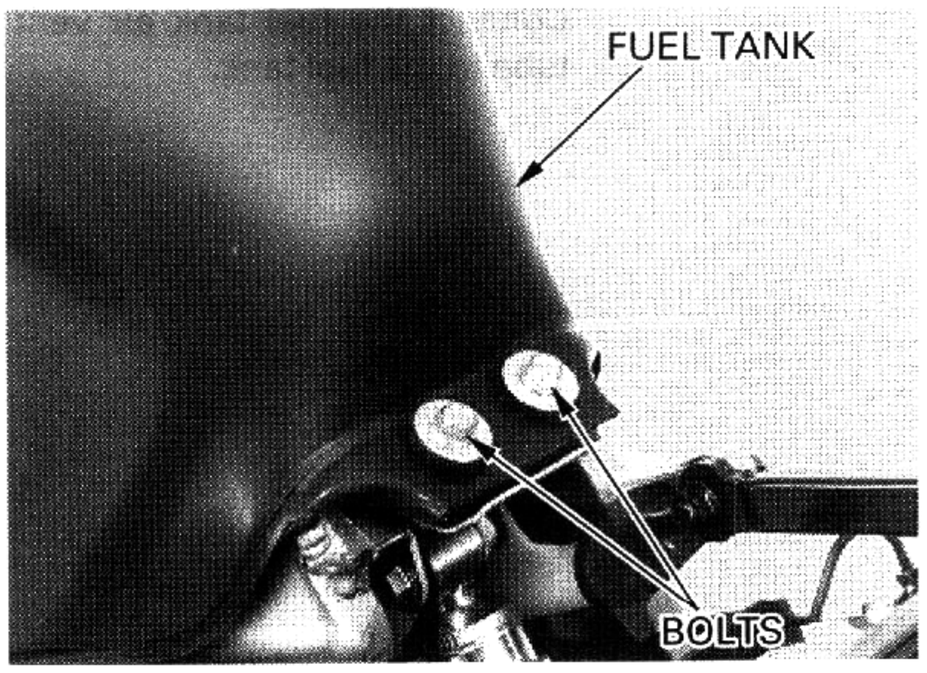
TORQUE: 22 N·m (2.2 kgf·m , 16 lbf·ft)



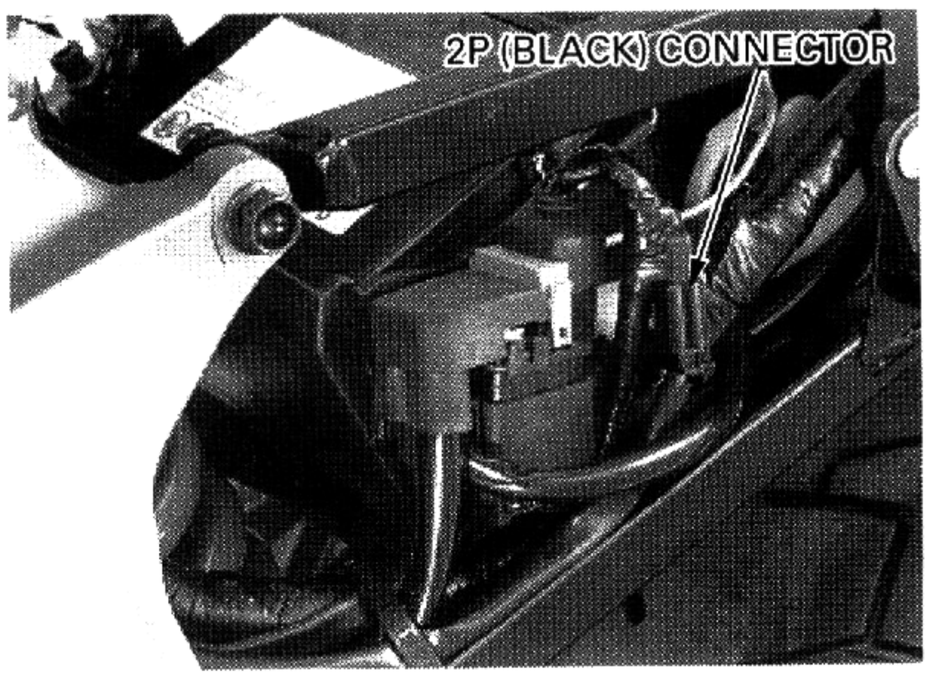
Remove the supporting tool and close the fuel tank.



Install the fuel tank mounting collar and bolts, then tighten the mounting bolts.



Connect the fuel pump/reserve sensor 2P (Black) connector.

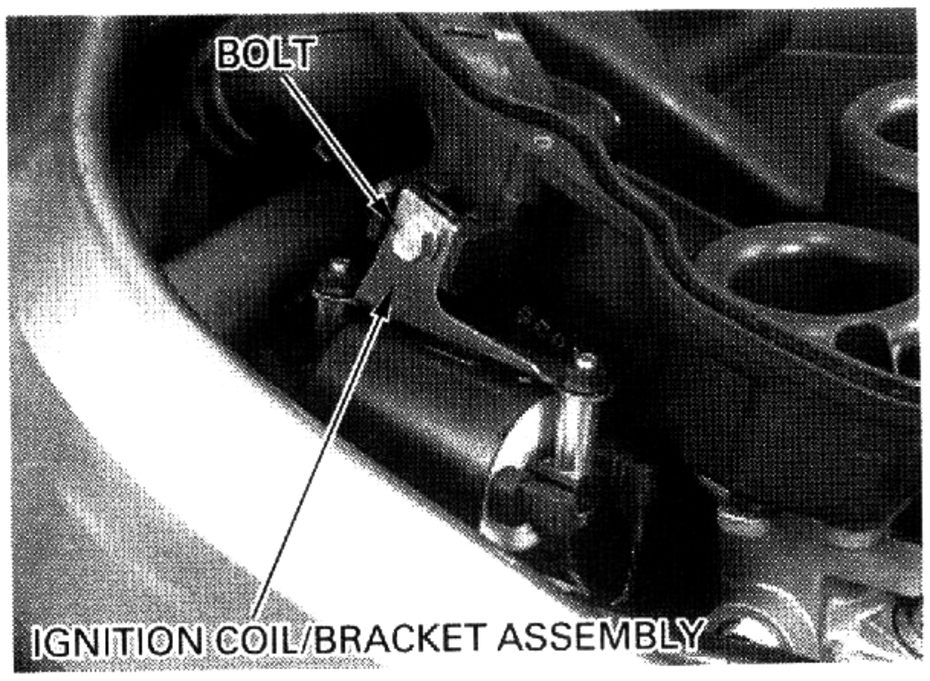


AIR CLEANER HOUSING

REMOVAL

Remove the air cleaner element (page 3-5).

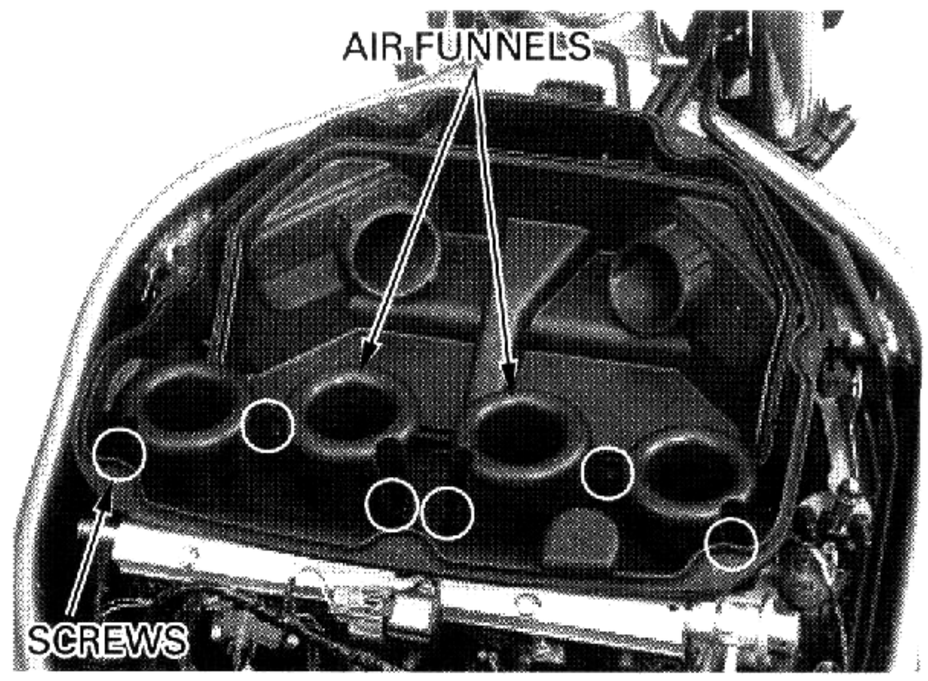
Loosen the ignition coil bracket mounting bolt, then remove the ignition coil assembly from the air cleaner housing on both side.



Disconnect the PAIR air suction hose from the air cleaner housing.

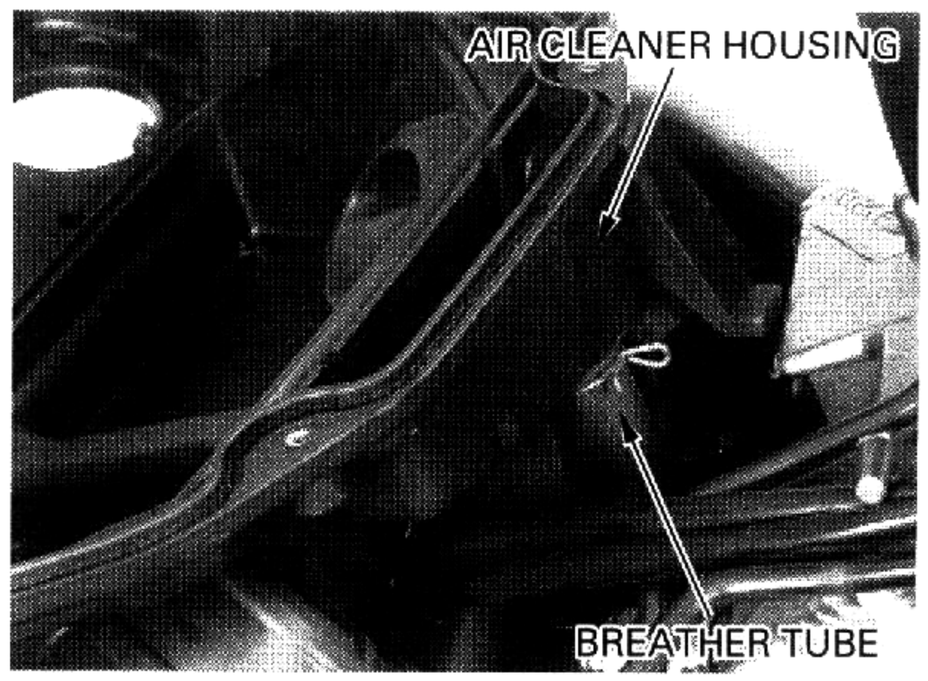


Remove the air funnel/air cleaner housing mounting screws, then remove the air funnels.



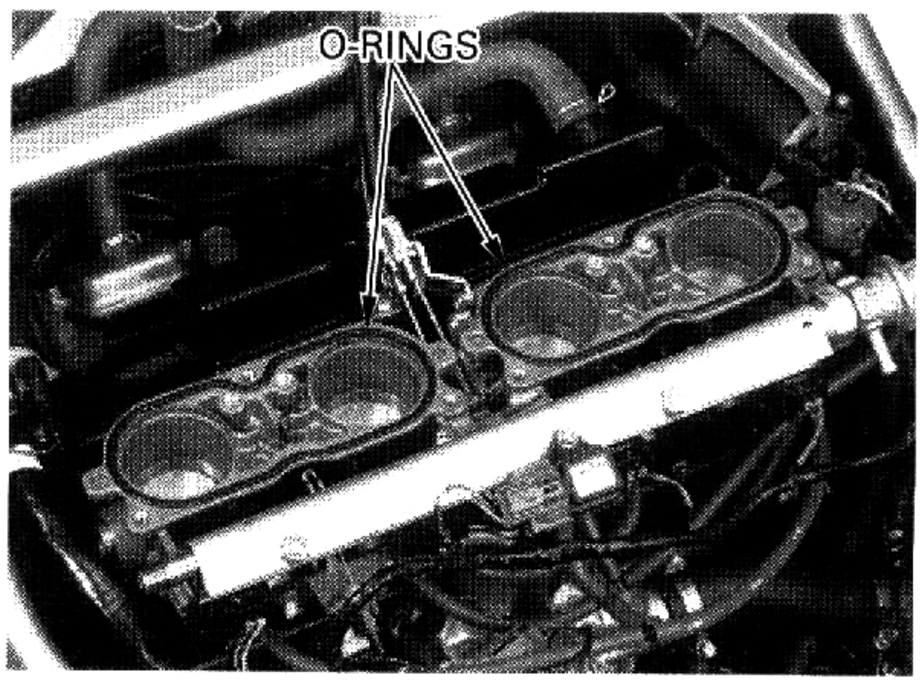
Disconnect the crankcase breather tube from the air cleaner housing.

Remove the air cleaner housing.



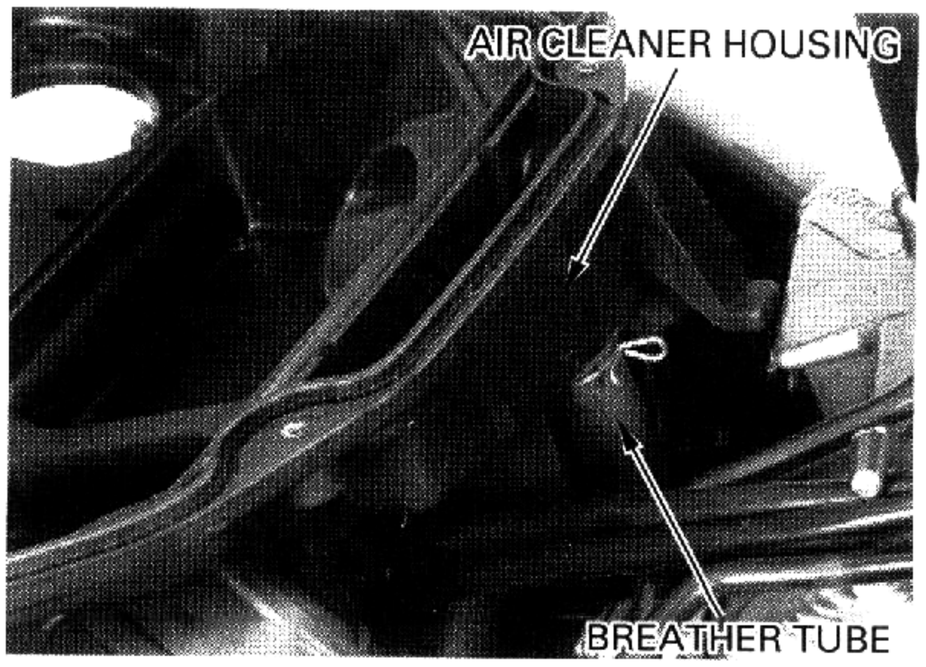
INSTALLATION

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

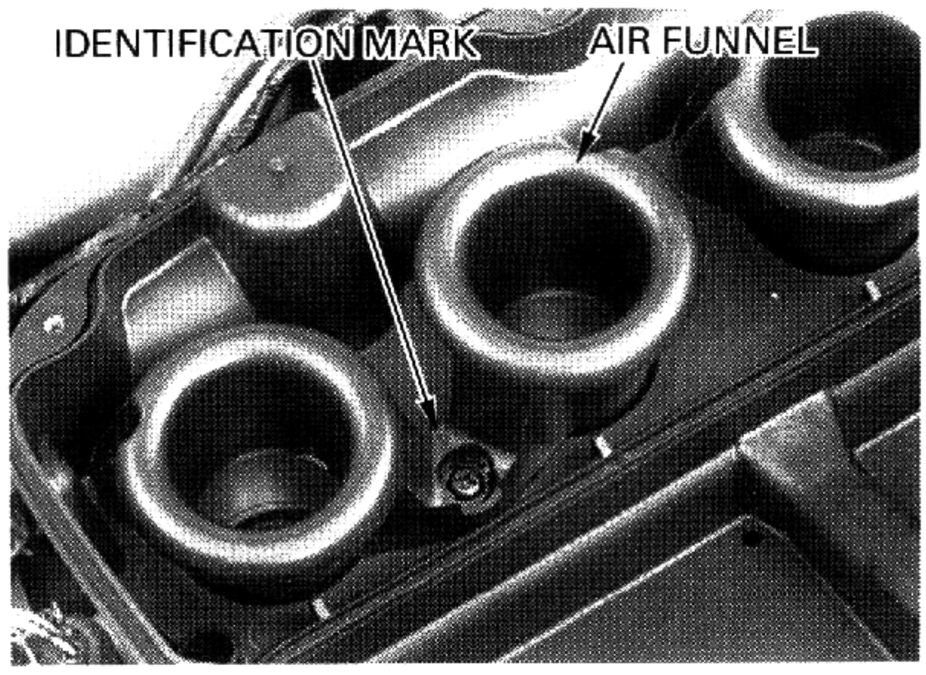


Connect the crankcase breather tube to the air cleaner housing.

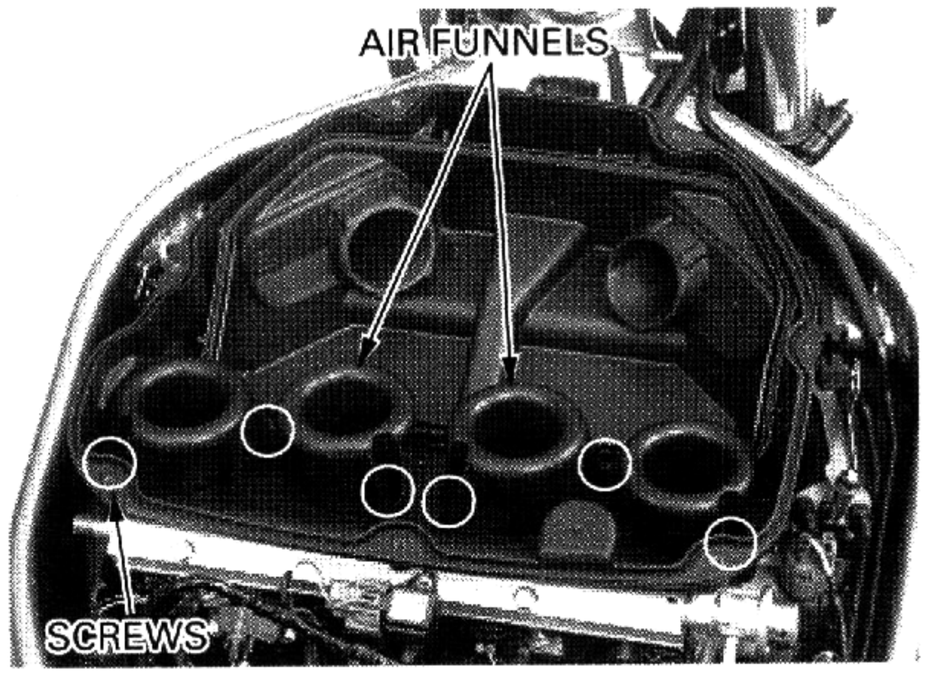
Install the air cleaner housing onto the throttle body.



Install the air cleaner housing onto the throttle body.
Install the air funnels in their proper locations referring their identification marks.



Install and tighten the air funnel/air cleaner housing mounting screws.

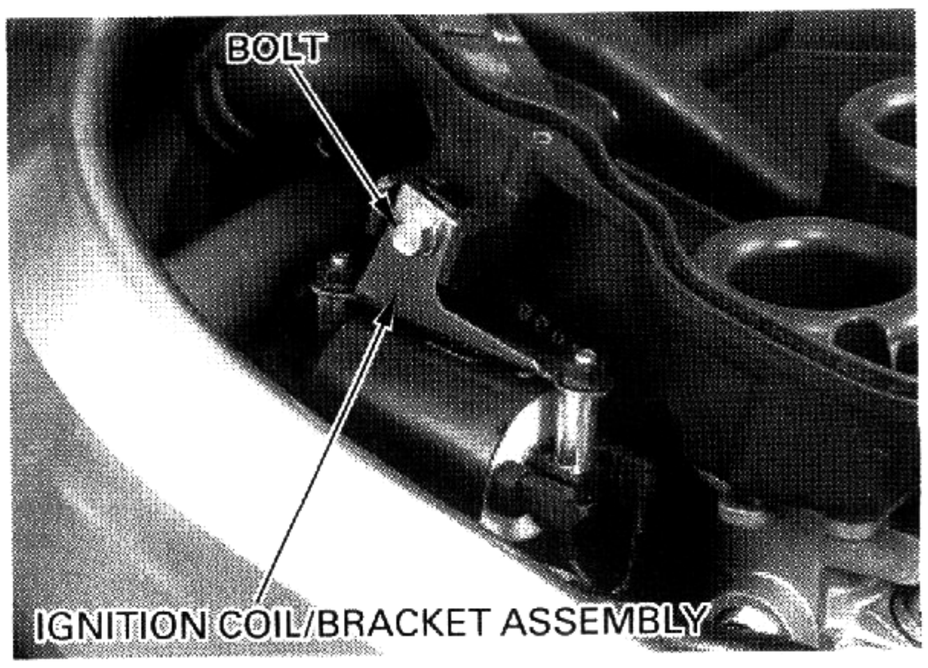


Connect the PAIR air suction hose to the air cleaner housing.



Install the ignition coil bracket assembly to the housing, tighten the bracket bolt securely on both side.

Install the air cleaner element (page 3-5).



THROTTLE BODY

REMOVAL

⚠WARNING

- ***Gasoline is extremely flammable and is explosive under certain conditions.***
- ***Be sure to relieve fuel pressure while the engine is OFF.***

CAUTION:

- ***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 tube, release the fuel pressure by loosening the service check bolt.***
- ***Always replace the sealing washer when the service check bolt is removed or loosened.***

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

Remove the following:
—Fuel tank (page 5-56)
—Air cleaner housing (page 5-60)

Remove the throttle cable guide bracket mounting bolts.
Disconnect the throttle cable ends from the throttle drum.

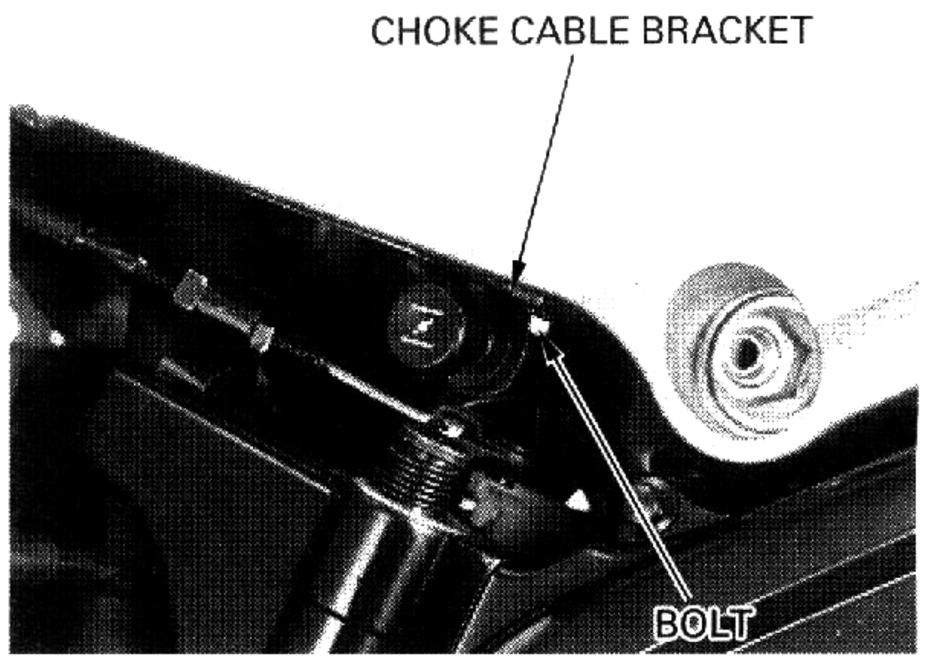
Remove the bolt and choke cable bracket.

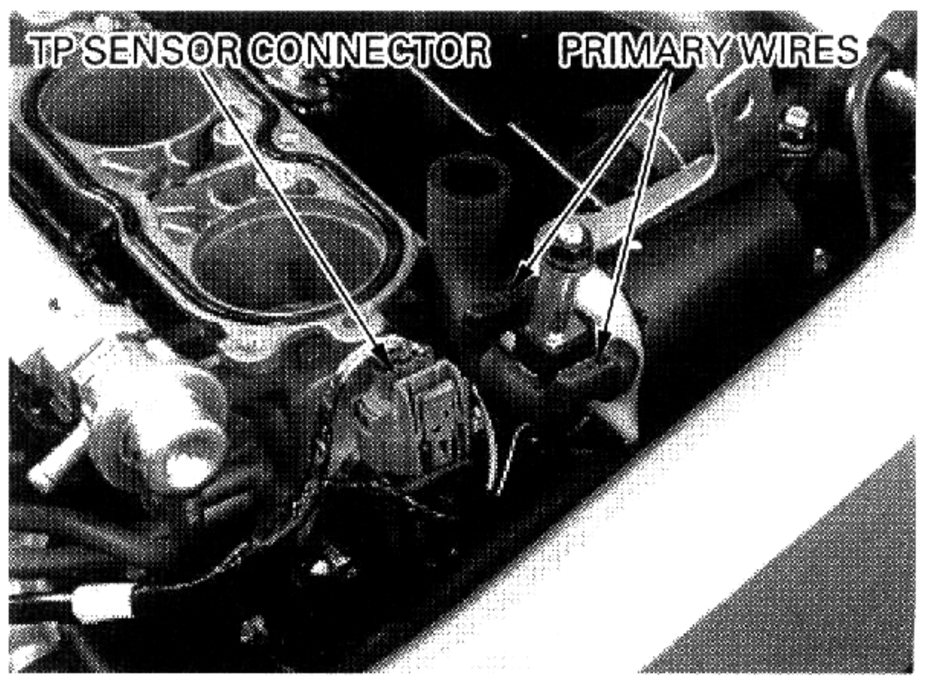
Disconnect the No. 1/3 ignition coil primary wires.

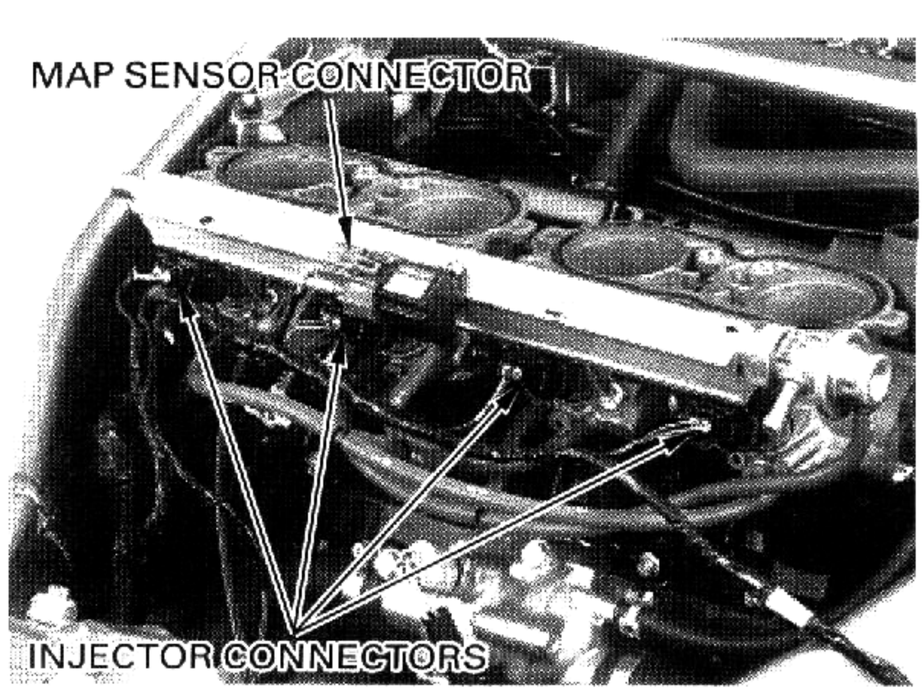
Disconnect the TP sensor connector.

Disconnect the MAP sensor connector and fuel injector connectors.



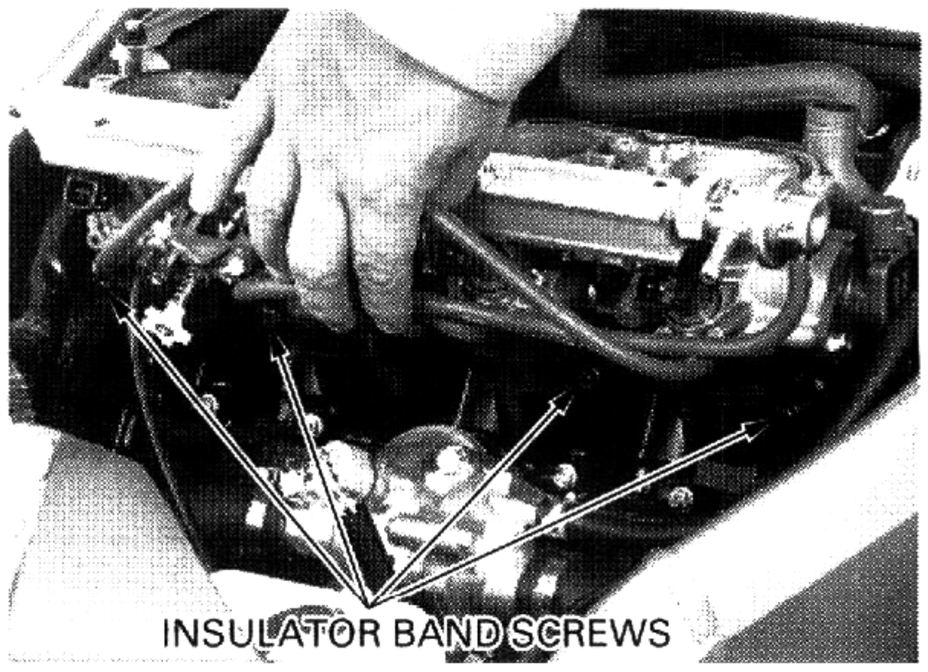






Loosen the engine side insulator band screws.

Remove the throttle body from the cylinder head.

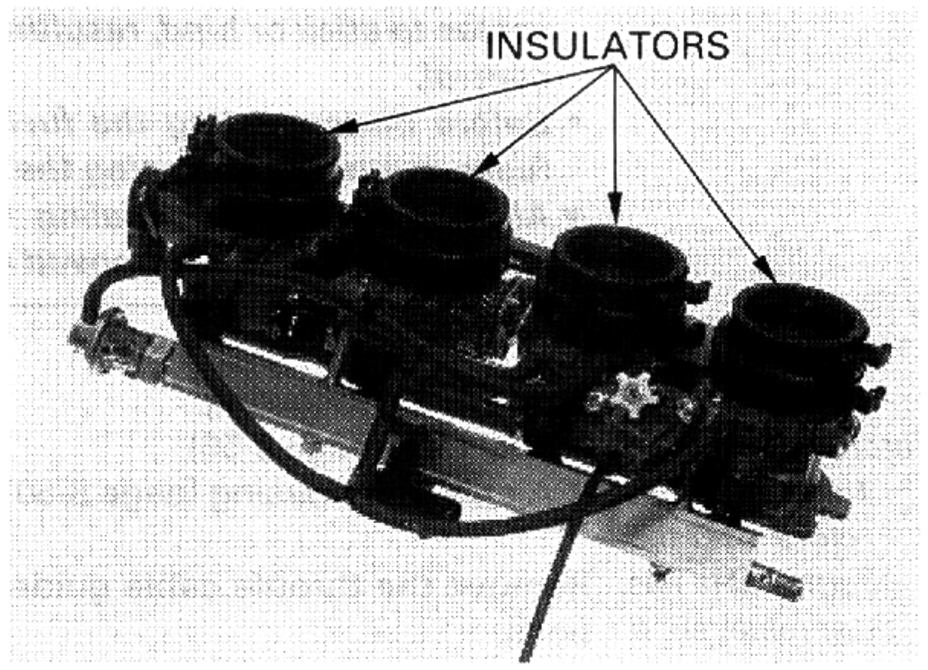


Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.

Remove the insulators from the throttle body.

CAUTION:

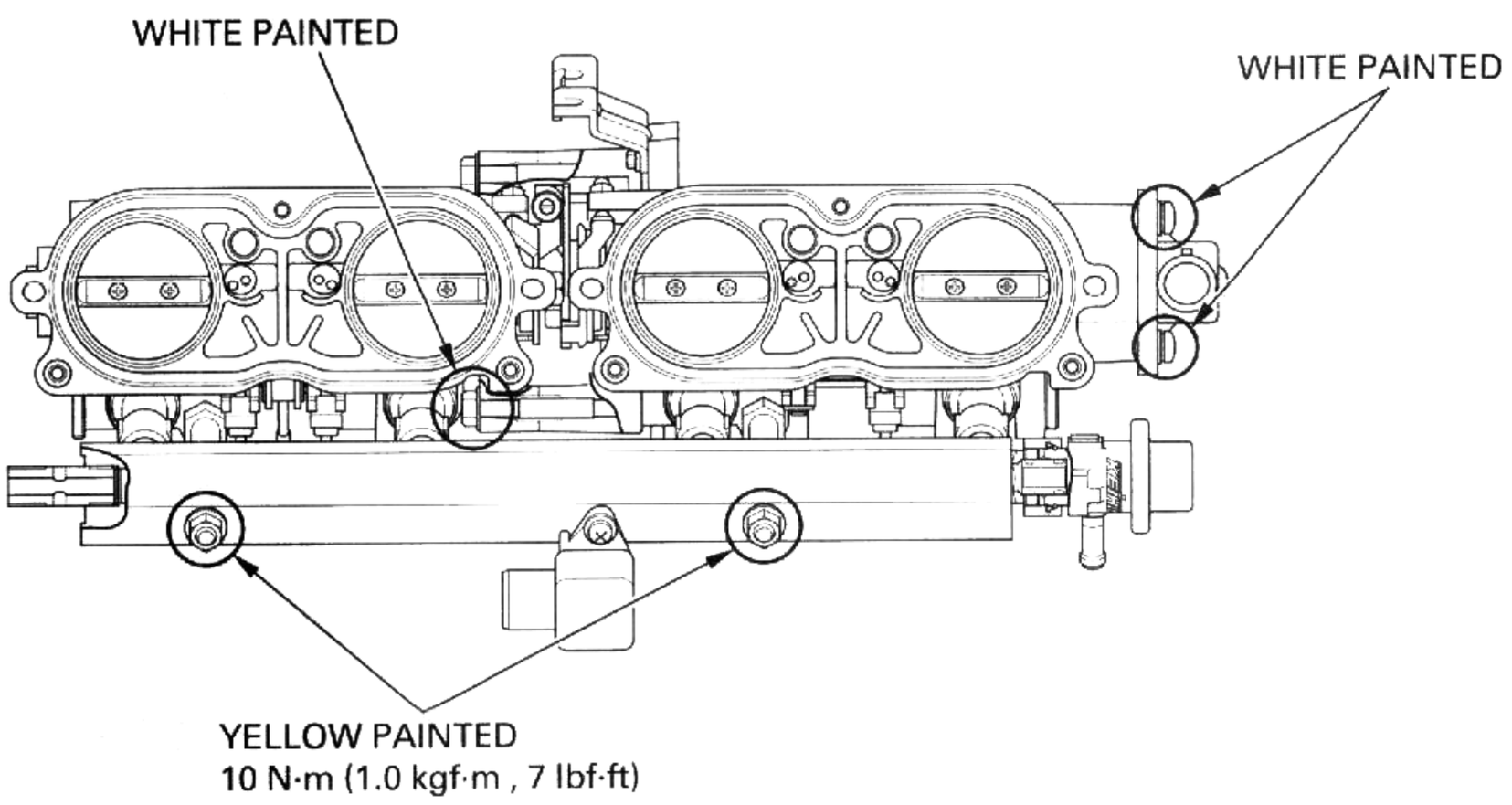
Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.



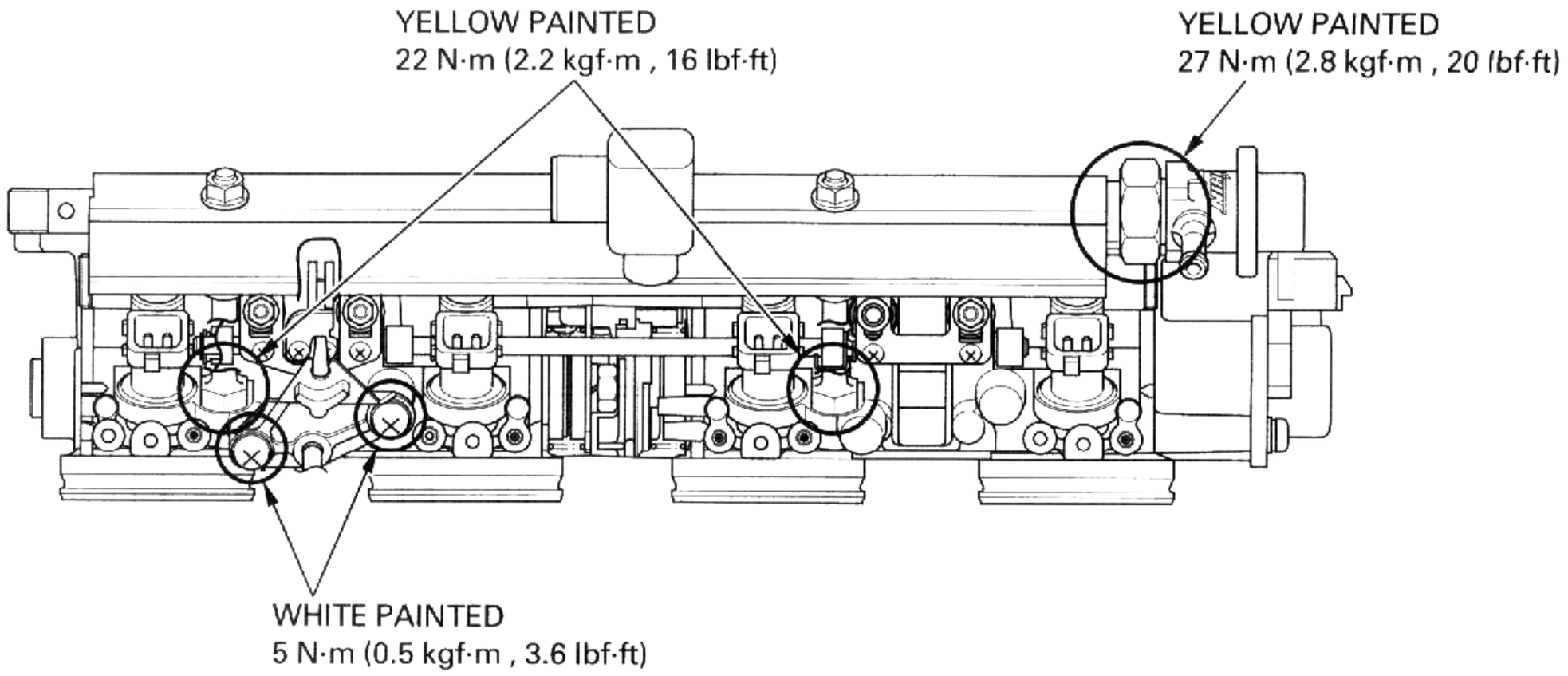
CAUTION:

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

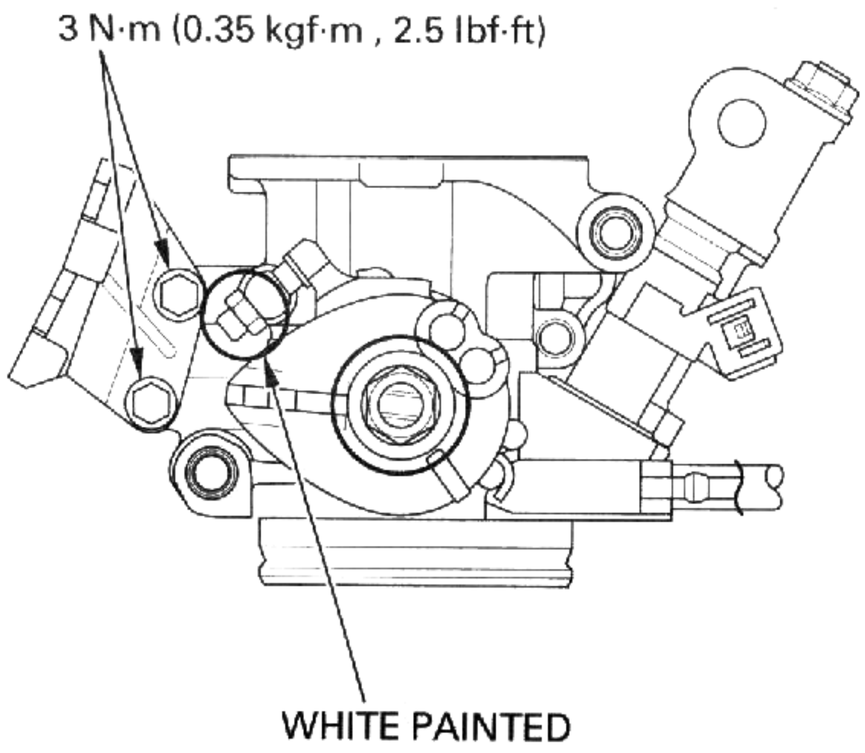
TOP VIEW:



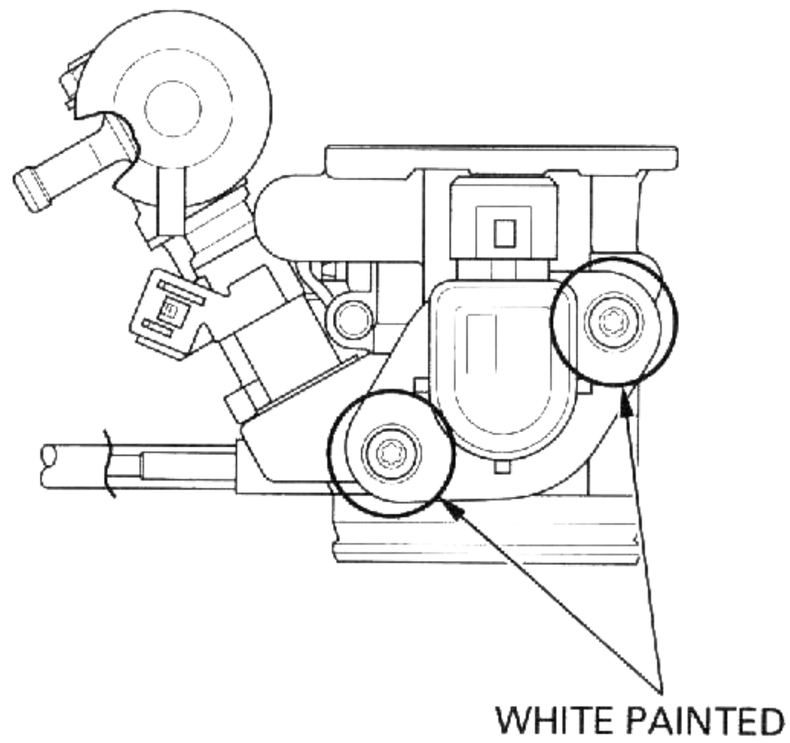
REAR VIEW:



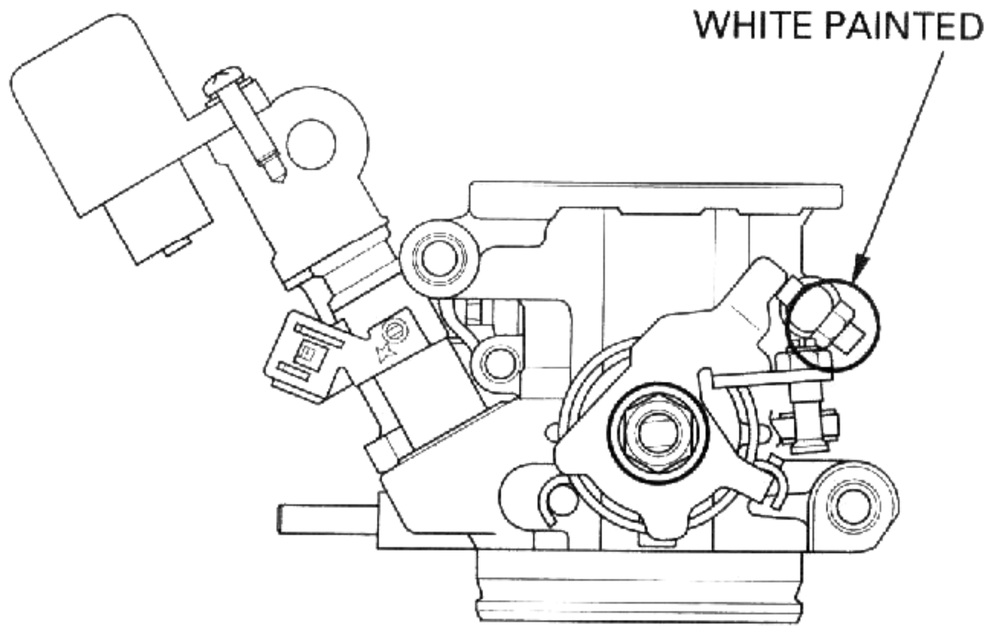
THROTTLE DRUM VIEW:



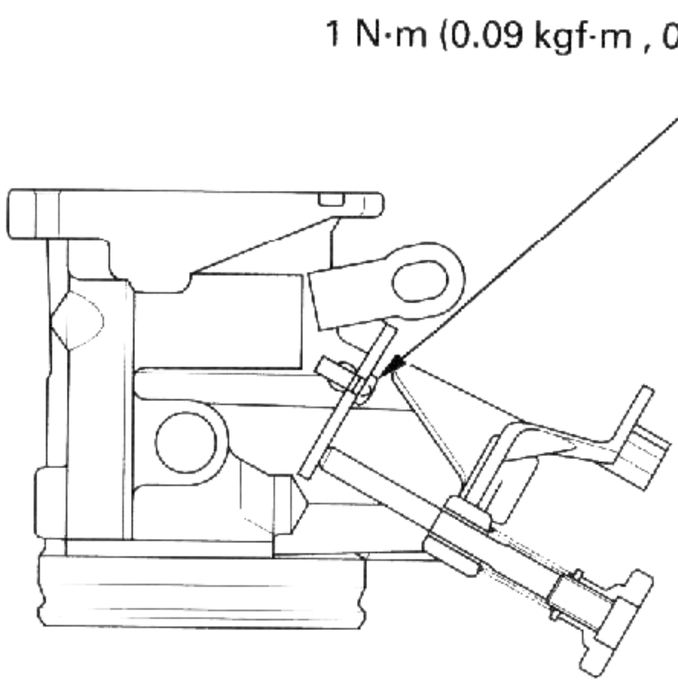
RIGHT SIDE VIEW:



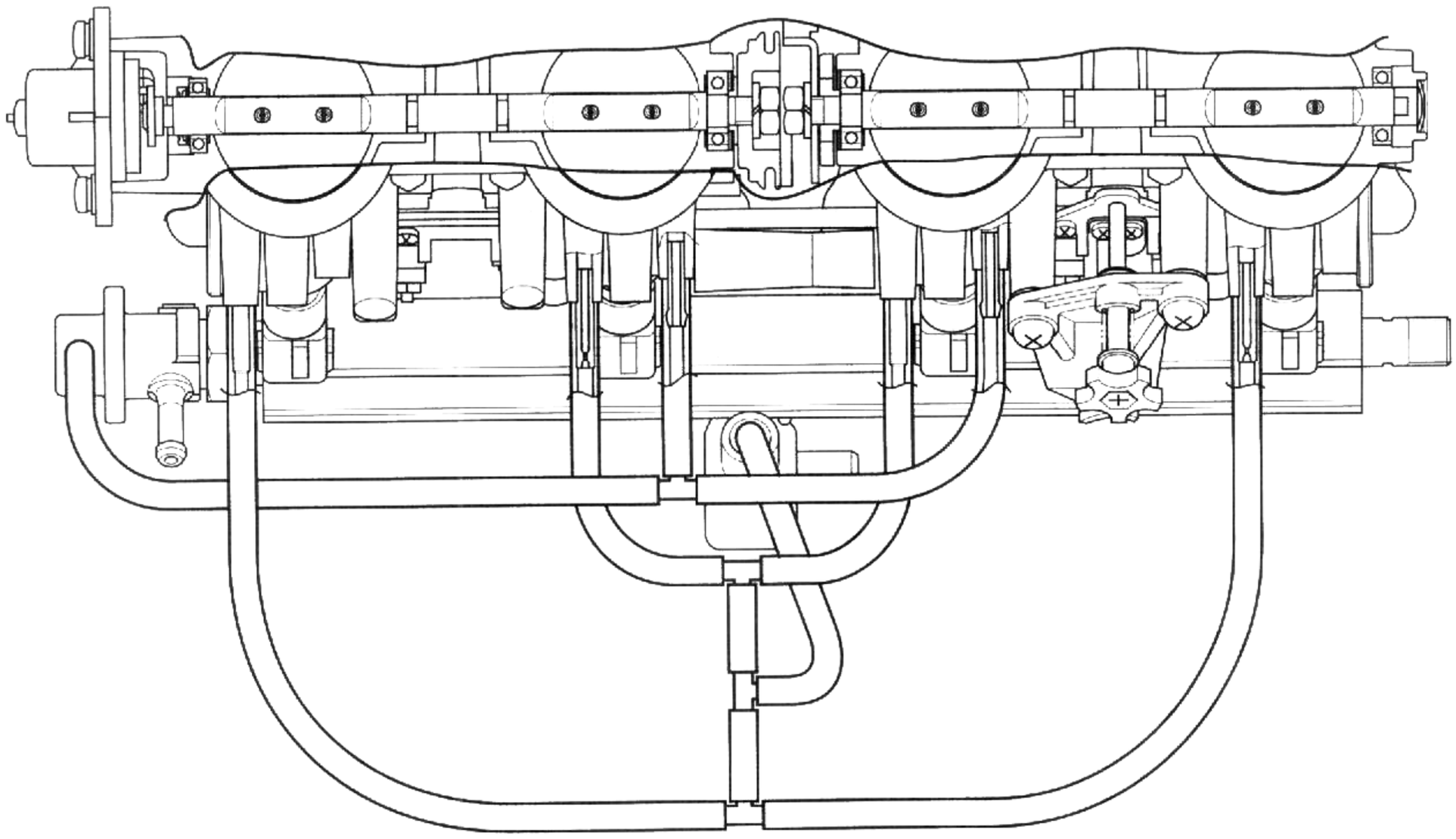
THROTTLE LINK VIEW:



STARTER VALVE LINK VIEW:

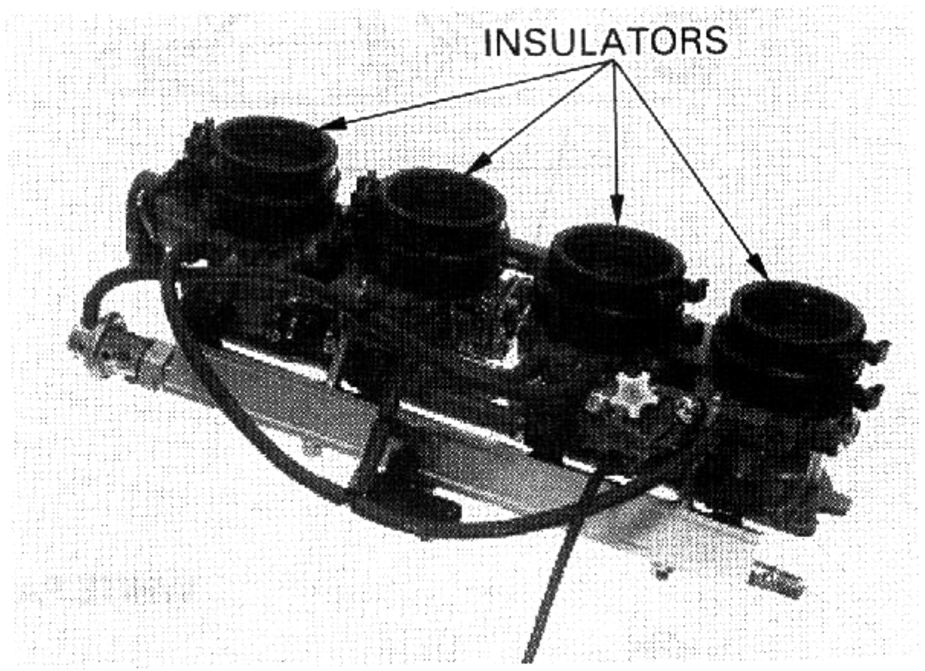


THROTTLE BODY VACUUM TUBE ROUTING



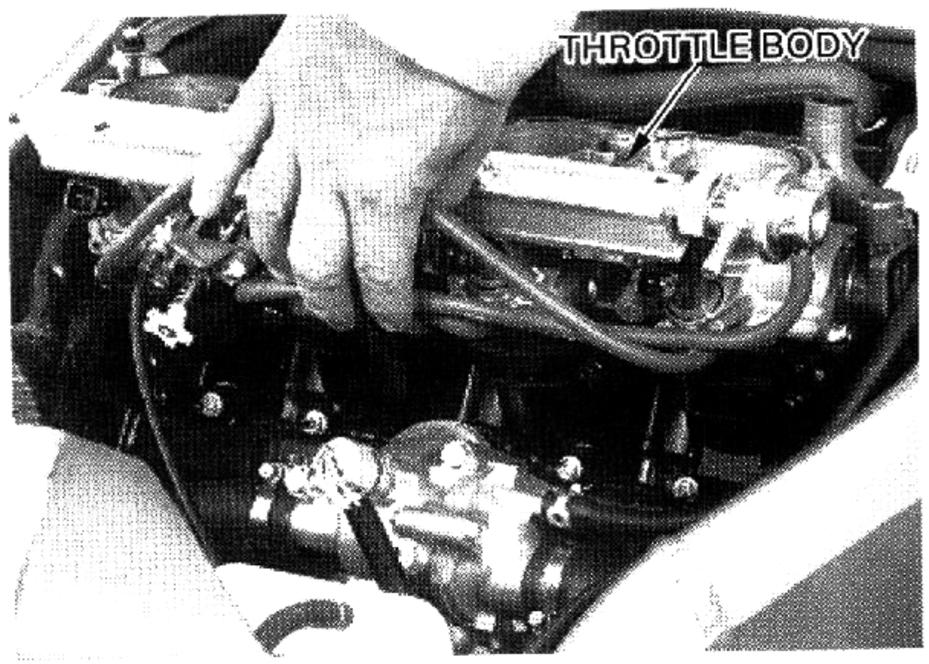
INSTALLATION

Check the insulator band angle.

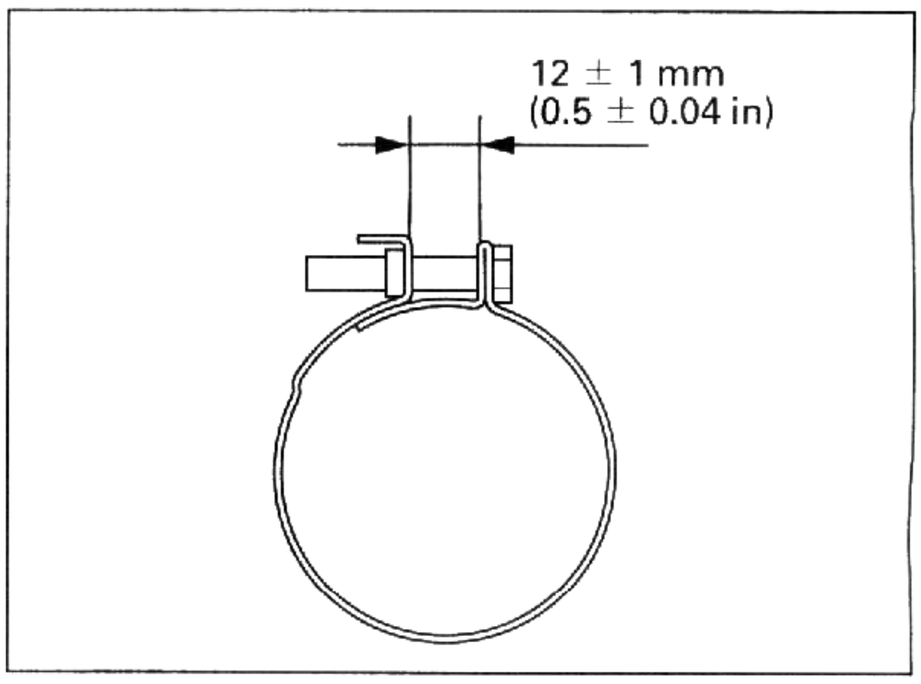


Apply oil to the insulator inside surfaces for ease of throttle body installation.

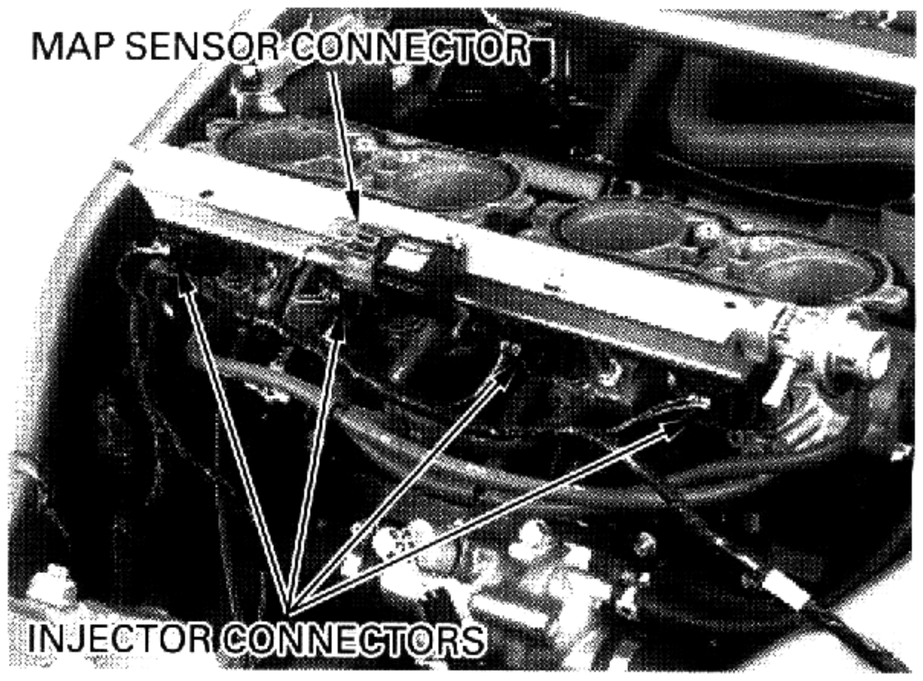
Install the throttle body onto the cylinder head.



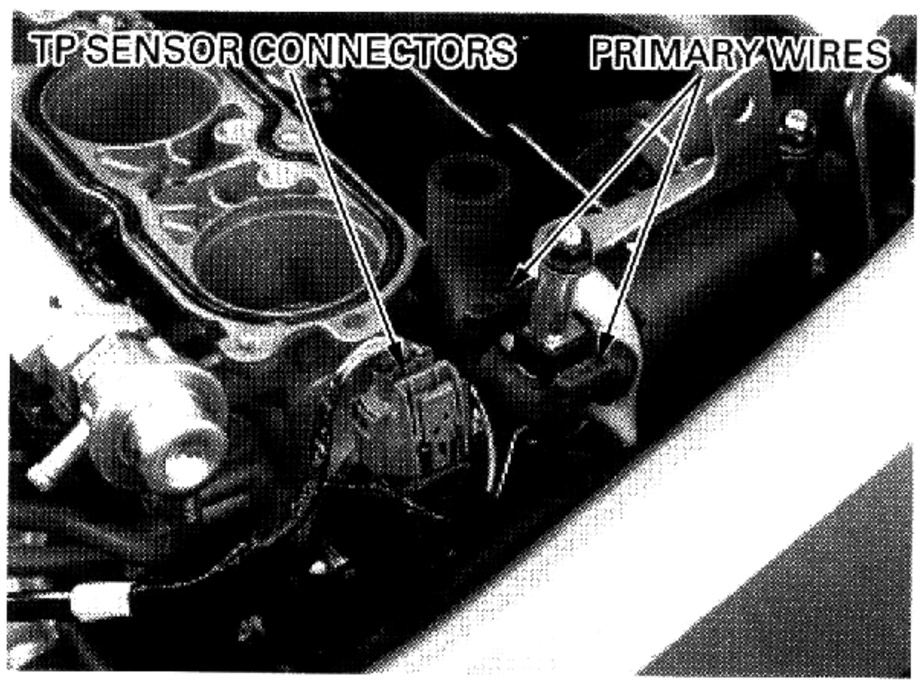
Tighten the insulator band so that the insulator band distance is 12 ± 1 mm (0.5 ± 0.04 in).



Route the throttle body sub-harness referring the wiring diagram (page 1-24).
Connect the fuel injectors and MAP sensor connectors.



Connect the TP (throttle position) sensor connector and No. 1/3 ignition coil primary wires.

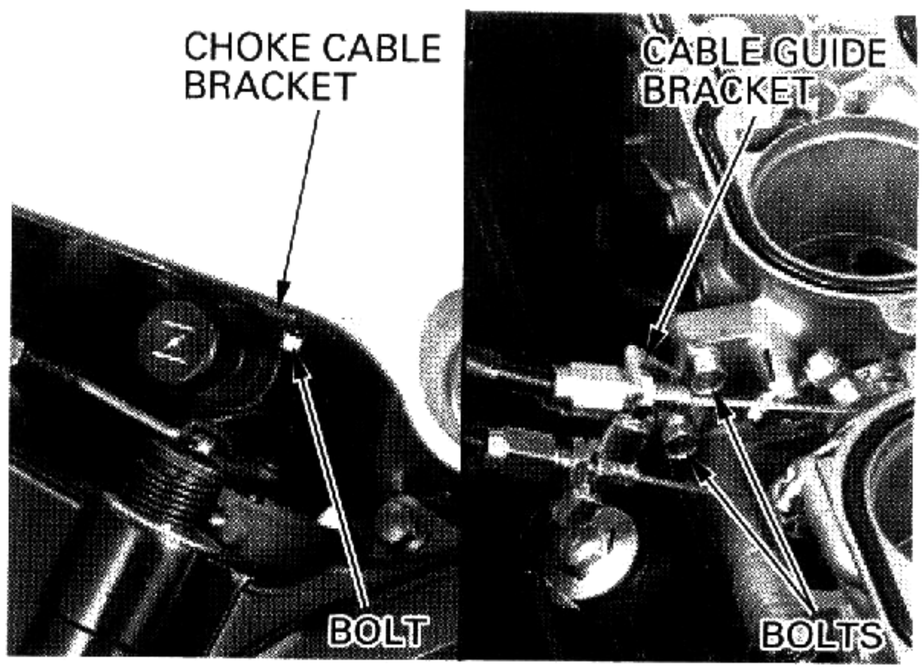


Install the choke cable bracket, then tighten the bolt securely.

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

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

Install the removed parts in the reverse order of removal.



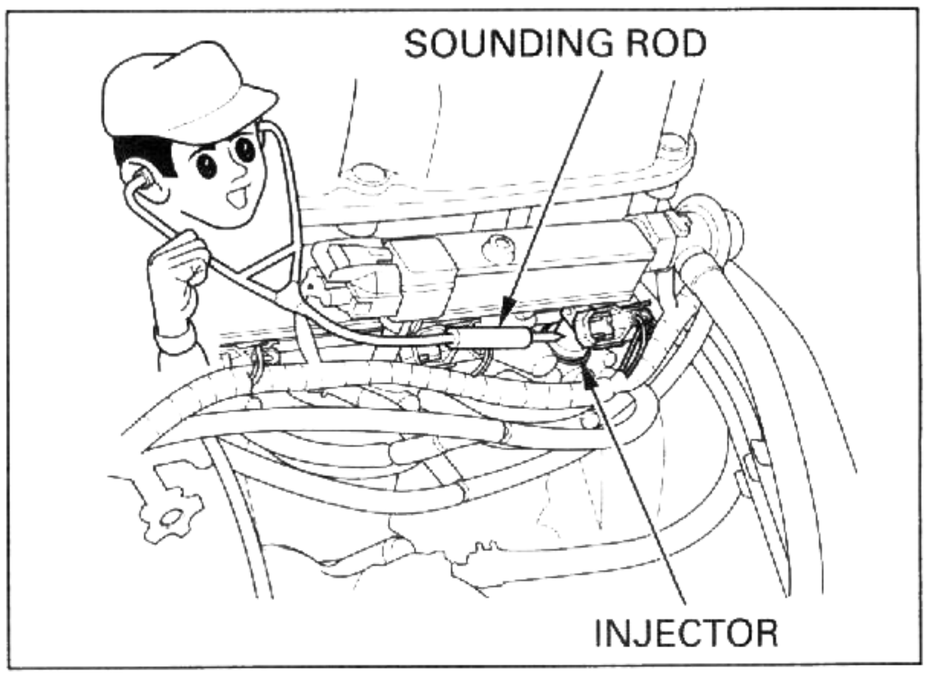
INJECTOR

INSPECTION

⚠WARNING

- ***If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area.***
- ***The exhaust contain poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death.***

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

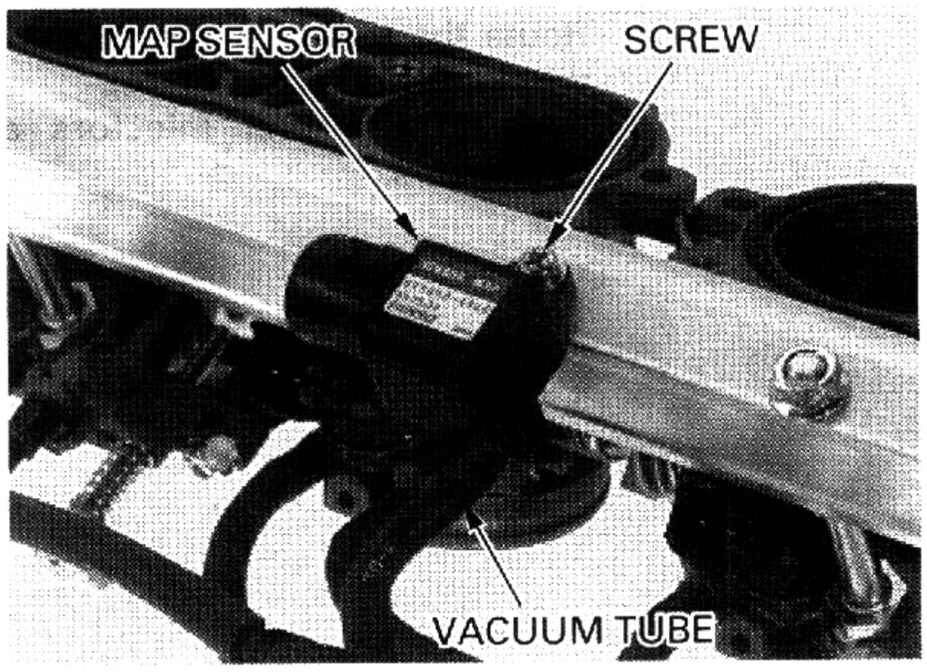


If the injector does not operates, replace the injector.

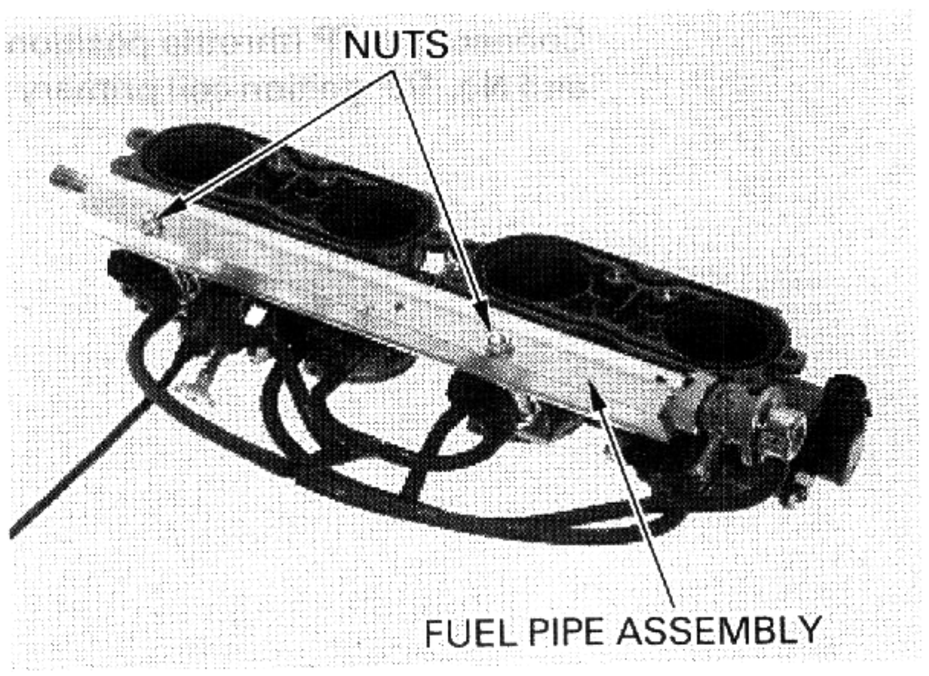
REMOVAL

Remove the throttle body (page 5-63).

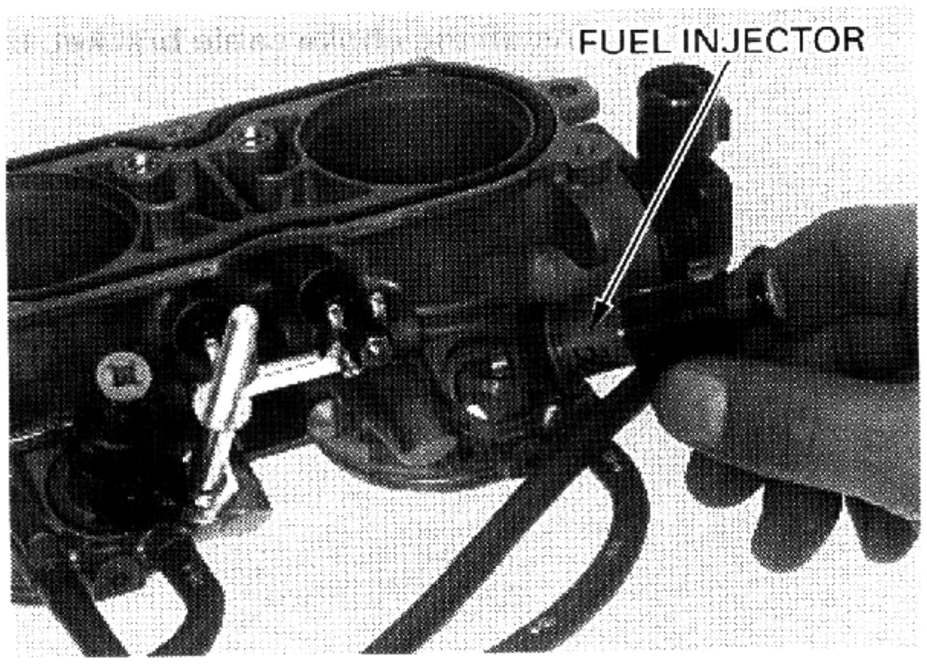
Disconnect the MAP sensor vacuum tube.
Remove the screw and MAP sensor.



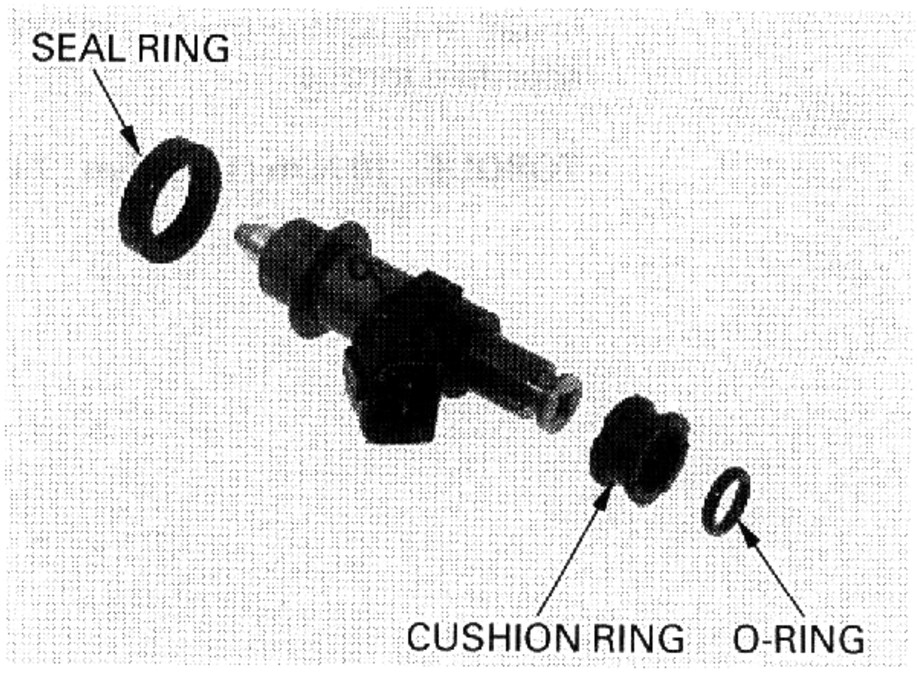
Remove the nuts and fuel pipe assembly.



Remove the injectors from the throttle body.



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



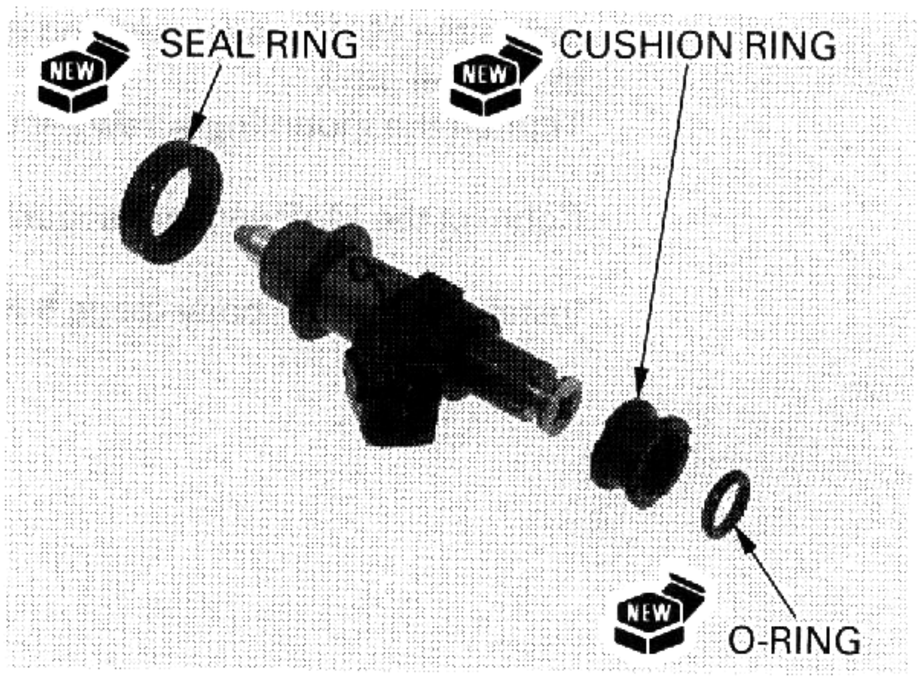
INSTALLATION

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

Apply oil to the new O-ring.
Install the new seal ring, cushion ring and O-ring.

CAUTION:

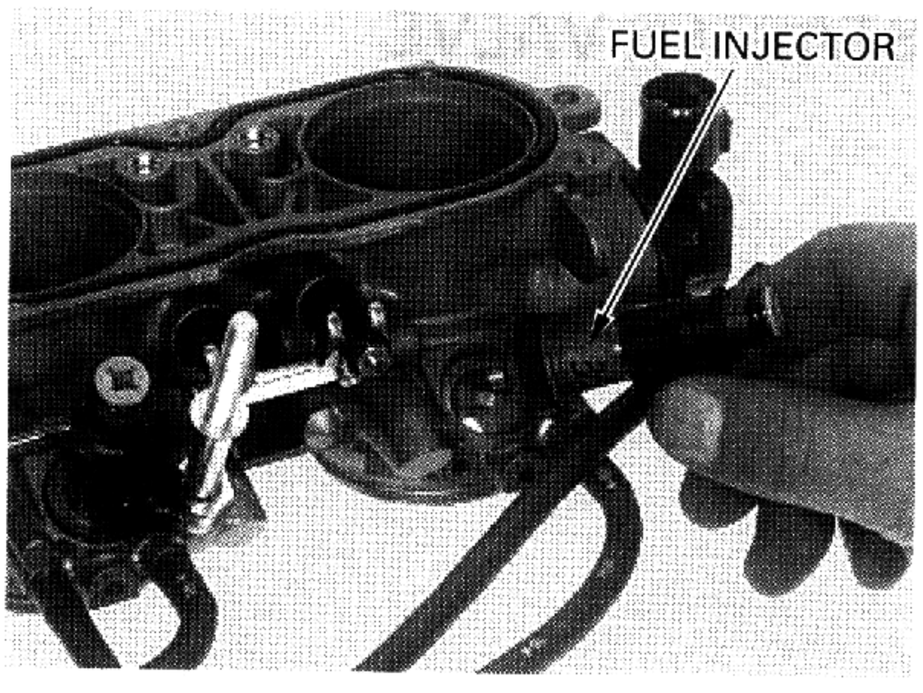
Be careful not to damage the O-ring when installing it.



Install the fuel injectors into the throttle body.

CAUTION:

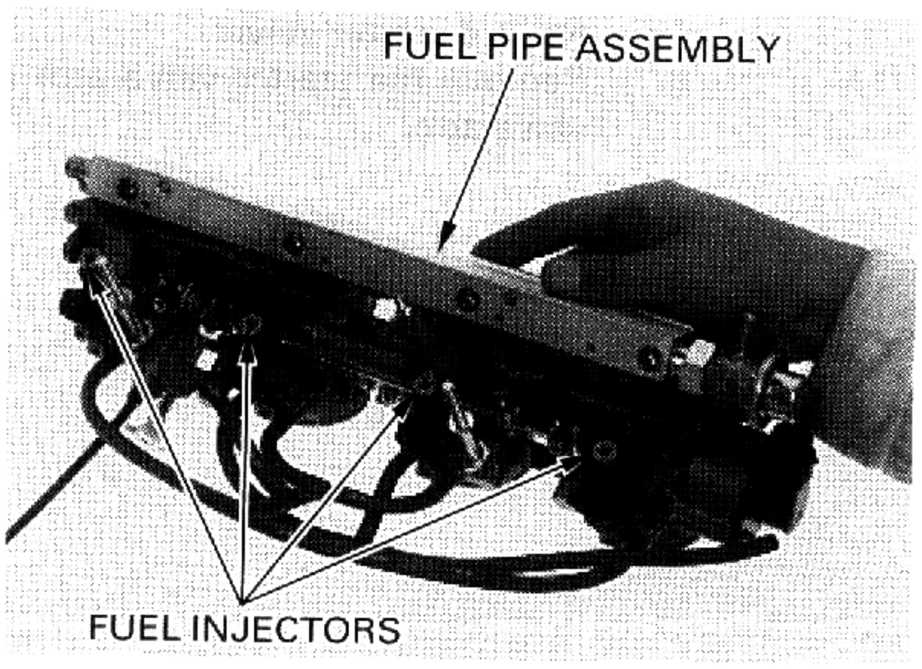
Be careful not to damage the seal ring when installing the injector into the throttle body.



Install the fuel pipe assembly over the fuel injectors.

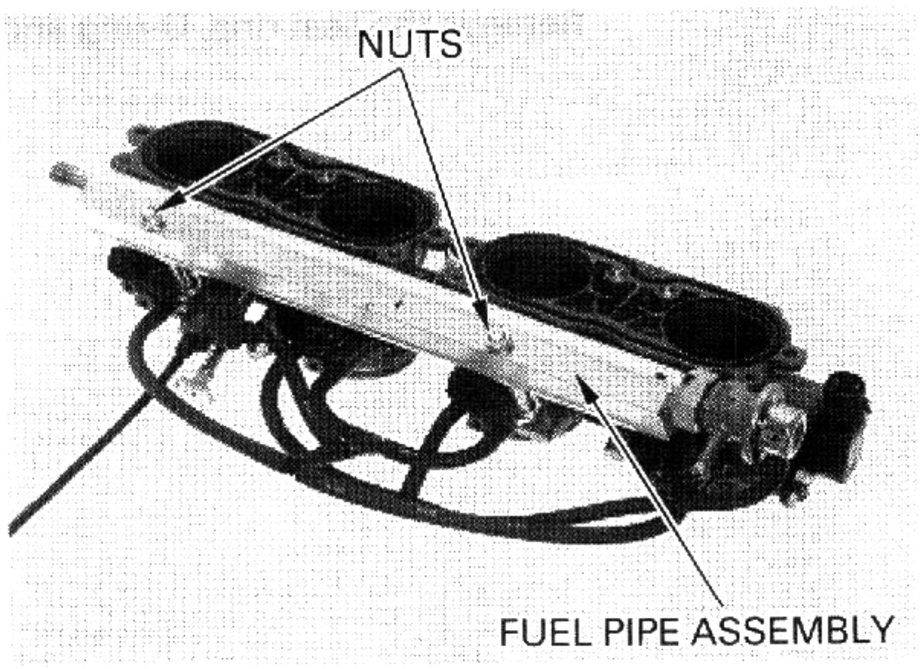
CAUTION:

Be careful not to damage the O-rings.



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

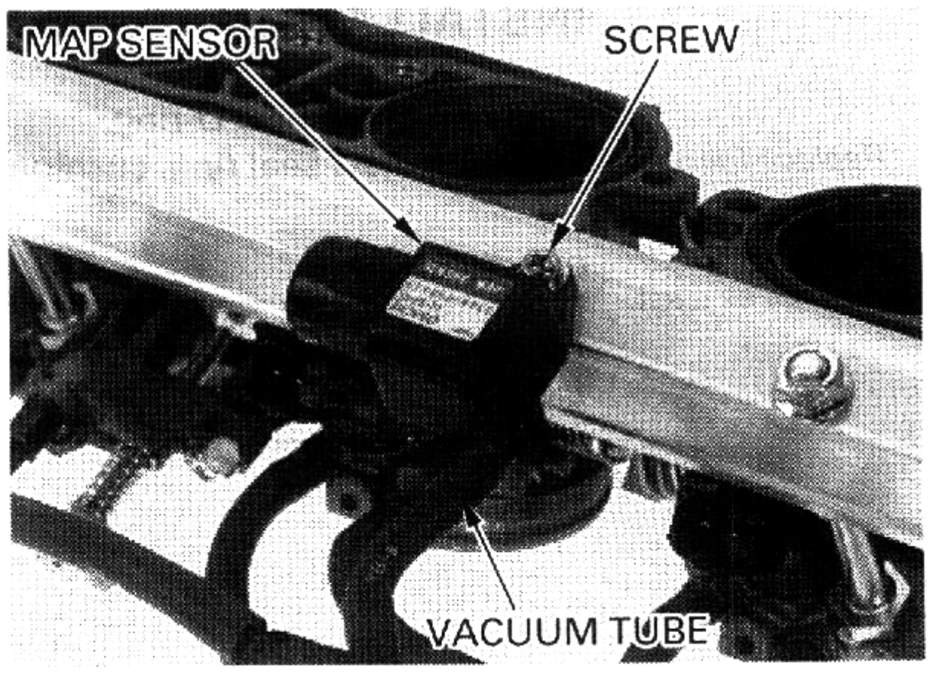
TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)



Install the MAP sensor aligning it boss with the hole in the fuel pipe.
Tighten the mounting screw securely.

Connect the MAP sensor vacuum tube.

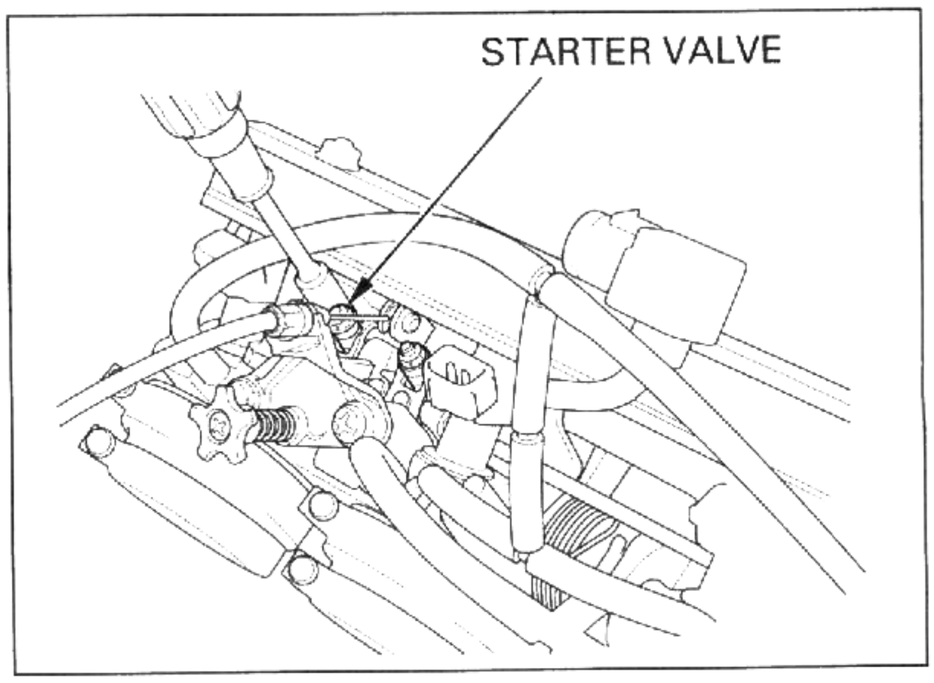
Install the throttle body (page 5-66).



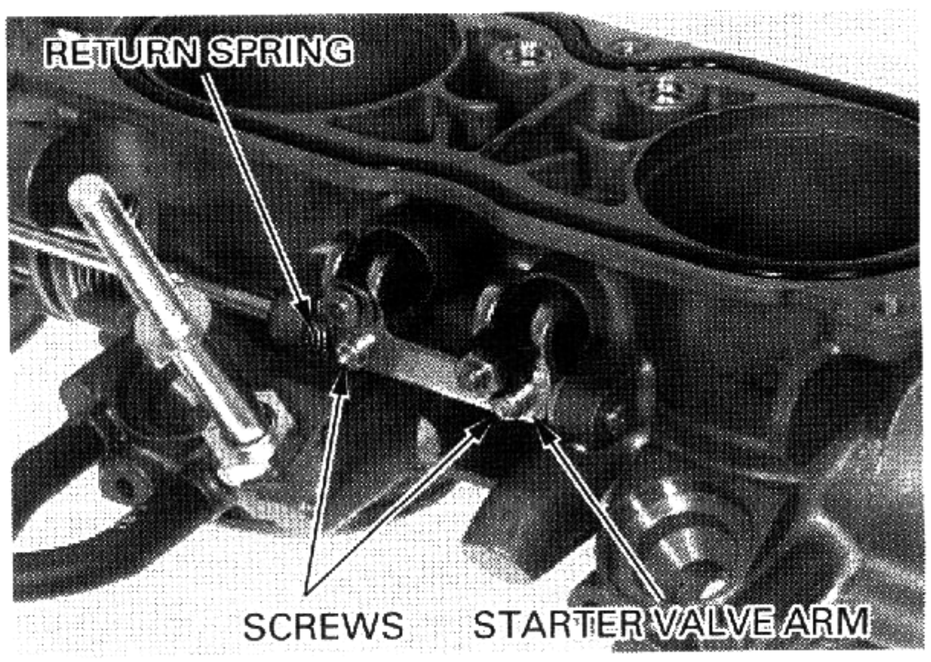
STARTER VALVE

DISASSEMBLY

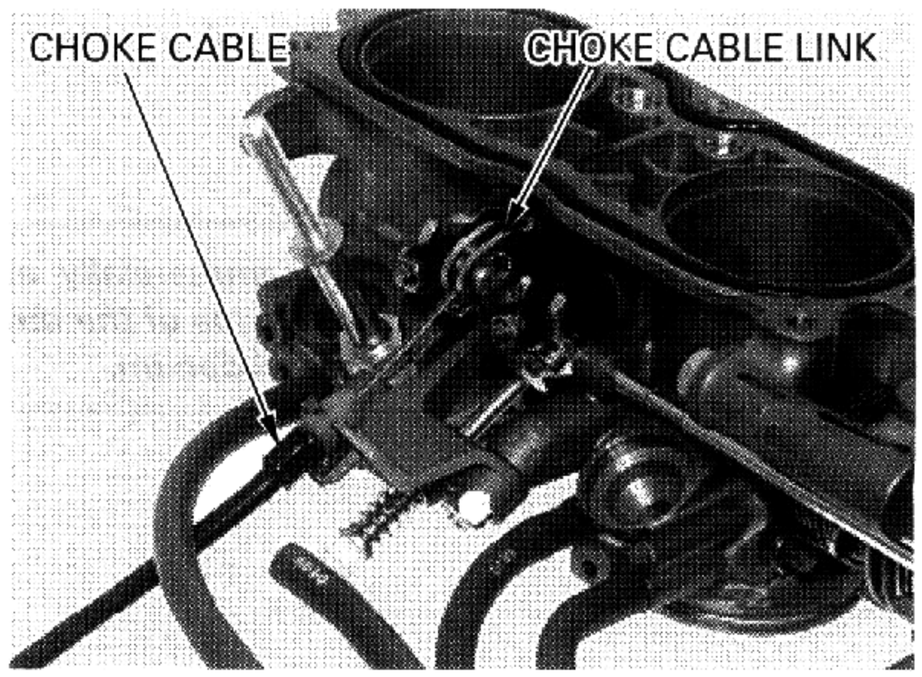
Turn each starter valve adjusting screw in, counting number of turns until it seats lightly.
Record the number of turns.



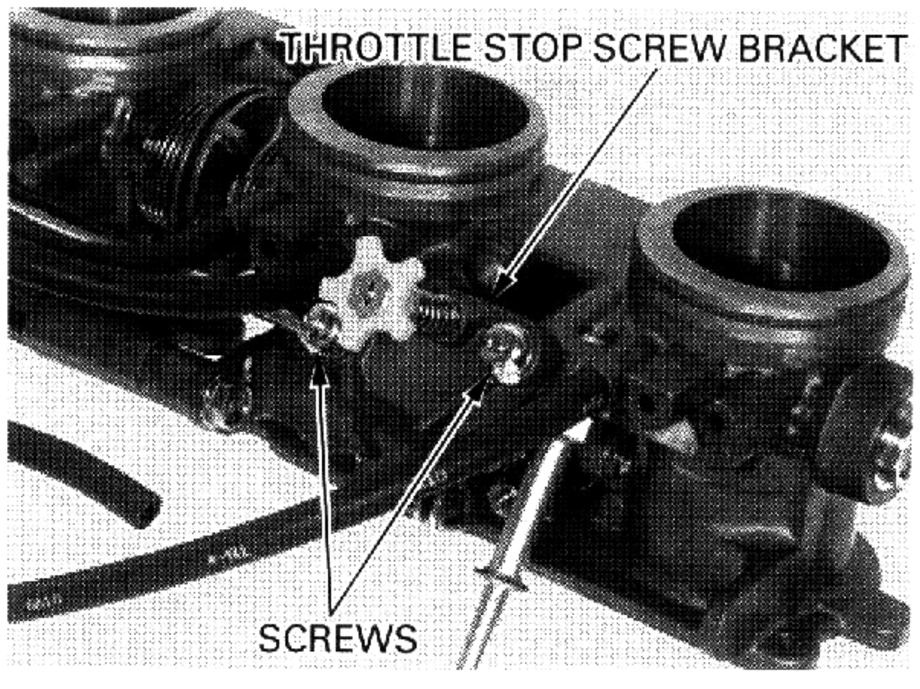
No. 3/4 starter valve:
Remove the starter valve arm screws and starter valve arm.



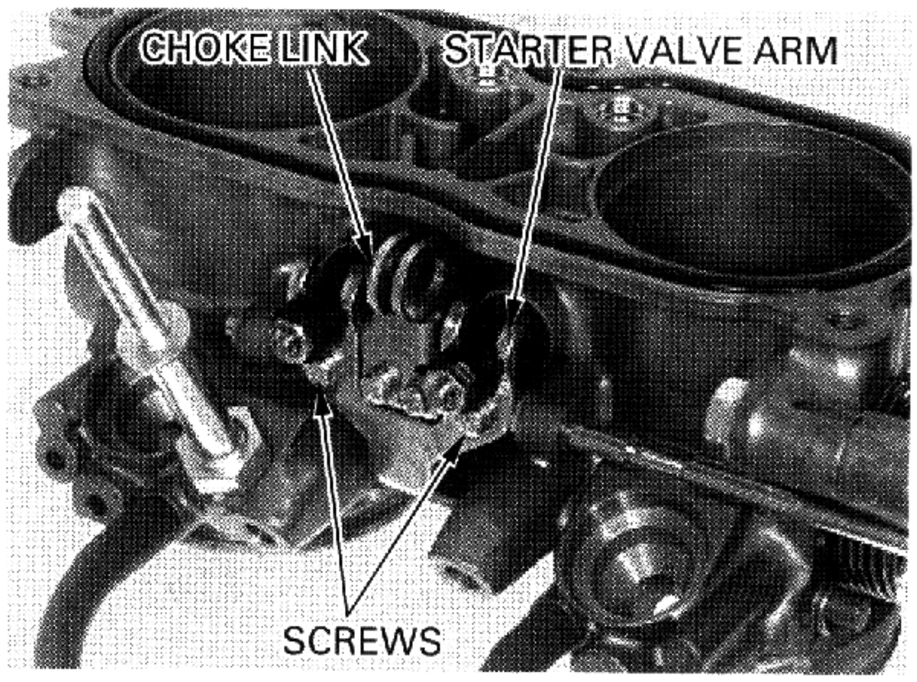
No. 1/2 starter valve:
Unhook the choke cable from the cable bracket, the remove the cable end from the link.



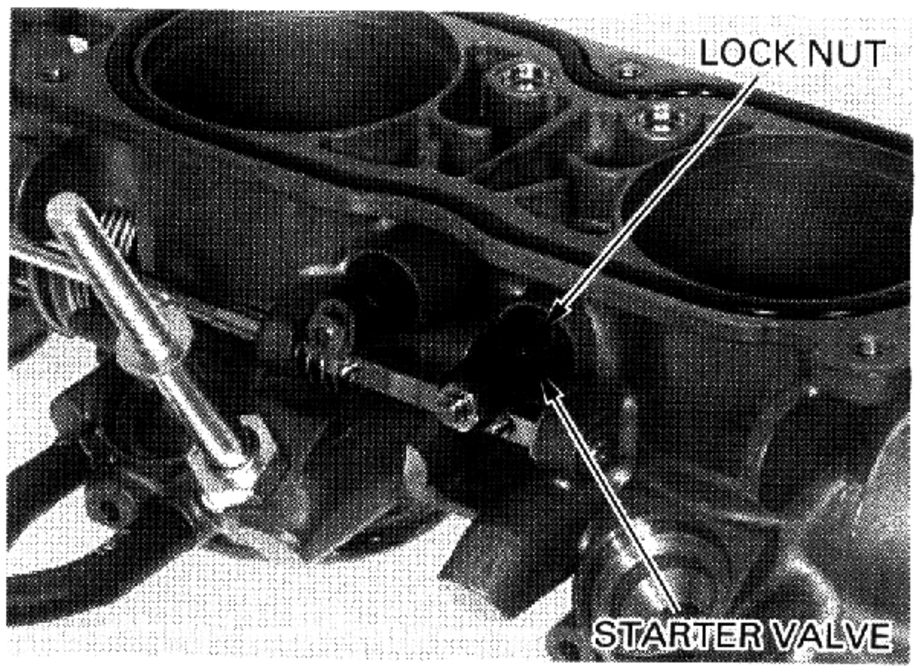
Remove the screws and throttle stop screw/choke cable bracket.



Remove the starter valve arm screws and starter valve arm.
Remove the screws and choke link.



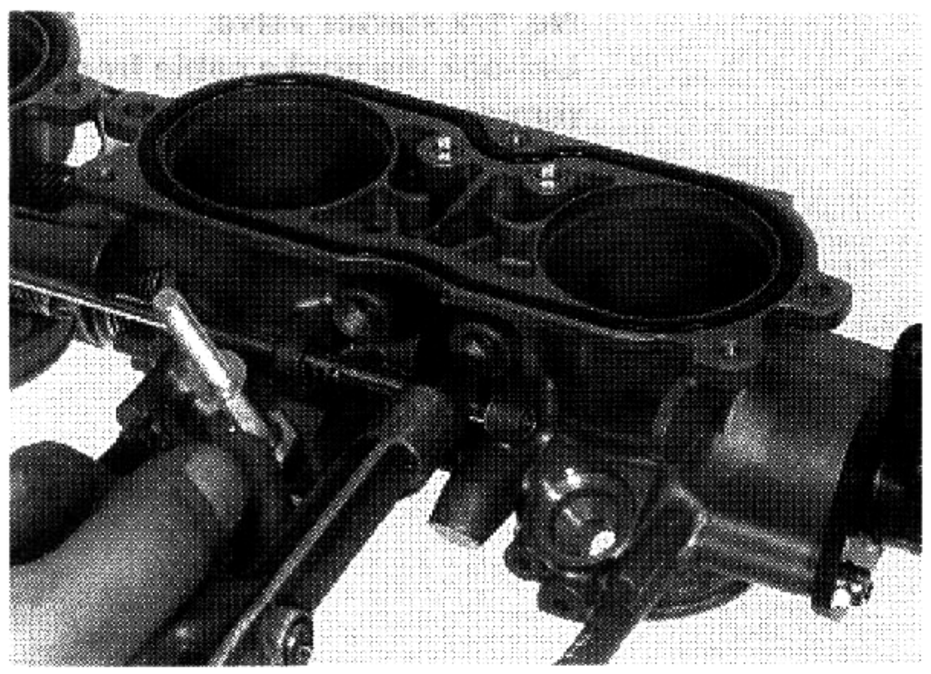
Loosen the lock nuts and remove the starter valve assembly.



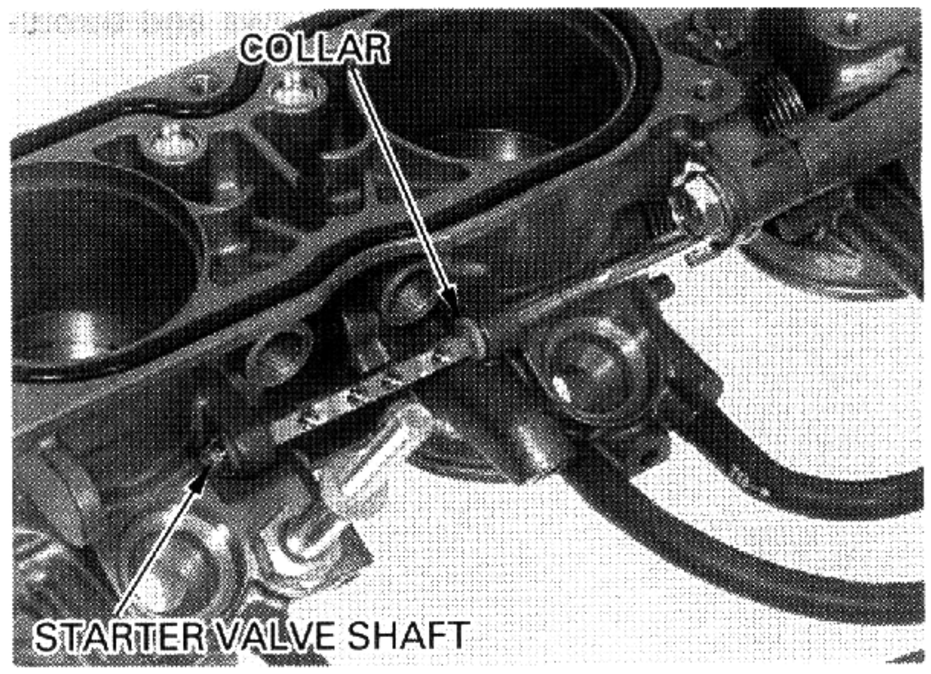
Clean the starter valve bypass using compressed air.

CAUTION:

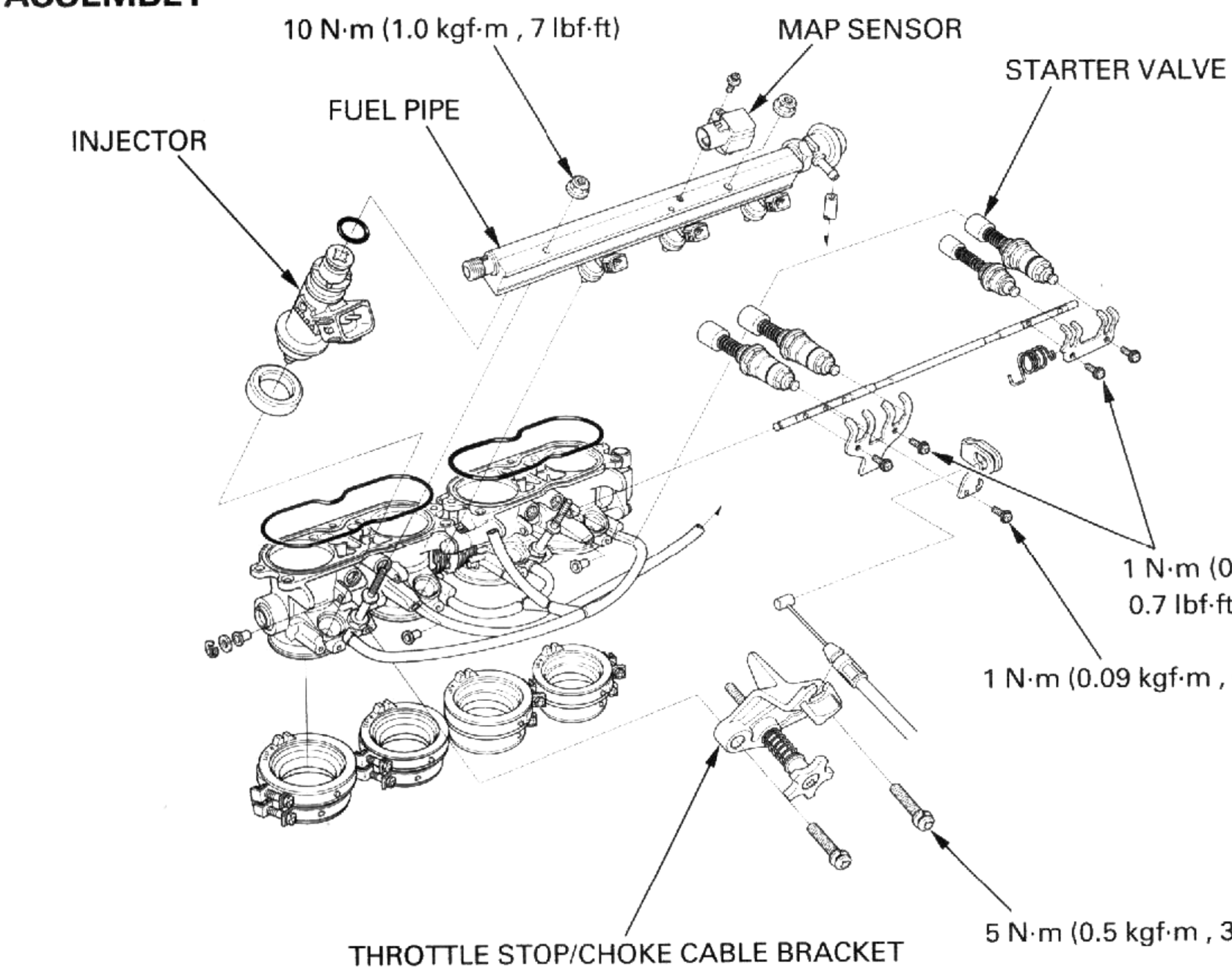
Do not apply commercially available carburetor cleaners to the inside of the throttle bore, which is coated with molybdenum.



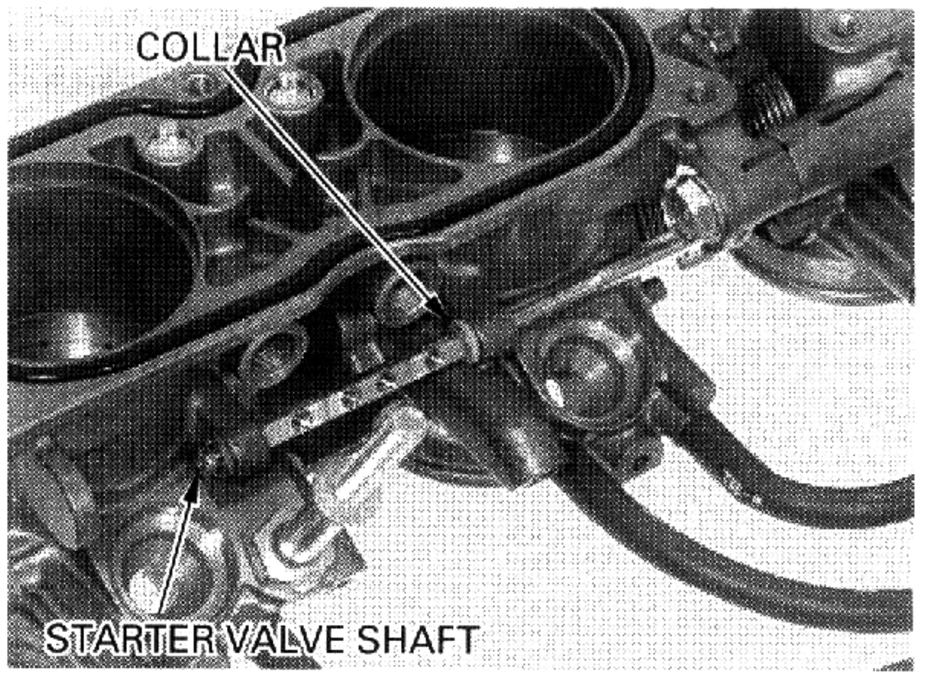
Remove the starter valve shaft, three collars and return spring.



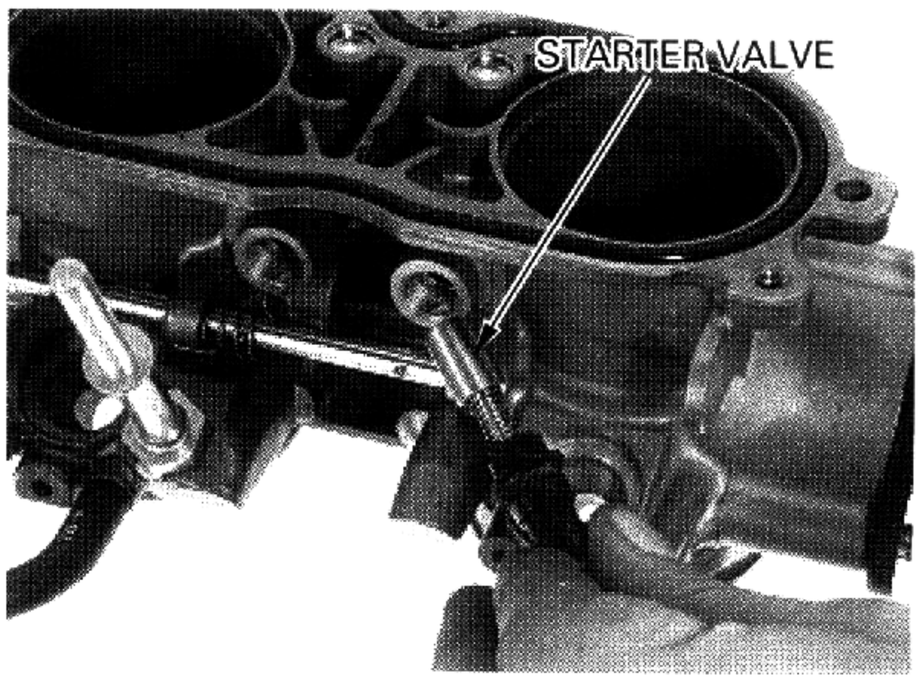
ASSEMBLY



Install the three collars, return spring and starter valve shaft.

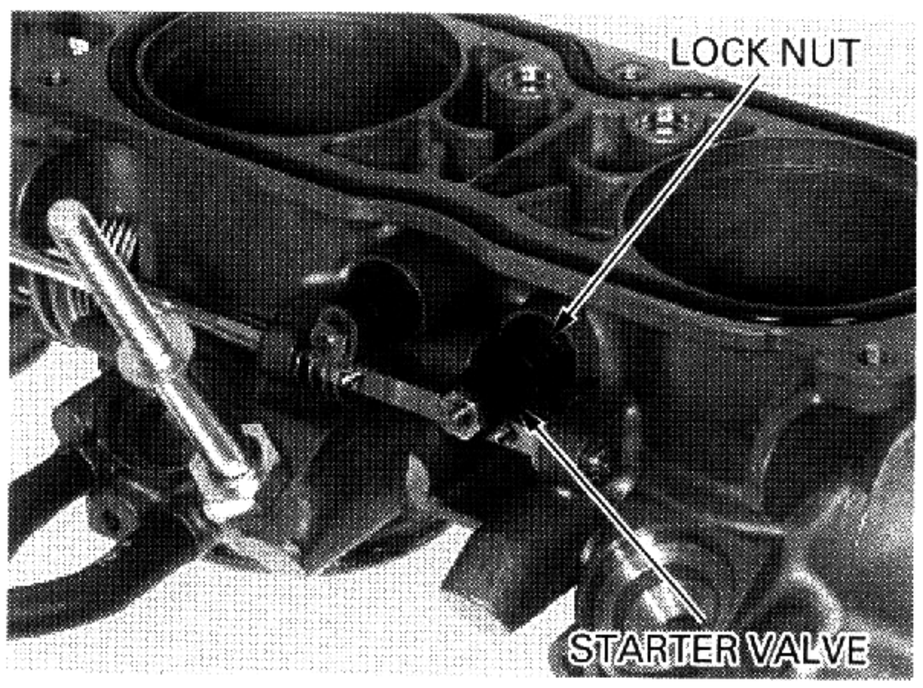


Install the starter valve assembly into the valve hole.



Tighten the starter valve lock nut to the specified torque.

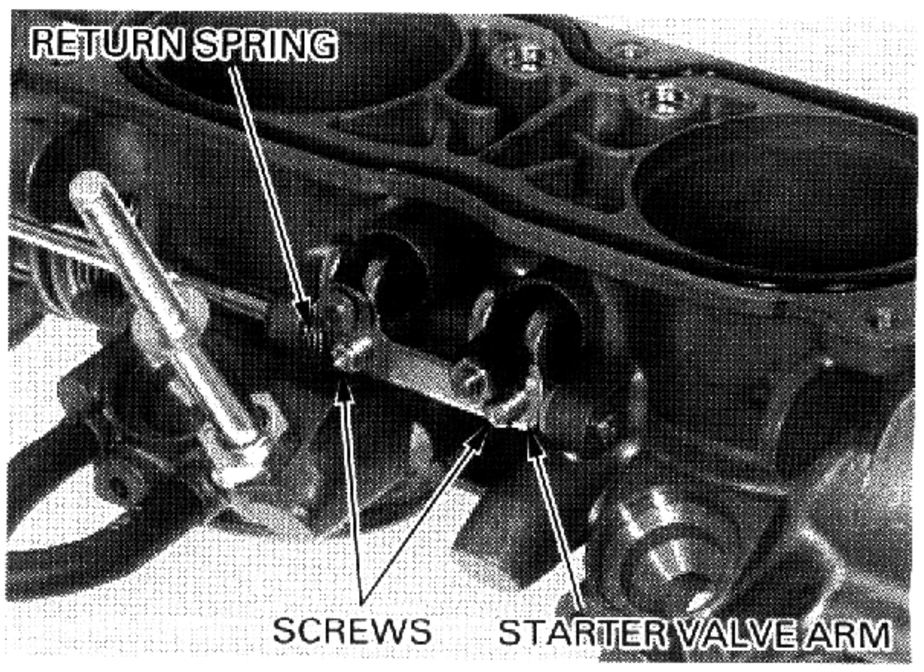
TORQUE: 2 N·m (0.18 kgf·m , 1.3 lbf·ft)



No. 3/4 starter valve:
Hook the return spring end with the No. 3/4 starter valve arm.

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

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

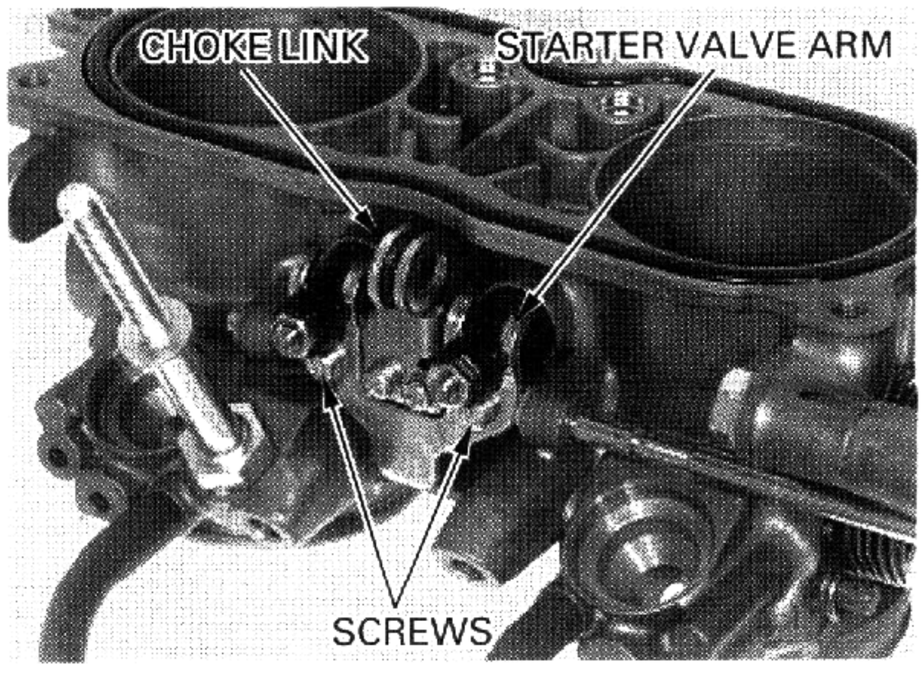


No. 1/2 starter valve:
Install and tighten the choke link bracket screws to the specified torque.

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

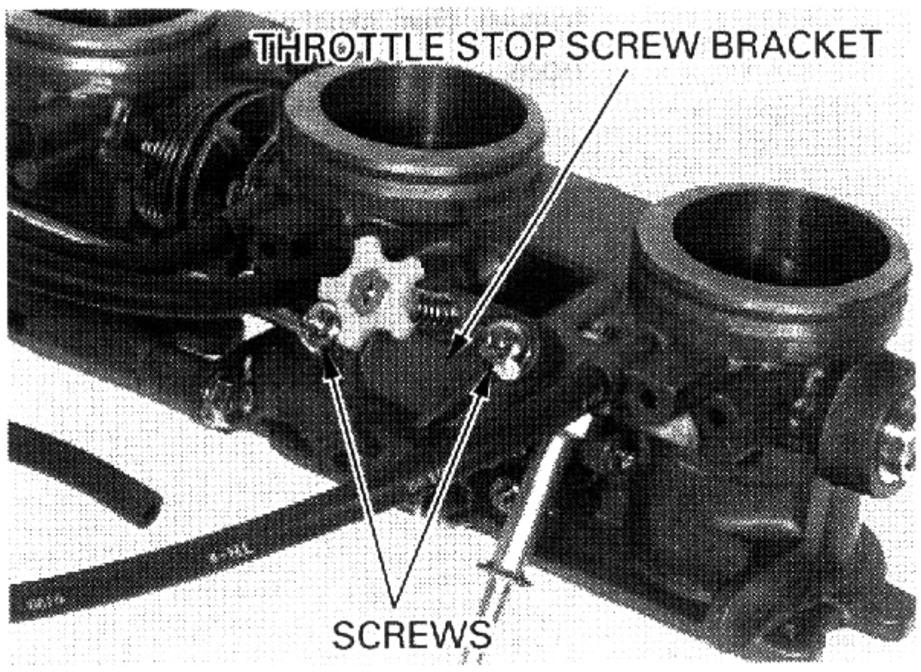
Install the starter valve arm to the starter valve. Tighten the screws to the specified torque.

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

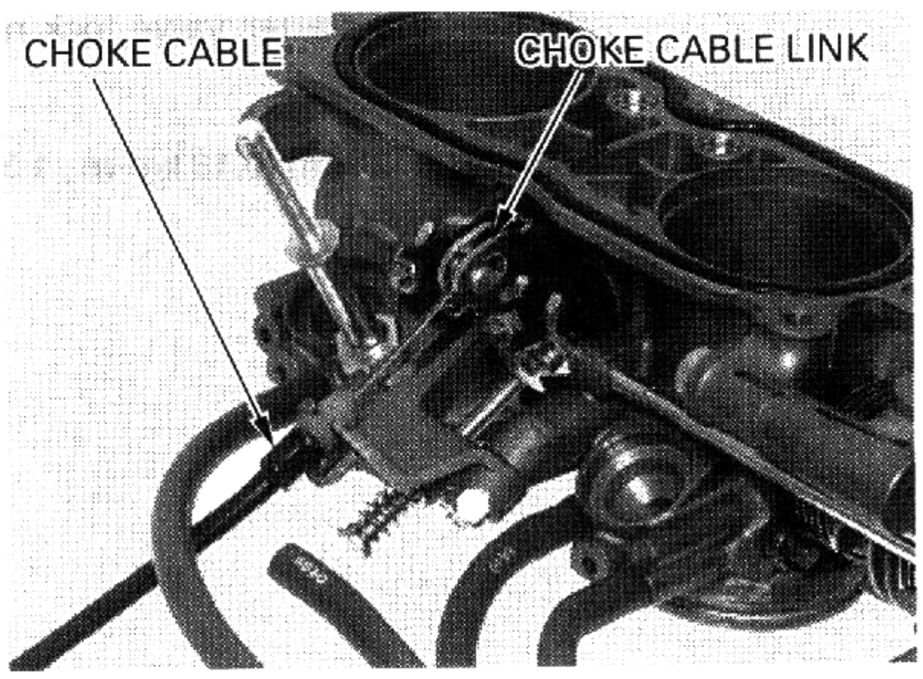


Install the throttle stop screw/choke cable bracket onto the throttle body, tighten the screws to the specified torque.

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

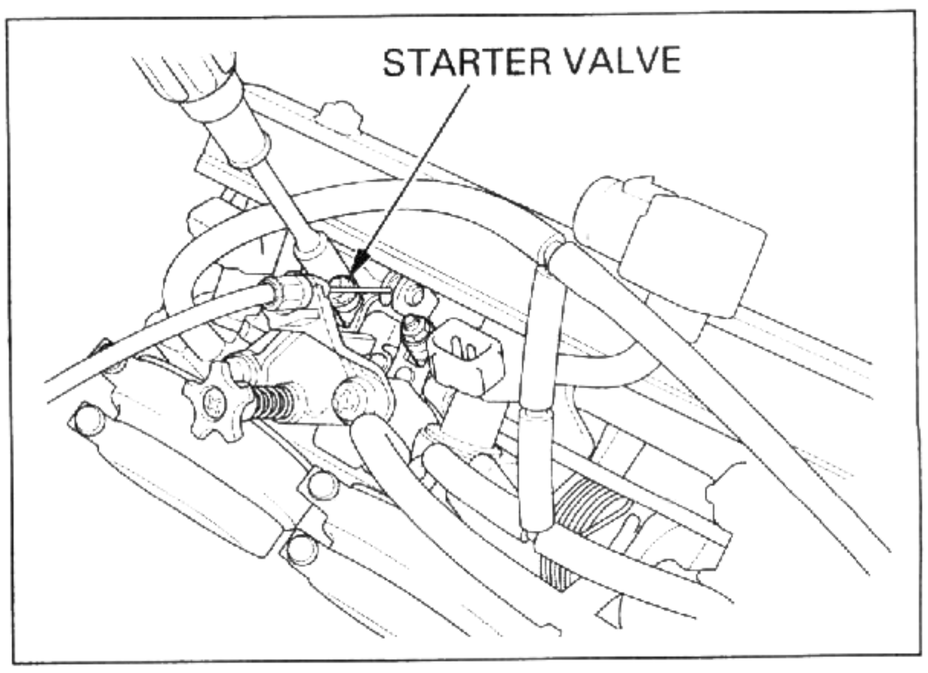


Install the choke cable end to the choke link, then hook the choke cable to the cable bracket.



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

Install the throttle body (page 5-63).



STARTER VALVE SYNCHRONIZATION

⚠WARNING

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

NOTE:

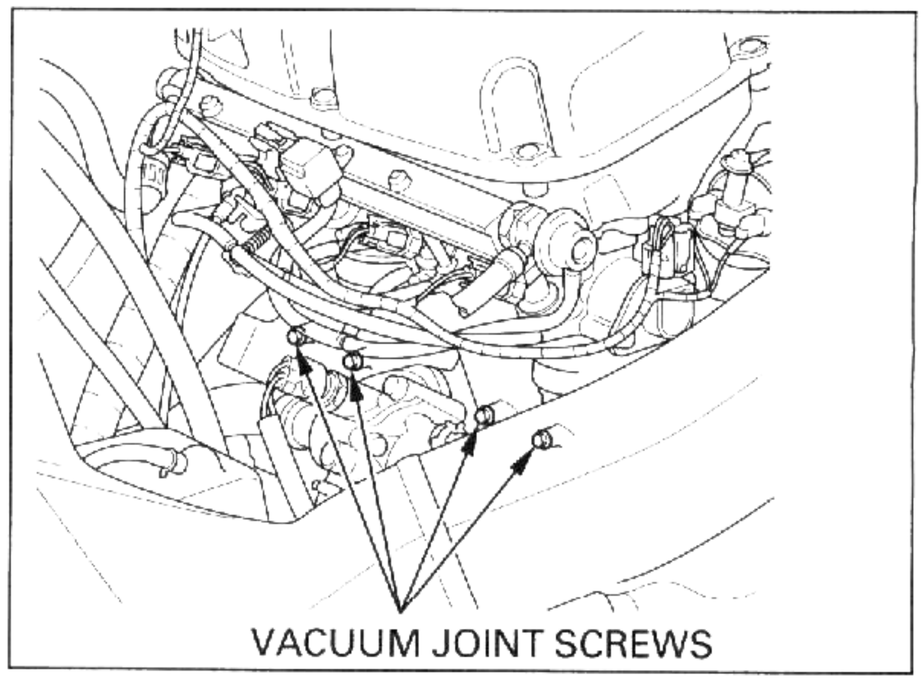
- Synchronize the starter valve with the engine at the normal operating temperature and with the transmission in neutral.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate 50 rpm change.

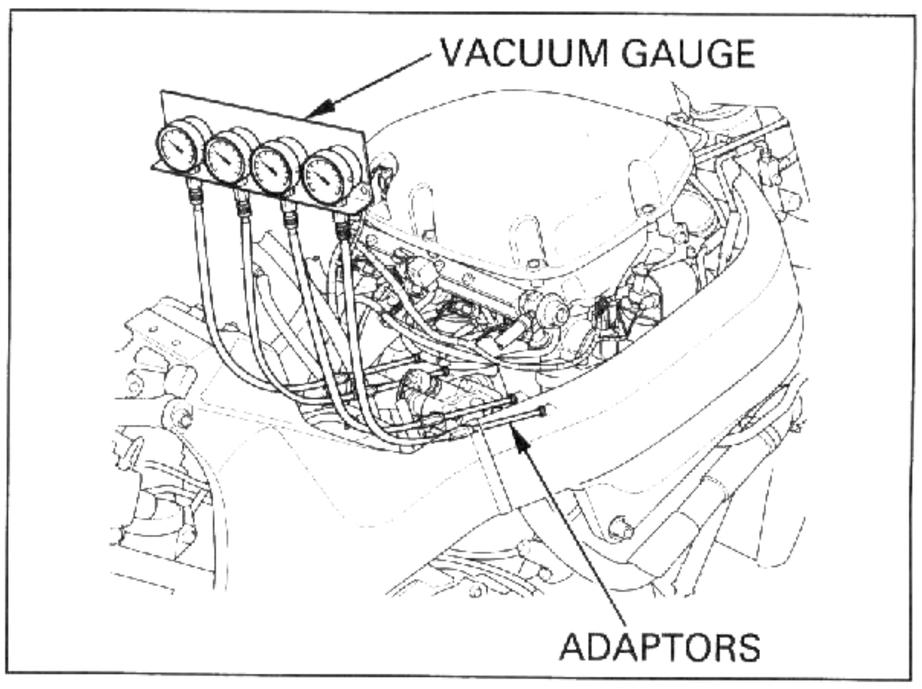
Support the rear end of the fuel tank (page 2-11).

Remove the vacuum joint screws.

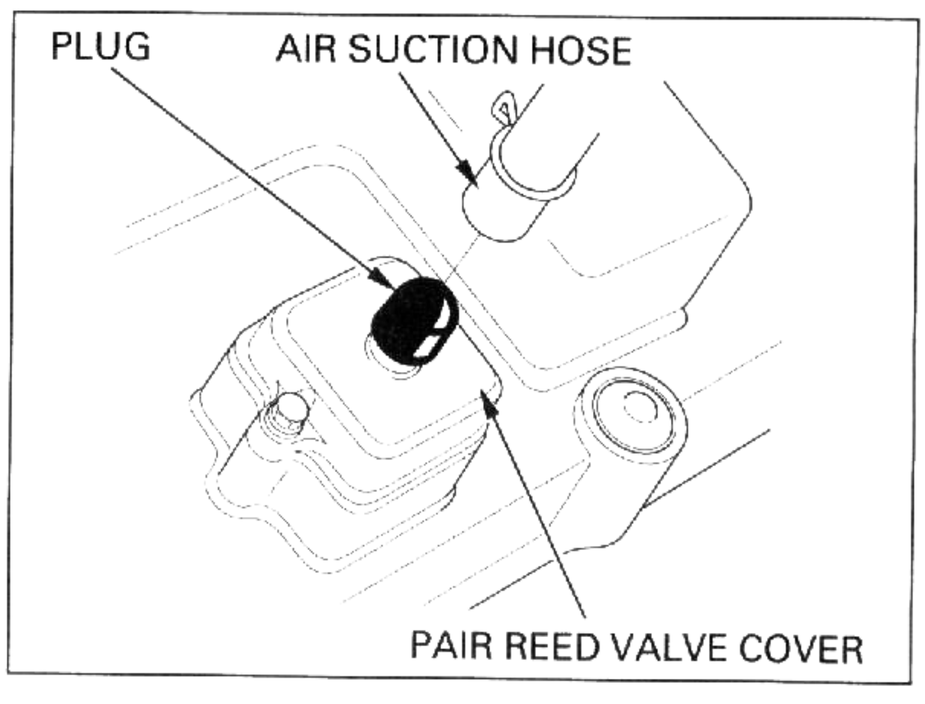
Connect the vacuum gauge adaptors to the vacuum joints, then connect the tubes to the vacuum gauge.

Connect the tachometer.





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



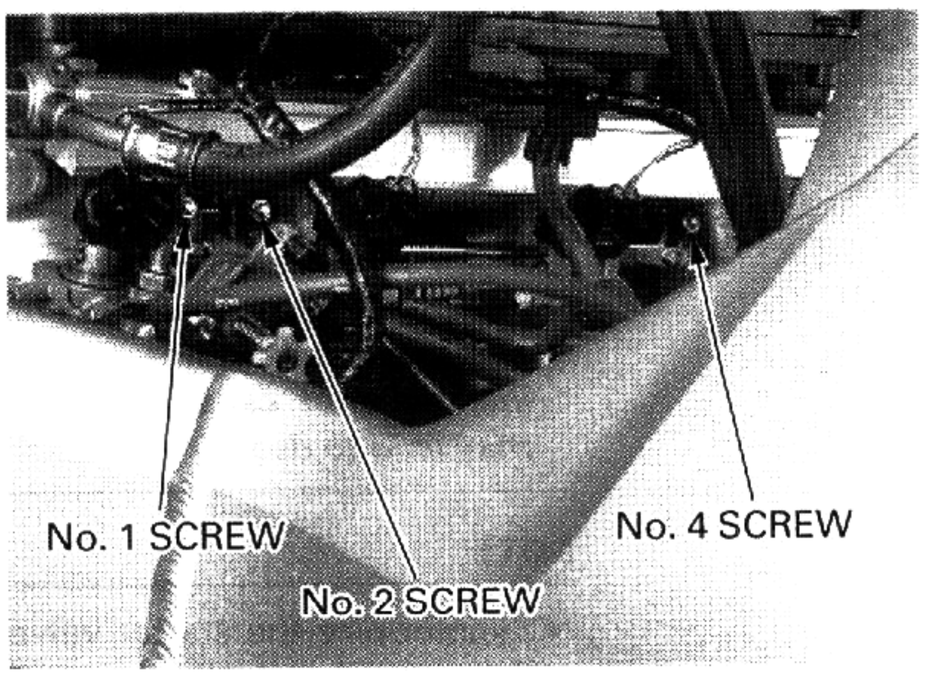
Start the engine and adjust the idle speed.

IDLE SPEED: 1,100 ± 100 min^{-1} (rpm)

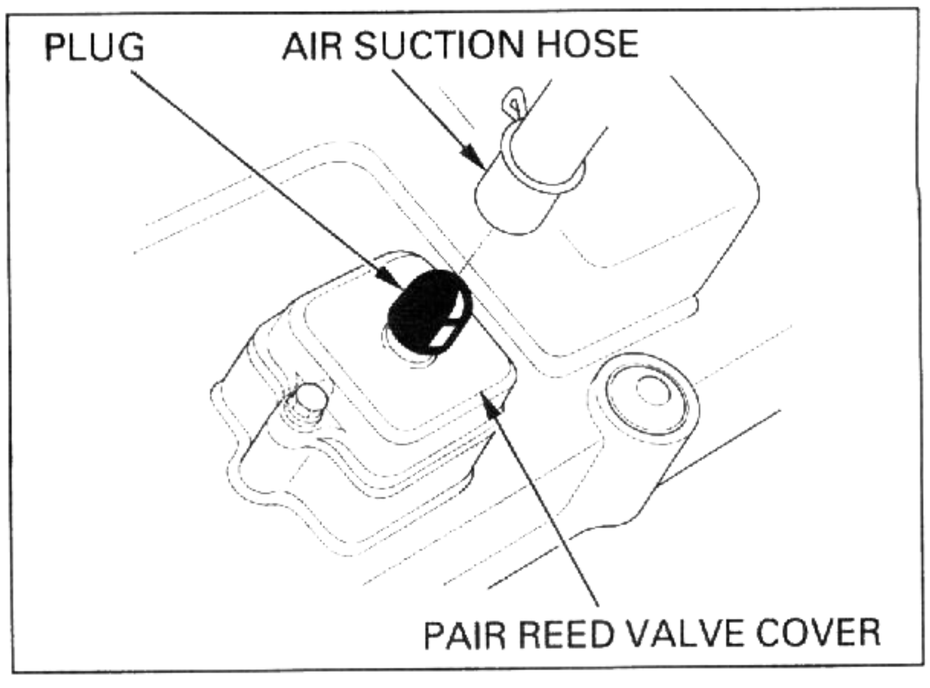


The No. 3 starter valve cannot be adjusted, it is the base starter valve.

Adjust each intake vacuum pressure with the No. 3 cylinder.

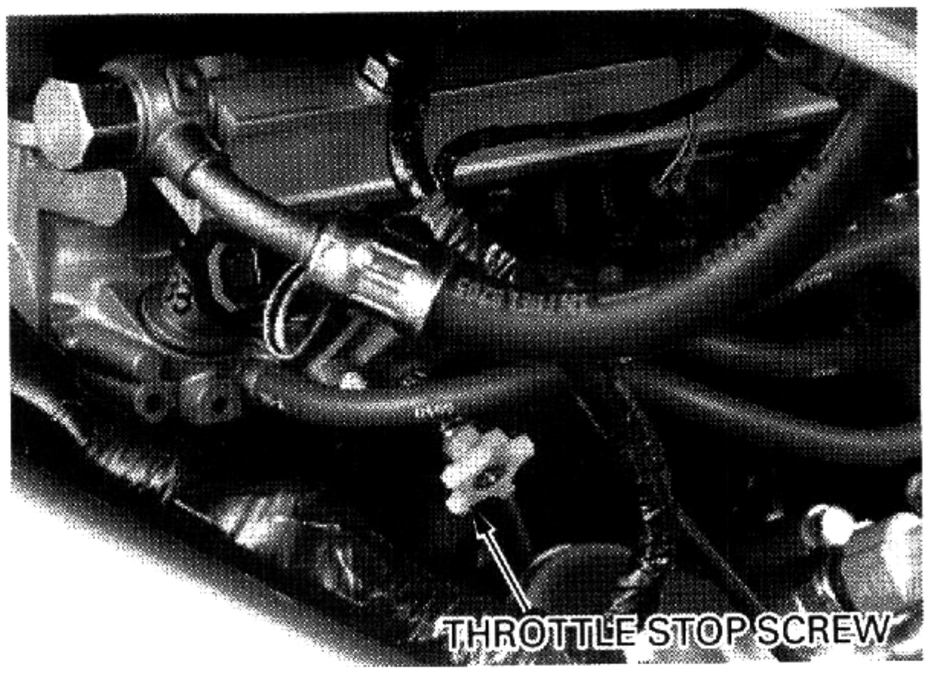


Remove the plugs and connect the PAIR air suction hoses to the reed valve covers.

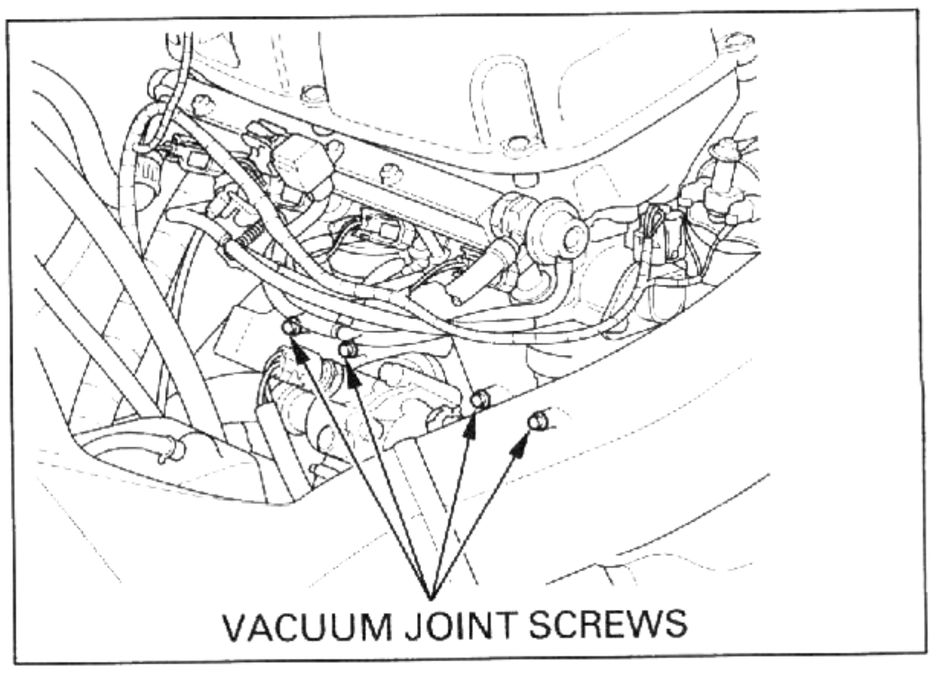


Adjust the idle speed if the idle speed differs from the specified speed.

IDLE SPEED: 1,100 ± 100 min^{-1} (rpm)



Remove the vacuum gauge and adaptors.
Install and tighten the intake port vacuum joint screws.



MAP SENSOR

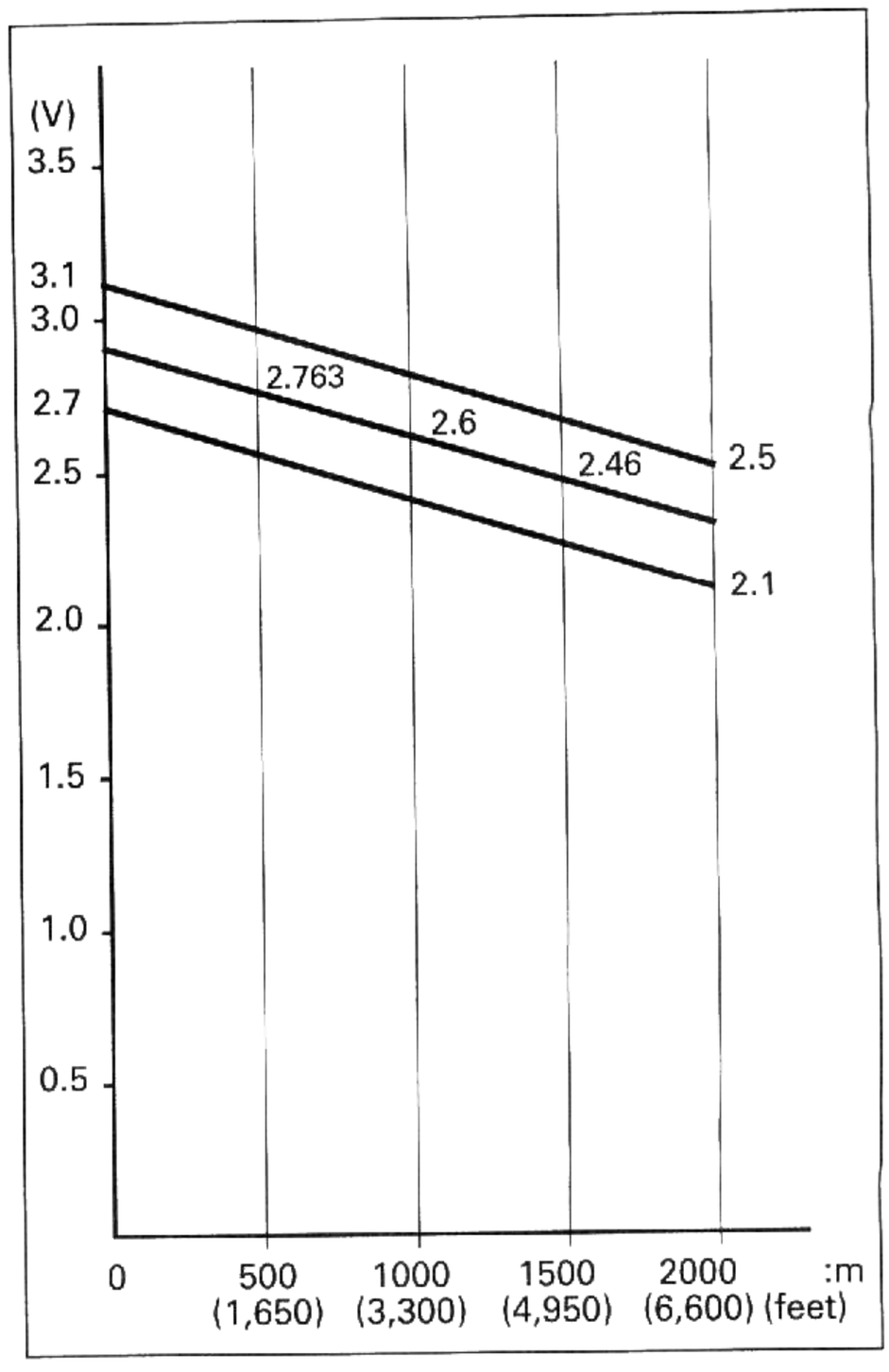
OUTPUT VOLTAGE INSPECTION

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

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

CONNECTION: No. 37 (+)—No. 22 (—)
STANDARD: 2.7—3.1 V

The MAP sensor output voltage (above) is measured under the standard atmosphere (1 atm = 1,030 hPa).
The MAP sensor output voltage is affected by the distance above sea level, because the output voltage is changed by atmosphere.
Check the sea level measurement and be sure that the measured voltage falls within the specified value.



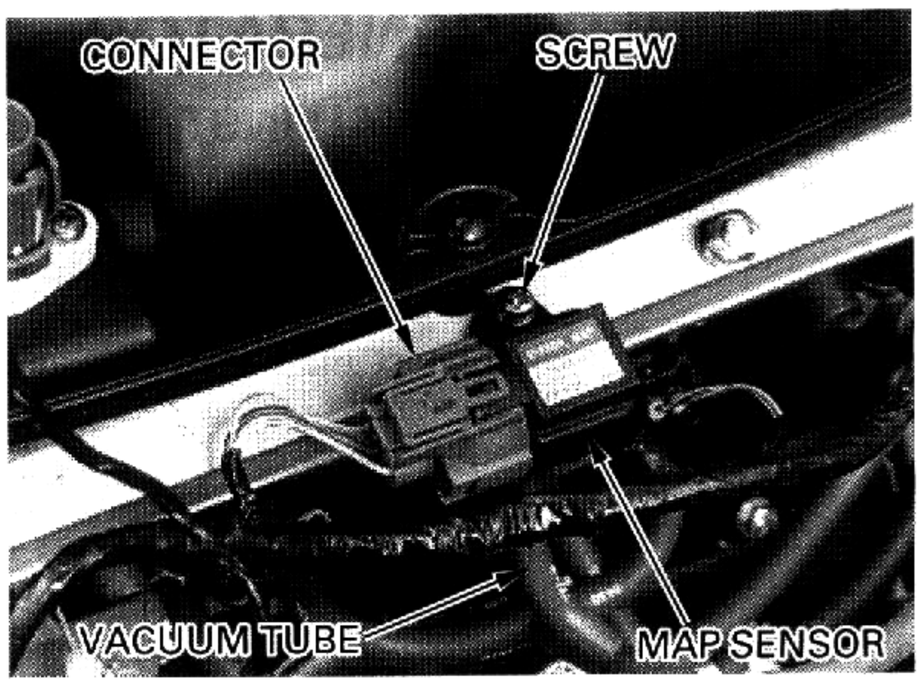
MAP SENSOR REMOVAL/ INSTALLATION

Support the front end of the fuel tank (page 3-5).

Disconnect the MAP sensor connector.
Disconnect the vacuum tube.
Remove the screw and MAP sensor from the throttle body.

Installation is in the reverse order of removal.
NOTE:

Align the MAP sensor boss with the hole in the fuel pipe.



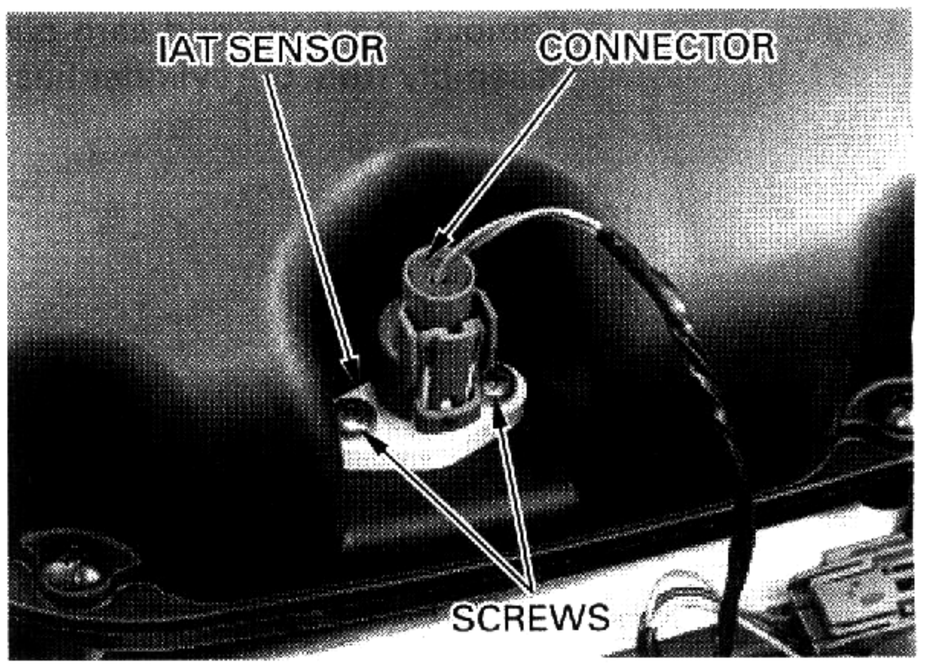
IAT SENSOR

REMOVAL/INSTALLATION

Support the front end of the fuel tank (page 3-5).

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

Installation is in the reverse order of removal.



ECT SENSOR

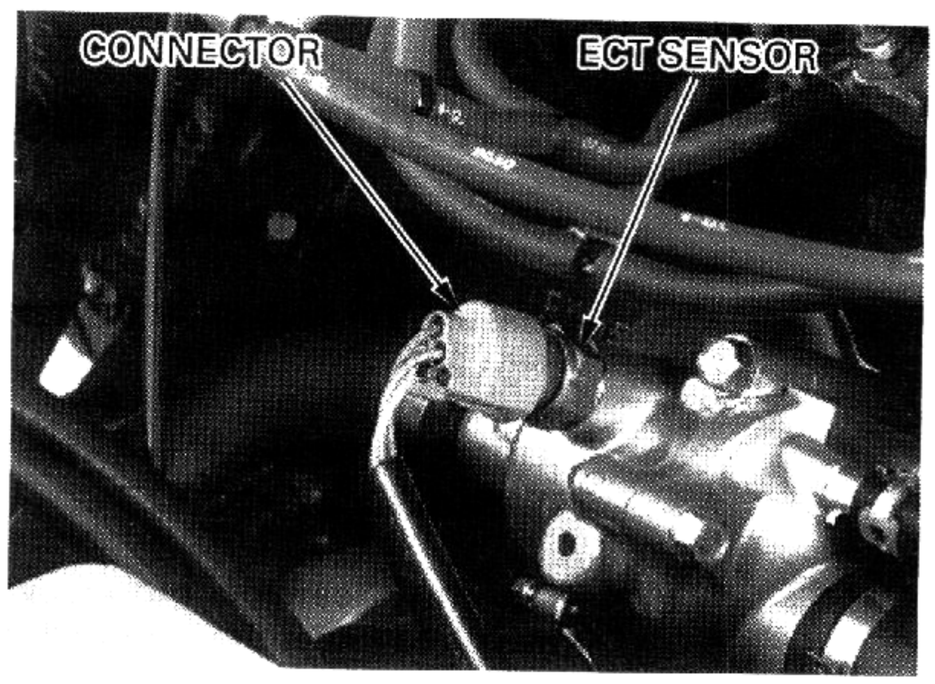
REMOVAL/INSTALLATION

NOTE:

Replace the ECT sensor while the engine is cold.

Drain the coolant from the system (page 6-5).
Support the front end of the fuel tank (page 3-5).

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

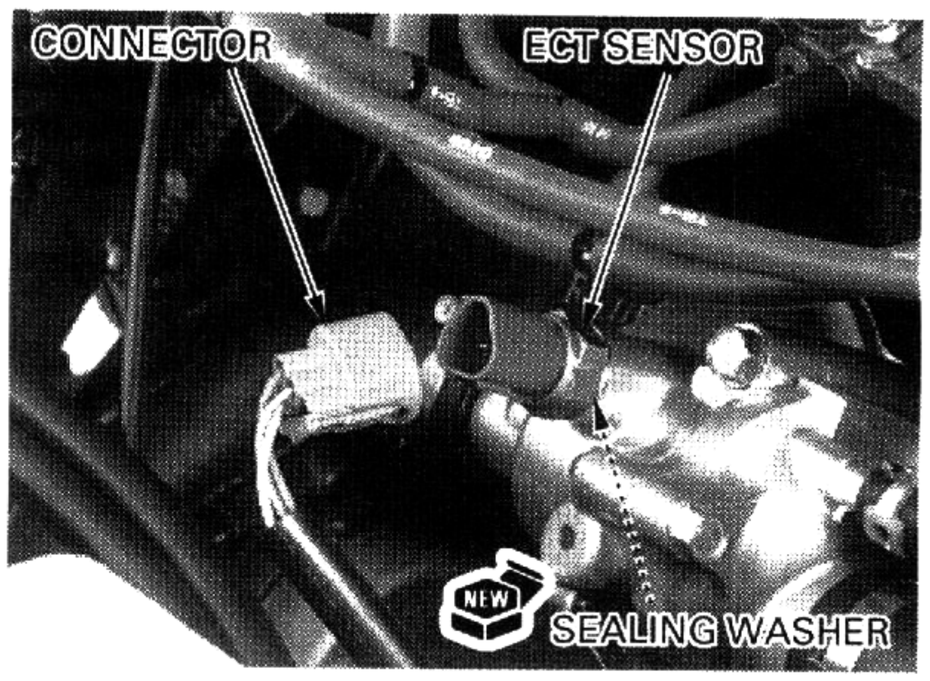


Always replace a sealing washer with a new one.

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

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

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

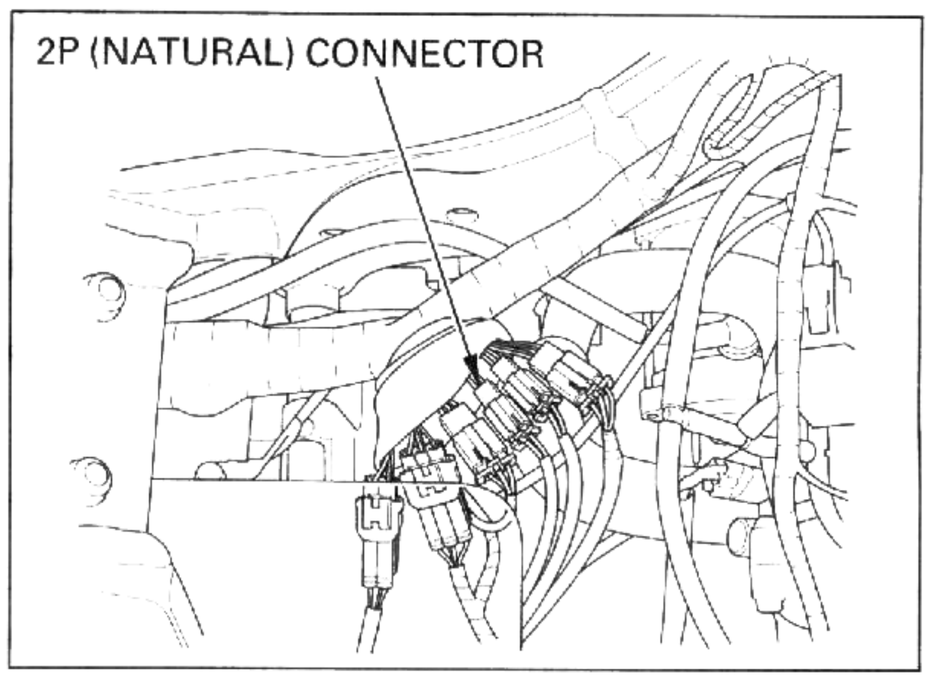


CAM PULSE GENERATOR

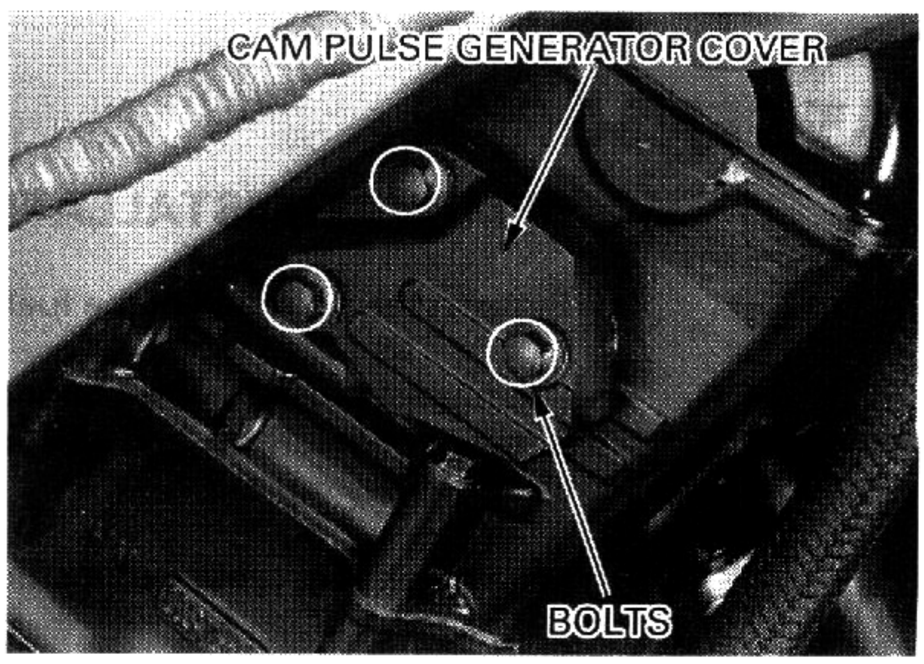
REMOVAL/INSTALLATION

Support the rear end of the fuel tank (page 5-51).
Remove the radiator grill (page 2-4).

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

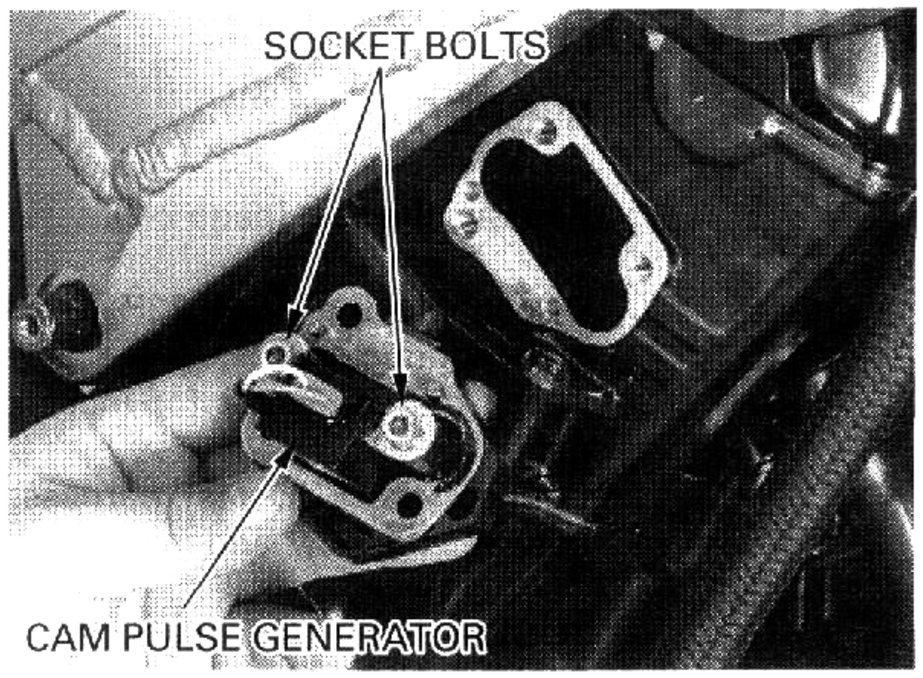


Remove the bolts and cam pulse generator cover assembly from the cylinder head.

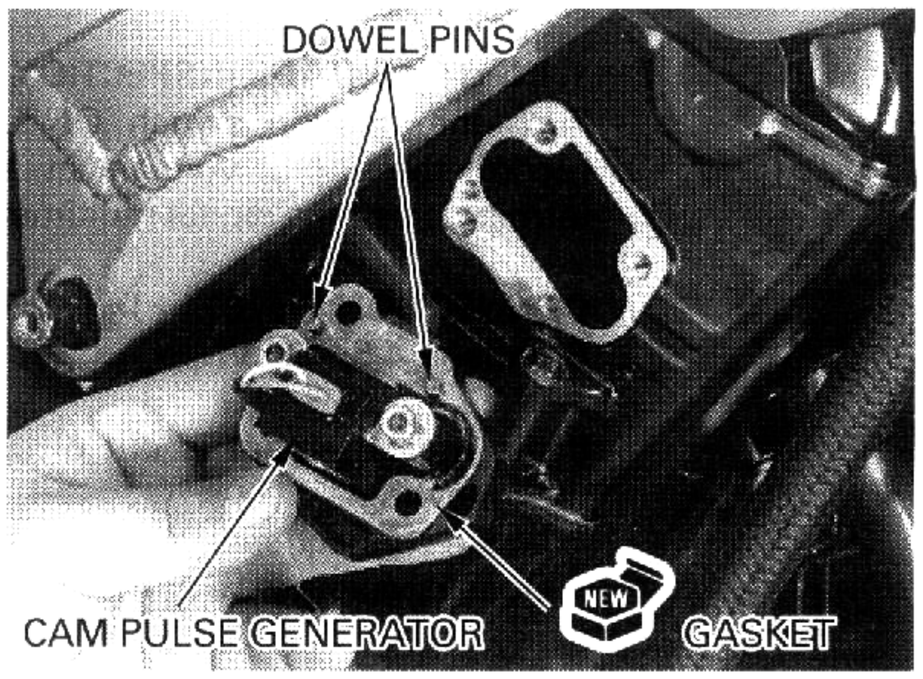


Remove the gasket.
Remove the socket bolts and cam pulse generator from the cover.

Apply sealant to the cam pulse generator wire grommet.
Install the cam pulse generator onto the cam pulse generator cover and tighten the two socket bolts.

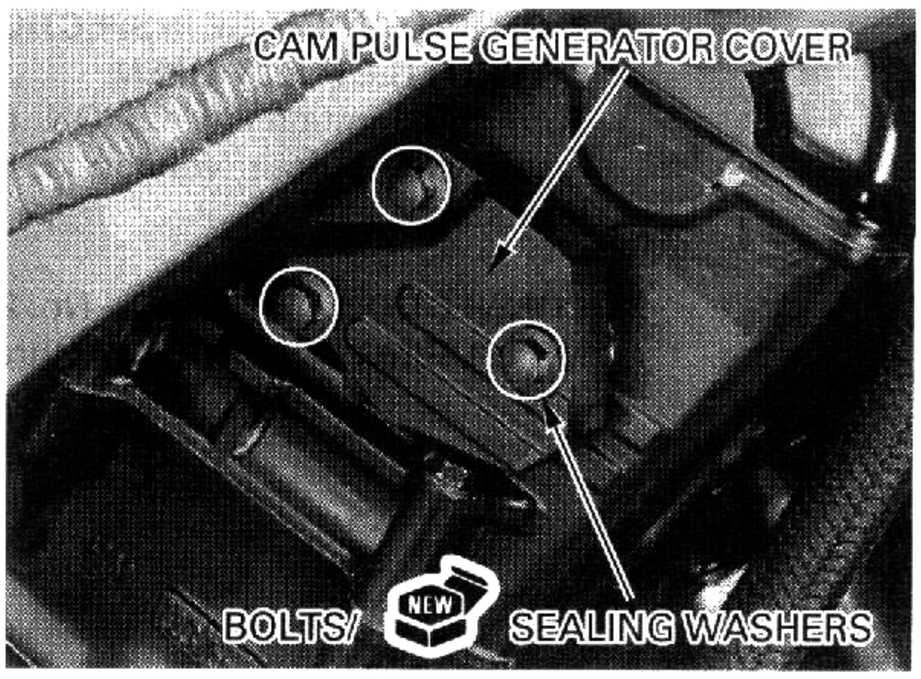


Install the new gasket onto the cam pulse generator cover.
Install the cam pulse generator cover assembly onto the cylinder head aligning the dowel pins with the holes in the cylinder head.



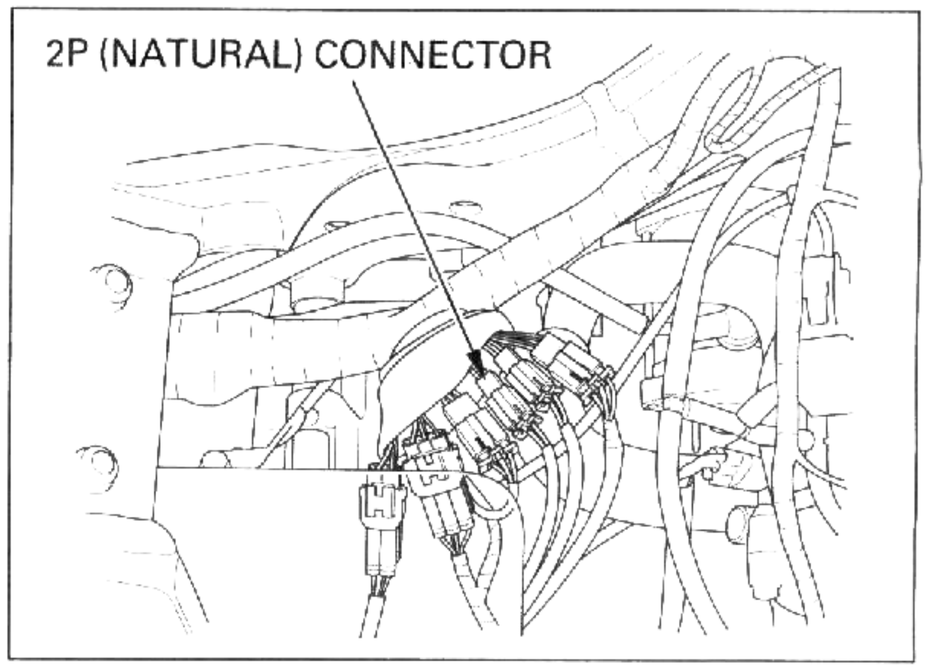
Install the new sealing washers and bolts, then tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



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

Install the removed parts in the reverse order of removal.

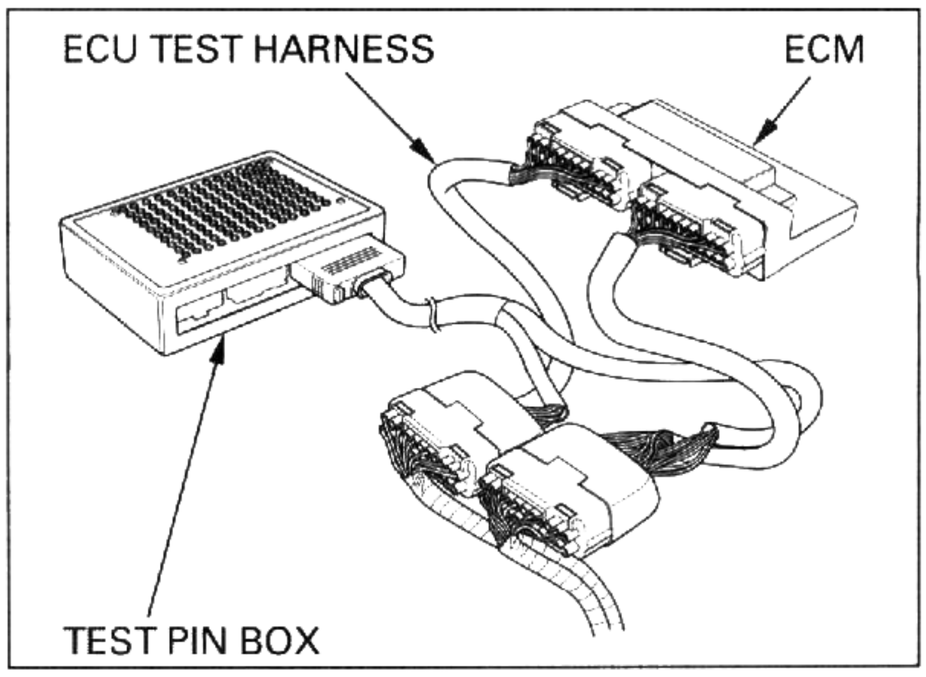


TP SENSOR

INSPECTION

Remove the seat (page 2-2).

Disconnect the ECM 22P (Black) and 22P (Light gray) connectors.
Check the connector for loose or corroded terminals.
Connect the ECU test harness and test pin box between the ECM and main wire harness.



TOOLS:

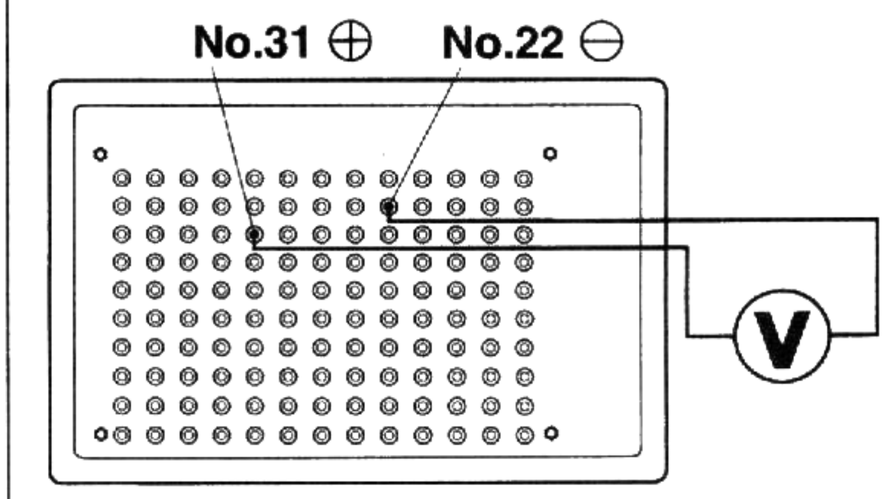
ECU test harness	07WMZ-MBG0100
Test pin box	07WGZ-0010100

1. INPUT VOLTAGE INSPECTION

Turn the ignition switch ON and measure and record the input voltage at the test pin box terminals using a digital multimeter.

CONNECTION: No. 31 (+)—No. 22 (—)
Standard: 4.5—5.5 V

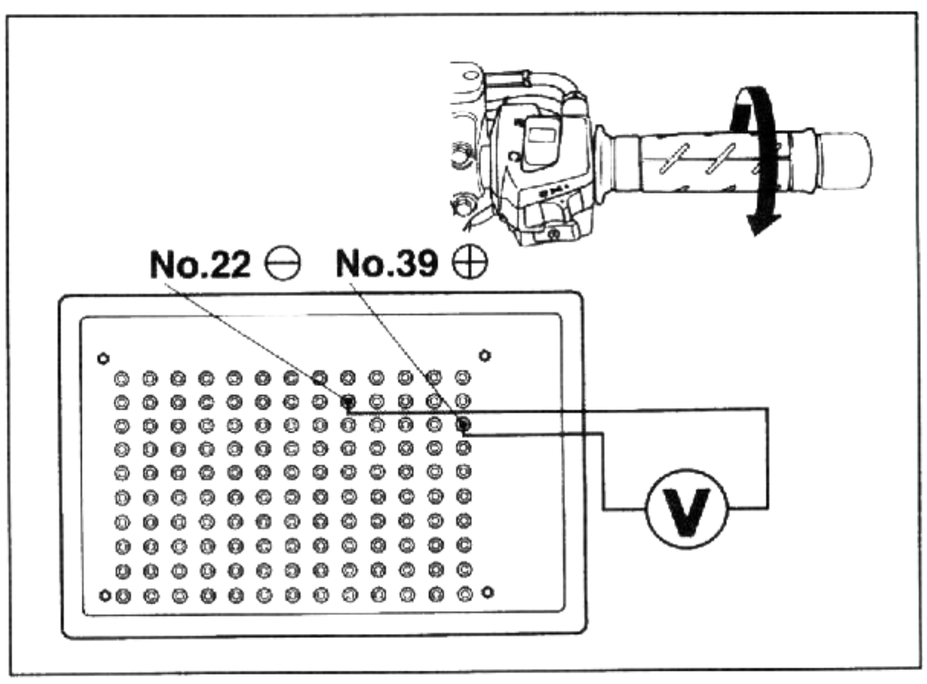
If the measurement is out of specification, check the following:
—Loose connection of the ECM multi-connector
—Open circuit in wire harness



2. OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY OPEN

Turn the ignition switch ON and measure and record the output voltage at the test pin box terminals.

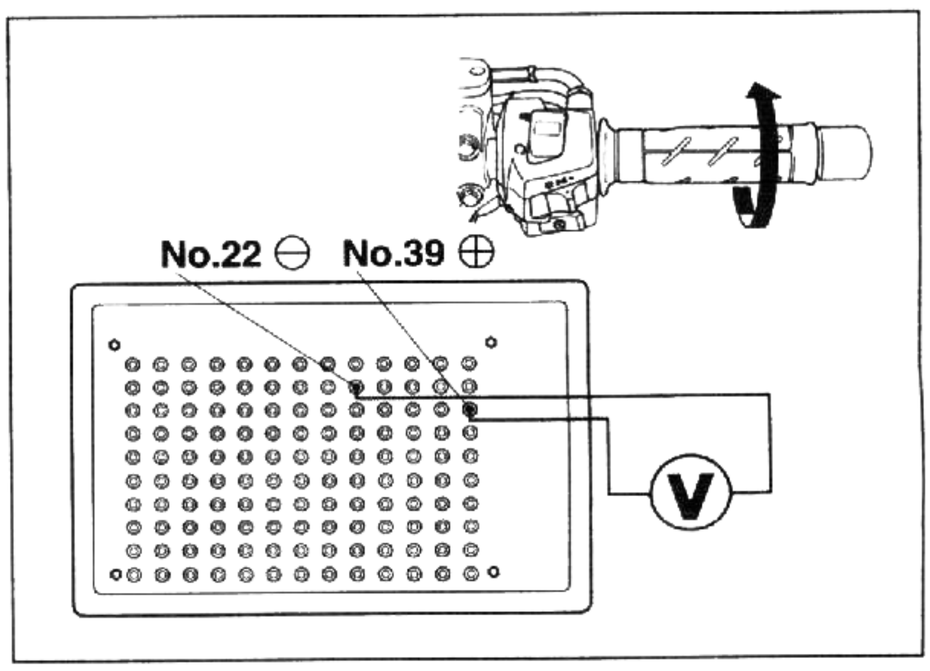
CONNECTION: No. 39 (+)—No. 22 (—)
MEASURING CONDITION: At throttle fully open



3. OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY CLOSED

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

CONNECTION: No. 39 (+)—No. 22 (—)
MEASURING CONDITION: At throttle fully closed



4. CALCULATE RESULT COMPARISON
Compare the measurement to the result of the following calculation.

With the throttle fully open:
Measured input voltage × 0.824 = Vo

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

With the throttle fully closed:
Measured input voltage × 0.1 = Vc

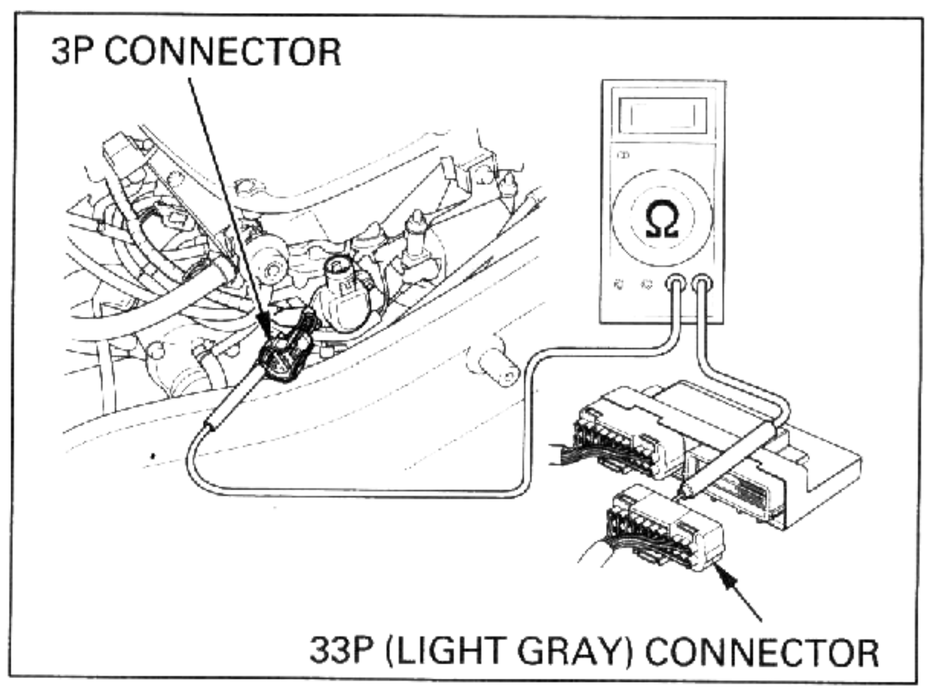
The sensor is normal if the throttle closed output voltage measured in step 3 is within 10% of Vc.

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

CONTINUITY INSPECTION
Support the rear end of the fuel tank (page 2-11).

Disconnect the ECM 22P (Light gray) connector and the TP sensor 3P connector.
Check for continuity between the ECM and TP sensor.

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



BANK ANGLE SENSOR

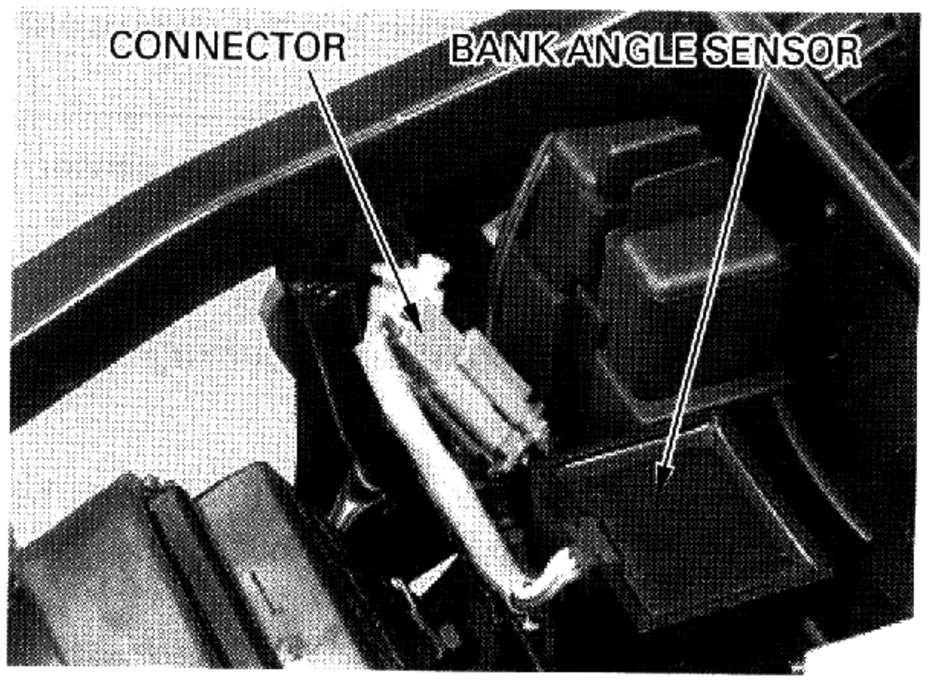
INSPECTION

Support the motorcycle on its center stand.
Remove the seat (page 2-2).

Do not disconnect the bank angle sensor connector during inspection.

Turn the ignition switch ON and measure the voltage between the following terminals of the bank angle sensor connector with the connector connected.

TERMINAL	STANDARD
White (+) – Green (–)	Battery voltage
Red/Green (+) – Green (–)	0 – 1 V



Turn the ignition switch OFF.
Remove the screws and bank angle sensor.



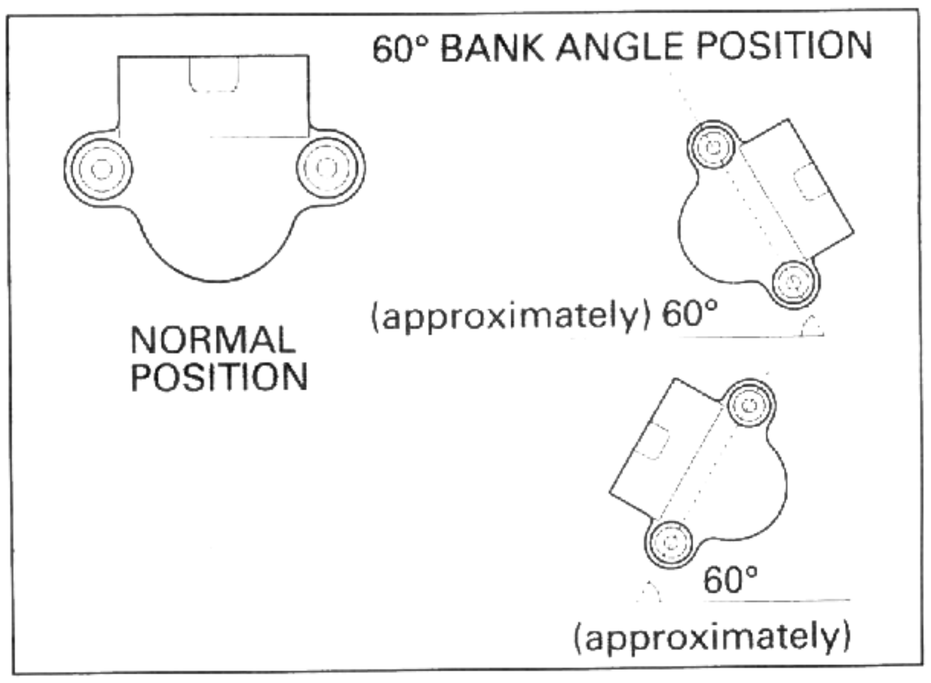
Connect the bank angle sensor 3P (Green) connector and place the bank angle sensor horizontal as shown, and ignition switch ON.

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

Incline the bank angle sensor approximately 60 degrees to the left or right with the ignition switch ON.
The bank angle sensor is normal if the engine stop relay clicks and power supply is open.

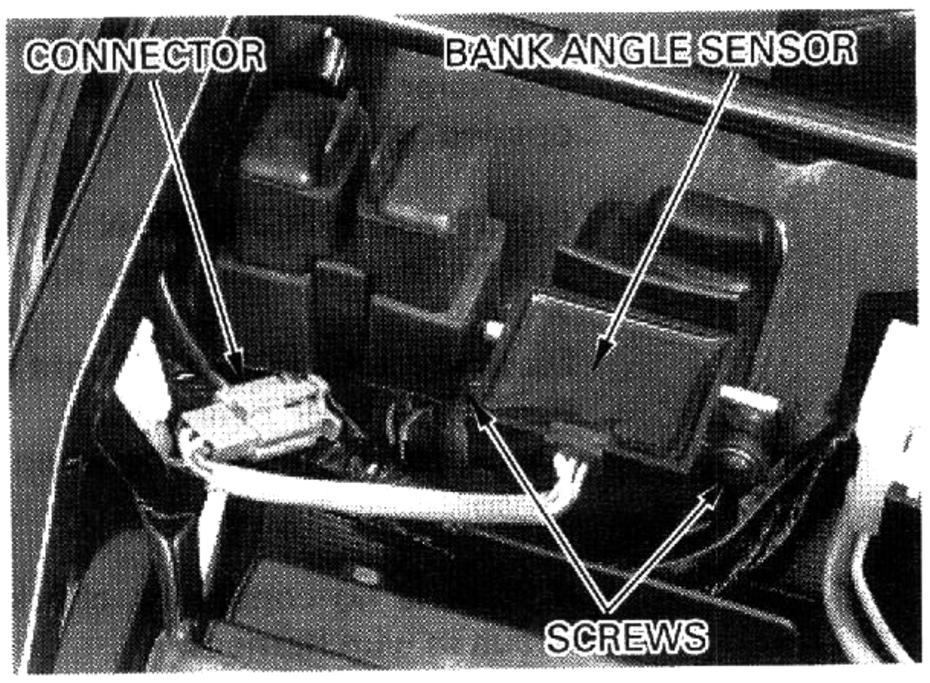
NOTE:

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



REMOVAL/INSTALLATION

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



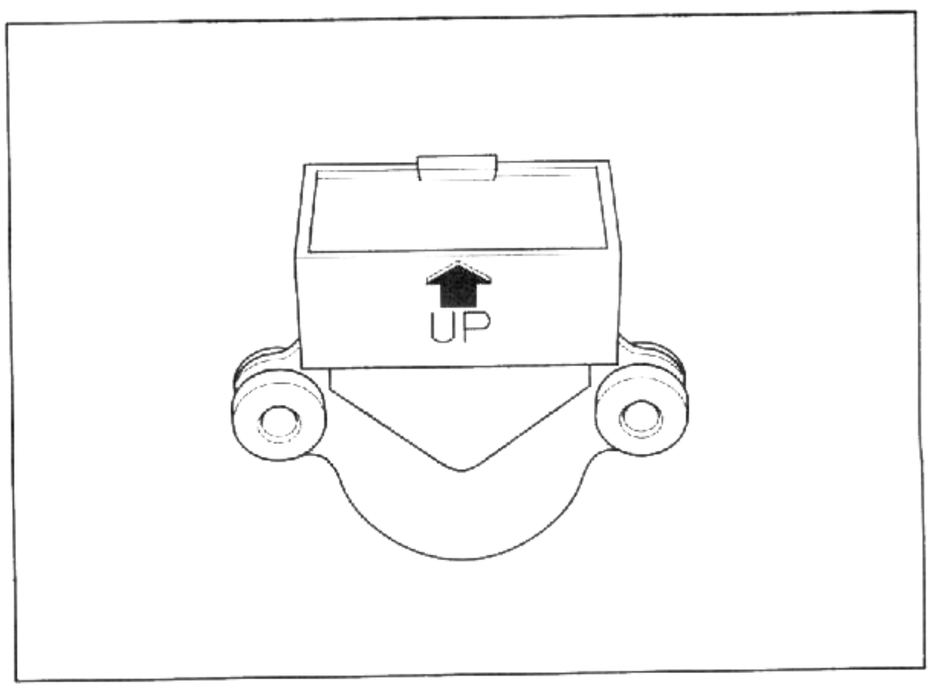
Installation is in the reverse order of removal.

NOTE:

Install the bank angle sensor with its "UP" mark facing up.

Tighten the mounting screws to the specified torque.

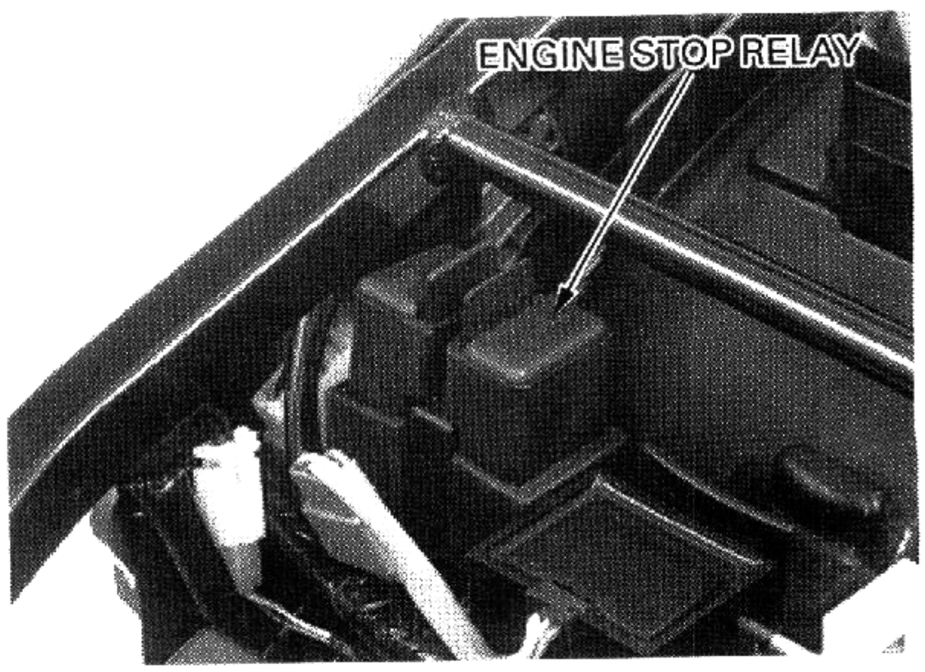
TORQUE: 2 N·m (0.2 kgf·m , 1.4 lbf·ft)



ENGINE STOP RELAY

INSPECTION

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



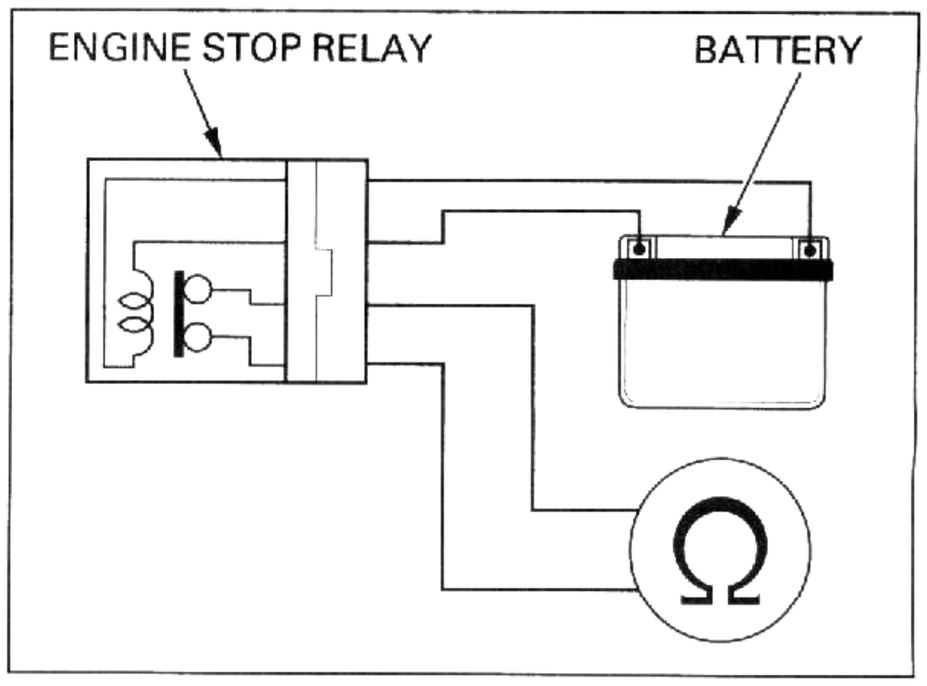
Connect the ohmmeter to the engine stop relay connector terminals.

CONNECTION: Black/Pink – Brown

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

CONNECTION: Red/Orange – Black

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



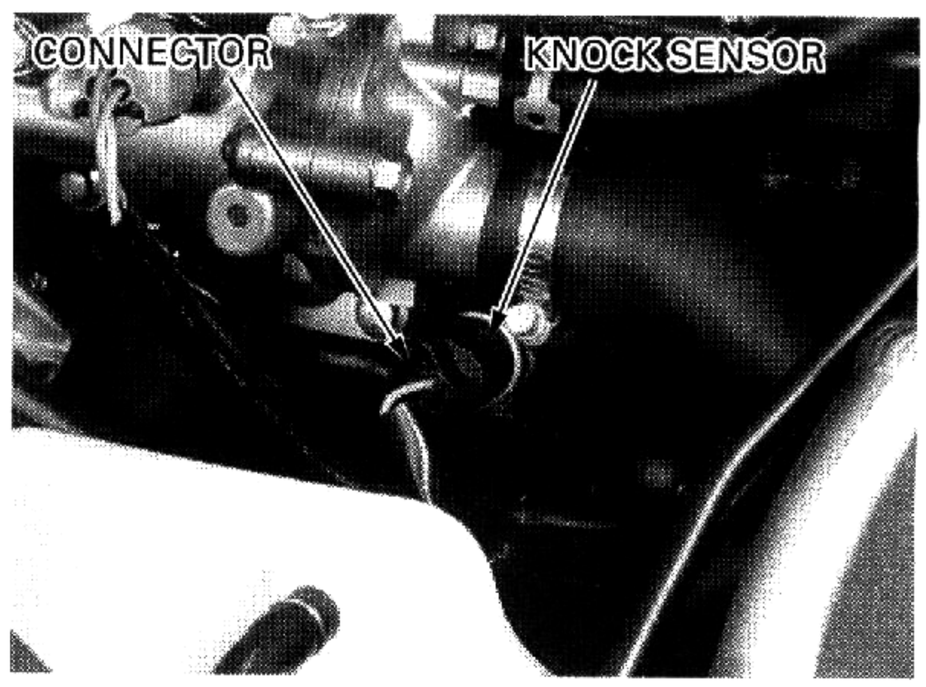
KNOCK SENSOR

REMOVAL/INSTALLATION

Disconnect the knock sensor connector.
Remove the knock sensor.

Installation is in the reverse order of removal.

TORQUE: 31 N·m (3.2 kgf·m , 23 lbf·ft)



ECM (ENGINE CONTROL MODULE)

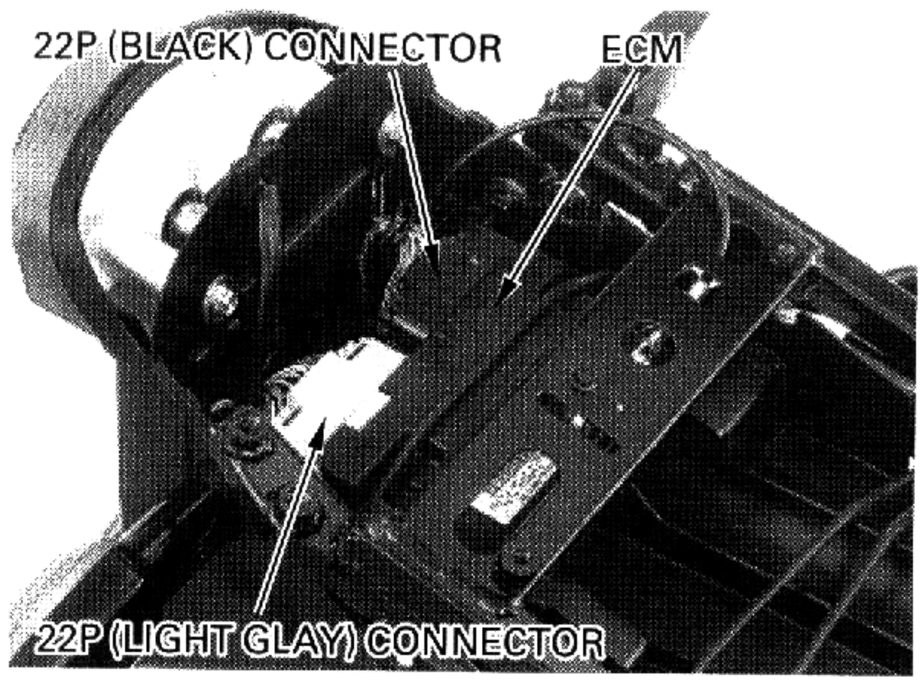
SYSTEM INSPECTION

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

Connect the test harness between the main wire harness and ECM (page 5-7).
Connect the test pin box (page 5-7).

TOOLS:

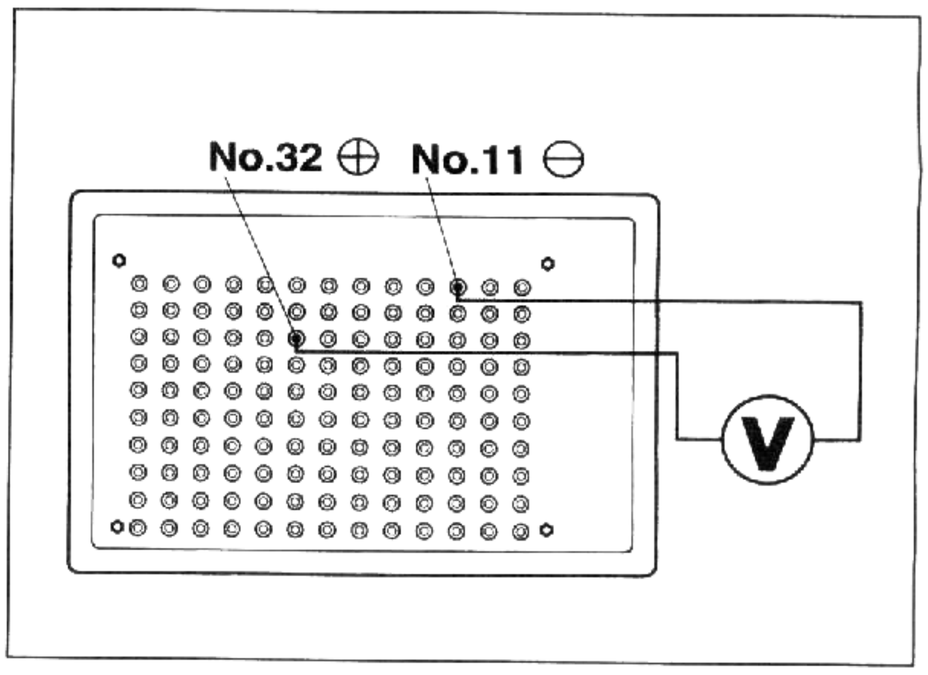
ECU test harness	07WMZ-MBG0100
Test pin box	07WGZ-0010100



Check the following items at the test pin box terminals.

TERMINAL	STANDARD
No. 32 (+) – No. 11 (–)	Battery voltage
No. 10 (+) – Ground (–)	Continuity
No. 11 (+) – Ground (–)	Continuity
No. 21 (+) – Ground (–)	Continuity

If the items are out of specification, check for the following:
– Open or short circuit in wire harness
– Loose or poor contacts connector

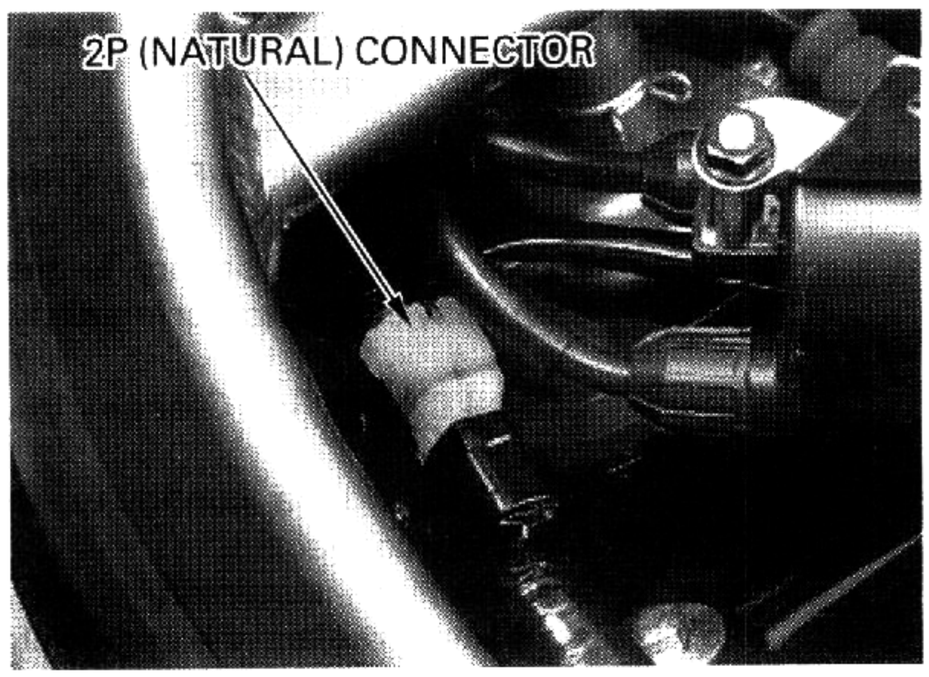


PAIR SOLENOID VALVE

REMOVAL/INSTALLATION

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

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



Disconnect the PAIR air suction hoses and remove the PAIR solenoid valve.

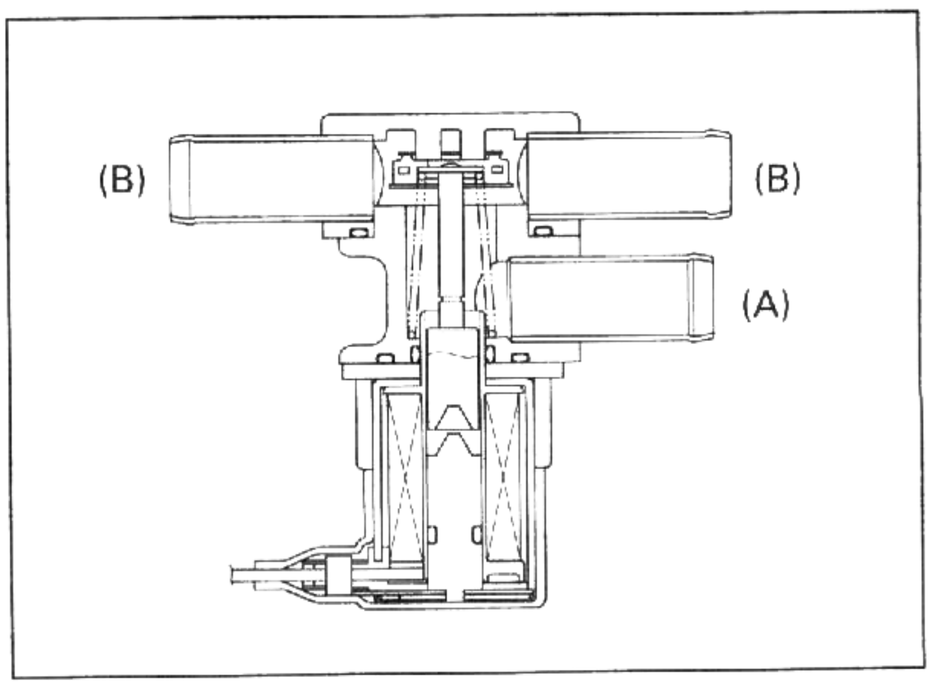
Installation is in the reverse order of removal.



INSPECTION

Remove the PAIR solenoid valve.

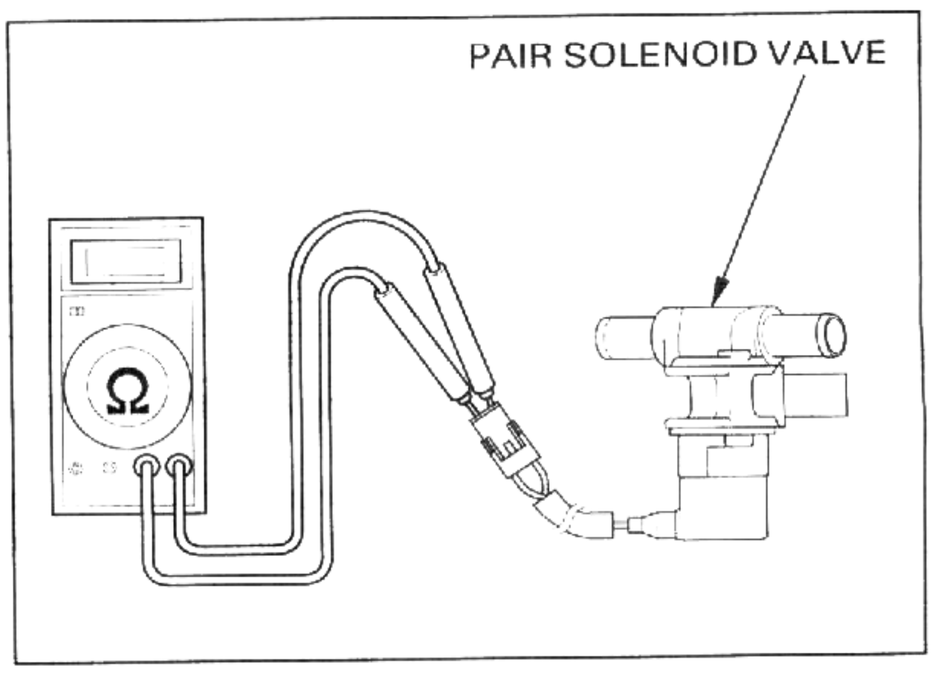
Check that the air should not flow (A) to (B), only when the 12V battery is connected to the PAIR solenoid valve terminals.



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

STANDARD: 20—24 Ω (20 °C/68 °F)

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



O_2 SENSOR

REMOVAL

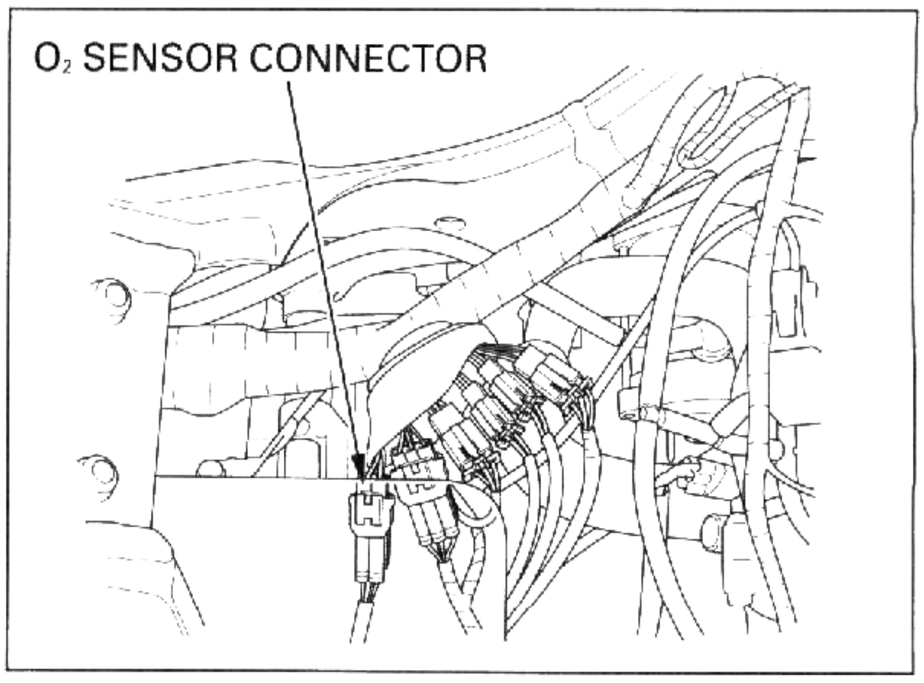
⚠WARNING

Do not service the O_2 sensor while the it is hot.

CAUTION:

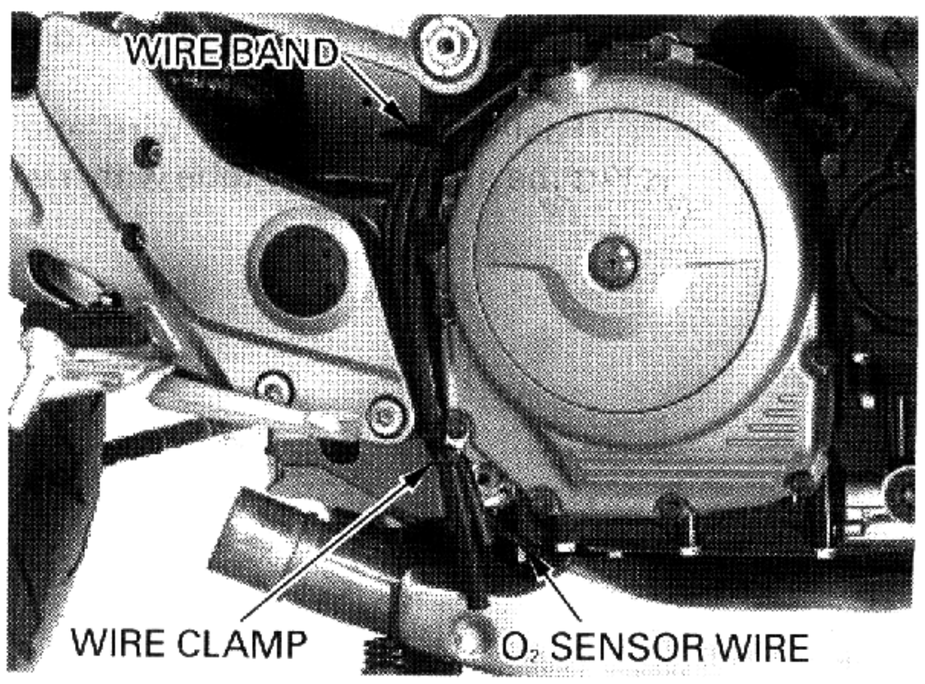
- ***Handle with care of the O_2 sensor.***
- ***Do not get grease, oil or other materials to the O_2 sensor air holes.***

Support the rear end of the fuel tank (page 2-11).

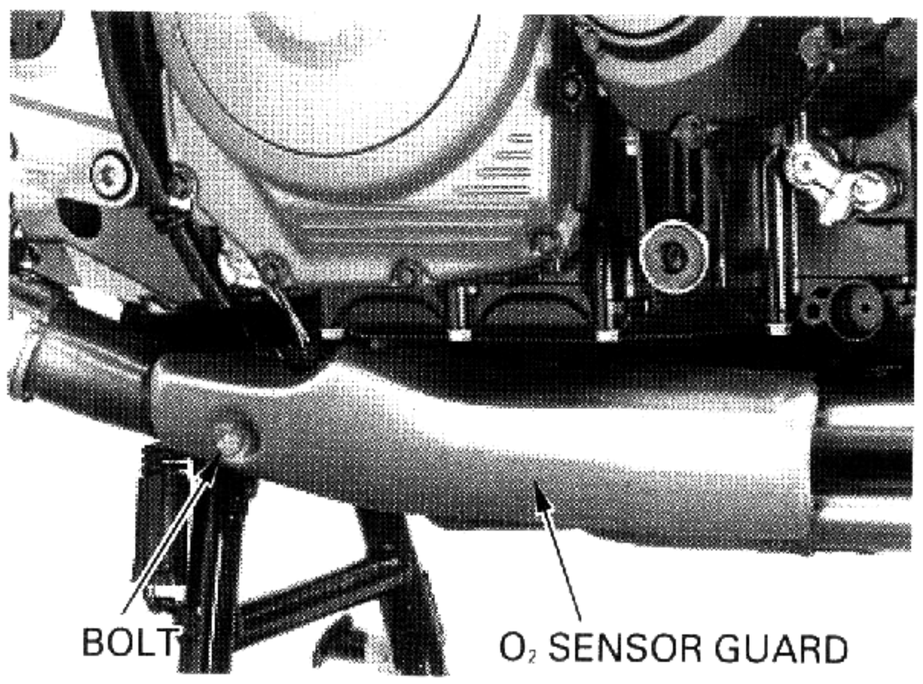


Disconnect the O_2 sensor 4P (Gray) connector.

Unfasten the tube/wire band.
Release the O_2 sensor wire from the wire clamp.



Remove the bolt and O_2 sensor guard.



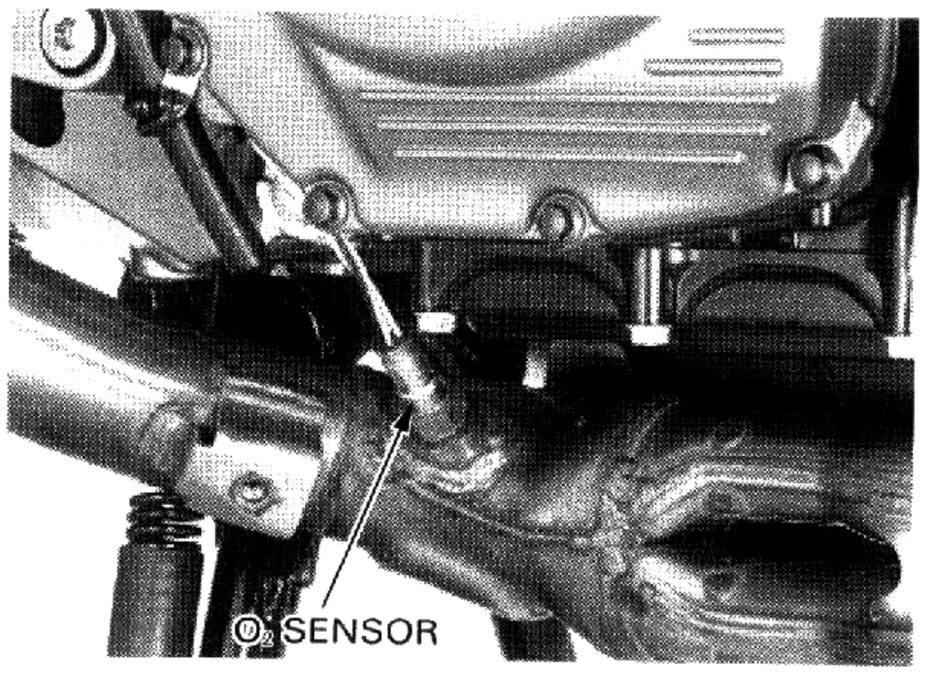
Remove the O_2 sensor unit.

CAUTION:

- ***Be careful not to damage the sensor wire.***
- ***Do not use impact wrench while removing or installing the O_2 sensor.***

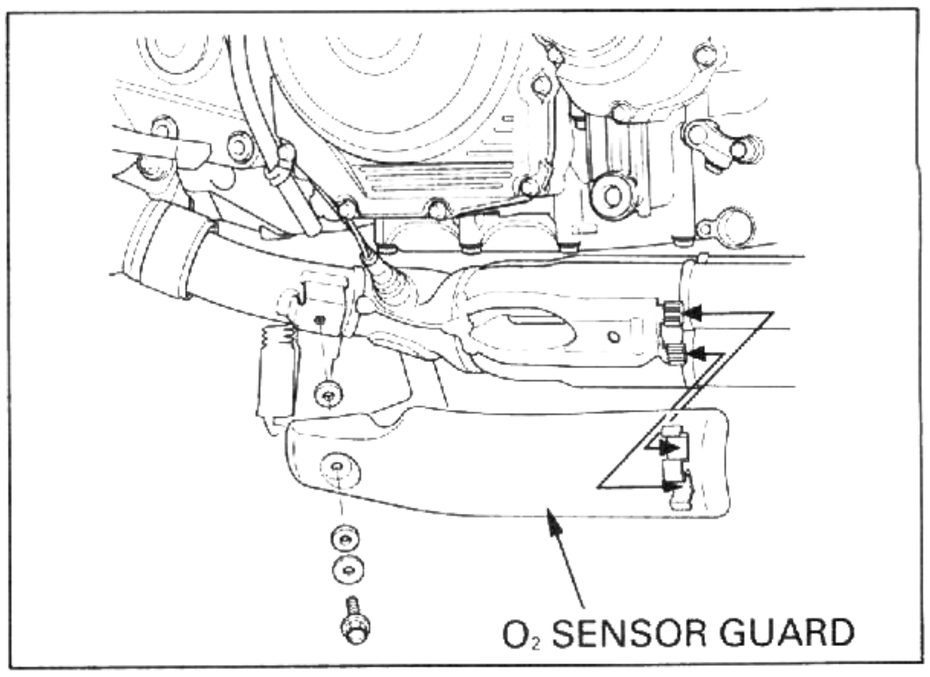
Install the O_2 sensor unit.
Tighten the unit to the specified torque.

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

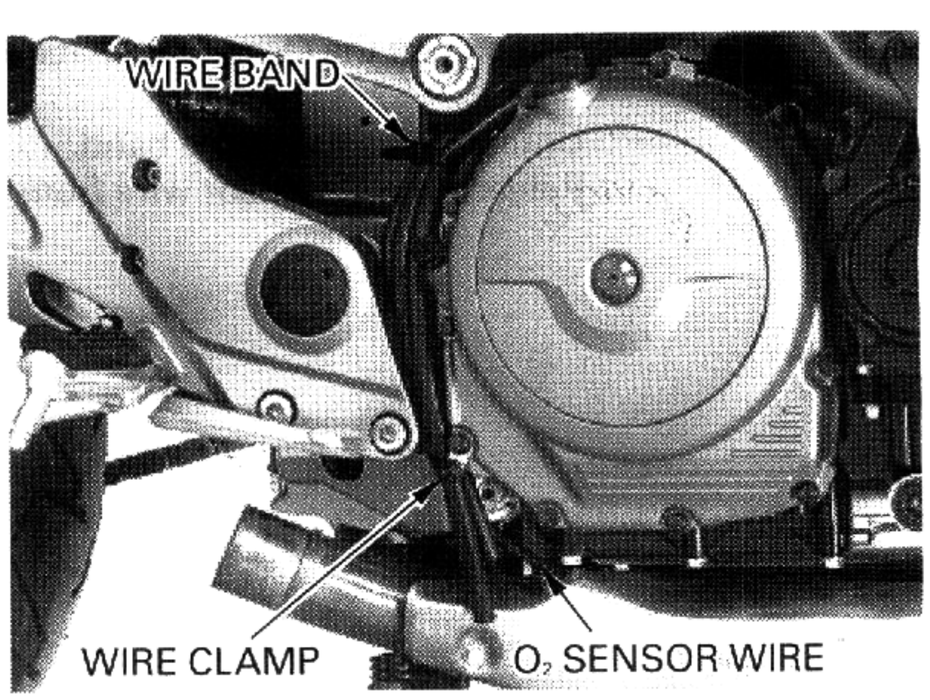


Install the O_2 sensor guard aligning its grooves with the bosses on the exhaust pipe.

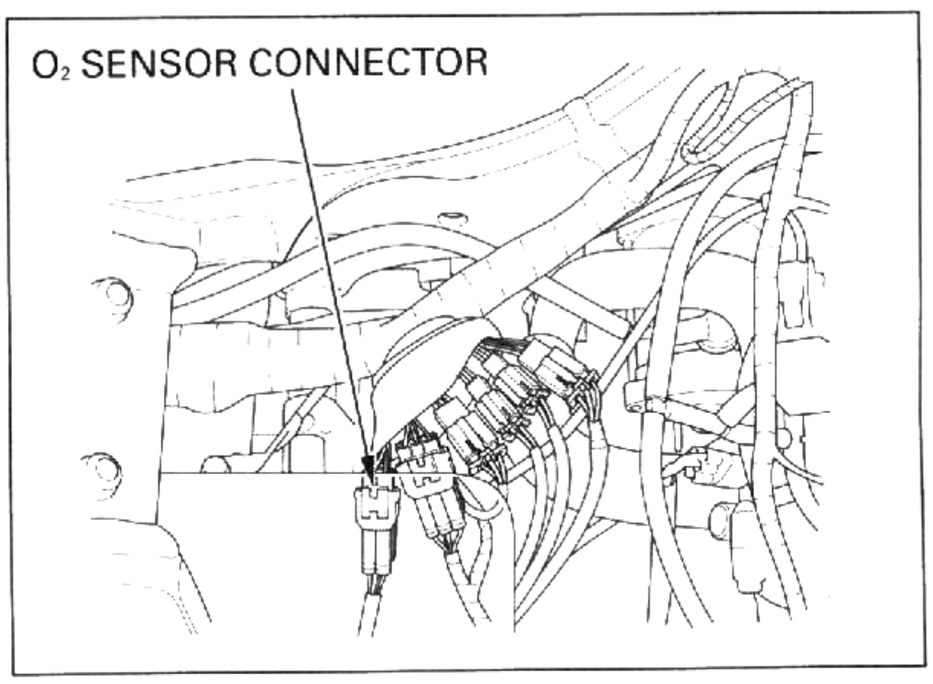
Install and tighten the O_2 sensor guard mounting bolt.



Route the O_2 sensor wire and clamp it with a wire clamp.
Fasten the O_2 sensor wire and fuel tank breather tube and overflow tube with a wire band.

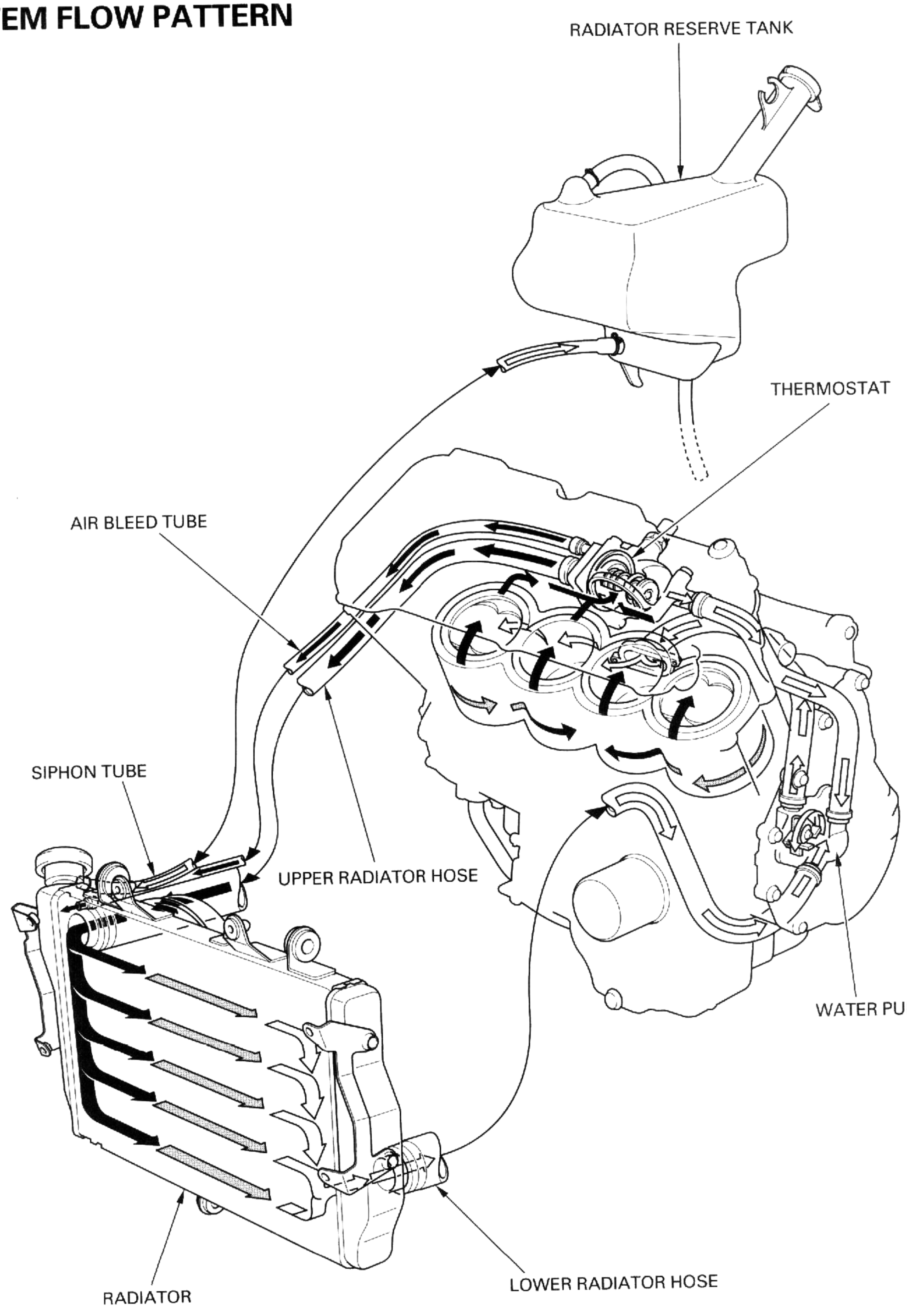


Connect the O_2 sensor 4P (Gray) connector.



MEMO

SYSTEM FLOW PATTERN



6. COOLING SYSTEM

SYSTEM FLOW PATTERN	6-0	THERMOSTAT	6-5
SERVICE INFORMATION	6-1	RADIATOR	6-8
TROUBLESHOOTING	6-2	WATER PUMP	6-13
SYSTEM TESTING	6-3	RADIATOR RESERVE TANK	6-16
COOLANT REPLACEMENT	6-4		

SERVICE INFORMATION

GENERAL

⚠WARNING

- *Wait until the engine is cool before slowly removing the radiator cap. Removing the cap while the engine is hot and the coolant is under pressure may cause serious scalding.*
- *Radiator coolant is toxic. Keep it away from eyes, mouth, skin and clothes.*
  - *If any coolant gets in your eyes, rinse them with water and consult a doctor 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.*
- *KEEP OUT OF REACH OF CHILDREN.*

CAUTION:

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

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

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	3.2 ℓ (3.4 US qt , 2.8 Imp qt)
	Reserve tank	0.5 ℓ (0.5 US qt , 0.4 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)
Thermostat	Begin to open	80 – 84 °C (176 – 183 °F)
	Fully open	95 °C (203 °F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		High quality ethylene glycol antifreeze containing corrosion protection inhibitors.
Standard coolant concentration		50% mixture with soft water

TORQUE VALUES

Water pump cover bolt	13 N·m (1.3 kgf·m , 9 lbf·ft)	CT bolt
ECT (Engine Coolant Temperature)/thermo sensor	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply sealant to the threads
Cooling fan nut	3 N·m (0.27 kgf·m , 2.0 lbf·ft)	Apply a locking agent to the threads
Fan motor nut	5 N·m (0.5 kgf·m , 3.6 lbf·ft)	
Fan motor switch	18 N·m (1.8 kgf·m , 13 lbf·ft)	Apply sealant to the threads

TROUBLESHOOTING

Engine temperature too high
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty water pump
- Thermostat stuck closed
- Faulty temperature gauge or coolant temperature sensor
- Faulty cooling fan motor
- Faulty fan motor switch

Engine temperature too low
- Faulty temperature gauge or ECT/thermo sensor
- Thermostat stuck open
- Faulty cooling fan motor switch

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

SYSTEM TESTING

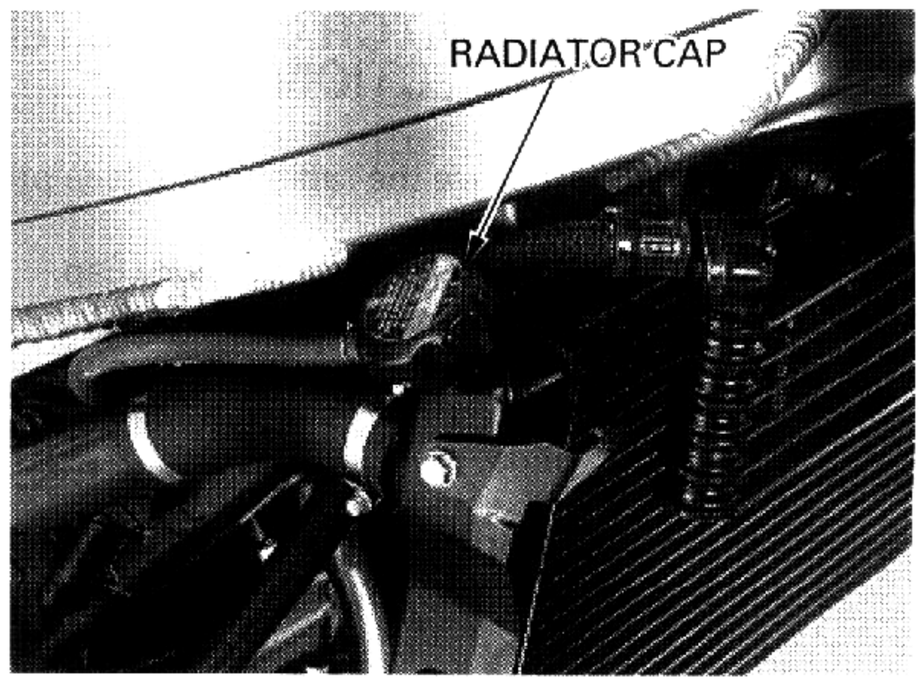
⚠WARNING

The engine must be cool before removing the radiator cap, or severe scalding may result.

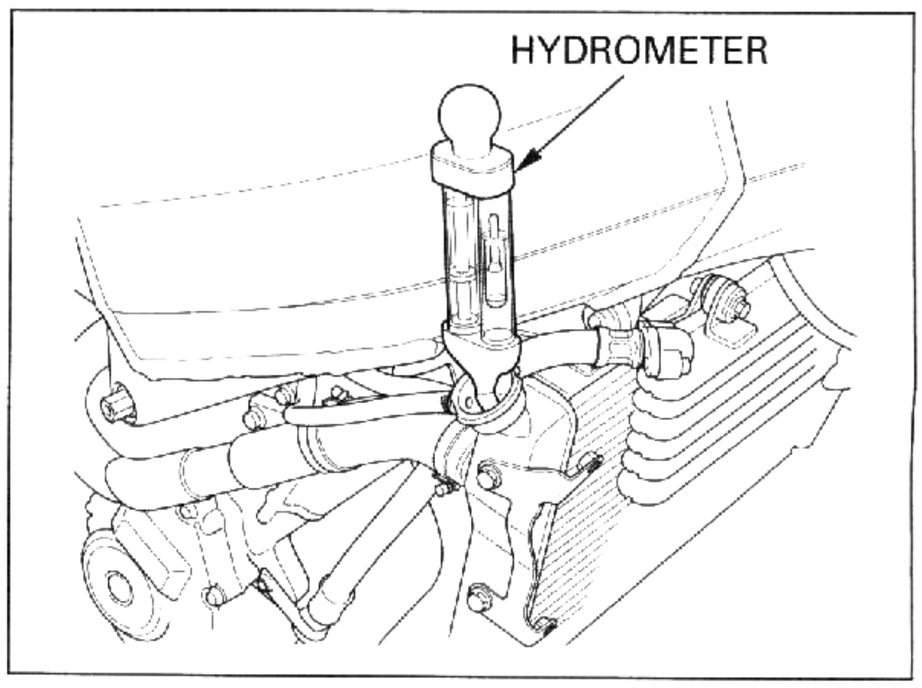
COOLANT (HYDROMETER TEST)

Remove the radiator grill (page 2-4).

Remove the radiator cap.



Test the coolant gravity using a hydrometer (see below for "Coolant gravity chart").
For maximum corrosion protection, a 50−50% solution of ethylene glycol and distilled water is recommended (page 6-4).
Look for contamination and replace the coolant if necessary.



COOLANT GRAVITY CHART

Coolant temperature °C (°F) / Coolant ratio %	0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	45 (113)	50 (122)
5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
30	1.053	1.052	1.051	1.047	1.046	1.045	1.043	1.041	1.038	1.035	1.032
35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
45	1.080	1.078	1.076	1.074	1.072	1.069	1.066	1.063	1.060	1.057	1.054
50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

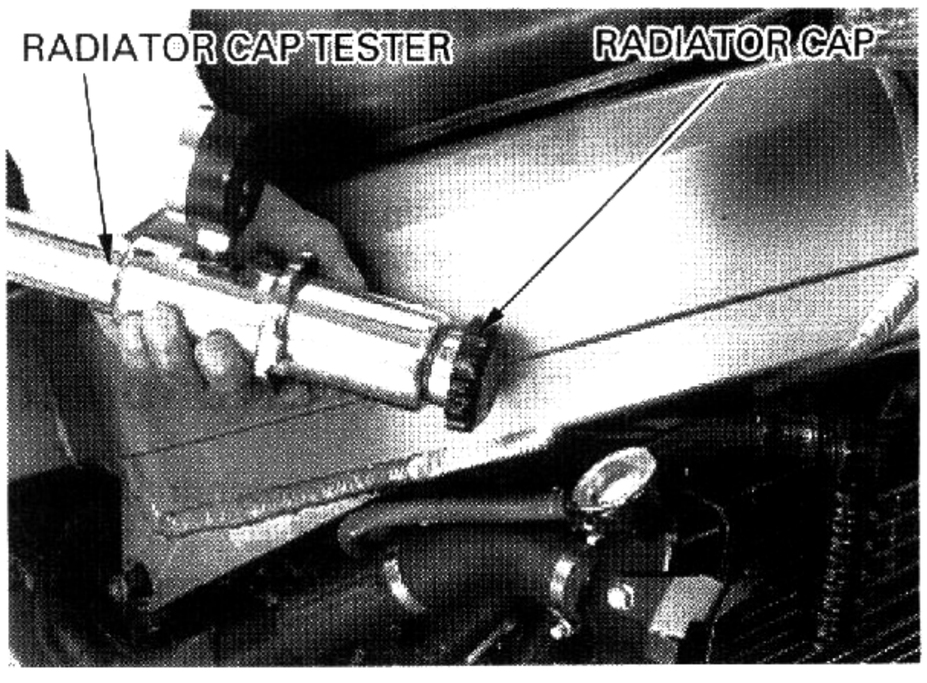
RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Before installing the cap in the tester, wet the sealing surfaces.

Remove the radiator cap (see previous page).

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

RADIATOR CAP RELIEF PRESSURE:
108 – 137 kPa (1.1 – 1.4 kgf/cm², 16 – 20 psi)

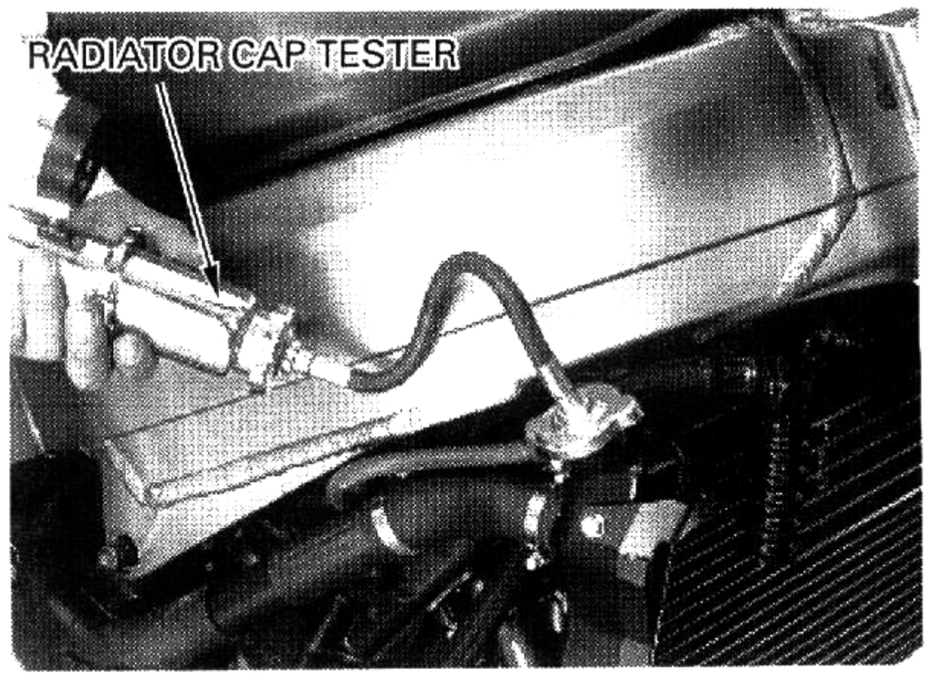


Pressure the radiator, engine and hoses, and check for leaks.

CAUTION:

Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm², 20 psi).

Repair or replace components if the system will not hold specified pressure for at least 6 seconds.



COOLANT REPLACEMENT

PREPARATION

⚠WARNING

- ***Radiator coolant is toxic. Keep it away from eyes, mouth, skin and clothes.***
  - ***If any coolant gets in your eyes, rinse them with water and consult a doctor 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.***
- ***KEEP OUT OF REACH OF CHILDREN.***

CAUTION:

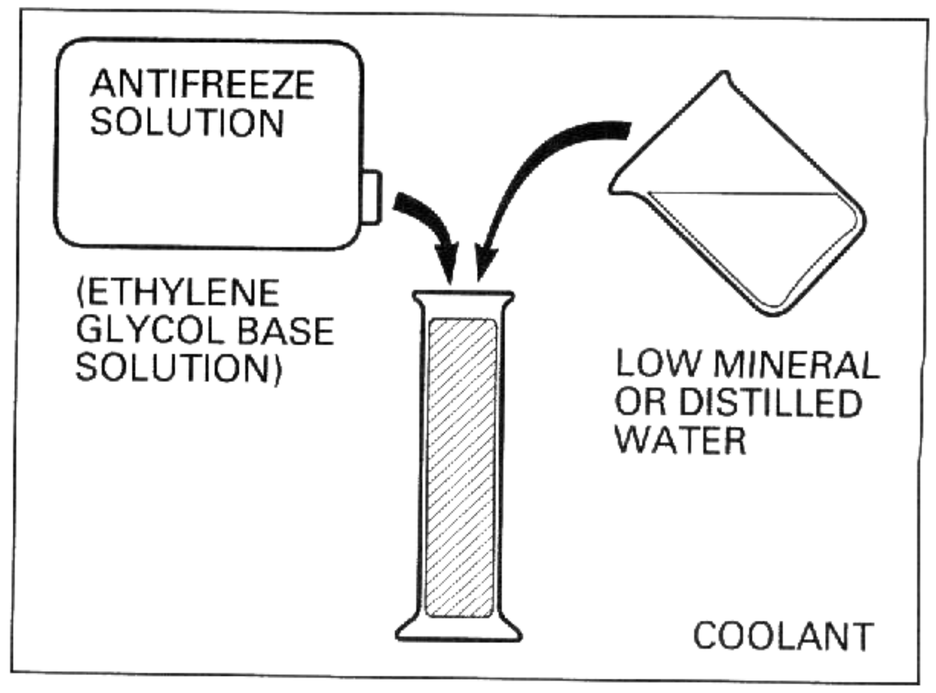
Using coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passages. Using tap water may cause engine damage.

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 antifreeze.

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

RECOMMENDED MIXTURE:
50—50 (Distilled water and antifreeze)



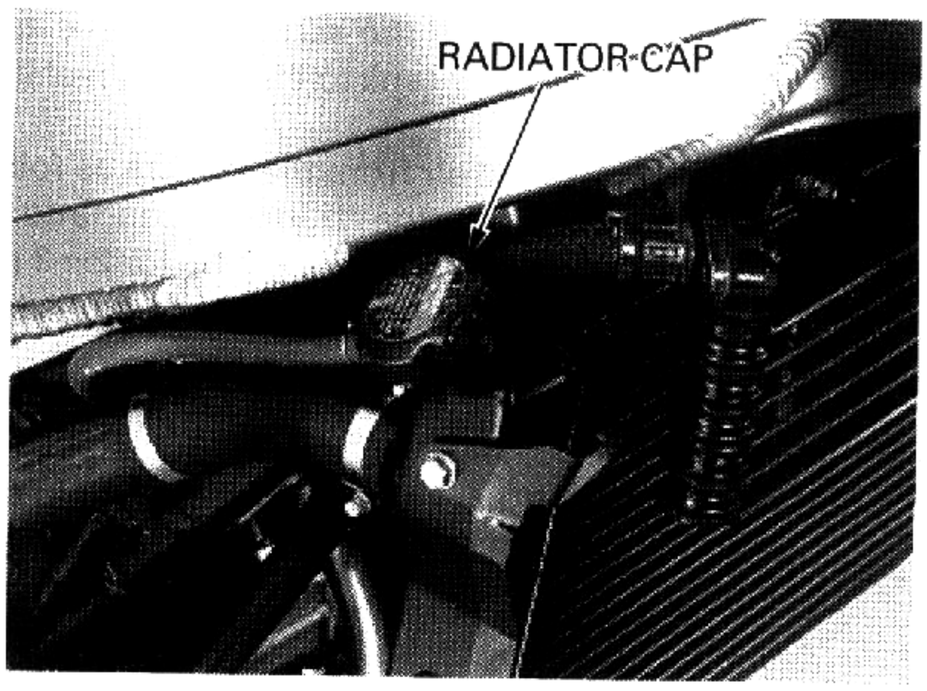
REPLACEMENT/AIR BLEEDING

⚠WARNING

The engine must be cool before servicing the cooling system, or severe scalding may result.

NOTE:

When filling the system or reserve tank with a coolant (checking coolant level), place the motorcycle in a vertical position on a flat, level surface.

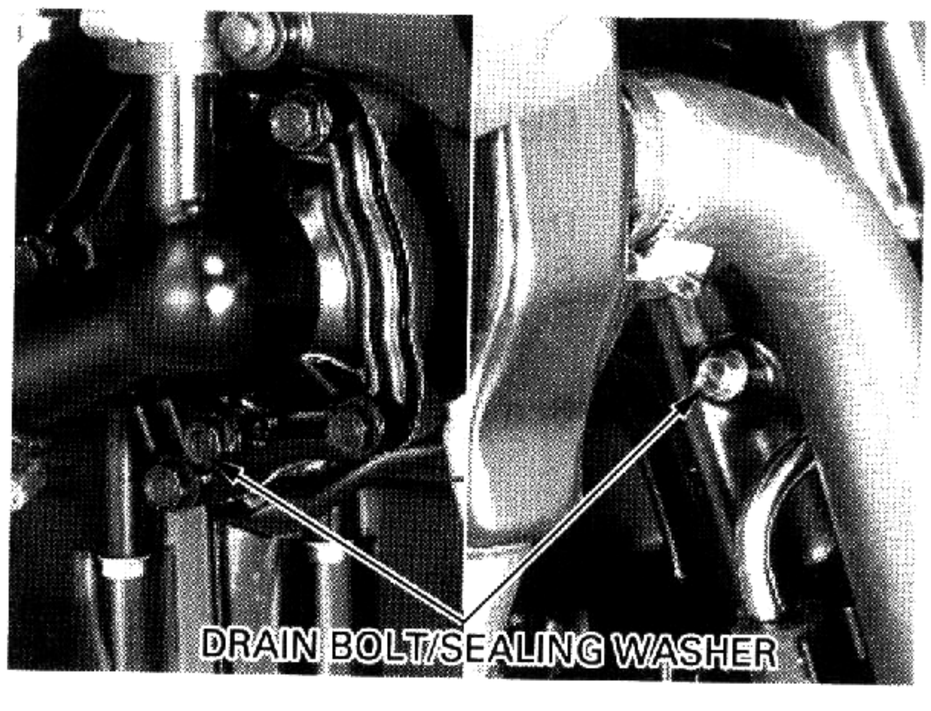


Remove the radiator cap.

Remove the drain bolt on the water pump cover and drain the system coolant.

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

Reinstall the drain bolt with the new sealing washer.

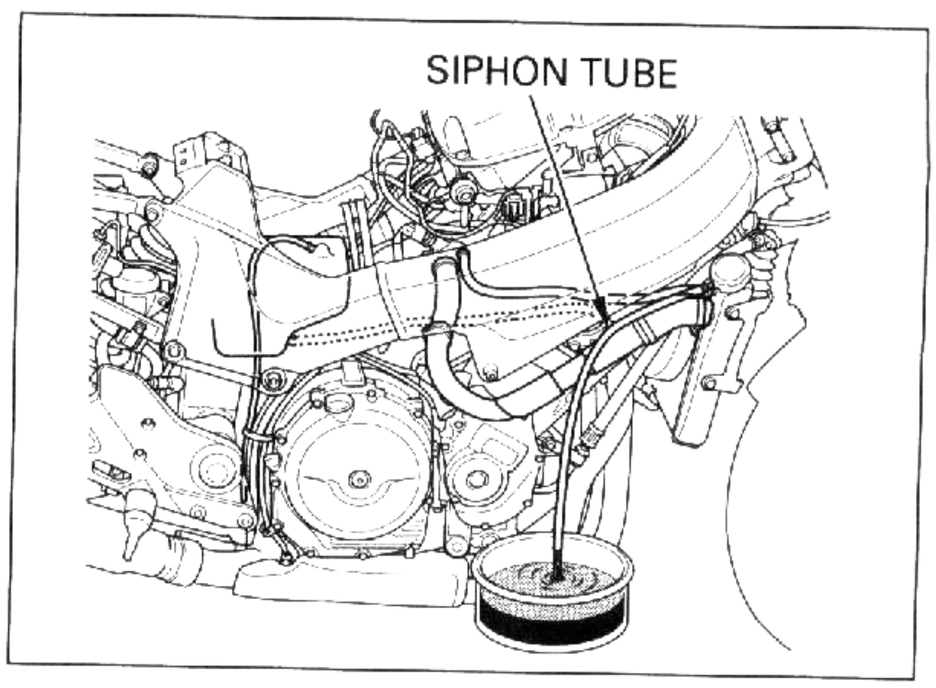


Support the rear end of the fuel tank (page 2-11).

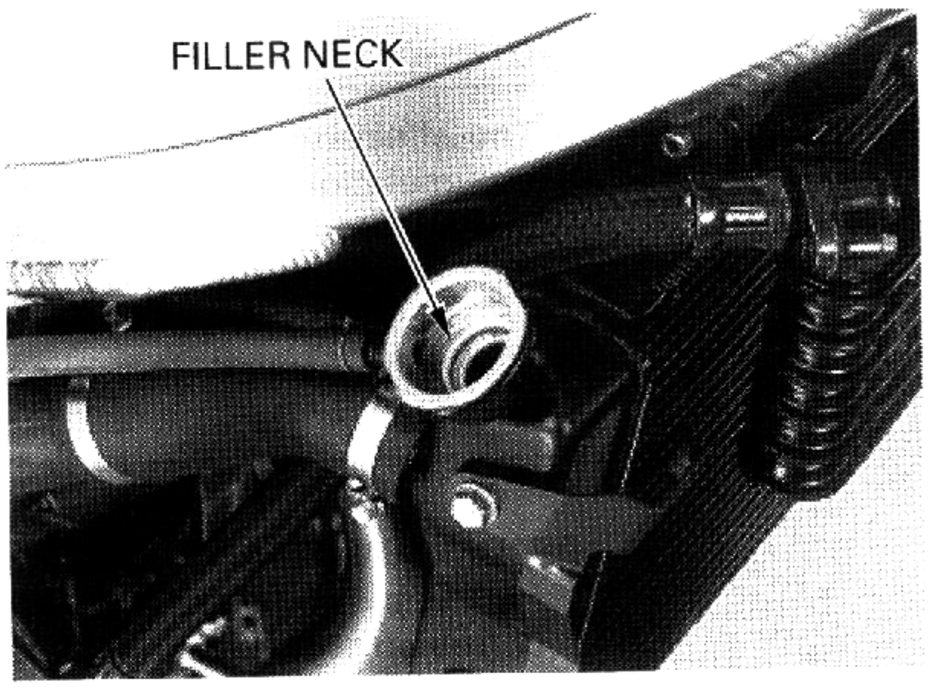
Disconnect the siphon tube from the radiator.

Drain the reserve tank coolant.
Empty the coolant and rinse the inside of the reserve tank with water.

Reinstall the radiator siphon tube.



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



Remove the radiator reserve tank cap and fill the reserve tank to the upper level line.

Bleed air from the system as follow:

1. Shift the transmission into neutral. Start the engine and let it idle for 2—3 minutes.
2. Snap the throttle 3—4 times to bleed air from the system.
3. Stop the engine and add coolant up to the proper level if necessary. Reinstall the radiator cap.
4. Check the level of coolant in the reserve tank and fill to the upper level if it is low.

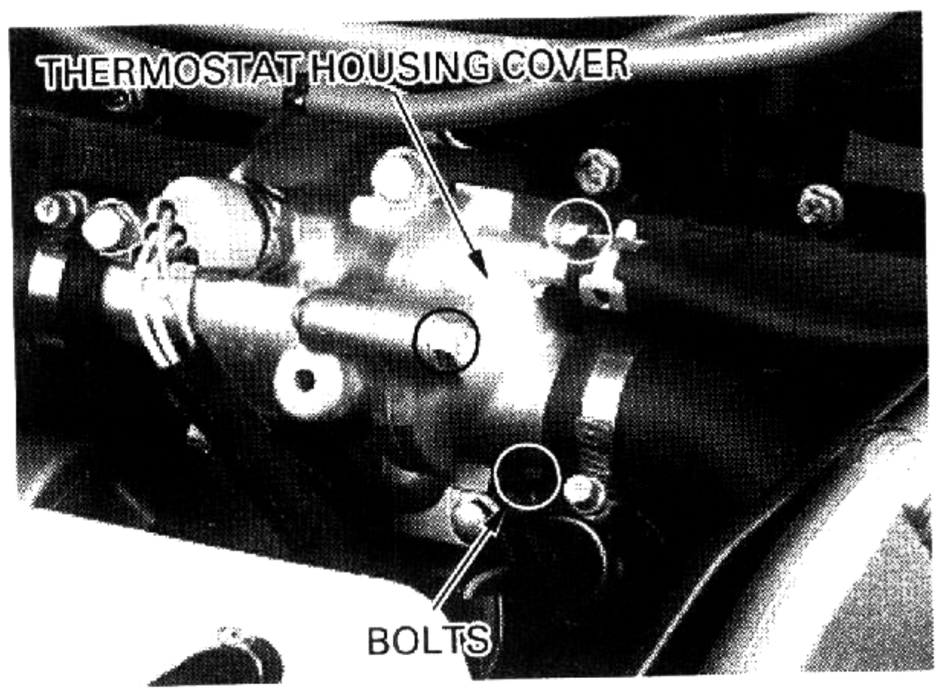


THERMOSTAT

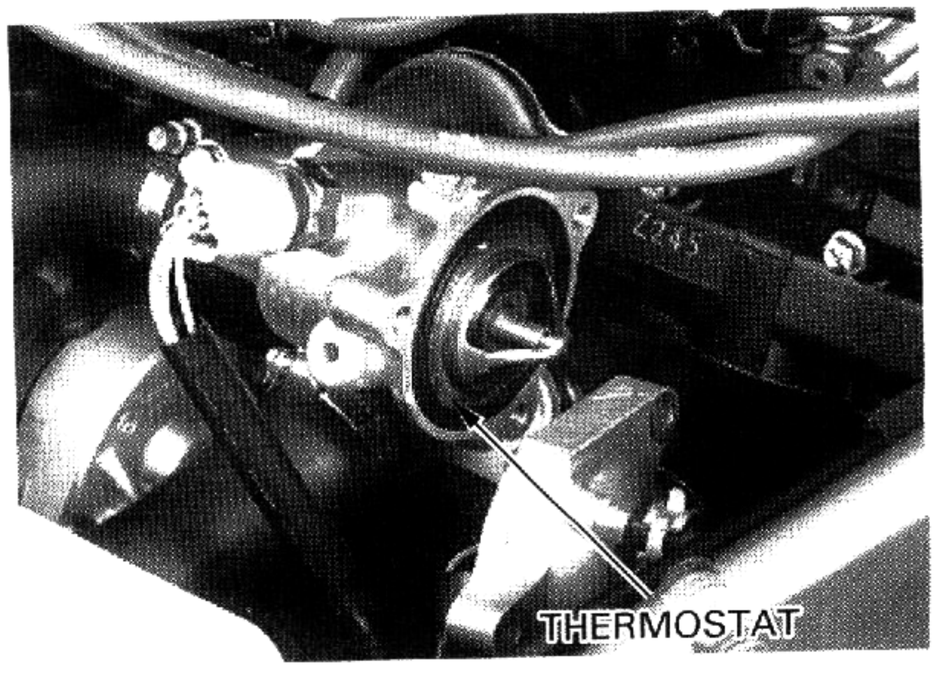
REMOVAL

Drain the coolant (page 6-5).
Support the rear end of the fuel tank (page 2-11).
Remove the radiator grill (page 2-4).

Remove the bolts and thermostat housing cover.



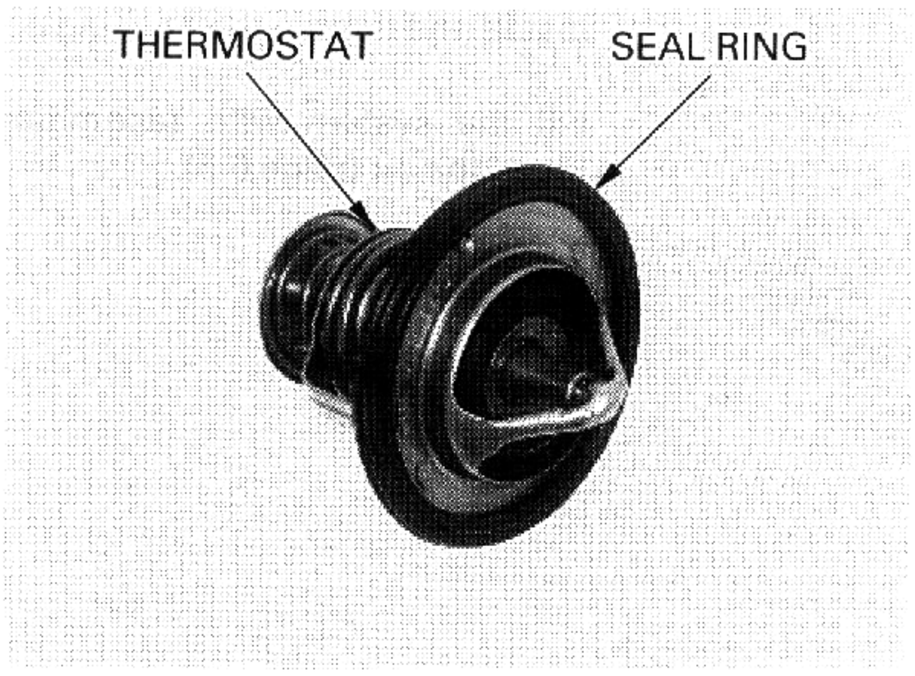
Remove the thermostat from the housing.



INSPECTION

⚠WARNING

- ***Wear insulated gloves and adequate eye protection.***
- ***Keep flammable materials away from the electric heating element.***



Visually inspect the thermostat for damage.
Check for damage of the seal ring.

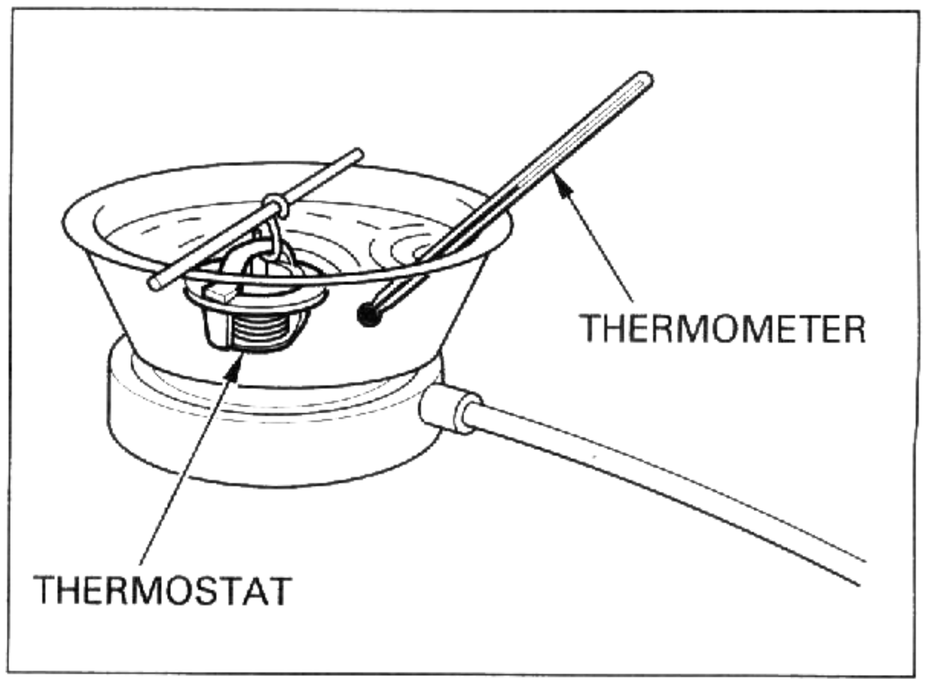
Do not let the thermostat or thermometer touch the pan, or you will get false reading.

Heat the water with an electric heating element to operating temperature for 5 minutes.
Suspend the thermostat in heated water to check its operation.

Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.

THERMOSTAT BEGIN TO OPEN:
80 – 84 °C (176 – 183 °F)

VALVE LIFT:
8 mm (0.3 in) minimum at 85 °C (185 °F)

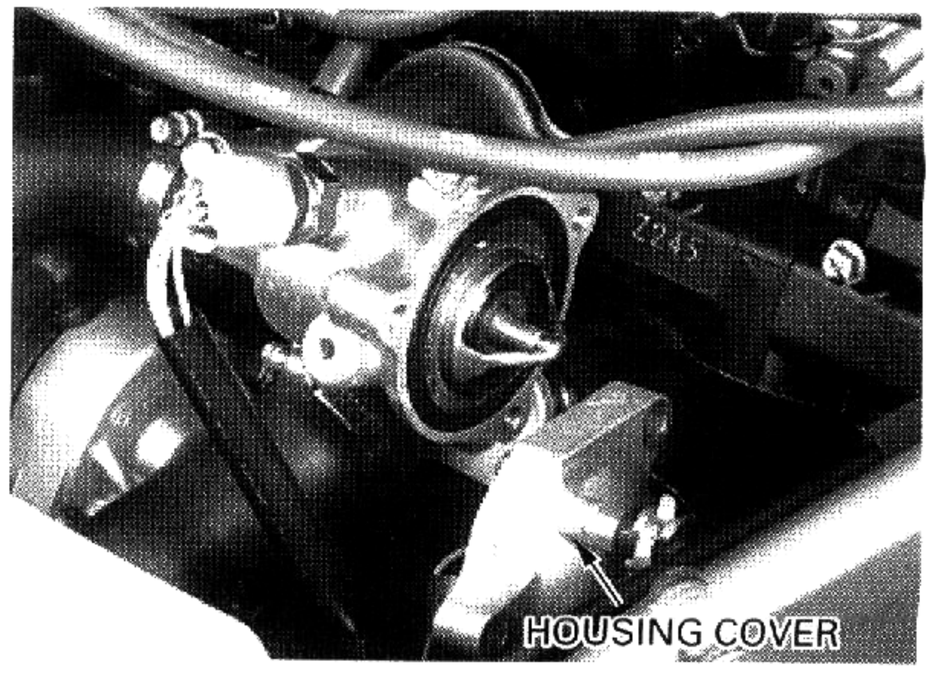


INSTALLATION

Install the thermostat into the housing with its air bleed hole facing up and aligning its ribs with the grooves in the housing.

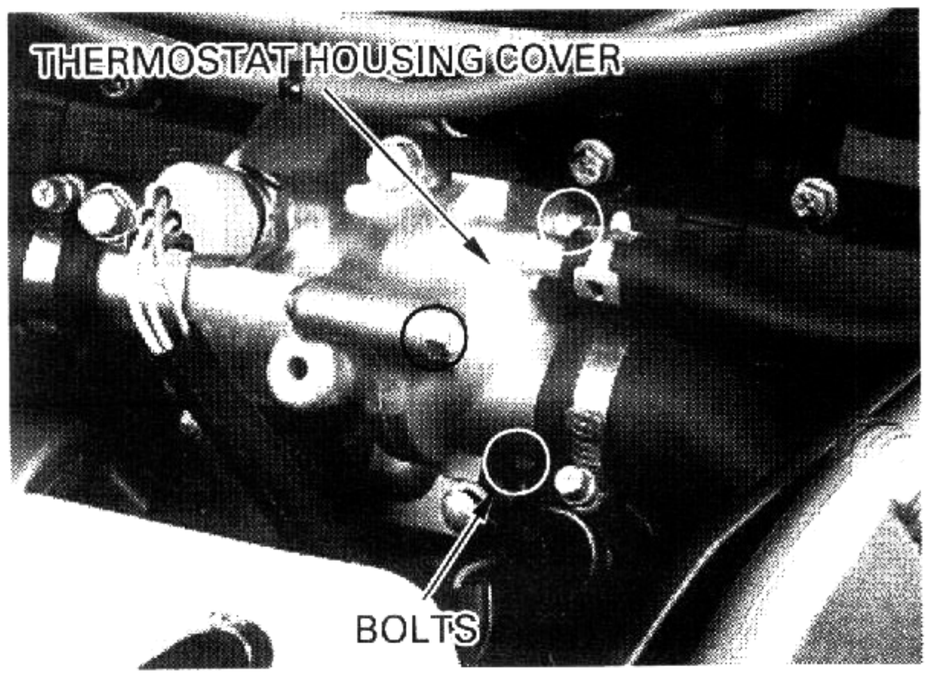


Install the thermostat housing cover onto the housing.



Install and tighten the housing cover bolts.

Fill the system with recommended coolant and bleed the air (page 6-5).



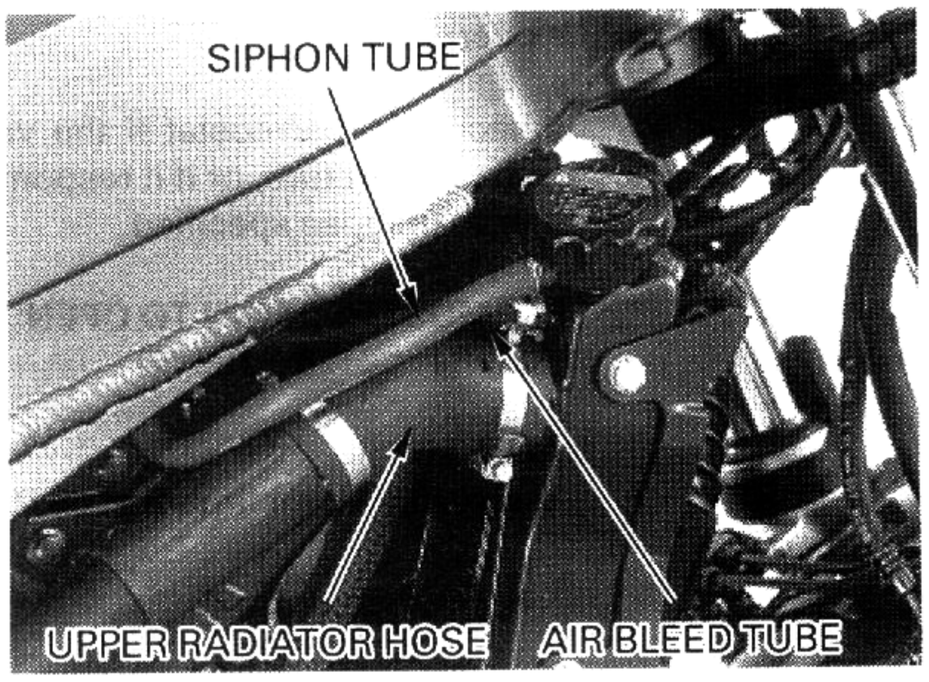
RADIATOR

REMOVAL

Remove the radiator grill (page 2-4).
Drain the coolant (page 6-4).

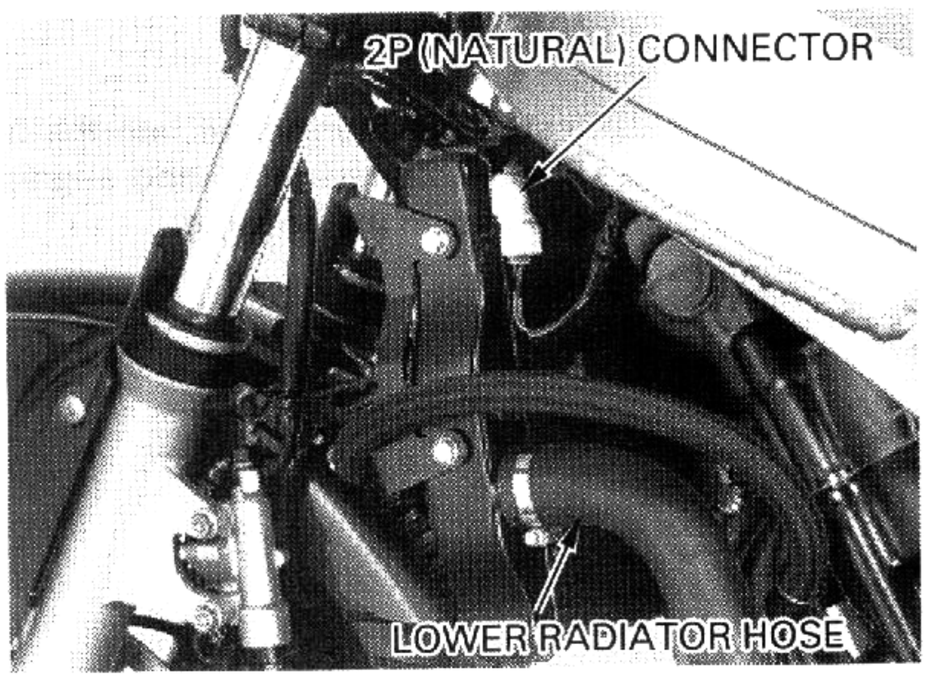
Remove the oil cooler mounting bolts, then move the oil cooler forward.

Disconnect the siphon tube and air bleed tube from the radiator.
Disconnect the upper radiator hose.

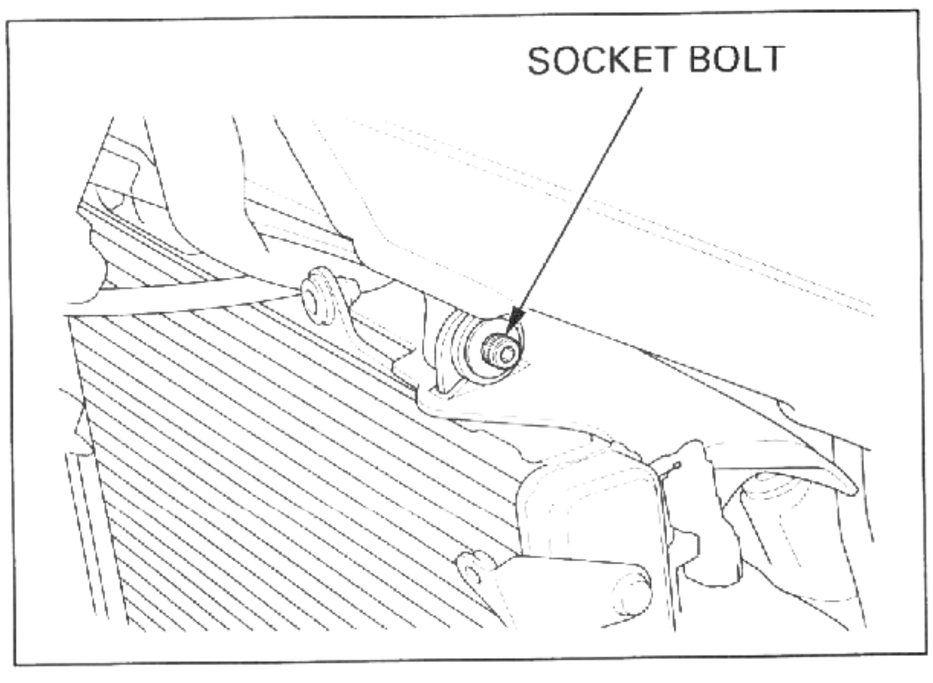


Disconnect the fan motor sub-harness 2P (Natural) connector.

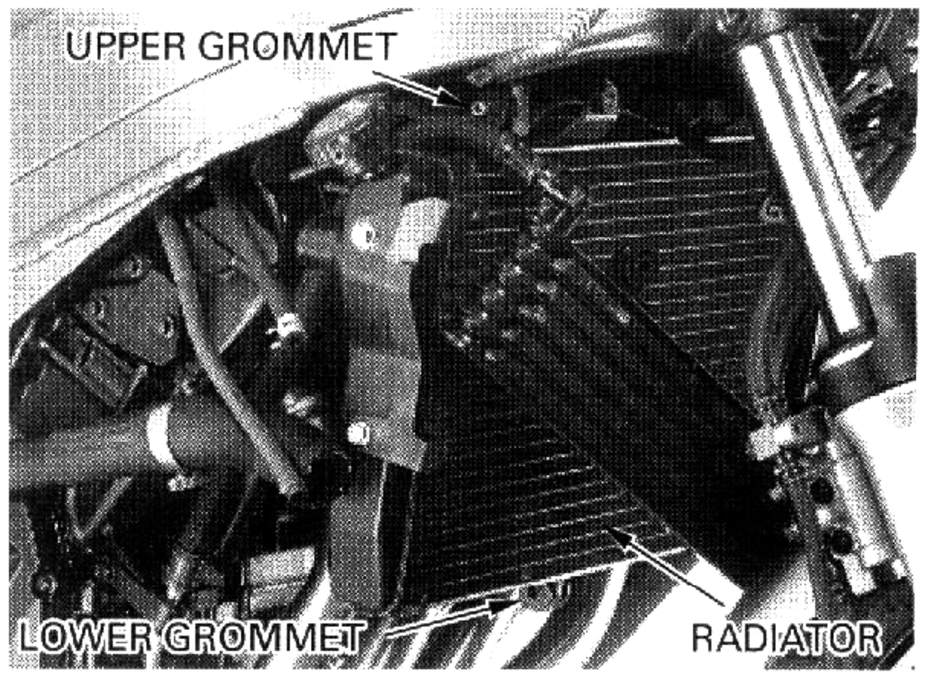
Disconnect the lower radiator hose.



Remove the radiator upper mounting socket bolt and washer.



Slide the radiator leftward, then release the upper and lower grommets from the bracket bosses.
Remove the heat guard rubber bosses from the cylinder head holes.
Remove the radiator assembly.

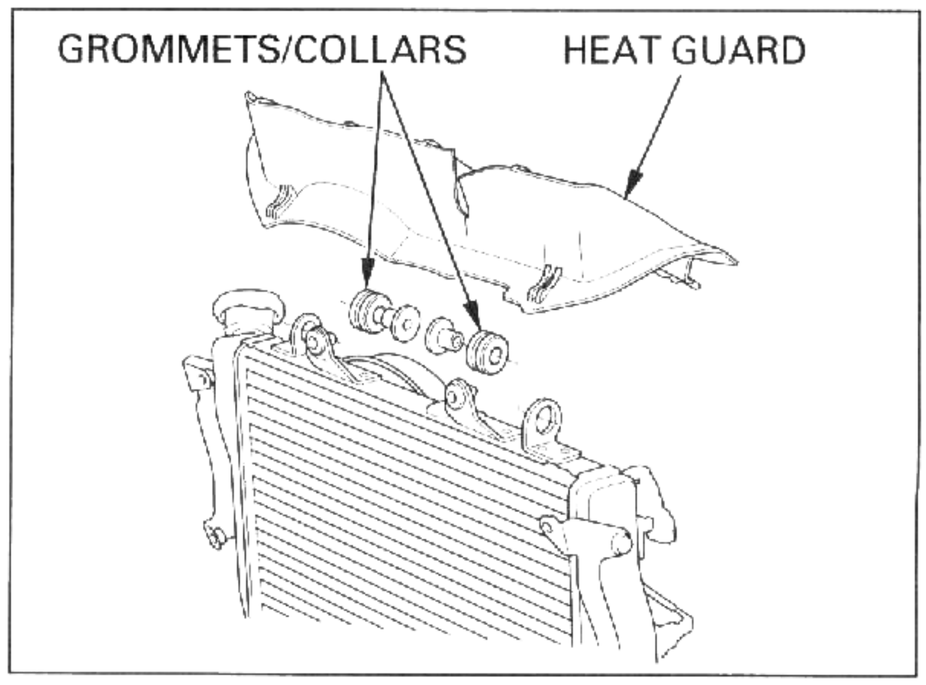


CAUTION:

Be careful not to damage the radiator core.

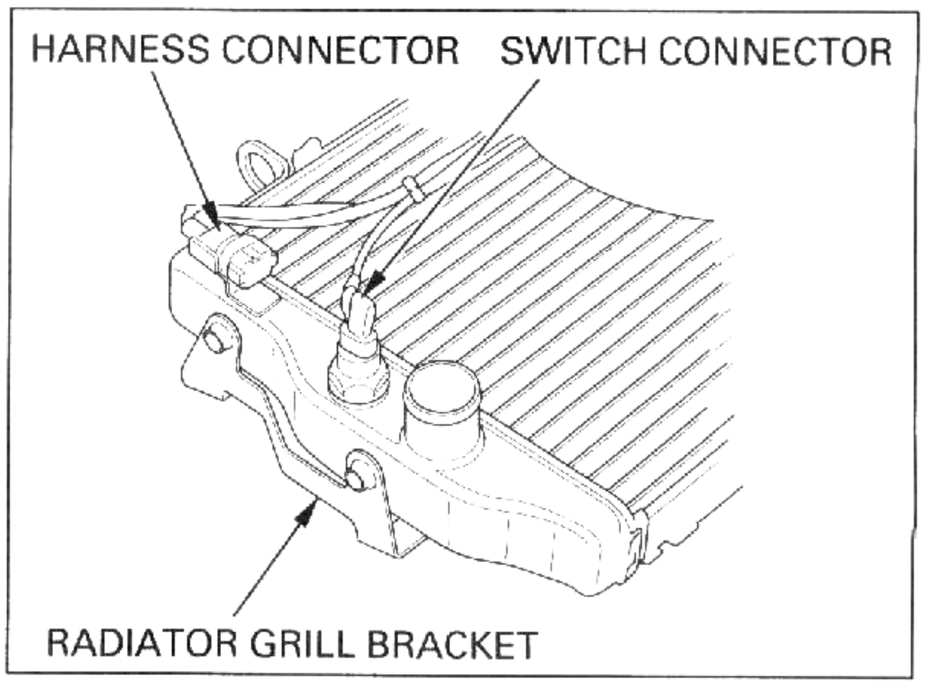
DISASSEMBLY

Remove the collars and grommets from the radiator mounting bosses, then remove the heat guard from the radiator.

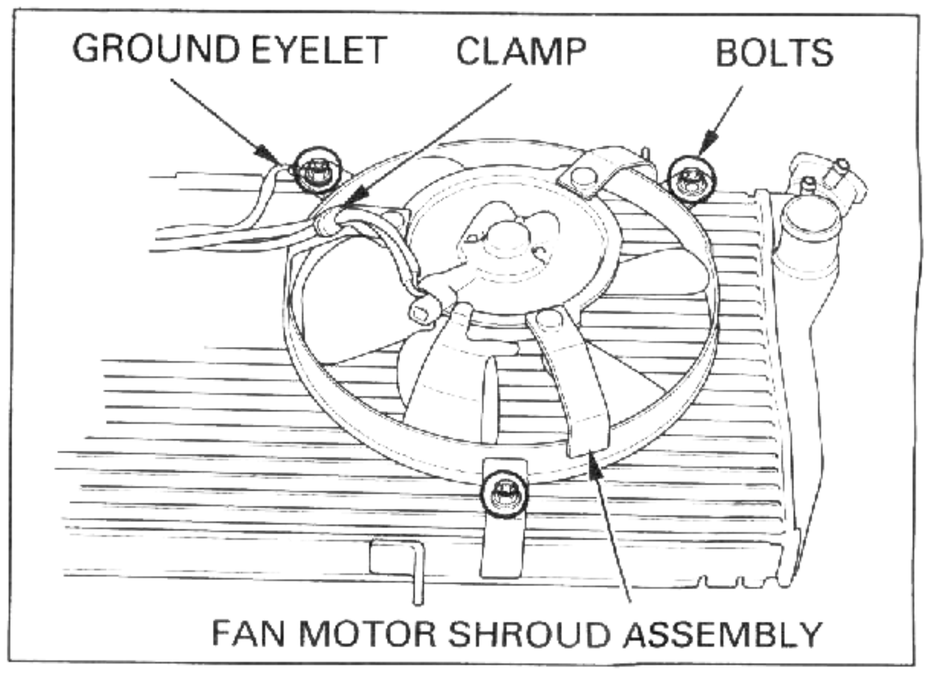


Release the fan motor sub-harness connector from the radiator bracket.
Disconnect the fan motor switch connector.

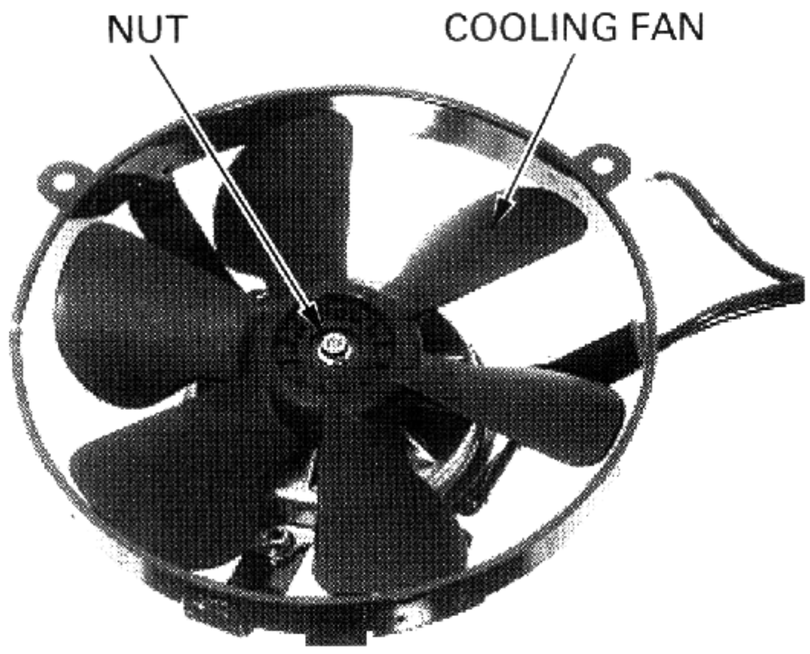
If necessary, remove the bolts and radiator grill mounting brackets.



Release the radiator sub-harness from the clamp.
Remove the three bolts, ground eyelet and cooling fan motor shroud assembly.

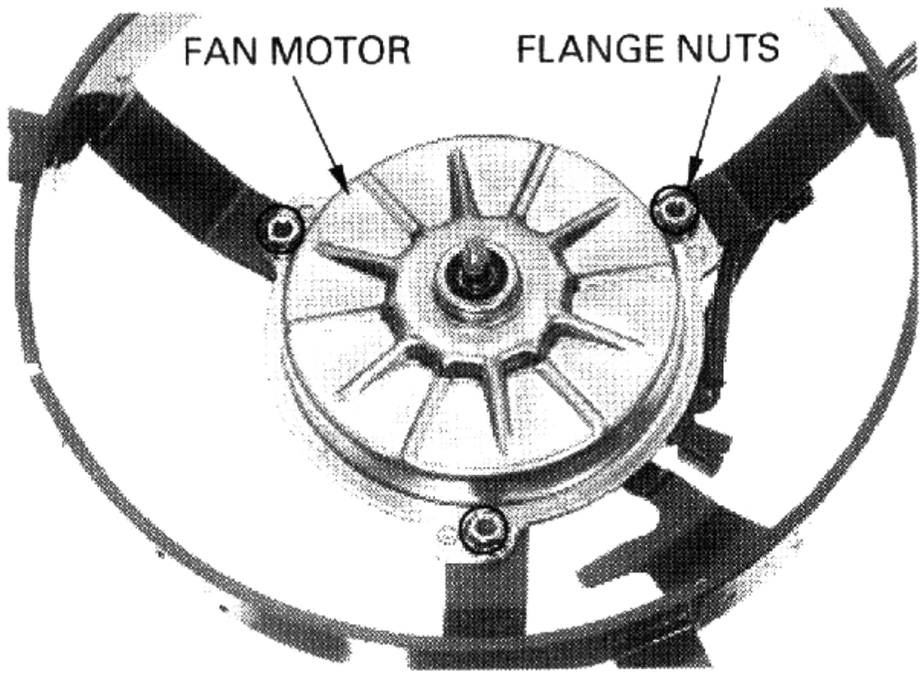


Remove the nut and cooling fan.

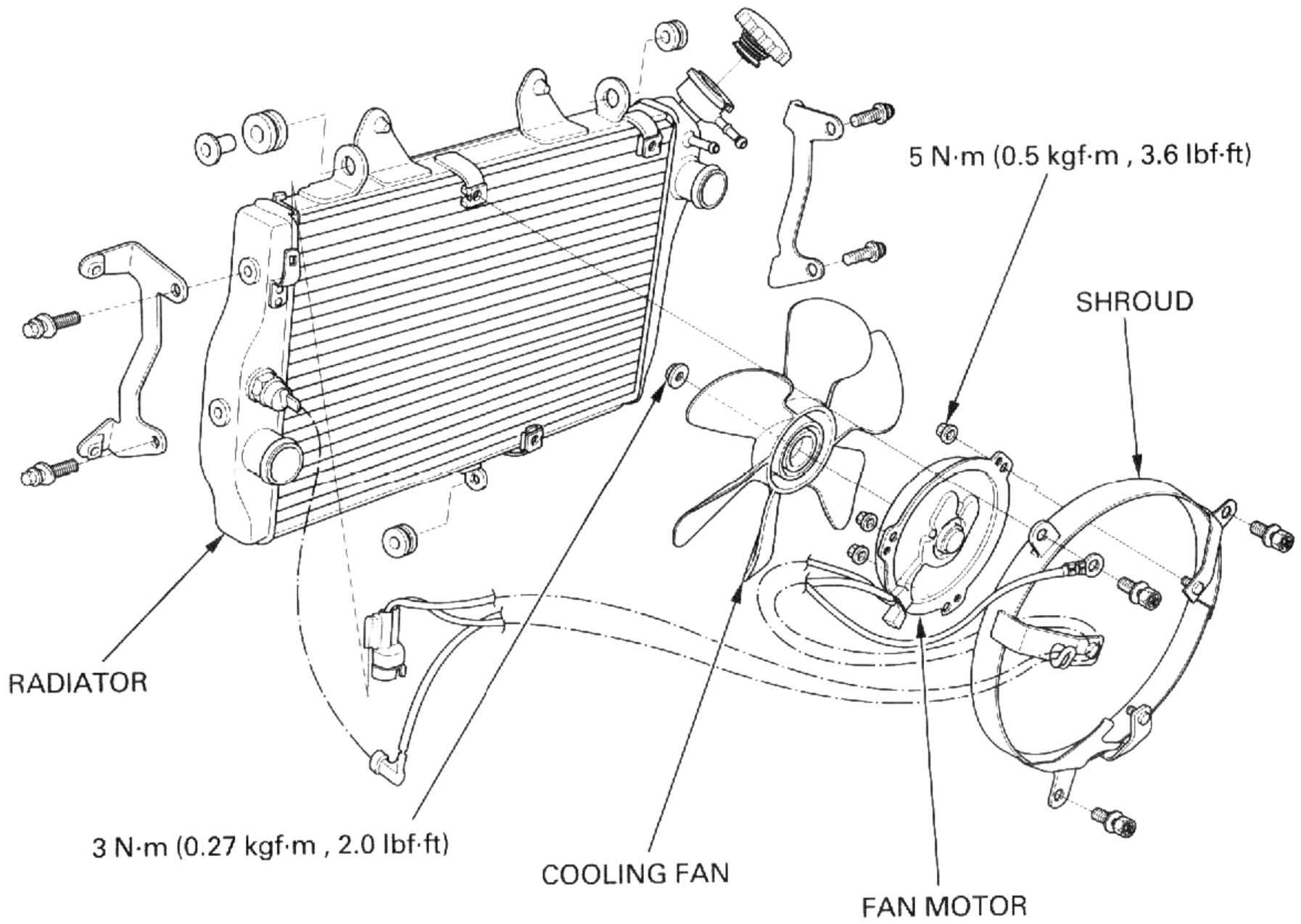


Remove the flange nuts and fan motor from the shroud.

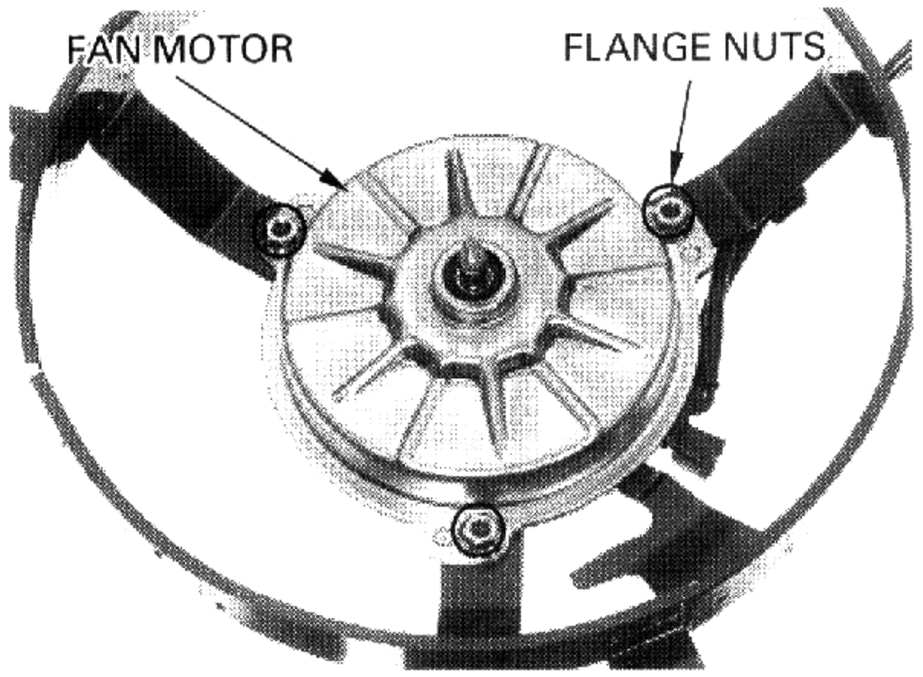
For fan motor switch information, refer to page 19-16.



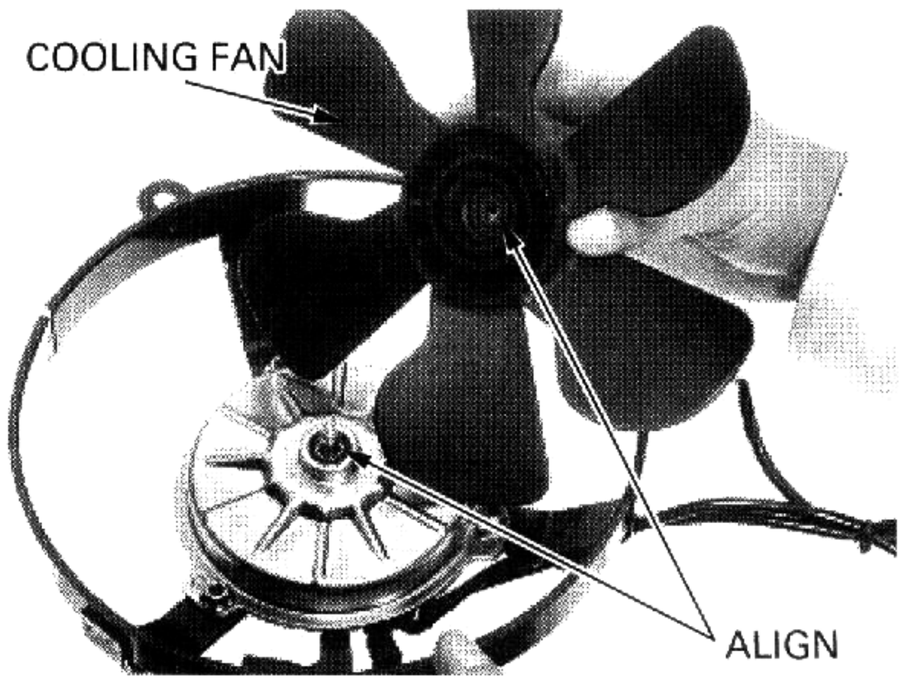
ASSEMBLY



Install the fan motor onto the fan motor shroud and tighten the nuts.

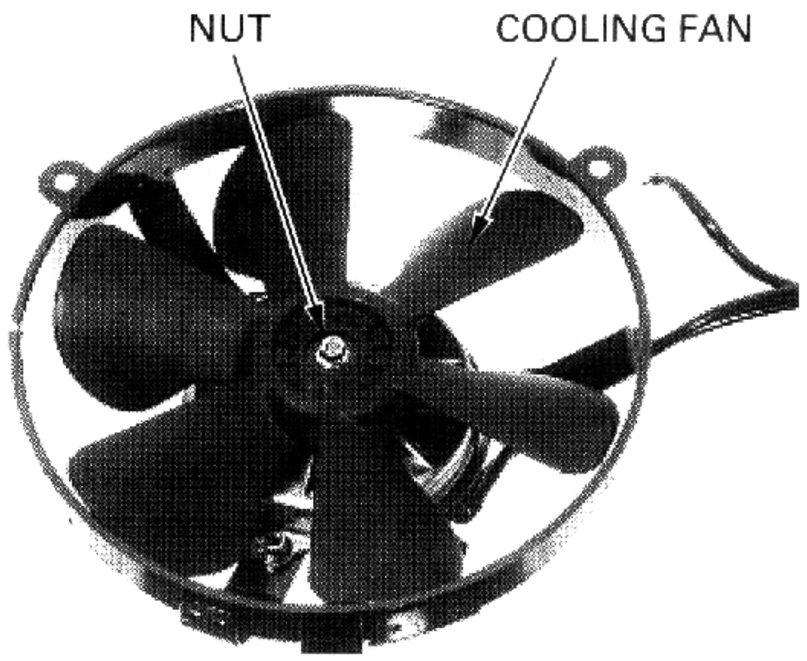


Install the cooling fan onto the fan motor shaft by aligning the flat surfaces.

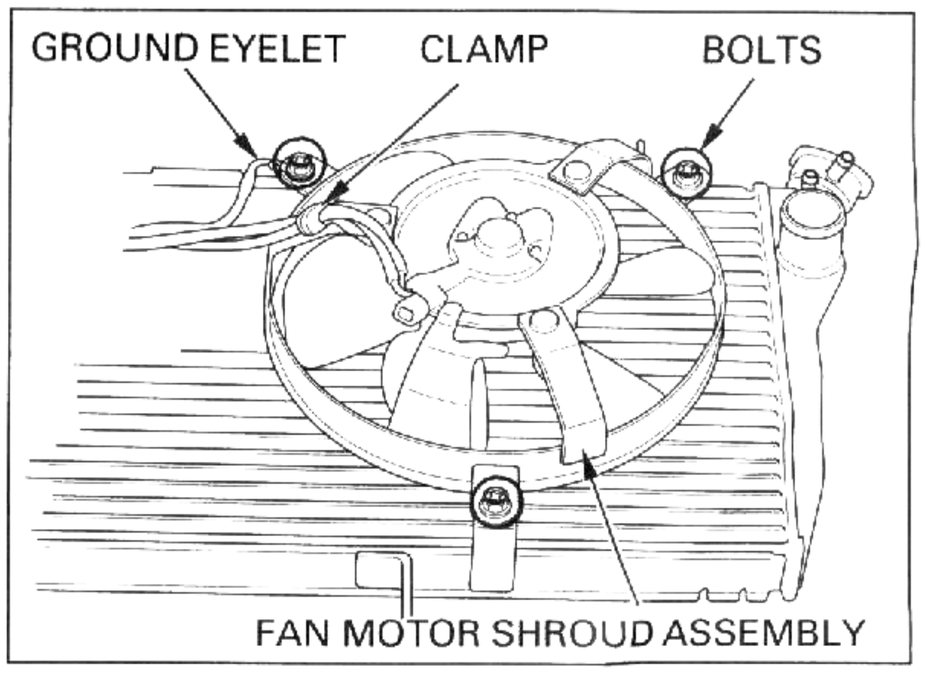


Apply a locking agent to the cooling fan nut threads.
Install and tighten the nut to the specified torque.

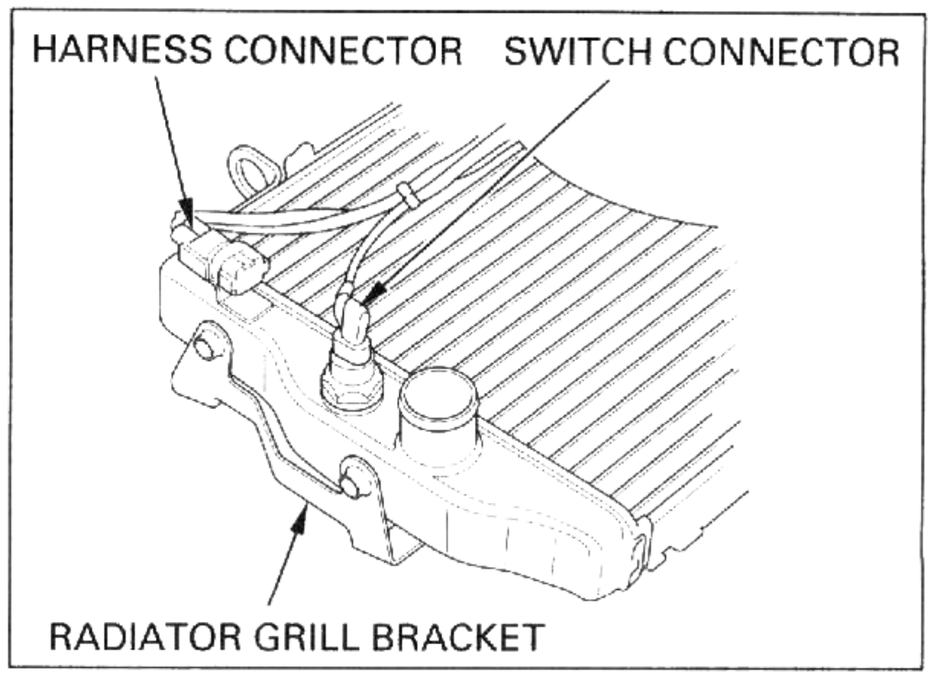
TORQUE: 5 N·m (0.5 kgf·m , 3.6 lbf·ft)



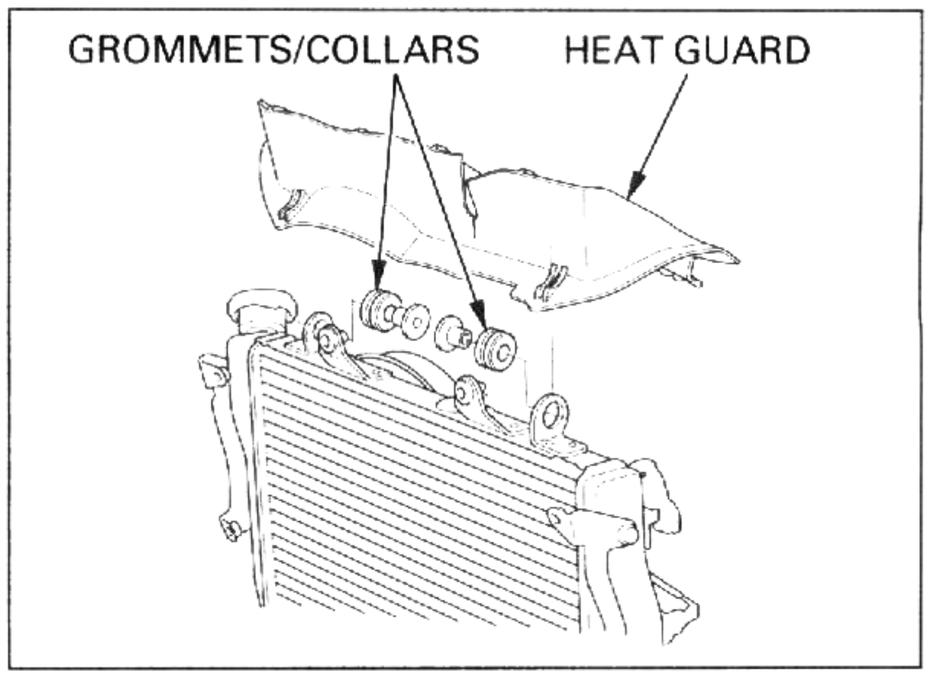
Install the cooling fan motor shroud assembly onto the radiator.
Route the fan motor switch cord and ground eyelet properly.
Install and tighten the bolts.



Connect the fan motor switch cord to the fan motor switch.
Install the radiator sub-harness connector to the radiator bracket.
Install the radiator grill brackets and tighten the bolts.



Install the heat guard rubber onto the radiator aligning its slits with the radiator mounting bosses.
Install the grommets and collars into the radiator mounting brackets.



INSTALLATION

CAUTION:

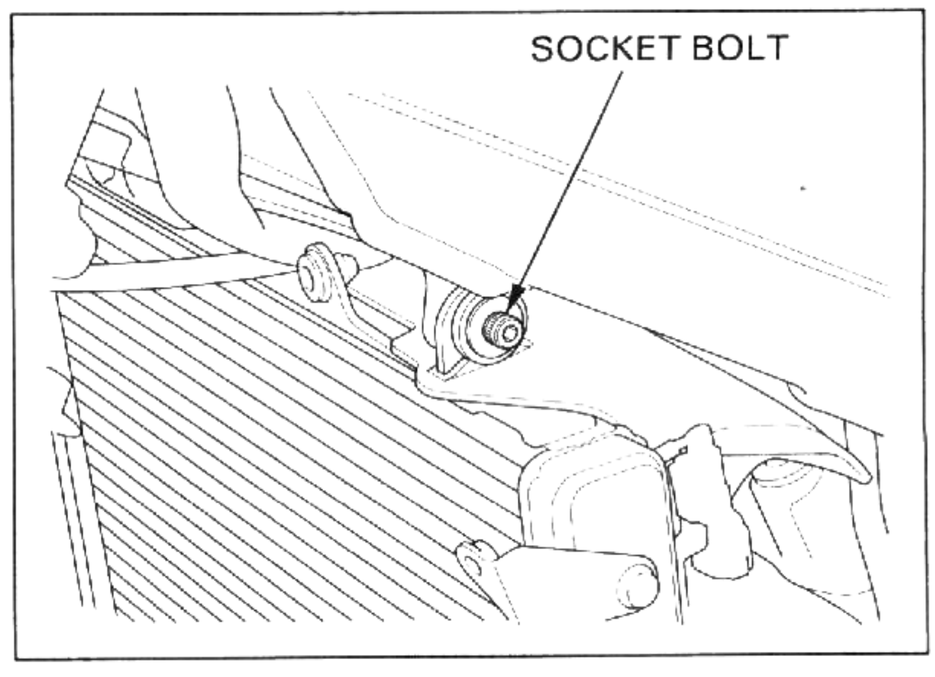
Be careful not to damage the radiator core.

Install the heat guard rubber bosses into the cylinder head holes.

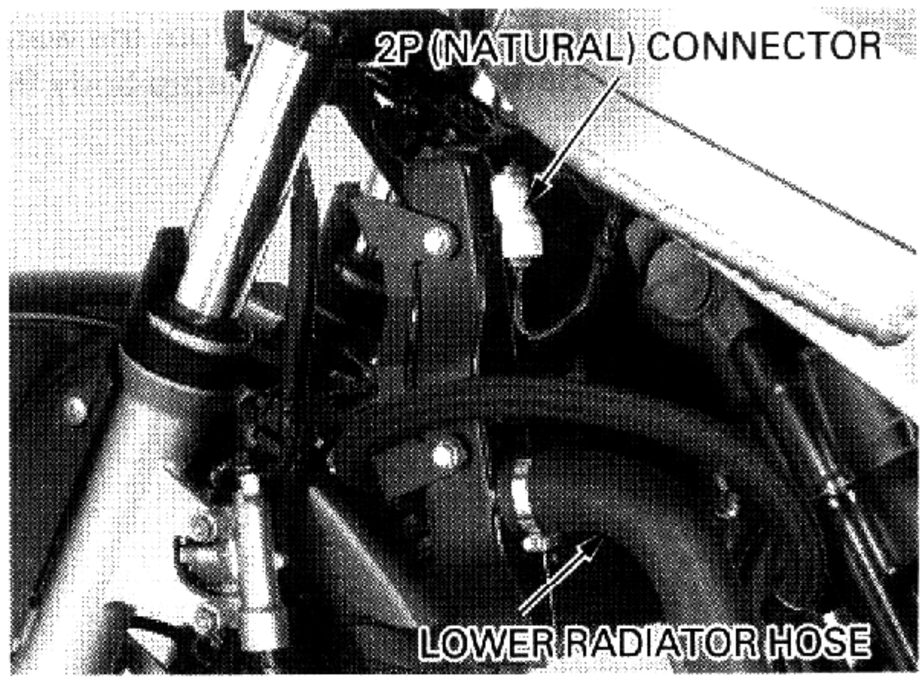
Install the radiator assembly, aligning its grommets with the bosses on the upper and lower brackets.



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



Connect the fan motor sub-harness 2P (Natural) connector.
Connect the lower radiator hose.

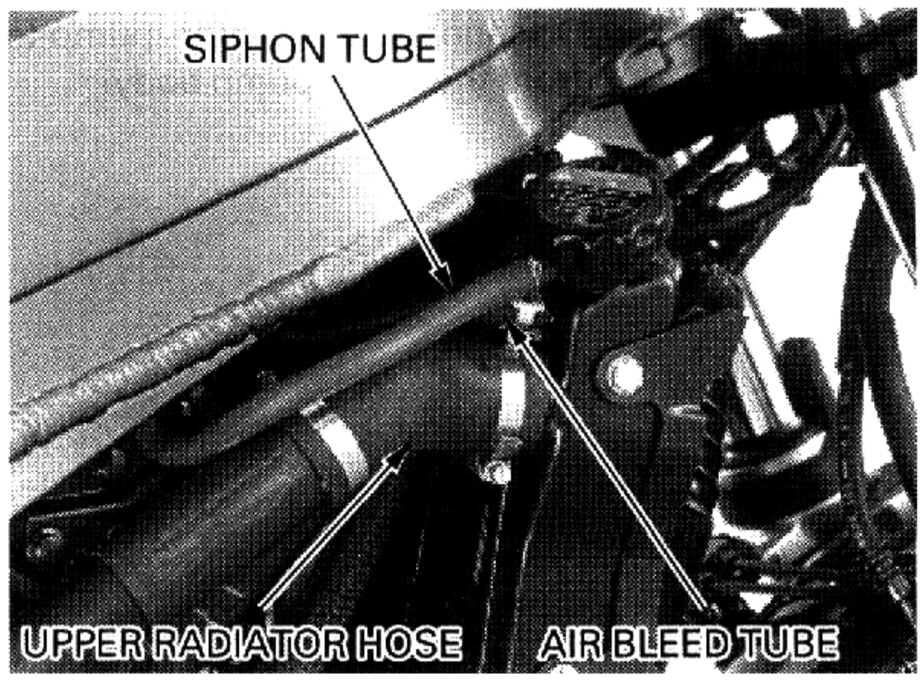


Connect the upper radiator hose.
Connect the siphon tube and air bleed tube to the radiator.

Install the oil cooler onto the brackets, install and tighten the mounting bolts (page 4-14).

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

Install the radiator grill (page 2-4).



WATER PUMP

MECHANICAL SEAL INSPECTION

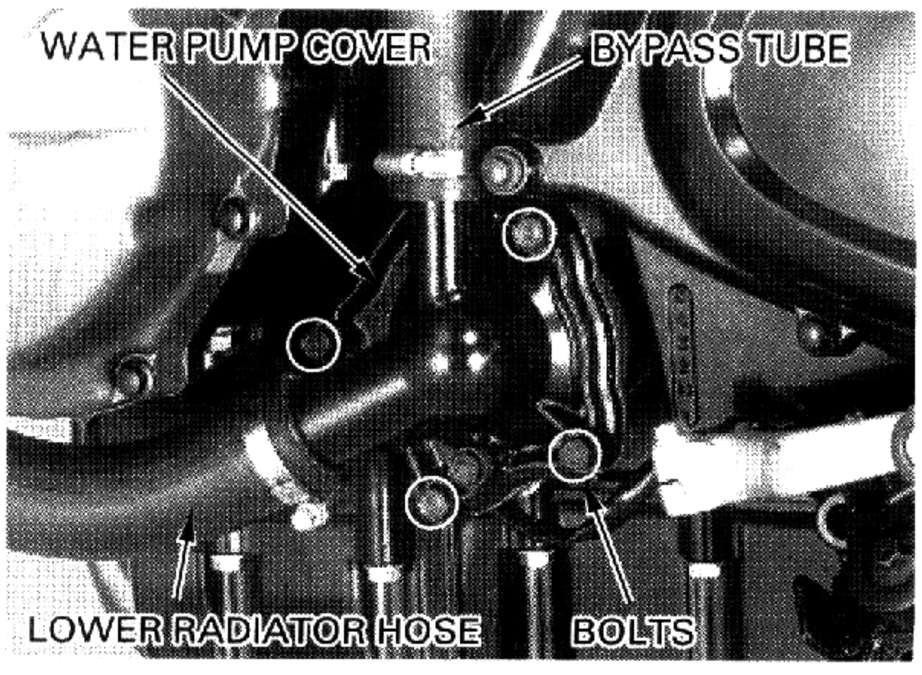
Inspect the inspection hole for signs of coolant leakage.
If there is leakage, the mechanical seal is defective and replace the water pump as an assembly.



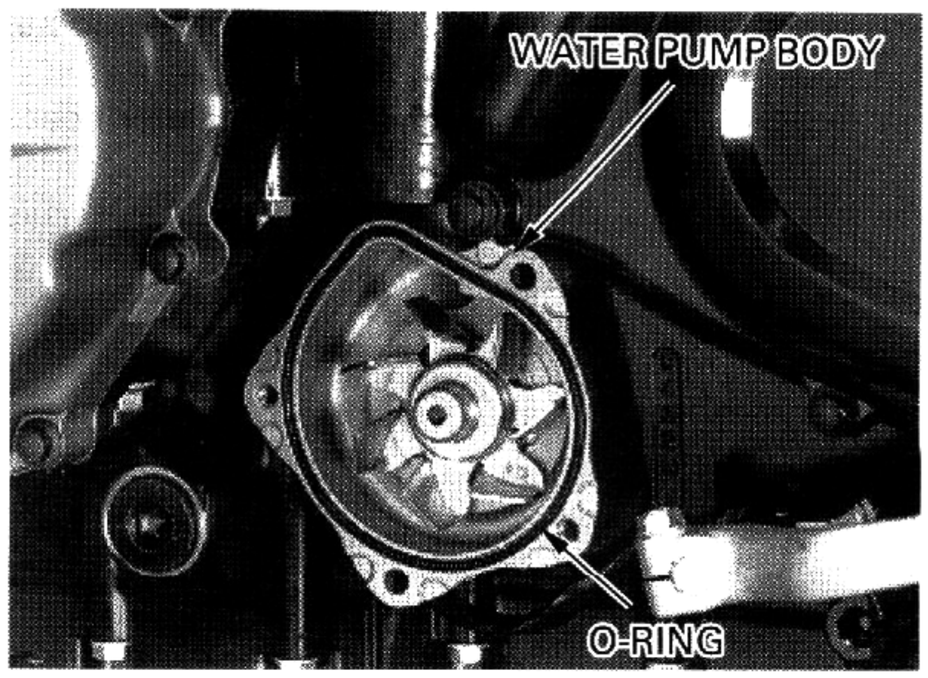
REMOVAL

Drain the coolant (page 6-4).

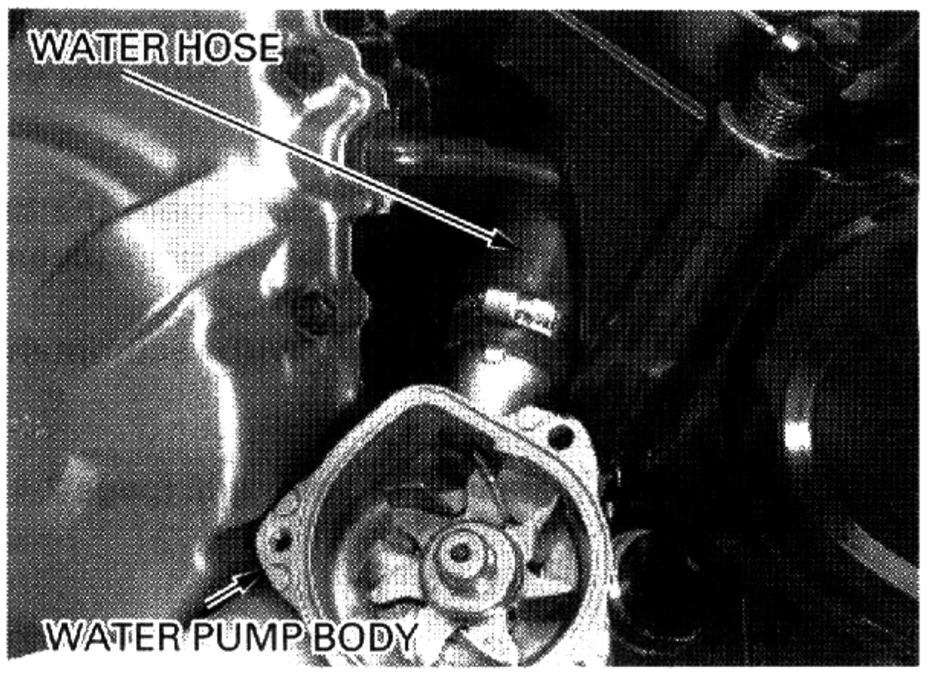
Disconnect the lower radiator hose and bypass tube from the water pump cover.
Remove the four flange bolts and water pump cover.



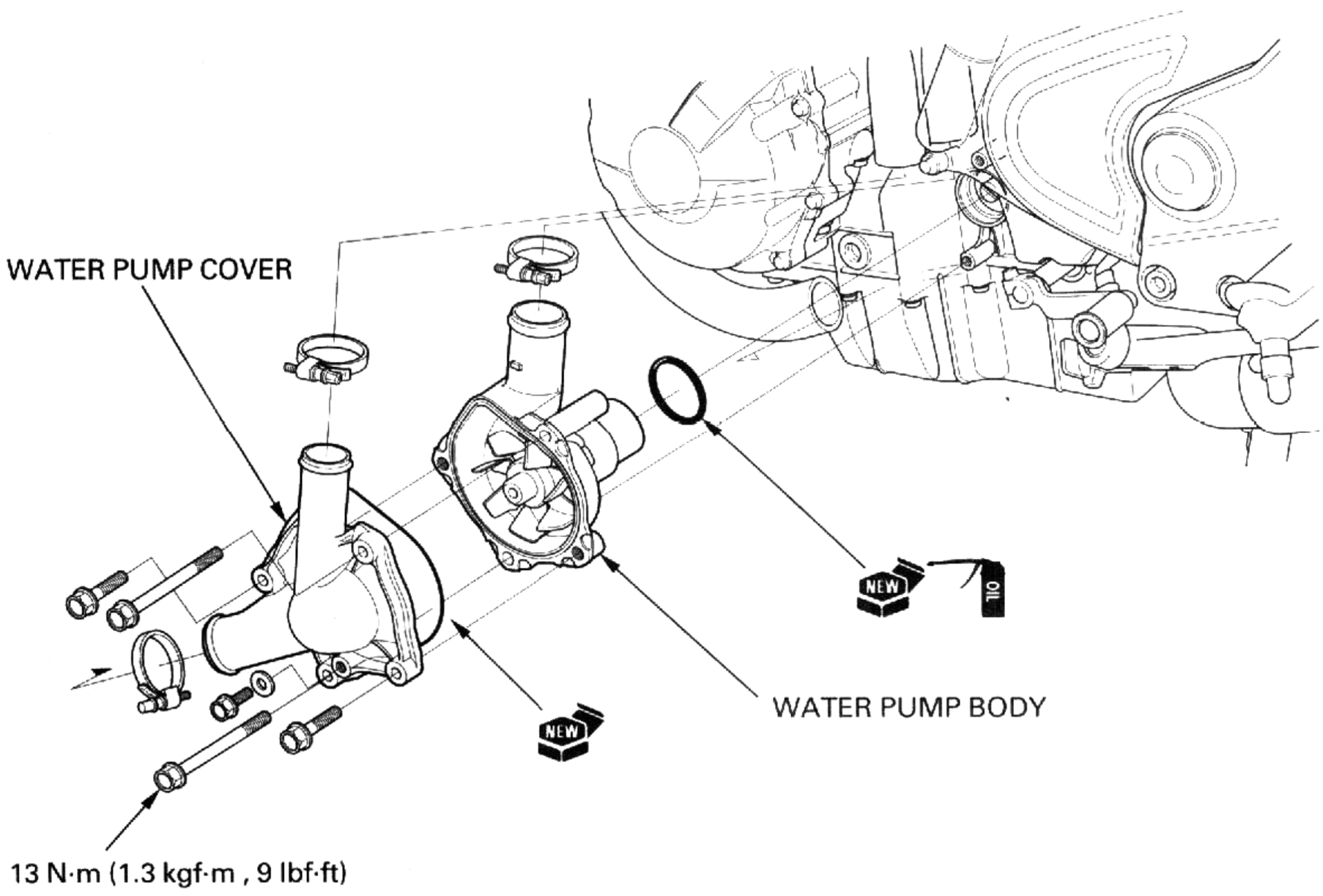
Remove the O-ring from the water pump body.
Remove the water pump body from the crankcase.



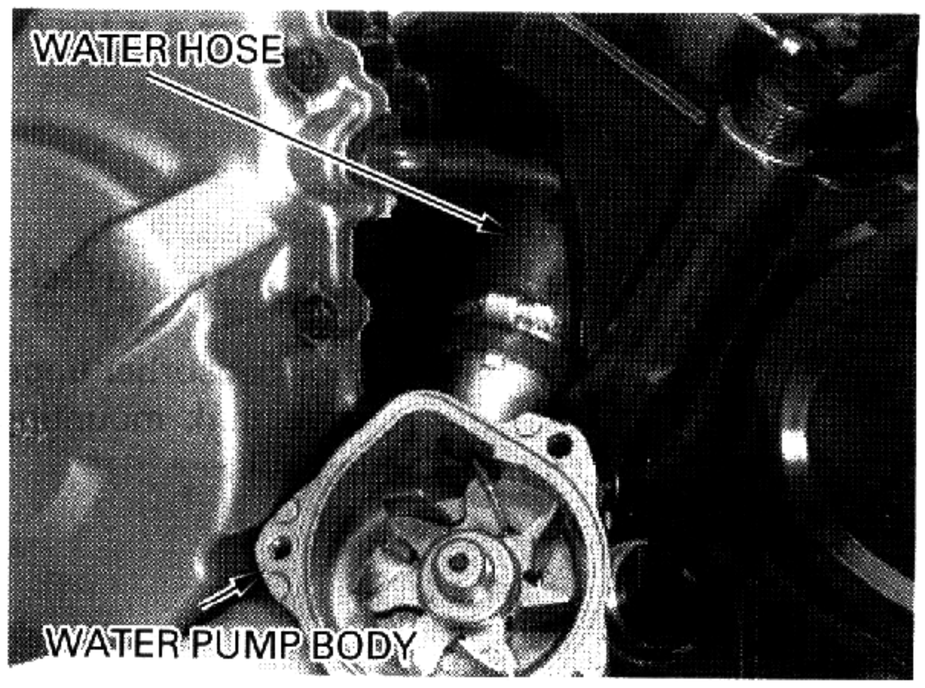
Disconnect the water pump-to-water joint hose from the water pump body.



INSTALLATION



Connect the water pump-to-water joint hose to the water pump and tighten the clamp screw.



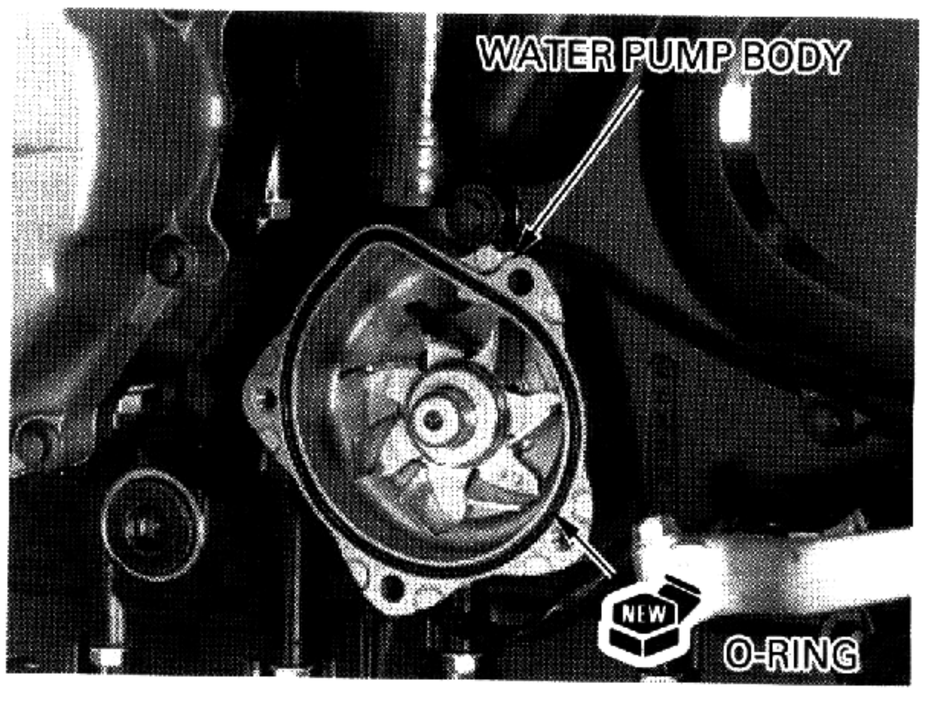
Apply engine oil to a new O-ring and install it onto the stepped portion of the water pump.

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



Align the mounting bolt holes in the water pump and crankcase and make sure the water pump is securely installed.

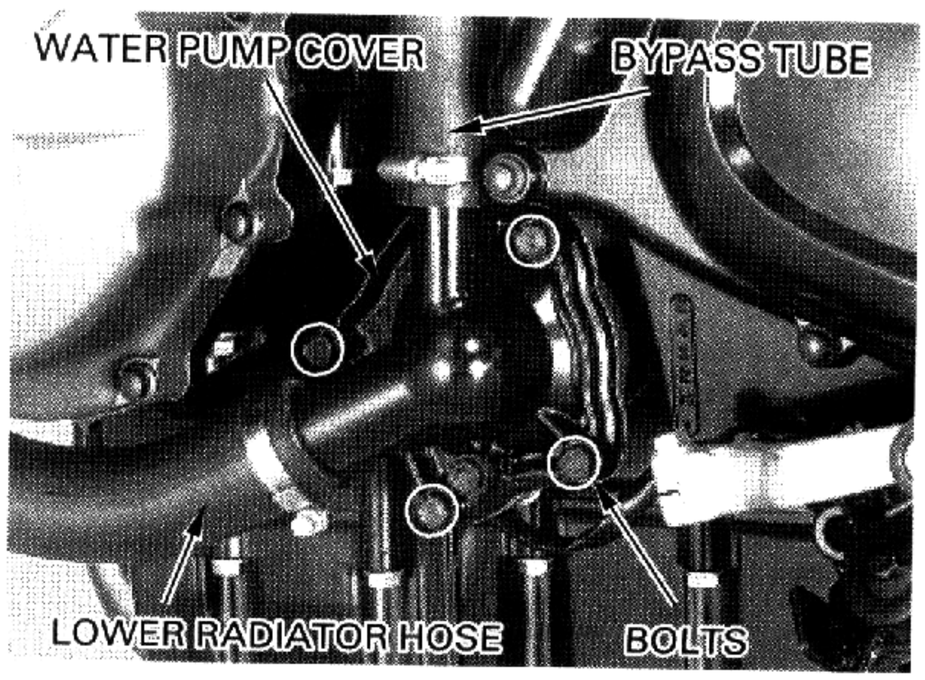
Install a new O-ring into the groove in the water pump body.



Install the water pump cover and tighten the four flange bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m , 9 lbf·ft)

Connect the lower radiator hose and bypass tube, then tighten the clamp screws.

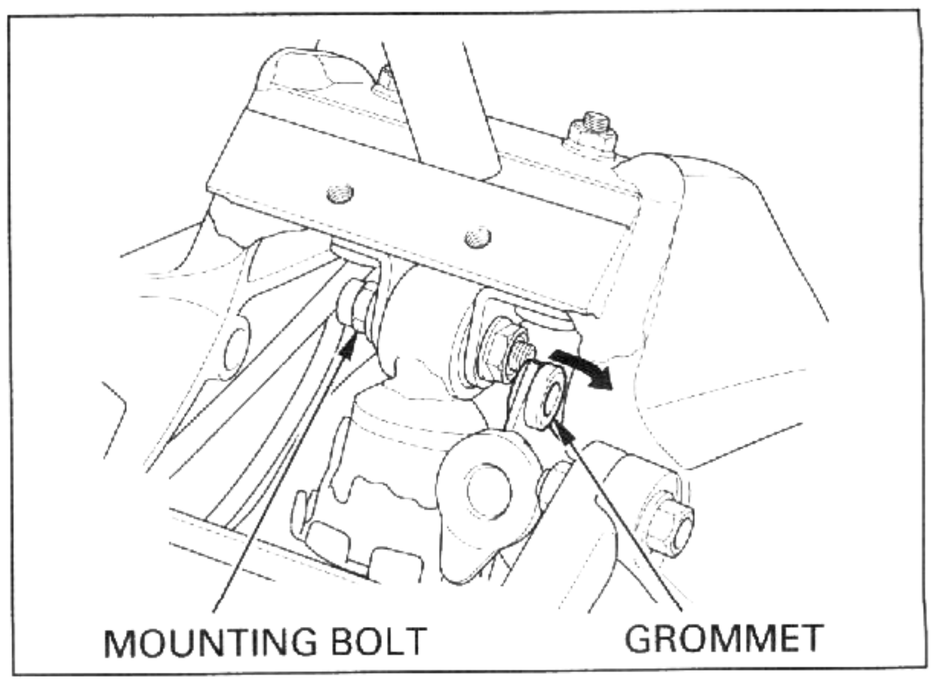


RADIATOR RESERVE TANK

REMOVAL

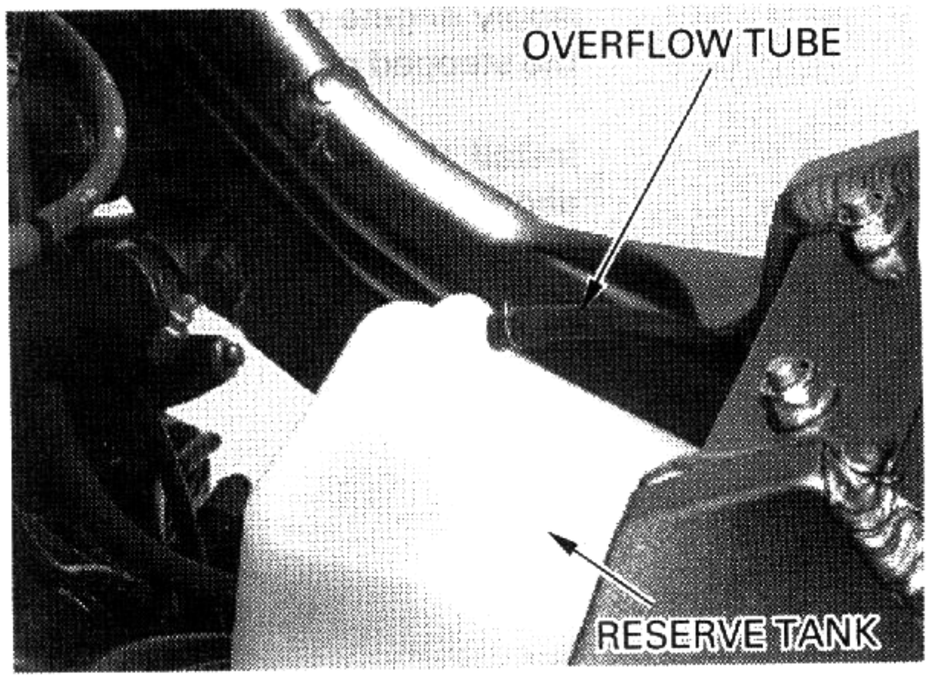
Remove the seat (page 2-2).
Support the rear end of the fuel tank (page 2-11).

Loosen the shock absorber upper mounting bolt so that the reserve tank mounting grommet is free from mounting bolt.



Remove the fuel tank (page 5-56).

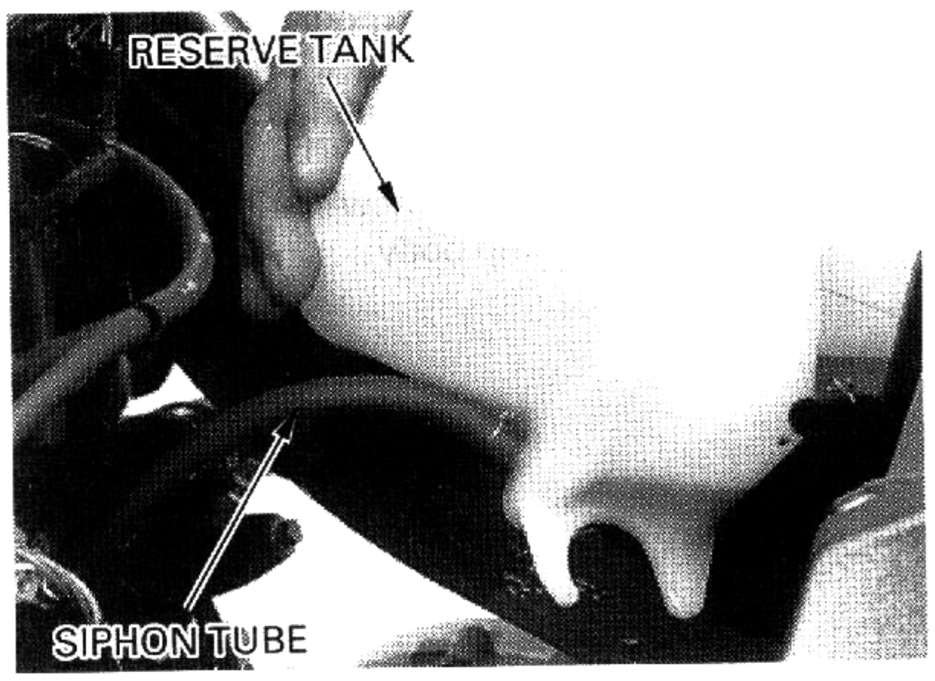
Release the hook from the engine mounting collar, then remove the reserve tank backward.
Disconnect the overflow tube and siphon tube.



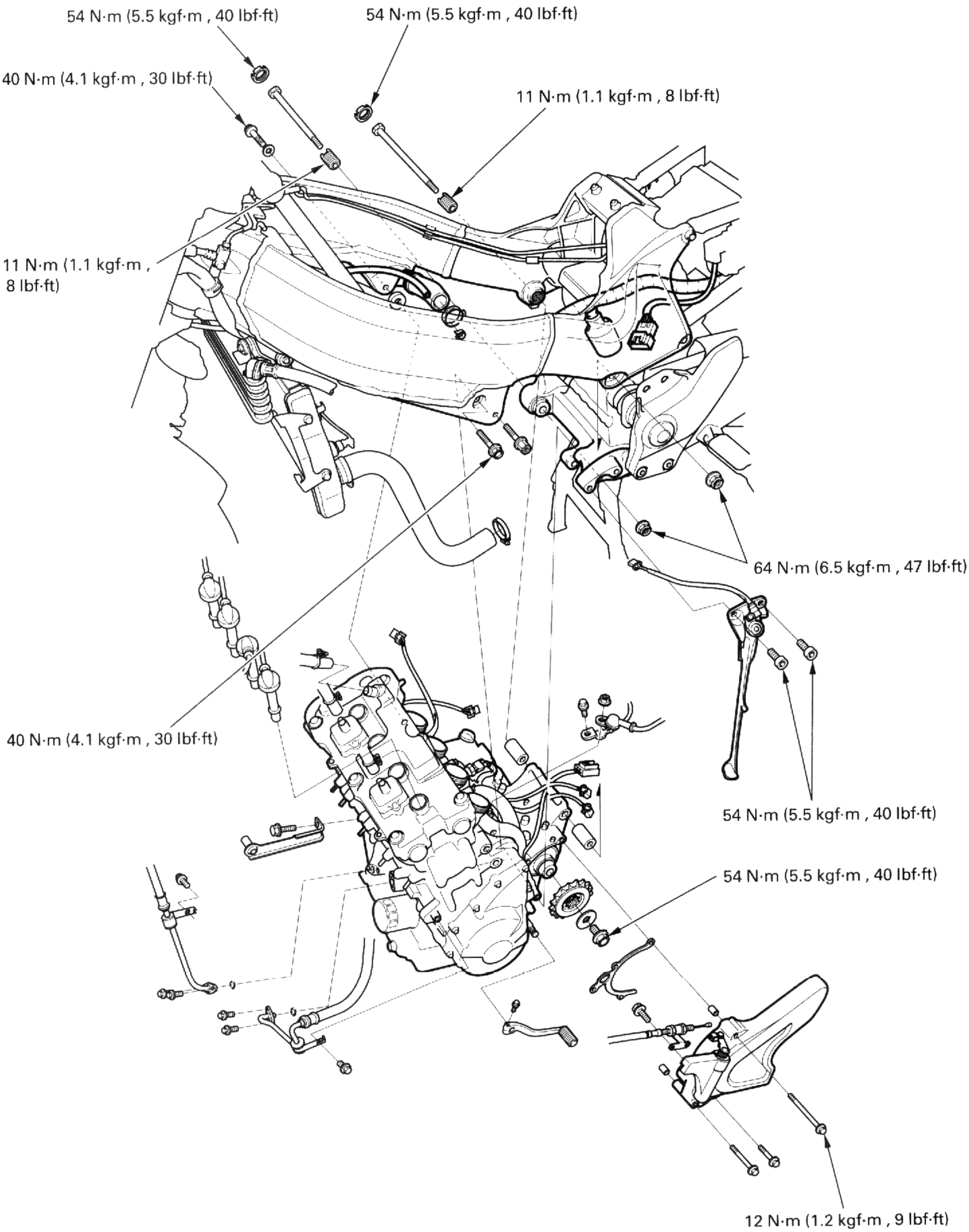
INSTALLATION

Connect the siphon tube to the reserve tank and install the radiator reserve tank aligning its hook with the engine mounting collar.

Install the removed parts in the reverse order of removal.



MEMO


54 N·m (5.5 kgf·m , 40 lbf·ft)
54 N·m (5.5 kgf·m , 40 lbf·ft)
40 N·m (4.1 kgf·m , 30 lbf·ft)
11 N·m (1.1 kgf·m , 8 lbf·ft)
11 N·m (1.1 kgf·m , 8 lbf·ft)
64 N·m (6.5 kgf·m , 47 lbf·ft)
40 N·m (4.1 kgf·m , 30 lbf·ft)
54 N·m (5.5 kgf·m , 40 lbf·ft)
54 N·m (5.5 kgf·m , 40 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)

7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION	7-1	ENGINE INSTALLATION	7-6
ENGINE REMOVAL	7-2		

SERVICE INFORMATION

GENERAL

- During engine removal and installation, support the motorcycle on its center stand.
- Support the engine using a jack or other adjustable support to ease of engine hanger bolts removal.

CAUTION:

Do not use the oil filter as a jacking point.

- The following components can be serviced with the engine installed in the frame.
  - —Alternator (Section 10)
  - —Clutch (Section 9)
  - —Cylinder head/valves (Section 8)
  - —Balancer (Section 12)
  - —Gearshift linkage (Section 9)
  - —Oil cooler (Section 4)
  - —Oil pump (Section 4)
  - —Shift forks/shift drum (Section 9)
  - —Water pump (Section 6)
- The following components require engine removal for service.
  - —Crankshaft/transmission (Section 12)
  - —Piston/cylinder (Section 11)

SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine dry weight		82.8 kg (182.5 lbs)
Coolant capacity	Radiator and engine	3.2 ℓ (3.4 US qt , 2.8 Imp qt)
Engine oil capacity	At disassembly	4.6 ℓ (4.9 US qt , 4.0 Imp qt)

TORQUE VALUES

Side stand bracket bolt	54 N·m (5.5 kgf·m , 40 lbf·ft)
Engine hanger bolt	40 N·m (4.1 kgf·m , 30 lbf·ft)
Engine hanger nut (Rear/upper)	64 N·m (6.5 kgf·m , 47 lbf·ft)
(Rear/lower)	64 N·m (6.5 kgf·m , 47 lbf·ft)
Engine hanger adjusting bolt	11 N·m (1.1 kgf·m , 8 lbf·ft)
Engine hanger adjusting bolt lock nut	54 N·m (5.5 kgf·m , 40 lbf·ft)
Drive sprocket special bolt	54 N·m (5.5 kgf·m , 40 lbf·ft)

TOOLS

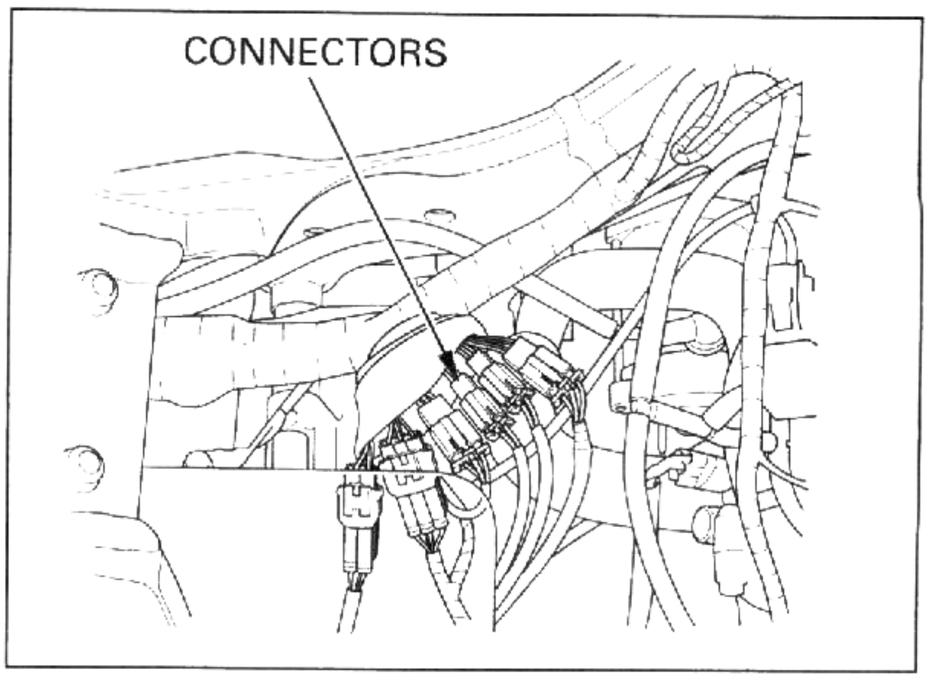
Lock nut wrench	07VMA-MAT0100

ENGINE REMOVAL

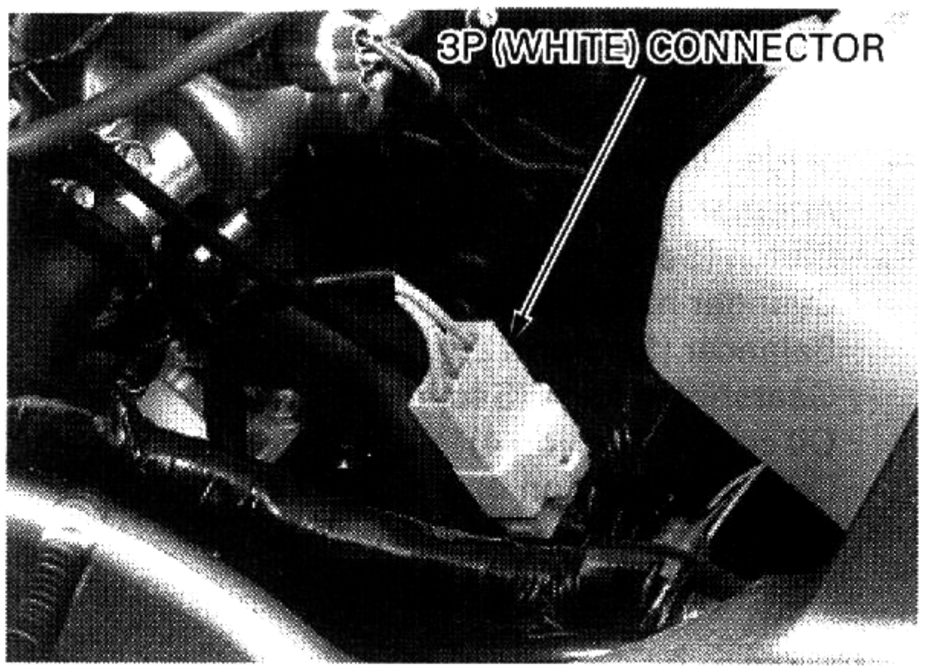
Support the motorcycle securely on its center stand.

Remove the following:
- Fuel tank (page 5-56)
- Throttle body (page 5-63)

Disconnect the following connectors:
- Ignition pulse generator 2P (Red) connector
- Cam pulse generator 2P (Natural) connector
- Speed sensor 3P (Natural) connector
- Side stand switch 2P (Green) connector
- Engine sub-harness 6P (Natural) connector
- O_2 sensor 4P (Gray) connector



Disconnect the alternator 3P (White) connector.



Disconnect the spark plug caps.

Disconnect the PAIR air tubes from the PAIR reed valve cover.
Remove the PAIR solenoid valve/tubes assembly.



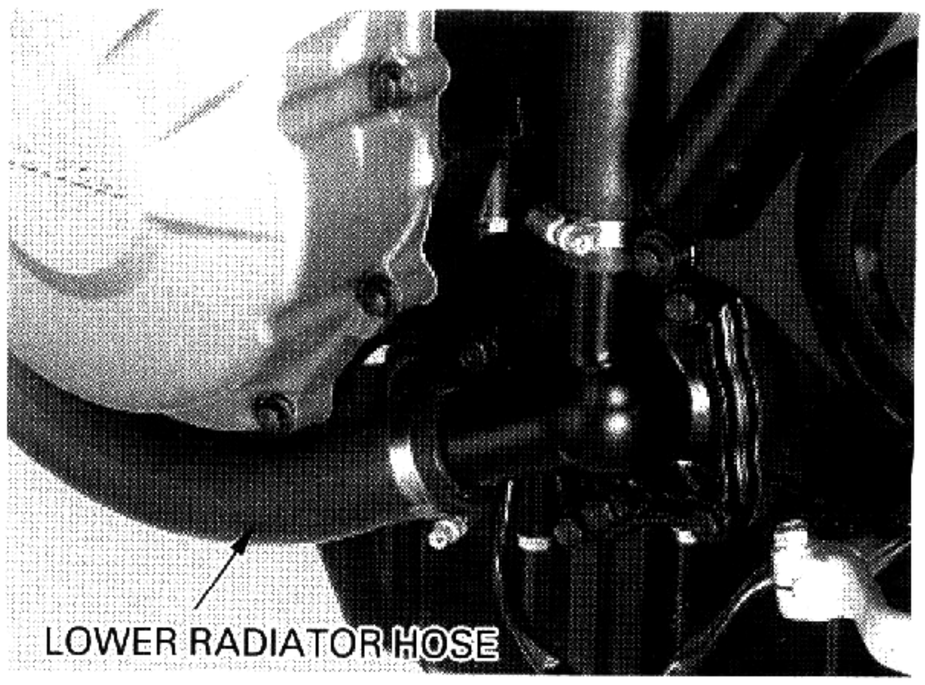
Disconnect the air bleed tube and upper radiator hose from the thermostat housing cover.

Remove the bolts and water joint from the cylinder block.
Remove the bolt and starter motor ground cable.
Remove the nut and starter motor cable.

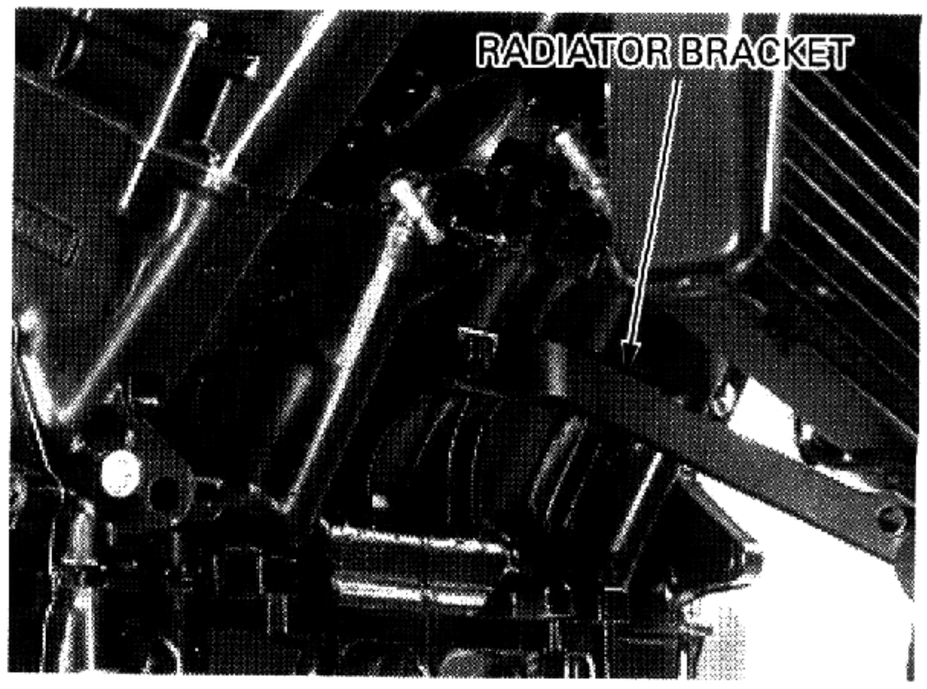


Disconnect the lower radiator hose from the water pump cover.

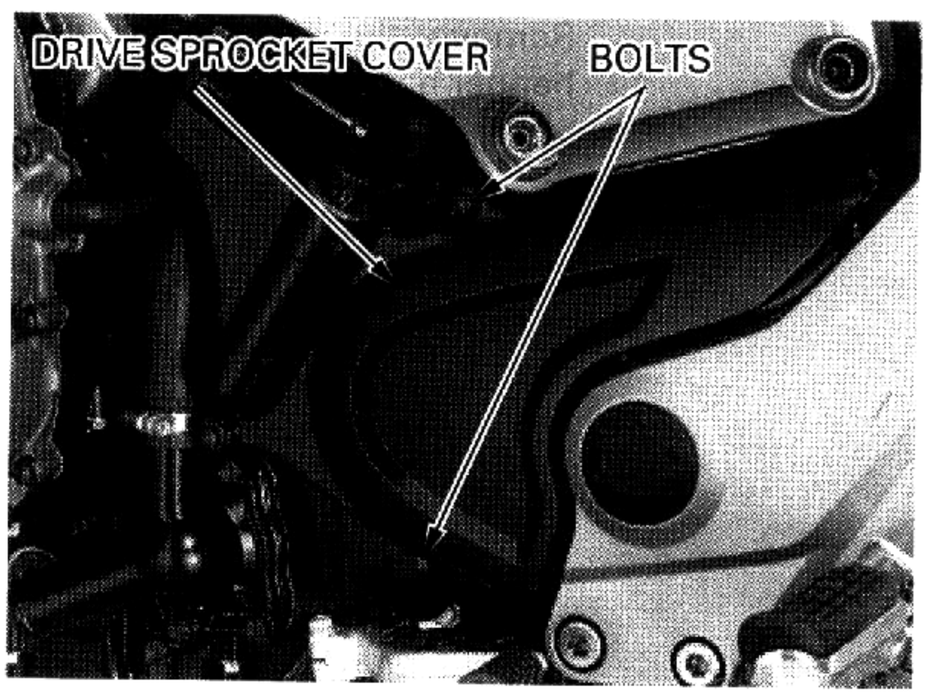
Remove the following:
—Muffler/exhaust pipe (page 2-10)
—Oil pipes (page 4-12)



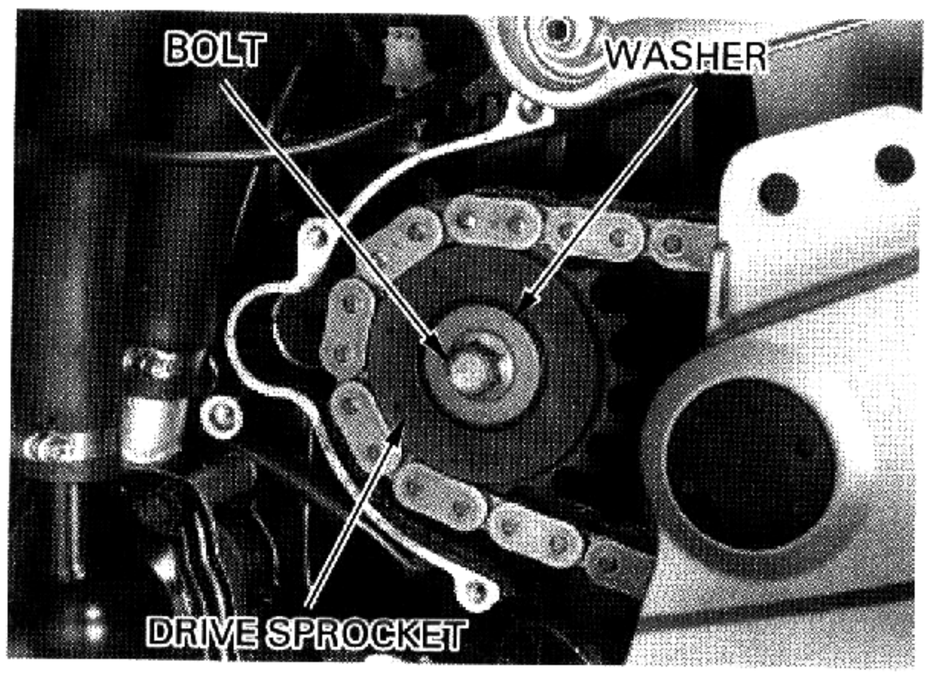
Remove the bolt and radiator lower bracket.



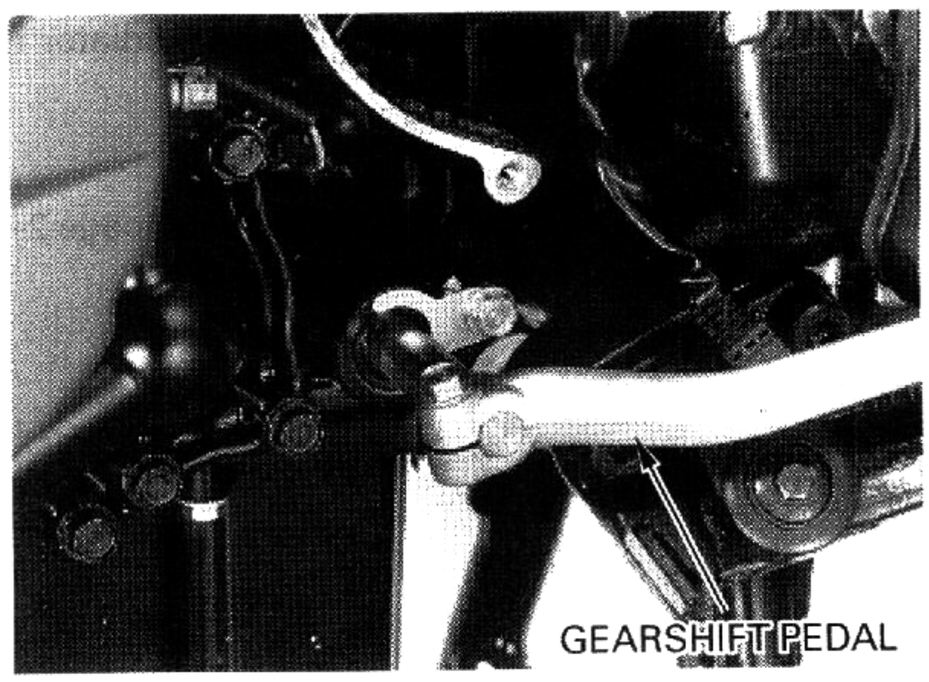
Remove the SH bolts, drive sprocket cover and guide plate.



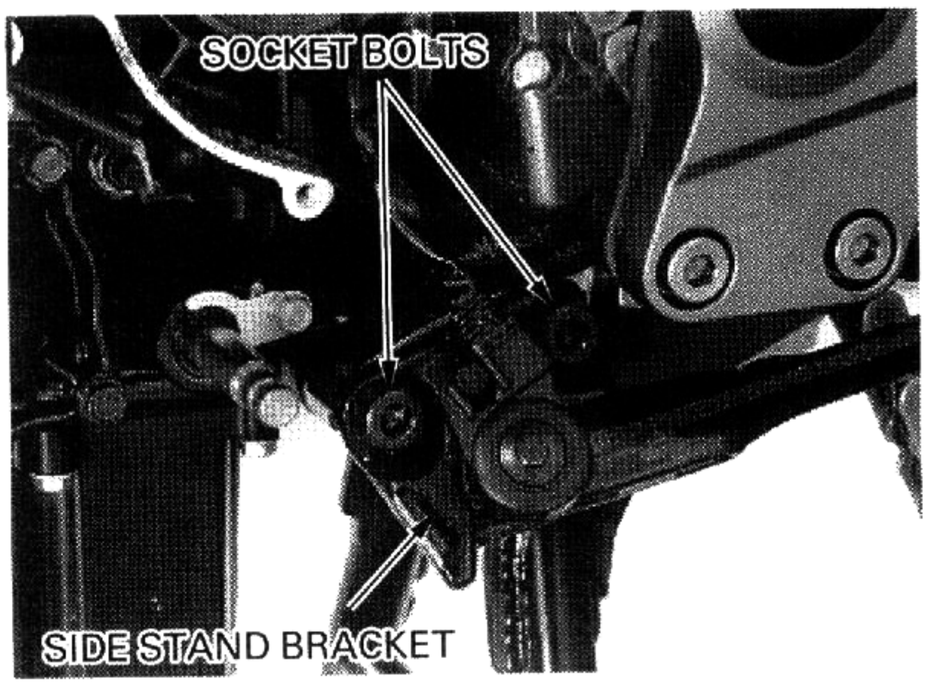
Loosen the rear axle nut and make the drive chain slack fully.
Shift the transmission into 5th gear and apply rear brake.
Remove the bolt, washer and drive sprocket.



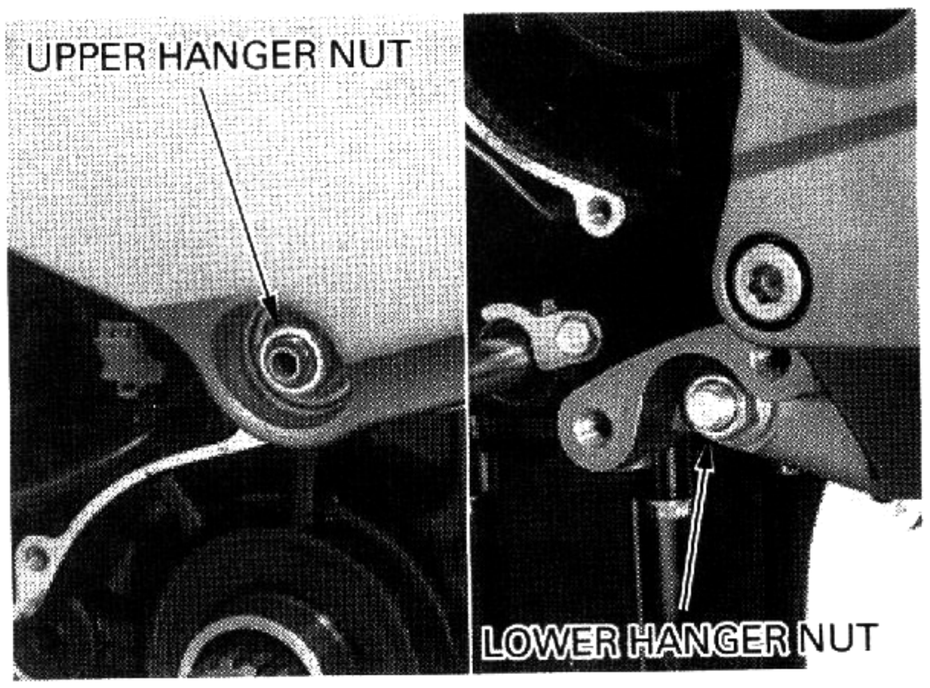
Remove the bolt and gearshift pedal.



Remove the socket bolts and side stand bracket assembly.



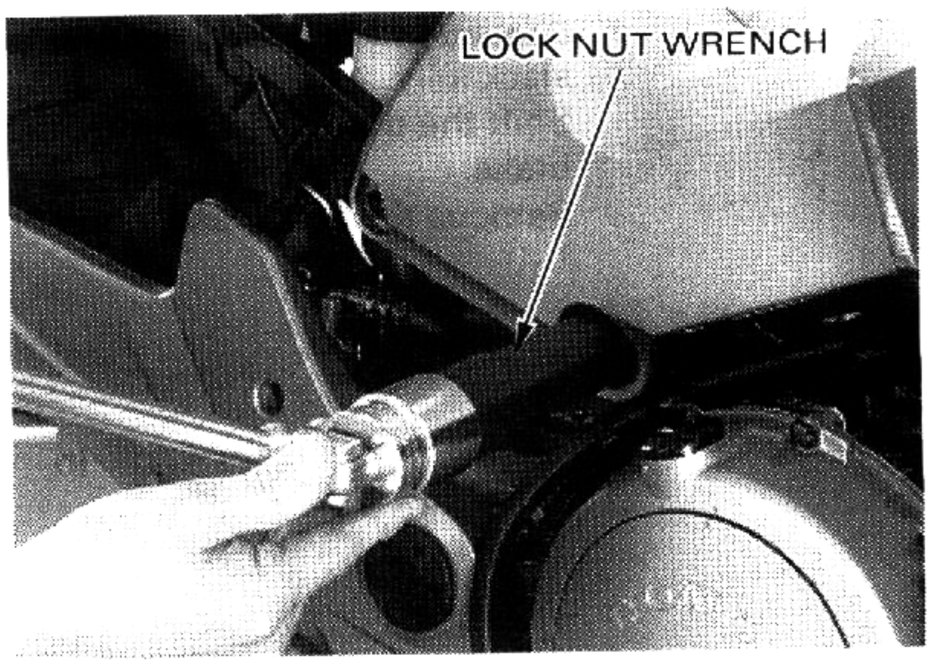
Remove the rear/upper and rear/lower engine hanger nuts.



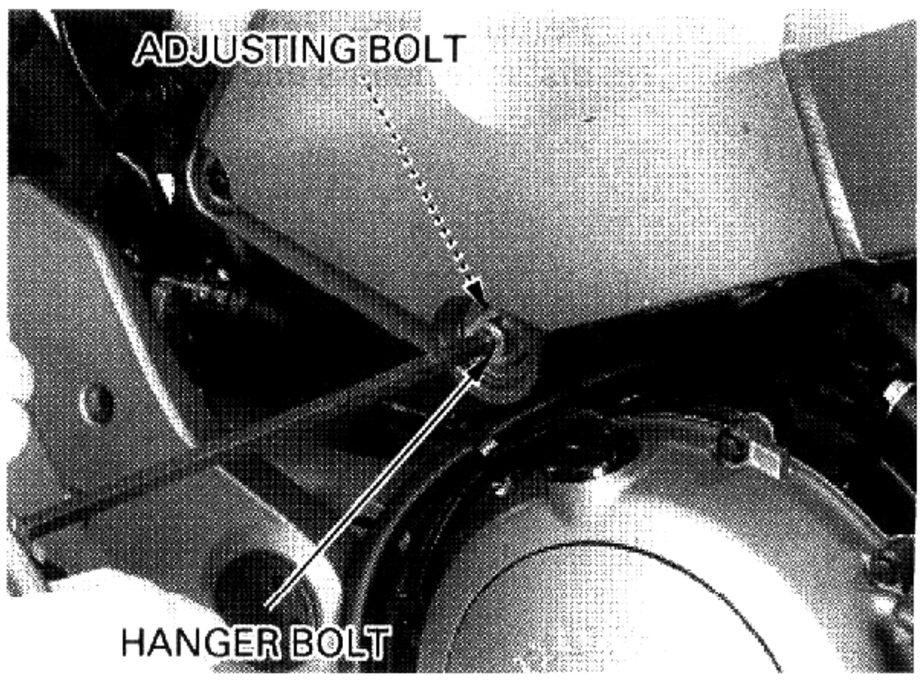
Loosen the rear/upper engine hanger adjusting bolt lock nut using the special tool.

TOOL:

Lock nut wrench	07VMA-MAT0100

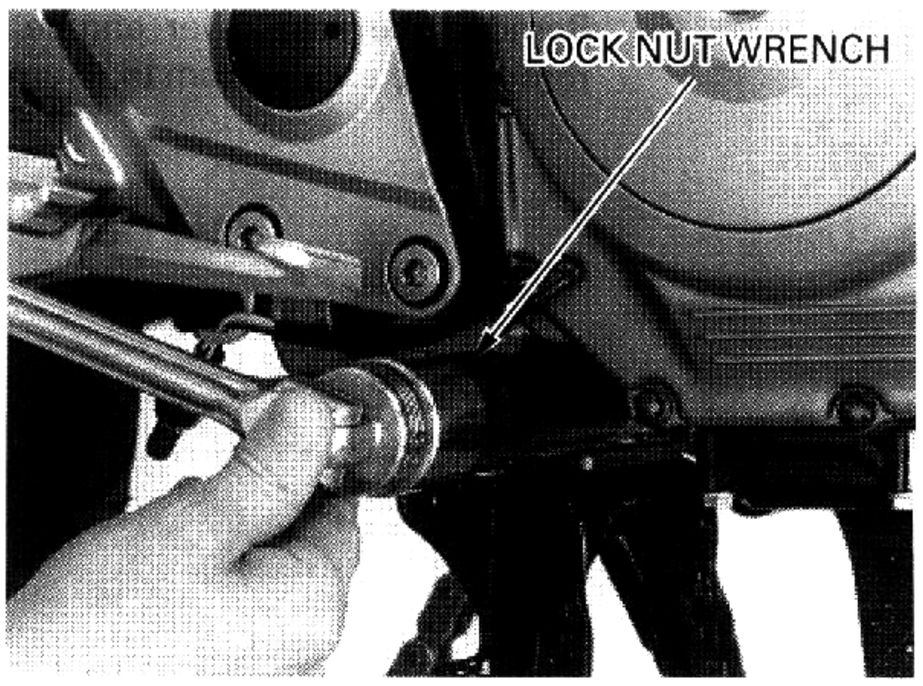


Turn the adjusting bolt with the engine hanger bolt counterclockwise to release the adjusting bolt from the engine.

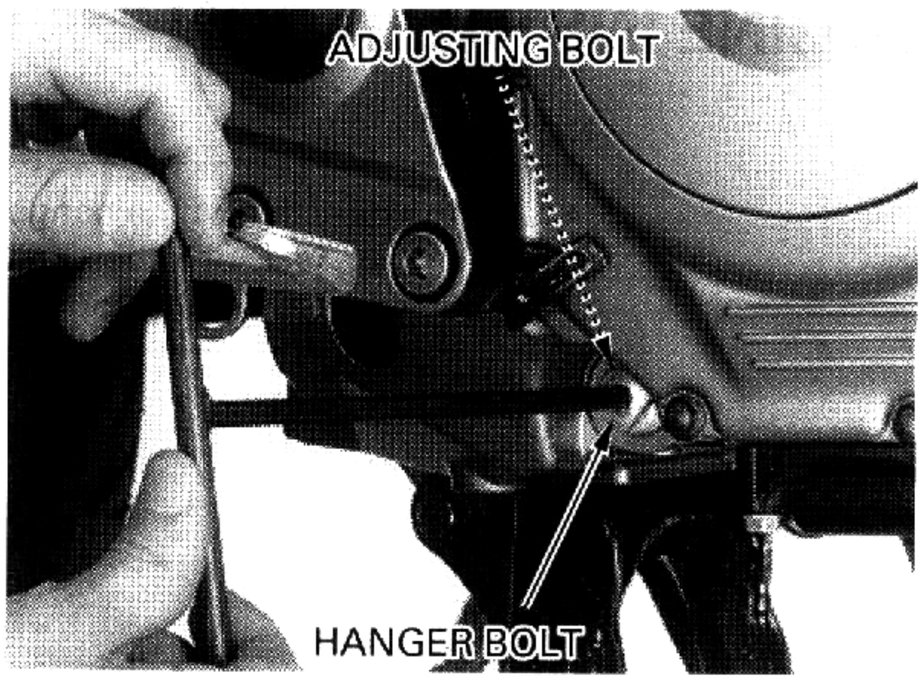


Loosen the rear lower engine hanger adjusting bolt lock nut using the special tool.

TOOL:
Lock nut wrench 07VMA-MAT0100

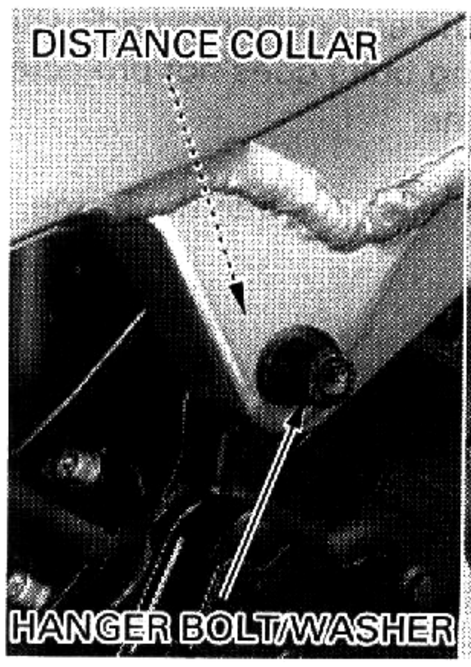


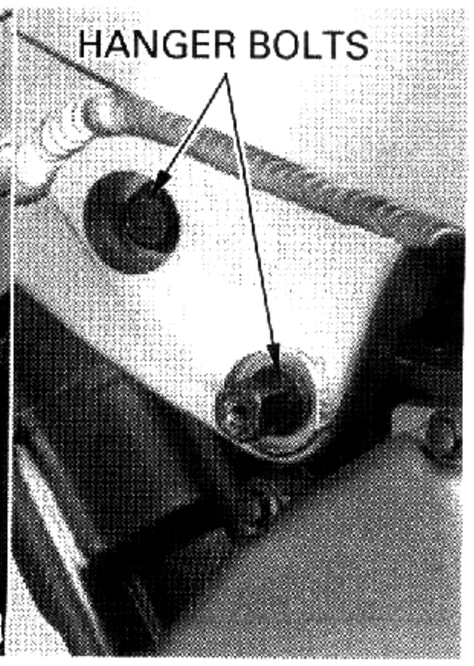
Turn the adjusting bolt with the engine hanger bolt counterclockwise to release the adjusting bolt from the engine.



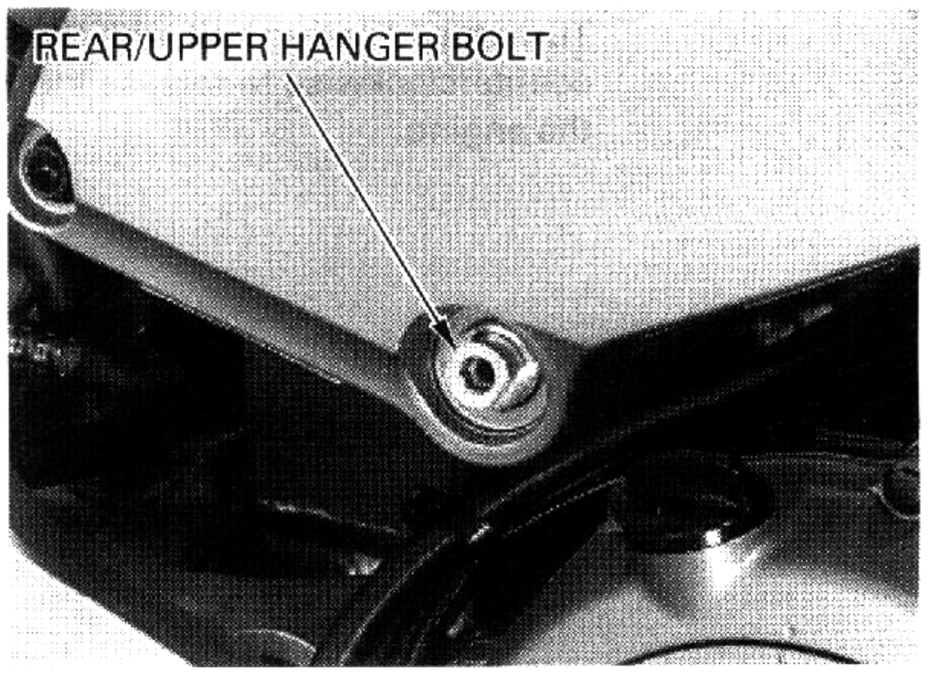
Support the engine using a jack or other adjustable support to ease of engine hanger bolts removal.

Remove the right engine hanger bolt, washer and distance collar.
Remove the left engine hanger bolts.





Remove the rear/upper engine hanger bolt, distance collars and spacer.



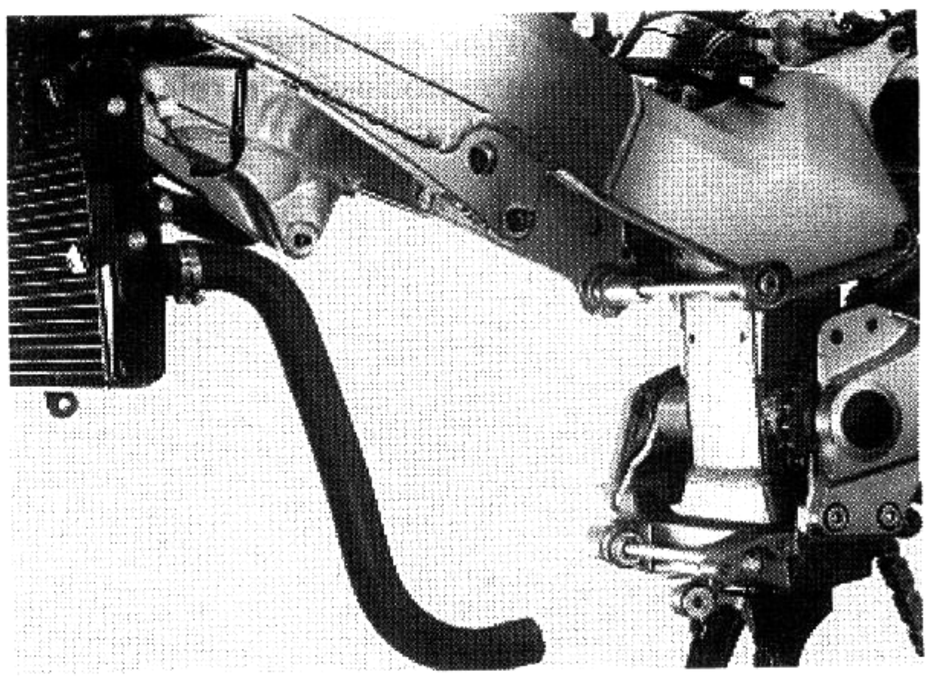
Remove the rear/lower engine hanger bolt, then remove the engine from the frame.



ENGINE INSTALLATION

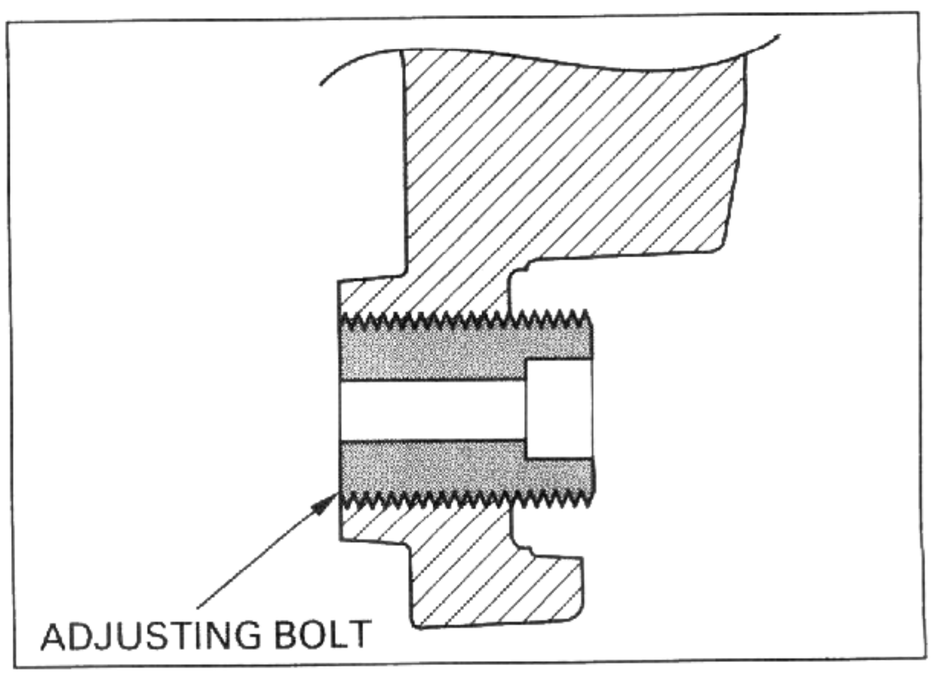
NOTE:

- Note the direction of the hanger bolts.
- Use a floor jack or other adjustable support to carefully maneuver the engine into place.

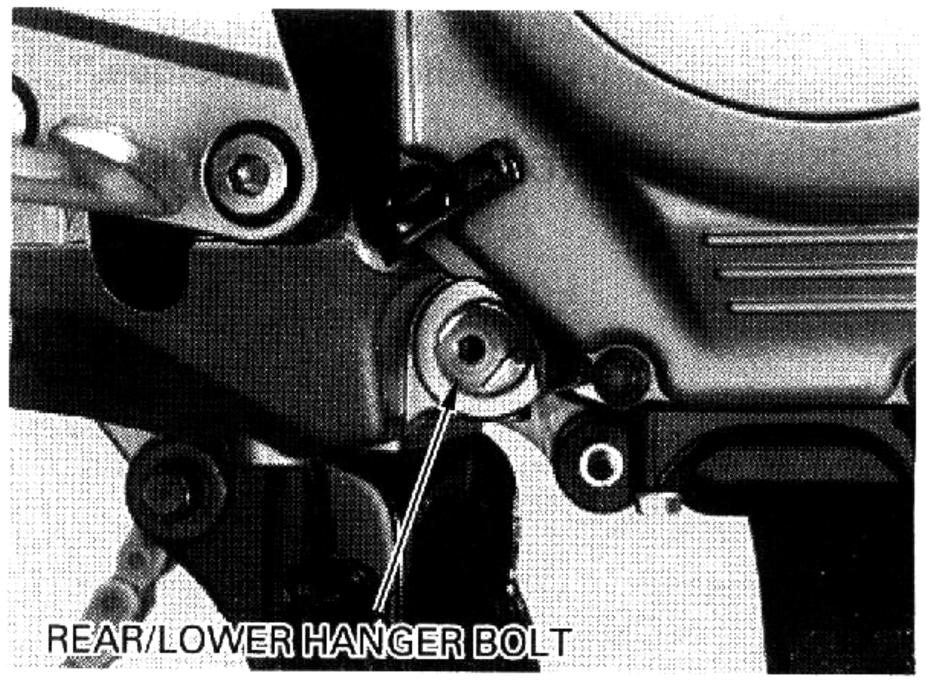


Install the engine hanger adjusting bolts so that the adjusting bolts does not projected inside surface of the frame.

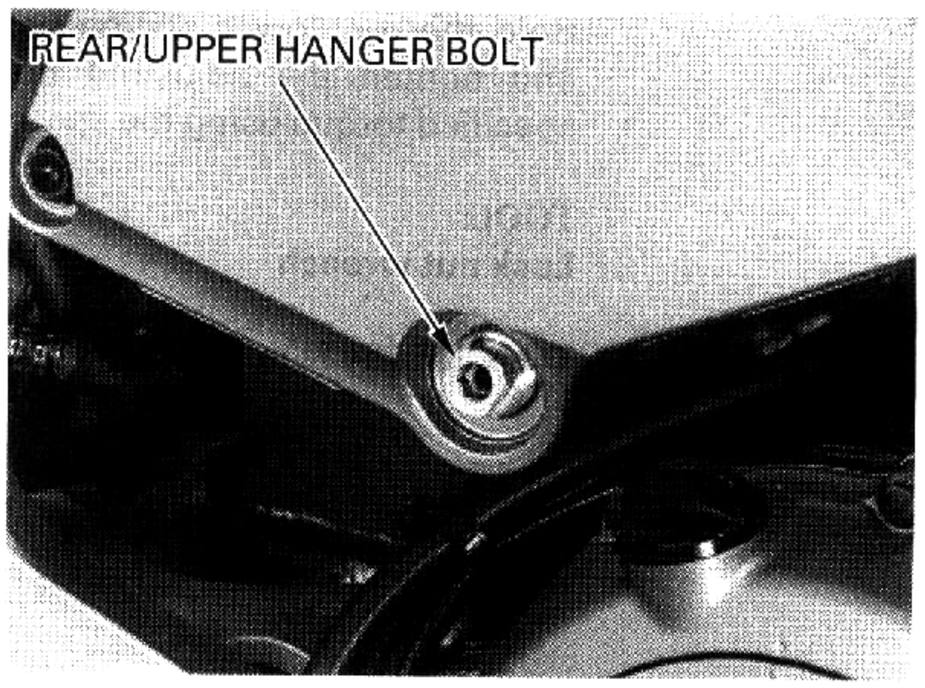
Install the engine into the frame.



Install the rear/lower engine hanger bolt.



Install the rear upper engine hanger with the distance collars.

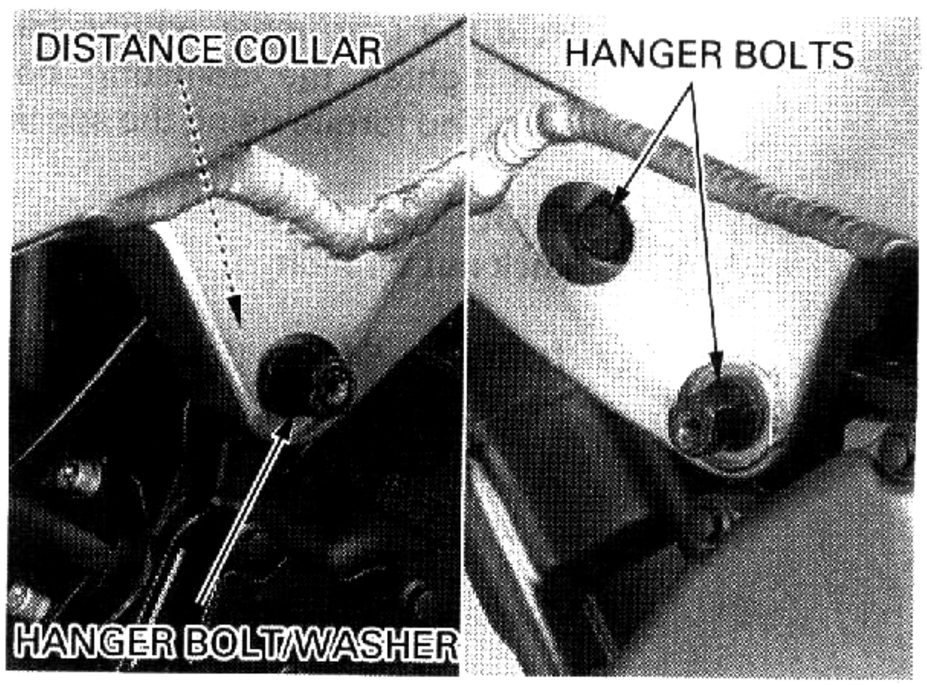


Install the distance collar, washer and right engine hanger bolt.

Install the left engine hanger bolts.

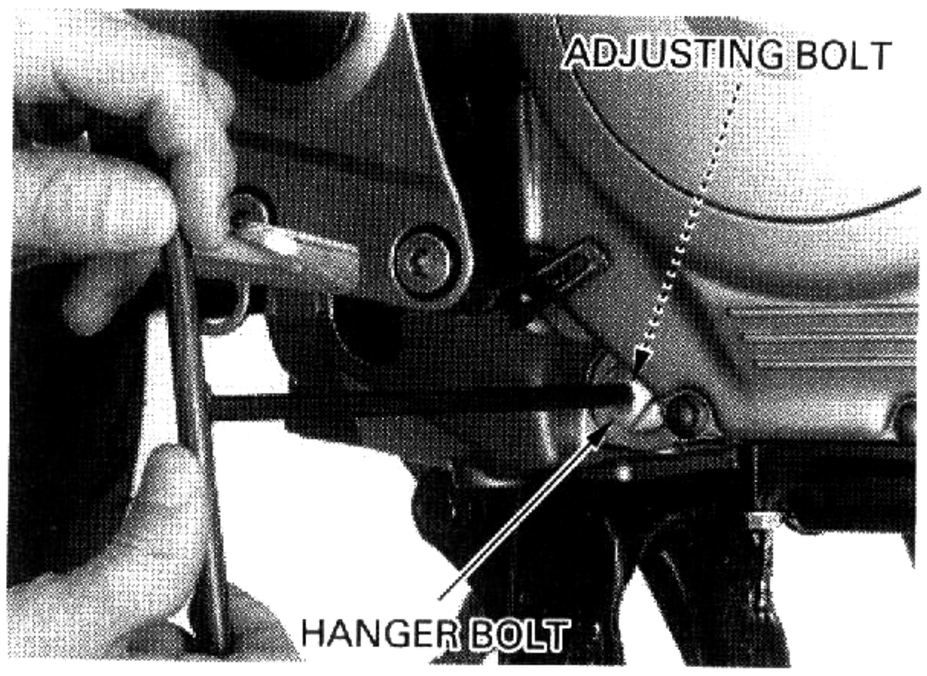
CAUTION:

Install the right and left front engine hanger bolts in their proper locations. Improper installation will damage the cylinder head.



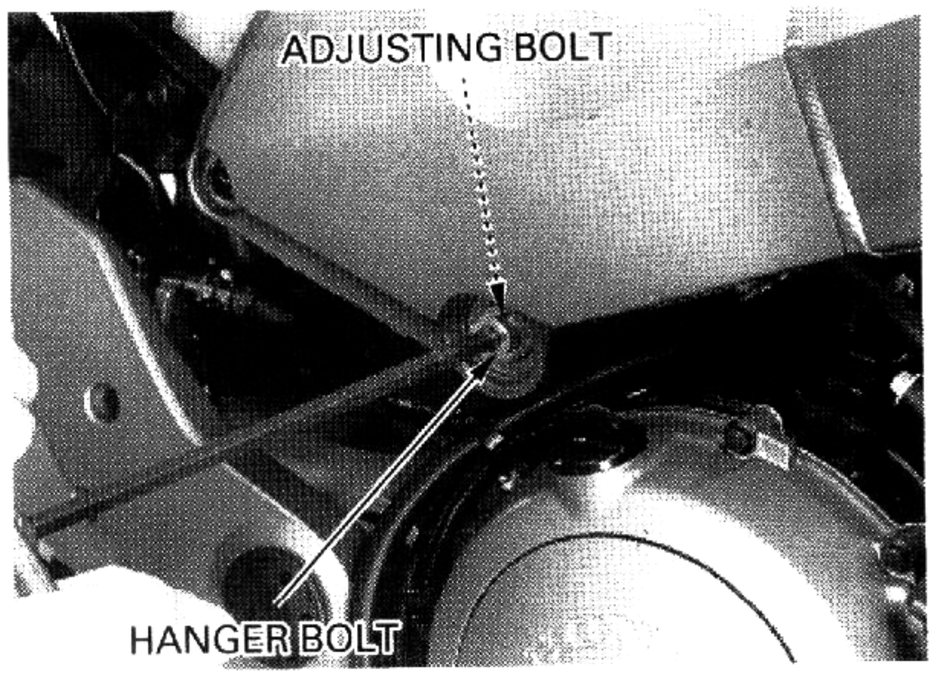
Tighten the rear/lower engine hanger adjusting bolt to the specified torque.

TORQUE: 11 N·m (1.1 kgf·m , 8 lbf·ft)



Tighten the rear/upper engine hanger adjusting bolt to the specified torque.

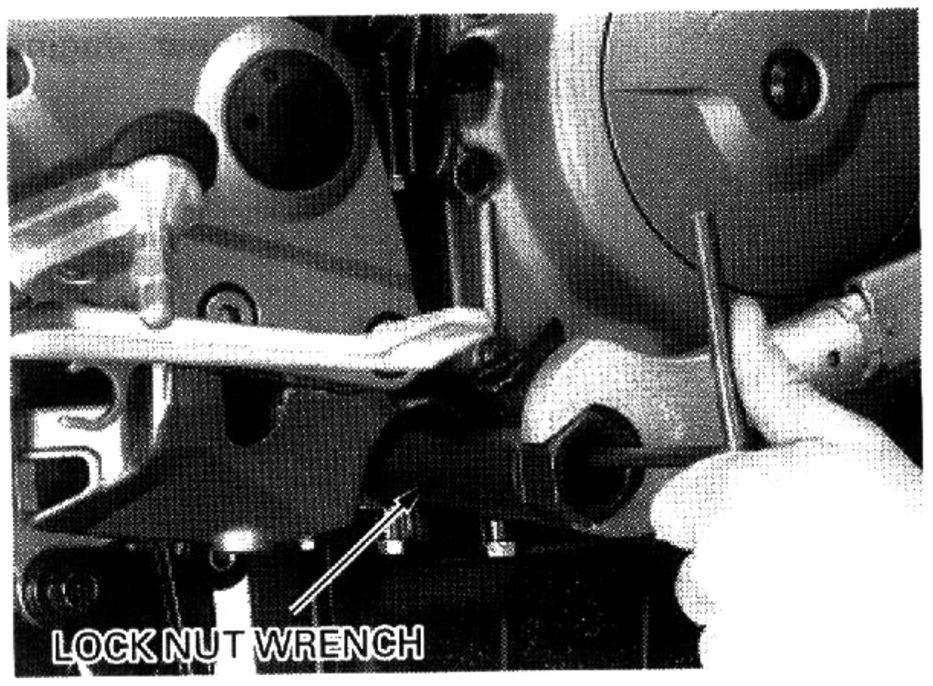
TORQUE: 11 N·m (1.1 kgf·m , 8 lbf·ft)



Hold the rear/lower engine hanger adjusting bolt and tighten the adjusting bolt lock nut to the specified torque using the special tool.

TOOL:
Lock nut wrench 07VMA-MAT0100

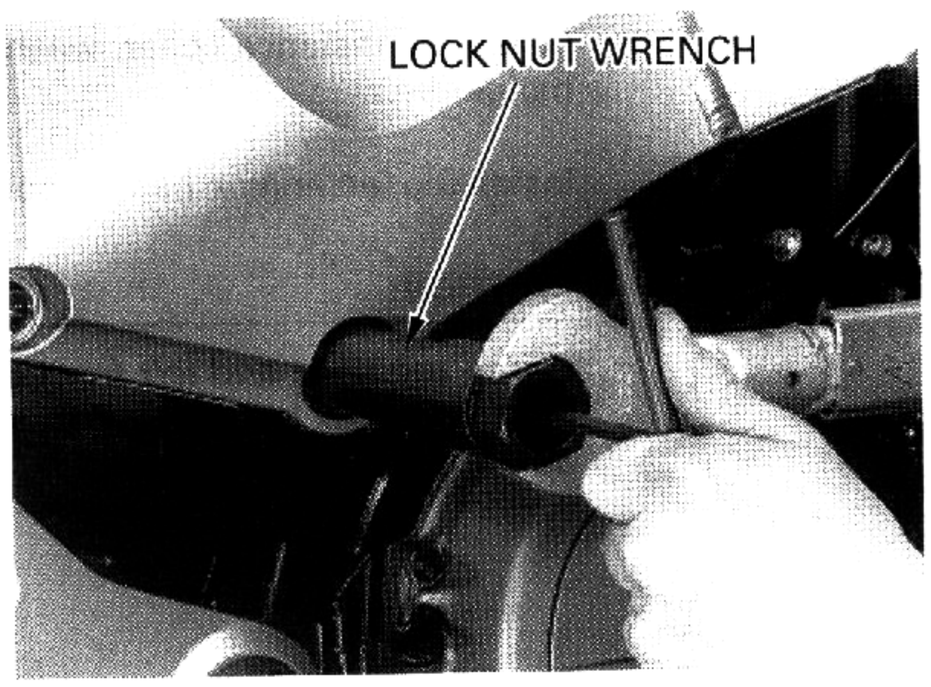
TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)



Hold the rear/upper engine hanger adjusting bolt and tighten the adjusting bolt lock nut to the specified torque using the special tool.

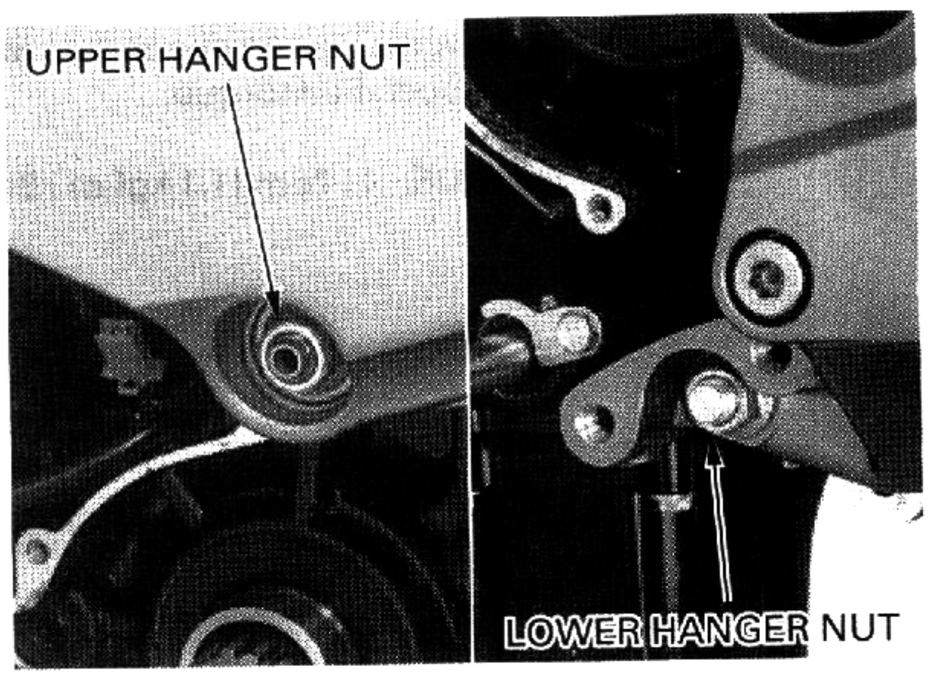
TOOL:
Lock nut wrench 07VMA-MAT0100

TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)



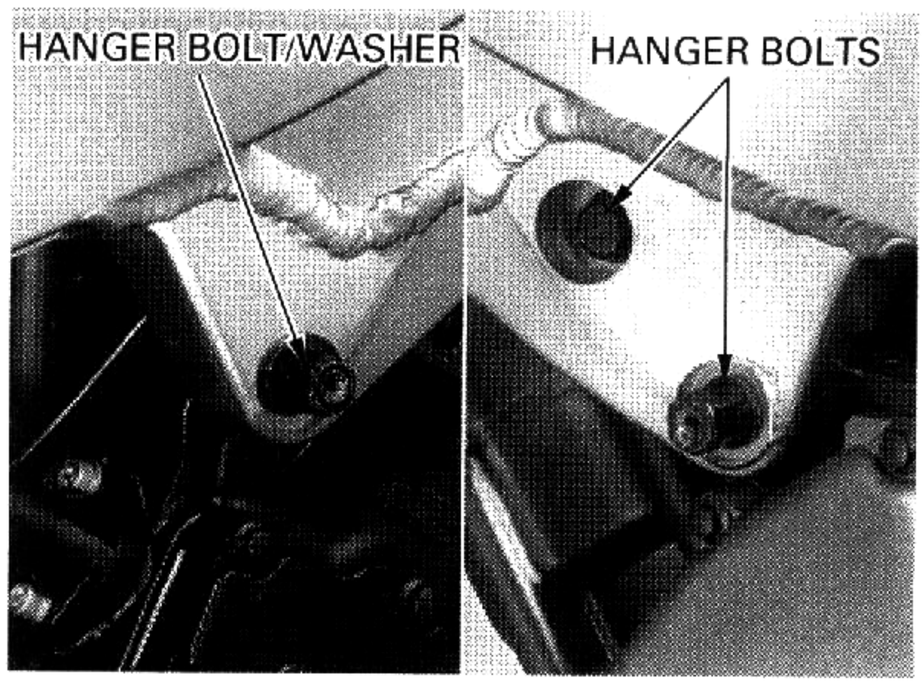
Install the rear/lower and rear/upper engine hanger nuts to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m , 47 lbf·ft)



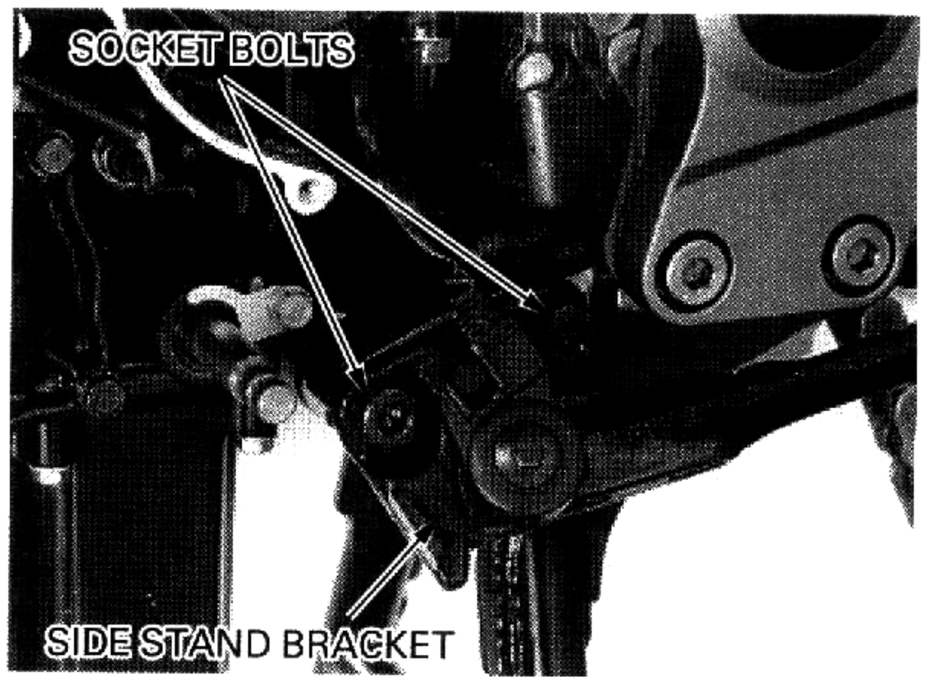
Tighten front/right and front/left engine hanger bolts to the specified torque.

TORQUE: 40 N·m (4.1 kgf·m , 30 lbf·ft)

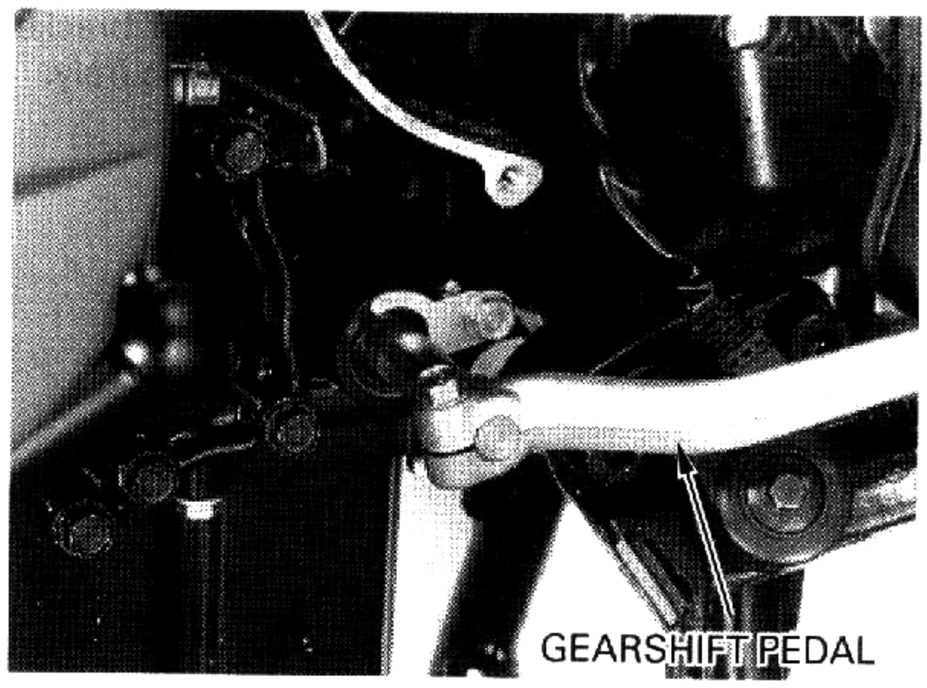


Route the side stand switch wire properly (page 1-24).
Install the side stand bracket and tighten the socket bolts to the specified torque.

TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)

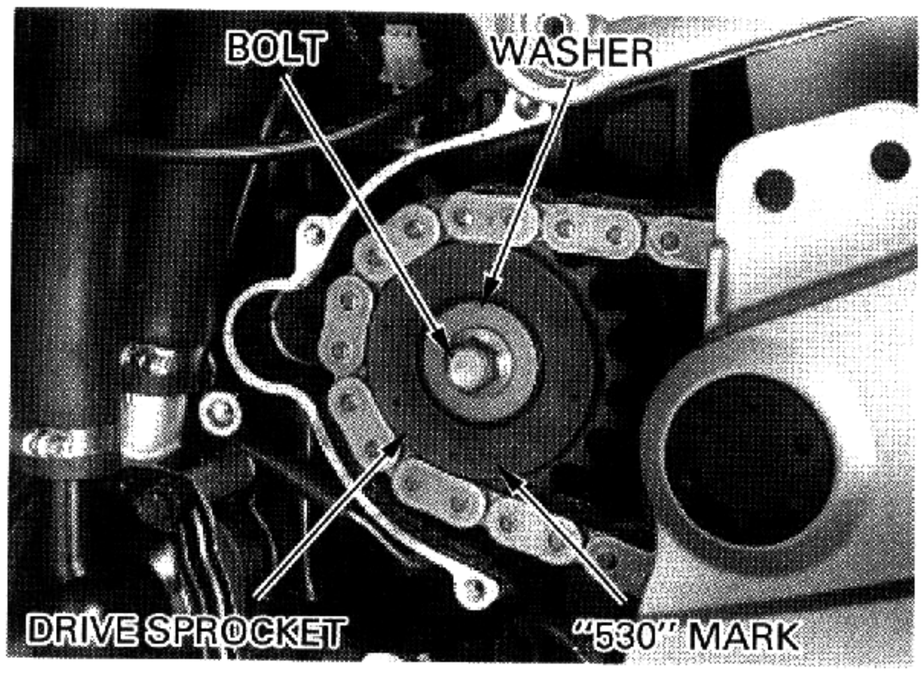


Install the gearshift pedal aligning its slit with the punch mark on the gearshift spindle.
Tighten the bolt securely.

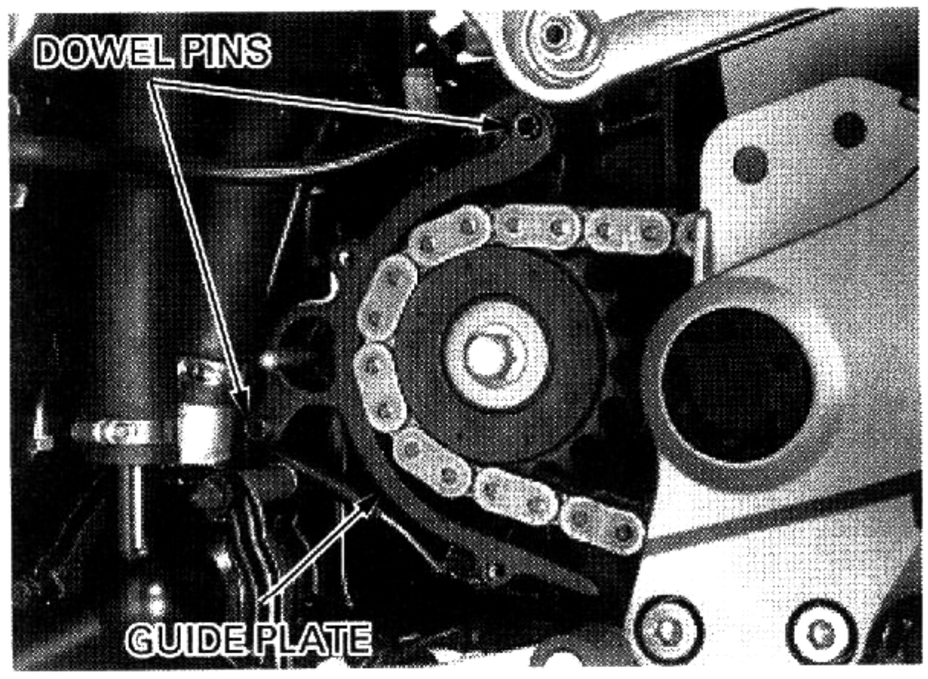


Install the drive sprocket with its "530" mark facing outward.
Install the washer and bolt.
Shift the transmission into 5th gear and apply rear brake.
Tighten the drive sprocket bolt to the specified torque.

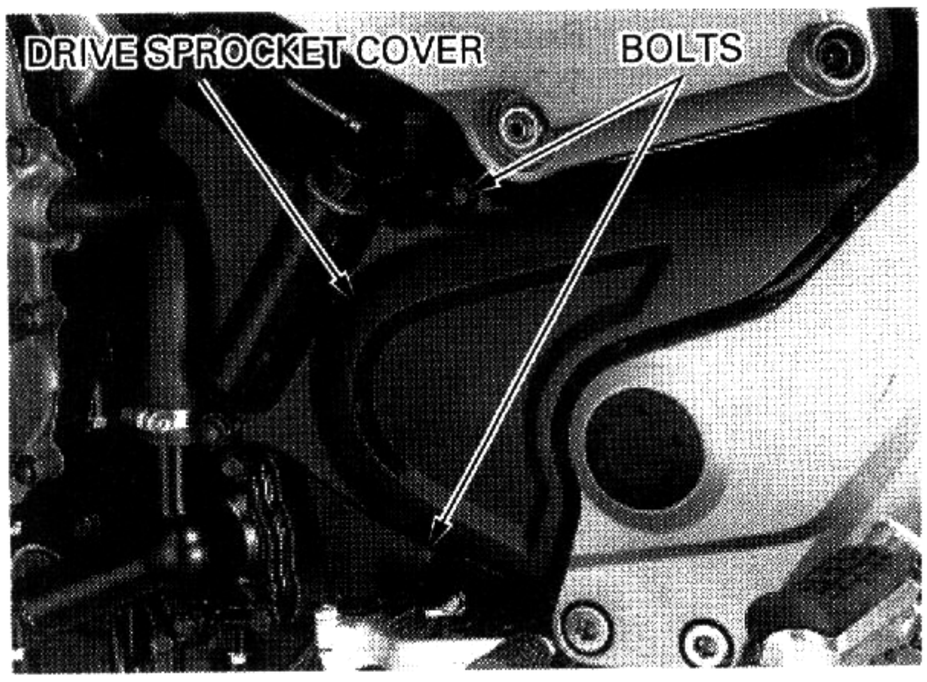
TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)



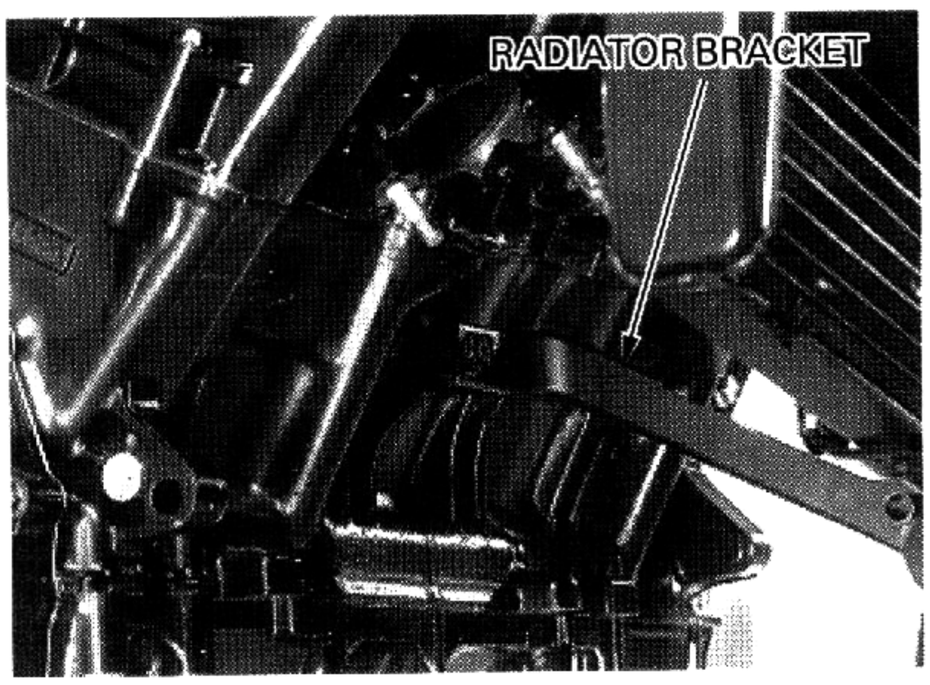
Install the dowel pins and drive chain guide plate.



Install the drive sprocket cover and tighten the SH bolts.

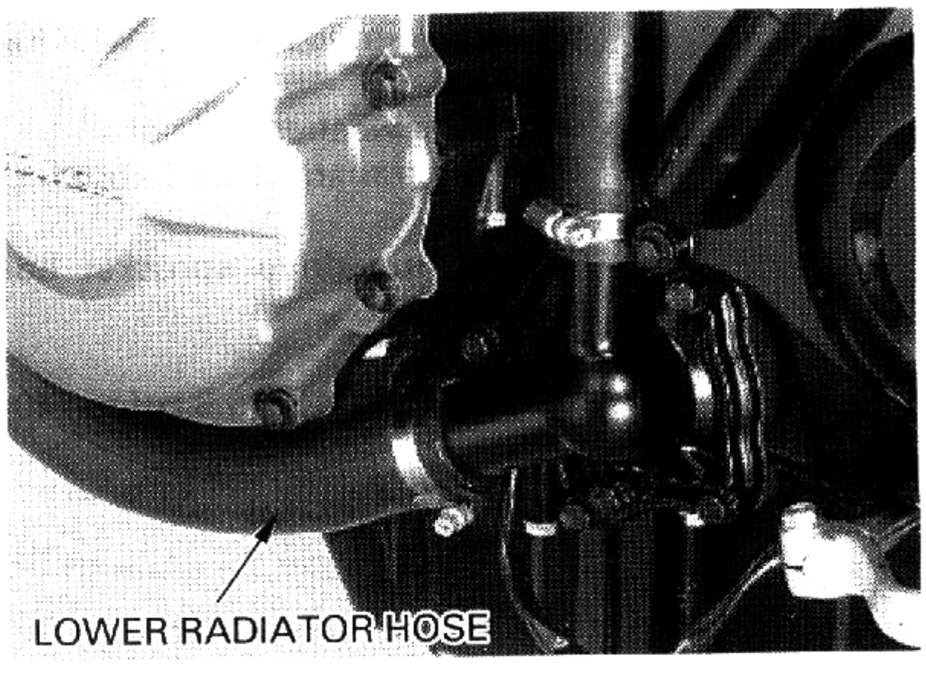


Install the radiator lower bracket onto the cylinder block, tighten the bolt securely.



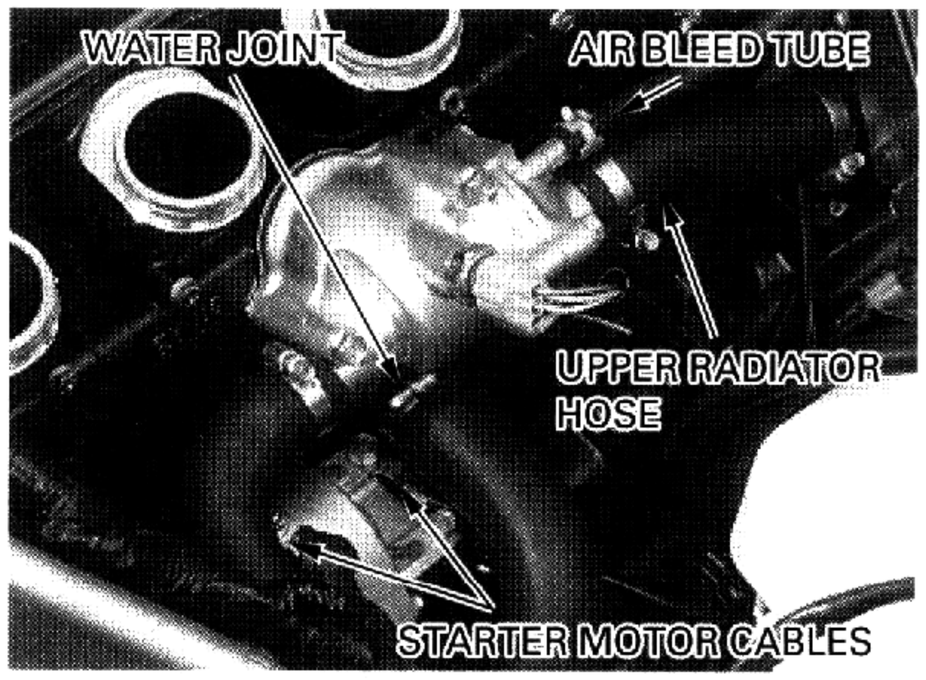
Install the radiator (page 6-11) and connect the lower radiator hose and tighten the clamp screw.

Install the muffler/exhaust pipe (page 2-13).
Connect the oil pipes (page 4-13).



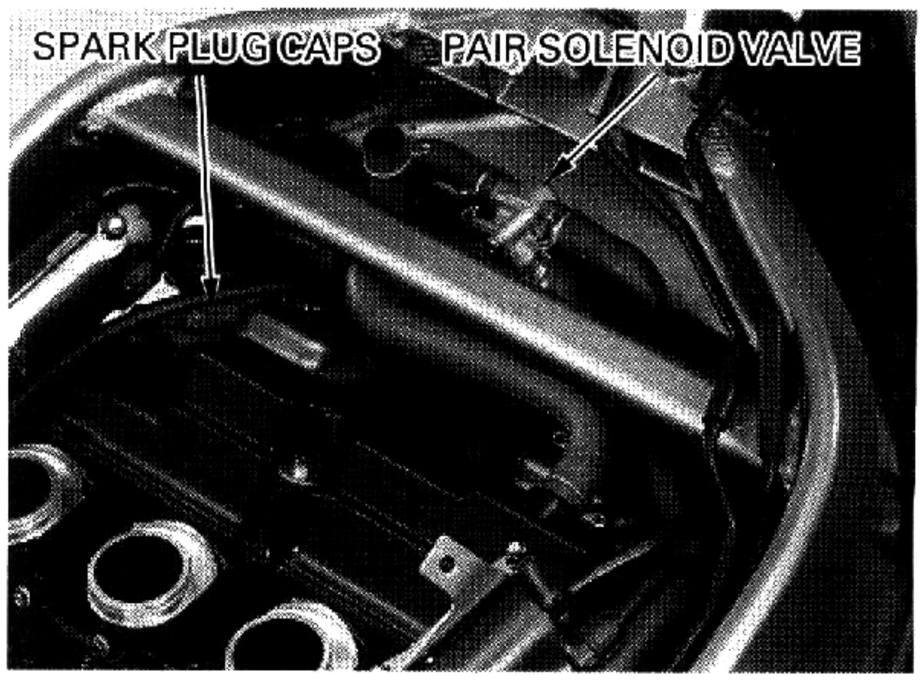
Route the starter motor cable and ground cables.
Tighten the starter motor cable nut and ground cable bolt.

Install the water joint to the cylinder block and tighten the bolts.
Connect the air bleed tube and upper radiator hose to the thermostat housing cover.

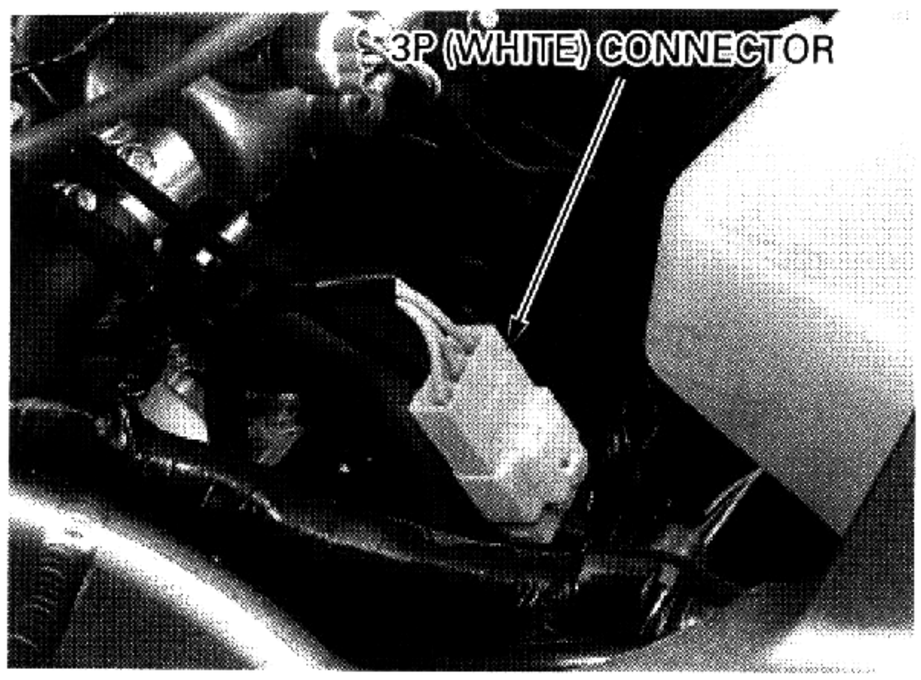


Install the PAIR solenoid valve/tubes assembly into the frame.
Connect the PAIR air tubes to the PAIR reed valve covers.

Install the spark plug caps.



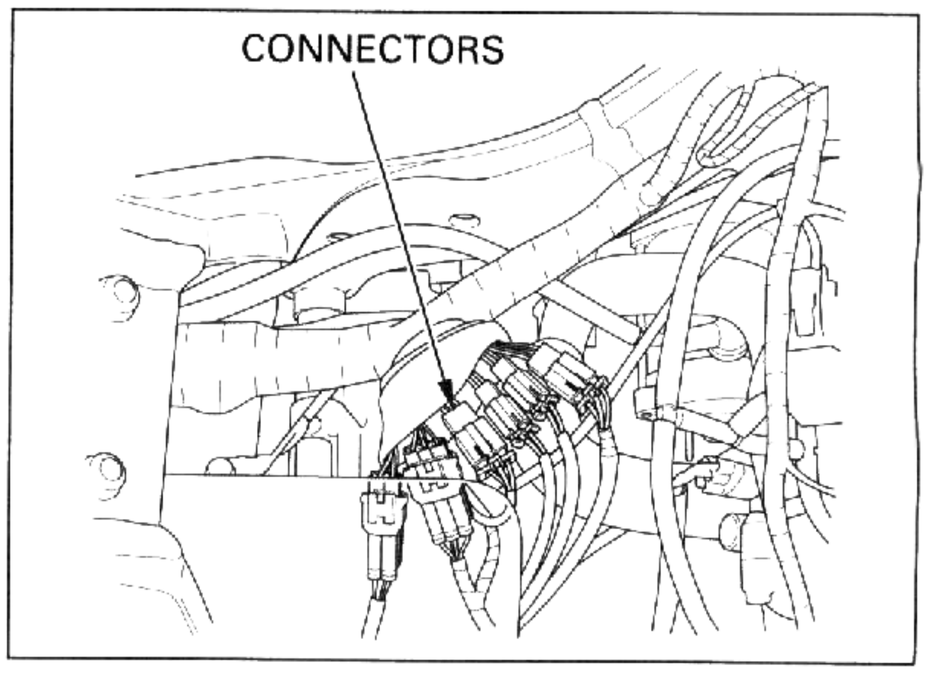
Route the alternator wire into the frame, connect the alternator 3P (White) connector.

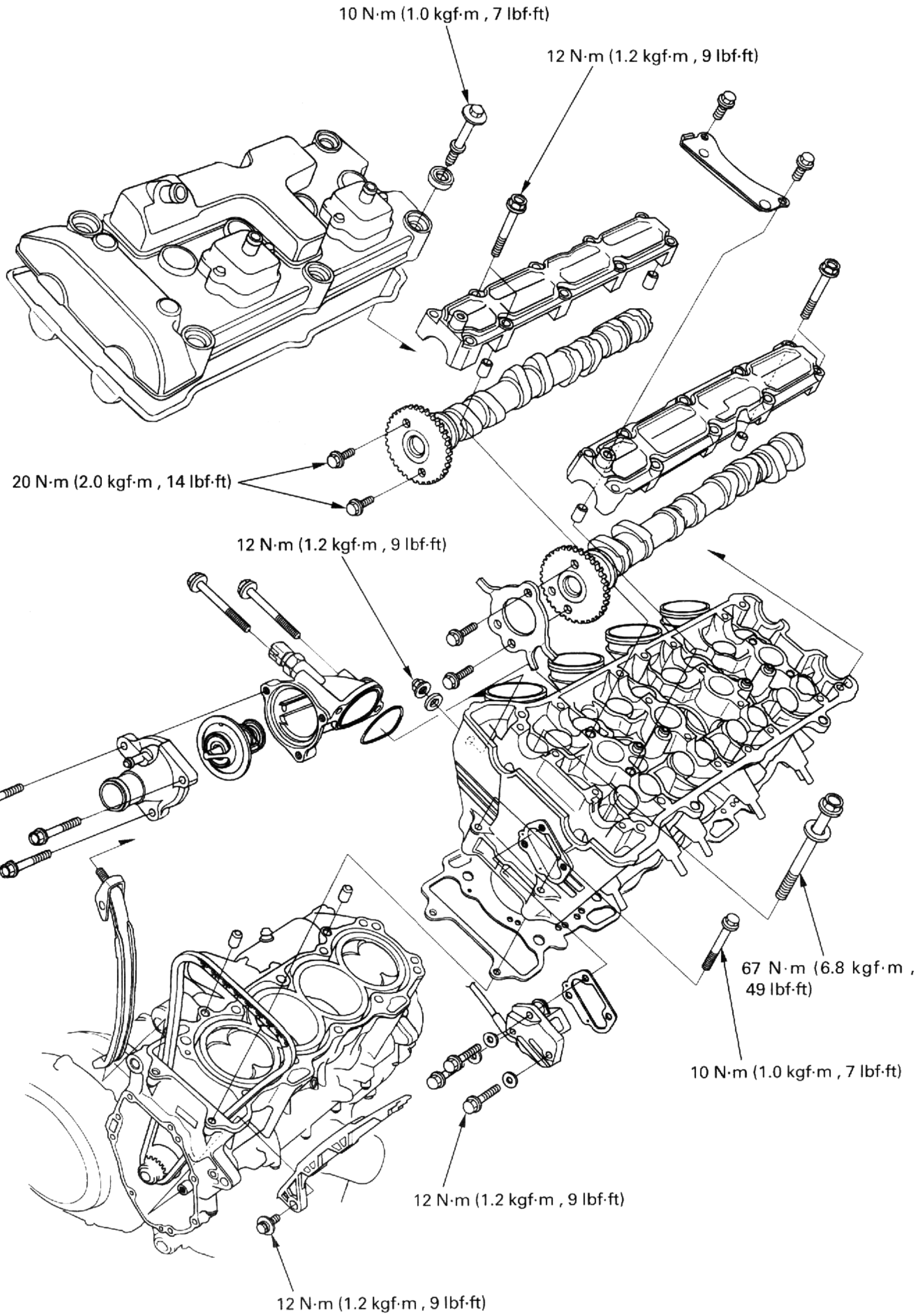


Connect the following connector:
- Ignition pulse generator 2P (Red) connector
- Cam pulse generator 2P (Natural) connector
- Speed sensor 3P (Natural) connector
- Side stand switch 2P (Green) connector
- Engine sub-harness 6P (Natural) connector
- O_2 sensor 4P (Gray) connector

Install the following:
- Throttle body (page 5-66)
- Fuel tank (page 5-58)

Adjust the drive chain slack (page 3-20).
Pour recommended engine oil up to the proper level (page 3-13).
Fill the cooling system with recommended coolant and bleed the air (page 6-4).




10 N·m (1.0 kgf·m , 7 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
20 N·m (2.0 kgf·m , 14 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
67 N·m (6.8 kgf·m , 49 lbf·ft)
10 N·m (1.0 kgf·m , 7 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)

8. CYLINDER HEAD/VALVES

SERVICE INFORMATION	8-1	VALVE GUIDE REPLACEMENT	8-16
TROUBLESHOOTING	8-3	VALVE SEAT INSPECTION/REFACING	8-17
CYLINDER COMPRESSION TEST	8-4	CYLINDER HEAD ASSEMBLY	8-20
CYLINDER HEAD COVER REMOVAL	8-5	CYLINDER HEAD INSTALLATION	8-21
CYLINDER HEAD COVER DISASSEMBLY	8-6	CAMSHAFT INSTALLATION	8-23
CAMSHAFT REMOVAL	8-7	CYLINDER HEAD COVER ASSEMBLY	8-27
CYLINDER HEAD REMOVAL	8-11	CYLINDER HEAD COVER INSTALLATION	8-27
CYLINDER HEAD DISASSEMBLY	8-13	CAM CHAIN TENSIONER LIFTER	8-30
CYLINDER HEAD INSPECTION	8-14		

8

SERVICE INFORMATION

GENERAL

- This section covers service of the cylinder head, valves and camshaft.
- The camshaft services can be done with the engine installed in the frame. The cylinder head service required engine removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling the cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,275 kPa (13.0 kgf/cm², 185 psi) at 350 min⁻¹ (rpm)	—
Cylinder head warpage			—	0.10 (0.004)
Valve, valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	—
		EX	0.22 ± 0.03 (0.009 ± 0.001)	—
	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1955)
		EX	4.960 – 4.975 (0.1953 – 0.1959)	4.950 (0.1949)
	Valve guide I.D.	IN	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
		EX	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	—
		EX	0.025 – 0.052 (0.0010 – 0.0020)	—
	Valve guide projection above cylinder head	IN	16.3 – 16.5 (0.64 – 0.65)	—
		EX	16.3 – 16.5 (0.64 – 0.65)	—
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length	Inner	IN/EX	37.4 (1.47)	35.4 (1.39)
	Outer	IN/EX	40.6 (1.60)	38.6 (1.52)
Valve lifter	Valve lifter O.D.	IN/EX	25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.	IN/EX	26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Camshaft	Cam lobe height	IN	38.32 – 38.40 (1.509 – 1.512)	38.02 (1.497)
		EX	38.38 – 38.46 (1.511 – 1.514)	38.08 (1.499)
	Runut		—	0.05 (0.002)
	Oil clearance		0.020 – 0.074 (0.0008 – 0.0029)	0.10 (0.004)

TORQUE VALUES

Cylinder head cover bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Breather plate flange bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply a locking agent to the threads CT bolt
Camshaft holder flange bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply oil to the threads
Cylinder head sealing bolt	32 N·m (3.3 kgf·m , 24 lbf·ft)	Apply a locking agent to the threads
Cylinder head mounting bolt	67 N·m (6.8 kgf·m , 49 lbf·ft)	Apply molybdenum disulfide oil to the threads (after removing anti-rust oil additive)
Cylinder head SH bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Cam sprocket bolt	20 N·m (2.0 kgf·m , 14 lbf·ft)	Apply a locking agent to the threads
Cam chain tensioner cap nut	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Cam chain tensioner lifter mounting bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Cam chain tensioner lifter sealing bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Cam chain guide A mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Cylinder head stud bolt	See page 1-15	
PAIR reed valve cover flange bolt	13 N·m (1.3 kgf·m , 9 lbf·ft)	
Vacuum joint plug socket bolt	3 N·m (0.3 kgf·m , 2.2 lbf·ft)	
Cam pulse generator cover SH bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	

TOOLS

Compression gauge attachment	07RMJ-MY50100	Equivalent commercially available
Valve spring compressor	07757-0010000	
Valve spring compressor attachment	07959-KM30101	
Tappet hole protector	07HMG-MR70002	
Valve guide driver, 5 mm	07942-MA60000	
Valve guide reamer	07984-MA60001	
Valve seat cutters		—these are commercially available
Seat cutter, 33 mm (45° IN)	07780-0010800	
Seat cutter, 29 mm (45° EX)	07780-0010300	
Flat cutter, 33 mm (32° IN)	07780-0012900	
Flat cutter, 29 mm (32° EX)	07780-0013400	
Interior cutter, 34 mm (60° IN)	07780-0014700	
Interior cutter, 30 mm (60° EX)	07780-0014000	
Cutter holder, 5 mm	07781-0010400	

TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problem can be diagnosed by a compression test or by tracing engine noises to the top-end with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smoky, check for a seized piston ring (Section 11).

Compression too low, hard starting or poor performance at low speed

- Valves:
  - —Incorrect valve adjustment
  - —Burned or bent valve
  - —Incorrect valve timing
  - —Broken valve spring
  - —Uneven valve seating
- Cylinder head:
  - —Leaking or damaged head gasket
  - —Warped or cracked cylinder head
- Worn cylinder, piston or piston rings (Section 11)

Compression too high, overheating or knocking

- Excessive carbon build-up on piston crown or on combustion chamber

Excessive smoke

- Cylinder head:
  - —Worn valve stem or valve guide
  - —Damaged stem seal
- Worn cylinder, piston or piston rings (Section 11)

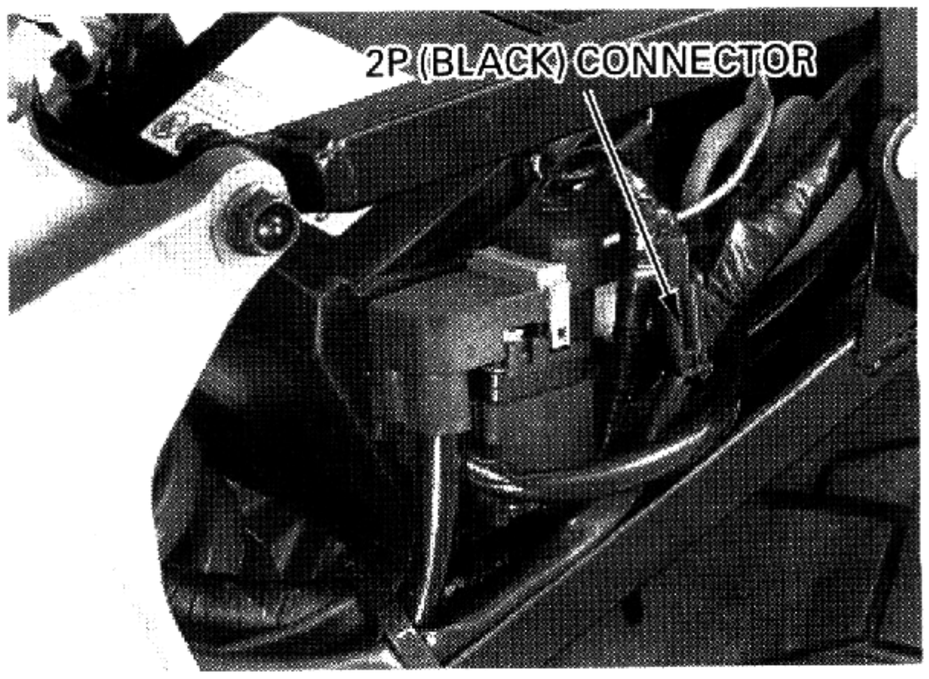
Excessive noise

- Cylinder head:
  - —Incorrect valve adjustment
  - —Sticking valve or broken valve spring
  - —Damaged or worn camshaft
  - —Loose or worn cam chain
  - —Worn or damaged cam chain
  - —Worn or damaged cam chain tensioner
  - —Worn cam sprocket teeth
- Worn cylinder, piston or piston rings (Section 11)

Rough idle

- Low cylinder compression

CYLINDER COMPRESSION TEST



⚠WARNING

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

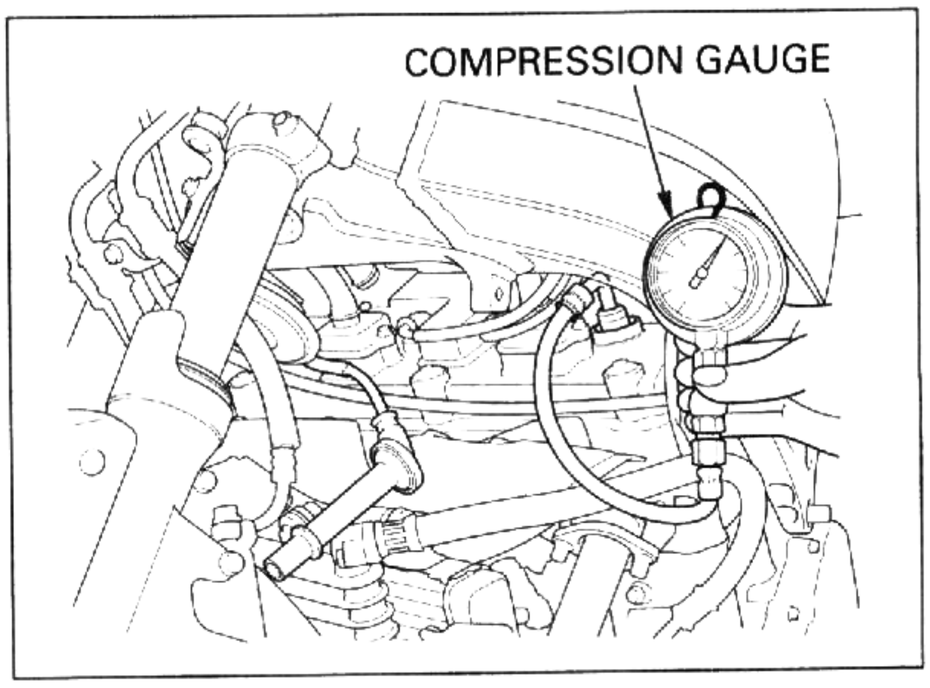
Warm up the engine to normal operating temperature.
Stop the engine and remove the all spark plug caps and spark plugs (page 3-7).
Support the rear end of the fuel tank (page 2-11).

Disconnect the pump/reserve sensor 2P (Black) connector.

Install a compression gauge into the spark plug hole.

TOOL:

Compression gauge attachment	07RMJ-MY50100 (Equivalent commercially available)



Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising.
The maximum reading is usually reached within 4—7 seconds.

NOTE:

To avoid discharging the battery, do not operate the starter motor for more than seven seconds.

Compression pressure:
1,275 kPa (13.0 kgf/cm², 185 psi) at
350 min^{-1} (rpm)

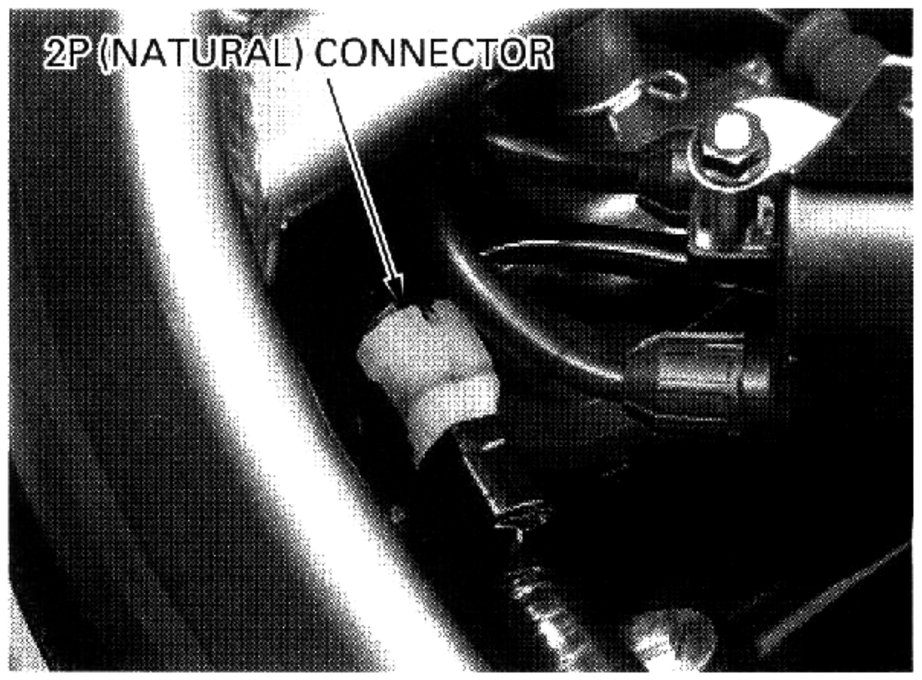
Low compression can be caused by:
- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

High compression can be caused by:
- Carbon deposits in combustion chamber or on piston head

CYLINDER HEAD COVER REMOVAL

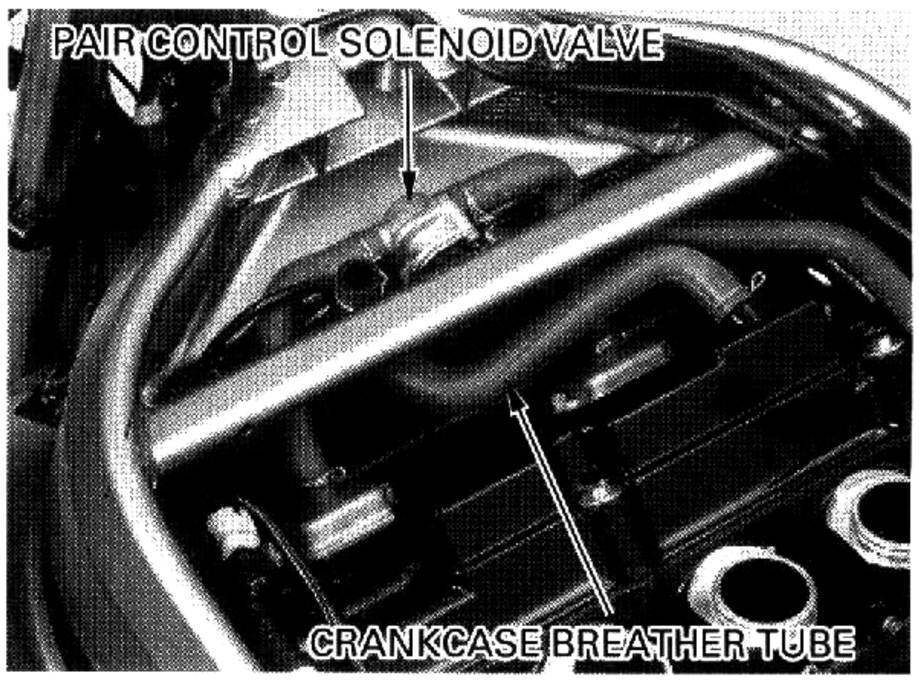
Remove the air cleaner housing (page 5-60).
Remove the spark plug caps (page 3-7).

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

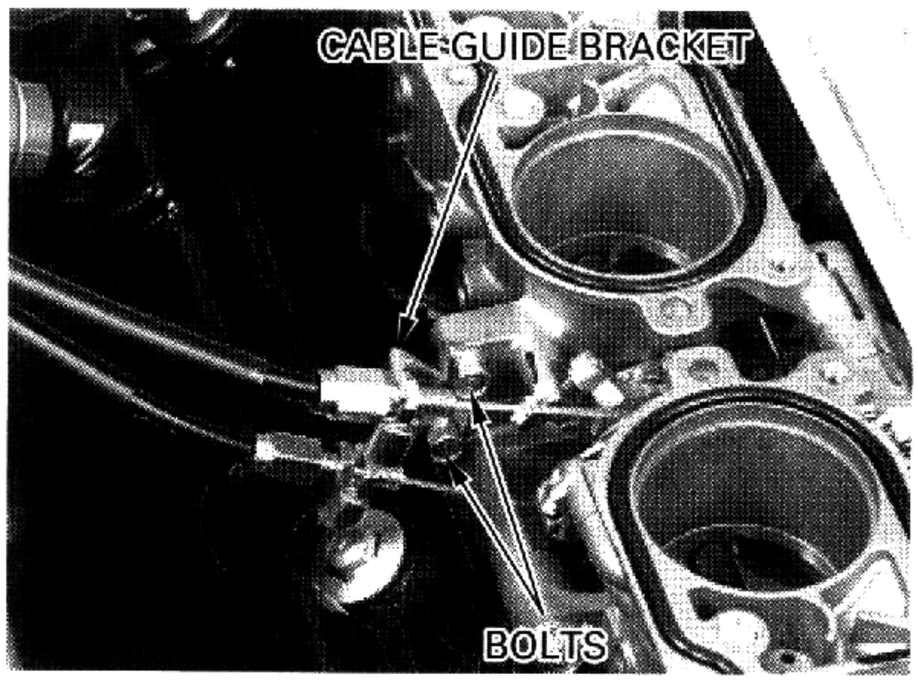


Disconnect the crankcase breather tube.

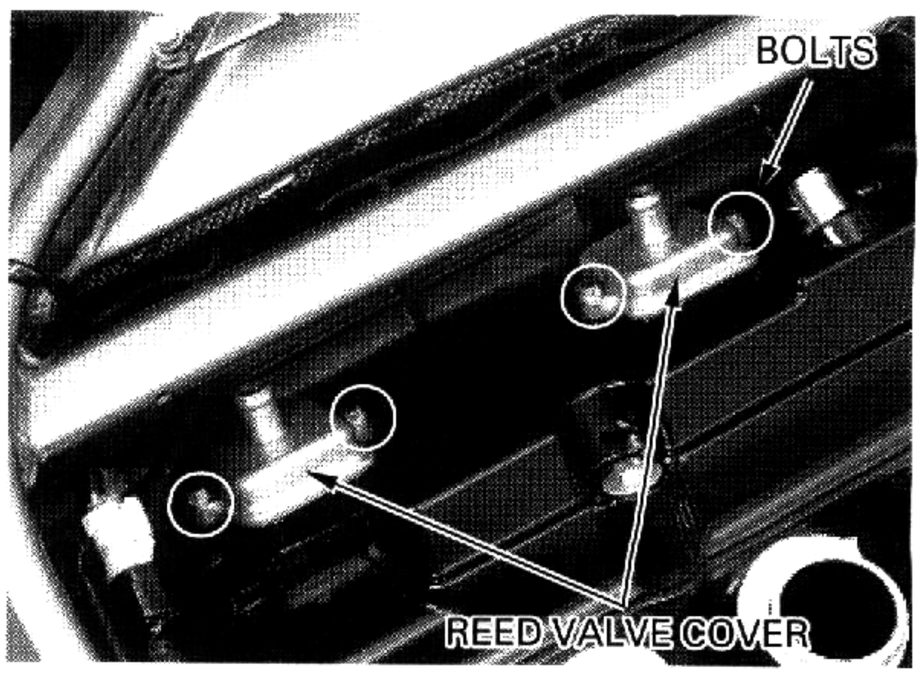
Disconnect the PAIR control solenoid valve air suction hoses, then remove the PAIR control solenoid valve assembly.



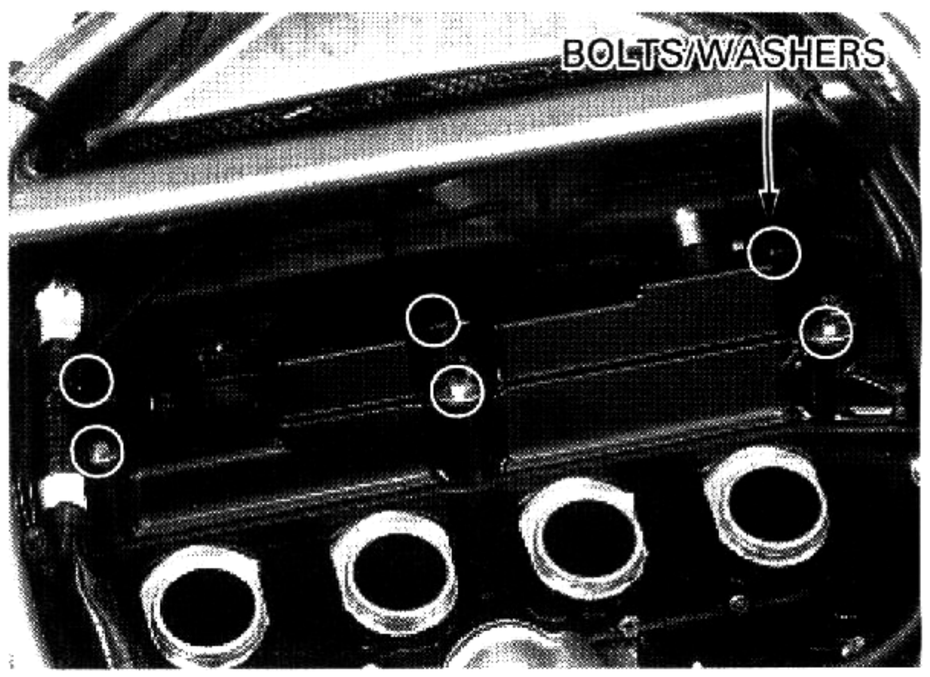
Remove the throttle cable guide bracket mounting bolts.
Disconnect the throttle cable ends from the throttle drum.



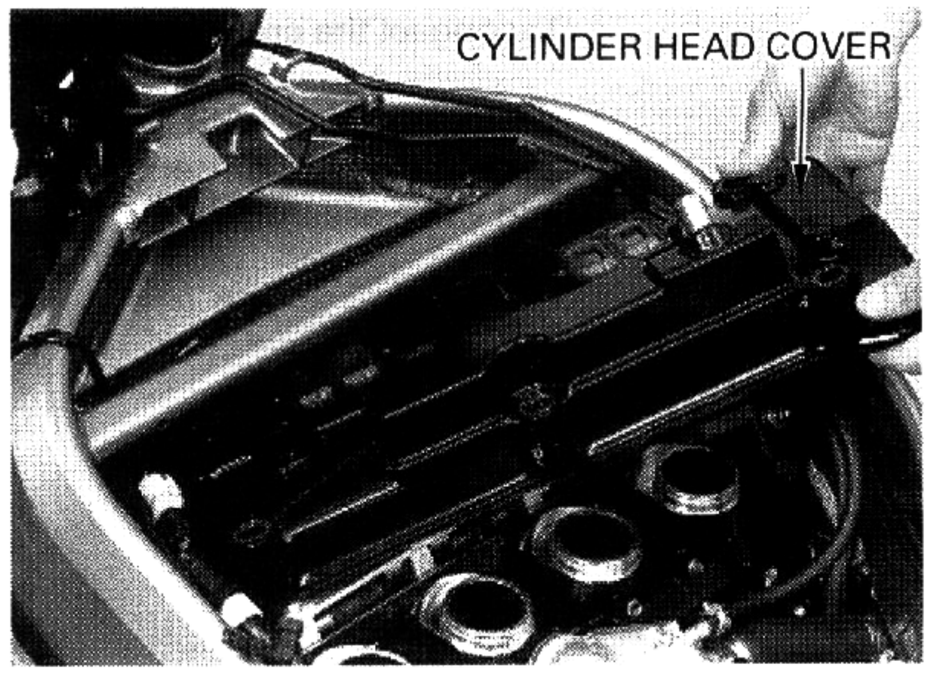
Remove the SH bolts and PAIR reed valve covers from the cylinder head.



Remove the cylinder head cover bolts and washers.

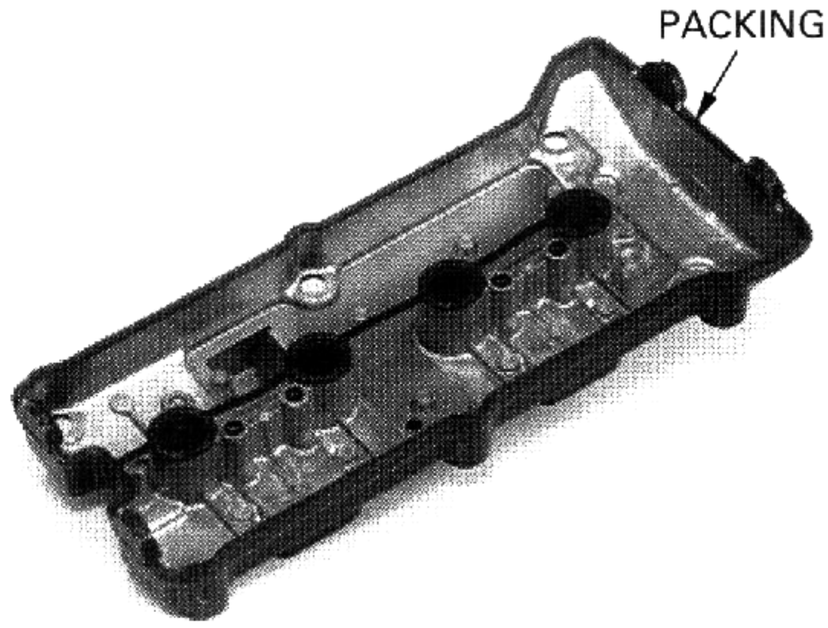


Remove the cylinder head cover forward.

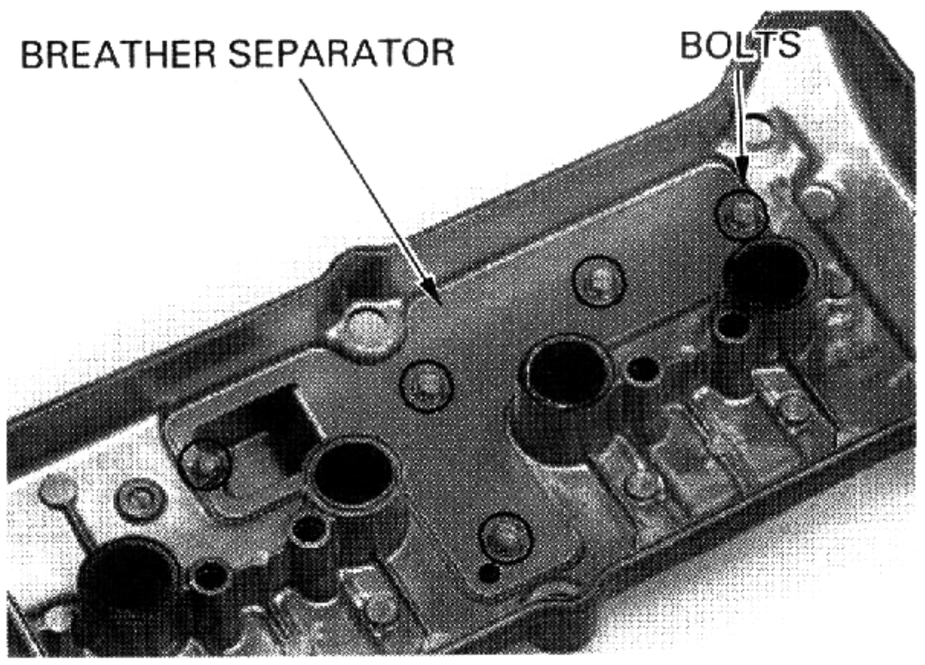


CYLINDER HEAD COVER DISASSEMBLY

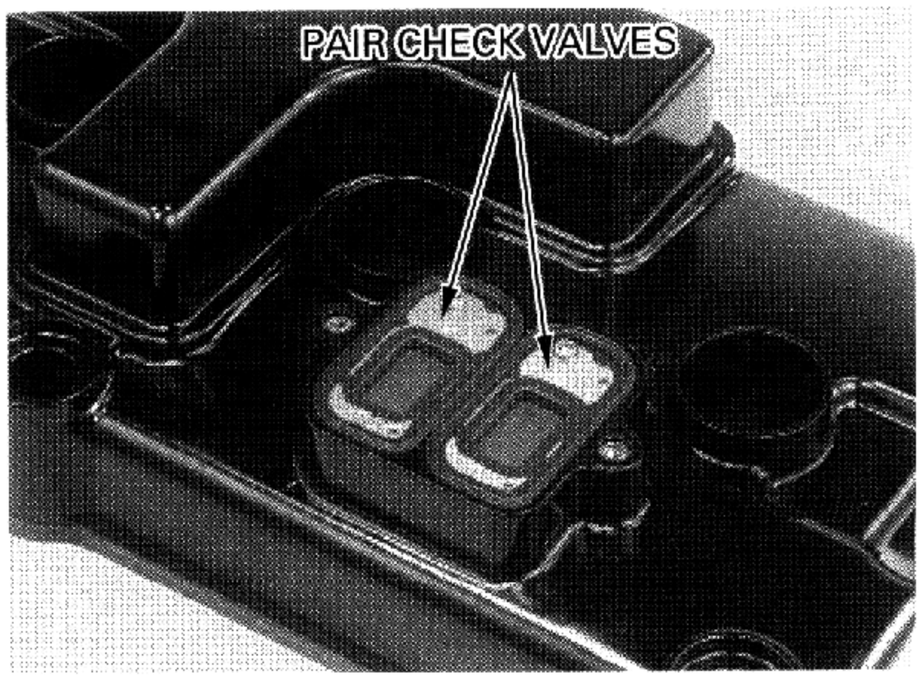
Remove the cylinder head cover packing.



Remove bolts and breather separator and gasket



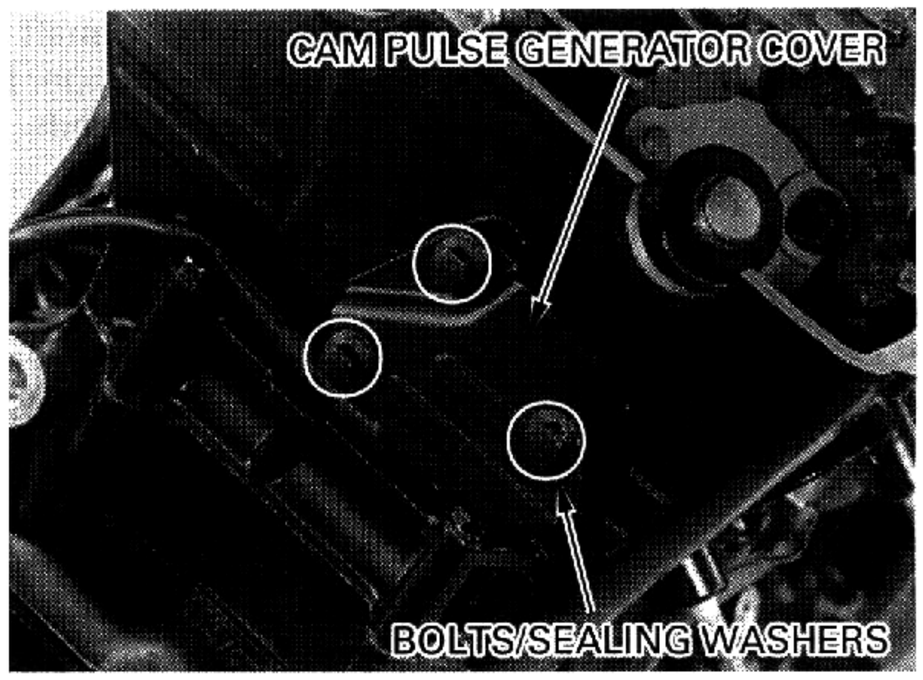
Check the PAIR check valve for wear or damage, replace if necessary.



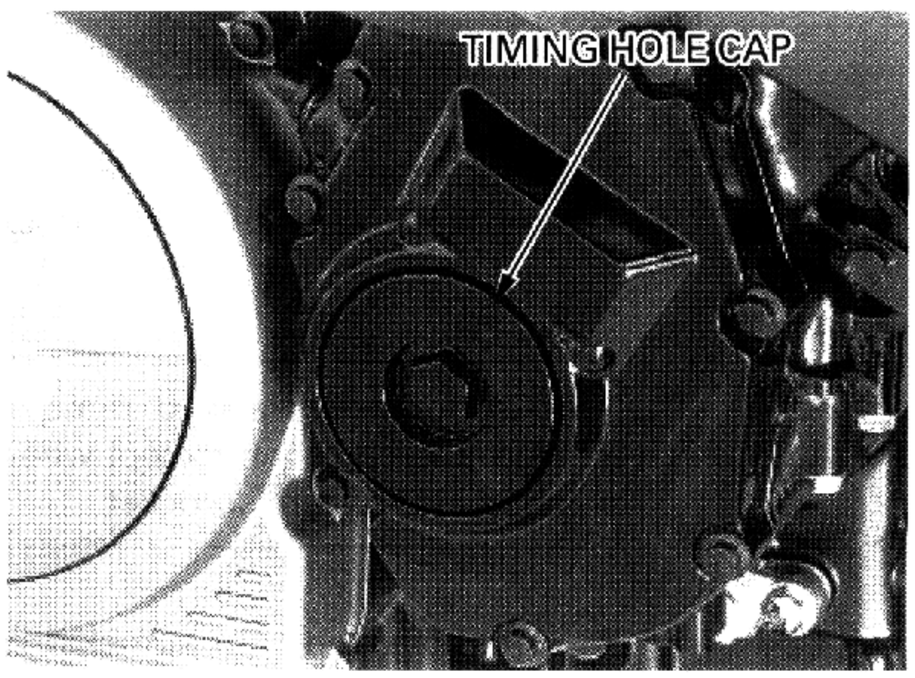
CAMSHAFT REMOVAL

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

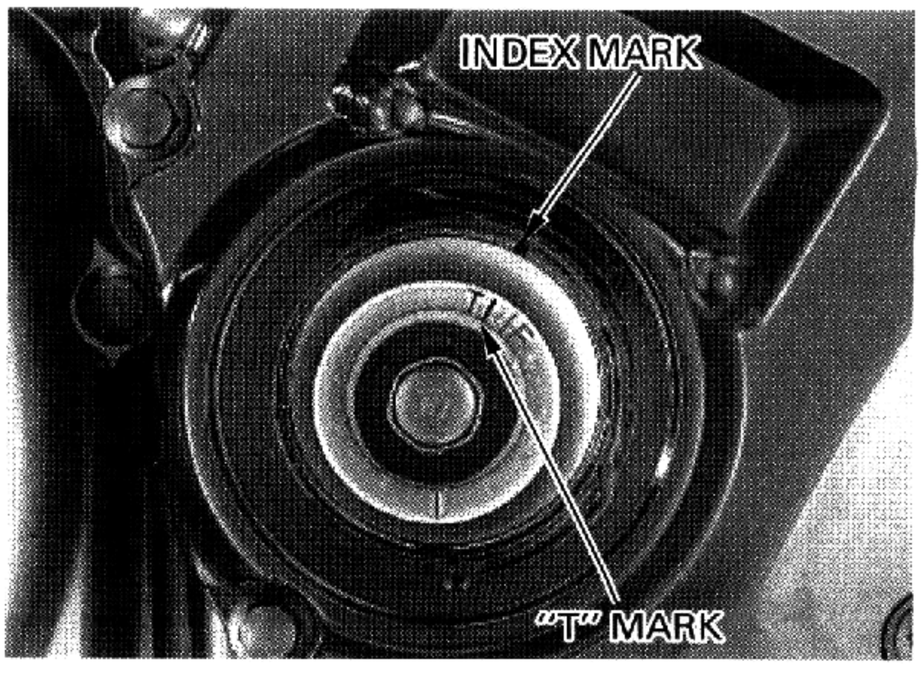
Avoid damaging the cam pulse generator while removing the camshafts, remove the bolts, sealing washers and cam pulse generator from the cylinder head.



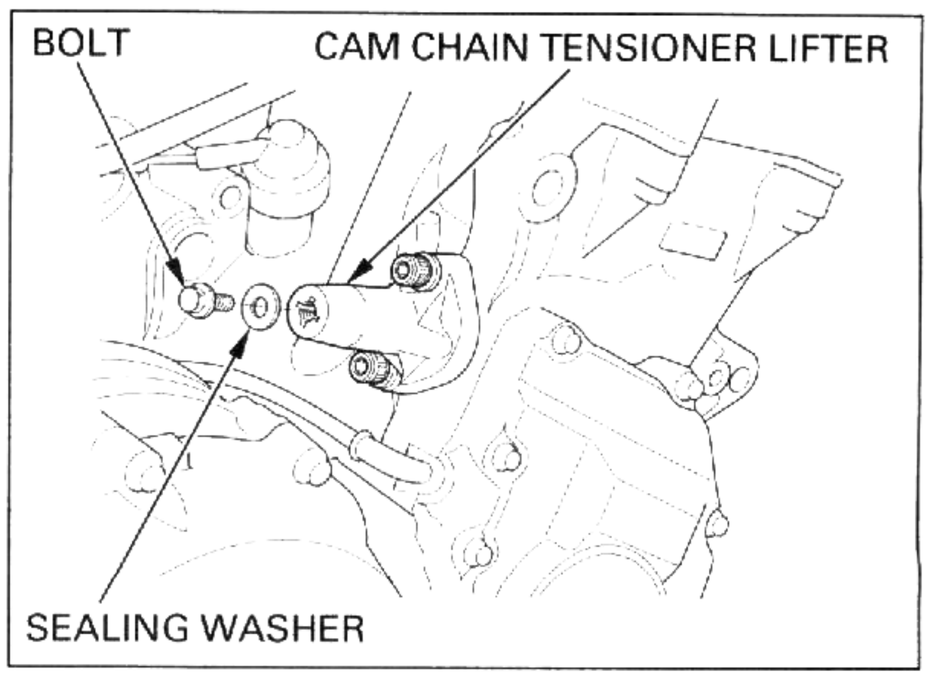
Remove the timing hole cap and O-ring.



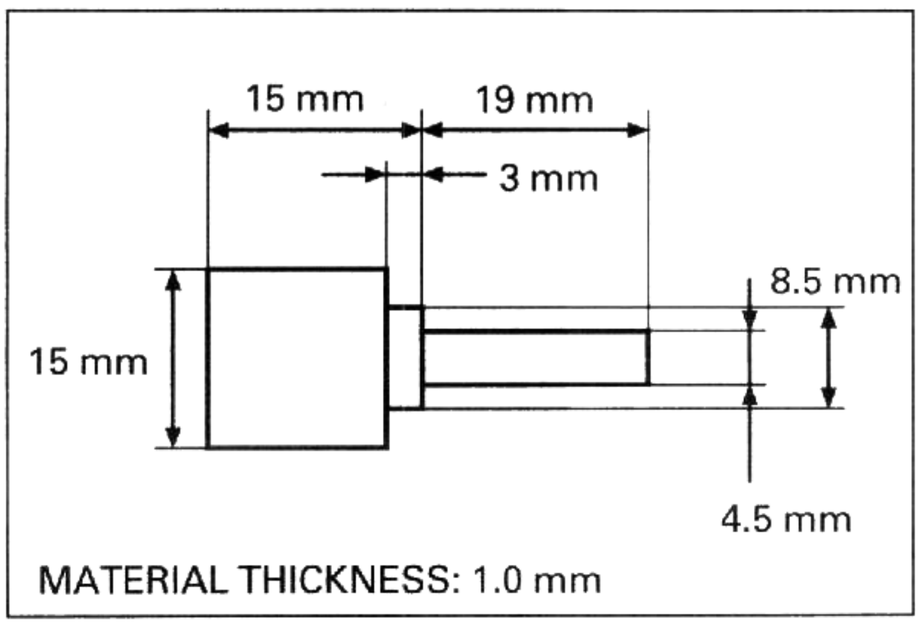
Turn the crankshaft clockwise, align the "T" mark on the ignition pulse generator rotor with the index mark on the ignition pulse generator rotor cover. Make sure the No. 1 piston is at TDC (Top Dead Center) on the compression stroke.

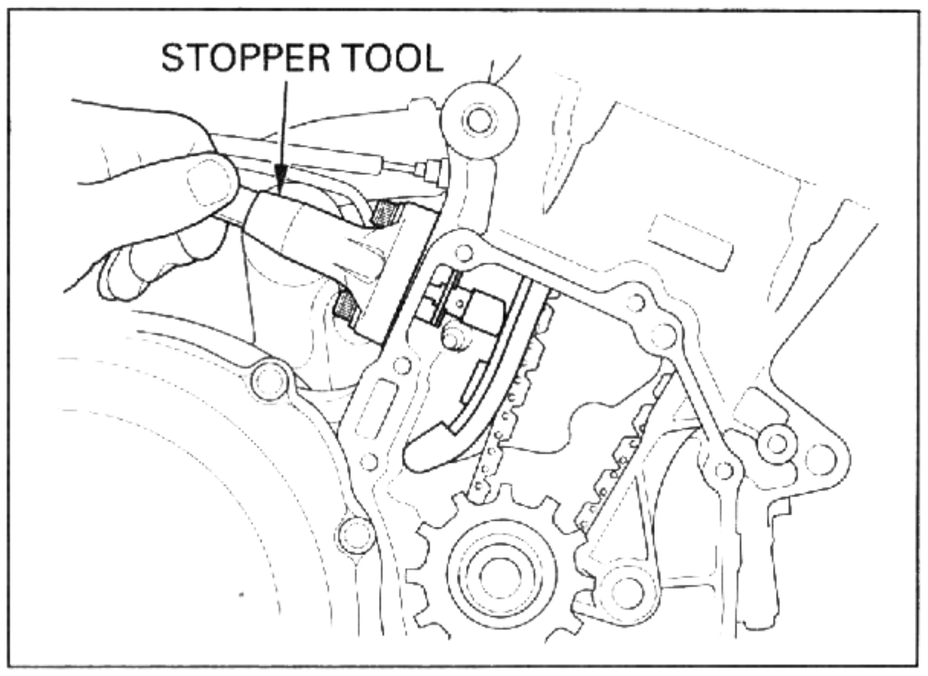


Remove the cam chain tensioner lifter sealing bolt and sealing washer.



Turn the tensioner lifter shaft fully in (clockwise) and secure it using the stopper tool.
This tool can easily be made from a thin (1 mm thickness) piece of steel.

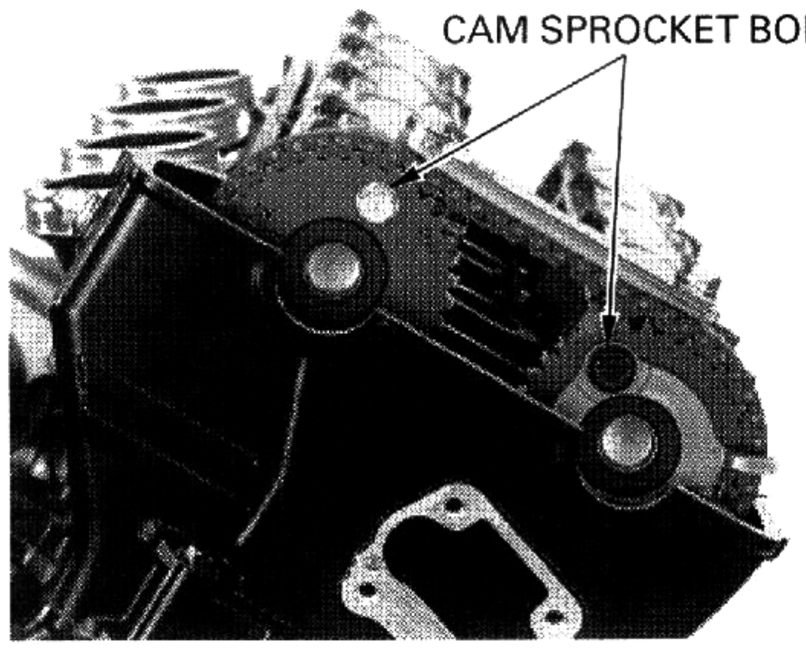




If you plan to replace the camshaft and/or cam sprocket, loosen the cam sprocket bolts as follow:

NOTE:

It is not necessary to remove the cam sprocket from the camshaft except when replacing the camshaft and/or cam sprocket.

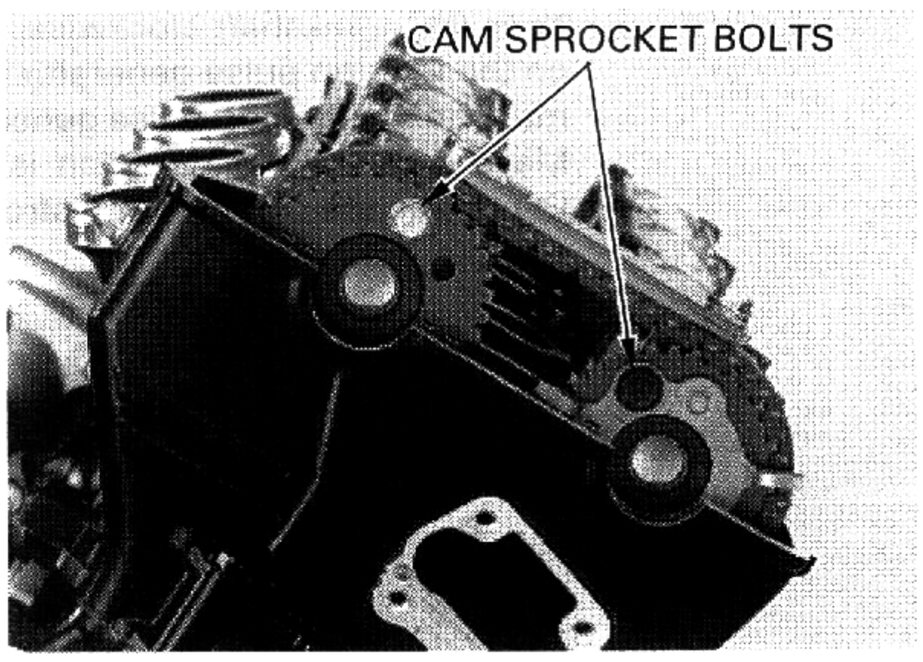


– Remove the cam sprocket bolt from intake and exhaust camshafts.

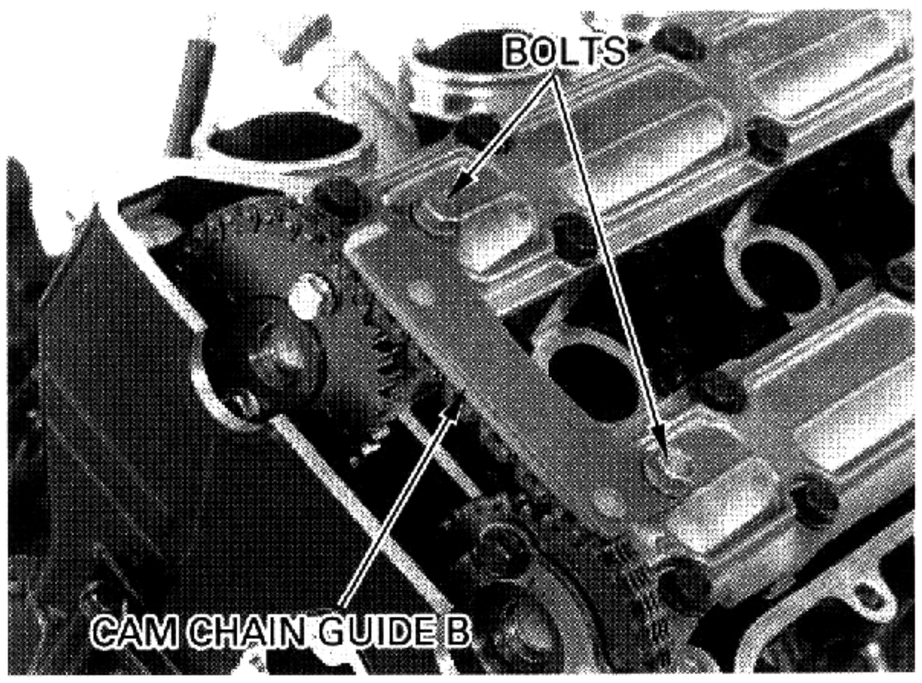
NOTE:

Be careful not to drop the cam sprocket bolts into the crankcase.

– Turn the crankshaft one full turn (360°), remove the other cam sprocket bolt from the camshafts.



—Remove the bolts and cam chain guide B.
—Remove the cam sprocket from the camshaft.



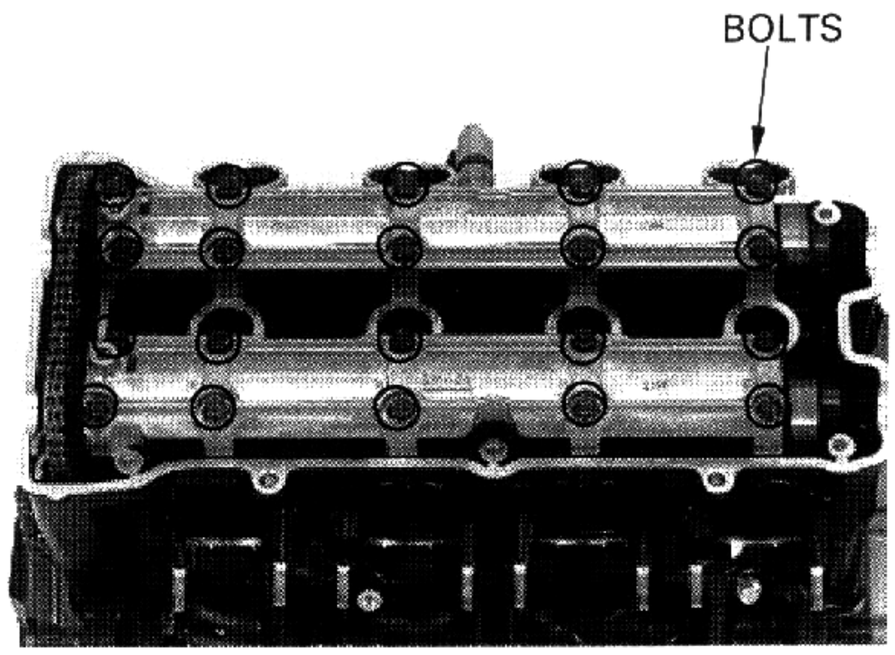
Loosen and remove the camshaft holder bolts, then remove the camshaft holders and camshafts.

CAUTION:

From outside to inside, loosen the bolts in a criss-cross pattern in several steps or the camshaft holder might break.

NOTE:

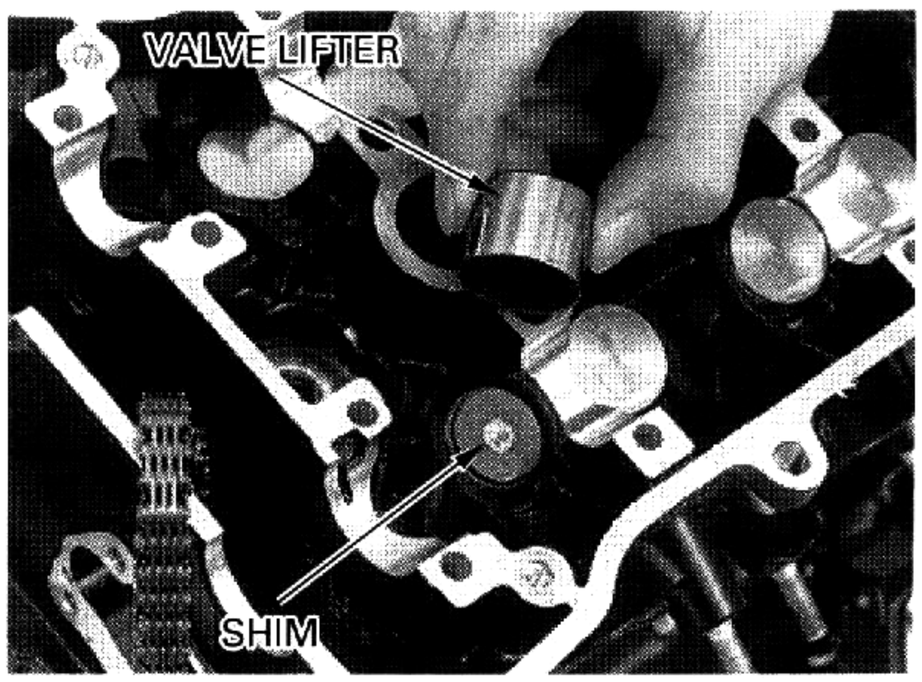
- Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.
- It is not necessary to remove the dowel pins from the camshaft holders.



Remove the valve lifters and shims.

NOTE:

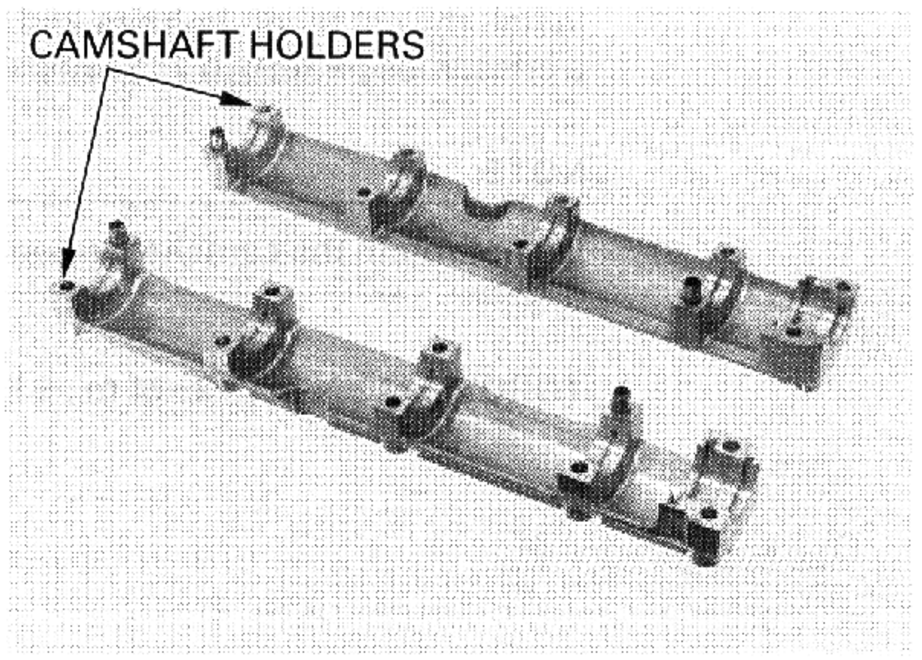
- Be careful not to damage the valve lifter bore.
- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping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



INSPECTION

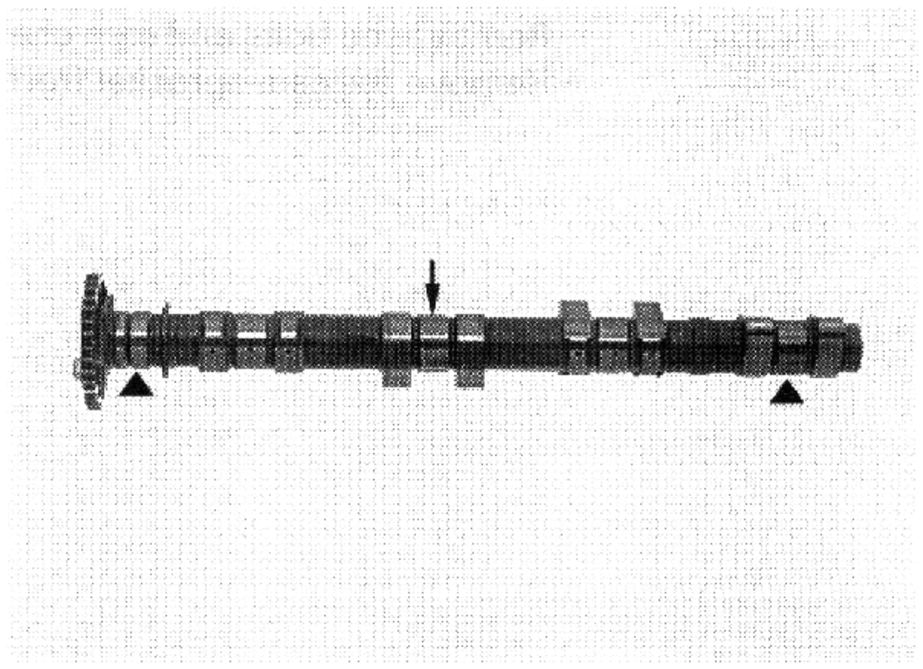
CAMSHAFT HOLDER

Inspect the bearing surface of the camshaft holder for scoring, scratches, or evidence of insufficient lubrication.
Inspect the oil orifices of the holders for clogging.



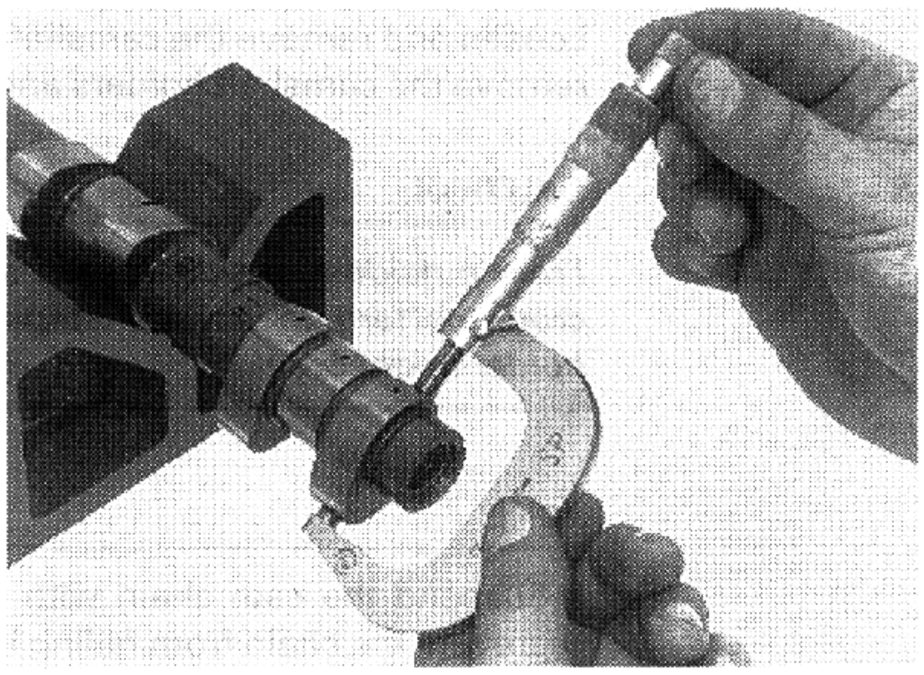
CAMSHAFT RUNOUT
Support both ends of the camshaft with V-blocks and check the camshaft runout with a dial gauge.

SERVICE LIMIT: 0.05 mm (0.002 in)

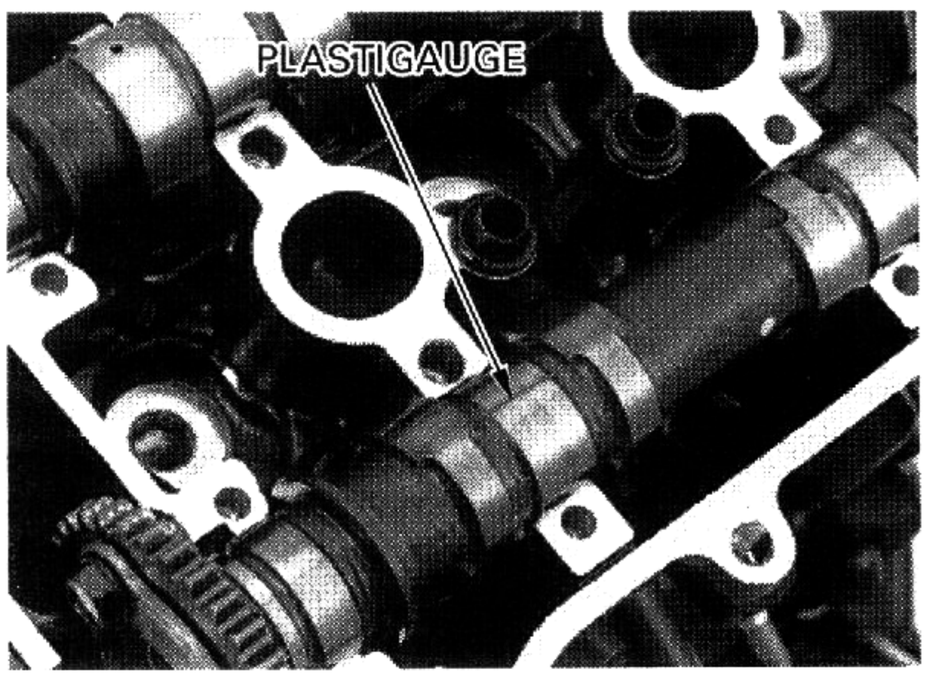


CAM LOBE HEIGHT
Using a micrometer, measure each cam lobe height.

SERVICE LIMITS:
IN: 38.02 mm (1.497 in)
EX: 38.08 mm (1.499 in)



CAMSHAFT OIL CLEARANCE
Wipe any oil from the journals of the camshaft, cylinder head and camshaft holders.
Lay a strip of plastigauge lengthwise on top of each camshaft journal.

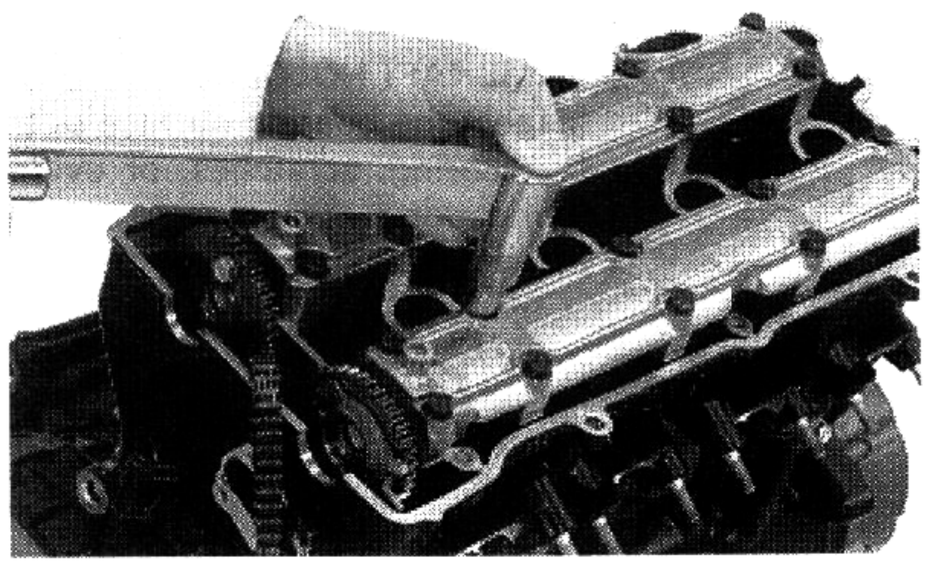


Install the camshaft holders and tighten the bolts in a crisscross pattern in 2—3 steps.

NOTE:

Do not rotate the camshaft when using plastigauge.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



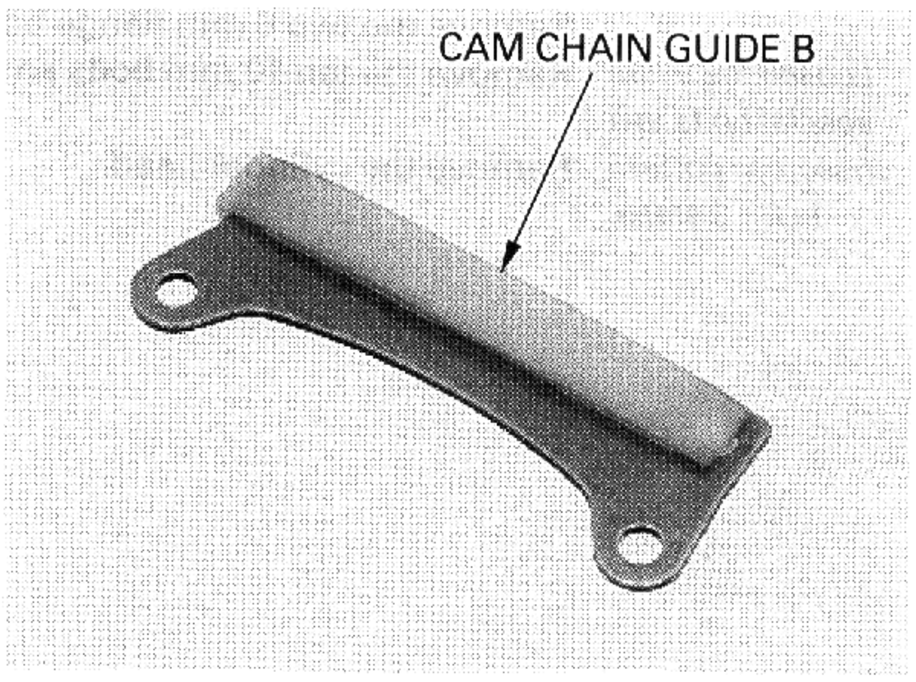
Remove the camshaft holders and measure the width of each plastigauge.
The widest thickness determines the oil clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

When the service limits are exceeded, replace the camshaft and recheck the oil clearance.
Replace the cylinder head and camshaft holders as a set if the clearance still exceeds the service limit.



CAM CHAIN GUIDE B
Inspect the cam chain slipper surface of the cam chain guide for wear or damage.



CYLINDER HEAD REMOVAL

Remove the engine from the frame (page 7-2).
Remove the camshaft (page 8-7).

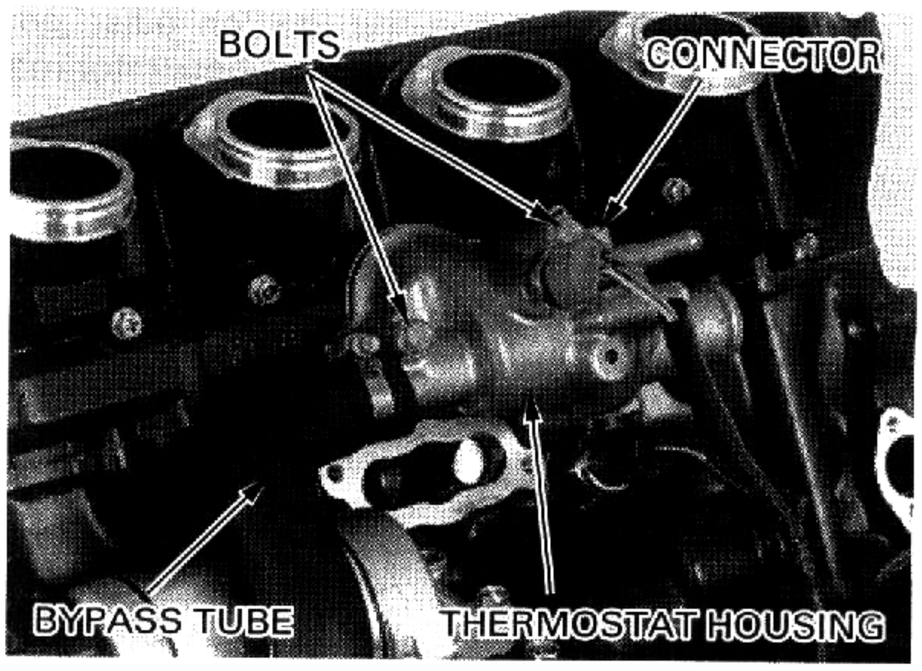
Remove the cylinder drain bolt and sealing washer.
Drain coolant from cylinder head and cylinder block.

Check the sealing washer is in good condition, replace if necessary.
Reinstall the sealing washer and drain bolt.

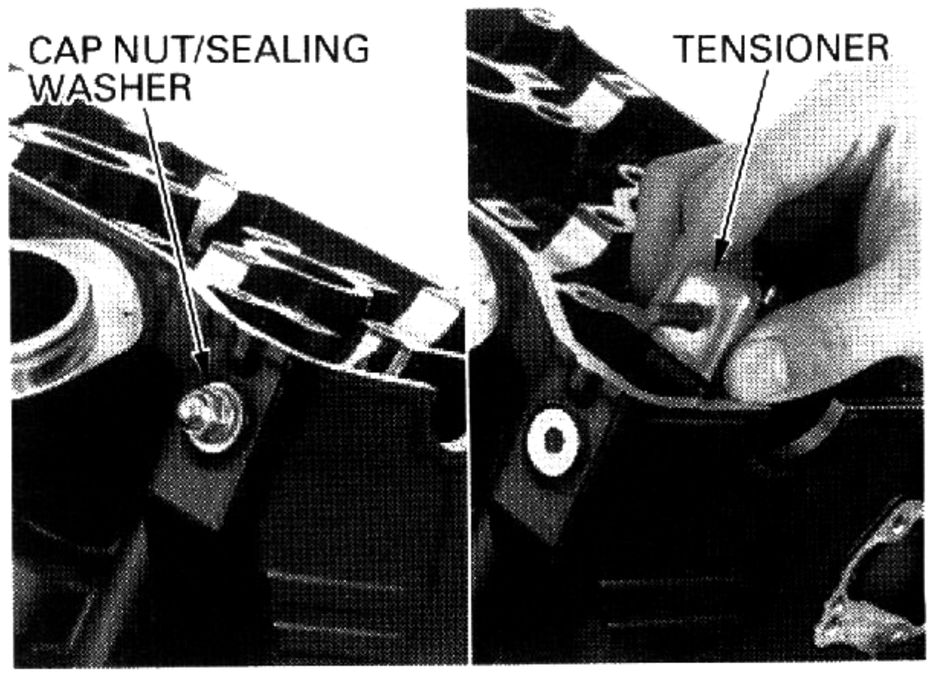


Disconnect the ECT/thermo sensor connector.
Disconnect the bypass tube from the thermostat housing.

Remove the bolts and thermostat housing.



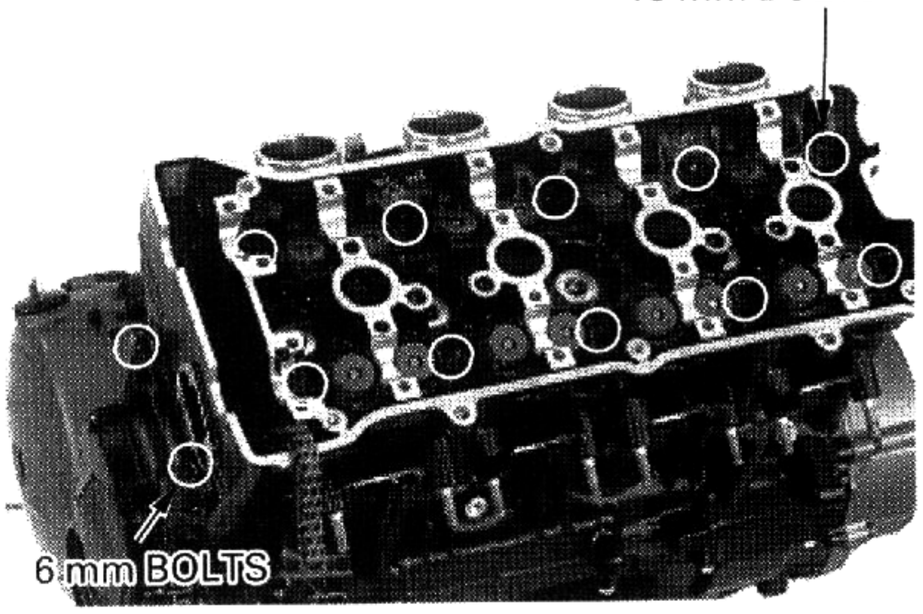
Remove the cam chain tensioner mounting cap nut and sealing washer.
Remove the cam chain tensioner.



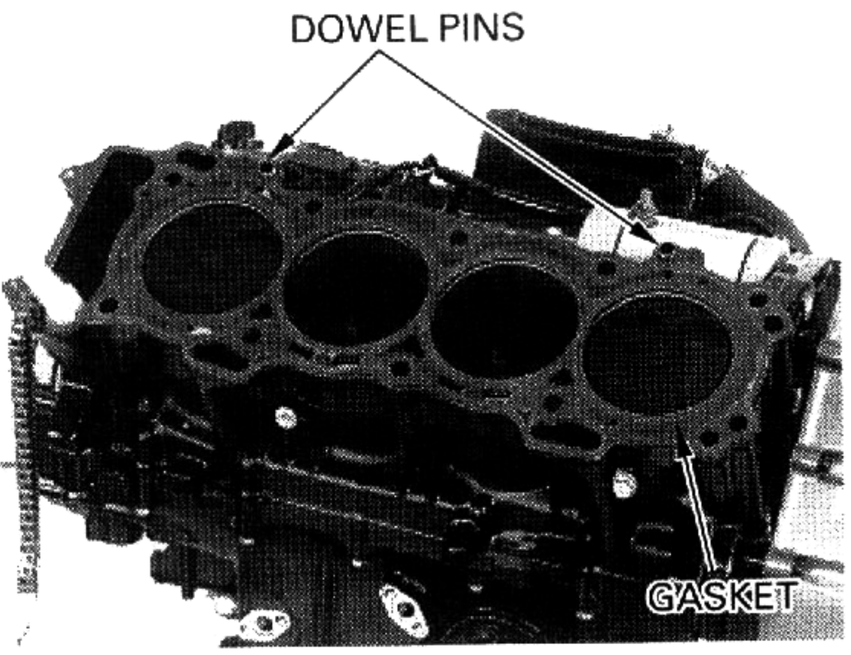
Remove the two 6 mm flange bolts.
Remove the ten 10 mm bolts and washers.

Loosen the 9 mm special bolts in a crisscross pattern in 2–3 steps.

Remove the cylinder head.



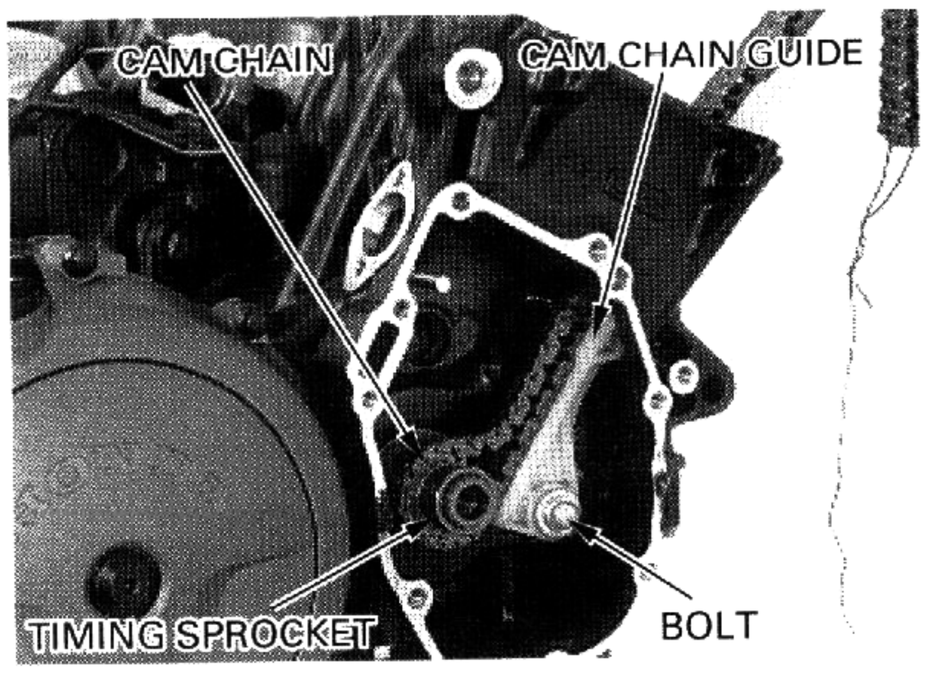
Remove the dowel pins and cylinder head gasket.



Remove the ignition pulse generator rotor cover and ignition pulse generator rotor (page 17-7).

Remove the bolt, cam chain guide and collar.

Remove the cam chain and timing sprocket from the crankshaft.

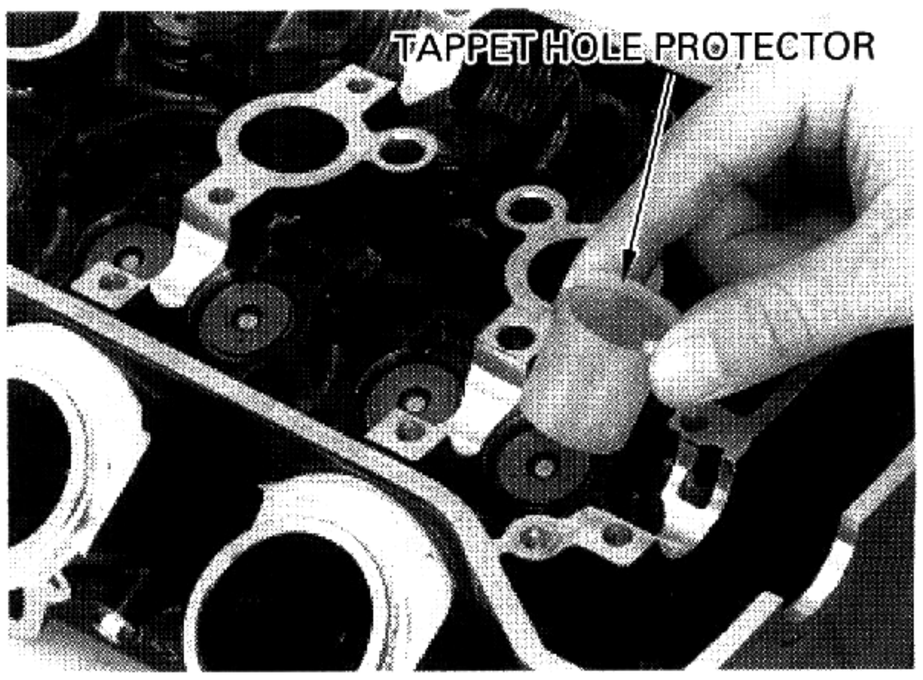


CYLINDER HEAD DISASSEMBLY

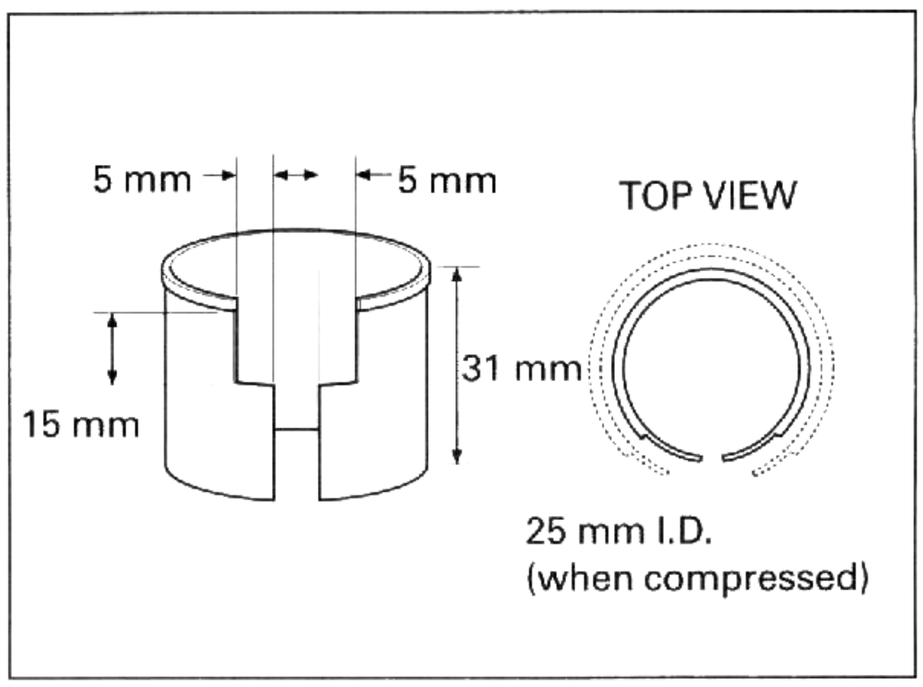
Remove the spark plugs from the cylinder head.

Install the tappet hole protector into the valve lifter bore.

TOOL:
Tappet hole protector 07HMG-MR70002



An equivalent tool can easily be made from a plastic 35 mm film container as shown.

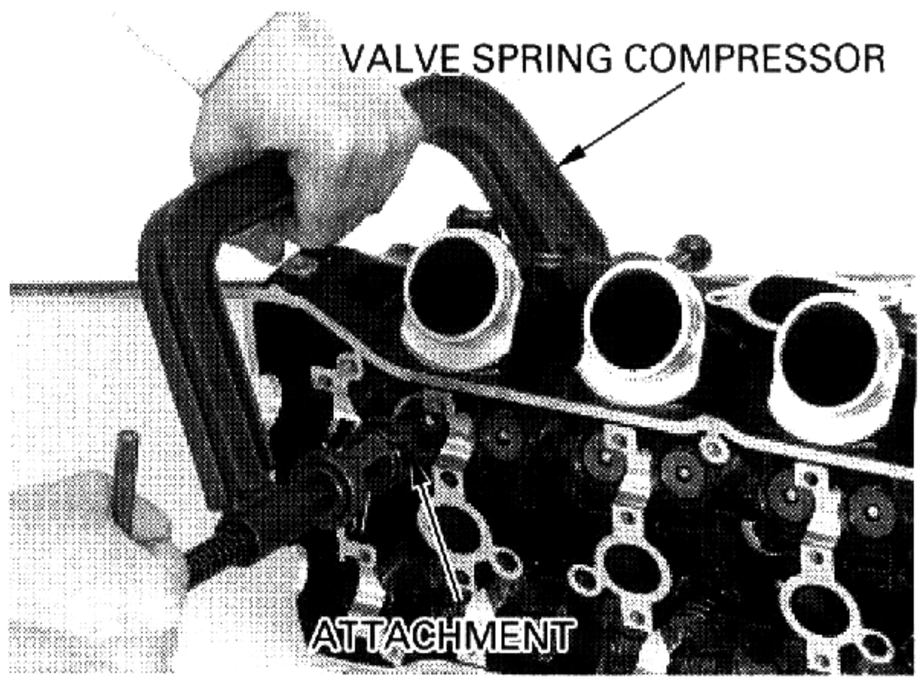


Remove the valve spring cotters using the special tools as shown.

TOOLS:
Valve spring compressor 07757-0010000
Valve spring compressor attachment 07959-KM30101

CAUTION:

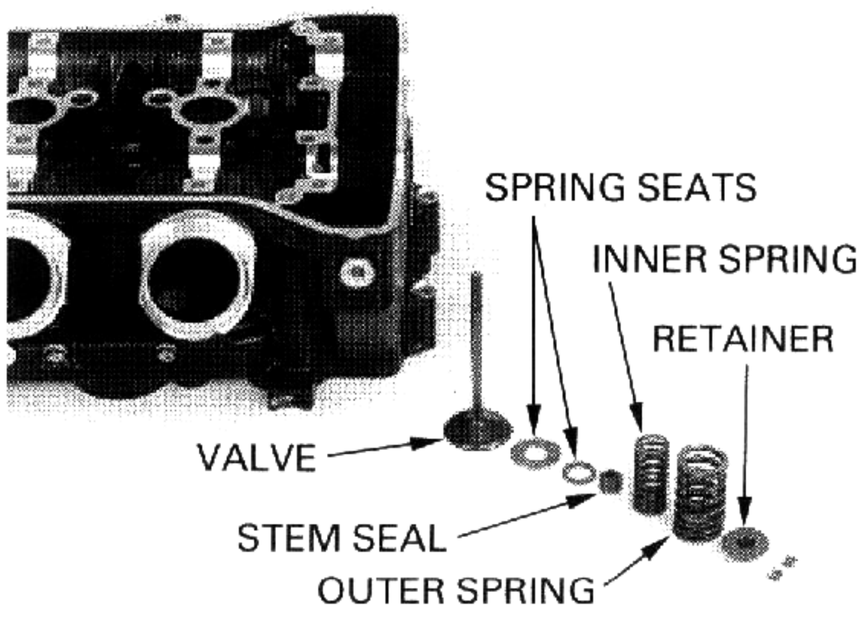
To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.



Remove the following:
- Spring retainer
- Outer and inner valve springs
- Valve
- Stem seal
- Inner and outer valve spring seats

NOTE:

Mark all parts during disassembly so they can be placed back in their original locations.



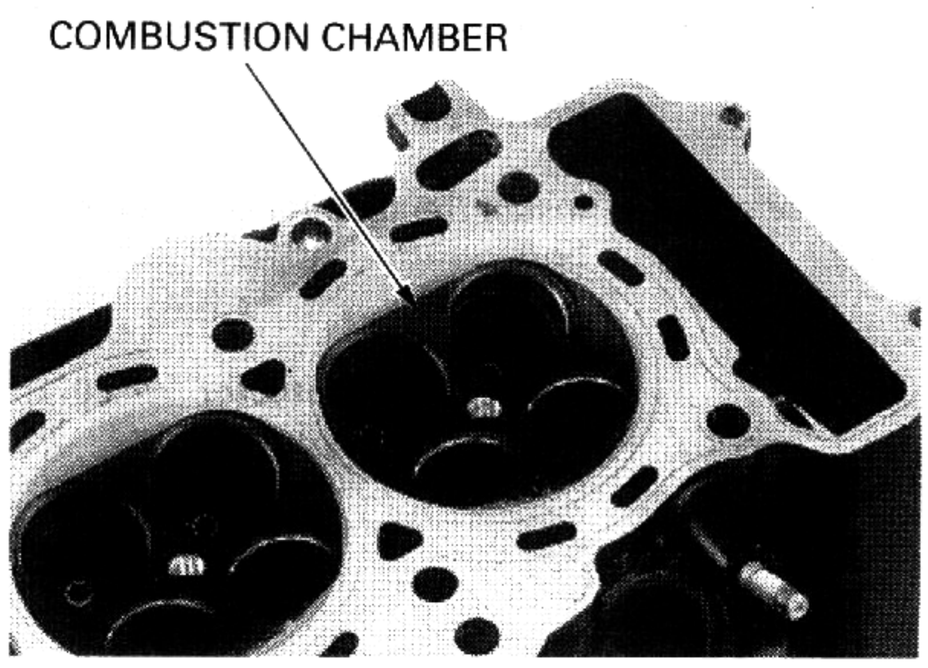
CYLINDER HEAD INSPECTION

CYLINDER HEAD

Remove carbon deposits from the combustion chambers.
Check the spark plug hole and valve areas for cracks.

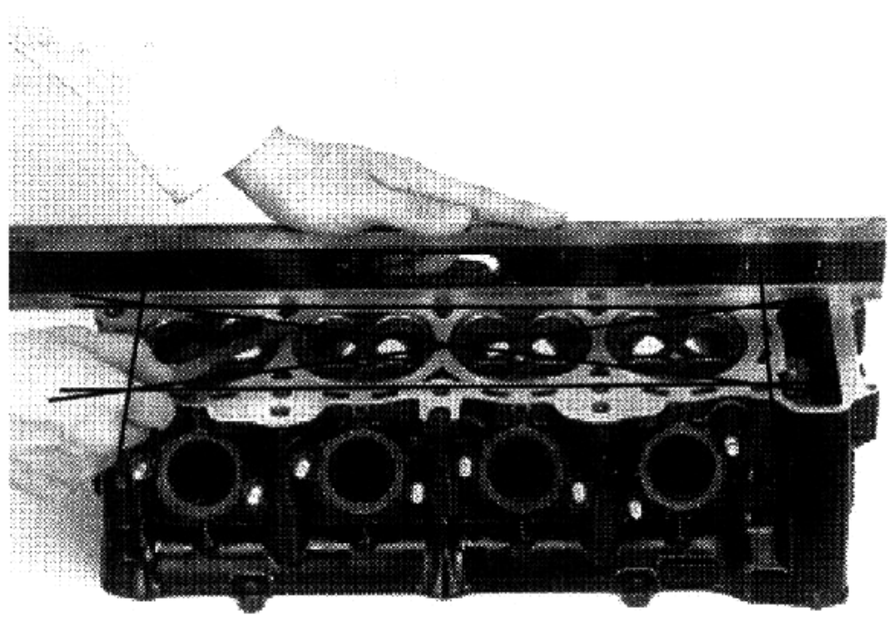
NOTE:

Avoid damaging the gasket surface.



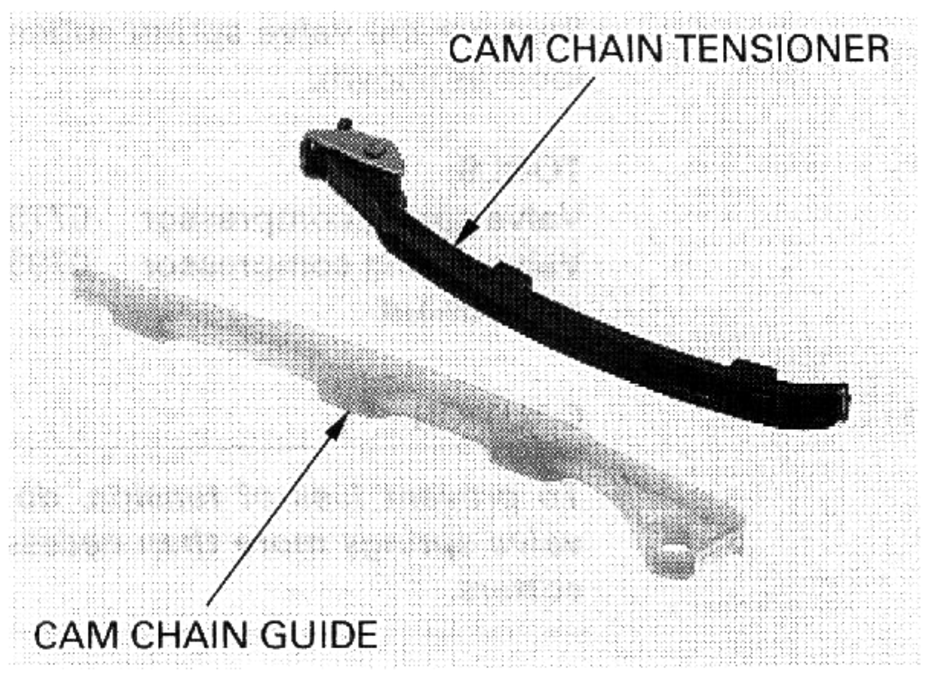
Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.10 mm (0.004 in)



CAM CHAIN TENSIONER/CAM CHAIN GUIDE

Inspect the cam chain tensioner and guide for excessive wear or damage, replace if necessary.

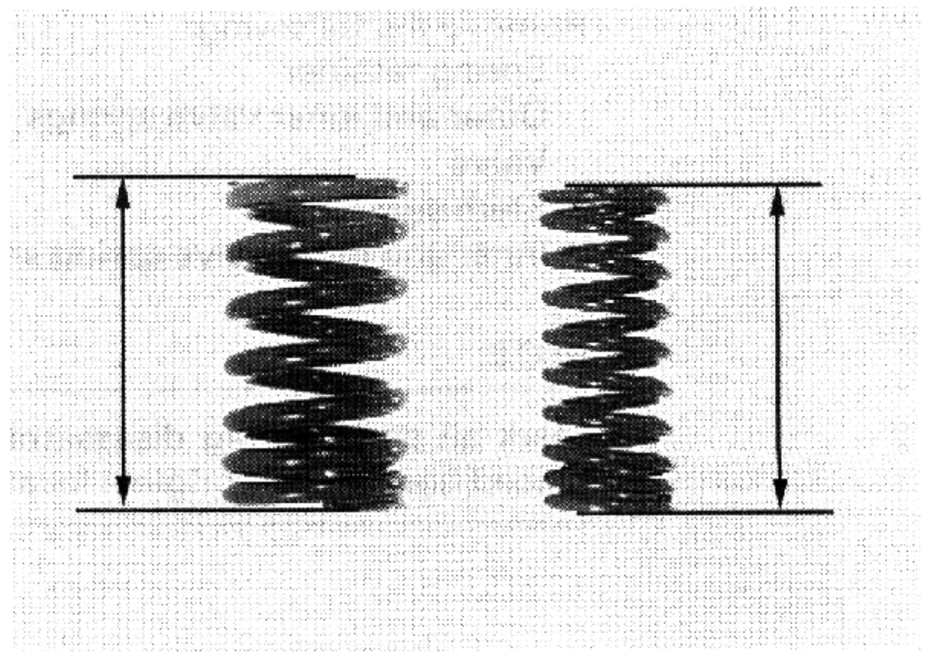


VALVE SPRING

Measure the free length of the inner and outer valve springs.

SERVICE LIMITS:
Inner: 35.4 mm (1.39 in)
Outer: 38.6 mm (1.52 in)

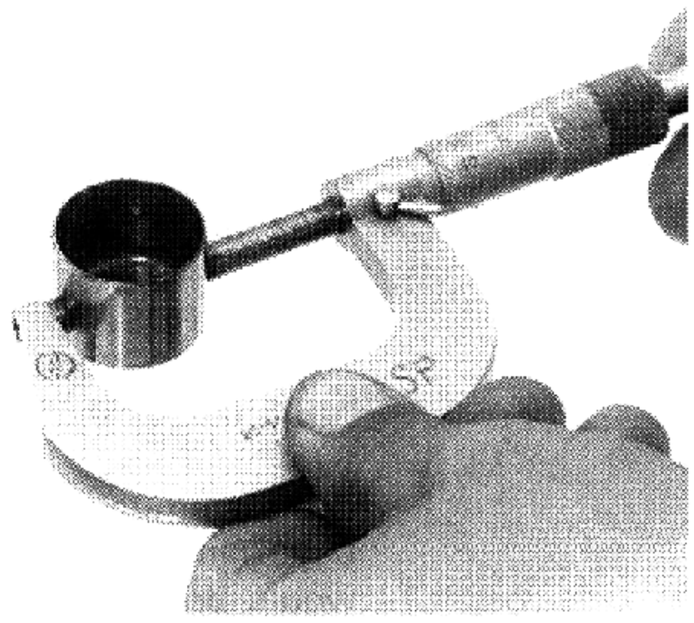
Replace the springs if they are shorter than the service limits.



VALVE LIFTER

Inspect each valve lifter for scratches or abnormal wear.
Measure the each valve lifter O.D.

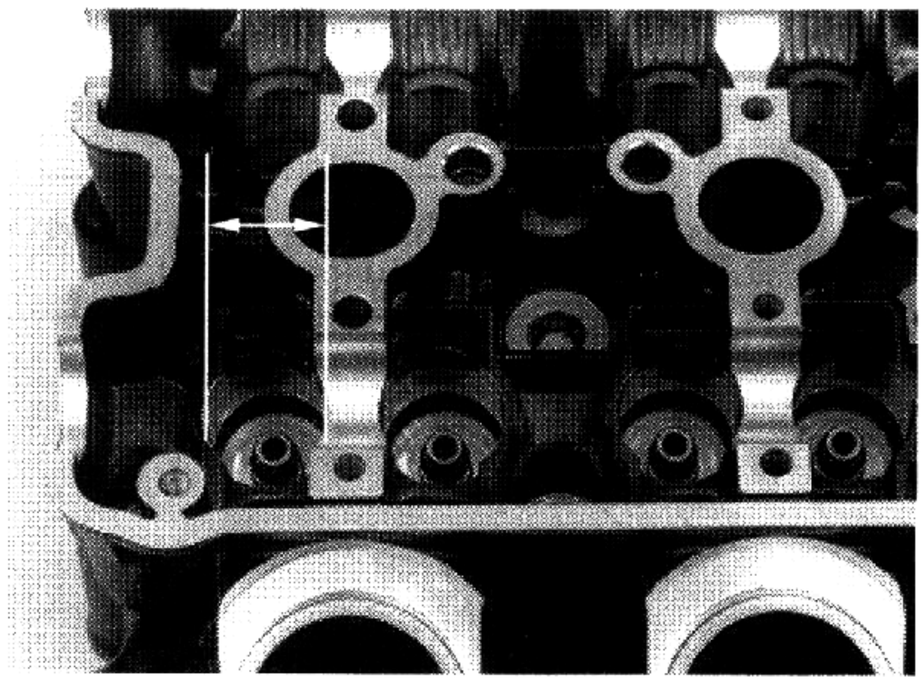
SERVICE LIMIT: 25.97 mm (1.022 in)



VALVE LIFTER BORE

Inspect each valve lifter bore for scratches or abnormal wear.
Measure the each valve lifter bore I.D.

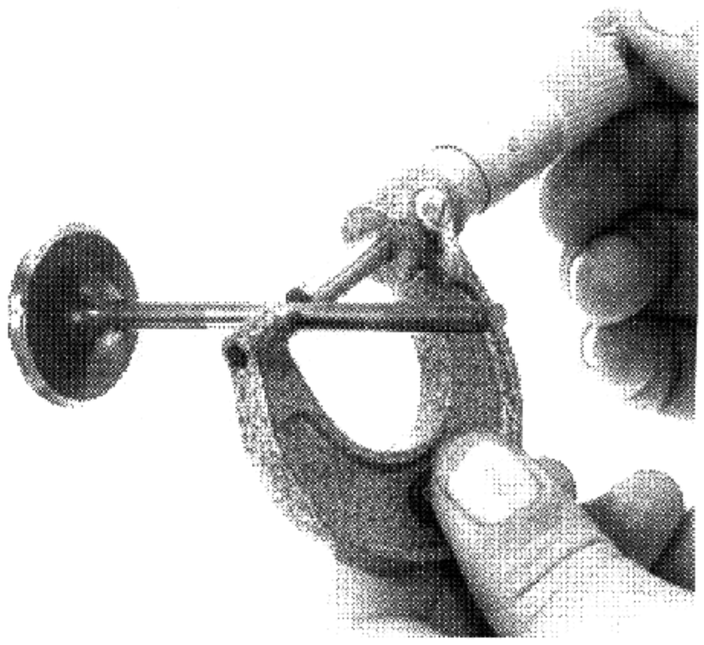
SERVICE LIMIT: 26.04 mm (1.025 in)



VALVE/VALVE GUIDE

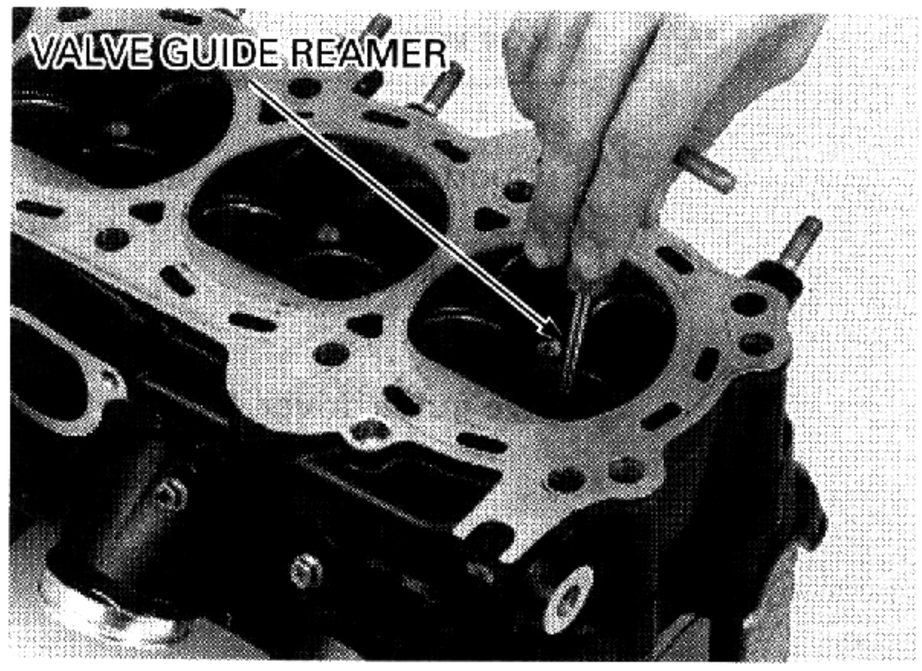
Inspect each valve for bending, burning or abnormal stem wear.
Check valve movement in the guide, measure and record each valve stem O.D.

SERVICE LIMITS:
IN: 4.965 mm (0.1955 in)
EX: 4.950 mm (0.1949 in)



Ream the guides to remove any carbon deposits before checking clearances.
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

TOOL:
Valve guide reamer 07984-MA60001



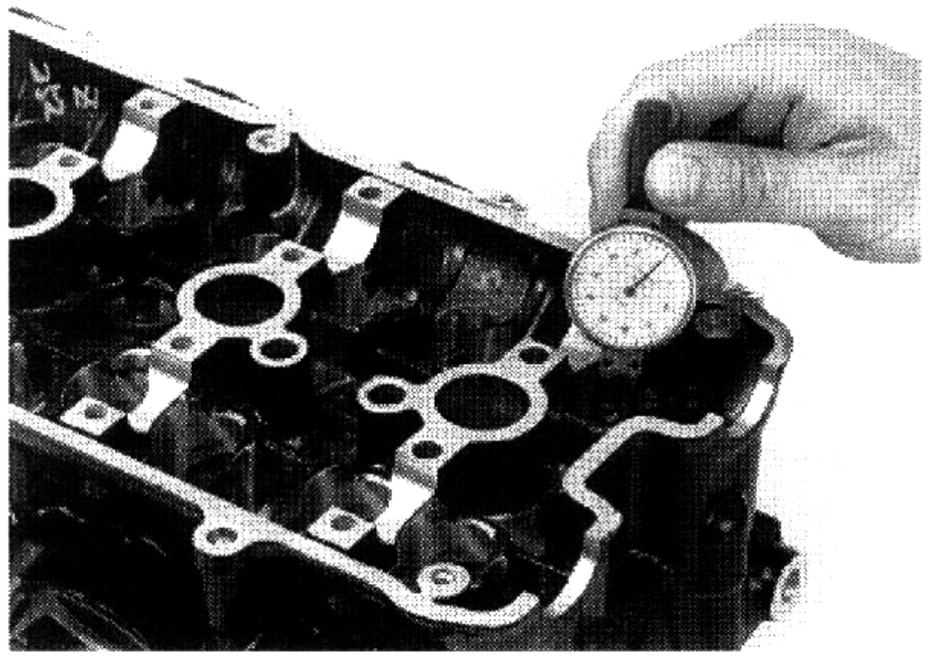
Measure and record each valve guide I.D.

SERVICE LIMIT: IN/EX: 5.040 mm (0.1984 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

STANDARDS:
IN: 0.010 – 0.037 mm (0.0004 – 0.0015 in)
EX: 0.025 – 0.052 mm (0.0010 – 0.0020 in)

If the stem-to-guide clearance is out of standard, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit.
If the stem-to-guide clearance is out of standard with the new guides, replace the valves and guides.



NOTE:

Reface the valve seats whenever the valve guides are replaced (page 8-17).

VALVE GUIDE REPLACEMENT

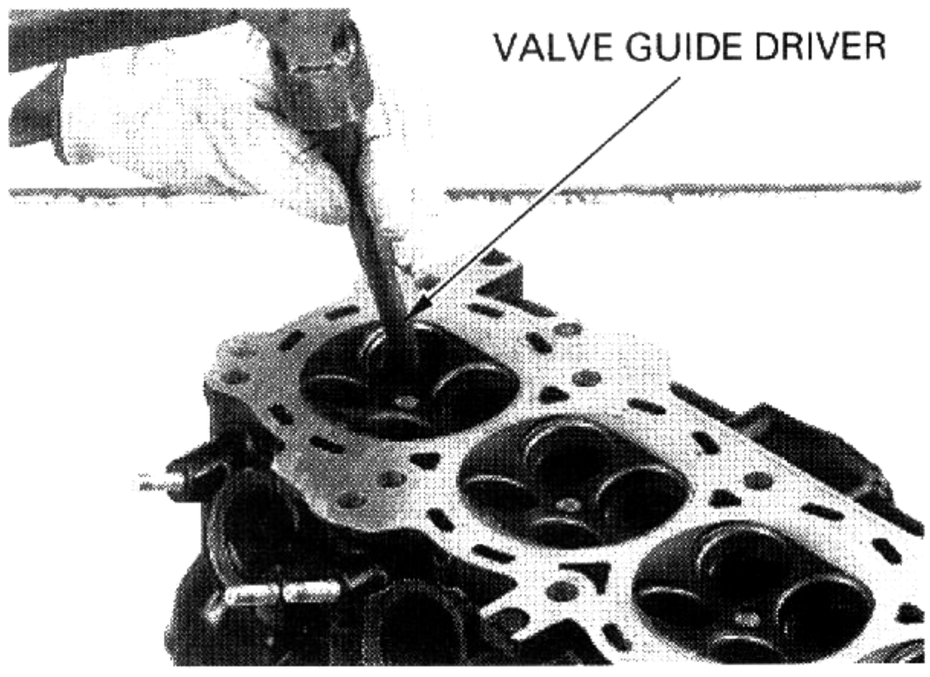
Chill the replacement valve guides in the freezer section of a refrigerator for about an hour.
Heat the cylinder head to 100 – 150 °C (212 – 300 °F) with a hot plate or oven.

⚠WARNING

To avoid burns, wear heavy gloves when handling the heated cylinder head.

CAUTION:

Do not use a torch to heat the cylinder head; it may cause warping.



Support the cylinder head and drive out the valve guides from combustion chamber side of the cylinder head.

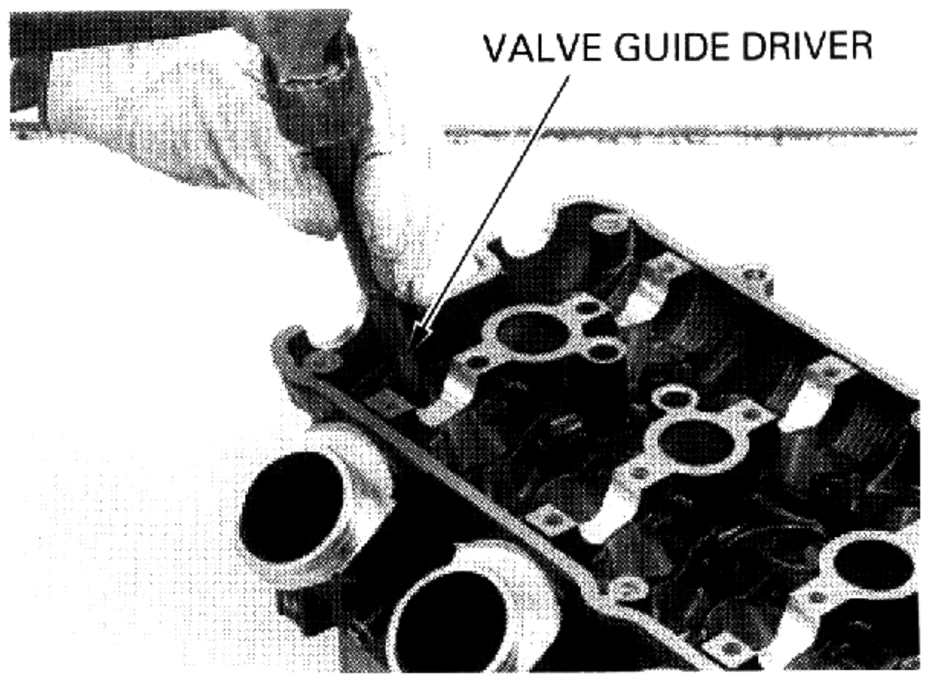
TOOL:
Valve guide driver, 5 mm 07942-MA600000

Drive in the guide to the specified depth from the top of the cylinder head.

SPECIFIED DEPTH:
IN/EX: 16.3—16.5 mm (0.64—0.65 in)

TOOL:
Valve guide driver, 5 mm 07942-MA600000

Let the cylinder head cool to room temperature.

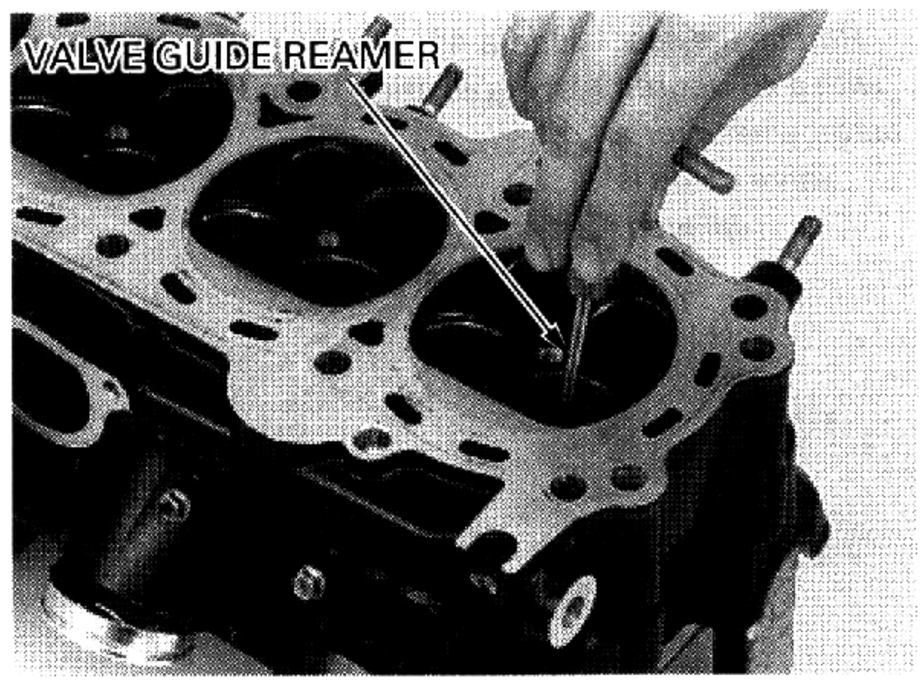


Ream the new valve guide after installation.
Insert the reamer from the combustion chamber side of the head and also always rotate the reamer clockwise.

TOOL:
Valve guide reamer 07984-MA60001

NOTE:

Use cutting oil on the reamer during this operation.



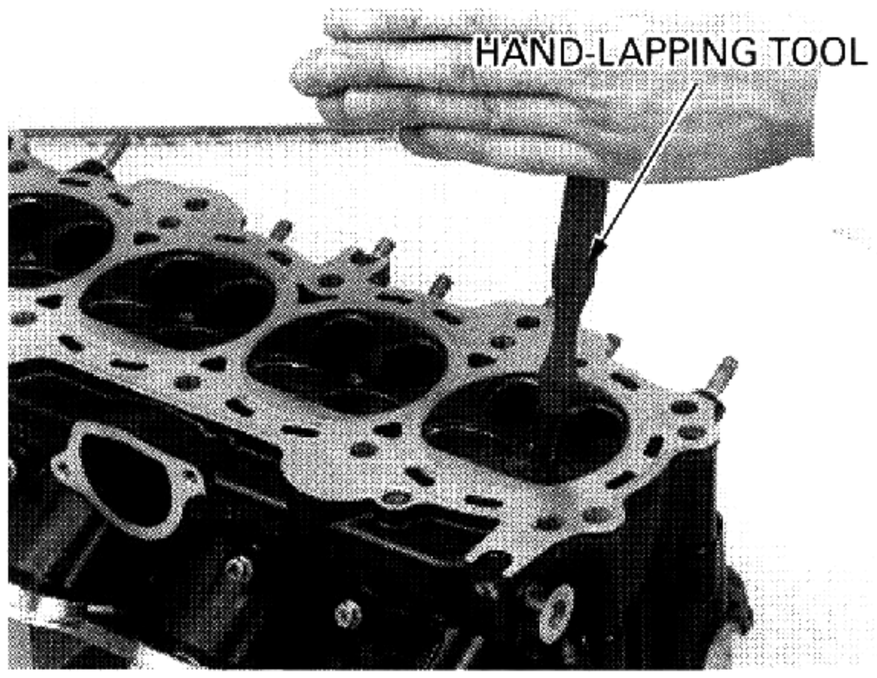
Clean the cylinder head thoroughly to remove any metal particles.
Reface the valve seat (see next page).

VALVE SEAT INSPECTION/REFACING

Clean the intake and exhaust valves thoroughly to remove carbon deposits.
Apply a light coating of Prussian Blue to the valve seats.
Lap the valves and seats using a rubber hose or other hand-lapping tool.
Remove and inspect the valves.

CAUTION:

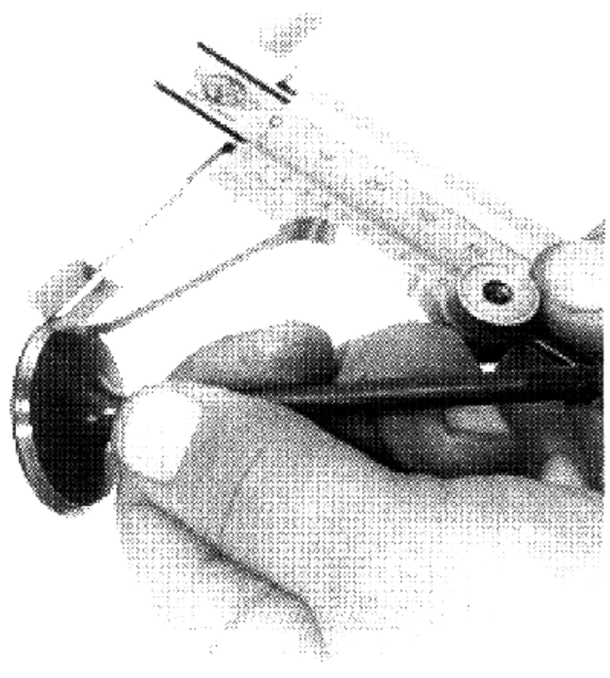
The valves cannot be ground. If a valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.



Inspect the width of each valve seat.

STANDARD: 0.90—1.10 mm (0.035—0.043 in)
SERVICE LIMIT: 1.5 mm (0.06 in)

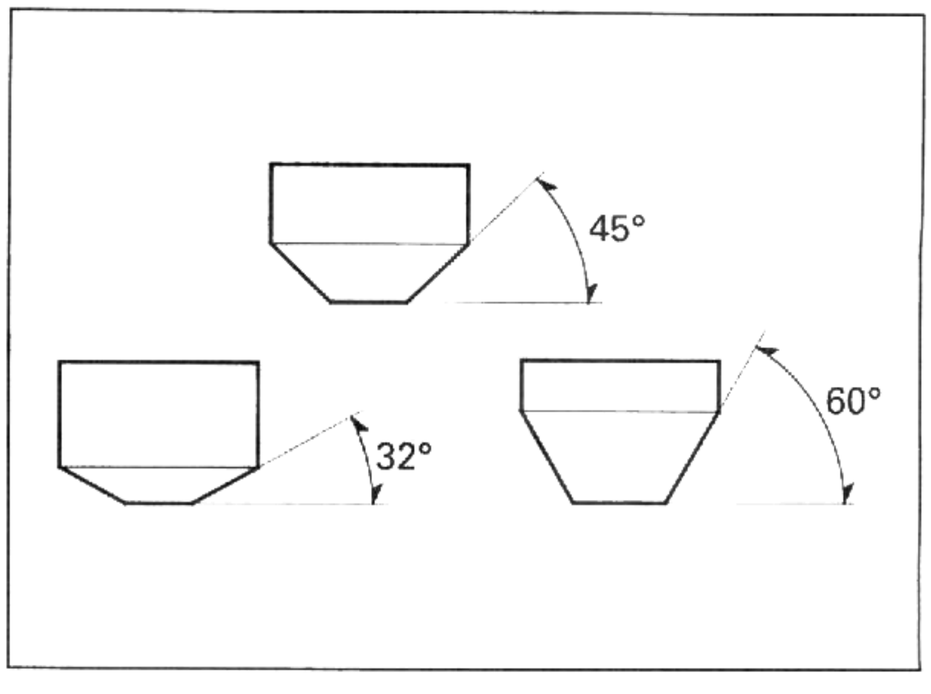
If the seat is too wide, too narrow or has low spots, the seat must be ground.



VALVE SEAT REFACING

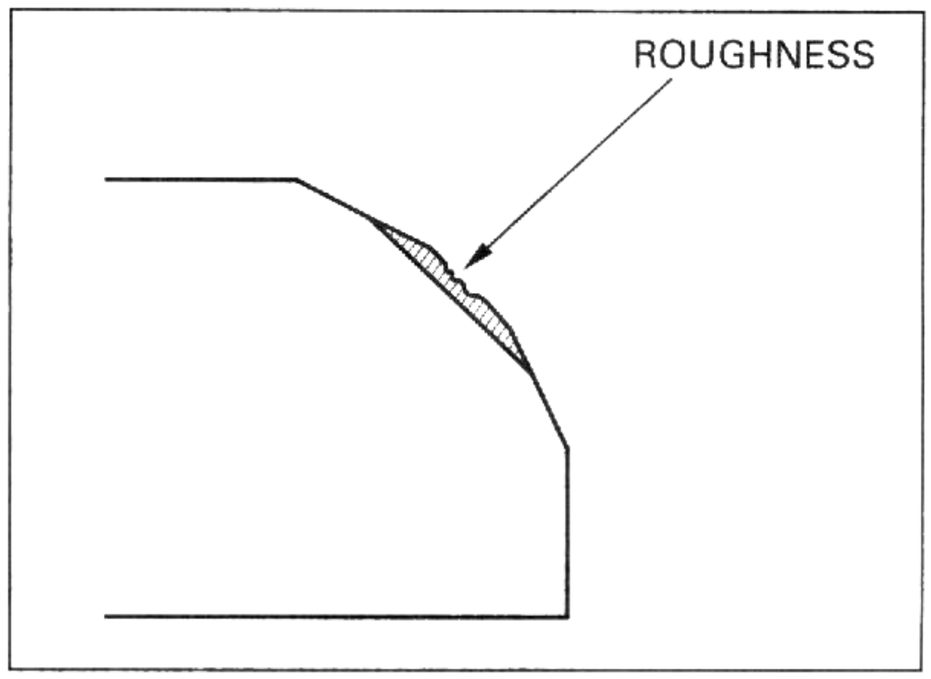
Follow the refacing manufacturer's operating instructions.

Valve seat cutters/grinders or equivalent valve seat refacing equipment are recommended to correct worn valve seats.

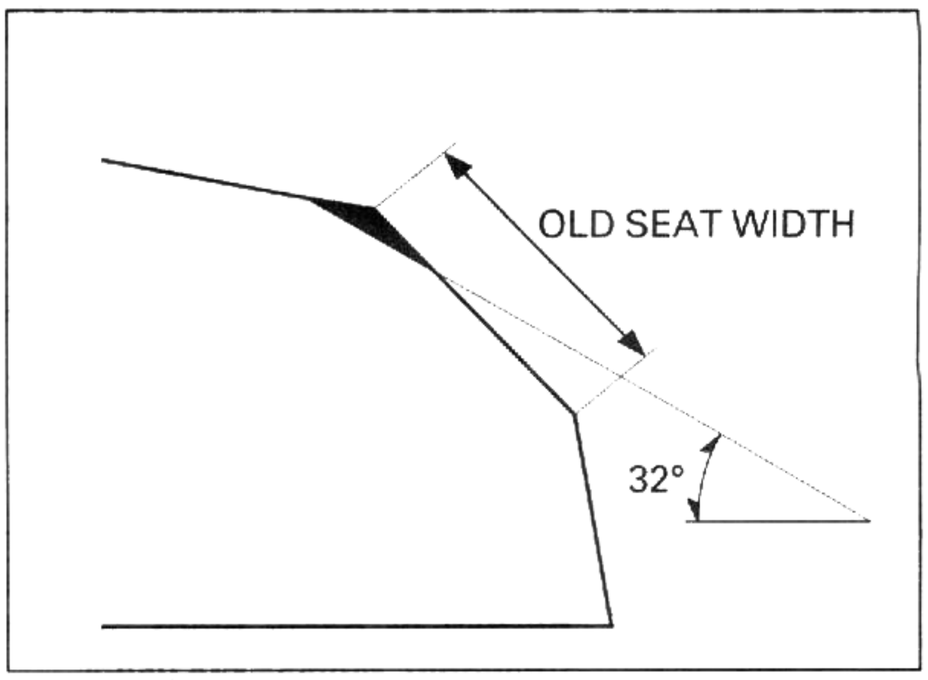


Reface the seat with a 45-degree cutter whenever a valve guide is replaced.

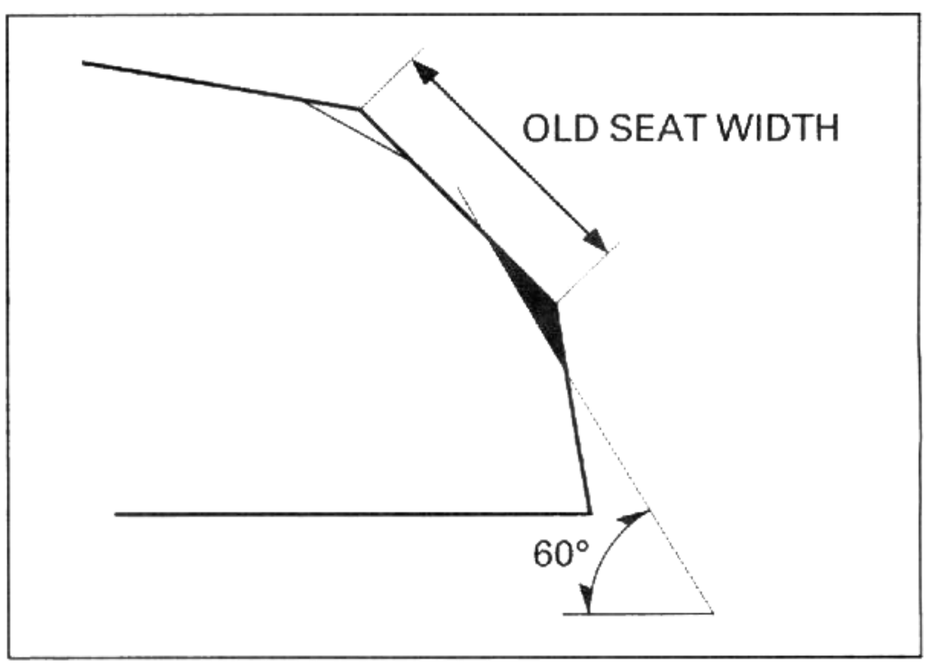
Use a 45-degree cutter to remove any roughness or irregularities from the seat.



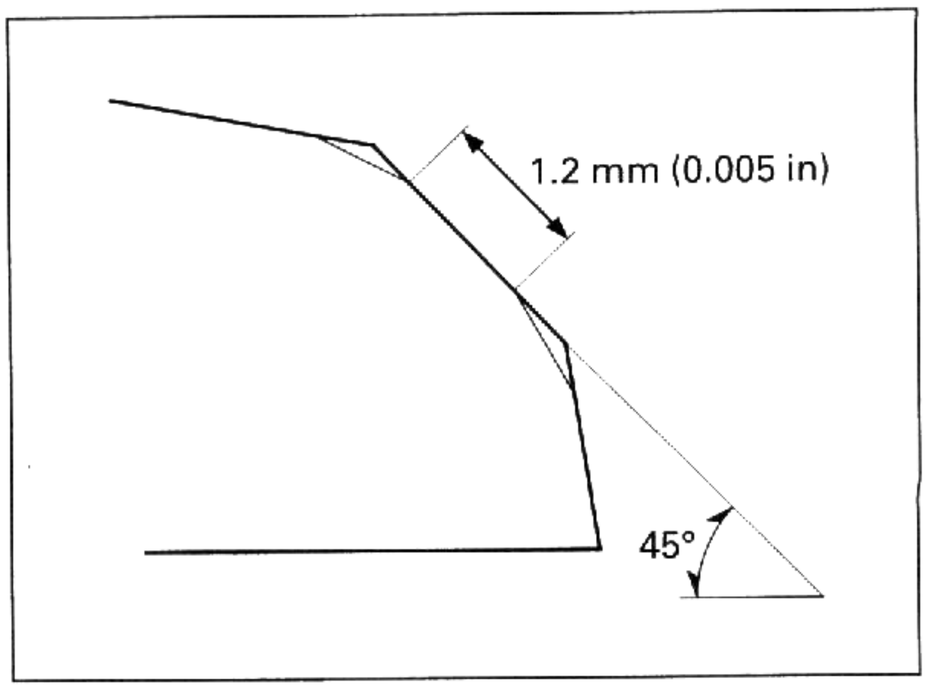
Use a 32-degree cutter to remove the top 1/4 of the existing valve seat material.



Use a 60-degree cutter to remove the bottom 1/4 of the old seat.
Remove the cutter and inspect the area you have refaced.



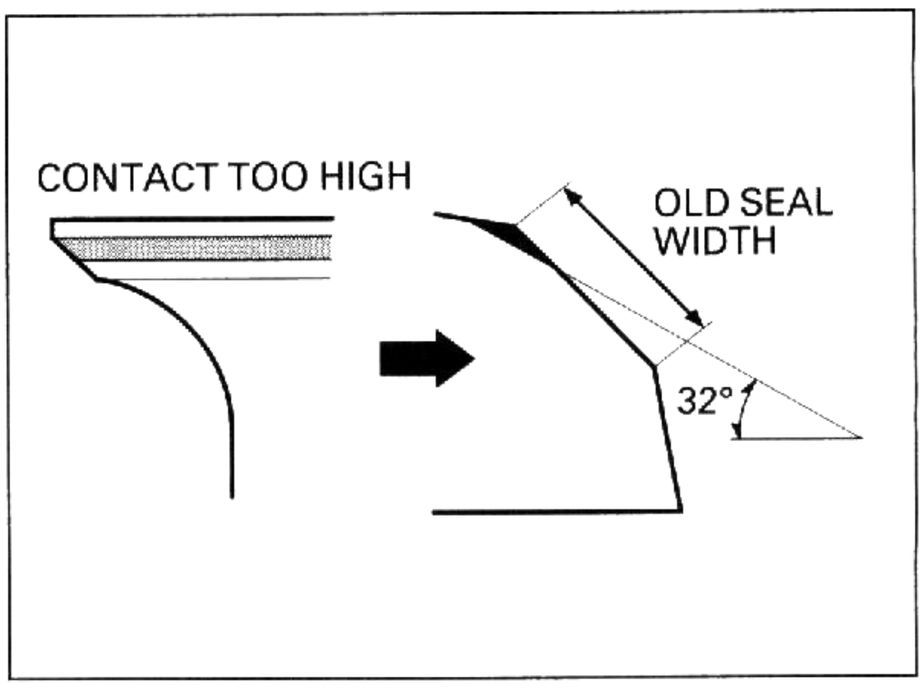
Install a 45-degree finish cutter and cut the seat to the proper width.
Make sure that all pitting and irregularities are removed.
Refinish if necessary.



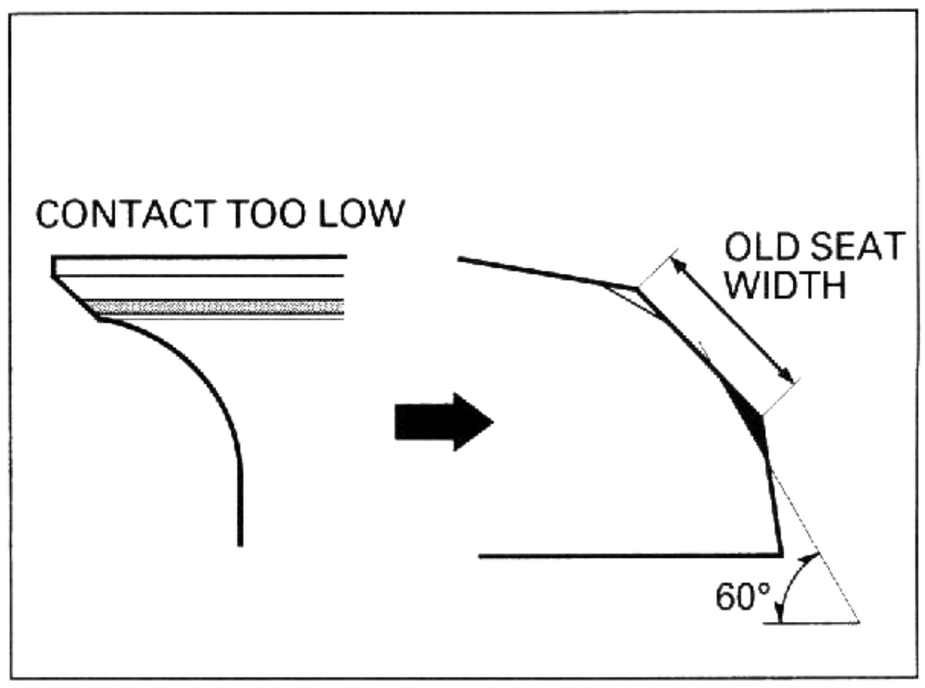
The location of the valve seat in relation to the valve face is very important for good sealing.

Apply a thin coating of Prussian Blue to the valve seat.
Press the valve through the valve guide and onto the seat to make a clear pattern.

If the contact area is too high on the valve, the seat must be lowered using a 32 degrees flat cutter.



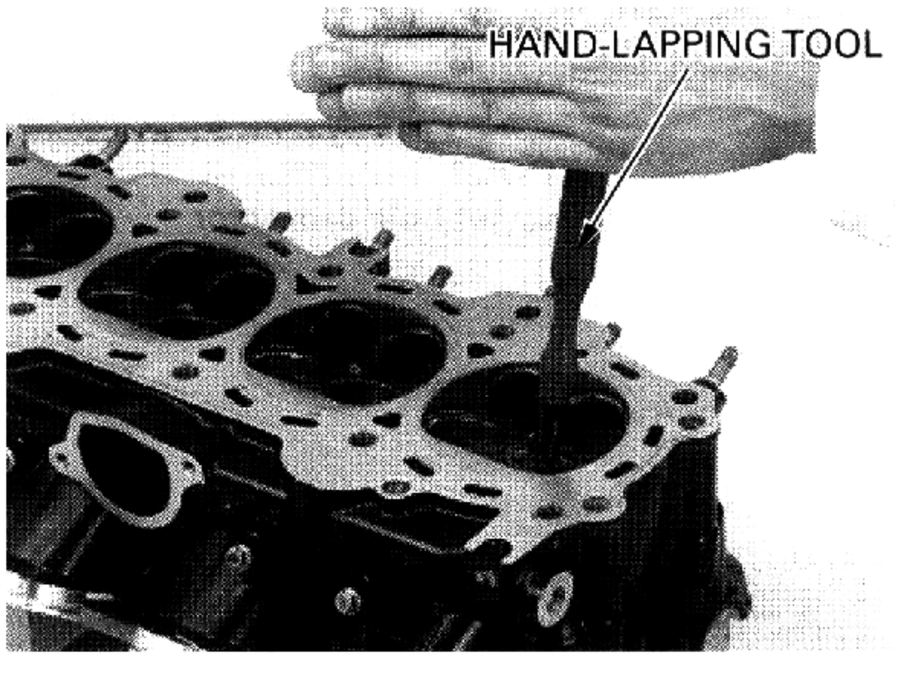
If the contact area is too low on the valve, the seat must be raised using a 60-degree inner cutter.



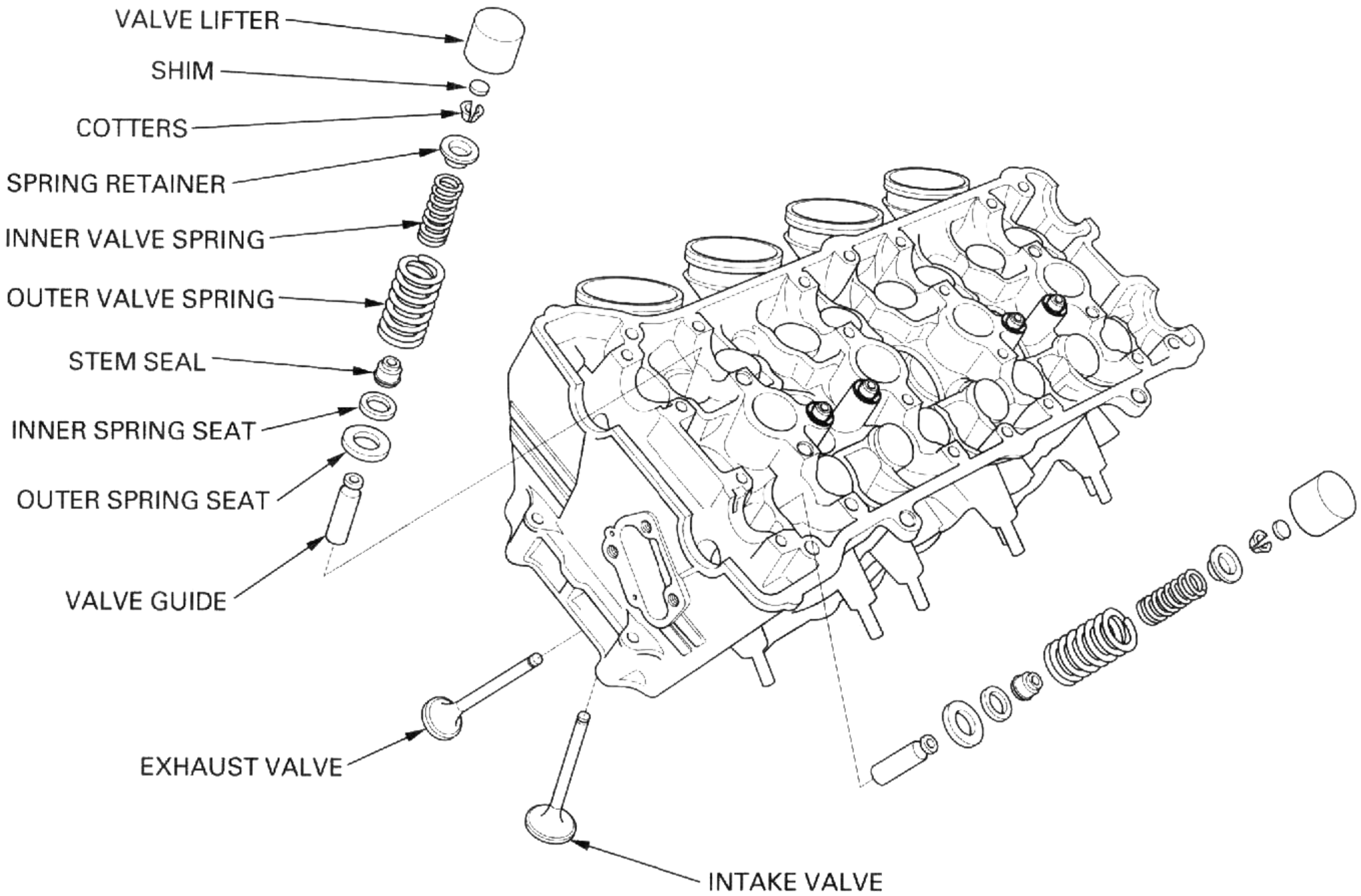
Refinish the seat to specifications, using a 45-degree finish cutter.
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

Do not allow lapping compound to enter the guides.

After lapping, wash all residual compound off the cylinder head and valve.



CYLINDER HEAD ASSEMBLY

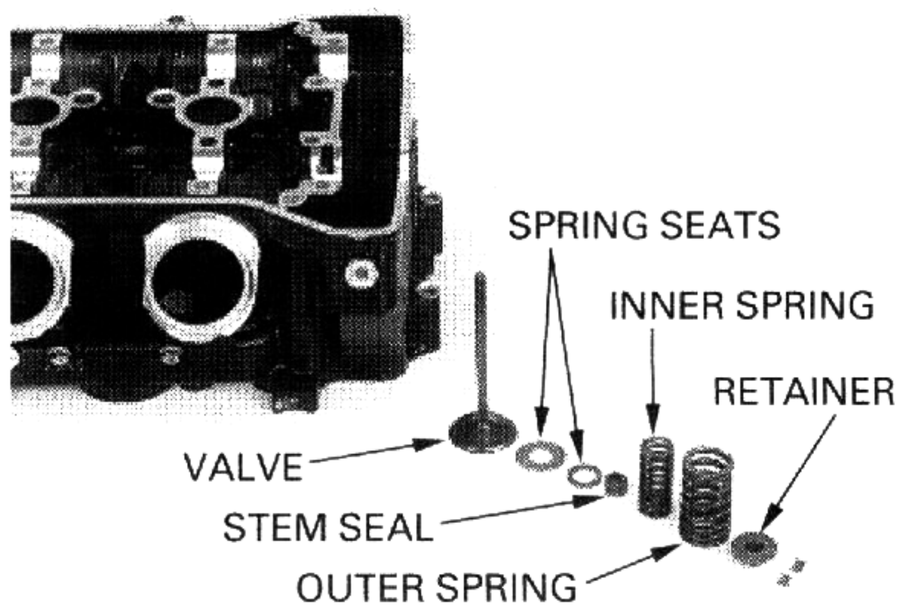


Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.

Install the inner and outer valve spring seats.
Install the new stem seals.

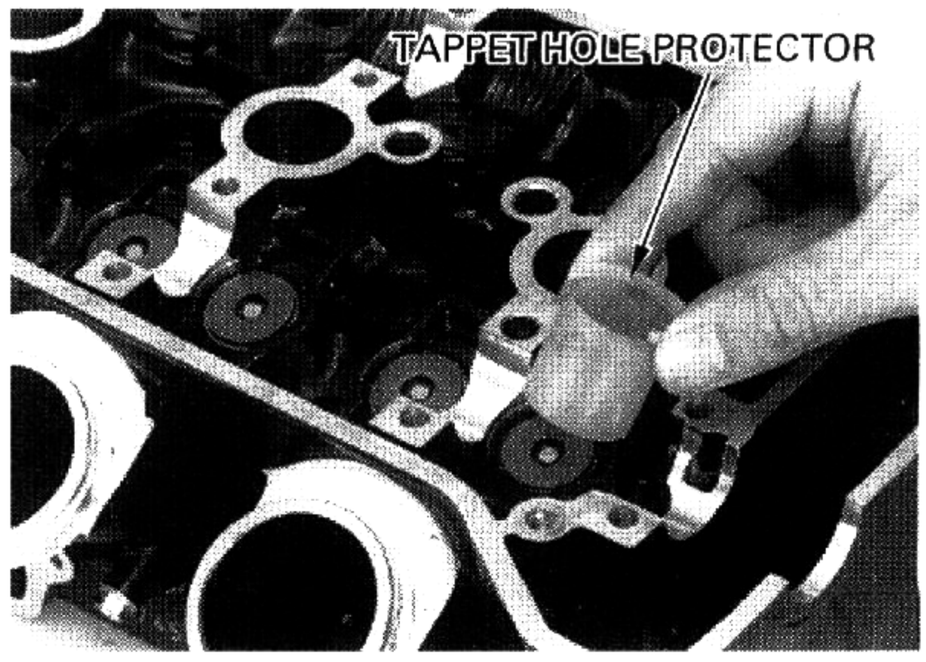
Lubricate the valve stems with molybdenum disulfide oil and insert the valve into the valve guide.

To avoid damage to the stem seal, turn the valve slowly when inserting.

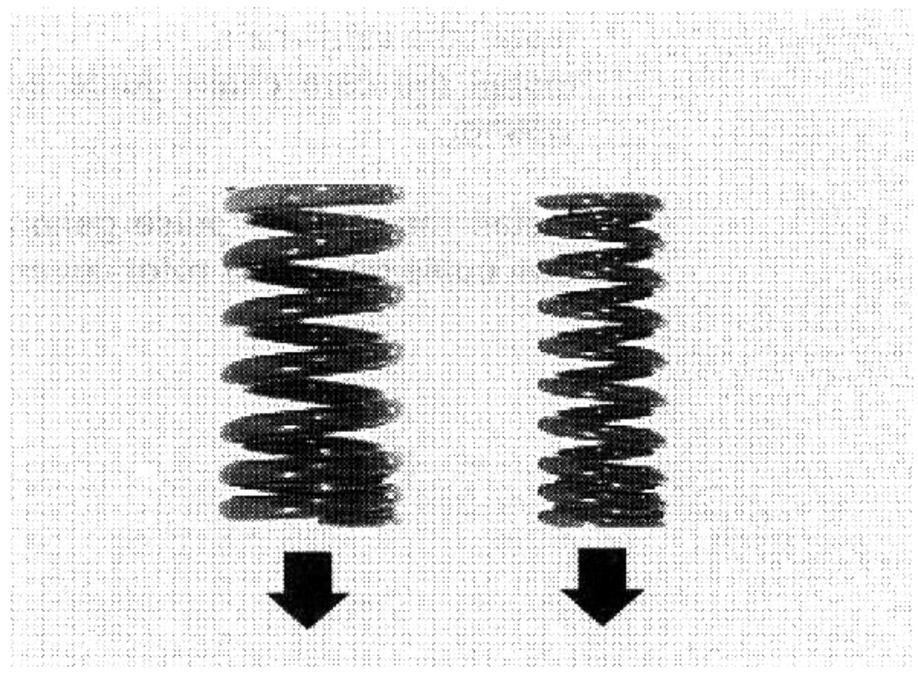


Install the tappet hole protector into the valve lifter bore.

TOOL:
Tappet hole protector 07HMG-MR70002



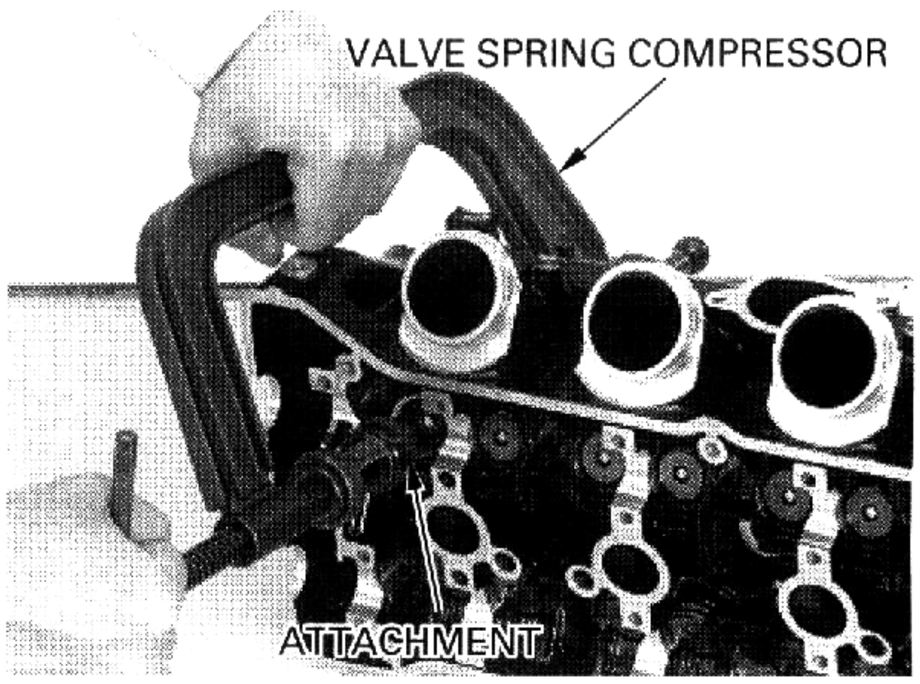
Install the valve springs with the tightly wound coils facing the combustion chamber.
Install the valve spring retainer.



Install the valve cotters using the special tool as shown.
To prevent loss of tension, do not compress the valve spring more than necessary.

TOOL:

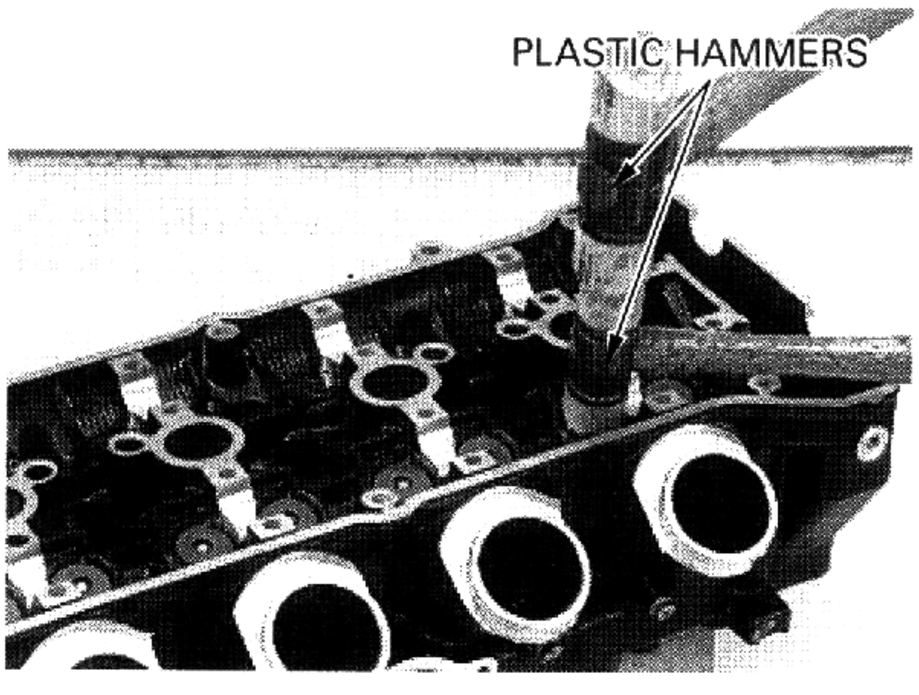
Valve spring compressor	07757-0010000
Valve spring compressor attachment	07959-KM30101



Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly.

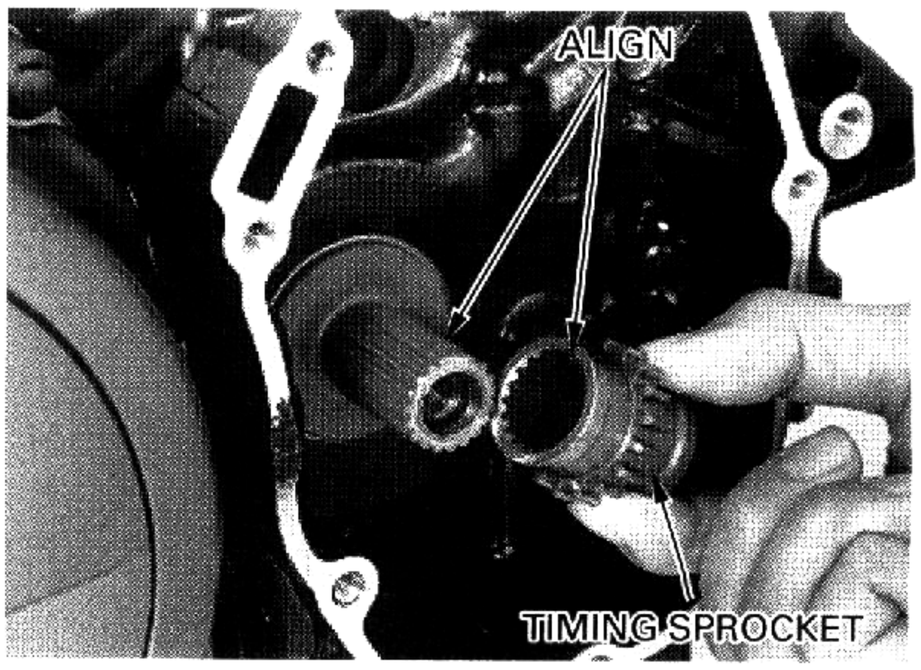
CAUTION:

Support the cylinder head above the work bench surface to prevent possible valve damage.



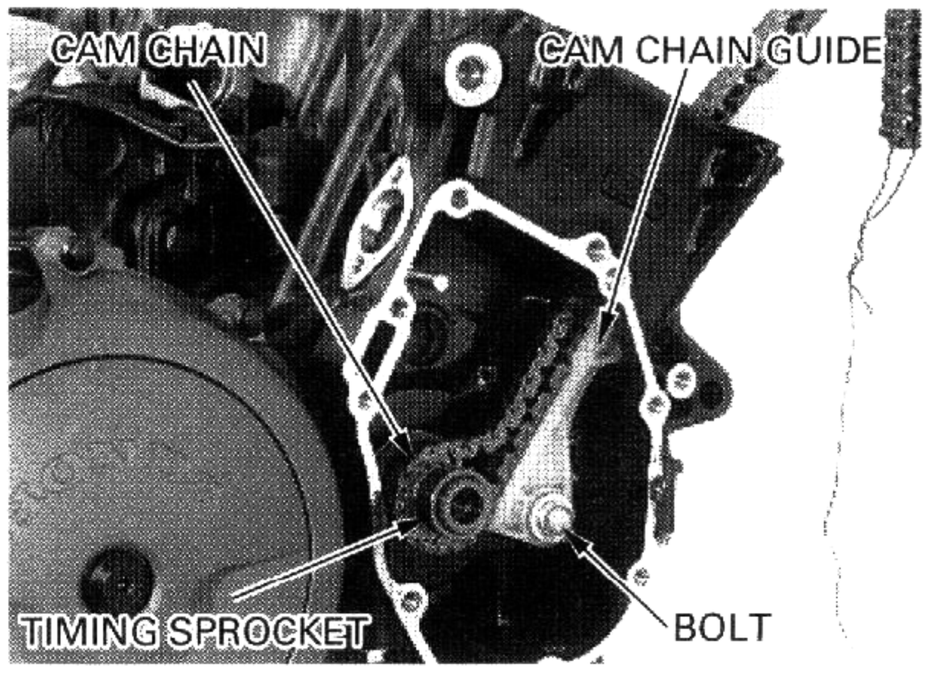
CYLINDER HEAD INSTALLATION

Install the timing sprocket by aligning the wide teeth between the crankshaft and sprocket.

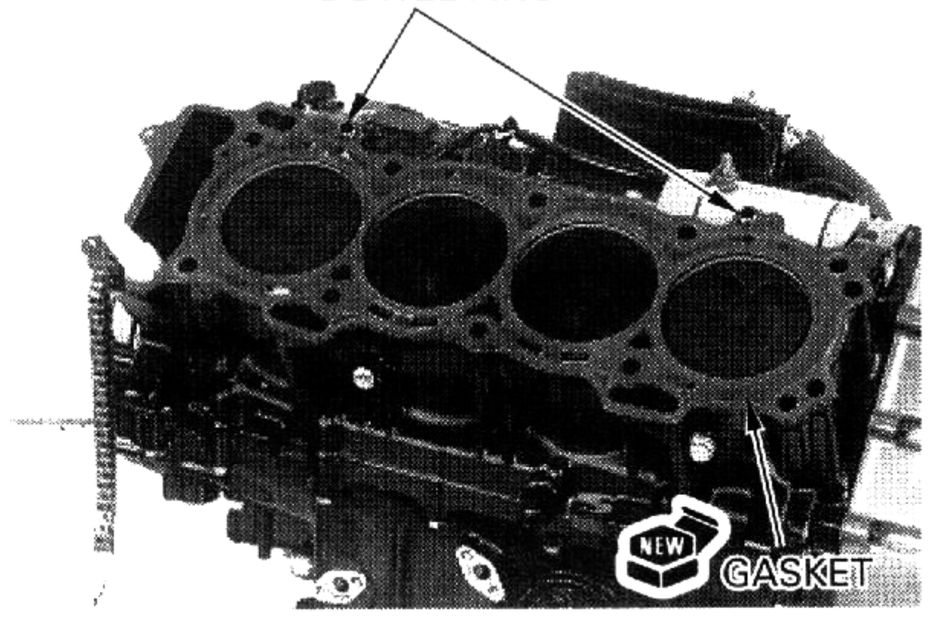


Install the cam chain.
Install the cam chain guide and tighten the bolt/washer.

Install the ignition pulse generator rotor and ignition pulse generator rotor cover (page 17-8).



Install the dowel pins and a new cylinder head gasket as shown.



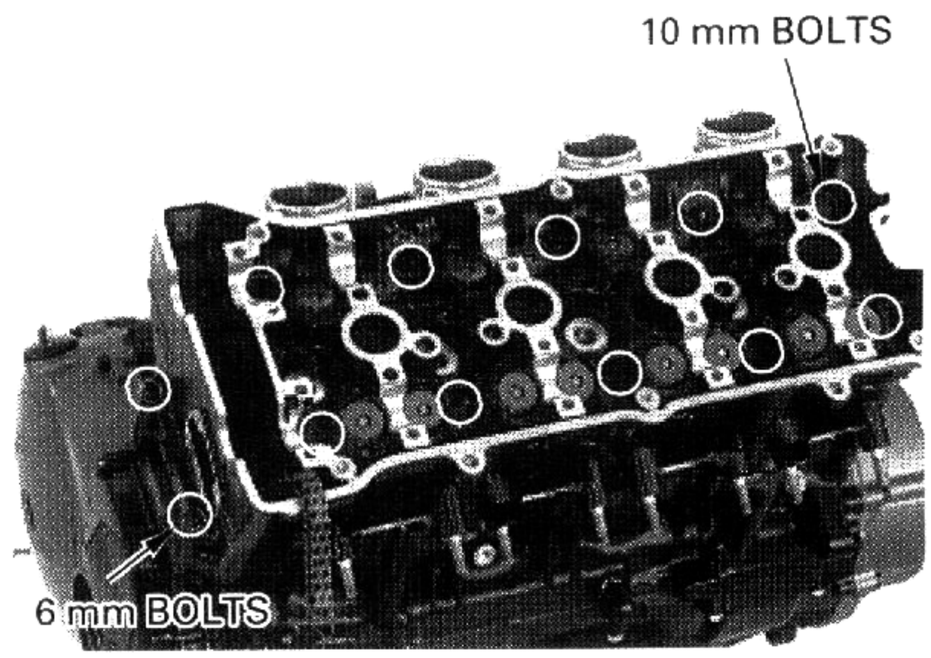
Install the cylinder head.

If using the new bolt, remove anti-rust additive from the bolt.
Apply molybdenum disulfide oil to the threads and seating surface of the 10 mm bolts/washers and install them.
Install the two 6 mm flange bolts.
Tighten the 10 mm bolts in a crisscross pattern in 2 – 3 steps to the specified torque.

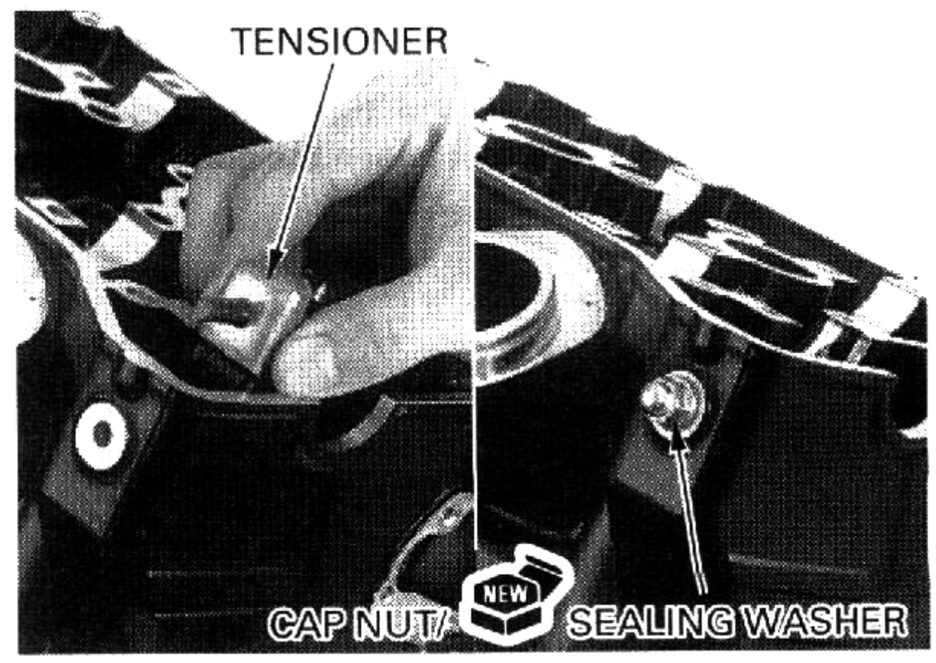
TORQUE: 67 N·m (6.8 kgf·m , 49 lbf·ft)

Tighten the 6 mm flange bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)



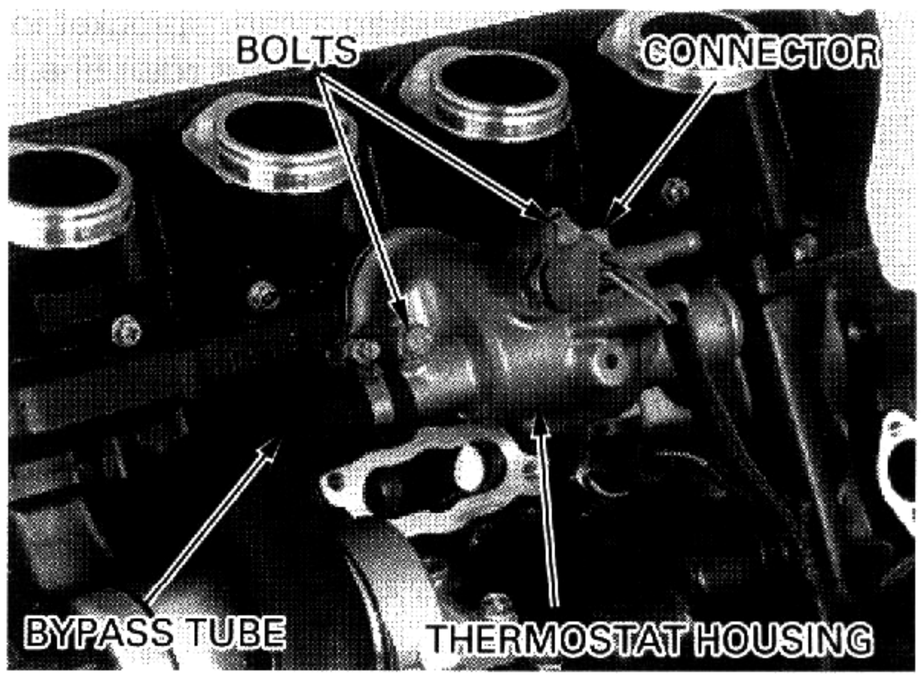
Install the cam chain tensioner into the cylinder head.
Install the new sealing washer and tighten the cap nut.



Install the new O-ring into the groove of the thermostat housing groove.
Install the thermostat housing onto the cylinder head and tighten the bolts securely.

Connect the bypass tube to the thermostat housing.
Connect the ECT/thermo sensor connector.

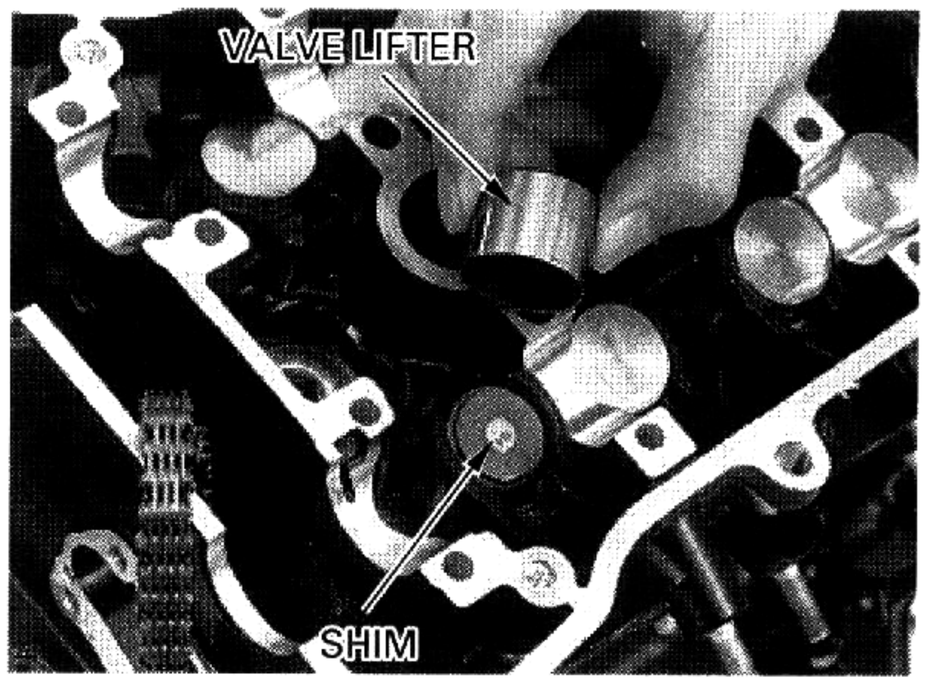
Install the engine into the frame (page 7-5).



CAMSHAFT INSTALLATION

Apply molybdenum disulfide oil to the outer surface of the each valve lifter.

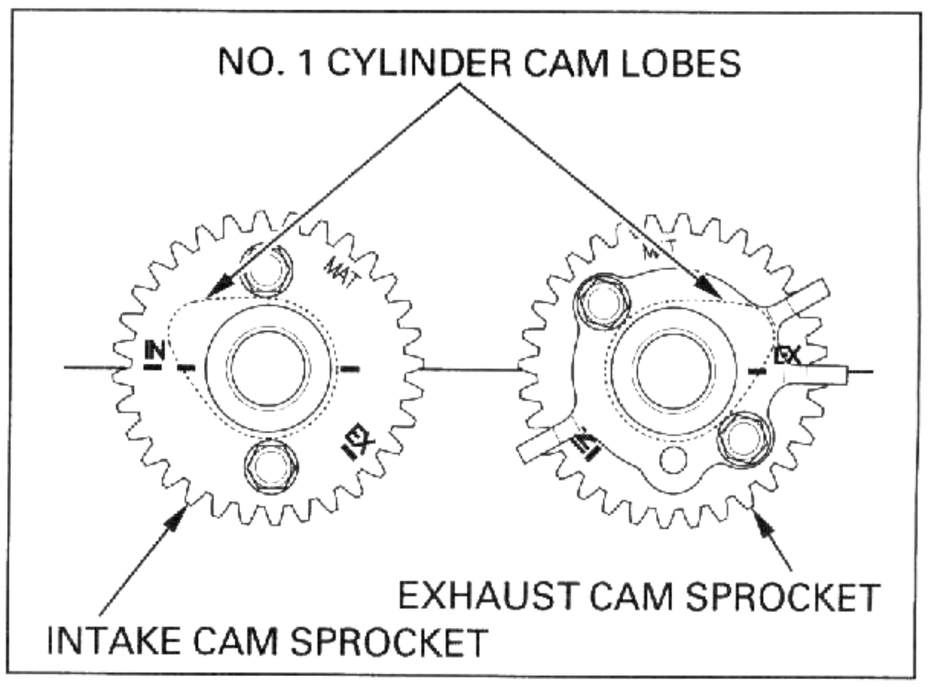
Install the shims and valve lifters into the valve lifter bores.



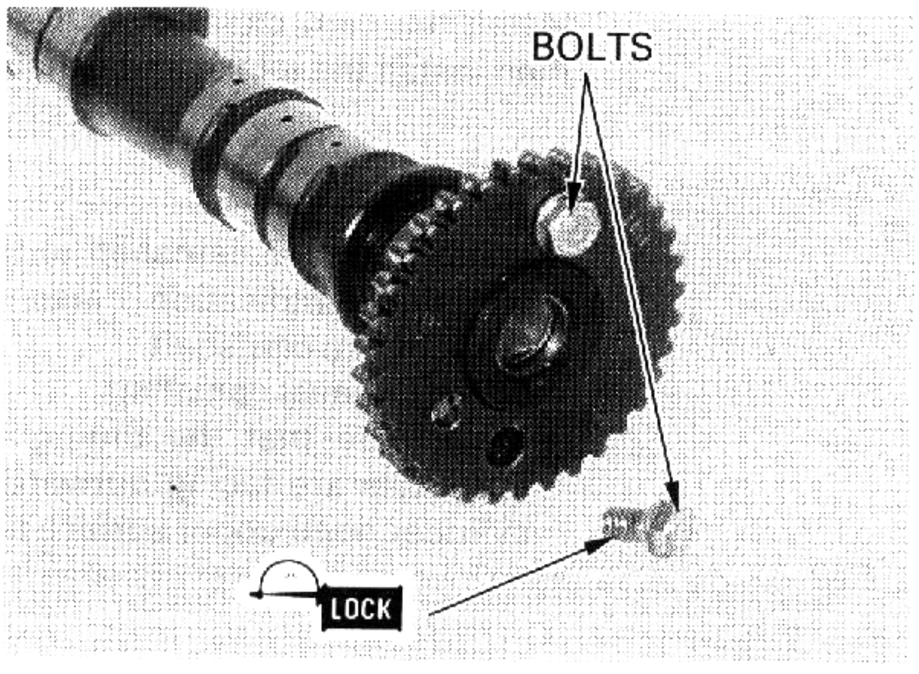
If the cam sprockets are removed, install the cam sprockets onto the camshafts.

NOTE:

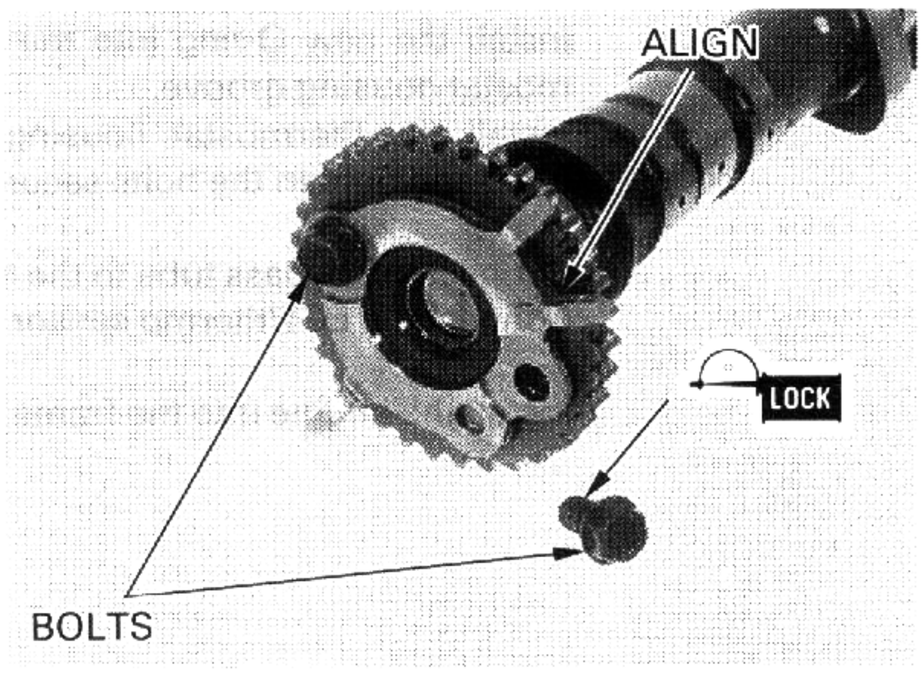
- Install the intake cam sprocket with the timing mark (IN) facing outward and the No. 1 cam lobes facing up and out as shown.
- Install the exhaust cam sprocket with the timing mark (EX) facing outward and the No. 1 cam lobes facing up and out as shown.



Clean and apply a locking agent to the cam sprocket bolt threads.
Install the cam sprocket bolts.



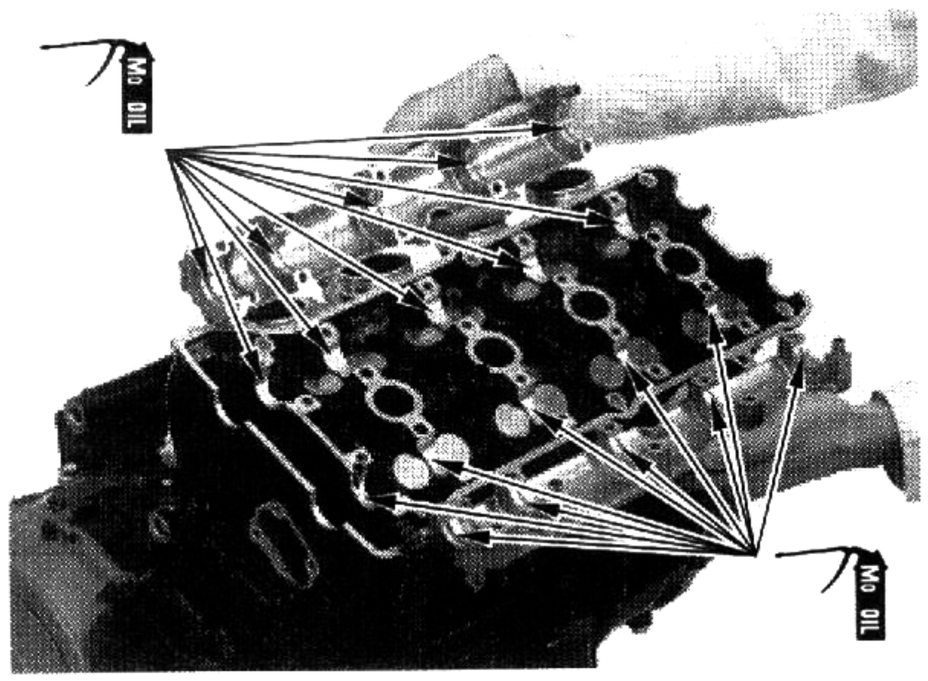
At the exhaust cam sprocket installation, align the cam pulse generator rotor line with the cam sprocket "EX" mark.



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



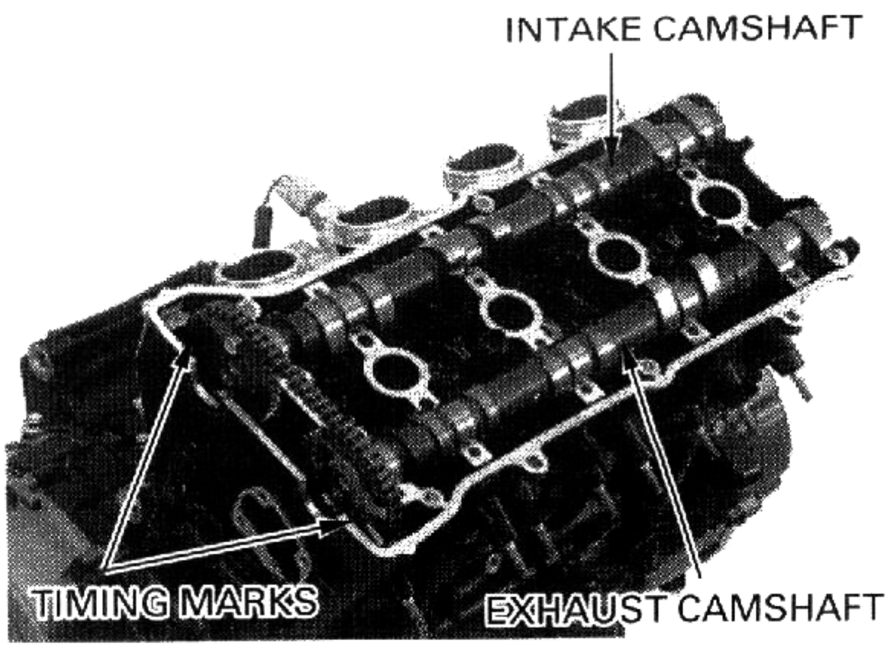
Apply molybdenum disulfide oil to the camshaft journals of the cylinder head and camshaft holder.



Install the cam chain over the cam sprockets and then install the intake and exhaust camshafts.

NOTE:

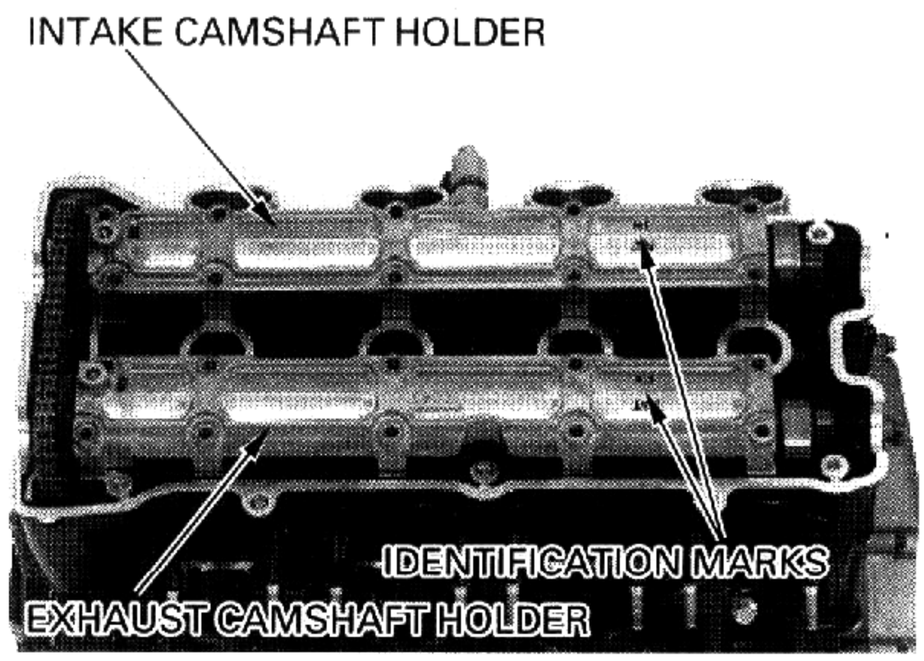
- Install the each camshaft to the correct locations with the identification marks.
  "IN": Intake camshaft
  "EX": Exhaust camshaft
- Make sure that the timing marks on the cam sprockets are facing outward and flush with the cylinder head upper surface as shown.



Install the camshaft holders onto the camshafts.

NOTE:

Install the each camshaft holder to the correct locations with the identification marks.
"IN": Intake camshaft holder
"EX": Exhaust camshaft holder



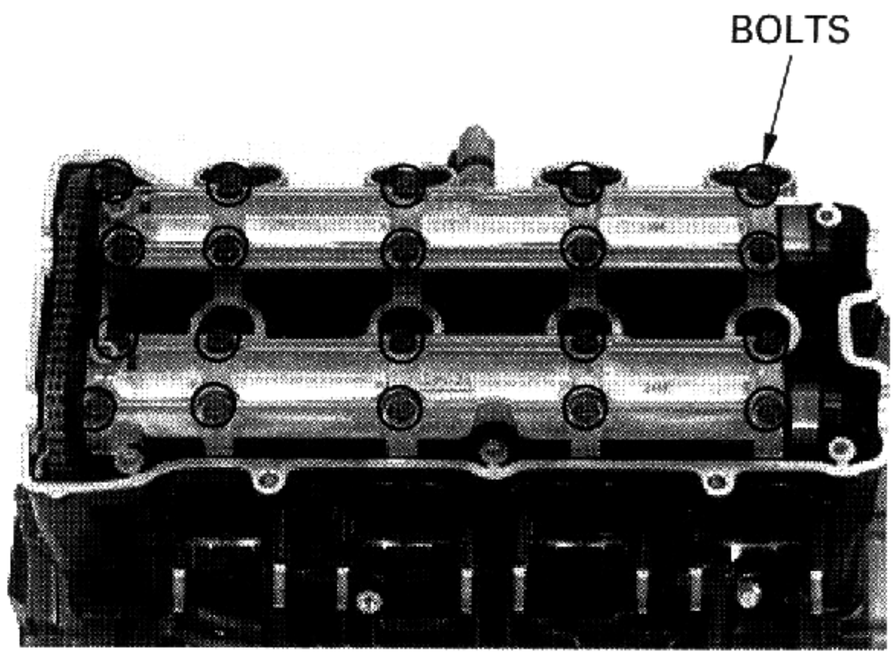
Temporarily install the eighteen holder bolts until the cam holders lightly contact the cylinder head surface.

CAUTION:

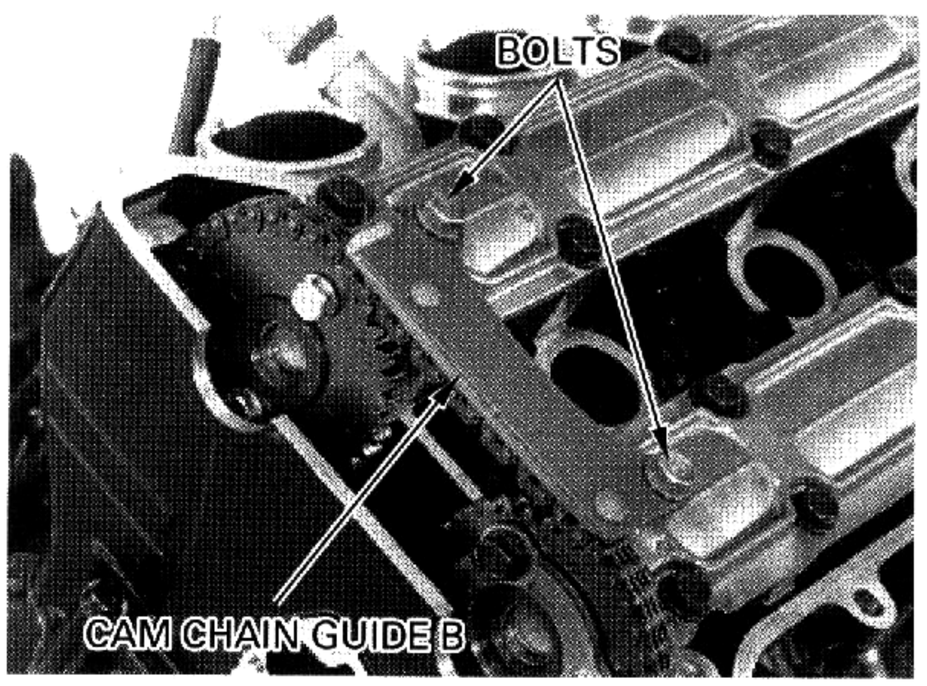
Tightening the camshaft holder bolts on only oneside might cause a camshaft holder to break.

Tighten all camshaft holder bolts in the numerical order casted on the camshaft holder.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



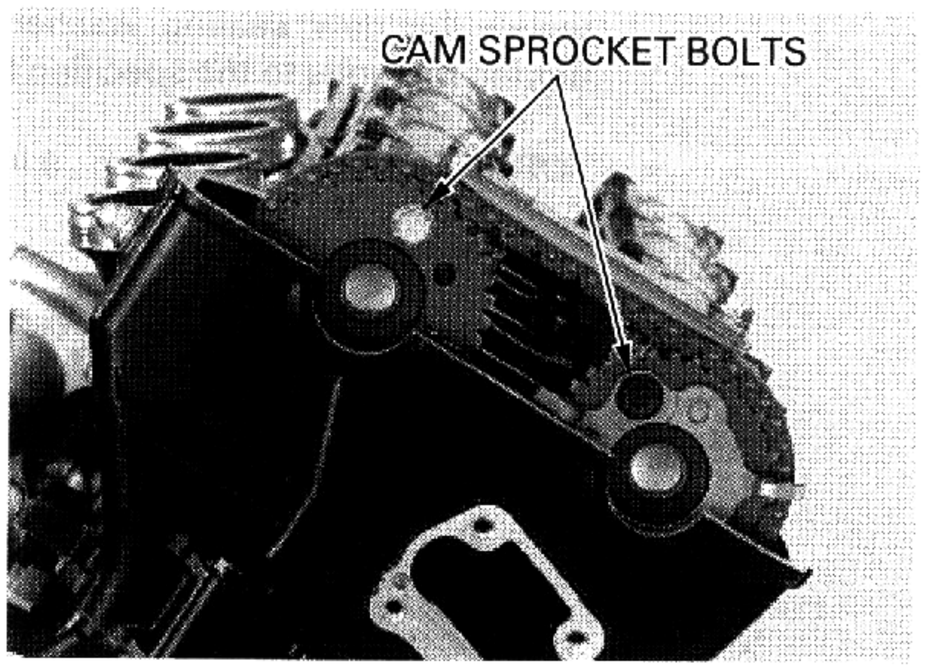
Install the cam chain guide B, and tighten the bolts.



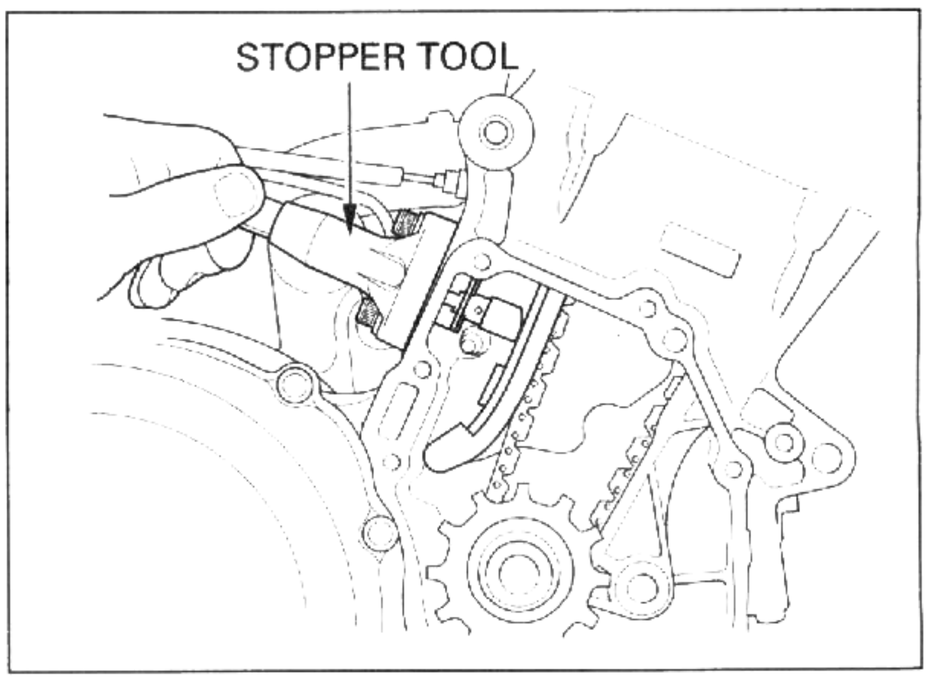
In case the cam sprockets were removed, tighten the cam sprocket bolts to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m , 14 lbf·ft)

Turn the crankshaft clockwise one full turn (360°) and tighten the other cam sprocket bolts.

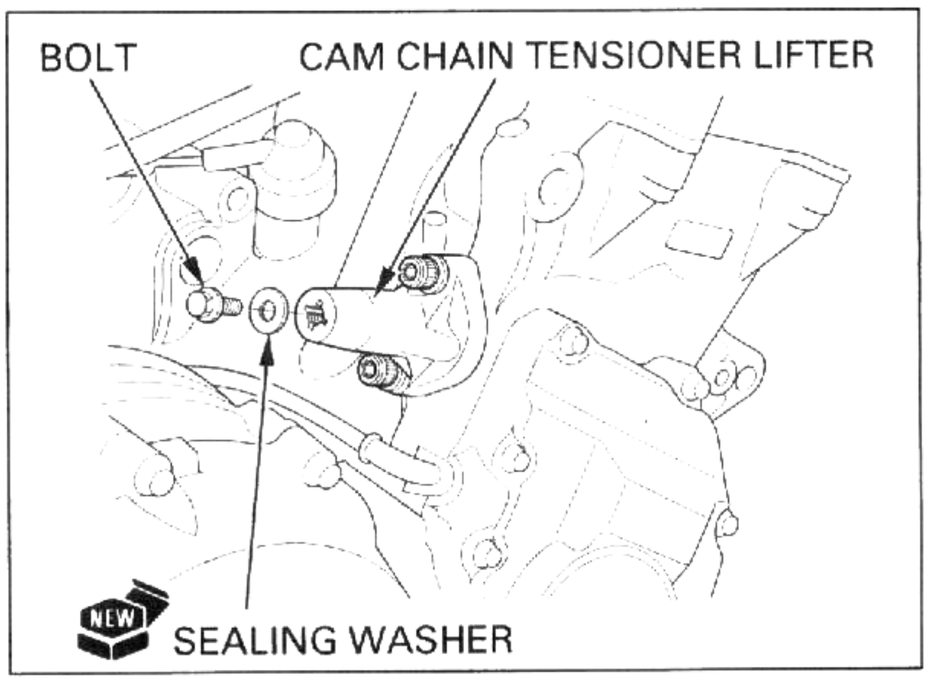


Remove the stopper tool from the cam chain tensioner lifter.

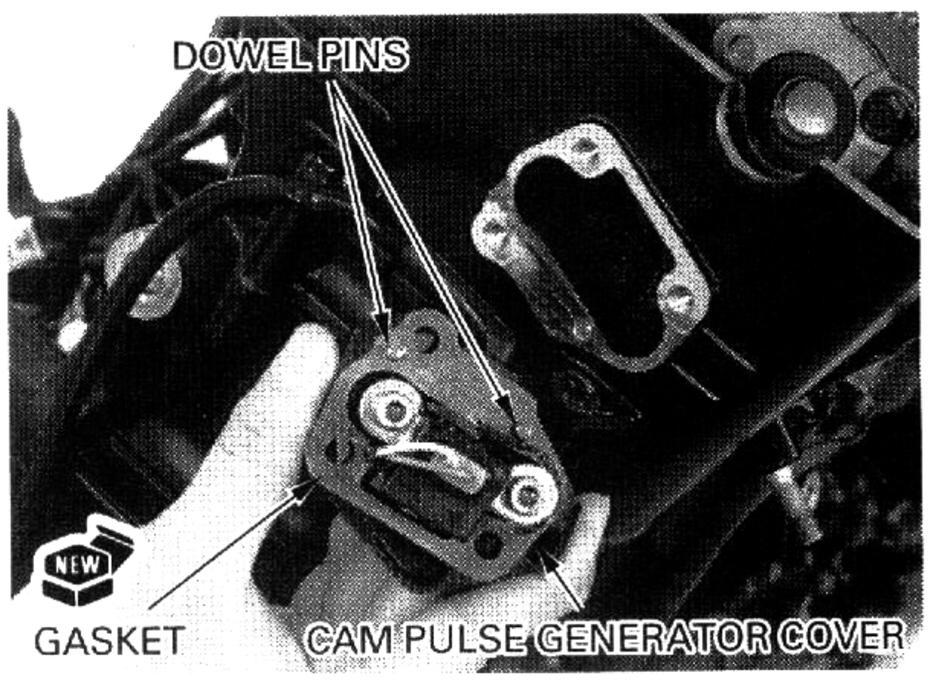


Install a new sealing washer and tighten the sealing bolt.

Recheck the valve timing.

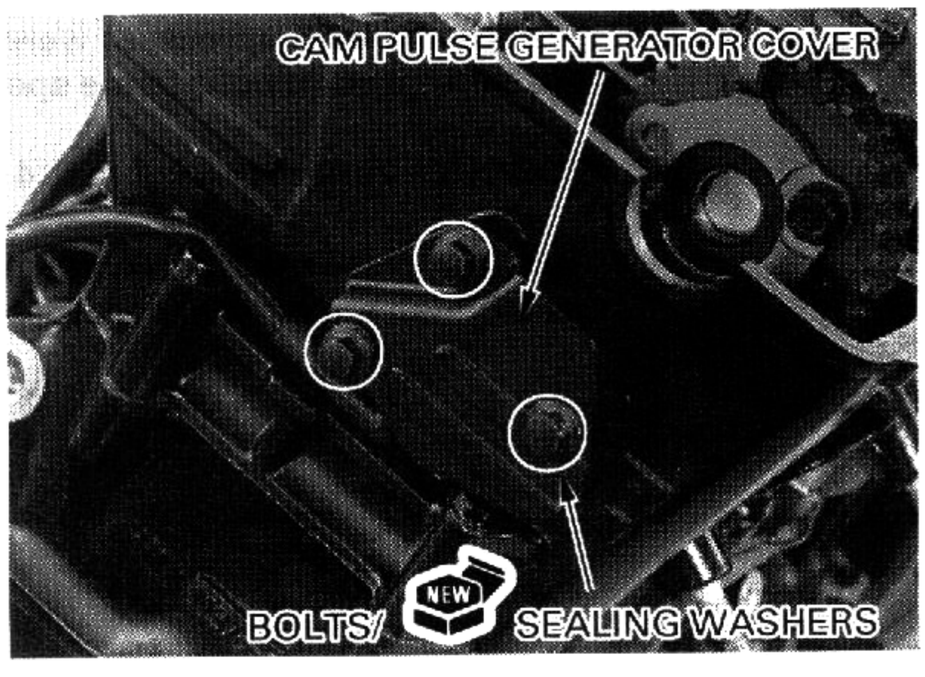


Install the new gasket onto the cam pulse generator cover.
Install the cam pulse generator cover aligning its dowel pins with the hole in the cylinder head.



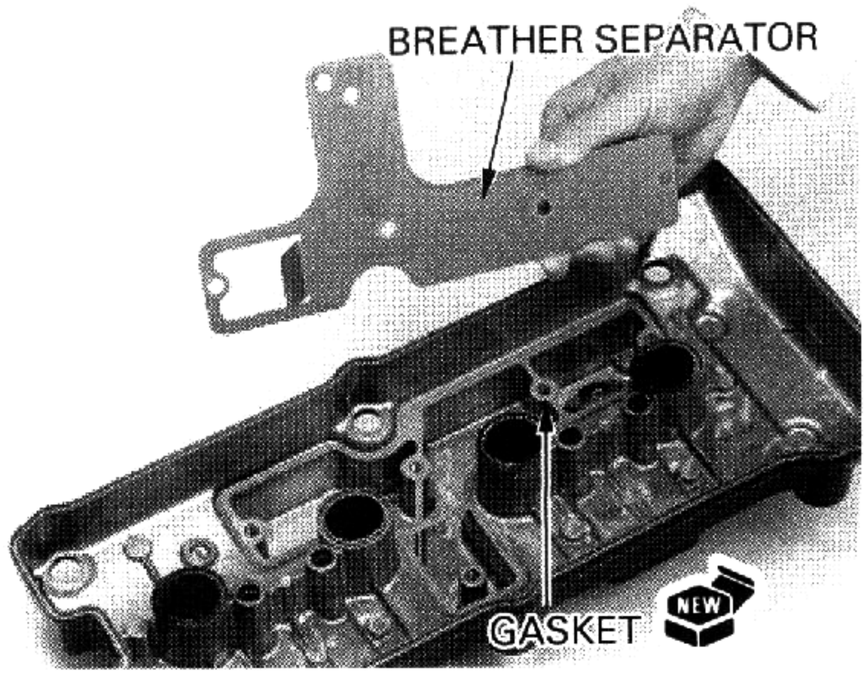
Install the new sealing washers and bolts, then tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



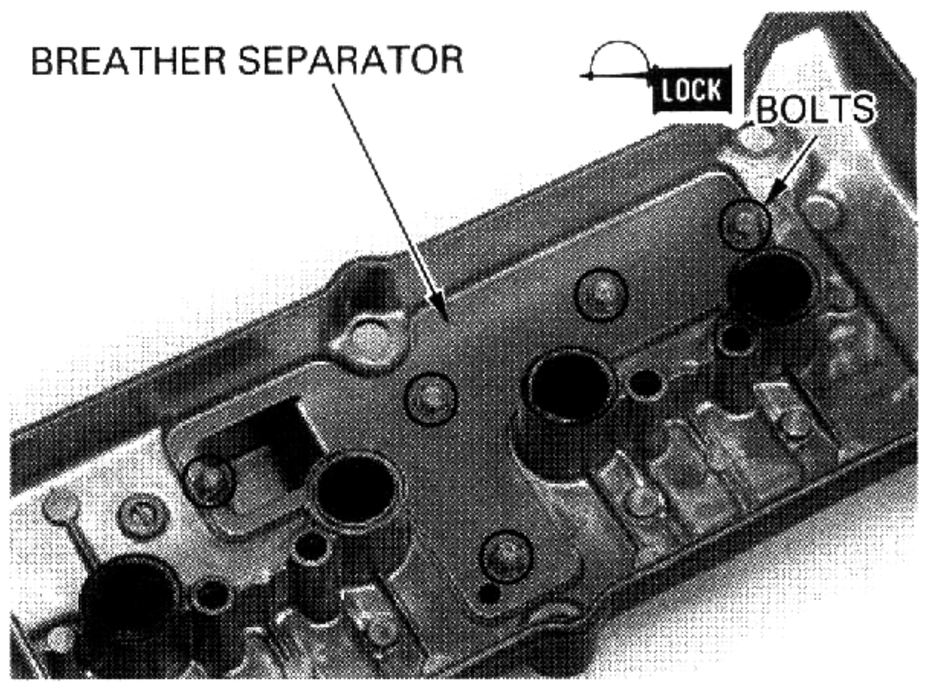
CYLINDER HEAD COVER ASSEMBLY

Install the new gasket and crankcase breather separator to the cylinder head cover.

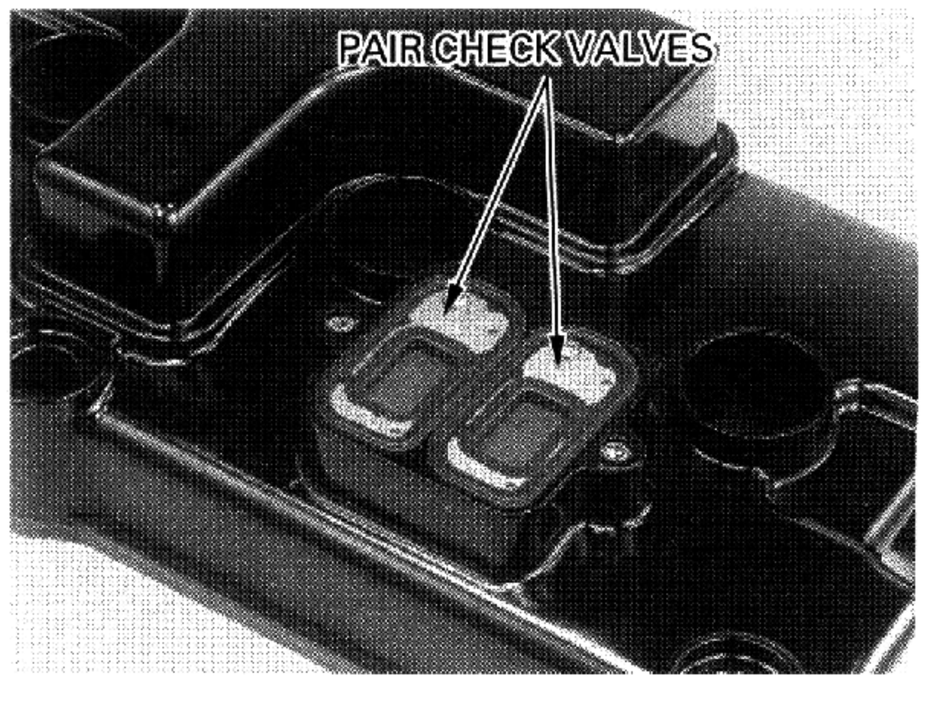


Apply a locking agent to the crankcase breather separator mounting bolt threads.
Tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

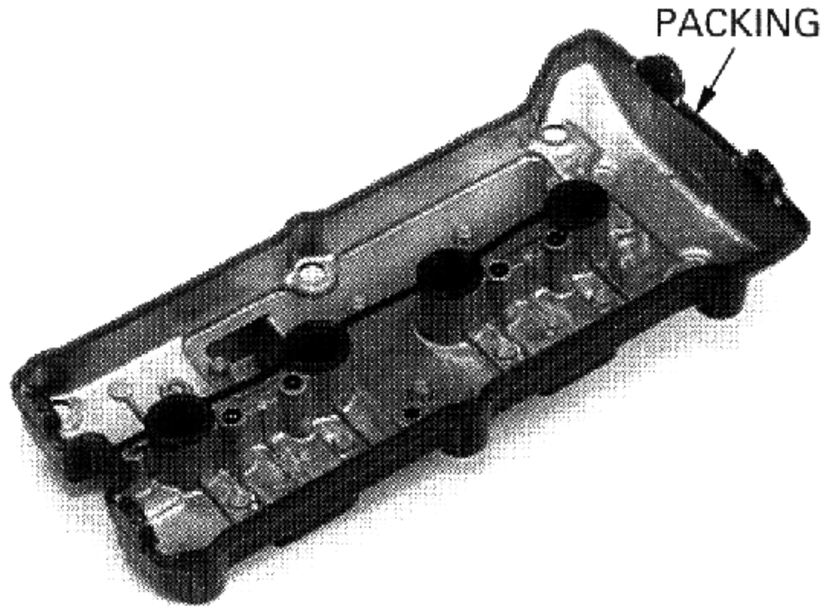


Install the PAIR check valves into the cylinder head cover.

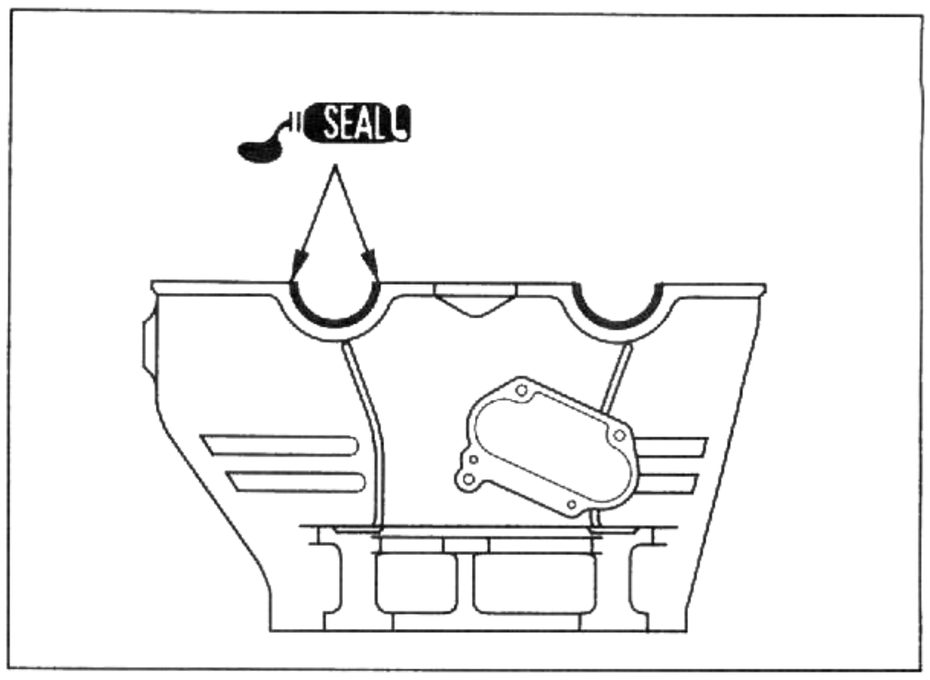


CYLINDER HEAD COVER INSTALLATION

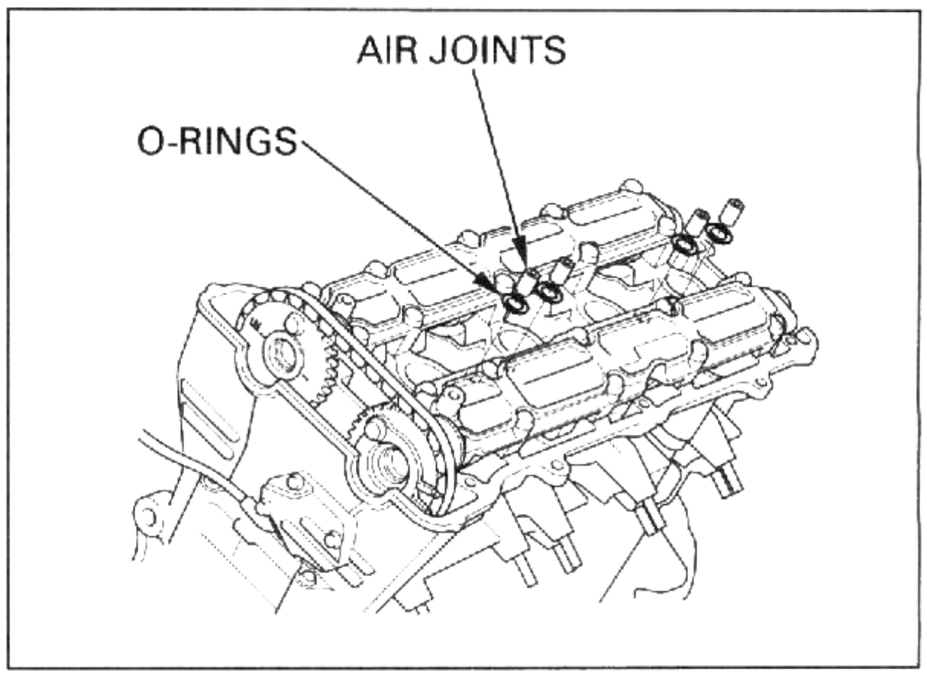
Install the cylinder head packing into the groove of the cylinder head cover.



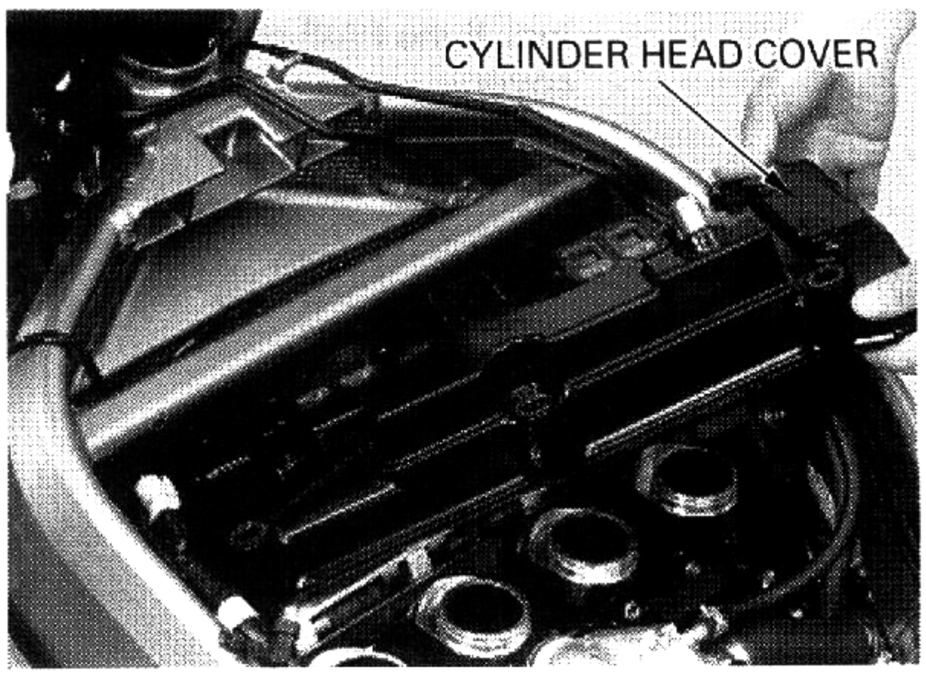
Apply sealant to the cylinder head semi-circular cutouts as shown.



Install the air joints and O-rings.



Install the cylinder head cover onto the cylinder head.



Install the washers with their "UP" mark facing up.



Install and tighten the cylinder head cover special bolts to the specified torque.

NOTE:

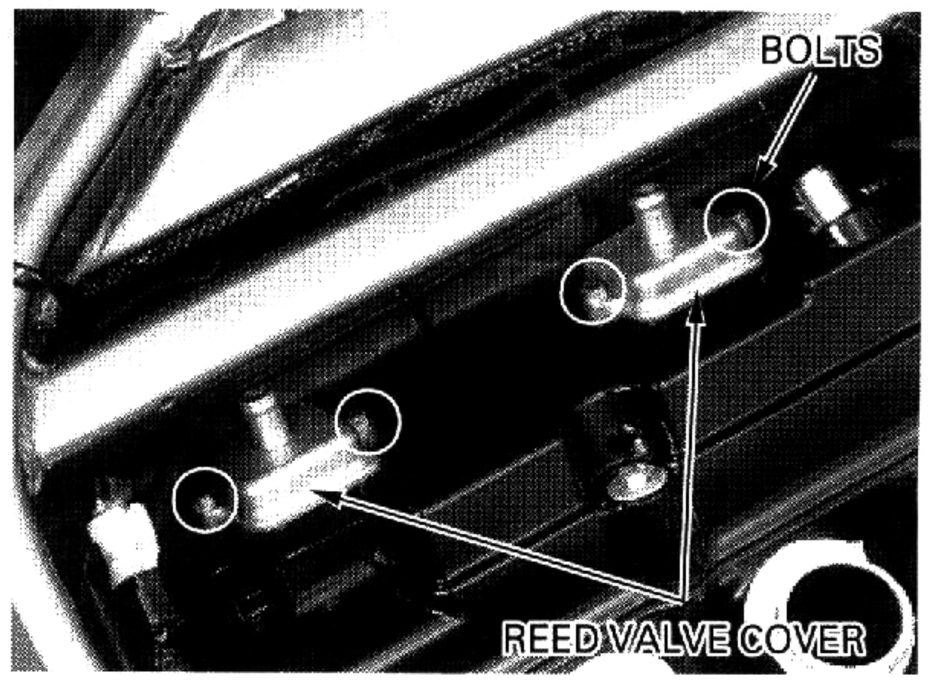
Tighten the "△" marked side bolts first.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)



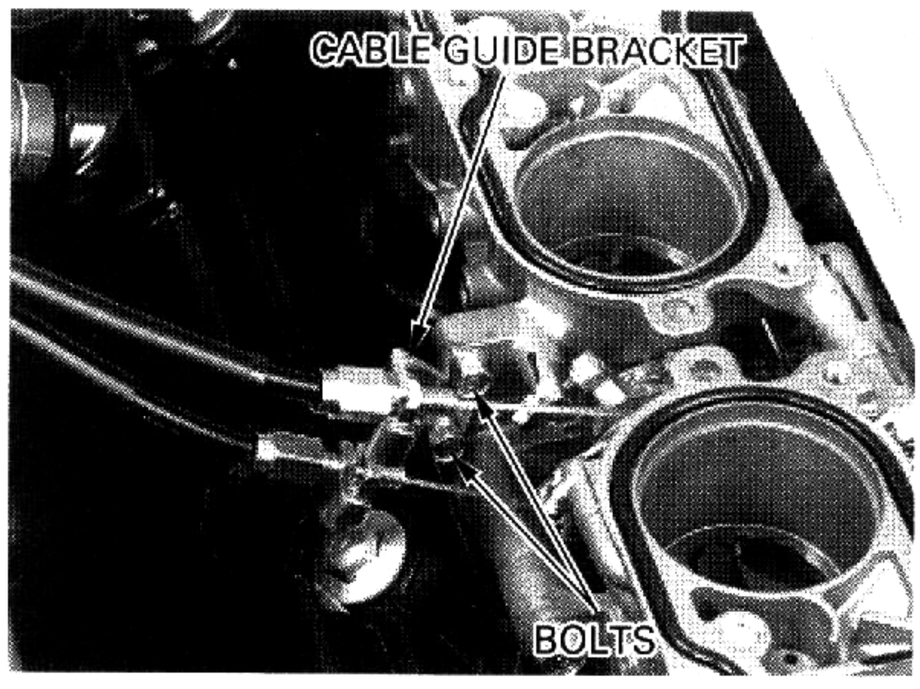
Install the PAIR reed valve covers and tighten the SH bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m , 9 lbf·ft)



Connect the throttle cables from the throttle drum. Install and tighten the throttle cable guide bracket mounting bolts to the specified torque.

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



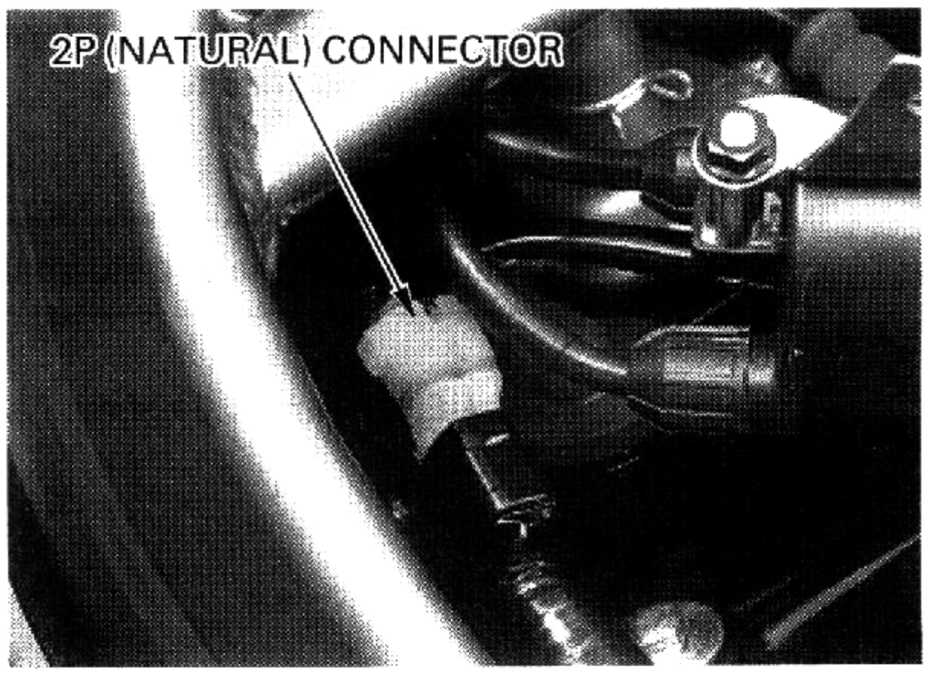
Install the PAIR solenoid valve assembly and connect the air suction hoses to the PAIR reed valve cover.

Connect the crankcase breather tube.



Connect the PAIR control solenoid valve 2P (Natural) connector.

Install the spark plug caps (page 3-9).
Install the air cleaner housing (page 5-61).

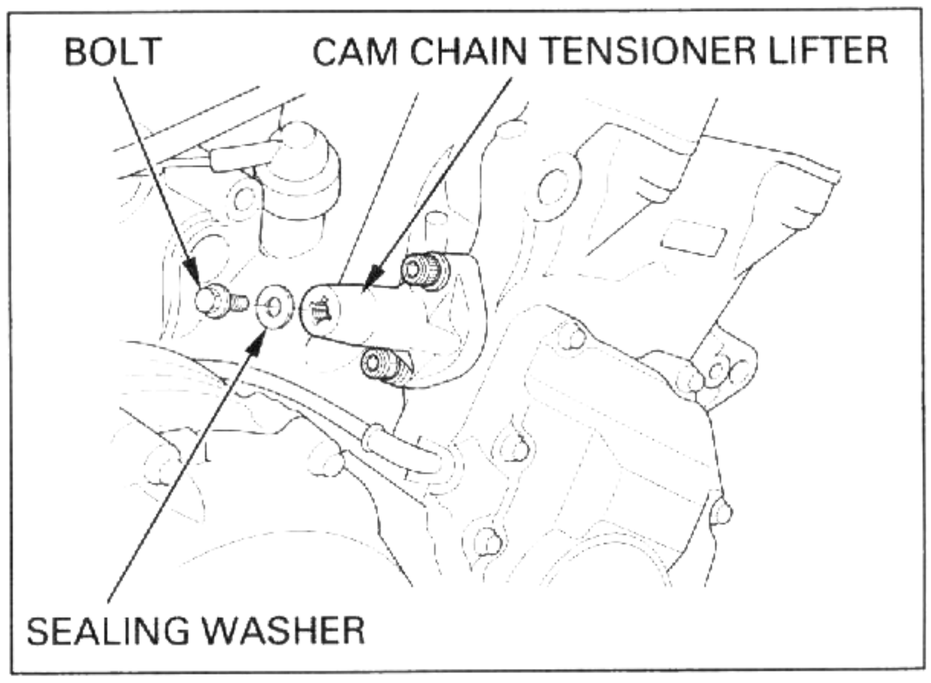


CAM CHAIN TENSIONER LIFTER

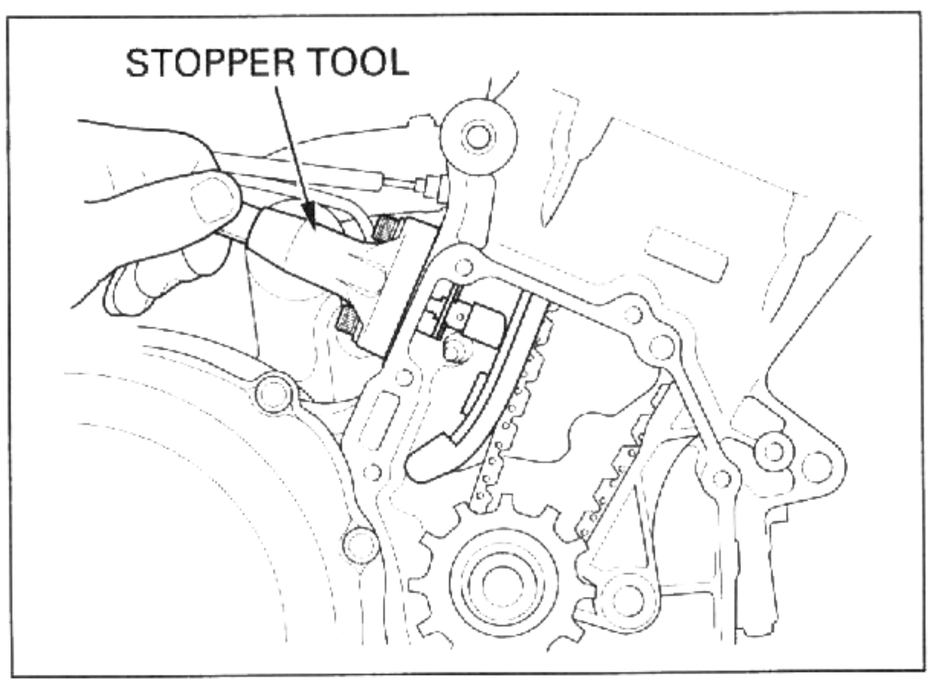
REMOVAL

Remove the radiator grill (page 2-4).

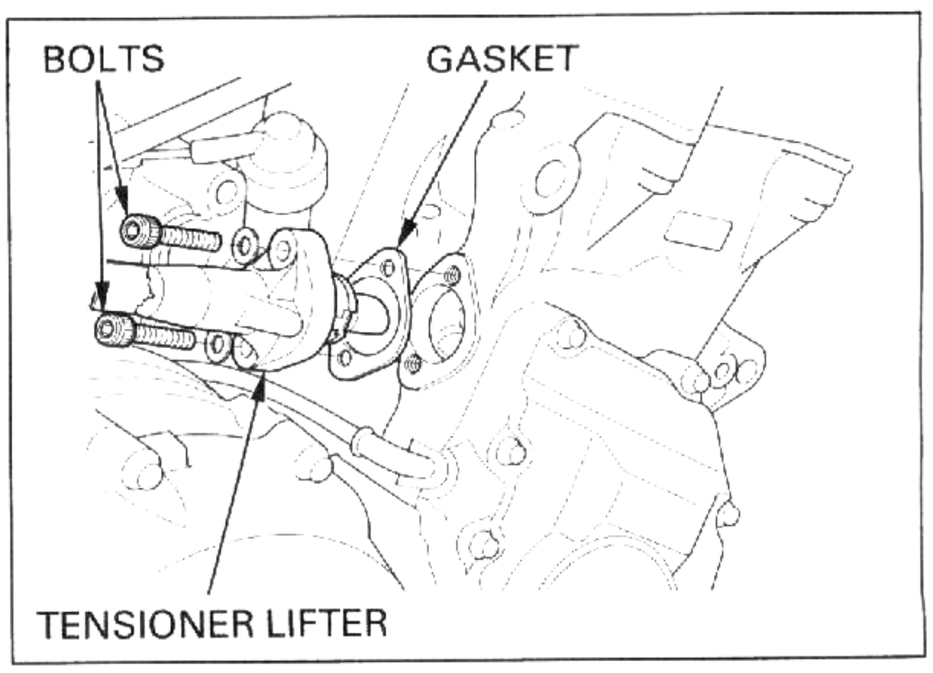
Remove the cam chain tensioner sealing bolt and sealing washer.



Turn the tensioner shaft fully in (clockwise) and secure it using the stopper tool to prevent damaging the cam chain.
See page 8-8 for detail of the tool.

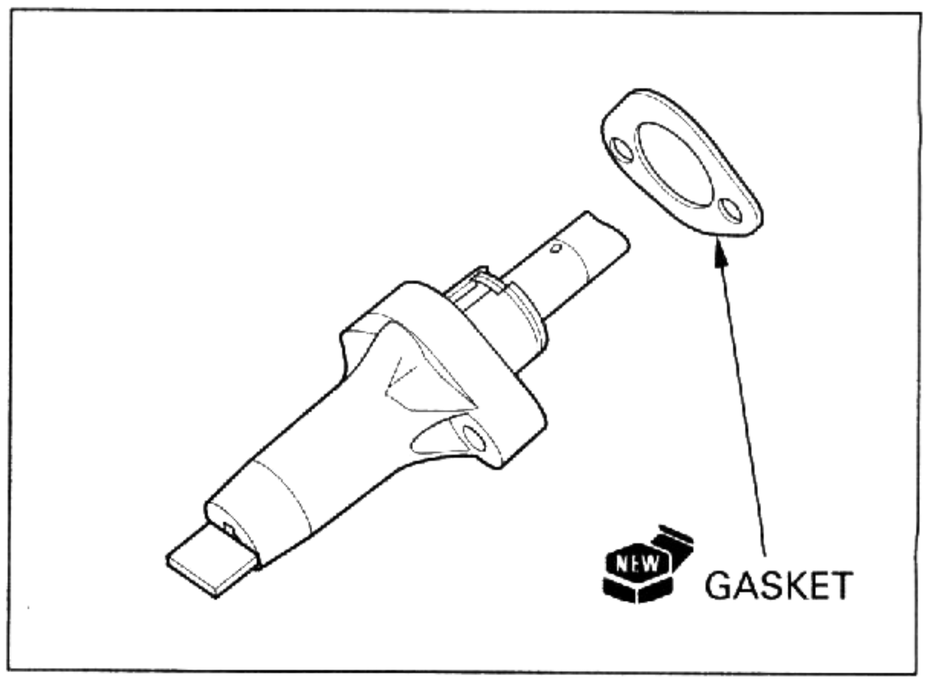


Remove the bolts, sealing washers and cam chain tensioner lifter.
Remove the gasket.



INSTALLATION

Install the new gasket onto the cam chain tensioner lifter.

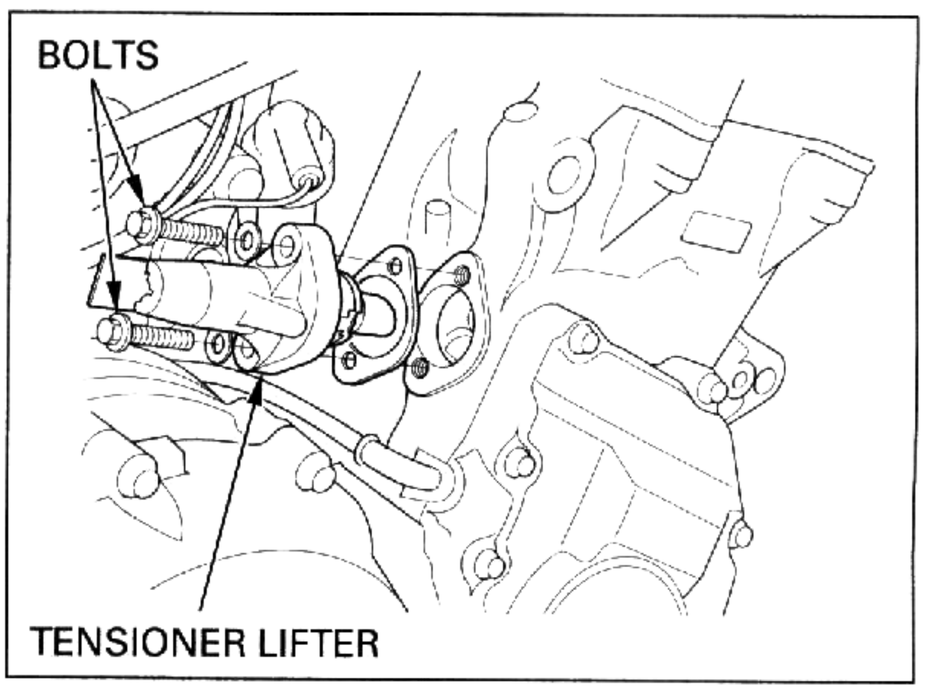


NOTE:

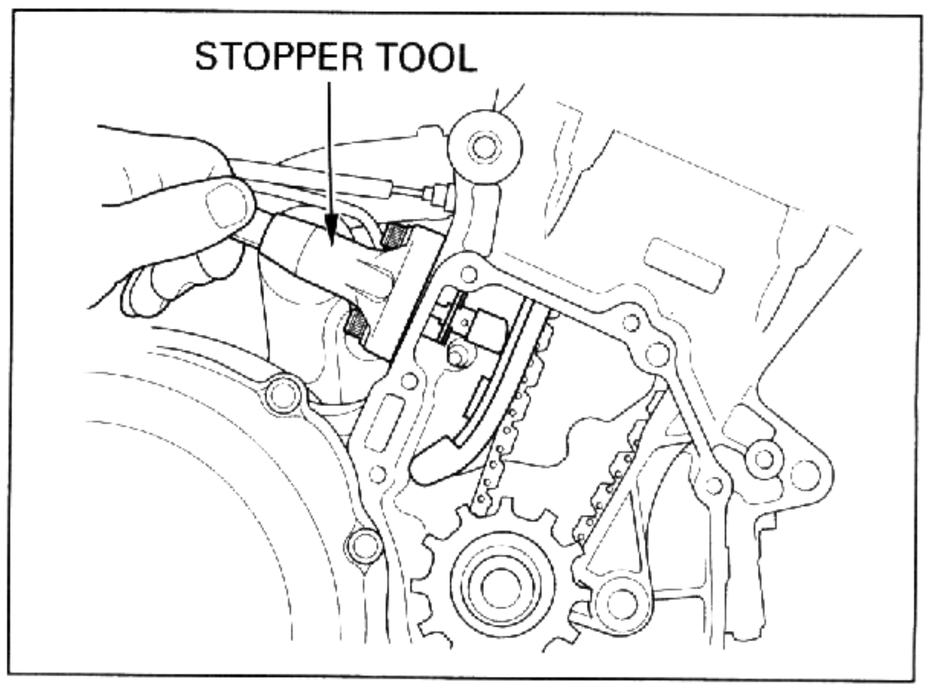
Note the direction of the gasket.

Install the cam chain tensioner lifter into the cylinder block.
Install the new sealing washers and bolts, then tighten the bolts to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

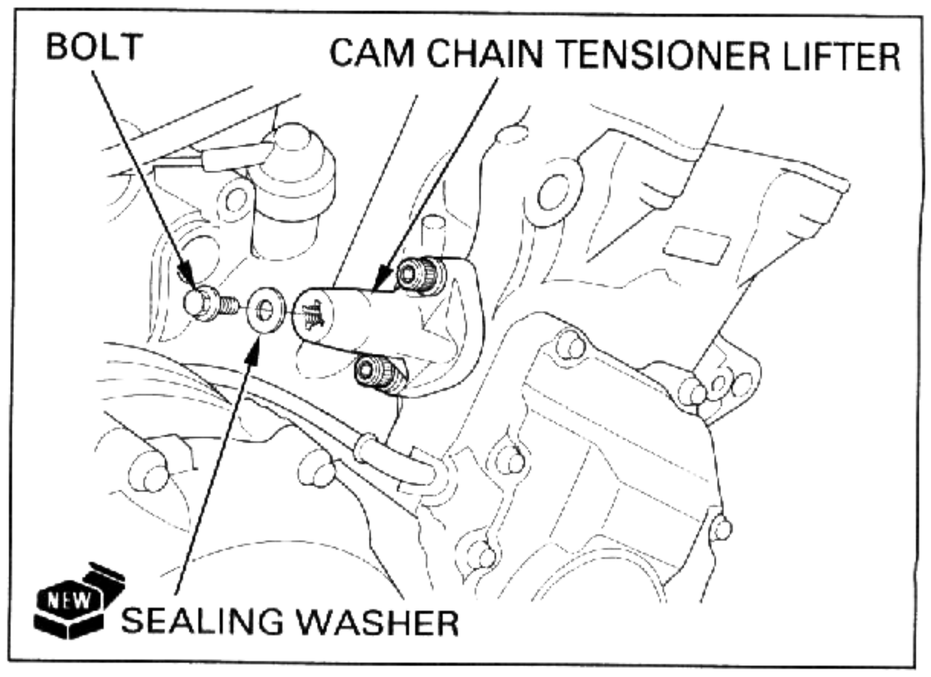


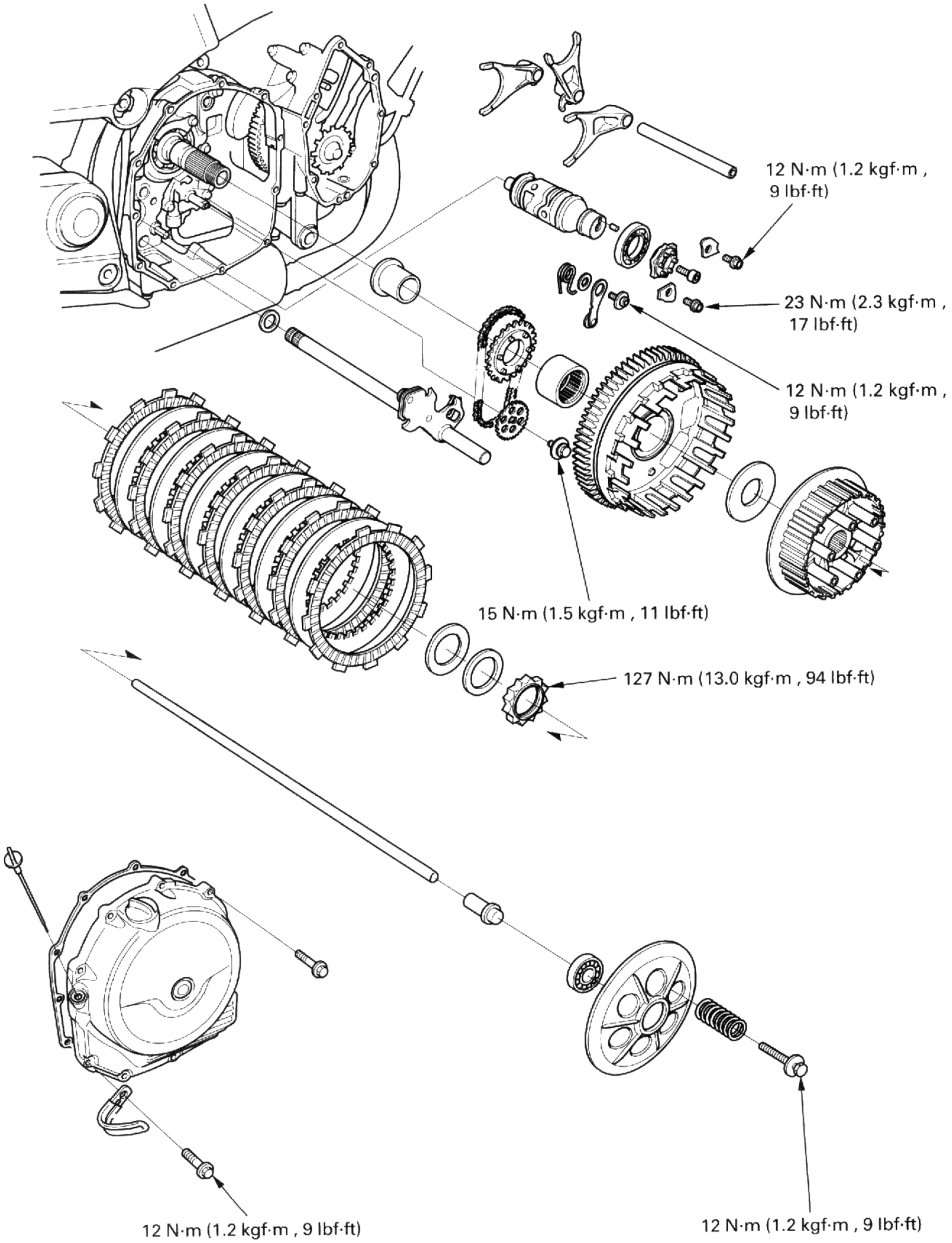
Remove the stopper tool.



Install a new sealing washer and tighten the sealing bolt securely.

Install the radiator grill (page 2-4).




12 N·m (1.2 kgf·m , 9 lbf·ft)
23 N·m (2.3 kgf·m , 17 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
15 N·m (1.5 kgf·m , 11 lbf·ft)
127 N·m (13.0 kgf·m , 94 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)

9. CLUTCH/GEARSHIFT LINKAGE

SERVICE INFORMATION	9-1	CLUTCH	9-3
TROUBLESHOOTING	9-2	GEARSHIFT LINKAGE	9-12
RIGHT CRANKCASE COVER REMOVAL	9-3	RIGHT CRANKCASE COVER INSTALLATION	9-17

SERVICE INFORMATION

GENERAL

- This section covers service of the clutch, gearshift linkage, shift drum and shift forks. All service can be done with the engine installed in the frame.
- Transmission oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the transmission oil level before servicing the clutch system.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Clutch lever free play			10 – 20 (3/8 – 13/16)	———
Clutch spring free length			57.4 (2.26)	56.2 (2.21)
Clutch disc thickness		Blue color	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
		Brown color	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
Clutch plate warpage			———	0.30 (0.012)
Clutch outer guide		I.D.	28.000 – 28.021 (1.1024 – 1.1032)	28.031 (1.1036)
		O.D.	34.975 – 34.991 (1.3770 – 1.3776)	34.965 (1.3766)
Mainshaft O.D. at clutch outer guide			27.980 – 27.993 (1.1016 – 1.1021)	27.970 (1.1012)
Shift fork, fork shaft	Fork	I.D.	12.000 – 12.021 (0.4724 – 0.4733)	12.03 (0.474)
		Claw thickness	5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
	Fork shaft O.D.		11.957 – 11.968 (0.4707 – 0.4712)	11.95 (0.470)

TORQUE VALUES

Clutch center lock nut	127 N·m (13.0 kgf·m , 94 lbf·ft)	Apply oil to the threads Stake the nut
Clutch spring bolt/washer	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Right crankcase cover SH bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Right crankcase cover center bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Shift drum center socket bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply a locking agent to the threads
Shift drum stopper pivot bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Gearshift return spring pin	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Gearshift drum bearing set plate flange bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply a locking agent to the threads
Gearshift pedal bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m , 11 lbf·ft)	Apply a locking agent to the threads

TOOLS

Clutch center holder	07724-0050002	Equivalent commercially available
Driver	07749-0010000	
Attachment, 37 × 40 mm	07746-0010200	
Attachment, 42 × 47 mm	07746-0010300	
Pilot, 35 mm	07746-0040800	

TROUBLESHOOTING

Clutch lever too hard to pull in
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing
- Clutch lifter piece installed improperly

Clutch slips when accelerating
- Worn clutch disc
- Weak clutch springs
- Transmission oil mixed with molybdenum or graphite additive

Clutch will not disengage or motorcycle creeps with clutch disengaged
- Clutch plate warped
- Loose clutch lock nut
- Oil level too high
- Improper oil viscosity
- Damaged clutch lifter mechanism
- Clutch lifter piece installed improperly

Hard to shift
- Improper clutch operation
- Improper oil viscosity
- Bent shift fork
- Bent shift fork shaft
- Bent fork claw
- Damaged shift drum cam groove
- Loose stopper plate bolt
- Damaged stopper plate and pin
- Damaged gearshift spindle

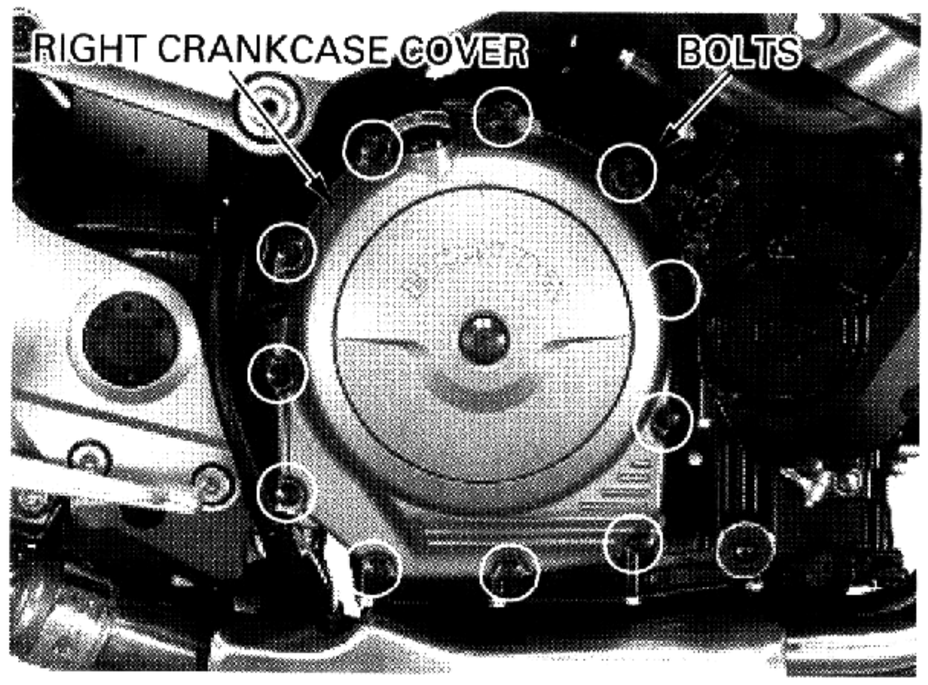
Transmission jumps out of gear
- Worn shift drum stopper arm
- Weak or broken shift arm return spring
- Loose stopper plate bolt
- Bent shift fork shaft
- Damaged shift drum cam groove
- Damaged or bent shift forks
- Worn gear engagement dogs or slots

Gearshift pedal will not return
- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

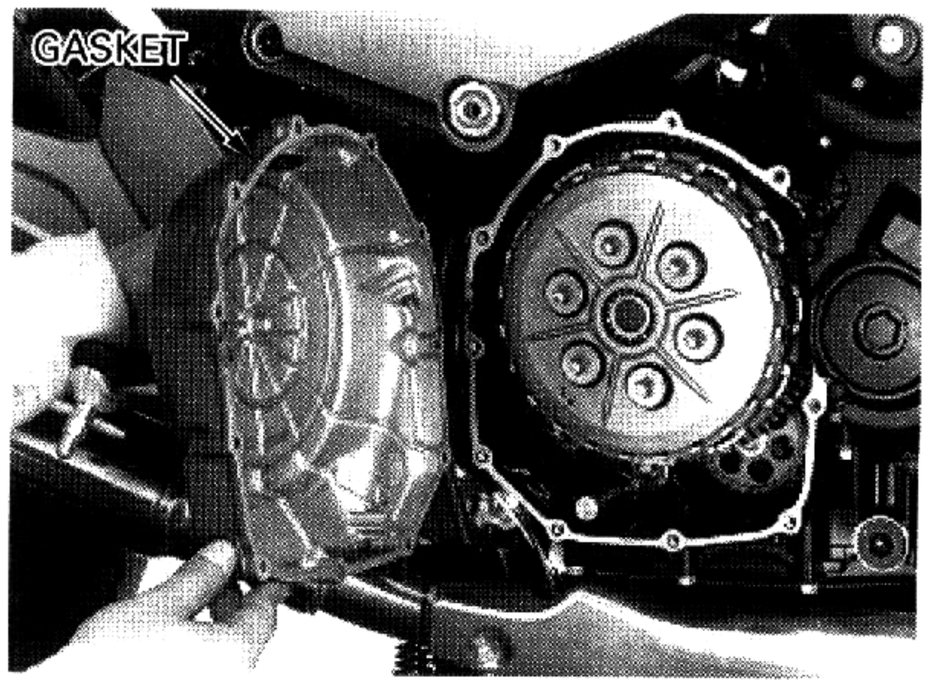
RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-16).

Remove the right crankcase cover SH bolts and right crankcase cover.



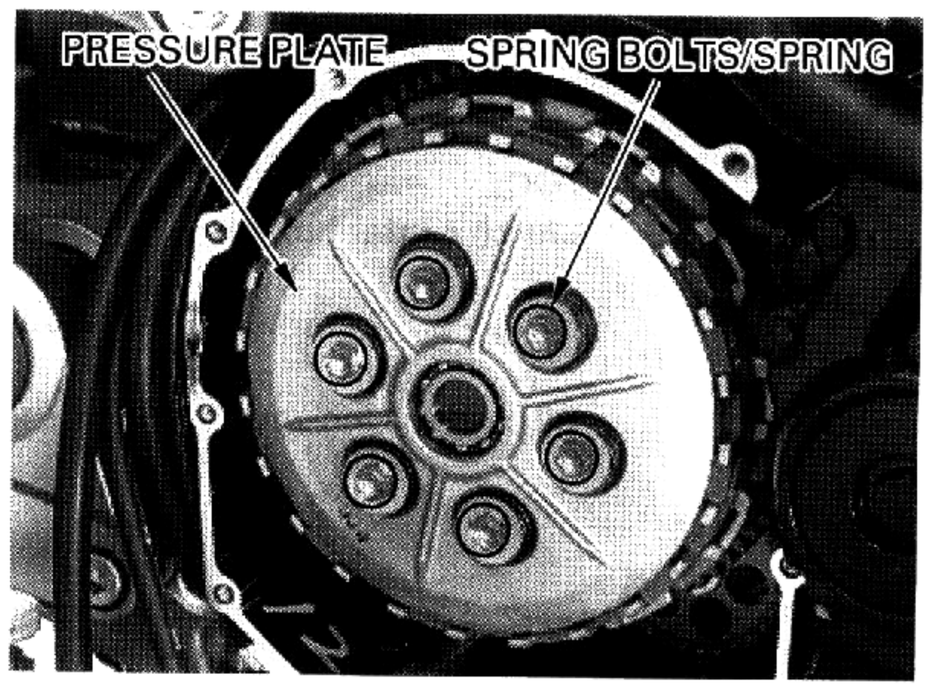
Remove the gasket.



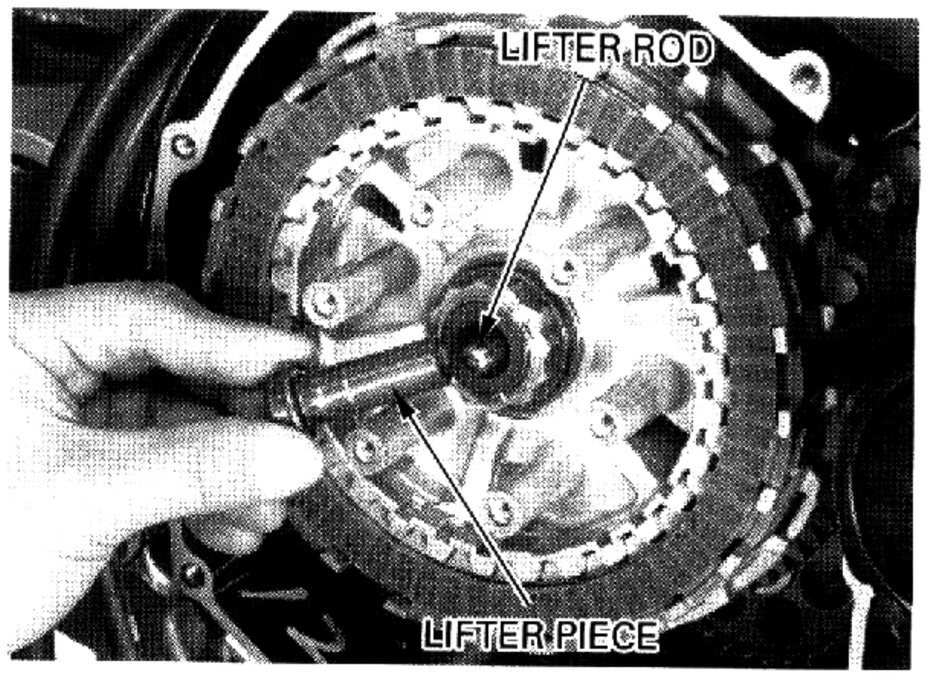
CLUTCH

REMOVAL

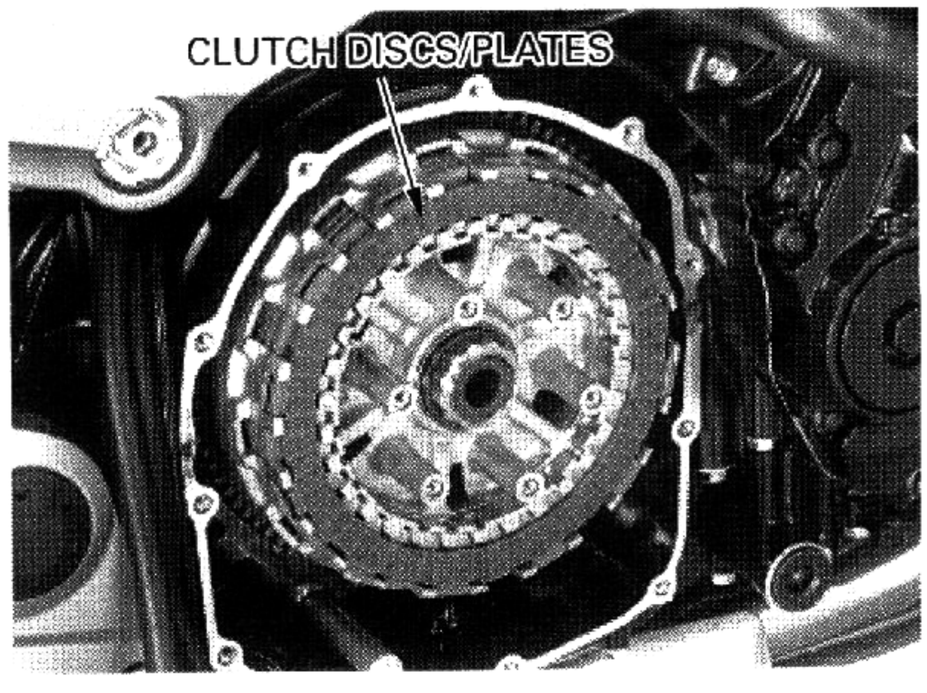
Remove the clutch spring bolts, springs and pressure plate.



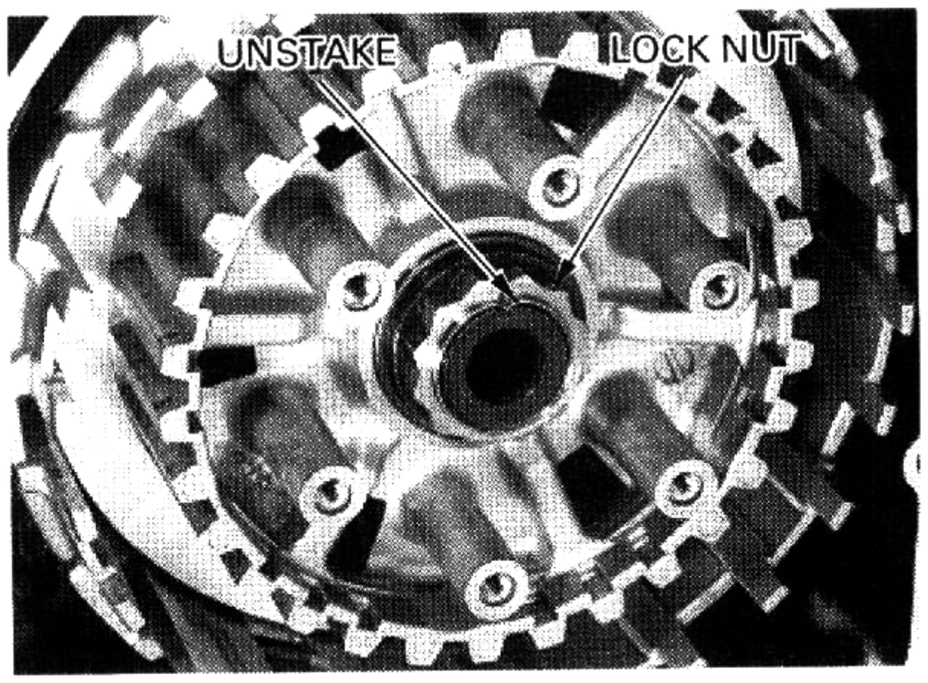
Remove the clutch lifter piece and lifter rod.



Remove the following:
—Seven clutch discs
—Six clutch plates



Unstake the clutch center lock nut.

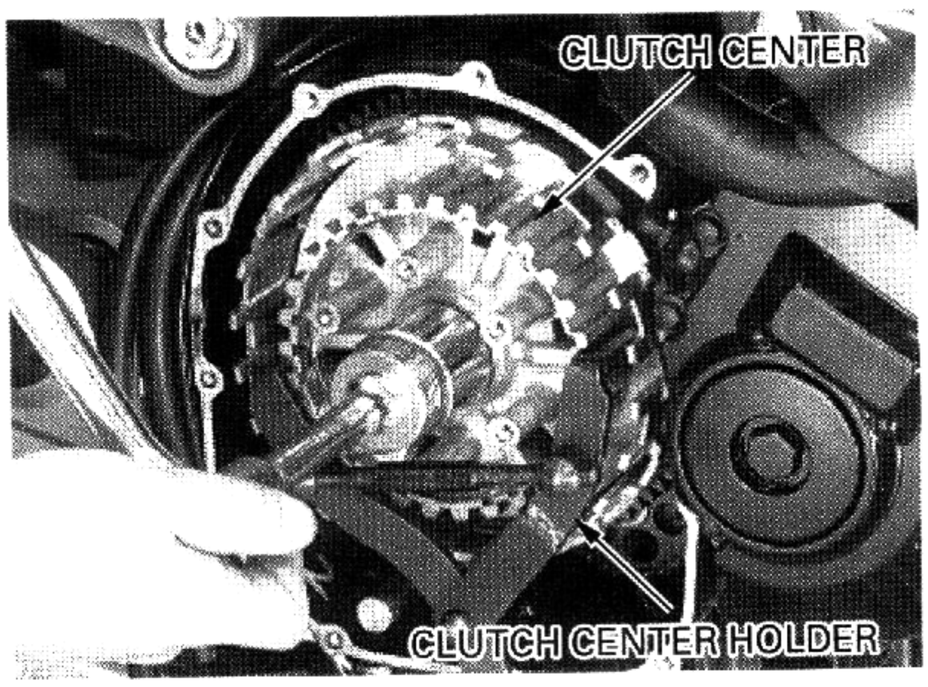


Hold the clutch center with the clutch center holder, then remove the lock nut.

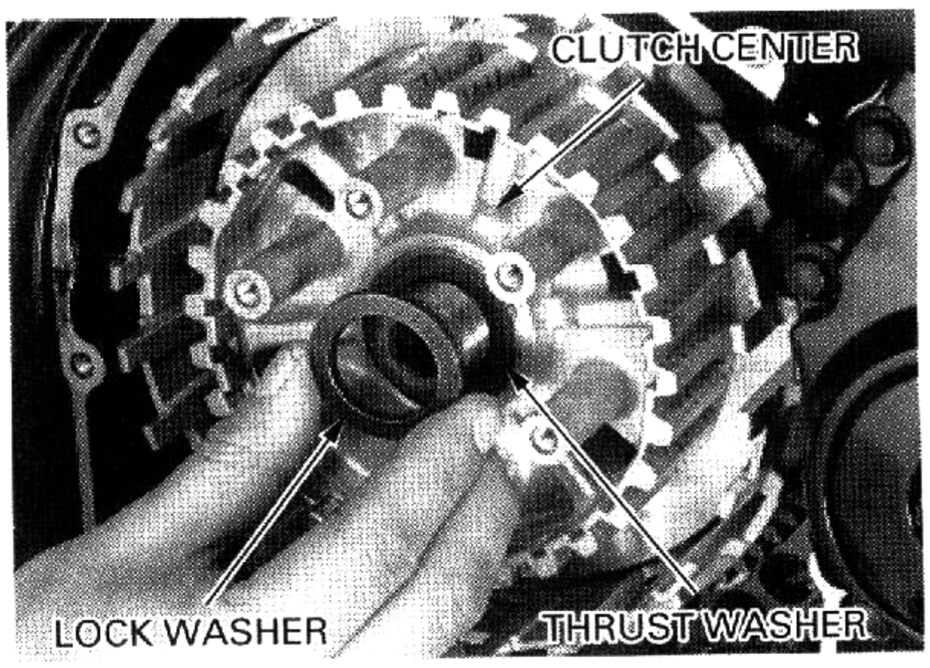
TOOL:

Clutch center holder	07724-0050002 (Equivalent commercially available)

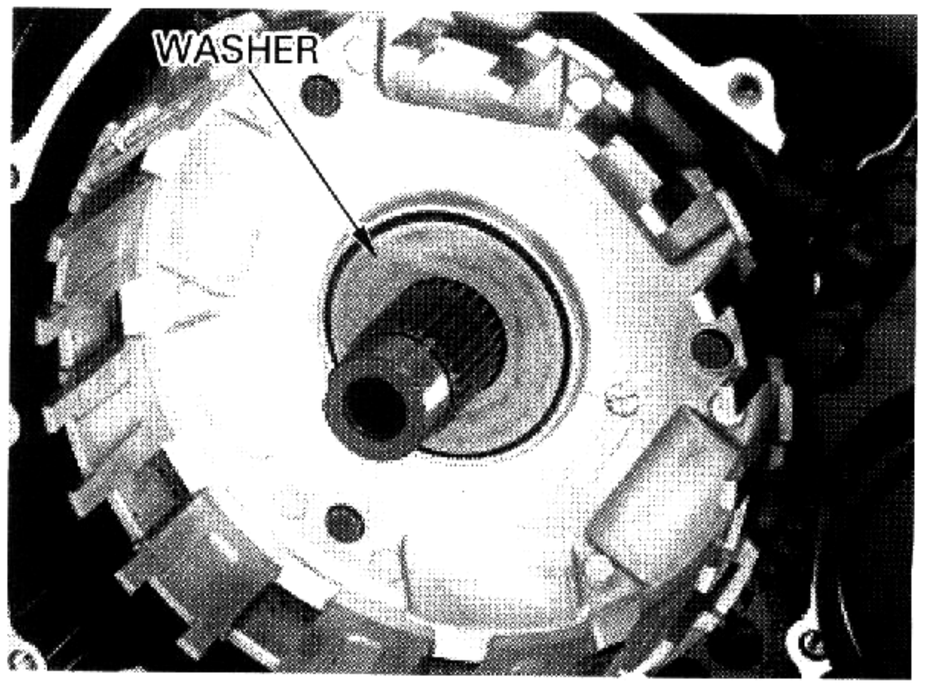
Discard the lock nut.



Remove the lock washer, thrust washer and clutch center.

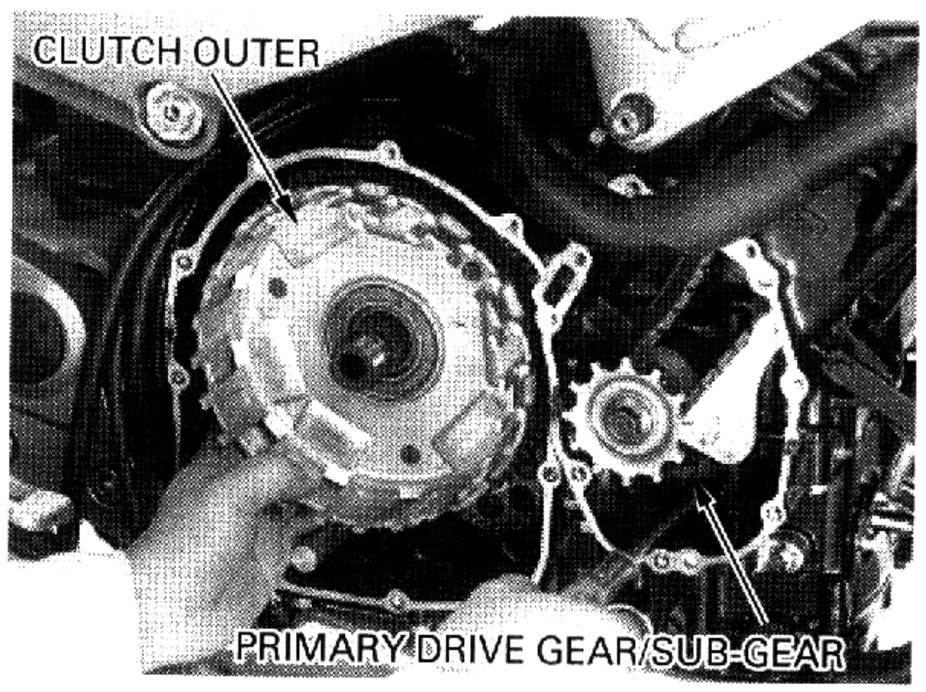


Remove the washer.



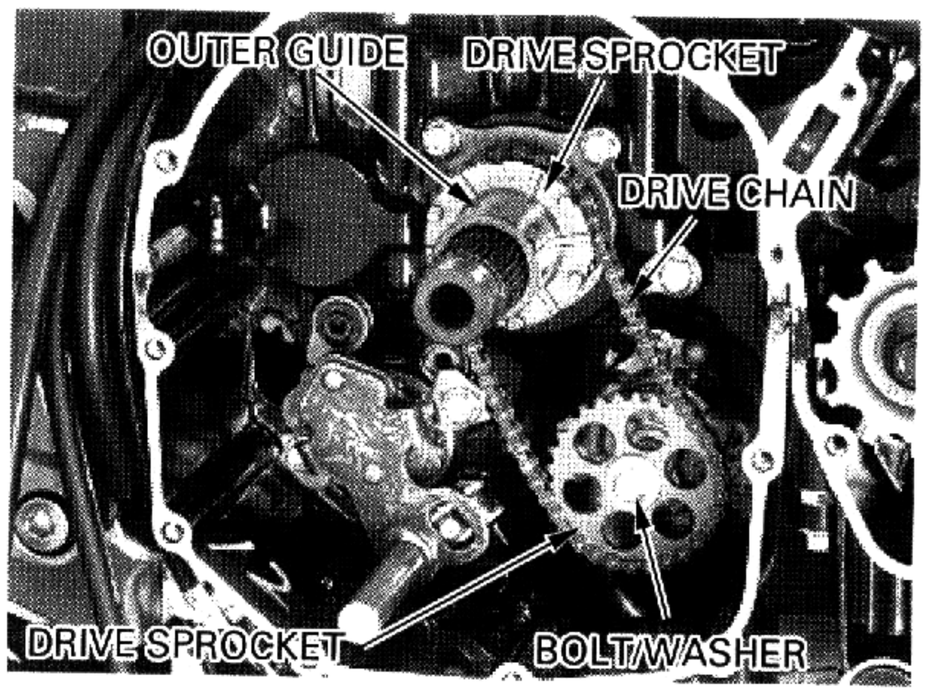
Remove the ignition pulse generator rotor cover (page 17-8).

Align the primary drive gear and sub-gear teeth with a screwdriver as shown.
Pull out the clutch outer.



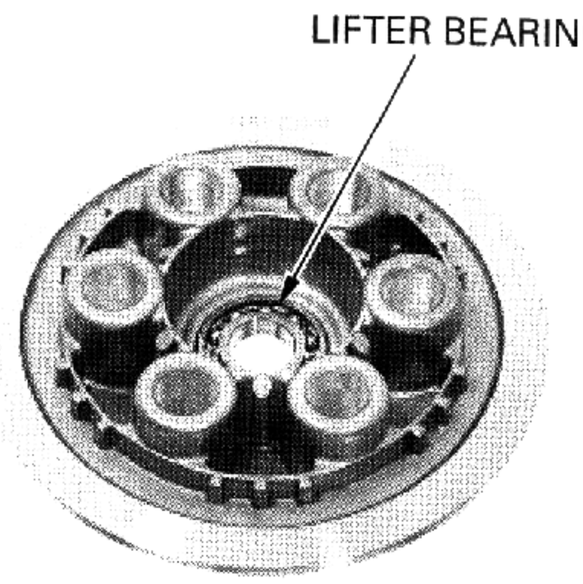
Remove the oil pump driven sprocket bolt/washer.
Remove the oil pump drive/driven sprocket and drive chain as an assembly.

Remove the clutch outer guide.



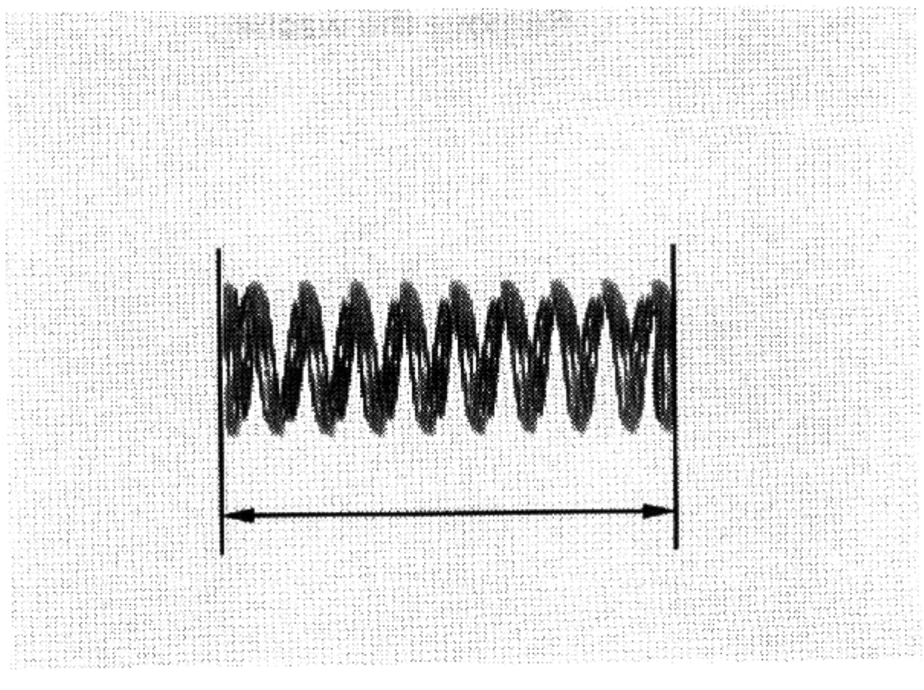
INSPECTION

Clutch lifter bearing
Turn the inner race of the lifter bearing with your finger.
The bearing should turn smoothly and freely without excessive play.
If necessary replace the bearing.

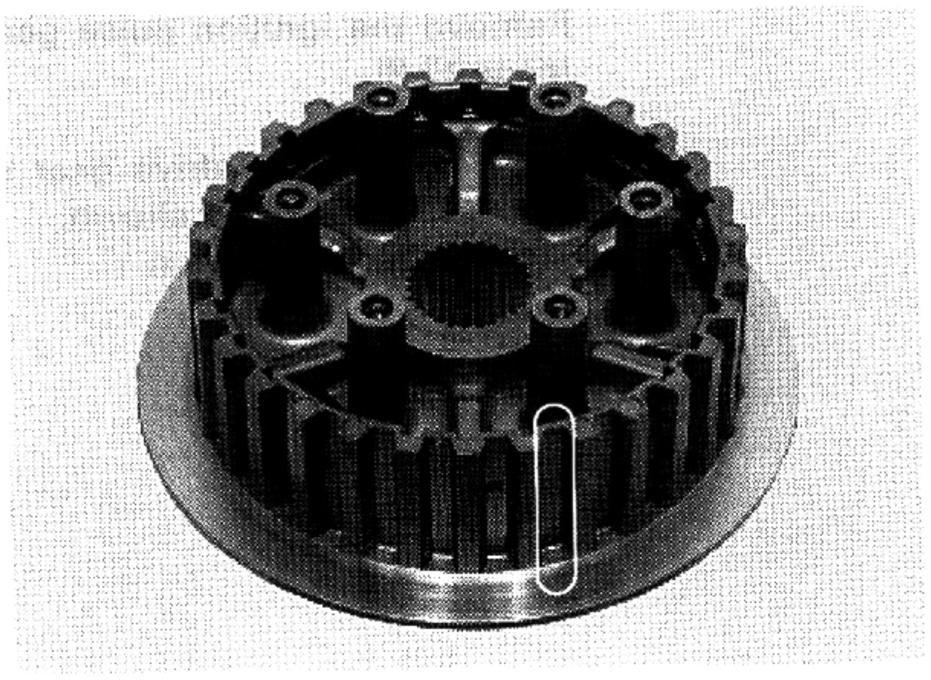


Clutch spring
Measure the clutch spring free length.

SERVICE LIMIT: 56.2 mm (2.21 in)



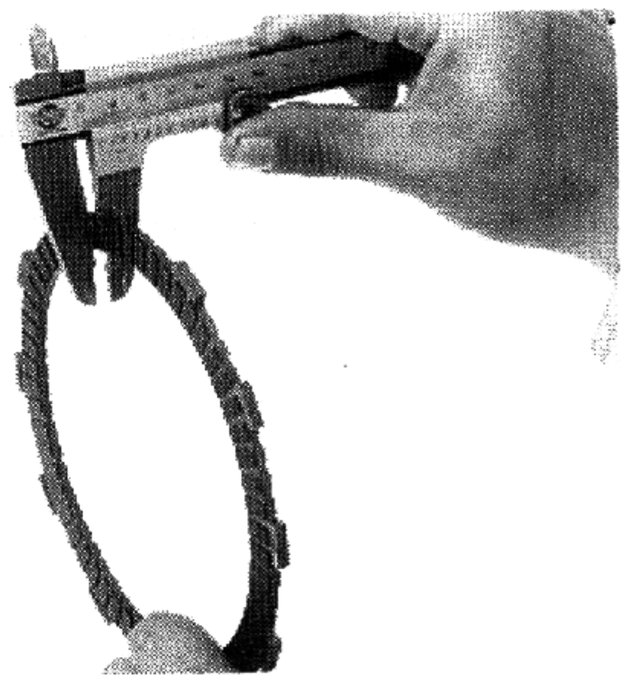
Clutch center
Check the grooves of the clutch center for damage or wear caused by the clutch plates.
Replace if necessary.



Clutch disc
Replace the clutch discs if they show sings of scoring or discoloration.

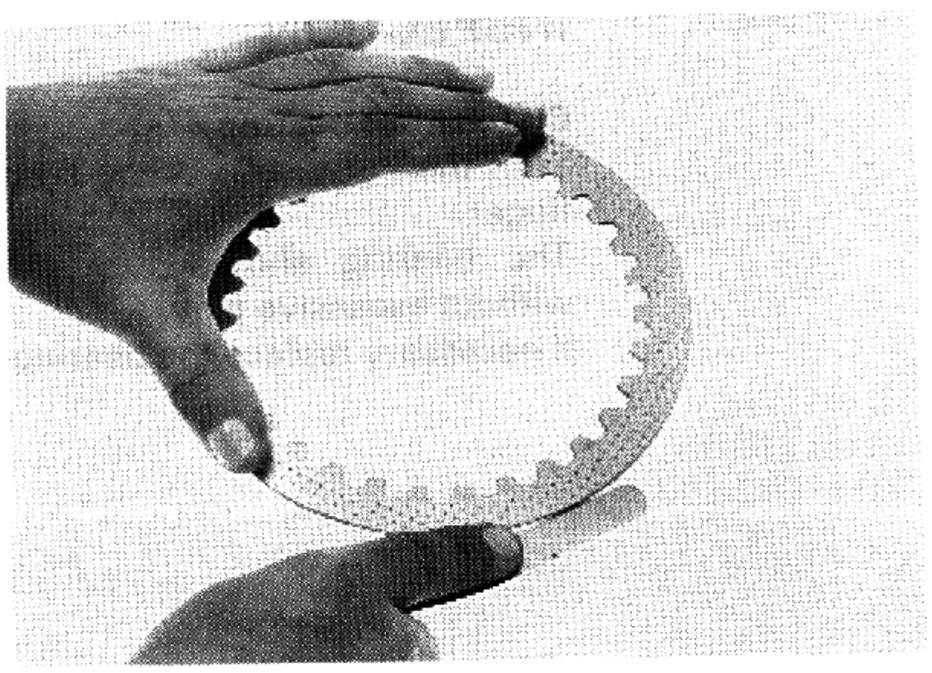
Measure the disc thickness of each disc.

SERVICE LIMIT: 3.5 mm (0.14 in)

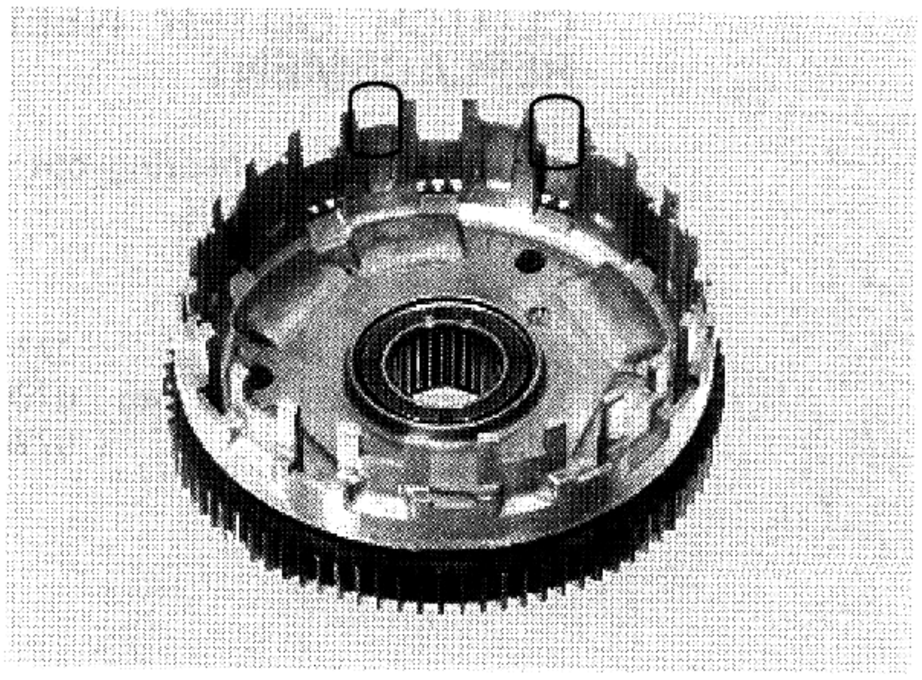


Clutch plate
Check each disc plate for warpage on a surface plate using a feeler gauge.

SERVICE LIMIT: 0.30 mm (0.012 in)

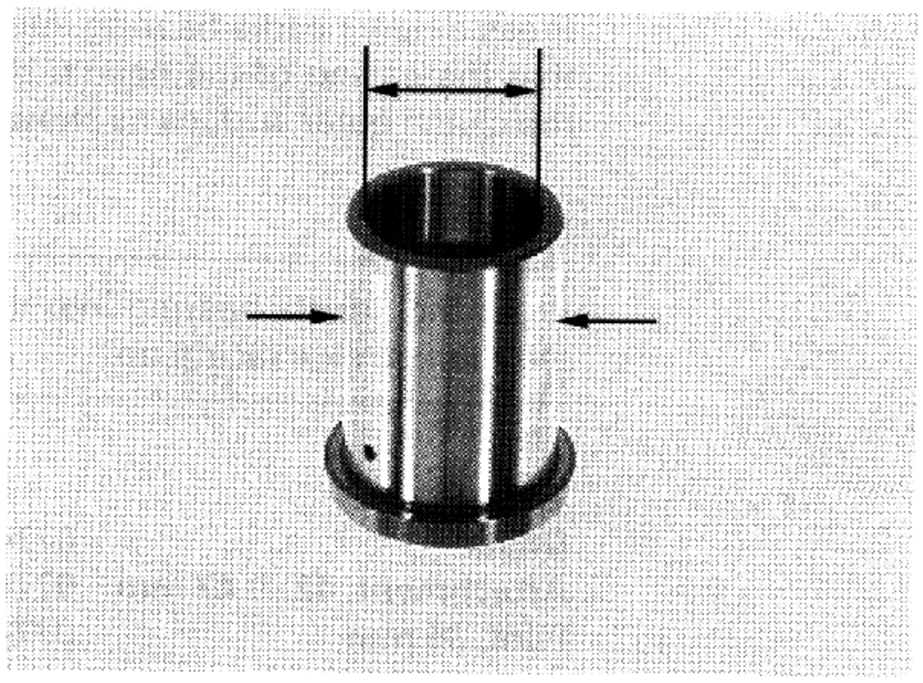


Clutch outer/clutch outer guide
Check the slots of the clutch outer for damage or wear caused by the clutch discs.
Replace if necessary.



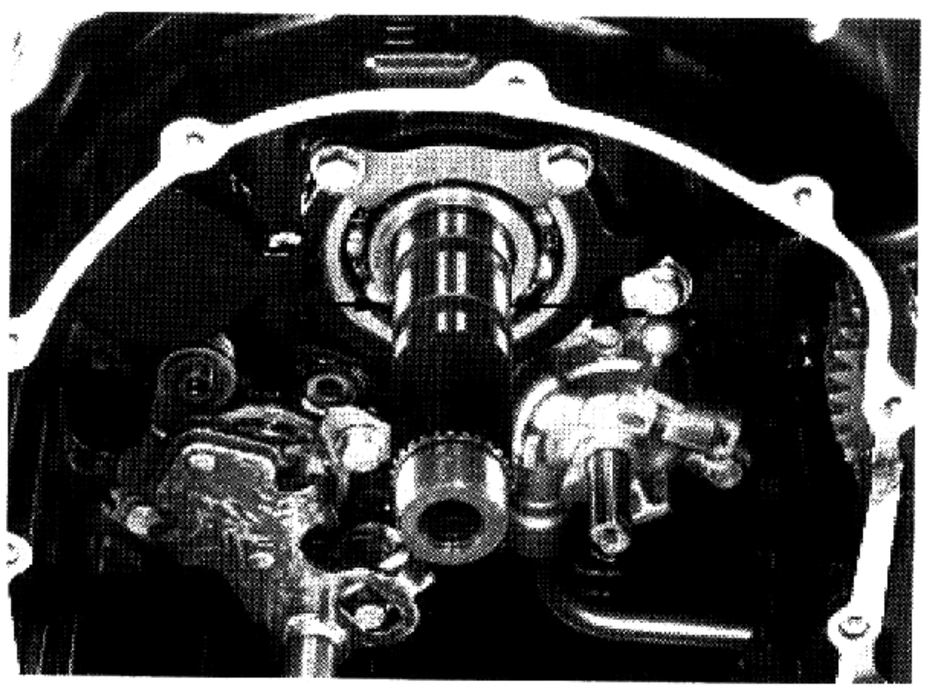
Measure the O.D. and I.D. of the clutch outer guide.

SERVICE LIMITS:
O.D.: 34.965 mm (1.3766 in)
I.D.: 28.031 mm (1.1036 in)

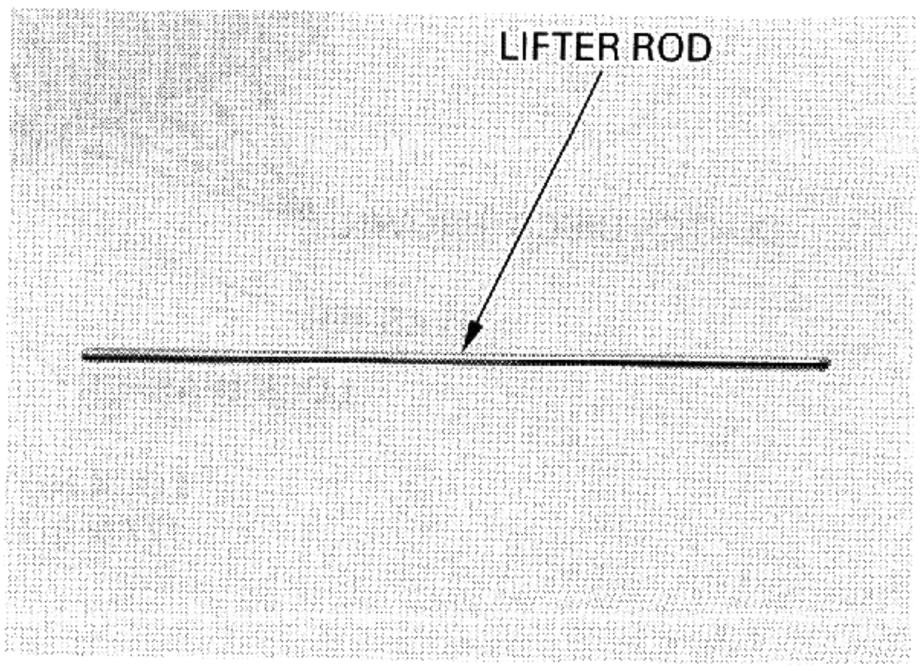


Mainshaft
Measure the mainshaft O.D. at clutch outer guide sliding surface.

SERVICE LIMIT: 27.970 mm (1.1012 in)



Clutch lifter rod
Check the clutch lifter rod for wear and trueness.

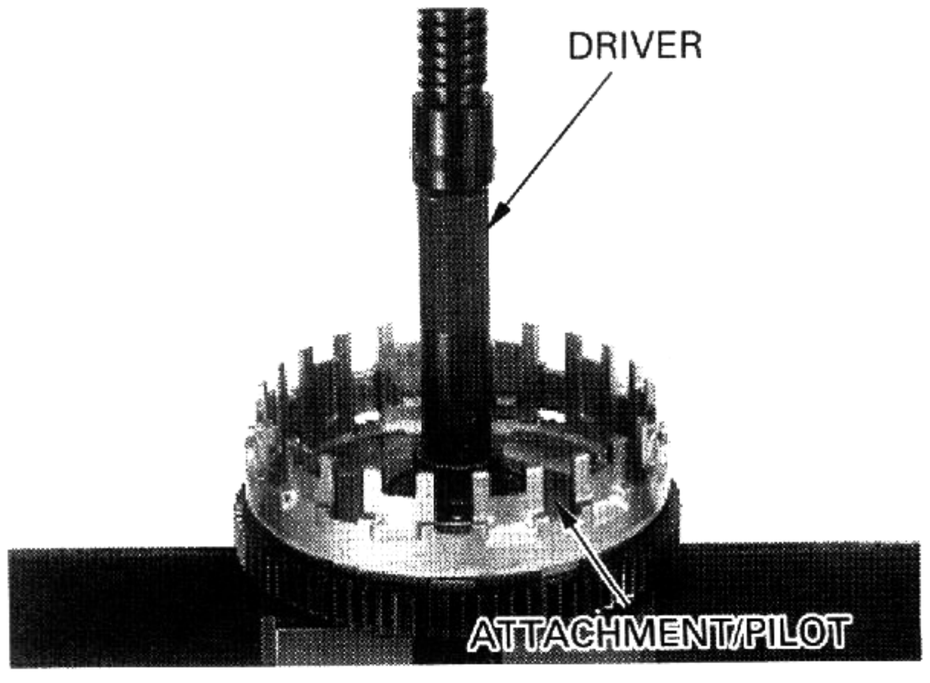


CLUTCH OUTER NEEDLE BEARING REPLACEMENT

Press the needle bearing out of the clutch outer using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 37 × 40 mm	07746-0010200
Pilot, 35 mm	07746-0040800



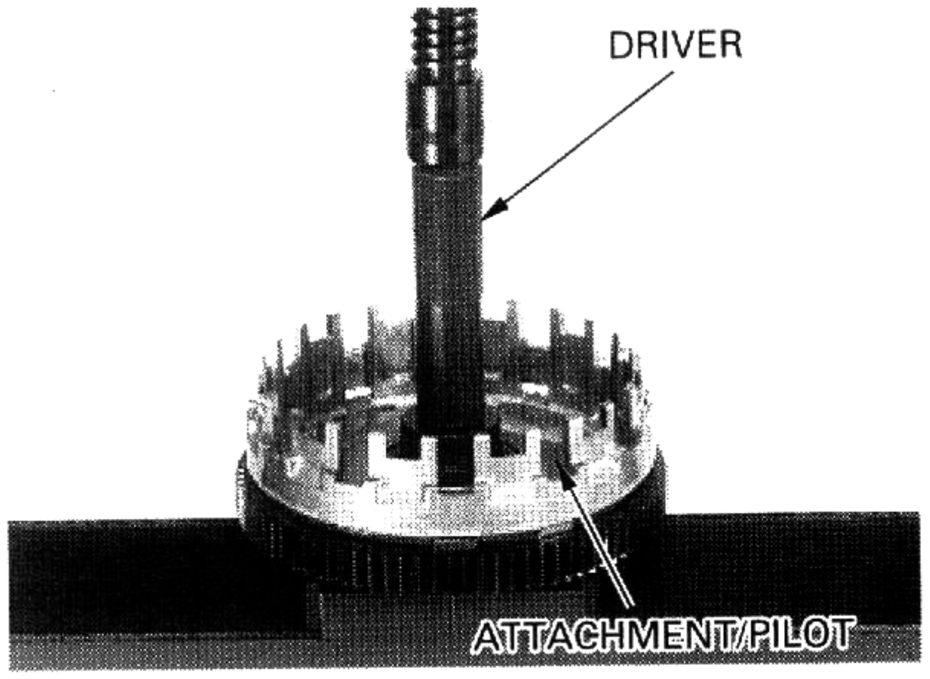
Press a new needle bearing into the clutch outer so that the casing of the needle bearing is flush with the clutch outer surface as shown.

NOTE:

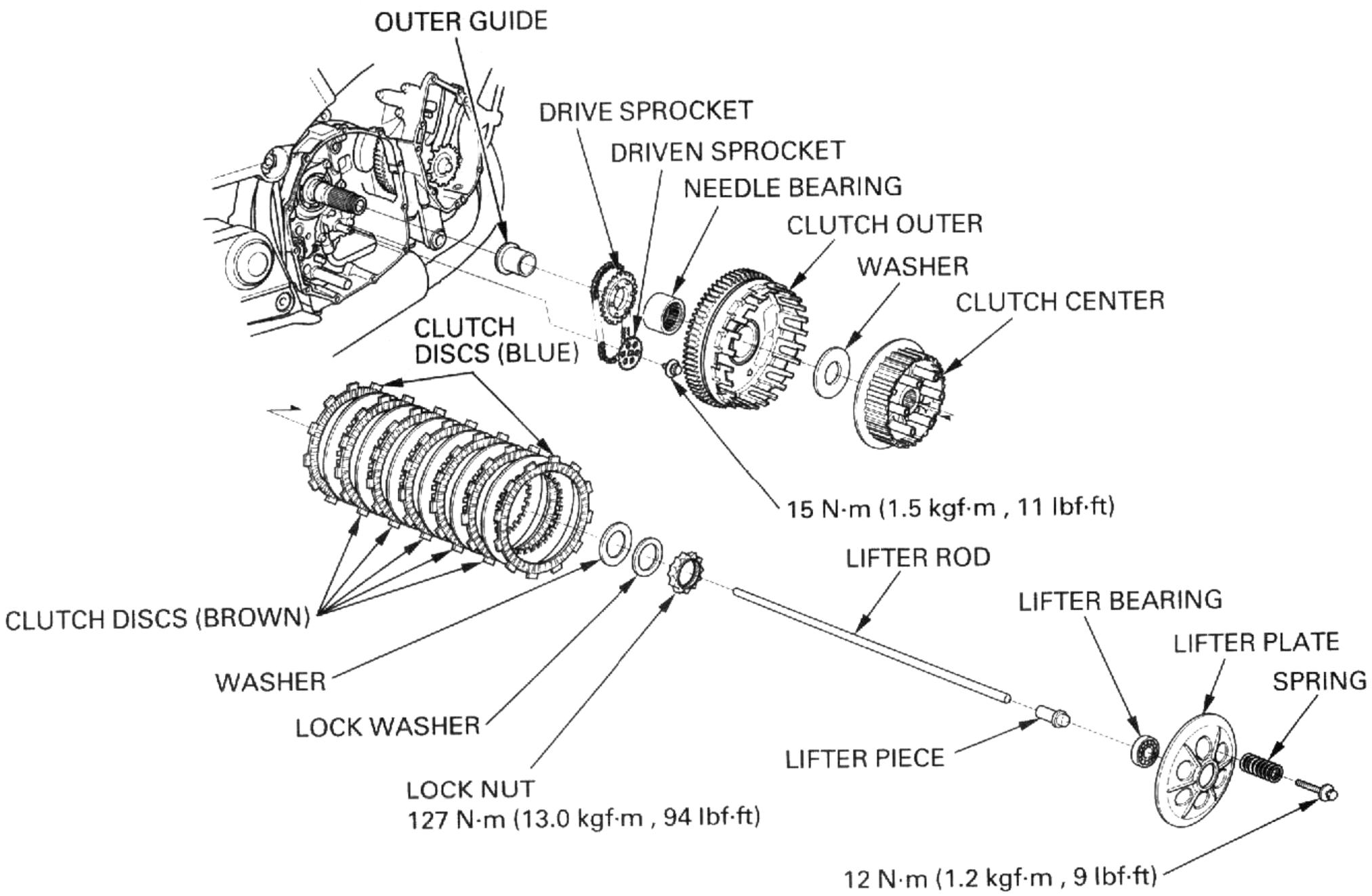
Press the needle bearing into the clutch outer with the marked side facing up.

TOOLS:

Driver	07749-0010000
Attachment, 42 × 47 mm	07746-0010300
Pilot, 35 mm	07746-0040800



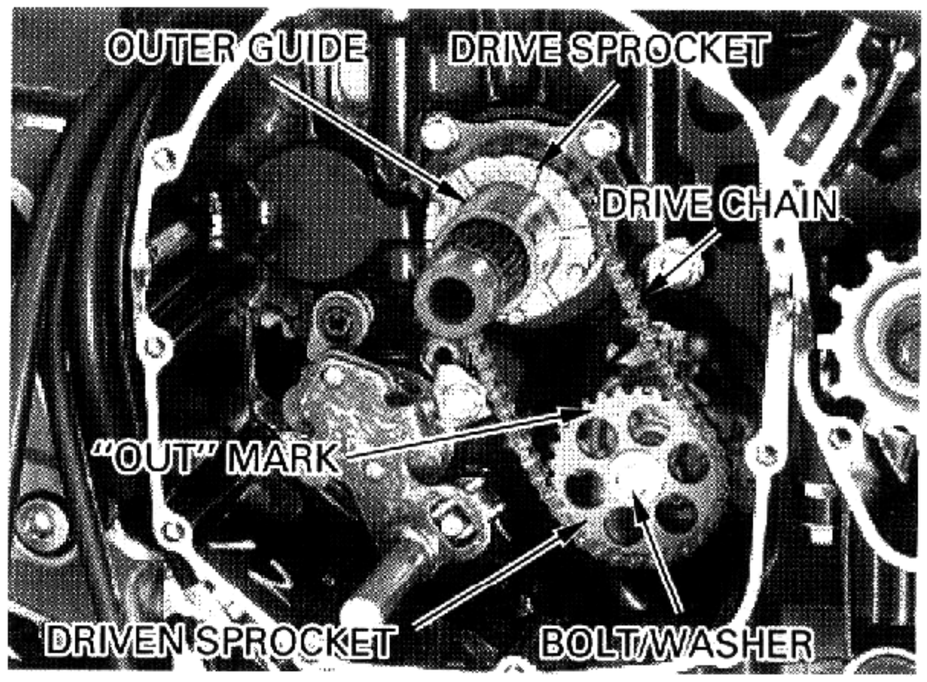
INSTALLATION



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

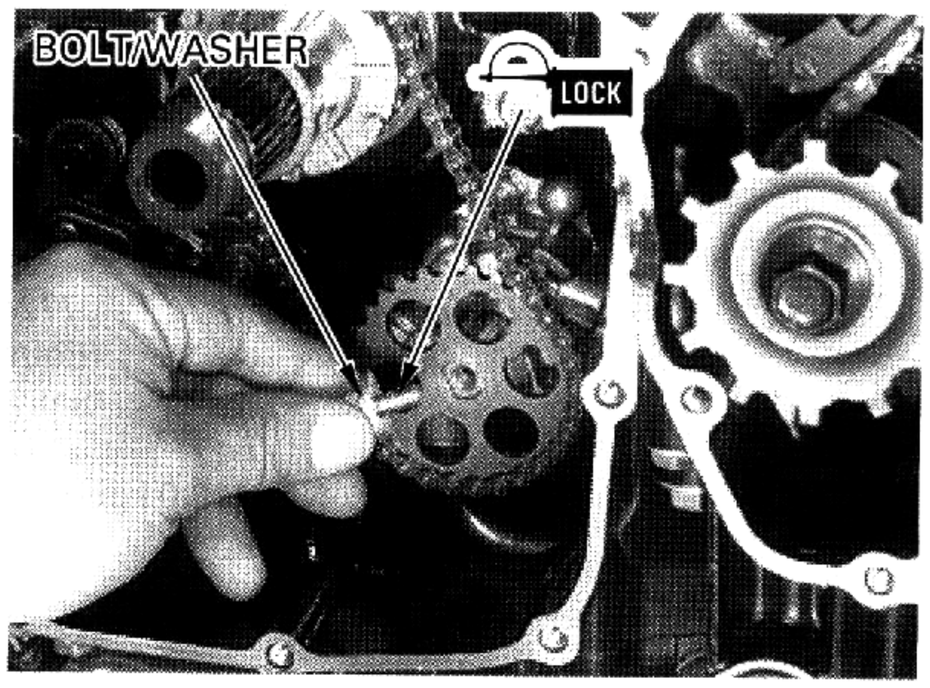
NOTE:

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



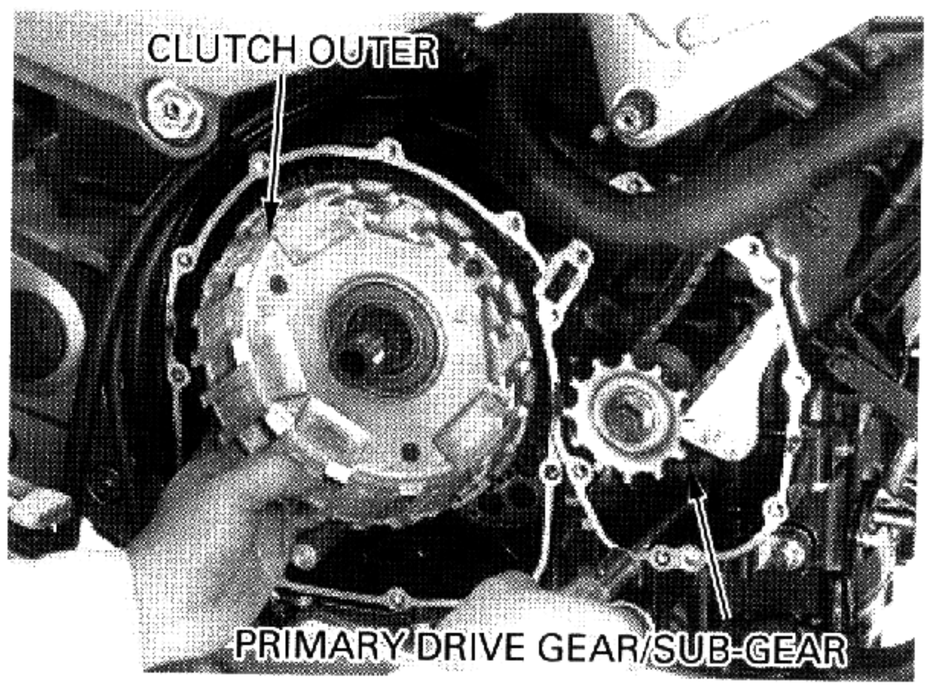
Apply a locking agent to the threads of the oil pump driven sprocket bolt.
Tighten the driven sprocket bolt to the specified torque.

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

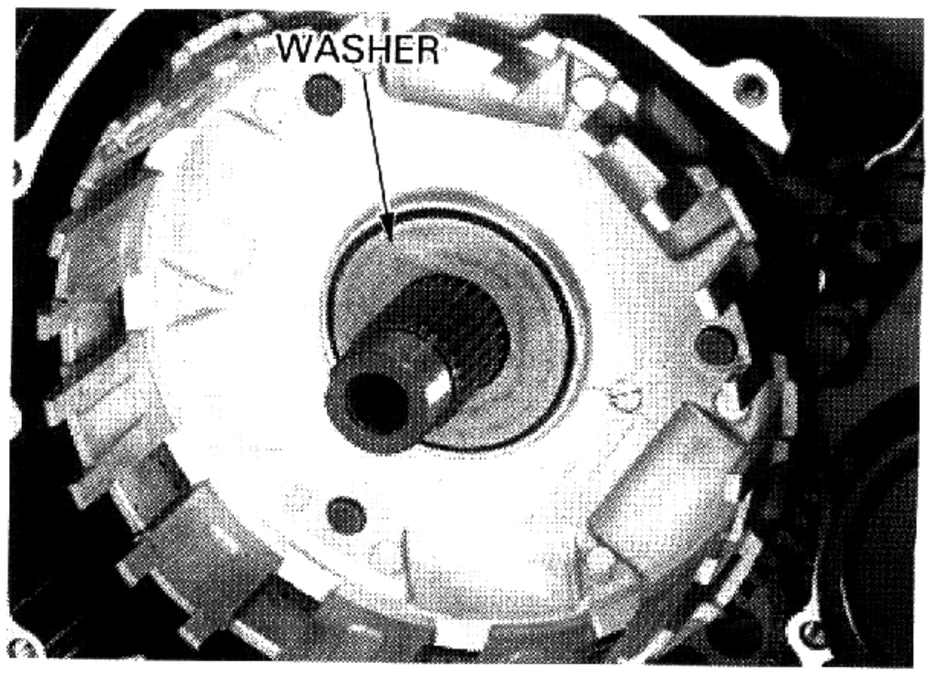


Align the primary drive gear and sub-gear teeth with a screwdriver as shown.

Install the clutch outer.



Install the washer onto the clutch outer.



Install the clutch center.

Install the thrust washer.
Install the lock washer with its "OUTSIDE" mark facing out.

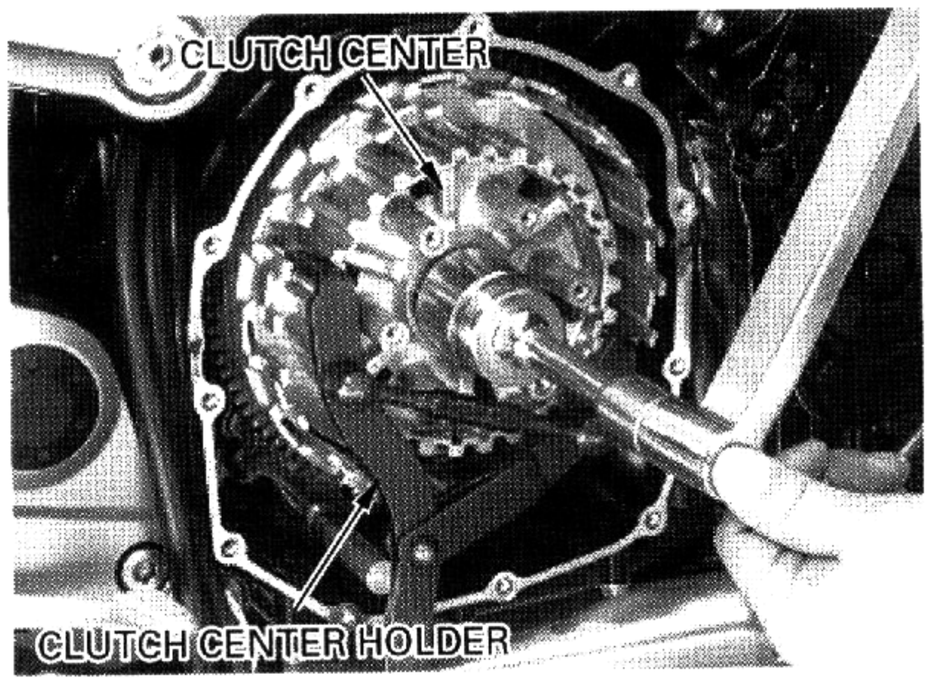


Install the new lock nut.

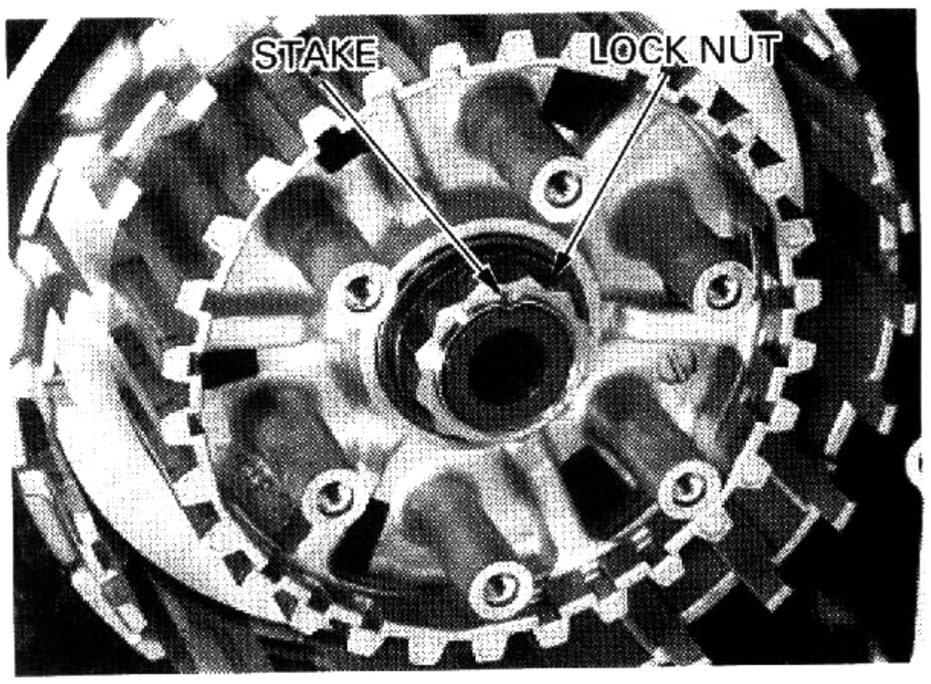
Hold the clutch center with the clutch center holder, then tighten the lock nut to the specified torque.

TOOL:
Clutch center holder 07724-0050002 (Equivalent commercially available)

TORQUE: 127 N·m (13.0 kgf·m , 94 lbf·ft)



Stake lock nut into the mainshaft groove with a punch.

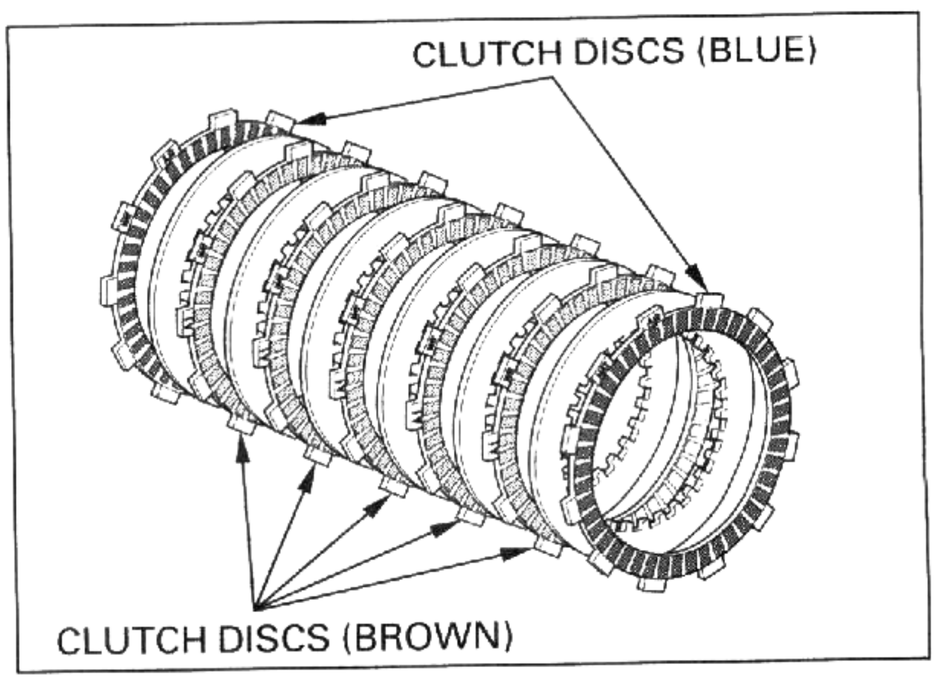


Coat the clutch discs and plates with clean engine oil.

Stack the clutch discs and plates alternately.

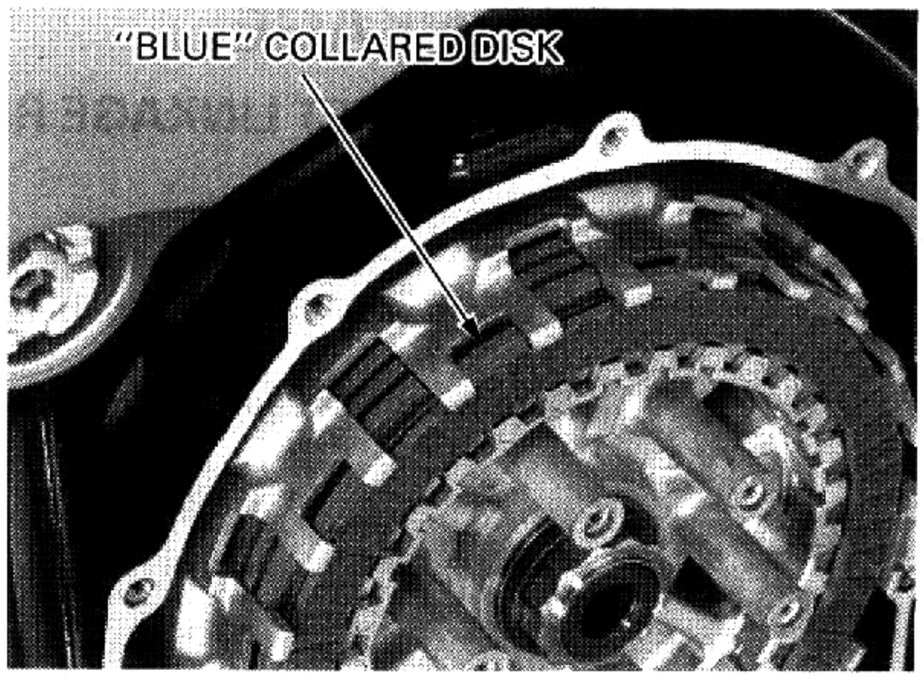
NOTE:

Install the discs colored "Blue" on both ends.



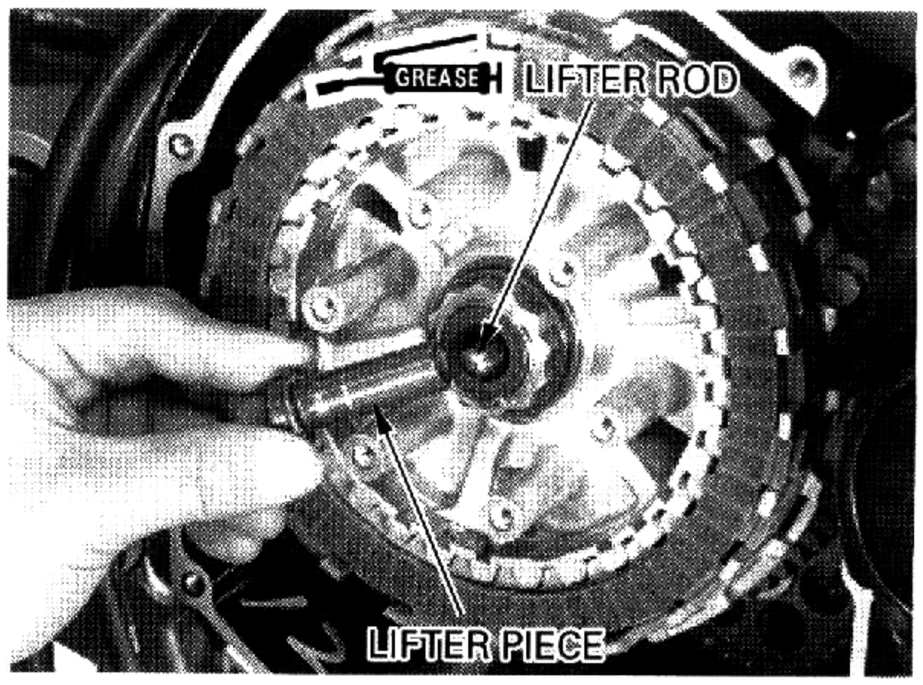
NOTE:

Install the outer clutch disc colored "Blue" in the shallow slot on the clutch outer.

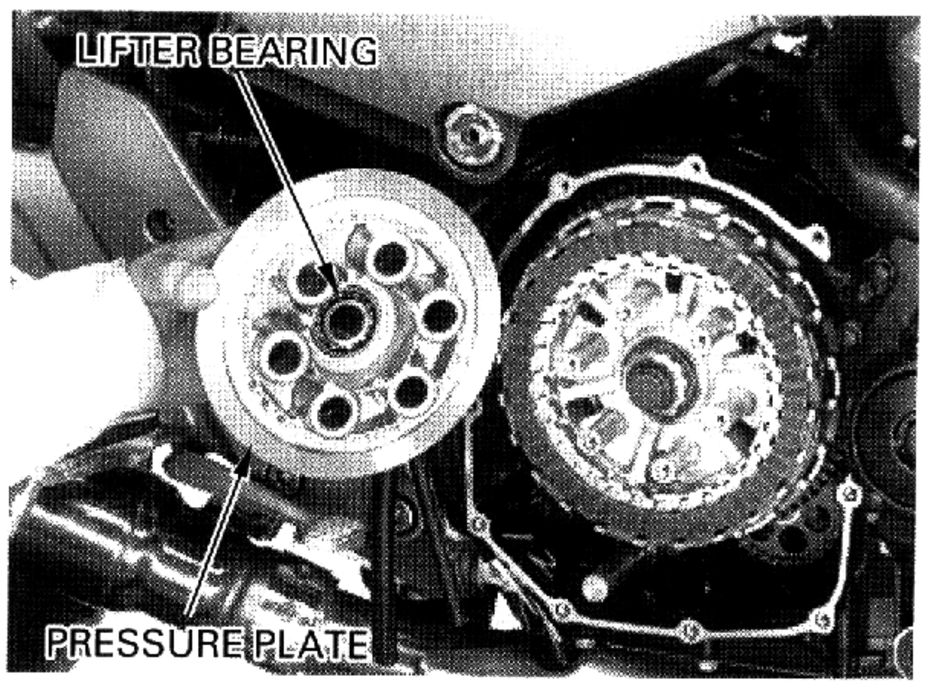


Install the clutch lifter rod into the mainshaft.

Apply grease to the tip of the lifter rod and install clutch lifter piece into the mainshaft.



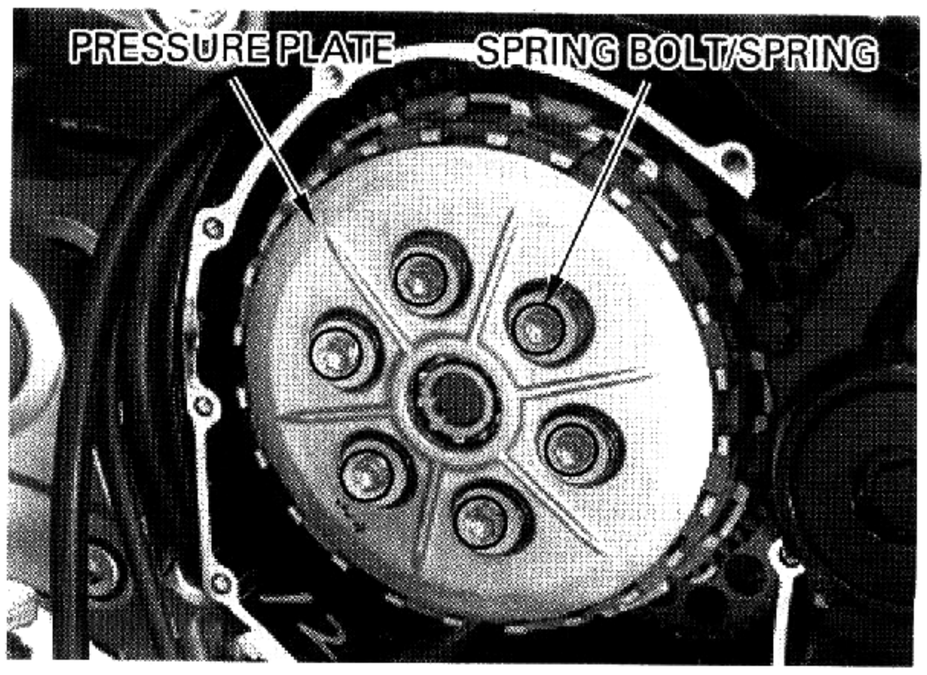
Install the lifter bearing into the pressure plate.
Install the pressure plate.



Install the clutch springs and spring bolts.
Tighten the bolts in a crisscross pattern in 2–3 steps to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the right crankcase cover (page 9-17).

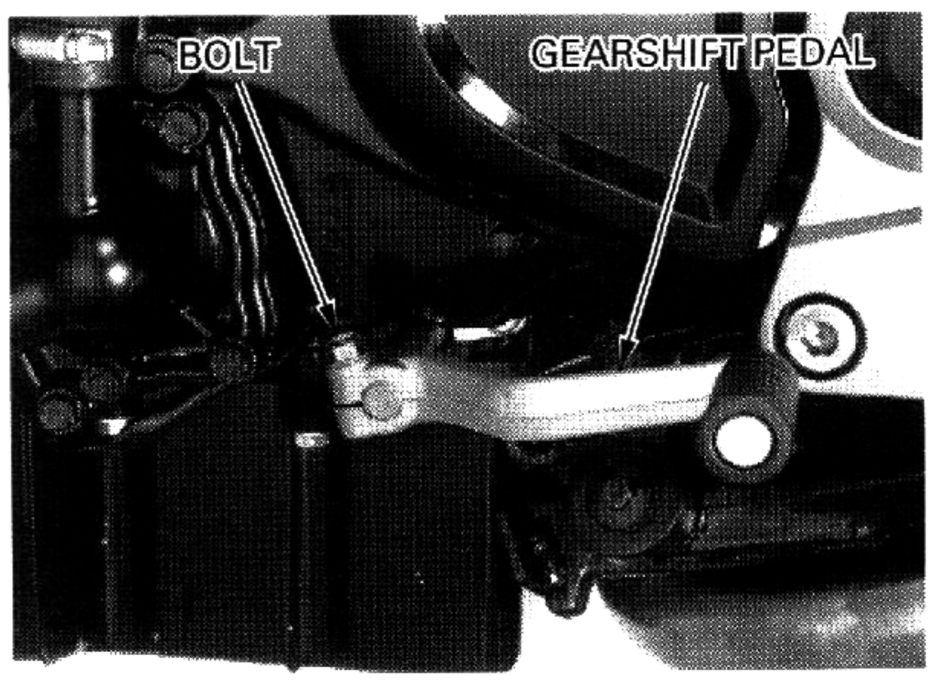


GEARSHIFT LINKAGE

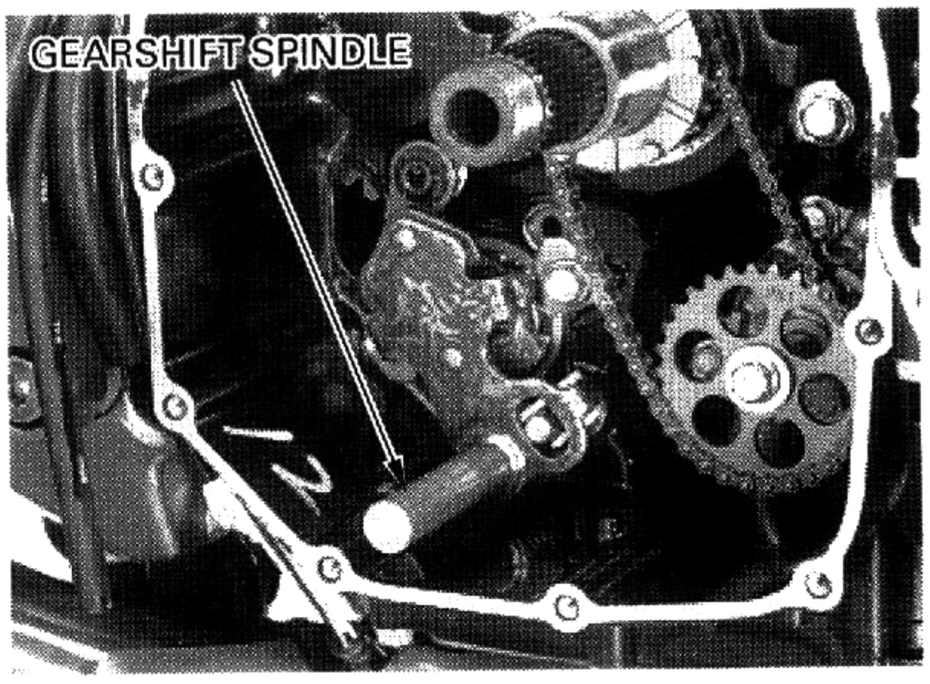
GEARSHIFT LINKAGE REMOVAL

Remove the following:
- Right crankcase cover (page 9-3)
- Clutch assembly (page 9-3)

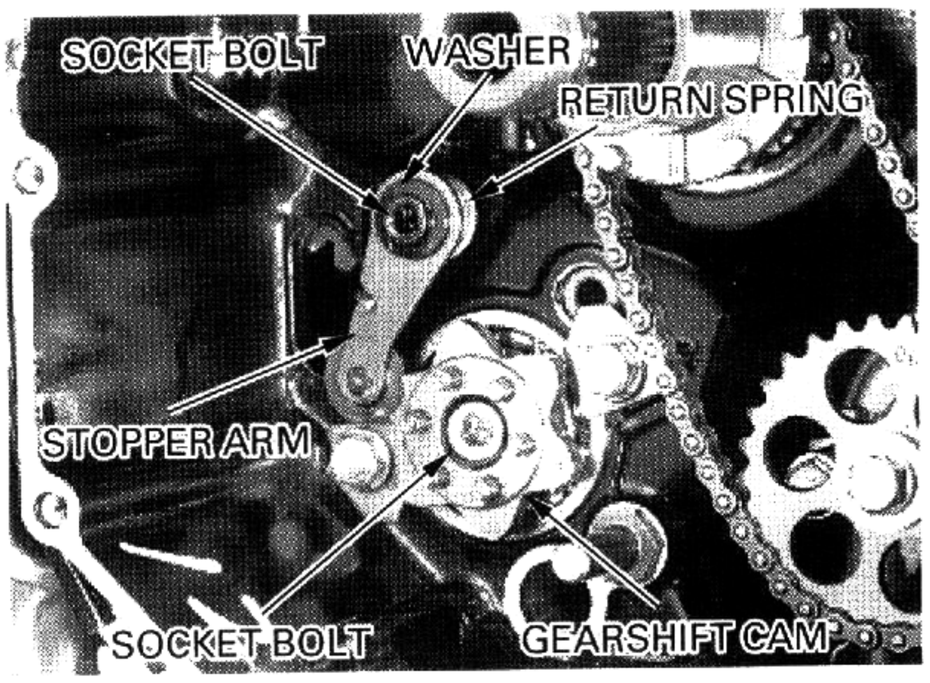
Remove the bolt and gearshift pedal.



Pull the gearshift spindle assembly and thrust washer out of the crankcase.

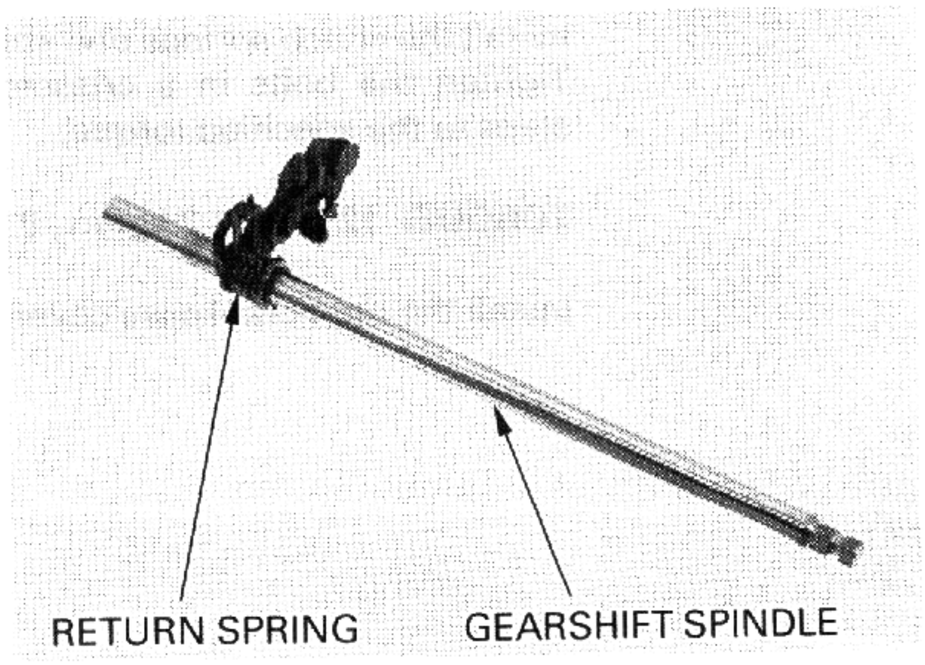


Remove the following:
- Stopper arm bolt
- Stopper arm
- Return spring
- Washer
- Dowel pins
- Socket bolt
- Gearshift cam



GEARSHIFT LINKAGE INSPECTION

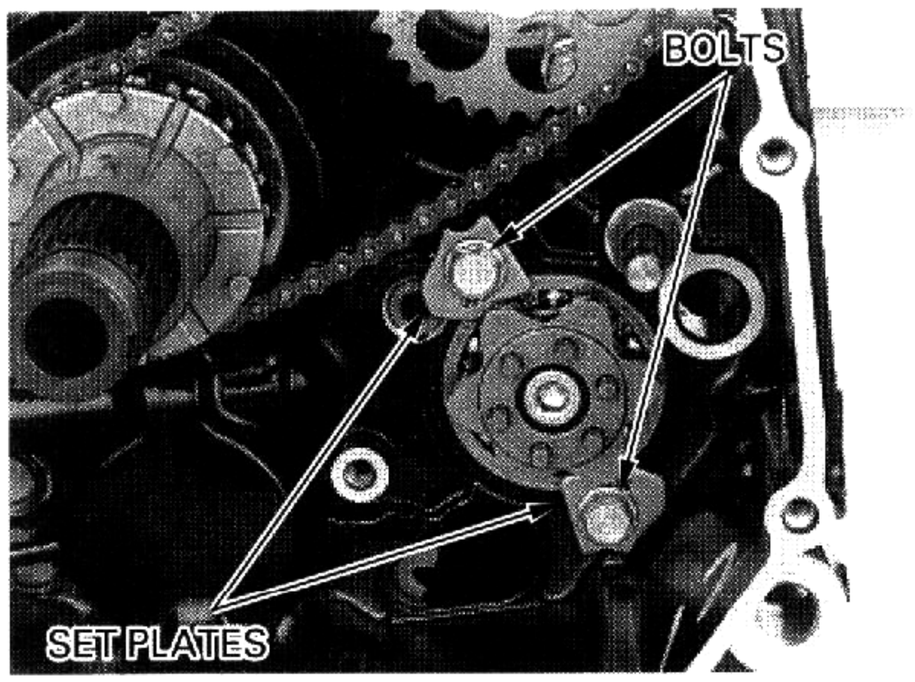
Check the gearshift spindle for wear, damage or bending.
Check the return spring for fatigue or damage.



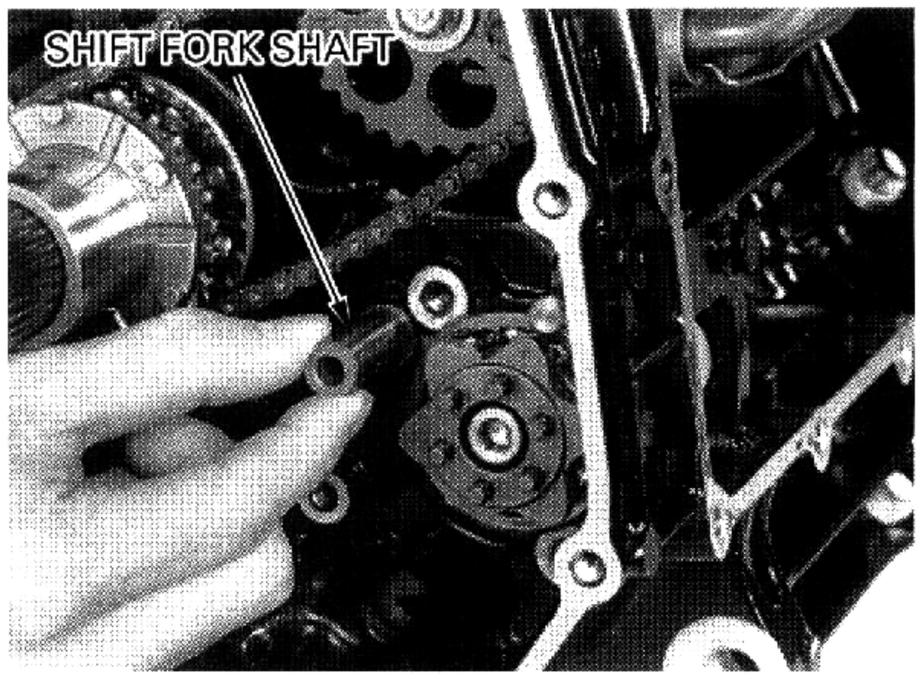
SHIFT DRUM/SHIFT FORK REMOVAL

Remove the following:
- Gearshift linkage (page 9-12)
- Oil pan (page 4-4)

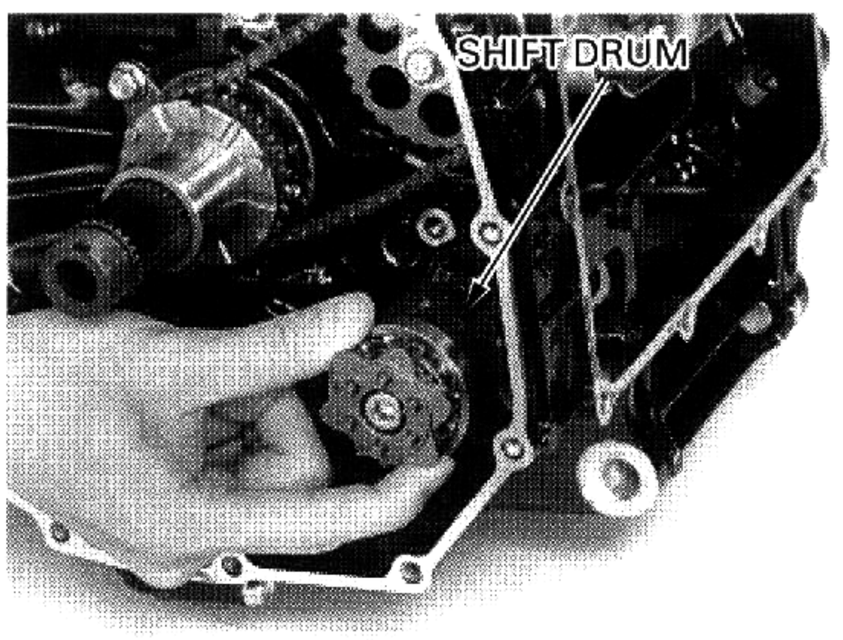
Remove the bolts and shift drum bearing set plates.



Remove the shift fork shaft and shift forks.



Remove the shift drum bearing and shift drum.



SHIFT DRUM/SHIFT FORK INSPECTION

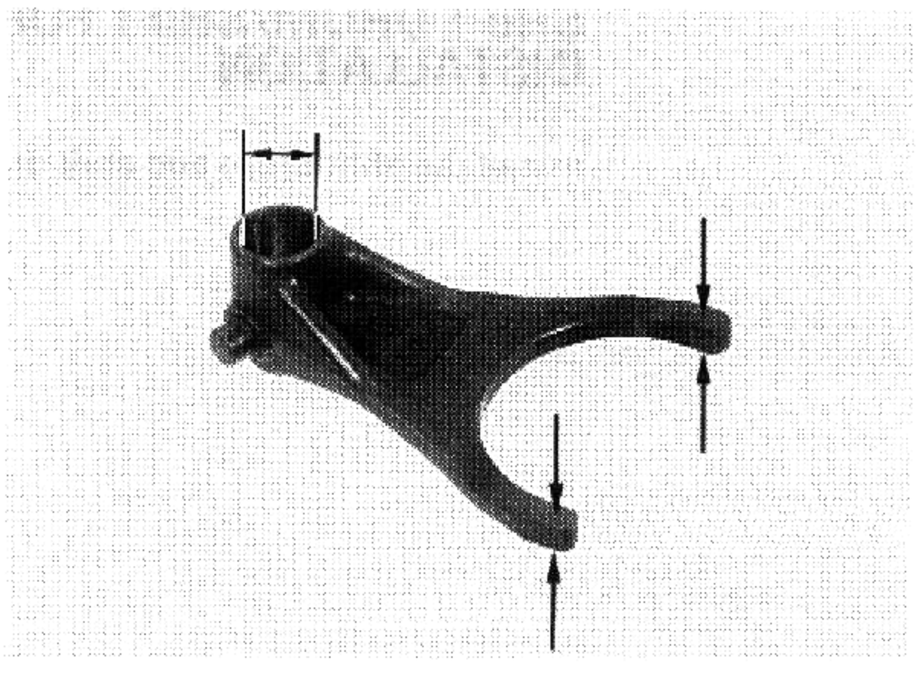
Check the shift fork and fork shaft for wear or damage.

Measure the I.D. of the shift fork.

SERVICE LIMIT: 12.03 mm (0.474 in)

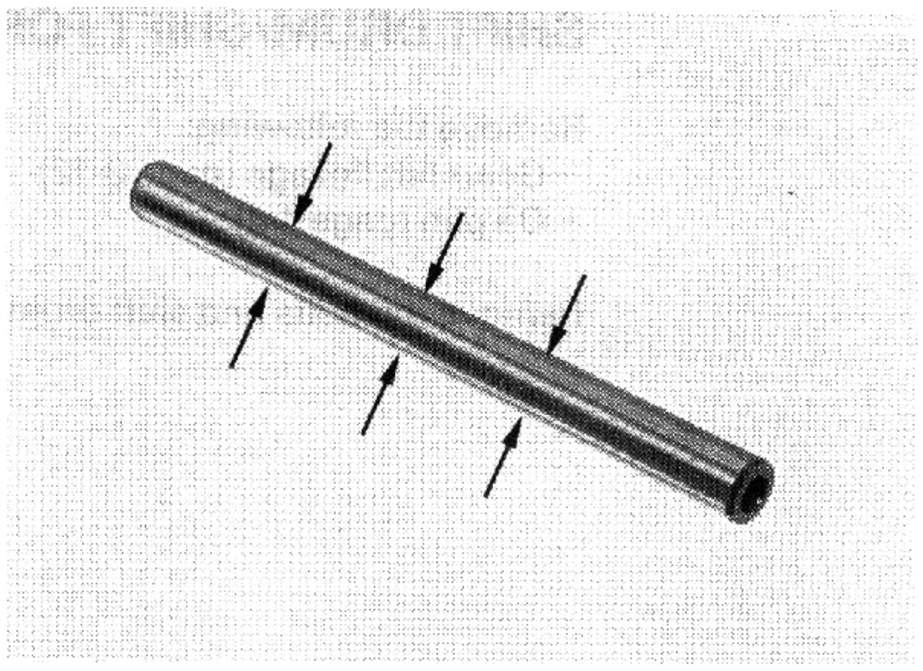
Measure the shift fork claw thickness.

SERVICE LIMIT: 5.9 mm (0.23 in)

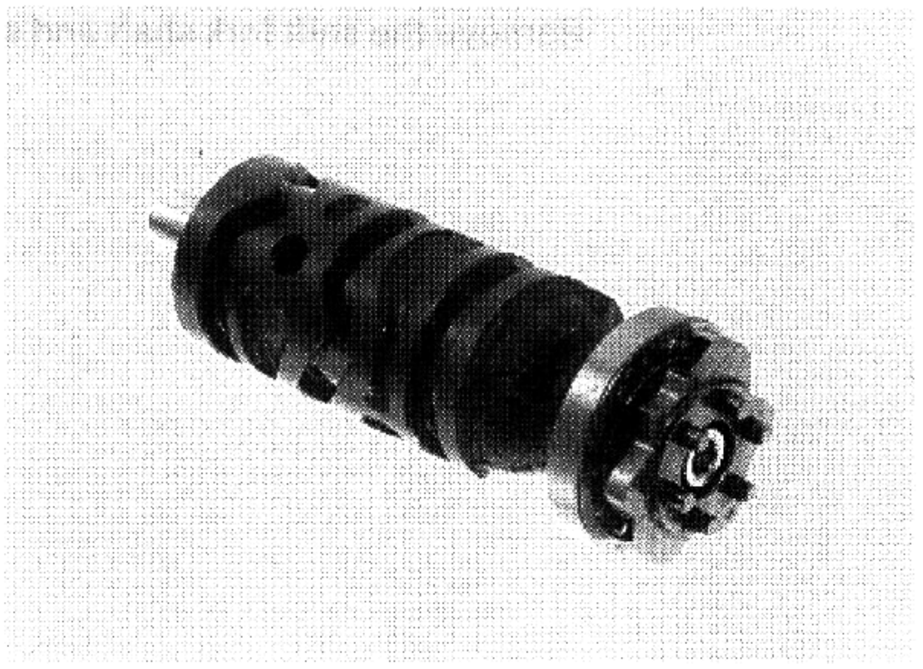


Measure the O.D. of the shift fork shaft.

SERVICE LIMIT: 11.95 mm (0.470 in)



Inspect the shift drum grooves for wear or damage.

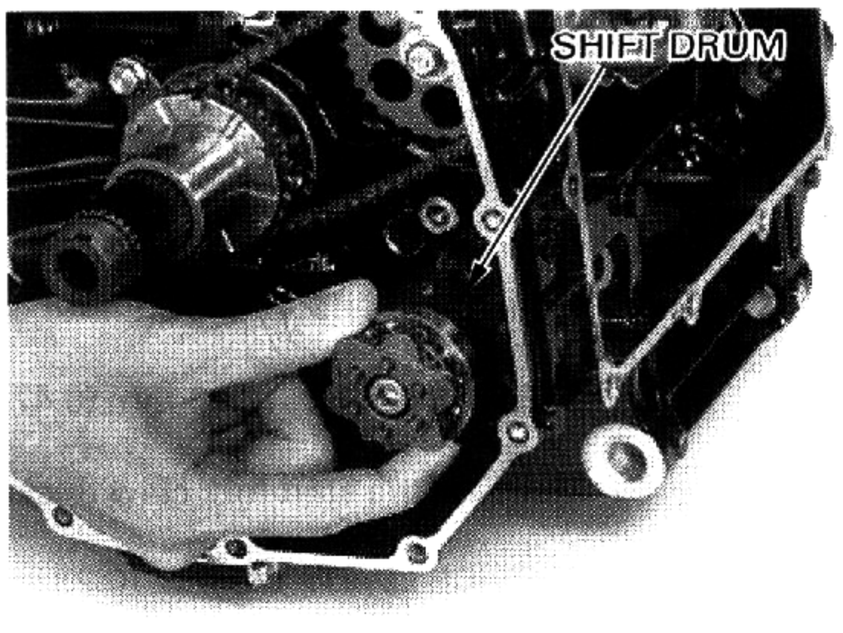


Turn the inner race of the shift drum bearing with your finger.
The bearing should turn smoothly and freely without excessive play.
If necessary replace the bearing.



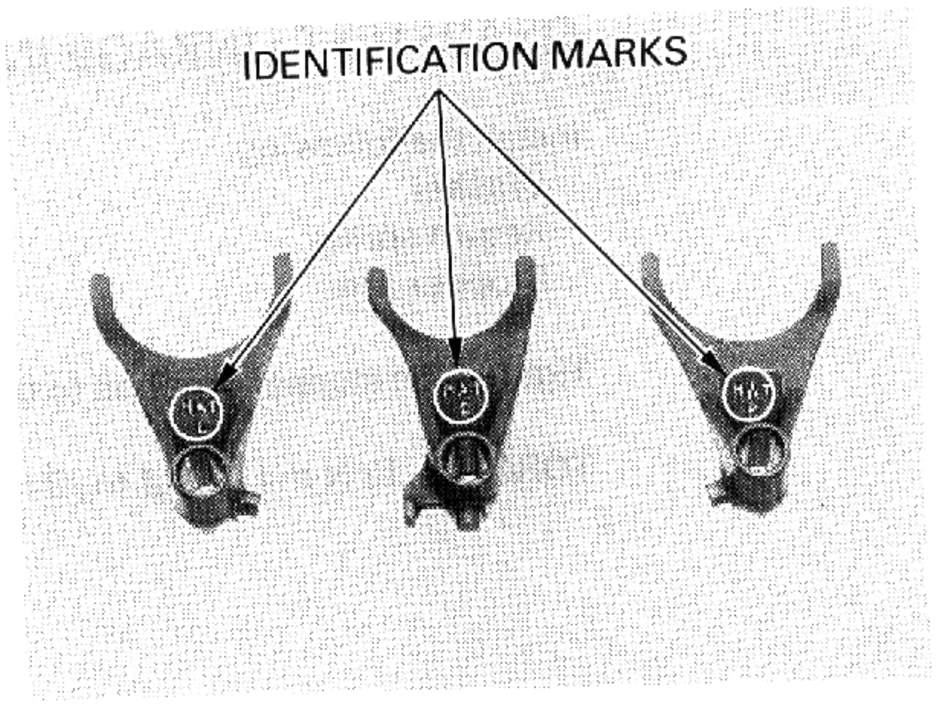
SHIFT DRUM/SHIFT FORK INSTALLATION

Install the shift drum and shift drum bearing.



NOTE:

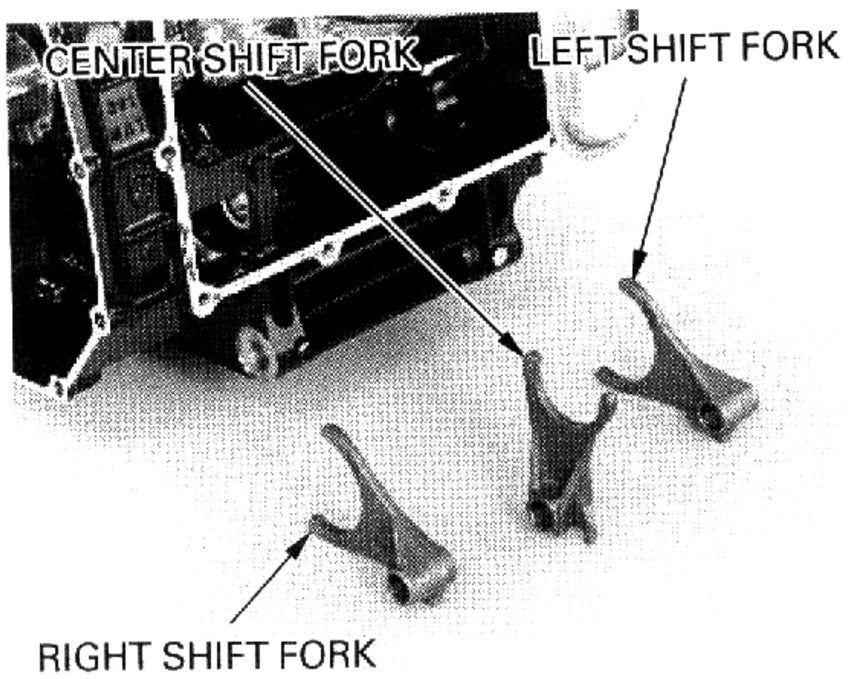
The shift forks have location marks.
"R" for right
"C" for center
"L" for left



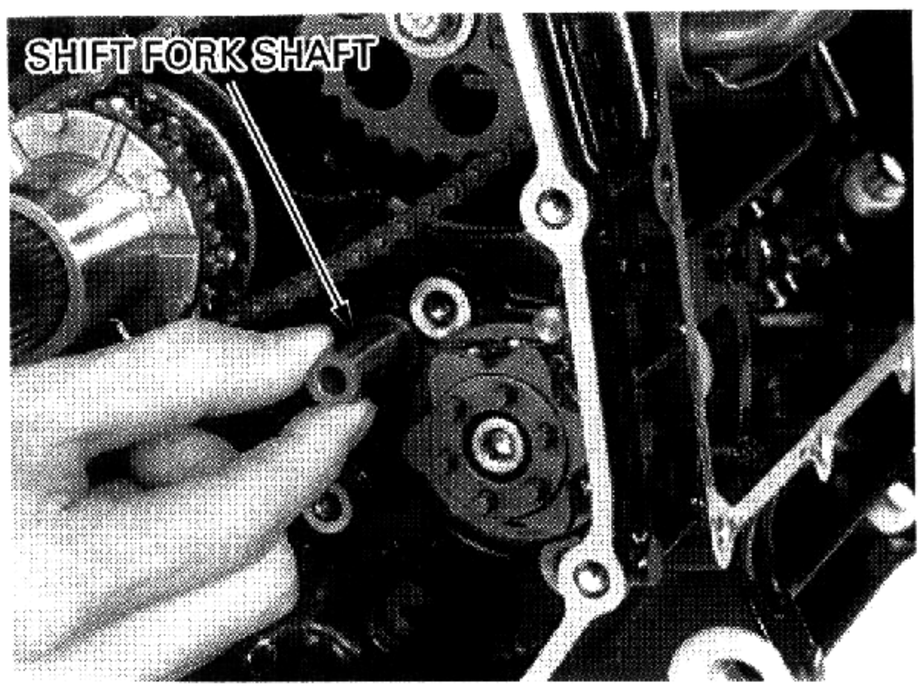
Apply molybdenum disulfide oil to shifter fork groove of the shift gears.
Install the shift forks on the transmission.

NOTE:

- Install the left shift fork with its identification mark facing to left.
- Install the center and right shift fork shaft with their identification mark facing to right.



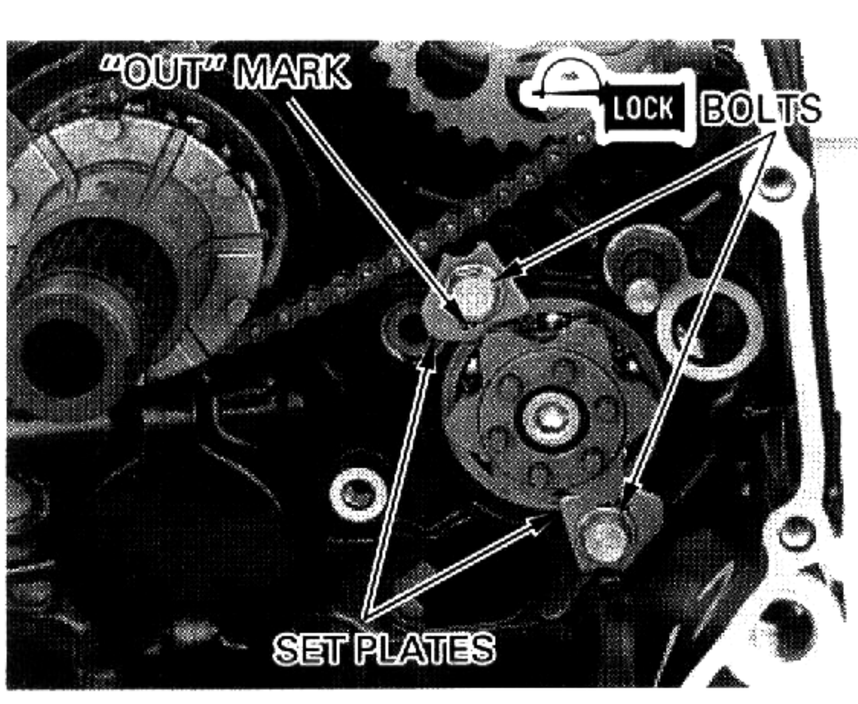
Install the shift fork shaft.



Install the bearing set plates with their "OUT" marks facing out.
Apply a locking agent to the threads of the set plate bolts.
Install and tighten the set plate bolts to the specified torque.

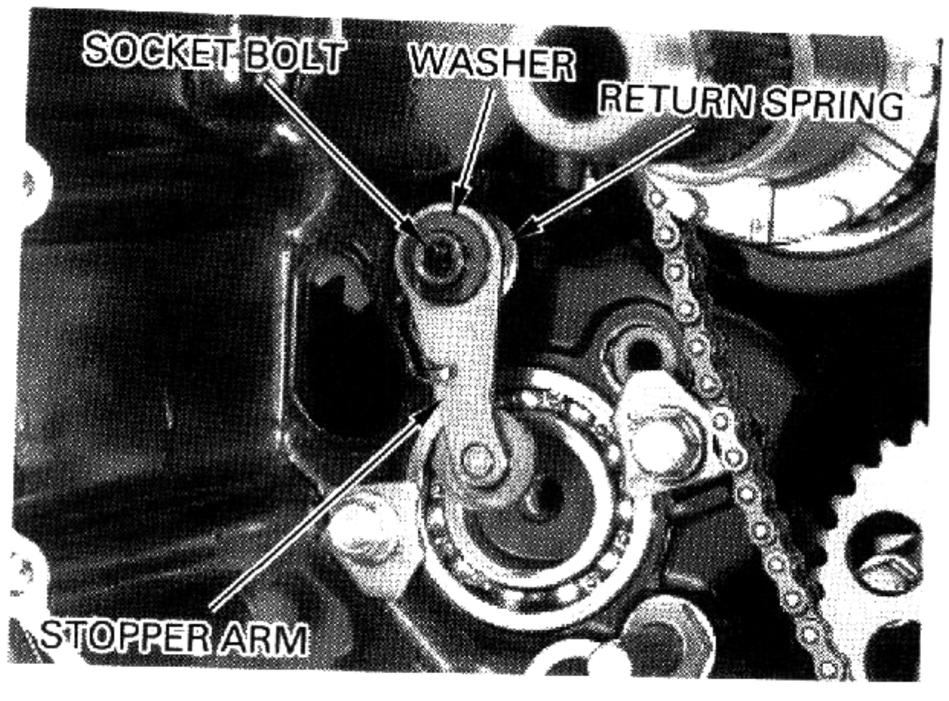
TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the gearshift linkage (see following steps).



GEARSHIFT LINKAGE INSTALLATION

Install the following:
– Washer
– Return spring
– Stopper arm

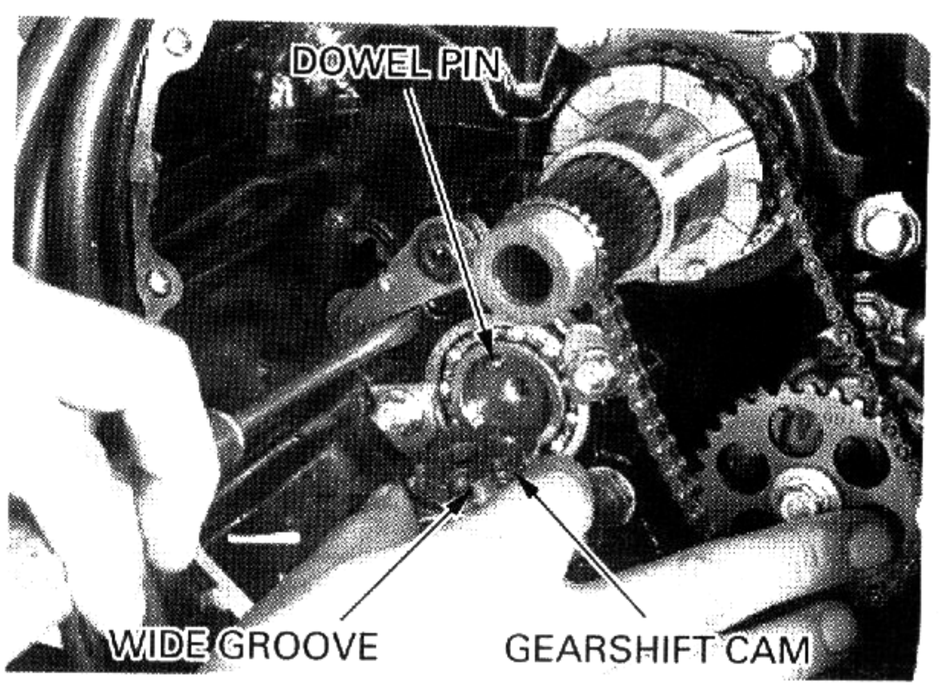


Tighten the stopper arm bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

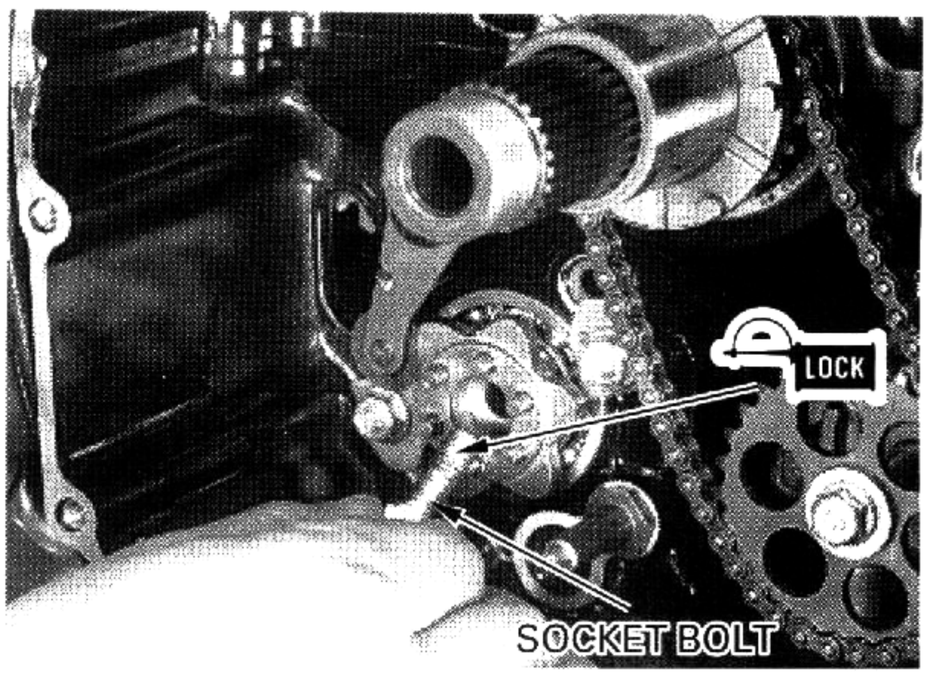
Install the dowel pin onto the shift drum.
Install the gearshift cam while holding the stopper arm using a screwdriver as shown.

Align the dowel pin on the shift drum center with the wide groove on the gearshift cam.

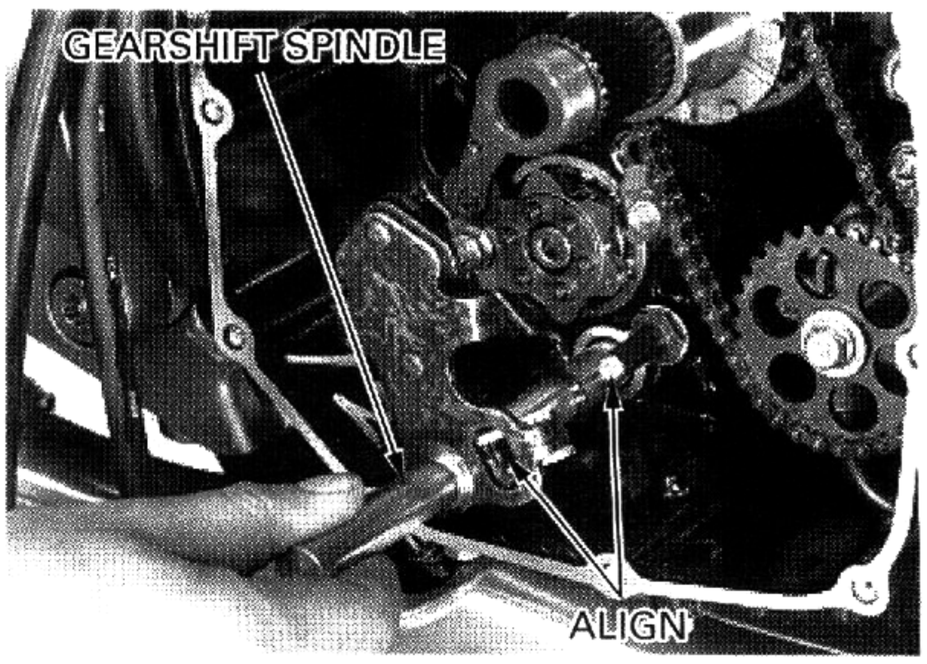


Apply a locking agent to the gearshift cam socket bolt threads.
Install and tighten the socket bolt to the specified torque.

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



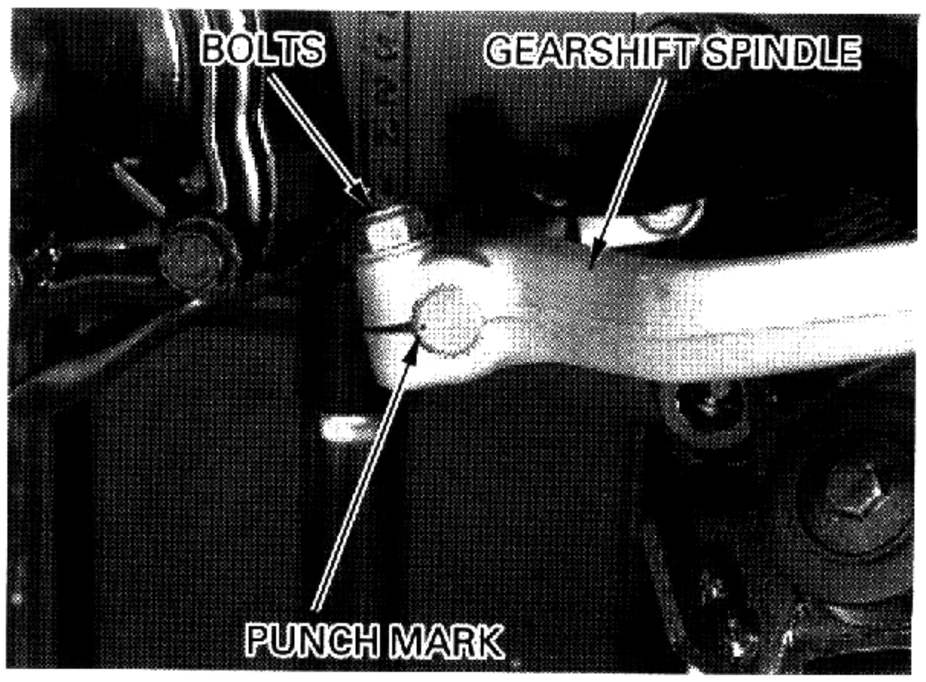
Install the thrust washer and gearshift spindle assembly into the crankcase while aligning the spring ends with the crankcase stopper pin.



Install the gearshift pedal aligning its slit with the punch mark on the gearshift spindle.
Install and tighten the pinch bolt to the specified torque.

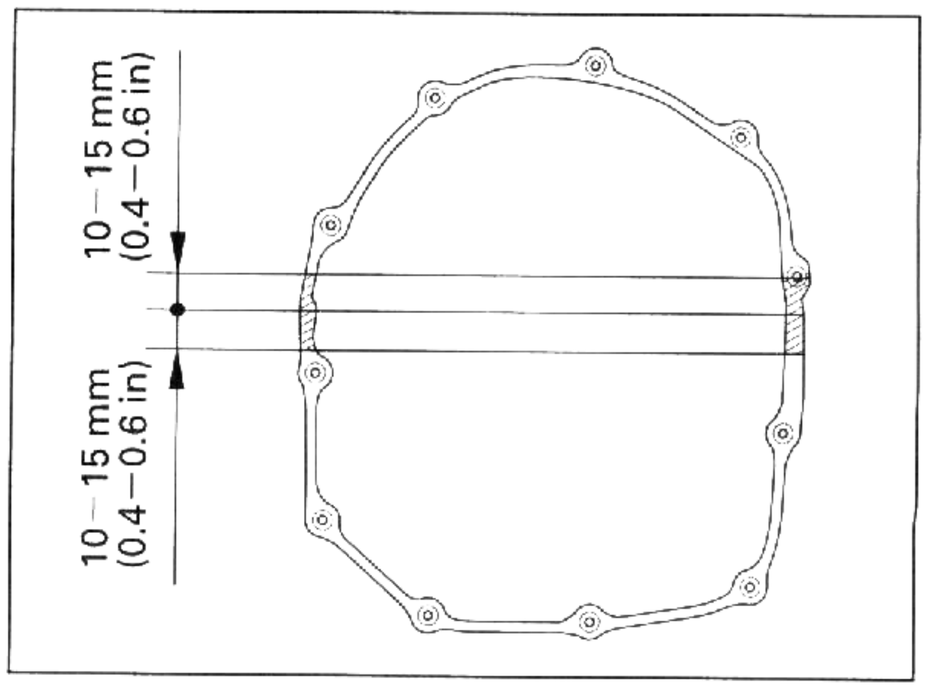
TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the clutch assembly (page 9-8).

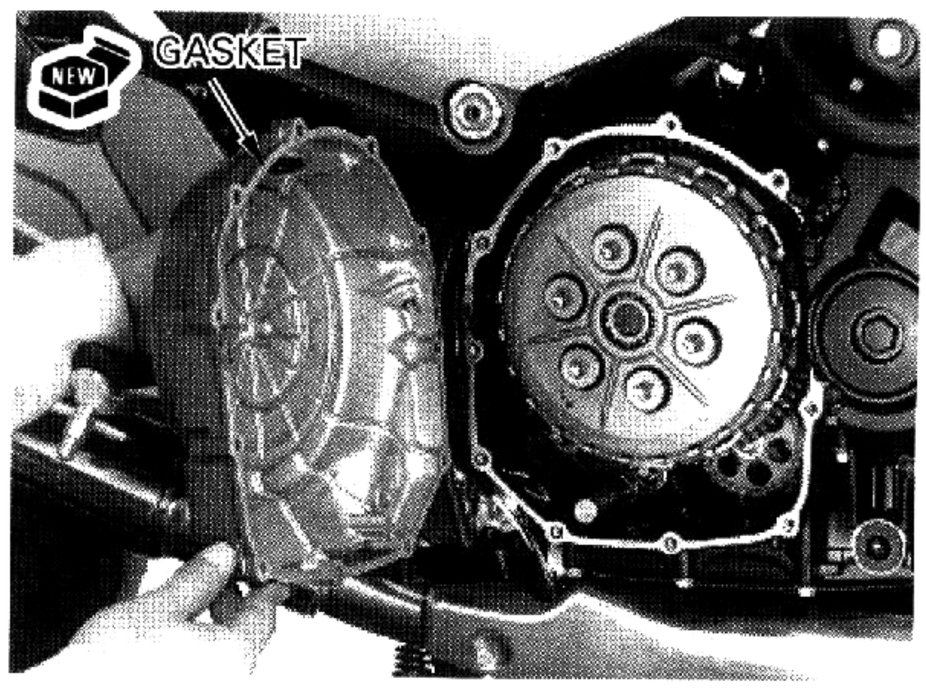


RIGHT CRANKCASE COVER INSTALLATION

Apply a sealant to the mating surfaces of the crankcase as shown.



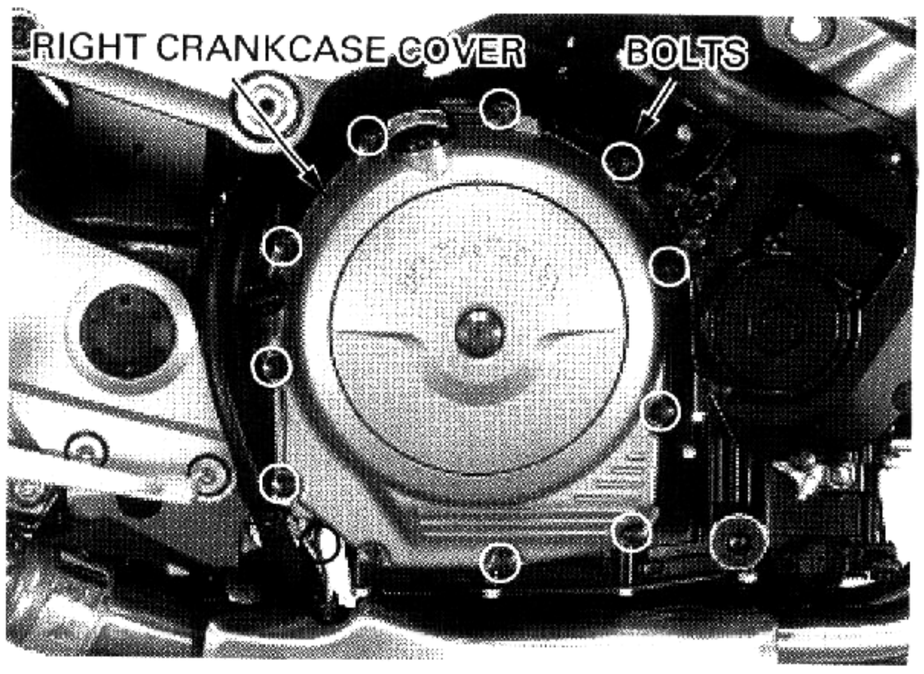
Install a new gasket onto the right crankcase cover.

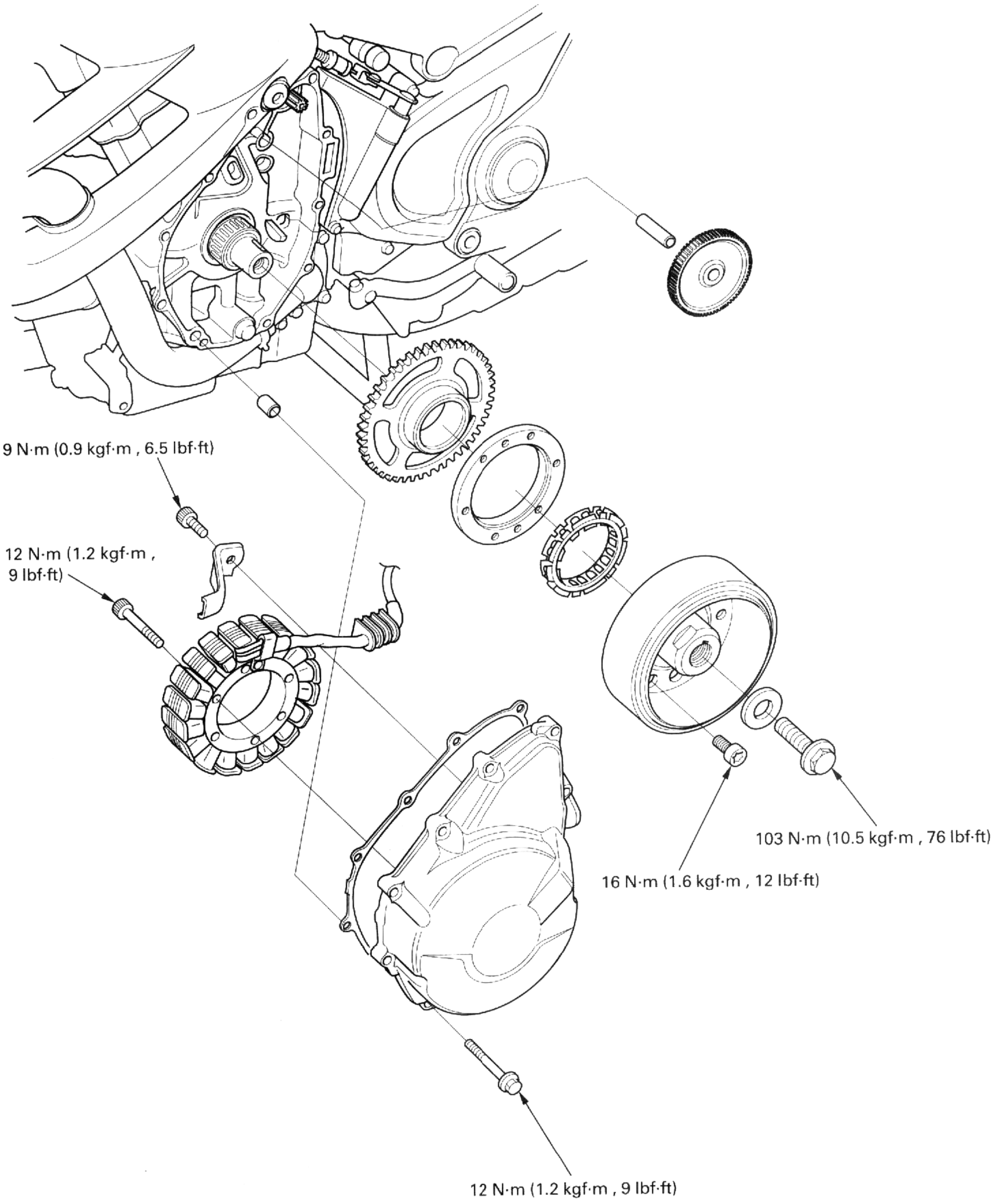


Install the right crankcase cover.
Install and tighten the right crankcase cover SH bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Pour the recommended engine oil (page 3-16).




9 N·m (0.9 kgf·m , 6.5 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
103 N·m (10.5 kgf·m , 76 lbf·ft)
16 N·m (1.6 kgf·m , 12 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)

10. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION	10-1	FLYWHEEL REMOVAL	10-3
TROUBLESHOOTING	10-1	STARTER CLUTCH	10-5
ALTERNATOR COVER REMOVAL	10-2	FLYWHEEL INSTALLATION	10-7
STATOR	10-2	ALTERNATOR COVER INSTALLATION	10-8

SERVICE INFORMATION

GENERAL

- This section covers service of the alternator, flywheel and starter clutch. All service can be done with the engine installed in the frame.
- Refer to section 16 for alternator stator inspection.

SPECIFICATIONS

Unit: mm (in)

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

TORQUE VALUES

Alternator cover SH bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Flywheel flange bolt	103 N·m (10.5 kgf·m , 76 lbf·ft)	Apply oil to the threads
Stator mounting socket bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Alternator wire holder socket bolt	9 N·m (0.9 kgf·m , 6.5 lbf·ft)	
Starter one-way clutch socket bolt	16 N·m (1.6 kgf·m , 12 lbf·ft)	Apply a locking agent to the threads

TOOLS

Flywheel holder	07725-0040000	Equivalent commercially available
Rotor puller	07733-0020001	or 07933-3950000

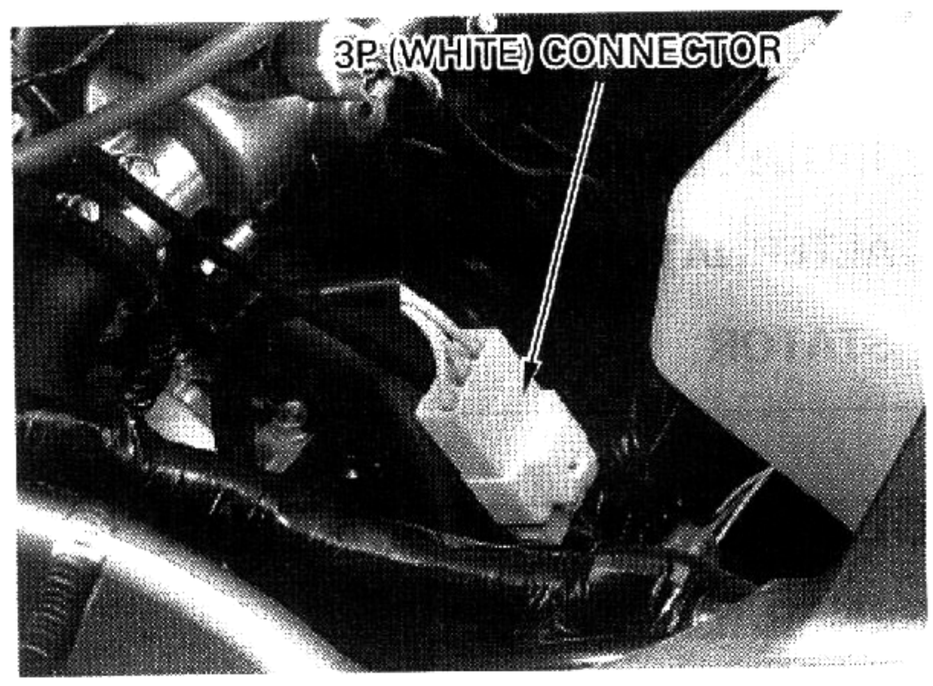
TROUBLESHOOTING

Engine does not turn
- Faulty starter clutch
- Damaged idle gear/shaft

ALTERNATOR COVER REMOVAL

Support the rear end of the fuel tank (page 2-11).

Disconnect the alternator 3P (White) connector.



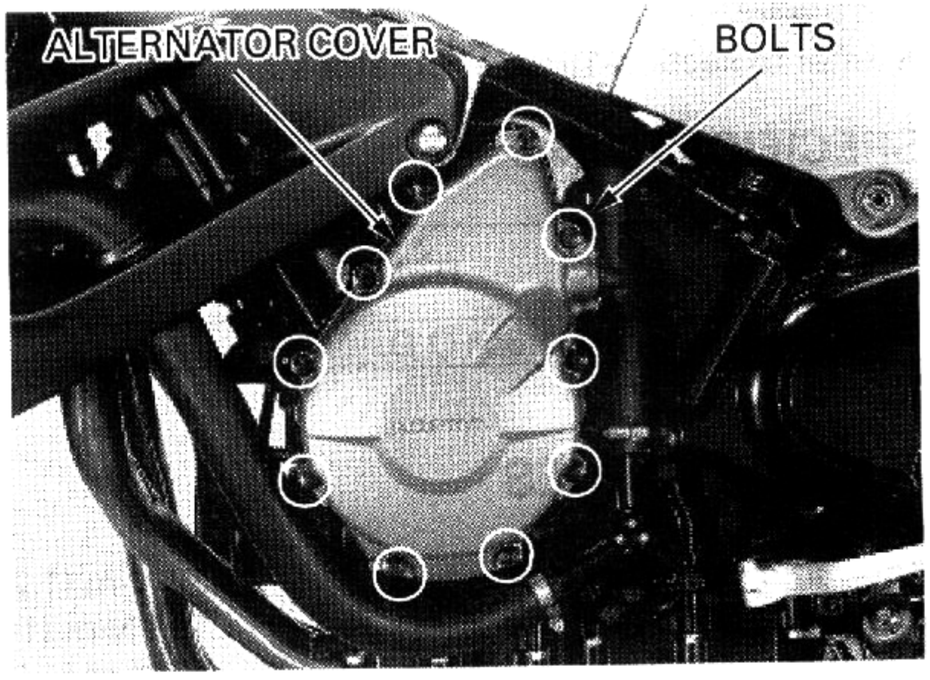
Remove the alternator cover SH bolts and alternator cover.

CAUTION:

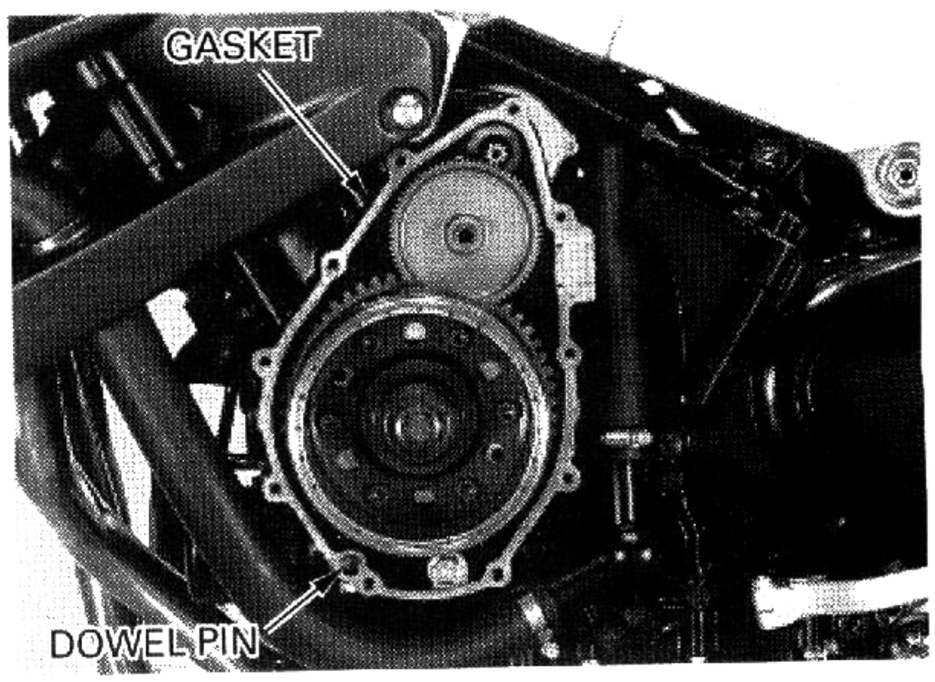
The alternator cover (stator) is magnetically attached to the flywheel, be careful during removal.

NOTE:

The engine oil will run out when the alternator cover is removed. Set a clean oil pan under the engine and add the recommended oil to the specified level after installation.



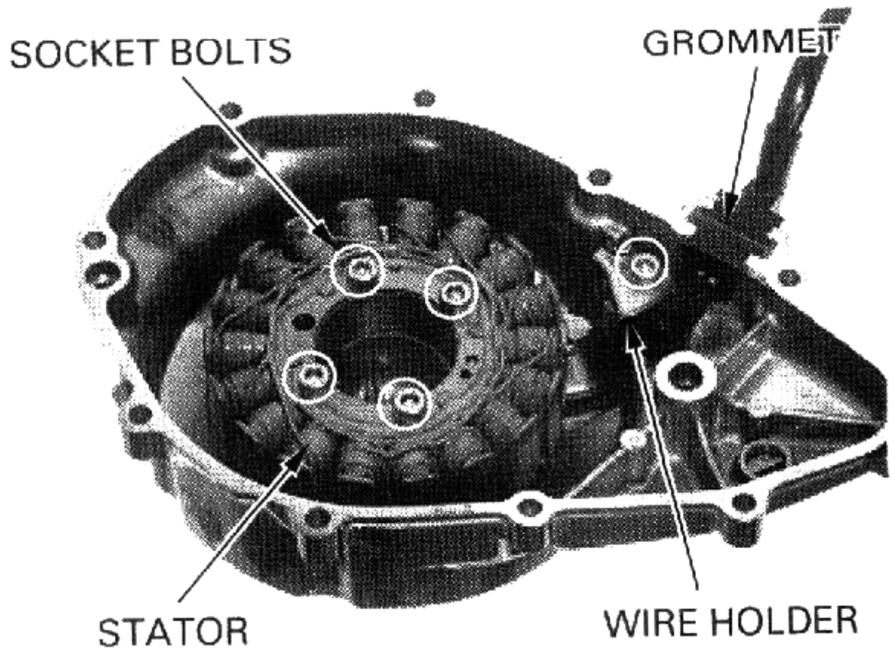
Remove the gasket and dowel pin.



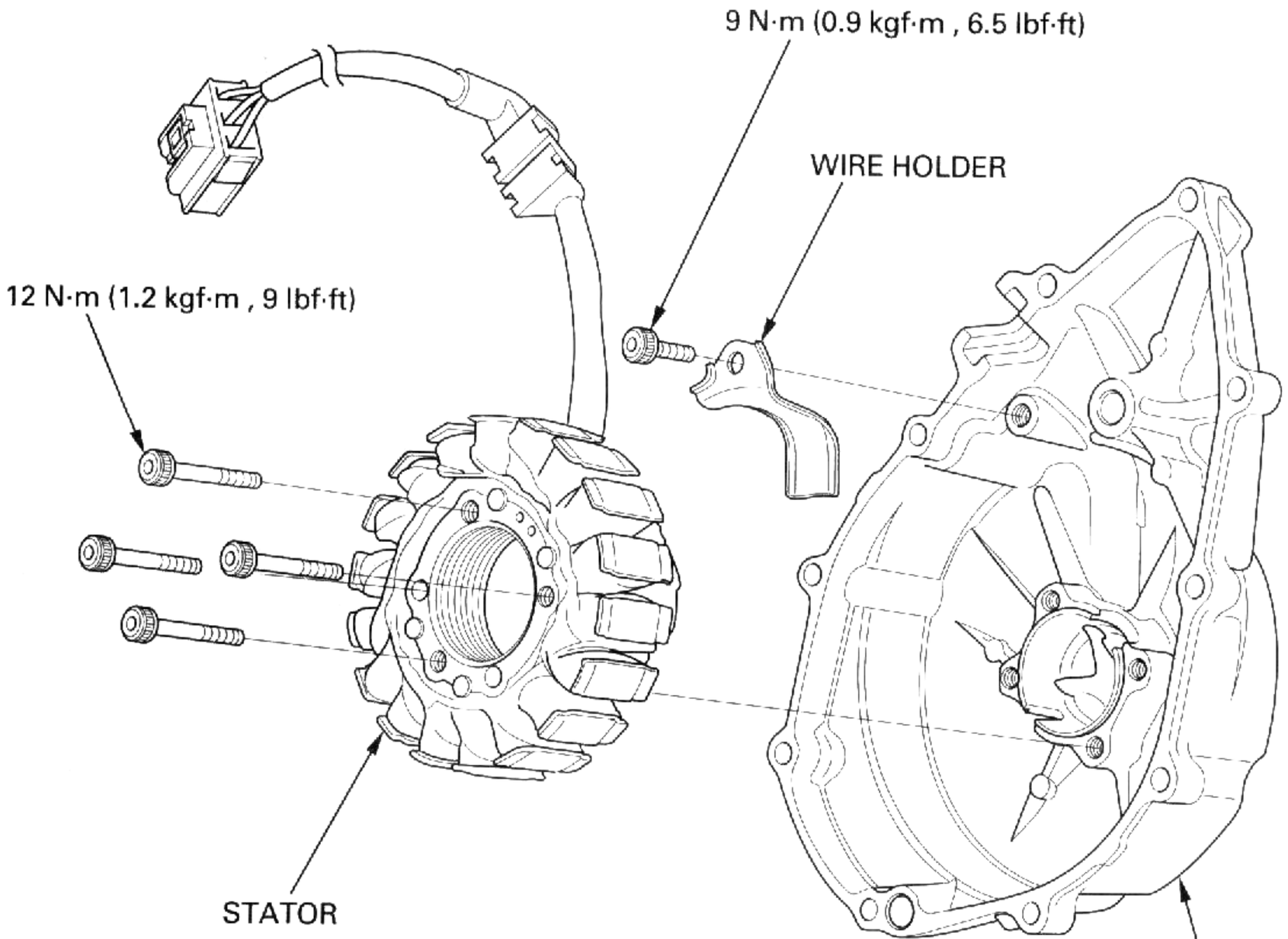
STATOR

REMOVAL

Remove the alternator wire grommet from the alternator cover.
Remove the socket bolt and stator wire holder.
Remove the socket bolts and stator.



INSTALLATION



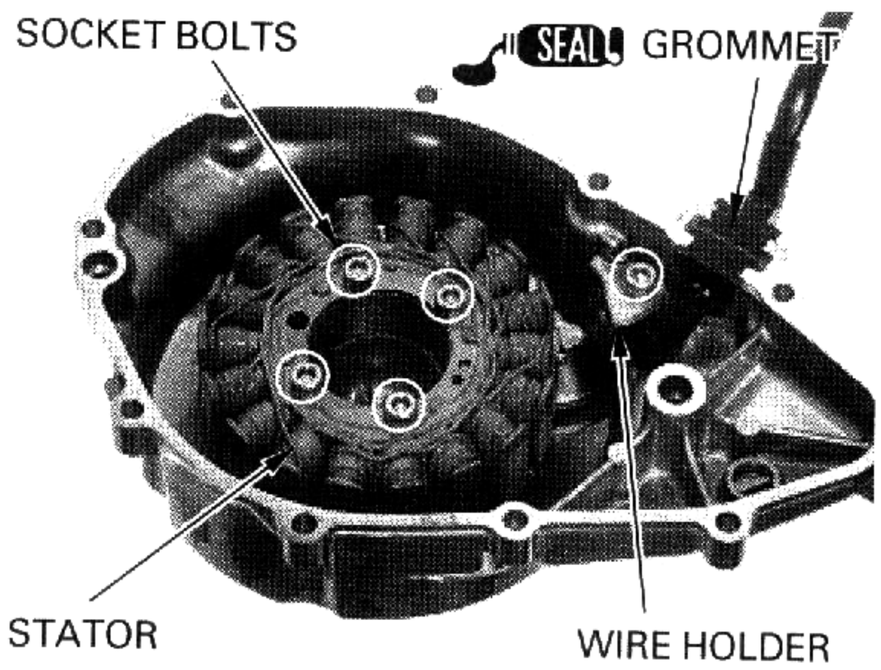
Install the stator into the alternator cover.

Apply sealant to the wire grommet, then install the wire grommet into the alternator groove securely. Install and tighten the socket bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the wire holder and tighten the socket bolt to the specified torque.

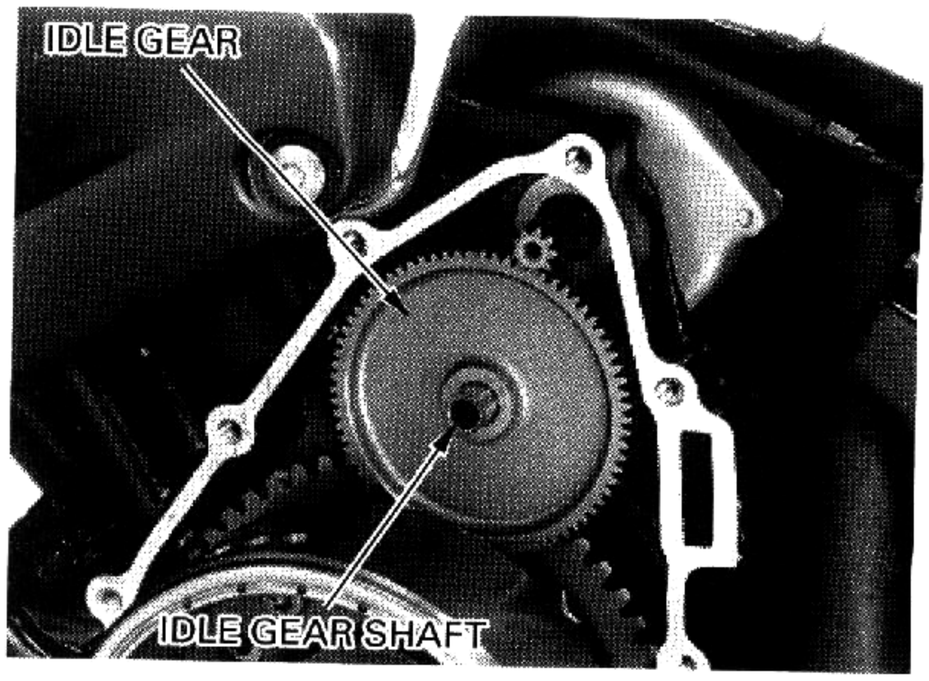
TORQUE: 9 N·m (0.9 kgf·m , 6.5 lbf·ft)



FLYWHEEL REMOVAL

Remove the alternator cover (page 10-2).

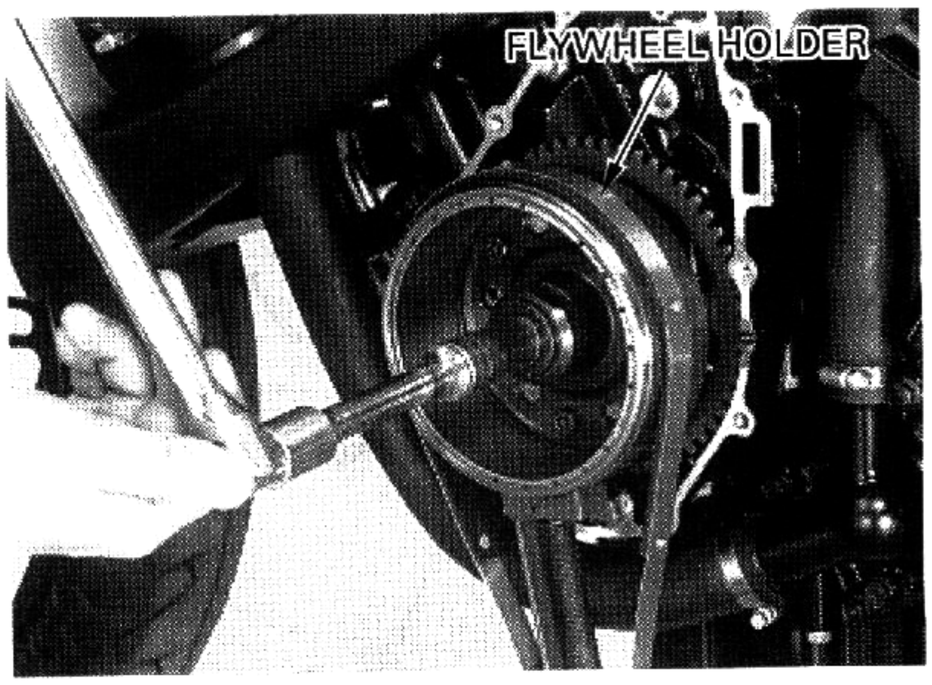
Remove the starter idle gear shaft and idle gear.



Hold the flywheel using the flywheel holder, then remove the flywheel bolt.

TOOL:

Flywheel holder	07725-0040000 (Equivalent commercially available)

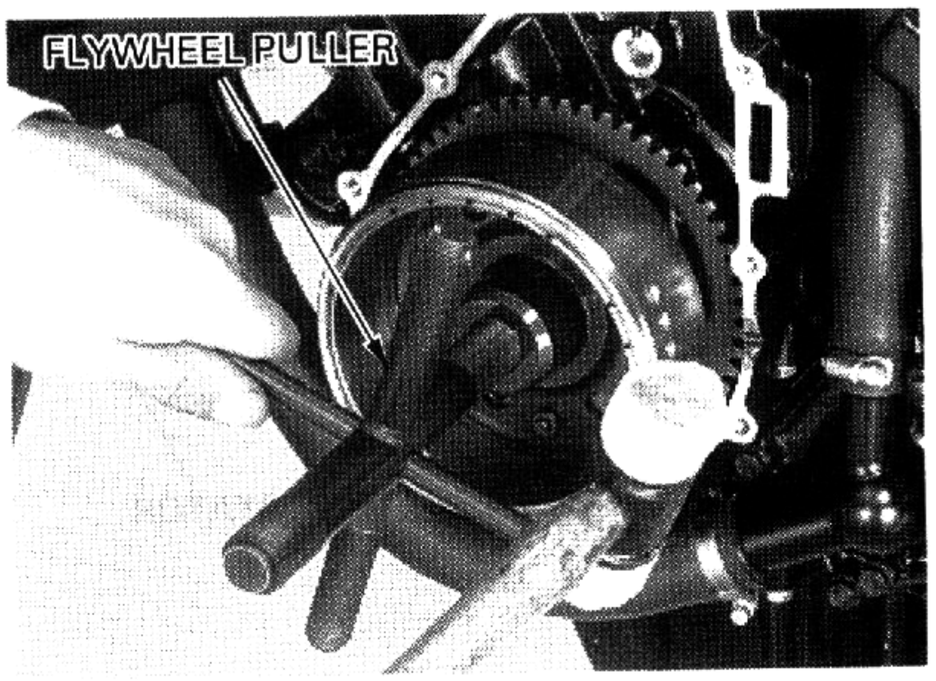


Remove the washer.

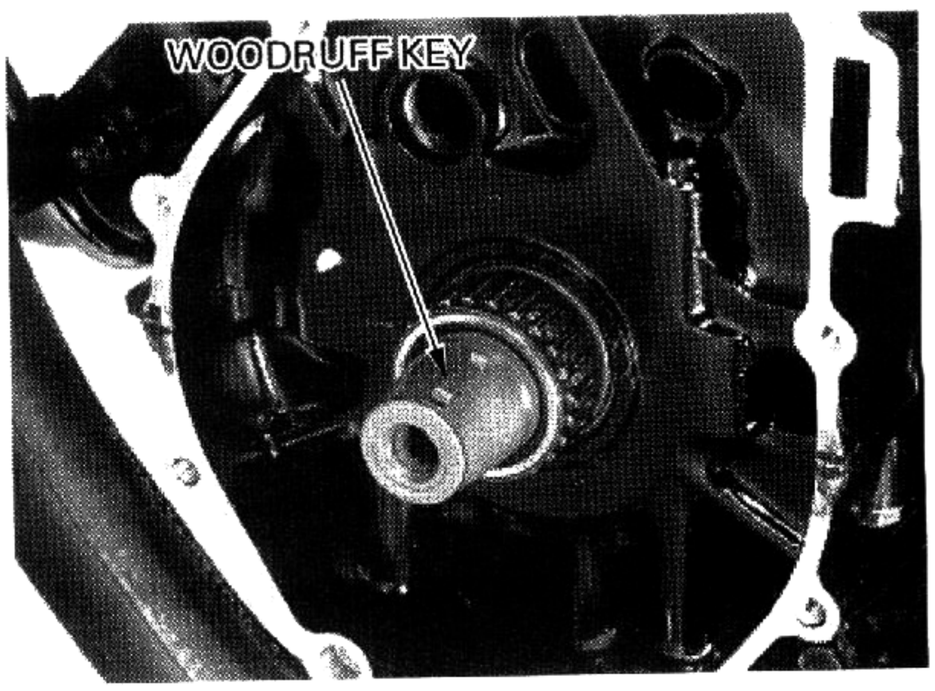
Remove the flywheel using the special tool.

TOOL:

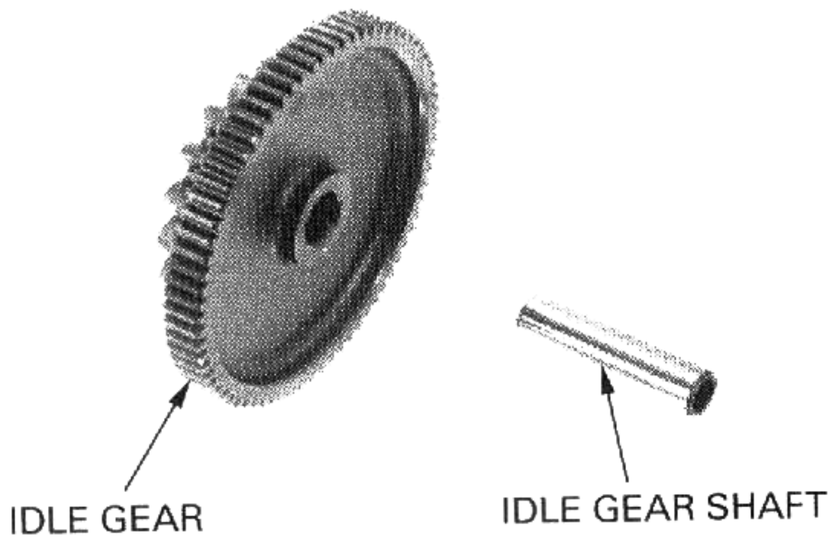
Rotor puller	07733-0020001 or 07933-3950000



Remove the woodruff key.



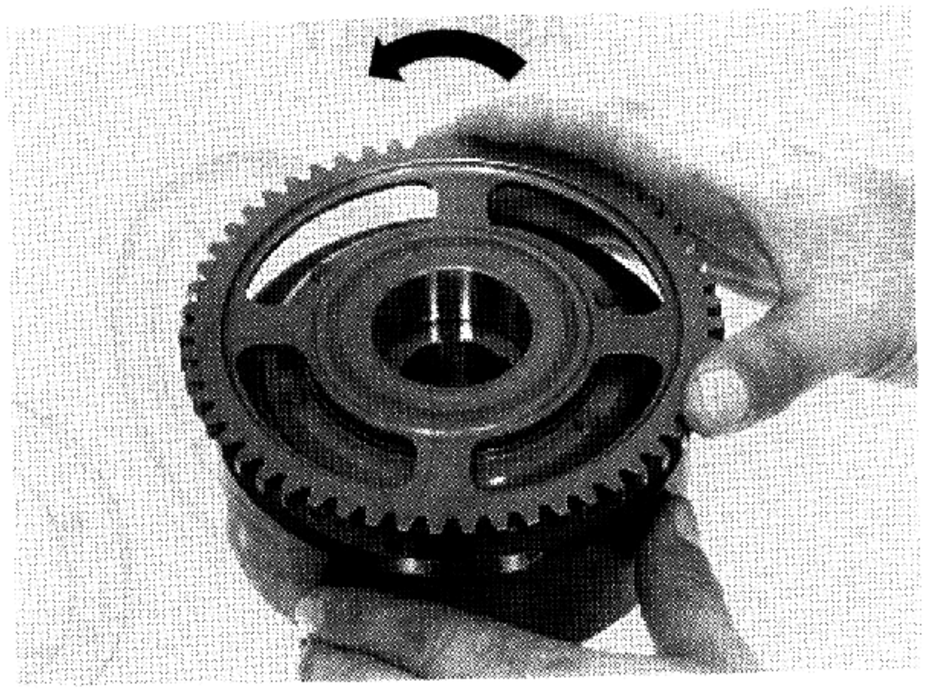
Check the starter idle gear and shaft for wear or damage.



STARTER CLUTCH

INSPECTION

Check the operation of the one-way clutch by turning the driven gear.
You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.

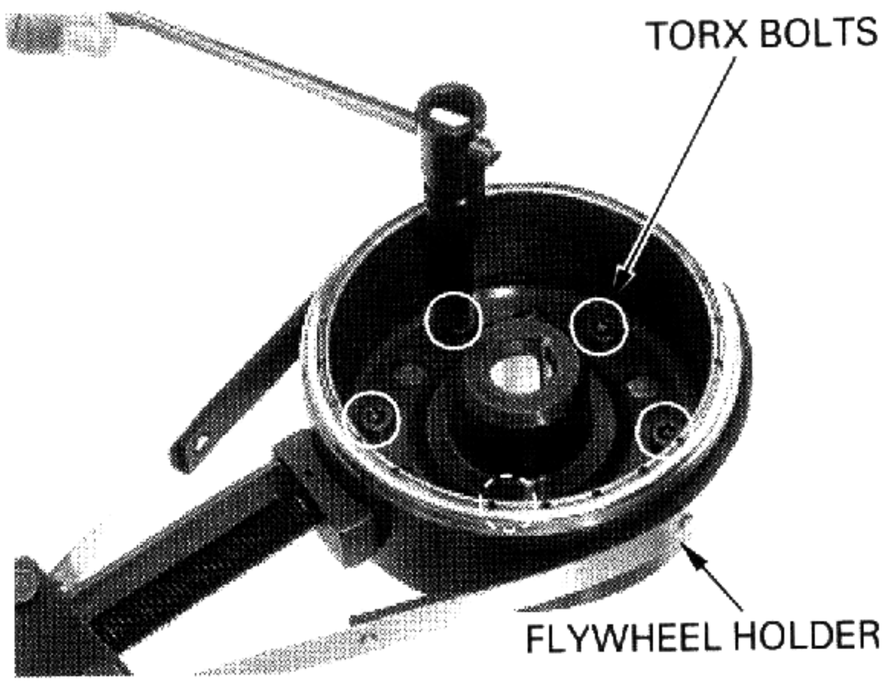


DISASSEMBLY

Remove the starter driven gear by turning it counterclockwise.

Hold the flywheel with a flywheel holder, and remove the starter clutch mounting torx bolts.

TOOL:
Flywheel holder 07725-0040000

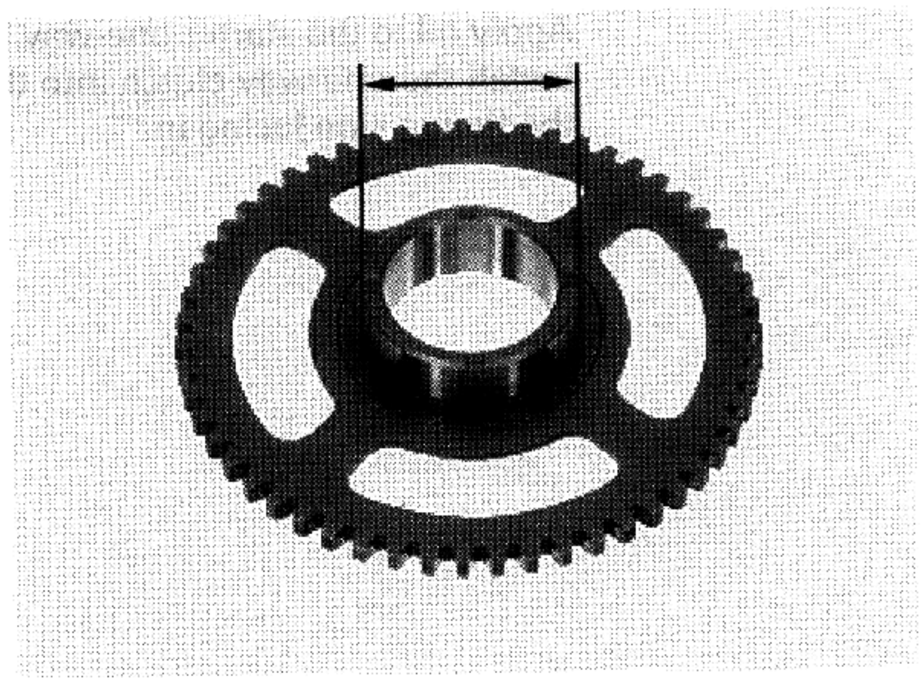


Remove the starter one-way clutch assembly.

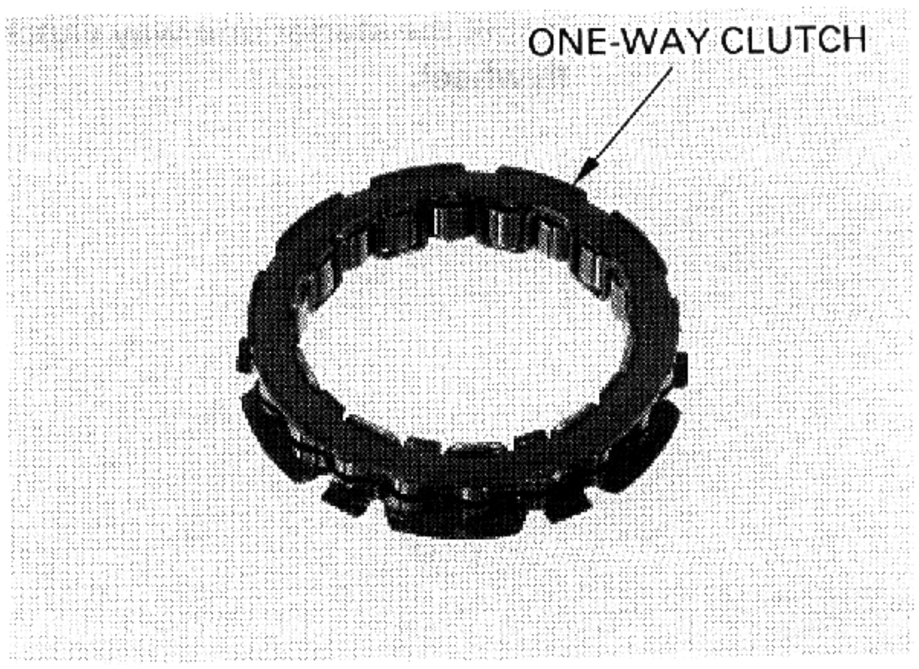
Check the starter driven gear for abnormal wear of damage.

Measure the starter driven gear boss O.D.

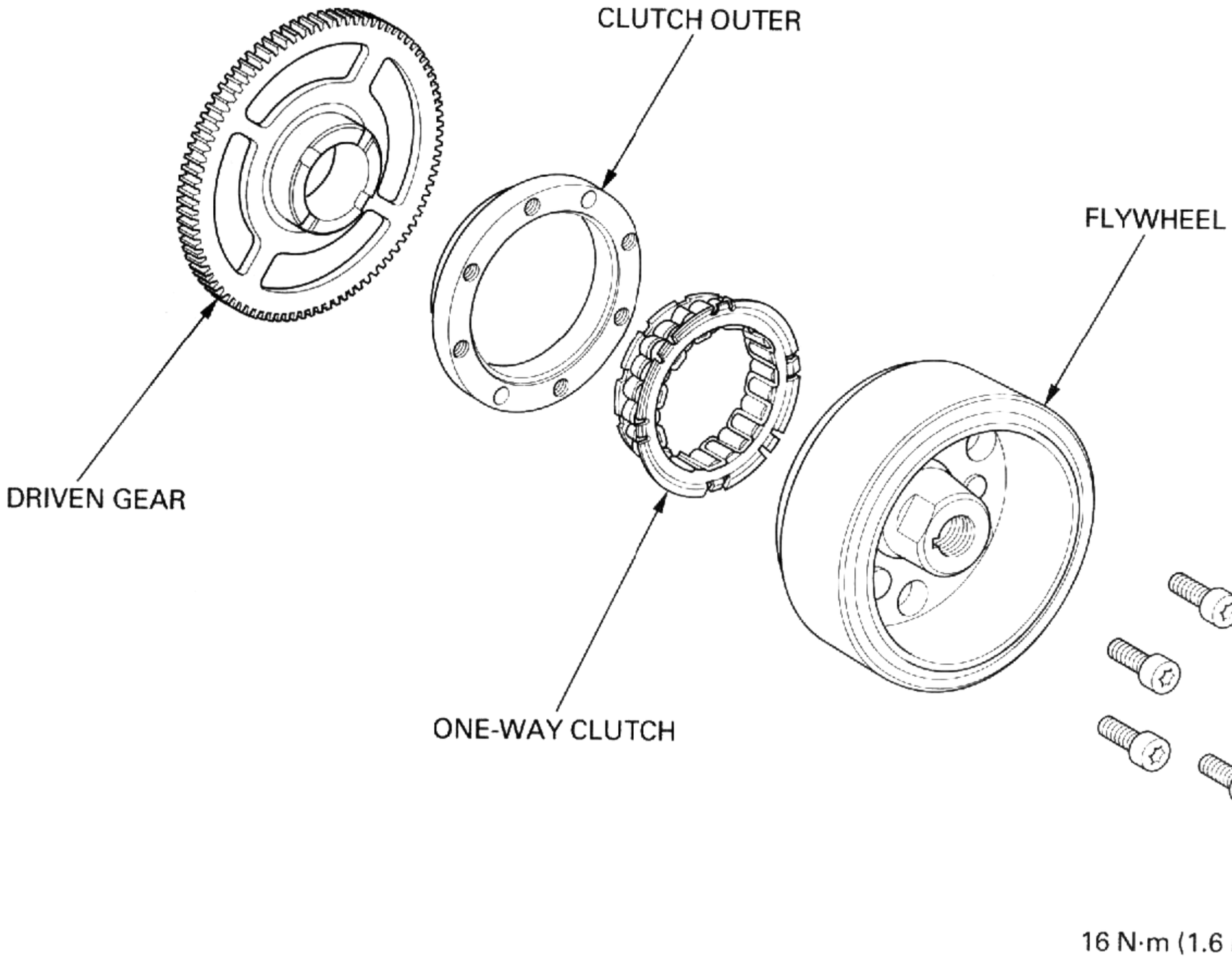
SERVICE LIMIT: 51.684 mm (2.0348 in)



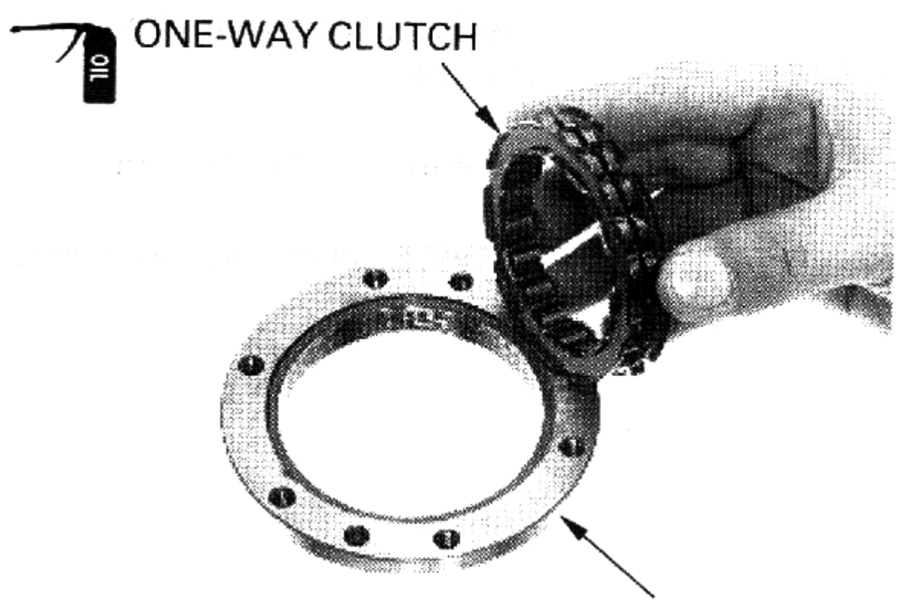
Check the one-way clutch for wear or damage and replace if necessary.



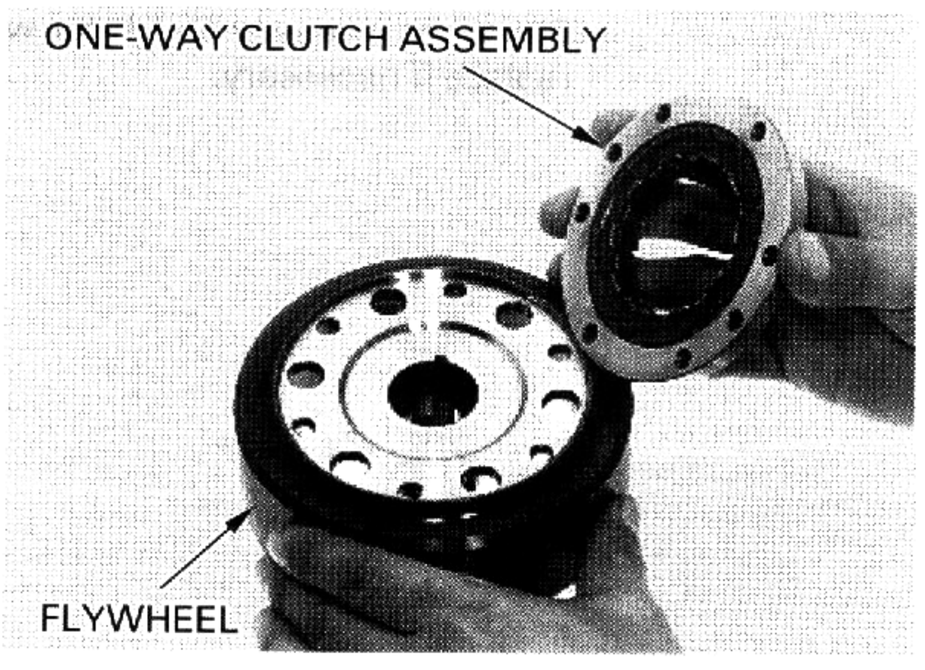
ASSEMBLY



Apply oil to the starter one-way clutch.
Install the one-way clutch into the clutch outer with the flange side facing in.



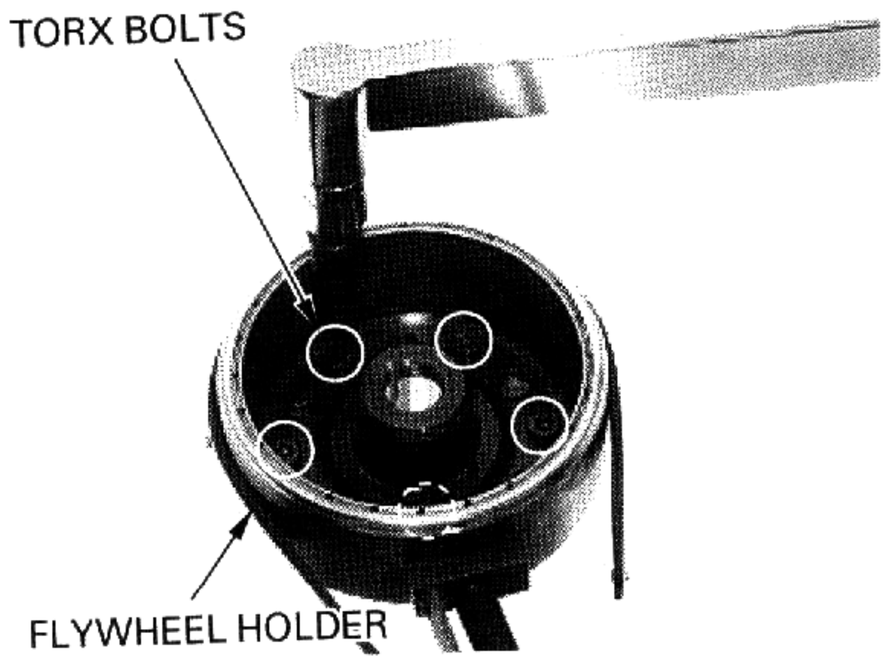
Install the starter one-way clutch assembly onto the flywheel.



Apply a locking agent to the starter clutch outer mounting bolt threads.
Hold the flywheel with a flywheel holder, and tighten the starter clutch mounting torx bolts.

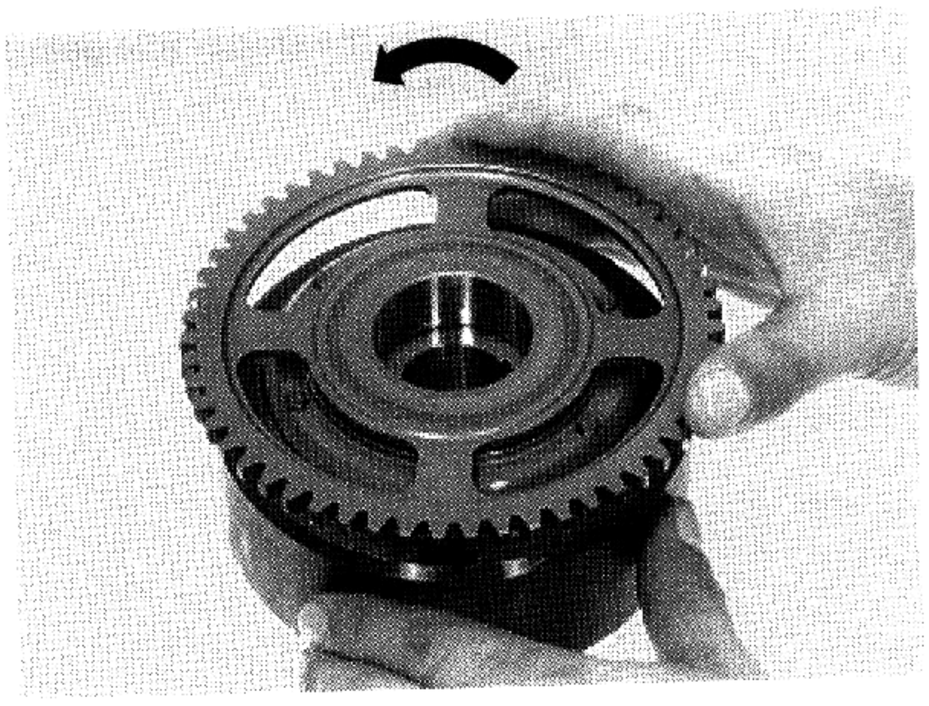
TOOL:
Flywheel holder 07725-0040000 (Equivalent commercially available)

TORQUE: 16 N·m (1.6 kgf·m , 12 lbf·ft)



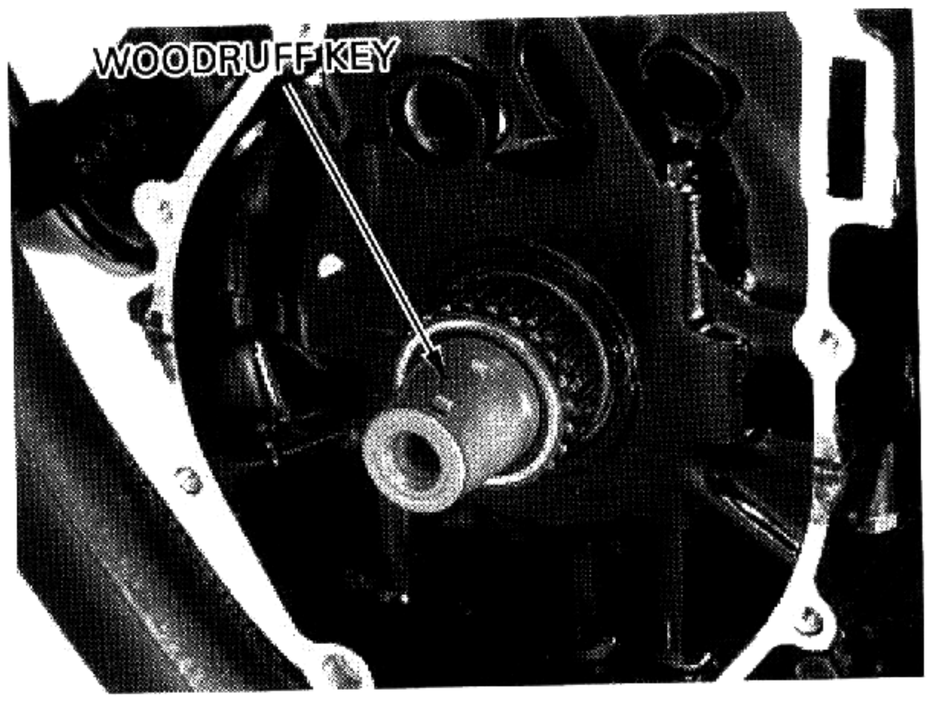
Install the starter driven gear into the one-way clutch.

Recheck the one-way clutch operation.
You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.



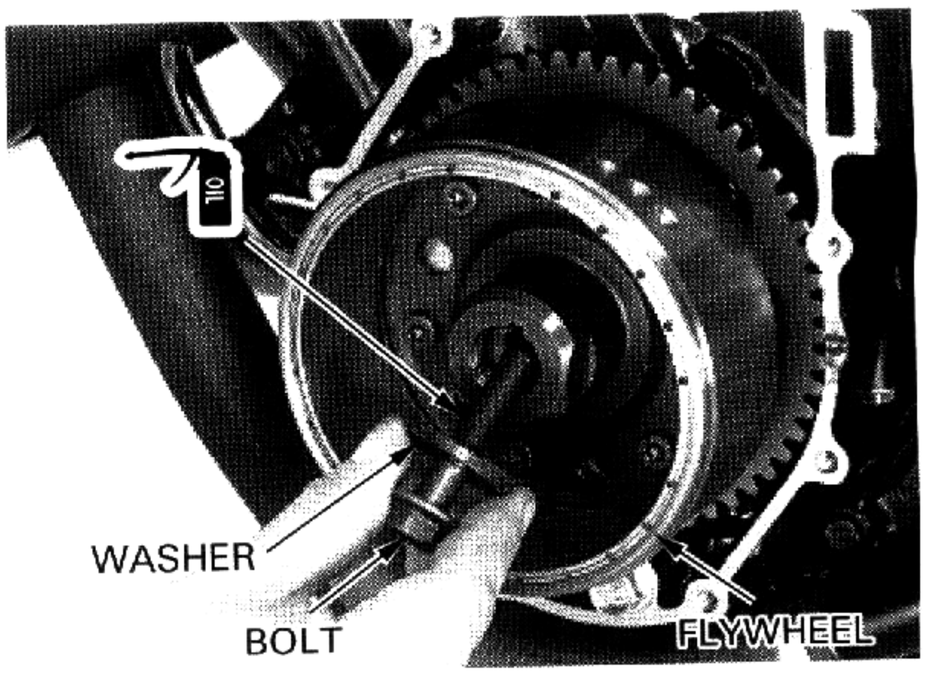
FLYWHEEL INSTALLATION

Clean any oil from the crankshaft taper.
Install the woodruff key on the crankshaft.



Install the flywheel aligning the key way in the flywheel with the woodruff key on the crankshaft.

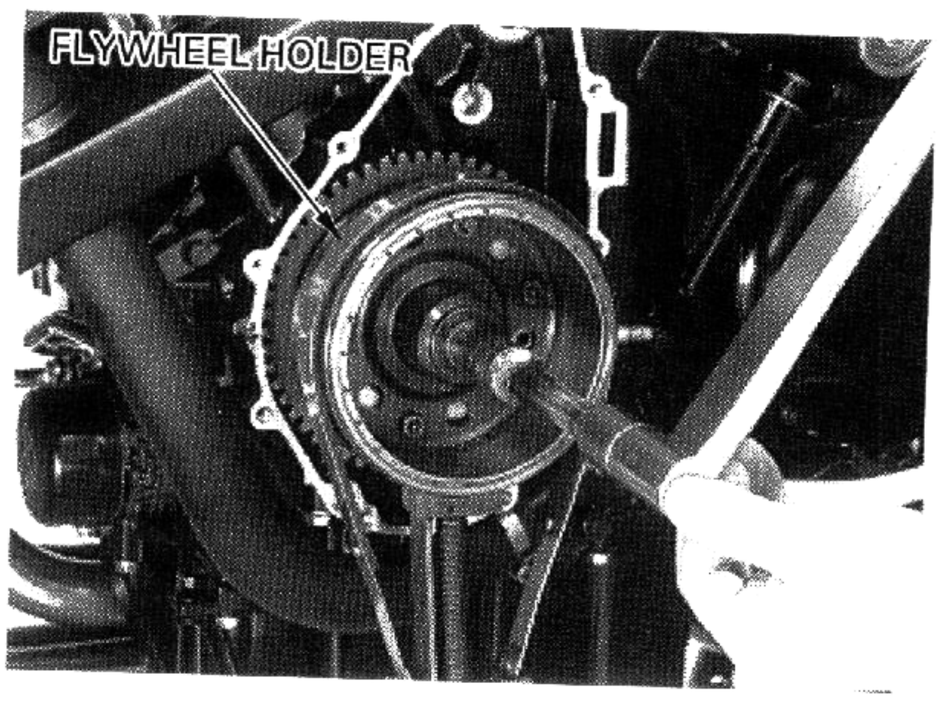
Apply oil to the flywheel bolt threads and seating surface.
Install the washer and flywheel bolt.



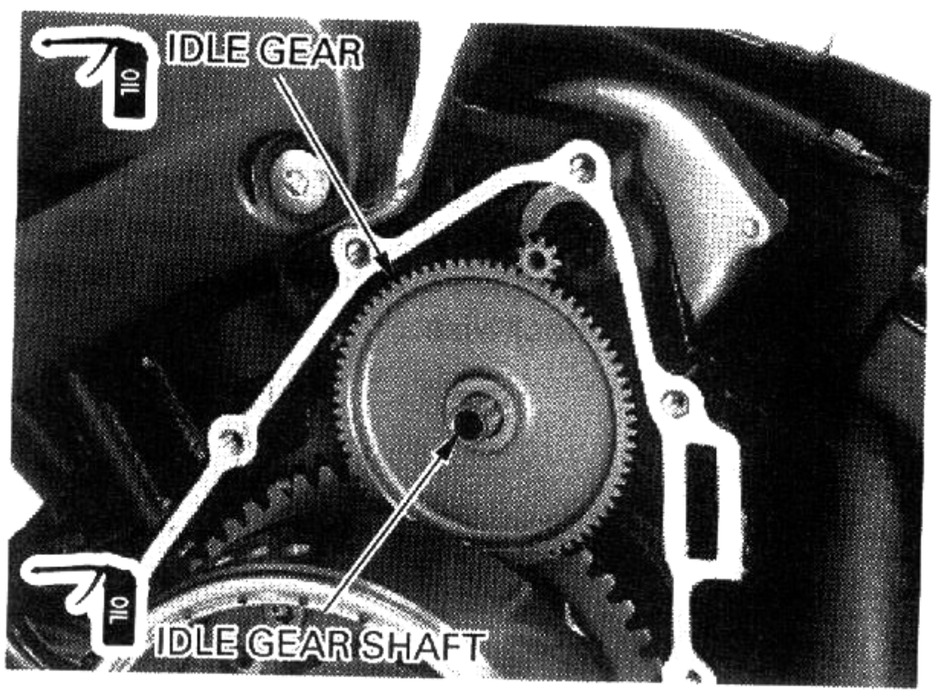
Hold the flywheel using the flywheel holder, then tighten the bolt to the specified torque.

TOOL:
Flywheel holder 07725-0040000 (Equivalent commercially available)

TORQUE: 103 N·m (10.5 kgf·m , 76 lbf·ft)

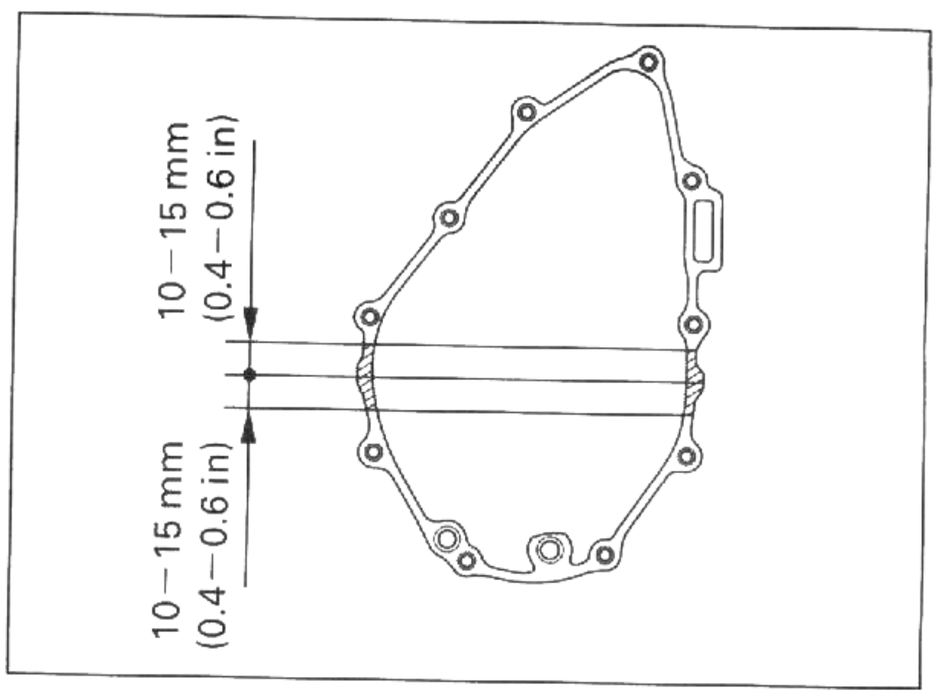


Apply oil to the starter idle gear and gear shaft, and install them.

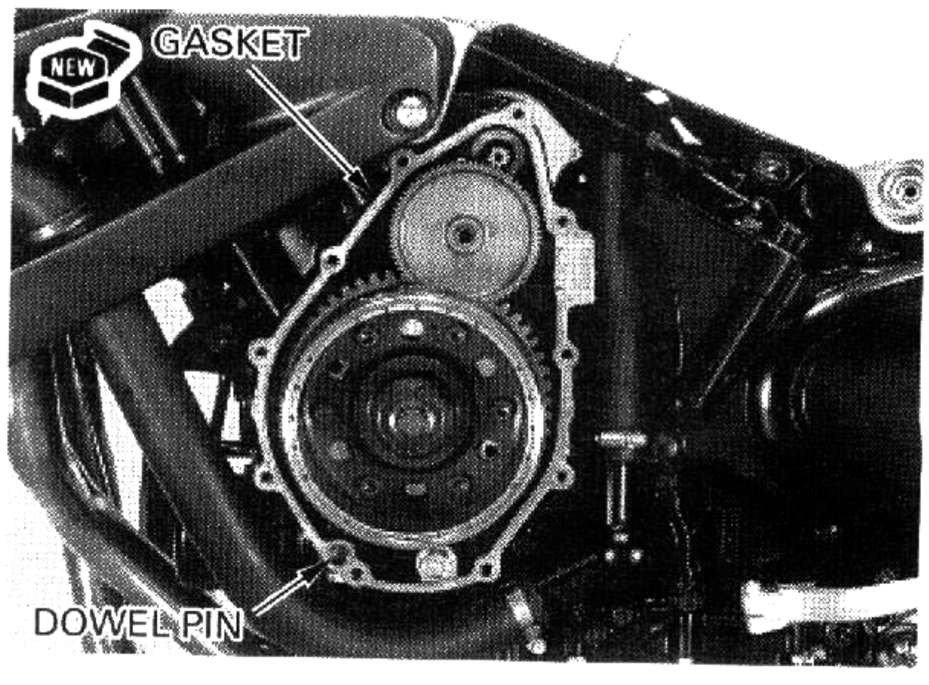


ALTERNATOR COVER INSTALLATION

Apply sealant to the mating surface of the crankcase as shown.



Install the dowel pin and new gasket.



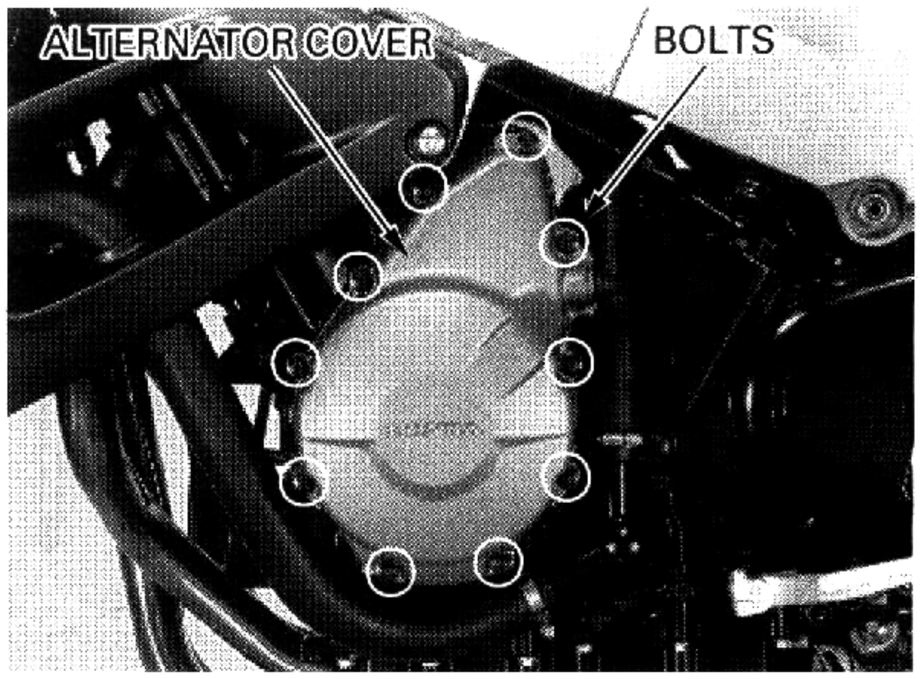
Install the alternator cover.

CAUTION:

The alternator cover (stator) is magnetically attached to the flywheel, be careful during installation.

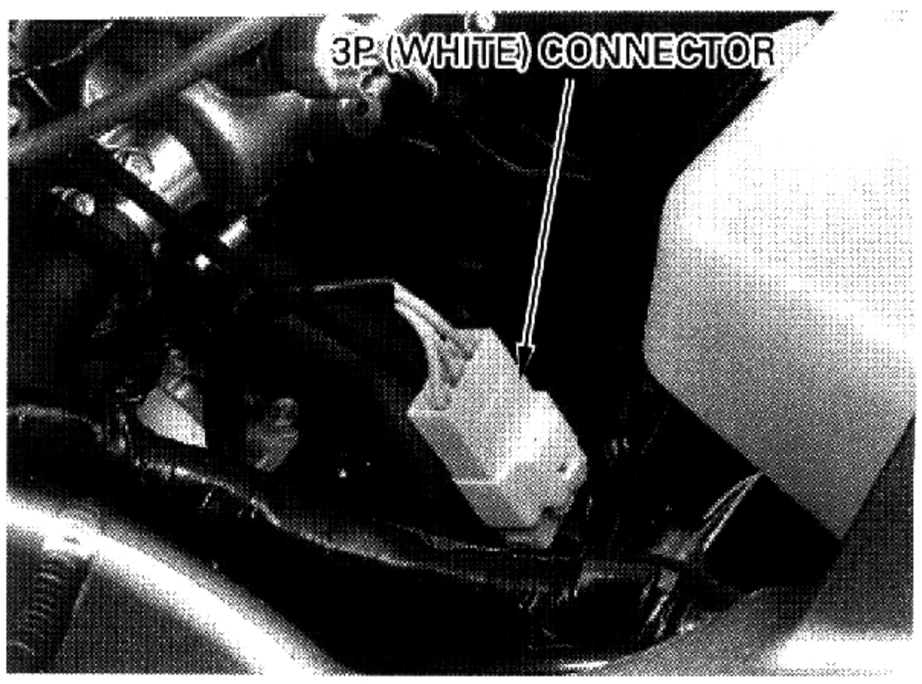
Install and tighten the SH bolts to the specified torque.

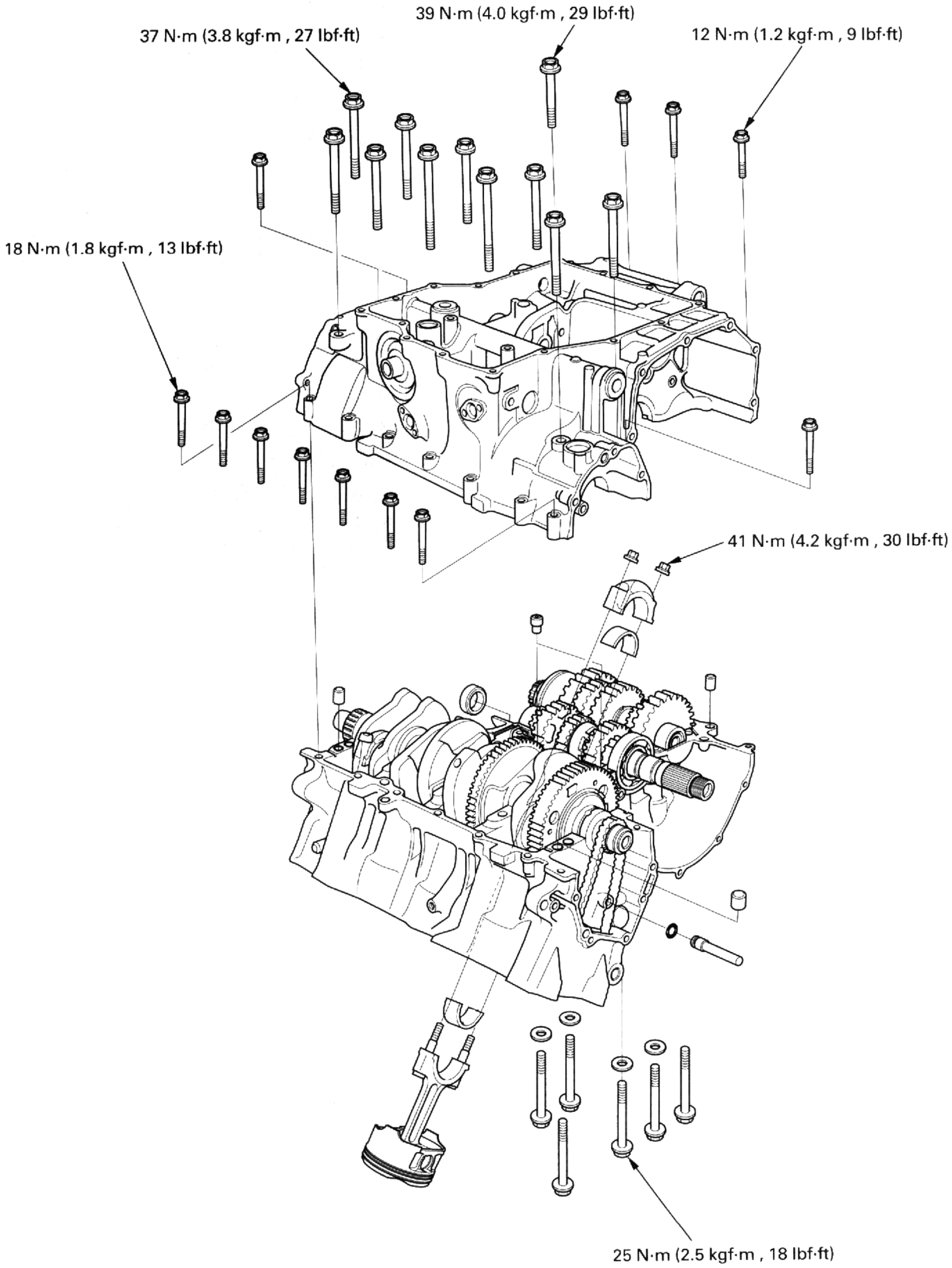
TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



Connect the alternator 3P (White) connector.

Remove the fuel tank support tool, then tighten the fuel tank mounting bolts (page 2-15).




39 N·m (4.0 kgf·m , 29 lbf·ft)
37 N·m (3.8 kgf·m , 27 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
18 N·m (1.8 kgf·m , 13 lbf·ft)
41 N·m (4.2 kgf·m , 30 lbf·ft)
25 N·m (2.5 kgf·m , 18 lbf·ft)

11. CRANKCASE/PISTON/CYLINDER

SERVICE INFORMATION	11-1	PISTON/CONNECTING ROD	11-4
TROUBLESHOOTING	11-2	CRANKCASE COMBINATION	11-12
CRANKCASE SEPARATION	11-3		

SERVICE INFORMATION

GENERAL

- This section covers crankcase separation for service of the crankshaft and piston.
- The following parts must be removed before separating the crankcase.
  - Alternator/flywheel (Section 10)
  - Clutch/gearshift linkage (Section 9)
  - Cylinder head (Section 8)
  - Engine (Section 6)
  - Oil pump (Section 4)
- Mark and store the disassemble parts to ensure that they are installed in their original locations.
- Mark and store the bearing inserts to be sure of their correct locations for reassembly. If the inserts are improperly installed, they will block the oil hole, causing insufficient lubrication and eventual engine seizure.
- The connecting rod bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After installing new bearings, recheck them with plastigauge to verify clearance. Apply molybdenum disulfide oil to the crank pin during assembly.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		79.000 – 79.015 (3.1102 – 3.1108)	79.10 (3.114)
	Out of round		—	0.10 (0.004)
	Taper		—	0.10 (0.004)
	Warpage		—	0.05 (0.002)
Piston, piston rings	Piston mark direction		"IN" mark facing toward the intake side	—
	Piston O.D.		78.970 – 78.990 (3.1090 – 3.1098)	78.90 (3.106)
	Piston O.D. measurement point		15 mm (0.6 in) from bottom of skirt	—
	Piston pin bore I.D.		19.002 – 19.008 (0.7481 – 0.7483)	19.03 (0.749)
	Piston pin O.D.		18.994 – 19.000 (0.7478 – 0.7480)	18.984 (0.7474)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	—
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.08 (0.003)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.06 (0.002)
	Piston ring end gap	Top	0.20 – 0.35 (0.008 – 0.014)	0.5 (0.02)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.7 (0.03)
		Oil (side rail)	0.2 – 0.8 (0.01 – 0.03)	1.0 (0.04)
Cylinder-to-piston clearance			0.010 – 0.045 (0.0004 – 0.0018)	—
Connecting rod small end I.D.			19.030 – 19.051 (0.7492 – 0.7500)	19.061 (0.7504)
Connecting rod-to-piston pin clearance			0.030 – 0.057 (0.0012 – 0.0022)	—
Crankpin oil clearance			0.030 – 0.052 (0.0012 – 0.0020)	0.062 (0.0024)

TORQUE VALUES

Crankcase bolt, 10 mm	39 N·m (4.0 kgf·m , 29 lbf·ft)	
9 mm	37 N·m (3.8 kgf·m , 27 lbf·ft)	Apply oil to the threads
8 mm	25 N·m (2.5 kgf·m , 18 lbf·ft)	
7 mm	18 N·m (1.8 kgf·m , 13 lbf·ft)	
6 mm	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Connecting rod nut	41 N·m (4.2 kgf·m , 30 lbf·ft)	Apply oil to the threads
Lower crankcase flange bolt	29 N·m (3.0 kgf·m , 22 lbf·ft)	Apply a locking agent to the threads
Lower crankcase sealing bolt, 20 mm	29 N·m (3.0 kgf·m , 22 lbf·ft)	Apply a locking agent to the threads
8 mm	22 N·m (2.2 kgf·m , 16 lbf·ft)	Apply a locking agent to the threads

TROUBLESHOOTING

Cylinder compression is too low, or engine is hard to start
- Blown cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder or piston
- Bent valve, or bent and deteriorated valve seat

Cylinder compression is too high, or engine overheats or knocks
- Carbon deposites on the cylinder head and/or piston crown

Piston sounds
- Worn cylinder, piston and/or piston ring
- Worn piston pin hole and piston pin
- Worn connecting rod small end

Excessive smoke
- Worn, stuck or broken piston ring
- Worn valve stem seal

Excessive noise
- Worn connecting rod big end bearing
- Bent connecting rod
- Worn crankshaft main journal bearing
- Worn transmission bearing

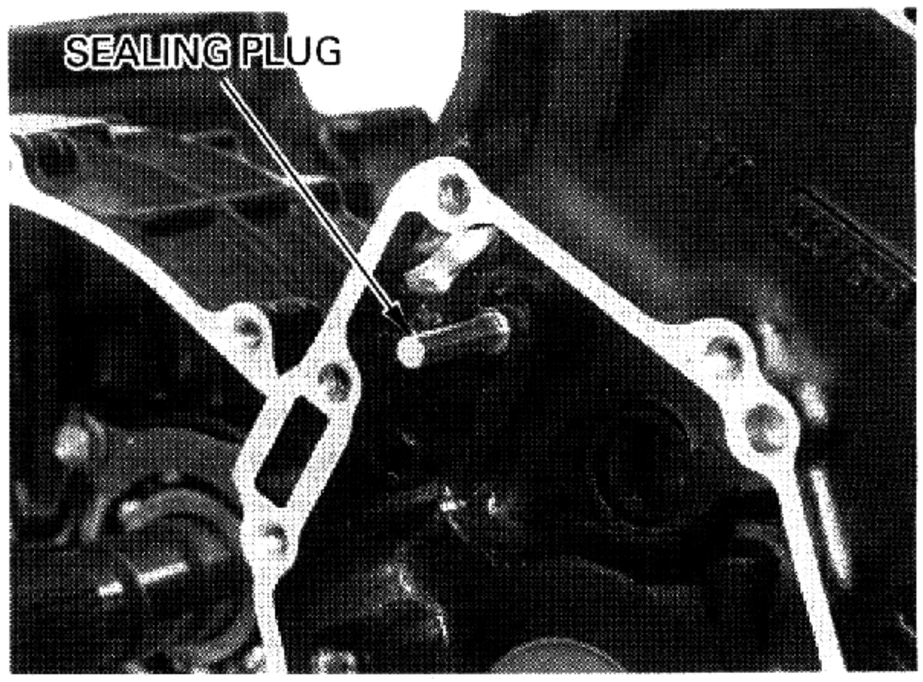
Engine vibration
- Excessive crankshaft runout

CRANKCASE SEPARATION

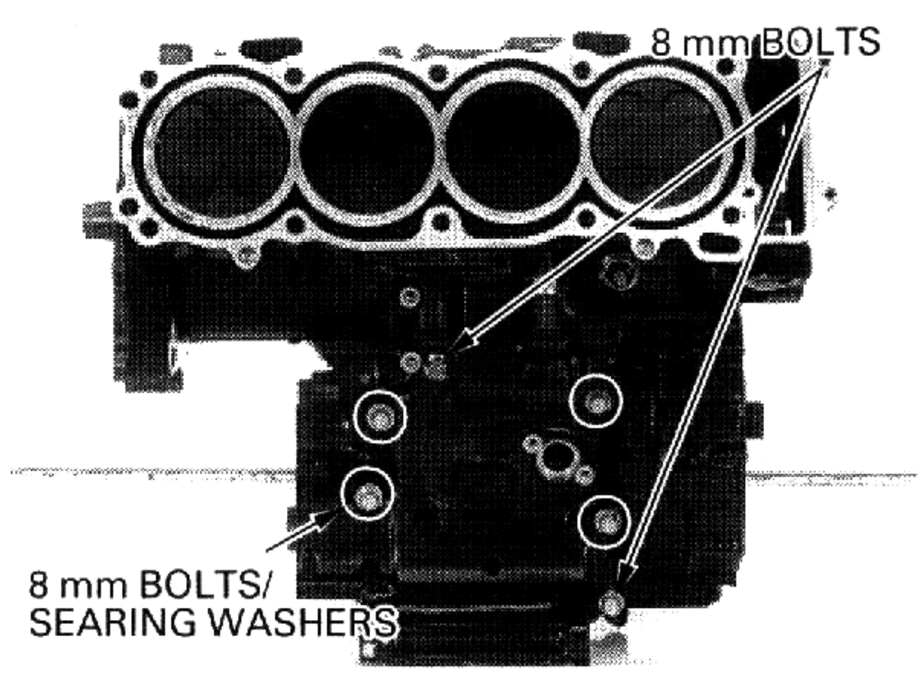
NOTE:

Refer to Service Information (page 11-1) for removal of necessary parts before separating the crankcase.

Remove the sealing plug and O-ring.

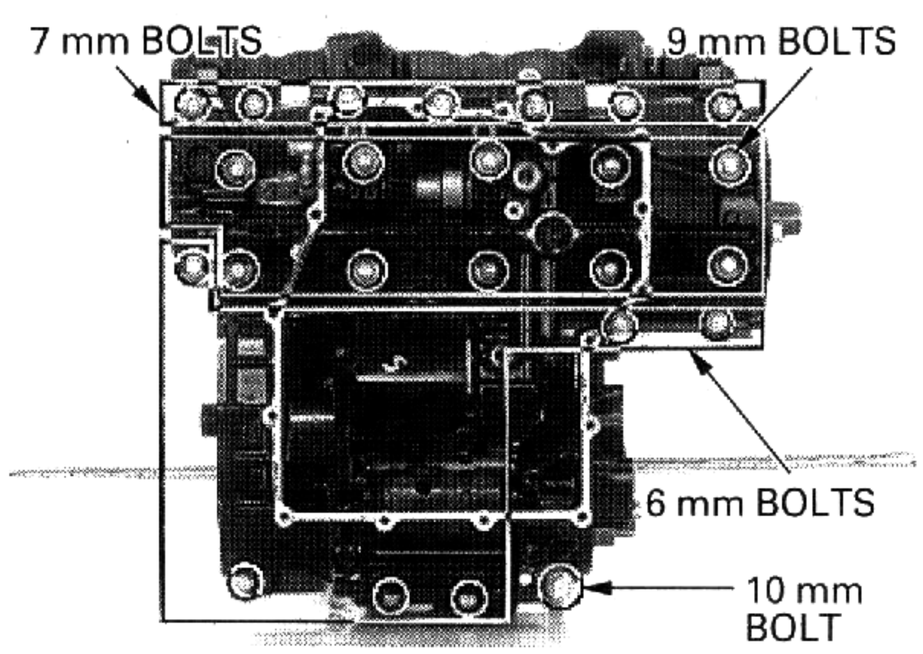


Remove the upper crankcase 8 mm bolts/sealing washers.

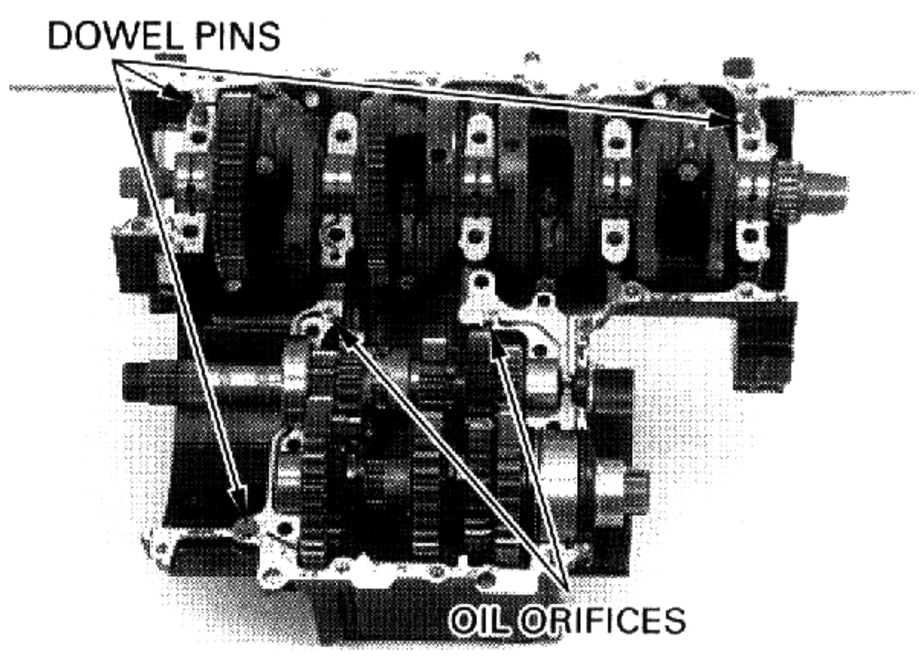


Remove the lower crankcase 6 mm bolts (six), 7 mm bolts (seven) and 10 mm bolt.
Loosen the ten lower crankcase 9 mm bolts in a crisscross pattern in 2—3 steps, then remove the bolts and sealing washers.

Separate the lower crankcase from the upper crankcase.



Remove the dowel pins and oil orifices.



PISTON/CONNECTING ROD

PISTON/CONNECTING ROD REMOVAL

CAUTION:

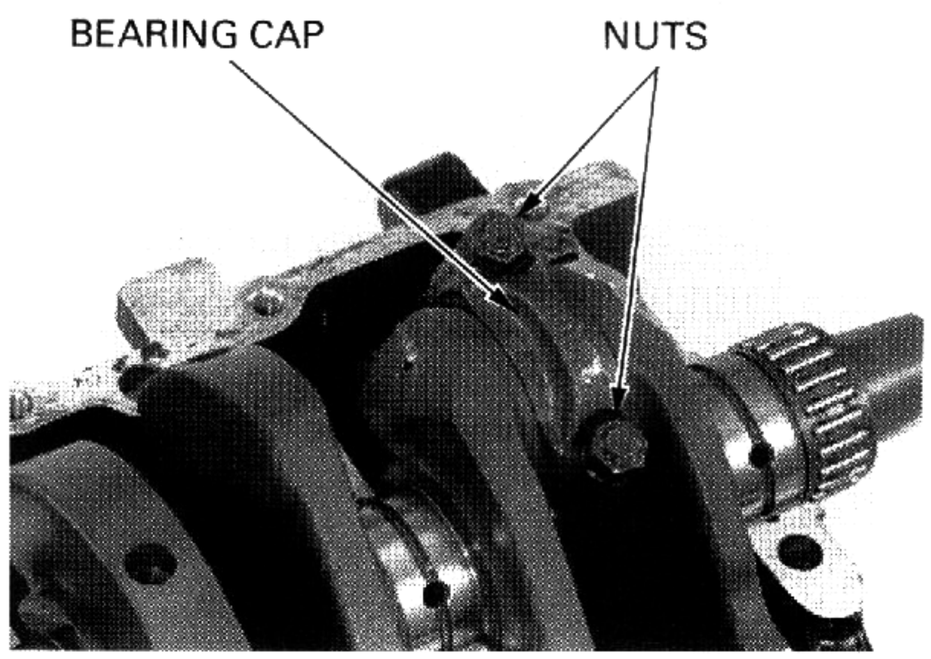
Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

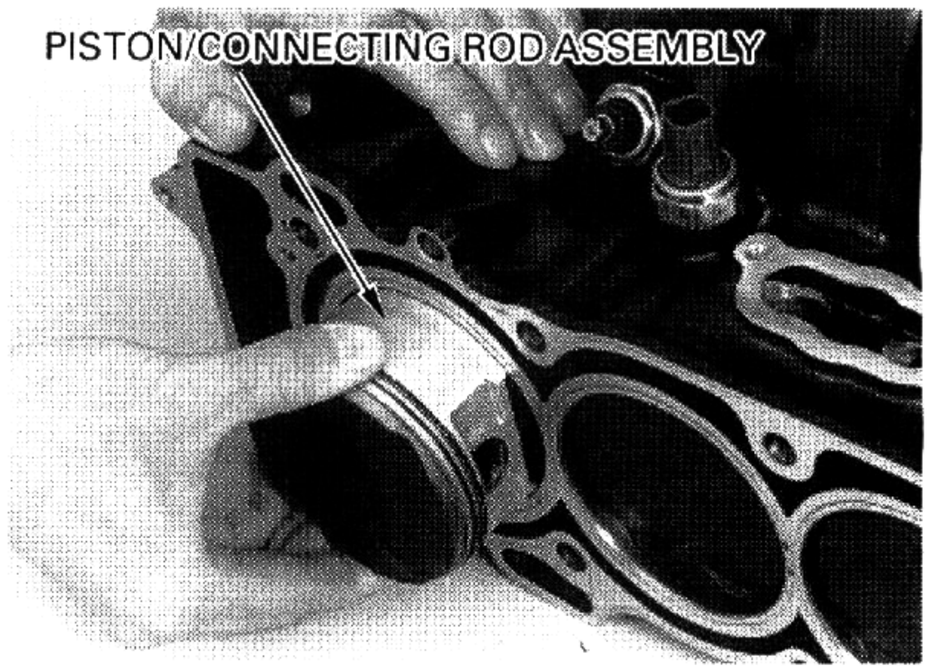
NOTE:

Mark all parts during removal so they can be replaced in their original locations.

Remove the nuts and connecting rod bearing cap.

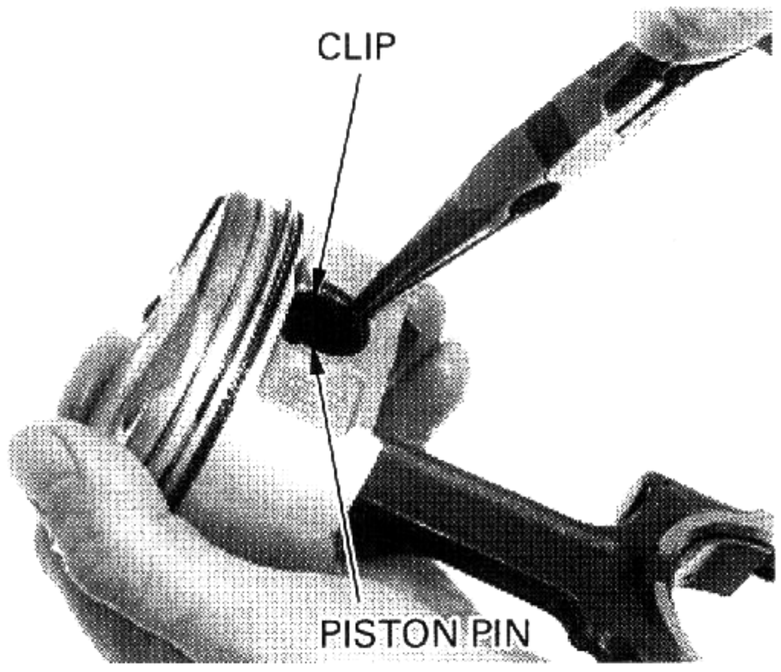
Remove the piston/connecting rod assembly from the top of the cylinder.





PISTON REMOVAL

Remove the piston pin clip with pliers.
Press the piston pin out of the piston and remove the piston from the connecting rod.

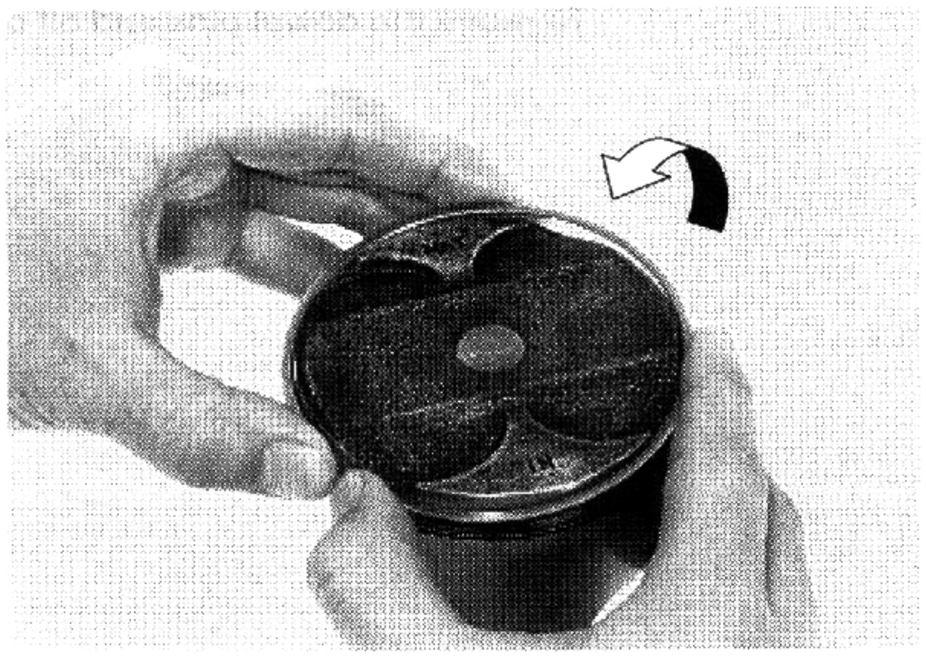


PISTON DISASSEMBLY

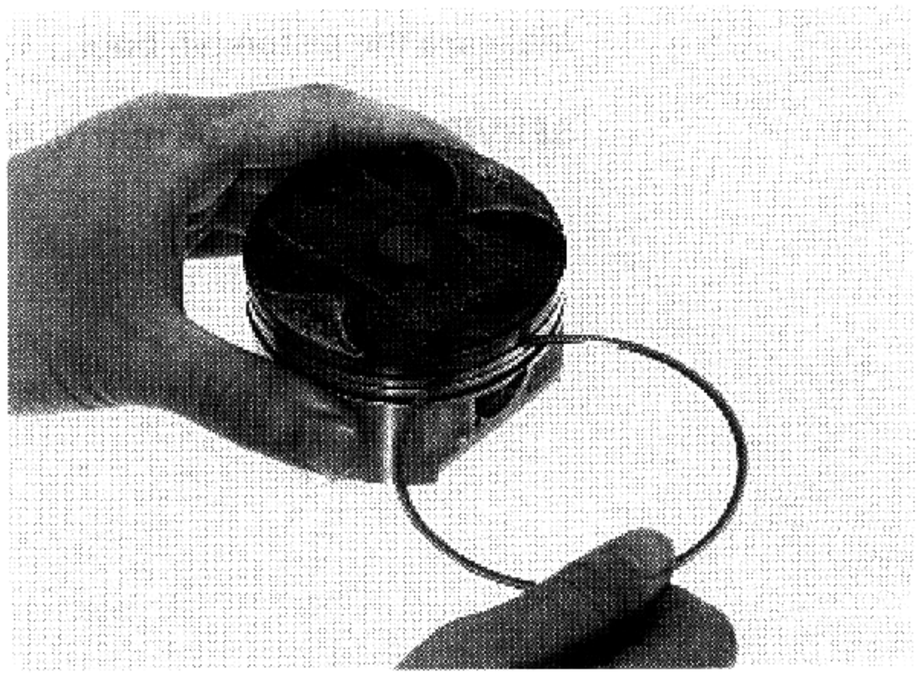
Remove the piston rings.

NOTE:

Do not damage the piston rings during removal.



Remove any carbon deposits from the piston ring grooves, using an old piston ring as shown.



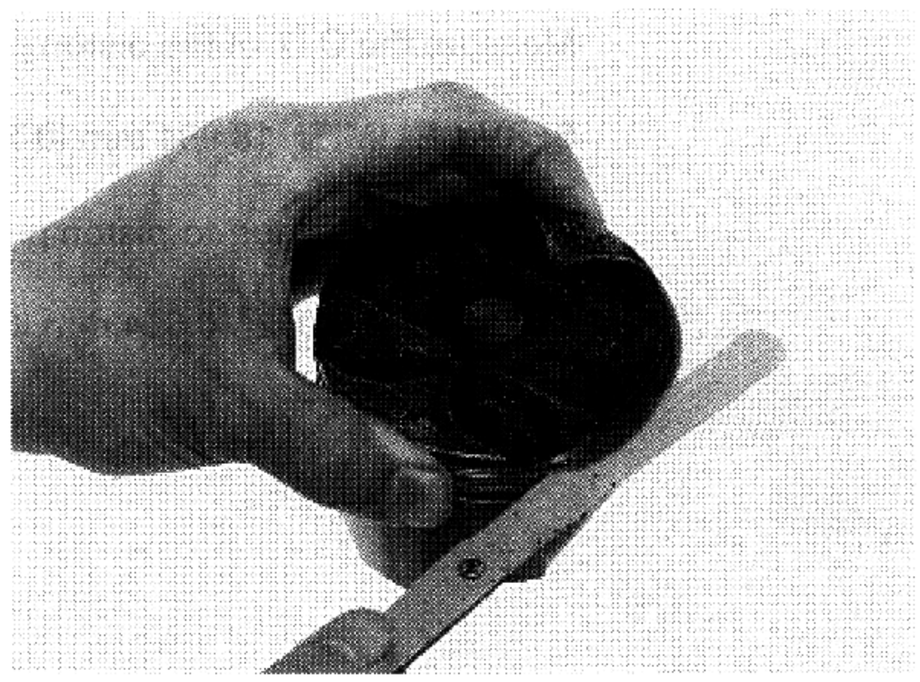
PISTON INSPCETION

Temporarily install the piston rings to their proper position with the mark facing up.

Measure the piston ring-to-ring groove clearance with the rings pushed into the grooves.

SERVICE LIMITS:
Top: 0.08 mm (0.003 in)
Second: 0.06 mm (0.002 in)

Inspect the piston for wear or damage.

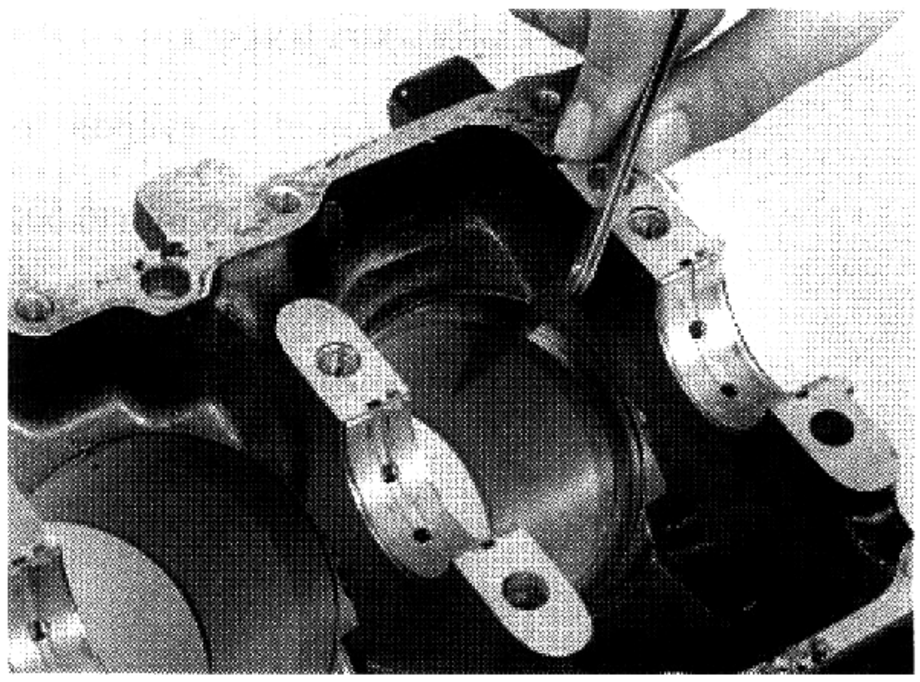


Insert the piston ring squarely into the bottom of the cylinder and measure the ring end gap.

NOTE:

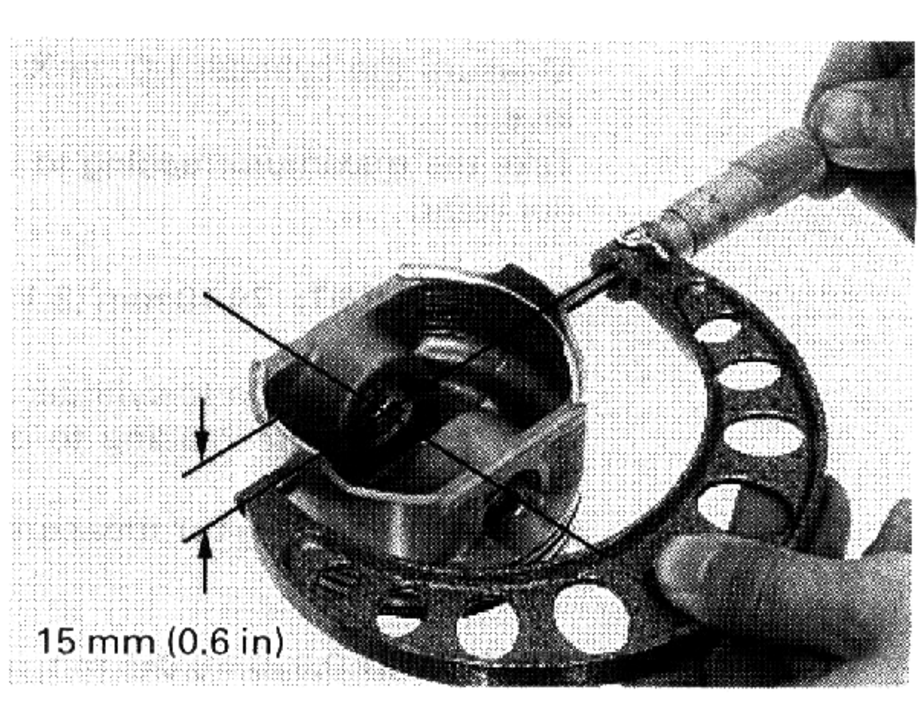
Push the rings into the cylinder with the top of the piston to be sure they are squarely in the cylinder.

SERVICE LIMITS:
Top: 0.5 mm (0.02 in)
Second: 0.7 mm (0.03 in)
Oil (side rail) : 1.0 mm (0.04 in)



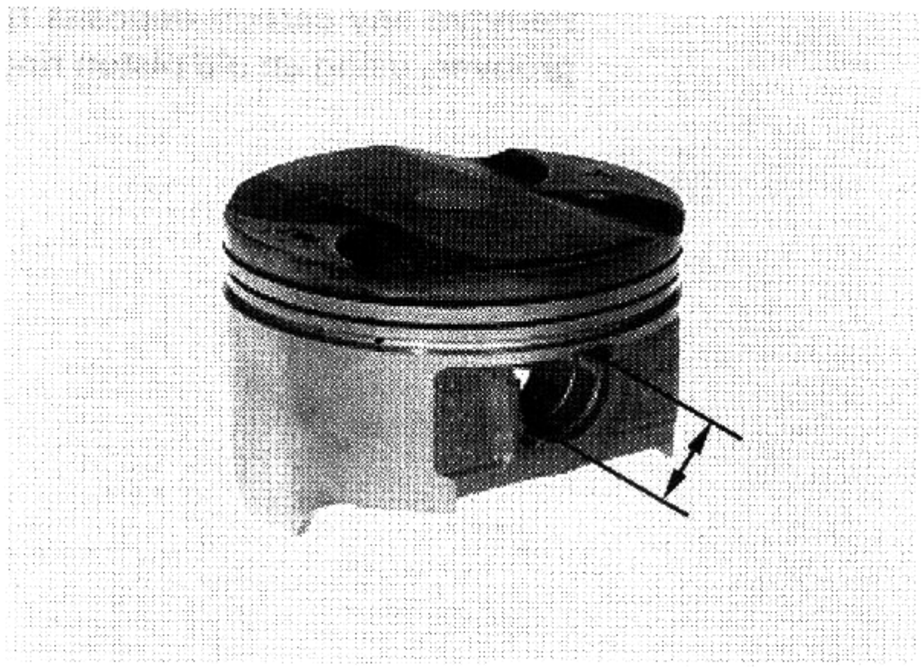
Measure the diameter of the piston at 15 mm (0.6 in) from the bottom and 90 degrees to the piston pin hole.

SERVICE LIMIT: 78.90 mm (3.106 in)



Measure the piston pin bore.

SERVICE LIMIT: 19.03 mm (0.749 in)

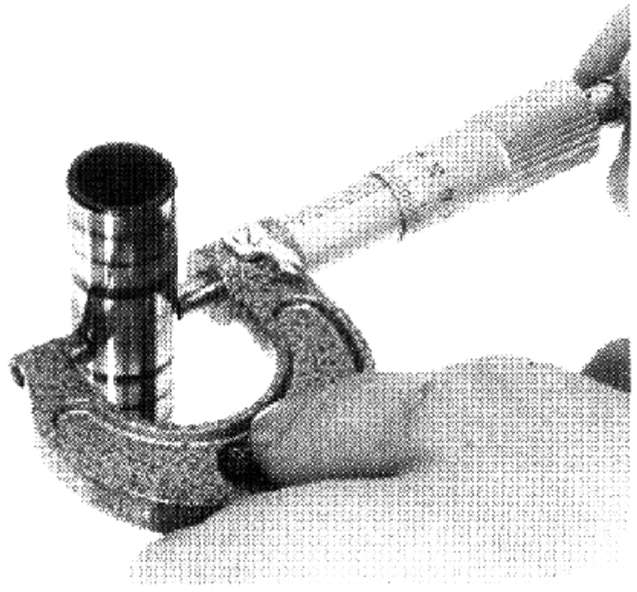


Measure the O.D. of the piston pin.

SERVICE LIMIT: 18.984 mm (0.7474 in)

Calculate the piston-to-piston pin clearance.

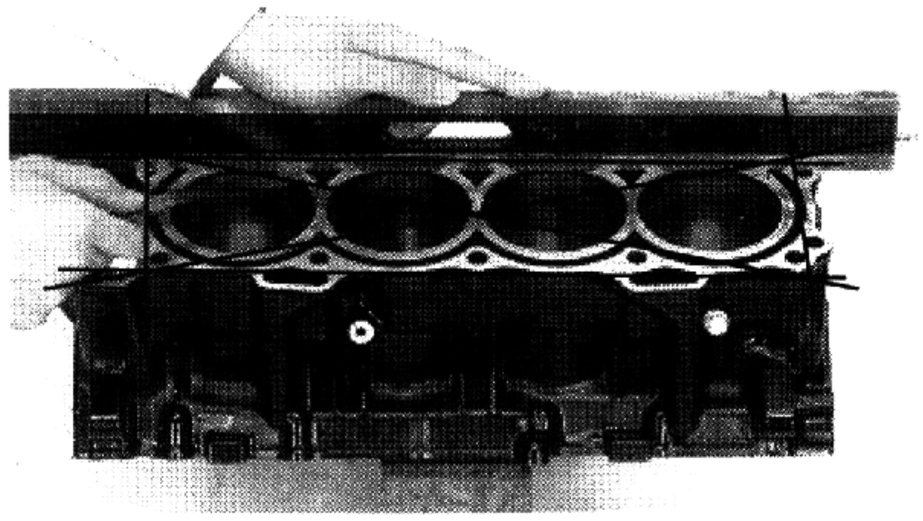
STANDARD: 0.002 – 0.014 mm (0.0001 – 0.0006 in)



CYLINDER INSPECTION

Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.05 mm (0.002 in)

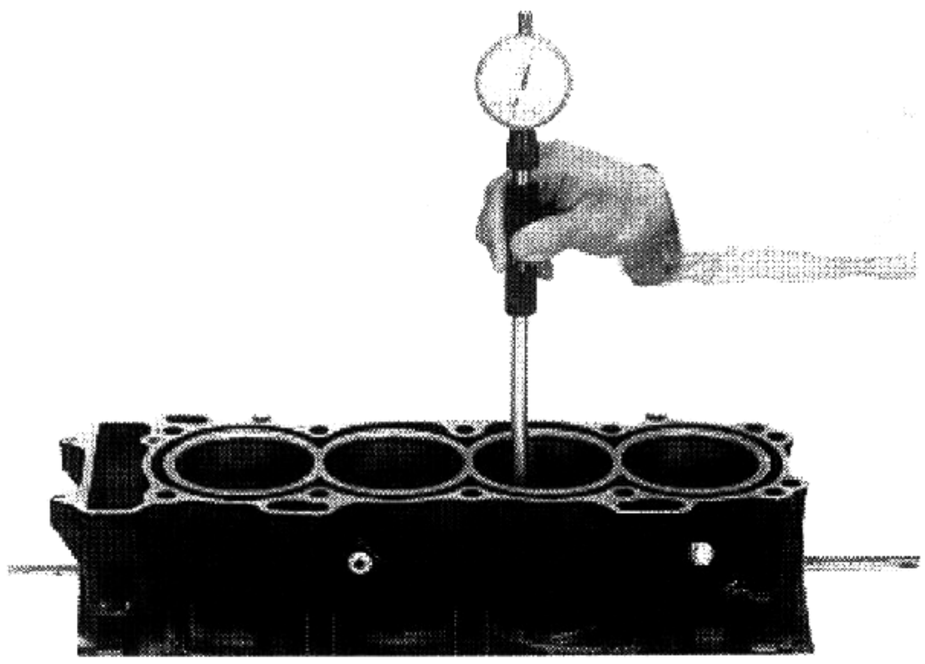


Inspect the cylinder bore for wear or damage.
Measure the cylinder I.D. in X and Y axis at three levels.
Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 79.10 mm (3.114 in)

Calculate the piston-to-cylinder clearance.
Take a maximum reading to determine the clearance.
Refer to page 11-5 for measurement of the piston O.D.

STANDARD: 0.010 – 0.045 mm (0.0004 – 0.0018 in)



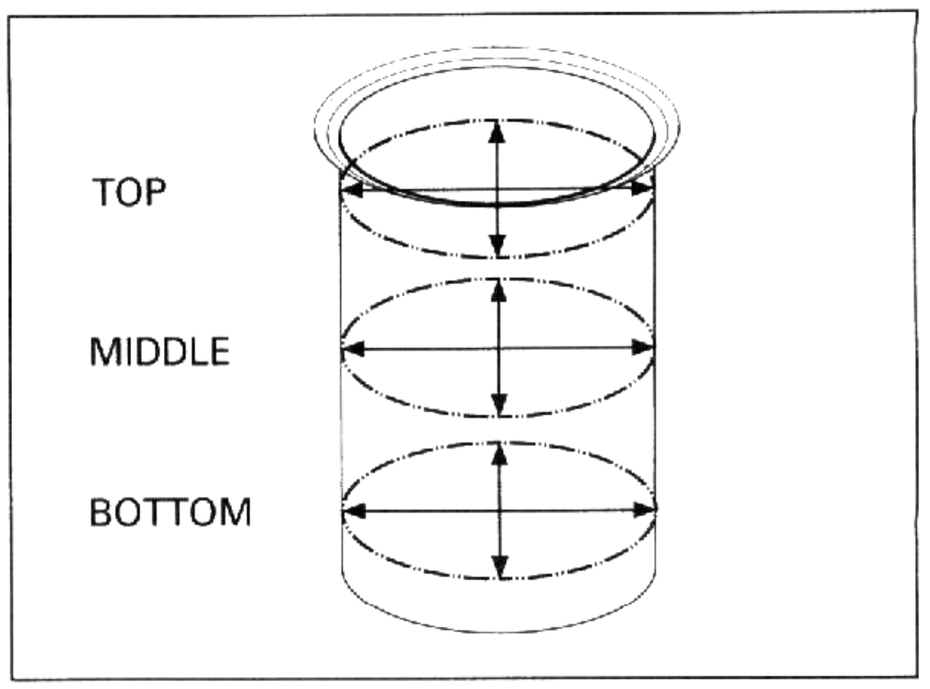
Calculate the taper and out of round at three levels in X and Y axis. Take the maximum reading to determine them.

SERVICE LIMITS:
Taper: 0.10 mm (0.004 in)
Out of round: 0.10 mm (0.004 in)

The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

The following oversize pistons are available:
0.50 mm (0.020 in)

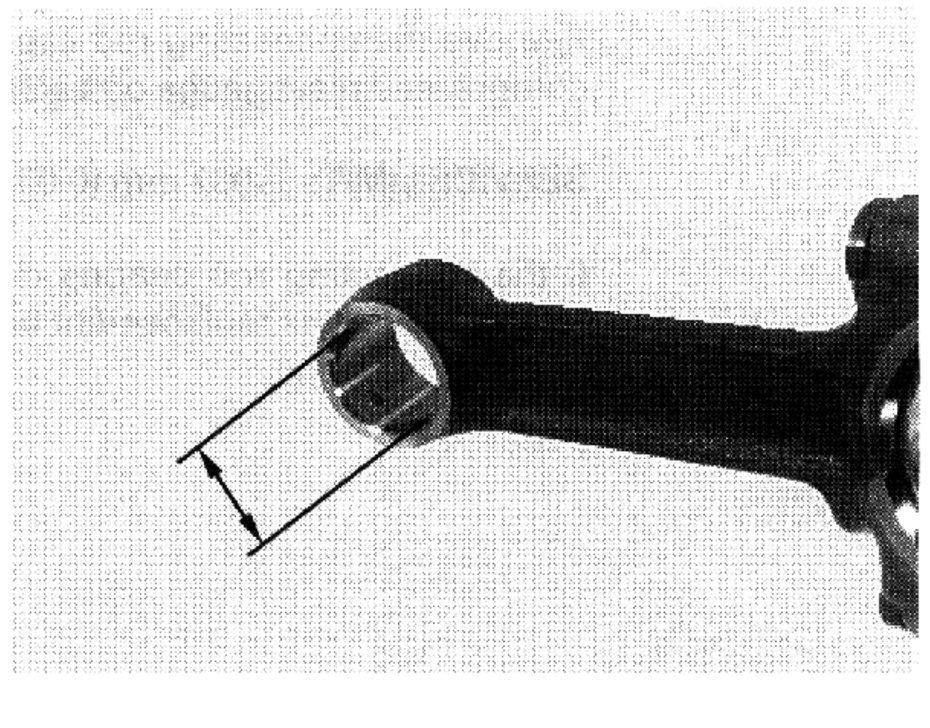
The piston to cylinder clearance for the oversize piston must be: 0.015 – 0.050 mm (0.0006 – 0.0020 in).



CONNECTING ROD INSPECTION

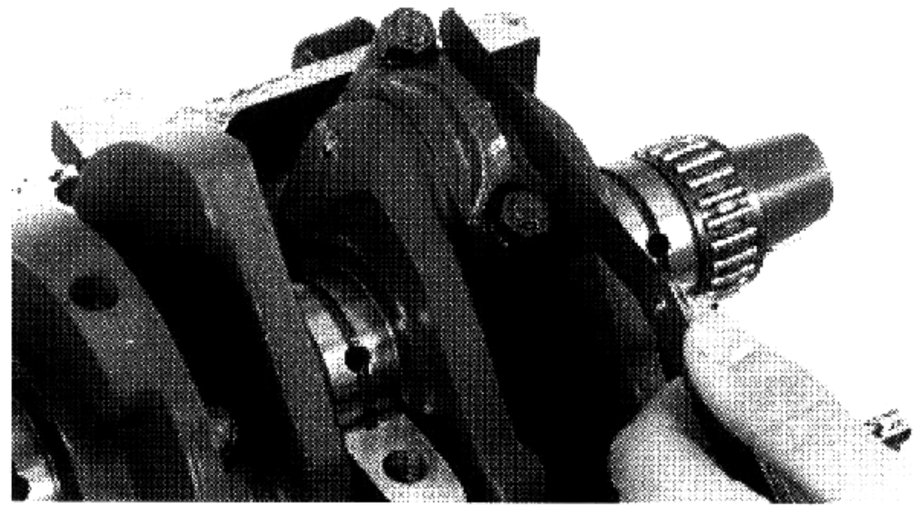
Measure the connecting rod small end I.D.

SERVICE LIMITS: 19.061 mm (0.7504 in)



Temporarily install the connecting rod to the crankshaft.
Install the bearing inserts and bearing cap, and tighten the bolts.
Measure the connecting rod side clearance.

SERVICE LIMITS: 0.30 mm (0.012 in)

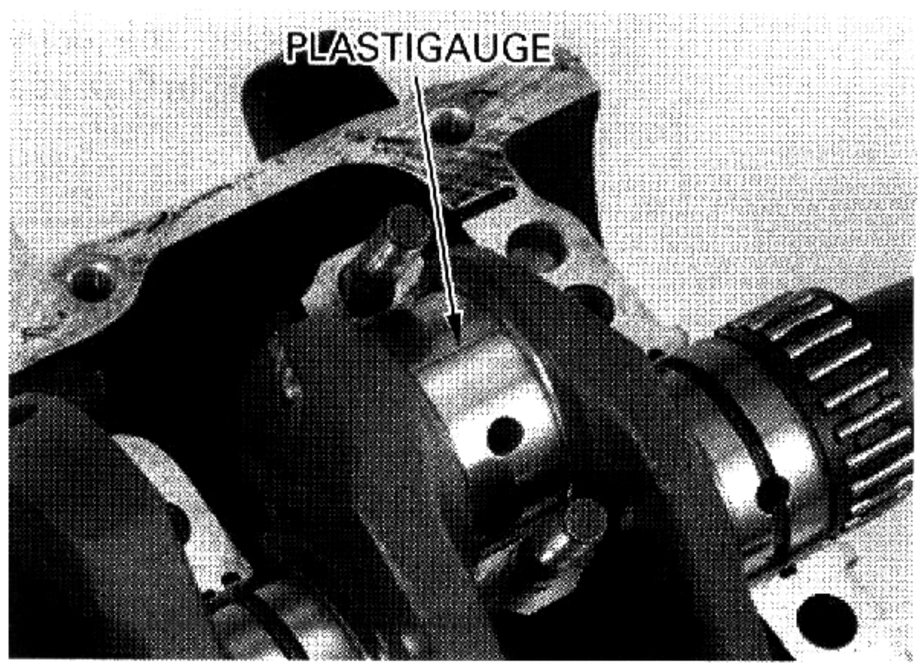


CRANKPIN BEARING INSPECTION

Wipe all oil from the bearing inserts and crankpins.
Put a piece of plastigauge on each crankpin.

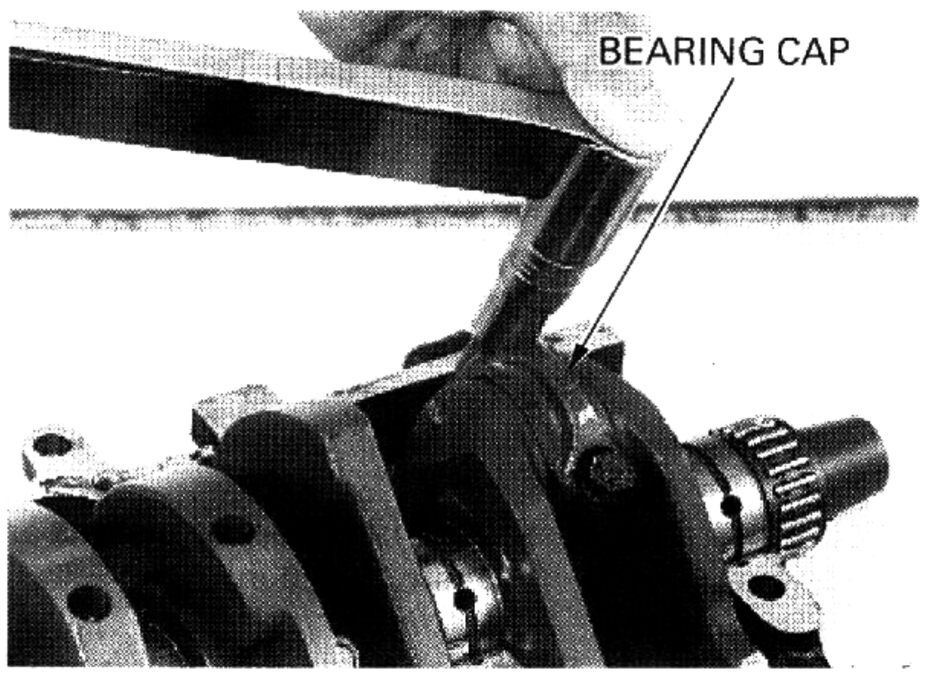
NOTE:

- Do not put the plastigauge over the oil hole in the crankpin.
- Do not rotate the crankshaft during inspection.



Install the bearing caps and connecting rods on a correct crankpins, and tighten the cap nuts to the specified torque.

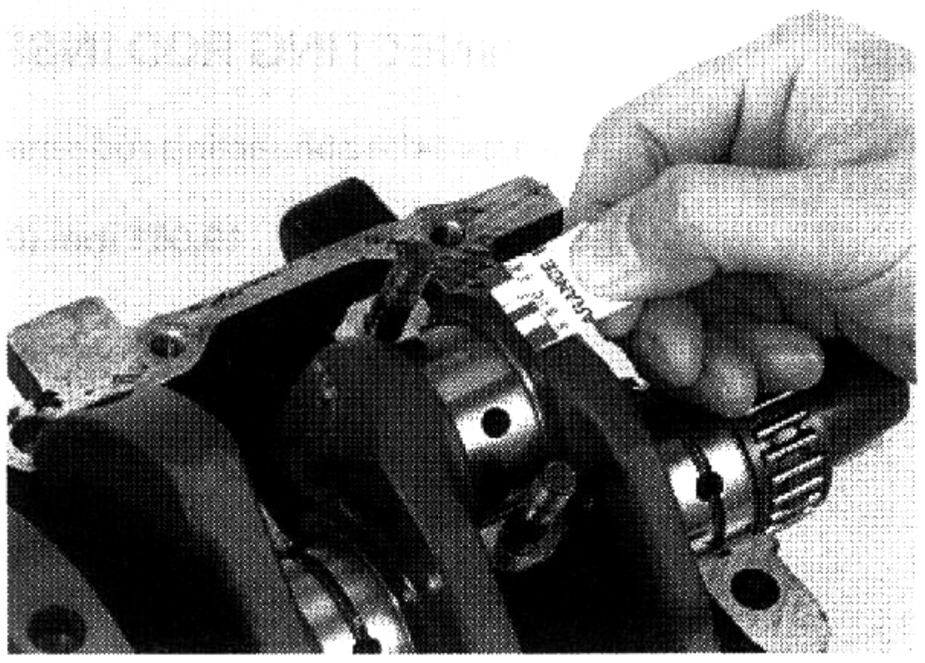
TORQUE: 41 N·m (4.2 kgf·m , 30 lbf·ft)



Remove the connecting rod caps and measure the compressed plastigauge on each crankpin.

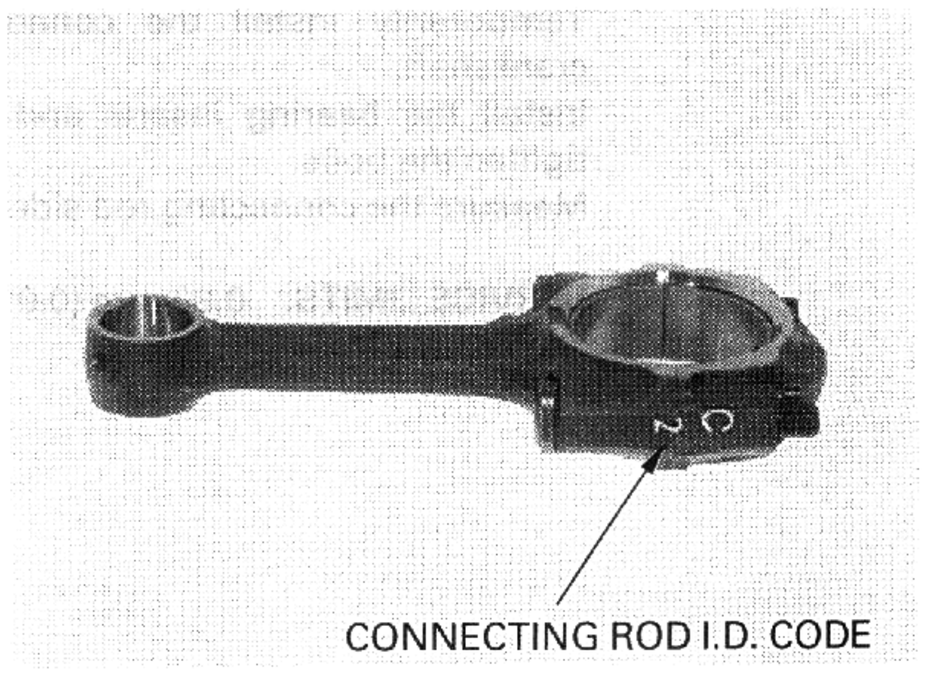
SERVICE LIMIT: 0.062 mm (0.0024 in)

If the connecting rod bearing clearance is beyond tolerance, selects replacement bearing.



CRANKPIN BEARING SELECTION

Record the connecting rod I.D. code number (1 or 2) or measure the I.D. with the bearing cap installed without bearing inserts.



If you are replacing the crankshaft, record the corresponding crankpin O.D. code number (A or B).

NOTE:

Numbers (A or B) on the crank weight are the codes for the crankpin O.D.s starting from the left.

If you are reusing the crankshaft, measure the crankpin O.D. with the micrometer.



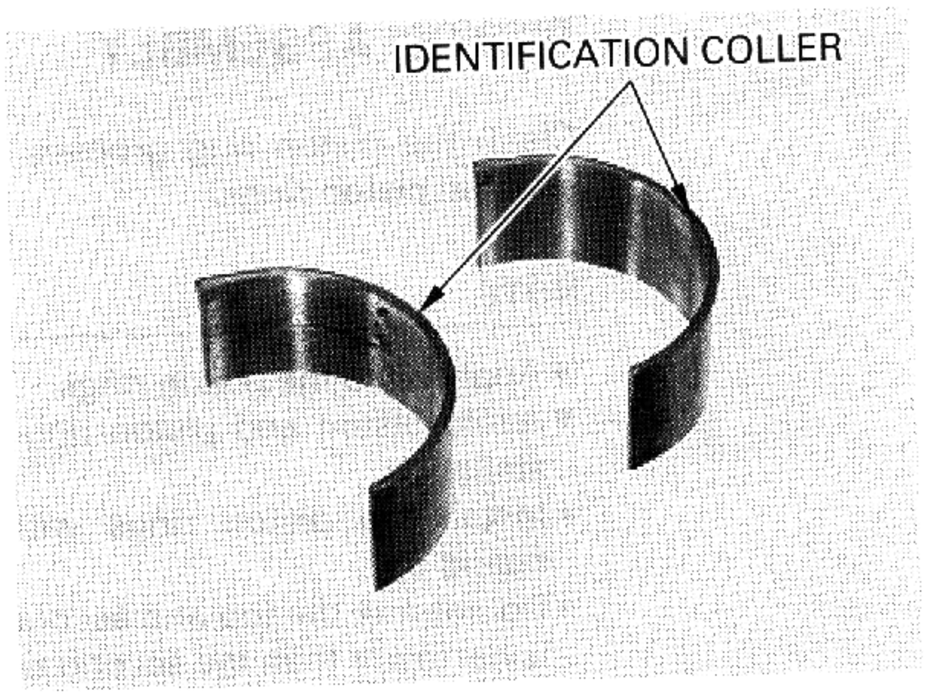
Cross-reference the crankpin and rod codes to determine the replacement bearing color.

BEARING THICKNESS:

A (Brown): Thick

B (Green):

C (Yellow): Thin



CRANKPIN BEARING SELECTION TABLE:

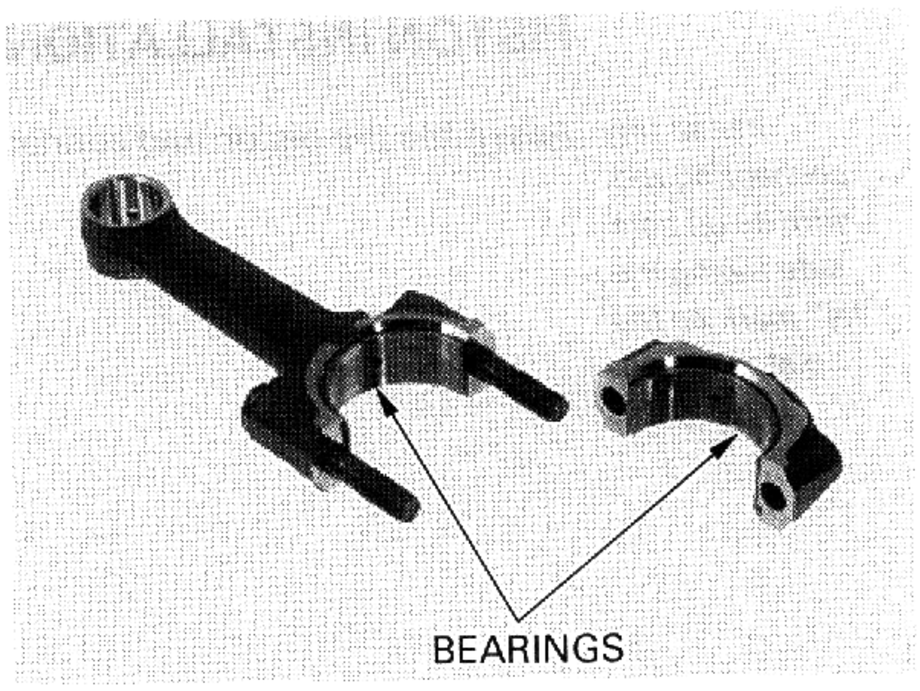
Unit: mm (in)

			CONNECTING ROD I.D. CODE	
			1	2
			43.000 – 43.008 (1.6929 – 1.6932)	43.008 – 43.016 (1.6932 – 1.6935)
CRANKPIN O.D. CODE LETTER	A	39.995 – 40.003 (1.5746 – 1.5749)	C (Yellow)	B (Green)
	B	39.987 – 39.995 (1.5743 – 1.5746)	B (Green)	A (Brown)

Install the bearing inserts into the connecting rod and bearing cap.

NOTE:

Align the oil hole between the connecting rod and bearing, and also align the bearing tabs with the groove in the connecting rod and bearing cap.



PISTON ASSEMBLY

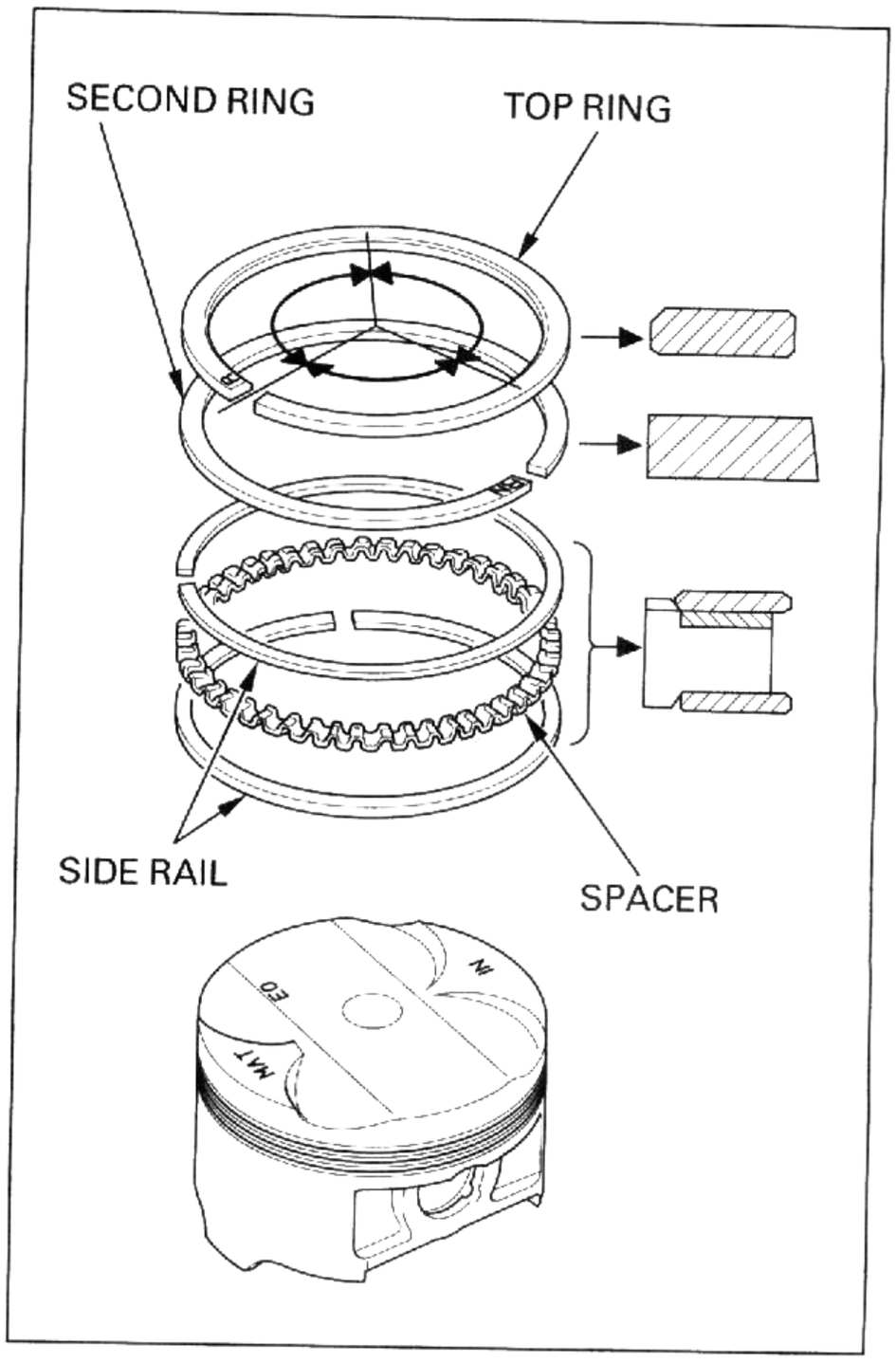
Clean the piston ring grooves thoroughly and install the piston rings.

NOTE:

- Apply oil to the piston rings.
- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marking (R) facing up.
- Do not mix the top and second rings; the top ring is narrower than the second ring in width.

Space the piston ring end gaps 180 degrees apart. Do not align the gaps in the oil rings (side rails).

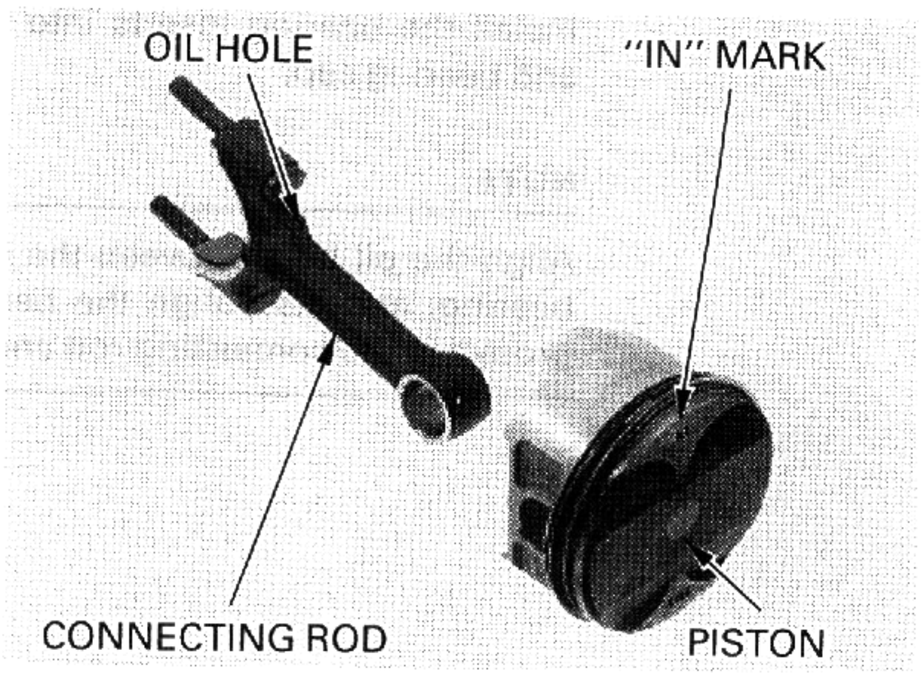
After installation, the rings should rotate freely in the ring grooves.



PISTON INSTALLATION

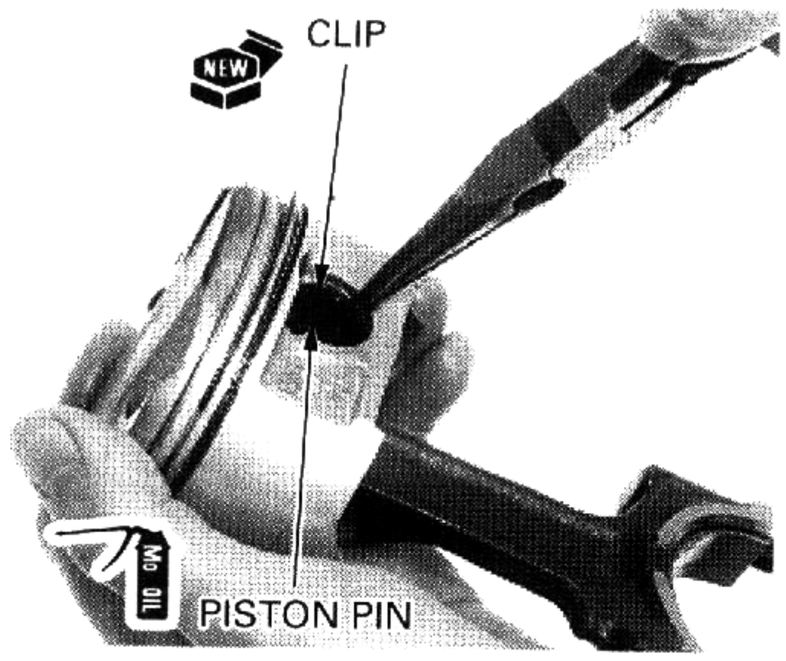
Install the connecting rod with its oil hole side facing the "IN" mark on the piston crown.

Assemble the piston and connecting rod.



Do not align the piston pin clips end gap with the piston cut-out.

Apply molybdenum disulfide oil to the piston pin outer surface.
Install the piston pin, and secure it using a new piston pin clips.



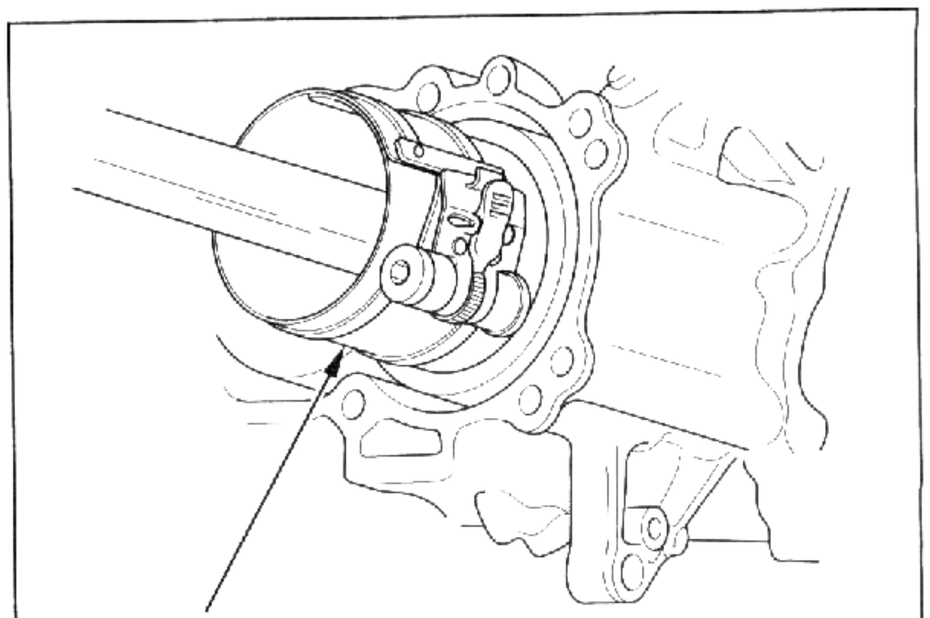
Apply oil to the cylinder sleeves and piston rings.

Install the piston/ connecting rod assembly with the piston "IN" mark facing to the intake side.

Install the piston/connecting rod assembly into the cylinder using a commercially available piston ring compressor tool.

CAUTION:

- ***While installing the piston, being careful not to damage the top surface of the cylinder, especially around the cylinder bore.***
- ***Be careful not to damage the cylinder sleeve and crankpin with the connecting rod bolt threads.***



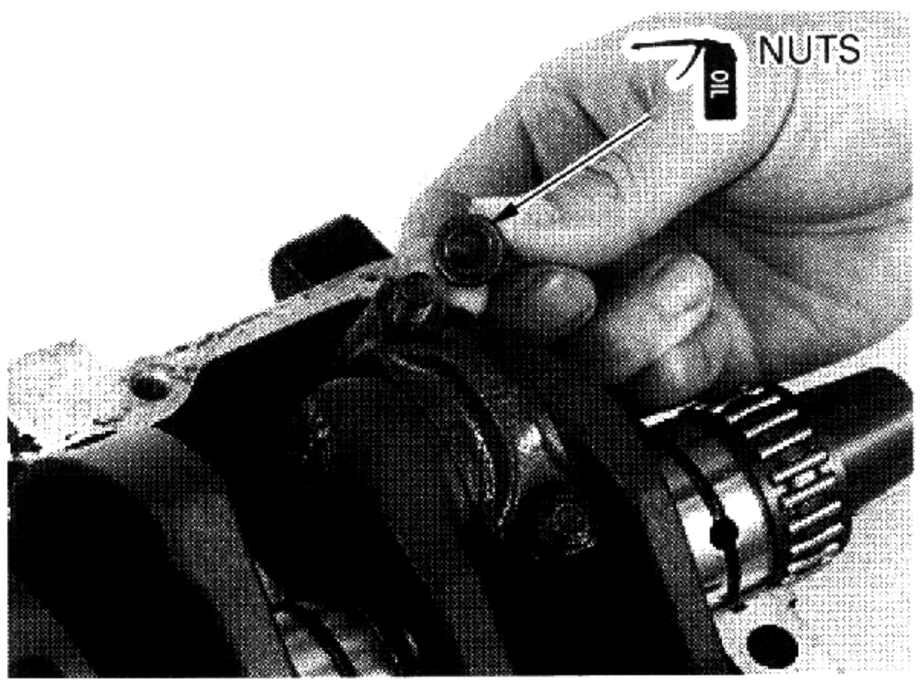
PISTON RING COMPRESSOR

Make sure ring compressor tool sits flush with top surface of the cylinder.

Use the handle of a plastic hammer to tap the piston into the cylinder.

Apply molybdenum disulfide oil to the crankpin bearing surfaces.
Install the bearing cap.
Insure that the marks on the caps are aligned with the marks on the connecting rods.

Apply oil to the connecting rod nut threads and seating surfaces.

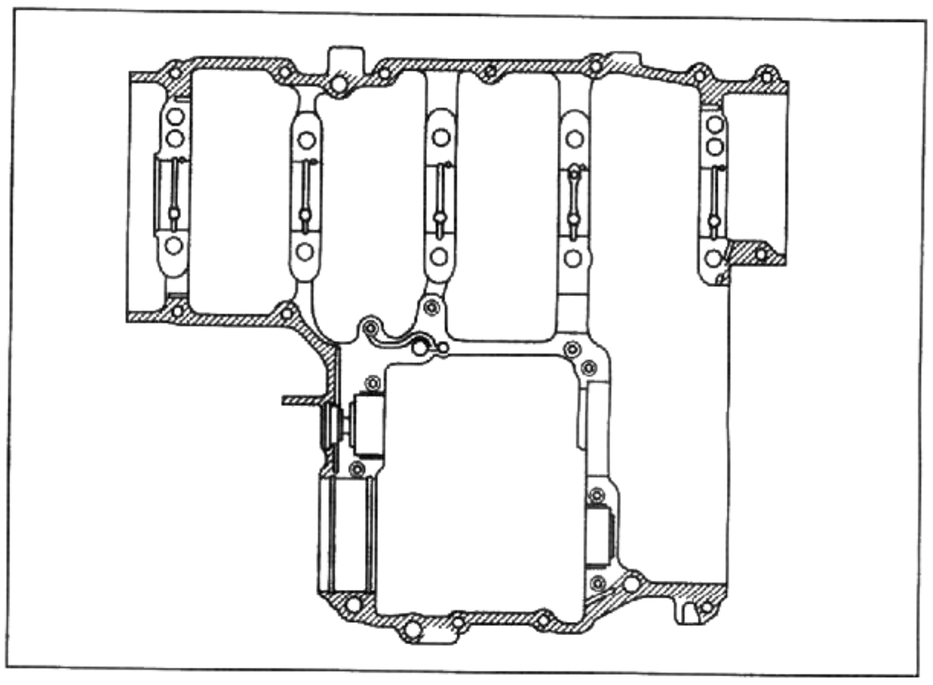


Install the connecting rod nut and tighten the nuts gradually and alternately.

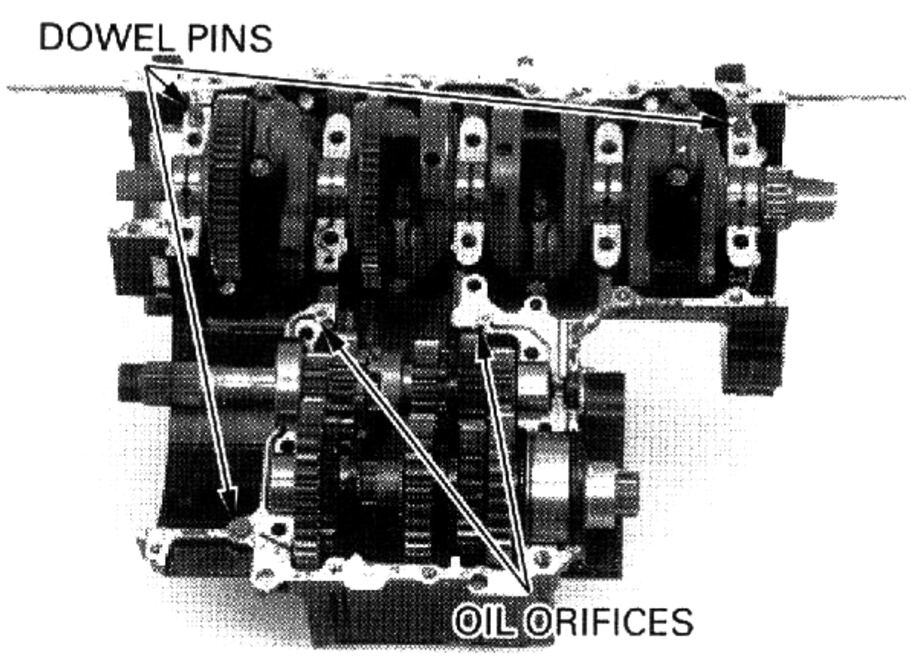
TORQUE: 41 N·m (4.2 kgf·m , 30 lbf·ft)

CRANKCASE COMBINATION

Apply a light, but through, coating of liquid sealant to the crankcase mating surface except to the main bearing journal bolt (lower crankcase bolt, 9 mm) area and the oil passage area as shown.



Install the three dowel pins.
Install oil orifices aligning their cut-out with the groove in the upper crankcase.



Install the lower crankcase onto the upper crankcase.
Clean the crankcase 9 mm bolts thoroughly with solvent and blow them dry.
Apply clean engine oil to the 9 mm bolt threads and seating surface and install them.

Loosely install all the lower crankcase bolts.
Make sure the upper and lower crankcase are seated securely.

From the inside to outside, tighten the lower crankcase 9 mm bolts in a crisscross pattern in 2 – 3 steps.

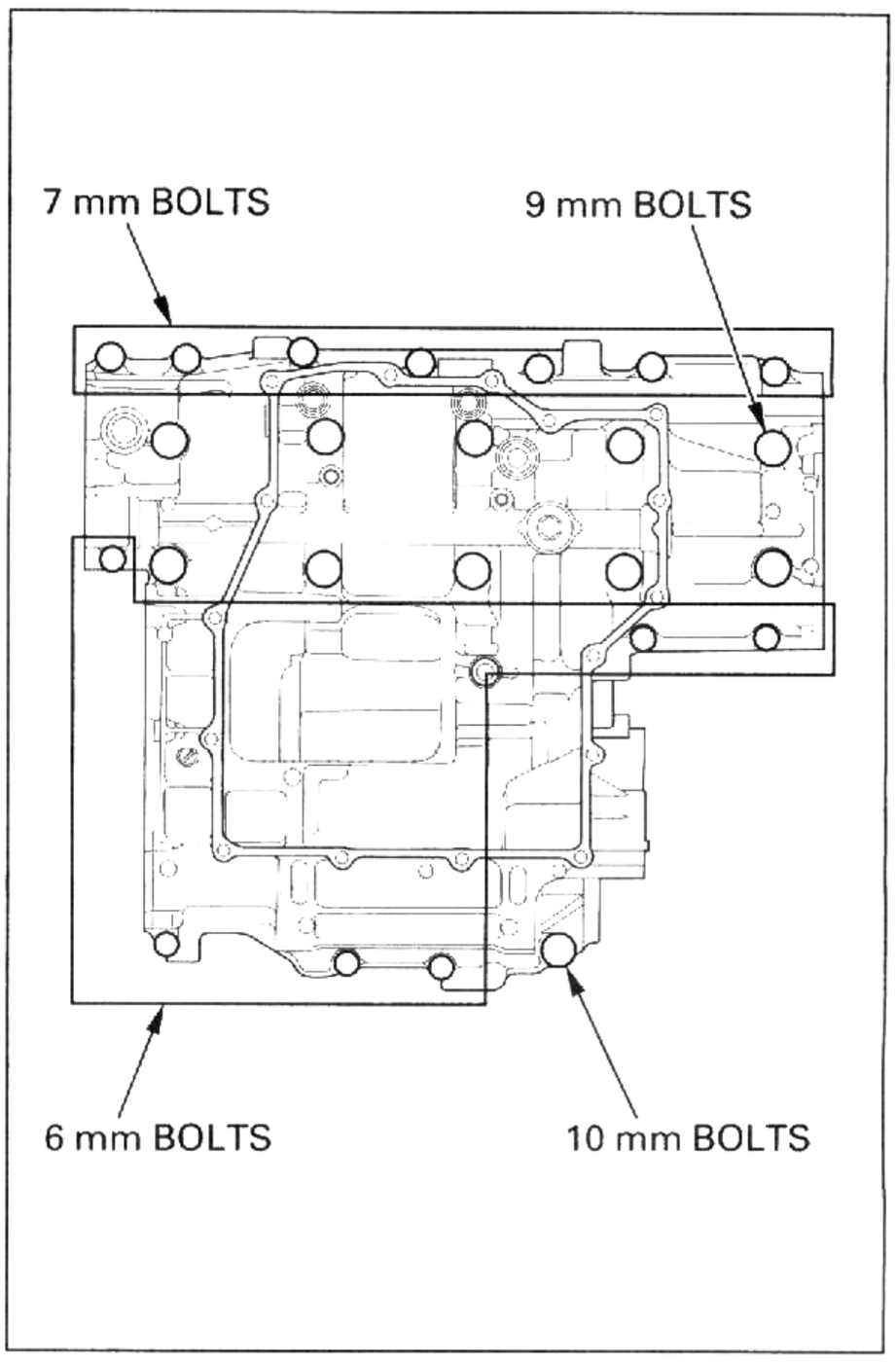
NOTE:

Tighten the 9 mm bolts in numerical order as shown in the illustration.

TORQUE: 37 N·m (3.8 kgf·m , 27 lbf·ft)

Tighten the 10 mm bolt, and then the 6 mm bolts and 7 mm bolts.

TORQUE: **10 mm bolt:** 39 N·m (4.0 kgf·m , 29 lbf·ft)
7 mm bolt: 18 N·m (1.8 kgf·m , 13 lbf·ft)
6 mm bolt: 12 N·m (1.2 kgf·m , 9 lbf·ft)



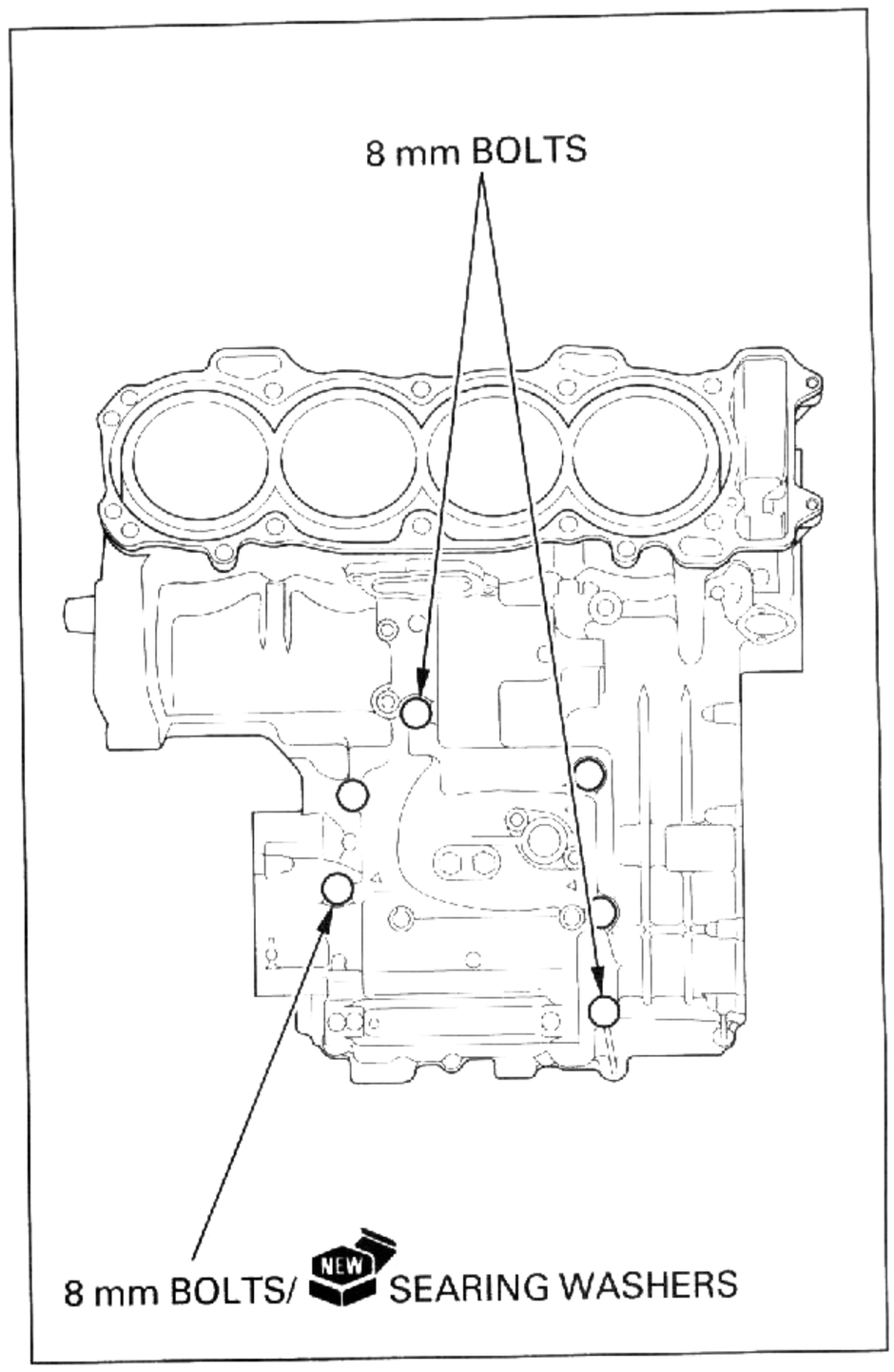
Install the upper crankcase 8 mm bolts and sealing washers.

NOTE:

The sealing washer locations are indicated on the upper crankcase using the "△" mark.

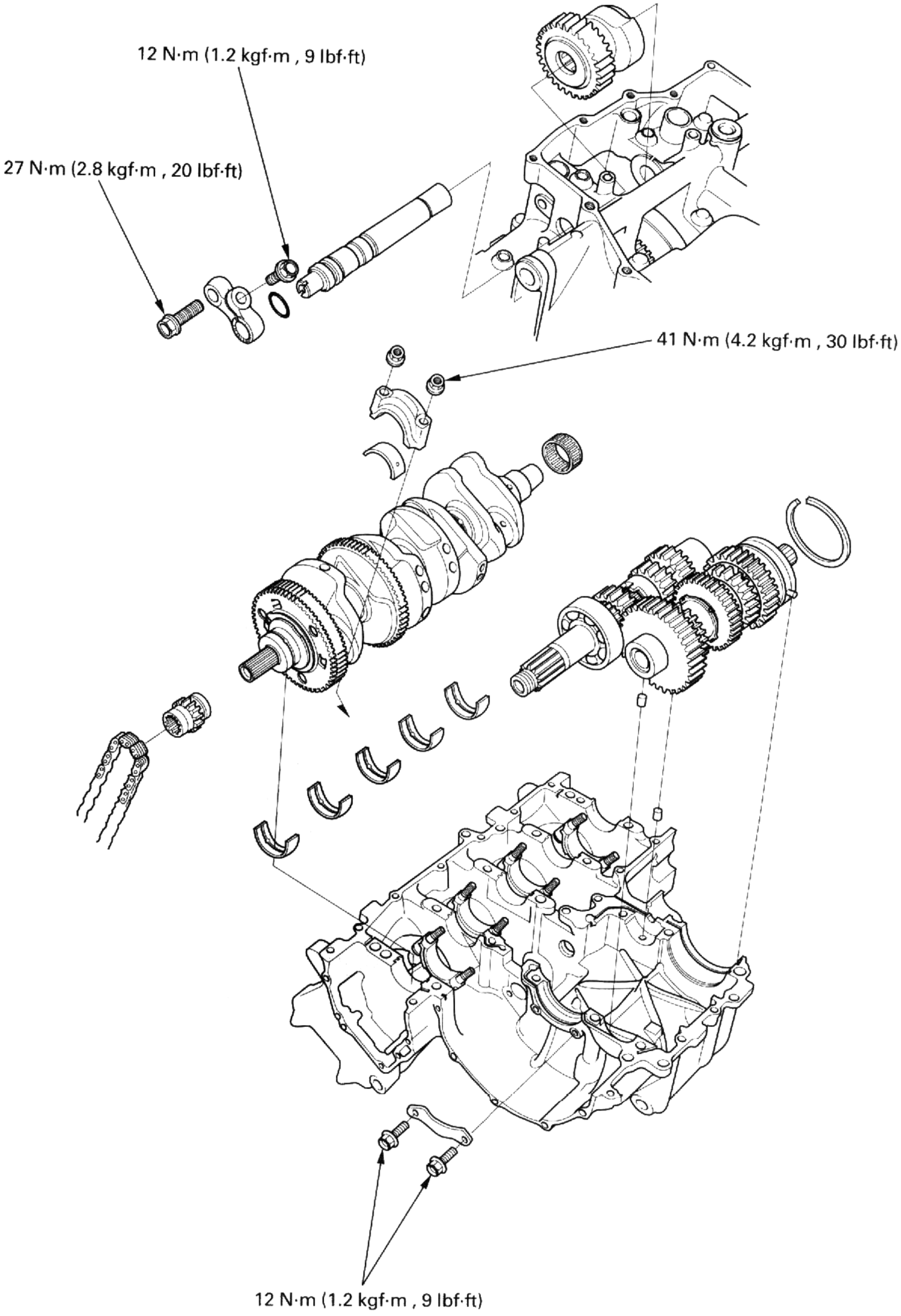
Tighten the 8 mm bolts to the specified torque.

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



Install the new O-ring and sealing plug.




12 N·m (1.2 kgf·m , 9 lbf·ft)
27 N·m (2.8 kgf·m , 20 lbf·ft)
41 N·m (4.2 kgf·m , 30 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)

12. CRANKSHAFT/TRANSMISSION/BALANCER

SERVICE INFORMATION	12-1	TRANSMISSION	12-9
TROUBLESHOOTING	12-2	BALANCER	12-14
CRANKSHAFT	12-3		

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the crankshaft, transmission and balancer. Refer to section 11 for crankcase separation/assembly.
- Be careful not to damage the crankshaft main journal and journal bearing while removing or installing the crankshaft.
- Mark and store the disassembled parts to ensure that they are installed in their original locations.
- Mark and store the bearing inserts to ensure that the parts are in their correct locations during reassembly. If the inserts are improperly installed, they will block the oil hole, causing insufficient lubrication and eventual engine seizure.
- The main journal bearing inserts are a select fit and are identified by color codes. Select replacement bearings from the code tables. After installing new bearings, recheck them with a plastigauge to verify clearance. Apply molybdenum disulfide oil to the main journal during assembly.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Side clearance		0.05–0.20 (0.002–0.008)	0.30 (0.012)
	Runout		———	0.30 (0.012)
	Main journal oil clearance		0.017–0.035 (0.0007–0.0014)	0.045 (0.0018)
Transmission	Gear I.D.	M4, M5	31.000–31.025 (1.2205–1.2215)	31.04 (1.222)
		C1	26.000–26.021 (1.0236–1.0244)	26.04 (1.025)
		C2, 3	33.000–33.025 (1.2992–1.3002)	33.04 (1.301)
	Bushing O.D.	M4, M5	30.950–30.975 (1.2185–1.2195)	30.93 (1.218)
		C2	32.955–32.980 (1.2974–1.2984)	32.93 (1.296)
		C3, distance collar	32.950–32.975 (1.2972–1.2982)	32.93 (1.296)
	Bushing I.D.	M4	27.985–28.006 (1.1018–1.1026)	28.02 (1.103)
		C2	29.985–30.006 (1.1805–1.1813)	30.02 (1.182)
	Gear-to-bushing clearance	M4, M5	0.020–0.062 (0.0008–0.0024)	0.10 (0.004)
		C2	0.020–0.070 (0.0008–0.0028)	0.11 (0.004)
		C3	0.025–0.075 (0.0010–0.0030)	0.11 (0.004)
	Mainshaft O.D.	M4	27.967–27.980 (1.1011–1.1016)	27.957 (1.1007)
		Clutch outer guide	27.980–27.993 (1.1016–1.1021)	27.970 (1.1012)
	Countershaft O.D.	C2	29.967–29.980 (1.1798–1.1803)	27.957 (1.1007)
	Bushing-to-shaft clearance	M4	0.005–0.039 (0.0002–0.0015)	0.08 (0.003)
		C2	0.005–0.039 (0.0002–0.0015)	0.08 (0.003)

TORQUE VALUES

Connecting rod nut	41 N·m (4.2 kgf·m , 30 lbf·ft)	Apply oil to the threads and seating surface
Mainshaft bearing set plate bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply a locking agent to the threads
Balancer shaft holder flange bolt	27 N·m (2.8 kgf·m , 20 lbf·ft)	
Balancer shaft pinch bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	

TOOLS

Driver, 40 mm I.D.	07746-0030100
Attachment, 30 mm	07746-0030300
Driver shaft	07964-MB00200
Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 15 mm	07746-0040300

TROUBLESHOOTING

Excessive noise
- Worn connecting rod big end bearing
- Bent connecting rod
- Worn crankshaft main journal bearing
- Worn transmission bearing
- Worn balancer bearing
- Incorrect balancer backlash adjustment

Hard to shift
- Improper clutch operation
- Incorrect transmission oil weight
- Incorrect clutch adjustment
- Bent shift fork
- Bent fork shaft
- Bent fork claw
- Damaged shift drum cam groove
- Bent shift spindle

Transmission jumps out of gear
- Worn gear dogs and slots
- Bent fork shaft
- Broken shift drum stopper
- Worn or bent shift forks
- Broken shift linkage return spring

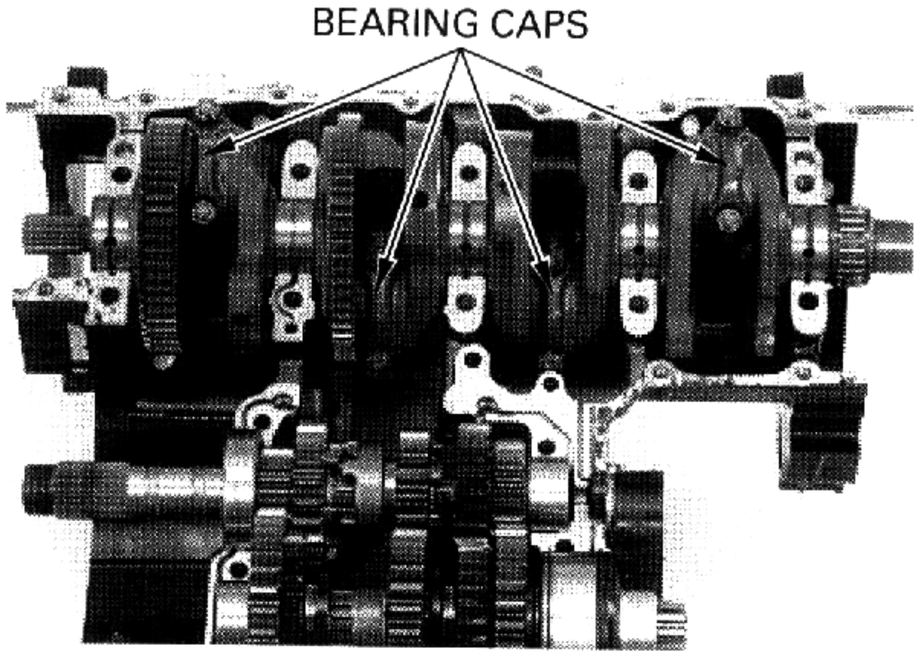
Engine vibration
- Excessive crankshaft runout
- Incorrect balancer timing

CRANKSHAFT

REMOVAL

Separate the crankcase halves (page 11-3).

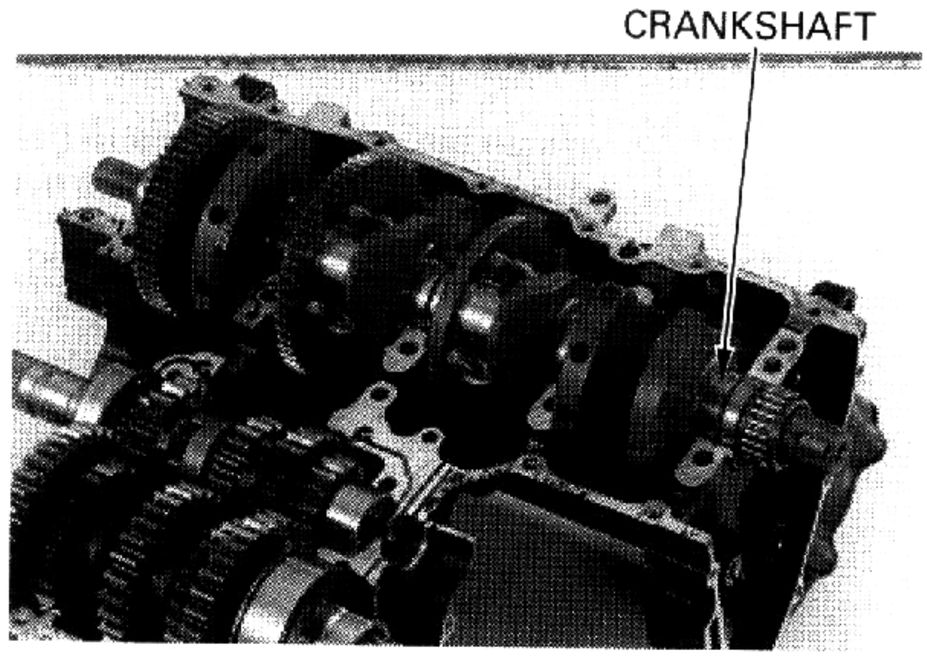
Remove the connecting rod bearing cap nuts and bearing caps.



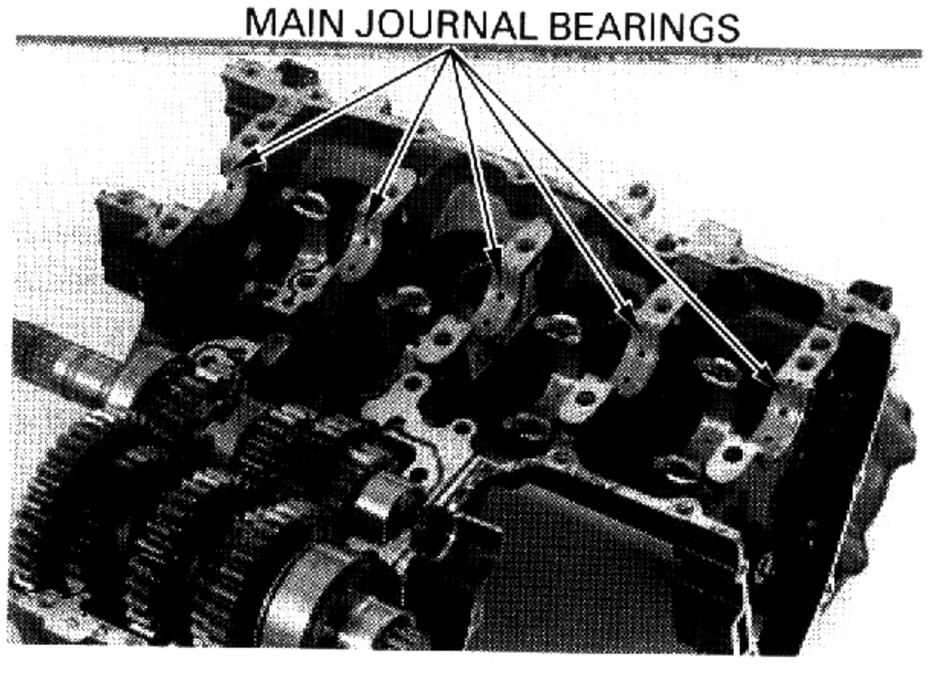
CAUTION:

Before removal, position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod bolt threads.

Remove the crankshaft.

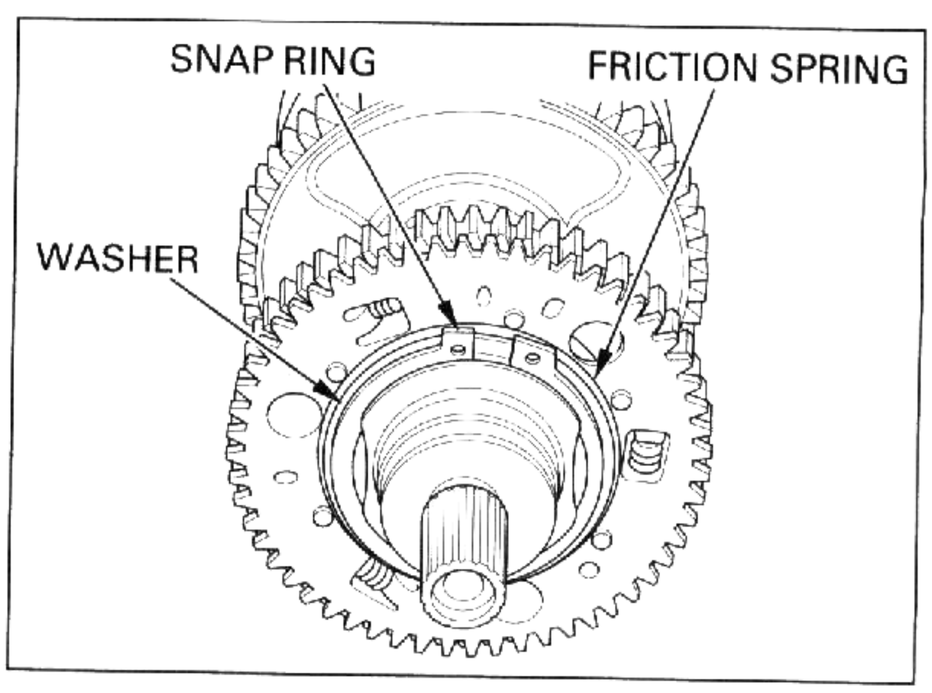


Remove the main journal bearings from both the crankcases.

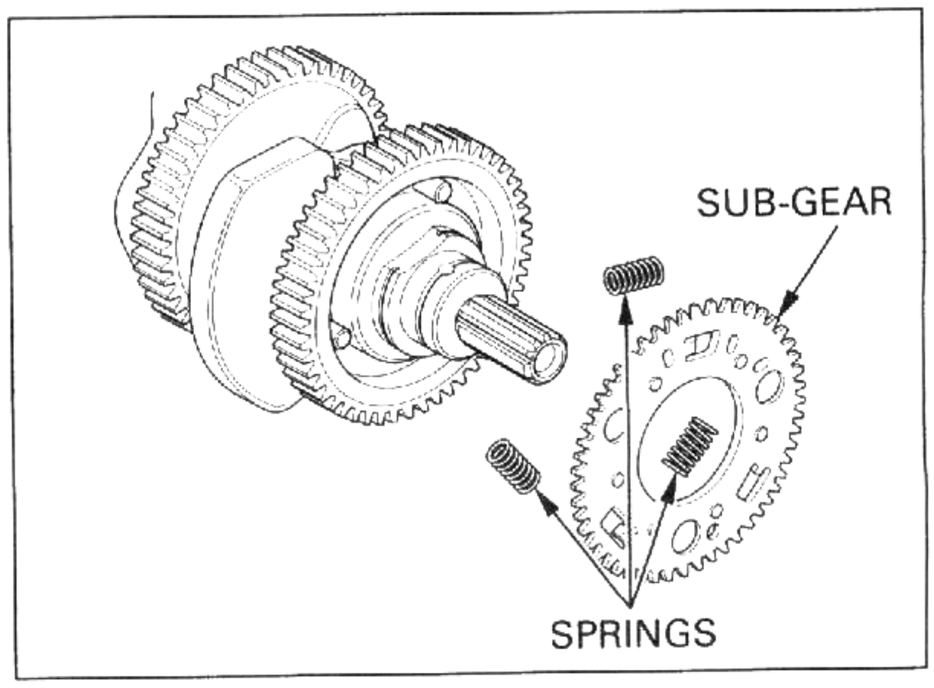


PRIMARY DRIVE SUB-GEAR REMOVAL

Remove the special snap ring, washer and friction spring.

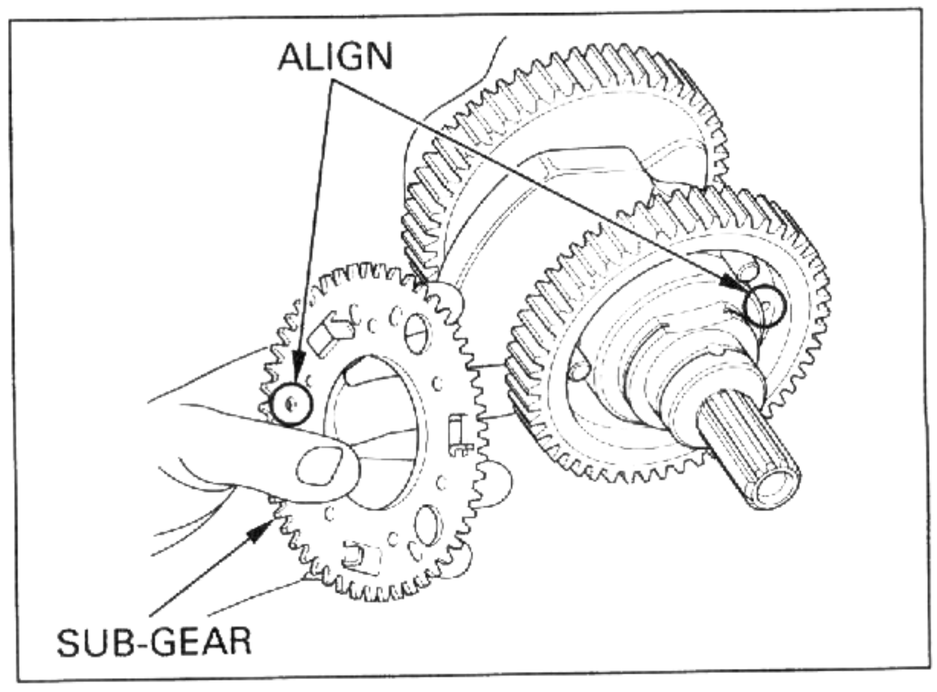


Remove the primary drive sub-gear and springs.



PRIMARY DRIVE SUB-GEAR INSTALLATION

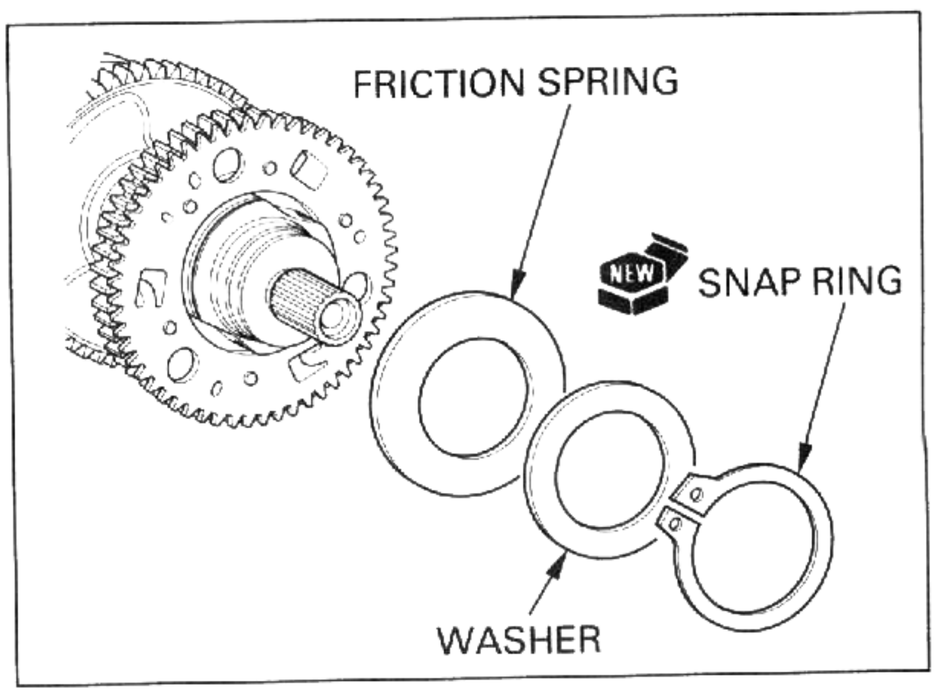
Install the primary drive sub-gear onto the primary drive gear, aligning the holes between the gear.

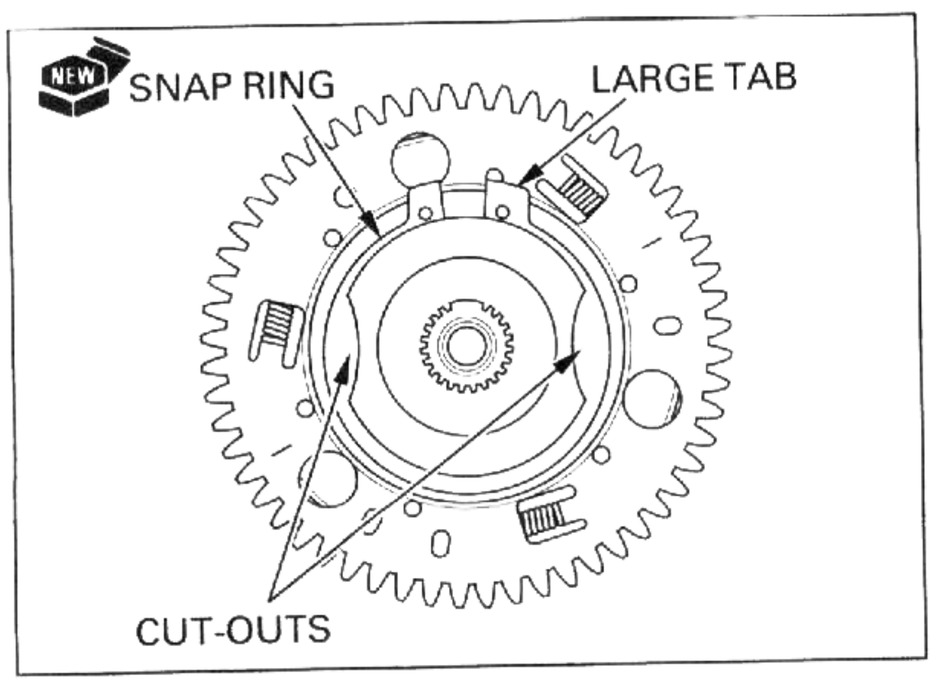


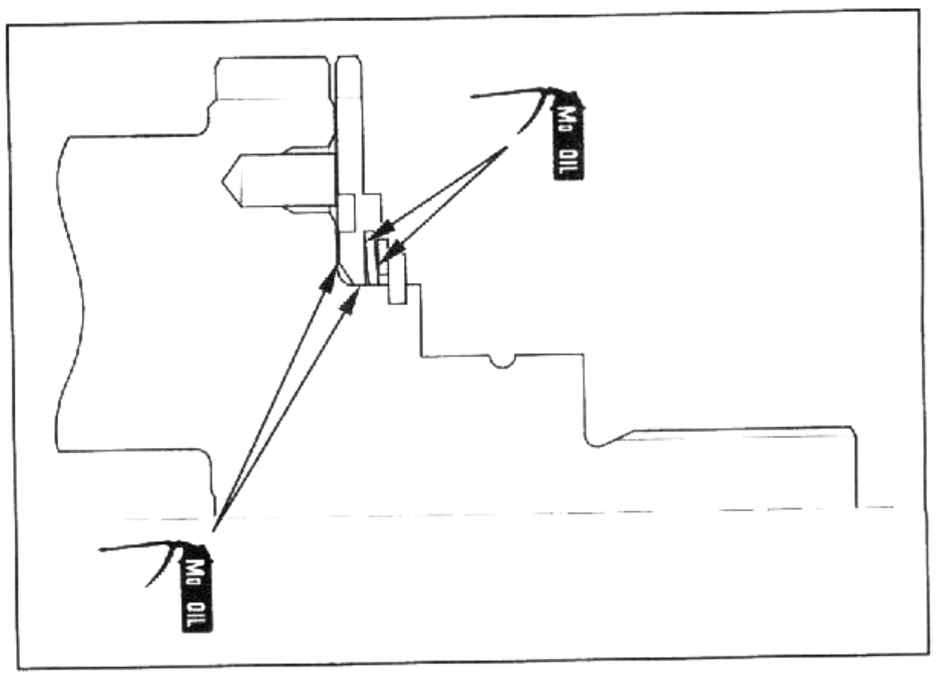
Apply molybdenum disulfide oil to the area shown in the illustration.
Install the friction spring, washer and new special snap ring.

CAUTION:

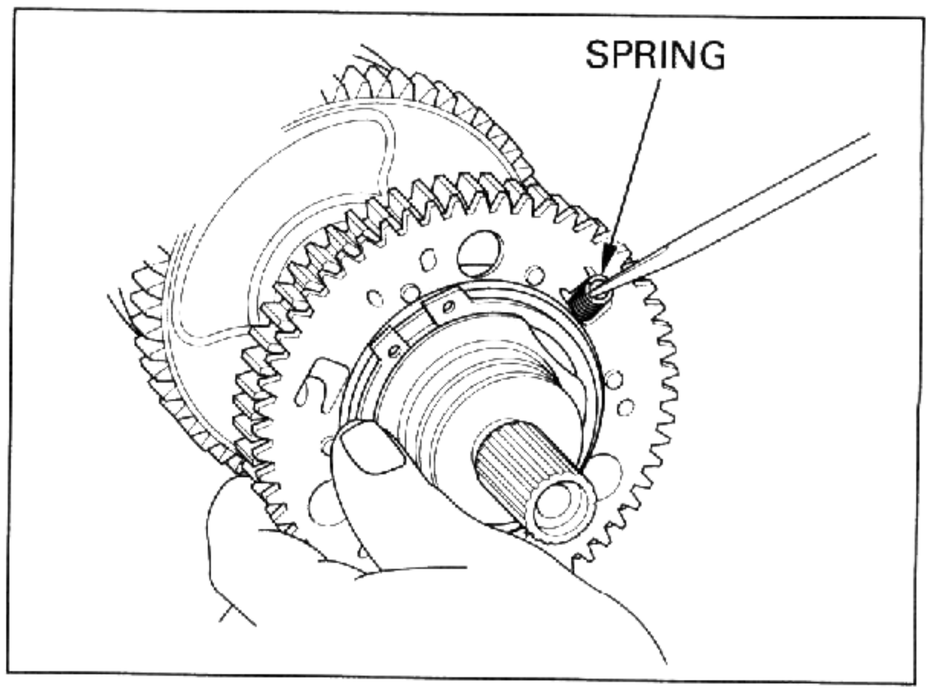
- ***You must use the new special snap ring. Using a snap ring other than specified or reusing the snap ring can cause severe engine damage.***
- ***Install the new special snap ring with its large tab facing to the right and the chamfered side facing in.***
- ***Make sure the new special snap ring end gap is aligned with the right angle of the crankshaft cut-outs as shown.***







Install the springs into the primary drive gear as shown.

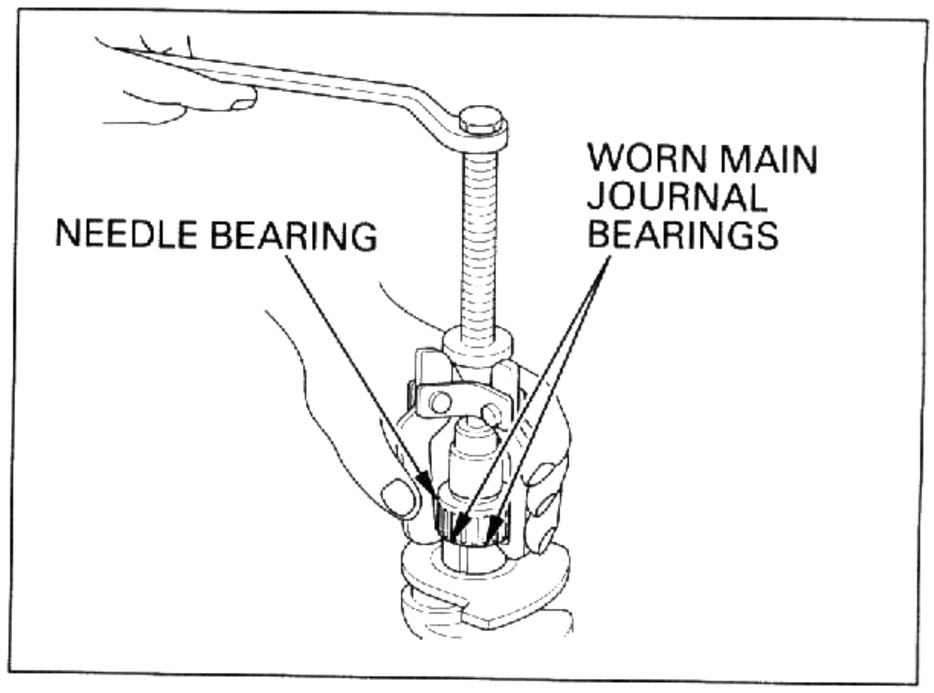


STARTER CLUTCH NEEDLE BEARING REPLACEMENT

Remove the needle bearing with a commercially available universal bearing puller.

CAUTION:

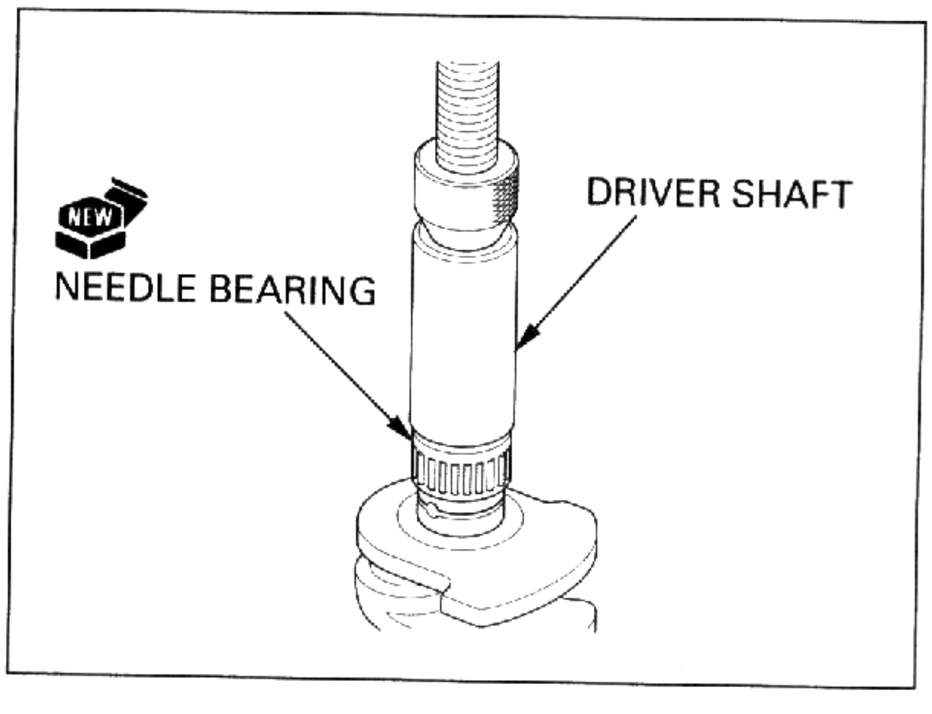
To protect the crankshaft main journal from the bearing puller claws, cover the main journal properly; worn main journal bearings are usable as protectors.



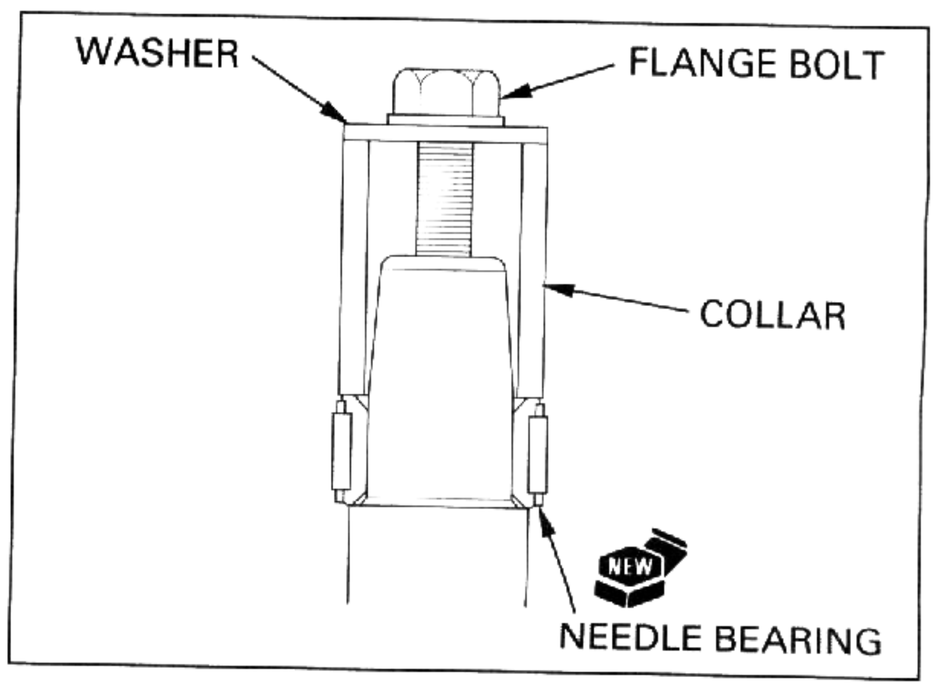
Press a new needle bearing onto the crankshaft using a hydraulic press and special tool.

TOOL:

Driver shaft	07964-MB00200



If the special tool is not available, prepare a suitable collar, washer and 8 mm flange bolt (example; flywheel bolt) for the bearing installation. Assemble the above items, and screw the bolt gradually, then install the new needle bearing.

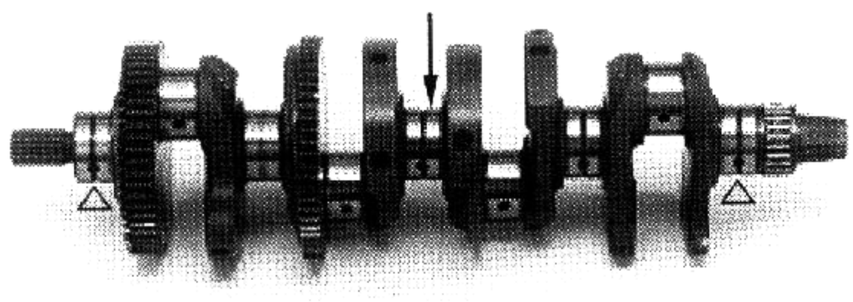


INSPECTION

CRANKSHAFT RUNOUT

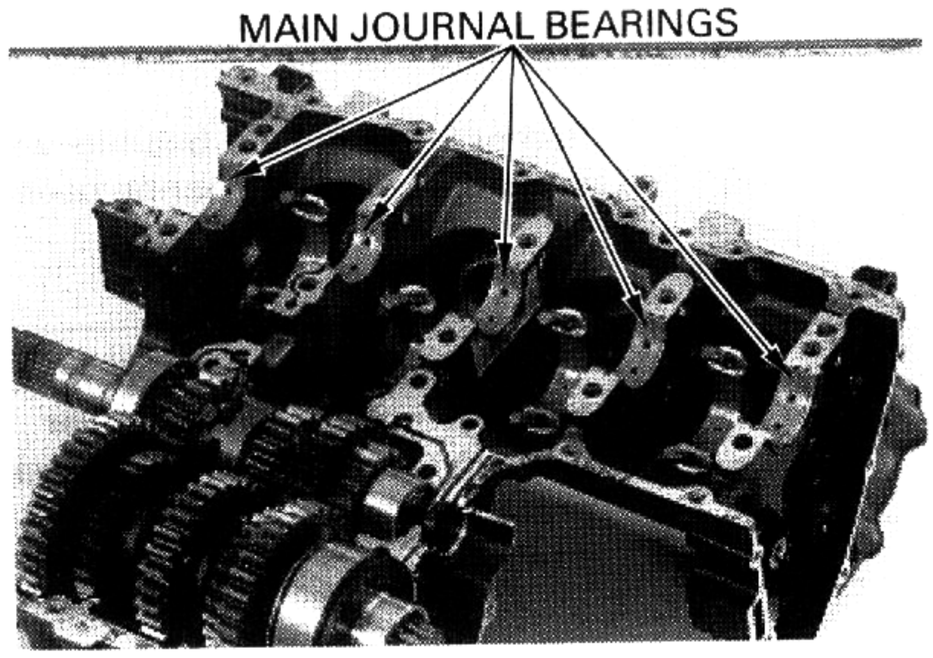
Hold the crankshaft both end.
Set a dial indicator on the center main journal of the crankshaft.
Rotate the crankshaft two revolutions and read runout at the center journal.

SERVICE LIMIT: 0.30 mm (0.012 in)



MAIN JOURNAL BEARING

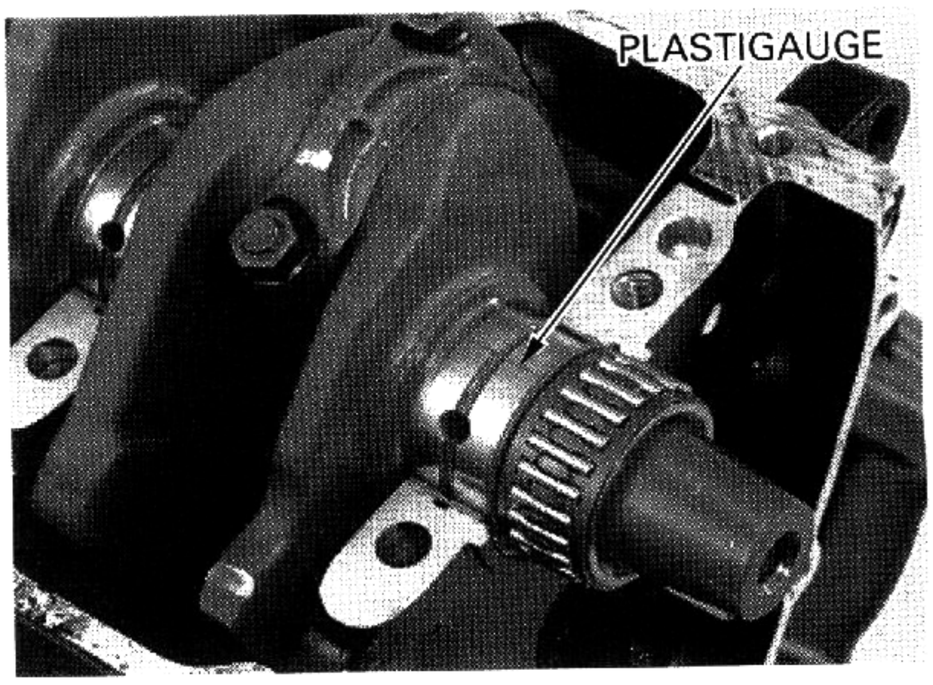
Inspect the main journal bearing inserts for damage or separation.



Wipe the oil from the bearing inserts and journals.
Reinstall the upper crankcase's main journal bearing inserts, then carefully lower the crankshaft in place.
Put a piece of plastigauge on each journals.

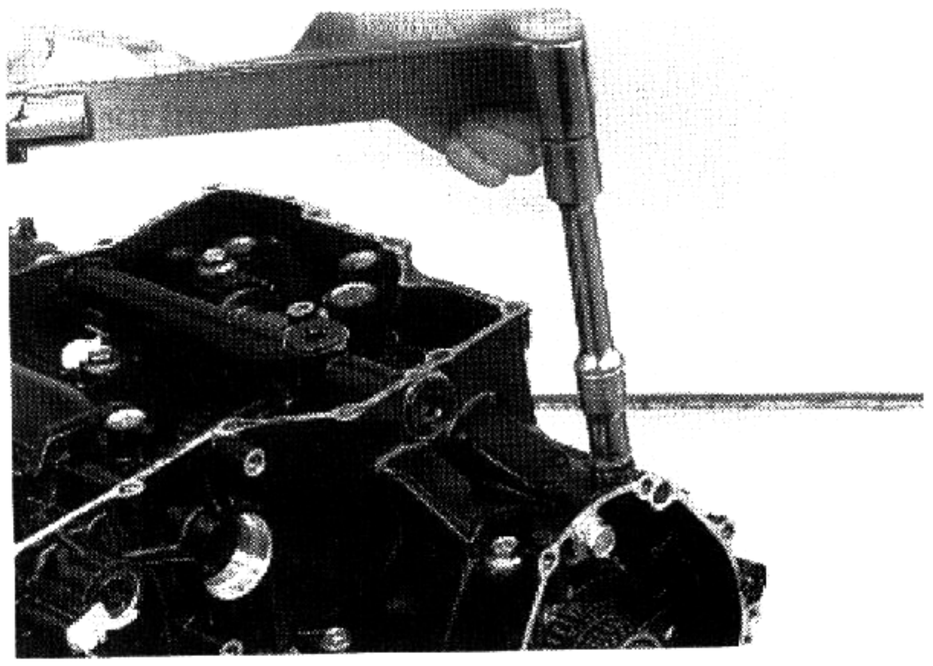
NOTE:

- Do not put the plastigauge over the oil hole in the main bearing journal of the crankshaft.
- Do not rotate the crankshaft during inspection.



Assemble the crankcase halves.
Tighten the 9 mm bolts to the specified torque.

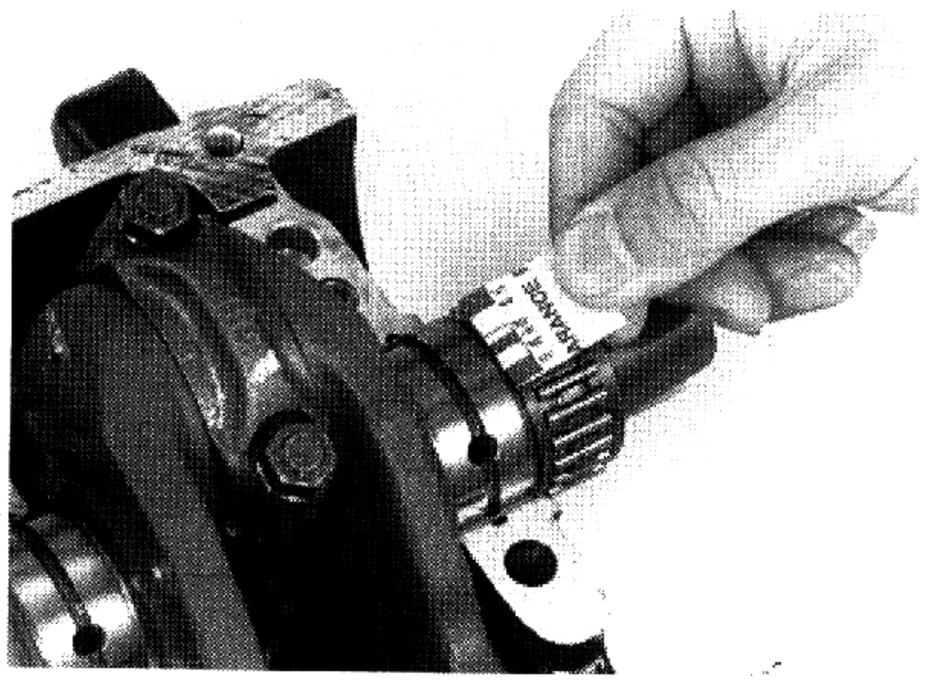
TORQUE: 37 N·m (3.8 kgf·m , 27 lbf·ft)



Remove the 9 mm bolts and lower crankcase.
Measure the compressed plastigauge on each journal.

SERVICE LIMIT: 0.045 mm (0.0018 in)

If main bearing clearance is beyond tolerance, select a replacement bearing.

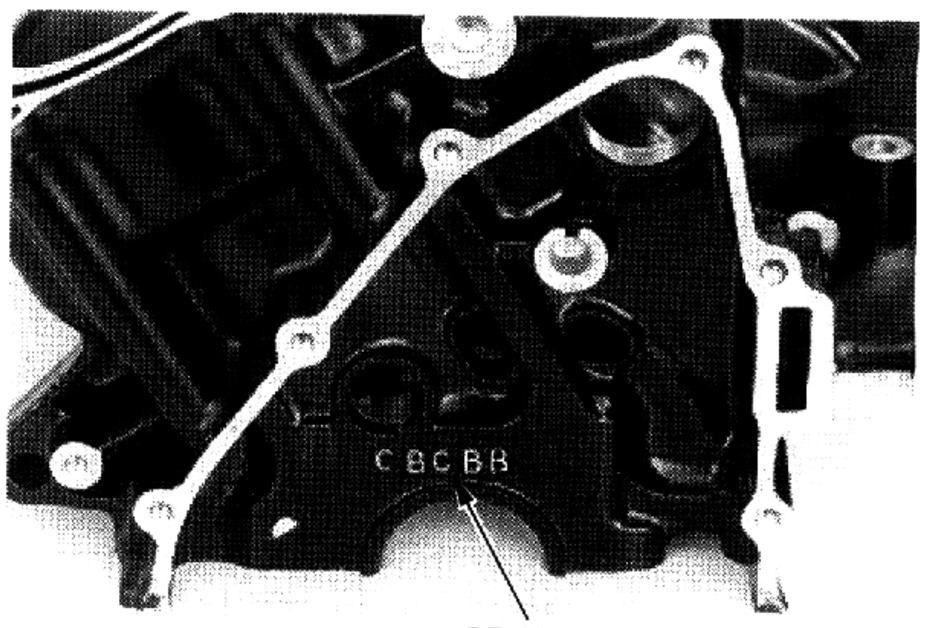


MAIN JOURNAL BEARING SELECTION

Record the crankcase I.D. letters from the pad on the left side of the upper crankcase as shown.

NOTE:

The letters (A, B or C) on the upper crankcase are the codes for the main journal I.D.s from left to right.



CRANKCASE I.D. CODE

Record the corresponding main journal O.D. code numbers from the crank weight.

NOTE:

The numbers (1, 2 or 3) on the crank weight are the codes for the main journal O.D.s from left to right.

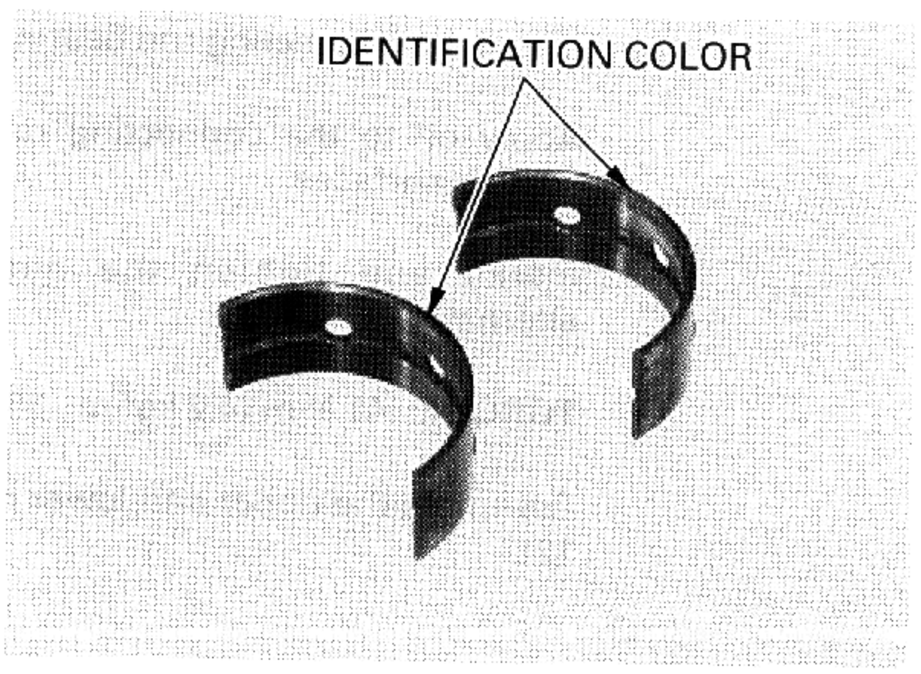
Cross reference the case and journal codes to determine the replacement bearing color codes.


MAIN JOURNAL O.D. CODE

BEARING THICKNESS:
- **A (Black):** Thick
- **B (Brown):**
- **C (Green):**
- **D (Yellow):**
- **E (Pink):** Thin

CAUTION:

After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.



MAIN JOURNAL BEARING SELECTION TABLE

Unit: mm (in)

			CRANKCASE I.D. CODE		
			A	B	C
			43.000 – 43.006 (1.6929 – 1.6931)	43.006 – 43.012 (1.6931 – 1.6934)	43.012 – 43.018 (1.6934 – 1.6936)
CRANKSHAFT O.D. CODE	1	40.000 – 40.006 (1.5748 – 1.5750)	E (Pink)	D (Yellow)	C (Green)
	2	39.994 – 40.000 (1.5746 – 1.5748)	D (Yellow)	C (Green)	B (Brown)
	3	39.988 – 39.994 (1.5743 – 1.5746)	C (Green)	B (Brown)	A (Black)

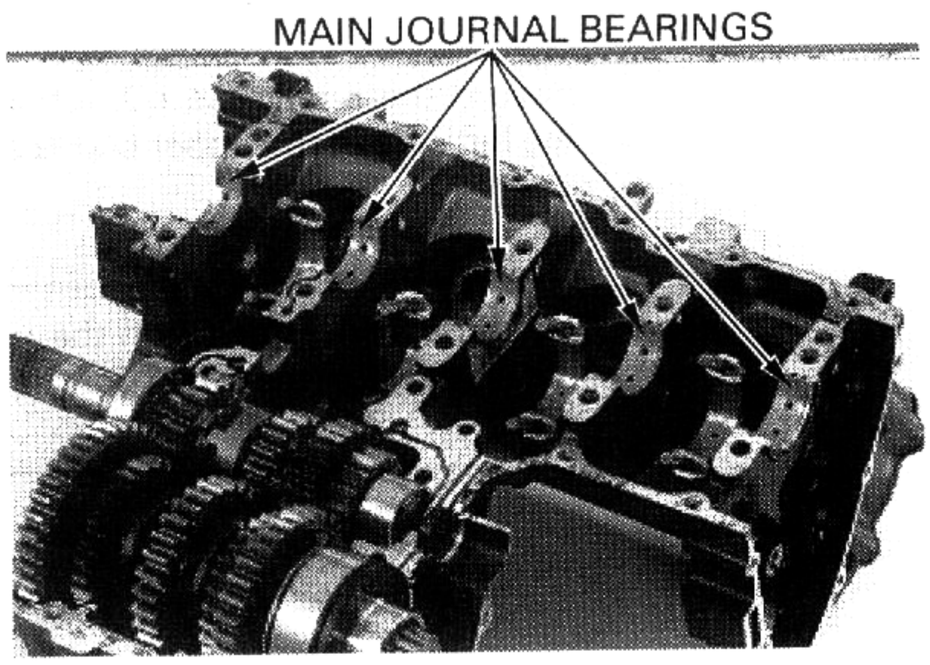
INSTALLATION

Install the main journal bearings into the upper and lower crankcase.

NOTE:

The bearing tabs should be aligned with the grooves in the case.

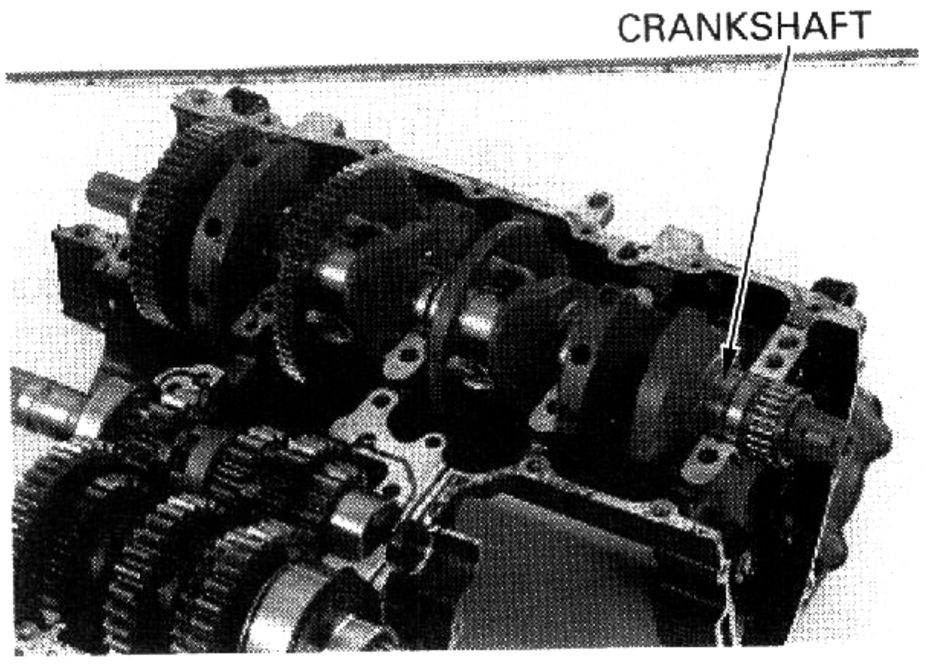
Apply molybdenum disulfide oil to the upper and lower main journal bearings.



Install the crankshaft.

CAUTION:

Before installation, position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod threads.



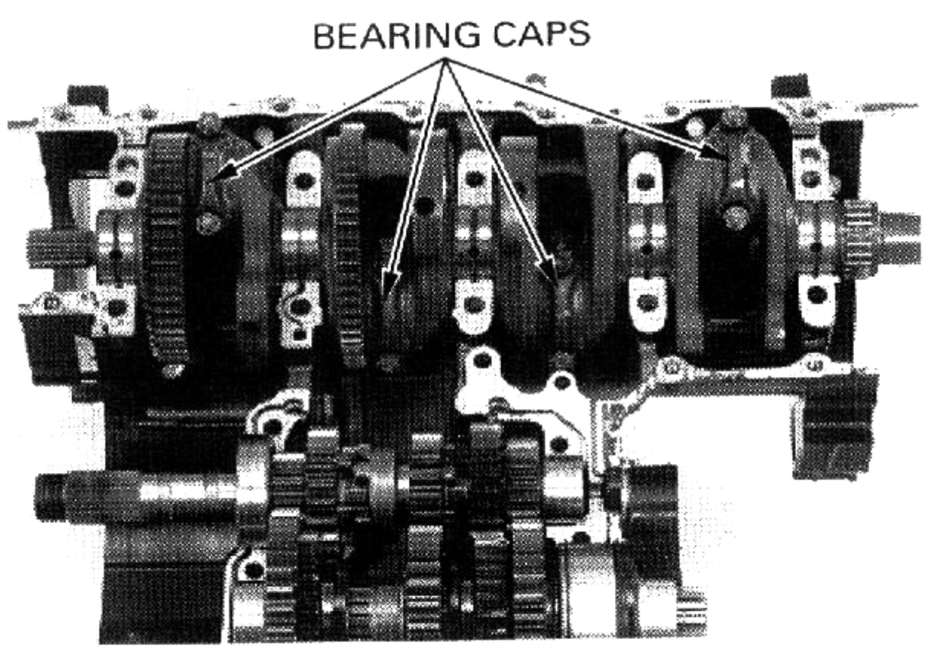
Install the connecting rod bearing caps.

Apply oil to the connecting rod nut threads and seating surfaces.

Install and tighten the nuts gradually and alternately.

TORQUE: 41 N·m (4.2 kgf·m , 30 lbf·ft)

Assemble the upper and lower crankcase (page 11-12).

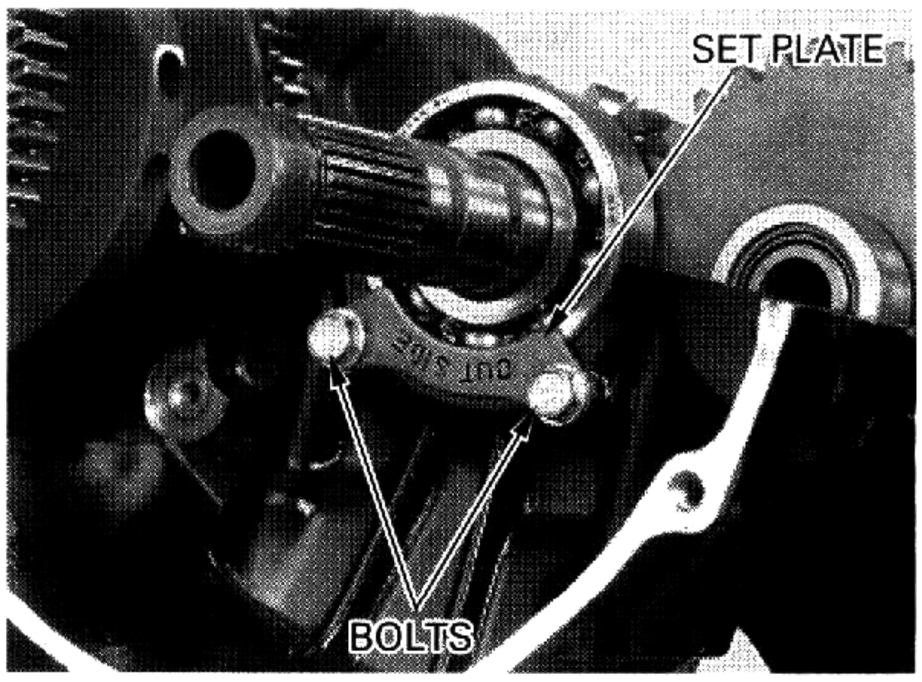


TRANSMISSION

REMOVAL/DISASSEMBLY

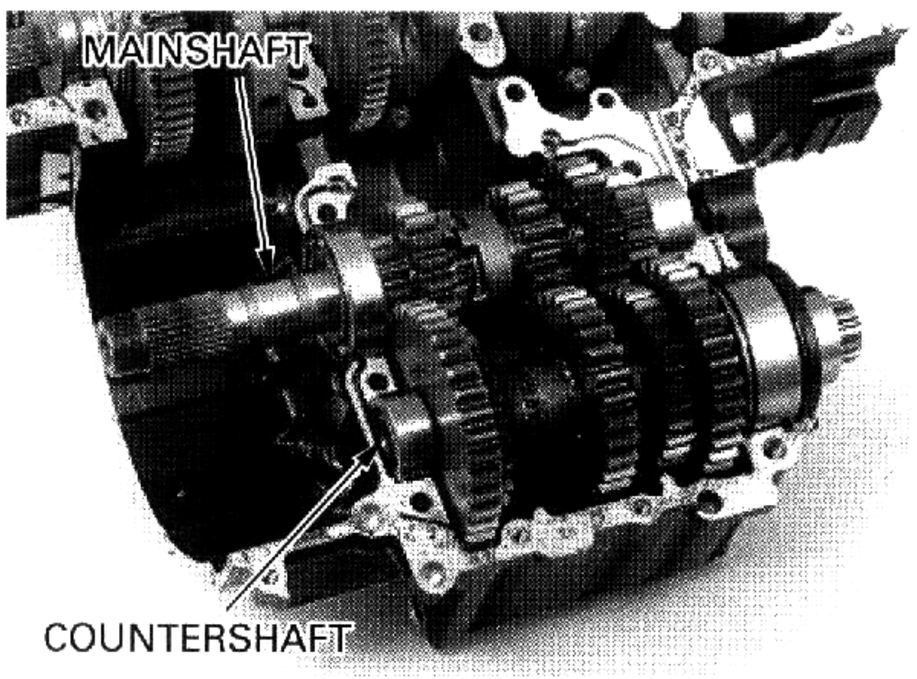
Separate the crankcase halves (page 11-3).

Remove the bolts and mainshaft bearing set plate.



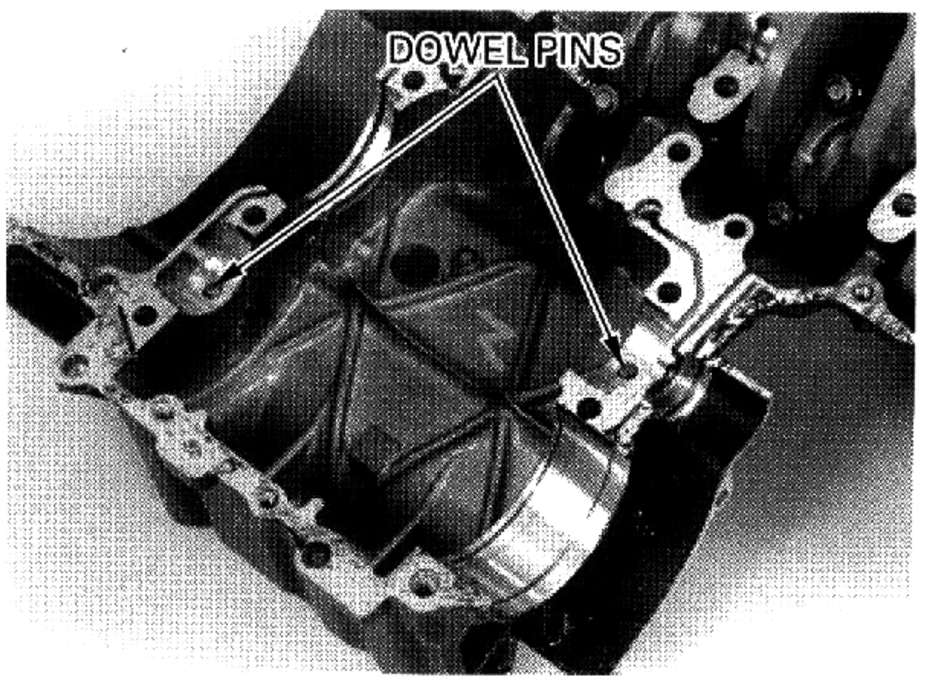
Remove the mainshaft and countershaft assembly.

Remove the oil seal.



Remove the dowel pins.

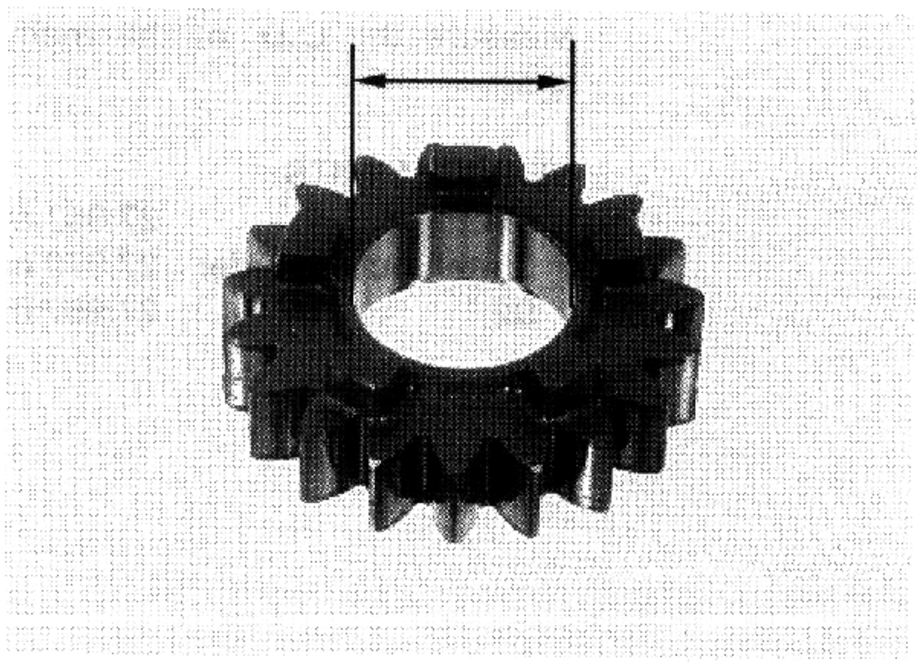
Disassemble the mainshaft and countershaft.



Check the gear dogs, dog holes and teeth for abnormal wear or lack of lubrication.
Measure the I.D. of each gear.

SERVICE LIMITS:

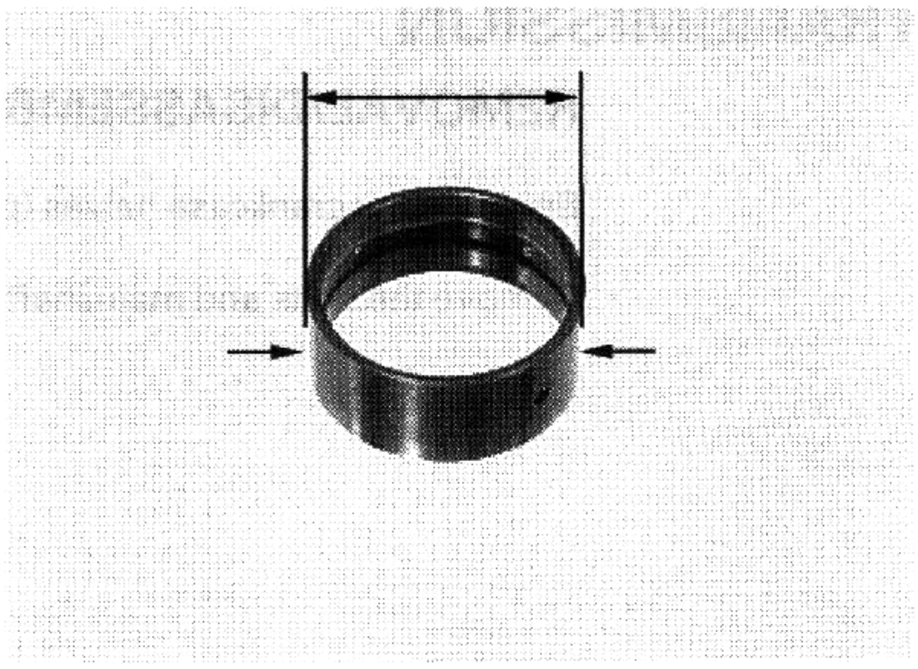
M4, M5:	31.04 mm (1.222 in)
C1:	26.04 mm (1.025 in)
C2, C3:	33.04 mm (1.301 in)



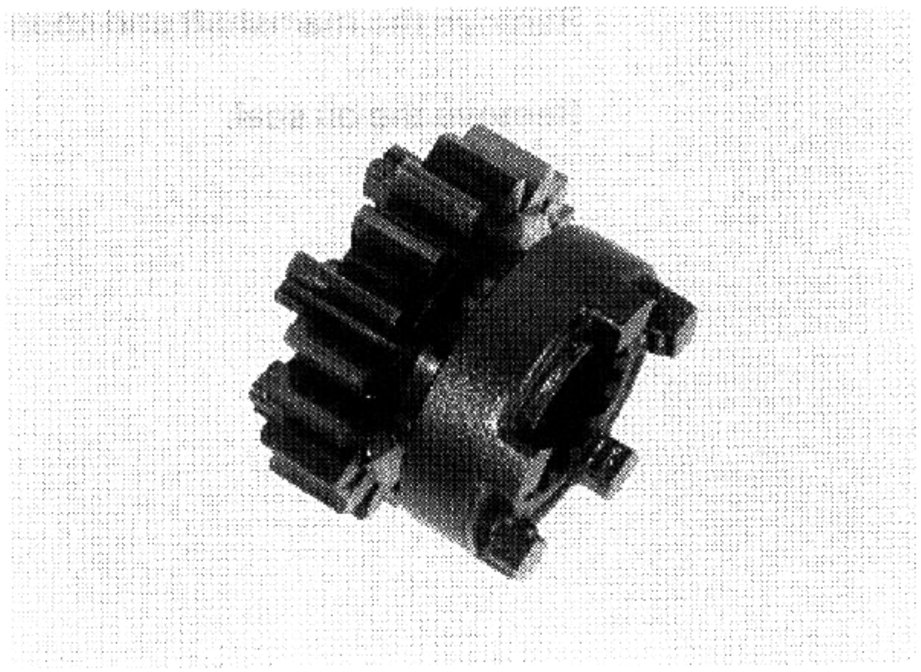
Measure the I.D. and O.D. of each gear bushing.

SERVICE LIMITS:

O.D.:	**M4, M5:**	30.93 mm (1.218 in)
	C2:	32.93 mm (1.296 in)
	C3,distance collar	32.93 mm (1.296 in)
I.D.:	**M4:**	28.02 mm (1.103 in)
	C2:	30.02 mm (1.182 in)



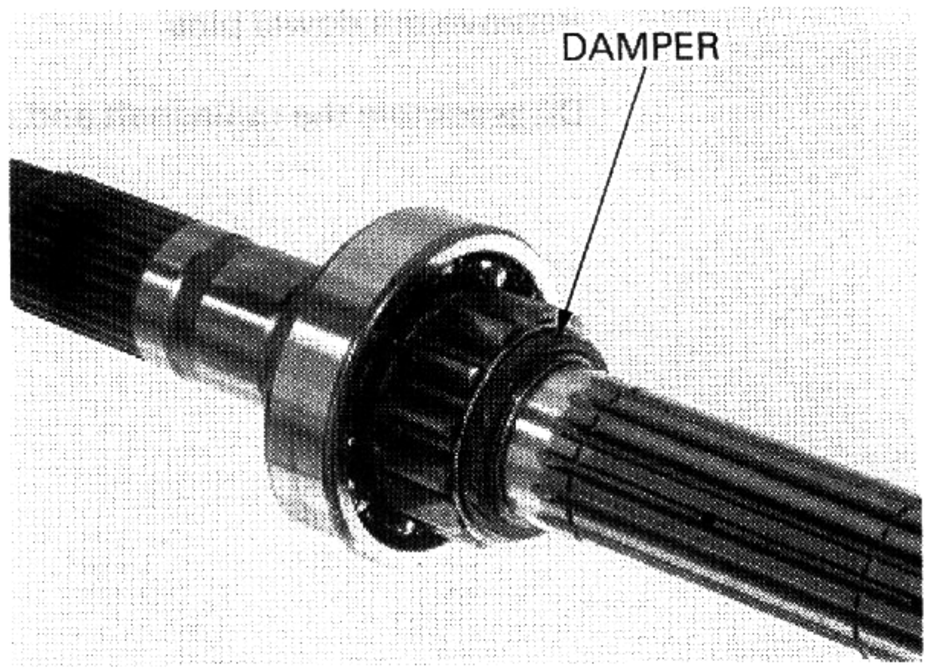
Check the shift fork groove of the shifter gear for excessive wear or damage.



Check the mainshaft damper for wear or damage.

CAUTION:

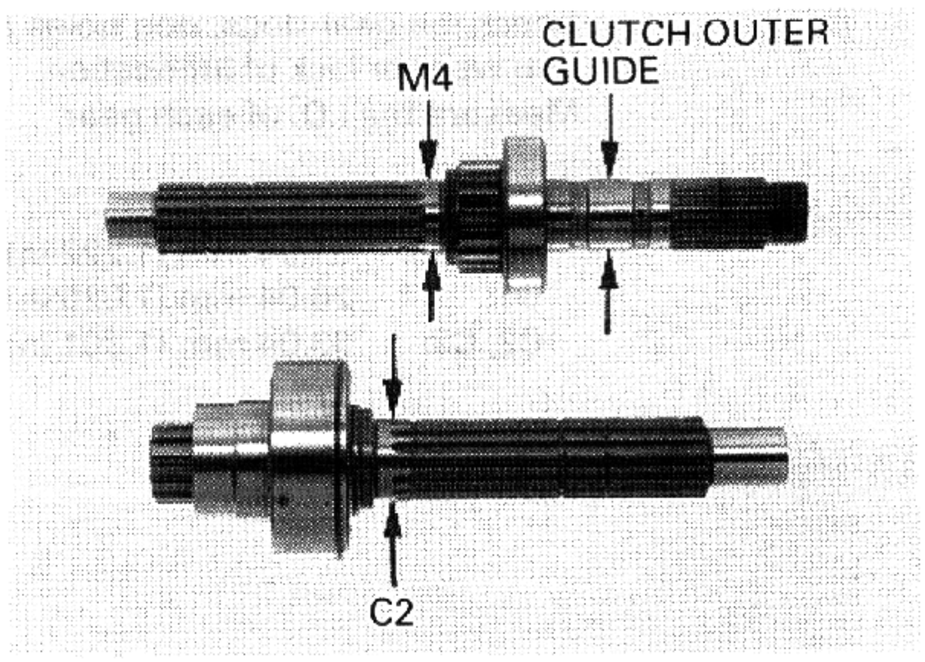
Do not try to remove the mainshaft damper. If it is damaged, replace the mainshaft assembly.



Measure the O.D. of the mainshaft and countershaft.

SERVICE LIMITS:

M4:	27.957 mm (1.1007 in)
Clutch outer guide:	27.970 mm (1.1012 in)
C2:	27.957 mm (1.1007 in)

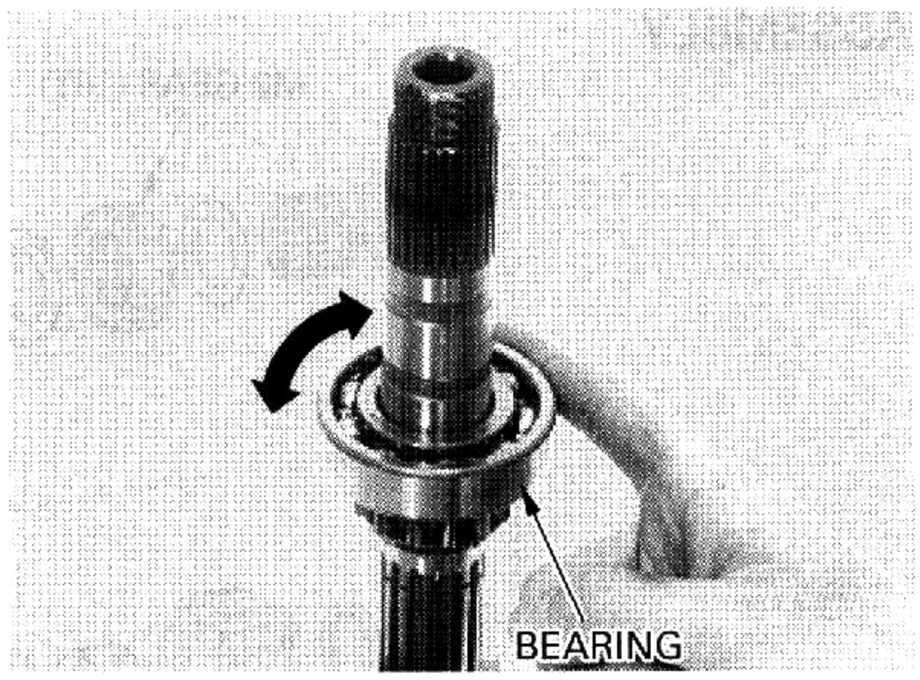


BEARING REPLACEMENT

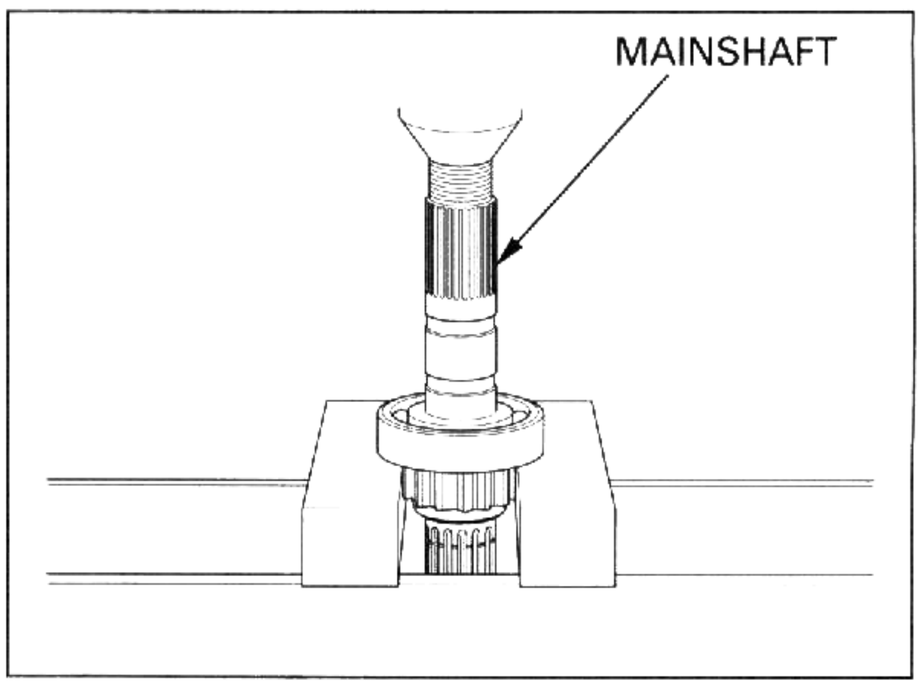
NOTE:

Do not try to remove the countershaft bearing from the shaft. If the bearing is worn or damaged, replace the countershaft as an assembly.

Turn the outer race of each bearing with your finger. The bearings should turn smoothly and quietly.
Also check that the bearing inner race fits tightly on the shaft.
Remove and discard the mainshaft bearing, if the race does not turn smoothly, quietly, or fits loosely on the mainshaft.
Replace the countershaft, collar, and bearing as an assembly, if the race does not turn smoothly, quietly, or fits loosely on the countershaft.



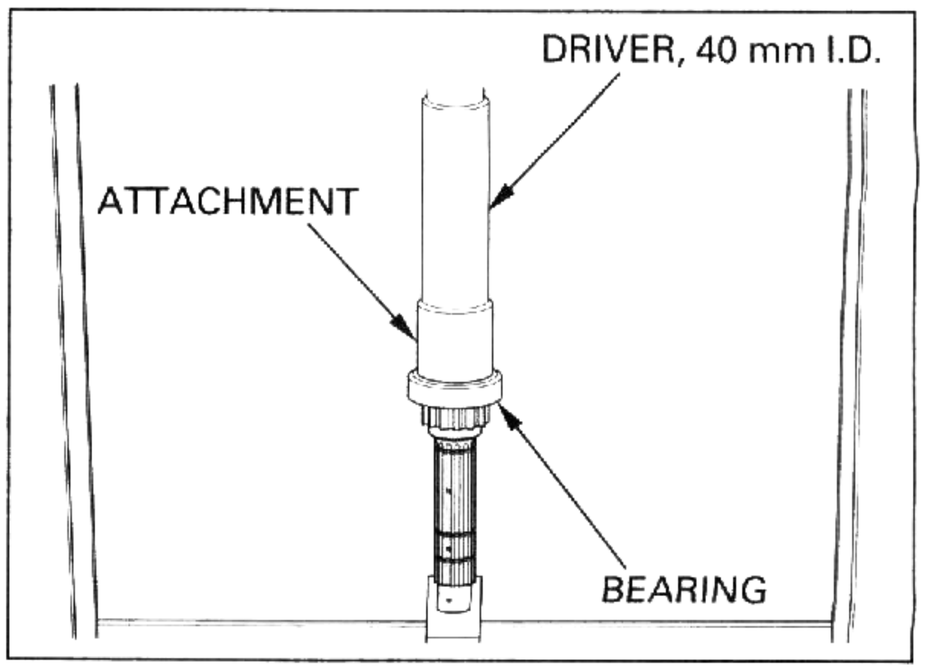
Press out the mainshaft from the bearing using a hydraulic press.



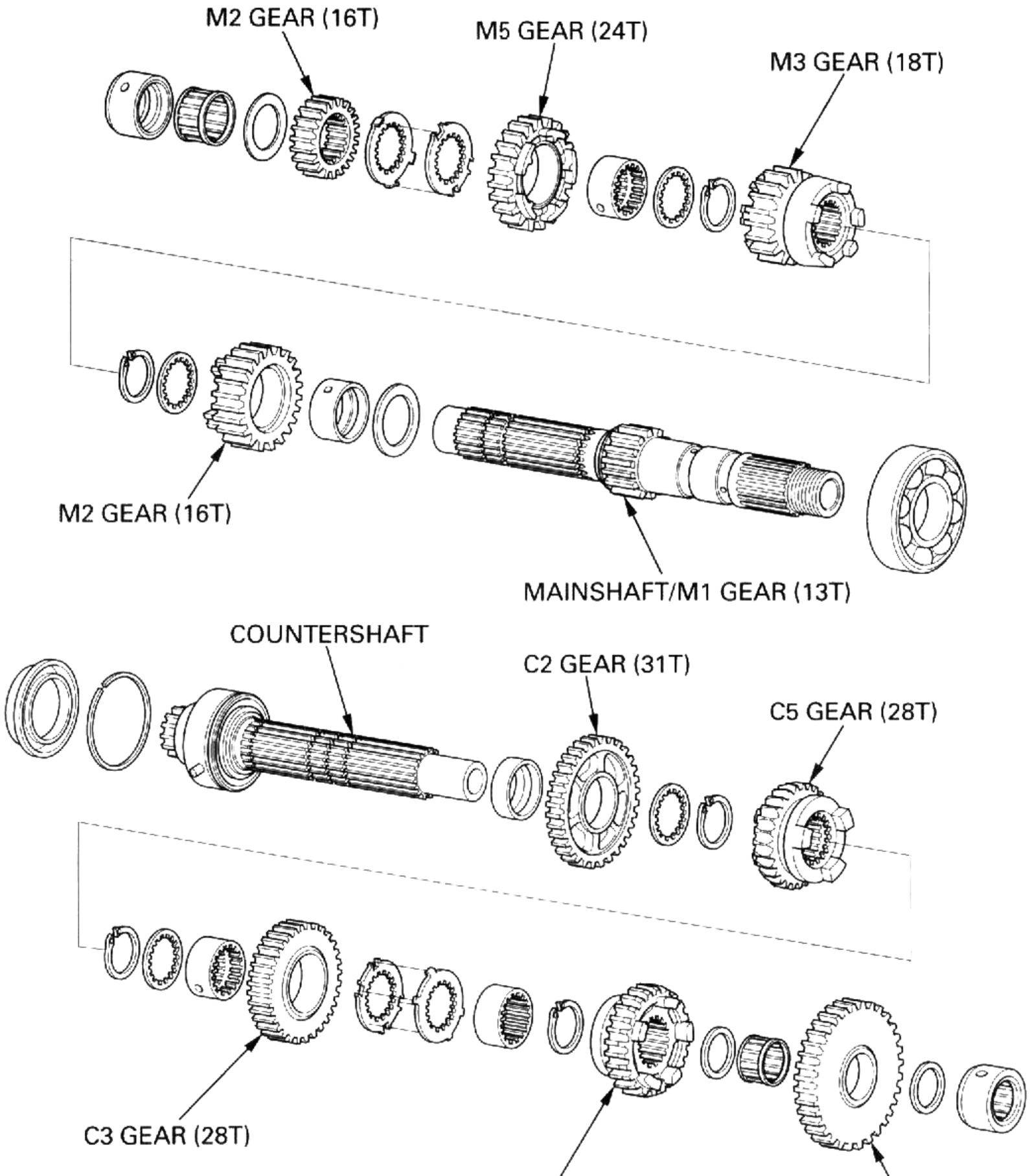
Install a new mainshaft bearing onto the mainshaft by pressing the mainshaft bearing inner race using the special tool.

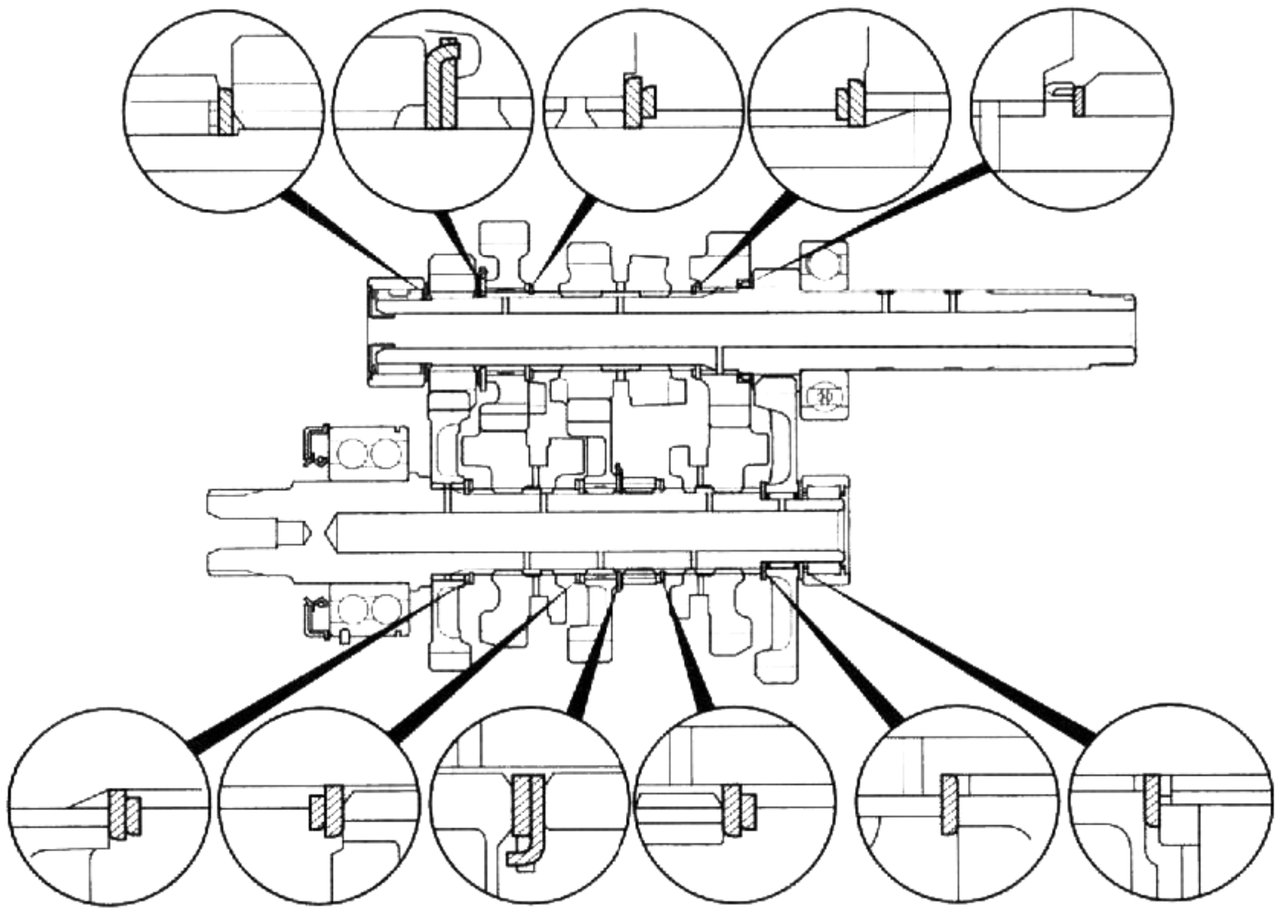
TOOLS:

Driver, 40 mm I.D.	07746-0030100
Attachment, 30 mm	07746-0030300



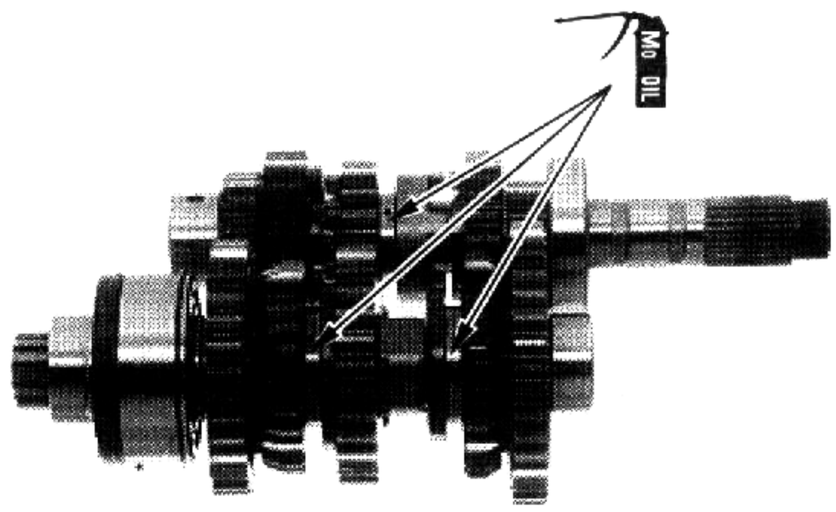
ASSEMBLY


M2 GEAR (16T)
M5 GEAR (24T)
M3 GEAR (18T)
M2 GEAR (16T)
MAINSHAFT/M1 GEAR (13T)
COUNTERSHAFT
C2 GEAR (31T)
C5 GEAR (28T)
C3 GEAR (28T)
C4 GEAR (25T)
C1 GEAR (36T)



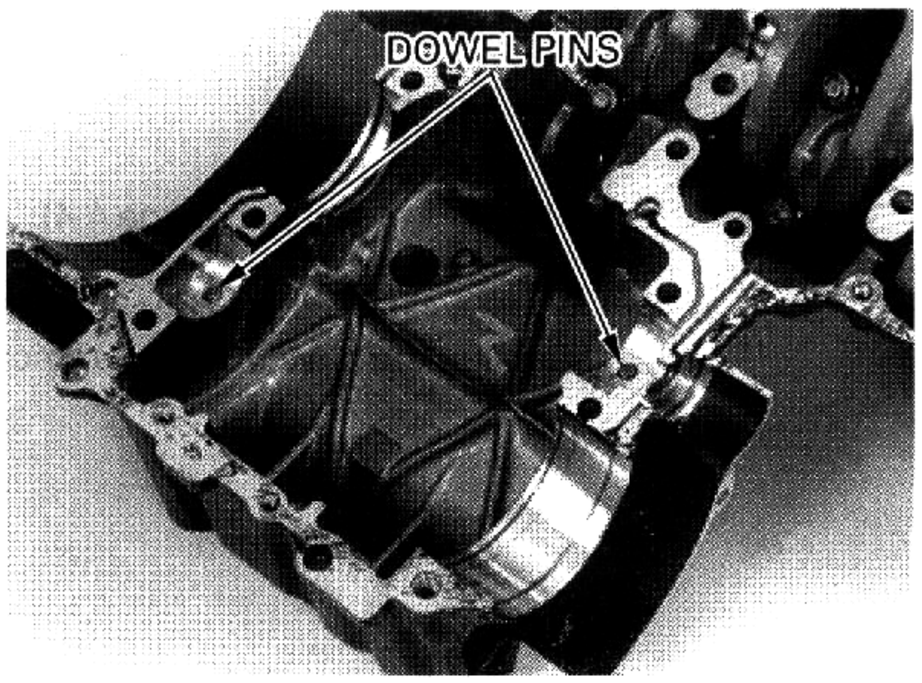
Assemble the transmission gear and shafts.
Coat each gear with clean engine oil and check for smooth movement.

Apply molybdenum disulfide oil to the shift fork grooves in the M3, C4 and C5 gear.

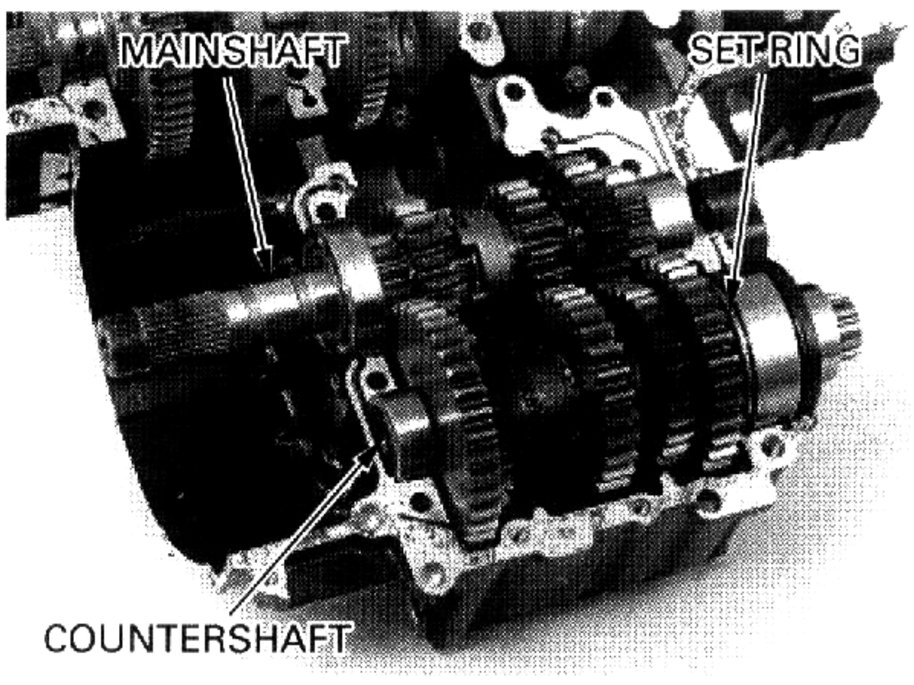


INSTALLATION

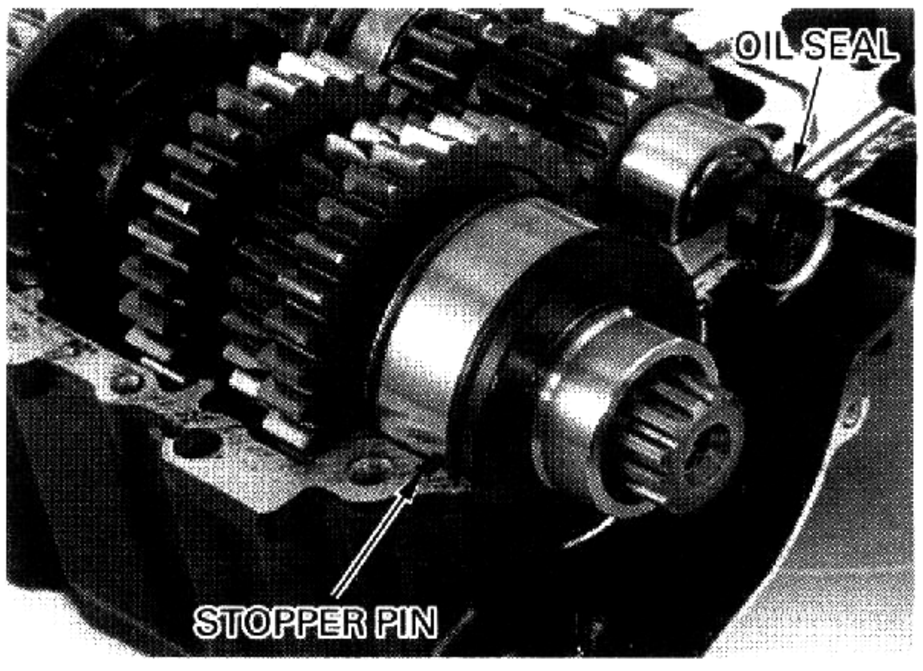
Install the dowel pins on the upper crankcase holes.



Install the mainshaft and countershaft by aligning the countershaft bearing set ring with the groove on the crankcase, and aligning the bearing cap holes with the dowel pins.



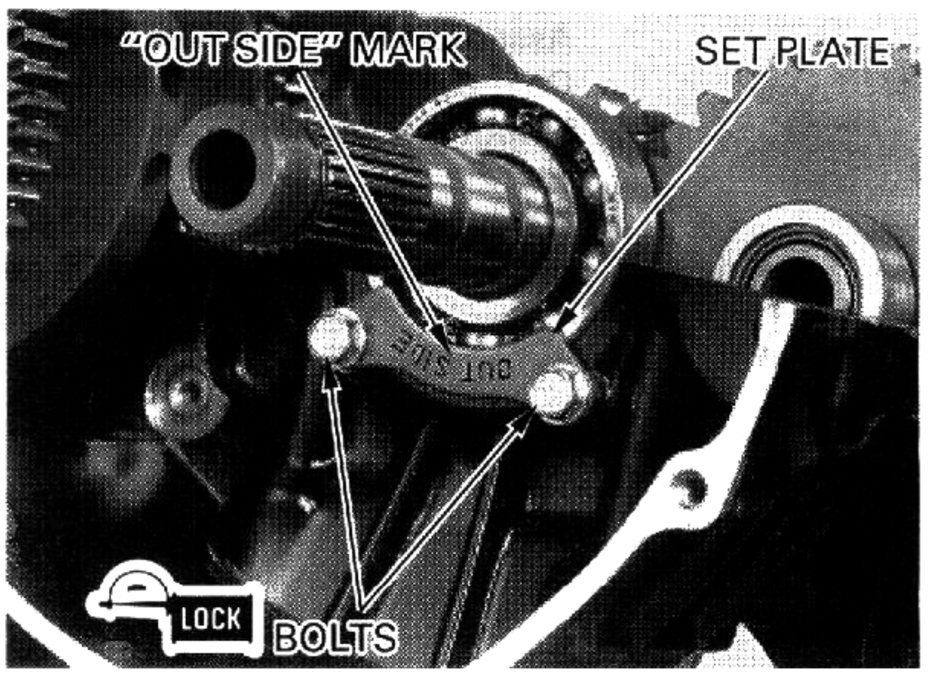
Also align the countershaft bearing stopper pin with the groove in the crankcase.



Apply a looking agent to the mainshaft bearing set plate bolt threads.
Install the mainshaft bearing set plate with its "OUT SIDE" mark facing out and tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Assemble the crankcase (page 11-12).



BALANCER

REMOVAL

Remove the oil pan (page 4-4).

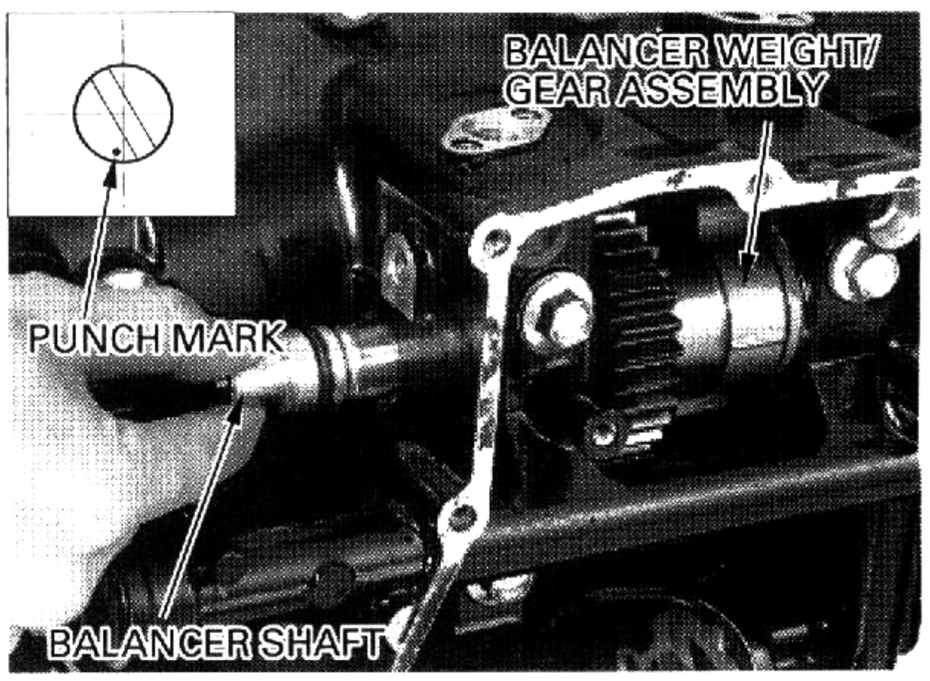
Remove the balancer shaft holder bolt.
Loosen the pinch bolt and remove the holder.



Rotate the balancer shaft and place the punch mark on the shaft facing down.

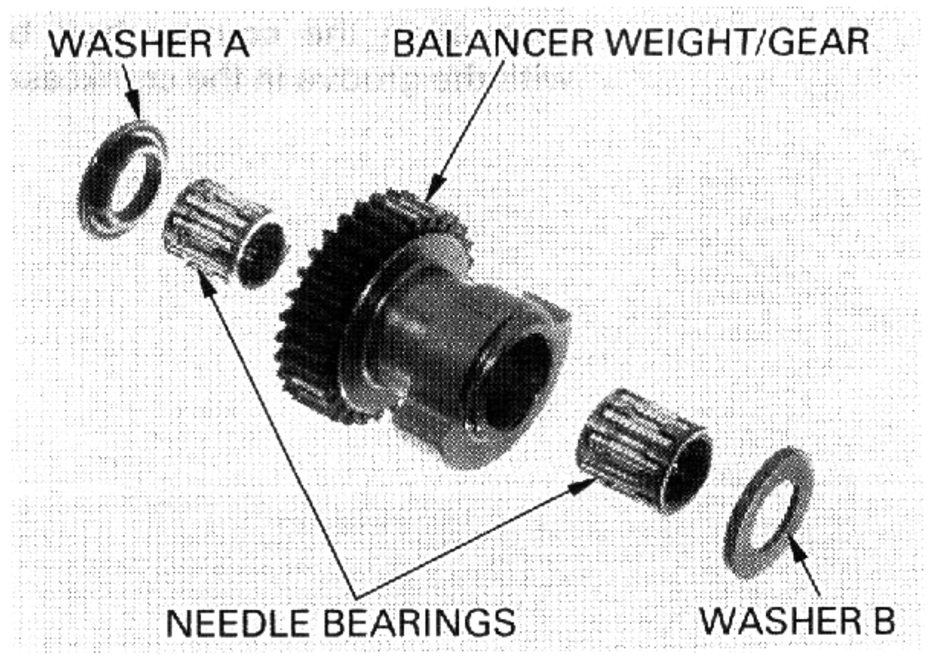
Pull the balancer shaft out and remove the balancer weight/gear assembly.

The balancer shaft will only come out from one particular position. Rotate it until it comes out easily; do not force it out.

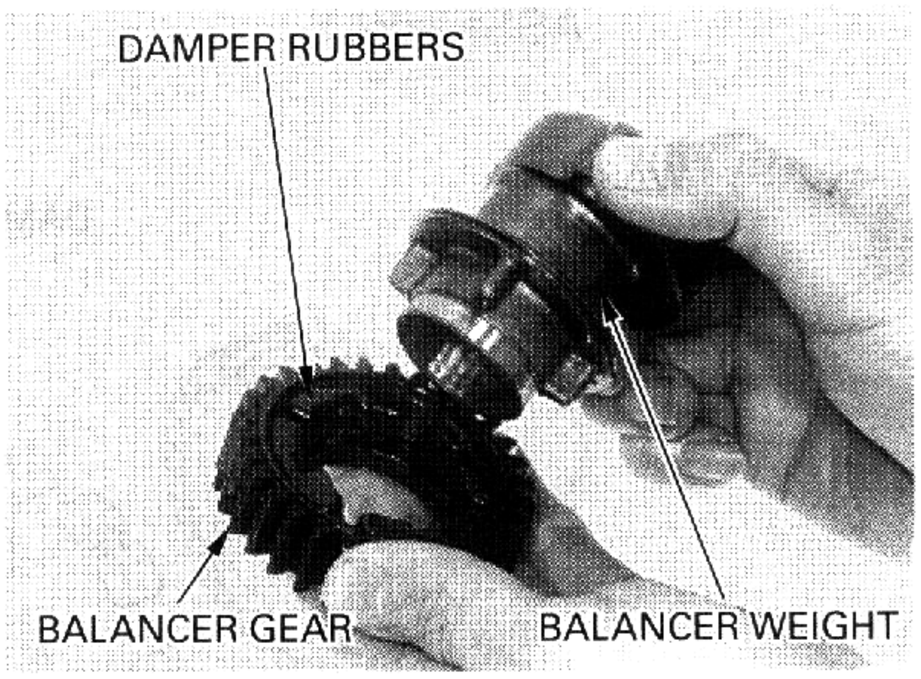


DISASSEMBLY

Remove the side washer A, B and needle bearings from the balancer weight.



Remove the balancer gear and damper rubbers from the balancer weight.



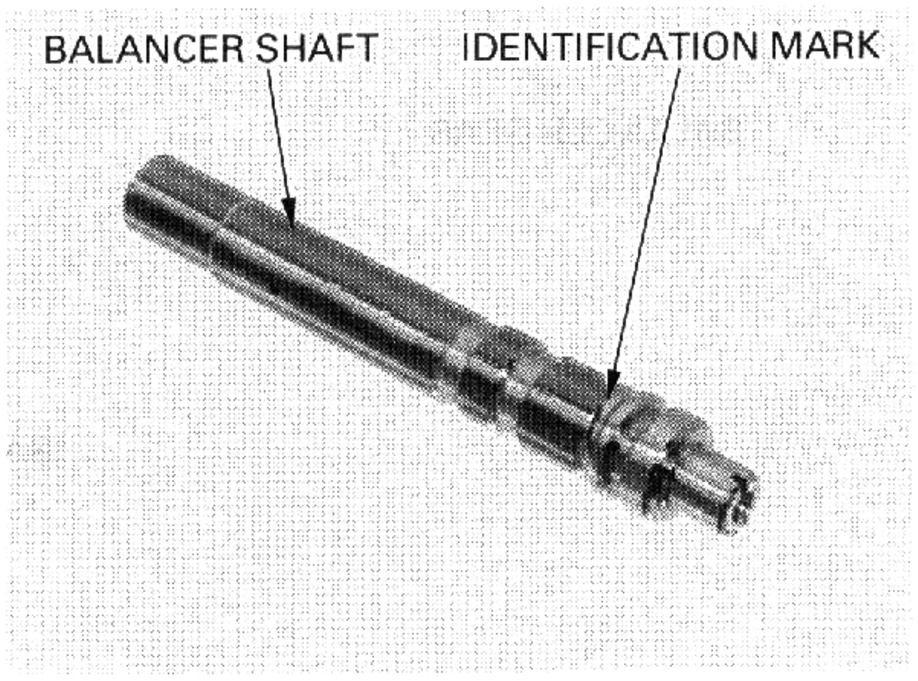
INSPECTION

NOTE:

Replace the balancer weight, shaft and needle bearings as an assembly.

Check the needle bearing sliding surfaces of the balancer weight for wear, damage or excessive scratches.

Check the needle bearing sliding surfaces of the balancer shaft for wear, damage or excessive scratches.



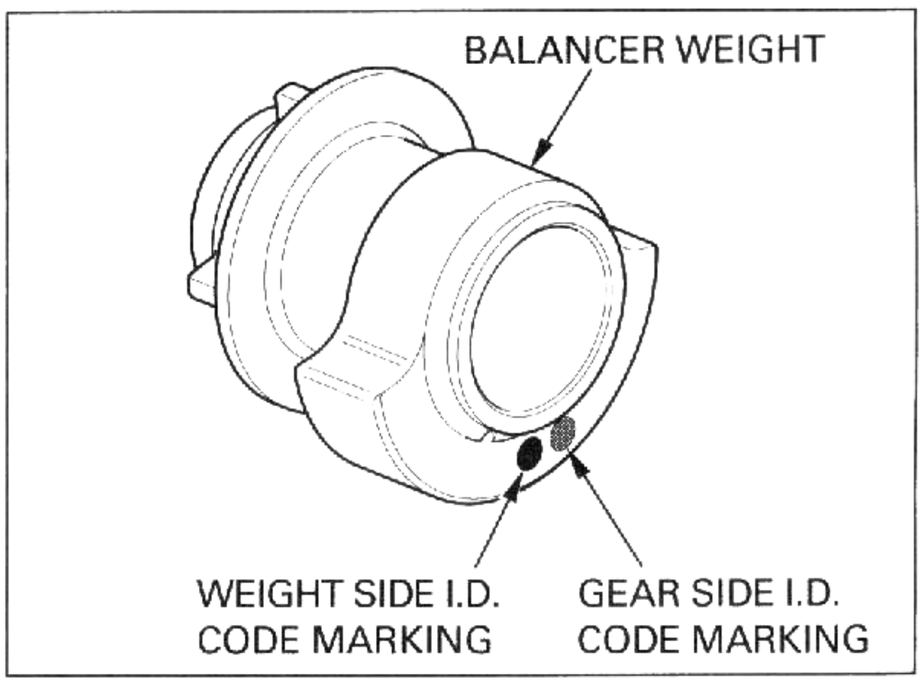
BALANCER BEARING SELECTION

NOTE:

The balancer weight, shaft and needle bearings are select fitted (selection table; see below).

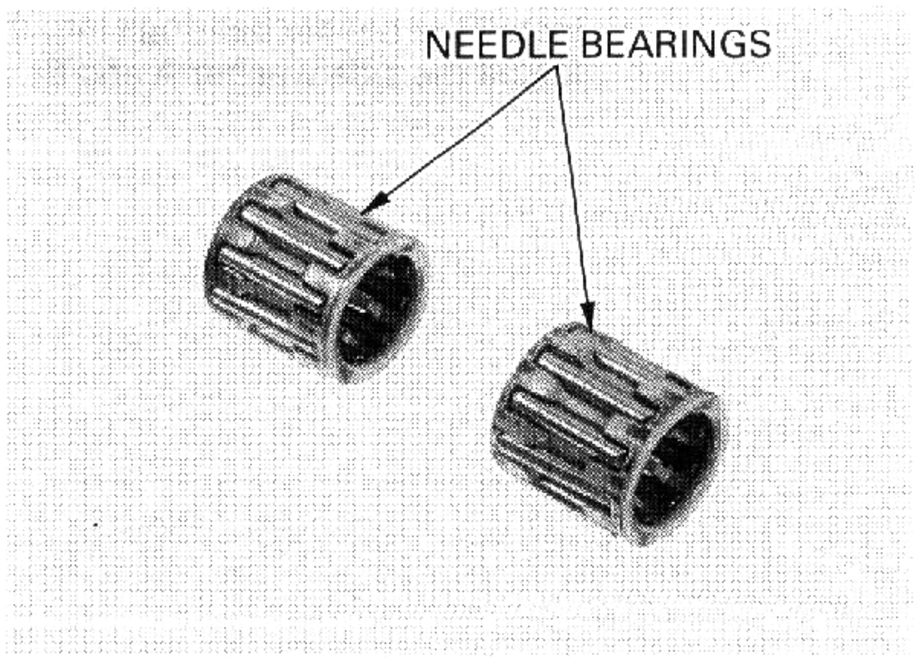
The balancer shaft has a I.D. code number or color.

The balancer weight has two I.D. code markings as shown.
The markings are identified each I.D. of the balancer weight as shown.



Cross-reference the balancer shaft and balancer weight codes determine the replacement bearing color.
Refer to the selection table below for bearing selection.

Check the needle bearing for smooth operation.

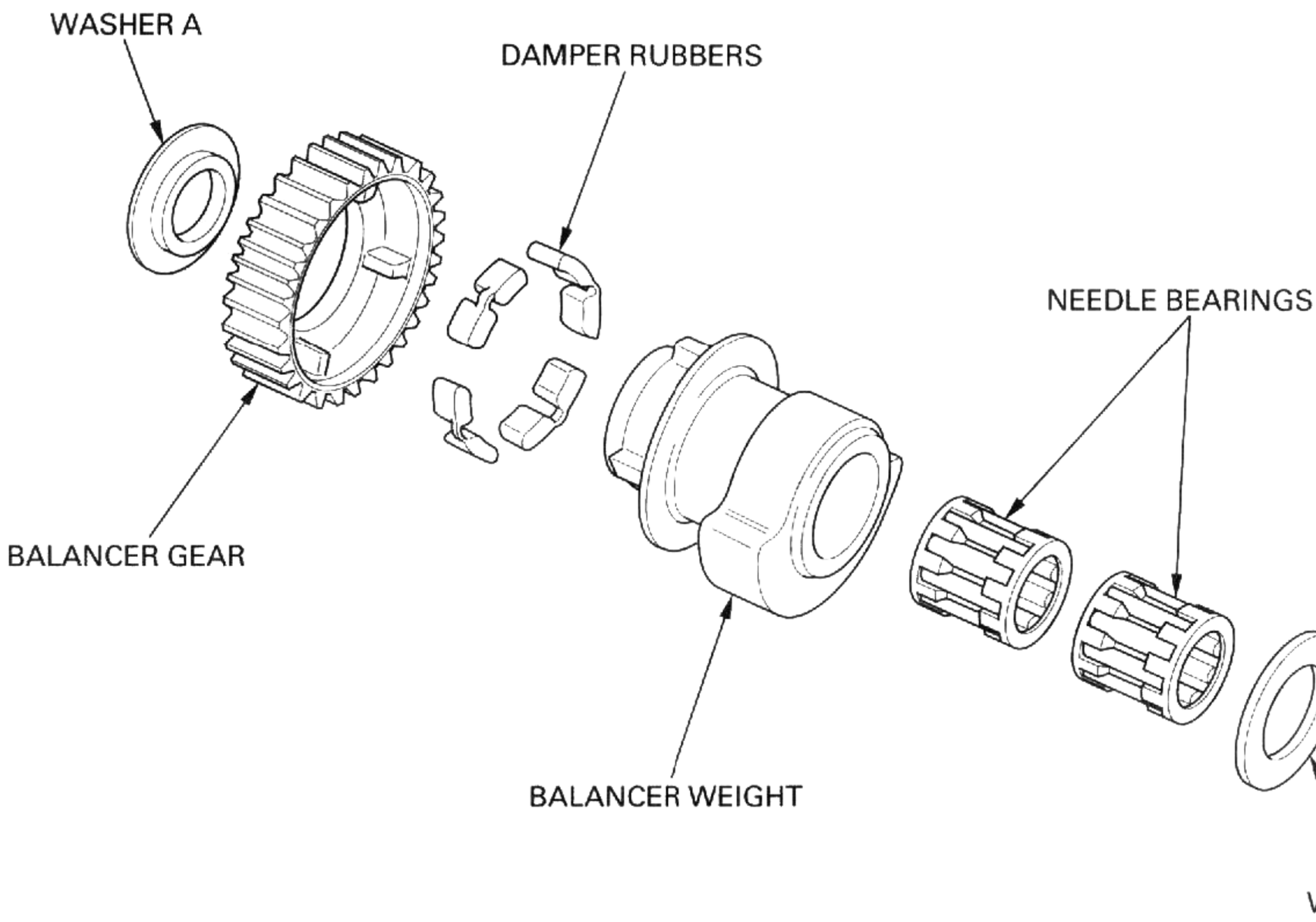


BALANCER BEARING SELECTION TABLE:

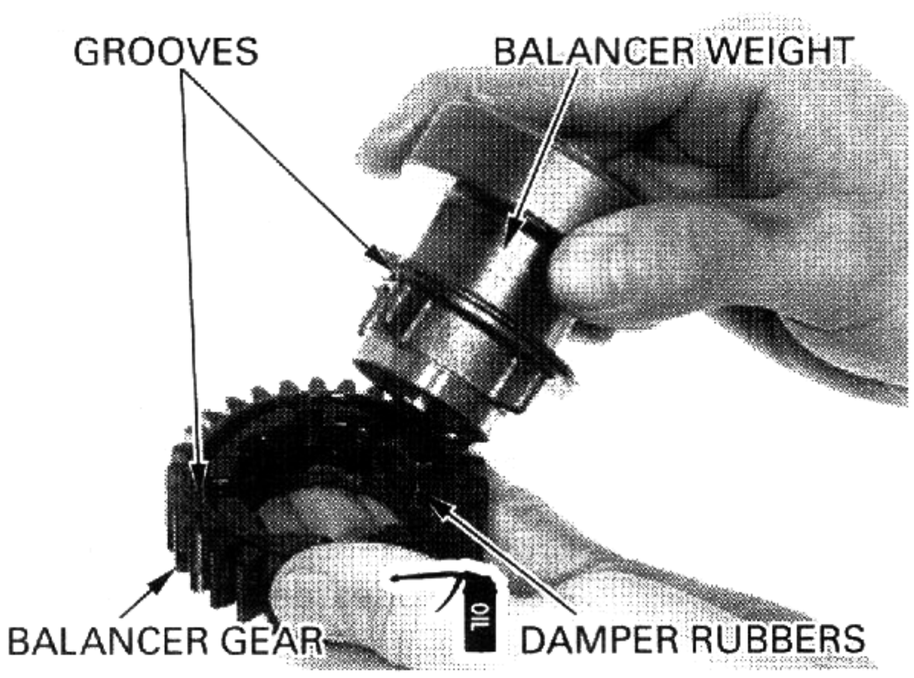
Unit: mm (in)

BALANCER WEIGHT I.D. CODE \ BALANCER SHAFT O.D. CODE		1 or Blue 17.996 – 18.000 (0.7085 – 0.7087)	2 or Black 17.991 – 17.996 (0.7083 – 0.7085)	3 or Red 17.987 – 17.991 (0.7081 – 0.7283)
A	26.996 – 27.000 (1.0628 – 1.0630)	C White	B Blue	A Red
B	26.991 – 26.996 (1.0626 – 1.0628)	D Green	C White	B Blue
C	26.987 – 26.991 (1.0625 – 1.0626)	E Yellow	D Green	C White

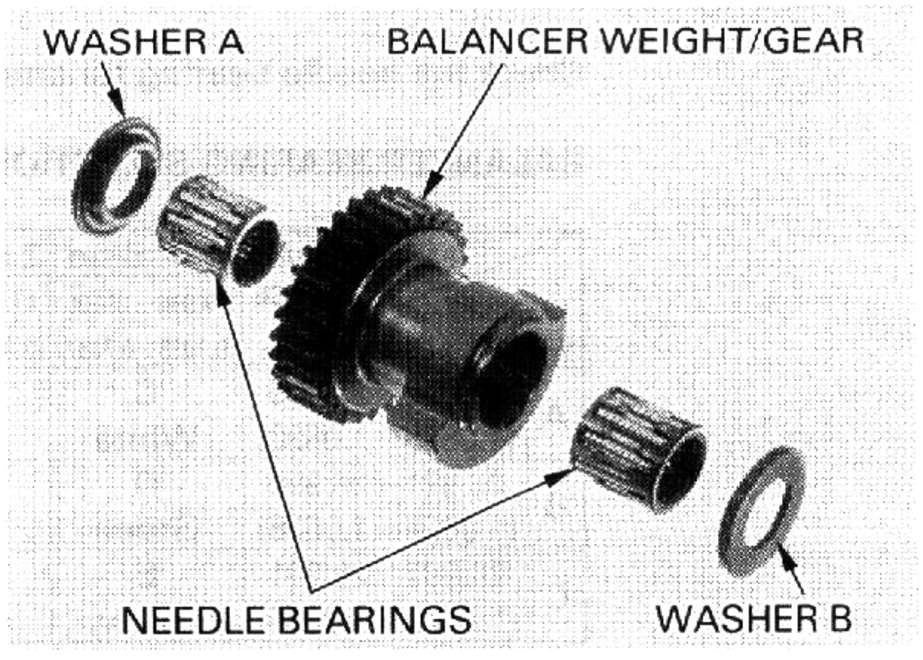
ASSEMBLY



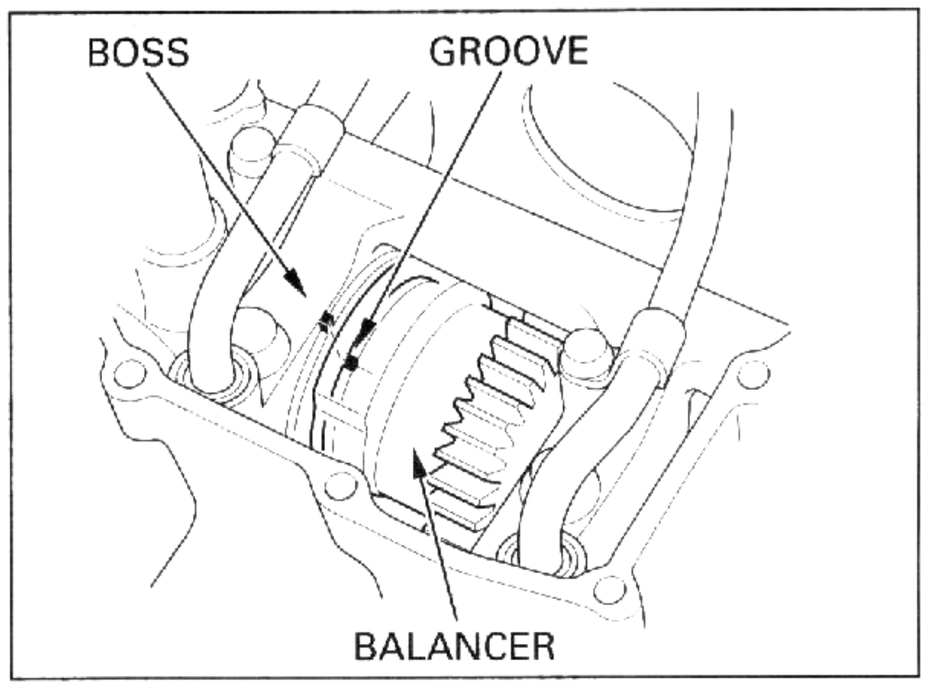
Apply clean engine oil to the damper rubbers.
Install the damper rubbers into the groove of the balancer gear.
Install the balancer gear onto the balancer weight while aligning the grooves.



Install the needle bearings into the balancer weight.
Install the side washer A and B.

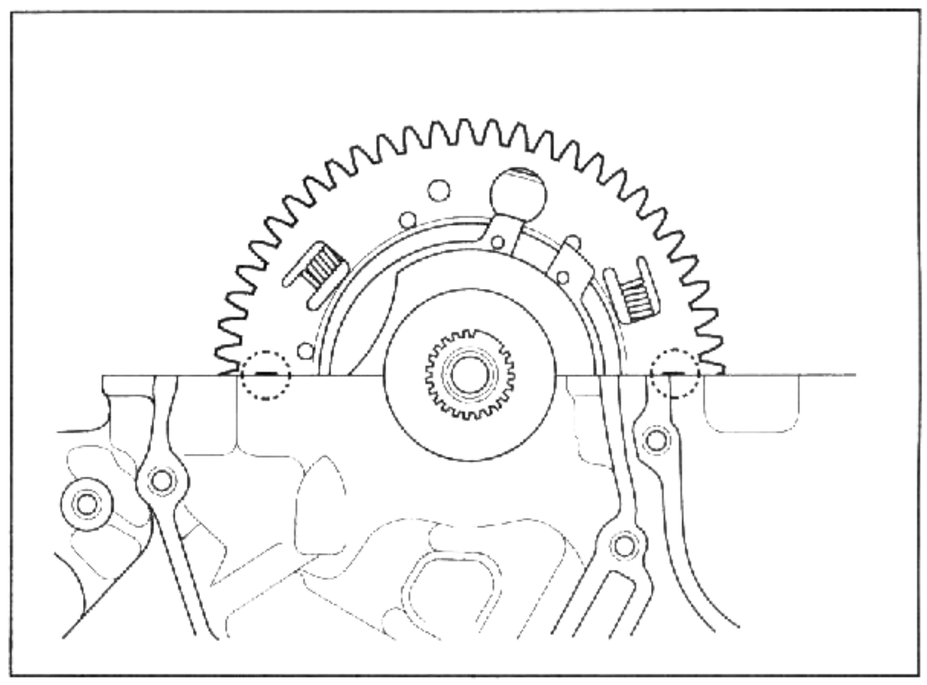


Set the balancer assembly onto the crankshaft drive gear while aligning it index groove with the boss on the lower crankcase.



NOTE:

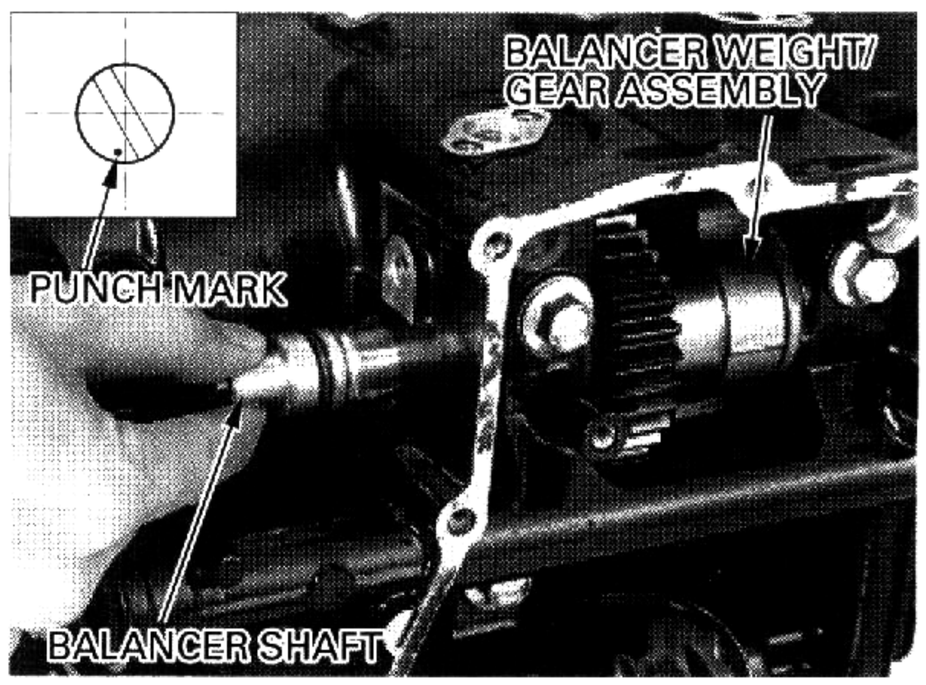
Make sure the No. 1 piston at TDC.



Install a new O-ring into the groove of the front balancer shaft.
Apply small amount of oil to the O-ring.

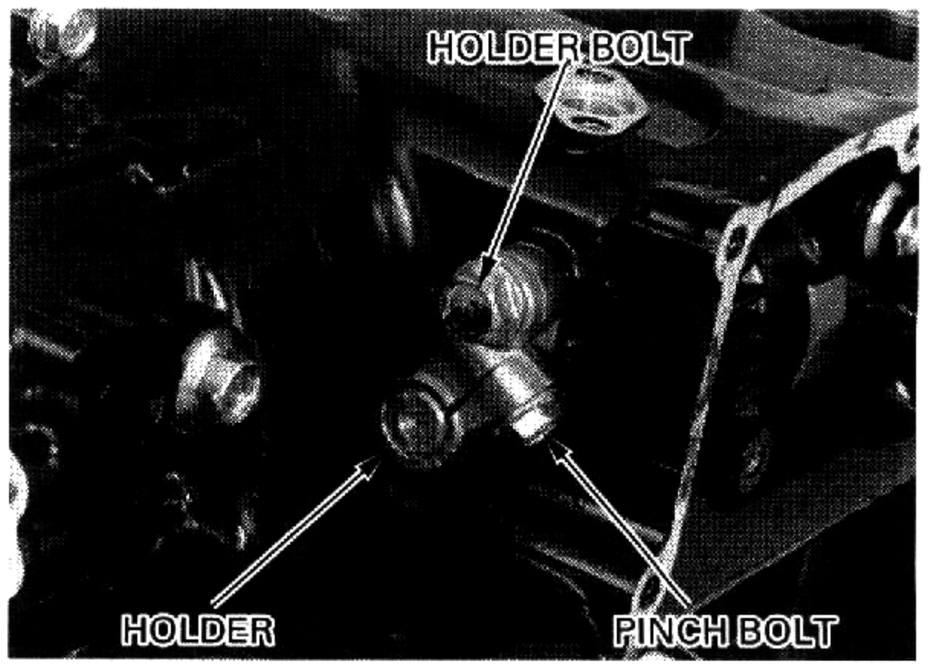
The balancer shaft will only installed one particular position. Rotate it until it installed easily; do not force it in.

Install the balancer shaft with its punch mark facing down.



Install the balancer shaft holder and tighten the holder bolt to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m , 20 lbf·ft)



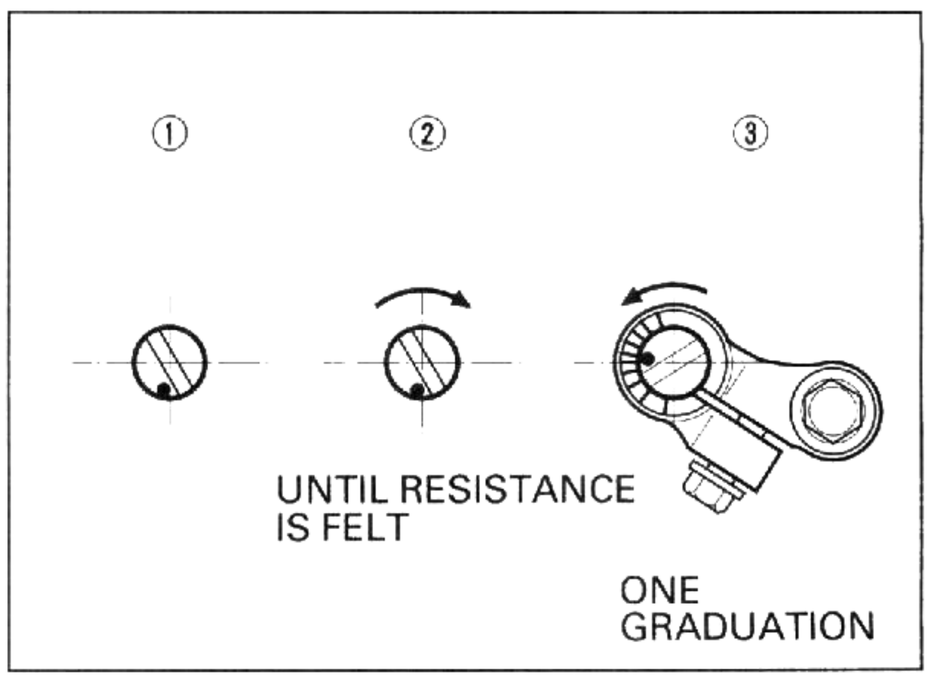
BACKLASH ADJUSTMENT

NOTE:

Adjust the backlash while the engine is cold (below 35°C/95°F) and the engine stopped.

Remove the balancer shaft holder pinch bolt.

Turn the balancer shaft clockwise until the resistance is felt, then back it off one graduation using the punch mark as a measure.



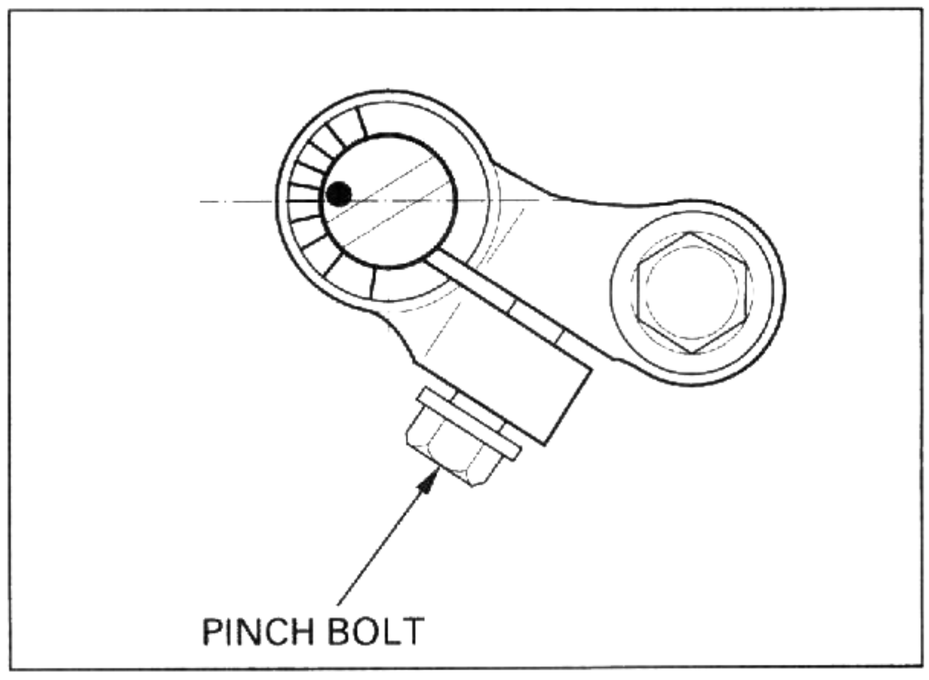
Warm up the engine and let it idle.

If the balancer gear noises excessive, adjust the balaner backlash as follows:

1. Turn the balancer shaft clockwise until the gears begin to make a "whining" noise. Then, turn the gear shaft counterclockwise until the gear "whine" noise disappears.

   Tighten the gear shaft pinch bolt to the specified torque.

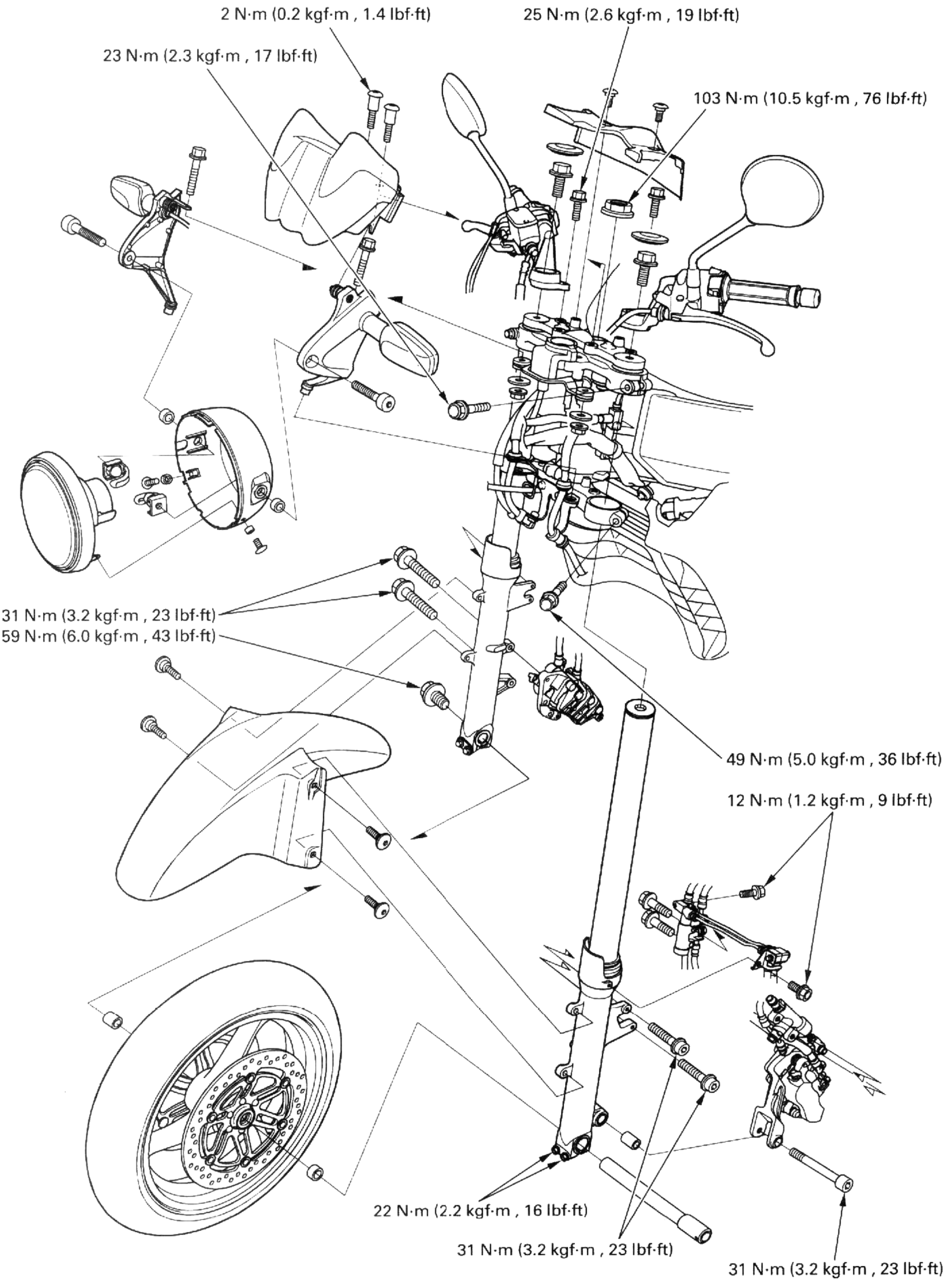
   TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



After gear backlash adjustment is done, snap the throttle and make sure the gear noises is no excessive.

If the gear "whine" noise is excessive, the backlash is too small.
If the gear "ratting" noise is excessive, the backlash is excessive.

MEMO


2 N·m (0.2 kgf·m , 1.4 lbf·ft)
25 N·m (2.6 kgf·m , 19 lbf·ft)
23 N·m (2.3 kgf·m , 17 lbf·ft)
103 N·m (10.5 kgf·m , 76 lbf·ft)
31 N·m (3.2 kgf·m , 23 lbf·ft)
59 N·m (6.0 kgf·m , 43 lbf·ft)
49 N·m (5.0 kgf·m , 36 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
22 N·m (2.2 kgf·m , 16 lbf·ft)
31 N·m (3.2 kgf·m , 23 lbf·ft)
31 N·m (3.2 kgf·m , 23 lbf·ft)

13. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	13-1	FRONT WHEEL	13-10
TROUBLESHOOTING	13-2	FORK	13-17
HANDLEBARS	13-3	STEERING STEM	13-28

SERVICE INFORMATION

GENERAL

⚠WARNING

- ***A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.***
- ***After the front wheel installation, check the brake operation by applying the brake lever and pedal.***

- When servicing the front wheel, fork or steering stem, support the motorcycle using a safety stand or hoist.
- Refer to section 15 for brake system information.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		———	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm², 36 psi)	———
	Driver and passenger	250 kPa (2.50 kgf/cm², 36 psi)	———
Axle runout		———	0.20 (0.008)
Wheel rim runout	Radial	———	2.0 (0.08)
	Axial	———	2.0 (0.08)
Fork	Spring free length	320.5 (12.62)	314.1 (12.37)
	Spring direction	With the tapered end facing down	———
	Tube runout	———	0.20 (0.008)
	Recommended fork fluid	Fork fluid	———
	Fluid level	164 (6.5)	———
	Fluid capacity	446 ± 2.5 cm³ (15.1 ± 0.08 US oz, 15.7 ± 0.09 Imp oz)	———
Steering head bearing pre-load		10—15 N (1.0—1.5 kgf)	———

13

TORQUE VALUES

Handlebar stopper bolt	25 N·m (2.6 kgf·m, 19 lbf·ft)	
Handlebar weight mounting screw	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC bolt
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	See page 13-33
Steering stem bearing adjusting nut A	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Steering stem bearing adjusting nut B	———	
Fork top bridge pinch bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Fork bottom bridge pinch bolt	49 N·m (5.0 kgf·m, 36 lbf·ft)	
Front axle bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)	
Front axle holder bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Front brake disc mounting bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	ALOC bolt
Fork cap	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Fork socket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply a locking agent to the threads
Fork damper lock nut	20 N·m (2.0 kgf·m, 14 lbf·ft)	

TOOLS

Steering stem socket	07916-3710101 or 07936-3710100
Ball race remover set	07946-KM90001
—Driver attachment, A	07946-KM90100
—Driver attachment, B	07946-KM90200
—Driver shaft assembly	07946-KM90300
—Bearing remover, A	07946-KM90401
—Bearing remover, B	07946-KM90500
—Assembly base	07946-KM90600
Steering stem driver	07946-MB00000
Oil seal driver	07947-KA40200
Slider weight	07947-KA50100
Driver	07749-0010000
Attachment, 42 × 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500
Bearing remover shaft	07746-0050100
Bearing remover head, 20 mm	07746-0050600

TROUBLESHOOTING

Hard steering
- Faulty or damaged steering head bearings
- Insufficient tire pressure
- Steering head bearing adjustment nut too tight

Steers to one side or does not track straight
- Unevenly adjusted right and left fork legs
- Bent fork
- Bent axle
- Wheel installed incorrectly
- Faulty steering head bearings
- Bent frame
- Worn wheel bearing
- Worn swingarm pivot components

Front wheel wobbling
- Bent rim
- Worn front wheel bearings
- Faulty tire
- Unbalanced tire and wheel

Wheel turns hard
- Faulty wheel bearing
- Faulty speedometer gear
- Bent front axle
- Brake drag

Soft suspension
- Insufficient fluid in fork
- Weak fork springs
- Tire pressure too low

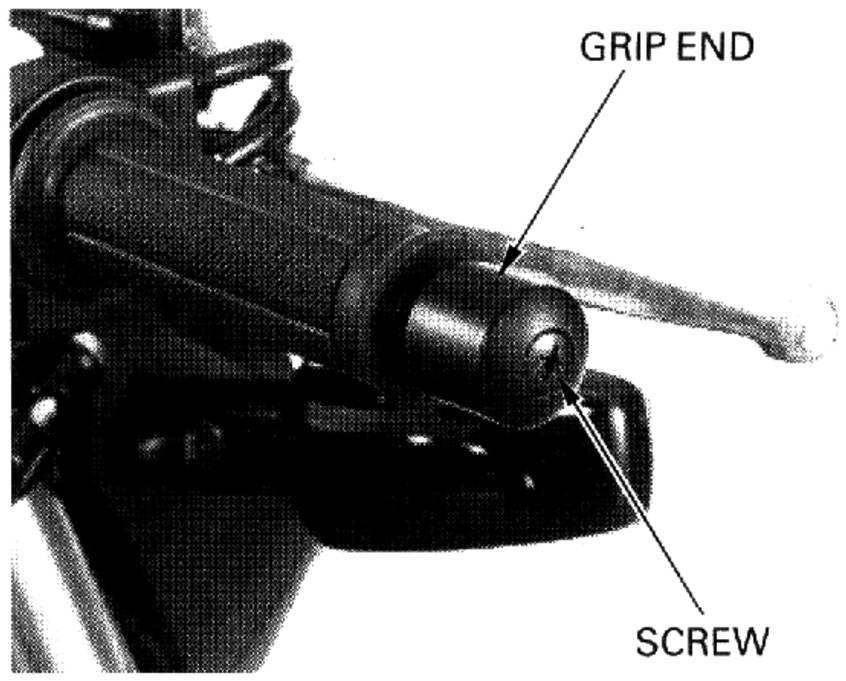
Hard suspension
- Incorrect fluid weight
- Bent fork tubes
- Clogged fork fluid passage

Front suspension noisy
- Insufficient fluid in fork
- Loose fork fasteners

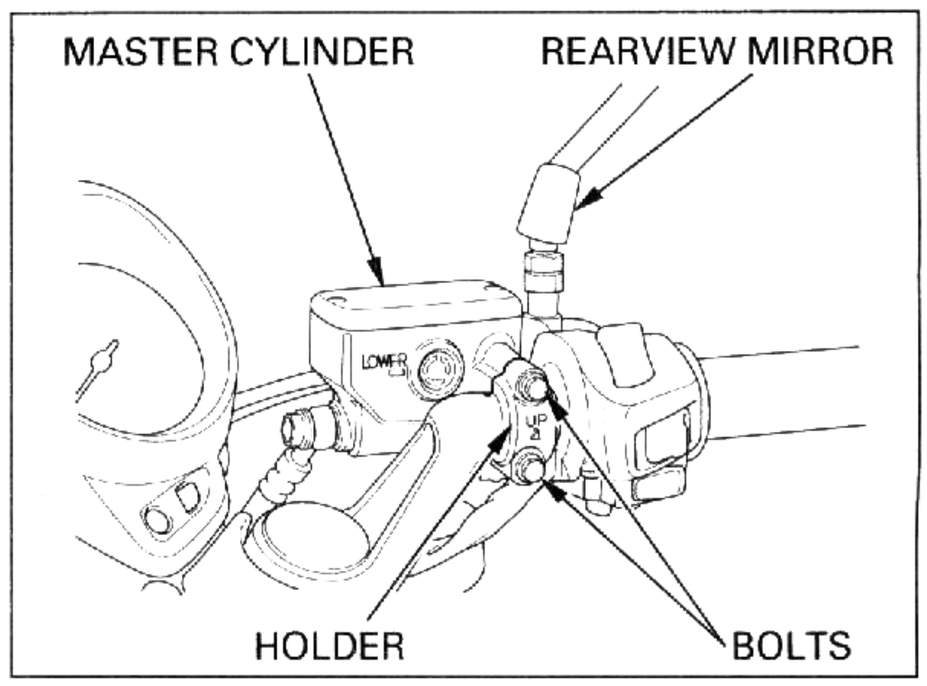
HANDLEBARS

RIGHT HANDLEBAR REMOVAL

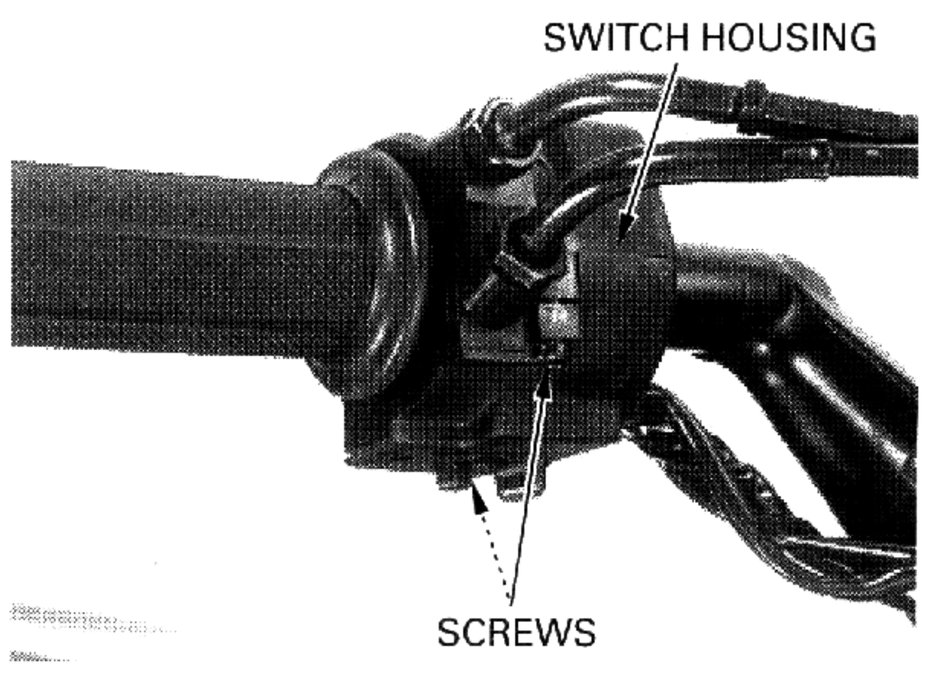
Remove the screw and the handlebar grip end.



Remove the rearview mirror.
Disconnect the front brake switch wires connectors from the switch.
Remove the master cylinder holder bolts, holder and master cylinder assembly.



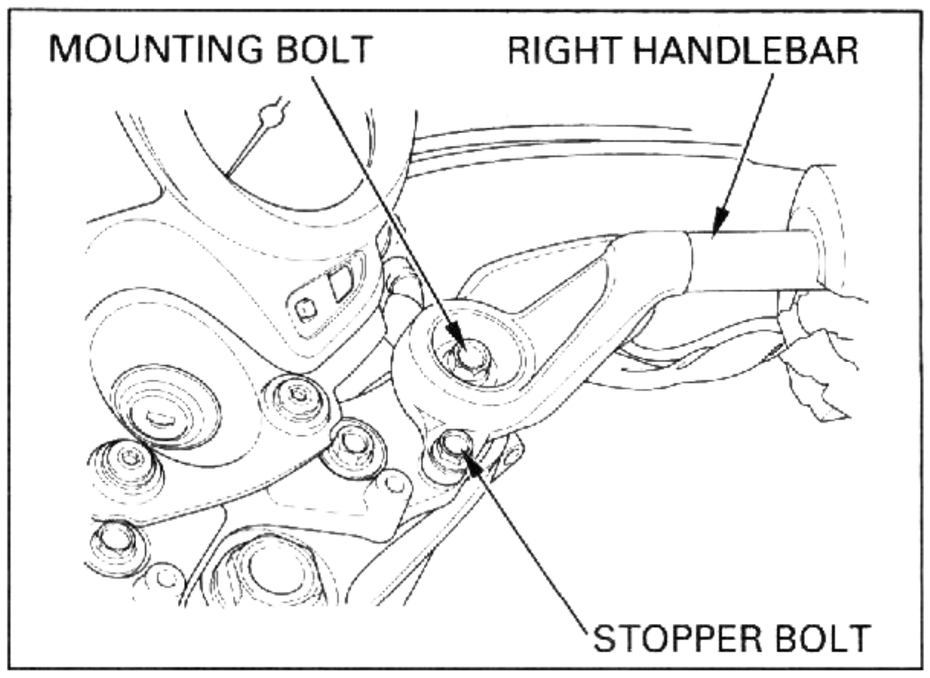
Remove the right handlebar switch/throttle housing screws.



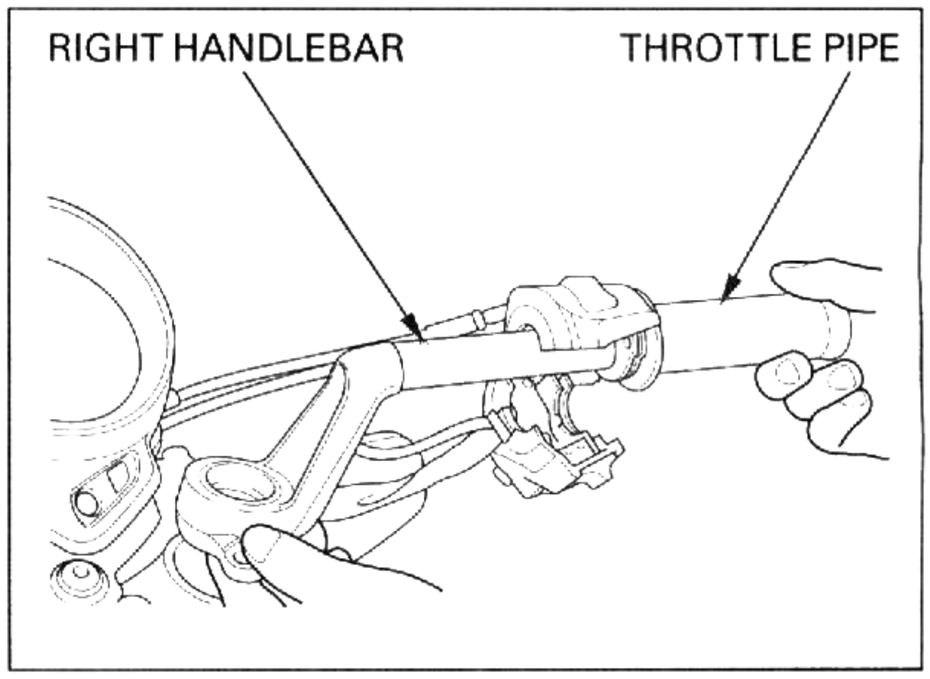
Remove the special bolts and top bridge cover.
Remove the right handlebar pivot cap.



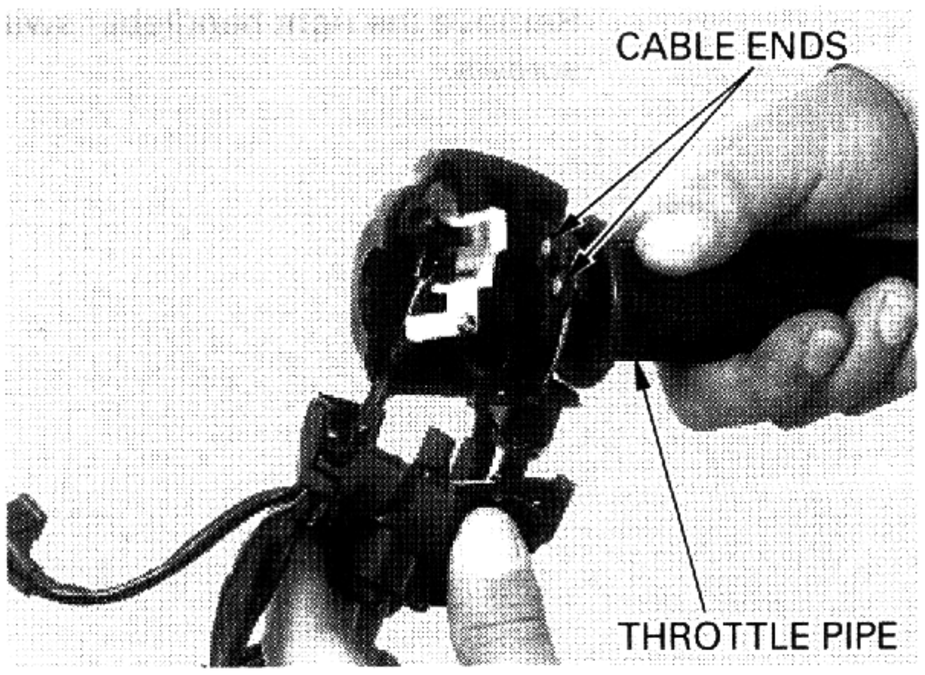
Remove the handlebar stopper bolt and mounting bolt.



Remove the right handlebar from the right handlebar switch/throttle housing.

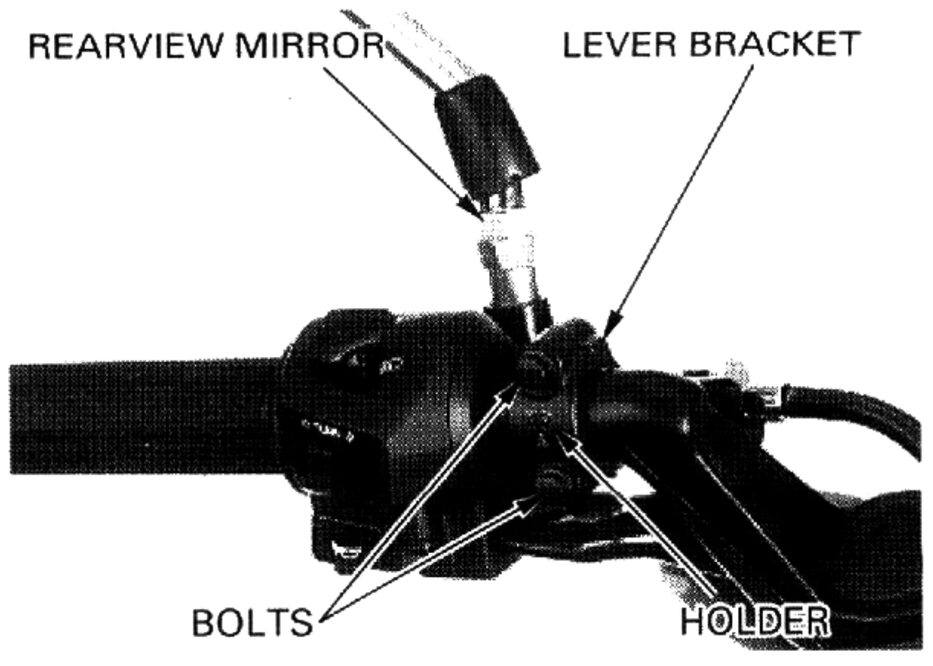


Disconnect the throttle cable ends from the throttle pipe and remove the housing.

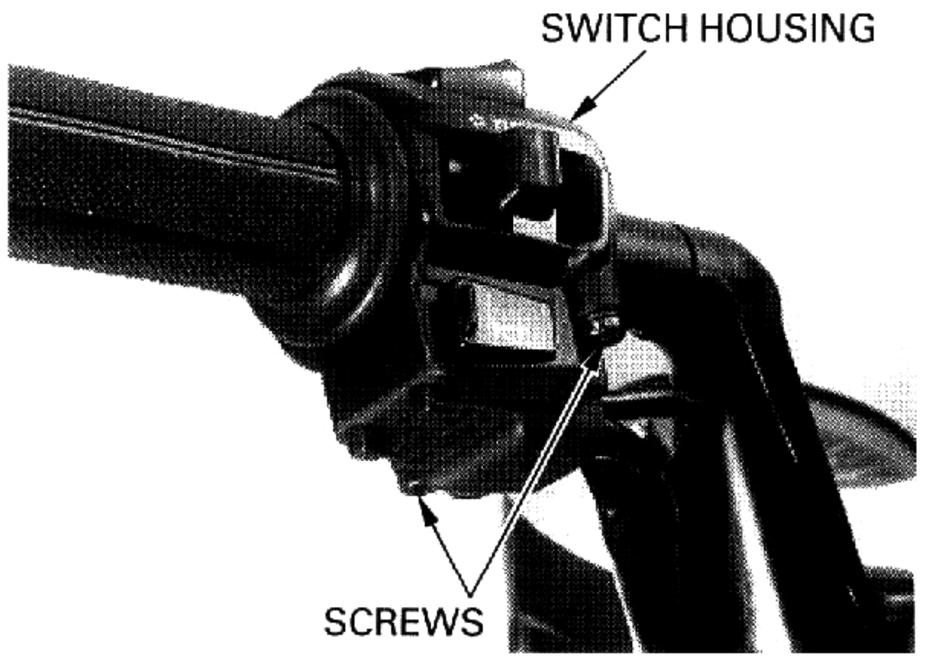


LEFT HANDLEBAR REMOVAL

Remove the left rearview mirror.
Disconnect the clutch switch wire connectors from the switch.
Remove the clutch lever bracket holder bolts, holder and clutch lever bracket assembly.

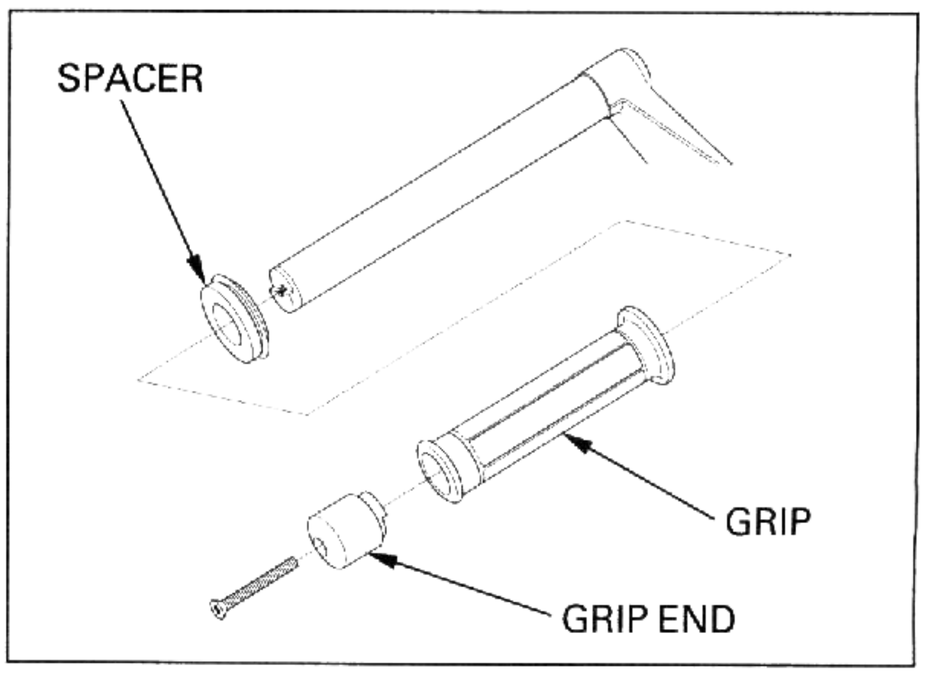


Remove the screws and left handlebar switch housing.

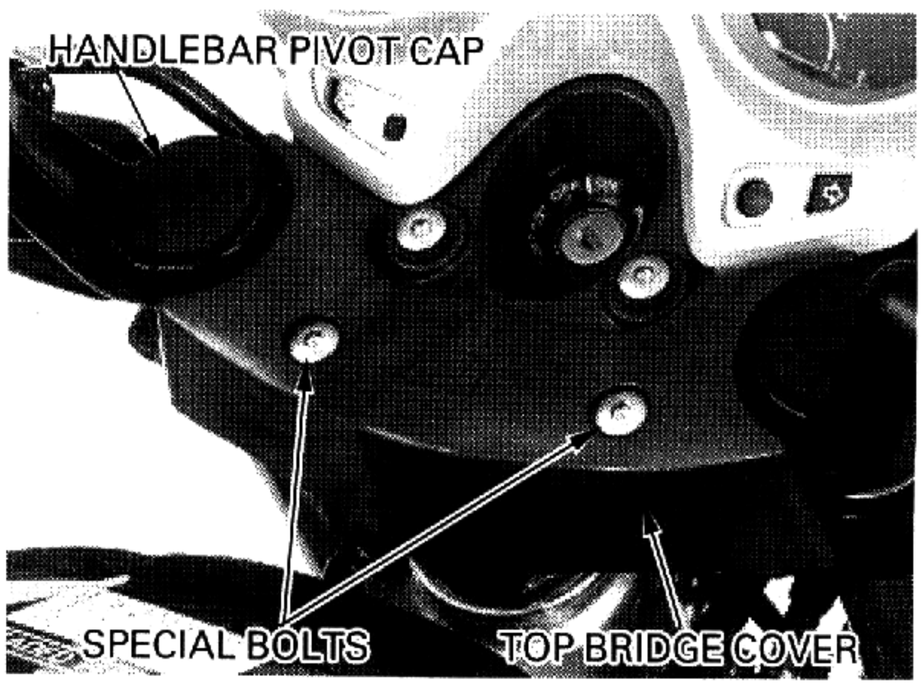


Remove the screw and handlebar grip end.
Remove the handle grip from the handlebar.

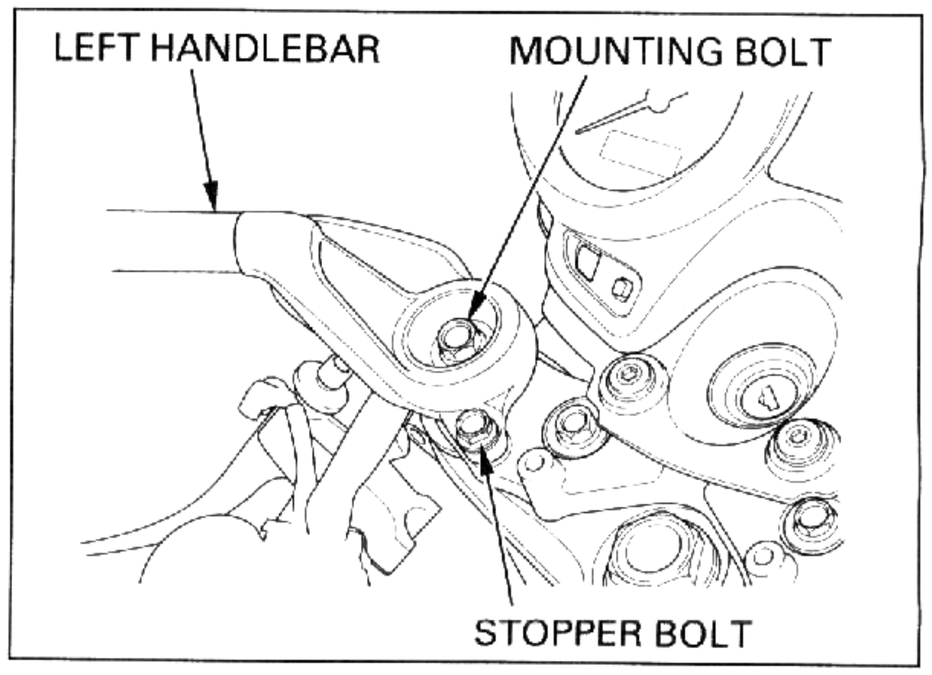
Remove the housing spacer from the handlebar.



Remove the special bolts and top bridge cover.
Remove the left handlebar pivot cap.



Remove the handlebar stopper bolt and mounting bolt, then remove the left handlebar.



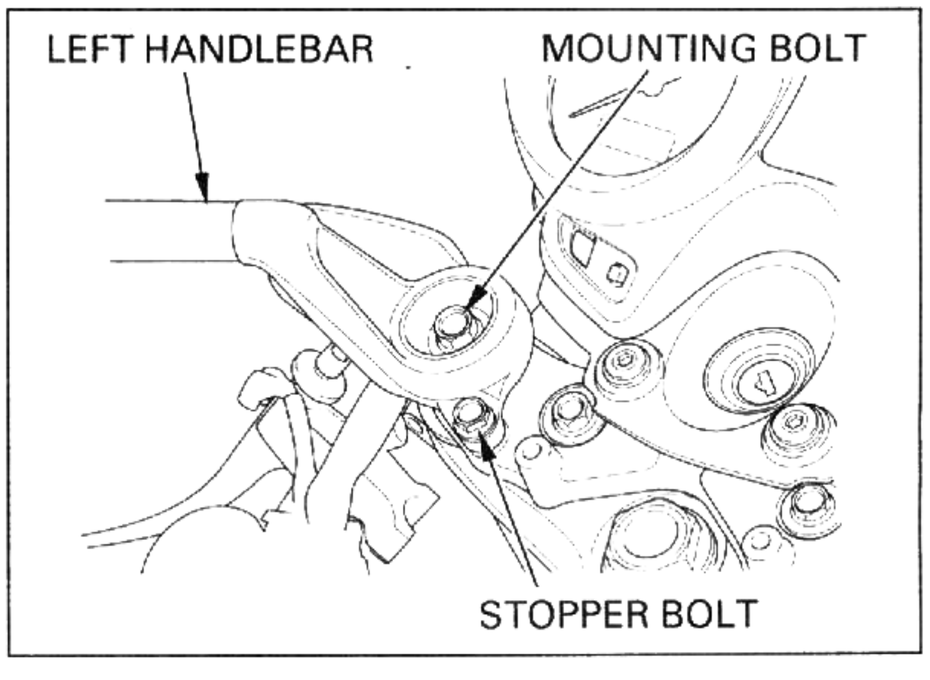
LEFT HANDLEBAR INSTALLATION

Install the left handlebar onto the top bridge, then install the handlebar mounting bolt and stopper bolt.
Pull the handlebar backward fully, then loosely tighten the left handlebar mounting bolt.

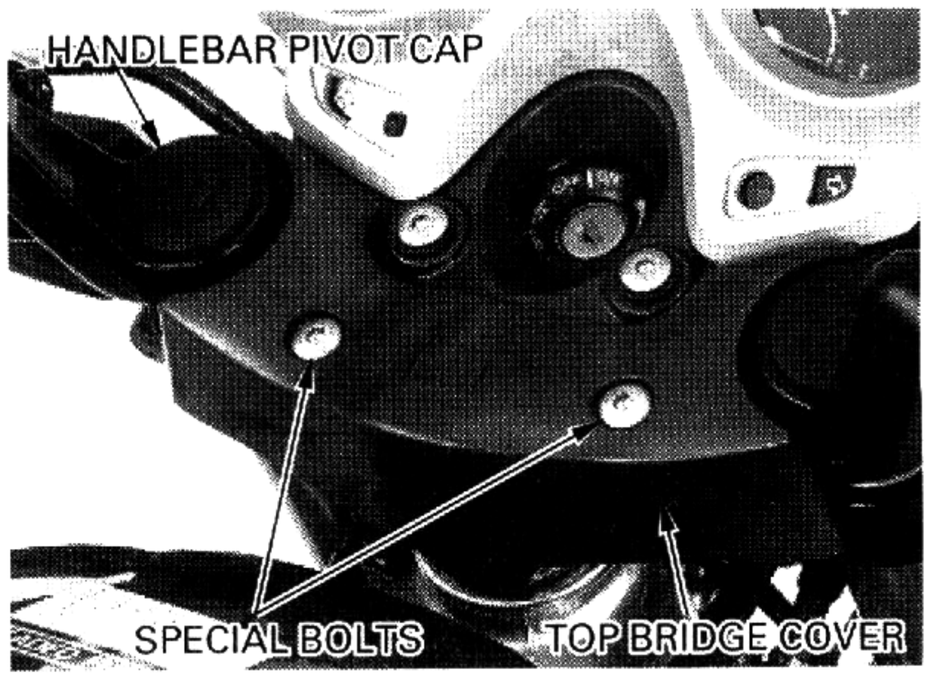
Tighten the left handlebar stopper bolt to the specified torque.

TORQUE: 25 N·m (2.6 kgf·m , 19 lbf·ft)

Tighten the left handlebar mounting bolt securely.



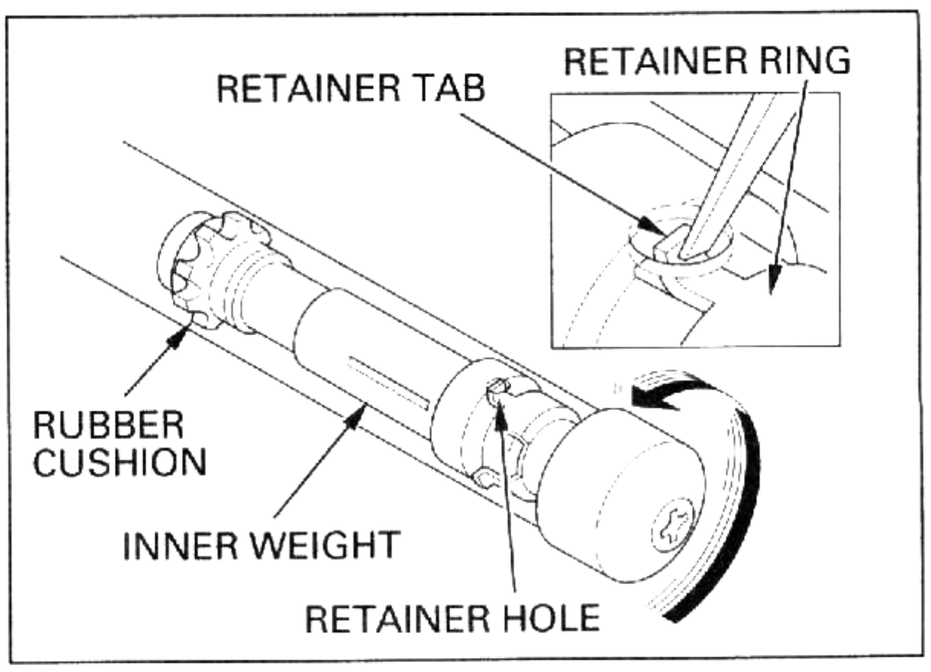
Install the left handlebar pivot cap.
Install the top bridge cover and tighten the special bolts.



HANDLEBAR WEIGHT REPLACEMENT

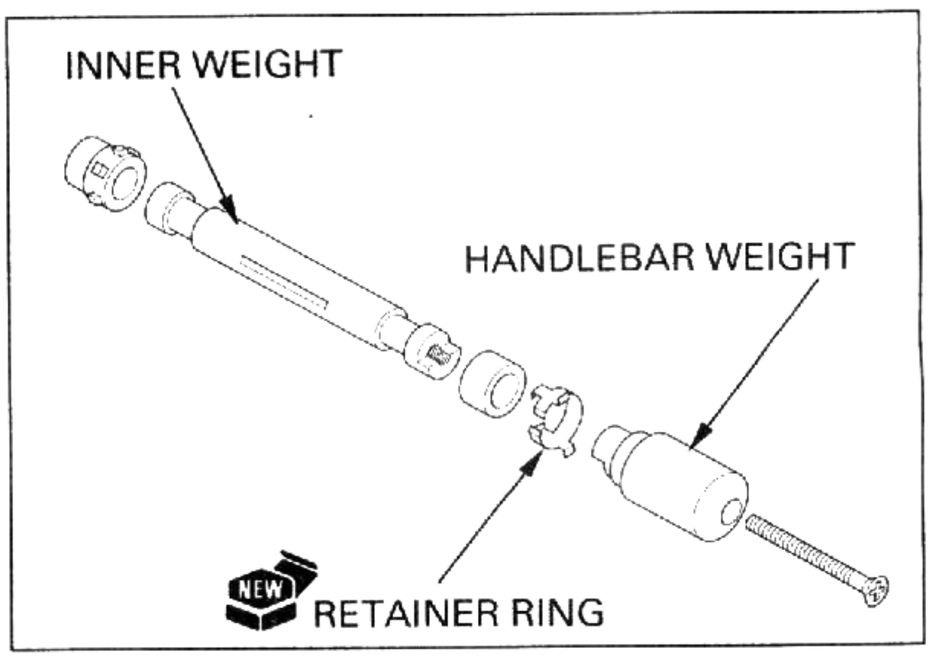
Remove the grip from the handlebar.
Straighten the weight retainer tab by the screwdriver or punch.
Temporarily install the grip end and screw, then remove the handlebar weight by turning the grip end.

Apply lubricant spray through the tab locking hole to the rubber for easy removal.

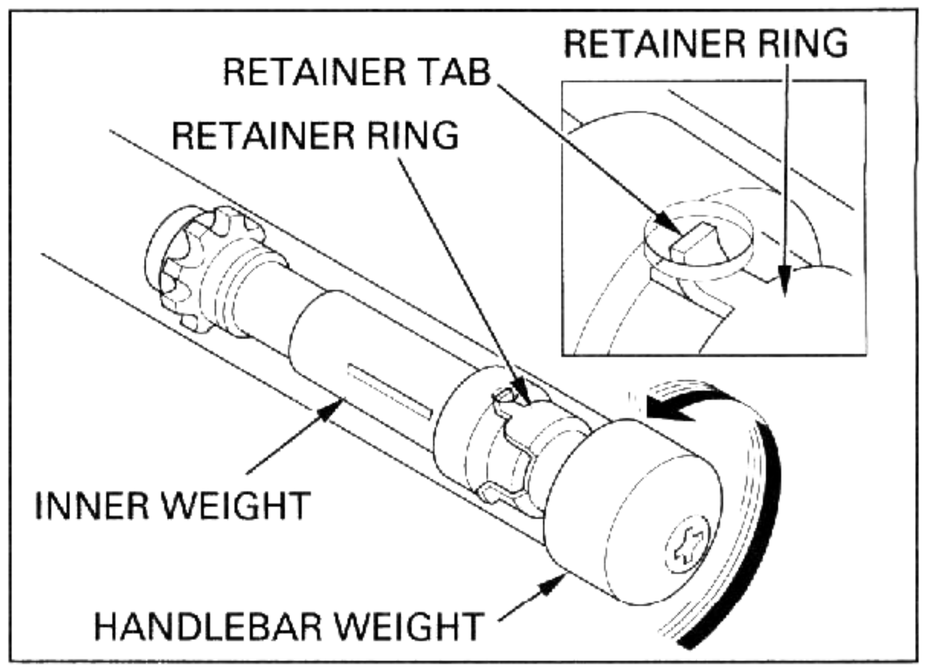


Remove the grip end from the handlebar weight.
Discard the retainer.

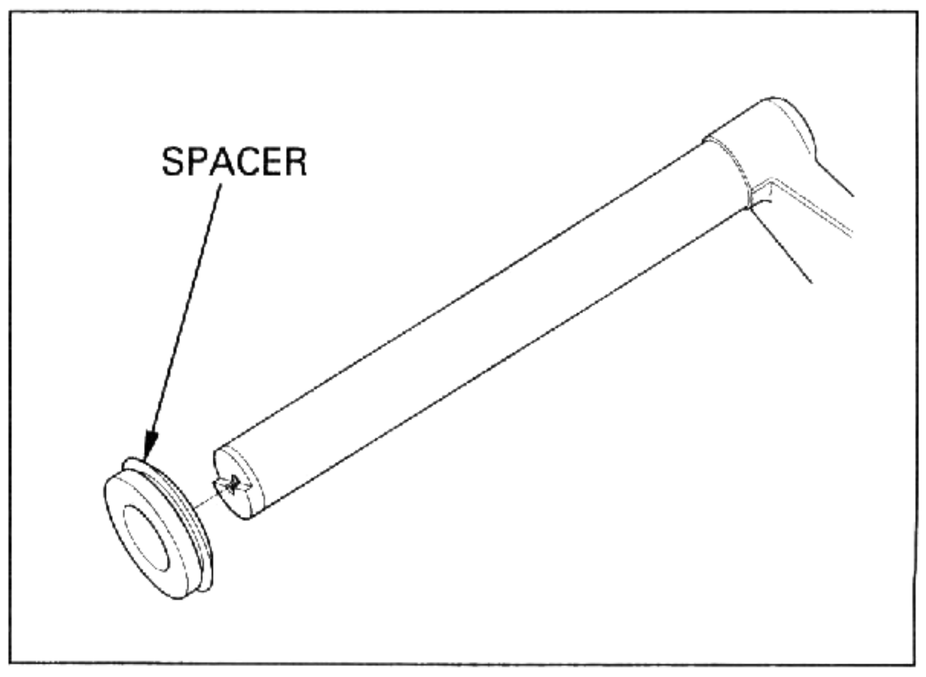
Install the new retainer onto the handlebar weight.
Install the grip end onto the handlebar weight aligning its boss with the slot in the handlebar weight.
Install a new mounting screw.



Insert the handlebar weight assembly into the handlebar.
Turn the handlebar weight and hook the retainer tab with the hole in the handlebar.



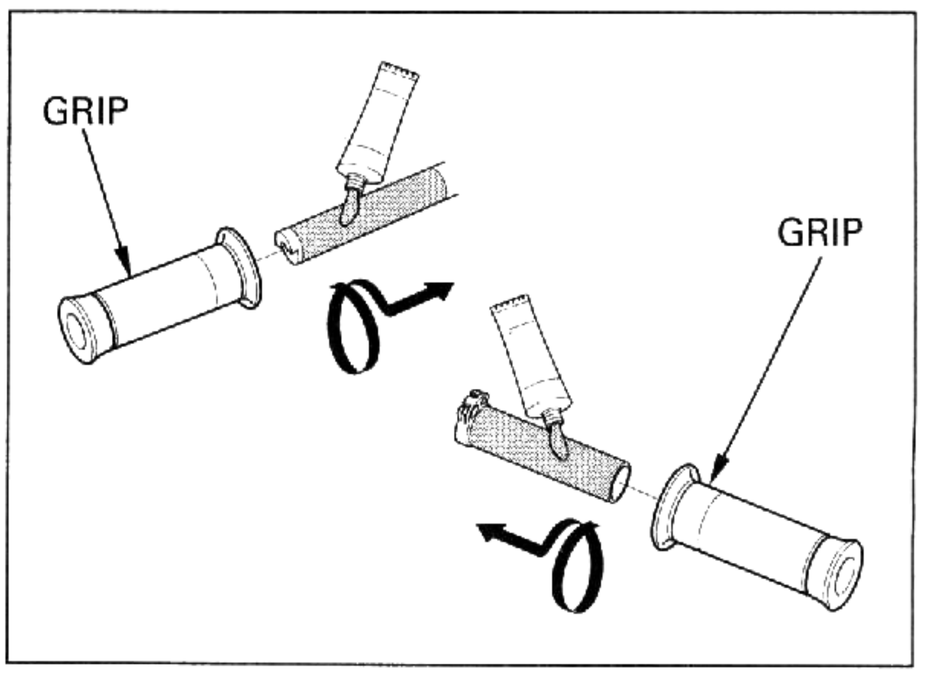
Install the left handlebar switch spacer onto the left handlebar.



Apply Honda Bond A or equivalent to the inside of the grip and to the clean surfaces of the left handlebar and throttle grip.

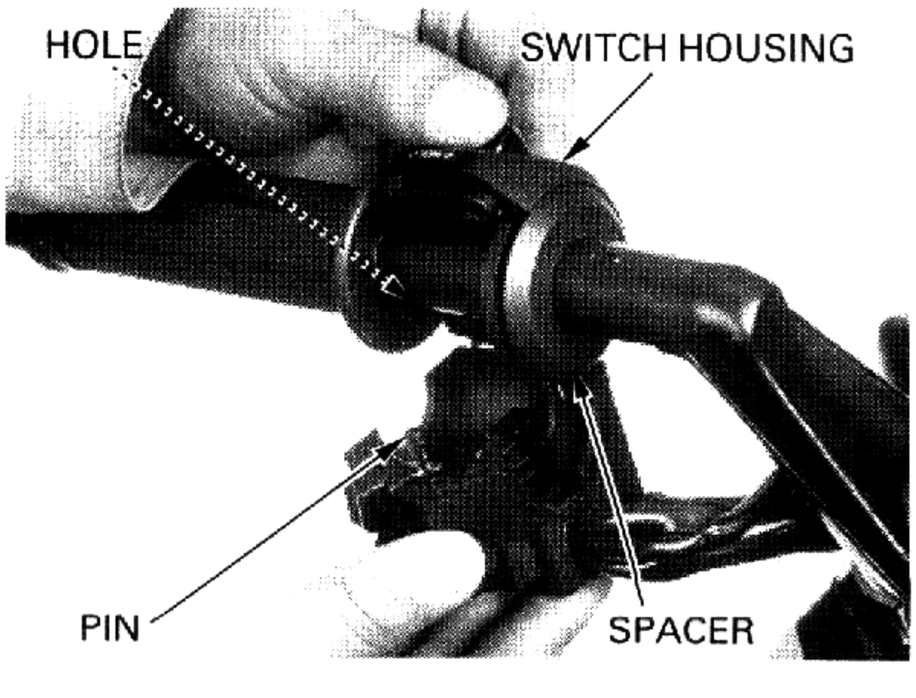
Wait 3—5 minutes and install the grip.
Rotate the grip for even application of the adhesive.

Allow the adhesive to dry for an hour before using.

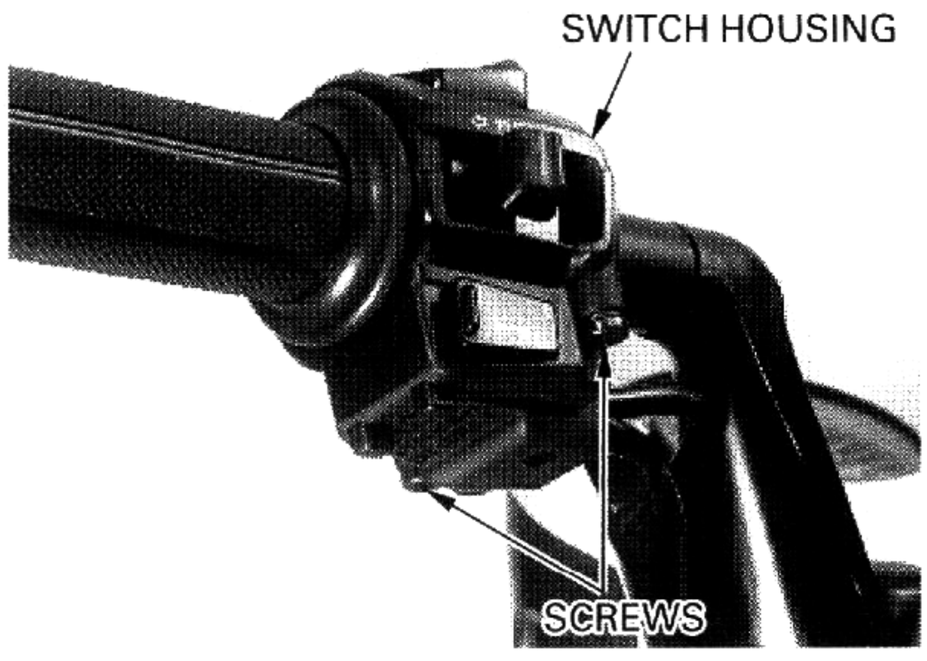


Install the left handlebar switch aligning its locating pin with the hole in the handlebar.

Install the spacer into the handlebar switch groove.



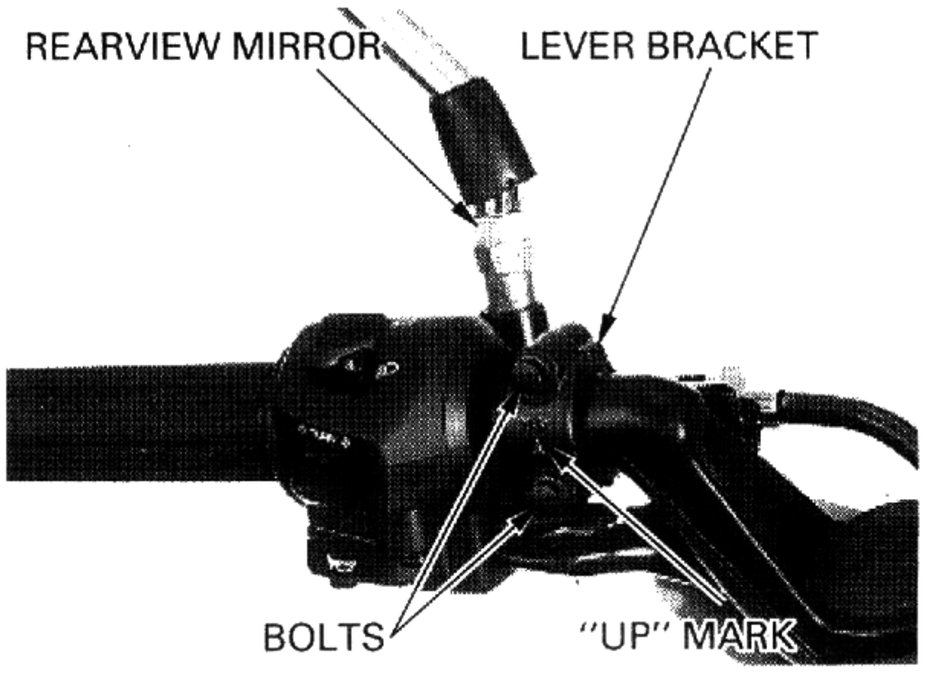
Tighten the forward screw first, then the rear screw.



Install the clutch lever bracket assembly by aligning the end of the bracket with the punch mark on the handlebar.
Install the clutch lever bracket holder with the "UP" mark facing up.
Tighten the upper bolt first, then the lower bolt.

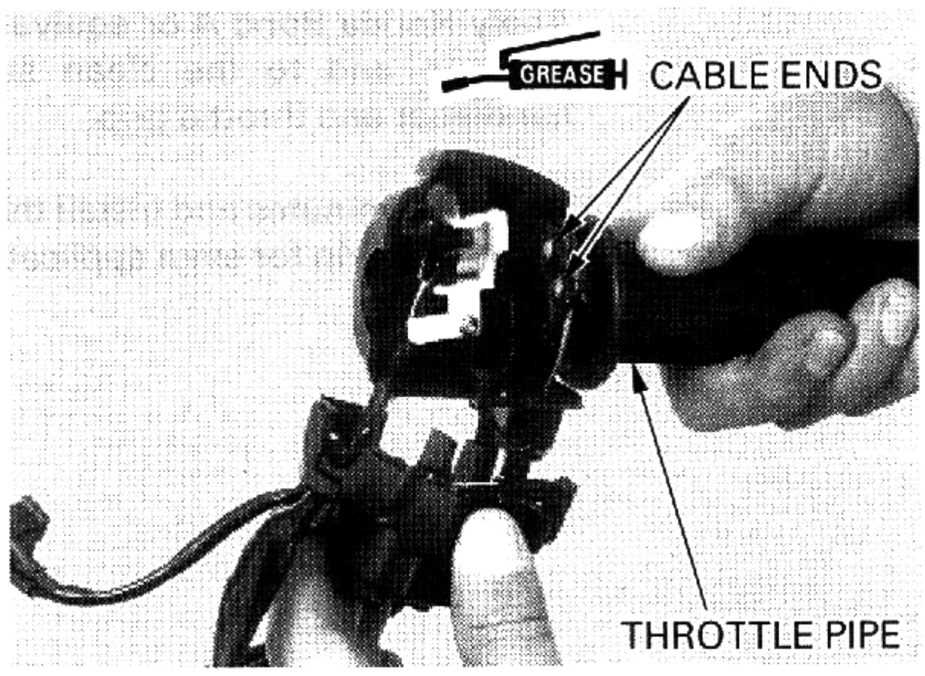
TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Connect the clutch switch wires.
Install the left rearview mirror.

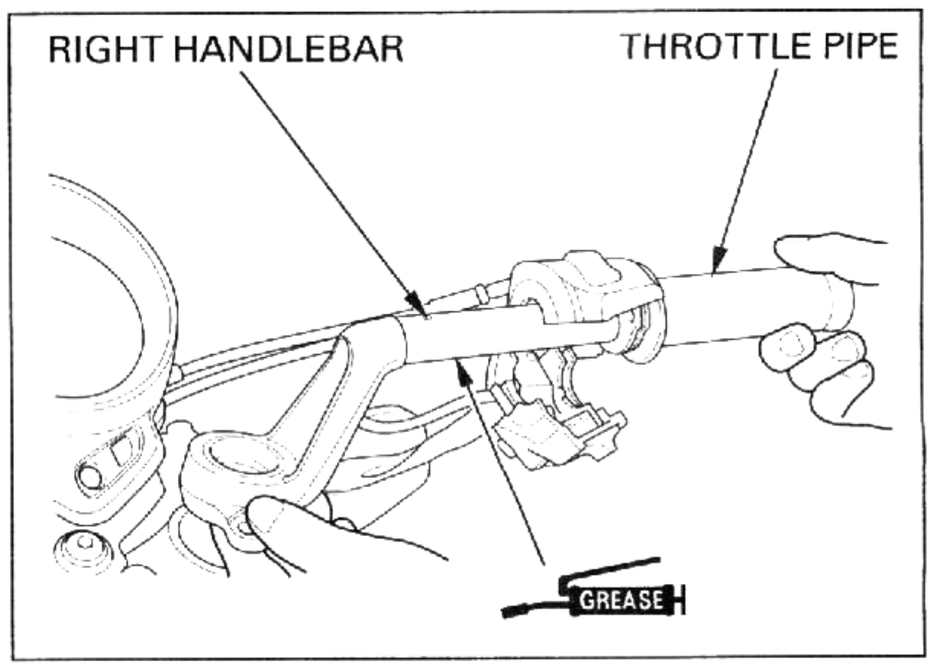


RIGHT HANDLEBAR INSTALLATION

Connect the throttle cable ends to the throttle pipe.



Apply grease to the sliding surface of the throttle pipe.
Install the right handlebar into the throttle pipe.

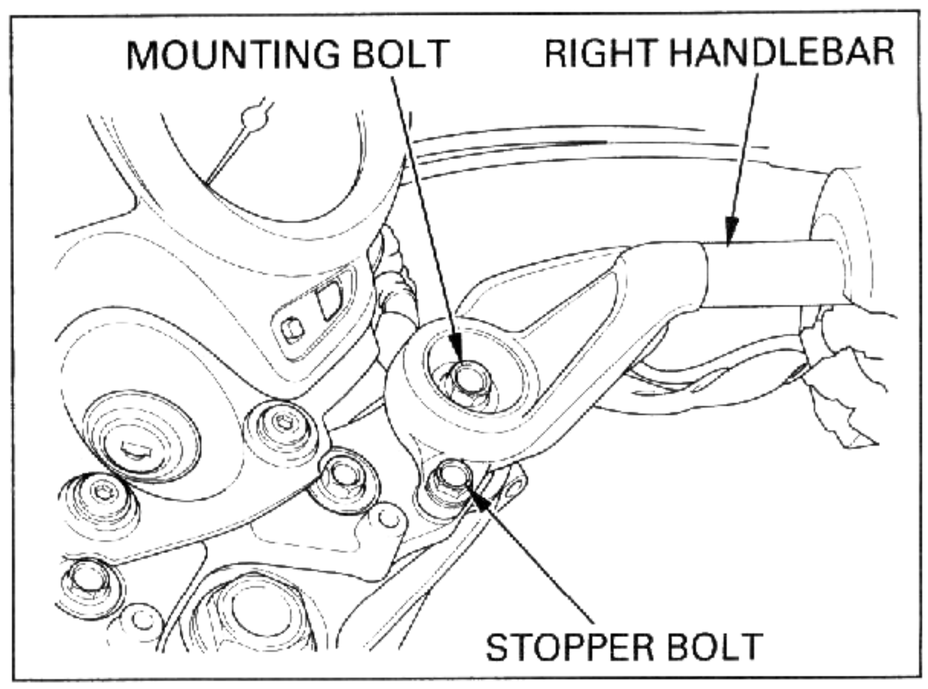


Install the right handlebar onto the top bridge, then install the handlebar mounting bolt and stopper bolt.
Pull the handlebar backward fully, loosely tighten the right handlebar mounting bolt.

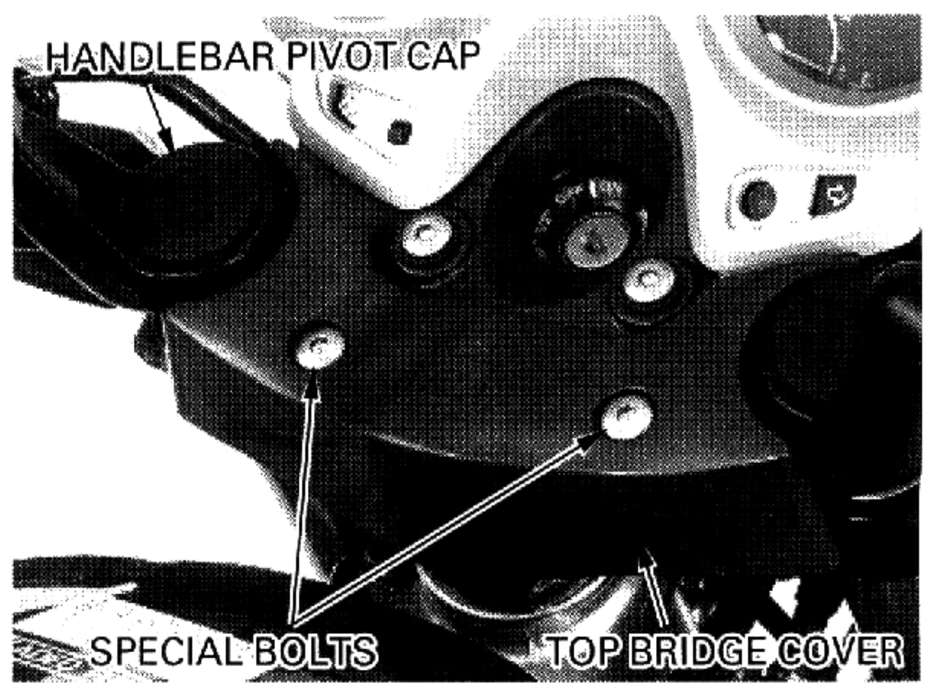
Tighten the right handlebar pinch bolt to the specified torque.

TORQUE: 25 N·m (2.6 kgf·m , 19 lbf·ft)

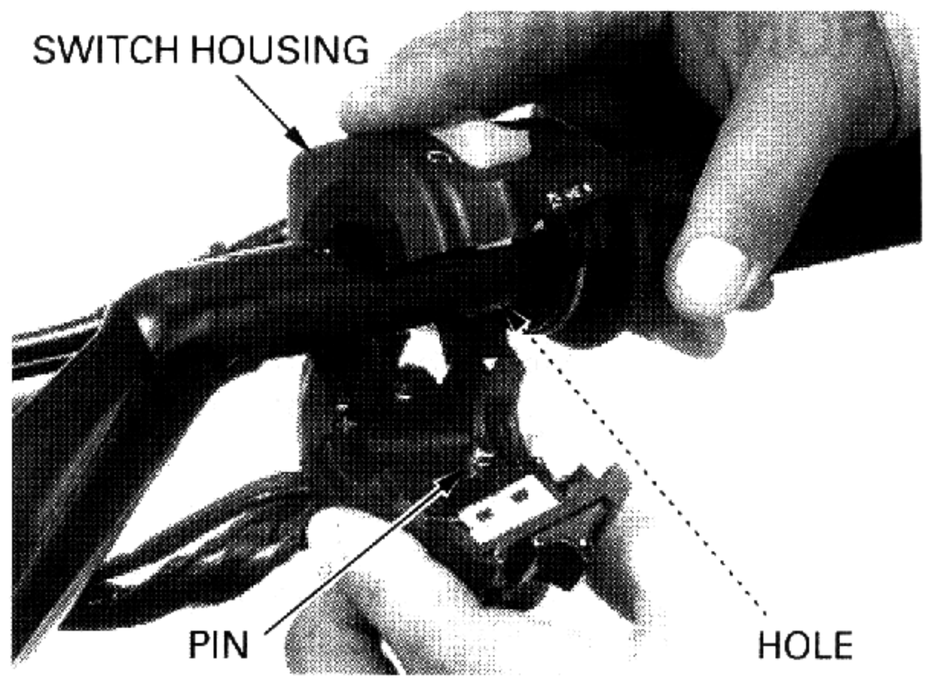
Tighten the right handlebar mounting bolt securely.



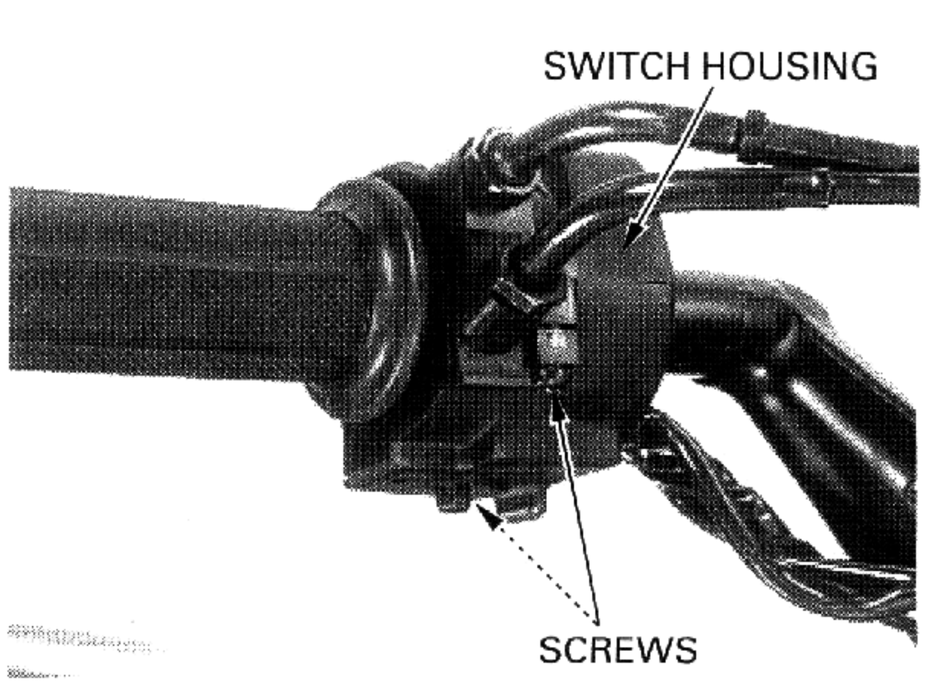
Install the left handlebar pivot cap.
Install the top bridge cover and tighten the special bolts.



Install the right handlebar switch/throttle housing by aligning its locating pin with the hole in the handlebar.



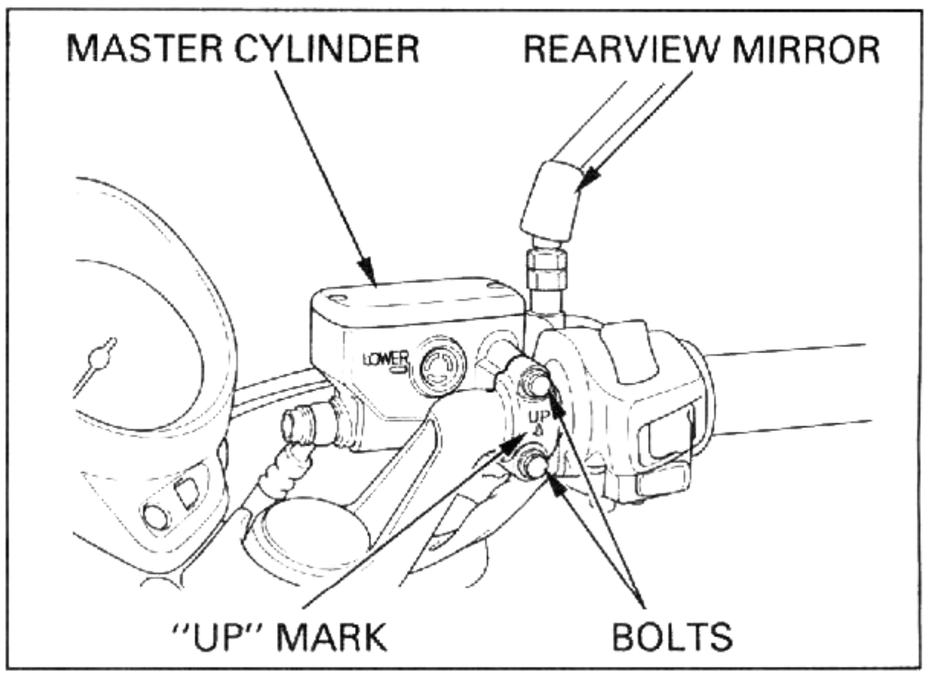
Tighten the forward screw first, then the rear screw.



Install the master cylinder by aligning the end of the master cylinder with the punch mark on the handlebar.
Install the master cylinder holder with the "UP" mark facing up.
Tighten the upper bolt first, the lower bolt.

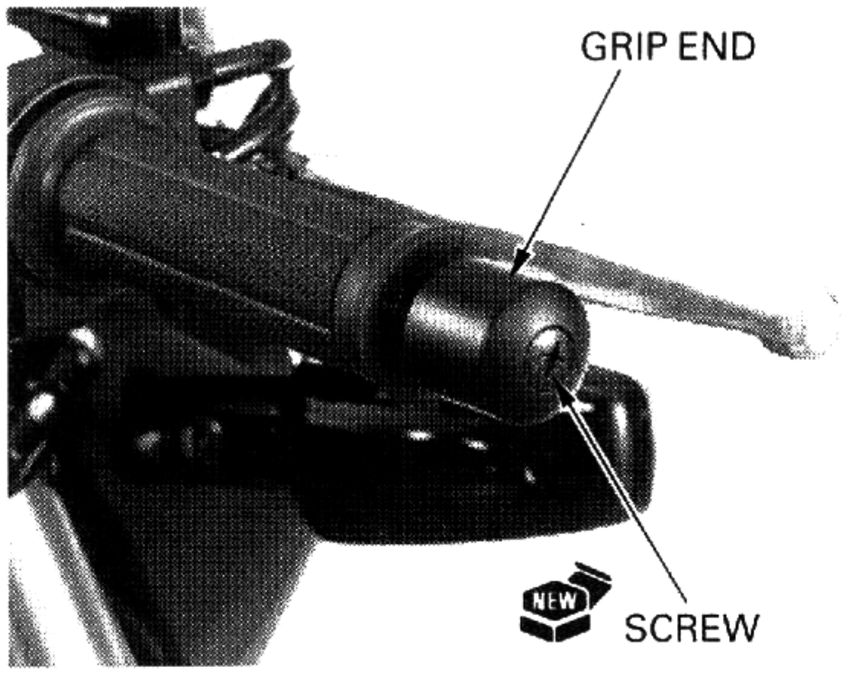
TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Connect the brake switch wires.



Install the grip end and tighten the new mounting screw to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)



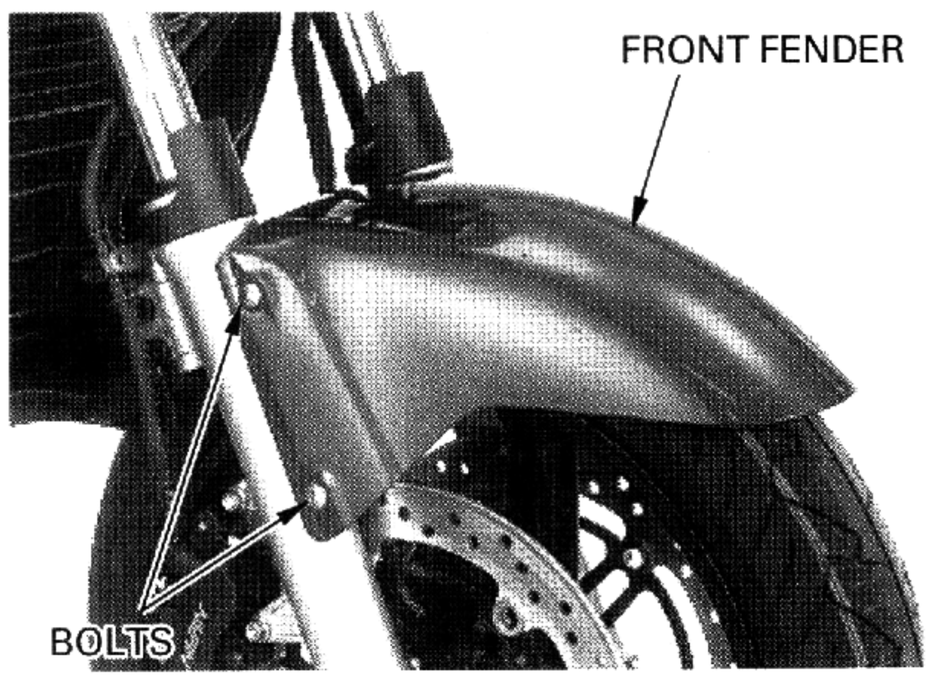
FRONT WHEEL

REMOVAL

⚠WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

Support the motorcycle securely using a safety stand or a hoist.
Remove the bolts and front fender.



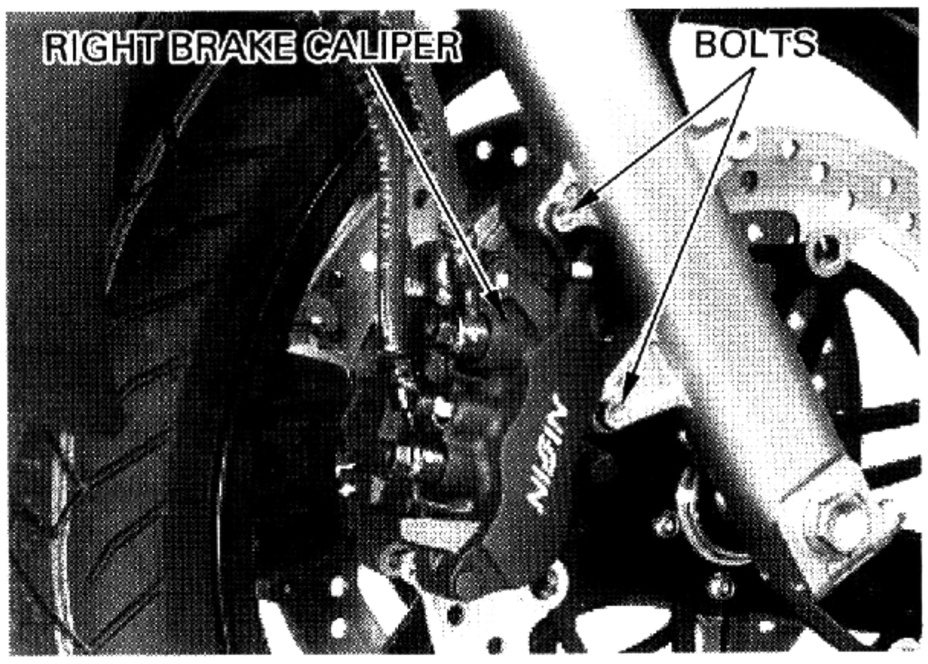
Remove the mounting bolts and right brake caliper.

CAUTION:

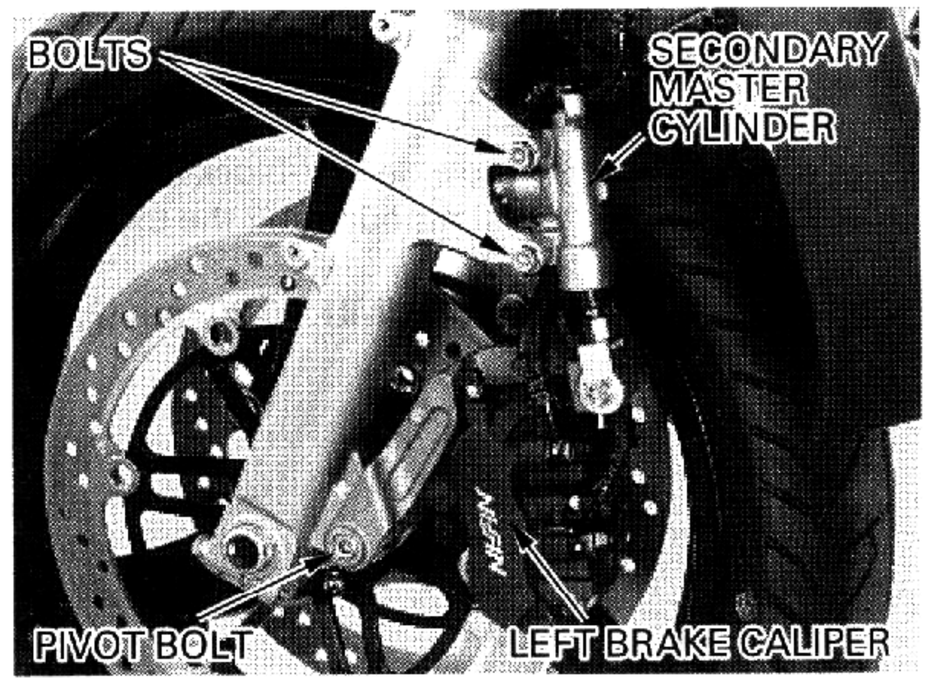
Support the brake caliper with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.

NOTE:

Do not operate the brake lever or pedal after the brake caliper is removed.



Remove the secondary master cylinder mounting bolts, left brake caliper pivot bolt and side the assembly out of the way.



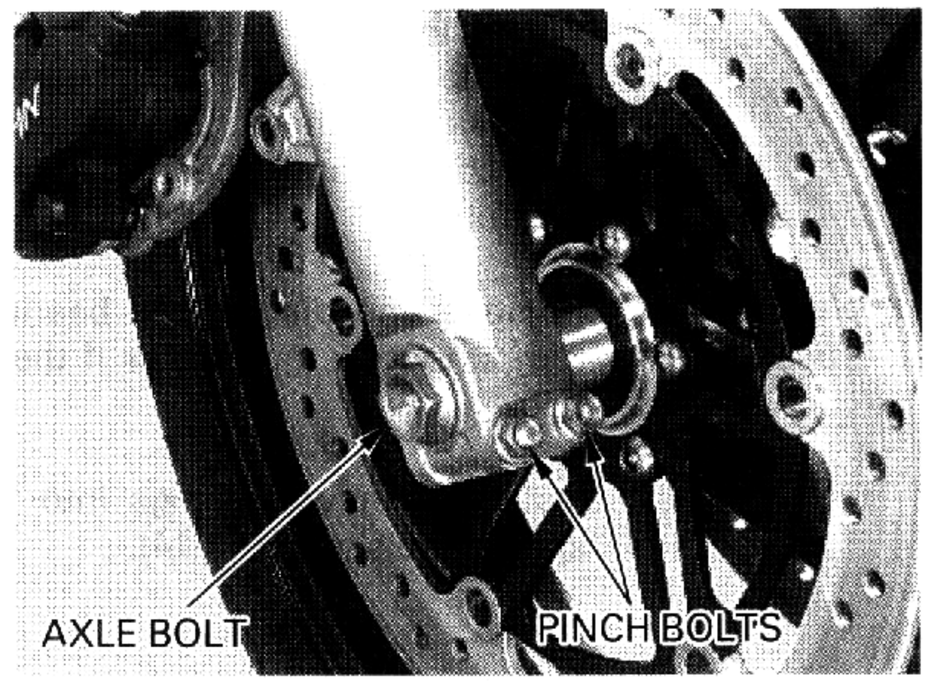
CAUTION:

Support the brake caliper and secondary master cylinder with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.

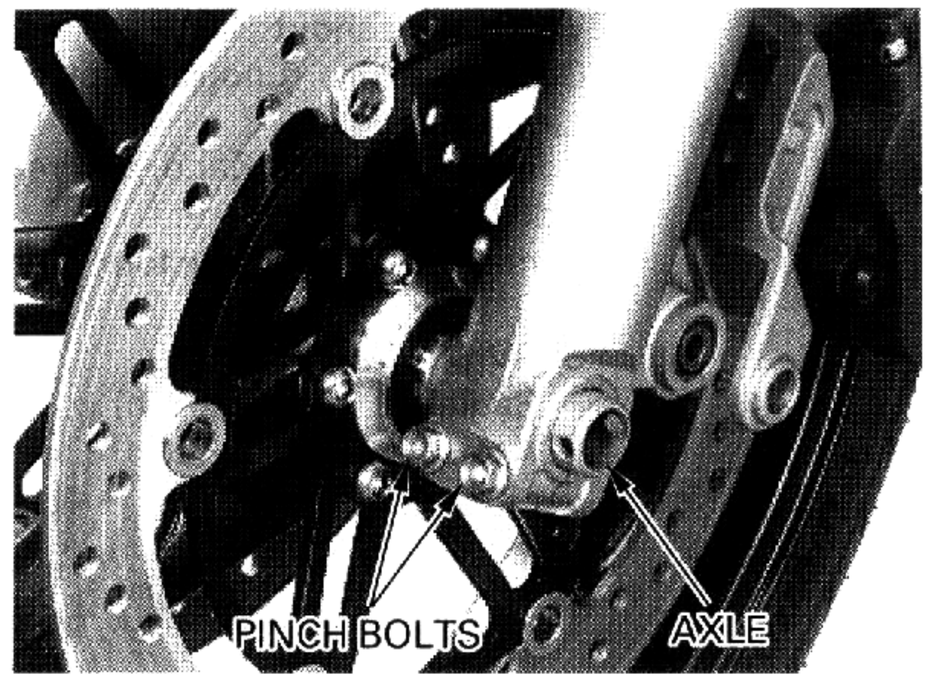
NOTE:

Do not operate the brake lever or pedal after the brake caliper is removed.

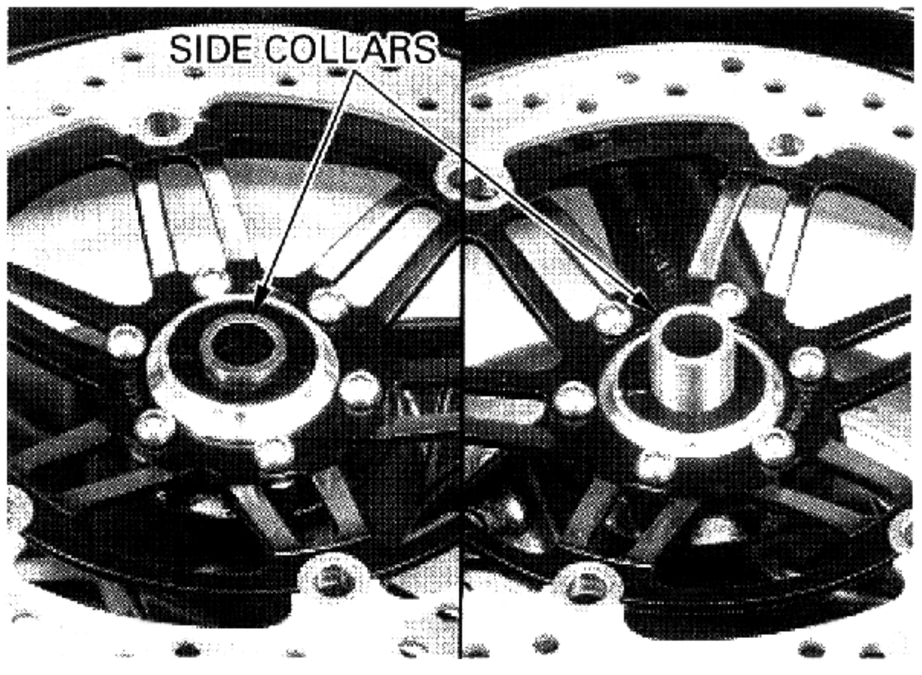
Loosen the right axle pinch bolts.
Remove the axle bolt.



Loosen the left axle pinch bolts.
Remove the axle and the front wheel.



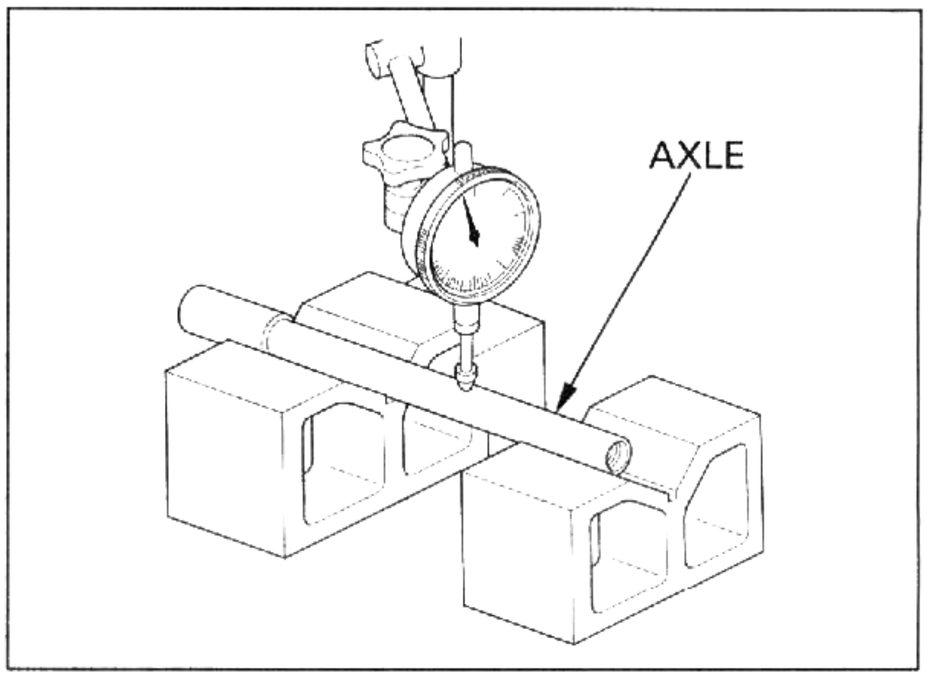
Remove the side collars.



INSPECTION

Axle
Set the axle in V-block and measure the runout.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)

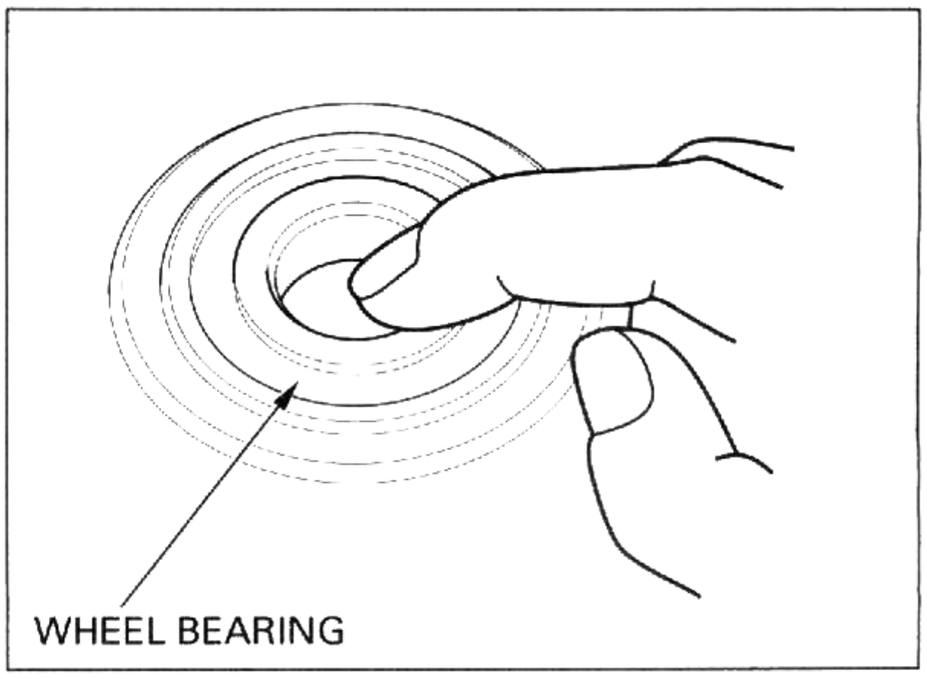


Wheel bearing
Turn the inner race of each bearing with your finger.
The bearings should turn smoothly and quietly.
Also check that the bearing outer race fits tightly in the hub.

Replace the bearings in pairs.

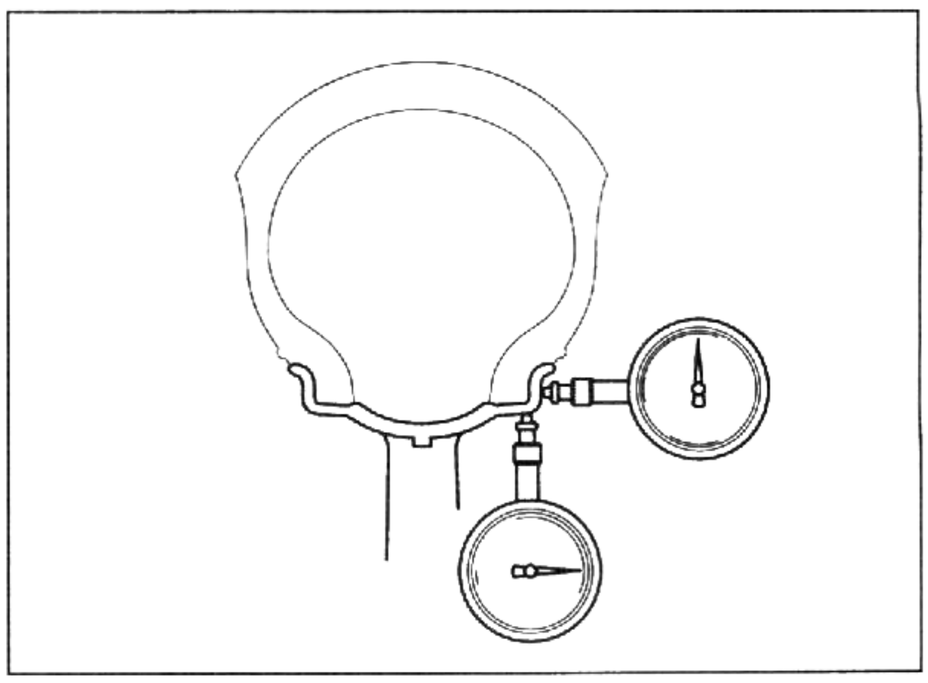
Remove and discard the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

Install the new bearings into the hub using the special tools (page 13-14).



Wheel rim runout
Check the rim runout by placing the wheel in a turning stand.
Spin the wheel by hand, and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS:
Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)



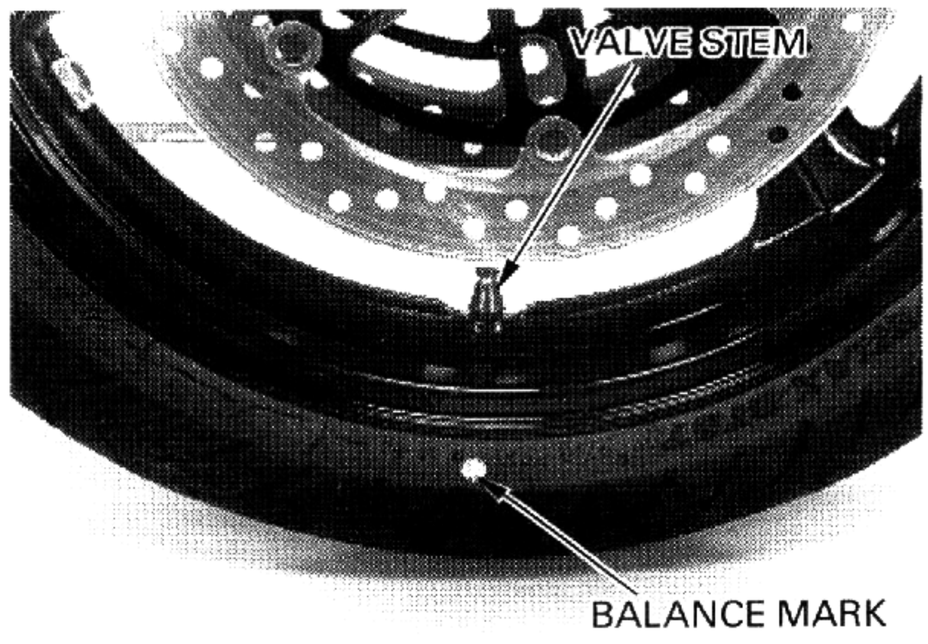
Wheel balance

CAUTION:

Wheel balance directly affects the stability, handling and over all safety of the motorcycle. Always check balance when the tire has been removed from the rim.

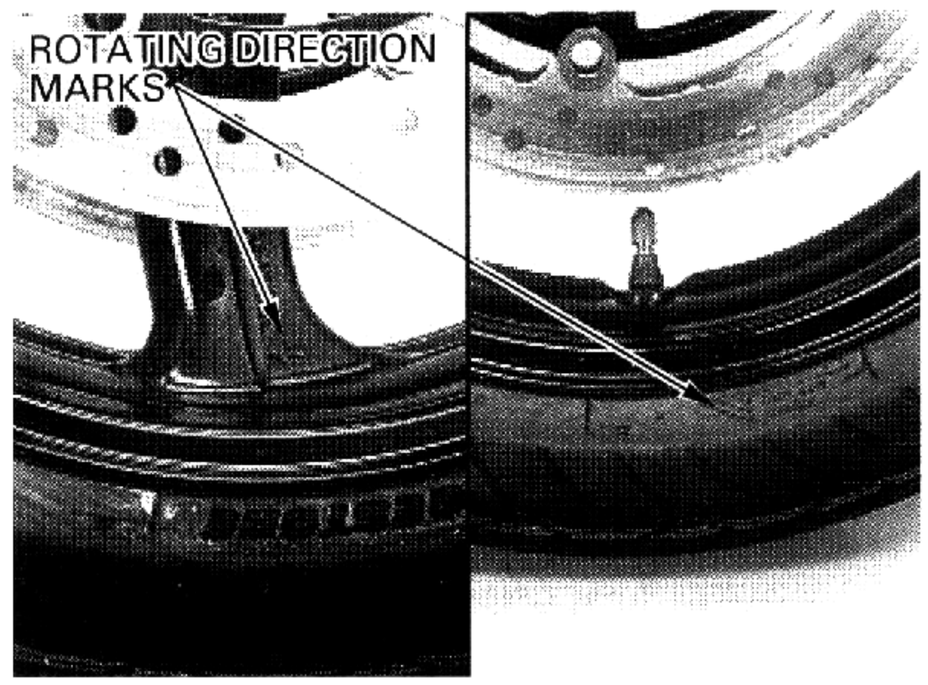
NOTE:

For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.



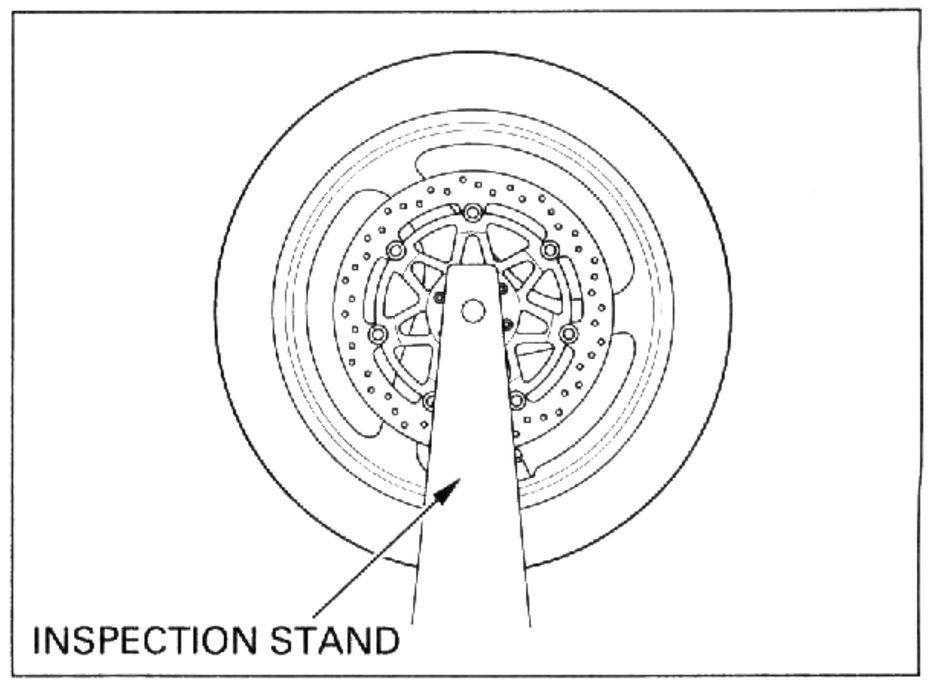
NOTE:

Note the rotating direction marks on the wheel and tire.



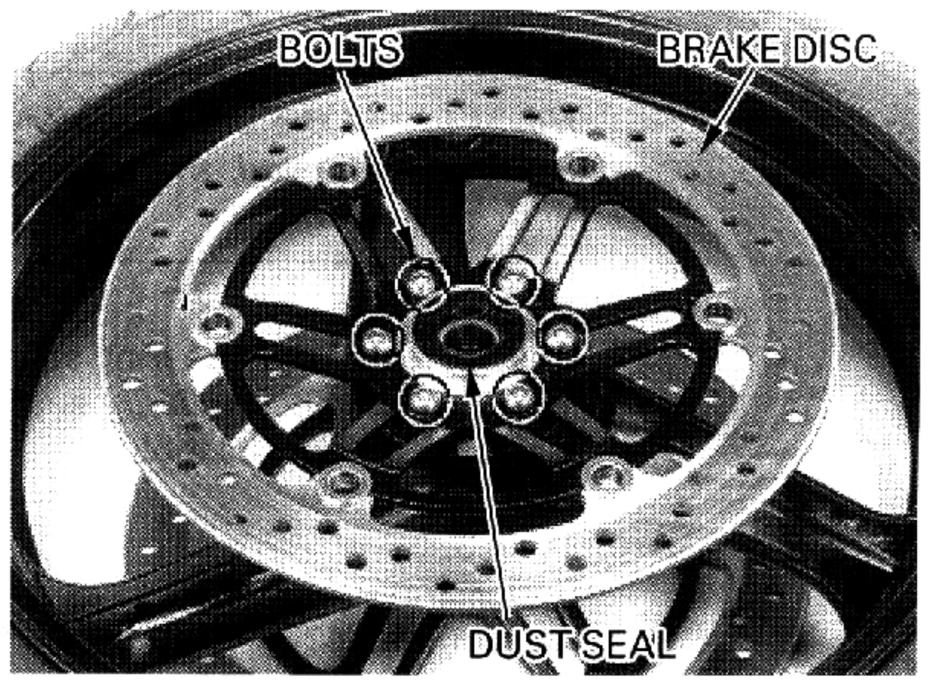
Remove the dust seals from the wheel.
Mount the wheel, tire and brake discs assembly in an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) point of the wheel with a chalk.
Do this two or three times to verify the heaviest area.
If the wheel is balanced, it will not stop consistently in the same position.

To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 60 grams to the wheel.



DISASSEMBLY

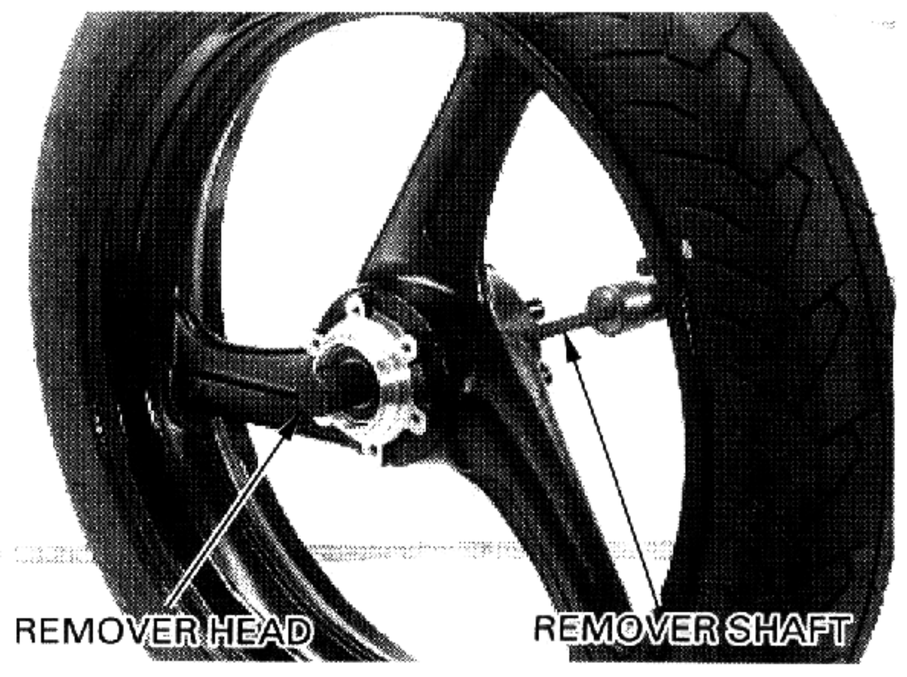
Remove the bolts and brake discs.
Remove the dust seals.



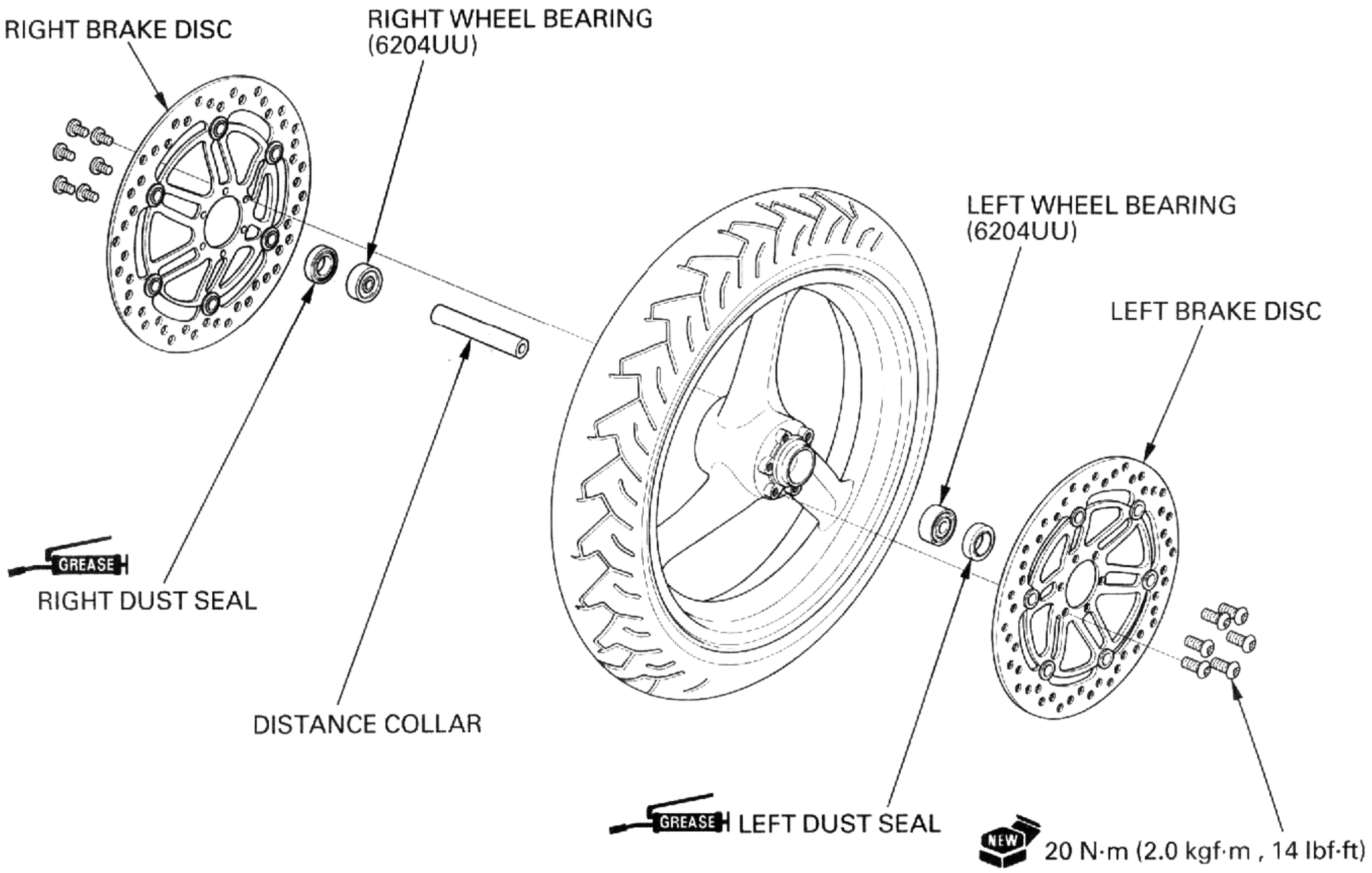
Install the bearing remover head into the bearing.
From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover head, 20 mm	07746-0050600
Bearing remover shaft	07746-0050100



ASSEMBLY



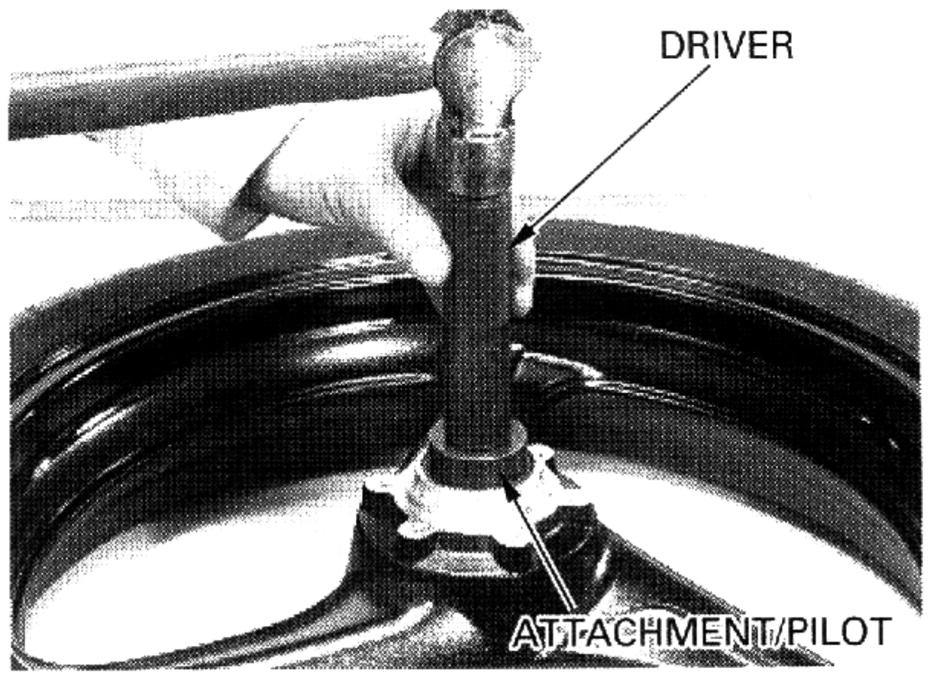
CAUTION:

Never install the old bearings. Once the bearings has been removed, the bearing must be replaced with new ones.

Drive in a new right bearing squarely.
Install the distance collar, then drive in the left bearing using the special tool.

TOOLS:

Driver	07749-0010000
Attachment, 42 × 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500



⚠WARNING

Do not get grease on the brake discs or stopping power will be reduced.

Install the brake discs on the wheel hub.
Install and tighten the new mounting bolts to the specified torque.

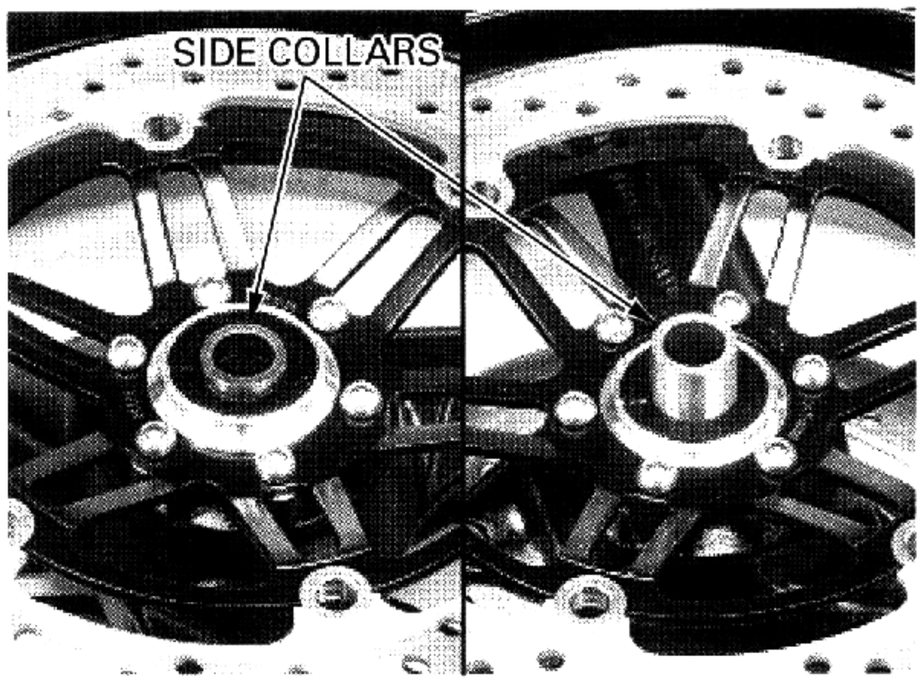
TORQUE: 20 N·m (2.0 kgf·m , 14 lbf·ft)

Apply grease to the dust seal lips, then install them into the wheel hub.



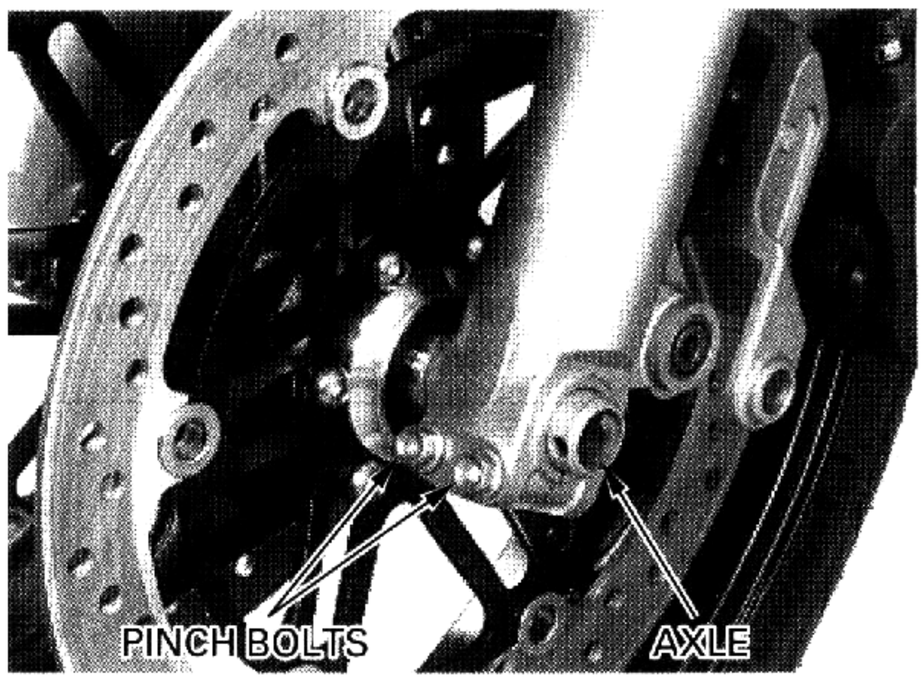
INSTALLATION

Install the side collars.



Install the front wheel between the fork legs while aligning the left brake disc between the left brake caliper pads.

Apply thin layer of grease to the front axle surface.
Install the front axle from the left side.

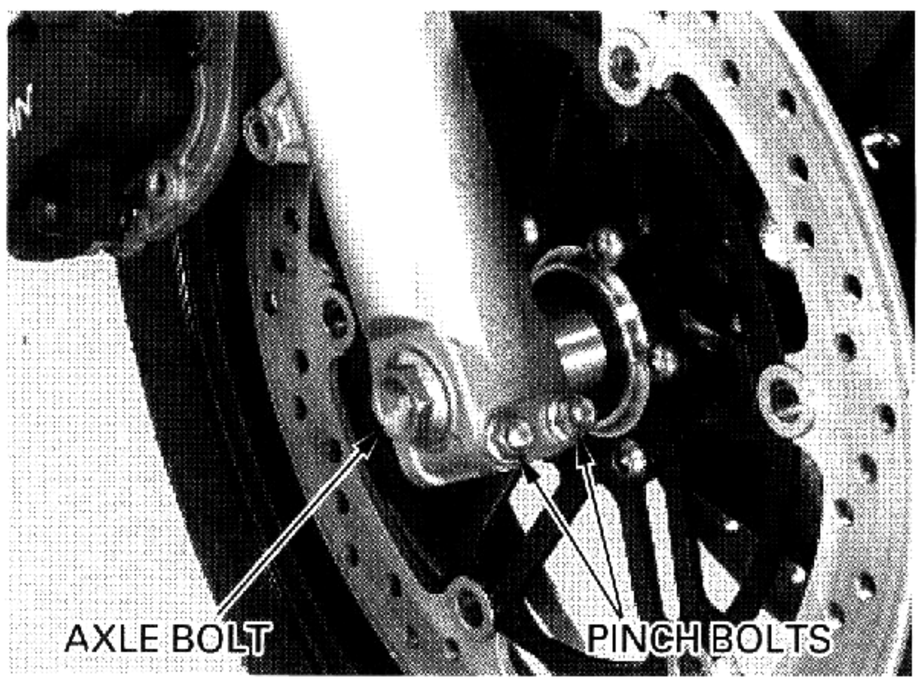


Hold the axle and tighten the axle bolt to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m , 43 lbf·ft)

Tighten the right axle pinch bolts to the specified torque.

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

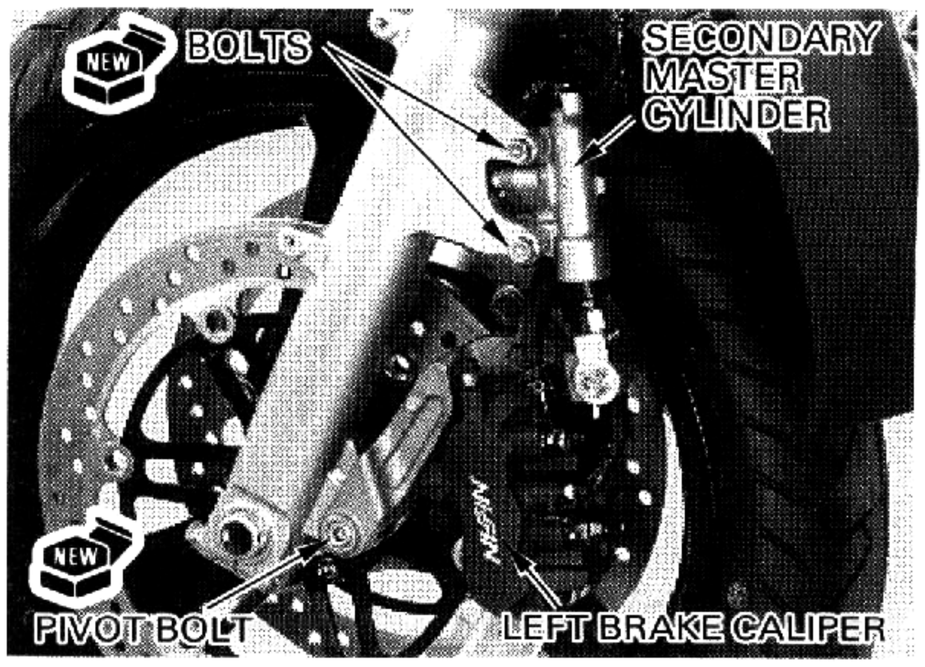


Install the left brake caliper and secondary master cylinder.
Install and tighten the new secondary master cylinder mounting bolts to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m , 23 lbf·ft)

Install and tighten the new left brake caliper pivot bolt to the specified torque.

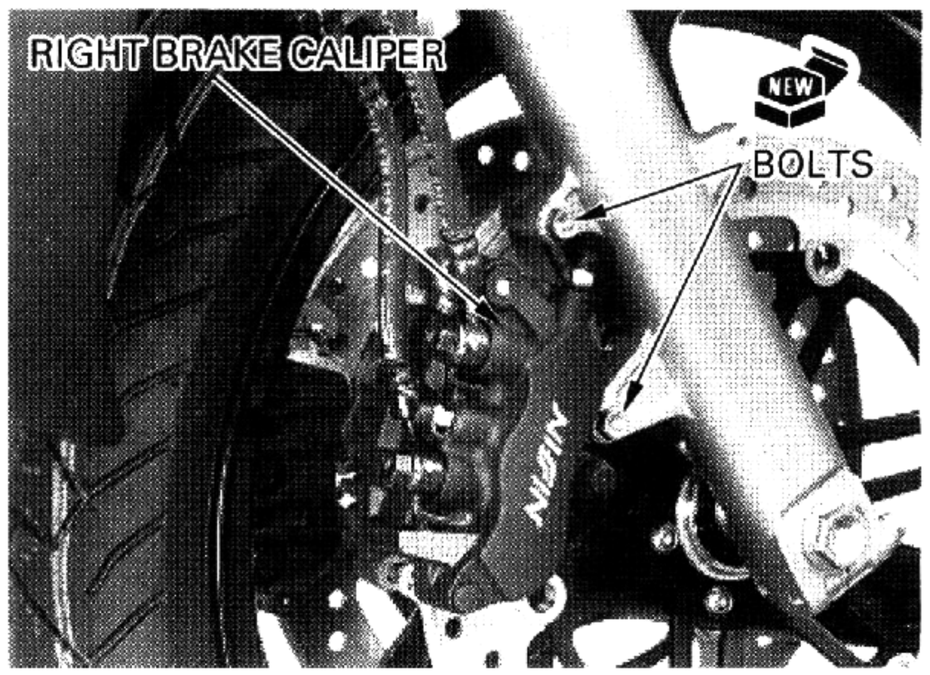
TORQUE: 31 N·m (3.2 kgf·m , 23 lbf·ft)



Install the right brake caliper and tighten the new mounting bolts to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m , 23 lbf·ft)

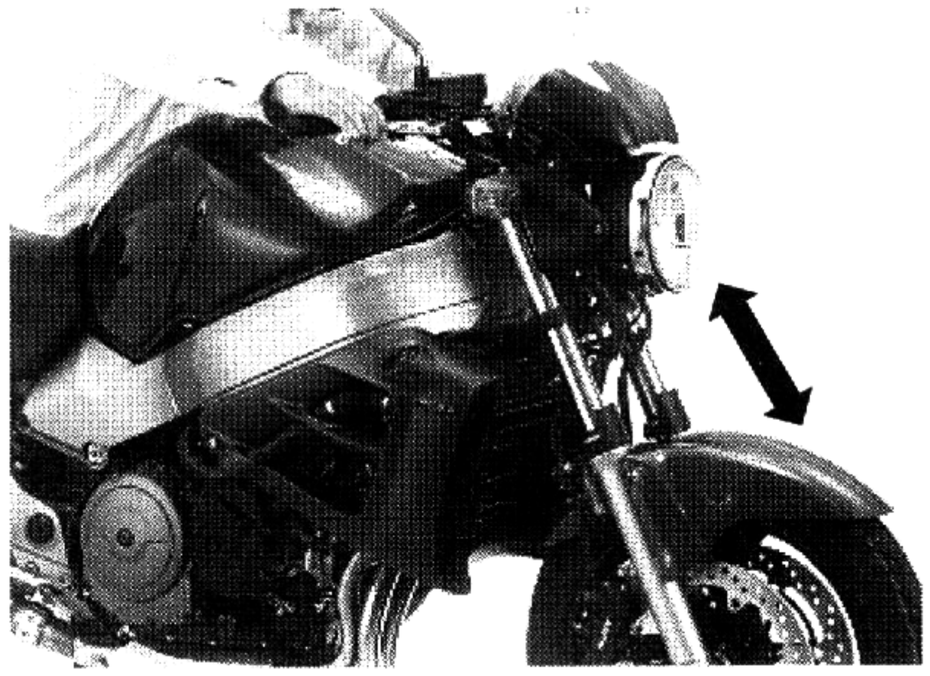
Install the front fender (page 2-5).



With the front brake applied, pump the fork up and down several times to seat the axle and check brake operation.

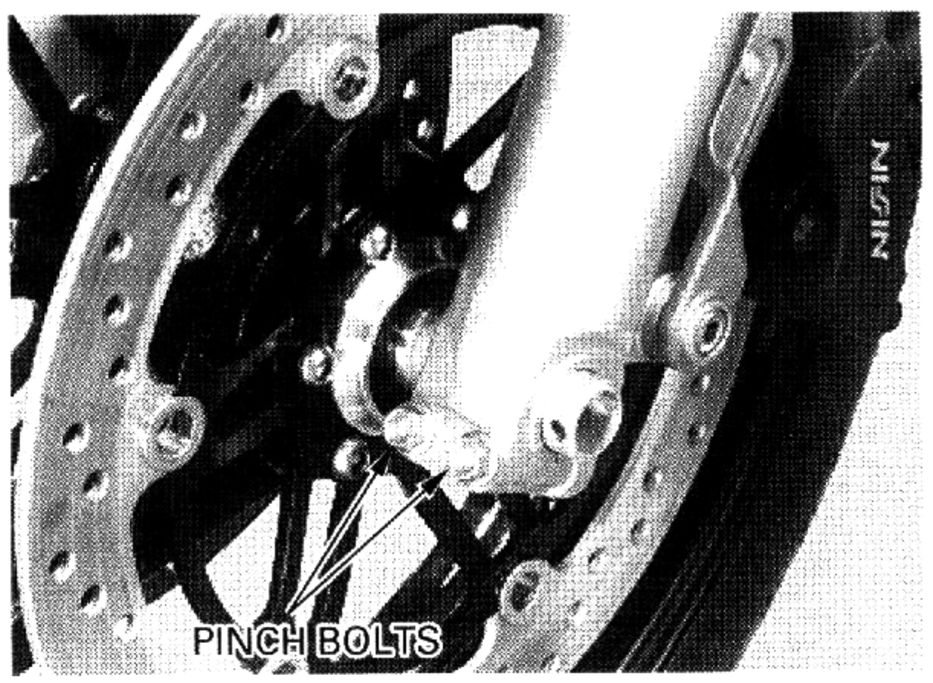
⚠WARNING

Check the brake operation by applying the brake lever and pedal.

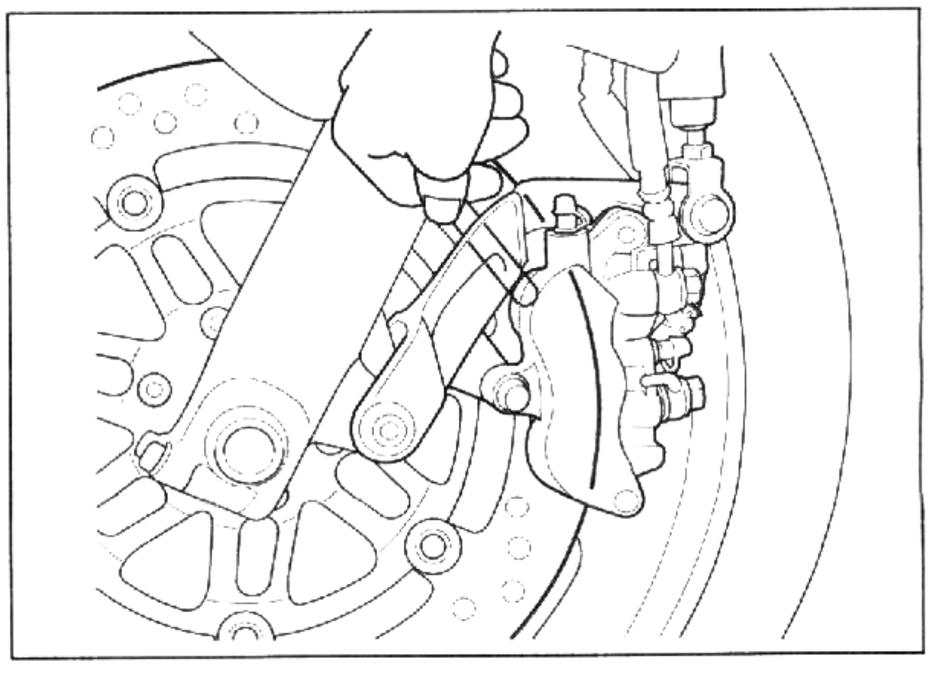


Tighten the left axle pinch bolts to the specified torque.

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



Check the clearance between the brake disc and caliper bracket on each side after installation.
The clearance should be at least 0.7 mm (0.03 in).



FORK

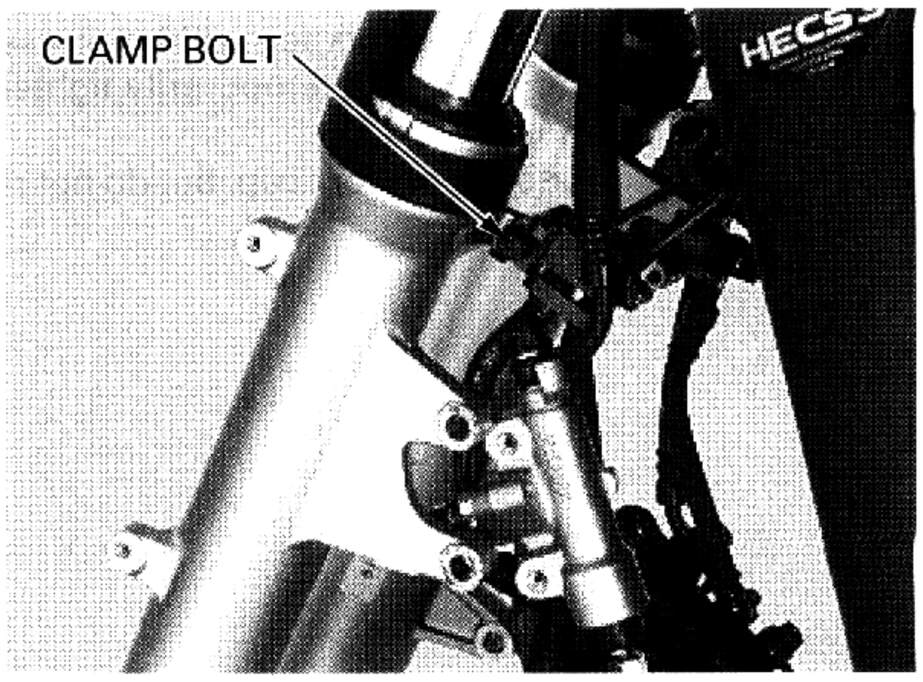
REMOVAL

Remove the front wheel (page 13-10).

CAUTION:

Keep the brake and clutch master cylinders upright.

For the left fork leg removal, remove the brake hose clamp bolt.



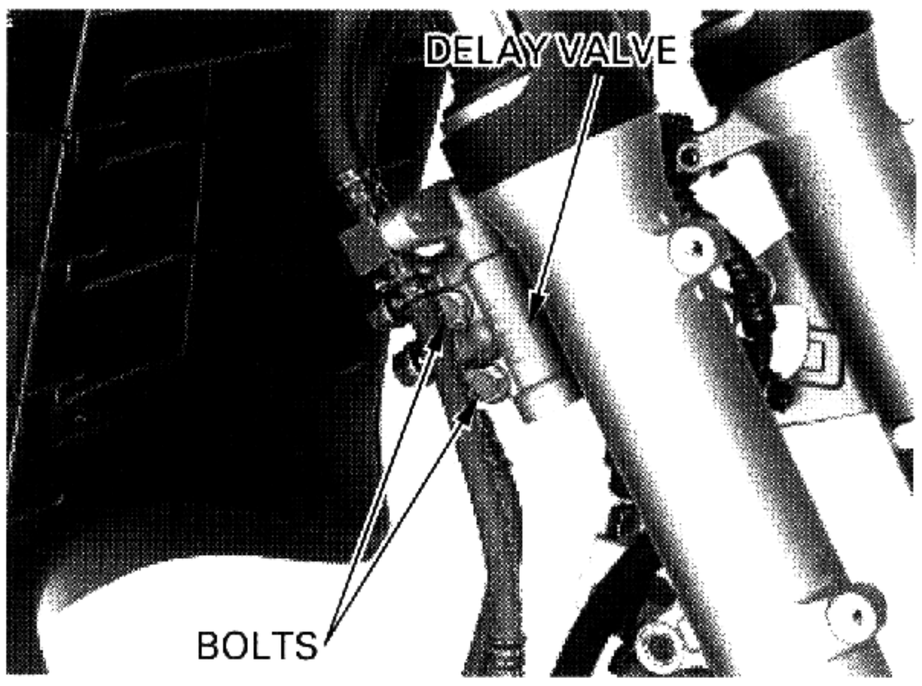
It is not necessary to remove the oil bolts and oil pipe from the delay valve.

For the right fork leg removal, remove the delay valve as follow:

1. Remove the brake pipe 3-way joint mounting bolt.

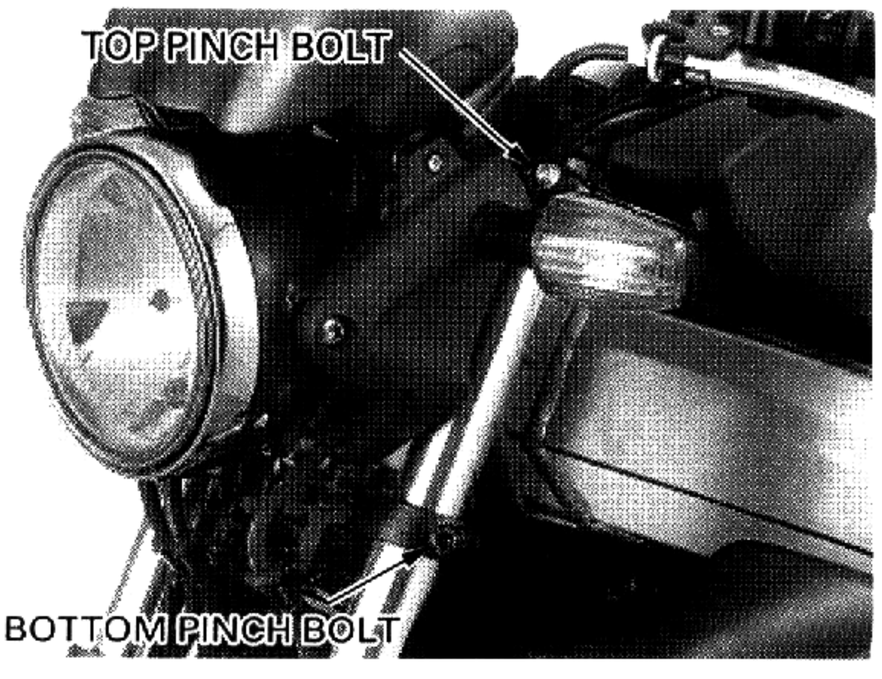


2. Remove the delay valve mounting bolts, then release the delay valve from the right fork leg.

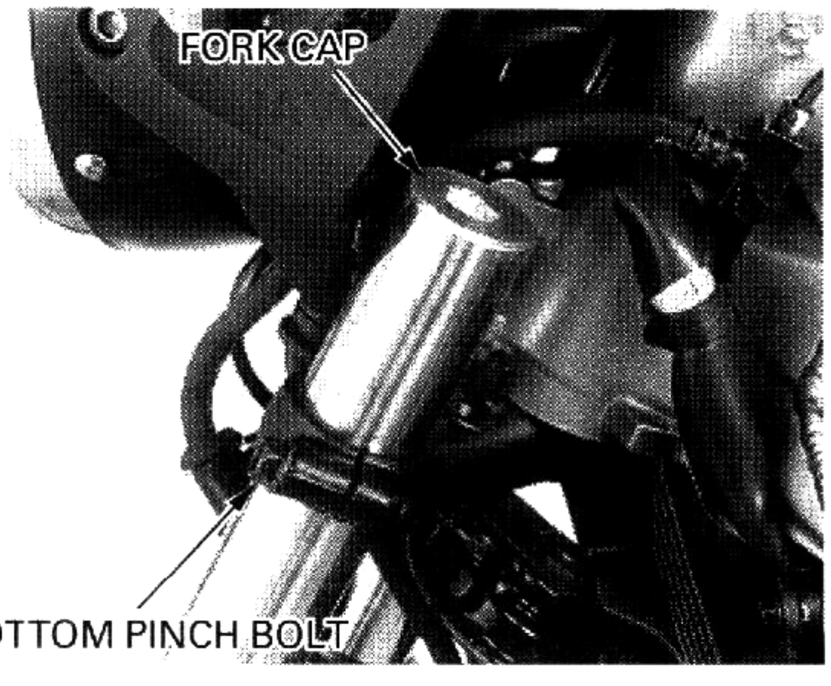


Loosen the top bridge pinch bolt.

Loosen the fork bottom pinch bolt and remove the fork tube from the fork top bridge and steering stem.



When the fork leg will be disassembled, lower the fork tube and temporarily tighten the bottom pinch bolt.
Loosen the fork cap, but do not remove it yet.

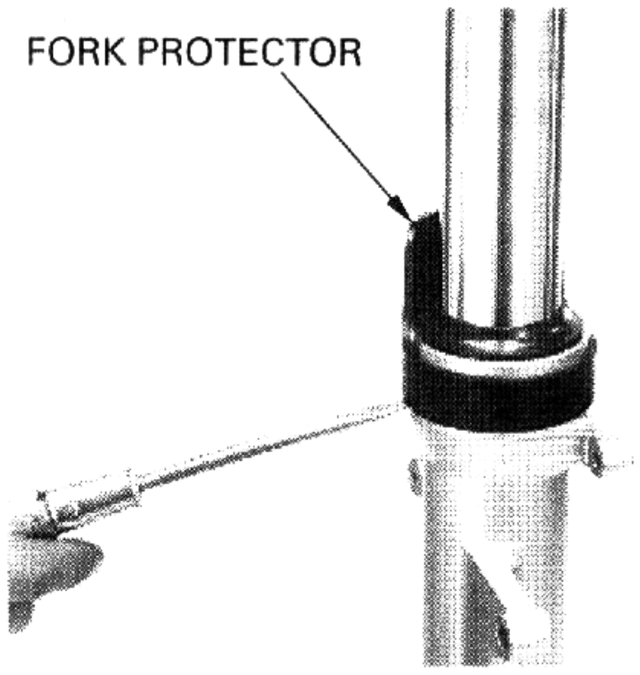


DISASSEMBLY

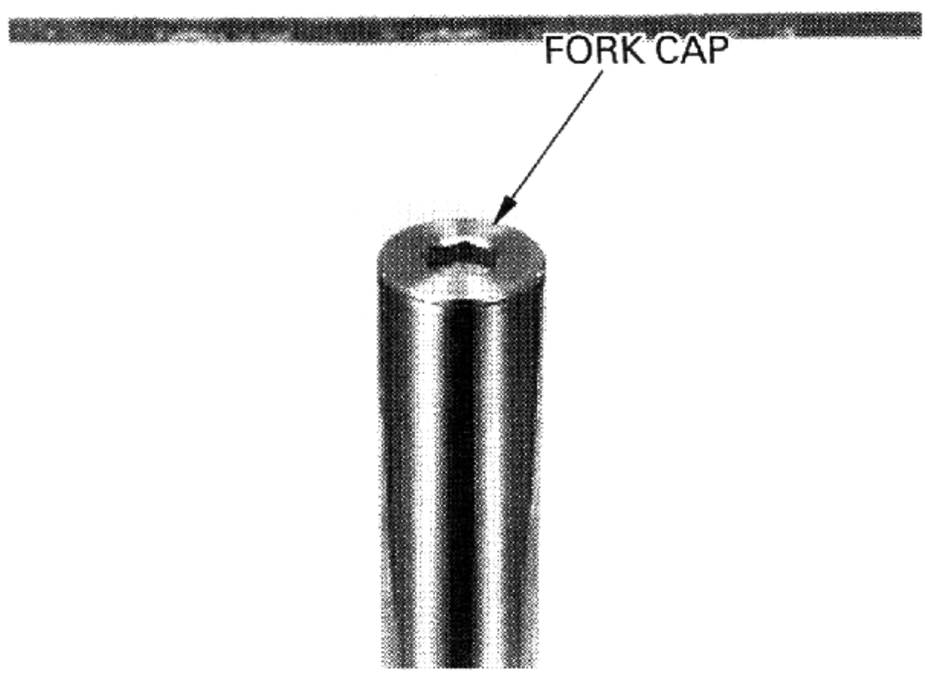
CAUTION:

Be careful not to scratch the fork tube or damage the dust seal.

Remove the fork protector from the fork slider by lifting at the three pry points.

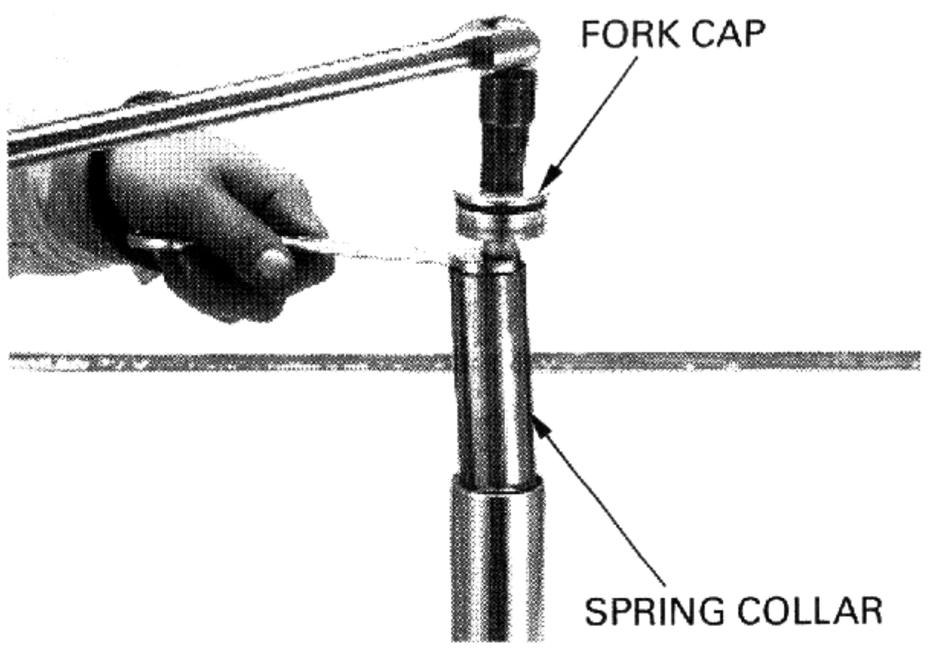


Remove the fork cap from the fork tube.

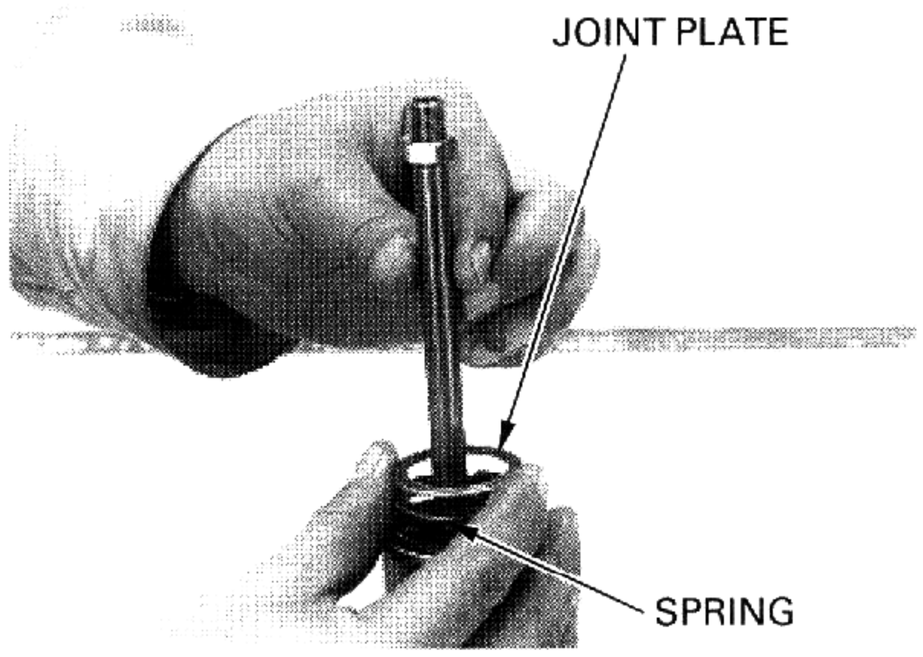


Hold the damper rod lock nut with a 14 mm spanner, then loosen and remove the fork cap from the damper rod.

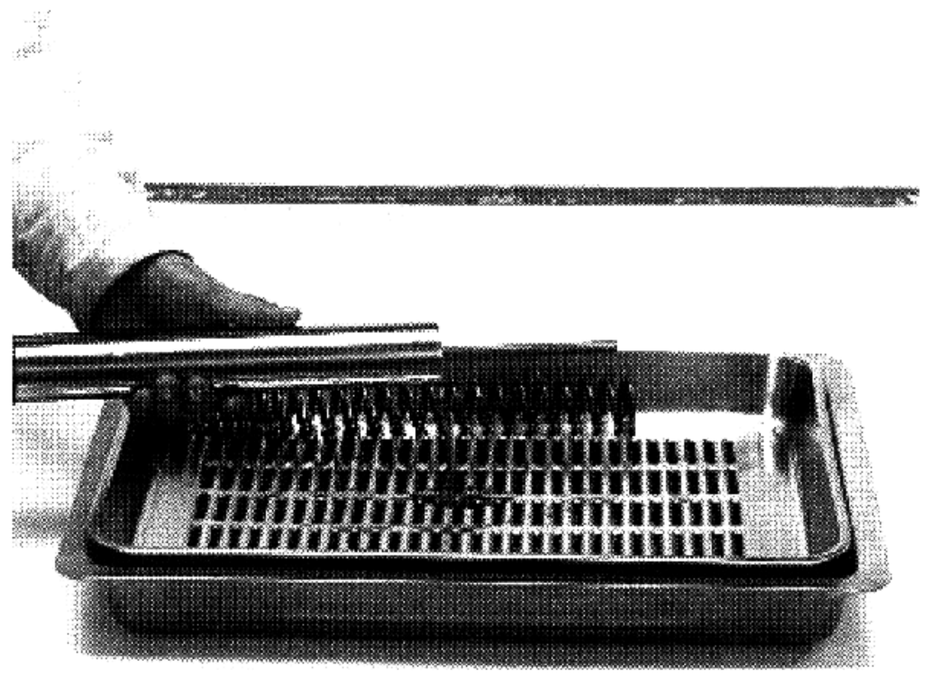
Remove the spring collar.



Remove the spring joint plate and fork spring.



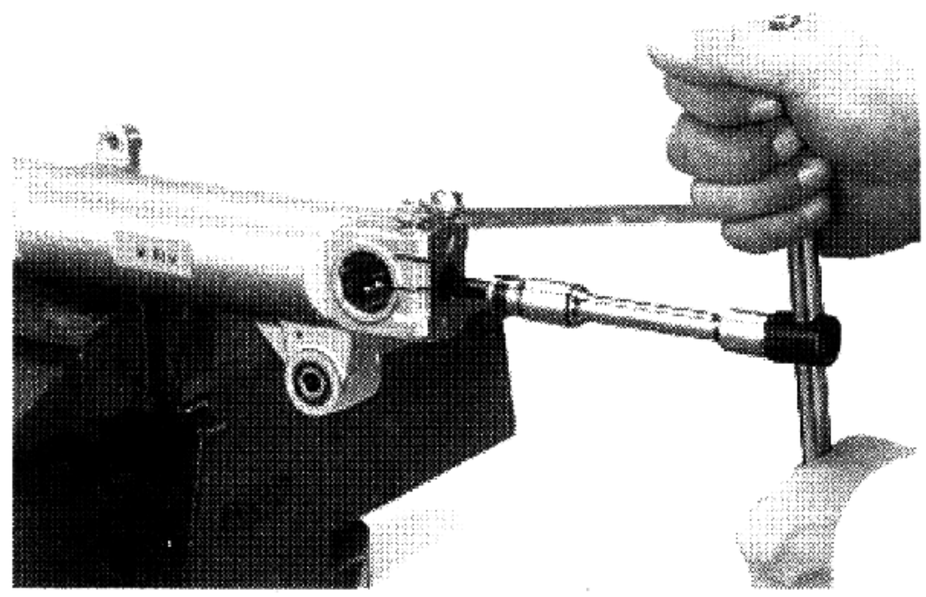
Pour out the fork fluid by pumping the fork tube up and down several times.



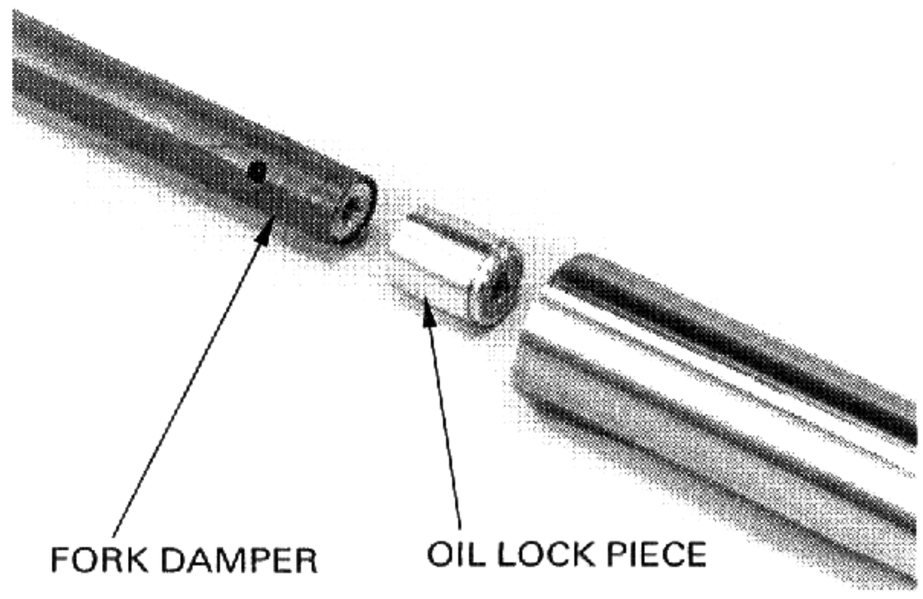
Hold the fork slider in a vice with soft jaws or a shop towel.
Remove the fork socket bolt with a hex wrench.

NOTE:

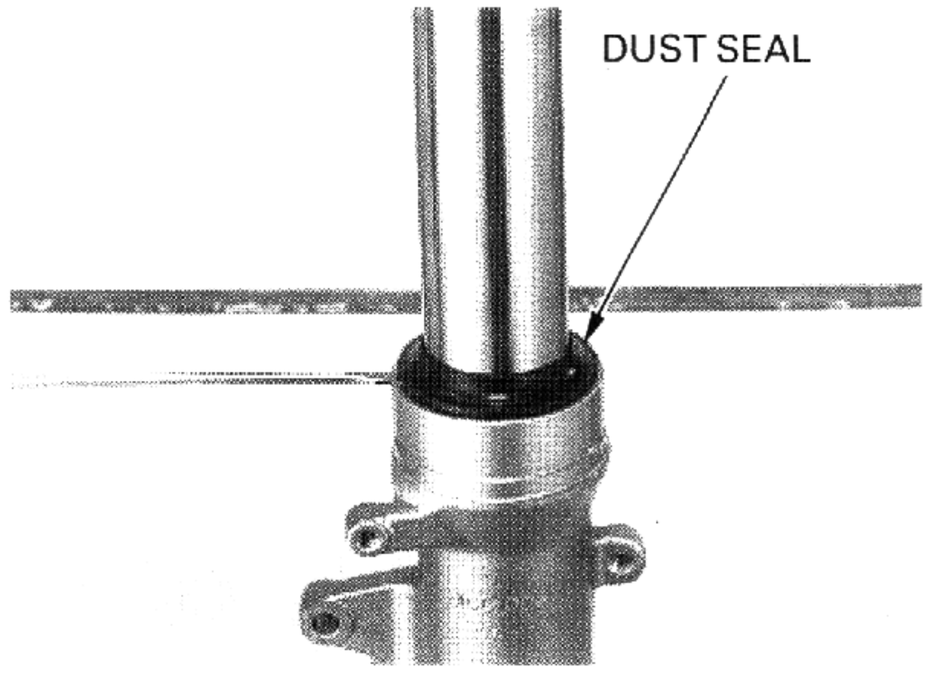
If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring collar and fork cap.



Remove the fork damper assembly and oil lock piece from the fork tube.



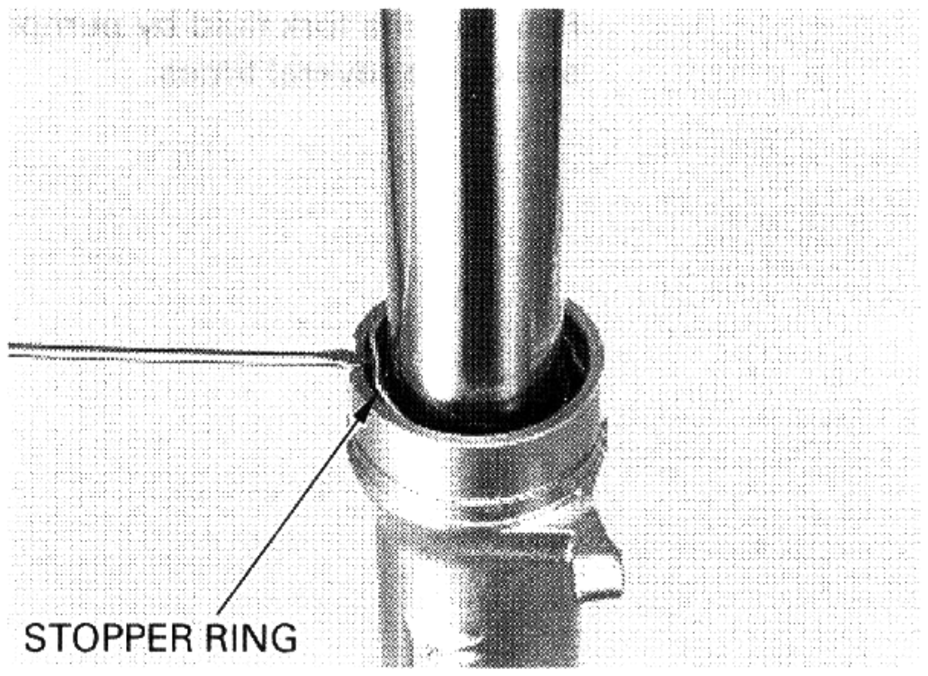
Remove the dust seal.



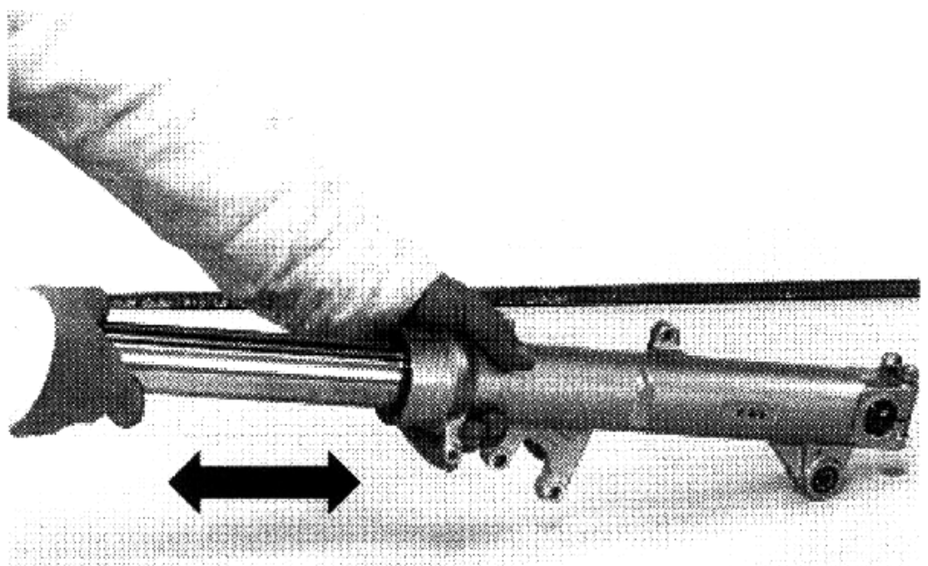
Remove the oil seal stopper ring.

CAUTION:

Do not scratch the fork tube sliding surface.



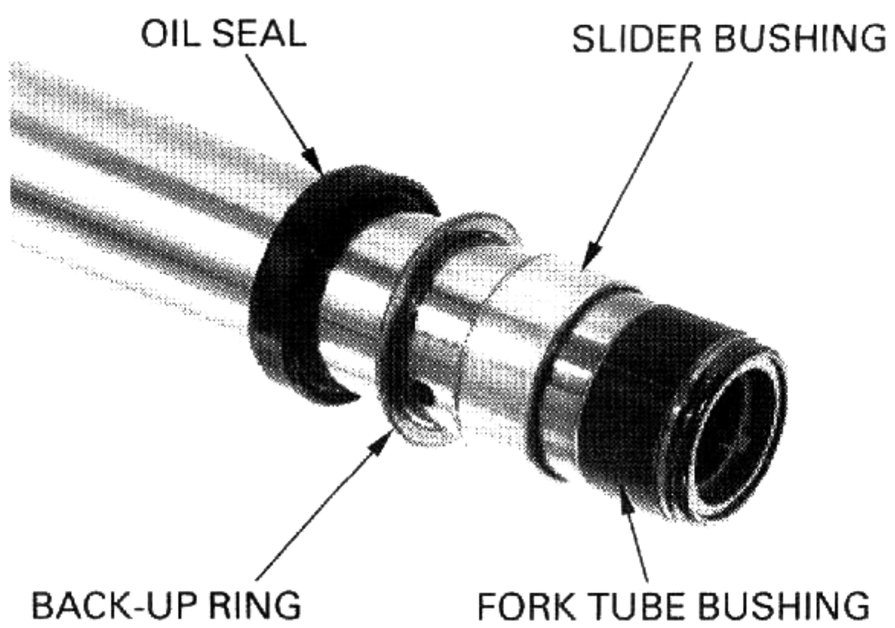
Pull the fork tube out until you feel resistance from the slider bushing. Then move it in and out, tapping the bushing lightly until the fork tube separates from the fork slider.
The slider bushing will be forced out by the fork tube bushing.



Remove the oil seal, back-up ring and slider bushing from the fork tube.

NOTE:

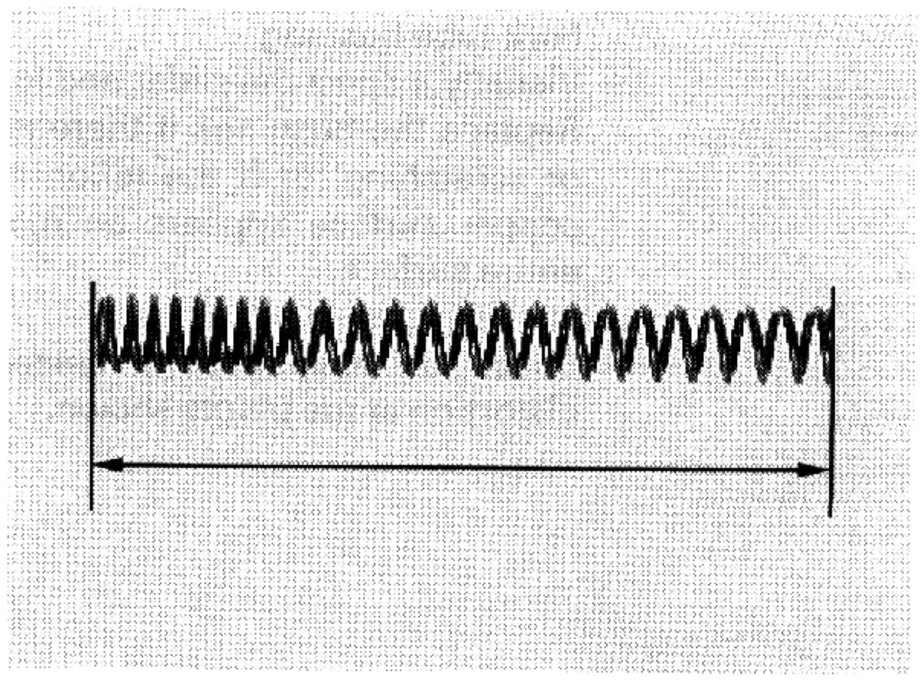
Do not remove the fork tube bushing unless it is necessary to replace it with a new one.



INSPECTION

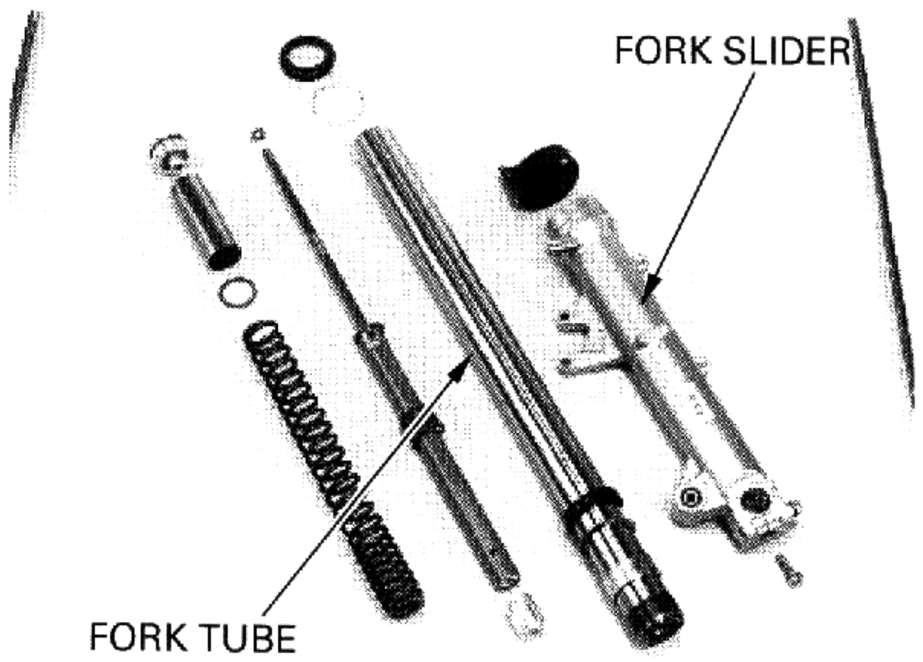
Fork spring
Measure the fork spring free length.

SERVICE LIMIT: 314.1 mm (12.37 in)



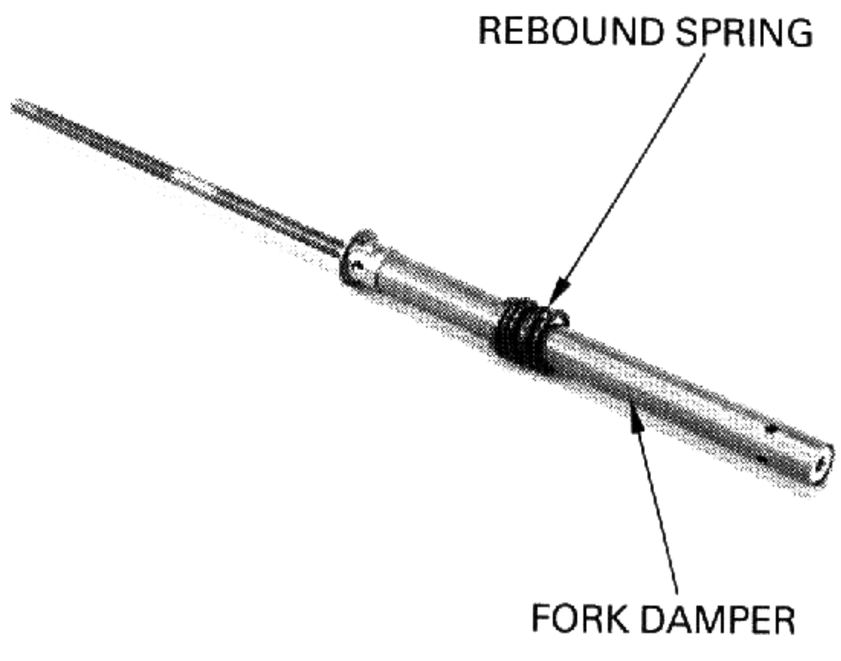
Fork tube/slider/damper
Check the fork tube and fork slider for score marks, scratches, or excessive or abnormal wear.

Replace any components which are worn or damaged.



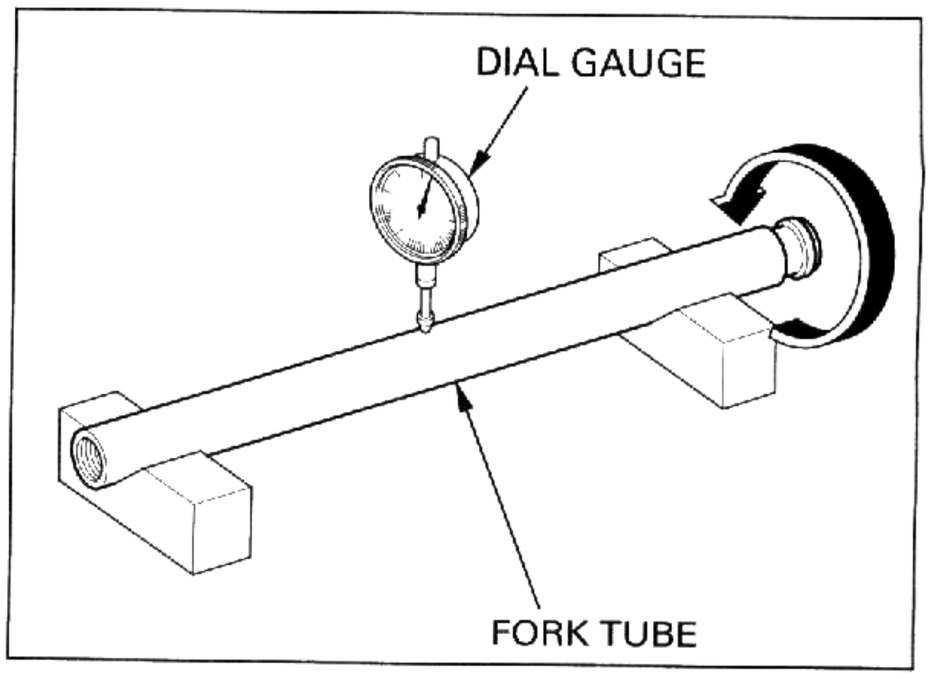
Fork damper
Check the fork damper for damage.
Check the rebound spring for fatigue or damage.

Replace the fork damper assembly, if any component are damaged.



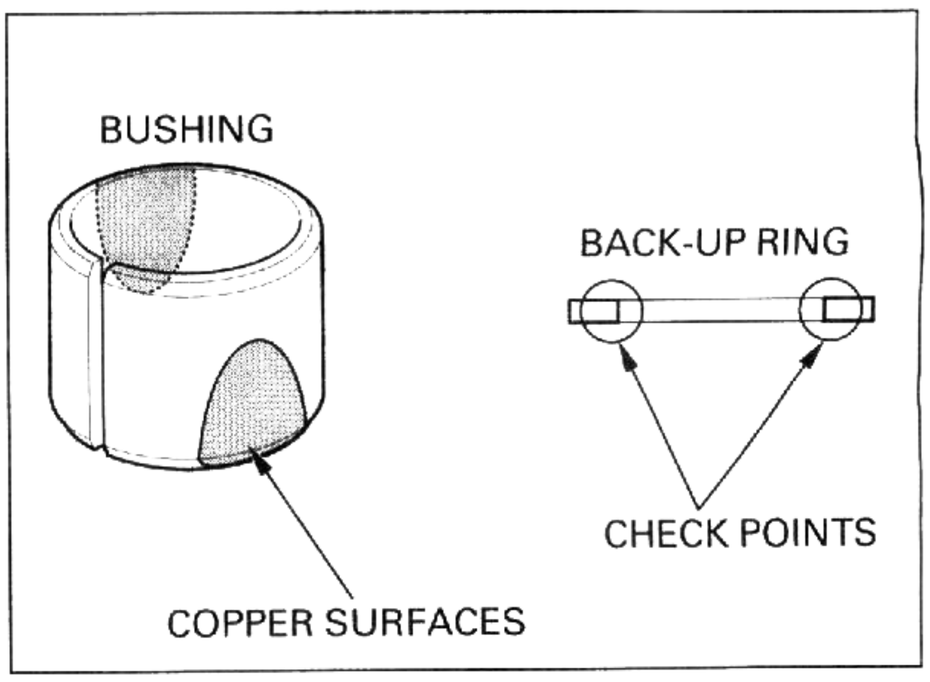
Place the fork tube in V-block and measure the runout.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)

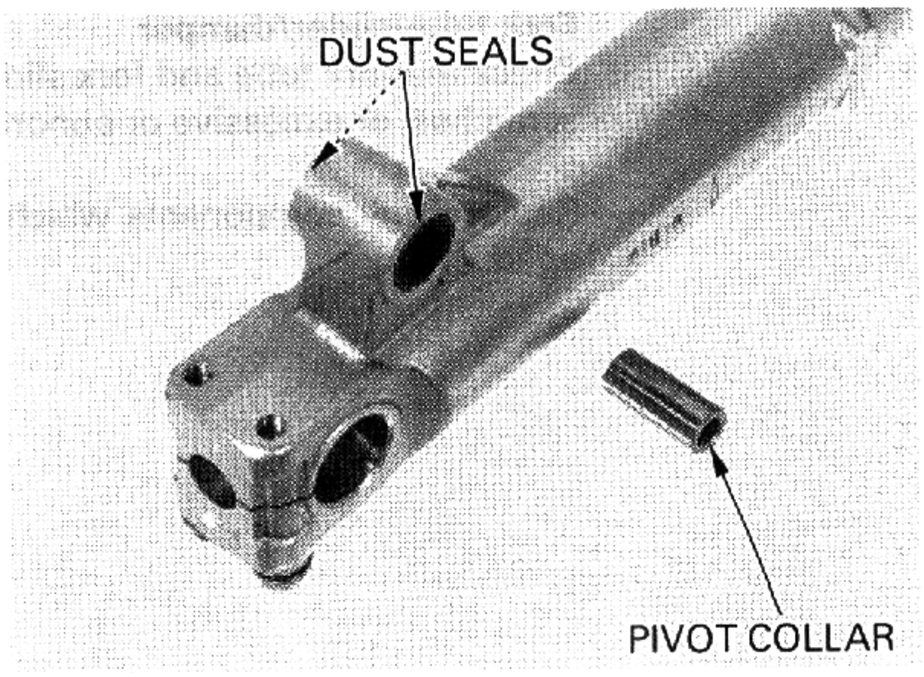


Fork tube bushing
Visually inspect the slider and fork tube bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



BRAKE CALIPER PIVOT BEARINGS REPLACEMENT
Remove the dust seals and pivot collar.



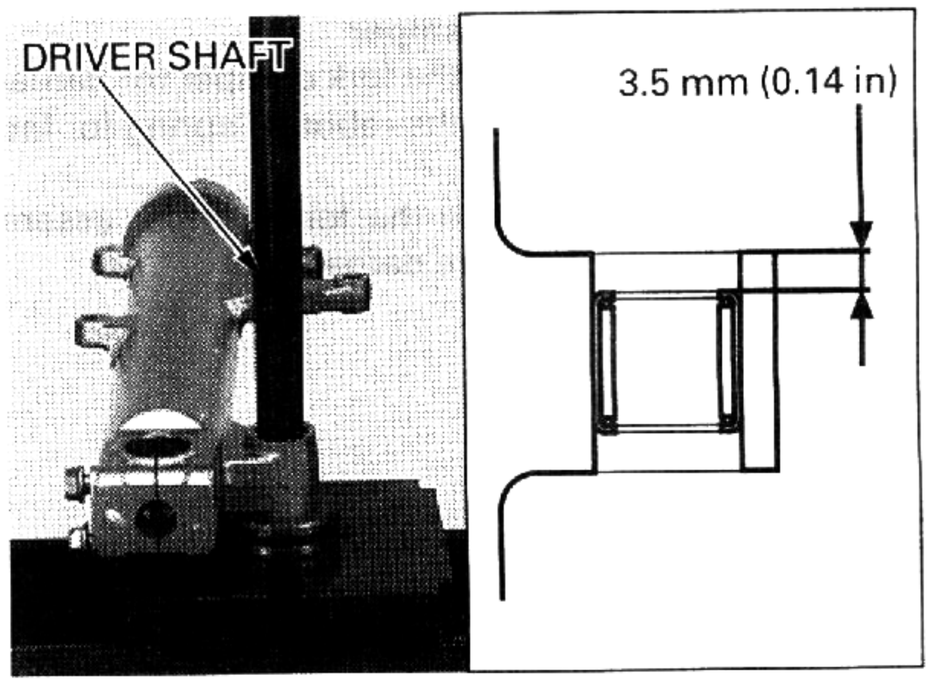
Press out the pivot bearings using the special tool.

TOOL:
Driver shaft 07946-KA50000

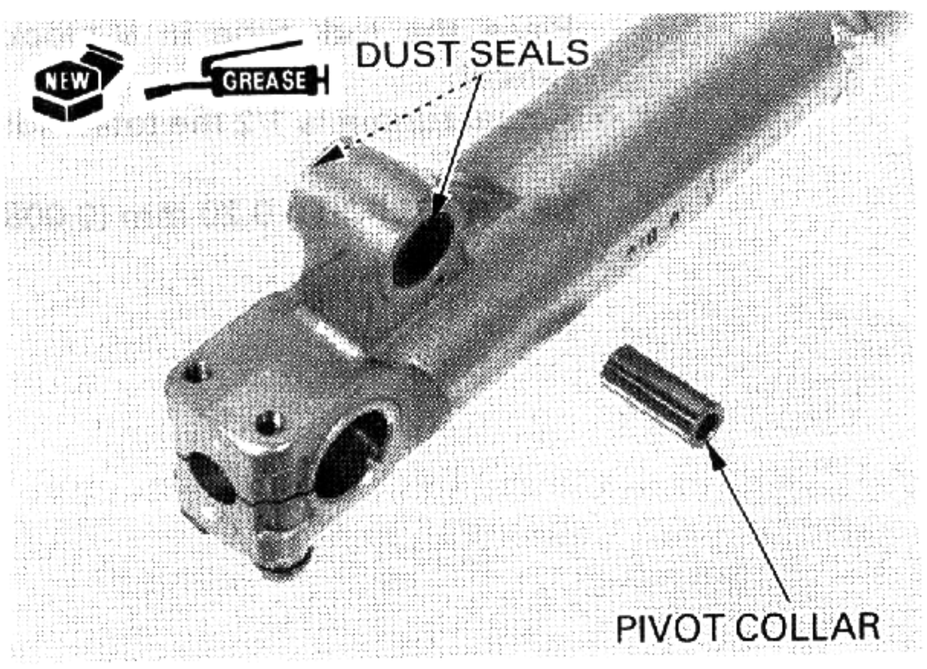
Apply grease to the pivot bearings.
Press the needle bearing into the fork slider using the same tool.

NOTE:

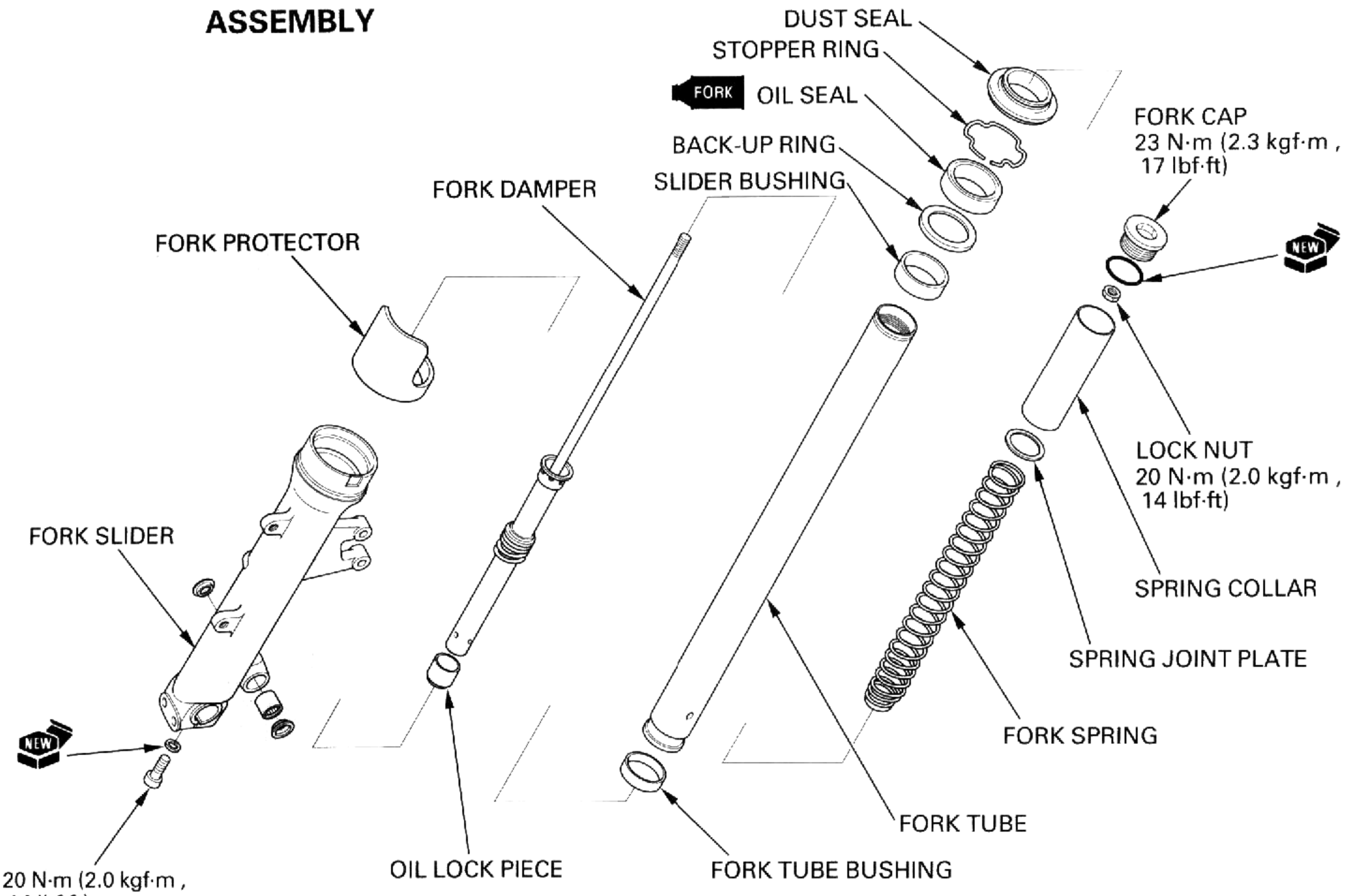
Install the bearing so that the bearing cage below 3.5 mm (0.14 in) from the pivot surface.



Apply grease to the new dust seal lips.
Install the dust seals and pivot collar.



ASSEMBLY



Before assembly, wash all parts with a high flash or non-flammable solvent and wipe them dry.

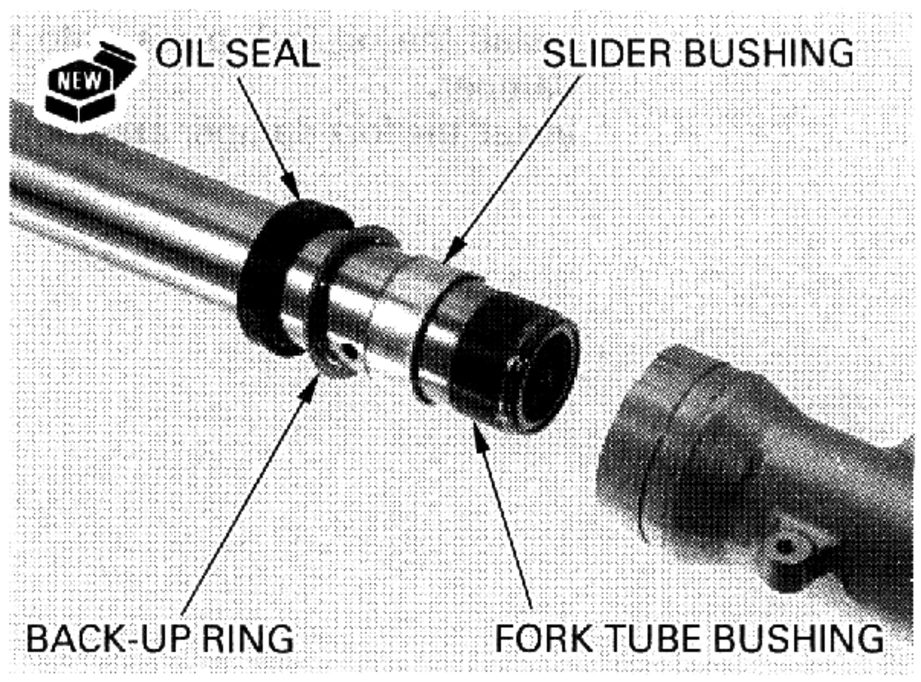
Install a new fork tube **bushing** if the bushing has been removed.

Install the oil seal with its marked side facing up.

Install the **slider bushing**, back-up ring and a new oil seal.

Apply fork fluid to the oil seal lips.

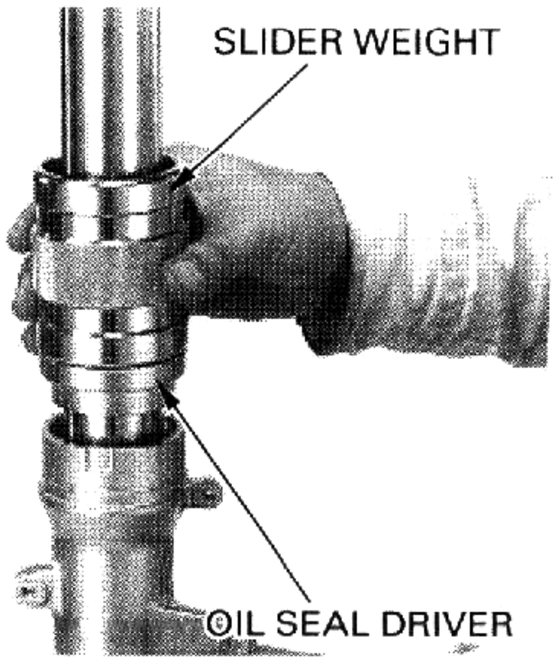
Install the fork tube into the fork slider.



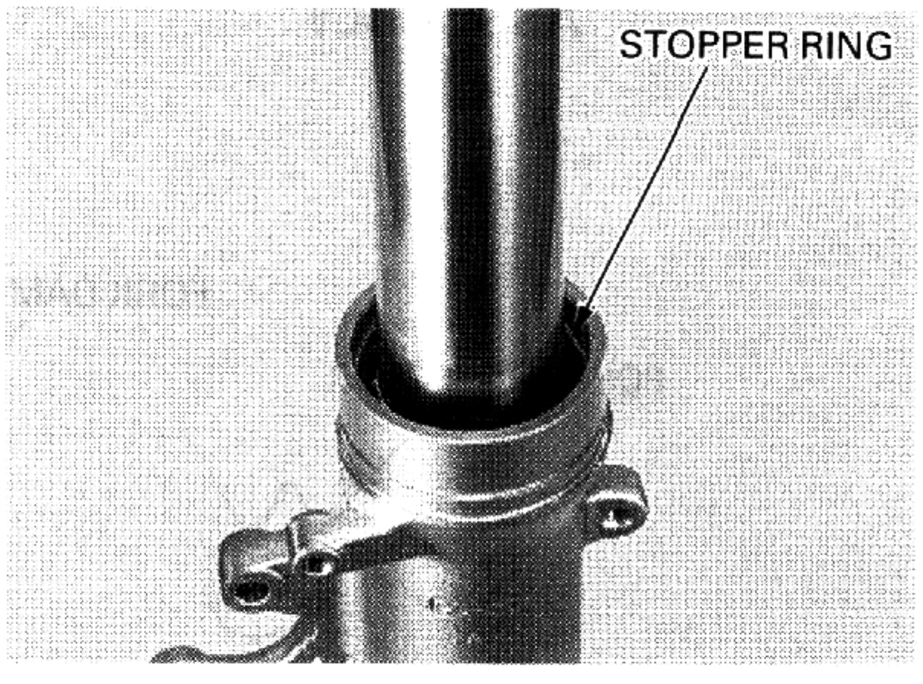
Drive the oil seal in using the special tools.

TOOL:

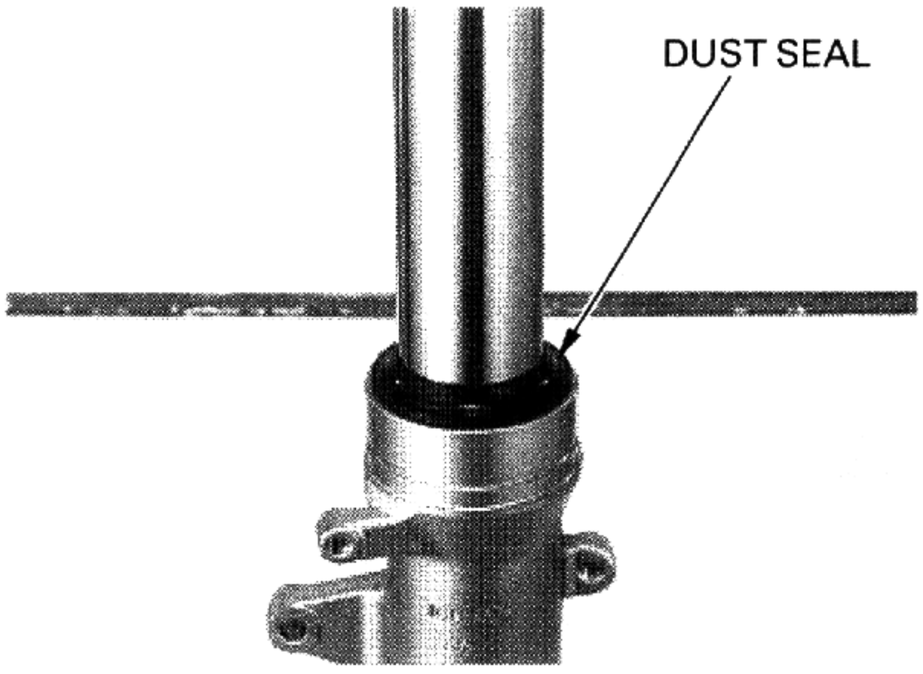
Slider weight	07947-KA50100
Oil seal driver	07947-KA40200



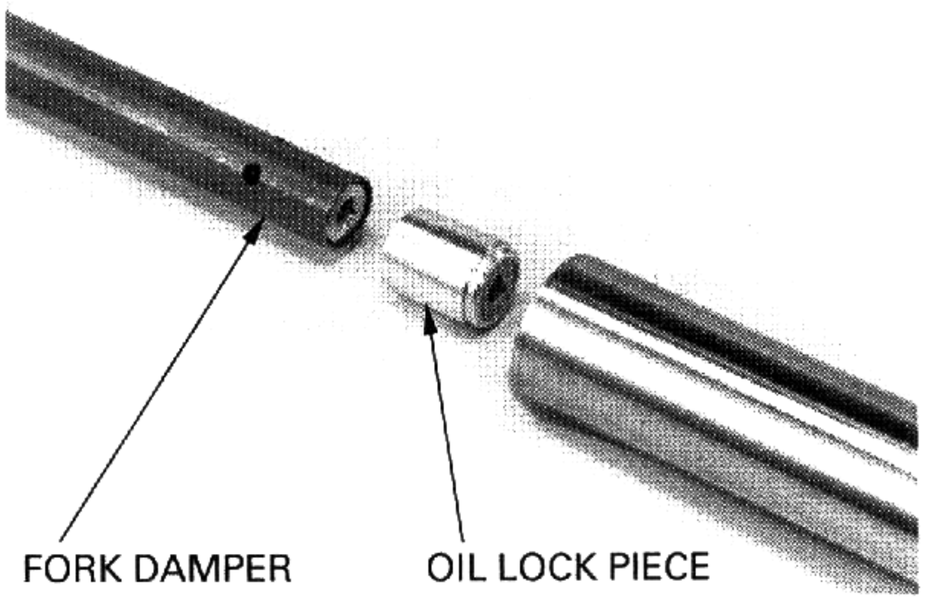
Install the stopper ring into the fork slider groove securely.



Install the dust seal.



Install the oil lock piece onto the end of the fork damper.
Install the fork damper assembly into the fork tube.

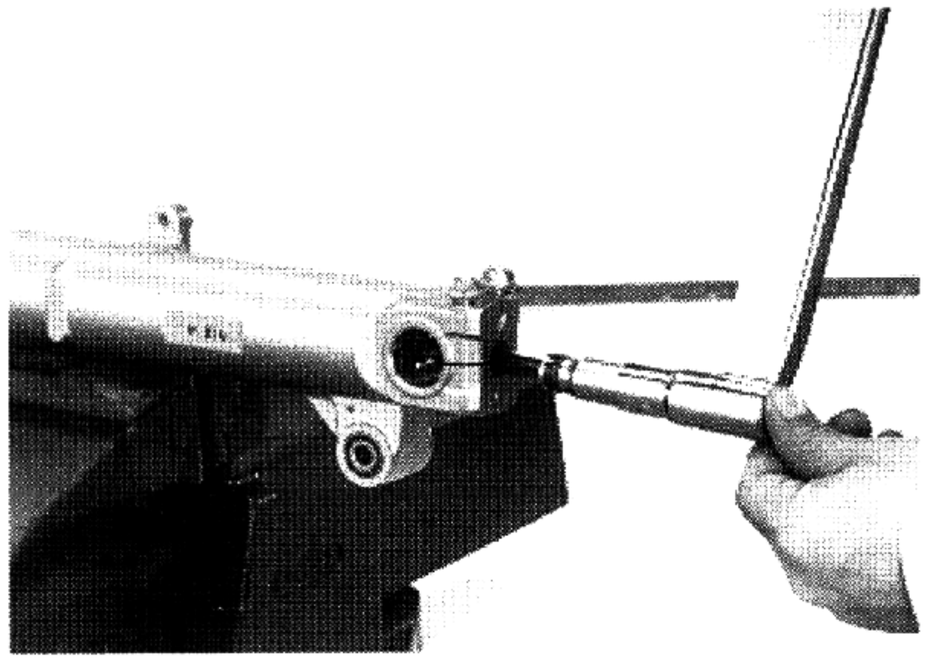


Hold the fork slider in a vise with soft jaws or a shop towel.
Apply a locking agent to the fork socket bolt threads.
Install the socket bolt with a new sealing washer, then tighten the bolt to the specified torque.

NOTE:

If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring collar and fork bolt.

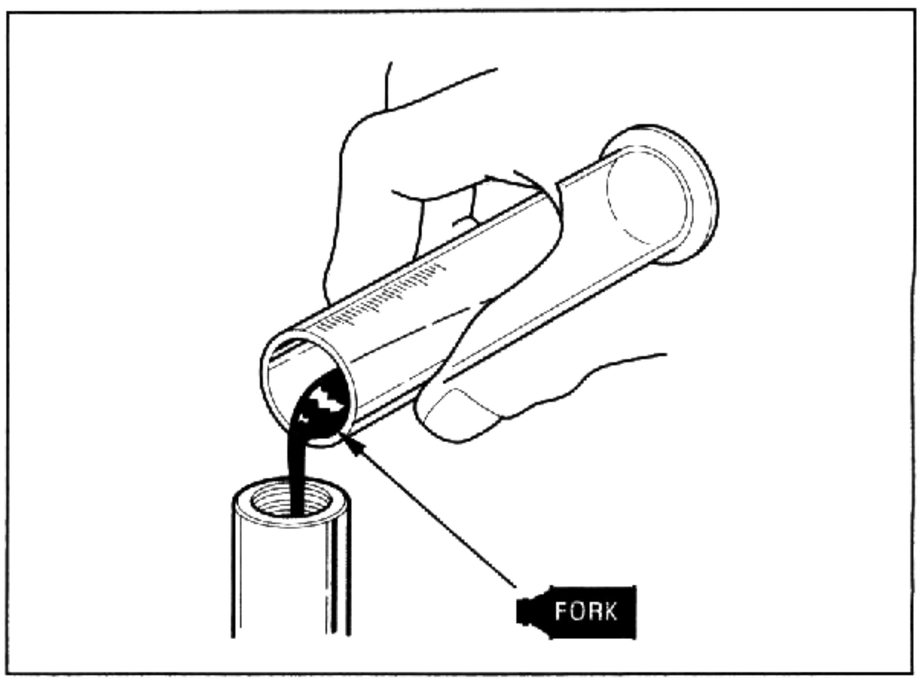
TORQUE: 20 N·m (2.0 kgf·m , 14 lbf·ft)



Pour the specified amount of recommended fork fluid into the fork tube.

RECOMMENDED FORK FLUID:
Fork fluid
FORK FLUID CAPACITY:
446 ± 2.5 cm³ (15.1 ± 0.08 US oz, 15.7 ± 0.09 Imp oz)

Pump the damper rod several times.

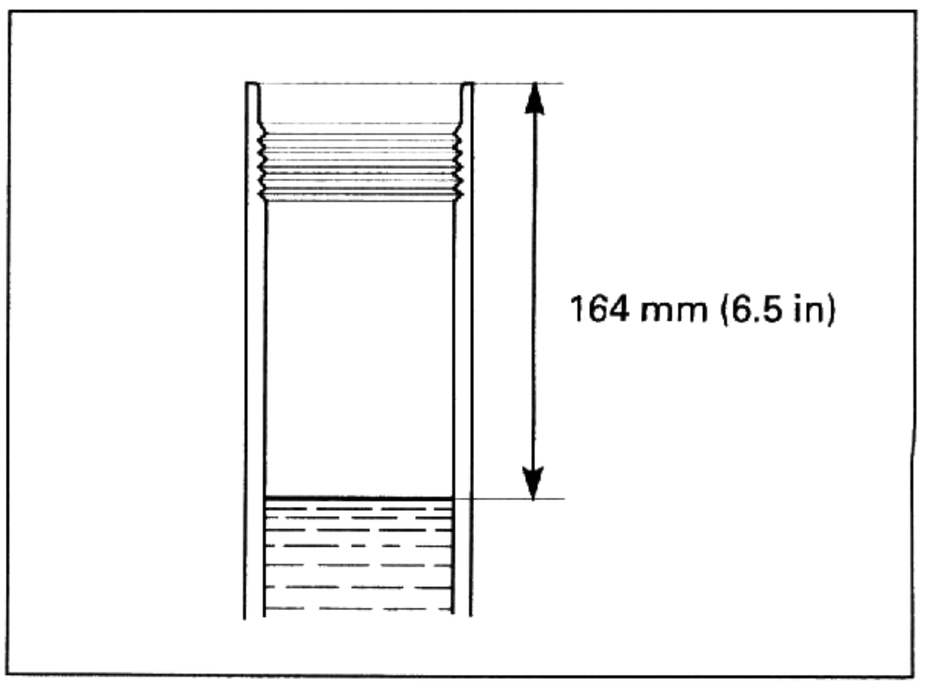


Measure the oil level from the top of the fork tube while compressing the tube all the way after stroking the fork tube slowly more than 5 times and the damper rod more than 10 times.

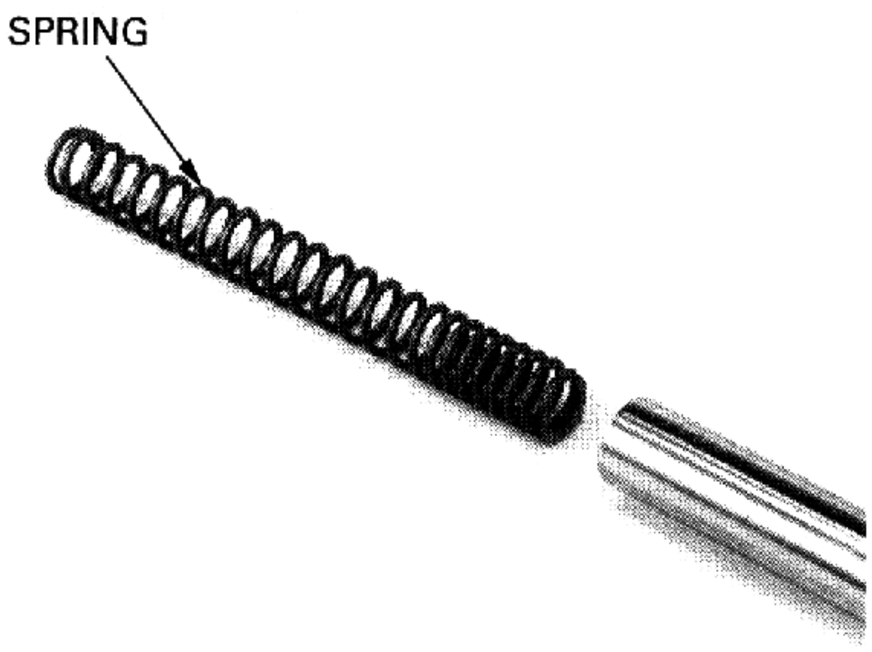
NOTE:

Be sure the oil level is the same in the both forks.

FORK OIL LEVEL: 164 mm (6.5 in)

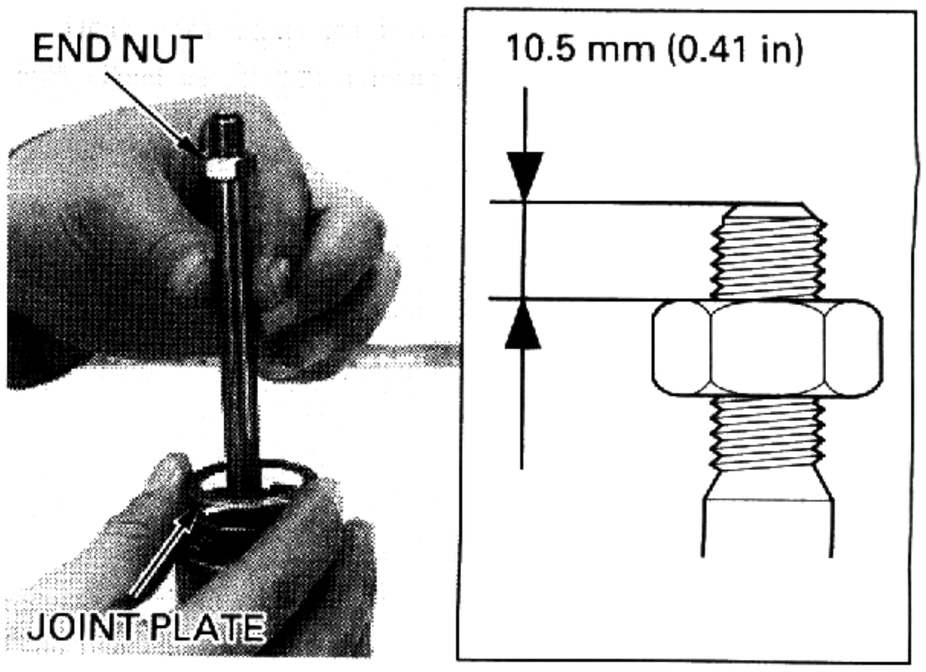


Pull the damper rod up and install the fork spring with the tapered end facing down.



Install the spring joint plate.

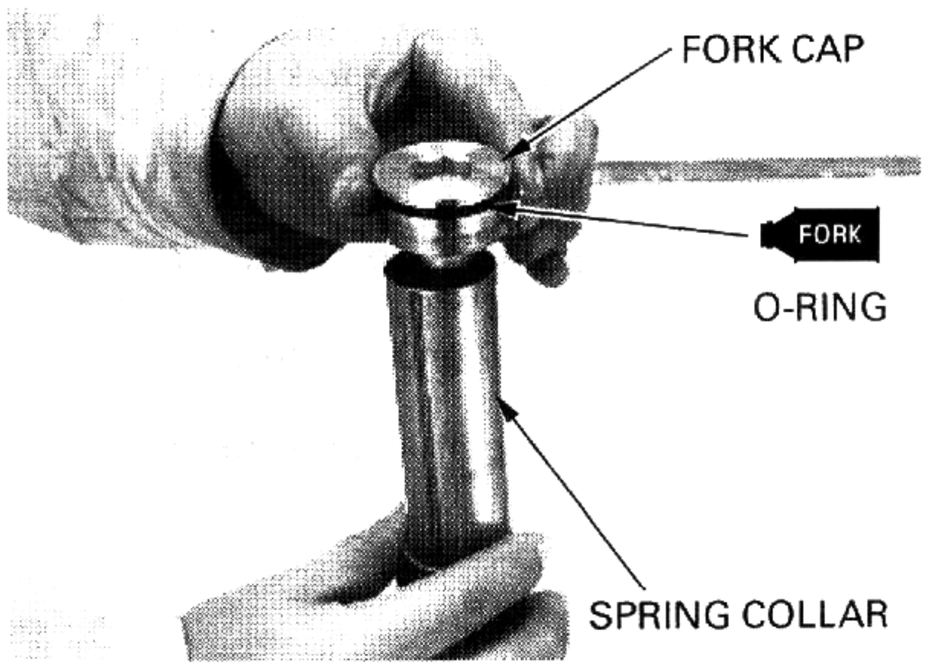
Screw the damper rod end nut so that the upper surface of the end nut below 10.5 mm (0.41 in) from top end of the damper rod as shown.



Install the spring collar.

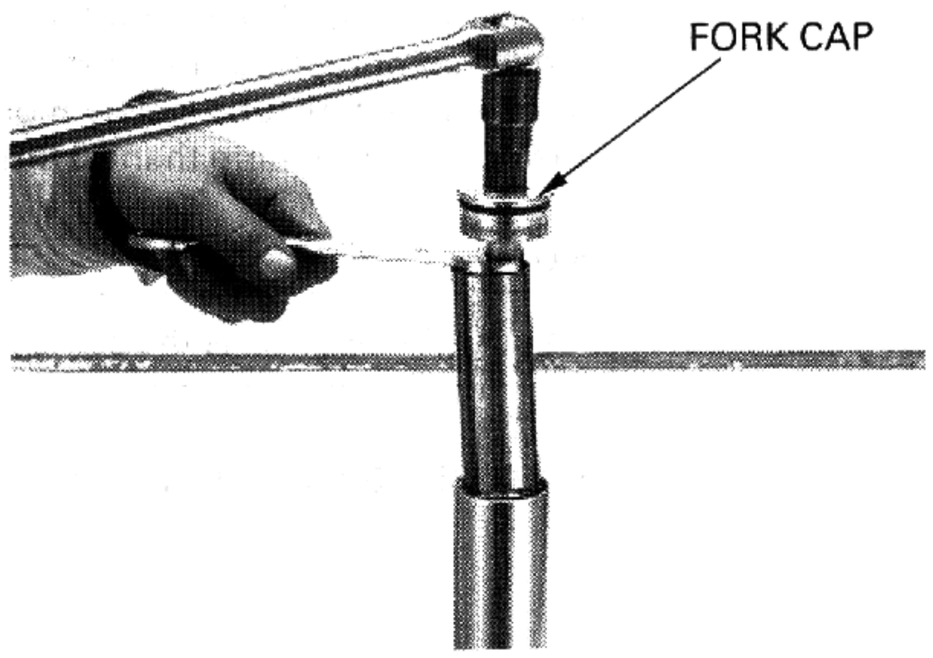
Install new O-rings onto the fork cap.
Apply fork fluid to the new O-rings.

Hold the damper rod and screw the fork cap onto the damper rod until it seats on the damper rod lock nut.

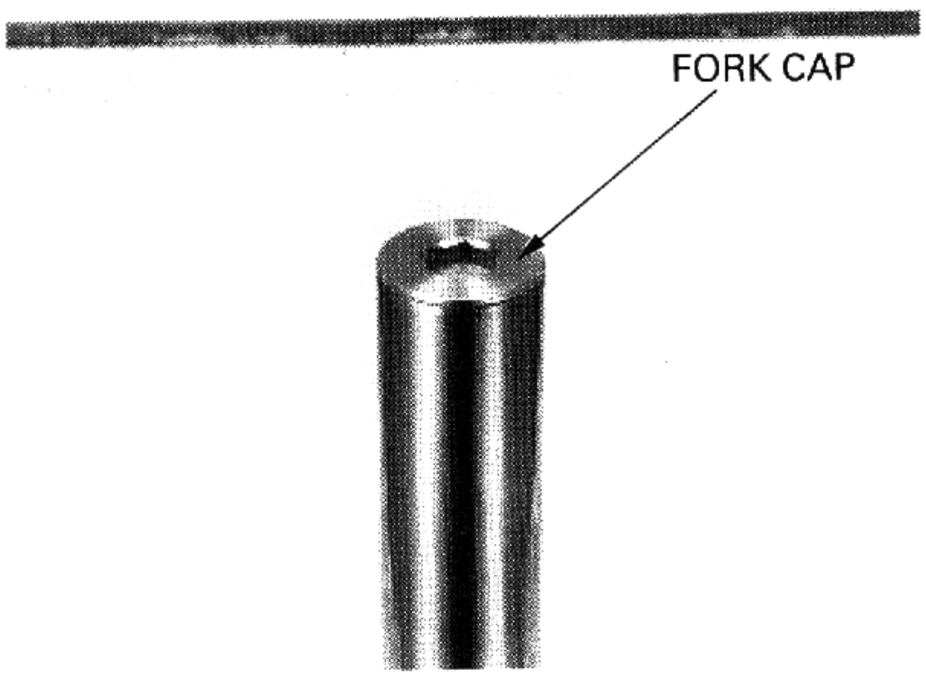


Hold the fork cap and tighten the lock nut to the specified torque.

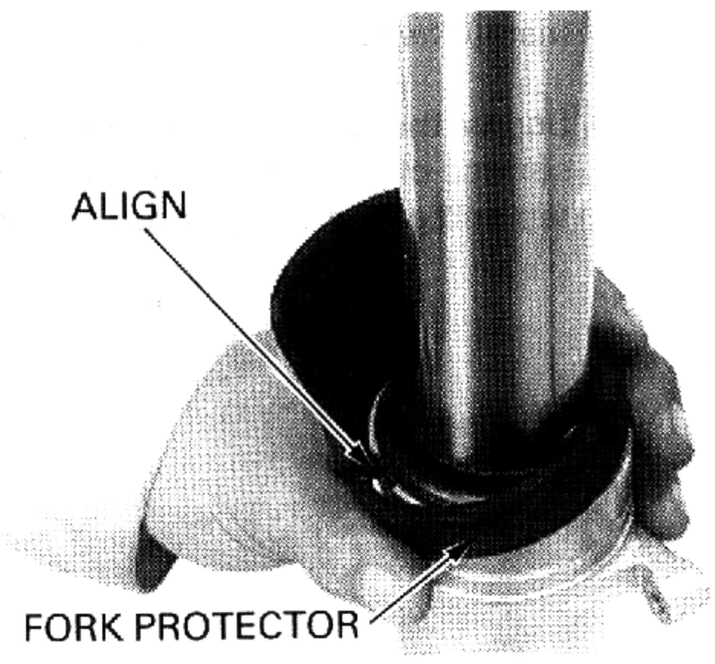
TORQUE: 20 N·m (2.0 kgf·m , 14 lbf·ft)



Screw the fork cap into the fork tube.



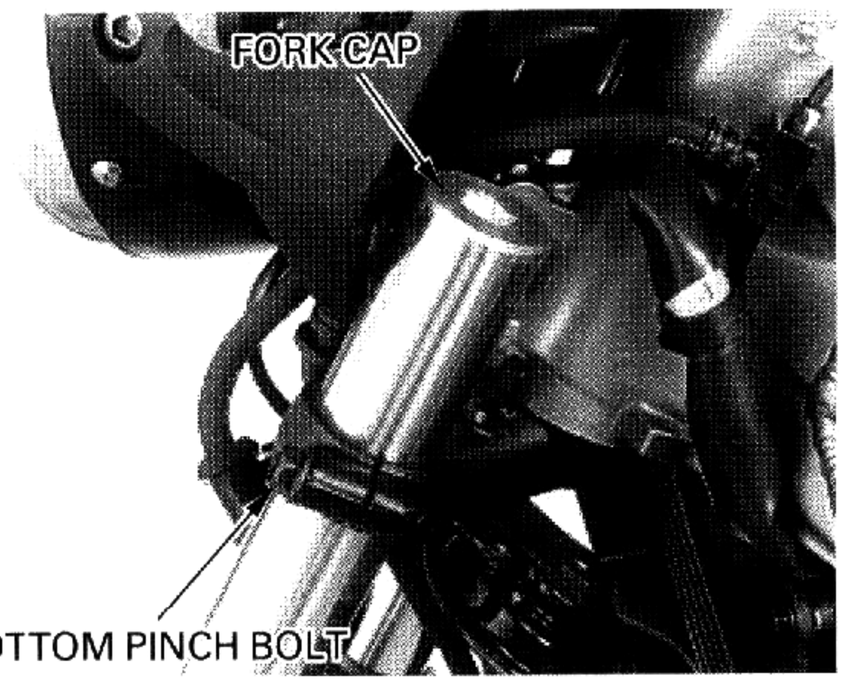
Install the fork protector onto the fork slider aligning the protector boss with the groove in the fork slider.



INSTALLATION

Install the fork leg into the bottom bridge, temporarily tighten the bottom pinch bolt.
Tighten the fork cap (if it was removed).

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



Loosen the bottom pinch bolt and pull up the fork legs into the top bridge.
Position the top end of the fork tube flash with the upper surface of the top bridge as shown.

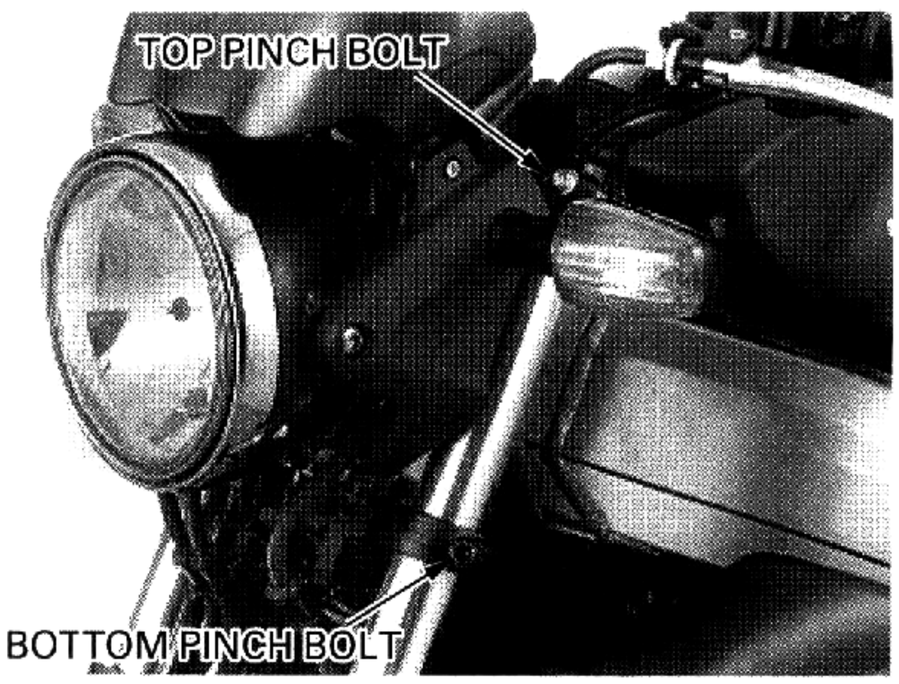


Tighten the bottom bridge pinch bolt to the specified torque.

TORQUE: 49 N·m (5.0 kgf·m , 36 lbf·ft)

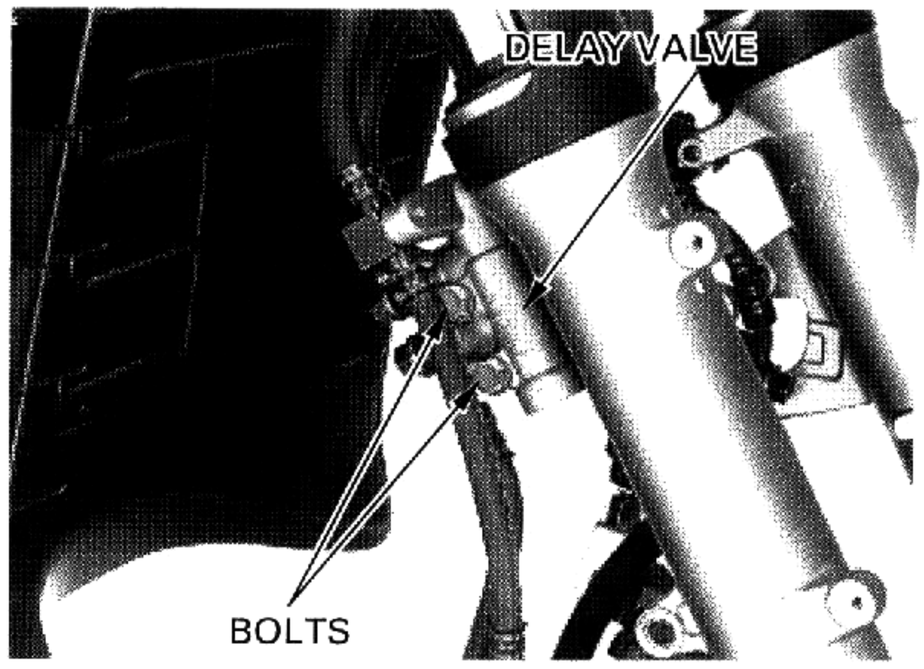
Tighten the top bridge pinch bolt to the specified torque.

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



Install the delay valve onto the right fork leg and tighten the mounting bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



Install the 3-way joint and tighten the mounting bolt to the specified torque.

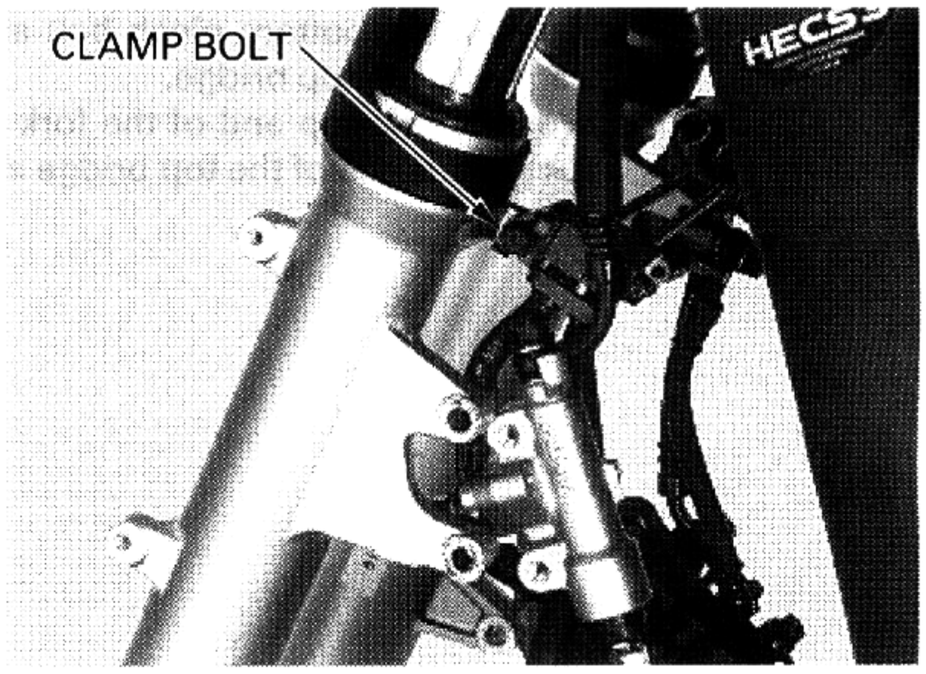
TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



Install and tighten the brake hose clamp bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the front wheel (page 13-15).

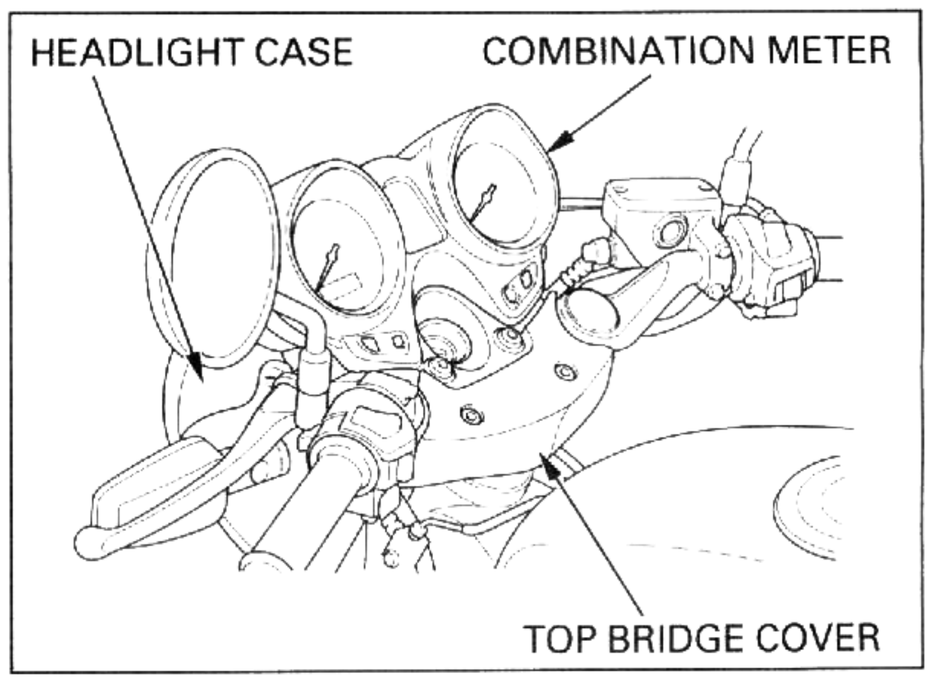


STEERING STEM

REMOVAL

Remove the following:
- Front wheel (page 13-10)
- Headlight case (page 19-4)
- Combination meter (page 19-8)

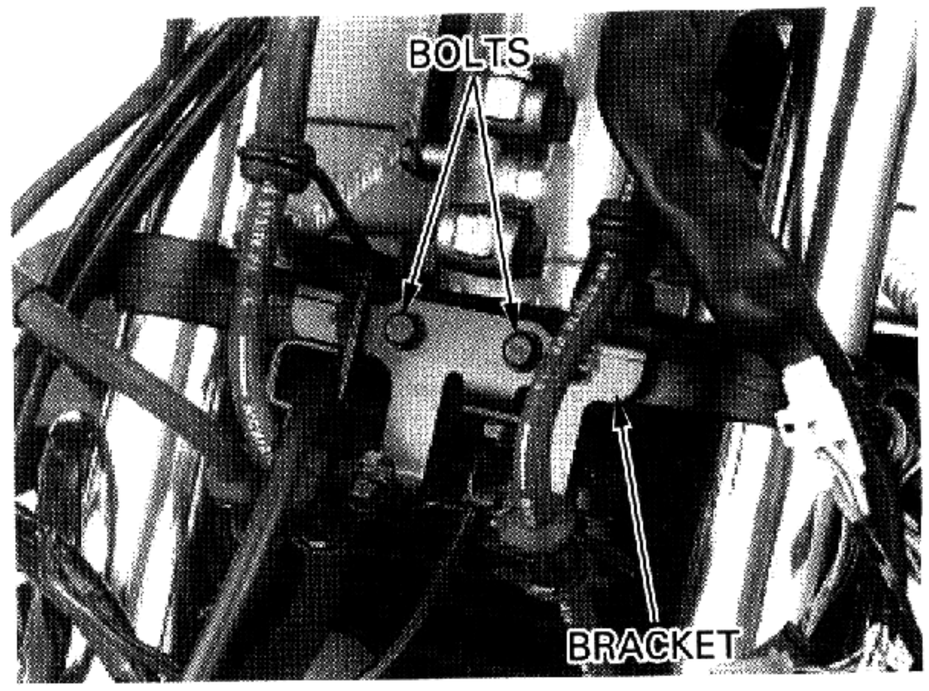
Remove the special bolts and top bridge cover.



Remove the bolt and headlight case stay.



Remove the bolts and front brake hose/horn mounting bracket.

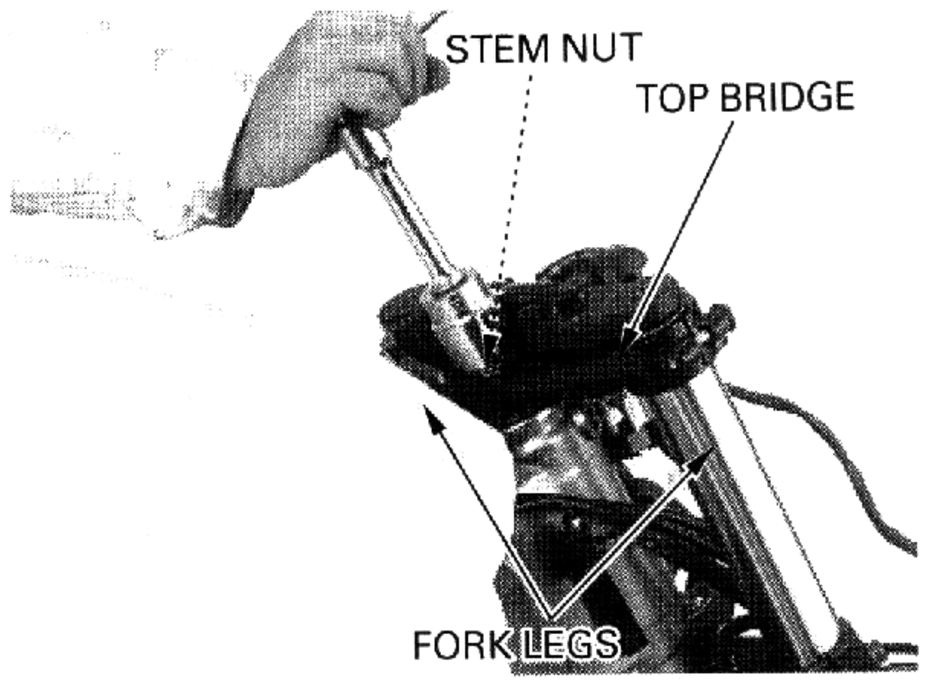


Remove the steering stem nut cap.

Loosen the steering stem nut.

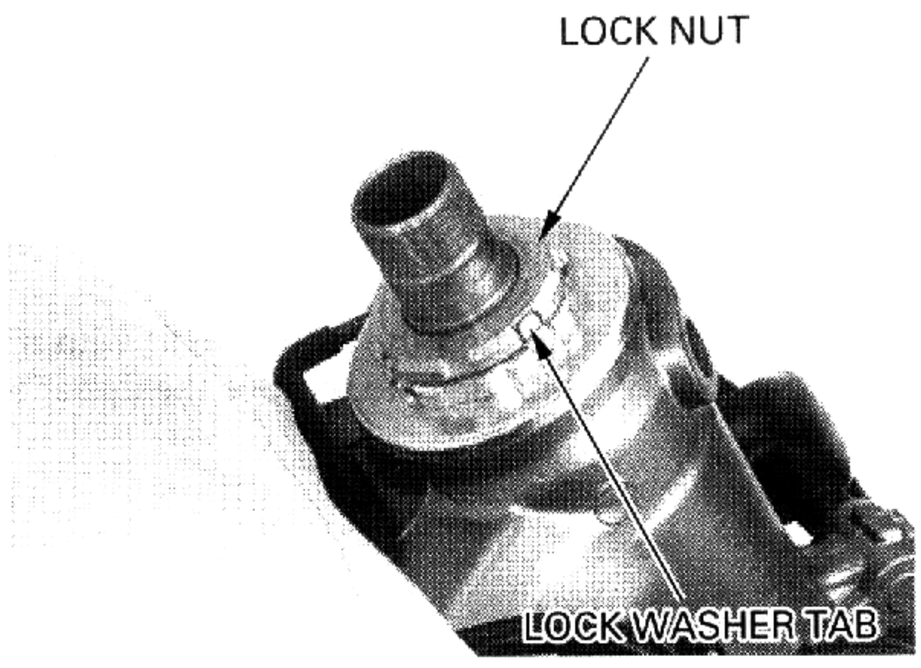
Remove the following:
– Handlebar (page 13-3)
– Fork legs (page 13-17)

Remove the stem nut and the top bridge.



Straighten the tabs of the lock washer.

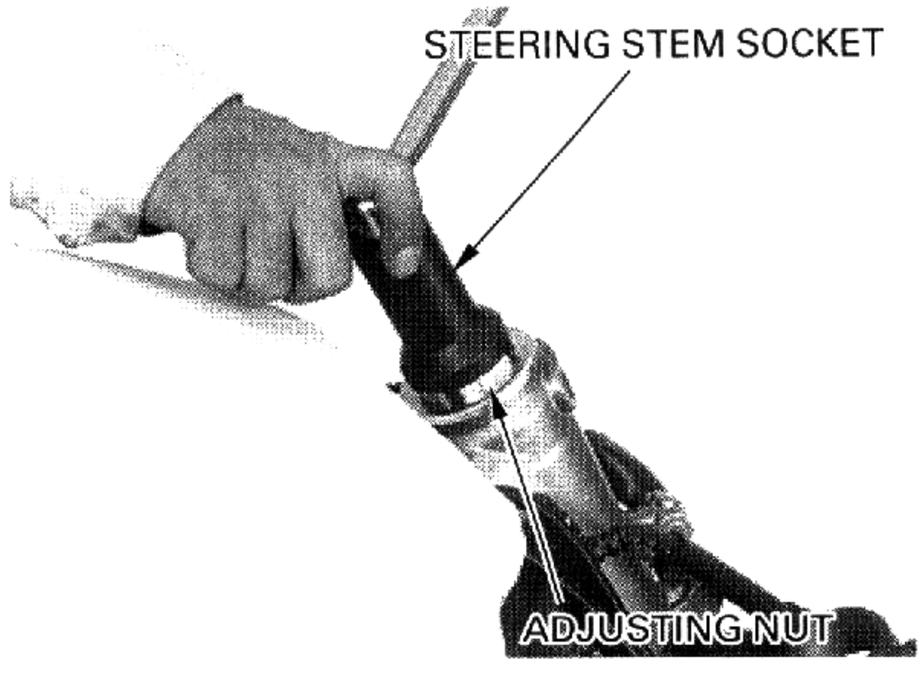
Remove the lock nut and lock washer.



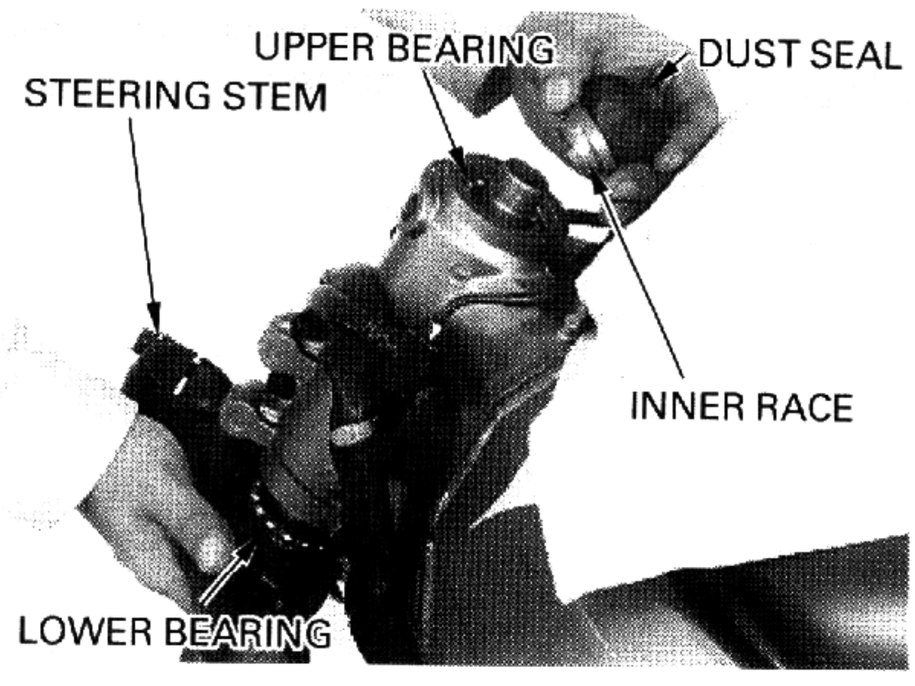
Remove the steering stem bearing adjusting nut using the special tool.

TOOL:

Steering stem socket	07916-3710101



Remove the following:
- Dust seal
- Upper bearing inner race
- Upper bearing
- Steering stem
- Lower bearing



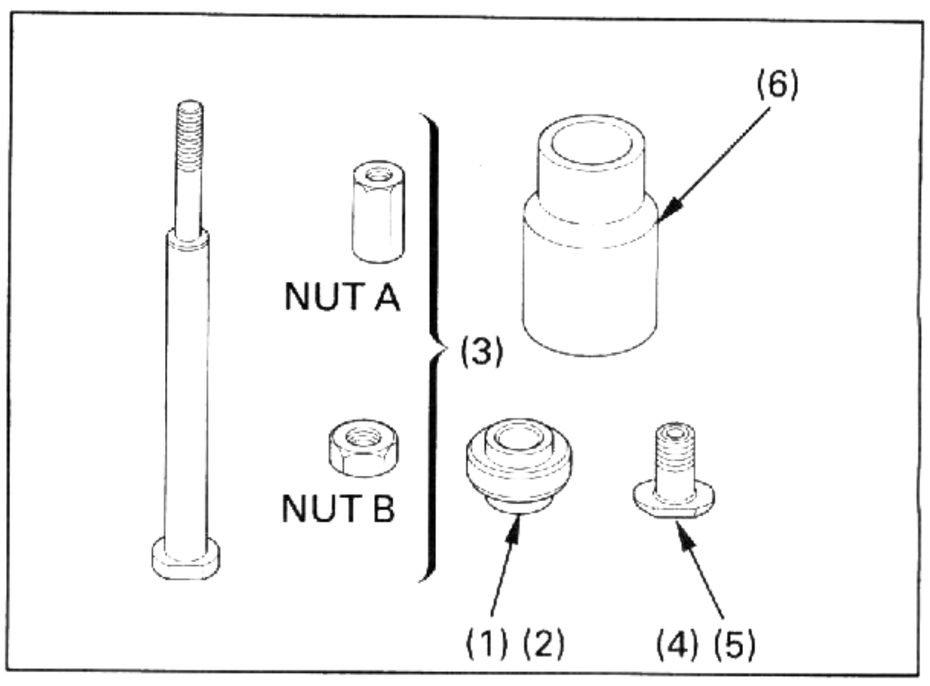
BEARING REPLACEMENT

Always replace the bearings and races as a set.

Replace the races using the Ball Race Remover Set as described in the following procedure.

TOOLS:

Ball race remover set	07946-KM90001
—Driver attachment, A (1)	07946-KM90100
—Driver attachment, B (2)	07946-KM90200
—Driver shaft assembly (3)	07946-KM90300
—Bearing remover, A (4)	07946-KM90401
—Bearing remover, B (5)	07946-KM90500
—Assembly base (6)	07946-KM90600



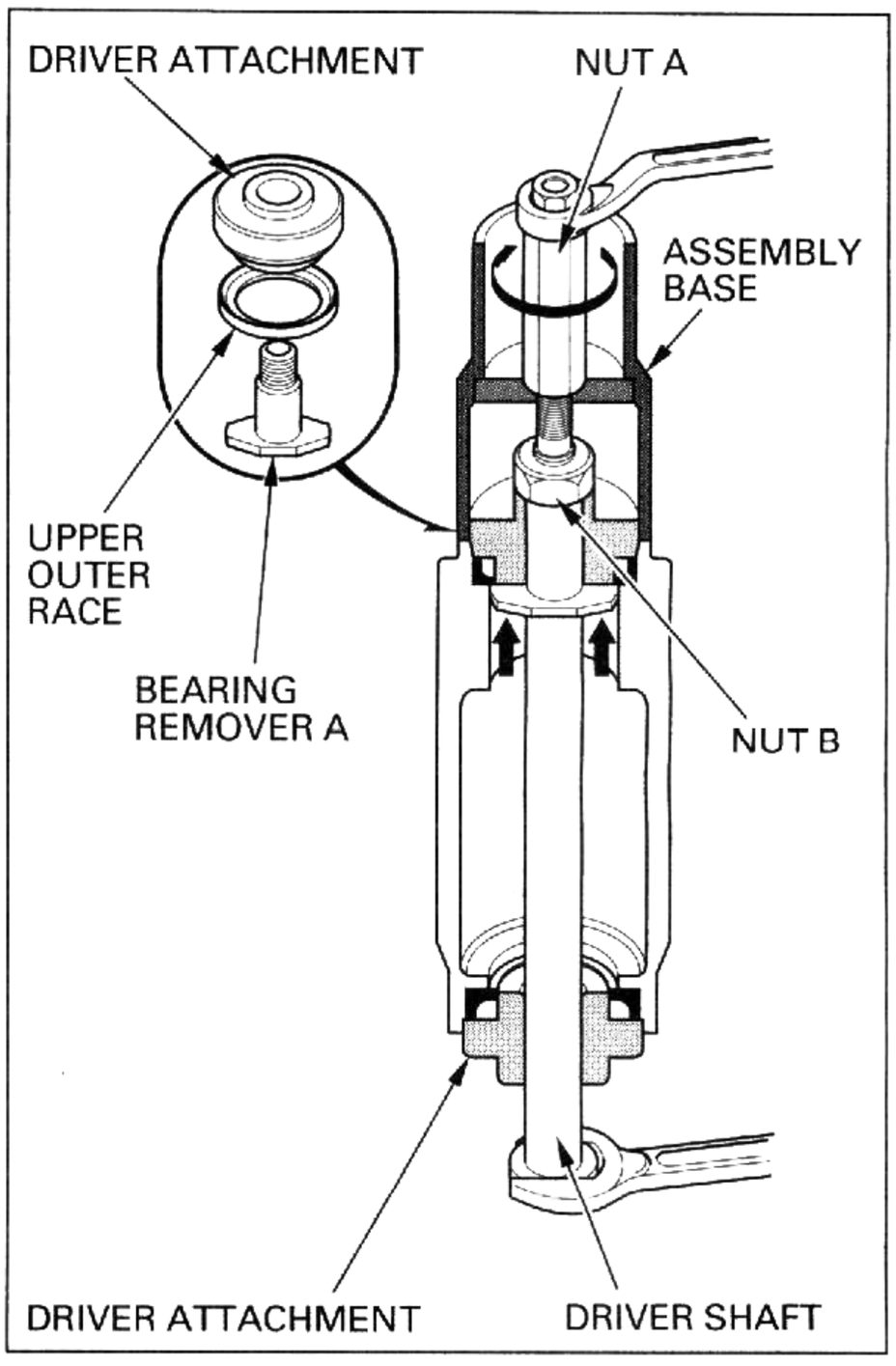
Install the ball race remover into the head pipe as shown.

Align bearing remover A with the groove in the steering head.

Note the installation direction of the assembly base.

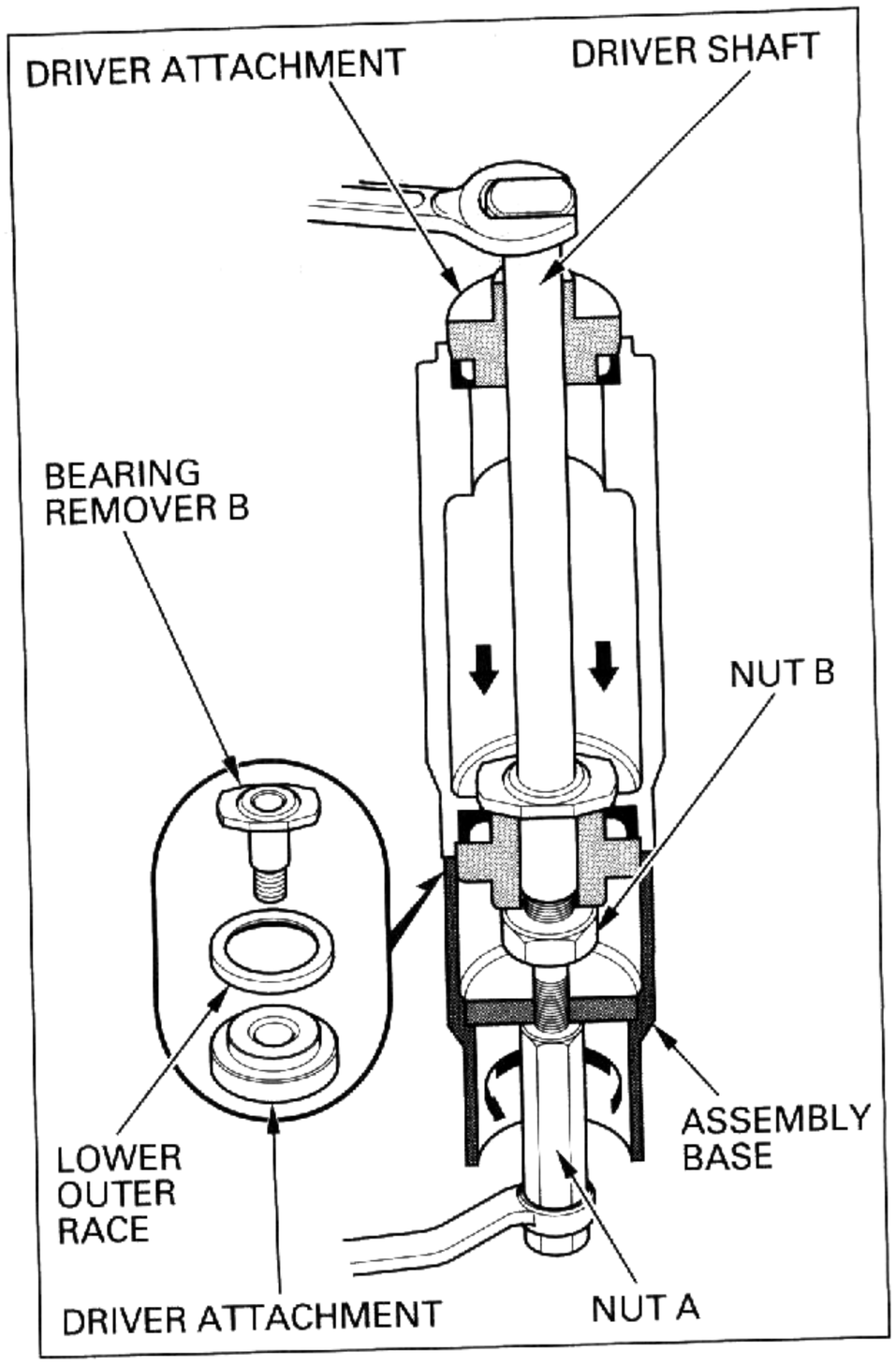
Lightly tighten nut B with a wrench.

Holding the driver shaft with a wrench, turn nut A gradually to remove the upper outer race.

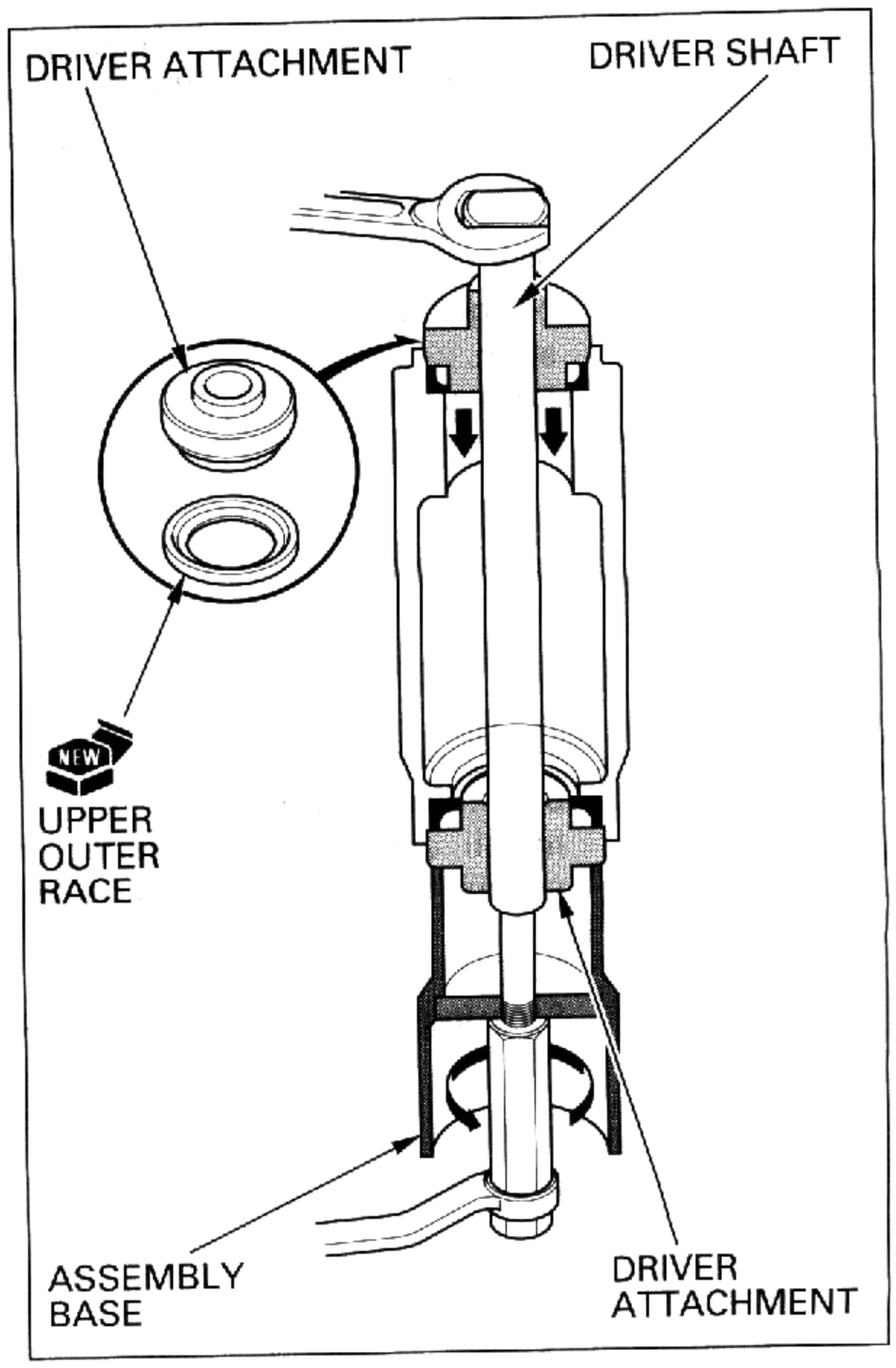


Install ball race remover B as shown and remove the lower outer race using the same procedure as for the upper outer race.

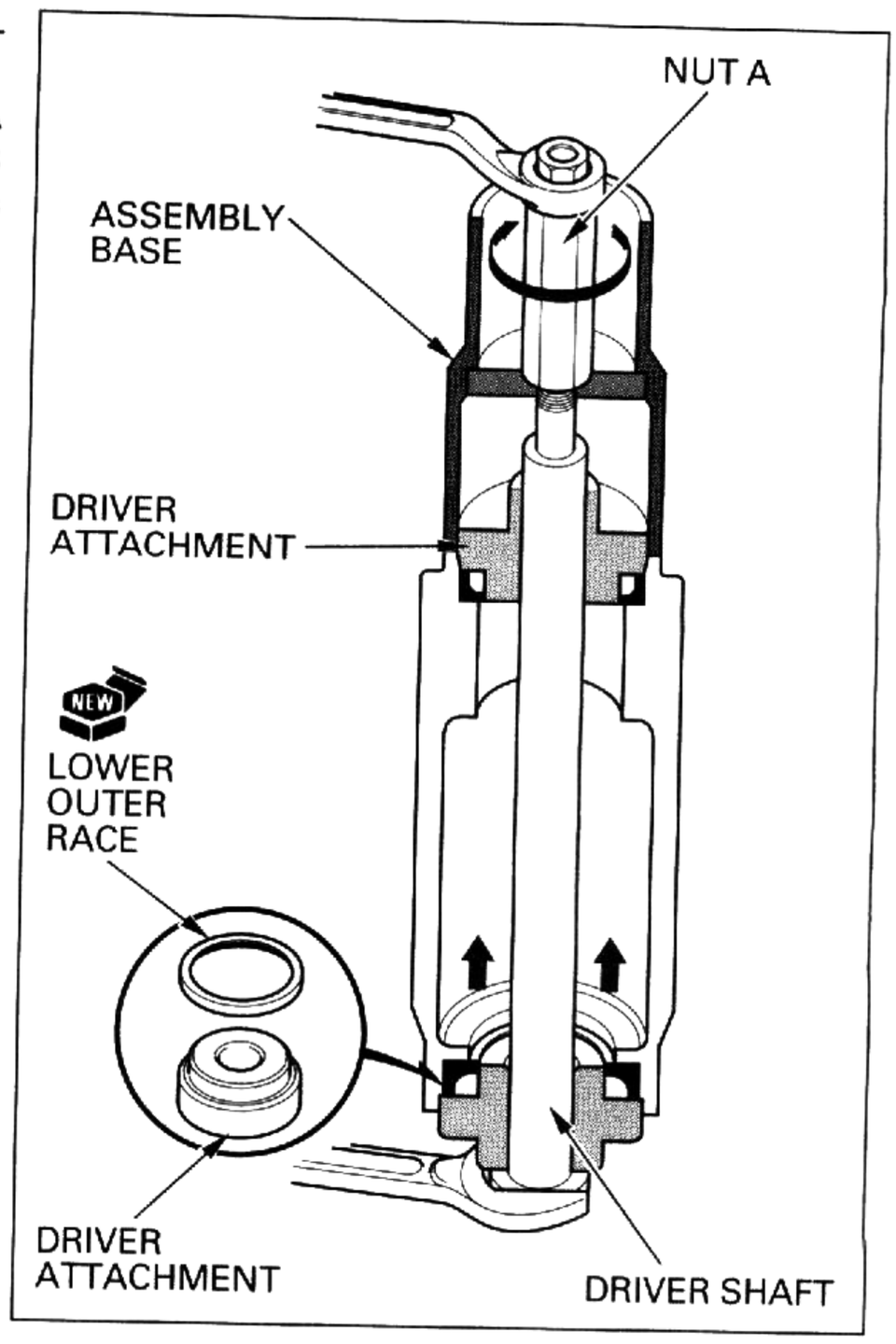
Align the bearing remover with the groove in the steering head.



Install a new upper outer race and the ball race remover as shown.
Hold the driver shaft with a wrench and turn nut A gradually until the groove in driver attachment A aligns with the upper end of the steering head. This will allow you to install the upper outer race.

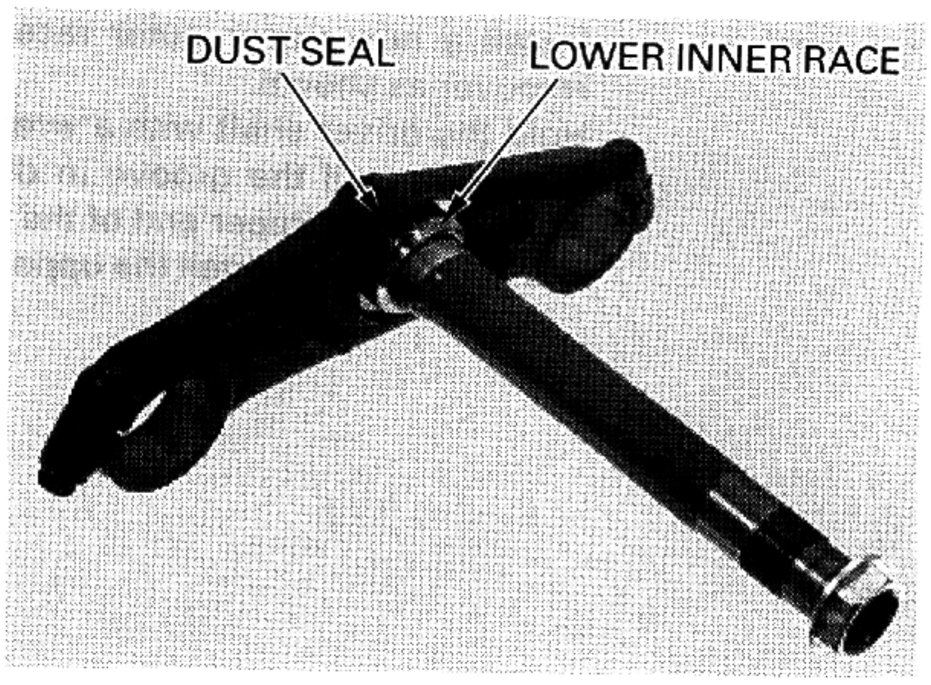


Install a new lower outer race and ball race remover as shown.
Holding the driver shaft with a wrench, turn nut A gradually until the groove in driver attachment B aligns with the upper end of the steering head. This will allow you to install the lower outer race.



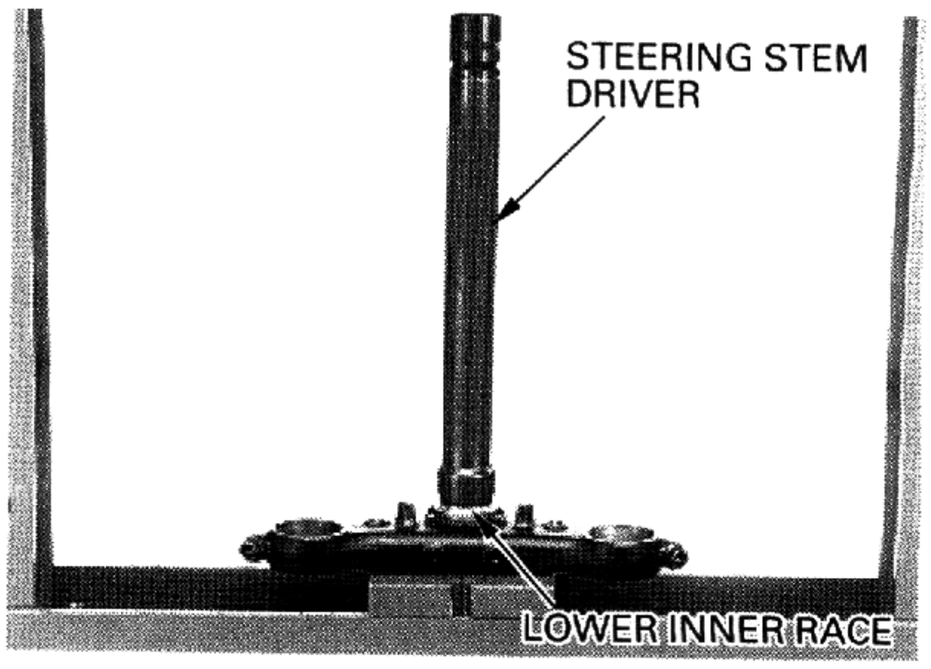
Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.
Remove the dust seal.



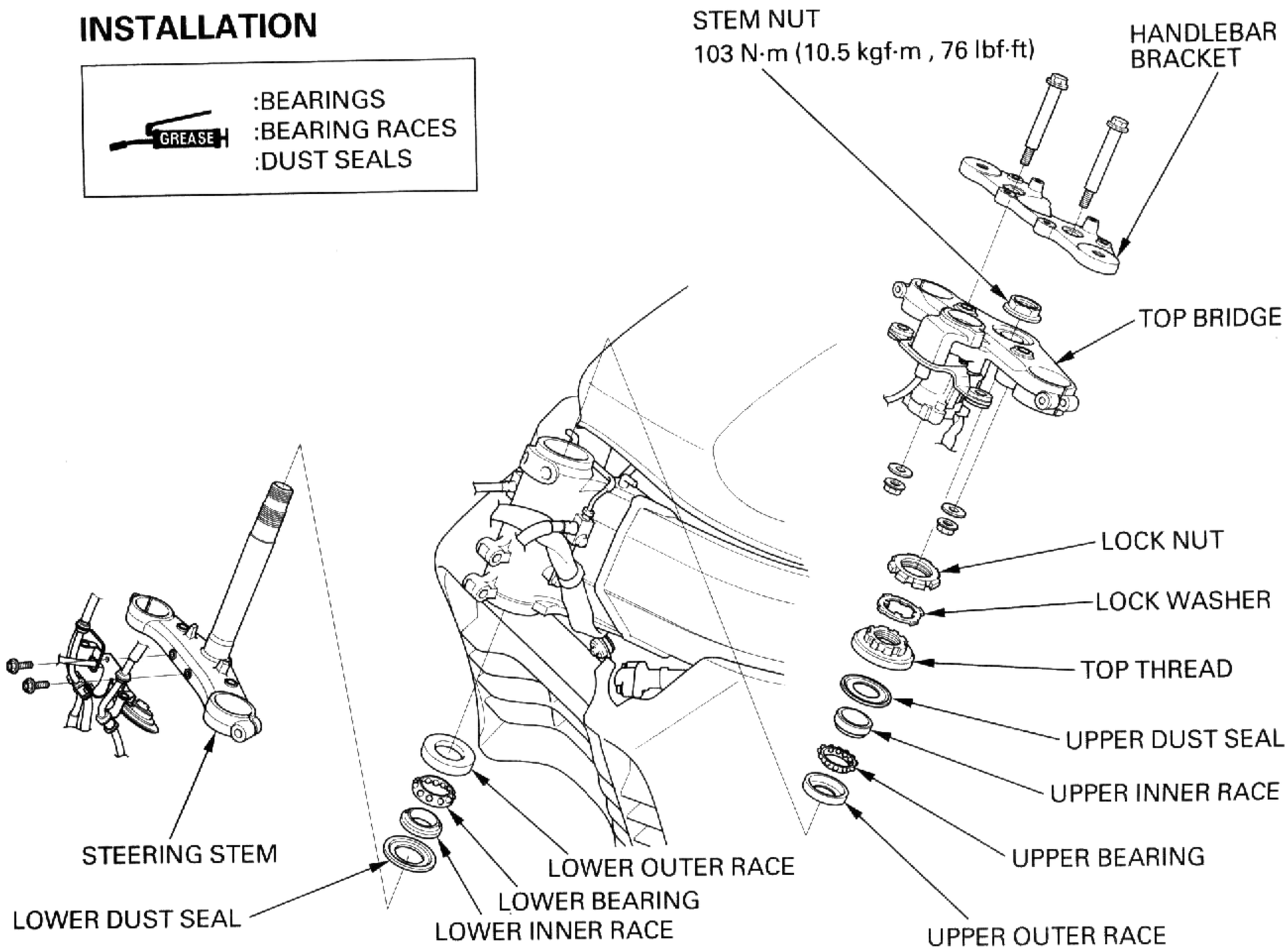
Apply grease to new dust seal lips and install it over the steering stem.
Install a new lower bearing inner race using a special tool and a hydraulic press.

TOOL:
Steering stem driver 07946-MB00000



INSTALLATION

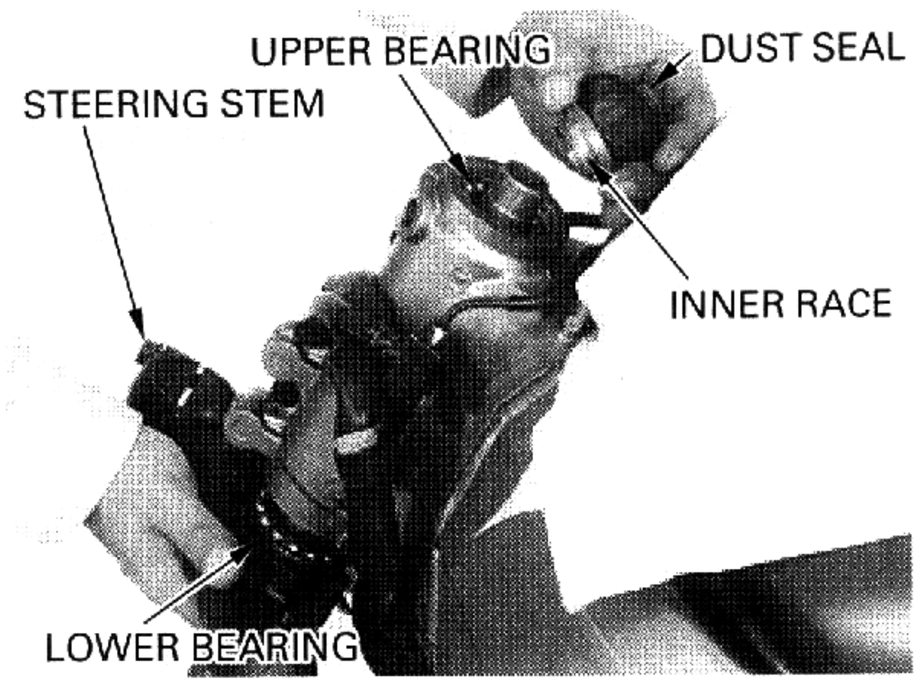
GREASE :BEARINGS
:BEARING RACES
:DUST SEALS



Apply grease to upper and lower bearings and bearing races.

Install the lower bearing onto the steering stem.
Insert the steering stem into the steering head pipe.

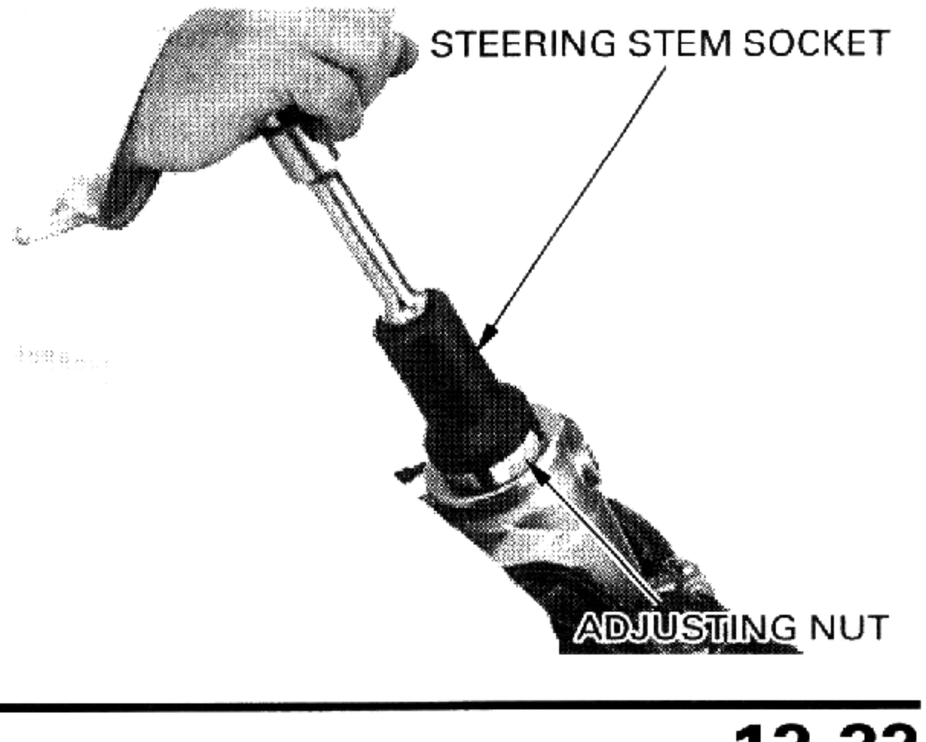
Install upper bearing, inner race and dust seal.



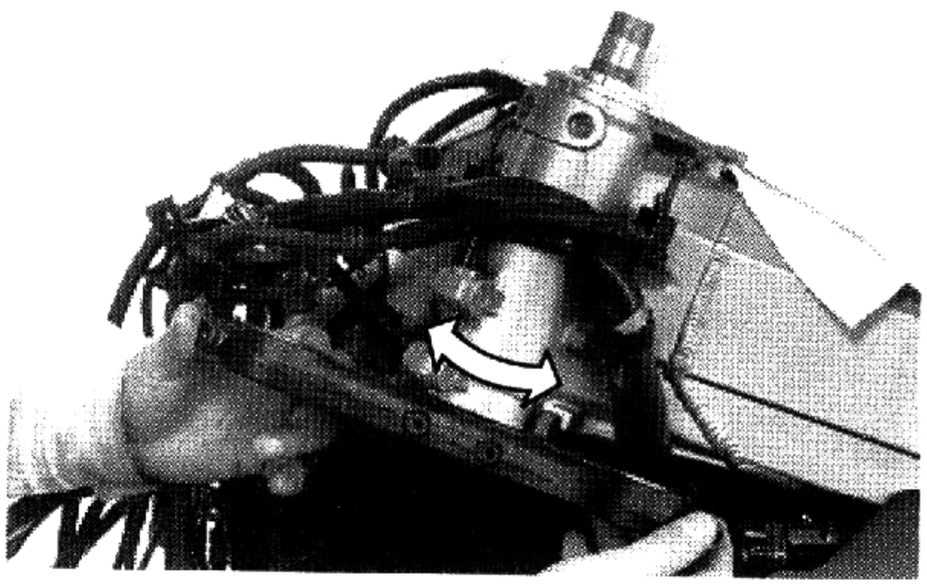
Apply oil to the bearing adjustment nut threads.
Install and tighten the stem bearing adjusting nut to the initial torque.

TOOL:
Steering stem socket 07916-3710101

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



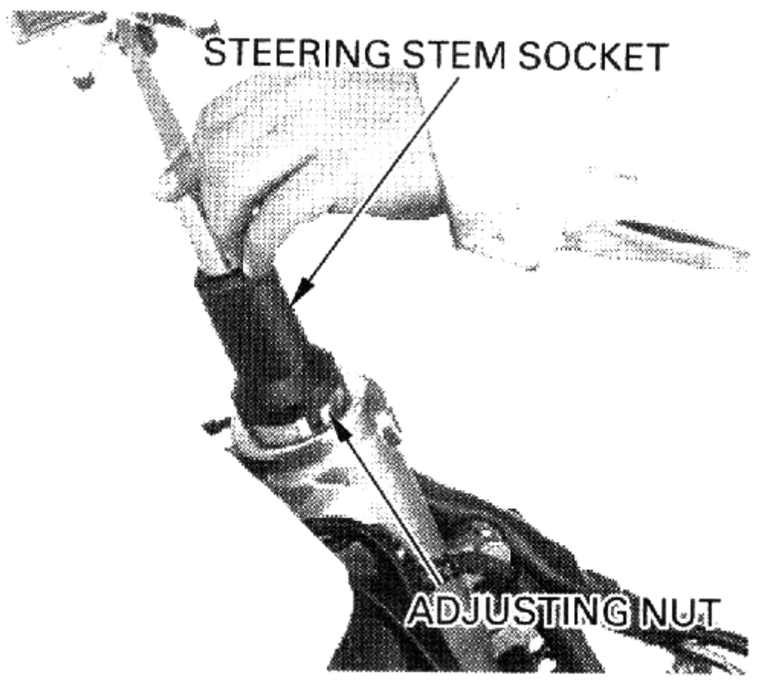
Move the steering stem right and left, lock-to-lock, five times to seat the bearings.
Make sure that the steering stem moves smoothly, without play or binding; then loosen the bearing adjusting nut.



Retighten the bearing adjusting nut to the specified torque.

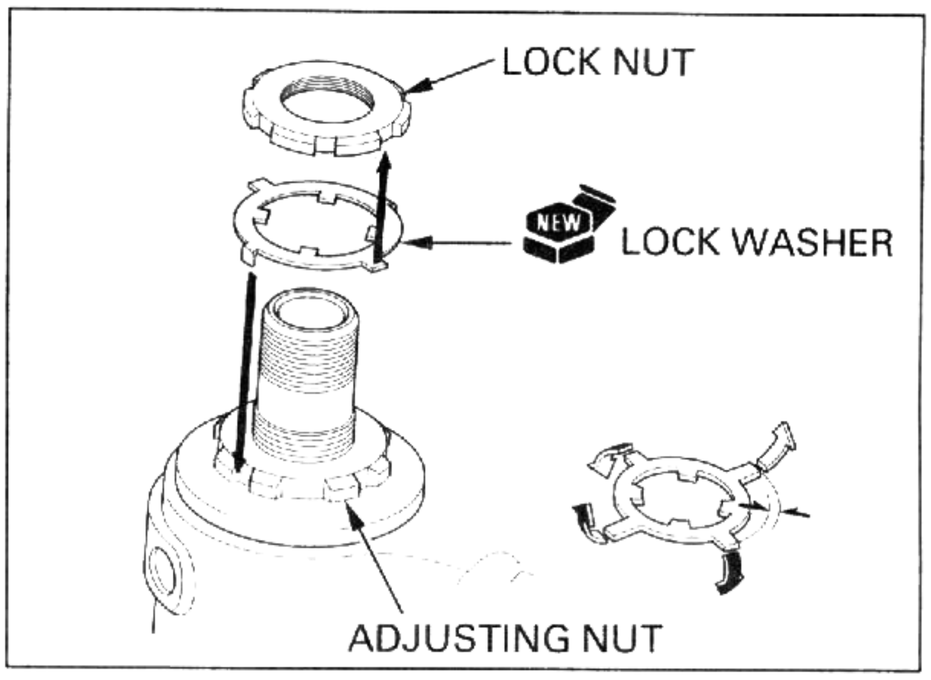
TORQUE: 26 N·m (2.7 kgf·m , 20 lbf·ft)

Recheck that the steering stem moves smoothly without play or binding.



Install the new lock washer onto the steering stem.

Align the tabs of the lock washer with the grooves in the adjustment nut and bend two opposite tabs (shorter) down into the adjustment nut groove.



Install and finger tighten the lock nut.
Hold the lock nut and further tighten the lock nut within 1/4 turn (90°) enough to align its grooves with the lock washer tabs.

Bend the lock washer tabs up into the lock nut groove.

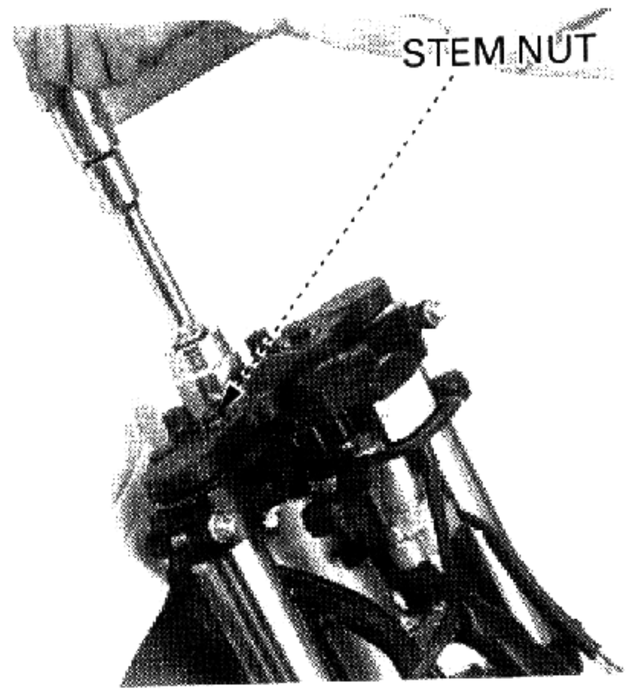


Install the top bridge.

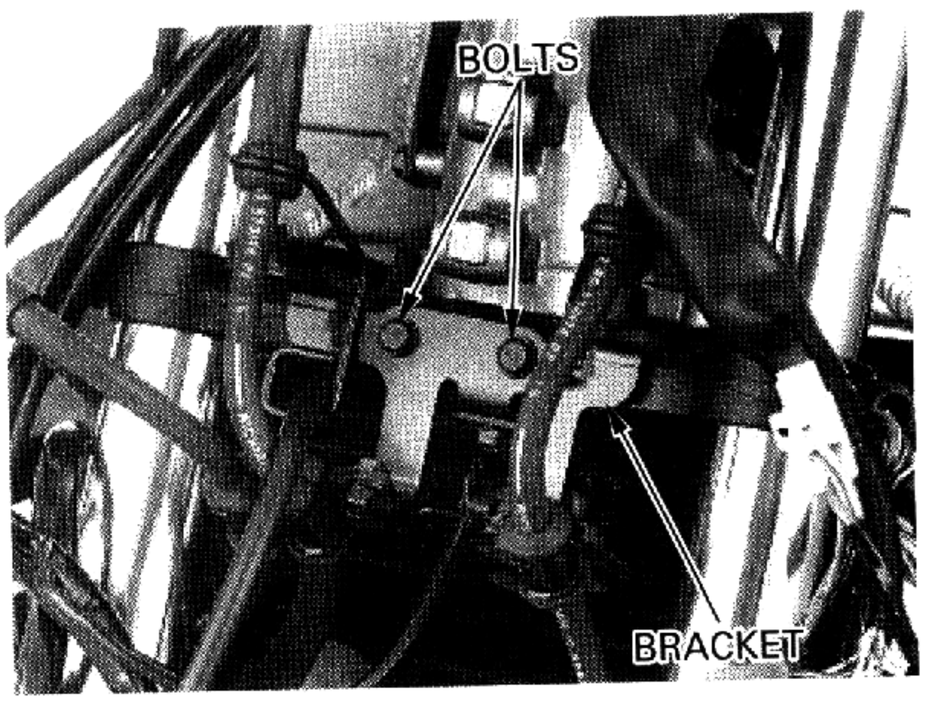
Install the following:
– Handlebar (page 13-6)
– Fork legs (page 13-27)

Install the steering stem nut.
Tighten the steering stem nut to the specified torque.

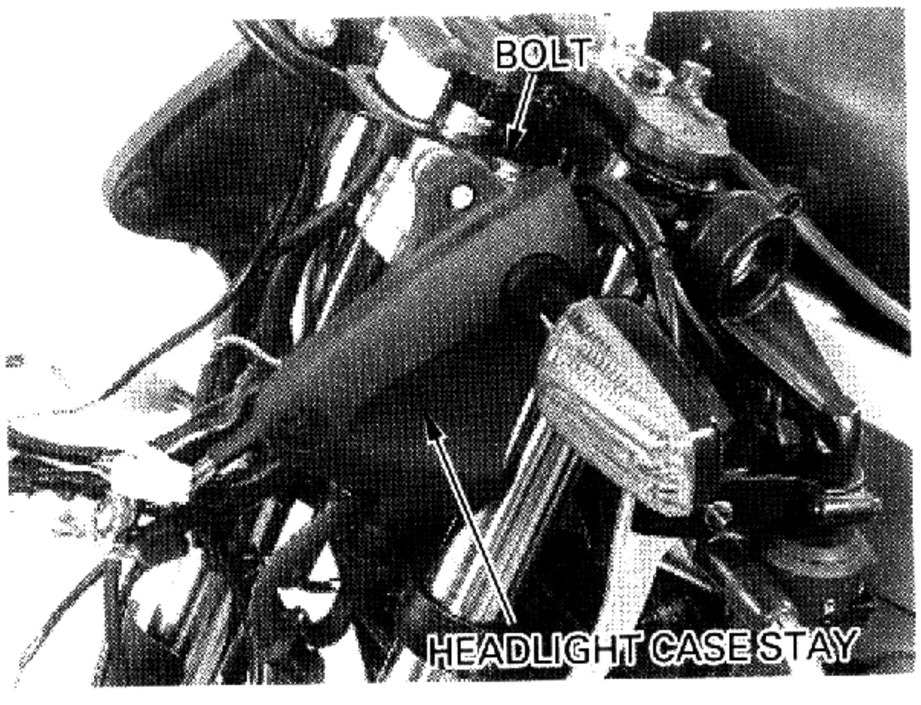
TORQUE: 103 N·m (10.5 kgf·m , 76 lbf·ft)



Install the front brake hose/horn mounting bracket and tighten the mounting bolts.

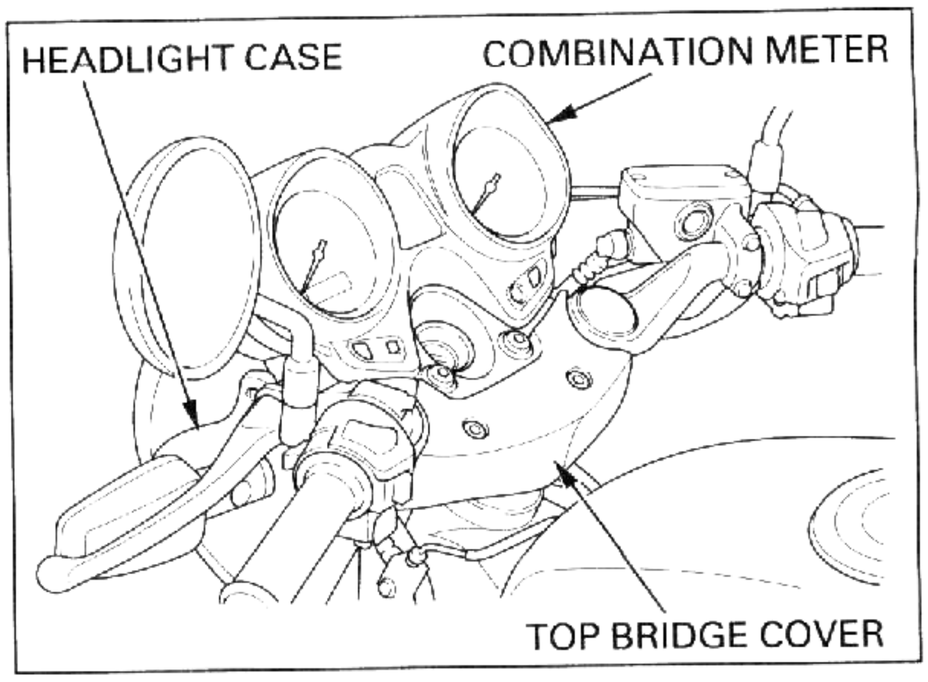


Install the headlight case stay onto the bottom bridge, then install and tighten the mounting bolt.

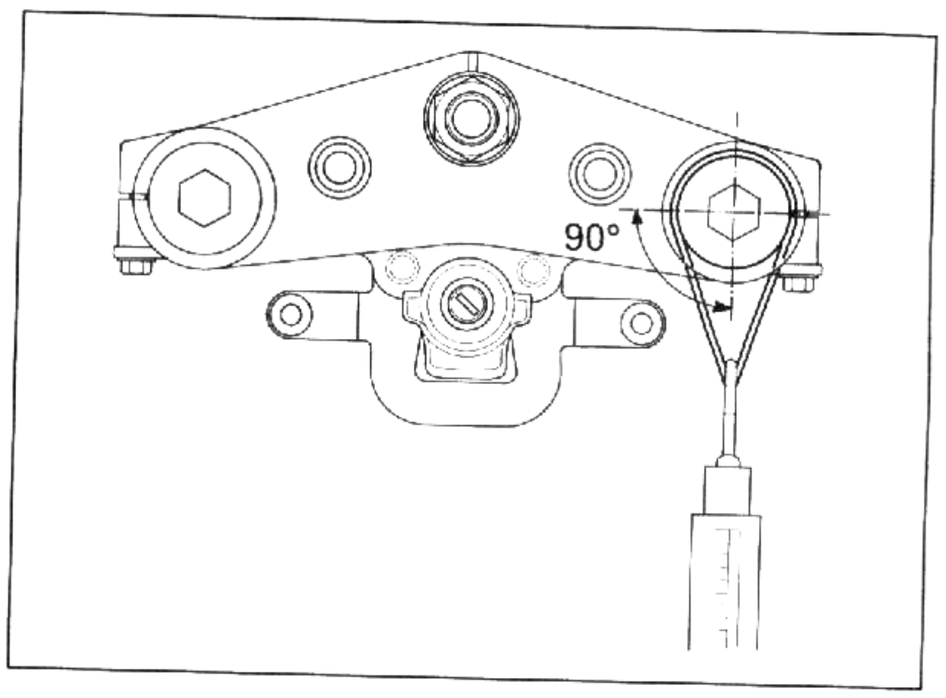


Install the following:
– Combination meter (page 19-11)
– Headlight case (page 19-4)
– Front wheel (page 13-15)

Install the top bridge cover and tighten the special bolts.



STEERING HEAD BEARING PRE-LOAD



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

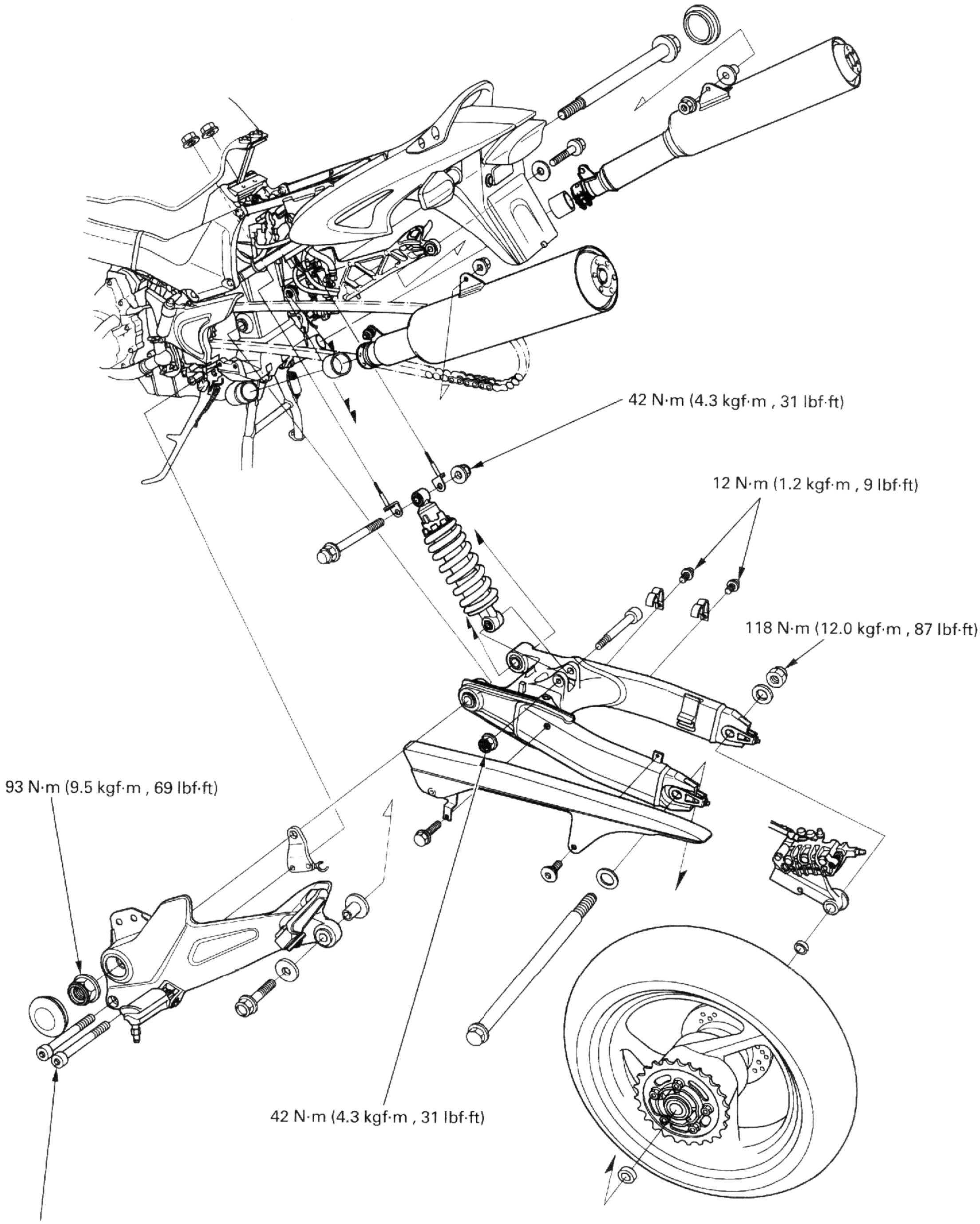
Position the steering stem to the straight ahead position.
Hook a spring scale to the fork tube and measure the steering head bearing pre-load.

NOTE:

Make sure that there is no cable or wire harness interference.

The pre-load should be within 10 – 15 N (1.0 – 1.5 kgf).
If the readings do not fall within the limits, lower the front wheel to the ground and adjust the steering bearing adjusting nut.

MEMO


42 N·m (4.3 kgf·m , 31 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
118 N·m (12.0 kgf·m , 87 lbf·ft)
93 N·m (9.5 kgf·m , 69 lbf·ft)
42 N·m (4.3 kgf·m , 31 lbf·ft)
39 N·m (4.0 kgf·m , 29 lbf·ft)

14. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	14-1	SHOCK ABSORBER	14-9
TROUBLESHOOTING	14-2	SWINGARM	14-12
REAR WHEEL	14-3		

SERVICE INFORMATION

GENERAL

⚠WARNING

- ***A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.***
- ***After the rear wheel installation, check the brake operation by appling the brake lever and pedal.***
- ***The shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.***
- ***Before disposal of the shock absorber, release the nitrogen (page 14-11).***

- When servicing the rear wheel, support the motorcycle using a safety stand or hoist.
- Refer to section 15 for brake system information.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".
- Use genuine Honda replacement bolts and nuts for all suspension pivot and mounting point.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			—	2.0 (0.08)
Cold tire pressure	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)
Drive chain	Size/link	DID	DID50ZV-110LE	—
		RK	RK50LFO-110LE	—
	Slack		25—35 (1.0—1.4)	50 (2.0)
Shock absorber spring adjuster standard position			3rd groove	—

TORQUE VALUES

Rear axle nut	118 N·m (12.0 kgf·m, 87 lbf·ft)	U-nut
Rear brake disc mounting bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt
Driven sprocket nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	U-nut
Shock absorber mounting nut	42 N·m (4.3 kgf·m, 31 lbf·ft)	U-nut
Swingarm pivot nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Footpeg holder socket bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Drive chain slider bolt	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	
Drive sprocket special bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Brake hose guide bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

TOOLS

Attachment, 32 × 35 mm	07746-0010100
Attachment, 52 × 55 mm	07746-0010400
Attachment, 62 × 68 mm	07746-0010500
Attachment, 22 × 24 mm	07746-0010800
Attachment, 28 × 30 mm	07946-1870100
Pilot, 17 mm	07746-0040400
Pilot, 20 mm	07746-0040500
Pilot, 28 mm	07746-0041100
Bearing remover shaft	07746-0050100
Bearing remover head, 20 mm	07746-0050600
Driver shaft	07946-MJ00100
Driver attachment handle	07949-3710001
Needle bearing remover	07HMC-MR70100

TROUBLESHOOTING

Soft suspension
- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Tire pressure too low

Hard suspension
- Damaged shock absorber mounting bearing
- Bent damper rod
- Damaged swingarm pivot bearings
- Bent swingarm pivot
- Incorrect suspension adjustment
- Tire pressure too high

Steers to one side or does not track straight
- Bent rear axle
- Axle alignment/chain adjustment not equal on both sides

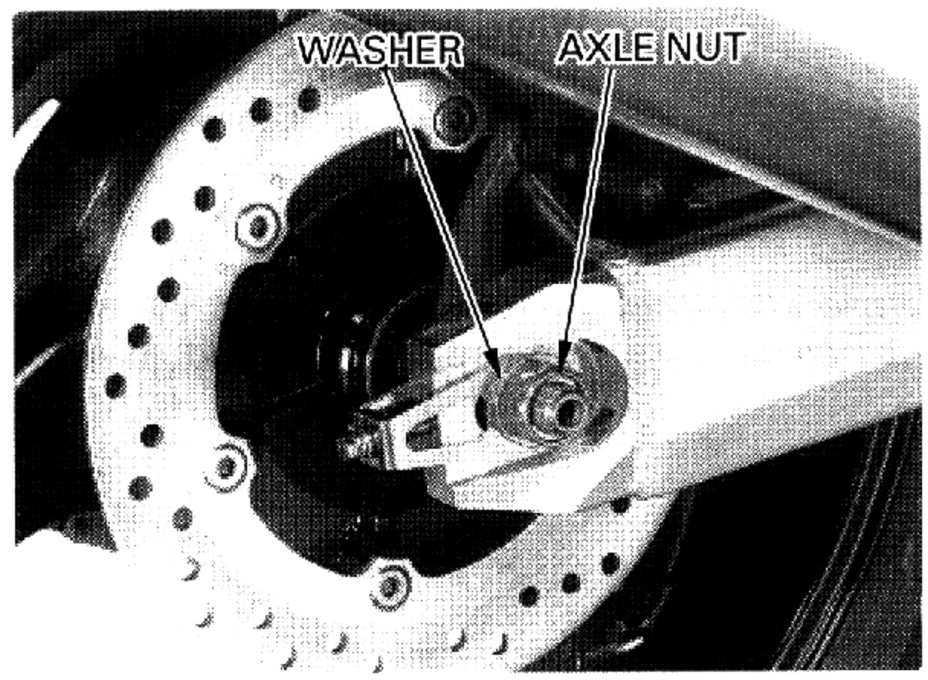
Rear wheel wobbling
- Bent rim
- Worn rear wheel bearings
- Faulty tire
- Unbalanced tire and wheel
- Tire pressure too low
- Faulty swingarm pivot bearings

REAR WHEEL

REMOVAL

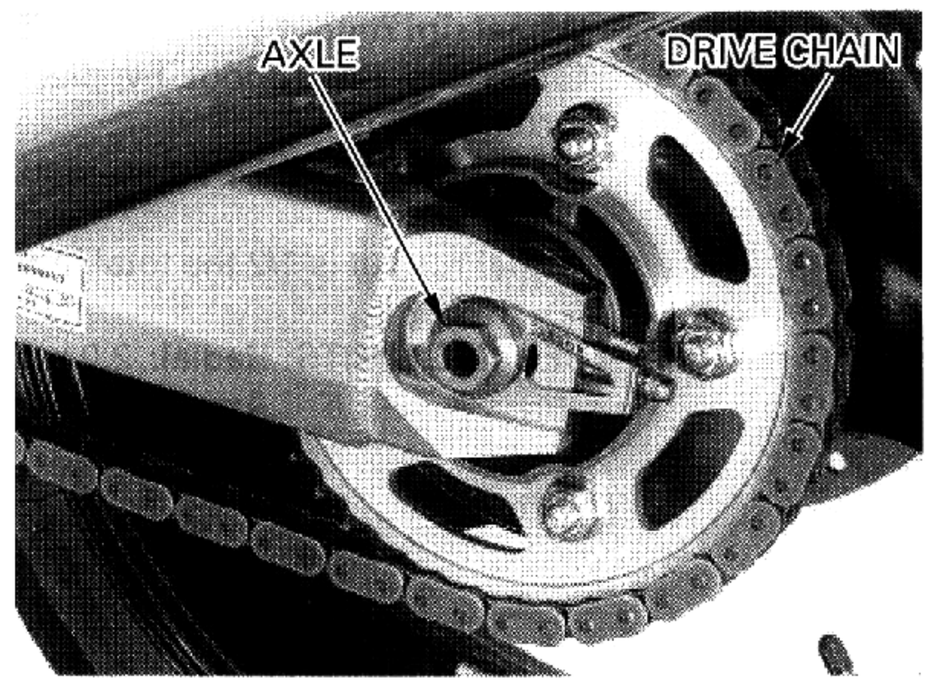
Support the motorcycle on its center stand.

Remove the axle nut and washer.

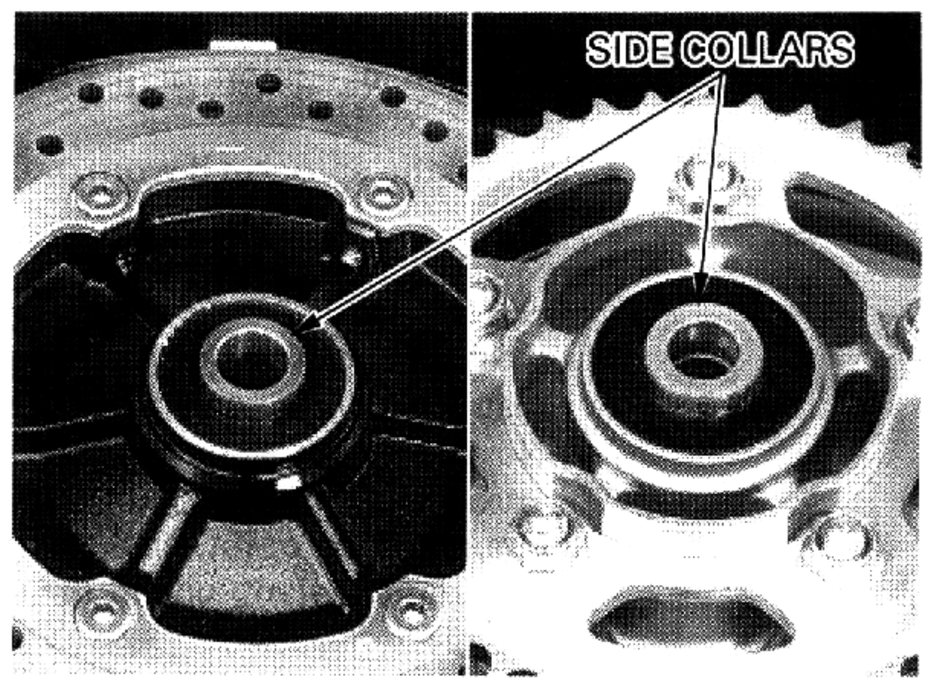


Push the rear wheel forward.
Derail the drive chain from the driven sprocket.

Remove the axle from the left side and remove the rear wheel.



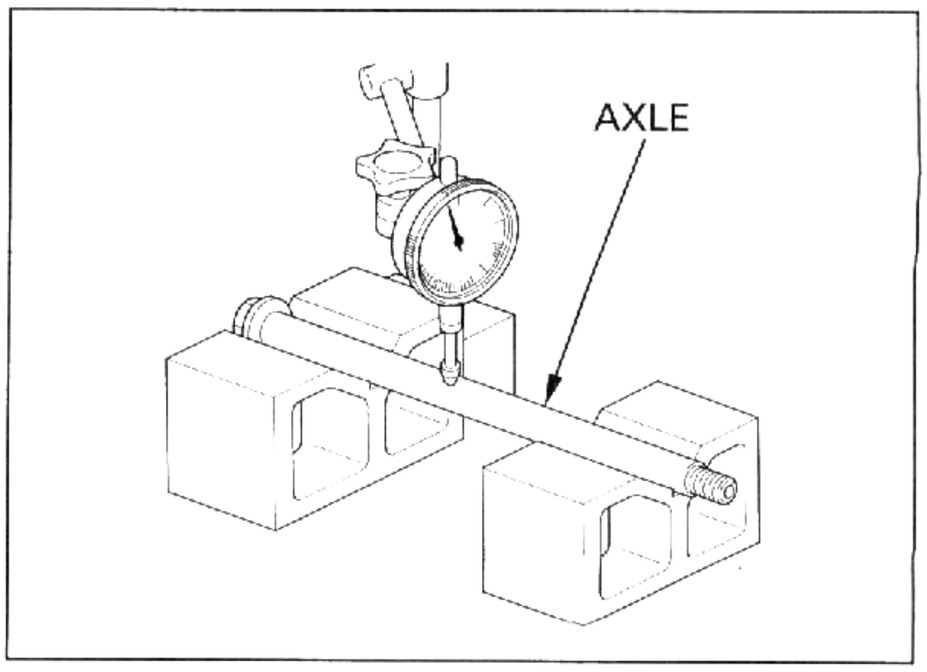
Remove the side collars.



INSPECTION

Axle
Place the axle in V-blocks and measure the runout.
Actual runout is 1/2 the total indicator reading.

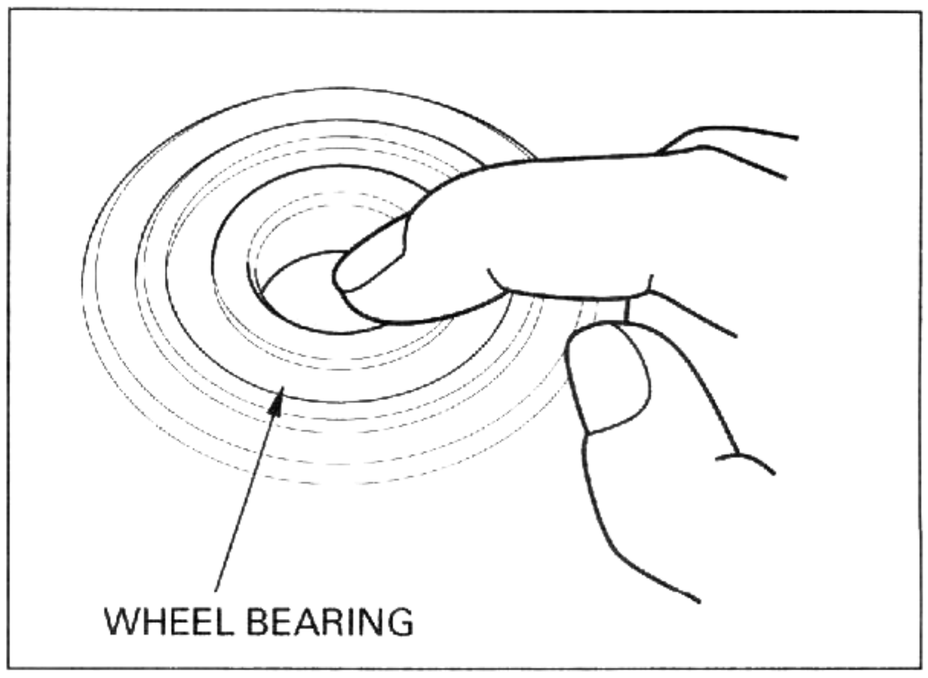
SERVICE LIMIT: 0.20 mm (0.008 in)



Wheel bearing
Turn the inner race of each bearing with your finger. Bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

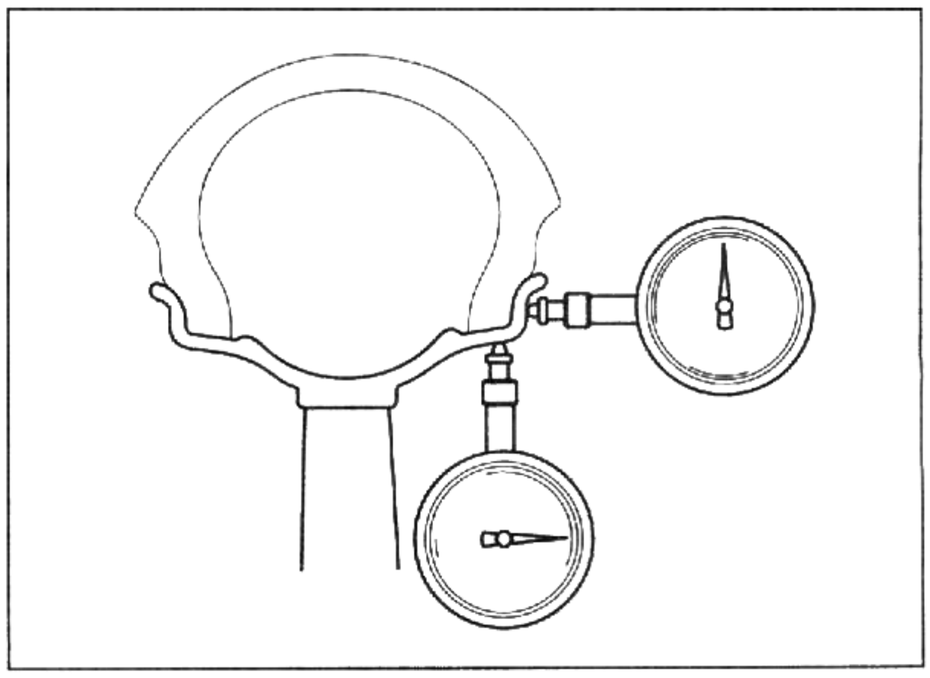
Replace the wheel bearings in pairs.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.



Wheel rim runout
Check the rim runout by placing the wheel in a turning stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

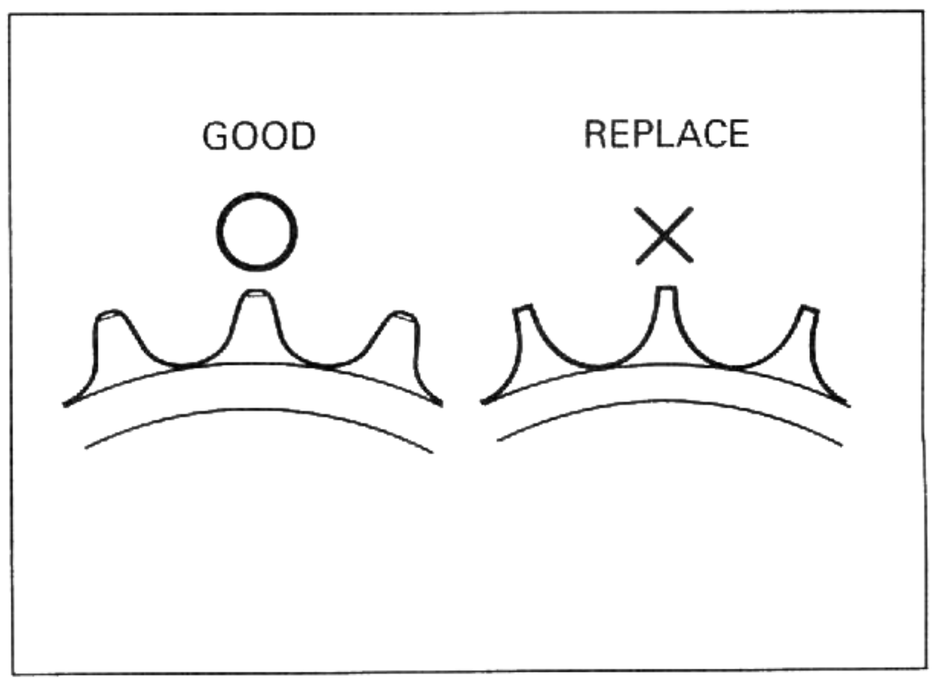
SERVICE LIMITS: Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)



Driven sprocket
Check the condition of the final driven sprocket teeth.
Replace the sprocket if worn or damaged.

NOTE:

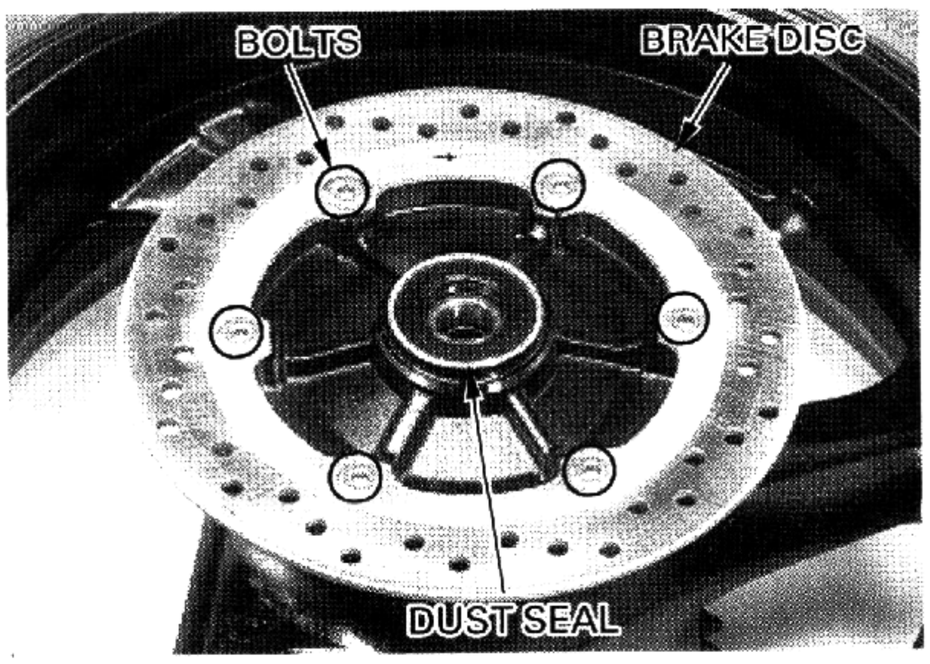
- If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the replacement chain or sprocket will wear rapidly.



Wheel balance
See page 13-13 for wheel balance.

DISASSEMBLY

Remove the bolts and brake disc.
Remove the right dust seal.



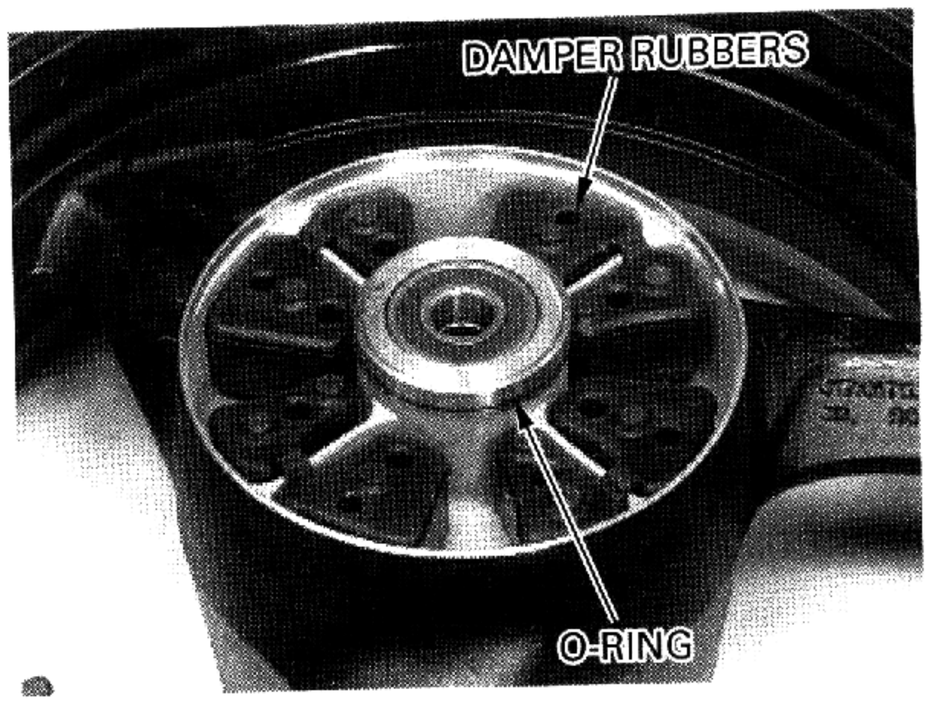
Remove the driven flange assembly from the left wheel hub.

NOTE:

If you will be disassemble the driven flange, loosen the driven sprocket nuts before removing the driven flange from the wheel hub.



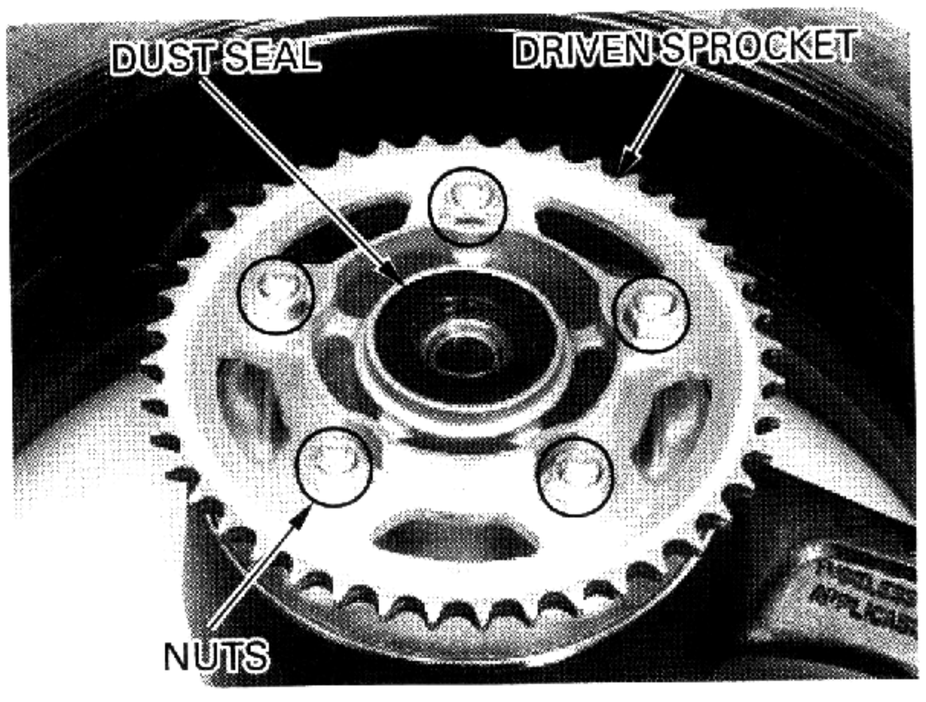
Remove the wheel damper rubbers.
Remove the O-ring.



Driven flange bearing removal
Loosen the driven sprocket nuts.

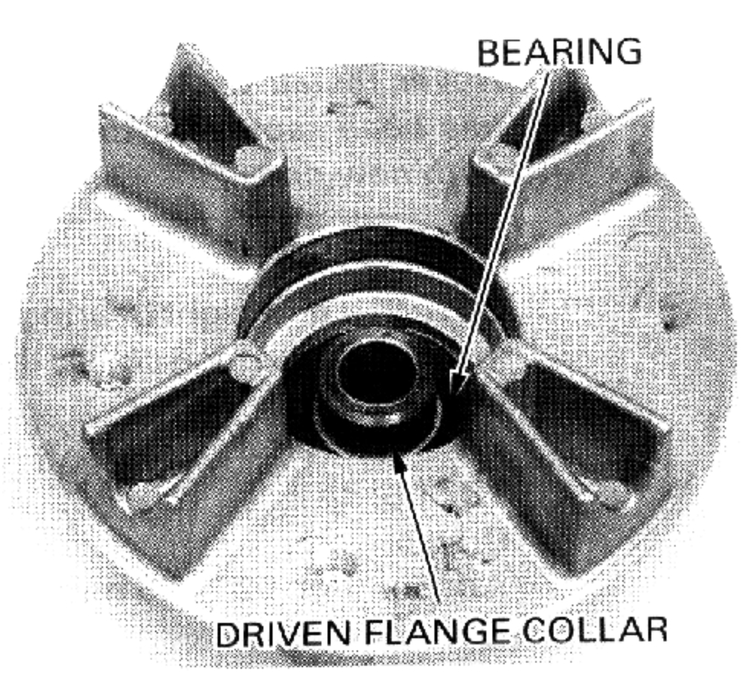
Remove the driven flange from the wheel hub, then remove the driven sprocket nuts and sprocket.

Remove the dust seal.



Remove the driven flange collar.

Drive out the driven flange bearing.

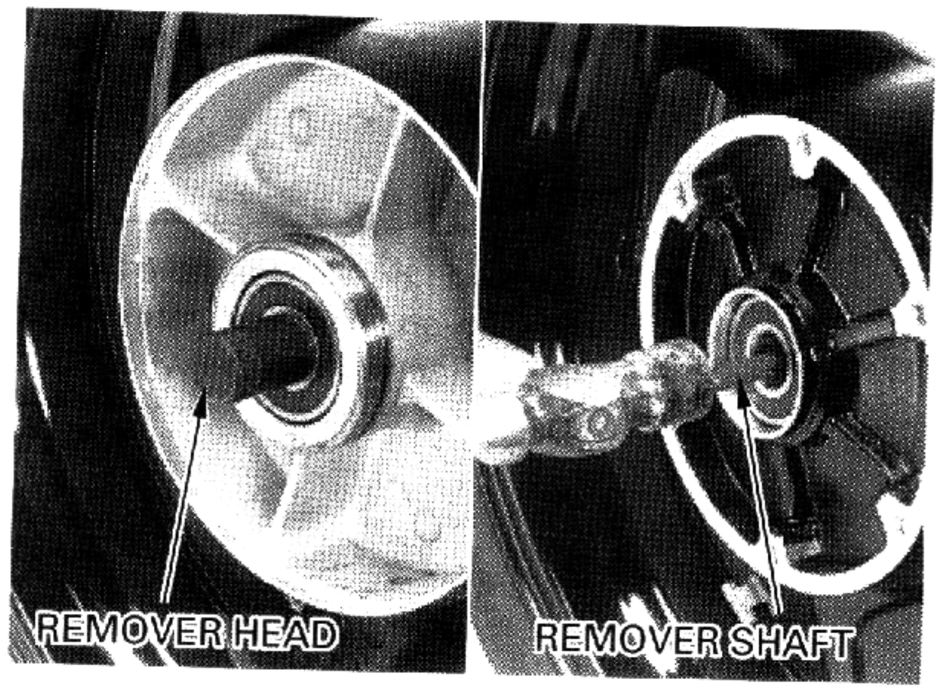


Wheel bearing removal

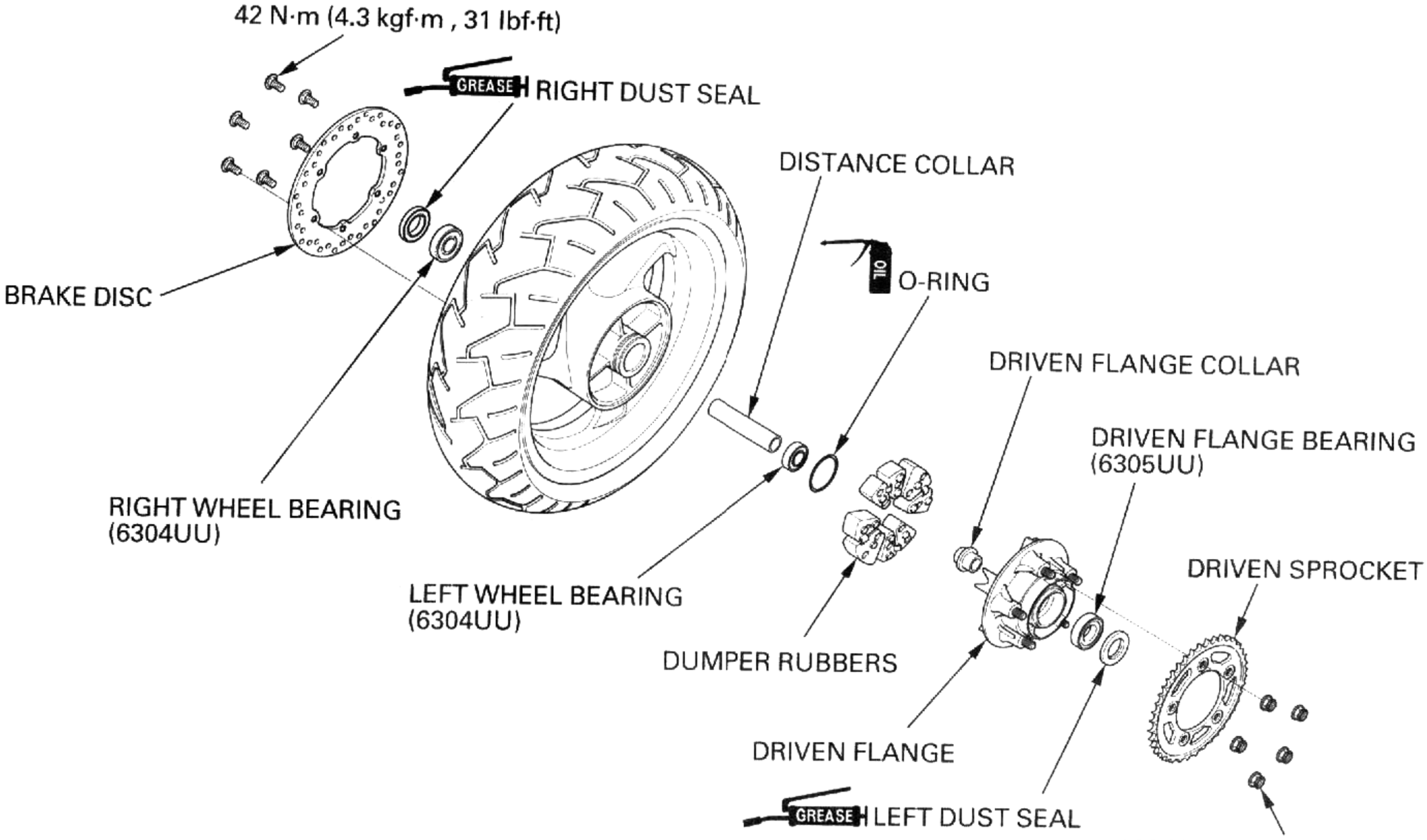
Install the bearing remover head into the bearing. From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover head, 20 mm	07746-0050600
Bearing remover shaft	07746-0050100



ASSEMBLY



Wheel bearing installation

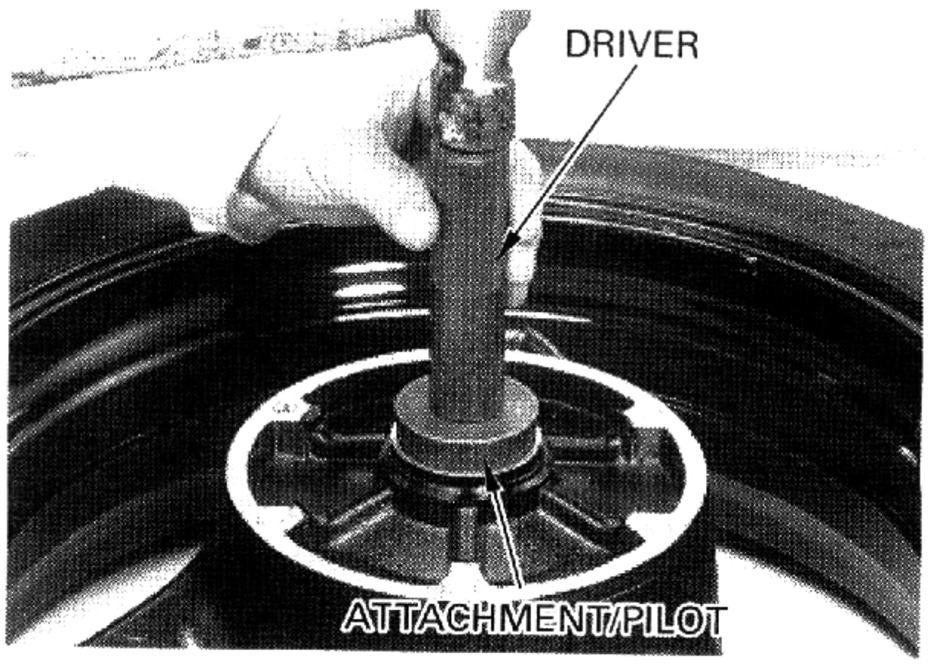
CAUTION:

Never install the old bearings, once the bearings has been removed, the bearing must be replaced with new ones.

Drive in a new right bearing squarely.
Install the distance collar, then drive in the left side bearing.

TOOLS:

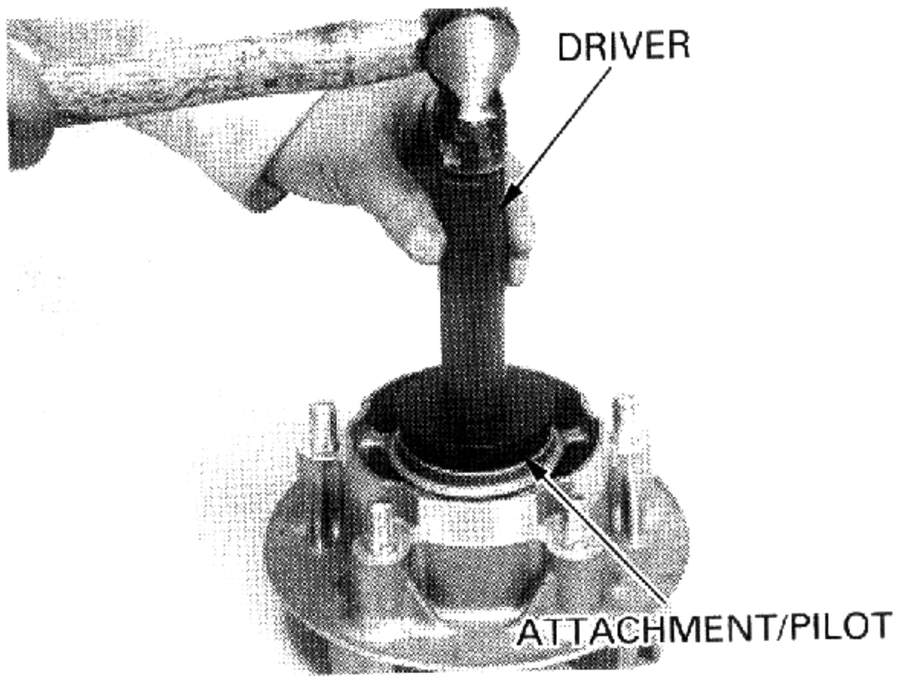
Driver	07749-0010000
Attachment, 52 × 55 mm	07746-0010400
Pilot, 20 mm	07746-0040500



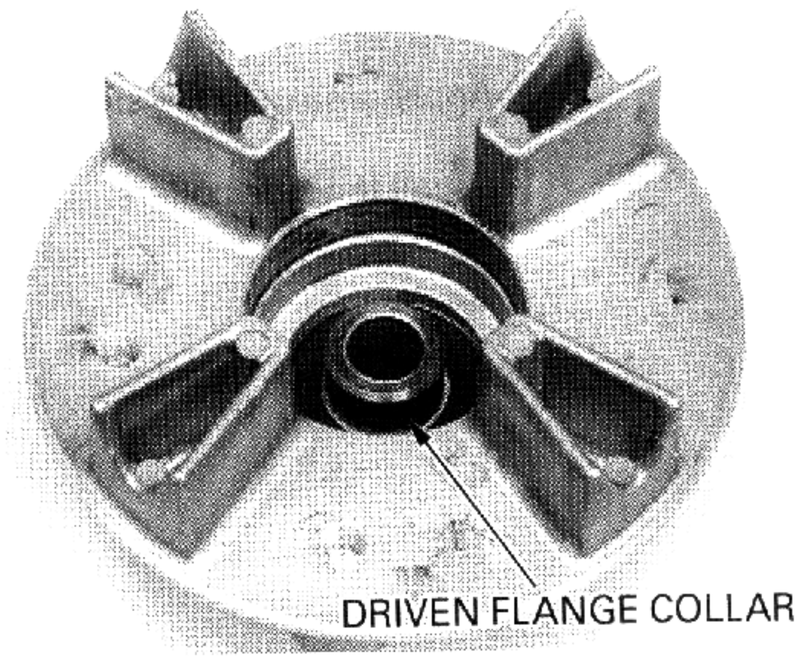
Driven flange bearing installation
Drive the new driven flange bearing into the driven flange using the special tools.

TOOLS:

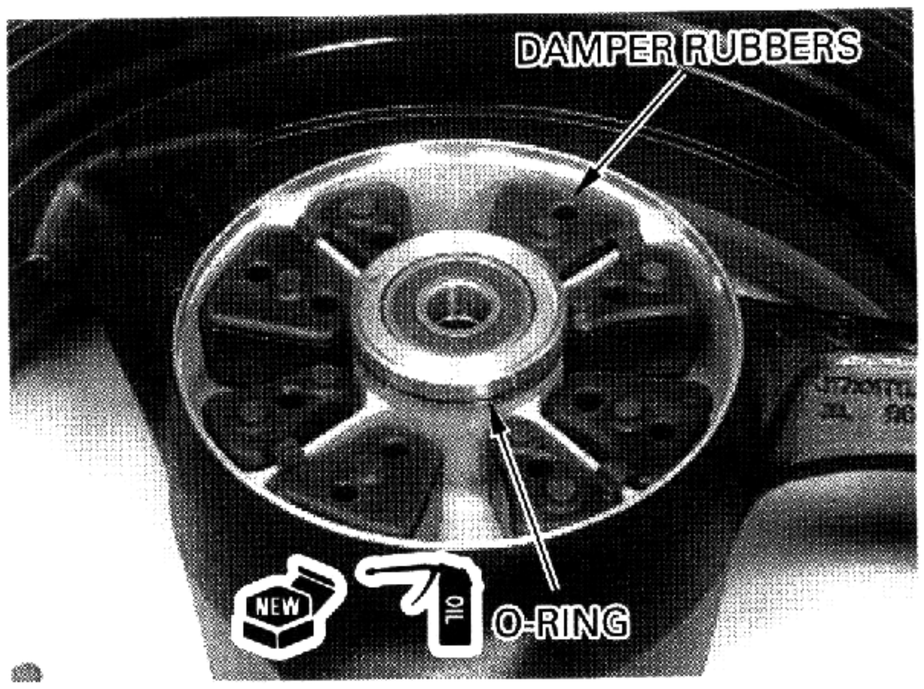
Driver	07749-0010000
Attachment, 62 × 68 mm	07746-0010500
Pilot, 25 mm	07746-0040600



Install the driven flange collar.



Install the wheel damper rubbers into the wheel hub.
Apply oil to the new O-ring and install it into the groove of the wheel hub.



Install the driven flange assembly into the left wheel hub.
If the driven sprocket was removed, install the driven sprocket and tighten the nuts.

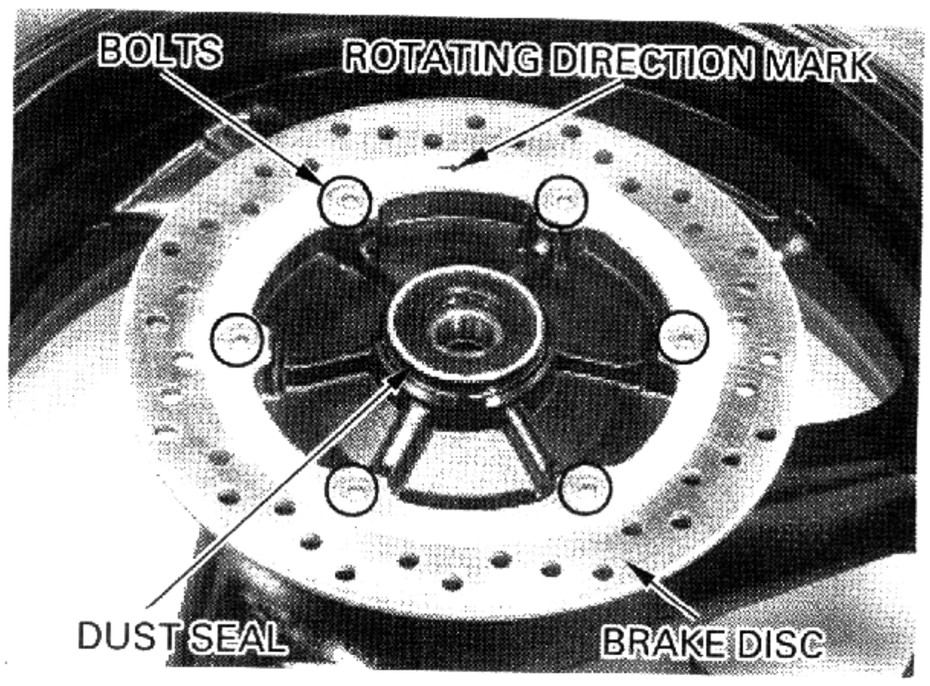
TORQUE: 108 N·m (11.0 kgf·m , 80 lbf·ft)

Apply grease to the dust seal lips, then install it into the driven flange.



Install the brake disc with its rotating direction mark facing out.
Install and tighten the new bolts to the specified torque.

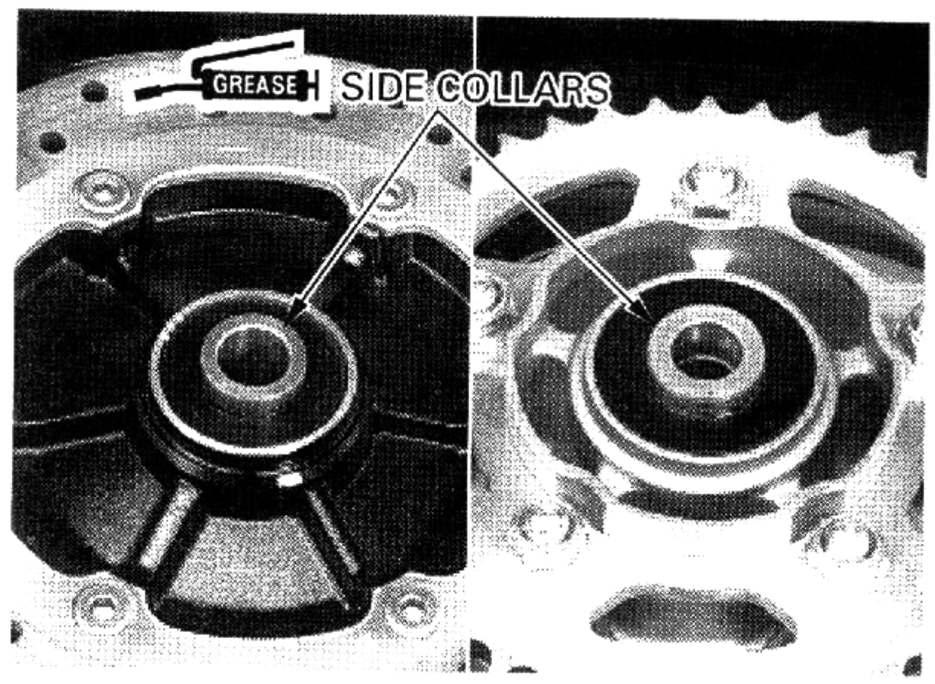
TORQUE: 42 N·m (4.3 kgf·m , 31 lbf·ft)



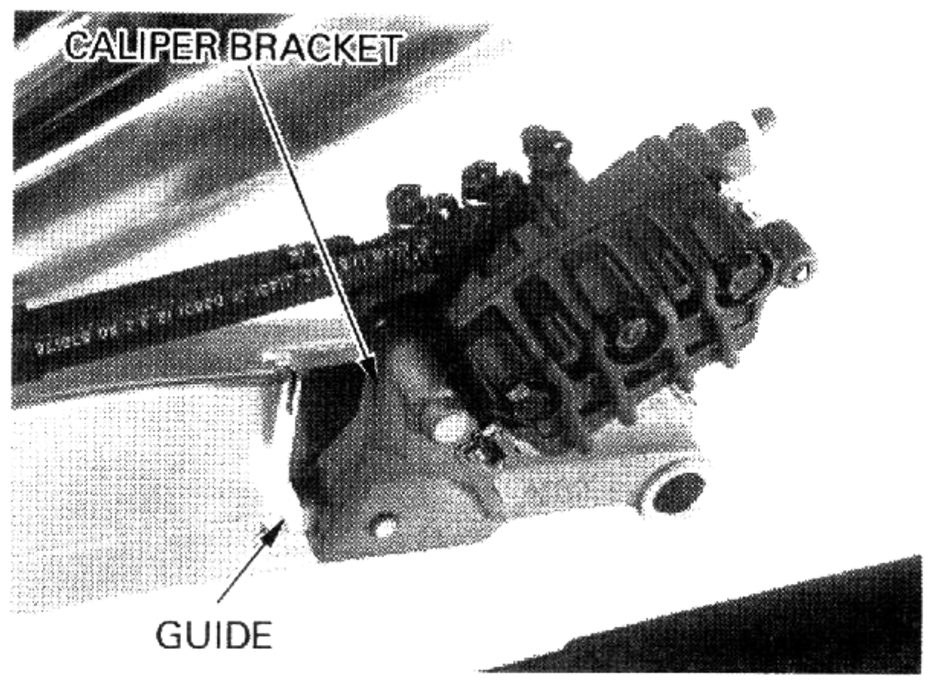
INSTALLATION

Apply grease to the side collar inside and grooves.

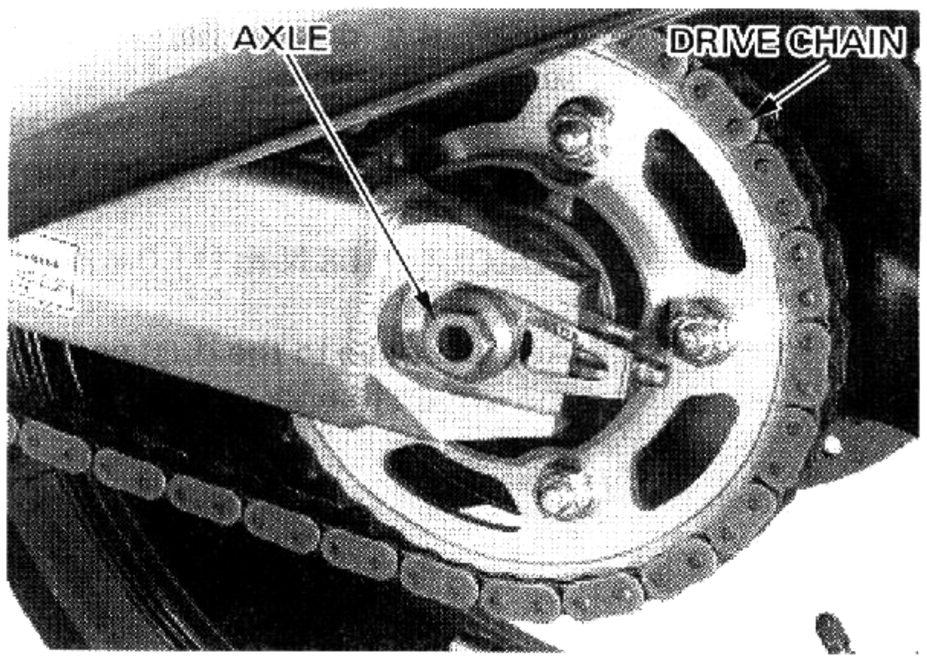
Install the side collars.



Install the rear brake caliper bracket onto the guide of the swingarm.



Place the rear wheel into the swingarm.
Install the drive chain over the driven sprocket.
Install the axle from the left side.

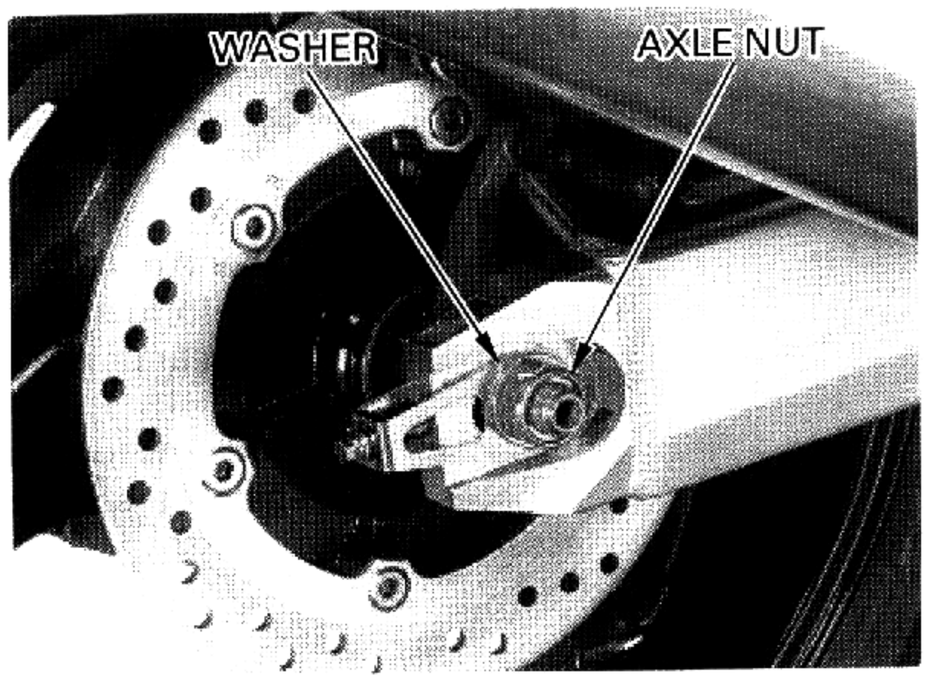


Install the washer and loosely install the axle nut.

Adjust the drive chain slack (page 3-20).

Tighten the axle nut to the specified torque.

TORQUE: 118 N·m (12.0 kgf·m , 87 lbf·ft)



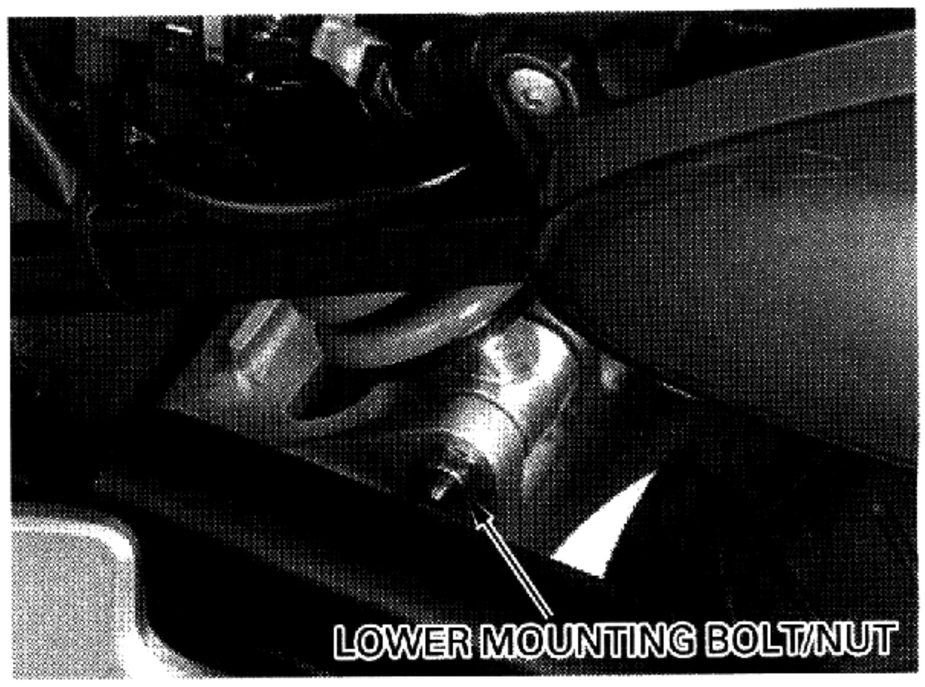
SHOCK ABSORBER

REMOVAL

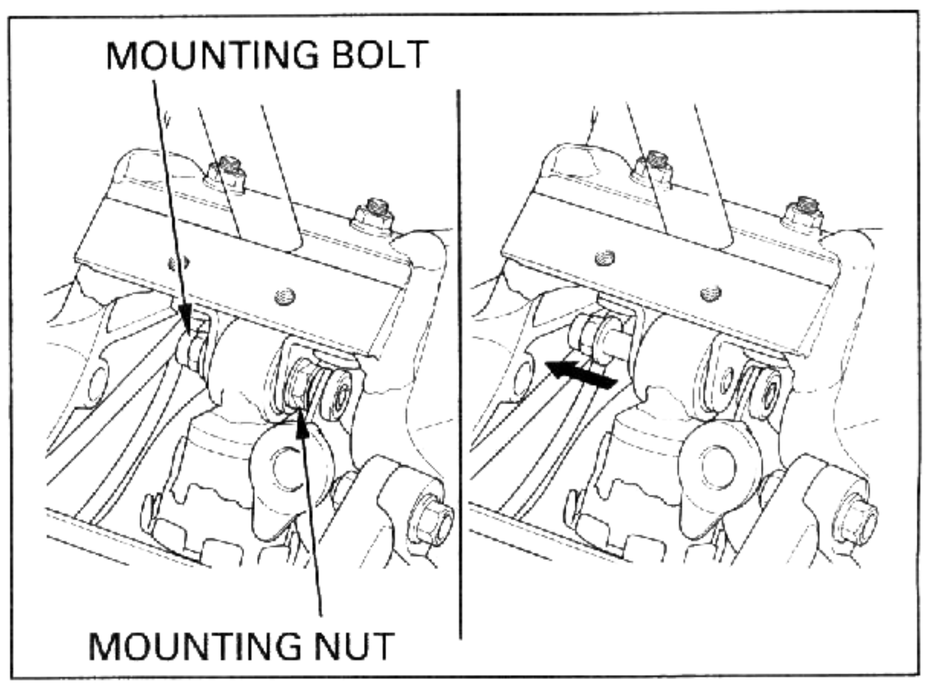
Place the motorcycle on its center stand.

Remove the seat (page 2-2).
Support the rear end of the fuel tank (page 2-11).

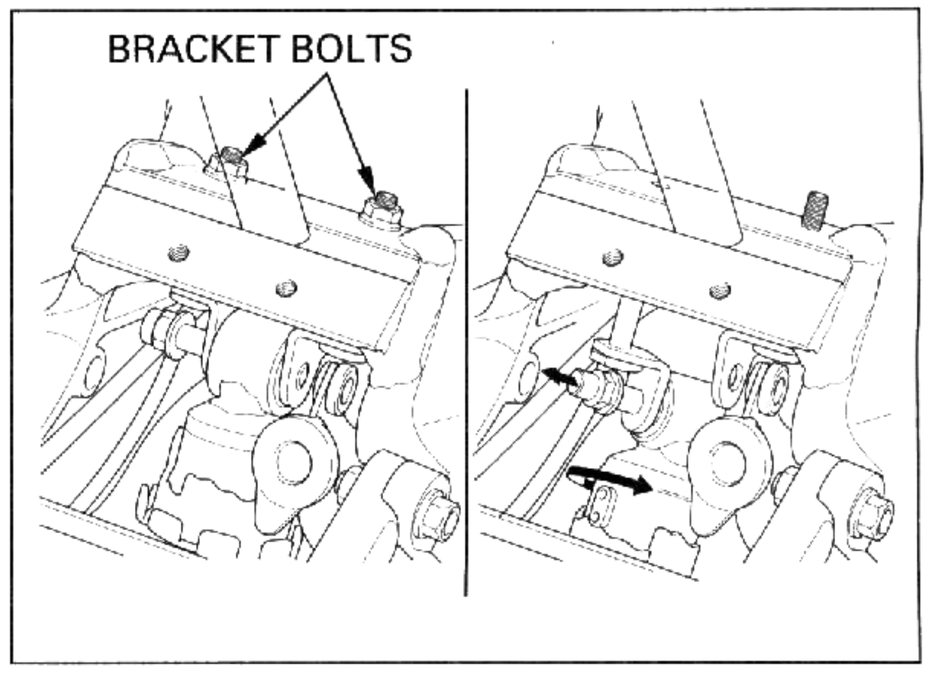
Remove the shock absorber lower mounting bolt/nut.



Loosen and remove the shock absorber upper mounting nut.
Move the upper mounting bolt to the left so that the left bolt is out from the right mounting bracket.



Remove the shock absorber upper mounting bracket nuts.
Lower and turn the shock absorber with the left bracket, so that the upper mounting bolt can be removed.
Remove the upper mounting bolt and shock absorber.

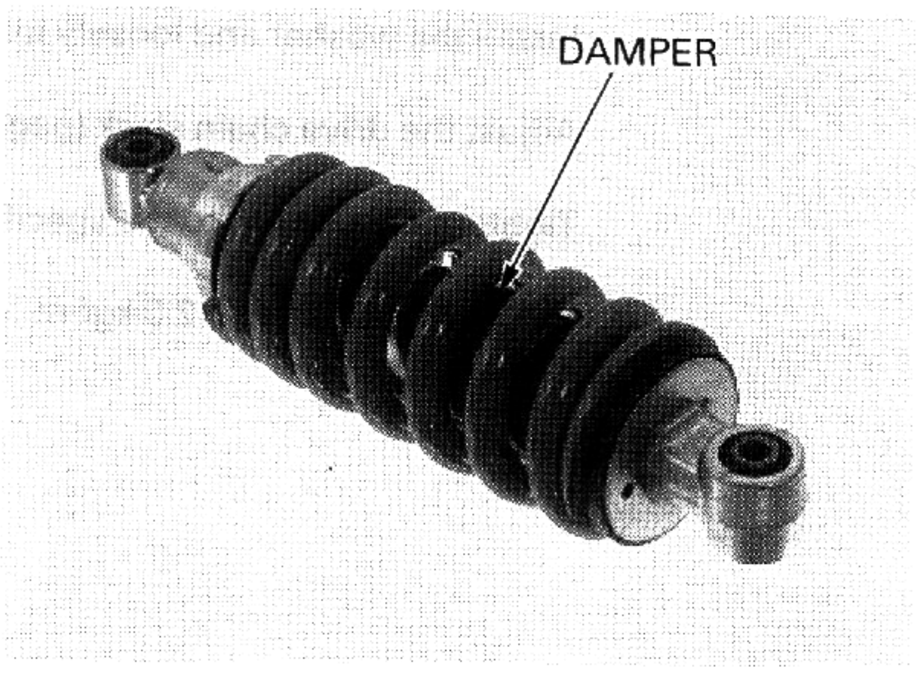


INSPECTION

Visually inspect the shock absorber for damage.

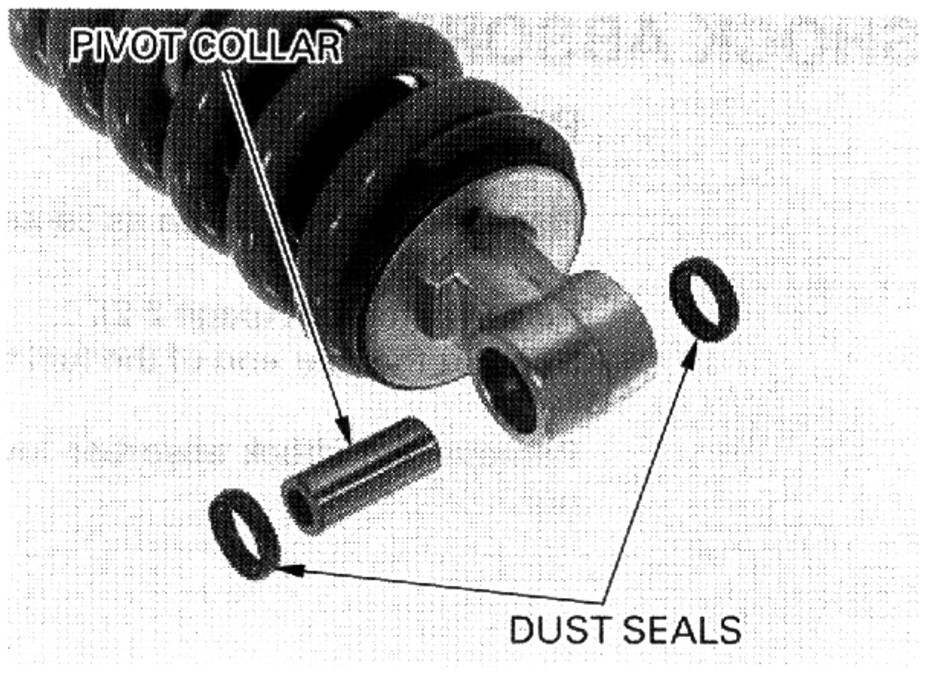
Check for the:
- Damper rod for bend or damage
- Damper unit for deformation or oil leaks
- Bump rubber for wear or damage

Inspect all the other parts for wear or damage.
If necessary, replace the shock absorber as an assembly.



NEEDLE BEARING REPLACEMENT

Remove the pivot collar and dust seals.

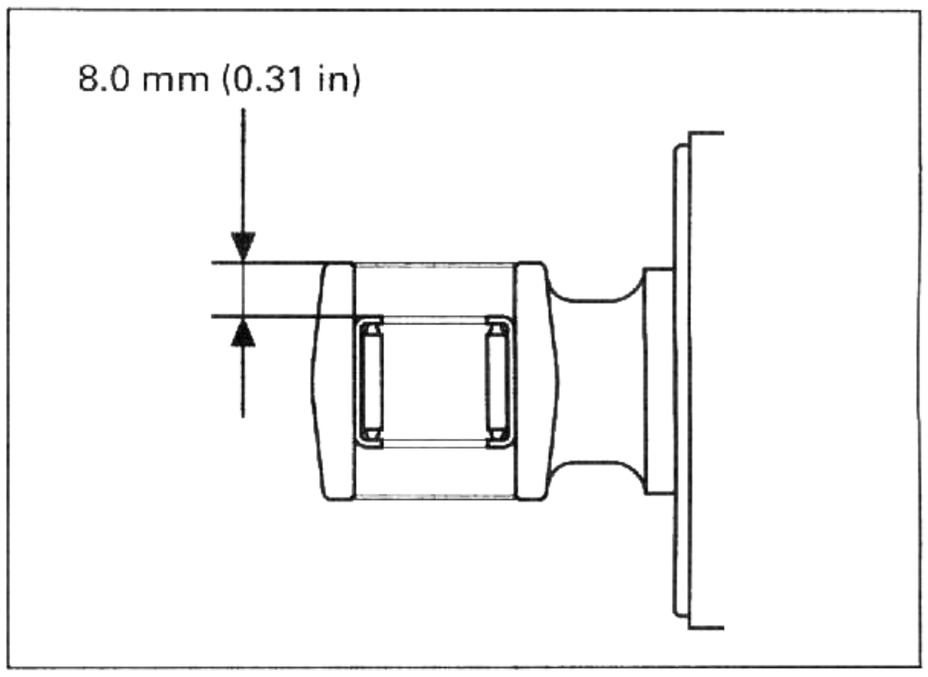


Press out the needle bearing out of the shock absorber lower mount using the special tools.

TOOLS:

Driver attachment handle	07949-3710001
Attachment, 22 × 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400

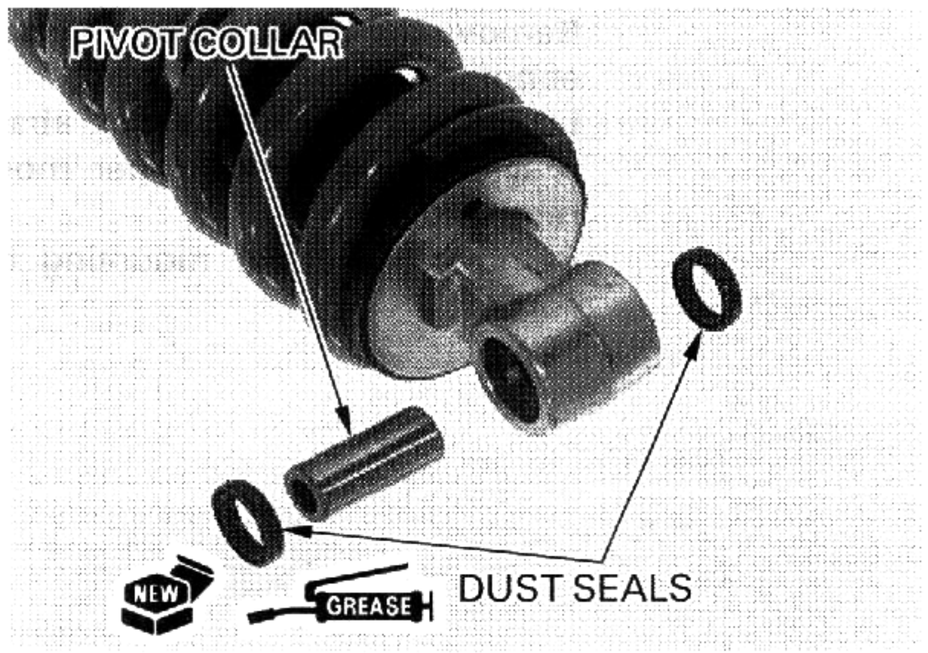
Press a new needle bearing into the lower mount so that the needle bearing surface is lower 8.0 mm (0.31 in) from the end of the lower mount using the same tools.



NOTE:

Press the needle bearing into the lower mount with the marked side facing out.

Apply grease to the new dust seal lips, install them into the lower mount.
Install the pivot collar.



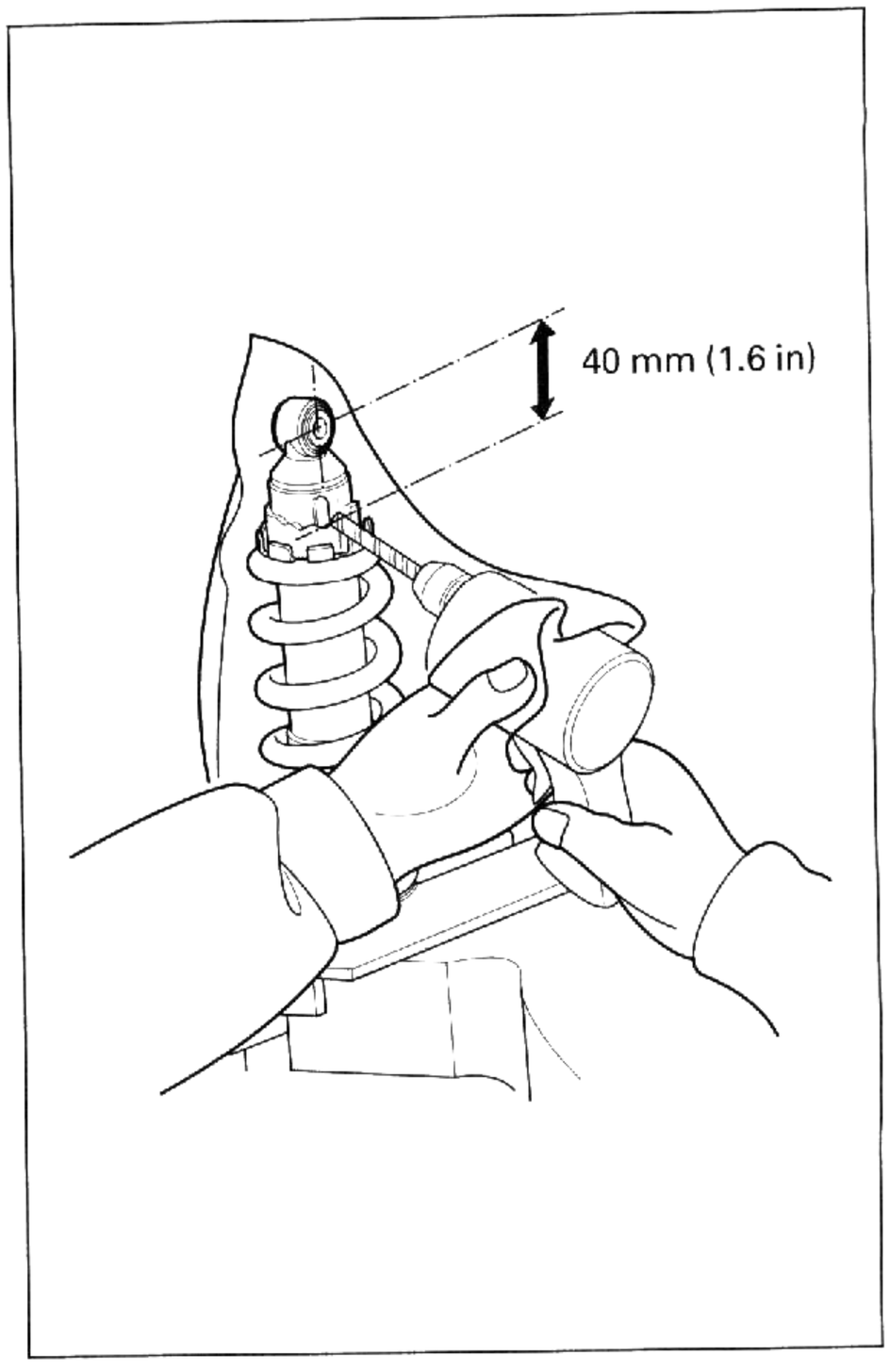
SHOCK ABSORBER DISPOSAL PROCEDURE

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 2—3 mm (5/64—1/8 in) drill bit.

⚠WARNING

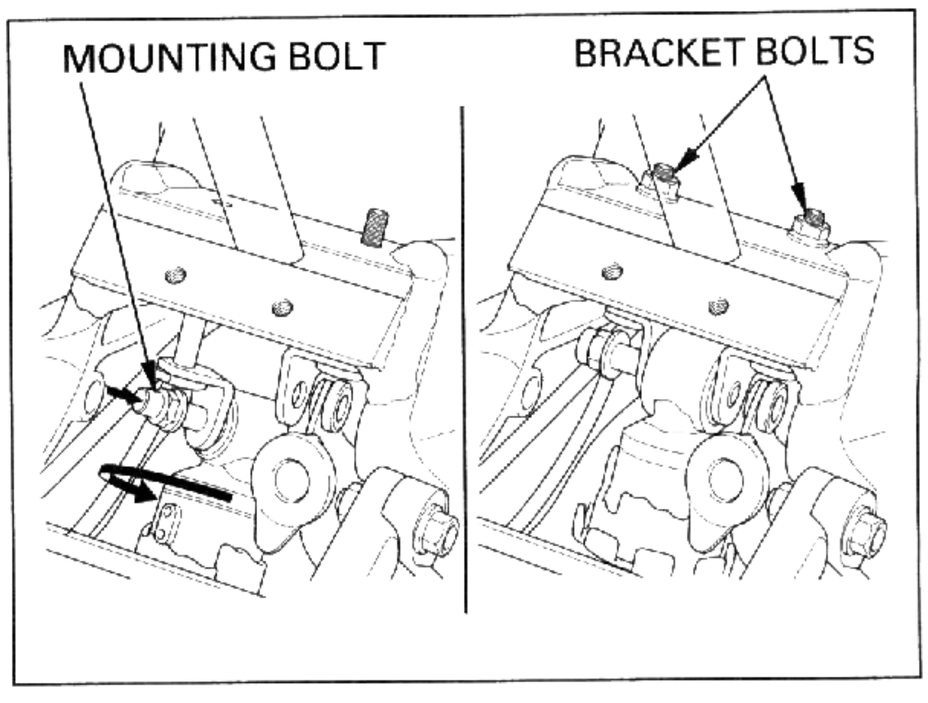
- ***Do not use a dull drill bit which could cause a build-up of excessive heat and pressure inside the damper, leading to explosion and severe personal injury.***
- ***The shock absorber contains nitrogen gas and oil under high pressure. Do not drill any farther down the damper case than the measurement given above, or you may drill into the oil chamber; oil escaping under high pressure may cause serious personal injury.***
- ***Always wear eye protection to avoid getting metal shaving in your eyes when the gas pressure is released. The plastic bag is only intended to shield you from the escaping gas.***



Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from getting caught in the bit when you start.

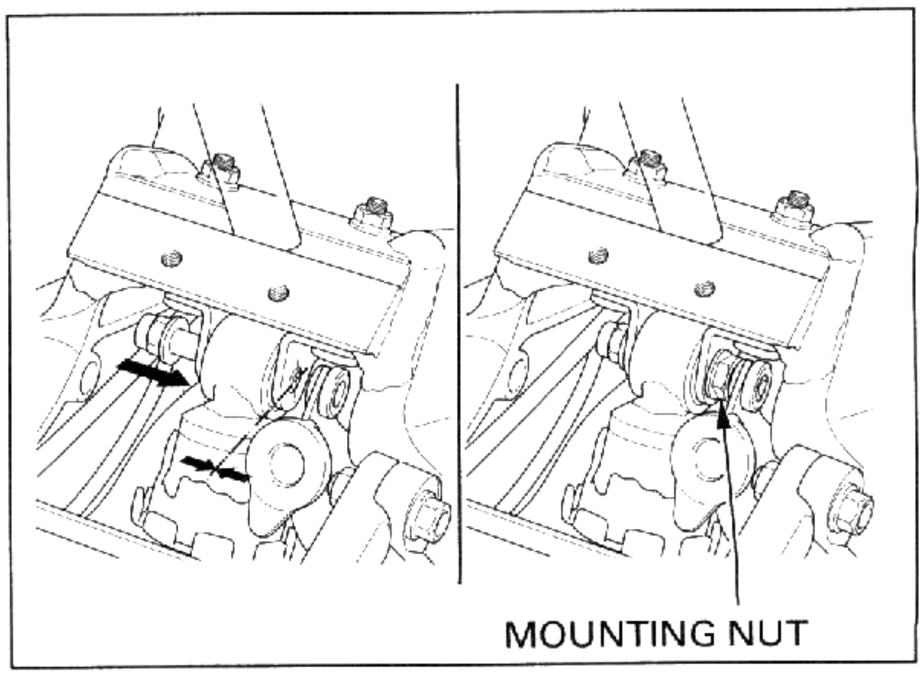
INSTALLATION

Install the shock absorber upper mounting brackets into the frame.
Install the shock absorber into the frame and install the upper mounting bolt.



Turn the shock absorber and pull up the left bracket.
Install the shock absorber upper mounting nut.
Set the radiator reserve tank grommet, then tighten the upper mounting bolts/nuts to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m , 31 lbf·ft)



Install and tighten the lower mounting bolts/nuts to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m , 31 lbf·ft)

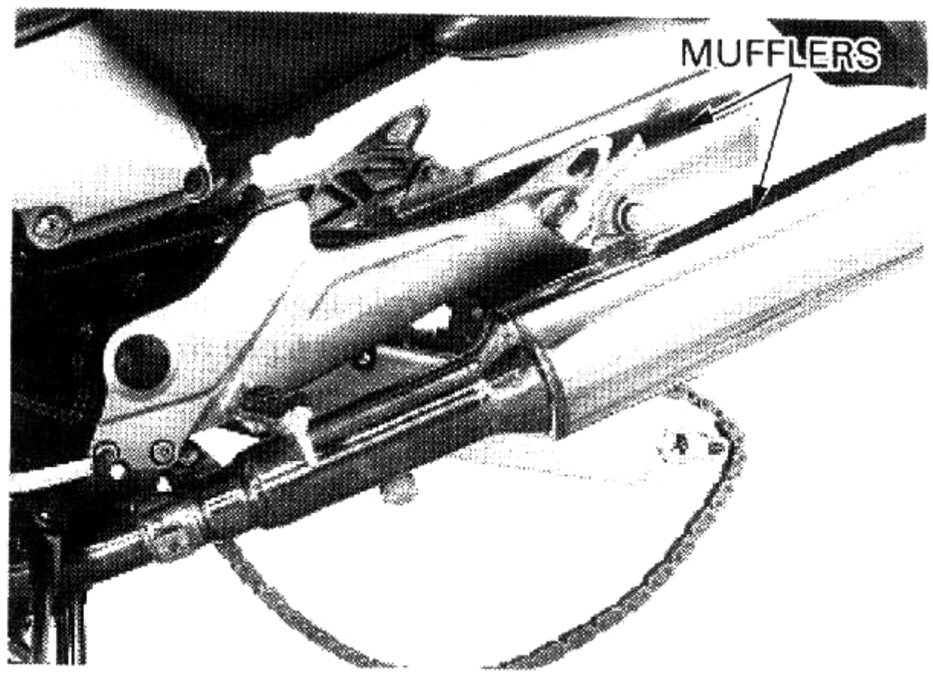
Install the removed parts in the reverse order of removal.



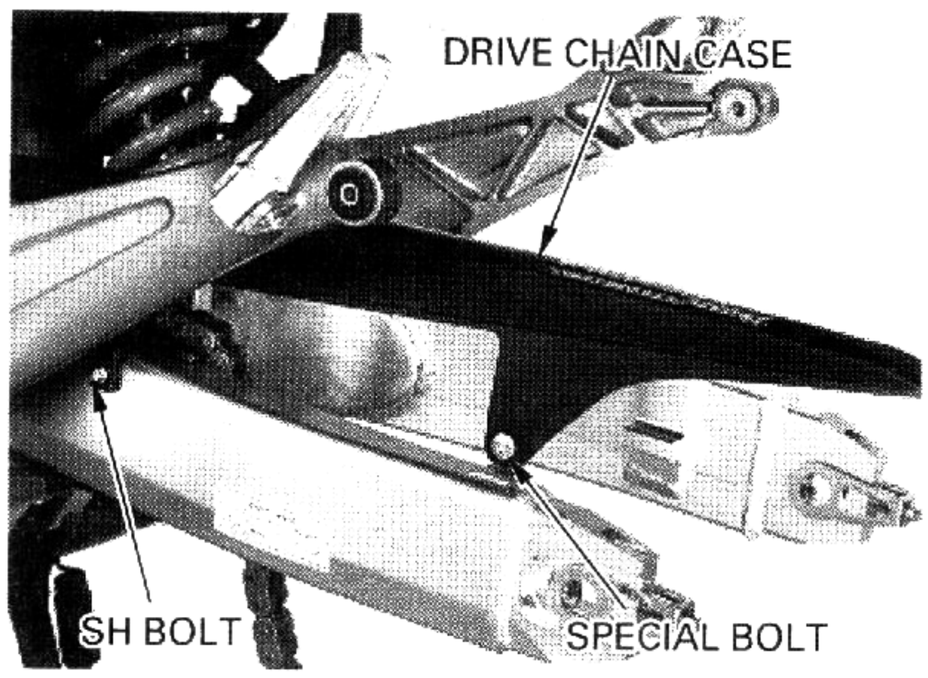
SWINGARM

REMOVAL

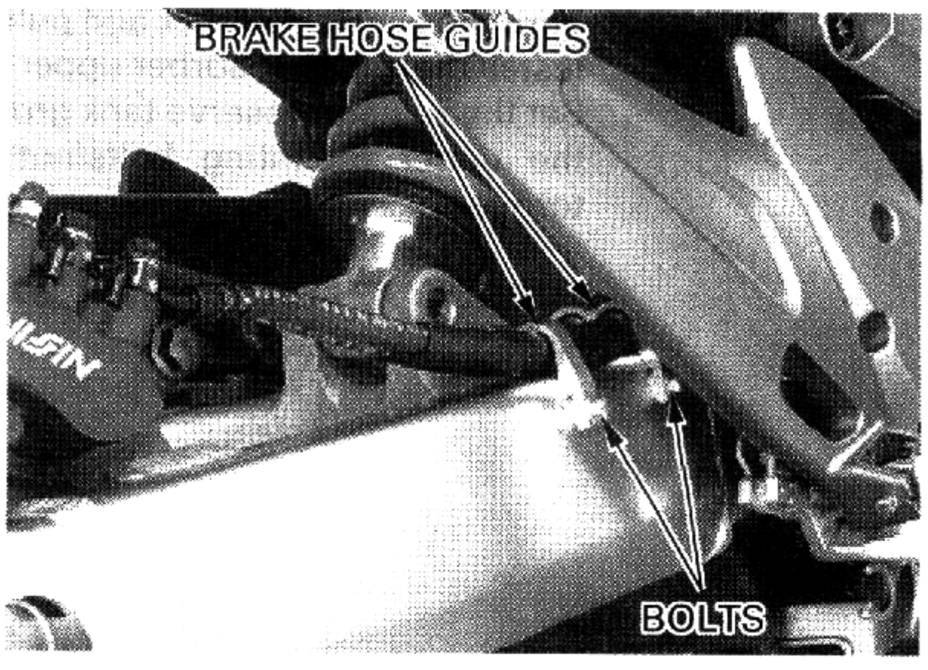
Remove the following:
- Rear wheel (page 14-3)
- Muffler (page 2-10)



Remove the SH bolt, special bolt and drive chain case.



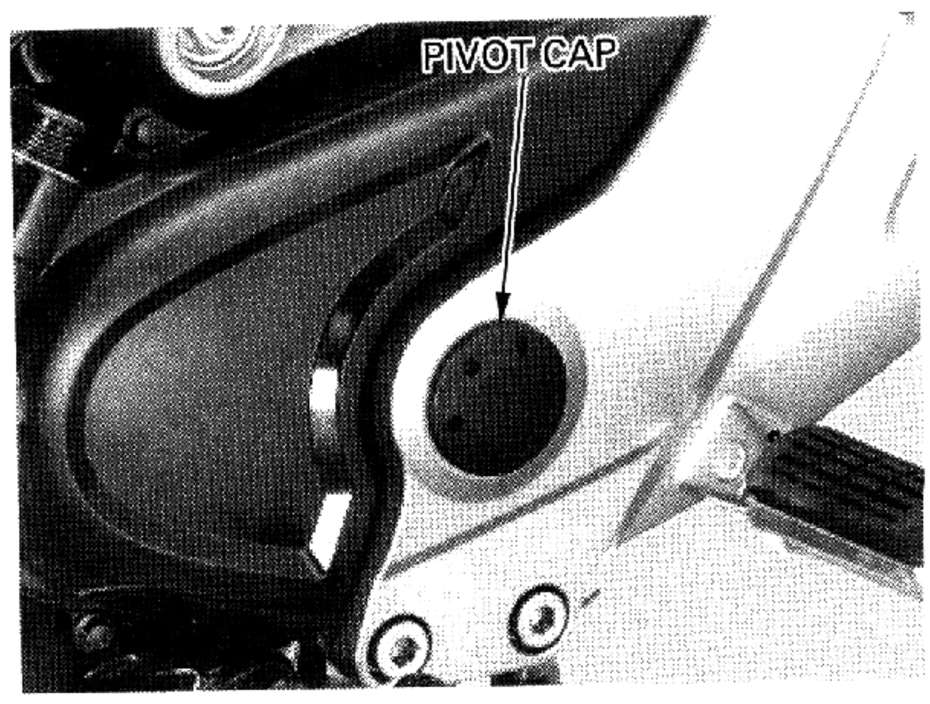
Remove the SH bolts and brake hose guides.



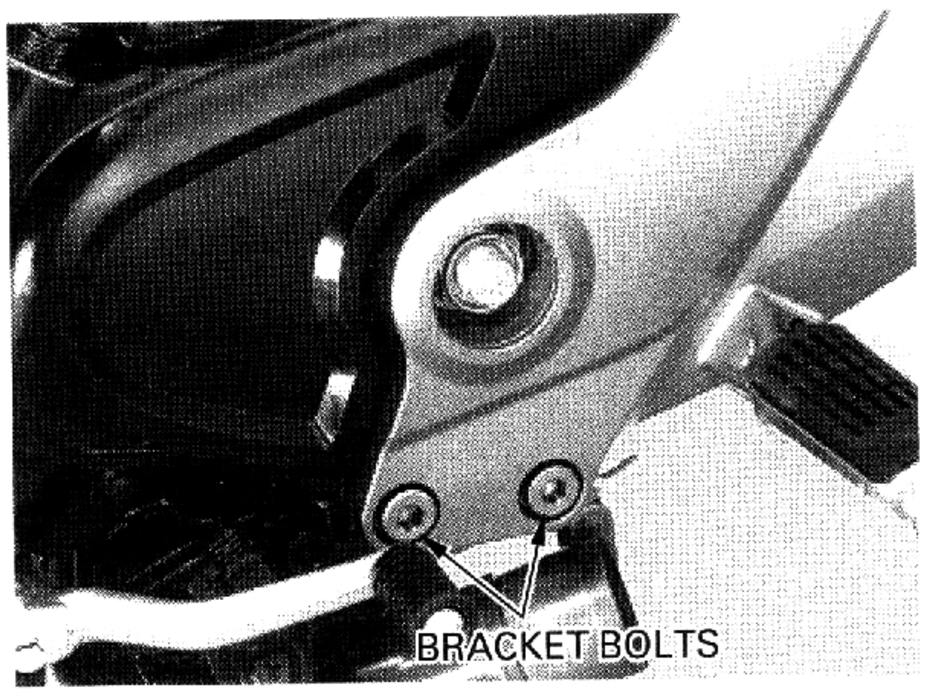
Remove the shock absorber lower mounting bolt/nut.



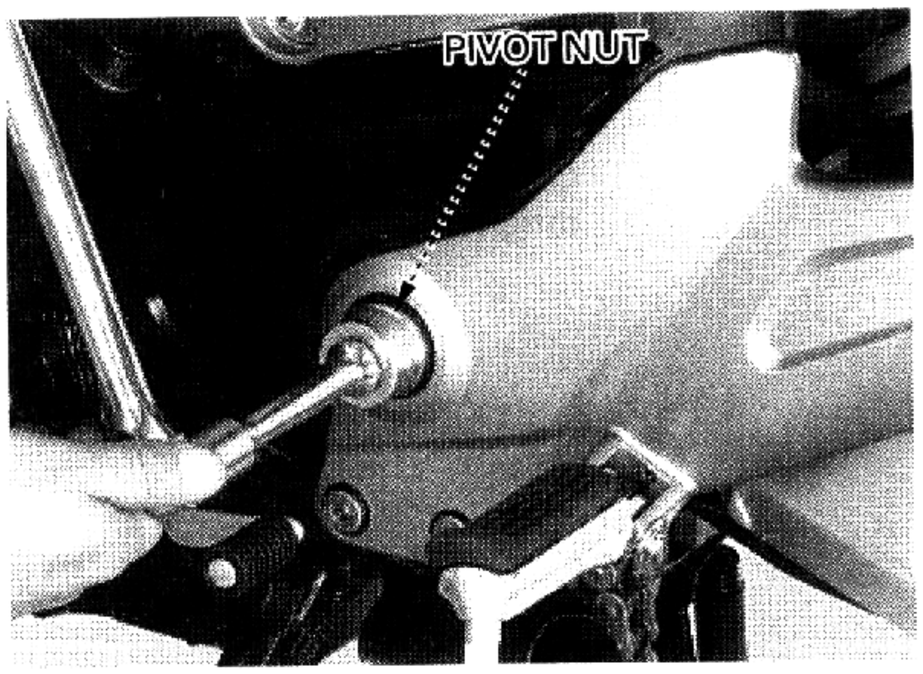
Remove the swingarm pivot caps.



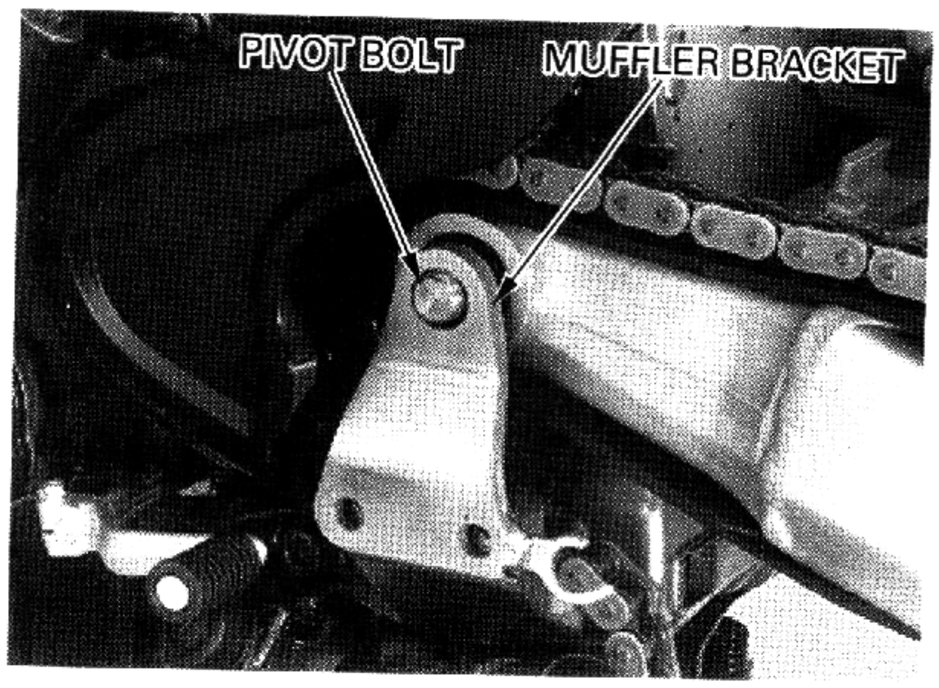
Loosen the footpeg/muffler bracket mounting bolts on both side.



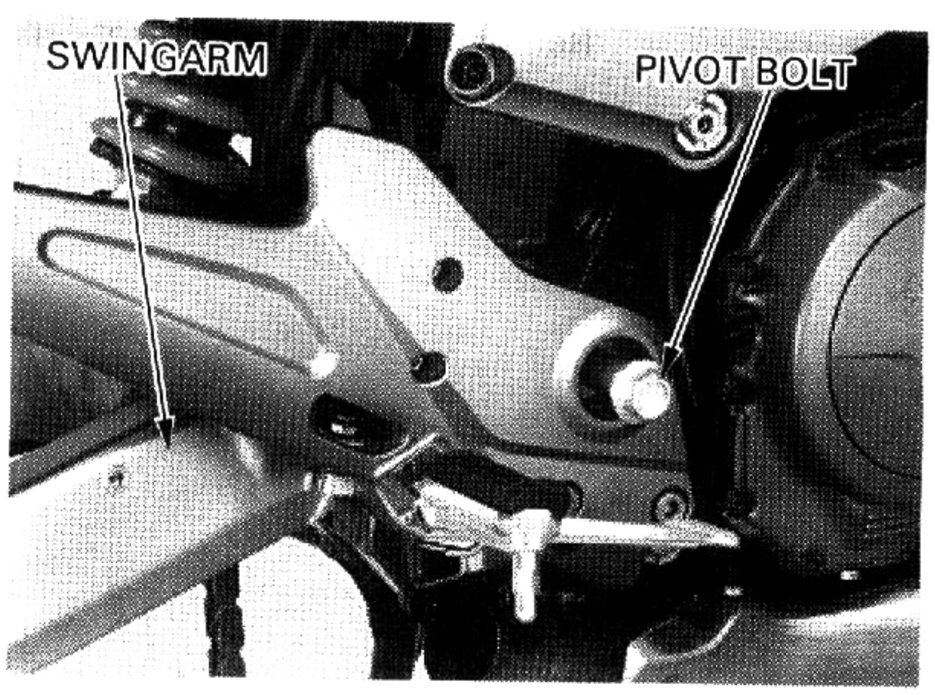
Remove the swingarm pivot nut.
Remove the footpeg/muffler bracket mounting bolts and left footpeg holder assembly.



Push the swingarm pivot bolt in and remove the left muffler mounting bracket.

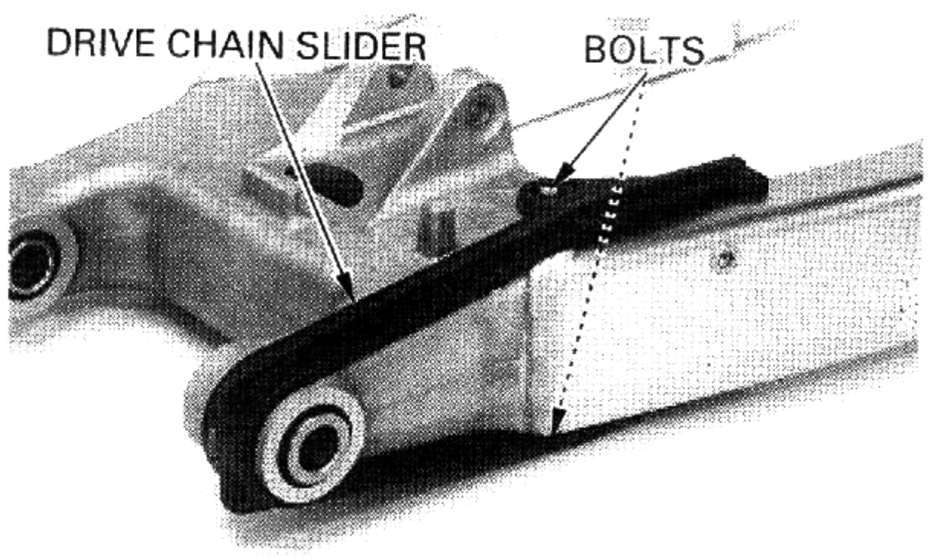


Pull out the swingarm pivot bolt and then remove the swingarm from the frame.



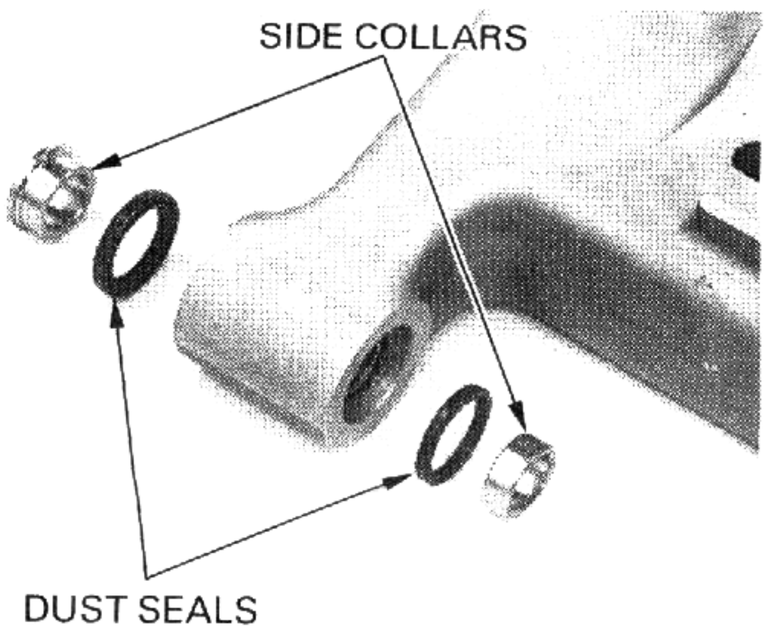
DISASSEMBLY/INSPECTION

Remove the following:
- Drive chain slider
- Drive chain adjusters



Check the drive chain slider for wear or damage.

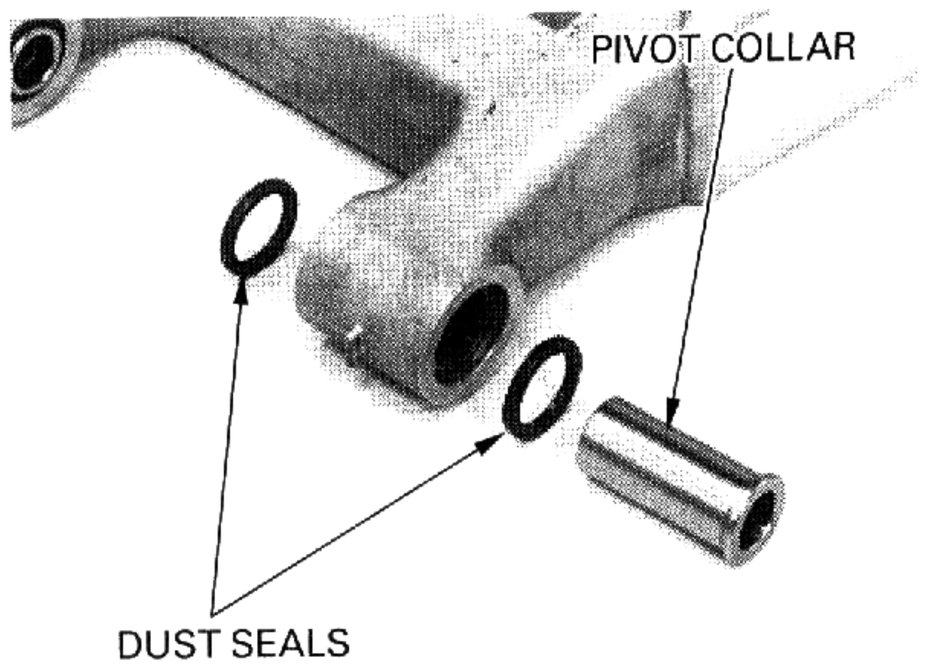
Remove the side collars and dust seals from the swingarm right pivot.



Check the dust seals and side collars for damage or fatigue.

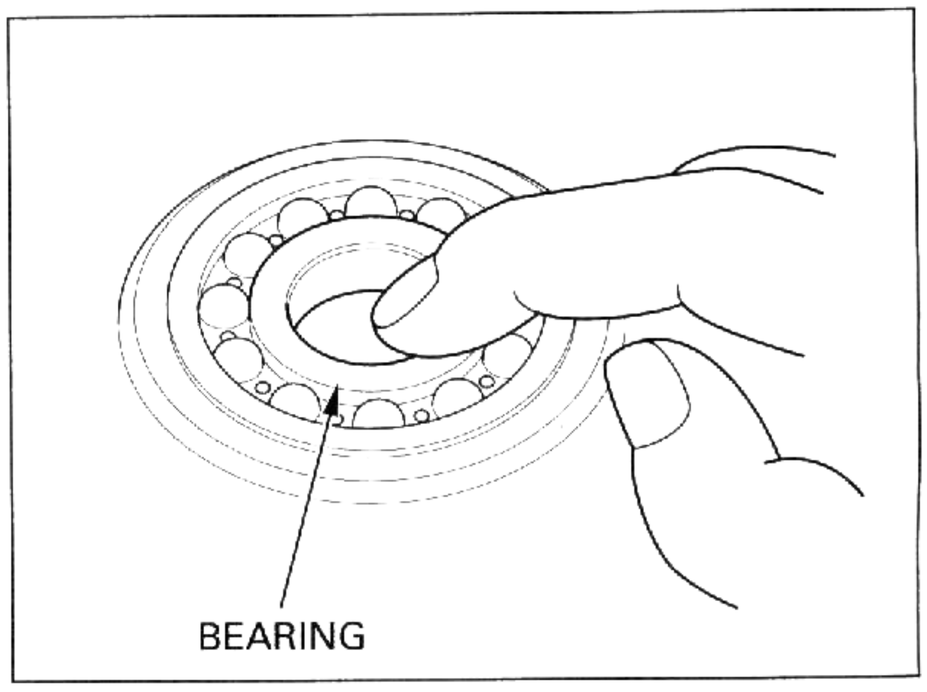
Remove the pivot collar and dust seals from the swingarm left pivot.

Check the dust seals and collar for damage or fatigue.



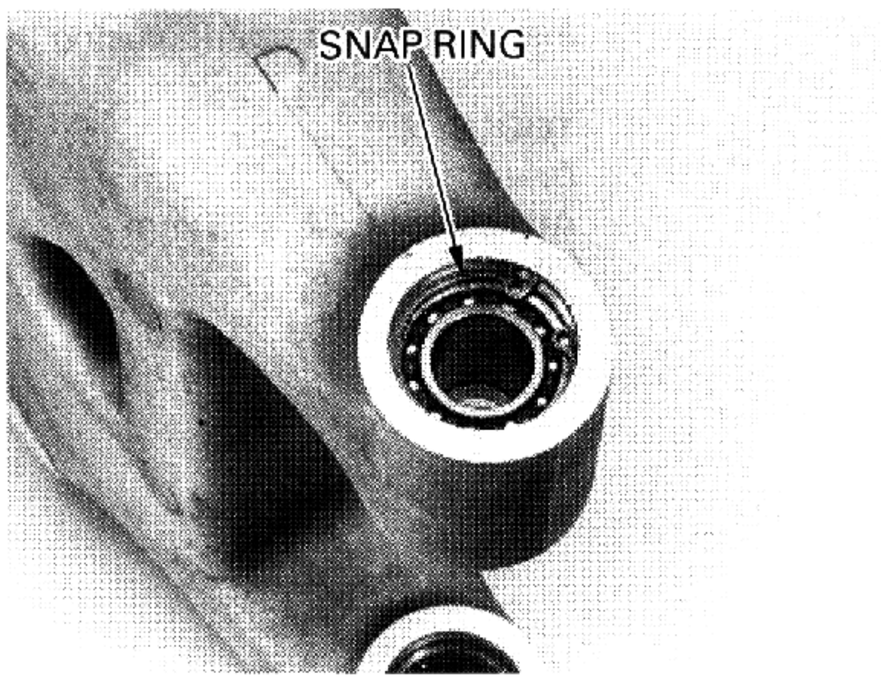
Turn the inner race of right pivot bearings with your finger.
The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the pivot.



PIVOT BEARING REPLACEMENT

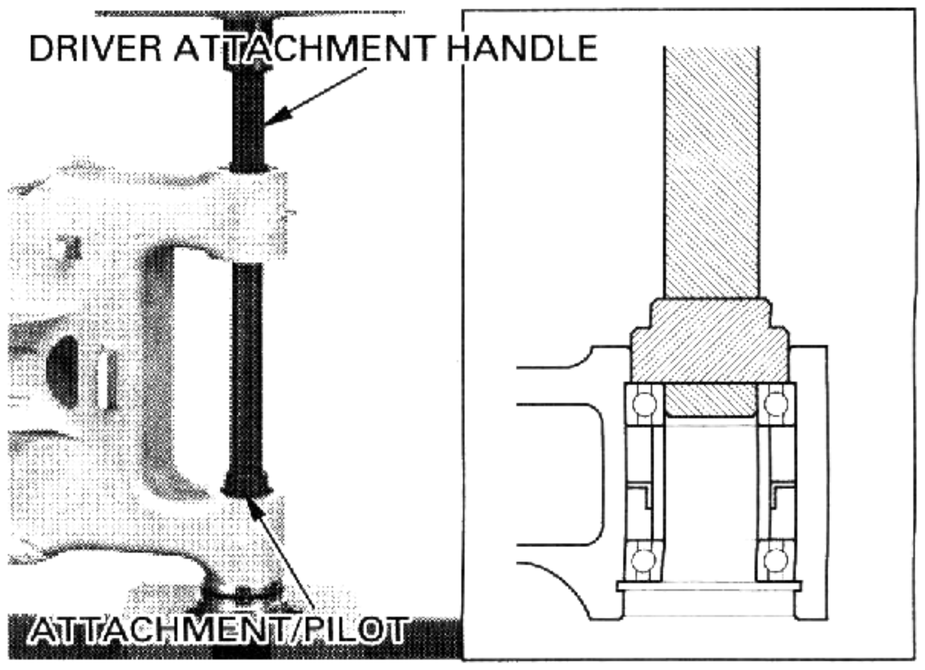
Remove the snap ring.



Press out the right pivot bearings (radial ball bearings) and distance collar from the swingarm pivot using the special tools.

TOOLS:

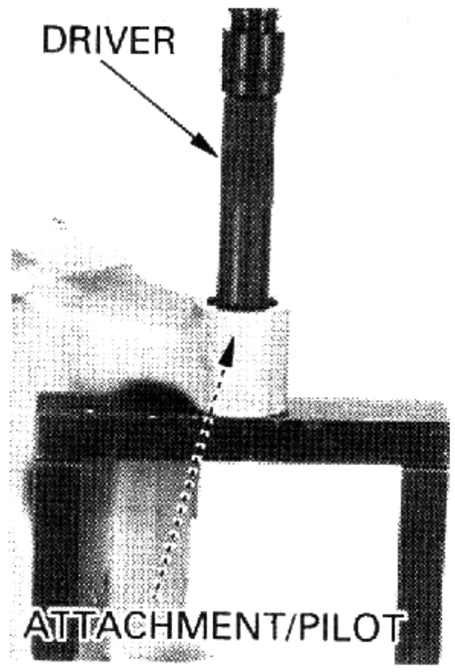
Driver attachment handle	07949-3710001
Attachment 28 × 30 mm	07946-1870100
Pilit, 20 mm	07746-0040500

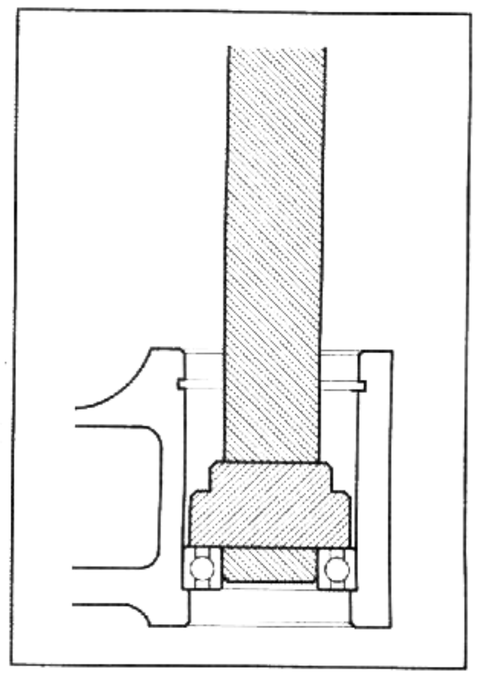


Press the inner bearing into the swingarm right pivot until it seats using the special tools.

TOOLS:

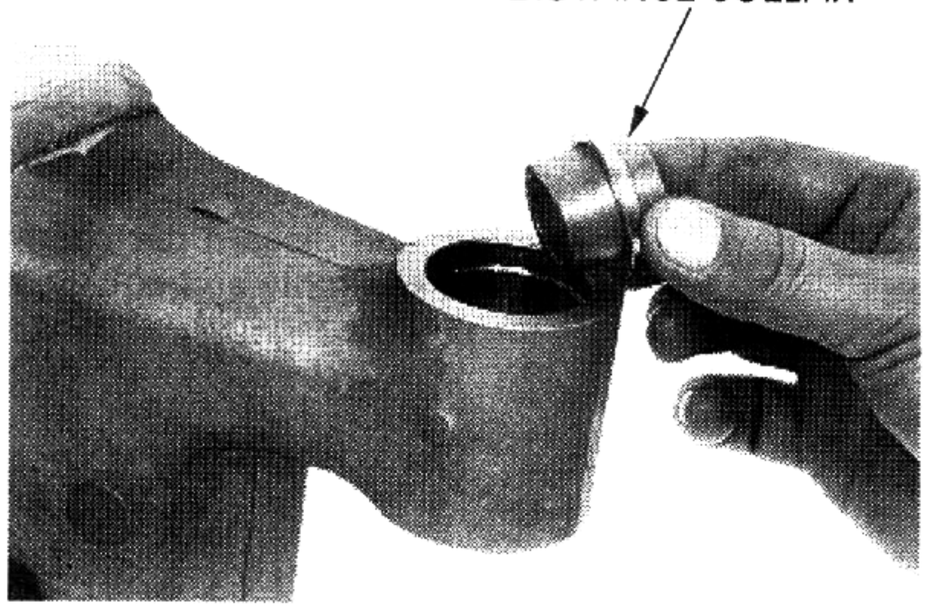
Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 20 mm	07746-0040500





Install the distance collar.

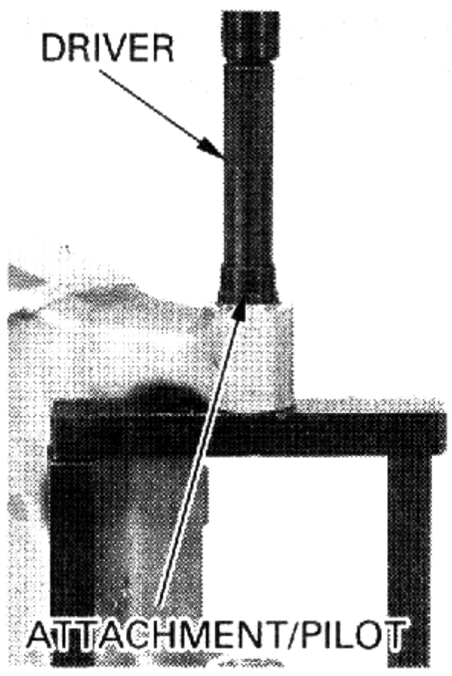
DISTANCE COLLAR

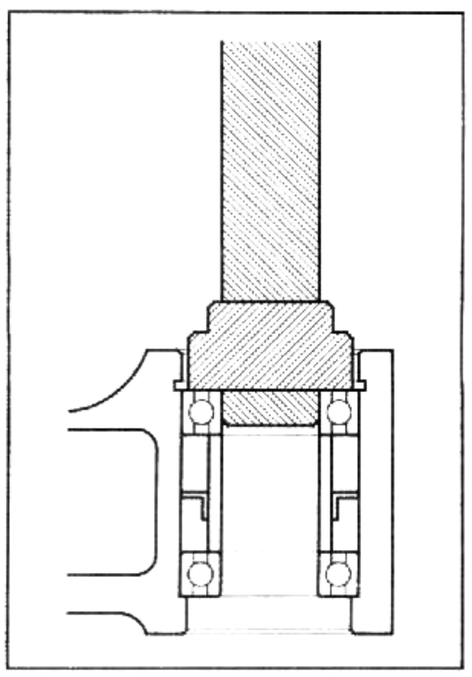


Install the outer bearing using the special tools.

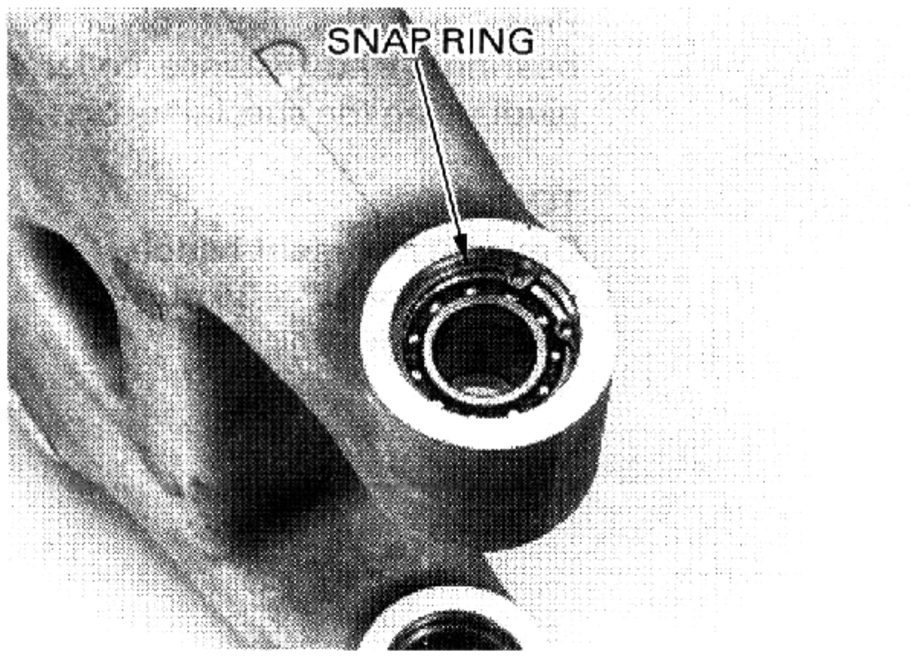
TOOLS:

Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 20 mm	07746-0040500





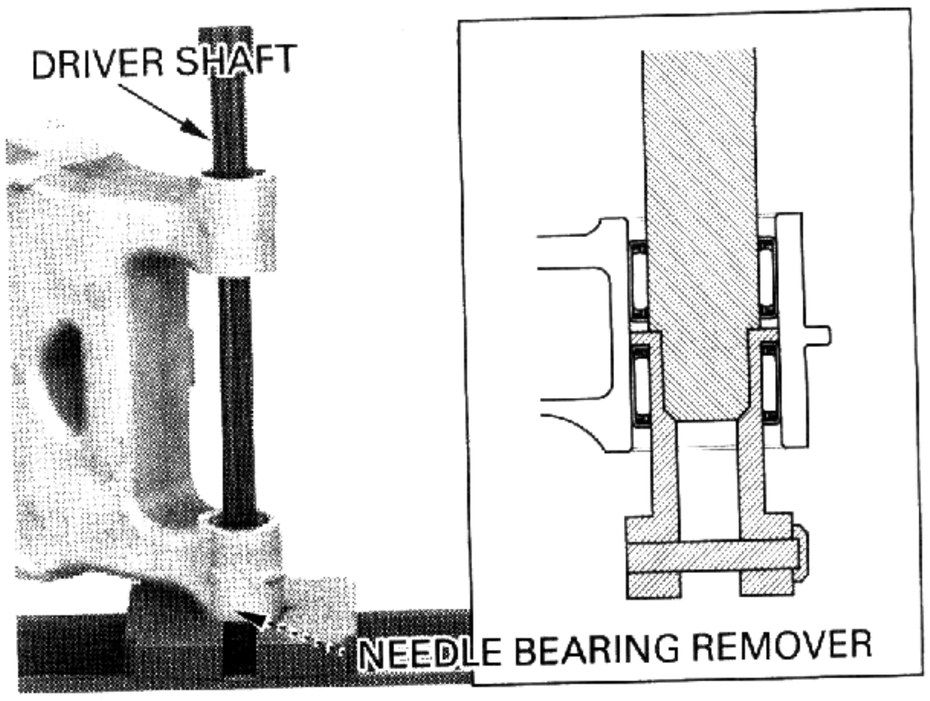
Install the snap ring into the groove securely.



Press out the left pivot outer needle bearing from the swingarm pivot using the special tools.

TOOLS:

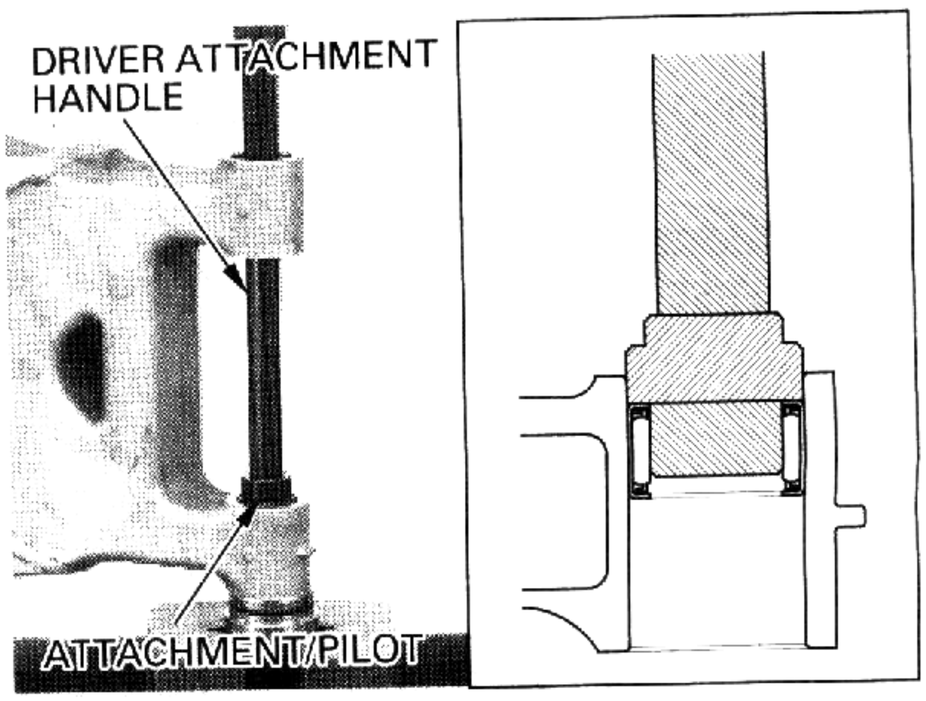
Driver shaft	07946-MJ00100
Needle bearing remover	07HMC-MR70100



Press out the left pivot inner needle bearing from the swingarm pivot using the special tools.

TOOLS:

Driver attachment handle	07949-3710001
Attachment, 32 × 35 mm	07746-0010100
Pilot, 28 mm	07746-0041100



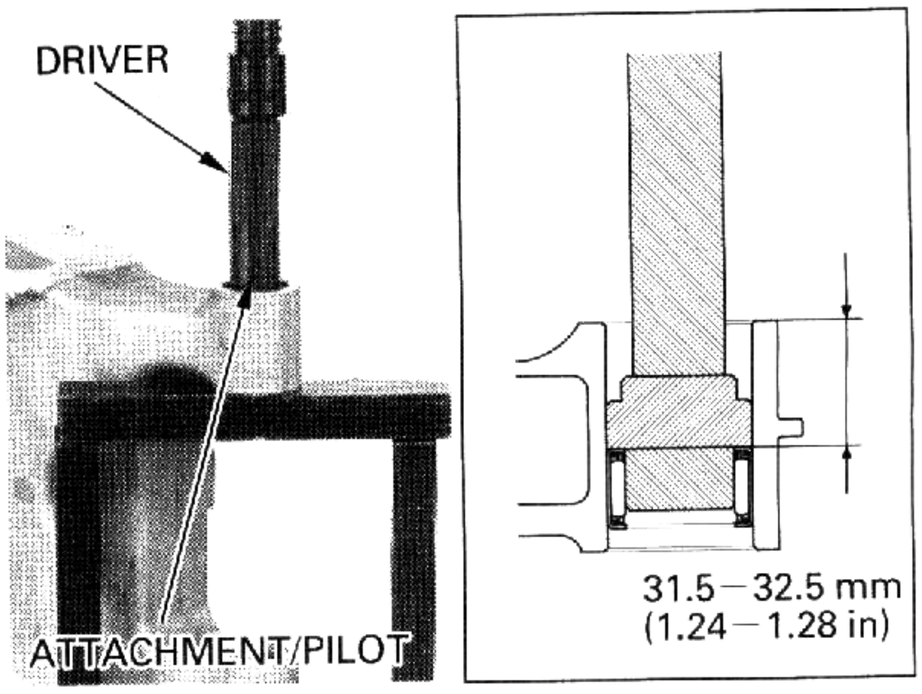
Press a new left pivot inner needle bearing into the swingarm pivot so that the needle bearing surface is lower 31.5–32.5 mm (1.24–1.28 in) from the end of the swingarm pivot surface using the special tools.

NOTE:

Press the needle bearing into the swingarm with the marked side facing out.

TOOLS:

Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 28 mm	07746-0041100



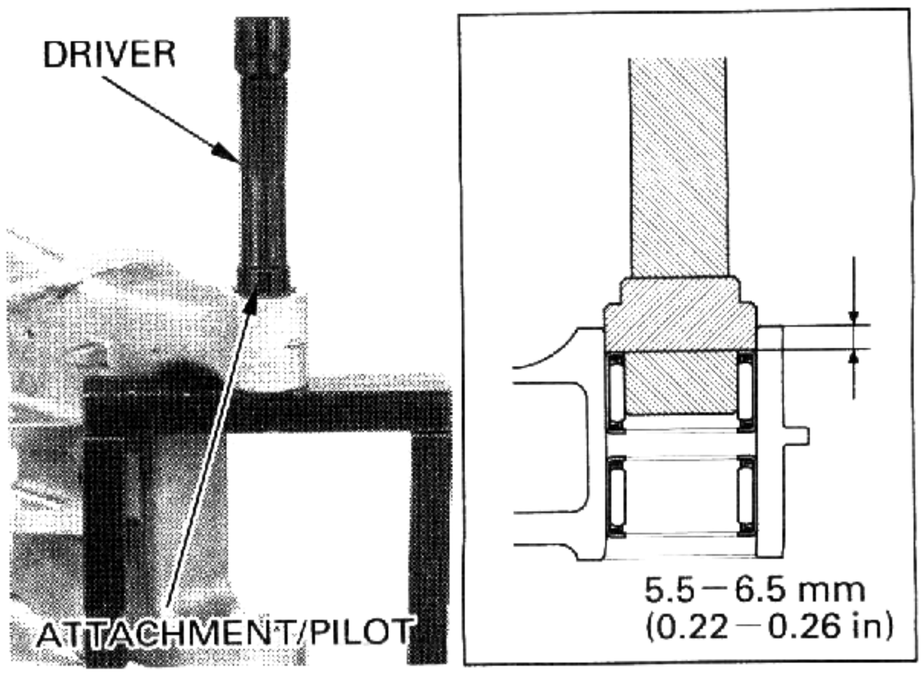
Press a new left pivot outer needle bearing into the swingarm pivot so that the needle bearing surface is lower 5.5–6.5 mm (0.22–0.26 in) from the end of the swingarm pivot surface using the special tools.

NOTE:

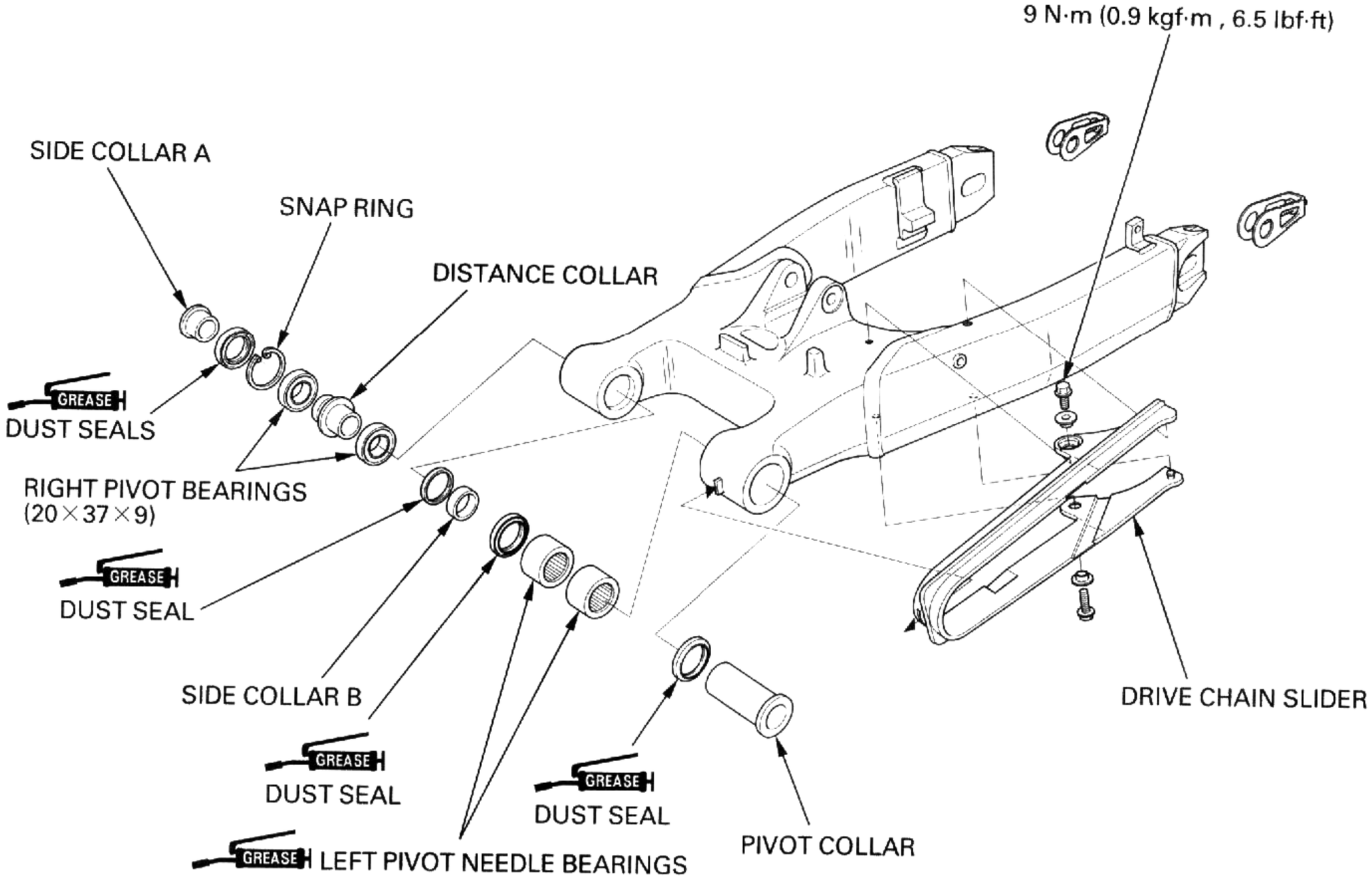
Press the needle bearing into the swingarm with the marked side facing out.

TOOLS:

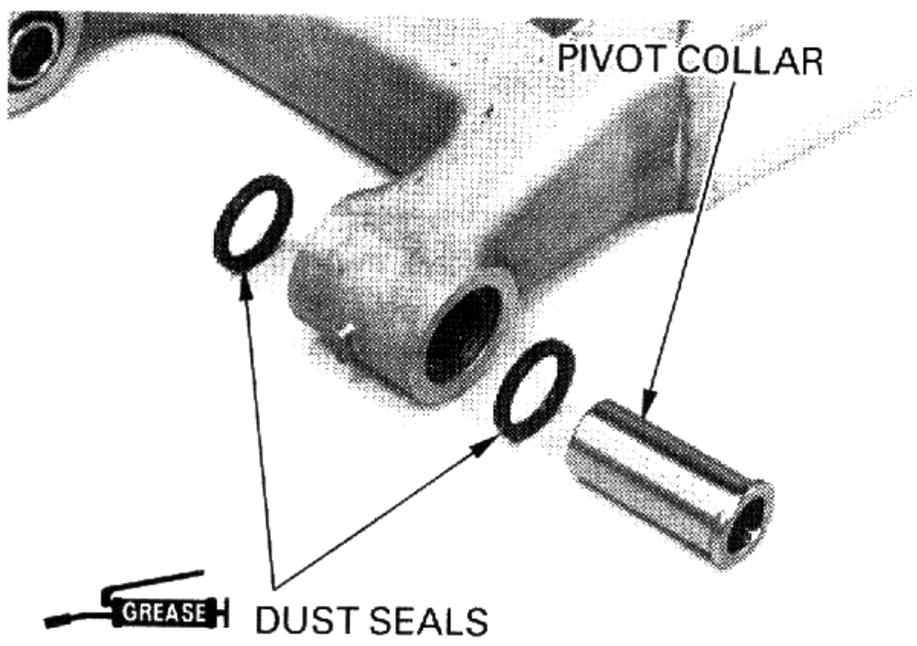
Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 28 mm	07746-0041100



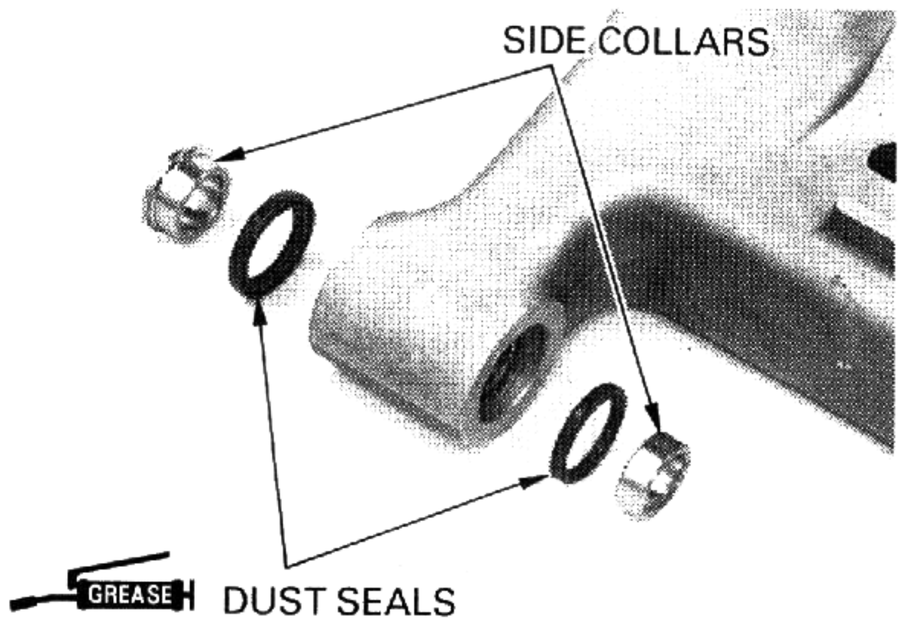
ASSEMBLY



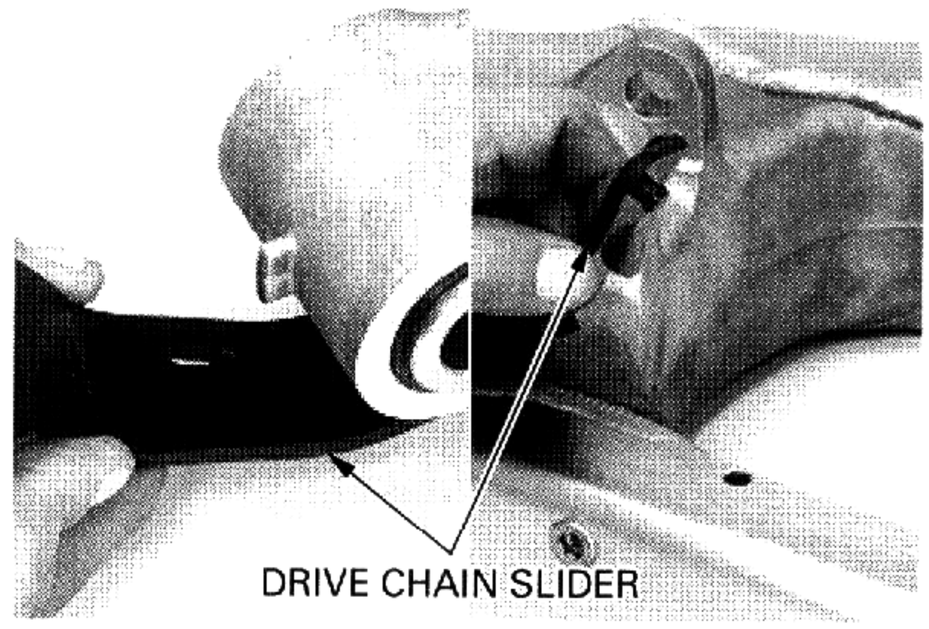
Apply grease to the dust seal lips, then install the dust seals and pivot collar into the left swingarm pivot.



Apply grease to the dust seal lips, then install the dust seals and side collars into the right swingarm pivot.



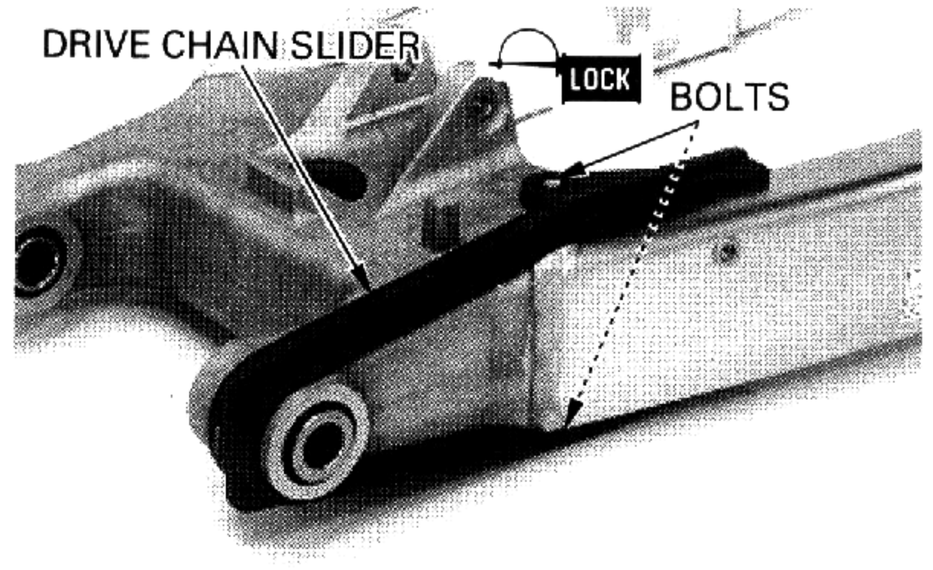
Install the drive chain slider aligning its tabs with the holes in the swingarm.



Apply a locking agent to the drive chain slider bolt threads.
Install the collars and bolts, then tighten the bolts to the specified torque.

TORQUE: 9 N·m (0.9 kgf·m , 6.5 lbf·ft)

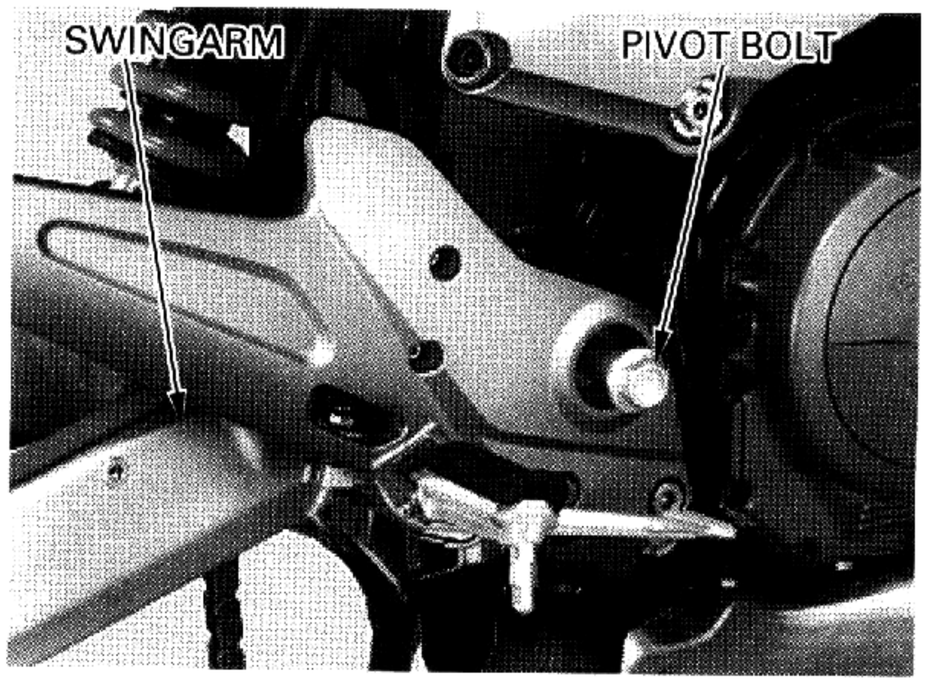
Install the drive chain adjusters.



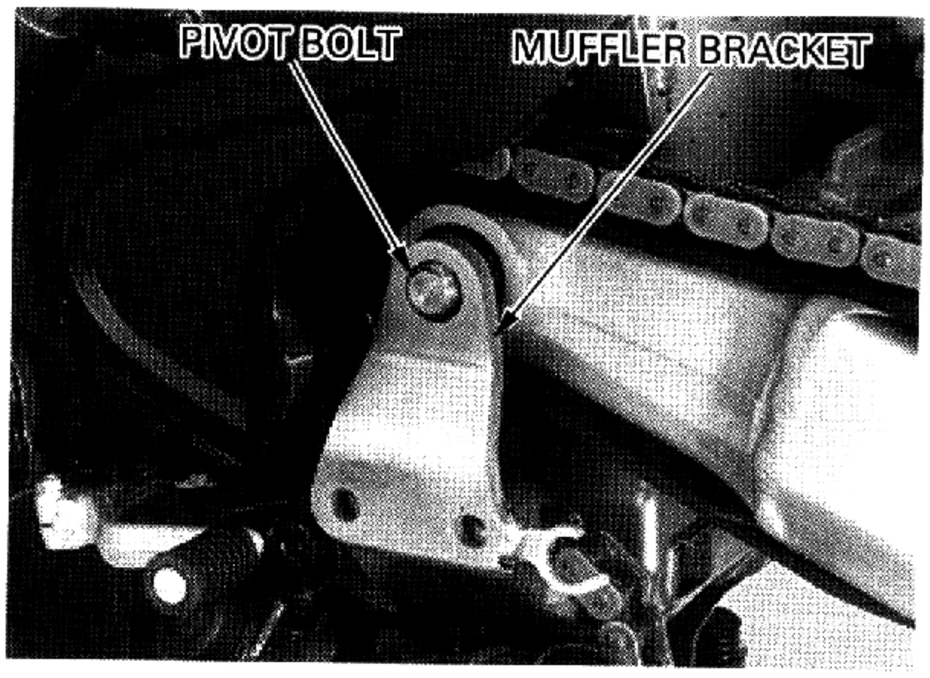
INSTALLATION

Apply thin coat of grease to the swingarm pivot bolt surface.
Install the swingarm into the frame, then install the pivot bolt from the right side.

The swingarm pivot bolt tip does not projected more than 10 mm from the left swingarm end.

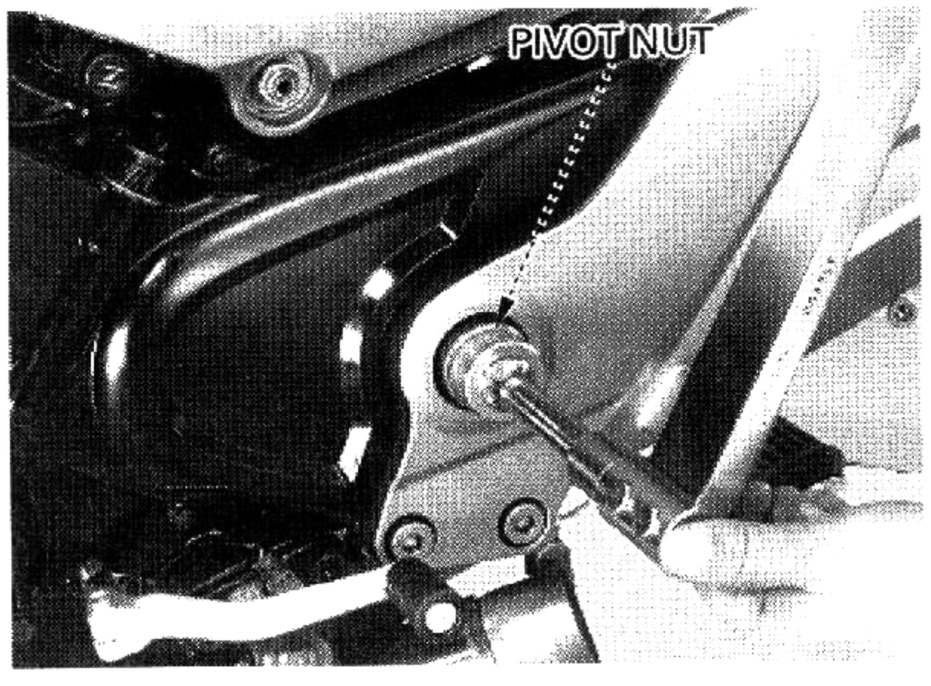


Install the left muffler bracket onto the swingarm pivot bolt.



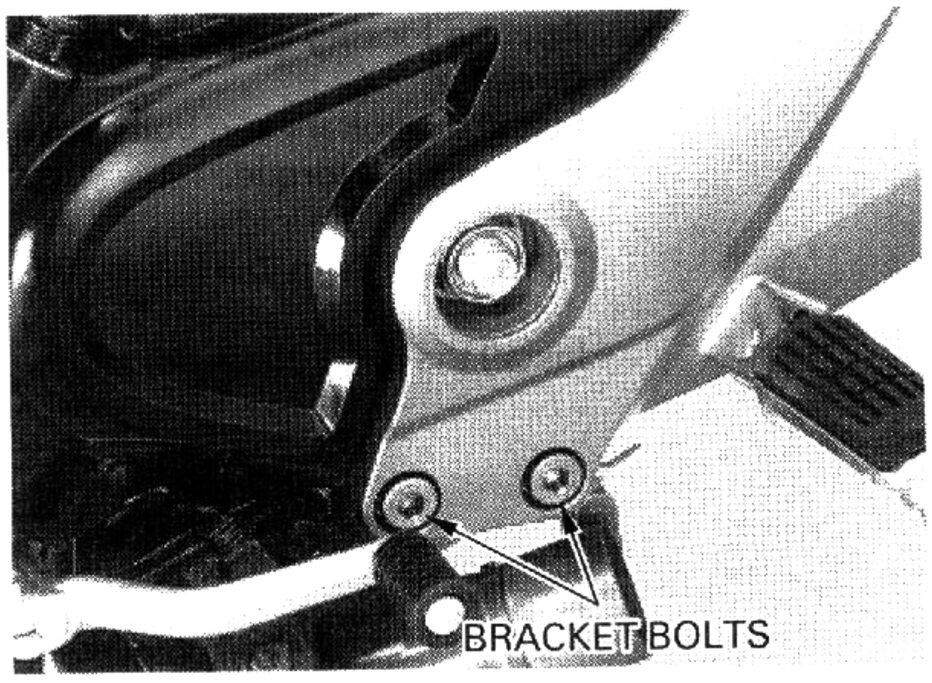
Install the left footpeg holder and temporarily install the footpeg/muffler bracket bolts.
Tighten the swingarm pivot nut to the specified torque.

TORQUE: 93 N·m (9.5 kgf·m , 69 lbf·ft)

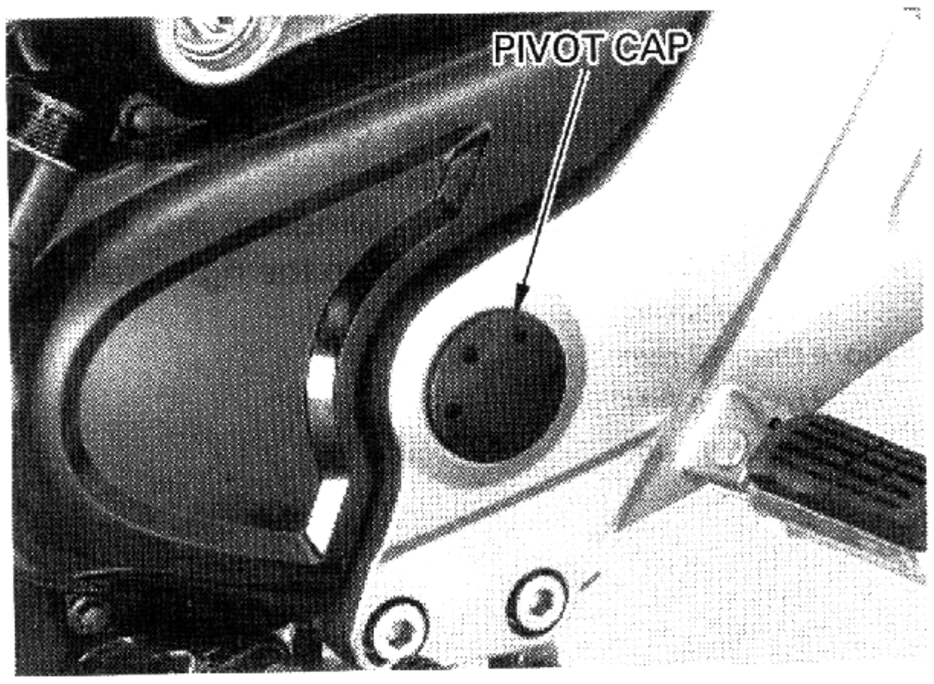


Tighten the footpeg/muffler bracket bolts to the specified torque on both side.

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

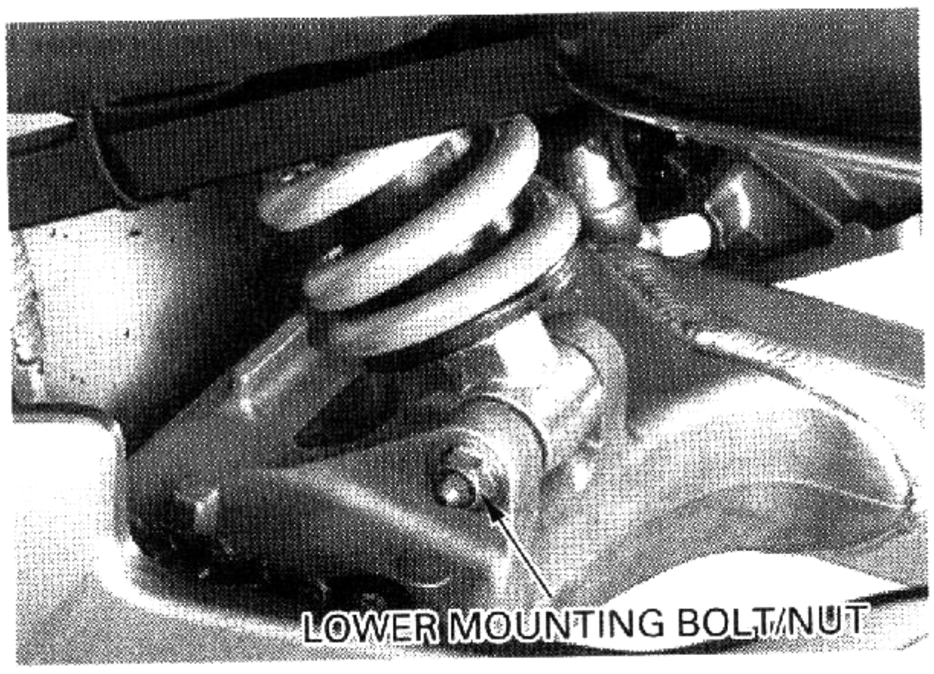


Install the swingarm pivot caps.



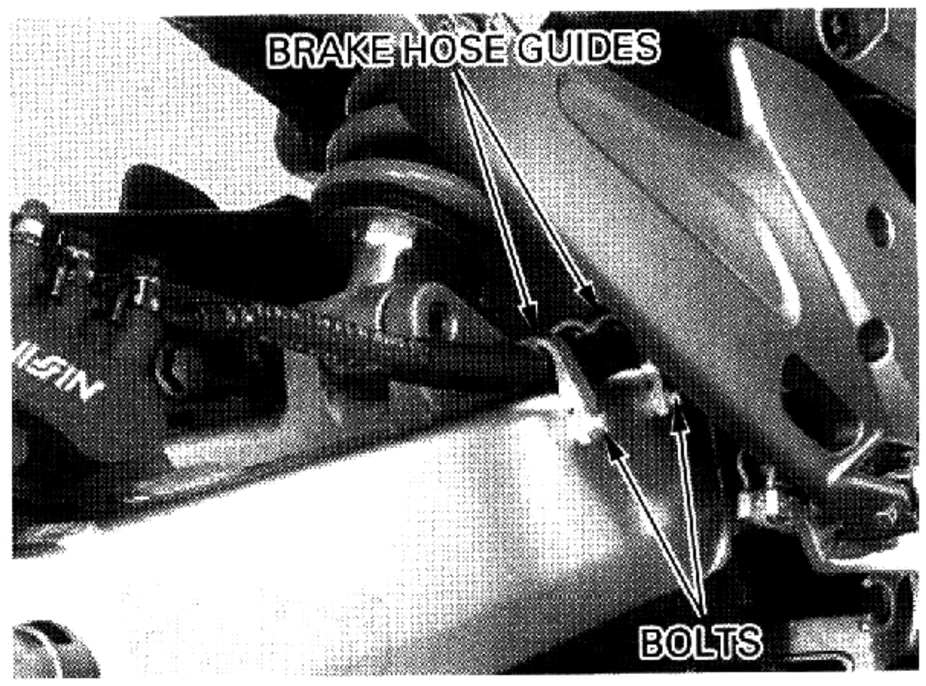
Install and tighten the rear shock absorber lower mounting bolt/nut to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m , 31 lbf·ft)

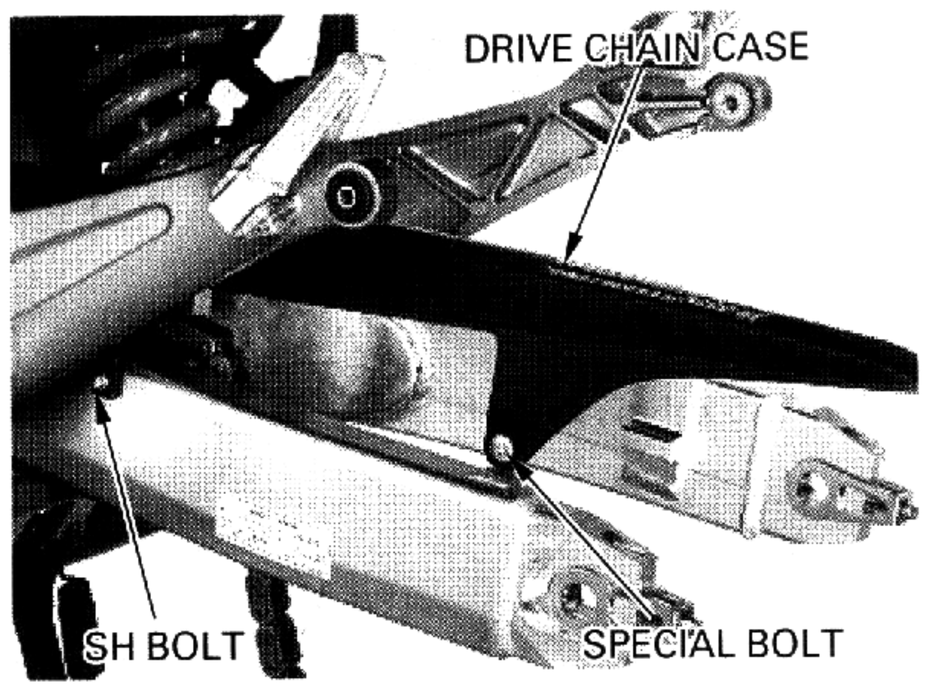


Route the brake hose properly, tighten the brake hose guide bolts to the specified torque.

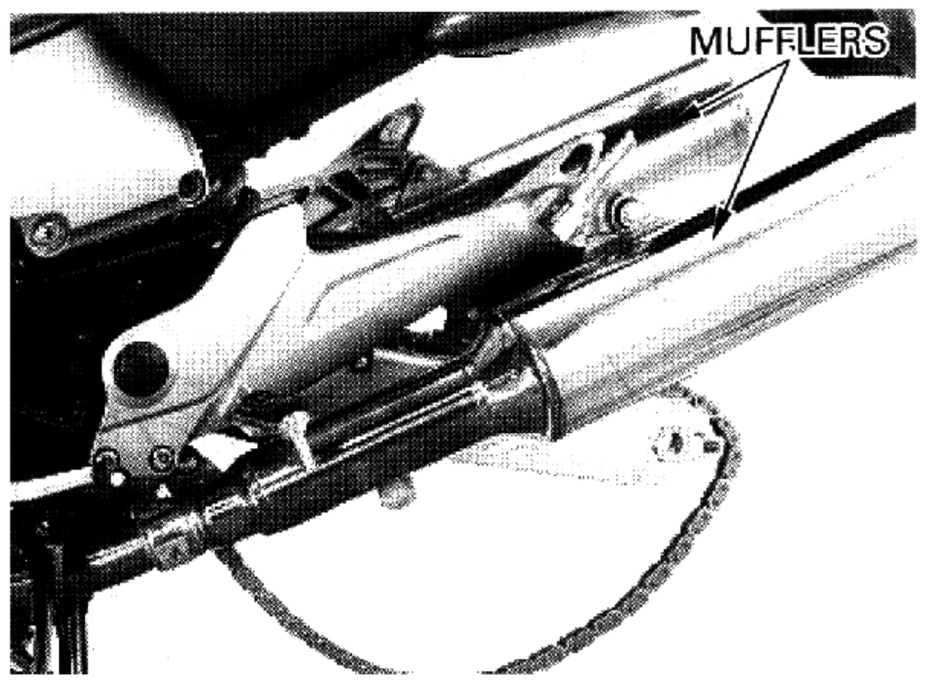
TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



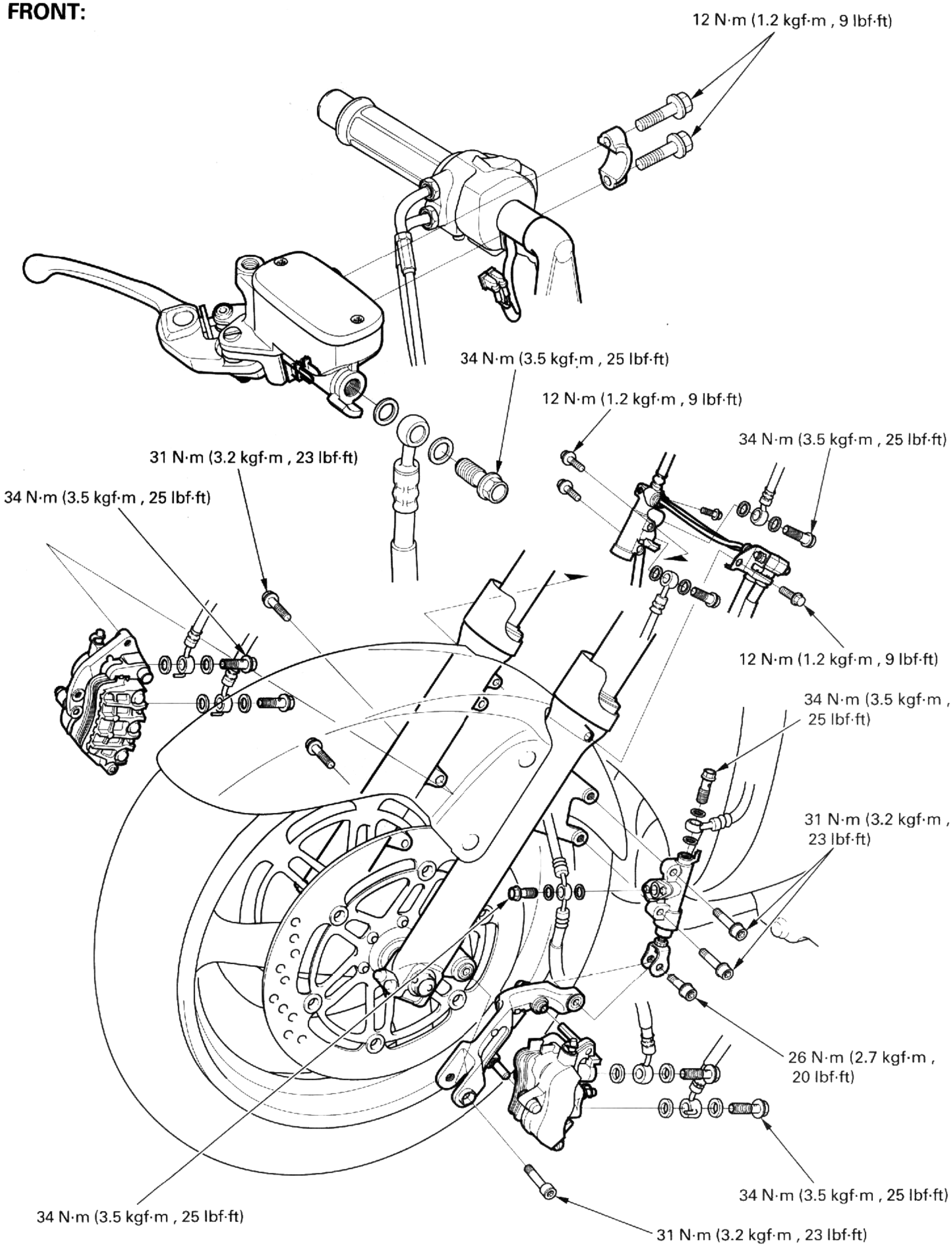
Install the drive chain case and tighten the SH bolt and special bolt.



Install the following:
- Muffler (page 2-13)
- Rear wheel (page 14-8)



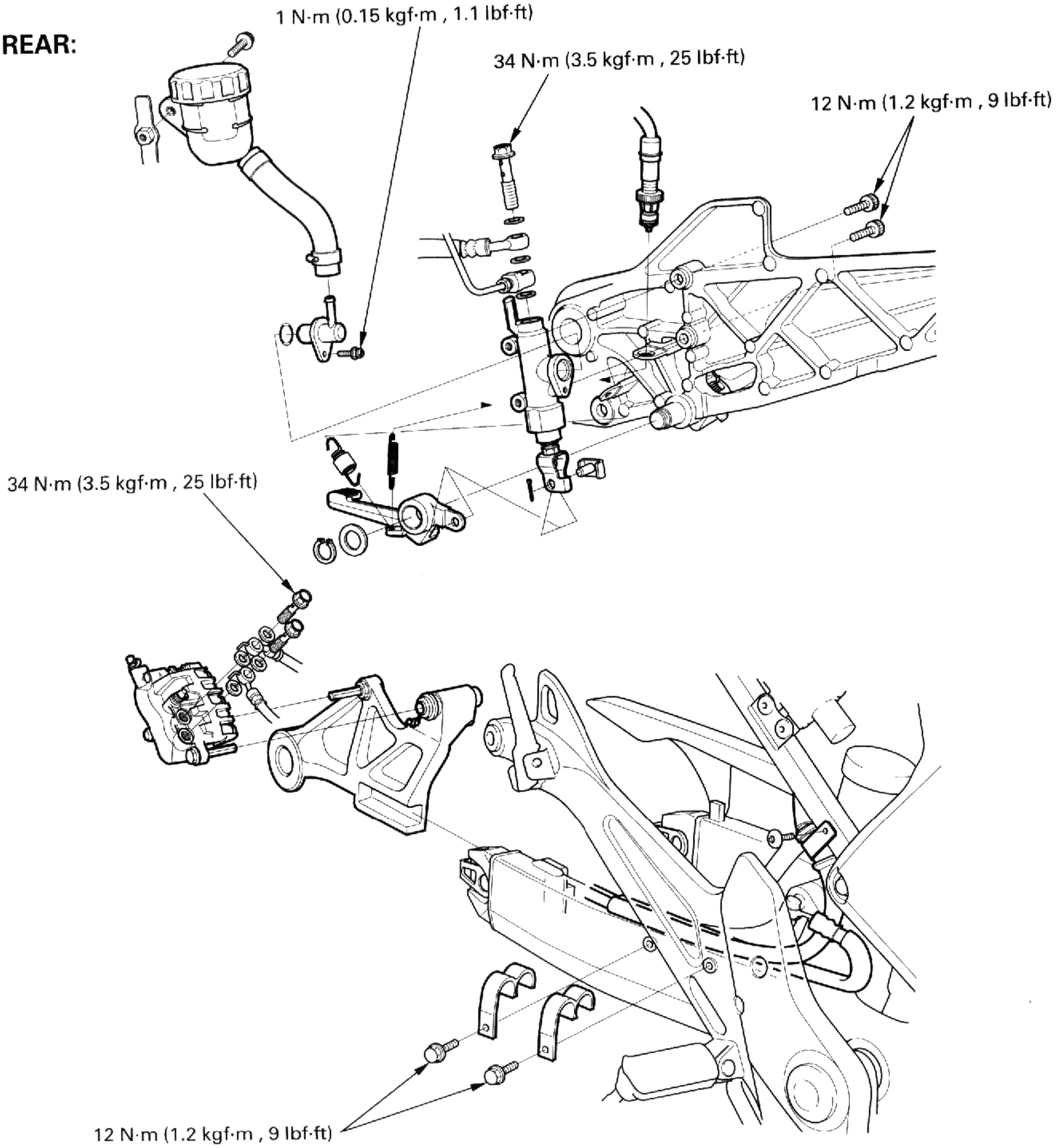
FRONT:


12 N·m (1.2 kgf·m , 9 lbf·ft)
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)
31 N·m (3.2 kgf·m , 23 lbf·ft)
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)
31 N·m (3.2 kgf·m , 23 lbf·ft)
26 N·m (2.7 kgf·m , 20 lbf·ft)
34 N·m (3.5 kgf·m , 25 lbf·ft)
34 N·m (3.5 kgf·m , 25 lbf·ft)
31 N·m (3.2 kgf·m , 23 lbf·ft)

15. HYDRAULIC BRAKE

SERVICE INFORMATION	15-2	REAR MASTER CYLINDER	15-23
TROUBLESHOOTING	15-4	PROPORTIONAL CONTROL VALVE	15-28
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15-5	DELAY VALVE	15-28
BRAKE PAD/DISC	15-12	FRONT BRAKE CALIPER	15-29
FRONT MASTER CYLINDER	15-16	REAR BRAKE CALIPER	15-35
SECONDARY MASTER CYLINDER	15-20	BRAKE PEDAL	15-39

REAR:



SERVICE INFORMATION

GENERAL

⚠WARNING

- *A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*
- *Check the brake system by applying the brake lever and pedal after the air bleeding.*

CAUTION:

- *This model equipped with a Dual Combined Brake System. Must be follow the system air bleeding procedure (page 15-5) if you disconnect or service any part of the brake hydraulic system.*
- *Do not disassemble the secondary master cylinder push rod or the correct brake performance will not be obtained.*

- Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the front reservoir is horizontal first.
- Never allow contaminates (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid they may not be compatible.
- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT
Front	Specified brake fluid			DOT 4	———
	Brake disc thickness			4.5 (0.18)	3.5 (0.14)
	Brake disc runout			———	0.30 (0.012)
	Master cylinder I.D.			12.700 – 12.743 (0.5000 – 0.5017)	12.76 (0.502)
	Master piston O.D.			12.657 – 12.684 (0.4983 – 0.4994)	12.65 (0.498)
	Secondary master cylinder I.D.			14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Secondary master piston O.D.			13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
	Caliper cylinder I.D.	Right	Upper	27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)
			Middle	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
			Lower	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
		Left	Upper	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
			Middle	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
			Lower	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
	Caliper piston O.D.	Right	Upper	26.916 – 26.968 (1.0597 – 1.0617)	26.910 (1.0594)
			Middle	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
			Lower	25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)
		Left	Upper	25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)
			Middle	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
			Lower	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Rear	Specified brake fluid		DOT 4	— — —
	Brake pedal height		65 (2.6)	— — —
	Brake disc thickness		5.0 (0.20)	4.0 (0.16)
	Brake disc runout		— — —	0.30 (0.012)
	Master cylinder I.D.		17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)
	Master piston O.D.		17.417 – 17.444 (0.6857 – 0.6868)	17.405 (0.6852)
	Caliper cylinder I.D.	Front	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
		Center	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
		Rear	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
	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)

TORQUE VALUES

Front brake master cylinder holder bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Front brake master cylinder cap screw	1 N·m (0.15 kgf·m , 1.1 lbf·ft)	
Brake lever pivot bolt	1 N·m (0.1 kgf·m , 0.7 lbf·ft)	
Brake lever pivot nut	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Brake lever adjuster	4 N·m (0.4 kgf·m , 2.9 lbf·ft)	
Front brake switch screw	1 N·m (0.12 kgf·m , 0.9 lbf·ft)	
Right front brake caliper mounting bolt	31 N·m (3.2 kgf·m , 23 lbf·ft)	ALOC bolt
Left front brake caliper pivot bolt	31 N·m (3.2 kgf·m , 23 lbf·ft)	ALOC bolt
Left front brake caliper bolt (secondary master joint)	26 N·m (2.7 kgf·m , 20 lbf·ft)	ALOC bolt
Caliper body B bolt	32 N·m (3.3 kgf·m , 24 lbf·ft)	ALOC bolt
Front brake caliper slide pin (main)	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply a locking agent to the threads
Front brake caliper slide pin (sub)	13 N·m (1.3 kgf·m , 9 lbf·ft)	Apply a locking agent to the threads
Pad pin	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Brake caliper bleeder	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Secondary master cylinder mounting bolt	31 N·m (3.2 kgf·m , 23 lbf·ft)	ALOC bolt
Secondary master cylinder push rod nut	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Secondary master cylinder connector	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Rear master cylinder mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Rear master cylinder reservoir mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Rear master cylinder push rod nut	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Rear master cylinder hose joint screw	1 N·m (0.15 kgf·m , 1.1 lbf·ft)	Apply a locking agent to the threads
Brake hose oil bolt	34 N·m (3.5 kgf·m , 25 lbf·ft)	
Brake pipe joint	17 N·m (1.7 kgf·m , 12 lbf·ft)	Apply oil to the threads
Brake pipe 2/3 way joint	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Brake hose guide bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Delay valve mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
PCV (Proportional Control Valve) mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Right brake hose clamp bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	

TOOL

Snap ring pliers	07914-SA50001 or 07914-3230001

TROUBLESHOOTING

Brake lever/pedal soft or spongy
- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever/pedal

Above items are normal but the brake system still has poor performance, check for nose dive during braking. If the nose dive excessive, check for secondary master cylinder hydraulic system.

Brake lever/pedal hard
- Clogged/restricted brake system
- Sticking/worn caliper piston
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

Brake drags
- Contaminated brake pad/disc
- Misaligned wheel
- Clogged/restricted brake hose joint
- Warped/deformed brake disc
- Caliper not sliding properly
- Improper secondary master cylinder installed length
- Clogged/restricted brake hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port

Rear wheel locks when only the brake lever is applied/ Front wheel locks when only the brake pedal is applied (In the case that all items are normal in "Poor lever/pedal brake performance")
- Improper secondary master cylinder push rod installed length
- Faulty proportional control valve (PCV)

BRAKE FLUID REPLACEMENT/ AIR BLEEDING

⚠WARNING

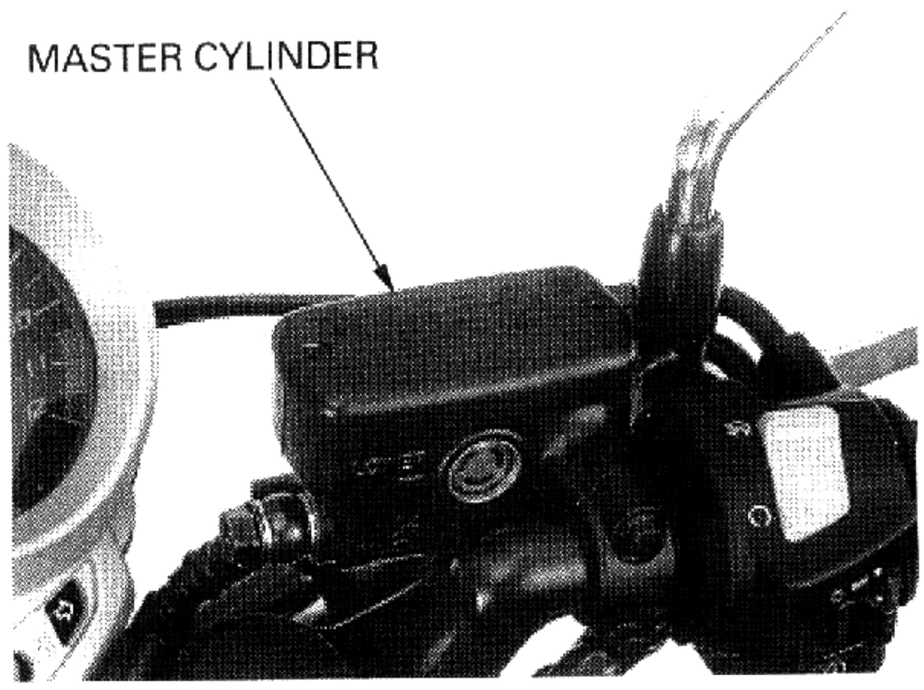
A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

CAUTION:

- ***Do not allow foreign material to enter the system when filling the reservoir.***
- ***Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.***

NOTE:

- The lever brake line air bleeding procedure is performed in the same manner as in the ordinal air bleeding procedure.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- When using a commercially available brake bleeder, follow the manufacturer's operating instructions.



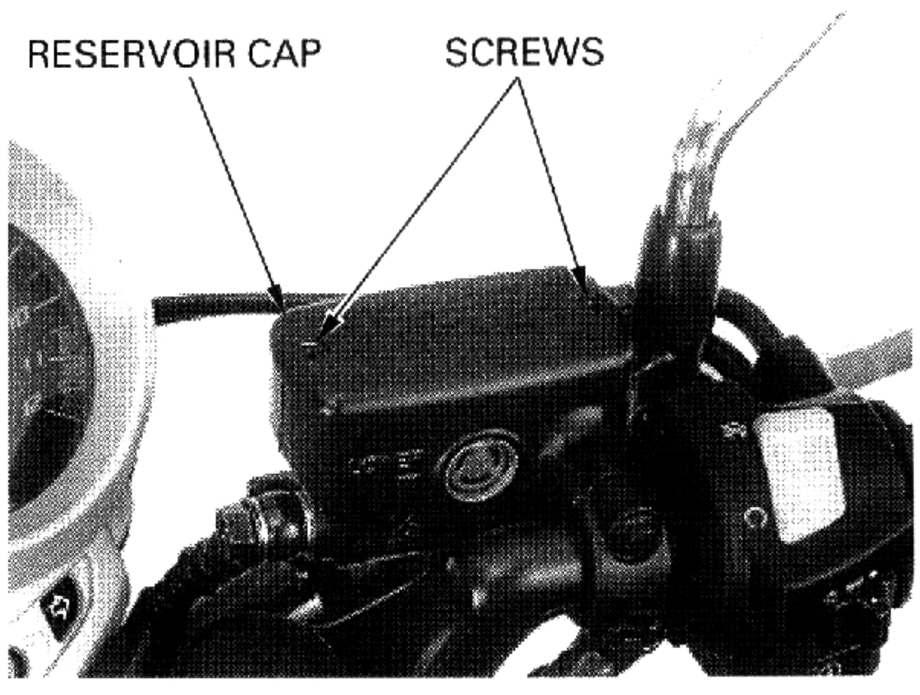
BRAKE FLUID DRAINING

Lever brake line

Support the motorcycle on its center stand.

Turn the handlebar to the left until the reservoir is parallel to the ground, before removing the reservoir cap.

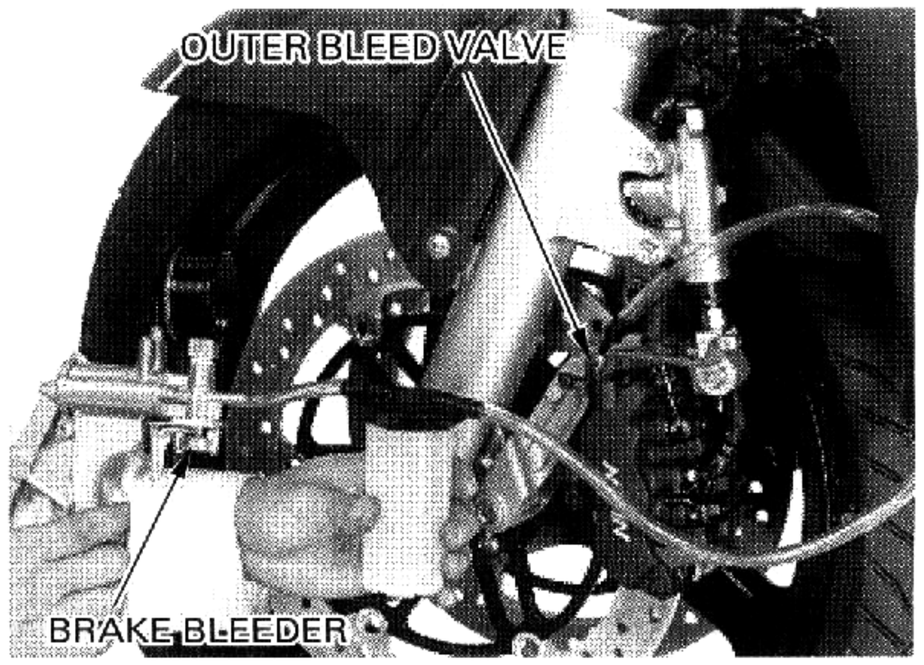
Remove the screws, reservoir cap, set plate and diaphragm.



Connect a commercially available brake bleeder to the front brake caliper outer bleed valve.

Loosen the bleed valve and pump the brake bleeder.

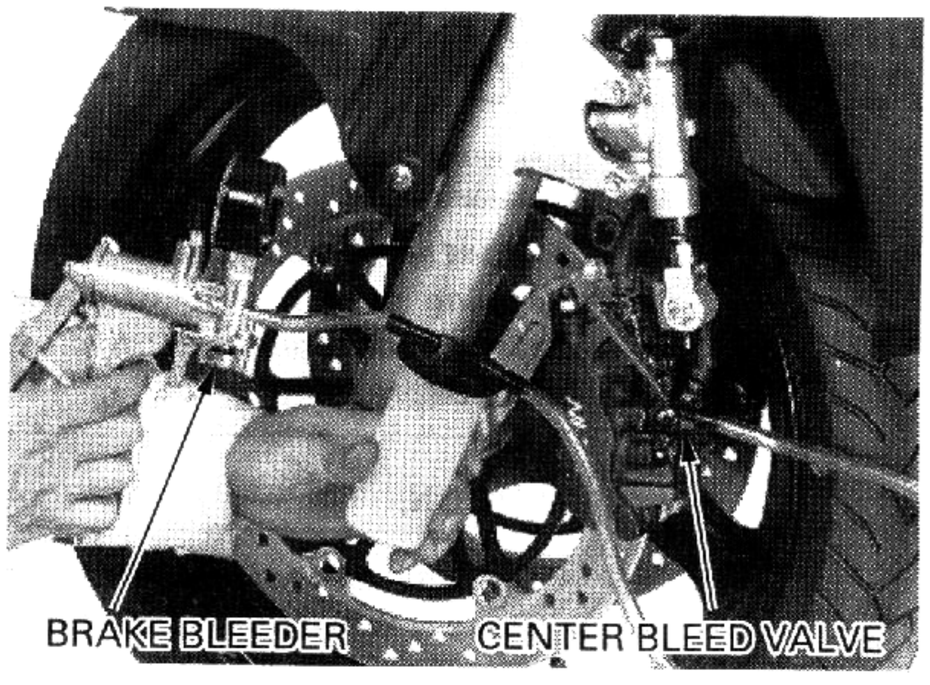
Stop pumping the bleeder when no more fluid flows out of the bleed valve.



Pedal brake line

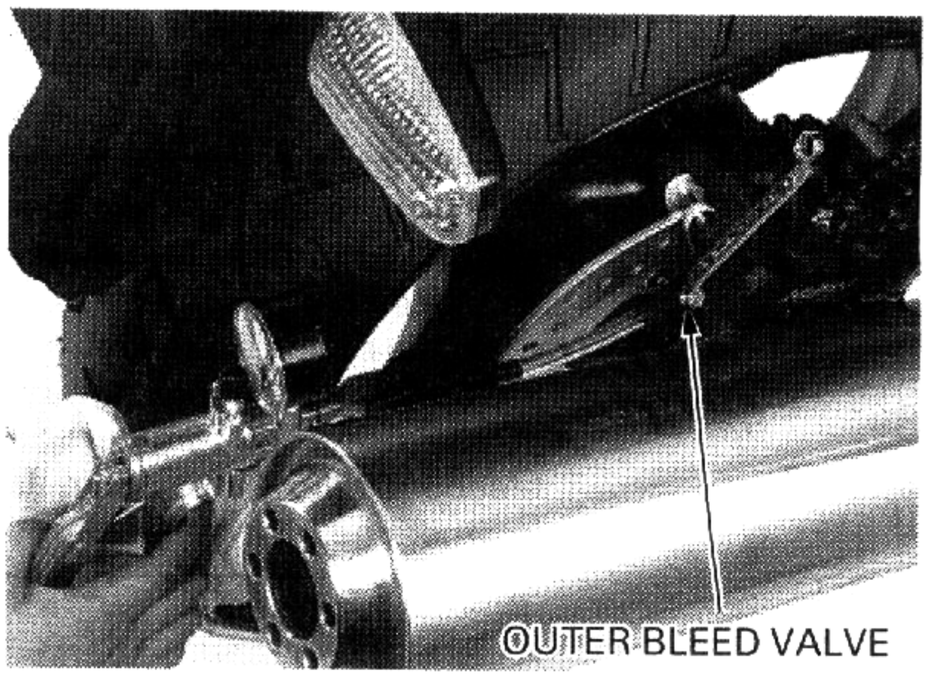
Connect a commercially available brake bleeder to the front brake caliper center bleed valve.

Loosen the bleed valve and pump the brake bleeder.
Stop pumping the bleeder when no more fluid flows out of the bleed valve.



Connect a commercially available brake bleeder to the rear brake caliper outer bleed valve.

Loosen the bleed valve and pump the brake bleeder.
Stop pumping the bleeder when no more fluid flows out of the bleed valve.



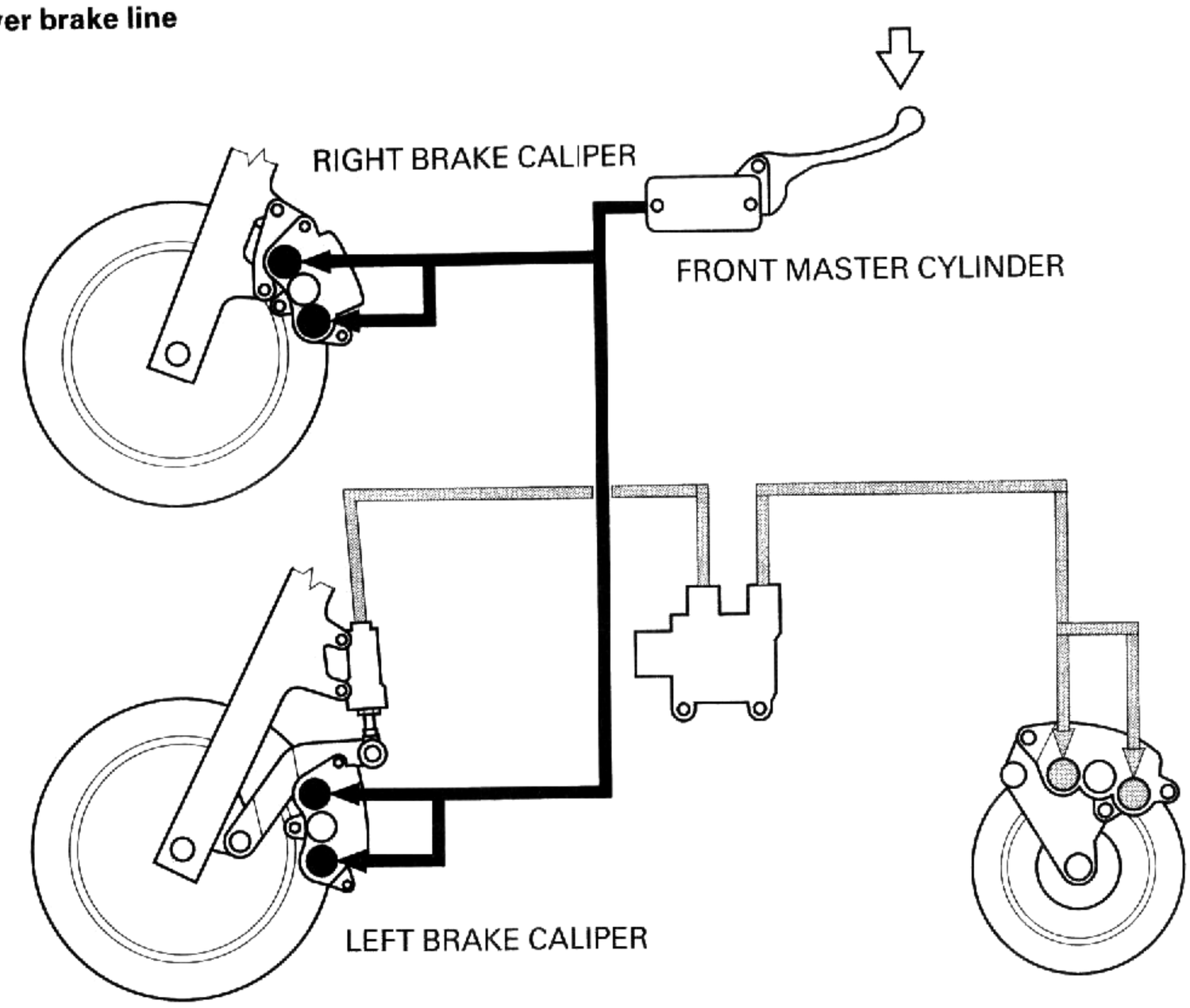
Connect a commercially available brake bleeder to the rear brake caliper center bleed valve.

Loosen the bleed valve and pump the brake bleeder.
Stop pumping the bleeder when no more fluid flows out of the bleed valve.



BRAKE FLUID FILLING/AIR BLEEDING

Lever brake line

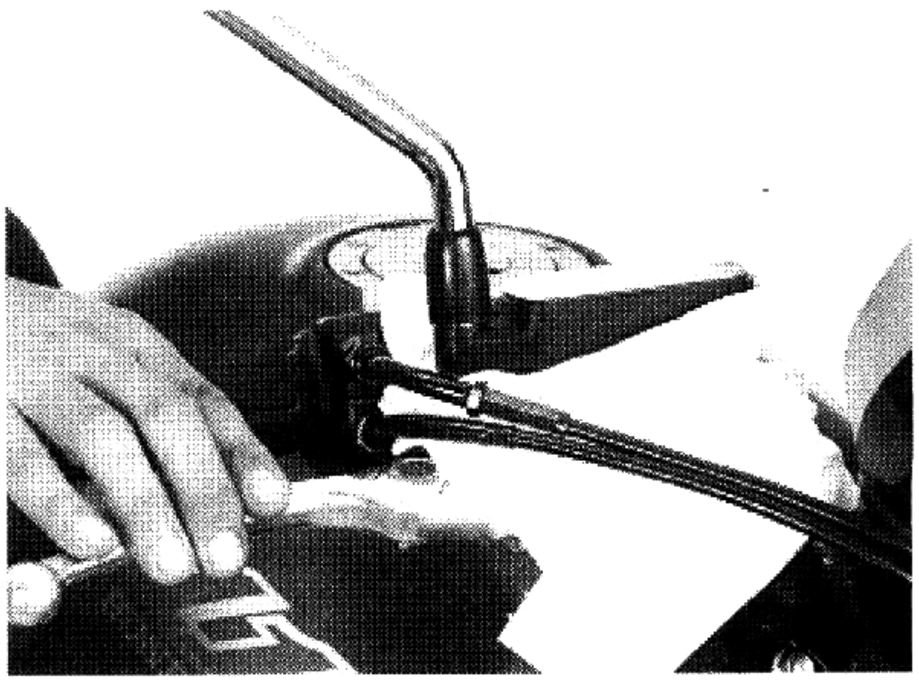


Fill the reservoir with DOT 4 brake fluid from a sealed container.

CAUTION:

- ***Use only DOT 4 brake fluid from a sealed container.***
- ***Do not mix different types of fluid. They are not compatible.***

Operate the brake lever several times to bleed air from the master cylinder.



Connect a commercially available brake bleeder to the outer bleed valve.
Pump the brake bleeder and loosen the bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

NOTE:

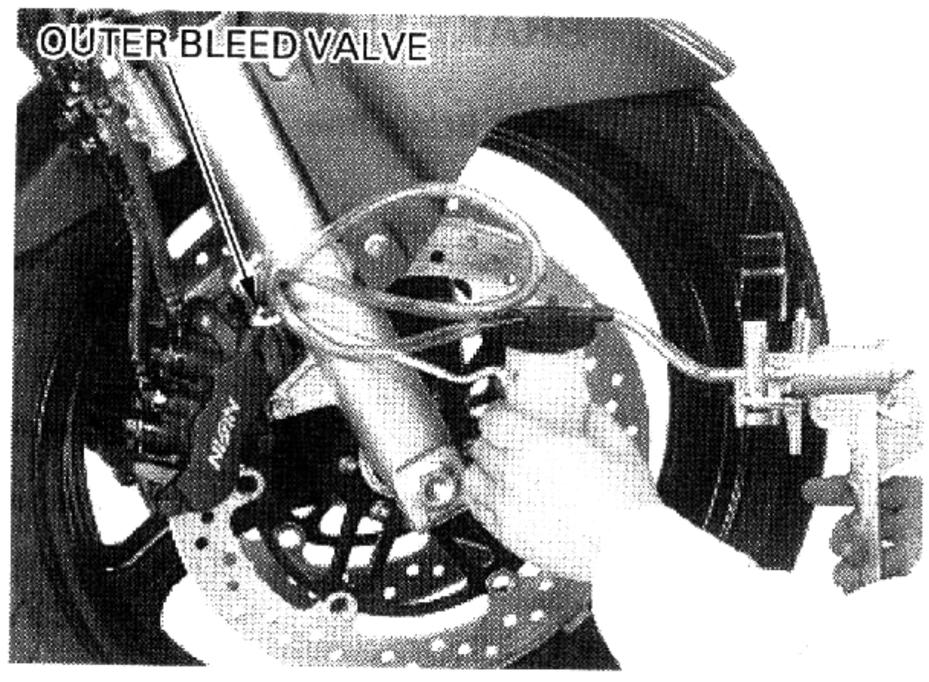
- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Repeat the above step procedures until air bubbles do not appear in the plastic hose.

Close the bleed valve.
Operate the brake lever and check brake operation.
If it still feels spongy, bleed the lever system again.



If a brake bleeder is not available, use the following procedure:
Connect a transparent bleed hose to the bleed valve and place the outer end of the hose in a container.
Loosen the bleed valve 1/4 turn and pump the brake lever until the brake fluid flows out from the bleed valve.

1. Pump the brake lever several times, then squeeze the brake lever all the way and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.

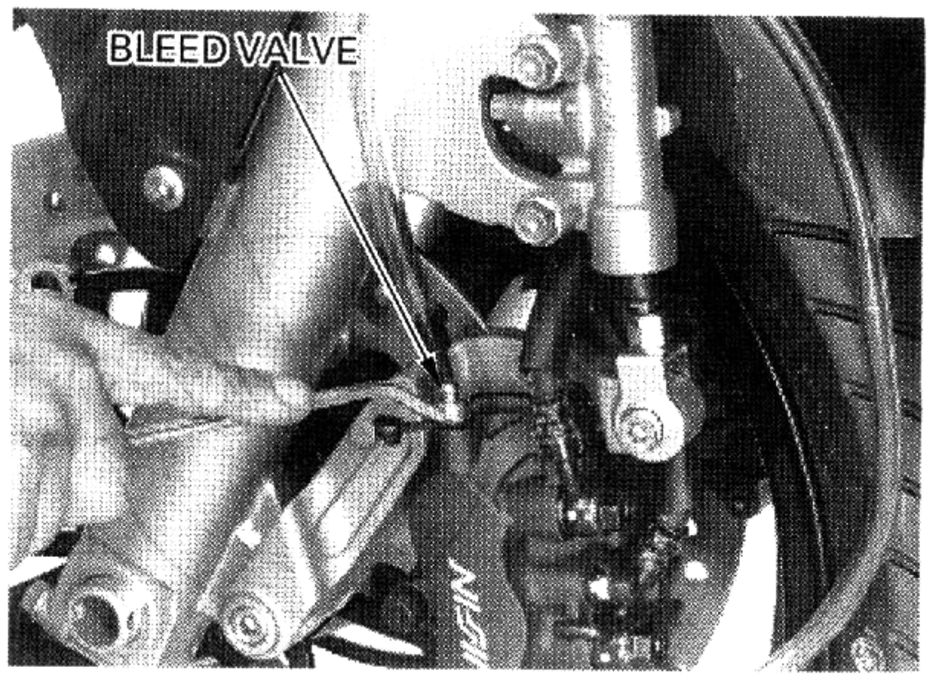
NOTE:

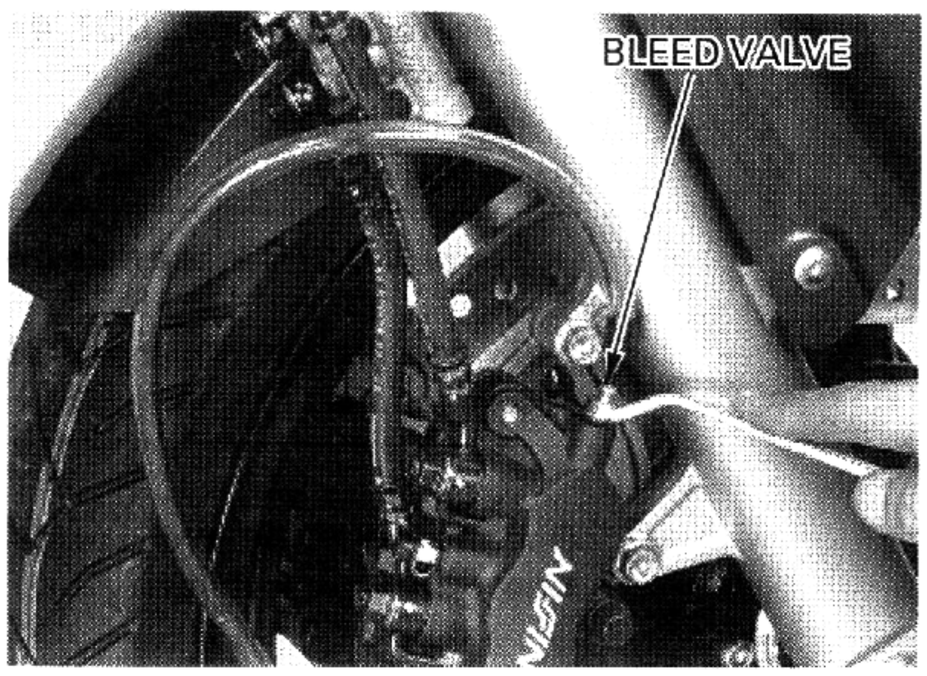
Do not release the brake lever until the bleed valve has been closed.

2. Release the brake lever slowly until the bleed valve has been closed.
3. Repeat the steps 1−2 until there are no air bubbles in the bleed hose.

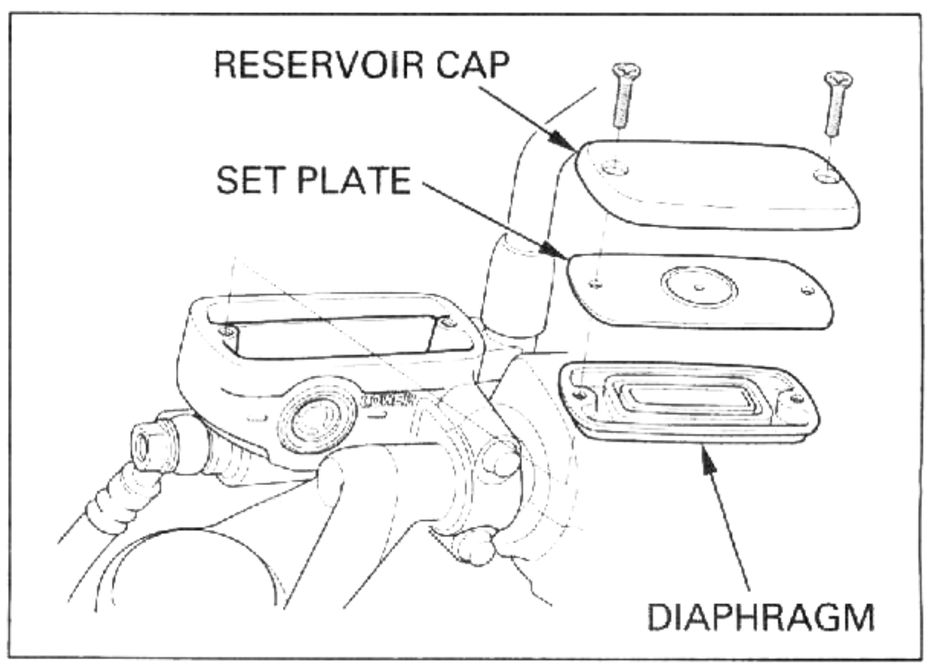
After bleeding air completely and tighten the bleed valves to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m , 4.3 lbf·ft)





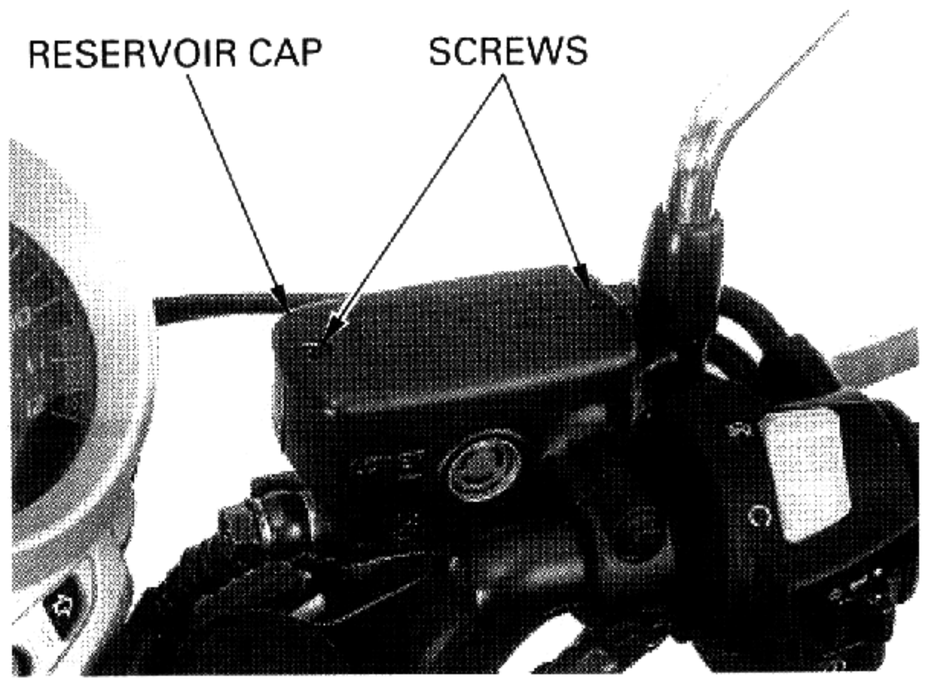
Fill the reservoir to the casting ledge with DOT 4 brake fluid from a sealed container.
Install the diaphragm, set plate and reservoir cap.



Tighten the reservoir cap screws to the specified torque.

TORQUE: 1 N·m (0.15 kgf·m , 1.1 lbf·ft)

Check the front brake operation (page 3-26).



Pedal brake line

NOTE:

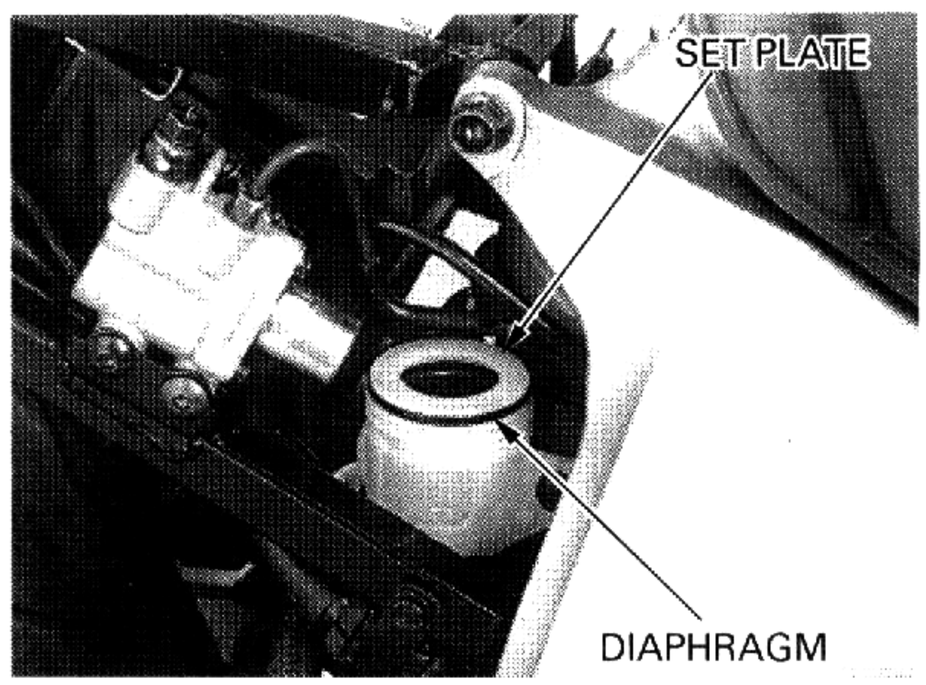
- Before performing this service, prepare the brake fluid 500 cm^3 (16.9 US oz, 14.1 Imp oz) or more, because the brake line is long.
- Fluid filling and bleed air from the brake pedal line in the sequence as follow:
  1. Right front caliper center bleed valve
  2. Left front caliper center bleed valve
  3. Rear caliper center bleed valve
  4. Rear caliper outer bleed valve



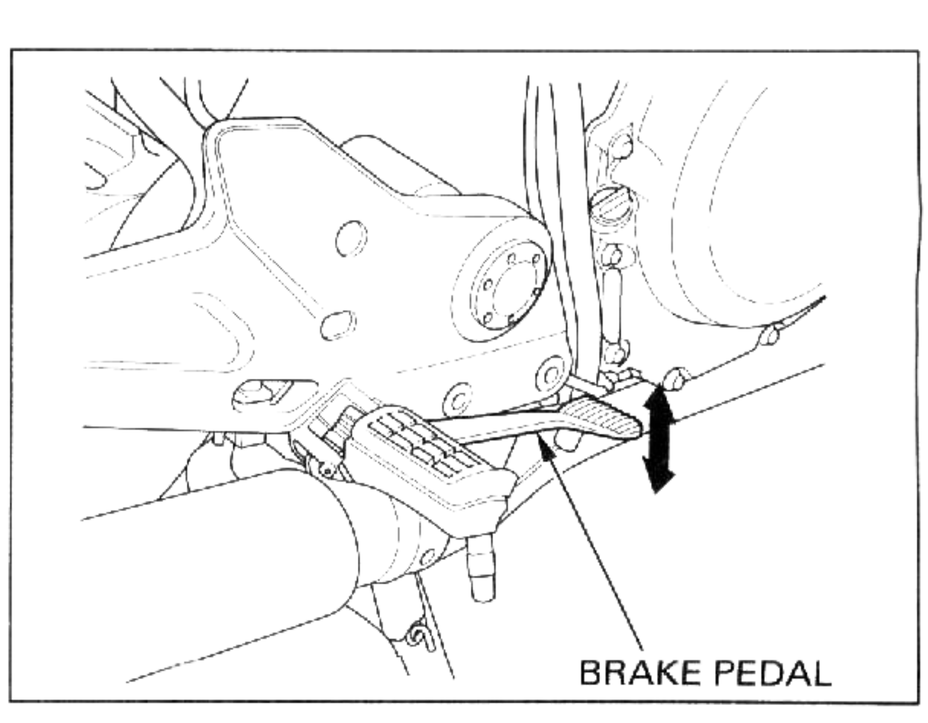
Remove the seat (page 2-2).

Remove the reservoir cap, set plate and diaphragm.

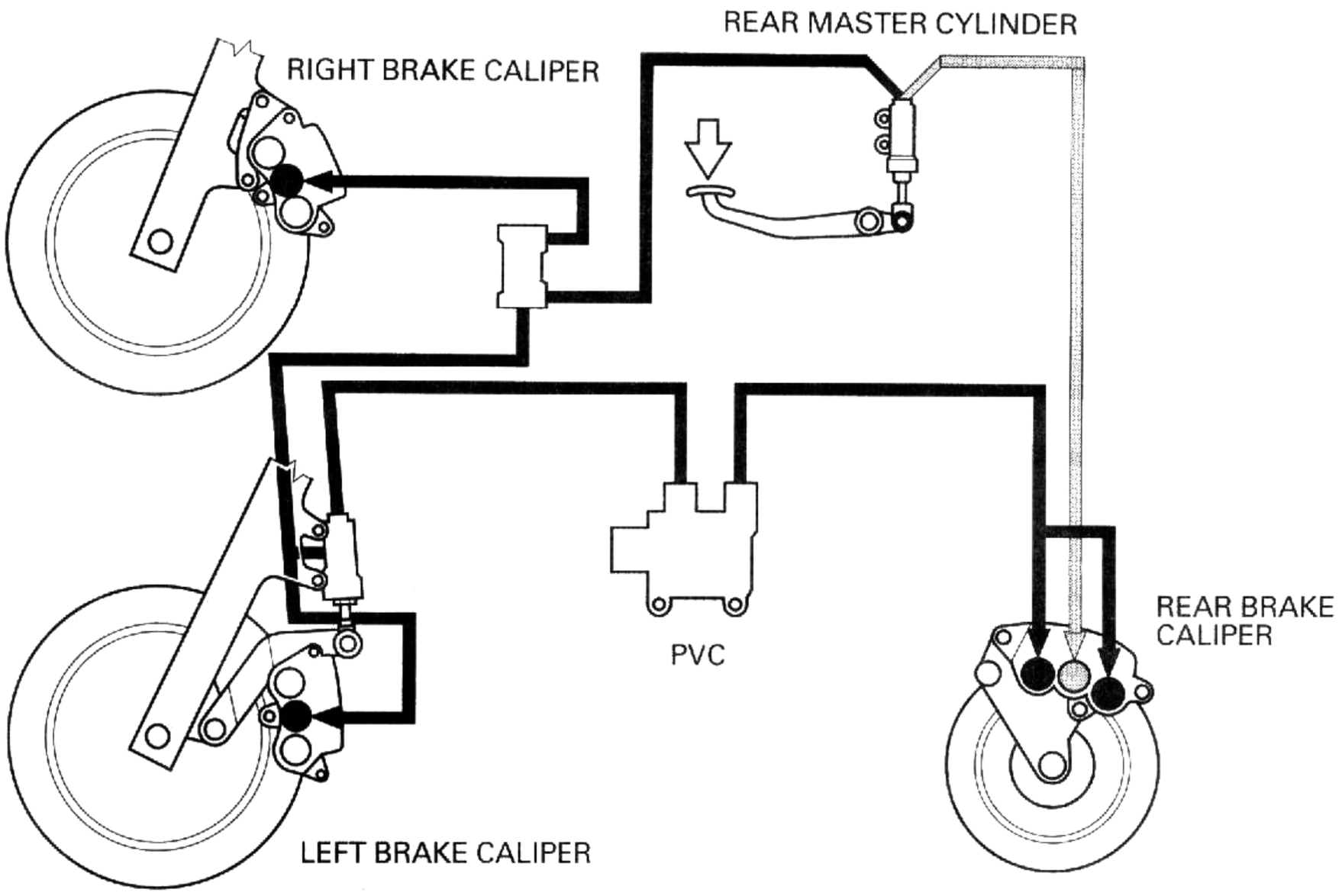
Fill the reservoir with DOT 4 brake fluid.



Pump the brake pedal while filling the brake fluid and feed fluid into the master cylinder.

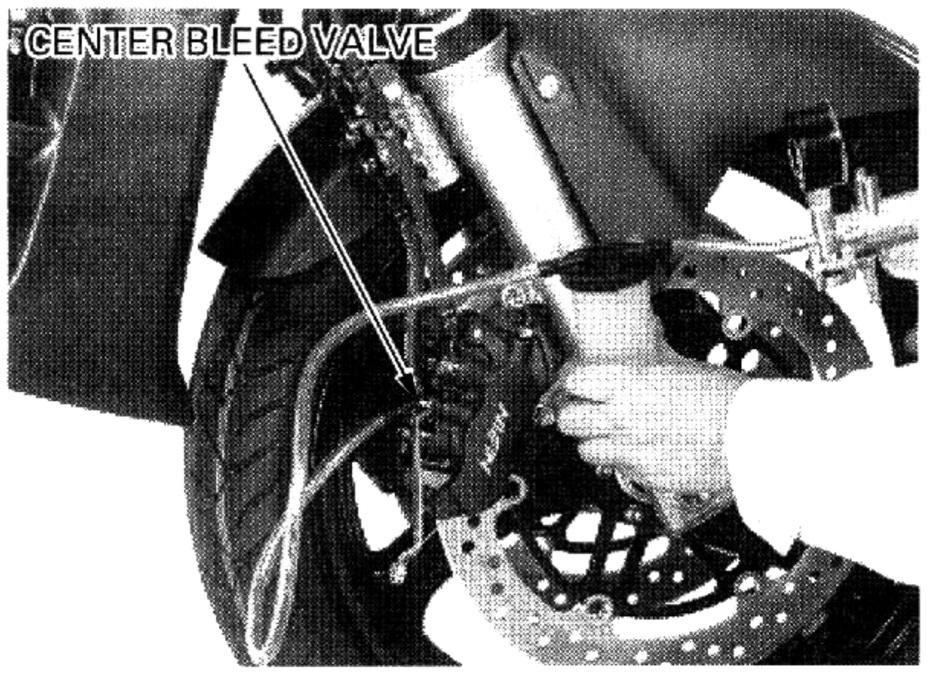


Rear master cylinder to front brake caliper lines:

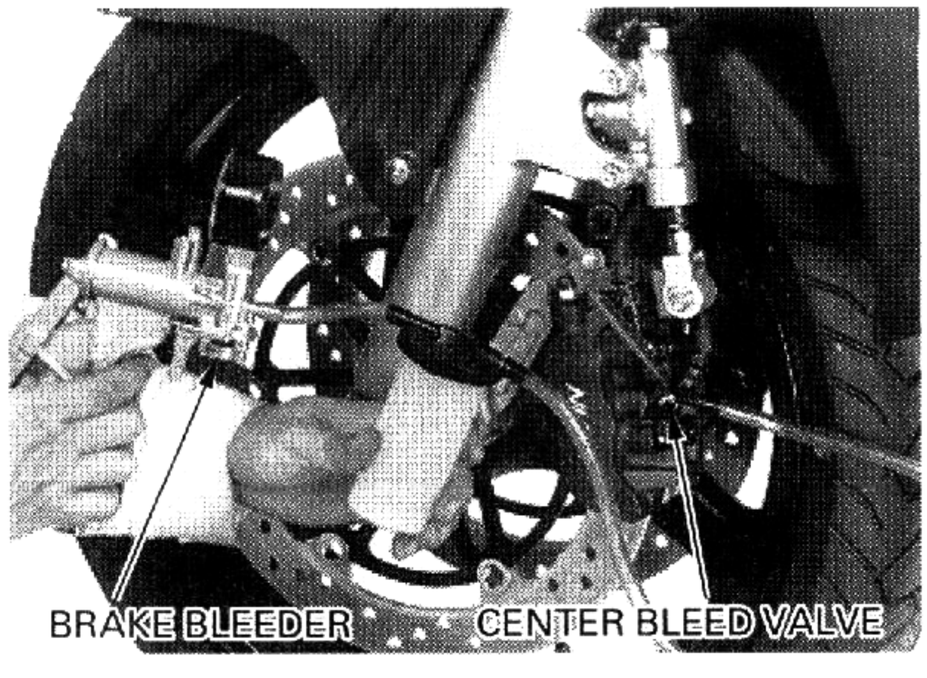


When using a brake bleeder, follow the manufacturer's operating instructions.

1. Connect a commercially available brake bleeder to the right front brake caliper center bleed valve. Pump the brake bleeder and loosen the bleed valve.
   Operate the brake bleeder and feed the brake fluid until fluid flow out from the bleeder valve.
   Close the bleeder valve.



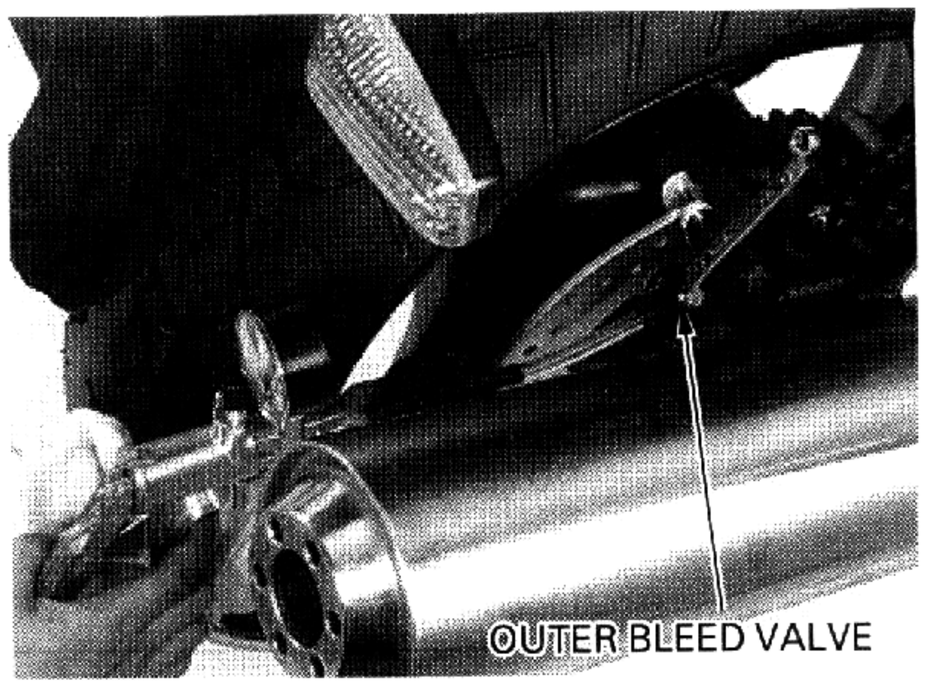
2. Feed the brake fluid at the left front brake caliper center bleeder valve as same procedure in step 1.



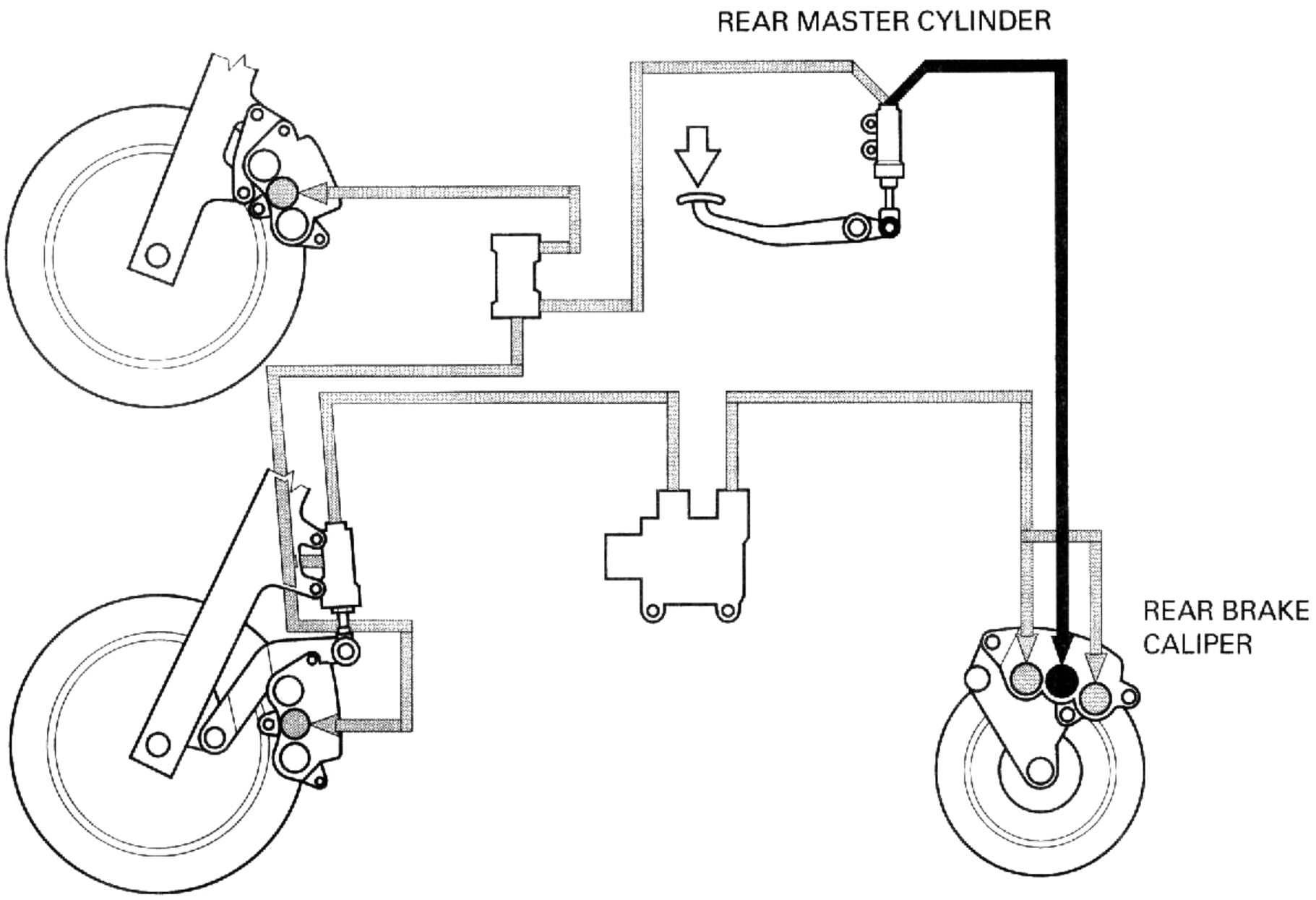
Secondary master cylinder to rear brake caliper line:

3. Feed the brake fluid at the rear brake caliper outer bleeder valve as same procedure in step 1.

4. Repeat step 1-7 until the pedal resistance is felt.

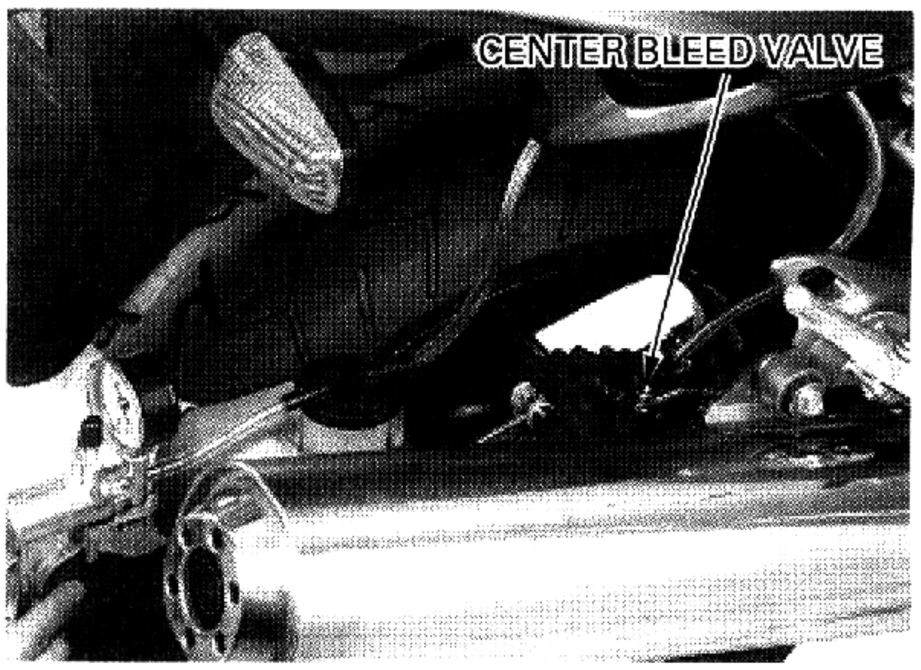


Rear master cylinder to rear brake caliper line:



5. Feed the brake fluid at the rear brake caliper center bleeder valve as same procedure in step 1.

Next bleed the air from the system without using a brake bleeder tool.



Connect the transparent bleeder tube to the bleed valve and place the outer end of the hose in a container.

1. Pump the brake pedal 5-10 times, then release the pedal.
   Loosen the bleed valve, then pushing down the brake pedal all the way.

NOTE:

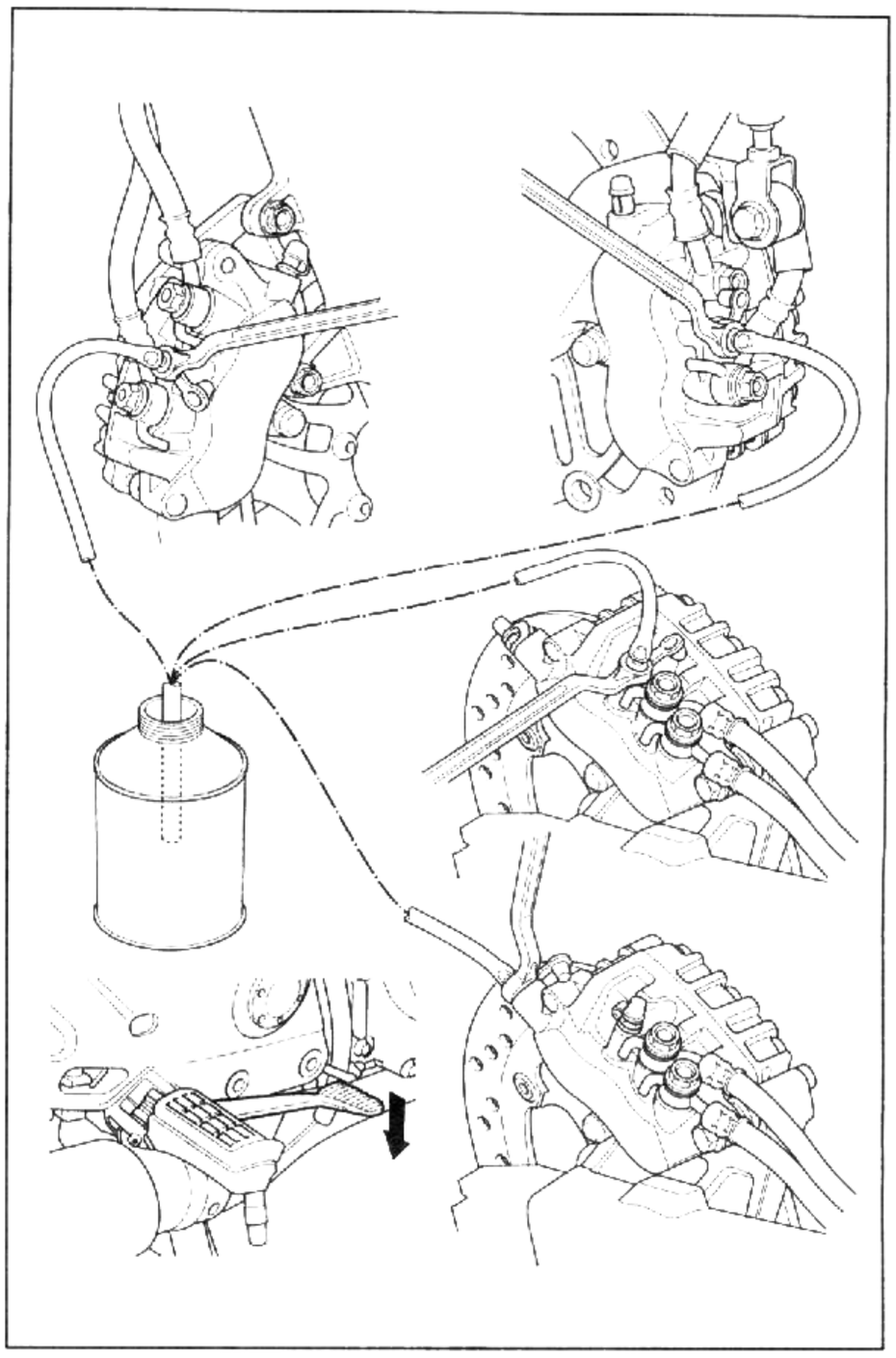
Do not release the brake pedal while opening the bleed valve.

Close the bleed valve.

2. Release the brake pedal slowly and wait several seconds after it reaches the end of its travel.
3. Repeat above step 1 and 2 until bubbles cease to appear in the fluid at the end of the bleed tube and pedal resistance is felt.

NOTE:

- After the bubbles cease to appear in the fluid, repeat air bleeding procedure about 2-3 times.
- Elaborately bleed the air from the rear brake caliper center bleeder valve (from secondary master cylinder-to-PCV-to-rear brake caliper line).



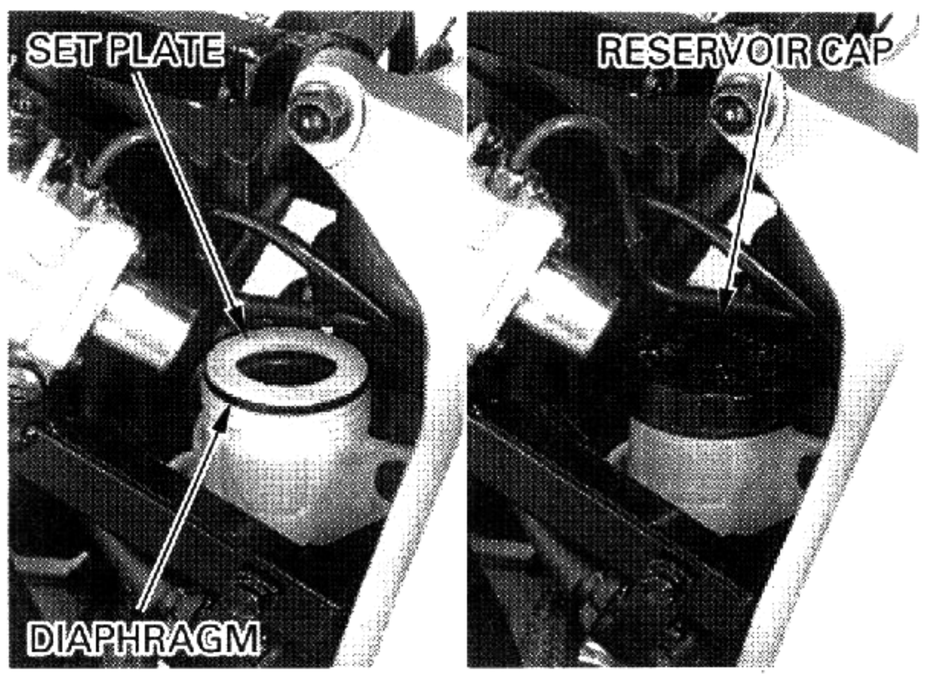
Tighten the each bleed valve to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

Fill the reservoir up to the "UPPER" level.

SPECIFIED BRAKE FLUID: DOT 4 brake fluid

Install the diaphragm, set plate and reservoir cap.



BRAKE PAD/DISC

FRONT BRAKE PAD REPLACEMENT

⚠WARNING

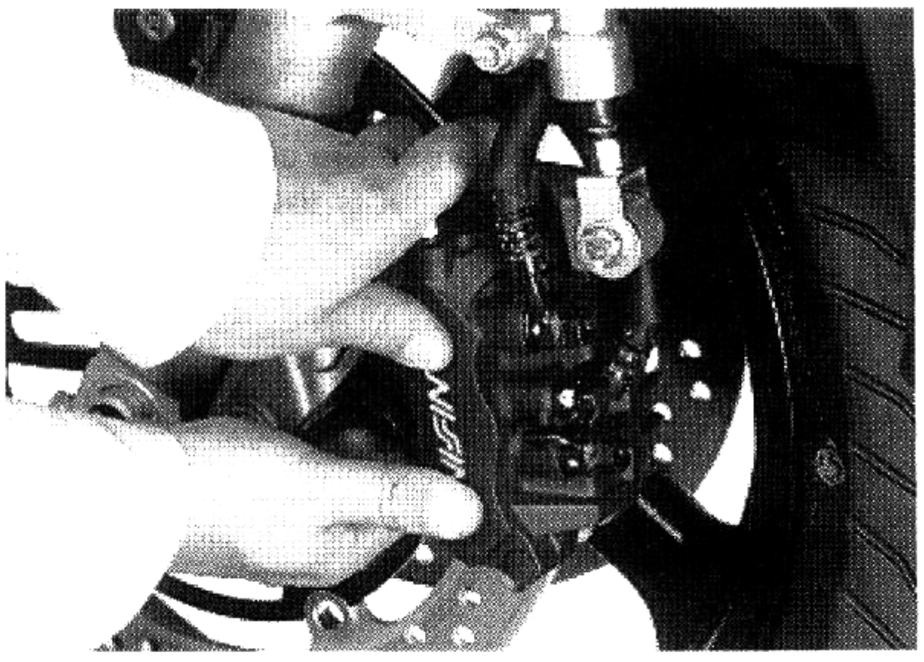
After the brake pad replacement, check the brake operation by applying the brake lever and pedal.

Always replace the brake pads in pairs to assure even disc pressure.

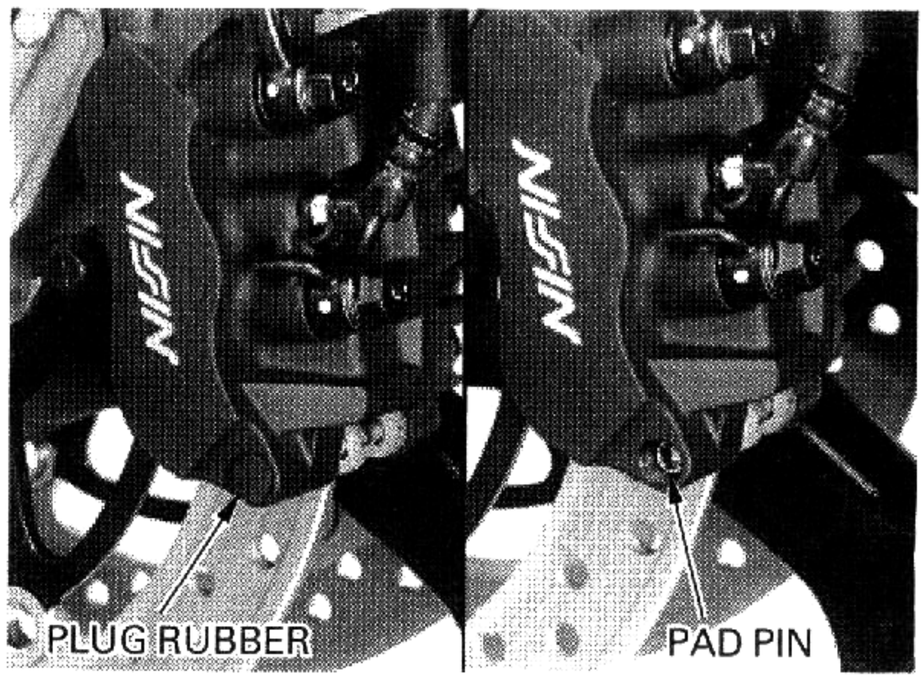
Push the caliper pistons all the way in to allow installation of new brake pads.

NOTE:

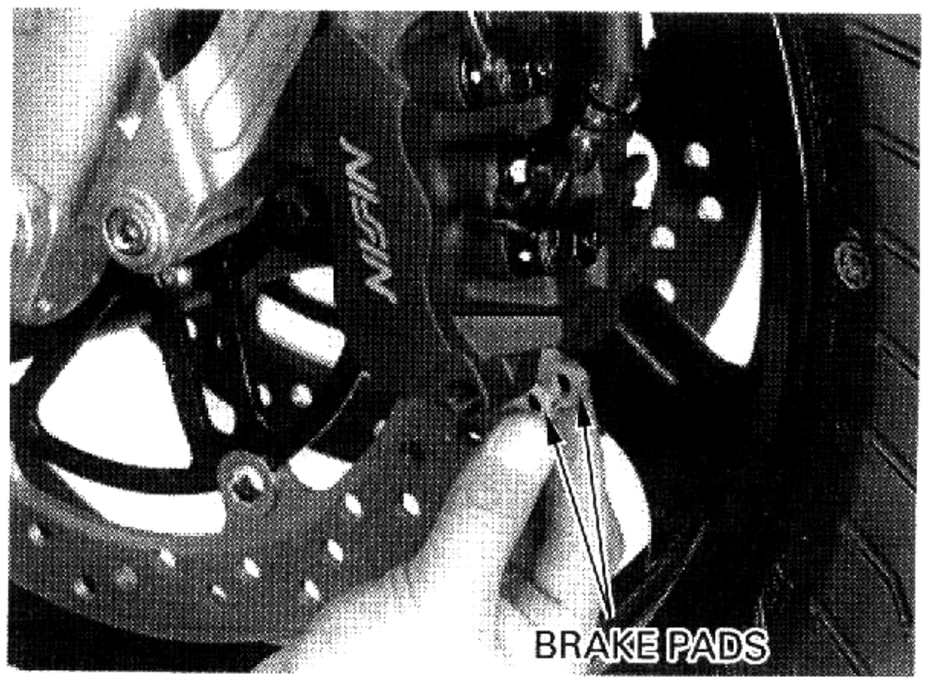
Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.



Remove the pad pin plug rubber and loosen the pad pin.

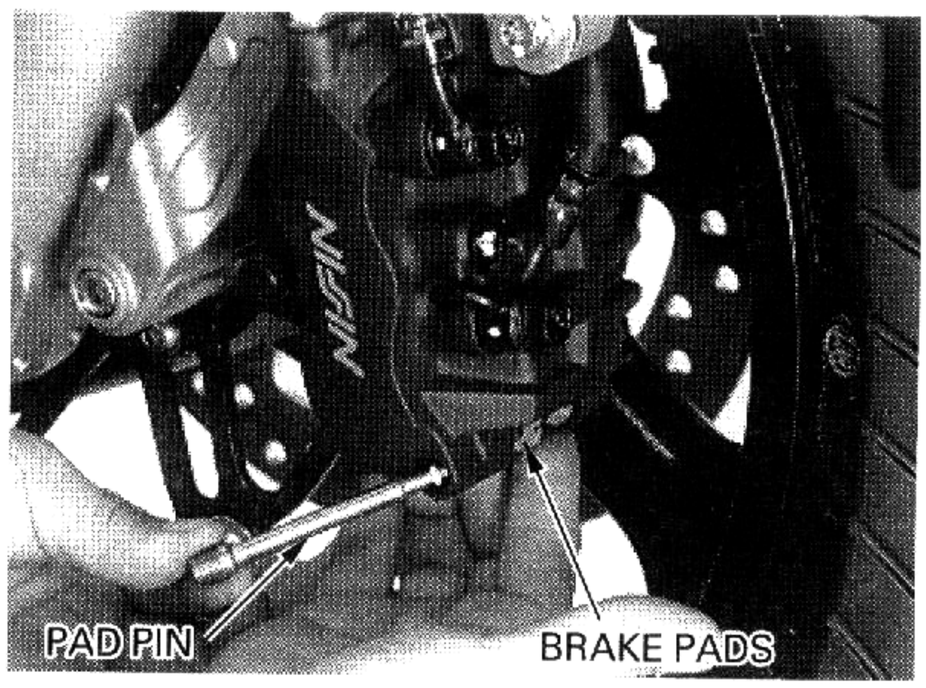


Remove the pad pin and brake pads.



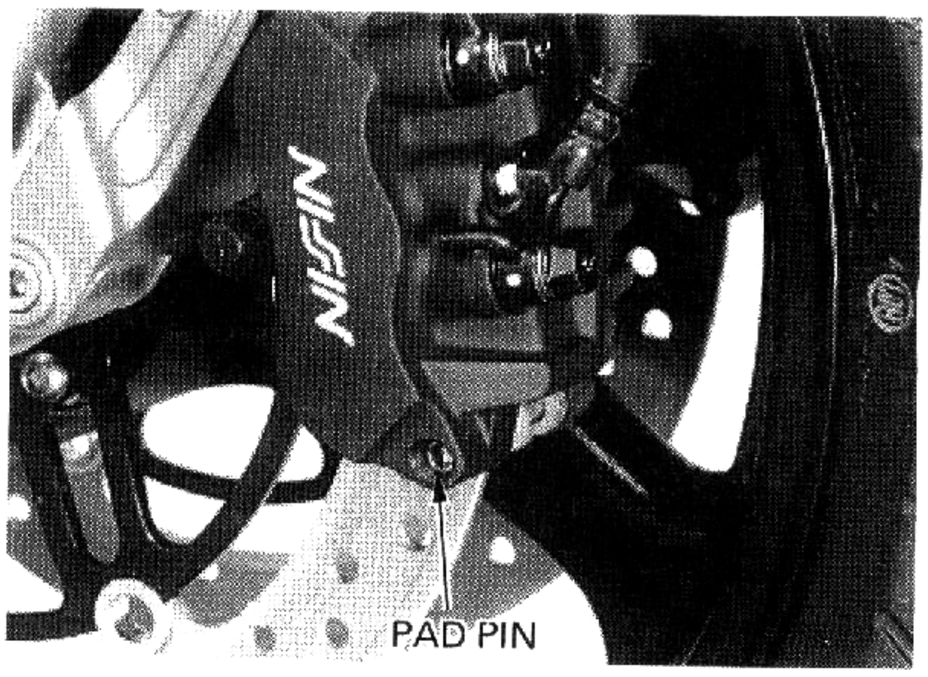
Clean the inside of the caliper especially around the caliper pistons.

Make sure the brake pad spring is in place.
Install the new brake pads.
Push the brake pads against the pad spring, then install the pad pin.

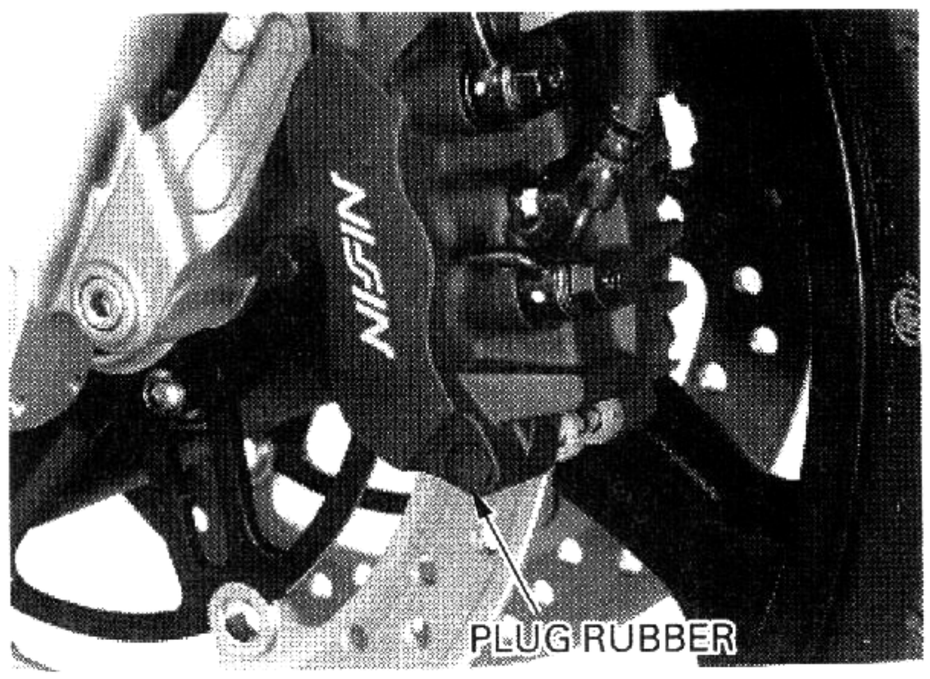


Tighten the pad pin to the specified torque.

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



Install the pad pin plug rubber.



REAR BRAKE PAD REPLACEMENT

⚠WARNING

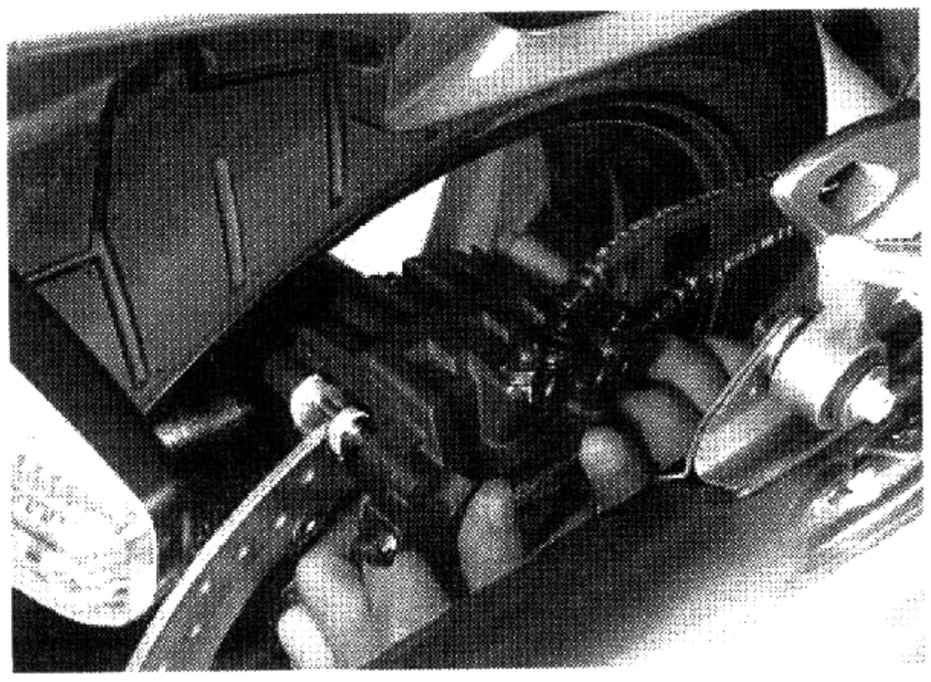
After the brake pad replacement, check the brake operation by applying the brake lever and pedal.

Always replace the brake pads in pairs to assure even disc pressure.

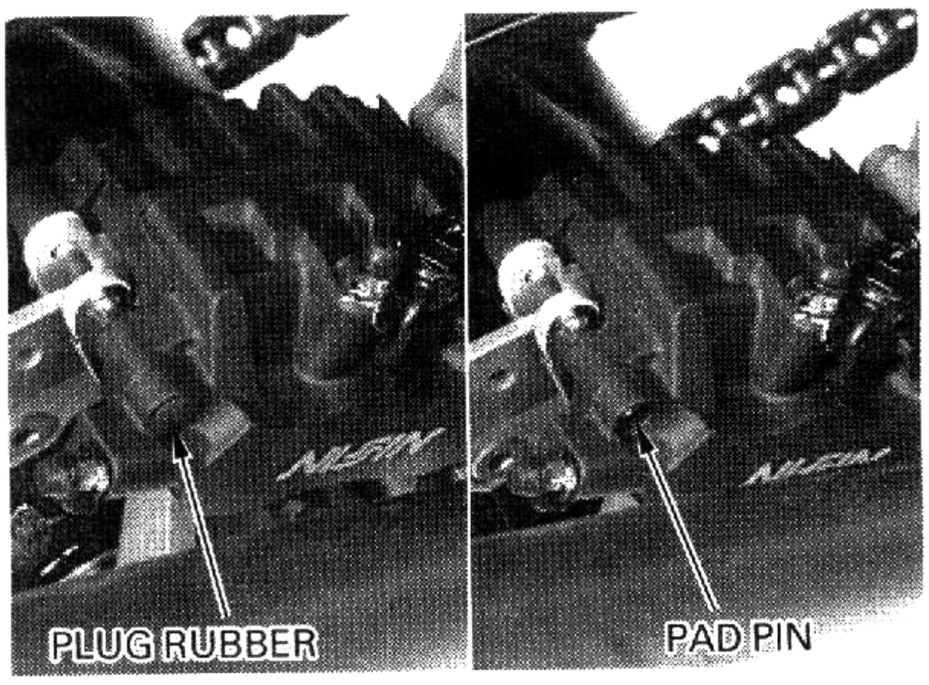
Push the caliper pistons all the way in by pushing the caliper body inward to allow installation of new brake pads.

NOTE:

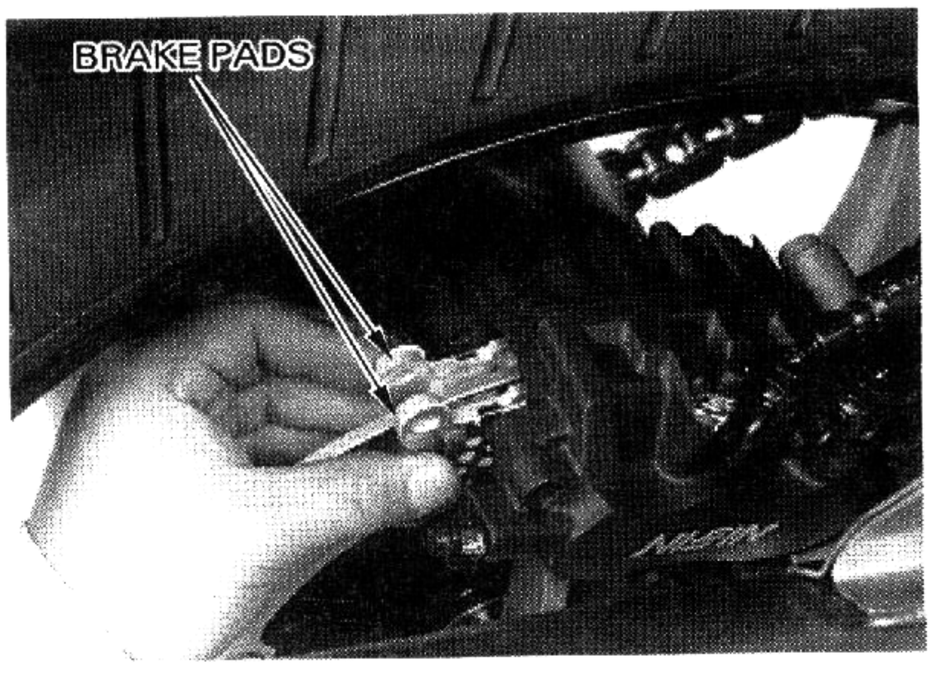
Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.



Remove the pad pin plug rubber and loosen the pad pin.

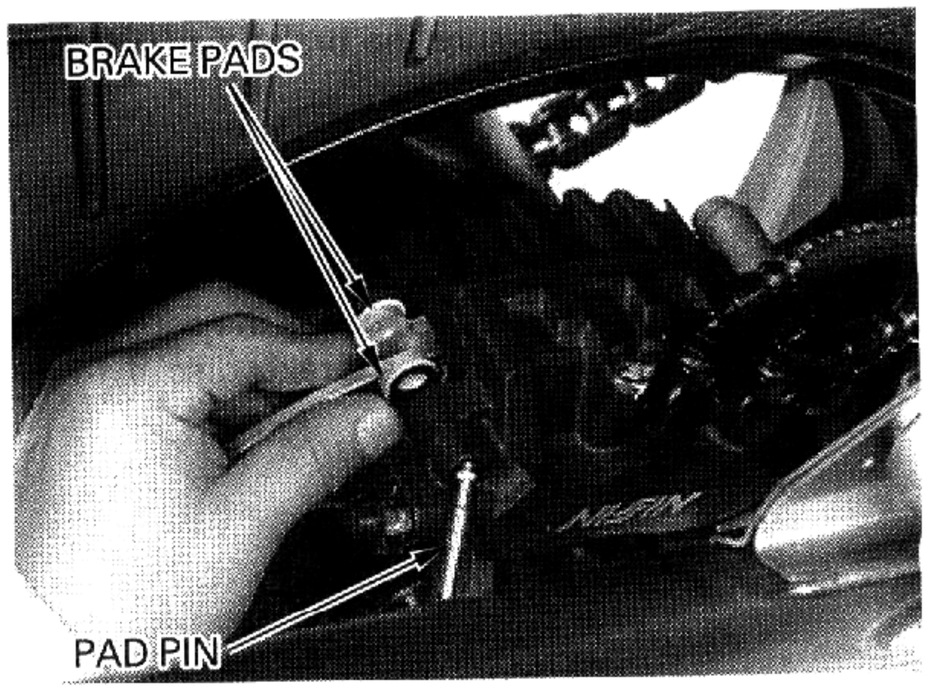


Remove the pad pin and brake pads.



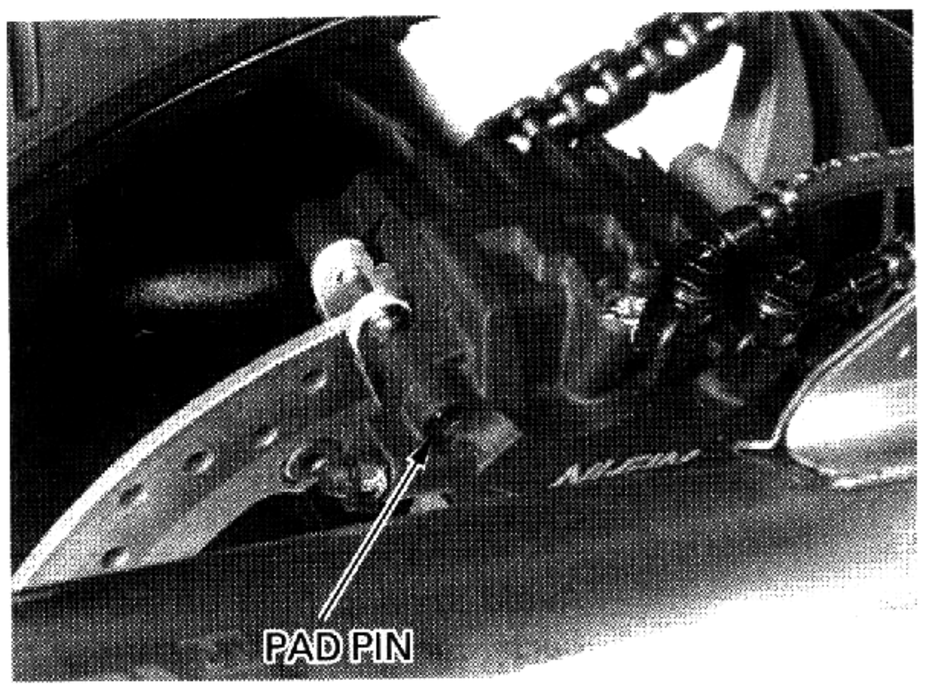
Clean the inside of the caliper especially around the caliper pistons.

Make sure the brake pad spring is in place.
Install the new brake pads and pad pin.



Tighten the pad pin to the specified torque.

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



Install the pad pin plug rubber.



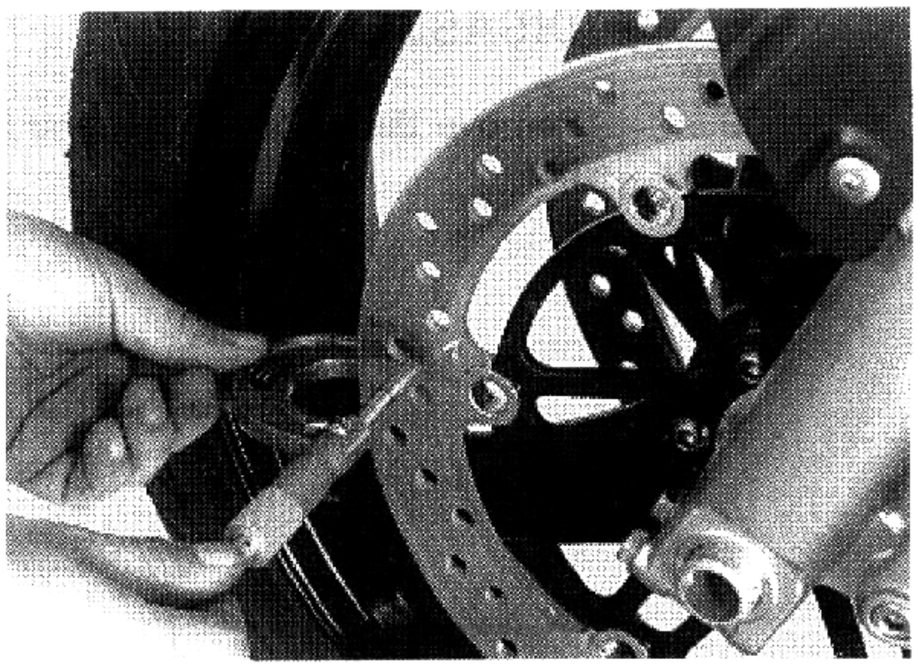
BRAKE DISC INSPECTION

Visually inspect the brake disc for damage or cracks.

Measure the brake disc thickness with a micrometer.

SERVICE LIMITS:
FRONT: 3.5 mm (0.14 in)
REAR: 4.0 mm (0.16 in)

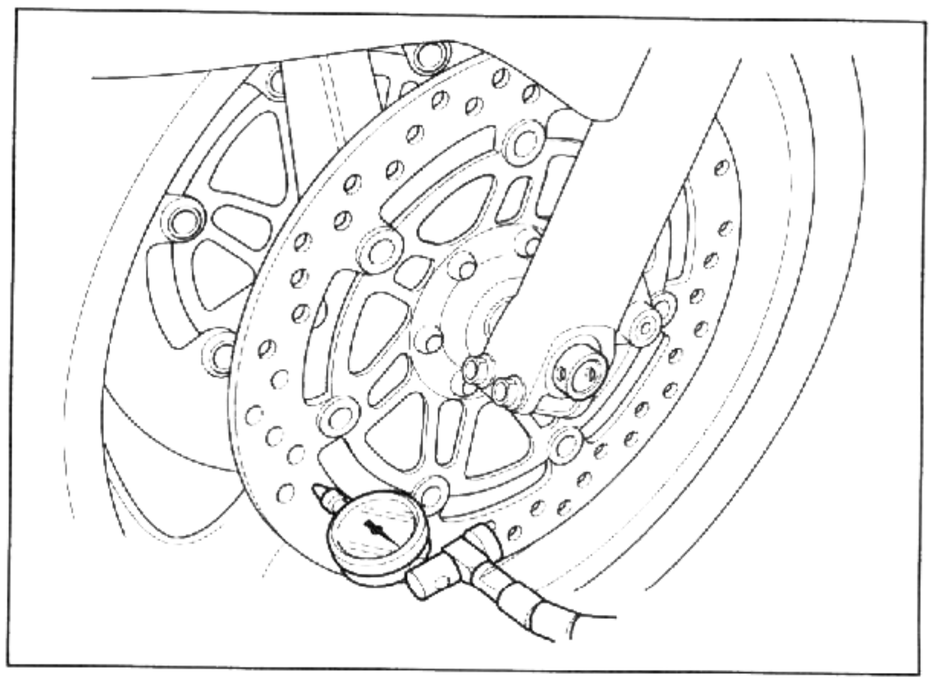
Replace the brake disc if the smallest measurement is less than the service limit.



Measure the brake disc warpage with a dial indicator.

SERVICE LIMIT: 0.30 mm (0.012 in)

Check the wheel bearings for excessive play, if the warpage exceeds the service limit.
Replace the brake disc if the wheel bearings are normal.



FRONT MASTER CYLINDER

REMOVAL

Drain the lever brake hydraulic system (page 15-5).

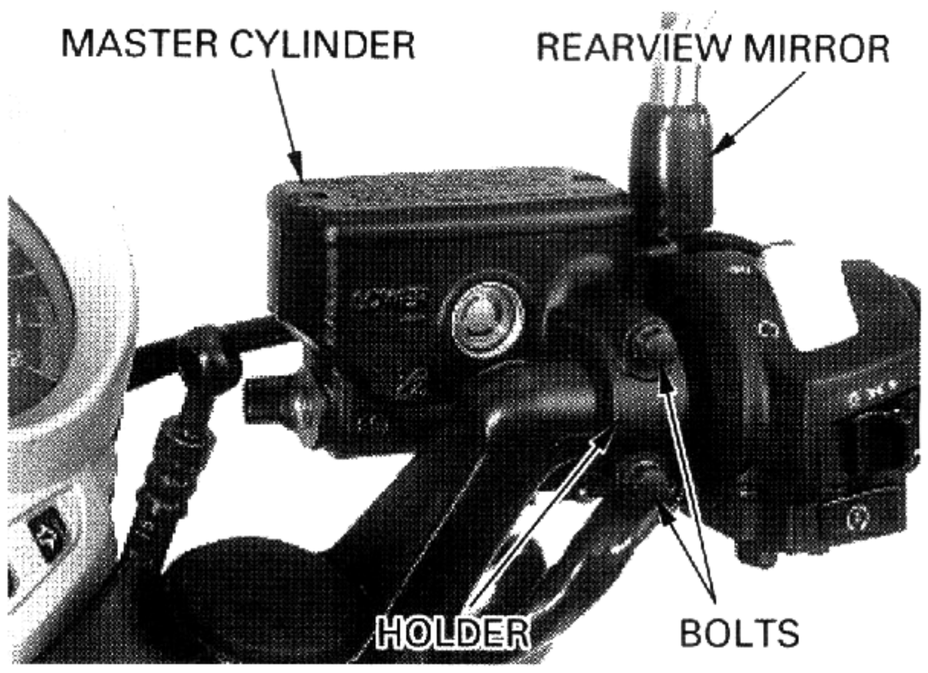
Disconnect the brake light switch wire connectors.
Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

CAUTION:

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

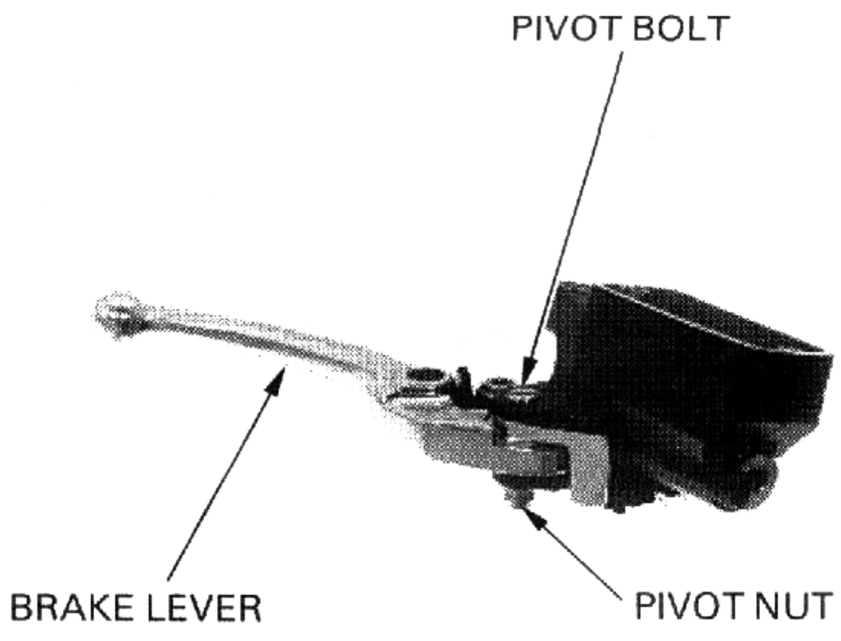


Remove the rearview mirror.
Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



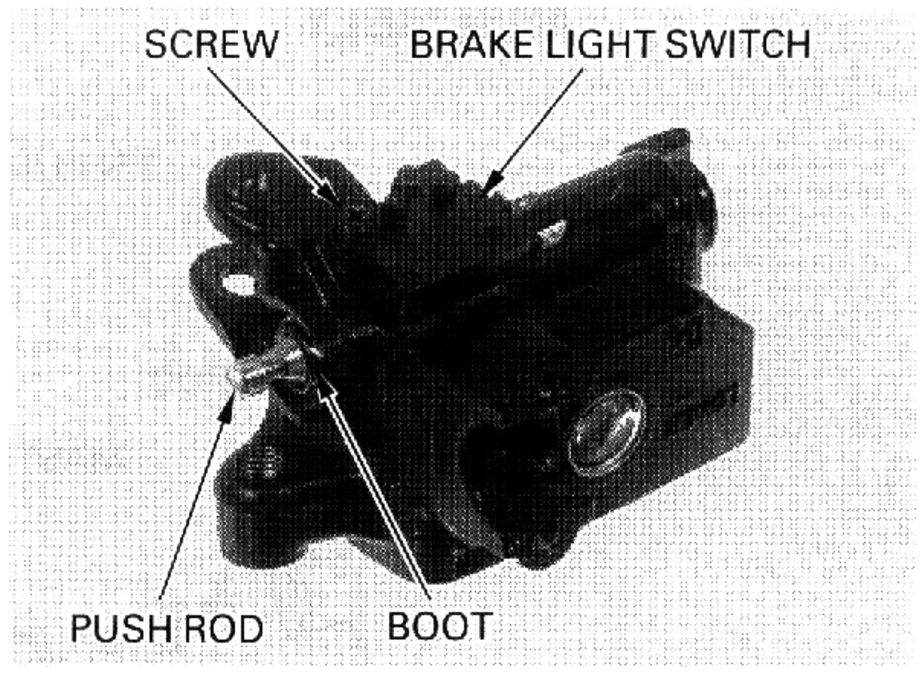
DISASSEMBLY

Remove the pivot bolt/nut and brake lever assembly.



Remove the screw and brake light switch.

Remove the boot and push rod.



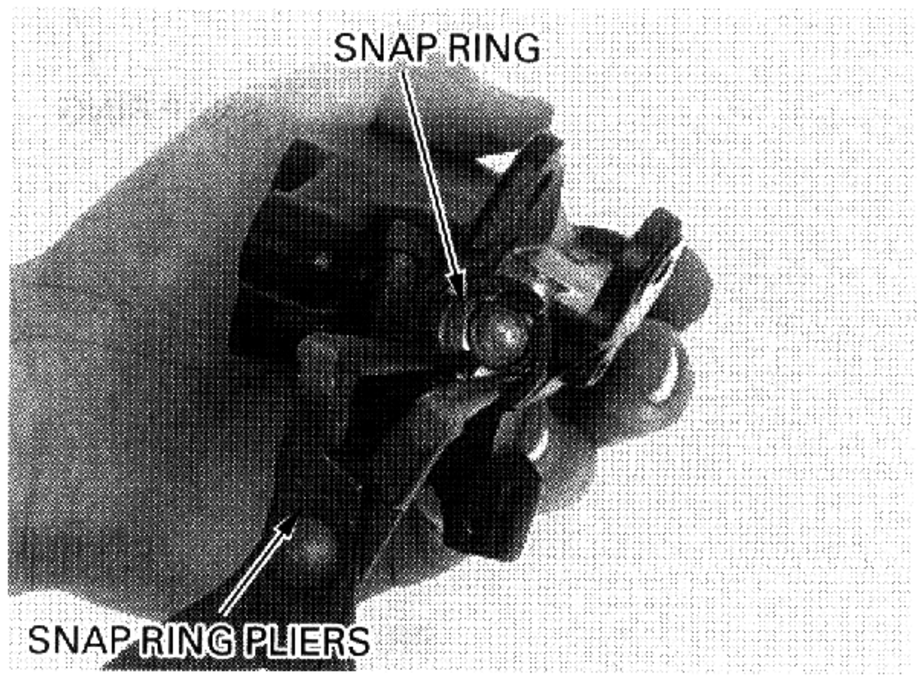
Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:

Snap ring pliers	07914-SA50001 or 07914-3230001

Remove the master piston and spring.

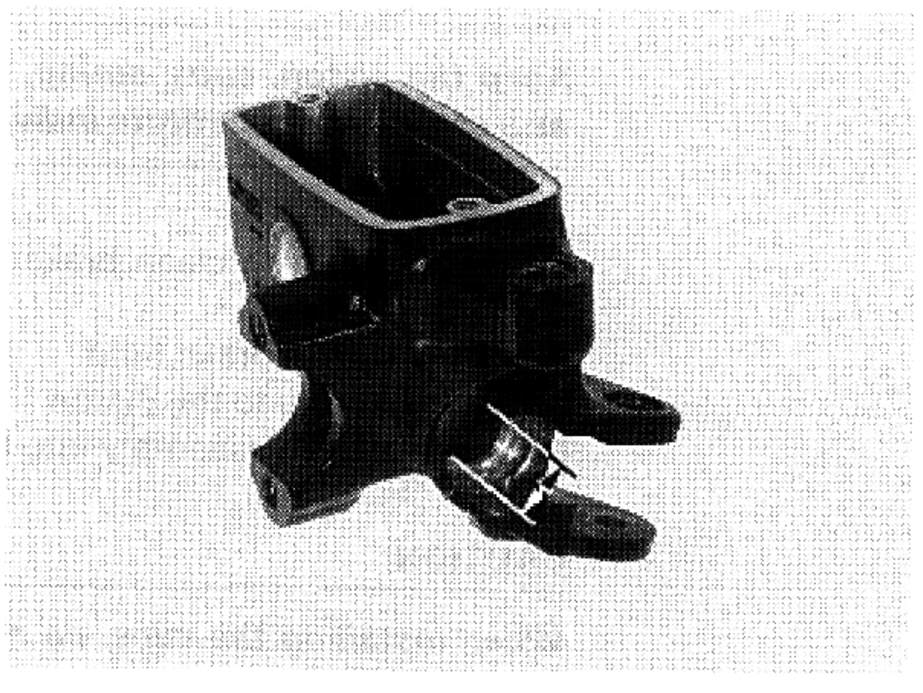
Clean the inside of the cylinder and reservoir with brake fluid.



INSPECTION

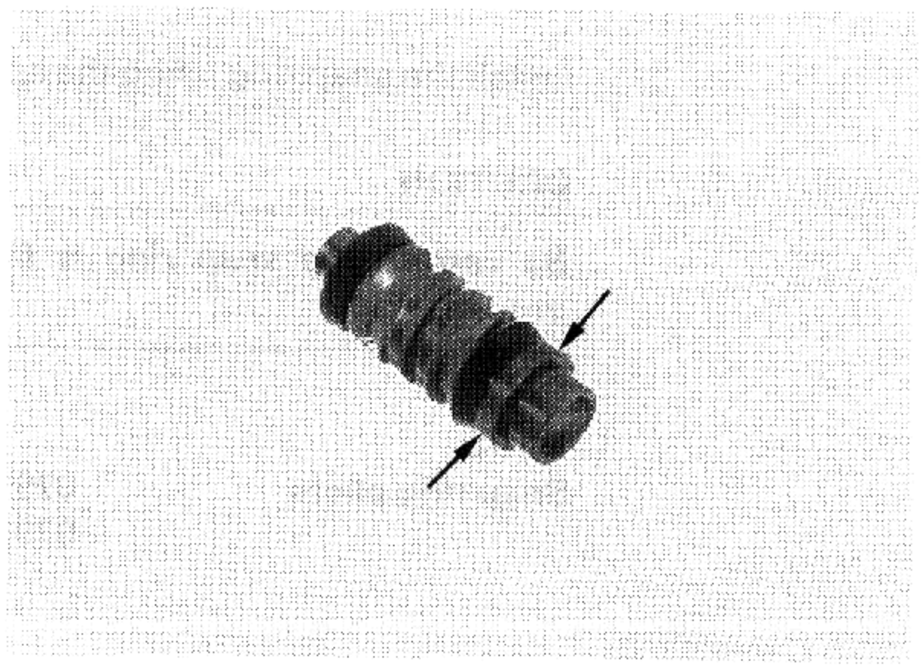
Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

SERVICE LIMIT: 12.76 mm (0.502 in)

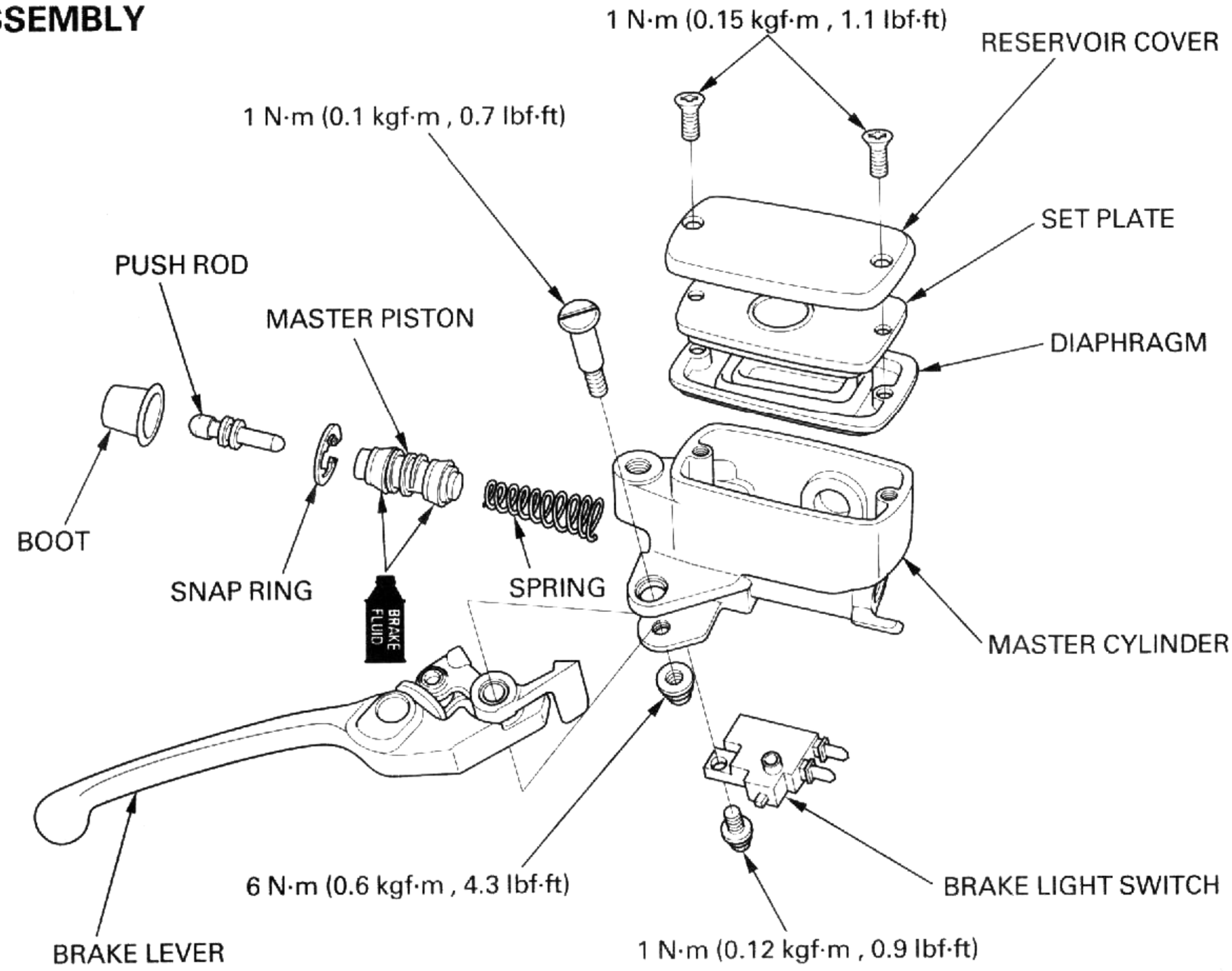


Measure the master cylinder piston O.D.

SERVICE LIMIT: 12.65 mm (0.498 in)



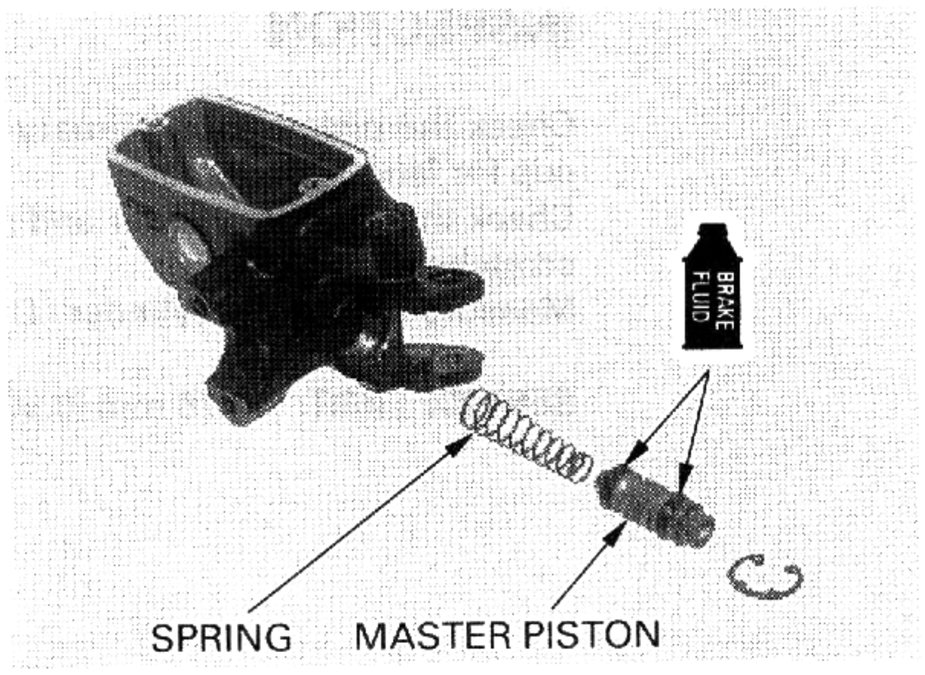
ASSEMBLY



CAUTION:

Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.
Dip the piston in brake fluid.
Install the spring to the piston.
Install the piston assembly into the master cylinder.



CAUTION:

When installing the cups, do not allow the lips to turn inside out.

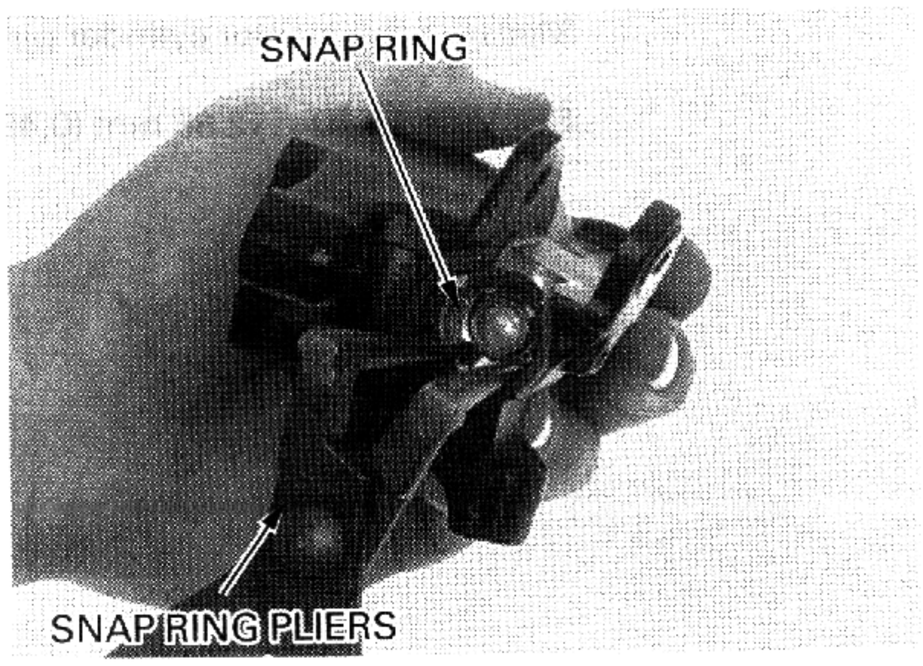
Install the snap ring using the special tool.

CAUTION:

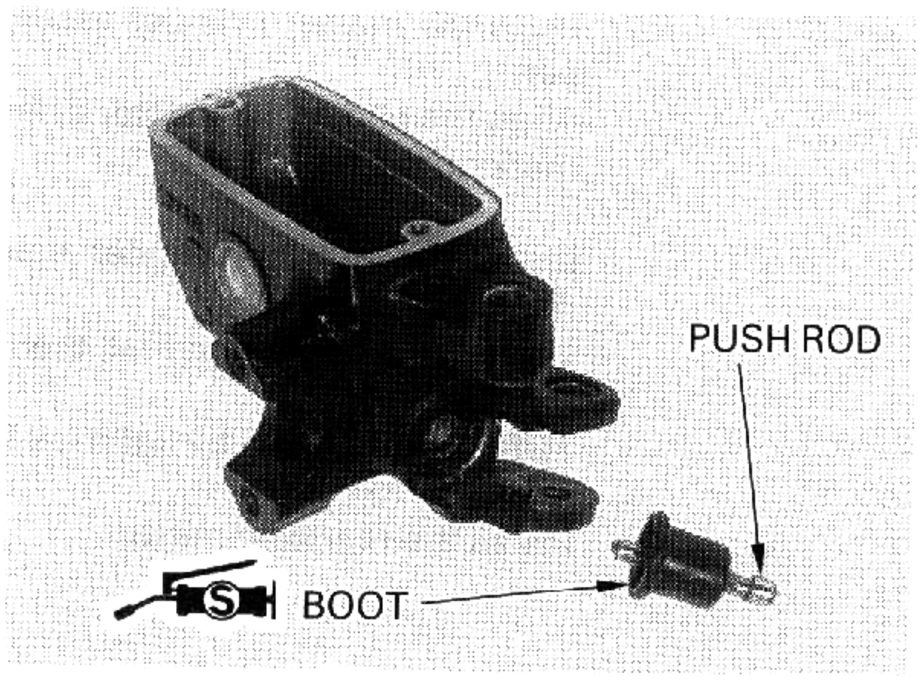
Be certain the snap ring is firmly seated in the groove.

TOOL:

Snap ring pliers	07914-SA50001 or 07914-3230001

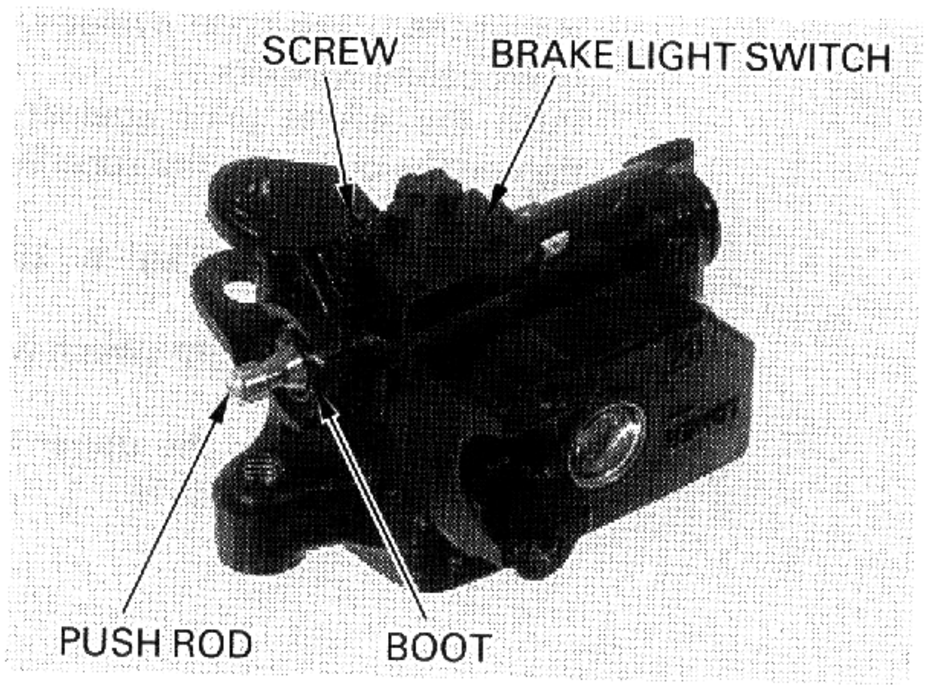


Apply silicone grease to the inside of the boot and master piston tip.
Install the push rod and boot.

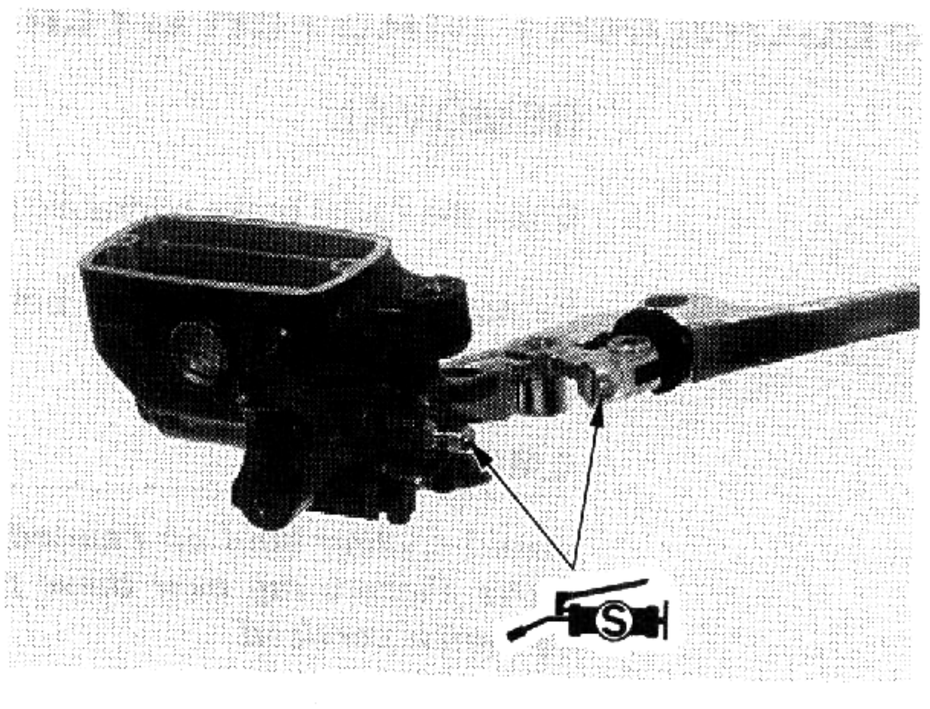


Install the brake light switch and tighten the screw to the specified torque.

TORQUE: 1 N·m (0.12 kgf·m , 0.9 lbf·ft)



Apply silicone grease to the contact surface of the master piston, then install the brake lever assembly.

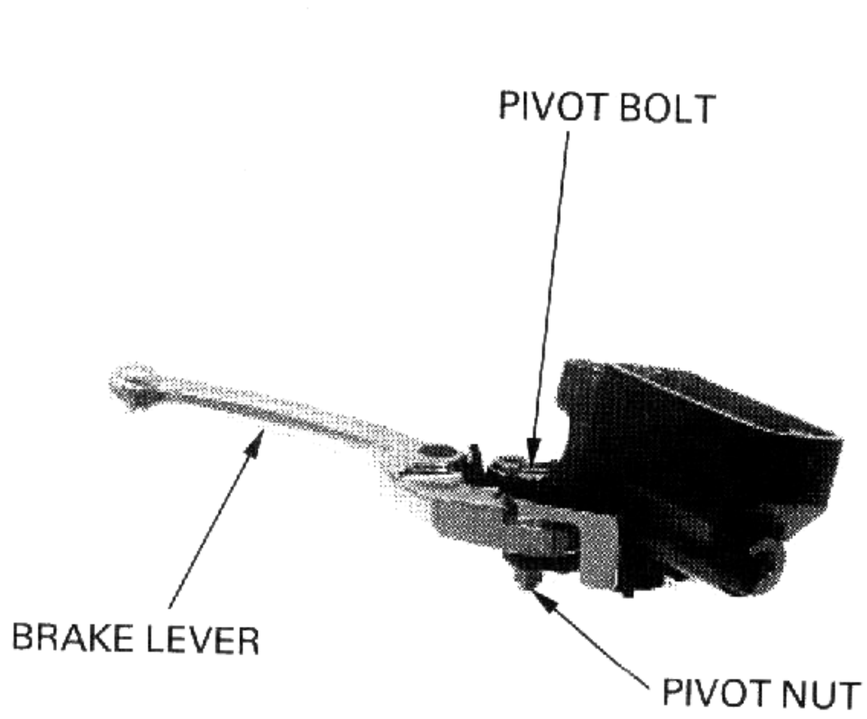


Install and tighten the pivot bolt to the specified torque.

TORQUE: 1 N·m (0.1 kgf·m , 0.7 lbf·ft)

Hold the pivot bolt and tighten the pivot nut to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

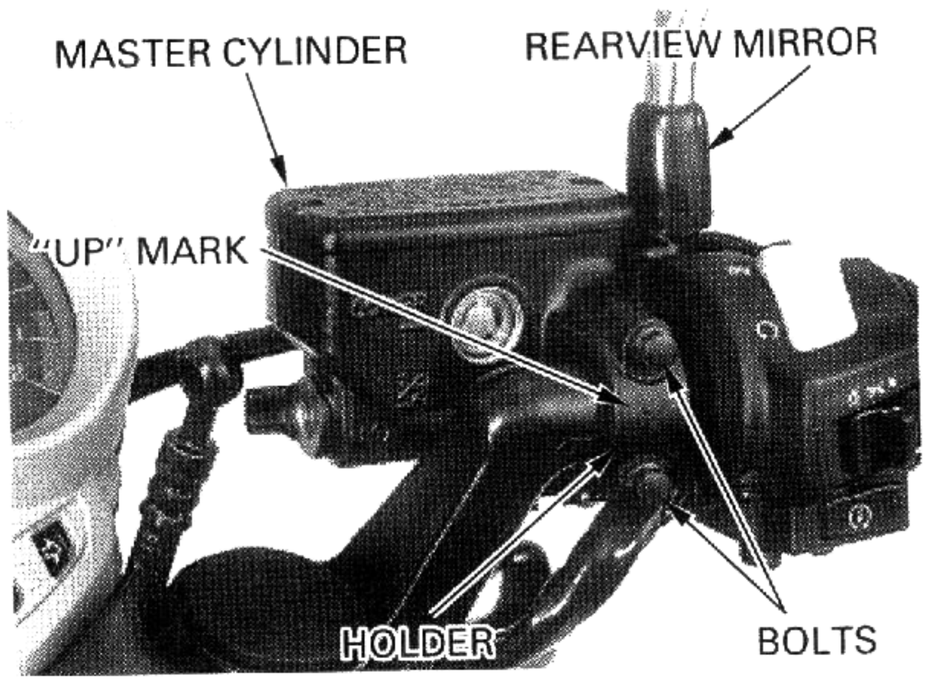


Place the master cylinder assembly on the handlebar.
Align the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.
Tighten the upper bolt first, then the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the rearview mirror.

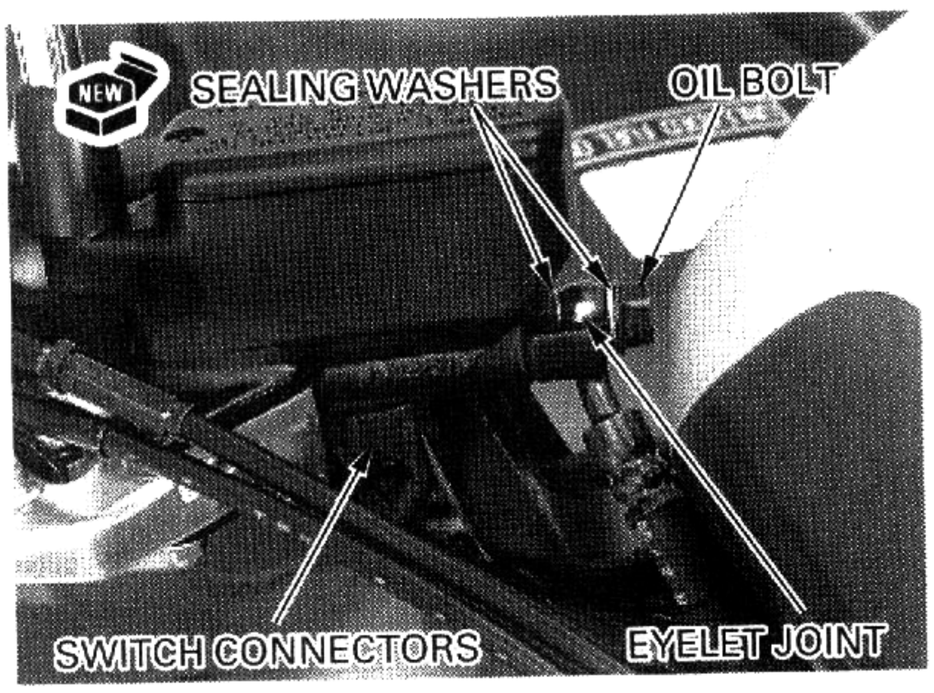


Install the brake hose eyelet with the oil bolt and new sealing washers.
Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m , 25 lbf·ft)

Connect the brake light switch wire connectors.

Fill the reservoir to the upper level and bleed the brake system (page 15-7).



SECONDARY MASTER CYLINDER

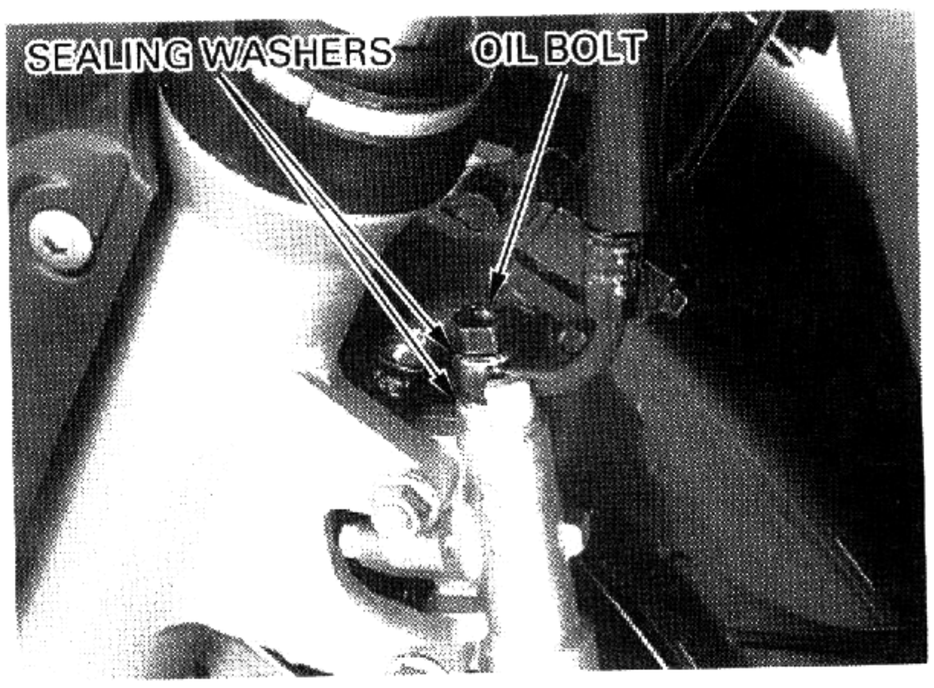
REMOVAL

Drain the pedal brake hydraulic system (page 15-5).

Remove the brake hose oil bolt, sealing washers, brake hose eyelet.

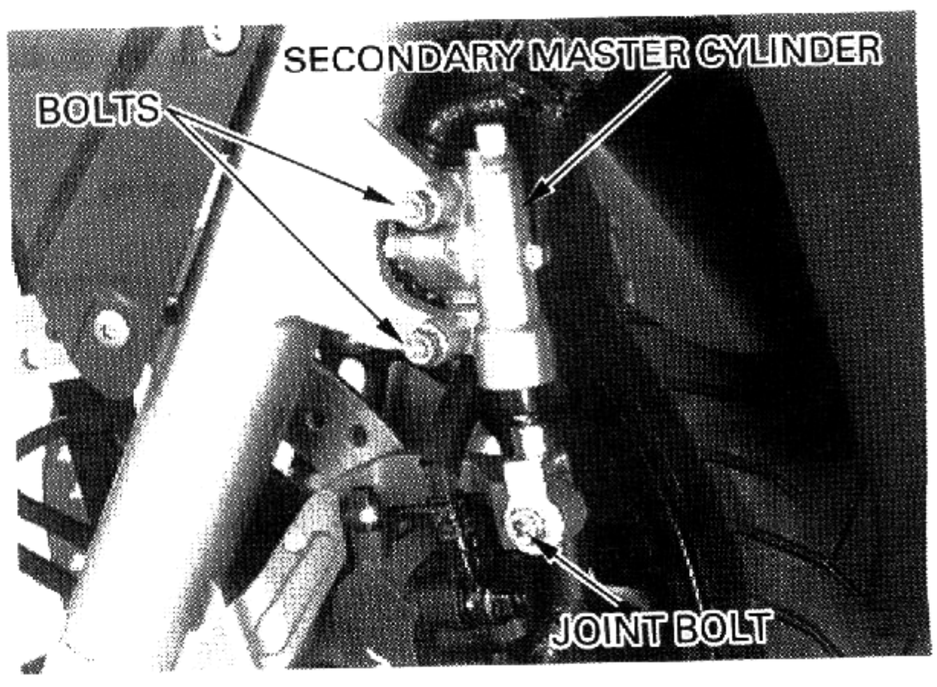
CAUTION:

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

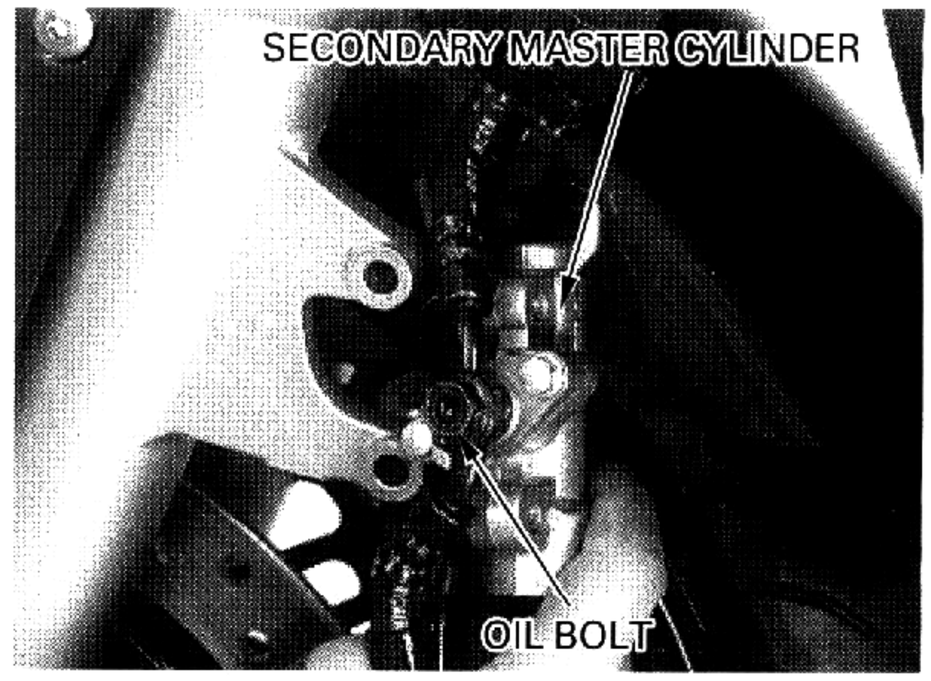


Remove the left front brake caliper joint bolt.

Remove the secondary master cylinder mounting bolts.



Remove the oil bolt, sealing washers and secondary master cylinder.

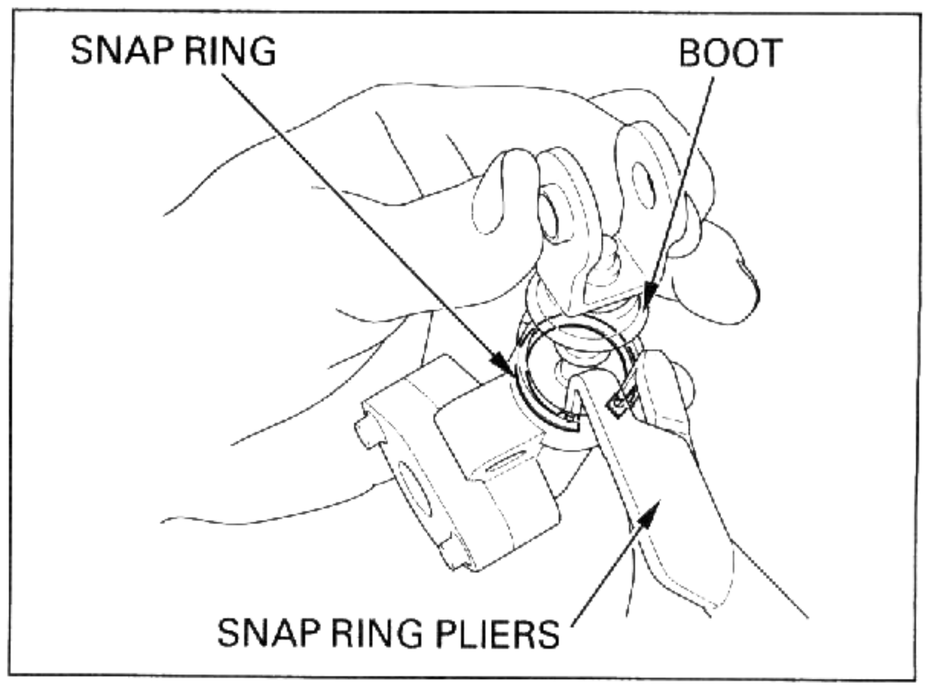


Remove the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:

Snap ring pliers	07914-SA50001 or 07914-3230001



Remove the push rod, master piston and spring.

Clean the inside of the cylinder with brake fluid.

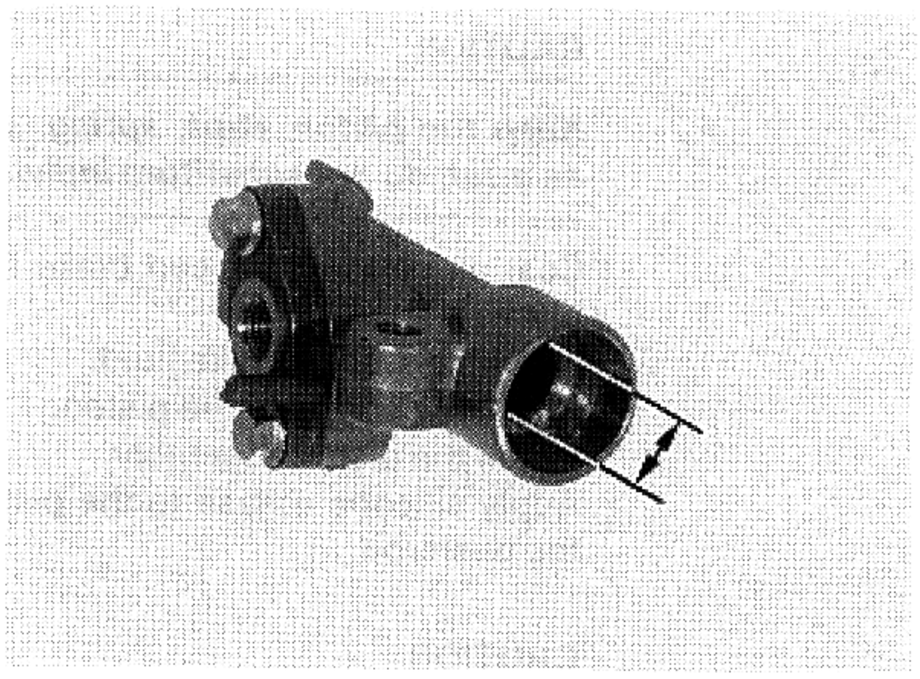
⚠WARNING

Do not disassemble the secondary master cylinder push rod or the correct brake performance is not obtained.

INSPECTION

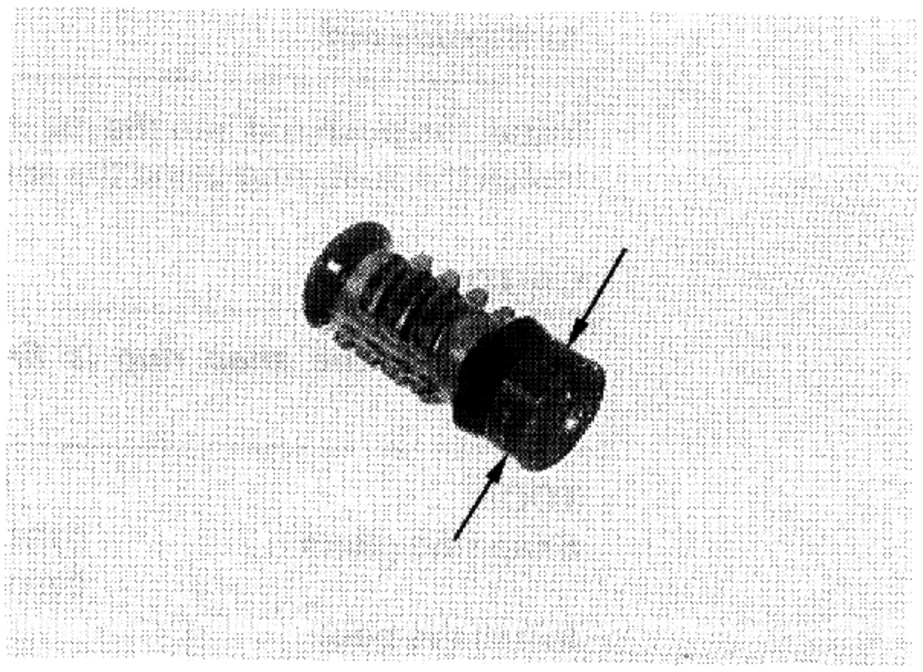
Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

SERVICE LIMIT: 14.055 mm (0.5533 in)

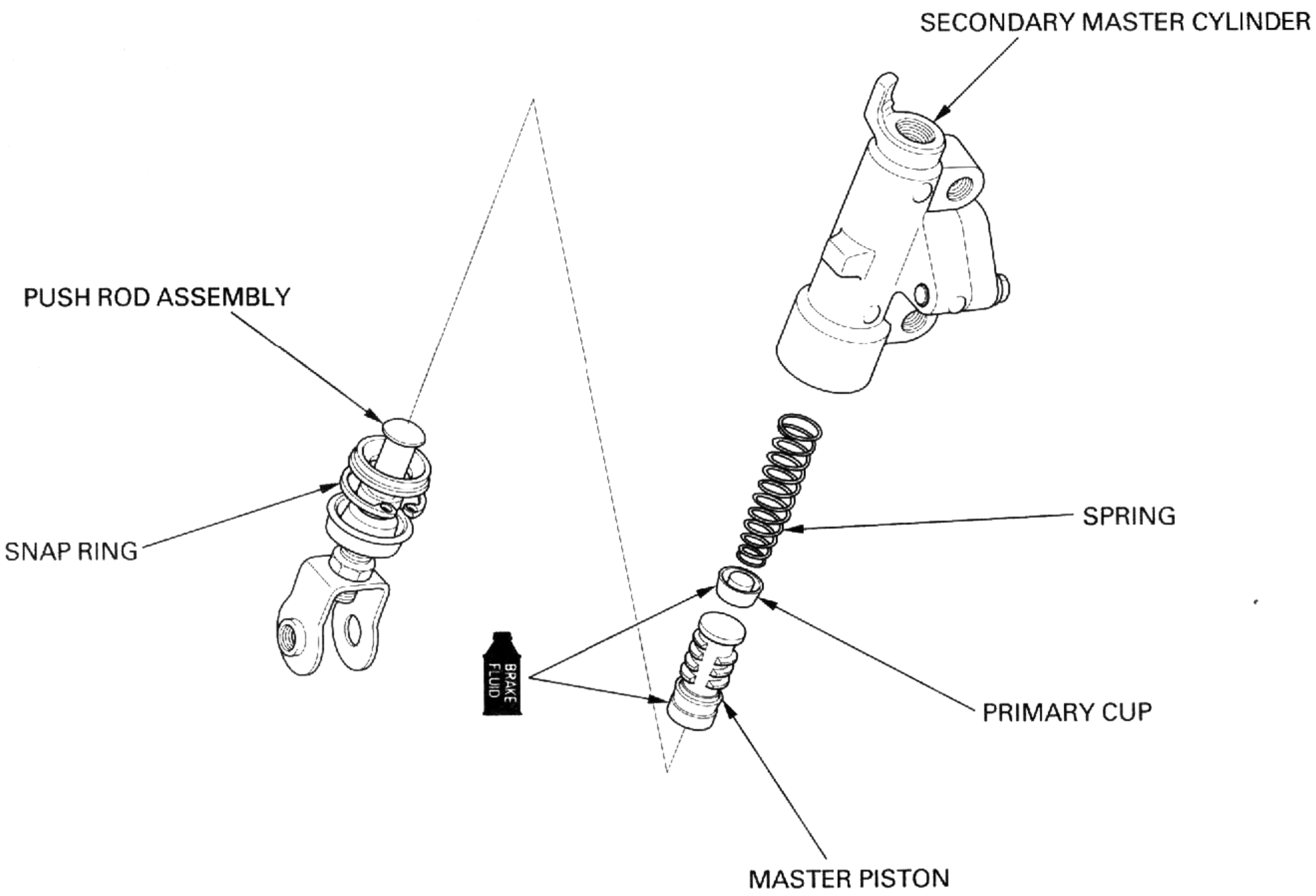


Measure the master cylinder piston O.D.

SERVICE LIMIT: 13.945 mm (0.5490 in)



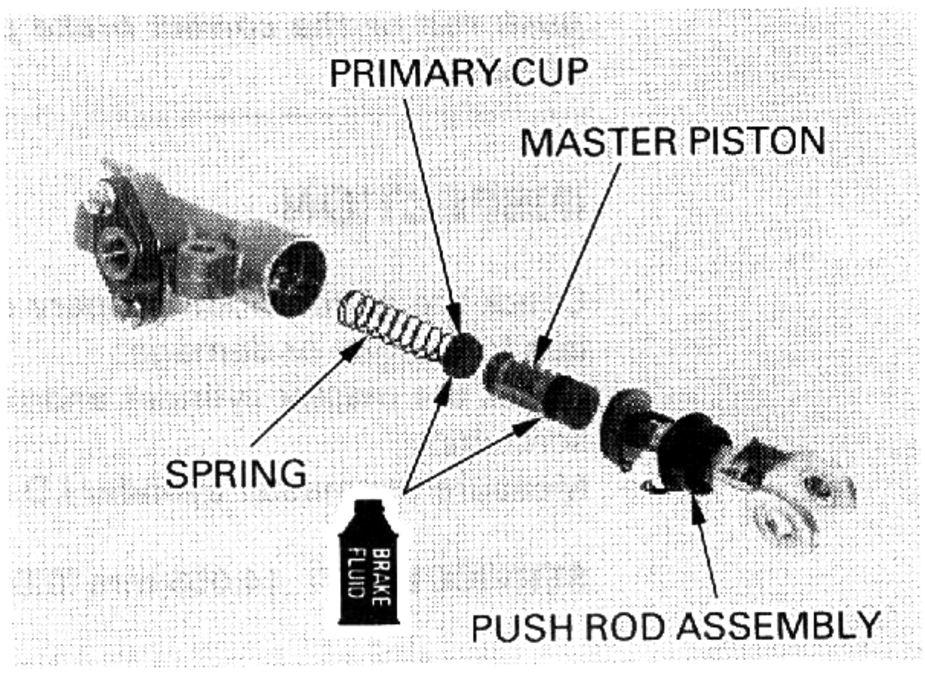
ASSEMBLY



CAUTION:

Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.
Dip the piston in brake fluid.
Install the spring to the piston.
Install the piston assembly.
Apply silicone grease to the piston contact area of the push rod.



CAUTION:

When installing the cups, do not allow the lips to turn inside out.

Install the push rod into the master cylinder.
Install the snap ring using the special tool.

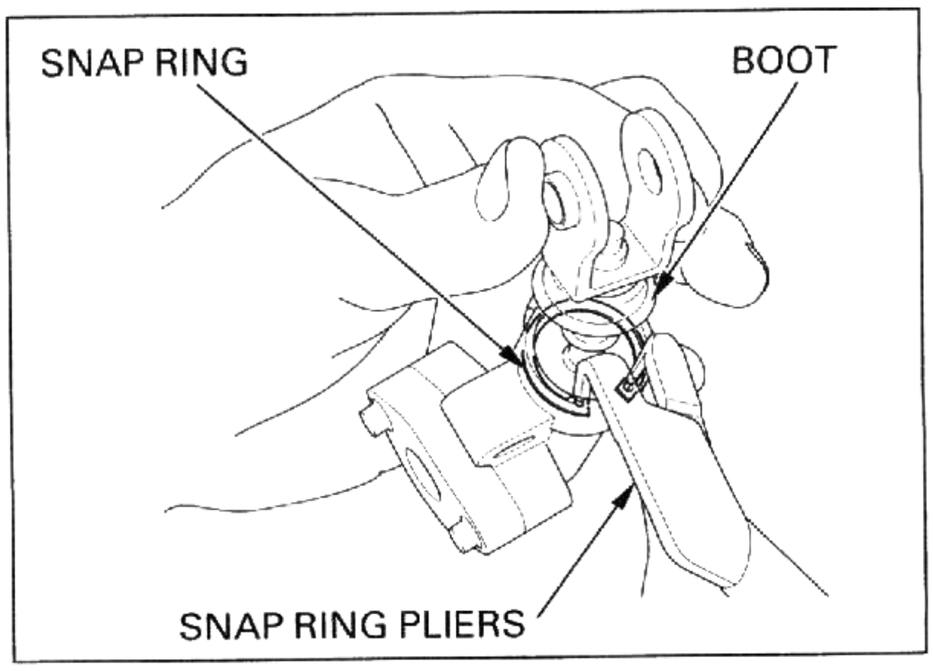
CAUTION:

Be certain the snap ring is firmly seated in the groove.

TOOL:

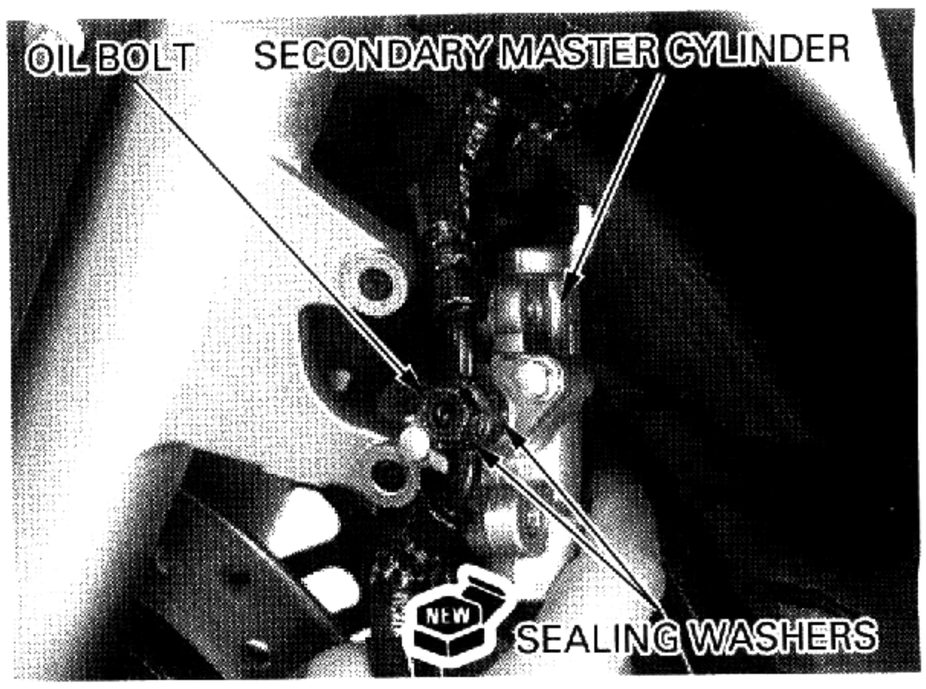
Snap ring pliers	07914-SA50001 or 07914-3230001

Install the boot.



Install the brake hose eyelet with the oil bolt and new sealing washers.
Tighten the oil bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m , 25 lbf·ft)

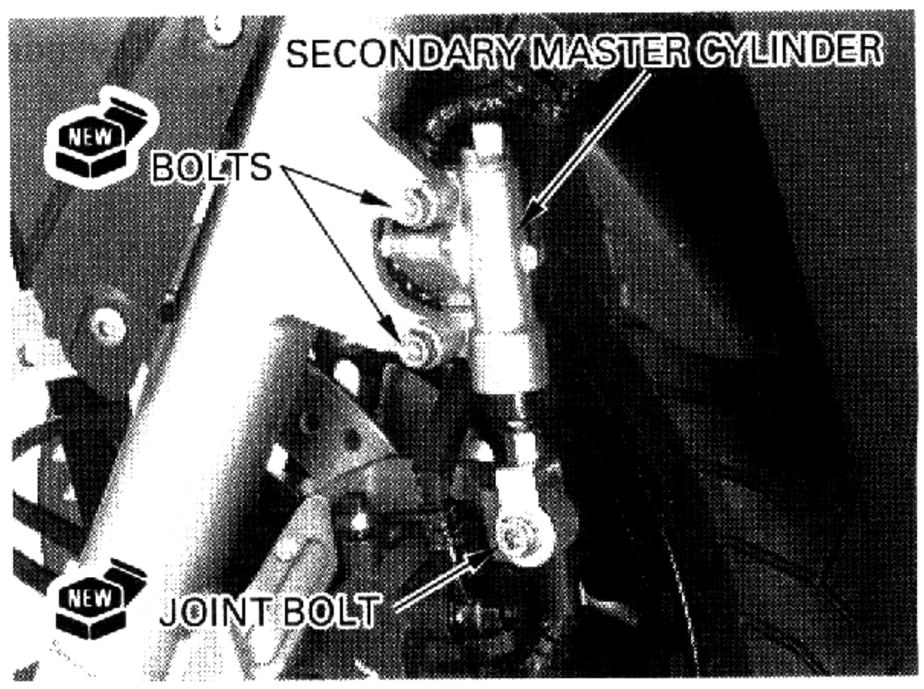


Place the secondary master cylinder onto the fork leg, then tighten the new mounting bolts.

TORQUE: 31 N·m (3.2 kgf·m , 23 lbf·ft)

Install and tighten the new left front brake caliper joint bolt to the specified torque.

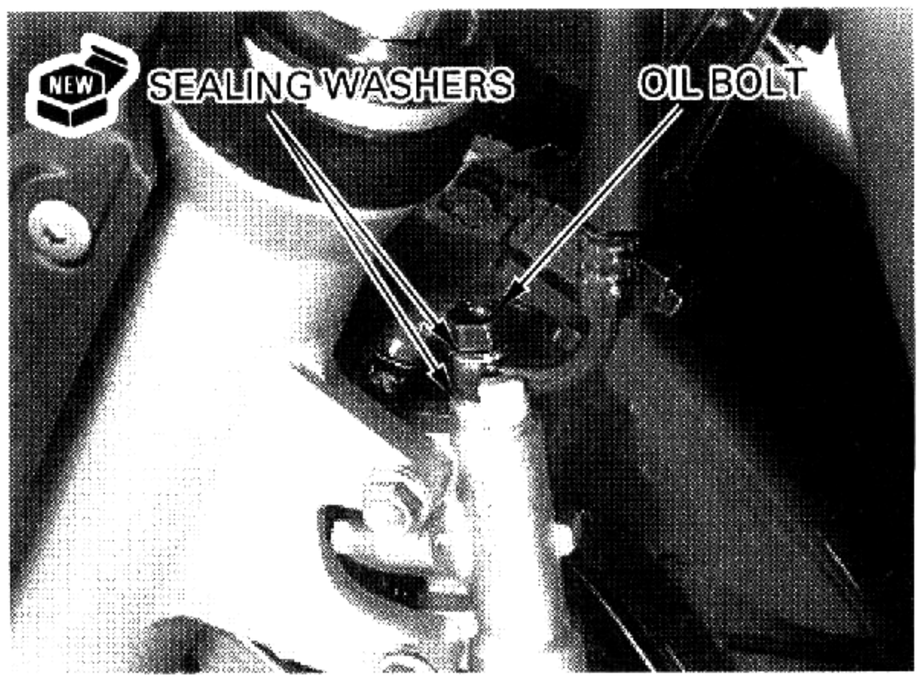
TORQUE: 26 N·m (2.7 kgf·m , 20 lbf·ft)



Install the brake hose with the oil bolt and new sealing washers.
Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m , 25 lbf·ft)

Bleed the air from pedal brake line (page 15-7).



REAR MASTER CYLINDER

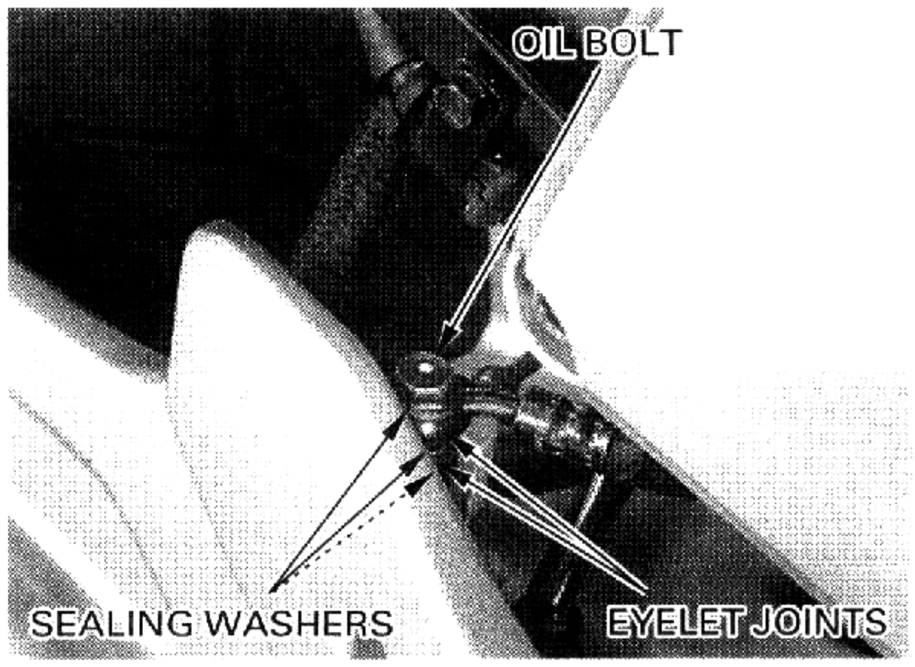
REMOVAL

Drain the pedal brake hydraulic system (page 15-5).

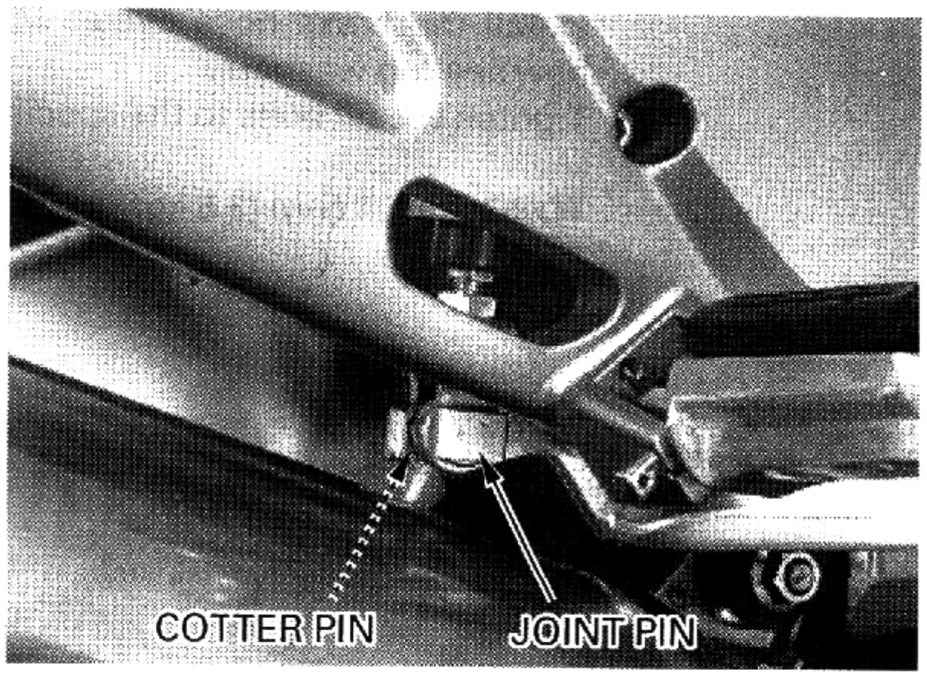
Remove the brake hose oil bolt, sealing washers and brake hose eyelet joints.

CAUTION:

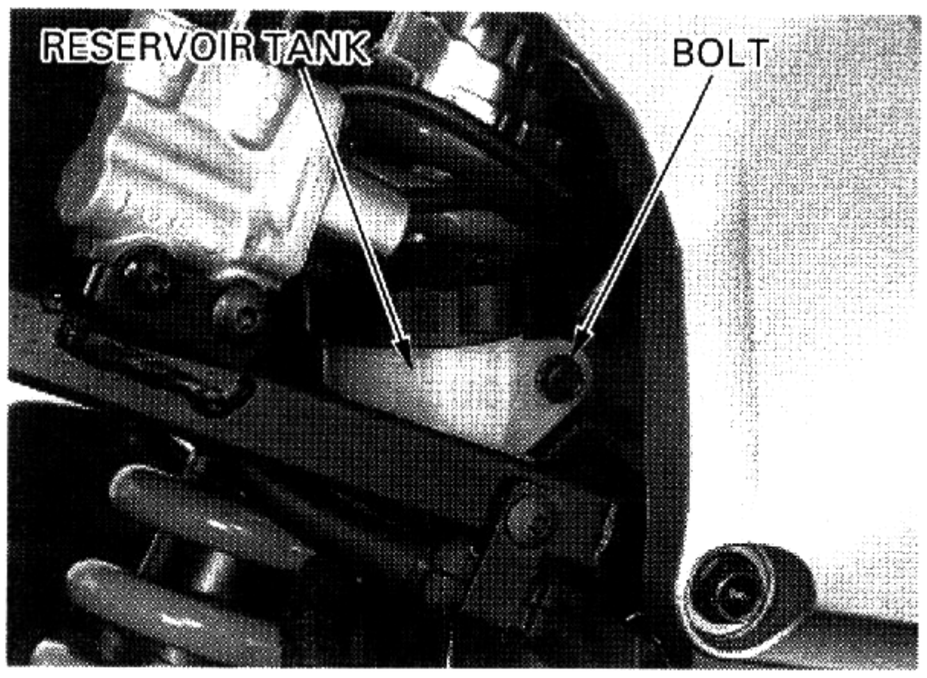
Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.



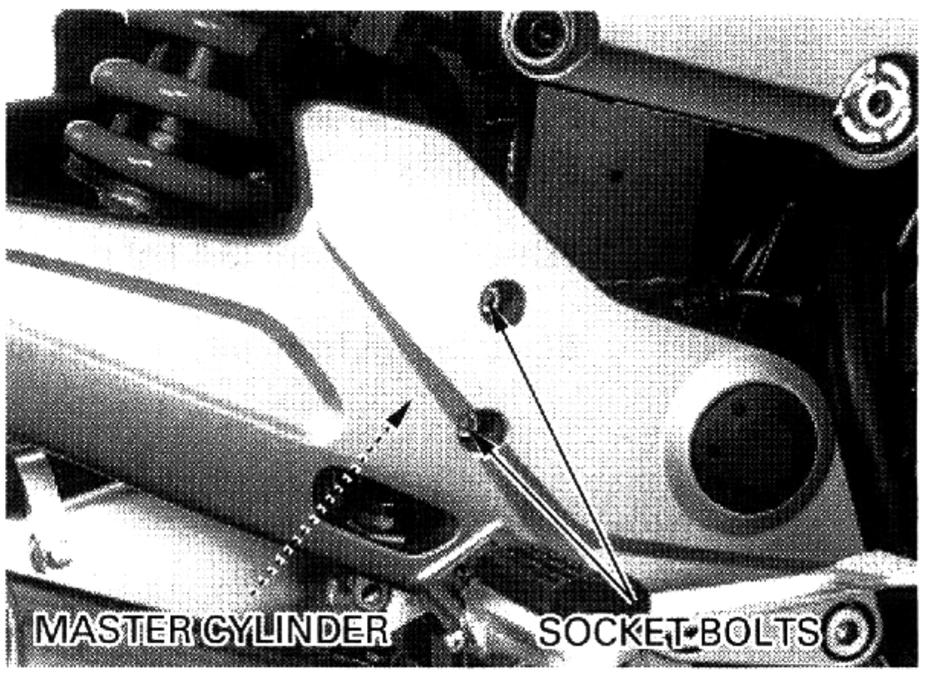
Remove and discard the brake pedal joint cotter pin.
Remove the joint pin.



Remove the rear master cylinder reservoir mounting bolt.

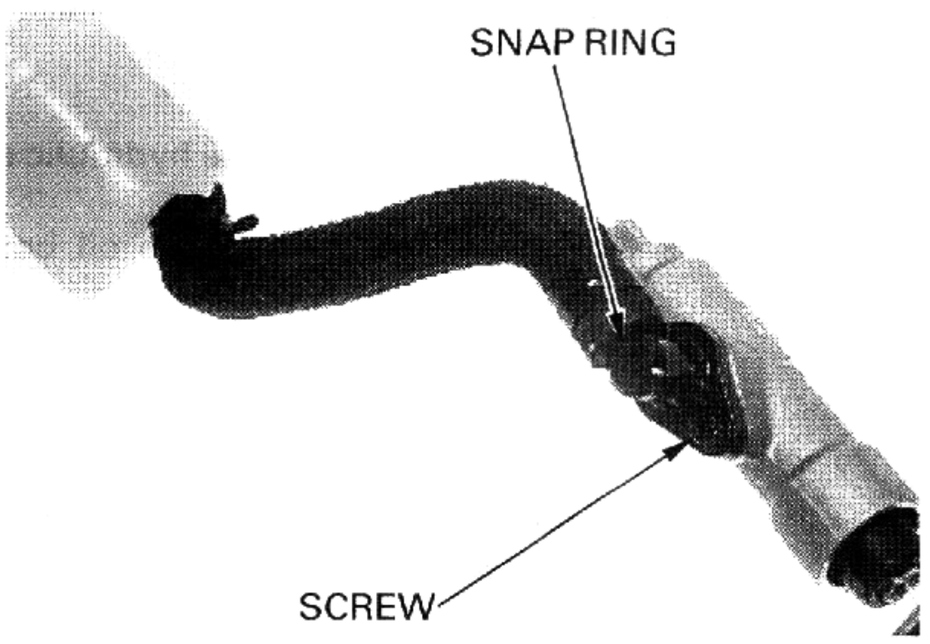


Remove the socket bolts and rear master cylinder.



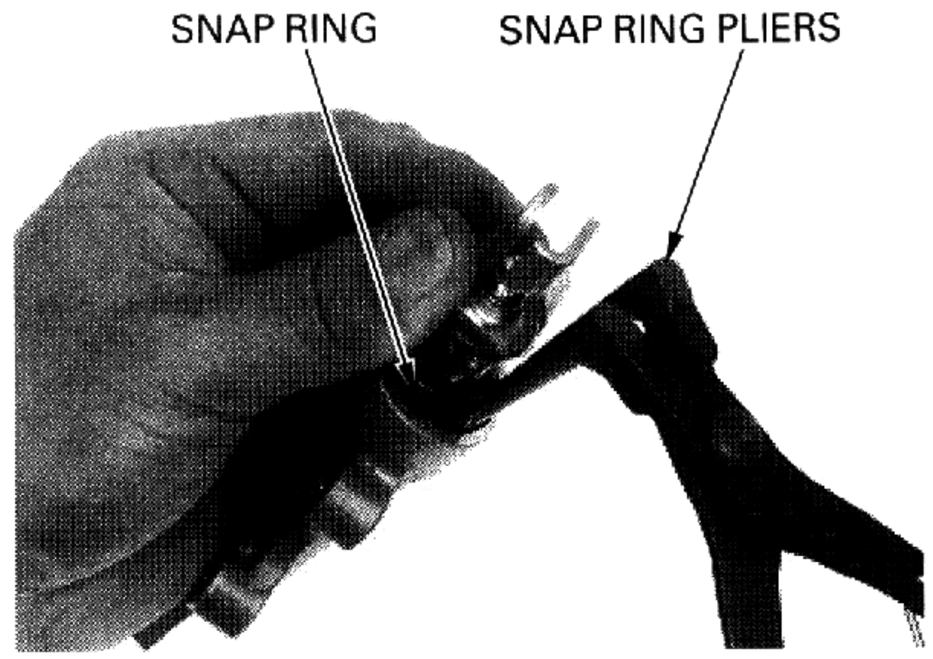
DISASSEMBLY

Remove the screw and reservoir hose joint from the master cylinder.



Remove the boot.
Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:
Snap ring pliers 07914-SA50001 or 07914-3230001



Remove the push rod, master piston and spring.

Clean the inside of the cylinder with brake fluid.

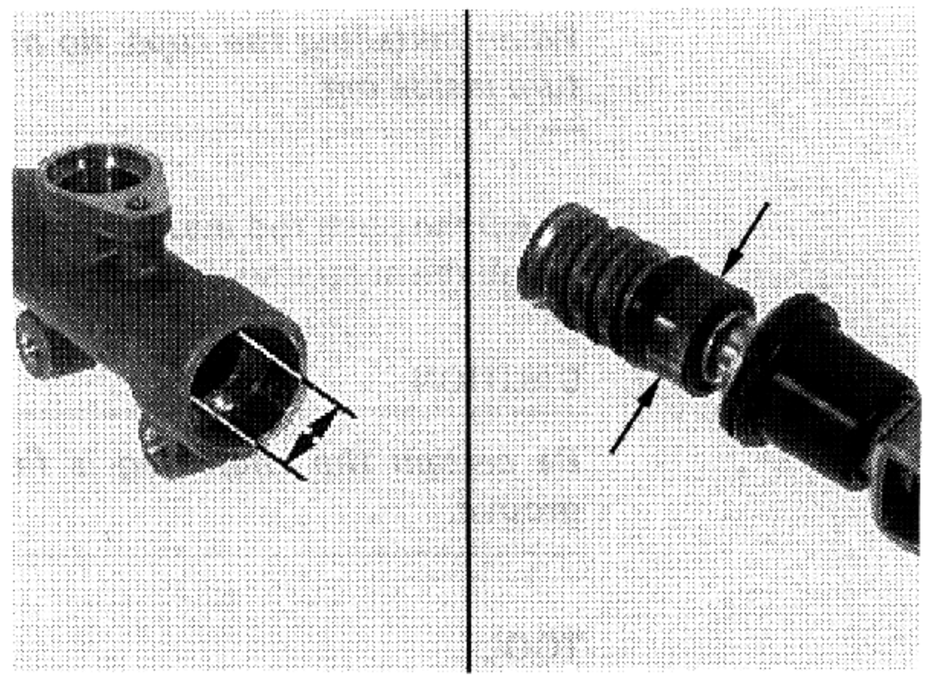
INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

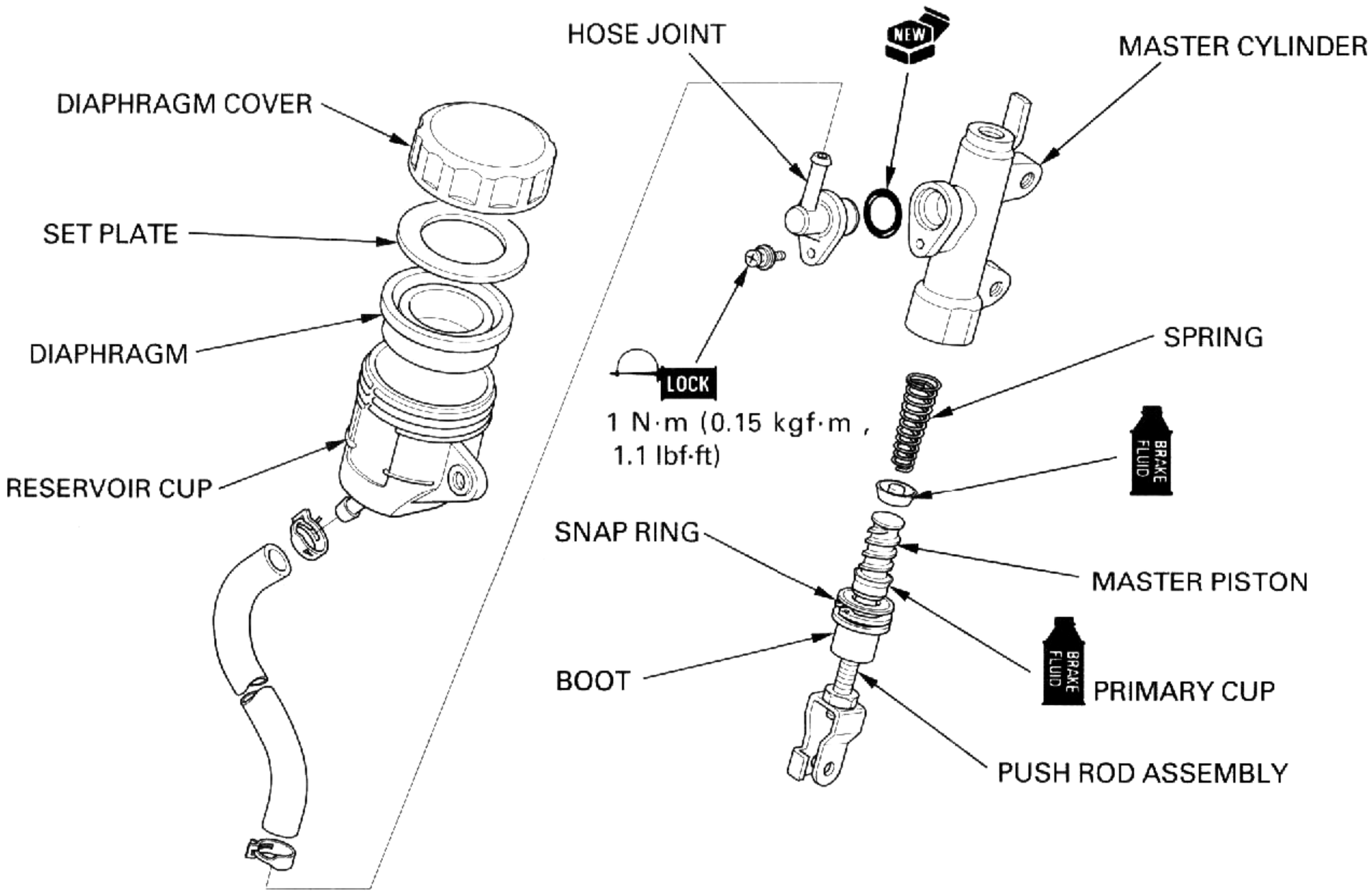
SERVICE LIMIT: 17.515 mm (0.6896 in)

Measure the master cylinder piston O.D.

SERVICE LIMIT: 17.405 mm (0.6852 in)



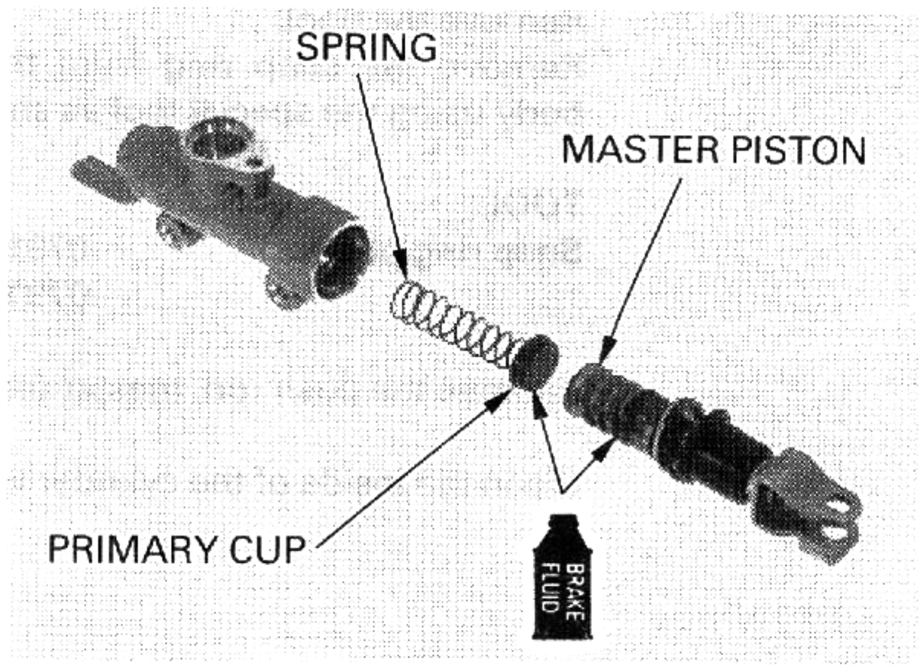
ASSEMBLY



CAUTION:

Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

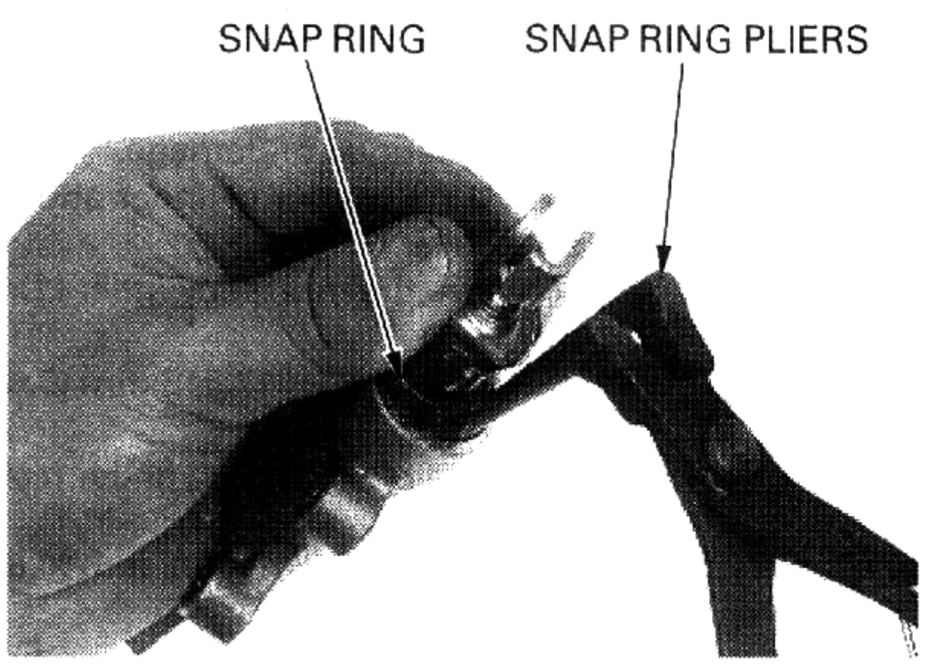
Coat all parts with clean brake fluid before assembly.
Dip the piston in brake fluid.
Install the spring to the piston.
Install the piston assembly.
Apply silicone grease to the piston contact area of the push rod.



CAUTION:

When installing the cups, do not allow the lips to turn inside out.

Install the push rod into the master cylinder.
Install the snap ring using the special tool.



CAUTION:

Be certain the snap ring is firmly seated in the groove.

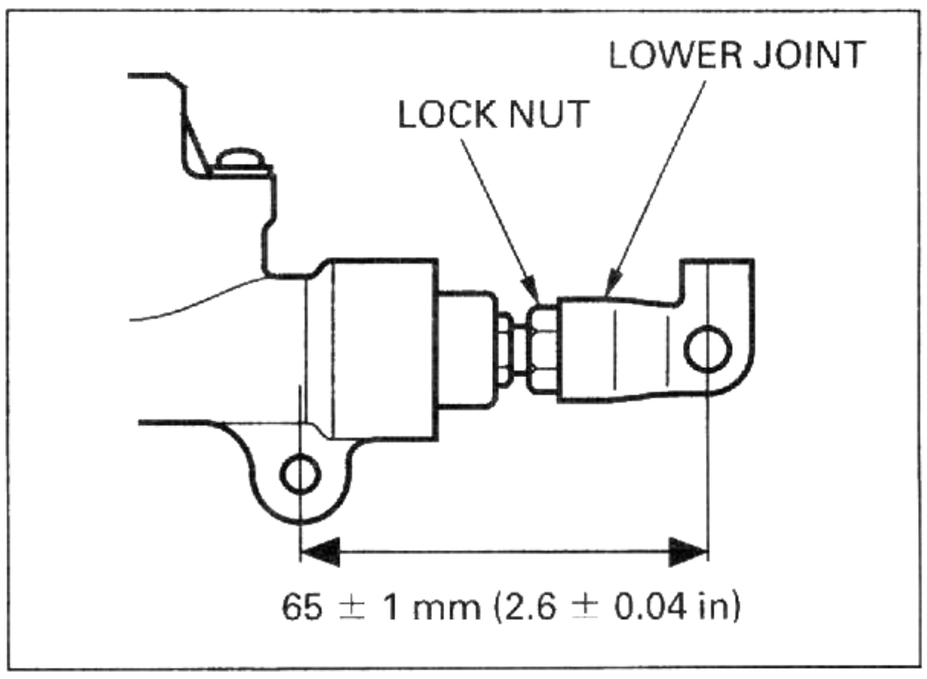
TOOL:

Snap ring pliers	07914-SA50001 or 07914-3230001

Install the boot.

If the push rod is disassembled, adjust the push rod length as shown.
After adjustment, tighten the lock nut to the specified torque.

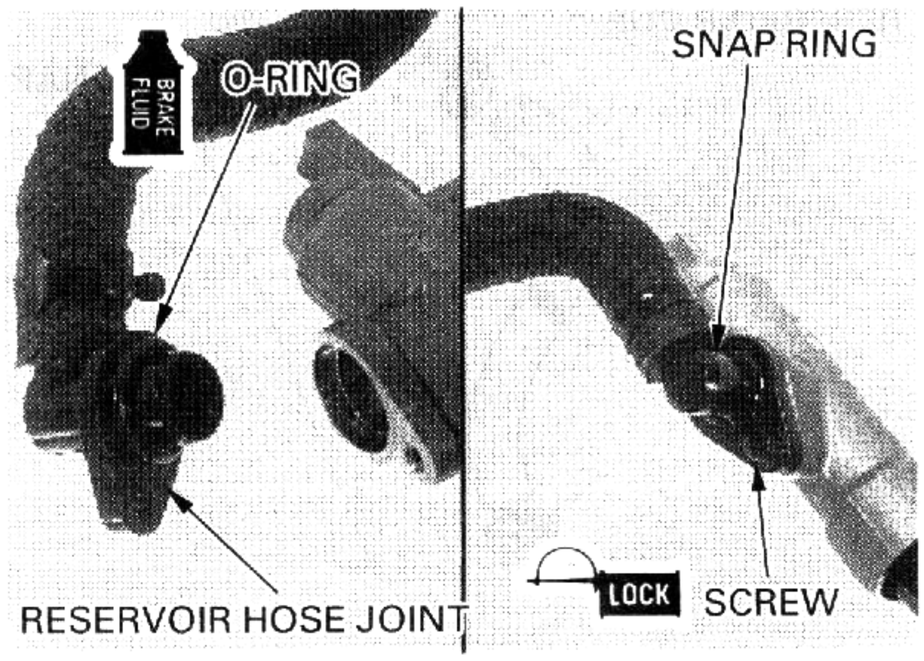
TORQUE: 18 N·m (1.8 kgf·m , 13 lbf·ft)



INSTALLATION

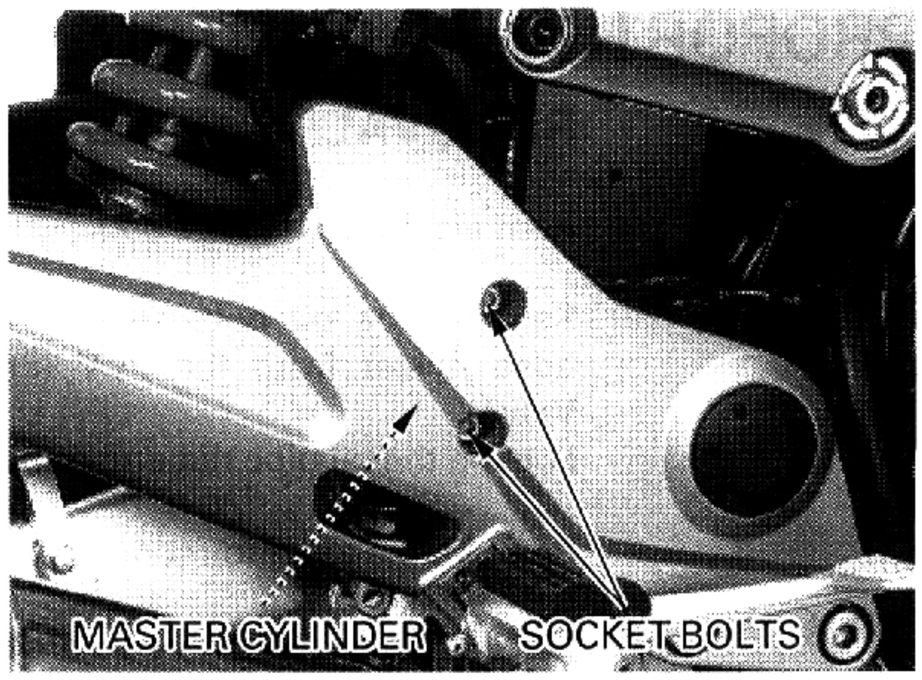
Apply brake fluid to a new- O-ring and install it onto the reservoir hose joint.
Install the reservoir hose joint into the master cylinder.
Apply a locking agent to the reservoir hose joint screw threads.
Install and tighten the screw to the specified torque.

TORQUE: 1 N·m (0.15 kgf·m , 1.1 lbf·ft)

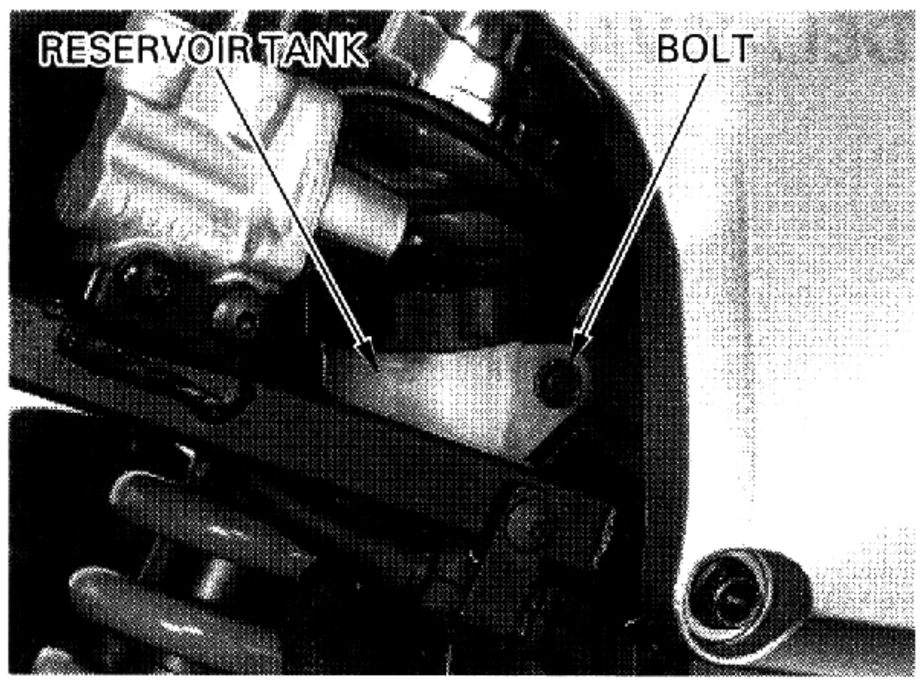


Install the rear master cylinder onto the right footpeg holder, then install and tighten the socket bolts to the specified torque.

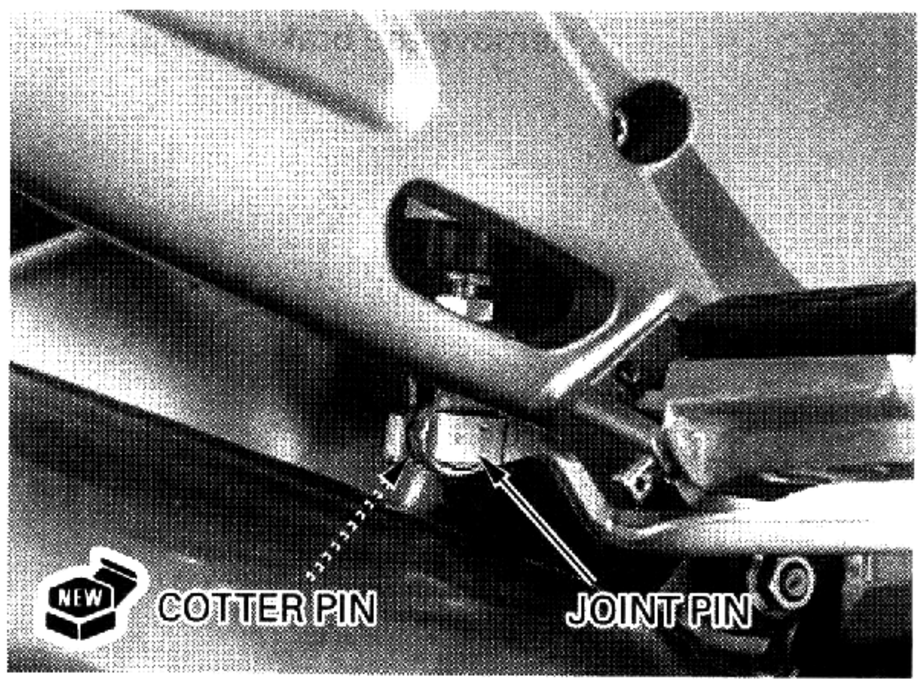
TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



Route the reservoir hose properly, then install and tighten the reservoir tank mounting bolt.



Connect the brake pedal to the push rod lower joint. Install the joint pin and secure it with a new cotter pin.



Install the brake hose eyelet joints with the oil bolt and new sealing washers.
Push the eyelet joints against the stopper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m , 25 lbf·ft)

Fill the reservoir to the upper level and bleed the pedal brake line (page 15-7).

PROPORTIONAL CONTROL VALVE

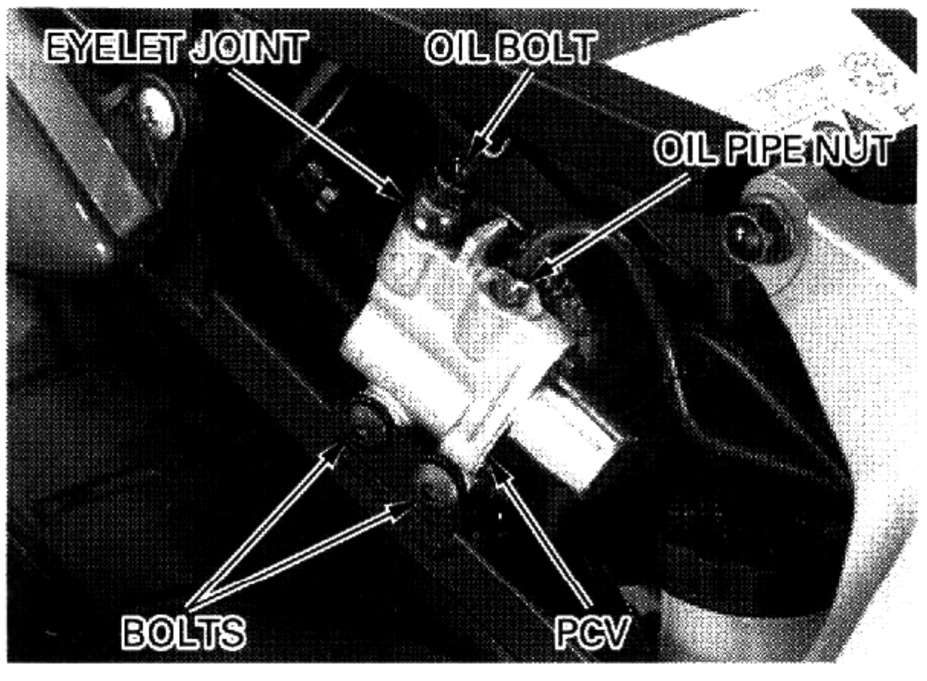
REMOVAL/INSTALLATION

Remove the seat (page 2-2).

Remove the oil bolt, sealing washers and brake hose eyelet from the PCV (Proportional Control Valve).
Loosen the oil pipe nut and remove the oil pipe.

Remove the two mounting bolts and PCV.

Installation is in the reverse order of removal.

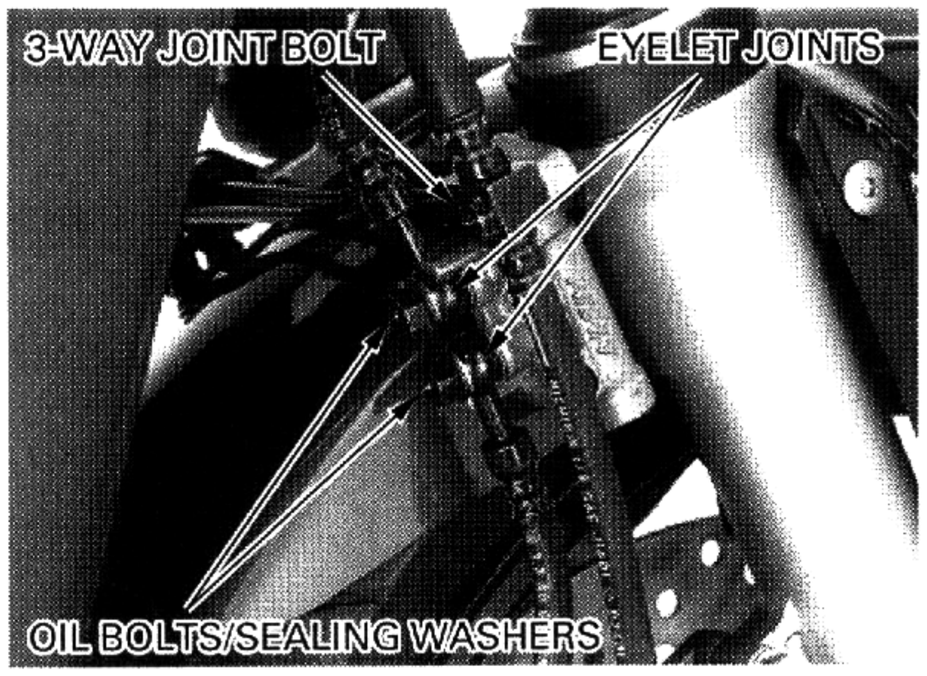


DELAY VALVE

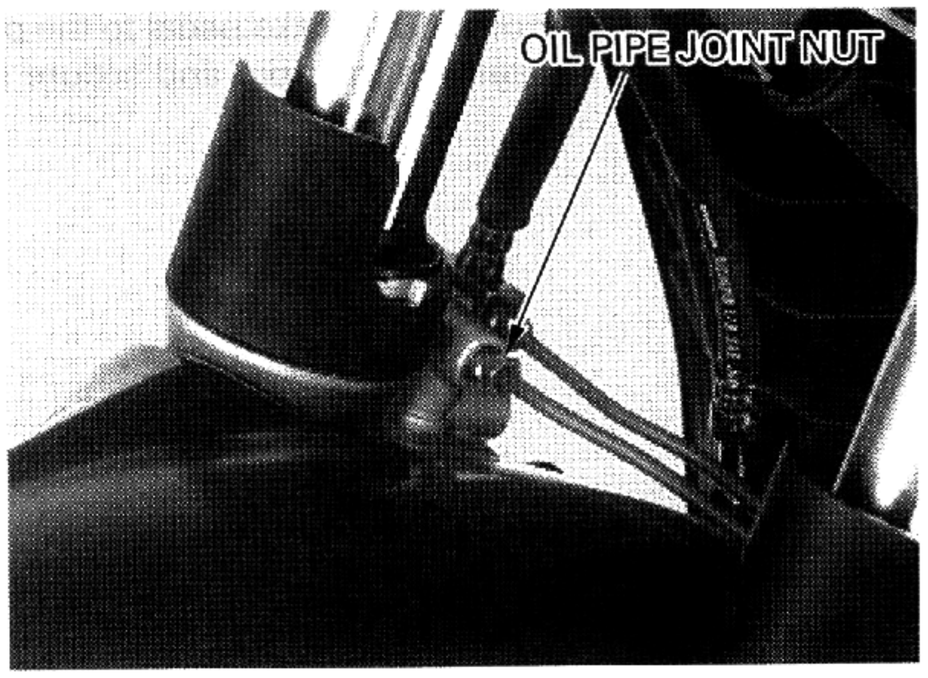
REMOVAL

Remove the oil bolts, sealing washers and brake hose eyelets from the delay valve.

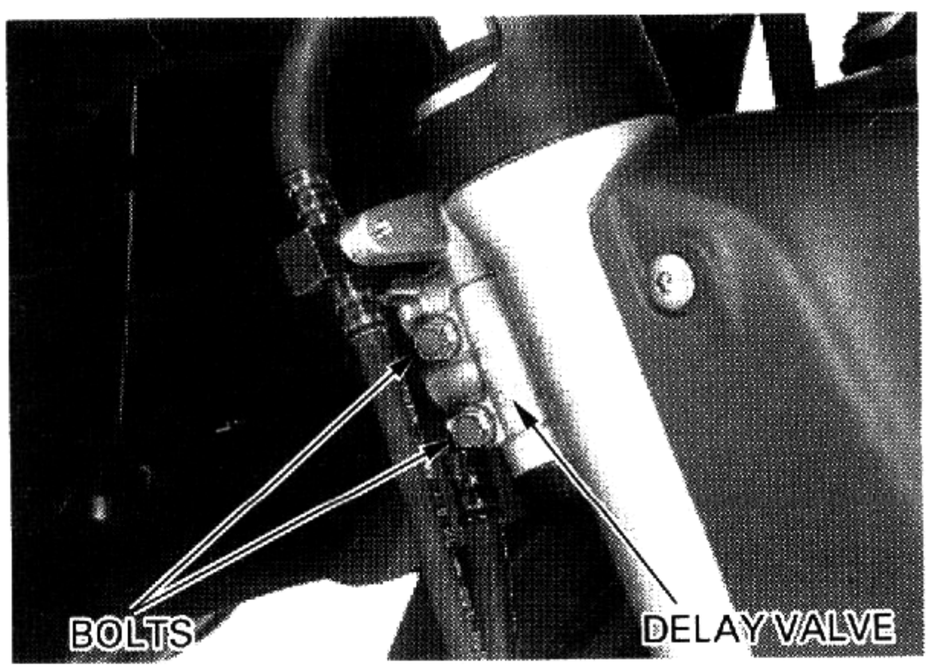
Remove the brake 3-way joint mounting bolt.



Remove the brake pipe joint nut.



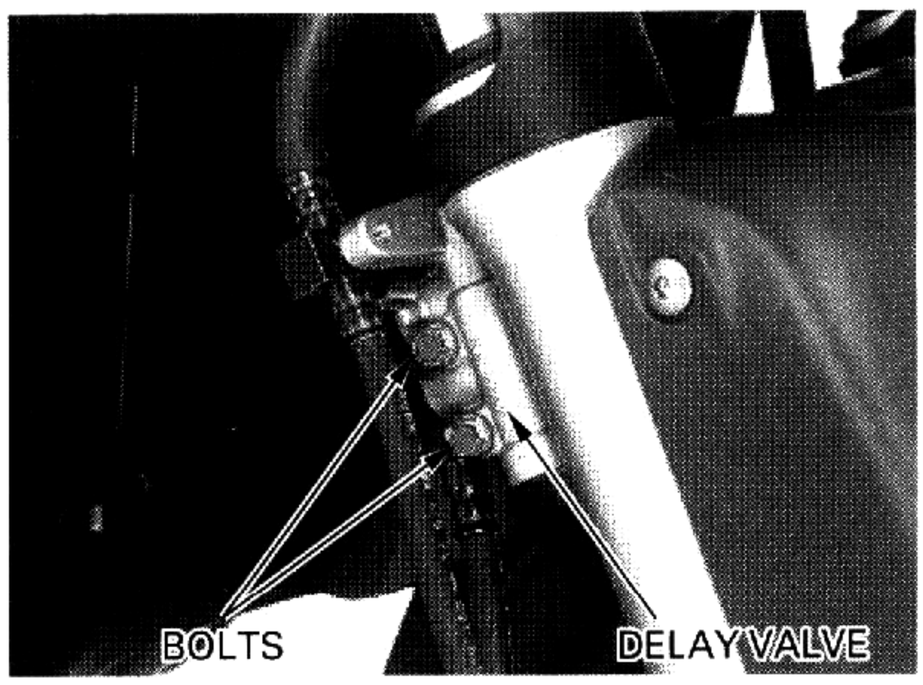
Remove the two mounting bolts and delay valve.



INSTALLATION

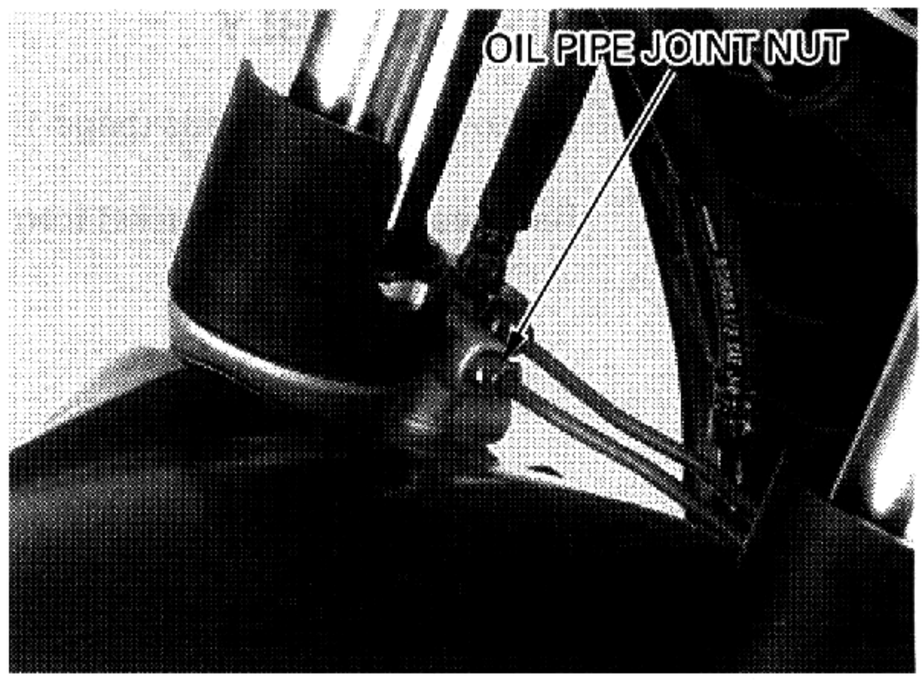
Install the delay valve onto the right fork slide while installing the brake pipe into the delay valve.
Install and tighten the delay valve mounting bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



Tighten the brake pipe joint nut to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m , 12 lbf·ft)



Install the 3 way joint and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the brake hose with the oil bolt and new sealing washers.
Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m , 25 lbf·ft)

Fill the reservoir to the upper level and bleed the pedal brake line (page 15-8).



FRONT BRAKE CALIPER

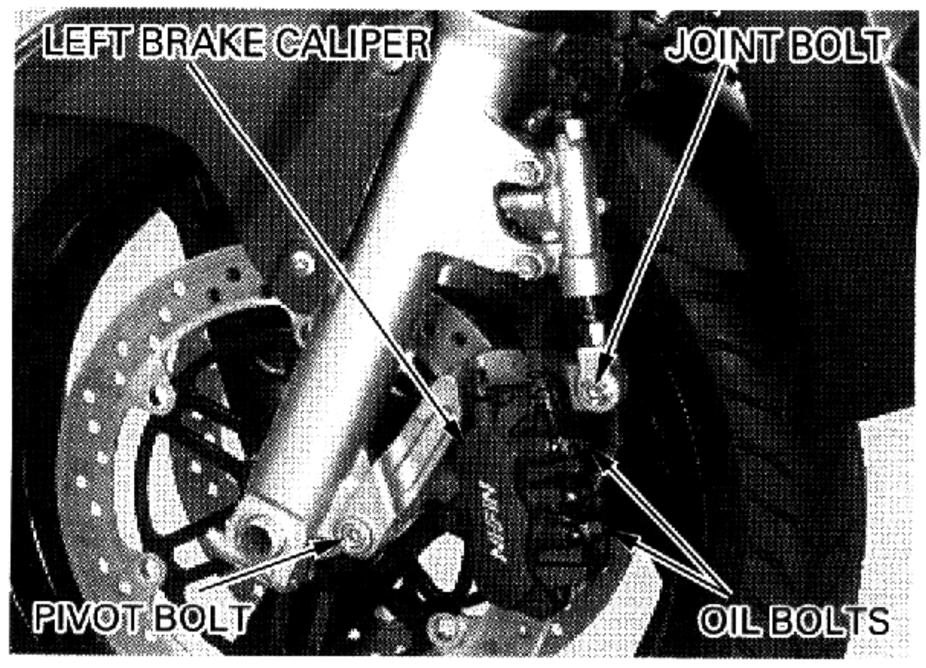
LEFT CALIPER REMOVAL

CAUTION:

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

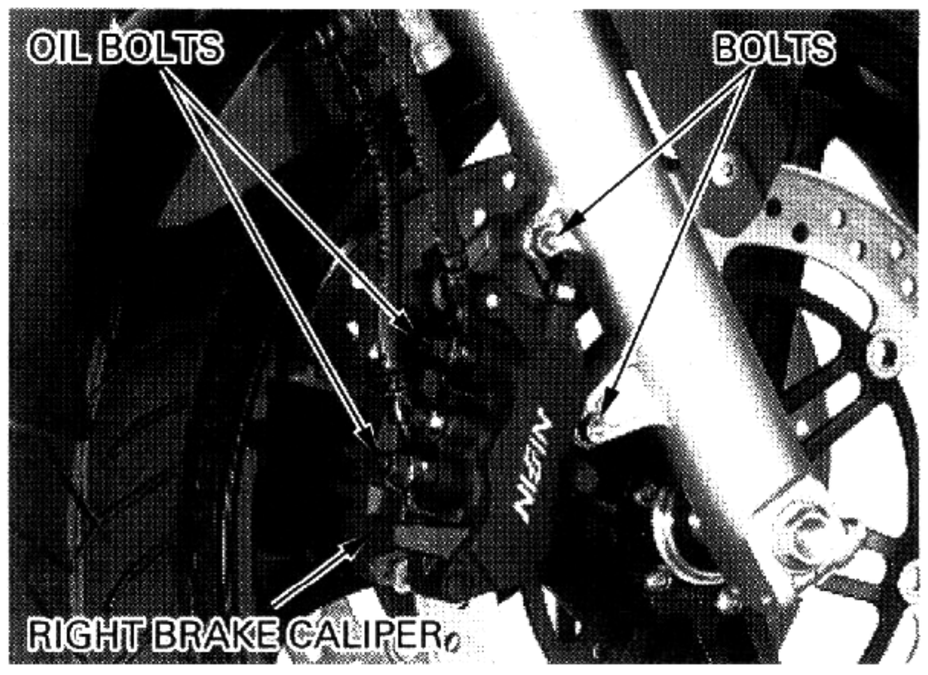
Drain the lever and pedal brake line hydraulic system (page 15-5).

Remove the oil bolts, sealing washers and brake hose eyelet joints.
Remove the secondary master cylinder joint bolt and caliper pivot bolt, then remove the caliper/ bracket as an assembly.



RIGHT CALIPER REMOVAL

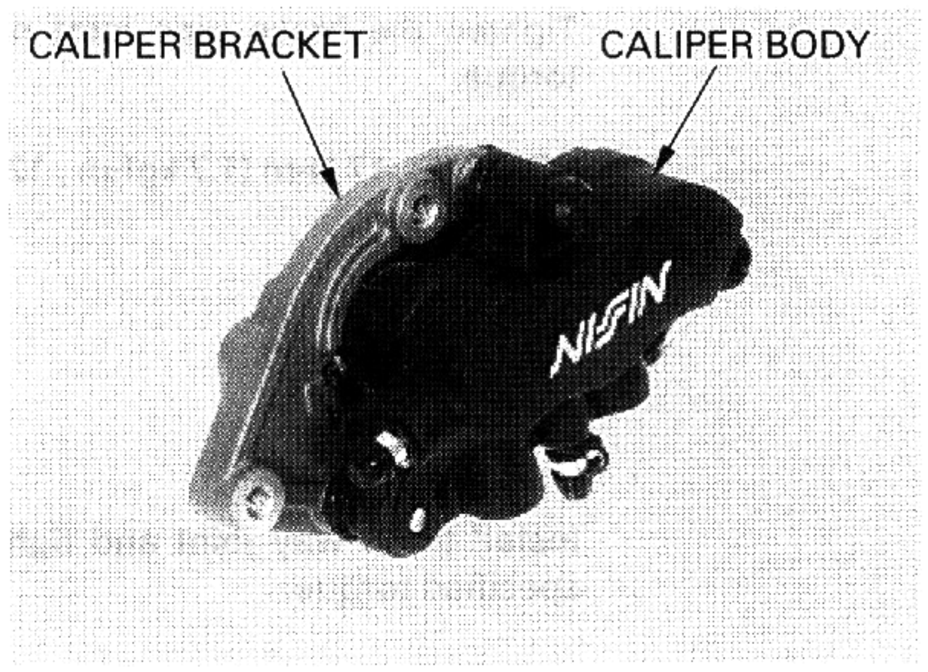
Remove the oil bolts, sealing washers and brake hose eyelet joints.
Remove the caliper bracket mounting bolts and then remove the caliper/bracket assembly.



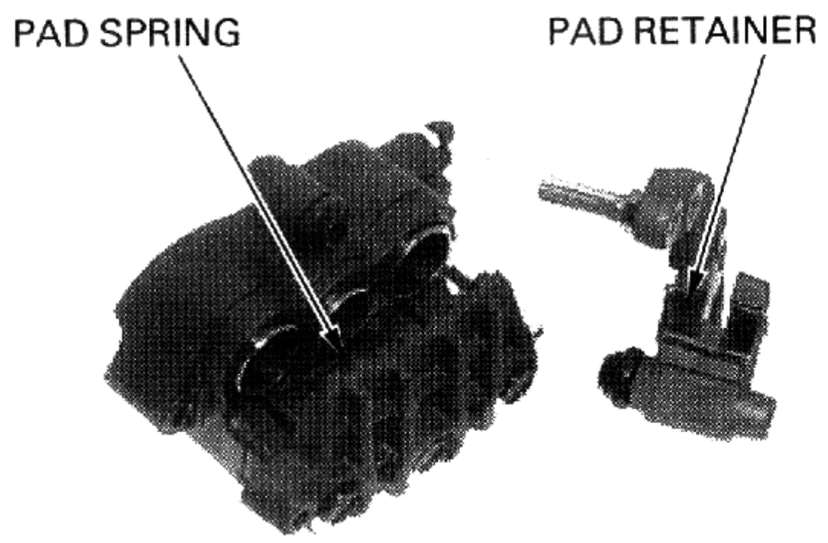
DISASSEMBLY

Remove the brake pads (page 15-12).

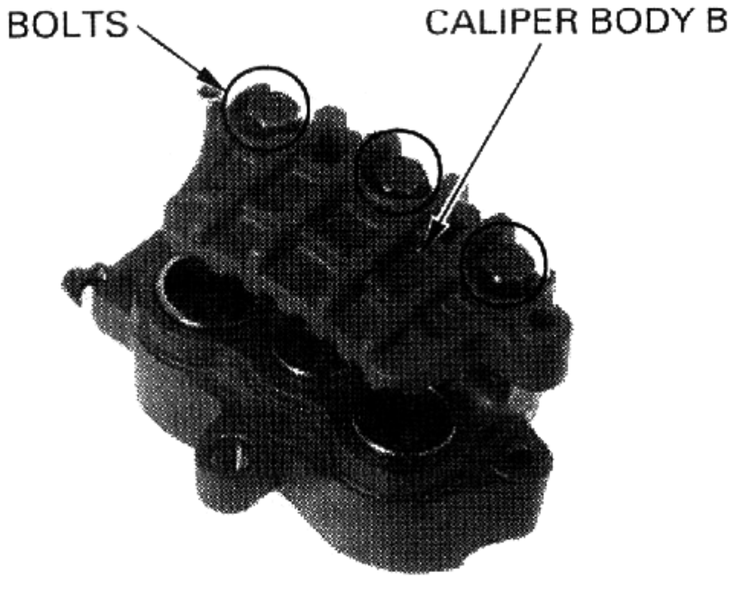
Remove the caliper bracket from the caliper body.



Remove the brake pad spring from the caliper body.
Remove the brake pad retainer from the caliper bracket.

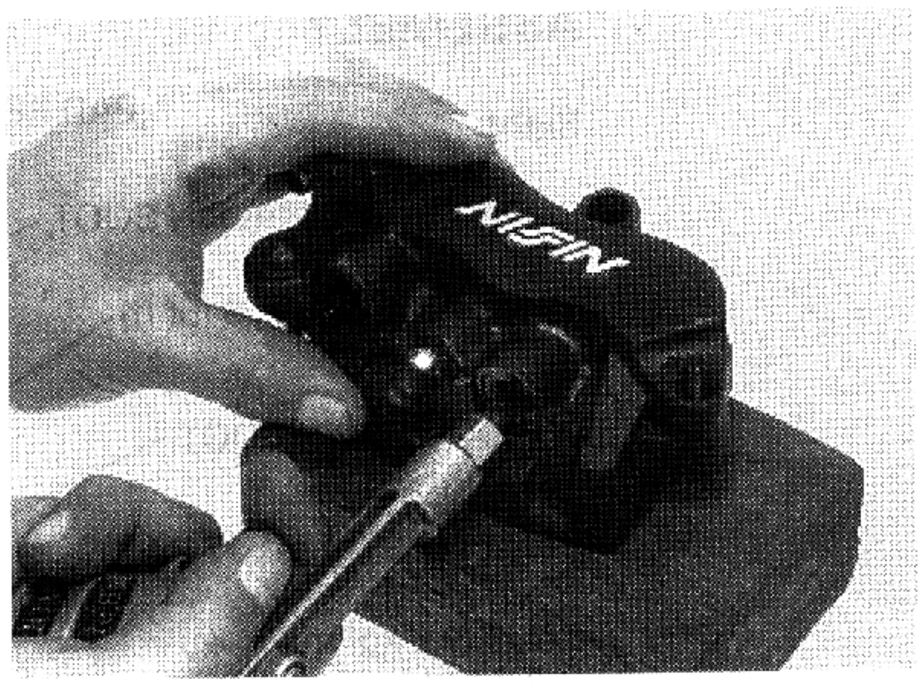


Remove the bolts and caliper body B.



Mark the pistons to ensure correct reassembly.

Place the piece of wood sheet under the caliper pistons.
Apply small squirts of air pressure to the fluid inlet to remove the pistons.



⚠WARNING

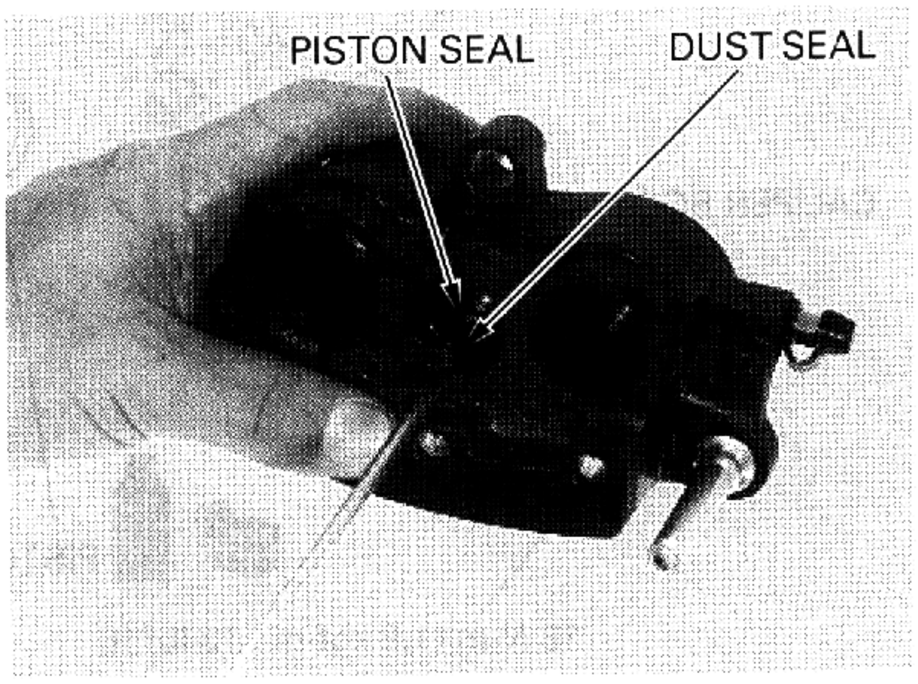
Do not use high pressure air or bring the nozzle too close to the inlet.

Push the dust seals and piston seals in and lift them out.

CAUTION:

Be careful not to damage the piston sliding surface.

Clean the seal grooves with clean brake fluid.

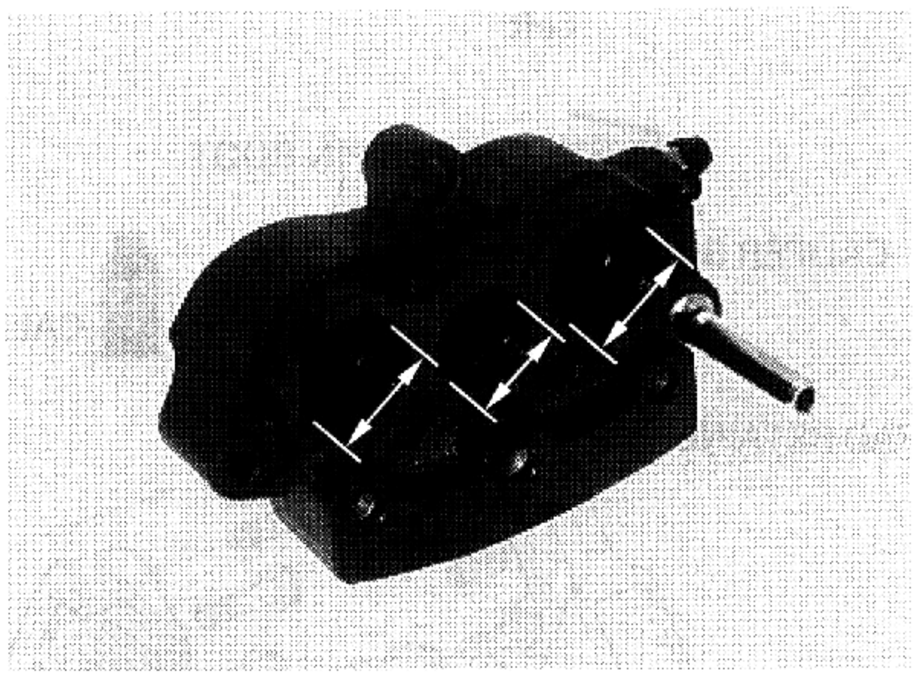


INSPECTION

Check the caliper cylinder for scoring or other damage.
Measure the caliper cylinder I.D.

SERVICE LIMITS:

Right:	**Upper:**	27.060 mm (1.0654 in)
	Middle:	22.710 mm (0.8941 in)
	Lower:	25.460 mm (1.0024 in)
Left:	**Upper:**	25.460 mm (1.0024 in)
	Middle:	22.710 mm (0.8941 in)
	Lower:	22.710 mm (0.8941 in)

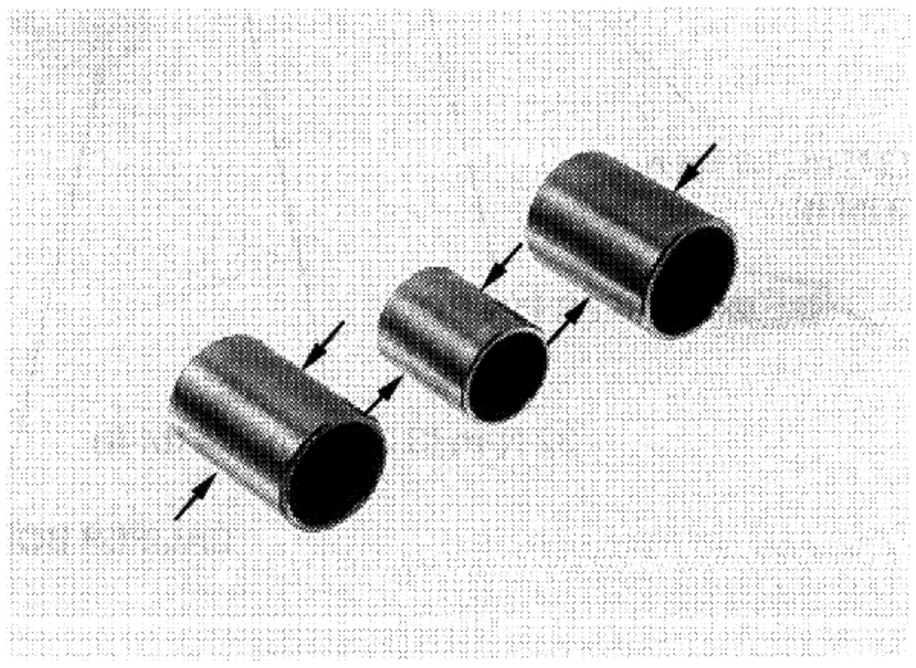


Check the caliper pistons for scratches, scoring or other damage.

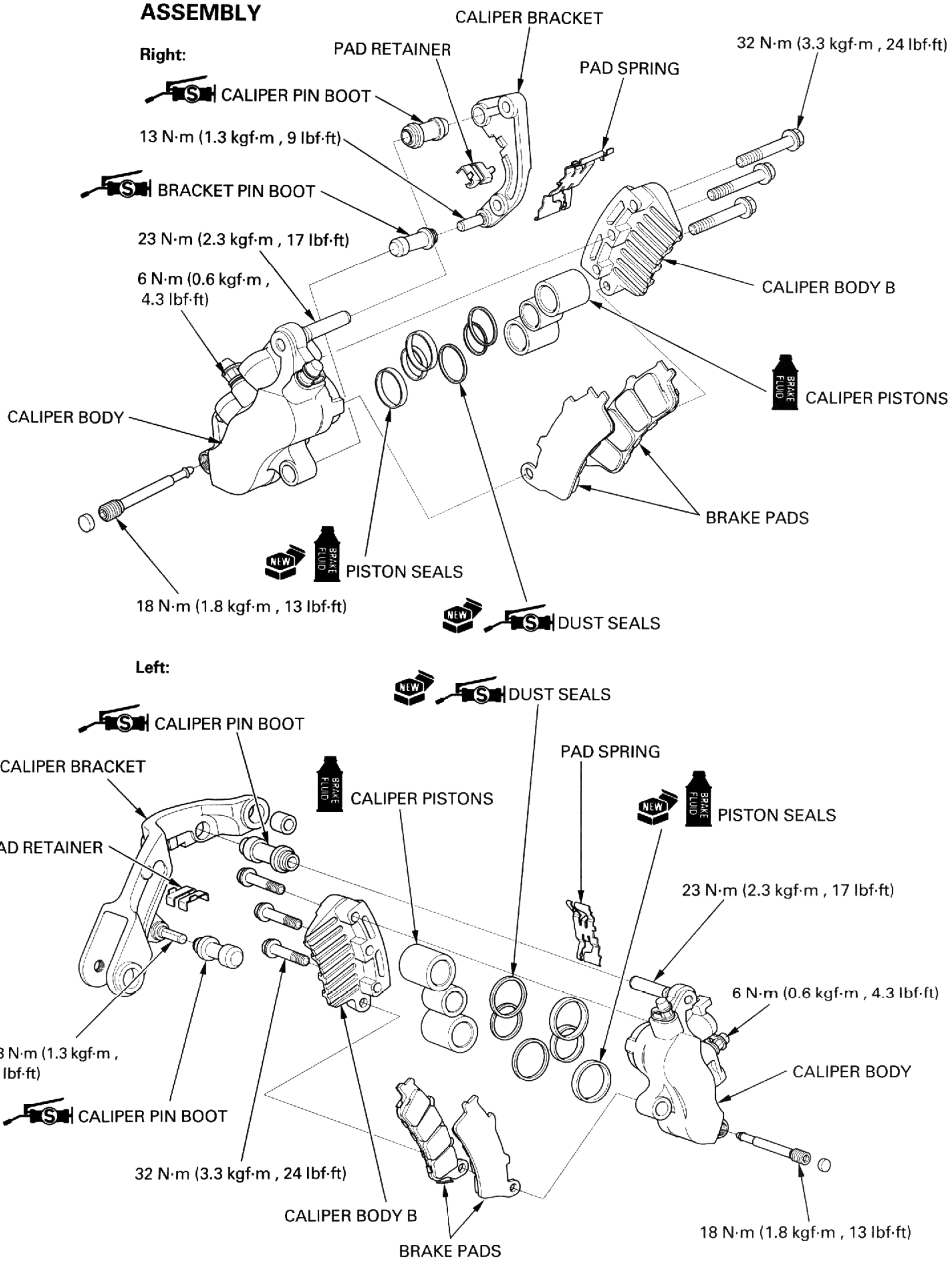
Measure the caliper piston O.D.

SERVICE LIMITS:

Right:	**Upper:**	26.910 mm (1.0594 in)
	Middle:	22.560 mm (0.8882 in)
	Lower:	25.310 mm (0.9965 in)
Left:	**Upper:**	25.310 mm (0.9965 in)
	Middle:	22.560 mm (0.8882 in)
	Lower:	22.560 mm (0.8882 in)



ASSEMBLY

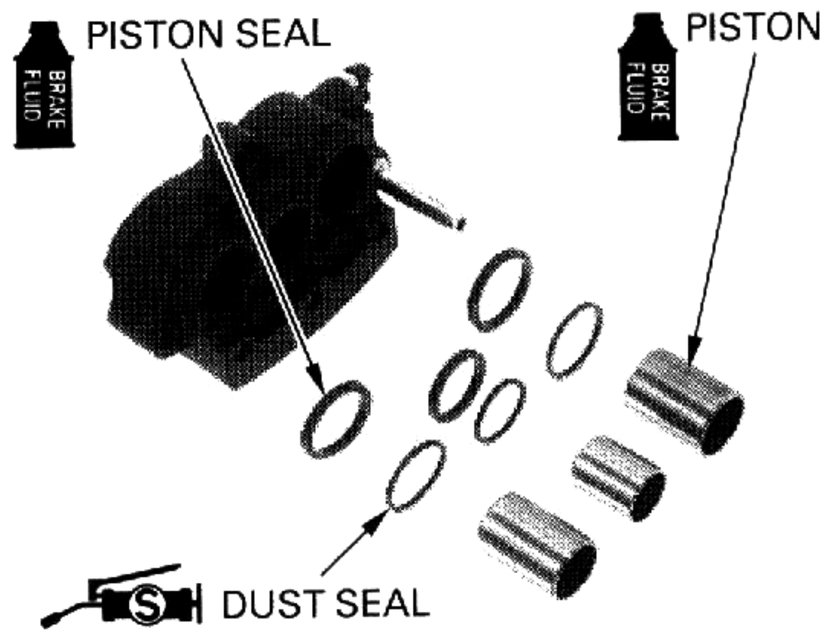

Right:
CALIPER BRACKET
PAD RETAINER
PAD SPRING
32 N·m (3.3 kgf·m , 24 lbf·ft)
CALIPER PIN BOOT
13 N·m (1.3 kgf·m , 9 lbf·ft)
BRACKET PIN BOOT
23 N·m (2.3 kgf·m , 17 lbf·ft)
6 N·m (0.6 kgf·m , 4.3 lbf·ft)
CALIPER BODY B
CALIPER BODY
CALIPER PISTONS
BRAKE PADS
PISTON SEALS
18 N·m (1.8 kgf·m , 13 lbf·ft)
DUST SEALS
Left:
DUST SEALS
CALIPER PIN BOOT
CALIPER BRACKET
CALIPER PISTONS
PAD SPRING
PISTON SEALS
PAD RETAINER
23 N·m (2.3 kgf·m , 17 lbf·ft)
6 N·m (0.6 kgf·m , 4.3 lbf·ft)
13 N·m (1.3 kgf·m , 9 lbf·ft)
CALIPER BODY
CALIPER PIN BOOT
32 N·m (3.3 kgf·m , 24 lbf·ft)
CALIPER BODY B
18 N·m (1.8 kgf·m , 13 lbf·ft)
BRAKE PADS

Coat the new piston seals with clean brake fluid.
Coat the new dust seals with silicone grease.

Install the each piston seal, dust seal and caliper piston in their proper locations.

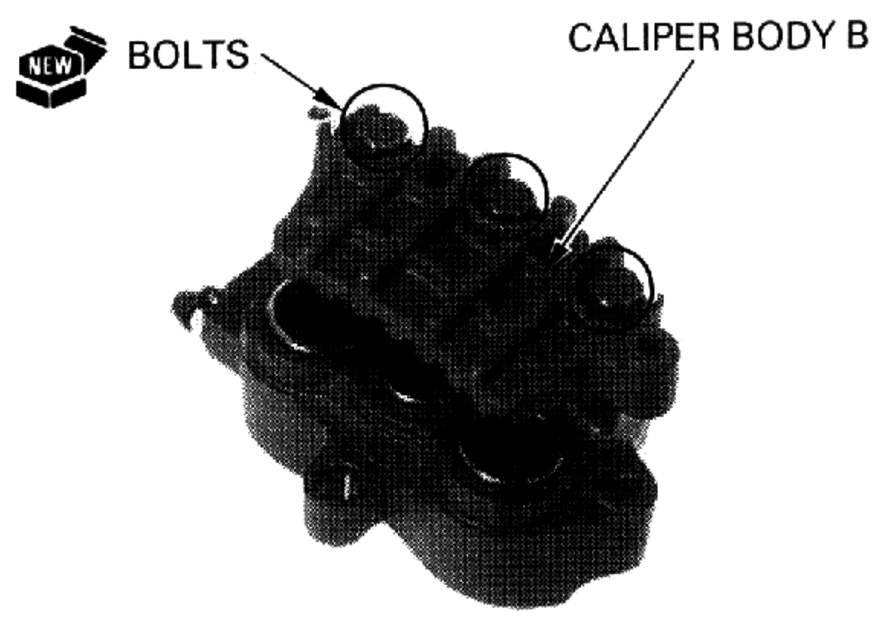
Install the pistons and dust seals into the groove of the caliper body.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their opening ends toward the pad.



Install the caliper body B and tighten the new bolts to the specified torque.

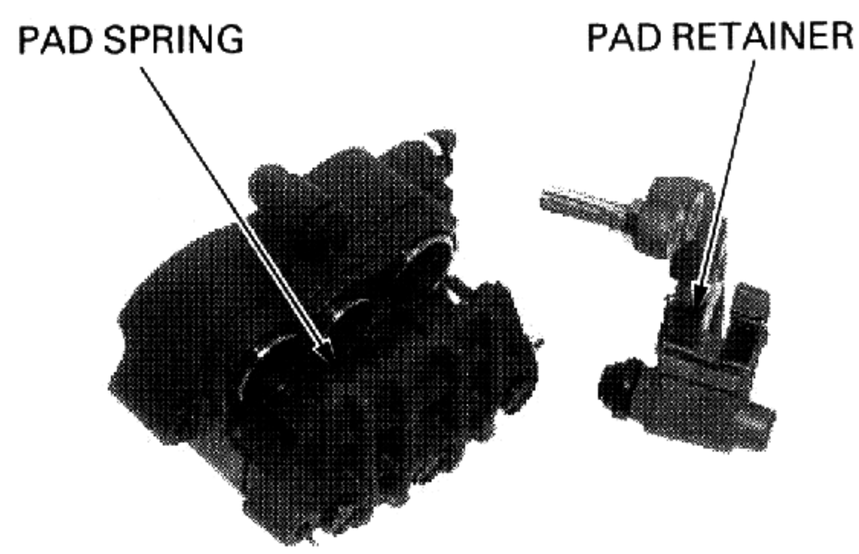
TORQUE: 32 N·m (3.3 kgf·m , 24 lbf·ft)



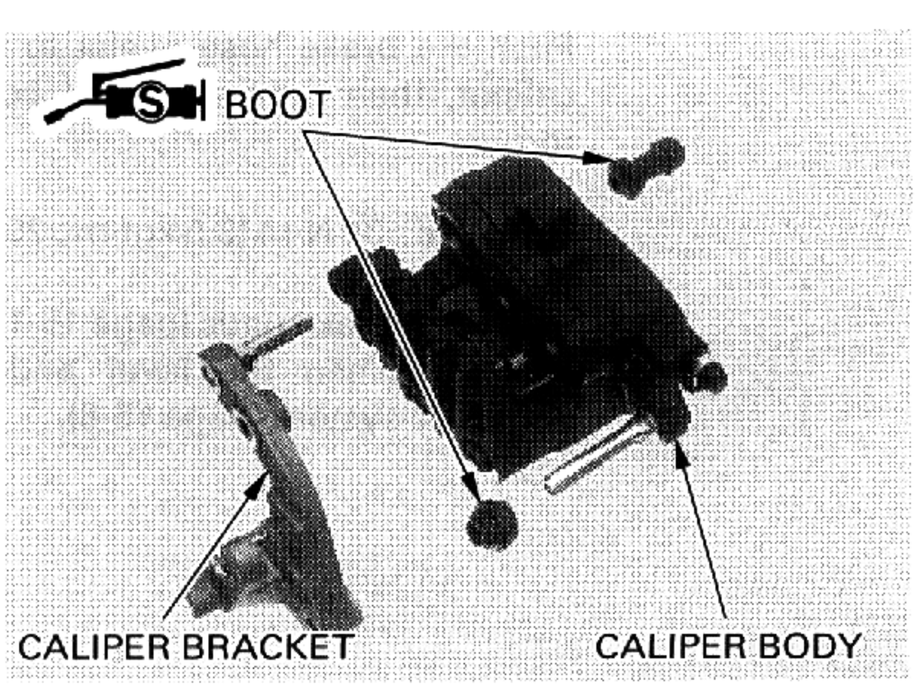
Install the brake pad retainer onto the caliper bracket.

Note the installation direction of the pad spring.

Install the pad spring into the caliper body.



Apply silicone grease to the boot inside then install them.
Assemble the caliper and bracket.

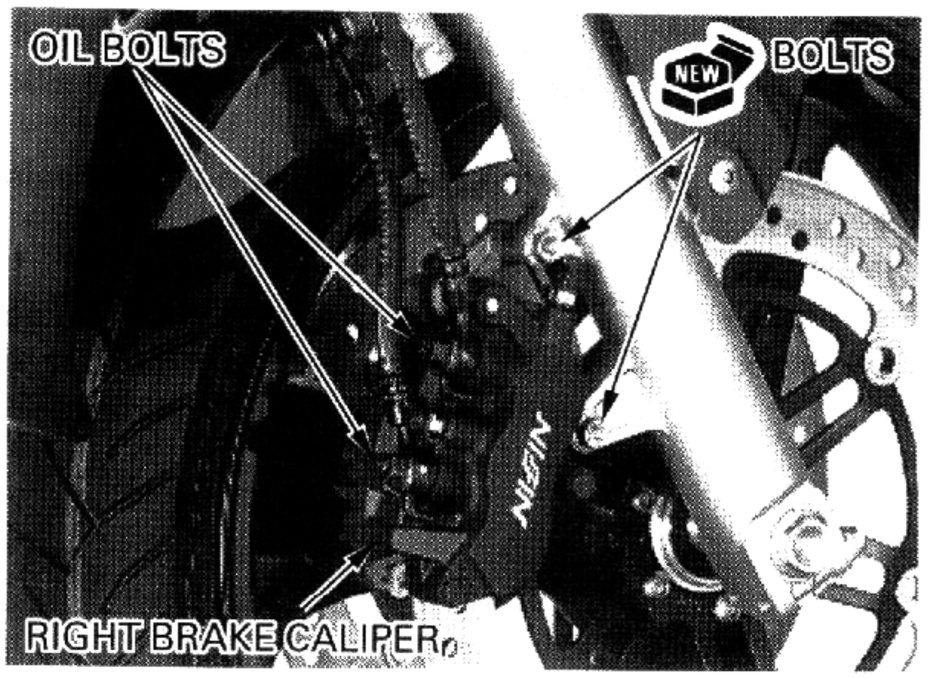


RIGHT CALIPER INSTALLATION

Install the right brake caliper/bracket assembly over the brake disc.
Install and tighten the new caliper mounting bolts.

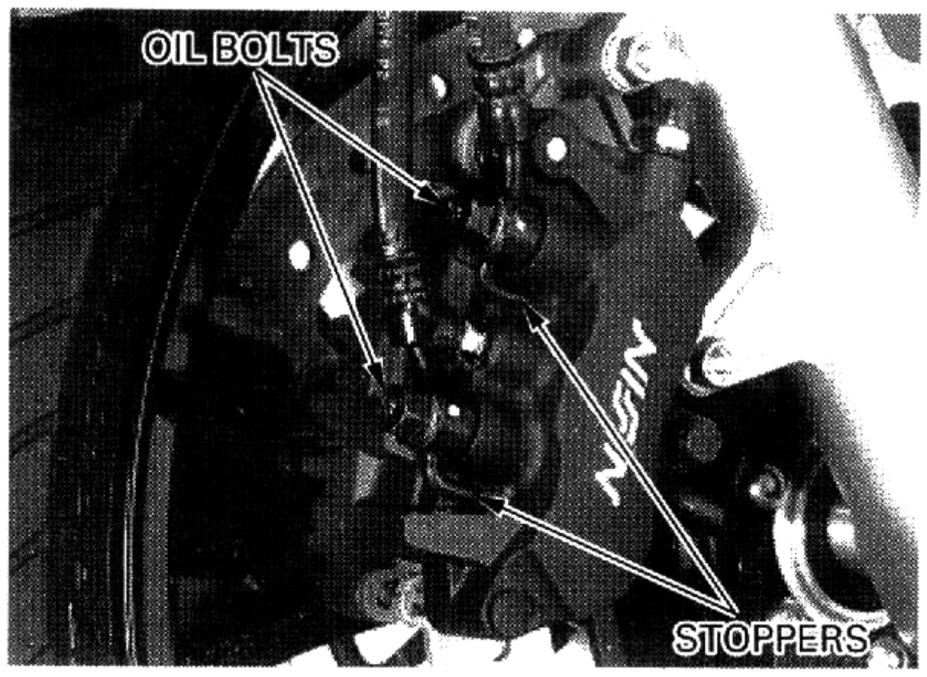
TORQUE: 31 N·m (3.2 kgf·m , 23 lbf·ft)

Install the brake hose eyelets to the caliper body with two new sealing washers and oil bolt.



Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m , 25 lbf·ft)

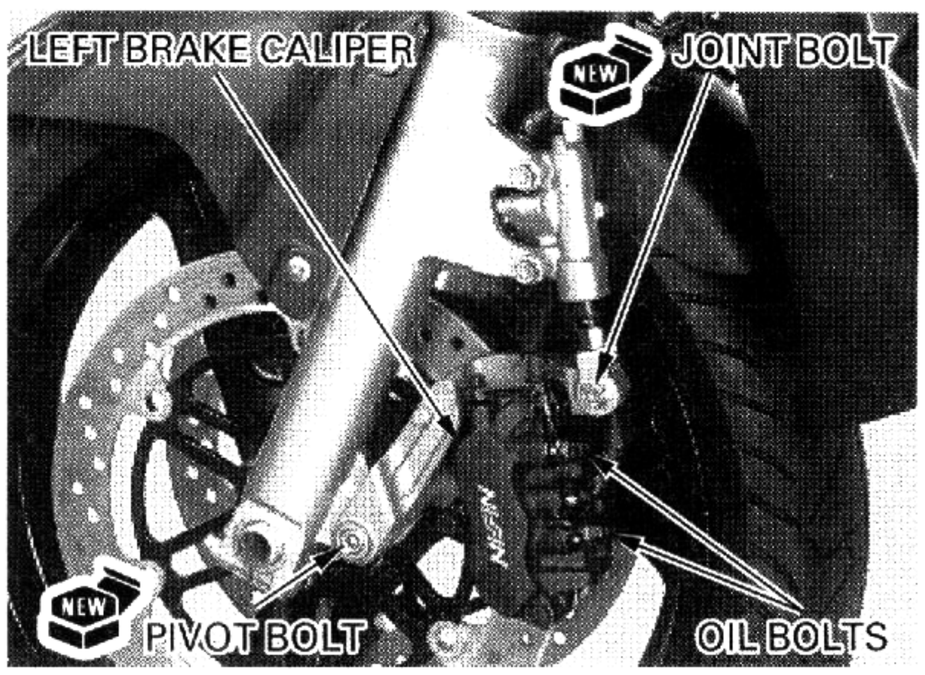


LEFT CALIPER INSTALLATION

Install the left brake caliper/bracket assembly over the brake disc.
Install the new caliper pivot bolt and secondary master cylinder joint bolt.
Tighten the bolts to the specified torque.

TORQUE:
Pivot bolt: 31 N·m (3.2 kgf·m , 23 lbf·ft)
Joint bolt: 26 N·m (2.7 kgf·m , 20 lbf·ft)

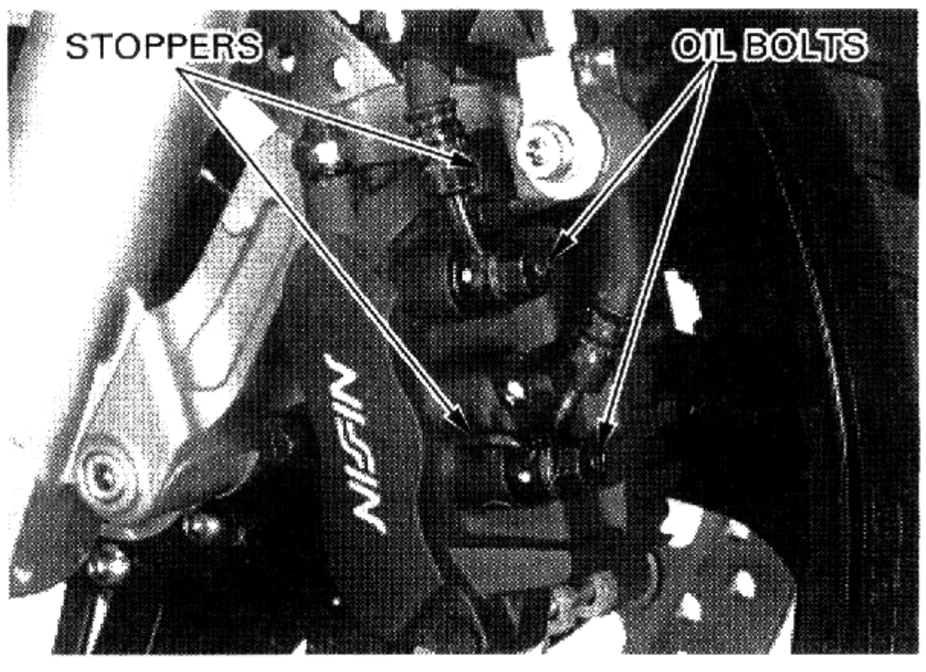
Install the brake hose eyelets to the caliper body with two new sealing washers and oil bolt.



Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m , 25 lbf·ft)

Install the brake pads (page 15-12).
Fill and bleed the lever and pedal line brake hydraulic system (page 15-8).

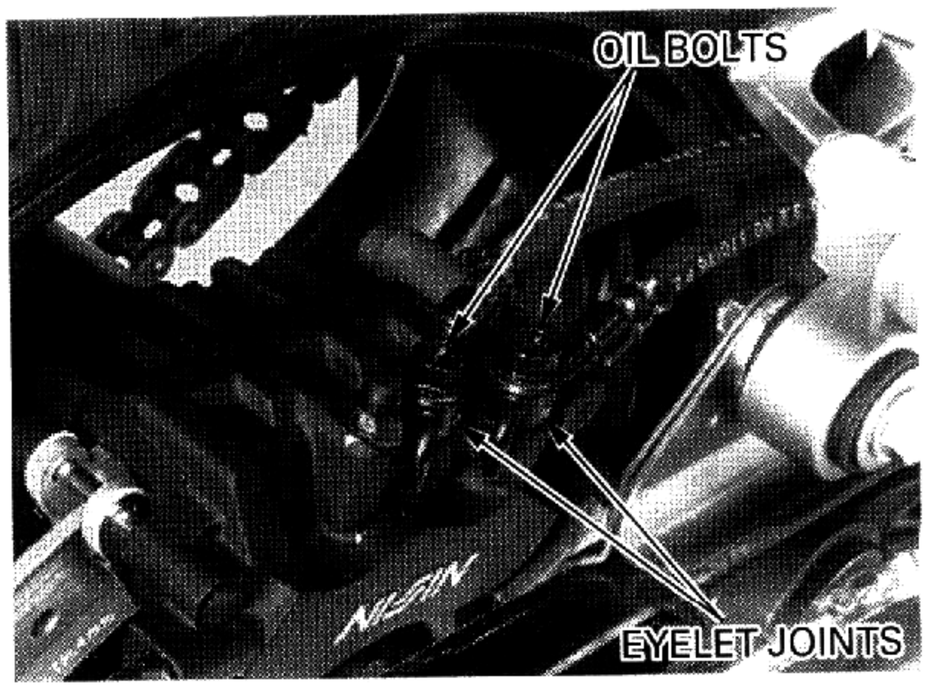


REAR BRAKE CALIPER

REMOVAL

Drain the pedal line brake hydraulic system (page 15-5).
Loosen the oil bolts, then remove the rear wheel (page 14-3).

Remove the oil bolts, sealing washers and brake hose eyelet joints.



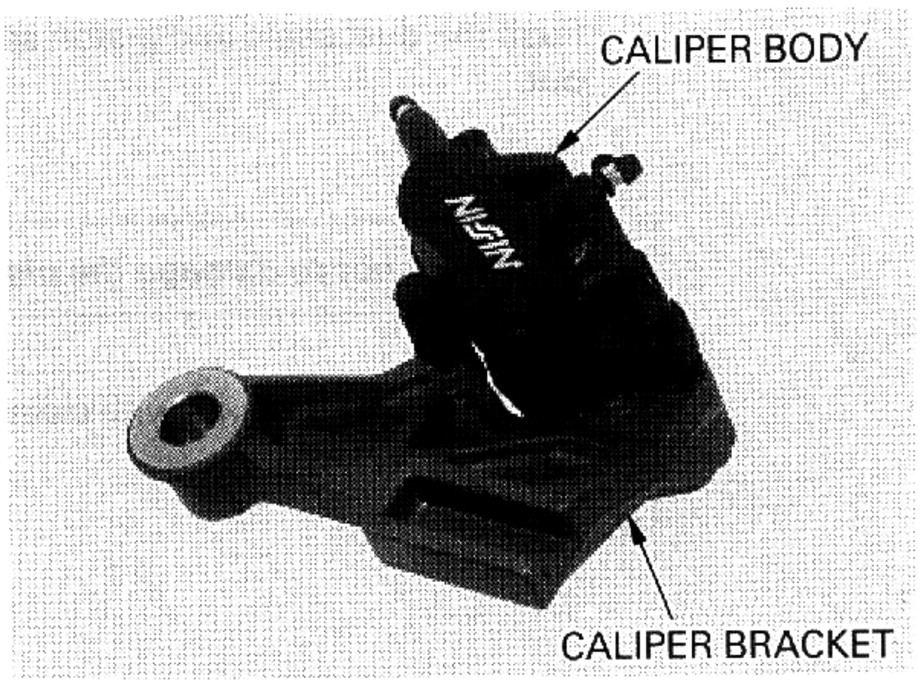
CAUTION:

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

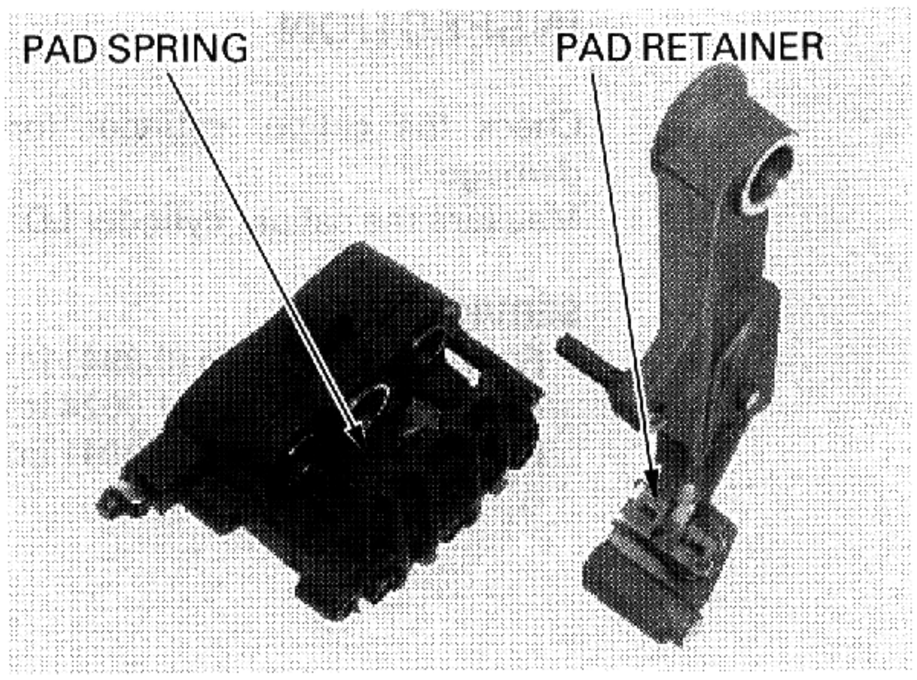
DISASSEMBLY

Remove the rear brake pads (page 15-14).

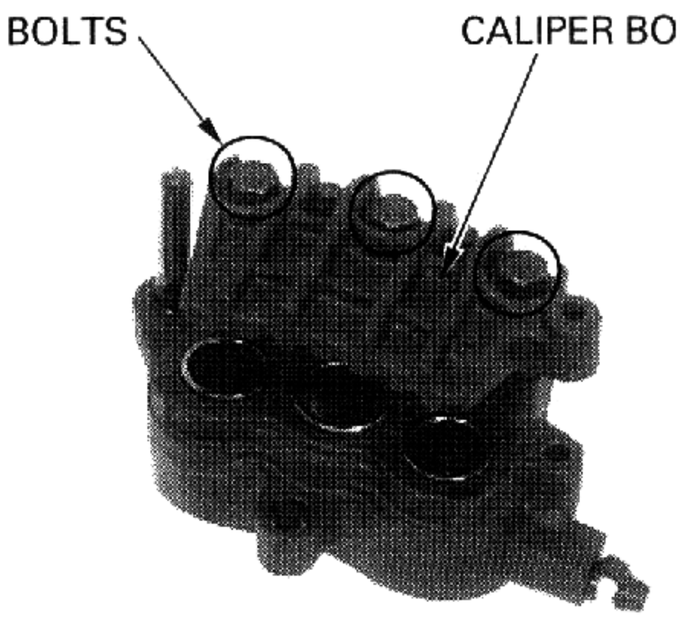
Remove the caliper bracket from the caliper body.



Remove the brake pad spring from the caliper body.
Remove the brake pad retainer from the caliper bracket.

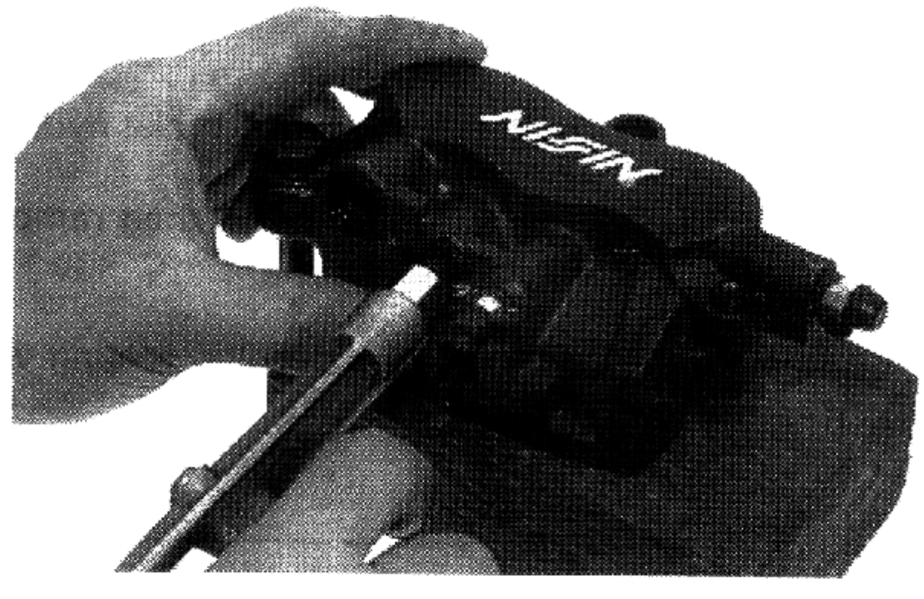


Remove the bolts and caliper body B.



Mark the pistons to ensure correct reassembly.

Place the piece of wood sheet under the caliper pistons.
Apply small squirts of air pressure to the fluid inlet to remove the pistons.



⚠WARNING

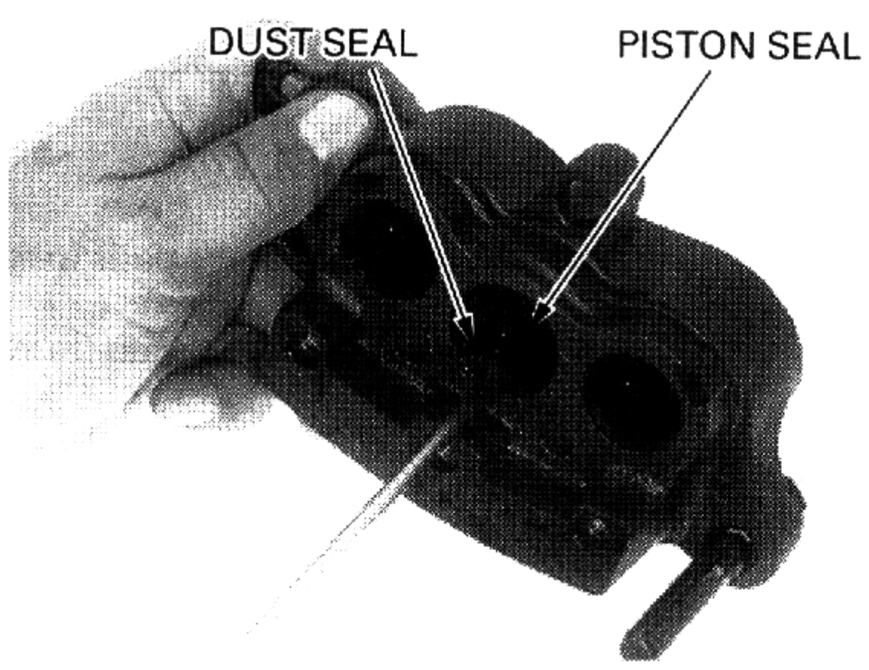
Do not use high pressure air or bring the nozzle too close to the inlet.

Push the dust seals and piston seals in and lift them out.

CAUTION:

Be careful not to damage the piston sliding surface.

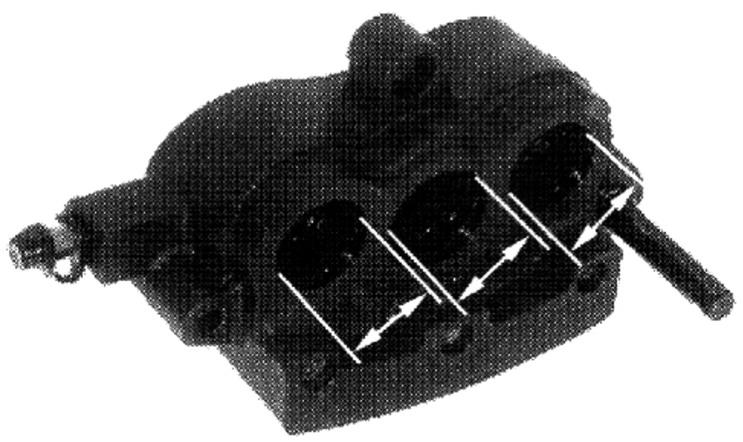
Clean the seal grooves with clean brake fluid.



INSPECTION

Check the caliper cylinder for scoring or other damage.
Measure the caliper cylinder I.D.

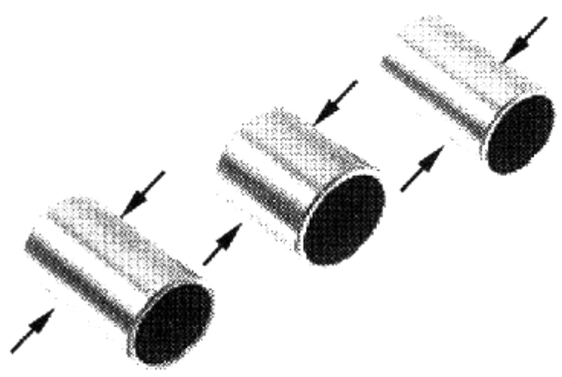
SERVICE LIMITS:
Front: 22.710 mm (0.8941 in)
Center: 25.460 mm (1.0024 in)
Rear: 22.710 mm (0.8941 in)



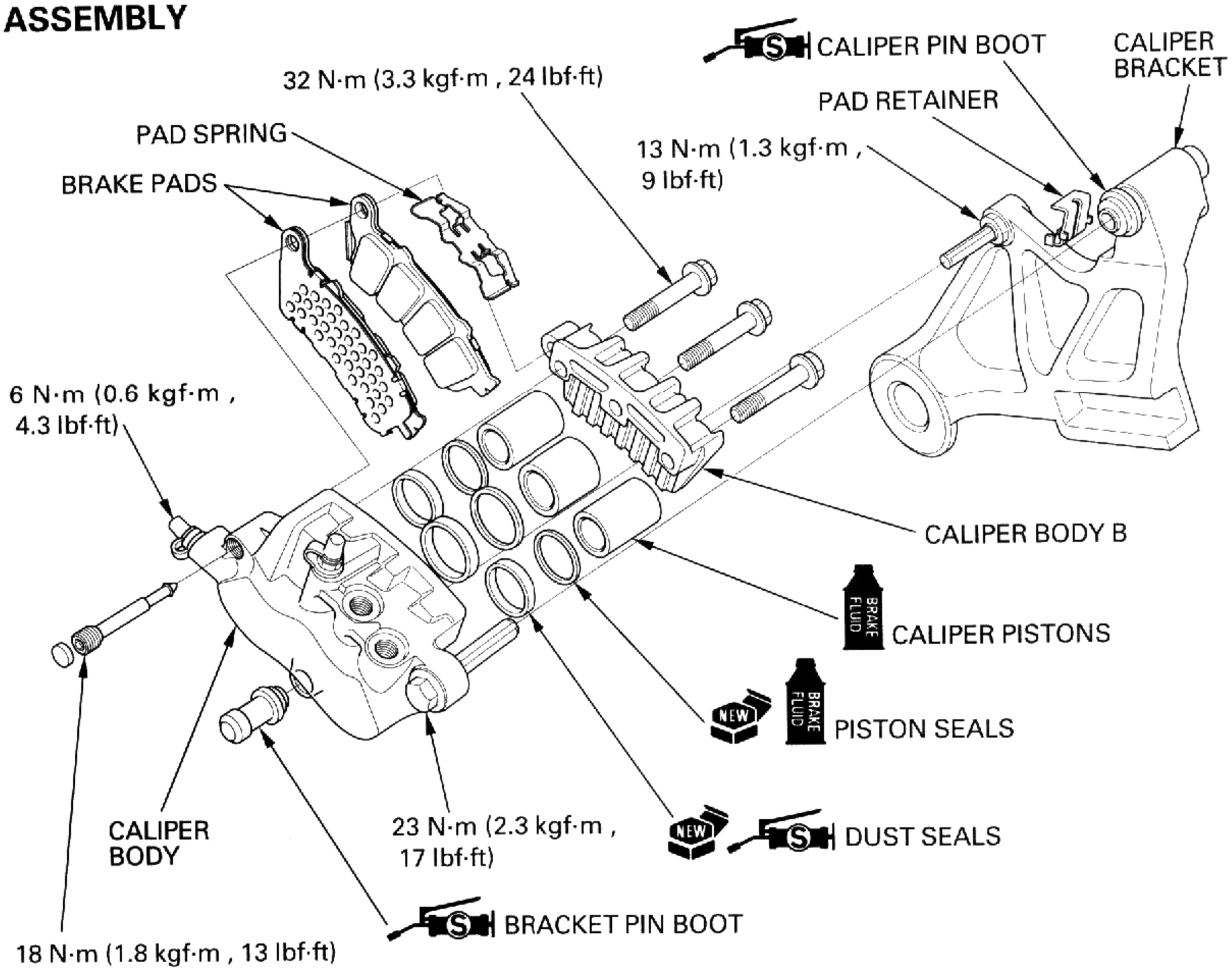
Check the caliper pistons for scratches, scoring or other damage.

Measure the caliper piston O.D.

SERVICE LIMITS:
Front: 22.560 mm (0.8882 in)
Center: 25.310 mm (0.9965 in)
Rear: 22.560 mm (0.8882 in)



ASSEMBLY

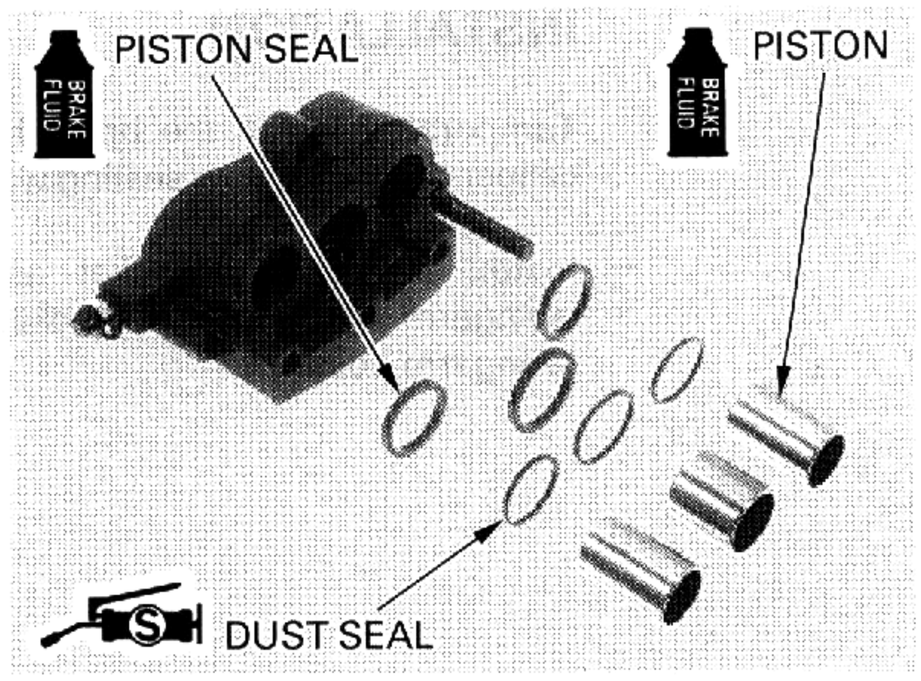


Coat the new piston seals with clean brake fluid.
Coat the new dust seals with silicone grease.

Install the pistons and dust seals into the groove of the caliper body.

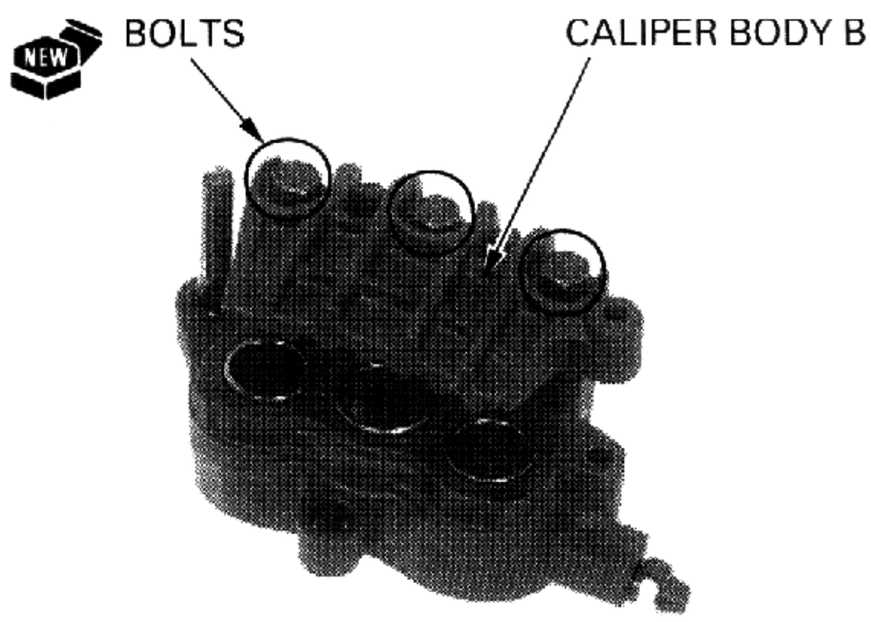
Install the each piston seal, dust seal and caliper piston in their proper locations.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their opening ends toward the pad.



Install the caliper body B and tighten the new bolts to the specified torque.

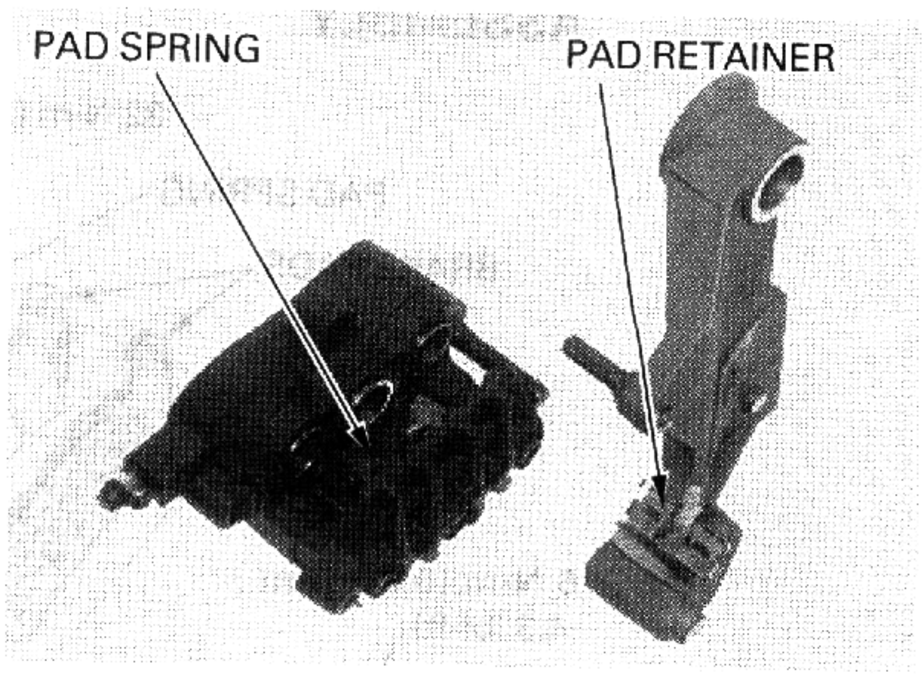
TORQUE: 32 N·m (3.3 kgf·m , 24 lbf·ft)



Install the brake pad retainer onto the caliper bracket.

Note the installation direction of the pad spring.

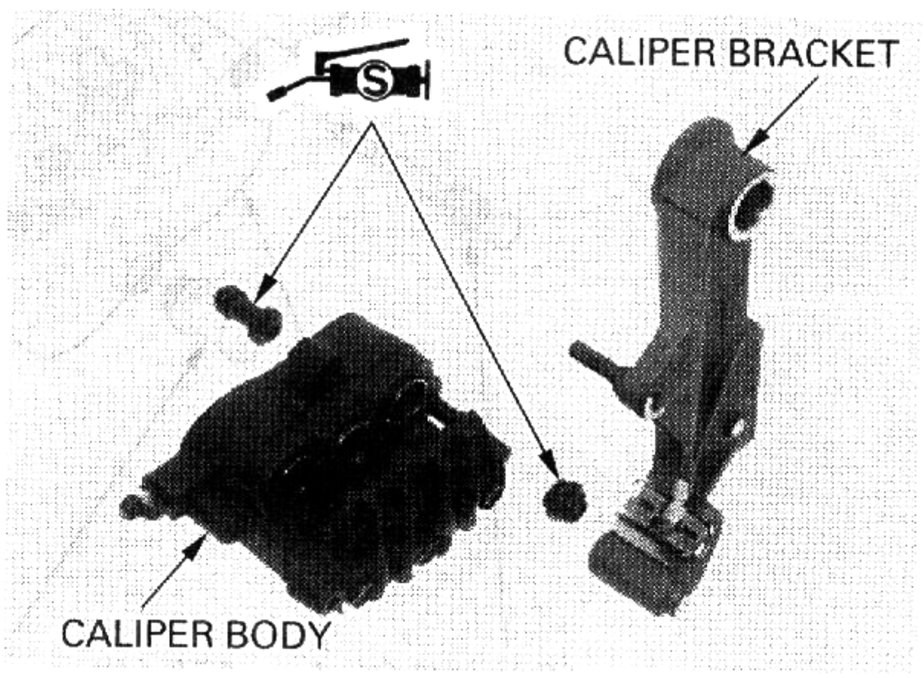
Install the pad spring into the caliper body.



Apply silicone grease to the boot inside then install them.

Assemble the caliper and bracket.

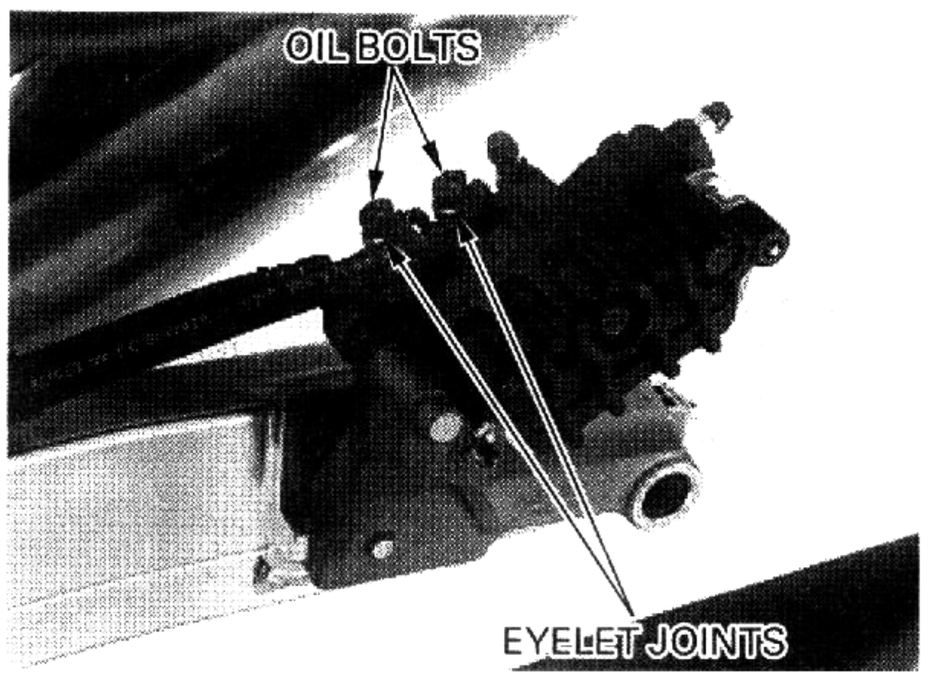
Install the rear brake pads (page 15-14).



INSTALLATION

Temporarily install the brake hose eyelets to the caliper body with new sealing washers and oil bolts.

Install the caliper/bracket assembly onto the swingarm aligning the bracket groove with the swingarm boss.

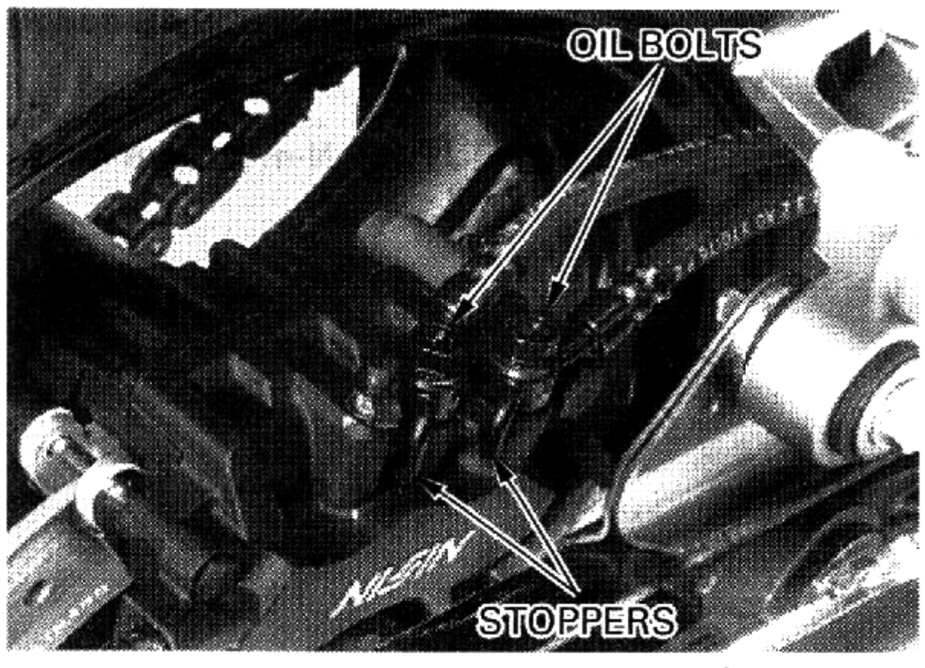


Install the rear wheel (page 14-8).

Push the brake hose eyelets to the stopper on the caliper, then tighten the oil bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m , 25 lbf·ft)

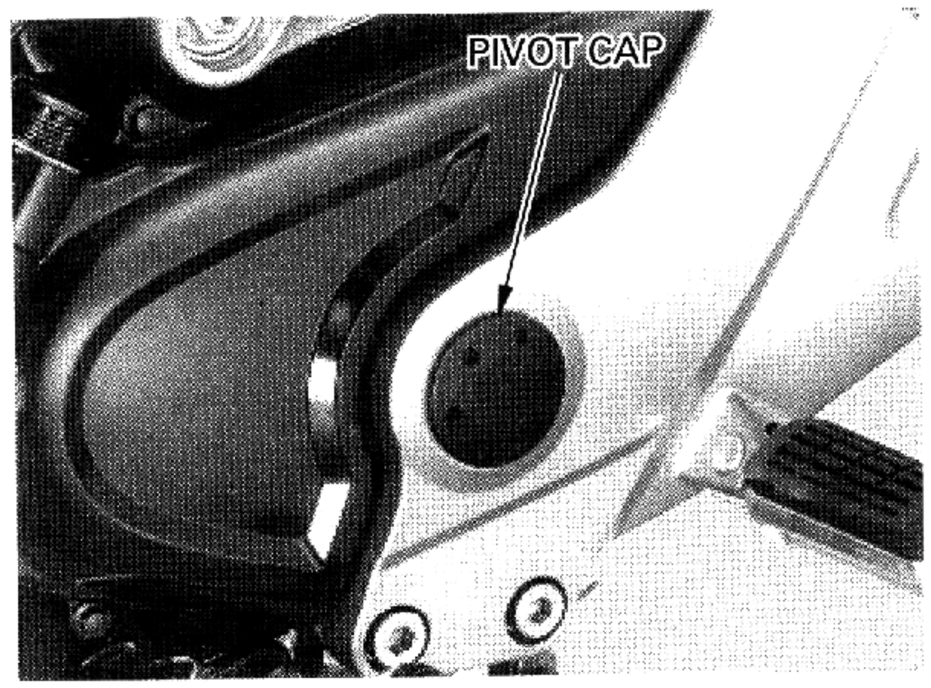
Fill and bleed the pedal brake line hydraulic system (page 15-8).



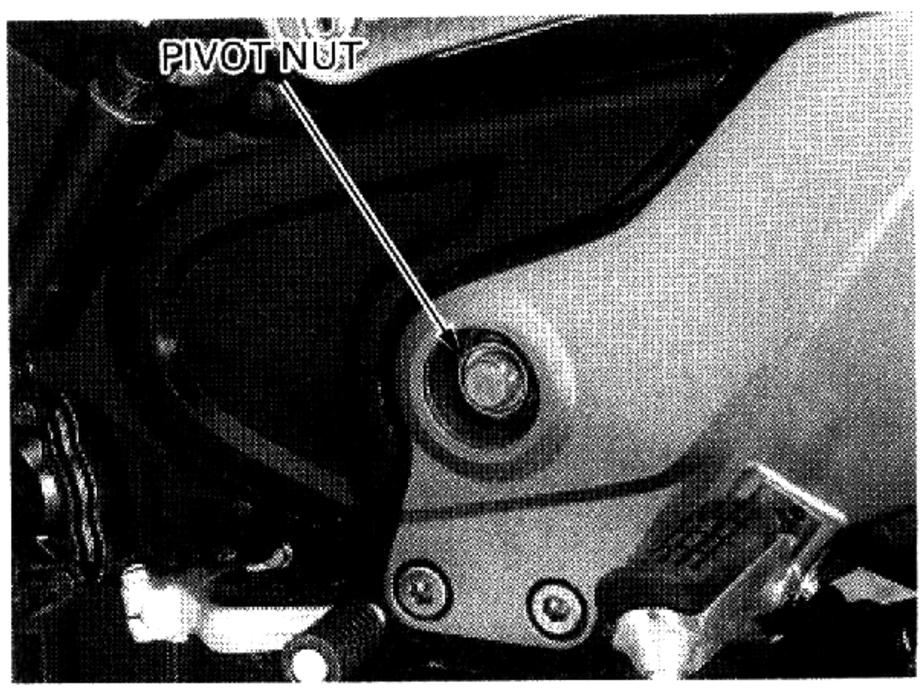
BRAKE PEDAL

REMOVAL

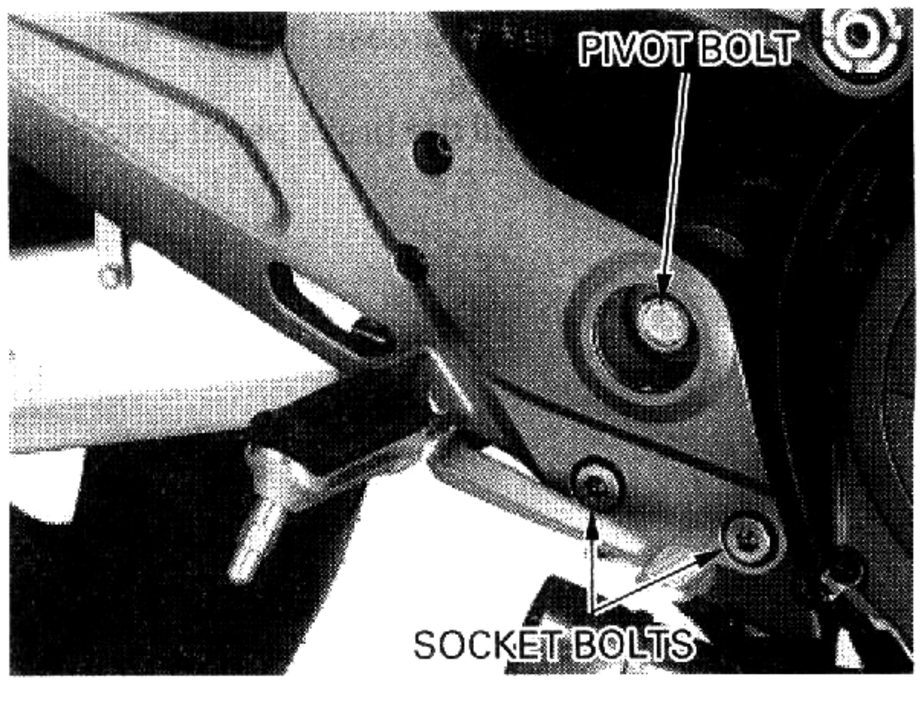
Remove the swingarm pivot cap.



Remove the swingarm pivot nut.

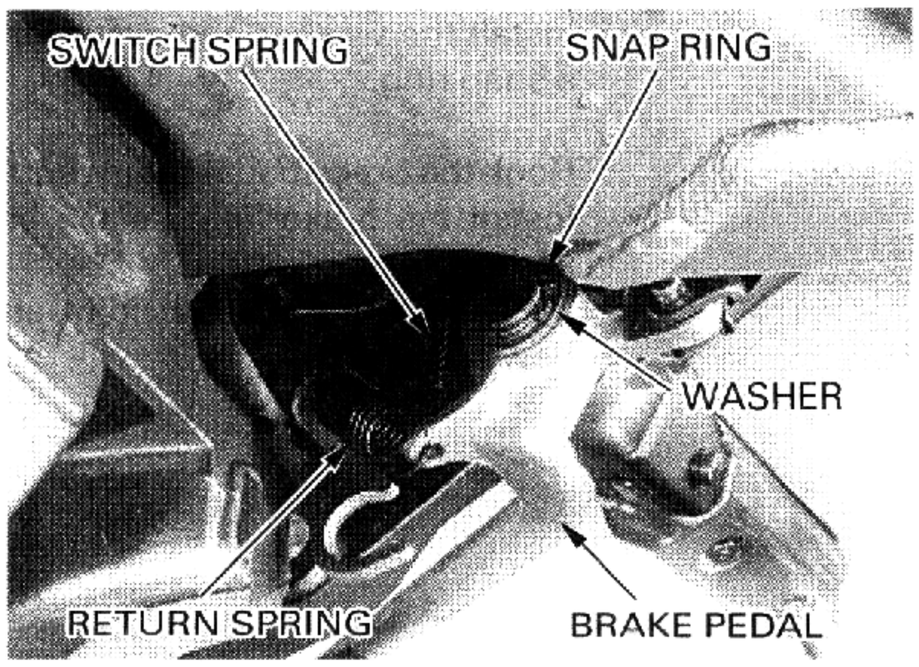


Remove the right footpeg/muffler bracket mounting socket bolts.
Pull the swingarm pivot bolt and right footpeg holder so that the brake pedal pivot snap ring can be removed.

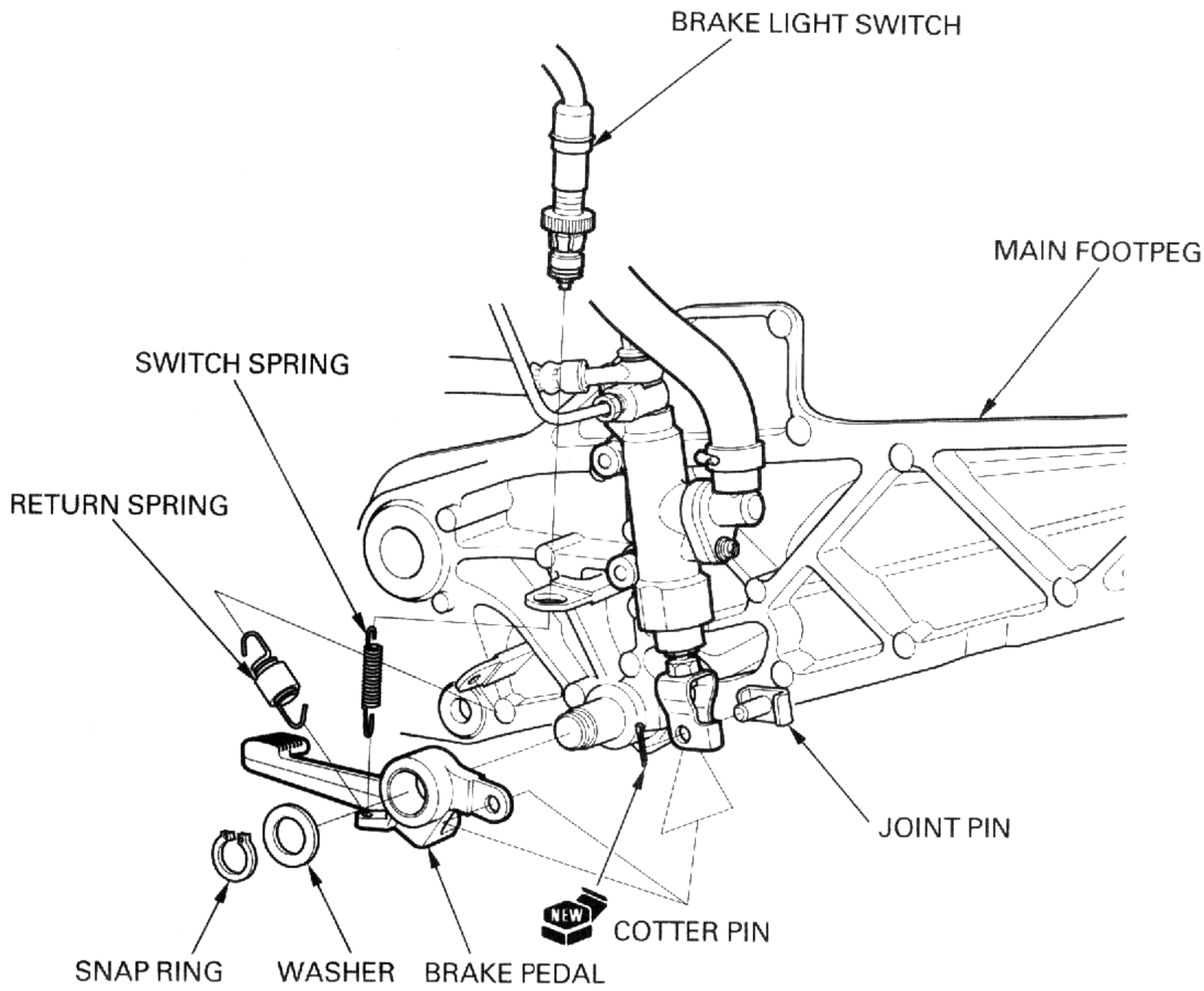


Remove and discard the brake pedal joint cotter pin.
Remove the joint pin.

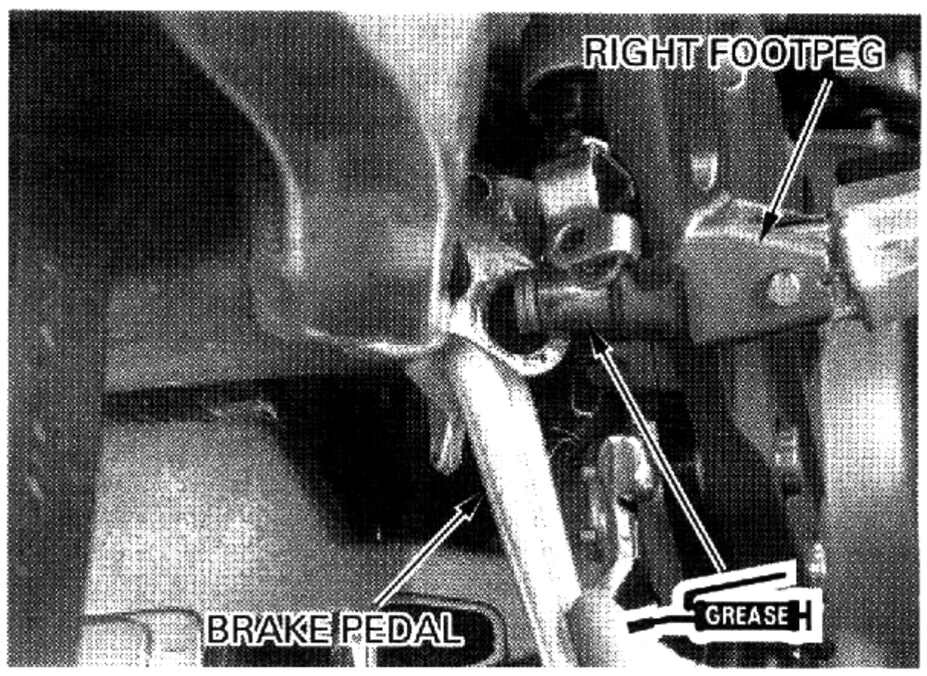
Unhook the switch spring and remove the brake light switch from the footpeg holder.
Unhook the brake pedal return spring.
Remove the snap ring, washer and brake pedal from the footpeg holder.



INSTALLATION

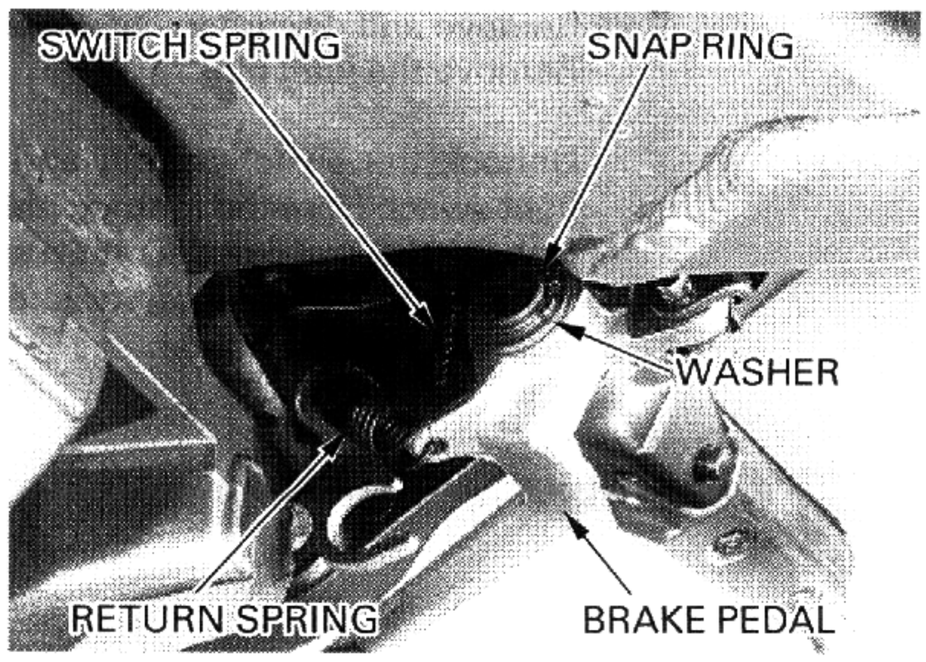


Apply grease to the brake pedal pivot sliding surface.
Install the brake pedal onto the right footpeg pivot.

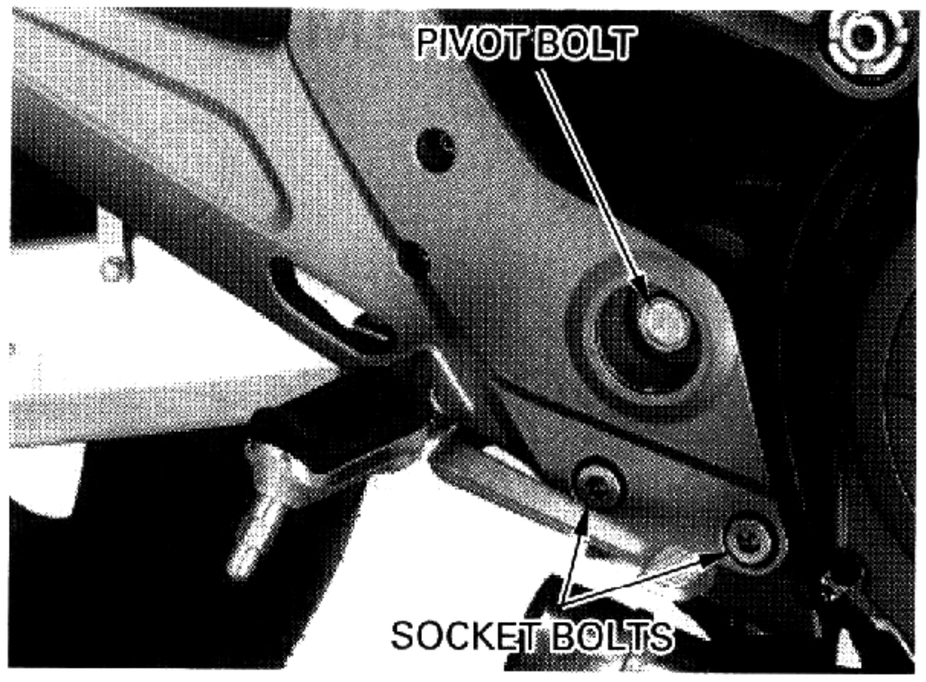


Install the washer and secure the brake pedal with a snap ring.

Hook the brake pedal return spring.
Install the brake light switch and hook the switch spring.
Install the brake pedal joint and secure it with a new cotter pin.



Replace the right footpeg holder and swingarm pivot bolt into their original position.
Install the footpeg/muffler bracket socket bolts.
Temporarily tighten the socket bolts.

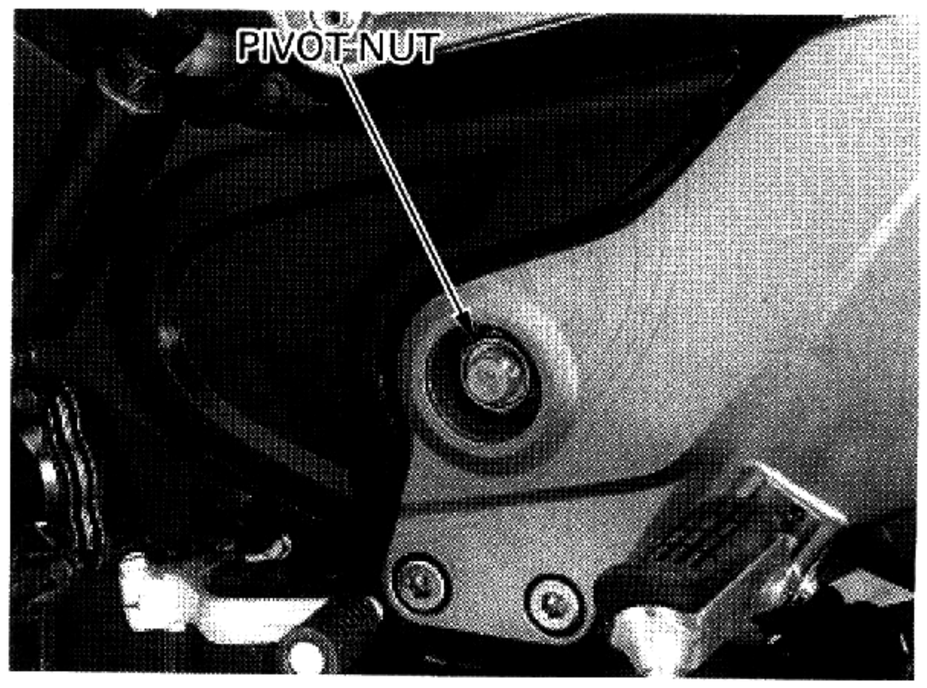


Install and tighten the swingarm pivot nut to the specified torque.

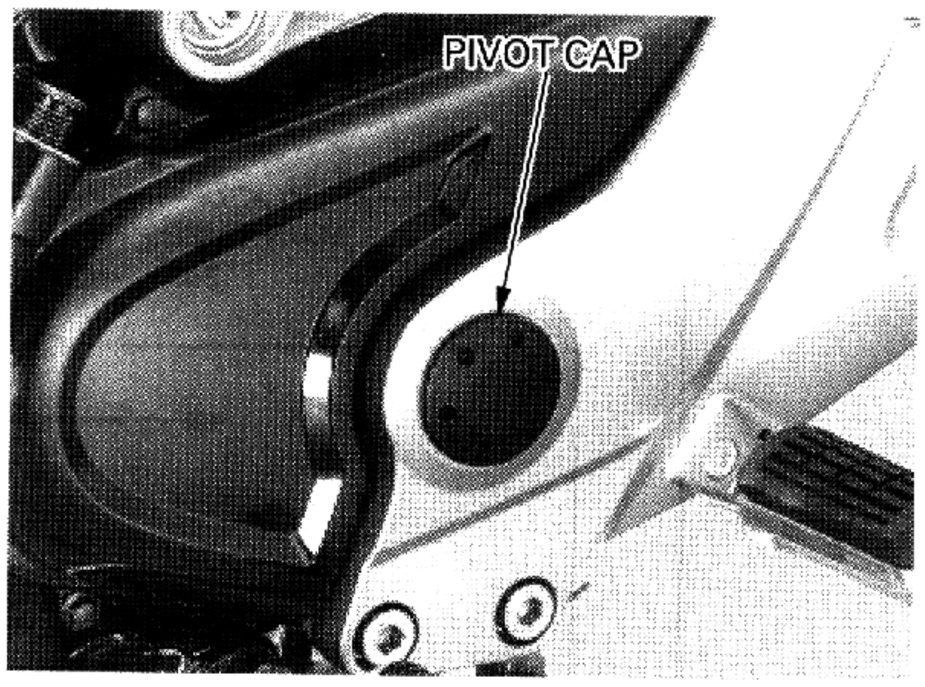
TORQUE: 93 N·m (9.5 kgf·m , 69 lbf·ft)

Tighten the footpeg/muffler bracket socket bolts to the specified torque.

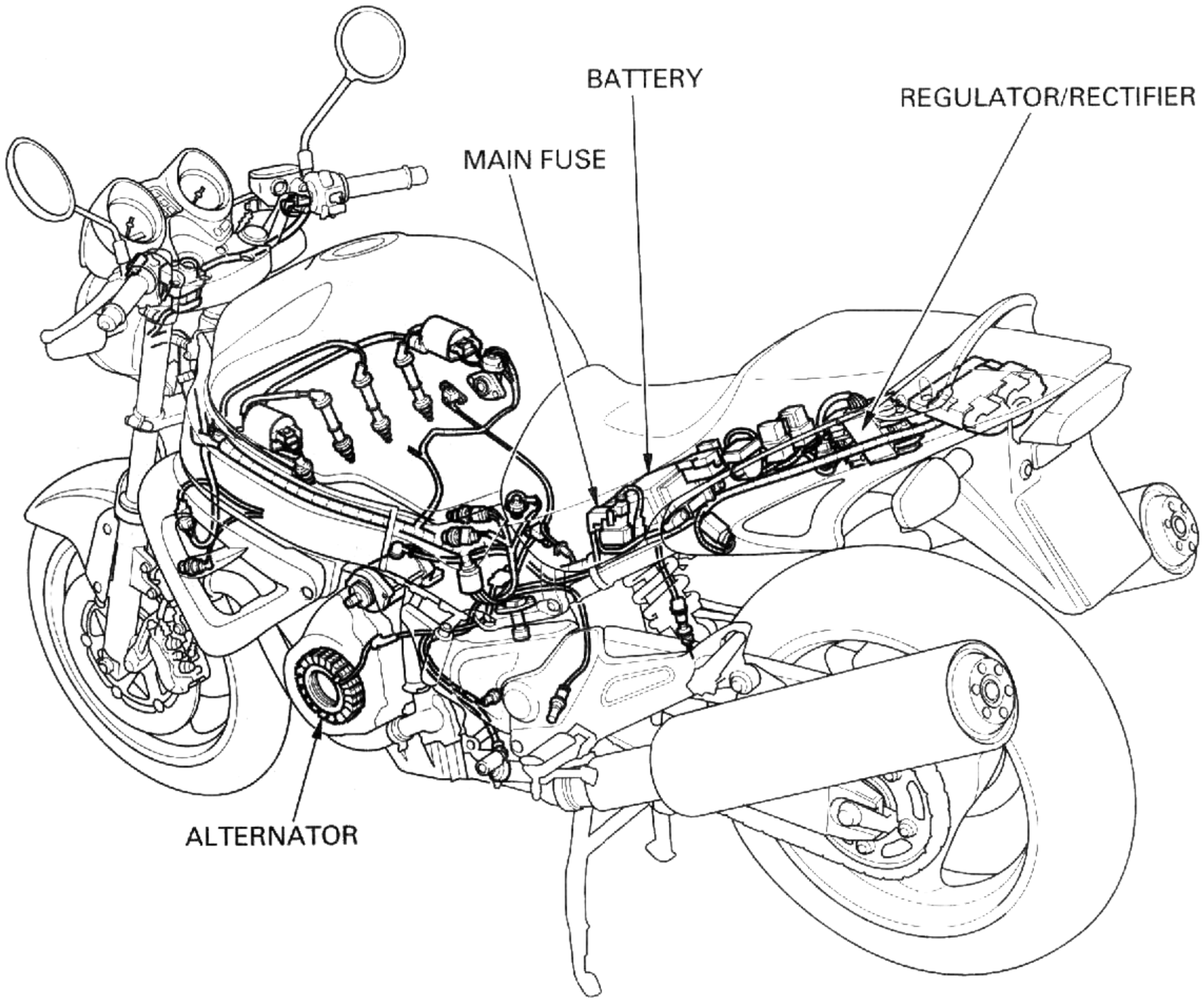
TORQUE: 39 N·m (4.0 kgf·m , 29 lbf·ft)

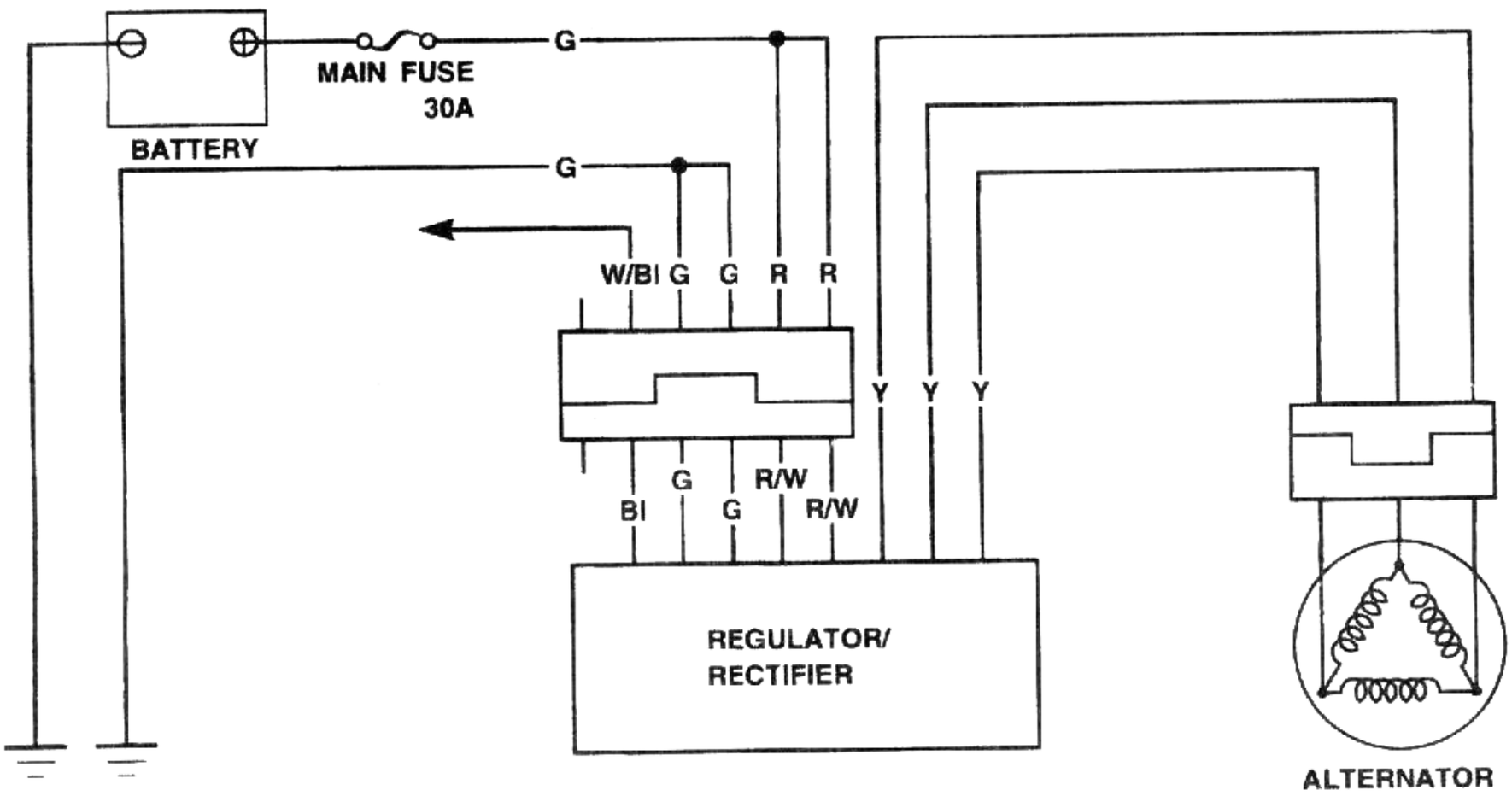


Install the swingarm pivot caps.



SYSTEM DIAGRAM





Y ..... YELLOW
G ..... GREEN
R ..... RED
W ..... WHITE
Bl ..... BLACK

16. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM	16-0	CHARGING SYSTEM INSPECTION	16-6
SERVICE INFORMATION	16-1	ALTERNATOR CHARGING COIL	16-7
TROUBLESHOOTING	16-3	REGULATOR/RECTIFIER	16-8
BATTERY	16-5		

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 follow with milk of magnesia or vegetable oil and call a physician. KEEP OUT OF REACH OF CHILDREN.***

- Always turn off the ignition switch before disconnecting any electrical component.

CAUTION:

Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.

- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.

NOTE:

The maintenance free battery must be replaced when it reaches the end of its service life.

CAUTION:

The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.

- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2—3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.

BATTERY/CHARGING SYSTEM

- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 16-3).

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 again

CAUTION:

For battery charging, do not exceed the charging current and time specified on the battery. Use of excessive current or charging time may damage the battery.

BATTERY TESTING

Refer to the instruction of the Operation Manual for the recommended battery tester. The recommended battery tester puts a "load" on the battery so that the actual battery condition of the load can be measured.

Recommended battery tester BM-210 or BATTERY MATE or equivalent

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 10 AH
	Current leakage		0.2 mA max.
	Voltage (20 °C/68 °F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A/5 – 10 h
		Quick	4.0 A/0.5 h
Alternator	Capacity		0.46 kW/5,000 min^{-1} (rpm)
	Charging coil resistance (20 °C/68 °F)		0.1 – 1.0 Ω

TROUBLESHOOTING

BATTERY IS DAMAGED OR WEAK

Remove the battery (page 16-5).
Check the battery condition using the recommended battery tester.

RECOMMENDED BATTERY TESTER:
BM-210 or BATTERY MATE or equivalent

Incorrect → • Faulty battery

Correct

Install the battery (page 16-5).
Check the battery current leakage (Leak test; page 16-7).

Incorrect → Disconnect the regulator/rectifier connector and recheck the battery current leakage.

Correct → • Faulty regulator/rectifier

Incorrect → • Shorted wire harness
• Faulty ignition switch

Correct

Check the alternator charging coil (page 16-7).

STANDARD: 0.1 — 1.0 Ω (20 °C/68 °F)

Incorrect → • Faulty charging coil

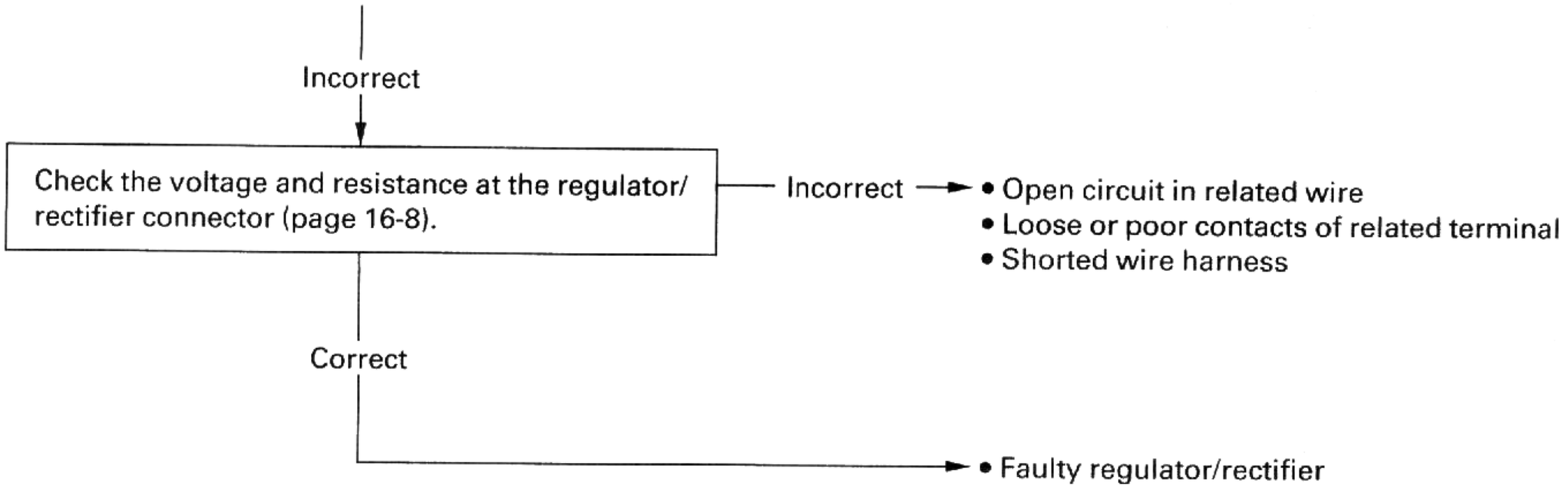
Correct

Measure and record the battery voltage using a digital multimeter (page 16-5).
Start the engine.
Measure the charging voltage (page 16-6).
Compare the measurement to result of the following calculation.

STANDARD:
Measured battery voltage < Masured charging voltage < 15.5 V

Correct → • Faulty battery

Incorrect


Incorrect
Check the voltage and resistance at the regulator/ rectifier connector (page 16-8).
Incorrect
• Open circuit in related wire
• Loose or poor contacts of related terminal
• Shorted wire harness
Correct
• Faulty regulator/rectifier

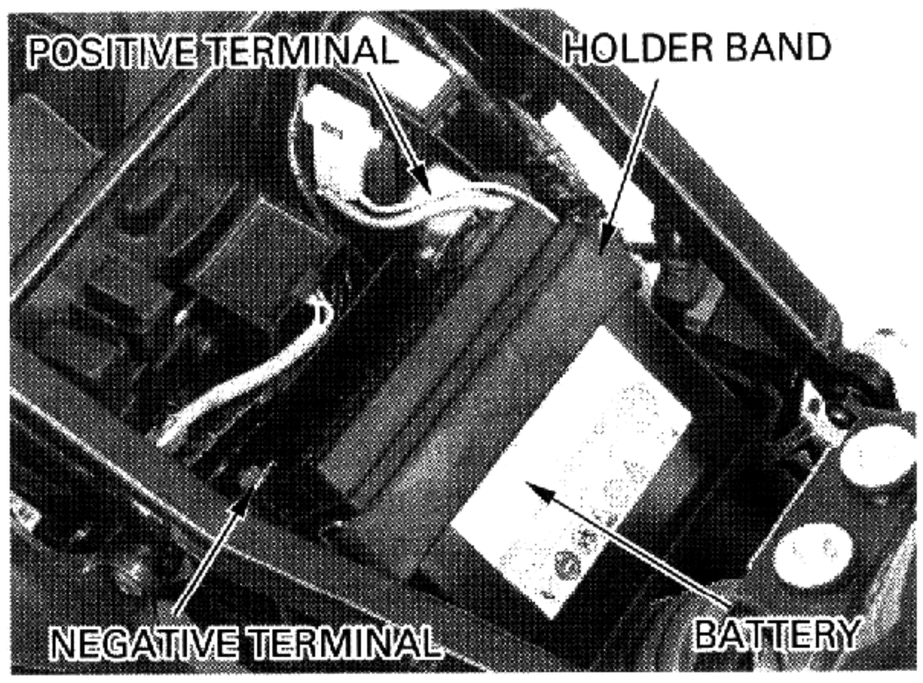
BATTERY

REMOVAL/INSTALLATION

Always turn the ignition switch OFF before removing the battery.

Remove the seat (page 2-2).

Remove the battery holder band.
Disconnect the negative cable and then the positive cable, and remove the battery.



Install the battery in the reverse order of removal with the proper wiring as shown.

NOTE:

Connect the positive terminal first and then the negative cable.

After installing the battery, coat the terminals with clean grease.
Reinstall the removed parts.

VOLTAGE INSPECTION

Measure the battery voltage using a digital multimeter.

VOLTAGE:
Fully charged: 13.0 – 13.2 V
Under charged: Below 12.3 V

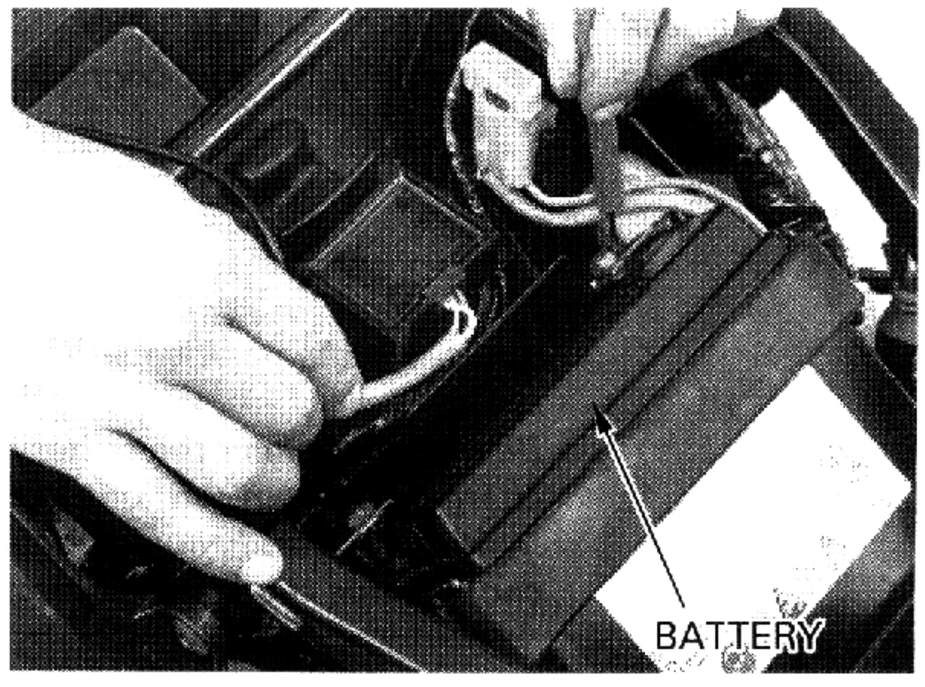
TOOL:
Digital multimeter Commercially available

BATTERY CHARGING

⚠WARNING

- ***The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.***
- ***Turn power ON/OFF at the charger, not at the battery terminal.***

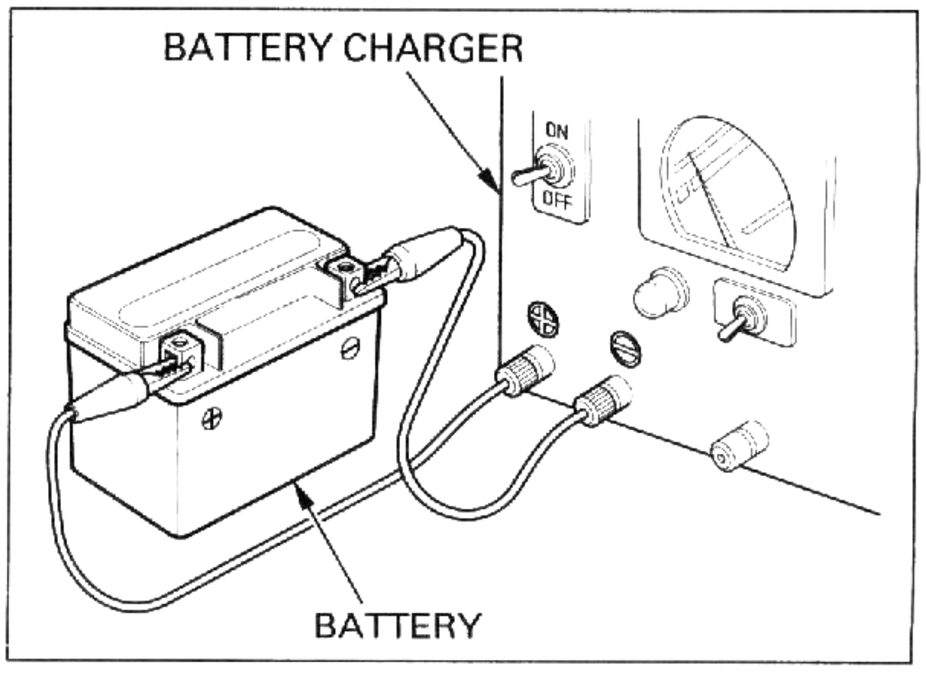
Remove the battery (see above).



Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (−) cable to the battery negative (−) terminal.

CAUTION:

- ***Quick-charging should only be done in an emergency; slow charging is preferred.***
- ***For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.***



CHARGING SYSTEM INSPECTION

NOTE:

- When inspecting the charging system, check the system components and lines step-by-step according to the troubleshooting on page 16-3.
- Measuring circuits with a large capacity that exceeds the capacity of the tester may cause damage to the tester. Before starting each test, set the tester at the highest capacity range first, then gradually lower the capacity ranges until you have the correct range.
- When measuring small capacity circuits, keep the ignition switch off. If the switch is suddenly turned on during a test, the tester fuse may blow.

CHARGING VOLTAGE INSPECTION

⚠WARNING

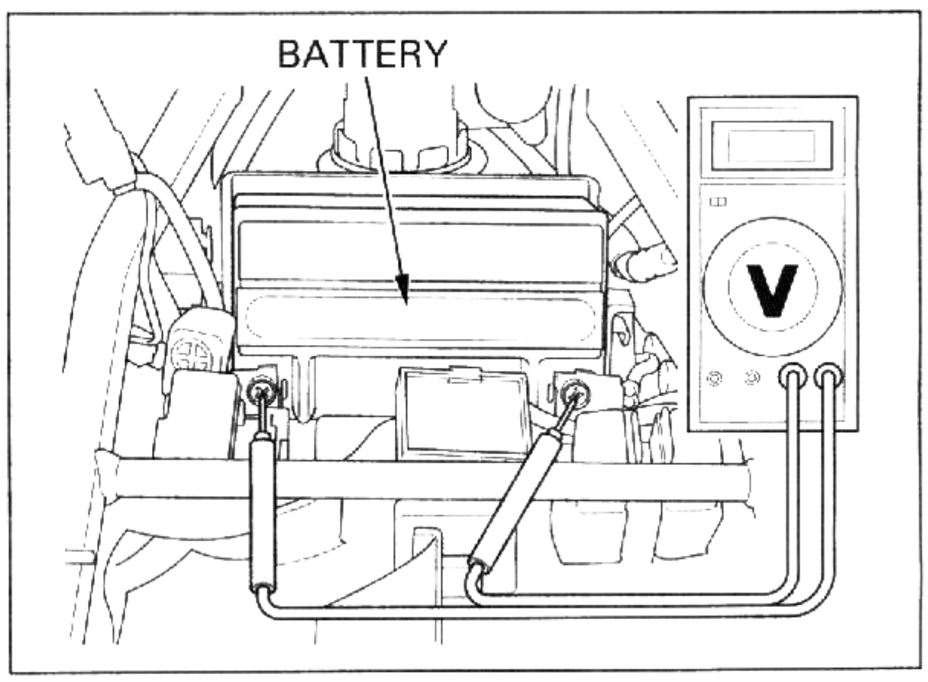
If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system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

Be sure the battery is in good condition before performing this test.

Warm up the engine to normal operating temperature.
Stop the engine, and connect the multimeter as shown.

CAUTION:

- ***To prevent a short, make absolutely certain which are the positive and negative terminals or cable.***
- ***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.***

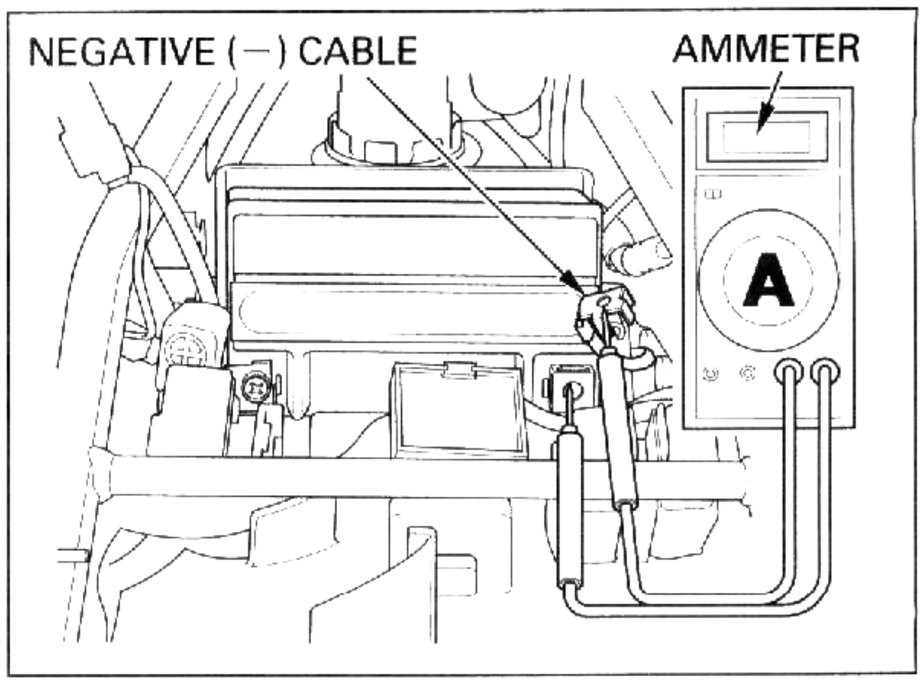


Restart the engine.
With the headlight on Hi beam, measure the voltage on the multimeter when the engine runs at 5,000 min^{-1} (rpm).

Standard: Measured battery voltage (page 16-5) < Measured charging voltage (see above) < 15.5 V at 5,000 min^{-1} (rpm)

CURRENT LEAKAGE INSPECTION

Turn the ignition switch off and disconnect the negative battery cable from the battery.
Connect the ammeter (+) probe to the ground cable and the ammeter (−) probe to the battery (−) terminal.
With the ignition switch off, check for current leakage.



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 out the fuse in the tester.
- While measuring current, do not turn the ignition on. A sudden surge of current may blow out the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 0.2 mA max.

If current leakage exceeds the specified value, a shorted circuit is likely.
Locate the short by disconnecting connections one by one and measuring the current.

ALTERNATOR CHARGING COIL

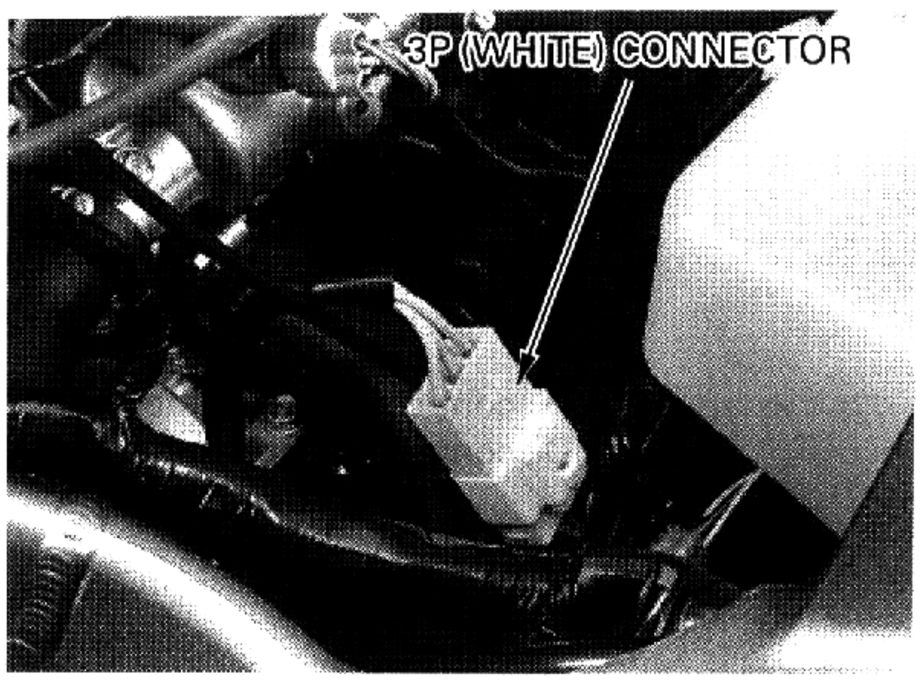
NOTE:

It is not necessary to remove the stator coil to make this test.

INSPECTION

Support the rear end of the fuel tank (page 2-11).

Disconnect the regulator/rectifier 3P (White) connector.

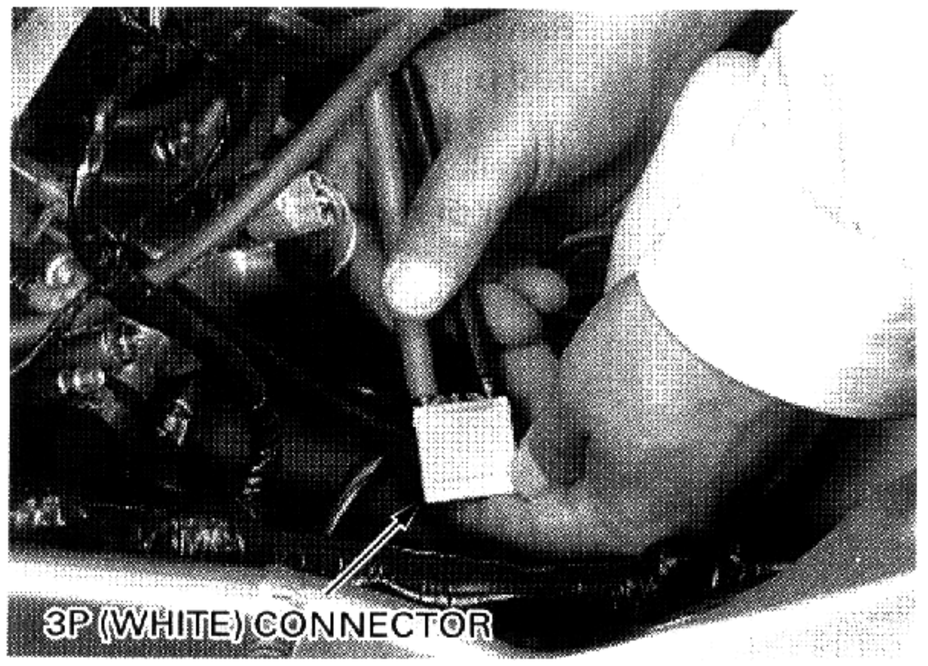


Check the resistance between all three Yellow terminals.

STANDARD: 0.1 − 1.0 Ω (at 20 °C/68 °F)

Check for continuity between all three Yellow terminals and Ground.
There should be no continuity.

If readings are far beyond the standard, or if any wire has continuity to ground, replace the alternator stator.
Refer to section 10 for stator removal.

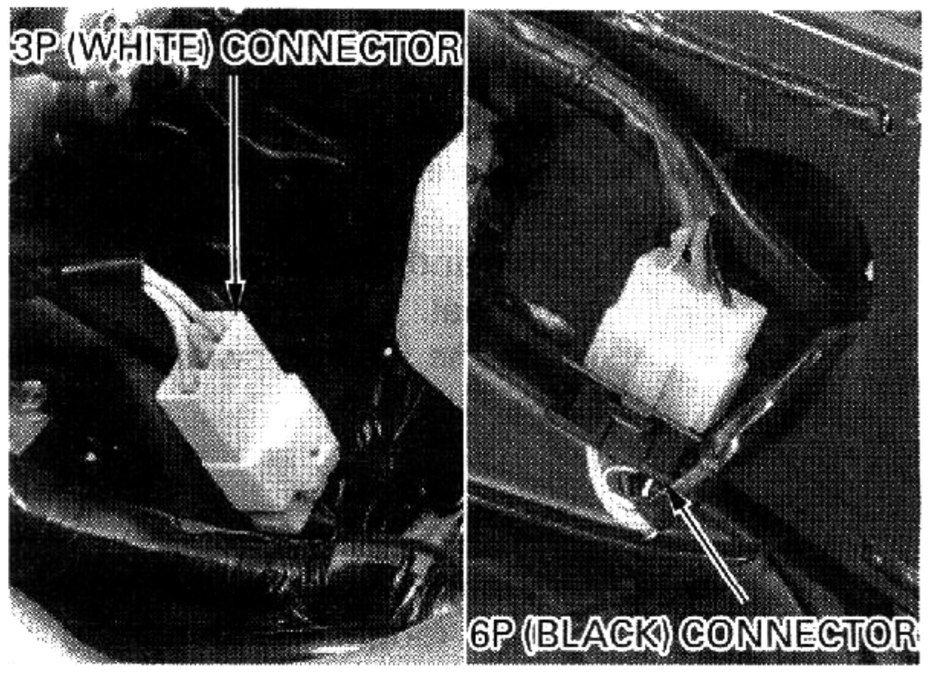


REGULATOR/RECTIFIER

SYSTEM INSPECTION

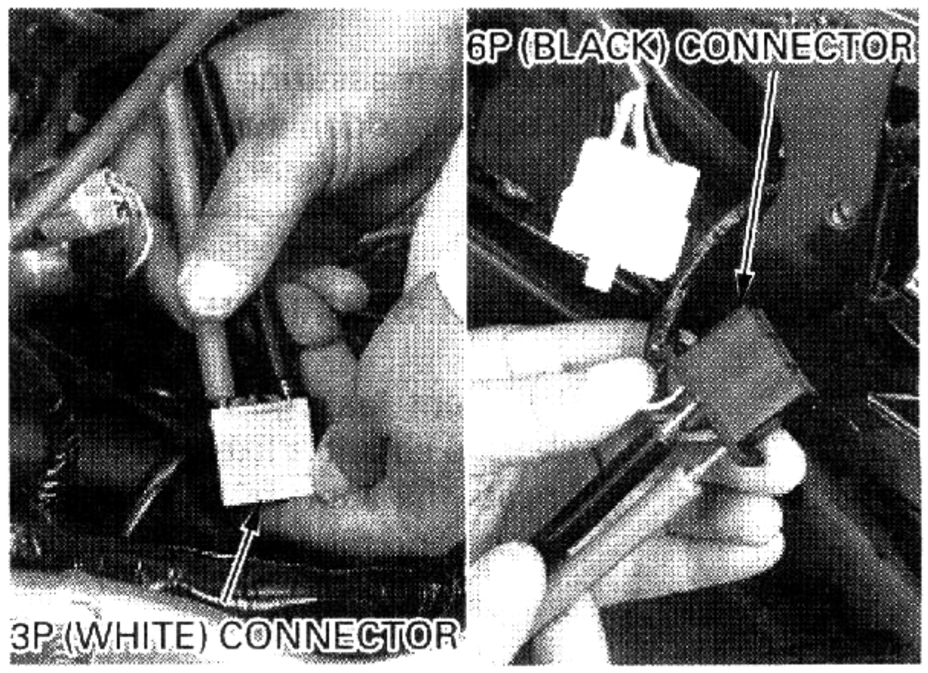
Remove the rear cowl (page 2-2).
Support the rear end of the fuel tank (page 2-11).

Disconnect the regulator/rectifier connectors, and check it for loose contact or corroded terminals.



If the regulated voltage reading (see page 16-6) is out of the specification, measure the voltage between connector terminals (wire harness side) as follows:

Item	Terminal	Specification
Battery charging line	Red/White (+) and ground (−)	Battery voltage should register
Charging coil line	Yellow and Yellow	0.1 − 1.0 Ω (at 20 °C/68 °F)
Ground line	Green and ground	Continuity should exist

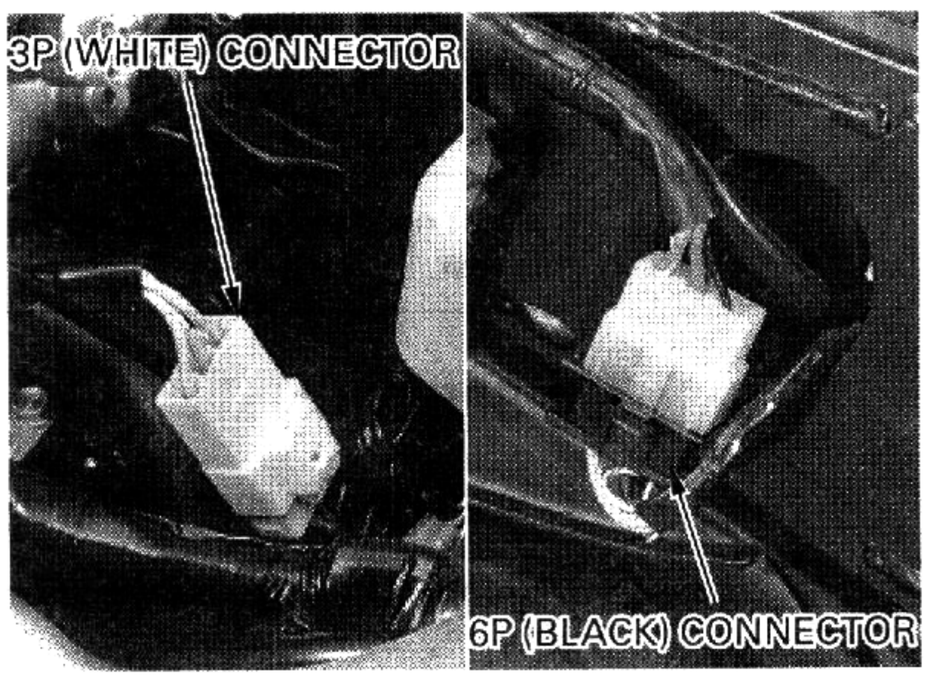


If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connectors, replace the regulator /rectifier unit.

REMOVAL/INSTALLATION

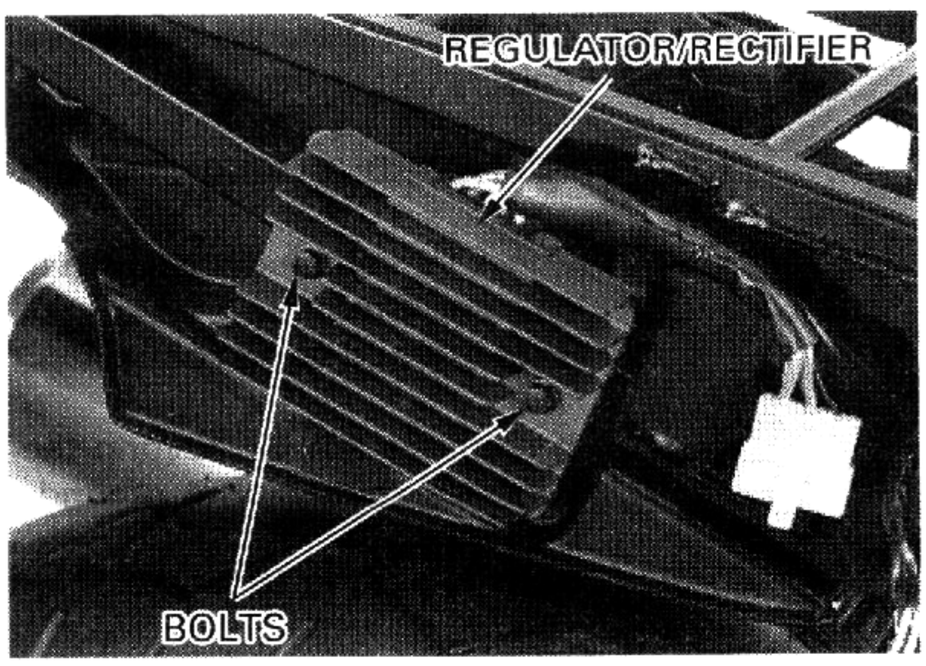
Remove the rear cowl (page 2-2).
Support the rear end of the fuel tank (page 2-11).

Disconnect the alternator 3P (White) connector.
Disconnect the alternator 6P (Black) connector.



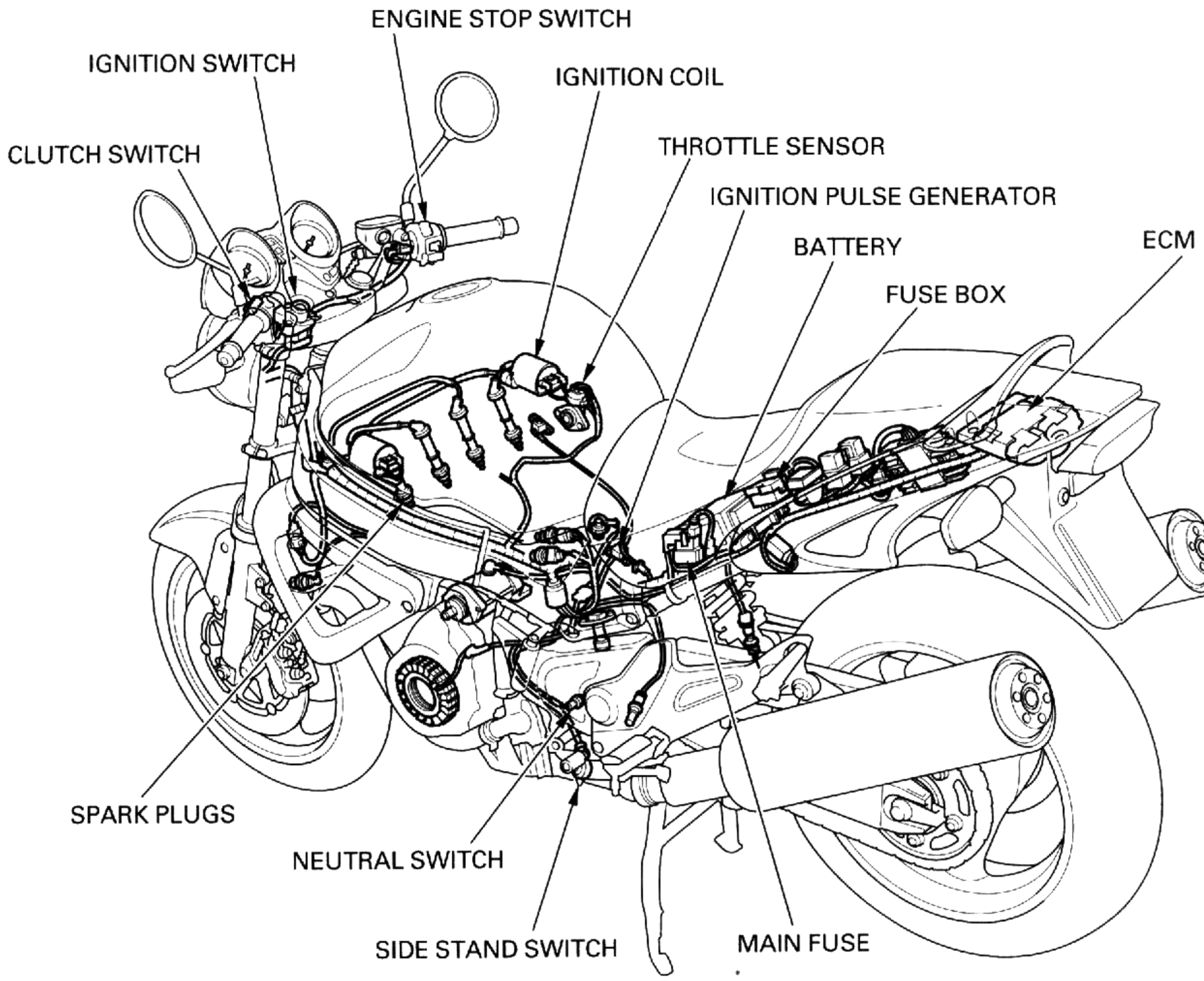
Remove the regulator/rectifier unit mounting bolts and regulator/rectifier.

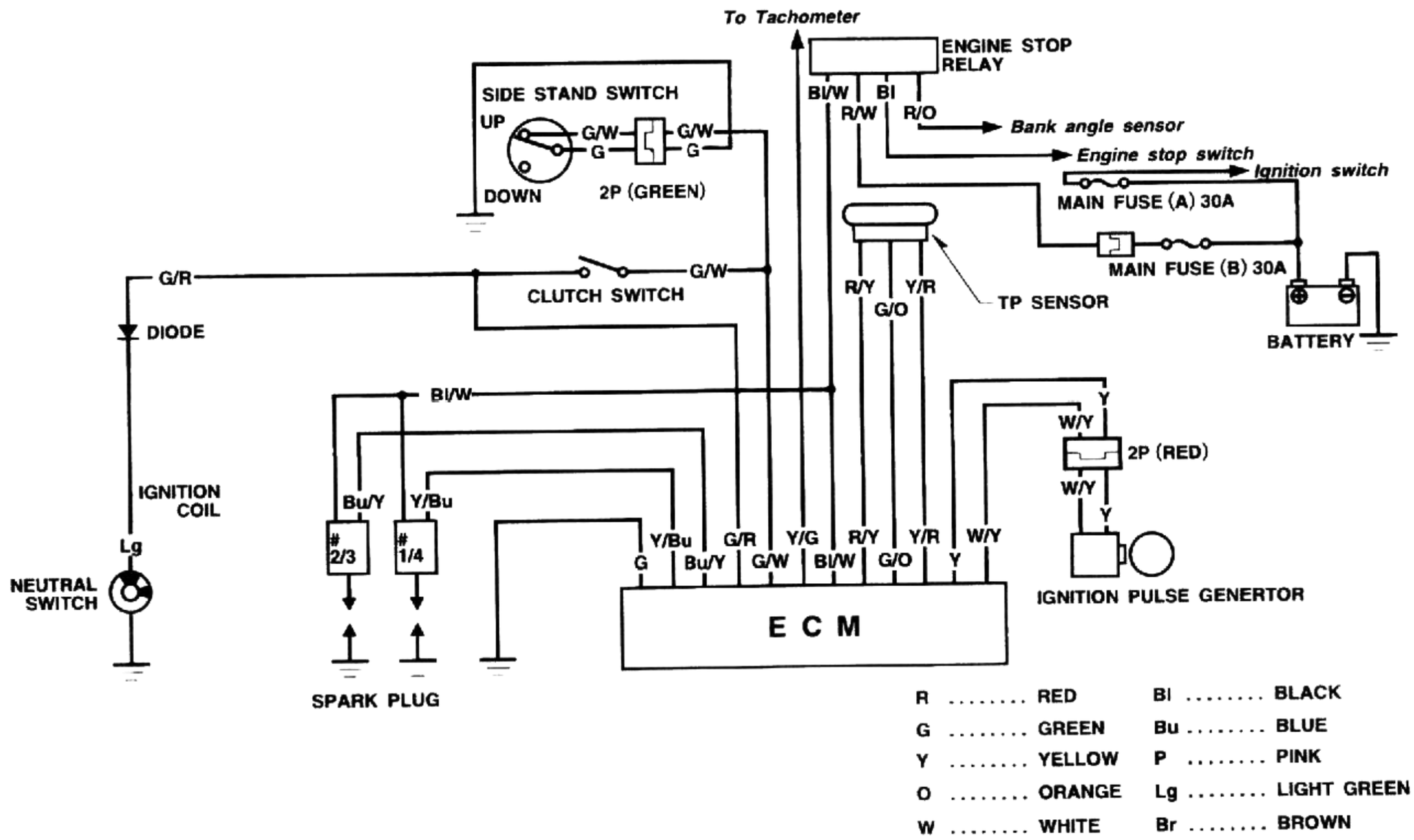
Install the regulator/rectifier unit in the reverse order of removal.



MEMO

SYSTEM DIAGRAM





17. IGNITION SYSTEM

SYSTEM DIAGRAM	17-0	IGNITION COIL	17-6
SERVICE INFORMATION	17-1	IGNITION PULSE GENERATOR	17-7
TROUBLESHOOTING	17-3	IGNITION TIMING	17-10
IGNITION SYSTEM INSPECTION	17-4		

SERVICE INFORMATION

GENERAL

⚠WARNING

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

CAUTION:

Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.

- When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 17-3.
- This motorcycle's Ignition Control Module (ICM) is built into the Engine Control Module (ECM).
- The ignition timing does not normally need to be adjusted since the ECM is factory preset.
- The ECM may be damaged if dropped. Also if the connector is disconnected when current if flowing, the excessive voltage may damage the module. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding. Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Use spark plug of the correct heat range. Using spark plug with an incorrect head range can damage the engine.
- Refer to section 5 for Throttle Position (TP) sensor and ECM inspection.

SPECIFICATIONS

ITEM	SPECIFICATIONS
Spark plug	CR8EHVX−9 (NGK)
Spark plug gap	0.80−0.90 mm (0.031−0.035 in)
Ignition coil peak voltage	100 V minimum
Ignition pulse generator peak voltage	0.7 V minimum
Ignition timing (''F'' mark)	12° BTDC at idle

TORQUE VALUES

Timing hole cap	18 N·m (1.8 kgf·m , 13 lbf·ft)	Apply grease to the threads
Spark plug	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Ignition pulse generator rotor special bolt	59 N·m (6.0 kgf·m , 43 lbf·ft)	Apply oil to the threads
Ignition pulse generator cover SH bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply sealant to the threads (2 places)

TOOLS

Imrie diagnostic tester (model 625) or Peak voltage adapter	07HGJ-0020100 with Commercially available digital multimeter (impedance 10 M Ω /DCV minimum)

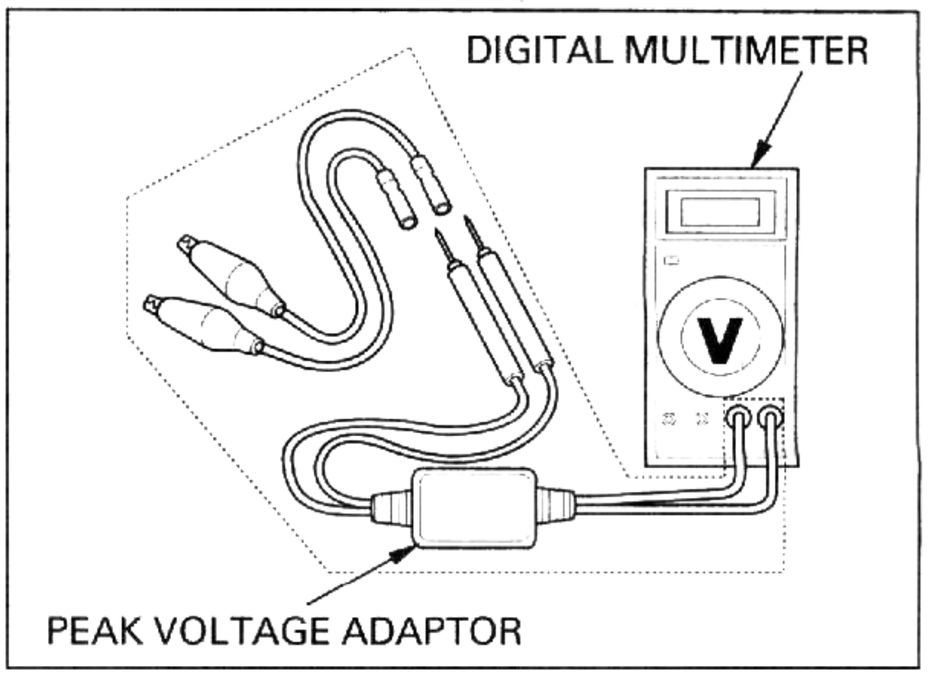
TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - —Faulty spark plug
  - —Loose spark plug cap or spark plug wire connection
  - —Water got into the spark plug cap (leaking the ignition coil secondary voltage)
- If there is no spark at either cylinder, temporarily exchange the ignition coil with the other good one and perform the spark test. If there is spark, the exchanged ignition coil is faulty.
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch ON and engine stop switch at RUN (The engine is not cranked by the starter motor).

No spark at all plugs

Unusual condition		Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with ignition and engine stop switches ON. (Other electrical components are normal)	1. Faulty engine stop switch. 2. An open circuit in Black/White wires between the ignition coil and engine stop switch. 3. Faulty ECM (in case when the initial voltage is normal while disconnecting ECM connector).
	Initial voltage is normal, but it drops down to 2—4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Undercharged battery. 3. No voltage between the Black/White (+) and Body ground (—) at the ECM multi-connector or loosen ECM connection. 4. An open circuit or loose connection in Green wire. 5. An open circuit or loose connection in Yellow/Blue and Blue/Yellow wires between the ignition coils and ECM. 6. Short circuit in ignition primary coil. 7. Faulty side stand switch or neutral switch. 8. An open circuit or loose connection in No. 7 related circuit wires. • Side stand switch line: Green/White wire. • Neutral switch line: Light Green and Light Green/Red wire 9. Faulty ignition pulse generator (measure the peak voltage). 10. Faulty ECM (in case when above No. 1—9 are normal).
	Initial voltage is normal, but no peak voltage while cranking the engine.	1. Faulty peak voltage adaptor connections. 2. Faulty peak voltage adaptor. 3. Faulty ECM (in case when above No. 1, 2 are normal).
	Initial voltage is normal, but peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too low (battery under-charged). 3. The sampling timing of the tester and measured pulse were not synchronised (system is normal if measured voltage is over the standard voltage at least once). 4. Faulty ECM (in case when above No. 1—3 are normal).
	Initial and peak voltage are normal, but does not spark.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coil.
Ignition pulse generator	Peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too low (battery under charged). 3. The sampling timing of the tester and measured pulse were not synchronised (system is normal if measured voltage is over the standard voltage at least once). 4. Faulty ECM (in case when above No. 1—3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty ignition pulse generator.

IGNITION SYSTEM INSPECTION



NOTE:

- If there is no spark at any plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use recommended digital multimeter or commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If using Imrie diagnostic tester (model 625), follow the manufacturer's instructions.

Connect the peak voltage adaptor to the digital multimeter, or use the Imrie diagnostic 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

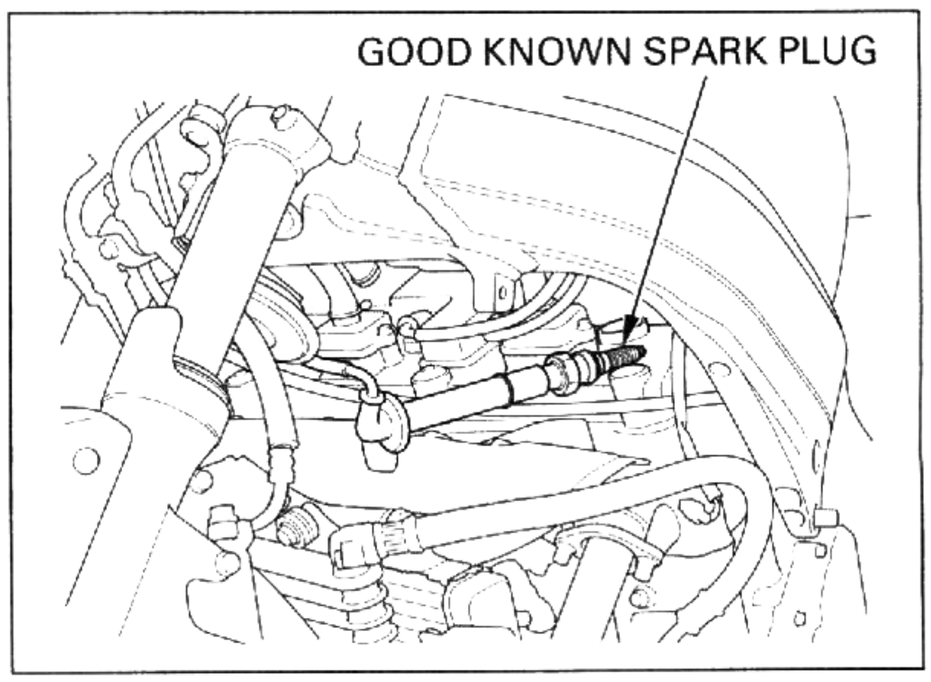
⚠WARNING

Avoid touching the spark plugs and tester probes to prevent electric shock.

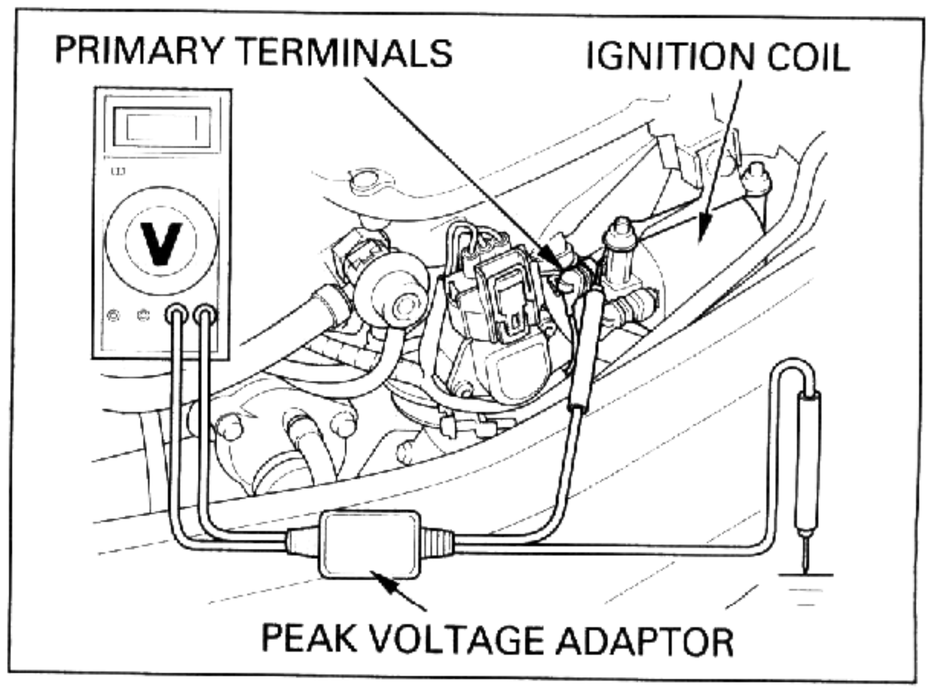
NOTE:

- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Shift the transmission into neutral and disconnect the all spark plug caps from the spark plugs.
Connect a known good spark plugs to the spark plug caps and ground the spark plugs to the cylinder as done in a spark test.



With the ignition coil primary wire connected, connect the peak voltage adaptor or Imrie tester to the ignition coil.



CONNECTION:

No. 1/4 coil:
Yellow/Blue terminal (+) — Body ground (−)

No. 2/3 coil:
Blue/Yellow terminal (+) — Body ground (−)

Turn the ignition switch "ON" and engine stop switch to "RUN".
Check for initial voltage at this time.
The battery voltage should be measured.
If the initial voltage cannot be measured, check the power supply circuit (refer to the troubleshooting, page 17-3).

Crank the engine with the starter motor and read ignition coil primary peak voltage.

PEAK VOLTAGE: 100 V minimum

If the peak voltage is abnormal, check for an open circuit or poor connection in Yellow/Blue and Blue/Yellow wires.
If not defects are found in the harness, refer to the troubleshooting chart on page 17-3.

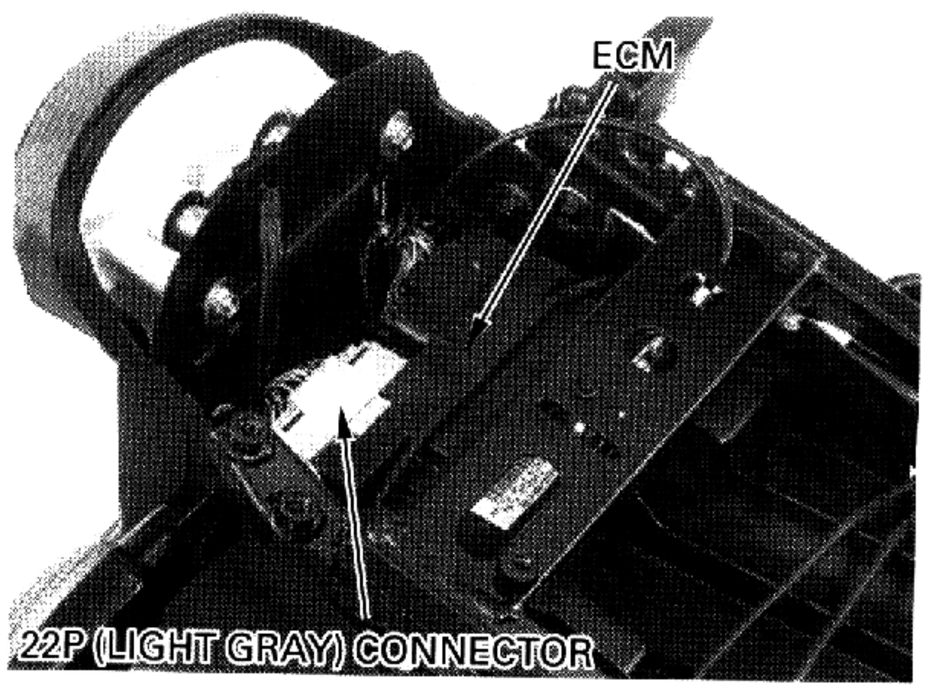
IGNITION PULSE GENERATOR PEAK VOLTAGE

⚠WARNING

Avoid touching the spark plugs and tester probes to prevent electric shock.

NOTE:

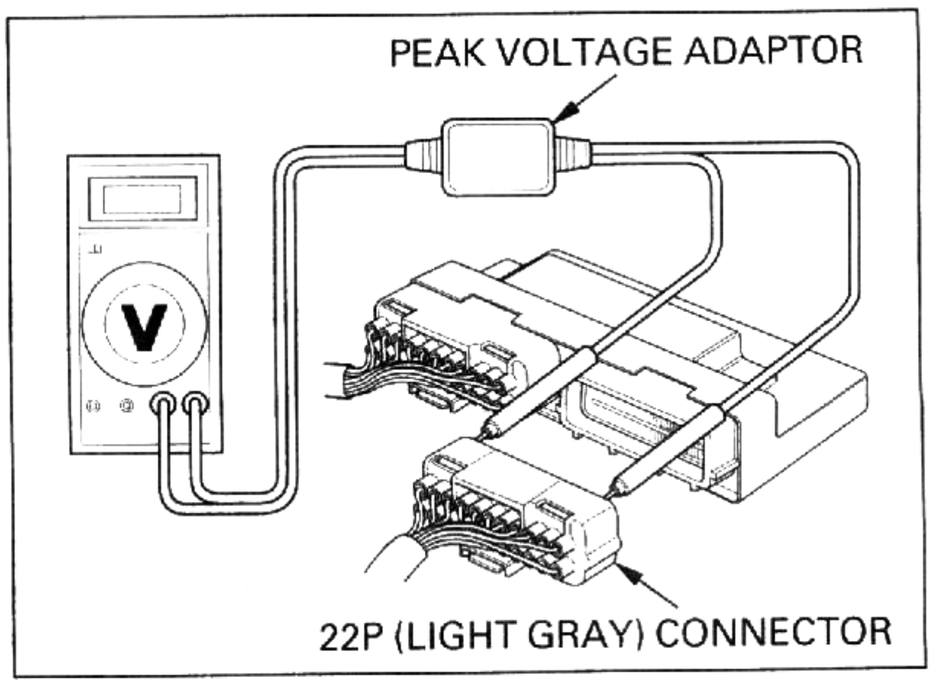
- Check all system connection before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.



Remove the seat (page 2-2).

Disconnect the 22P (Light gray) connector from the ECM.

Connect the peak voltage adaptor or Imrie tester probes to the connector terminals of the wire harness side.



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

CONNECTION:
Yellow terminal (+) — White/Yellow (−)

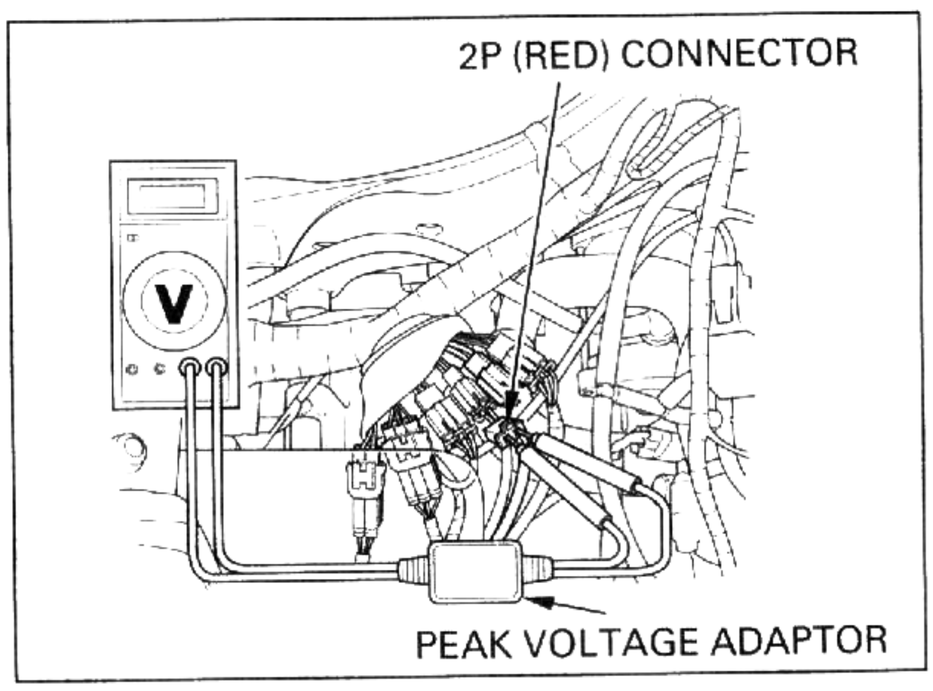
Crank the engine with the starter motor and read the peak voltage.

PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured at ECM multi-connector is abnormal, measure the peak voltage at the ignition pulse generator connector.

Support the rear end of the fuel tank (page 2-11).

Disconnect the ignition pulse generator 2P (Red) connector and connect the tester probes to the terminal (Yellow and White/Yellow).
In the same manner as at the ECM connector, measure the peak voltage and compare it to the voltage measured at the ECM connector.



- If the peak voltage measured at the ECM is abnormal and the one measured at the ignition pulse generator is normal, the wire harness has an open circuit or loose connection.
- If both peak voltages measure are abnormal, check each item in the troubleshooting chart. If all items are normal, the ignition pulse generator is faulty.
  See page 17-7 for ignition pulse generator replacement.

IGNITION COIL

REMOVAL/INSTALLATION

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

Disconnect the primary wires from the ignition coils.
Disconnect the spark plug caps from the plugs, then remove the ignition coil assembly.

Installation is in the reverse order of removal.

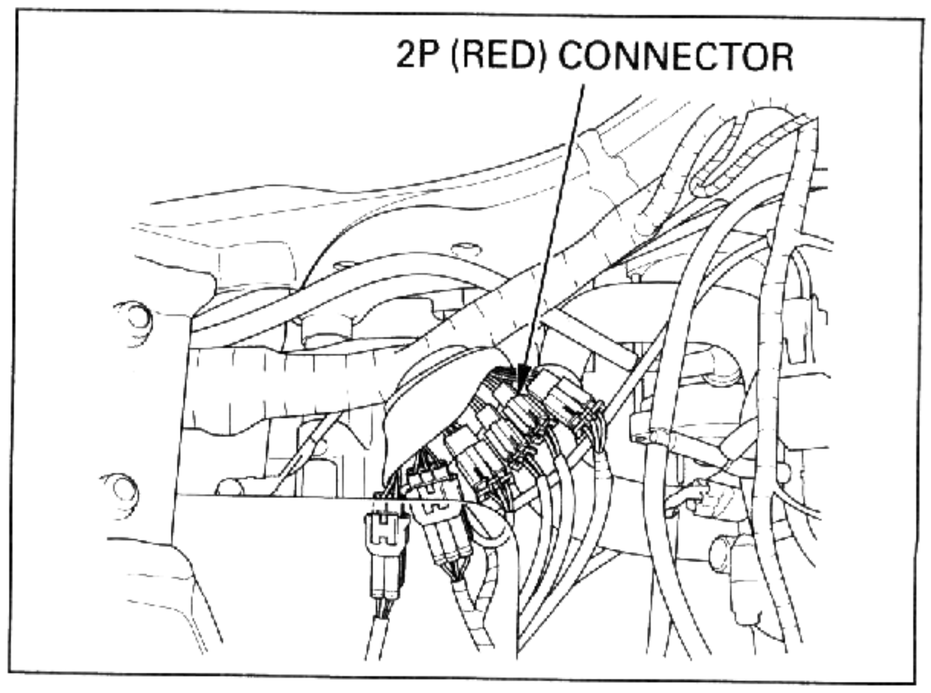


IGNITION PULSE GENERATOR

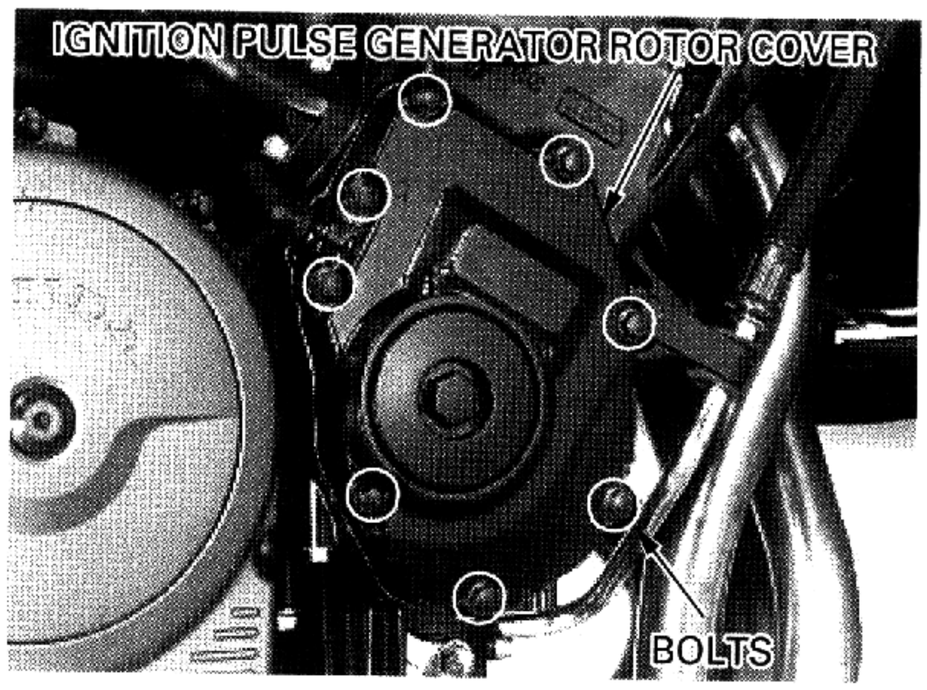
REMOVAL

Support the rear end of the fuel tank (page 2-11).

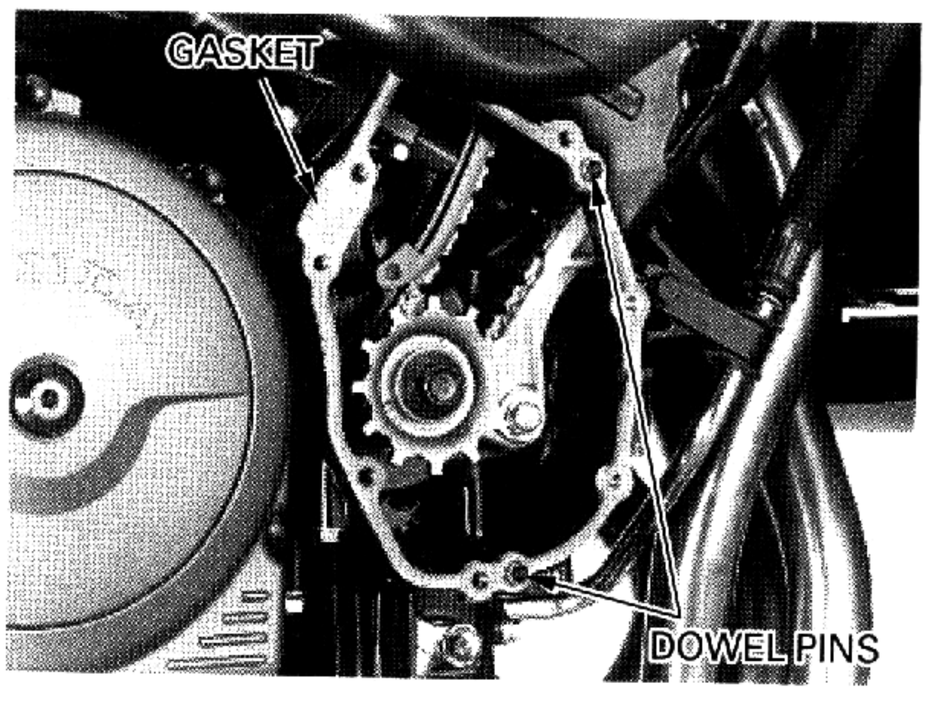
Disconnect the ignition pulse generator 2P (Red) connector.
Release the wire from the wire clamp.



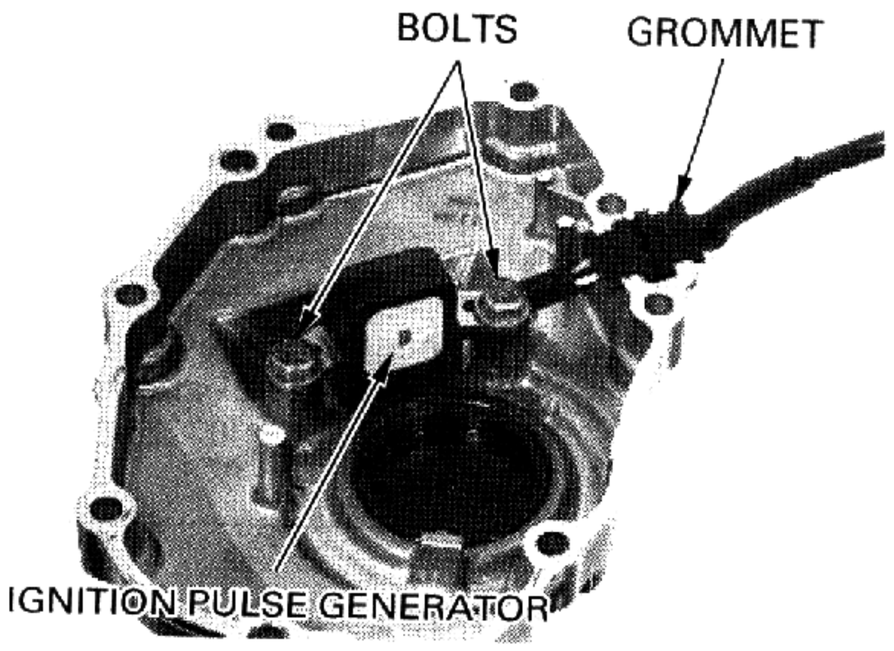
Remove the SH bolts and ignition pulse generator rotor cover.



Remove the gasket and dowel pins.



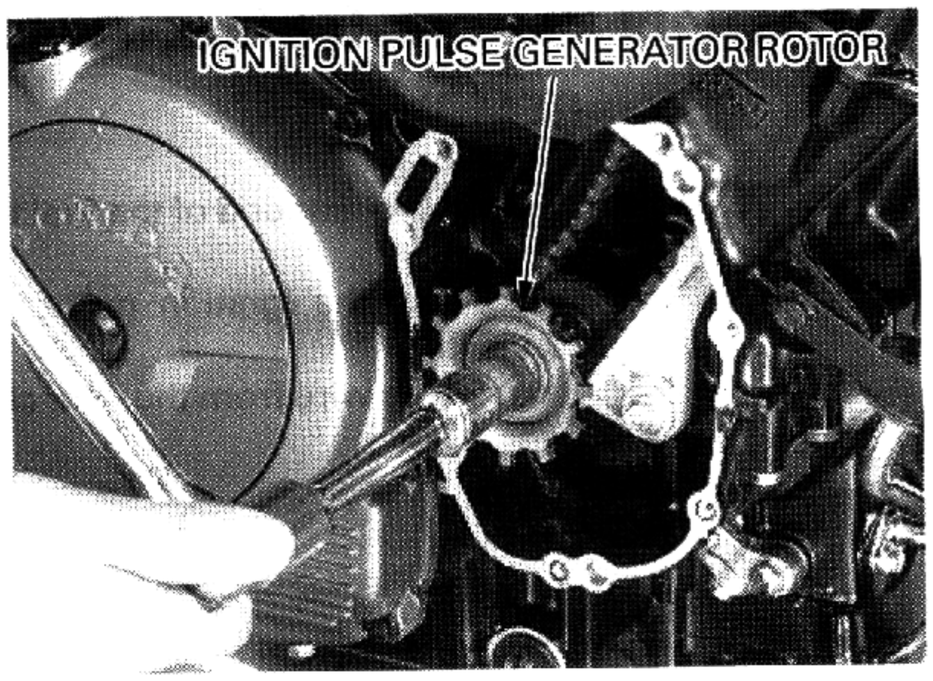
Remove the wire grommet from the cover.
Remove the bolts and ignition pulse generator.



Shift the transmission into 6th gear and apply rear brake.
Remove the ignition pulse generator rotor bolt.

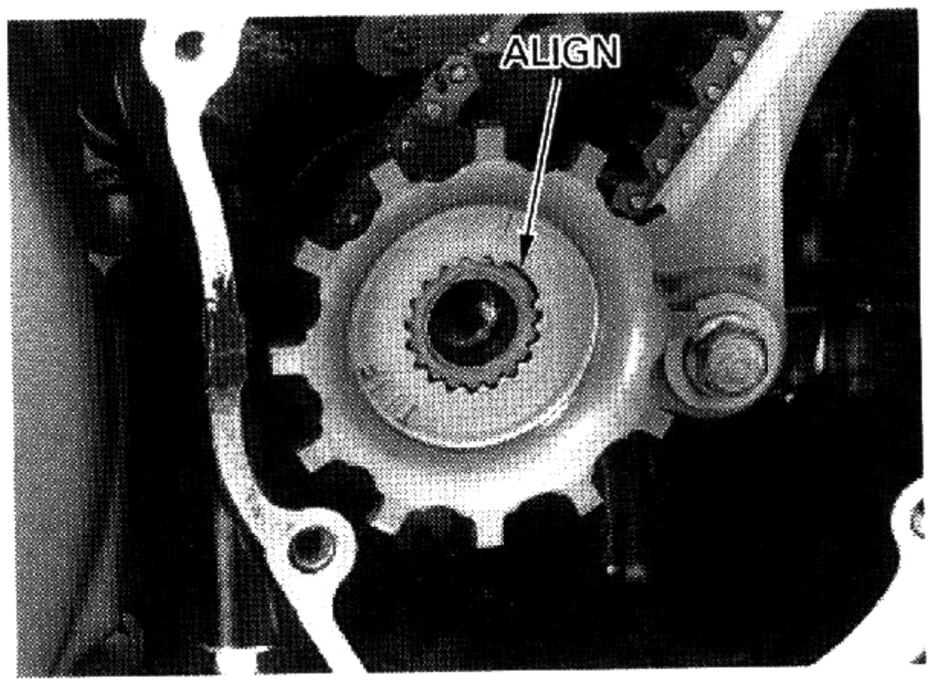
NOTE:

If the engine is out of the frame, remove the alternator cover (page 10-2) and hold the flywheel with the flywheel holder (07725-0040000), then remove the bolt.

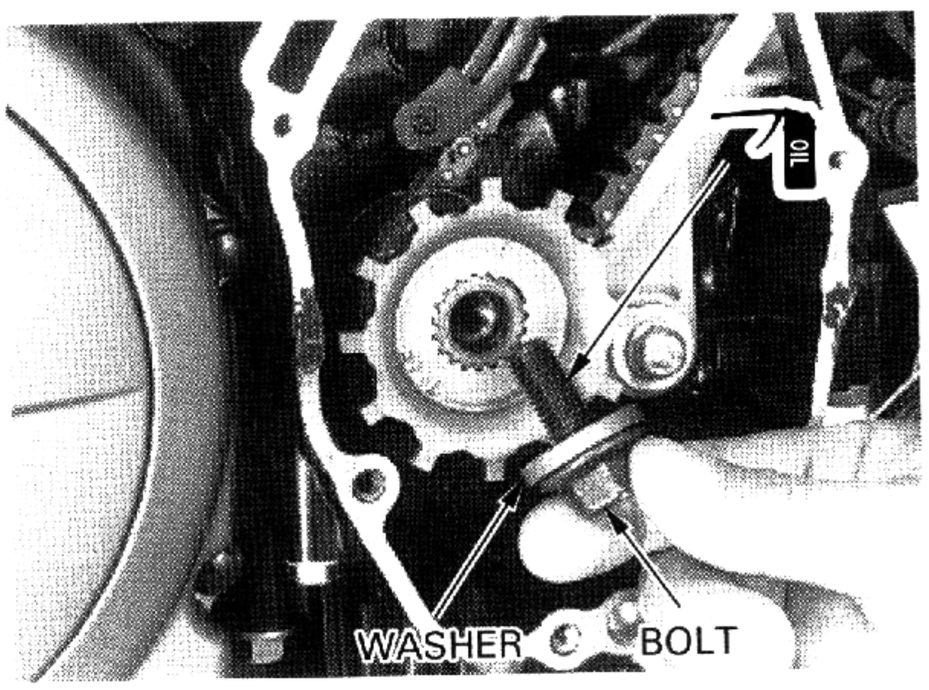


INSTALLATION

Install the ignition pulse generator rotor by aligning the wide groove with the wide teeth of the crankshaft.



Apply oil to the ignition pulse generator rotor bolt threads, then install the washer and rotor bolt.

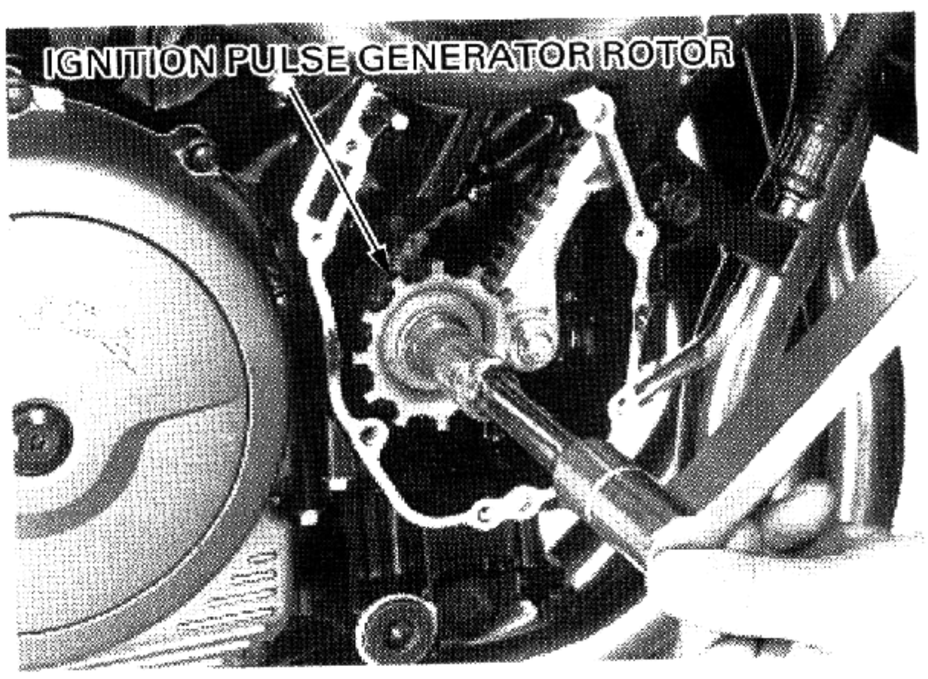


Shift the transmission into 6th gear and apply rear brake.
Tighten the ignition pulse generator rotor bolt to the specified torque.

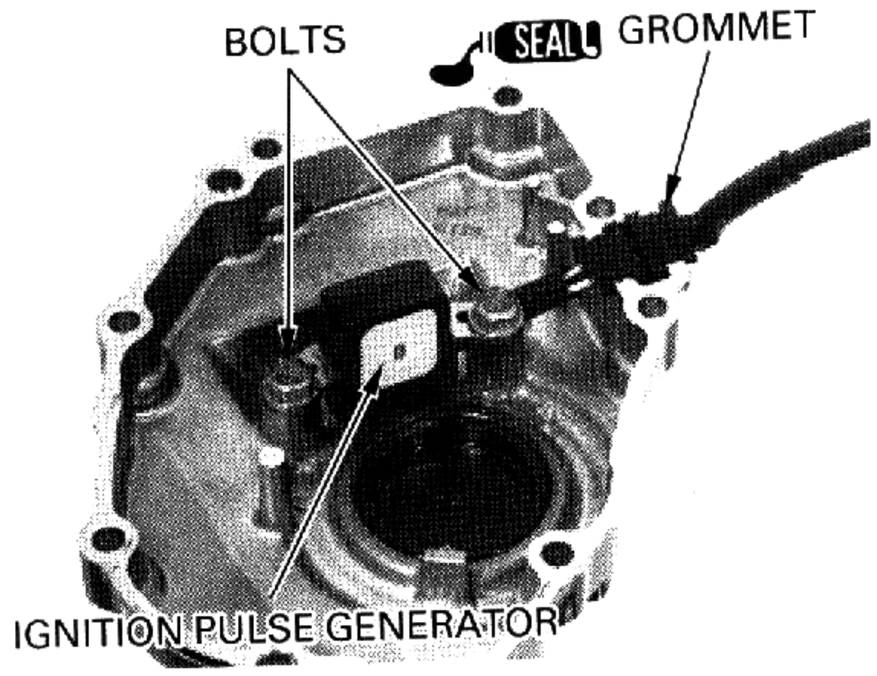
NOTE:

If the engine is out of frame, remove the alternator cover (page 10-2) and hold the flywheel with the flywheel holder (07725-0040000), then tighten the bolt.

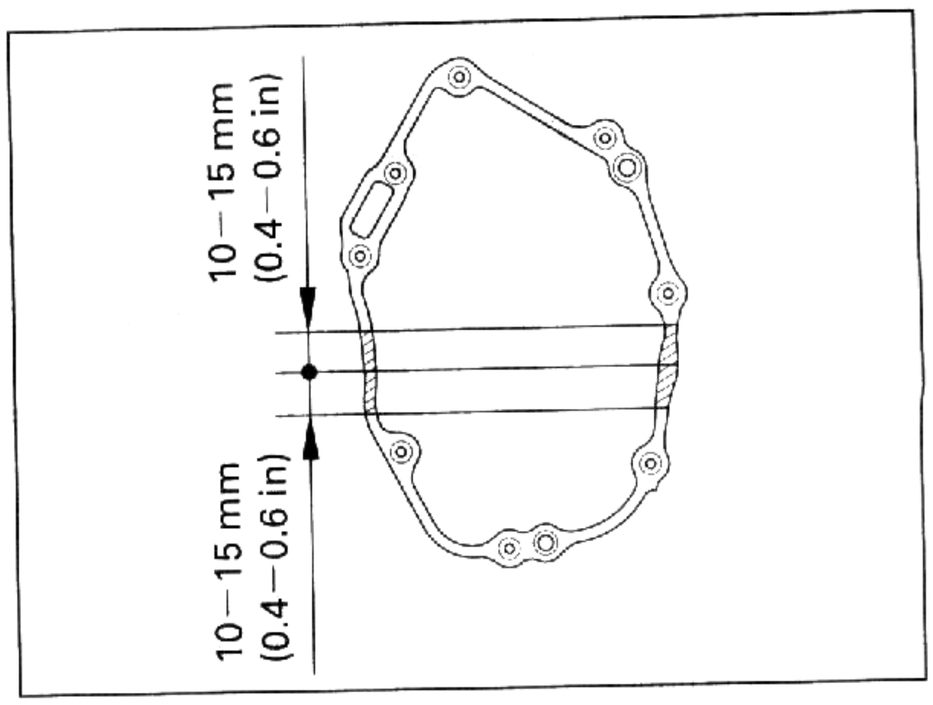
TORQUE: 59 N·m (6.0 kgf·m , 43 lbf·ft)



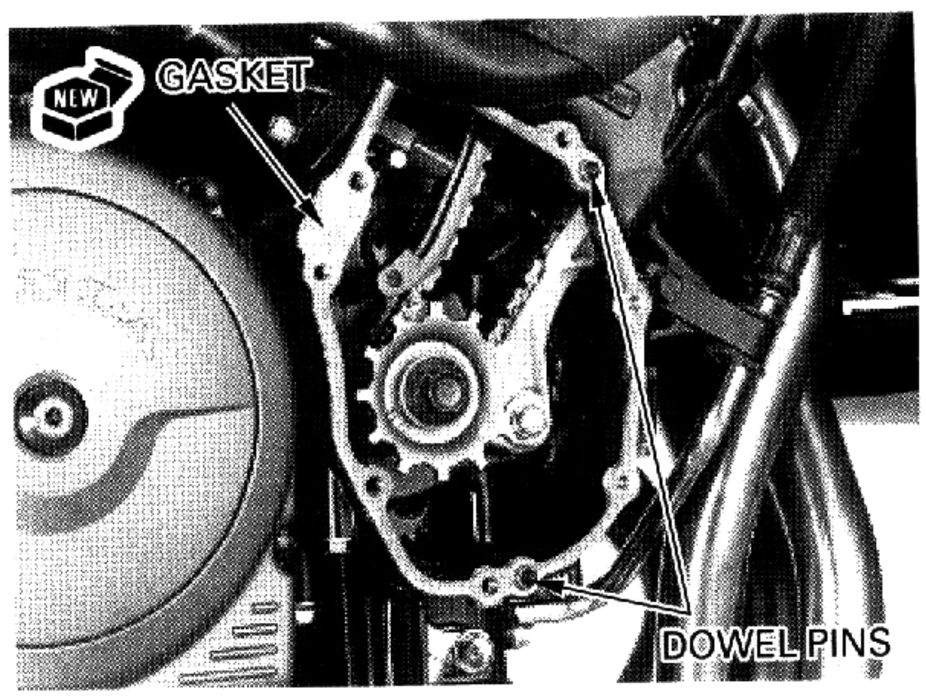
Install the ignition pulse generator into the cover.
Apply sealant to the wire grommet, then install it into the groove of the cover.
Install and tighten the ignition pulse generator bolts.



Apply liquid sealant to the mating surface of the crankcase as shown.

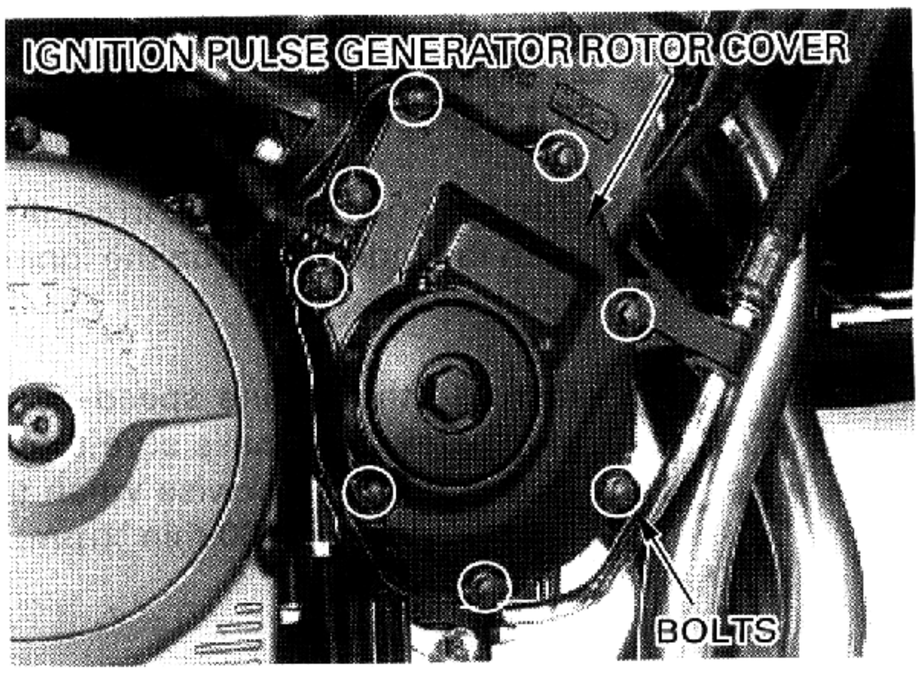


Install the dowel pins and a new gasket.



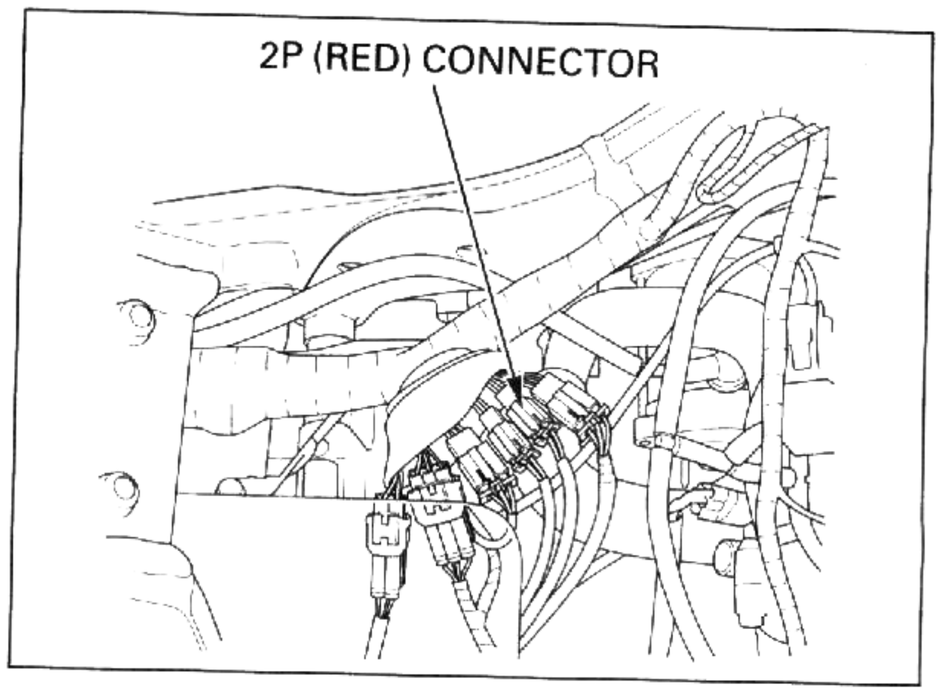
Apply sealant to the threads of the two bolts indicated by "△" mark on the cover.
Install the ignition pulse generator rotor cover and tighten the SH bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



Route the ignition pulse generator wire properly, connect the 2P (Red) connector.
Clamp the wire with the band.

Install the removed parts in the reverse order of removal.



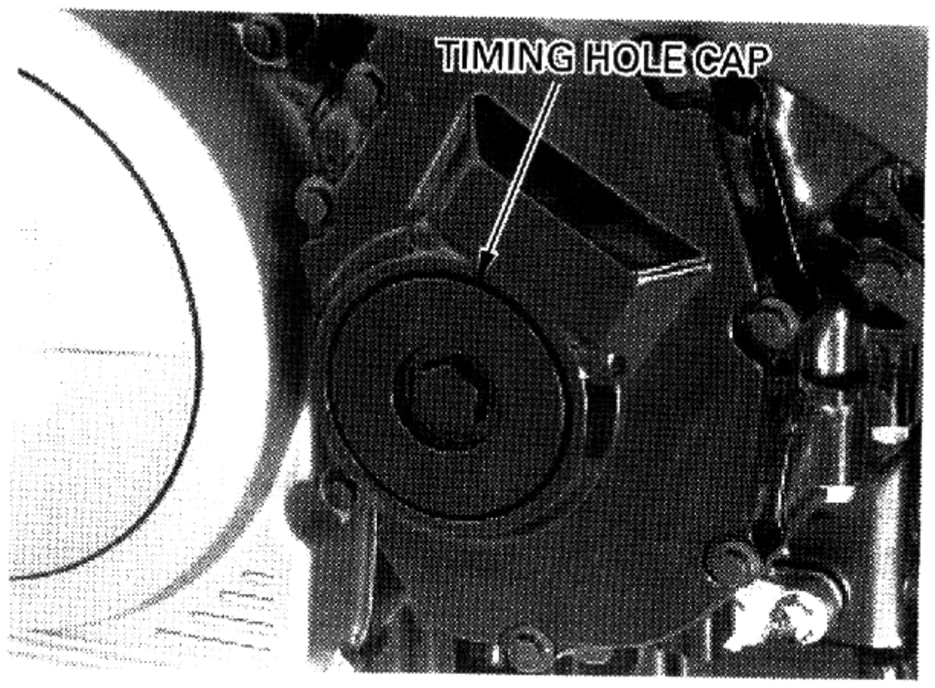
IGNITION TIMING

⚠WARNING

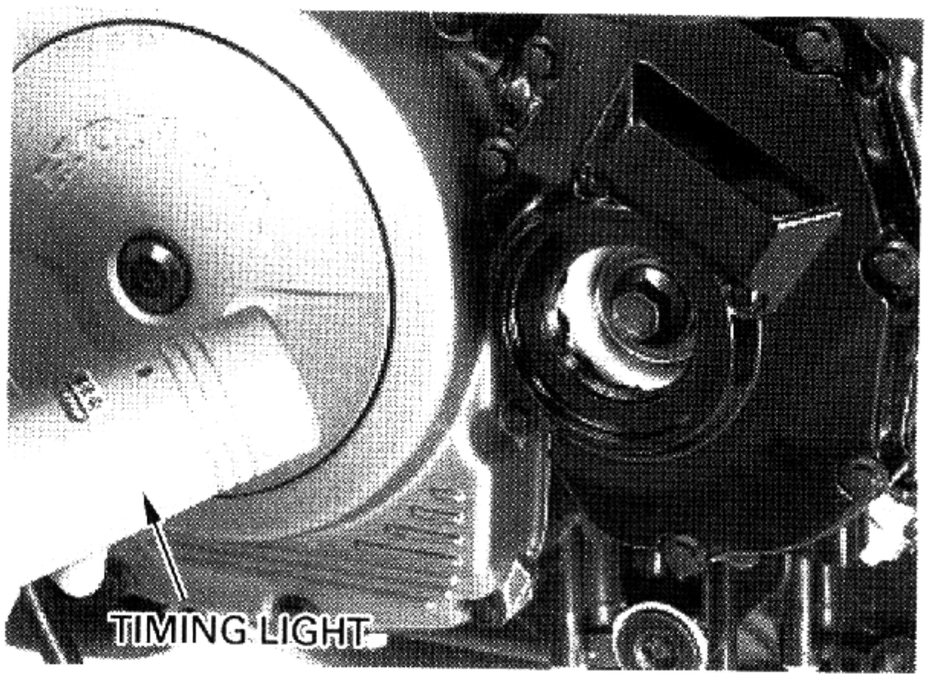
- ***If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area.***
- ***The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death.***

Read the instructions for timing light operation.

Warm up the engine.
Stop the engine and remove the timing hole cap.



Connect the timing light to the No. 1 spark plug wire.



Start the engine and let it idle.

IDLE SPEED: 1,100 ± 100 min^{-1} (rpm)

The ignition timing is correct if the "F" mark aligns with the index mark on the ignition pulse generator rotor cover.

Increase the engine speed by turning the throttle stop screw and make sure the "F" mark begins to move counterclockwise when the engine speed at approximately 1,500 min^{-1} (rpm).

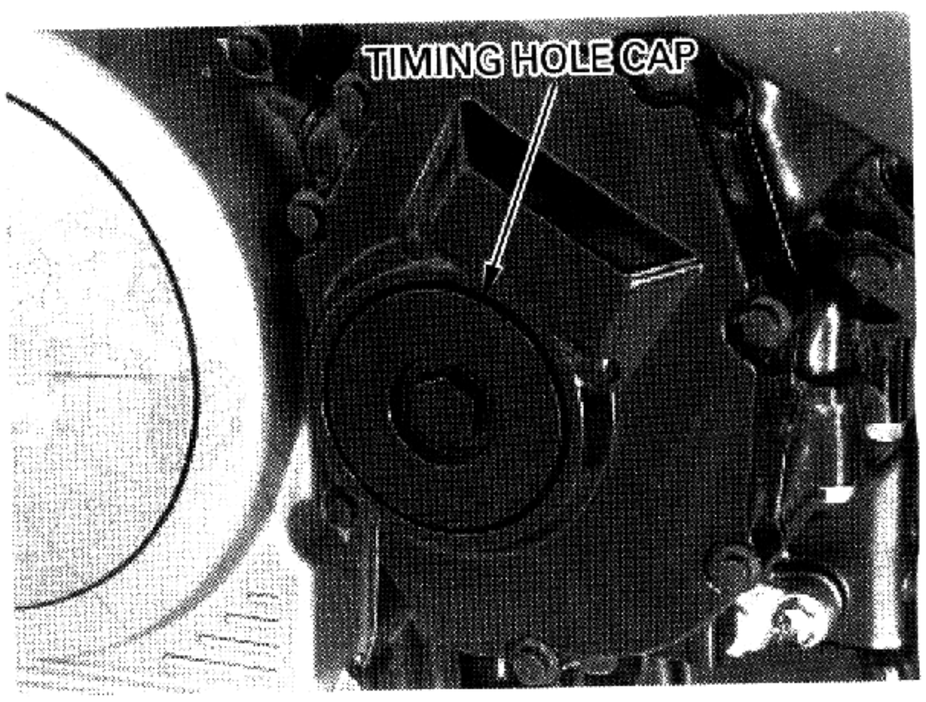


Check the O-ring is in good condition, replace if necessary.
Apply oil to the O-ring and install the timing hole cap.

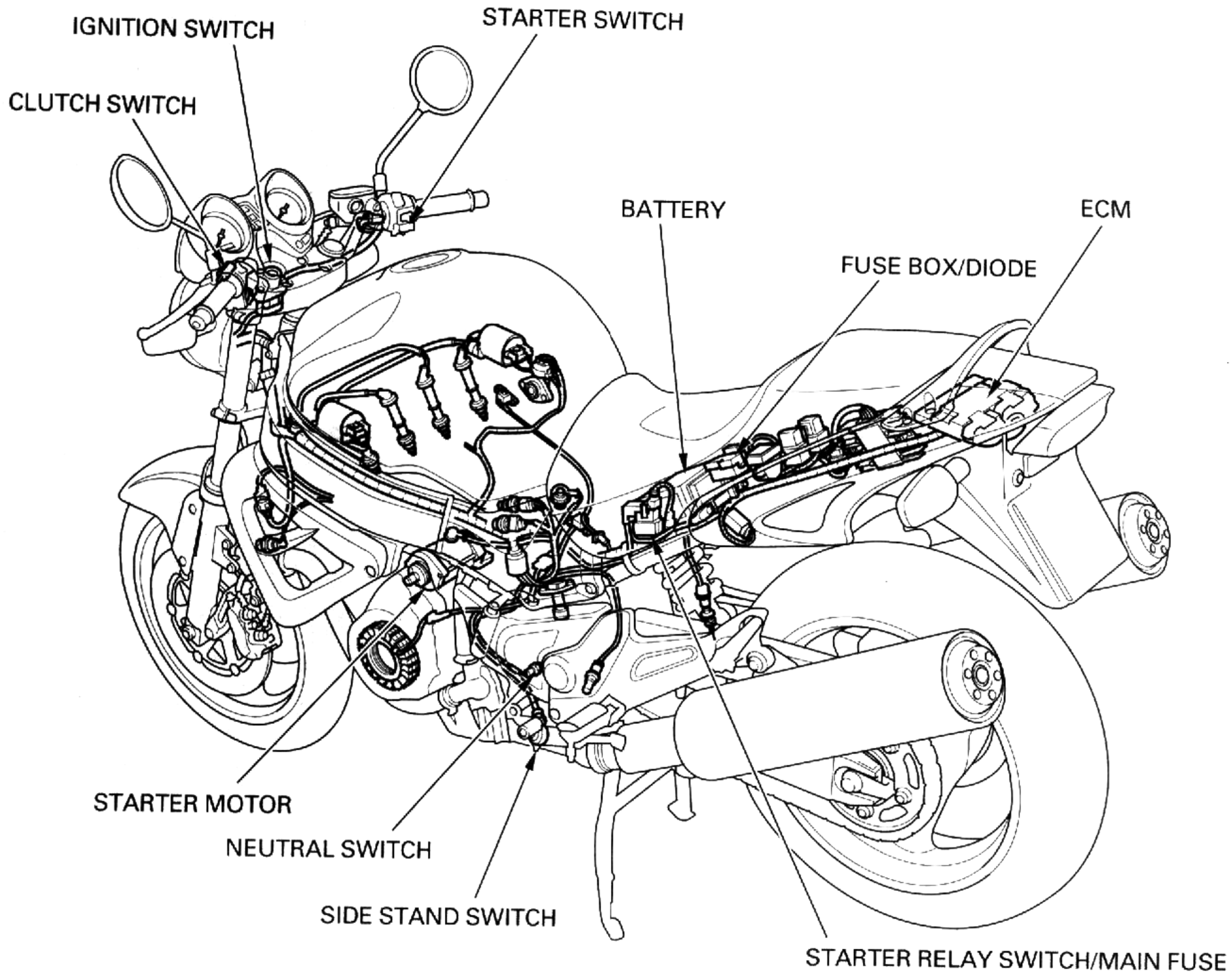


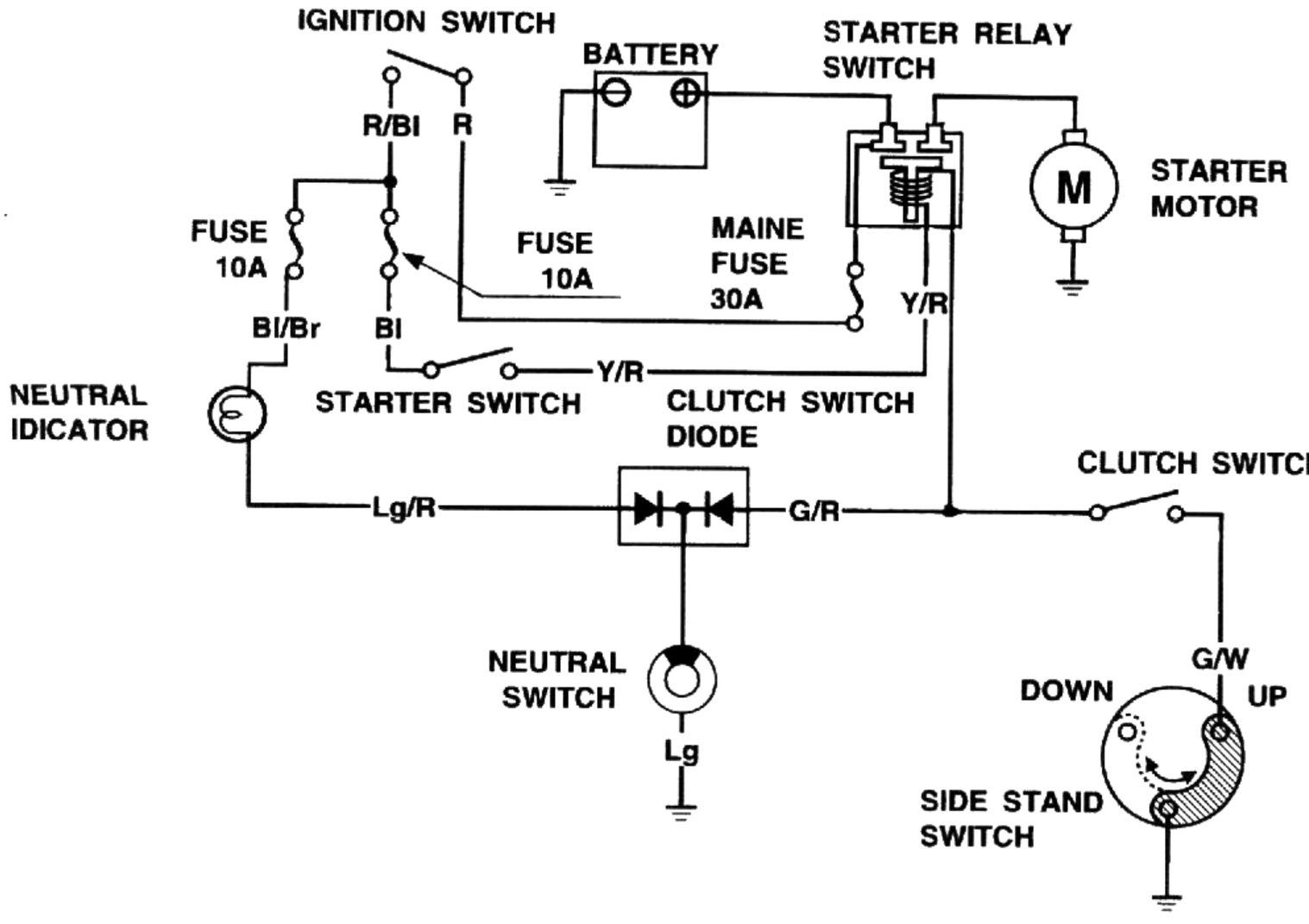
Tighten the timing hole cap to the specified torque.

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



SYSTEM DIAGRAM





18. ELECTRIC STARTER

SYSTEM DIAGRAM	18-0	STARTER MOTOR	18-4
SERVICE INFORMATION	18-1	STARTER RELAY SWITCH	18-10
TROUBLESHOOTING	18-2	DIODE	18-11

SERVICE INFORMATION

GENERAL

- The starter motor can be removed with the engine in the frame.
- For the starter drive and driven gear removal/installation, see section 10.

SPECIFICATION

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	4.5 (0.18)

TROUBLESHOOTING

Starter motor does not turn

- Check for a blown main or sub fuses before servicing.
- Make sure the battery is fully charged and in good condition.

Check the starter relay switch operation.
You should hear the relay "CLICK" when the starter switch button is depressed.

"CLICK" heard → Apply battery voltage to the starter motor directly and check the operation.

- Normal → • Poorly connected starter motor cable
  • Faulty starter relay switch (page 18-10)
- Abnormal → • Faulty starter motor (page 18-4)

"CLICK" not heard

Disconnect the starter relay switch connector, and check the relay coil ground wire lines as below for continuity:
1. Green/Red terminal-clutch switch diode-neutral switch line (with the transmission in neutral and clutch lever released).
2. Green/Red terminal/clutch switch-side stand switch line (in any gear except neutral, and with the clutch lever pulled in and the side stand up.

Abnormal →
- Faulty neutral switch (page 19-21)
- Faulty neutral diode
- Faulty clutch switch
- Faulty clutch/side stand diode
- Faulty side stand switch
- Loose or poor contact connector
- Open circuit in wire harness

Normal

Connect the starter relay switch connector.
With the ignition switch ON and the starter switch pushed, measure the starter relay voltage at the starter switch connector (between Yellow/Red (+) and ground (−).

No voltage →
- Faulty ignition switch
- Faulty starter switch
- Blown out main or sub-fuse
- Loose or poor contact of connector
- Open circuit in wire harness

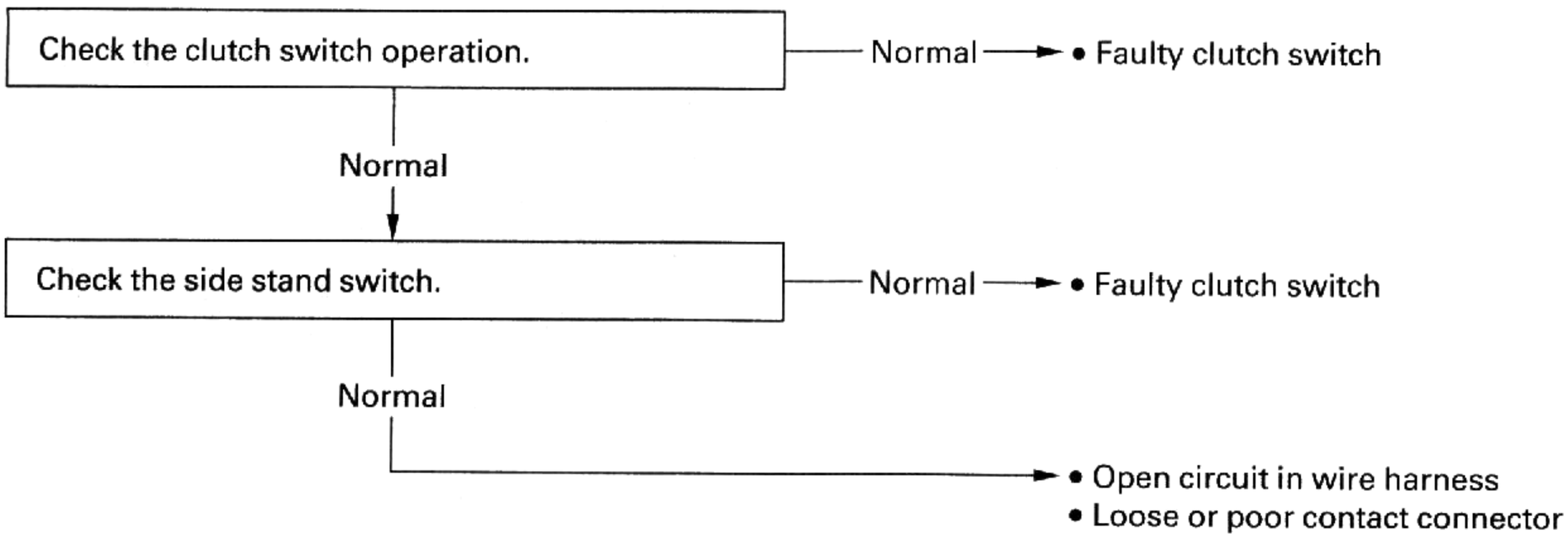
Battery voltage registered

Check the starter relay switch operation.

Normal → • Loose or poor contact starter relay switch connector

Abnormal → • Faulty starter relay switch

The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the side stand up and the clutch lever pulled in.



Starter motor turns engine slowly
- Low battery voltage
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected battery ground cable

Starter motor turns, but engine does not turn
- Starter motor is running backwards
  - Case assembled improperly
  - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter drive gear

Starter relay switch "Clicks", but engine does not turn over
- Crankshaft does not turn due to engine problems

STARTER MOTOR

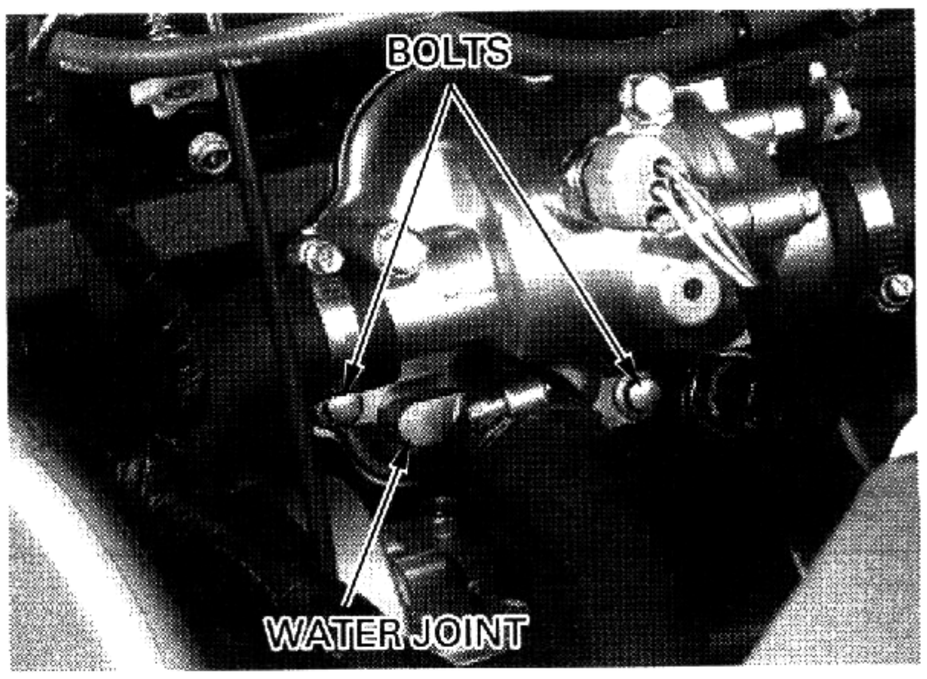
REMOVAL

⚠WARNING

With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Support the rear end of the fuel tank (page 2-11).
Drain the coolant (page 6-4).

Remove the two SH bolts and water joint.



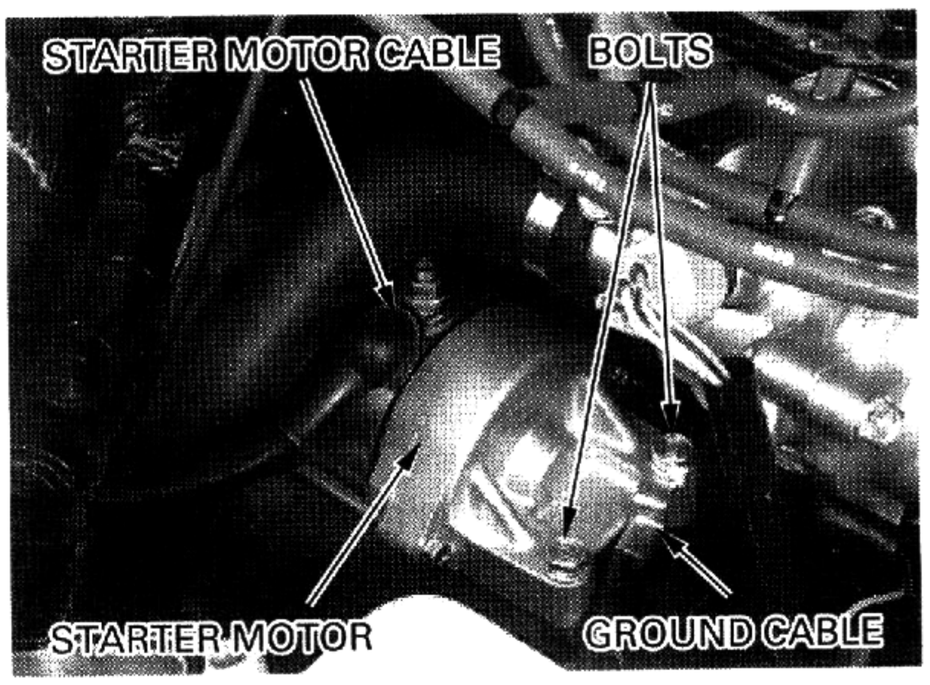
Remove the nut and the starter motor cable from the starter motor.

CAUTION:

Be careful not to damage the water hose.

Remove the starter motor mounting bolts and ground wire.

Pull the starter motor out of the crankcase.

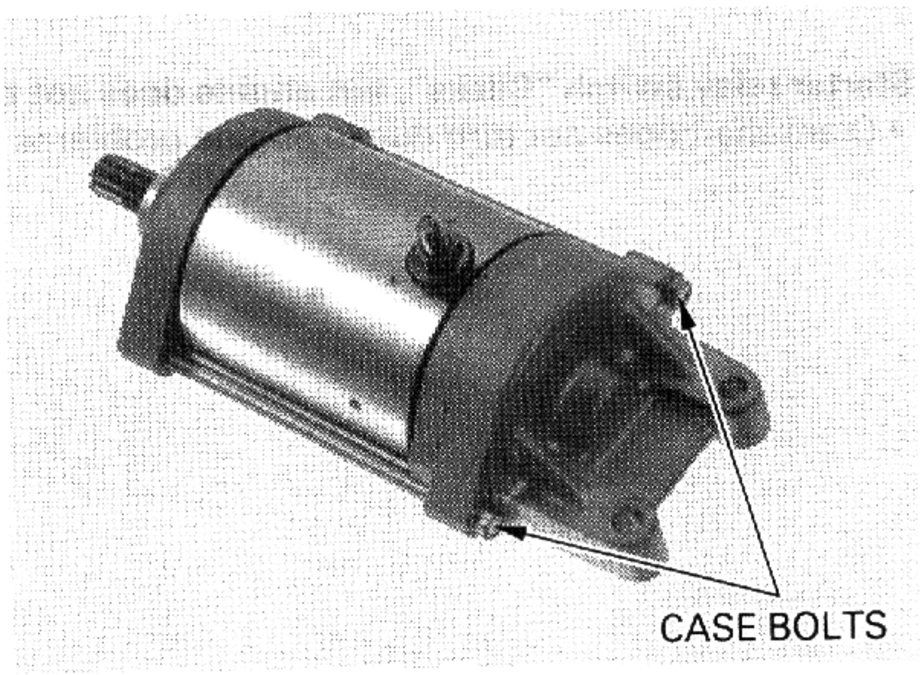


DISASSEMBLY

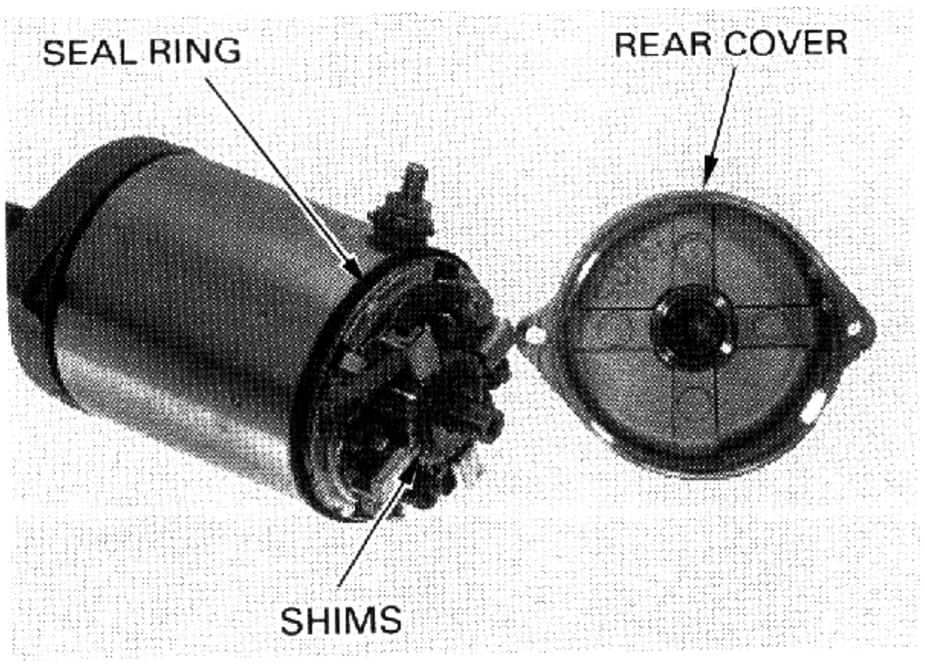
NOTE:

Record the location and number of shims.

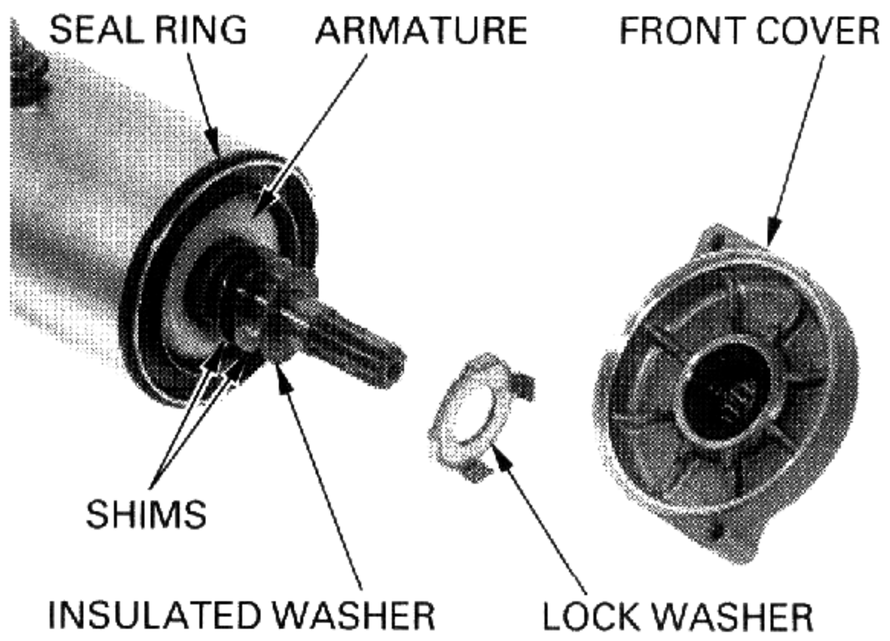
Record the following:
—Starter motor case bolts



—Rear cover assembly
—Seal ring
—Shims

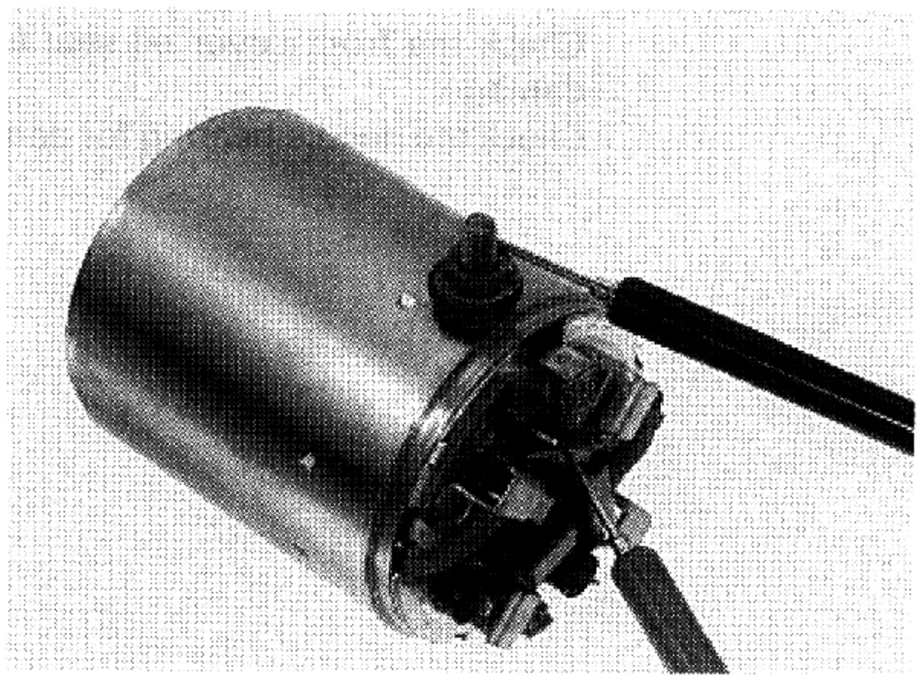


Remove the following:
- Front cover assembly
- Seal ring
- Lock washer
- Insulated washer
- Shims
- Armature

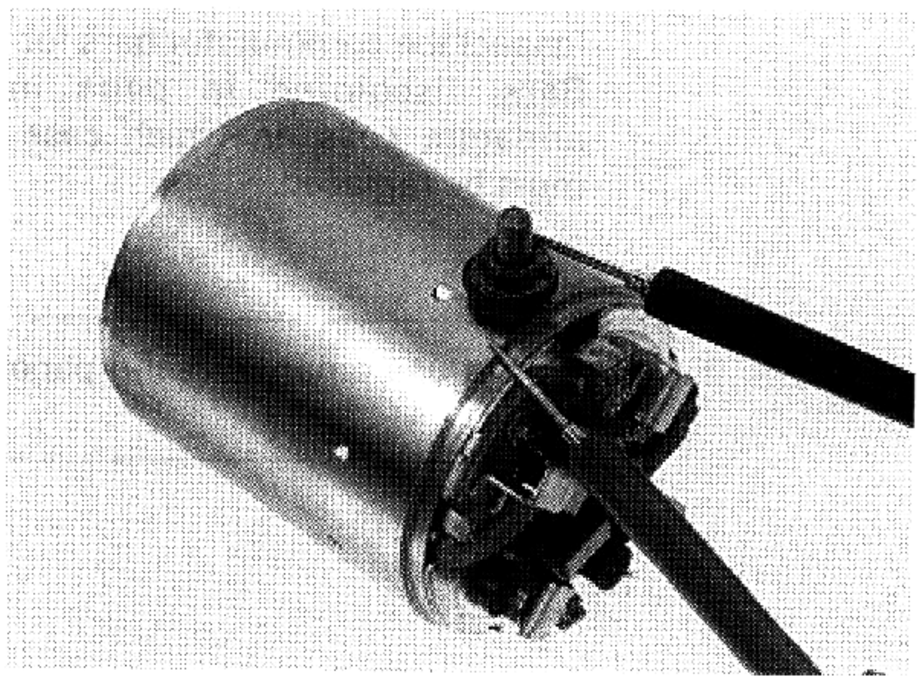


INSPECTION

Check for continuity between the cable terminal and the brush wire (the indigo colored wire or the insulated brush holder).
There should be continuity.

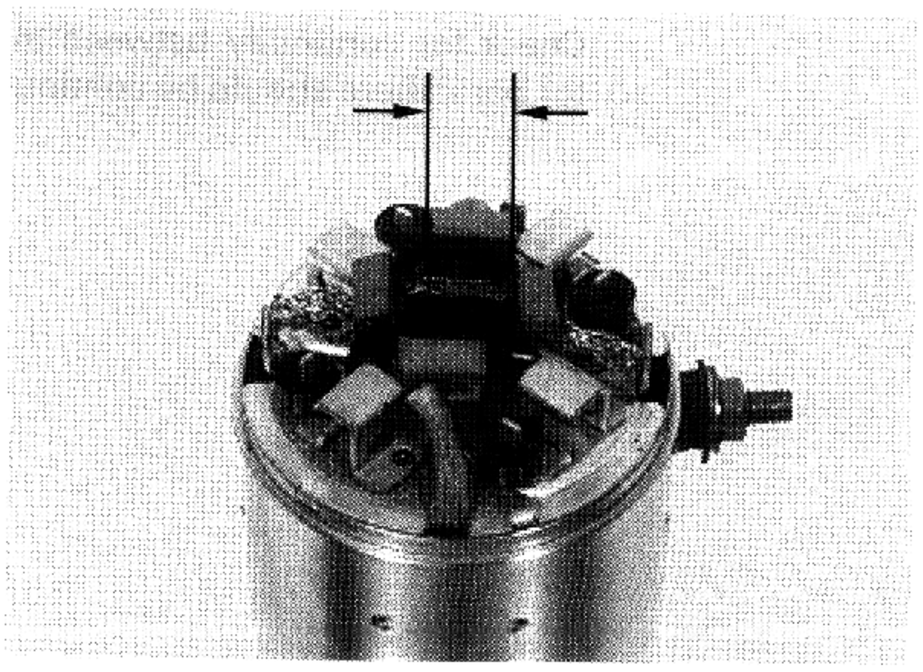


Check for continuity between the motor case and the cable terminal.
There should be no continuity.

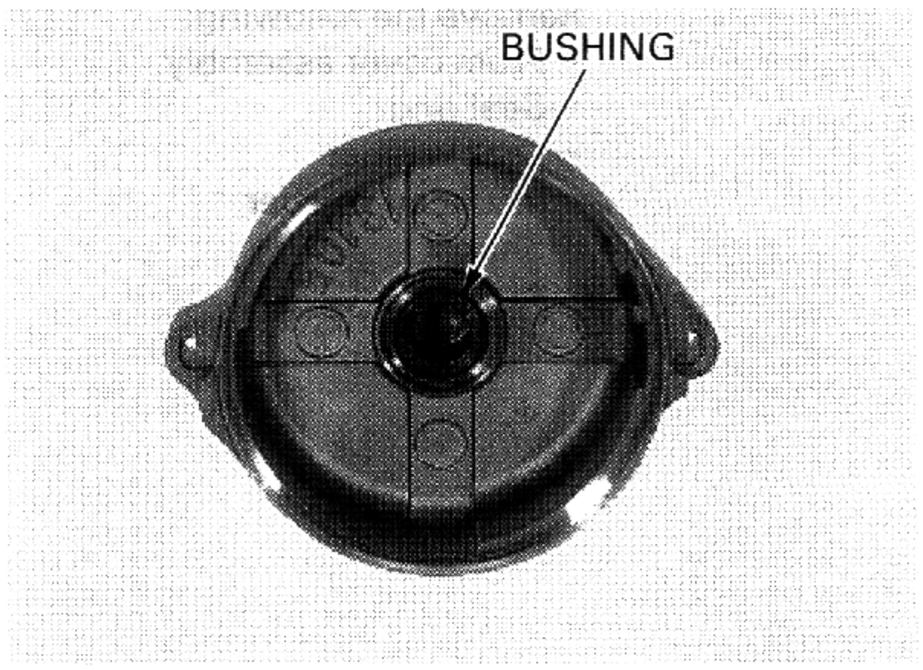


Inspect the brushes for damage and measure the brush length.

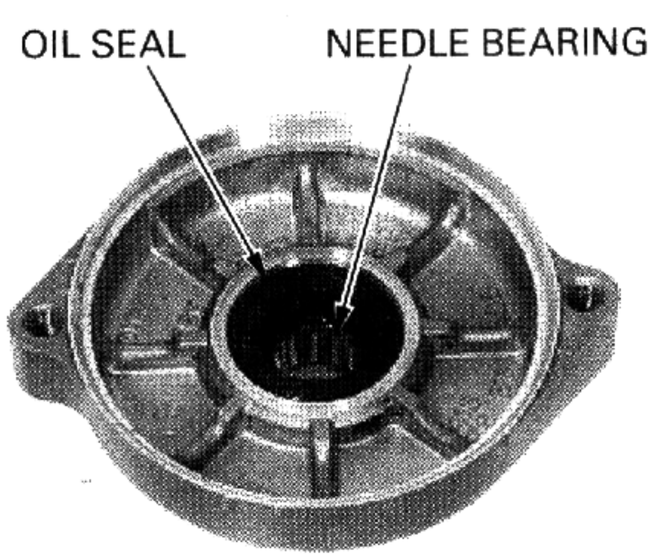
SERVICE LIMIT: 4.5 mm (0.18 in)



Check the bushing of the rear cover for wear or damage.



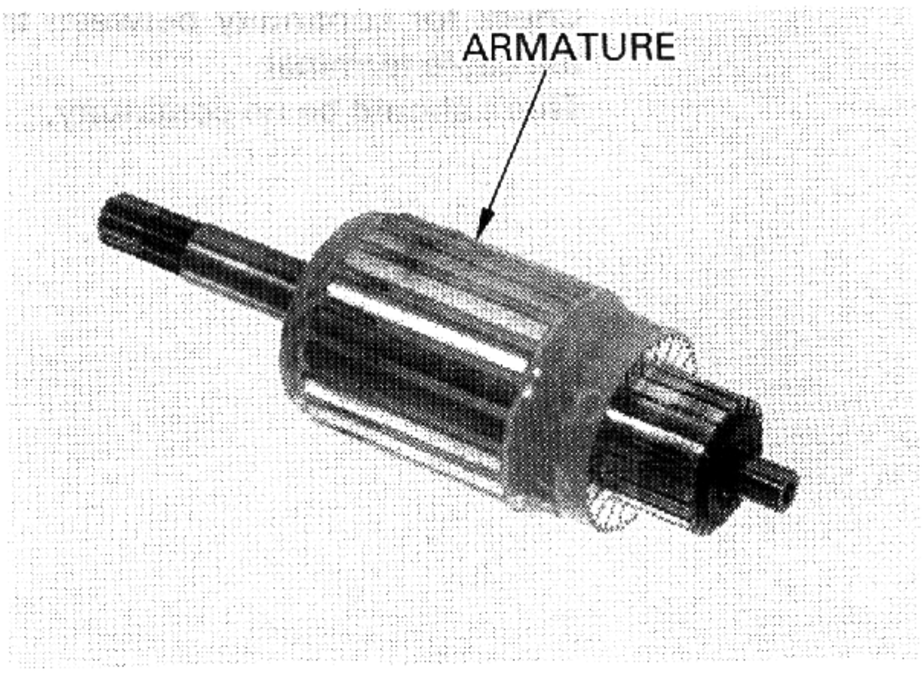
Check the front cover oil seal for fatigue or other damage.
Check the needle bearing for damage.



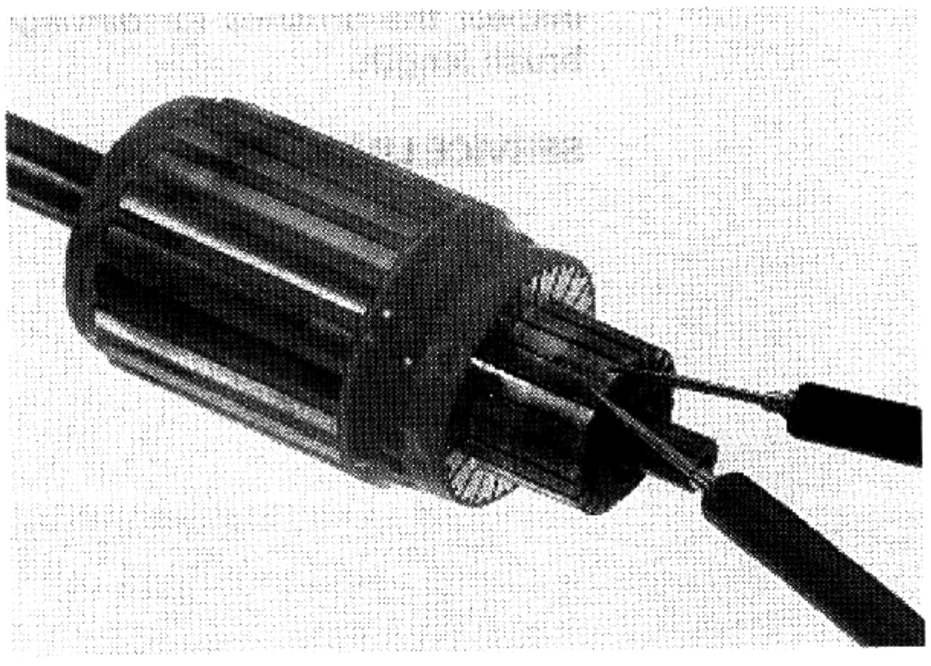
Inspect the commutator bars for discoloration,
Bars discolored in pairs indicate grounded armature coils, in which case the starter motor must be replaced.

NOTE:

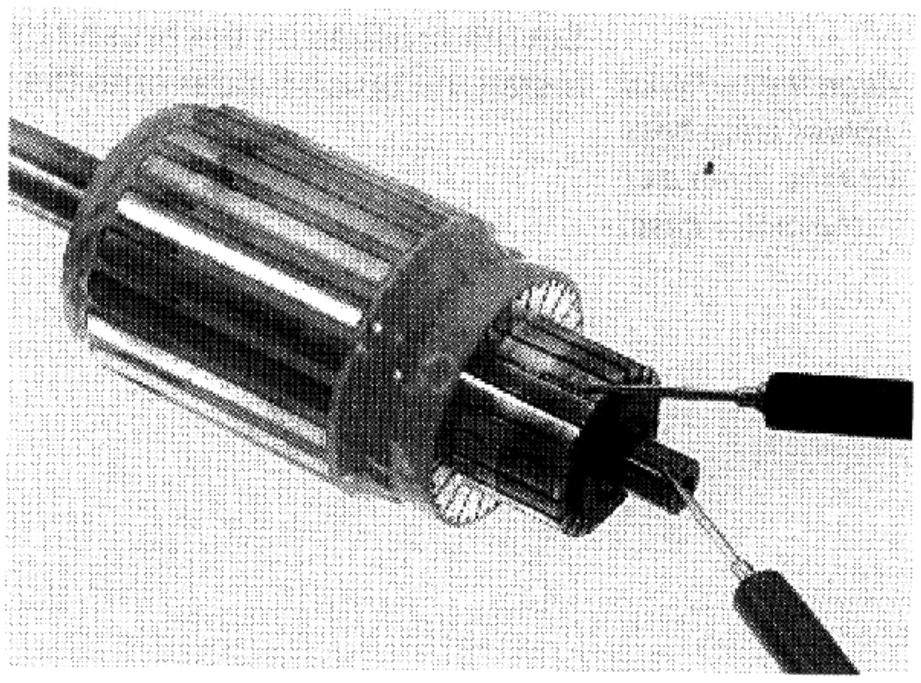
Do not use emery or sand paper on the commutator.



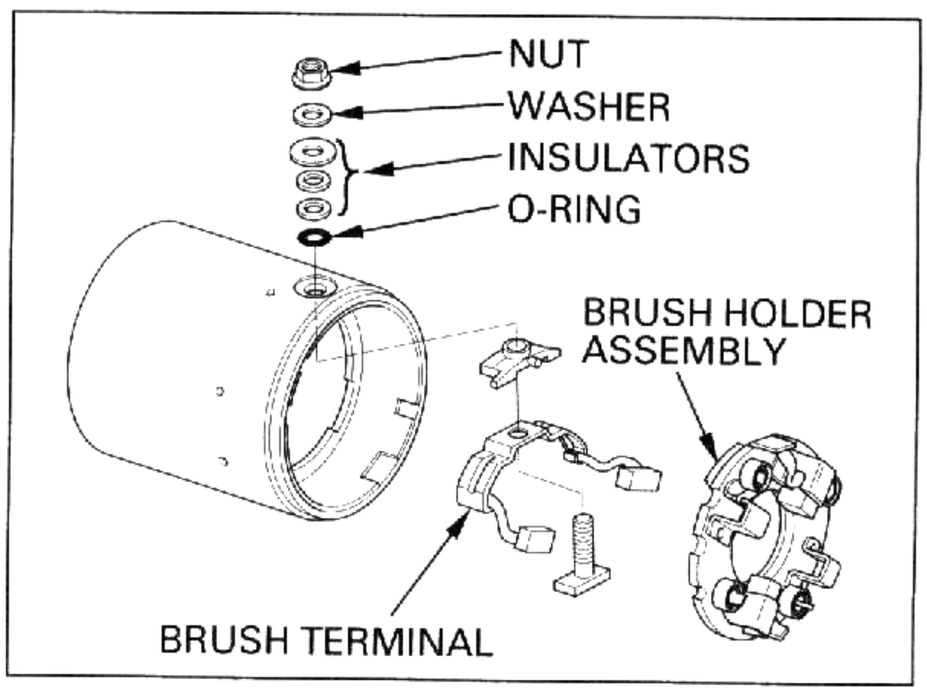
Check for continuity between individual commutator bars; there should be continuity.



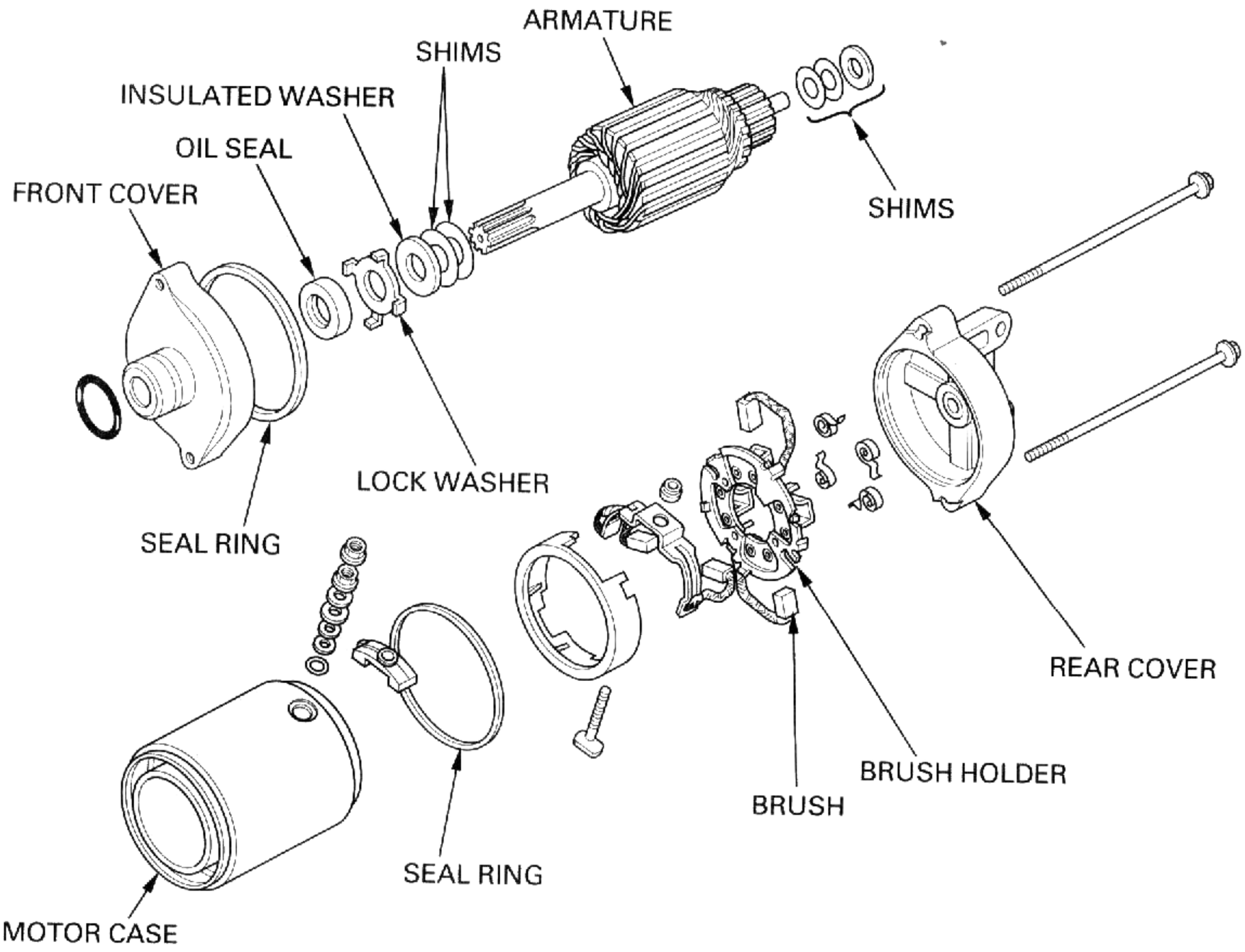
Also, check for continuity between individual commutator bars and the armature shaft; there should be no continuity.



Remove the following:
- Nut
- Washer
- Insulators
- O-ring
- Brush holder assembly
- Brush/terminal



ASSEMBLY



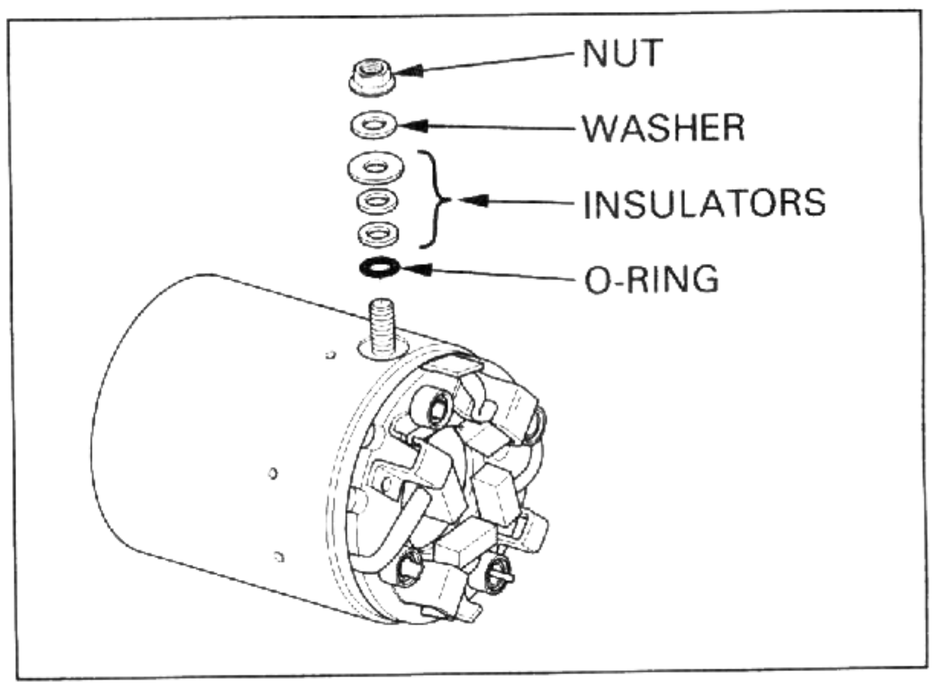
Align the terminal holder plate boss with the groove of the motor case.

Set the brushes on the brush holder.
Install the brush holder onto the motor case.



Install the insulators properly as noted during removal.

Install the following:
—O-ring
—Insulators
—Washer
—Nut



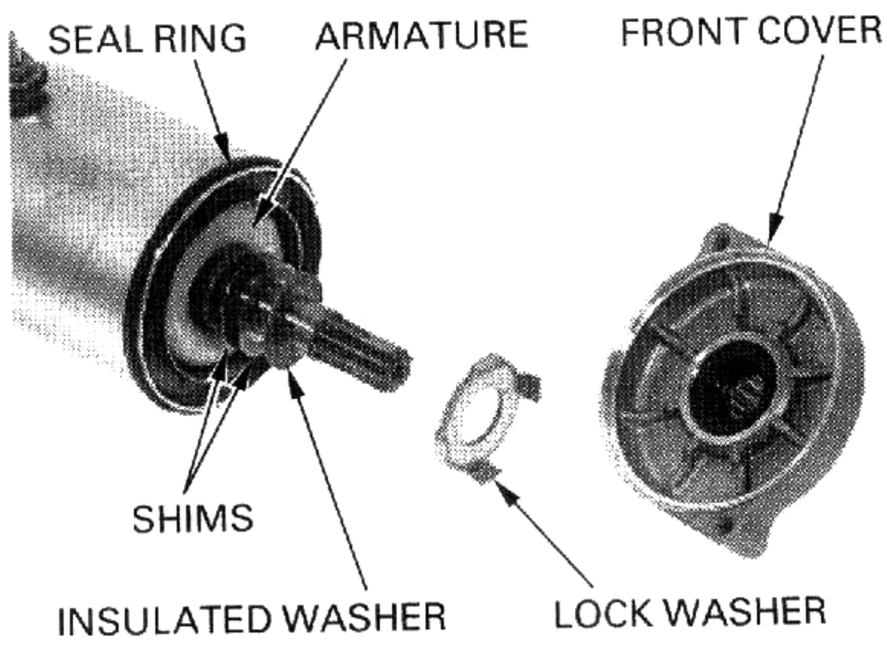
Install the armature in the motor case.

Install the shims properly as noted during removal.

Install the shims on the armature shaft.

Install the insulated washer and lock washer on the armature shaft.

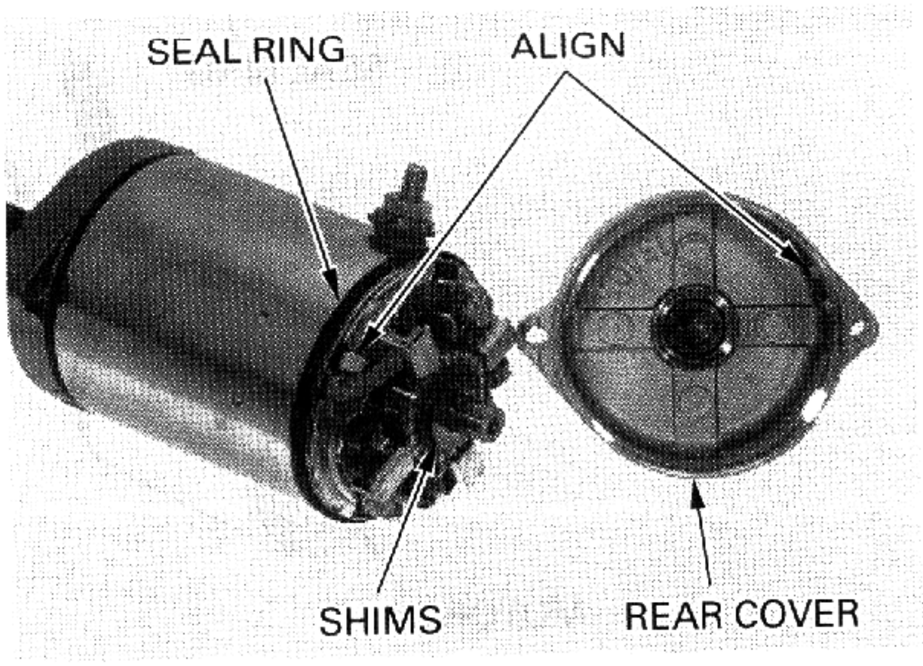
Install the seal ring onto the motor case.



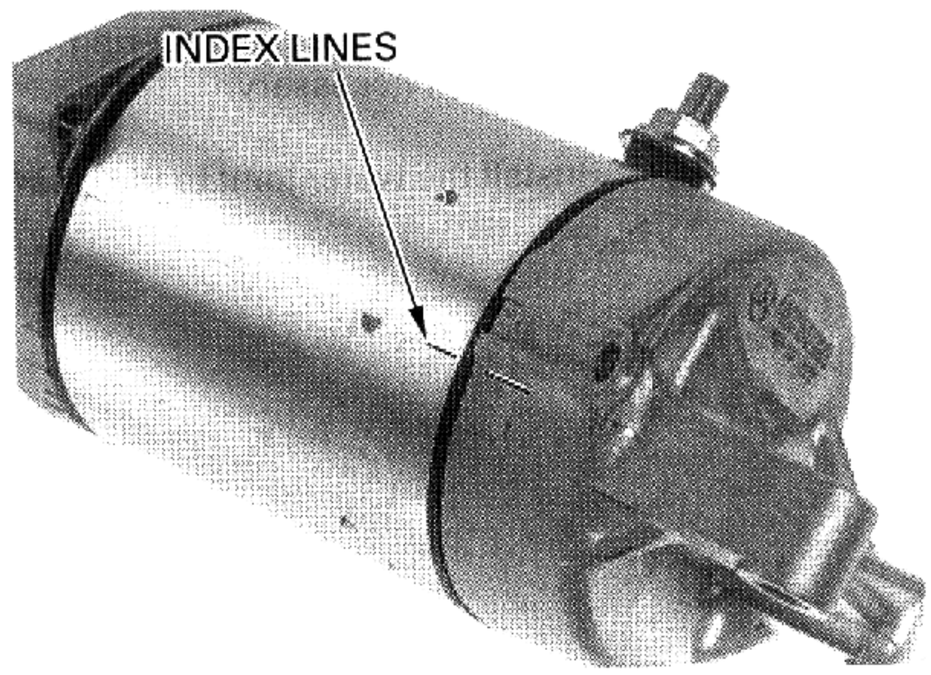
Install the shims properly as noted during removal.

Install the seal ring on the motor case.
Install the shims on the armature shaft.

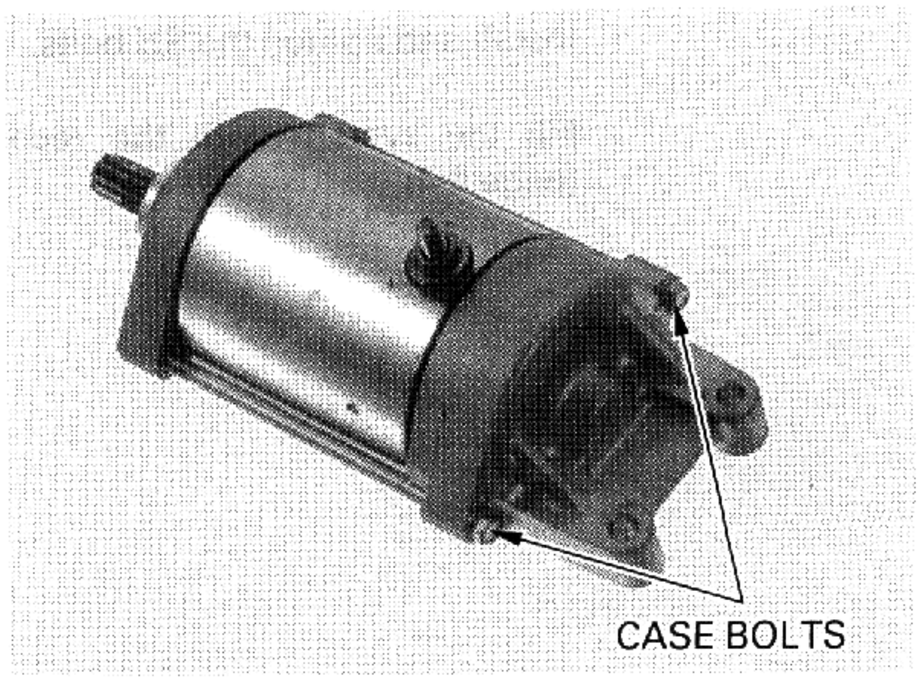
Assemble the motor case and rear cover, aligning the brush holder boss with the groove in the rear cover.



Install the front cover to the motor case.
Make sure the index lines are aligned.



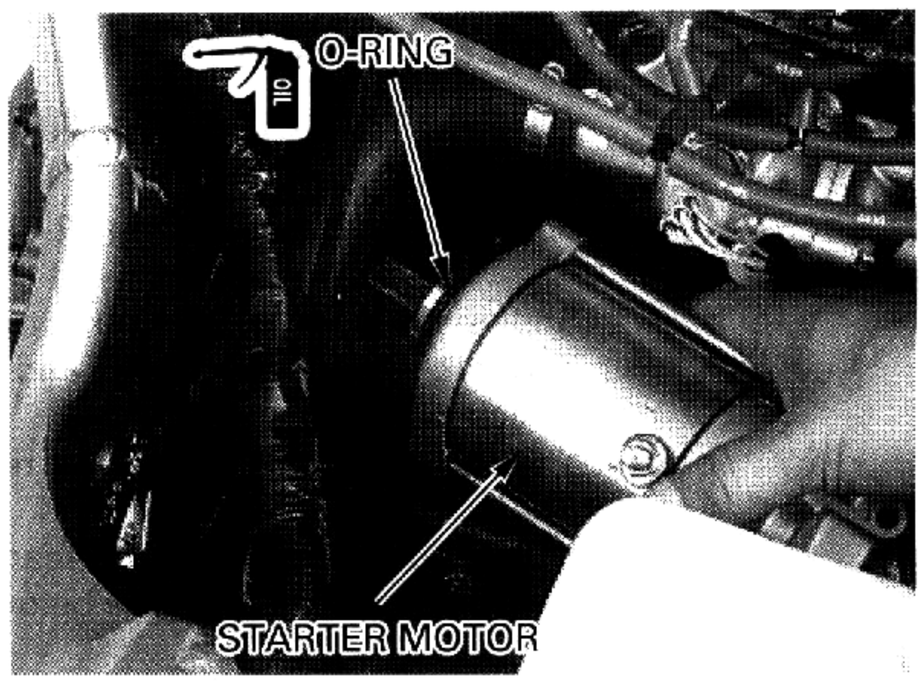
Install and tighten the case bolts securely.



INSTALLATION

Apply clean engine oil to the new O-ring.
Install a new O-ring onto the starter motor boss.

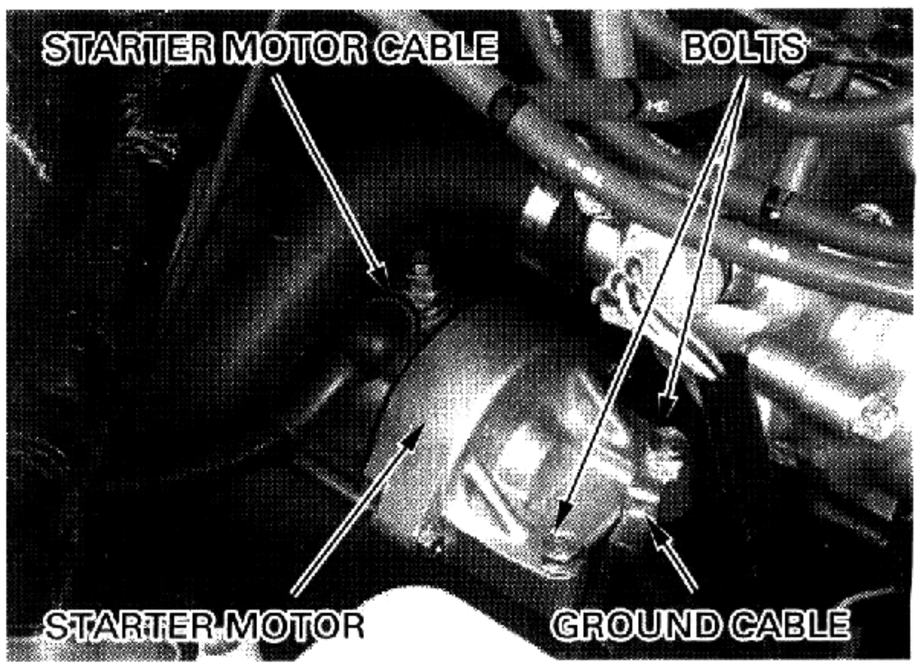
Install the starter motor into the crankcase.



Route the starter motor cable and ground cable.
Install the starter motor cables, then tighten the mounting bolts and terminal nut securely.

CAUTION:

Be careful not to damage the water hose.



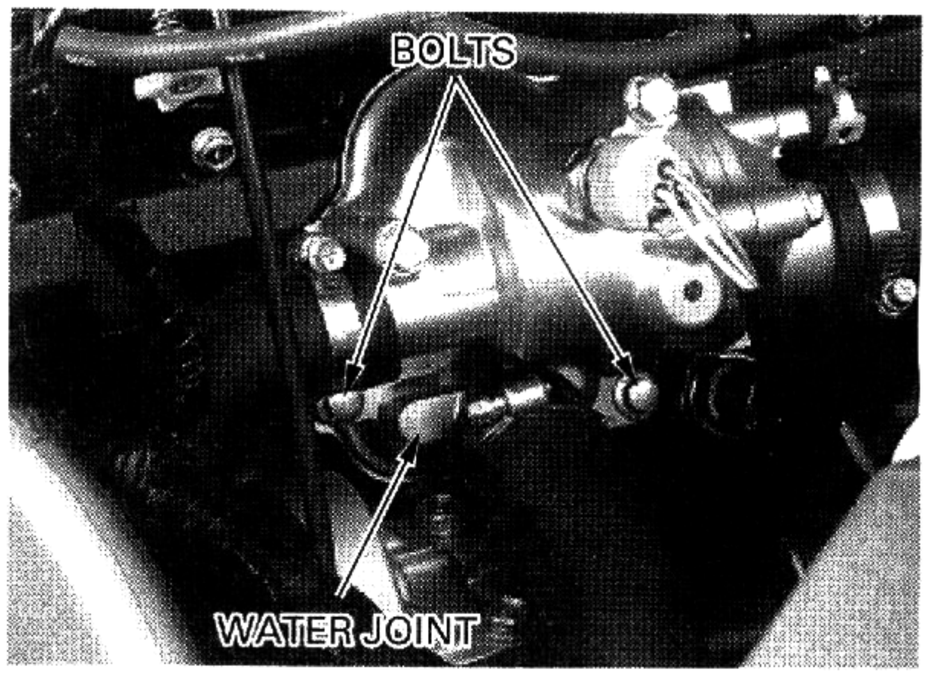
Check the water joint O-ring is in good condition, replace if necessary.

Install the water joint to the cylinder block.



Install and tighten the SH bolts.

Fill the system with the recommended coolant (page 6-4).



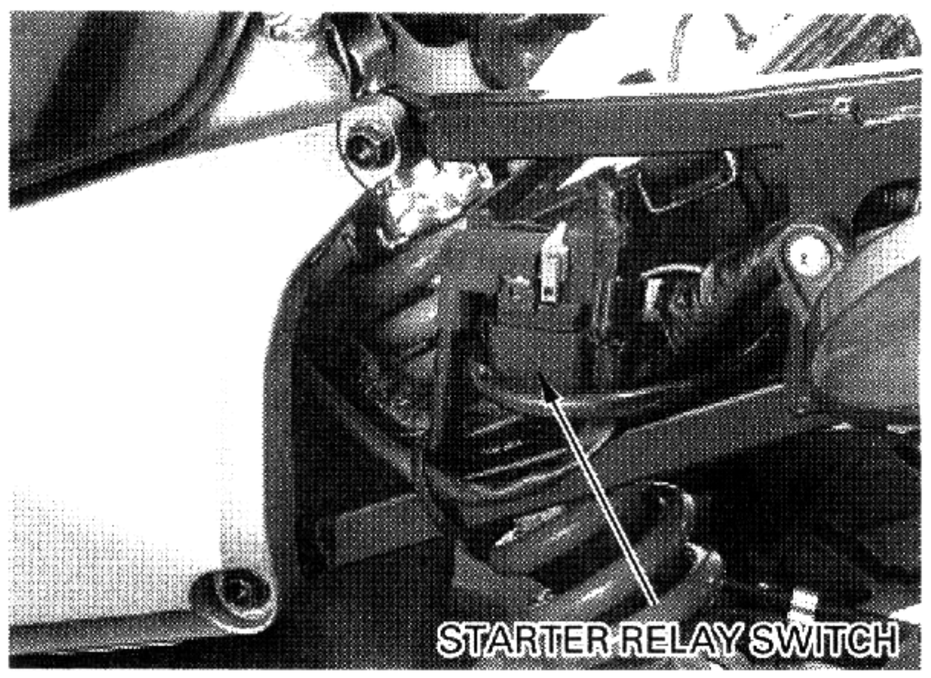
STARTER RELAY SWITCH

OPERATION INSPECTION

Remove the seat cowl (page 2-2).

Shift the transmission into neutral.
Turn the ignition switch ON and depress the starter switch button.
The coil is normal if the starter relay switch clicks.

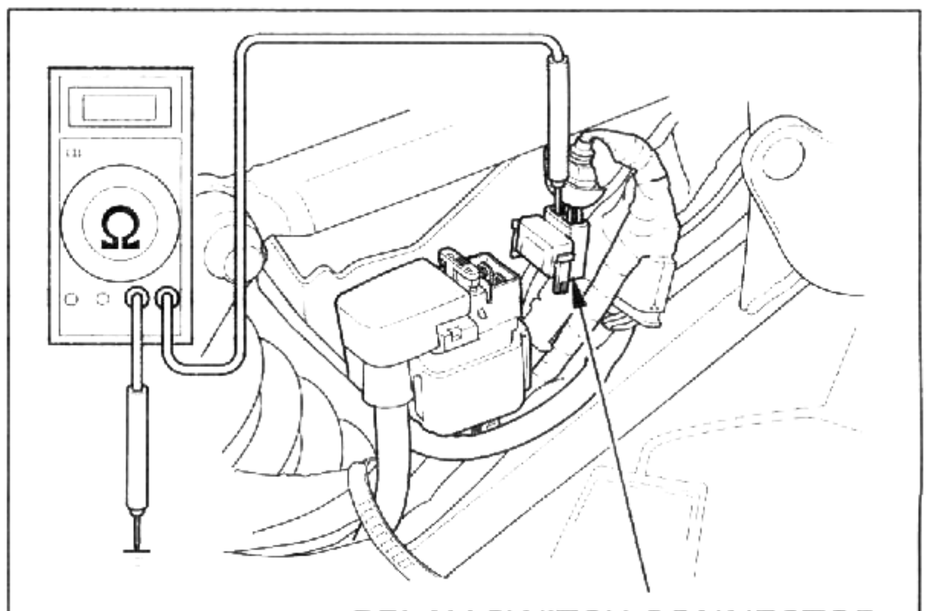
If the switch "CLICK" is not heard, inspect the relay switch using the procedure below.



GROUND LINE INSPECTION

Disconnect the relay connector.

Check for continuity between the Green/Red wire and ground.
If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand switch is up, the ground circuit is normal (in neutral, there is a slight resistance due to the diode).

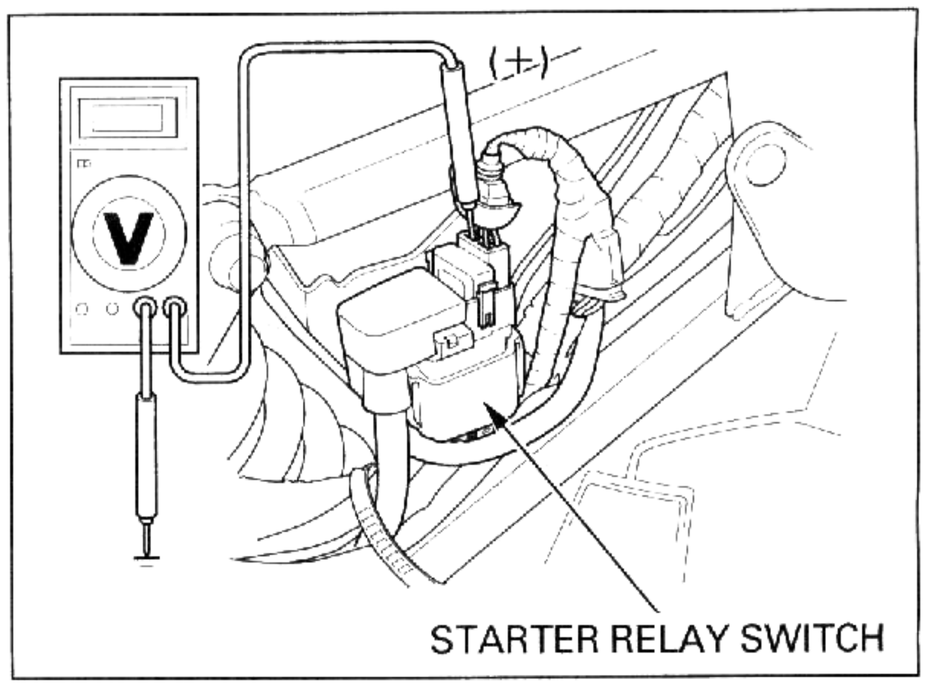


RELAY SWITCH CONNECTOR

VOLTAGE INSPECTION

Connect the starter relay switch connector.
Shift the transmission into neutral.

Measure the voltage between the Yellow/Red wire (+) and ground at the starter relay switch connector.
There should be battery voltage only when the starter switch button is depressed with the ignition switch is ON.

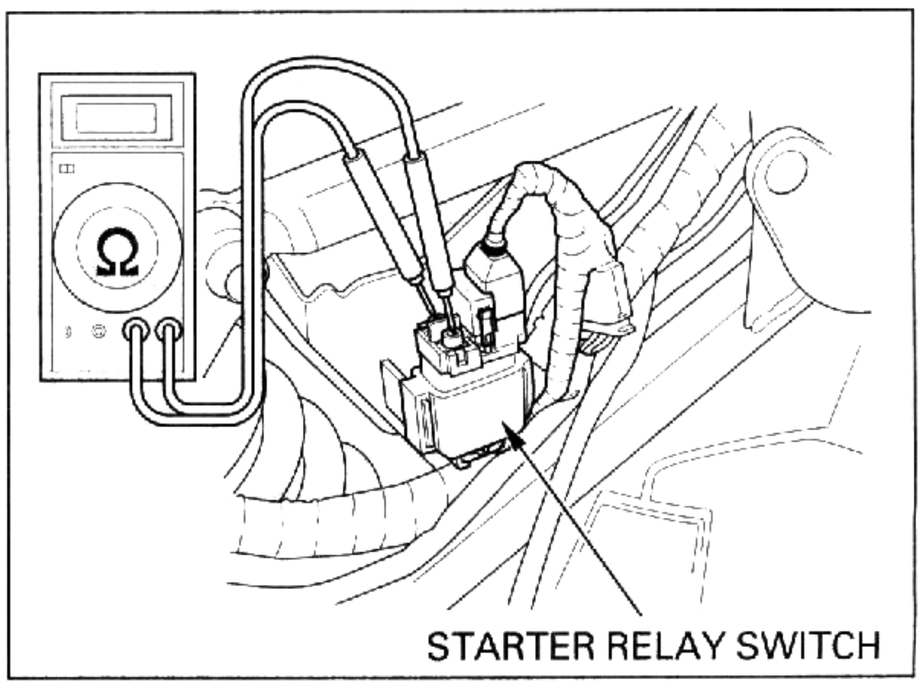


CONTINUITY INSPECTION

Disconnect the starter relay connector and cables.

Connect an ohmmeter to the starter relay switch large terminals.
Connect a fully charged 12 V battery to the starter relay switch connector terminals (Yellow/Red and Green/Red).
Check for continuity between the starter relay switch terminals.

There should be continuity while 12 V battery is connected to the starter relay switch connector terminals and should be no continuity when the battery is disconnected.

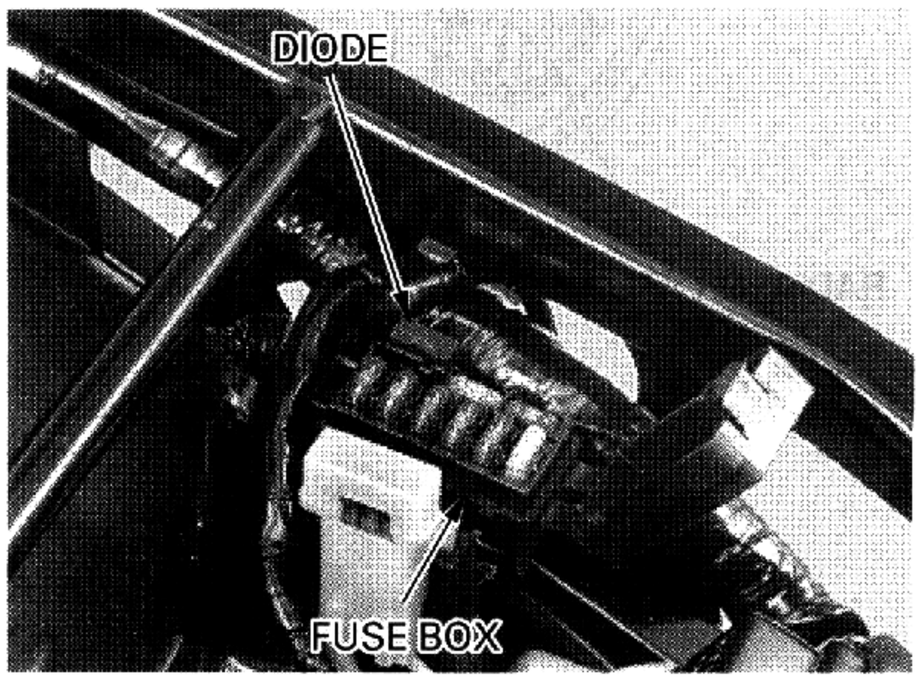


DIODE

REMOVAL

Remove the seat (page 2-2).

Open the fuse box and remove the diode.



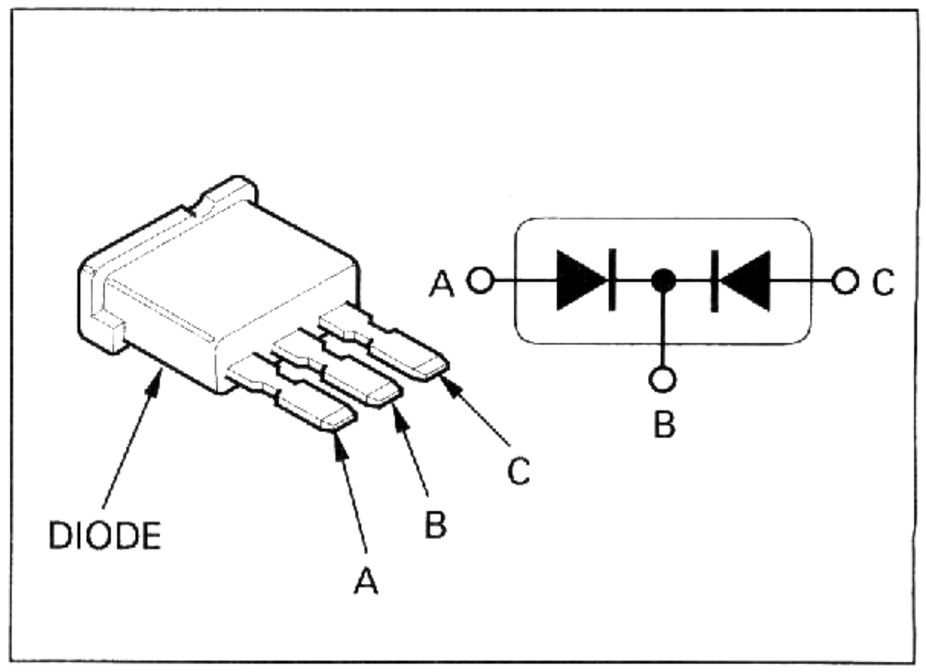
INSPECTION

Check for continuity with an ohmmeter.

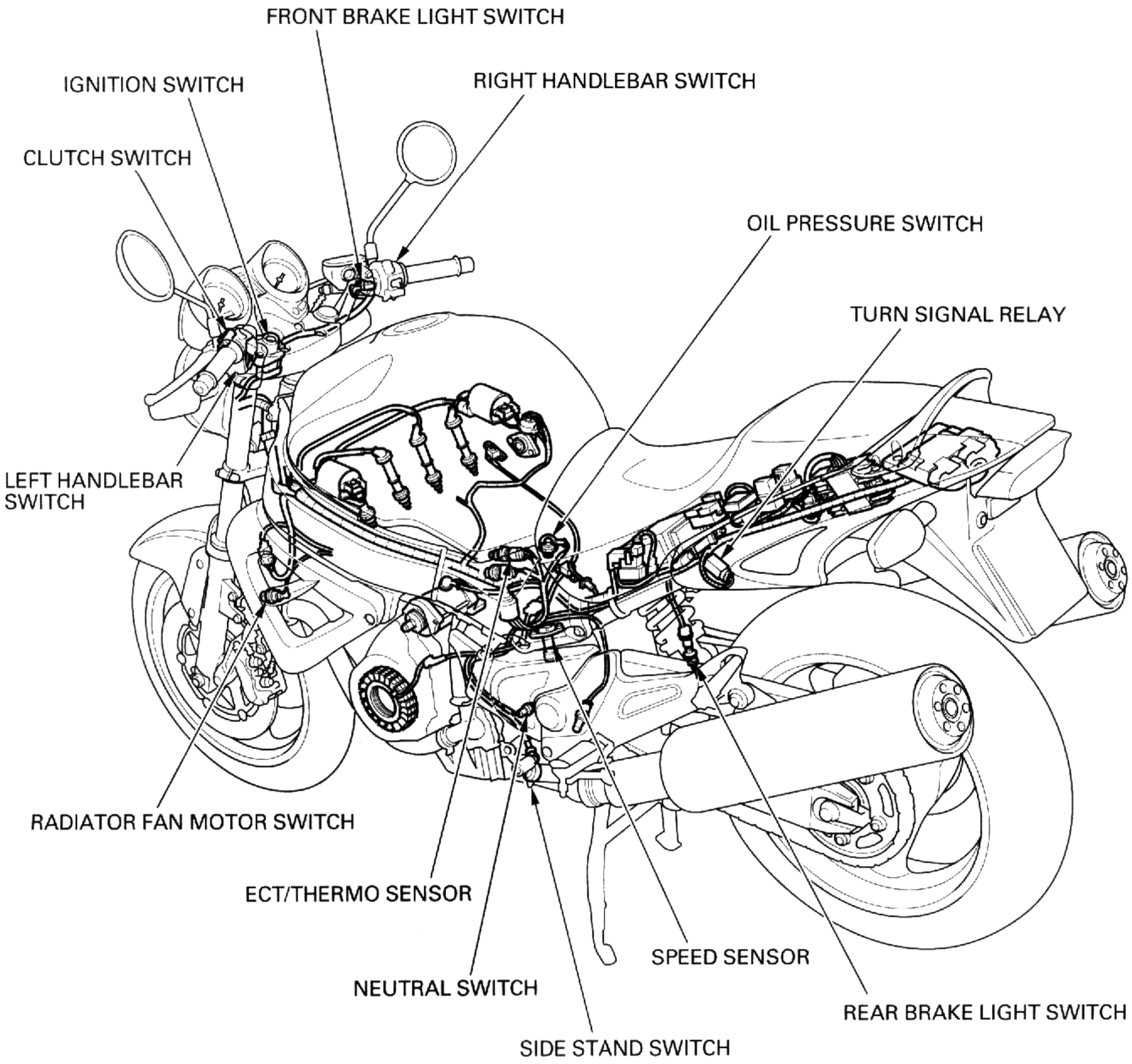
Normal direction: Continuity
Reverse direction: No continuity

INSTALLATION

Install the diode in the reverse order of removal.



SYSTEM LOCATION



19. LIGHTS/METERS/SWITCHES

SYSTEM LOCATION	19-0	COOLING FAN MOTOR SWITCH	19-16
SERVICE INFORMATION	19-1	OIL PRESSURE SWITCH	19-17
TROUBLESHOOTING	19-3	FUEL RESERVE SENSOR	19-18
HEADLIGHT	19-4	IGNITION SWITCH	19-19
POSITION LIGHT	19-5	HANDLEBAR SWITCHES	19-20
TURN SIGNAL	19-6	BRAKE LIGHT SWITCH	19-21
TAIL/BRAKE LIGHT	19-7	CLUTCH SWITCH	19-21
COMBINATION METER	19-8	NEUTRAL SWITCH	19-21
SPEEDOMETER/VEHICLE SPEED SENSOR	19-12	SIDE STAND SWITCH	19-22
TACHOMETER	19-14	HORN	19-23
COOLANT TEMPERATURE GAUGE/ SENSOR	19-15	TURN SIGNAL RELAY	19-23

SERVICE INFORMATION

GENERAL

⚠WARNING

- ***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.***
- ***Use an electric heating element to heat the water/coolant mixture for the fan motor switch inspection. Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.***

- Note the following when replacing the halogen headlight bulb.
  - —Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause is to fail.
  - —If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
  - —Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes are used throughout this section.

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

ITEM			SPECIFICATIONS
Bulbs	Headlight (Hi/Lo)		12V−60/55W
	Position light		12V−4W
	Brake/tail light		12V−21/5W × 2
	Front turn signal light		12V−21W × 2
	Rear turn signal light		12V−21W × 2
	Instrument light		12V−1.7W × 3
	Turn signal indicator		12V−3.4W × 2
	High beam indicator		12V−1.7W
	Neutral indicator		12V−1.7W
	Oil pressure indicator		12V−1.7W
	PGM-FI warning indicator		12V−1.7W
	Fuel reserve indicator		12V−1.7W
	Immobilizer indicator		12V−1.7W
Fuse	Main fuse		30A
	PGM-FI fuse		30A
	Sub fuse		10A ×6
Tachometer peak voltage			10.5 V minimum
Thermo sensor resistance		80 °C	47.5−56.8 kΩ
		120 °C	14.9−17.3 kΩ
Fan motor switch	Start to close (ON)		98−102 °C (208−216 °F)
	Stop to open		93−97 °C (199−207 °F)

TORQUE VALUES

Side stand mounting bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Side stand lock nut	29 N·m (3.0 kgf·m , 22 lbf·ft)	
Side stand switch mounting bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	ALOC bolt
Side stand bracket bolt	54 N·m (5.5 kgf·m , 40 lbf·ft)	ALOC bolt
Tail/brake light mounting bolt	7 N·m (0.7 kgf·m , 5.1 lbf·ft)	
Rear turn signal unit mounting nut	5 N·m (0.5 kgf·m , 3.6 lbf·ft)	
Combination meter mounting bolt	2 N·m (0.2 kgf·m , 1.4 lbf·ft)	
Fan motor switch	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Ignition switch mounting bolt	25 N·m (2.5 kgf·m , 18 lbf·ft)	
Coolant temperature/ECT sensor	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply sealant to the threads
Neutral switch	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Oil pressure switch	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply sealant to the threads
Oil pressure switch wire terminal screw	2 N·m (0.2 kgf·m , 1.4 lbf·ft)	

TROUBLESHOOTING

SPEED SENSOR/SPEEDOMETER

The odometer/trip meter operate normally, but the speedometer does not operate
- Faulty speedometer

The speedometer operate normally, but the odometer/trip meter does not operate
- Faulty odometer/trip meter

The speedometer operate is abnormal
- Check for the following before diagnosing.
  - Blown main or sub fuses
  - Loose or corroded terminals of the connectors
  - Discharged battery

Check for loose or poor contact of the speed sensor 3P (Natural) connector.
With the ignition switch ON and measure the voltage at the speed sensor connector.
- Abnormal →
  - Loose or poor contact of related terminals
  - Open circuit in Black/Brown or Green/Black wires between the battery and speed sensor

Normal ↓

Check for loose or poor contact of the combination meter multi-connectors.
With the ignition switch ON and measure the voltage at the bottom of the speedometer terminals.
- Abnormal →
  - Loose or poor contact of related terminals
  - Open circuit in Black/Brown or Green/Black wires between the battery and speedometer

Normal ↓

With the ignition switch OFF, check for continuity of the Pink/Green wire between the terminals of the speed sensor and speedometer.
- Abnormal →
  - Open circuit or loose connection in Pink/Green wire

Normal ↓

Support the motorcycle using a hoist or other support to rise the rear wheel off the ground.
Measure the output voltage (sensor signal) at the speedometer with the ignition switch is ON while slowly turning the rear wheel by your hand.
- Abnormal →
  - Faulty speed sensor
  - Loose speed sensor mounting bolts

Normal →
- Faulty speed sensor

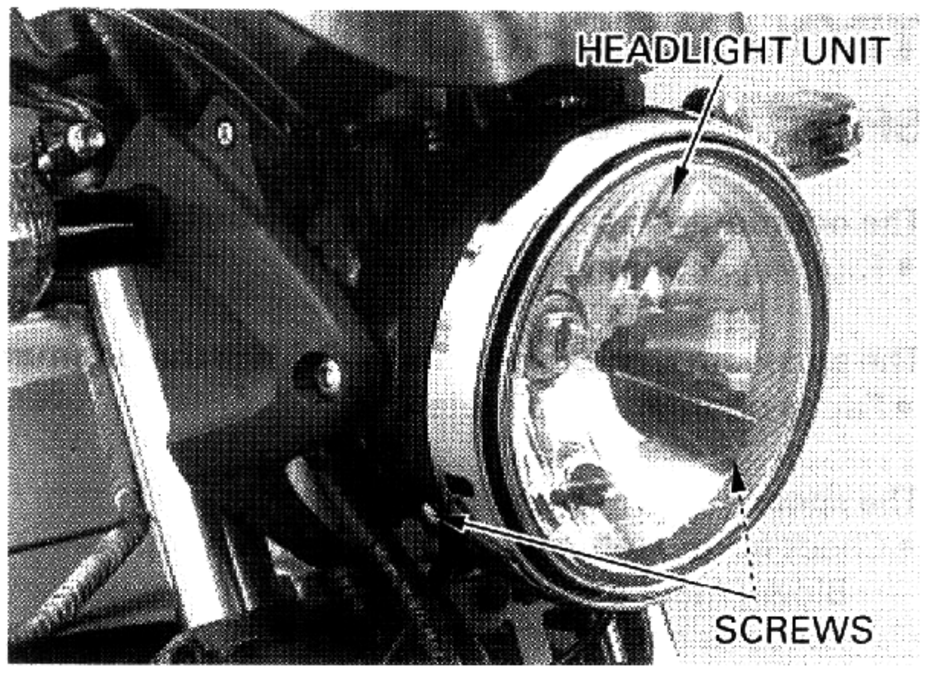
HEADLIGHT

BULB REPLACEMENT

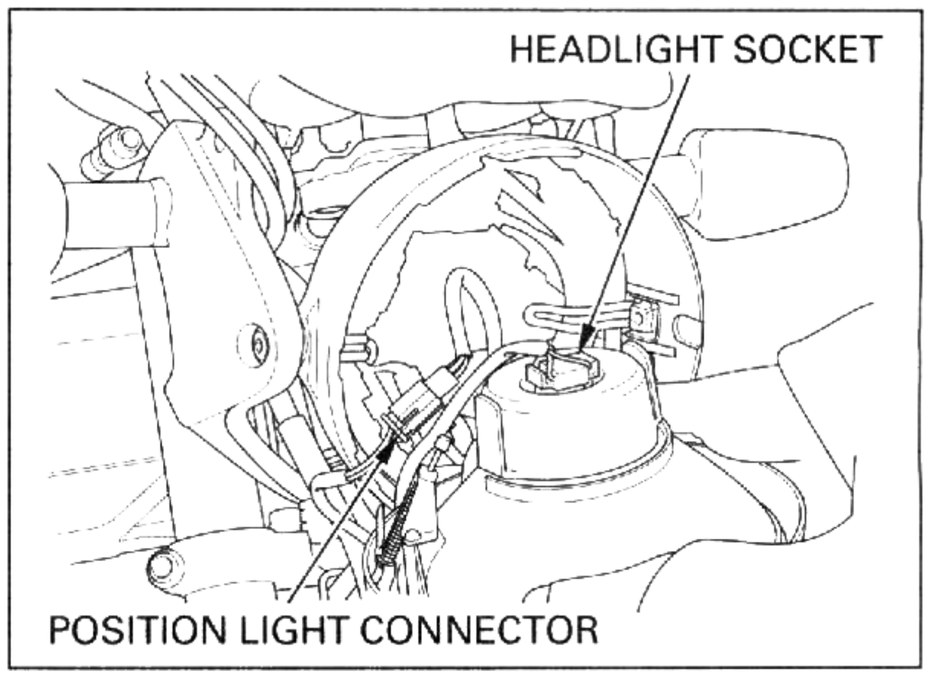
⚠WARNING

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.

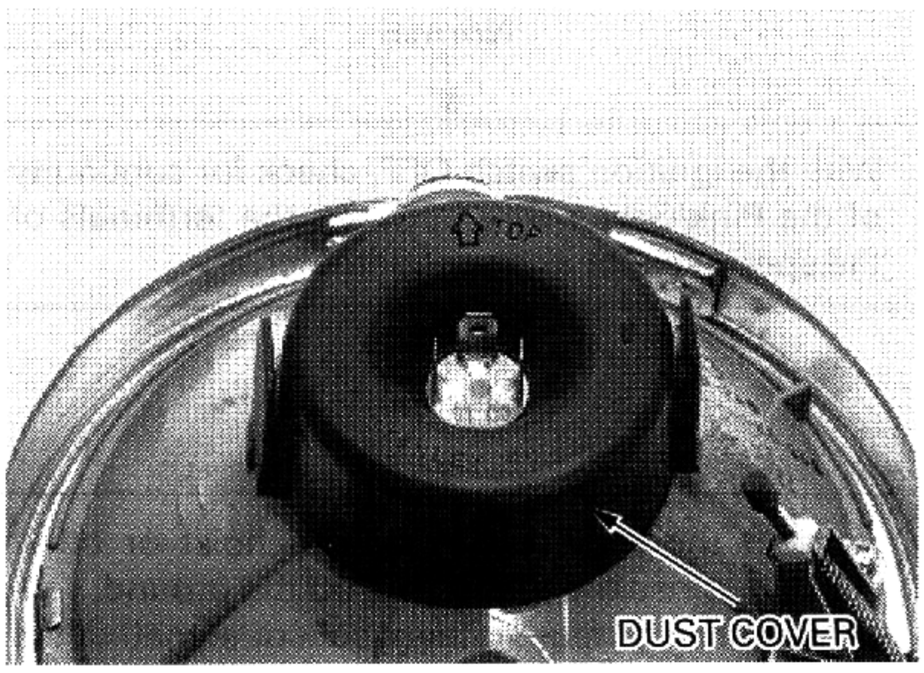
Remove the headlight unit mounting screws and collars, then remove the headlight unit.



Disconnect the headlight socket and position light connector.



Remove the dust cover.

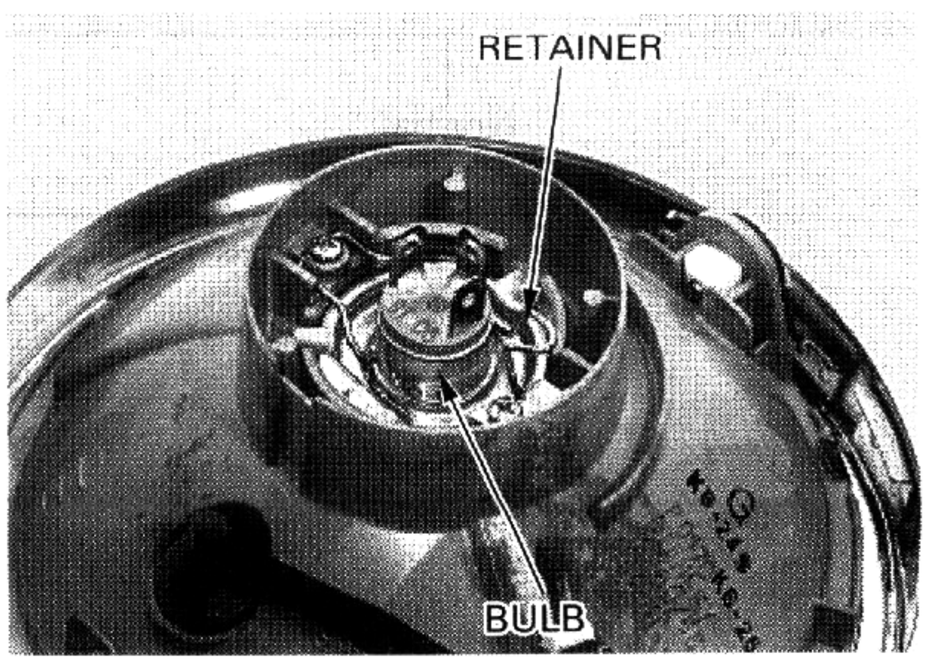


Unhook the bulb retainer and remove the headlight bulb.

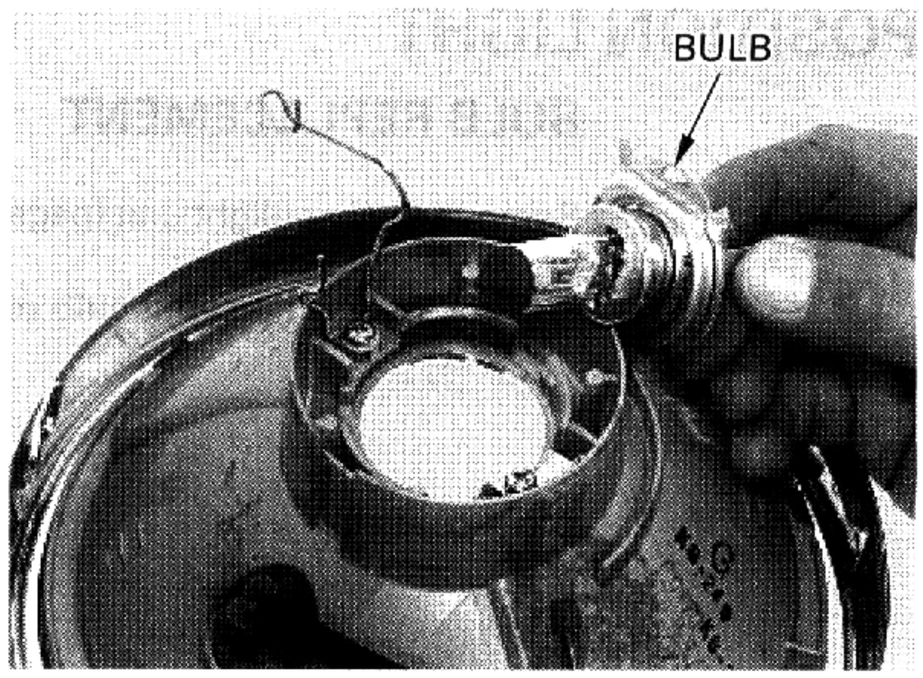
CAUTION:

Avoid touching halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.

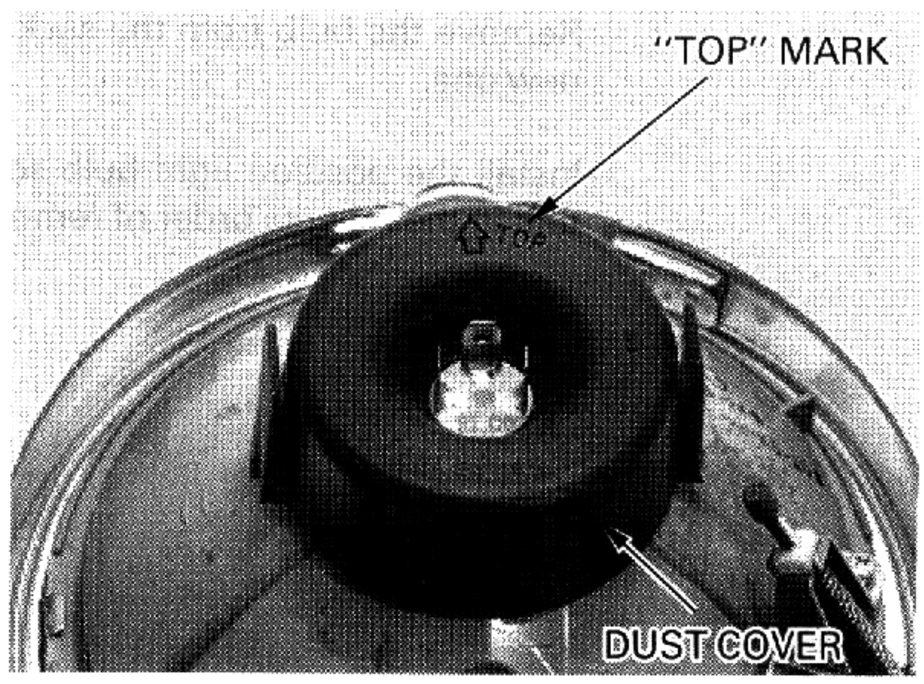
If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.



Install the new headlight bulb aligning its tabs with the groove in the headlight unit.



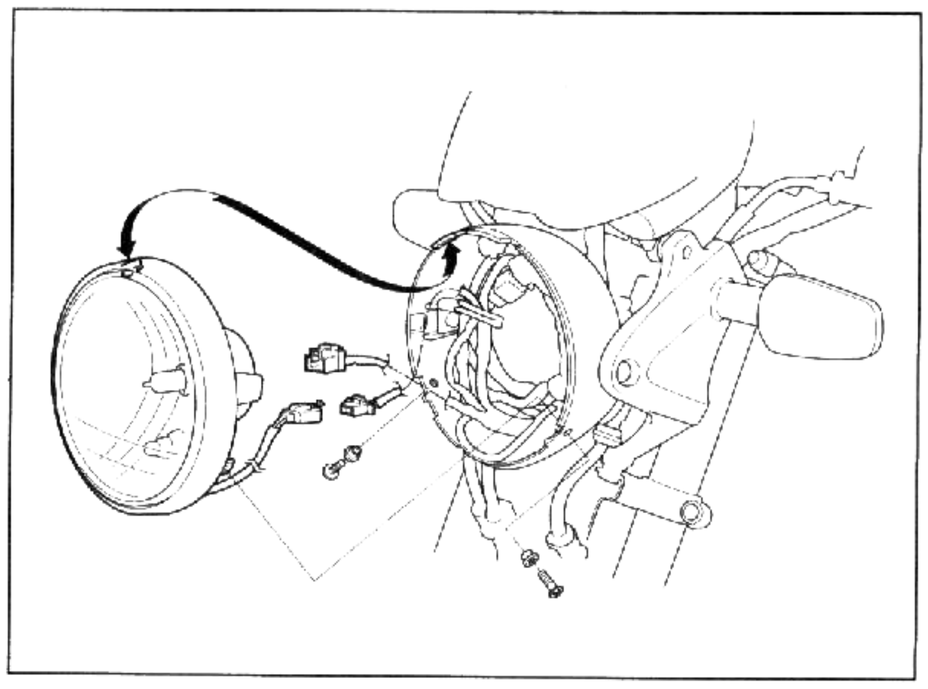
Install the dust cover tightly against the headlight unit with its "TOP" mark facing up.



Install the headlight unit in the reverse order of, removal.

NOTE:

While installing the headlight unit, align the tab in the headlight rim with the slit of the headlight case.



HEADLIGHT CASE REMOVAL/ INSTALLATION

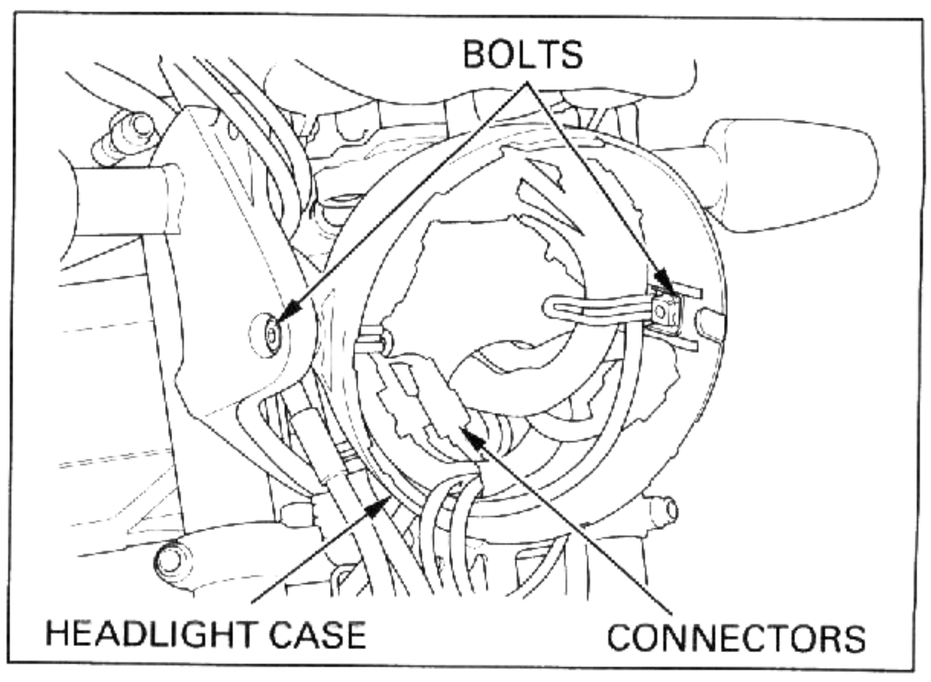
Remove the headlight unit (page 19-4).

Disconnect the connectors in the headlight case. Remove the socket bolts and nuts, then remove the headlight case.

Installation is in the reverse order of removal.

NOTE:

Route the harness and wires properly (page 1-24).

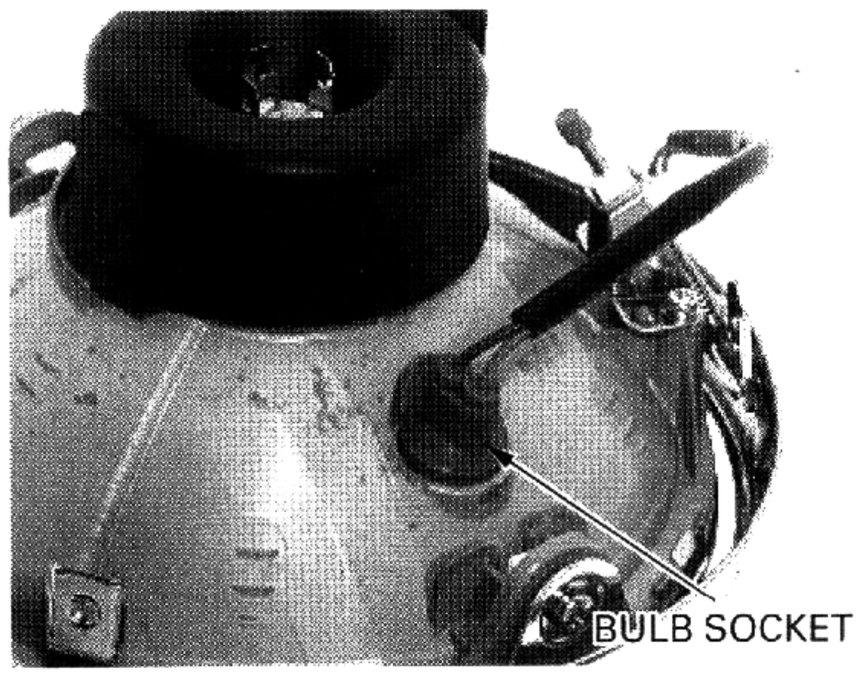


POSITION LIGHT

BULB REPLACEMENT

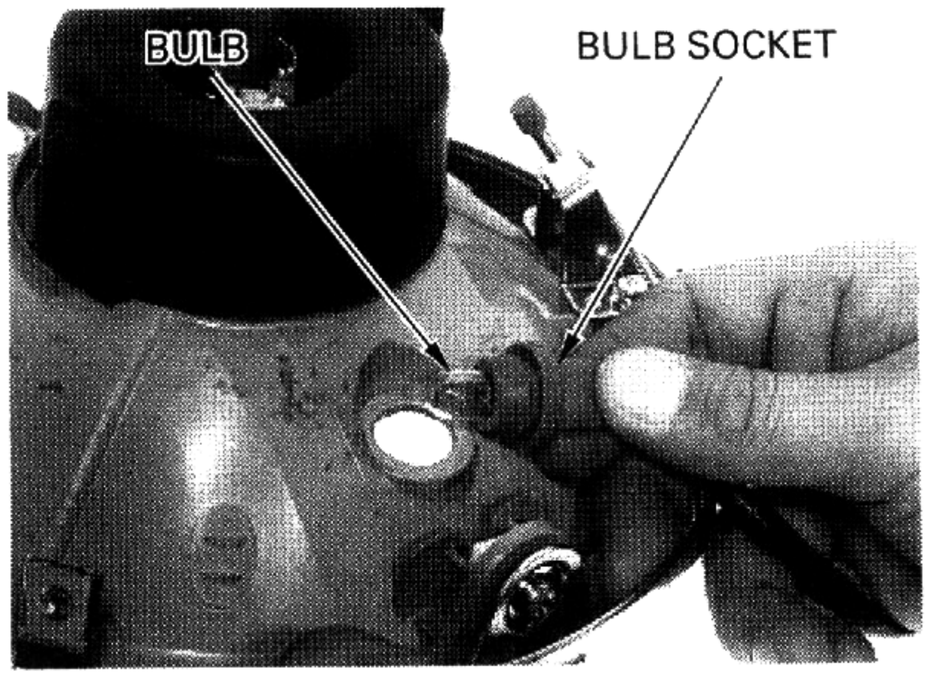
Remove the headlight unit (page 19-4).

Pull out the position light bulb socket.



Remove the bulb from the socket, replace it with a new one.

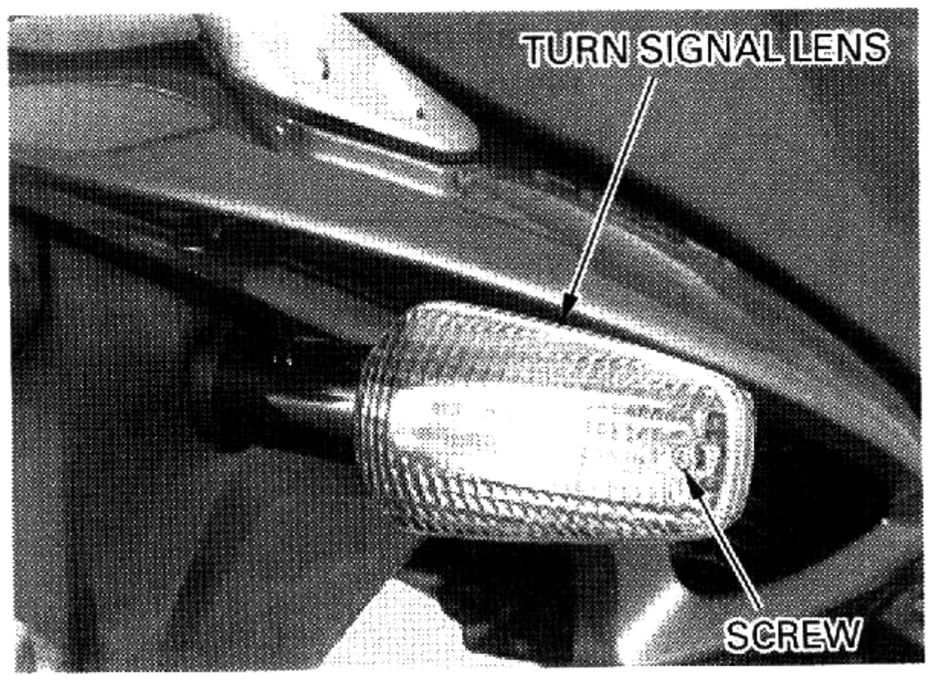
Install the position light bulb socket and headlight unit in the reverse order of removal.



TURN SIGNAL

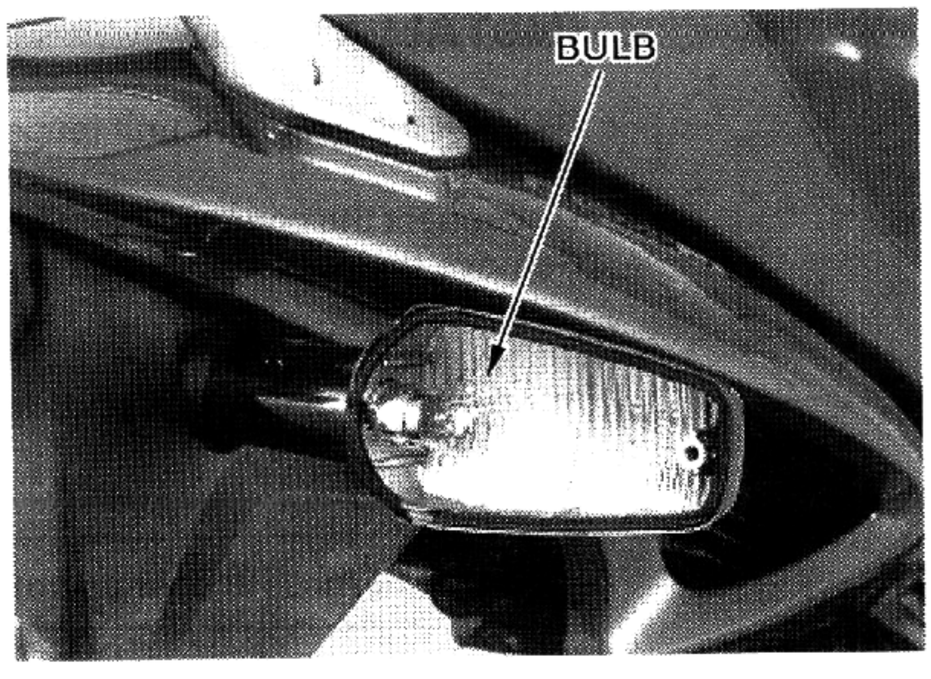
BULB REPLACEMENT

Remove the screw and turn signal lens.



While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.

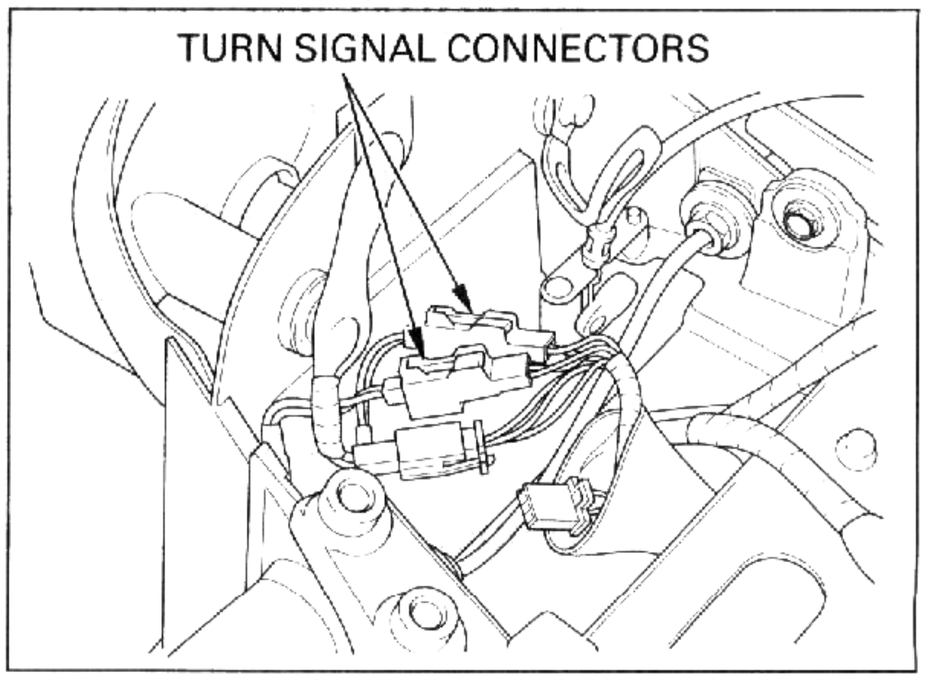
Install the turn signal lens in the reverse order of removal.



REMOVAL/INSTALLATION

For from turn signal unit removal, remove the headlight case (page 19-5).
For rear turn signal removal, remove the following:
– Seat (page 2-2)
– Engine control module (page 5-83)

Disconnect the turn signal connector.

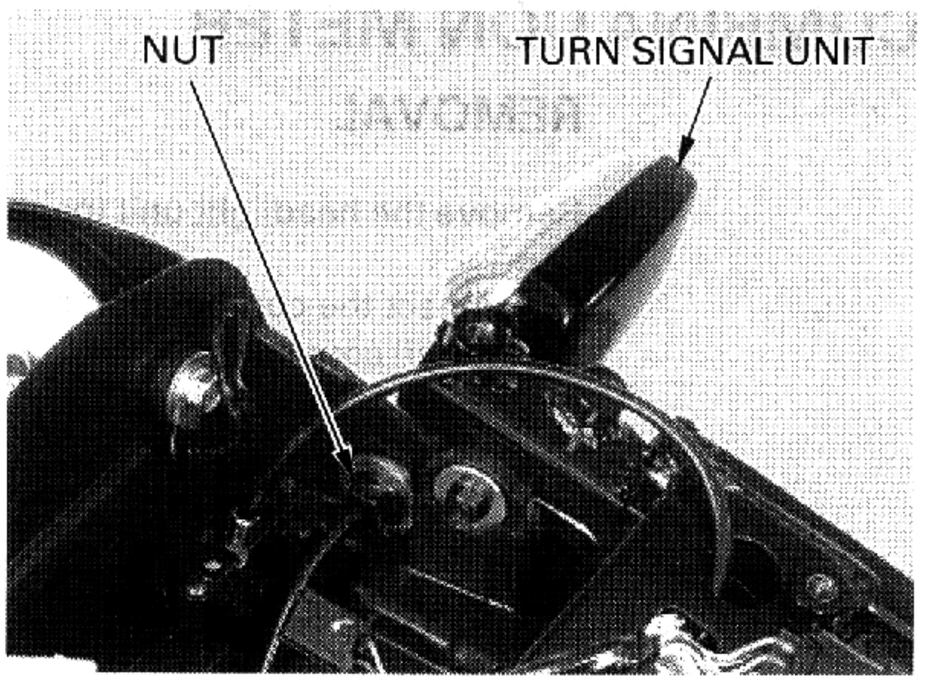


Remove the turn signal unit mounting nut.
Release the turn signal wire and remove the turn signal unit.

Route the turn signal wire properly (page 1-24).

Install the turn signal unit in the reverse order of removal.

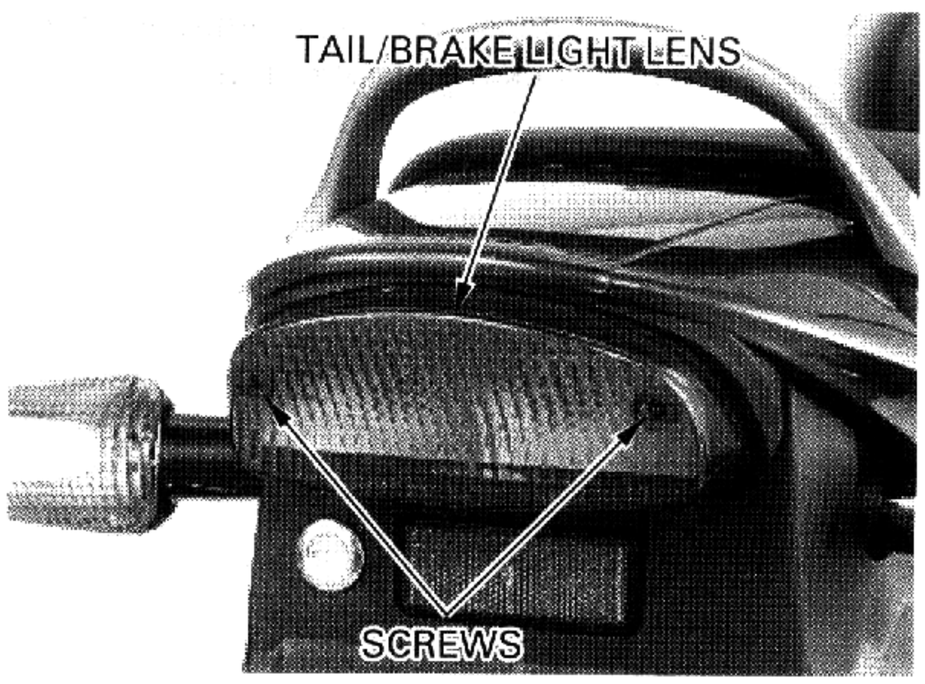
TORQUE: 5 N·m (0.5 kgf·m , 3.6 lbf·ft)



TAIL/BRAKE LIGHT

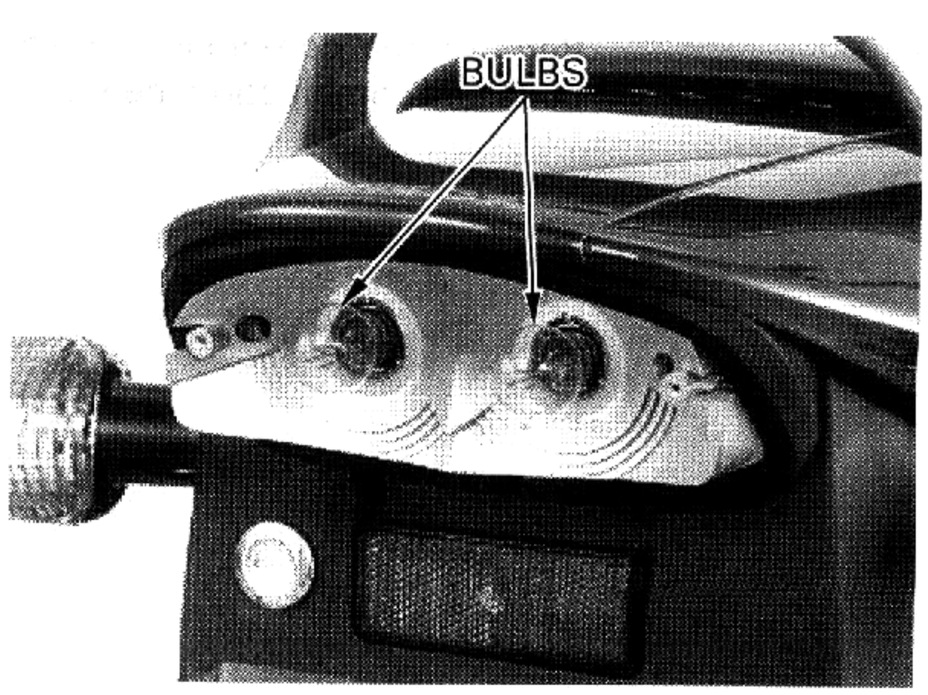
BULB REPLACEMENT

Remove the screws and tail/brake light lens.



While pushing in, turn the bulbs counterclockwise to remove them and replace with new ones.

Install the tail/brake light lens in the reverse order of removal.



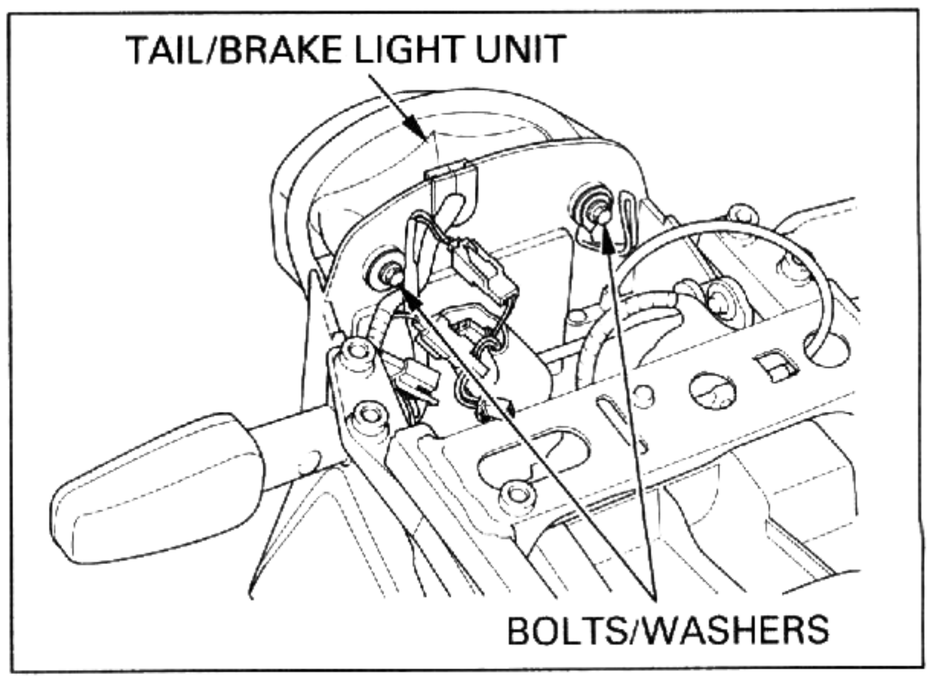
REMOVAL/INSTALLATION

Remove the following:
- Seat (page 2-2)
- Engine control module (page 5-83)

Disconnect the tail/brake light socket.
Remove the bolts, washers and tail/brake light unit.

Installation is in the reverse order of removal.

TORQUE: 7 N·m (0.7 kgf·m , 5.1 lbf·ft)

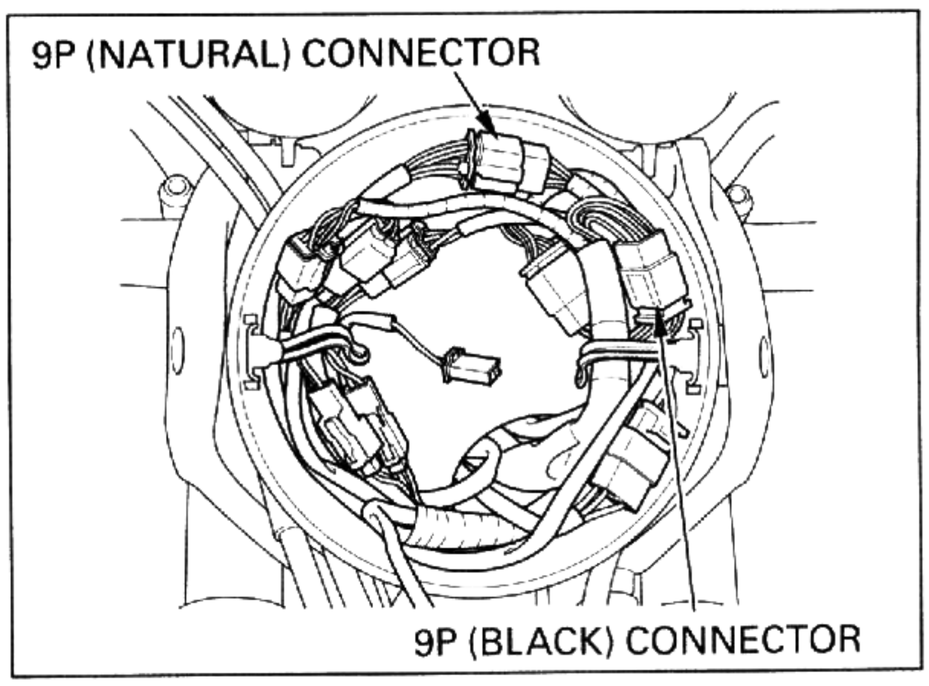


COMBINATION METER

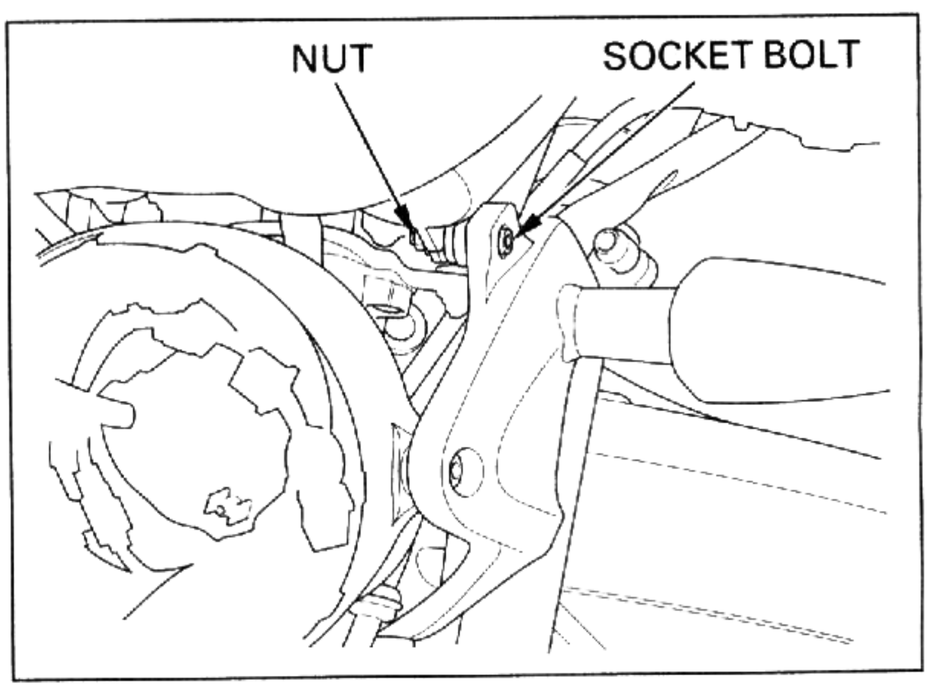
REMOVAL

Remove the headlight unit (page 19-4).

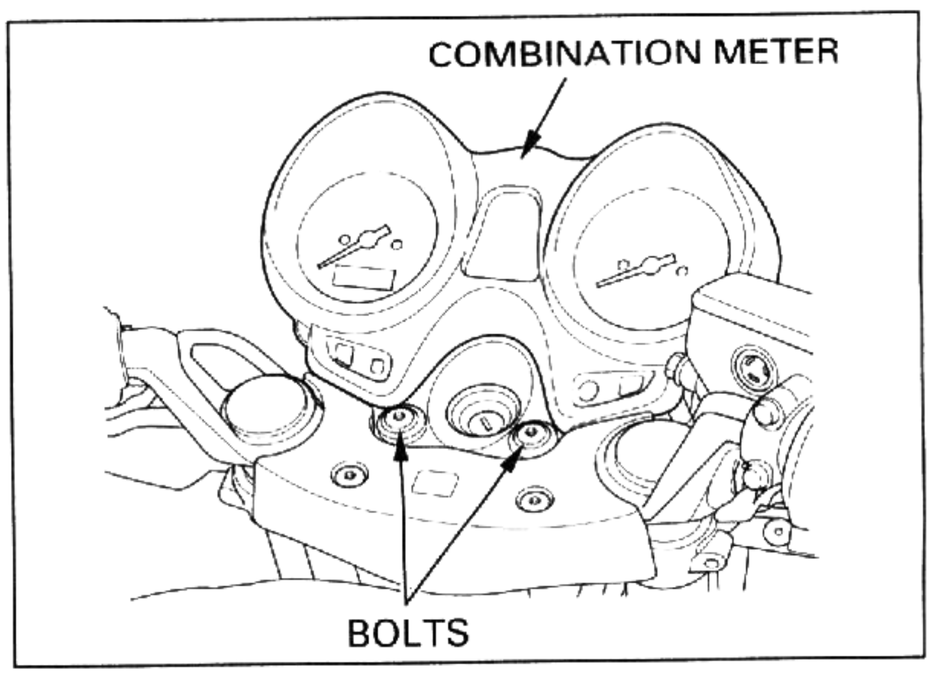
Disconnect the combination meter 9P (Black) and 9 P (Natural) connectors.



Loosen the combination meter lower mounting socket bolts and nuts.

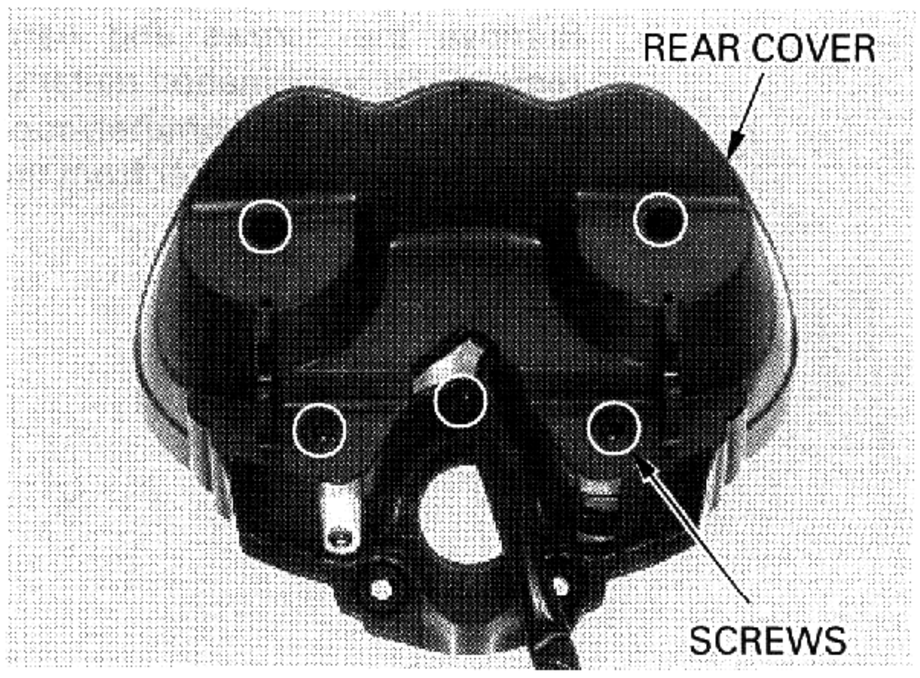


Remove the combination meter upper mounting bolts and combination meter.

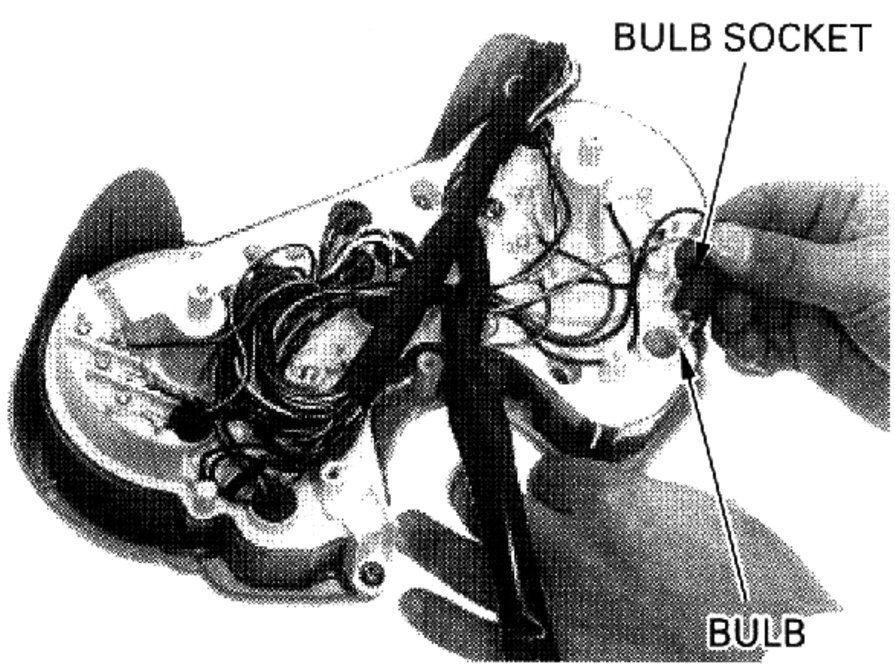


DISASSEMBLY/BULB REPLACEMENT

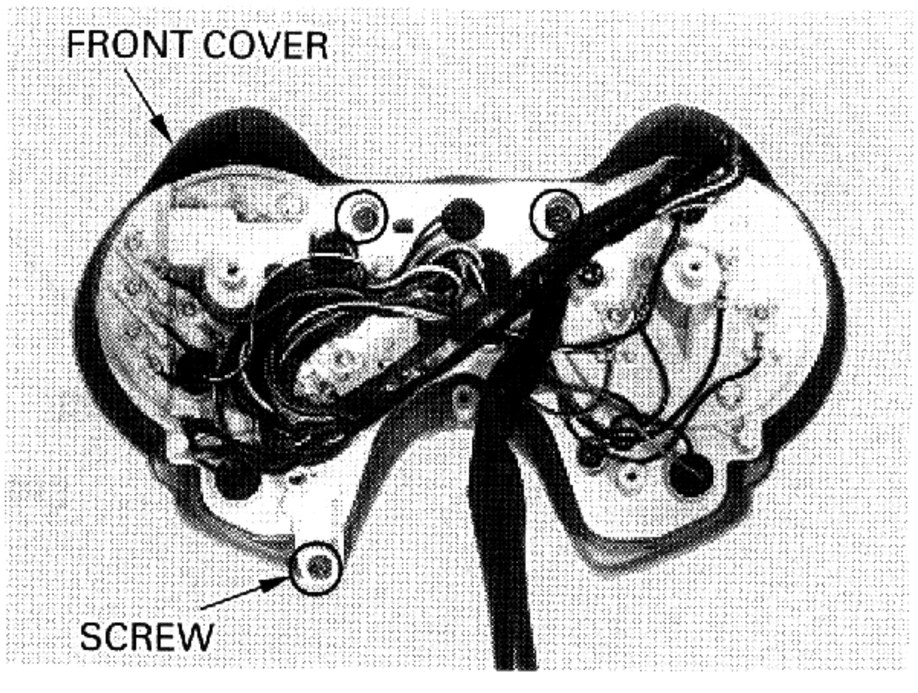
Remove the screws and combination meter rear cover.



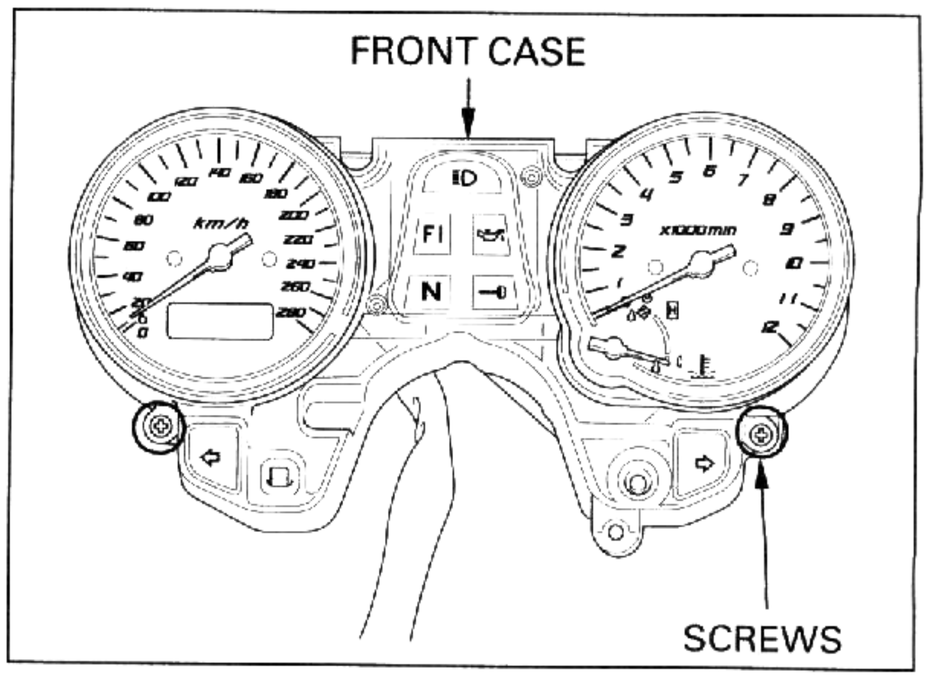
Pull the indicator bulb socket out of the combination meter.
Remove the bulb from the socket and replace it with a new one.



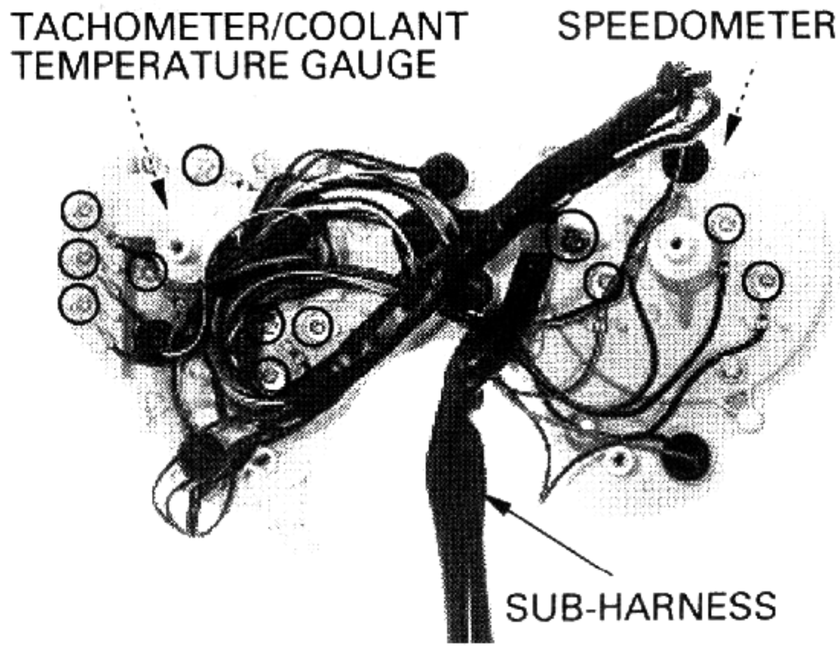
Remove the screws and combination meter front cover.



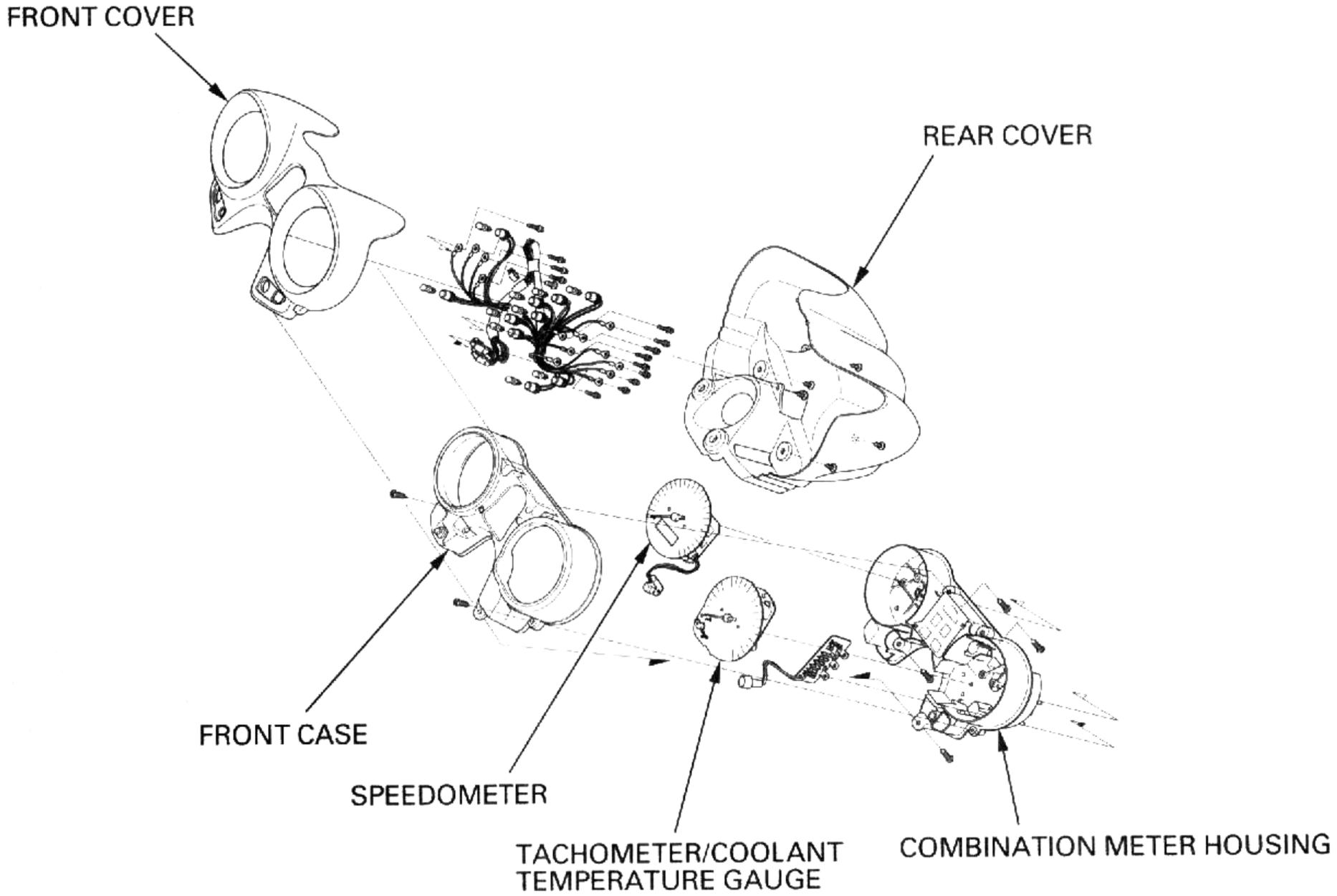
Remove the screws and combination meter front case.



Remove the screws and harness clamp, them remove the combination meter sub-harness.
Remove the tachometer/coolant temperature gauge and speedometer from the case.



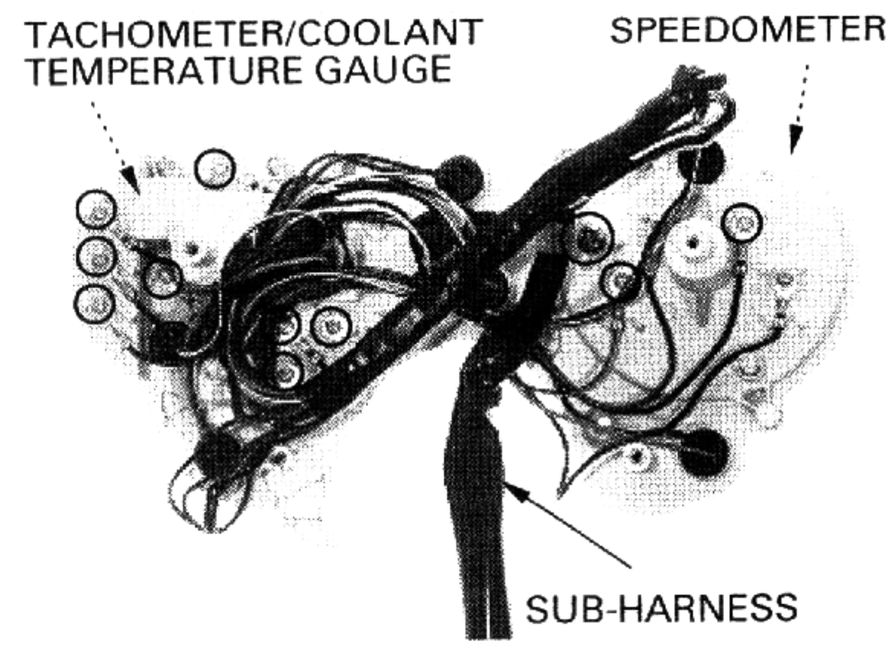
ASSEMBLY



Assemble the combination meter in the reverse order of removal.

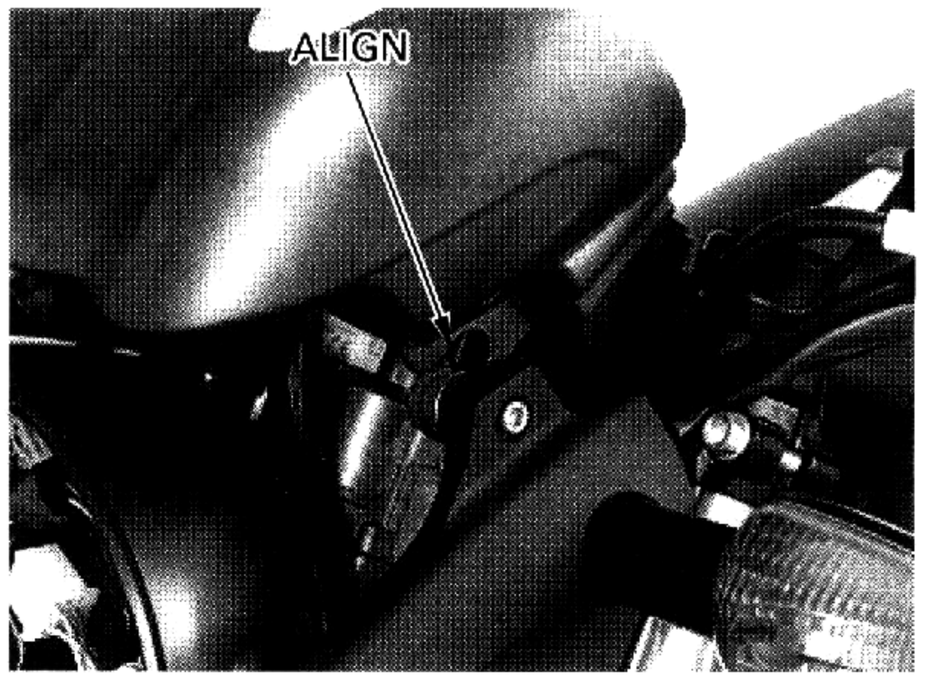
NOTE:

Route the sub-harness properly.



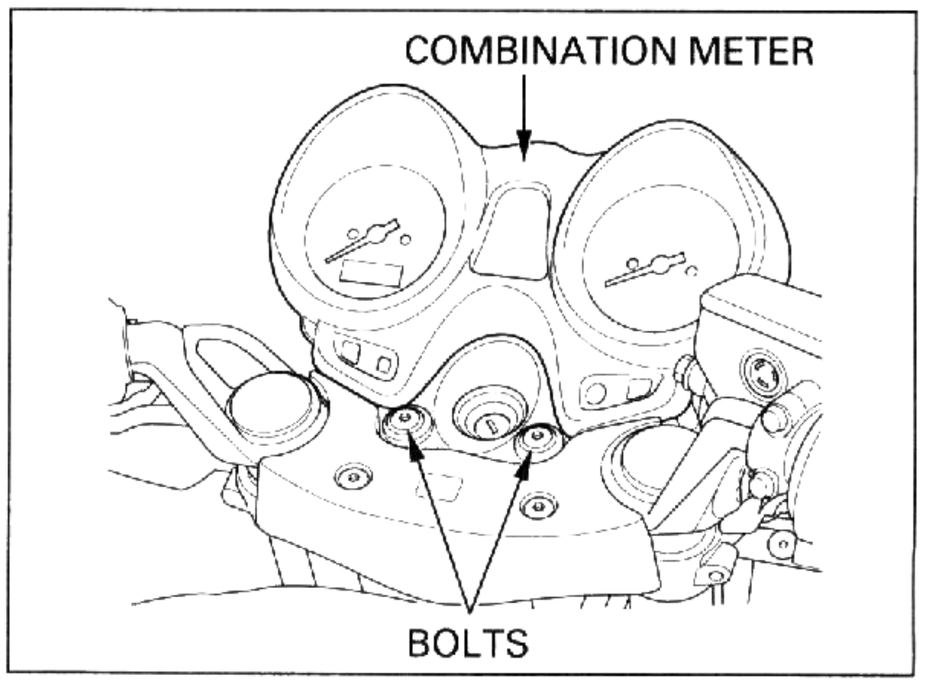
INSTALLATION

Install the combination meter assembly onto the lower mounting grommet while aligning the front panel grooves with the grommets.

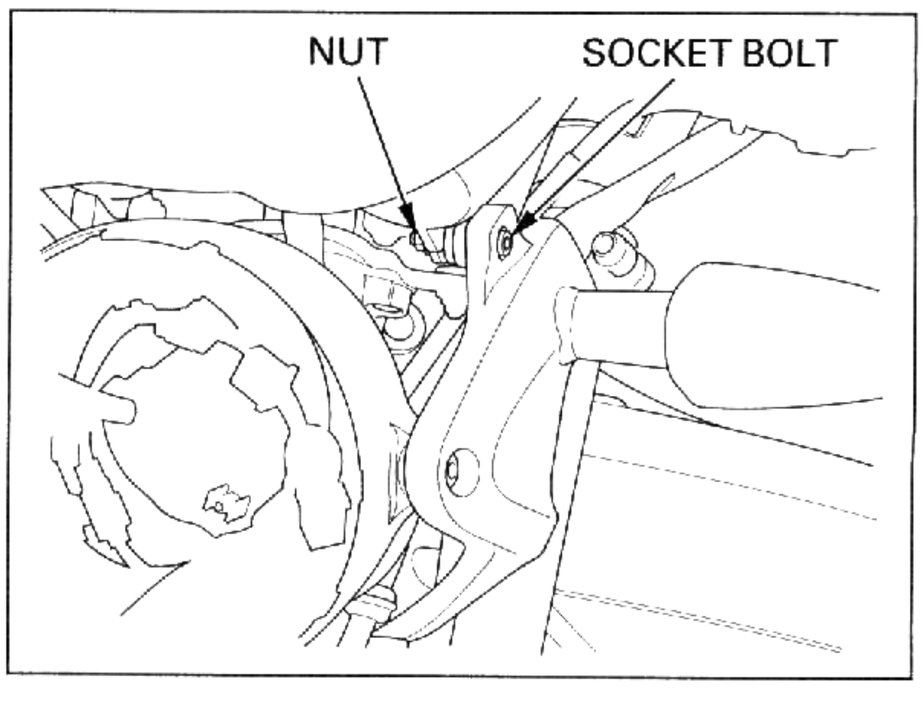


Install and tighten the combination meter upper mounting bolts to the specified torque.

TORQUE: 2 N·m (0.2 kgf·m , 1.4 lbf·ft)



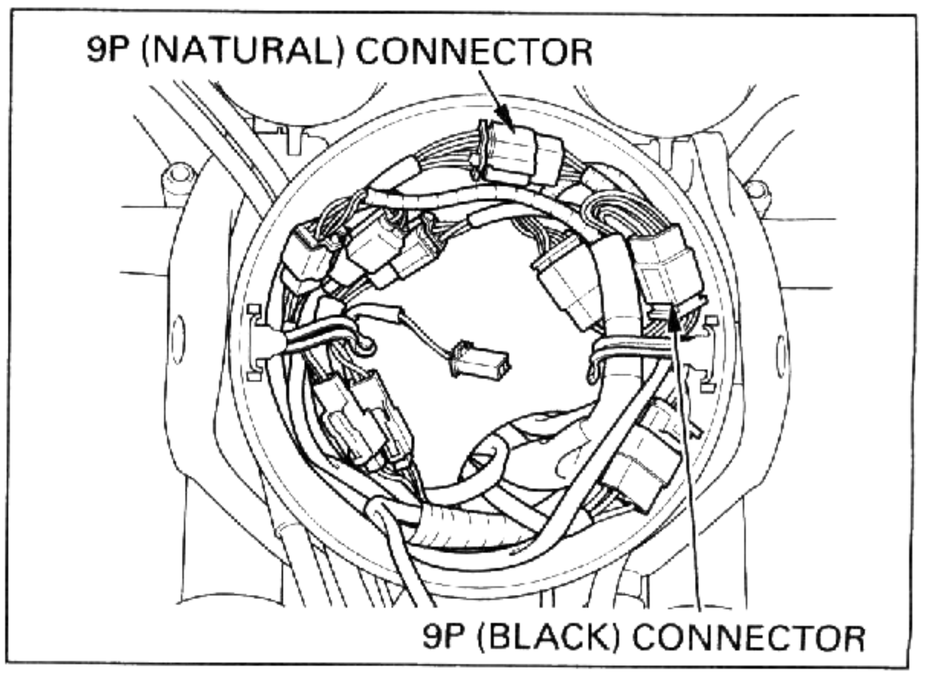
Tighten the lower mounting socket bolts and nuts.



Connect the combination meter 9P (Black) and 9P (Natural) connectors.

NOTE:

Route the combination meter wire properly (page 1-24).

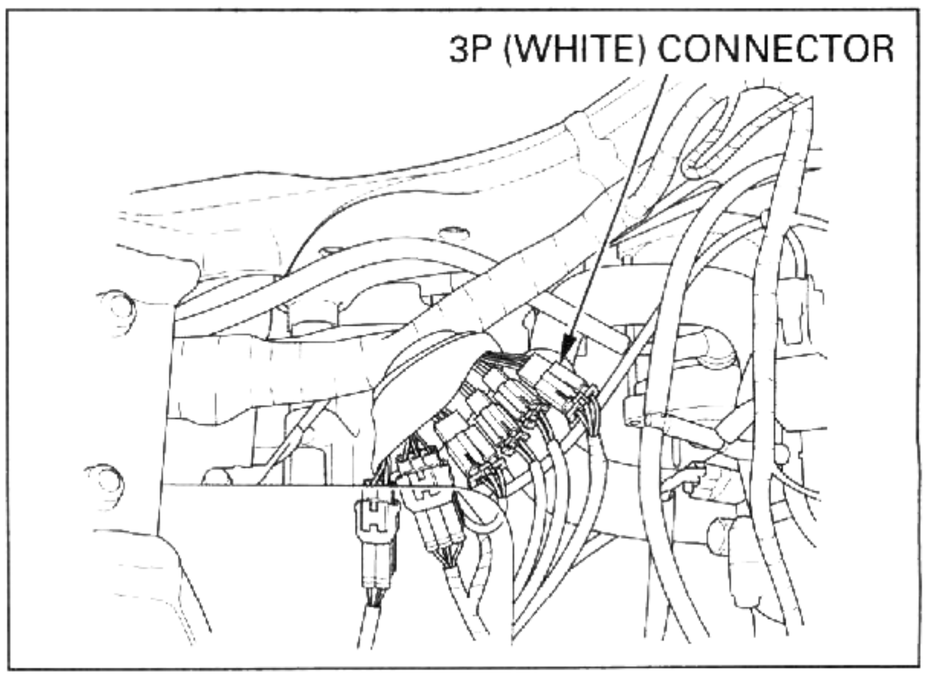


SPEEDOMETER/VEHICLE SPEED SENSOR

VOLTAGE INSPECTION

Support the rear end of the fuel tank (page 2-11).

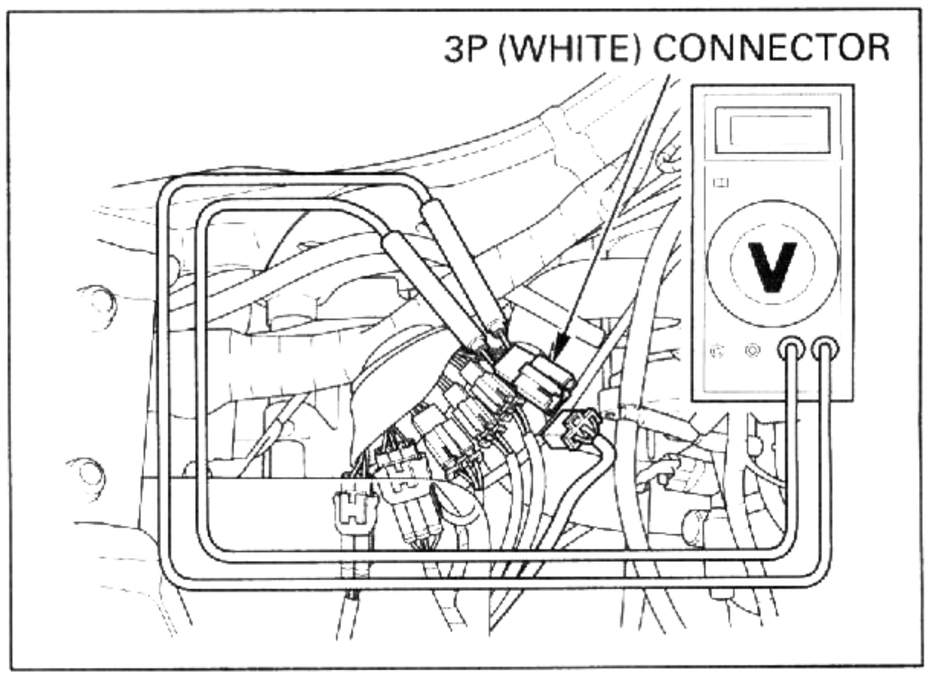
Disconnect the speed sensor 3P (White) connector and check for loose or poor contact of the connector.



With the ignition switch is ON and measure the voltage at the 3P (White) connector of the wire harness side.

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

If there is no voltage, replace and repair the wire harness.



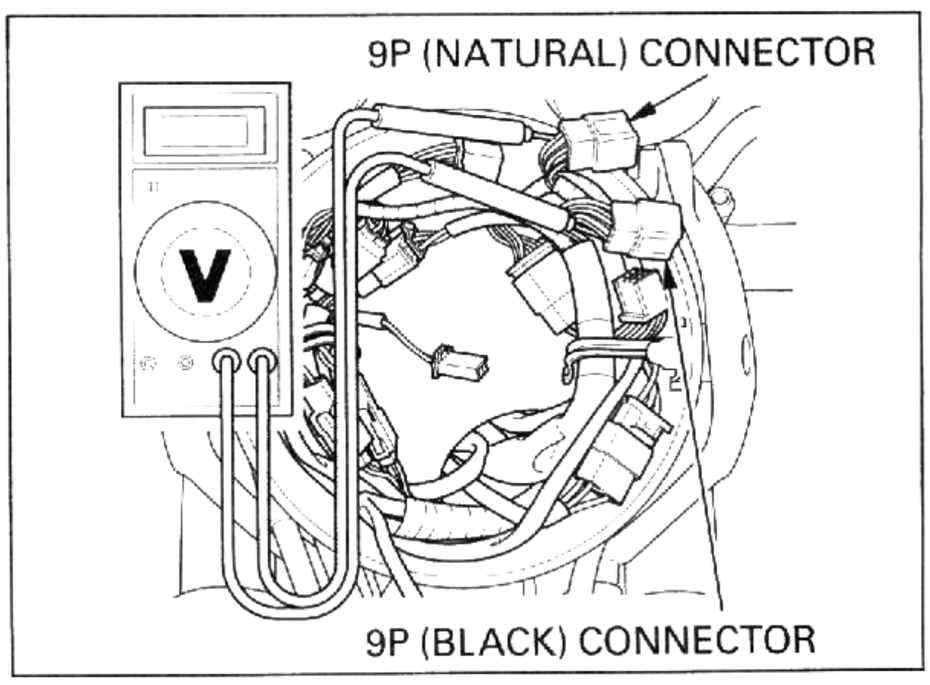
Remove the headlight unit (page 19-4).

Check for loose or poor connection of the combination meter 9P (Black) and 9P (Natural) connectors.

With the ignition switch is ON and measure the voltage at the 9P (Black) and 9P (Natural) connector terminals.

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

If there is no voltage, replace and repair the wire harness.



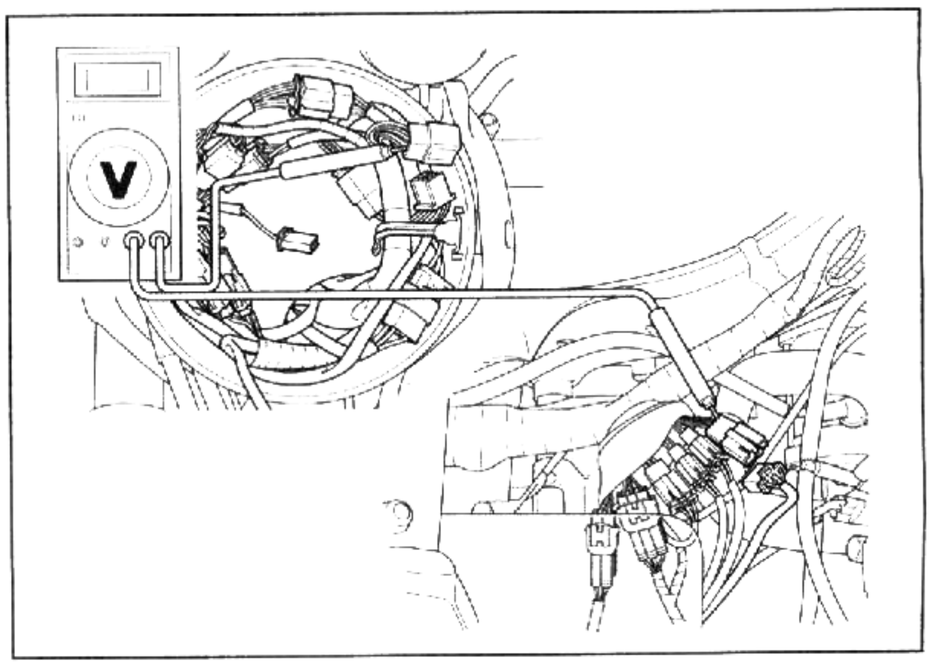
OUTPUT SIGNAL INSPECTION

Remove the headlight unit (page 19-4).

With the ignition switch is OFF, check for continuity of the Pink/Green wire between the speed sensor connector and combination meter 9P (Black) connector.

There should be continuity.

If there is no continuity, replace and repair the wire harness.

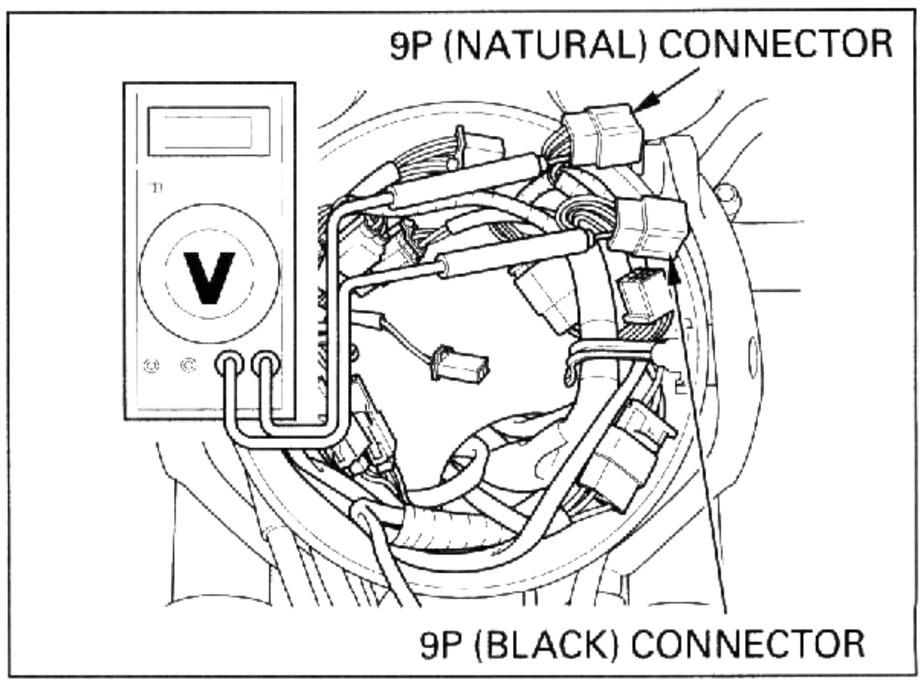


Support the motorcycle on its center stand and shift the transmission into gear.

Connect the speed sensor 3P (White) connector.
Measure the voltage at the combination meter terminals with the ignition switch is ON while slowly turning the rear wheel by hand.

CONNECTION: Pink/Green (+) — Green/Black (−)
STANDARD: Repeat 0 to 5V

If the measurement is out of specification, inspect the open circuit in wire harness.

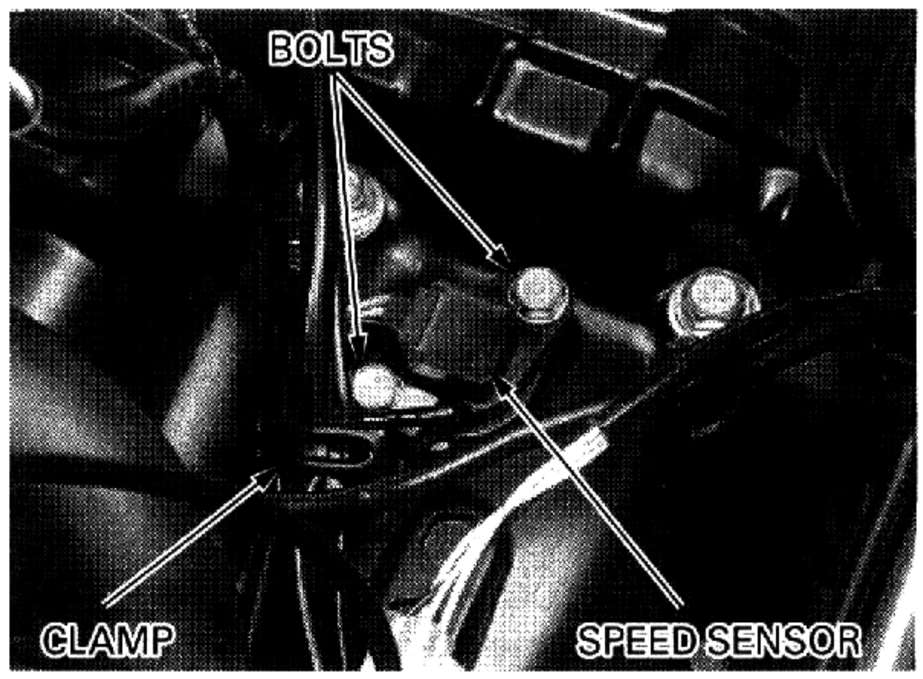


REMOVAL/INSTALLATION

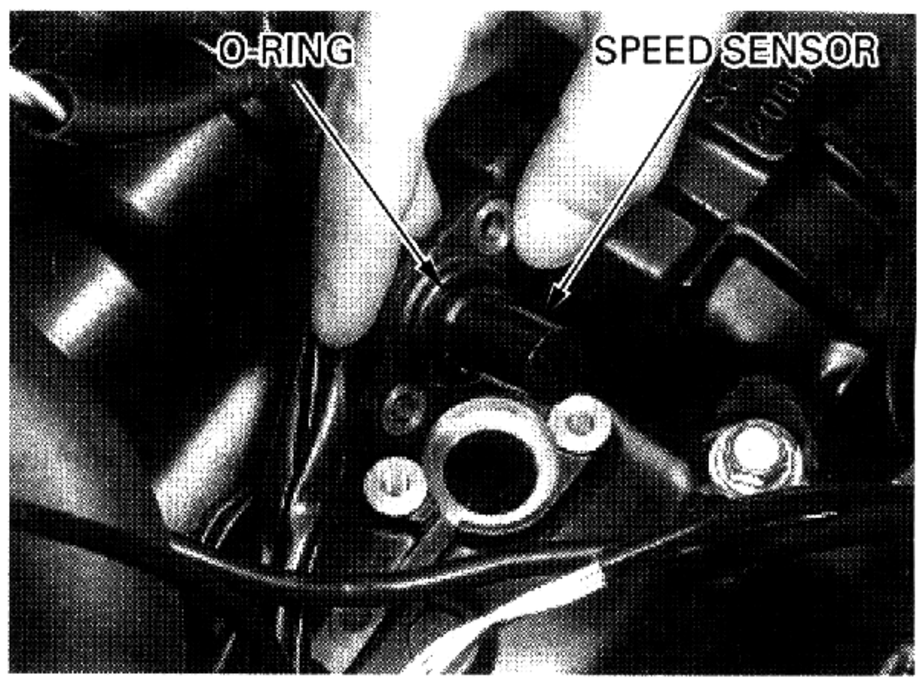
Support the rear end of the fuel tank (page 2-11).

Disconnect the speed sensor 3P (White) connector.

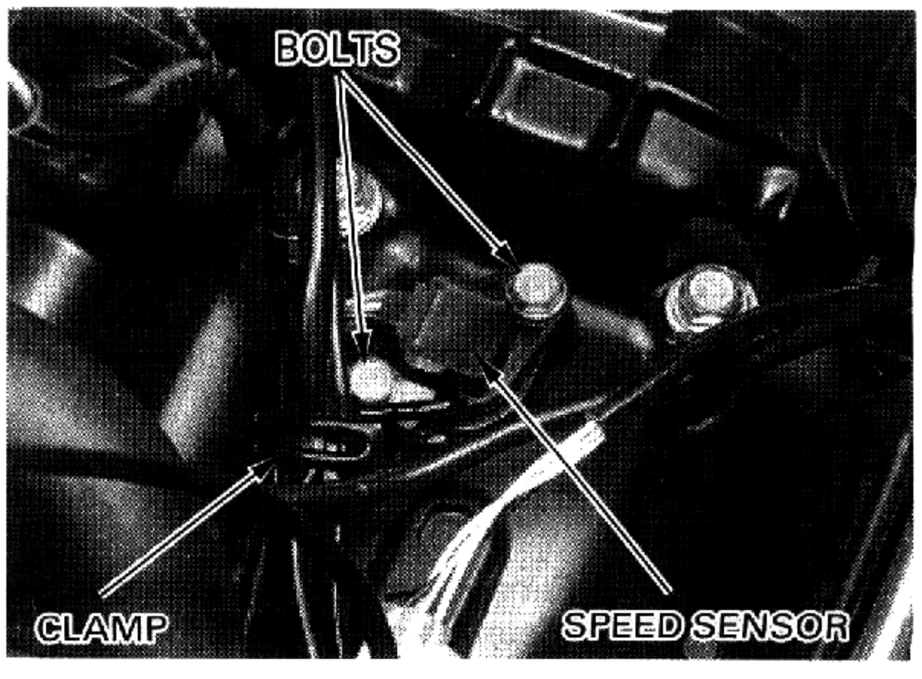
Release the speed sensor wire from the clamp.
Remove the bolts and speed sensor.



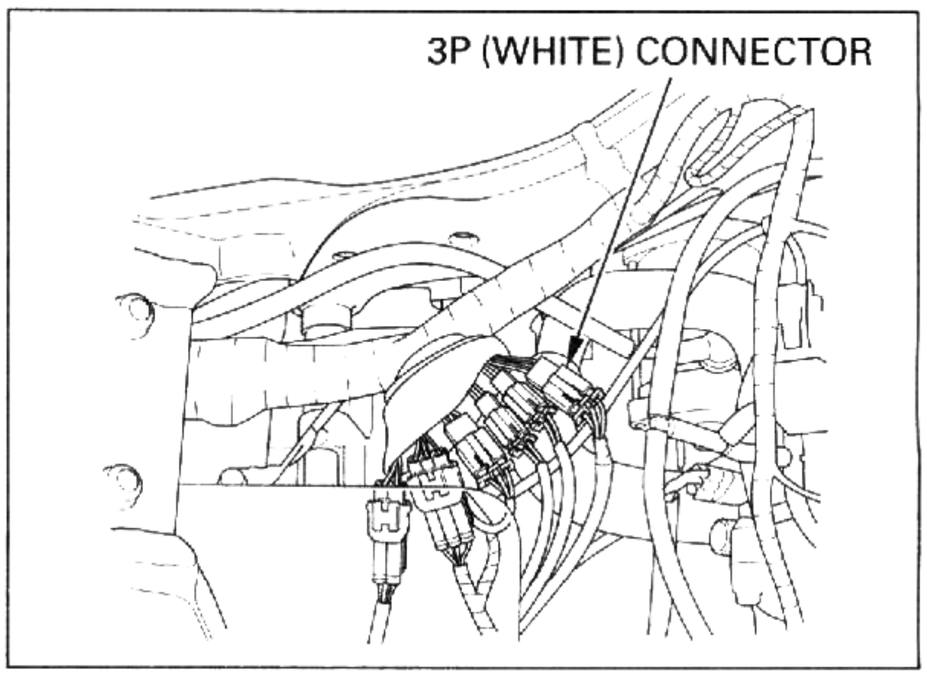
Check the O-ring is in good condition, replace if necessary.
Install the speed sensor into the upper crankcase.



Install and tighten the mounting bolts securely.
Route the sensor wire and clamp it.



Connect the speed sensor 3P (White) connector.



TACHOMETER

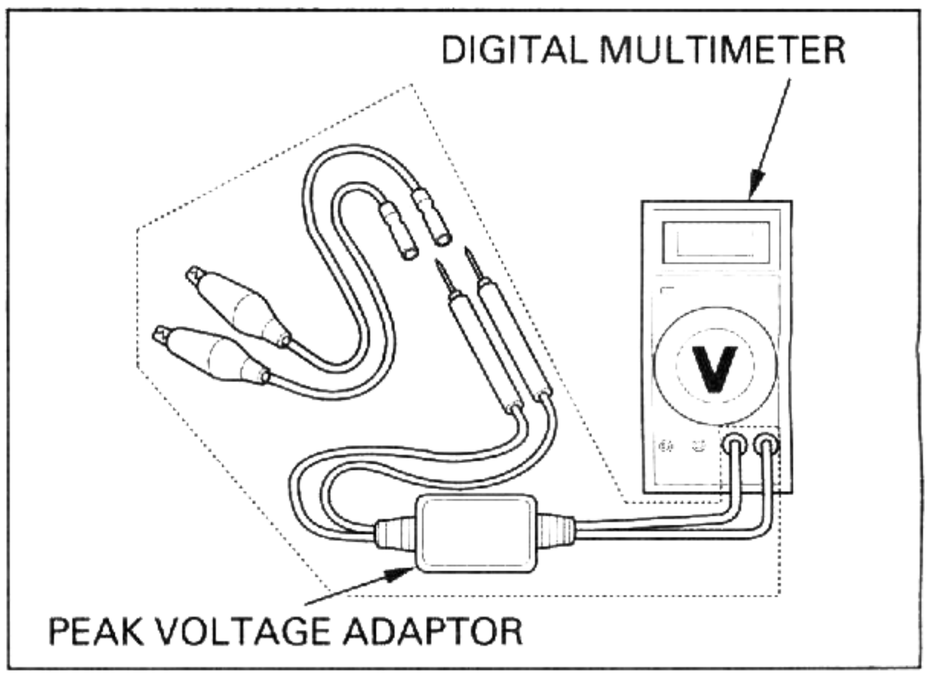
INSPECTION

Remove the headlight unit (page 19-4).

Check for loose or poor contact terminals of the combination meter.

Connect the peak voltage adaptor to the tachometer Black/Yellow terminal and ground.

TOOLS:
Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with Commercially available digital multimeter (impedance 10 M Ω /DCV minimum)

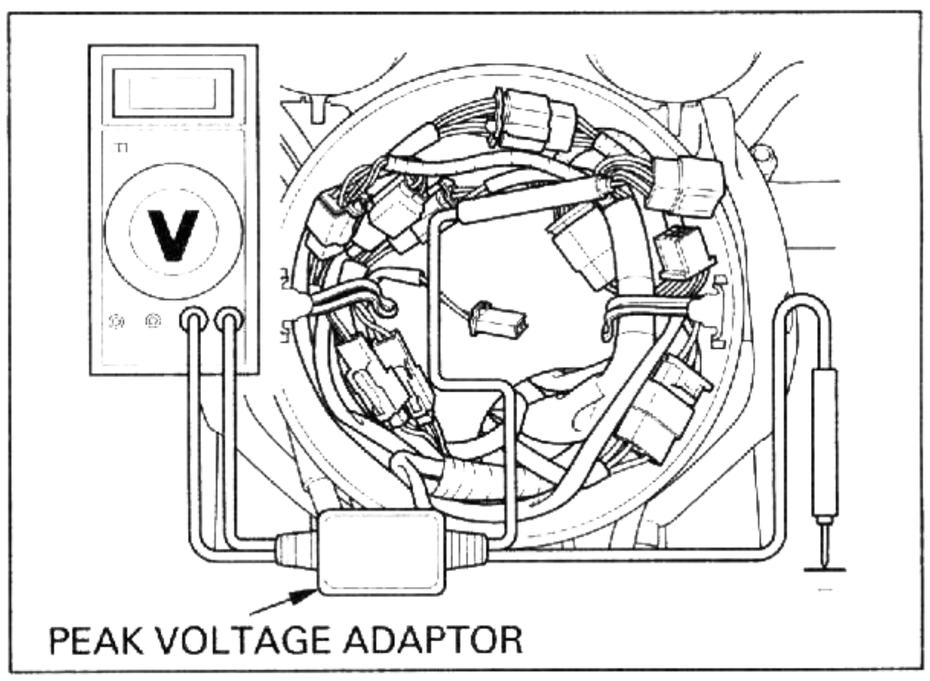


CONNECTION: Yellow/Green (+) and Ground (−)

Start the engine and measure the tachometer input voltage.

PEAK VOLTAGE: 10.5 V minimum

If the value is normal, replace the tachometer.
If the measured value is below 10.5 V, replace the ECM.

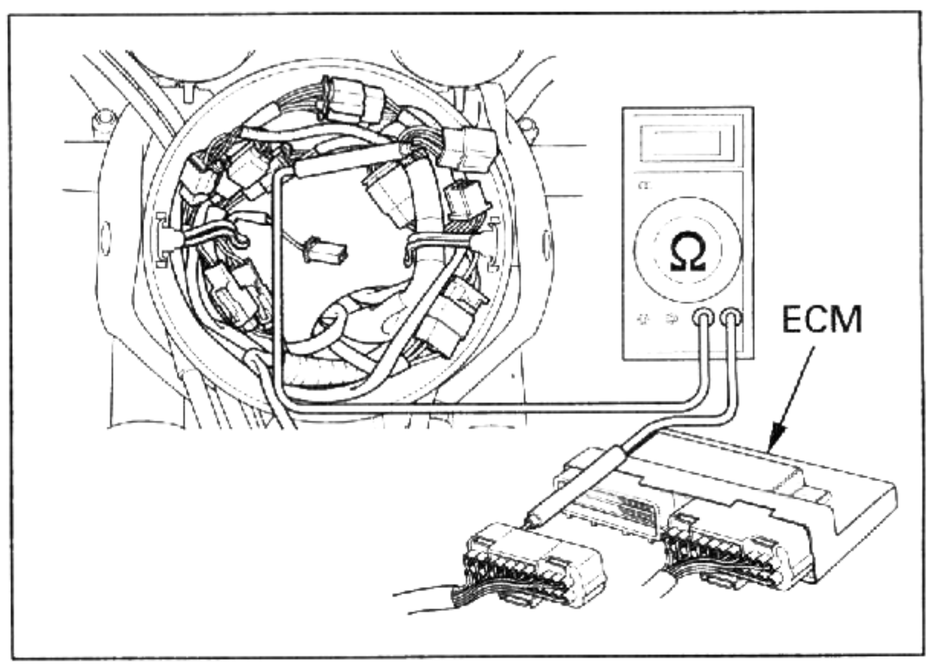


If the value is 0 V, perform the following:
Remove the seat (page 2-2) and disconnect the ECM multi-connector.

Check for continuity between the tachometer terminal and the ECM multi-connector Yellow/Green terminals.
If there is no continuity, check the wire harness for an open circuit.

If there is continuity, replace the tachometer unit.

For tachometer replacement, see 19-8; combination meter disassembly and assembly.

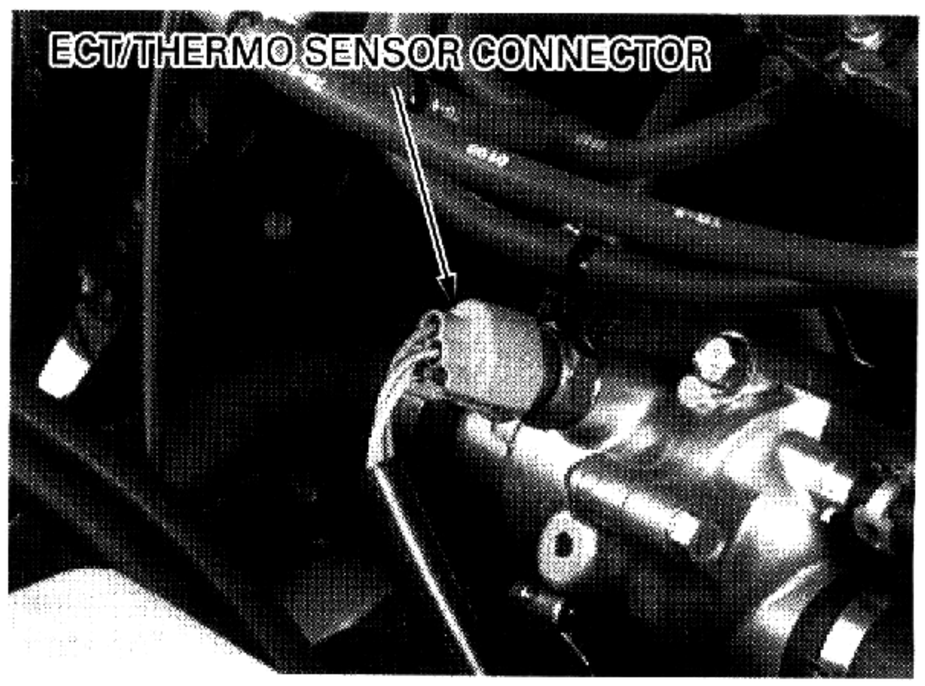


COOLANT TEMPERATURE GAUGE/SENSOR

INSPECTION

Support the rear end of the fuel tank (page 2-11).

Disconnect the ECT/thermo sensor wire connector from the sensor.

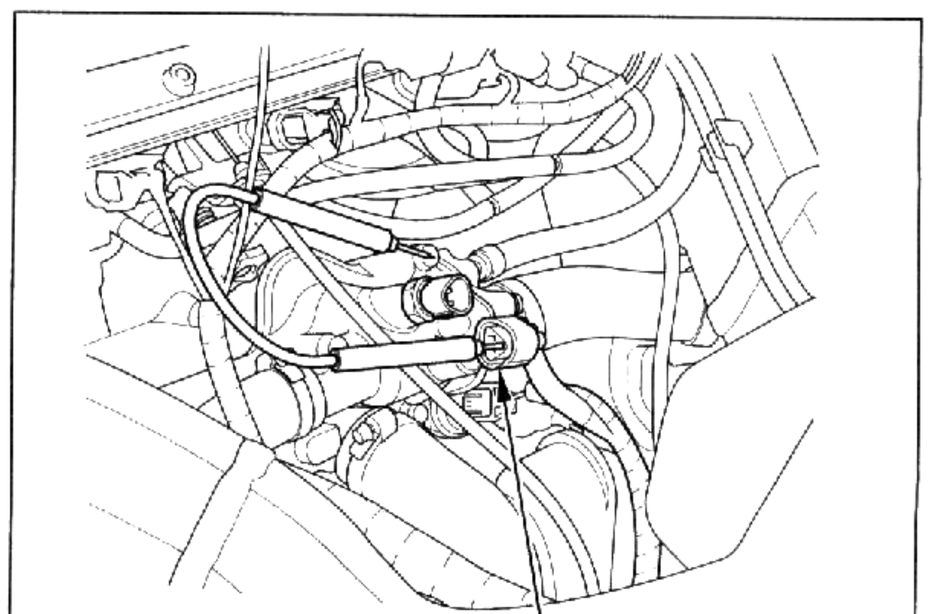


Ground the thermo sensor connector Green/Blue terminal with a jumper wire.

Turn the ignition switch ON and check the coolant temperature gauge.
Disconnect the thermo sensor wire connector from the ground immediately if the gauge needle moves fully to H.

CAUTION:

Immediately disconnect the sensor wire connector from the ground when the needle moves to H (hot) to prevent damage to the gauge.

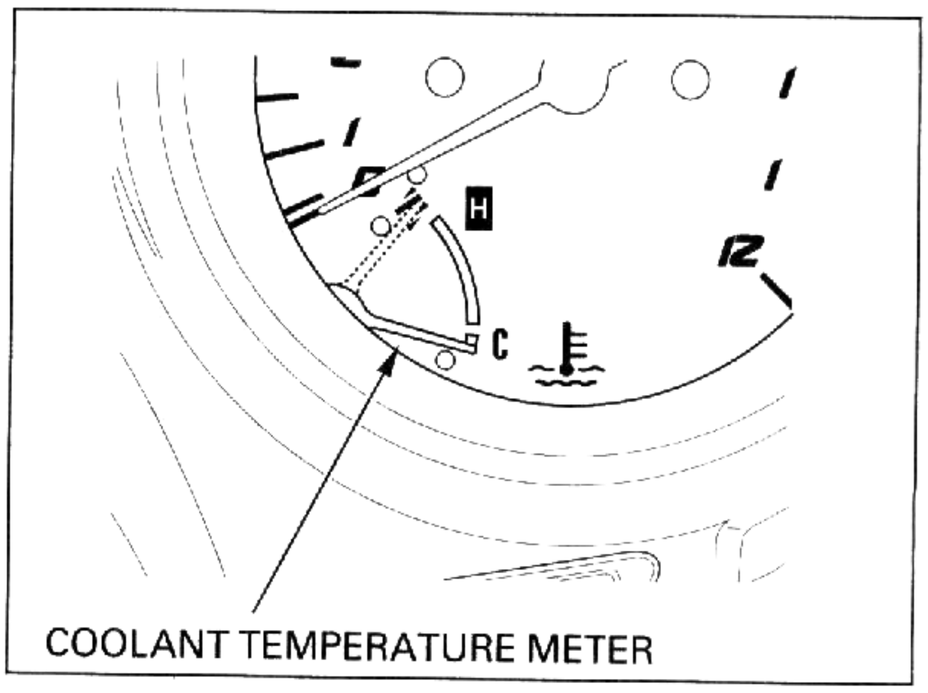

ECT/THERMO SENSOR CONNECTOR

If the needle moves, check the thermo sensor unit (see below).

If the needle does not move, check for voltage between the sensor wire connector and ground.

If the voltage is measured, the coolant temperature gauge unit is faulty.
If there is no voltage, check for voltage between the Black/Brown and Green/Blue wire terminals.

If there is no voltage between the terminal, coolant temperature gauge unit is faulty.
If a voltage is measured, check for the wire harness.



COOLANT TEMPERATURE METER

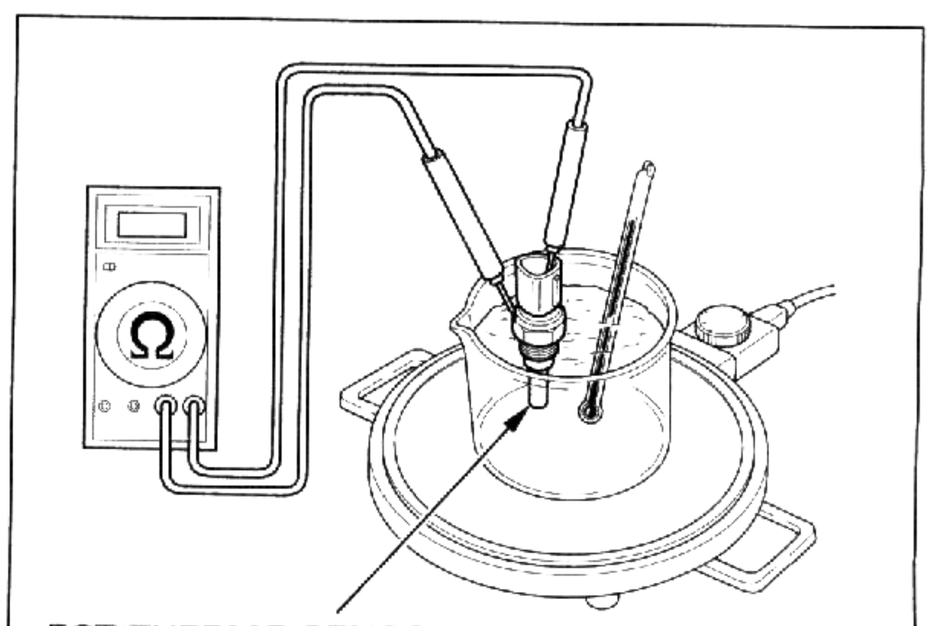
THERMO SENSOR UNIT INSPECTION

⚠WARNING

- ***Wear insulated gloves and adequate eye protection.***
- ***Keep flammable materials away from the electric heating element.***

Drain the coolant (page 6-3).

Disconnect the wire connector from the coolant temperature sensor and remove the sensor.

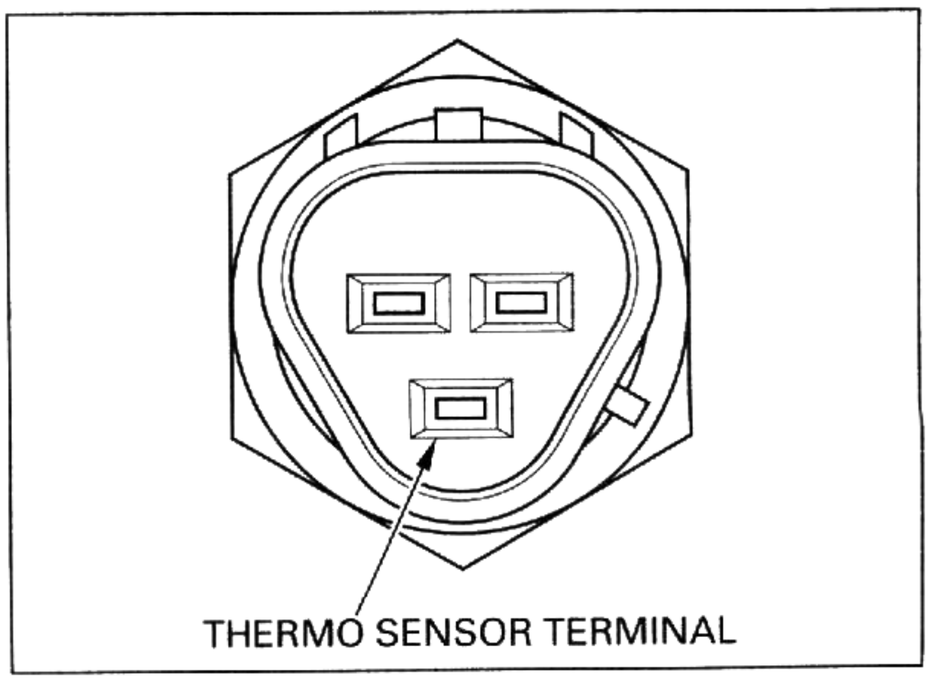


ECT/THERMO SENSOR

Suspend the ECT/thermo sensor in a pan of coolant (50−50 mixture) an electric heating element and measure the resistance through the sensor as the coolant heats up.

NOTE:

- Soak the thermo sensor in coolant up to its threads with at least 40 mm (1.6 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or ECT/thermo sensor touch the pan.



Temperature	80°C (68°F)	120°C (248°F)
Resistance	47.5−56.8 kΩ	14.9−17.3 kΩ

Replace the sensor if it is out of specification by more than 10% at any temperature listed.

Always replace the sealing washer with a new one.

Install and tighten the thermo sensor.

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

Connect the ECT/thermo sensor connector.
Fill the system and bleed the air (page 6-4).



COOLING FAN MOTOR SWITCH

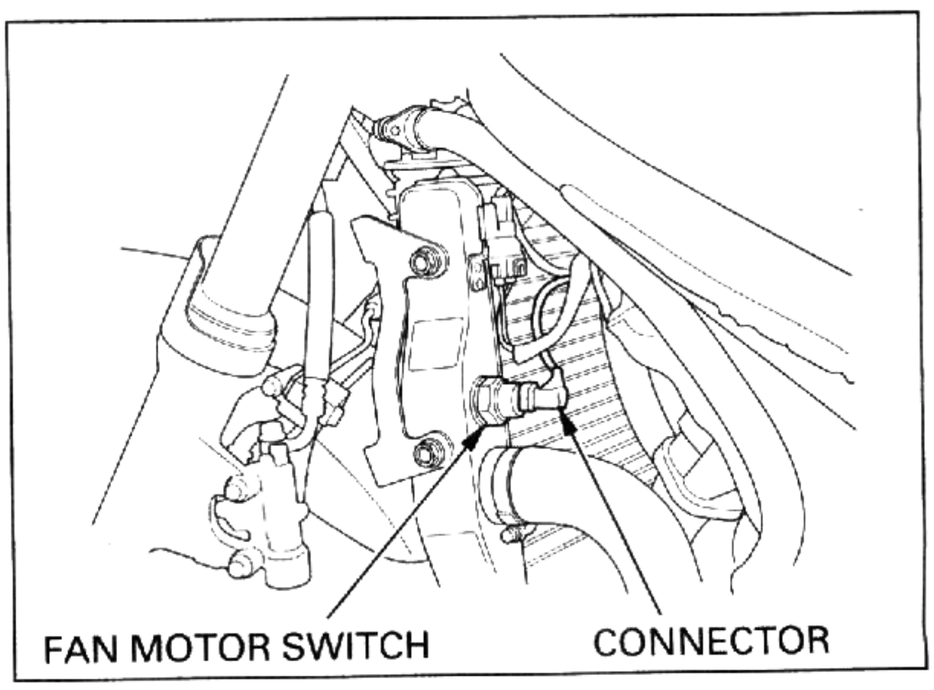
INSPECTION

Remove the following:
- Seat (page 2-2)
- Radiator grill (page 2-4)

Check for a blown fuse before inspection.

Fan motor does not stop
Turn the ignition switch OFF, disconnect the connector from the fan motor switch and turn the ignition switch ON again.

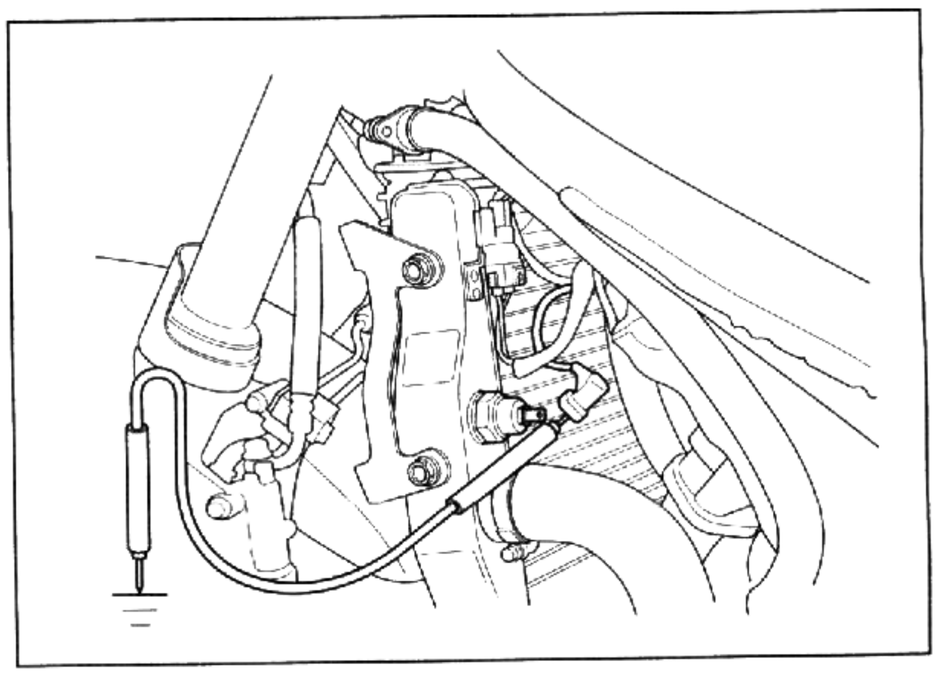
If the fan motor does not stop, check for a shorted wire between the fan motor and switch.
If the fan motor stops, replace the fan motor switch.



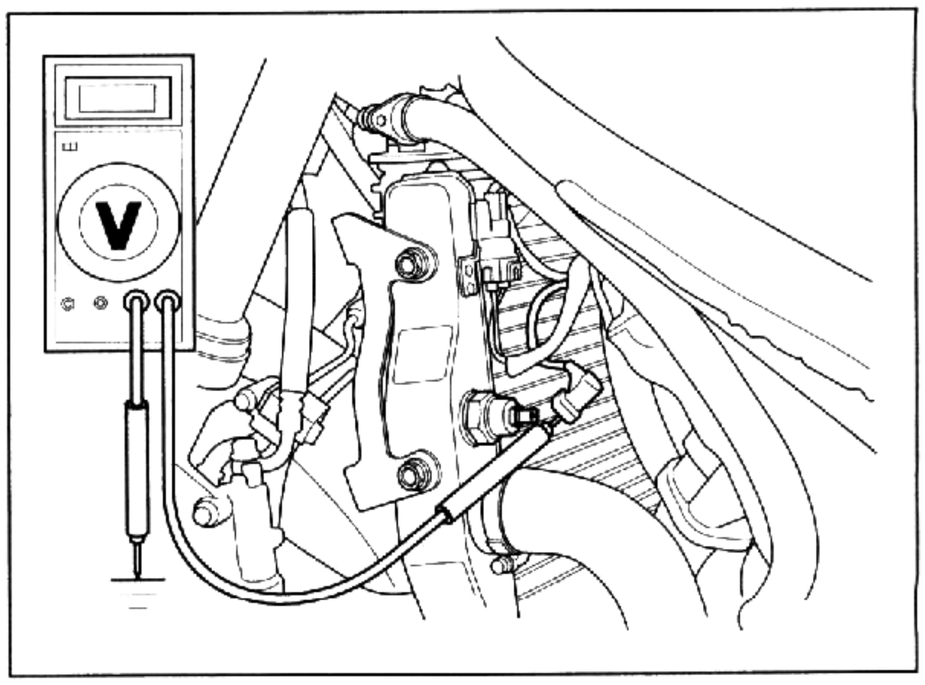
Fan motor does not start
Before testing, warm up the engine to operating temperature.

Disconnect the connector from the fan motor switch and ground the connector to the body with a jumper wire.
Turn the ignition switch ON and check the fan motor.

If the motor starts, check the connection at the fan motor switch terminal.
It is OK, replace the fan motor switch.



If the motor does not start, check for voltage between the fan motor switch connector and ground.
If battery voltage is measured, replace fan motor.
If there is no battery voltage, check for poor connection of the connector or broken wire harness.



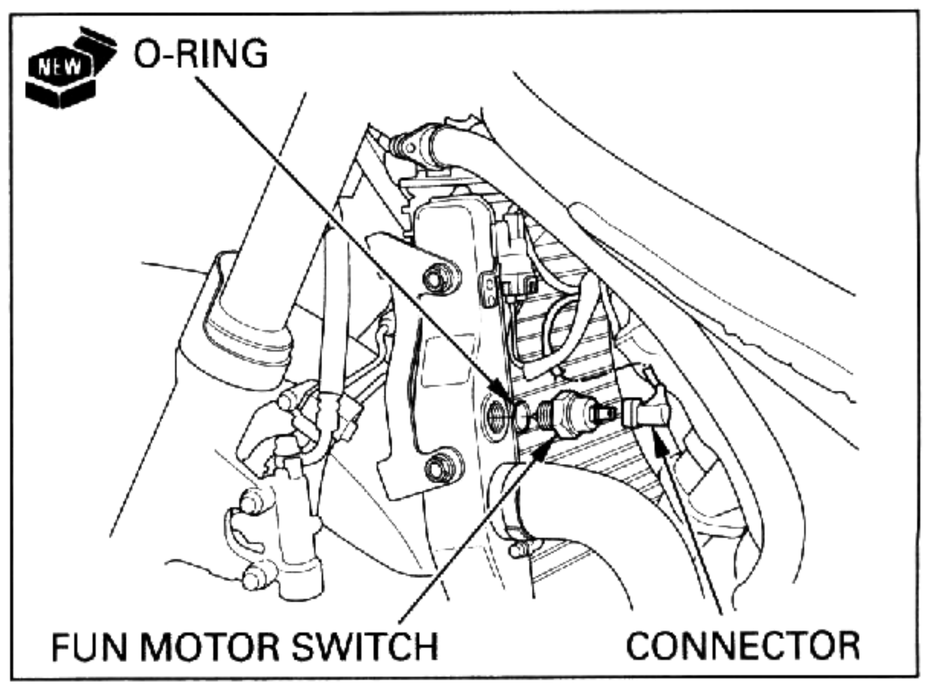
REMOVAL/INSTALLATION

Disconnect the fan motor switch connector and remove the switch.

Install a new O-ring onto the fan motor switch.
Install and tighten the fan motor switch.

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

Install the removed parts in the reverse order of removal.

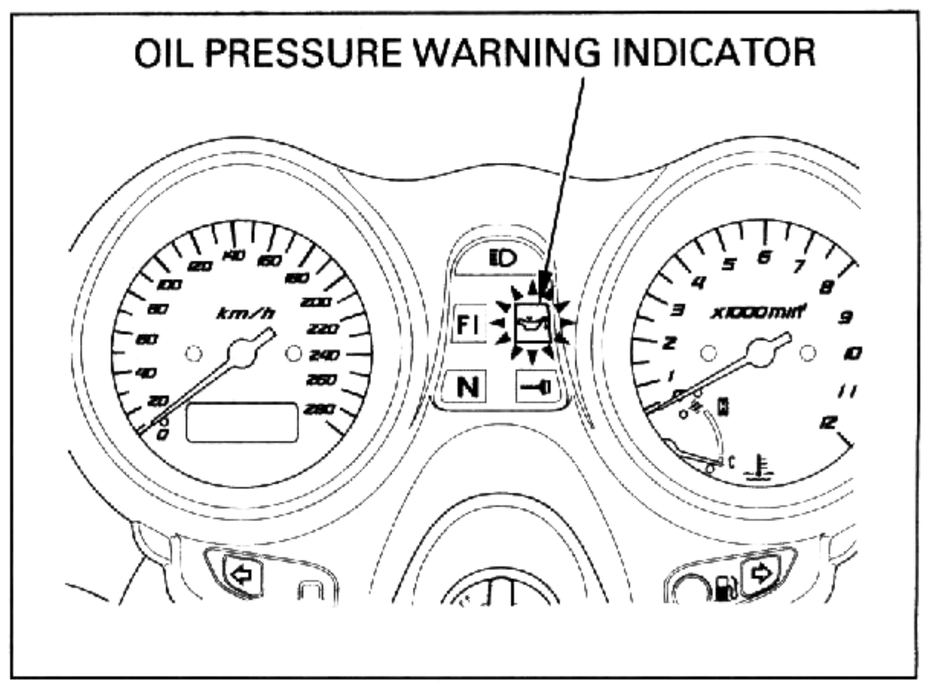


OIL PRESSURE SWITCH

INSPECTION

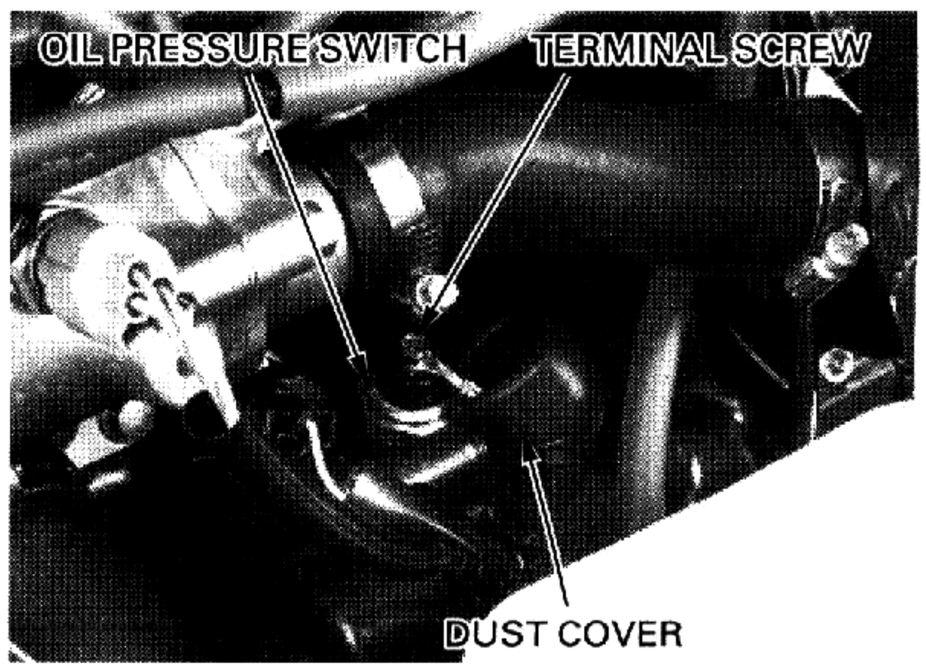
If the oil pressure warning indicator stays on while the engine running, check the engine oil level before inspection.

Make sure that the oil pressure warning indicator come on with the ignition switch ON.



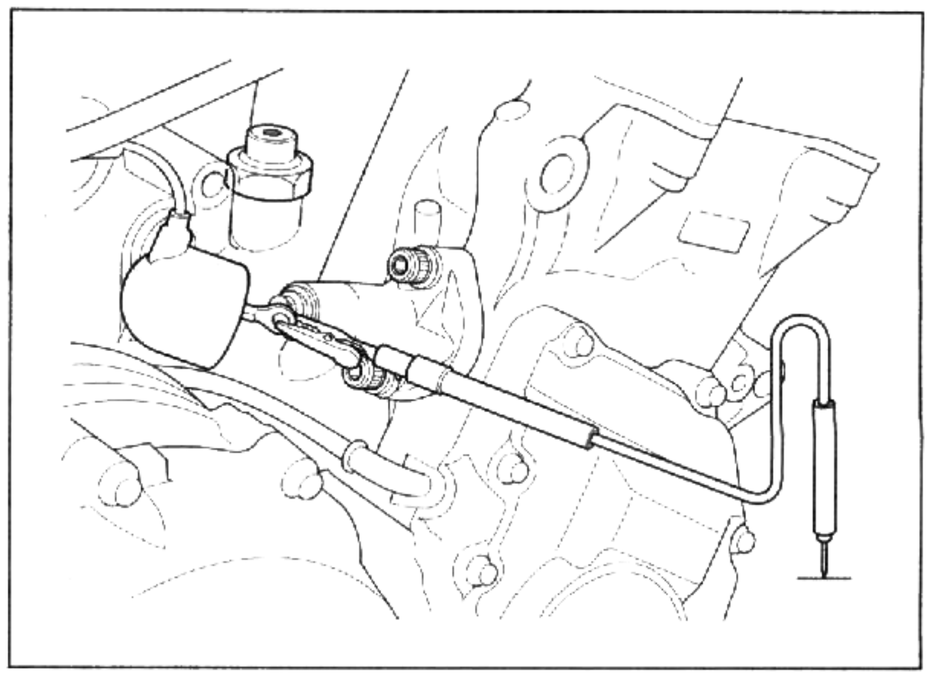
If the indicator does not come on, inspect as follow:
Remove the radiator grill (page 2-4).

Remove the dust cover.
Remove the screw and oil pressure switch terminal.

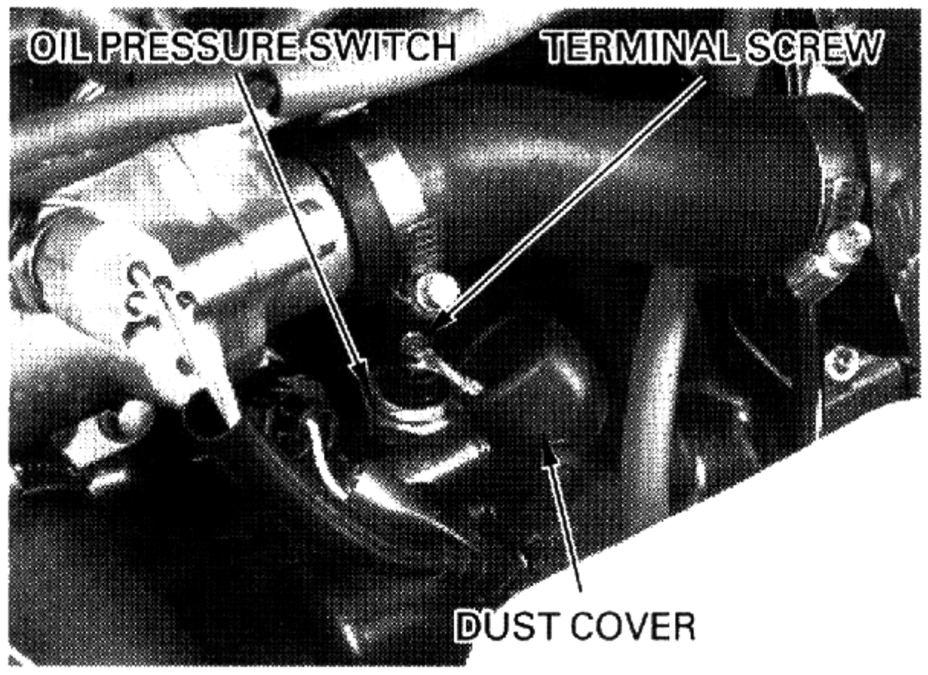


Short the oil pressure switch wire terminal with the ground using a jumper wire.
The oil pressure warning indicator comes on with the ignition switch is ON.
If the light does not comes on, check the sub-fuse (10A) and wires for a loose connection or an open circuit.

Start the engine and make sure that the light goes out.
If the light does not go out, check the oil pressure (page 4-3).
If the oil pressure is normal, replace the oil pressure switch (page 4-3).



Connect the oil pressure switch terminal to the switch and tighten the screw.
Install the dust cover.



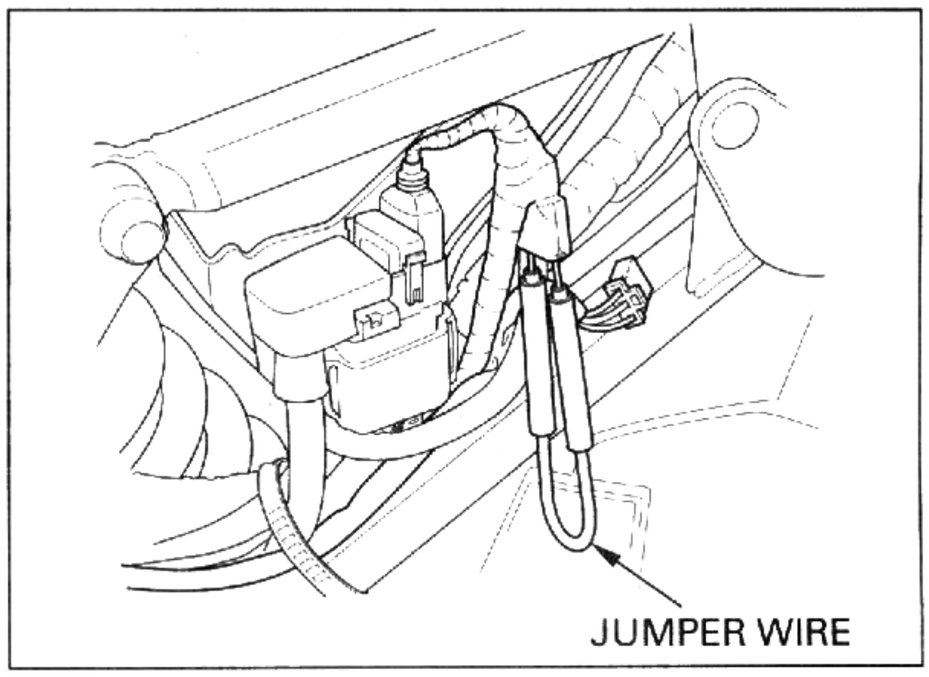
FUEL RESERVE SENSOR

INSPECTION

Turn the ignition switch is ON and make sure the fuel reserve indicator come ON.

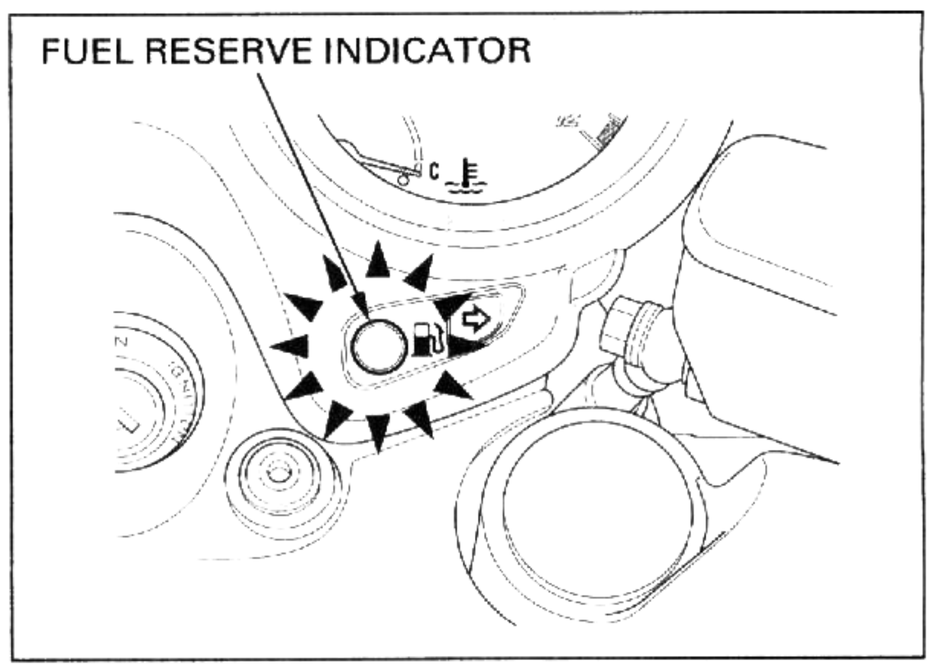
If the fuel reserve indicator does not indicate properly, check for the following.

Disconnect the fuel reserve sensor 3P (Black) connector.
Short the wire harness side connector Brown/Black and Green/Black terminals with a jumper wire.



Turn the ignition switch is ON and make sure the fuel reserve indicator come ON.

If the indicator come ON, replace the fuel pump assembly.
If the indicator still not come ON, check for open or short circuit in wire harness.

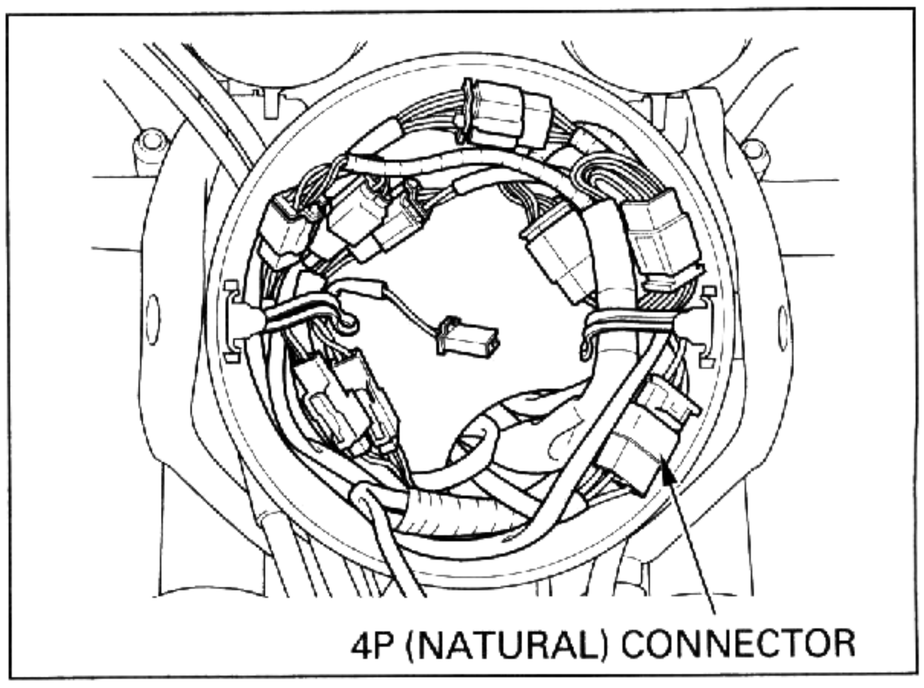


IGNITION SWITCH

INSPECTION

Remove the headlight unit (page 19-4).

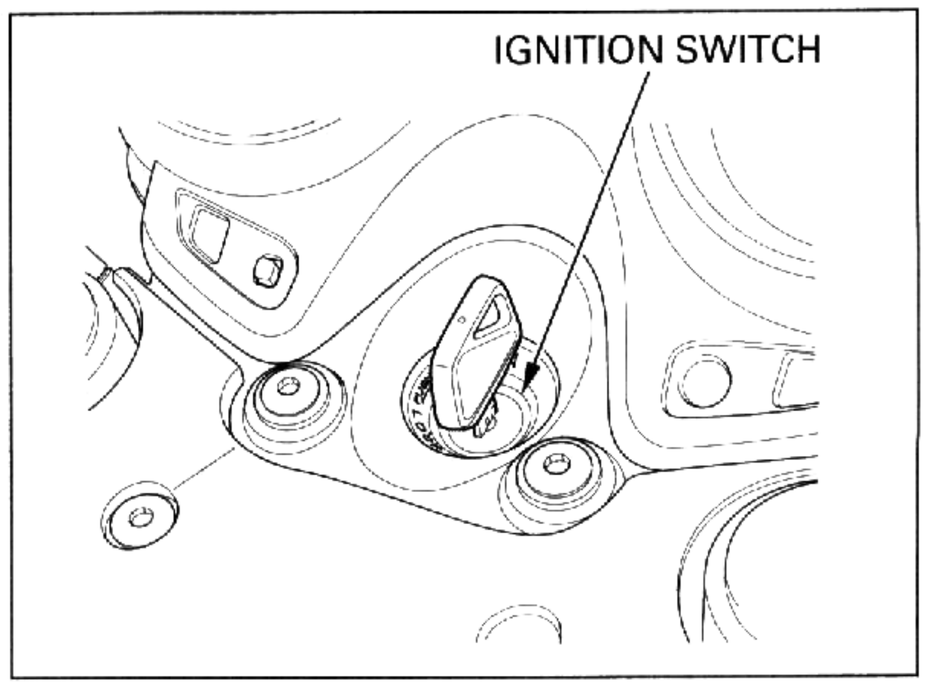
Disconnect the ignition switch wire 4P (Natural) connectors.



Check for continuity between the wire terminals of the ignition switch connector in each switch position.
Continuity should exist between the color coded wires as follows:

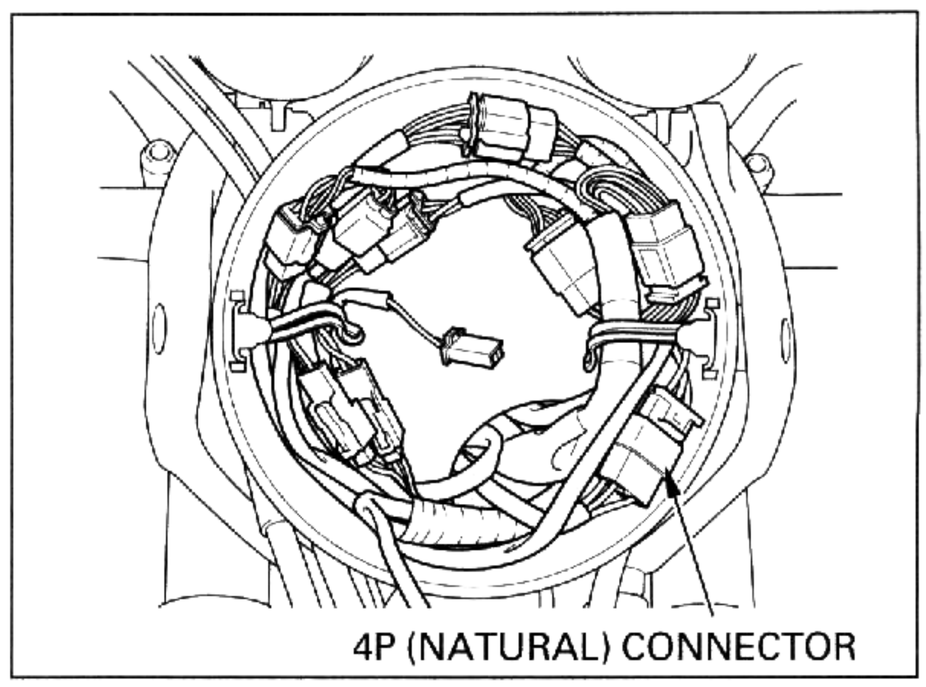
IGNITION SWITCH

	FAN	IG	BAT1	KEY
ON	○	○	○	KEY ON
OFF				KEY OFF
LOCK				KEY OFF LOCK PIN
COLOR	Bu/O	R/Bl	R	———



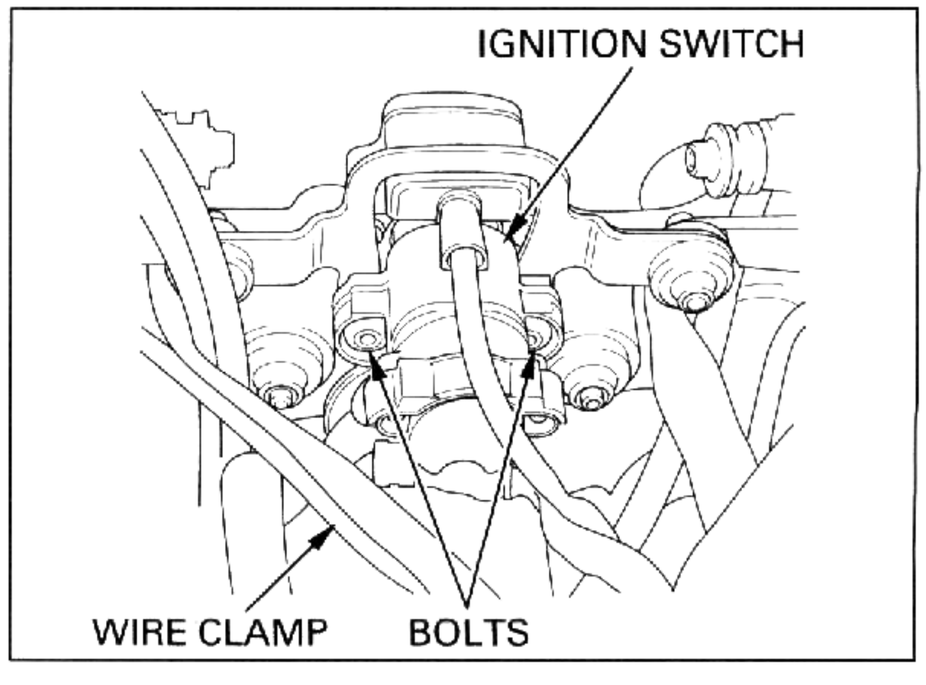
REMOVAL/INSTALLATION

Disconnect the ignition switch wire 4P (Natural) connector.

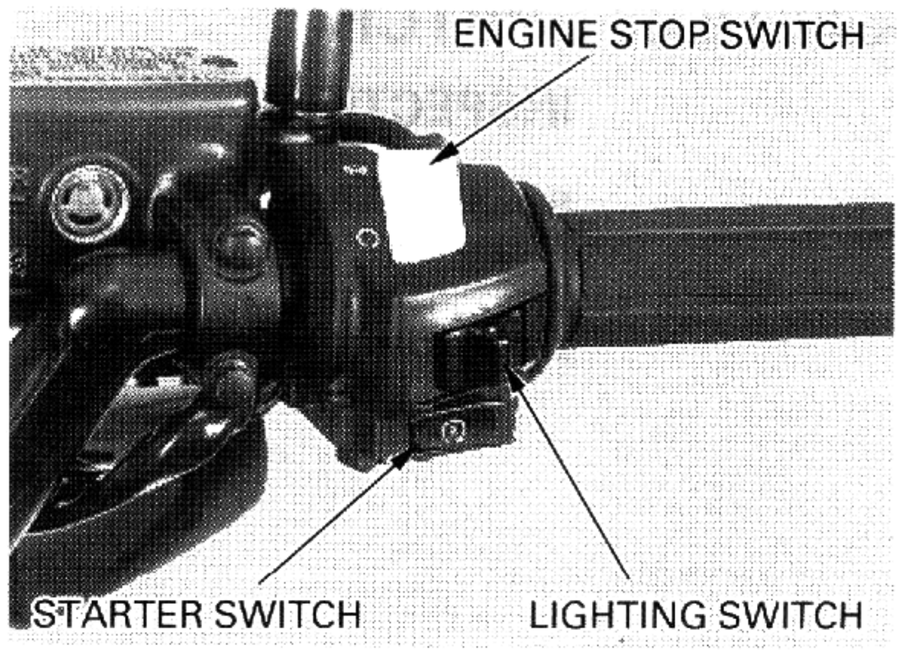


Remove the wire clamp.
Remove the bolts and ignition switch.

Install the ignition switch in the reverse order of removal.



HANDLEBAR SWITCHES



Disconnect the handlebar switch connectors.

Check for continuity between the wire terminals of the handlebar switch connector.
Continuity should exist between the color coded wire terminals as follows:

ENGINE STOP SWITCH

	IG	BAT
OFF		
RUN	○—○	
COLOR	BI	W/BI

STARTER SWITCH

	ST	IG
FREE		
PUSH	○—○	
COLOR	Y/R	BI

LIGHTING SWITCH

	BAT3	TL	BAT4	HL
•				
P	○	○		
H	○	○	○	○
COLOR	Br/Bu	Br/W	BI/R	Bu/W

TURN SIGNAL SWITCH

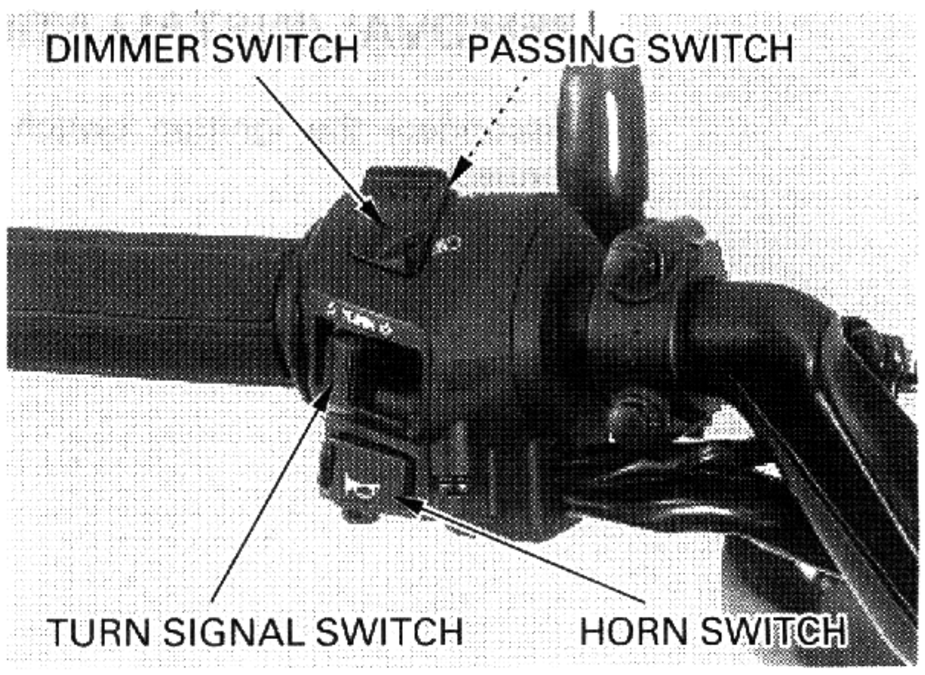
	W	R	L
R	○—○		
N			
L	○		○
COLOR	GR	SB	O

PASSING SWITCH

	BAT	Hi
FREE		
PUSH	○—○	
COLOR	BI/R	•

DIMMER SWITCH

	HL	Lo	HI
Lo	○—○		
(N)	○—○	○	
Hi	○		○
COLOR	•	W	Bu •



HORN SWITCH

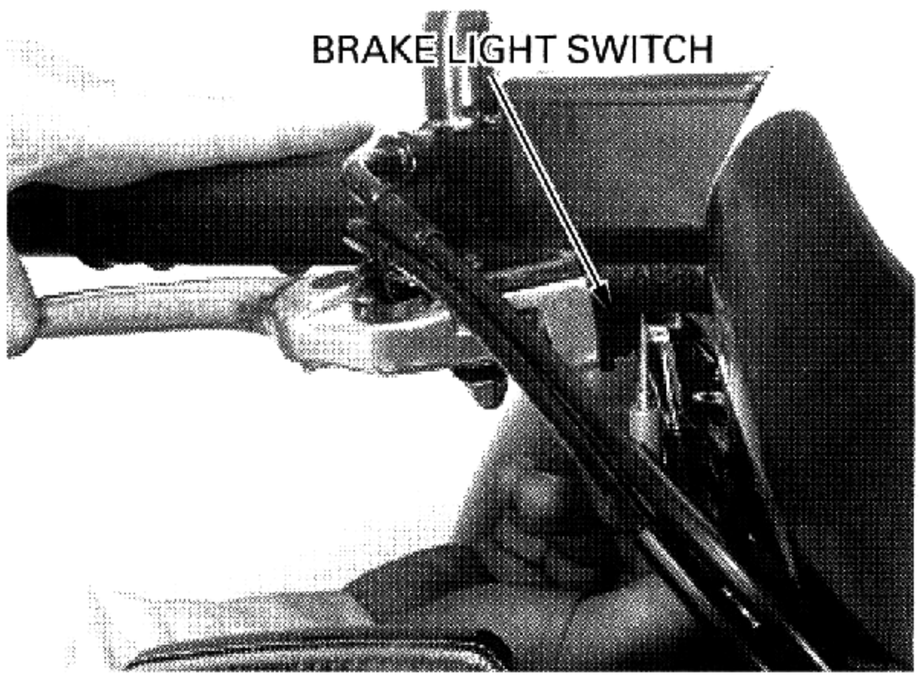
	Ho	BAT
FREE		
PUSH	○—○	
COLOR	Lg	BI/Br

BRAKE LIGHT SWITCH

FRONT

Disconnect the front brake light switch connectors and check for continuity between the terminals.

There should be continuity with the brake lever applied, and there should be no continuity with the brake lever is released.

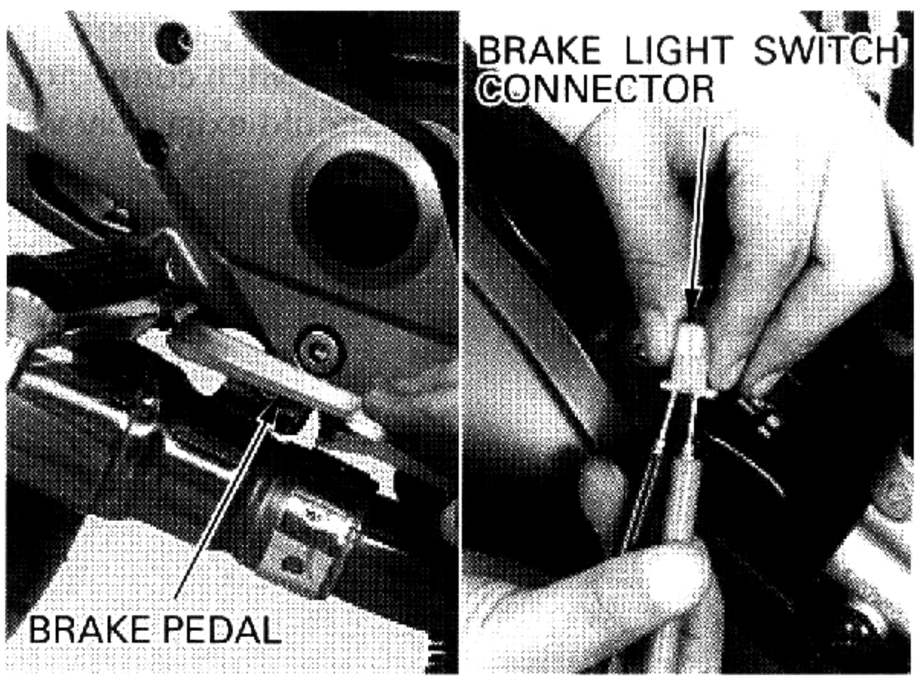


REAR

Remove the seat (page 2-2).

Disconnect the rear brake light switch connector and check for continuity between the terminals.

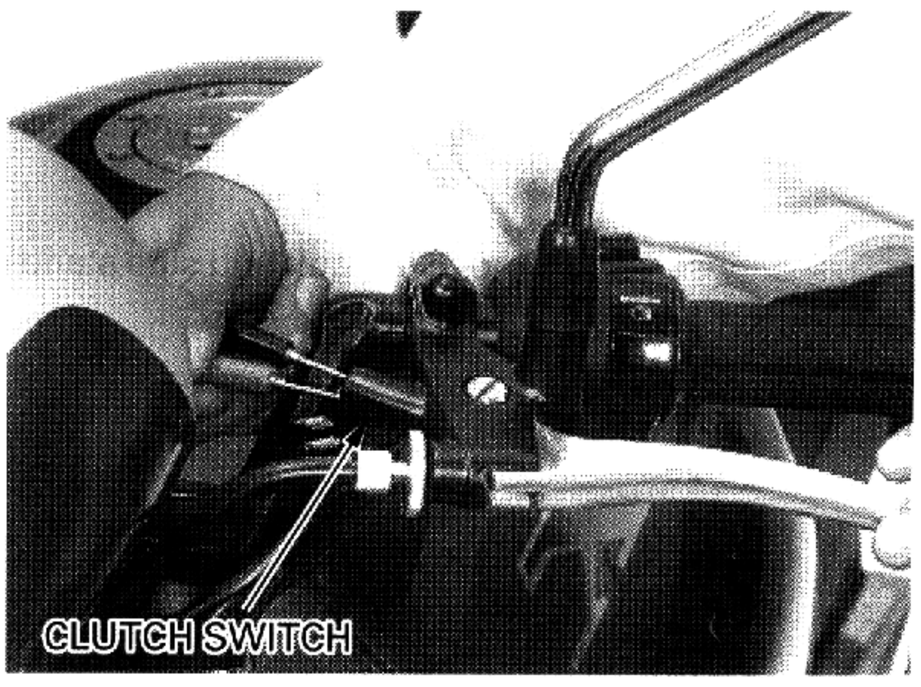
There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal is released.



CLUTCH SWITCH

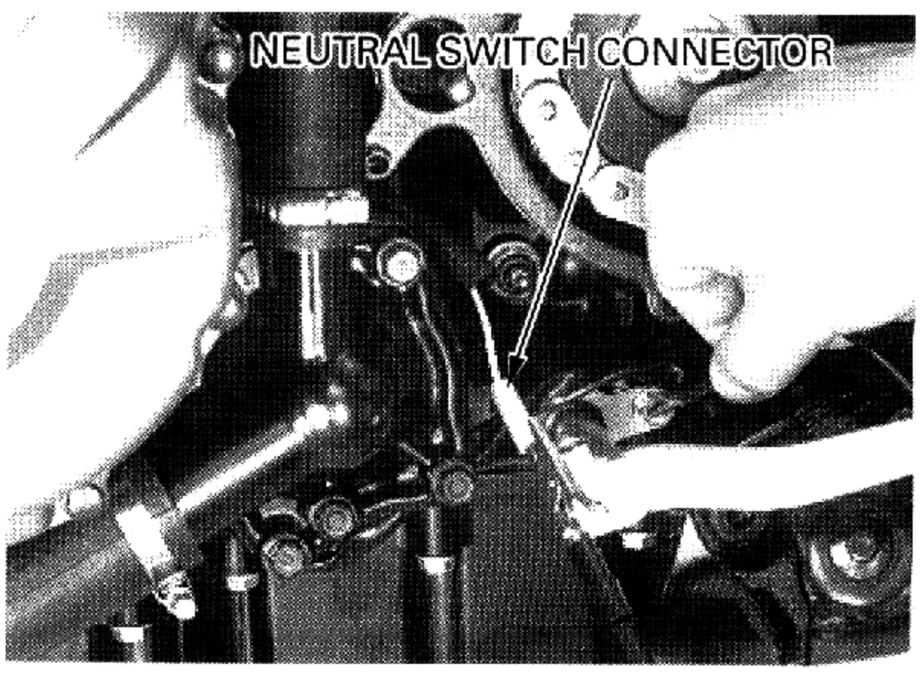
Disconnect the clutch switch connectors.

There should be continuity with the clutch lever applied, and there should be no continuity with the clutch lever is released.



NEUTRAL SWITCH

Disconnect the neutral switch connector from the switch.
Shift the transmission into neutral and check for continuity between the Light Green wire terminal and ground.
There should be continuity with the transmission is in neutral, and no continuity when the transmission is into gear.

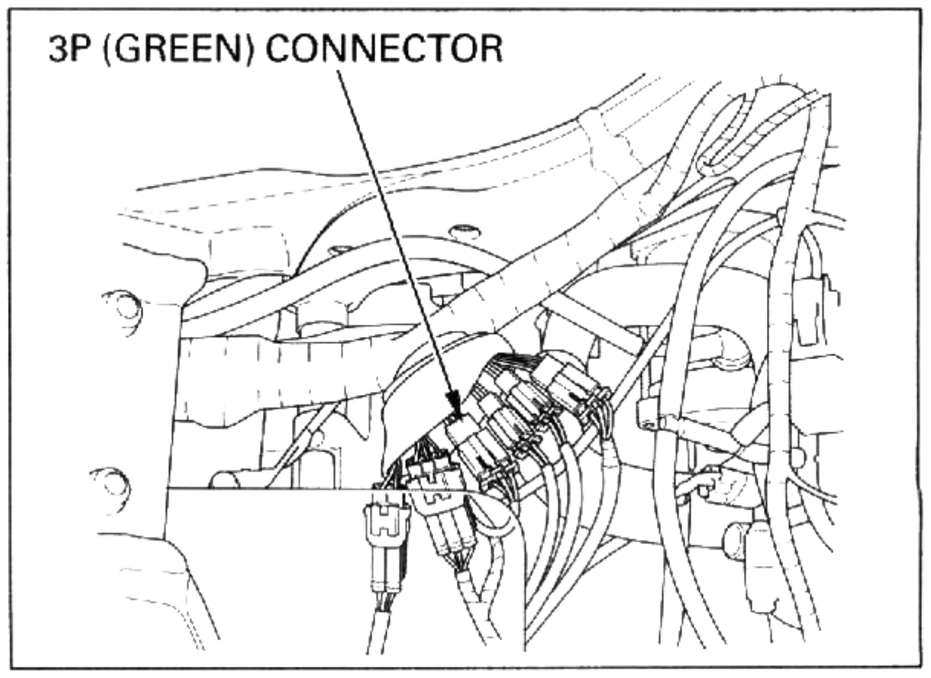


SIDE STAND SWITCH

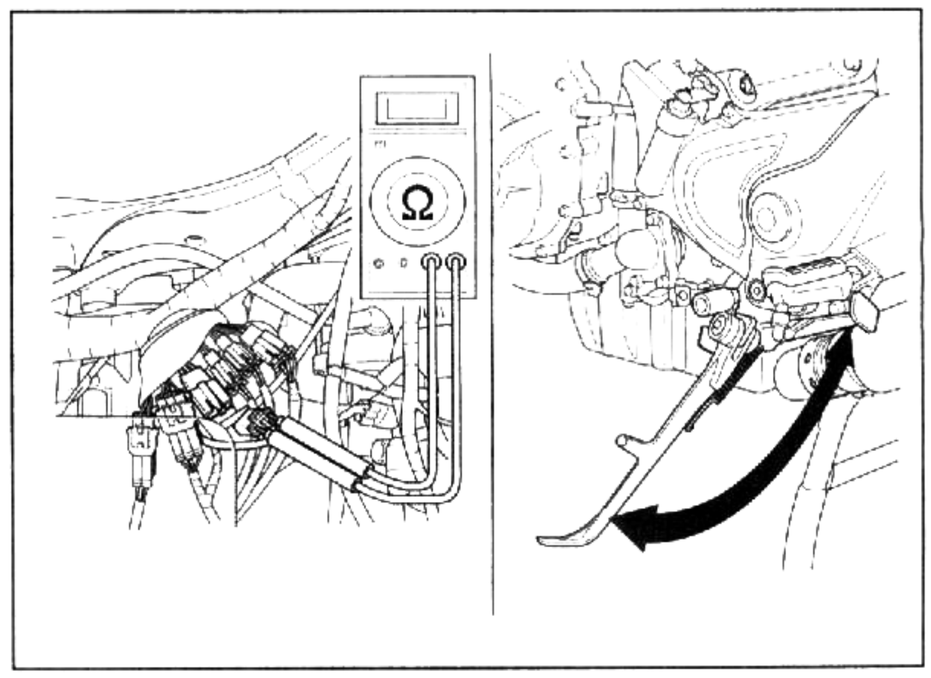
INSPECTION

Support the rear end of the fuel tank (page 2-11).

Disconnect the side stand switch 3P (Green) connector.



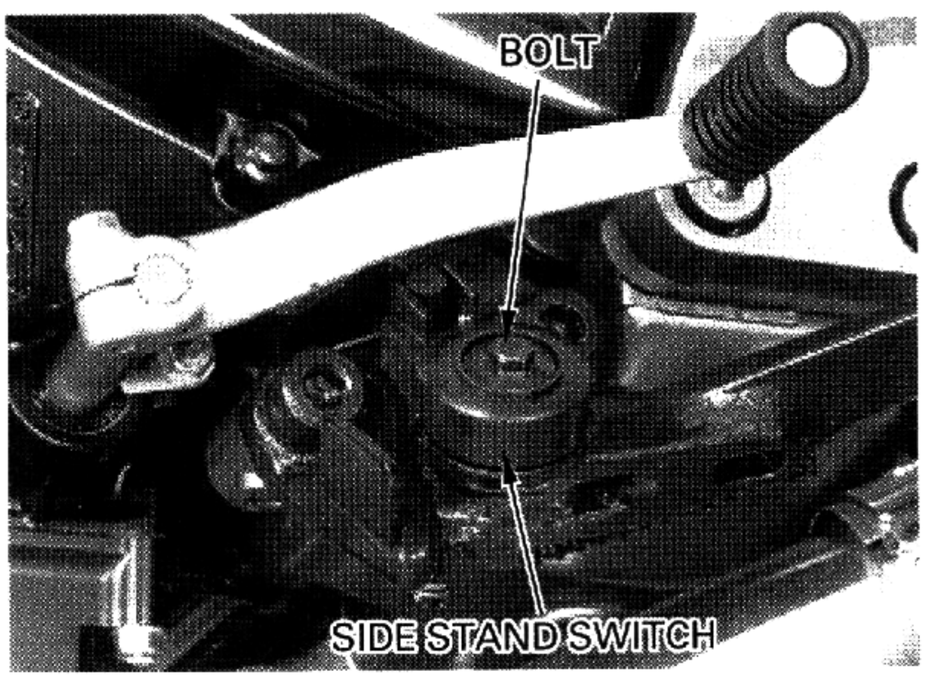
Check for continuity between the wire terminals of the side stand switch connector.
Continuity should exist only when the side stand is UP.



REMOVAL

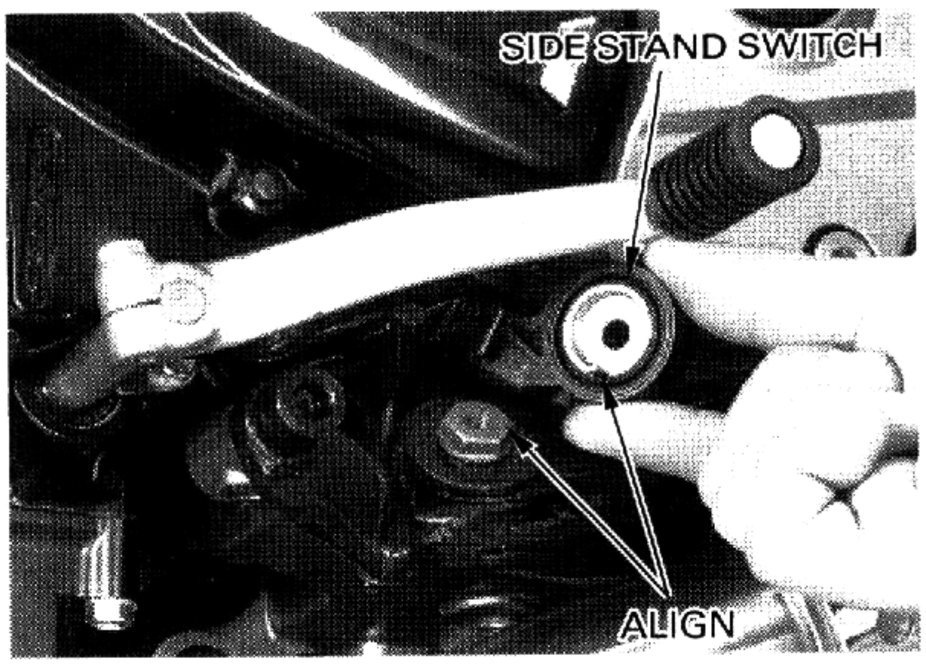
Disconnect the side stand switch 3P (Green) connector.

Remove the bolt and side stand switch.



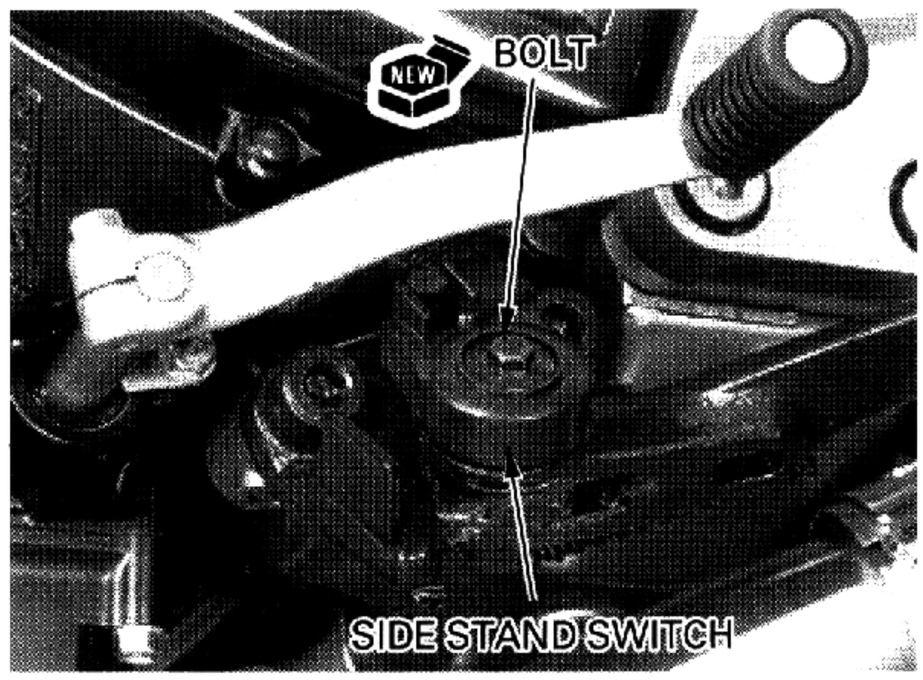
INSTALLATION

Install the side stand switch by aligning the switch pin with the side stand hole and the switch groove with the return spring holding pin.

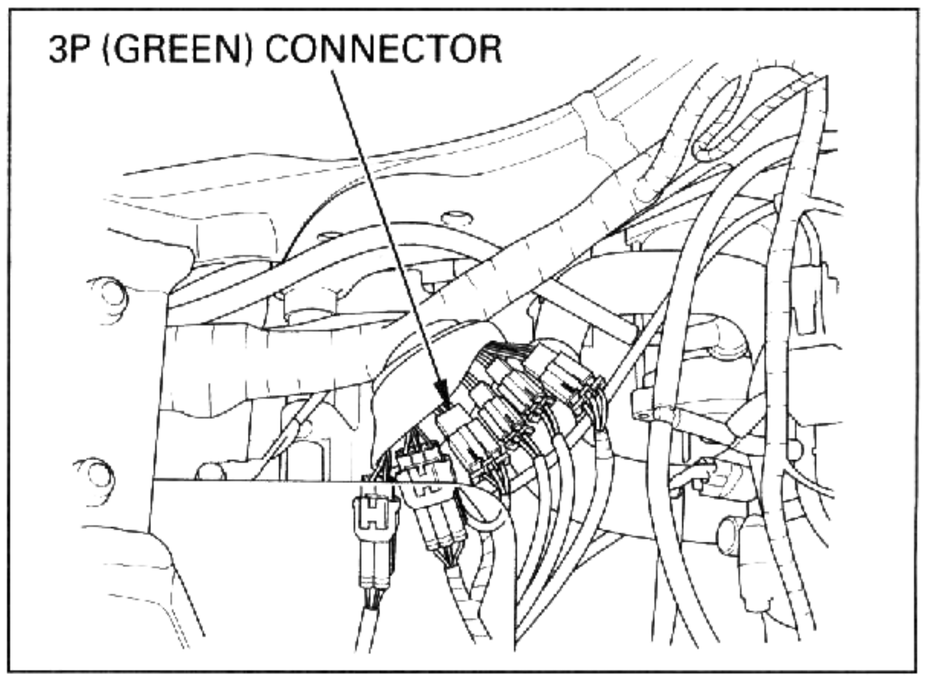


Secure the side stand switch with a new bolt.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)



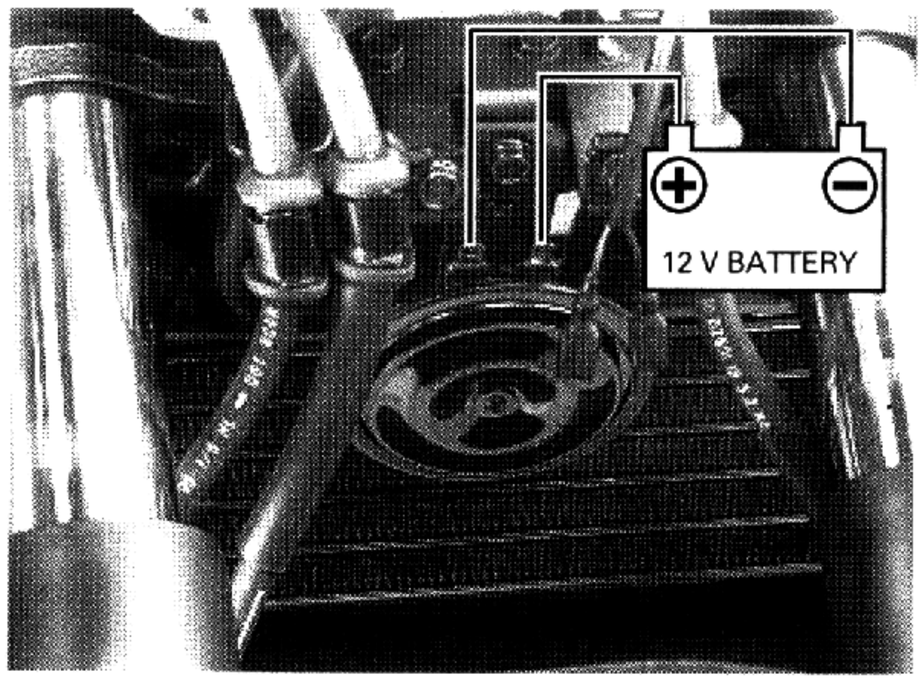
Connect the side stand switch 3P (Green) connector.



HORN

Disconnect the wire connectors from the horn.

Connect the 12 V battery to the horn terminal directly.
The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.

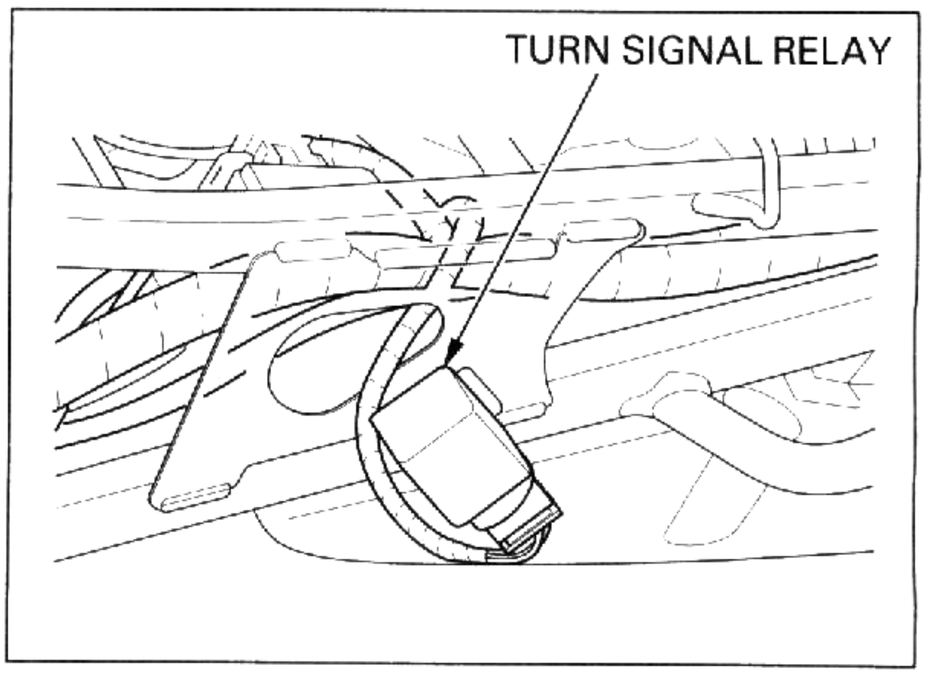


TURN SIGNAL RELAY

INSPECTION

Check the following:
- Battery condition
- Burned out bulb or non-specified wattage
- Burned fuse
- Ignition switch and turn signal switch function
- Loose connectors

If the above items are all normal, check the following:
Disconnect the turn signal connectors from the relay.



1. Short the black and gray terminals of the turn signal relay connector with a jumper wire. Start the engine and check the turn signal light by turning the switch ON.

Light comes on

Light does not come on

- Broken wire harness

2. Check for continuity between the green terminal of the relay connector and ground.

Continuity

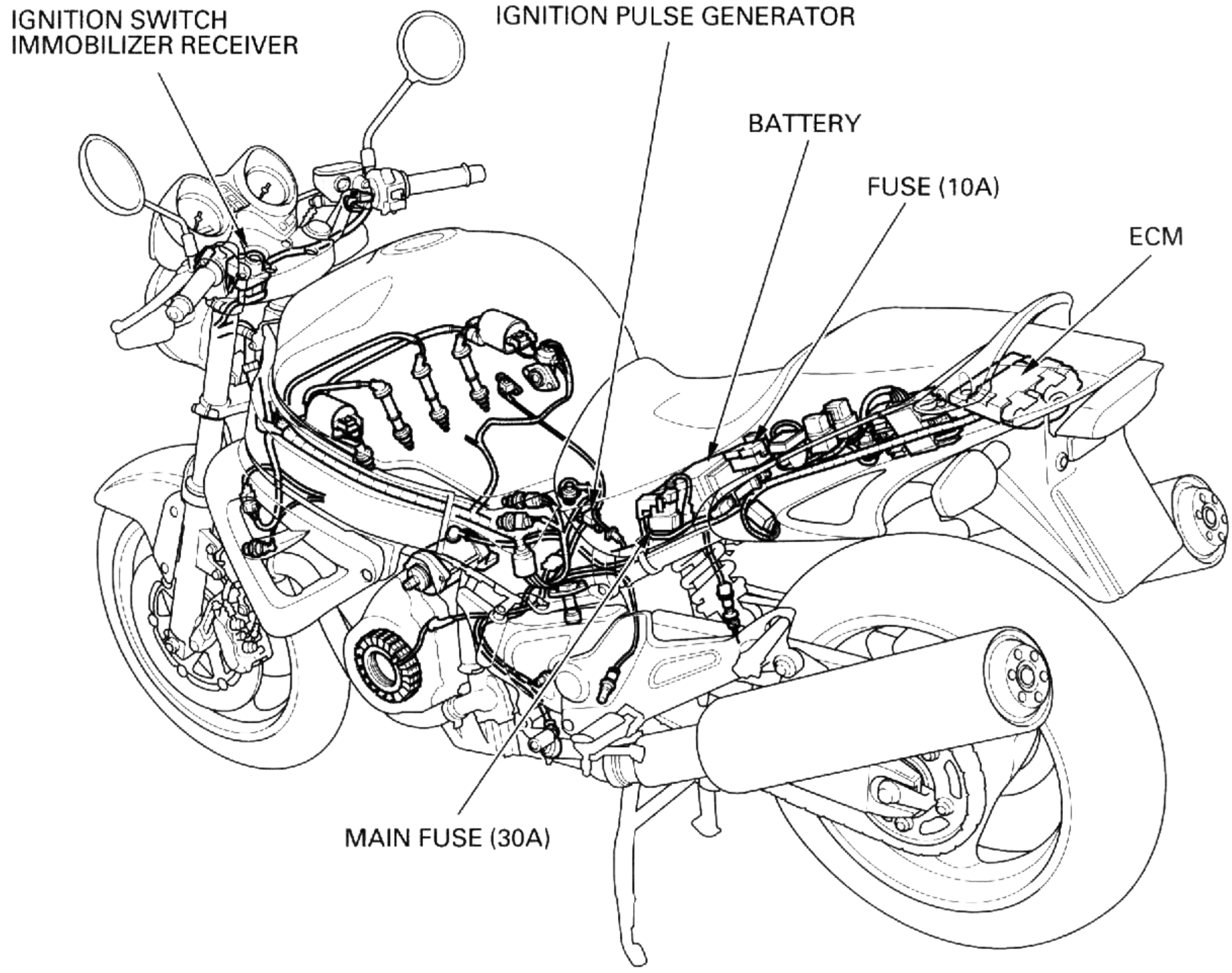
No continuity

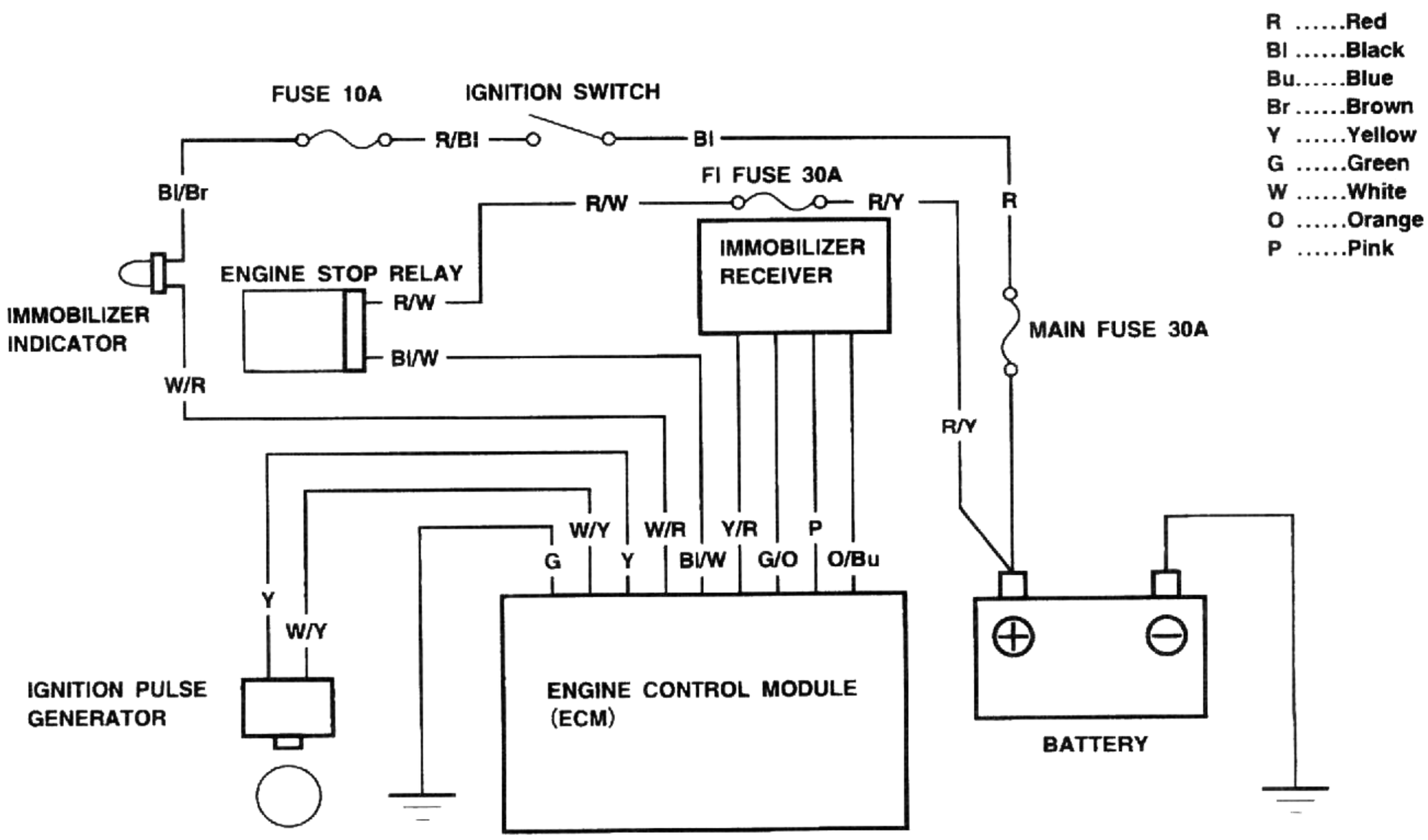
- Broken ground wire

- Faulty turn signal relay.
- Poor connection of the connector.

MEMO

SYSTEM DIAGRAM





20. IMMOBILIZER SYSTEM (HISS)

SERVICE INFORMATION	20-1	IMMOBILIZER INDICATOR	20-10
KEY REGISTRATION PROCEDURES	20-2	ENGINE CONTROL MODULE (ECM)	20-10
DIAGNOSTIC CODE INDICATION	20-5	IMMOBILIZER RECEIVER	20-11
TROUBLESHOOTING	20-7	REQUIRED PARTS FOR PROBLEM	20-12

SERVICE INFORMATION

GENERAL

- HISS is the abbreviation of Honda Ignition Security System.
- When checking the immobilizer system (HISS), always follow the steps in the troubleshooting flow chart (page 20-7).
- Keep the immobilizer key away from the other vehicle's immobilizer key when using it. The jamming of the key code signal may occur and the proper operation of the system will be obstructed.
- The key has built-in electronic part (transponder). Do not drop and strike the key against a hard material object, and do not leave the key on the dashboard in the car, etc. where the temperature will rise. Do not leave the key in the water for a prolonged time such as by washing the clothes.
- The engine control module (ECM) as well as the transponder keys must be replaced if all transponder keys have been lost.
- The system does not function with a duplicated key unless the 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 (HISS) as it can cause the system failure. (The engine cannot be started.)
- For ignition system inspection, see section 17.
- For ignition switch servicing, see section 19.

TOOL

Inspection adaptor 07XMZ-MBW0100

KEY REGISTRATION PROCEDURES

When the key has been lost, or additional spare key is required:

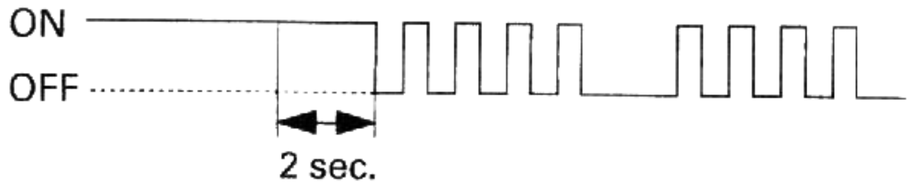
1. Obtain a new transponder key.

2. Grind the key in accordance with the shape of the original key.

3. Apply 12 V battery voltage to the ignition pulse generator lines of the engine control module (ECM) using the special tool (page 20-5).

4. Turn the ignition switch ON with the original key. The immobilizer indicator comes on and it remains on.
   - The code of the original key 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 20-5).

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.



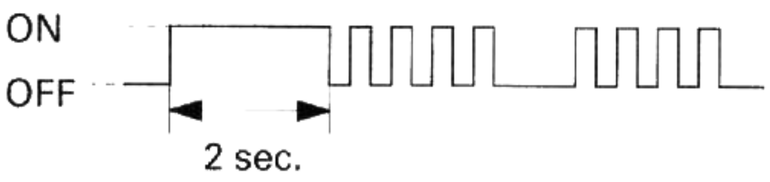
   - The immobilizer system enters the registration mode. Registrations of all key except the original key inserted in the ignition switch are cancelled. (Registration of the lost key or spare key is cancelled.)

NOTE:

The spare key must be registered again.

6. Turn the ignition switch OFF and remove the key.

7. Turn the ignition switch ON with a new key or the spare key. (Never use the key registered in previous step.) 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 on for approx. ten seconds, then it will indicate the diagnostic code (page 20-6).

CAUTION:

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.

NOTE:

The ECM can store up to four key codes. (The four keys can be registered.)

9. Turn the ignition switch OFF, remove the inspection adaptor and connect the ignition pulse generator connector.

10. Turn the ignition switch ON with the registered key.
    - The immobilizer system 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.

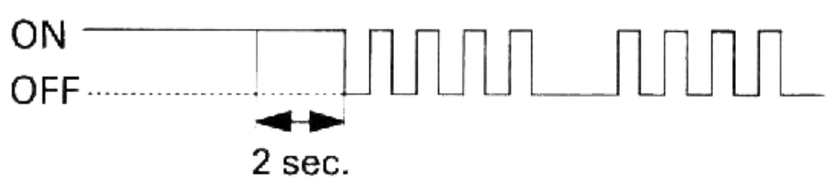
2. Remove the ignition switch (page 19-19).

3. Apply 12 V battery voltage to the ignition pulse generator lines of the engine control module (ECM) using the special tool (page 20-5).

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 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 20-5).

6. Disconnect the red clip of the inspection adaptor from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds then it blinks four times repeatedly.

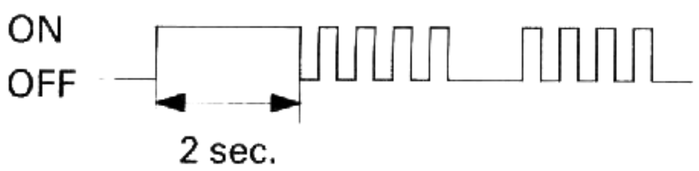


   - The immobilizer system (HISS) enters the registration mode. Registrations of all key except the original key set near the receiver are cancelled.

7. Turn the ignition switch OFF and remove the key.

8. Install the ignition switch onto the top bridge (page 19-19).

9. Turn the ignition switch ON with a first new key. The indicator comes on for two seconds then it blinks four times repeatedly.



   - The first key 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 on for approx. ten seconds, then it will indicate the diagnostic code (page 20-6).

10. Turn the ignition switch OFF and disconnect the red clip of the inspection adaptor from the battery positive (+) terminal.

11. Turn the ignition switch ON (with the first key registered in step 9). The immobilizer indicator comes on for two seconds then it goes off.
    - The immobilizer system returns to the normal mode.

12. Turn the ignition switch OFF and connect the red clip of the inspection adaptor to the battery positive (+) terminal.

13. Turn the ignition switch ON (with the first key registered in step 9). The immobilizer indicator comes on and it remains on.
    - The code of the first key is recognized by the ECM.
    - If there is any problem in the immobilizer sysytem, the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 20-5).

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 OFF and remove the key.

16. Turn the ignition switch ON with a second new key. (Never use the key registered in previous step.) The indicator comes on for two seconds then it blinks four times repeatedly.
    - The second key 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 on for approx. ten seconds, then it will indicate the diagnostic code (page 20-6).

CAUTION:

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.

NOTE:

The ECM can store up to four key codes. (The four keys can be registered.)

18. Turn the ignition switch OFF, remove the inspection adaptor and connect the ignition pulse generator connector.

19. Turn the ignition switch ON with the registered key.
    - The immobilizer system (HISS) returns to the normal mode.

20. Check that the engine can be started using all registered key.

When all keys have been lost, or the engine control module (ECM) is faulty:

1. Obtain a new ECM and two new transponder keys.

2. Grind the keys in accordance with the shape of the original key (or use the key number plate when all key have been lost).

3. Replace the ECM with new one.

4. Turn the ignition switch ON with a first new key. The immobilizer indicator comes on for two seconds, then it blinks four times repeatedly.
    - The first key is registered in the ECM.
    - If there is any problem in the registration, the system will enter the daignostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 20-6).

5. Turn the ignition switch OFF and remove the first key.

6. Turn the ignition switch ON with a second new key. The immobilizer indicator comes on for two seconds, then it blinks four times repeatedly.
    - The second key is registered in the ECM.
    - If there is any ploblem in the registration, the system will enter the daignostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 20-6).

7. Turn the ignition switch OFF and remove the second key.

NOTE:

- The system (ECM) will not enter the normal mode unless the two keys are registered in ECM.
- The third new key cannot be continuously registered. When it is necessary to register the third key, follow the procedures "When the key has been lost, or additional key is required" (page 20-2).

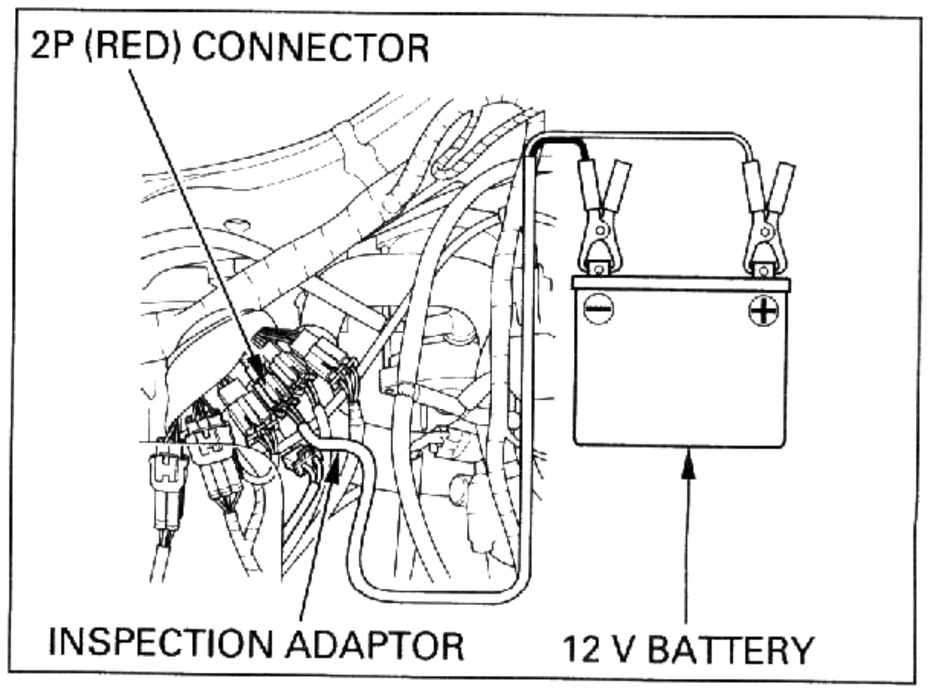
8. Check that the engine can be started using all registered keys.

DIAGNOSTIC CODE INDICATION

Support the rear end of the fuel tank (page 2-11).

Disconnect the ignition pulse generator 2P (red) connector.
Connect the inspection adaptor to the wire harness side connector.
Connect the red clip of the adaptor to the 12 V battery positive (+) terminal and green clip to the negative (−) terminal.

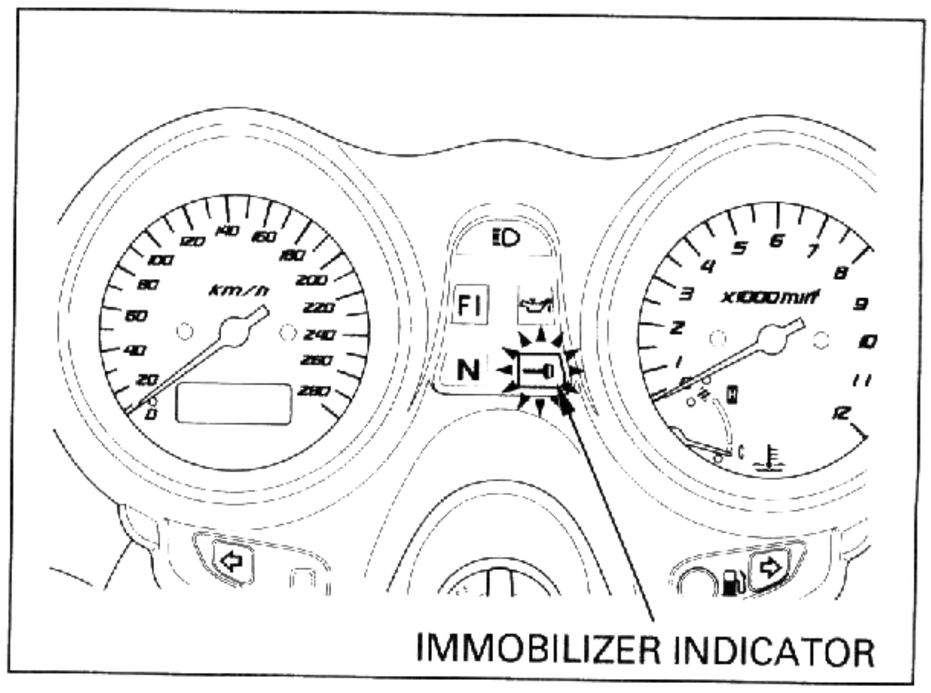
TOOL:
Inspection adaptor 07XMZ-MBW0100



Turn the ignition switch ON with the properly registered key.
The immobilizer indicator will come on for approx. ten seconds then it will start blinking to indicate the diagnostic code if the system is abnormal.
The blinking frequency is repeated.

NOTE:

The immobilizer indicator remains on when the system is normal. (The system is in the normal mode and the diagnostic code does not appear.)

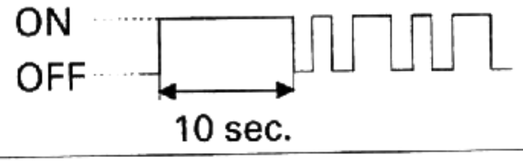


DIAGNOSTIC CODE

When the system (ECM) enters the diagnostic mode from the normal mode:

BLINKING PATTERN	SYMPTOM	PROBLEM	PROCEDURE
ON / OFF — 10 sec.	Engine control module (ECM) data is abnormal.	Faulty ECM	Replace the ECM
	Code signals cannot send or receive.	Faulty receiver or wire harness	Follow the trouble-shooting (page 20-9).
	Identification code is disagree	Jamming by the other transponder	Keep the other vehicle's transponder key away from the immobilizer receiver more than 50 mm (2.0 in).
	Secret code is disagree		

When the system (ECM) enters the diagnostic mode from the registration mode:

BLINKING PATTERN	SYMPTOM	PROBLEM	PROCEDURE
	Registration is over-lapped.	The key is already registered properly.	Use a new key or cancelled key.
	Code signals cannot send or receive.	Communication fails.	Follow the trouble-shooting (page 20-9).
	Registration is impossible	The key is already registered on the other system.	Use a new key.

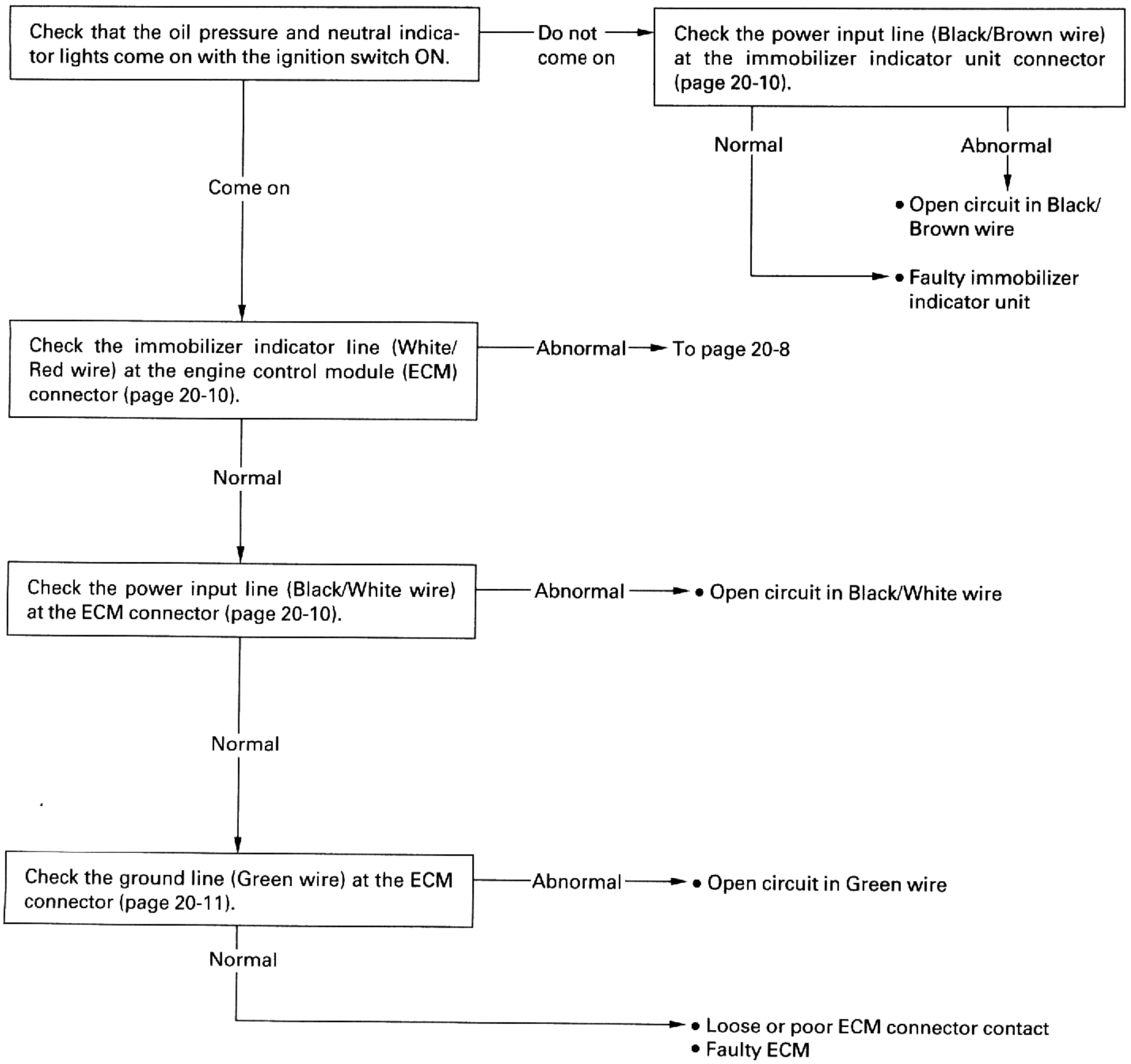
TROUBLESHOOTING

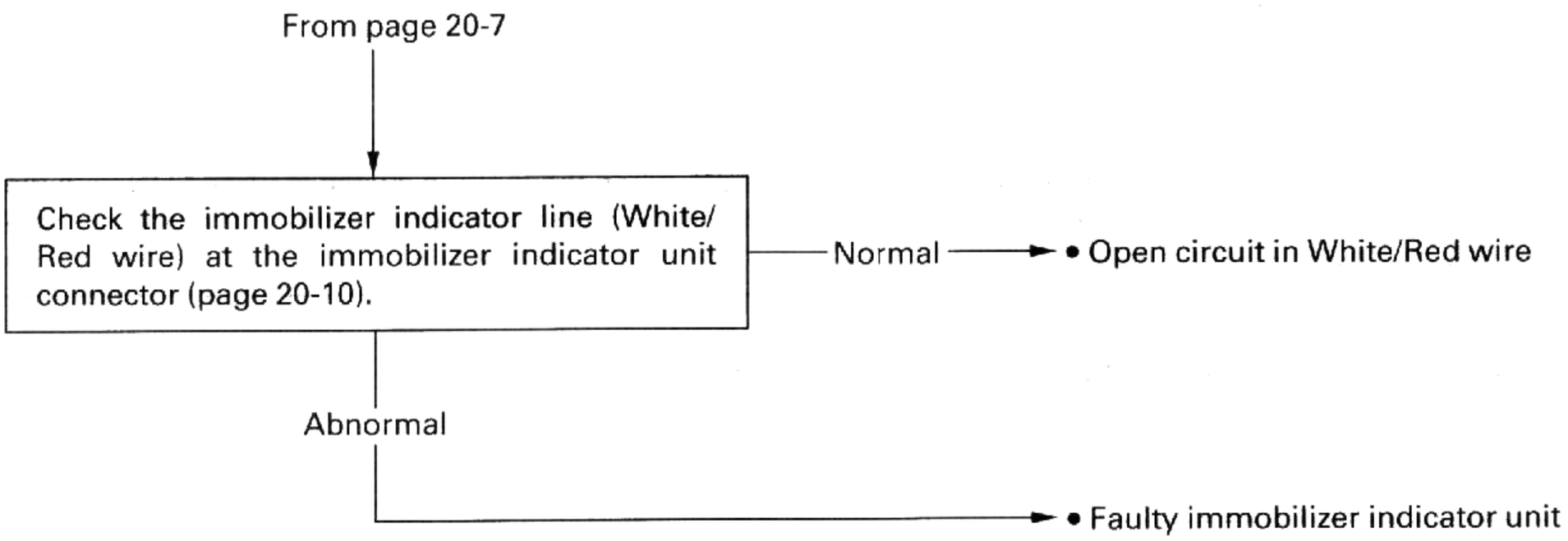
NOTE:

The immobilizer indicator comes on for approx. two seconds then it goes off, when the ignition switch is turned ON with the properly registered key and the immobilizer system (HISS) functions normally. If there is any problem or the properly registered key is not used, the indicator will remains on.

Immobilizer indicator does not come on when the ignition switch is turned ON

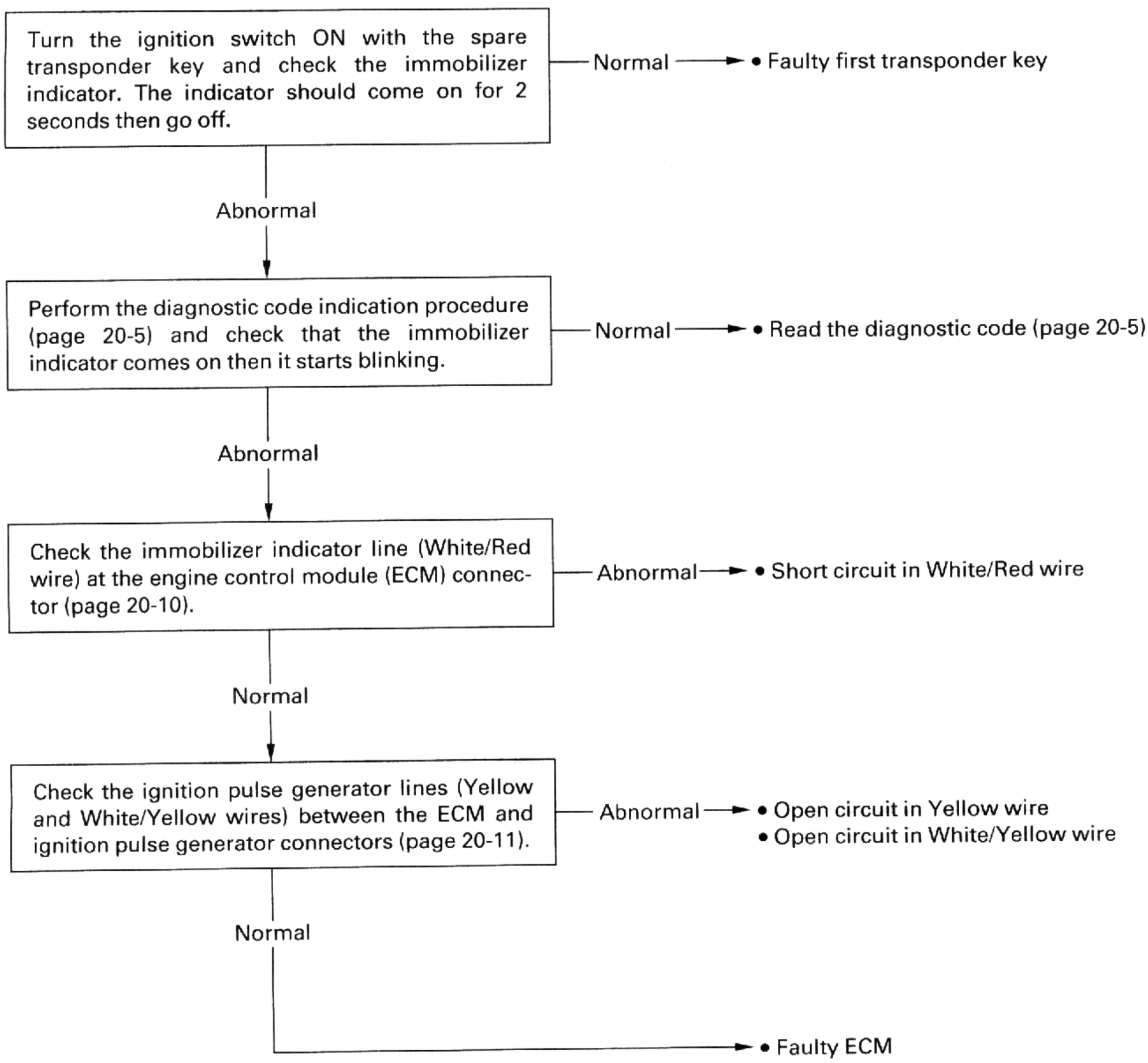
- Check for a blown fuses (10 A).





Immobilizer indicator remains on with the ignition switch ON

- Check that there is any metal obstruction or the other vehicle's transponder key near the immobilizer receiver and key. If so, remove it and recheck.



Diagnostic code  **is indicated (Code signals cannot send or receive)**

Check the power input line at the immobilizer receiver connector (page 20-11).
- Abnormal → • Open or short circuit in Yellow/Red wire

Normal ↓

Check the ground line at the immobilizer receiver connector (page 20-11).
- Abnormal → • Open circuit in Green/Orange wire

Normal ↓

Check the signal lines between the immobilizer receiver and ECM connectors (page 20-12).
- Abnormal → • Open or short circuit in Pink wire
  • Open or short circuit in Orange/Blue wire

Normal →
- • Faulty immobilizer receiver

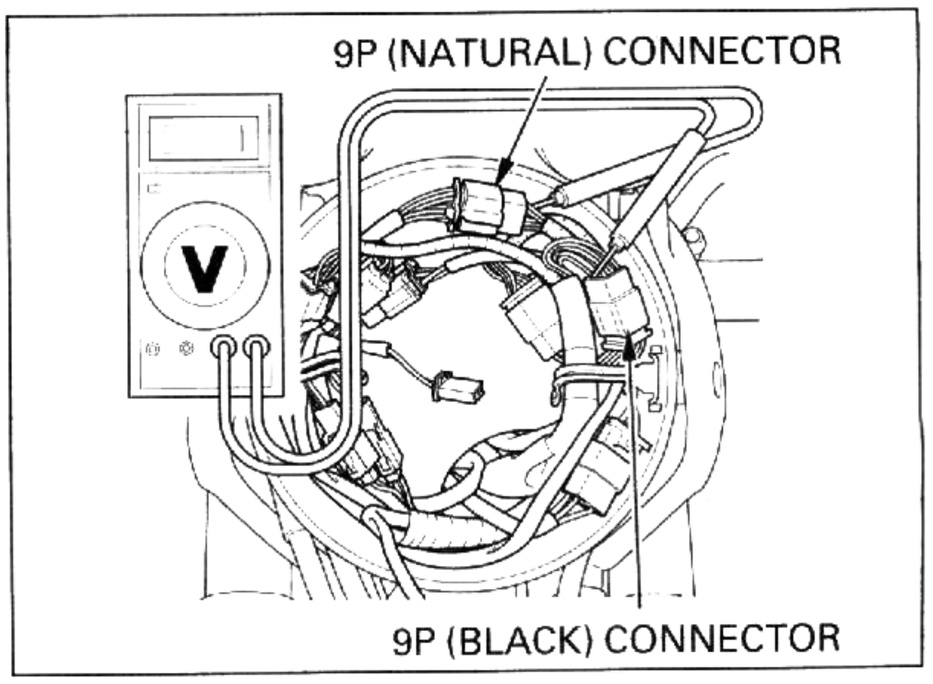
IMMOBILIZER INDICATOR

Remove the headlight unit (page 19-4).

Perform the following inspections with the combination meter 9P (Black) connector connected.

POWER INPUT LINE INSPECTION

Measure the voltage between the Black/Brown (+) and Green (−) wire terminals.
Turn the ignition switch ON.
There should be battery voltage.

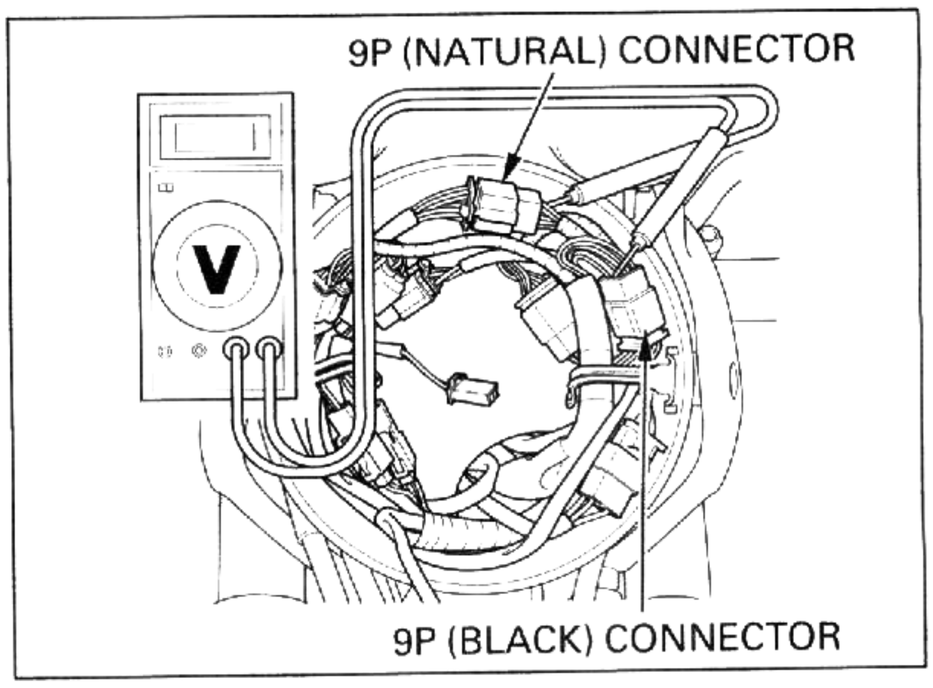


IMMOBILIZER INDICATOR LINE INSPECTION

Measure the voltage between the White/Red (+) and Green (−) wire terminals.
Turn the ignition switch ON.
There should be battery voltage.

NOTE:

There should be no voltage for approx. two seconds after the ignition switch is turned ON, then the battery voltage should appear, if the system is normal.



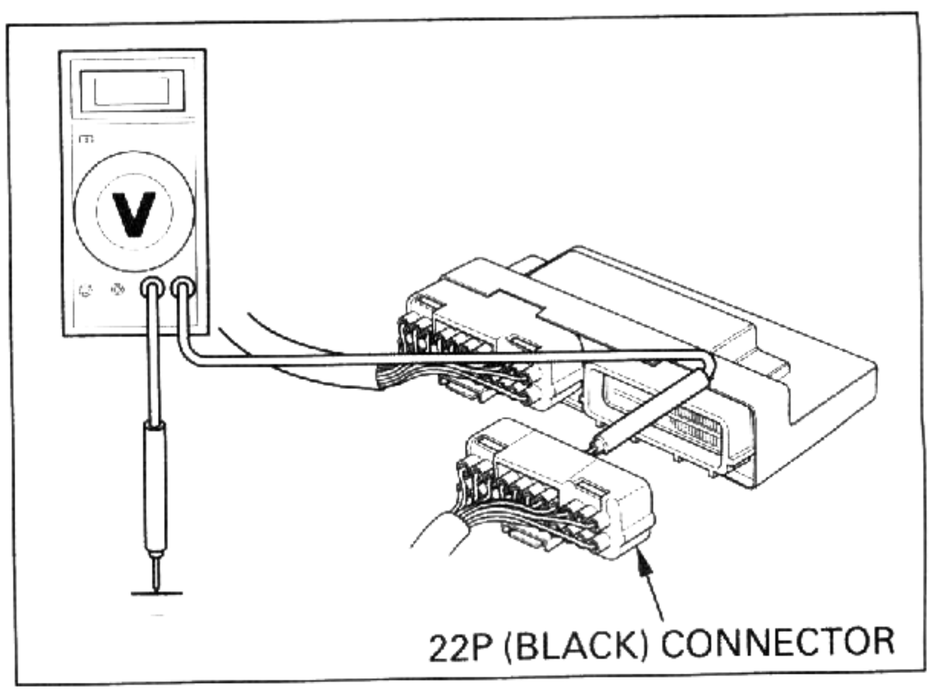
ENGINE CONTROL MODULE (ECM)

Remove the seat (page 2-2).

Disconnect the ECM 22P multi- connector.
Perform the following inspections at the wire harness side connector of the ECM.

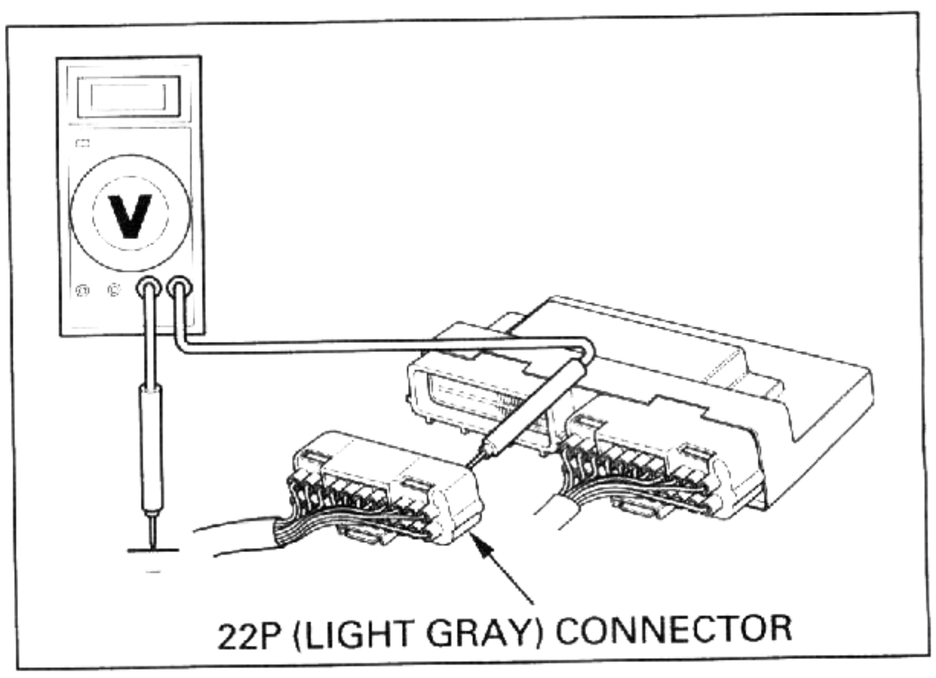
IMMOBILIZER INDICATOR LINE INSPECTION

Measure the voltage between the White/Red wire terminal (+) and ground (−).
Turn the ignition switch ON.
There should be battery voltage.



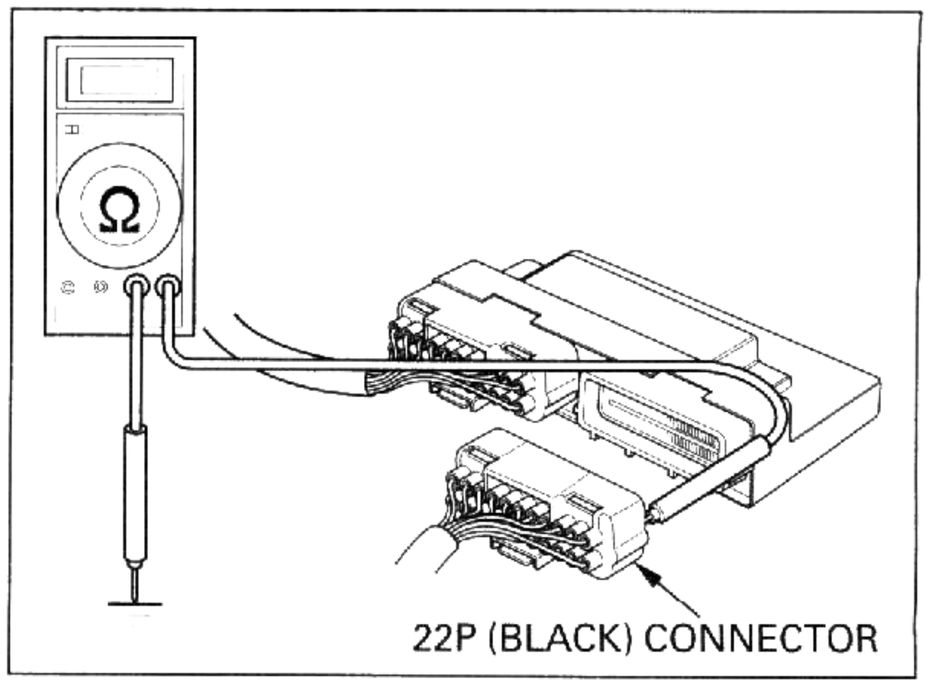
POWER INPUT LINE INSPECTION

Measure the voltage between the Black/White wire terminal (+) and ground (−).
Turn the ignition switch ON.
There should be battery voltage.



GROUND LINE INSPECTION

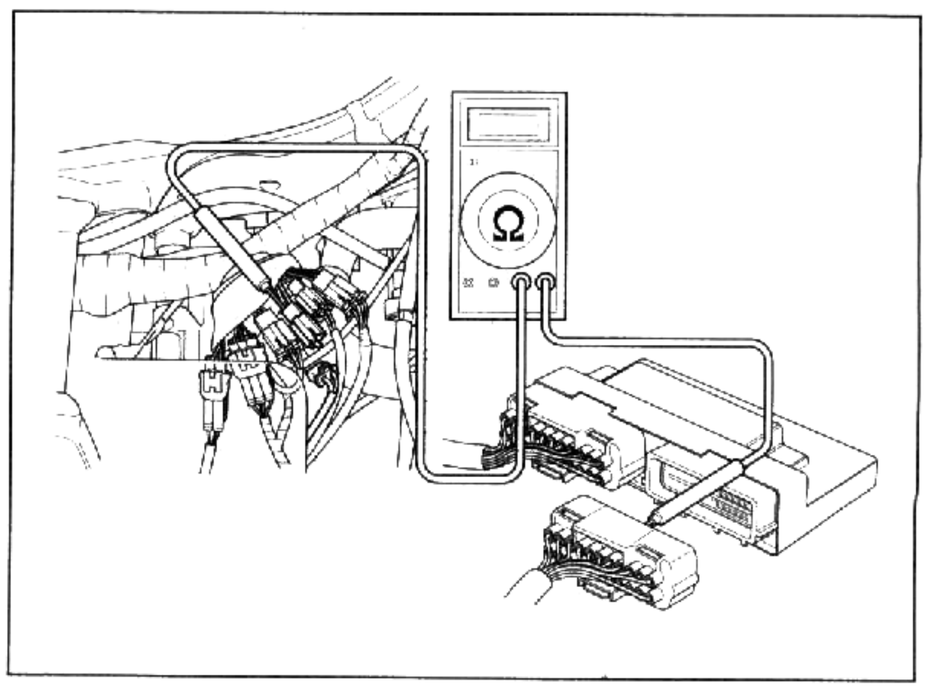
Check for continuity between the Green wire terminal and ground.
There should be continuity at all times.



IGNITION PULSE GENERATOR LINE INSPECTION

Disconnect the ignition pulse generator 2P (Red) connector (page 20-5).

Check the Yellow and White/Yellow wires for continuity between the ECM and ignition pulse generator connectors.
There should be continuity between the same color wire terminals.



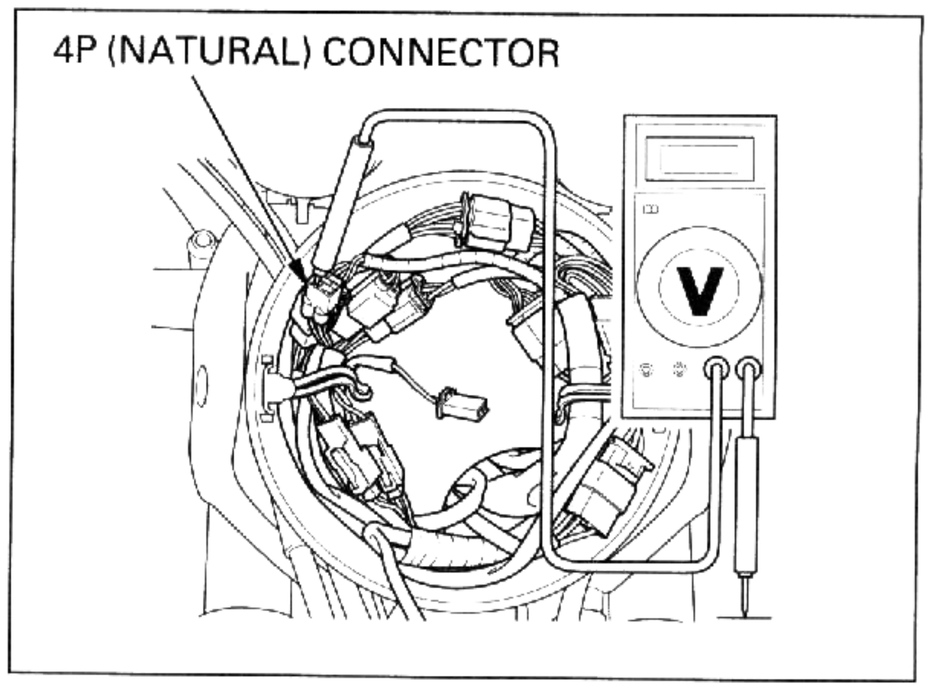
IMMOBILIZER RECEIVER

Remove the headlight unit (page 19-4).

Disconnect the immobilizer receiver 4P (Natural) connector.

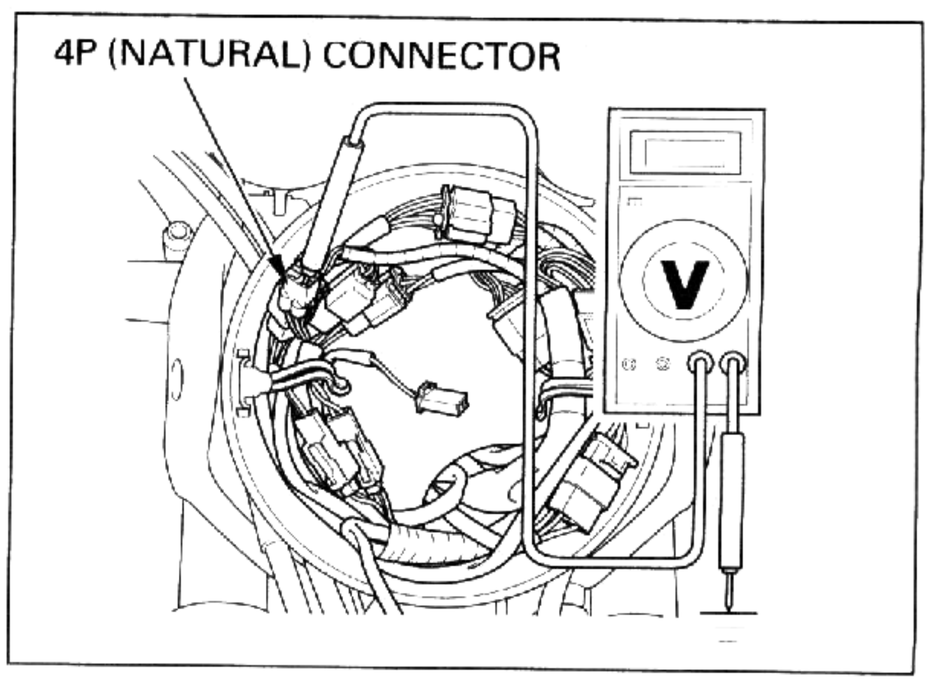
POWER INPUT LINE INSPECTION

Measure the voltage between the Yellow/Red wire terminal (+) of the wire harness side connector and ground (−).
Turn the ignition switch ON.
There should be approx. 5 V.



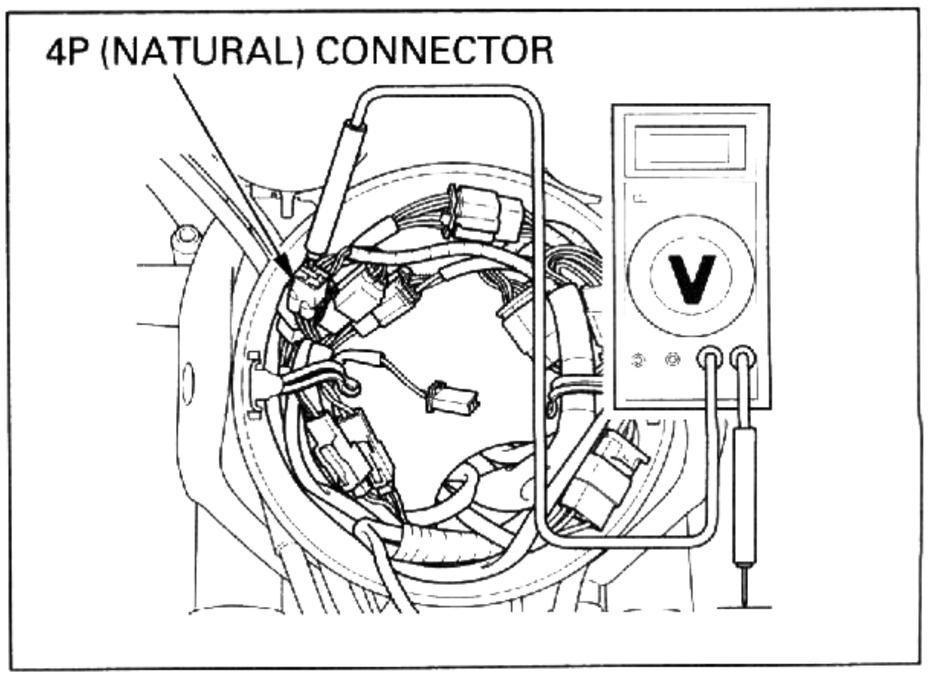
GROUND LINE INSPECTION

Check for continuity between the Green/Orange wire terminal of the wire harness side connector and ground.
There should be continuity at all times.



SIGNAL LINE INSPECTION

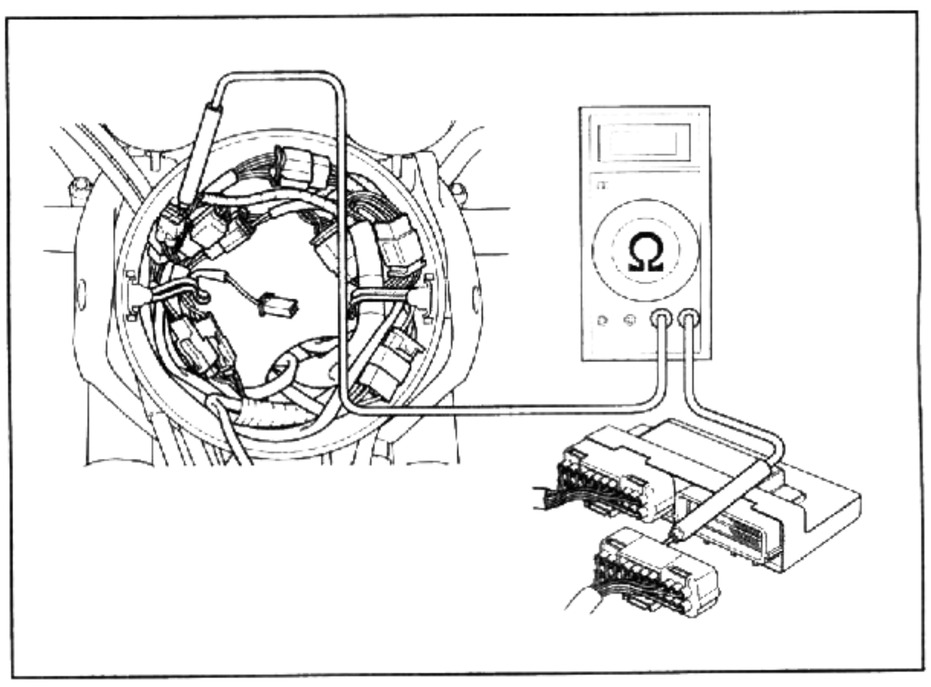
Measure the voltage between the Pink wire terminal (+) of the wire harness side connector and ground (−).
Turn the ignition switch ON.
There should be approx. 5 V.



Remove the seat (page 2-2).

Disconnect the engine control module (ECM) 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.

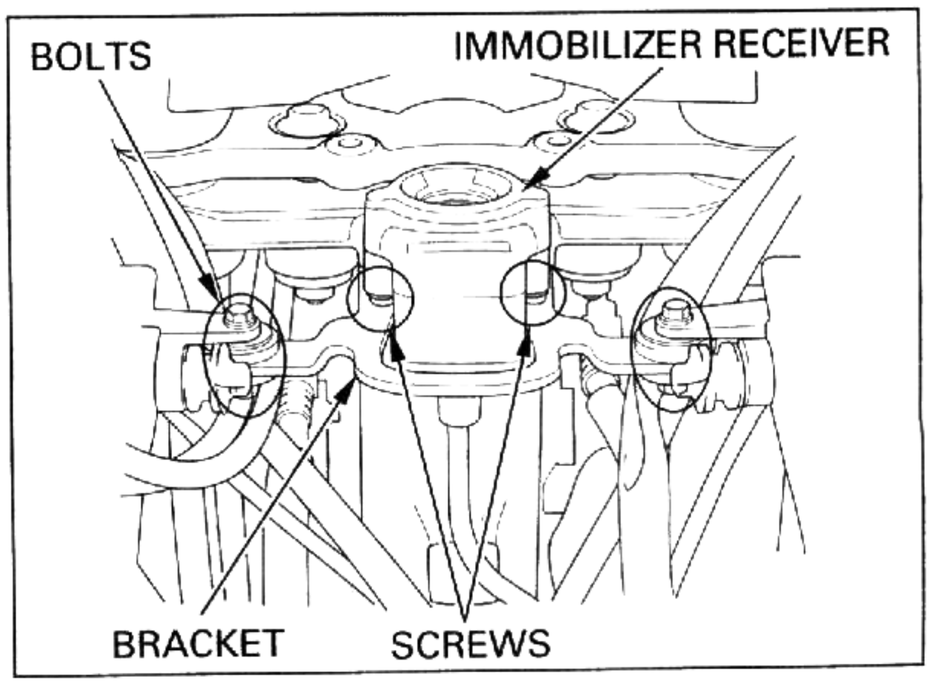


REPLACEMENT

Remove the wire band.
Remove the two screws and the immobilizer receiver.

Install a new receiver and tighten the two screws.
Route the receiver wire properly (page 1-24).

Install the removed part in the reverse order of removal.



REQUIRED PARTS FOR PROBLEM

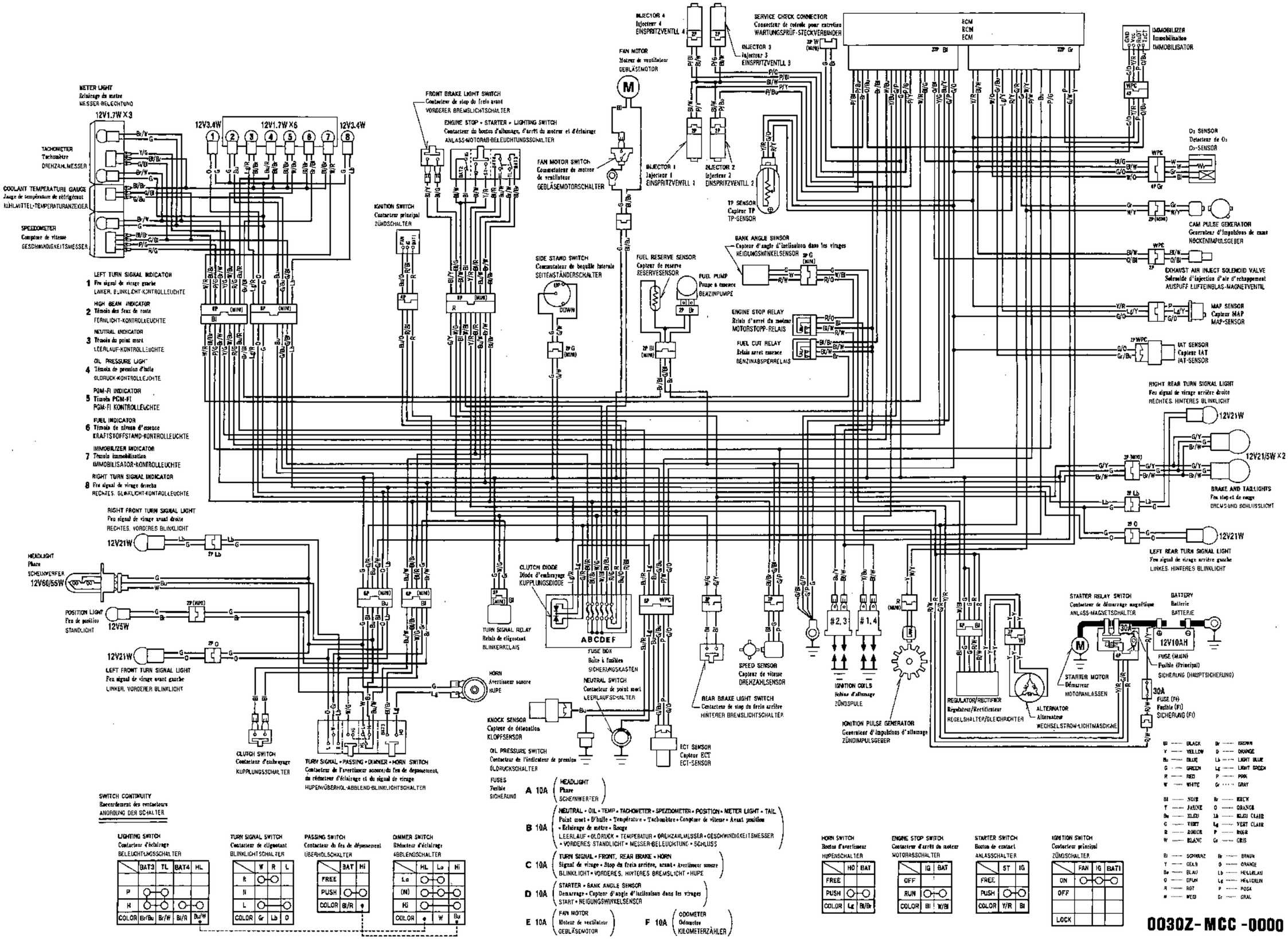
Problem	Replacement parts				
	Transponder key	Immobilizer receiver	ECM	Ignition switch	*Accessory lock and key
One key has been lost, or additional spare key is required	○				
All keys have been lost, or engine control module (ECM) is faulty	○		○		
Immobilizer receiver is faulty		○			
Ignition switch is faulty	○			○	
*Accessory lock is faulty					○

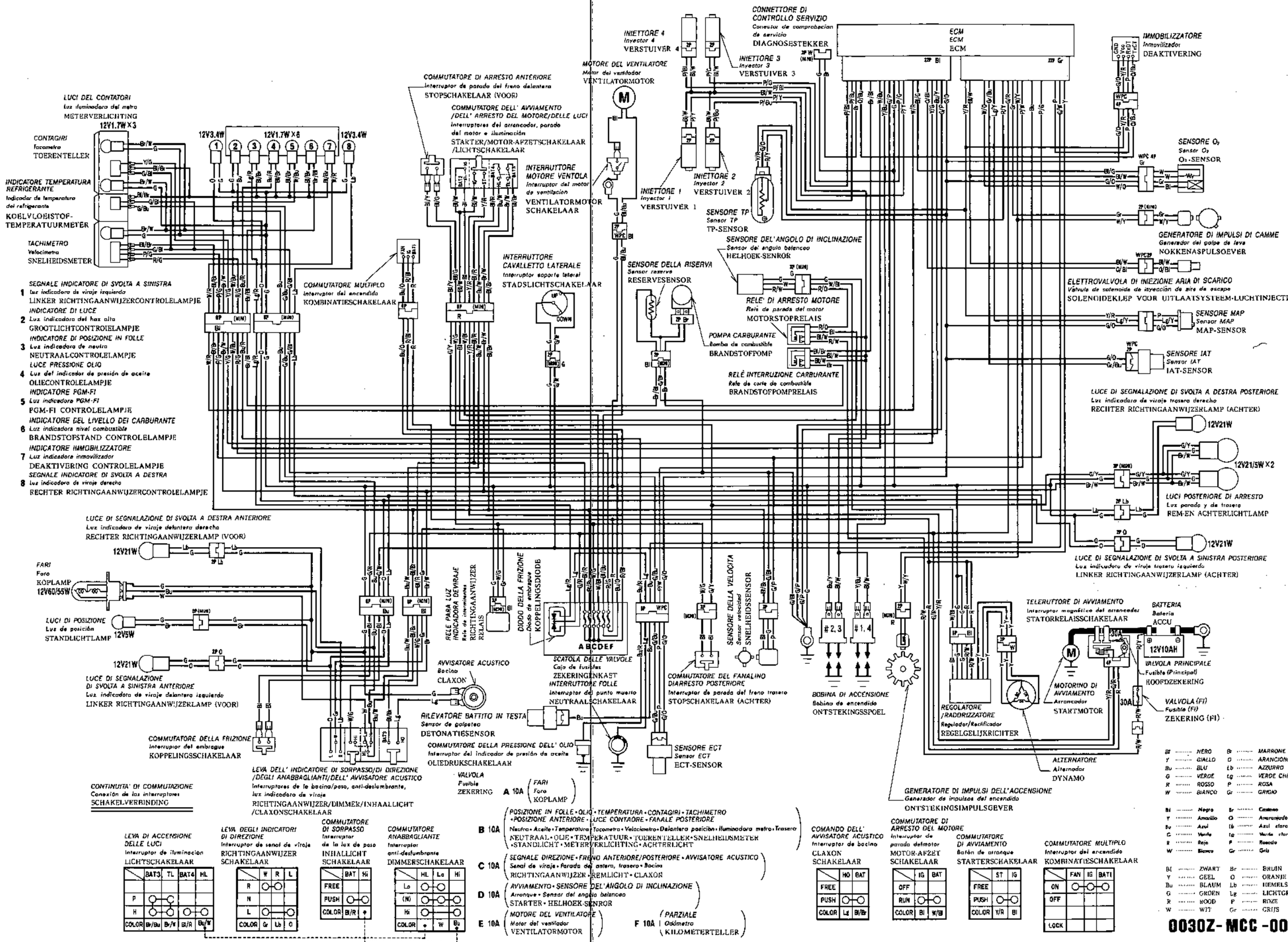
*Accessory lock means the seat lock, fuel fill cap or helmet holder.

MEMO

MEMO

21. WIRING DIAGRAM




LUCI DEL CONTATORI
Luz iluminadora del metro
METERVERLICHTING
12V1.7W X 3
CONTAGIRI
Tacometro
TOERENTELLER
INDICATORE TEMPERATURA REFRIGERANTE
Indicador de temperatura del refrigerante
KOELVLOEISTOF-TEMPERATUURMETER
TACHIMETRO
Velocímetro
SNELHEIDSMETER
12V3.4W
12V1.7W X 6
12V3.4W
SEGNALE INDICATORE DI SVOLTA A SINISTRA
1 Luz indicadora de viraje izquierda
LINKER RICHTINGAANWIJZERCONTROLELAMPJE
INDICATORE DI LUCE
2 Luz indicadora del haz alto
GROOTLICHTCONTROLELAMPJE
INDICATORE DI POSIZIONE IN FOLLE
3 Luz indicadora de neutro
NEUTRAALCONTROLELAMPJE
LUCE PRESSIONE OLIO
4 Luz del indicador de presión de aceite
OLIECONTROLELAMPJE
INDICATORE PGM-FI
5 Luz indicadora PGM-FI
PGM-FI CONTROLELAMPJE
INDICATORE DEL LIVELLO DEI CARBURANTE
6 Luz indicadora nivel combustible
BRANDSTOPSTAND CONTROLELAMPJE
INDICATORE IMMOBILIZZATORE
7 Luz indicadora inmovilizador
DEAKTIVERING CONTROLELAMPJE
SEGNALE INDICATORE DI SVOLTA A DESTRA
8 Luz indicadora de viraje derecho
RECHTER RICHTINGAANWIJZERCONTROLELAMPJE
COMMUTATORE MULTIPLO
Interruptor del encendido
KOMBINATIESCHAKELAAR
COMMUTATORE DI ARRESTO ANTERIORE
Interruptor de parada del freno delantero
STOPSCHAKELAAR (VOOR)
COMMUTATORE DELL' AVVIAMENTO /DELL' ARRESTO DEL MOTORE/DELLE LUCI
Interruptores del arrancador, parada del motor e iluminación
STARTER/MOTOR-AFZETSCHAKELAAR /LICHTSCHAKELAAR
INTERRUTTORE MOTORE VENTOLA
Interruptor del motor de ventilación
VENTILATORMOTOR SCHAKELAAR
INTERRUTTORE CAVALLETTO LATERALE
Interruptor soporte lateral
STADSLICHTSCHAKELAAR
MOTORE DEL VENTILATORE
Motor del ventilador
VENTILATORMOTOR
INIETTORE 4
Inyector 4
VERSTUIVER 4
INIETTORE 3
Inyector 3
VERSTUIVER 3
INIETTORE 2
Inyector 2
VERSTUIVER 2
INIETTORE 1
Inyector 1
VERSTUIVER 1
CONNETTORE DI CONTROLLO SERVIZIO
Conector de comprobacion de servicio
DIAGNOSESTEKKER
ECM
ECM
ECM
IMMOBILIZZATORE
Inmovilizador
DEAKTIVERING
SENSORE O_2
Sensor O_2
O_2-SENSOR
SENSORE TP
Sensor TP
TP-SENSOR
SENSORE DELL'ANGOLO DI INCLINAZIONE
Sensor del angulo balanceo
HELHOEK-SENSOR
GENERATORE DI IMPULSI DI CAMME
Generador del golpe de leva
NOKKENASPULSGEVER
ELETTROVALVOLA DI INIEZIONE ARIA DI SCARICO
Válvula de solenoide de inyección de aire de escape
SOLENOIDEKLEP VOOR UITLAATSYSTEEM-LUCHTINJECTIE
SENSORE MAP
Sensor MAP
MAP-SENSOR
SENSORE IAT
Sensor IAT
IAT-SENSOR
SENSORE DELLA RISERVA
Sensor reserva
RESERVESENSOR
RELE' DI ARRESTO MOTORE
Relé de parada del motor
MOTORSTOPRELAIS
POMPA CARBURANTE
Bomba de combustible
BRANDSTOFPOMP
RELÈ INTERRUZIONE CARBURANTE
Relé de corte de combustible
BRANDSTOFPOMPRELAIS
LUCE DI SEGNALAZIONE DI SVOLTA A DESTRA POSTERIORE
Luz indicadora de viraje trasero derecho
RECHTER RICHTINGAANWIJZERLAMP (ACHTER)
12V21W
12V21/5W X 2
LUCI POSTERIORE DI ARRESTO
Luz parada y de trasero
REM-EN ACHTERLICHTLAMP
12V21W
LUCE DI SEGNALAZIONE DI SVOLTA A SINISTRA POSTERIORE
Luz indicadora de viraje trasero izquierda
LINKER RICHTINGAANWIJZERLAMP (ACHTER)
LUCE DI SEGNALAZIONE DI SVOLTA A DESTRA ANTERIORE
Luz indicadora de viraje delantero derecha
RECHTER RICHTINGAANWIJZERLAMP (VOOR)
12V21W
FARI
Faro
KOPLAMP
12V60/55W
LUCI DI POSIZIONE
Luz de posición
STANDLICHTLAMP 12V5W
12V21W
LUCE DI SEGNALAZIONE DI SVOLTA A SINISTRA ANTERIORE
Luz indicadora de viraje delantero izquierdo
LINKER RICHTINGAANWIJZERLAMP (VOOR)
RELE' PARA LUZ INDICADORA DE VIRAJE
Relé de intermitentes
RICHTINGAANWIJZER RELAIS
DIODO DELLA FRIZIONE
Diodo de embrague
KOPPELINGSDIODE
SCATOLA DELLE VALVOLE
Caja de fusibles
ZEKERINGENKAST
INTERRUTTORE FOLLE
Interruptor del punto muerto
NEUTRAALSCHAKELAAR
SENSORE DELLA VELOCITÀ
Sensor velocidad
SNELHEIDSSENSOR
AVVISATORE ACUSTICO
Bocina
CLAXON
RILEVATORE BATTITO IN TESTA
Sensor de golpeteo
DETONATIESENSOR
COMMUTATORE DELLA PRESSIONE DELL' OLIO
Interruptor del indicador de presión de aceite
OLIEDRUKSCHAKELAAR
SENSORE ECT
Sensor ECT
ECT-SENSOR
COMMUTATORE DELLA FRIZIONE
Interruptor del embrague
KOPPELINGSSCHAKELAAR
LEVA DELL' INDICATORE DI SORPASSO/DI DIREZIONE /DEGLI ANABBAGLIANTI/DELL' AVVISATORE ACUSTICO
Interruptores de la bocina/paso, anti-deslumbrante, luz indicadora de viraje
RICHTINGAANWIJZER/DIMMER/INHAALLICHT /CLAXONSCHAKELAAR
COMMUTATORE DEL FANALINO DIARRESTO POSTERIORE
Interruptor de parada del freno trasero
STOPSCHAKELAAR (ACHTER)
BOBINA DI ACCENSIONE
Bobina de encendido
ONTSTEKINGSSPOEL
#2, 3
#1, 4
REGOLATORE /RADDRIZZATORE
Regulador/Rectificador
REGELGELIJKRICHTER
TELERUTTORE DI AVVIAMENTO
Interruptor magnético del arrancador
STATORRELAISSCHAKELAAR
MOTORINO DI AVVIAMENTO
Arrancador
STARTMOTOR
BATTERIA
Batería
ACCU
12V10AH
VALVOLA PRINCIPALE
Fusible (Principal)
HOOFDZEKERING
VALVOLA (FI)
Fusible (FI)
ZEKERING (FI)
ALTERNATORE
Alternador
DYNAMO
GENERATORE DI IMPULSI DELL'ACCENSIONE
Generador de impulsos del encendido
ONTSTEKINGSIMPULSGEVER
CONTINUITA' DI COMMUTAZIONE
Conexión de los interruptores
SCHAKELVERBINDING
VALVOLA
Fusible
ZEKERING
A 10A (FARI, Faro, KOPLAMP)
B 10A (POSIZIONE IN FOLLE • OLIO • TEMPERATURA • CONTAGIRI • TACHIMETRO • POSIZIONE ANTERIORE • LUCE CONTAORE • FANALE POSTERIORE / Neutro • Aceite • Temperatura • Tacometro • Velocimetro • Delantera posición • Iluminadora metro • Trasero / NEUTRAAL • OLIE • TEMPERATUUR • TOERENTELLER • SNELHEIDSMETER • STANDLICHT • METERVERLICHTING • ACHTERLICHT)
C 10A (SEGNALE DIREZIONE • FRENO ANTERIORE/POSTERIORE • AVVISATORE ACUSTICO / Señal de viraje • Parada del antero, trasero • Bocina / RICHTINGAANWIJZER • REMLICHT • CLAXON)
D 10A (AVVIAMENTO • SENSORE DELL'ANGOLO DI INCLINAZIONE / Arranque • Sensor del angulo balanceo / STARTER • HELHOEK-SENROR)
E 10A (MOTORE DEL VENTILATORE / Motor del ventilador / VENTILATORMOTOR)
F 10A (PARZIALE / Odómetro / KILOMETERTELLER)
LEVA DI ACCENSIONE DELLE LUCI
Interruptor de iluminación
LICHTSCHAKELAAR
LEVA DEGLI INDICATORI DI DIREZIONE
Interruptor de señal de viraje
RICHTINGAANWIJZER SCHAKELAAR
COMMUTATORE DI SORPASSO
Interruptor de la luz de paso
INHAALLICHT SCHAKELAAR
COMMUTATORE ANABBAGLIANTE
Interruptor anti-deslumbrante
DIMMERSCHAKELAAR
COMANDO DELL' AVVISATORE ACUSTICO
Interruptor de bocina
CLAXON SCHAKELAAR
COMMUTATORE DI ARRESTO DEL MOTORE
Interruptor de parada del motor
MOTOR-AFZET SCHAKELAAR
COMMUTATORE DI AVVIAMENTO
Botón de arranque
STARTERSCHAKELAAR
COMMUTATORE MULTIPLO
Interruptor del encendido
KOMBINATIESCHAKELAAR
BI ..... NERO
Y ..... GIALLO
Bu ..... BLU
G ..... VERDE
R ..... ROSSO
W ..... BIANCO
Br ..... MARRONE
O ..... ARANCIONE
Lb ..... AZZURRO
Lg ..... VERDE CHIARO
P ..... ROSA
Gr ..... GRIGIO
Bl ..... Negro
Y ..... Amarillo
Bu ..... Azul
G ..... Verde
R ..... Roja
W ..... Blanco
Br ..... Castaño
O ..... Anaranjado
Lb ..... Azul claro
Lg ..... Verde claro
P ..... Rosado
Gr ..... Gris
BI ..... ZWART
Y ..... GEEL
Bu ..... BLAUW
G ..... GROEN
R ..... ROOD
W ..... WIT
Br ..... BRUIN
O ..... ORANJE
Lb ..... HEMELSBLAUW
Lg ..... LICHTGROEN
P ..... ROZE
Gr ..... GRIJS
0030Z-MCC-0000

22. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START	22-1	POOR PERFORMANCE AT HIGH SPEED	22-4
ENGINE LACKS POWER	22-2	POOR HANDLING	22-4
POOR PERFORMANCE AT LOW AND IDLE SPEED	22-3		

ENGINE DOES NOT START OR IS HARD TO START

		Possible cause
1. Check for operation of the fuel pump	Abnormal	• Faulty fuel pump (Section 5)
Normal		
2. Inspect the fuel flow	Abnormal	• Faulty pressure regulator (Section 5)
Normal		
3. Inspect the fuel injector	Abnormal	• See section 5
Normal		
4. Perform a spark test	Weak or no spark	• Faulty spark plug • Fouled spark plug • Faulty ECM • Broken or shorted spark plug wire • Faulty ignition switch • Faulty ignition pulse generator • Faulty engine stop switch • Loose or disconnected ignition system wires
Good spark		
5. Test cylinder compression	Low compression	• Valve stuck open • Worn cylinder and piston ring • Damaged cylinder head gasket • Seized valve • Improper valve timing
Compression normal		
6. Starting following normal procedure	Engine starts but stops	• Improper starter valve operation • Intake pipe leaking • Improper ignition timing (Faulty ignition coil or ignition pulse generator) • Fuel contaminated
Engine does not start		
7. Remove and inspect spark plug	Wet plug	• Starter valve closed • Throttle valve open • Clogged air cleaner

ENGINE LACKS POWER

		Possible cause
1. Raise wheel off the ground and spin by hand	Wheels do not spin freely	• Brake dragging • Worn or damaged wheel bearing
Wheel spins freely		
2. Check tire pressure	Pressure low	• Faulty tire valve • Punctured tire
Pressure normal		
3. Accelerate rapidly from low to second	Engine speed doesn't change accordingly when clutch is released	• Clutch slipping • Worn clutch discs/plates • Warped clutch discs/plates • Weak clutch spring • Additive in engine oil
Engine speed reduced when clutch is released		
4. Accelerate lightly	Engine speed does not increase	• Air cleaner dirty • Restricted fuel flow • Clogged muffler • Pinched fuel tank breather
Engine speed increase		
5. Check ignition timing	Incorrect	• Faulty ECM • Faulty ignition pulse generator
Correct		
6. Test cylinder compression	Incorrect	• Valve stuck open • Worn cylinder and piston rings • Leaking head gasket • Improper valve timing
Normal		
7. Inspect fuel flow	Abnormal	• Faulty pressure regulator (Section 5)
Normal		
8. Inspect the fuel injector	Abnormal	• See section 5
Normal		
9. Remove spark plugs	Fouled or discolored	• Faulty spark plug
Not fouled or discolored		
10. Check oil level and condition	Incorrect	• Oil level too high • Oil level too low • Contaminated oil
Correct		
11. Remove cylinder head cover and inspect lubrication	Valve train not lubricated properly	• Clogged oil passage • Clogged oil control orifice
Valve train lubricated properly		

		Possible cause
12. Check for engine overheating	Overheating	• Coolant level low • Fan motor not working (faulty fan motor switch) • Thermostat stuck close • Excessive carbon build-up in combustion chamber • Use of poor quality fuel • Wrong type of fuel • Clutch slipping
Not overheating		
13. Accelerate or run at high speed	Engine knocks	• Worn piston and cylinder • Wrong type of fuel • Excessive carbon build-up in combustion chamber • Ignition timing to advanced (faulty ECM) • Lean fuel mixture
Engine does not knock		

POOR PERFORMANCE AT LOW AND IDLE SPEED

		Possible cause
1. Check ignition timing	Incorrect	• Improper ignition timing
Correct		
2. Check the starter valve synchronization	Incorrect	• See section 5
Correct		
3. Inspect the fuel flow	Abnormal	• Faulty pressure regulator (Section 5)
Normal		
4. Inspect the fuel injector	Abnormal	• See section 5
Normal		
5. Check for leaks in the intake pipe	Leaking	• Loose insulator clamp • Damaged insulator
Not leak		
6. Perform spark test	Weak or intermittent spark	• Faulty spark plug • Faulty carbon or wet fouled spark plug • Faulty ECM • Faulty ignition coil • Broken or shorted spark plug wire • Faulty engine stop switch • Faulty ignition pulse generator • Faulty ignition switch • Loose or disconnected ignition system wires
Good spark		

POOR PERFORMANCE AT HIGH SPEED

		Possible cause
1. Check ignition timing	Incorrect	• Faulty ECM
Correct ↓		
2. Inspect the fuel flow	Abnormal	• Faulty pressure regulator (Section 5)
Normal ↓		
3. Inspect the fuel injector	Abnormal	• See section5
Normal ↓		
4. Check valve timing	Incorrect	• Camshaft not installed properly
Correct ↓		
5. Check valve spring	Weak	• Faulty valve spring
Not weak		

POOR HANDLING

	Possible cause
1. If steering is heavy	• Steering stem adjusting nut too tight • Damaged steering head bearings
2. If either wheel is wobbling	• Excessive wheel bearing play • Bent rim • Improper installed wheel hub • Swingarm pivot bearing excessively worn • Bent frame
3. If the motorcycle pulled to one side	• Faulty shock absorber • Front and rear wheel not aligned • Bent fork • Bent swingarm • Bent axle

INDEX

AIR CLEANER	3-5	FLYWHEEL INSTALLATION	10-7
AIR CLEANER HOUSING	5-60	FLYWHEEL REMOVAL	10-3
ALTERNATOR/CHARGING COIL	16-7	FOOTPEG	2-16
ALTERNATOR COVER INSTALLATION	10-8	FORK	13-17
ALTERNATOR COVER REMOVAL	10-2	FRONT BRAKE CALIPER	15-29
BANK ANGLE SENSOR	5-81	FRONT FENDER	2-5
BALLANCER	12-14	FRONT MASTER CYLINDER	15-16
BATTERY	16-5	FRONT WHEEL	13-10
BODY PANEL LOCATIONS	2-0	FUEL CUT RELAY	5-55
BRAKE FLUID	3-25	FUEL LINE	3-4
BRAKE FLUID REPLACEMENT/AIR BLEEDING	15-5	FUEL LINE INSPECTION	5-51
BRAKE LIGHT SWITCH	3-27	FUEL PUMP	5-54
BRAKE LIGHT SWITCH	19-21	FUEL RESERVE SENSOR	19-18
BRAKE PAD WEAR	3-25	FUEL TANK	5-56
BRAKE PAD/DISC	15-12	GEARSHIFT LINKAGE	9-12
BRAKE PEDAL	15-39	GENERAL SAFETY	1-1
BRAKE SYSTEM	3-26	HANDLEBAR SWITCHES	19-20
CABLE & HARNESS ROUTING	1-24	HANDLEBARS	13-3
CAMSHAFT INSTALLATION	8-23	HEADLIGHT	19-4
CAMSHAFT REMOVAL	8-7	HEADLIGHT AIM	3-28
CAM PULSE GENERATOR	5-78	HORN	19-23
CAM CHAIN TENSIONER	8-30	IAT SENSOR	5-77
CHARGING SYSTEM INSPECTION	16-6	IGNITION COIL	17-6
CHOKE OPERATION	3-5	IGNITION PULSE GENERATOR	17-7
CLUTCH	9-3	IGNITION SYSTEM INSPECTION	17-4
CLUTCH SWITCH	19-21	IGNITION SWITCH	19-19
COOLANT REPLACEMENT	6-4	IGNITION TIMING	17-10
COOLANT TEMPERATURE GAUGE/SENSOR	19-15	IMMOBILIZER INDICATOR	20-10
COOLING FAN MOTOR SWITCH	19-16	IMMOBILIZER RECEIVER	20-11
COOLING SYSTEM	3-19	INJECTOR	5-68
COMBINATION METER	19-8	KEY REGISTRATION PROCEDURE	20-2
CRANKCASE COMBINATION	11-12	KNOCK SENSOR	5-83
CRANKCASE SEPARATION	11-3	LUBRICATION SYSTEM DIAGRAM	4-0
CRANKSHAFT	12-3	LUBRICATION & SEAL POINTS	1-20
CYLINDER COMPRESSION TEST	8-4	MAINTENANCE SCHEDULE	3-3
CYLINDER HEAD ASSEMBLY	8-20	MAP SENSOR	5-77
CYLINDER HEAD COVER ASSEMBLY	8-27	MODEL IDENTIFICATION	1-3
CYLINDER HEAD COVER DISASSEMBLY	8-6	MUFFLER/EXHAUST PIPE	2-10
CYLINDER HEAD COVER INSTALLATION	8-27	NEUTRAL SWITCH	19-21
CYLINDER HEAD COVER REMOVAL	8-5	NUTS, BOLTS, FASTENERS	3-30
CYLINDER HEAD DISASSEMBLY	8-13	OIL COOLER	4-12
CYLINDER HEAD INSPECTION	8-14	OIL PRESSURE SWITCH	19-16
CYLINDER HEAD INSTALLATION	8-21	OIL PRESSURE INSPECTION	4-3
CYLINDER HEAD REMOVAL	8-11	OIL PUMP	4-7
DELAY VALVE	15-28	OIL STRAINER/PRESSURE RELIEF VALVE	4-4
DIAGNOSTIC CODE INDICATION	20-5	O_2 SENSOR	5-85
DIODE	18-11	PAIR CONTROL SOLENOID VALVE	5-84
DRIVE CHAIN	3-20	PGM-FI (Programmed Fuel Injection) SYSTEM	5-6
DRIVE CHAIN SLIDER	3-24	PGM-FI SELF-DIAGNOSIS MALFUNCTION	
ECT SENSOR	5-78	INDICATOR FAILURE CODES	5-10
ECM (ENGINE CONTROL MODULE)	5-83	PISTON/CONNECTING ROD	11-4
ECM (ENGINE CONTROL MODULE)	20-10	POSITION LIGHT	19-5
ENGINE IDLE SPEED	3-18	PROPORTIONAL CONTROL VALVE	15-28
ENGINE INSTALLATION	7-6	RADIATOR	6-8
ENGINE OIL/OIL FILTER	3-15	RADIATOR COOLANT	3-18
ENGINE REMOVAL	7-2	RADIATOR GRILL	2-4
ENGINE STOP RELAY	5-82	RADIATOR RESERVE TANK	6-16
EMISSION CONTROL SYSTEMS	1-36	REAR BRAKE CALIPER	15-35

REAR COWL 2-2
REAR FENDER 2-5
REAR MASTER CYLINDER 15-23
REAR WHEEL 14-3
REGULATOR/RECTIFIER 16-8
REQUIRED PARTS FOR PROBLEM 20-12
RIGHT CRANKCASE COVER INSTALLATION 9-17
RIGHT CRANKCASE COVER REMOVAL 9-3
SEAT 2-2
SEAT RAIL 2-8
SERVICE RULES 1-2
SECONDARY AIR SUPPLY SYSTEM 3-19
SECONDARY MASTER CYLINDER 15-20
SERVICE INFORMATION
(ALTERNATOR/STARTER CLUTCH) 10-1
(BATTERY/CHARGING SYSTEM) 16-1
(CLUTCH/GEARSHIFT LINKAGE) 9-1
(COOLING SYSTEM) 6-1
(CRANKCASE/PISTON/CYLINDER) 11-1
(CRANKSHAFT/TRANSMISSION) 12-1
(CYLINDER HEAD/VALVES) 8-1
(ELECTRIC STARTER) 18-1
(ENGINE REMOVAL/INSTALLATION) 7-1
(FRAME/BODY PANELS/EXHAUST SYSTEM) 2-1
(FRONT WHEEL/SUSPENSION/STEERING) 13-1
(FUEL SYSTEM) 5-1
(HYDRAULIC BRAKE) 15-2
(IGNITION SYSTEM) 17-1
(IMMOBILIZER SYSTEM (HISS)) 20-1
(LIGHTS/METERS/SWITCHES) 19-1
(LUBRICATION SYSTEM) 4-1
(MAINTENANCE) 3-1
(REAR WHEEL/SUSPENSION) 14-1
SHOCK ABSORBER 14-9
SIDE STAND 3-29
SIDE STAND SWITCH 19-22
SPARK PLUG 3-7
SPECIFICATIONS 1-4
SPEEDOMETER/VEHICLE SPEED SENSOR 19-12
STARTER CLUTCH 10-5
STARTER MOTOR 18-4
STARTER RELAY SWITCH 18-10
STARTER VALVE 5-70
STARTER VALVE SYNCHRONIZATION 5-75
STATOR 10-2
STEERING HEAD BEARINGS 3-31
STEERING STEM 13-28
SUSPENSION 3-29
SWINGARM 14-12
SYSTEM DIAGRAM
(BATTERY/CHARGING SYSTEM) 16-0
(ELECTRIC STARTER) 18-0
(FUEL SYSTEM) 5-5
(IGNITION SYSTEM) 17-0
SYSTEM DIAGRAM
(IMMOBILIZER SYSTEM (HISS)) 20-0
SYSTEM LOCATION
(FUEL SYSTEM) 5-4
(LIGHTS/METERS/SWITCHES) 19-0
SYSTEM FLOW PATTERN 6-0
SYSTEM TESTING 6-3
TACHOMETER 19-14
TAIL/BRAKE LIGHT 19-7
THERMOSTAT 6-5
THROTTLE BODY 5-63
THROTTLE OPERATION 3-4
TORQUE VALUES 1-13
TOOLS 1-18
TP SENSOR 5-80
TRANSMISSION 12-9
TROUBLESHOOTING
(ALTERNATOR/STARTER CLUTCH) 10-1
(BATTERY/CHARGING SYSTEM) 16-3
(CLUTCH/GEARSHIFT LINKAGE) 9-2
(COOLING SYSTEM) 6-2
(CRANKCASE/PISTON/CYLINDER) 11-2
(CRANKSHAFT/TRANSMISSION) 12-2
(CYLINDER HEAD/VALVES) 8-3
(ELECTRIC STARTER) 18-2
(ENGINE DOES NOT START OR IS HARD TO START) 22-1
(ENGINE LACKS POWER) 22-2
(FRAME/BODY PANELS/EXHAUST SYSTEM) 2-1
(FRONT WHEEL/SUSPENSION/STEERING) 13-2
(FUEL SYSTEM) 5-3
(HYDRAULIC BRAKE) 15-4
(IGNITION SYSTEM) 17-3
(IMMOBILIZER SYSTEM (HISS)) 20-7
(LIGHTS/METERS/SWITCHES) 19-3
(LUBRICATION SYSTEM) 4-2
(POOR HANDLING) 22-4
(POOR PERFORMANCE AT HIGHT SPEED) 22-4
(POOR PERFORMANCE AT LOW AND IDLE SPEED) 23-3
(REAR WHEEL/SUSPENSION) 14-2
TURN SIGNAL 19-6
TURN SIGNAL RELAY 19-23
VALVE CLEARANCE 3-11
VALVE GUIDE REPLACEMENT 8-16
VALVE SEAT INSPECTION/REFACING 8-17
WATER PUMP 6-13
WHEELS/TIRES 3-31
WIRING DIAGRAM 21-1



HONDA

62MCC00
HONDA MOTOR CO., LTD. TOKYO. JAPAN

英 O HC A10009906Y
PRINTED IN JAPAN