1998-2001

HONDA



SERVICE MANUAL

VFR800FI

INTERCEPTOR®

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the VFR800FI.

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

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

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections.
Section 4 through 19 describe parts of the motorcycle, grouped according to location.

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

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

If you are not familiar with this motorcycle, read Technical Features in section 21.
If you don't know the source of the trouble, go to section 22 Troubleshooting.

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HONDA MOTOR CO., LTD.
SERVICE PUBLICATION OFFICE

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SYMBOLS

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

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

1. GENERAL INFORMATION

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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 stored.

⚠ 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.

⚠ WARNING

Inhaled asbestos fibers have been found to cause respiratory disease and cancer.

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 condition, 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.***

BATTERY HYDROGEN GAS & ELECTROLYTE

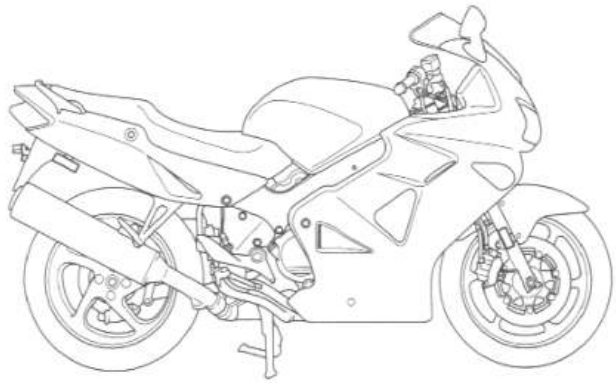
⚠ WARNING

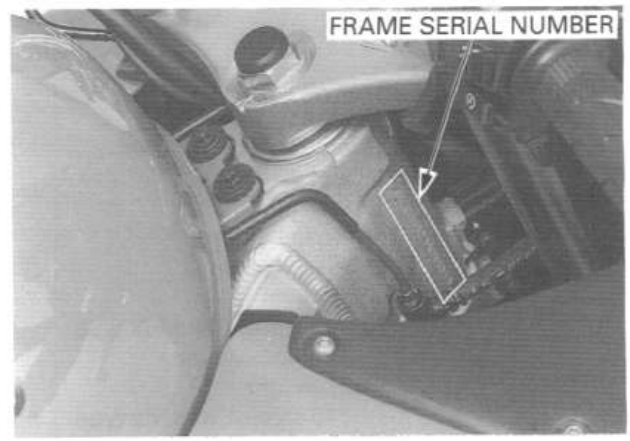
- ***The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.***
- ***The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.***
  - ***— If electrolyte 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

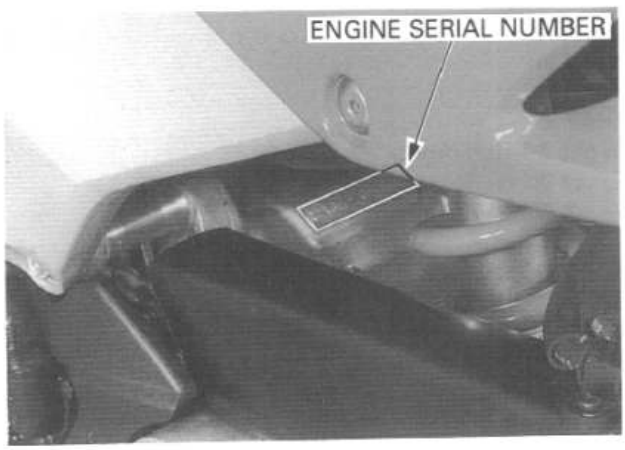
1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that don't meet HONDA's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing 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 1-43, Cable and Harness Routing.

MODEL IDENTIFICATION

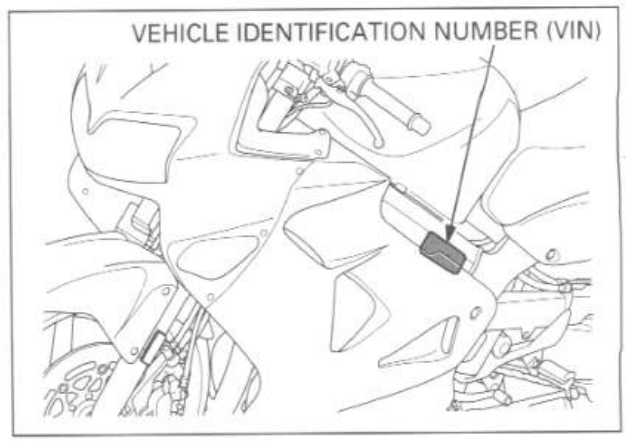




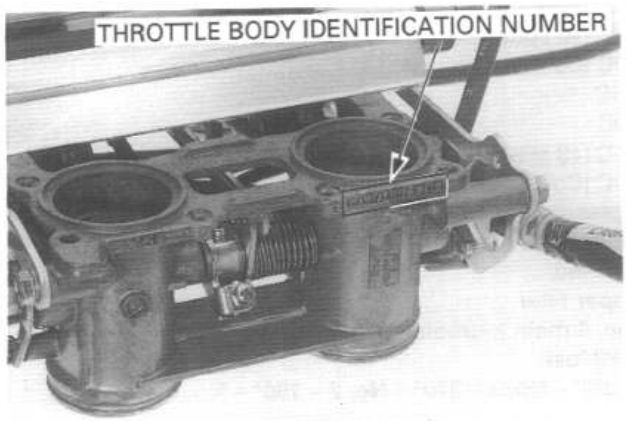
(1) The frame serial number is stamped on the right side of the steering head.



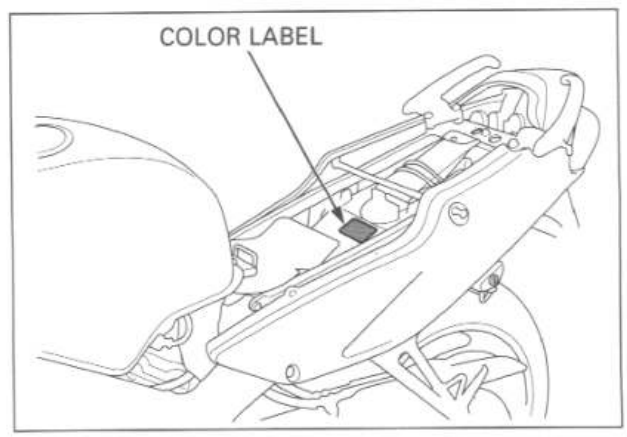
(2) The engine serial number is stamped on the lower left side of the cylinder block.



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



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



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

SPECIFICATIONS

GENERAL

ITEM		SPECIFICATIONS
DIMENSIONS	Overall length	2,100 mm (82.7 in)
	Overall width	735 mm (28.9 in)
	Overall height	1,190 mm (46.9 in)
	Wheelbase	1,440 mm (56.7 in)
	Seat height	805 mm (31.7 in)
	Footpeg height	351 mm (13.8 in)
	Ground clearance	130 mm (5.1 in)
	Dry weight	
	49 states/Cananda type	208 kg (459 lbs)
	California type	210 kg (463 lbs)
	Curb weight	
	49 states/Cananda type	234 kg (516 lbs)
	California type	236 kg (520 lbs)
	Maximum weight capacity	
	49 states	409 kg (902 lbs)
	Cananda type	413 kg (910 lbs)
	California type	411 kg (906 lbs)
FRAME	Frame type	Diamond
	Front suspension	Telescopic fork
	Front wheel travel	120 mm (4.7 in)
	Rear suspension	Swingarm
	Rear wheel travel	120 mm (4.7 in)
	Rear damper	Nitrogen gas filled damper
	Front tire size	120/70 ZR 17 (58W) Radial
	Rear tire size	180/55 ZR 17 (73W) Radial
	Tire brand	
	Bridgestone	Front: BT57F Radial J/Rear: BT57R Radial J
	Dunlop	Front: D204FK/Rear: D204K
	Metzeler	Front: MEZ4/Rear: MEZ4A
	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	95 mm (3.7 in)
	Fuel tank capacity	21.0 liter (5.55 US gal, 4.62 Imp gal)
ENGINE	Bore and stroke	72.0 x 48.0 mm (2.83 x 1.89 in)
	Displacement	781 cc (47.6 cu-in)
	Compression ratio	11.6 : 1
	Valve train	Cam gear driven DOHC, 4 valves per cylinder
	Intake valve opens (at 1 mm (0.04 in) lift)	10° BTDC (49 states/Canada type)
		−5° BTDC (California type)
	Intake valve closes	35° ABDC
	Exhaust valve opens	35° BBDC
	Exhaust valve closes	10° ATDC (49 states/Canada type)
		−5° ATDC (California type)
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid/double rotor
	Cooling system	Liquid cooled
	Air filtration	Oiled paper filter
	Crankshaft type	Unit type, 3 main journals
	Engine dry weight	74 kg (163 lbs)
	Firing order	No. 1 – 180° – No. 3 – 270° – No. 2 – 180° – No. 4 – 90° – No. 1
	Cylinder arrangement	90° V

GENERAL (cont'd)

ITEM			SPECIFICATIONS
CARBURETION	Type		PGM-FI (Programmed Fuel Injection)
	Throttle bore		36 mm (1.4 in)
DRIVE TRAIN	Clutch system		Multi-plate, wet
	Clutch operating system		Hydraulic operated type
	Transmission		Constant mesh, 6-speed
	Primary reduction		1.939 (64/33)
	Final reduction		2.529 (43/17)
	Gear ratio	1st	2.846 (37/13)
		2nd	2.062 (33/16)
		3rd	1.631 (31/19)
		4th	1.333 (28/21)
		5th	1.153 (30/26)
		6th	1.035 (29/28)
	Gearshift pattern		Left foot operated return system, 1 – N – 2 – 3 – 4 – 5 – 6
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	2.9 liter (3.1 US qt, 2.6 Imp qt)	———
		At disassembly	3.8 liter (4.0 US qt, 3.3 Imp qt)	———
		At oil filter change	3.1 liter (3.3 US qt, 2.7 Imp qt)	———
Recommended engine oil			HONDA GN4 4-stroke oil or equivalent motor oil API service classification SF or SG Viscosity: SAE 10W-40	———
Oil pressure at oil pressure switch			490 kPa (5.0 kgf/cm², 71 psi) at 6,000 rpm/(80°C/176°F)	———
Oil pump rotor	Feed pump	Tip clearance	0.15 (0.006) max.	0.20 (0.008)
		Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
		Side clearance	0.02 – 0.07 (0.001 – 0.003)	0.10 (0.004)
	Cooler pump	Tip clearance	0.15 (0.006) max.	0.20 (0.008)
		Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
		Side clearance	0.02 – 0.07 (0.001 – 0.003)	0.10 (0.004)

FUEL SYSTEM (Programmed Fuel Injection)

ITEM		SPECIFICATIONS
Throttle body identification number	49 states/Canada type	GQ30A
	California type	GQ30B
Starter valve vacuum difference		20 mmHg
Base throttle valve for synchronization		No. 1
Idle speed	49 states/Canada type	1,200 ± 100 rpm
	California type	1,300 ± 100 rpm
Throttle grip free play		2 – 6 mm (1/12 – 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
Cam pulse generator resistance (at 20°C/68°F)		400 – 600 Ω
Fuel injector resistance (at 20°C/68°F)		13.0 – 14.4 kΩ
Bypass solenoid valve resistance (at 20°C/68°F)		28 – 32 Ω
PAIR solenoid valve resistance (at 20°C/68°F)		20 – 24 Ω
Purge control solenoid valve resistance (at 20°C/68°F)		30 – 34 Ω
Cam pulse generator peak voltage (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 mmHg
Fuel pressure at idle		250 kPa (2.55 kgf/cm², 36 psi)
Fuel pump flow (at 12 V)		150 cc (5.0 US oz, 5.3 Imp oz) minimum/10 seconds

COOLING SYSTEM

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.75 liter (2.9 US qt, 2.4 Imp qt)
	Reserve tank	0.45 liter (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

CYLINDER HEAD/VALVES

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			981 – 1,373 kPa (10.0 – 14.0 kgf/cm², 142 – 199 psi) at 300 rpm	———
Cylinder head warpage			———	0.10 (0.004)
Valve, valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	———
		EX	0.30 ± 0.03 (0.012 ± 0.001)	———
	Valve stem O.D.	IN	4.475 – 4.490 (0.1762 – 0.1768)	4.465 (0.1758)
		EX	4.465 – 4.480 (0.1758 – 0.1764)	4.455 (0.1754)
	Valve guide I.D.	IN	4.500 – 4.512 (0.1772 – 0.1776)	4.540 (0.1787)
		EX	4.500 – 4.512 (0.1772 – 0.1776)	4.540 (0.1787)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	———
		EX	0.020 – 0.047 (0.0008 – 0.0019)	———
	Valve guide projection above cylinder head	IN	17 (0.7)	———
		EX	17 (0.7)	———
	Valve seat width	IN/EX	0.9 – 1.1 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length	Inner	IN/EX	39.5 (1.56)	37.6 (1.48)
	Outer	IN/EX	42.5 (1.67)	40.5 (1.59)
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 (49 states/Canada type)	IN	36.24 – 36.48 (1.427 – 1.436)	36.21 (1.426)
		EX	36.08 – 36.32 (1.420 – 1.430)	36.05 (1.419)
	Cam lobe height (California type)	IN	35.34 – 35.58 (1.391 – 1.400)	35.31 (1.390)
		EX	35.18 – 35.42 (1.385 – 1.394)	35.15 (1.384)
	Journal O.D.		24.959 – 24.980 (0.9826 – 0.9835)	———
	Runout		———	0.05 (0.002)
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)

CLUTCH

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended clutch fluid		DOT 4 brake fluid	———
Clutch master cylinder	Cylinder I.D.	14.000 – 14.043 (0.5512 – 0.5529)	14.06 (0.554)
	Piston O.D.	13.957 – 13.984 (0.5495 – 0.5506)	13.94 (0.549)
Clutch outer guide I.D.		24.995 – 25.012 (0.9841 – 0.9847)	25.08 (0.987)
Clutch spring free length		45.6 (1.80)	42.6 (1.68)
Clutch disc thickness		2.92 – 3.08 (0.115 – 0.121)	2.5 (0.10)
Clutch plate warpage		———	0.30 (0.012)

CRANKCASE/PISTON/CYLINDER

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		72.000 – 72.015 (2.8346 – 2.8352)	72.10 (2.839)
	Out of round		———	0.10 (0.004)
	Taper		———	0.10 (0.004)
	Warpage		———	0.10 (0.004)
Piston, piston rings	Piston mark direction		"IN" mark facing toward the intake side	———
	Piston O.D.		71.975 – 72.003 (2.8337 – 2.8348)	71.90 (2.831)
	Piston O.D. measurement point		18 mm (0.7 in) from bottom of skirt	———
	Piston pin bore I.D.		17.002 – 17.008 (0.6694 – 0.6696)	17.02 (0.670)
	Piston pin O.D.		16.994 – 17.000 (0.6691 – 0.6693)	16.98 (0.669)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.11 (0.004)
		Second	0.015 – 0.050 (0.0006 – 0.0020)	0.10 (0.004)
	Piston ring end gap	Top	0.20 – 0.30 (0.008 – 0.012)	0.5 (0.02)
		Second	0.30 – 0.45 (0.012 – 0.018)	0.6 (0.02)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.9 (0.04)
Cylinder-to-piston clearance			0.015 – 0.050 (0.0006 – 0.0020)	———
Connecting rod small end I.D.			17.016 – 17.034 (0.6699 – 0.6706)	17.044 (0.6710)
Connecting rod-to-piston pin clearance			0.016 – 0.040 (0.0006 – 0.0016)	———
Crankpin oil clearance			0.030 – 0.052 (0.0012 – 0.0020)	0.08 (0.003)

CRANKSHAFT/TRANSMISSION

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Side clearance		0.10 – 0.30 (0.004 – 0.012)	0.40 (0.016)
	Runout		———	0.03 (0.001)
	Main journal oil clearance		0.023 – 0.041 (0.0009 – 0.0016)	0.06 (0.002)
Transmission	Gear I.D.	M5, M6	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C1	26.007 – 26.028 (1.0239 – 1.0247)	26.04 (1.025)
		C2	31.000 – 31.016 (1.2205 – 1.2211)	31.04 (1.222)
		C3, C4	31.000 – 31.025 (1.2205 – 1.2215)	31.04 (1.222)
	Bushing O.D.	M5, M6	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		C2	30.970 – 30.995 (1.2193 – 1.2203)	30.95 (1.219)
		C3, C4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
	Bushing I.D.	M5	24.985 – 25.006 (0.9837 – 0.9845)	25.03 (0.985)
		C2	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
	Gear-to-bushing clearance	M5, M6	0.020 – 0.062 (0.0008 – 0.0024)	———
		C2	0.005 – 0.046 (0.0002 – 0.0018)	———
		C3, C4	0.025 – 0.075 (0.0010 – 0.0030)	———
	Mainshaft O.D.	M5	24.959 – 24.980 (0.9826 – 0.9835)	24.95 (0.982)
	Countershaft O.D.	C2	27.967 – 27.980 (1.1011 – 1.1016)	27.96 (1.101)
	Bushing-to-shaft clearance	M5	0.005 – 0.047 (0.0002 – 0.0019)	———
		C2	0.020 – 0.054 (0.0008 – 0.0021)	———
Shift fork, fork shaft	Shift fork	Fork I.D.	14.000 – 14.021 (0.5512 – 0.5520)	14.03 (0.552)
		Claw thickness	6.43 – 6.50 (0.253 – 0.256)	6.40 (0.252)
	Fork shaft O.D.		13.973 – 13.984 (0.5501 – 0.5506)	13.965 (0.5498)

FRONT WHEEL/SUSPENSION/STEERING

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	250 kPa (2.50 kgf/cm², 36 psi)	—
	Up to maximum weight capacity	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	382.7 (15.07)	375.0 (14.76)
	Spring direction	With the tapered end facing down	—
	Tube runout	—	0.20 (0.008)
	Pre-load adjuster standard position	9 mm (0.4 in) from top surface of fork cap	—
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8	—
	Fluid level	130 (5.1)	—
	Fluid capacity	457 ± 2.5 cc (15.5 ± 0.08 US oz, 16.1 ± 0.09 Imp oz)	—
Steering head bearing pre-load		1.0 – 1.5 kgf (2.2 – 3.3 lbf)	—

REAR WHEEL/SUSPENSION

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			—	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lb) load		290 kPa (2.90 kgf/cm², 42 psi)	—
	Up to maximum weight capacity		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	50VA7 – 108LE	—
		RK	HF0Z3 – 108LE	—
	Slack		20 – 30 (0.9 – 1.2)	50 (2.0)
Shock absorber	Pre-load adjuster standard position		2nd groove	—
	Rebound damping adjuster standard position		1-1/2 turns from full hard	—

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 – 12.043 (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.			12.700 – 12.043 (0.5000 – 0.5017)	12.76 (0.502)
	Secondary master piston O.D.			12.657 – 12.684 (0.4983 – 0.4994)	12.65 (0.498)
	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			67.5 (2.66)	———
	Brake disc thickness			6.0 (0.24)	5.0 (0.20)
	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	27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)
			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	26.916 – 26.968 (1.0597 – 1.0617)	26.910 (1.0594)
			Rear	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)

CHARGING SYSTEM/ALTERNATOR

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 10 Ah
	Current leakage		1.2 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.2 A/5 – 10 h
		Quick	5.0 A/1.0 h
Alternator	Capacity		0.47 kW/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω
Regulator/rectifier regulated voltage			14.0 – 14.8 V/5,000 rpm

IGNITION SYSTEM

ITEM			SPECIFICATIONS
Spark plug	NGK		CR9EH-9
	DENSO		U27FER9
Spark plug gap			0.8 – 0.9 mm (0.03 – 0.04 in)
Ignition coil peak voltage			100 V minimum
Ignition pulse generator peak voltage			0.7 V minimum
Ignition timing ("F" mark)		49 states/Canada type	15° BTDC at idle
		California type	10° BTDC at idle

ELECTRIC STARTER/STARTER CLUTCH

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	4.5 (0.18)
Starter driven gear O.D.	45.657 – 45.673 (1.7975 – 1.7981)	45.64 (1.797)

LIGHTS/METERS/SWITCHES

ITEM			SPECIFICATIONS
Bulbs	Headlight (Hi/Lo)		12 V – 45/45 W x 2
	Brake/taillight		12 V – 21/5 W x 2
	Front turn signal/running light		12 V – 21/5 W x 2
	Rear turn signal light		12 V – 21 W x 2
	License light		12 V – 8 W
	Instrument light		12 V – 1.7 W x 5
	Turn signal indicator		12 V – 3.4 W x 2
	High beam indicator		12 V – 1.7 W
	Neutral indicator		12 V – 1.7 W
	Oil pressure indicator		12 V – 1.7 W
	PGM-FI malfunction indicator		12 V – 1.7 W
Fuse	Main fuse	A	30 A
		B	30 A
	Sub fuse		20 A x 2, 10 A x 5
Coolant temperature sensor resistance (at 50°C/122°F)			6.8 – 7.2 Ω
Fan motor switch	Start to close (ON)		98 – 102°C (208 – 216°F)
	Stop to open		93 – 97°C (199 – 207°F)

TORQUE VALUES

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

- 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

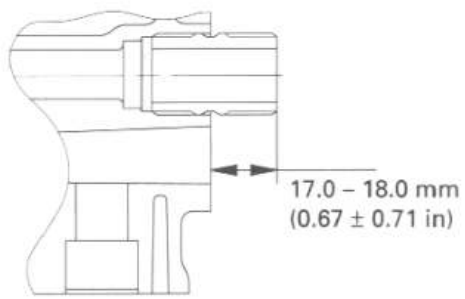
ENGINE

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	12	29 (3.0, 22)	
Oil pump assembly flange bolt	2	6	12 (1.2, 9)	NOTE 9
Oil pump driven sprocket bolt	1	6	18 (1.8, 13)	NOTE 2
Oil filter cartridge	1	20	10 (1.0, 7)	NOTE 6
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 1
PGM-FI (Programmed Fuel Injection):				
Engine coolant temperature (ECT) sensor	1	12	23 (2.3, 17)	
Insulator band screw	4	5	———	See page 1-15
Fuel pressure regulator mounting nut	1	12	29 (3.0, 22)	
Fuel injector holder mounting bolt	4	6	10 (1.0, 7)	
Fuel pipe mounting nut	2	12	22 (2.2, 16)	
COOLING SYSTEM:				
Water pump cover bolt	2	6	13 (1.3, 9)	NOTE 9
CYLINDER HEAD/VALVES:				
Cylinder head cover bolt	8	6	10 (1.0, 7)	
Breather plate flange bolt	4	6	12 (1.2, 9)	NOTE 2, 9
PAIR reed valve cover flange bolt	4	6	12 (1.2, 9)	NOTE 9
Camshaft holder flange bolt	24	6	12 (1.2, 9)	NOTE 5
Cylinder head mounting bolt	12	9	44 (4.5, 33)	NOTE 5
Cylinder head sealing bolt	1	18	32 (3.3, 24)	NOTE 2
Cylinder head stud bolt	8	8	———	See page 1-15
Gear train mounting bolt/washer	8	6	12 (1.2, 9)	

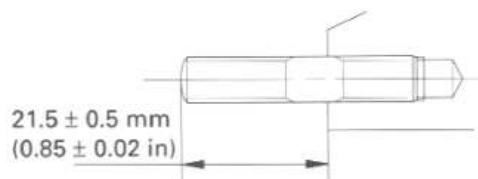
ENGINE (cont'd)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
CLUTCH:				
Clutch center lock nut	1	22	127 (13.0, 94)	NOTE 4, 5
Clutch slave cylinder bleeder	1	8	9 (0.9, 6.5)	
GEARSHIFT LINKAGE:				
Drive sprocket cover rubber mounting bolt	2	6	12 (1.2, 9)	NOTE 2, 9
Drive sprocket special bolt	1	10	51 (5.2, 38)	
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)	
CRANKCASE/PISTON/CYLINDER:				
Crankcase bolt, 10 mm	5	10	39 (4.0, 29)	
9 mm	8	9	See page 11-12	NOTE 5
7 mm	3	7	18 (1.8, 13)	
Lower crankcase sealing bolt	1	20	29 (3.0, 22)	NOTE 2
Connecting rod nut	8	8	33 (3.4, 25)	NOTE 5
CHARGING SYSTEM/ALTERNATOR:				
Flywheel flange bolt	1	10	103 (10.5, 76)	NOTE 5
Stator mounting torx bolt	4	6	12 (1.2, 9)	
Alternator wire clamp socket bolt	1	6	12 (1.2, 9)	
IGNITION SYSTEM:				
Ignition pulse generator SH bolt	2	6	12 (1.2, 9)	
ELECTRIC STARTER/STARTER CLUTCH:				
Ignition pulse generator rotor/primary drive gear bolt	1	10	103 (10.5, 76)	NOTE 5
LIGHTS/METERS/SWITCHES:				
Neutral switch	1	10	12 (1.2, 9)	

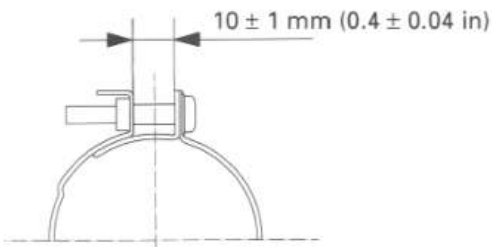
Oil filter boss:



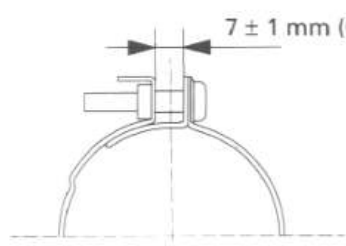
Exhaust pipe stud bolt:



Insulator clamp (cylinder head side):



Insulator clamp (throttle body side):



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)	
Side stand bracket bolt	2	10	39 (4.0, 29)	
Side stand switch mounting bolt	1	6	10 (1.0, 7)	NOTE 8
Main stand mounting bolt	1	10	54 (5.5, 40)	NOTE 8
Rear grip socket bolt	4	8	34 (3.5, 25)	
Exhaust pipe joint special nut	8	6	12 (1.2, 9)	
Muffler bracket bolt	1	8	21 (2.1, 15)	
Upper cowl stay mounting flange nut	2	8	32 (3.3, 24)	NOTE 7
Upper cowl screw	2	5	1 (0.15, 1.1)	
Side cowl screw	10	5	1 (0.15, 1.1)	
Inner half cowl screw	4	5	1 (0.15, 1.1)	
Meter panel screw	2	5	1 (0.15, 1.1)	
Rear cowl screw	4	5	1 (0.15, 1.1)	
Seat rail special bolt	2	10	44 (4.5, 33)	
Seat rail flange nut	2	10	44 (4.5, 33)	
Bank sensor	2	8	22 (2.2, 16)	
Pillion step flange bolt	4	8	32 (3.3, 24)	
PGM-FI (Programmed Fuel Injection):				
Fuel tube bolt (fuel tank side)	1	12	22 (2.2, 16)	Yellow paint
Fuel tube sealing nut A (throttle body side)	1	12	22 (2.2, 16)	
Fuel pump mounting flange nut	6	6	12 (1.2, 9)	See page 5-49
Fuel filler cap socket bolt	3	4	2 (0.18, 1.3)	
COOLING SYSTEM:				
Cooling fan motor nut	1	6	2.5 (0.25, 1.8)	Note 2
Fan motor switch	1	16	18 (1.8, 13)	Note 1
ENGINE MOUNTING:				
Engine hanger nut (front)	1	12	54 (5.5, 40)	See page 7-7
Engine hanger flange bolt (middle/rear)	4	10	44 (4.5, 33)	
Shock absorber lower bracket flange cap nut (upper)	1	10	39 (4.0, 29)	
Shock absorber lower bracket flange nut (lower)	1	10	42 (4.3, 31)	NOTE 7
CLUTCH:				
Clutch master cylinder holder bolt	2	6	12 (1.2, 9)	
Clutch master cylinder cap screw	2	4	1 (0.15, 1.1)	
Clutch lever pivot bolt	1	6	1 (0.1, 0.7)	
Clutch lever pivot nut	1	6	6 (0.6, 4.3)	
Clutch lever adjuster	1	5	4 (0.4, 2.9)	
Clutch switch screw	1	4	1 (0.12, 0.8)	
GEARSHIFT LINKAGE:				
Gearshift pedal flange bolt	1	6	10 (1.0, 7)	
FRONT WHEEL/SUSPENSION/STEERING:				
Handlebar pinch bolt	2	8	26 (2.7, 20)	
Handlebar weight mounting screw	2	6	10 (1.0, 7)	NOTE 8
Steering stem nut	1	24	103 (10.5, 76)	See page 13-31
Top thread A	1	26	———	
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	35	201 (20.5, 148)	NOTE 4
Final driven sprocket nut	6	8	34 (3.5, 25)	
Rear wheel nut	4	12	108 (11.0, 80)	
Rear brake disc mounting nut	4	8	34 (3.5, 25)	NOTE 7
Rear brake torque rod	2	10	34 (3.5, 25)	NOTE 2
Swingarm pivot nut	1	18	93 (9.5, 69)	NOTE 7
Drive chain slider bolt	4	6	9 (0.9, 6.5)	NOTE 8
Bearing holder pinch bolt	1	16	74 (7.5, 54)	
Air guide mounting bolt	2	6	9 (0.9, 6.5)	NOTE 8
Rear shock absorber upper bracket nut	1	10	42 (4.3, 31)	NOTE 7
Rear shock absorber mounting nut	2	10	42 (4.3, 31)	NOTE 7
Shock link nut (frame side)	1	10	59 (6.0, 43)	NOTE 7
Shock link nut (shock arm plate side)	1	10	42 (4.3, 31)	NOTE 7
Shock arm plate nut (swingarm side)	1	10	42 (4.3, 31)	NOTE 7
HYDRAULIC BRAKE:				
Front brake master cylinder holder bolt	2	6	12 (1.2, 9)	
Front brake master cylinder cap screw	2	4	1.5 (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	1.2 (0.12, 0.8)	
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	31 (3.2, 23)	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 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)	
Rear brake caliper mounting bolt	2	8	31 (3.2, 23)	NOTE 8
LIGHTS/METERS/SWITCHES:				
Ignition switch mounting one-way bolt	2	8	26 (2.7, 20)	

TOOLS

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

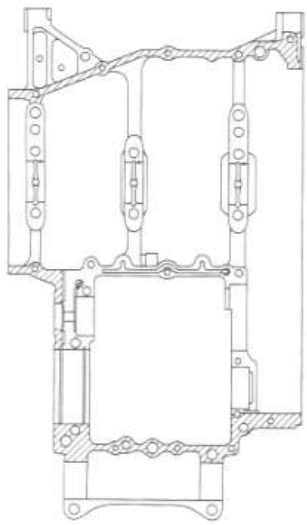
DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Oil pressure gauge attachment	07406 – 0030000	NOTE 1	4
Fuel pressure gauge	07406 – 0040002		5
Oil pressure gauge	07506 – 3000000	NOTE 1	4
Clutch center holder	07724 – 0050002		9
Universal holder	07725 – 0030000		18
Flywheel holder	07725 – 0040000	NOTE 1	10
Rotor puller	07733 – 0020001	NOTE 3: 07933 – 3950000	10
Attachment, 32 x 35 mm	07746 – 0010100		14
Attachment, 37 x 40 mm	07746 – 0010200		14
Attachment, 42 x 47 mm	07746 – 0010300		13, 14
Attachment, 52 x 55 mm	07746 – 0010400		14
Attachment, 62 x 68 mm	07746 – 0010500		14
Attachment, 24 x 26 mm	07746 – 0010700		14
Driver B	07746 – 0030100		12
Attachment, 25 mm (IN)	07746 – 0030200		12
Pilot, 17 mm	07746 – 0040400		14
Pilot, 20 mm	07746 – 0040500		14
Pilot, 40 mm	07746 – 0040900		14
Pilot, 28 mm	07746 – 0041100		14
Bearing remover shaft	07746 – 0050100		13
Bearing remover head, 20 mm	07746 – 0050600		13
Driver	07749 – 0010000		13, 14
Valve spring compressor	07757 – 0010000		8
Valve seat cutter		NOTE 1	8
Seat cutter, 29 mm (45° IN)	07780 – 0010300		
Seat cutter, 27.5 mm (45° EX)	07780 – 0010200		
Flat cutter, 30 mm (32° IN)	07780 – 0012200		
Flat cutter, 27 mm (32° EX)	07780 – 0013300		
Interior cutter, 30 mm (60° IN/EX)	07780 – 0014000		
Cutter holder, 4.5 mm	07781 – 0010600		
Snap ring pliers	07914 – SA50001	NOTE 3: 07914 – 3230001	15
Steering stem socket	07916 – 3710101	NOTE 3: 07916 – 3710100 (U.S.A. only)	13
Bearing remover set	07936 – 3710001		14
— Remover handle	07936 – 3710100		
— Remover set	07936 – 3710600		
— Remover weight	07741 – 0010201	NOTE 3: 07936 – 3710200 07936 – 371020A (U.S.A. only)	
Driver shaft	07946 – KA50000		13
Ball race remover set	07946 – KM90001	NOTE 3:	13
— Driver attachment, A	07946 – KM90100	Can be used with the following	
— Driver attachment, B	07946 – KM90200	combination:	
— Driver shaft assembly	07946 – KM90300	07VMF – MAT0100	
— Bearing remover, A	07946 – KM90401	07VMF – MAT0200	
— Bearing remover, B	07946 – KM90500	07VMF – KZ30200	
— Assembly base	07946 – KM90600	07VMF – MAT0300	
		07VMF – MAT0400	
		07947 – KA50100	
		07965 – MA60000	
		07946 – ME90200	
Steering stem driver	07946 – MB00000		13
Driver shaft	07946 – MJ00100		14
Slider weight	07947 – KA50100		13
Oil seal driver	07947 – KF00100		13
Valve spring compressor attachment	07959 – KM30101		8

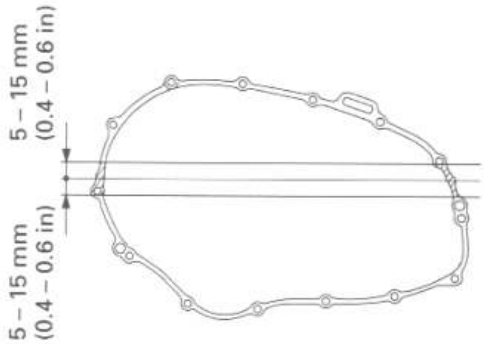
DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Pin driver	07GMD – KT80100	NOTE 3: 07949 – 3710001	14
Oil filter wrench	07HAA – PJ70100		3, 4
Peak voltage adaptor	07HGJ – 0020100	NOTE 4: Peak voltage tester (U.S.A. only)	5, 17
Needle bearing remover	07HMC – MR70100		14
Valve guide driver	07HMD – ML00101		8
Bushing driver attachment	07HMF – MM90300		14
Tappet hole protector	07HMG – MR70002	NOTE 2:	8
Valve guide reamer, 4.5 mm	07HMH – ML00101	NOTE 3: 07HMH – ML0010A (U.S.A. only)	8
Drive chain tool set	07HMH – MR10103	NOTE 3: 07HMH – MR1010B (U.S.A. only)	3
Socket wrench, 46 mm	07JMA – MN50100		14
Needle bearing remover set	07LMC – KV30100		14
Compression gauge attachment	07RMJ – MY50100	NOTE 1	8
Oil pressure gauge joint adaptor	07RMK – MW40100	NOTE 2	4
Test pin box	07WGZ – 0010100	NOTE 4	5
ECU test harness	07WMZ – MBG0100	NOTE 4	5

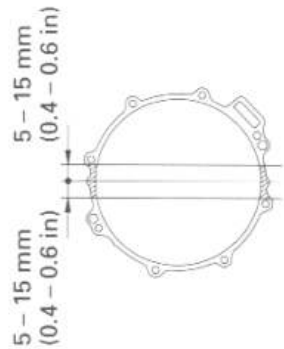
LUBRICATION & SEAL POINTS

ENGINE

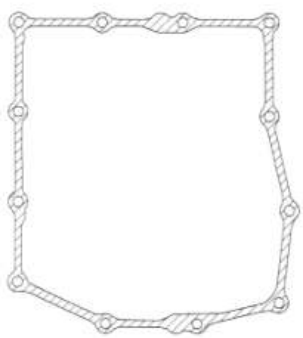
LOCATION	MATERIAL	REMARKS
Crankcase mating surface	Liquid sealant (Three Bond 1207B or equivalent)	





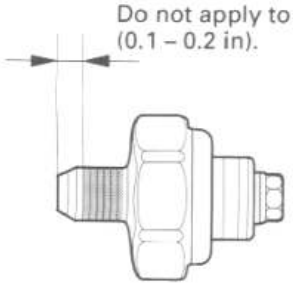


Oil pan mating surface



Oil pressure switch threads

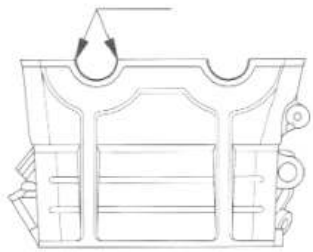
Do not apply to the thread head 3 – 4 mm (0.1 – 0.2 in).



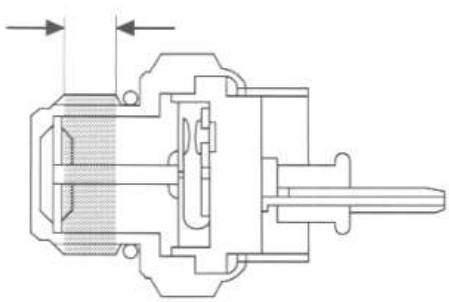
Alternator grommet — Crankcase mating surface

Ignition pulse generator grommet — Crankcase mating surface

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 bore Main journal bearing surface Connecting rod bearing surface Connecting rod small end bore Cam gear sliding surface Second cam gear sliding surface Clutch outer sliding surface Primary drive gear sliding surface M3/4, C5, C6 shifter gear (shift fork grooves)	Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
Cylinder head 9 mm bolt threads and seating surface Piston surface Piston ring surface Clutch center lock nut threads Clutch friction disc lining surface Connecting rod bolt/nut threads Main journal 9 mm bolt threads and seating surface Flywheel bolt threads Ignition pulse generator rotor bolt threads Oil filter cartridge threads and mating surface Each bearing Each gear Each O-ring Other rotating area and sliding surface	Engine oil	
Timing hole cap threads Each oil seal lips	Multi-purpose grease	
Cylinder head 18 mm sealing bolt threads Gearshift cover bolt threads Drive sprocket cover rubber bolt threads Cylinder head cover breather plate bolt threads Oil filter boss threads Oil pump driven sprocket bolt threads Lower crankcase 20 mm sealing bolt threads Mainshaft bearing set plate bolt threads Shift drum bearing set plate bolt threads Shift drum center bolt threads	Locking agent	Coating width: 6.5 ± 1 mm

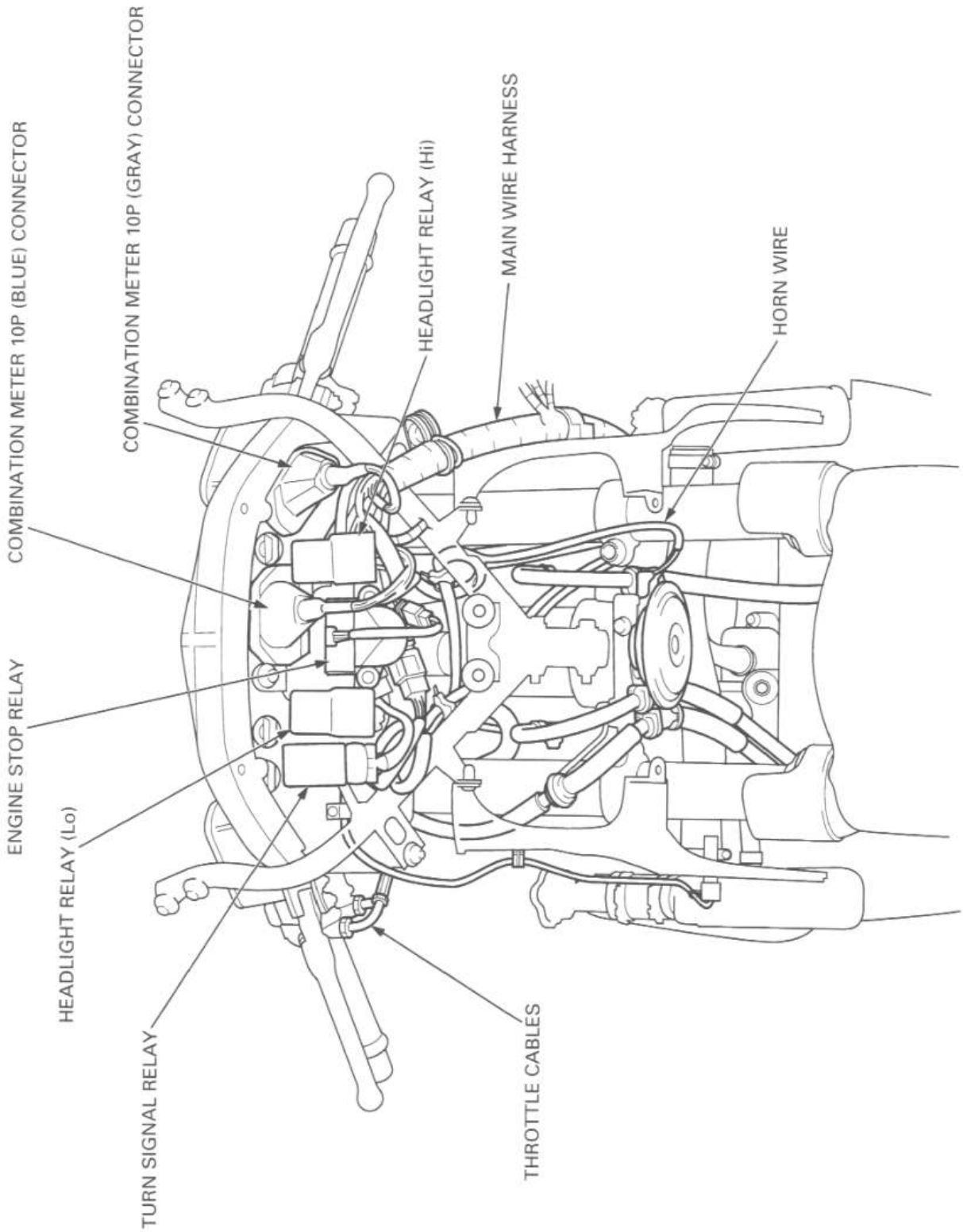
FRAME

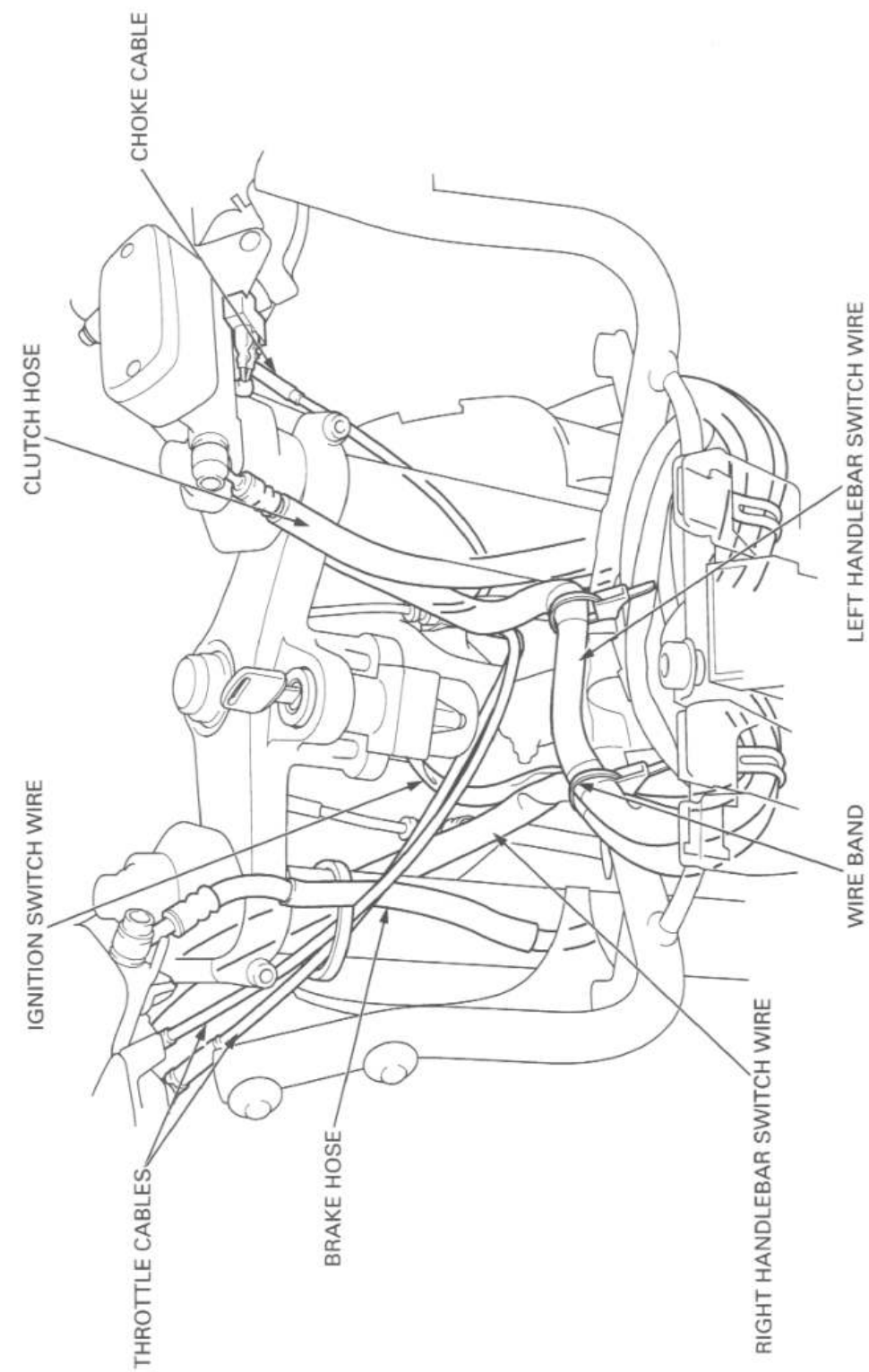
LOCATION	MATERIAL	REMARKS
Steering head bearing sliding surface Steering head dust seal lips Swingarm pivot needle bearing Swingarm pivot dust seal lips Front wheel dust seal lips Left fork needle bearing sliding surface Left fork dust seal sliding surface Shock absorber needle bearing Shock link needle bearing Shock link dust seal lips Swingarm shock link plate pivot needle bearing Swingarm shock link plate pivot dust seal lips Rear wheel hub bearing holder dust seal lips Driven flange O-ring sliding surface Dust seal holder dust seal lips Driven flange needle bearing Footpeg pivot sliding area Pillion footpeg pivot sliding area Pillion footpeg spring inside Side stand pivot sliding surface Main stand pivot sliding surface Throttle pipe sliding area Rear brake pedal sliding surface Seat catch hook	Multi-purpose grease	
Shock absorber spring adjuster cam surface	Molybdenum paste	
Steering stem top thread Throttle cable A and B casing inner Choke cable casing inner Brake pipe joint threads	Engine oil	
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	
Rear brake torque rod bolt threads Fork socket bolt threads Brake caliper slide pin threads	Locking agent	
Thermo switch threads and O-ring 	Sealant	

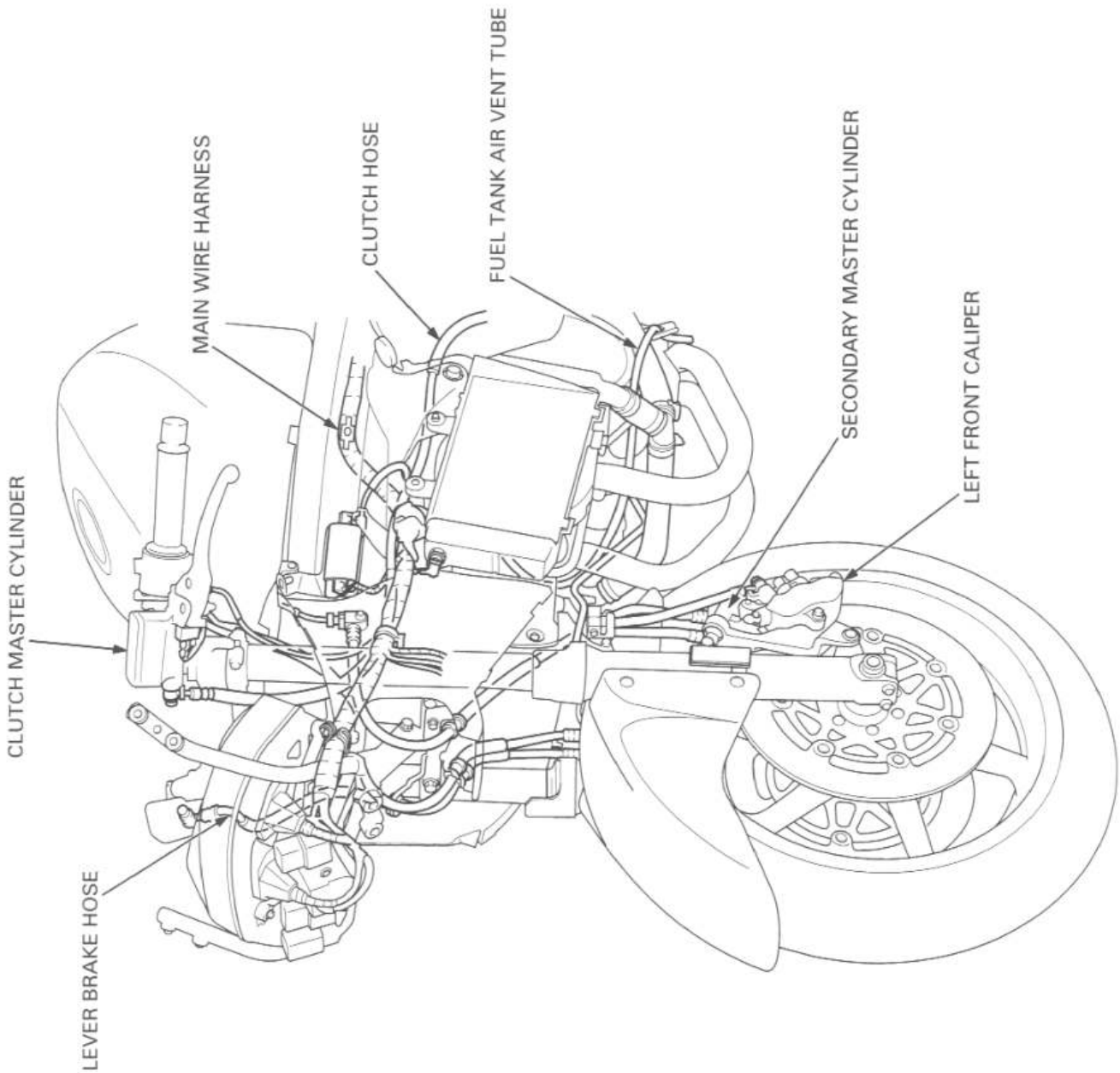
FRAME (cont'd)

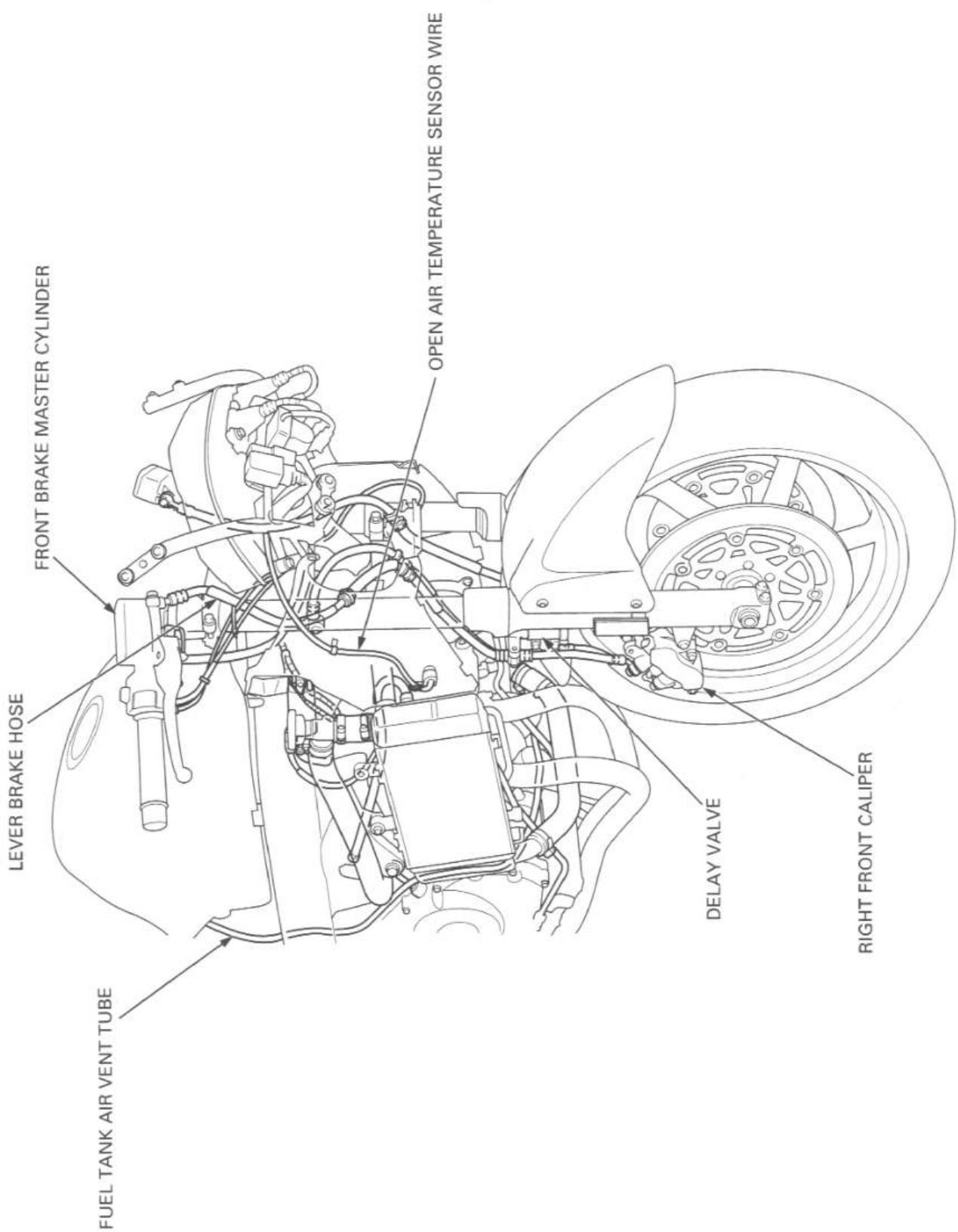
LOCATION	MATERIAL	REMARKS
Handle grip rubber inside	Honda Bond A or Honda Hand Grip Cement (U.S.A. only)	
Fork cap O-ring Fork oil seal lips	Pro Honda Suspension Fluid SS-8	

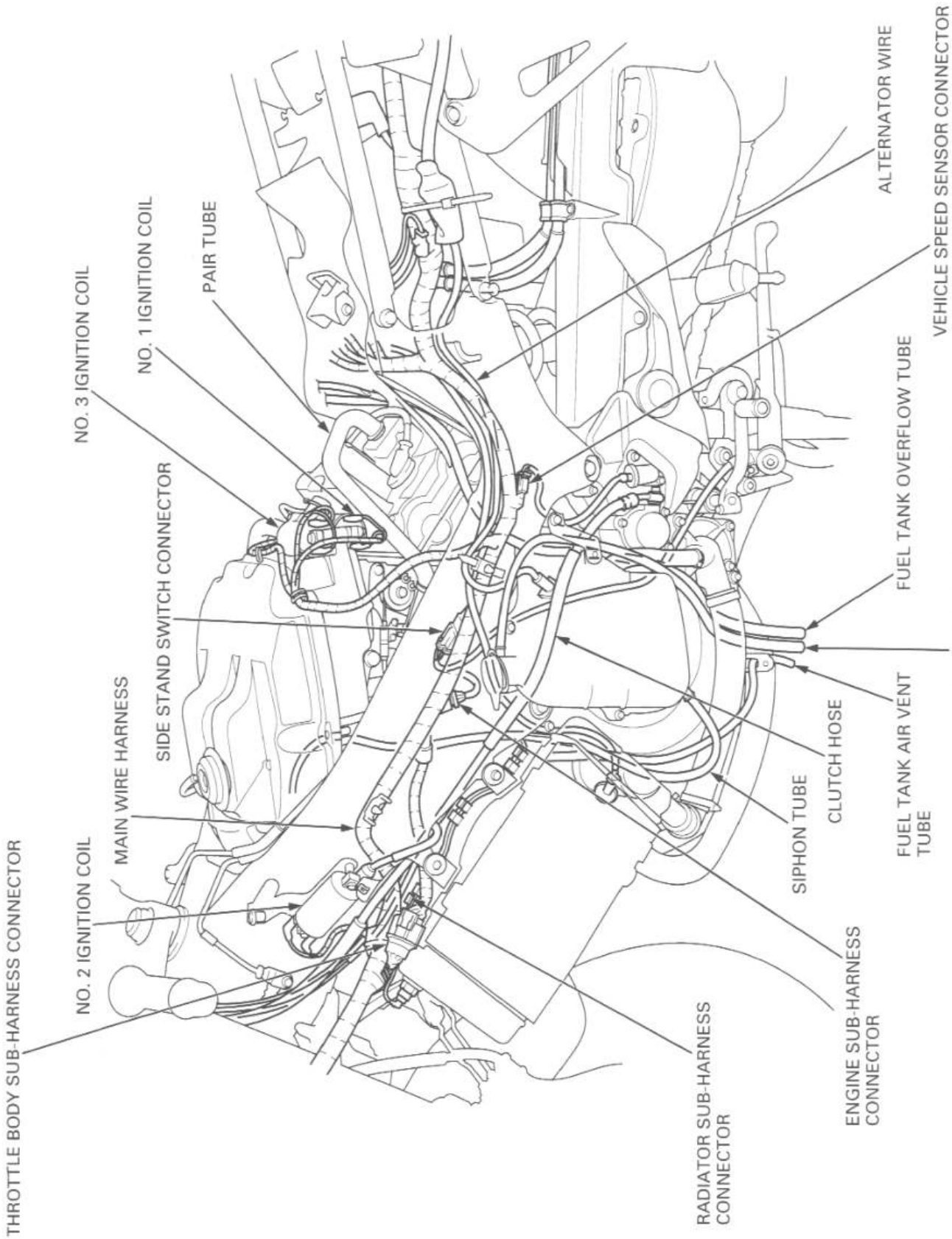
CABLE & HARNESS ROUTING

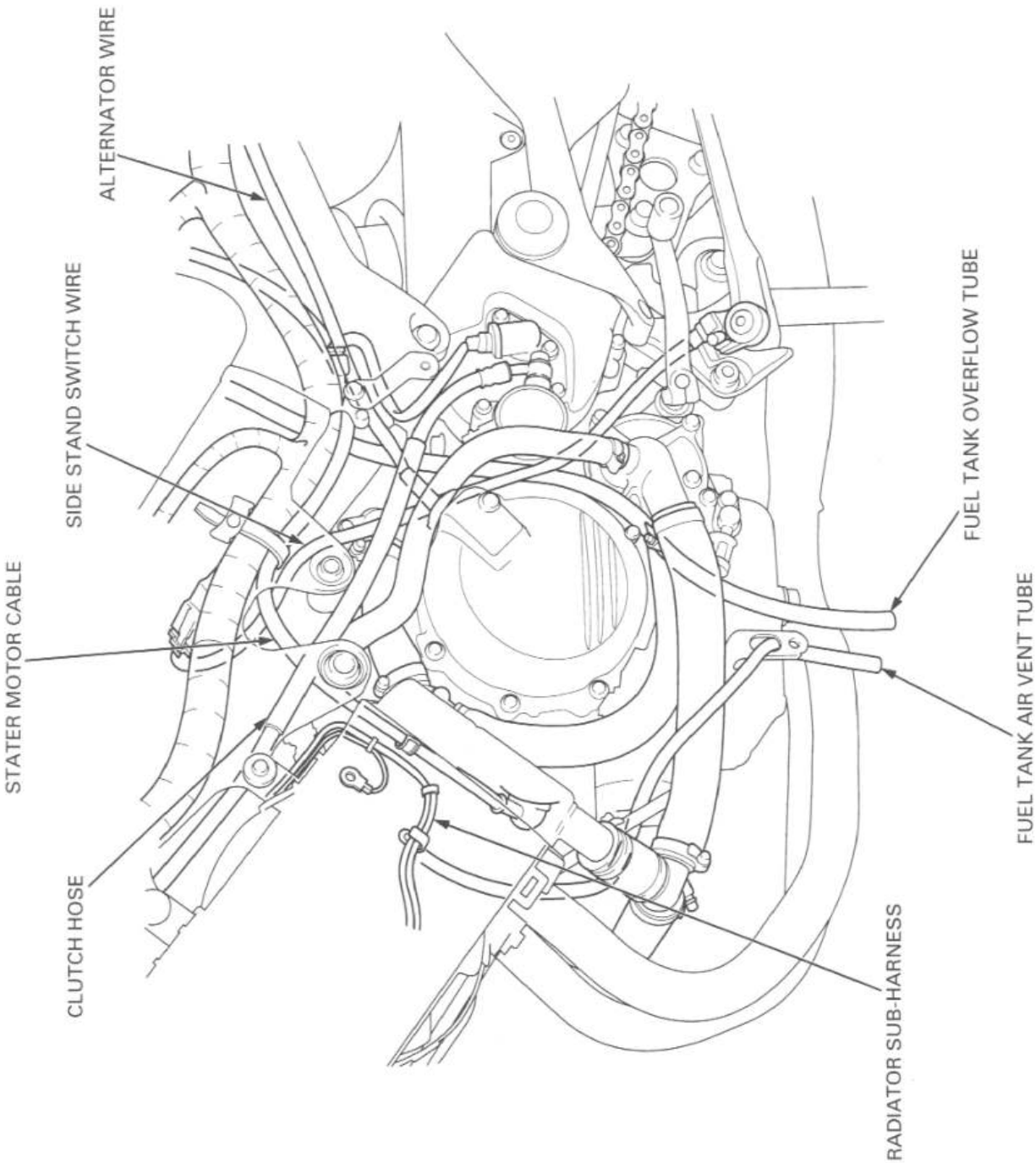


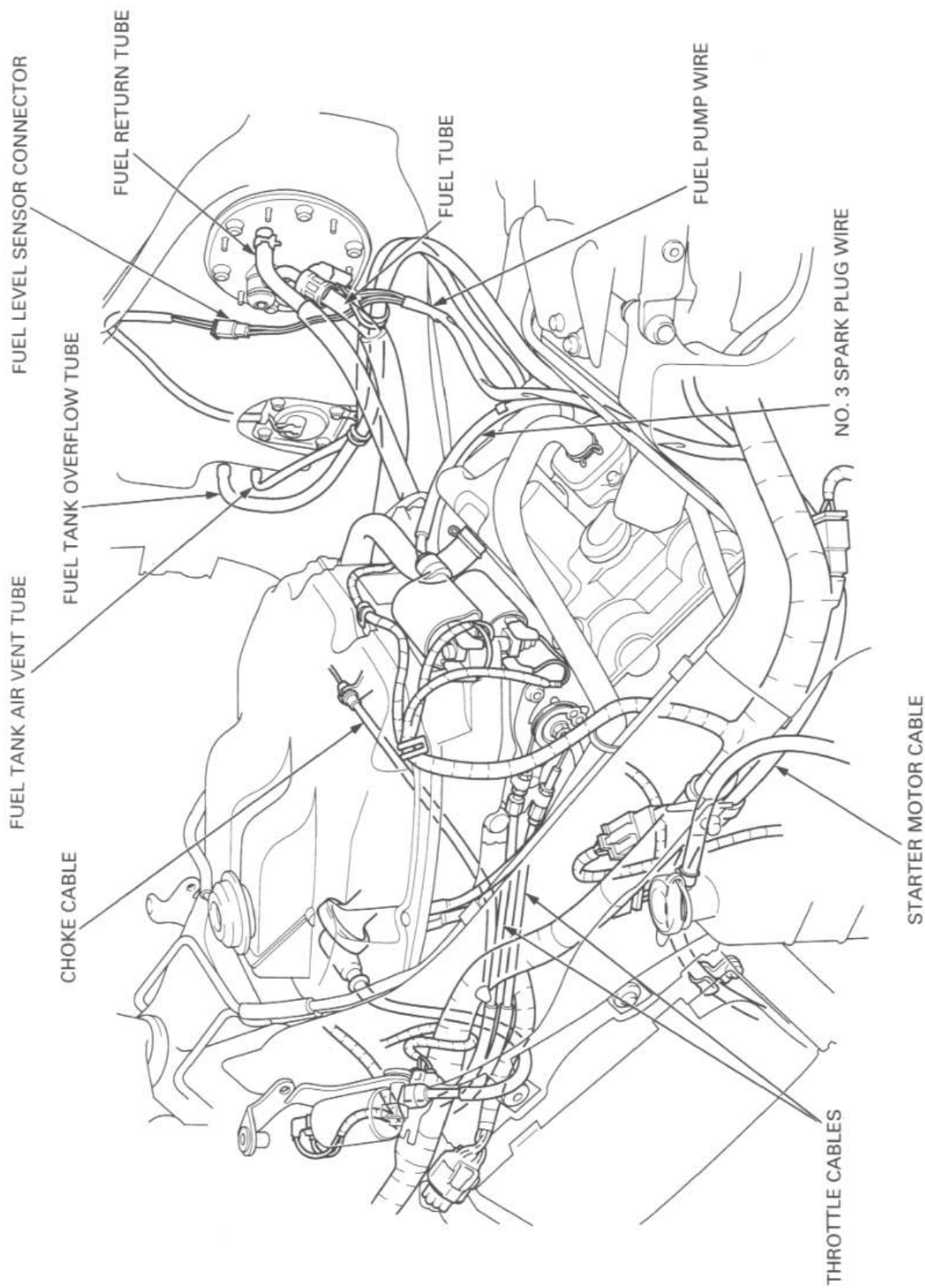

CHOKE CABLE
CLUTCH HOSE
IGNITION SWITCH WIRE
THROTTLE CABLES
BRAKE HOSE
RIGHT HANDLEBAR SWITCH WIRE
WIRE BAND
LEFT HANDLEBAR SWITCH WIRE

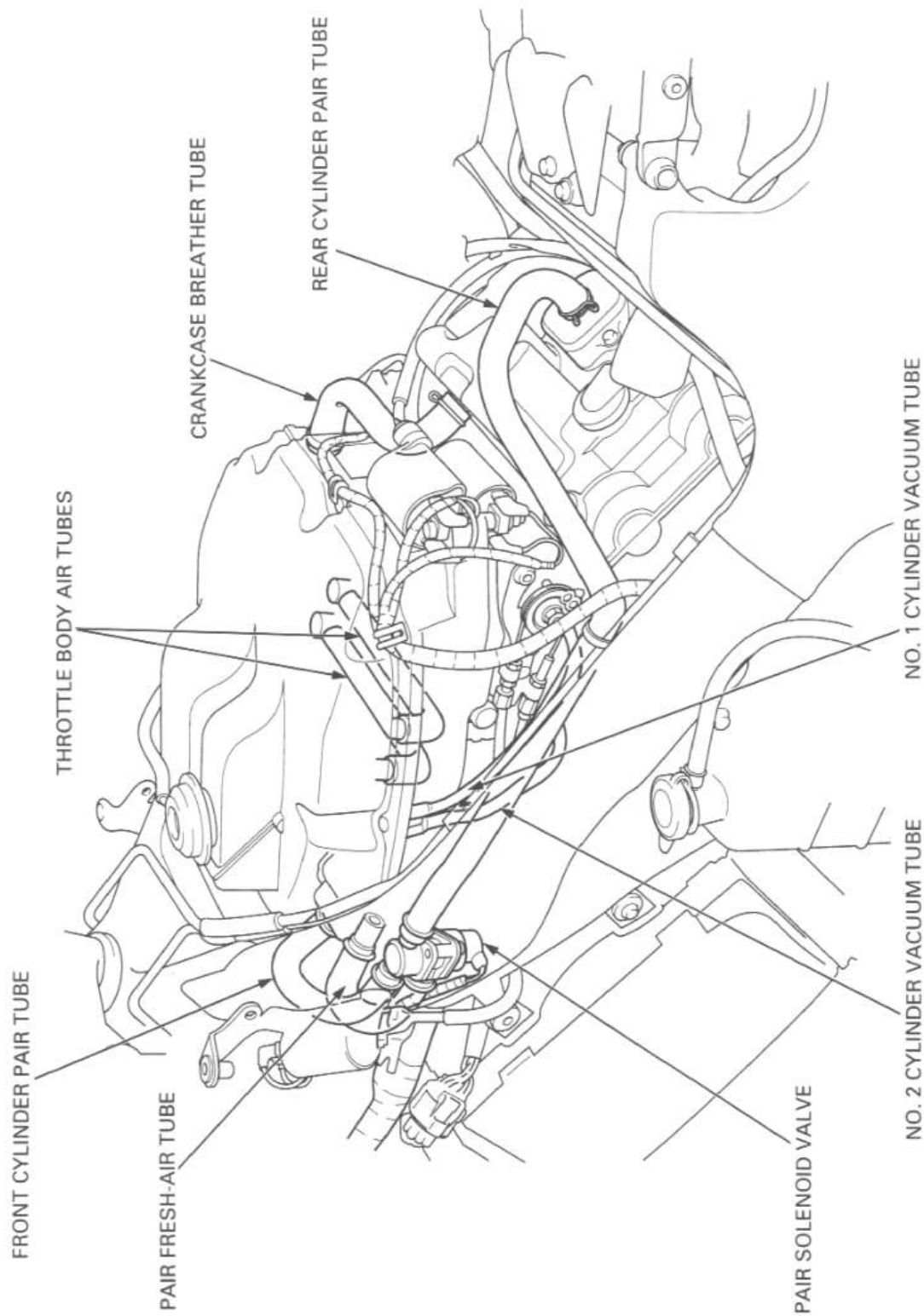

CLUTCH MASTER CYLINDER
MAIN WIRE HARNESS
CLUTCH HOSE
FUEL TANK AIR VENT TUBE
SECONDARY MASTER CYLINDER
LEFT FRONT CALIPER
LEVER BRAKE HOSE

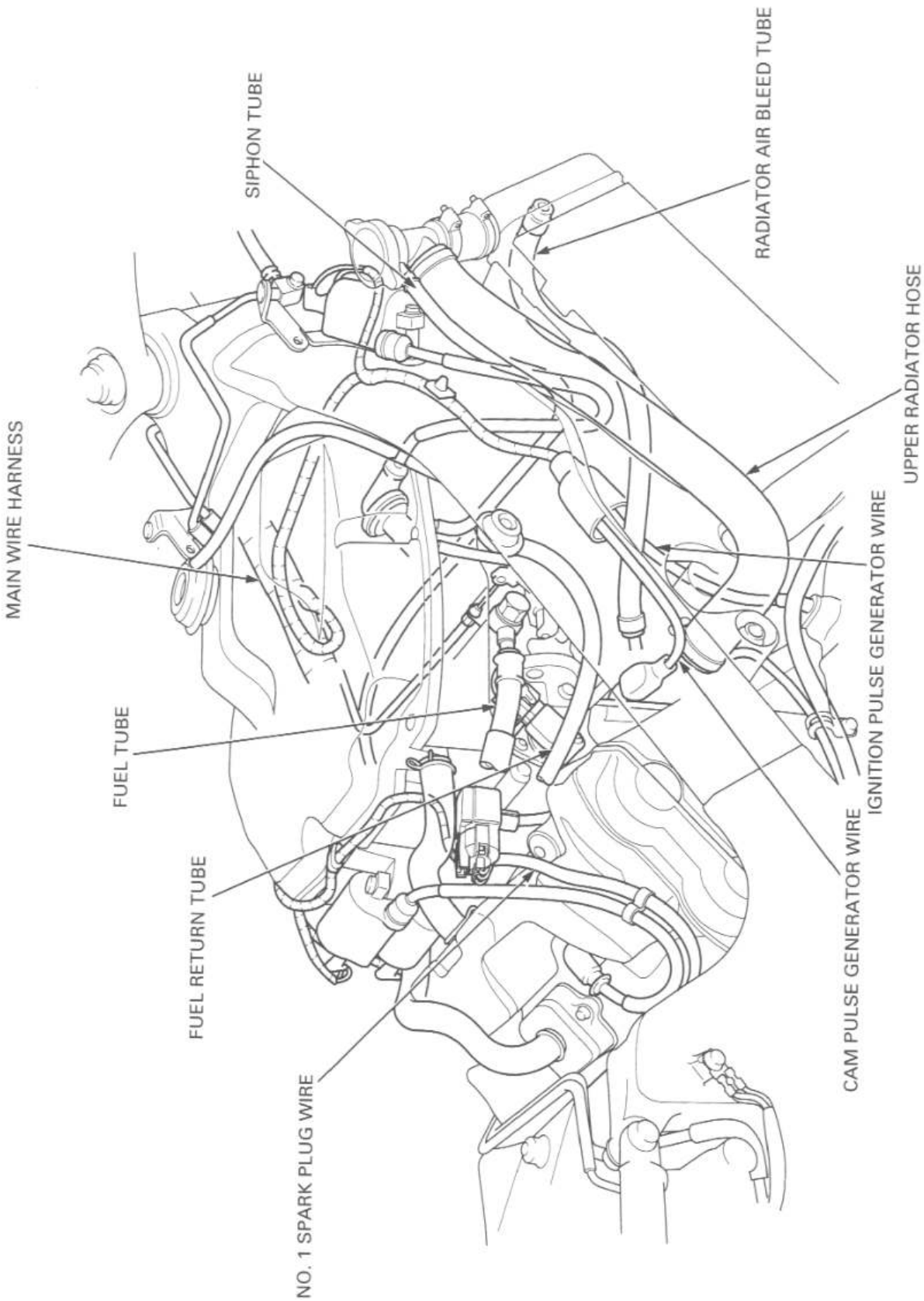

FRONT BRAKE MASTER CYLINDER
OPEN AIR TEMPERATURE SENSOR WIRE
LEVER BRAKE HOSE
DELAY VALVE
RIGHT FRONT CALIPER
FUEL TANK AIR VENT TUBE

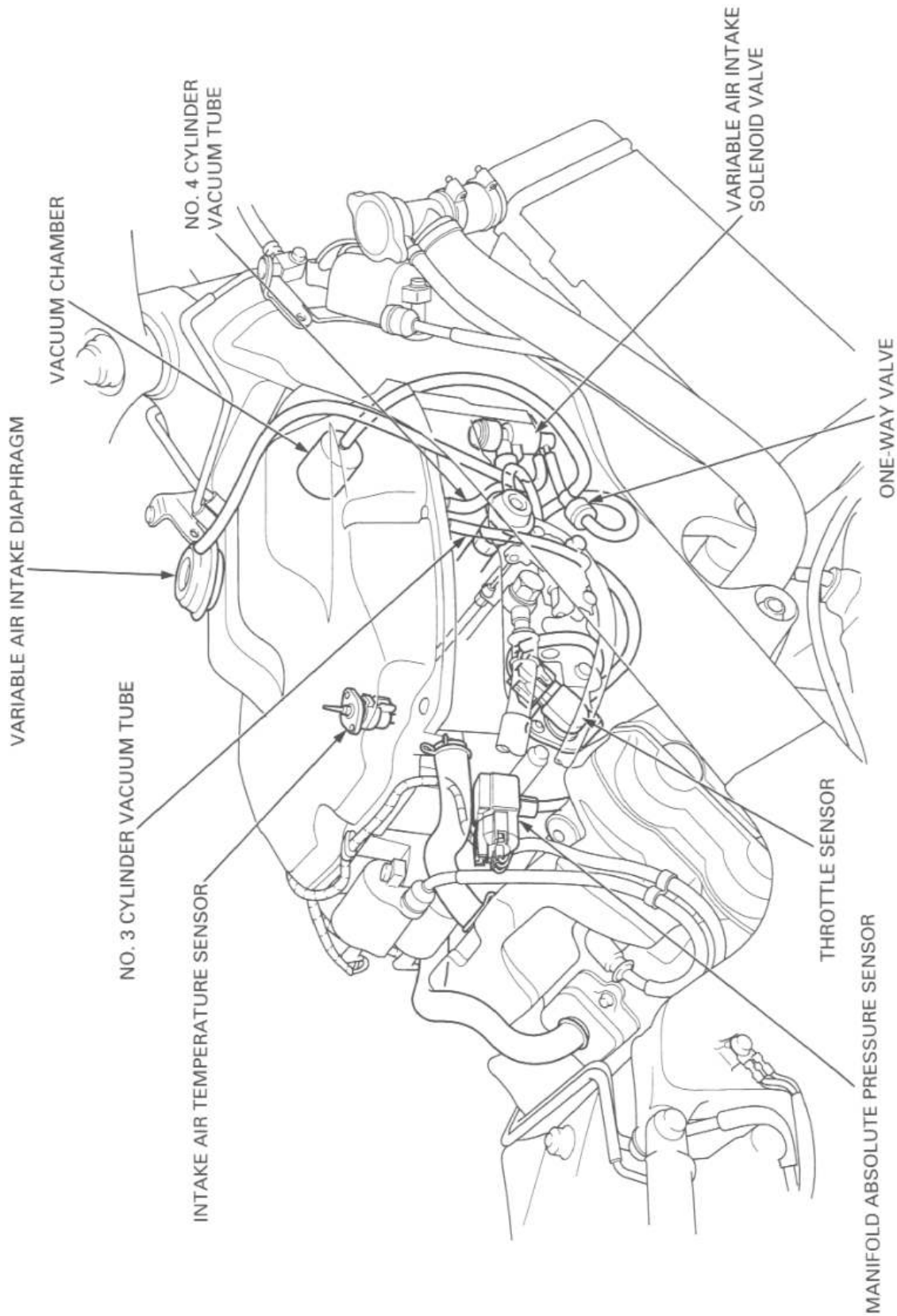

THROTTLE BODY SUB-HARNESS CONNECTOR
NO. 2 IGNITION COIL
MAIN WIRE HARNESS
SIDE STAND SWITCH CONNECTOR
NO. 3 IGNITION COIL
NO. 1 IGNITION COIL
PAIR TUBE
ALTERNATOR WIRE
VEHICLE SPEED SENSOR CONNECTOR
FUEL TANK OVERFLOW TUBE
RADIATOR OVERFLOW TUBE
FUEL TANK AIR VENT TUBE
CLUTCH HOSE
SIPHON TUBE
ENGINE SUB-HARNESS CONNECTOR
RADIATOR SUB-HARNESS CONNECTOR

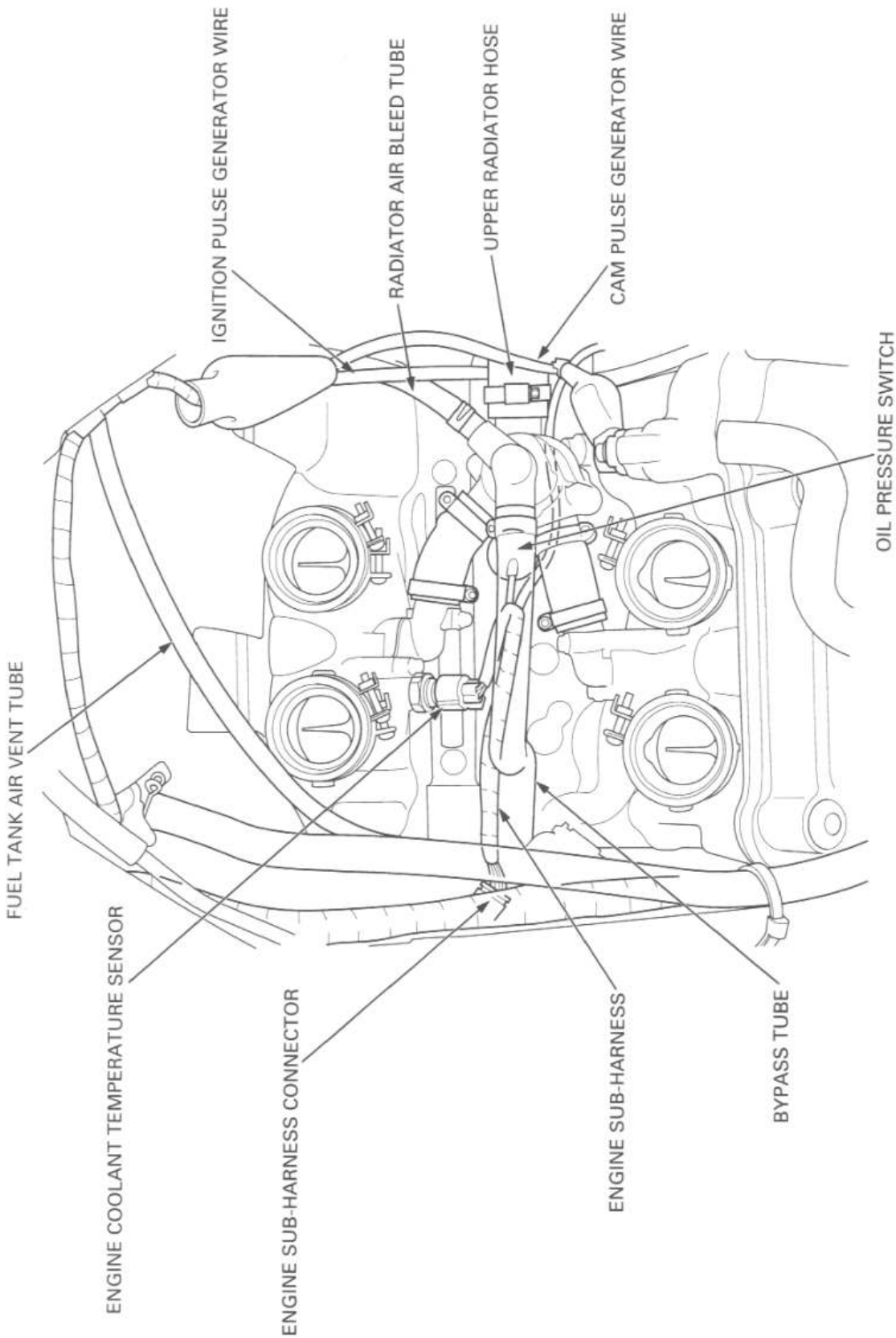

ALTERNATOR WIRE
SIDE STAND SWITCH WIRE
STATER MOTOR CABLE
CLUTCH HOSE
RADIATOR SUB-HARNESS
FUEL TANK OVERFLOW TUBE
FUEL TANK AIR VENT TUBE

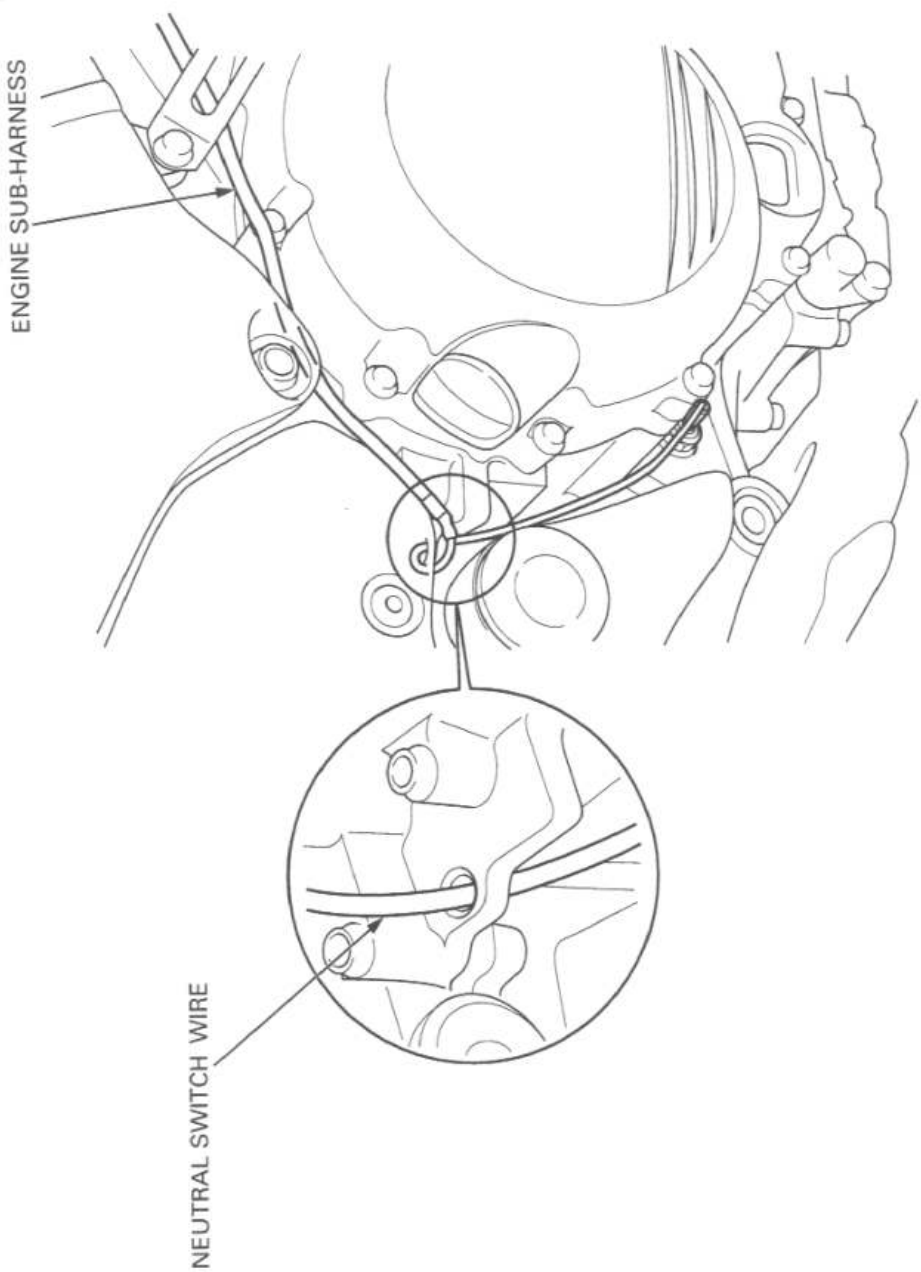

FUEL LEVEL SENSOR CONNECTOR
FUEL RETURN TUBE
FUEL TUBE
FUEL PUMP WIRE
FUEL TANK OVERFLOW TUBE
NO. 3 SPARK PLUG WIRE
FUEL TANK AIR VENT TUBE
CHOKE CABLE
STARTER MOTOR CABLE
THROTTLE CABLES

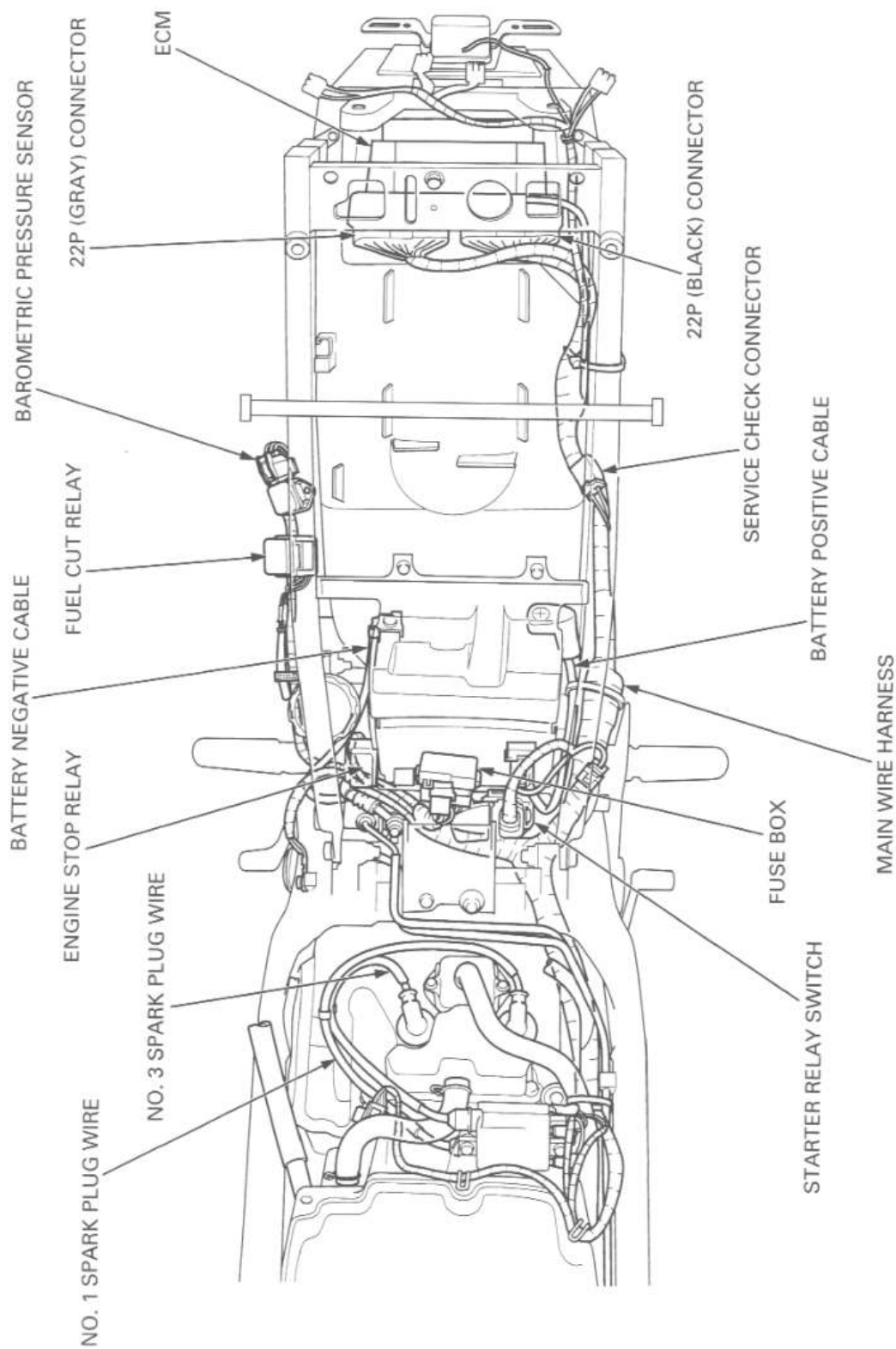

FRONT CYLINDER PAIR TUBE
PAIR FRESH-AIR TUBE
THROTTLE BODY AIR TUBES
CRANKCASE BREATHER TUBE
REAR CYLINDER PAIR TUBE
PAIR SOLENOID VALVE
NO. 2 CYLINDER VACUUM TUBE
NO. 1 CYLINDER VACUUM TUBE

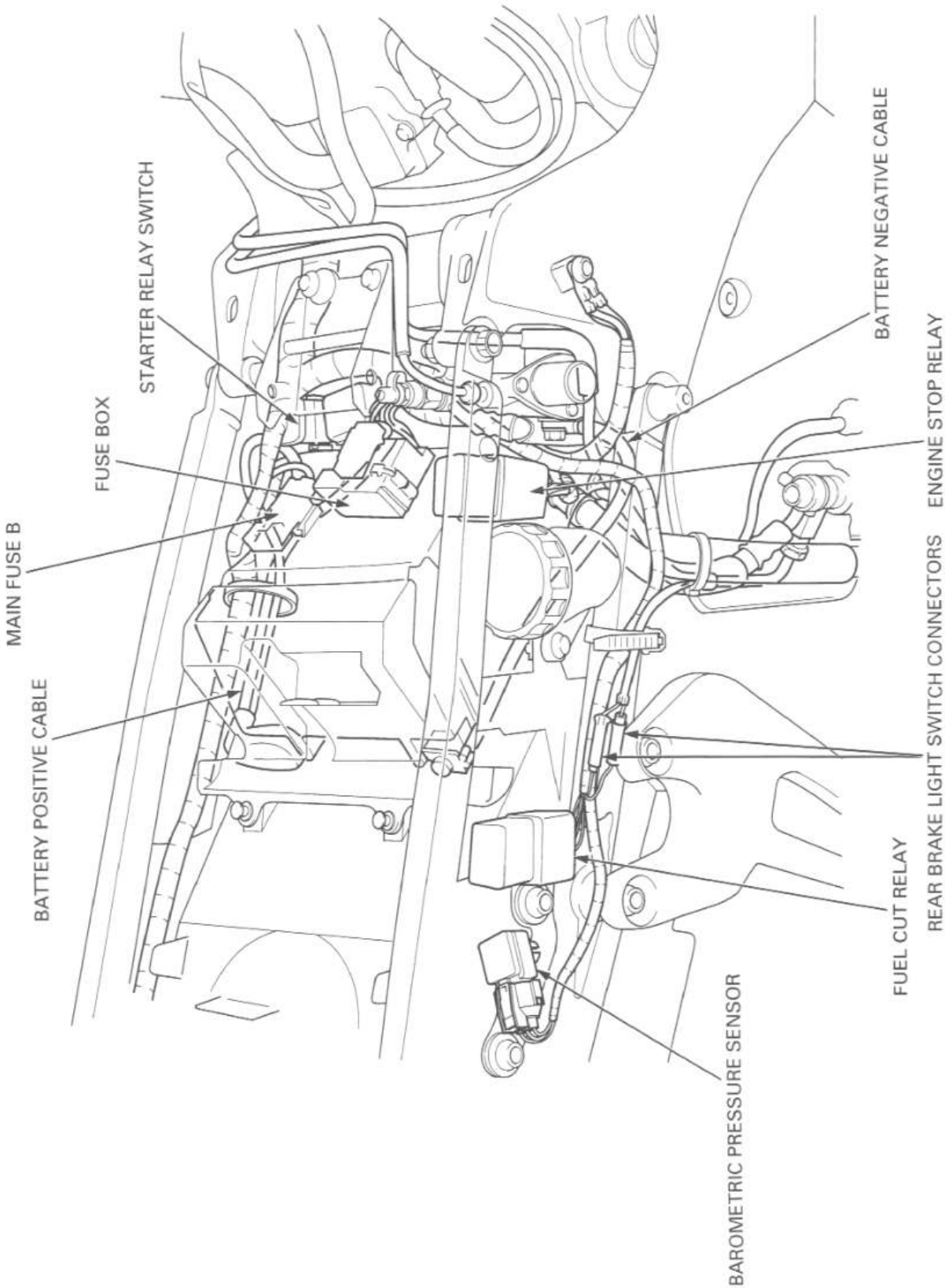

SIPHON TUBE
RADIATOR AIR BLEED TUBE
MAIN WIRE HARNESS
UPPER RADIATOR HOSE
FUEL TUBE
IGNITION PULSE GENERATOR WIRE
FUEL RETURN TUBE
CAM PULSE GENERATOR WIRE
NO. 1 SPARK PLUG WIRE

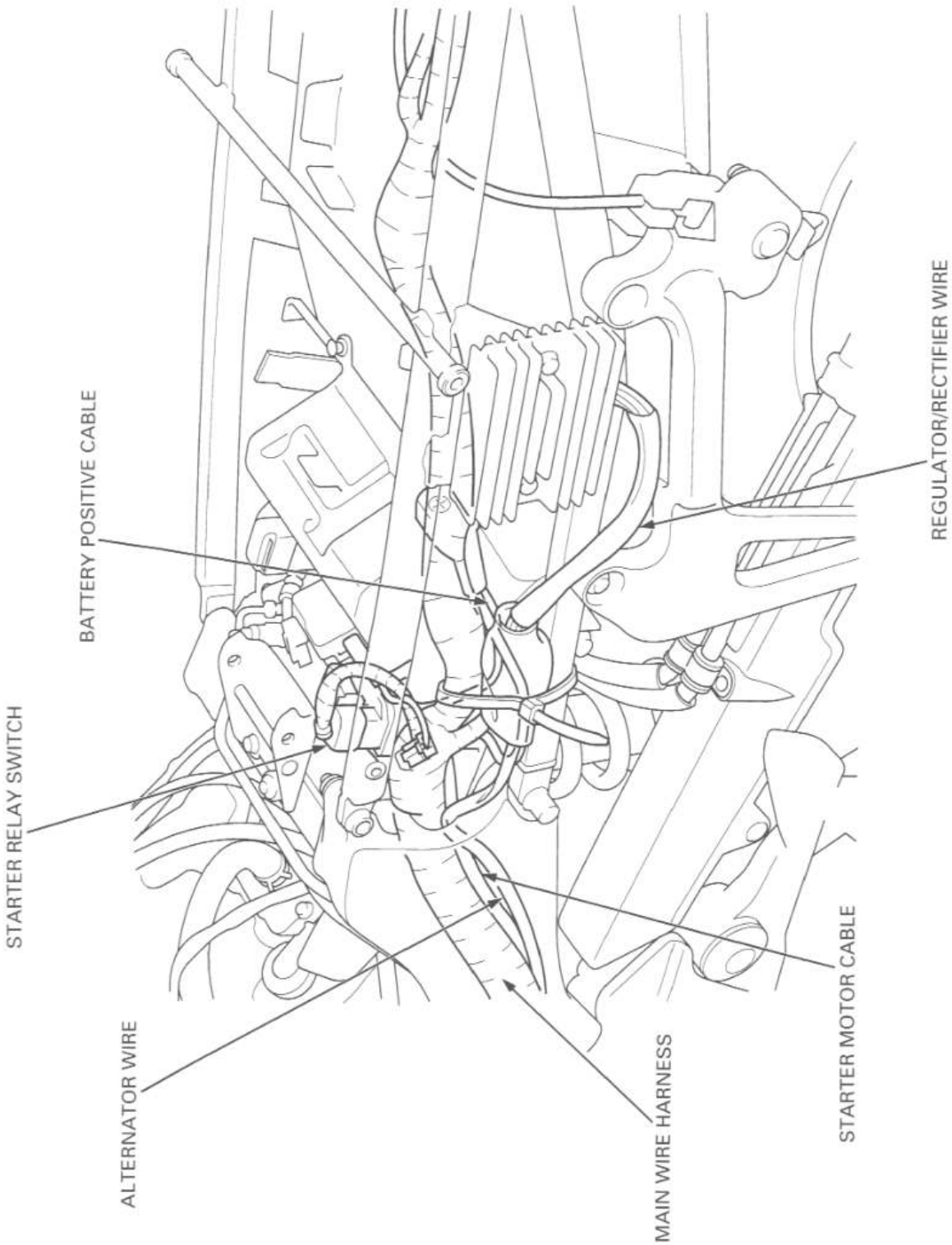

VARIABLE AIR INTAKE DIAPHRAGM
VACUUM CHAMBER
NO. 4 CYLINDER VACUUM TUBE
VARIABLE AIR INTAKE SOLENOID VALVE
ONE-WAY VALVE
NO. 3 CYLINDER VACUUM TUBE
INTAKE AIR TEMPERATURE SENSOR
THROTTLE SENSOR
MANIFOLD ABSOLUTE PRESSURE SENSOR

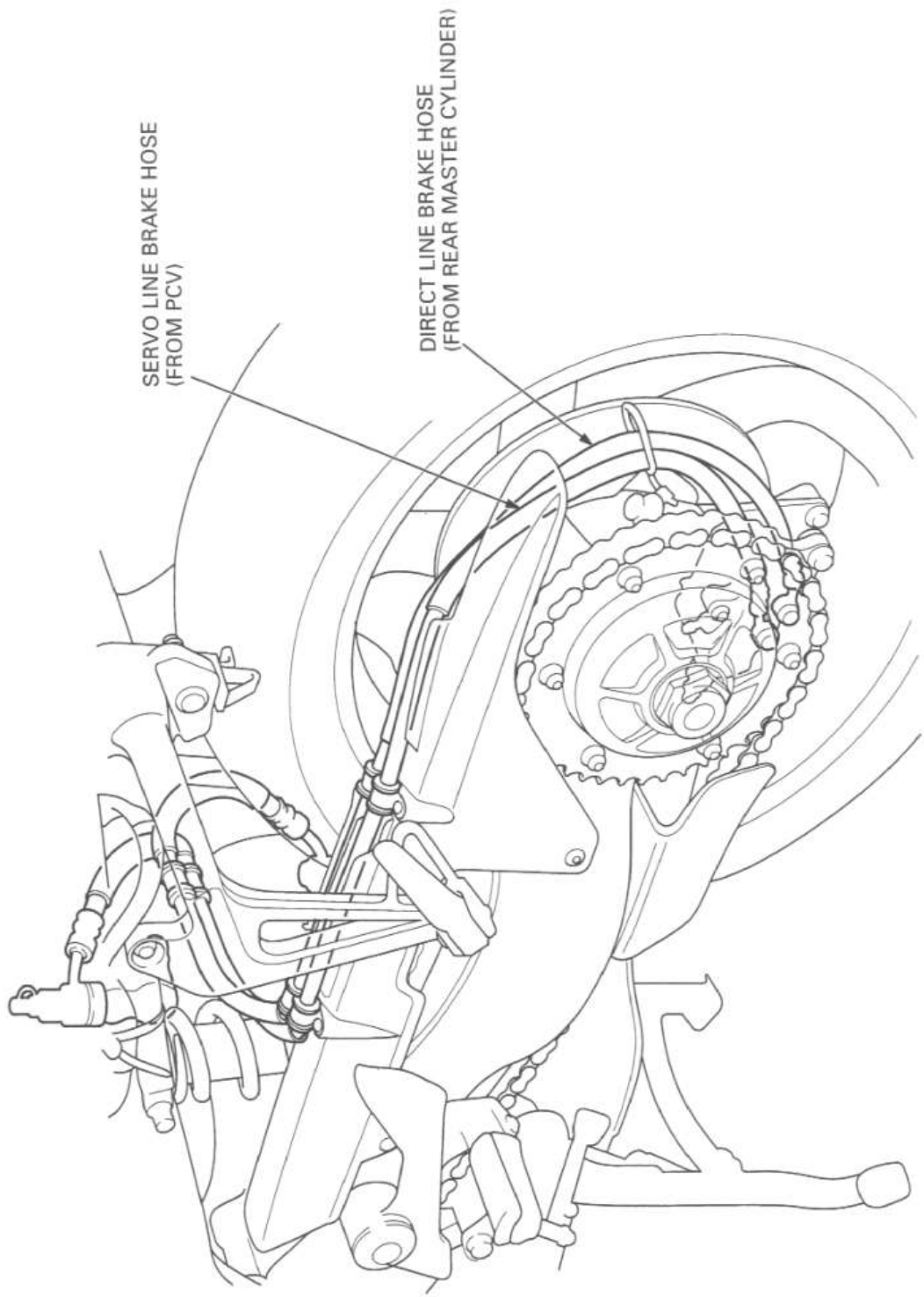

IGNITION PULSE GENERATOR WIRE
RADIATOR AIR BLEED TUBE
UPPER RADIATOR HOSE
CAM PULSE GENERATOR WIRE
OIL PRESSURE SWITCH
FUEL TANK AIR VENT TUBE
ENGINE COOLANT TEMPERATURE SENSOR
ENGINE SUB-HARNESS CONNECTOR
ENGINE SUB-HARNESS
BYPASS TUBE


ENGINE SUB-HARNESS
NEUTRAL SWITCH WIRE

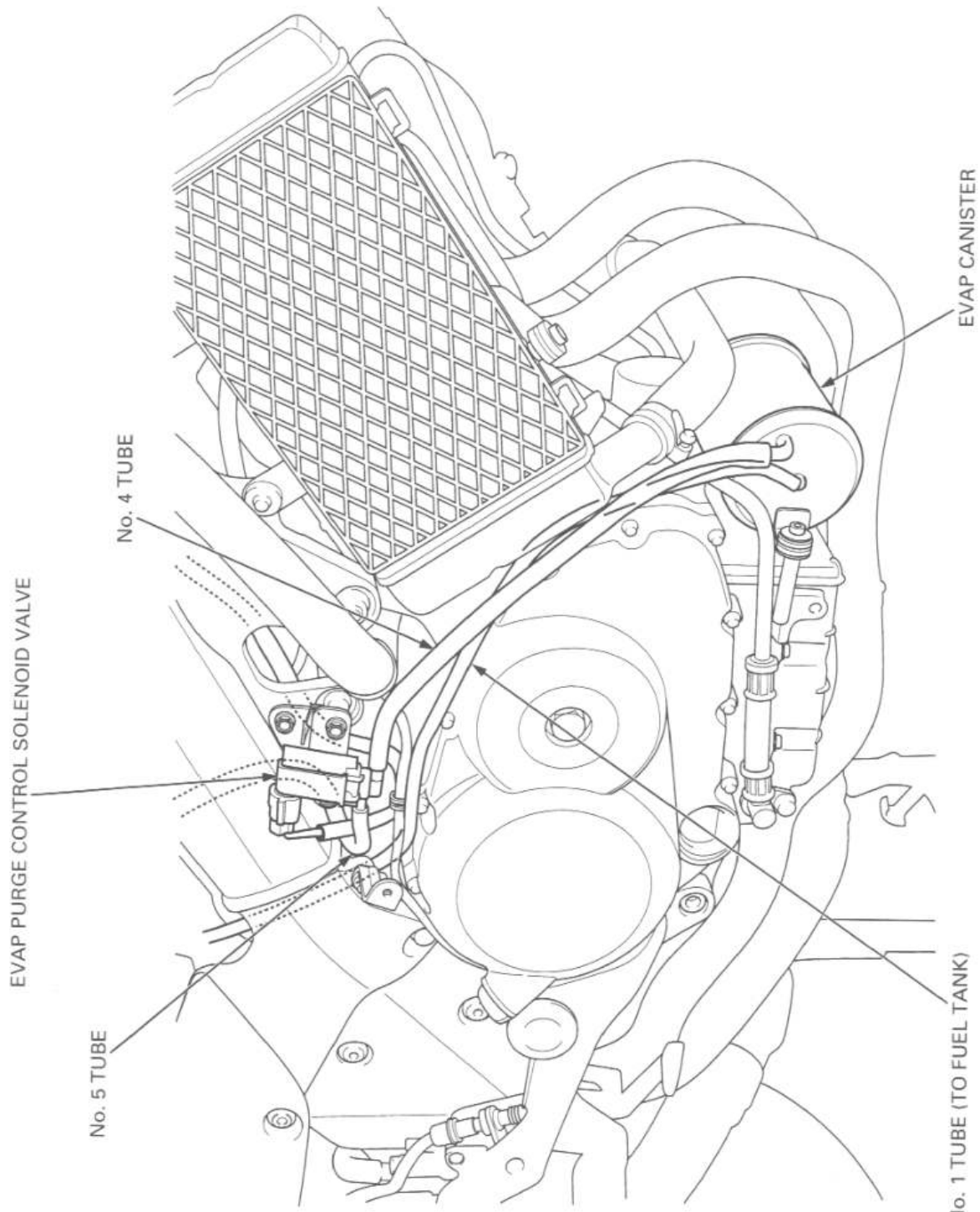

ECM
22P (GRAY) CONNECTOR
BAROMETRIC PRESSURE SENSOR
FUEL CUT RELAY
BATTERY NEGATIVE CABLE
ENGINE STOP RELAY
NO. 3 SPARK PLUG WIRE
NO. 1 SPARK PLUG WIRE
22P (BLACK) CONNECTOR
SERVICE CHECK CONNECTOR
BATTERY POSITIVE CABLE
MAIN WIRE HARNESS
FUSE BOX
STARTER RELAY SWITCH

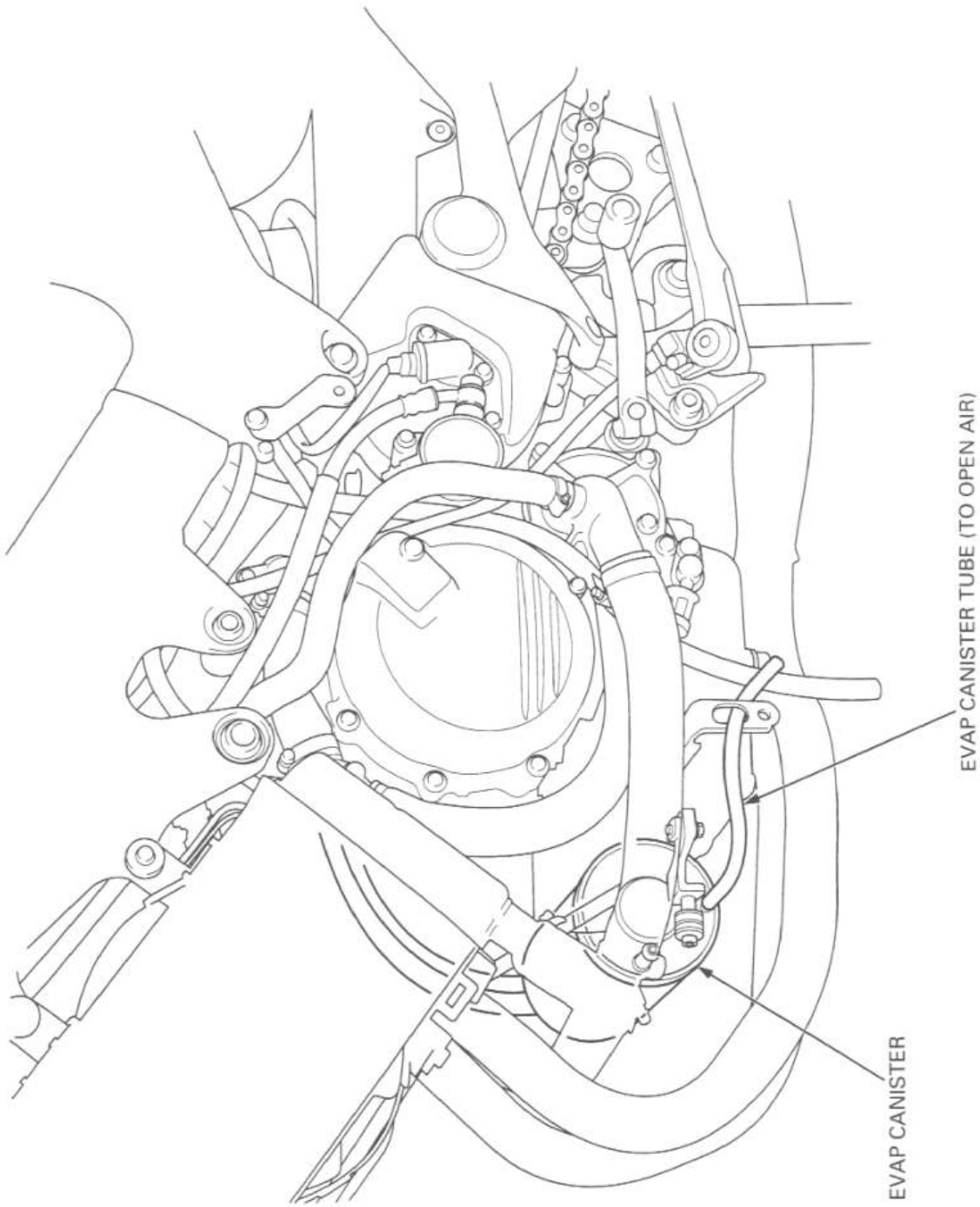

MAIN FUSE B
BATTERY POSITIVE CABLE
FUSE BOX
STARTER RELAY SWITCH
BATTERY NEGATIVE CABLE
ENGINE STOP RELAY
REAR BRAKE LIGHT SWITCH CONNECTORS
FUEL CUT RELAY
BAROMETRIC PRESSURE SENSOR

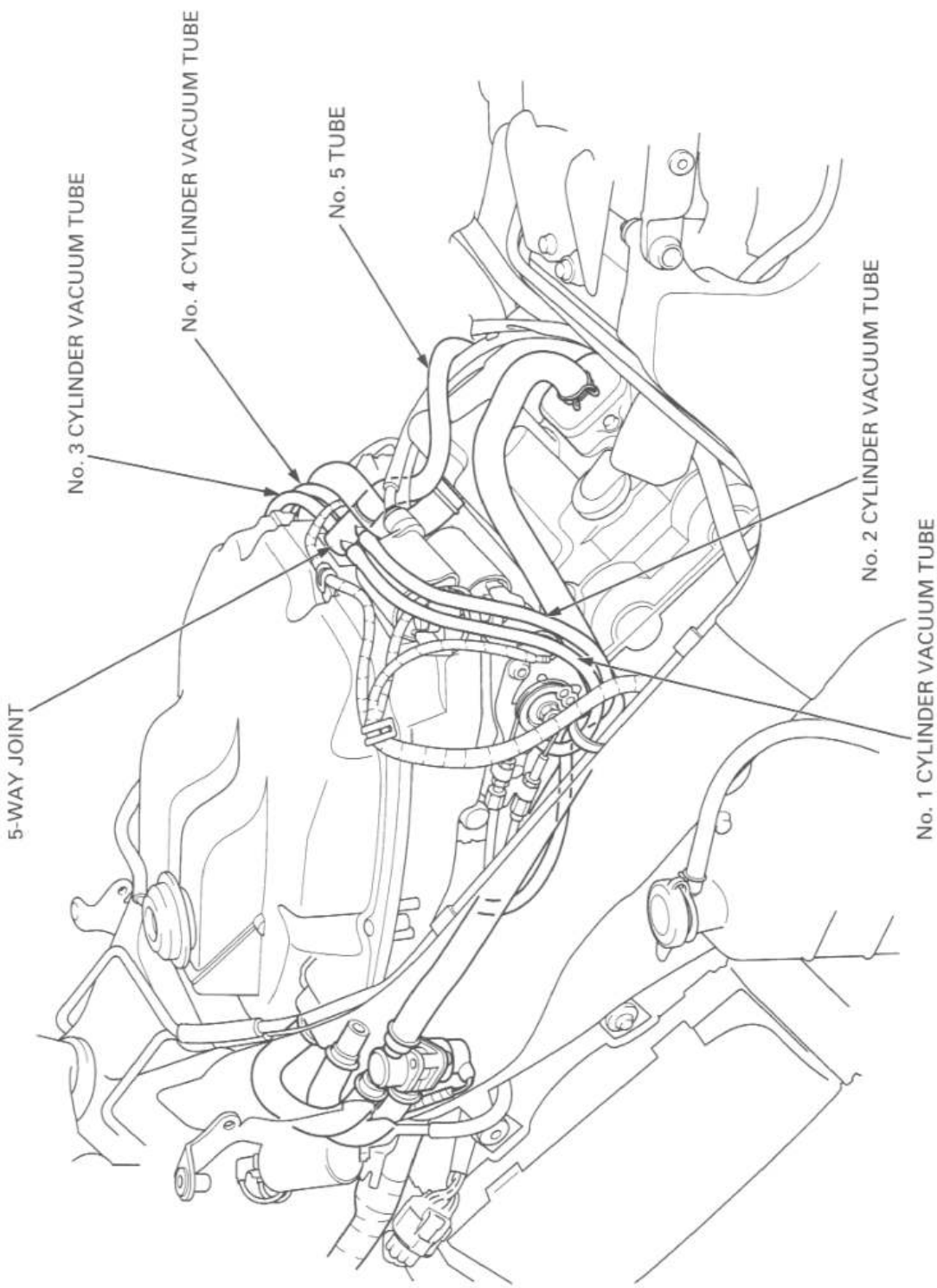

STARTER RELAY SWITCH
BATTERY POSITIVE CABLE
REGULATOR/RECTIFIER WIRE
ALTERNATOR WIRE
MAIN WIRE HARNESS
STARTER MOTOR CABLE

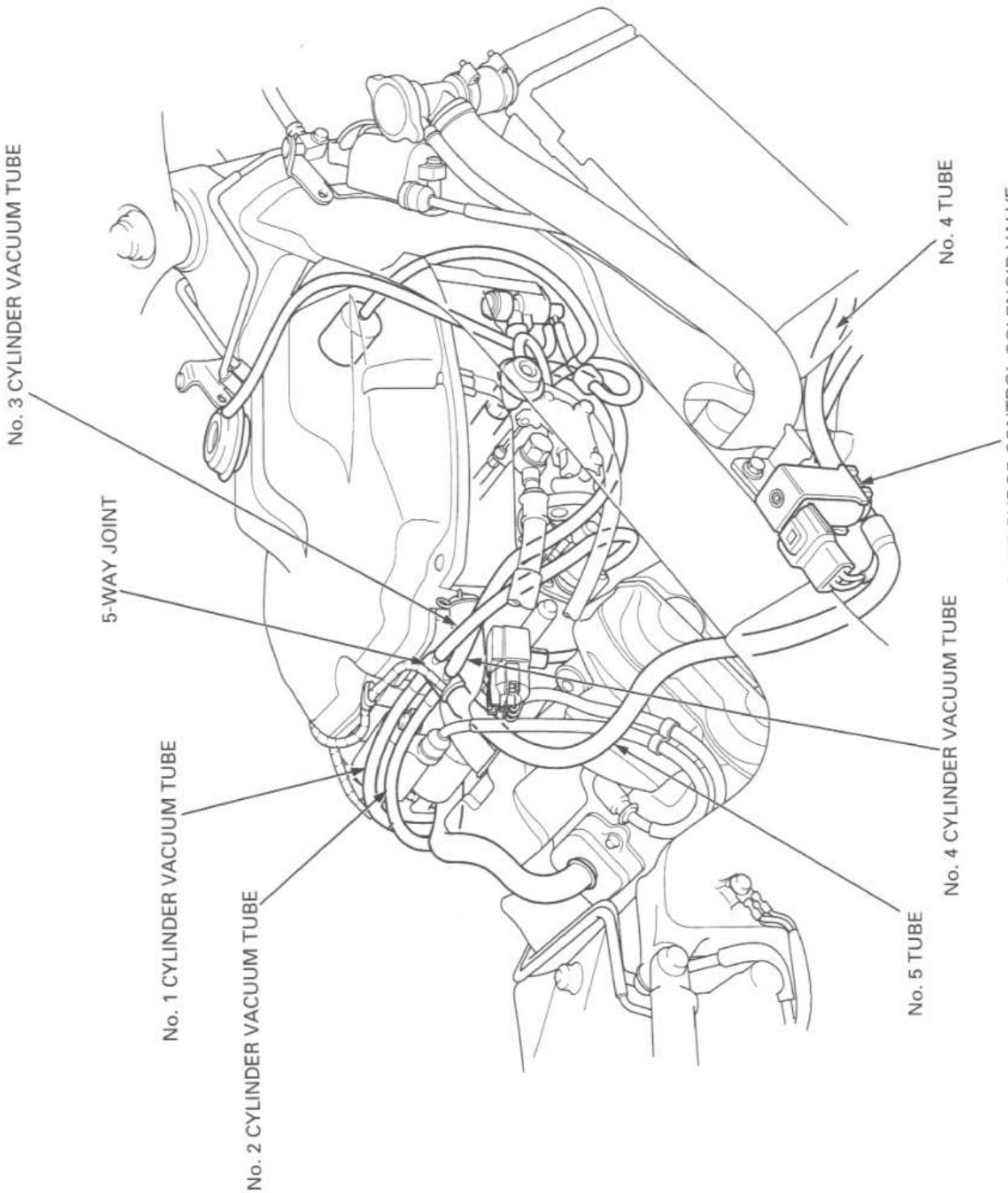

SERVO LINE BRAKE HOSE
(FROM PCV)
DIRECT LINE BRAKE HOSE
(FROM REAR MASTER CYLINDER)

CALIFORNIA TYPE:




EVAP CANISTER TUBE (TO OPEN AIR)
EVAP CANISTER


No. 3 CYLINDER VACUUM TUBE
No. 4 CYLINDER VACUUM TUBE
No. 5 TUBE
5-WAY JOINT
No. 2 CYLINDER VACUUM TUBE
No. 1 CYLINDER VACUUM TUBE


No. 3 CYLINDER VACUUM TUBE
5-WAY JOINT
No. 1 CYLINDER VACUUM TUBE
No. 2 CYLINDER VACUUM TUBE
No. 4 TUBE
EVAP PURGE CONTROL SOLENOID VALVE
No. 4 CYLINDER VACUUM TUBE
No. 5 TUBE

EMISSION CONTROL SYSTEMS

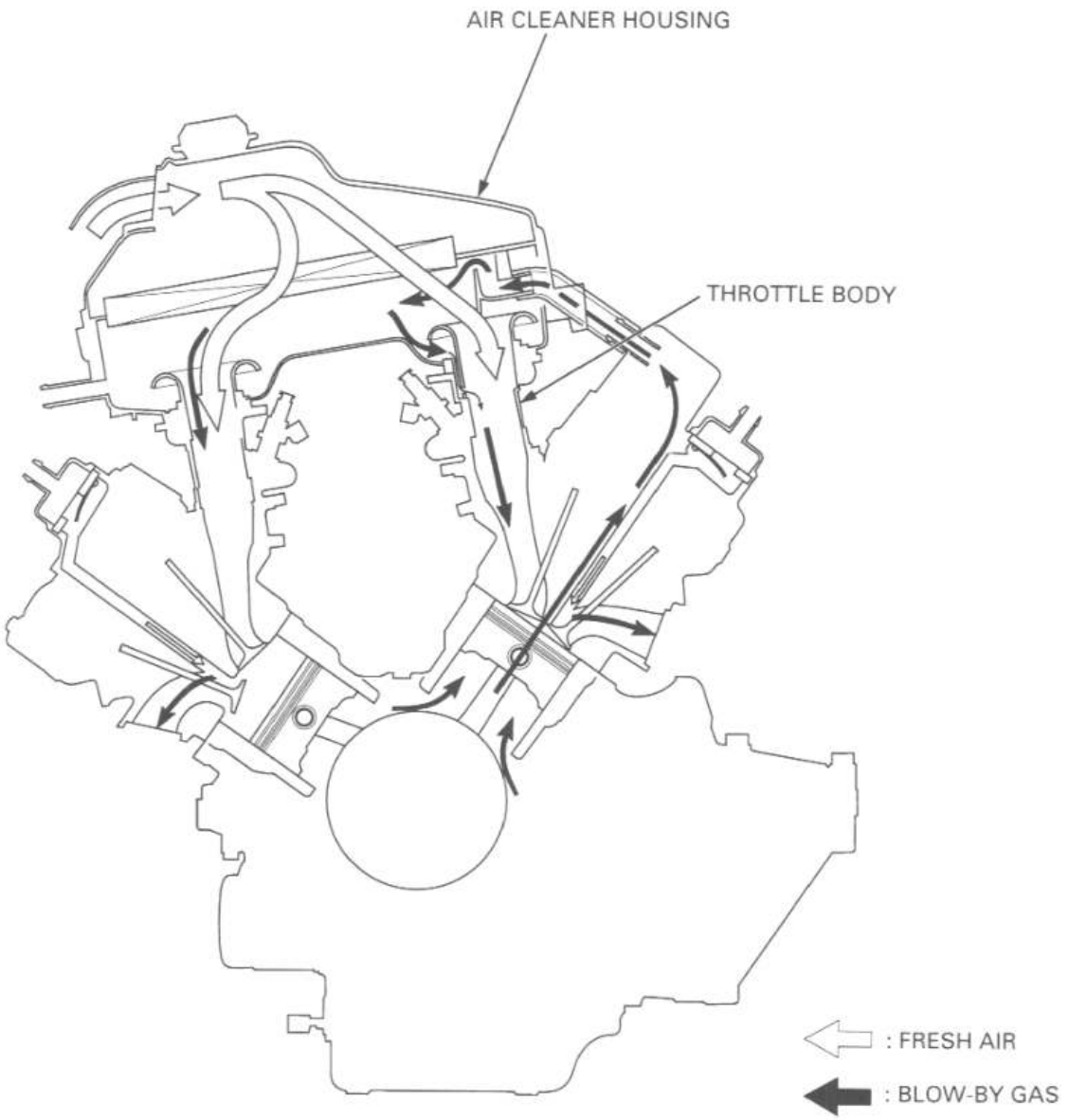
The U.S. Environmental Protection Agency, California Air Resources Board (CARB) and Transport Canada require manufacturers to certify that their motorcycles comply with applicable exhaust emissions standards during their useful life, when operated and maintained according to the instructions provided,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

SOURCE OF EMISSIONS

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

CRANKCASE EMISSION CONTROL SYSTEM

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



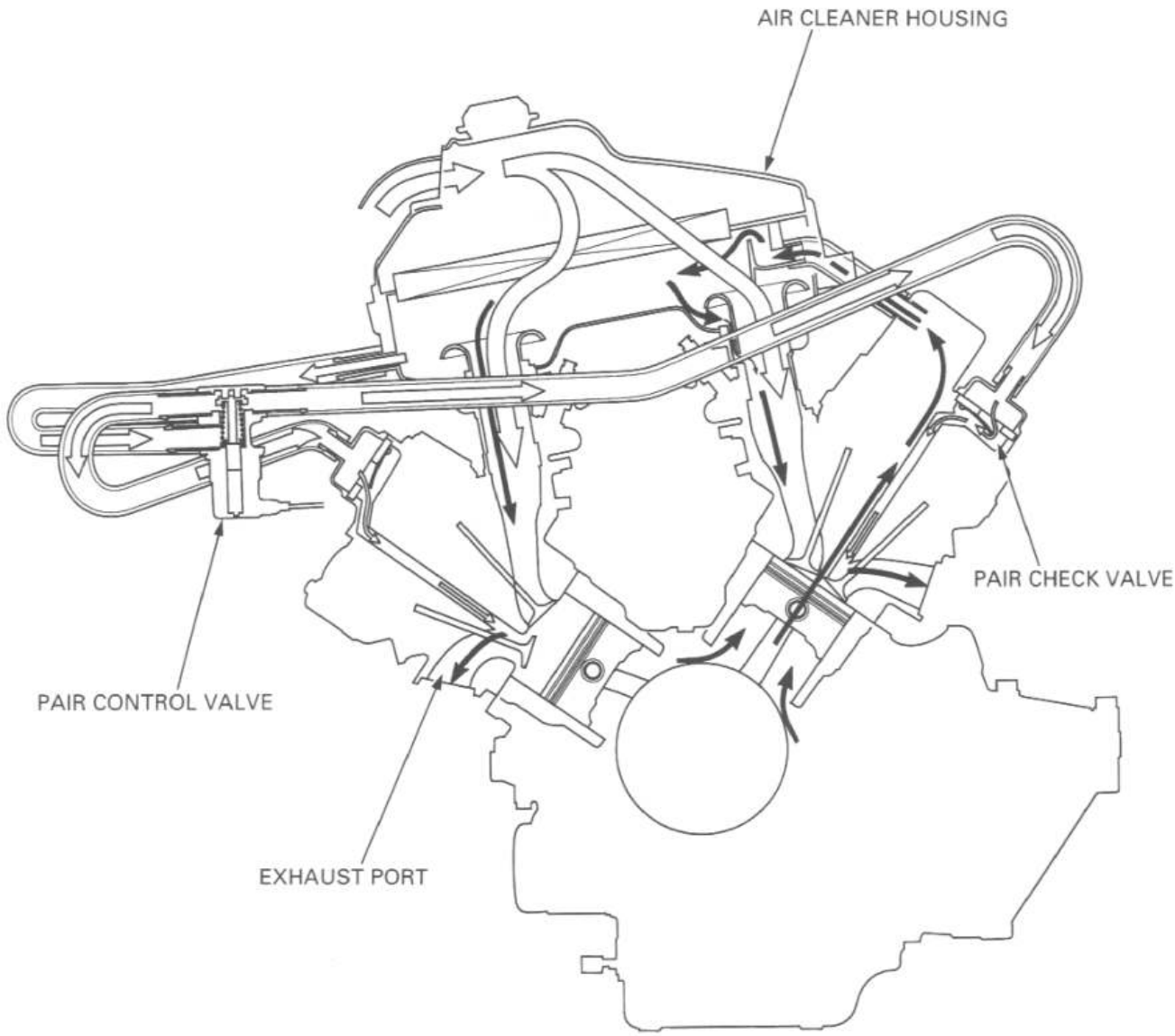
EXHAUST EMISSION CONTROL SYSTEM (SECONDARY AIR SUPPLY SYSTEM)

The exhaust emission control system is composed of a lean fuel injection setting, and no adjustments should be made except to the 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.

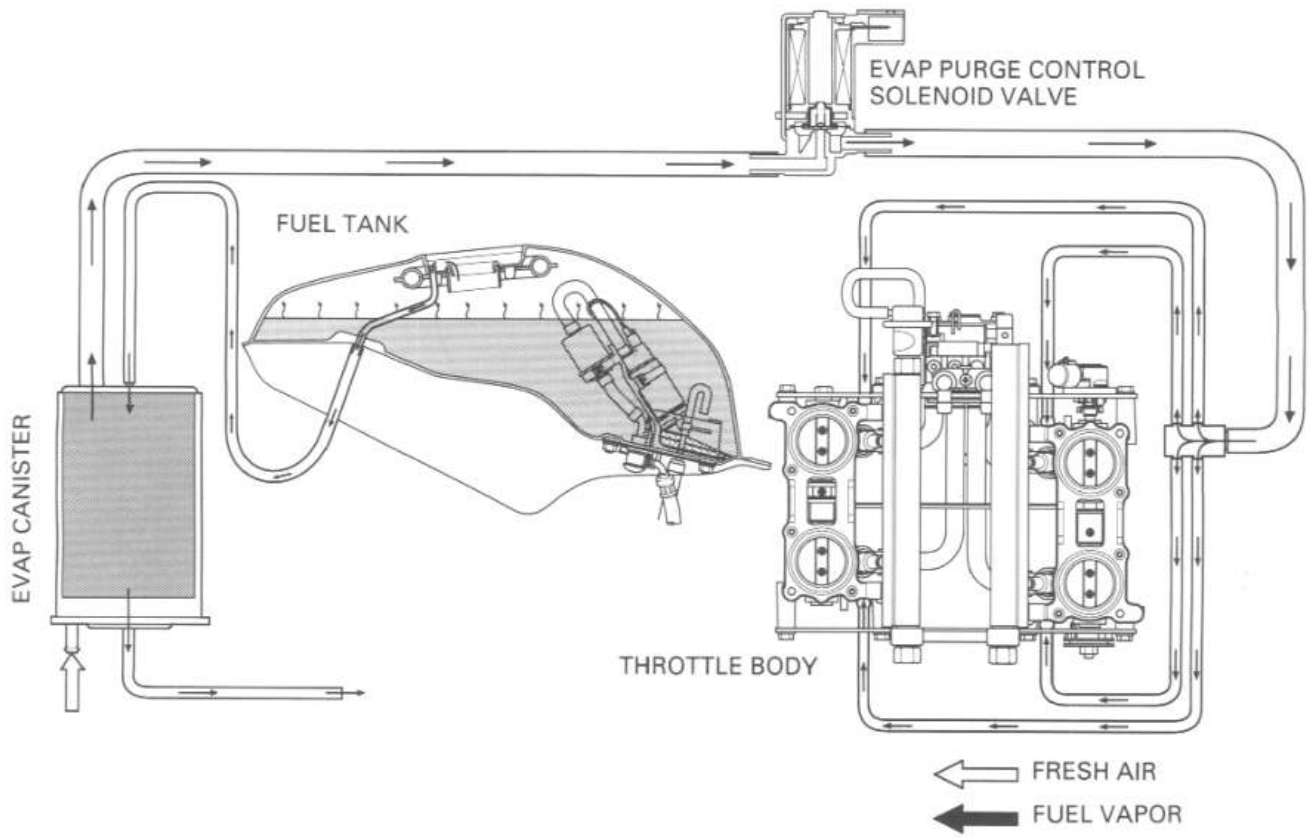
The reed valve prevents reverse air flow through the system. The PAIR control valve is operated by the solenoid valve. The solenoid valve is controlled by the ECM, and the fresh air passage is opened/closed according the running condition (ECT/IAT/TPS/MAP sensor and engine revolution).

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



EVAPORATIVE EMISSION CONTROL SYSTEM (CALIFORNIA TYPE ONLY)

This model complies with California Air Resources Board evaporative emission requirements.
Fuel vapor from the fuel tank is routed into the evaporative emission (EVAP) canister where it is absorbed and stored while the engine is stopped. When the engine is running and the evaporative emission (EVAP) purge control solenoid valve is open, fuel vapor in the EVAP canister is drawn into the engine through the throttle body.



NOISE EMISSION CONTROL SYSTEM

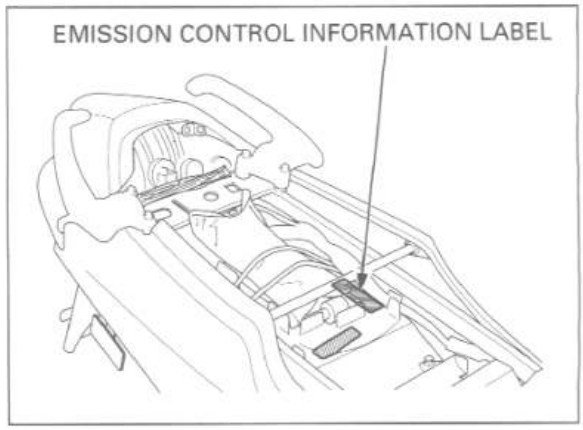
TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: Local law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle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

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

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

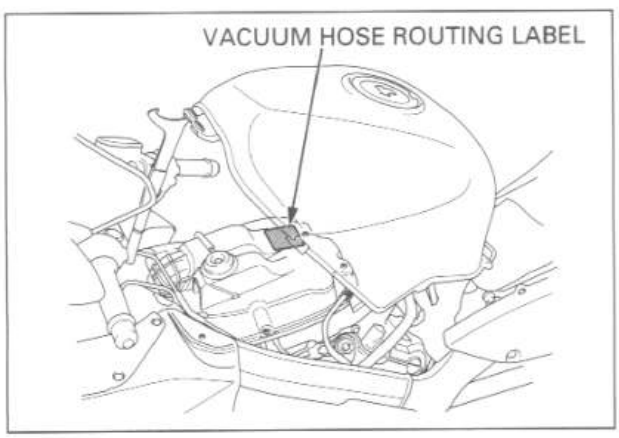
EMISSION CONTROL INFORMATION LABELS

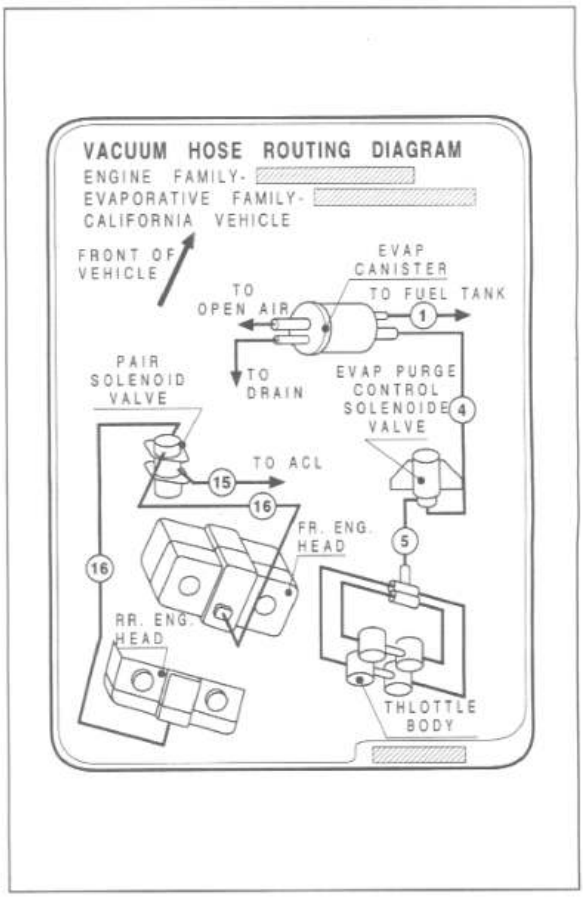
An Emission Control Information Label is located on the storage compartment as shown.
The seat must be removed to read it.
It gives base tune-up specifications.



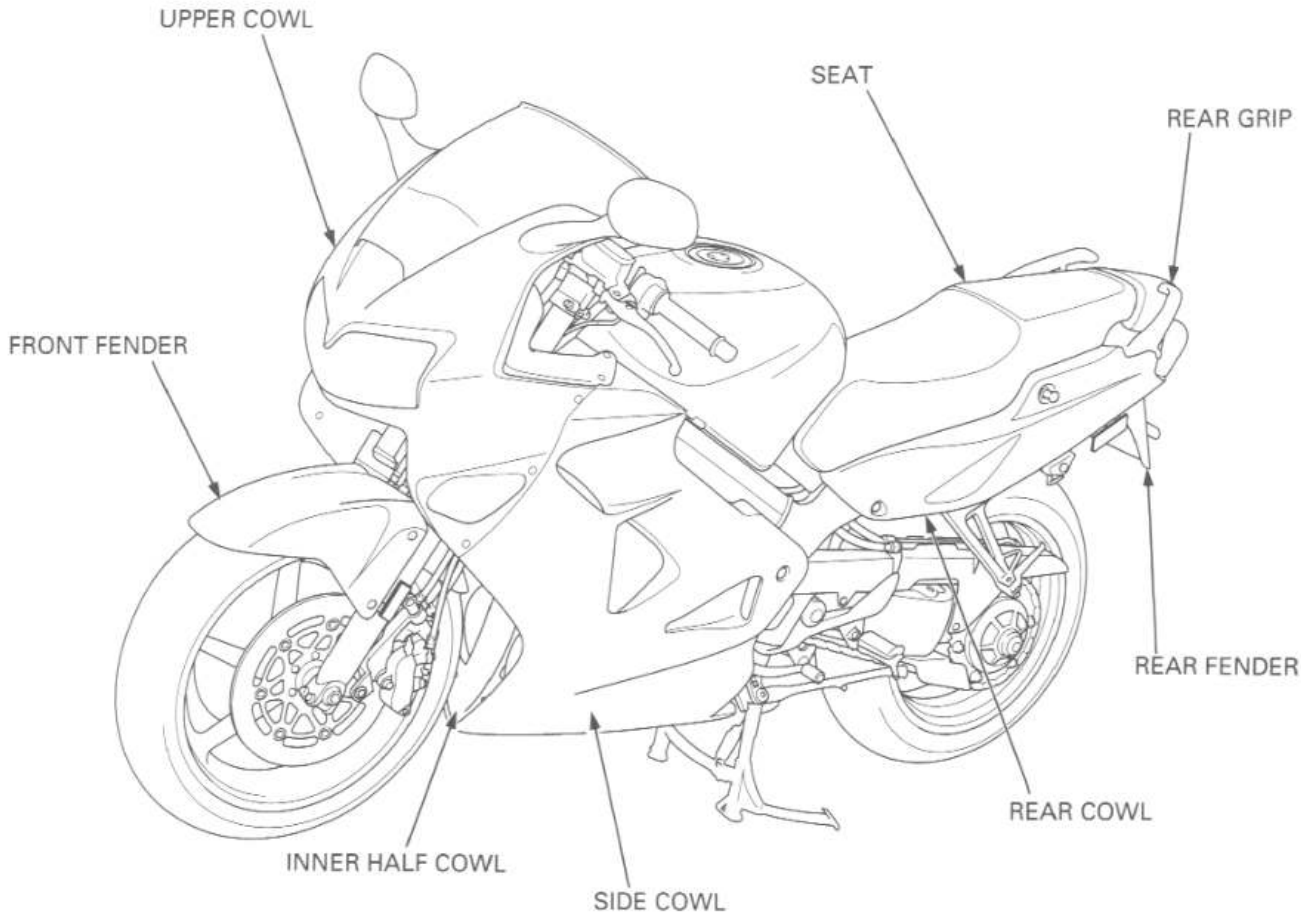
VACUUM HOSE ROUTING DIAGRAM LABEL (CALIFORNIA TYPE ONLY)

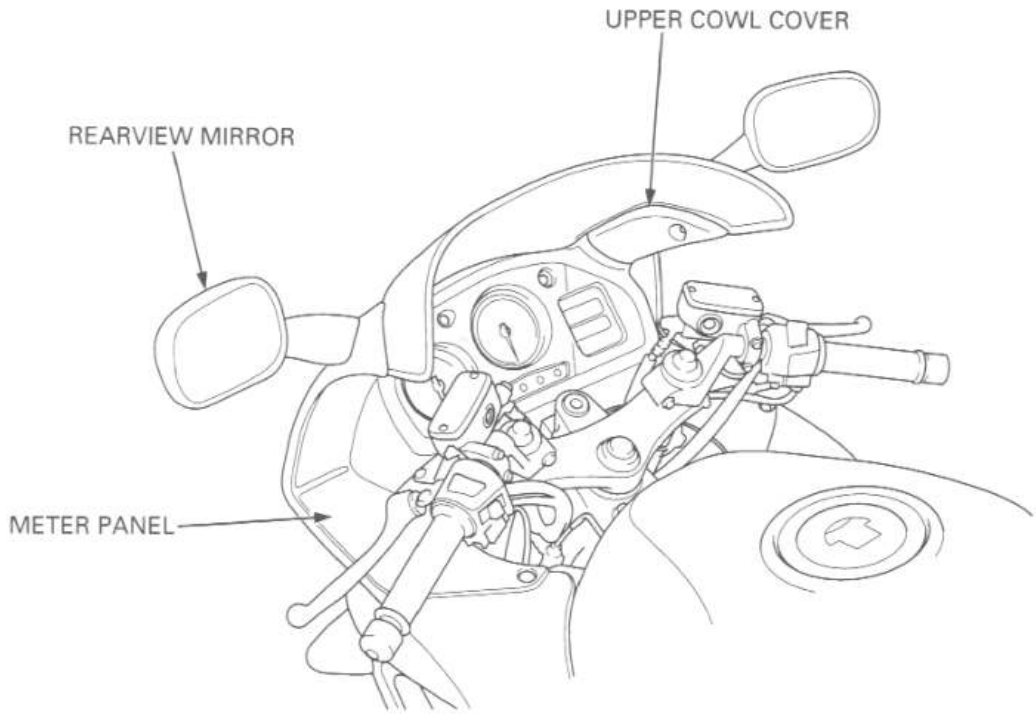
The Vacuum Hose Routing Diagram Label is on the air cleaner housing cover as shown.
The fuel tank must be opened to read it. Refer to page 3-4 for fuel tank opening.





BODY PANEL LOCATIONS





2. FRAME/BODY PANELS/EXHAUST SYSTEM

BODY PANEL LOCATIONS	2-0	REAR COWL	2-3
SERVICE INFORMATION	2-1	SIDE COWL	2-6
TROUBLESHOOTING	2-1	UPPER COWL	2-7
TRIM CLIPS	2-2	FRONT FENDER	2-12
SEAT STOPPER	2-2	SEAT RAIL/REAR FENDER	2-12
SEAT	2-3	MUFFLER/EXHAUST PIPE	2-19

SERVICE INFORMATION

GENERAL

⚠ WARNING

- ***Gasoline is extremely flammable and is explosive under certain condition. 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.
- Refer to section 5 for fuel tank removal/installation.
- Always replace the exhaust pipe gaskets after removing the exhaust pipe from the engine.
- When installing the exhaust system, loosely install all of the exhaust pipe fasteners. Always tighten the exhaust clamps first, then tighten the mounting fasteners. If you tighten the mounting fasteners first, the exhaust pipe may not seat properly.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

Side stand pivot bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Side stand pivot lock nut	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Side stand bracket bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Side stand switch mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC bolt
Main stand mounting bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)	ALOC bolt
Rear grip socket bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Exhaust pipe joint special nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Muffler bracket bolt	21 N·m (2.1 kgf·m, 15 lbf·ft)	
Upper cowl stay mounting flange nut	32 N·m (3.3 kgf·m, 24 lbf·ft)	U-nut
Upper cowl screw	1 N·m (0.15 kgf·m, 1.1 lbf·ft)	
Side cowl screw	1 N·m (0.15 kgf·m, 1.1 lbf·ft)	
Inner half cowl screw	1 N·m (0.15 kgf·m, 1.1 lbf·ft)	
Meter panel screw	1 N·m (0.15 kgf·m, 1.1 lbf·ft)	
Rear cowl screw	1 N·m (0.15 kgf·m, 1.1 lbf·ft)	
Seat rail special bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Seat rail flange nut	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Bank sensor	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Pillion step flange bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	

TROUBLESHOOTING

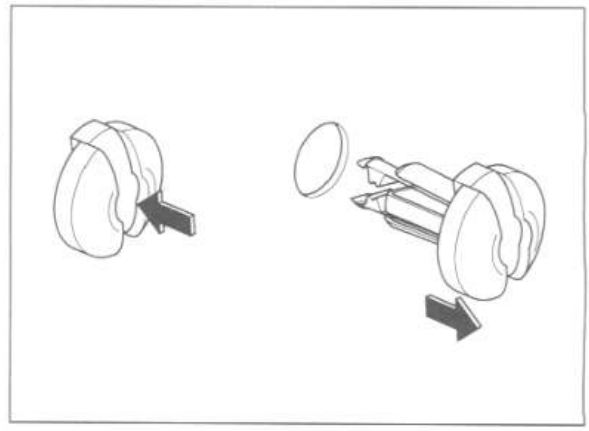
Excessive exhaust noise
- Broken exhaust system
- Exhaust gas leak

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

TRIM CLIPS

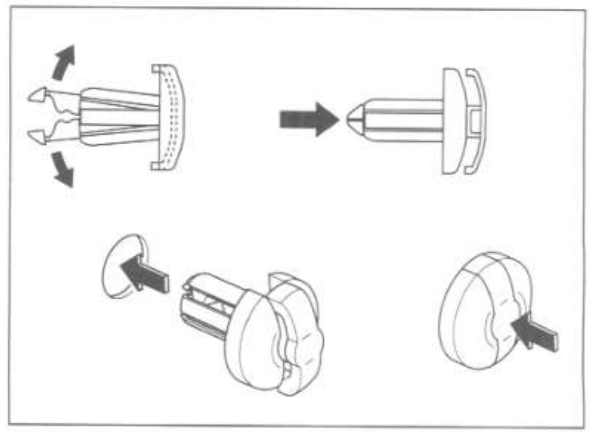
REMOVAL

Push the center of the trim clip in.
Remove the trim clip.



INSTALLATION

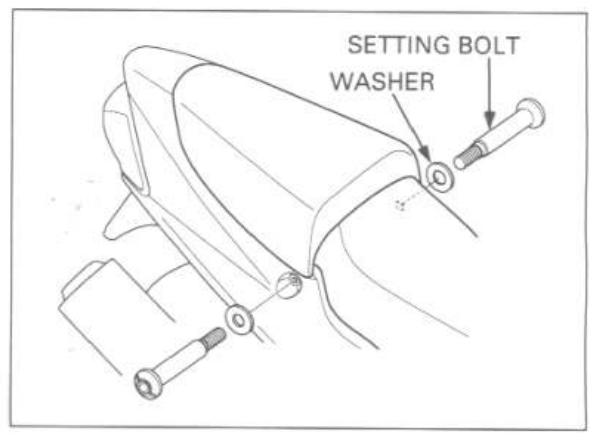
Raise the center pin by pushing the retaining tabs back.
Install the trim clip.
Push the center pin until the pin flush with the outer casing.



SEAT STOPPER

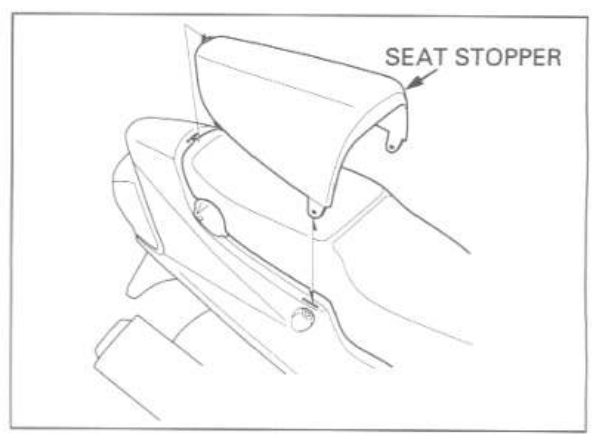
REMOVAL/INSTALLATION

Remove the setting bolts and washers.



Remove the seat stopper by releasing the tabs from the rear cowl.

Install the seat stopper in the reverse order of removal.



SEAT

REMOVAL

Unlock the helmet holder using the ignition key.
Pull the seat lock lever down.

Remove the seat backward while releasing the front end of the seat hooks from the fuel tank.

INSTALLATION

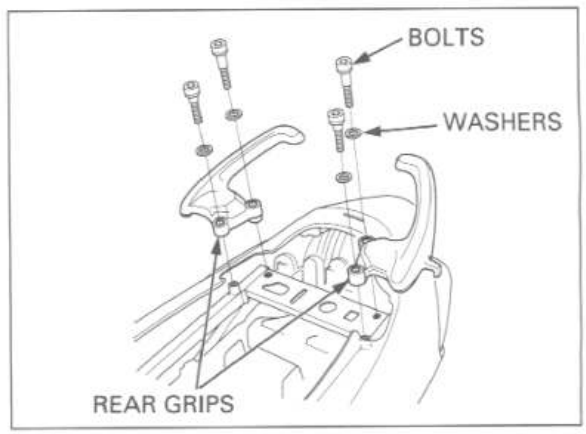
Install the seat while aligning its hooks, with the fuel tank.
Push the seat forward, lock it securely.



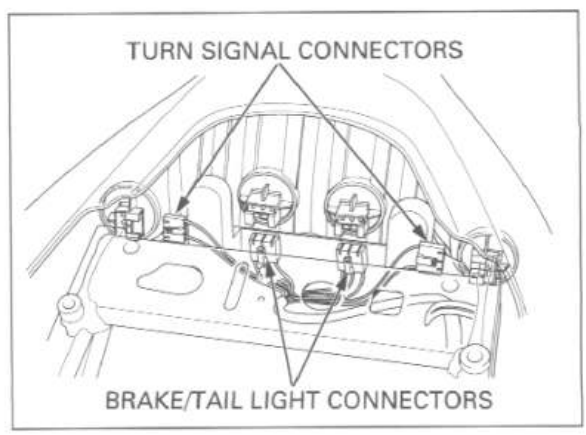
REAR COWL

REMOVAL

Remove the rear grip mounting bolts, washers and both rear grips.

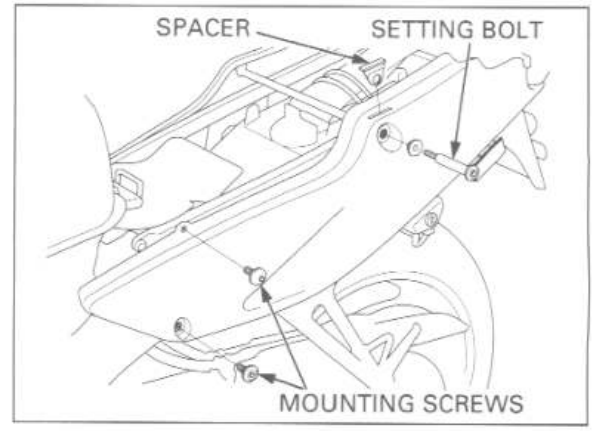


Disconnect the tail/brake light connectors and turn signal connectors.

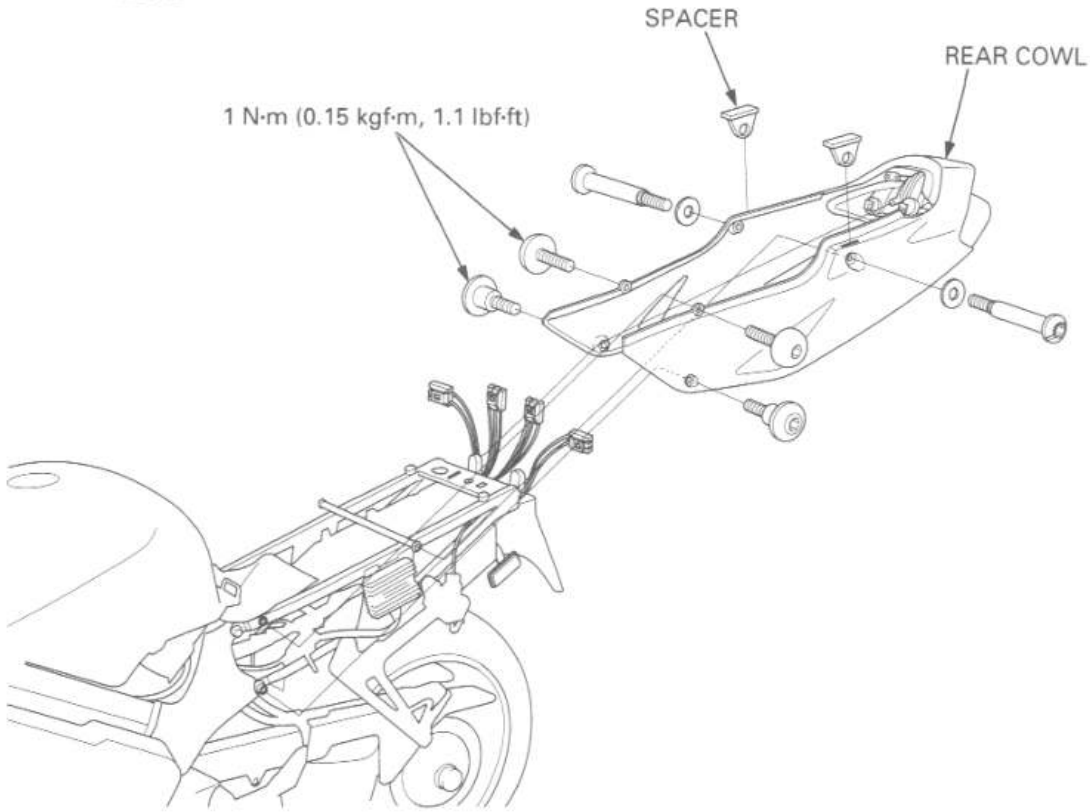


Remove the rear cowl setting bolts, washers and spacers.
Remove the rear cowl mounting screws.

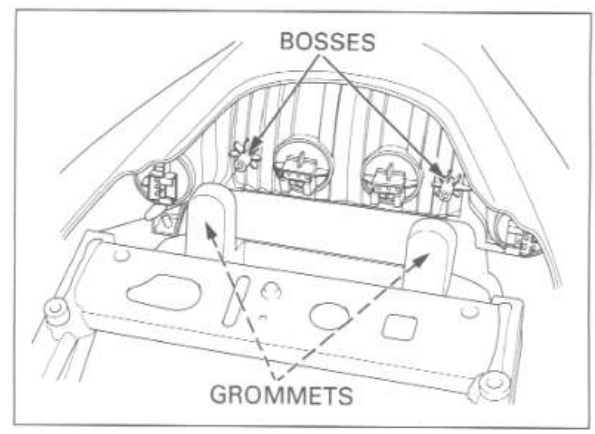
Remove the rear cowl backward.



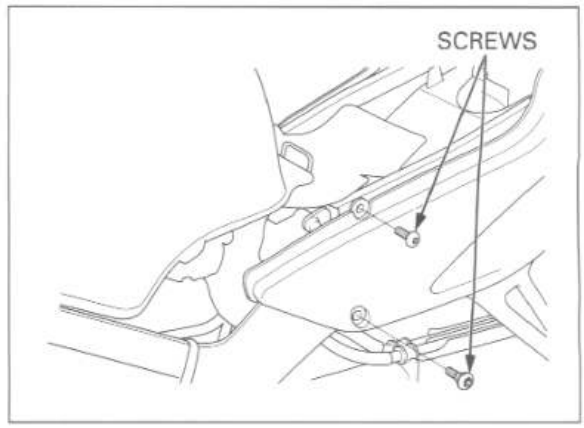
INSTALLATION



Install the rear cowl while aligning its bosses with the grommet on the rear fender.



Install the rear cowl mounting screws.



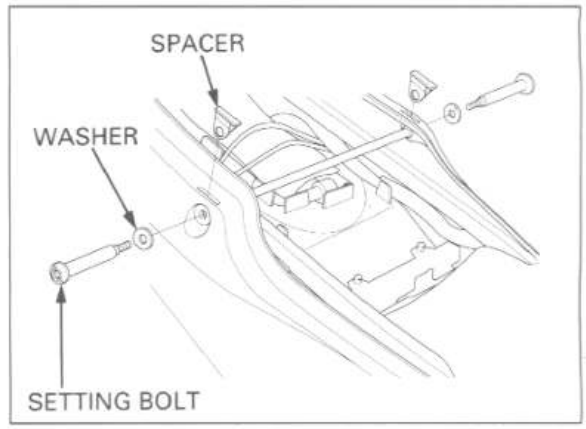
Install the spacers, collars and setting bolts.

NOTE:

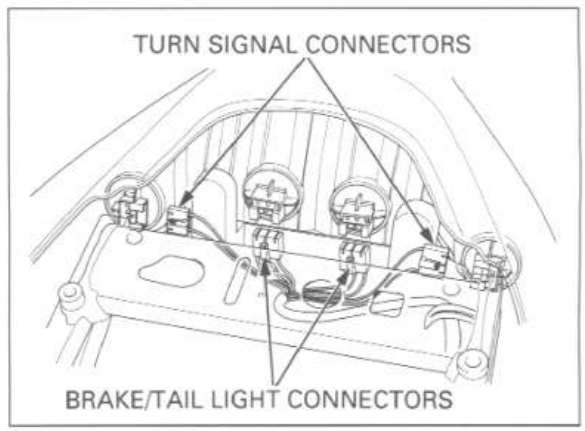
Note the direction of the spacers.

Tighten the setting bolts.
Tighten the mounting screws to the specified torque.

TORQUE: 1 N·m (0.15 kgf·m, 1.1 lbf·ft)

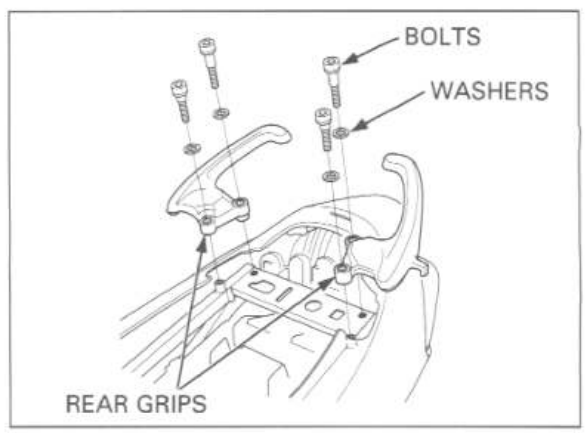


Connect the turn signal connectors and brake/tail light connectors.



Install the rear grips, washers and socket bolts, then tighten the socket bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



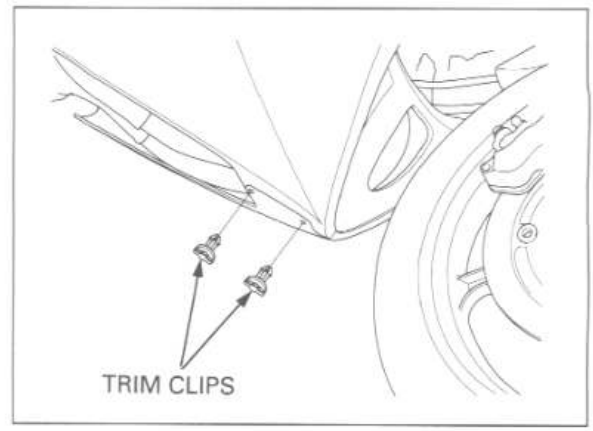
SIDE COWL

REMOVAL

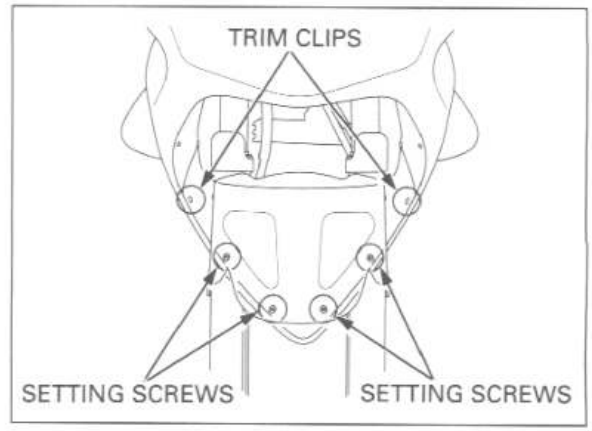
NOTE:

The right and left side cowls can be removed individually.

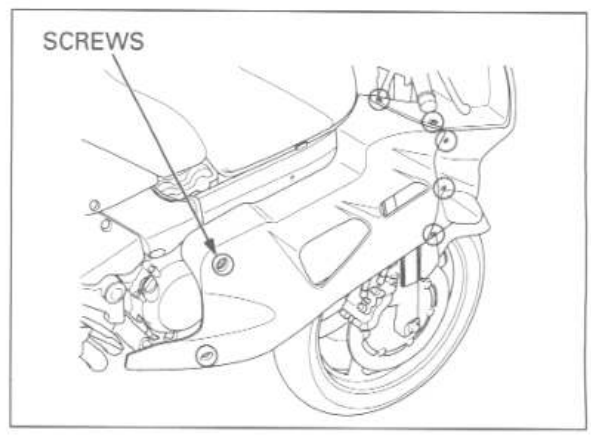
Remove the trim clips between the right and left side cowls.



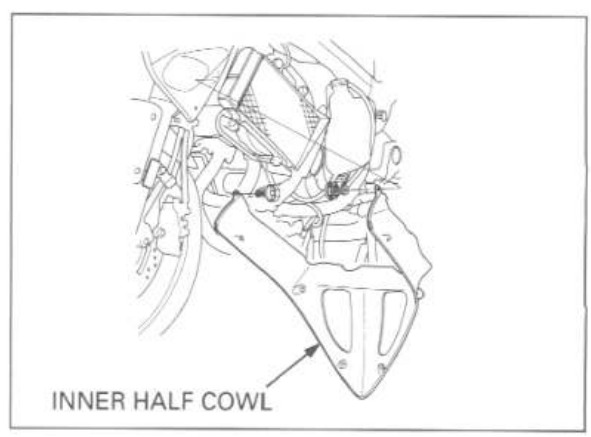
Remove the trim clips and setting screws between the right and left side cowls and inner half cowl.



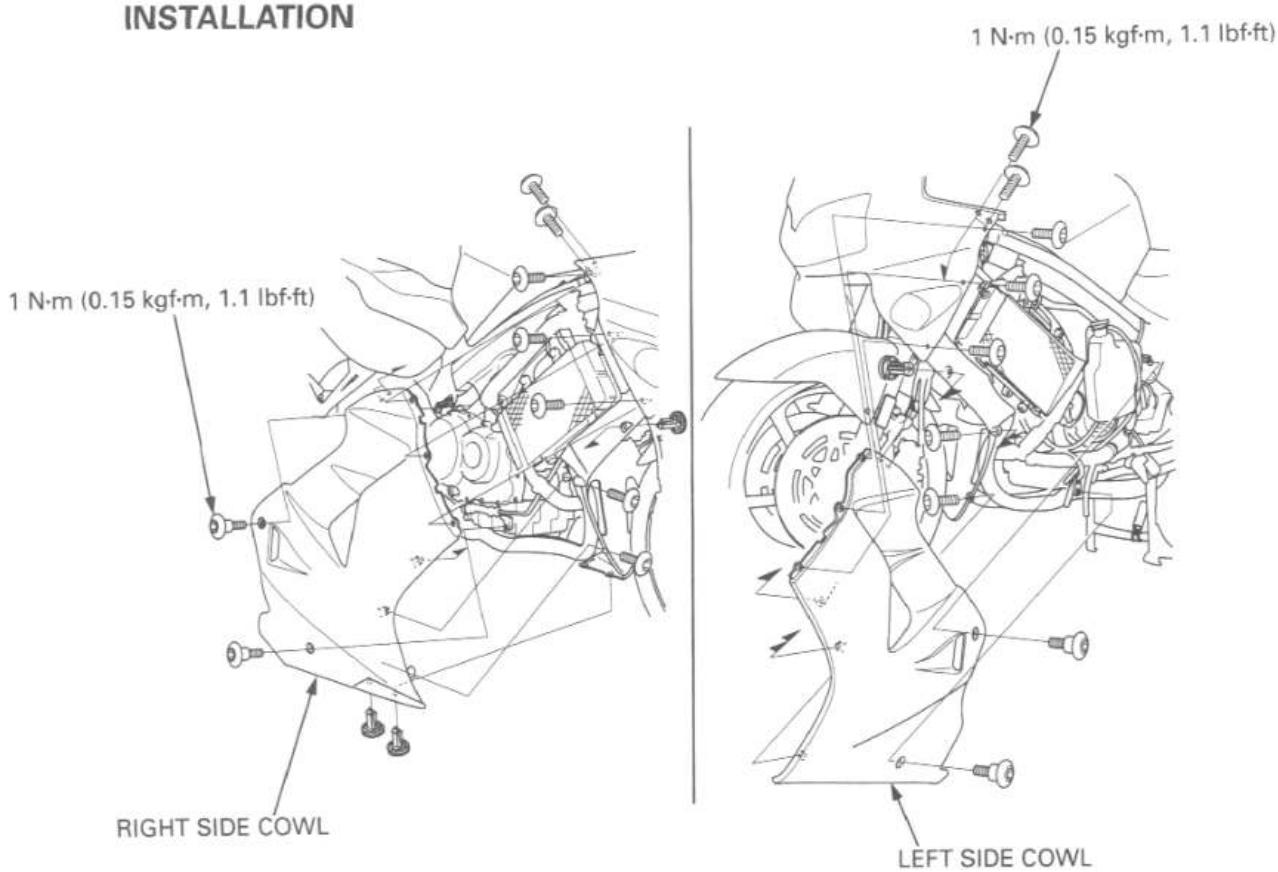
Remove the special screws and cowl setting screws, then remove the side cowl.



Remove the two trim clips and inner half cowl.



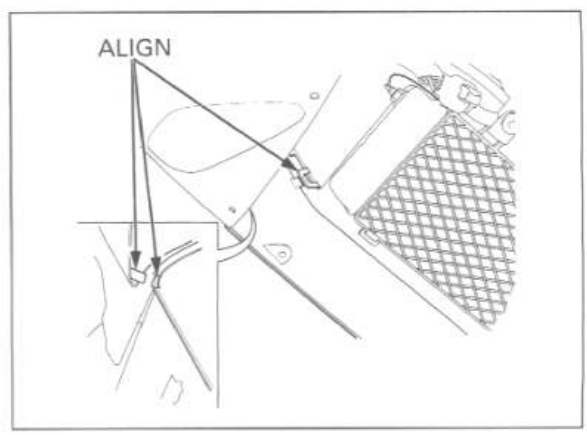
INSTALLATION



Installation is in the reverse order of removal.

NOTE:

Align the tabs of the inner half cowl with the upper cowl.

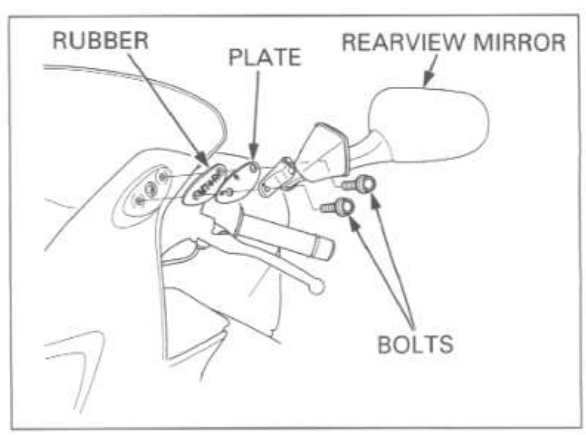


UPPER COWL

REARVIEW MIRROR REMOVAL

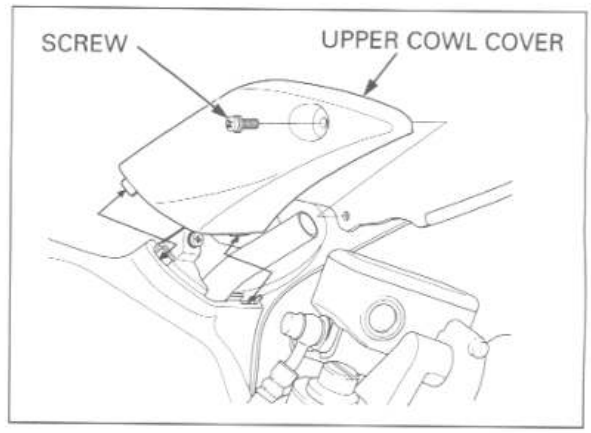
Remove the rearview mirror pivot boot.

Remove the following:
— Bolts
— Rearview mirror
— Mirror plate
— Rubber cushion



WINDSCREEN REPLACEMENT

Remove the screw/washer and upper cowl cover.

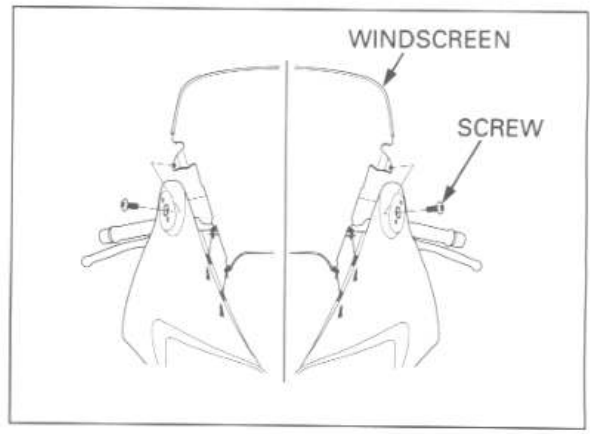


Remove the windscreen mounting screws.

Remove the windscreen upward.

NOTE:

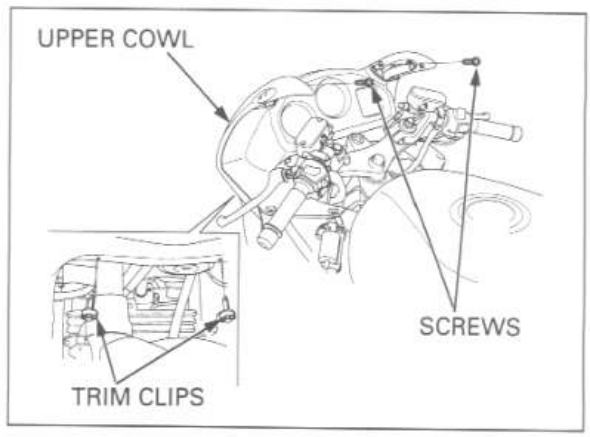
At installation, install the windscreen bosses into the upper cowl grooves.



UPPER COWL REMOVAL

Remove the following:
— Side cowls and inner half cowl (page 2-6)
— Rearview mirror (page 2-7) and windscreen

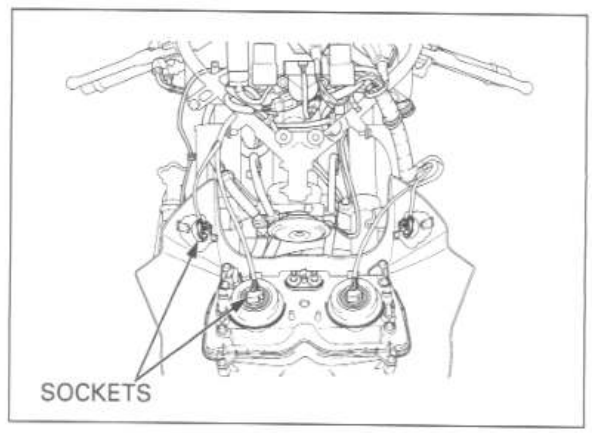
Remove the two trim clips.
Remove the upper cowl mounting screws.



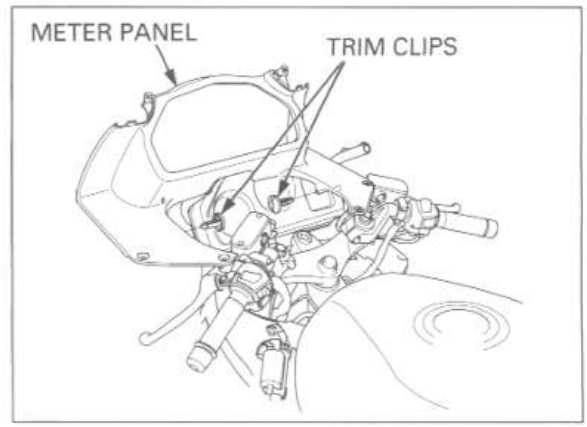
Release the upper cowl from the rearview mirror bracket and pull the upper cowl forward.

Disconnect the headlight sockets and turn signal sockets.

Remove the upper cowl.



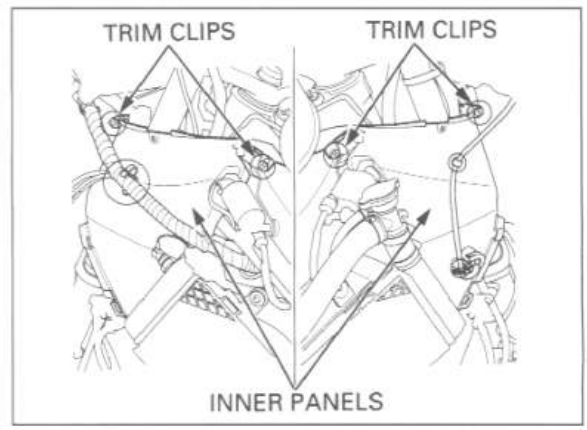
Remove the trim clips and meter panel.



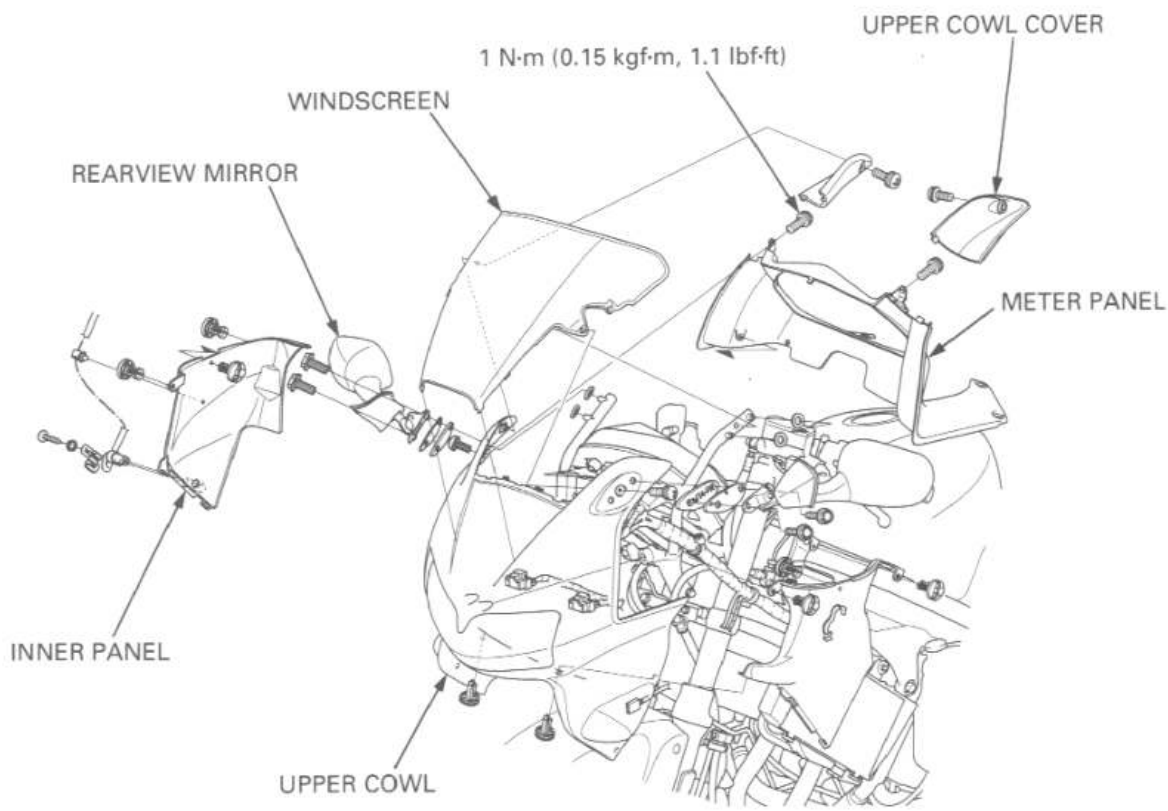
Remove the air temperature sensor from the right inner panel (page 19-10).
Release the main wire harness from the left inner panel.

Remove the trim clips and both inner panels.

Remove the headlight unit from the upper cowl (page 19-7).

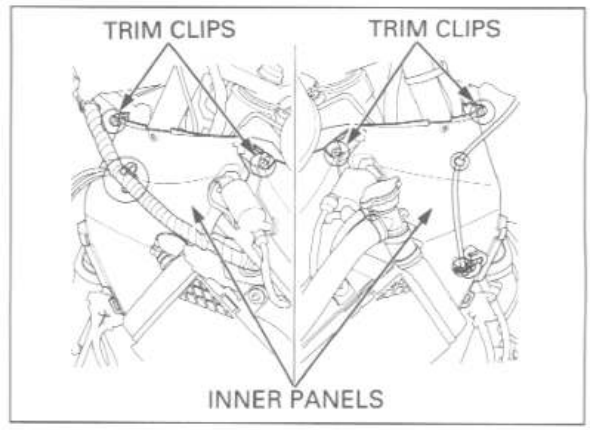


UPPER COWL INSTALLATION

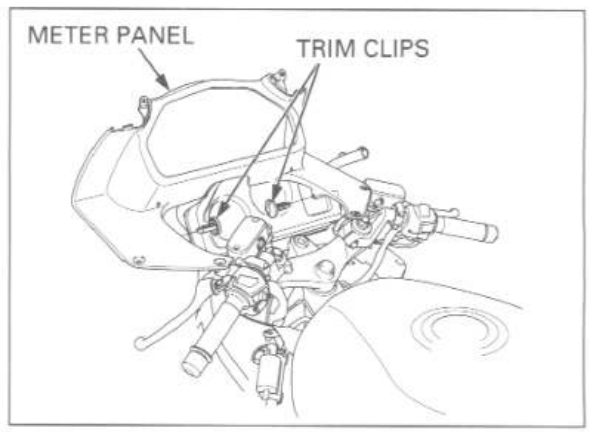


Install the inner panels and secure it with two trim clips.
Install the main wire harness to the left inner panel.

Install the air temperature sensor onto the right inner panel (page 19-12).

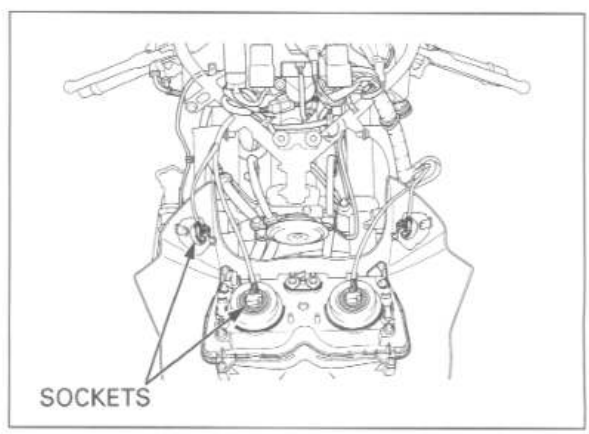


Install the meter panel and secure it with two trim clips.

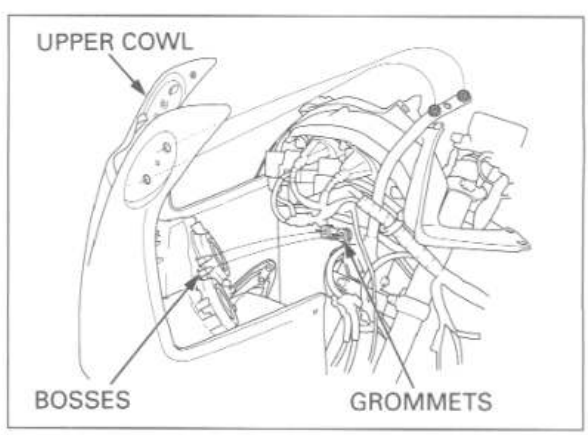


Install the headlight unit (page 19-5).

Connect the headlight sockets and turn signal sockets.



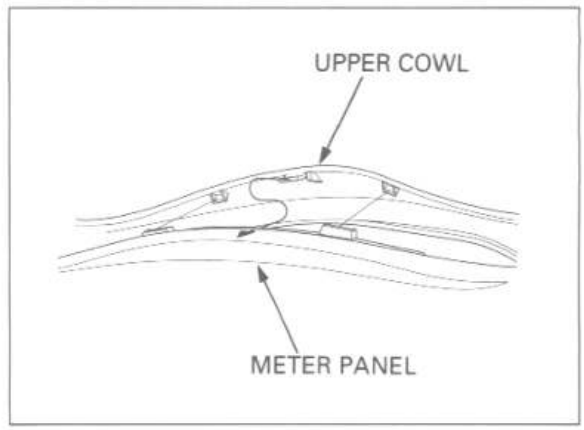
Install the upper cowl aligning the bosses on the headlight unit with the rubber grommets on the upper cowl stay.



Align the upper cowl bosses with the meter panel grooves.

NOTE:

Align the rearview mirror hole on the upper cowl with the bosses on the upper cowl stay.

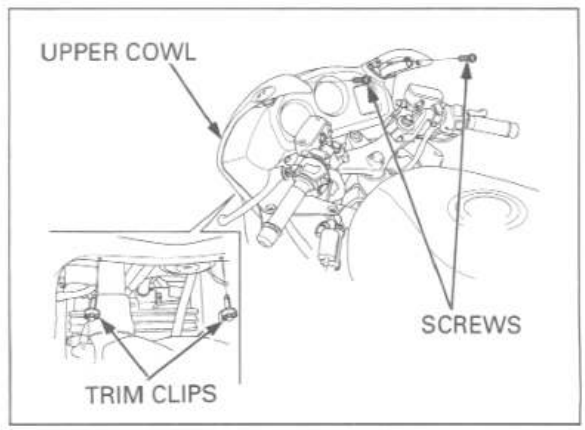


Install and tighten the upper cowl mounting screws to the specified torque.

TORQUE: 1 N·m (0.15 kgf·m, 1.1 lbf·ft)

Install the two trim clips.

Install the following:
— Windscreen (page 2-7)
— Inner half cowl and side cowls (page 2-7)

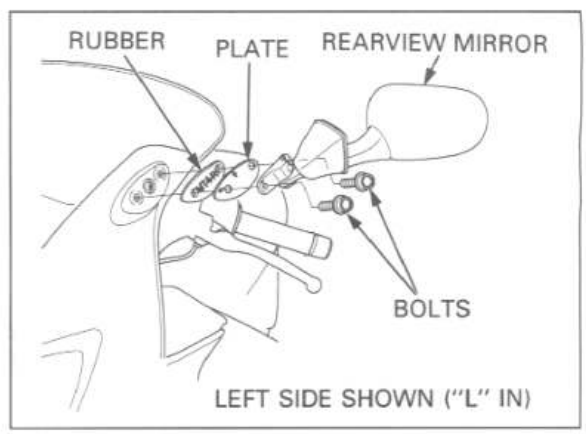


REARVIEW MIRROR INSTALLATION

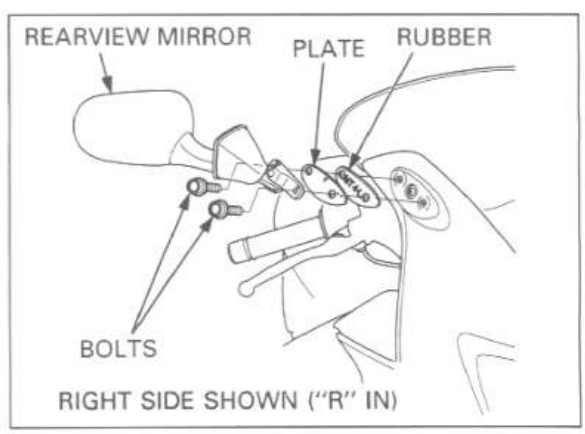
Install the rubber seats and rearview mirror plate.

NOTE:

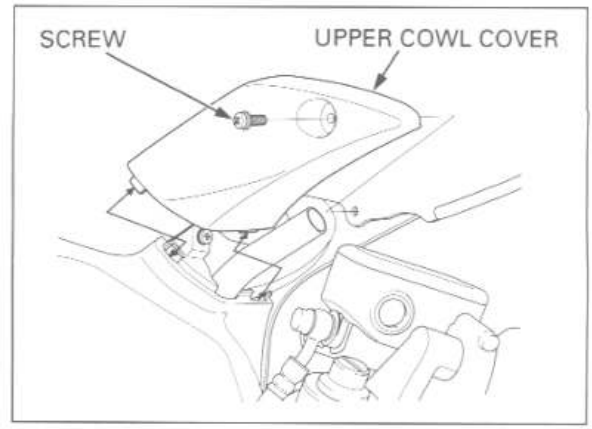
- Install the rubber cushions with their identification mark ("R" or "L") facing in.
- Install the mirror plate with its arrow marks facing forward and upward.



Install the rearview mirror and tighten the bolts securely.



Install the upper cowl cover aligning it bosses with the grooves in the meter panel.
Install and tighten the screw/washer.



FRONT FENDER

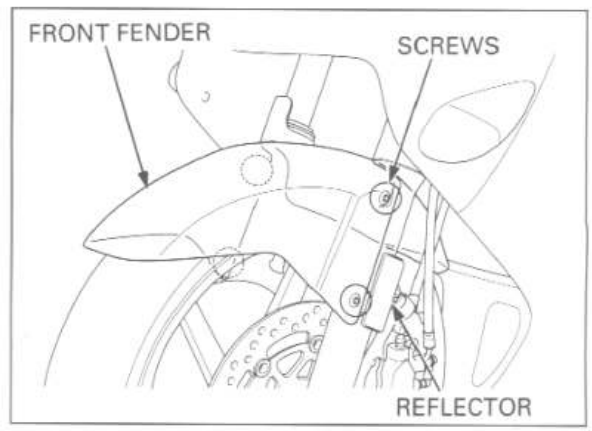
REMOVAL

Remove the four front fender mounting special screws and reflector.

Remove the front fender forward.

INSTALLATION

Installation is in the reverse order of removal.

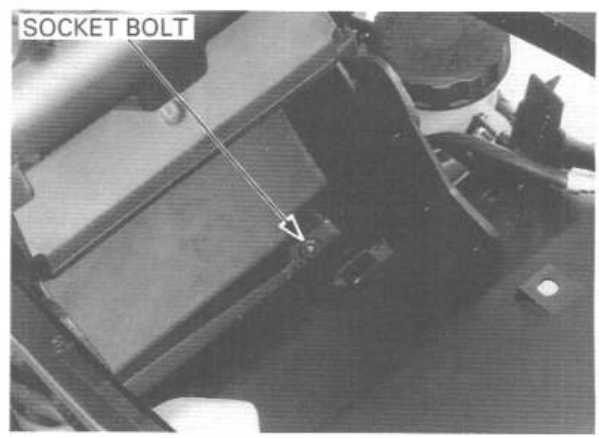


SEAT RAIL/REAR FENDER

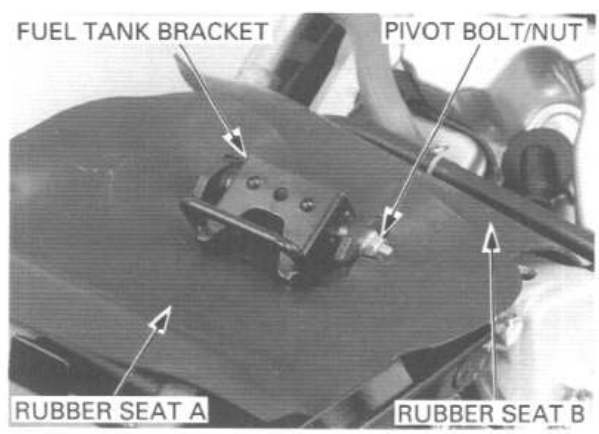
REMOVAL

Remove the following:
— Rear cowl (page 2-5)
— Fuel tank (page 5-50)
— Battery (page 16-5)
— ECM (page 5-74)

Remove the brake hose clamp socket bolt from the inside of the battery compartment.

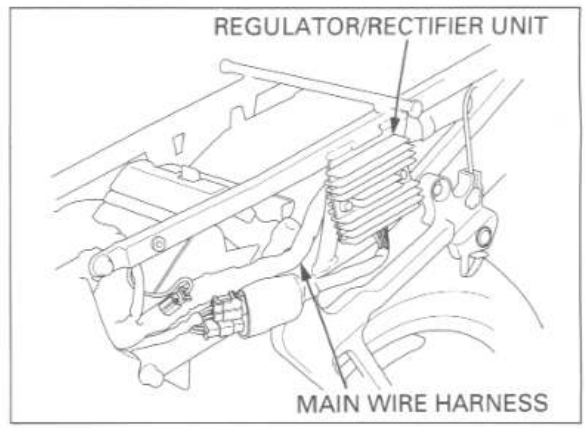


Remove the fuel tank bracket pivot bolt/nut and bracket.
Remove the rubber seat A and lift up rubber seat B.

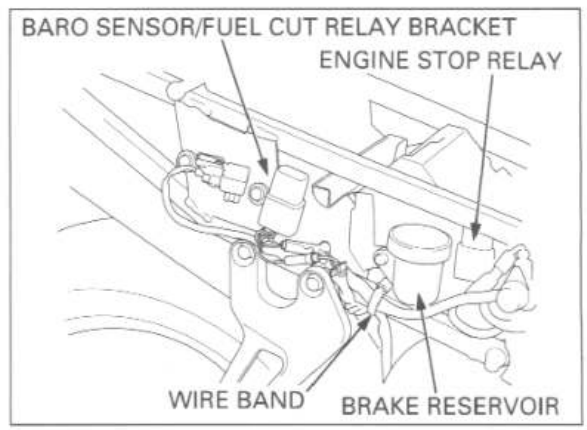


Remove the regulator /rectifier unit (page 16-12).

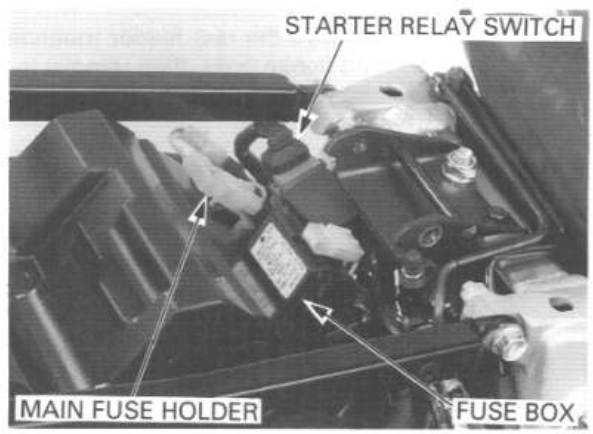
Release the main wire harness from the seat rail and remove from the seat rail/rear fender assembly.



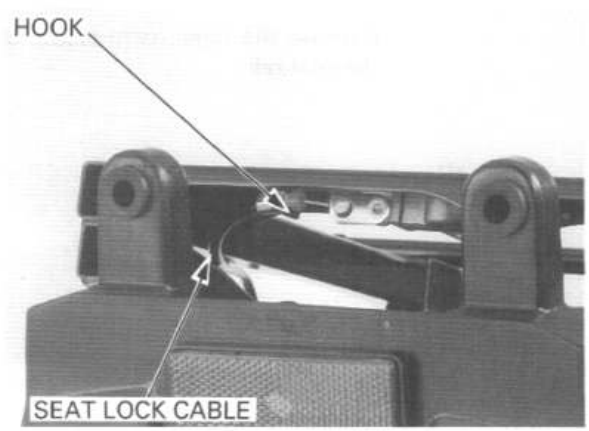
Remove the bolts and BARO sensor/fuel cut relay bracket.
Remove the wire band.
Remove the rear master cylinder reservoir mounting bolt.
Release the engine stop relay from the rear fender bosses.



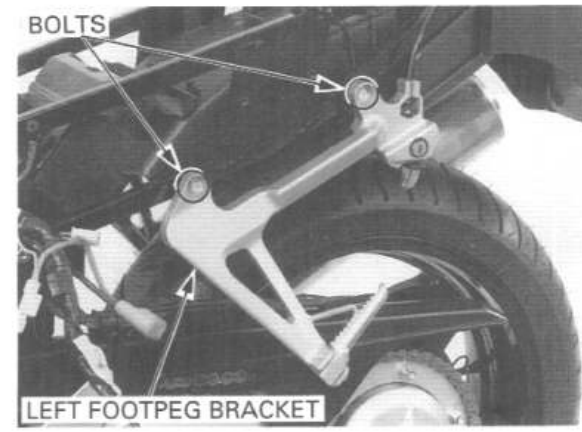
Unhook the retaining tab and remove the fuse box.
Unhook the retaining tab and remove the main fuse holder.
Release the starter relay switch from the rear fender boss.



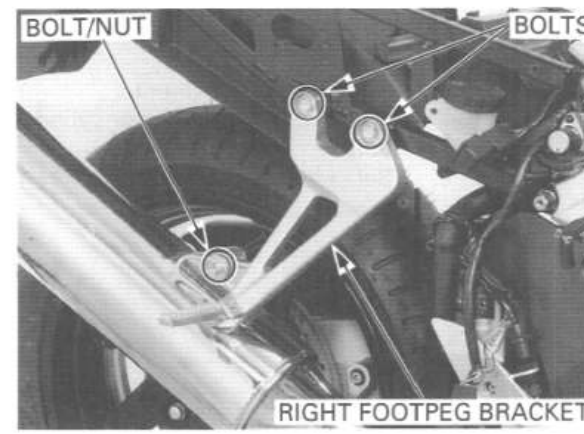
Remove the seat lock cable from the seat rail hook.



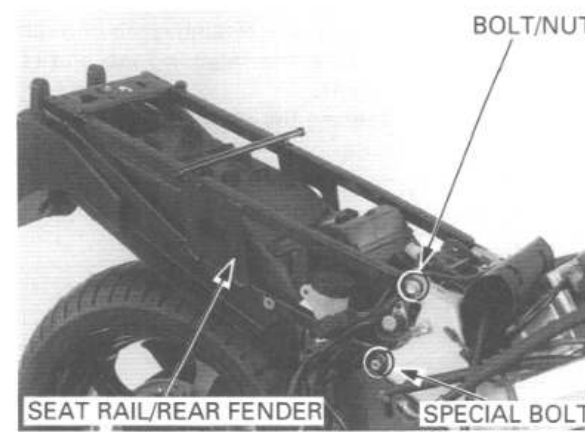
Remove the bolts and left pillion footpeg bracket.



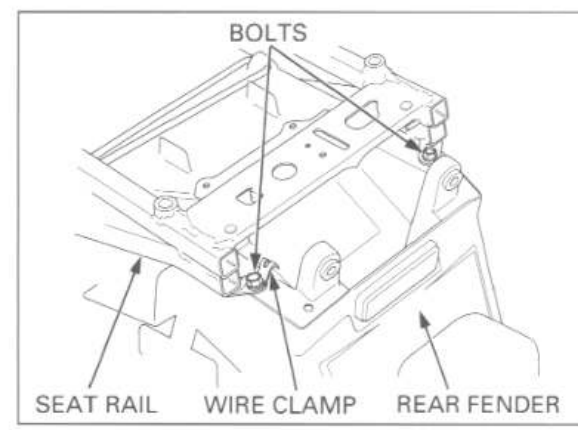
Remove the muffler bracket mounting bolt/nut.
Remove the bolts and right pillion footpeg bracket.



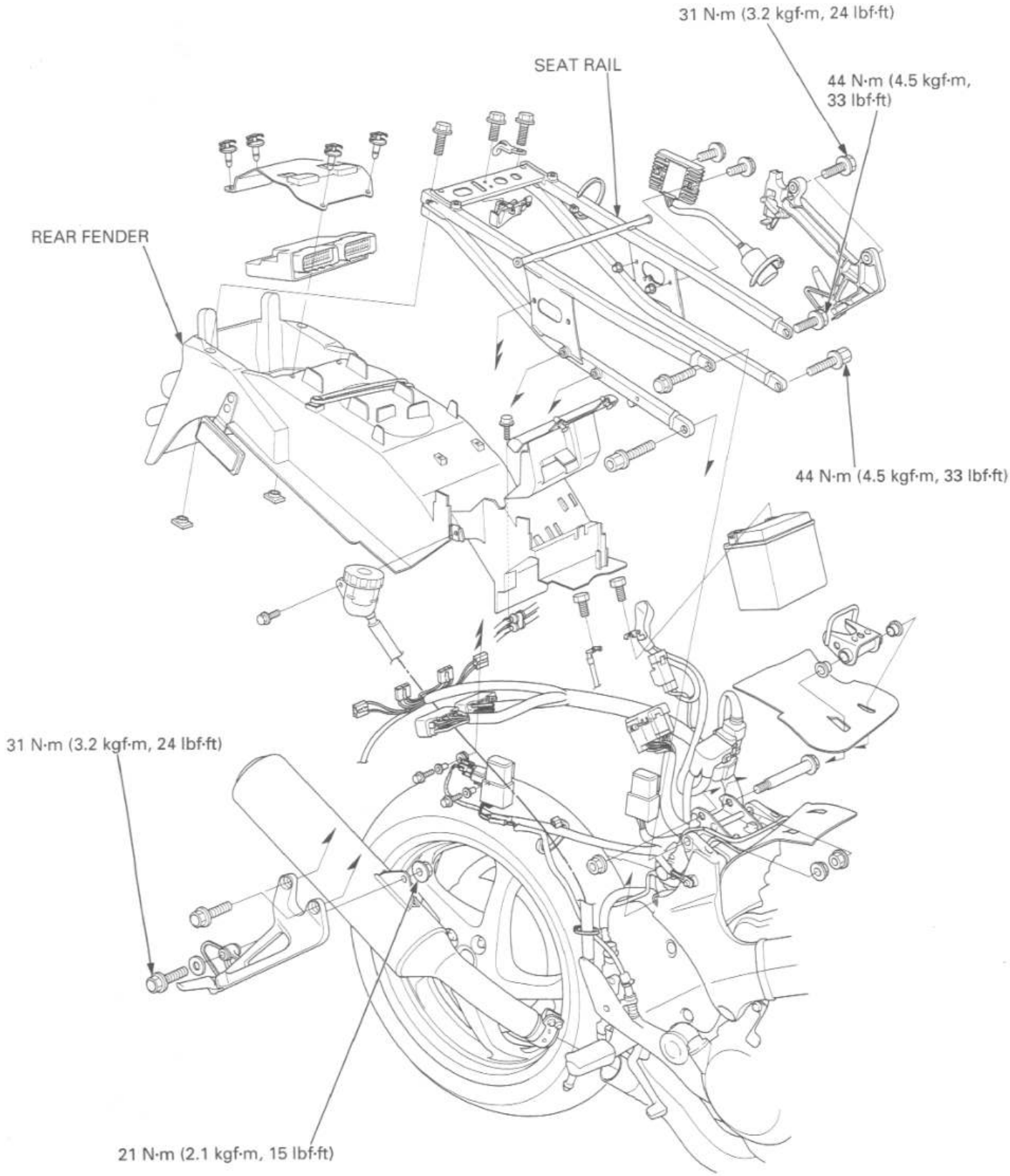
Remove the rear fender mounting special bolts, nuts and flange bolts, then remove the seat rail/rear fender assembly.



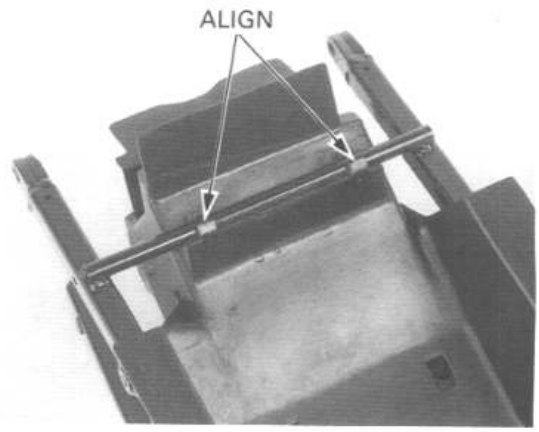
Remove the bolts, wire clamp and rear fender from the seat rail.



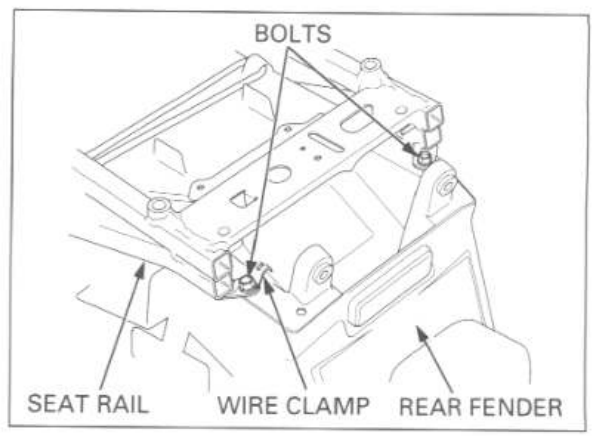
INSTALLATION



Install the rear fender into the seat rail aligning its groove with the seat rail cross bar.



Install the wire clamp and tighten the rear fender mounting bolts.



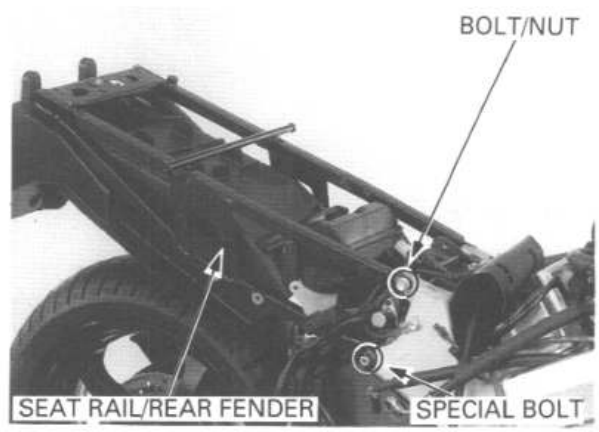
Install the seat rail/rear fender assembly onto the frame, install the flange bolts, flange nuts and special bolts.

NOTE:

Route the main wire harness while installing the seat rail/rear fender.

Tighten the flange nuts and special bolts to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

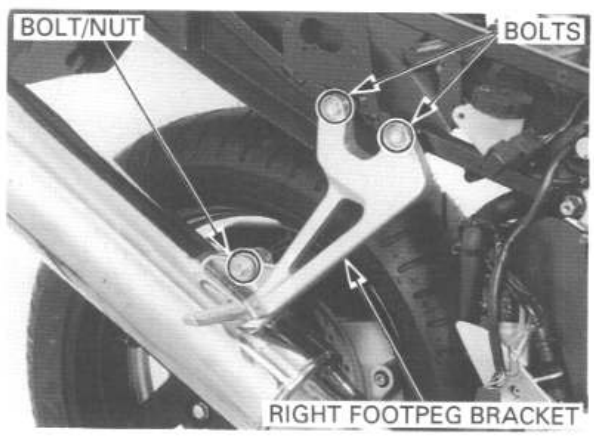


Install the right pillion footpeg bracket and tighten the bolts to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)

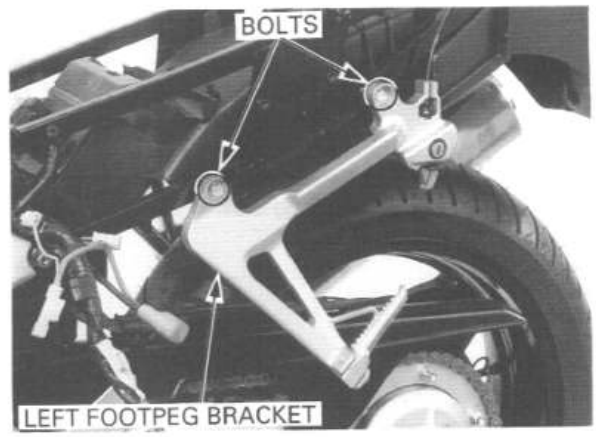
Install the muffler bracket mounting bolt/nut, tighten the nut to the specified torque.

TORQUE: 21 N·m (2.1 kgf·m, 15 lbf·ft)

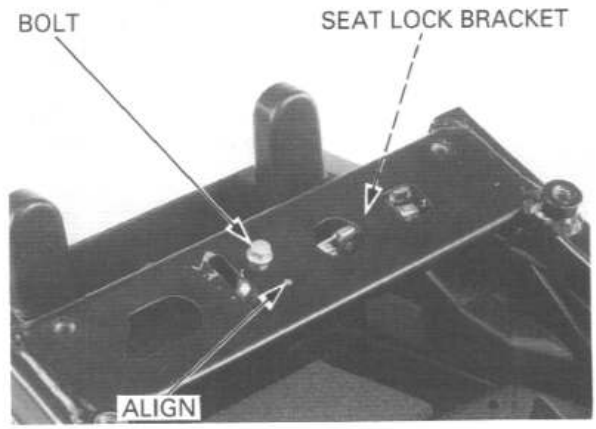


Install the left pillion footpeg bracket and tighten the bolts to the specified torque.

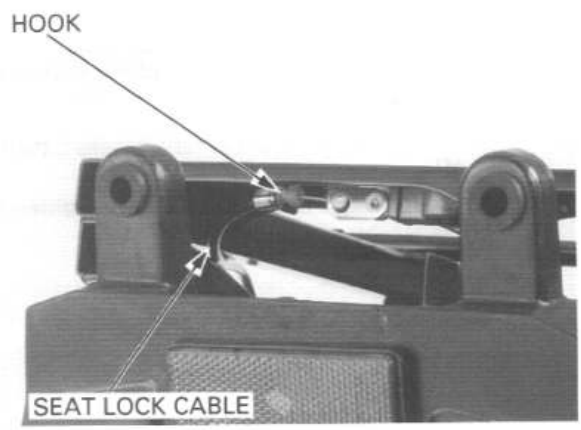
TORQUE: 31 N·m (3.2 kgf·m, 24 lbf·ft)



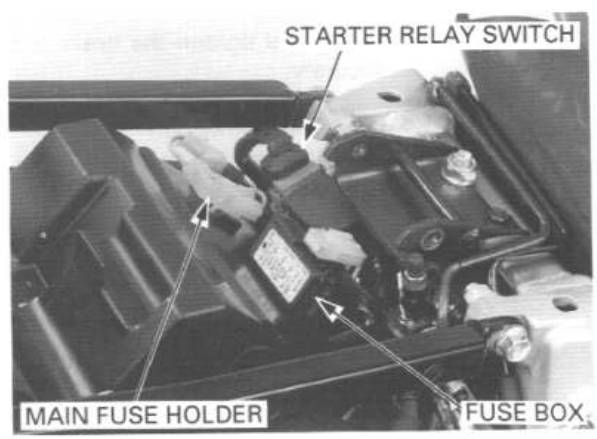
If the seat lock lever bracket is removed, install the lever aligning its boss with the seat rail hole.
Tighten the bolt securely.



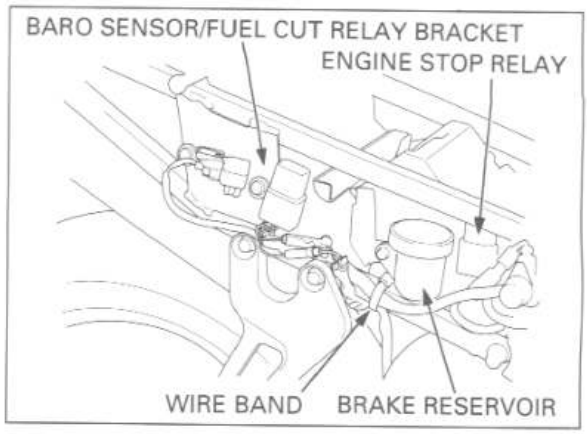
Route and connect the seat lock cable to the lever.
Install the seat lock cable to the bracket hook.



Install the fuse box, main fuse holder and starter relay switch.

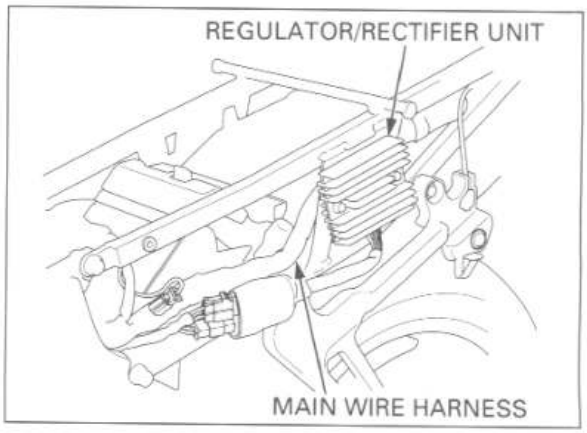


Route the wire harness.
Install the engine stop relay to the rear fender boss.
Install the BARO sensor/fuel cut relay bracket and tighten the bolts.
Install the wire band.
Install and tighten the rear master cylinder reservoir mounting bolt.



Route the wire harness onto the rear fender, then install the regulator/rectifier unit (page 16-12).

Connect the regulator/rectifier unit connectors and secure them with a wire band.

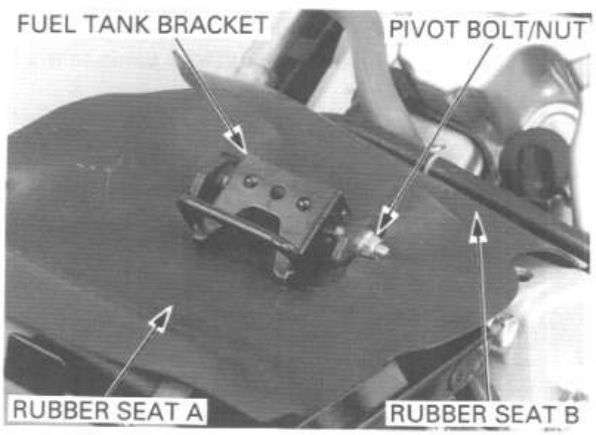


Install the rubber seat A onto the fuel tank bracket.

NOTE:

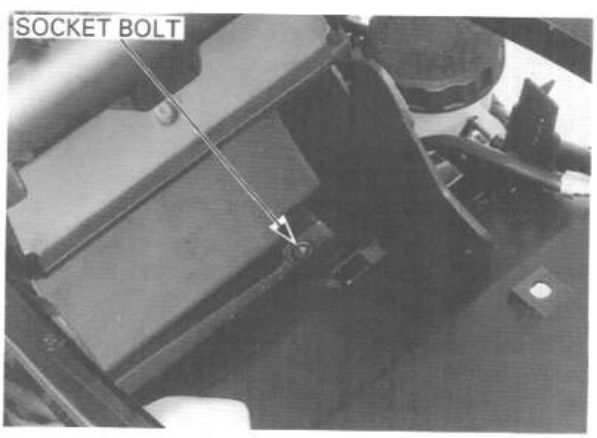
Note the direction of the rubber seat.

Install the fuel tank bracket, then install the pivot bolt from the left side.
Hold the pivot bolt, then tighten the nut.



Install and tighten the brake hose clamp socket bolt securely.

Install the following:
— ECM (page 5-74)
— Battery (page 16-5)
— Fuel tank (page 5-51)
— Rear cowl (page 2-5)



MUFFLER/EXHAUST PIPE

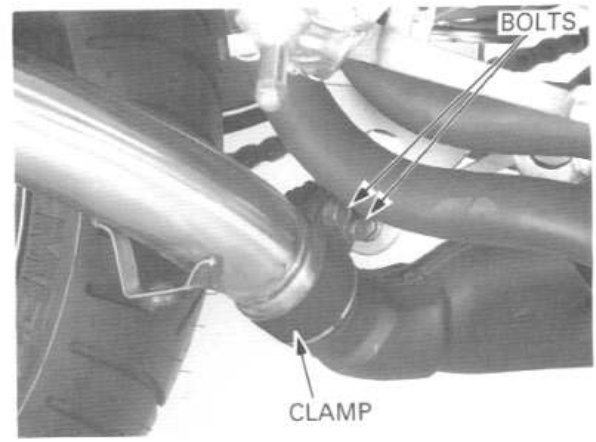
REMOVAL

⚠ WARNING

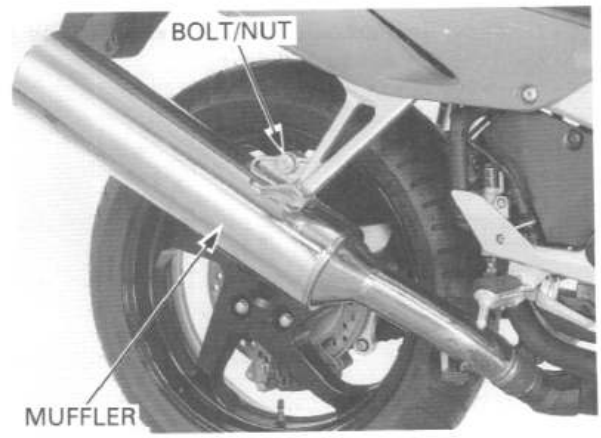
Do not service the exhaust system while it is not.

Remove the side cowl (page 2-7).

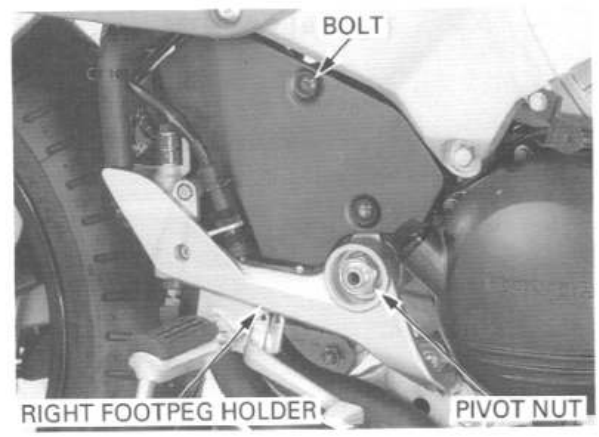
Loosen the exhaust pipe/muffler clamp bolts.



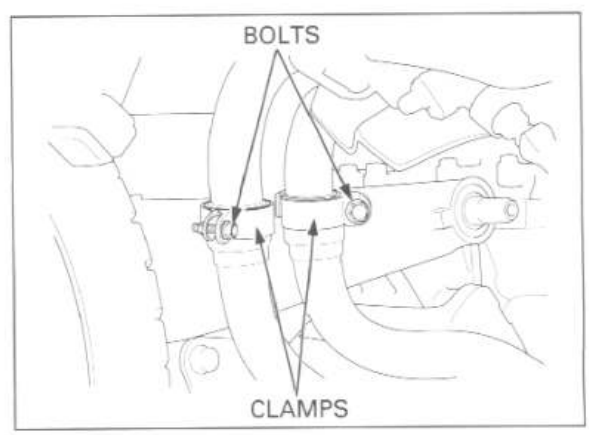
Remove the muffler bracket mounting bolt/nut, then remove the muffler.



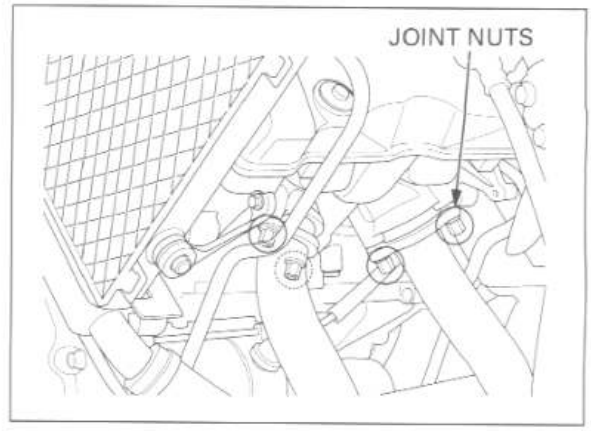
Remove the swingarm pivot nut cap, pivot nut and upper heat guard plate mounting bolt.
Remove the right footpeg holder/heat guard assembly.



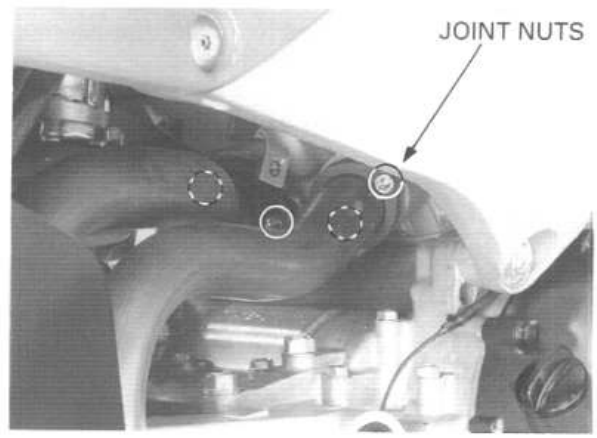
Loosen the exhaust pipe clamp bolts.



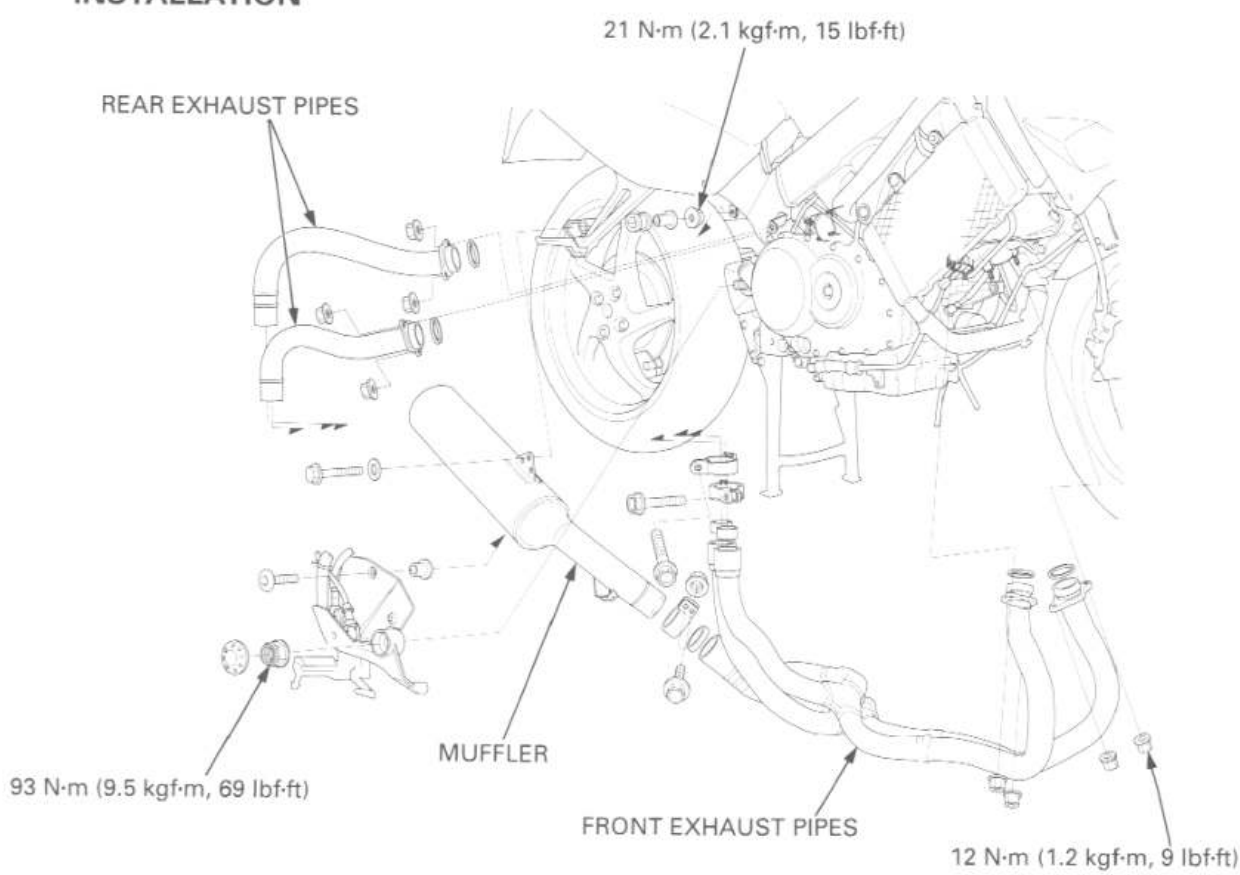
Remove the front exhaust pipe joint nuts.
Remove the front exhaust pipe.



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



INSTALLATION

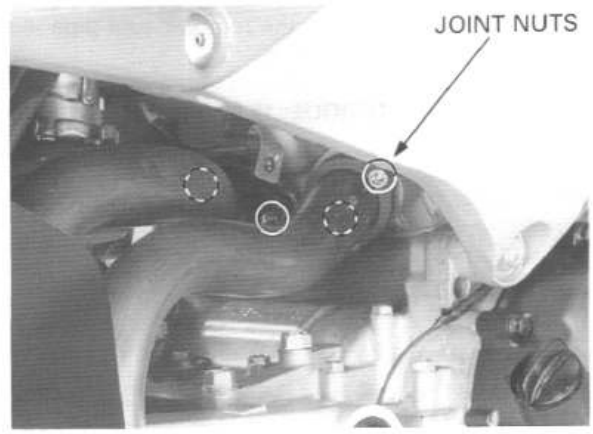


Install the new exhaust pipe gasket onto the exhaust ports of the rear cylinder head.

NOTE:

- Always replace the exhaust pipe gaskets and exhaust pipe joint gaskets with new ones.
- Prevent falling the gasket, apply grease to the exhaust pipe gaskets.

Install the rear exhaust pipes, temporarily install the rear exhaust pipe joint nuts but do not tighten them yet.

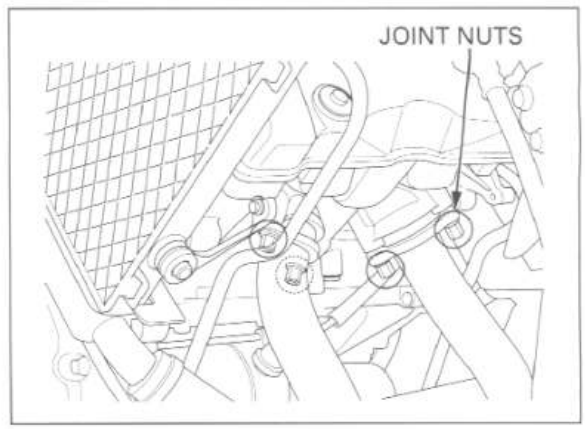


Install the new exhaust pipe gasket onto the exhaust ports of the front cylinder head and exhaust pipe joints.

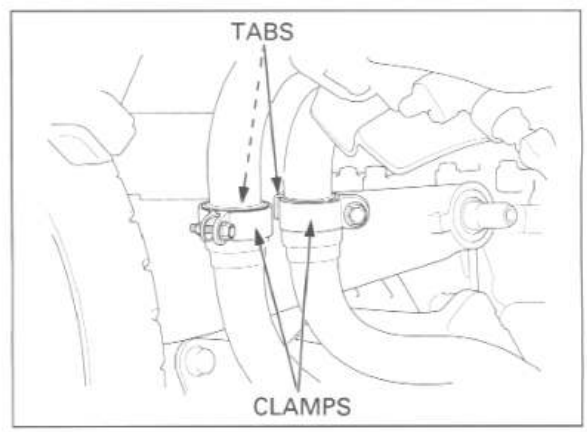
NOTE:

- Always replace the exhaust pipe gaskets and exhaust pipe joint gaskets with new ones.
- Prevent falling the gasket, apply grease to the exhaust pipe gaskets.

Route and install the front exhaust pipe into the center stand.
Temporarily install the front exhaust pipe joint nuts but do not tighten them yet.

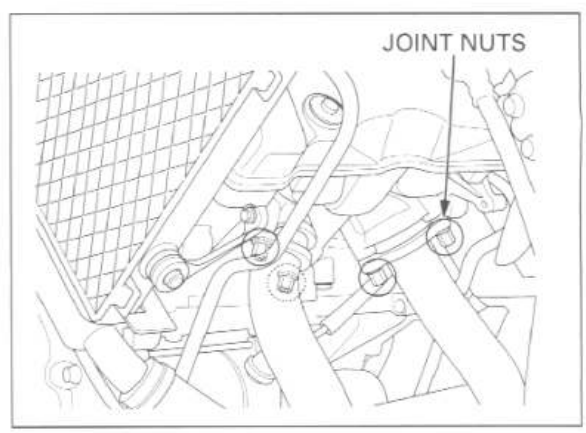


Make sure the exhaust pipe band tabs are seated onto the exhaust pipe flange.



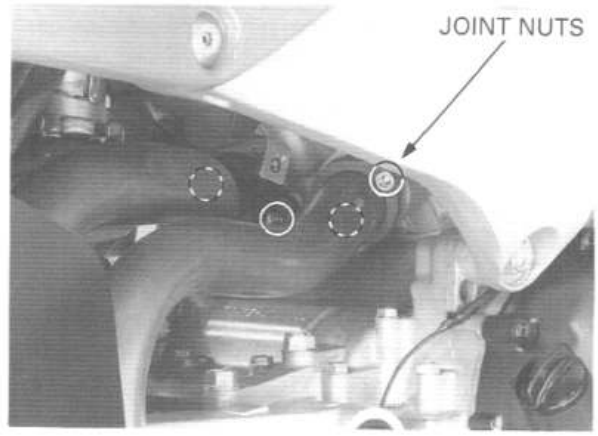
Tighten the front exhaust pipe joint nuts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

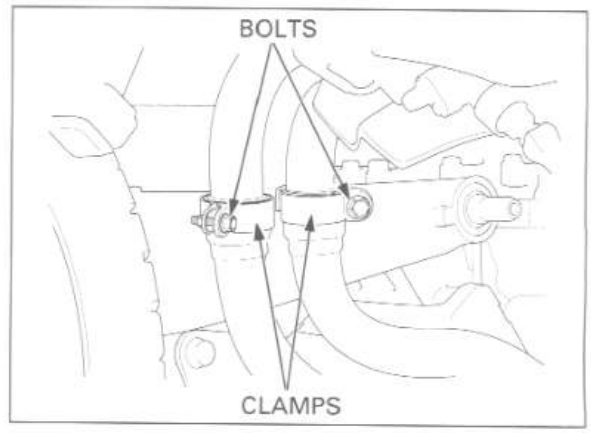


Tighten the rear exhaust pipe joint nuts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Tighten the exhaust pipe joint band bolts.

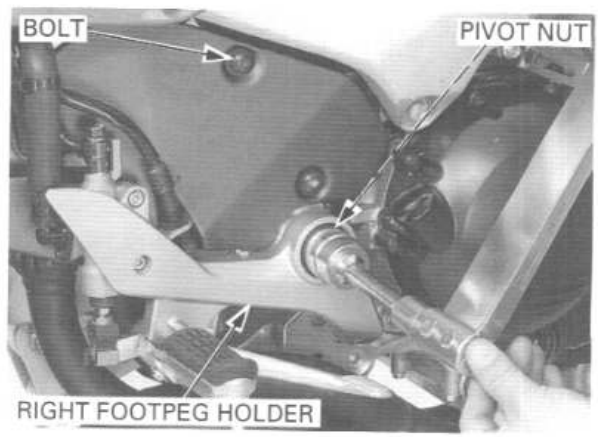


Install the heat guard/right footpeg holder assembly onto the frame, install the swingarm pivot nut and upper heat guard mounting bolt.

Tighten the swingarm pivot bolt to the specified torque.

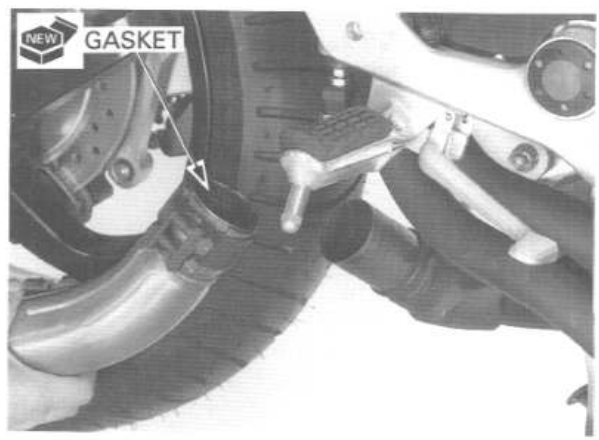
TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)

Install the swingarm pivot cap.



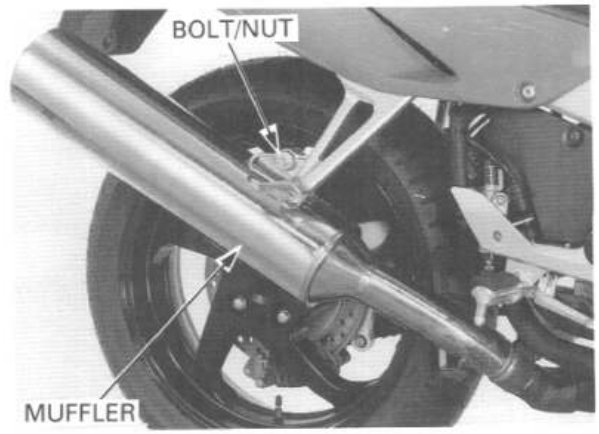
Install the new gasket onto the muffler joint.

Install the muffler.

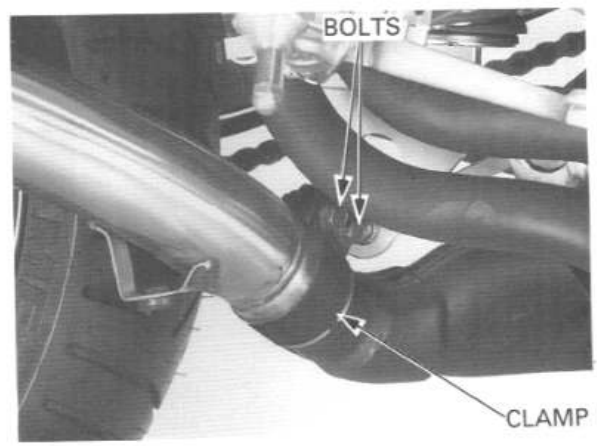


Install the muffler bracket mounting bolt/nut, then tighten the nut to the specified torque.

TORQUE: 21 N·m (2.1 kgf·m, 15 lbf·ft)



Tighten the exhaust pipe/muffler clamp bolts.



MEMO

SERVICE INFORMATION	3-1	DRIVE CHAIN	3-17
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FUEL LINE	3-4	BRAKE FLUID	3-22
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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 may lead to death.***

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

SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle grip free play		2 – 6 mm (1/12 – 1/4 in)
Spark plug	NGK	CR9EH-9
	DENSO	U27FER9
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)
Valve clearance	IN	0.16 ± 0.03 mm (0.006 ± 0.001 in)
	EX	0.30 ± 0.03 mm (0.012 ± 0.001 in)

ITEM			SPECIFICATIONS
Engine oil capacity	At draining		2.9 liter (3.1 US qt, 2.6 Imp qt)
	At oil filter change		3.1 liter (3.3 US qt, 2.7 Imp qt)
Recommended engine oil			HONDA GN4 4-stroke oil or equivalent motor oil API service classification SF or SG Viscosity: SAE 10W-40
Engine idle speed	49 States/Canada type		1,200 ± 100 rpm
	California type		1,300 ± 100 rpm
Drive chain slack			20 – 30 mm (0.9 – 1.2 in)
Recommended brake fluid			DOT 4
Tire size		Front	120/70 ZR 17 (58W) Radial
		Rear	180/55 ZR 17 (73W) Radial
Tire brand	Bridgestone	Front	BT57F Radial J
		Rear	BT57R Radial J
	Dunlop	Front	D204FK
		Rear	D204K
	Metzeler	Front	MEZ4
		Rear	MEZ4A
Tire air pressure	Driver only	Front	250 kPa (2.50 kgf/cm², 36 psi)
		Rear	290 kPa (2.90 kgf/cm², 42 psi)
	Driver and passenger	Front	250 kPa (2.50 kgf/cm², 36 psi)
		Rear	290 kPa (2.90 kgf/cm², 42 psi)
Minimum tire tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

TORQUE VALUES

Spark plug	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply grease to the threads
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
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Camshaft holder flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply oil to the threads and seating surface
Rear wheel nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	
Bearing holder pinch bolt	74 N·m (7.5 kgf·m, 54 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	NOTE ⇩	ODOMETER READING (NOTE 1) x 1,000 mi	0.6	4	8	12	16	20	24	REFER TO PAGE
				x 1,000 km	1	6	12	18	24	30	36	
EMISSION RELATED ITEMS	*	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	3-6
		SPARK PLUG					R		R		R	3-7
	*	VALVE CLEARANCE							I			3-9
		ENGINE OIL			R		R		R		R	3-12
		ENGINE OIL FILTER			R		R		R		R	3-12
	*	ENGINE IDLE SPEED			I	I	I	I	I	I	I	3-14
		RADIATOR COOLANT	NOTE 4				I		I		R	3-15
	*	COOLING SYSTEM					I		I		I	3-15
	*	SECONDARY AIR SUPPLY SYSTEM					I		I		I	3-16
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 3					I			I	3-16
NON-EMISSION RELATED ITEMS		DRIVE CHAIN			EVERY 500 mi (800 km) I, L							3-17
		DRIVE CHAIN SLIDER					I		I		I	3-22
		BRAKE FLUID	NOTE 4			I	I	R	I	I	R	3-22
		BRAKE PAD WEAR				I	I	I	I	I	I	3-23
		BRAKE SYSTEM			I		I		I		I	3-23
	*	BRAKE LIGHT SWITCH					I		I		I	3-25
	*	HEADLIGHT AIM					I		I		I	3-25
		CLUTCH SYSTEM					I		I		I	3-26
		CLUTCH FLUID	NOTE 4			I	I	R	I	I	R	3-26
		SIDE STAND					I		I		I	3-27
	*	SUSPENSION					I		I		I	3-27
	*	NUTS, BOLTS, FASTENERS			I		I		I		I	3-29
	**	WHEELS/TIRES					I		I		I	3-29
	**	STEERING HEAD BEARINGS			I		I		I		I	3-30

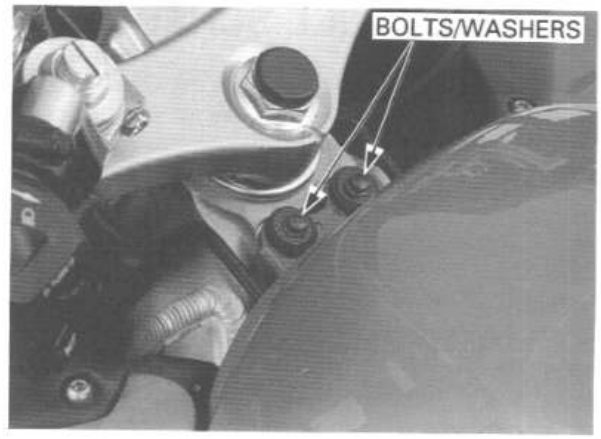
* Should be serviced by an authorized HONDA dealer, unless the owner has proper tools and service data and is mechanically qualified.
** In the interest of safety, we recommend these items be serviced only by an authorized HONDA dealer.

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

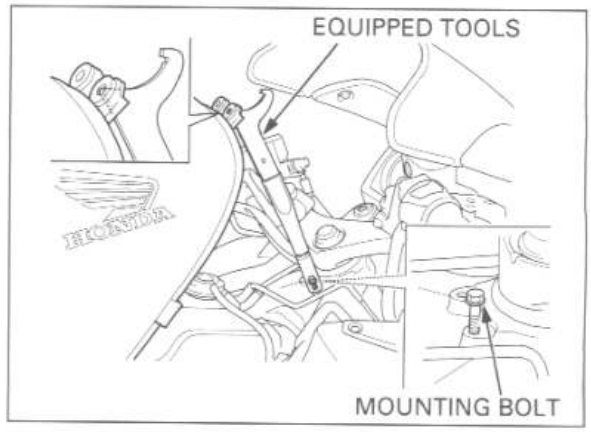
FUEL LINE

Remove the seat (page 2-3).

Remove the two fuel tank mounting bolts and washers.



Lift the fuel tank and temporarily install the either of the mounting bolts.
Open and support the fuel tank using the equipped tools (pin spanner and extension).



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

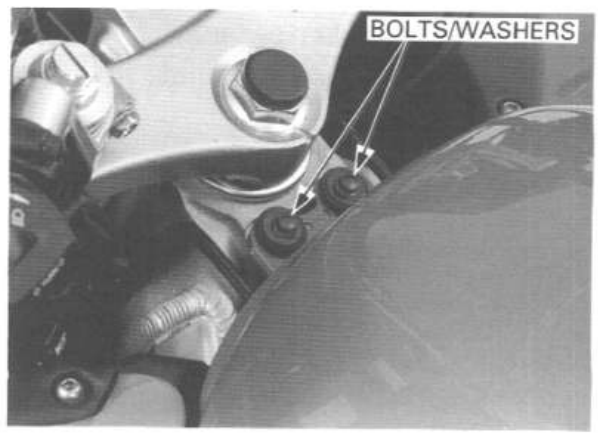
Remove the support tools and close the fuel tank.

CAUTION:

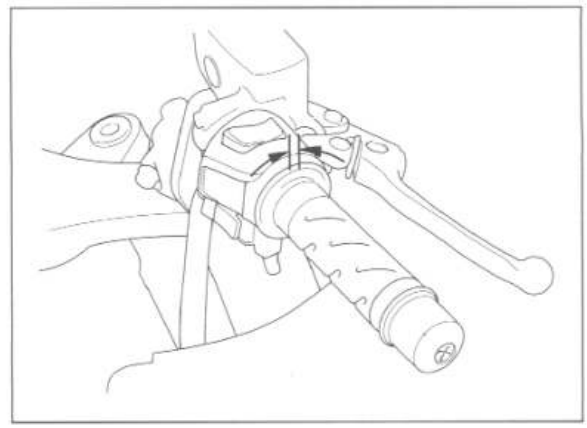
Be careful not to pinch the air vent and overflow tubes.



Install and tighten two fuel tank mounting bolts.



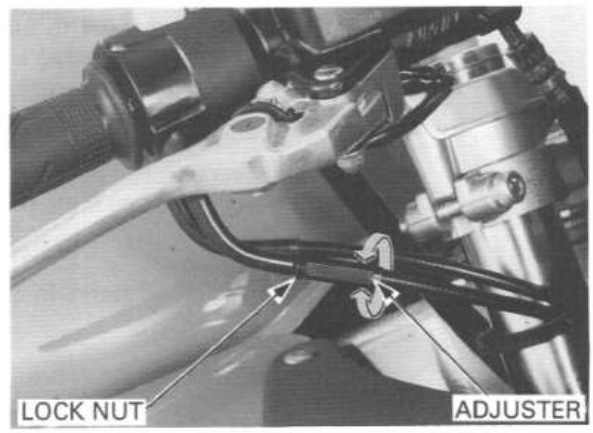
THROTTLE OPERATION



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.

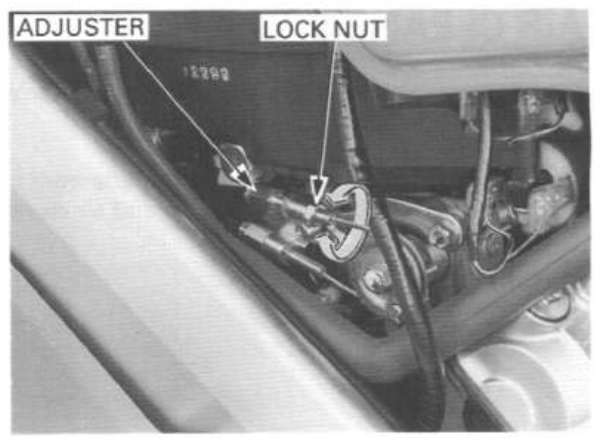
Measure the free play at the throttle grip flange.

FREE PLAY: 2 – 6 mm (1/12 – 1/4 in)



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

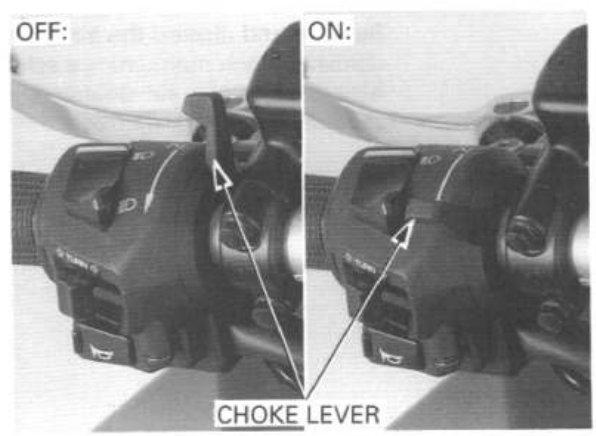
Minor adjustment are made with the upper adjuster.
Adjust the free play by loosening the lock nut and turning the adjuster.



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

Open and support the fuel tank (page 3-4).
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 lever on the left handlebar switch is turned ON.

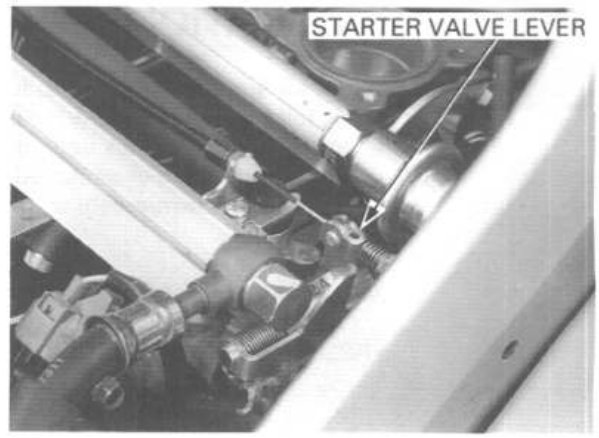
Choke lever operation

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

Starter valve lever operation

Remove the air cleaner housing (page 5-53).

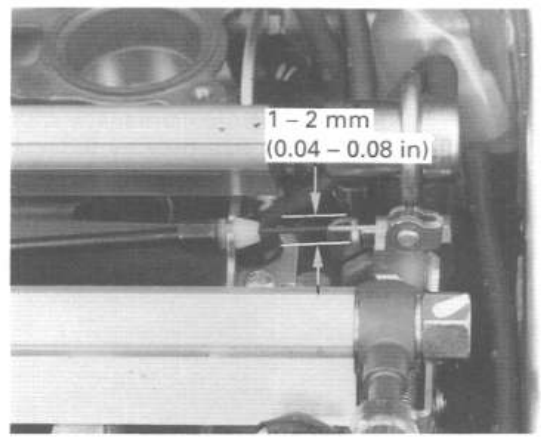
Check for smooth operation of the starter valve lever. There should be no free play.



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 lever set to fully OFF.
Replace the choke cable if the free play is out of specification.

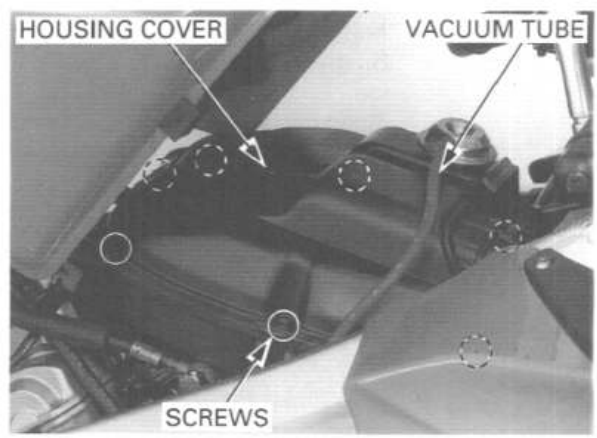
Install the removed parts in the reverse order of removal.



AIR CLEANER

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

Remove the vacuum tube from the air intake valve.
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

Front cylinder:

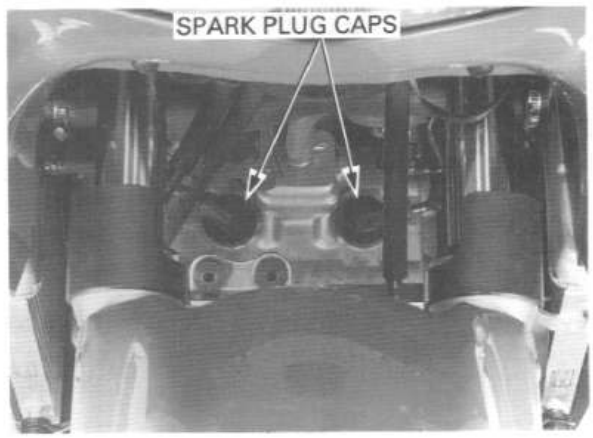
Remove the side cowl and inner half cowl (page 2-6).

Remove the oil cooler mounting bolts.



Move the oil cooler forward.

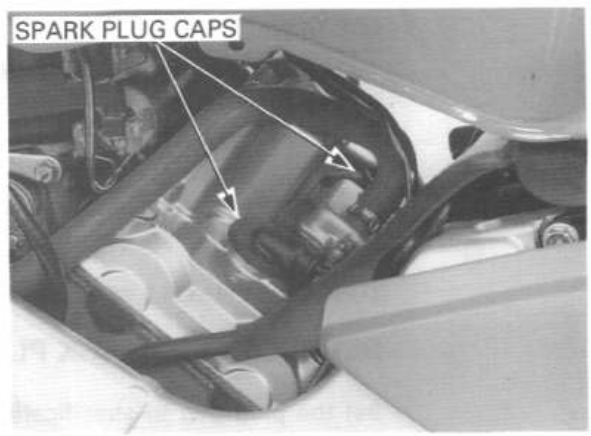
Remove the spark plug caps.



Rear cylinder:

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

Remove the spark plug caps.

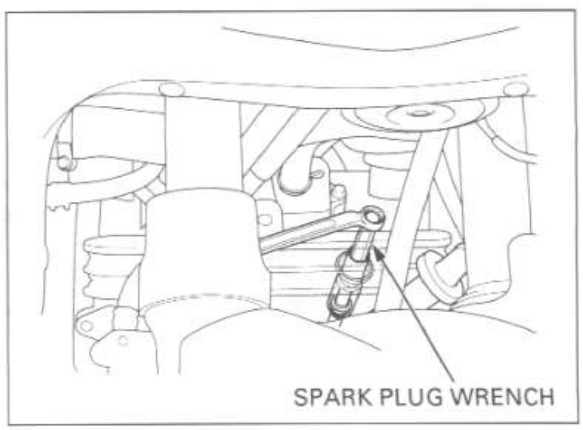


NOTE:

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

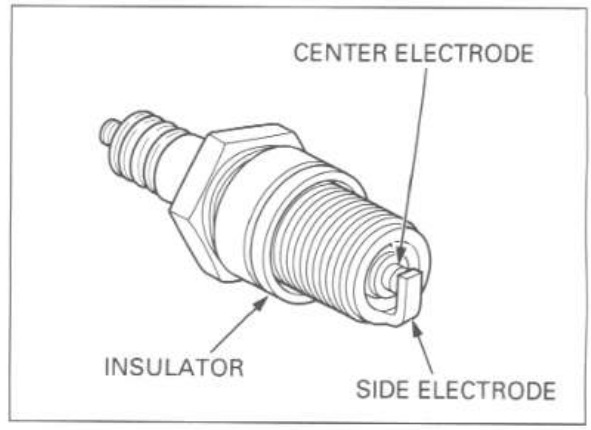
Remove the spark plugs using a equipped spark plug wrench or an equivalent.

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



INSPECTION

Check the following and replace if necessary (recommended spark plug: page 3-1)
— Insulator for damage
— Electrodes for wear
— Burning condition, coloration;
  — dark to light brown indicates good condition.
  — excessive lightness indicates malfunctioning ignition system or lean mixture.
  — wet or black sooty deposit indicates over-rich mixture.

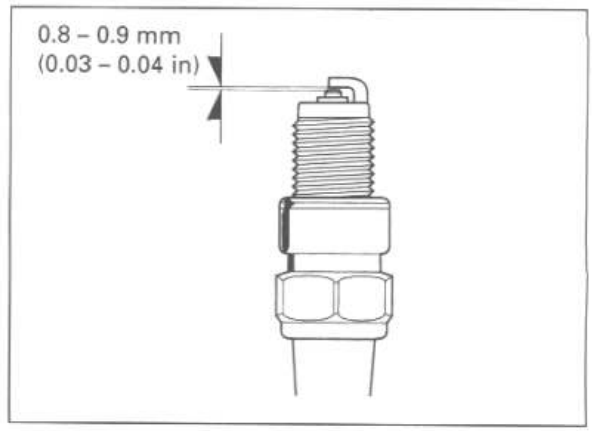


REUSING A SPARK PLUG

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

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

SPARK PLUG GAP: 0.8 – 0.9 mm (0.03 – 0.04 in)



CAUTION:

To prevent damage to the cylinder head, hand-tighten the spark plug before using a wrench to tighten to the specified torque.

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

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

REPLACING A SPARK PLUG

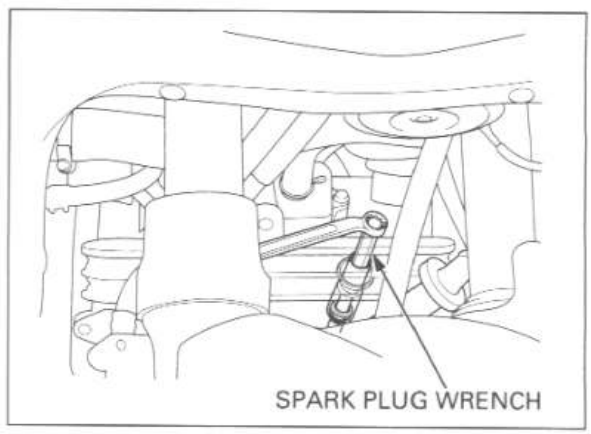
Set the plug gap to specification with a wire-type feeler gauge (see above).

CAUTION:

Do not overtighten the plug.

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

Install the spark plug caps.



VALVE CLEARANCE

INSPECTION

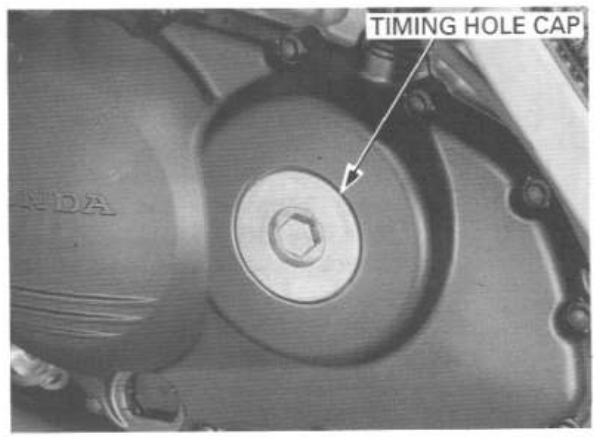
NOTE:

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

Remove the side cowl and inner half cowl (page 2-6). Remove the front and rear cylinder head covers (page 8-4).

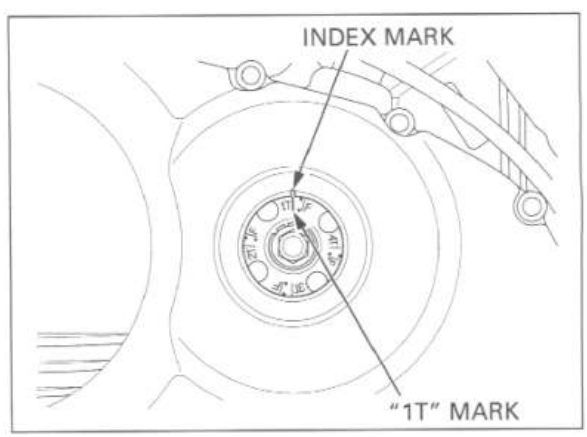


Remove the timing hole cap and O-ring.



Turn the crankshaft clockwise, align the "1T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.

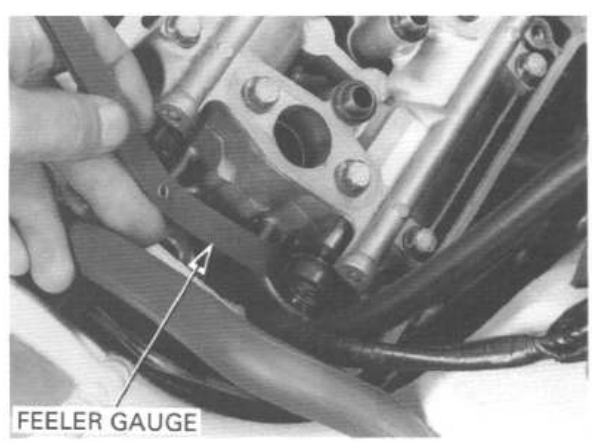
Make sure that the No. 1 piston is at TDC (Top Dead Center) on the compression stroke.

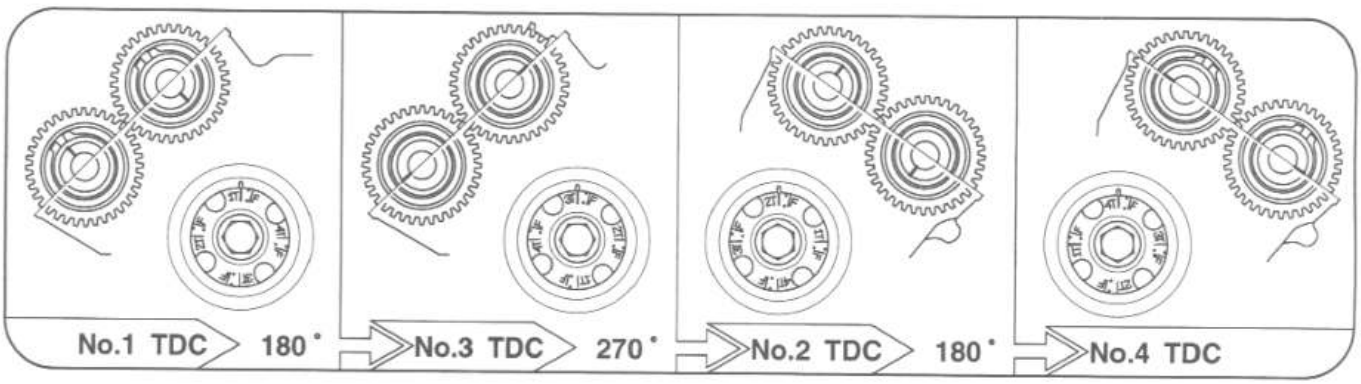


Record the clearance for each valve for reference in shim selection if adjustment is required.

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

VALVE CLEARANCE:
IN: 0.16 ± 0.03 mm (0.006 ± 0.001 in)
EX: 0.30 ± 0.03 mm (0.012 ± 0.001 in)

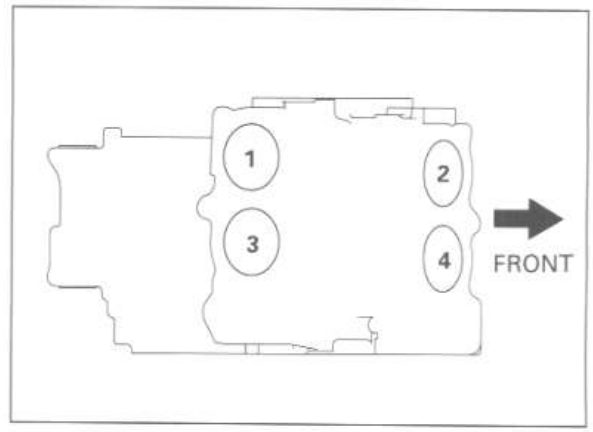




Turn the crankshaft clockwise 1/2 turn (180°), and align the "3T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.
Check the valve clearance for the No. 3 cylinder.

Turn the crankshaft clockwise 3/4 turn (270°), and align the "2T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.
Check the valve clearance for the No. 2 cylinder.

Turn the crankshaft clockwise 1/2 turn (180°), and align the "4T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.
Check the valve clearance for the No. 4 cylinder.

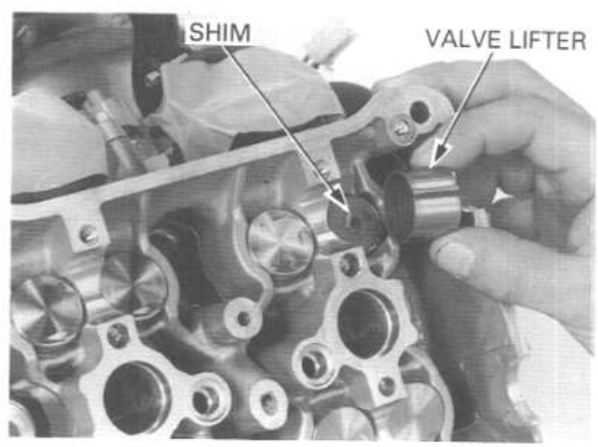


ADJUSTMENT

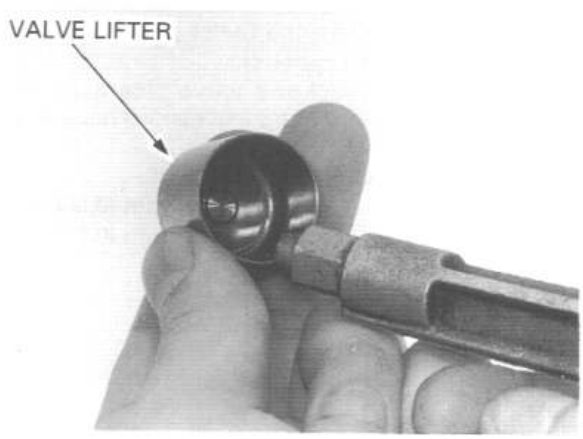
Remove the camshafts (page 8-9).
Remove the valve lifters and shims.

NOTE:

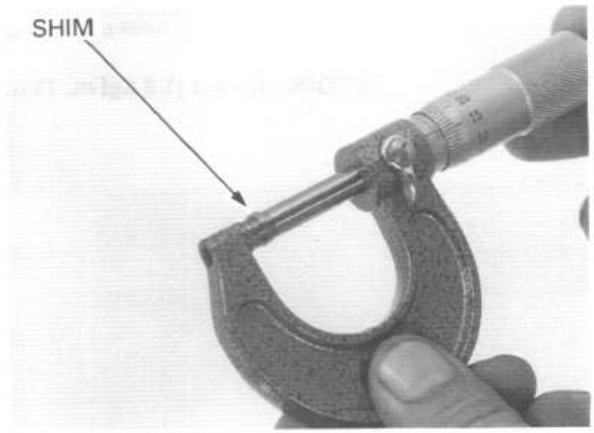
- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall into the crankcase.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.
- The shims can be easily removed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

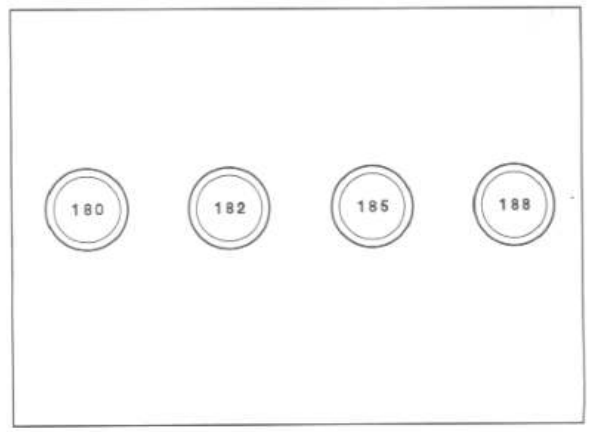


NOTE:

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

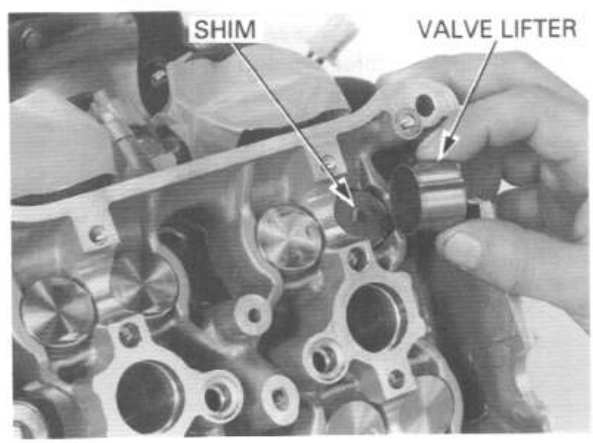


NOTE:

- 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 shims and valve lifters in their original locations.

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



Install the camshaft (page 8-28).

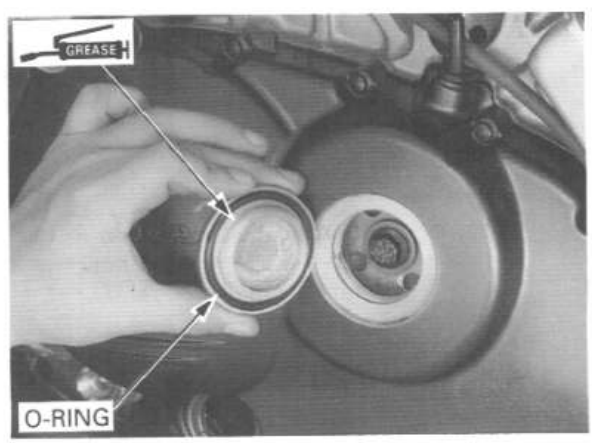
Rotate the camshafts by rotating the crankshaft clockwise several times.
Recheck the valve clearance.

Install the removed parts in the reverse order of removal.

Apply grease to the timing hole cap threads, install the timing hole cap.

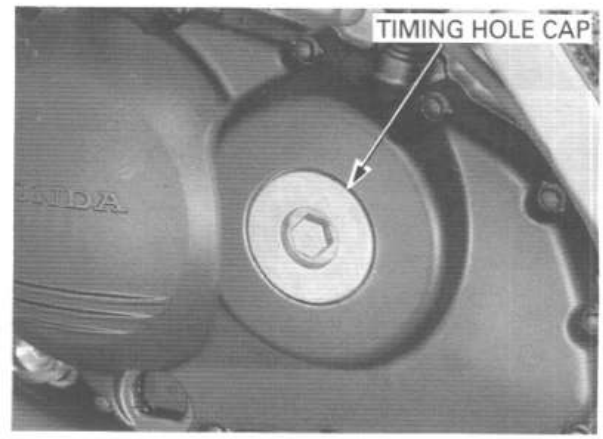
NOTE:

Check that the O-ring is in good condition, replace if necessary.



Tighten the timing hole cap to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

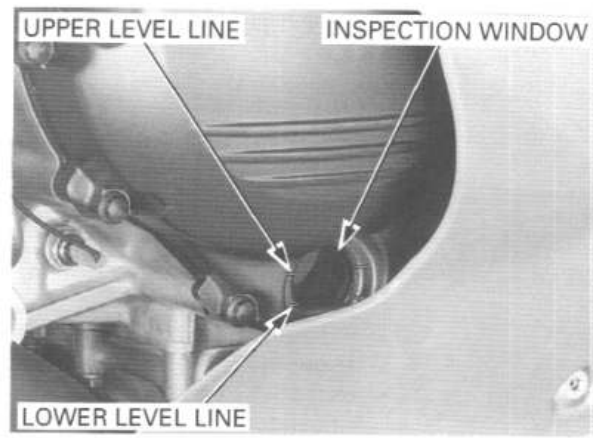


ENGINE OIL/OIL FILTER

OIL LEVEL INSPECTION

Start the engine and let it idle for 2 – 3 minutes.
Stop the engine and wait 3 minutes.

Support the motorcycle on its center stand, check the oil level through the inspection window.



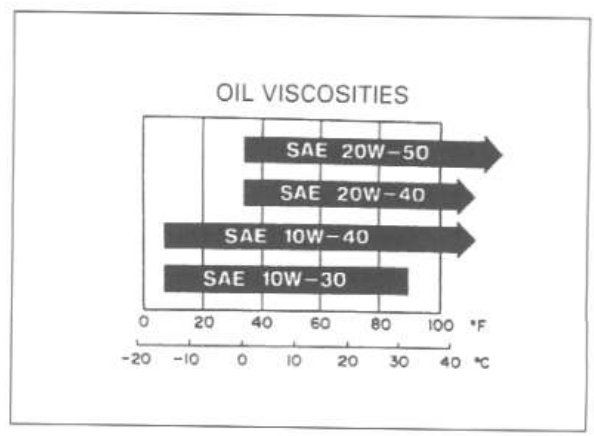
If the level is below the lower line, remove the oil filler cap and fill the crankcase with recommended oil up to the upper level line.



RECOMMENDED ENGINE OIL:
HONDA GN4 4-stroke oil or equivalent motor oil
API service classification: 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 oil filler cap.

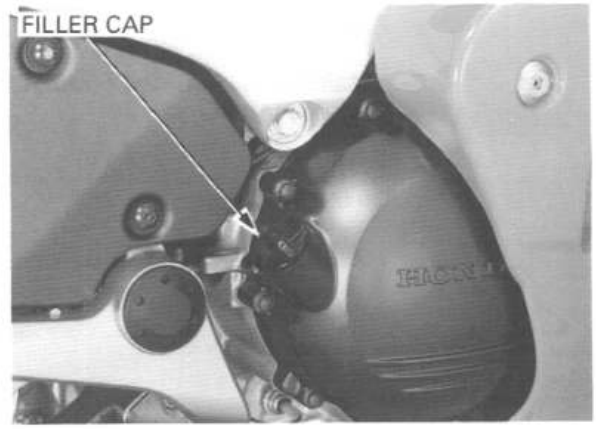
ENGINE OIL & FILTER CHANGE

⚠ WARNING

A warmed-up engine and the oil in it are hot, be careful not to burn yourself.

NOTE:

- If you plan to replace the oil and filter, remove the side cowl and inner half cowl (page 2-6).
- Change the engine oil with the engine warm and the motorcycle on level ground to assure complete draining.

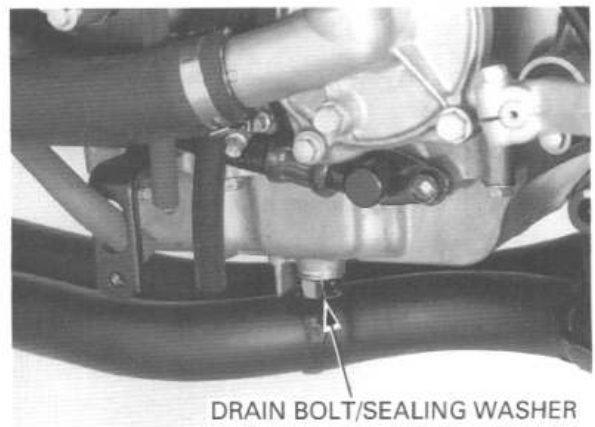


Remove the oil filler cap.

Place a oil drain pan under the engine to catch the oil, then remove the oil drain bolt and sealing washer. Drain the oil completely.

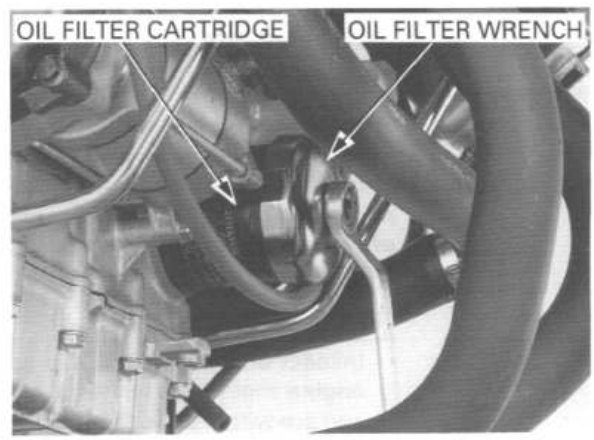
CAUTION:

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.



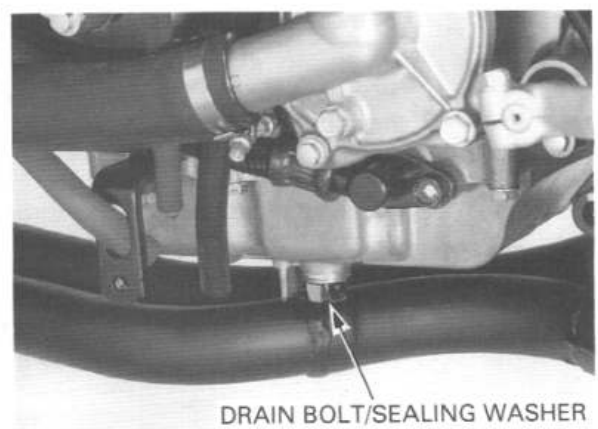
Remove and discard the oil filter cartridge using the special tool.

TOOL:
Oil filter wrench **07HAA – PJ70100**



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

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)

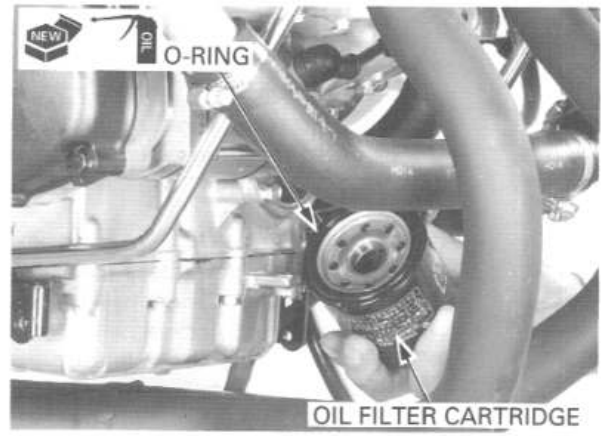


Apply oil to the new oil filter cartridge O-ring.

Install the new oil filter cartridge 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:
2.9 liter (3.1 US qt, 2.6 Imp qt) at draining
3.1 liter (3.3 US qt, 2.7 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 may lead to death.

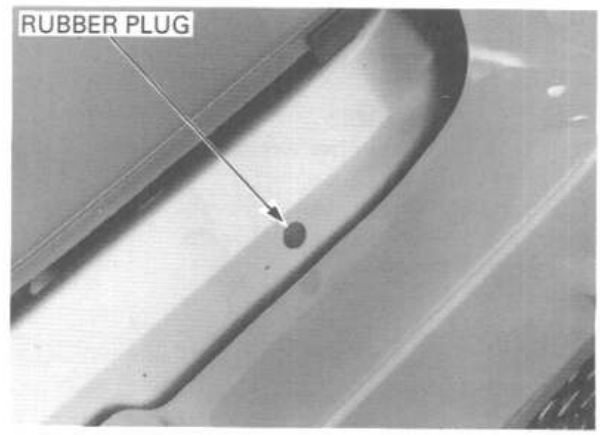
NOTE:

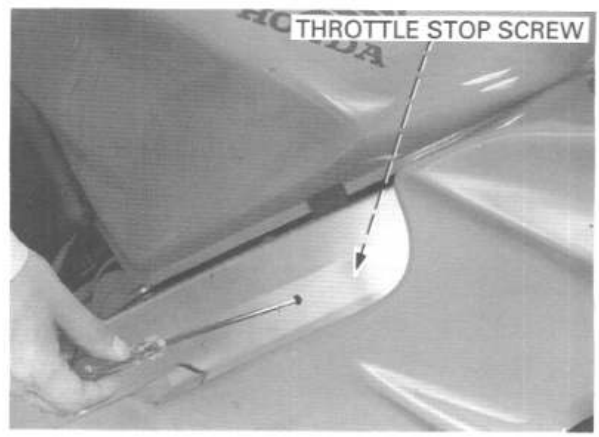
- Inspect and adjust the idle speed after all other engine maintenance items have been performed and are within specifications.
- The engine must be warm for accurate idle speed inspection and adjustment.

Warm up the engine and shift the transmission into neutral.
Remove the adjusting hole rubber plug.

Turn the throttle stop screw through the frame hole as required to obtain the specified idle speed.

IDLE SPEED:
49 states/Canada type: 1,200 ± 100 rpm
California type: 1,300 ± 100 rpm

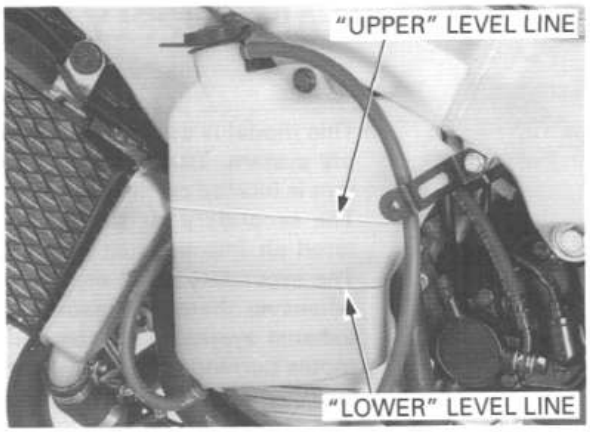




RADIATOR COOLANT

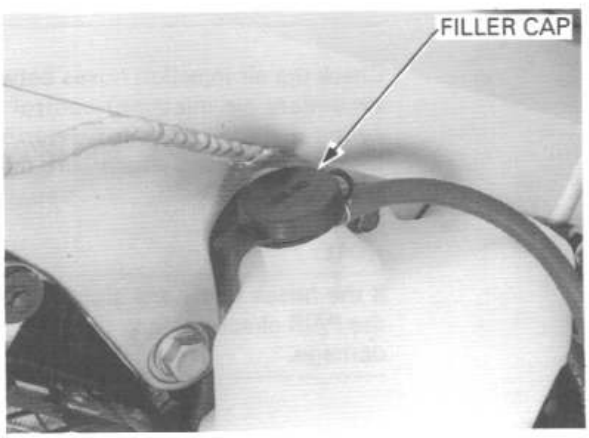
Check the coolant level of the reserve tank with the engine running at normal operating temperature.
The level should be between the "UPPER" and "LOWER" level lines.

If necessary, add recommended coolant.



Remove the side cowl (page 2-6).

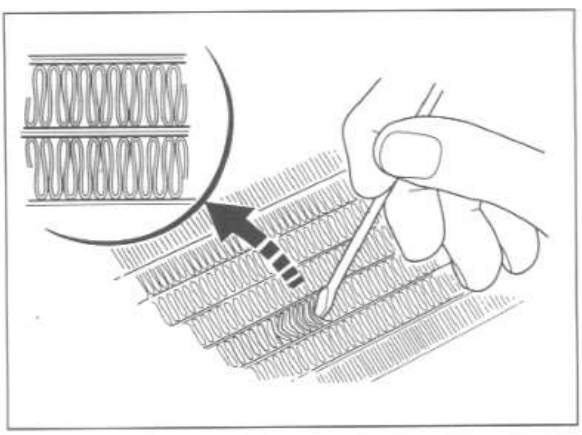
Remove the reserve tank filler cap and fill to the "UPPER" level line with 50/50 mixture of distilled water and antifreeze.
Reinstall the filler cap.



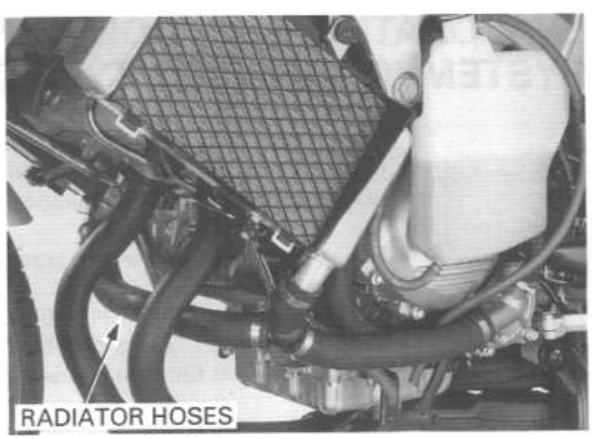
COOLING SYSTEM

Remove the side cowl (page 2-6).

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

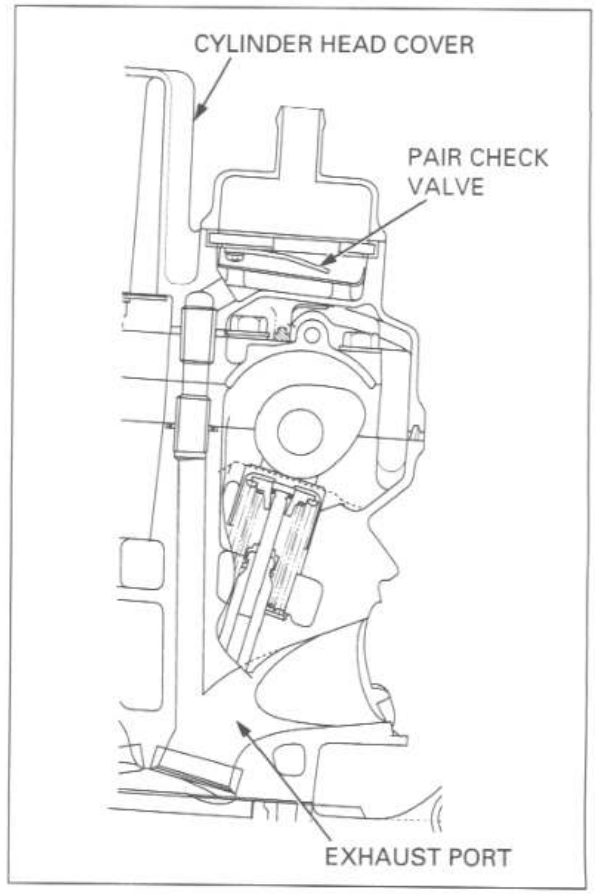
NOTE:

- 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.

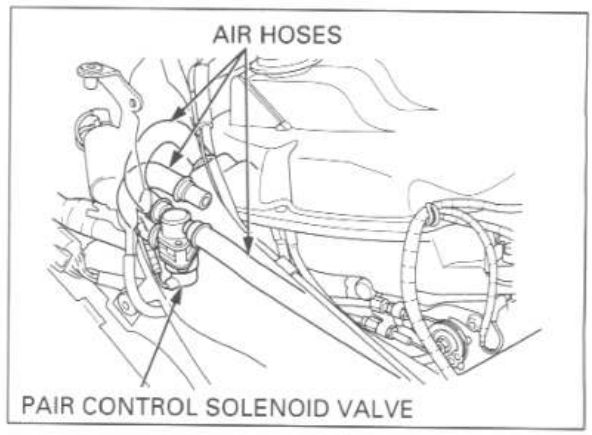
Check the air injection hoses between the PAIR (pulse secondary air injection) control solenoid valve and cylinder head cover for deterioration, damage or loose connections. Make sure that the hoses are not cracked.

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 filter and PAIR control solenoid valve for deterioration, damage or loose connections. Make sure that the hoses are not kinked, pinched or cracked.

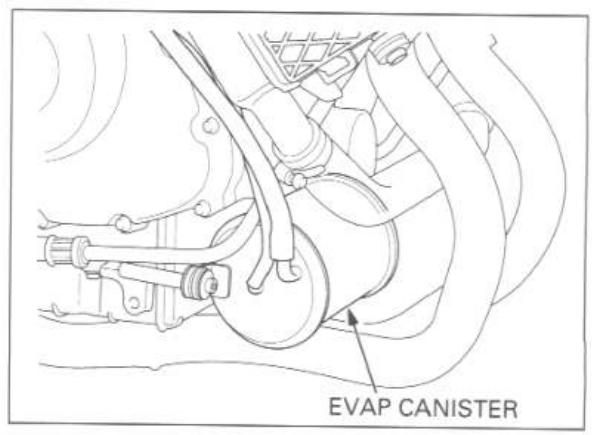


EVAPORATIVE EMISSION CONTROL SYSTEM (CALIFORNIA TYPE ONLY)

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

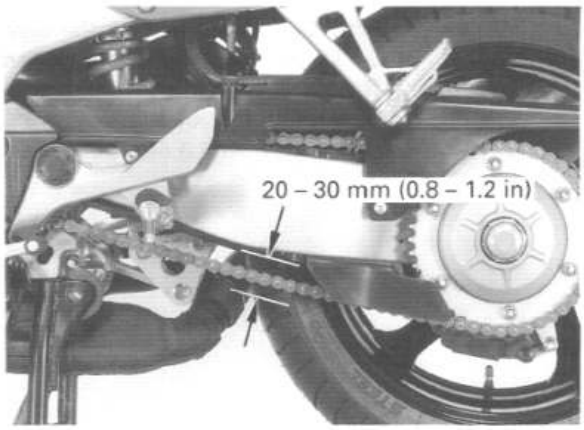
Check the EVAP canister for cracks or other damage.

Refer to the VACUUM HOSE ROUTING DIAGRAM LABEL (page 1-47) and CABLE & HARNESS ROUTING (page 1-24) for tube connections.



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 center stand and shift the transmission into neutral.
Check the slack in the drive chain lower run midway between the sprockets.

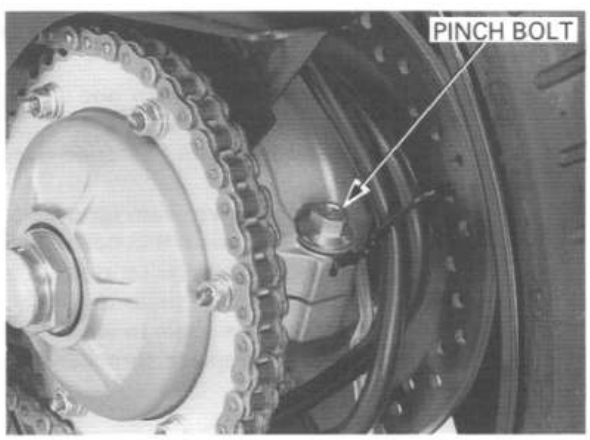
CHAIN SLACK: 20 – 30 mm (0.8 – 1.2 in)

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 Pro Honda chain lube designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.

ADJUSTMENT



Loosen the axle bearing holder pinch bolt.

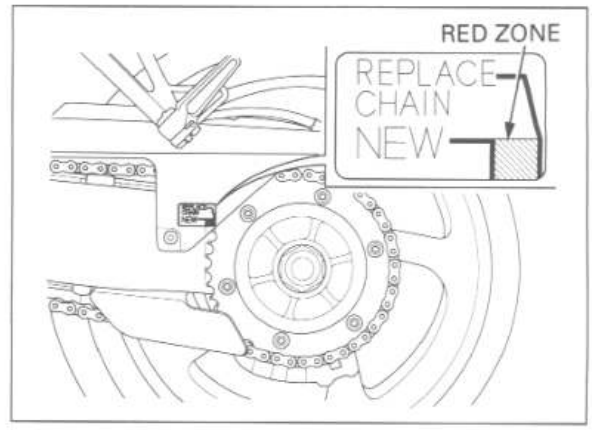


Turn the axle bearing holder with the pin spanner provided in the tool kit until the correct drive chain slack is obtained.

NOTE:

For ease of adjustment, raise the rear wheel using the center stand and turn the wheel in the same direction as the axle bearing holder rotation.

After adjustment, check the drive chain wear indicator label attached on the swingarm.
If the red zone of the indicator label reaches the outside diameter of the driven sprocket, replace the drive chain with a new one (page 3-19).

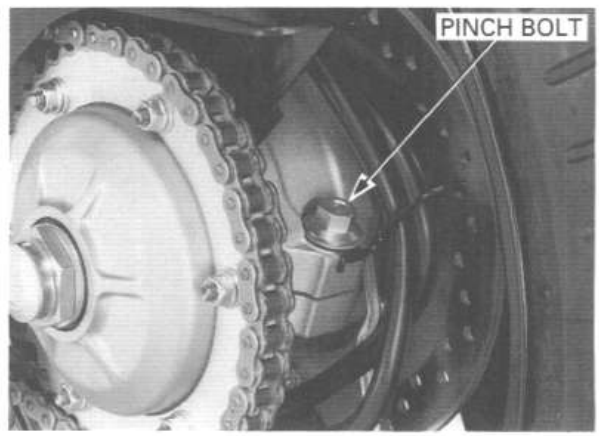


Make sure brake hose guide is positioned properly after tightening pinch bolt.

Tighten the axle bearing holder pinch bolt to the specified torque.

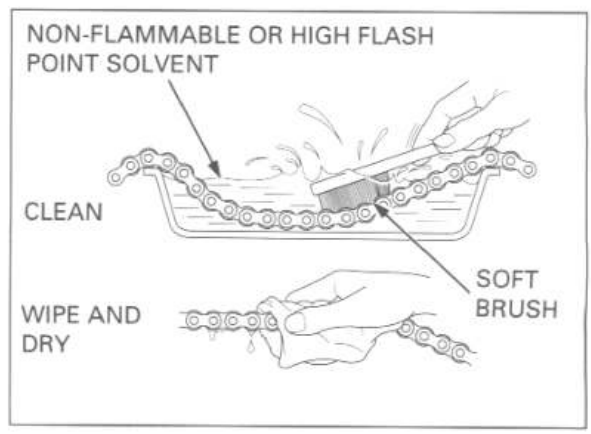
TORQUE: 74 N·m (7.5 kgf·m, 54 lbf·ft)

Recheck the drive chain slack and free wheel rotation.
Lubricate the drive chain.

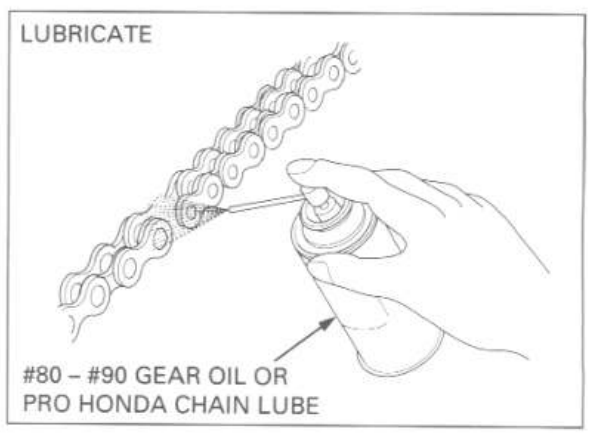


CLEANING AND LUBRICATION

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.

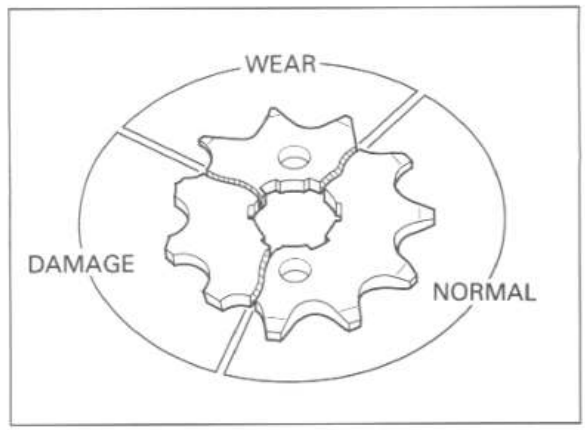


Lubricate the drive chain with #80 – #90 gear oil or Pro Honda chain lube designed specifically for use with O-ring chains. Wipe off the excess oil or chain lubricant.



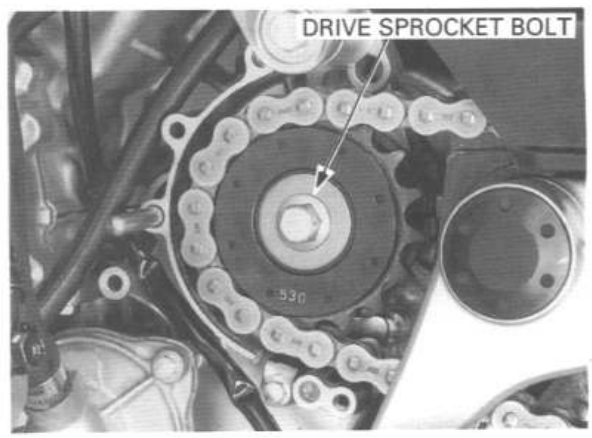
SPROCKETS INSPECTION

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: 51 N·m (5.2 kgf·m, 38 lbf·ft)
Driven sprocket nut: 34 N·m (3.5 kgf·m, 25 lbf·ft)



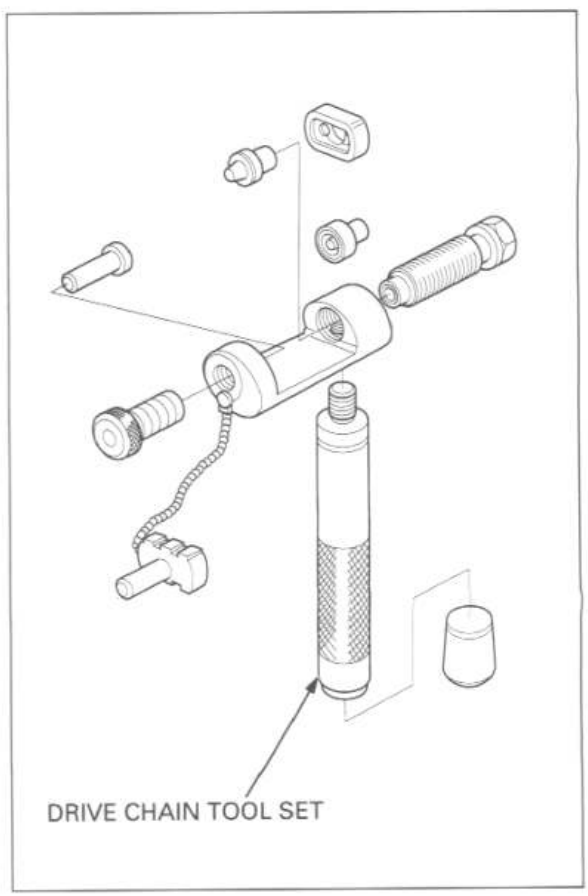
REPLACEMENT

This motorcycle uses a drive chain with a staked master link.
Loosen the drive chain (page 3-17).
Assemble the special tool as shown.

TOOL:
Drive chain tool set — **07HMH – MR10103 or 07HMH – MR1010B (U.S.A. only)**

NOTE:

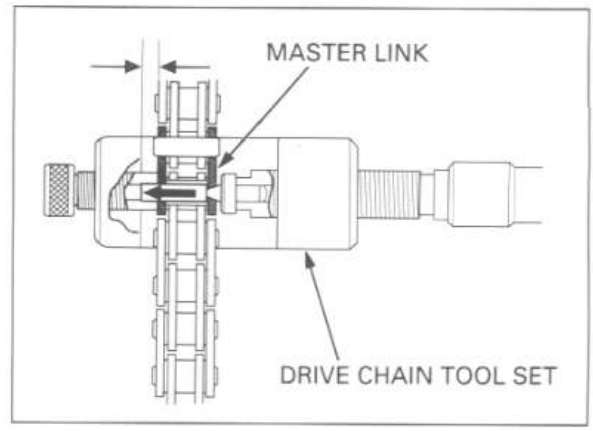
When using the special tool, follow the manufacturer's instruction.



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

TOOL:
Drive chain tool set — **07HMH – MR10103 or 07HMH – MR1010B (U.S.A. only)**

Remove the drive chain.

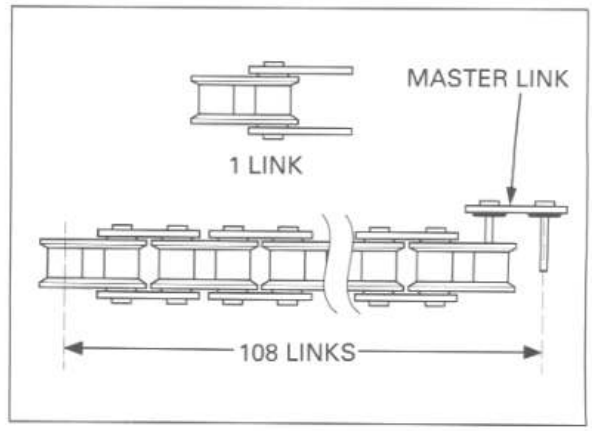


Remove the excess drive chain links from the new drive chain with the drive chain tool set.

NOTE:

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

STANDARD LINKS: 108 links
REPLACEMENT CHAIN:
DID: DID50VA7 – 120ZB
RK: RK50MF0Z3 – 120JFZ



CAUTION:

Never reuse the old 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.

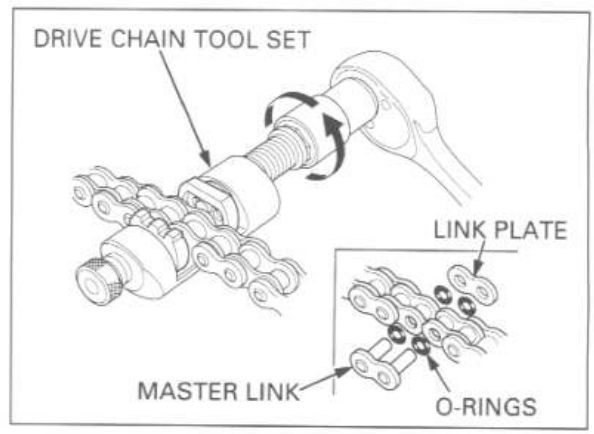
Assemble and set the drive chain tool set.

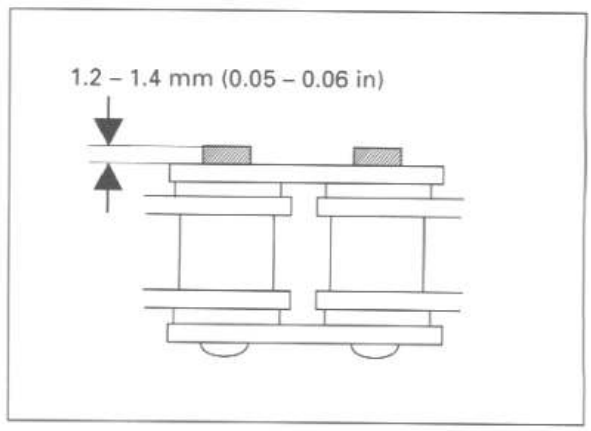
TOOL:
Drive chain tool set — **07HMH – MR10103 or 07HMH – MR1010B (U.S.A. only)**

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

STANDARD LENGTH: 1.2 – 1.4 mm (0.05 – 0.06 in)

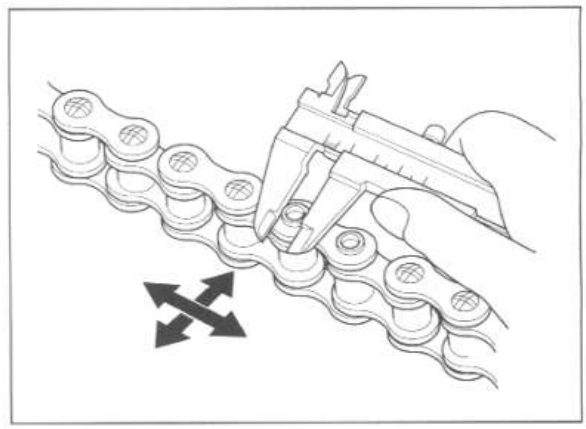
Stake the master link pins.





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

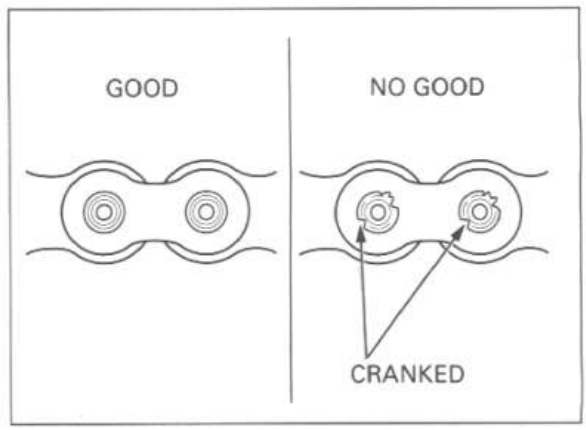
DIAMETER OF THE STAKED AREA:
5.55 – 5.85 mm (0.219 – 0.230 in)



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.

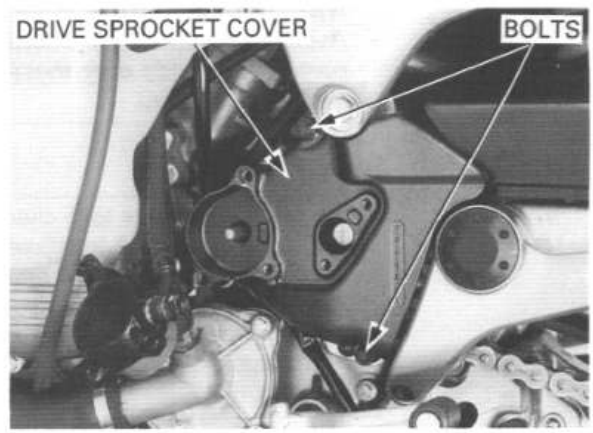
CAUTION:

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



DRIVE CHAIN GUIDE PLATE INSPECTION

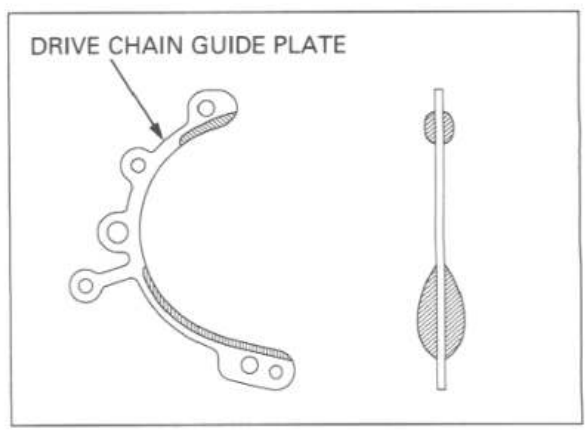
Remove the bolts, drive sprocket cover and drive chain guide plate.



Check the drive chain guide plate for wear or damage. If the drive chain guide plate is excessively wear or damage, replace it with a new one.

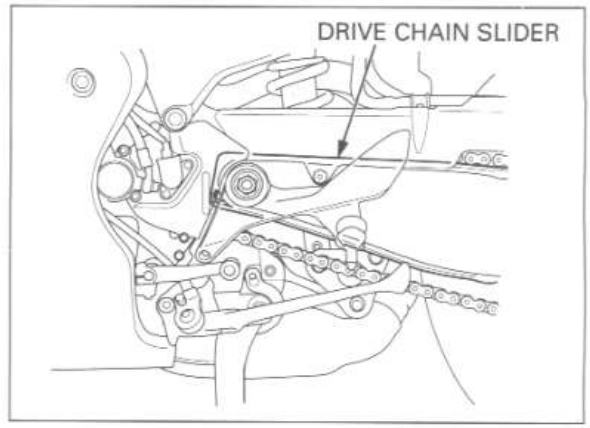
CAUTION:

Avoid damaging the crankcase, periodically inspect the drive chain guide plate, replace if necessary.

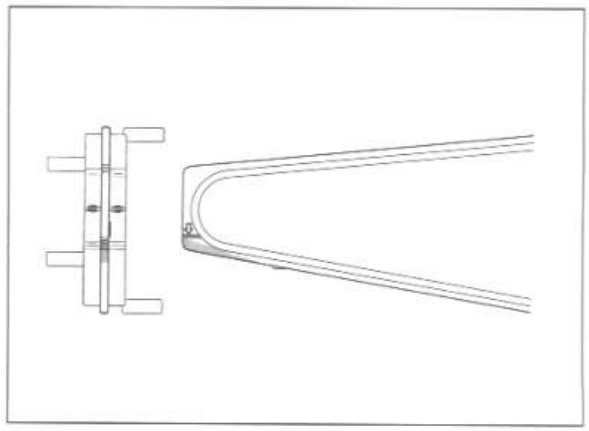


DRIVE CHAIN SLIDER

Inspect the drive chain slider for excessive wear or damage.



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



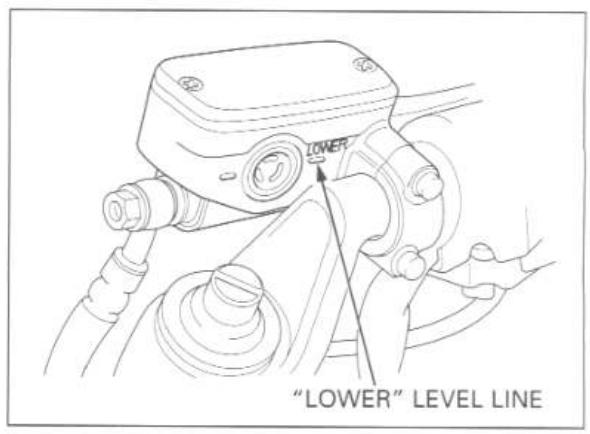
BRAKE FLUID

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 next page). A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper piston is pushed out, and this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check entire system for leaks (page 3-24).

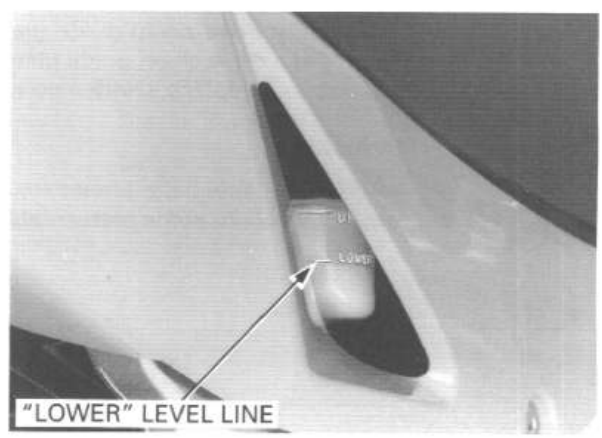


FRONT BRAKE

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 next page).

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 next page).

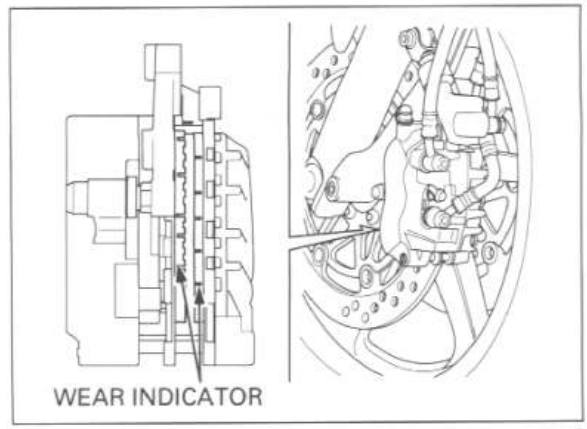


BRAKE PAD WEAR

FRONT BRAKE PADS

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

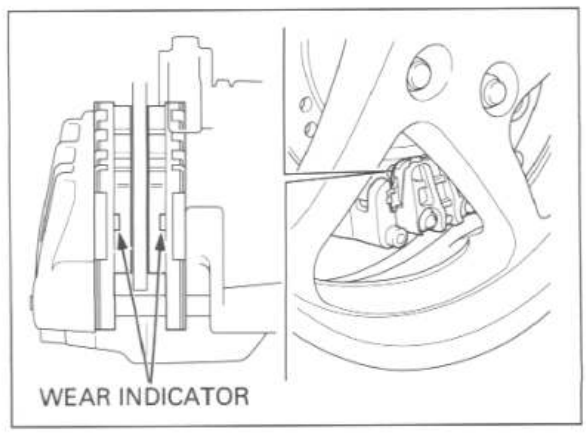
Refer to page 15-14 for brake pad replacement.



REAR BRAKE PADS

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

Refer to page 15-16 for brake pad replacement.

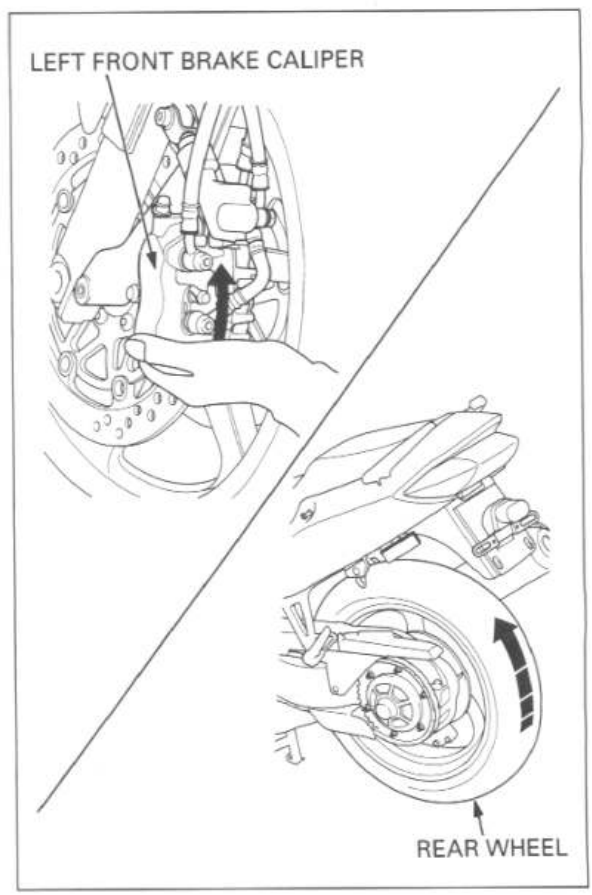


BRAKE SYSTEM

INSPECTION

This model is equipped with a Linked 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.

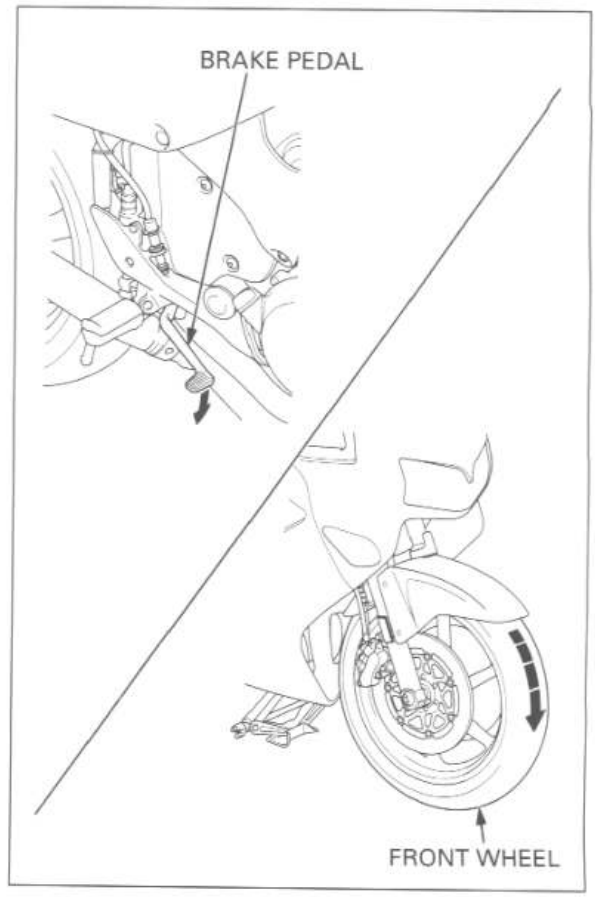


Jack-up the motorcycle to raise the front wheel off the ground.

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 15-7 for brake bleeding procedures.



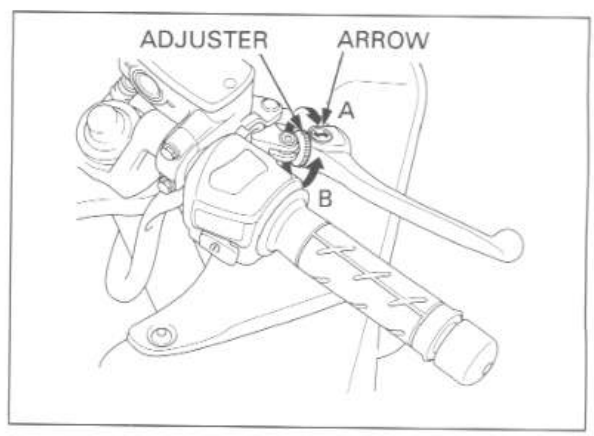
BRAKE LEVER ADJUSTMENT

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

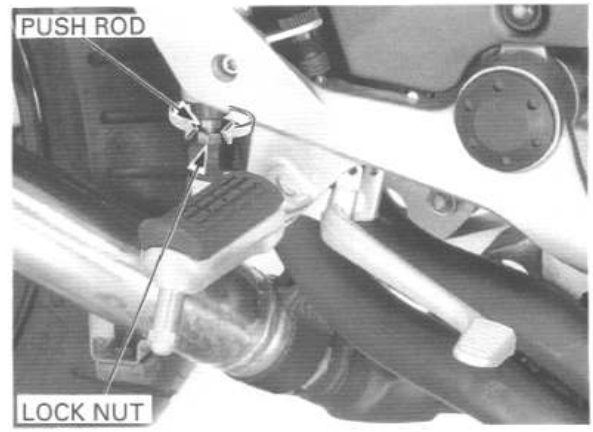
CAUTION:

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.

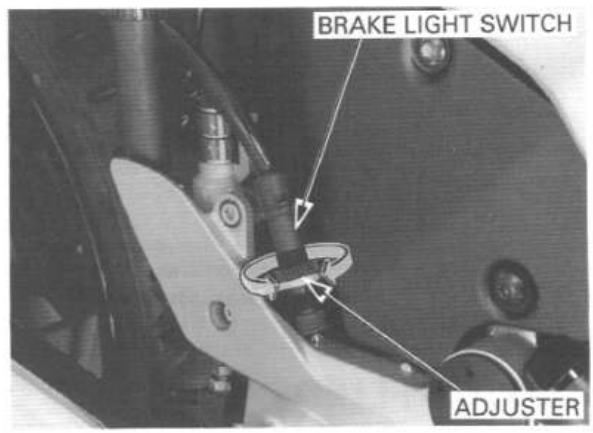


BRAKE LIGHT SWITCH

NOTE:

The front brake light switch does not require adjustment.

Adjust the rear 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 on-coming drivers, or it may fail to light the road for a safe distance.

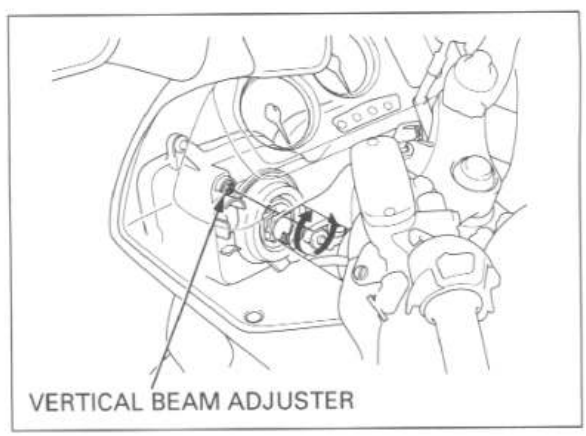
NOTE:

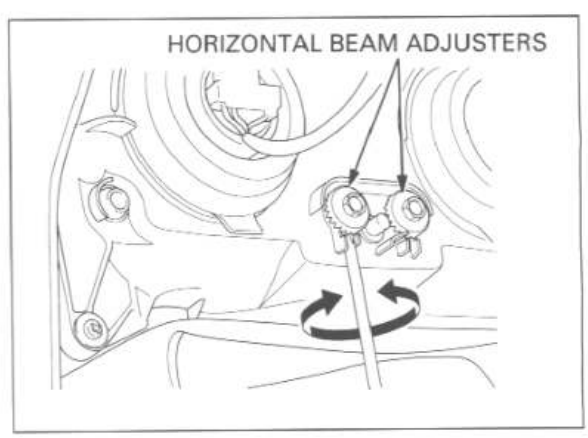
Adjust the headlight beam as specified by local laws and regulations.

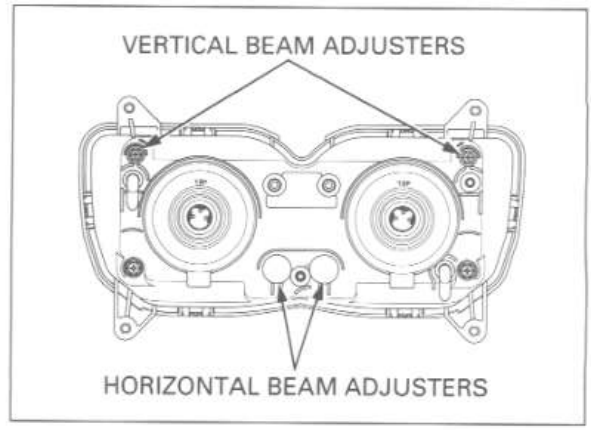
Place the motorcycle on a level surface.

Adjust the headlight beam vertically by turning the vertical beam adjusting screws.
A clockwise rotation moves the beam up.

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







CLUTCH SYSTEM

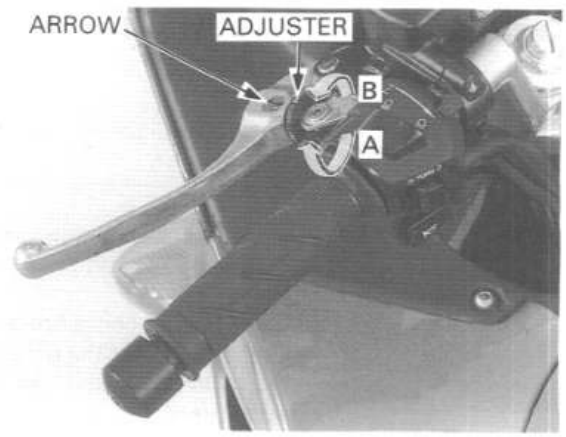
CLUTCH LEVER ADJUSTMENT

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

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

CAUTION:

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



CLUTCH 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.***

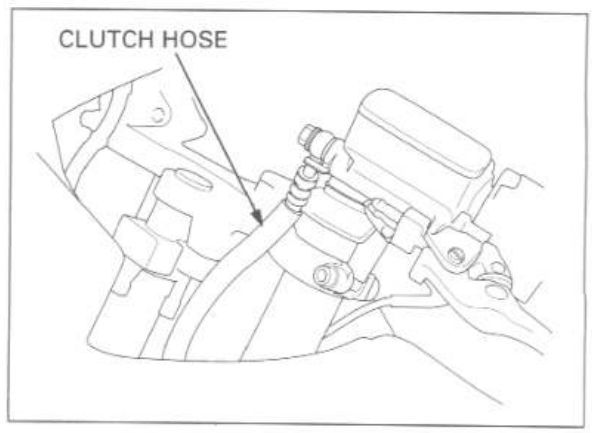
NOTE:

When the fluid level is low, check entire system for leaks.



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

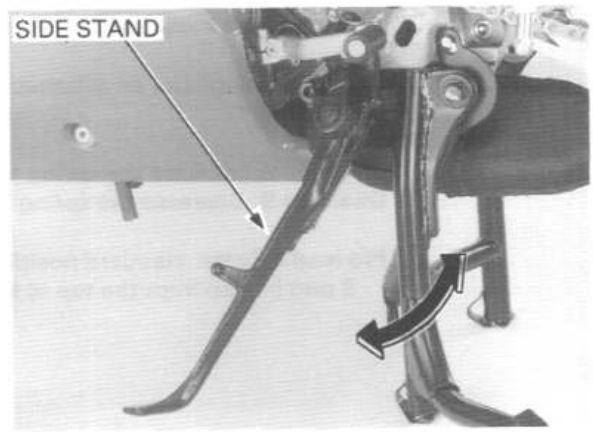
Firmly apply the clutch lever, and check that no air has entered the system.
If the lever feels soft or spongy when operated, bleed the air from the system.



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

Refer to page 9-4 for hydraulic clutch bleeding procedures.

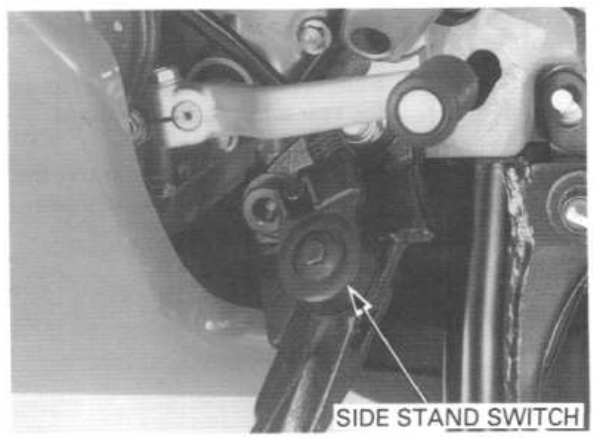
SIDE STAND



Support the motorcycle on a level surface.

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

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



SUSPENSION

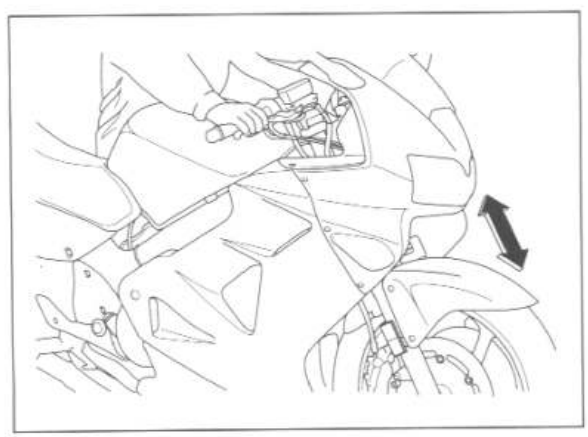
⚠ WARNING

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.

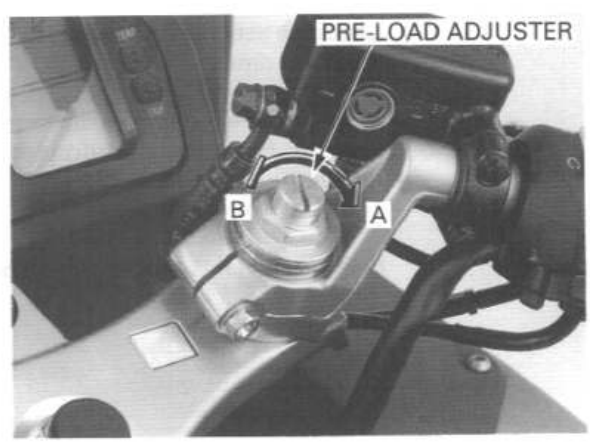
Refer to section 13 for fork service.



FRONT SUSPENSION ADJUSTMENT

NOTE:

To adjust both sides equally, set the right and left preload adjusters to the same position.



Spring pre-load adjuster

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

Direction A: Increase the spring pre-load
Direction B: Decrease the spring pre-load

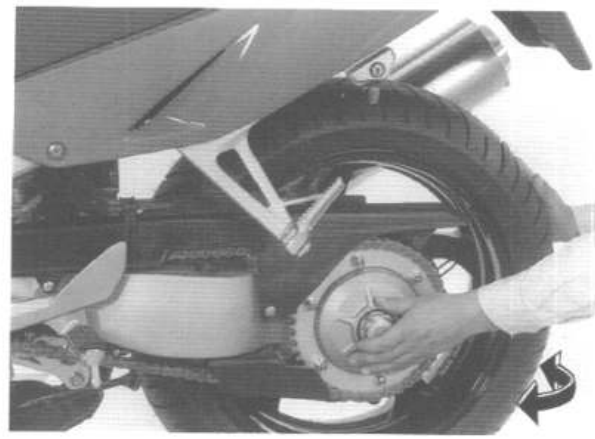
Pre-load adjuster standard position:
9 mm (0.4 in) from the top of fork bolt



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 axle bearings are worn.

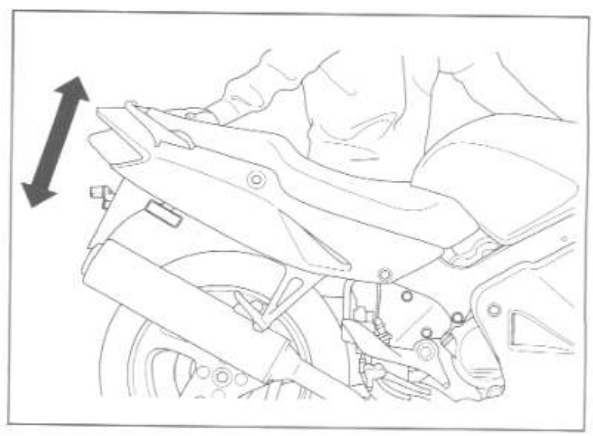


Check for worn swingarm bearings by grabbing the rear swingarm and attempting to move the swingarm side to side.
Replace the bearings if any looseness is noted.



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

Refer to section 14 for shock absorber service.



REAR SUSPENSION ADJUSTMENT



REBOUND DAMPING ADJUSTER

CAUTION:

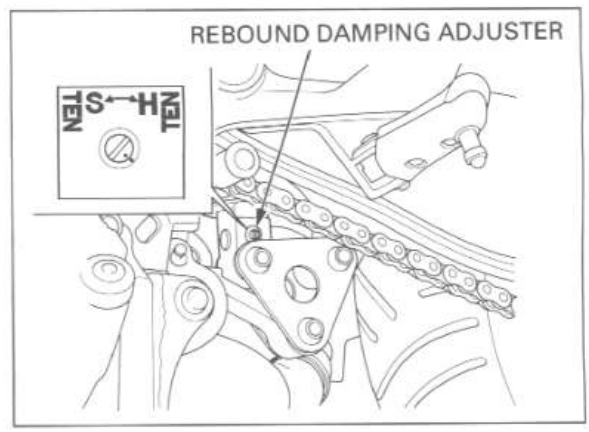
- ***Always start on full hard when adjusting the damping.***
- ***Do not turn the adjuster screws more than the given positions or the adjusters may be damaged.***

The rebound damping can be adjusted by turning the adjuster.

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

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

REBOUND ADJUSTER STANDARD POSITION:
1-1/2 turn out from full hard



NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-14).
Check that all safety clips, hosè clamps and cable stays are in place and properly secured.

WHEELS/TIRES



NOTE:

Tire pressure should be checked when the tires are COLD.

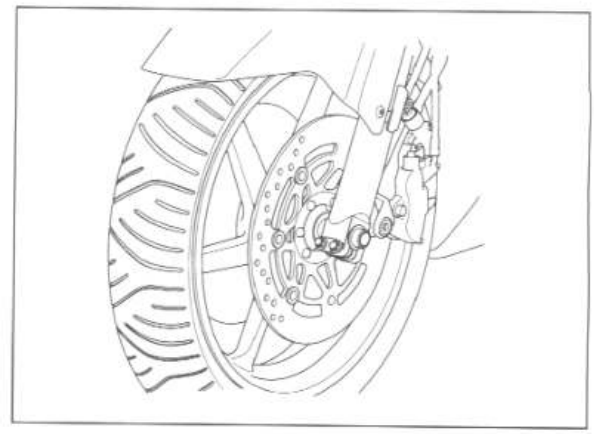
RECOMMENDED TIRE PRESSURE AND TIRE SIZE:

		FRONT	REAR
Tire pressure kPa (kgf/cm², psi)		250 (2.50, 36)	290 (2.90, 42)
Tire size		120/70 ZR 17 (58W)	180/55 ZR 17 (73W)
Tire bland	Bridgestone	BT57F Radial J	BT57R Radial J
	Dunlop	D204FK	D204K
	Metzeler	MEZ4	MEZ4A

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)

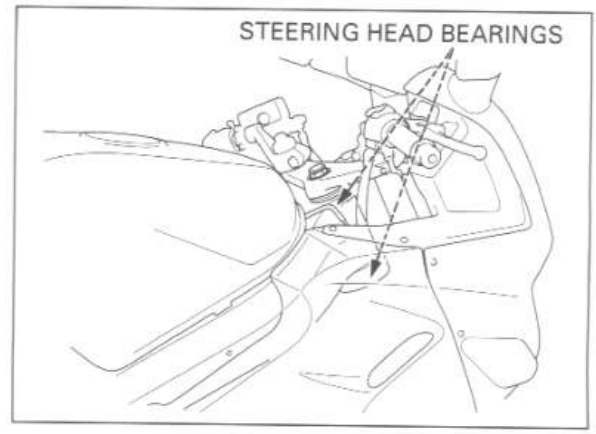


STEERING HEAD BEARINGS

NOTE:

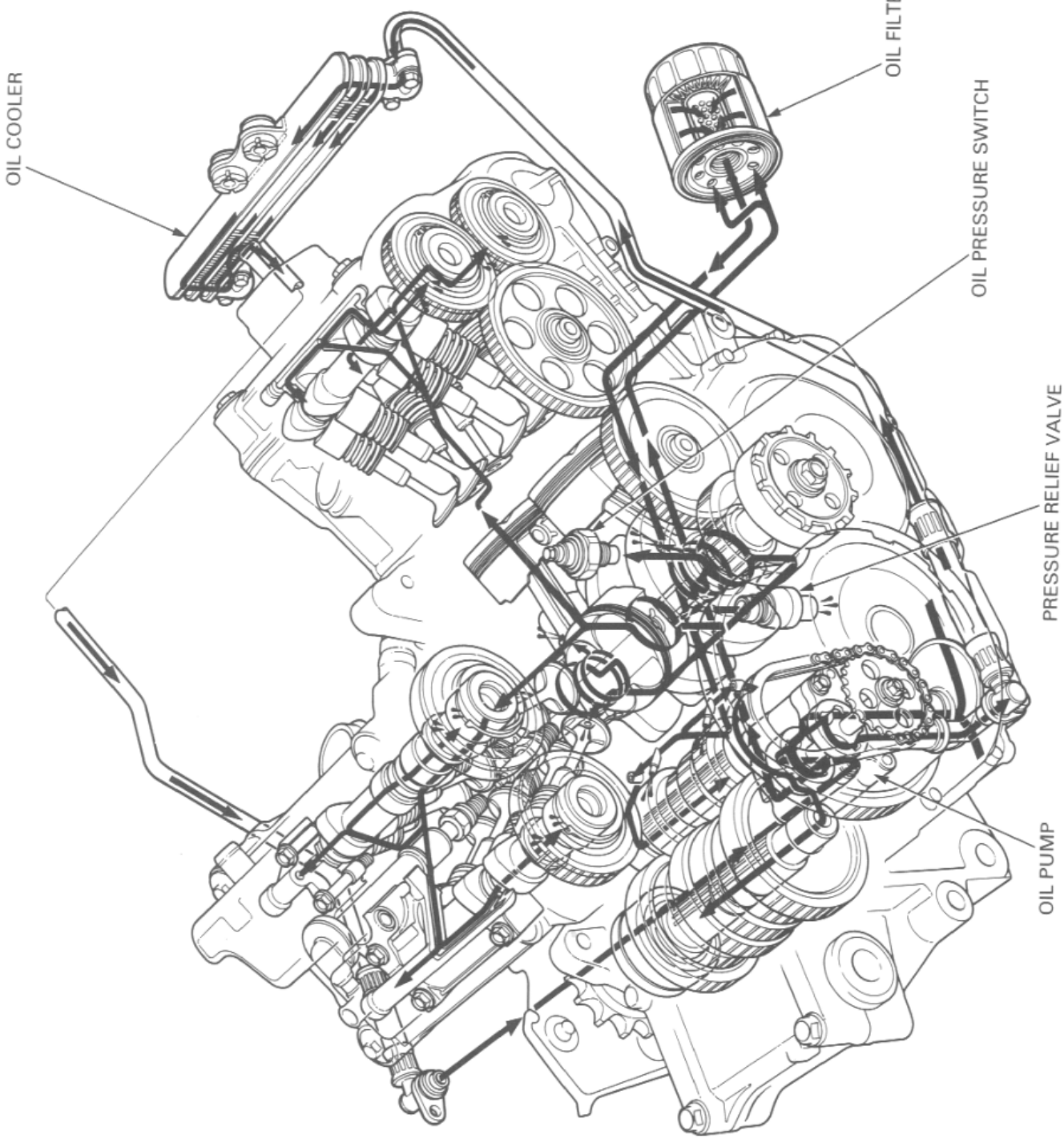
Check that the control cables do not interfere with handlebar rotation.

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).



MEMO

LUBRICATION SYSTEM DIAGRAM



4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM	4-0	OIL STRAINER/PRESSURE RELIEF VALVE	4-4
SERVICE INFORMATION	4-1	OIL PUMP	4-6
TROUBLESHOOTING	4-2	OIL COOLER	4-12
OIL PRESSURE INSPECTION	4-3		

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

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

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Engine oil capacity		At draining	2.9 liter (3.1 US qt, 2.6 Imp qt)	———
		At disassembly	3.8 liter (4.0 US qt, 3.3 Imp qt)	———
		At oil filter change	3.1 liter (3.3 US qt, 2.7 Imp qt)	———
Recommended engine oil			HONDA GN4 4-stroke oil or equivalent motor oil API service classification SF or SG Viscosity: SAE 10 W-40	———
Oil pressure at oil pressure switch			490 kPa (5.0 kgf/cm², 71 psi) at 6,000 rpm/ (80°C/178°F)	———
Oil pump rotor	Feed pump	Tip clearance	0.15 (0.006) max.	0.20 (0.008)
		Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
		Side clearance	0.02 – 0.07 (0.001 – 0.003)	0.10 (0.004)
	Cooler pump	Tip clearance	0.15 (0.006) max.	0.20 (0.008)
		Body clearance	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
		Side clearance	0.02 – 0.07 (0.001 – 0.003)	0.10 (0.004)

TORQUE VALUES

Oil drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Oil filter center boss	See page 1-15	Apply a locking agent to the threads
Oil pump assembly bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	CT bolt
Oil pump driven sprocket bolt	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply a locking agent to the threads
Oil filter cartridge	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply clean engine oil to the O-ring

TOOLS

Oil pressure gauge	07506 – 3000000	Equivalent commercially available in U.S.A.
Oil pressure gauge attachment	07406 – 0030000	Equivalent commercially available in U.S.A.
Oil pressure gauge joint adapter	07RMK – MW40100	
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

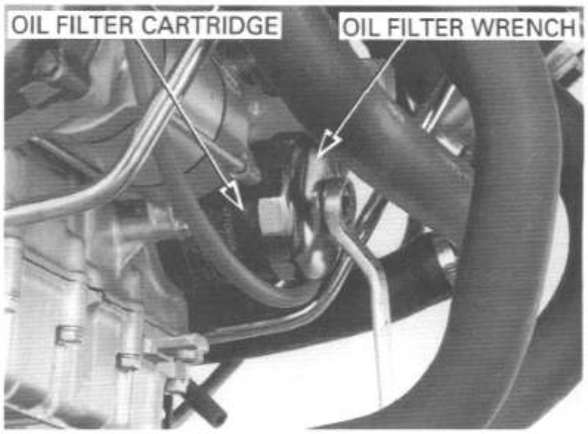
Low or no oil pressure
- Clogged oil orifice
- Incorrect oil being used

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:

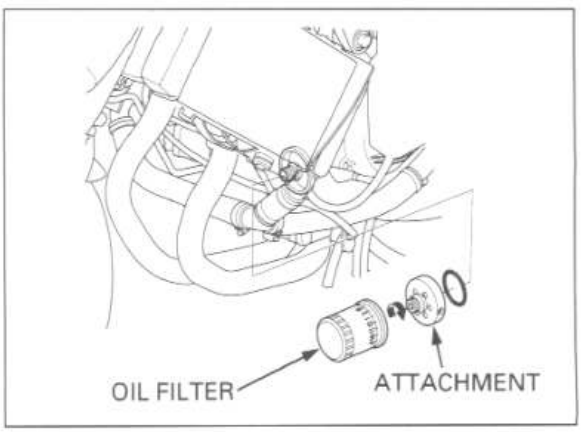
If the oil pressure indicator light remains on a few seconds, check the indicator system before checking the oil pressure.

Remove the oil filter cartridge using the special tool.

TOOL:
Oil filter wrench **07HAA – PJ70100**

Apply oil to the oil pressure gauge joint attachment O-ring.
Install the oil pressure gauge joint attachment to the engine block, then tighten the nut.

TOOL:
Oil pressure gauge joint attachment
07RMK – MW40100

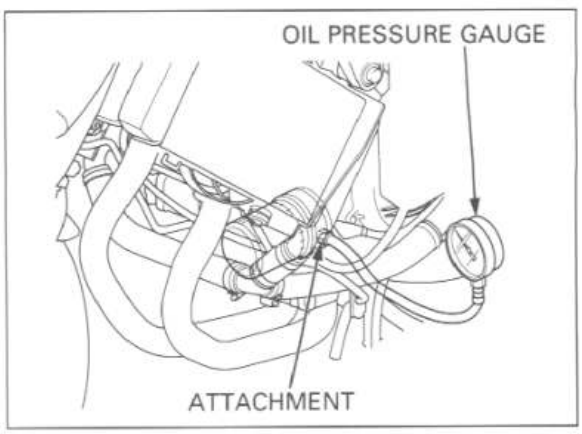


Reinstall the oil filter.

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

TOOLS:

Oil pressure gauge	**07506 – 3000000 (Equivalent commercially available in U.S.A.)**
Oil pressure gauge attachment	**07510 – 4220100 (Equivalent commercially available in U.S.A.)**



Check the oil level (page 3-12).

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

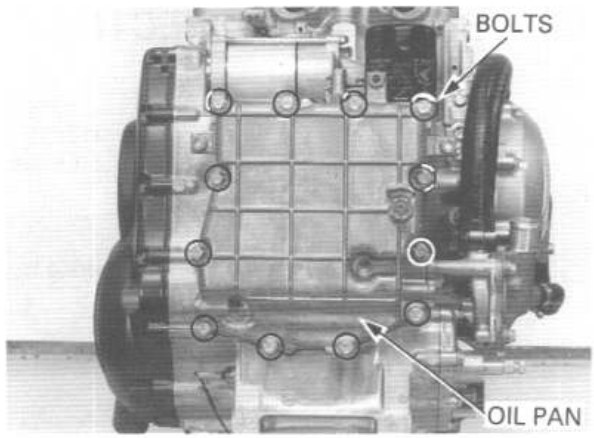
OIL PRESSURE:
490 kPa (5.0 kgf/cm², 71 psi) at 6,000 rpm (80°C/176°F)

OIL STRAINER/PRESSURE RELIEF VALVE

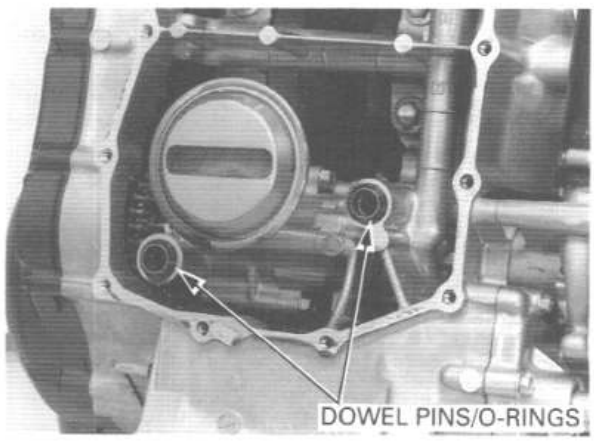
REMOVAL

Drain the engine oil (page 3-13).
Remove the oil cooler hose joints (page 4-12).
Remove the exhaust pipe (page 2-19).

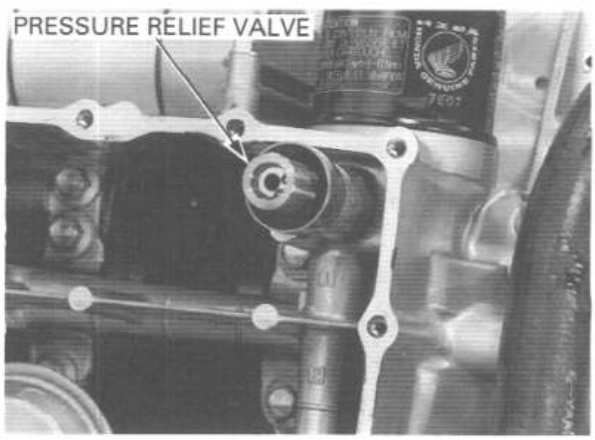
Remove the oil pan flange bolts and oil pan.



Remove the 15 mm dowel pins and O-rings.

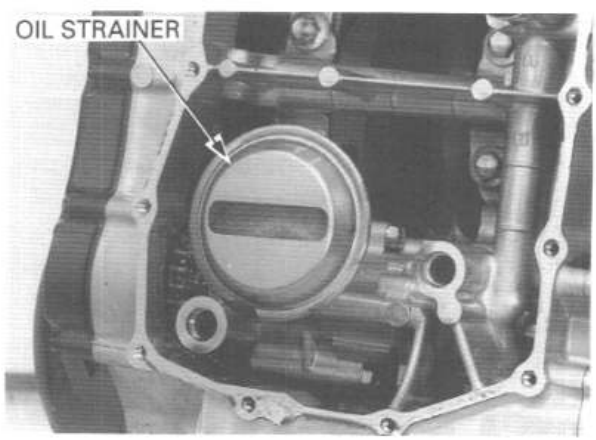


Remove the pressure relief valve and O-ring.



Remove the oil strainer and gasket.

Clean the oil strainer screen.

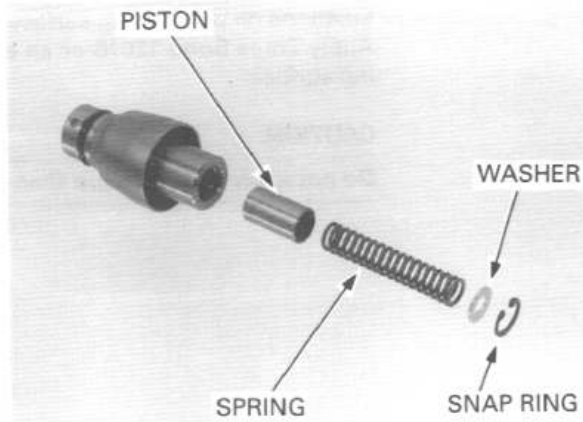


INSPECTION

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

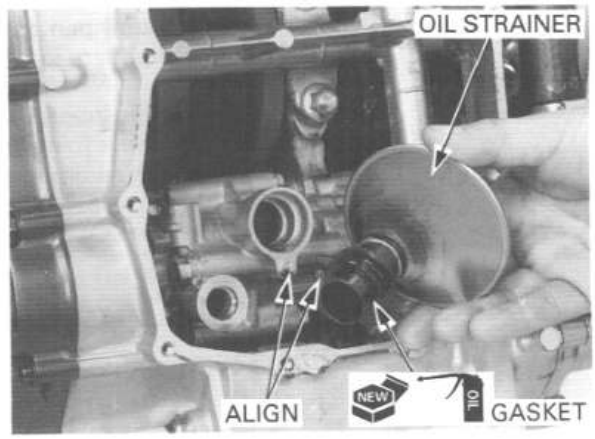
Inspect the piston for wear, sticking or damage.
Inspect the spring for weakness or damage.

Assemble the relief valve in the reverse order of disassembly.

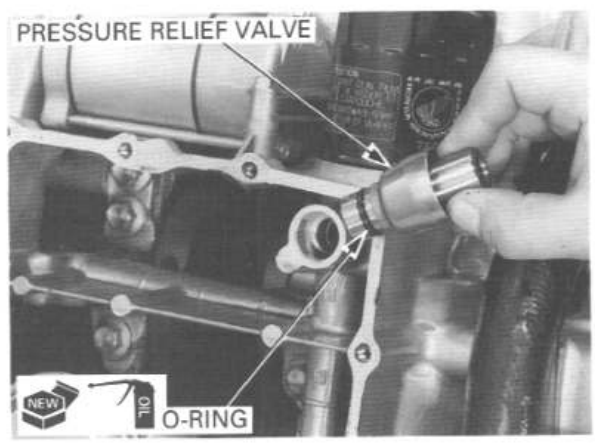


INSTALLATION

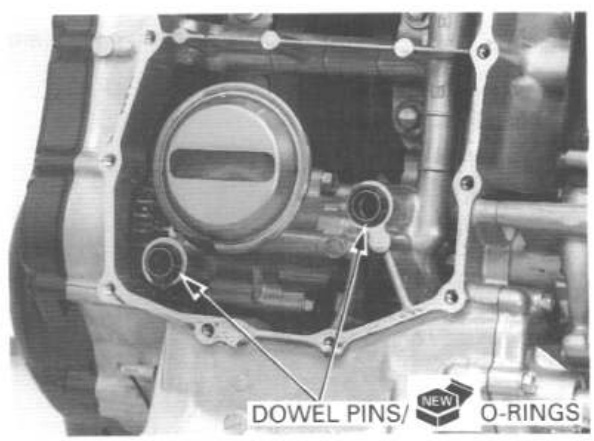
Apply oil to the new gasket and install it onto the oil strainer.
Install the oil strainer into the crankcase while aligning its grooves with the boss on the oil pump body.



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



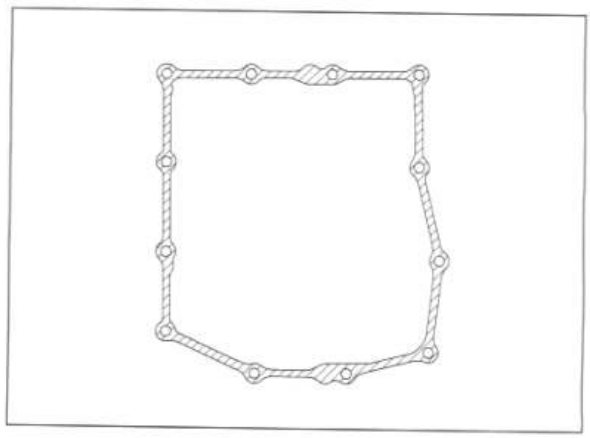
Install the 15 mm dowel pins and new O-rings.



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.

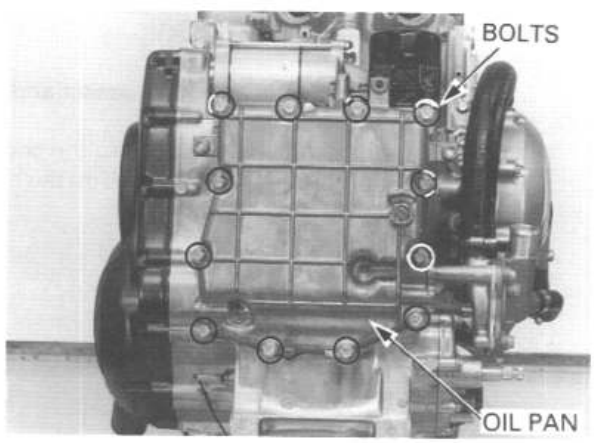


Carefully install the oil pan and tighten the flange bolts in a crisscross pattern in 2-3 steps.

Install the exhaust pipe (page 2-20).
Install the oil cooler hose joints (page 4-13).
Fill the crankcase with recommended oil (page 3-13).

NOTE:

After installation, check that there are no oil leaks.

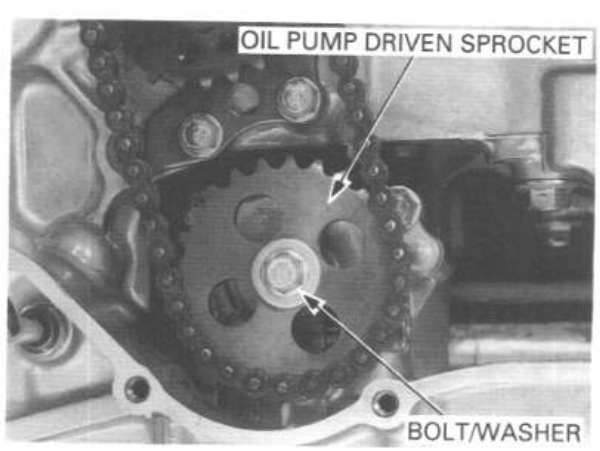


OIL PUMP

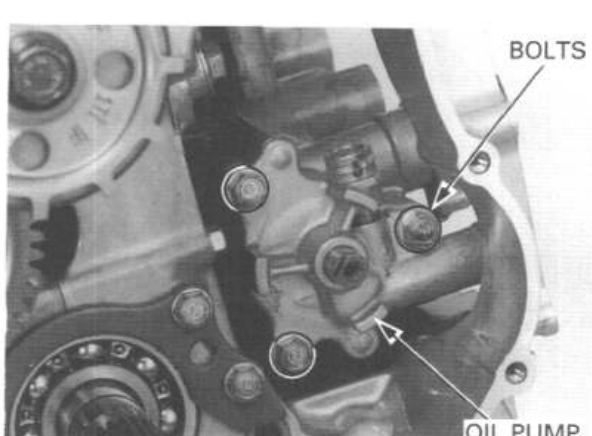
REMOVAL

Remove the following:
— Clutch assembly (page 9-13)
— Oil strainer and pressure relief valve (page 4-4)

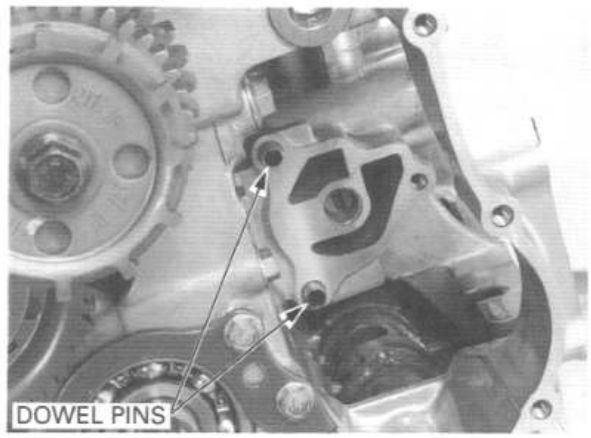
Remove the bolt/washer, then remove the oil pump drive/driven sprocket, clutch outer guide and drive chain as an assembly.



Remove the three flange bolts and oil pump assembly.



Remove the dowel pins.



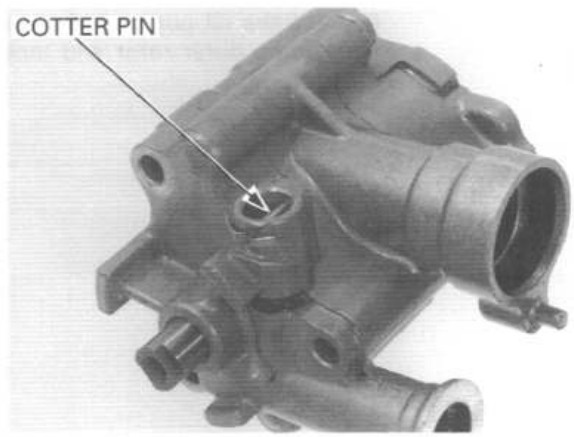
DISASSEMBLY

NOTE:

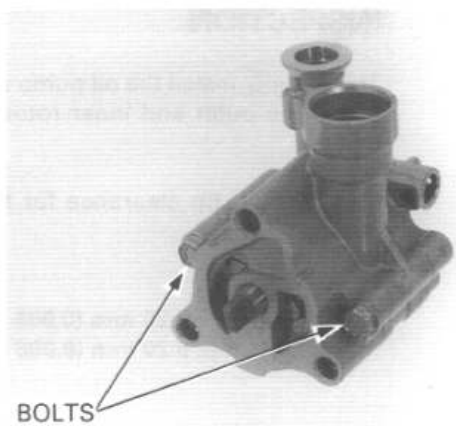
If any portion of the oil pump is worn beyond the specified service limit, replace the oil pump as an assembly.

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

Check the pressure relief valve for wear or damage.

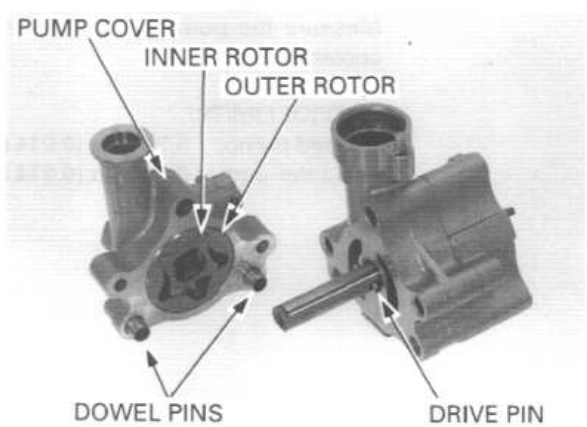


Remove the oil pump assembly bolts.

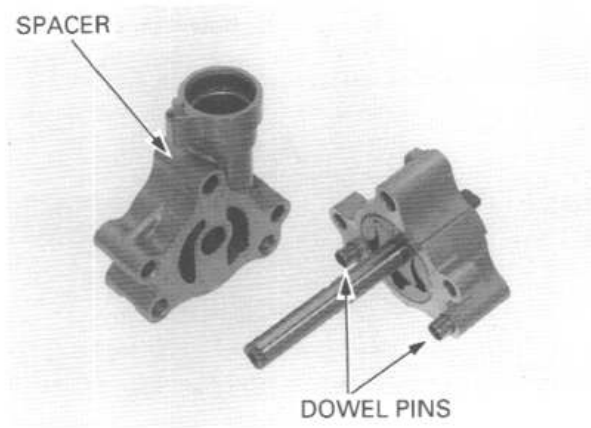


Remove the oil pump cover and dowel pins.

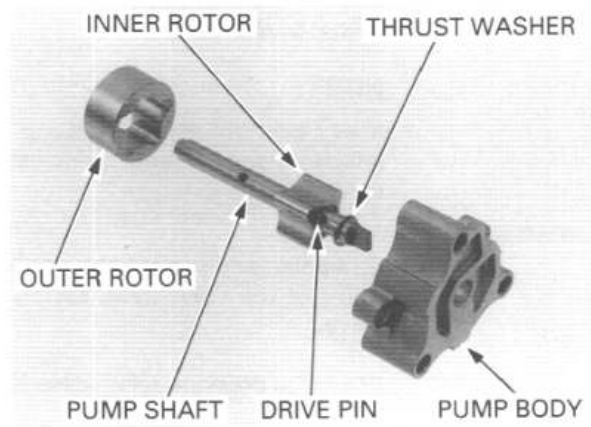
Remove the cooler pump outer rotor and inner rotor.
Remove the drive pin.



Remove the oil pump spacer and dowel pins.



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

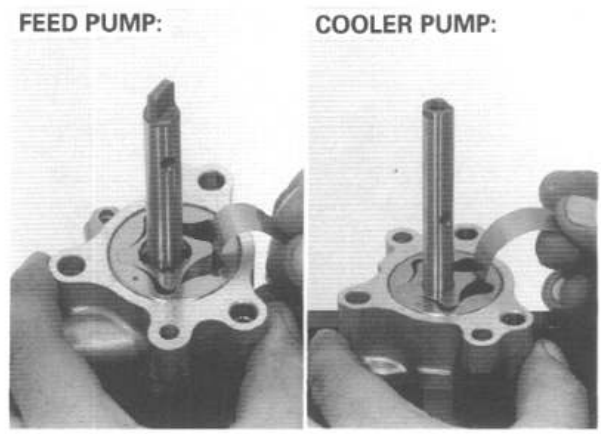


INSPECTION

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

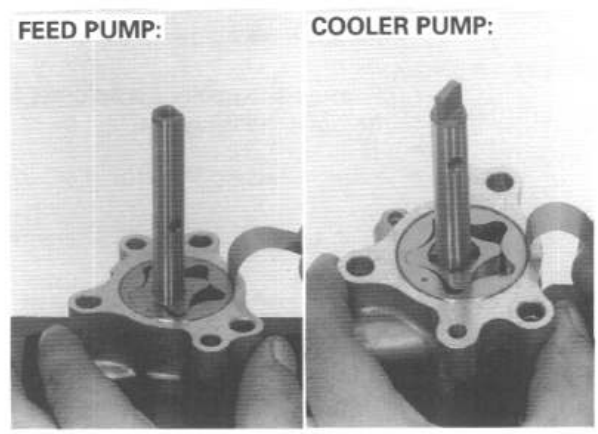
Measure the tip clearance for the feed and cooler pump.

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



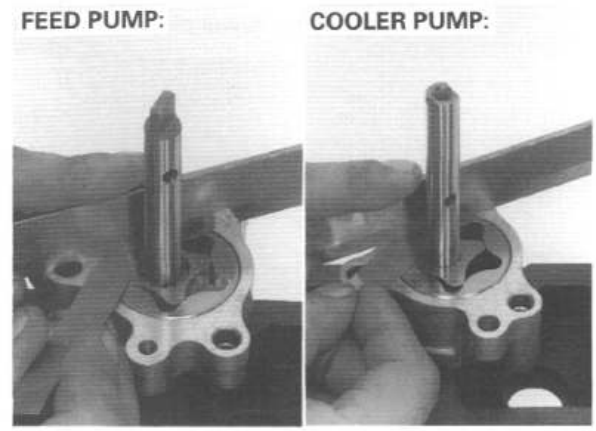
Measure the pump body clearance for the feed and cooler pump.

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

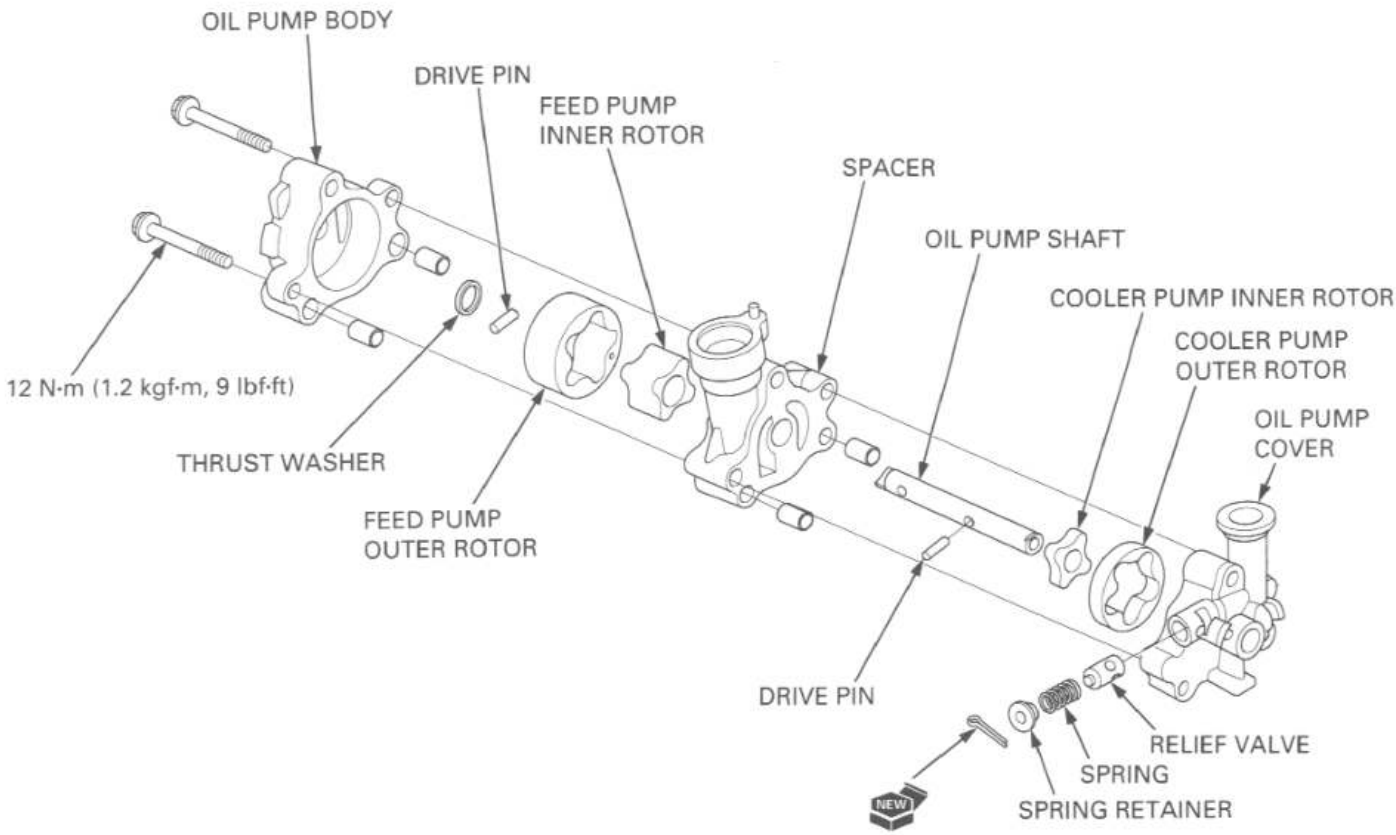


Measure the side clearance for the feed and cooler pump using a straight edge and feeler gauge.

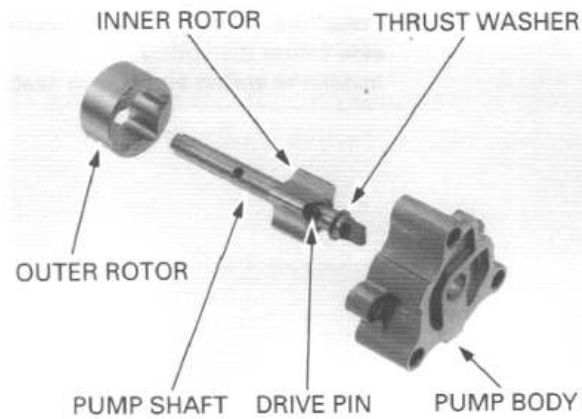
SERVICE LIMITS:
Feed pump: 0.10 mm (0.004 in)
Cooler pump: 0.10 mm (0.004 in)



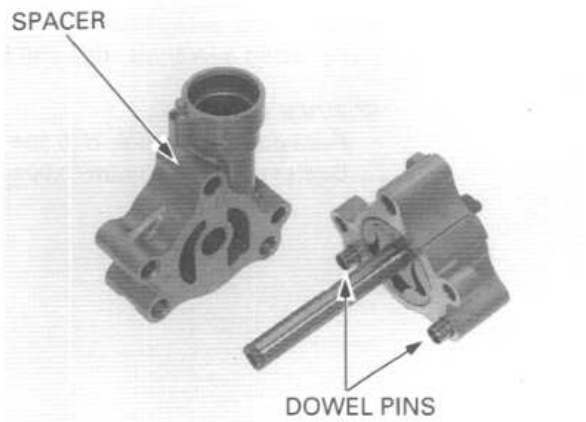
ASSEMBLY



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



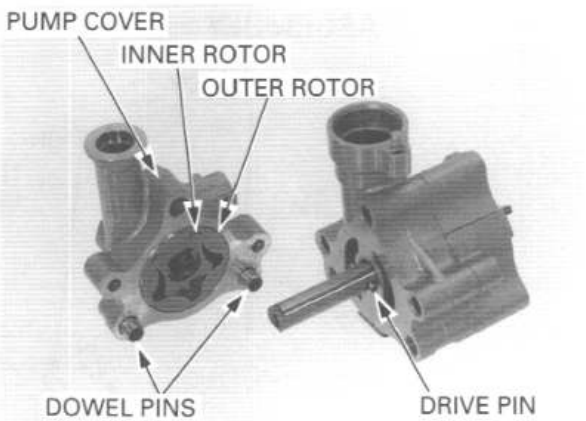
Install the dowel pins and oil pump spacer.



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

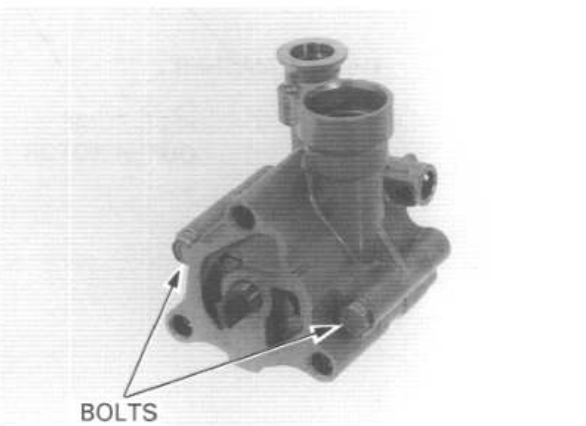
Install the cooler pump outer and inner rotor into the oil pump cover.

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

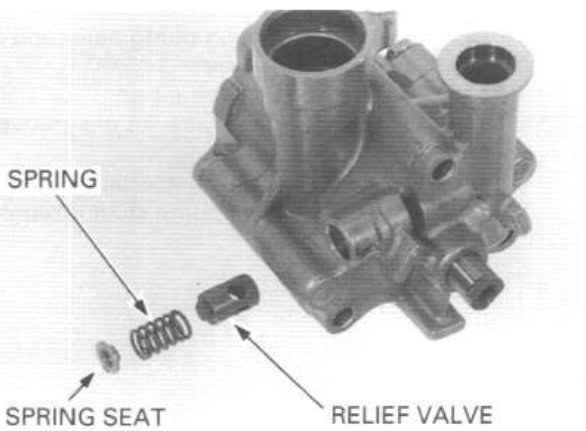


Install and tighten the assembly bolts to the specified torque.

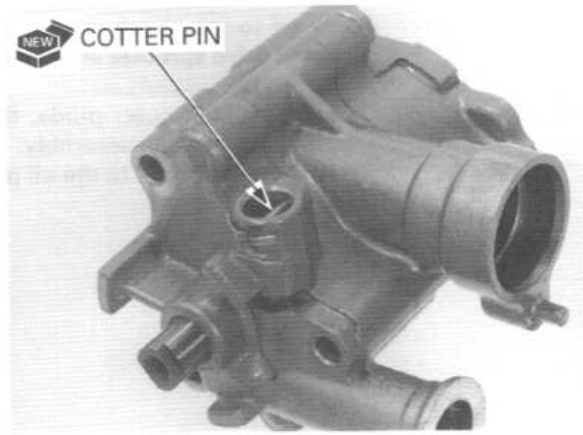
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



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

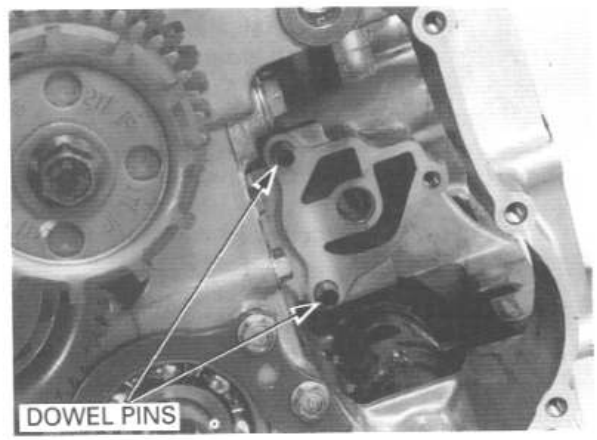


Hold the spring seat and install a new cotter pin. Bend the cotter pin securely as indicated in the illustration.

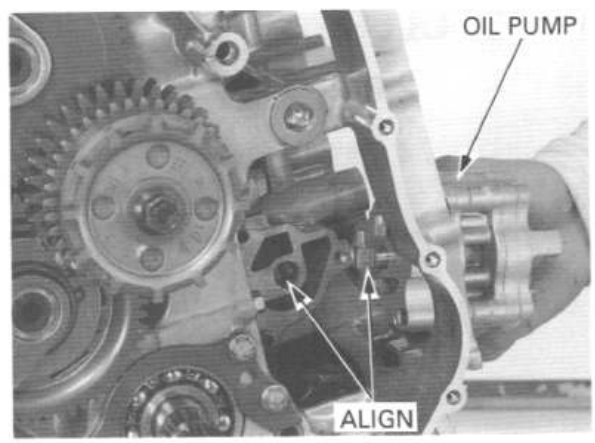


INSTALLATION

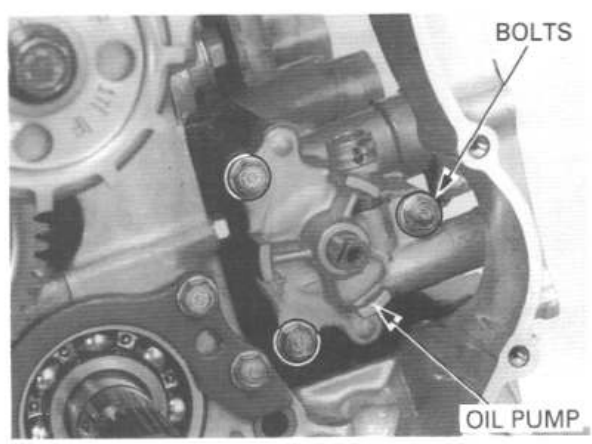
Install the dowel pins into the crankcase.



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

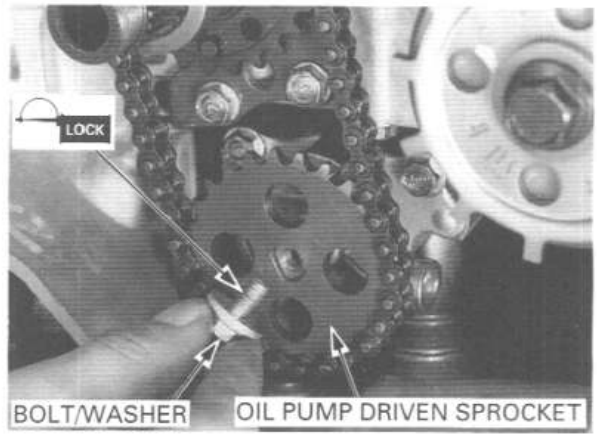


Install and tighten the three flange bolts securely.



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

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.

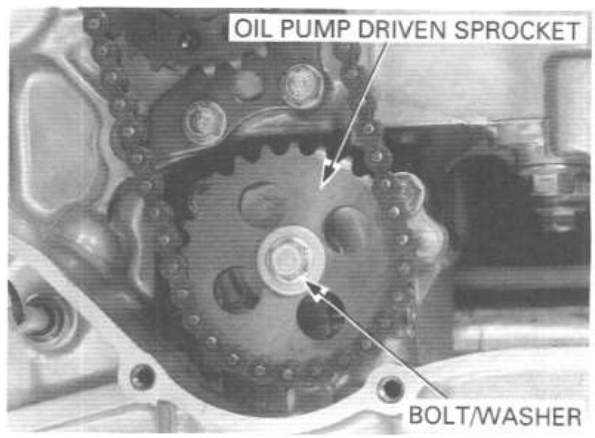


Install and tighten the driven sprocket bolt/washer to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the following:
— Oil strainer and oil pan (page 4-5)
— Clutch assembly (page 9-18)

Fill the crankcase with recommended engine oil (page 3-13), and check for oil leaks.
Check the oil pressure (page 4-3).

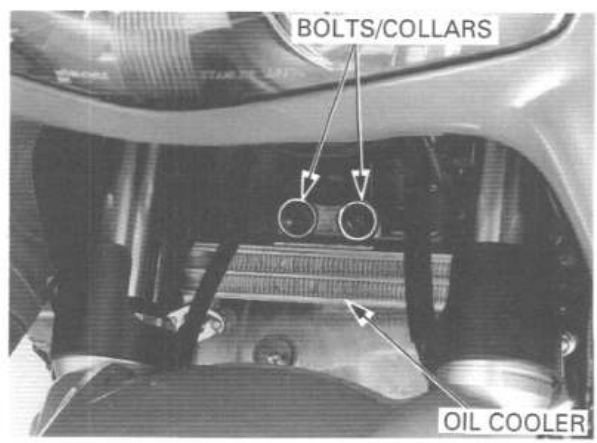


OIL COOLER

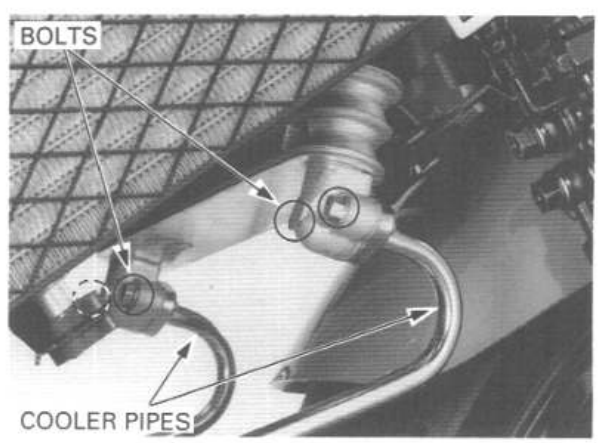
REMOVAL

Drain the engine oil (page 3-13).
Remove the side cowl and inner half cowl (page 2-4).

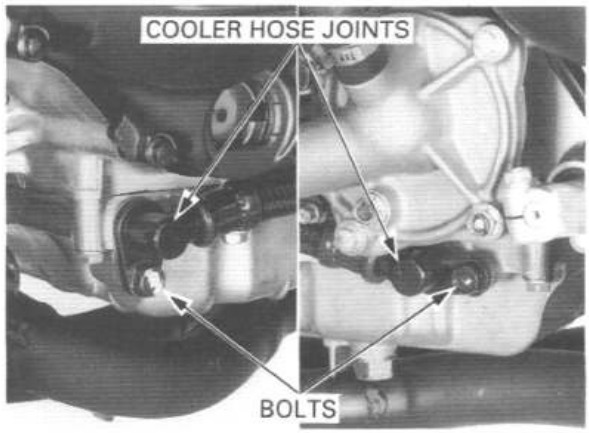
Remove the oil cooler mounting bolts, collars.



Remove the oil cooler pipe joint mounting bolts and cooler pipes.



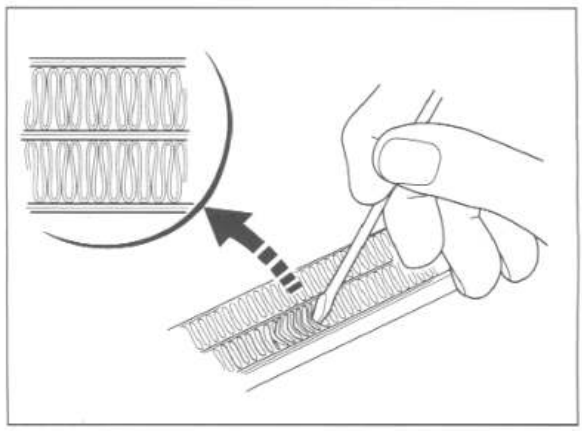
Remove the oil cooler hose bolt and oil cooler hose joint on each side.



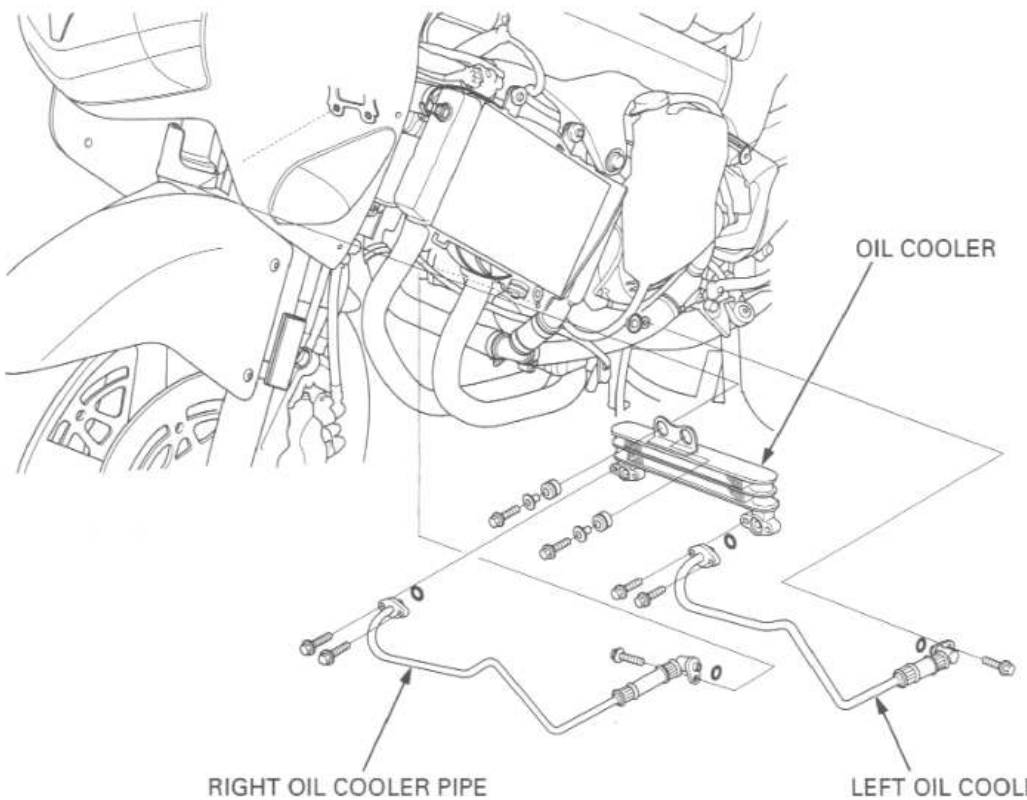
INSPECTION

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.

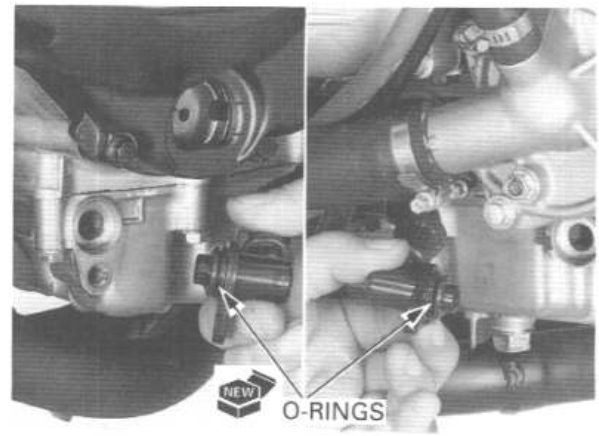


INSTALLATION

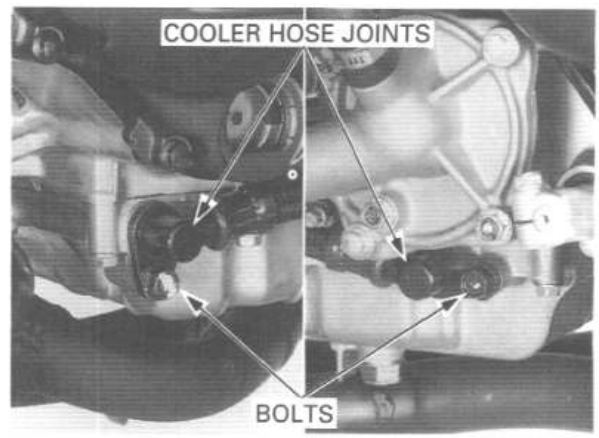


Apply clean engine oil to the new O-ring, and install it onto the oil cooler hose joint on each side.

Install the oil cooler hose joints onto the oil pan.

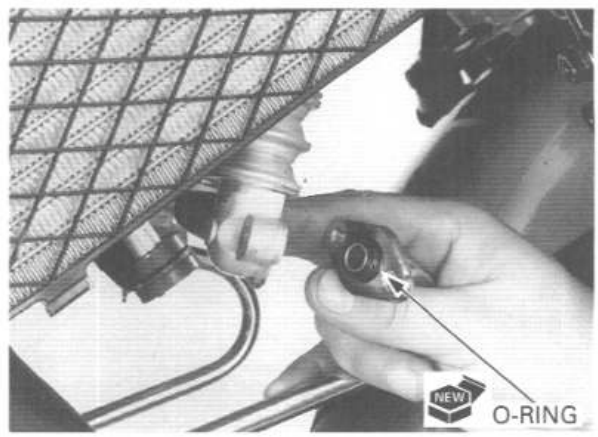


Tighten the oil cooler hose joint bolt on each side.

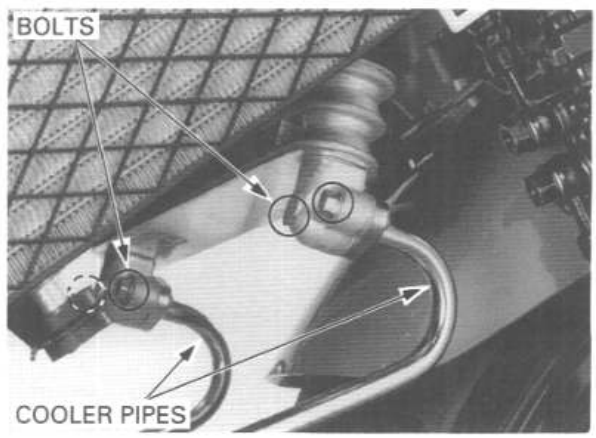


Apply clean engine oil to the new O-ring, and install it onto the oil cooler pipe joint on each side.

Install the oil cooler pipes to the oil cooler.

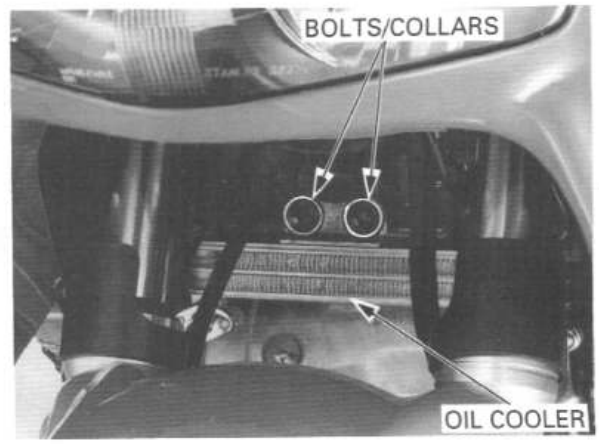


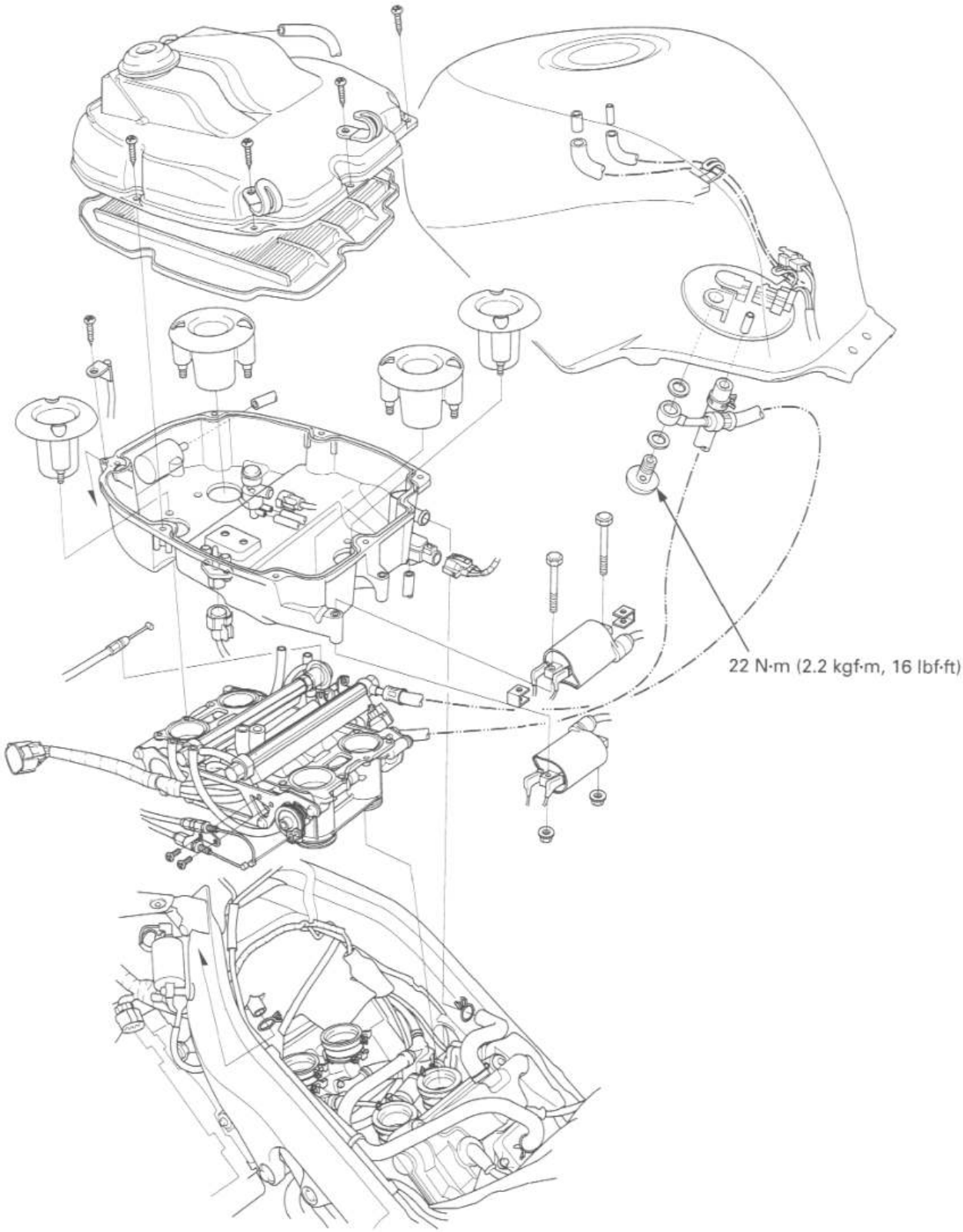
Tighten the oil cooler pipe joint SH bolts on each side.



Place the oil cooler onto the bracket, install the collars and tighten the mounting bolts securely.

Fill the crankcase with recommended engine oil (page 3-13), and check for oil leaks.
Install the inner half cowl and side cowl (page 2-7).




22 N·m (2.2 kgf·m, 16 lbf·ft)

5. FUEL SYSTEM (Programmed Fuel Injection)

SERVICE INFORMATION	5-1	STARTER VALVE	5-65
TROUBLESHOOTING	5-3	STARTER VALVE SYNCHRONIZATION	5-67
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SERVICE INFORMATION

GENERAL

⚠ WARNING

- ***Gasoline is extremely flammable and is explosive under certain condition. 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.***

NOTE:

- The programmed fuel injection system is equipped with the Self-Diagnostic System described on page 5-6. If the malfunction 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 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 fuel tube banjo 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	49 states/Canada type	GQ30A
	California type	GQ30B
Starter valve vacuum difference		20 mmHg
Base throttle valve for synchronization		No. 1
Idle speed	49 states/Canada type	1,200 ± 100 rpm
	California type	1,300 ± 100 rpm
Throttle grip free play		2 – 6 mm (1/12 – 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
Cam pulse generator resistance (at 20°C/68°F)		400 – 600 Ω
Fuel injector resistance (at 20°C/68°F)		13.0 – 14.4 kΩ
Bypass solenoid valve resistance (at 20°C/68°F)		28 – 32 Ω
PAIR solenoid valve resistance (at 20°C/68°F)		20 – 24 Ω
Purge control solenoid valve resistance (at 20°C/68°F)		30 – 34 Ω
Cam pulse generator peak voltage (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		140 – 190 mmHg
Fuel pressure at idle		250 kPa (2.55 kgf/cm², 36 psi)
Fuel pump flow		150 cc (5.0 US oz, 5.3 Imp oz) minimum/10 seconds

TORQUE VALUES

Engine coolant temperature sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Insulator band screw	See page 1-15	
Fuel pressure regulator mounting nut	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Fuel injector holder mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Fuel pipe mounting nut	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fuel tube bolt (fuel tank side)	22 N·m (2.2 kgf·m, 16 lbf·ft)	Yellow paint
Fuel tube sealing nut A (throttle body side)	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Fuel pump mounting flange nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	See page 5-50 for tightening sequence
Fuel filler cap socket bolt	2 N·m (0.18 kgf·m, 1.3 lbf·ft)	

TOOLS

Peak voltage tester (U.S.A. only) or 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

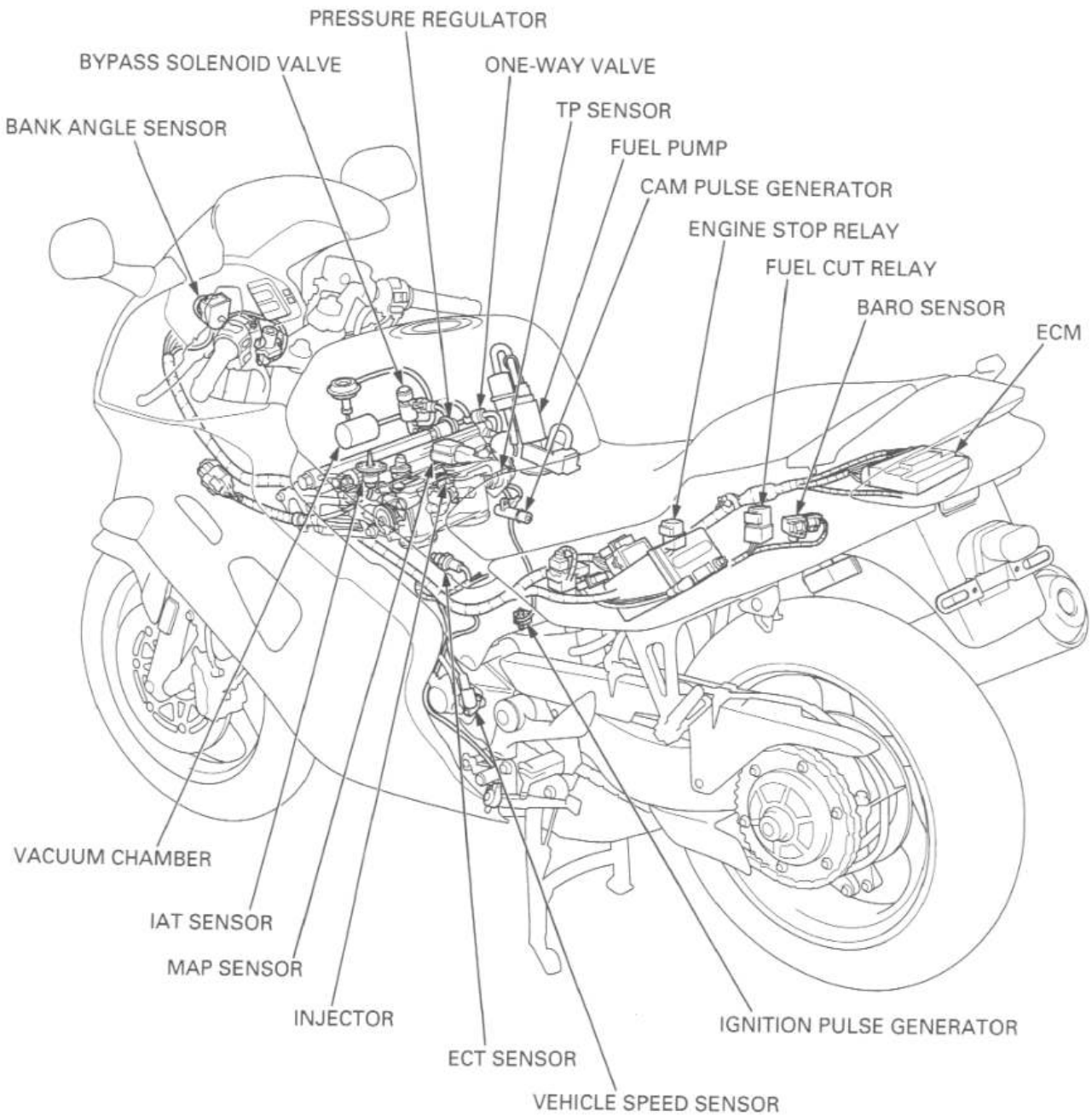
Engine won't to start
- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel tube
- Faulty fuel pump
- Clogged fuel filter
- Clogged fuel injector filter
- Sticking fuel injector needle
- Faulty fuel pump operating system

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

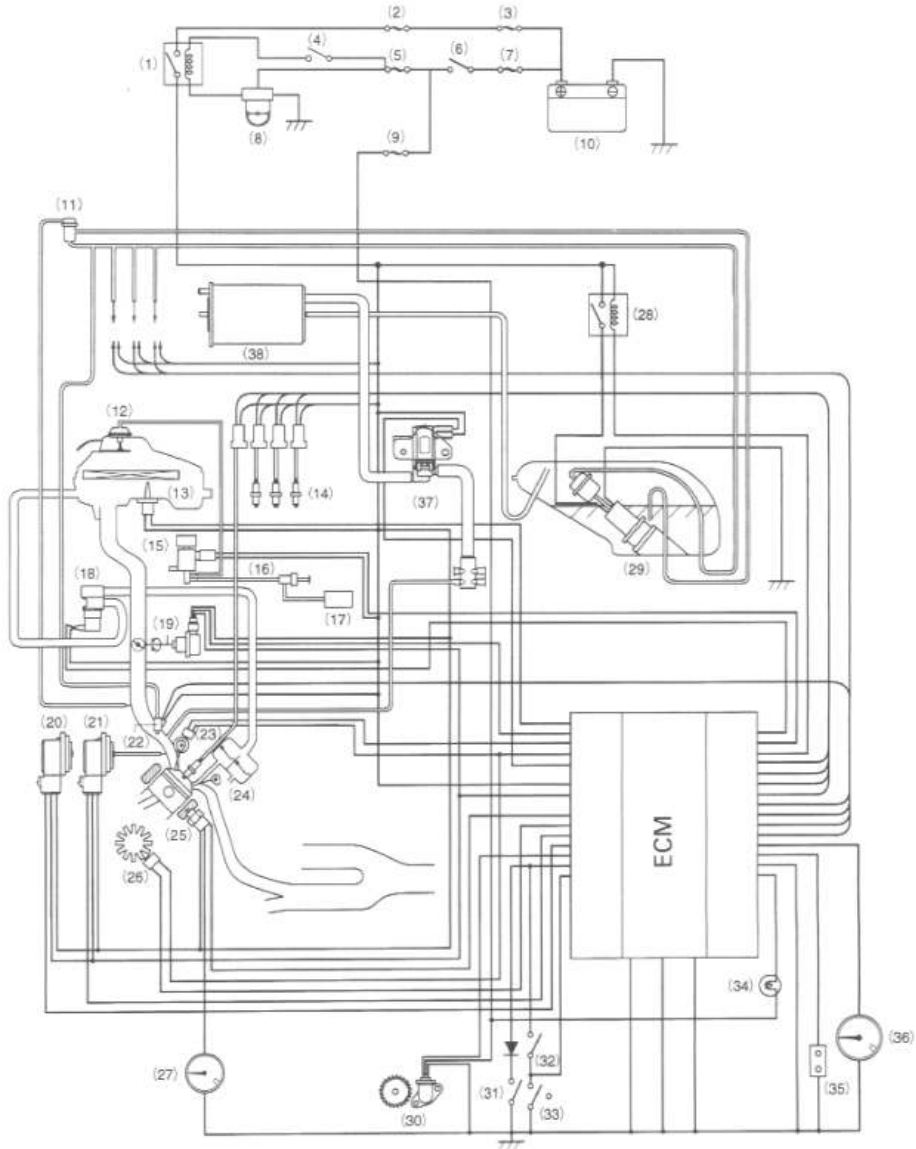
Poor performance (driveability) and poor fuel economy
- Pinched or clogged fuel tube
- Variable air intake port malfunction
- Faulty pressure regulator

SYSTEM LOCATION



FULL NAME	ABBREVIATIONS
Manifold absolute pressure sensor	MAP sensor
Barometric pressure sensor	BARO 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)	Sub-fuse (20 A)
(3)	Main fuse B (30 A)
(4)	Engine stop switch
(5)	Sub-fuse (10 A)
(6)	Ignition switch
(7)	Main fuse A (30 A)
(8)	Bank angle sensor
(9)	Sub-fuse (10 A)
(10)	Battery
(11)	Pressure regulator
(12)	Variable intake port diaphragm
(13)	IAT sensor
(14)	Spark plug
(15)	Bypass control solenoid valve
(16)	One-way valve
(17)	Vacuum chamber
(18)	PAIR solenoid valve
(19)	Throttle position sensor

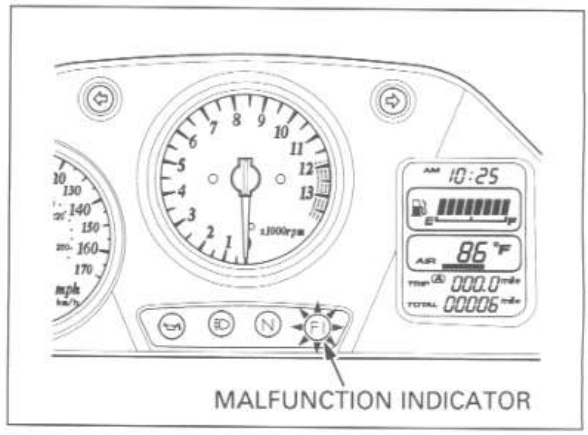
(20)	BARO sensor
(21)	MAP sensor
(22)	Injector
(23)	Cam pulse generator
(24)	PAIR check valve
(25)	ECT sensor
(26)	Ignition pulse generator
(27)	Water temperature meter
(28)	Fuel cut relay
(29)	Fuel pump
(30)	Vehicle speed sensor
(31)	Neutral switch
(32)	Clutch switch
(33)	Side stand switch
(34)	Malfunction indicator
(35)	Service check connector
(36)	Tachometer
(37)	EVAP purge control valve
(38)	EVAP canister

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 5-45).

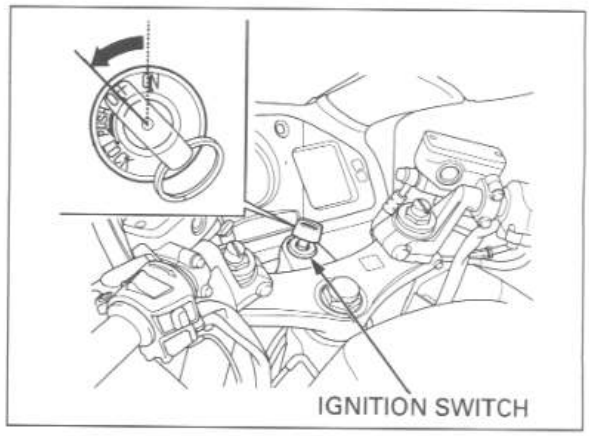


NOTE:

The malfunction indicator will start blinking only when the engine revs are below 5,000 rpm with the side stand down. In any other conditions, the malfunction indicator will illuminate and stay on.

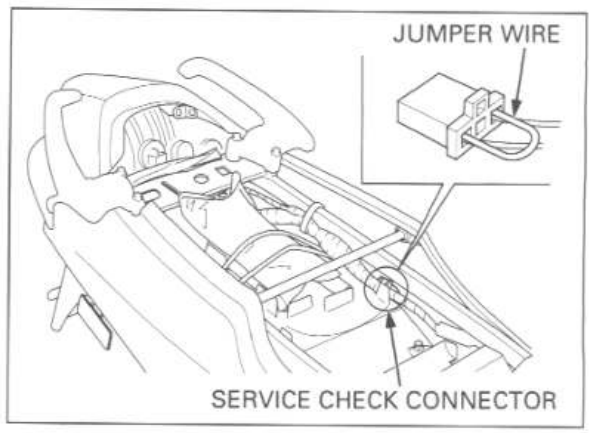
If you wish to read the PGM-FI memory for trouble data, perform the following:

Turn the ignition switch OFF.



Remove the seat (page 2-3).

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



Turn the ignition switch ON.

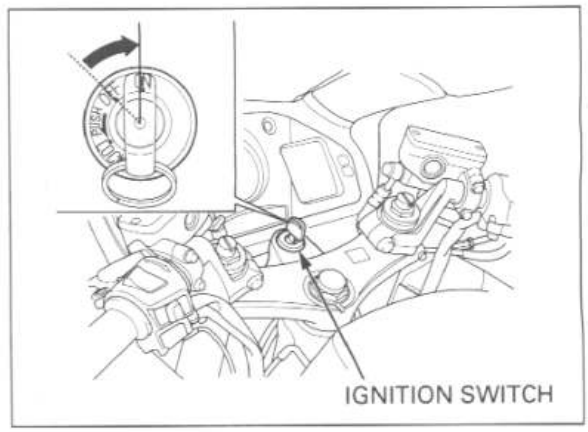
If the ECM has no self diagnosis memory data, the malfunction indicator will illuminate, when you turn the ignition switch ON.

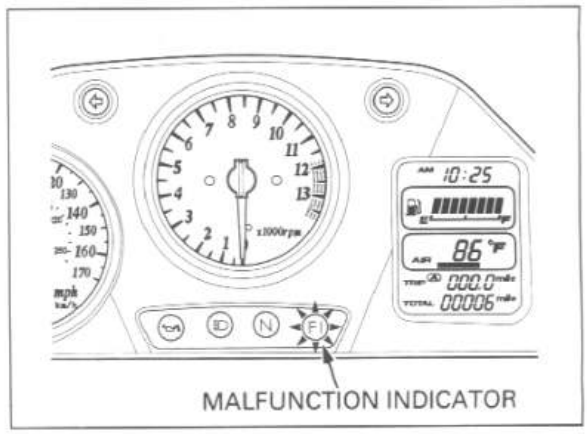
If the ECM has self diagnosis memory data, the malfunction indicator will start blinking when you turn the ignition switch ON.

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 rpm).

Note how many times the malfunction indicator blinks, and determine the cause of the problem (page 5-10 through 5-45).





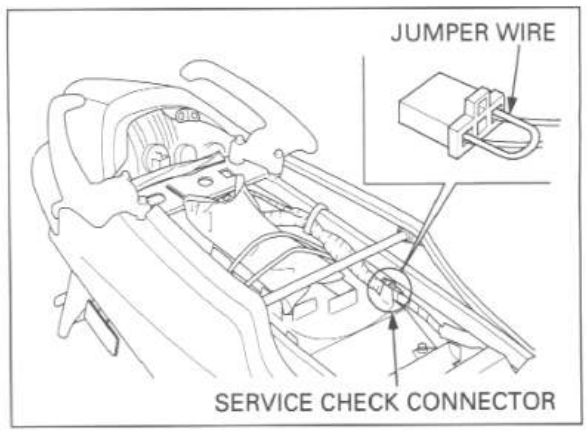
SELF-DIAGNOSIS RESET PROCEDURE

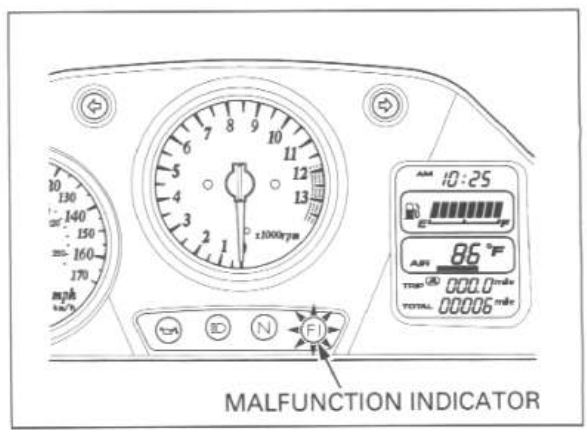
1. Turn the ignition switch OFF.
2. Short the service check connector of the PGM-FI system using a jumper wire.
3. Turn the ignition switch ON.
4. Remove the jumper wire from the service check connector.
5. The malfunction indicator lights about 5 seconds. While the indicator lights, short the service 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 jumpered 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:

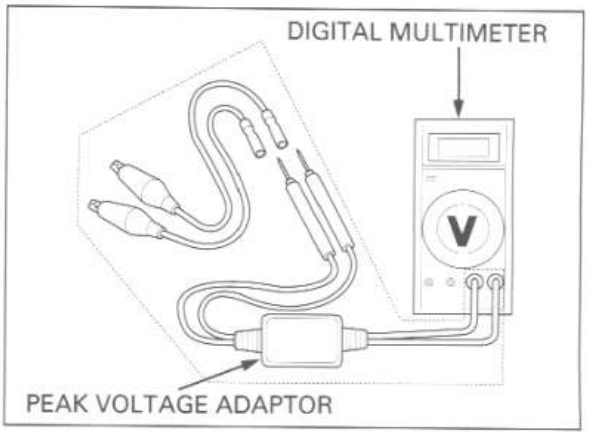
- Use this procedure for the ignition pulse generator and cam pulse generator inspection.
- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the all spark plugs are installed correctly.
- 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.
- If using Peak voltage tester (U.S.A. only), follow the manufacturer's instructions.
- Disconnect the fuel pump connector before checking the peak voltage.



Disconnect the fuel pump 2P (Brown) connector.

Connect the peak voltage adaptor to the digital multimeter.

TOOLS:
Peak voltage tester (U.S.A. only) or
Peak voltage adaptor 07HGJ – 0020100
with commercially available digital multimeter
(impedance 10 MΩ/DCV minimum)



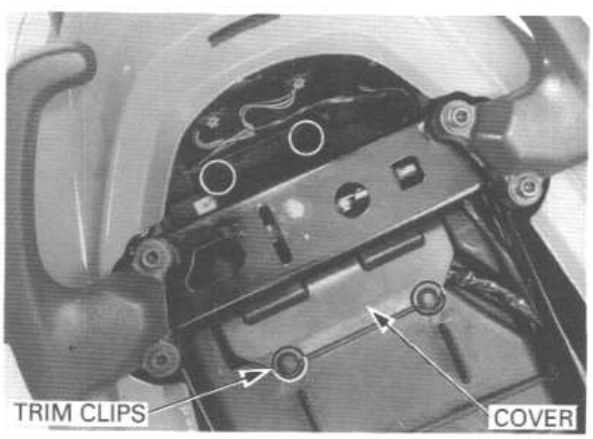
⚠ WARNING

Avoid touching the tester probes to prevent electric shock.

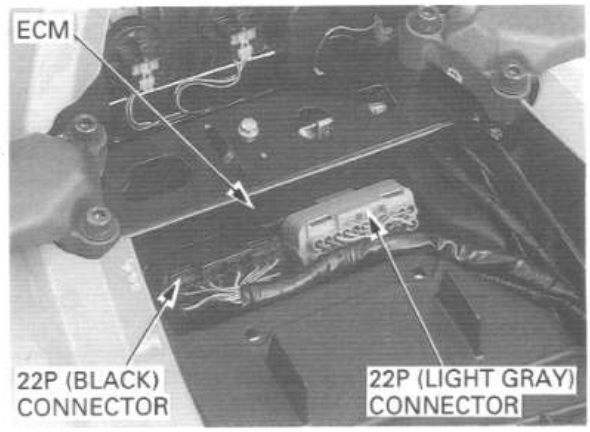
TEST HARNESS CONNECTION

Remove the seat (page 2-3).

Remove the four trim clips and ECM cover.



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



Connect the test harness to the test pin box.

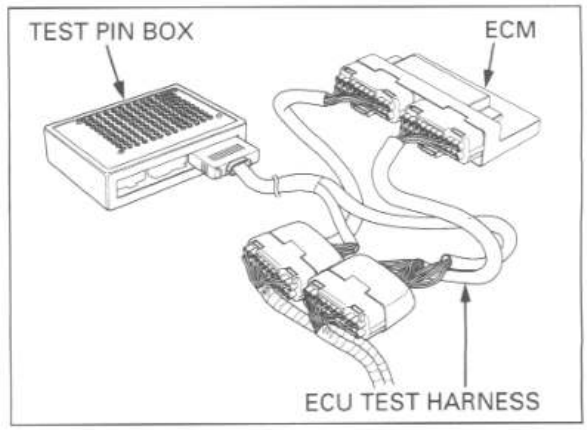
TOOLS:

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.

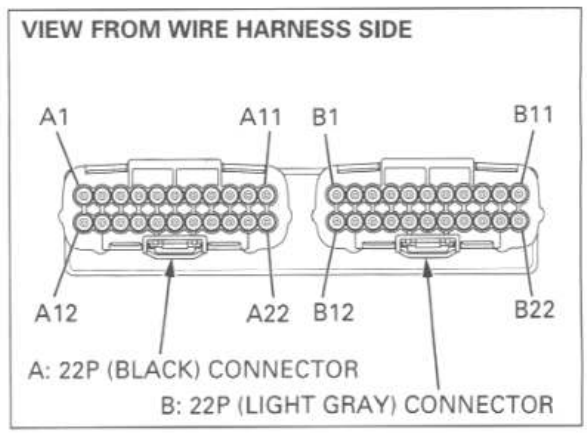


TEST PIN BOX TERMINAL LAYOUT

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

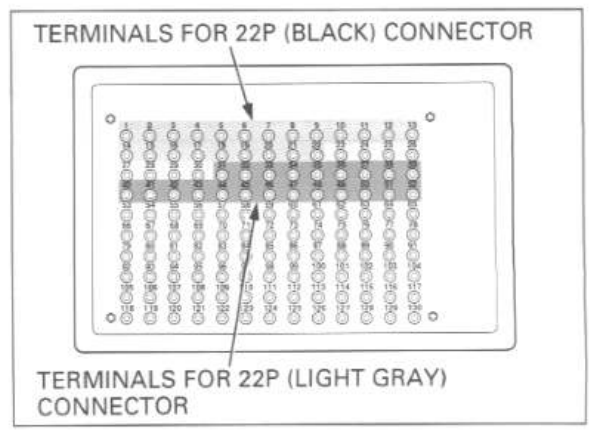
The test pin box No. 1 to No. 22 terminals are for the ECM 22P (Black) connector A1 to A22 terminals. The test pin box uses the No. 31 to No. 52 terminals for the ECM 22P (Light gray) connector B1 to B22 terminals.

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



Terminal conversion chart

22P (Black) No.	Test pin box No.
A1 A2 ↓ A22	1 2 ↓ 22
22P (Light gray) No.	**Test pin box No.**
B1 B2 ↓ B22	31 32 ↓ 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 20). When the indicator lights for 1.3 seconds it is equivalent to ten blinks. For example, a 1.3 second illumination and two blinks (0.5 second x 2) of the indicator equals 12 blinks. Follow code 12 on page 5-28).
- 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).

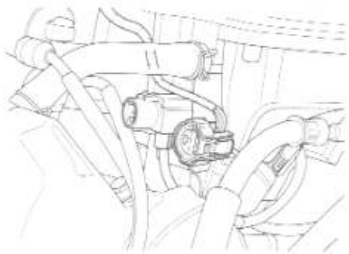
Number of PGM-FI malfunction indicator blinks		Causes	Symptoms (Fail-safe contents)	Refer to page
0	○ Stays lit	• Open or short circuit at the input power line of the ECM • Faulty engine stop relay • Faulty engine stop switch • Faulty ignition switch • Faulty bank angle sensor • Faulty ECM • Blown main 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; 80°C/176°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; 20°C/68°F)	5-22

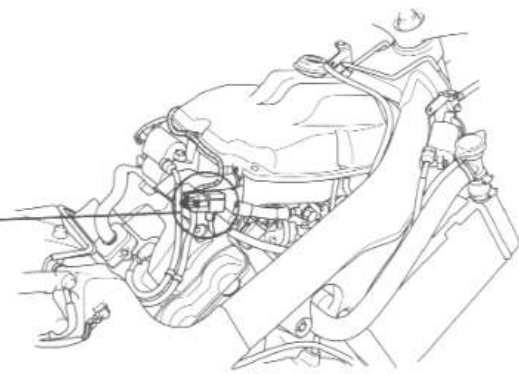
Number of PGM-FI malfunction indicator blinks		Causes	Symptoms (Fail-safe contents)	Refer to page
10	○ Blinks	• Loose or poor contact on BARO sensor connector • Open or short circuit in BARO sensor wire • Faulty BARO sensor	• Engine operates normally at a low altitude • Engine idles roughly at a high altitude (Simulate using numerical 760 mmHg/1,013 hPa)	5-24
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	5-26
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	5-28
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	5-31
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	5-34
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	5-37
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	5-40
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	5-42
20	○ Blinks	• Faulty E^2-PROM in ECM	• Engine operates normally • Does not hold the self-diagnosis data	5-44

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.





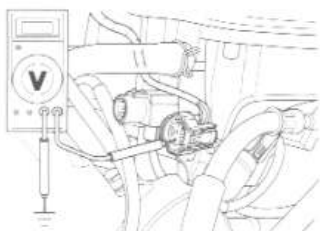
Connect the MAP sensor connector.
Short the service check connector (page 5-6).
Start the engine and check the malfunction indicator blinks.

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

1 blink ↓

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.

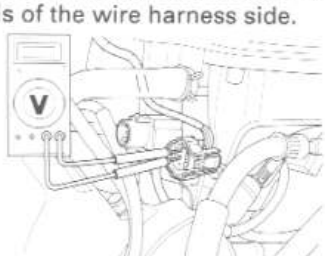


Connection: Pink (+) – Ground (–)
Standard: 4.75 – 5.25 V

Out of range →
- Open or short circuit in Pink wire
- Loose or poor contact on the ECM connectors

Voltage exists ↓

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

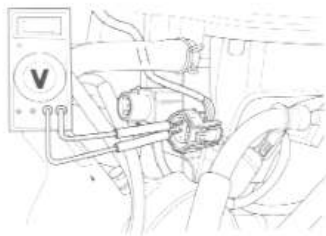


Connection: Pink (+) – Green/Orange (–)
Standard: 4.75 – 5.25 V

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.

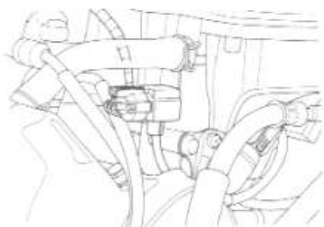


Connection:
Light green/Yellow (+) – Green/Orange (–)
Standard: 4.75 – 5.25 V

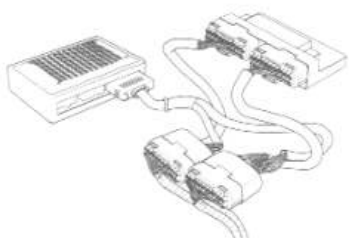
Out of range →
- Open or short circuit in Light green/Yellow wire
- Loose or poor contact on the ECM connectors

Voltage exists ↓

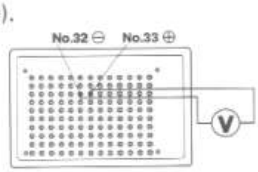
Turn the ignition switch OFF.
Connect the MAP sensor 3P connector.



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



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



Connection: No. 33 (+) – No. 32 (–)
Standard: 2.7 – 3.1 V (760 mm Hg/1,013 kPa)

Out of range →
- Faulty MAP sensor

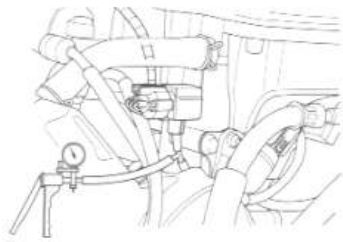
Voltage exists →
- Replace the ECM with a new one, and inspect it again

PGM-FI MALFUNCTION INDICATOR 2 BLINKS (MAP SENSOR)

Turn the ignition switch OFF.

↓

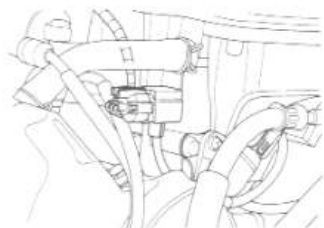
Disconnect the tube from the MAP sensor.
Connect the vacuum gauge between the throttle body and the MAP sensor using a 3-way joint.
Start the engine and measure the manifold absolute pressure at idle speed.



Out of range → Check the tube installation

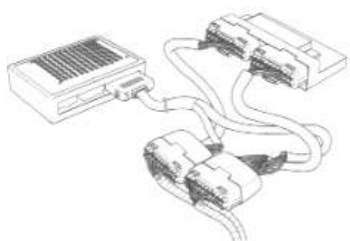
↓

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



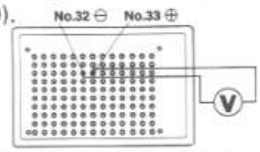
↓ Normal

Disconnect the ECM connector.
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).

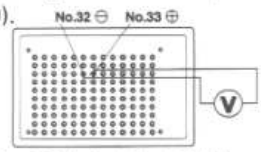


Connection: No. 33 (+) – No. 32 (–)
Standard: 2.7 – 3.1 V (760 mm Hg/1,013 kPa)

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. 33 (+) – No. 32 (–)
Standard: 2.7 V maximum

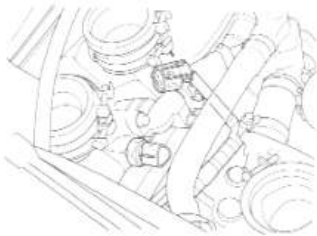
Out of range → Faulty MAP sensor

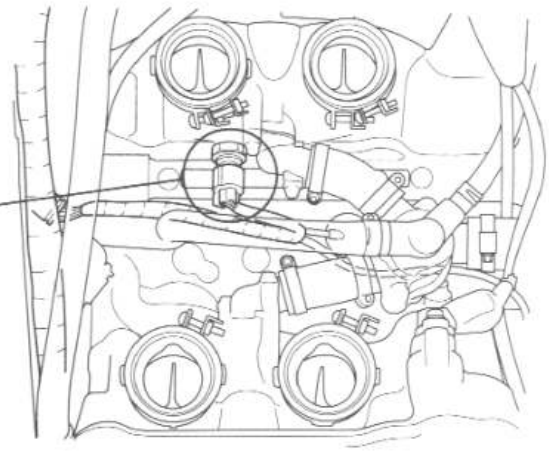
Voltage exists → Replace the ECM with a new one, and inspect it again

PGM-FI MALFUNCTION INDICATOR 7 BLINKS (ECT SENSOR)

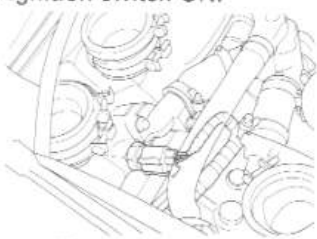
Turn the ignition switch OFF.

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





Connect the ECT sensor connector.
Turn the ignition switch ON.

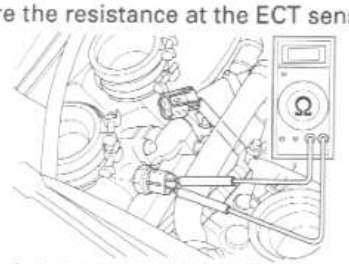


Check the malfunction indicator blinks.

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

7 blinks

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

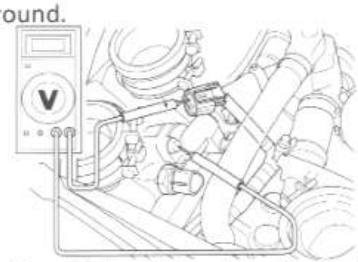


Standard: 2.2 – 2.7 kΩ (20°C/68°F)

Abnormal → • Faulty ECT sensor

Normal

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

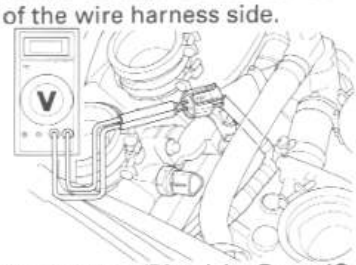


Connection: Yellow/Blue (+) – Ground (–)
Standard: 4.75 – 5.25 V

Out of range →
- Open or short circuit in Yellow/Blue 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: Yellow/Blue (+) – 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

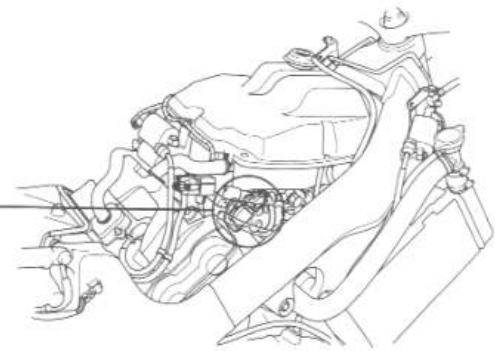
Voltage exists →
- Replace the ECM with a new one, and inspect it again

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.
Short the service check connector (page 5-6).
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.



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

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

Voltage exists

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

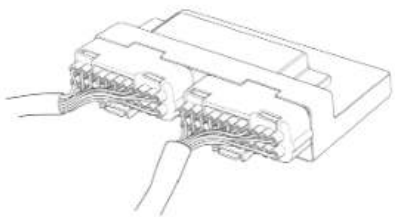


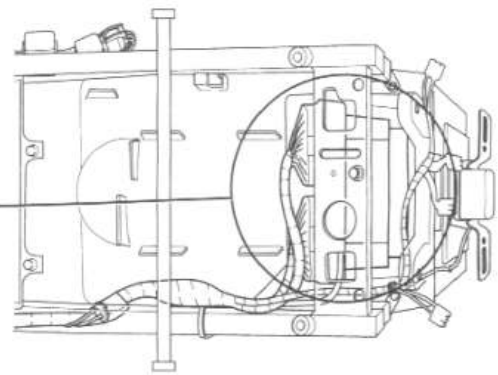
Connection: Pink (+) – Green/Orange (–)
Standard: 4.75 – 5.25 V

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

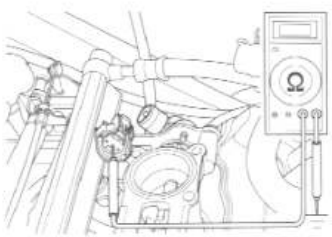
Voltage exists ↓

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





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

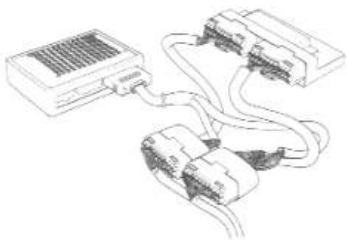


Connection: Light green (+) – Ground (–)
Standard: No continuity

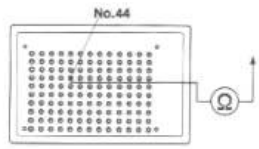
Continuity →
- Short circuit in Light green wire

No continuity ↓

Connect the test harness to the ECM connector.



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



Connection: Light green – No. 44
Standard: Continuity

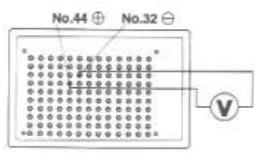
No continuity → Open or short circuit in Light green wire

Continuity

Connect the TP sensor 3P connector.



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



Connection: No. 44 (+) – No. 32 (–)
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 5 V. When the reading shows other than 5 V, derive a voltage at the test harness as follows:

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

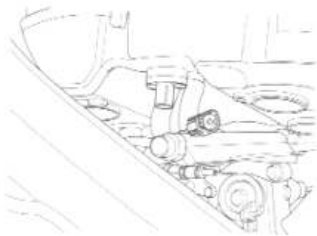
0.4 x 4.75/5.0 = 0.38 V
0.6 x 4.75/5.0 = 0.57 V

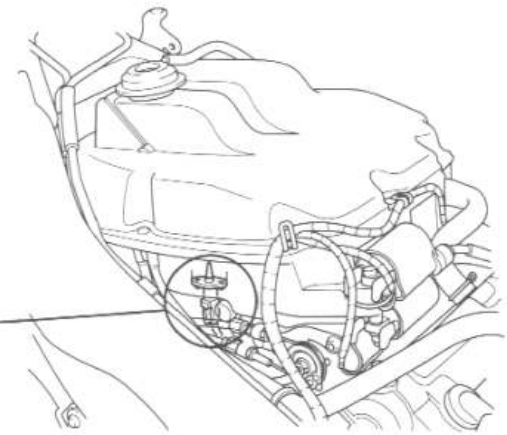
Thus, the solution is "0.38 – 0.57 V"

PGM-FI MALFUNCTION INDICATOR 9 BLINKS (IAT SENSOR)

Turn the ignition switch OFF.

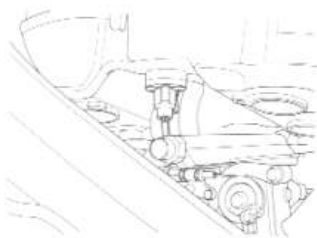
Disconnect the IAT sensor 2P connector.
Check for loose or poor contact on the IAT sensor connector.





Connect the IAT sensor 2P connector.
Turn the ignition switch ON.
Check the malfunction indicator blinks.

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

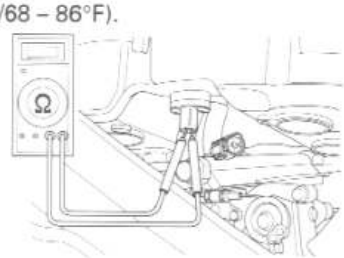


9 blinks

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

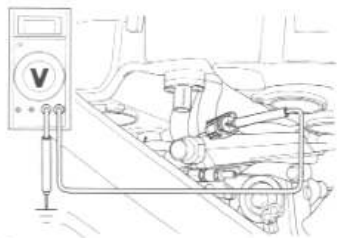


Standard: 1 – 4 kΩ

Normal

Turn the ignition switch ON.

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

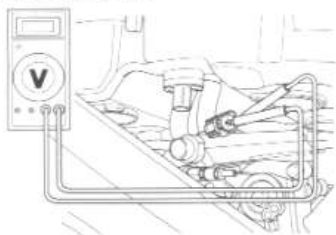


Connection:
Gray/Blue (+) – Ground (–)
Standard: 4.75 – 5.25 V

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

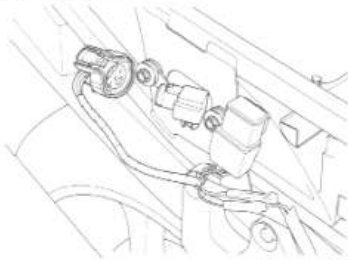
Out of range →
- Open or short circuit in Green/Orange wire
- Loose or poor contact on the ECM connectors

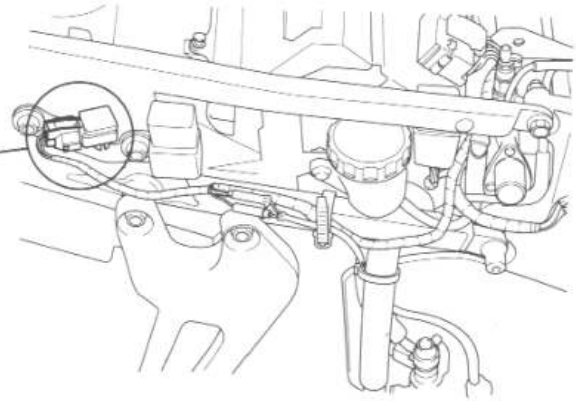
Voltage exists →
- Replace the ECM with a new one, and inspect it again

PGM-FI MALFUNCTION INDICATOR 10 BLINKS (BARO SENSOR)

Turn the ignition switch OFF.

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





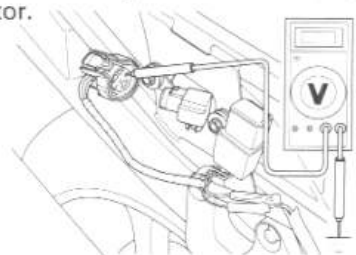
Connect the BARO sensor 3P connector.
Turn the ignition switch ON.
Check the malfunction indicator blinks.

No blinks →
- Loose or poor contacts on the BARO sensor connector

10 blinks

Turn the ignition switch OFF.

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



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

Out of range →
- Open or short circuit in Pink wire
- Loose or poor contact on the ECM connectors

Voltage exists

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

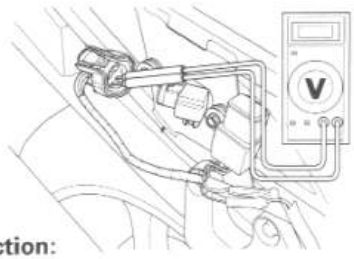


Connection: Pink (+) – Green/Orange (–)
Standard: 4.75 – 5.25 V

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.

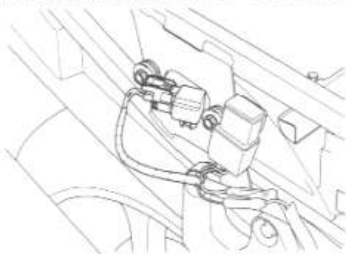


Connection:
Light green/Black (+) – Green/Orange (–)
Standard: 4.75 – 5.25 V

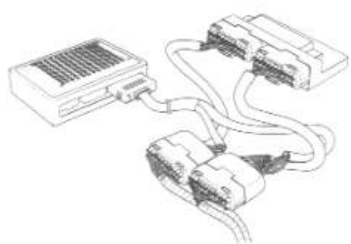
Out of range →
- Open or short circuit in Light green/Black wire
- Loose or poor contact on the ECM connectors

Voltage exists ↓

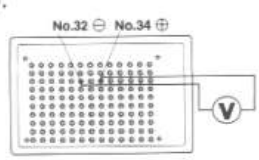
Turn the ignition switch OFF.
Connect the BARO sensor 3P connector.



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. 34 (+) – No. 32 (–)
Standard: 2.7 – 3.1 V (760 mmHg/1,013 kPa)

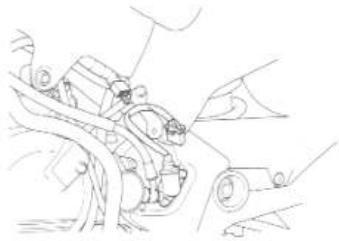
Out of range →
- Faulty BARO sensor

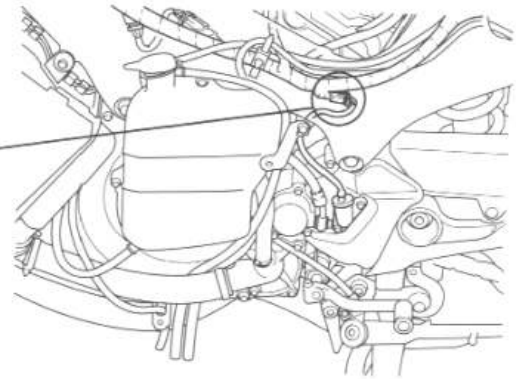
Voltage exists →
- Replace the ECM with a new one, and inspect it again

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.





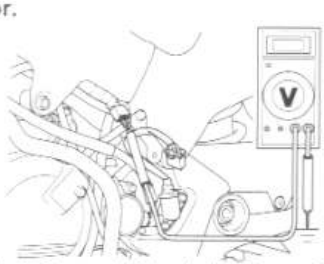
Connect the vehicle speed sensor 3P connector.
Start the engine.
With the side stand UP and keep the engine rev more than 5,000 rpm about 20 seconds or more.
Check the malfunction indicator blinks.

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.

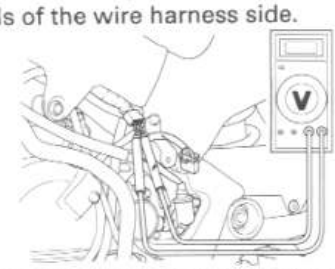


Connection: Brown/Blue (+) – Ground (–)
Standard: 12 V

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

Voltage exists

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

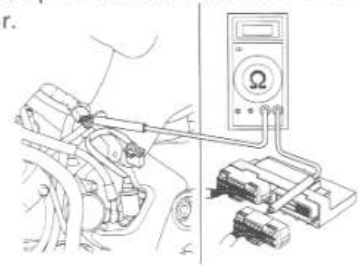


Connection: Brown/Blue (+) – Green/Black (–)
Standard: 12 V

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

Voltage exists

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



Standard: Continuity

No continuity → • Open or short circuit in Pink wire

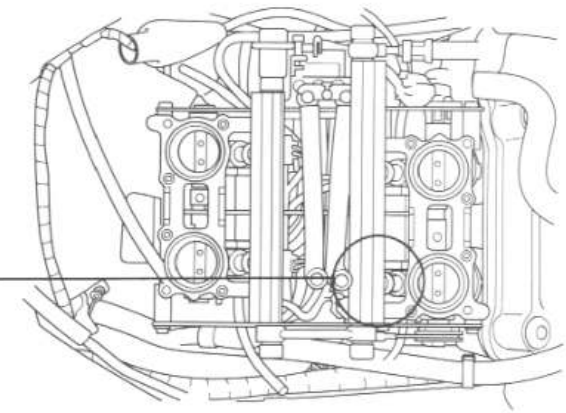
Continuity → • Replace the ECM with a new one, and inspect it again

PGM-FI MALFUNCTION 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.
Turn the ignition switch ON.
Check the malfunction indicator blinks.

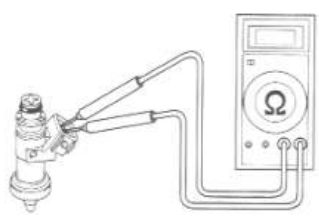
No blinks → • Loose or poor contacts on the No. 1 injector connector



12 blinks

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

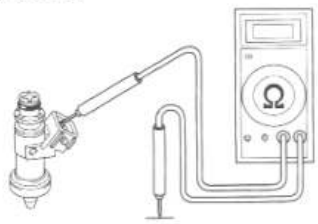
Abnormal → • Faulty No. 1 injector



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

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

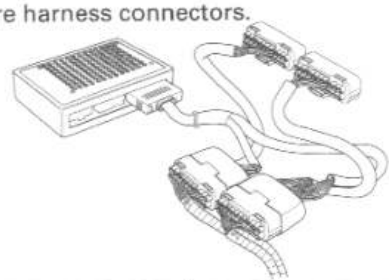
Out of range → • Open or short circuit in Black/White wire

Voltage exists ↓

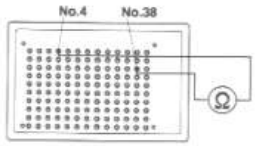
Turn the ignition switch OFF.
Connect the No. 1 injector connector.



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.

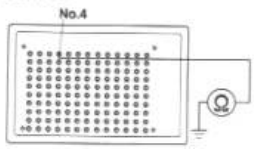


Connection: No. 4 – No. 38
Standard: 9 – 15 Ω (20°C/68°F)

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. 4 – Ground
Standard: No continuity

Continuity → Short circuit in Pink/Blue wire

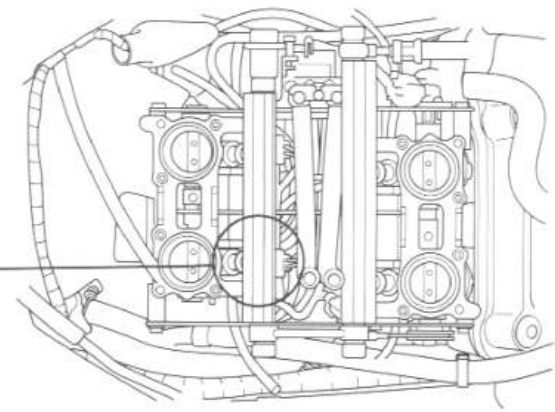
No continuity → Replace the ECM with a new one, and inspect it again

PGM-FI MALFUNCTION INDICATOR 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.
Turn the ignition switch ON.
Check the malfunction indicator blinks.

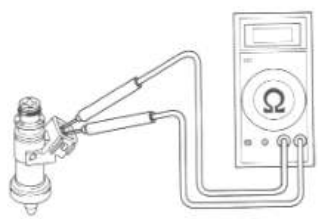
No blinks → • Loose or poor contacts on the No. 2 injector connector



13 blinks

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

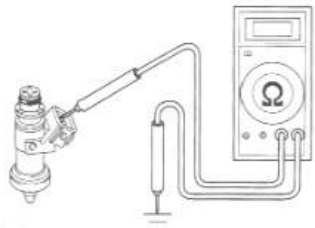
Abnormal → • Faulty No. 2 injector



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

Normal

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

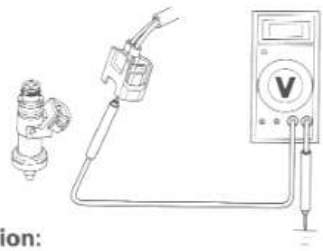


Connection:
Black/White (+) – Ground (–)
Standard: No continuity

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

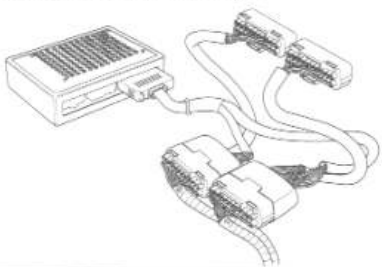
Out of range → Open or short circuit in Black/White wire

Voltage exists

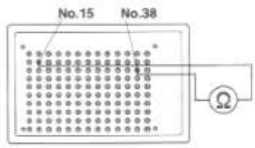
Turn the ignition switch OFF.
Connect the No. 2 injector connector.



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.

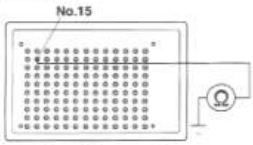


Connection: No. 15 – No. 38
Standard: 9 – 15 Ω (20°C/68°F)

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. 15 – Ground
Standard: No continuity

Continuity → Short circuit in Pink/Yellow wire

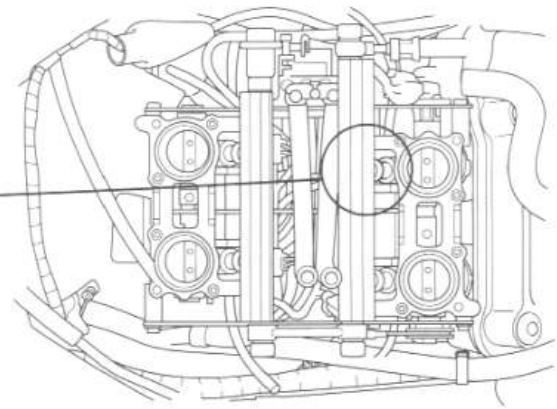
No continuity → Replace the ECM with a new one, and inspect it again

PGM-FI MALFUNCTION INDICATOR 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.





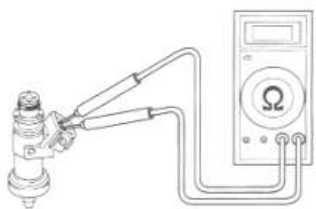
Connect the No. 3 injector 2P connector.
Turn the ignition switch ON.
Check the malfunction indicator blinks.



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.

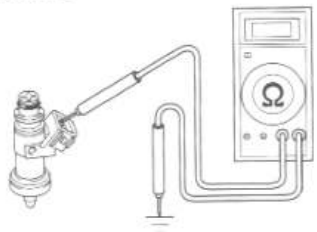


Connection:
Black/White (+) – Pink/Green (–)
Standard: 13.0 – 14.4 Ω (20°C/68°F)

Abnormal → • Faulty No. 3 injector

Normal

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

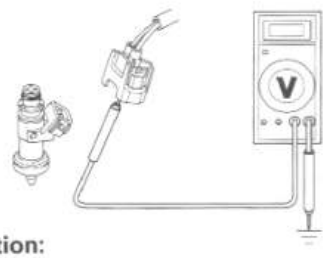


Connection:
Black/White (+) – Ground (–)
Standard: No continuity

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

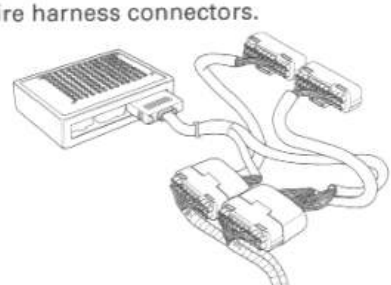
Out of range → Open or short circuit in Black/White wire

Voltage exists

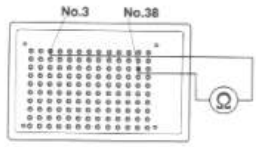
Turn the ignition switch OFF.
Connect the No. 3 injector connector.



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.

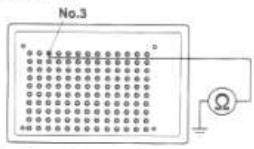


Connection: No. 3 – No. 38
Standard: 9 – 15 Ω (20°C/68°F)

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. 3 – Ground
Standard: No continuity

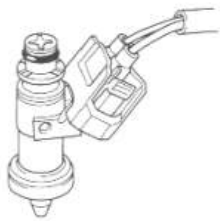
Continuity → • Short circuit in Pink/Green wire

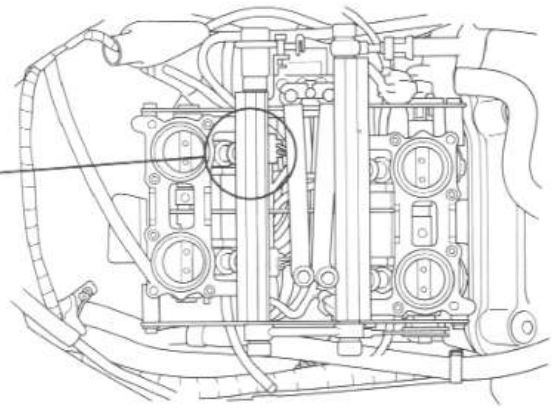
No continuity → • Replace the ECM with a new one, and inspect it again

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.
Turn the ignition switch ON.
Check the malfunction indicator blinks.

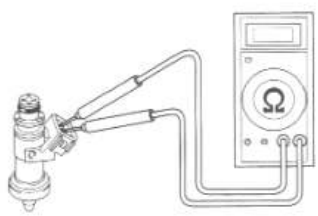
No blinks → Loose or poor contacts on the No. 4 injector connector



15 blinks

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

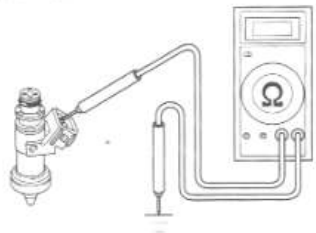
Abnormal → Faulty No. 4 injector



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

Normal

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

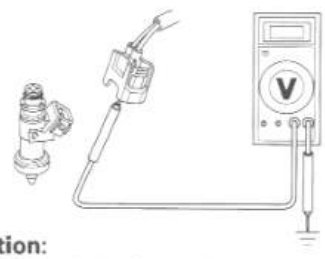


Connection:
Black/White (+) – Ground (–)
Standard: No continuity

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

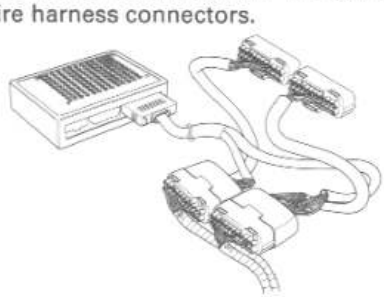
Out of range → • Open or short circuit in Black/White wire

Voltage exists ↓

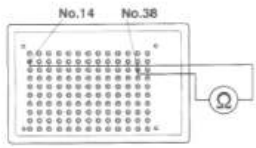
Turn the ignition switch OFF.
Connect the No. 4 injector connector.



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.

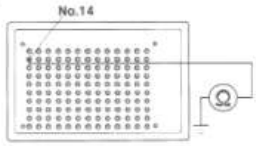


Connection: No. 14 – No. 38
Standard: 9 – 15 Ω (20°C/68°F)

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. 14 – Ground
Standard: No continuity

Continuity → Short circuit in Pink/Black wire

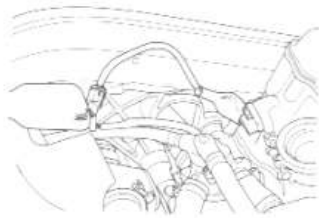
No continuity → Replace the ECM with a new one, and inspect it again

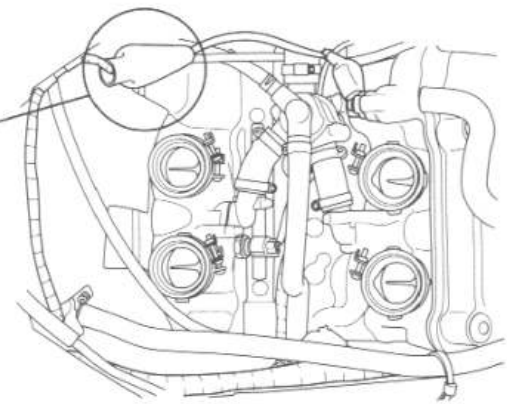
PGM-FI MALFUNCTION INDICATOR 18 BLINKS (CAM PULSE GENERATOR)

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.





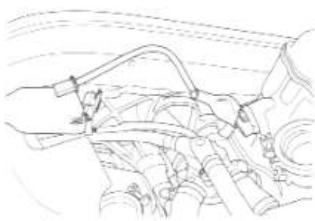
↓

Connect the cam pulse generator 2P connector.
Short the service check connector (page 5-6).
Turn the ignition switch ON and check the malfunction indicator blinks.

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

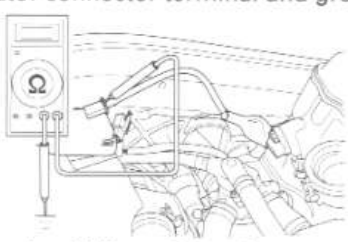
↓ 18 blinks

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.

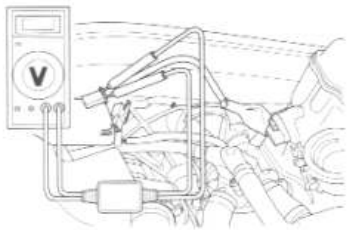


Connection: White – Ground
Gray – Ground
Standard: No continuity

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.

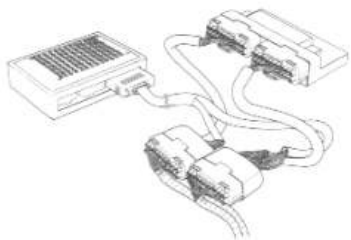


Connection: White (+) – Gray (–)
Standard: 0.7 V minimum (20°C/68°F)

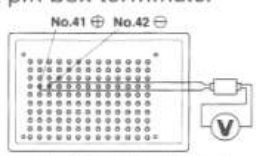
Out of range → Faulty cam pulse generator

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.

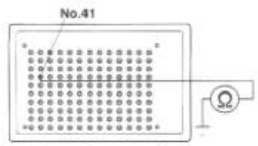


Connection: No. 41 (+) – No. 42 (–)
Standard: 0.7 V minimum (20°C/68°F)

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

Normal

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



Connection: No. 41 – Ground
Standard: No continuity

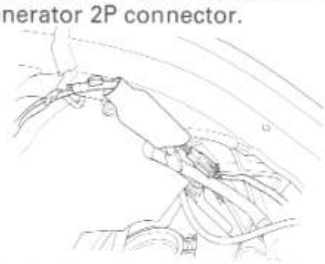
Continuity → Short circuit in White wire

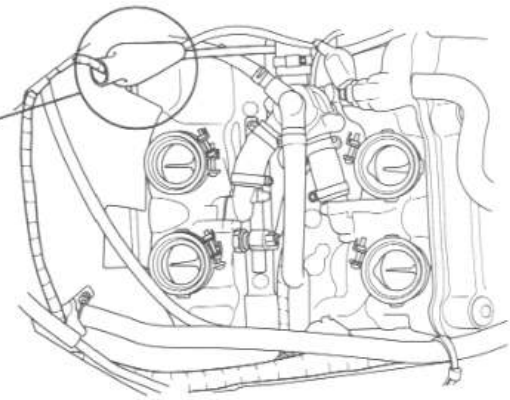
No continuity → Replace the ECM with a new one, and inspect it again

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.



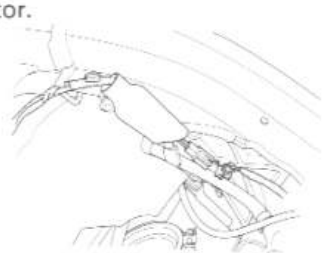


Connect the ignition pulse generator 2P connector.
Short the service check connector (page 5-6).
Turn the ignition switch ON and check the malfunction indicator blinks.

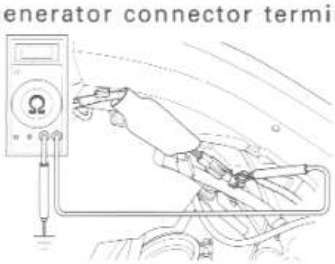
No blinks → • Loose or poor contacts on the ignition pulse generator 2P connector

19 blinks

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



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

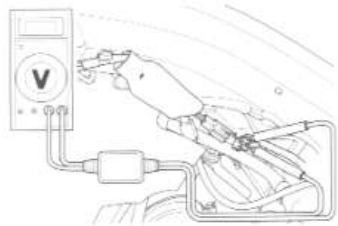


Connection: White/Yellow – Ground
Yellow – Ground
Standard: No continuity

Continuity → • Faulty ignition pulse generator

No continuity

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

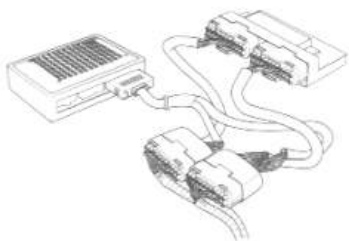


Connection: Yellow (+) – White/Yellow (–)
Standard: 0.7 V minimum (20°C/68°F)

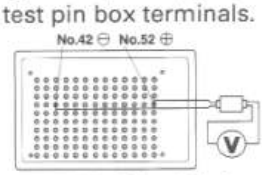
Out of range → • Faulty ignition pulse generator

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.

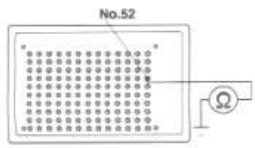


Connection: No. 52 (+) – No. 42 (–)
Standard: 0.7 V minimum (20°C/68°F)

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

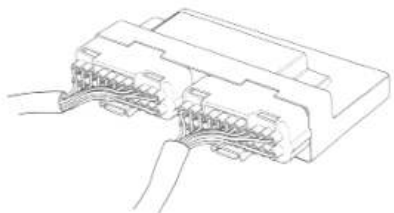
Continuity → • Short circuit in White wire

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

PGM-FI MALFUNCTION INDICATOR 20 BLINKS (E^2-PROM)

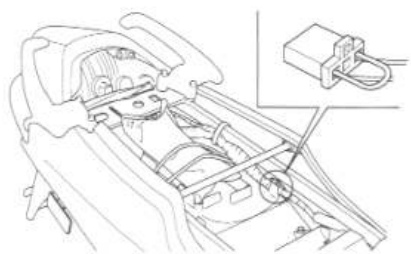
Turn the ignition switch OFF.

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

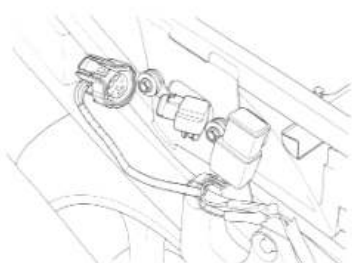


Connect the ECM connectors.
Short the service check connector with a jumper wire (page 5-6).
Turn the ignition switch ON and check the malfunction indicator blinks.

- 20 blinks → Reset the self-diagnosis memory data (page 5-7).
  Turn the ignition switch ON and check the malfunction indicator blinks.
  - 20 blinks → • Replace the ECM
  - Blinks → Remove the jumper wire from the service check connector (page 5-7).
- Except 20 blinks → Remove the jumper wire from the service check connector (page 5-7).

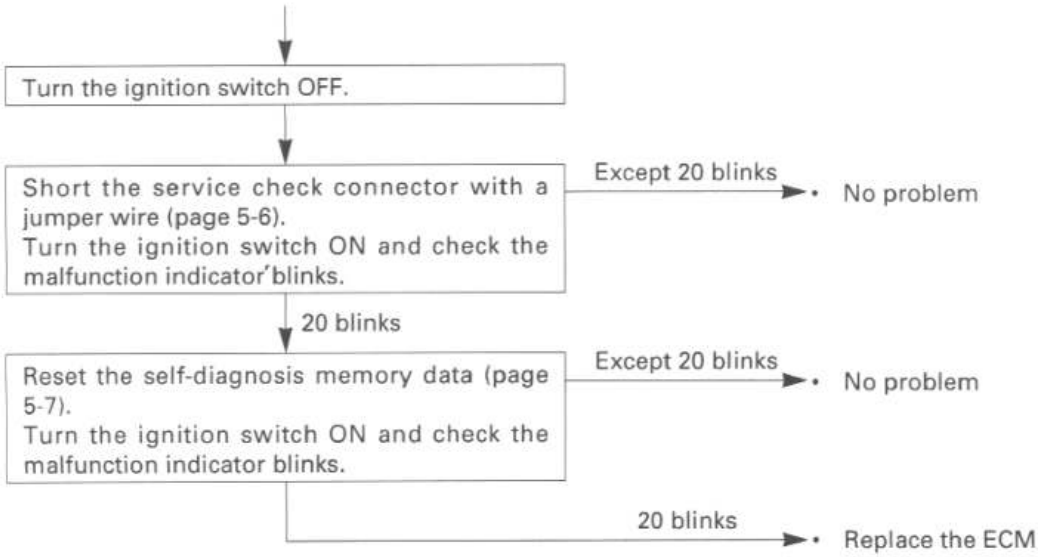


Disconnect the BARO sensor connector.



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

- Except 20 blinks → • No problem
- 20 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 20 blinks
No problem
20 blinks
Reset the self-diagnosis memory data (page 5-7).
Turn the ignition switch ON and check the malfunction indicator blinks.
Except 20 blinks
No problem
20 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 fuel tube banjo bolt at the fuel tank.***
- ***Always replace the sealing washer when the fuel tube banjo bolt is removed or loosened.***

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

Open the battery cover and disconnect the battery negative cable from the battery terminal.

Remove the air cleaner housing (page 5-53).

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

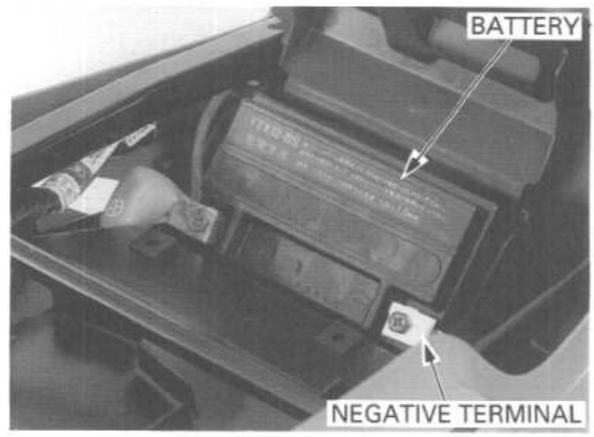
Cover the fuel tube banjo bolt with a rag or shop towel.

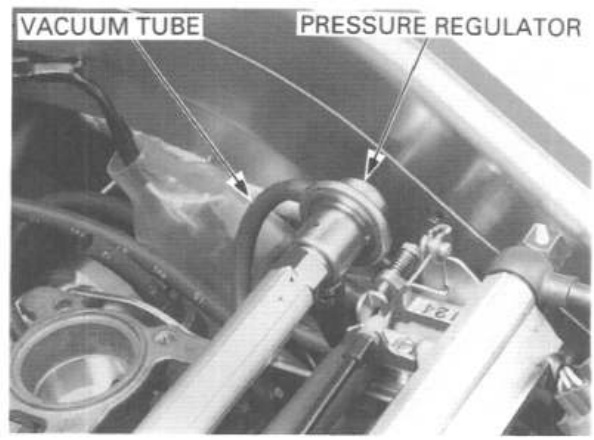
Slowly loosen the fuel tube banjo bolt and catch the remaining fuel using a approved gasoline container.

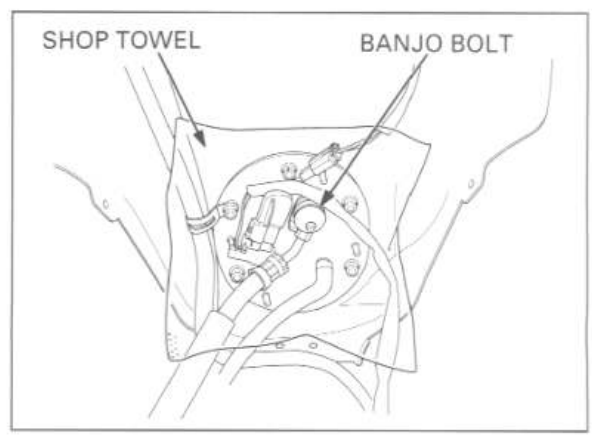
Remove the fuel tube banjo bolt and attach the fuel pressure gauge with the following Honda Genuine parts.

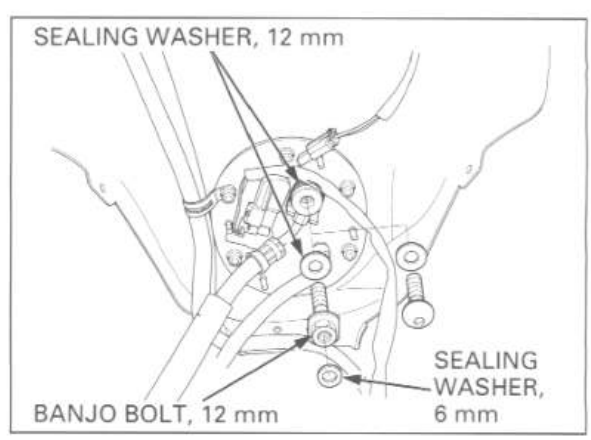
Banjo bolt, 12 mm
Part No. 90008 – PP4 – E02
Sealing washer, 12 mm
Part No. 90428 – PD6 – 003
Sealing washer, 6 mm
Part No. 90430 – PD6 – 003

TOOL:
Fuel pressure gauge **07406 – 0040002**



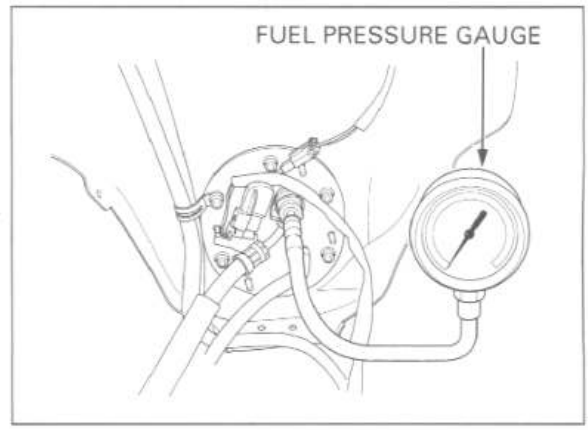






Connect the battery negative cable.
Start the engine.
Read the fuel pressure at idle speed.

IDLE SPEED:
49 states/Canada type: 1,200 ± 100 rpm
California type: 1,300 ± 100 rpm
STANDARD: 250 kPa (2.55 kgf/cm², 36 psi)



If the fuel pressure is higher than specified, inspect the following:
— Pinched or clogged fuel return tube
— Pressure regulator
— Fuel pump (page 5-48)

If the fuel pressure is lower than specified, inspect the following:
— Fuel line leaking
— Clogged fuel filter
— Pressure regulator
— Fuel pump (page 5-48)



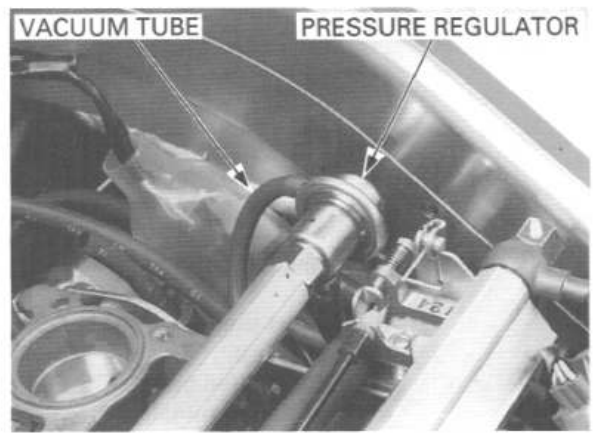
After inspection, remove the banjo bolt and reinstall the and tighten the original fuel tube banjo bolt using new sealing washers.

CAUTION:

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

Connect the pressure regulator vacuum tube.

Install the removed parts in the reverse order of removal.



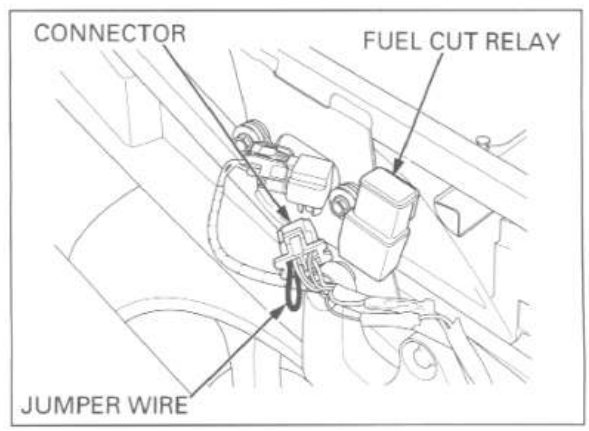
FUEL FLOW INSPECTION

⚠ WARNING

Gasoline is extremely flammable and is explosive under certain conditions.

Remove the rear cowl (page 2-3).
Open and support the fuel tank (page 3-4).

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.

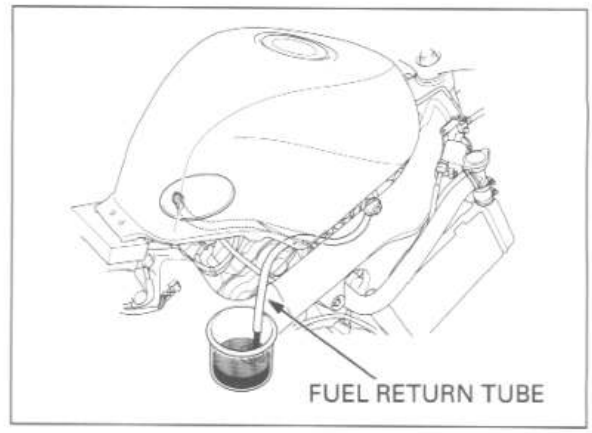
Disconnect the fuel return tube at the fuel tank, plug the fuel tank inlet joint.

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

Amount of fuel flow:
150 cc (5.0 US oz, 5.3 Imp oz)/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

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:

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

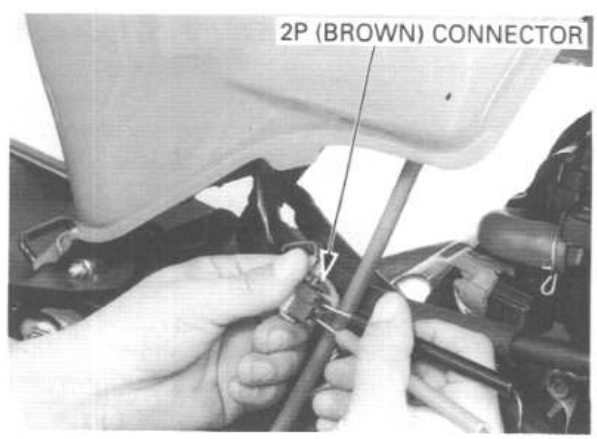
Disconnect the fuel pump 2P (Brown) connector from the fuel pump.
Turn the ignition switch ON and measure the voltage between the terminals.

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 30 A
— Sub fuse 10 A, 20 A
— Engine stop switch (Section 19)
— Fuel cut relay
— Engine stop relay
— Bank angle sensor (page 5-73)
— ECM (page 5-74)





REMOVAL

⚠ WARNING

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

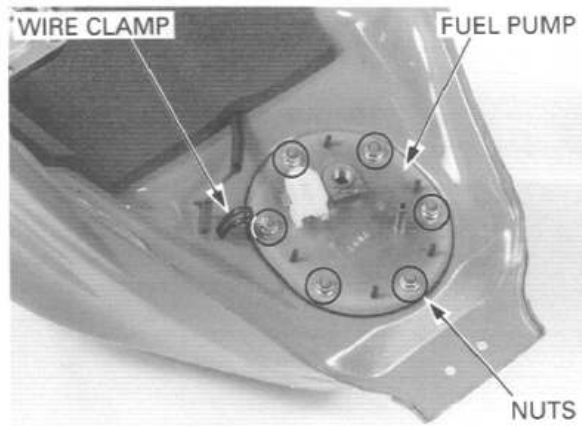
CAUTION:

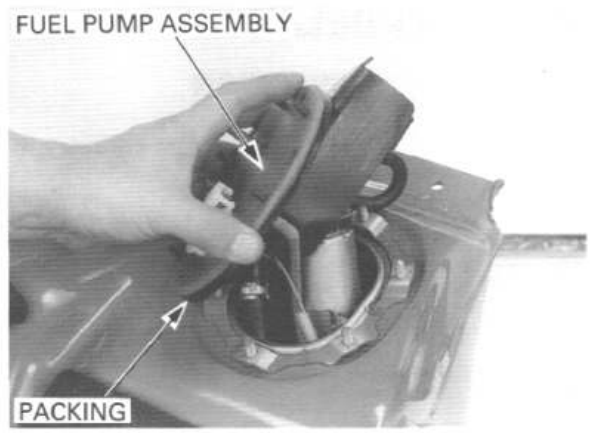
- ***Before disconnecting the fuel tube, release the fuel pressure by loosening the fuel tube banjo bolt at the fuel tank.***
- ***Always replace the sealing washer when the fuel tube banjo bolt is removed or loosened.***

Remove the fuel tank (page 5-50).

Remove the fuel pump mounting nuts.

Remove the fuel pump assembly and packing.





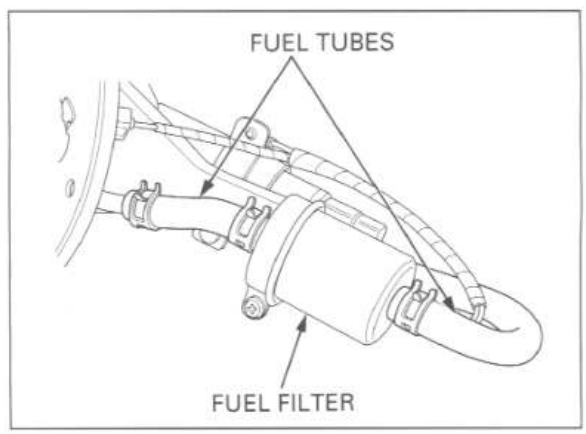
FUEL FILTER REPLACEMENT

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.



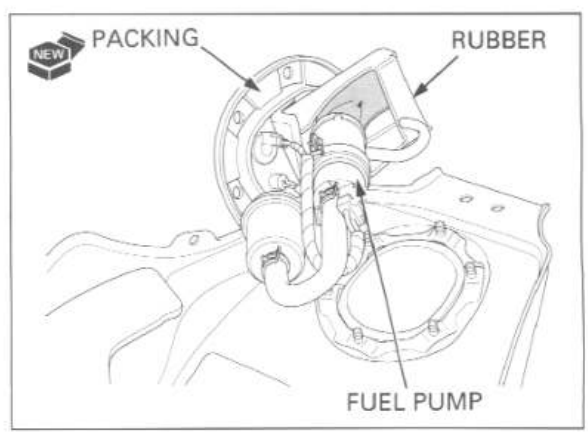
INSTALLATION

Place a new seal rubber onto the fuel tank.

NOTE:

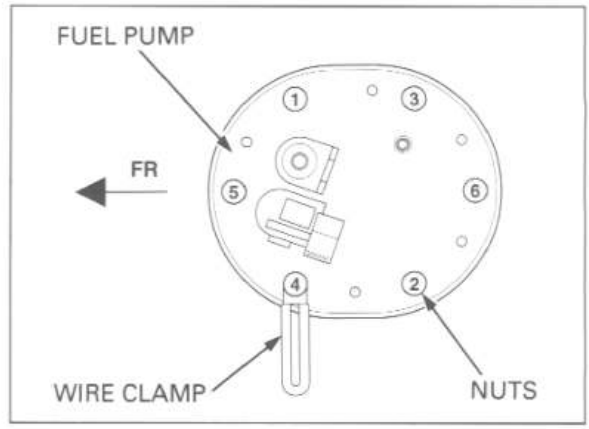
Always replace packing with a new one.

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



Install the wire clamp and nuts, then tighten the fuel pump mounting nuts in the sequence shown.

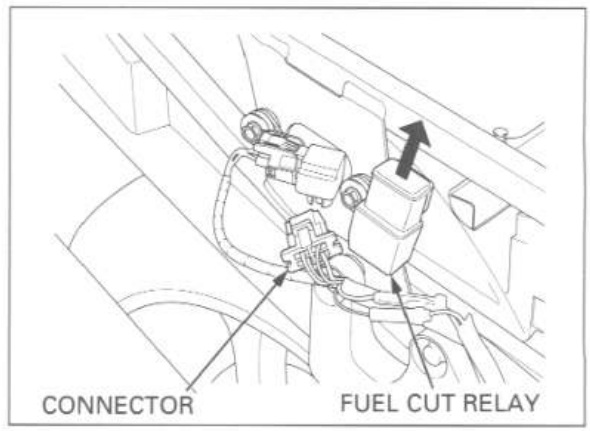
TORQUE: 14 N·m (1.4 kgf·m, 10 lbf·ft)



FUEL CUT RELAY

INSPECTION

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



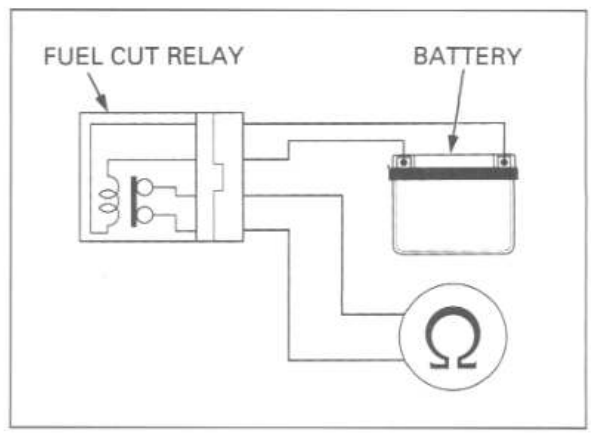
Connect the ohmmeter to the fuel cut relay connector terminals.

CONNECTION: Black/White – Brown

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

CONNECTION: Brown/Black – Black/White

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



FUEL TANK

REMOVAL

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

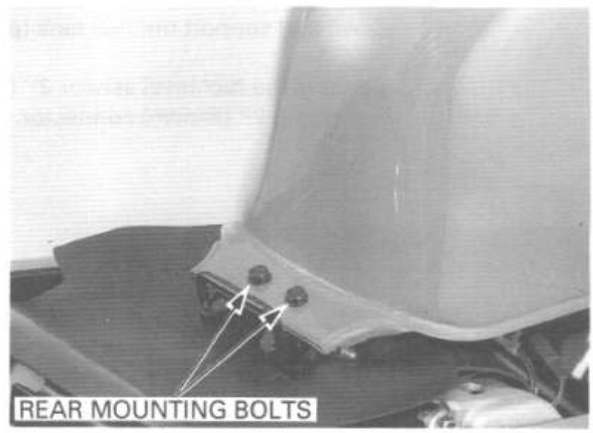
Disconnect the fuel tank air vent tube and overflow tube.



Disconnect the fuel pump 2P (Brown) connector and fuel unit 2P (Blue) connector.



Close the fuel tank, then remove the fuel tank rear mounting bolts.



Place the fuel tank upside down and support it securely.

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 19-18 for fuel level sensor removal.
Refer to page 5-48 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.

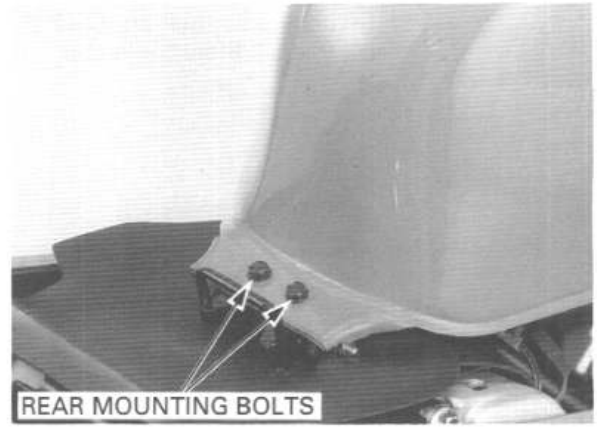
Install and tighten the fuel tube banjo bolt to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Connect the fuel return tube to the fuel pump.



Place the fuel tank assembly onto the rear bracket, tighten the two mounting bolts.



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

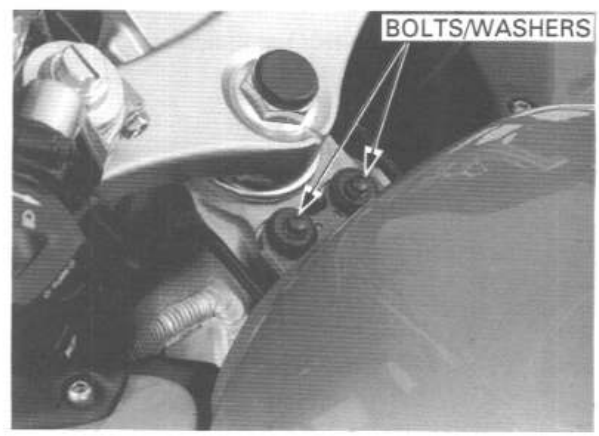
Connect the fuel level sensor 2P (Blue) connector and fuel pump 2P (Brown) connector.



Route the fuel tank air vent tube and overflow tube and clamp the tubes.
Connect the fuel tank air vent tube and overflow tube to the fuel tank.



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



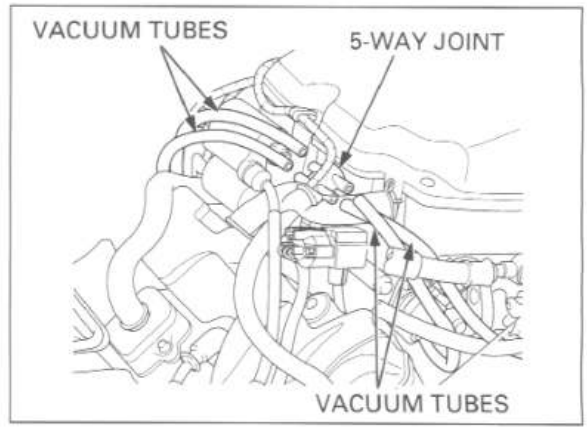
AIR CLEANER HOUSING

REMOVAL

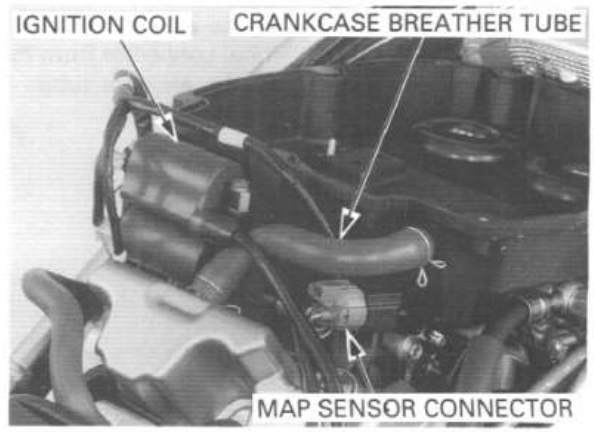
Remove the following:
— Air cleaner element (page 3-4)
— No. 1/No. 3 ignition coil (page 17-7)

California type only

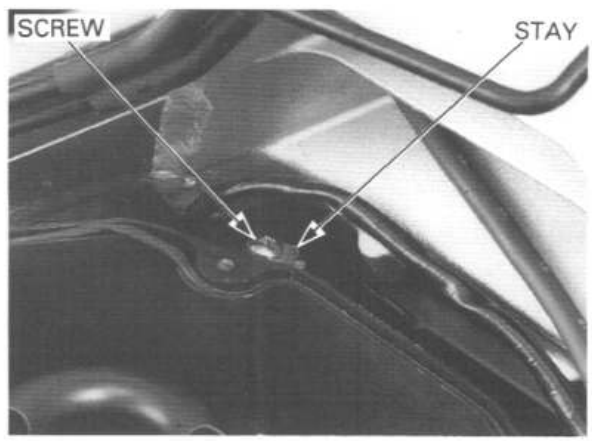
Disconnect the intake vacuum tubes from the 5-way joint.



Disconnect the MAP sensor 3P connector and vacuum tube from the sensor.
Disconnect the crankcase breather tube from the air cleaner housing.



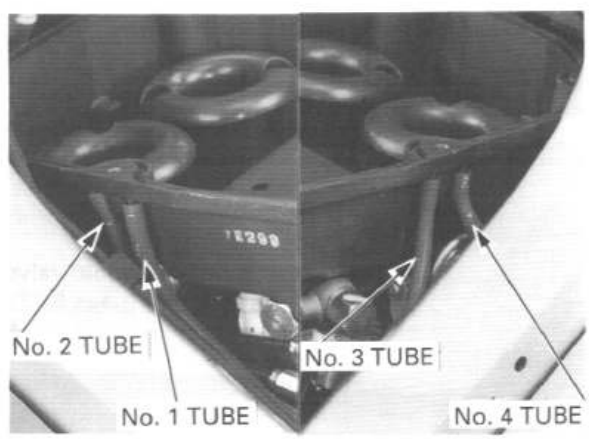
Remove the PAIR control solenoid valve stay mounting screw.



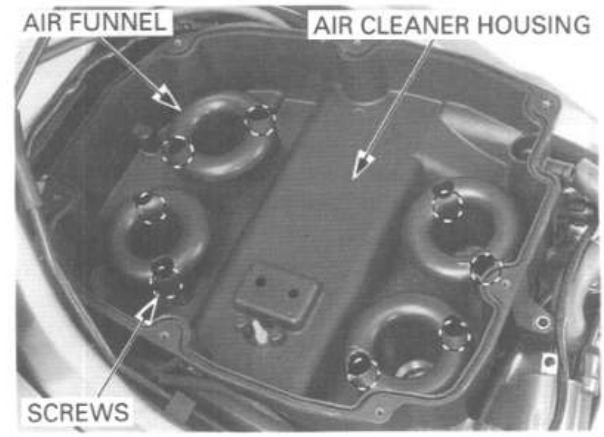
49 states/Canada type

Disconnect the No. 1 and No. 2 intake vacuum tubes from the air cleaner housing.

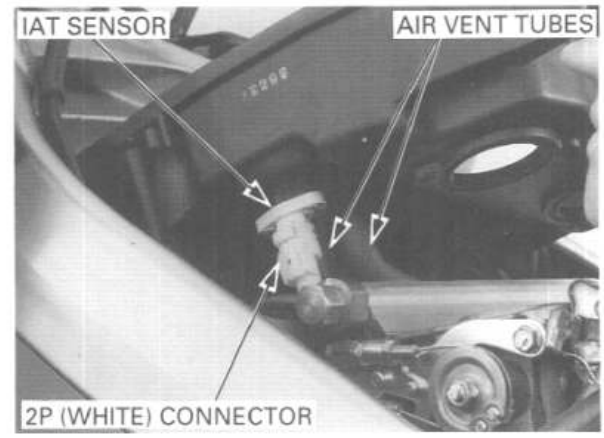
Disconnect the No. 3 and No. 4 intake vacuum tubes from the air cleaner housing.



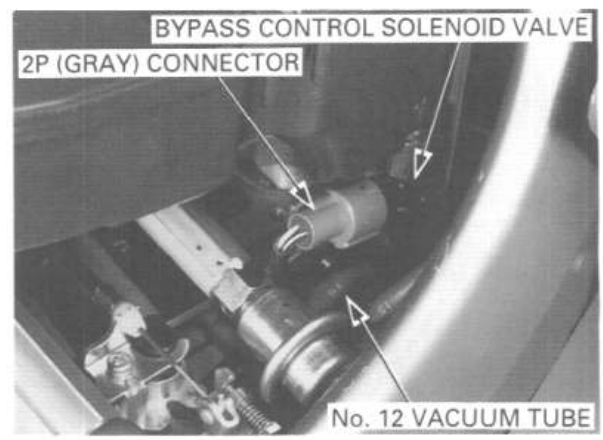
Remove the air funnel/air cleaner housing mounting screws, then remove the air funnels.



Slightly lift the air cleaner housing, then disconnect the 2P (White) connector from the IAT sensor.
Disconnect the air vent tubes from the air cleaner housing.

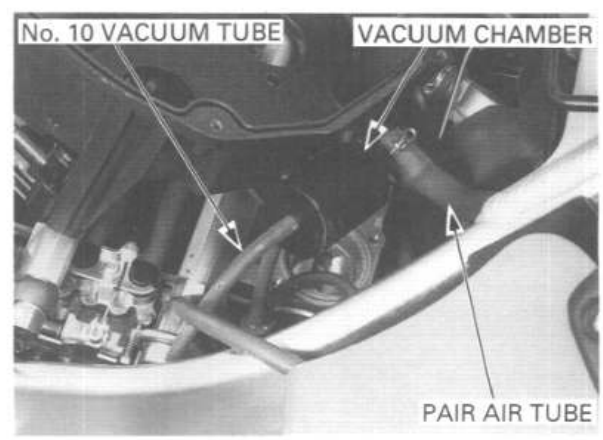


Disconnect the 2P (Gray) connector from the bypass control solenoid valve.
Disconnect the No. 12 vacuum tube from the bypass control solenoid valve.

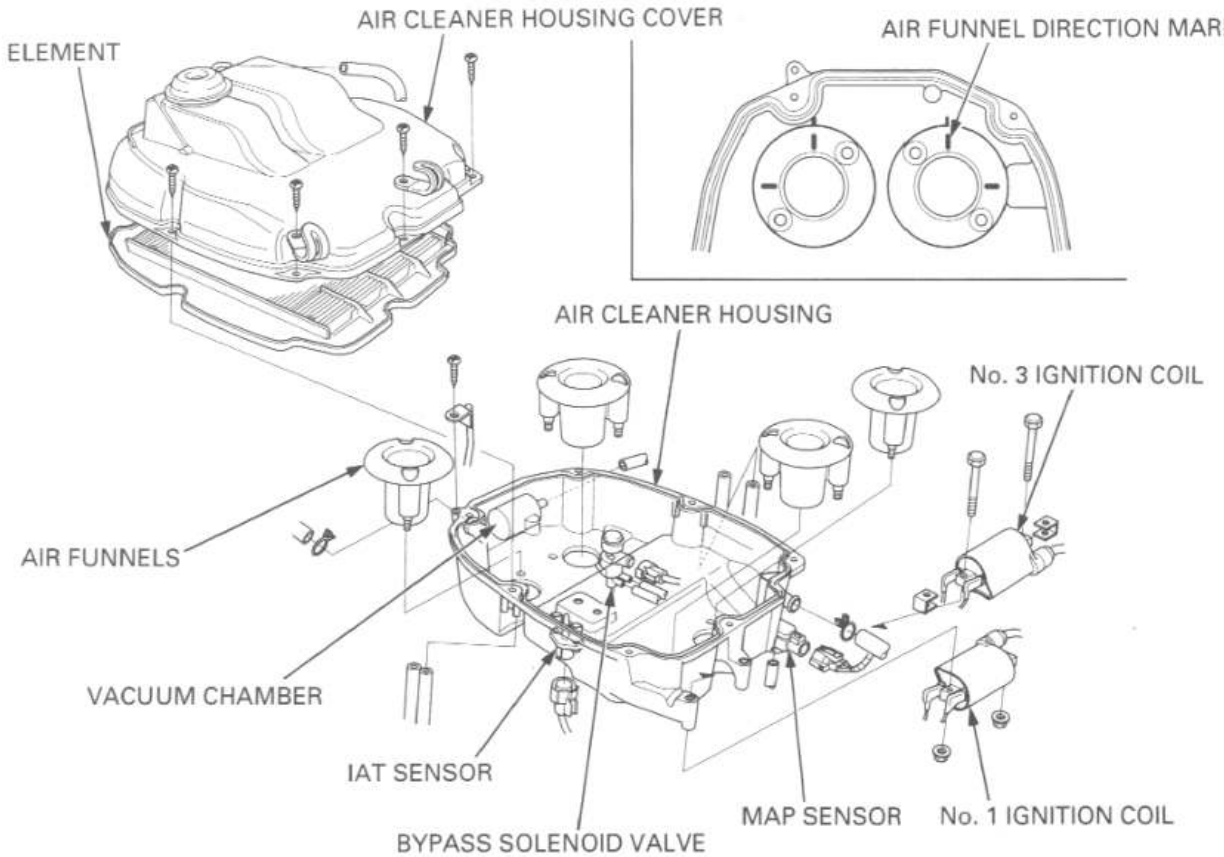


Disconnect the No. 10 vacuum tube from the vacuum chamber.
Disconnect the PAIR fresh air tube from the air cleaner housing, then remove the housing.

Remove the following:
— MAP sensor (page 5-69)
— IAT sensor (page 5-70)
— Bypass control solenoid valve (page 5-76)
— Vacuum chamber (page 5-77)



INSTALLATION

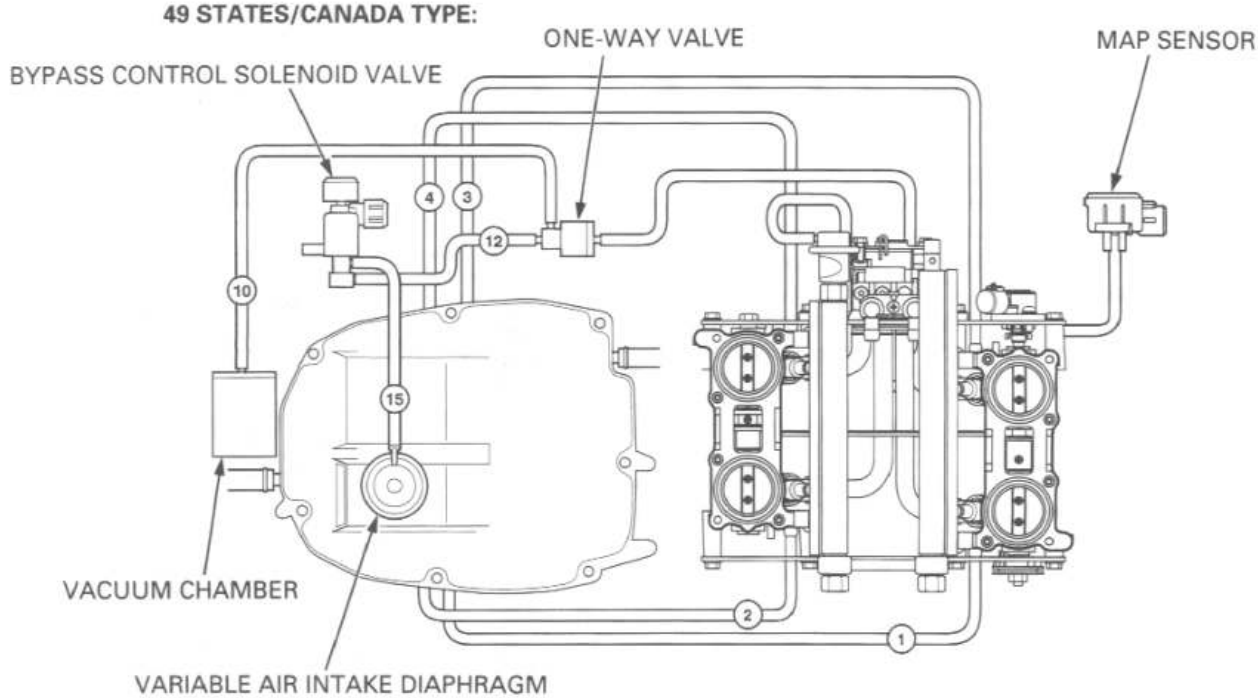


Install the air cleaner housing in the reverse order of removal.

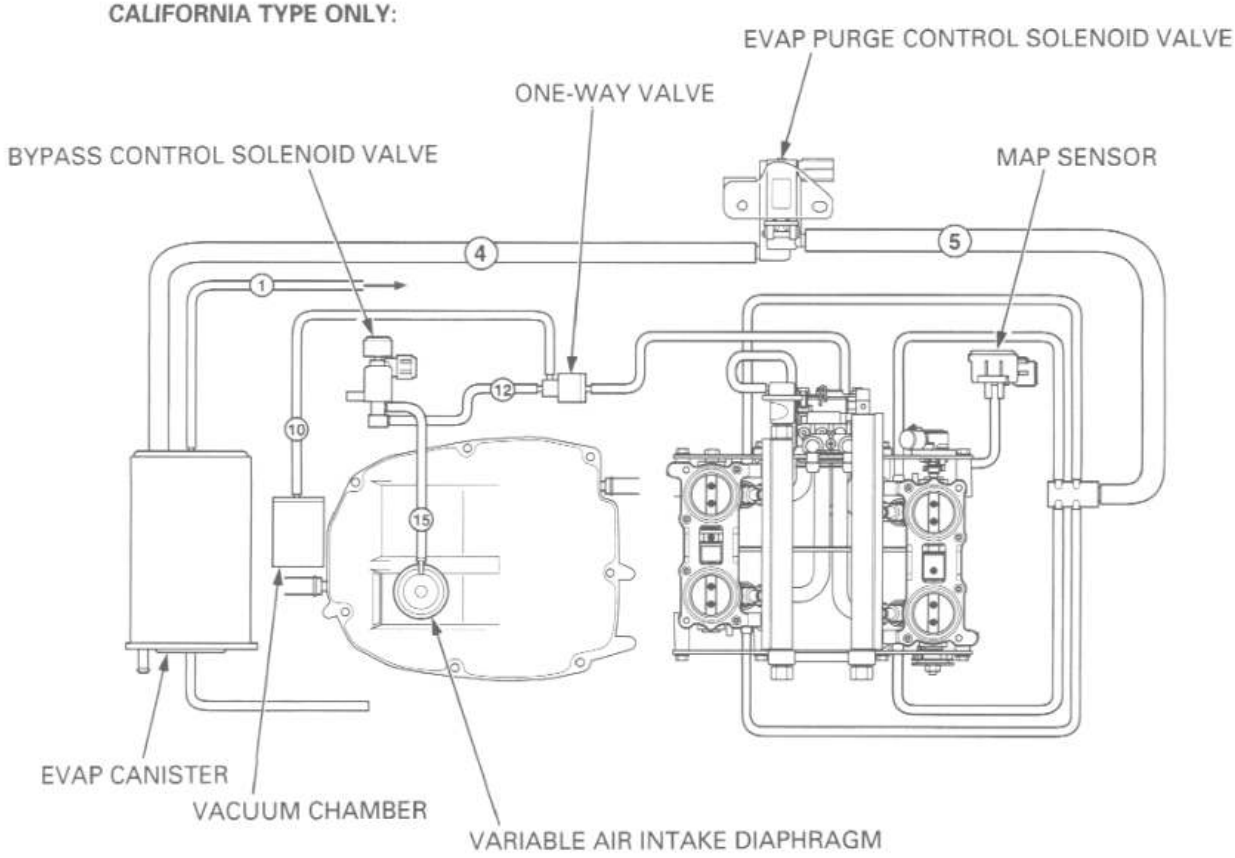
NOTE:

Route the wires and vacuum tubes properly.

49 STATES/CANADA TYPE:



CALIFORNIA TYPE ONLY:



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 fuel tube banjo bolt.***
- ***Always replace the sealing washer when the fuel tube banjo bolt is removed or loosened.***

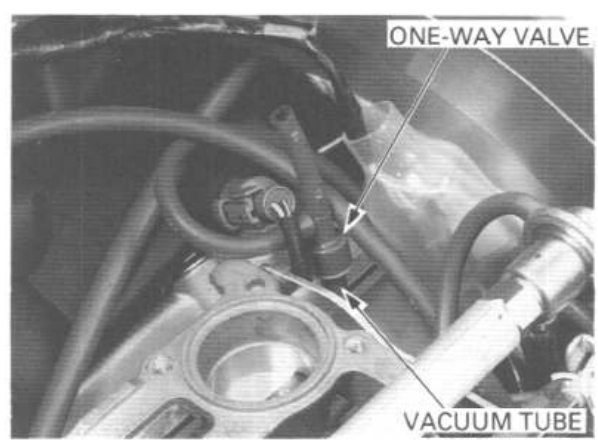
Do not snap the throttle valve from full open to full close after the throttle cable has been removed. It may cause incorrect idle operation.

Remove the air cleaner housing (page 5-53).

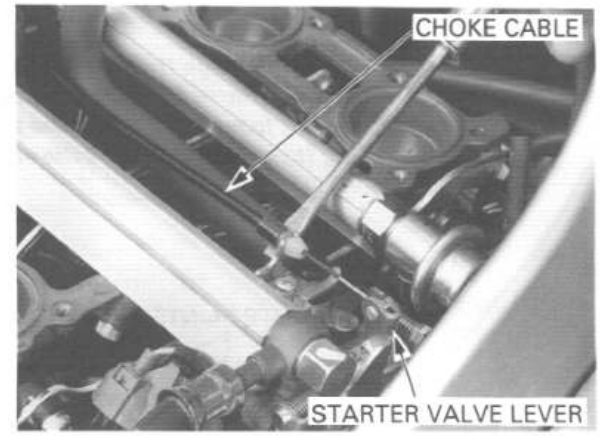
Disconnect the fuel tube and fuel return tube from the fuel pump.

Disconnect the vacuum tubes and one-way valve.

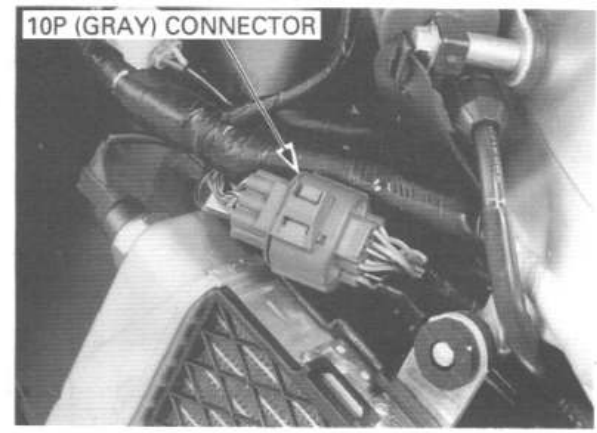




Release the choke cable hook from the bracket, then disconnect the choke cable end from the starter valve lever.



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



Remove the radiator reserve tank (page 6-15).

Loosen the throttle body insulator band screws.

Remove the throttle body from the insulators.



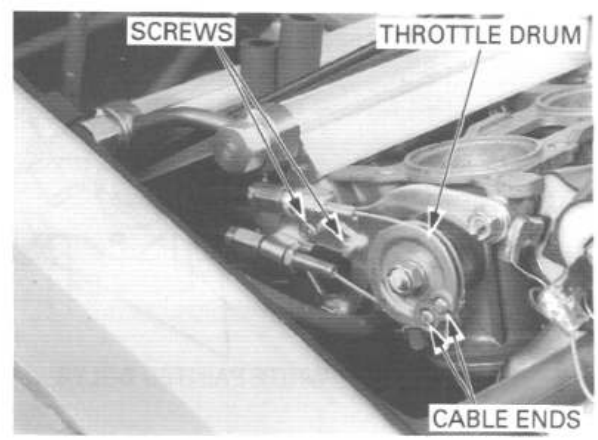
Remove the throttle cable bracket retaining screws and bracket.
Disconnect the throttle cable ends from the throttle drum.

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

Remove the throttle body.

CAUTION:

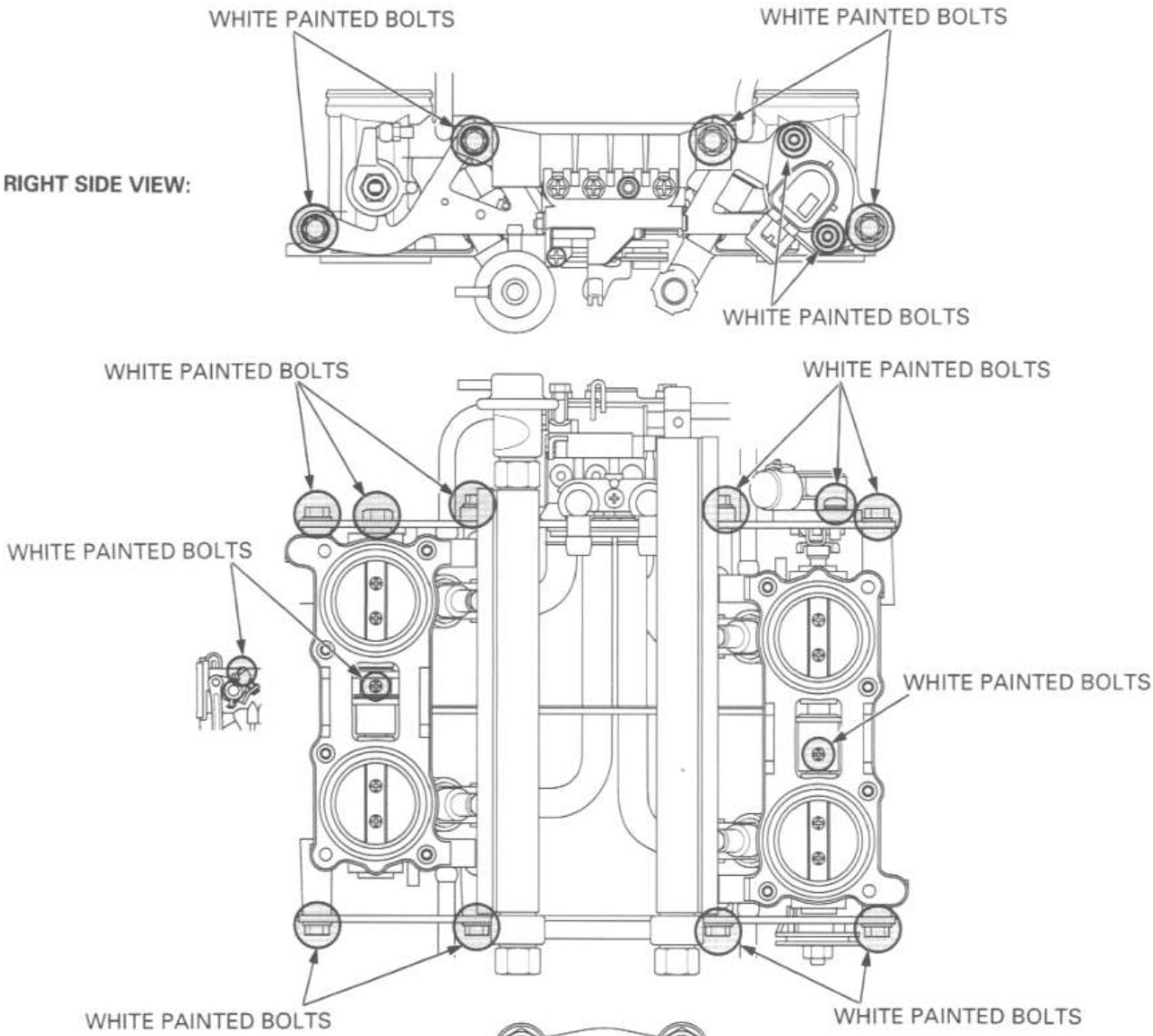
Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.



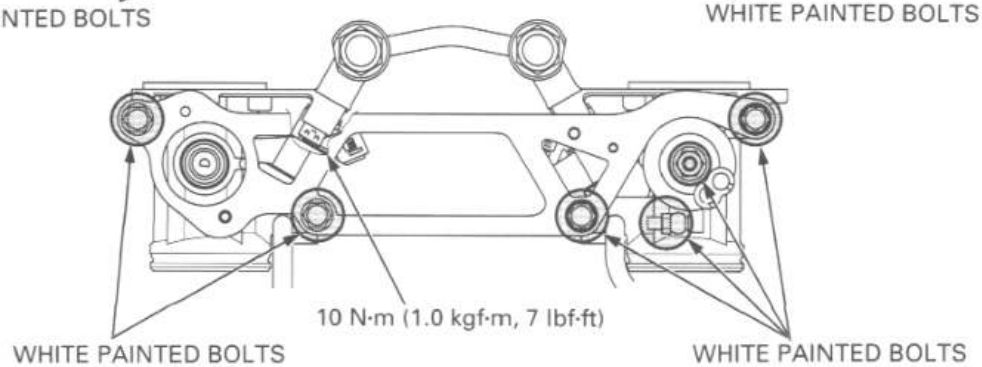
CAUTION:

- ***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.***

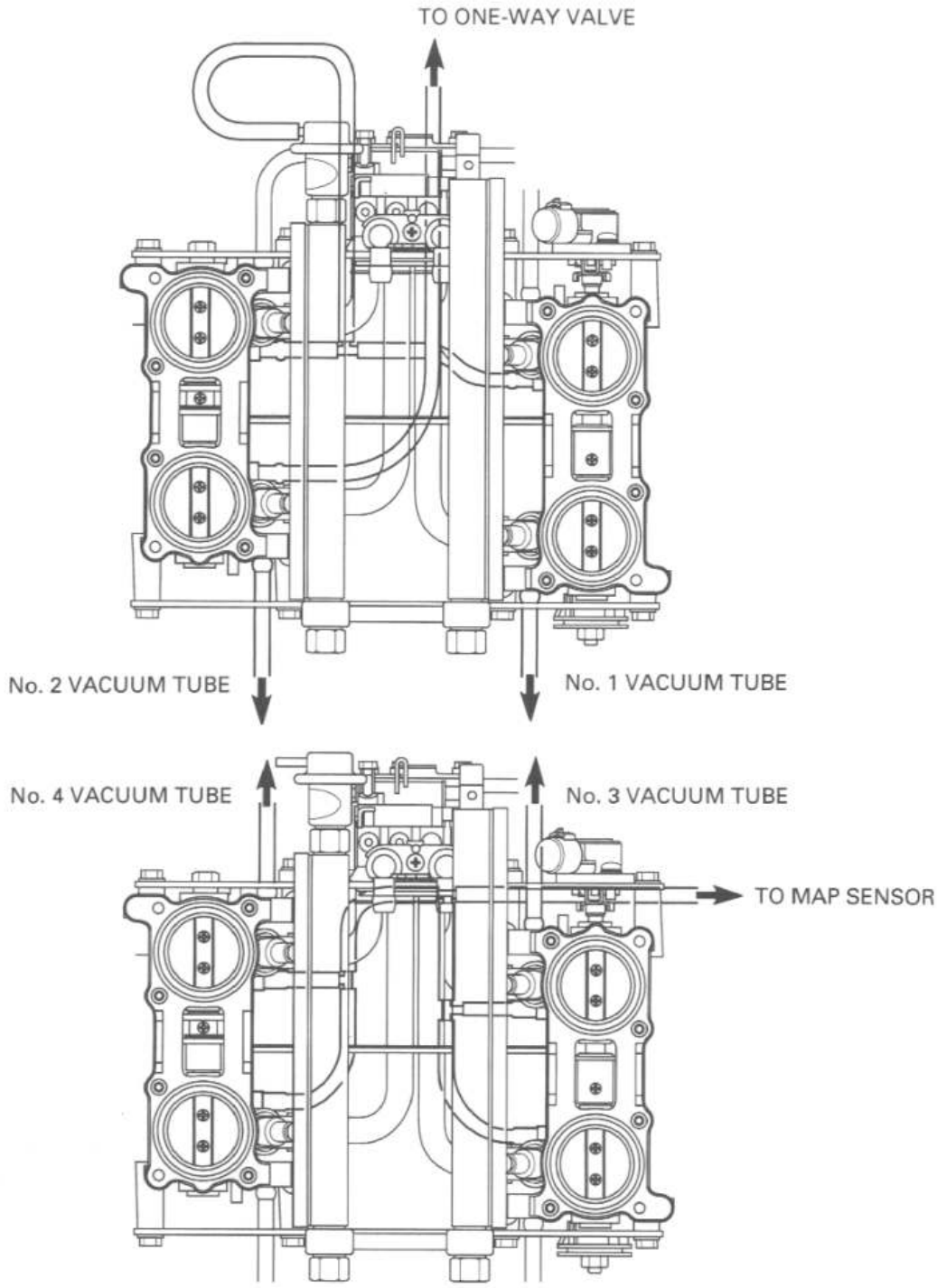
RIGHT SIDE VIEW:



LEFT SIDE VIEW:

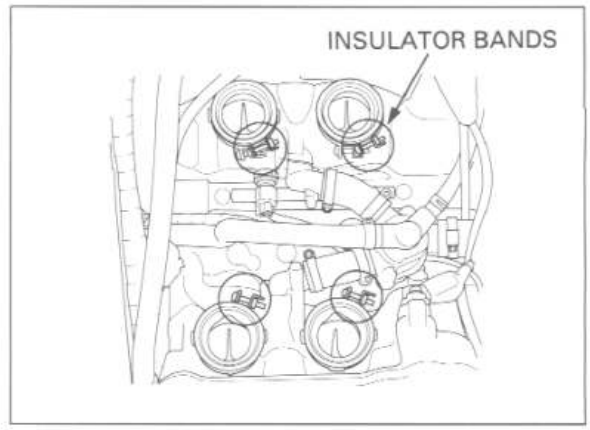


THROTTLE BODY VACUUM TUBE ROUTING

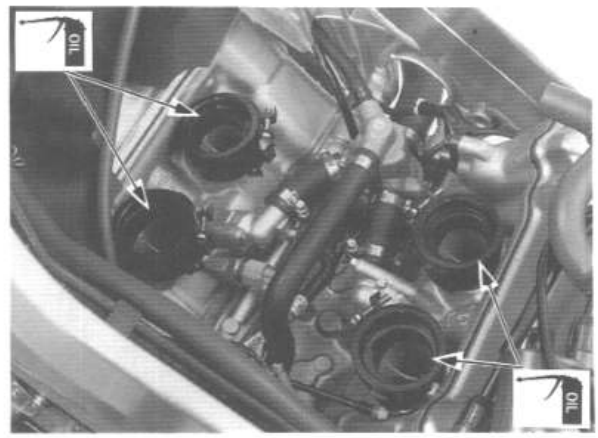


INSTALLATION

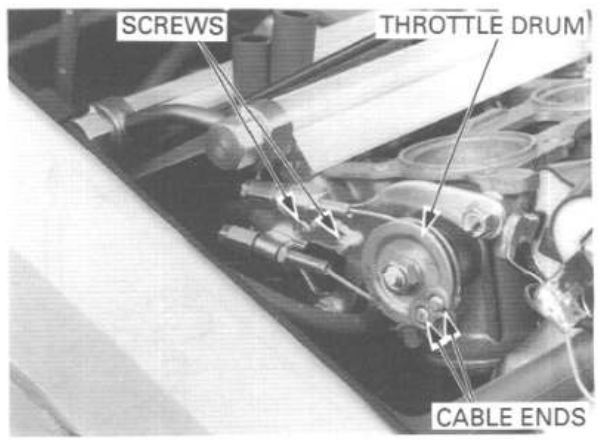
Check the insulator band angle.



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



Connect the throttle cable ends to the throttle drum. Set the throttle cable guide to the throttle body, tighten the two retaining screws securely.



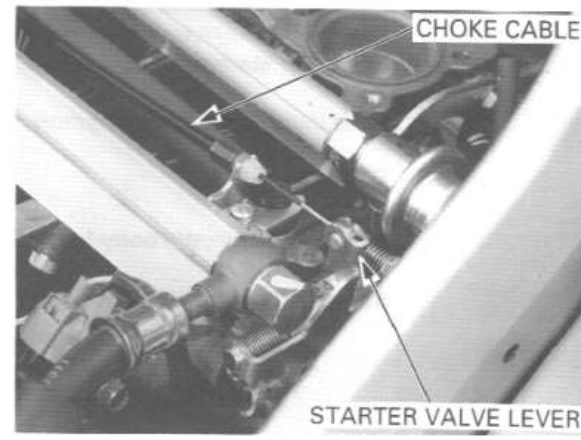
Route the throttle body sub-harness, connect the connector.



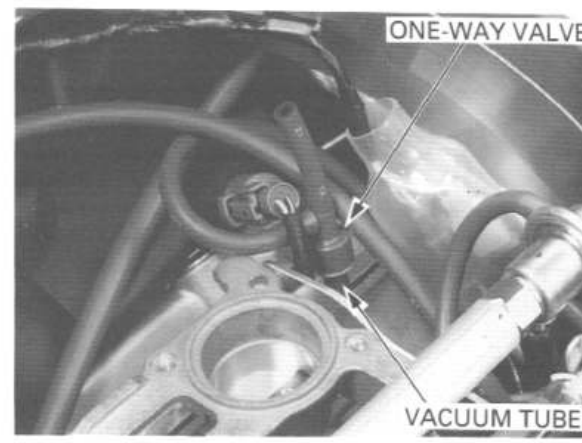
Install the throttle body into the insulators and tighten the insulator band screws securely.



Connect the choke cable end to the starter valve lever, then set the cable hook onto the throttle body bracket.



Install the one-way valve and connect the vacuum tubes.



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 removed parts in the reverse order of removal.



INJECTOR

INSPECTION

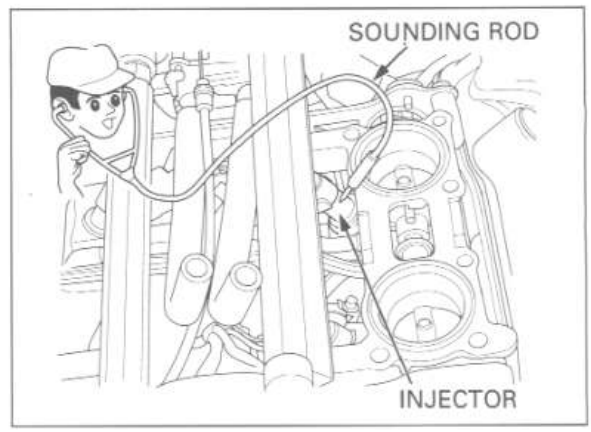
⚠ WARNING

- ***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.***

Remove the air cleaner housing (page 5-53).

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

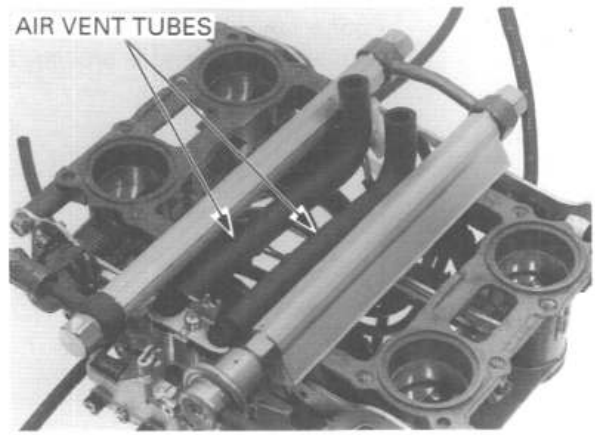
If the injector does not operates, replace the injector.



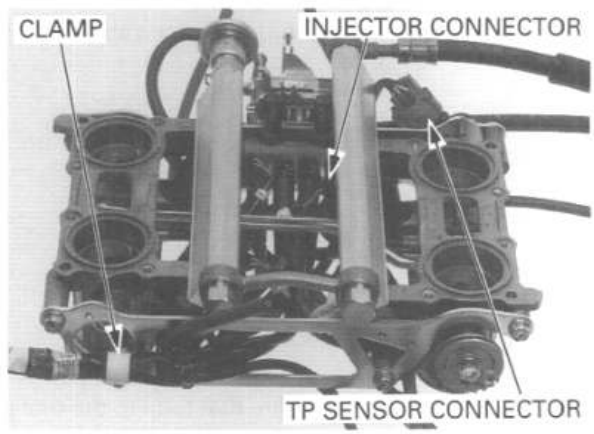
REMOVAL

Remove the throttle body (page 5-56).

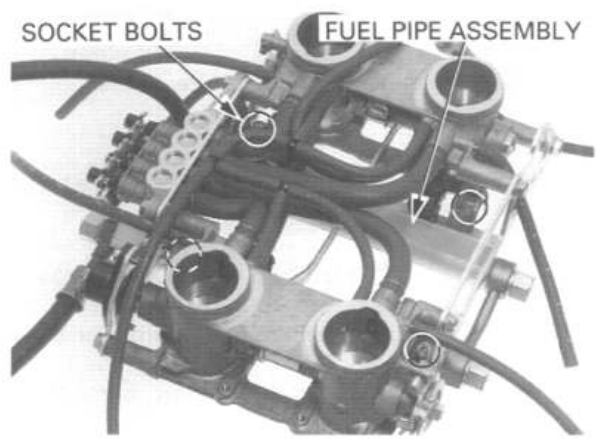
Remove the air vent tubes from the joints.



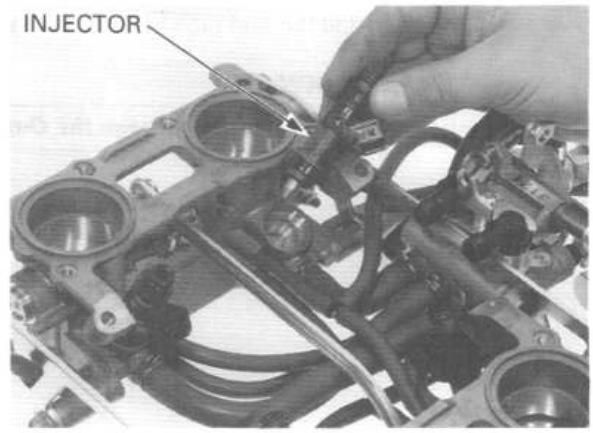
Disconnect the throttle position (TP) sensor connector.
Disconnect the fuel injector connectors from each injector.
Remove the wire clamp screw, then remove the throttle body sub-harness from the throttle body.



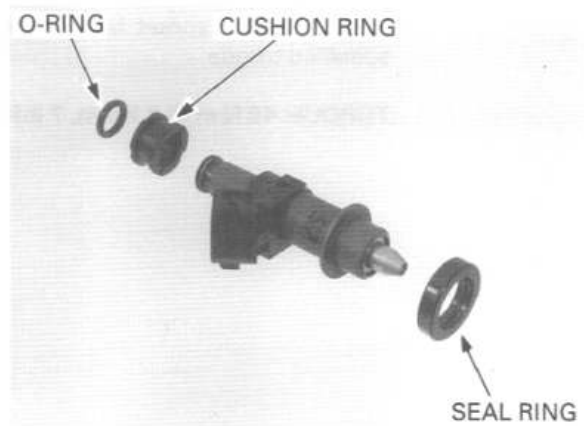
Remove the four socket bolts and fuel pipe assembly.



Remove the injectors from the throttle body.



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



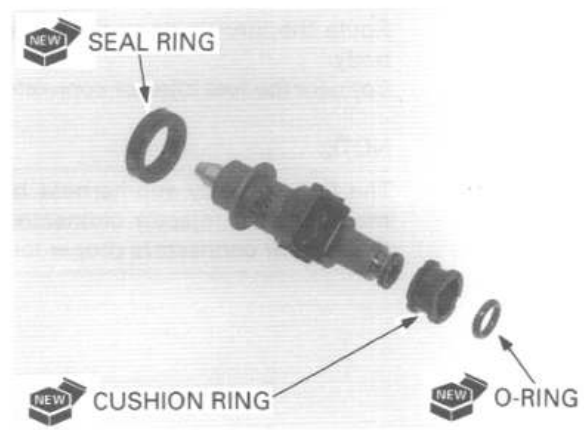
INSTALLATION

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:

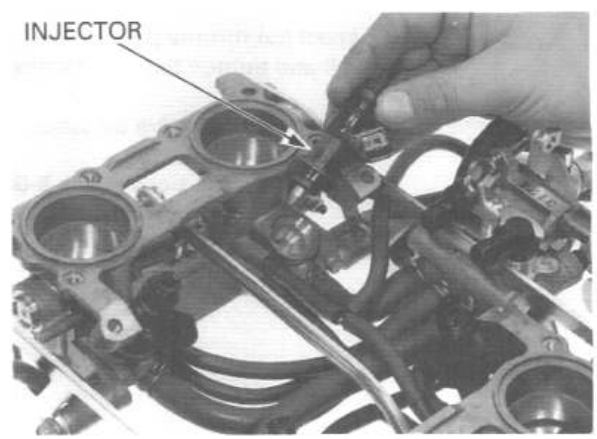
Be careful not to damage the O-ring when installing it.



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.

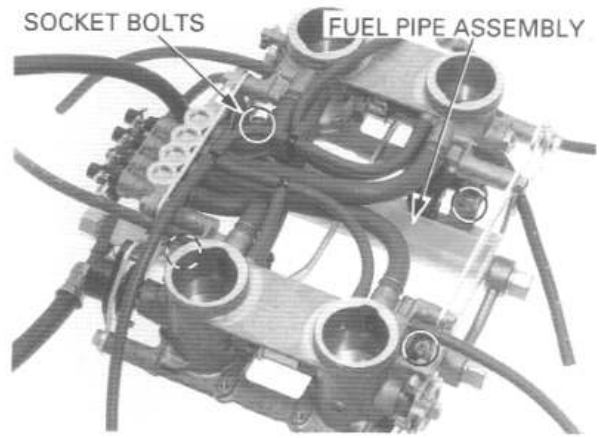
CAUTION:

Be careful not to damage the O-rings.



Install the four socket bolts, tighten the bolts to the specified torque.

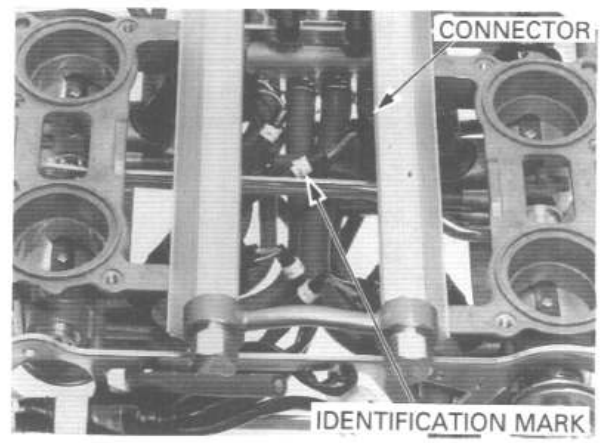
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Route the throttle body sub-harness into the throttle body.
Connect the fuel injector connectors to each injector.

NOTE:

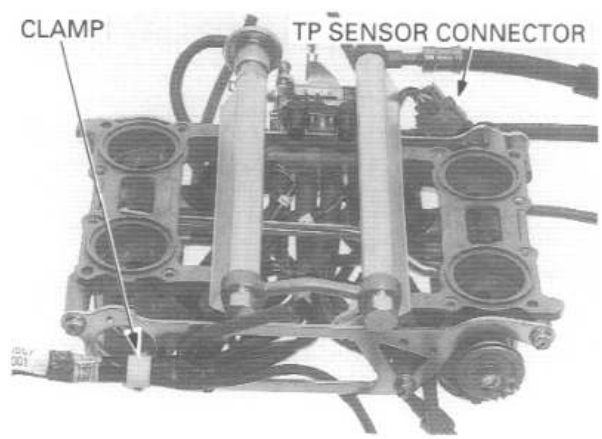
The throttle body sub-harness has the identification marks for the injector connector connection. Install the injector connectors proper locations.



Connect the throttle position (TP) sensor connector.
Install and tighten the sub-harness clamp screw.

Install the starter valve air tubes.

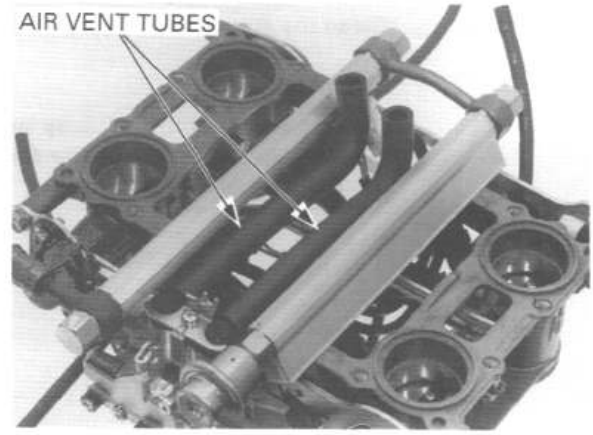
Install the throttle body (page 5-60).



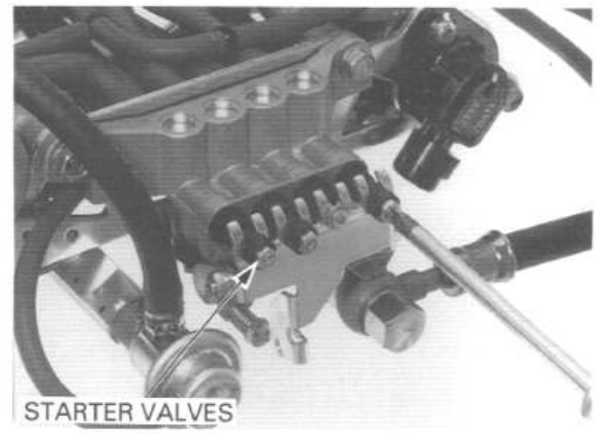
STARTER VALVE

DISASSEMBLY

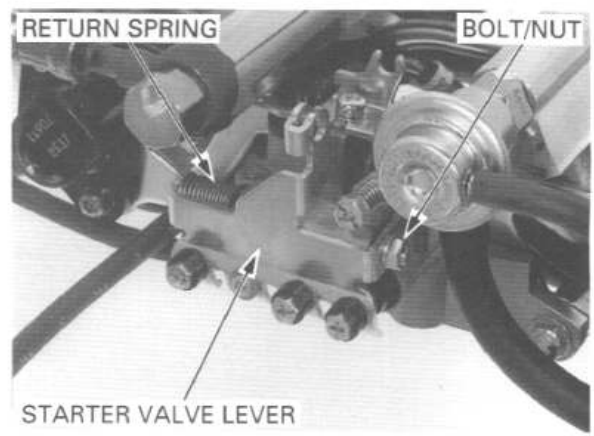
Remove the starter valve air vent tubes.



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

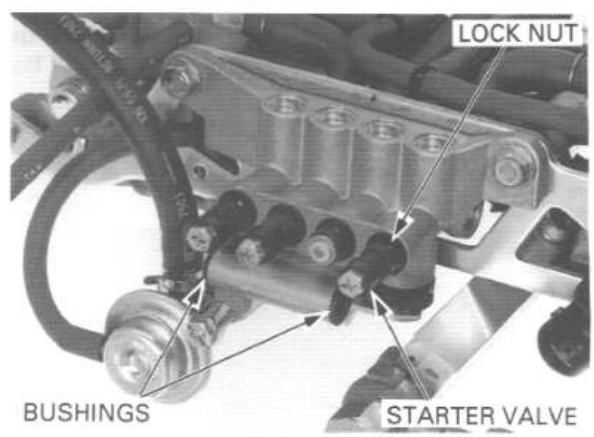


Remove the starter valve arm pivot nut, washer, bolt and return spring.
Remove the starter valve lever from the starter valves.



Remove the starter valve lever pivot bushings.

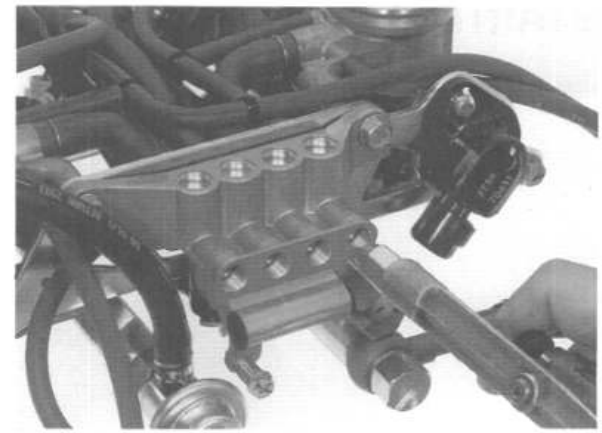
Loosen the lock nuts and remove the starter valve assembly.



Clean the starter valve bypass using compressed air.

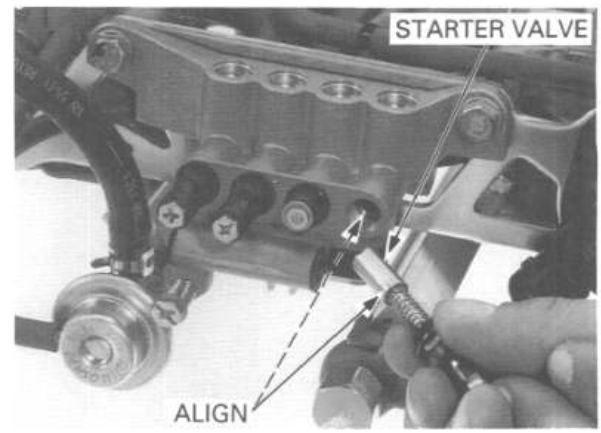
CAUTION:

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



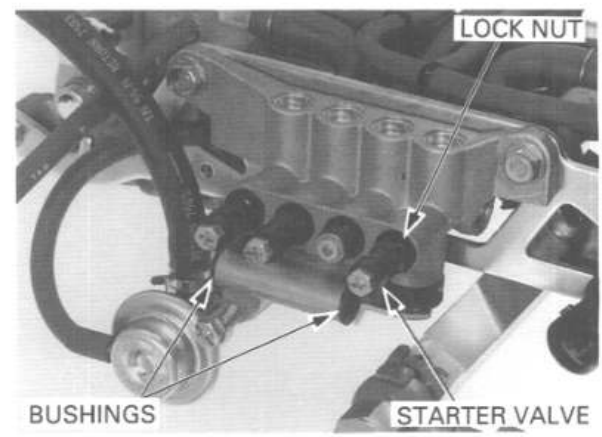
ASSEMBLY

Install the starter valve assembly into the valve hole aligning the groove on the starter valve with the guide in the valve hole.

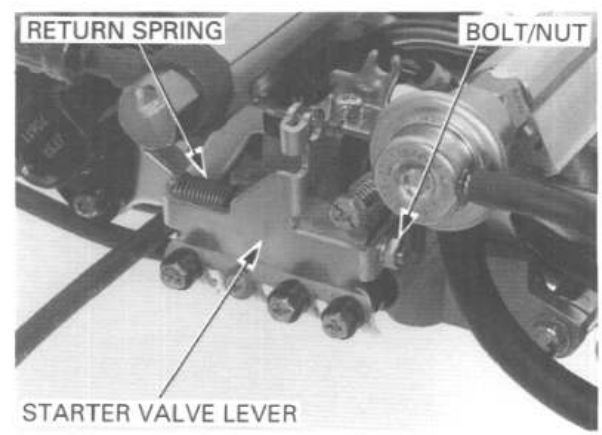


Tighten the starter valve lock nut.

Install the starter valve lever pivot bushings.

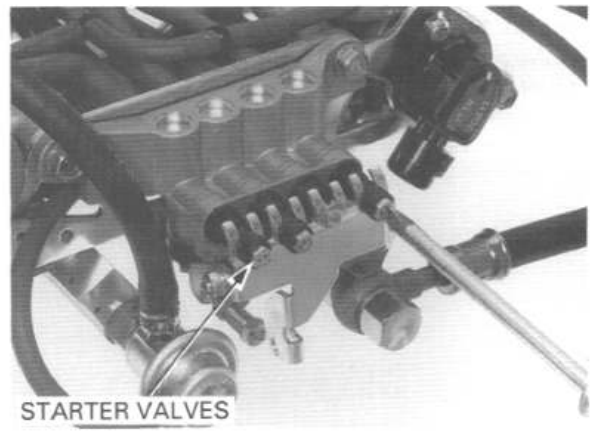


Install the starter valve lever to the starter valve.
Install the return spring, pivot bolt, washer and pivot nut.
Tighten the nut securely.



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

Install the throttle body (page 5-60).



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:

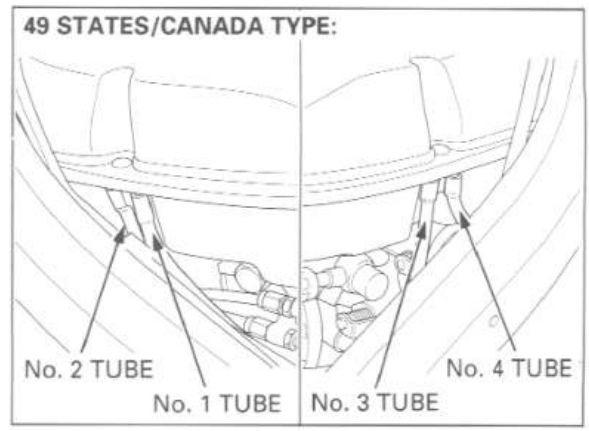
- Synchronize the starter valve with the engine at the normal operating temperature and with the transmission in neutral.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate 50 rpm change.

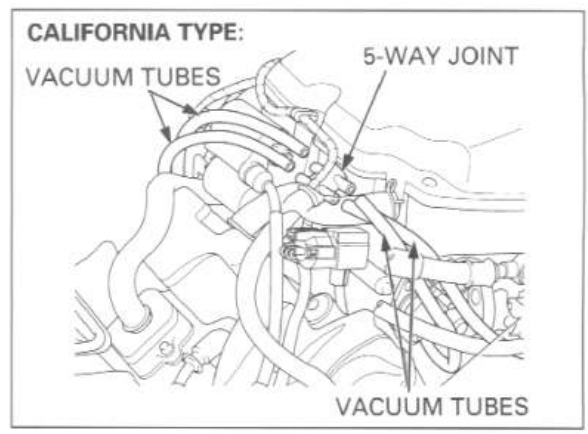
Open and support the fuel tank (page 3-4).

49 states/Canada type Remove the No. 1 to No. 4 vacuum tubes from the air cleaner housing and connect to the vacuum gauge.

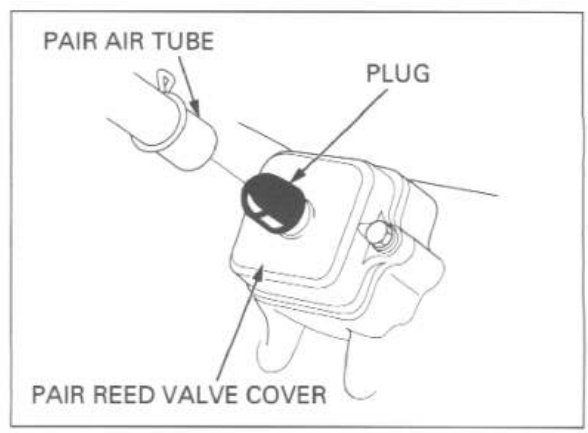
California type Remove the No. 1 to No. 4 tubes from the 5-way air joint.

Connect the tachometer.





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

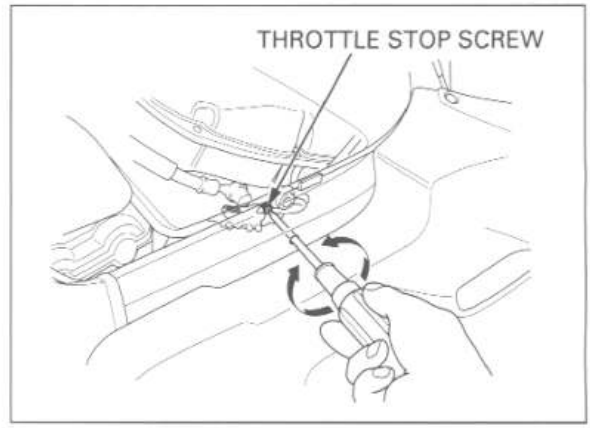


The No. 1 starter valve cannot be adjusted, it is the base starter valve.

Synchronize the starter valve as follows:

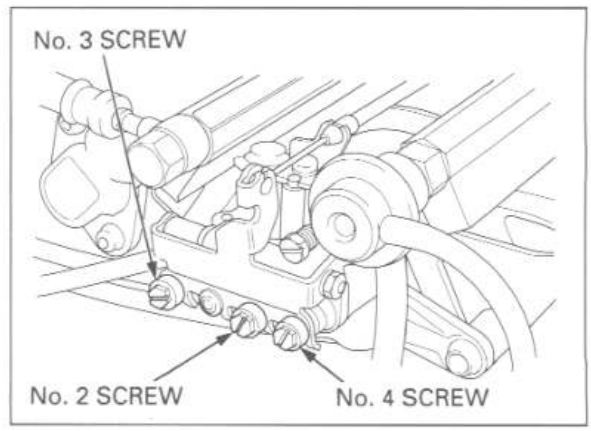
1. Start the engine and adjust the idle speed.

IDLE SPEED:
49 states/Canada type: 1,200 ± 100 rpm
California type: 1,300 ± 100 rpm

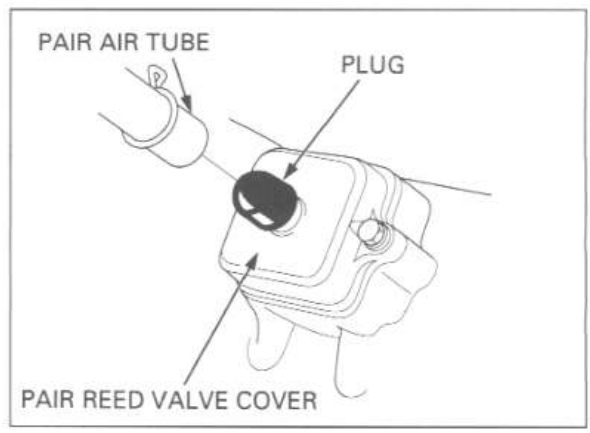


Turn the starter valve screws using a 7 mm open end wrench.

2. Adjust each intake vacuum pressure with the No. 1 cylinder.
3. Turn the No. 3 starter valve screw until the No. 3 vacuum pressure is dropped 20 ± 5 mmHg from the No. 1 vacuum pressure.
4. Turn the No. 4 starter valve screw until the No. 4 vacuum pressure is dropped 10 ± 5 mmHg from the No. 1 vacuum pressure.
5. If the idle speed is changed, readjust the idle speed and return step 3.



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



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

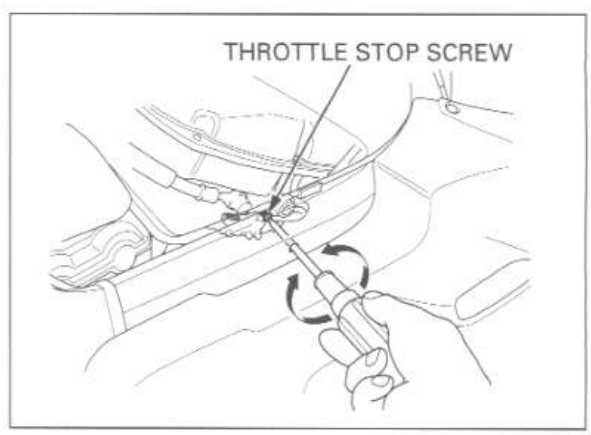
IDLE SPEED:
49 states/Canada type: 1,200 ± 100 rpm
California type: 1,300 ± 100 rpm

49 states/Canada type

Remove the vacuum gauge and install the vacuum tubes to the air cleaner housing.

California type

Remove the vacuum gauge and install the vacuum tubes to the 5-way joint.



BARO/MAP SENSORS

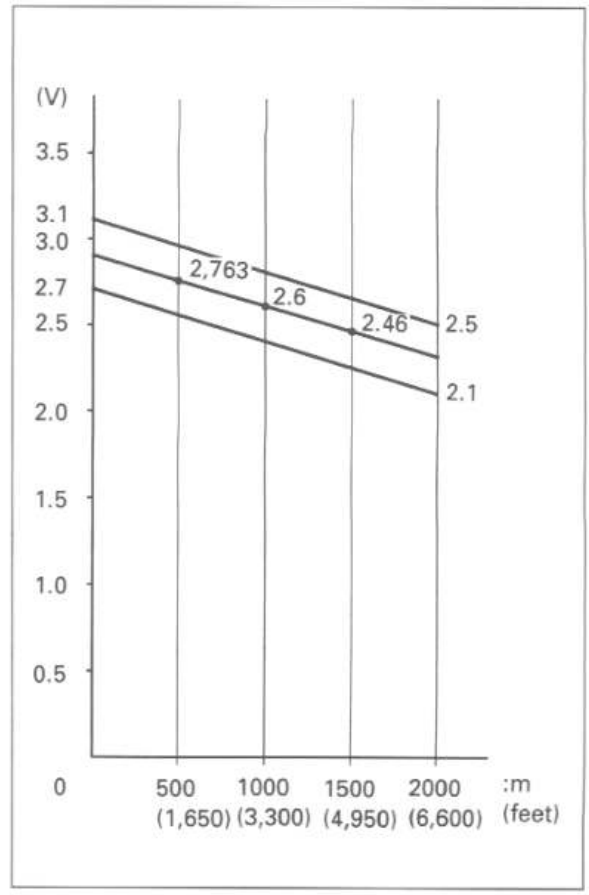
OUTPUT VOLTAGE INSPECTION

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

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

CONNECTION:
BARO sensor: No. 34 (+) – No. 32 (–)
MAP sensor: No. 33 (+) – No. 32 (–)
STANDARD: 2.7 – 3.1 V

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

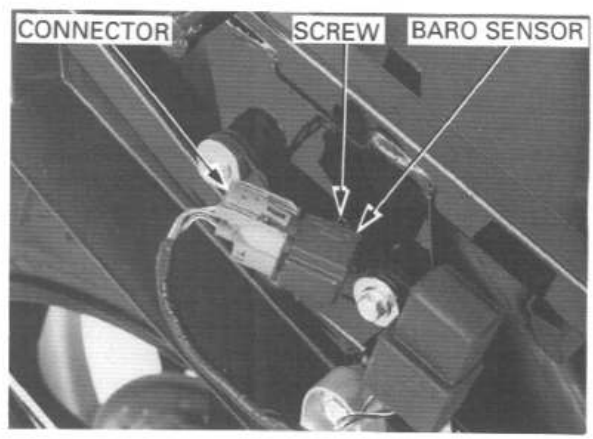


BARO SENSOR REMOVAL/INSTALLATION

Remove the rear cowl (page 2-3).

Disconnect the BARO sensor connector.
Remove the screw and BARO sensor from the bracket.

Installation is in the reverse order of removal.

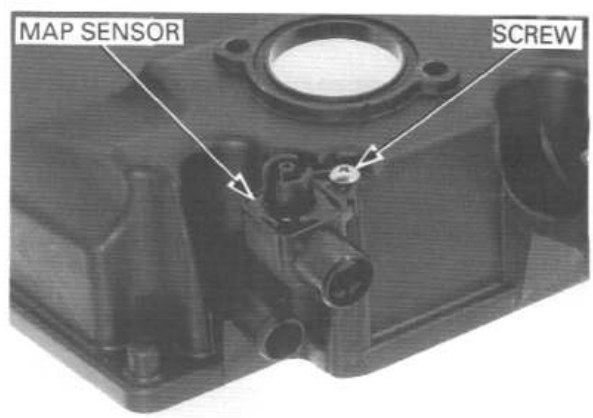


MAP SENSOR REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-53).

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

Installation is in the reverse order of removal.



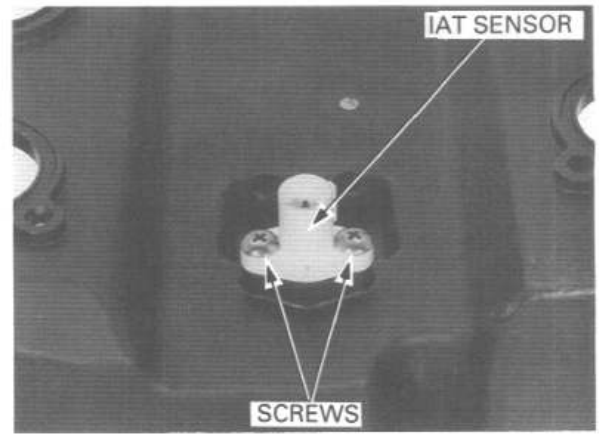
IAT SENSOR

REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-53).

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

Installation is in the reverse order of removal.



ECT SENSOR

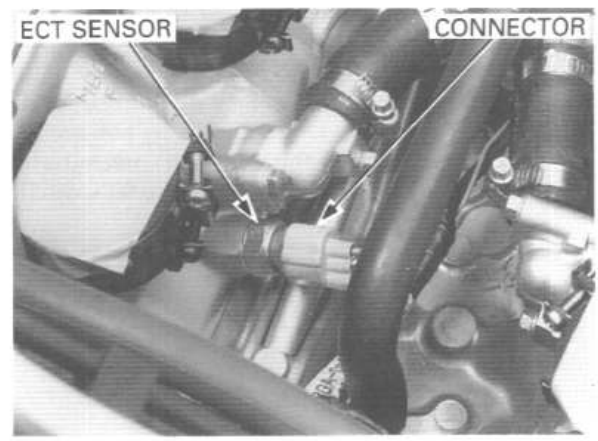
REMOVAL/INSTALLATION

NOTE:

Replace the ECT sensor while the engine is cold.

Drain the coolant from the system (page 6-5).
Remove the throttle body (page 5-56).

Disconnect the ECT sensor connector from the sensor.

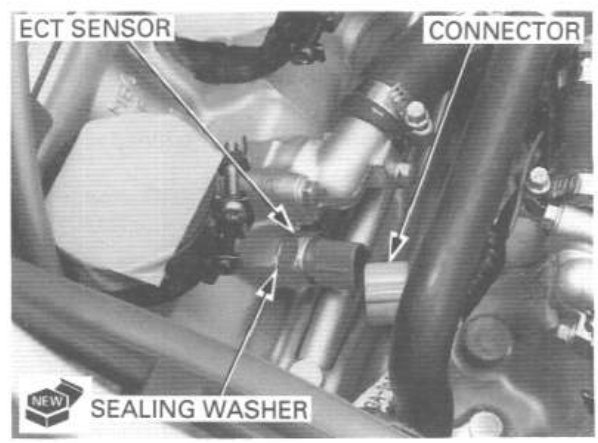


Remove the ECT sensor and sealing washer.

Always replace a sealing washer with a new one.

Installation is in the reverse order of removal.

Install the throttle body (page 5-60).
Fill the cooling system with recommended coolant (page 6-5).

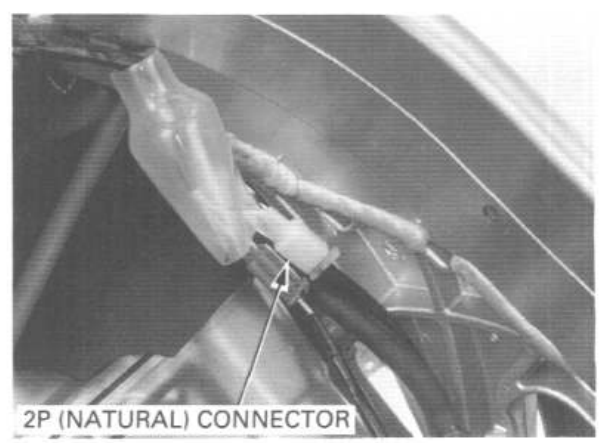


CAM PULSE GENERATOR

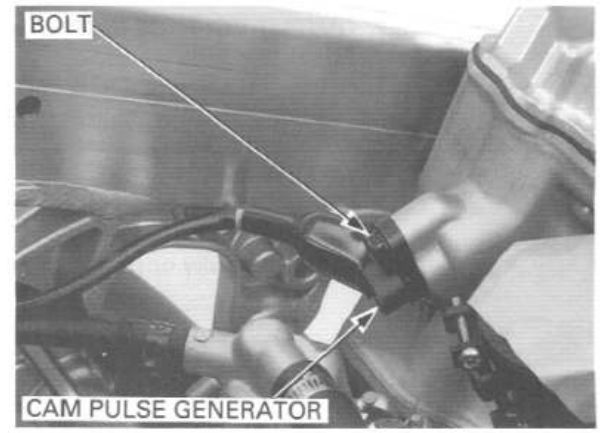
REMOVAL/INSTALLATION

Remove the throttle body (page 5-56).

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



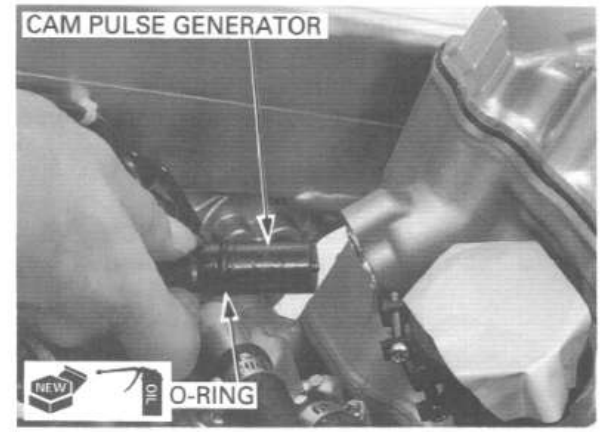
Remove the bolt and cam pulse generator from the rear cylinder head.



Installation is in the reverse order of removal.

NOTE:

- Route the cam pulse generator wire properly.
- Replace the O-ring with a new one.
- Apply engine oil to the new O-ring.

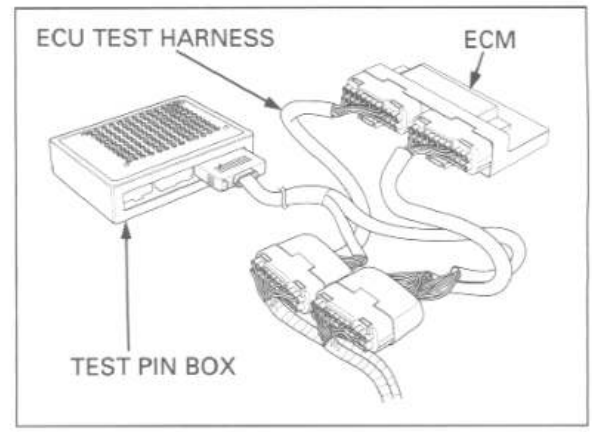


TP SENSOR

INSPECTION

Remove the seat (page 2-3).

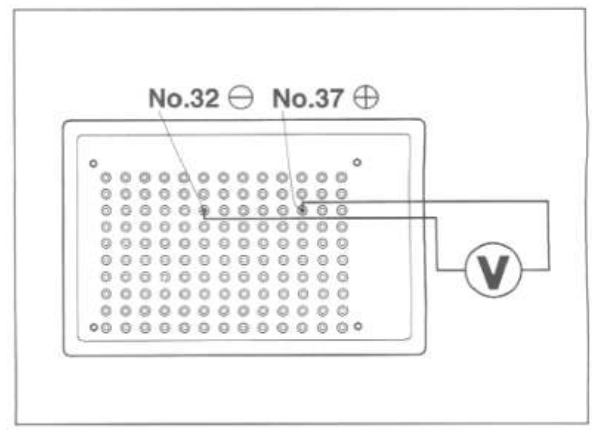
Disconnect the ECM 22P (Black) and 22P (Light gray) connectors.
Check the connector for loose or corroded terminals.
Connect the ECU test harness and test pin box between the ECM and main wire harness.



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.



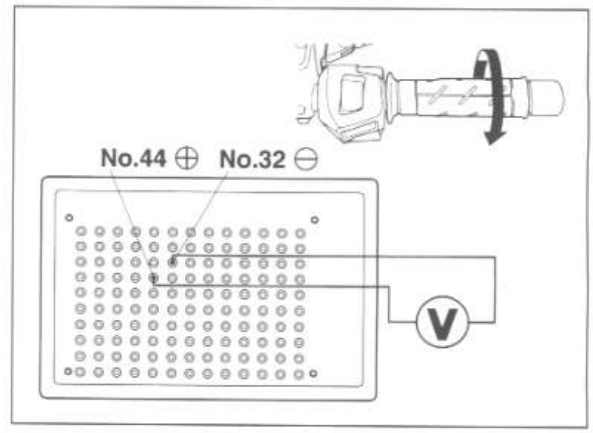
CONNECTION:
No. 37 (+) – No. 32 (–)
Standard: 4.5 – 5.5 V

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.

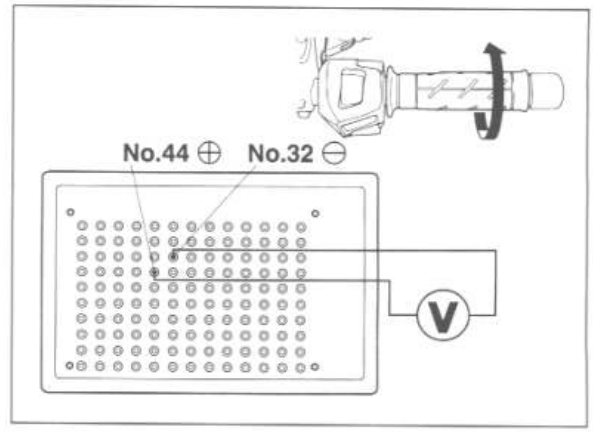
CONNECTION:
No. 44 (+) – No. 32 (–)
MEASURING CONDITION:
At throttle fully open



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. 44 (+) – No. 32 (–)
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 x 0.824 = Vo

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

With the throttle fully closed:
Measured input voltage x 0.1 = Vc

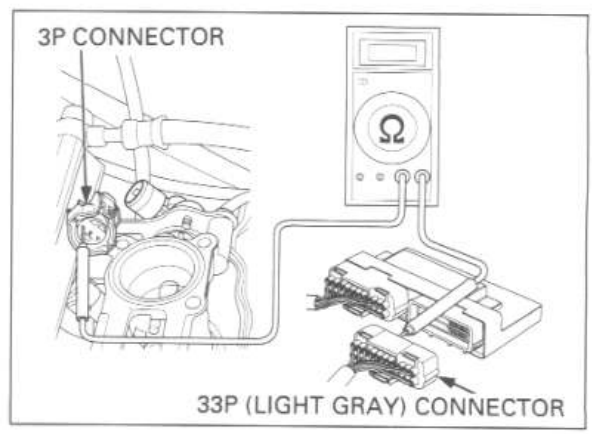
The sensor is normal if the throttle closed output voltage measured in step 3 is within 10% of Vc.

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

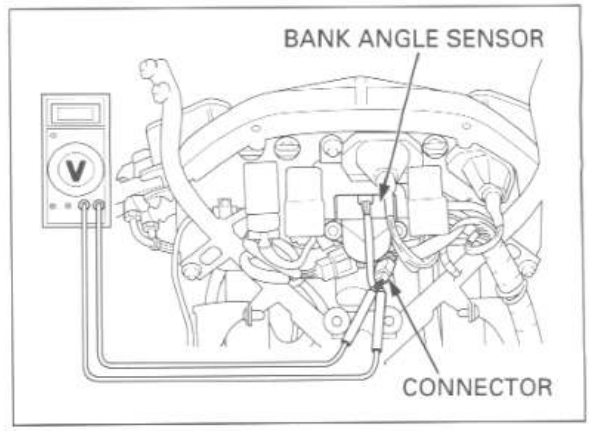
CONTINUITY INSPECTION

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

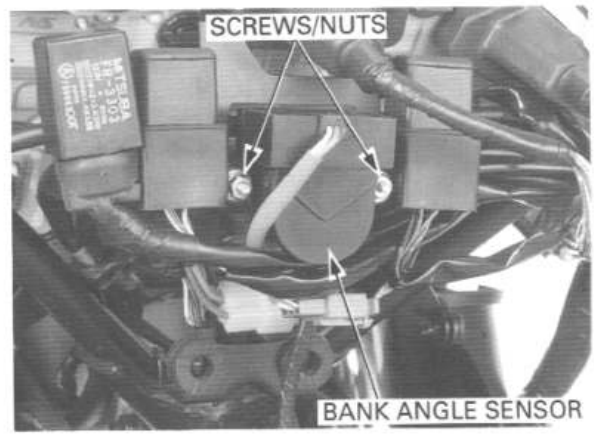
Support the motorcycle on its center stand.
Remove the upper cowl (page 2-7).

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

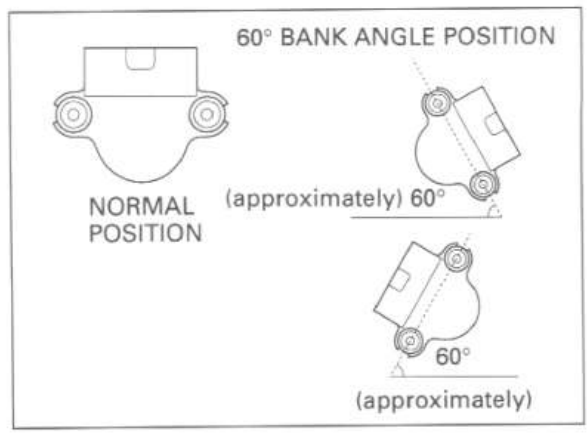
Turn the ignition switch OFF.
Remove the screws, nuts and bank angle sensor.



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.



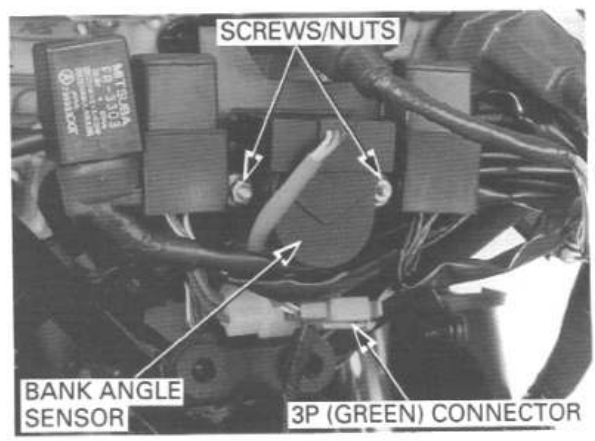
NOTE:

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

REMOVAL/INSTALLATION

Remove the upper cowl (page 2-7).

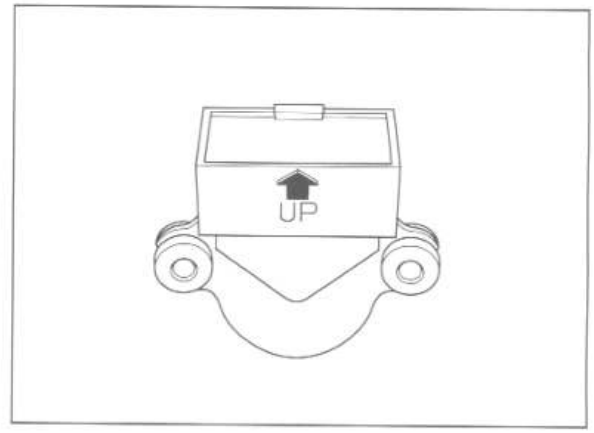
Disconnect the bank angle sensor 3P (Green) connector.
Remove the two screws, nuts and bank angle sensor.



Installation is in the reverse order of removal.

NOTE:

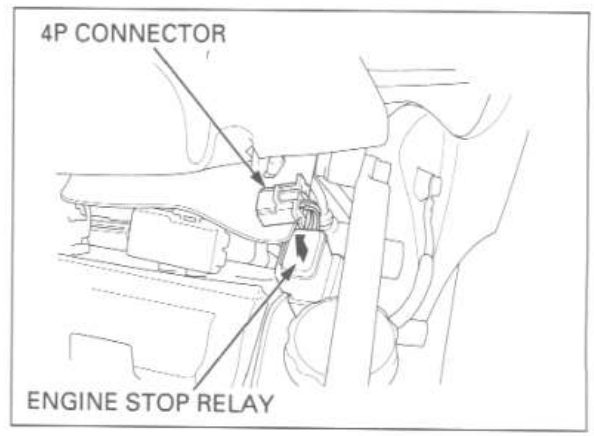
Install the bank angle sensor with its "UP" mark facing up.



ENGINE STOP RELAY

INSPECTION

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



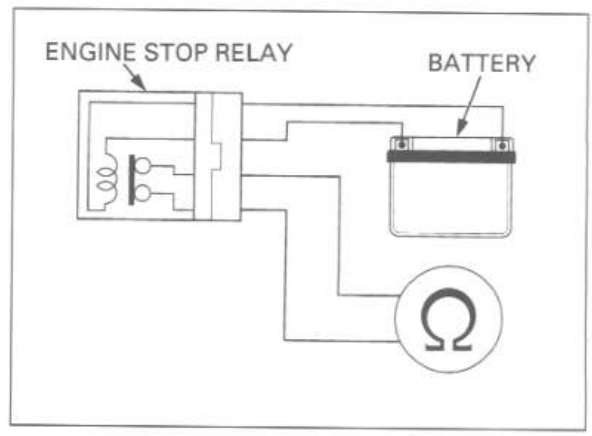
Connect the ohmmeter to the engine stop relay connector terminals.

CONNECTION: Black/Pink – Brown

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

CONNECTION: Red/Orange – Black

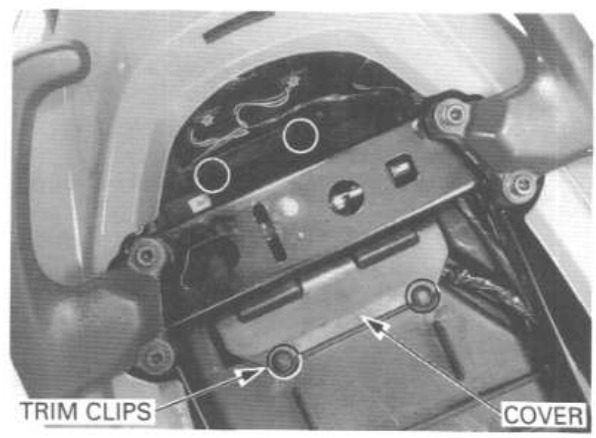
There should be no continuity only when the 12 V battery is connected.
If the continuity is exist when the 12 V battery is connected, replace the engine stop relay.



ECM (ENGINE CONTROL MODULE)

SYSTEM INSPECTION

Remove the four trim clips and ECM cover.



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

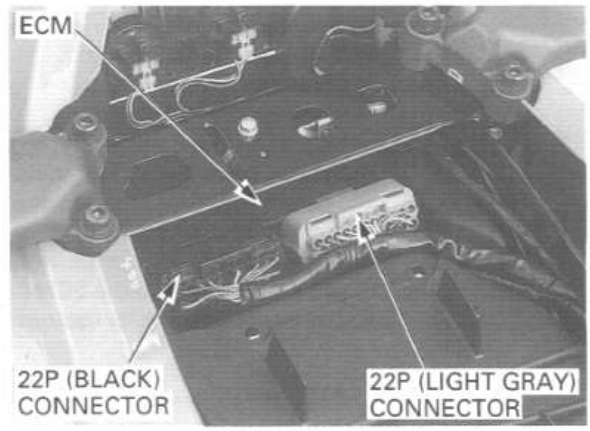
Connect the test harness between the main wire harness and ECM (page 5-7).
Connect the test pin box (page 5-7).

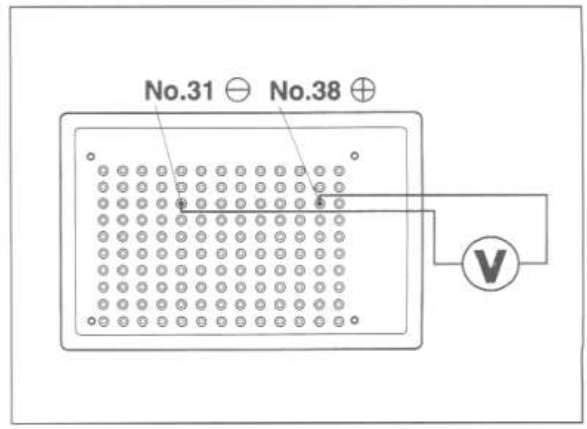
TOOLS:
ECU test harness **07WMZ – MBG0100**
Test pin box **07WGZ – 0010100**

Check the following items at the test pin box terminals.

TERMINAL	STANDARD
No. 38 (+) – No. 31 (–)	Battery voltage
No. 9 (+) – Ground (–)	Continuity
No. 20 (+) – Ground (–)	Continuity
No. 31 (+) – Ground (–)	Continuity
No. 32 (+) – 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





VARIABLE AIR INTAKE CONTROL SYSTEM

INSPECTION

⚠ WARNING

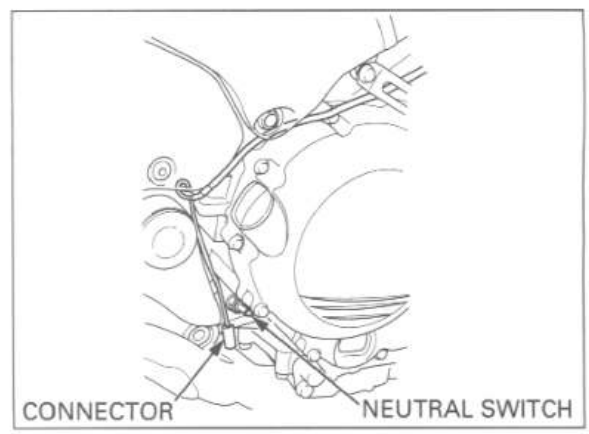
- ***If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area.***
- ***The exhaust contains poisonous carbon monoxide gas that cause loss of consciousness and may lead to death.***

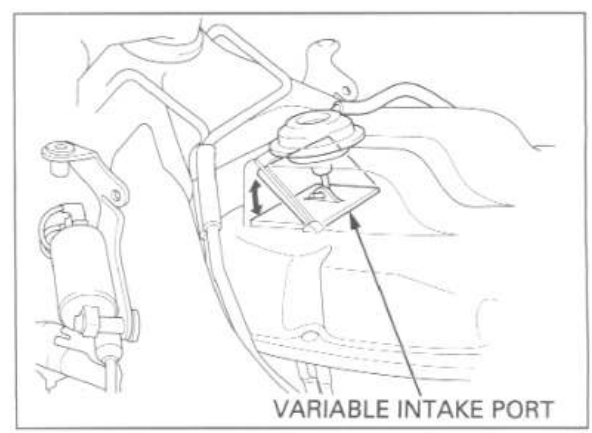
Support the motorcycle on its center stand with the transmission is in neutral.

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

Disconnect the neutral switch connector from the switch.
Start the engine.
Check the operation of the variable air intake port.

With the engine speed above 5,500 rpm, the variable air intake port is opens.
With the engine speed below 5,000 rpm, the variable air intake port is closes.



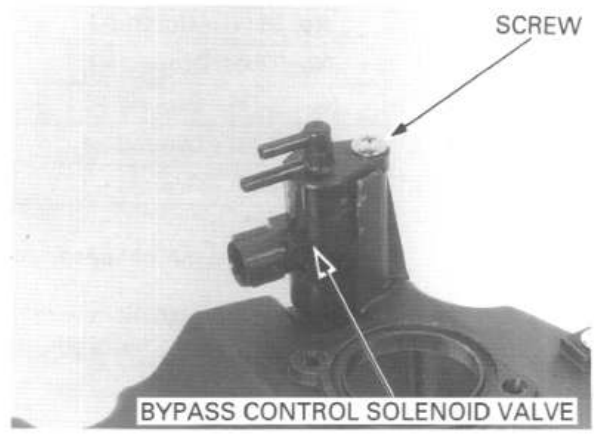


If the operation of the variable air intake port is incorrect, inspect the following:
— Diaphragm damage
— Vacuum tube leakage
— Loose or poor contact on the vacuum tube
— Bypass control solenoid valve (see below)
— Loose or poor contact on the bypass control solenoid valve connector
— Open or short circuit between the bypass control solenoid valve and the ECM
— One-way valve and/or vacuum chamber (page 5-74)

BYPASS CONTROL SOLENOID VALVE

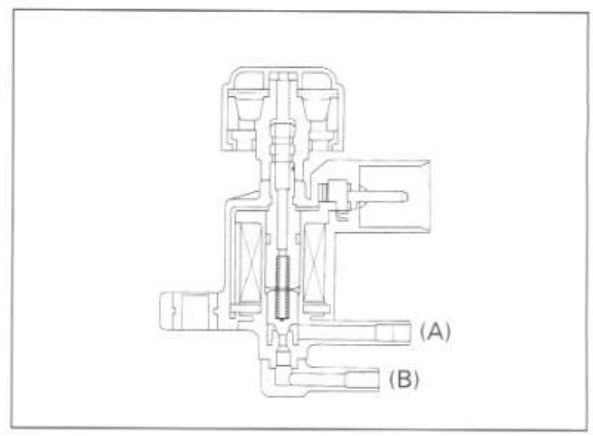
Removal
Remove the air cleaner housing (page 5-53).

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



Inspection
Remove the bypass control solenoid valve.

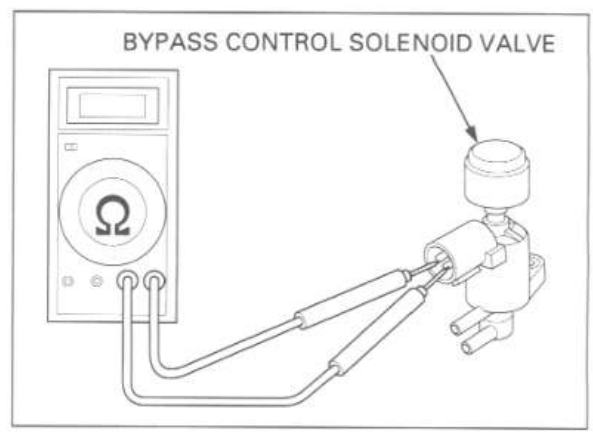
Check that the air should not flow (A) to (B), only when the 12 V battery is connected to the bypass control solenoid valve terminals.



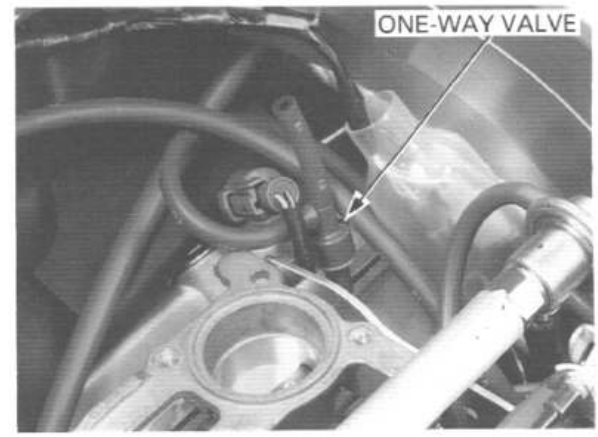
Check the resistance between the terminals of the bypass control solenoid valve.

STANDARD: 28 – 32 Ω (20°C/68°F)

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



ONE-WAY VALVE



Removal/Installation
Remove the air cleaner housing (page 5-53).

Disconnect the vacuum tubes and the one-way valve.

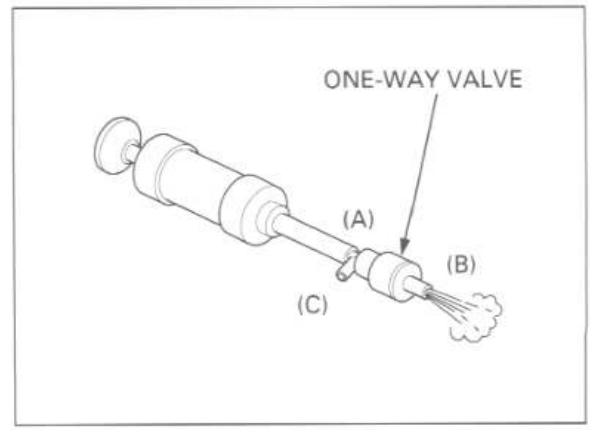
Installation is in the reverse order of removal.

NOTE:

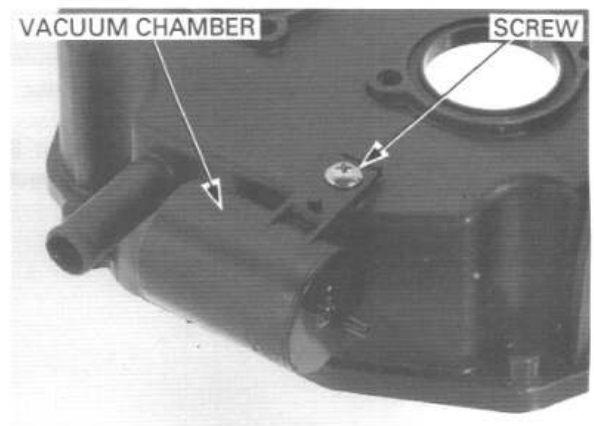
Route the vacuum tubes correctly.

Inspection
Check the one-way valve operation as follow:
— Air should flow (A) to (B)
— Air should flow (A) to (C)
— Air should not flow (B) to (A)
— Air should not flow (B) to (C)

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



VACUUM CHAMBER



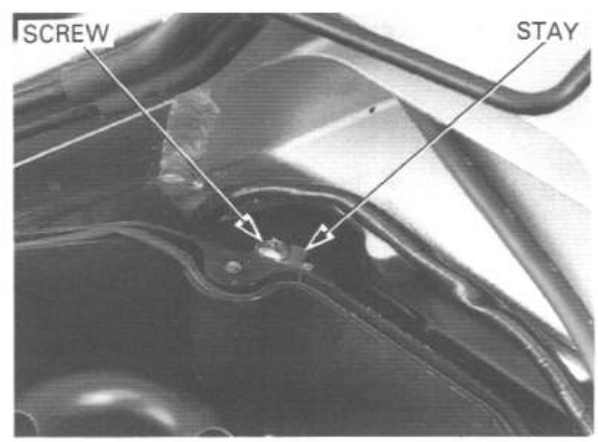
Removal/Installation
Remove the air cleaner housing (page 5-53).

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

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

PAIR SOLENOID VALVE

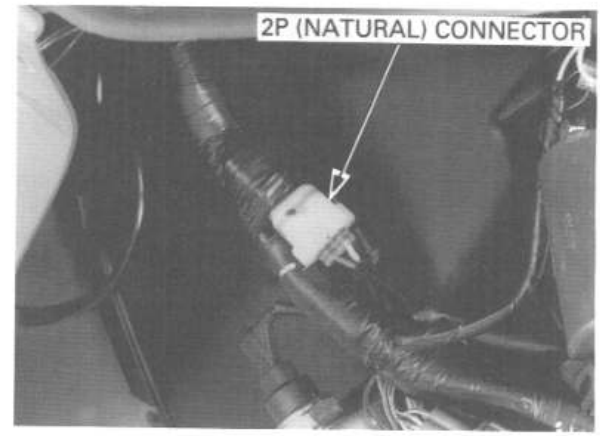
REMOVAL/INSTALLATION



Remove the following:
— Side cowl (page 2-6)
— Air cleaner housing cover (page 3-6)
— Radiators without disconnecting the hoses (page 8-5)

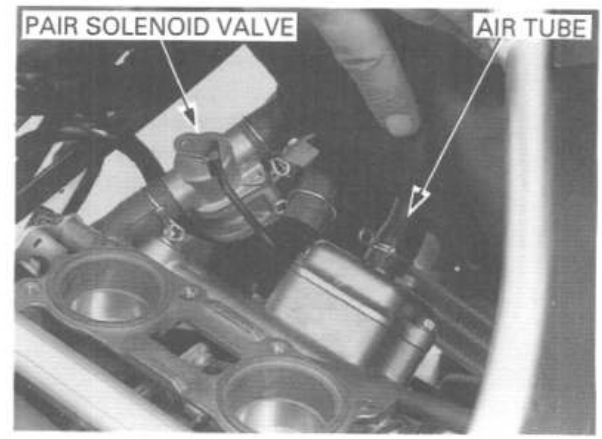
Remove the pulse secondary air injection (PAIR) solenoid valve stay mounting screw.

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



Disconnect the air tubes and remove the PAIR solenoid valve.

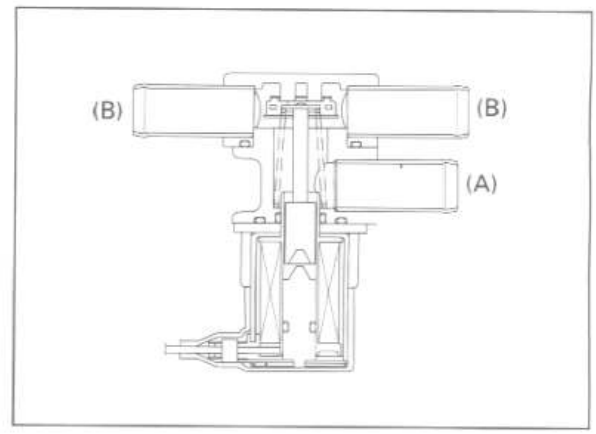
Installation is in the reverse order of removal.



INSPECTION

Remove the PAIR solenoid valve.

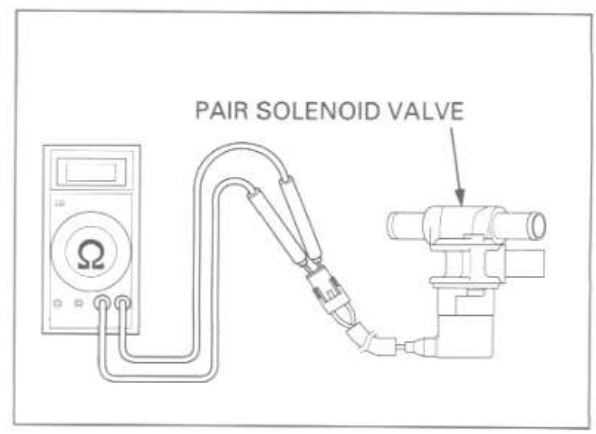
Check that the air should not flow (A) to (B), only when the 12 V battery is connected to the PAIR control solenoid valve terminals.



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

STANDARD: 20 – 24 Ω (20°C/68°F)

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



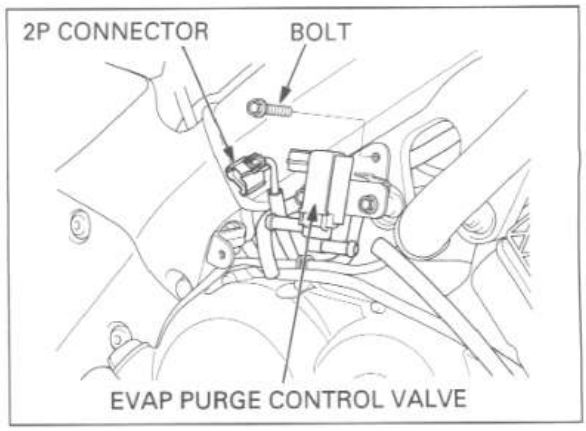
EVAP PURGE CONTROL VALVE (CALIFORNIA TYPE ONLY)

REMOVAL

Remove the side cowl (page 2-6).

Disconnect the EVAP purge control valve 2P connector.
Disconnect the air tubes from the EVAP purge control valve.
Remove the bolt and EVAP purge control valve bracket assembly.

Installation is in the reverse order of removal.

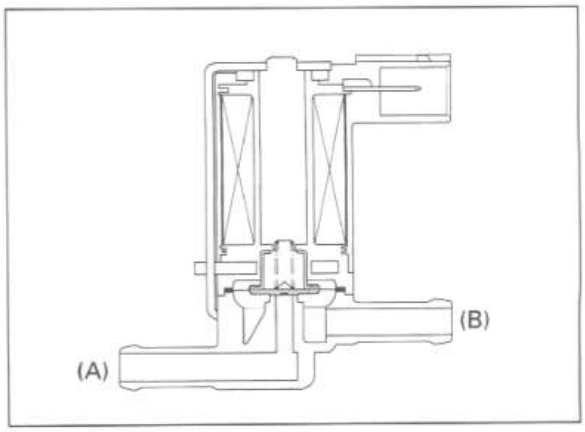


EVAP PURGE CONTROL VALVE

INSPECTION

Remove the EVAP purge control valve.

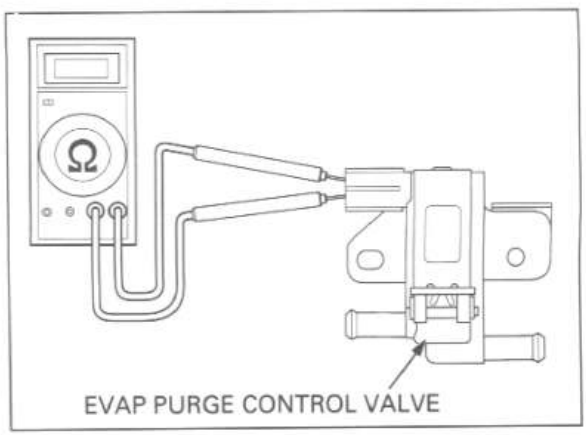
Check that the air should not flow (A) to (B), only when the 12 V battery is connected to the EVAP purge control valve terminals.



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

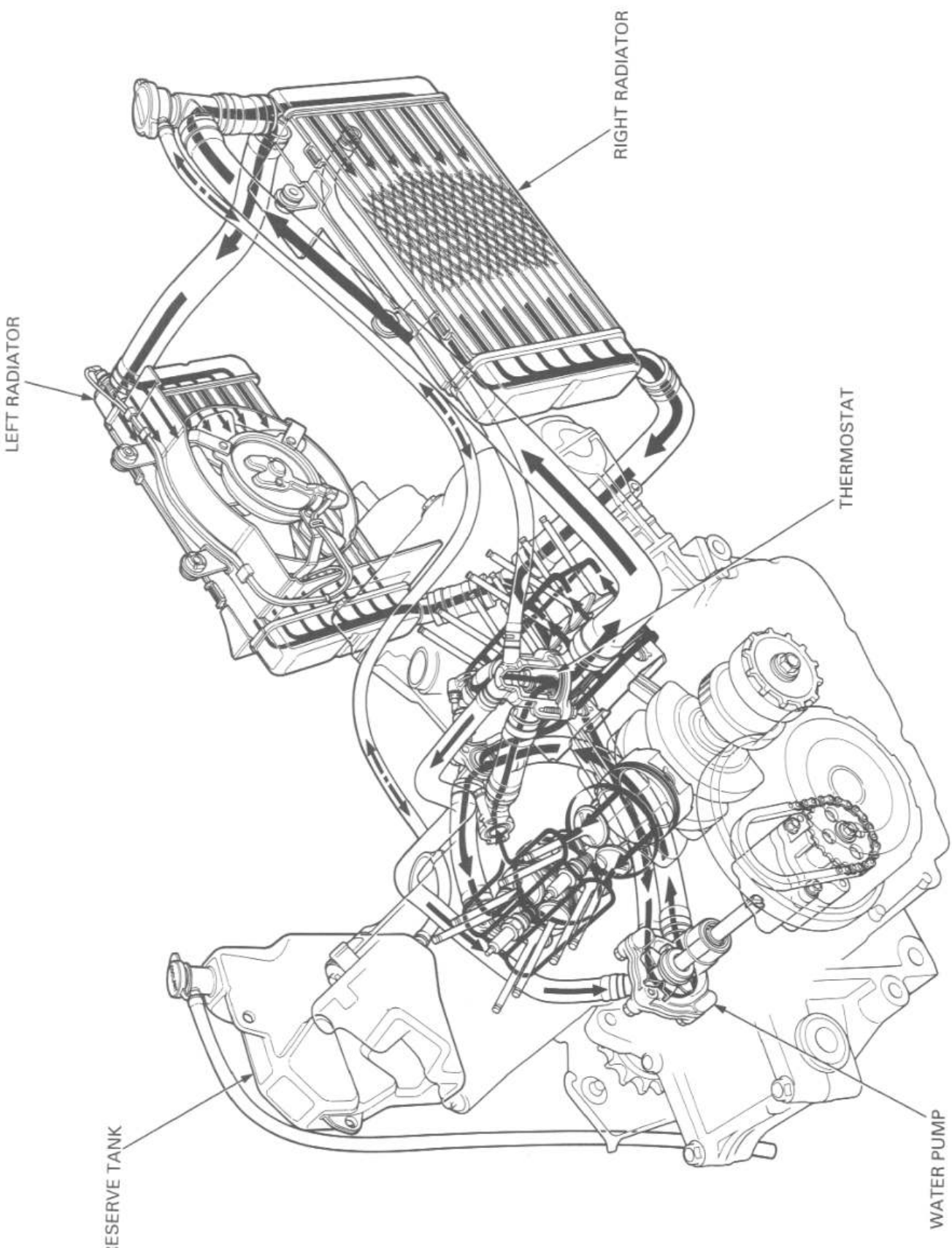
STANDARD: 30 – 34 Ω (20°C/68°F)

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



EVAP PURGE CONTROL VALVE

SYSTEM FLOW PATTERN



6. COOLING SYSTEM

SYSTEM FLOW PATTERN	6-0	THERMOSTAT	6-7
SERVICE INFORMATION	6-1	RADIATOR	6-11
TROUBLESHOOTING	6-2	RADIATOR RESERVE TANK	6-15
SYSTEM TESTING	6-3	WATER PUMP	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 in 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.***

- Use only distilled water and ethylene glycol in the cooling system. A 50–50 mixture is recommended for maximum corrosion protection. Do not use an alcohol-based antifreeze.
- Add coolant to the 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	2.75 liter (2.9 US qt, 2.4 Imp qt)
	Reserve tank	0.45 liter (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

TORQUE VALUES

Water pump cover bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	CT bolt
Fan motor nut	2.5 N·m (0.25 kgf·m, 1.8 lbf·ft)	Apply a locking agent to the threads
Fan motor switch	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply sealant to the threads

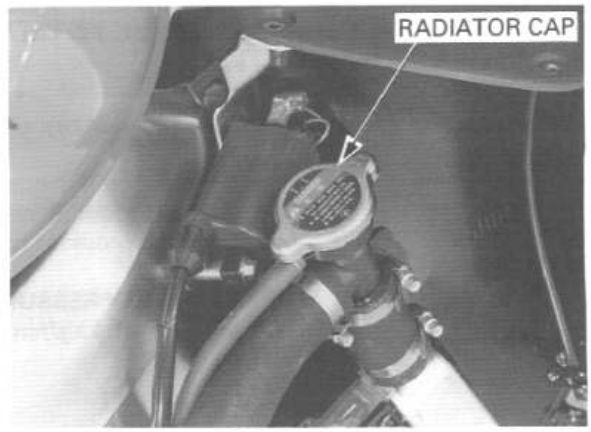
TROUBLESHOOTING

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 coolant temperature 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



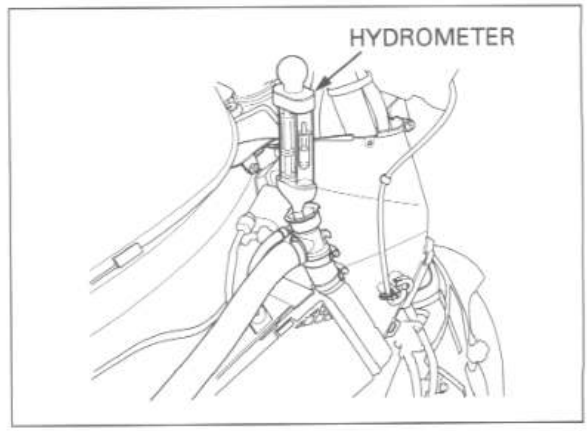
⚠ WARNING

The engine must be cool before removing the radiator cap, or severe scalding may result.

COOLANT (HYDROMETER TEST)

Remove the side cowl (page 2-6).

Remove the radiator cap.



Test the coolant gravity using a hydrometer.

STANDARD COOLANT CONCENTRATION: 50%

Look for contamination and replace the coolant if necessary.

COOLANT SPECIFIC GRAVITY

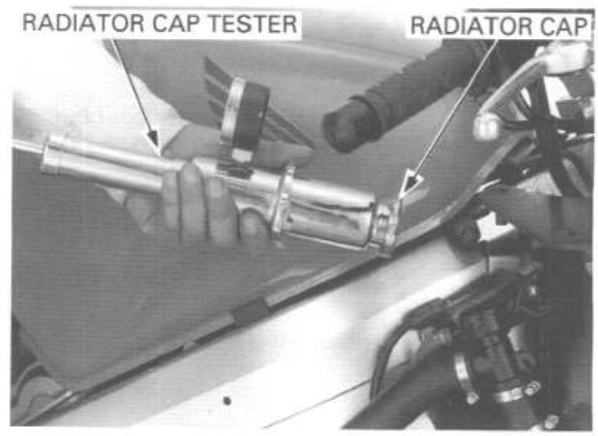
Coolant temperature °C (°F) / Coolant ratio %	0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	45 (113)	50 (122)
5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
15	1.028	1.027	1.026	1.025	1.024	1.011	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.

Pressure test the radiator cap using the radiator cap tester.
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)

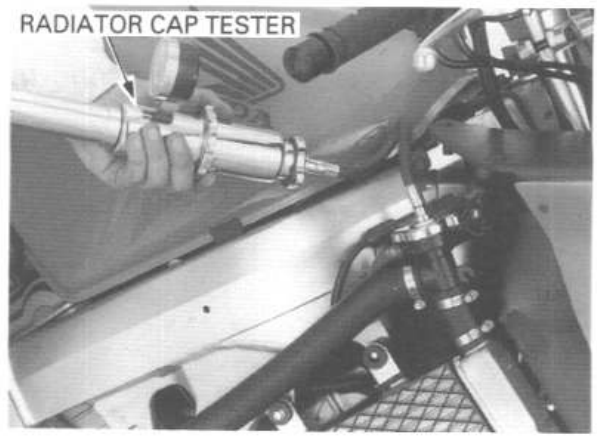


Pressure the radiator, engine and hoses, and check for leaks.

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.

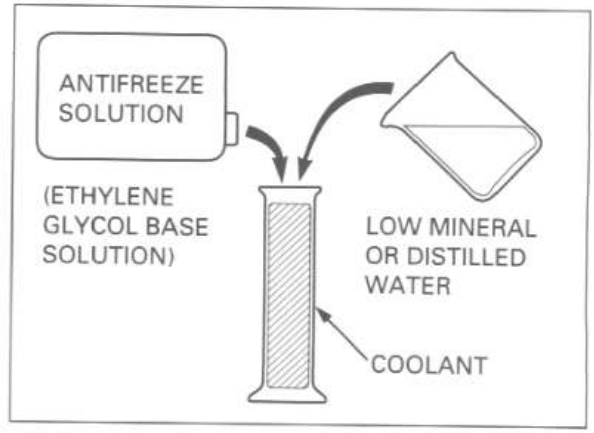


COOLANT REPLACEMENT

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 in 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.***



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 MIXTURE:
50 – 50 (Distilled water and antifreeze)

REPLACEMENT/AIR BLEEDING

⚠ WARNING

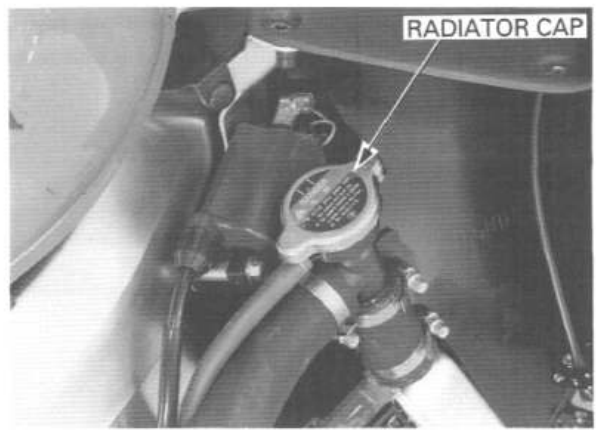
The engine must be cool before servicing the cooling system, or severe scalding may result.

NOTE:

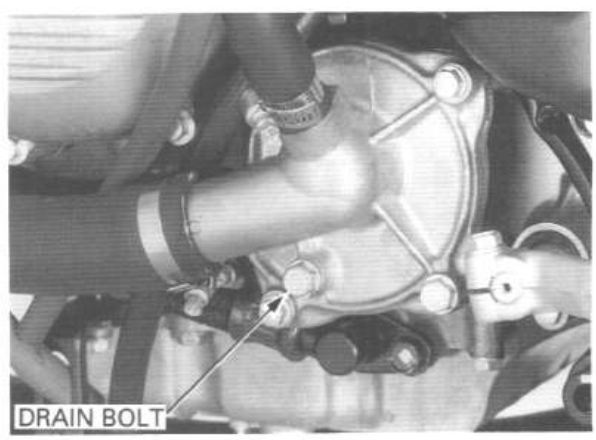
When filling the system or reserve tank with a coolant (checking coolant level), place the motorcycle in a vertical position on a flat, level surface.

Remove the side cowl (page 2-6).

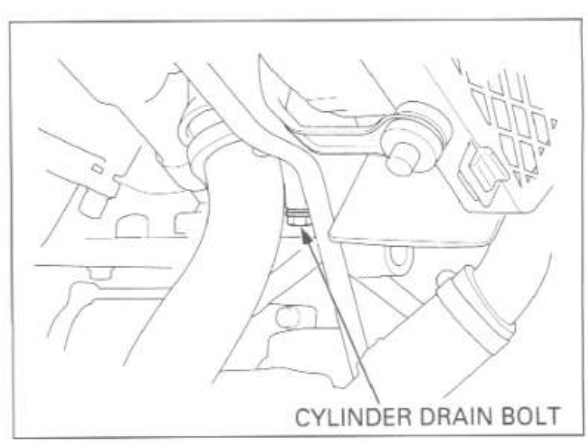
Remove the radiator cap.



Remove the drain bolt on the water pump cover and drain the system coolant.

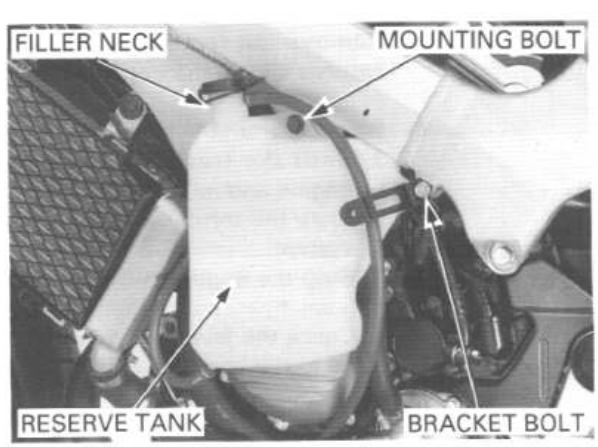


Remove the cylinder drain bolt and sealing washer.

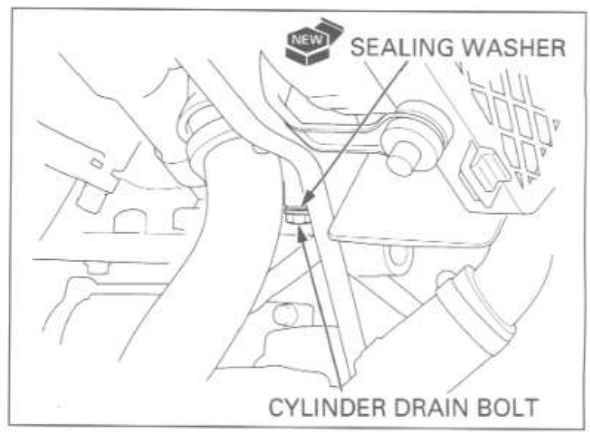


Loosen the side cowl bracket bolt and remove the radiator reserve tank mounting bolt.
Drain the reserve tank coolant from the filler neck.
Empty the coolant and rinse the inside of the reserve tank with water.

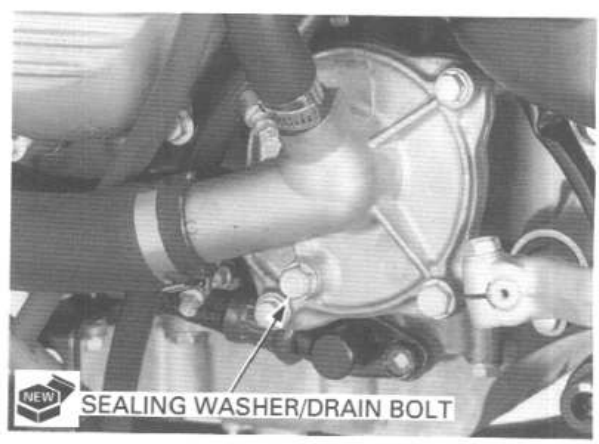
Reinstall the radiator reserve tank.



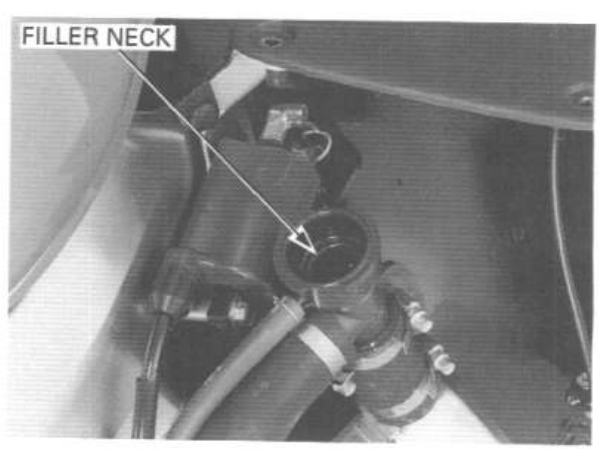
Install the cylinder drain bolt with a new sealing washer, and tighten the bolt securely.



Install the water pump cover drain bolt with a new sealing washer, and tighten the bolt securely.



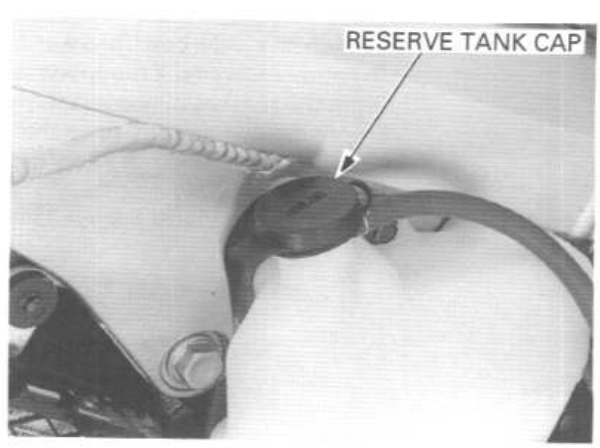
Fill the system with the recommended coolant through the filler opening up to filler neck.



Remove the radiator reserve tank cap and fill the reserve tank to the upper level line.

Bleed air from the system as follows:

1. Shift the transmission into neutral. Start the engine and let it idle for 2 – 3 minutes.
2. Snap the throttle 3 – 4 times to bleed air from the system.
3. Stop the engine and add coolant up to the proper level if necessary. Reinstall the radiator cap.
4. Check the level of coolant in the reserve tank and fill to the upper level if it is low.

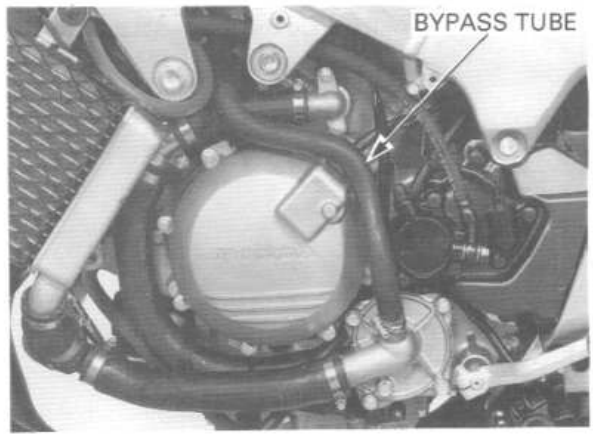


THERMOSTAT

REMOVAL

Drain the coolant (page 6-5).
Remove the throttle body (page 5-56).

Disconnect the bypass tube from the water pump cover.

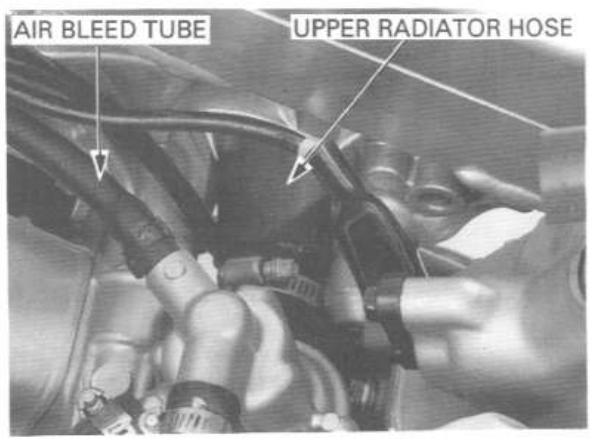


Loosen the water hose clamp screws.

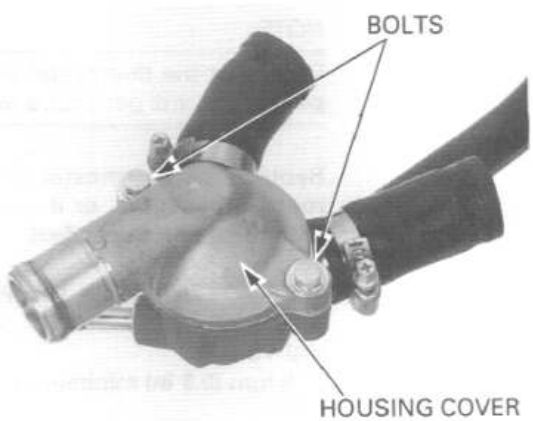


Loosen the upper radiator hose clamp screw.
Disconnect the upper radiator hose and air bleed tube from the thermostat housing.

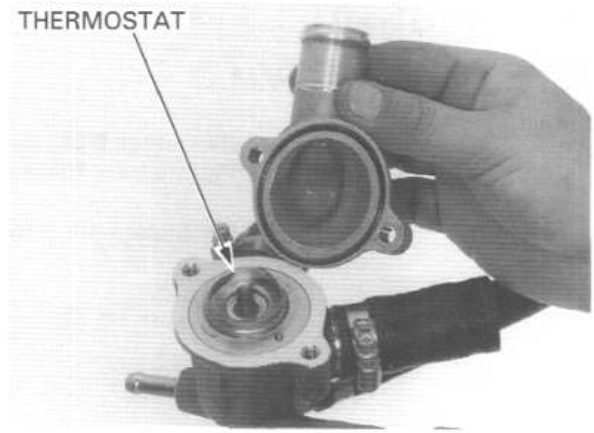
Disconnect the water hoses from the water joints, then remove the housing.



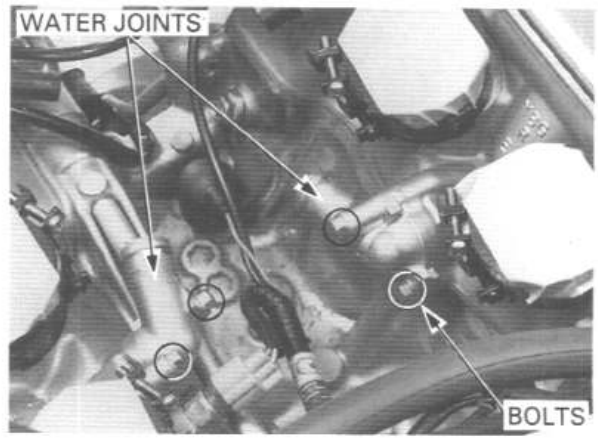
Remove the bolts, thermostat housing cover and O-ring.



Remove the thermostat from the housing.



Remove the bolts and water joints.



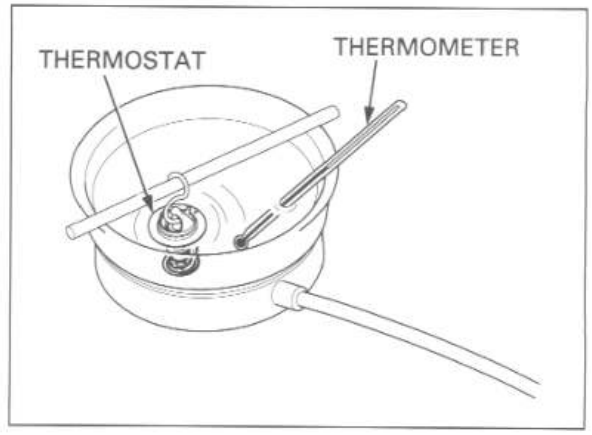
INSPECTION

⚠ WARNING

- ***Wear insulated gloves and adequate eye protection.***
- ***Keep flammable materials away from the electric heating element.***

Visually inspect the thermostat for damage.

Heat the water with an electric heating element to operating temperature for 5 minutes.
Suspend the thermostat in heated water to check its operation.



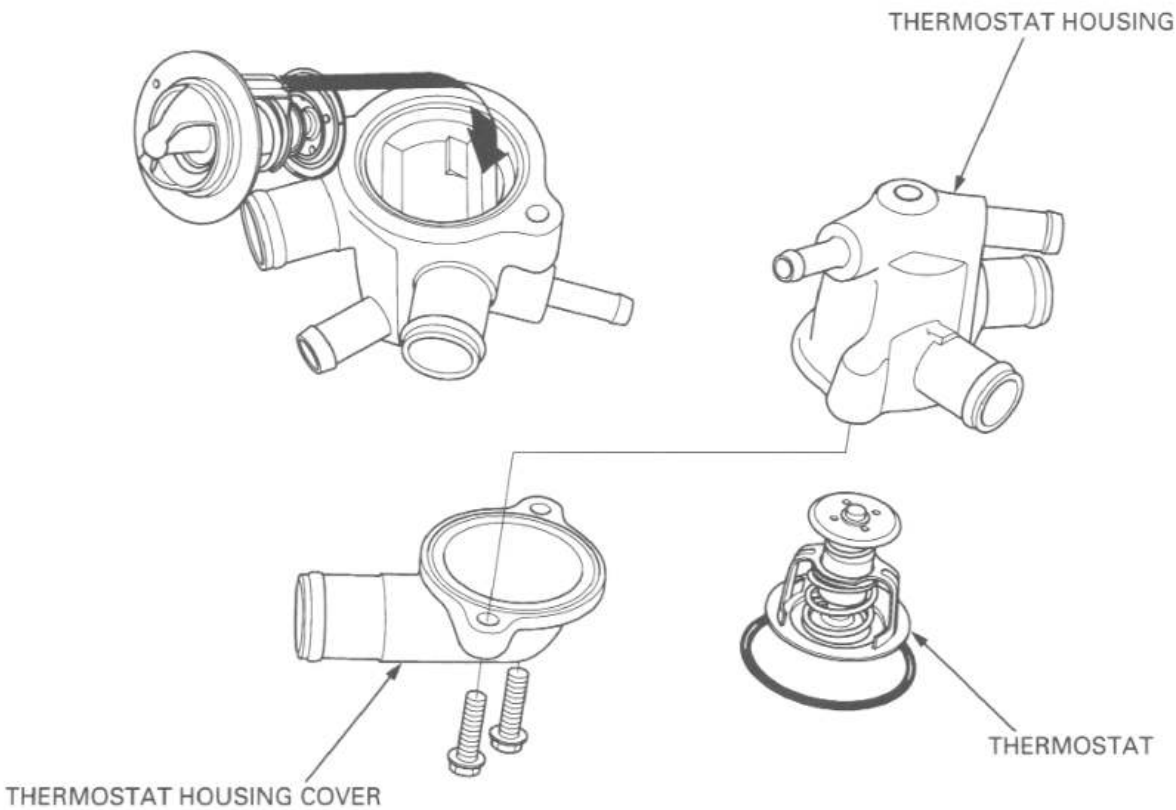
NOTE:

Do not let the thermostat or thermometer touch the pan, or you will get a false reading.

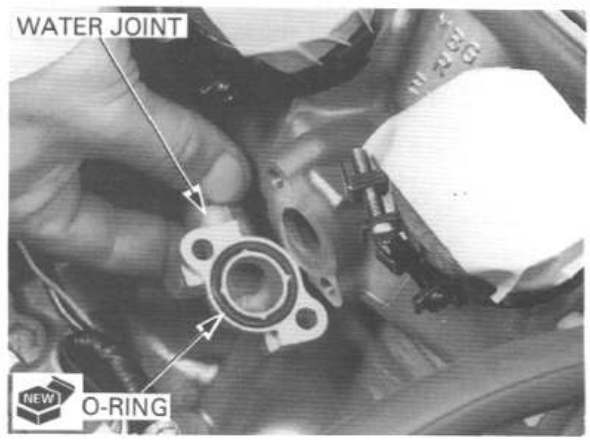
Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.

THERMOSTAT BEGIN TO OPEN:
80 – 84°C (176 – 183°F)
VALVE LIFT:
8 mm (0.3 in) minimum at 95°C (203°F)

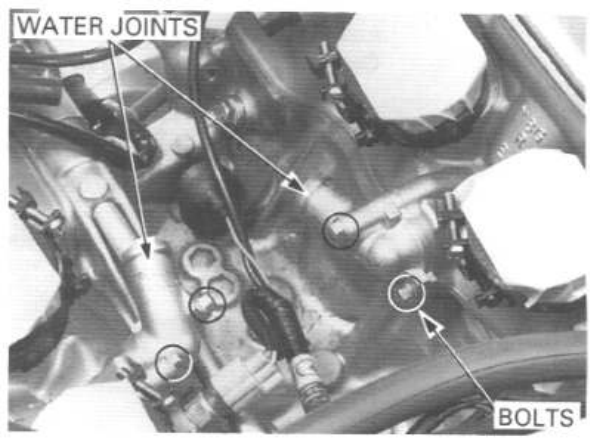
INSTALLATION



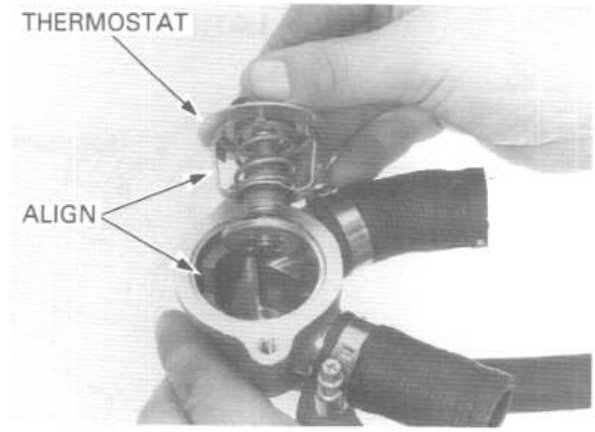
Install a new O-ring into the each groove of the water joint.



Install the water joints and tighten the bolts.



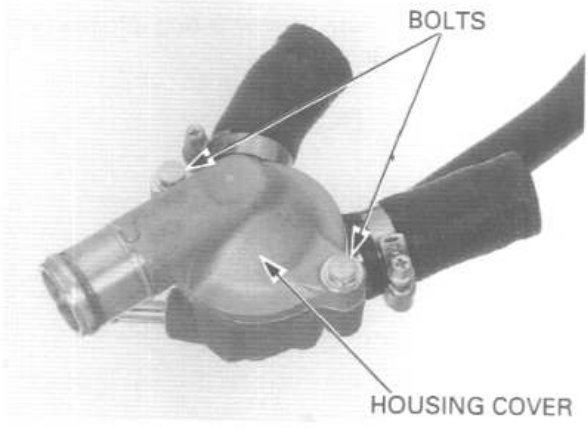
Install the thermostat into the housing aligning the body with the groove in the housing.



Apply grease to the new O-ring and install it into the thermostat housing cover groove.
Install the thermostat housing cover onto the housing.

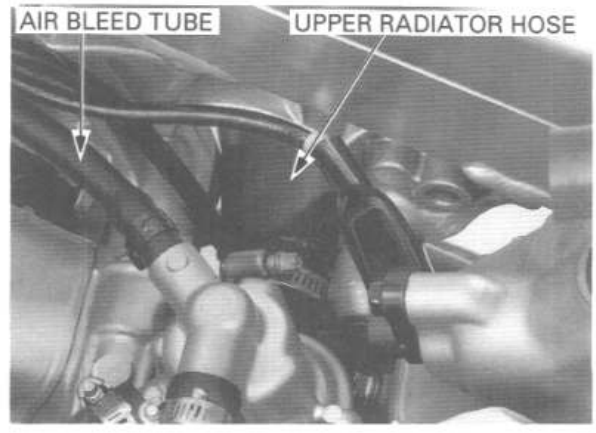


Install and tighten the housing cover bolts.



Install all clamps onto the hoses.
Connect the water hoses to the water joints.

Connect the upper radiator hose and air bleed tube to the thermostat housing.
Tighten the upper radiator hose clamp screws securely.
Secure the air bleed tube with the clamp.

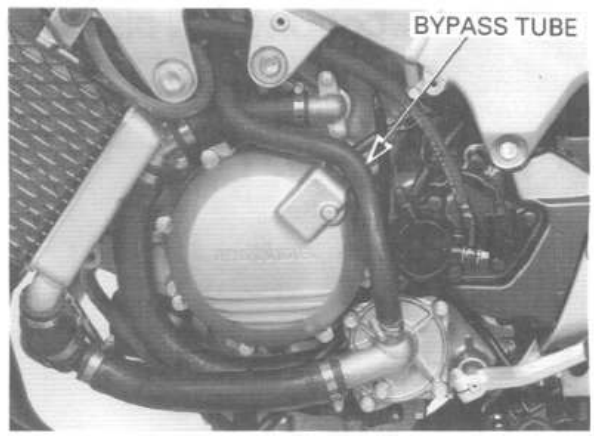


Tighten the water hose clamp screws securely.



Connect the bypass tube to the water pump cover, then tighten the clamp screw.

Fill the system with recommended coolant and bleed the air (page 6-5).
Install the throttle body (page 5-60).



RADIATOR

CAUTION:

Be careful not to damage the radiator fins while servicing the radiator.

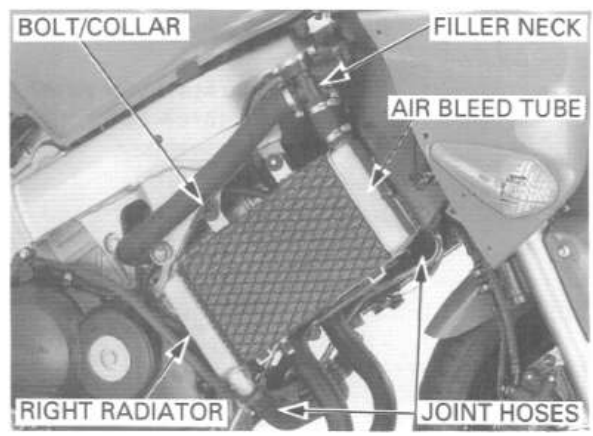
REMOVAL

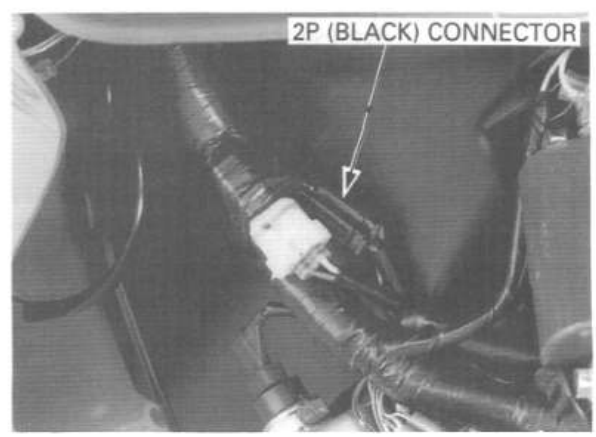
Drain the coolant (page 6-4).
Remove the side cowl (page 2-6).

Right radiator:
Loosen the filler neck joint hose and radiator joint hose clamps. Disconnect the filler neck joint hose, upper and lower radiator joint hoses.
Disconnect the air bleed tube.

Remove the mounting bolt and collar, then remove the right radiator from the frame.

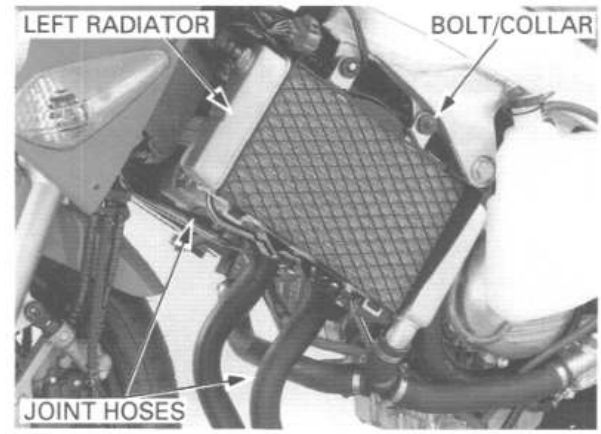
Left radiator:
Disconnect the radiator sub-harness 2P (Black) connector.





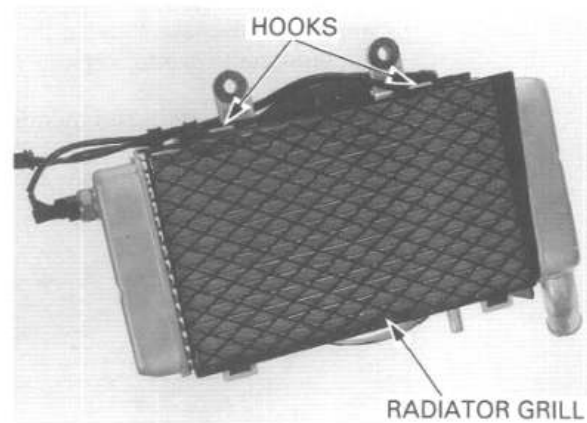
Remove the mounting bolt and collar, then remove the left radiator from the frame.

Loosen the upper joint hose clamp and lower radiator hose clamp, then disconnect the hoses.
Remove the left radiator.



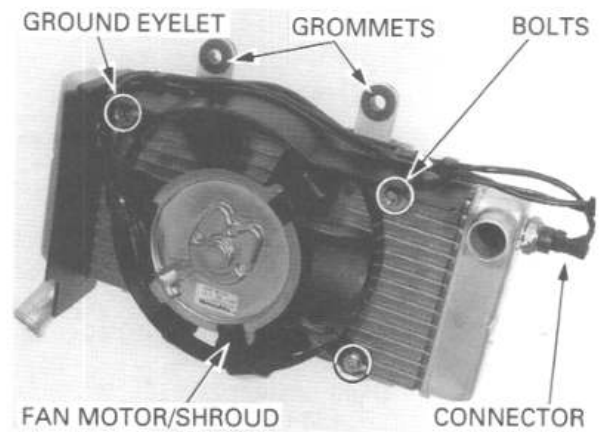
COOLING FAN DISASSEMBLY

Release the hooks and remove the radiator grill.

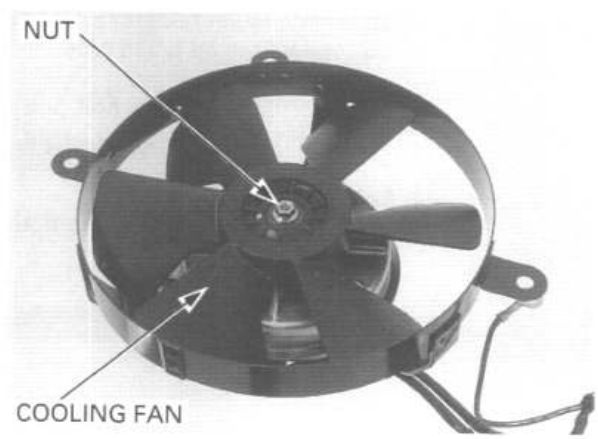


Remove the radiator mounting grommets.

Disconnect the fan motor switch connector.
Remove the three bolts, ground eyelet and fan motor/shroud assembly.

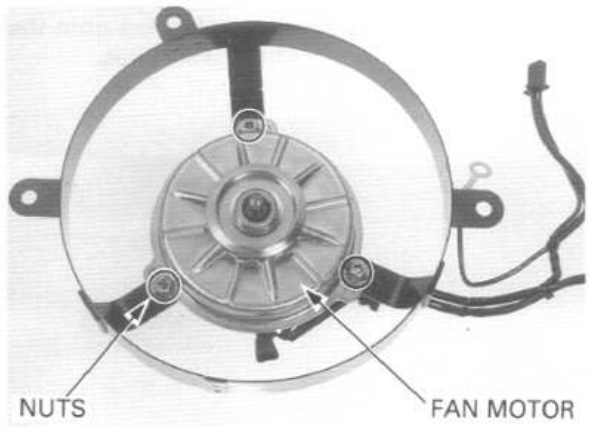


Remove the nut and cooling fan.

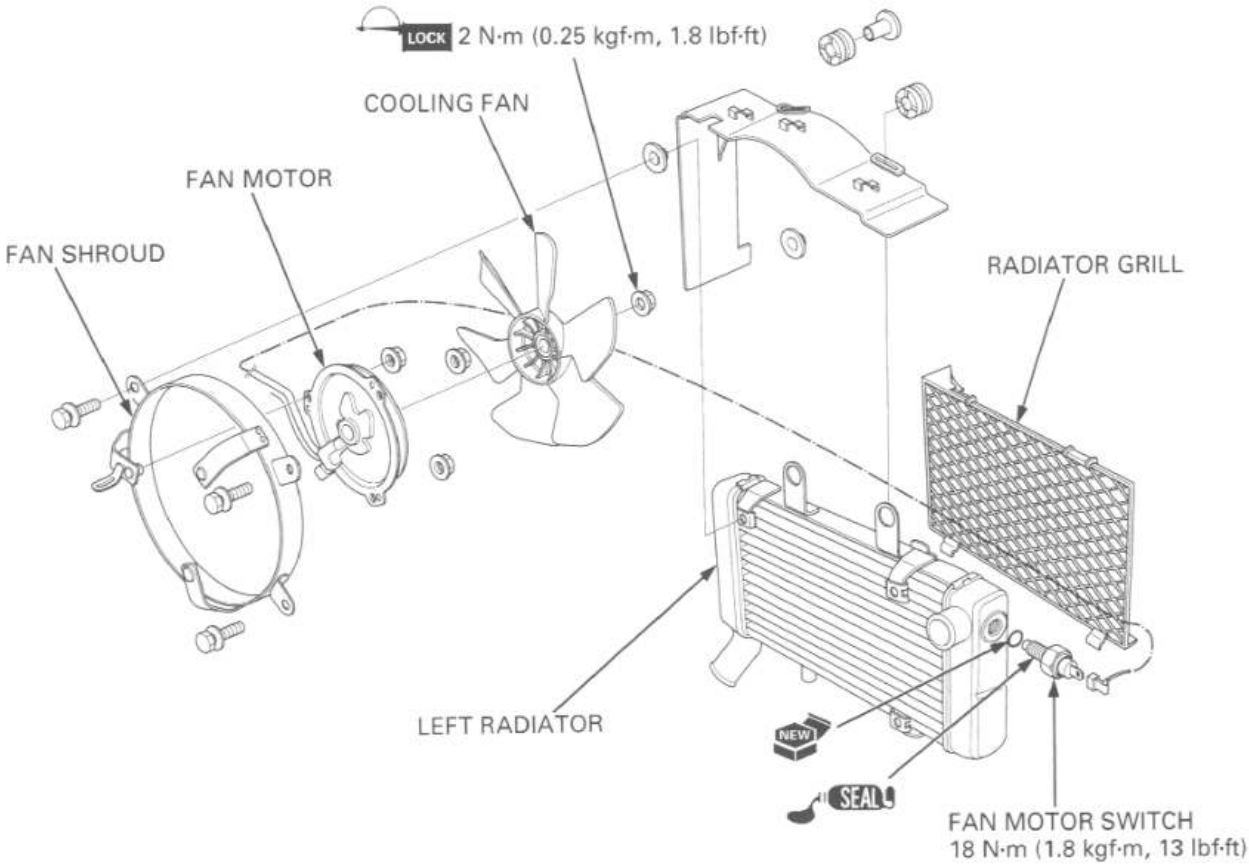


Release the sub-harness from the wire clamp.
Remove the flange nuts and fan motor.

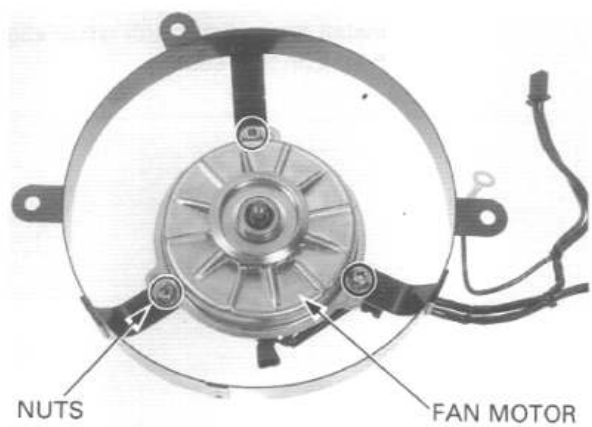
For fan motor switch information, refer to page 19-16.



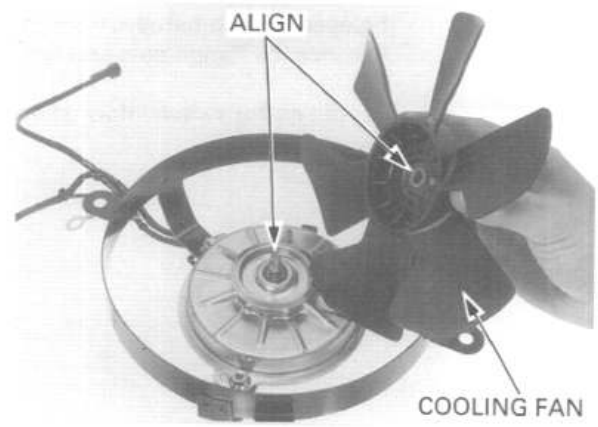
COOLING FAN ASSEMBLY



Install the fan motor onto the shroud and tighten the three flange nuts.
Clamp the sub-harness to the wire clamp.

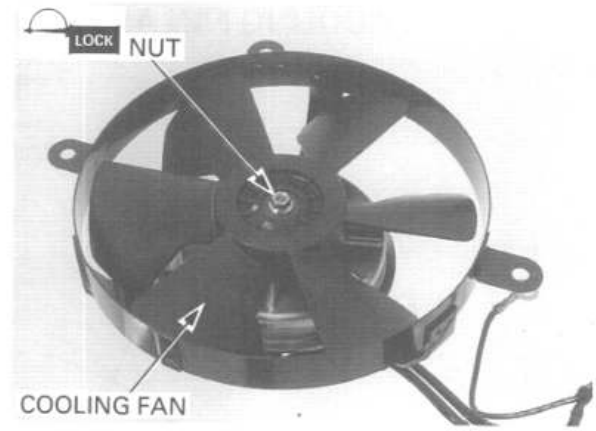


Install the cooling fan onto the fan motor shaft by aligning the flat surfaces.



Apply a locking agent to the cooling fan nut threads.
Install and tighten the nut to the specified torque.

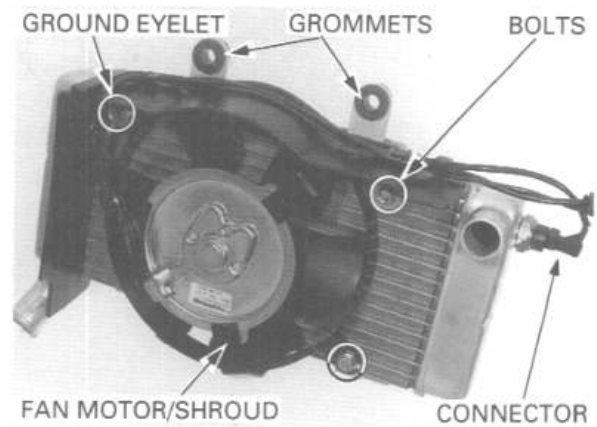
TORQUE: 2 N·m (0.25 kgf·m, 1.8 lbf·ft)



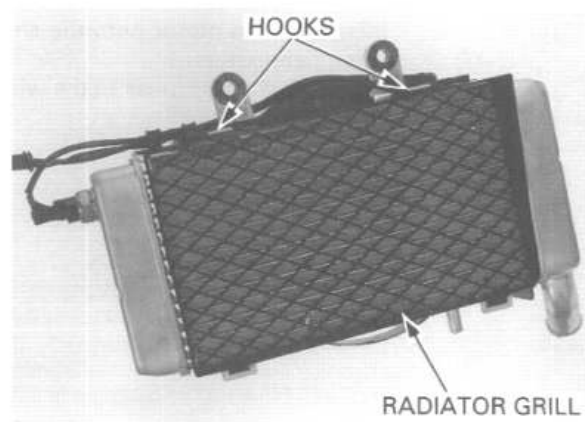
Install the fan motor/shroud assembly onto the radiator.
Route the fan motor switch cord and ground eyelet properly.
Install and tighten the three mounting bolts.

Route the sub-harness, and connect the fan motor switch cord to the switch as shown.

Install the mounting grommets.



Install the radiator grill while aligning the tabs to the hooks on the radiator.



INSTALLATION

CAUTION:

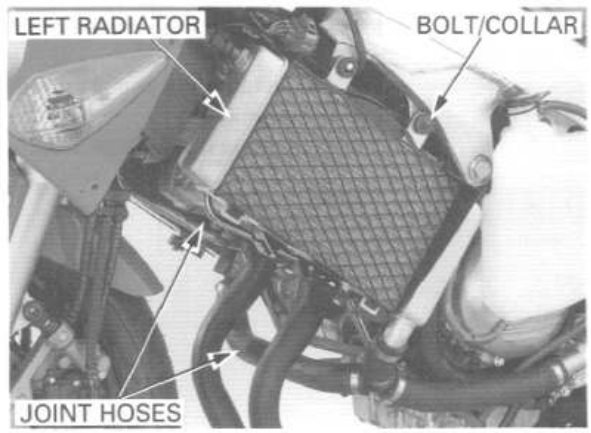
Be careful not to damage the radiator core.

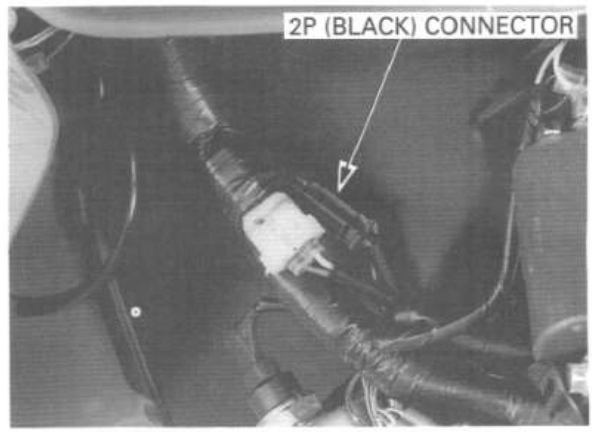
Left radiator:
Place the left radiator onto the lower stay, connect the upper and lower radiator hoses.
Tighten the clamp screws securely.

Install the left radiator onto the frame boss, then install the collar and mounting bolt.
Tighten the mounting bolt securely.

Tighten the hose clamp screws securely.

Connect the radiator sub-harness 2P (Black) connector.



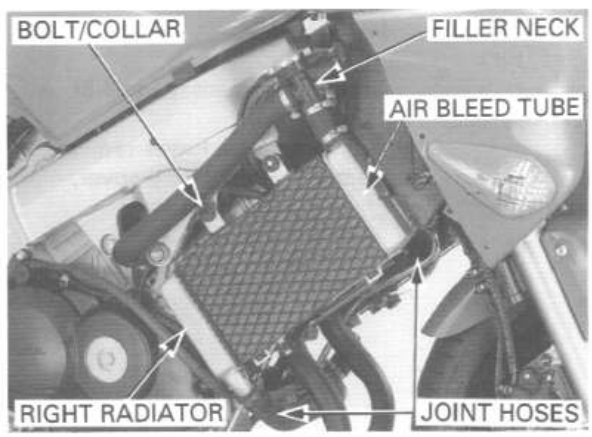


Right radiator:
Connect the air bleed tube.
Place the right radiator onto the lower stay, connect the upper and lower radiator hoses and filler neck joint hose.

Install the right radiator onto the frame boss, then install the collar and mounting bolt.
Tighten the mounting bolt securely.

Tighten the hose clamp screws securely.

Fill the system with recommended coolant (page 6-5).
Install the side cowl (page 2-7).

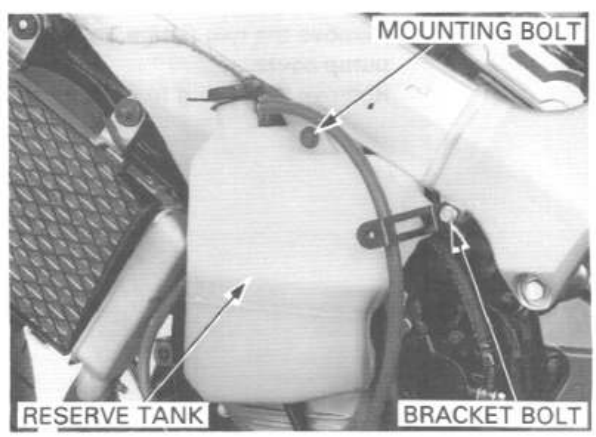


RADIATOR RESERVE TANK

REMOVAL/INSTALLATION

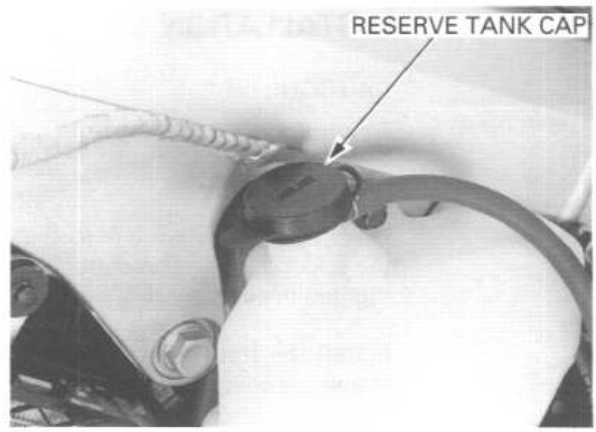
Remove the side cowl (page 2-6).

Loosen the side cowl bracket bolt and remove the radiator reserve tank mounting bolt.
Remove the radiator reserve tank and disconnect the overflow tube and siphon tube.



Installation is in the reverse order of removal.

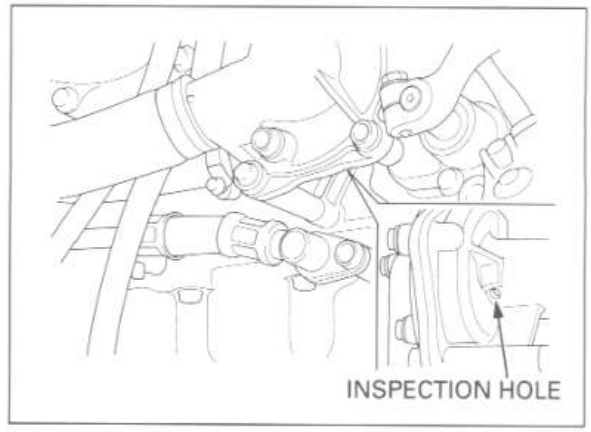
Fill the system with recommended coolant and bleed the air (page 6-5).
Install the side cowl (page 2-7).



WATER PUMP

MECHANICAL SEAL INSPECTION

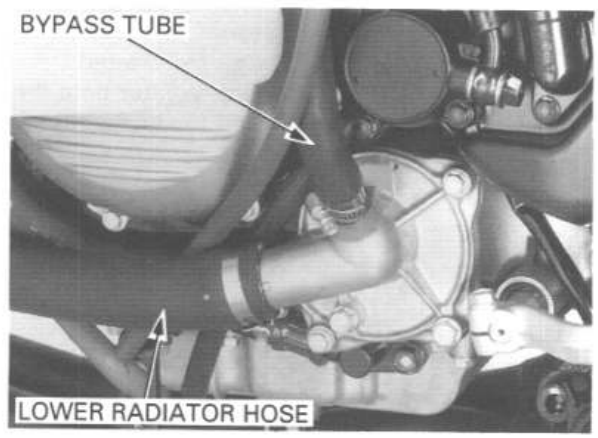
Inspect the inspection hole for signs of coolant leakage.
If there is leakage, the mechanical seal is defective and replace the water pump as an assembly.



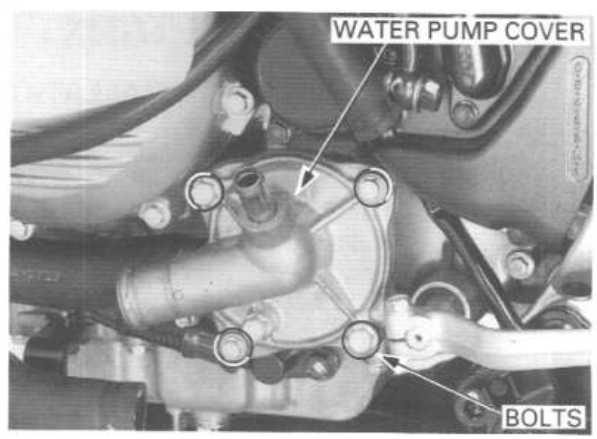
REMOVAL

Drain the coolant (page 6-5).

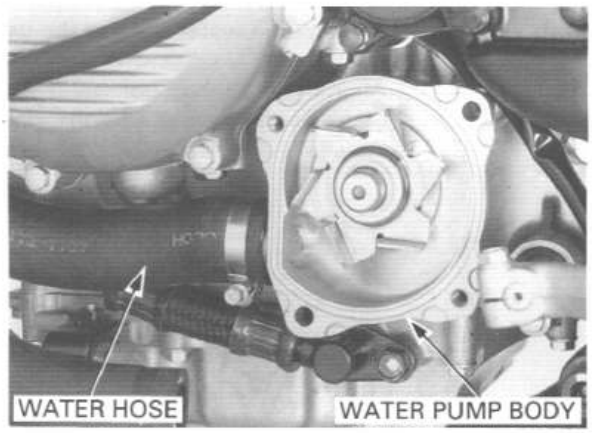
Disconnect the lower radiator hose and bypass tube from the water pump cover.



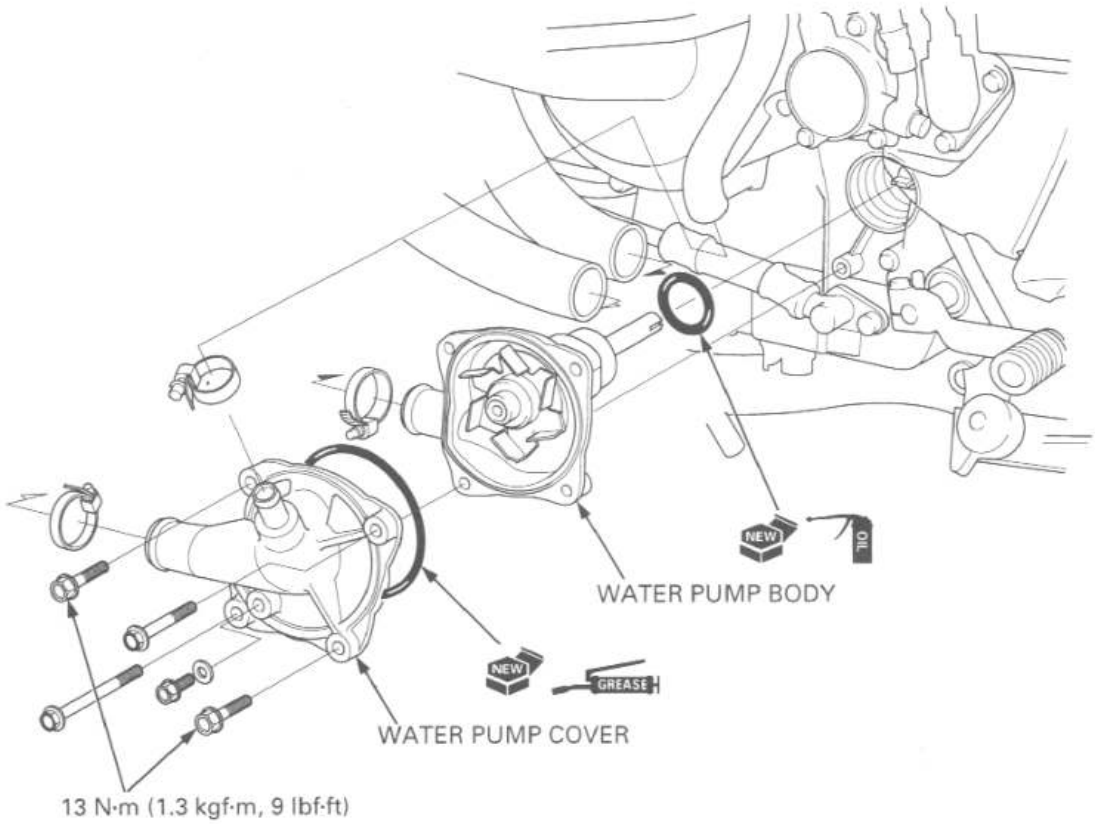
Remove the two flange bolts, two SH bolts and water pump cover.
Remove the O-ring from the water pump body.



Remove the water hose from the water pump body.
Remove the water pump body from the crankcase.

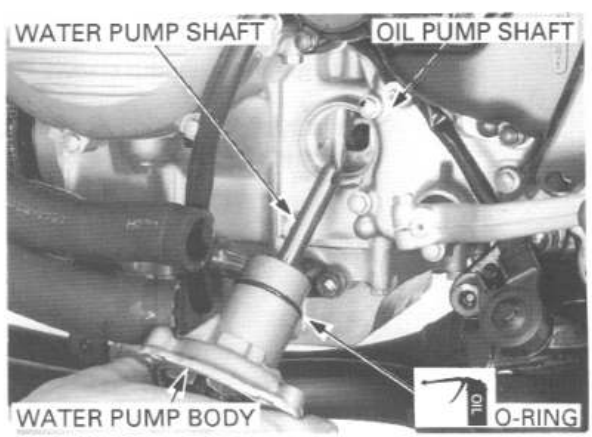


INSTALLATION

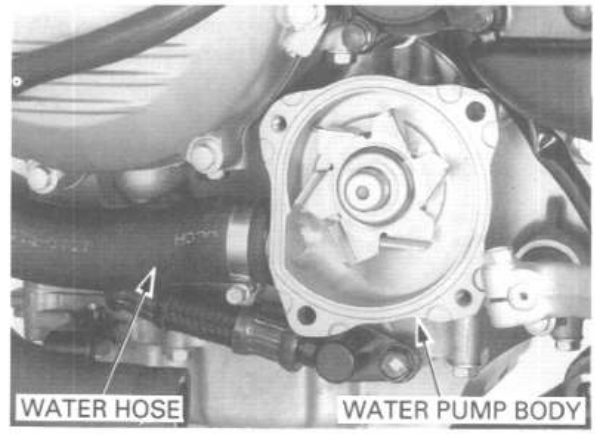


Apply engine oil to a new O-ring and install it onto the stepped portion of the water pump body.

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



Connect the water hose to the water pump body and tighten the clamp screw.
Align the mounting bolt holes in the water pump and crankcase and make sure the water pump is securely installed.



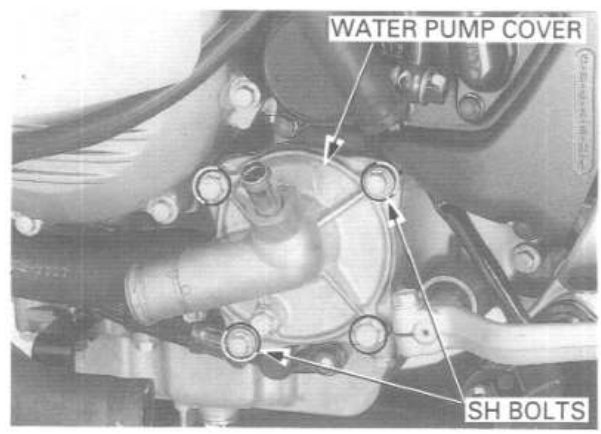
Apply grease to a new O-ring and install it into the groove in the water pump body.

Install the water pump cover.



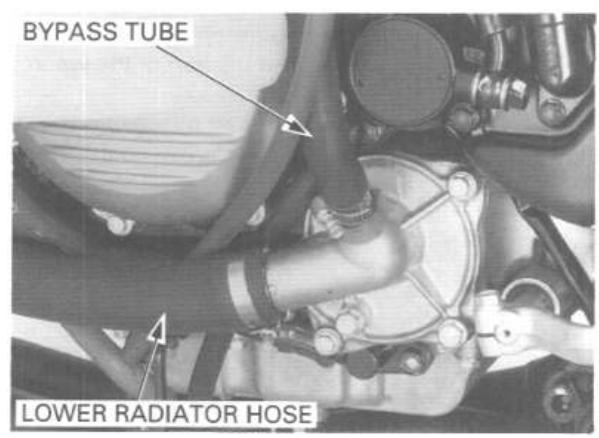
Tighten the two SH bolts first, then two flange bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

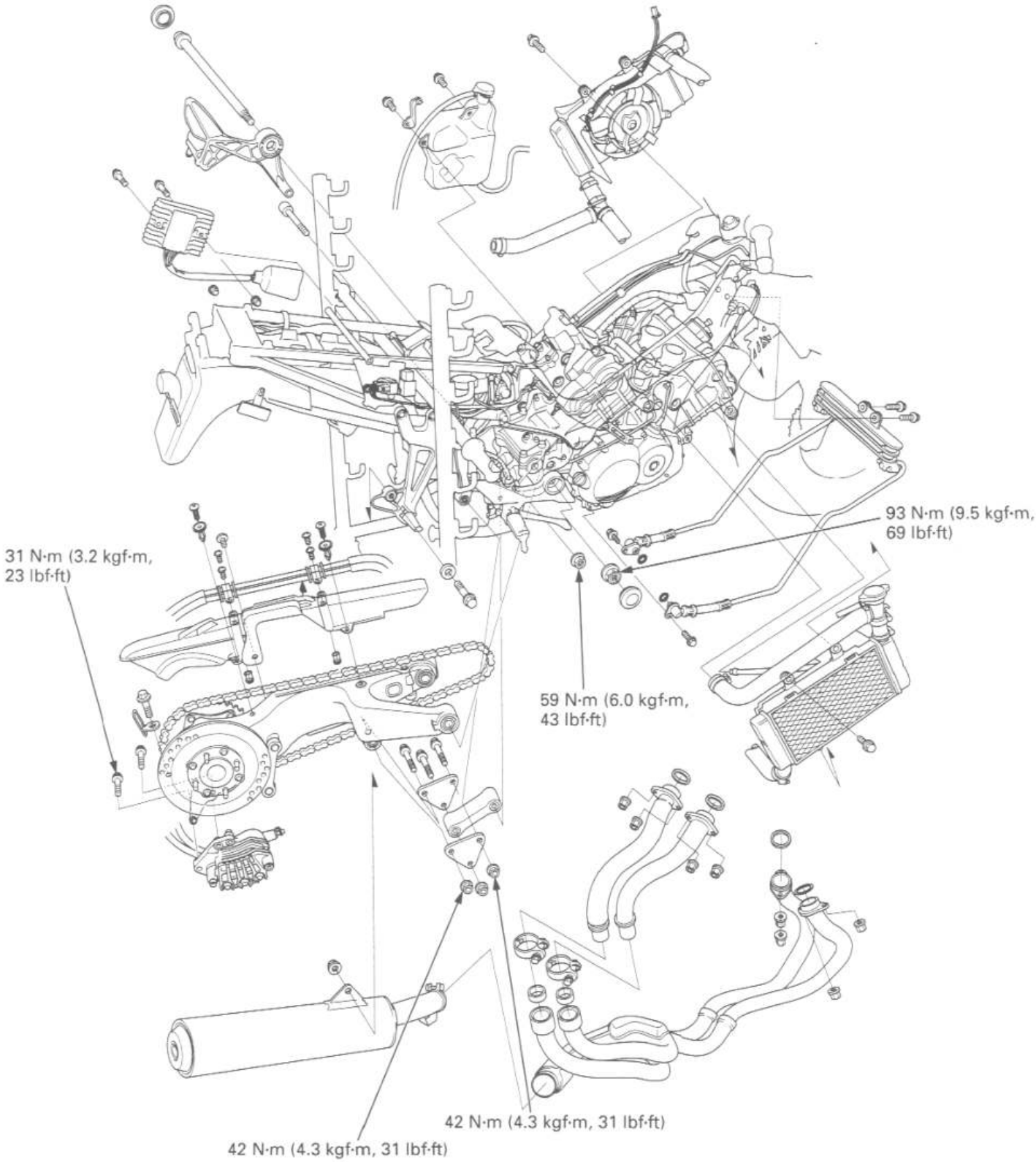


Connect the lower radiator hose and bypass tube, then tighten the clamp screws.

Fill the system with recommended coolant (page 6-5).
Install the side cowl (page 2-7).

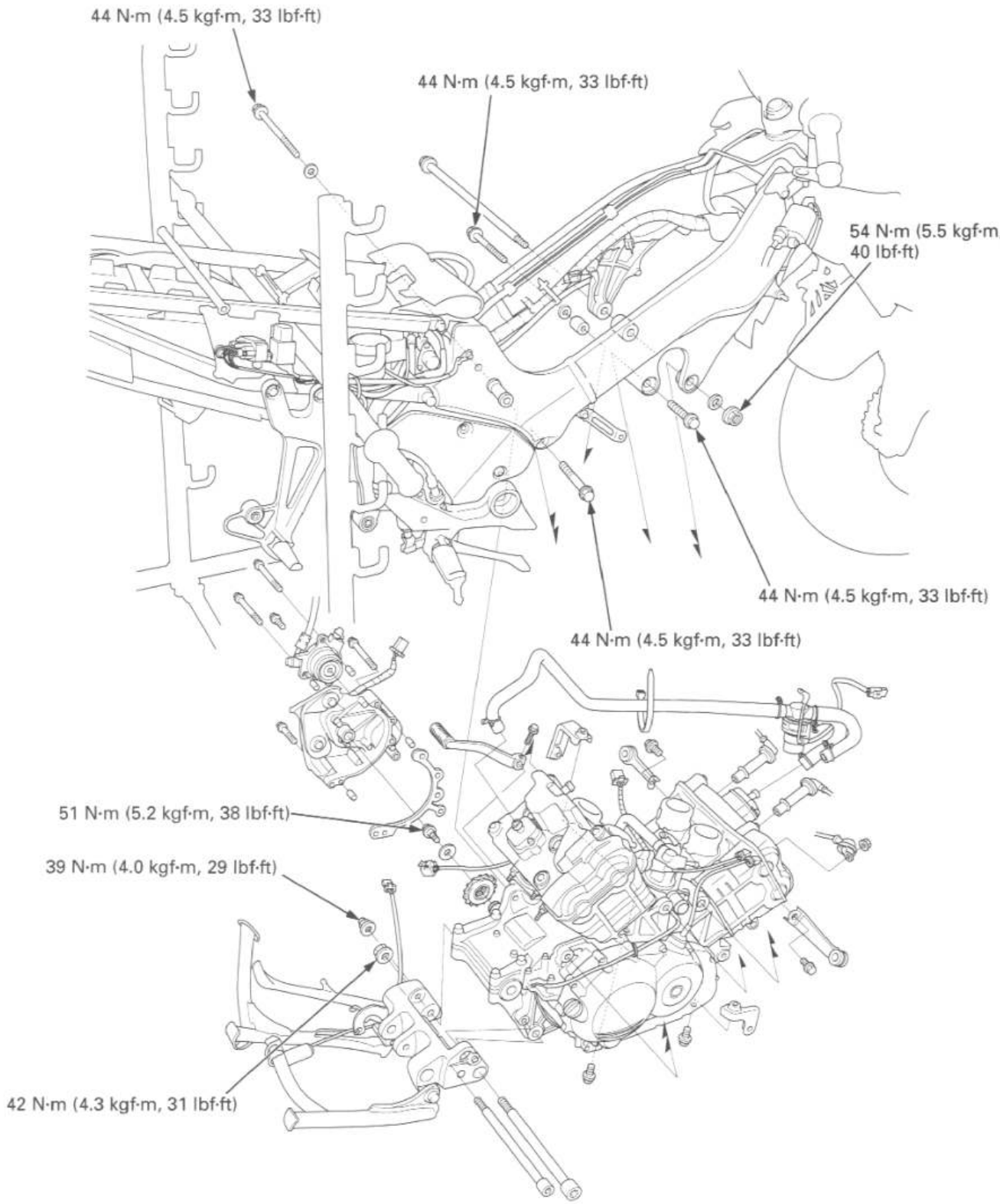


MEMO


93 N·m (9.5 kgf·m, 69 lbf·ft)
31 N·m (3.2 kgf·m, 23 lbf·ft)
59 N·m (6.0 kgf·m, 43 lbf·ft)
42 N·m (4.3 kgf·m, 31 lbf·ft)
42 N·m (4.3 kgf·m, 31 lbf·ft)

7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION	7-2	ENGINE INSTALLATION	7-7
ENGINE REMOVAL	7-3		



SERVICE INFORMATION

GENERAL

- During engine removal and installation, support the motorcycle using a hoist or an equivalent.
- 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 16)
  - — Clutch (Section 9)
  - — Cylinder head/valves (Section 8)
  - — Gearshift linkage (Section 10)
  - — Oil cooler (Section 4)
  - — Oil pump (Section 4)
  - — Water pump (Section 6)

- The following components require engine removal for service.
  - — Crankshaft/transmission (Section 12)
  - — Piston/cylinder (Section 11)

SERVICE DATA

ITEM		SPECIFICATIONS
Engine dry weight		74 kg (163 lbs)
Coolant capacity	Radiator and engine	2.75 liter (2.9 US qt, 2.4 Imp qt)
Engine oil capacity	At disassembly	3.8 liter (4.0 US qt, 3.3 Imp qt)

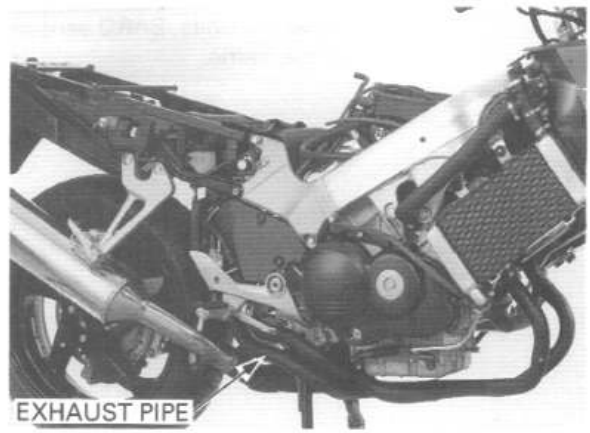
TORQUE VALUES

Engine hanger nut (front)	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Engine hanger flange bolt (middle/rear)	44 N·m (4.5 kgf·m, 33 lbf·ft)	
Drive sprocket special bolt	51 N·m (5.2 kgf·m, 38 lbf·ft)	
Shock absorber lower bracket flange cap nut (upper)	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Shock absorber lower bracket flange nut (lower)	42 N·m (4.3 kgf·m, 31 lbf·ft)	U-nut
Side stand switch mounting bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC bolt
Gearshift pedal pinch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	

ENGINE REMOVAL

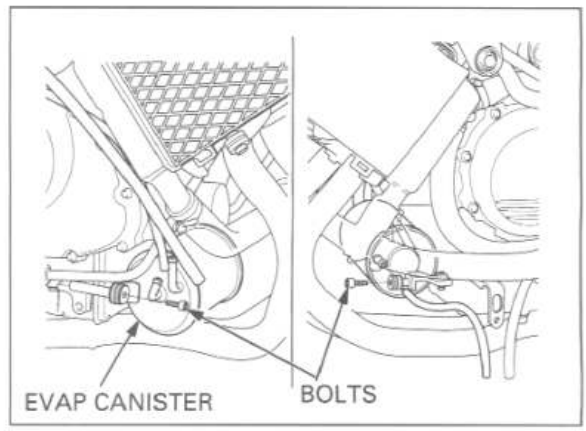
Support the motorcycle securely on its center stand.

Remove the following:
— Side cowl (page 2-6)
— Rear cowl (page 2-3)
— Fuel tank (page 5-50)
— Throttle body (page 5-56)
— Muffler and exhaust pipe (page 2-19)

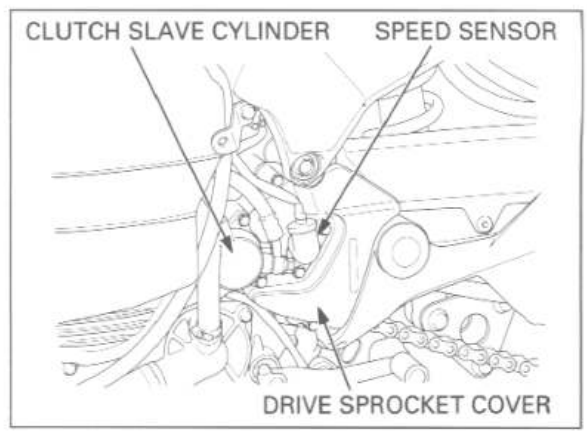


California type only

Remove the bolts and EVAP canister.
Remove the EVAP purge control valve (page 5-79).

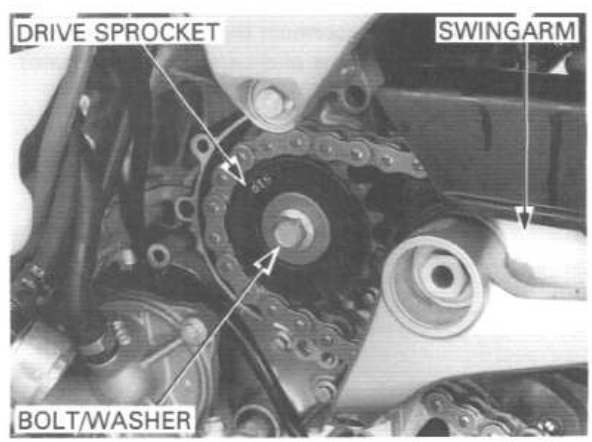


Remove the following:
— Radiator reserve tank (page 6-15)
— Vehicle speed sensor (page 19-14)
— Clutch slave cylinder (page 9-10)
— Drive sprocket cover (page 10-2)

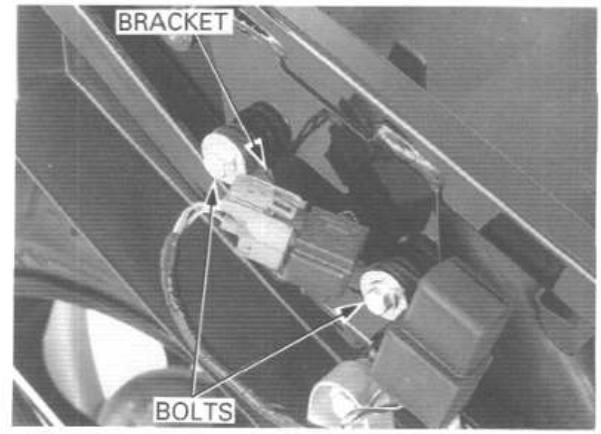


Remove the drive sprocket bolt, washer and drive sprocket (page 10-2).

Remove the swingarm assembly from the frame (page 14-25).
Remove the shock link socket bolt/nut (14-21).

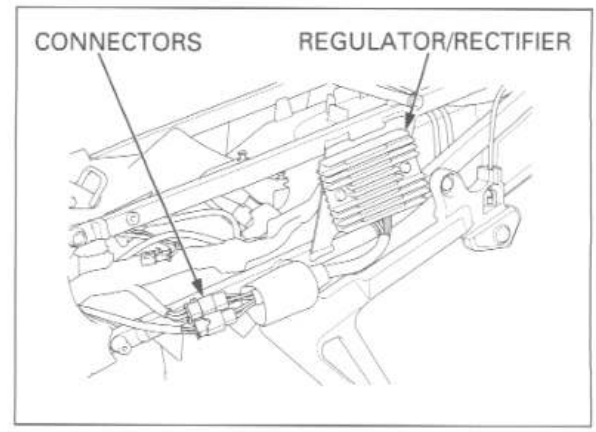


Remove the bolts, BARO sensor/fuel cut relay bracket from the frame.

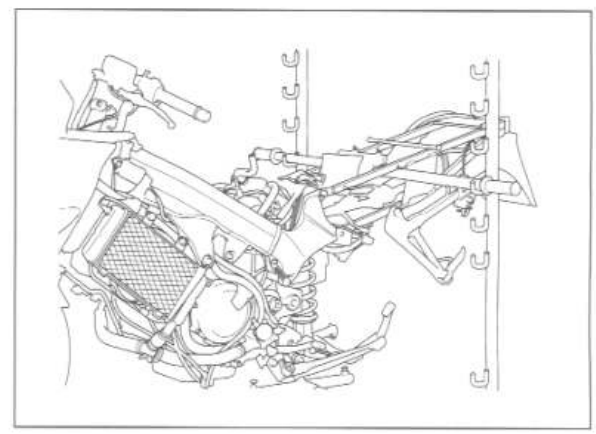


Disconnect the regulator/rectifier 4P (Black) and 3P (Natural) connectors and release the alternator wire out of the frame.

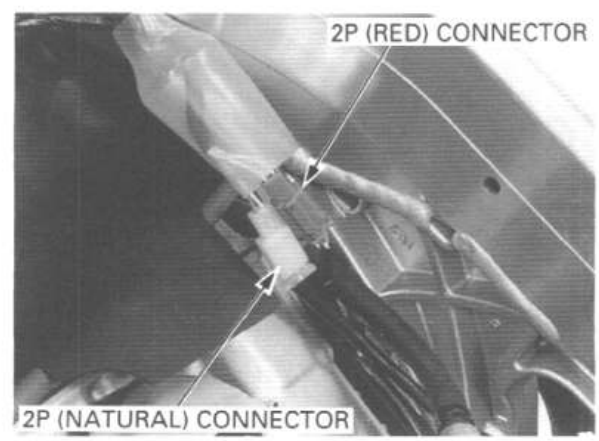
For supporting the motorcycle, remove the regulator/rectifier unit from the seat rail.



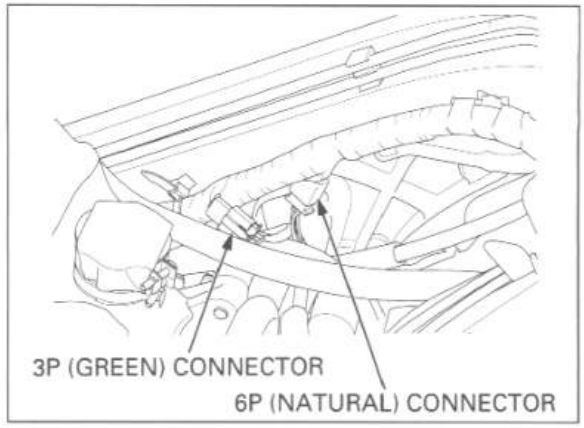
Support the motorcycle securely at the seat rail as shown.



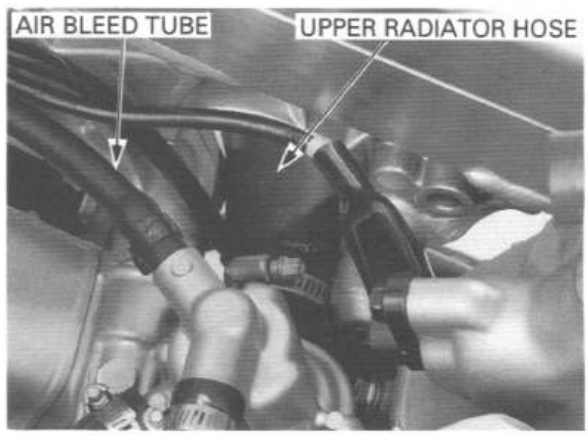
Disconnect the ignition pulse generator 2P (Red) connector and cam pulse generator 2P (Natural) connector.



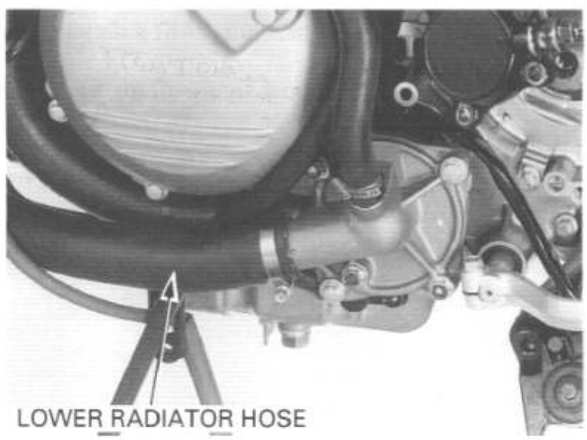
Disconnect the engine sub-harness 6P (Natural) connector and side stand switch 3P (Green) connector.



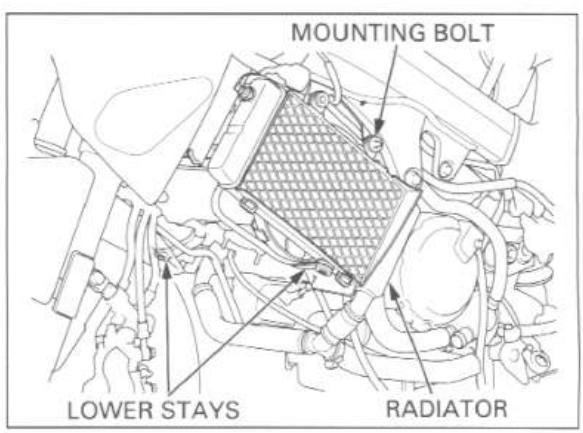
Loosen the clamp screw and disconnect the upper radiator hose and air bleed tube from the thermostat housing.



Loosen the clamp screw and disconnect the lower radiator hose from the water pump.

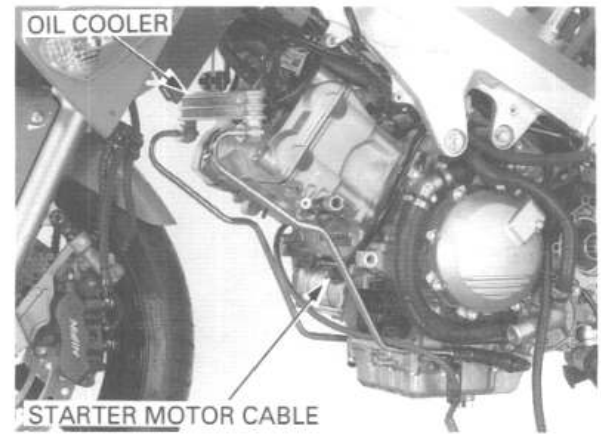


Disconnect the radiator sub-harness 2P (Black) connector.
Remove the SH bolts and radiator lower stays.
Remove the radiator mounting bolts and remove the right and left radiator as an assembly.

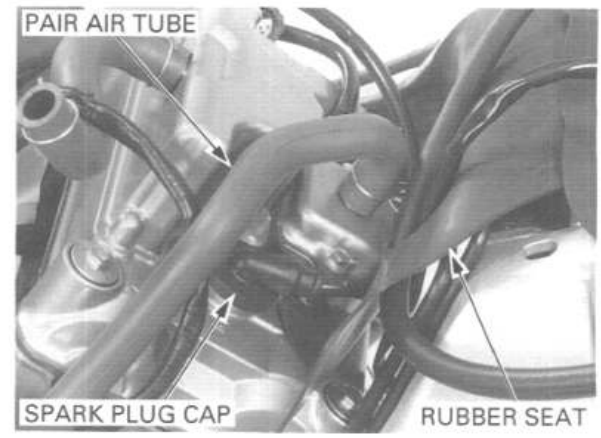


Remove the oil cooler hose joint mounting bolts.
Remove the mounting bolts and oil cooler assembly.

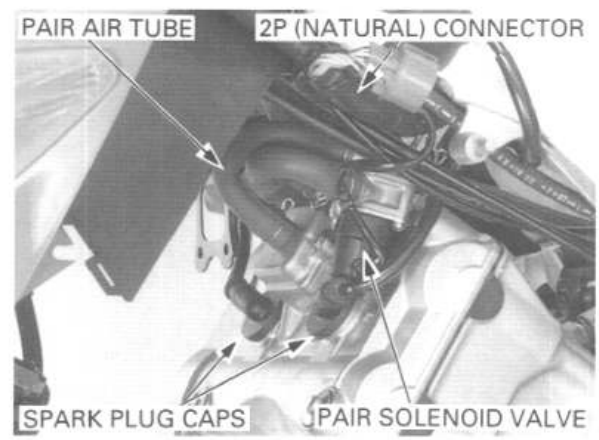
Remove the nut and starter motor cable from the starter motor.



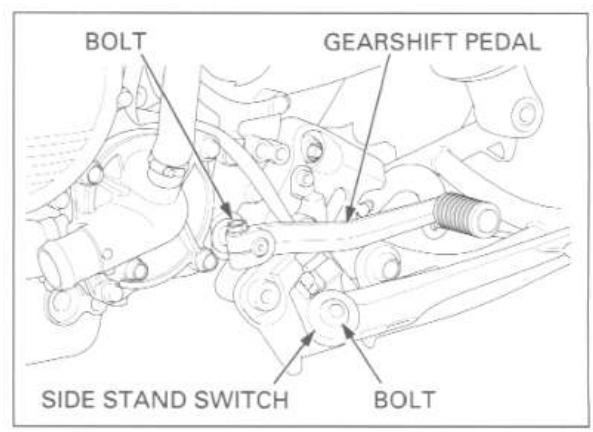
Disconnect the PAIR air tube from the rear cylinder head cover.
Remove the spark plug caps and rubber seat from the rear cylinder head cover.



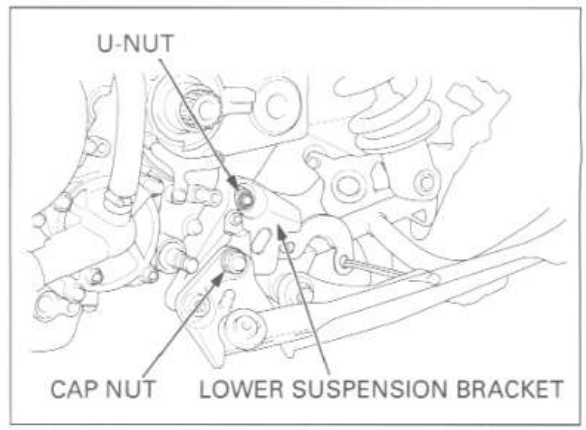
Disconnect the PAIR solenoid valve 2P (Natural) connector.
Disconnect the PAIR air tube from the front cylinder head cover, then remove the PAIR air tubes and solenoid valve as an assembly.
Disconnect the spark plug caps from the front cylinder head.



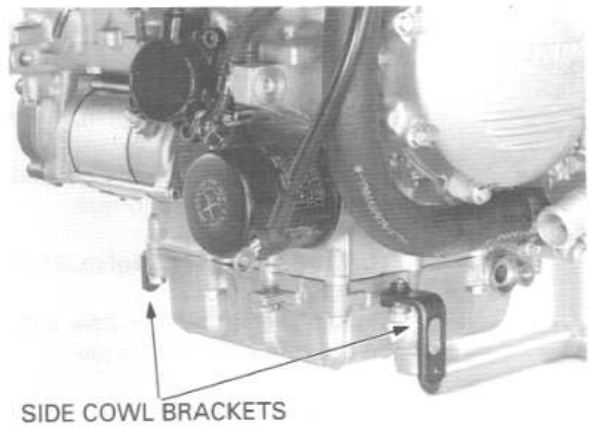
Remove the bolt and gearshift pedal.
Remove the bolt and side stand switch.



Remove the lower suspension bracket cap nut and U-nut.
Remove the socket bolts and lower suspension bracket/side stand bracket as an assembly.



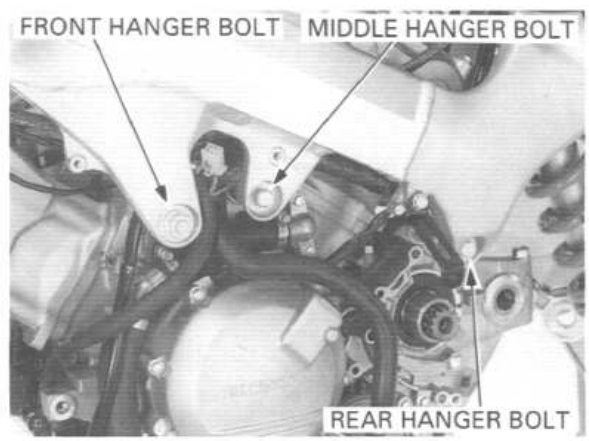
To prevent damaging the oil pan bosses, remove the bolts and side cowl brackets.



Support the engine using a jack or other adjustable support to ease of engine hanger bolts removal.

Remove the following:
— Rear engine hanger bolts, washer and distance collar
— Middle engine hanger bolt, washer and distance collar
— Front engine hanger nut, washer, bolt and distance collar

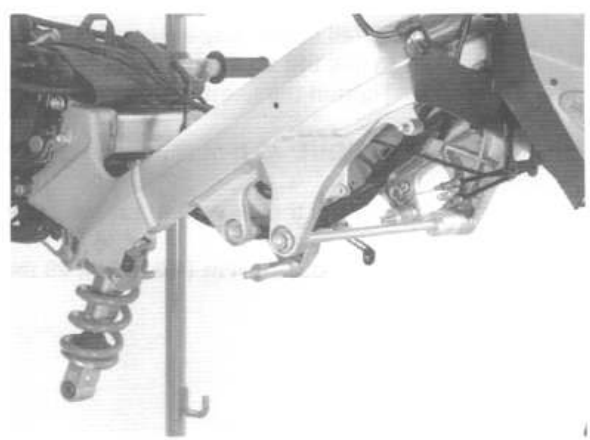
Carefully lower the adjustable support, then remove the engine from the frame.



ENGINE INSTALLATION

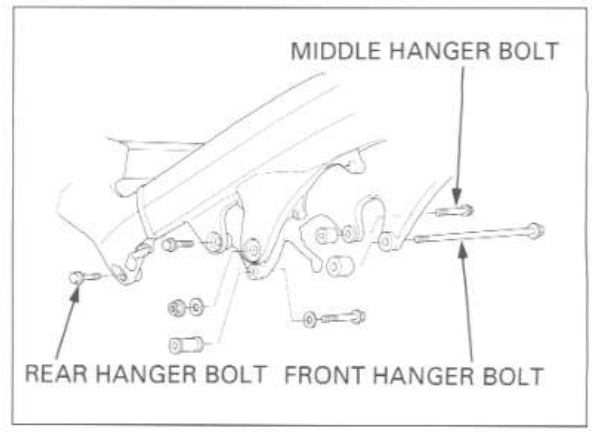
NOTE:

- 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 into the frame.

Install the following:
— Front engine hanger bolt, distance collar, washer and nut
— Middle engine hanger distance collar, washer and bolts
— Rear engine hanger distance collar, washer and bolts



Tighten the front engine hanger nut to the specified torque.

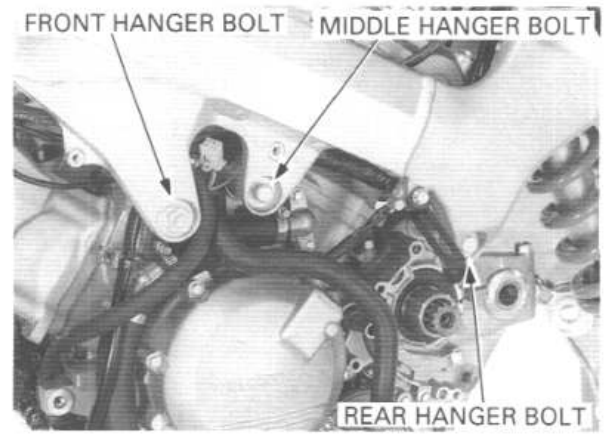
TORQUE: 54 N·m (5.5 kgf·m, 40 lbf·ft)

Tighten the right side middle and rear engine hanger bolts to the specified torque.

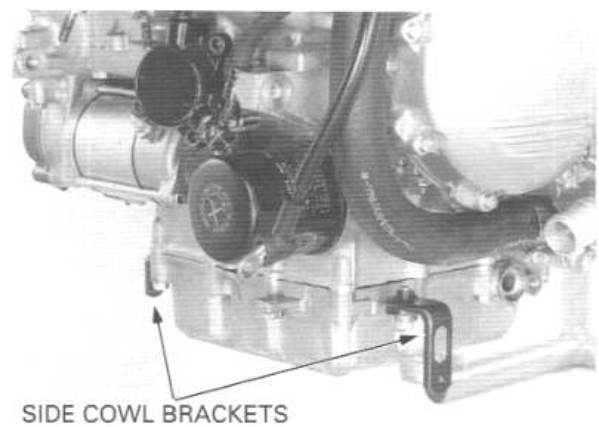
TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

Tighten the left side middle and rear engine hanger bolts to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)



Install the side cowl brackets and tighten the bolts.

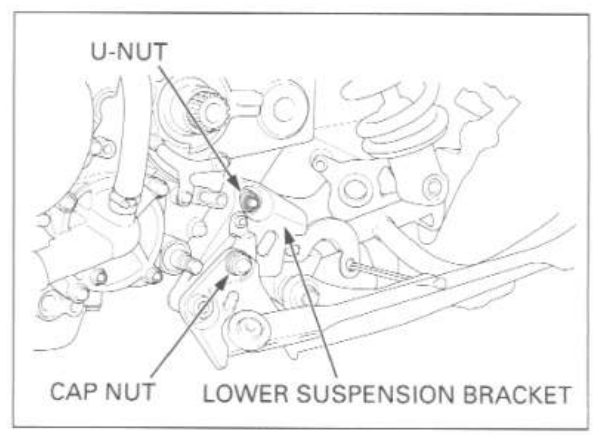


Install lower suspension bracket onto the engine.
Install the socket bolts.
Tighten the U-nut to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

Tighten the cap nut to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

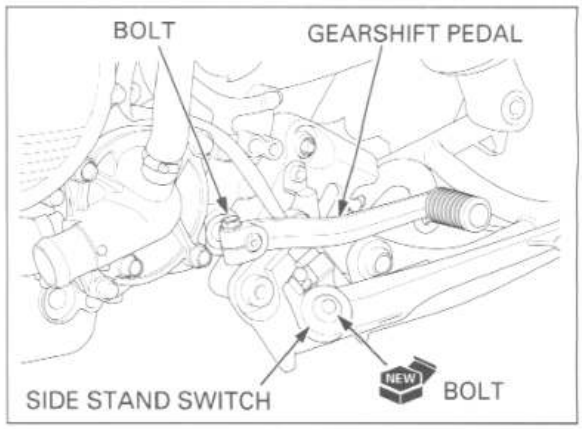


Install the side stand switch by aligning the switch pin with the side stand hole and the switch groove with the return spring holding pin.
Install and tighten the new bolt to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

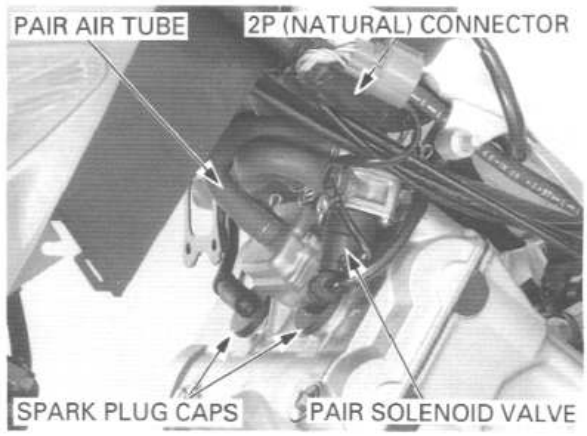
Install the gearshift pedal aligning its slit with the punch mark on the gearshift spindle.
Install and tighten the pinch bolt to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Install the spark plug caps to the front cylinder head.

Install the PAIR air tubes and PAIR solenoid valve assembly.
Connect the PAIR air tube to the front cylinder head cover.
Route the PAIR solenoid valve wire, connect the 2P (Natural) connector.



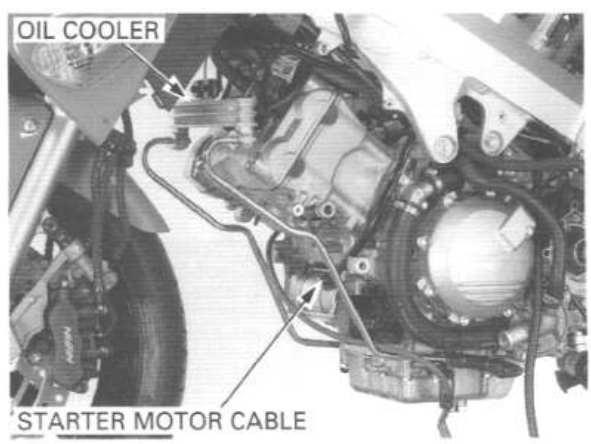
Install the rubber cover to the rear cylinder head cover.
Install the spark plug caps to the rear cylinder head.
Connect the PAIR air tube to the rear cylinder head cover.



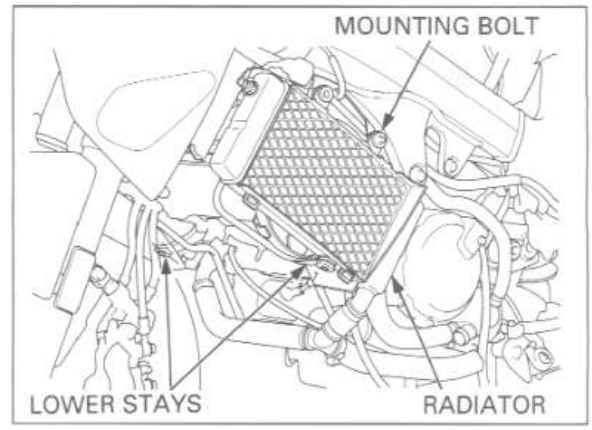
Route the starter motor cable and connect to the starter motor terminal.
Tighten the terminal nut securely.

Install the oil cooler assembly.
Install the collars and tighten the oil cooler mounting bolts.
Install new O-rings to the oil cooler hose joints.
Install the oil cooler hose joints to the oil pan, tighten the bolts securely.

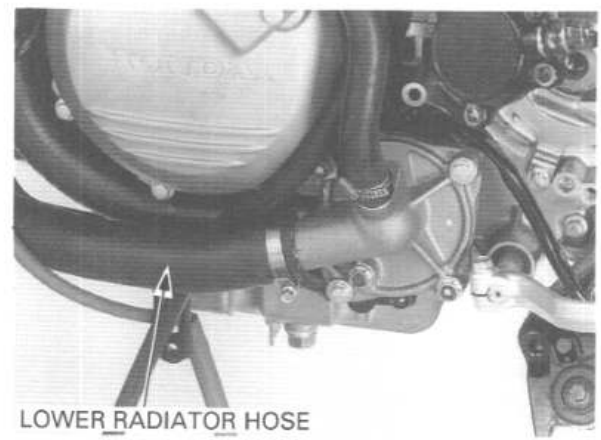
Route the fuel tank air vent tube.



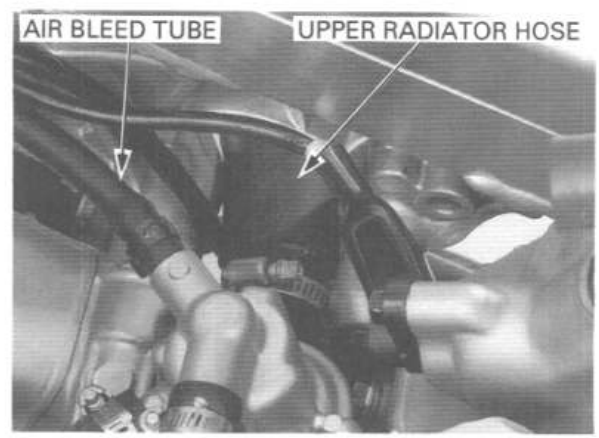
Install the right and left radiator as an assembly (see page 8-36 for detail).



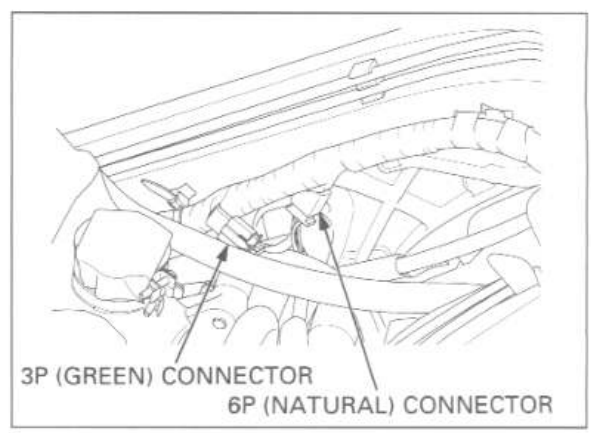
Connect the lower radiator hose to the water pump cover, tighten the clamp screw securely.



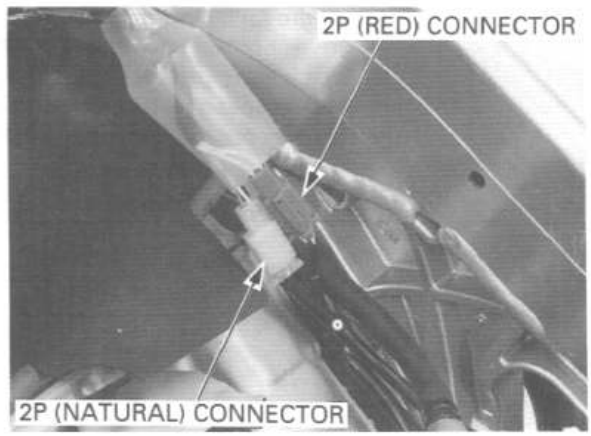
Connect the air bleed tube to the thermostat housing. Connect the upper radiator hose to the thermostat housing cover, tighten the clamp screw securely.



Connect the engine sub-harness 6P (Natural) connector and side stand switch 3P (Green) connector.

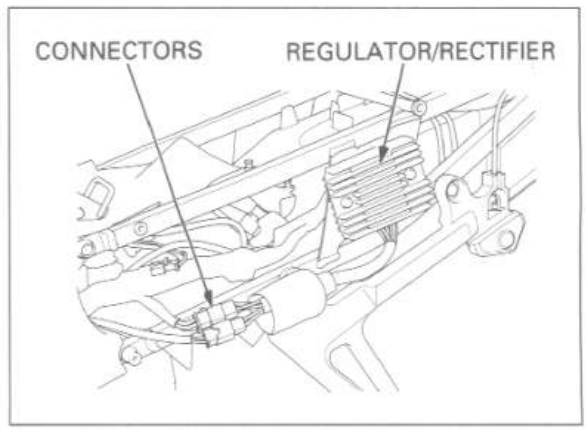


Connect the ignition pulse generator 2P (Red) connector and cam pulse generator 2P (Natural) connector.

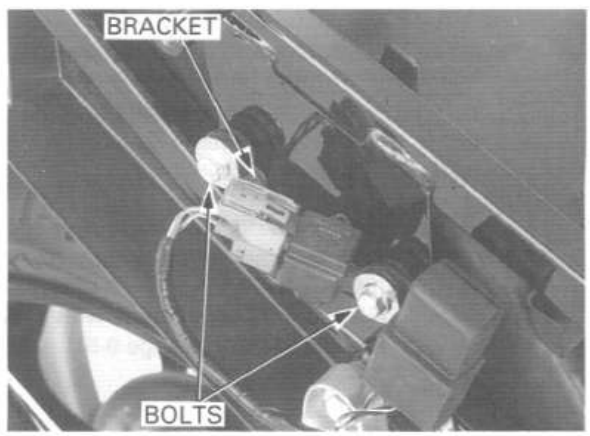


Support the motorcycle using the center stand, then remove the frame support.

Install the regulator/rectifier and tighten the two bolts.
Route the alternator wire into the frame.
Connect the regulator/rectifier 4P (Black) and 3P (Natural) connectors.



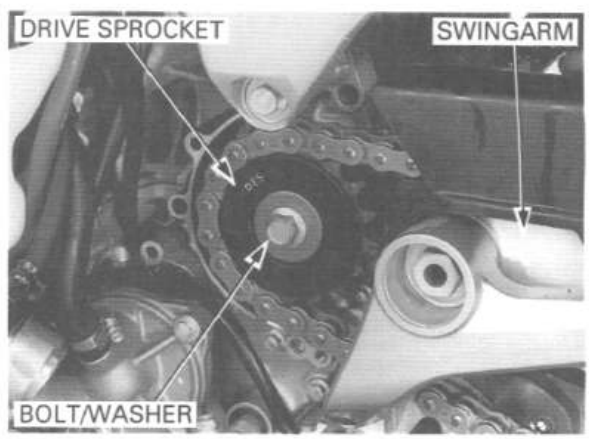
Install the MAP sensor/fuel cut relay bracket to the frame, tighten the bolts.



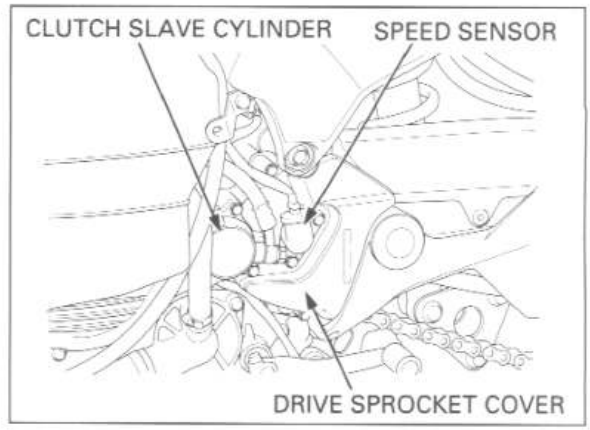
Install the swingarm (page 14-31).

Install the drive sprocket with its "530" mark facing outward.
Install the washer and tighten the bolt to the specified torque.

TORQUE: 51 N·m (5.2 kgf·m, 38 lbf·ft)

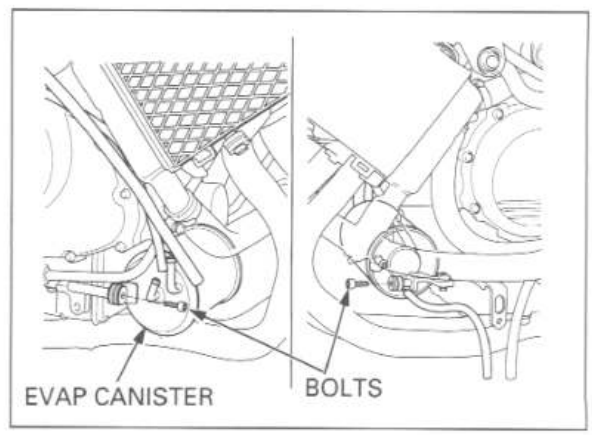


Install the following:
— Drive sprocket cover (page 10-8)
— Clutch slave cylinder (page 9-11)
— Vehicle speed sensor (page 19-14)
— Radiator reserve tank (page 6-15)



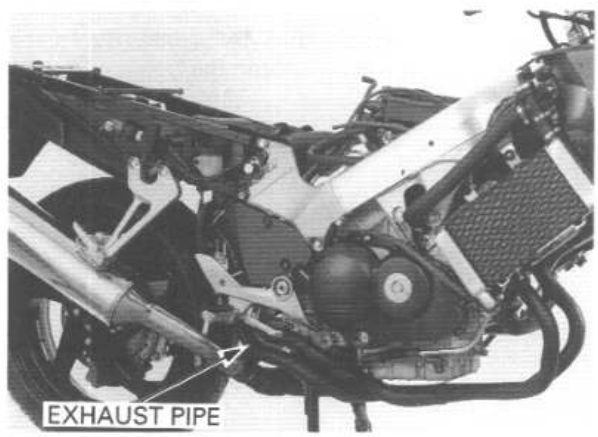
California type only

Install the EVAP canister onto the bracket, then install and tighten the socket bolts securely.
Install the EVAP purge control valve (page 5-79).

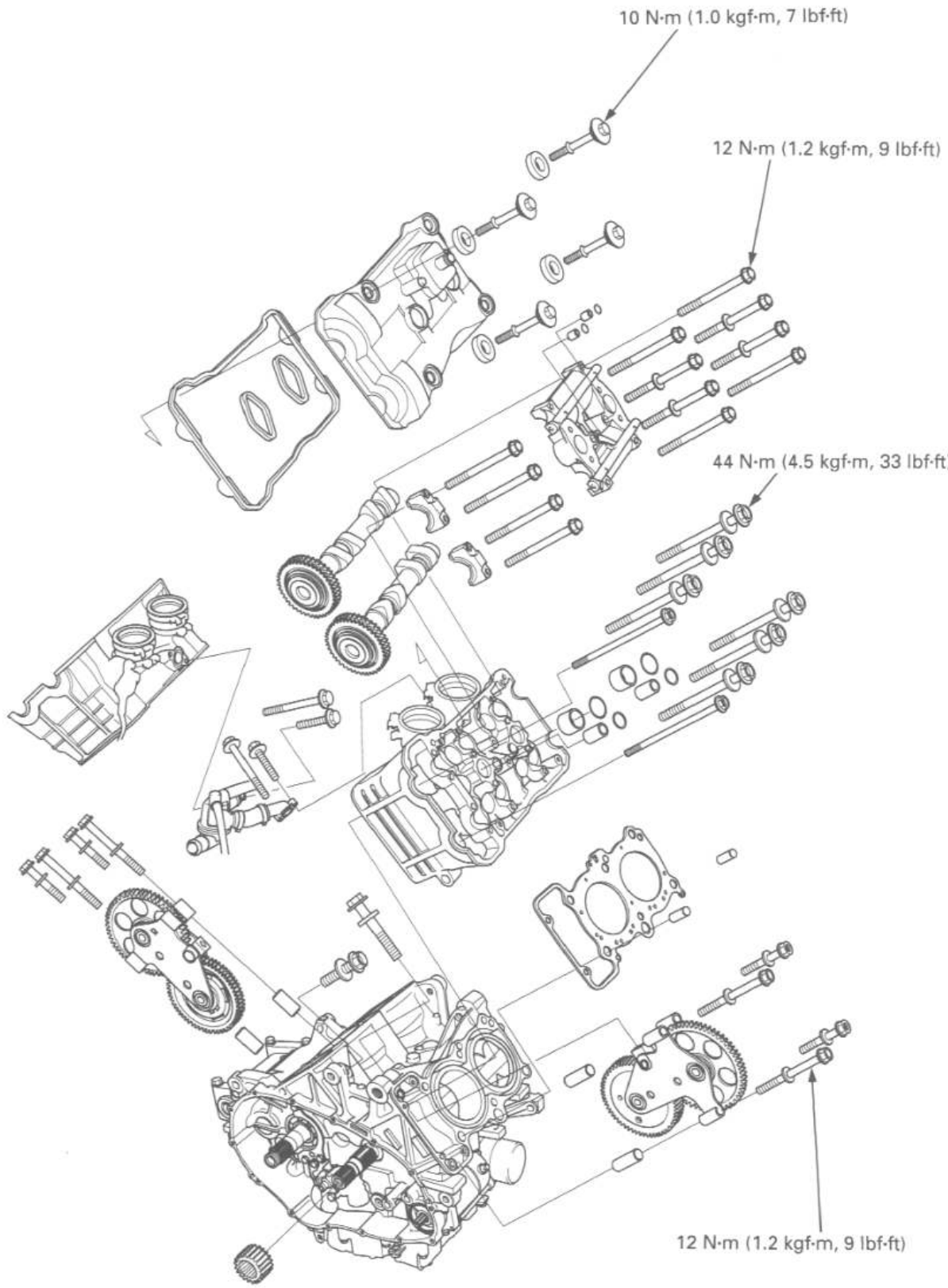


Install the following:
— Muffler and exhaust pipe (page 2-20)
— Throttle body (page 5-60)
— Fuel tank (page 5-51)
— Rear cowl (page 2-4)
— Side cowl (page 2-7)

Adjust the drive chain slack (page 3-16).
Pour recommended engine oil up to the proper level (page 3-13).
Fill the cooling system with recommended coolant and bleed the air (page 6-5).



MEMO


10 N·m (1.0 kgf·m, 7 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)
44 N·m (4.5 kgf·m, 33 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)

8. CYLINDER HEAD/VALVES

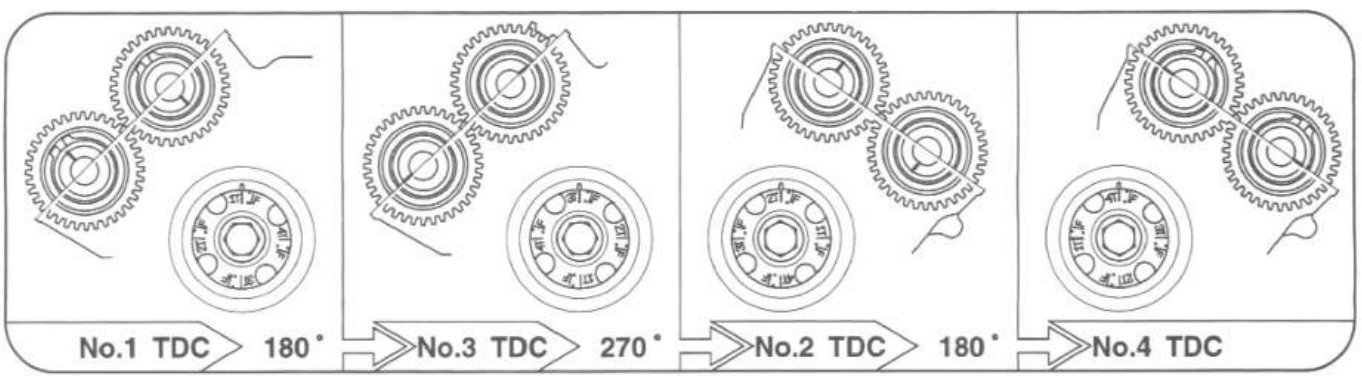
SERVICE INFORMATION	8-1	CYLINDER HEAD INSPECTION	8-16
TROUBLESHOOTING	8-3	VALVE GUIDE REPLACEMENT	8-19
CYLINDER COMPRESSION TEST	8-4	VALVE SEAT INSPECTION/REFACING	8-20
CYLINDER HEAD COVER REMOVAL	8-4	CYLINDER HEAD ASSEMBLY	8-22
CYLINDER HEAD COVER DISASSEMBLY	8-8	CAM GEAR CASE INSTALLATION	8-25
CAMSHAFT REMOVAL	8-9	CYLINDER HEAD INSTALLATION	8-26
CYLINDER HEAD REMOVAL	8-12	CAMSHAFT INSTALLATION	8-28
CAM GEAR CASE REMOVAL	8-14	CYLINDER HEAD COVER ASSEMBLY	8-33
CYLINDER HEAD DISASSEMBLY	8-15	CYLINDER HEAD COVER INSTALLATION	8-34

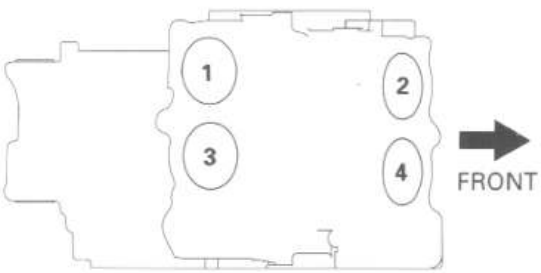
SERVICE INFORMATION

GENERAL

- This section covers service of the cylinder head, valves, camshaft and cam gear train.
- The camshaft services can be done with the engine installed in the frame.
- The front cylinder head service can be done with the engine installed in the frame. The rear 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 cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

VALVE TIMING/CYLINDER NUMBER





SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			981 – 1,373 kPa (10.0 – 14.0 kgf/cm², 142 – 199 psi) at 300 rpm	———
Cylinder head warpage			———	0.10 (0.004)
Valve, valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	———
		EX	0.30 ± 0.03 (0.012 ± 0.001)	———
	Valve stem O.D.	IN	4.475 – 4.490 (0.1762 – 0.1768)	4.465 (0.1758)
		EX	4.465 – 4.480 (0.1758 – 0.1764)	4.455 (0.1754)
	Valve guide I.D.	IN	4.500 – 4.512 (0.1772 – 0.1776)	4.540 (0.1787)
		EX	4.500 – 4.512 (0.1772 – 0.1776)	4.540 (0.1787)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	———
		EX	0.020 – 0.047 (0.0008 – 0.0019)	———
	Valve guide projection above cylinder head	IN	17 (0.7)	———
		EX	17 (0.7)	———
	Valve seat width	IN/EX	0.9 – 1.1 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length	Inner	IN/EX	39.5 (1.56)	37.6 (1.48)
	Outer	IN/EX	42.5 (1.67)	40.5 (1.59)
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 (49 states/Canada type)	IN	36.24 – 36.48 (1.427 – 1.436)	36.21 (1.426)
		EX	36.08 – 36.32 (1.420 – 1.430)	36.05 (1.419)
	Cam lobe height (California type)	IN	35.34 – 35.58 (1.391 – 1.400)	35.31 (1.390)
		EX	35.18 – 35.42 (1.385 – 1.394)	35.15 (1.384)
	Journal O.D.		24.959 – 24.980 (0.9826 – 0.9835)	———
	Runout		———	0.05 (0.002)
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	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
PAIR reed valve cover flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Camshaft holder flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply oil to the threads
Cylinder head mounting bolt	44 N·m (4.5 kgf·m, 33 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 stud bolt	See page 1-15	
Gear train mounting mounting bolt/washer	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Engine coolant temperature sensor	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply grease to the threads

TOOLS

Compression gauge attachment	07RMJ – MY50100	Equivalent commercially available in U.S.A.
Valve spring compressor	07757 – 0010000	
Valve spring compressor attachment	07959 – KM30101	
Tappet hole protector	07HMG – MR70002	Not available in U.S.A.
Valve guide driver	07HMD – ML00101	
Valve guide reamer, 4.5 mm	07HMH – ML00101	or 07HMH – ML0010A (U.S.A. only)
Valve seat cutters		— these are commercially available in U.S.A.
Seat cutter, 29 mm (45° IN)	07780 – 0010300	
Seat cutter, 27.5 mm (45° EX)	07780 – 0010200	
Flat cutter, 30 mm (32° IN)	07780 – 0012200	
Flat cutter, 27 mm (32° EX)	07780 – 0013300	
Interior cutter, 30 mm (60° IN/EX)	07780 – 0014000	
Cutter holder, 4.5 mm	07781 – 0010600	

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 or 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)

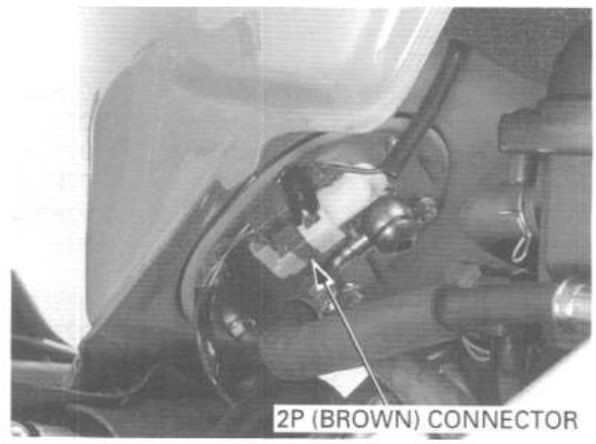
Excessive noise

- Cylinder head:
  - — Incorrect valve adjustment
  - — Sticking valve or broken valve spring
  - — Damaged or worn camshaft
  - — Worn or damaged cam gear train
  - — Worn cam gear teeth
- Worn cylinder, piston or piston rings (section 11)

Rough idle

- Low cylinder compression

CYLINDER COMPRESSION TEST



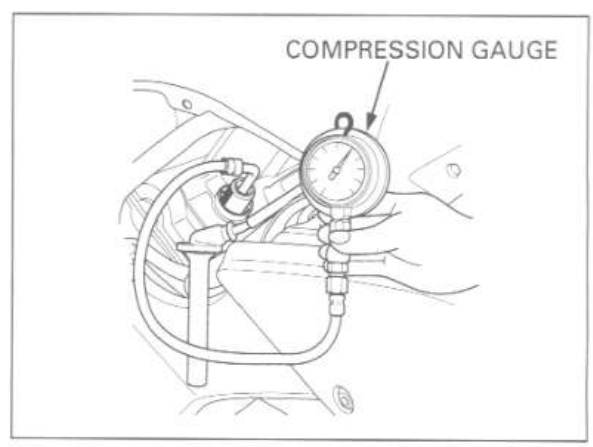
⚠ WARNING

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.

Warm up the engine to normal operating temperature. Stop the engine and remove the all spark plug caps and spark plug (page 3-7).

Disconnect the fuel pump 2P (Brown) connector.

Install a compression gauge into the spark plug hole.



TOOL:

Compression gauge attachment	**07RMJ – MY50100 (Equivalent commercially available in U.S.A.)**

Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising. The maximum reading is usually reached within 4 – 7 seconds.

NOTE:

To avoid discharging the battery, do not operate the starter motor for more than seven seconds.

Compression pressure:
981 – 1,373 kPa (10.0 – 14.0 kgf/cm², 142 – 199 psi) at 300 rpm

Low compression can be caused by:
— Blown cylinder head gasket
— Improper valve adjustment
— Valve leakage
— Worn piston ring or cylinder
High compression can be caused by:
— Carbon deposits in combustion chamber or on piston head

CYLINDER HEAD COVER REMOVAL

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

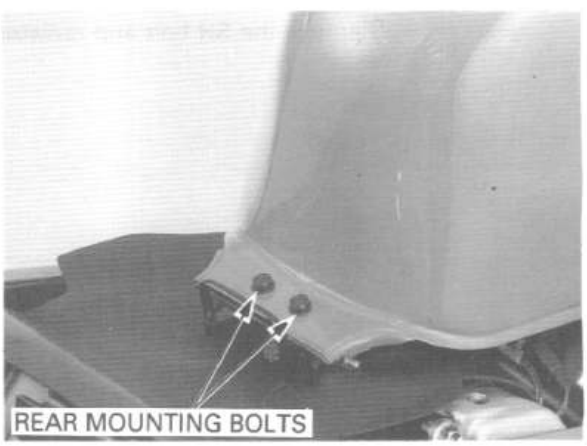
Disconnect the fuel tank air vent tube and overflow tube.



Disconnect the fuel pump 2P (Brown) connector and fuel unit 2P (Blue) connector.



Close the fuel tank, then remove the fuel tank rear mounting bolts.



Place the fuel tank upside down and remove the fuel tank without disconnecting the fuel tubes.

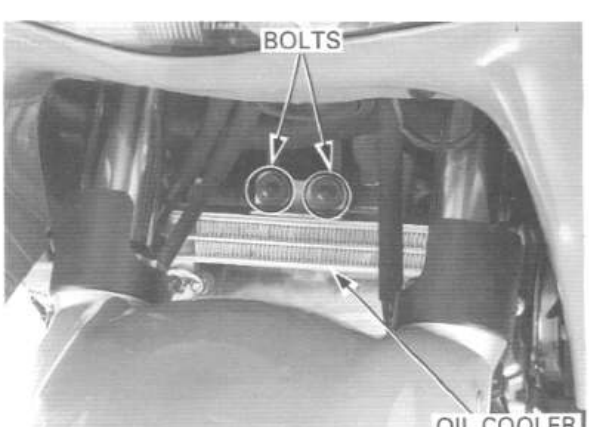
CAUTION:

Be careful not to damage the fuel tank.

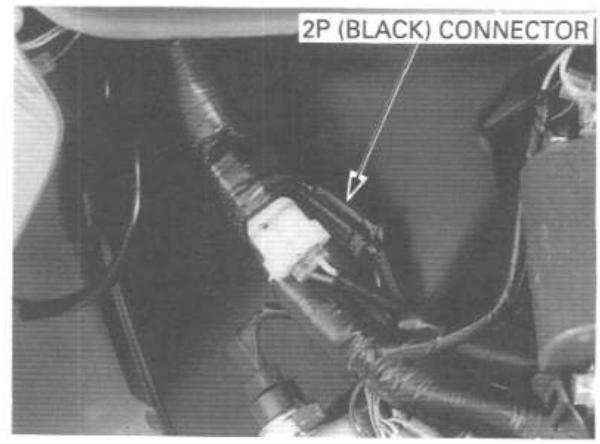


Front:
Remove the following:
— Side cowls (page 2-6)
— Air cleaner housing (page 5-53)

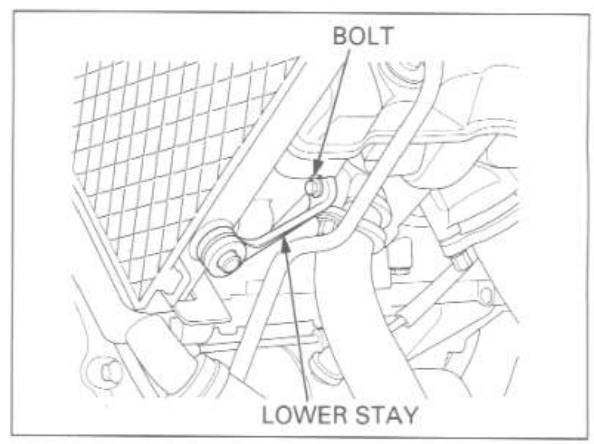
Remove the oil cooler mounting bolts.



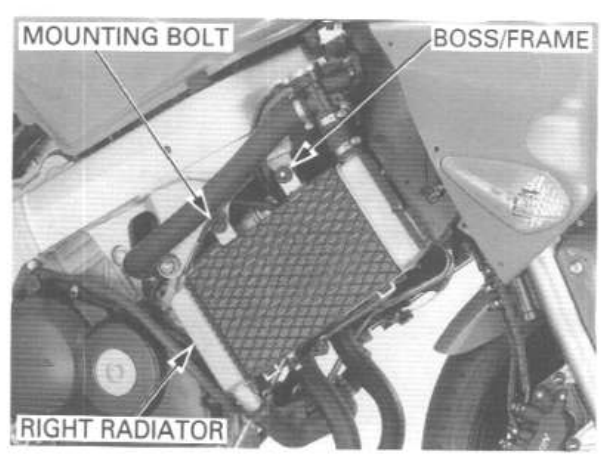
Disconnect the radiator sub-harness 2P (Black) connector.



Remove the SH bolt and radiator lower stay on each side.

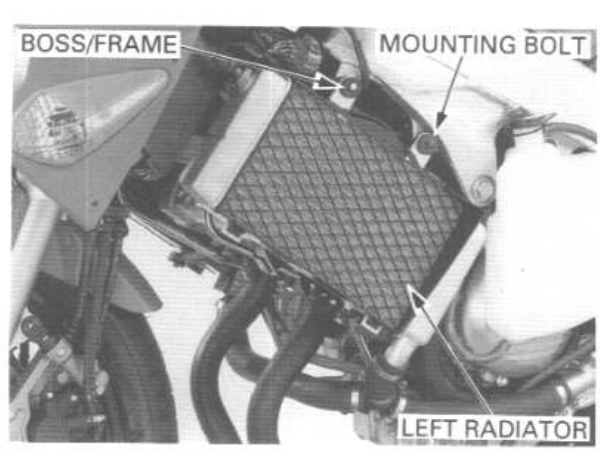


Remove the right radiator mounting bolt.
Release the both radiator from the bosses on the frame.



Remove the left radiator mounting bolt.

Lower the radiator without disconnecting water tubes.

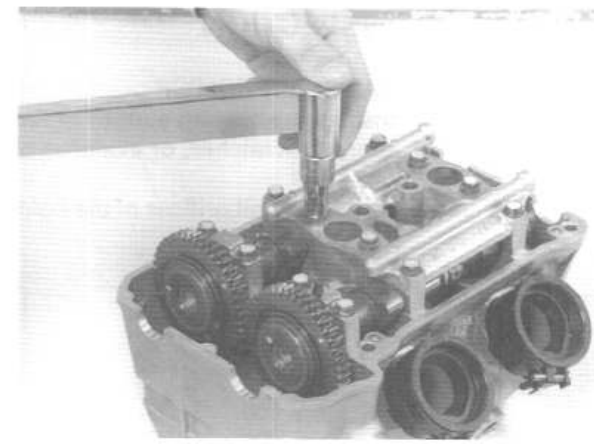


Install the camshaft holders and tighten the bolts in a crisscross pattern in 2 – 3 steps.

NOTE:

Do not rotate the camshaft when using plastigauge.

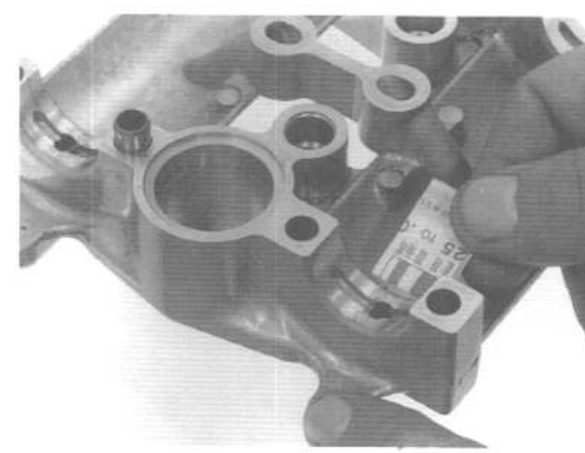
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



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.



CYLINDER HEAD REMOVAL

NOTE:

- The front cylinder head can be removed without removing the engine from the frame.
- Rear cylinder head removal requires engine removal.

Remove the following:
— Throttle body (page 5-56)
— Camshaft (page 8-6)

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

Remove the cylinder drain bolt and sealing washer, drain coolant from the cylinder.



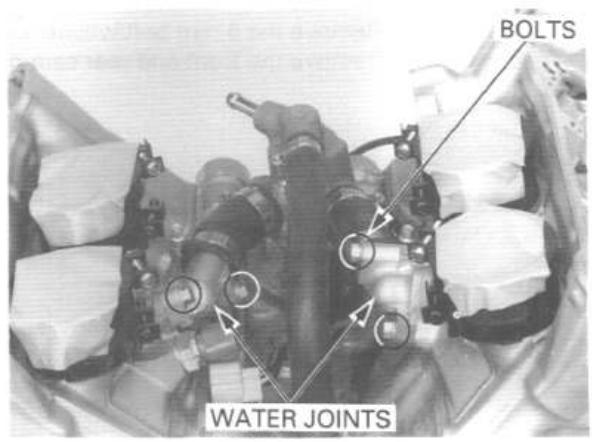
Front:
Disconnect the ECT sensor connector from the front cylinder head.



Rear:
Remove the bolt, cam pulse generator and O-ring.



Front/rear:
Remove the SH bolts and water joints from the cylinder head.

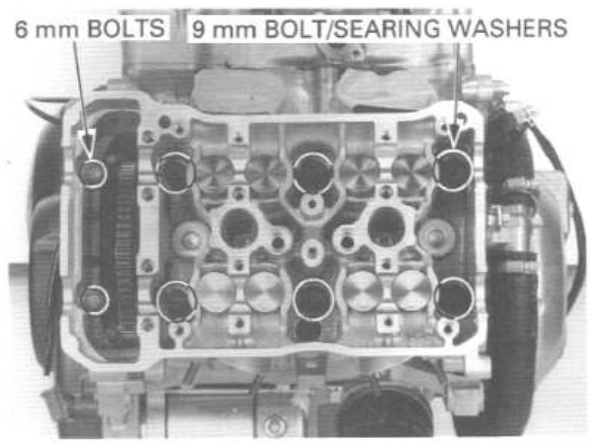


Remove the two 6 mm flange bolts.
Remove the six 9 mm special bolts and sealing washers.

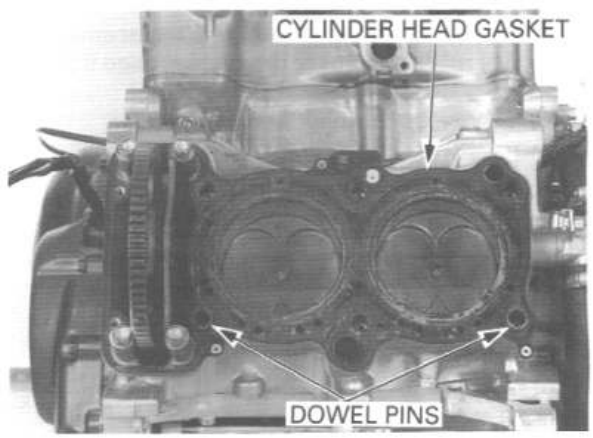
NOTE:

Loosen the 9 mm special bolts in a crisscross pattern in 2 – 3 steps.

Remove the cylinder head.

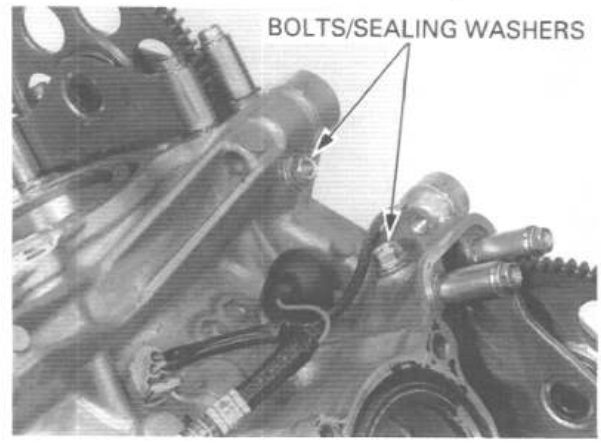


Remove the dowel pins and cylinder head gasket.

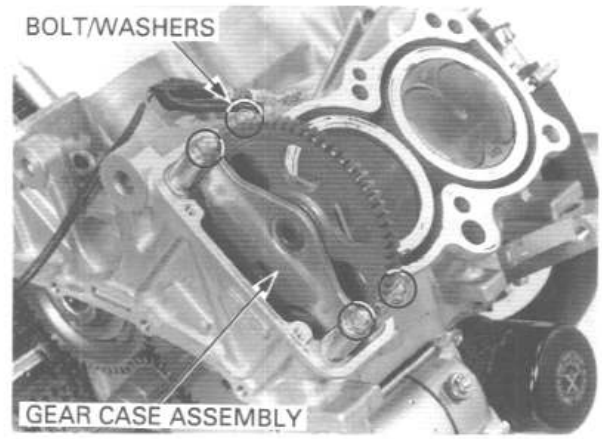


CAM GEAR CASE REMOVAL

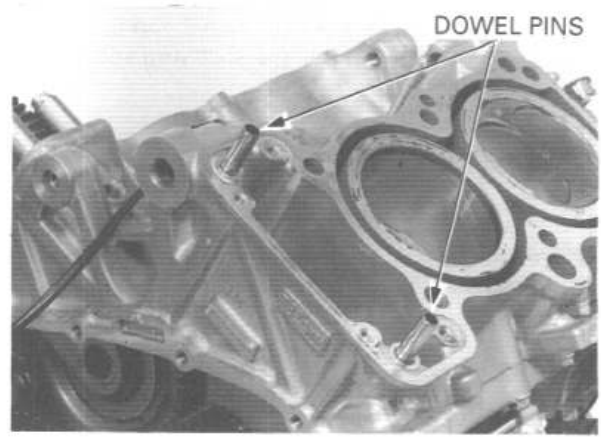
Remove the 8 mm bolts and sealing washers.



Remove the 6 mm bolt/washers.
Remove the front and rear cam gear case assembly.

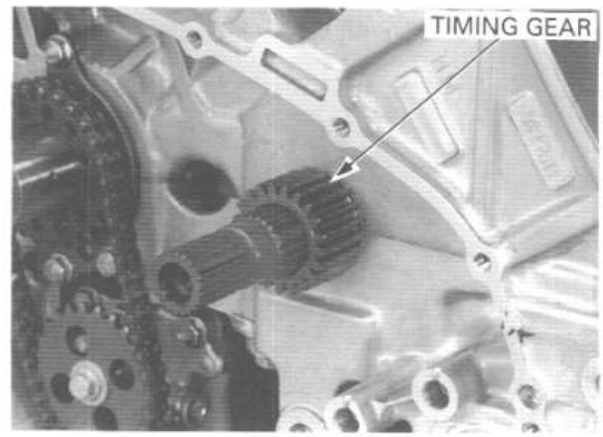


Remove the dowel pins.



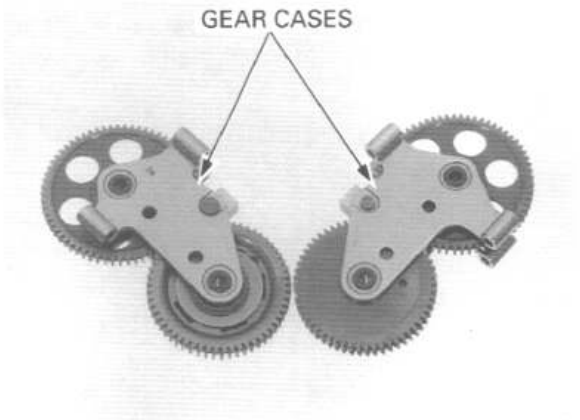
If the timing gear replacement is required, remove the primary drive gear (page 9-21).

Remove the timing gear.



INSPECTION

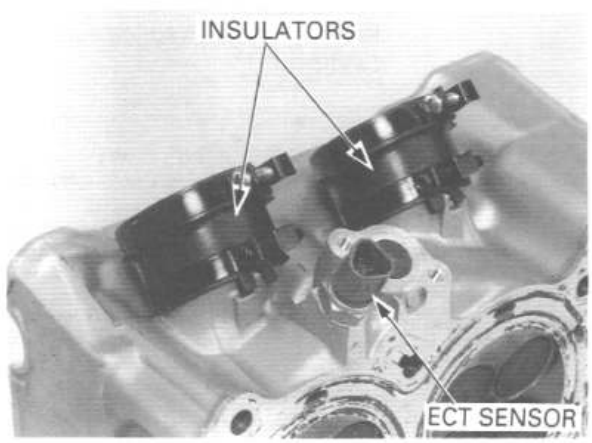
Check the cam gear case assembly for wear or damage. If the gear or gear case is damaged, replace the cam gear case as an assembly.



CYLINDER HEAD DISASSEMBLY

Loosen the screws and remove the insulators from the front and rear cylinder head.

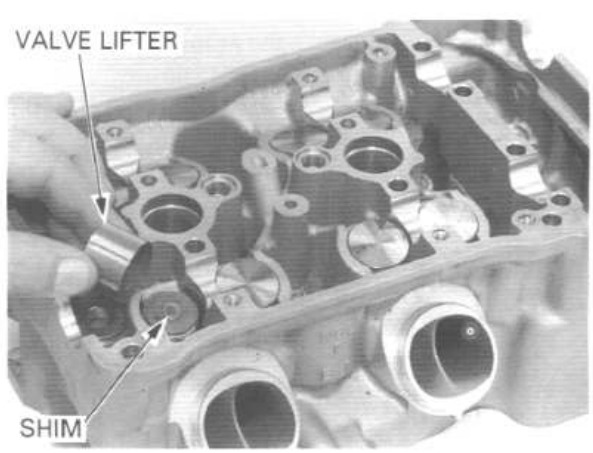
Remove the ECT sensor from the front cylinder head.



Remove the spark plugs from the cylinder head.
Remove the valve lifters and shims.

NOTE:

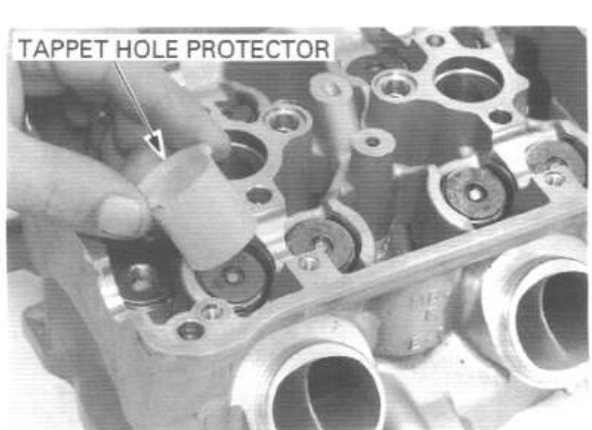
- Be careful not to damage the valve lifter bore.
- Shim may stick to the inside of the valve lifter. Do not allow the shims to fall.
- Mark all valve lifters and shims to ensure correct reassembly in their original locations.
- The valve lifter can be easily removed with a valve lapping tool or magnet.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



Install the tappet hole protector into the valve lifter bore.

TOOL:

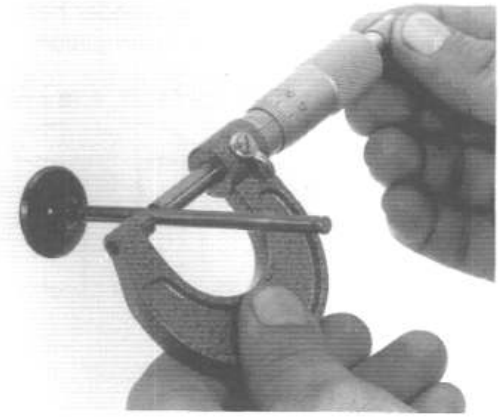
Tappet hole protector	**07HMG – MR70002 (Not available in U.S.A.)**



VALVE/VALVE GUIDE

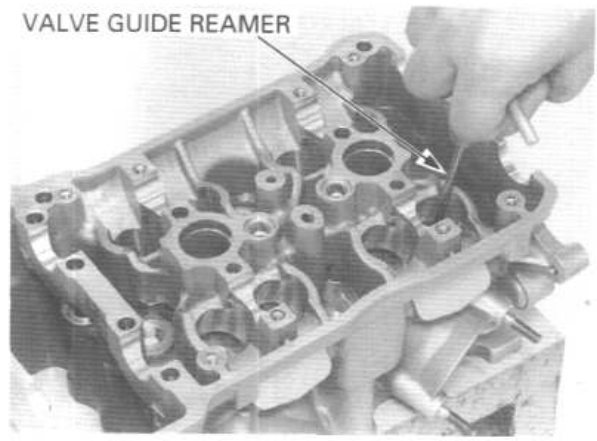
Inspect each valve for bending, burning or abnormal stem wear.
Check valve movement in the guide, measure and record each valve stem O.D.

SERVICE LIMITS:
IN: 4.465 mm (0.1758 in)
EX: 4.455 mm (0.1754 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 — **07HMH – ML00101 or 07HMH – ML0010A (U.S.A. only)**

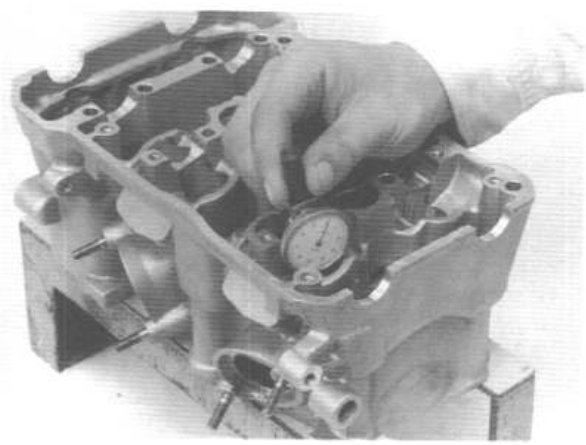


Measure and record each valve guide I.D.

SERVICE LIMIT: IN/EX: 4.540 mm (0.1787 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: 0.020 – 0.047 mm (0.0008 – 0.0019 in)



If the stem-to-guide clearance is out of standard, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit.
If the stem-to-guide clearance is out of standard with the new guides, replace the valves and guides.

NOTE:

Reface the valve seats whenever the valve guides are replaced (page 8-20).

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

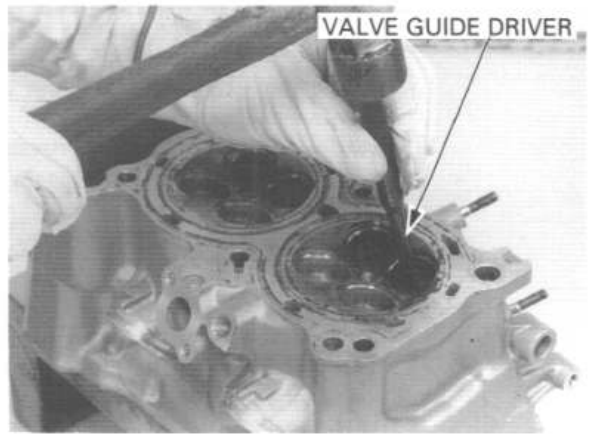
To avoid burns, wear heavy gloves when handling the heated cylinder head.

CAUTION:

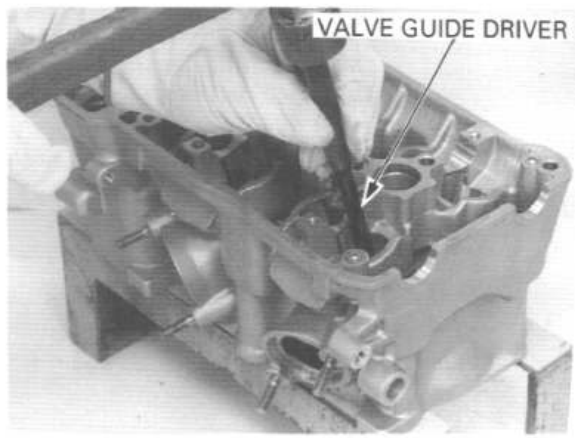
Do not use a torch to heat the cylinder head; it may cause warping.

Support the cylinder head and drive out the valve guides from combustion chamber side of the cylinder head.

TOOL:
Valve guide driver **07HMD – ML00101**



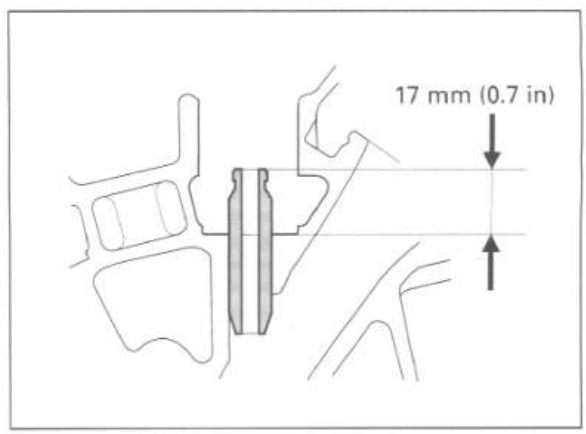
Drive in the guide from the top of the head to the specified depth using the same tool.



NOTE:

Install the valve guide while measuring the valve guide height from the cylinder head.

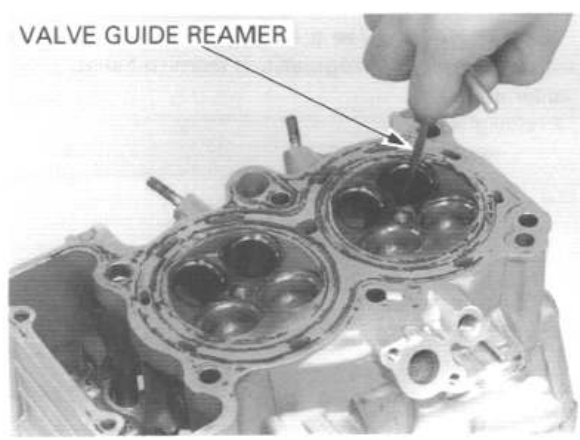
SPECIFIED HEIGHT:
IN/EX: 17 mm (0.7 in)



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 **07HMH – ML00101 or 07HMH – ML0010A (U.S.A. only)**

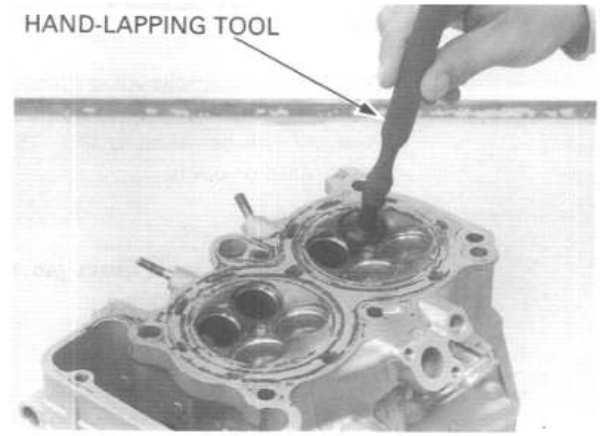


NOTE:

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



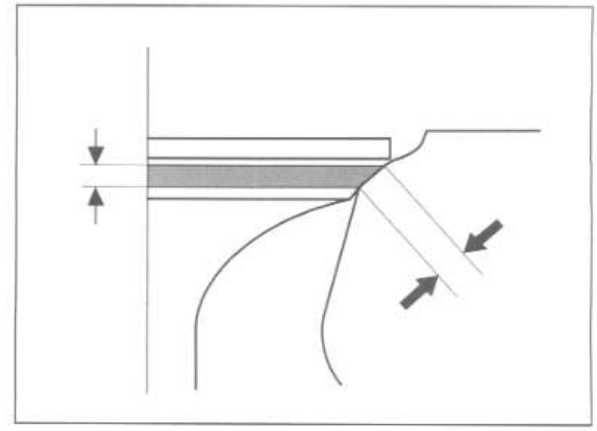
Clean the intake and exhaust valves thoroughly to remove carbon deposits.
Apply a light coating of Prussian Blue to the valve seats. Lap the valves and seats using a rubber hose or other hand-lapping tool.
Remove and inspect the valves.

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: 0.9 – 1.1 mm (0.035 – 0.043 in)
SERVICE LIMIT: 1.5 mm (0.06 in)

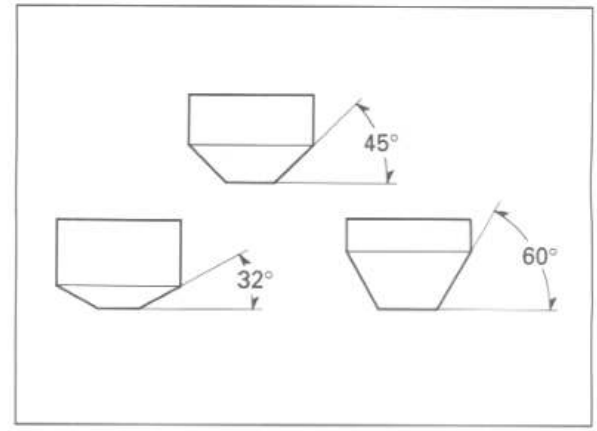


If the seat is too wide, too narrow or has low spots, the seat must be ground.

VALVE SEAT REFACING

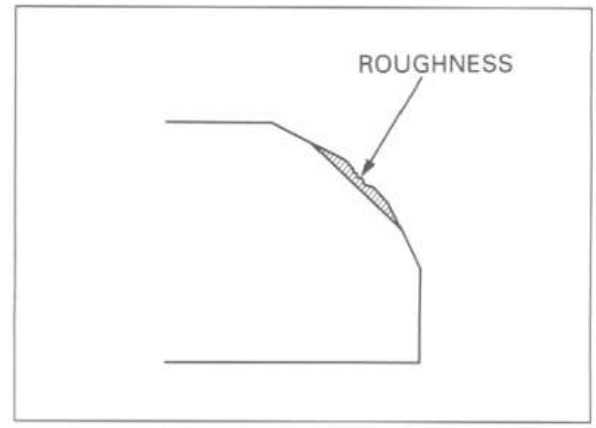
Follow the refacing manufacturer's operating instructions.

Valve seat cutters/grinders or equivalent valve seat refacing equipment are recommended to correct worn valve seats.

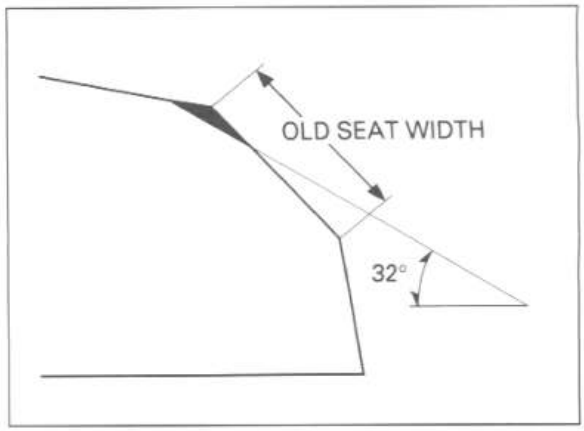


Reface the seat with a 45-degree cutter whenever a valve guide is replaced.

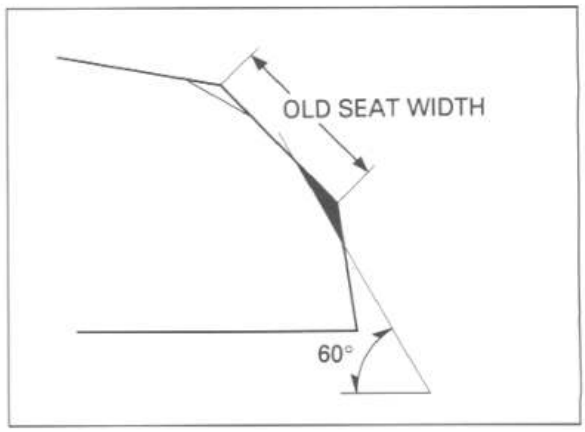
Use a 45-degree cutter to remove any roughness or irregularities from the seat.



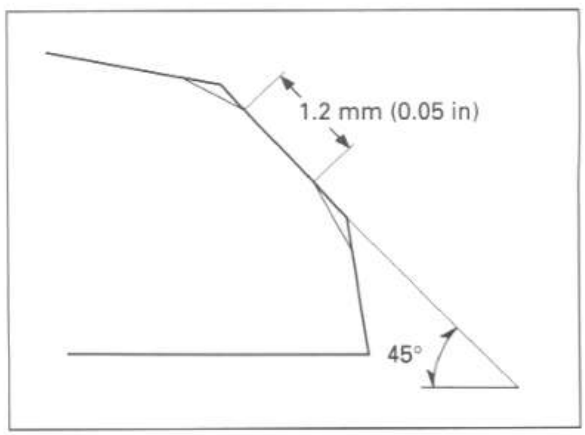
Use a 32-degree cutter to remove the top 1/4 of the existing valve seat material.



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.



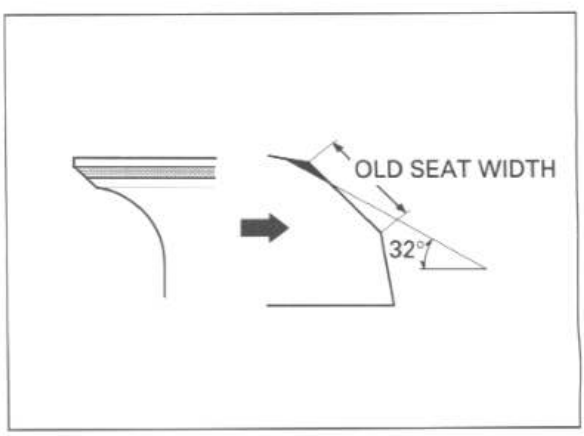
Install a 45-degree finish cutter and cut the seat to the proper width.
Make sure that all pitting and irregularities are removed.
Refinish if necessary.



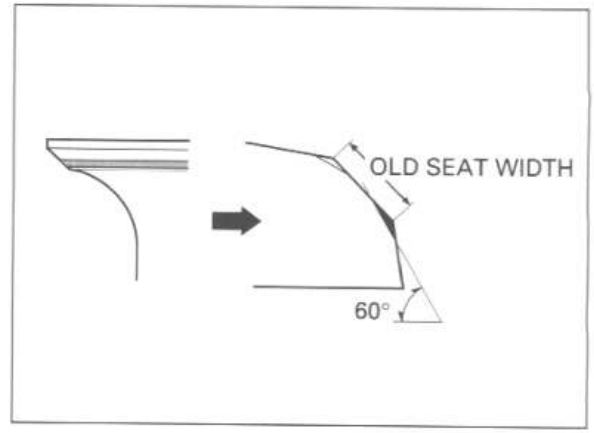
The location of the valve seat in relation to the valve face is very important for good sealing.

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.



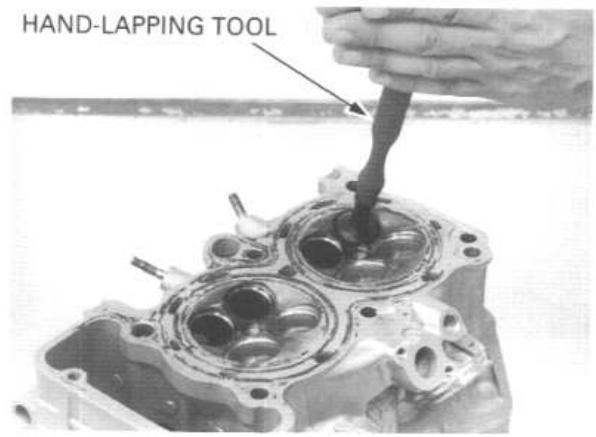
If the contact area is too low on the valve, the seat must be raised using a 60-degree inner cutter.



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.

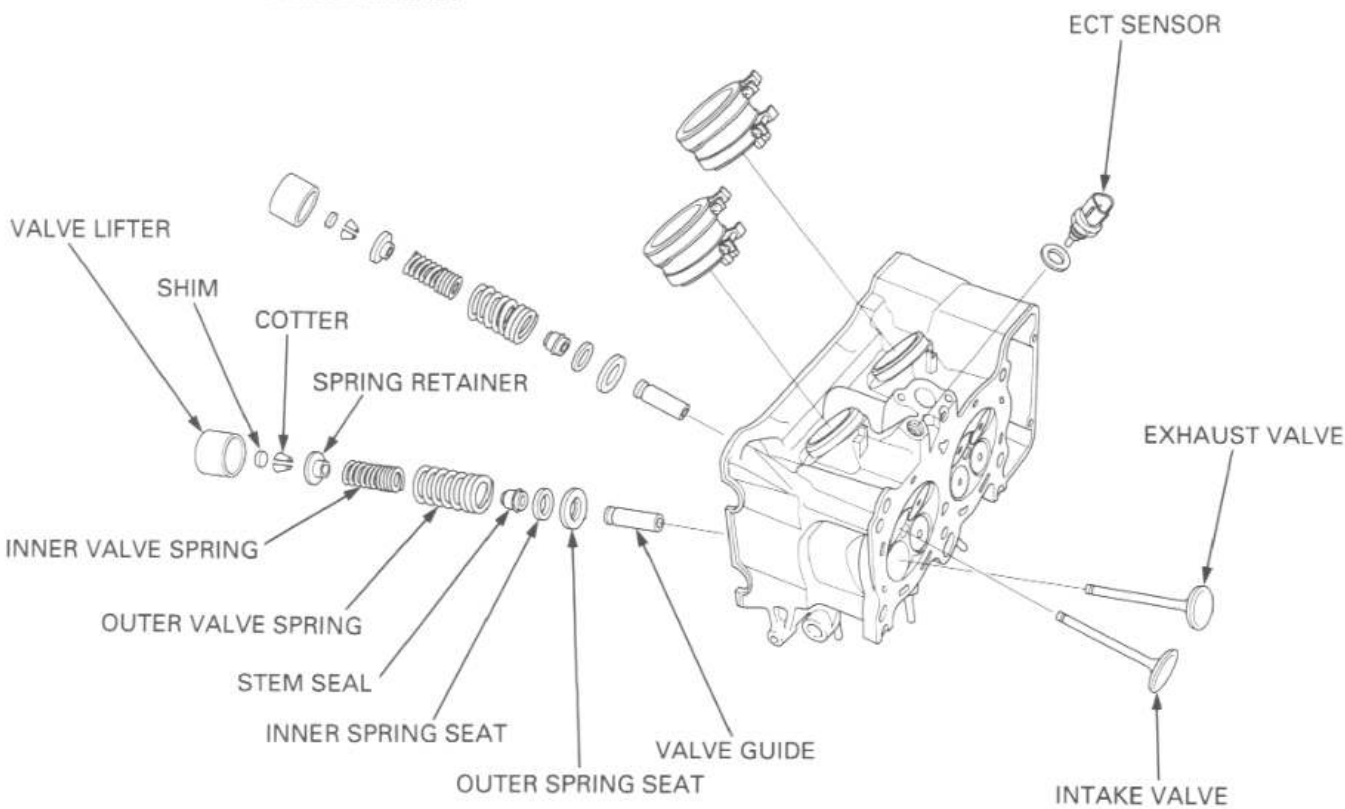
Do not allow lapping compound to enter the guides.

After lapping, wash all residual compound off the cylinder head and valve.

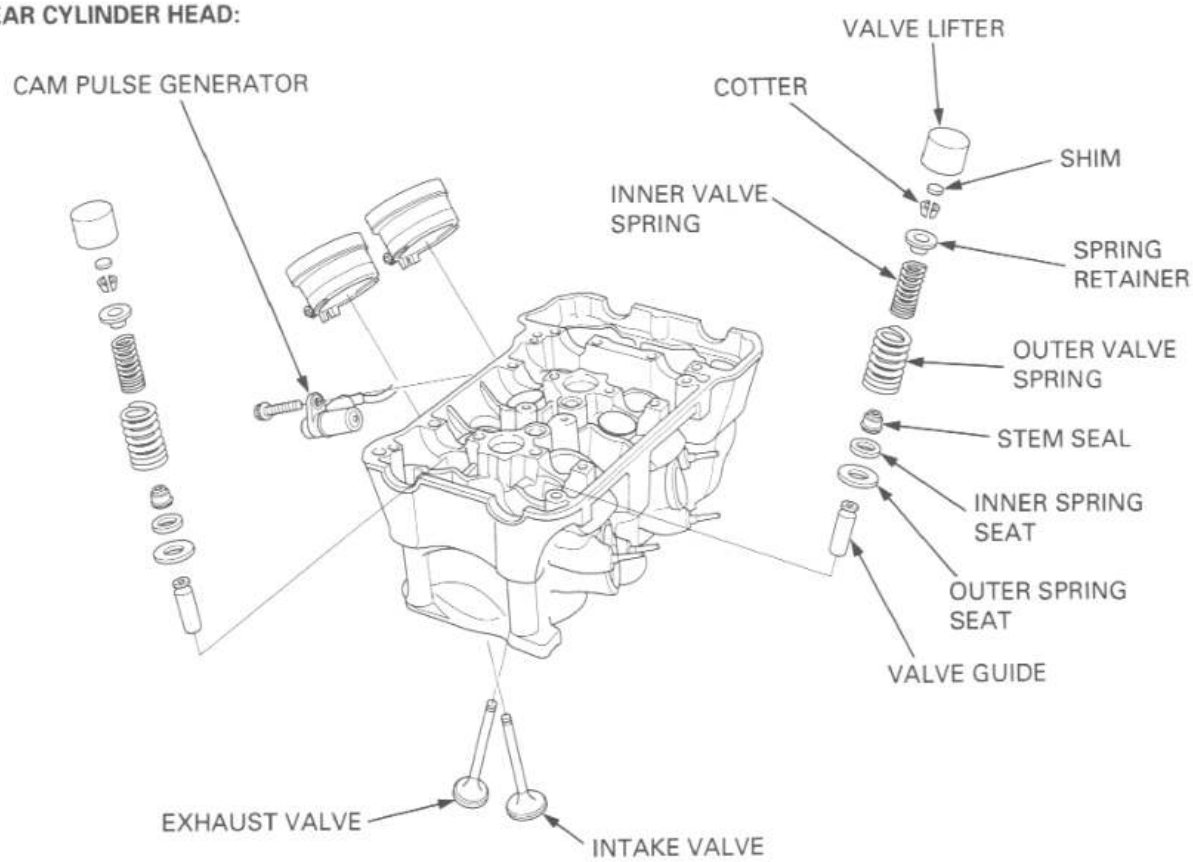


CYLINDER HEAD ASSEMBLY

FRONT CYLINDER HEAD:



REAR CYLINDER HEAD:

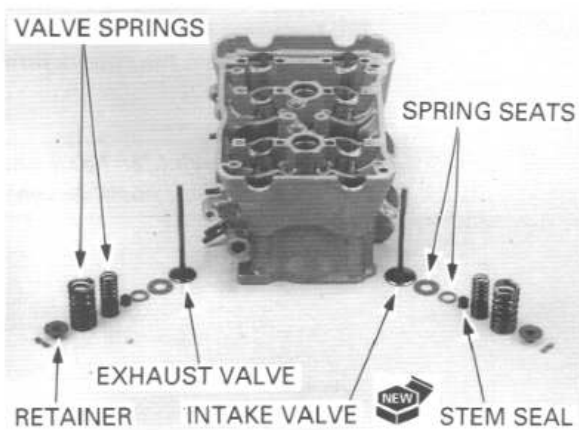


Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.

Install the inner and outer valve spring seats.
Install the new stem seals.

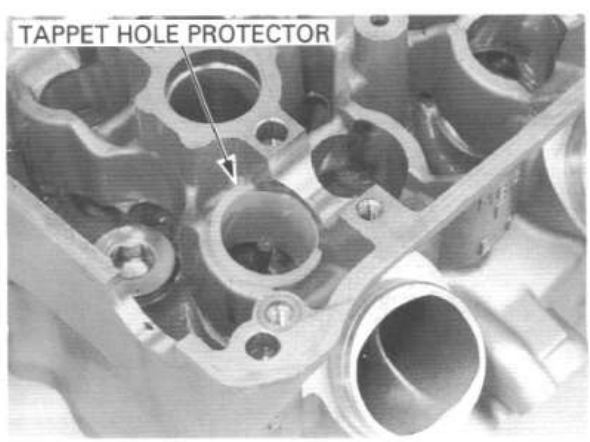
Lubricate the valve stems with molybdenum disulfide oil and insert the valve into the valve guide.

To avoid damage to the stem seal, turn the valve slowly when inserting.

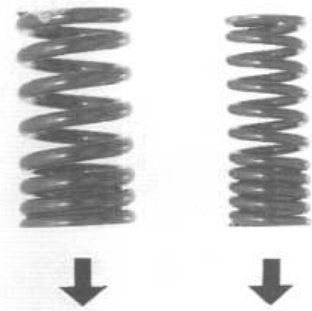


Install the tappet hole protector into the valve lifter bore.

TOOL:
Tappet hole protector **07HMG – MR70002**



Install the valve springs with the tightly wound coils facing the combustion chamber.
Install the valve spring retainer.

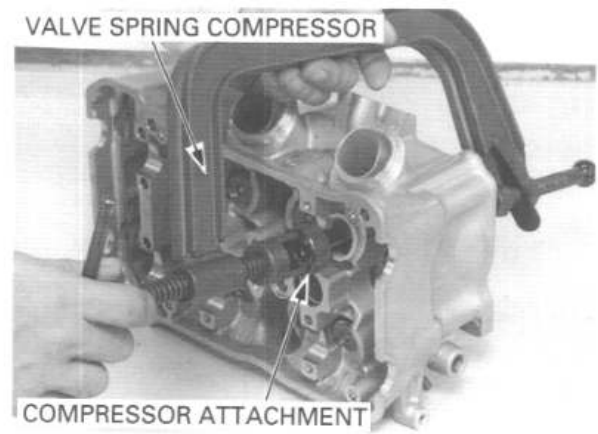


Install the valve cotters using the special tool as shown.

TOOLS:
Valve spring compressor 07757 – 0010000
Valve spring compressor attachment 07959 – KM30101

CAUTION:

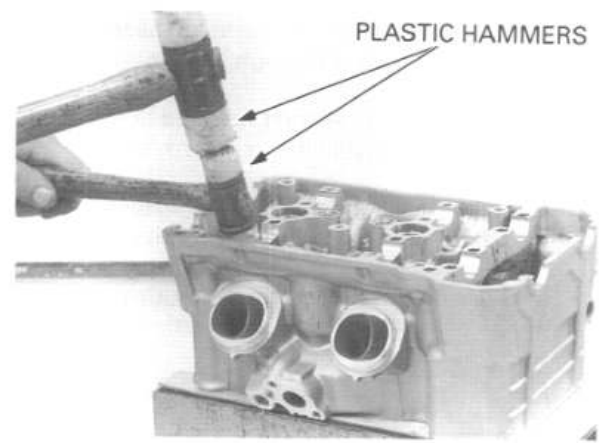
To prevent loss of tension, do not compress the valve spring more than necessary.



Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly.

CAUTION:

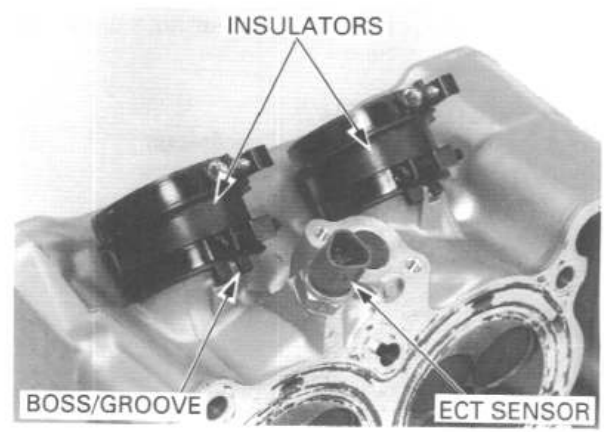
Support the cylinder head above the work bench surface to prevent possible valve damage.



Install the ECT sensor with a new sealing washer to the front cylinder head and tighten it to the specified torque.

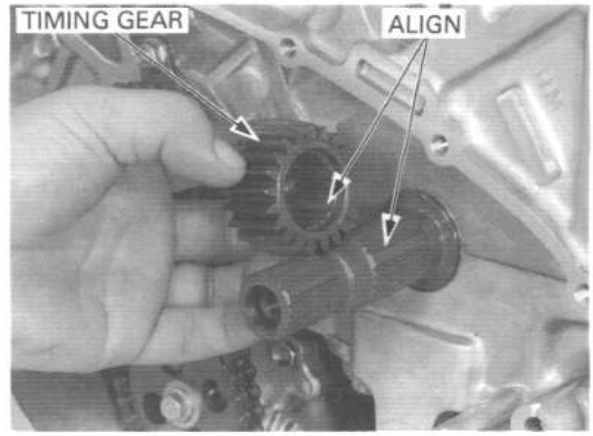
TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Install the insulators aligning their grooves with the bosses on the cylinder head.

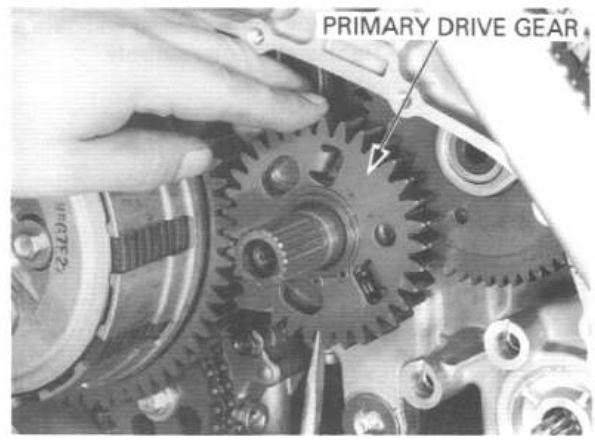


CAM GEAR CASE INSTALLATION

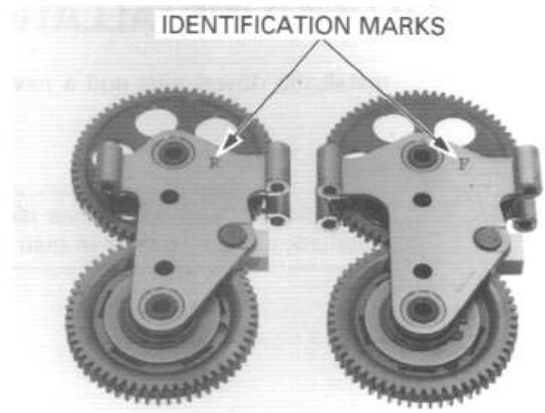
Install the timing gear aligning its wide groove with the wide teeth on the crankshaft.



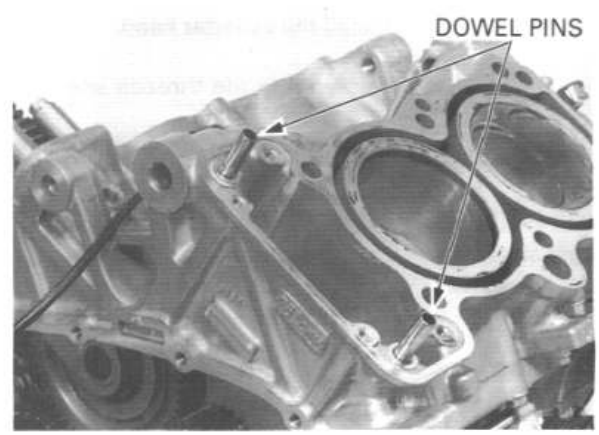
Install the primary drive gear (page 9-22).



The cam gear case assembly has identification mark on the gear case as shown. At installation, install each cam gear train in their proper position.



Install the dowel pins into the cylinder block.

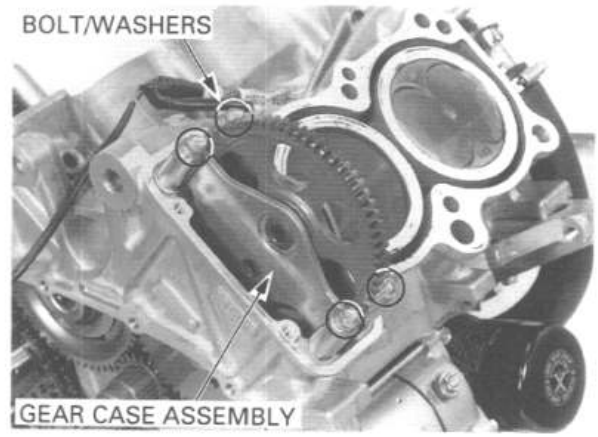


Install the front and rear cam gear case assembly into the cylinder block.
Install and tighten the 6 mm bolt/washers.

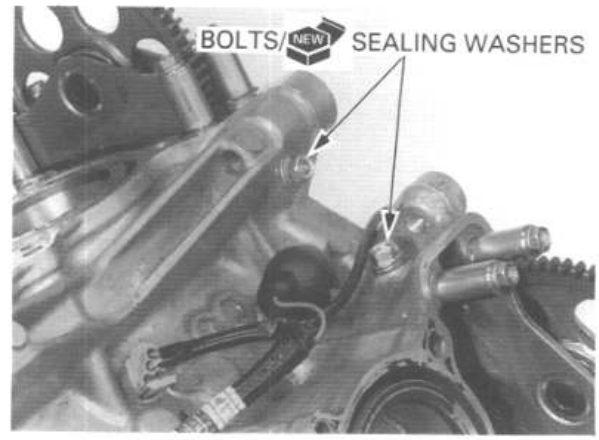
NOTE:

- Install the 6 x 40 mm bolts to the correct position:
  Front: inside
  Rear: inside
- Tighten the bolts gradually starting at the dowel pin side.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the new sealing washers and 8 mm bolts.
Tighten the bolt securely.

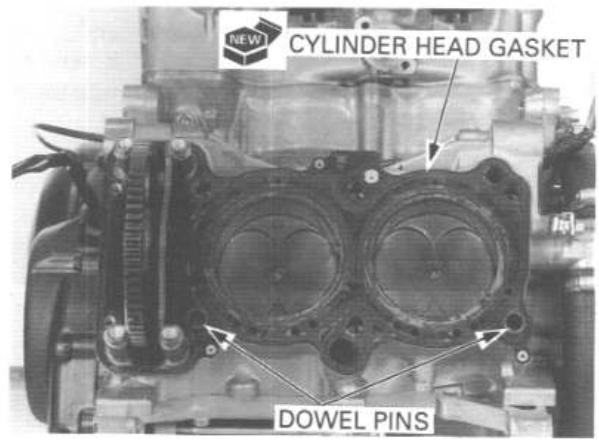


CYLINDER HEAD INSTALLATION

Install the dowel pins and a new cylinder head gasket.

NOTE:

The cylinder head gasket has identification mark. At installation, install gasket in their proper position.



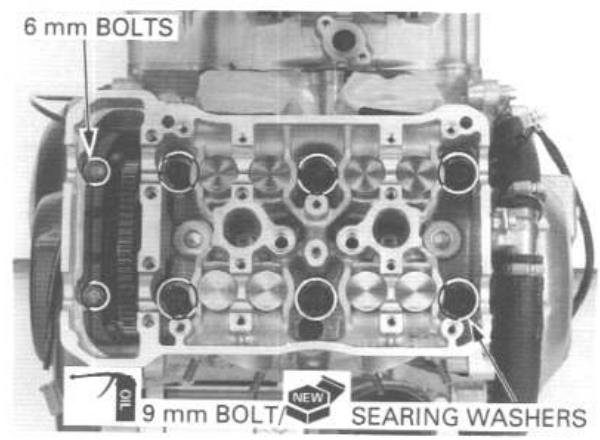
Install the cylinder head.

Apply oil to the threads and seating surface of the 9 mm special bolts.
Install the 9 mm bolts with new sealing washers.

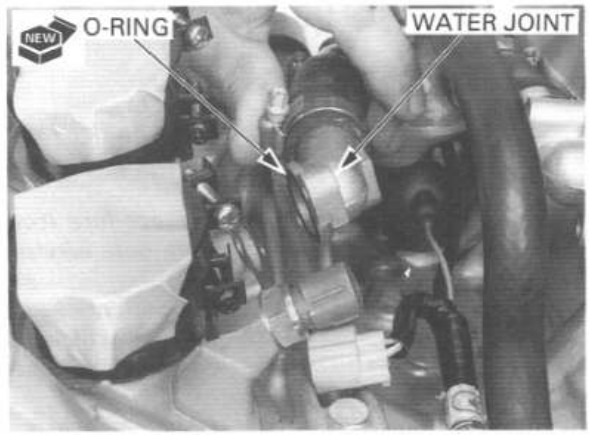
Install the two 6 mm flange bolts.
Tighten the 9 mm special bolts in a crisscross pattern in 2 – 3 steps to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

Tighten the 6 mm flange bolts.



Install new O-ring into the groove of the water joint.



Install the water joint to the cylinder head, then install and tighten the SH bolts.



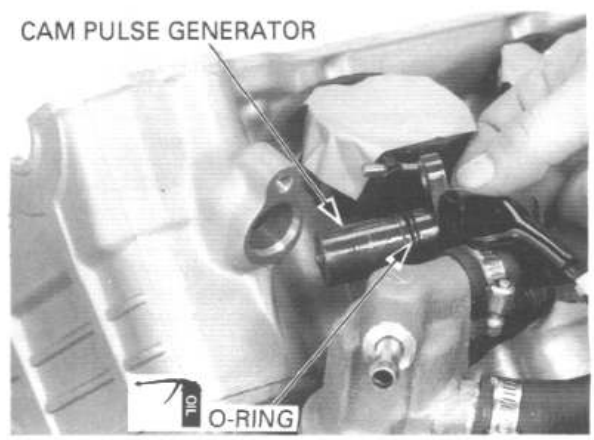
Front cylinder head:
Connect the ECT sensor connector.



Rear cylinder head:
Apply oil to the new cam pulse generator O-ring and install it into the groove of the cam pulse generator.

Install the cam pulse generator, tighten the bolt.

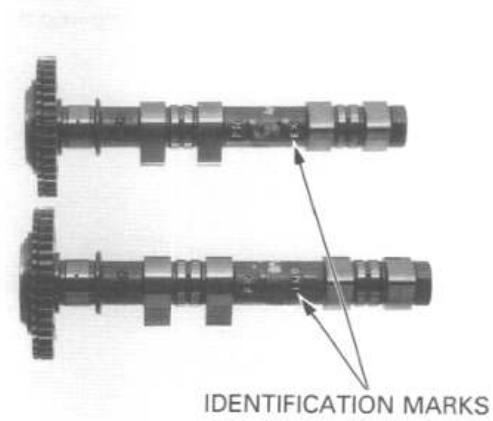
Install the engine into the frame (page 7-7).

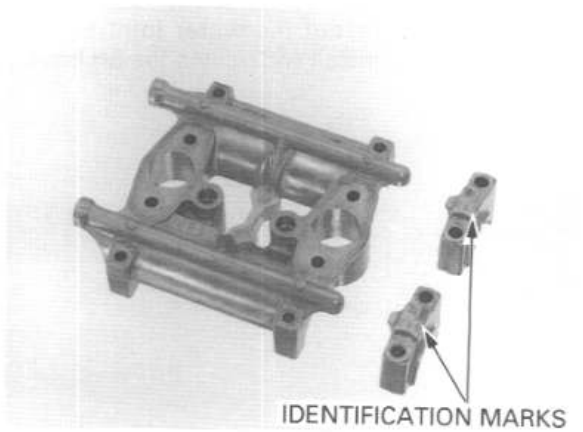


CAMSHAFT INSTALLATION

CAUTION:

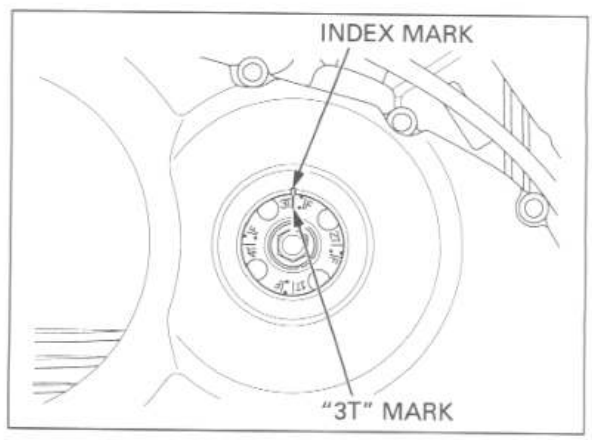
- *If the camshaft holder replacement is required, replace the holder and cylinder head as an assembly.*
- *Follow this procedure from beginning to end, even if you are only servicing one cylinder head camshafts.*
- *Check the camshaft marks so that you install each camshaft in its correct location.*
- *The mark on camshaft have the following meanings.*
  FR: Front cylinder camshaft
  RR: Rear cylinder camshaft
  IN: Intake camshaft
  EX: Exhaust camshaft
- *Apply molybdenum disulfide oil to the cam lobes and journals.*
- *Check the camshaft holder marks as noted during removal, so that you install each camshaft holder in its correct location.*



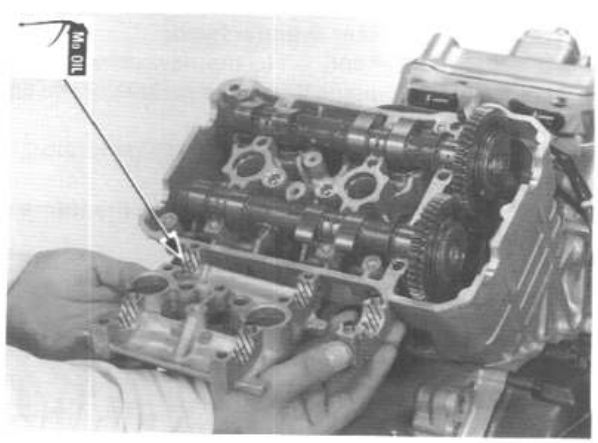


WHEN BOTH THE FRONT AND REAR CAMSHAFTS WERE REMOVED:

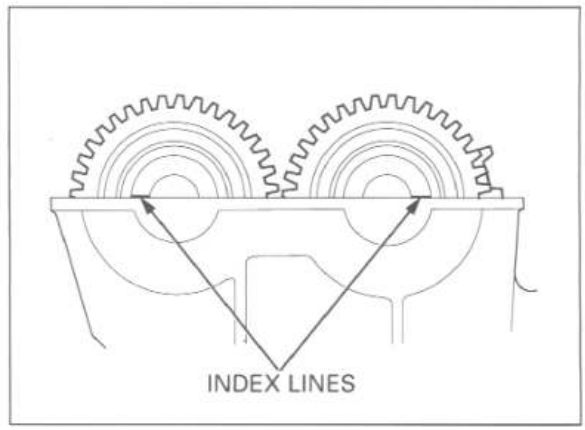
Turn the crankshaft clockwise and align the "3T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.
Make sure that the No. 3 piston is at TDC (Top Dead Center) on the compression stroke.



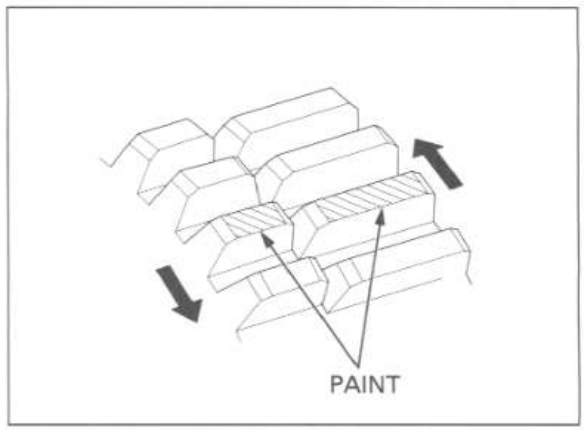
Apply molybdenum disulfide oil to the camshaft journals of the cylinder head and camshaft holder.



Install the rear cylinder intake and exhaust camshafts with the index lines on the camshaft gear facing outward.



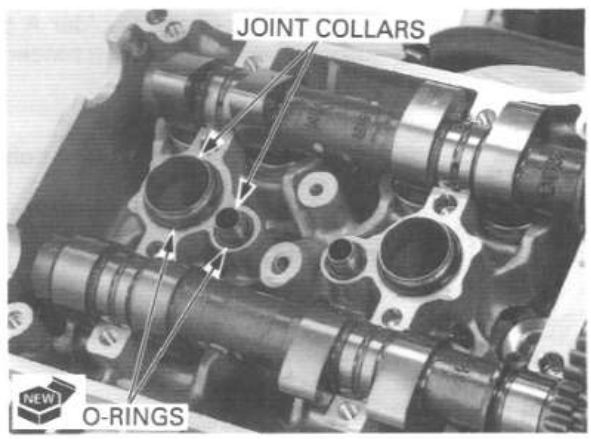
Paint the pair of gear teeth as shown to avoid misaligning the camshaft gear teeth with the third gear of the cam gear train.



Install joint collars and new O-rings into the cylinder head.

NOTE:

Always replace the O-rings with new ones.

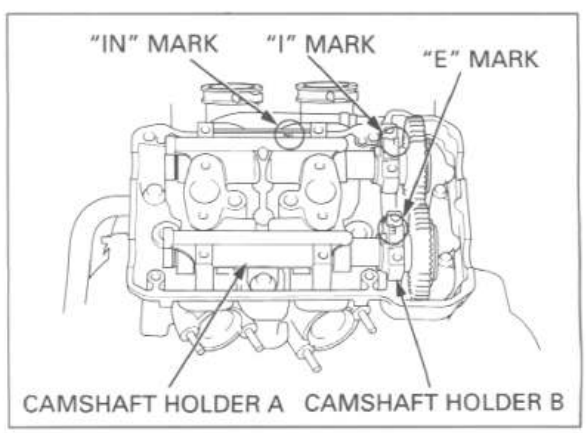


Install the camshaft holder A with the "IN" mark facing to the intake side.

Install the "I" marked camshaft holder B onto the intake camshaft and the "E" marked camshaft holder B onto the exhaust camshaft.

NOTE:

Install the camshaft holders B with their bosses facing the holder A.

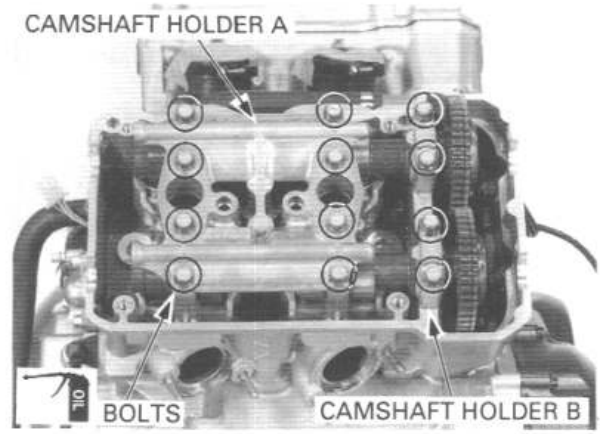


Apply clean engine oil to the threads and seating surfaces of the camshaft holder flange bolts.

Install new sealing washers and flange bolts.
Tighten the camshaft holder A flange bolts in a crisscross pattern in two or more steps until the holder rests lightly on the cylinder head surface.
Tighten the camshaft holder B flange bolts gradually in two or more steps.

NOTE:

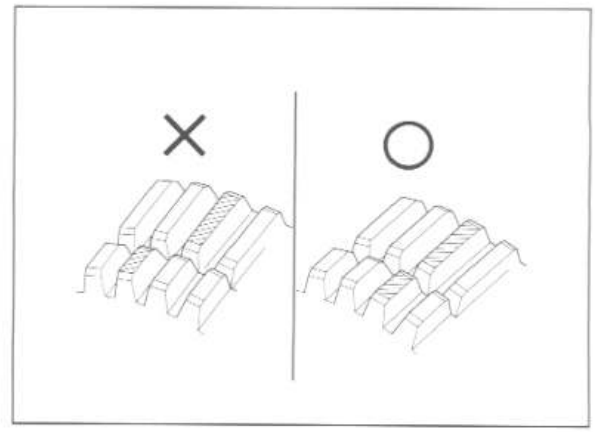
Tighten the camshaft holder bolts, starting with the bolts at the dowel pins, in two or more steps.



Check that the paint on the cam gear teeth are in line as shown.

NOTE:

Recheck that the index lines on the cam gear are flush with the cylinder head surface.

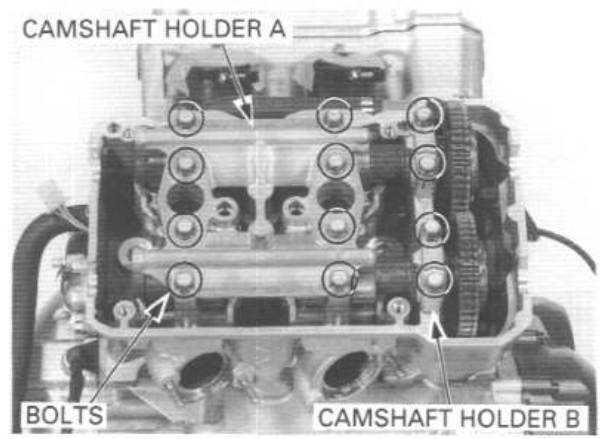


Tighten the camshaft holder A bolts to the specified torque, then the camshaft holder B bolts.

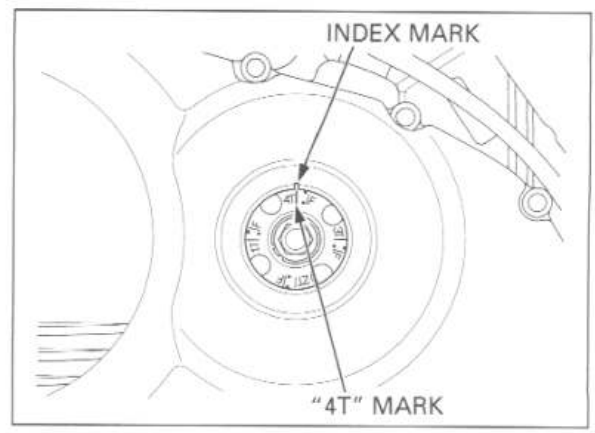
NOTE:

Tighten the camshaft holder bolts in a crisscross pattern in 2 or 3 steps.

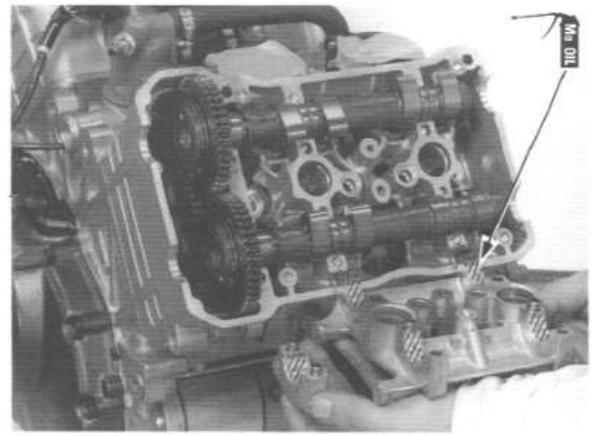
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Turn the crankshaft clockwise 1-1/4 turn (450°) and align the "4T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.
Make sure that the No. 4 piston is at TDC (Top Dead Center) on the compression stroke.



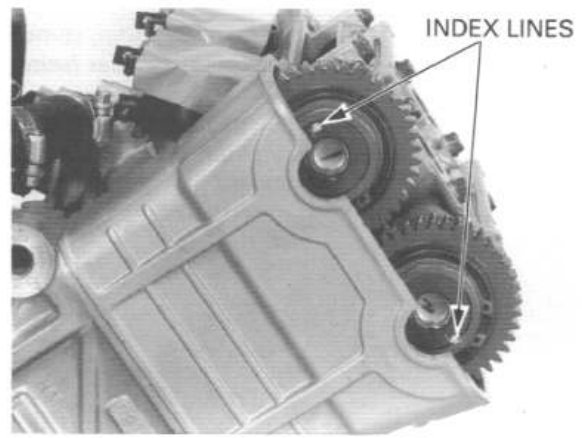
Apply molybdenum disulfide oil to the camshaft journals of the cylinder head and camshaft holder.



Install the front cylinder intake and exhaust camshafts with the index lines on the camshaft gear facing outward.

NOTE:

Make sure that the index lines on the camshaft gear are facing outward and are flush with the cylinder head.

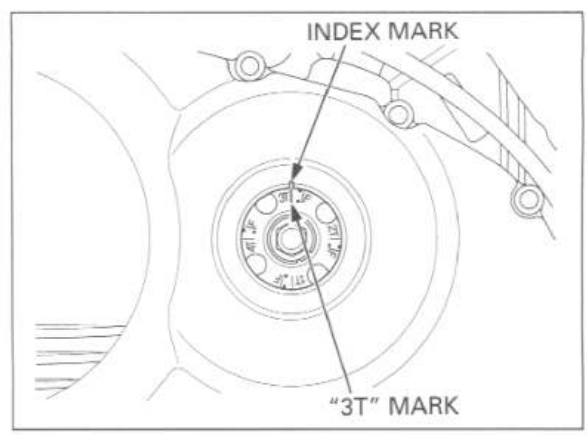


Install the front cylinder head camshaft holders following the same procedure as for the rear.

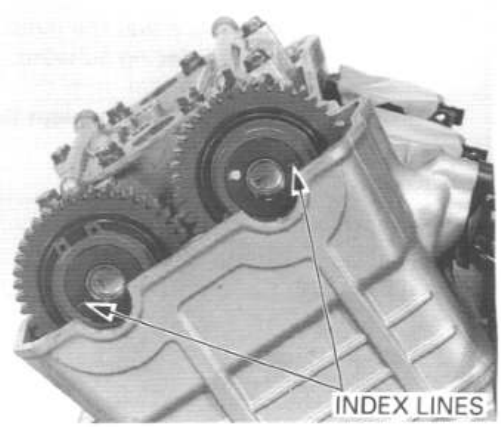
IF ONLY THE FRONT CYLINDER CAMSHAFT WAS REMOVED:

Remove the rear cylinder head cover (page 8-7).

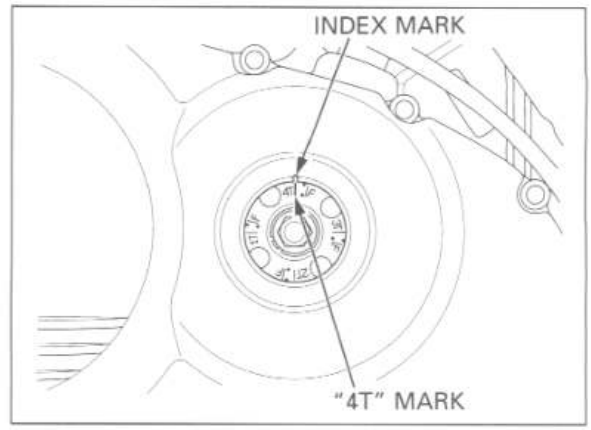
Turn the crankshaft clockwise and align the "3T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.



Make sure that the index lines on the rear camshaft gear are facing outward.
If they are not, turn the crankshaft clockwise one full turn (360°) and realign the "3T" mark with the index mark.

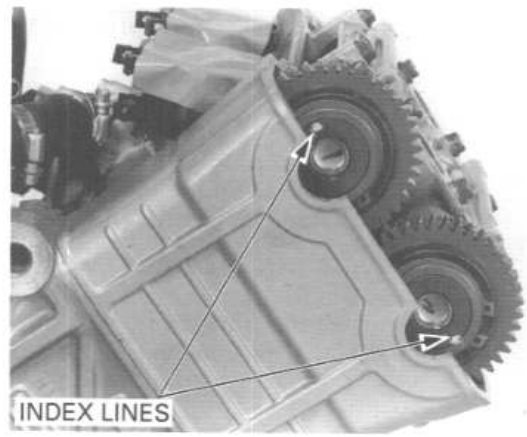


Turn the crankshaft clockwise 1-1/4 turn (450°) and align the "4T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.



Install the front cylinder camshafts with the index lines on the camshaft gear facing outward.

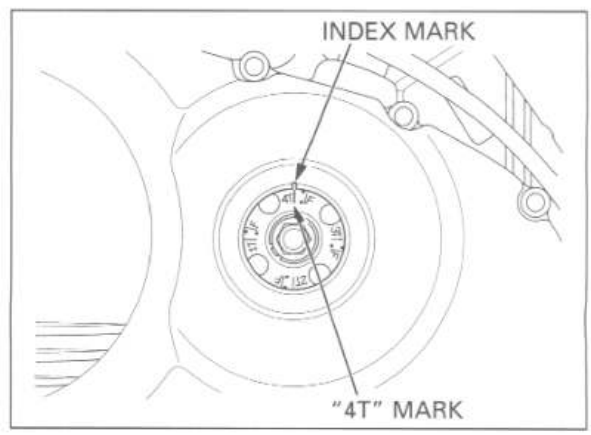
Install the camshaft holders following the same procedure as when both the front and rear camshafts were removed.



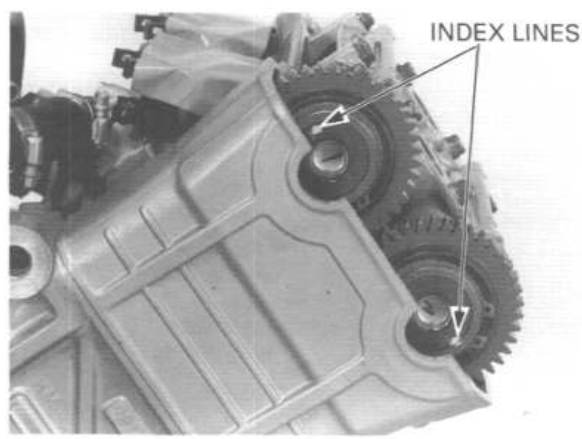
IF ONLY THE REAR CYLINDER CAMSHAFT WAS REMOVED

Remove the front cylinder head cover (page 8-4).

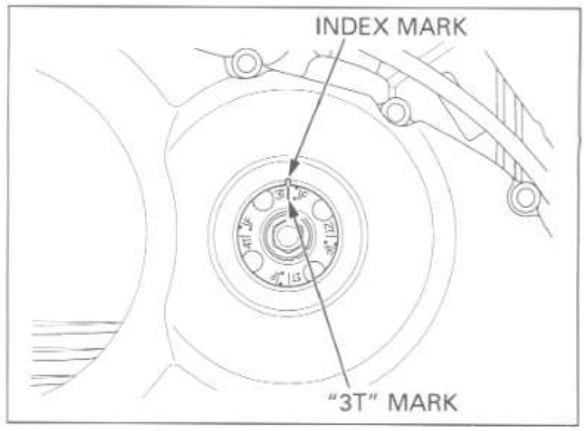
Turn the crankshaft clockwise and align the "4T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.



Make sure that the index lines on the front camshaft gear are facing outward.
If they are not, turn the crankshaft clockwise one full turn (360°) and realign the "4T" mark with the index mark.

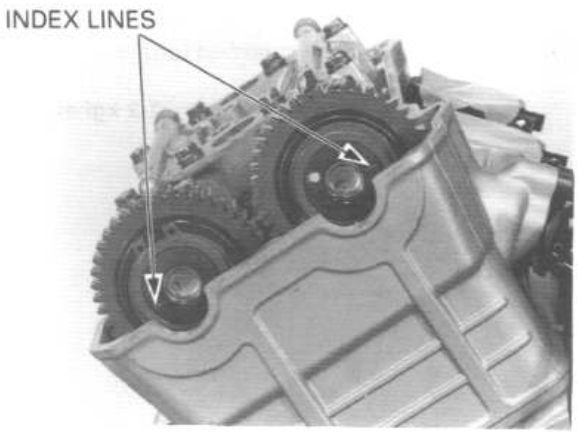


Turn the crankshaft clockwise 3/4 turn (270°) and align the "3T" mark on the ignition pulse generator rotor with the index mark on the right crankcase cover.



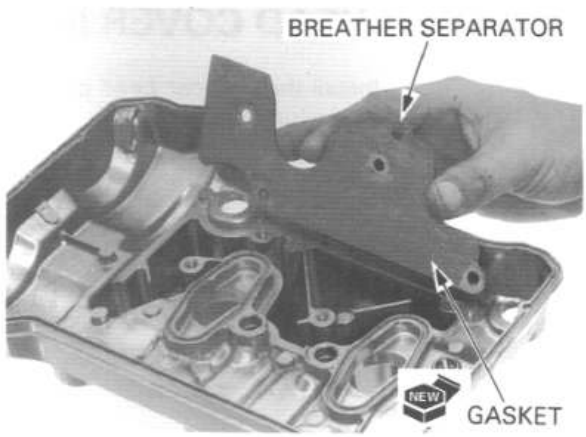
Install the rear cylinder camshafts with the index lines on the camshaft gear facing outward.

Install the camshaft holders following the same procedure as when both the front and rear camshafts were removed.



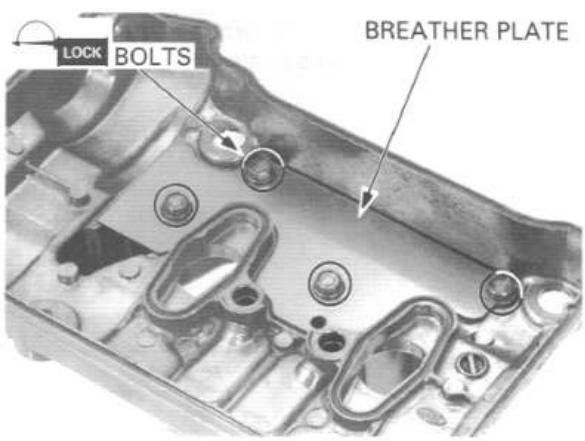
CYLINDER HEAD COVER ASSEMBLY

Install the new gasket and crankcase breather separator to the rear cylinder head cover.

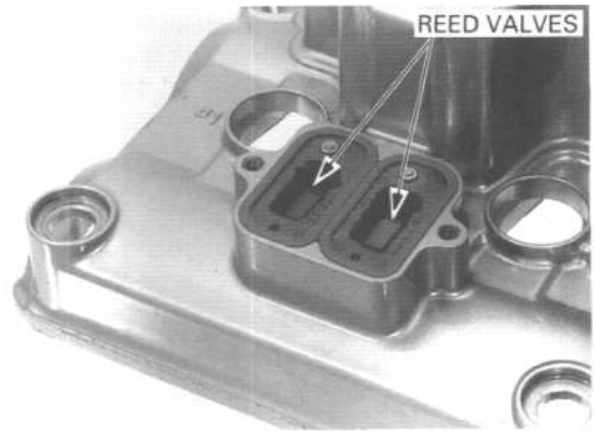


Apply a locking agent to the crankcase breather separator mounting bolt threads.
Tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

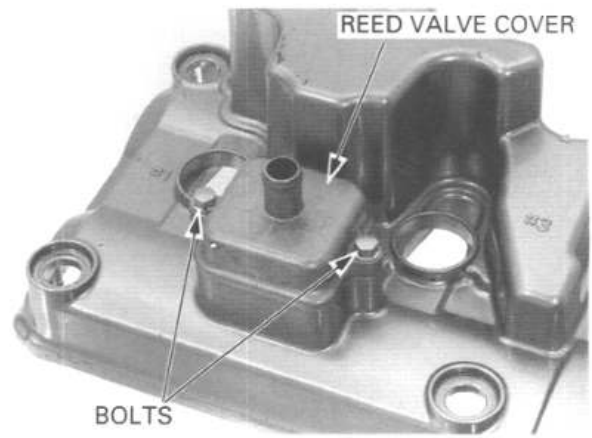


Install the PAIR reed valves into the cylinder head cover.



Install the PAIR reed valve cover and tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

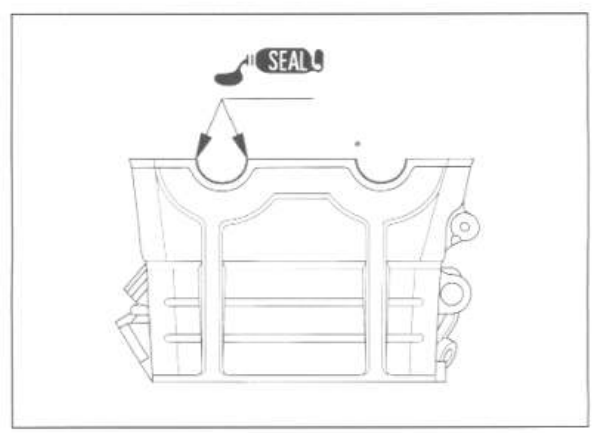


CYLINDER HEAD COVER INSTALLATION

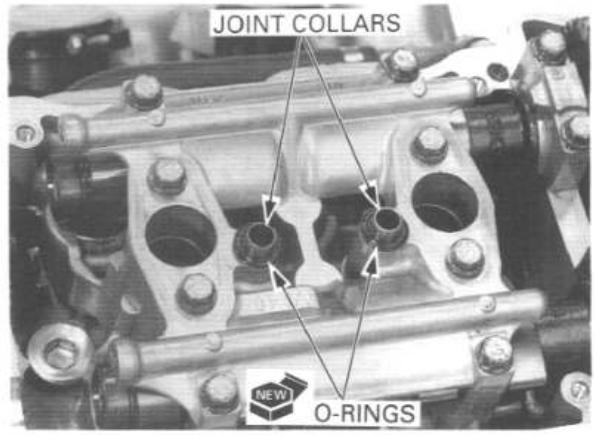
Install the cylinder head packings into the groove of the cylinder head cover.



Apply sealant to the cylinder head semi-circular cutouts as shown.

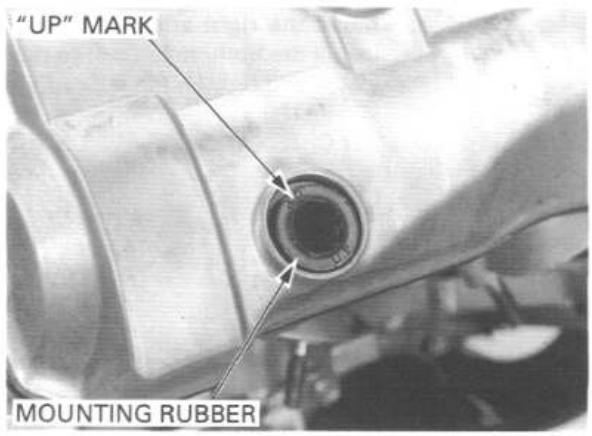


Install the air joint collars and new O-rings.



Install the cylinder head cover onto the cylinder head.

Install the mounting rubbers with their "UP" mark facing up.



Install and tighten the cylinder head cover special bolts to the specified torque.

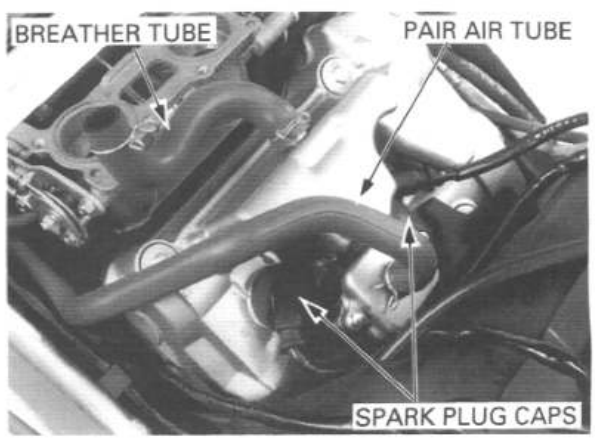
NOTE:

Tighten the "△" marked side bolts first.

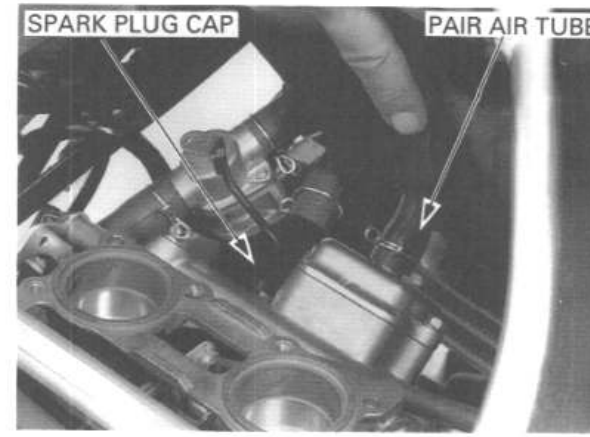
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



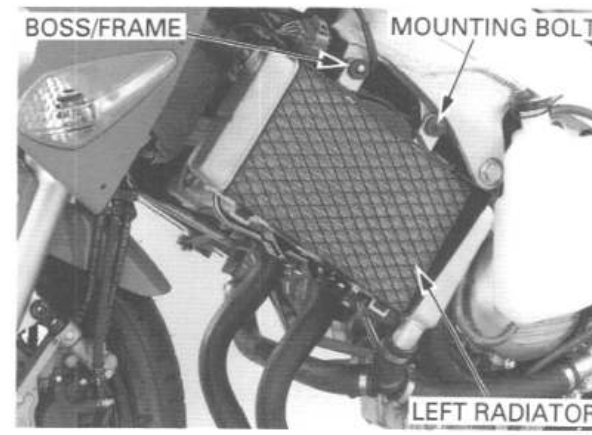
Rear:
Install the rubber seat onto the rear cylinder head cover.
Install the spark plug caps.
Install the PAIR system, connect the air tube to the rear cylinder head cover.
Connect the crankcase breather tube.



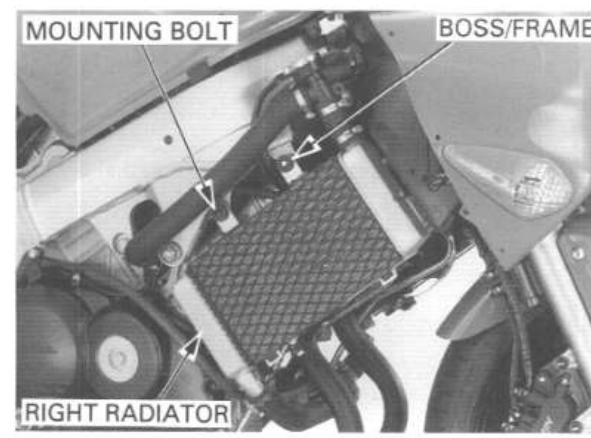
Front:
Install the PAIR system, connect the air tube to the front cylinder head cover.
Install the spark plug caps.



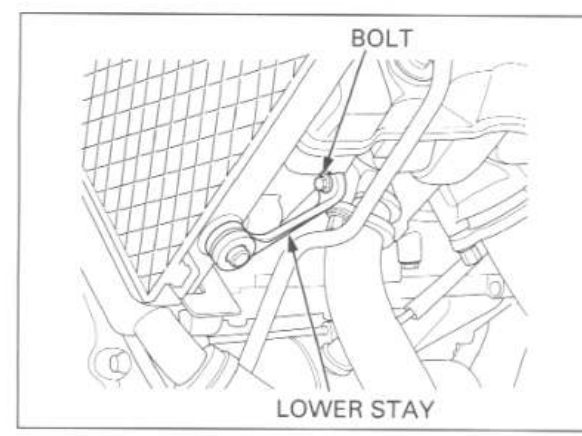
Move the right and left radiator assembly upward, install the both radiator onto the frame boss.
Install and tighten the left radiator mounting bolt.



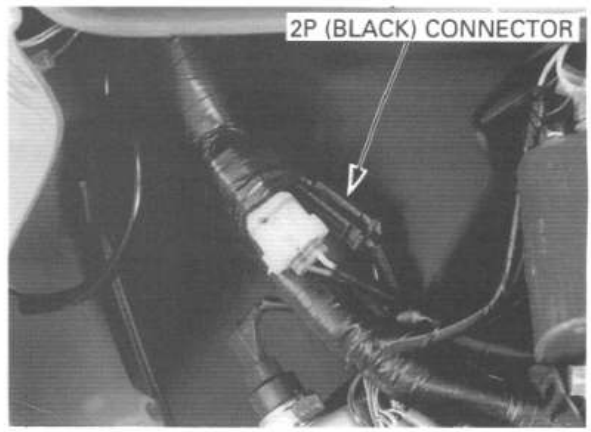
Install and tighten the right radiator mounting bolt.



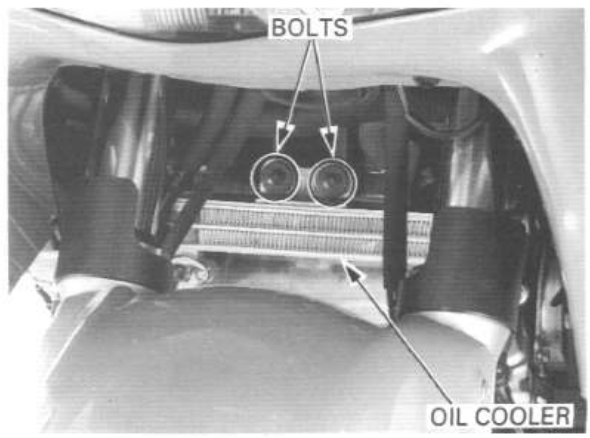
Install the radiator lower stay and tighten the bolt on each side.



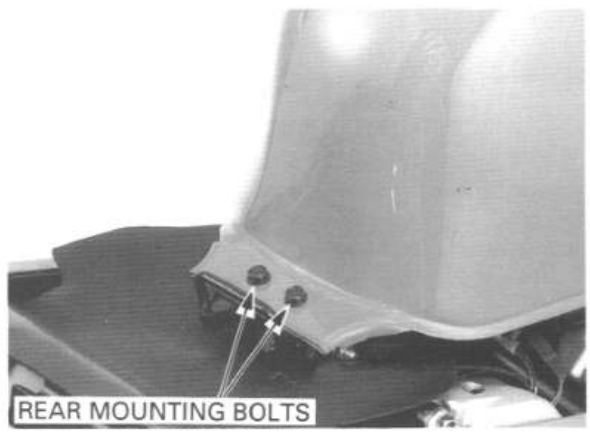
Connect the radiator sub-harness 2P (Black) connector.



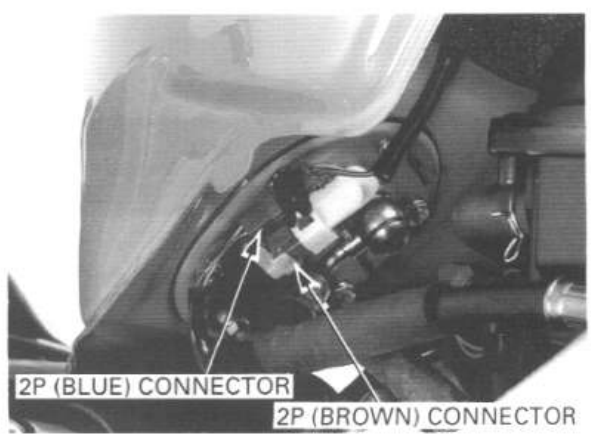
Install the oil cooler onto the bracket, install the bolts. Tighten the bolts securely.



Install the fuel tank onto the rear bracket, tighten the two bolts securely.



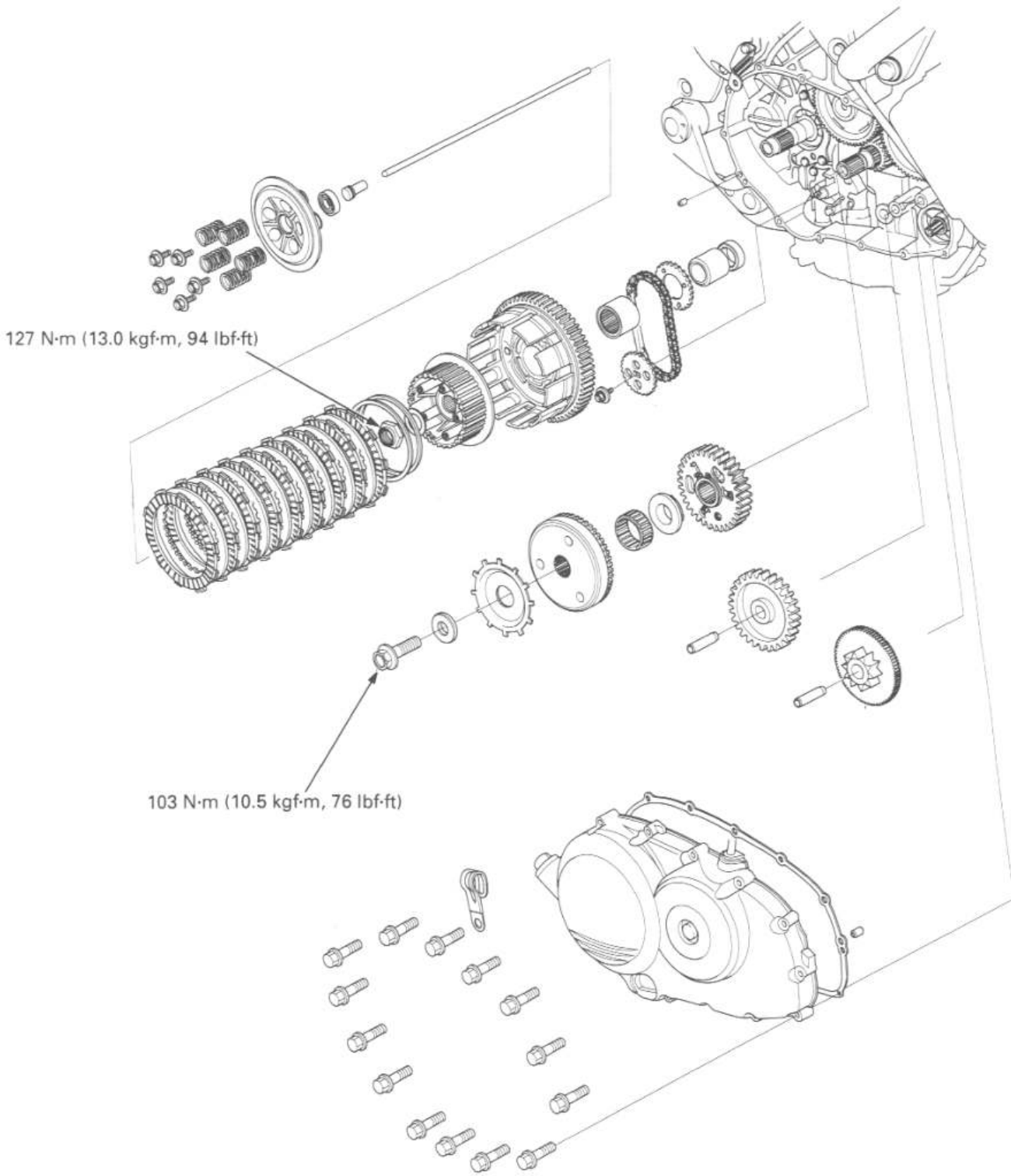
Connect the fuel pump 2P (Brown) connector and fuel level sensor 2P (Blue) connector.



Install the fuel tank air vent tube and overflow tube.

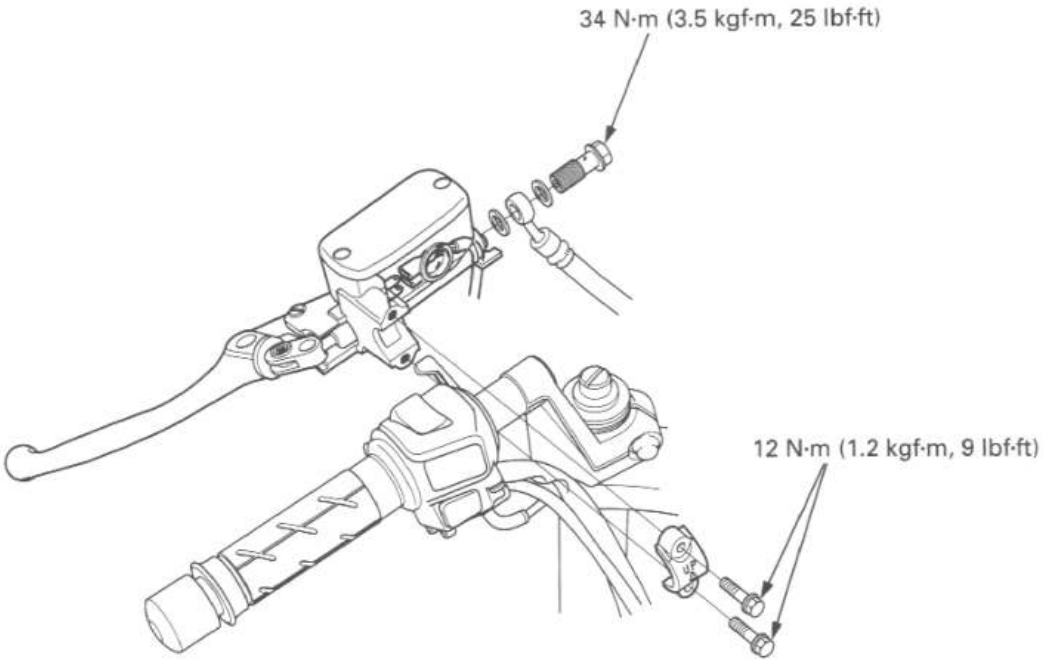
Install the following:
— Throttle body (page 5-60)
— Air cleaner housing (page 5-55)
— Side cowl (page 2-7)
— Fuel tank (page 5-51)

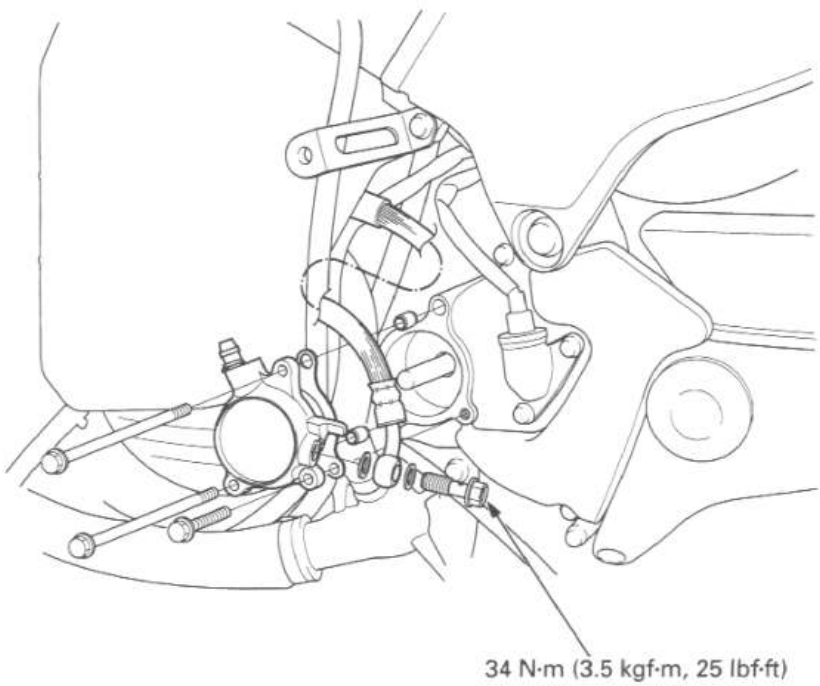



127 N·m (13.0 kgf·m, 94 lbf·ft)
103 N·m (10.5 kgf·m, 76 lbf·ft)

9. CLUTCH

SERVICE INFORMATION	9-2	RIGHT CRANKCASE COVER REMOVAL	9-12
TROUBLESHOOTING	9-3	CLUTCH	9-13
CLUTCH FLUID REPLACEMENT/ AIR BLEEDING	9-4	PRIMARY DRIVE GEAR	9-21
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CLUTCH SLAVE CYLINDER	9-10		





SERVICE INFORMATION

GENERAL

- This section covers service of the clutch. All service can be done with the engine installed in the frame.
- 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 clutch 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 clutch lever 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.
- Transmission oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the transmission oil level before servicing the clutch system.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Recommended clutch fluid		DOT 4 brake fluid	———
Clutch master cylinder	Cylinder I.D.	14.000 – 14.043 (0.5512 – 0.5529)	14.06 (0.554)
	Piston O.D.	13.957 – 13.984 (0.5495 – 0.5506)	13.94 (0.549)
Clutch outer guide I.D.		24.995 – 25.012 (0.9841 – 0.9847)	25.08 (0.987)
Clutch spring free length		45.6 (1.80)	42.6 (1.68)
Clutch disc thickness		2.92 – 3.08 (0.115 – 0.121)	2.5 (0.10)
Clutch plate warpage		———	0.30 (0.012)

TORQUE VALUES

Clutch center lock nut	127 N·m (13.0 kgf·m, 94 lbf·ft)	* Apply oil to the threads and flange surface Stake the nut
Ignition pulse generator/primary drive gear bolt	103 N·m (10.5 kgf·m, 76 lbf·ft)	Apply oil to the threads and flange surface
Oil pump driven sprocket bolt	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply a locking agent to the threads
Clutch slave cylinder bleeder	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	
Clutch hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Clutch master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Clutch master cylinder cap screw	1 N·m (0.15 kgf·m, 1.1 lbf·ft)	
Clutch lever pivot bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Clutch lever pivot nut	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Clutch lever adjuster	4 N·m (0.4 kgf·m, 2.9 lbf·ft)	
Clutch switch screw	1 N·m (0.12 kgf·m, 0.8 lbf·ft)	
Gearshift pedal flange bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	

TOOLS

Clutch center holder	07724 – 0050002	Equivalent commercially available in U.S.A.
Universal holder	07725 – 0030000	Equivalent commercially available in U.S.A.

TROUBLESHOOTING

Clutch lever soft or spongy
- Air in hydraulic system
- Low fluid level
- Hydraulic system leaking

Clutch lever too hard to pull in
- Sticking master cylinder piston
- Sticking slave cylinder piston
- Clogged hydraulic system
- Damaged clutch lifter mechanism
- Faulty clutch lifter bearing
- Clutch lifter piece installed improperly

Clutch slips when accelerating
- Hydraulic system sticking
- Worn clutch disc
- Weak clutch springs
- Transmission oil mixed with molybdenum or graphite additive

Clutch will not disengage or motorcycle creeps with clutch disengaged
- Air in hydraulic system
- Low fluid level
- Hydraulic system leaking or clogged
- Clutch plate warped
- Loose clutch lock nut
- Oil level too high
- Improper oil viscosity
- Damaged clutch lifter mechanism
- Clutch lifter piece installed improperly

Hard to shift
- Improper clutch operation
- Improper oil viscosity

CLUTCH FLUID REPLACEMENT/ AIR BLEEDING

CAUTION:

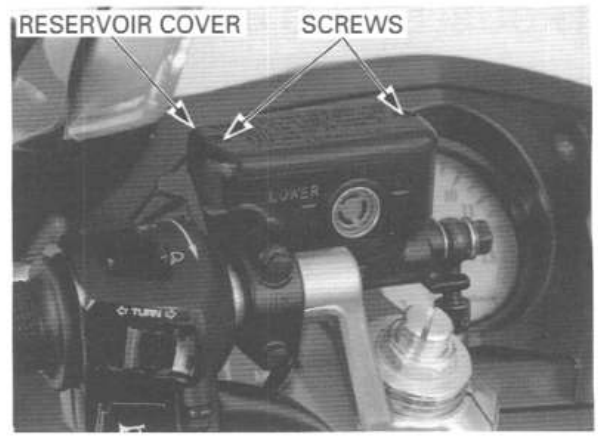
- ***Do not allow foreign material to enter the system when filling the reservoir.***
- ***Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.***

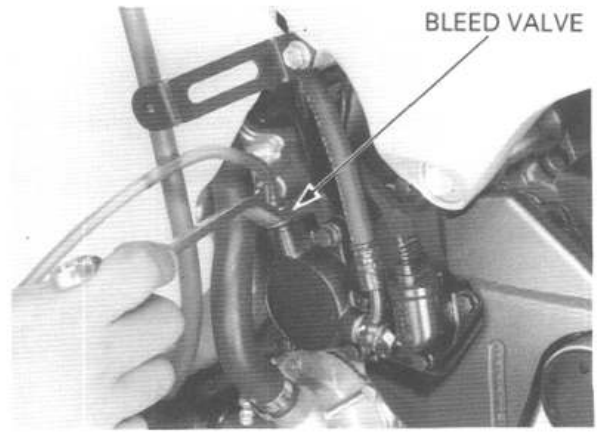
CLUTCH FLUID DRAINING

Support the motorcycle on its center stand.
Turn the handlebar to the right until the reservoir is parallel to the ground, before removing the reservoir cap.

Remove the screws, reservoir cap, set plate and diaphragm.

Connect a bleed hose to the clutch slave cylinder 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.





CLUTCH FLUID FILLING/AIR BLEEDING

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

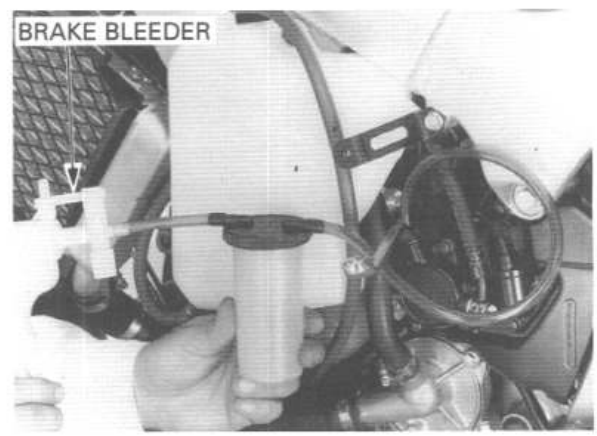
CAUTION:

Do not mix different types of fluid. They are not compatible.

Connect a commercially available brake bleeder to the 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:

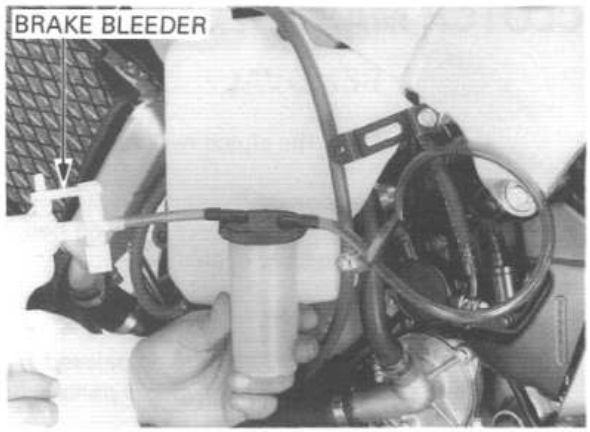
- Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



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 clutch lever and check clutch operation.
If it still feels spongy, bleed the system again.



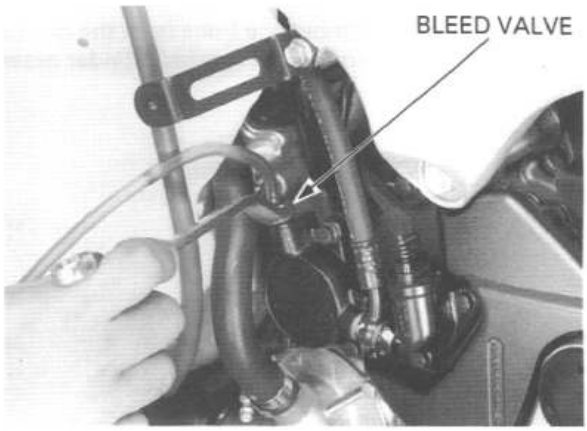
If a brake bleeder is not available, use the following procedure:
Connect a transparent bleed hose to the bleed valve and place the outer end of the hose in a container.
Loosen the bleed valve 1/4 turn and pump the clutch lever until the fluid flows out from the bleed valve.

1. Pump the clutch lever several times, then squeeze the clutch 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 clutch lever until the bleed valve has been closed.

2. Release the clutch 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.



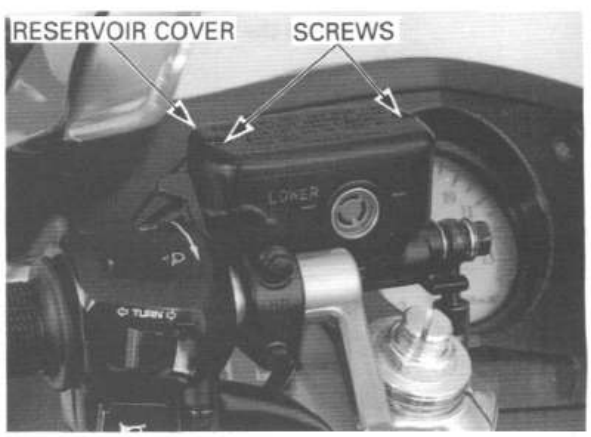
After bleeding air completely and tighten the bleed valve to the specified torque.

TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)

Fill the reservoir to the casting ledge with 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 clutch operation (page 3-25).



CLUTCH MASTER CYLINDER

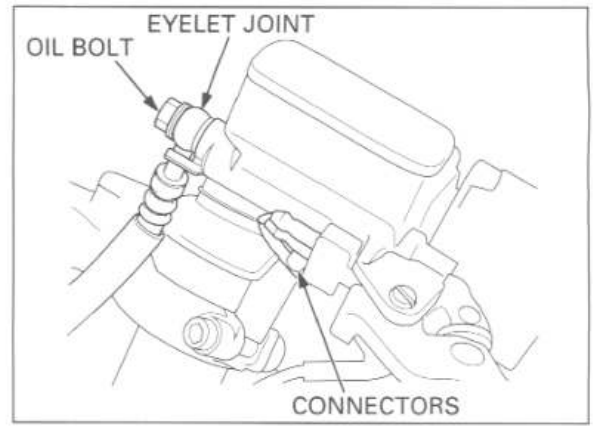
REMOVAL

Drain the clutch hydraulic system (page 9-4).

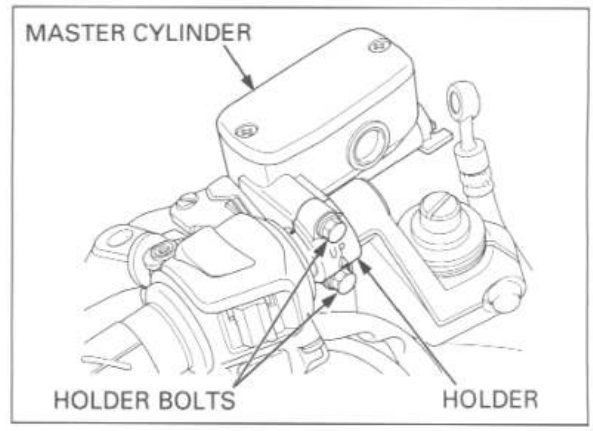
Disconnect the clutch switch wire connectors.
Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

CAUTION:

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.



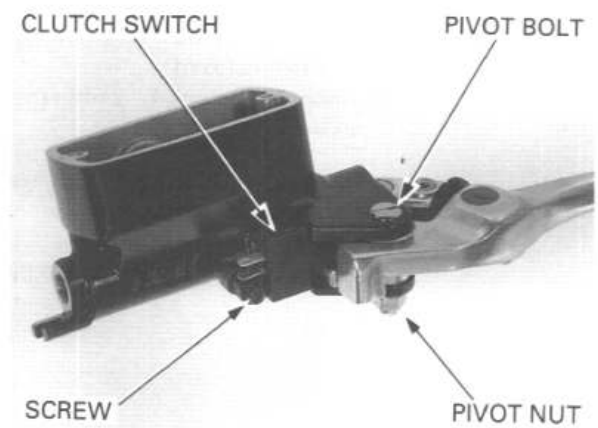
Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



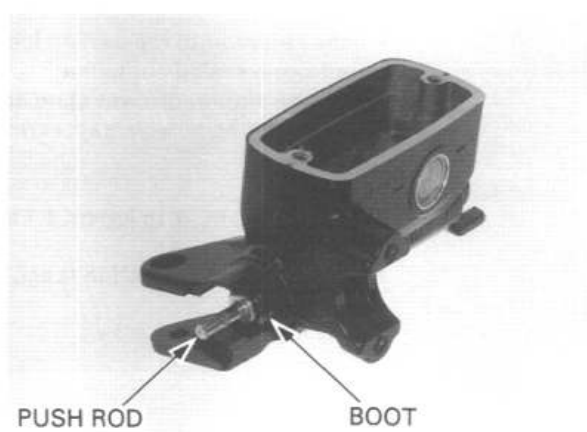
DISASSEMBLY

Remove the pivot bolt/nut and clutch lever assembly.

Remove the screw and clutch switch.

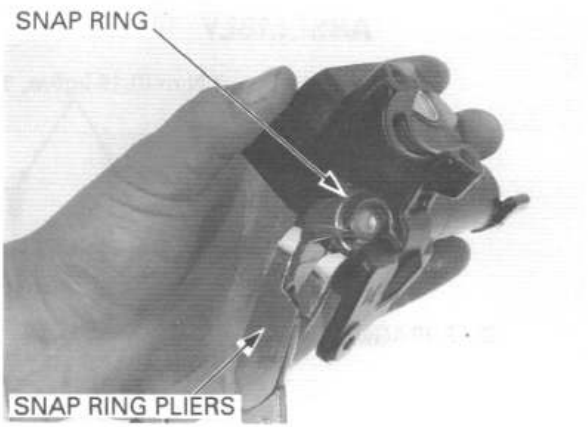


Remove the boot and push rod.



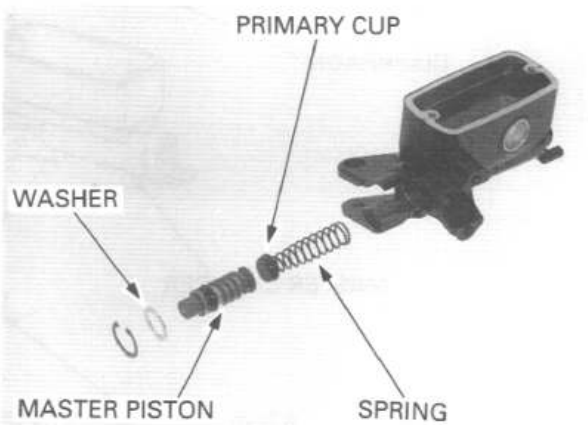
Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:
Snap ring pliers **07914 – SA50001 or 07914 – 3230001**



Remove the washer, master piston, primary cup and spring.

Clean the inside of the cylinder and reservoir with brake fluid.



INSPECTION

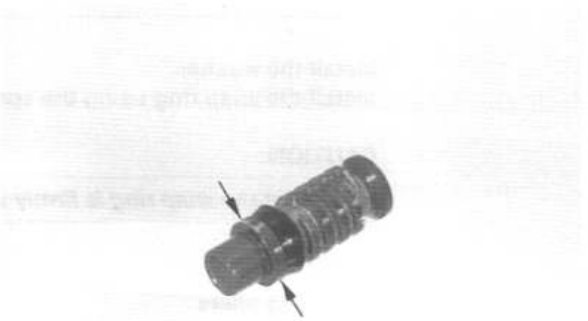
Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

SERVICE LIMIT: 14.06 mm (0.554 in)

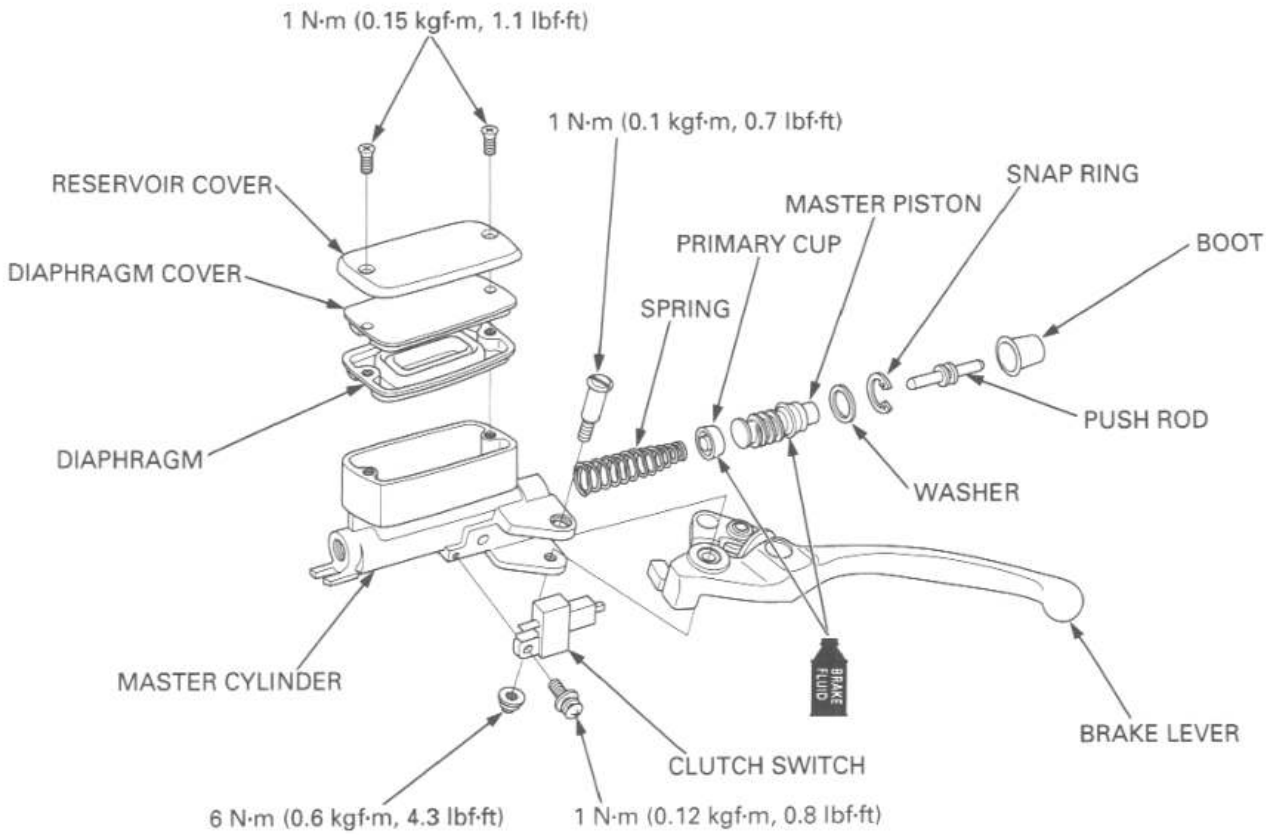


Measure the master cylinder piston O.D.

SERVICE LIMIT: 13.94 mm (0.549 in)



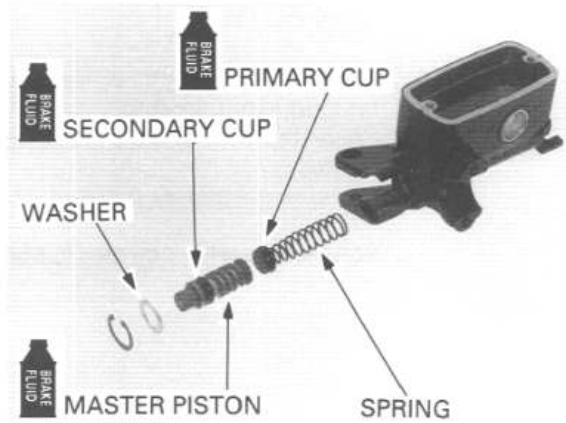
ASSEMBLY



CAUTION:

Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

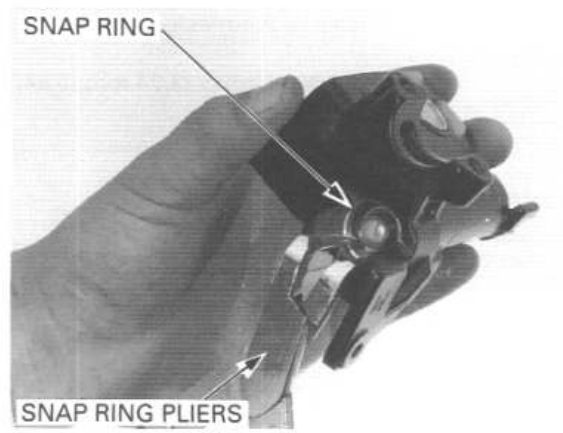
Coat all parts with clean brake fluid before assembly.
Dip the piston in brake fluid.
Install the primary cup onto the spring.
Install the spring and primary cup into the master cylinder.
Install the piston assembly into the master cylinder.



CAUTION:

When installing the cups, do not allow the lips to turn inside out.

Install the washer.
Install the snap ring using the special tool.



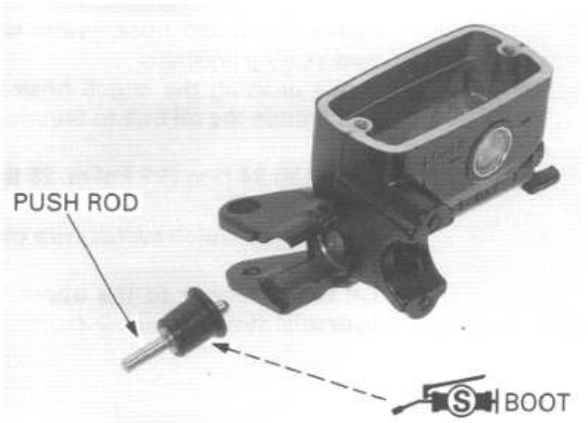
CAUTION:

Be certain the snap ring is firmly seated in the groove.

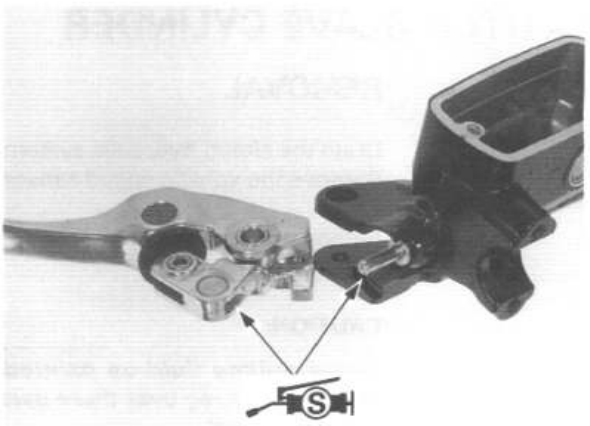
TOOL:

Snap ring pliers	**07914 – SA50001 or 07914 – 3230001**

Apply silicone grease to the boot inside and tip of the push rod.
Install the push rod and boot.



Apply silicone grease to the tip of the push rod, then install the clutch lever assembly.



Install and tighten the pivot bolt to the specified torque.

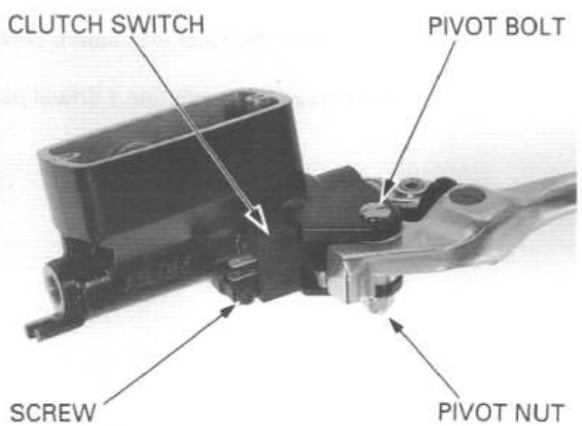
TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)

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)

Install the clutch switch and tighten the screw to the specified torque.

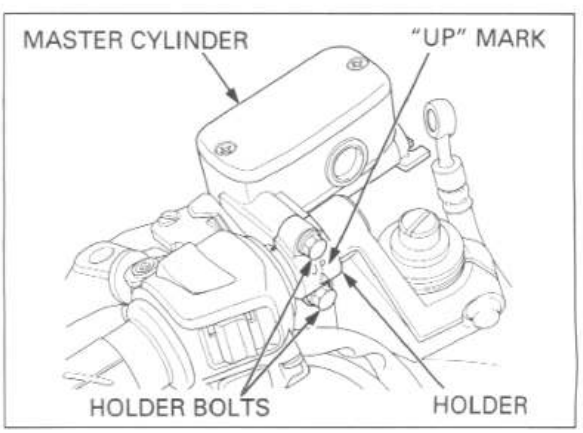
TORQUE: 1 N·m (0.12 kgf·m, 0.8 lbf·ft)



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)

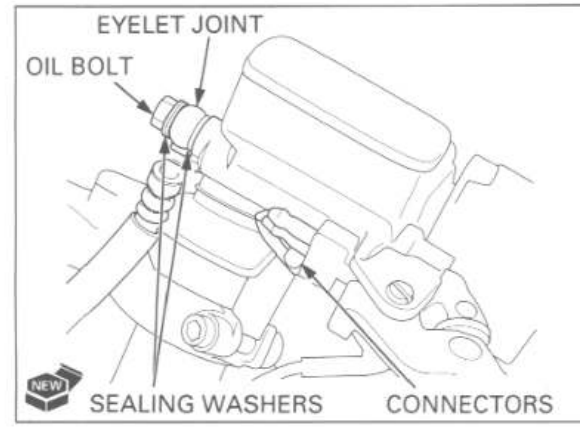


Install the clutch hose eyelet with the oil bolt and new sealing washers.
While pushing the clutch hose against the stopper and tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Connect the clutch switch wire connectors.

Fill the reservoir to the upper level and bleed the hydraulic system (page 9-4).



CLUTCH SLAVE CYLINDER

REMOVAL

Drain the clutch hydraulic system (page 9-4).
Remove the vehicle speed sensor (page 19-14).

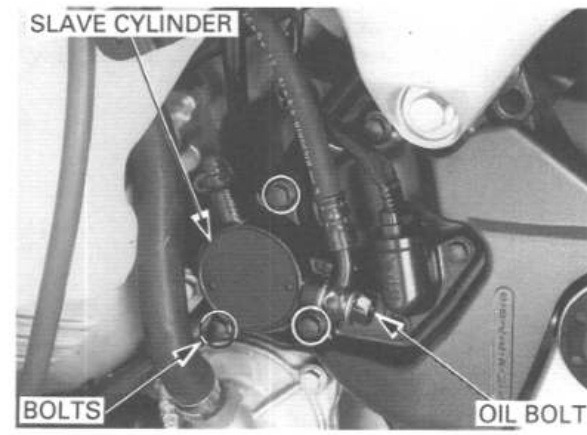
Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

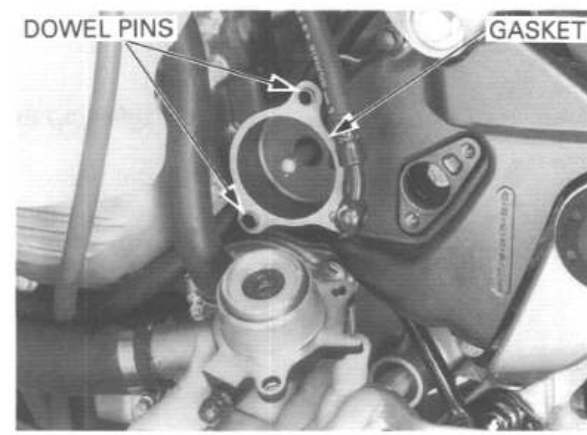
CAUTION:

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

Remove the bolts and clutch slave cylinder assembly.

Remove the gasket and dowel pins.



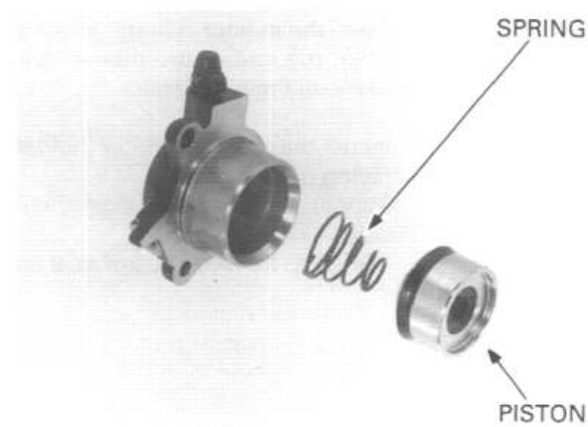


DISASSEMBLY

Remove the slave cylinder piston and spring.
If the piston is hard to remove, remove the following:
Place a shop towel over the piston to cushion the piston when it is expelled, and position the cylinder with the piston down.
Apply small squirts of air pressure to the fluid inlet to remove the pistons.

⚠ WARNING

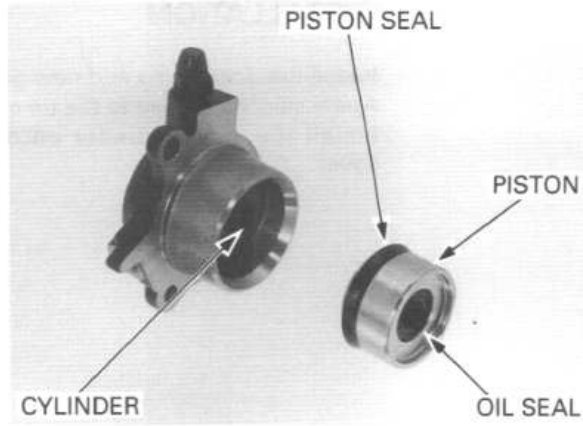
Do not use high pressure air or bring the nozzle too close to the inlet.



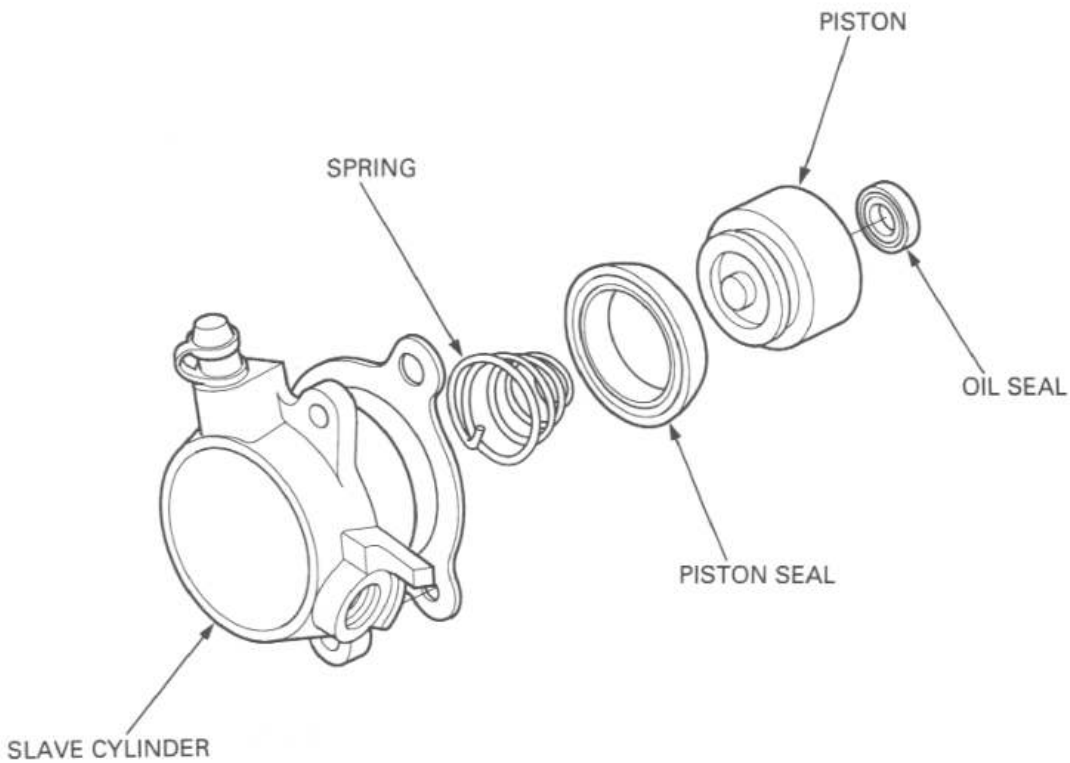
INSPECTION

Check the piston spring for weakness or damage.
Inspect the oil and piston seals for damage or deterioration.
Replace the oil seal and piston seal if necessary.
Clean the seal grooves with clean brake fluid.

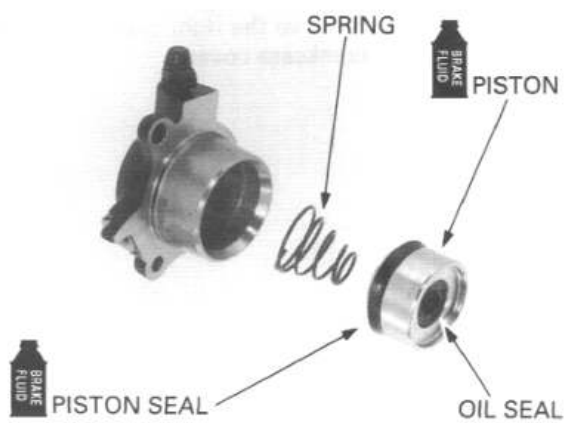
Check the slave cylinder for scoring or other damage.
Check the slave cylinder piston for scratches, scoring or other damage.



ASSEMBLY

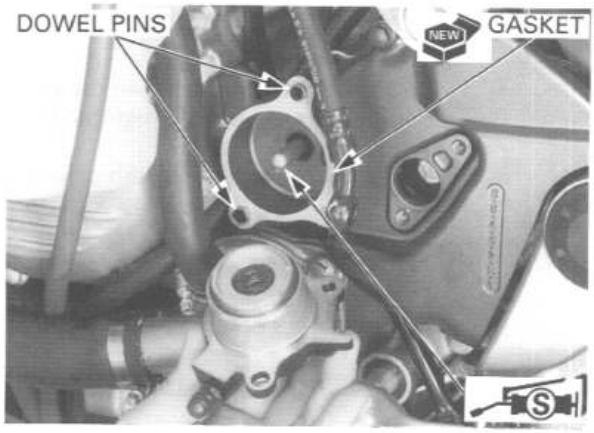


Install the new piston seal with its groove side facing to the slave cylinder.
Install the new oil seal with its groove side facing to the slave cylinder piston.
Install the spring into the boss of the piston.
Lubrication the piston and piston seal with brake fluid.
Install the spring and piston into the slave cylinder.



INSTALLATION

Install the dowel pins and new gasket.
Apply silicone grease to the tip of the push rod tip.
Install the slave cylinder onto the drive sprocket cover.

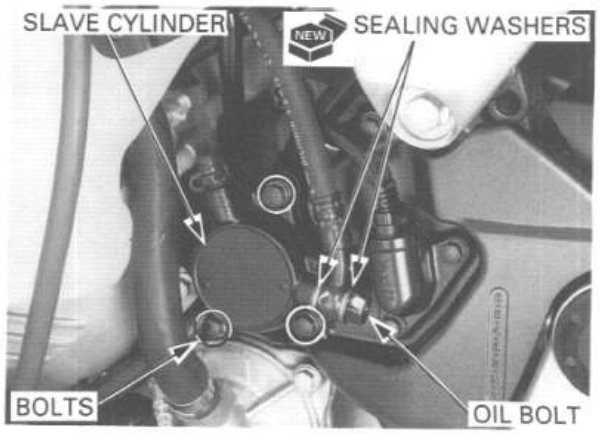


Install and tighten the SH bolts.

Install the clutch hose eyelet with the oil bolt and new sealing washers.
While pushing the clutch hose against the stopper and tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the vehicle speed sensor (page 19-14).
Fill the reservoir to the upper level and bleed the hydraulic system (page 9-4).

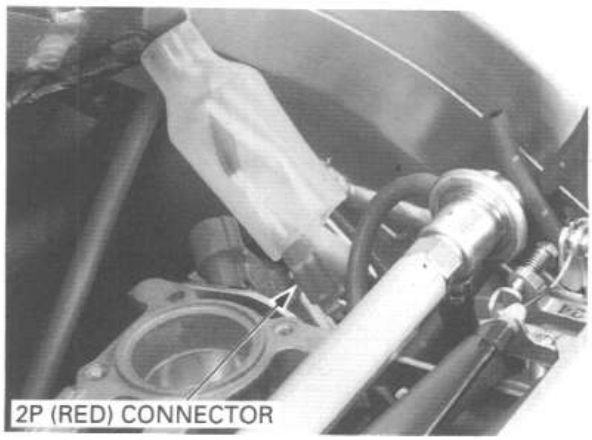


RIGHT CRANKCASE COVER REMOVAL

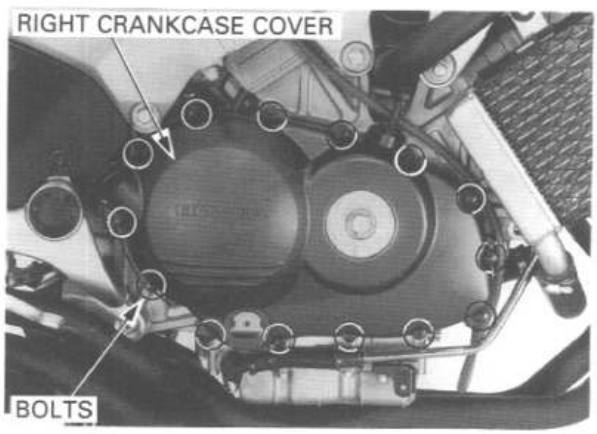
Remove the following:
— Air cleaner housing (page 5-53)
— Side cowl (page 2-6)

Drain the engine oil (page 3-13).

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

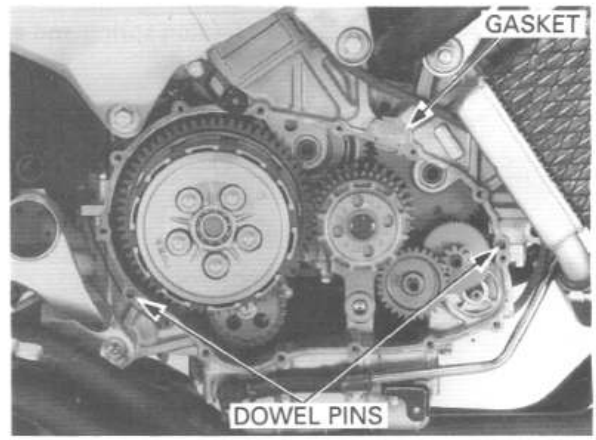


Remove the right crankcase cover SH bolts and right crankcase cover.



Remove the gasket and dowel pins.

See page 17-7 for ignition pulse generator removal/ installation.

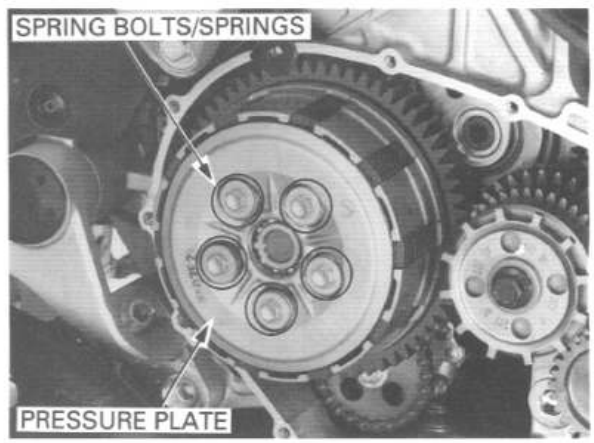


CLUTCH

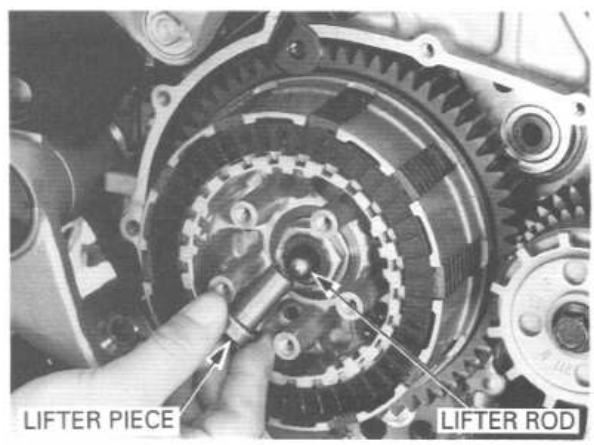
REMOVAL

Remove the right crankcase cover (page 9-12).

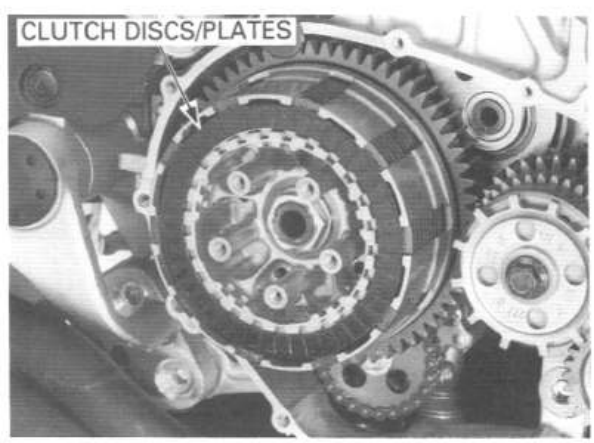
Remove the clutch spring bolts, springs and pressure plate.



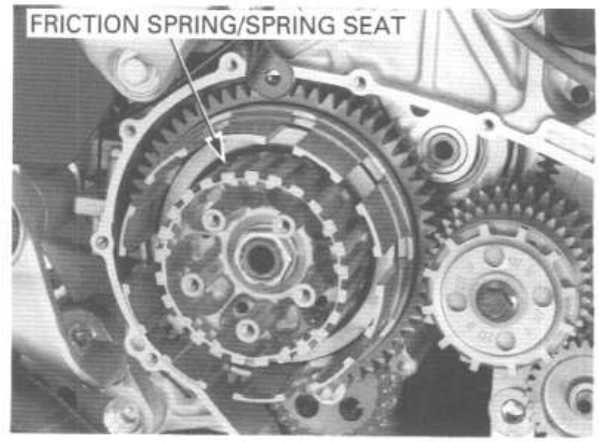
Remove the lifter piece and clutch lifter rod.



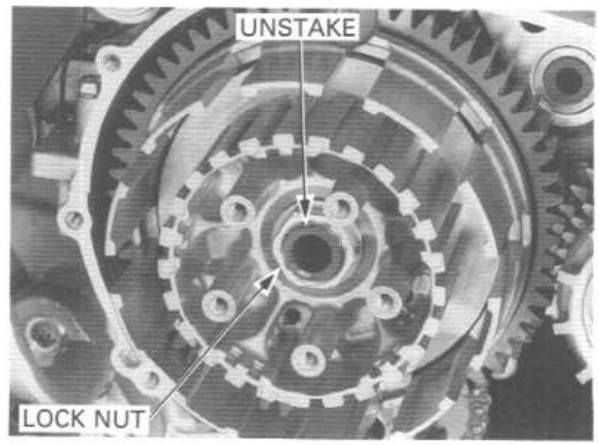
Remove the clutch discs and plates.



Remove the friction spring and spring seat.



Unstake the clutch center lock nut.

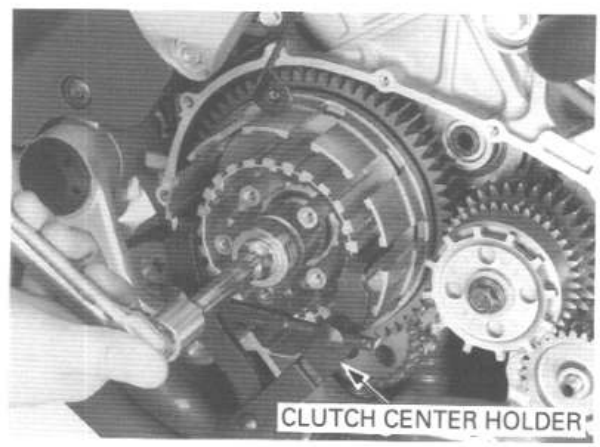


Hold the clutch center with the clutch center holder, then loosen and remove the lock nut.

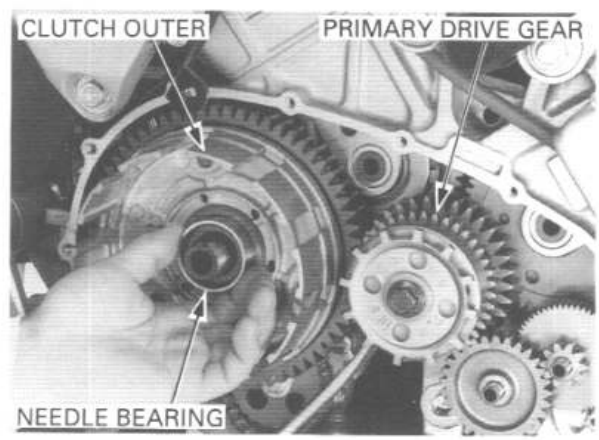
TOOL:

Clutch center holder	**07724 – 0050002 (Equivalent commercially available in U.S.A.)**

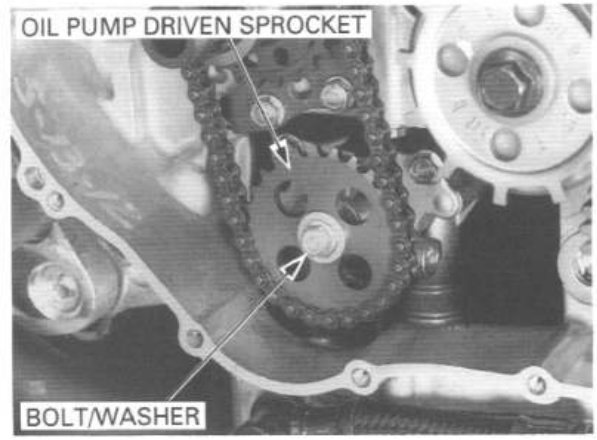
Discard the lock nut.
Remove the lock washer and clutch center.



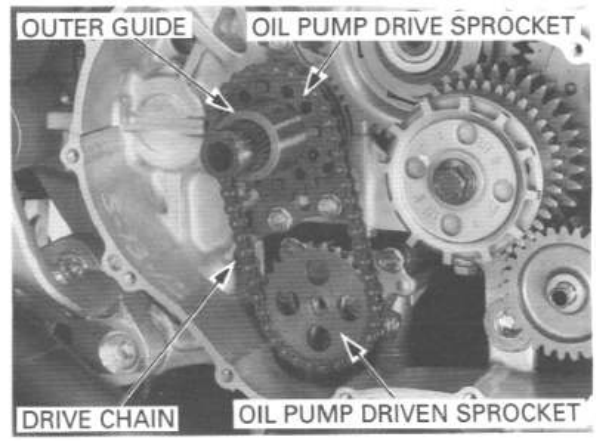
Align the primary drive gear and sub-gear teeth with a flat blade screw driver, then remove the clutch outer and needle bearing.



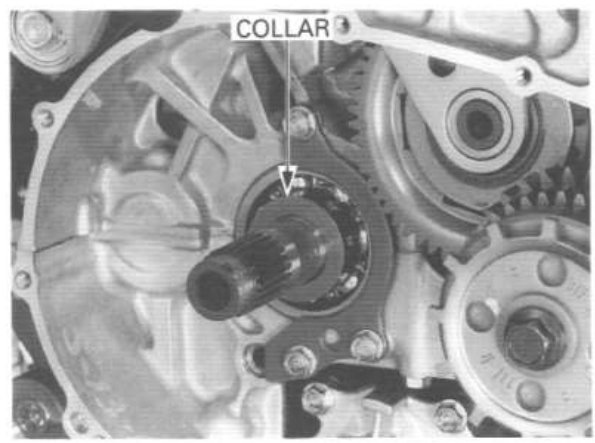
Remove the oil pump driven sprocket bolt/washer.



Remove the clutch outer guide.
Remove the oil pump drive sprocket, driven sprocket and drive chain as an assembly.

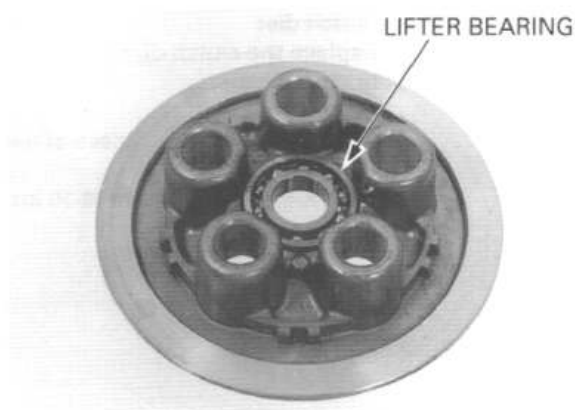


Remove the collar from the mainshaft.

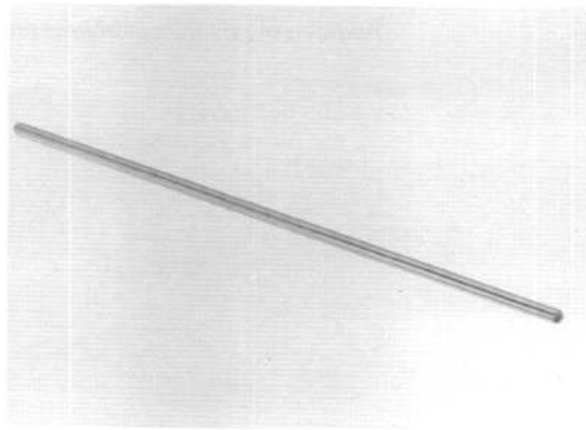


INSPECTION

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.

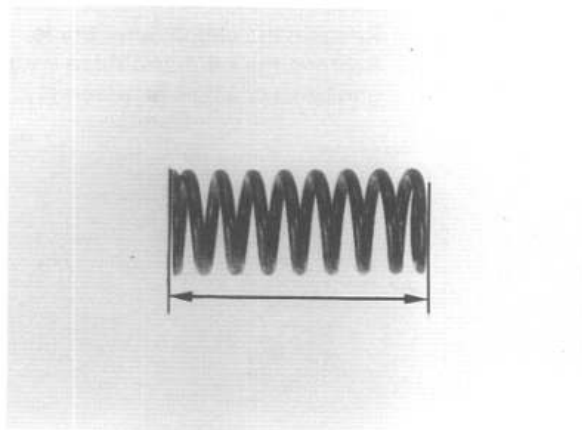


Clutch lifter rod
Check the clutch lifter rod for wear and trueness.



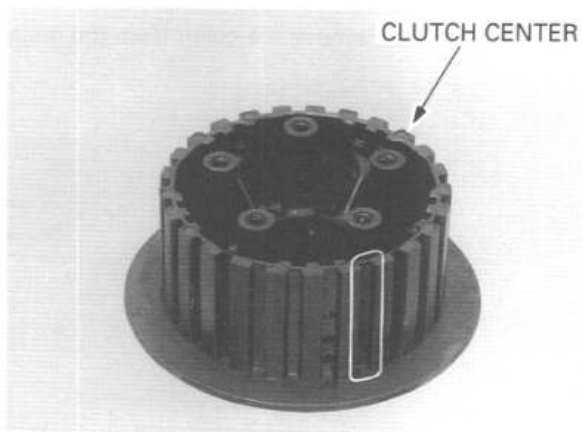
Clutch spring
Measure the clutch spring free length.

SERVICE LIMIT: 42.6 mm (1.68 in)



Clutch center
Check the grooves of the clutch center for damage or wear caused by the clutch plates.

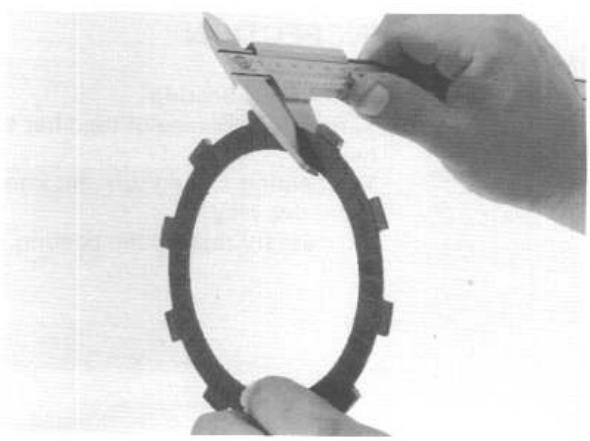
Replace if necessary.



Clutch disc
Replace the clutch discs if they show signs of scoring or discoloration.

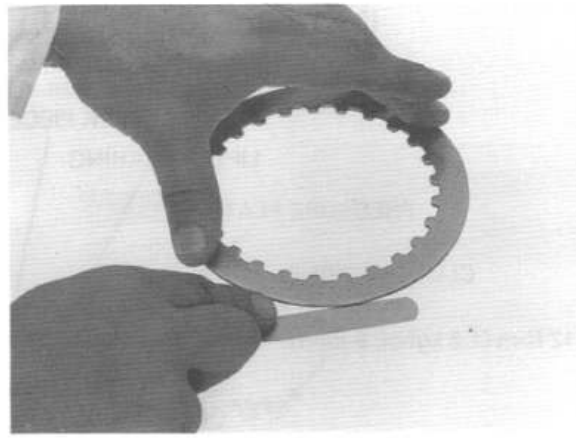
Measure the disc thickness of each disc.

SERVICE LIMIT: 2.5 mm (0.10 in)

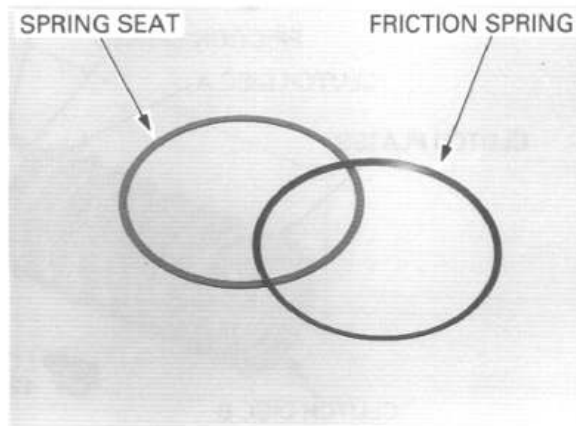


Clutch plate
Check each disc plate for warpage on a surface plate using a feeler gauge.

SERVICE LIMIT: 0.30 mm (0.012 in)

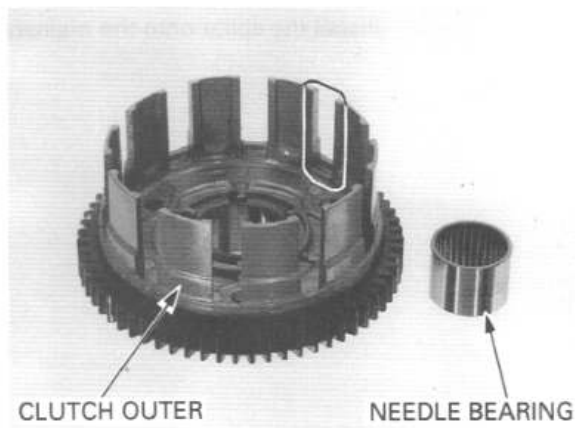


Friction spring/spring seat
Check the friction spring and spring seat for wear or other damage, replace if necessary.



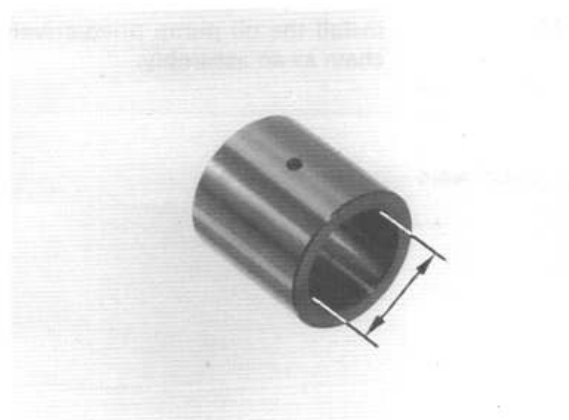
Clutch outer
Check the slots of the clutch outer for damage or wear caused by the clutch discs.
Replace if necessary.

Check the clutch outer needle bearing for wear or damage, replace if necessary.

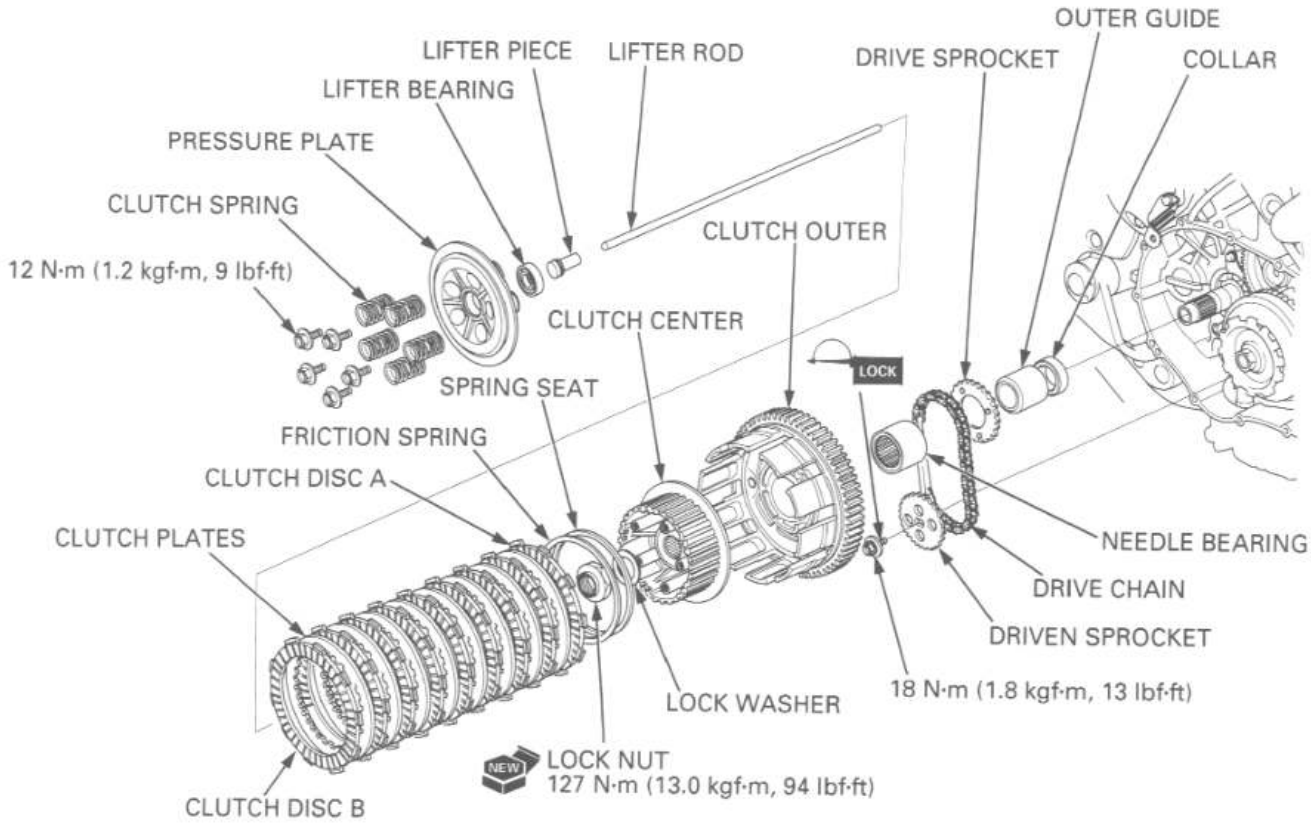


Clutch outer guide
Measure the I.D. of the clutch outer guide.

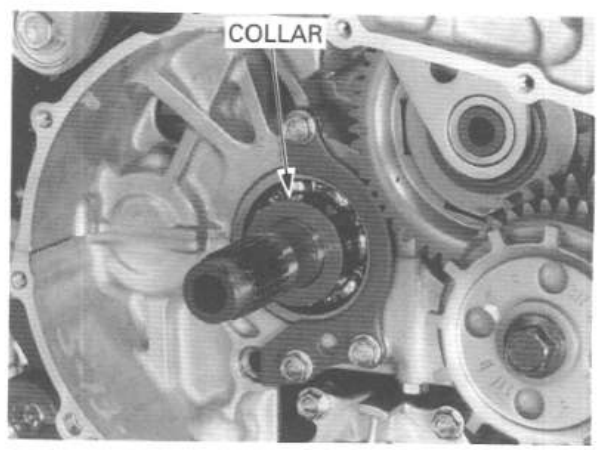
SERVICE LIMIT: 25.08 mm (0.987 in)



INSTALLATION

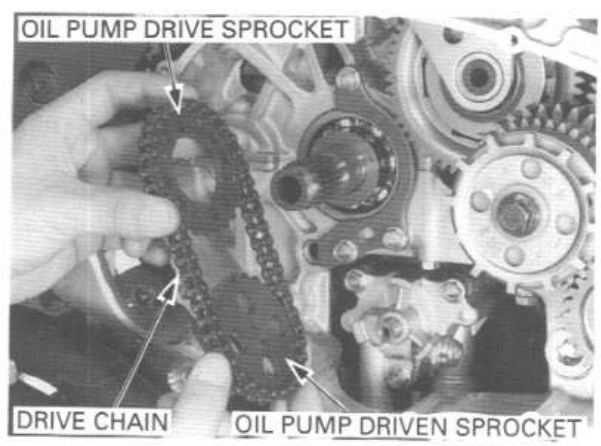


Install the collar onto the mainshaft.

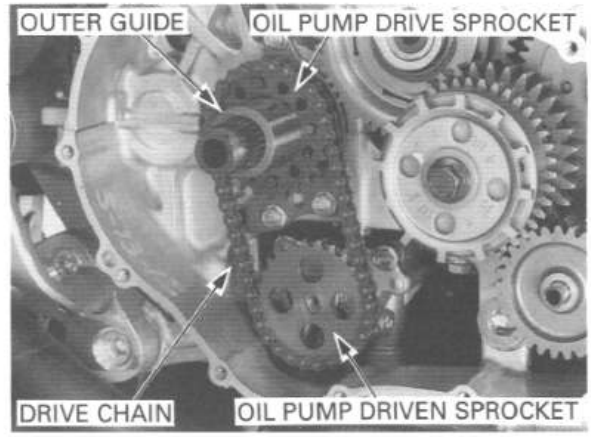


Make sure that the 4 posts on the oil pump drive sprocket face toward the clutch outer.

Install the oil pump drive/driven sprocket and drive chain as an assembly.

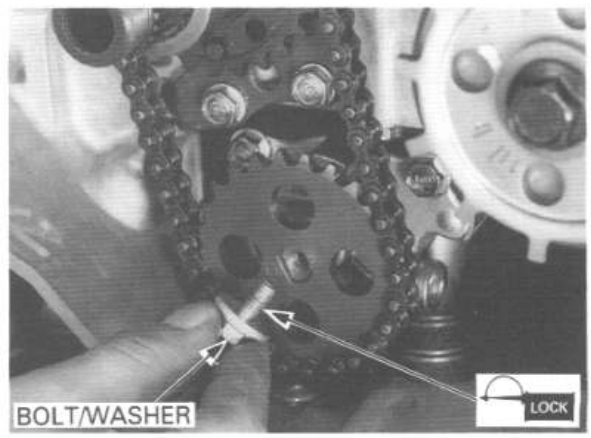


Install the clutch outer guide.



Apply a locking agent to the threads of the oil pump driven sprocket bolt.
Tighten the driven sprocket bolt to the specified torque.

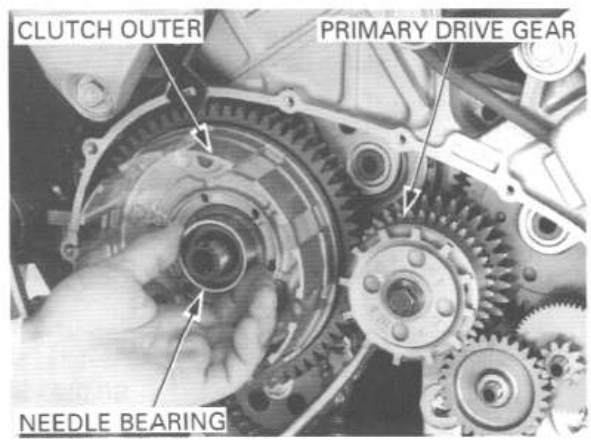
TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



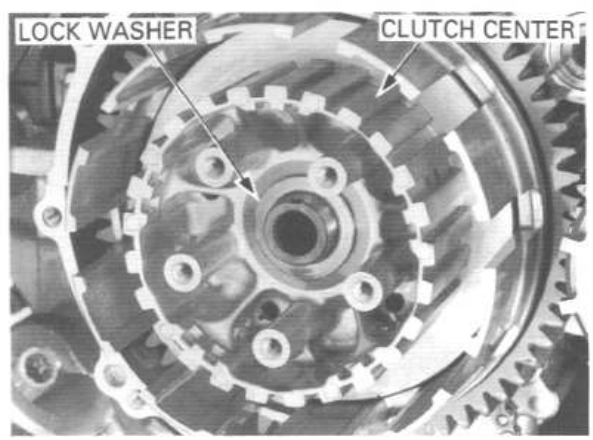
Align the primary drive gear and sub-gear teeth with a flat blade screwdriver as shown.
Install the clutch outer and needle bearing.

NOTE:

Align the bosses on the oil pump drive sprocket with the holes in the clutch outer by turning the driven sprocket with your finger.



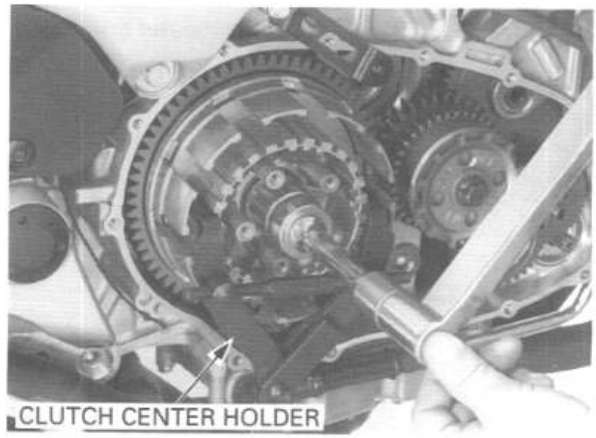
Install the clutch center.
Install the lock washer with its dished face facing out.



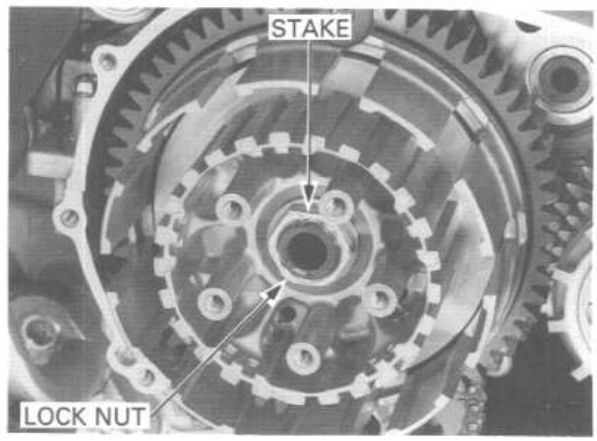
Install the new lock nut.
Hold the clutch center with the clutch center holder, then tighten the lock nut to the specified torque.

TOOL:
Clutch center holder — **07724 – 0050002 (Equivalent commercially available in U.S.A.)**

TORQUE: 127 N·m (13.0 kgf·m, 94 lbf·ft)



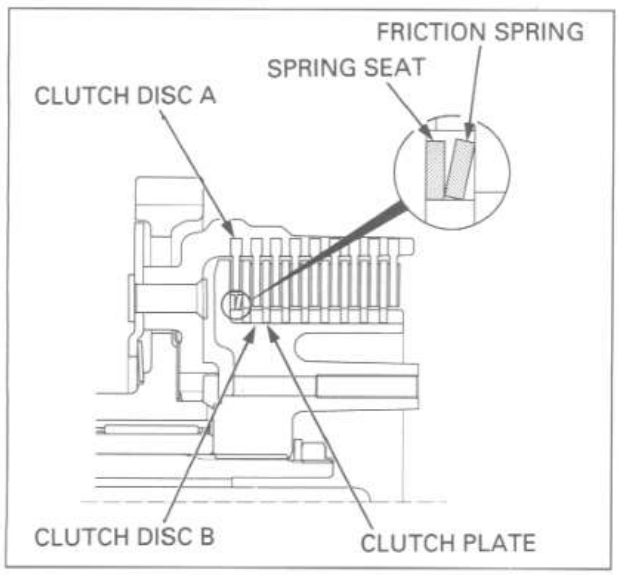
Stake the lock nut into the mainshaft groove with a punch.

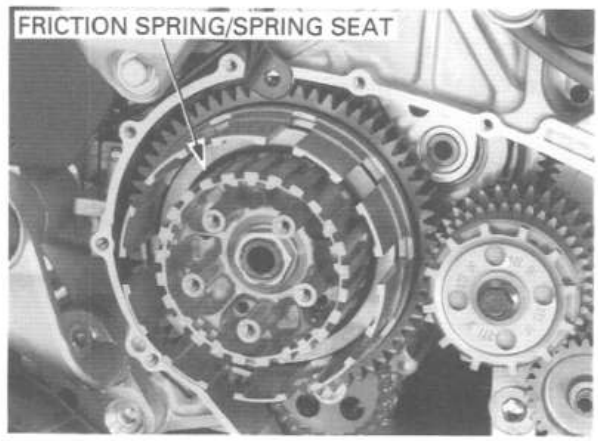


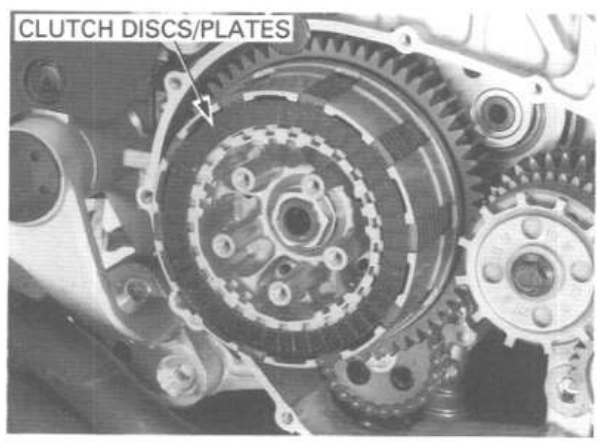
Install the spring seat and judder spring onto the clutch center as shown.

Coat the clutch discs and plates with clean engine oil.

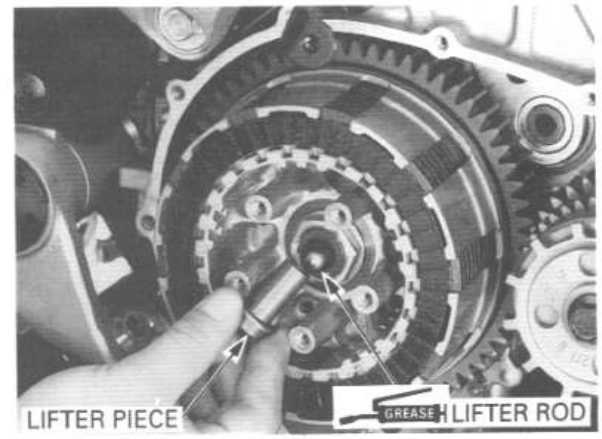
Install the clutch disc A (larger I.D. disc) into the clutch outer.
Install the clutch plate.
Stack the clutch discs B and plates alternately.







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.

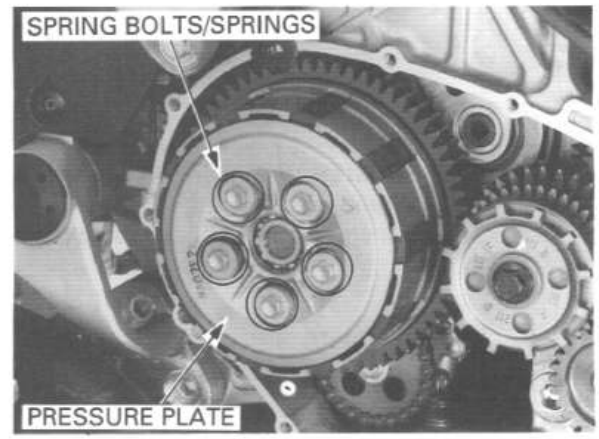


Install the lifter bearing into the pressure plate.
Install the pressure plate.

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 9-23).

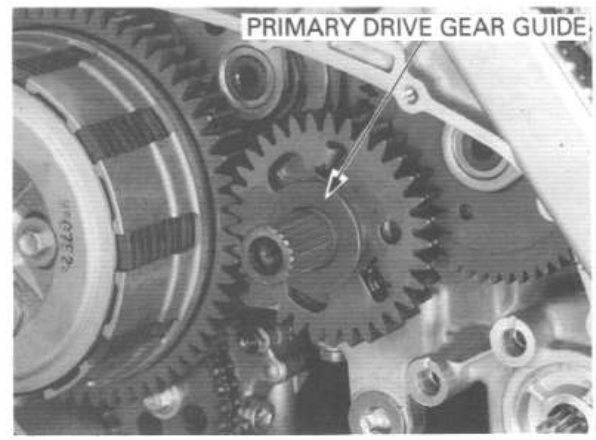


PRIMARY DRIVE GEAR

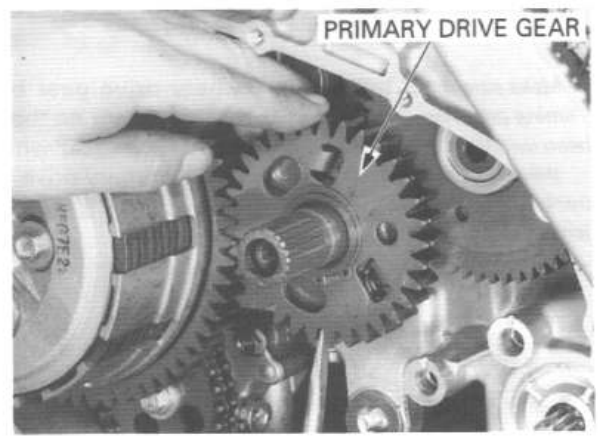
REMOVAL

Remove the starter clutch assembly (page 18-9).

Remove the primary drive gear guide from the crankshaft.

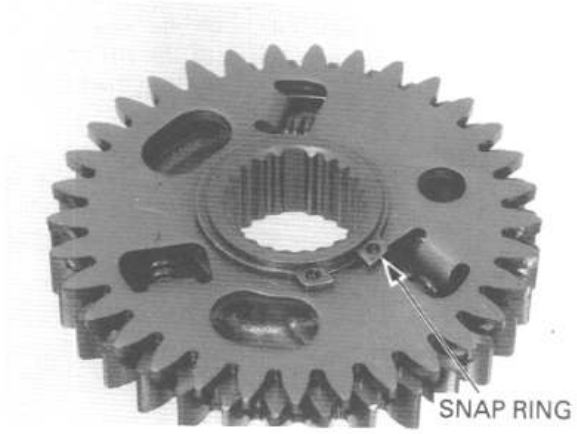


Remove the primary drive gear from the crankshaft while aligning the sub-gear teeth with the primary drive gear teeth.



DISASSEMBLY/INSPECTION

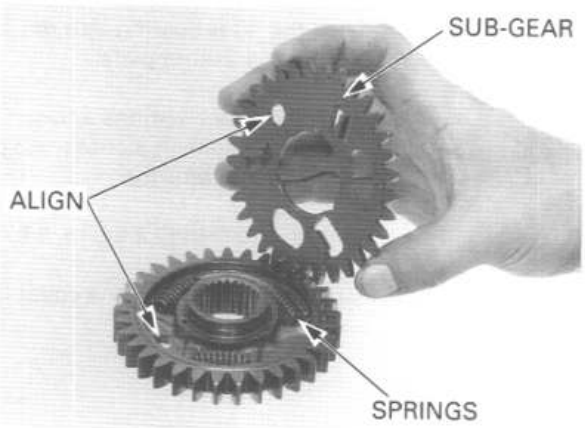
Remove the snap ring and primary drive sub-gear.



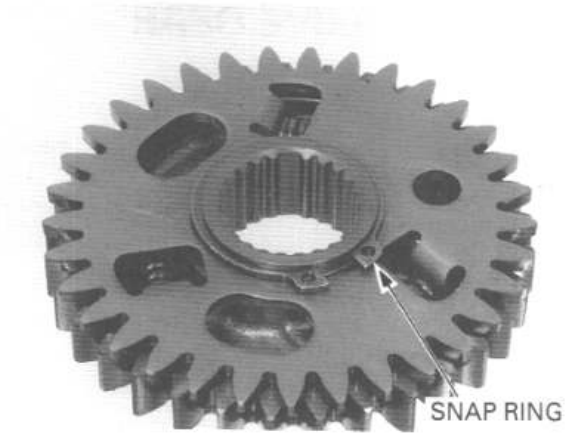
Inspect the springs for fatigue or other damage, replace if necessary.

ASSEMBLY

Install the springs into the primary drive gear grooves.
Install the sub-gear aligning the holes.



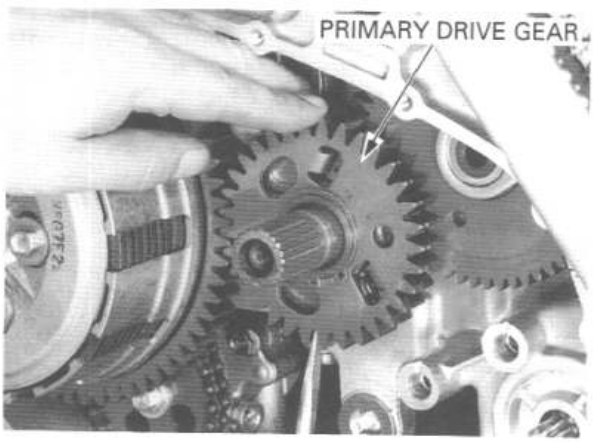
Install the snap ring securely into the groove.



INSTALLATION

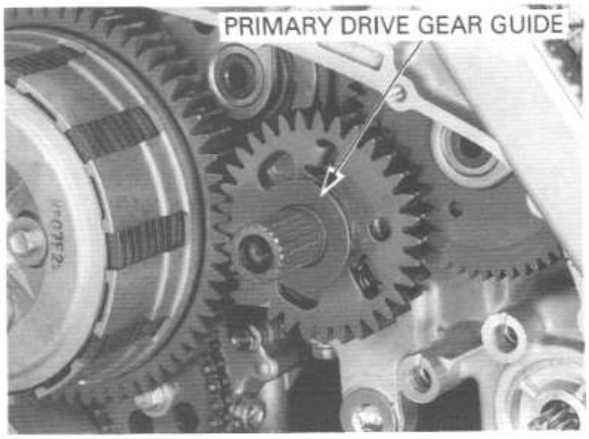
Make sure the timing gear has been installed on the end of the crankshaft before installing the primary drive gear (page 8-25).

Install the primary drive gear by aligning its wide groove with the wide teeth on the crankshaft.
Install the primary drive gear while aligning the sub-gear teeth with the primary drive gear teeth.



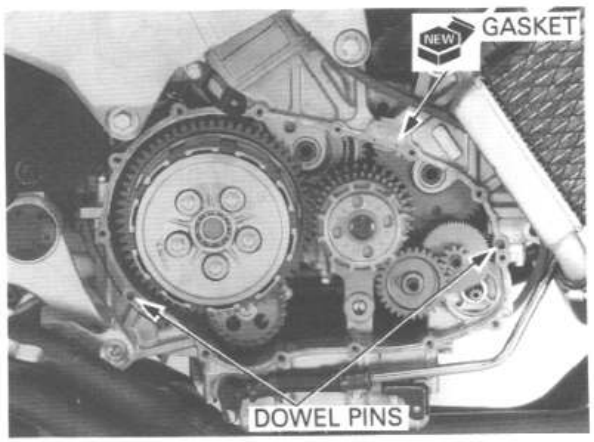
Install the primary drive gear guide.

Install the starter clutch assembly (page 18-13).

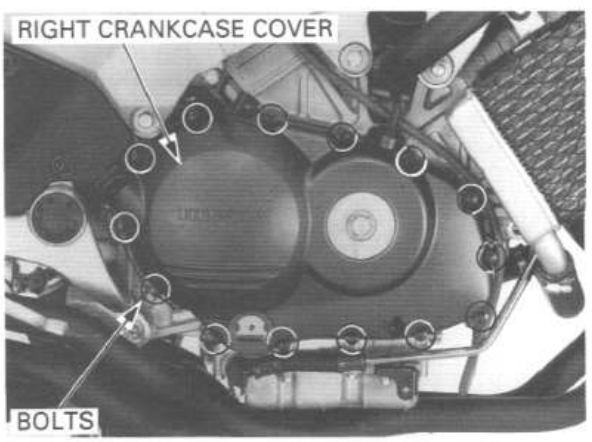


RIGHT CRANKCASE COVER INSTALLATION

Install the dowel pins and new gasket.



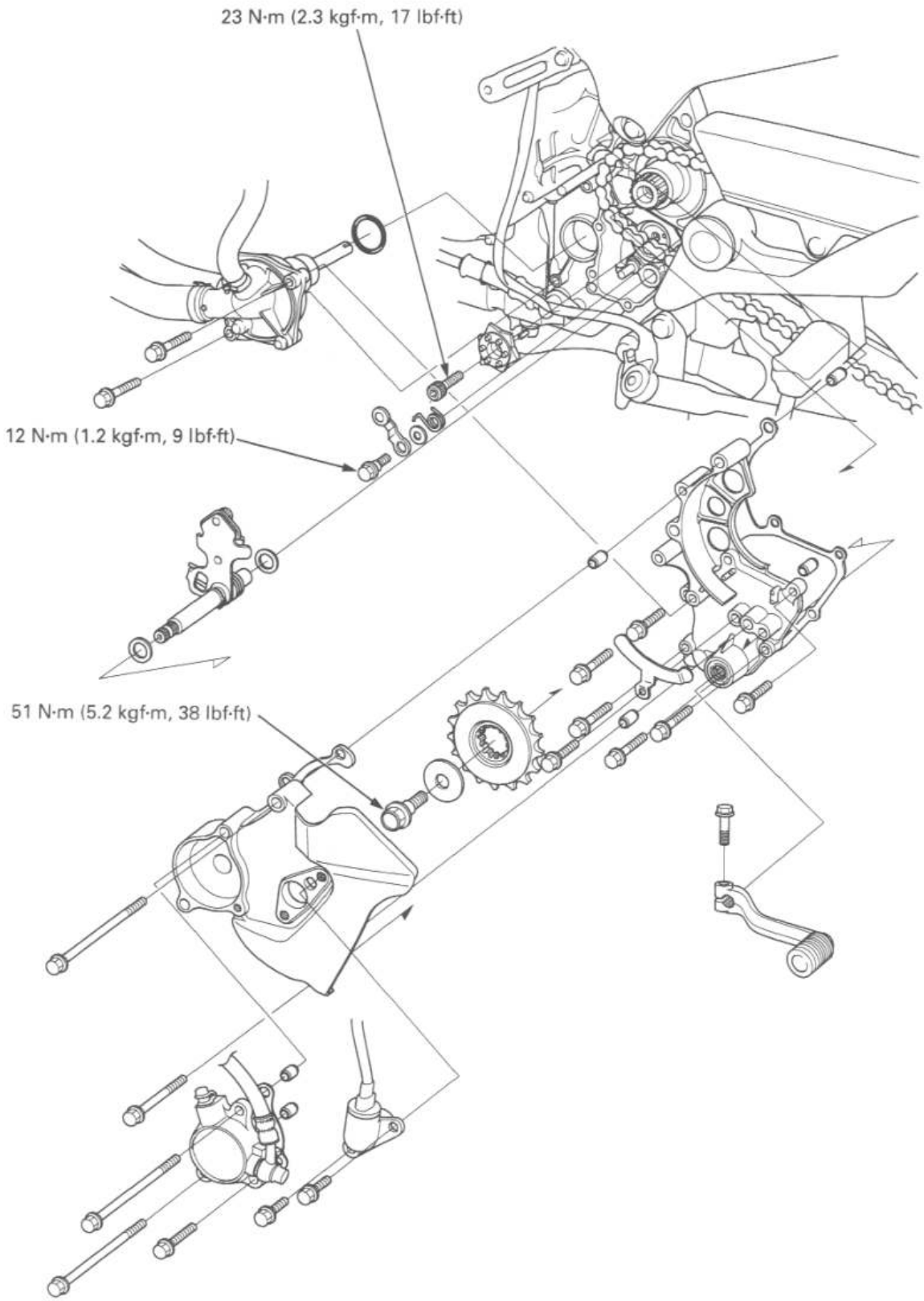
Apply sealant to the ignition pulse generator grommet.
Install the right crankcase cover and tighten the bolts in a crisscross pattern in 2 – 3 steps.



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

Install the following:
— Air cleaner housing (page 5-55)
— Side cowl (page 2-7)




23 N·m (2.3 kgf·m, 17 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)
51 N·m (5.2 kgf·m, 38 lbf·ft)

10. GEARSHIFT LINKAGE

SERVICE INFORMATION	10-1	GEARSHIFT LINKAGE	10-3
TROUBLESHOOTING	10-1	DRIVE SPROCKET INSTALLATION	10-8
DRIVE SPROCKET REMOVAL	10-2		

SERVICE INFORMATION

GENERAL

- The gearshift linkage service can be done with the engine installed in the frame.

TORQUE VALUES

Drive sprocket cover rubber mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	CT bolt Apply a locking agent to the threads
Drive sprocket special bolt	51 N·m (5.2 kgf·m, 38 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)	

TROUBLESHOOTING

Hard to shift
- Improper clutch operation
- Improper oil viscosity
- Bent shift fork
- Bent shift fork shaft
- Bent fork claw
- Damaged shift drum cam groove
- Loose stopper plate bolt
- Damaged stopper plate and pin
- Damaged gearshift spindle

Transmission jumps out of gear
- Worn shift drum stopper arm
- Weak or broken shift arm return spring
- Loose stopper plate bolt
- Bent shift fork shaft
- Damaged shift drum cam groove
- Damaged or bent shift forks
- Worn gear engagement dogs or slots

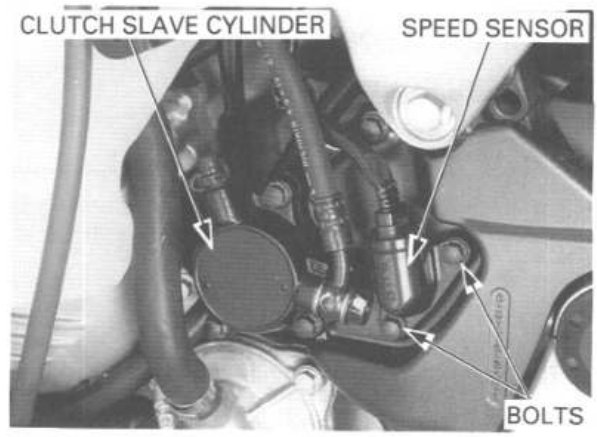
Gearshift pedal will not return
- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

DRIVE SPROCKET REMOVAL

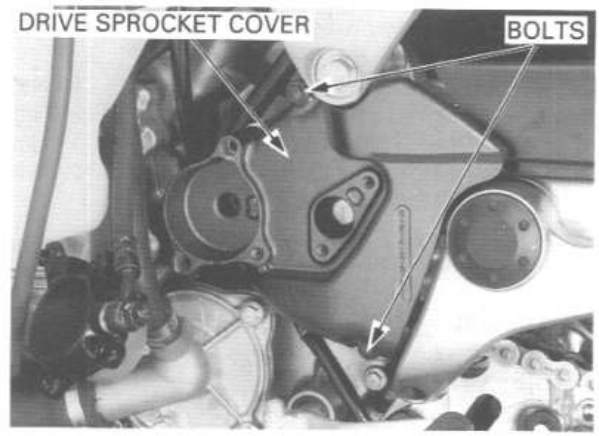
Remove the following:
— Side cowl (page 2-6)
— Clutch slave cylinder (page 9-9)

It is not necessary to disconnect the oil hose from the slave cylinder.

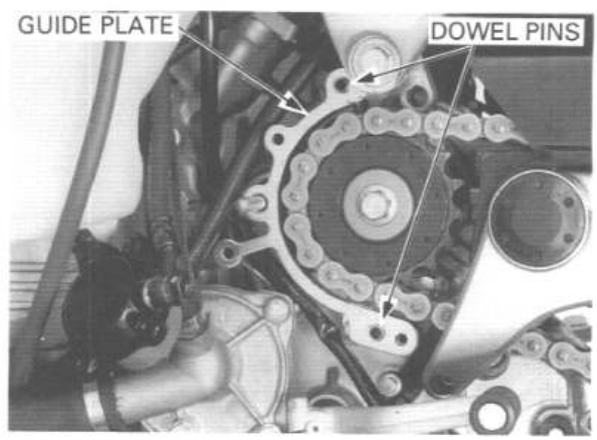
Disconnect the vehicle speed sensor connector.
Remove the two SH bolts and vehicle speed sensor.



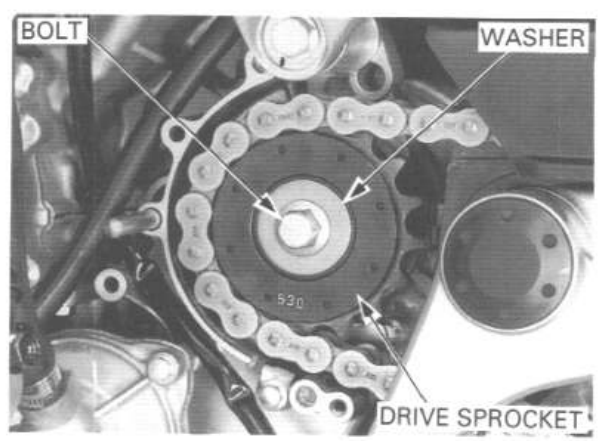
Remove the two SH bolts and drive sprocket cover.



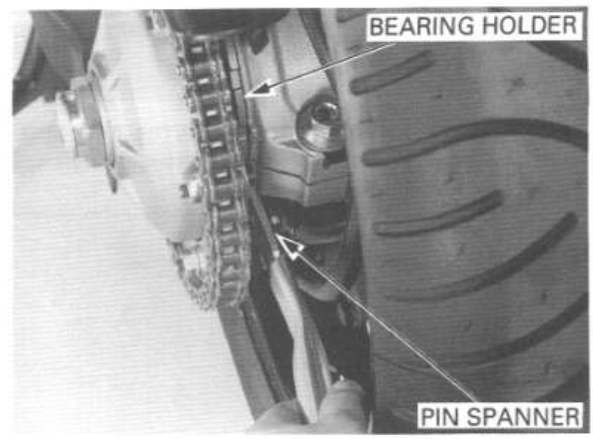
Remove the drive chain guide plate and dowel pins.



Shift the transmission into 6th gear and apply rear brake.
Loosen and remove the drive sprocket bolt and washer.



Loosen the drive chain by turning the rear axle bearing holder, then remove the drive sprocket from the countershaft.

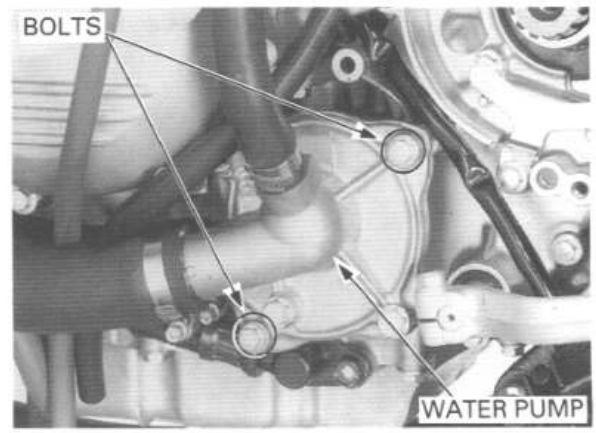


GEARSHIFT LINKAGE

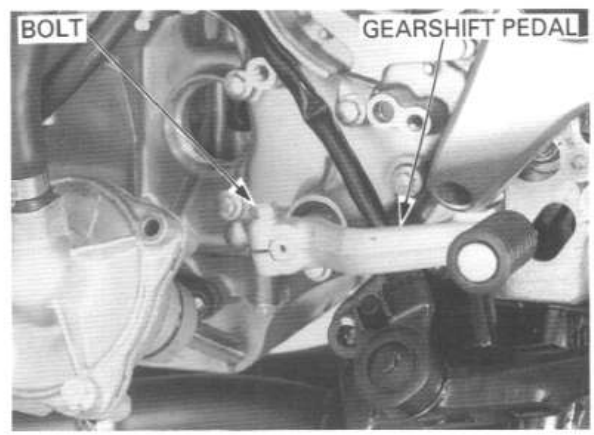
REMOVAL

Drain the engine oil (page 3-13).

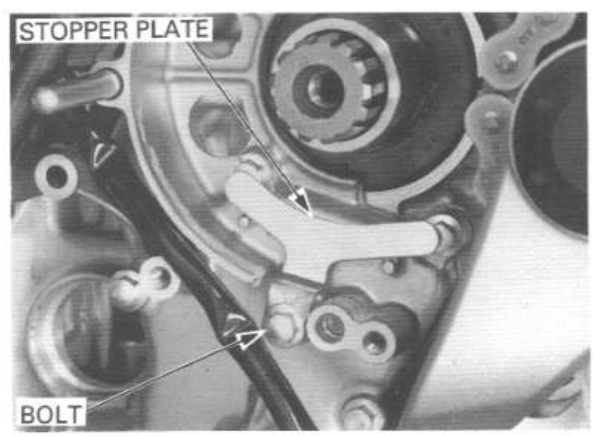
Remove the two water pump mounting SH bolts, then remove the water pump without disconnecting the water hoses.



Remove the pinch bolt and gearshift pedal from the gearshift spindle.



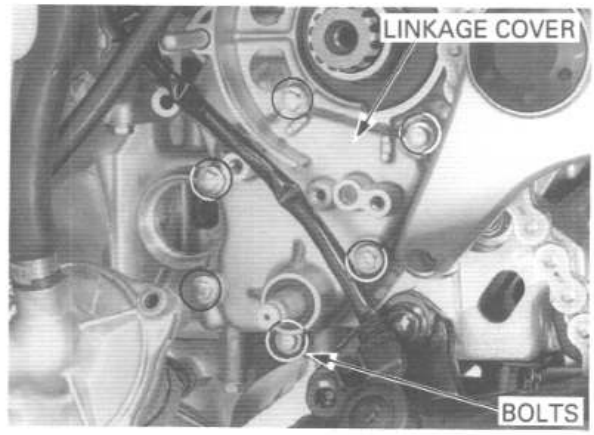
Remove the bolt and stopper plate.



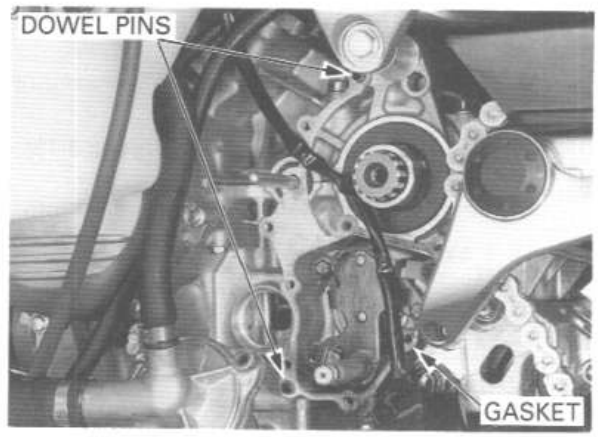
Remove the six SH bolts and gearshift linkage cover.

NOTE:

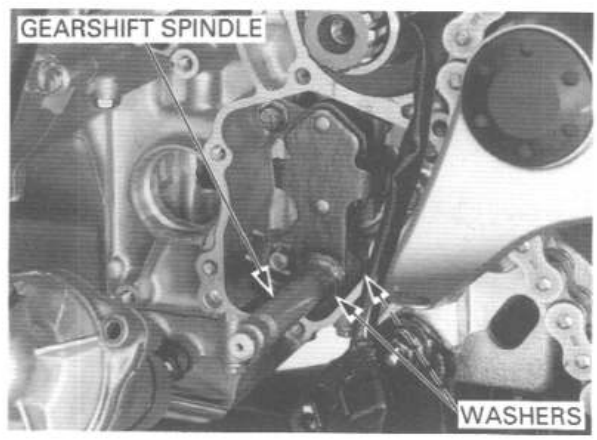
Before removing the gearshift linkage cover, clean any dirt around the gearshift spindle avoid damaging the dust seal.



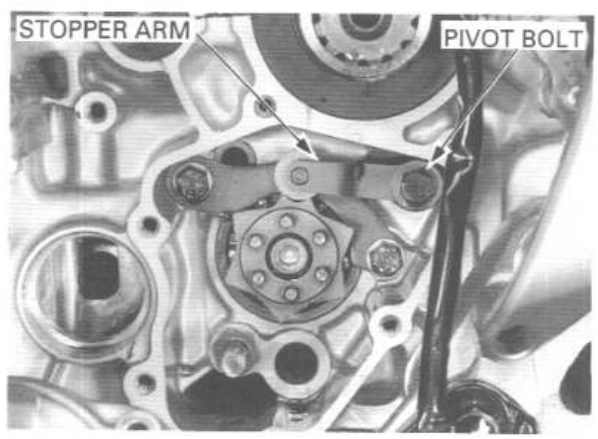
Remove the gasket and dowel pins.



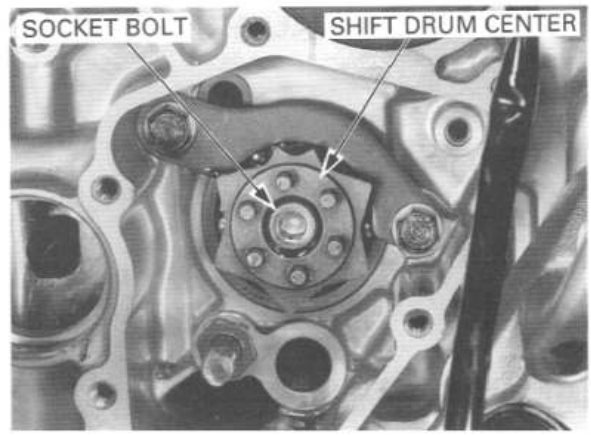
Remove the gearshift spindle and washers.



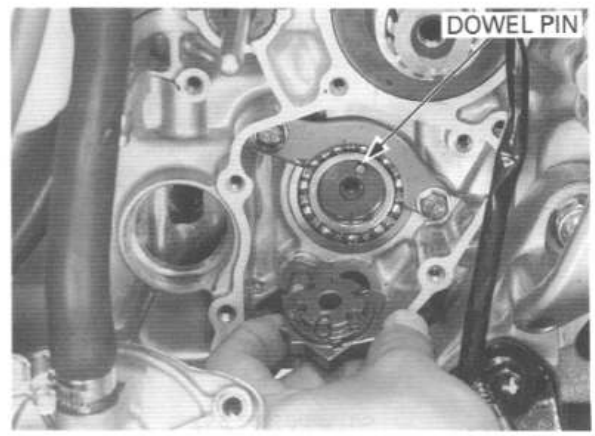
Remove the pivot bolt, shift drum stopper arm, washer and return spring.



Remove the shift drum center socket bolt and shift drum center.

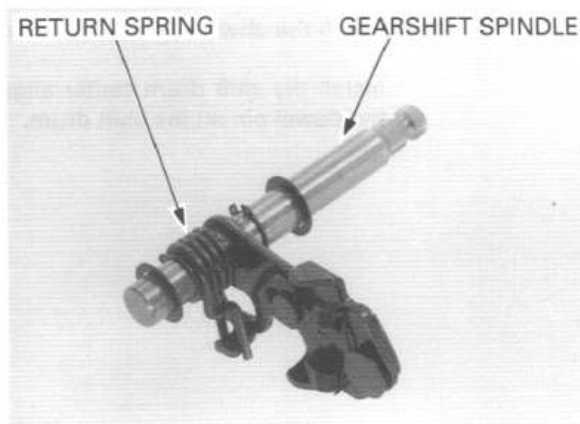


Remove the dowel pin from the shift drum.

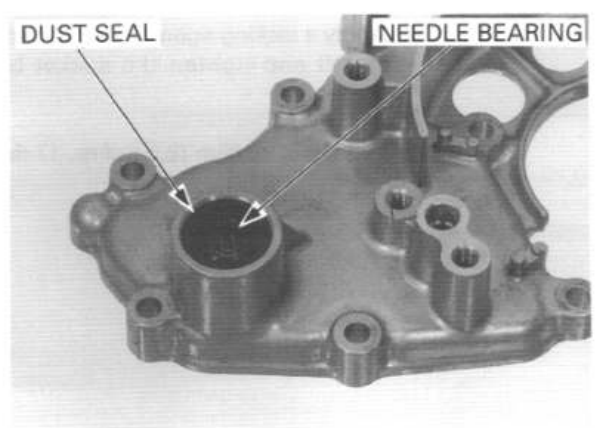


INSPECTION

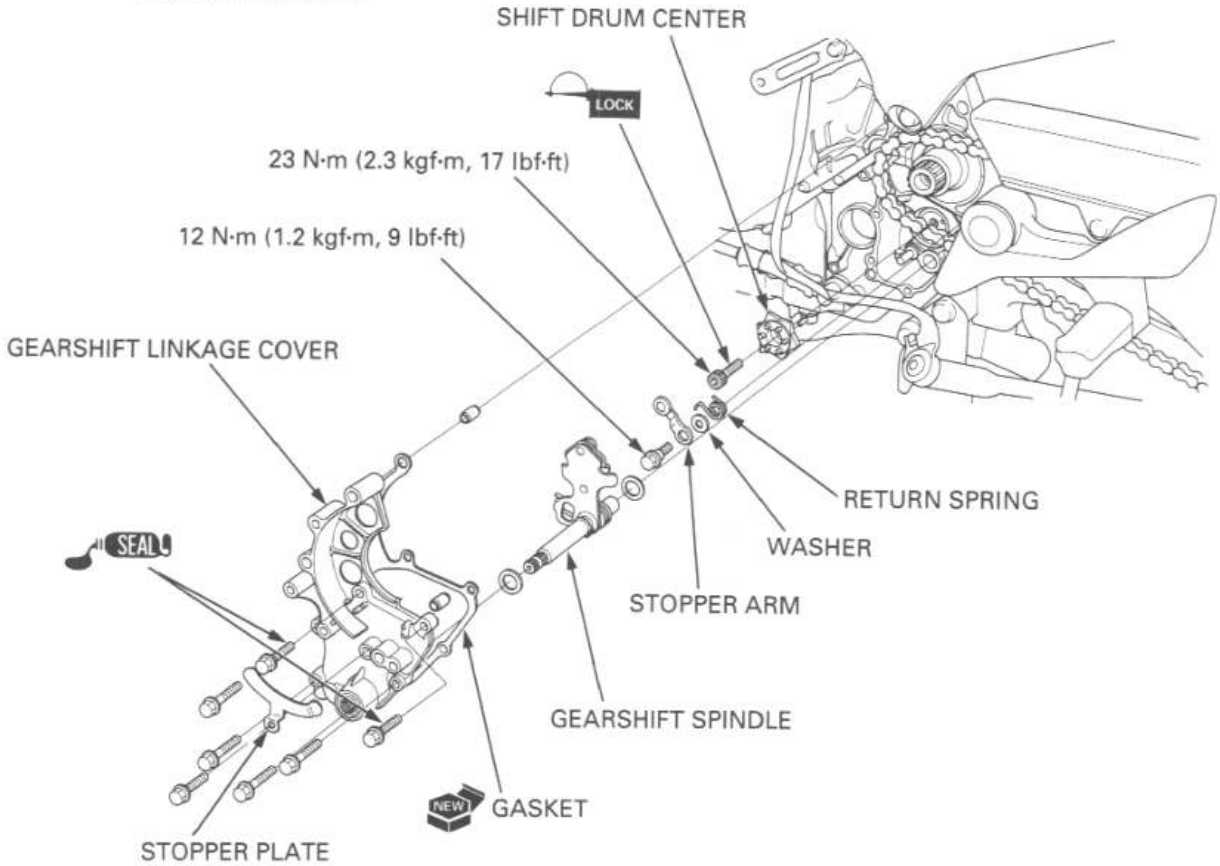
Gearshift spindle
Check the gearshift spindle for wear, damage or bending.
Check the return spring for fatigue or damage.



Dust seal/needle bearing
Check the needle bearing for wear or damage.
Check the dust seal for damage, replace if necessary.

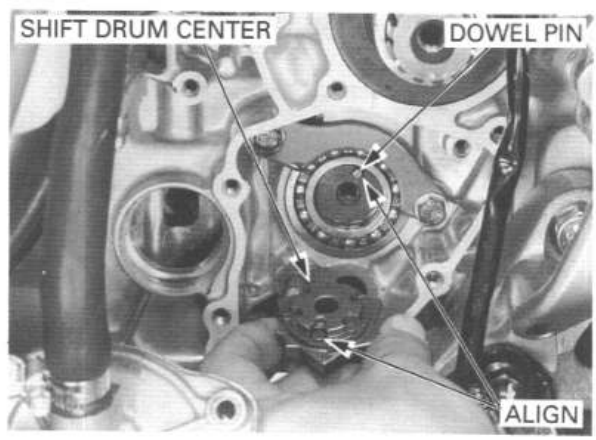


INSTALLATION



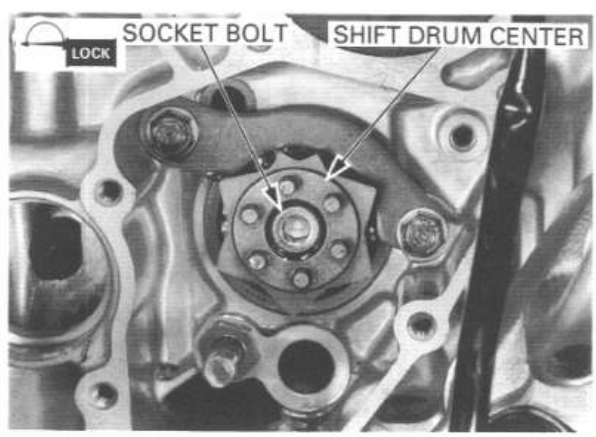
Install the dowel pin into the hole of the shift drum.

Install the shift drum center aligning its cut-out with the dowel pin on the shift drum.



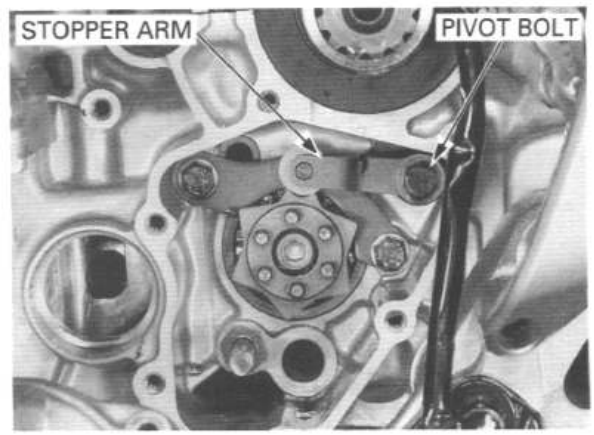
Apply a locking agent to the threads of the socket bolt. Install and tighten the socket bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

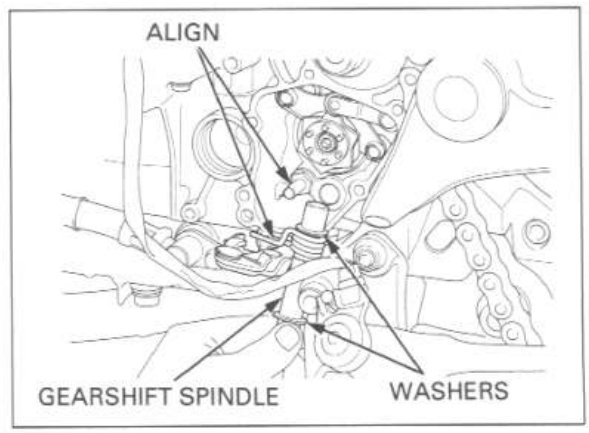


Install the return spring, washer, stopper arm and pivot bolt.
Tighten the pivot bolt to the specified torque.

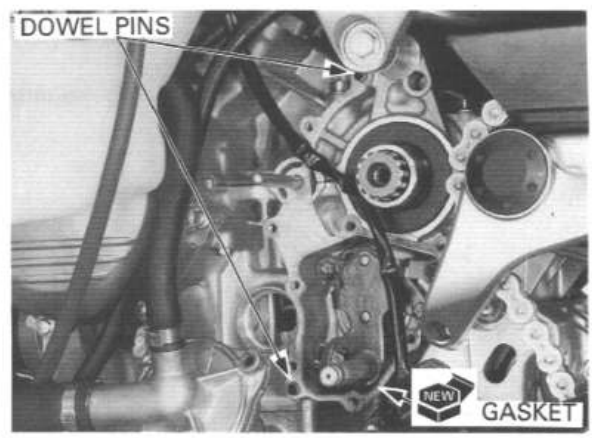
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install two washers onto the gearshift spindle.
Install the gearshift spindle aligning its return spring ends with the return spring pin onto the crankcase.

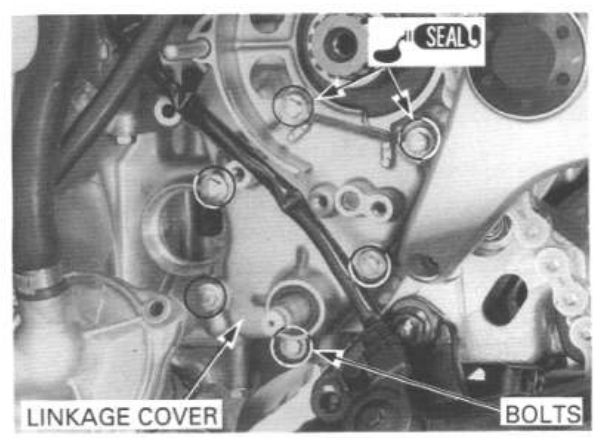


Install the dowel pins and new gasket.

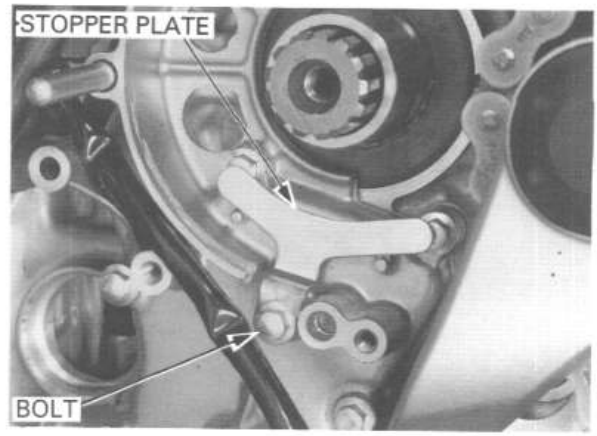


Install the gearshift linkage cover.
Apply sealant to the two 6 x 22 mm SH bolt threads.
Install the two 6 x 22 mm SH bolts and four 6 x 28 mm SH bolts.
Tighten the SH bolts to the specified torque.

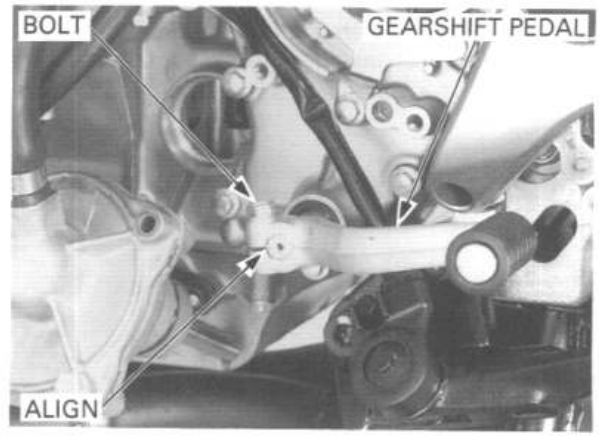
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Install the stopper plate and tighten the bolt securely.

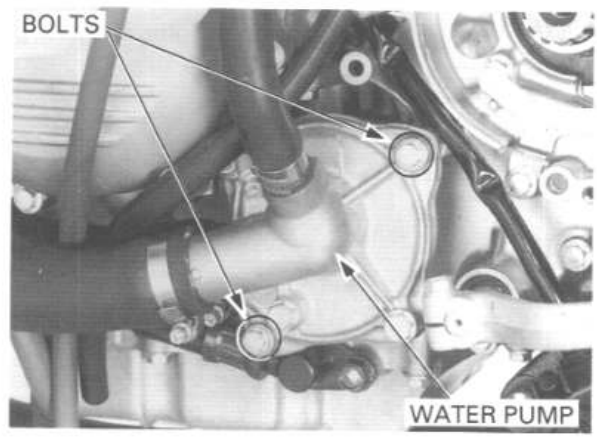


Install the gearshift pedal while aligning its split with the punch mark on the gearshift spindle.
Install and tighten the gearshift pedal pinch bolt.



Install the water pump assembly (page 6-17).

Tighten the water pump mounting SH bolts.



DRIVE SPROCKET INSTALLATION

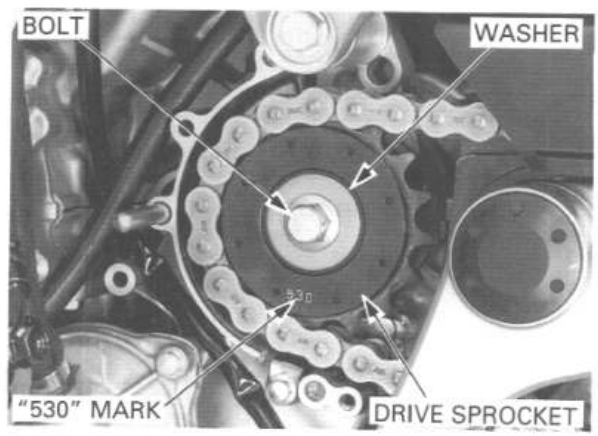
Install the drive chain over the sprocket.

NOTE:

Install the drive sprocket with its "530" mark facing out.

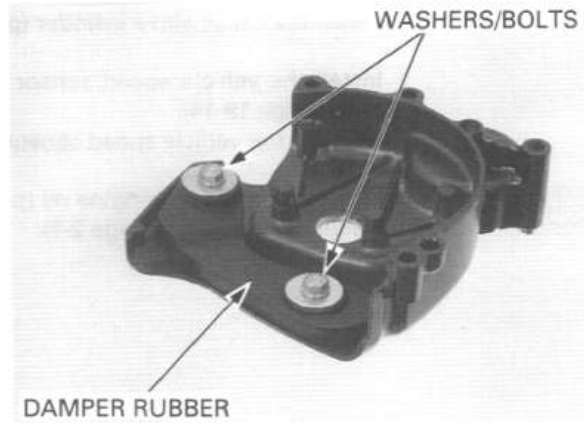
Install the drive sprocket onto the countershaft.
Install the washer and drive sprocket bolt.
Shift the transmission into 6th gear and apply rear brake.
Tighten the drive sprocket bolt to the specified torque.

TORQUE: 51 N·m (5.2 kgf·m, 38 lbf·ft)

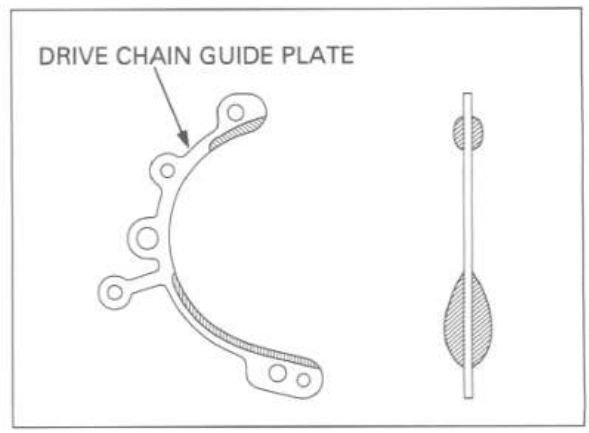


If the damper rubber in the drive sprocket cover is removed, install the damper rubber.
Apply a locking agent to the damper rubber bolt threads.
Install the washers and bolts, then tighten the bolts to the specified torque.

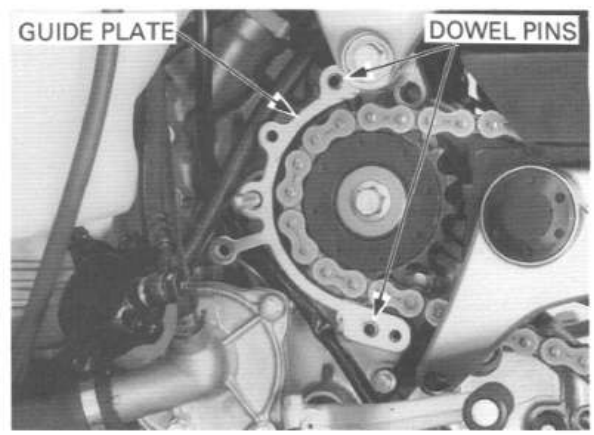
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



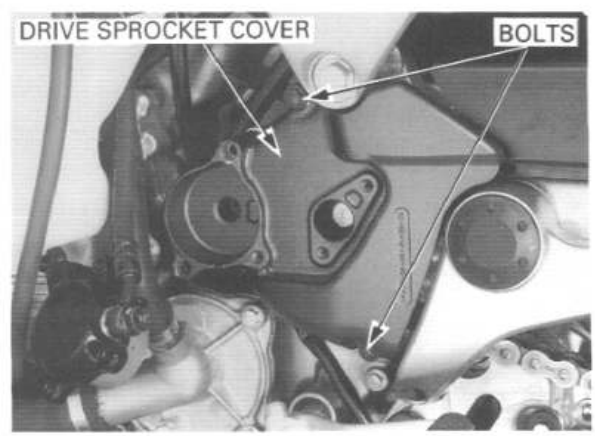
Check the drive chain guide plate for wear or damage, replace if necessary.



Install the dowel pins and drive chain guide plate.



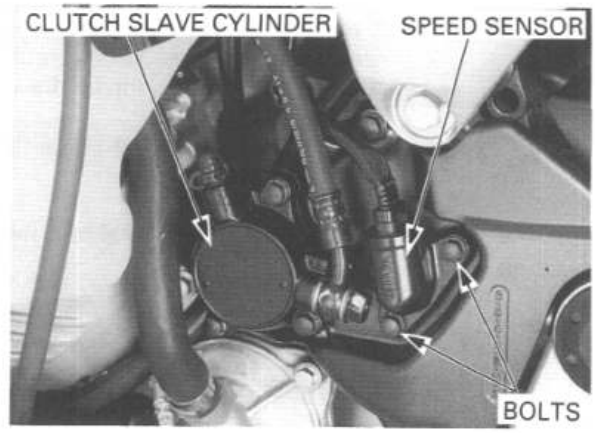
Install the drive sprocket cover and tighten the two SH bolts.



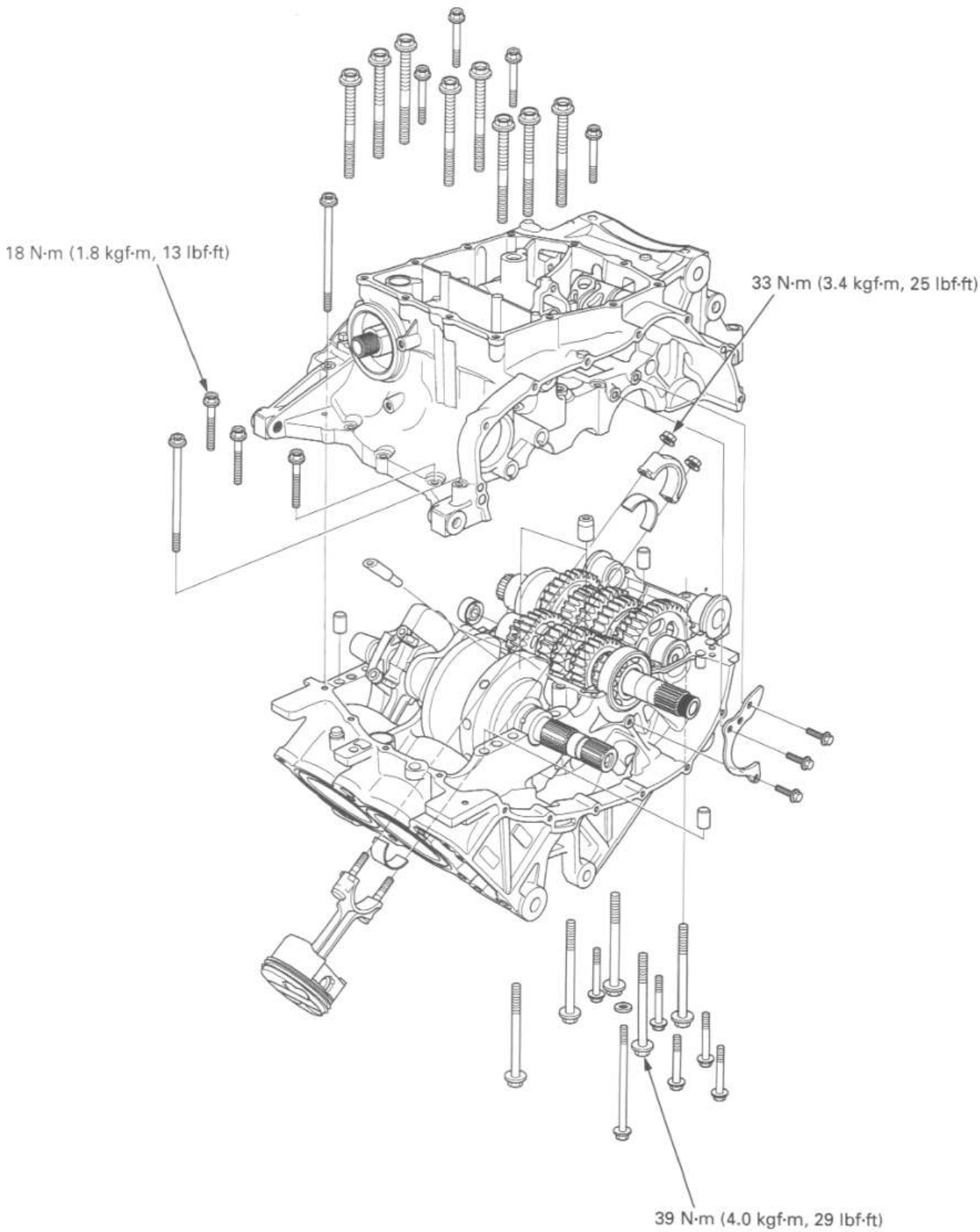
Install the clutch slave cylinder (page 9-12).

Install the vehicle speed sensor and tighten two SH bolts (page 19-14).
Connect the vehicle speed sensor connector.

Pour recommended engine oil (page 3-13).
Install the side cowl (page 2-7).



MEMO


18 N·m (1.8 kgf·m, 13 lbf·ft)
33 N·m (3.4 kgf·m, 25 lbf·ft)
39 N·m (4.0 kgf·m, 29 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

CAUTION:

- ***The main journal 9 mm bolts tightening method using the Plastic Region Tightening Method.***
- ***Always use a new main journal 9 mm bolts (page 21-5).***
- ***The main journal 9 mm bolt is pre-coated with an oil additive for axial tension stability. Do not remove the oil additive from the new 9 mm bolt surfaces.***
- ***Must be follow the tightening procedure on page 11-12 for crankcase bolt tightening.***

- The crankcase must be separated to service the crankshaft, piston, cylinder and transmission.
- The following parts must be removed before separating the crankcase.
  - — Alternator/flywheel (Section 16)
  - — Clutch (Section 9)
  - — Cylinder head (Section 8)
  - — Engine (Section 7)
  - — Gearshift linkage (Section 10)
  - — Oil pump (Section 4)
  - — Starter motor (Section 18)
- Mark and store the disassembled 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.		72.000 – 72.015 (2.8346 – 2.8352)	72.10 (2.839)
	Out of round		———	0.10 (0.004)
	Taper		———	0.10 (0.004)
	Warpage		———	0.10 (0.004)
Piston, piston rings	Piston mark direction		"IN" mark facing toward the intake side	———
	Piston O.D.		71.975 – 72.003 (2.8337 – 2.8348)	71.90 (2.831)
	Piston O.D. measurement point		18 mm (0.7 in) from bottom of skirt	———
	Piston pin bore I.D.		17.002 – 17.008 (0.6694 – 0.6696)	17.02 (0.670)
	Piston pin O.D.		16.994 – 17.000 (0.6691 – 0.6693)	16.98 (0.669)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.002)
	Piston ring-to-ring groove clearance	Top	0.030 – 0.065 (0.0012 – 0.0026)	0.11 (0.004)
		Second	0.015 – 0.050 (0.0006 – 0.0020)	0.10 (0.004)
	Piston ring end gap	Top	0.20 – 0.30 (0.008 – 0.012)	0.5 (0.02)
		Second	0.30 – 0.45 (0.012 – 0.018)	0.6 (0.02)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.9 (0.04)
Cylinder-to-piston clearance			0.015 – 0.050 (0.0006 – 0.0020)	———
Connecting rod small end I.D.			17.016 – 17.034 (0.6699 – 0.6706)	17.044 (0.6710)
Connecting rod-to-piston pin clearance			0.016 – 0.040 (0.0006 – 0.0016)	———
Crankpin oil clearance			0.030 – 0.052 (0.0012 – 0.0020)	0.08 (0.003)

TORQUE VALUES

Crankcase bolt, 10 mm	39 N·m (4.0 kgf·m, 29 lbf·ft)	
9 mm	See page 11-13	Apply oil to the threads
7 mm	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Lower crankcase sealing bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	Apply a locking agent to the threads
Connecting rod nut	33 N·m (3.4 kgf·m, 25 lbf·ft)	Apply oil 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

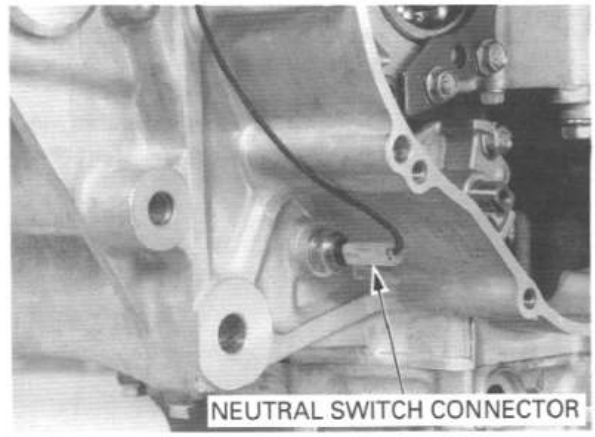
Engine vibration
- Excessive crankshaft runout

CRANKCASE SEPARATION

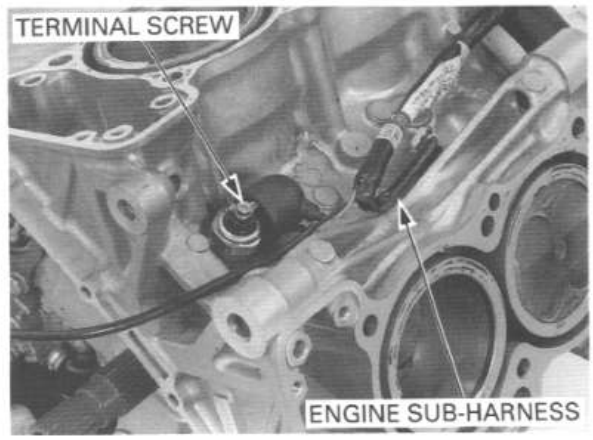
NOTE:

Refer to Service Information (page 11-1) for removal of necessary parts before separating the crankcase.

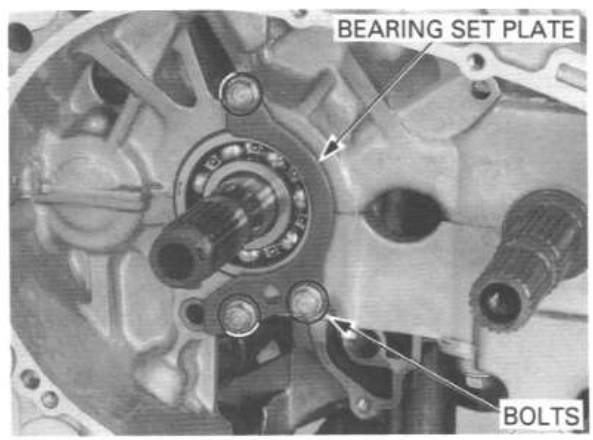
Disconnect the neutral switch connector from the switch.



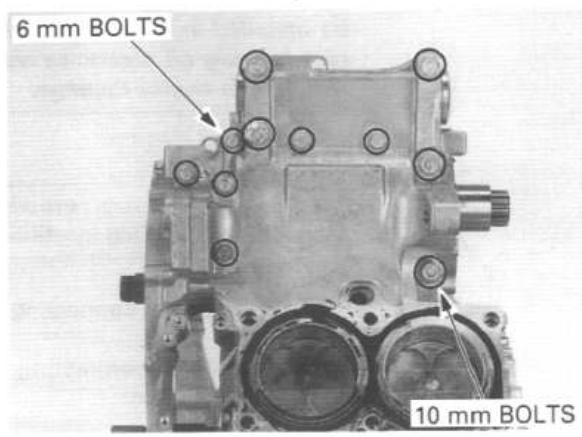
Remove the oil pressure switch terminal screw, then remove the engine sub-harness from the engine.



Remove the three bolts and mainshaft bearing set plate.

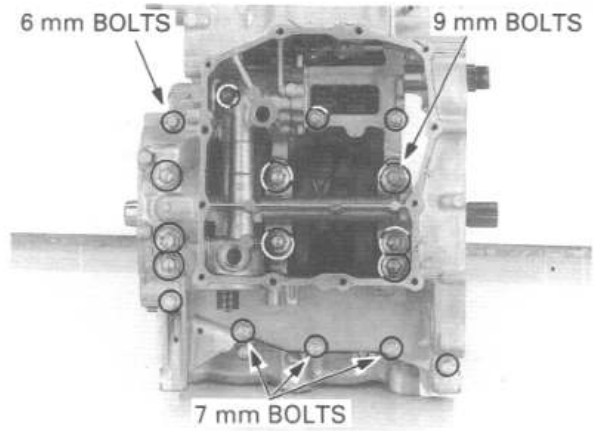


Remove the upper crankcase 6 mm bolts, sealing washer and 10 mm bolts.



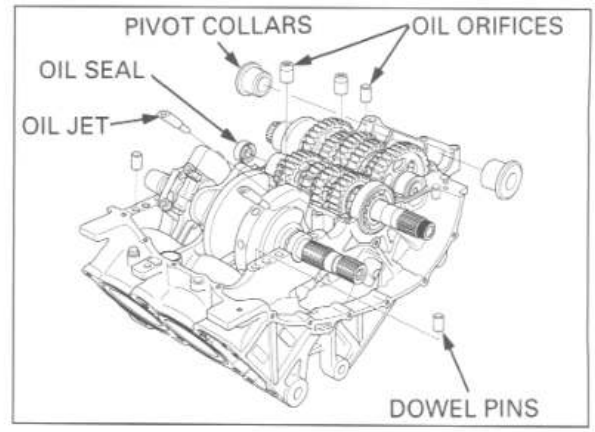
Remove the lower crankcase 6 mm bolts and 7 mm bolts.

Loosen the main journal 9 mm bolts in a crisscross pattern in 2 – 3 steps, then remove and discard the 9 mm bolts.



Separate the lower crankcase from the upper crankcase.

Remove the following:
— Swingarm pivot collars
— Dowel pins
— Oil orifices
— Transmission oil jets
— Mainshaft oil seal



PISTON/CONNECTING ROD

PISTON/CONNECTING ROD REMOVAL

CAUTION:

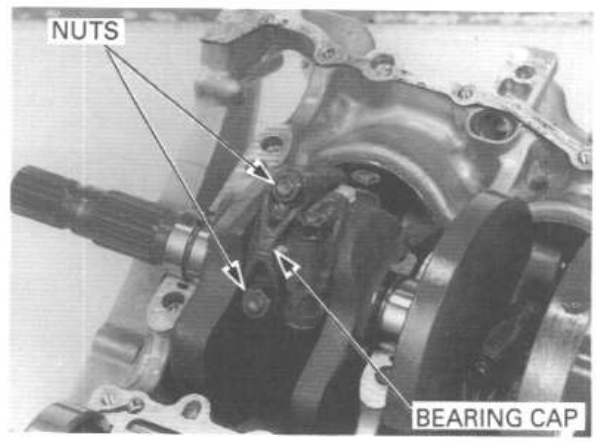
- ***This motorcycle is equipped with aluminum cylinder sleeves. Before piston removal, place a clean shop towel around the connecting rod to prevent damaging the cylinder sleeve.***
- ***Do not try to remove the piston/connecting rod assembly from bottom of the cylinder; the assembly will be sticked so that the oil ring expands in the gap between the cylinder liner and the upper crankcase.***
- ***Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.***

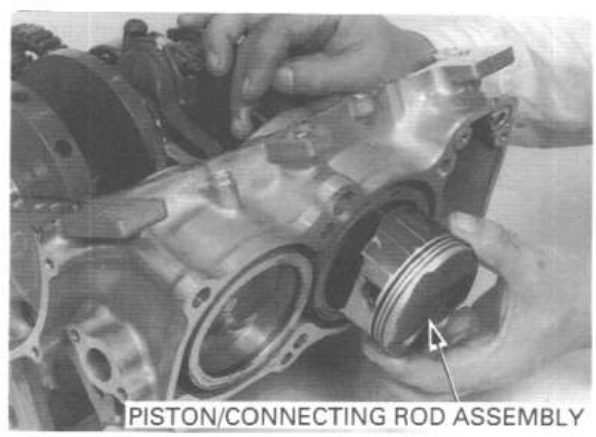
NOTE:

Mark all parts during removal so they can be replaced in their original locations.

Remove the nuts and connecting rod bearing cap.

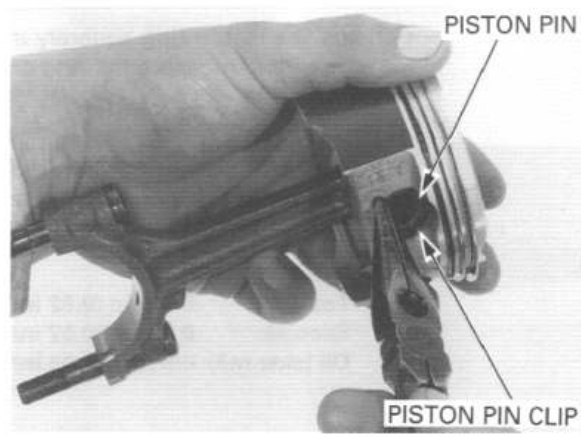
Remove the piston/connecting rod assembly from the top of the cylinder.





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.

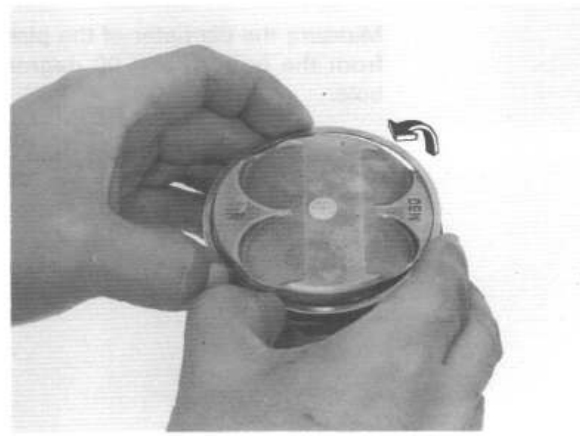


PISTON DISASSEMBLY

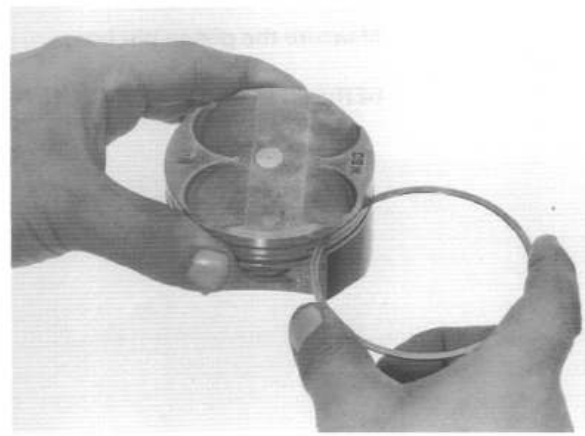
Remove the piston rings.

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.



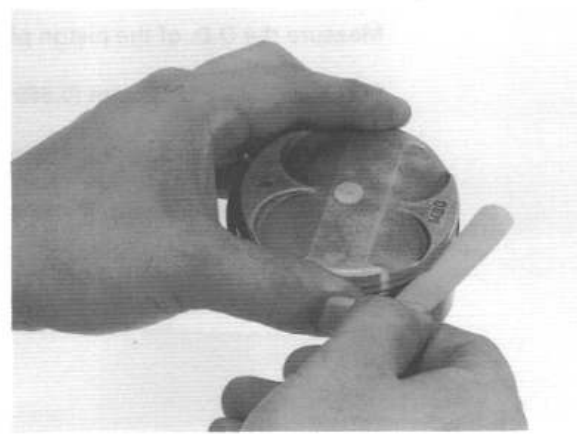
PISTON INSPECTION

Temporarily install the piston rings to their proper position with the mark facing up.

Measure the piston ring-to-ring groove clearance with the rings pushed into the grooves.

SERVICE LIMITS:
Top: 0.11 mm (0.004 in)
Second: 0.10 mm (0.004 in)

Inspect the piston for wear or damage.



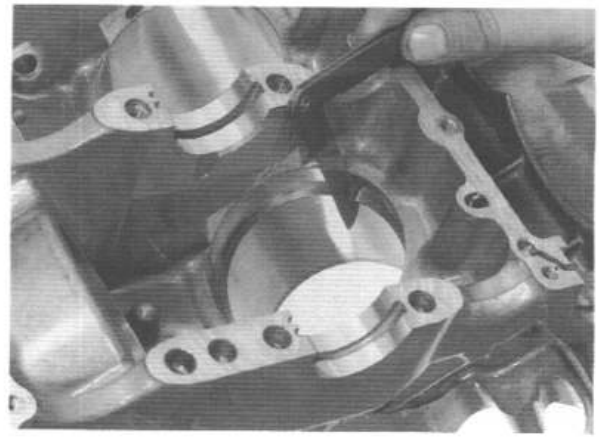
Insert the piston ring squarely into the bottom of the cylinder and measure the ring end gap.

NOTE:

Push the rings into the cylinder with the top of the piston to be sure they are squarely in the cylinder.

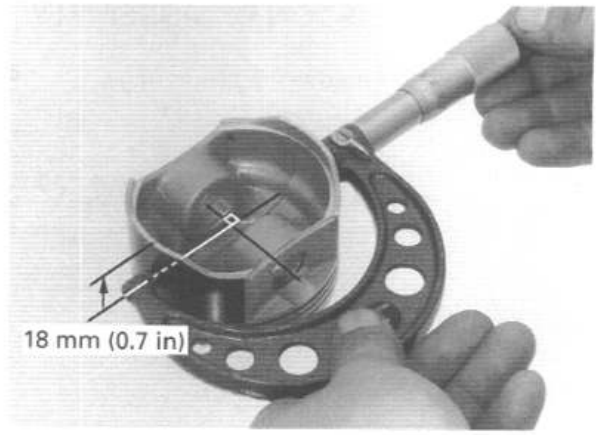
SERVICE LIMITS:

Top:	**0.5 mm (0.02 in)**
Second:	**0.6 mm (0.02 in)**
Oil (side rail):	**0.9 mm (0.04 in)**



Measure the diameter of the piston at 18 mm (0.7 in) from the bottom and 90 degrees to the piston pin hole.

SERVICE LIMIT: 71.90 mm (2.831 in)



Measure the piston pin bore.

SERVICE LIMIT: 17.02 mm (0.670 in)



Measure the O.D. of the piston pin.

SERVICE LIMIT: 16.98 mm (0.669 in)

Calculate the piston-to-piston pin clearance.

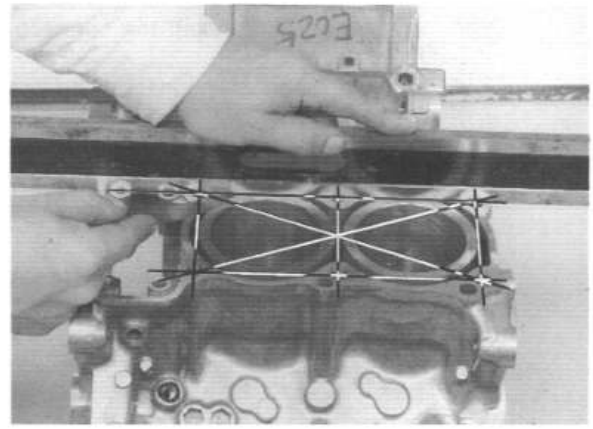
SERVICE LIMIT: 0.04 mm (0.002 in)



CYLINDER INSPECTION

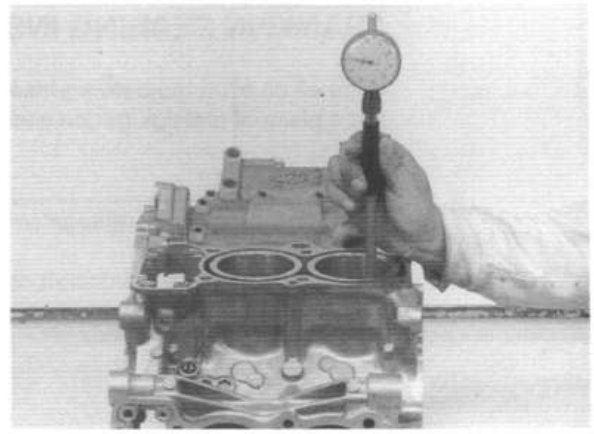
Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.10 mm (0.004 in)



Inspect the cylinder bore for wear or damage.
Measure the cylinder I.D. in X and Y axis at three levels.
Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 72.10 mm (2.839 in)

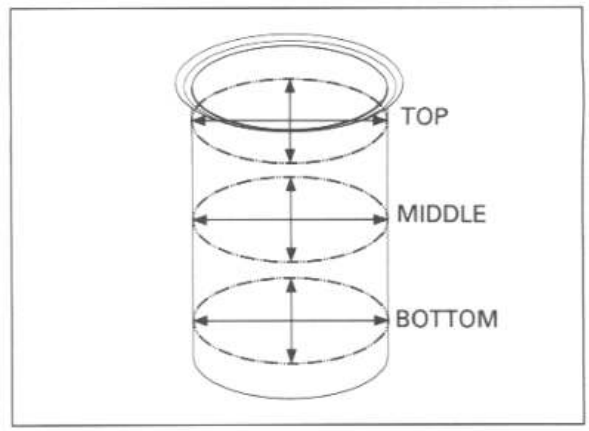


Calculate the piston-to-cylinder clearance.
Take a maximum reading to determine the clearance.
Refer to page 11-6 for measurement of the piston O.D.

STANDARD: 0.015 – 0.050 mm (0.0006 – 0.0020 in)

Calculate the taper and out of round at three levels in X and Y axis. Take the maximum reading to determine them.

SERVICE LIMITS:
Taper: 0.10 mm (0.004 in)
Out of round: 0.10 mm (0.004 in)



The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

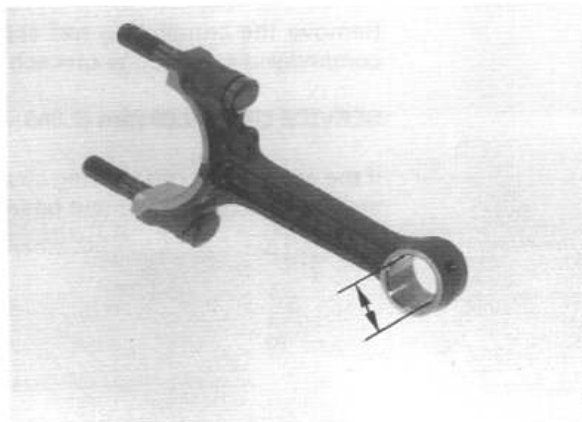
The following oversize pistons are available:
0.25 mm (0.010 in)
0.50 mm (0.020 in)

The piston to cylinder clearance for the oversize piston must be: 0.015 – 0.050 mm (0.0006 – 0.0020 in).

CONNECTING ROD INSPECTION

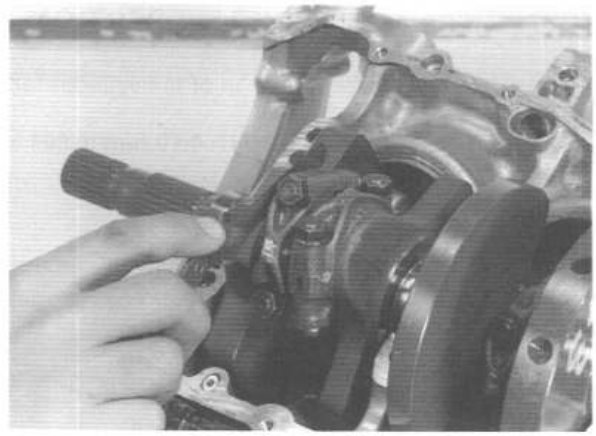
Measure the connecting rod small end I.D.

SERVICE LIMIT: 17.044 mm (0.6710 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 LIMIT: 0.40 mm (0.016 in)

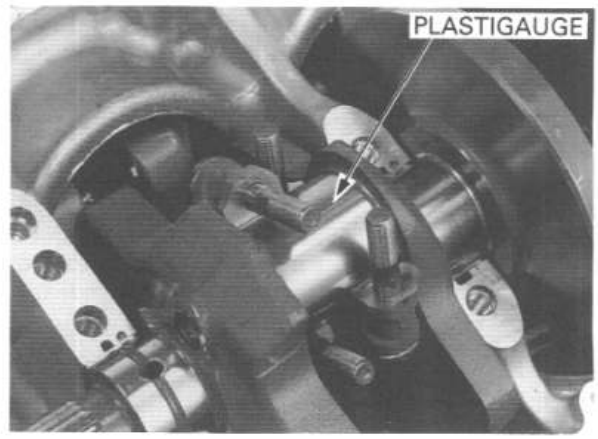


CRANKPIN BEARING INSPECTION

Wipe all oil from the bearing inserts and crankpins.
Put a piece of plastigauge on each crankpin.

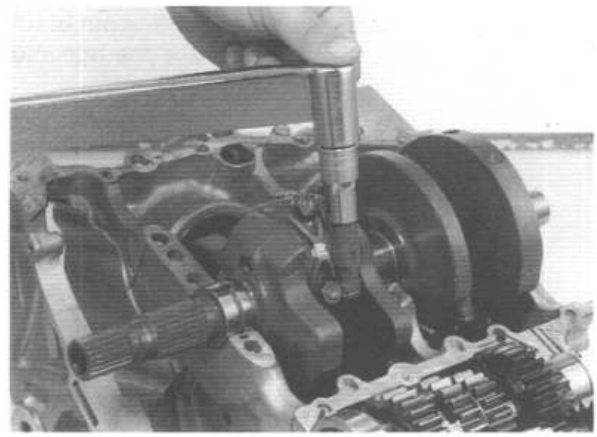
NOTE:

- 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.

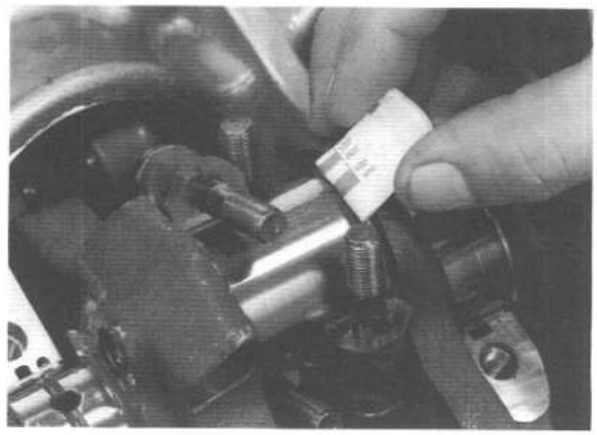
TORQUE: 33 N·m (3.4 kgf·m, 25 lbf·ft)



Remove the connecting rod caps and measure the compressed plastigauge on each crankpin.

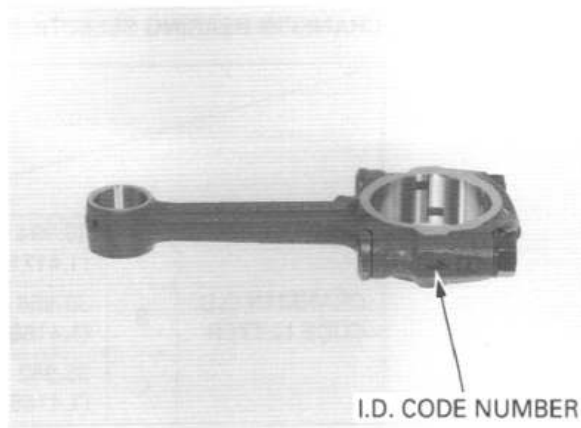
SERVICE LIMIT: 0.08 mm (0.003 in)

If the connecting rod bearing clearance is beyond tolerance, selects replacement bearing.



CRANKPIN BEARING SELECTION

Record the connecting rod I.D. code number (1, 2 or 3) or measure the I.D. with the bearing cap installed without bearing inserts.

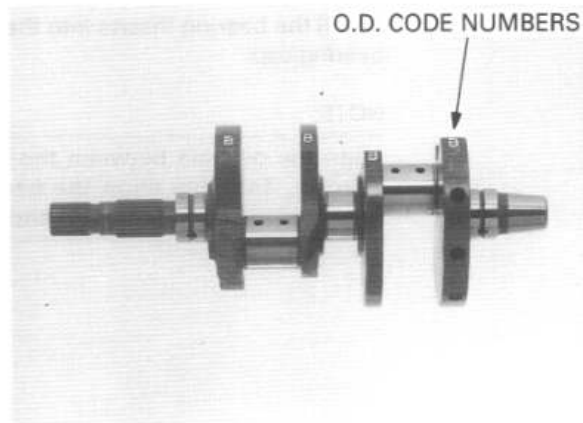


If you are replacing the crankshaft, record the corresponding crankpin O.D. code number (A, B or C)

NOTE:

Numbers (A, B or C) 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.

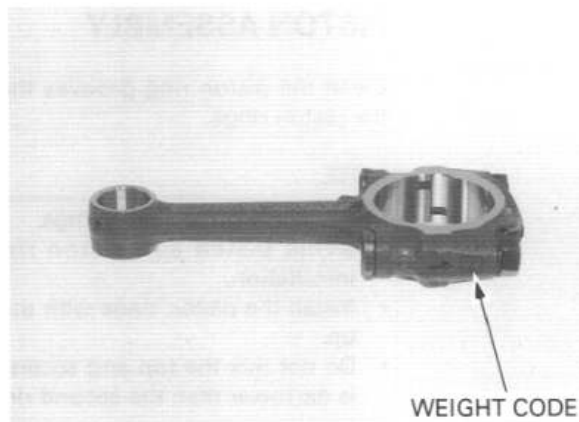


CONNECTING ROD SELECTION

The weight code is stamped on the connecting rod using an alphabetical code.

NOTE:

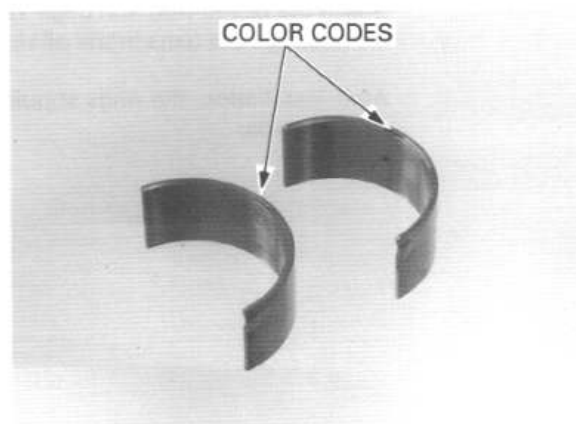
The replacement connecting rod is available only weight code B. If the original connecting rod weight code is either A or C, you can use weight code B connecting rod.



Cross-reference the crankpin and rod codes to determine the replacement bearing color.

BEARING THICKNESS:

A (Blue): Thick
B (Black):
C (Brown):
D (Green):
E (Yellow): Thin



CRANKPIN BEARING SELECTION TABLE

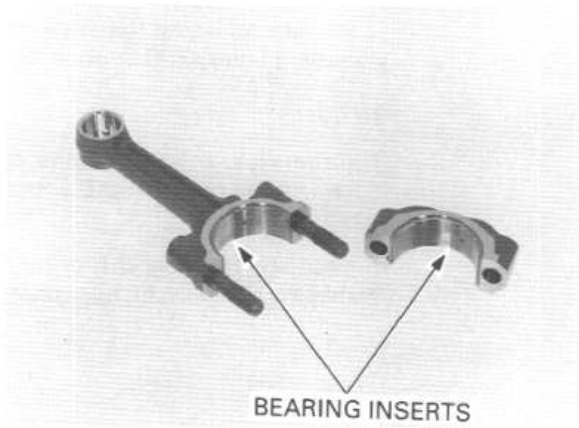
Unit: mm (in)

			CONNECTING ROD I.D. CODE		
			1	2	3
			39.000 – 39.006 (1.5354 – 1.5356)	39.006 – 39.012 (1.5357 – 1.5359)	39.012 – 39.018 (1.5359 – 1.5361)
CRANKPIN O.D. CODE LETTER	A	35.994 – 36.000 (1.4171 – 1.4173)	E (Yellow)	D (Green)	C (Brown)
	B	35.988 – 35.994 (1.4168 – 1.4171)	D (Green)	C (Brown)	B (Black)
	C	35.982 – 35.988 (1.4166 – 1.4168)	C (Brown)	B (Black)	A (Blue)

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

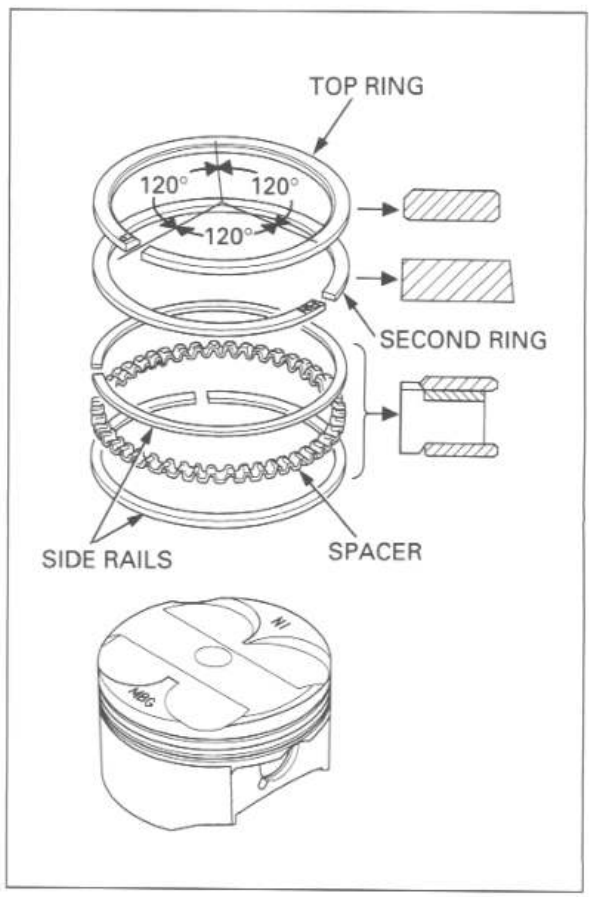
Clean the piston ring grooves thoroughly and install the piston rings.

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 120 degrees apart. Do not align the gaps in the oil rings (side rails).

After installation, the rings should rotate freely in the ring grooves.

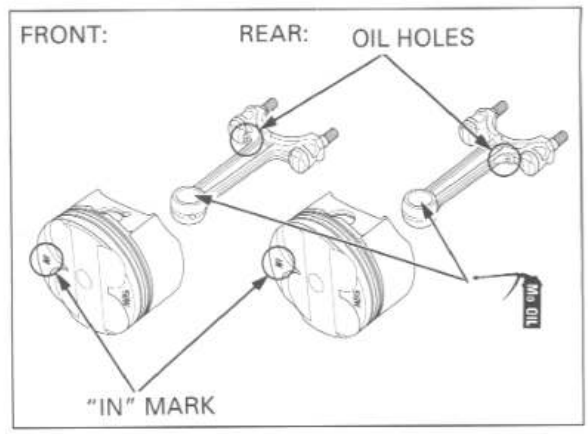


PISTON INSTALLATION

Apply molybdenum disulfide oil to the connecting rod small end.
Assemble the piston and connecting rod.

NOTE:

- Install the front connecting rod with its oil hole side facing the "IN" mark on the piston crown.
- Install the rear connecting rod with its oil hole side facing the opposite side of the "IN" mark on the piston crown.



Do not align the piston pin clips end gap with the piston cut-out.

Apply oil to the piston pin outer surface.
Install the piston pin, and secure it using a new piston pin clip.



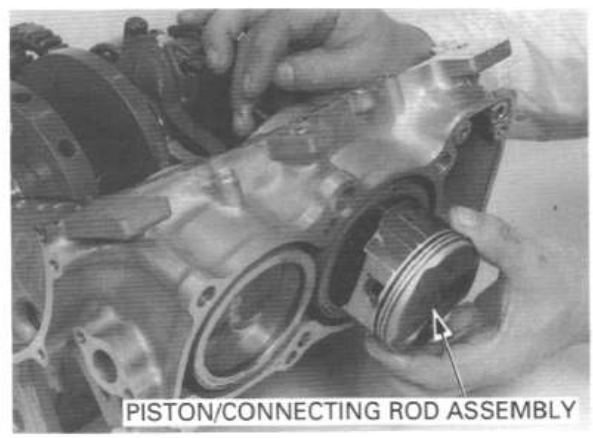
Apply oil to the cylinder sleeve and piston rings.

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.

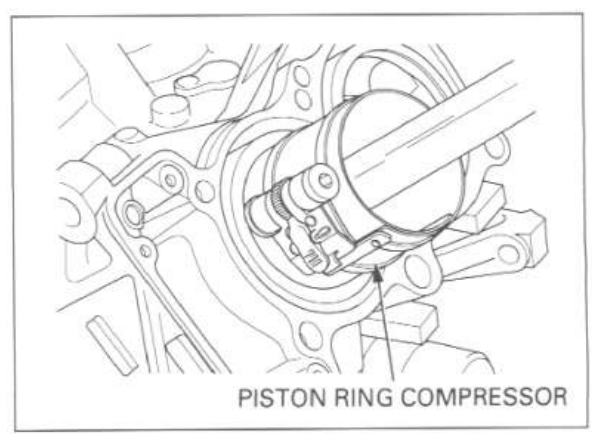
CAUTION:

- ***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.***



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.

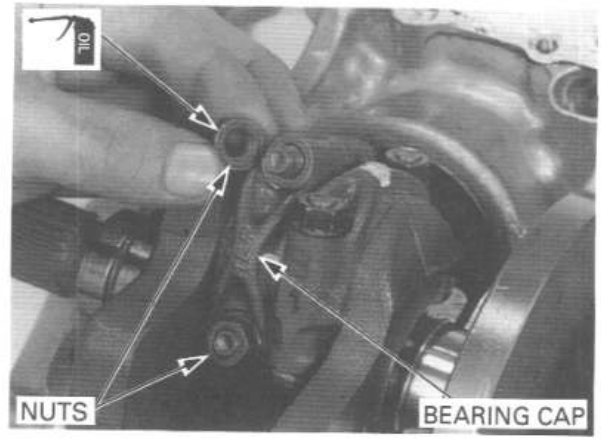


Apply molybdenum disulfide oil to the crankpin bearing surfaces.

Be sure to install the bearing caps with their markings aligned.

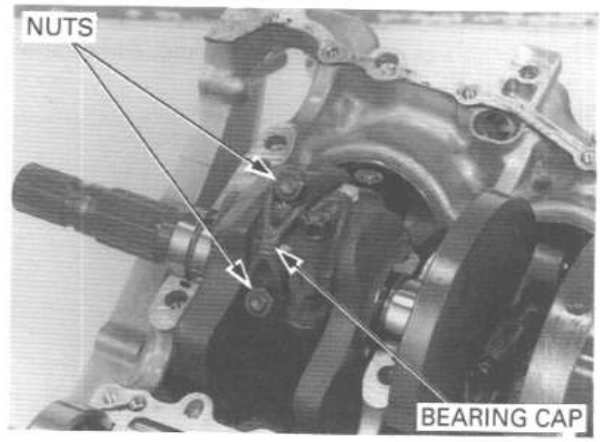
Install the bearing cap.

Apply oil to the connecting rod nut threads and seating surfaces.



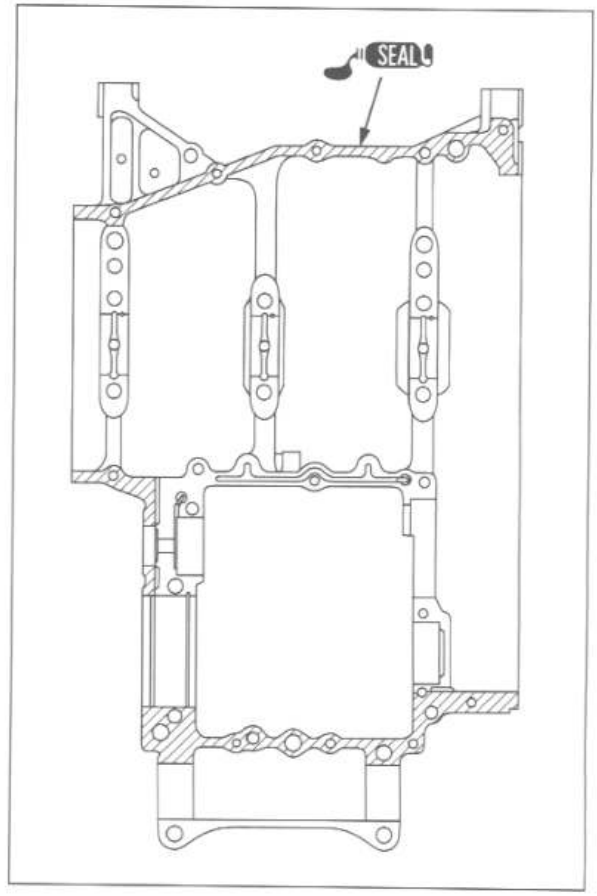
Install the nuts and tighten them gradually and alternately.

TORQUE: 33 N·m (3.4 kgf·m, 25 lbf·ft)

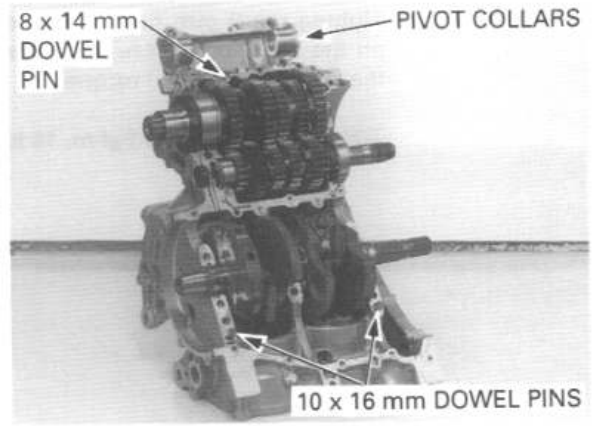


CRANKCASE COMBINATION

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.

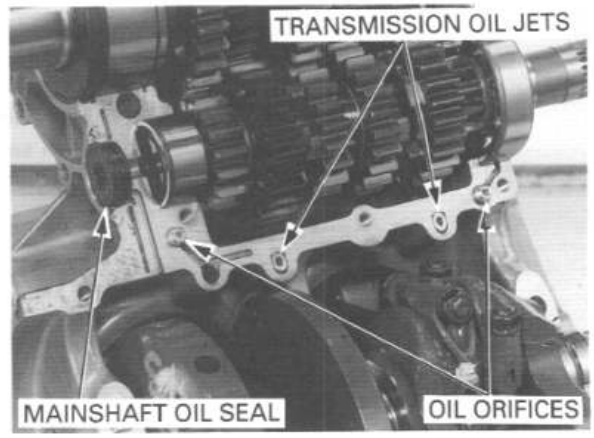


Install the two 10 x 16 mm dowel pins and 8 x 14 mm dowel pin.
Install the swingarm pivot collars.



Install the oil orifices with their large I.D. side facing the upper crankcase.

Install oil orifices, transmission oil jets and mainshaft oil seal in the upper crankcase.



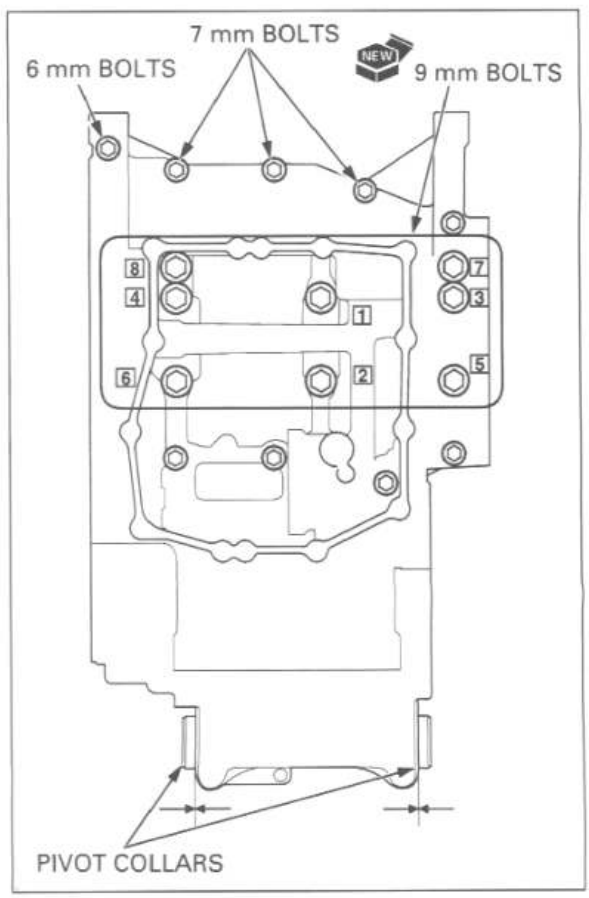
Assemble crankcase halves by aligning the shift forks onto their proper grooves on the mainshaft and countershaft.

Install the new main journal 9 mm bolts.
Loosely install all the lower crankcase bolts.

Make sure the upper and lower crankcase are seated securely.
Check that the swingarm pivot collars are seated in the crankcase.

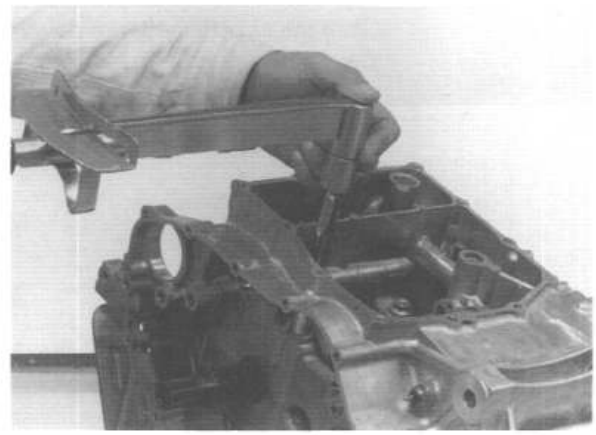
CAUTION:

- ***Tighten the main journal 9 mm bolts using the Plastic Region Tightening Method described below.***
- ***Do not reuse the main journal 9 mm bolts, because the correct axial tension will not be obtained.***
- ***The main journal 9 mm bolt is pre-coated with an oil additive for axial tension stability. Do not remove the oil additive from the new 9 mm bolt surface.***



Tighten the 9 mm bolts in the numerical order cast on the lower crankcase in several steps, then tighten them to the specified torque.

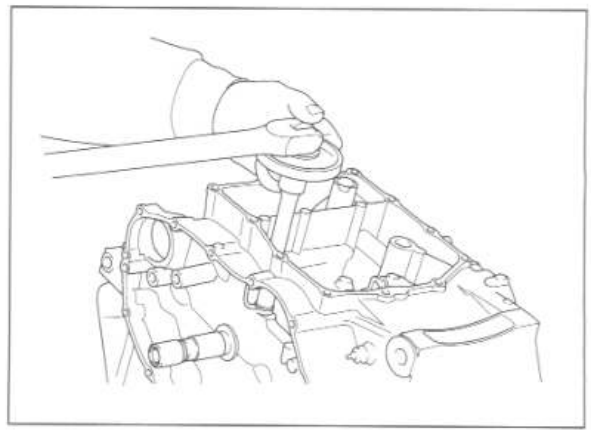
TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)



Further tighten the 9 mm bolts 90 degrees in numerical order cast on the lower crankcase.

Tighten the lower crankcase 6 mm bolts and 7 mm bolts in a crisscross pattern in several steps (see previous page for bolt location).

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



Check that the swingarm pivot collars are seated in the crankcase.
Install the upper crankcase 10 mm bolts.
Install a new sealing washer and 6 mm bolts.

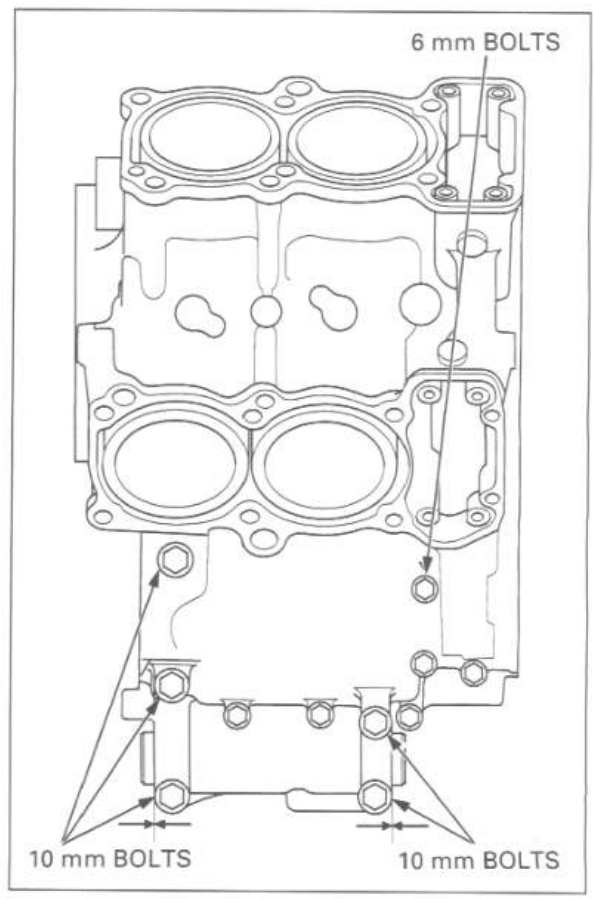
NOTE:

The sealing washer location is indicated on the upper crankcase using the "△" mark.

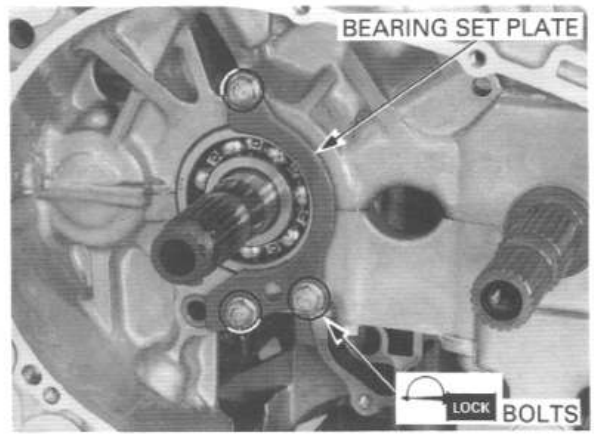
Tighten the 10 mm bolts to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

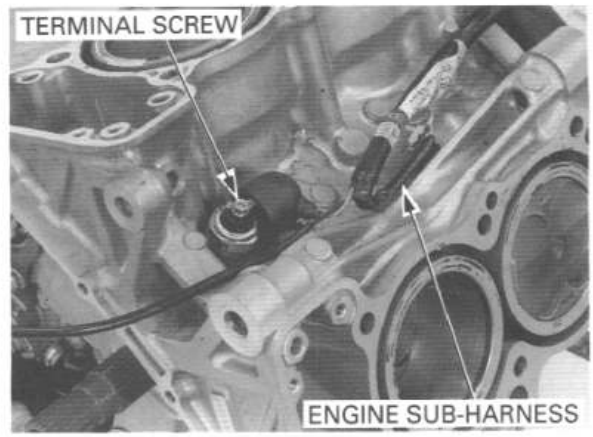
Tighten the 6 mm bolts in a crisscross pattern in 2 or 3 steps.



Install the mainshaft bearing set plate.
Apply a locking agent to the bearing set plate bolt threads.
Tighten the set plate bolts.

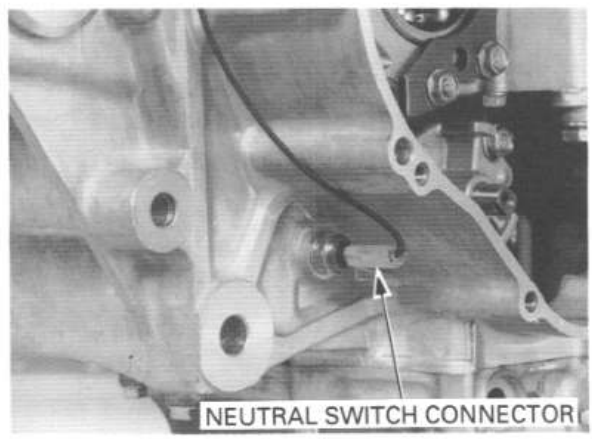


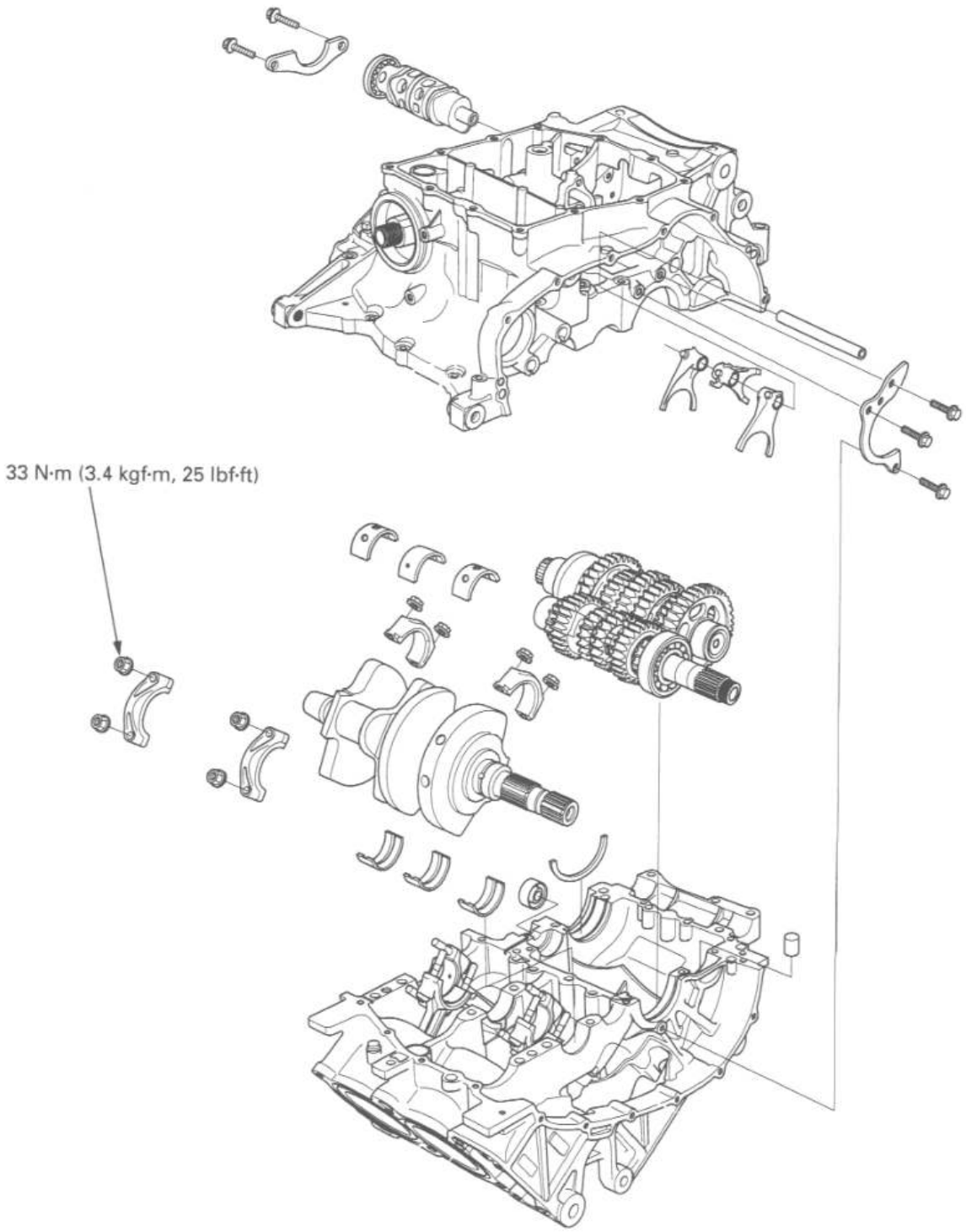
Route the engine sub-harness, install the oil pressure switch terminal to the switch.
Tighten the oil pressure switch terminal screw.



Route the neutral switch wire through the hole in the crankcase (page 1-35).
Install the neutral switch connector.

Install the removed parts in the reverse order of removal.




33 N·m (3.4 kgf·m, 25 lbf·ft)

12. CRANKSHAFT/TRANSMISSION

SERVICE INFORMATION	12-1	CRANKSHAFT	12-3
TROUBLESHOOTING	12-2	TRANSMISSION	12-6

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the crankshaft and transmission. Refer to section 11 for crankcase separation/assembly.
- Be careful not to damage the crankshaft main journal and journal bearing while removing or installing the crankshaft.
- Mark and store the disassembled parts to ensure that they are installed in their original locations.
- Mark and store the bearing inserts to ensure that the parts are in their correct locations during reassembly. If the inserts are improperly installed, they will block the oil 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		0.10 – 0.30 (0.004 – 0.012)	0.40 (0.016)
	Runout		———	0.03 (0.001)
	Main journal oil clearance		0.023 – 0.041 (0.0009 – 0.0016)	0.06 (0.002)
Transmission	Gear I.D.	M5, M6	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C1	26.007 – 26.028 (1.0239 – 1.0247)	26.04 (1.025)
		C2	31.000 – 31.016 (1.2205 – 1.2211)	31.04 (1.222)
		C3, C4	31.000 – 31.025 (1.2205 – 1.2215)	31.04 (1.222)
	Bushing O.D.	M5, M6	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
		C2	30.970 – 30.995 (1.2193 – 1.2203)	30.95 (1.219)
		C3, C4	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
	Bushing I.D.	M5	24.985 – 25.006 (0.9837 – 0.9845)	25.03 (0.985)
		C2	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
	Gear-to-bushing clearance	M5, M6	0.020 – 0.062 (0.0008 – 0.0024)	———
		C2	0.005 – 0.046 (0.0002 – 0.0018)	———
		C3, C4	0.025 – 0.075 (0.0010 – 0.0030)	———
	Mainshaft O.D.	M5	24.959 – 24.980 (0.9826 – 0.9835)	24.95 (0.982)
	Countershaft O.D.	C2	27.967 – 27.980 (1.1011 – 1.1016)	27.96 (1.101)
	Bushing-to-shaft clearance	M5	0.005 – 0.047 (0.0002 – 0.0019)	———
		C2	0.020 – 0.054 (0.0008 – 0.0021)	———
Shift fork, fork shaft	Shift fork	Fork I.D.	14.000 – 14.021 (0.5512 – 0.5520)	14.03 (0.552)
		Claw thickness	6.43 – 6.50 (0.253 – 0.256)	6.40 (0.252)
	Fork shaft O.D.		13.973 – 13.984 (0.5501 – 0.5506)	13.965 (0.5498)

TORQUE VALUES

Connecting rod nut	33 N·m (3.4 kgf·m, 25 lbf·ft)	Apply oil to the threads and seating surface

TOOLS

Driver, 40 mm I.D.	07746 – 0030100
Attachment, 25 mm (IN)	07746 – 0030200

TROUBLESHOOTING

Excessive noise
- Worn connecting rod big end bearing
- Bent connecting rod
- Worn crankshaft main journal bearing
- Worn transmission bearing

Hard to shift
- Improper clutch operation
- Incorrect transmission oil weight
- Incorrect clutch adjustment
- Bent shift fork
- Bent fork shaft
- Bent fork claw
- Damaged shift drum cam groove
- Bent shift spindle

Transmission jumps out of gear
- Worn gear dogs and slots
- Bent fork shaft
- Broken shift drum stopper
- Worn or bent shift forks
- Broken shift linkage return spring

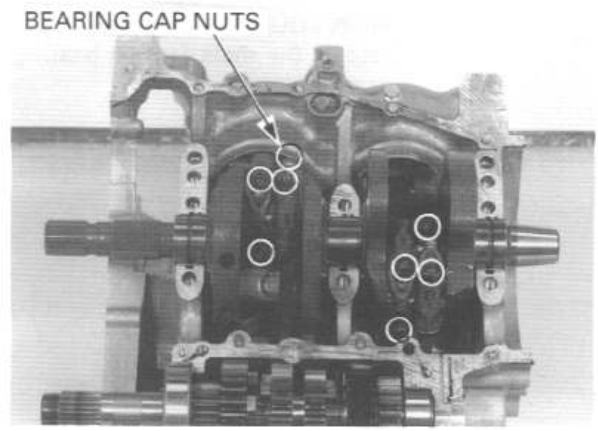
Engine vibration
- Excessive crankshaft runout

CRANKSHAFT

REMOVAL

Separate the crankcase halves (page 11-3).

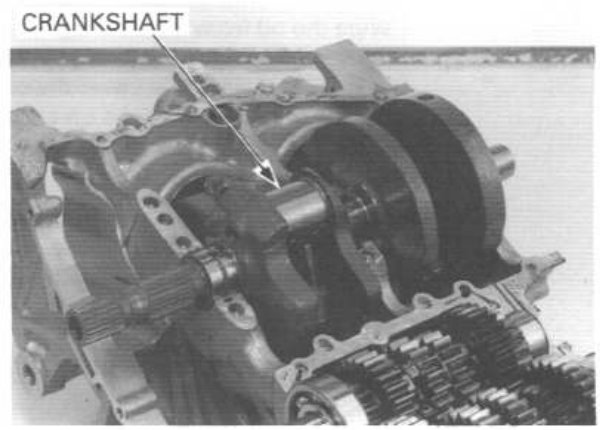
Remove the connecting rod bearing cap nuts and bearing caps.



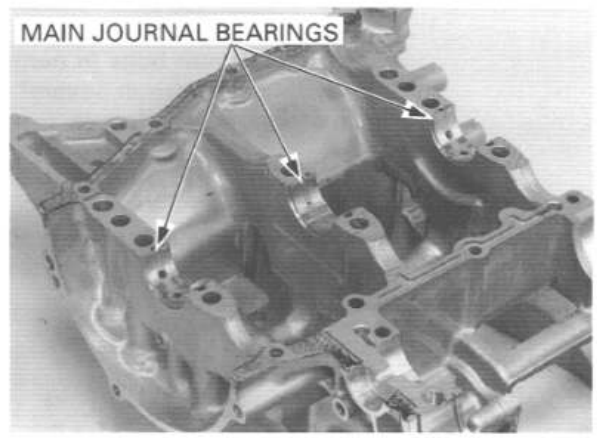
CAUTION:

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.



INSPECTION

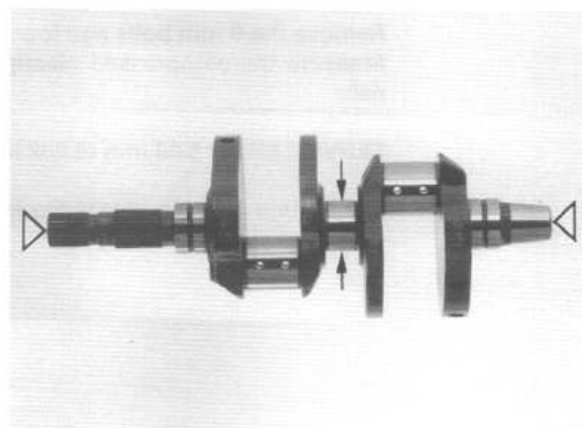
CRANKSHAFT RUNOUT

Hold the crankshaft both end.

Set a dial indicator on the center main journal of the crankshaft.

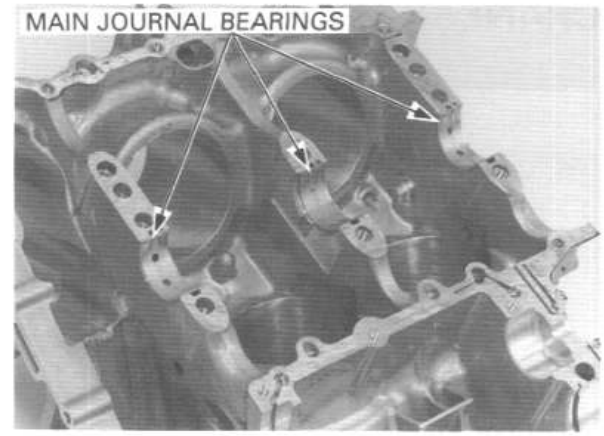
Rotate the crankshaft two revolutions and read runout at the center journal.

SERVICE LIMIT: 0.03 mm (0.001 in)



MAIN JOURNAL BEARING

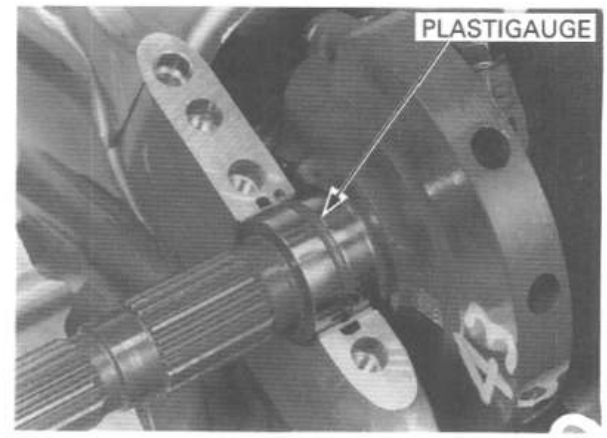
Inspect the main journal bearing inserts for damage or separation.



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:

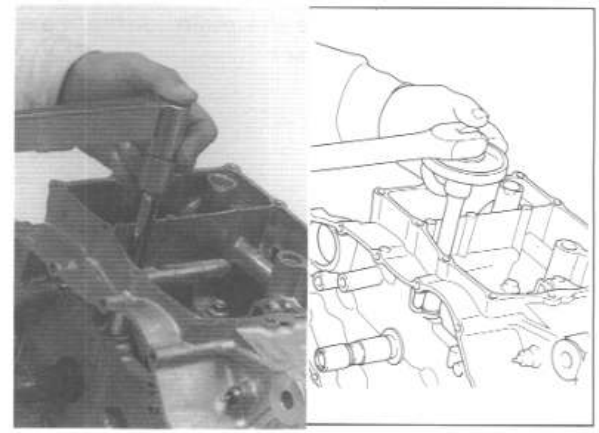
- Do not put the plastigauge over the oil hole in the main bearing journal of the crankshaft.
- Do not rotate the crankshaft during inspection.



Assemble the crankcase halves.
Tighten the 9 mm bolts in numerical order cast on the lower crankcase in several steps, then tighten them to the specified torque.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

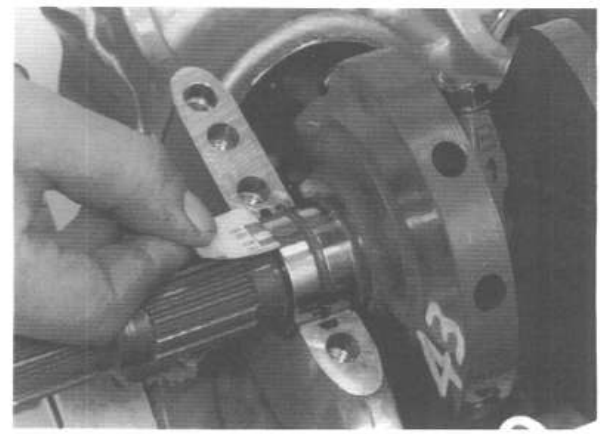
Further tighten the 9 mm bolts 90 degrees in numerical order cast on the lower crankcase.



Remove the 9 mm bolts and lower crankcase.
Measure the compressed plastigauge on each journal.

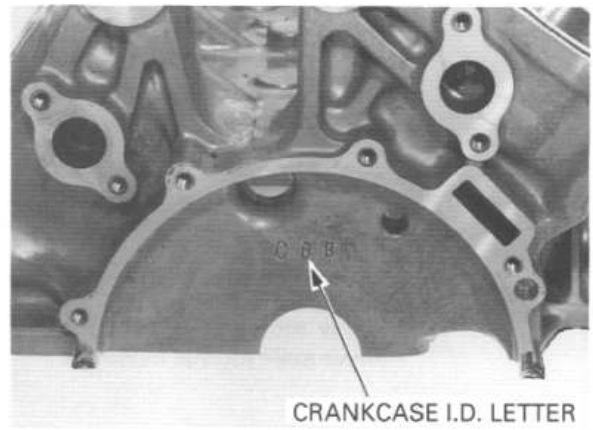
SERVICE LIMIT: 0.06 mm (0.002 in)

If the main bearing clearance is beyond tolerance, select a replacement bearing.



MAIN JOURNAL BEARING SELECTION

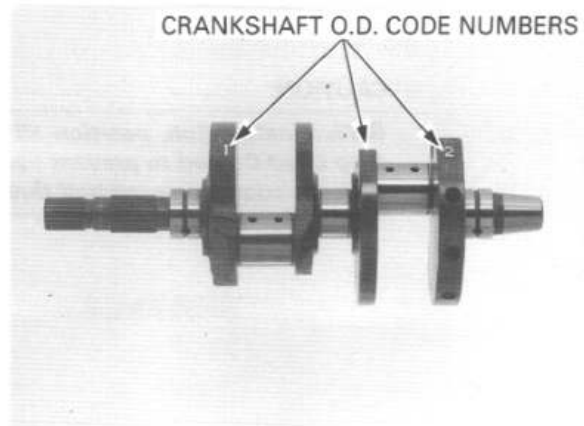
Record the crankcase I.D. letters from the pad on the left side of the upper crankcase as shown.



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.

Record the corresponding main journal O.D. code numbers from the crank weight.



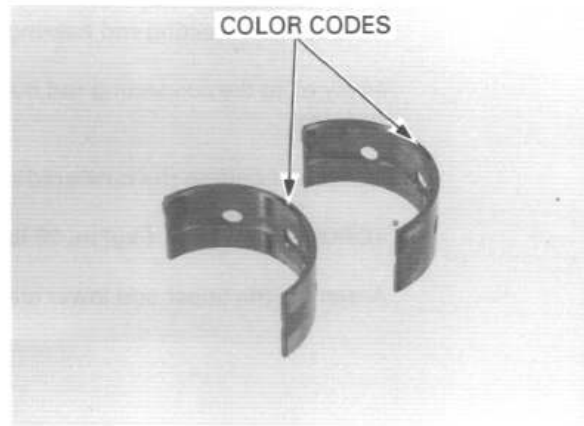
NOTE:

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.

BEARING THICKNESS:

A (Blue): Thick
B (Black):
C (Brown):
D (Green):
E (Yellow): 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
			37.000 – 37.006 (1.4567 – 1.4569)	37.006 – 37.012 (1.4569 – 1.4572)	37.012 – 37.018 (1.4572 – 1.4574)
CRANKSHAFT O.D. CODE	1	34.007 – 34.013 (1.3389 – 1.3391)	E (Yellow)	D (Green)	C (Brown)
	2	34.001 – 34.007 (1.3386 – 1.3389)	D (Green)	C (Brown)	B (Black)
	3	33.995 – 34.001 (1.3384 – 1.3386)	C (Brown)	B (Black)	A (Blue)

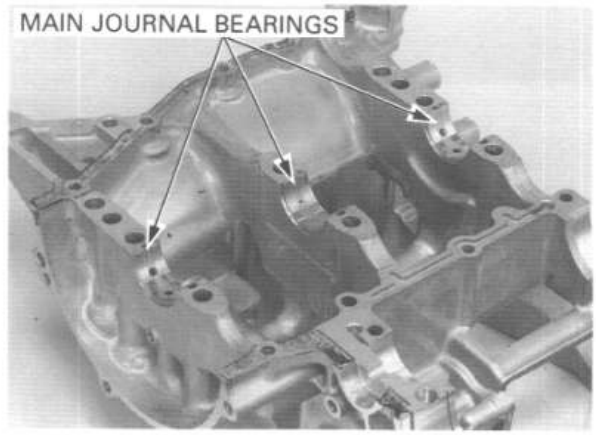
INSTALLATION

Install the main journal bearings into the upper and lower crankcase.

NOTE:

The bearing tabs should be aligned with the grooves in the case.

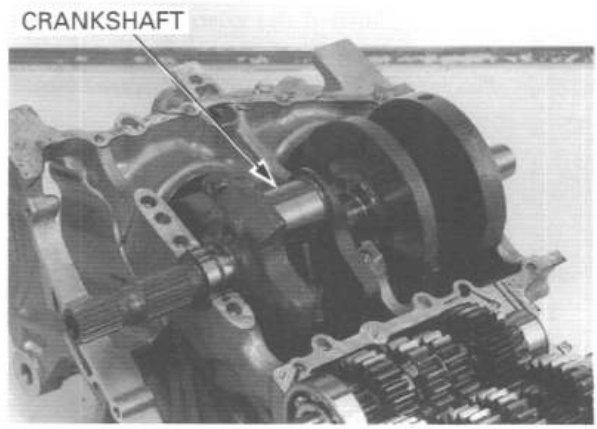
Apply molybdenum disulfide oil to the upper and lower main journal bearings.



Install the crankshaft.

CAUTION:

Before installation, position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod bolt threads.



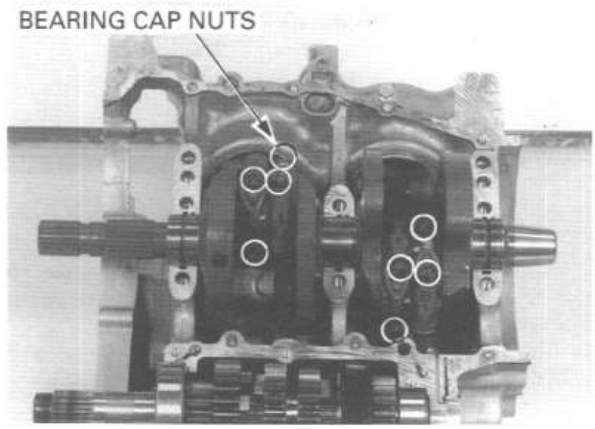
Install the connecting rod bearing caps.

Apply oil to the connecting rod nut threads and seating surfaces.

Install and tighten the nuts gradually and alternately.

TORQUE: 33 N·m (3.4 kgf·m, 25 lbf·ft)

Assemble the upper and lower crankcase (page 11-12).

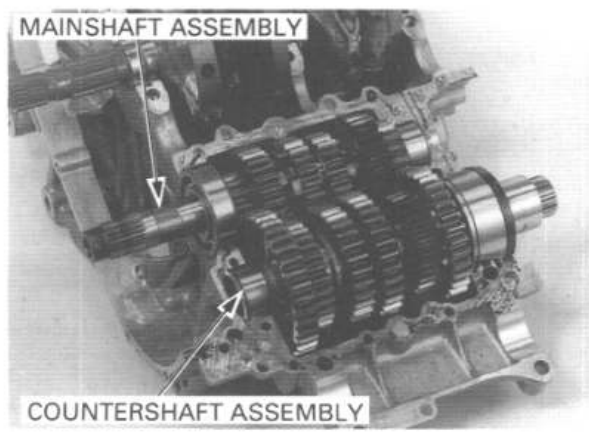


TRANSMISSION

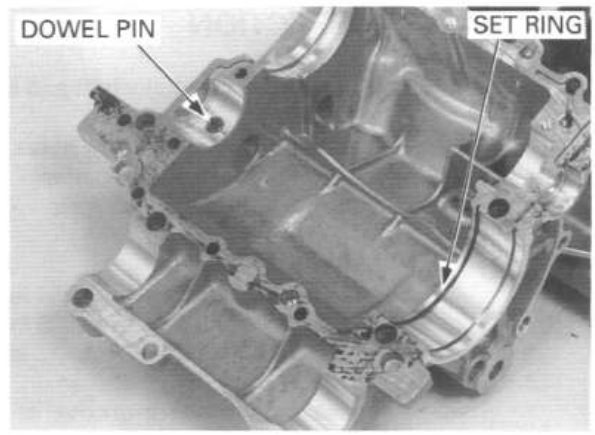
REMOVAL/DISASSEMBLY

Separate the crankcase (page 11-3).

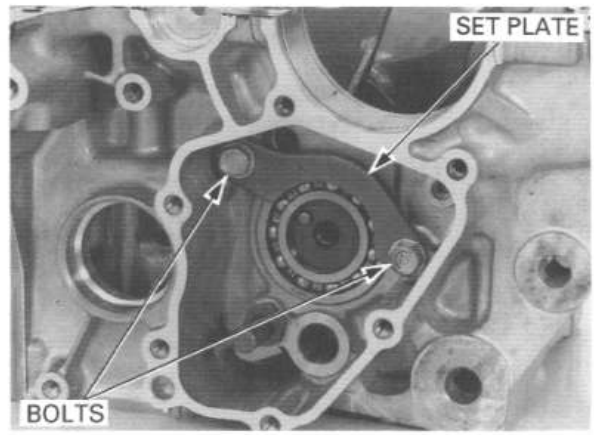
Remove the mainshaft and countershaft assembly from the upper crankcase.



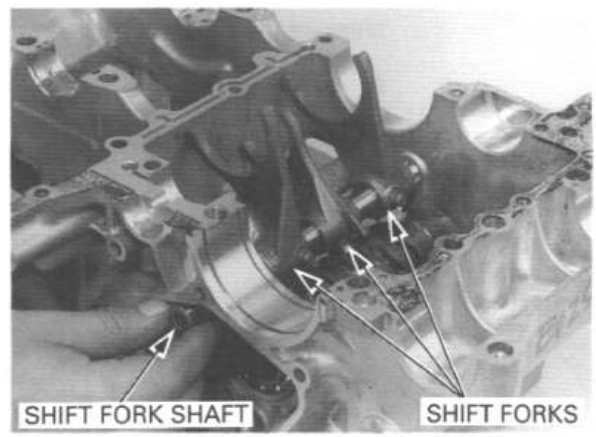
Remove the dowel pin and bearing set ring.



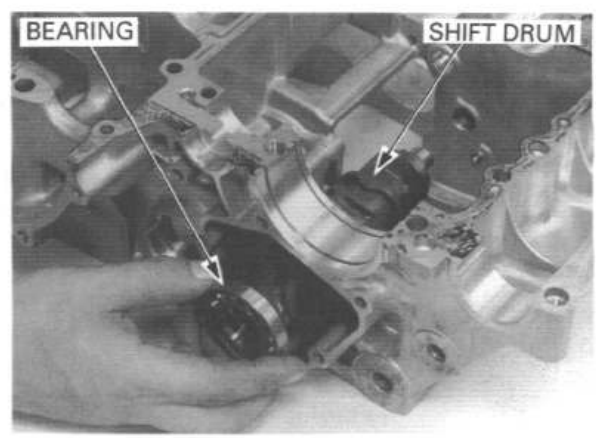
Remove the bolts and shift drum bearing set plate.



Remove the shift fork shaft and shift forks.



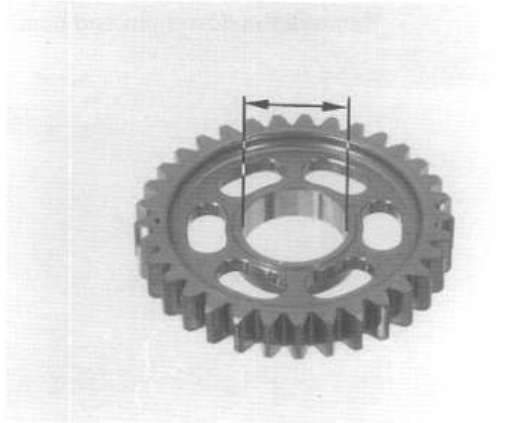
Remove the shift drum bearing and shift drum.



INSPECTION

Disassemble the mainshaft and countershaft.

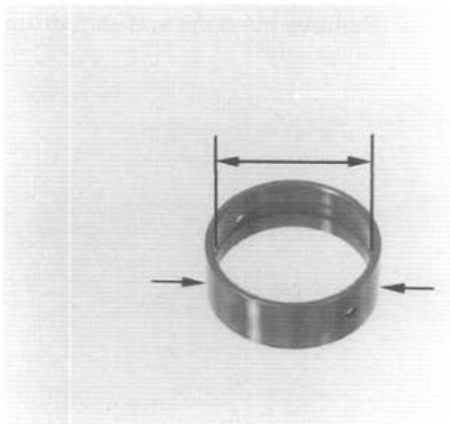
Check the gear dogs, dog holes and teeth for abnormal wear or lack of lubrication.
Measure the I.D. of each gear.



SERVICE LIMITS:
M5, M6: 28.04 mm (1.104 in)
C1: 26.04 mm (1.025 in)
C2, C3, C4: 31.04 mm (1.222 in)

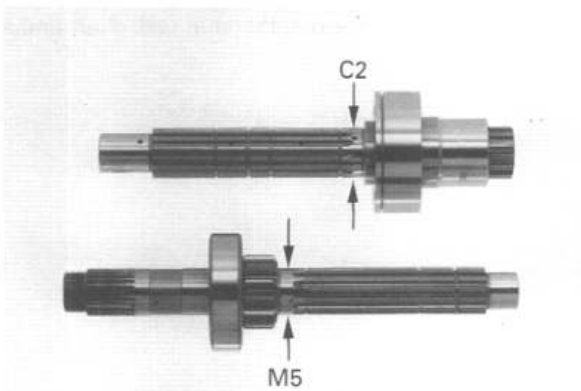
Check the shift fork groove of the shifter gear for excessive wear or damage.

Measure the I.D. and O.D. of each gear bushing.



SERVICE LIMITS:
O.D.: M5, M6: 27.94 mm (1.100 in)
C2: 30.95 mm (1.219 in)
C3, C4: 30.93 mm (1.218 in)
I.D.: M5: 25.03 mm (0.985 in)
C2: 28.04 mm (1.104 in)

Measure the O.D. of the mainshaft and countershaft.

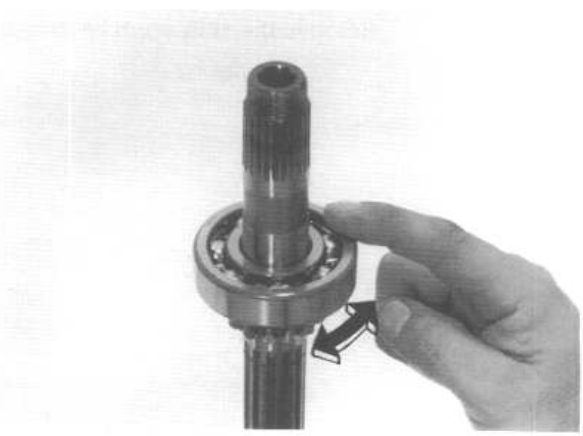


SERVICE LIMITS:
M5: 24.95 mm (0.982 in)
C2: 27.96 mm (1.101 in)

MAINSHAFT BEARING REPLACEMENT

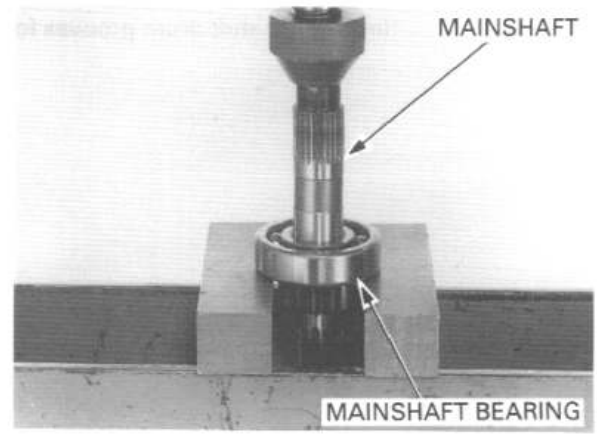
NOTE:

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.



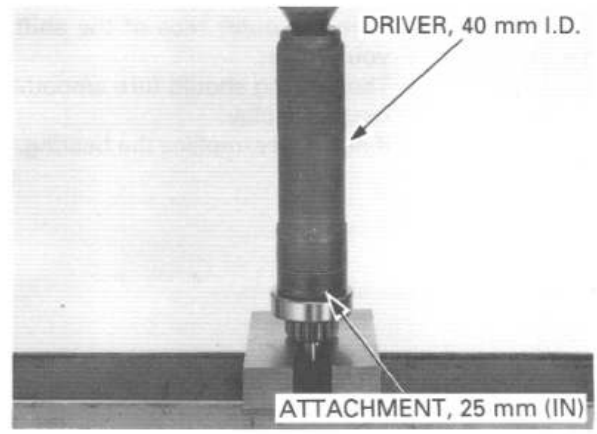
Install a new mainshaft bearing onto the mainshaft by pressing the mainshaft bearing inner race using the special tools.

TOOLS:

Driver, 40 mm I.D.	**07746 – 0030100**
Attachment, 25 mm (IN)	**07746 – 0030200**

NOTE:

Install the bearing with its marking facing out.



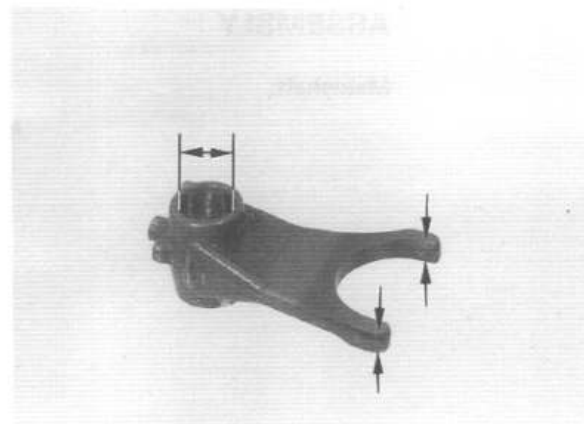
Check the shift fork and fork shaft for wear or damage.

Measure the I.D. of the shift fork.

SERVICE LIMIT: 14.03 mm (0.552 in)

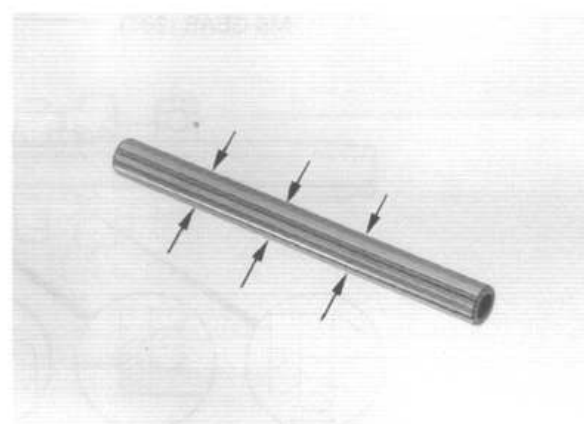
Measure the shift fork claw thickness.

SERVICE LIMIT: 6.40 mm (0.252 in)



Measure the O.D. of the shift fork shaft.

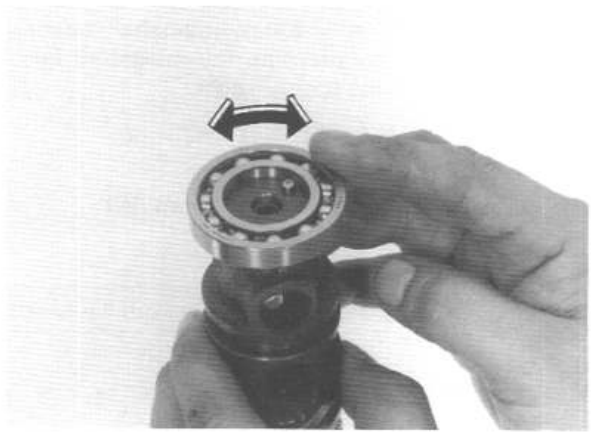
SERVICE LIMIT: 13.965 mm (0.5498 in)



Inspect the shift drum grooves for wear or damage.

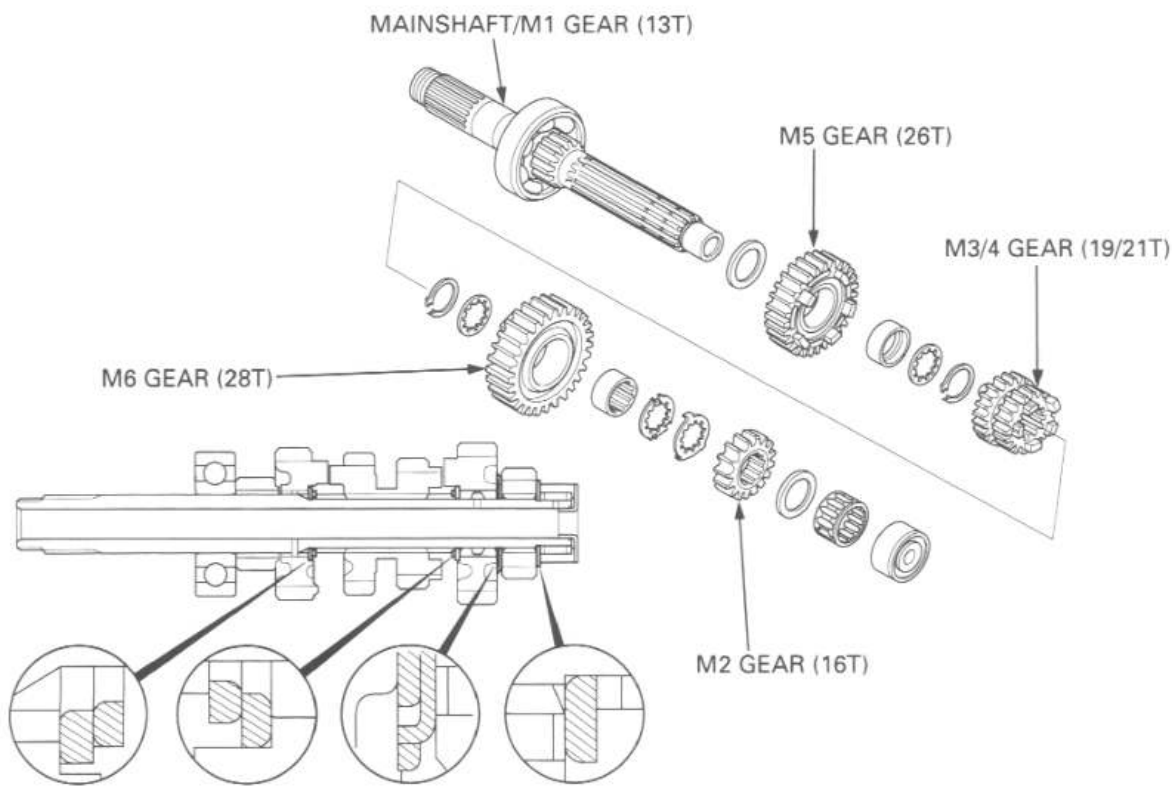


Turn the outer race of the shift drum bearing with your finger.
The bearing should turn smoothly and freely without excessive play.
If necessary, replace the bearing.

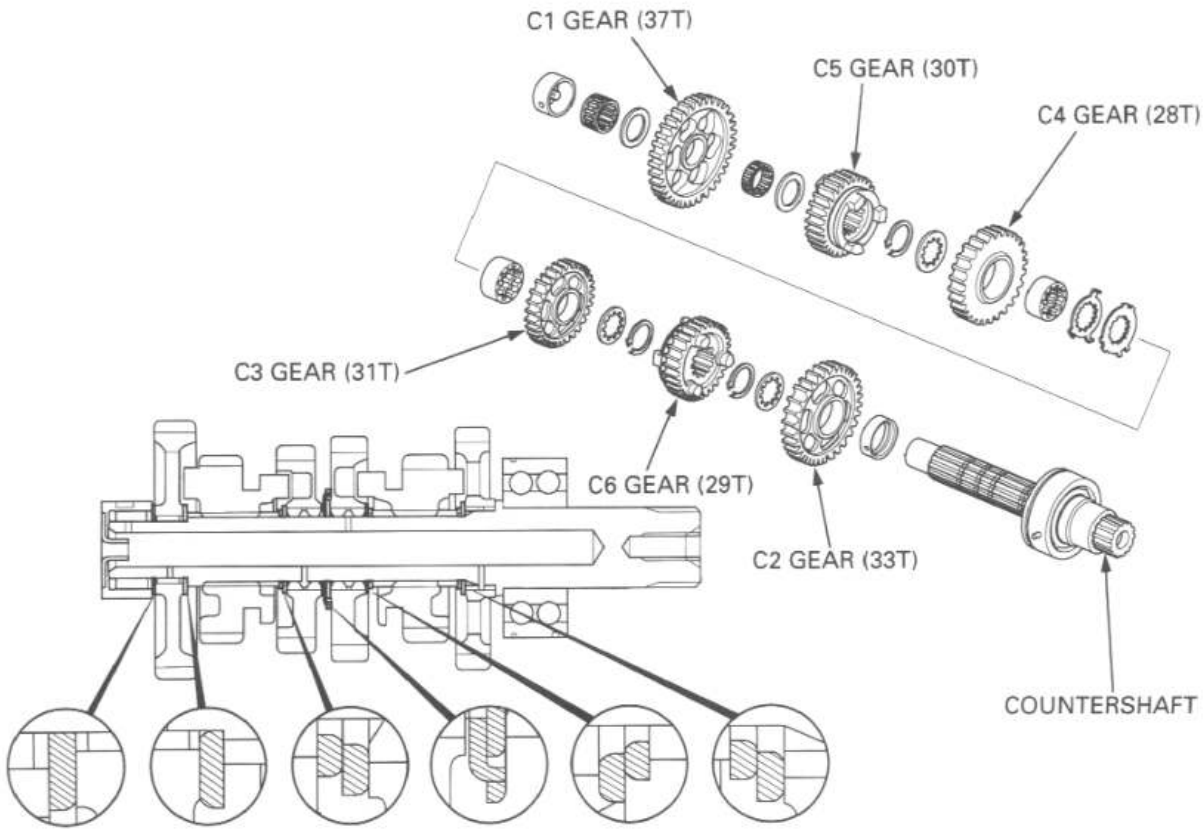


ASSEMBLY

Mainshaft:

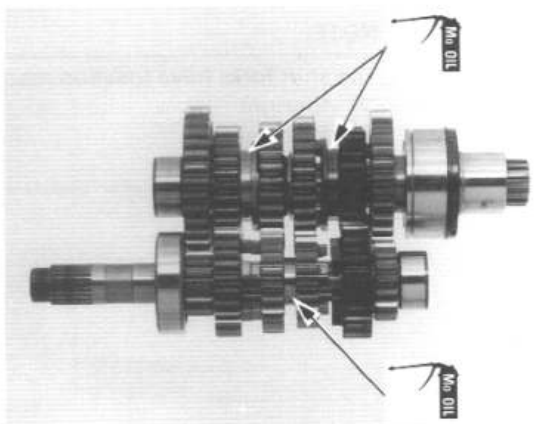


Countershaft:



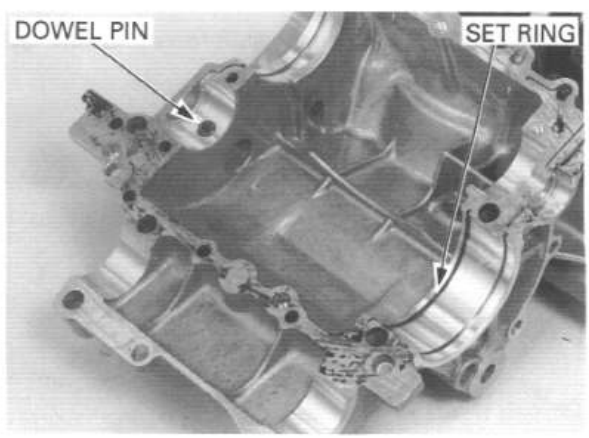
Assemble the transmission gear and shafts.
Coat each gear with clean engine oil and check for smooth movement.

Apply molybdenum disulfide oil to the shift fork grooves in the M3/4, C5 and C6 gear.

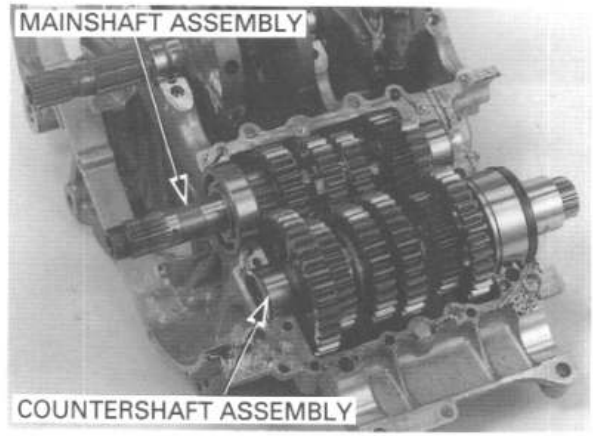


INSTALLATION

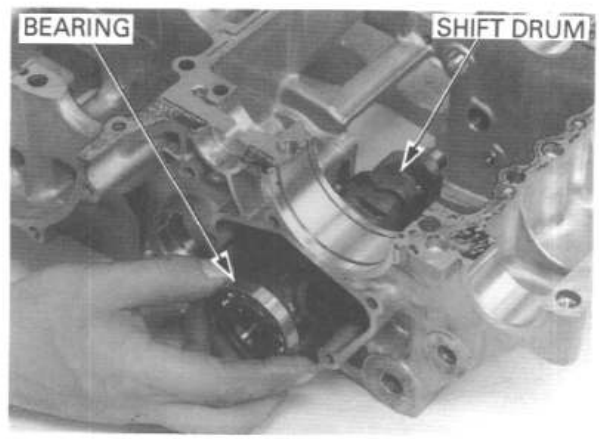
Install the dowel pin and bearing set ring on the upper crankcase holes.



Install the mainshaft and countershaft into the upper crankcase by aligning the countershaft bearing set ring with the groove on the countershaft bearing, and aligning the bearing cap hole with the dowel pin.

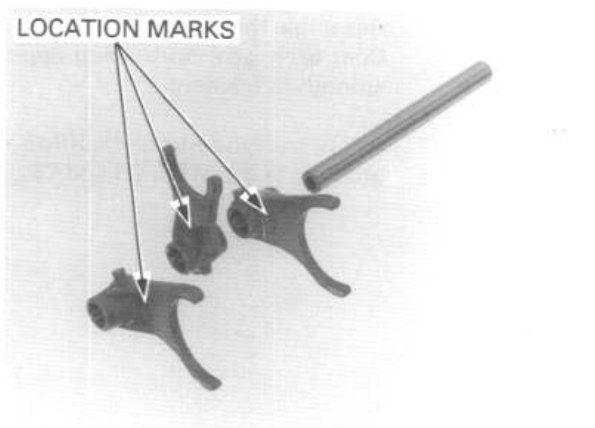


Install the shift drum and shift drum bearing into the lower crankcase.



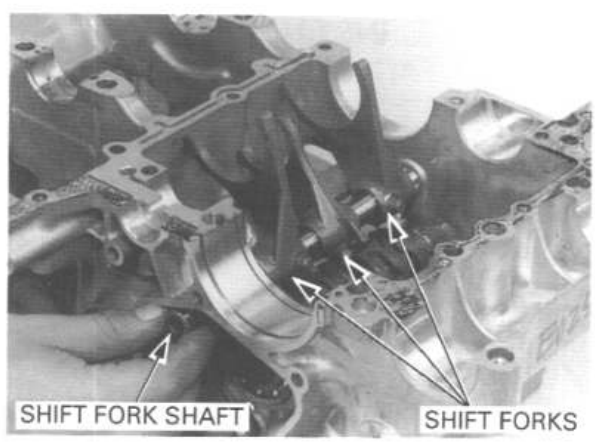
NOTE:

The shift forks have location marks.
"R" for right
"C" for center
"L" for left



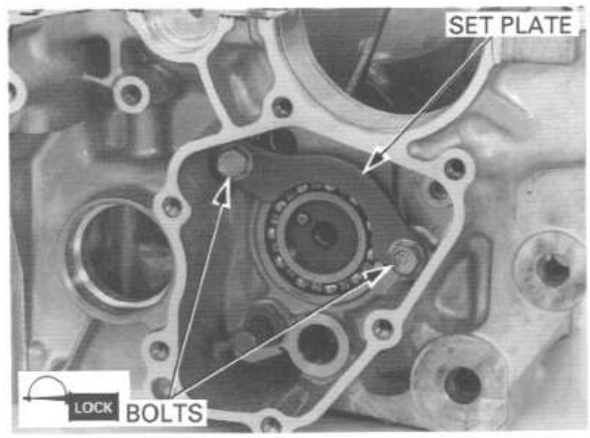
Face the shift fork identification marks to the clutch side.

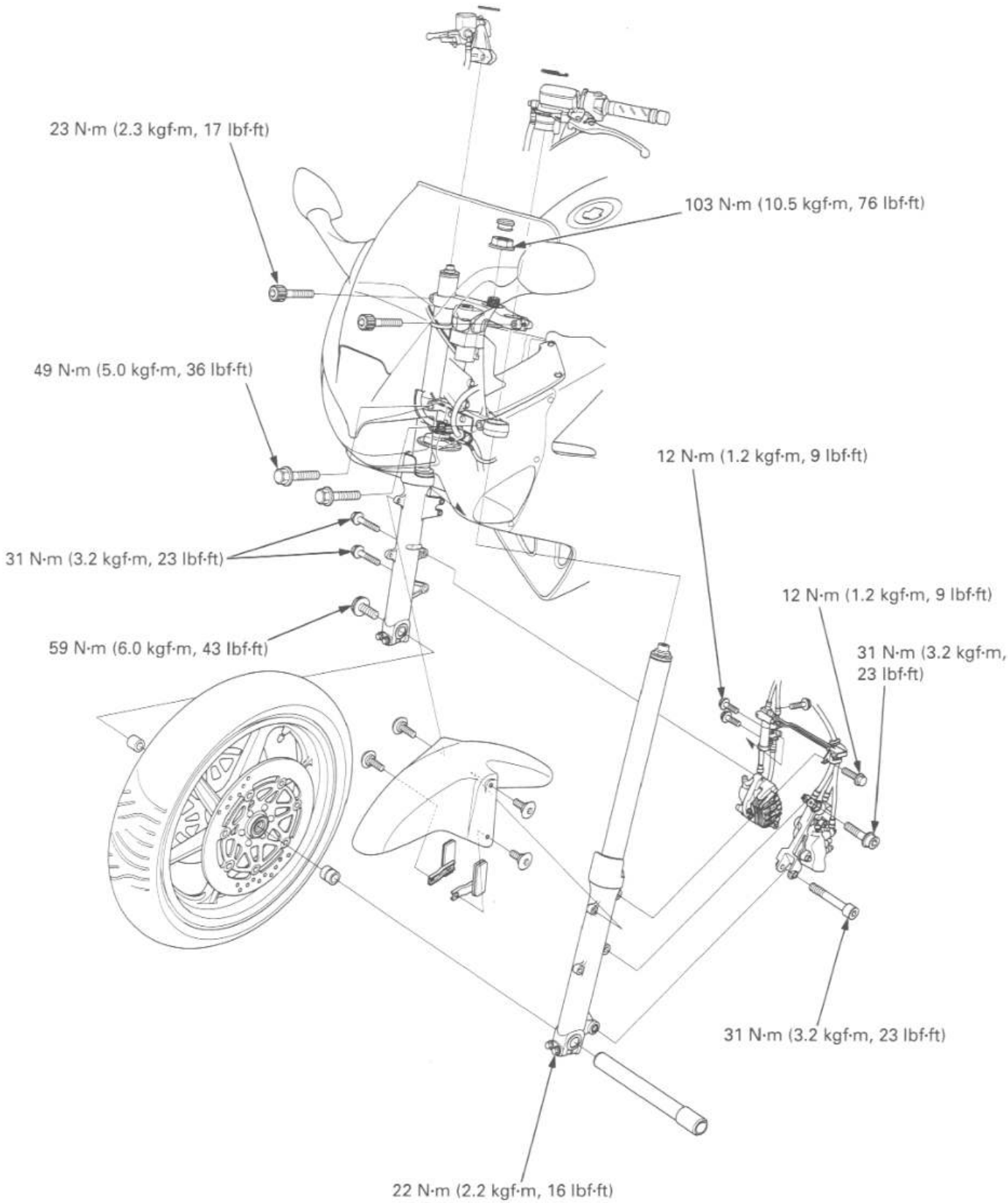
Install the shift forks and shift fork shaft.



Apply a locking agent to the shift drum bearing set plate bolt threads.
Install the shift drum bearing set plate and tighten the bolts securely.

Assemble the crankcase halves (page 11-12).




23 N·m (2.3 kgf·m, 17 lbf·ft)
103 N·m (10.5 kgf·m, 76 lbf·ft)
49 N·m (5.0 kgf·m, 36 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)
31 N·m (3.2 kgf·m, 23 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)
59 N·m (6.0 kgf·m, 43 lbf·ft)
31 N·m (3.2 kgf·m, 23 lbf·ft)
31 N·m (3.2 kgf·m, 23 lbf·ft)
22 N·m (2.2 kgf·m, 16 lbf·ft)

13. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	13-1	FRONT WHEEL	13-9
TROUBLESHOOTING	13-2	FORK	13-15
HANDLEBARS	13-3	STEERING STEM	13-27

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.

- 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	Up to 90 kg (200 lb) load	250 kPa (2.50 kgf/cm², 36 psi)	—
	Up to maximum weight capacity	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	382.7 (15.07)	375.0 (14.76)
	Spring direction	With the tapered end facing down	—
	Tube runout	—	0.20 (0.008)
	Pre-load adjuster standard position	9 mm (0.4 in) from top surface of fork cap	—
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8	—
	Fluid level	130 (5.1)	—
	Fluid capacity	457 ± 2.5 cc (15.5 ± 0.08 US oz, 16.4 ± 0.09 Imp oz)	—
Steering head bearing pre-load		1.0 – 1.5 kgf (2.2 – 3.3 lbf)	—

TORQUE VALUES

Handlebar pinch bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Handlebar weight mounting screw	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC bolt
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	See page 13-31
Top thread A		
Top thread 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

Bearing remover shaft	07746 – 0050100	
Bearing remover head, 20 mm	07746 – 0050600	
Driver	07749 – 0010000	
Attachment, 42 x 47 mm	07746 – 0010300	
Pilot, 20 mm	07746 – 0040500	
Slider weight	07947 – KA50100	
Oil seal driver	07947 – KF00100	
Driver shaft	07946 – KA50000	
Steering stem socket	07916 – 3710101	or 07916 – 3710100 (U.S.A. only)
Ball race remover set	07946 – KM90001	or 07VMF – MAT0100
— Driver attachment, A	07946 – KM90100	07VMF – MAT0200
— Driver attachment, B	07946 – KM90200	07VMF – KZ30200
— Driver shaft assembly	07946 – KM90300	07VMF – MAT0300
— Bearing remover, A	07946 – KM90401	07VMF – MAT0400
— Bearing remover, B	07946 – KM90500	07947 – KA50100
— Assembly base	07946 – KM90600	07965 – MA60000
		07946 – ME90200
Steering stem driver	07946 – MB00000	

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

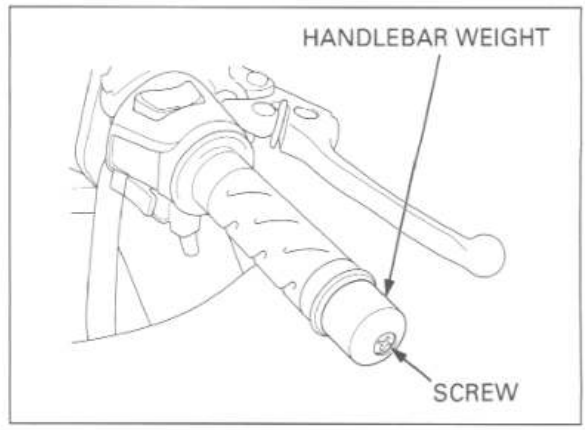
Hard suspension
- Incorrect fluid weight
- Bent fork tubes
- Clogged fork fluid passage

Front suspension noisy
- Insufficient fluid in fork
- Loose fork fasteners

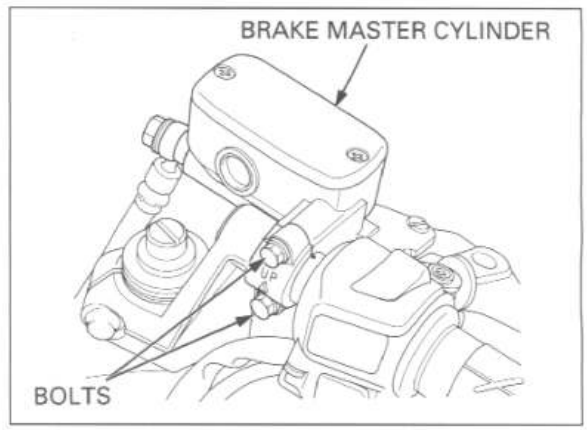
HANDLEBARS

RIGHT HANDLEBAR REMOVAL

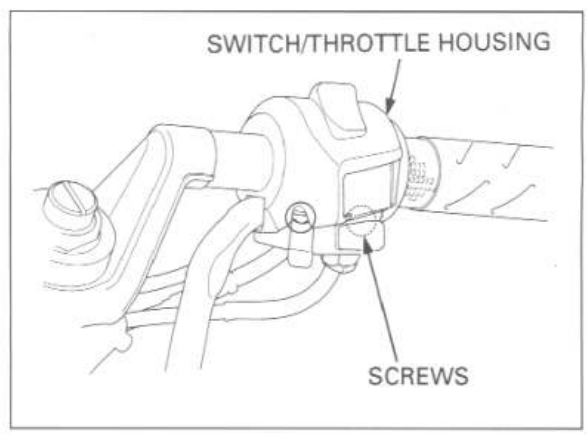
Remove the screw and the handlebar weight.



Disconnect the front brake switch wires connectors from the switch.
Remove the master cylinder holder bolts, holder and master cylinder assembly.

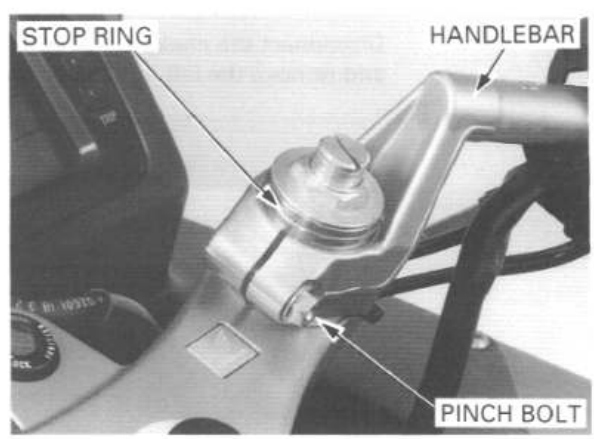


Remove the right handlebar switch/throttle housing screws.



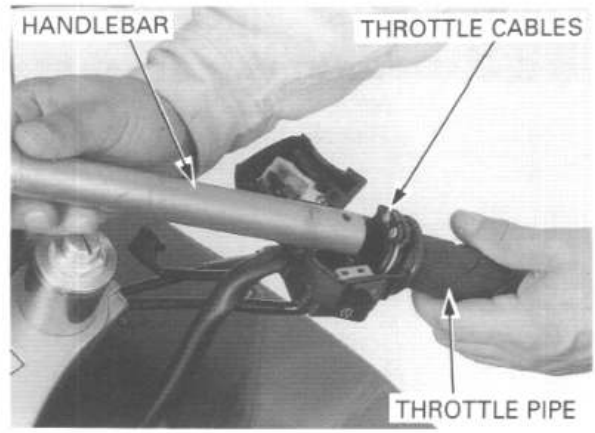
Remove the stop ring from the fork pipe.

Loosen the right handlebar pinch bolt and remove the handlebar.



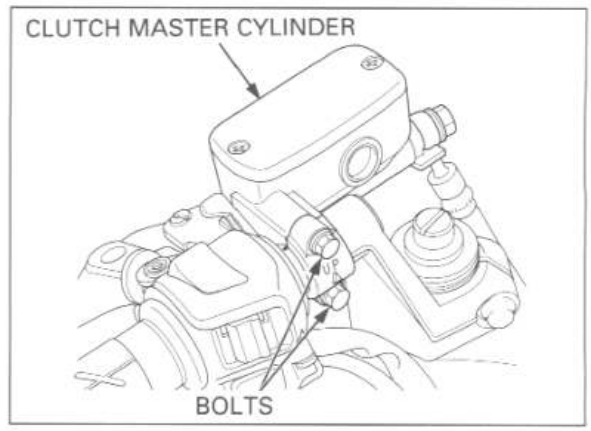
Remove the throttle pipe from the right handlebar.

Disconnect the throttle cable ends from the throttle pipe and remove the housing.

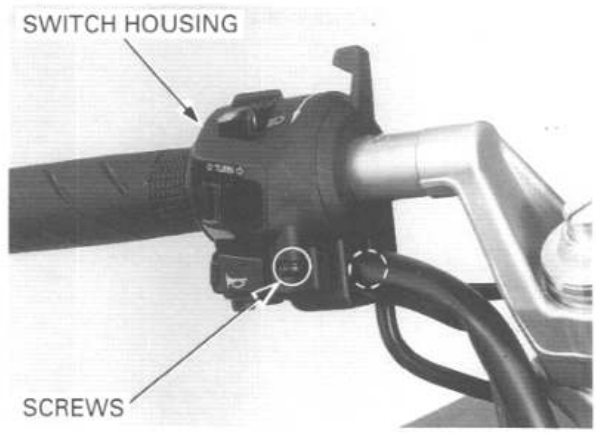


LEFT HANDLEBAR REMOVAL

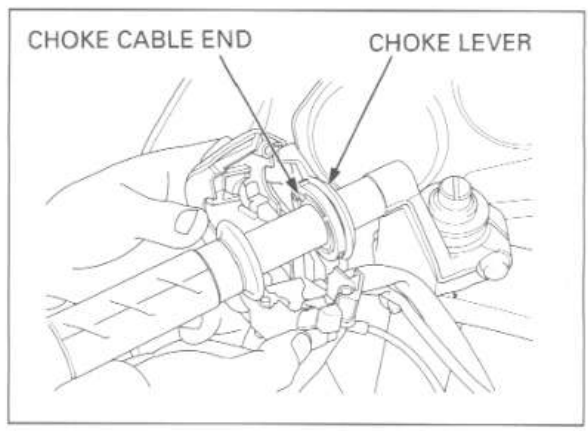
Disconnect the clutch switch wire connectors from the switch.
Remove the clutch master cylinder holder bolts, holder and clutch master cylinder assembly.



Remove the left handlebar switch housing screws.

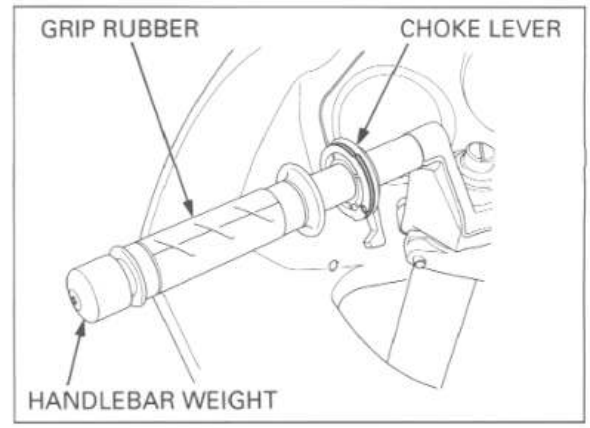


Disconnect the choke cable end from the choke lever and remove the left handlebar switch housing.



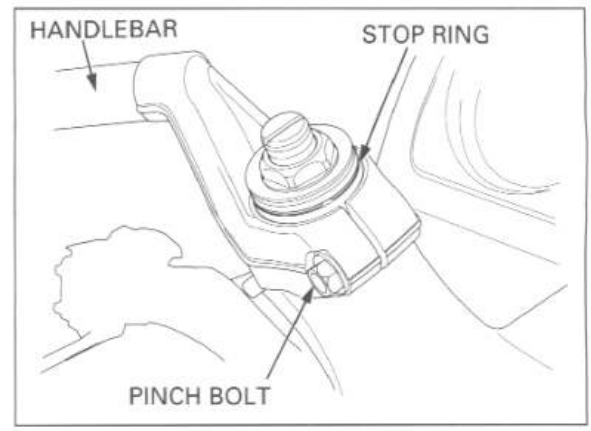
Remove the screw and handlebar weight.
Remove the handle grip rubber from the handlebar.

Remove the choke lever from the handlebar.



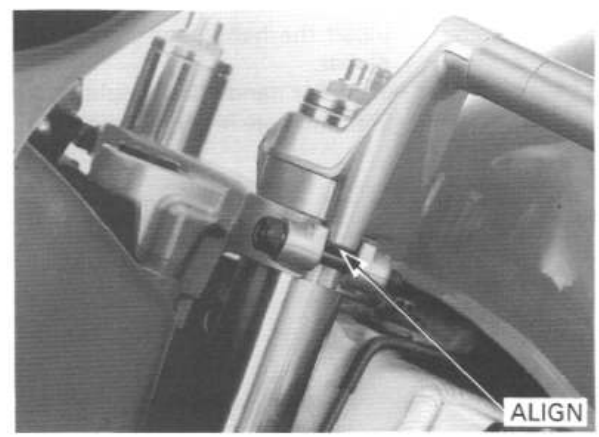
Remove the stop ring from the fork pipe.

Loosen the left handlebar pinch bolt and remove the handlebar.



LEFT HANDLEBAR INSTALLATION

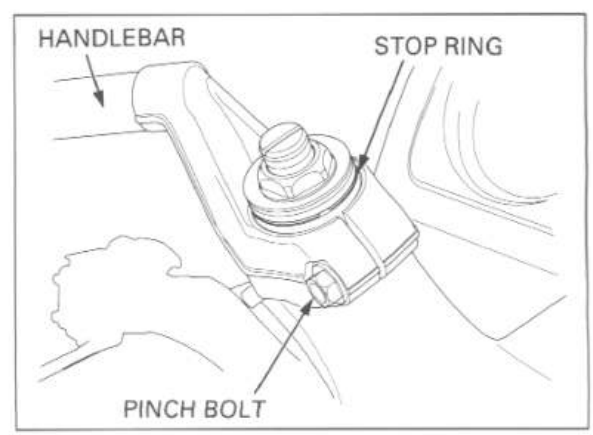
Install the left handlebar onto the fork pipe while aligning its boss with the groove of the top bridge.
Make sure the handlebar is seated on the top bridge.



Tighten the left handlebar pinch bolt to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Install the stopper ring into the fork groove securely.



HANDLEBAR WEIGHT REPLACEMENT

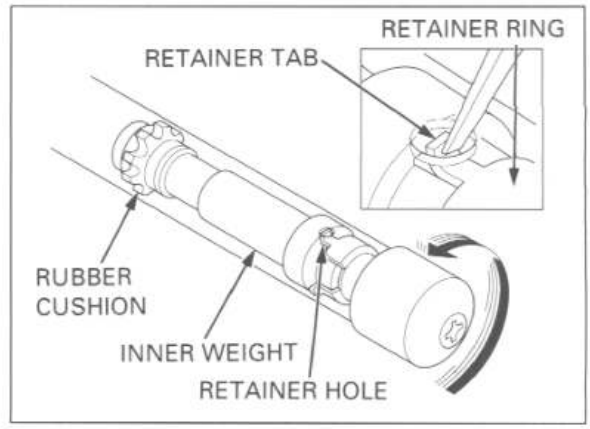
Remove the grip from the handlebar.

Straighten the weight retainer tab by the screwdriver or punch.

Temporarily install the handlebar weight and screw, then remove the inner weight by turning the handlebar weight.

NOTE:

Apply lubricant spray (CRC 5-56 or an equivalent) through the tab retainer hole to the rubber for easy removal.

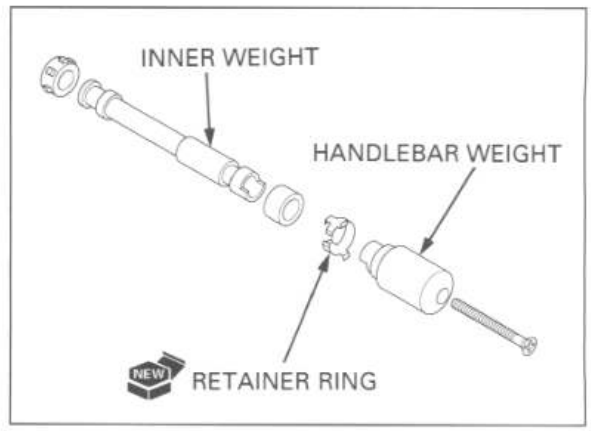


Remove the handlebar weight front the inner weight. Discard the retainer.

Install the new retainer onto the handlebar inner weight.

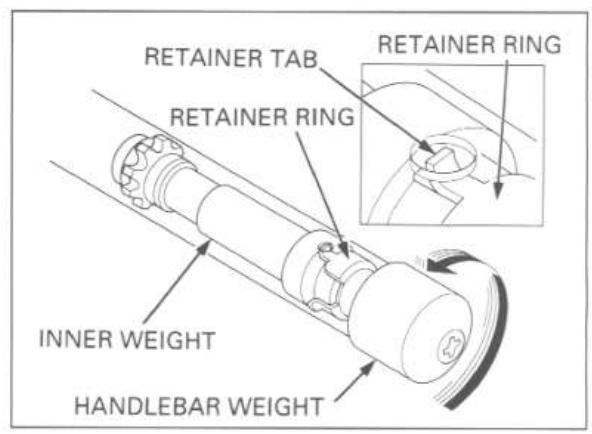
Install the handlebar weight onto the inner weight aligning its boss with the slot in the inner weight.

Install a new mounting screw.

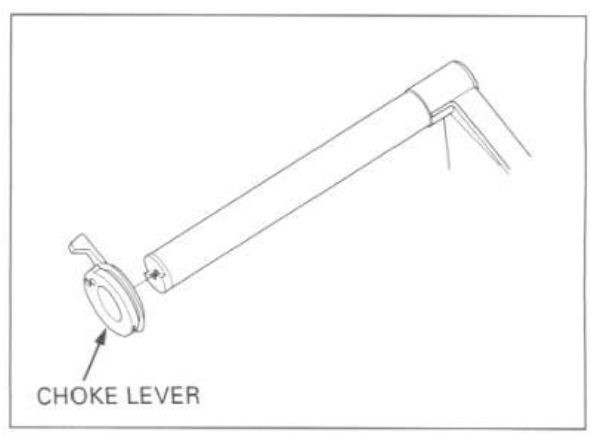


Insert the handlebar weight assembly into the handlebar.

Turn the handlebar weight and hook the retainer tab with the hole in the handlebar.



Install the choke lever onto the left handlebar.

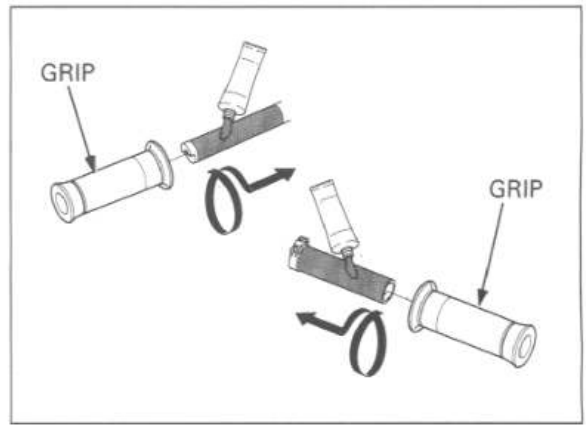


Apply Honda Bond A or Honda Hand Grip Cement (U.S.A. only) to the inside of the grip and to the clean surfaces of the left handlebar and throttle grip.

Wait 3 – 5 minutes and install the grip.
Rotate the grip for even application of the adhesive.

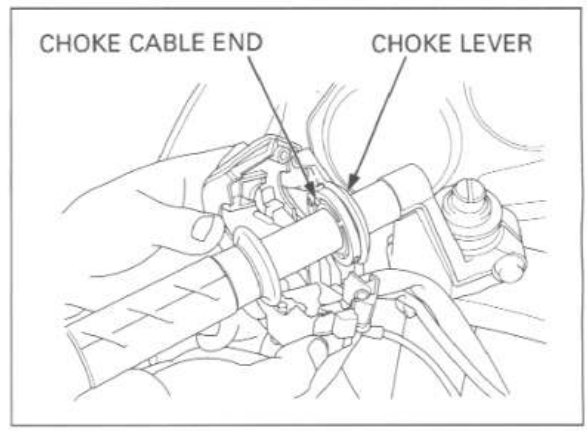
NOTE:

Allow the adhesive to dry for an hour before using.

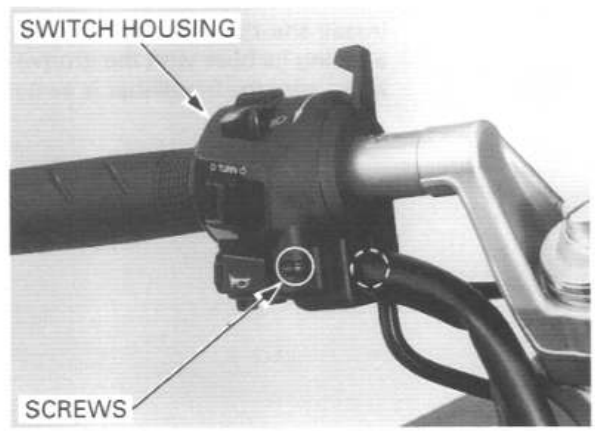


Apply clean grease to the choke cable sliding surface.
Connect the choke cable end to the choke lever.

Install the left handlebar switch aligning its locating pin with the hole in the handlebar.



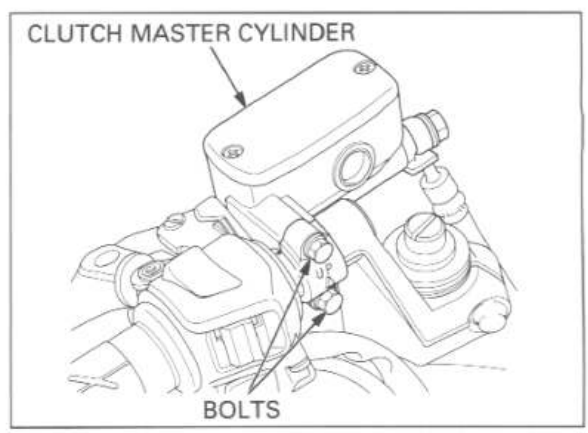
Tighten the forward screw first, then the rear screw.



Install the clutch master cylinder assembly by aligning the end of the master cylinder with the punch mark on the handlebar.
Install the clutch master cylinder holder with the "UP" mark facing up.
Tighten the upper bolt first, then the lower bolt.

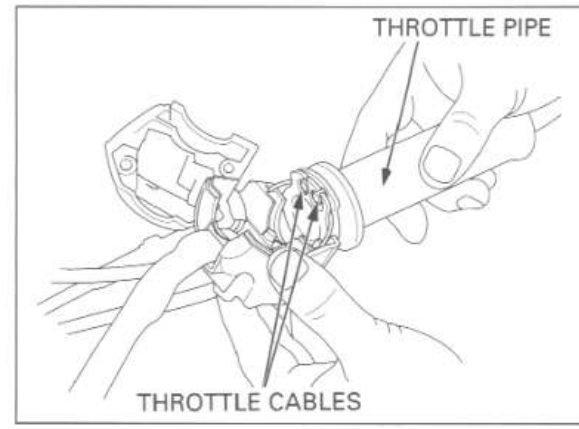
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the clutch switch wires.



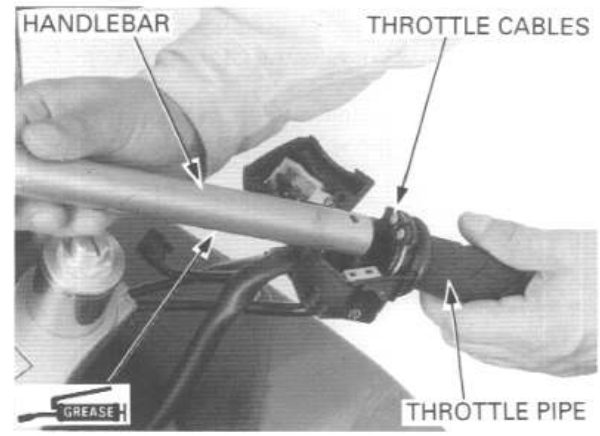
RIGHT HANDLEBAR INSTALLATION

Apply grease to the throttle cable sliding surface of the throttle pipe.
Connect the throttle cables to the throttle pipe.

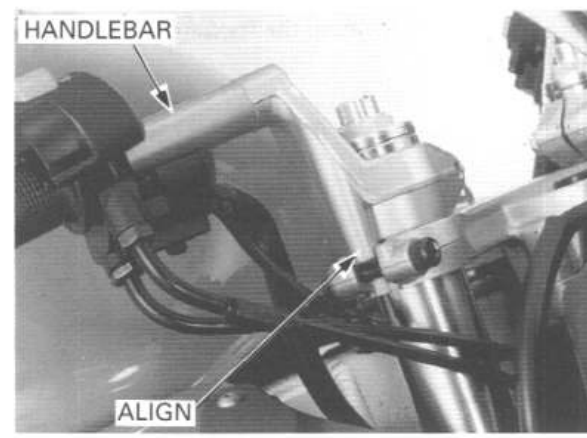


Install the throttle pipe into the right handlebar switch housing/throttle housing.

Apply grease to the sliding surface of the throttle pipe.
Install the throttle pipe on the right handlebar.



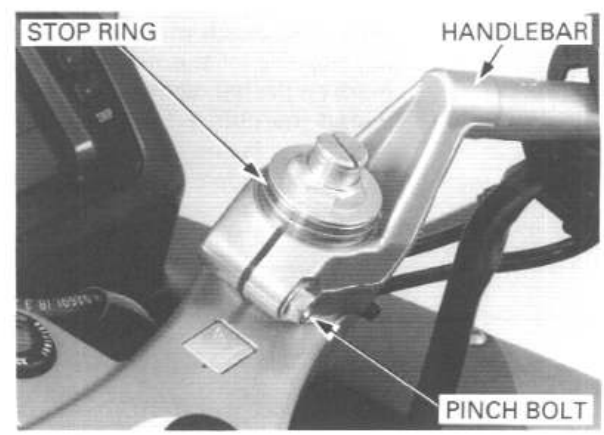
Install the right handlebar onto the fork pipe while aligning its boss with the groove of the top bridge.
Make sure the handlebar is seated on the top bridge.



Tighten the right handlebar pinch bolt to the specified torque.

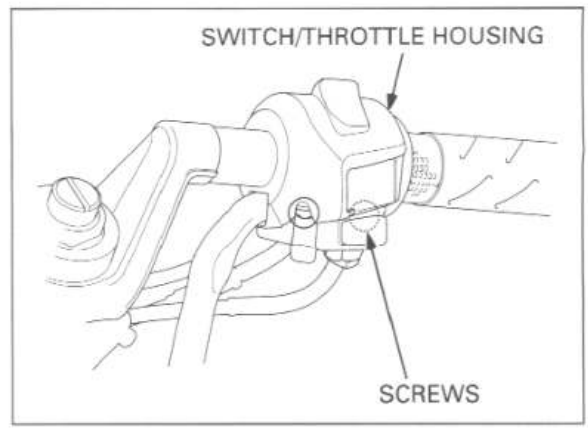
TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Install the stopper ring into the fork groove securely.



Install the right handlebar switch/throttle housing by aligning its locating pin with the hole in the handlebar.

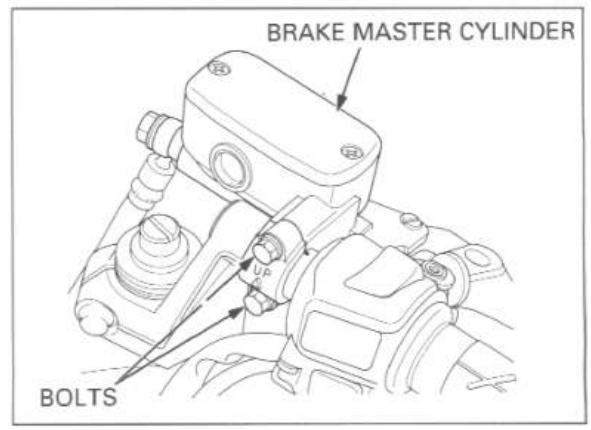
Tighten the forward screw first, then the rear screw.



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.

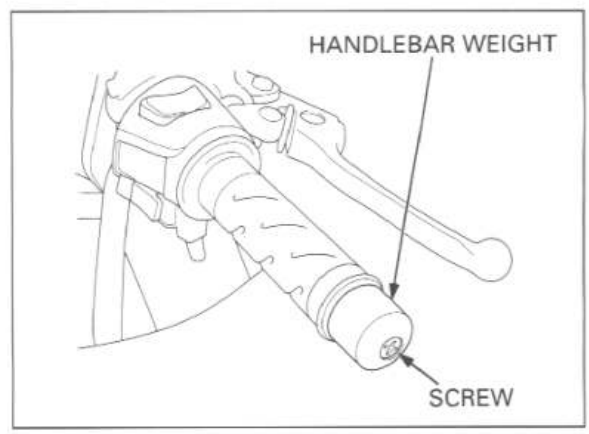
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the brake switch wires.



Install the handlebar weight and tighten the new mounting screw to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



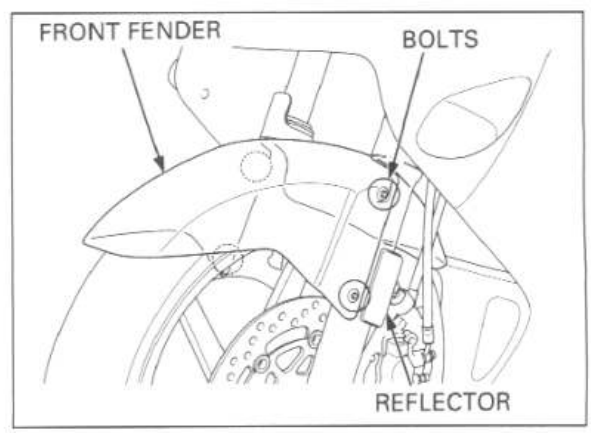
FRONT WHEEL

REMOVAL

⚠ 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, reflectors and front fender.



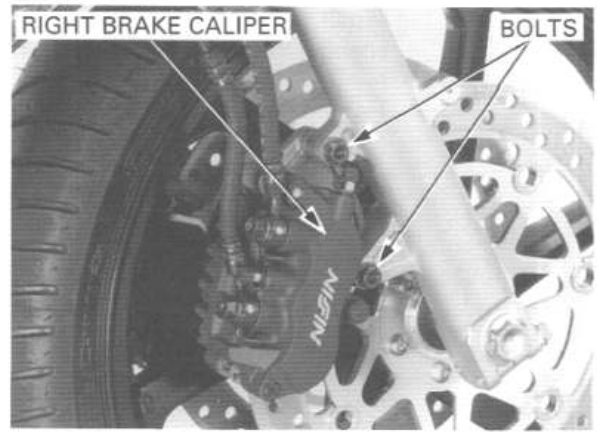
Remove the mounting bolts and right brake caliper.

CAUTION:

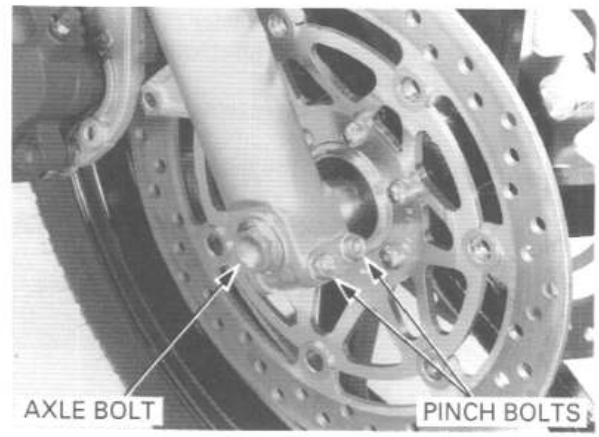
Support the brake caliper with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.

NOTE:

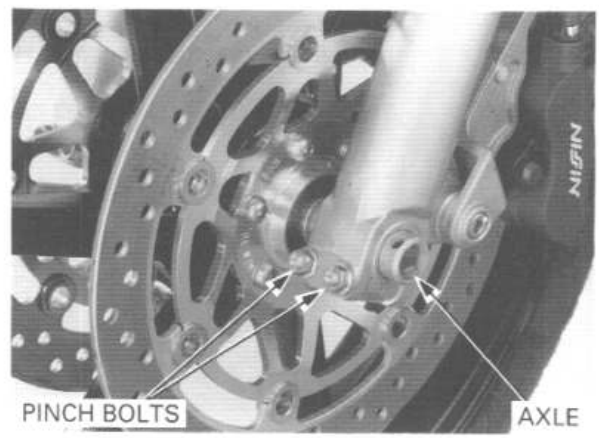
Do not operate the brake lever or pedal after the brake caliper is removed.



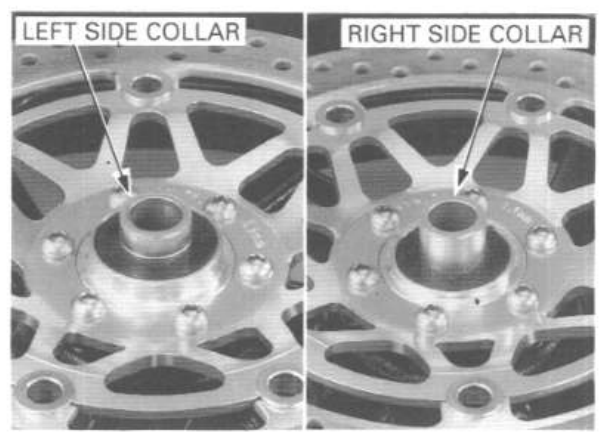
Loosen the right axle pinch bolts.
Remove the axle bolt.



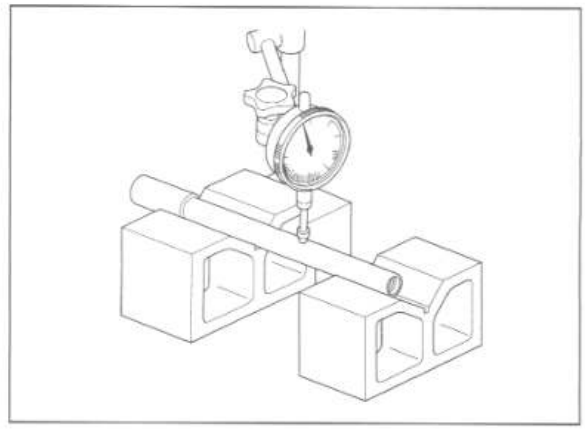
Loosen the left axle pinch bolts.
Remove the axle and the front wheel.



Remove the side collars.

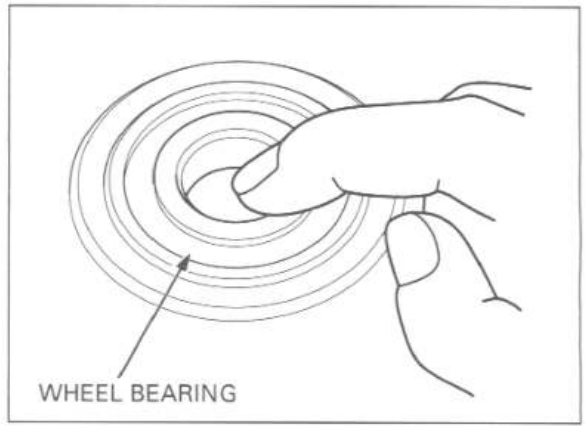


INSPECTION



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)



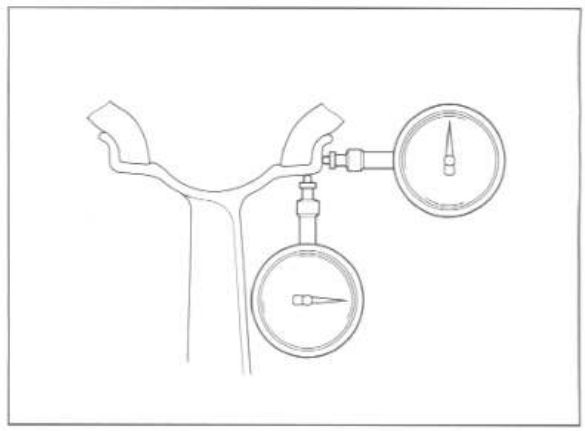
Wheel bearing
Turn the inner race of each bearing with your finger.
The bearings should turn smoothly and quietly.
Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

NOTE:

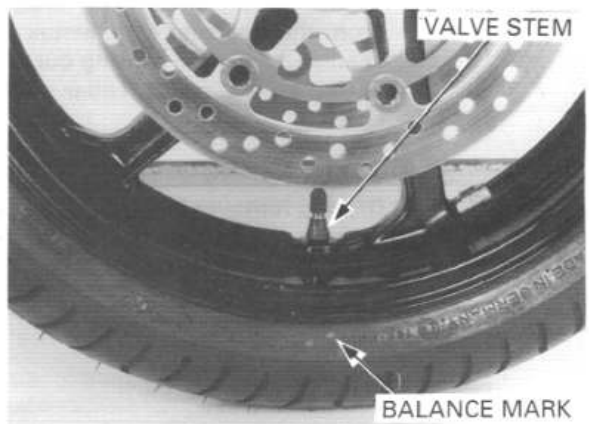
Replace the bearings in pairs.

Install the new bearings into the hub using the special tools (page 13-12).



Wheel rim runout
Check the rim runout by placing the wheel in a 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.

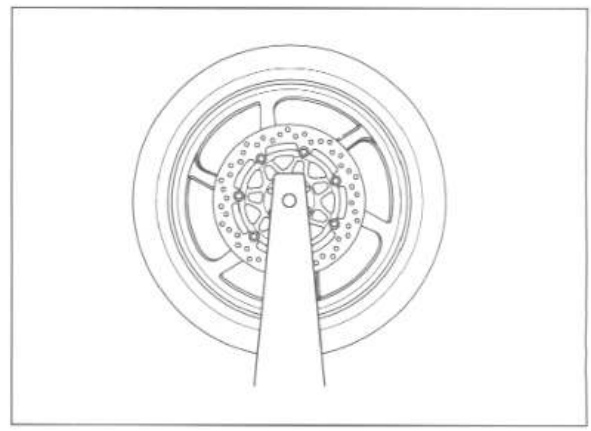
NOTE:

Note the rotating direction marks on the wheel and tire.



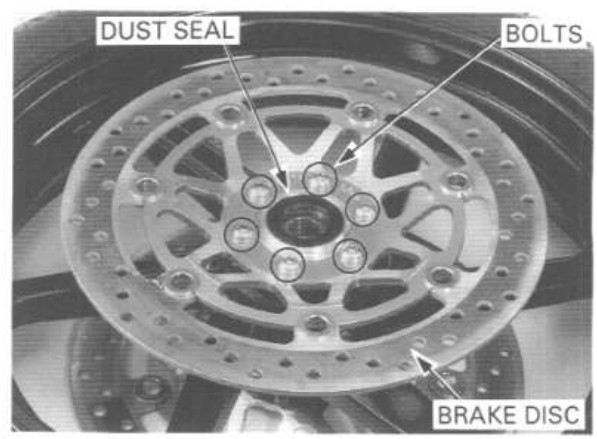
Remove the dust seals form the wheel.
Mount the wheel, tire and brake discs assembly in an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) point of the wheel with a chalk.
Do this two or three times to verify the heaviest area.
If the wheel is balanced, it will not 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

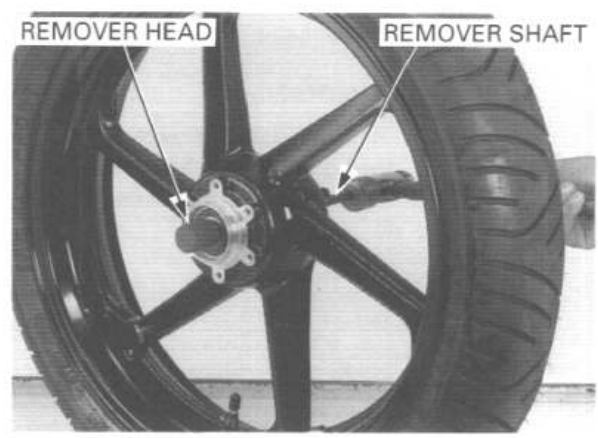
Remove the bolts and brake discs.
Remove the dust seals.



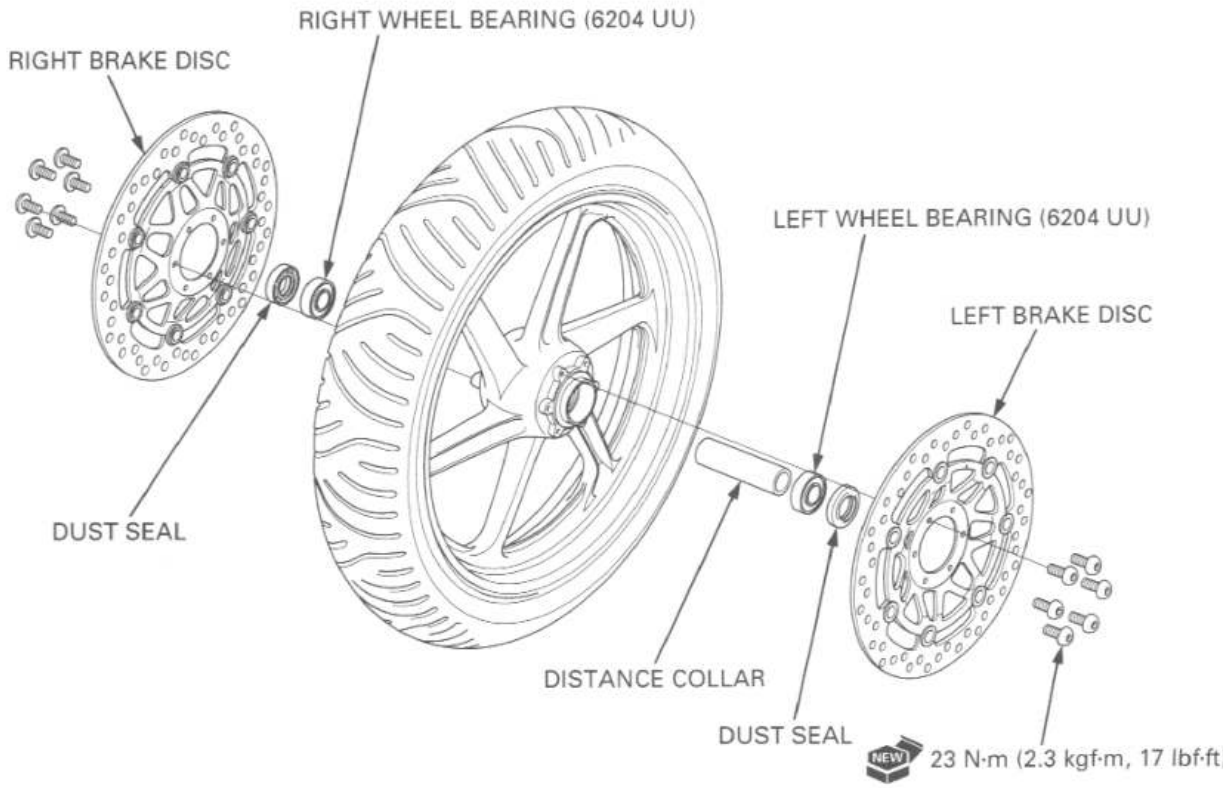
Install the bearing remover head into the bearing.
From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover head, 20 mm	**07746 – 0050600**
Bearing remover shaft	**07746 – 0050100**



ASSEMBLY



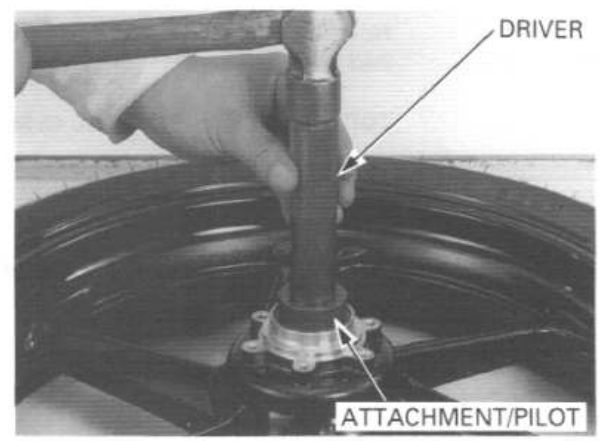
CAUTION:

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 tools.

TOOLS:

Driver	**07749 – 0010000**
Attachment, 42 x 47 mm	**07746 – 0010300**
Pilot, 20 mm	**07746 – 0040500**



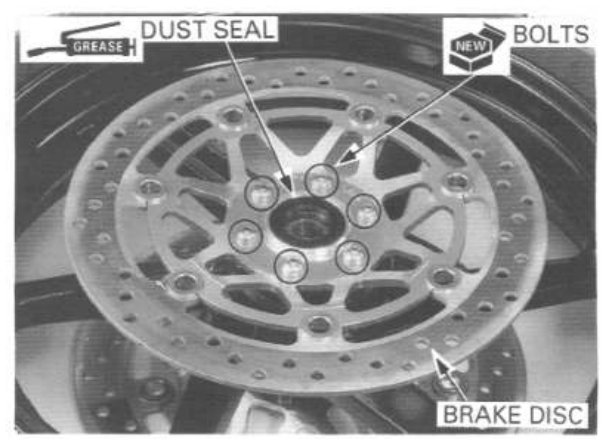
⚠ WARNING

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.

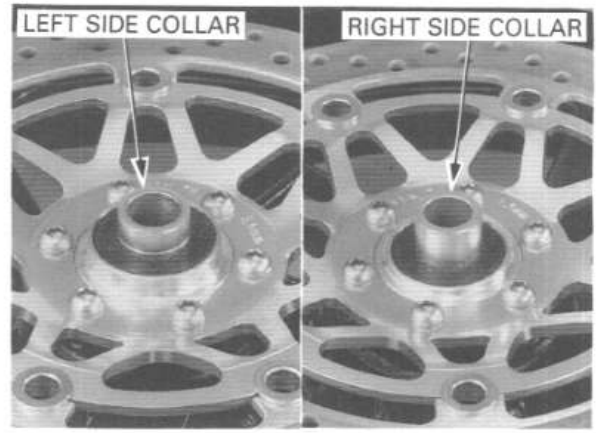
TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

Apply grease to the dust seal lips, then install them into the wheel hub.



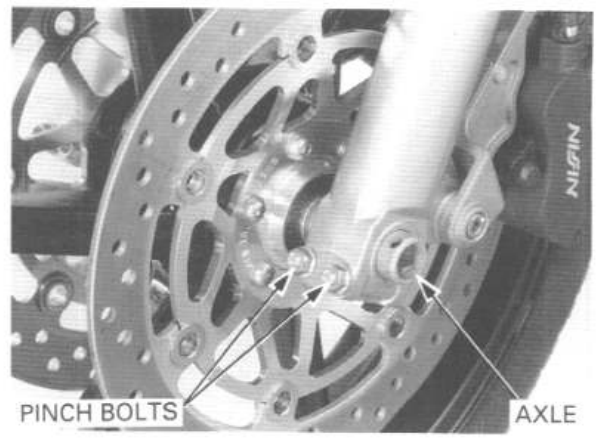
INSTALLATION

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.

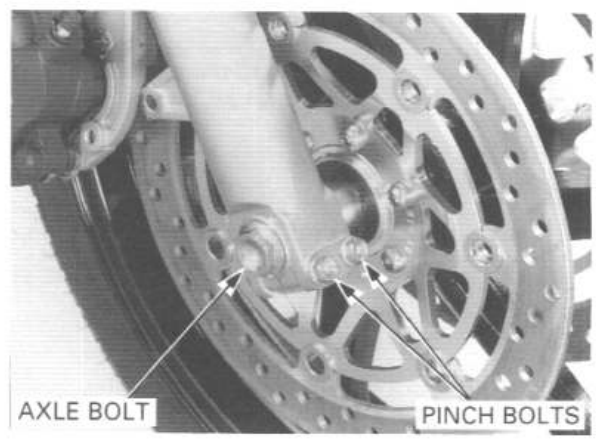


Hold the axle and tighten the axle bolt to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

Tighten the right axle pinch bolts to the specified torque.

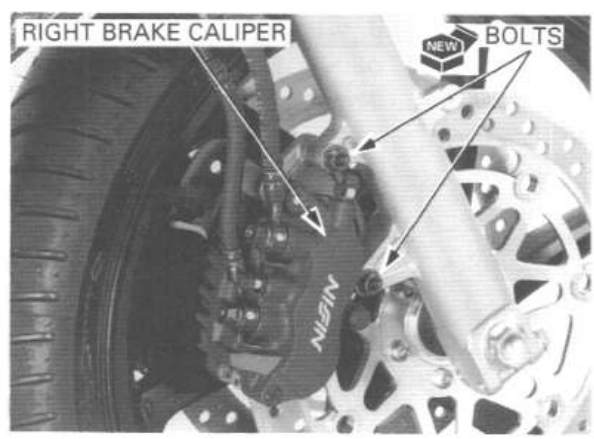
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



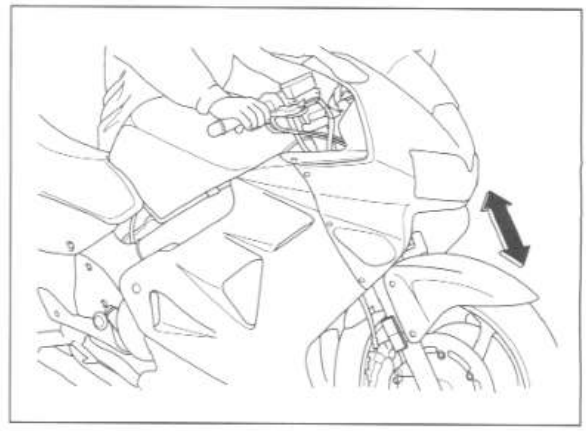
Install the right brake caliper and tighten the new mounting bolts to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

Install the front fender (page 2-15).

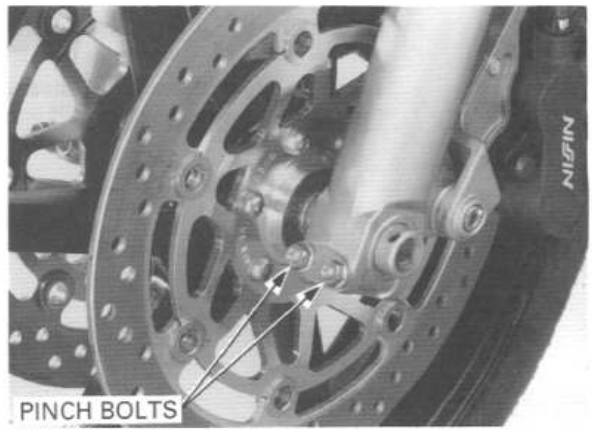


With the front brake applied, pump the fork up and down several times to seat the axle and check brake operation.

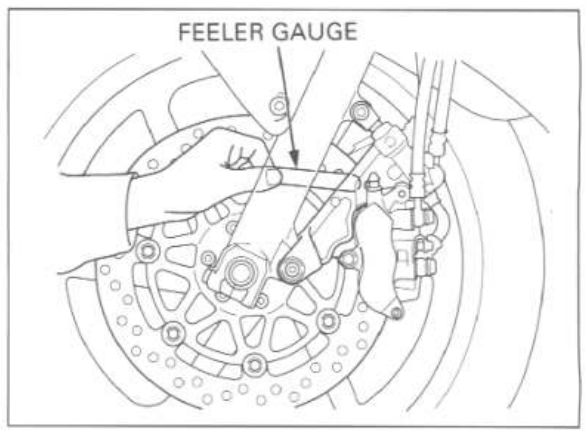


Tighten the left axle pinch bolts to the specified torque.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



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

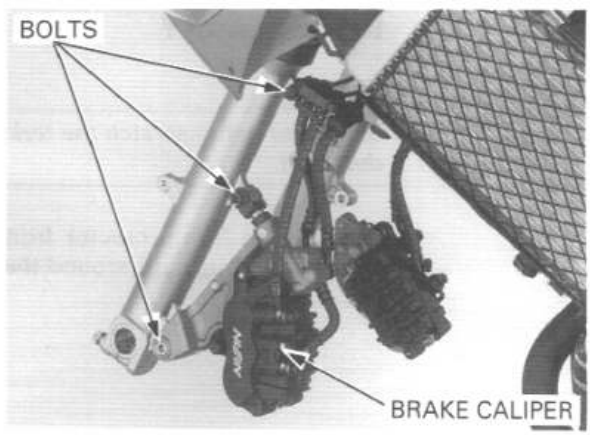
REMOVAL

Remove the following:
— Front wheel (page 13-9)
— Handlebars (page 13-3)

CAUTION:

Keep the brake and clutch master cylinders upright.

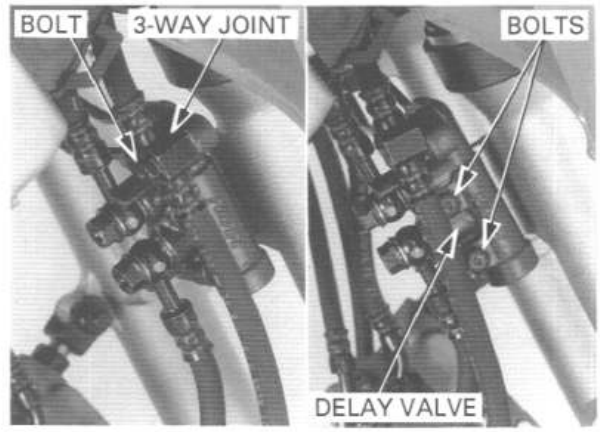
For the left fork leg removal, remove the following:
— Left brake caliper lower mounting bolt
— Secondary master cylinder joint bolt
— Brake hose clamp bolt



For the right fork leg removal, remove the brake pipe 3-way joint mounting bolt and delay valve mounting bolts (page 15-25).

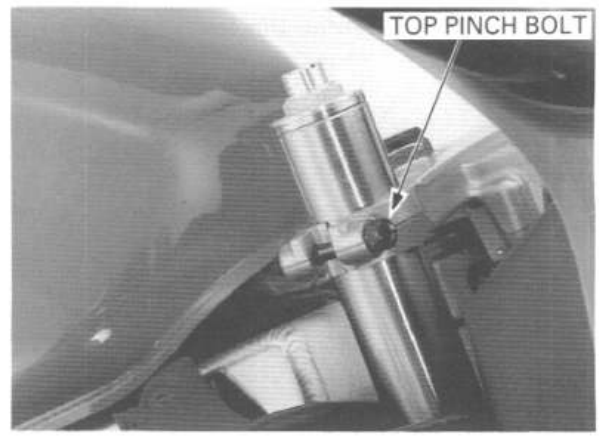
NOTE:

It is not necessary to remove the oil bolts and oil pipe from the delay valve.

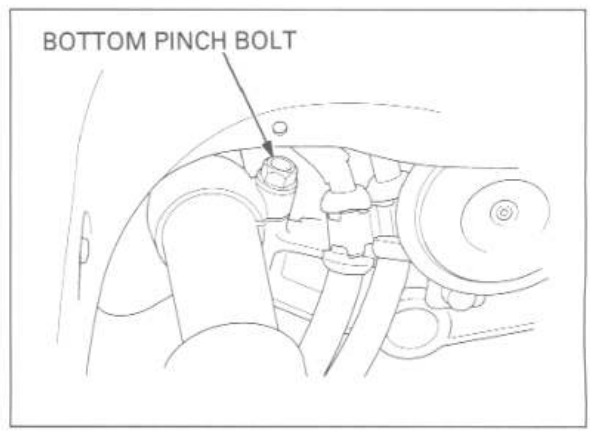


Loosen the top bridge pinch bolt.

When the fork leg will be disassembled, loosen the fork cap, but do not remove it yet.



Loosen the fork bottom pinch bolt and remove the fork tube from the fork top bridge and steering stem.

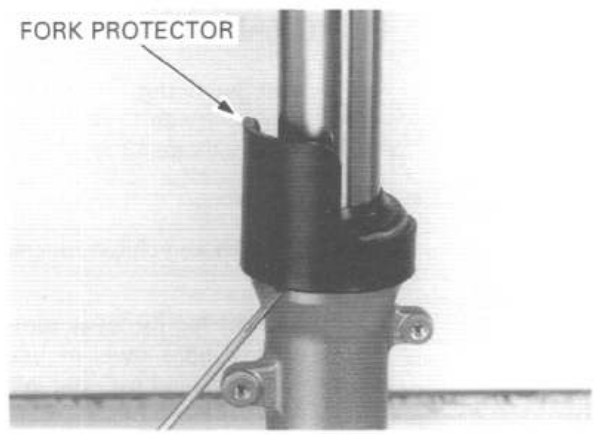


DISASSEMBLY

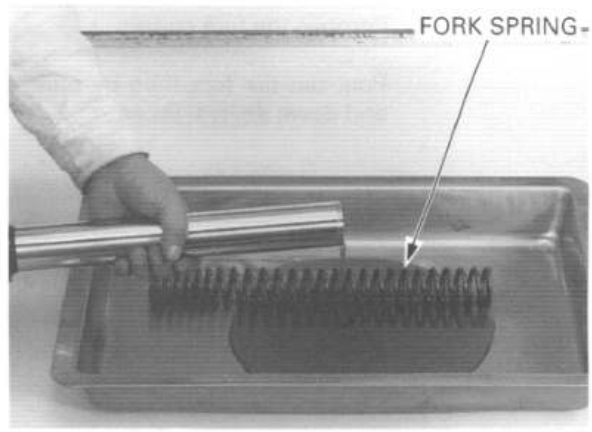
CAUTION:

Be careful not to scratch the fork tube or damage the dust seal.

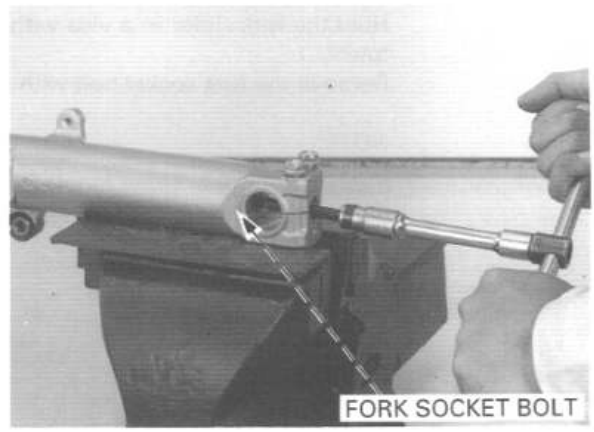
Remove the fork protector from the fork slider by gently prying upward around the base of the protector.



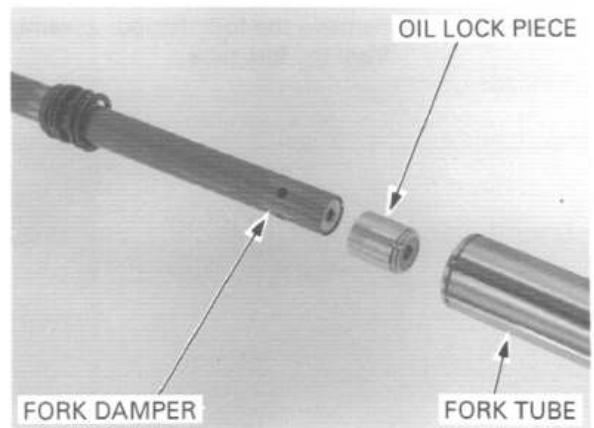
Remove the fork cap from the fork tube.



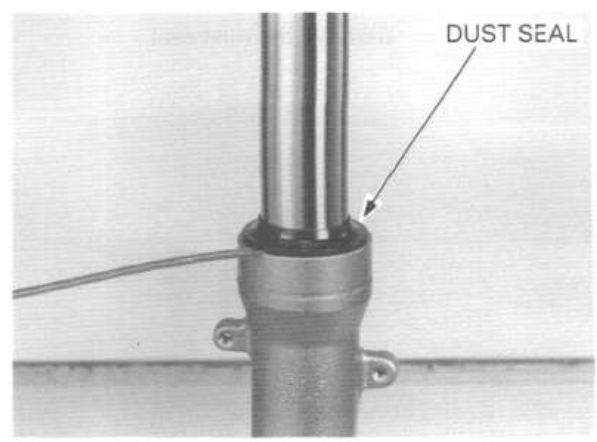
Hold the damper rod with a 14 mm spanner, then loosen the lock nut and remove the fork cap from the damper rod.



Remove the spring seat stopper.

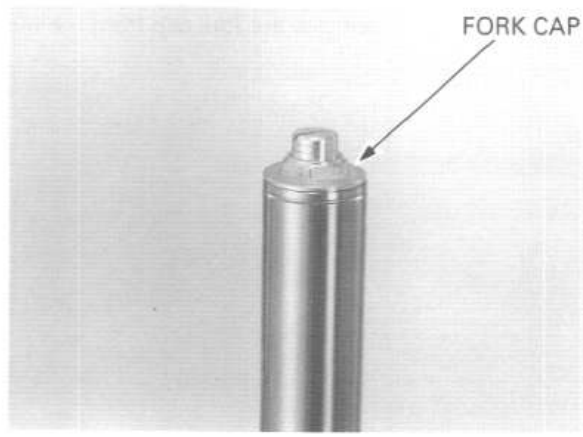


Remove the spring seats and spring collar.



Remove the fork spring.

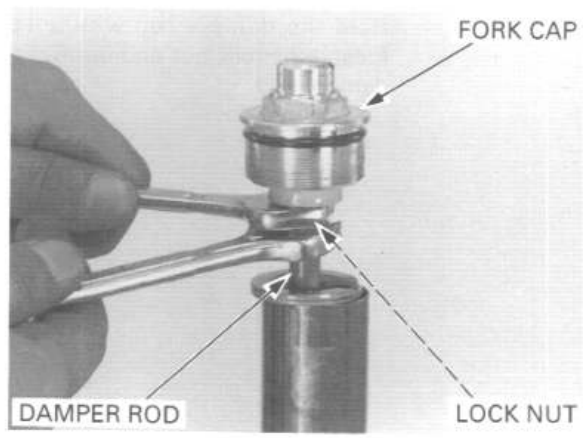
Pour out the fork fluid by pumping the fork tube up and down several times.



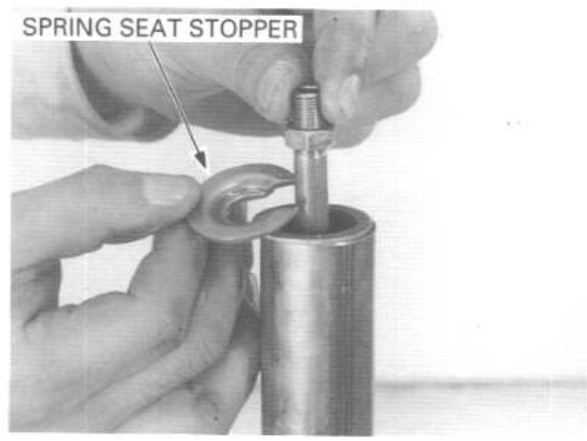
Hold the fork slider in a vice with soft jaws or a shop towel.
Remove the fork socket bolt with a hex wrench.

NOTE:

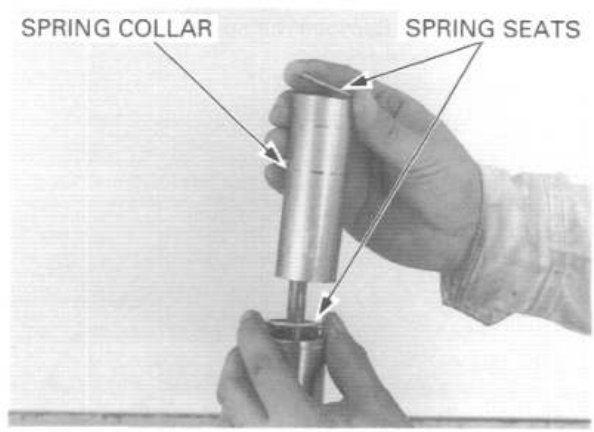
If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring collar and fork cap.



Remove the fork damper assembly and oil lock piece from the fork tube.



Remove the dust seal.



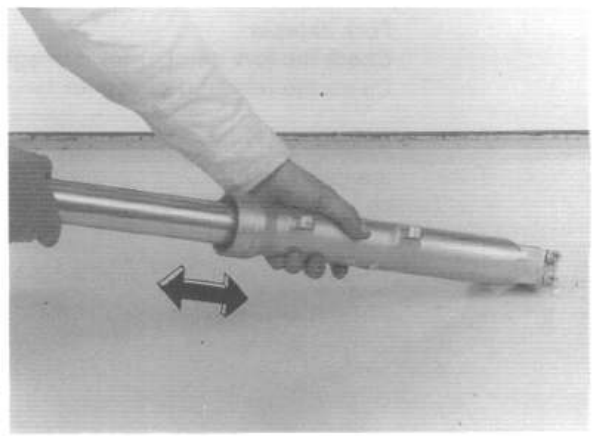
Remove the oil seal stopper ring.

CAUTION:

Do not scratch the fork tube sliding surface.



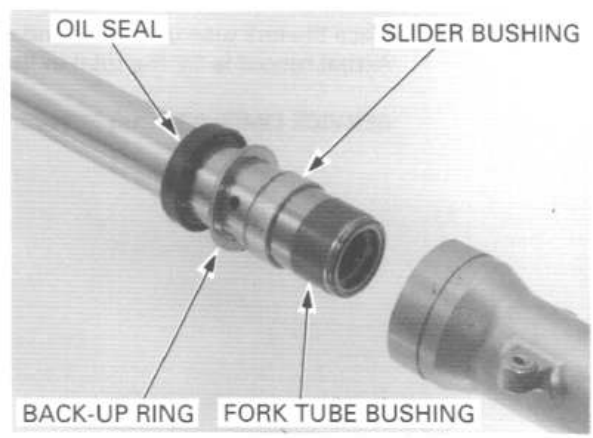
Pull the fork tube out until you feel resistance from the slider bushing. Then move it in and out, tapping the bushing lightly until the fork tube separates from the fork slider.
The slider bushing will be forced out by the fork tube bushing.



Remove the oil seal, back-up ring and slider bushing from the fork tube.

NOTE:

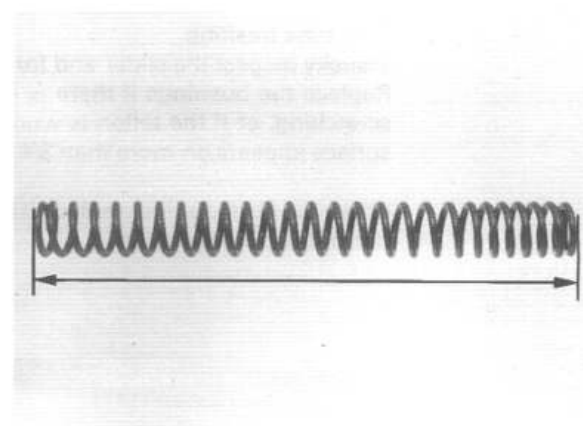
Do not remove the fork tube bushing unless it is necessary to replace it with a new one.



INSPECTION

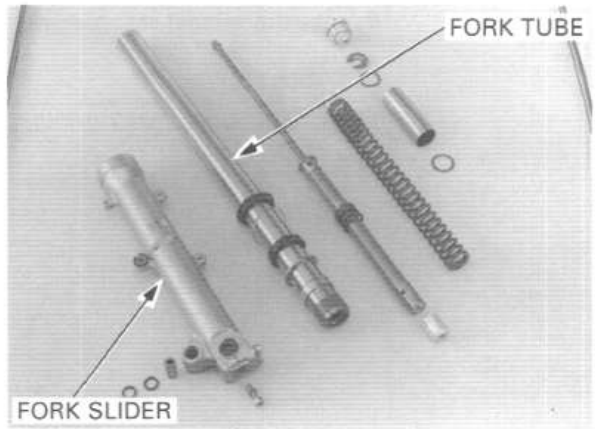
Fork spring
Measure the fork spring free length.

SERVICE LIMIT: 375.0 mm (14.76 in)



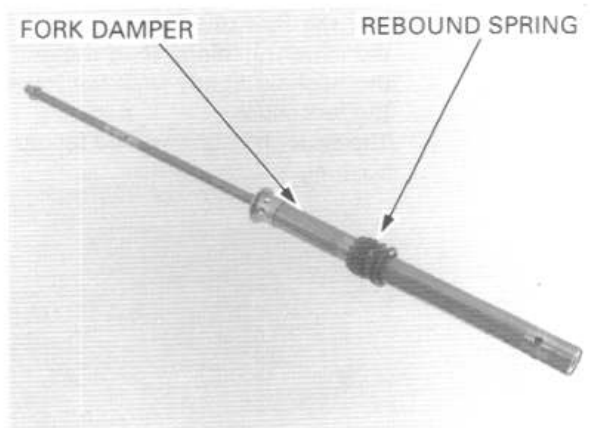
Fork tube/slider/damper
Check the fork tube and fork slider for score marks, scratches, or excessive or abnormal wear.

Replace any components which are worn or damaged.



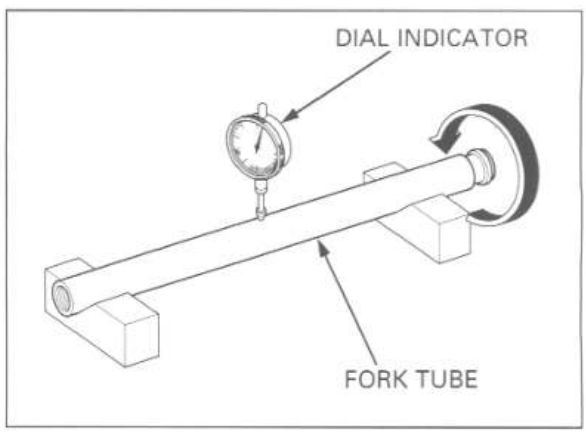
Fork damper
Check the fork damper for damage.
Check the rebound spring for fatigue or damage.

Replace the fork damper assembly, if any component are damaged.



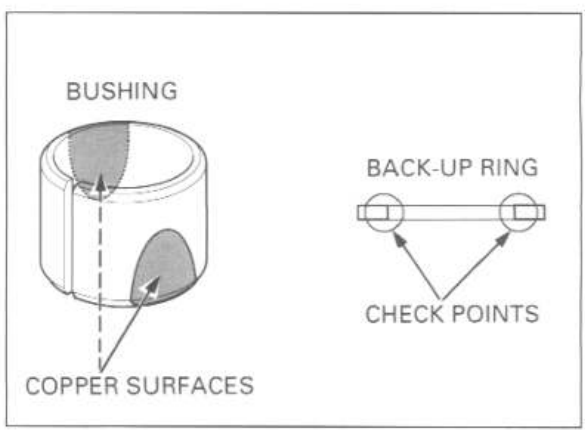
Place the fork tube in V-block and measure the runout. Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)



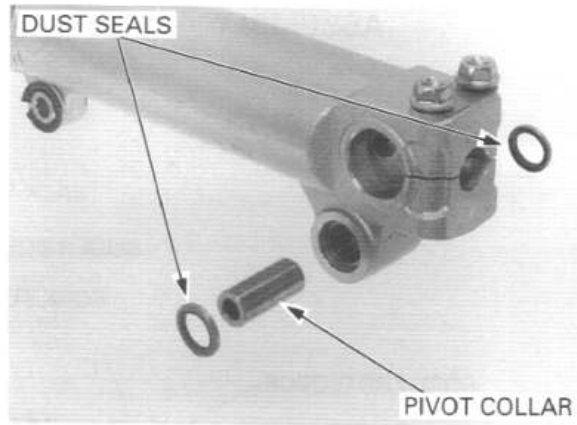
Fork tube bushing
Visually inspect the slider and fork tube bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



BRAKE CALIPER PIVOT BEARINGS REPLACEMENT

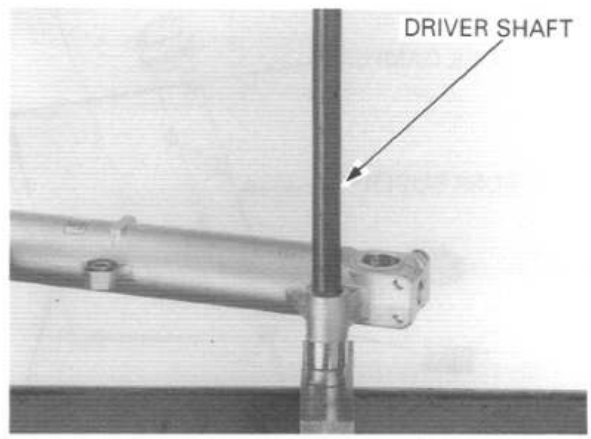
Remove the dust seals and pivot collar.



Press out the pivot bearings using the special tool.

TOOL:

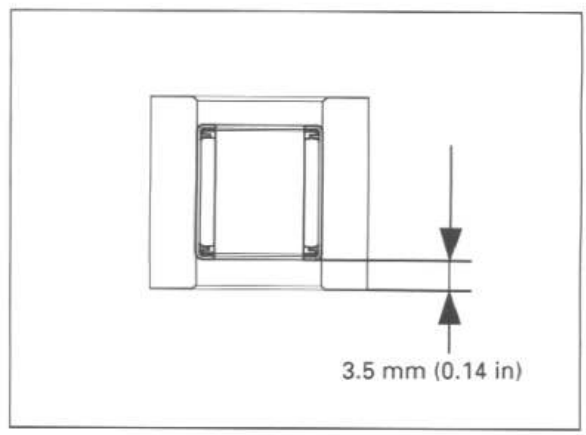
Driver shaft	**07946 – KA50000**



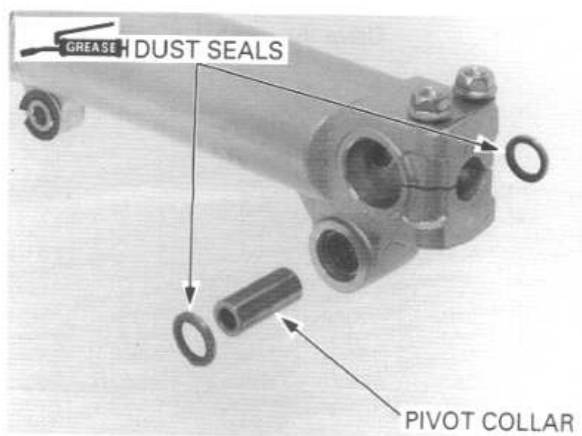
Apply grease to the pivot bearings.
Press the needle bearing into the fork slider using the same tool.

NOTE:

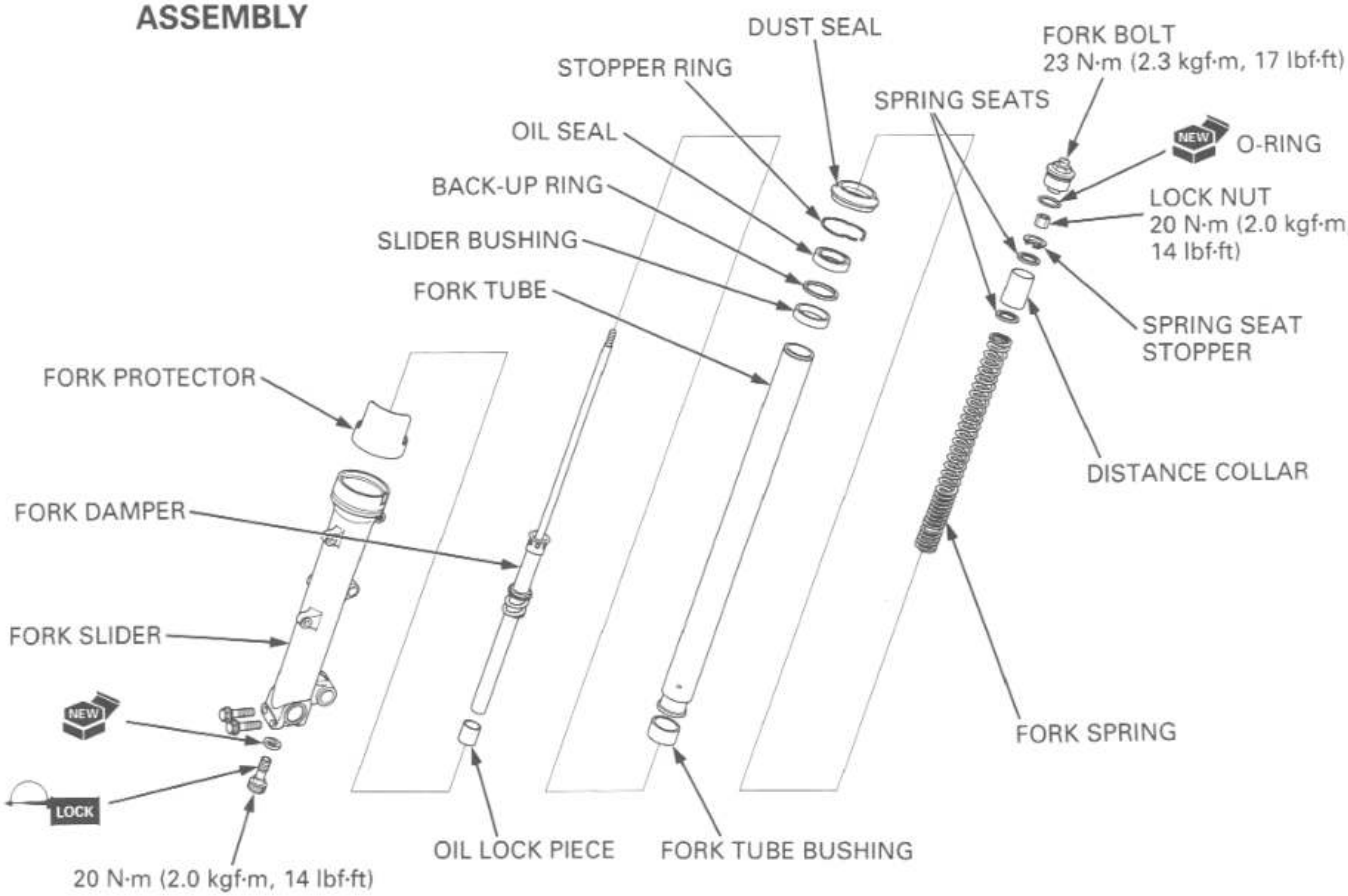
Install the bearing so that the bearing cage below 3.5 mm (0.14 in) from the pivot surface.



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.

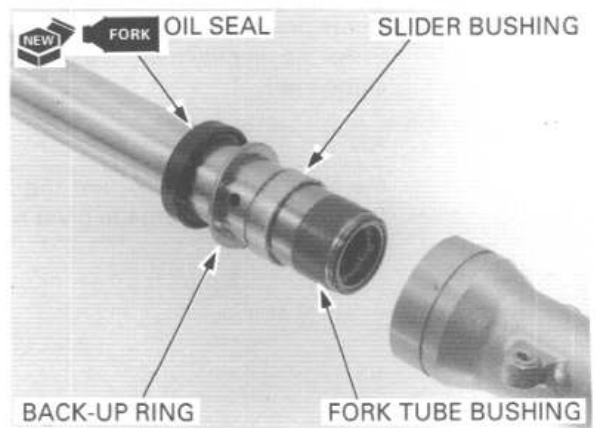
Install a new fork tube bushing if the bushing has been removed.

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.

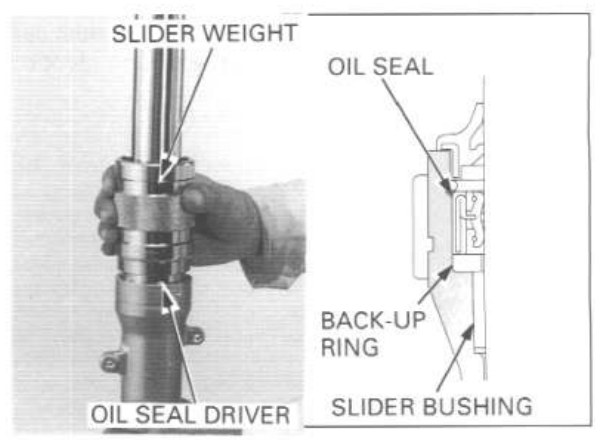
Install the fork tube into the fork slider.



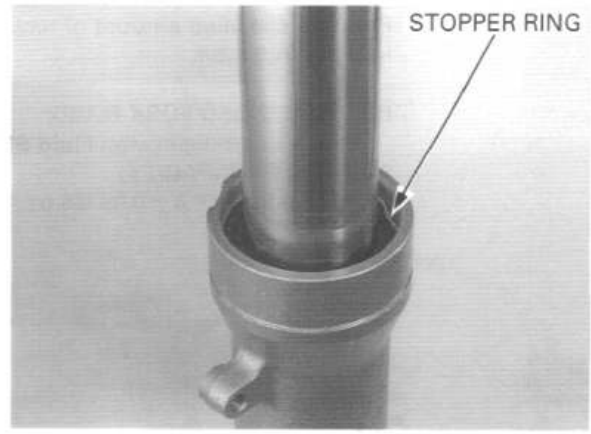
Drive the oil seal in using the special tools.

TOOLS:

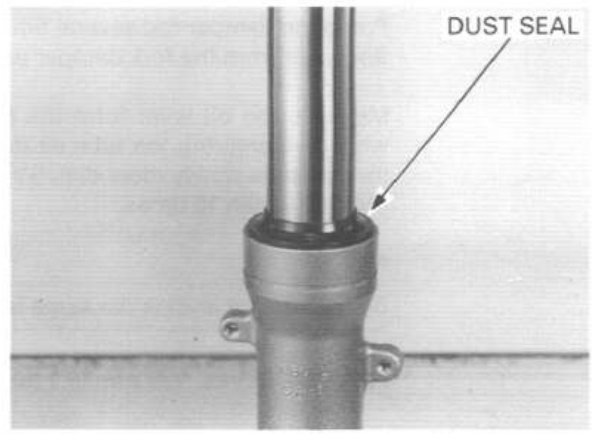
Slider weight	**07947 – KA50100**
Oil seal driver	**07947 – KF00100**



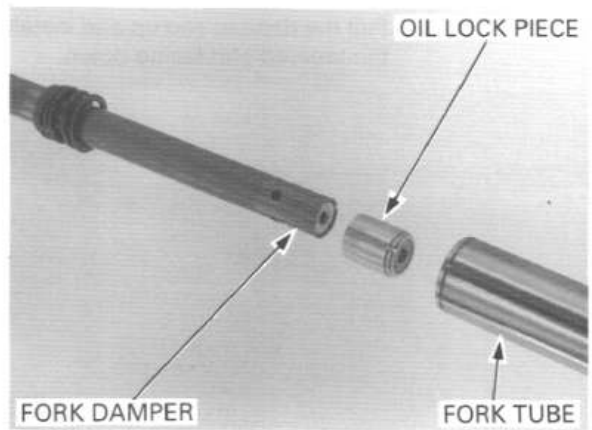
Install the stopper ring into the fork slider groove securely.



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.



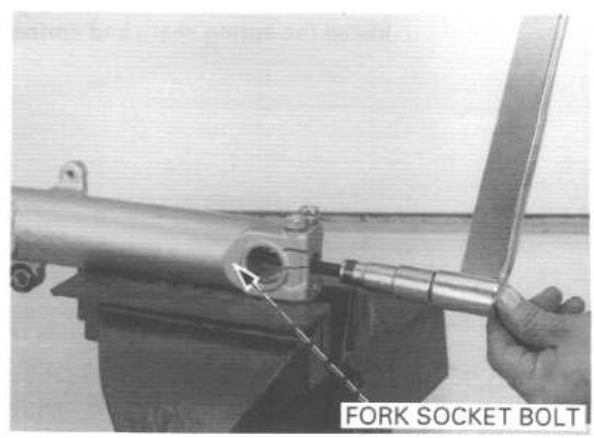
Hold the fork slider in a vise with soft jaws or a shop towel.
Apply a locking agent to the fork socket bolt threads.
Install the socket bolt with a new sealing washer.

Tighten the fork socket bolt to the specified torque.

NOTE:

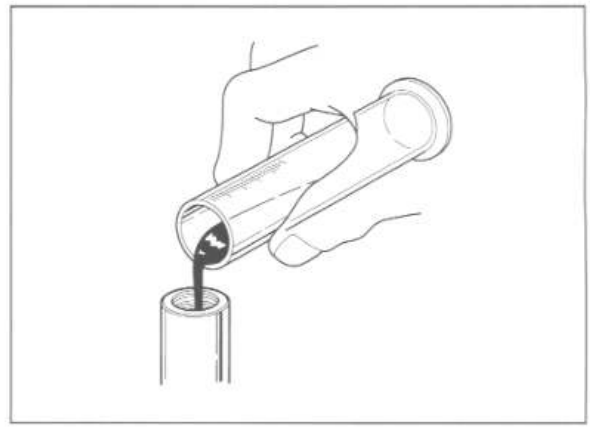
If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring collar and fork bolt.

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:
Pro Honda Suspension Fluid SS-8
FORK FLUID CAPACITY:
457 ± 2.5 cc (15.5 ± 0.08 US oz, 16.1 ± 0.09 Imp oz)



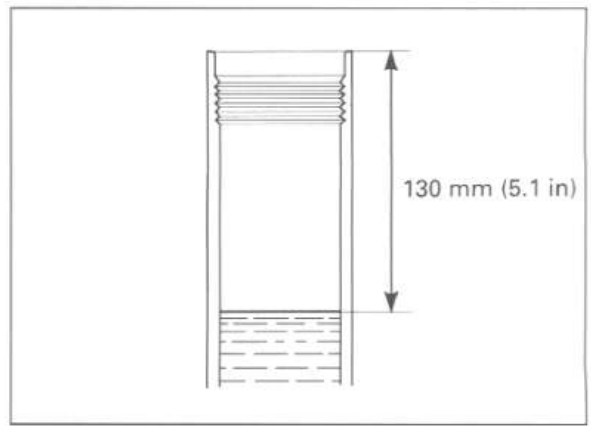
Pump the damper rod several times until the fork fluid flows out from the fork damper end.

Measure the oil level form 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.

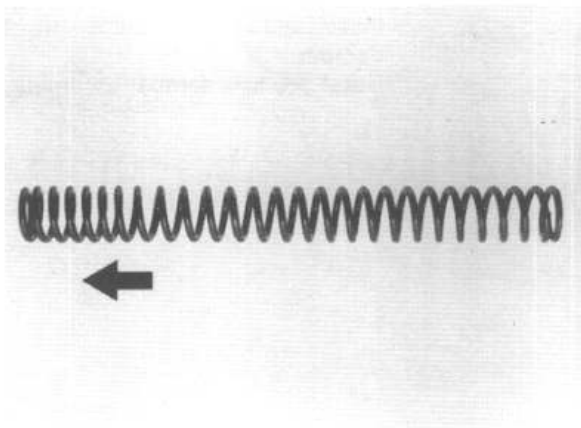
NOTE:

Be sure the oil level is the same in the both forks.

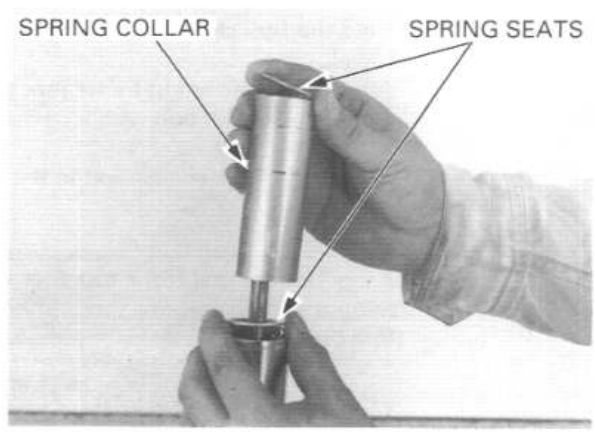
FORK OIL LEVEL: 130 mm (5.1 in)



Pull the damper rod up and install the fork spring with the tapered end facing down.

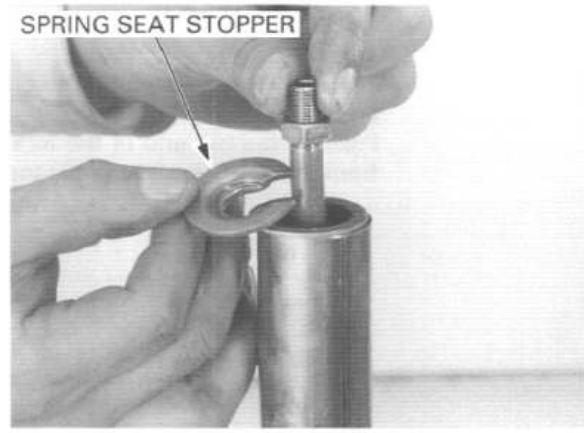


Install the spring seats and spring collar.



Screw the damper rod end nut down fully by hand.

Install the spring seat stopper.

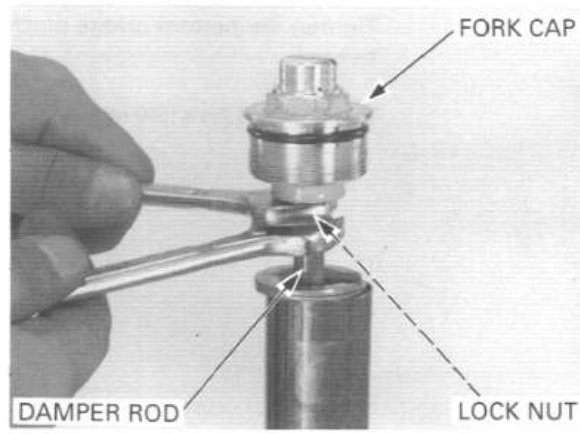


Install new O-rings onto the fork cap.
Apply fork fluid to the new O-rings.

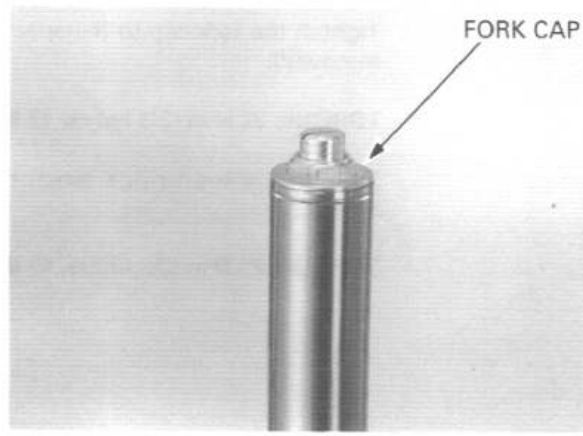
Hold the damper rod and screw the fork cap onto the damper rod until it seats on the damper rod lock nut.

Hold the fork cap and tighten the lock nut to the specified torque.

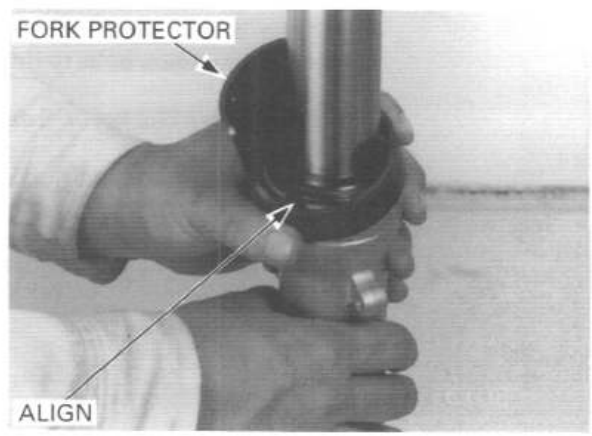
TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)



Screw the fork cap into the fork tube.

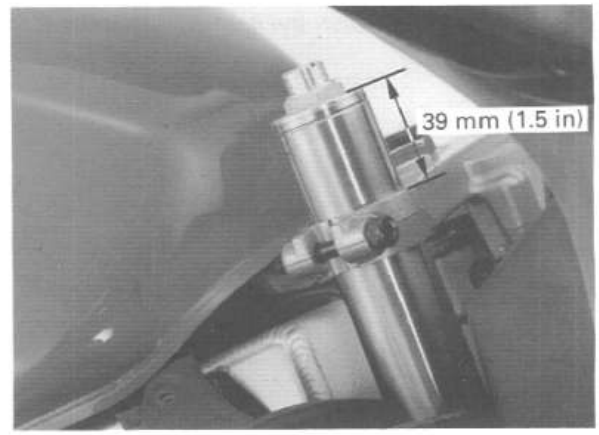


Install the fork protector onto the fork slider aligning the protector boss with the groove in the fork slider.



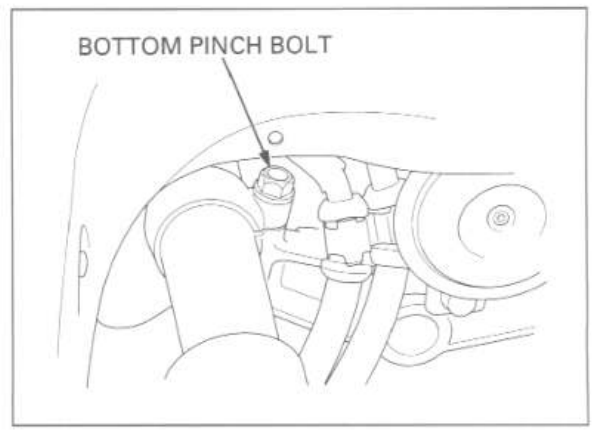
INSTALLATION

Install the fork legs into the steering stem and fork top bridge.
Position the top end of the fork tube 39 mm (1.5 in) from 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)

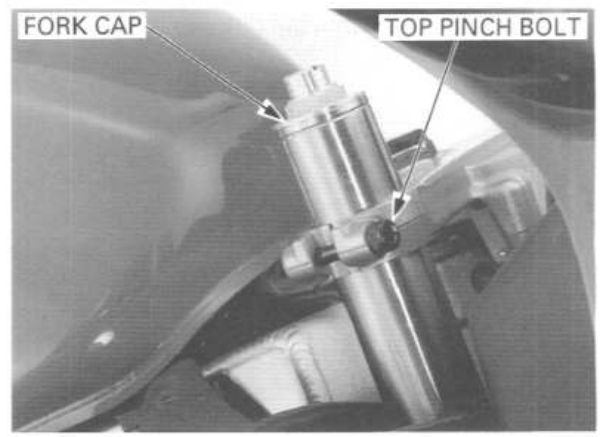


Tighten the fork cap to the specified torque (if it was removed).

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Tighten the top bridge pinch bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

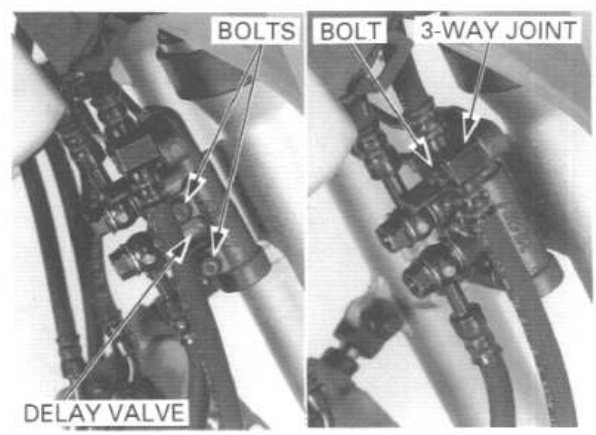


Install the delay valve onto the right fork leg and tighten the mounting bolts to the specified torque.

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 new left caliper pivot bolt to the specified torque.

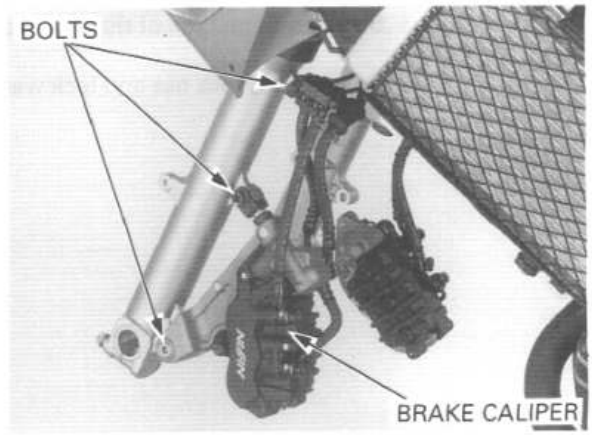
TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

Install and tighten the new secondary master cylinder joint bolt to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 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)



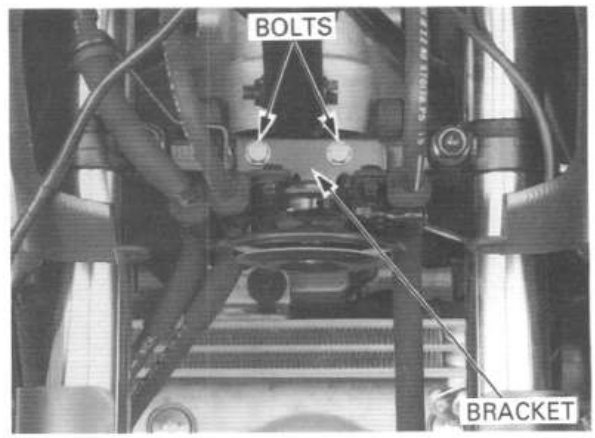
Install the following:
— Handlebar (page 13-5).
— Front wheel (page 13-14).

STEERING STEM

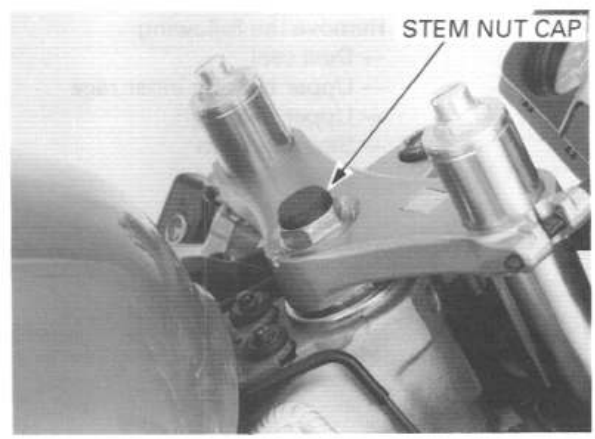
REMOVAL

Remove the following:
— Front wheel (page 13-9)
— Handlebar (page 13-3)

Remove the bolts and front brake hose/horn mounting bracket.



Remove the steering stem nut cap.



Loosen the steering stem nut.

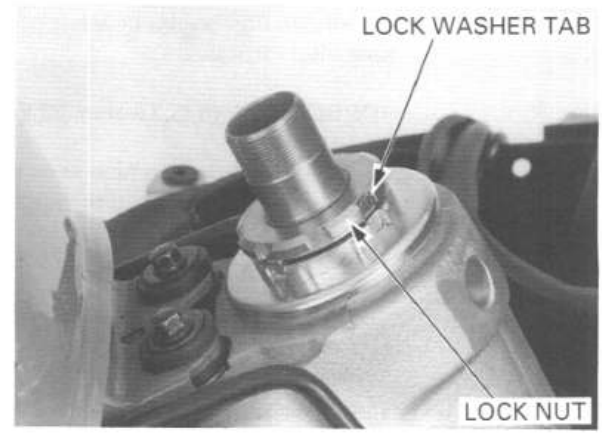
Remove the fork legs (page 13-15).

Remove the stem nut and the top bridge.



Straighten the tabs of the lock washer.

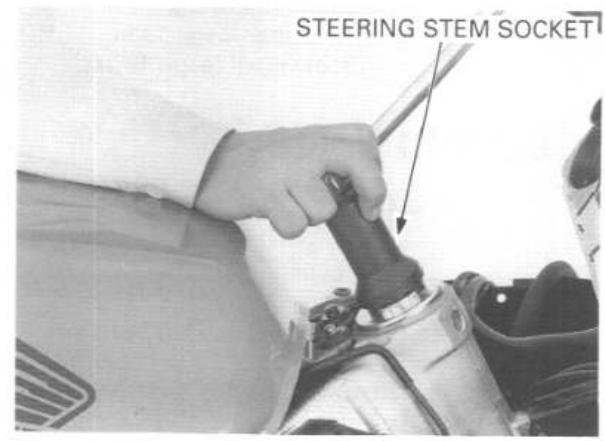
Remove the lock nut and lock washer.



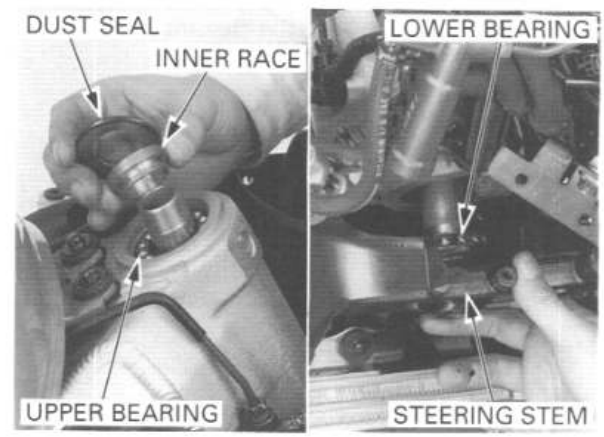
Remove the steering stem bearing adjusting nut using the special tool.

TOOL:

Steering stem socket	**07916 – 3710101**



Remove the following:
— Dust seal
— Upper bearing inner race
— Upper bearing
— Steering stem
— Lower bearing



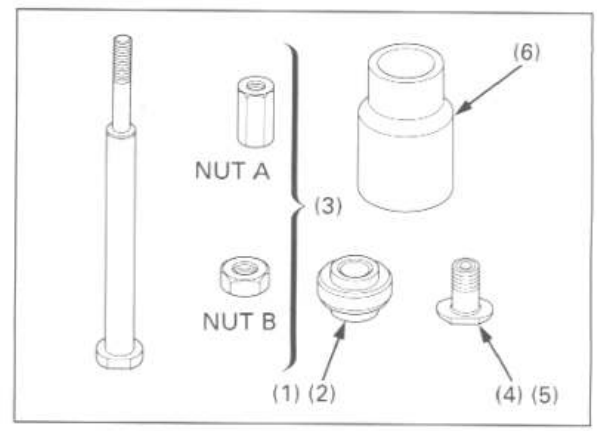
BEARING REPLACEMENT

Always replace the bearings and races as a set.

Except U.S.A.:
Replace the races using the Ball Race Remover Set as described in the following procedure.

TOOLS:

Ball race remover set	**07946 – KM90001**
— Driver attachment, A (1)	**07946 – KM90100**
— Driver attachment, B (2)	**07946 – KM90200**
— Driver shaft assembly (3)	**07946 – KM90300**
— Bearing remover, A (4)	**07946 – KM90401**
— Bearing remover, B (5)	**07946 – KM90500**
— Assembly base (6)	**07946 – KM90600**

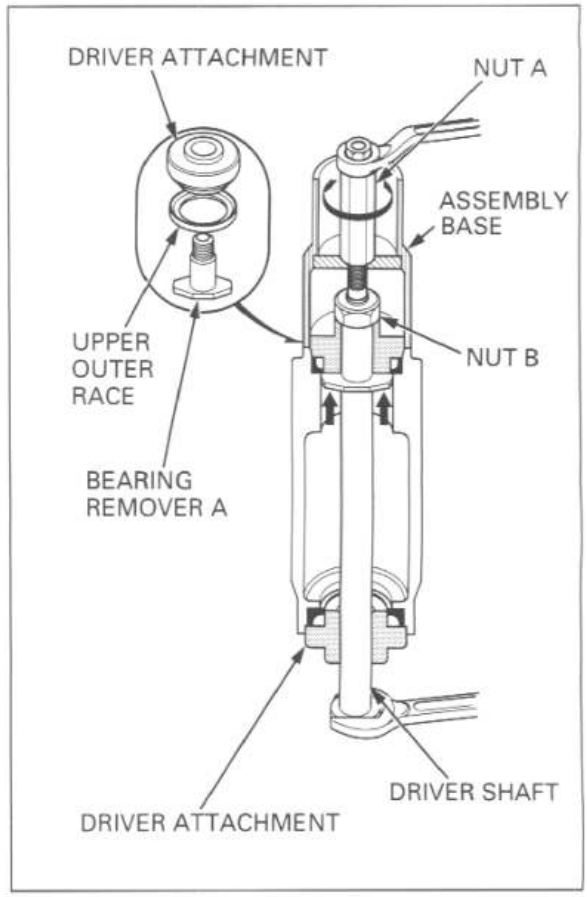


Note the installation direction of the assembly base.

Install the ball race remover into the head pipe as shown.

Align bearing remover A with the groove in the steering head.
Lightly tighten nut B with a wrench.

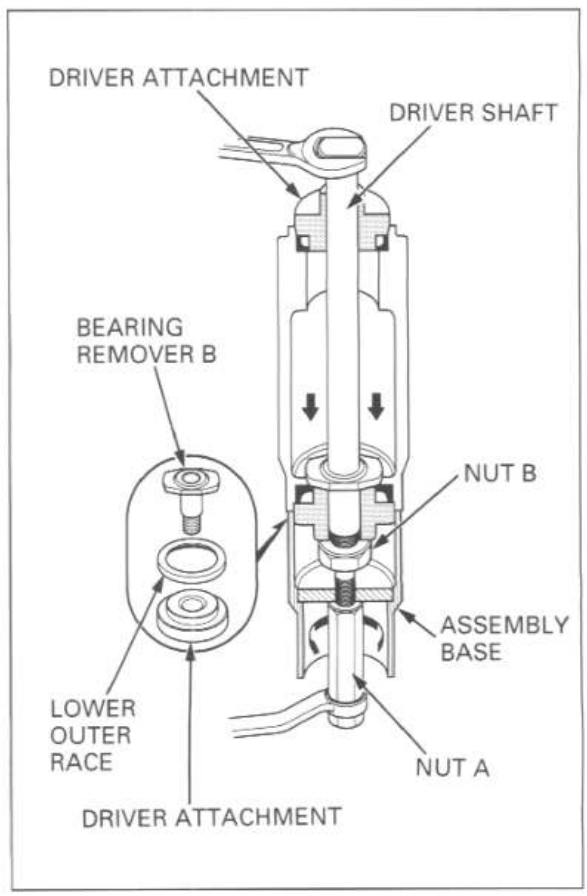
Holding the driver shaft with a wrench, turn nut A gradually to remove the upper outer race.



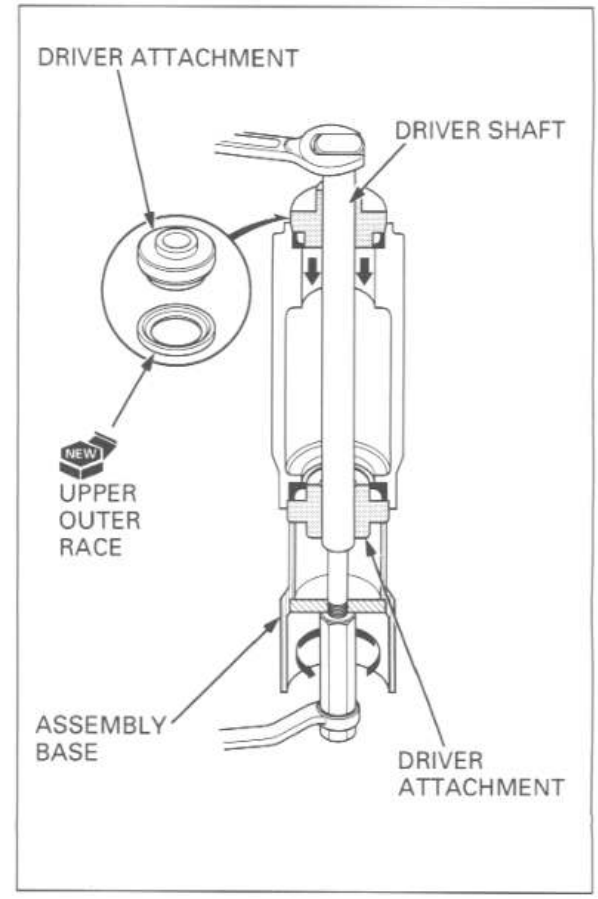
Note the installation direction of the assembly base.

Install ball race remover B as shown and remove the lower outer race using the same procedure as for the upper outer race.

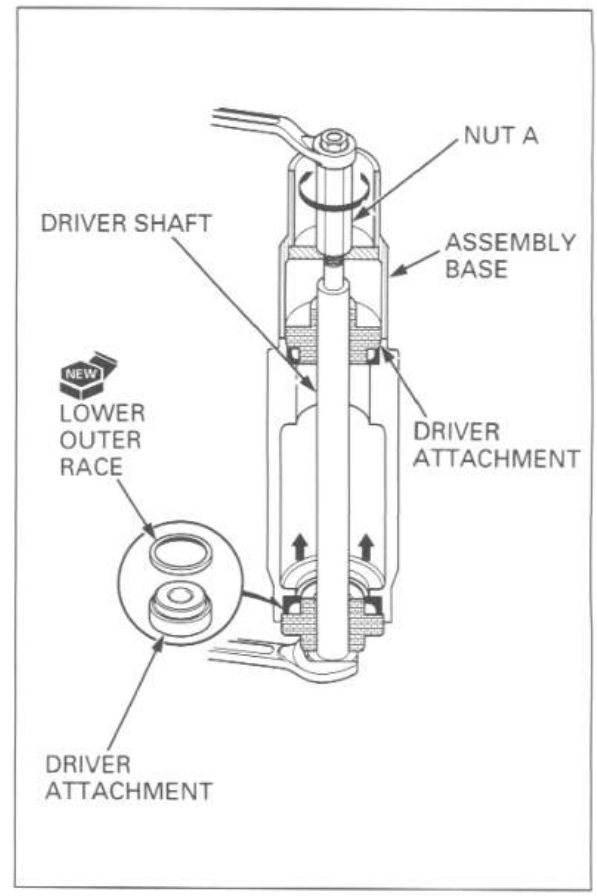
Align the bearing remover with the groove in the steering head.



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.

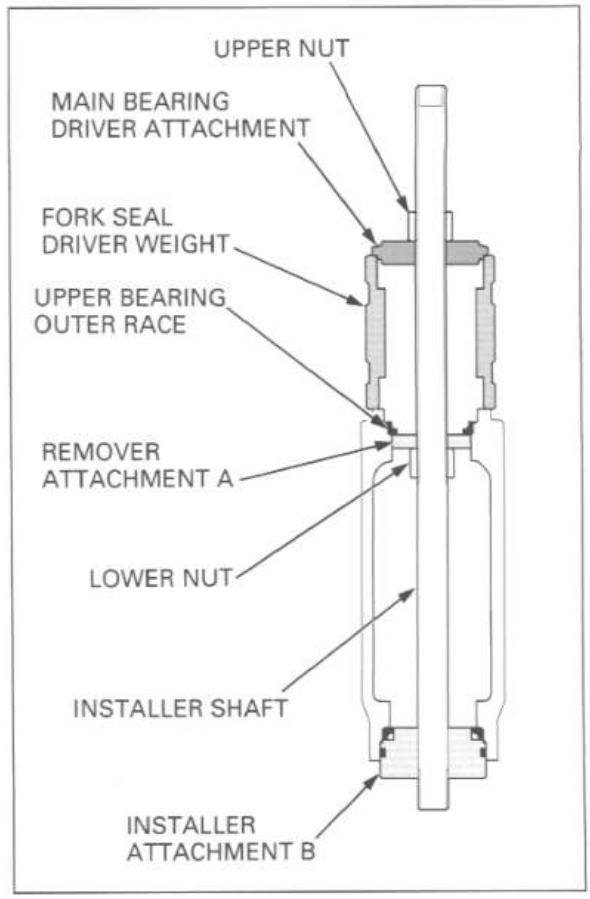


U.S.A. only:
Replace the steering head bearing outer races using the special tools listed below.

TOOLS:

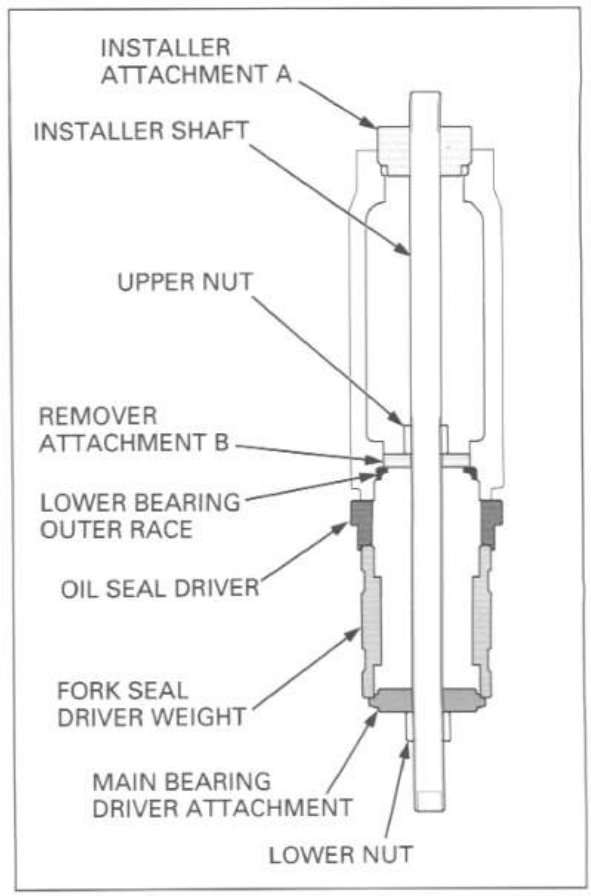
Main bearing driver attachment	**07946 – ME90200**
Fork seal driver weight	**07947 – KA50100**
Oil seal driver	**07965 – MA60000**
Installer shaft	**07VMF – KZ30200**
Installer attachment A	**07VMF – MAT0100**
Installer attachment B	**07VMF – MAT0200**
Remover attachment A	**07VMF – MAT0300**
Remover attachment B	**07VMF – MAT0400**

Install the special tools into the steering head pipe as shown.
Align remover attachment A with the groove in the steering head.
While holding the installer shaft with the wrench, turn the upper nut gradually to remove the upper bearing outer race.

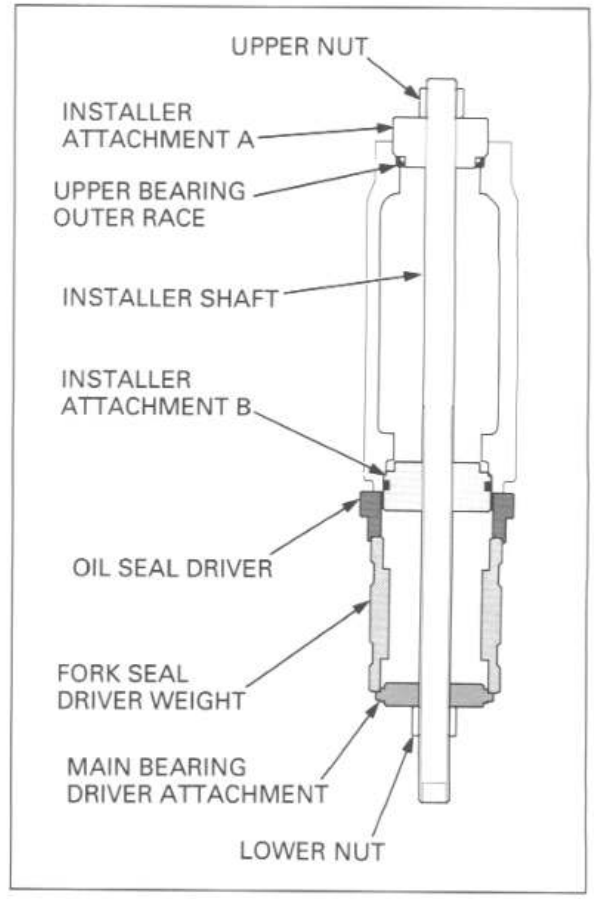


Be careful not to drop the attachment into the frame.

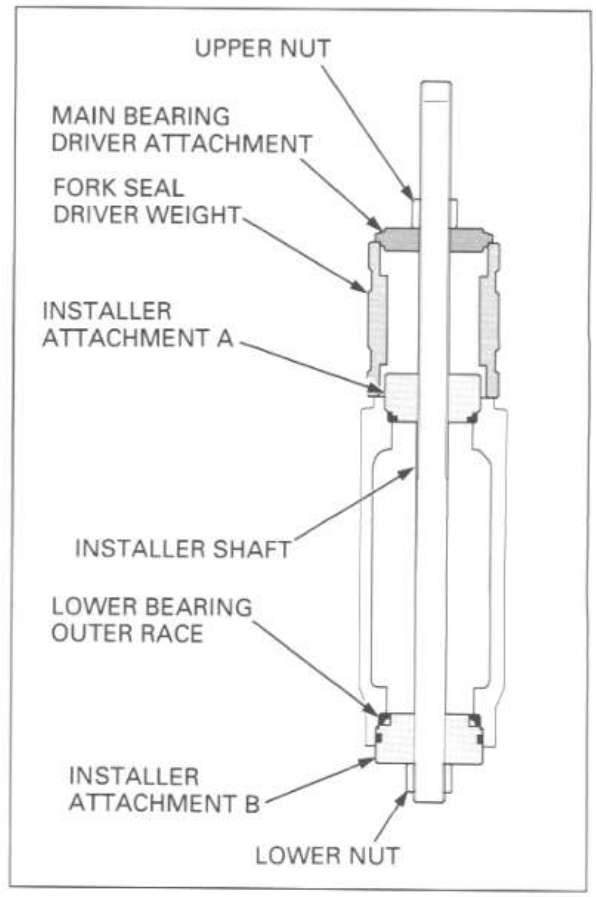
Install the special tools into the steering head pipe as shown.
Align remover attachment B with the groove in the steering head.
While holding the installer shaft with the wrench, turn the lower nut gradually to remove the lower bearing outer race.



Install a new upper bearing outer race and the special tools as shown.
While holding the installer shaft with the wrench, turn the lower nut gradually until the groove in installer attachment A aligns with the upper end of the steering head. This will allow you to install the upper bearing outer race.



Install a new lower bearing outer race and the special tools as shown.
While holding the installer shaft with the wrench, turn the upper nut gradually until the groove in installer attachment B aligns with the lower end of the steering head. This will allow you to install the lower bearing outer race.



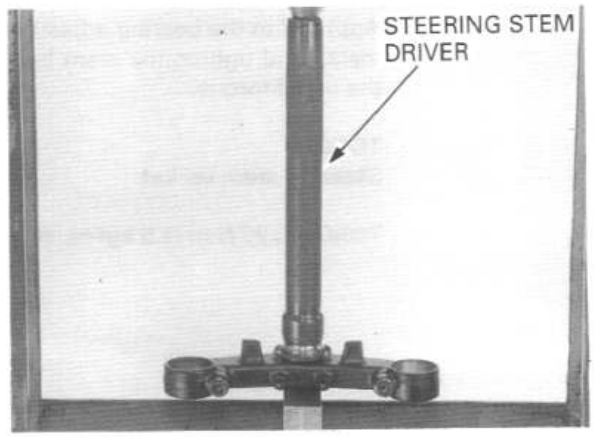
Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem. Remove the dust seal.

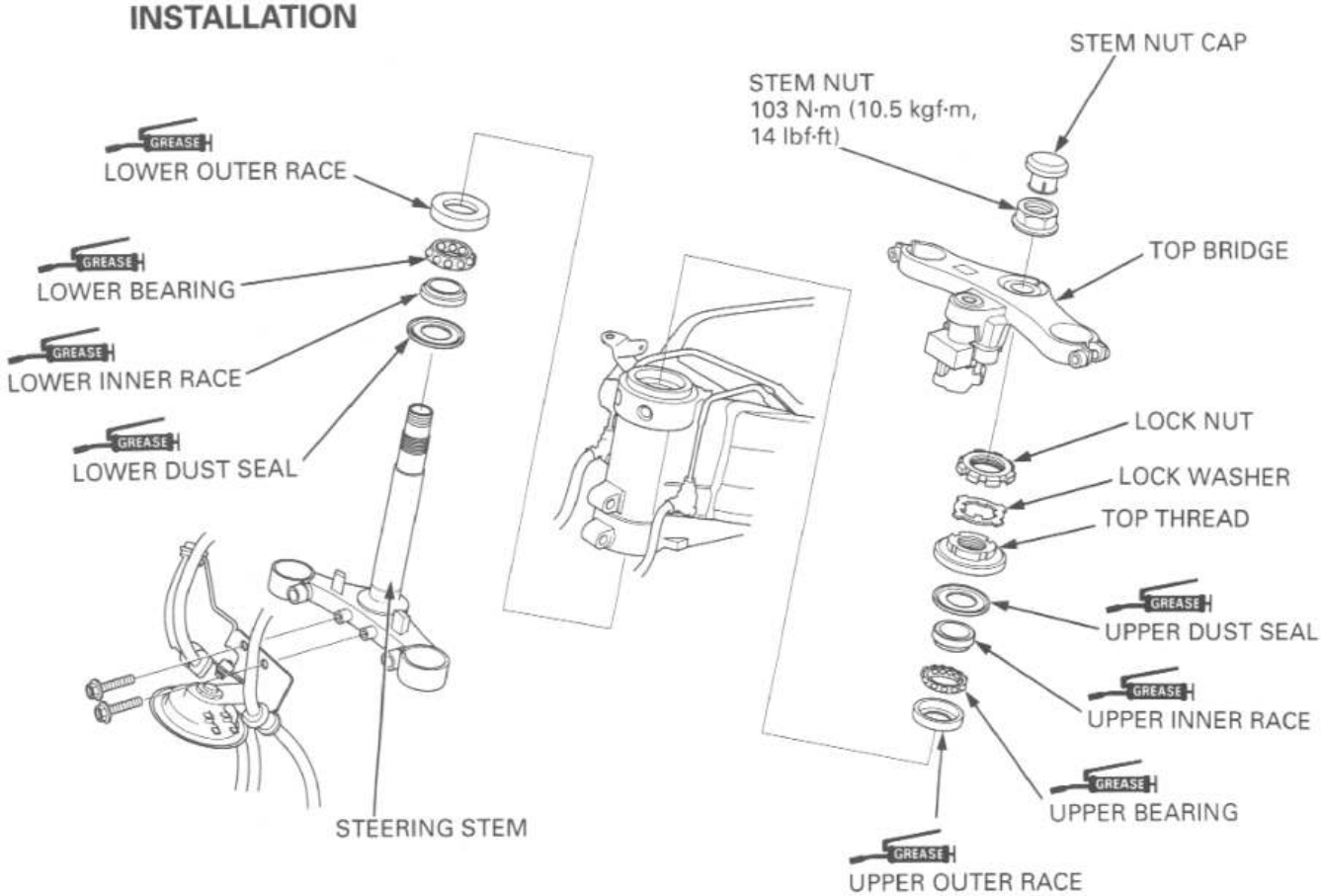


Apply grease to new dust seal lips and install it over the steering stem.
Install a new lower bearing inner race using a special tool and a hydraulic press.

TOOL:
Steering stem driver **07946 – MB00000**



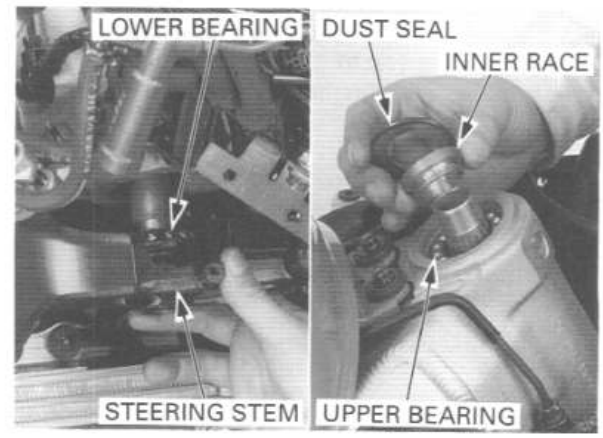
INSTALLATION



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.

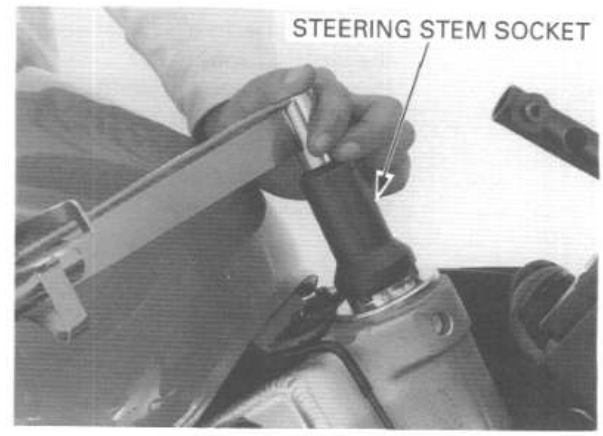
Install upper bearing, inner race and dust seal.



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: 25 N·m (2.5 kgf·m, 18 lbf·ft)



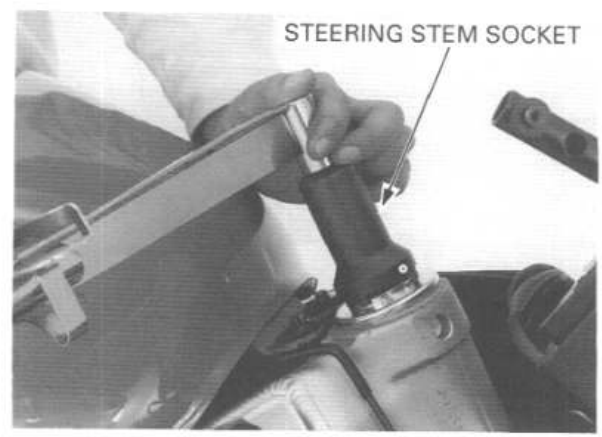
Move the steering stem right and left, lock-to-lock, five times to seat the bearings.
Make sure that the steering stem moves smoothly, without play or binding; then loosen the bearing adjusting nut.



Retighten the bearing adjusting nut to the specified torque.

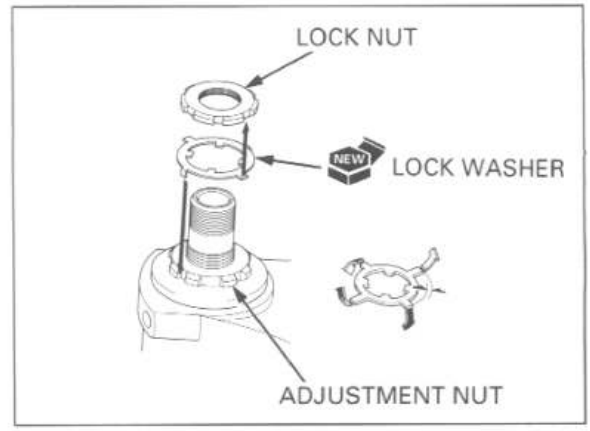
TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Recheck that the steering stem moves smoothly without play or binding.



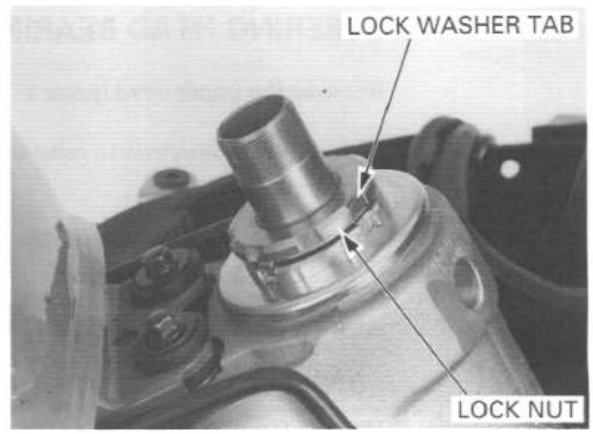
Install the new lock washer onto the steering stem.

Align the tabs of the lock washer with the grooves in the adjustment nut and bend two opposite tabs (shorter) down into the adjustment nut groove.



Install and finger tighten the lock nut.
Hold the adjusting nut and further tighten the lock nut within 1/4 turn (90°) enough to align its grooves with the lock washer tabs.

Bend the lock washer tabs up into the lock nut groove.

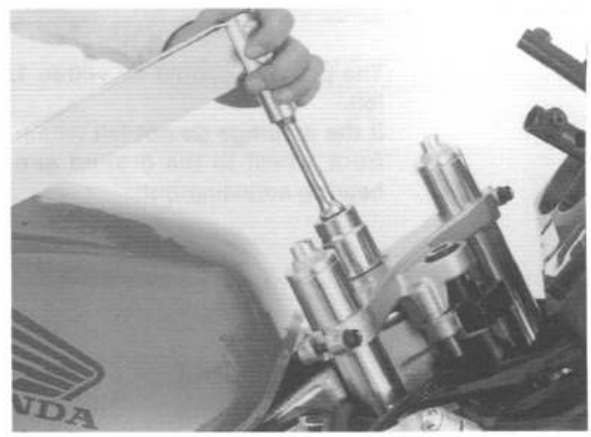


Install the top bridge.

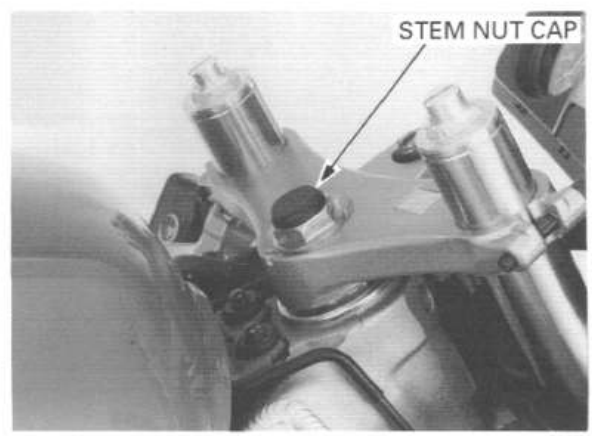
Install the fork legs (page 13-25).

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)

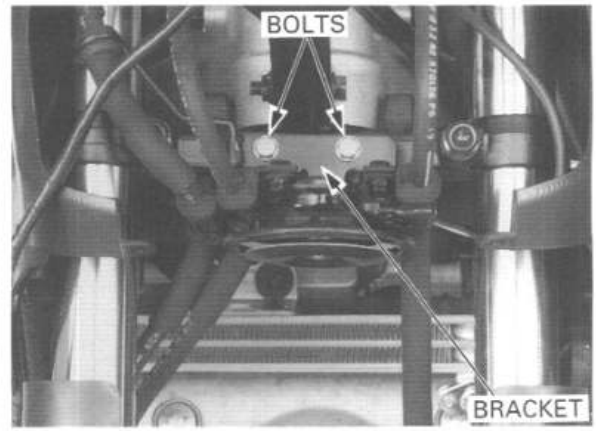


Install the steering stem nut cap.



Install the front brake hose/horn mounting bracket and tighten the mounting bolts.

Install the front wheel (page 13-9).

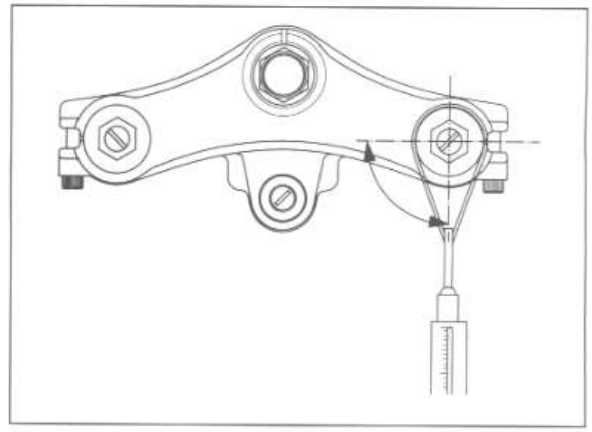


STEERING HEAD BEARING PRE-LOAD

Remove the upper cowl (page 2-11).

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.

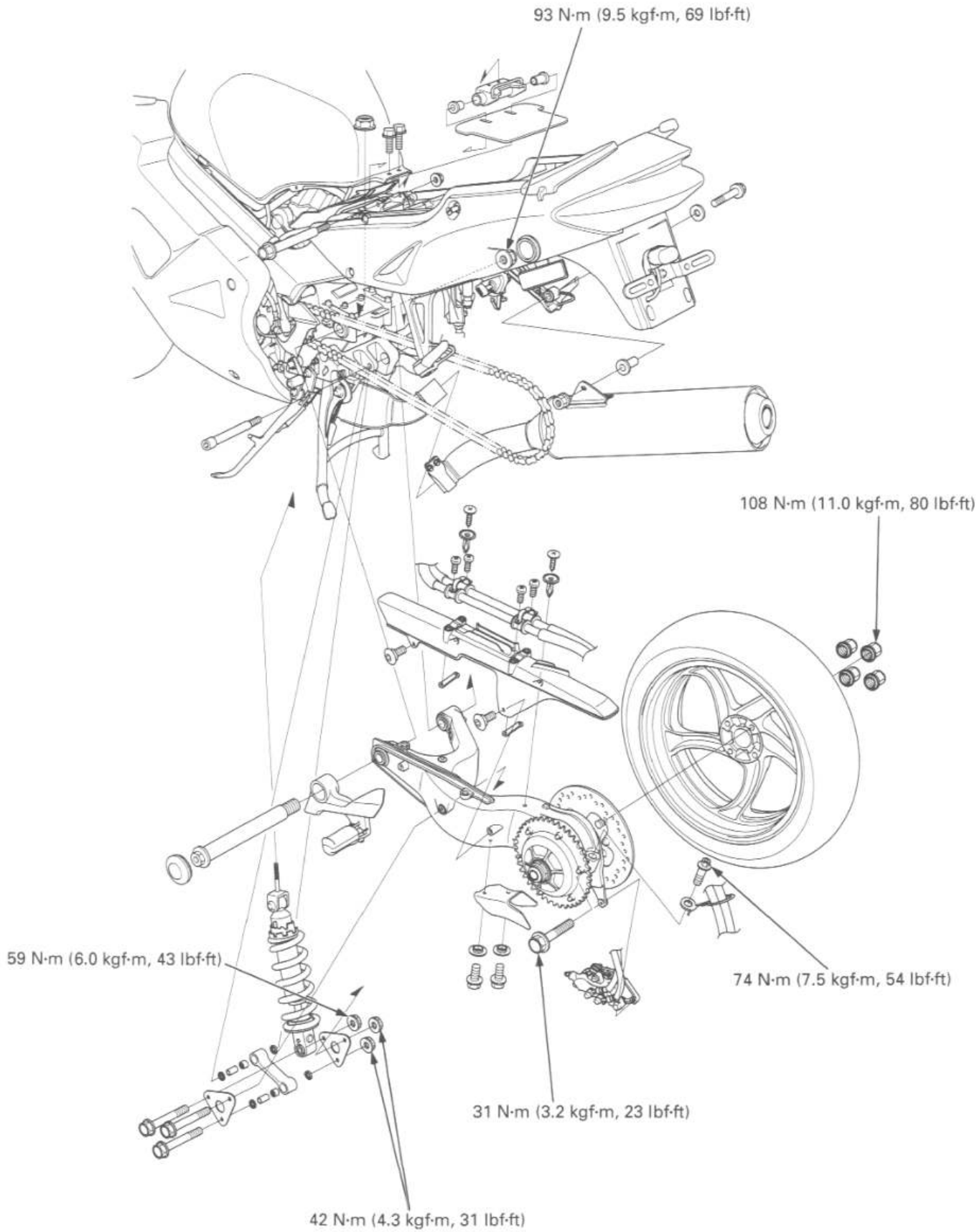


NOTE:

Make sure that there is no cable or wire harness interference.

The pre-load should be within 1.0 – 1.5 kgf (2.2 – 3.3 lbf).
If the readings do not fall within the limits, lower the front wheel to the ground and adjust the steering bearing adjusting nut.

MEMO


93 N·m (9.5 kgf·m, 69 lbf·ft)
108 N·m (11.0 kgf·m, 80 lbf·ft)
59 N·m (6.0 kgf·m, 43 lbf·ft)
74 N·m (7.5 kgf·m, 54 lbf·ft)
31 N·m (3.2 kgf·m, 23 lbf·ft)
42 N·m (4.3 kgf·m, 31 lbf·ft)

14. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	14-1	REAR AXLE/BRAKE DISC	14-14
TROUBLESHOOTING	14-2	REAR AXLE ASSEMBLY	14-16
REAR WHEEL	14-3	SUSPENSION LINKAGE	14-21
REAR AXLE DISASSEMBLY	14-4	SHOCK ABSORBER	14-22
BEARING HOLDER	14-7	SWINGARM	14-25
DRIVEN FLANGE	14-10		

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.***
- ***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 14-24).***

- When servicing the rear suspension linkage, swingarm or shock absorber, 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	Up to 90 kg (200 lb) load		290 kPa (2.90 kgf/cm², 42 psi)	———
	Up to maximum weight capacity		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	50VA7-108LE	———
		RK	HF0Z3-108LE	———
	Slack		20 – 30 (0.9 – 1.2)	50 (2.0)
Shock absorber	Pre-load adjuster standard position		2nd groove	———
	Rebound damping adjuster standard position		1-1/2 turns from full hard	———

TORQUE VALUES

Rear axle nut	201 N·m (20.5 kgf·m, 148 lbf·ft)	Stake
Final driven sprocket nut	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Rear wheel nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	
Rear brake disc mounting bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	ALOC bolt
Rear brake torque rod	34 N·m (3.5 kgf·m, 25 lbf·ft)	Apply a locking agent to the threads
Swingarm pivot nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Drive chain slider bolt	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	ALOC bolt
Bearing holder pinch bolt	74 N·m (7.5 kgf·m, 25 lbf·ft)	
Air guide mounting bolt	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	Apply a locking agent to the threads
Rear shock absorber upper bracket nut	42 N·m (4.3 kgf·m, 31 lbf·ft)	U-nut
Rear shock absorber mounting nut	42 N·m (4.3 kgf·m, 31 lbf·ft)	U-nut
Shock link nut (frame side)	59 N·m (6.0 kgf·m, 43 lbf·ft)	U-nut
Shock link nut (shock arm plate side)	42 N·m (4.3 kgf·m, 31 lbf·ft)	U-nut
Shock arm plate nut (swingarm side)	42 N·m (4.3 kgf·m, 31 lbf·ft)	U-nut

TOOLS

Socket wrench, 46 mm	07JMA – MN50100	
Driver	07749 – 0010000	
Attachment, 24 x 26 mm	07746 – 0010700	
Attachment, 32 x 35 mm	07746 – 0010100	
Attachment, 37 x 40 mm	07746 – 0010200	
Attachment, 42 x 47 mm	07746 – 0010300	
Attachment, 52 x 55 mm	07746 – 0010400	
Attachment, 62 x 68 mm	07746 – 0010500	
Pilot, 17 mm	07746 – 0040400	
Pilot, 20 mm	07746 – 0040500	
Pilot, 28 mm	07746 – 0041100	
Pilot, 40 mm	07746 – 0040900	
Needle bearing remover	07HMC – MR70100	
Driver shaft	07946 – MJ00100	
Pin driver	07GMD – KT80100	
Needle bearing remover	07LMC – KV30100	
Bearing remover set	07936 – 3710001	
— Remover handle	07936 – 3710100	
— Remover set	07936 – 3710600	
— Remover weight	07741 – 0010201	or 07936 – 3710200, 07936 – 371020A (U.S.A. only)
Bushing driver attachment	07HMF – MM90300	

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

Rear wheel wobbling
- Bent rim
- Worn rear axle bearings
- Faulty tire
- Unbalanced tire and wheel
- Tire pressure too low
- Faulty swingarm pivot bearings

REAR WHEEL

REMOVAL

Support the motorcycle securely on its center stand.
Remove the muffler bracket bolt/nut, then move the muffler outward.

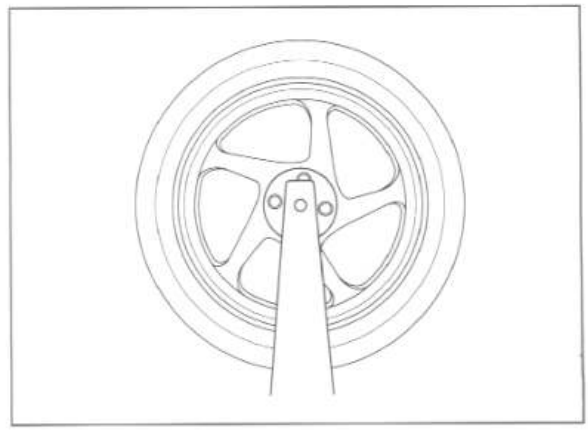
Remove the wheel nuts and rear wheel.



INSPECTION

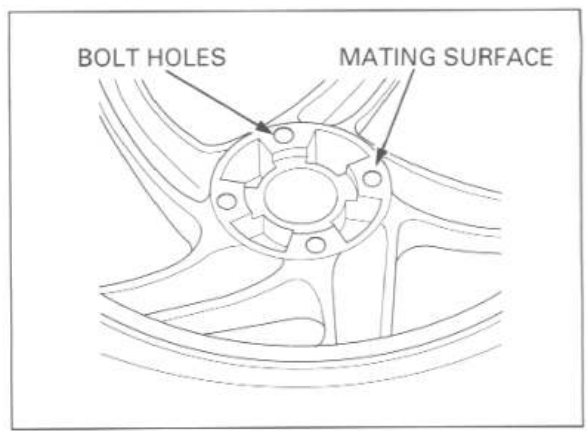
Wheel rim runout
Check the rim runout by placing the wheel in a turning stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS: Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)



Wheel balance
See page 13-11 for wheel balance.

Wheel bolt hole
Check the wheel bolt holes for wear, clacks or other damage.
Clean the axle hub mating surface of the wheel.



INSTALLATION

Install the rear wheel in the reverse order of removal.

Tighten the wheel nut to the specified torque.

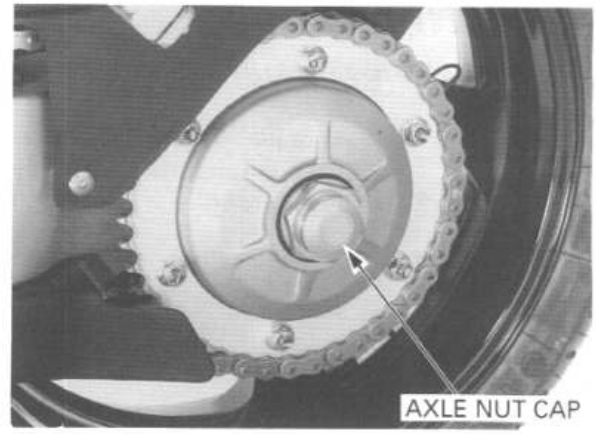
TORQUE: 108 N·m (11.0 kgf·m, 80 lbf·ft)

Install the muffler (page 2-20).



REAR AXLE DISASSEMBLY

Remove the rear axle nut cap.



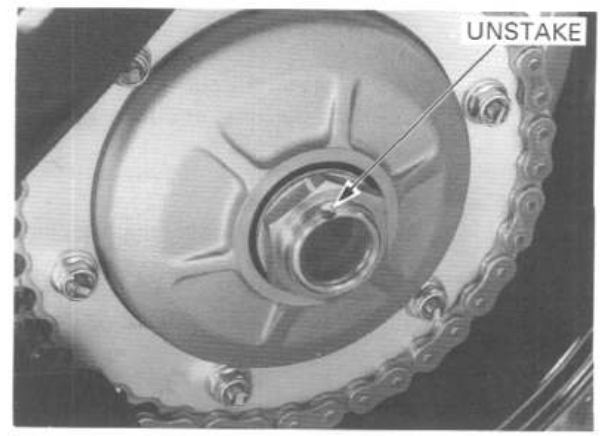
Unstake the rear axle nut.

Loosen the axle nut while applying the rear brake.

TOOL:
Socket wrench, 46 mm **07JMA – MN50100**

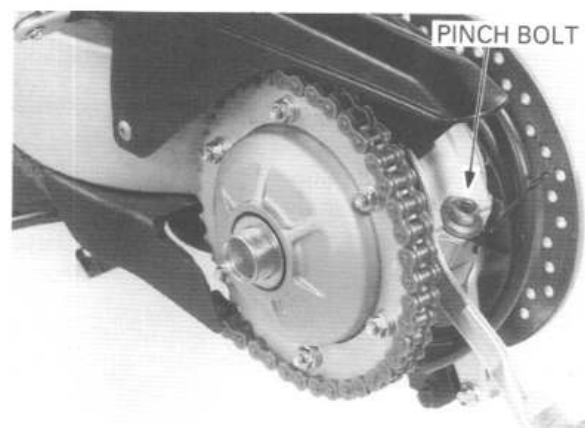
Remove the nut and spring washer.

Remove the rear wheel (page 14-3).

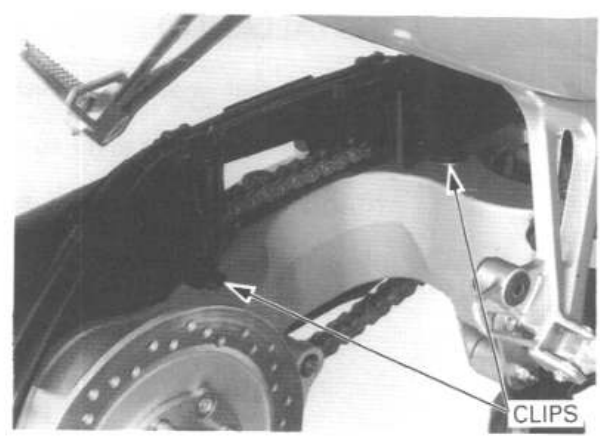


Loosen the axle bearing holder pinch bolt.

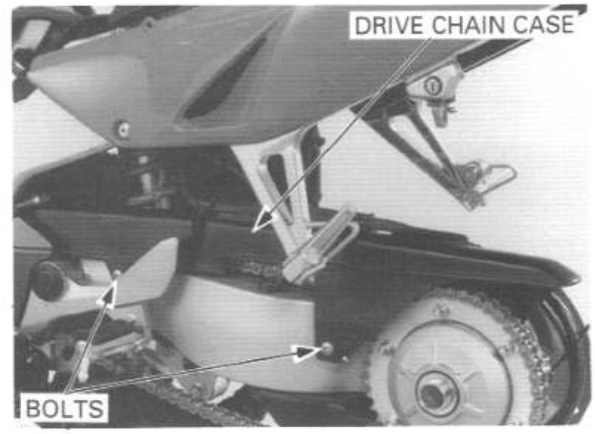
Turn the bearing holder to loosen the drive chain using a equipped pin spanner.



Remove the drive chain case retaining clips.

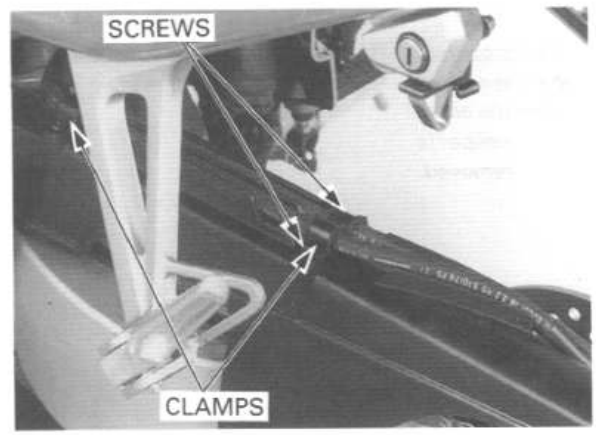


Remove the drive chain case mounting bolts.



Remove the rear brake hose clamp screws, clamps and brake hoses from the drive chain case.

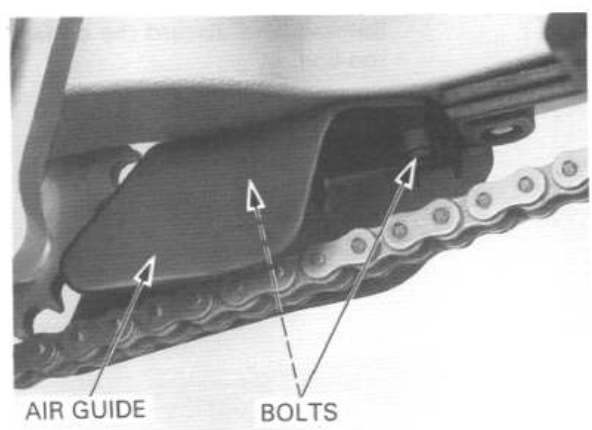
Remove the drive chain case.



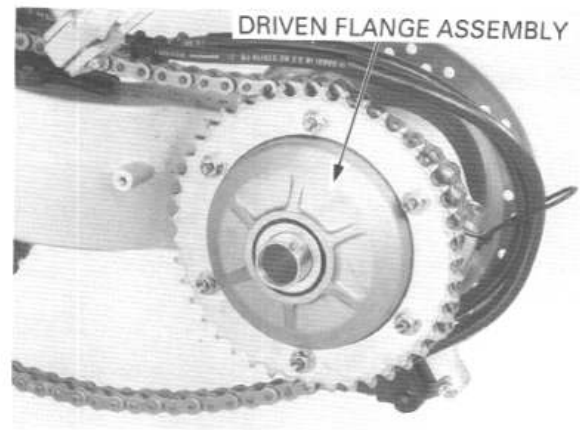
Remove the drive chain clamp retainer.



Remove the bolts, collars and air guide.

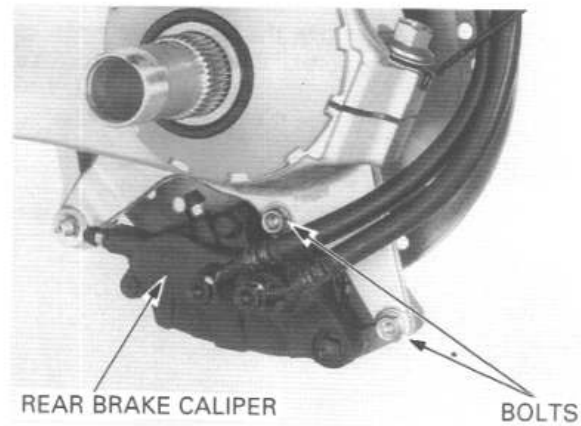


Remove the driven flange assembly from the axle.

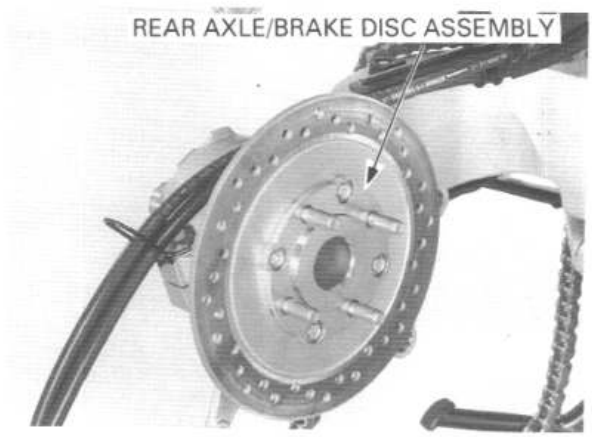


Do not operate the brake pedal after the brake caliper is removed.

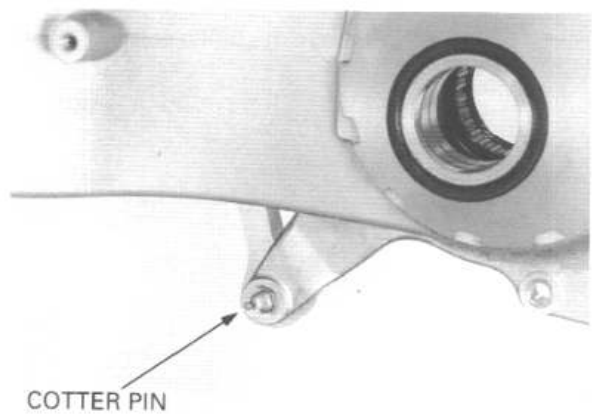
Remove the rear brake caliper mounting bolts. Remove the caliper form the brake disc.



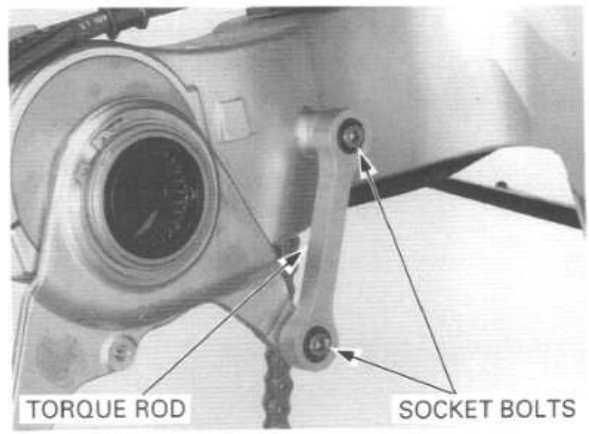
Remove the rear axle/brake disc assembly.



Remove and discard the cotter pin from the torque rod bolt.

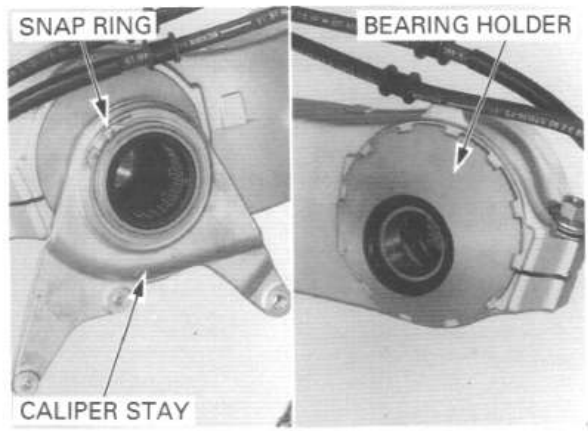


Remove the two socket bolts and torque rod.



Remove the snap ring and brake caliper stay.

Remove the bearing holder from the swingarm.



BEARING HOLDER

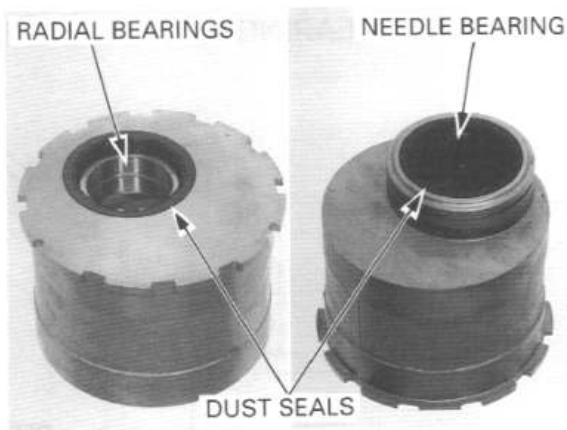
BEARING REPLACEMENT

Turn the inner race of each radial bearing with your finger.
Bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the bearing holder.

Check the needle rollers for obvious signs of wear.

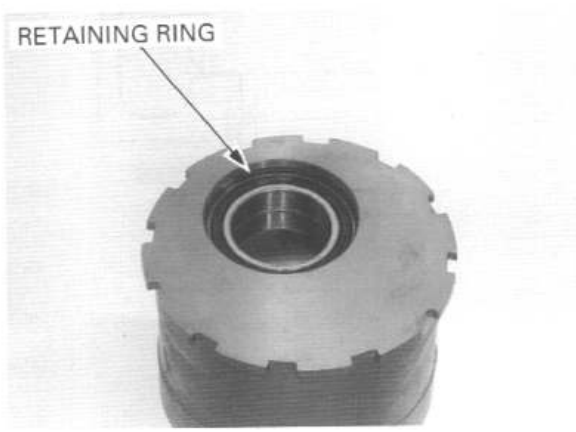
Always replace the bearings in pairs.

Remove and discard the ball bearings if the races do not turn smoothly and quietly, or if they fit loosely in the bearing holder.
Replace the needle bearing if it is wear or damaged.



Remove the dust seal.

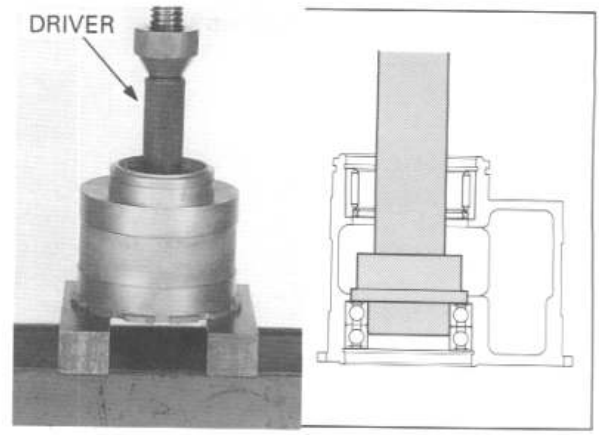
Remove the retaining rings from each side.



Press the ball bearing out of the bearing holder first using the special tools and a hydraulic press.

TOOLS:

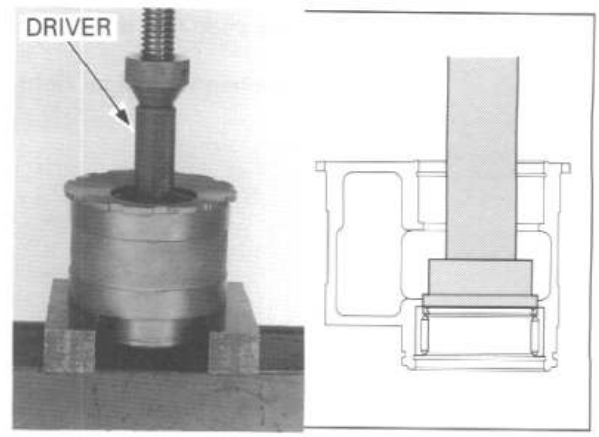
Driver	**07749 – 0010000**
Attachment, 42 x 47 mm	**07746 – 0010300**
Pilot, 40 mm	**07746 – 0040900**



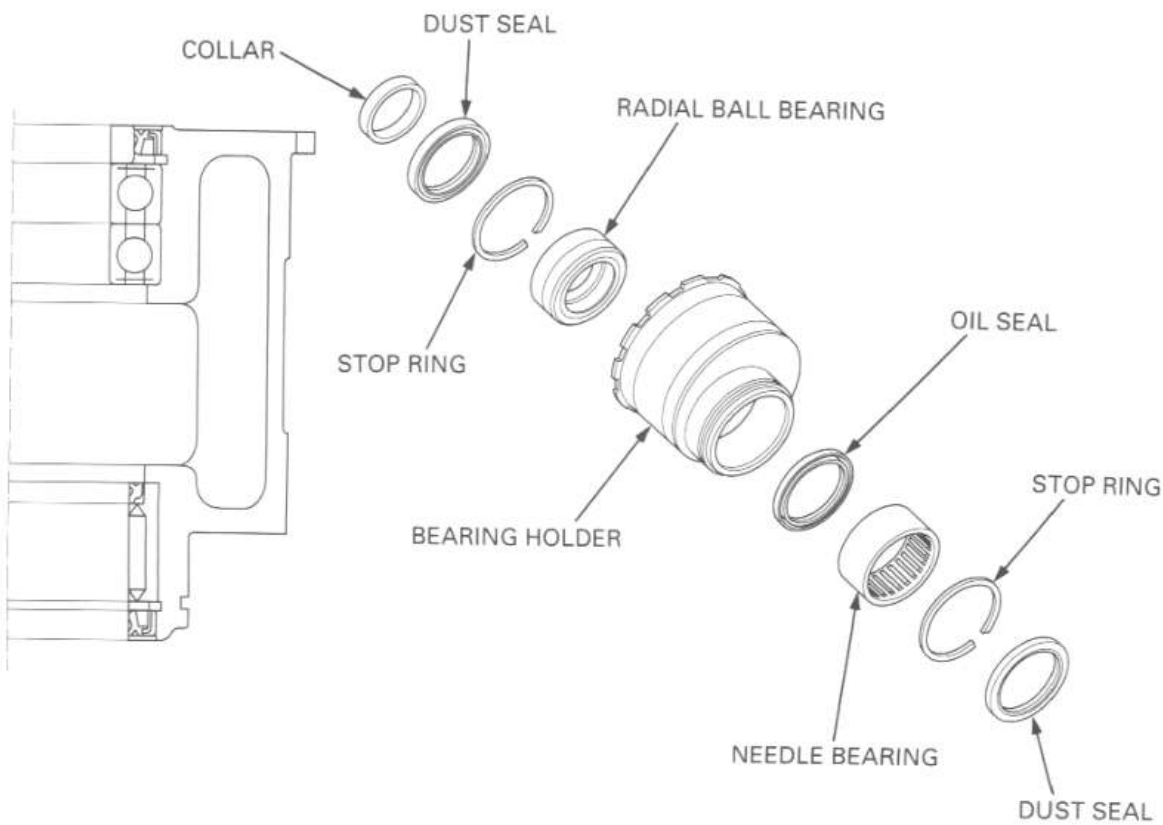
Press the needle bearing out from the bearing holder using the special tools and a hydraulic press.

TOOLS:

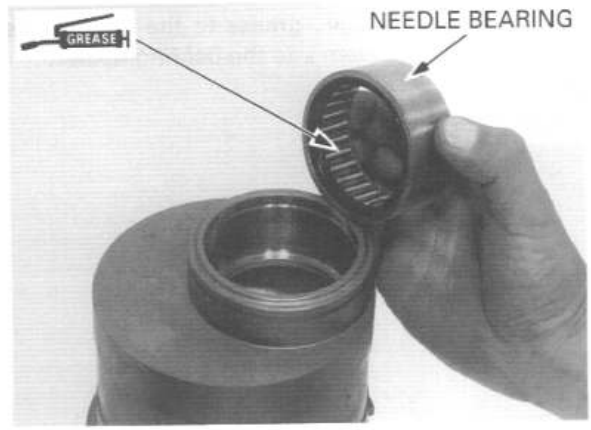
Driver	**07749 – 0010000**
Attachment, 52 x 55 mm	**07746 – 0010400**



BEARING HOLDER ILLUSTRATION



Fill the new needle bearing with multi-purpose grease.

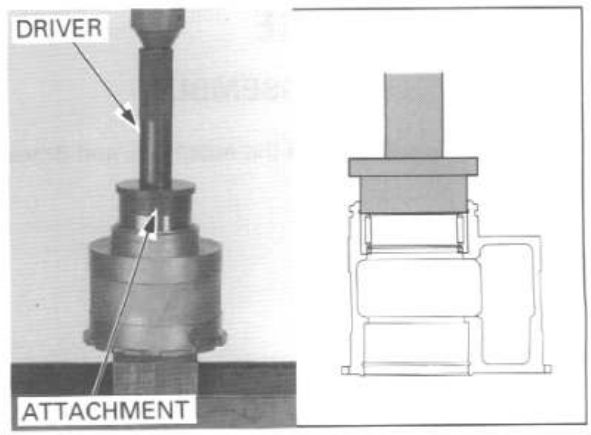


Install the bearing with the marking facing out.

Press it into the bearing holder using the special tools and a hydraulic press.

TOOLS:

Driver	**07749 – 0010000**
Attachment, 62 x 68 mm	**07746 – 0010500**

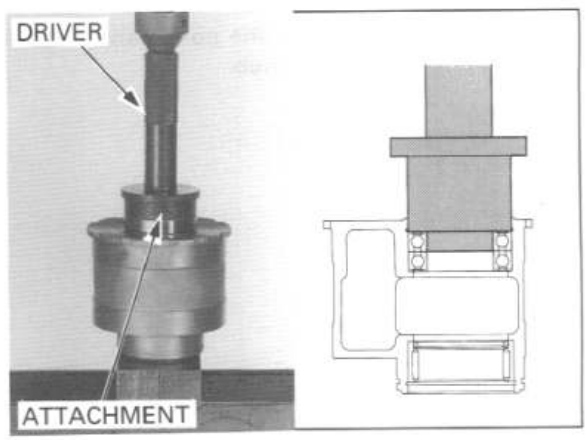


Install the bearing with the marking facing out.

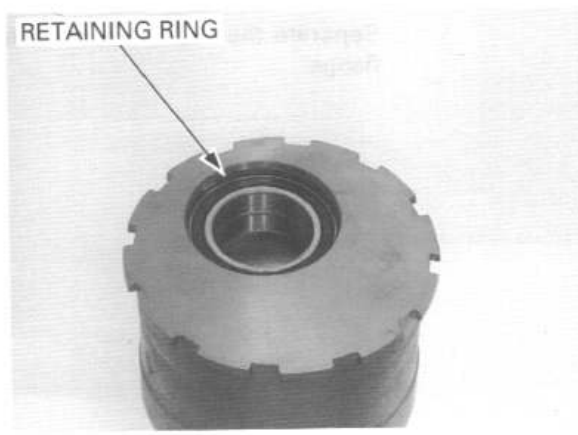
Press the new ball bearings into the bearing holder using the special tools and a hydraulic press.

TOOLS:

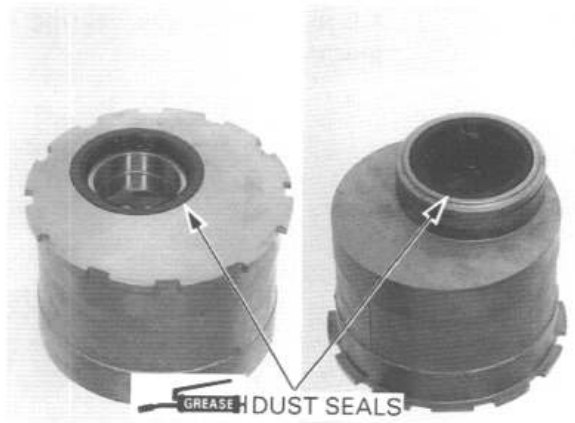
Driver	**07749 – 0010000**
Attachment, 62 x 68 mm	**07746 – 0010500**
Pilot, 40 mm	**07746 – 0040900**



Install the retaining rings into the holder groove securely.



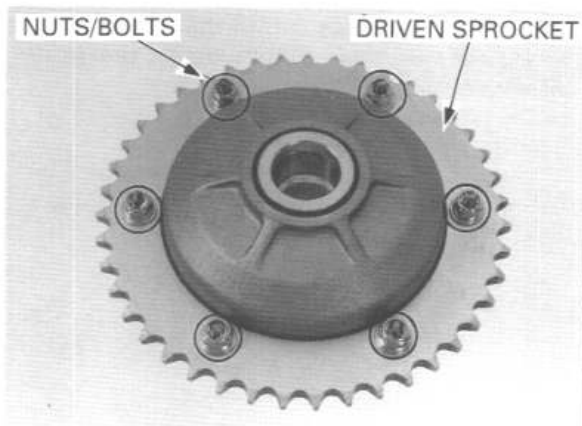
Apply grease to the new dust seal lips, then install them into the bearing holder.



DRIVEN FLANGE

DISASSEMBLY

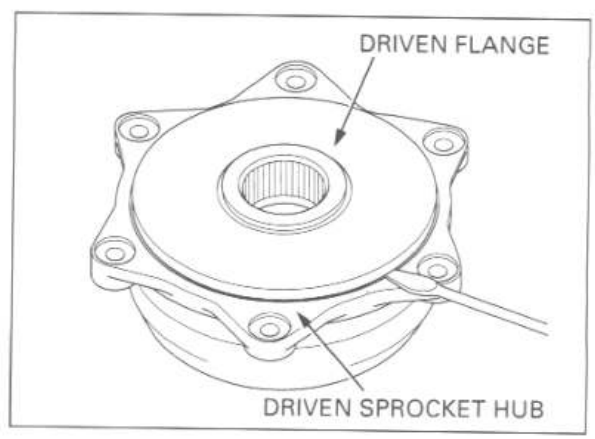
Remove the nuts/bolts and driven sprocket.



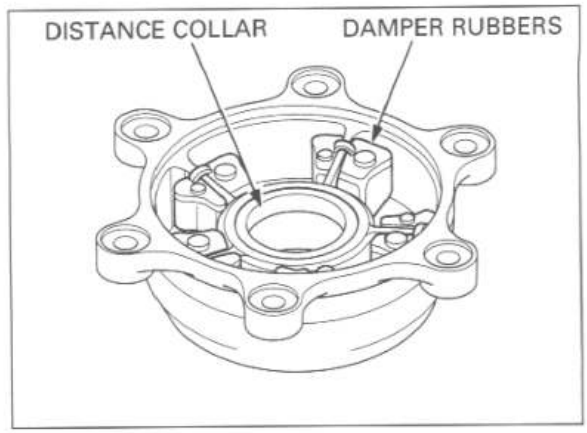
Remove the collar and dust seal from the driven sprocket hub.



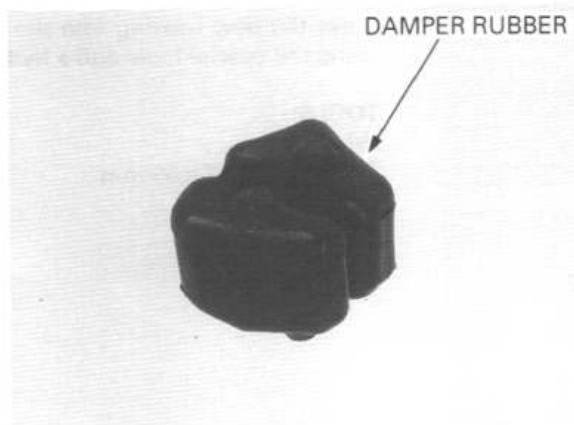
Separate the driven sprocket hub from the driven flange.



Remove the O-ring and distance collar.
Remove the damper rubbers from the driven sprocket hub.



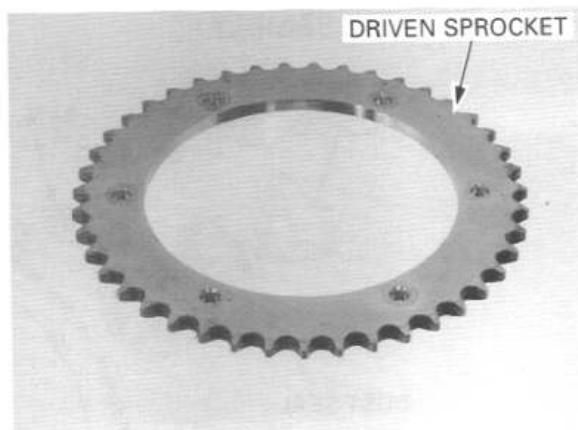
Check the damper rubbers for wear or damage, replace if necessary.



Check the condition of the final driven sprocket teeth. Replace the sprocket if it is worn or damaged.

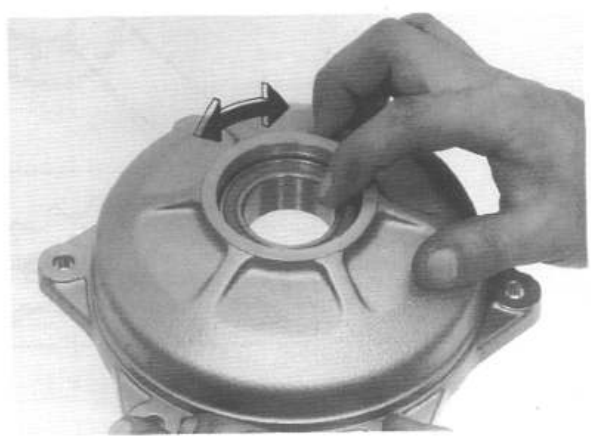
NOTE:

- 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.



DRIVEN SPROCKET HUB BEARING INSPECTION/REPLACEMENT

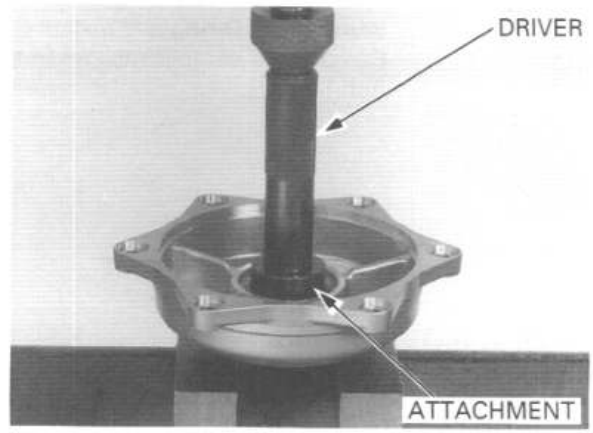
Turn the inner race of the bearing with your finger. The bearing should turn smoothly and quietly.
Also check that the bearing outer race fits tightly in the driven sprocket hub.
Remove and discard the ball bearing if the races do not turn smoothly and quietly, or if they fit loosely in the driven sprocket hub.



Press the bearing out from the driven sprocket hub using the special tools and a hydraulic press.

TOOLS:

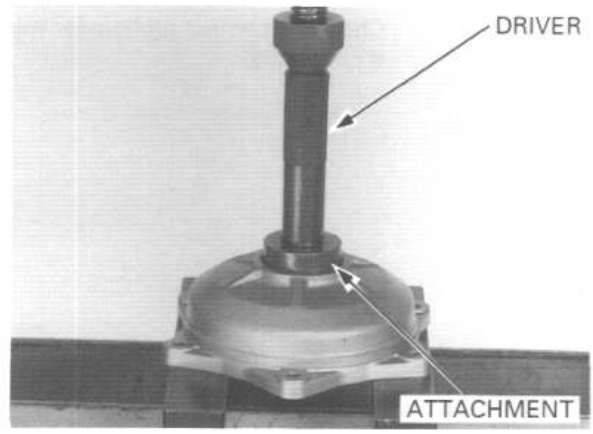
Driver	**07749 – 0010000**
Attachment, 42 x 47 mm	**07746 – 0010300**
Pilot, 35 mm	**07746 – 0040800**



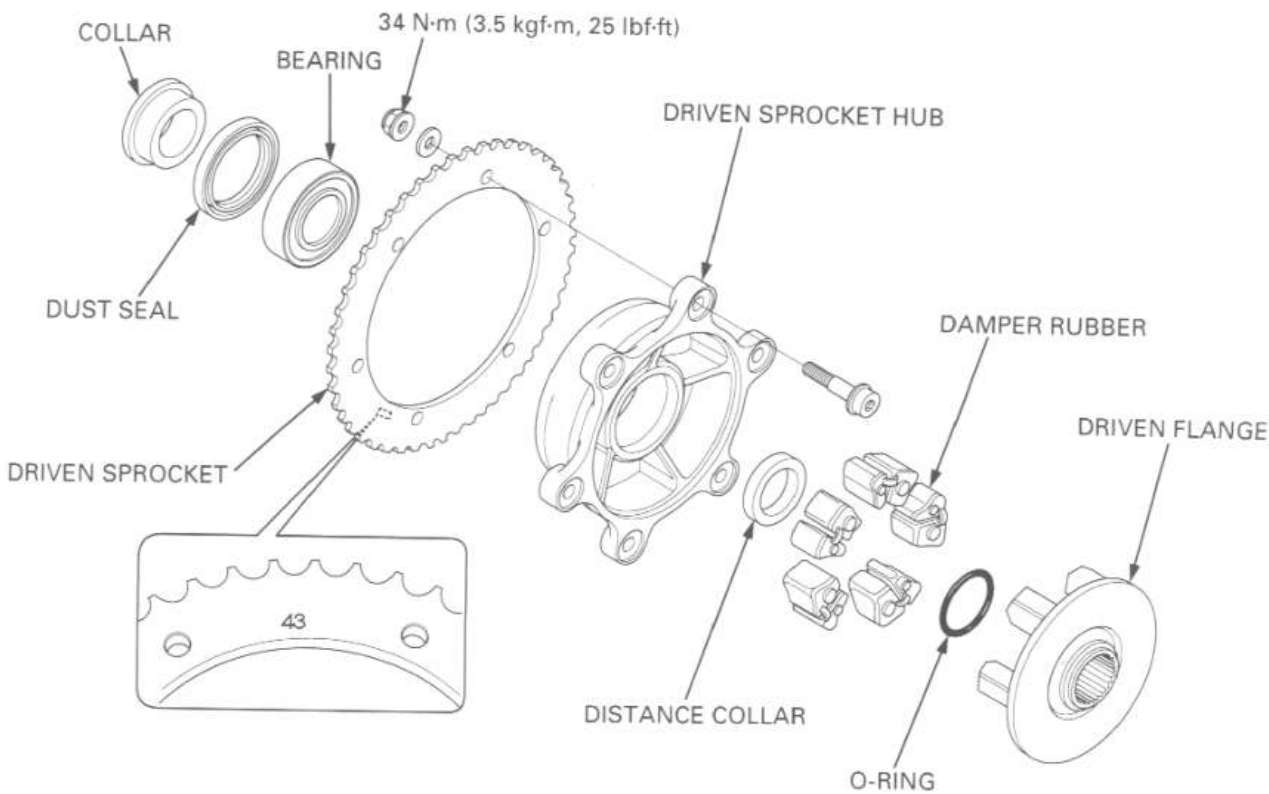
Press the new bearing into the driven sprocket hub using the special tools and a hydraulic press.

TOOLS:

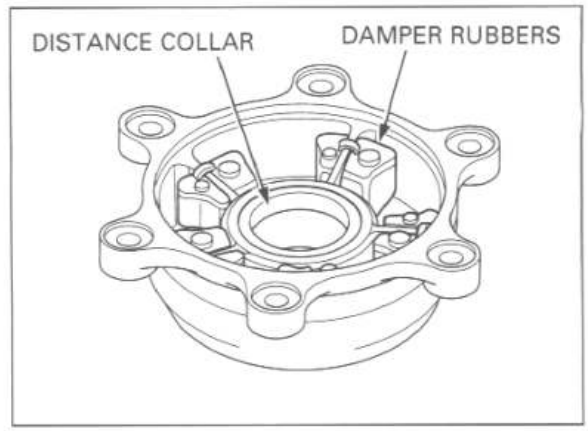
Driver	**07749 – 0010000**
Attachment, 52 x 55 mm	**07746 – 0010400**
Pilot, 35 mm	**07746 – 0040800**



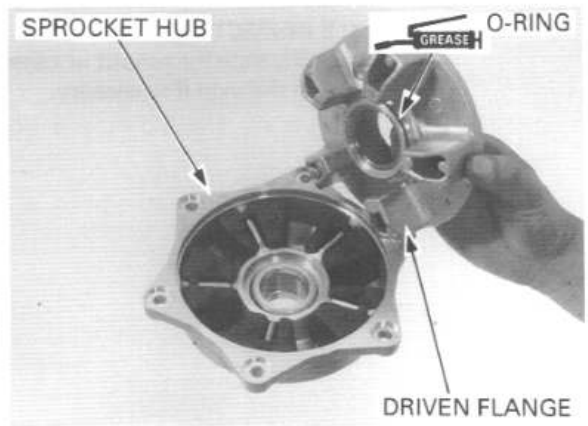
ASSEMBLY



Install the damper rubbers and distance collar into the driven sprocket hub.



Apply grease to a new O-ring and install it onto the driven flange.
Install the driven flange onto the driven sprocket hub.

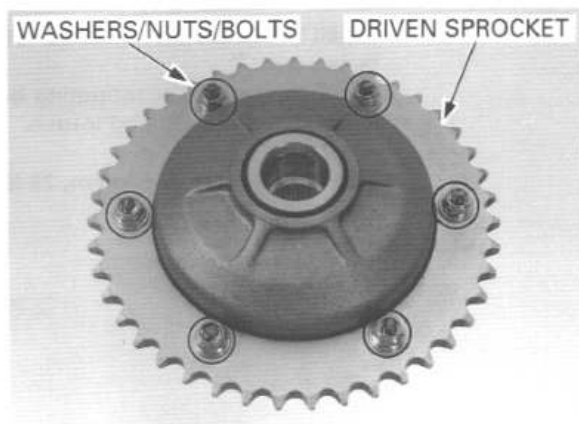


Apply grease to the dust seal lips, install it into the driven flange.
Install the collar.



Install the driven sprocket onto the hub.
Install the washers and mounting bolts/nuts.
Hold the bolt and tighten the nut to the specified torque.

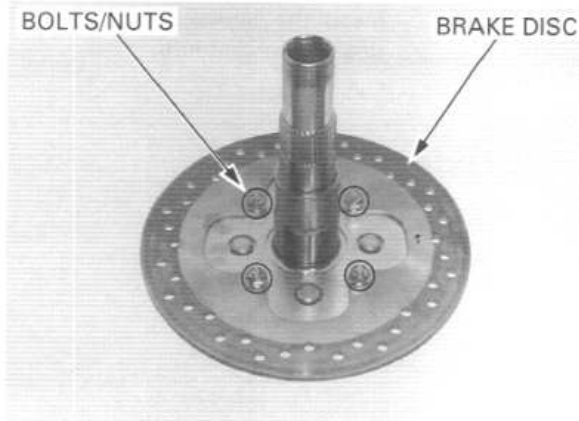
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



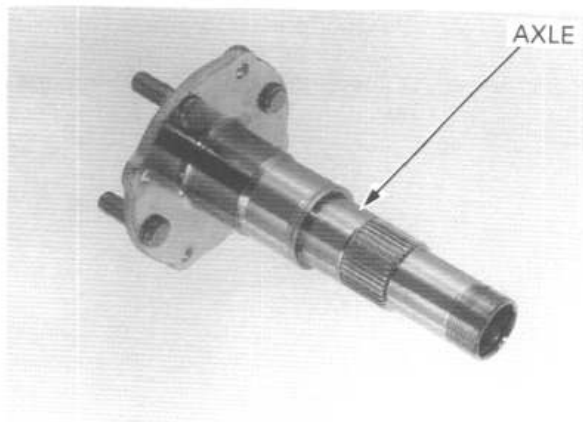
REAR AXLE/BRAKE DISC

BRAKE DISC REPLACEMENT

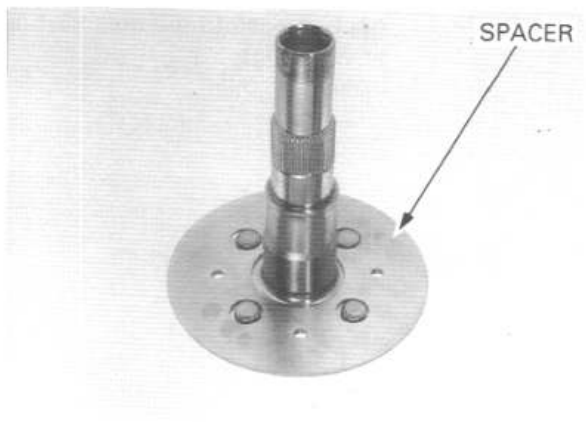
Remove the bolts/nuts and brake disc from the axle flange.
Remove the brake disc spacer.



AXLE INSPECTION
Check the axle for runout or other damage.
Replace the axle if necessary.

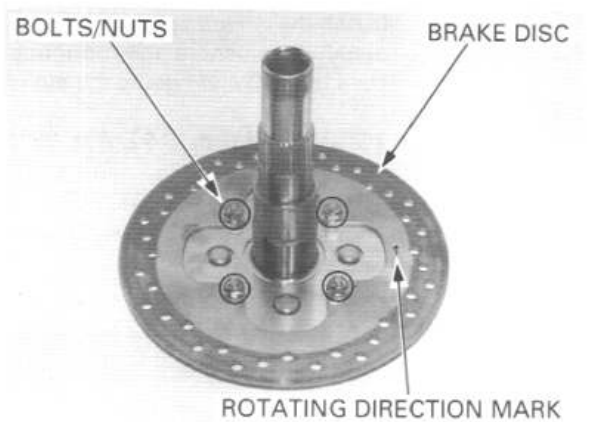


Install the brake disc spacer onto the rear axle flange.



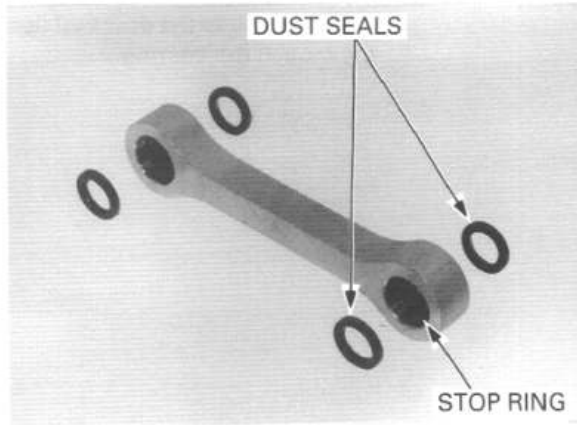
Install the brake disc with its rotating direction mark facing out.
Install the brake disc mounting bolts and nuts, tighten the nuts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



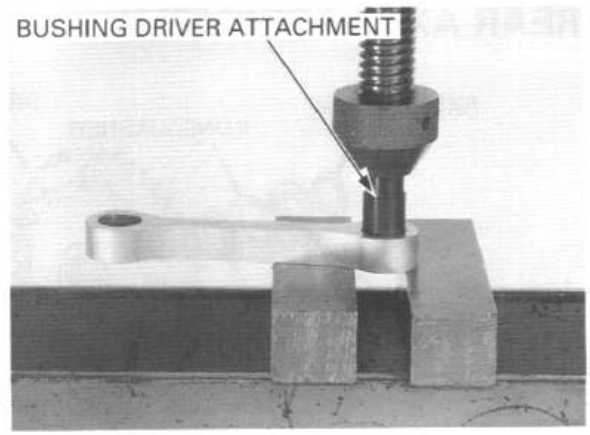
BRAKE TORQUE ROD SPHERICAL BEARING REPLACEMENT

Remove the dust seals and stop rings.



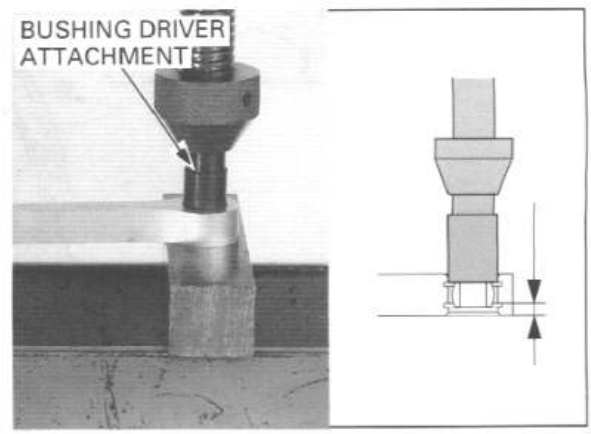
Press out the spherical bearing using the special tool.

TOOL:
Bushing driver attachment **07HMF – MM90300**

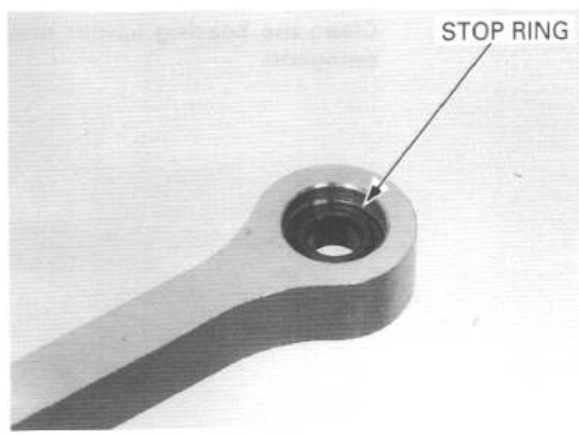


Press the new spherical bearing in using the same tool until the bearing casing is placed between the stop ring grooves.

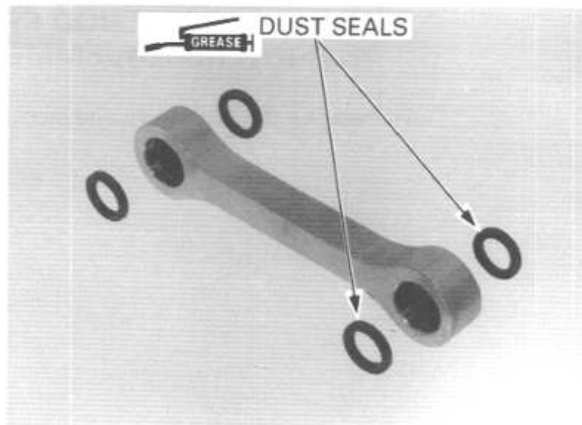
TOOL:
Bushing driver attachment **07HMF – MM90300**



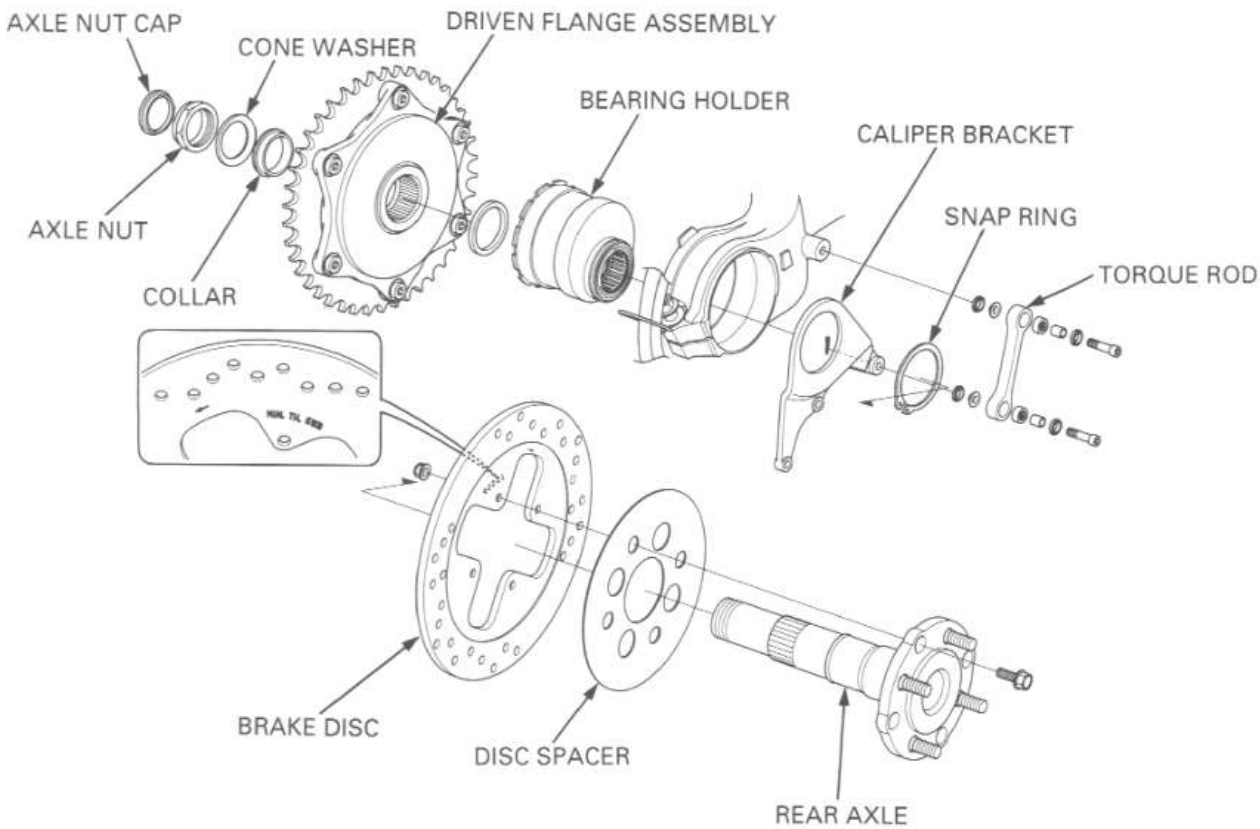
Install stop rings into the grooves securely.



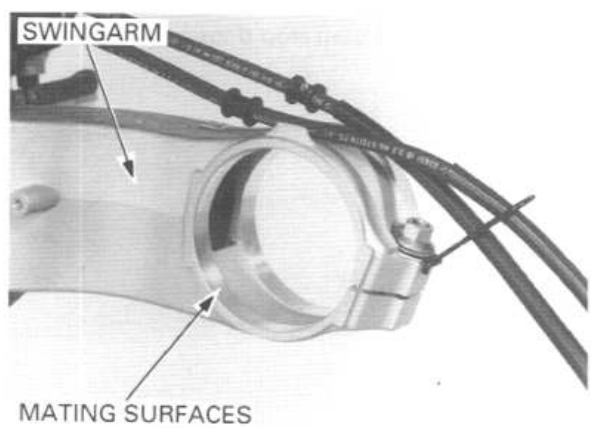
Apply grease to the dust seal lips and install them until they touch the bearing.



REAR AXLE ASSEMBLY

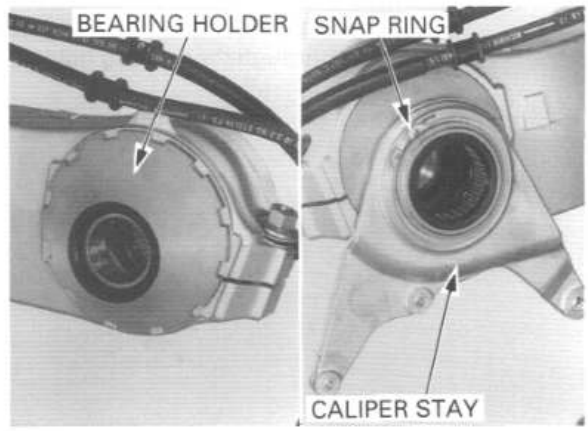


Clean the bearing holder mating surfaces of the swingarm.

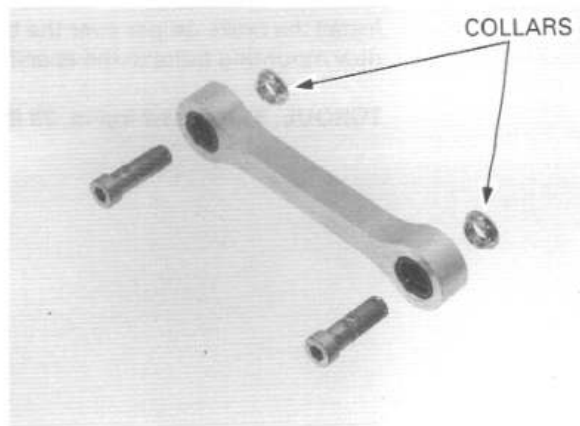


Install the bearing holder into the swingarm.

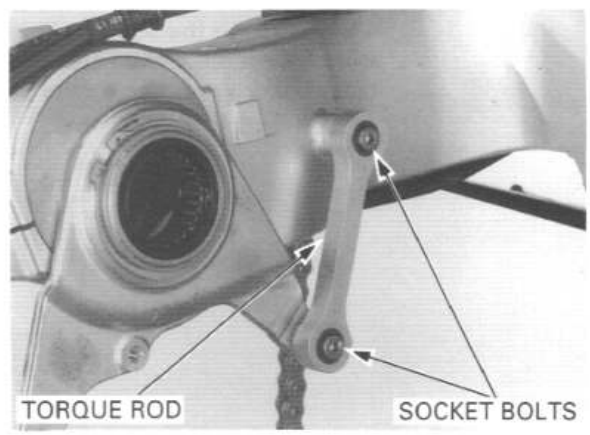
Install the rear brake caliper stay onto the bearing holder, secure it with a snap ring.



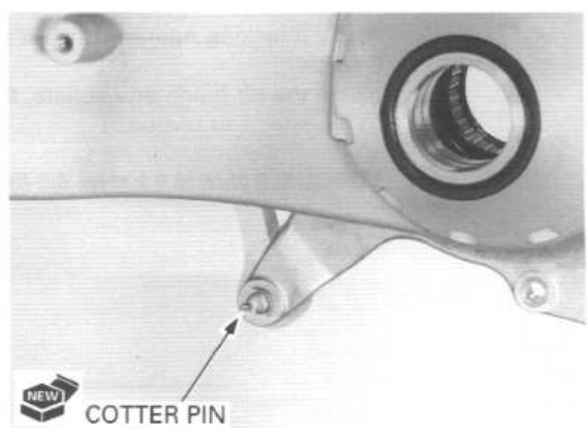
Install the collars and brake torque rod to the swingarm and brake caliper stay.



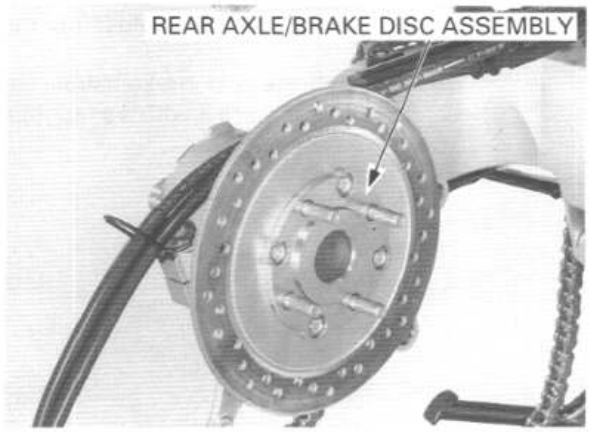
Install and tighten the socket bolt securely.



Secure the caliper bracket side bolt with a new cotter pin.

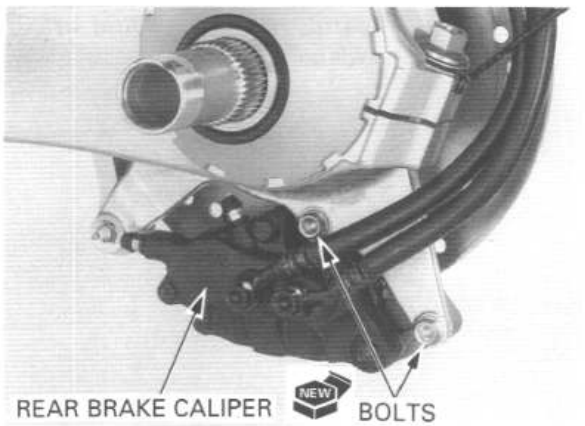


Install the rear axle/brake disc assembly from the right side through the bearing holder.

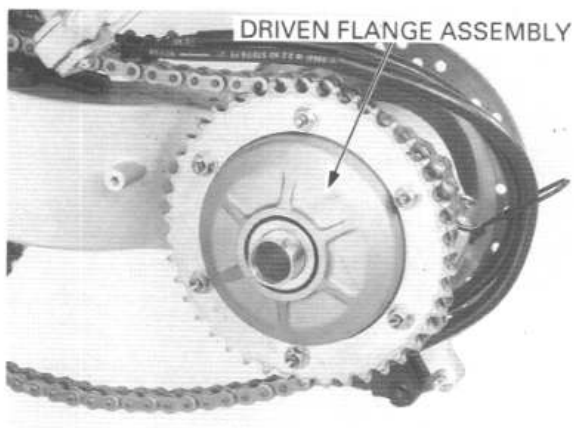


Install the brake caliper over the brake disc, tighten the new mounting bolts to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

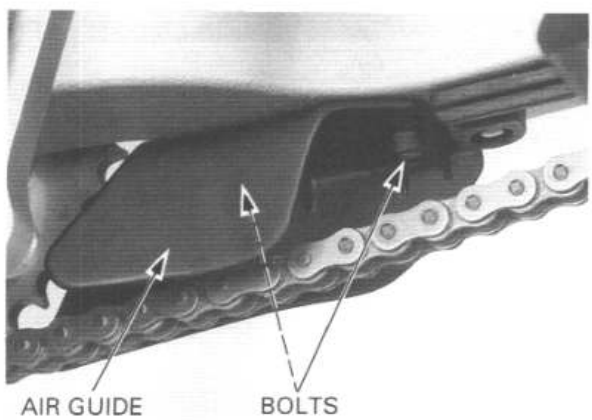


While aligning the splines, install the driven flange assembly onto the rear axle.
Install the drive chain over the driven sprocket.



Apply a locking agent to the air guide mounting bolt threads.
Install the air guide and collars, then tighten the bolts to the specified torque.

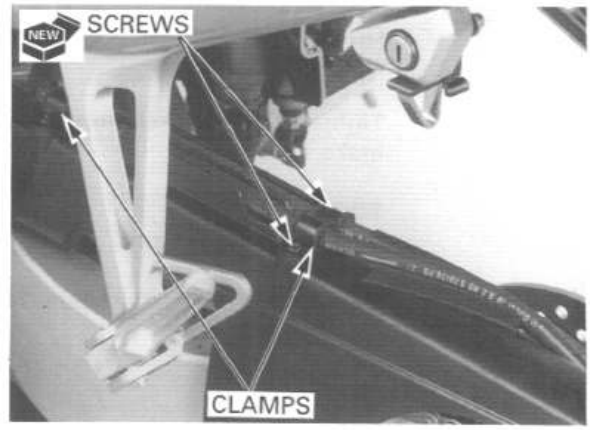
TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)



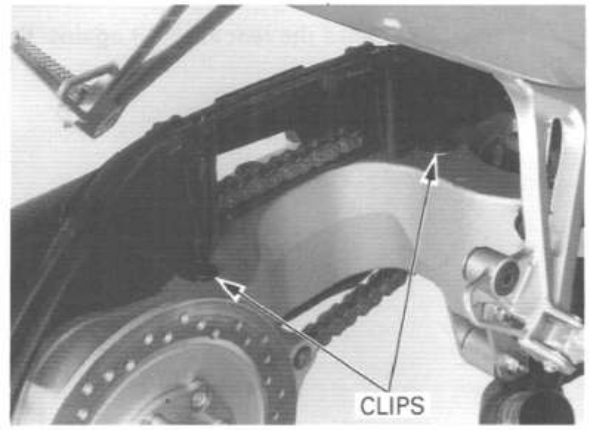
Install the brake hose clamp retainer into the drive chain case.



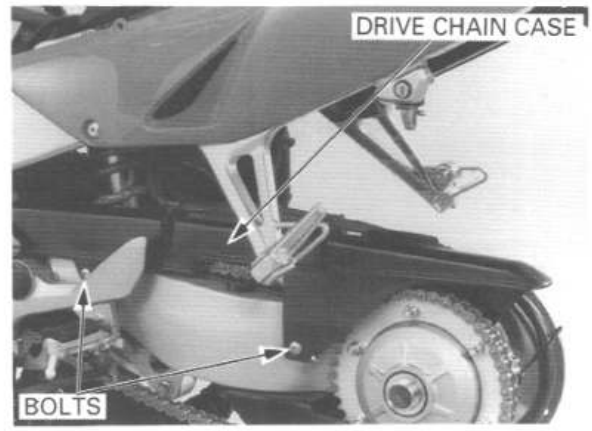
Route the brake hoses onto the drive chain case. Install the brake hose camps and tighten the new screws securely.



Install the drive chain case retaining trim clips.



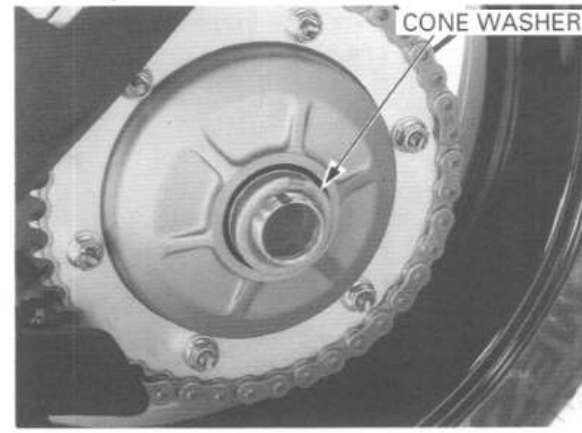
Install and tighten the drive chain case mounting bolts.



Install the cone washer with its marking facing out.

Apply oil to the new axle nut threads and seating surface.
Install the axle nut.

Install the rear wheel (page 14-3).

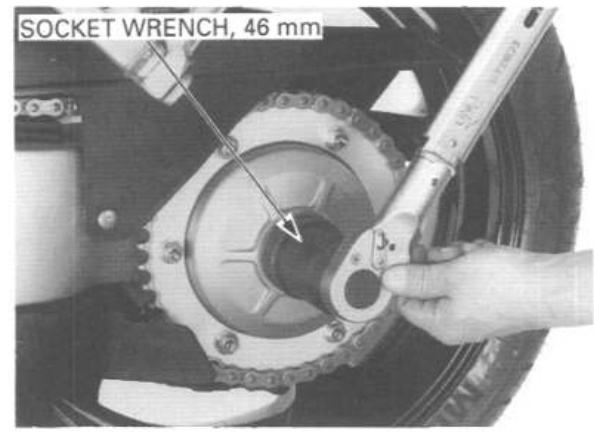


Operate the brake pedal to seat the caliper piston against the pads.

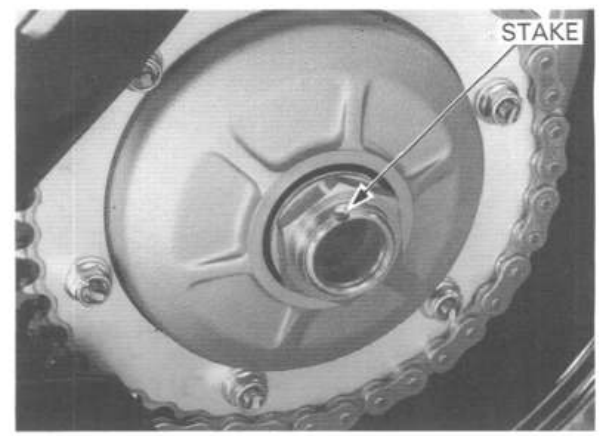
Tighten the rear axle nut while applying the rear brake.

TOOL:
Socket wrench, 46 mm **07JMA – MN50100**

TORQUE: 201 N·m (20.5 kgf·m, 148 lbf·ft)

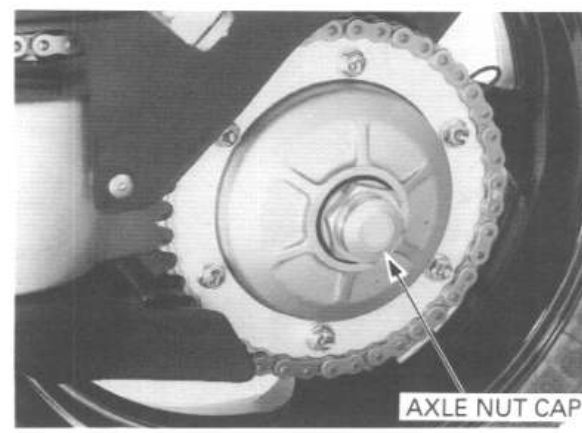


Stake the rear axle nut against the rear axle groove.



Install the rear axle cap.

Adjust the drive chain slack by turning the bearing holder (page 3-16).



SUSPENSION LINKAGE

⚠ WARNING

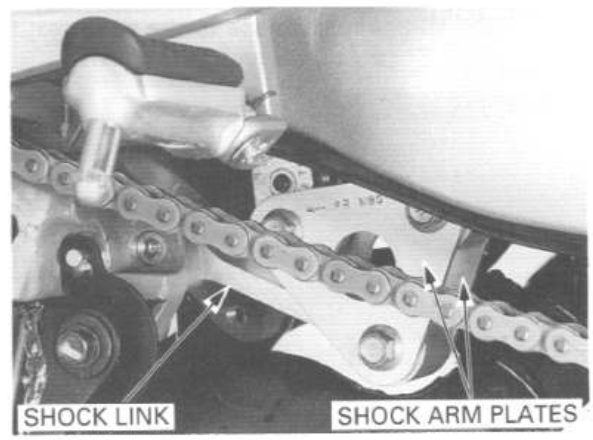
Do not service the suspension linkage while the exhaust system is hot.

REMOVAL/DISASSEMBLY

Place the motorcycle on its center stand.

Remove the following:
— Shock absorber lower mounting bolt/nut
— Shock link bolt/nut (shock arm plate side)
— Shock arm plate bolt/nut (swingarm side)
— Shock arm plates
— Shock link socket bolt/nut (frame side)
— Shock link

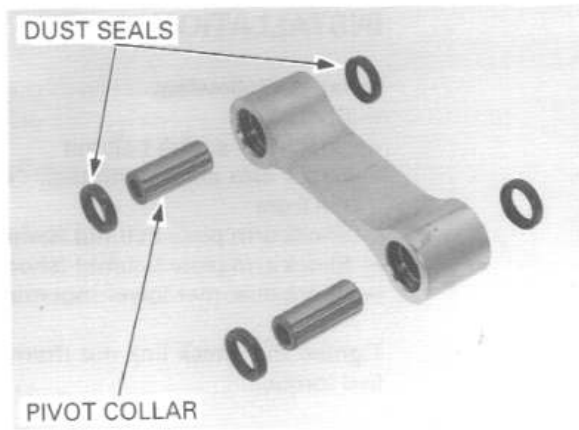
Remove the pivot collars and dust seals from the shock link.



INSPECTION

Check the dust seals and collars for wear, damage or fatigue.
Check the needle bearings for damage or loose fit.

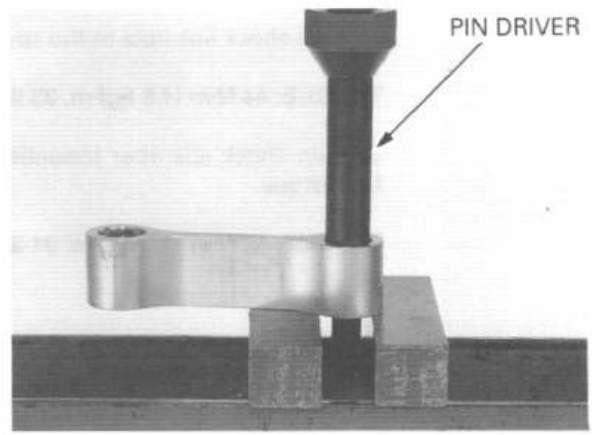
If the needle bearings are damaged, replace them.



SHOCK LINK NEEDLE BEARING REPLACEMENT
Press the needle bearing out of the shock link using special tool and a hydraulic press.

TOOL:

Pin driver	**07GMD – KT80100**



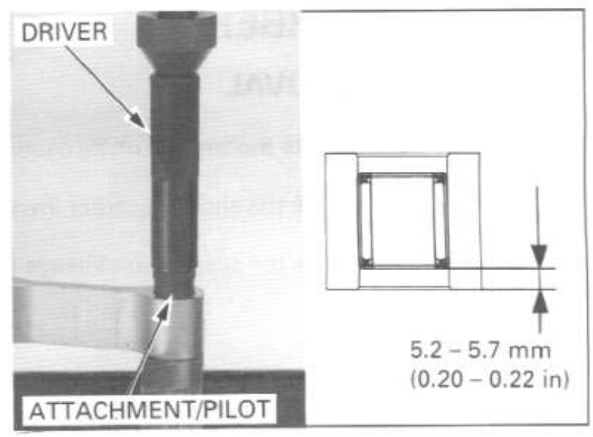
Pack a new needle bearing with multi-purpose grease.
Press a new needle bearing into the shock link so that the needle bearing surface is lower 5.2 – 5.7 mm (0.20 – 0.22 in) from the end of the shock link surface.

NOTE:

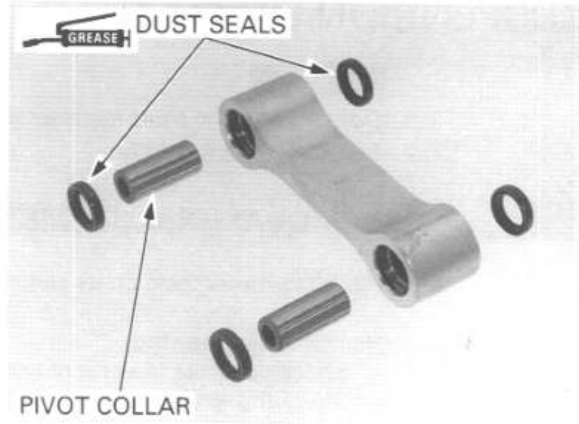
Press the needle bearing into the shock link with the marked side facing out.

TOOLS:

Driver	**07749 – 0010000**
Attachment, 24 x 26 mm	**07746 – 0010700**
Pilot, 17 mm	**07746 – 0040400**



Apply grease to the dust seal lips, then install the dust seals and pivot collars.



INSTALLATION

Install the following:
— Shock link
— Shock link socket bolt/nut
— Shock arm plates with their "←FR" mark facing to the front
— Shock arm plate bolt/nut (swingarm side)
— Shock arm plate bolt/nut (shock link side)
— Shock absorber lower mounting bolt/nut

Tighten the shock link nut (frame side) to the specified torque.

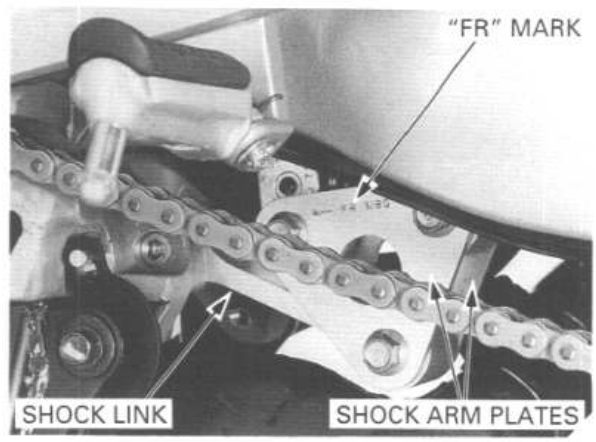
TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

Tighten shock link nuts to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

Tighten shock absorber mounting nuts to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



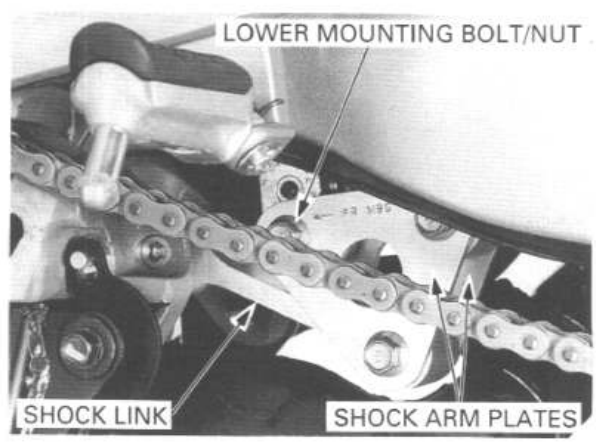
SHOCK ABSORBER

REMOVAL

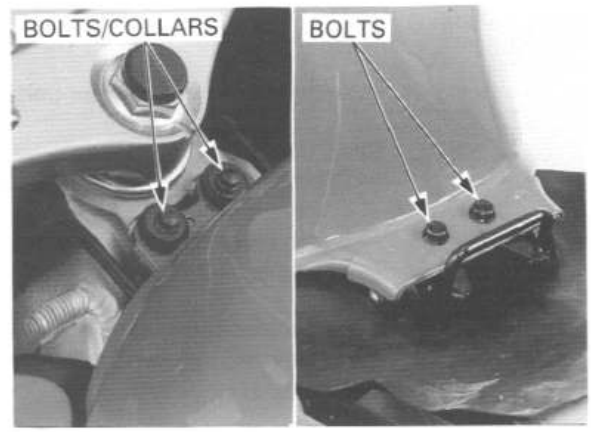
Place the motorcycle on its center stand.

Remove the shock absorber lower mounting bolt/nut.

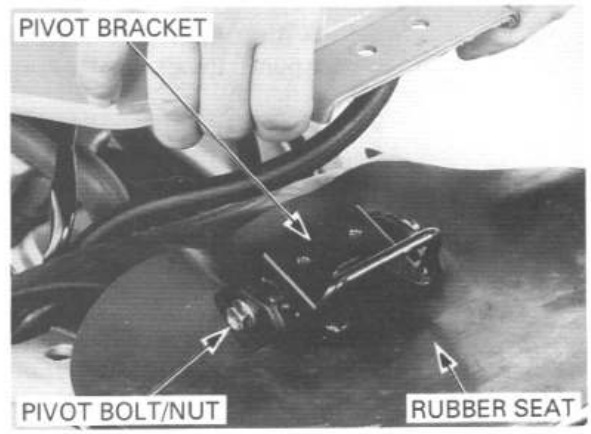
Remove the suspension linkage (page 14-21).



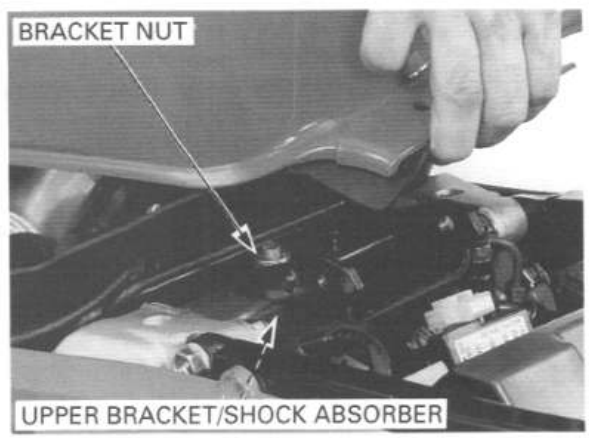
Remove the fuel tank front and rear mounting bolts.



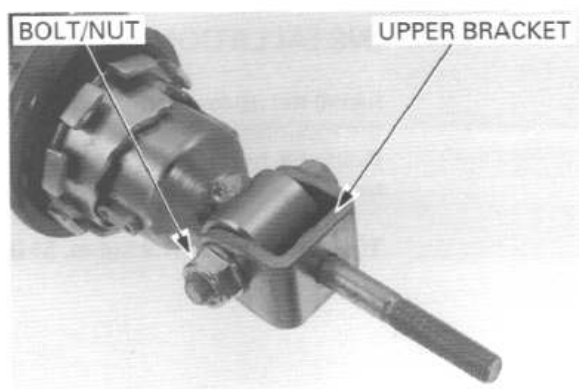
Remove the fuel tank rear pivot bracket bolt/nut and pivot bracket.
Remove the rubber seats.



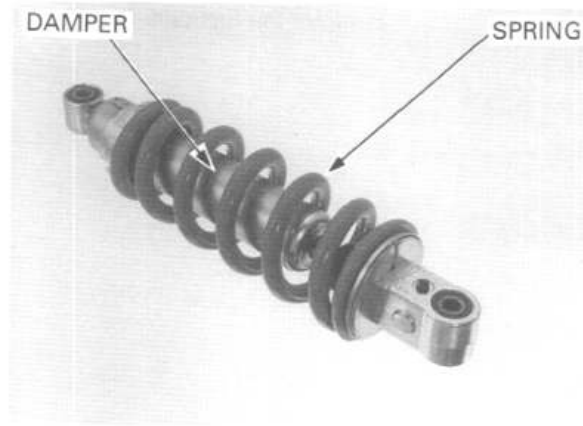
Remove the shock absorber upper bracket nut and shock absorber/upper bracket assembly.



Remove the shock absorber upper mounting bolt/nut, then remove the shock absorber upper bracket.



INSPECTION

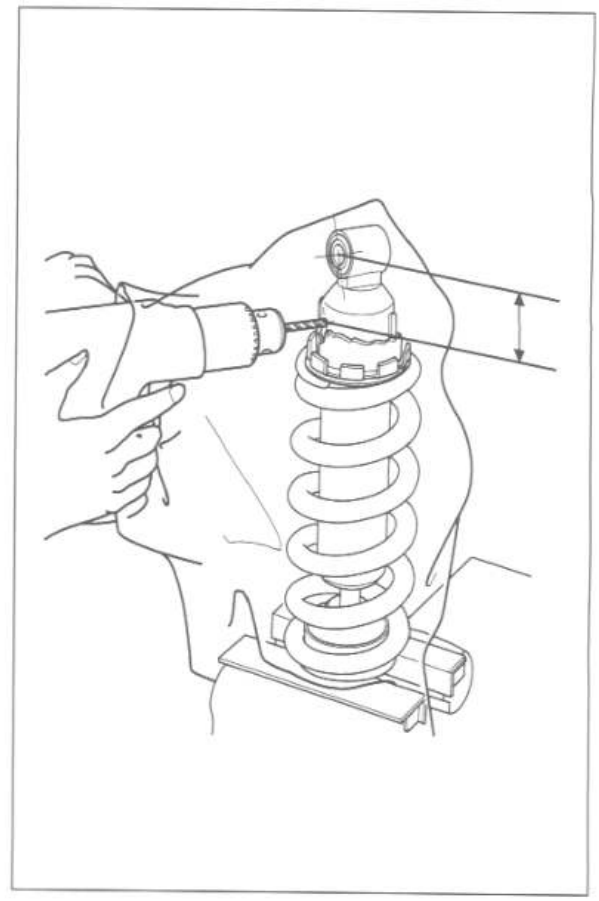


Visually inspect the damper unit for damage.

Check for the:
— Damper rod for bend or damage
— Damper unit for deformation or oil leaks
— Bump rubber for wear or damage
— Spring for damage

Inspect all the other parts for wear or damage.
If necessary, replace the shock absorber as an assembly.

SHOCK ABSORBER DISPOSAL PROCEDURE
Center punch the damper to mark the drilling point.



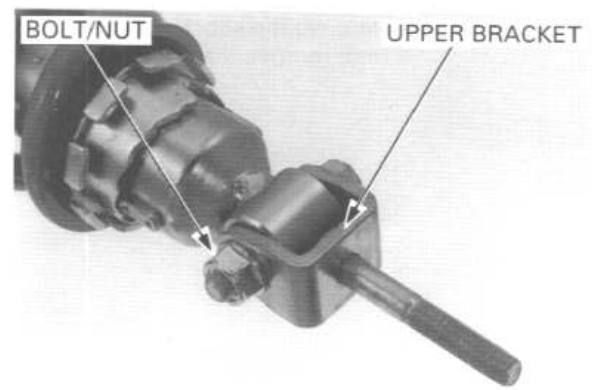
Wrap the damper unit inside a plastic bag.
Support the damper in a vise as shown.
Through the open end of the bag, insert a drill motor with a sharp 2 – 3 mm (5/64 – 1/8 in) drill bit.

⚠ 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



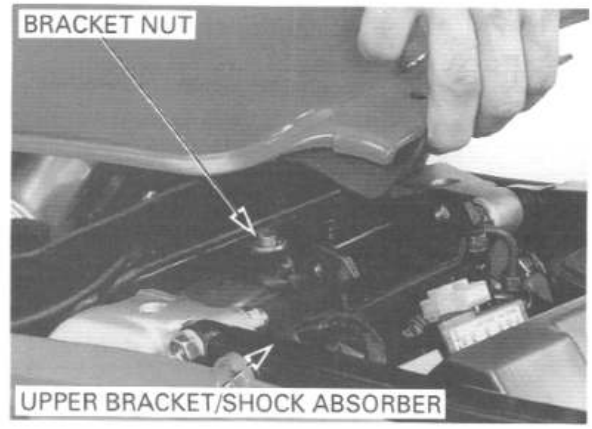
Install the upper bracket to the shock absorber, install the mounting bolt/nut.
Hold the bolt and tighten the nut to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)

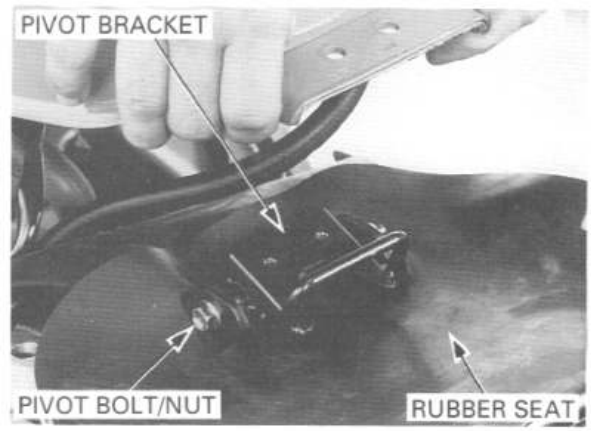
Install the shock absorber/upper bracket assembly into the frame with the rebound damping adjuster facing to the left.

Install and tighten the upper bracket nut to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



Install the rubber seats.
Install the fuel tank rear pivot bracket and bolt/nut.
Tighten the nut securely.

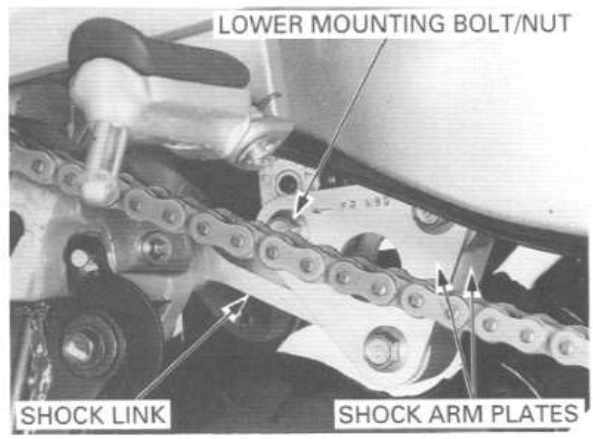


Install the suspension linkage (page 14-22).

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 fuel tank mounting bolts in the reverse order of removal.

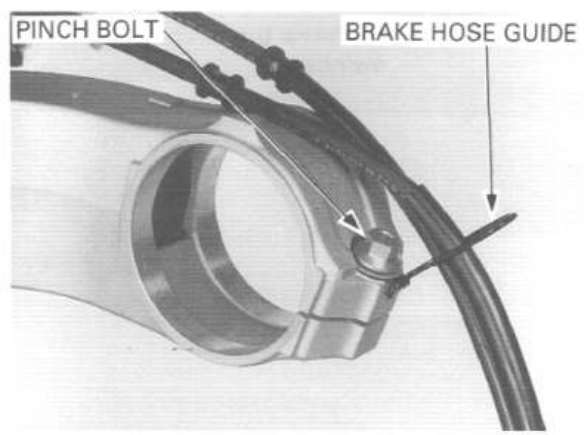


SWINGARM

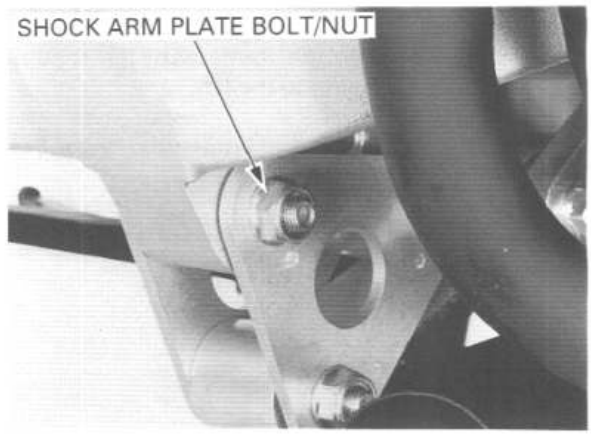
REMOVAL

Remove the rear axle and bearing holder (page 14-4, 7).

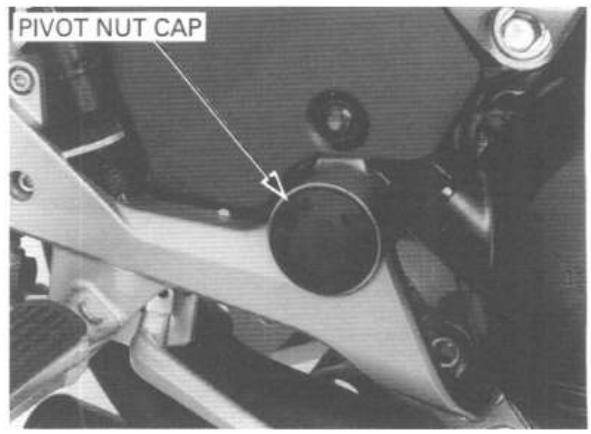
Remove the axle bearing holder pinch bolt and brake hose guide.



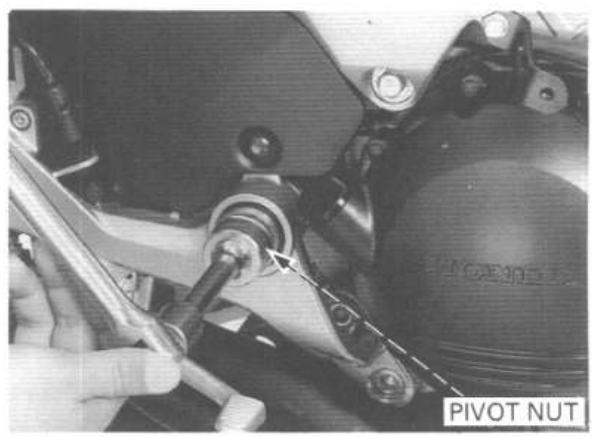
Remove the shock arm plate bolt/nut (swingarm side).



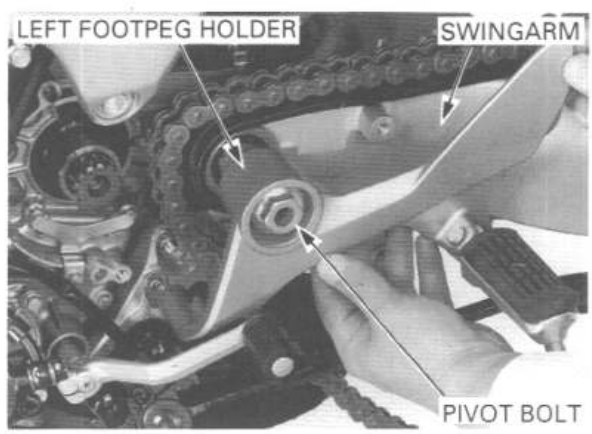
Remove the swingarm pivot nut caps.



Remove the heat guard plate mounting bolt.
Loosen and remove the swingarm pivot nut.



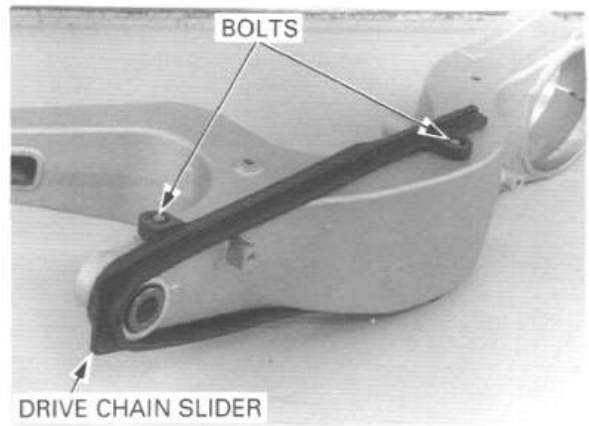
Remove the pivot bolt, left footpeg holder and swingarm.



DISASSEMBLY/INSPECTION

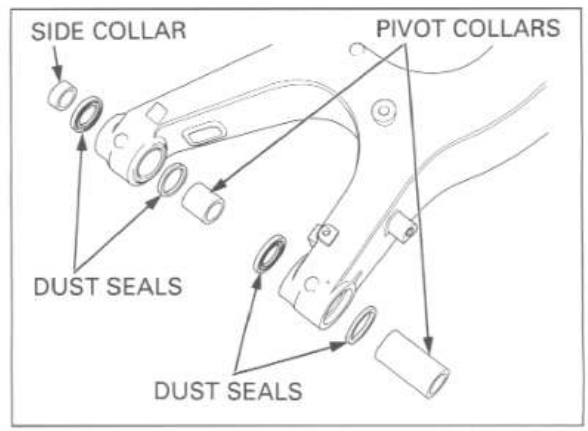
Remove the bolts and drive chain slider.

Check the drive chain slider for wear or damage.

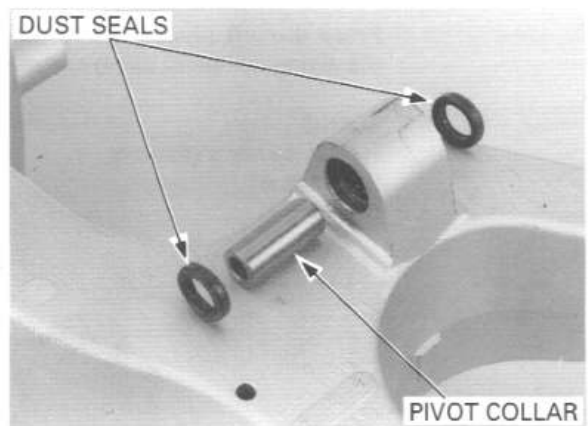


Remove the side collar, pivot collars and dust seals from the swingarm pivot.

Check the dust seals and collar for damage or fatigue.

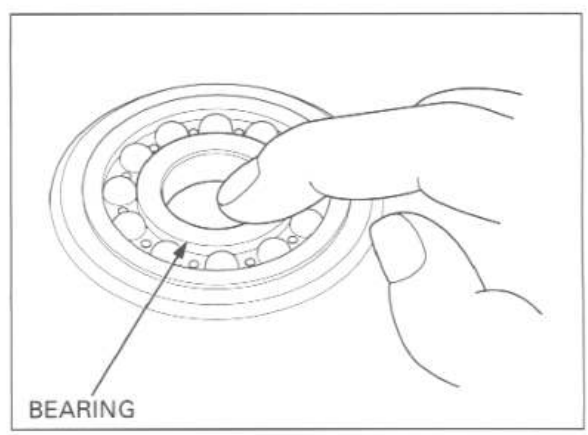


Remove the pivot collar and dust seals from the shock link pivot.
Check the dust seals and collar for damage or fatigue.
Check the needle bearing for damage.



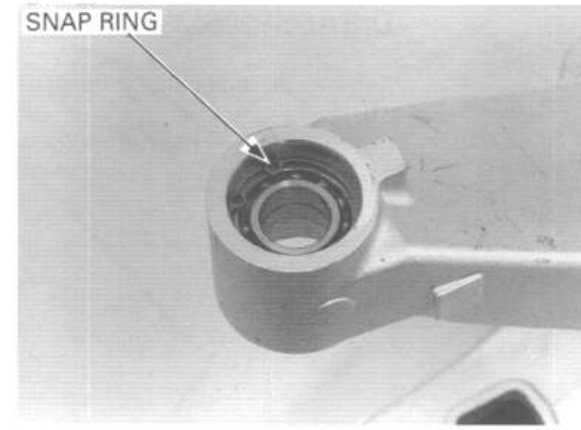
Turn the inner race of right pivot bearings with your finger.
The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the pivot.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the pivot.



PIVOT BEARING REPLACEMENT

Remove the snap ring.



Remove the right pivot bearings (radial ball bearings) from the swingarm pivot using the special tools.

TOOLS:

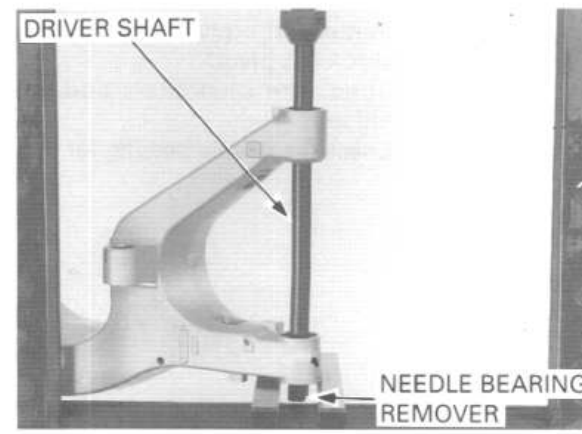
Bearing remover set	**07936 – 3710001**
— Remover handle	**07936 – 3710100**
— Remover set	**07936 – 3710600**
— Sliding weight	**07741 – 0010201 or 07936 – 3710200 or 07936 – 371020A (U.S.A. only)**



Press the left pivot bearing (needle bearing) out of the swingarm pivot using the special tools.

TOOLS:

Needle bearing remover	**07HMC – MR70100**
Driver shaft	**07946 – MJ00100**



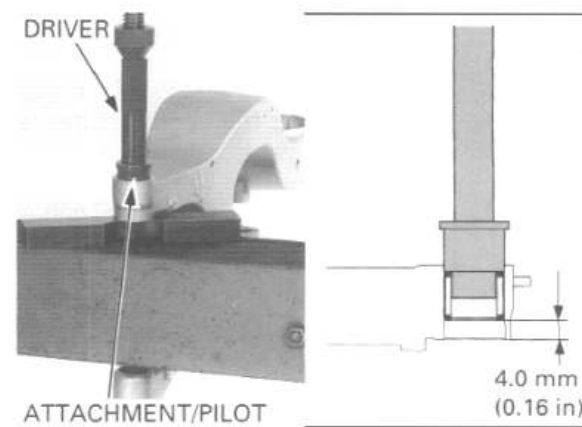
Press a new left pivot bearing (needle bearing) into the swingarm pivot so that the needle bearing surface is 4.0 mm (0.16 in) below from the outer surface of the swingarm pivot using the special tools.

NOTE:

Press the needle bearing into the swingarm with the marked side facing out.

TOOLS:

Driver	**07749 – 0010000**
Attachment, 37 x 40 mm	**07746 – 0010200**
Pilot, 28 mm	**07746 – 0041100**

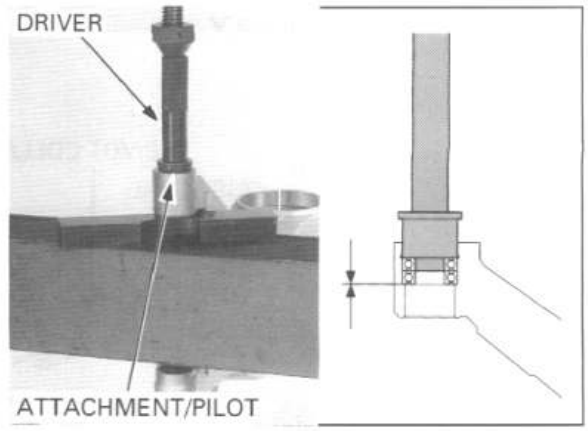


Press the new right pivot bearings in until the inner bearing seats in the swingarm pivot.

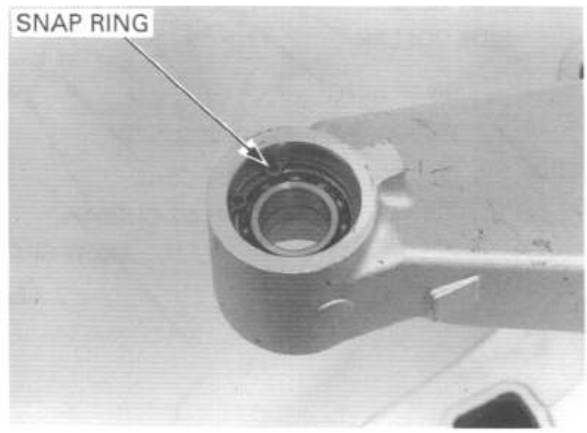
Press new right pivot bearings (radial ball bearing) into the swingarm pivot one at a time using the special tools.

TOOLS:

Driver	**07749 – 0010000**
Attachment, 37 x 40 mm	**07746 – 0010200**
Pilot, 20 mm	**07746 – 0040500**



Install the snap ring into the swingarm pivot groove securely.

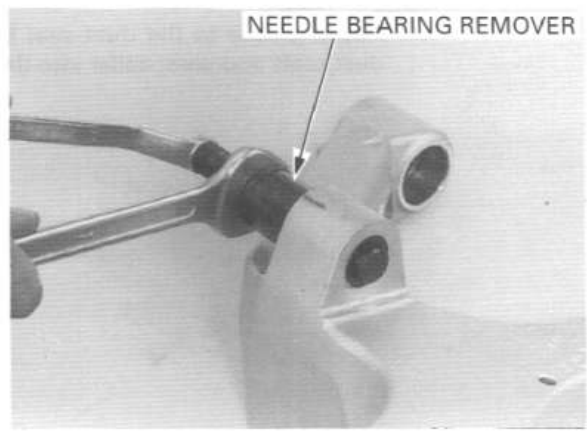


SHOCK LINK PIVOT BEARING REPLACEMENT

Remove the needle bearing out of the shock link pivot using special tool.

TOOL:

Needle bearing remover	**07LMC – KV30100**



Pack a new needle bearing with multi-purpose grease.

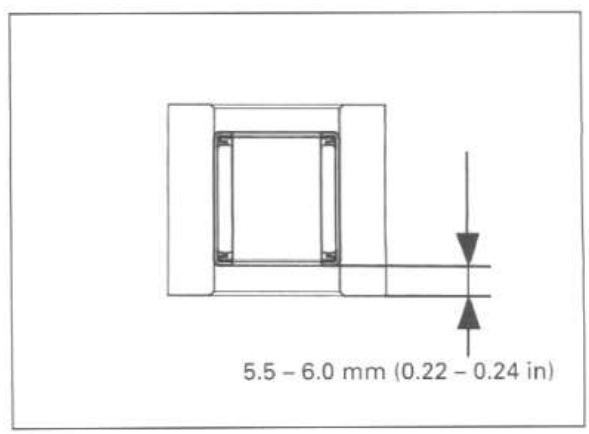
Install a new needle bearing into the shock link so that the needle bearing surface is lower 5.5 – 6.0 mm (0.22 – 0.24 in) from the end of the shock link surface.

NOTE:

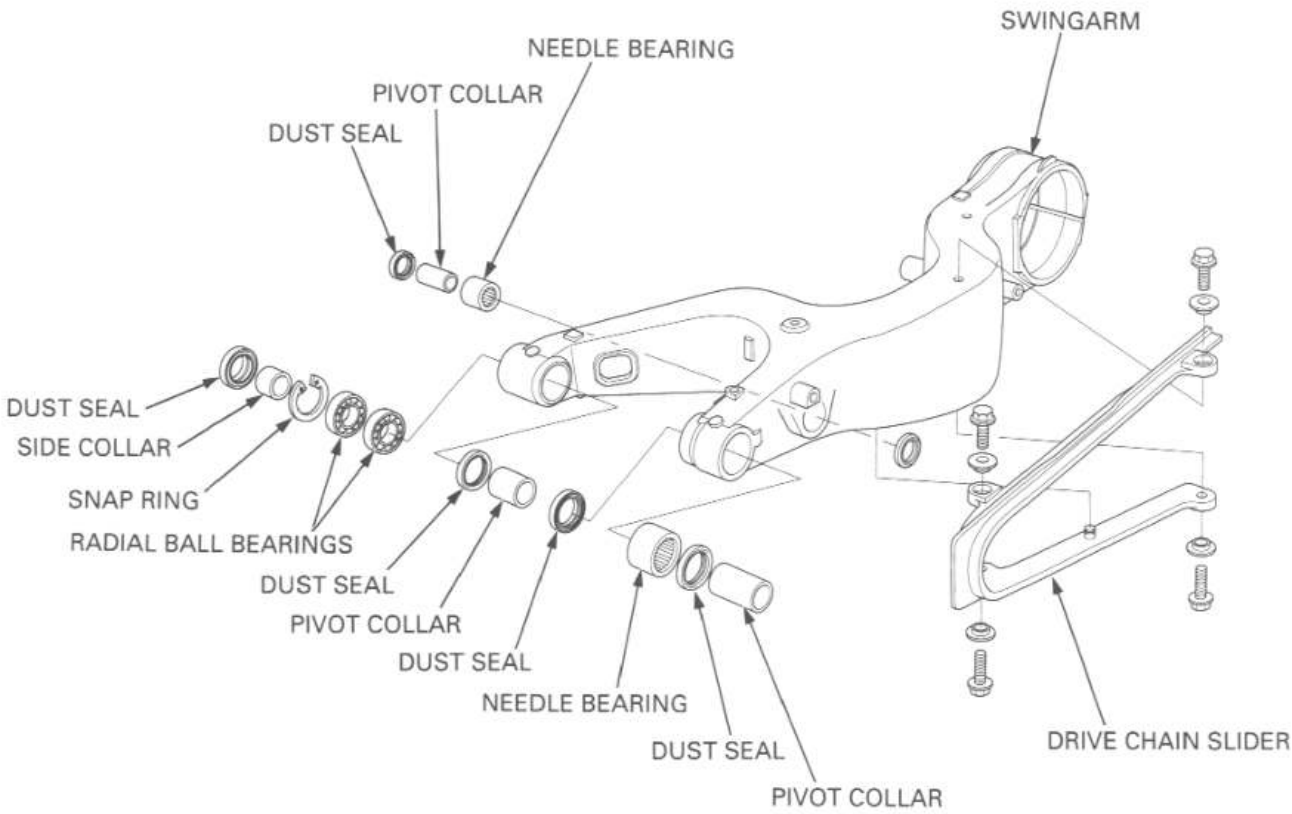
Press the needle bearing into the shock link with the marked side facing out.

TOOL:

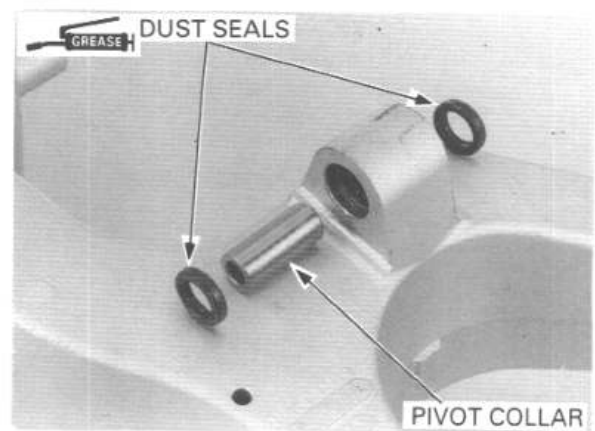
Needle bearing remover	**07LMC – KV30100**



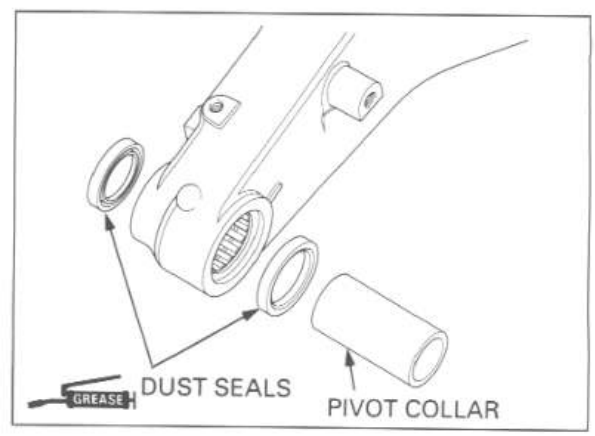
ASSEMBLY



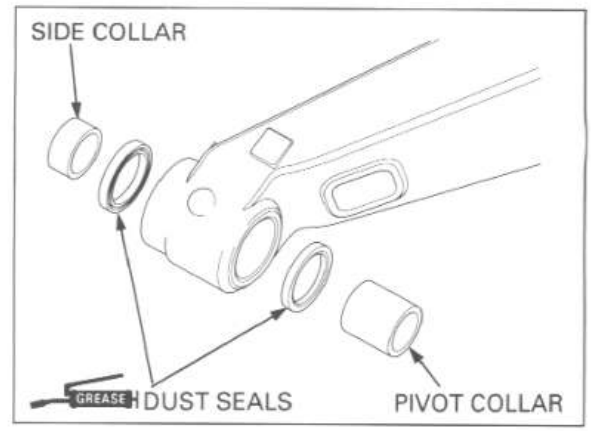
Apply grease to the dust seal lips, then install the dust seals and pivot collar into the shock link pivot.



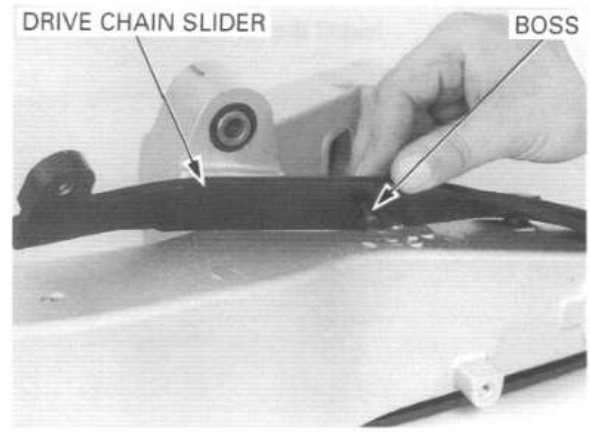
Apply grease to the dust seal lips, then install the dust seals and pivot collar into the swingarm left pivot.



Apply grease to the dust seal lips, then install the dust seals, pivot collars and side collar into the swingarm right pivot.

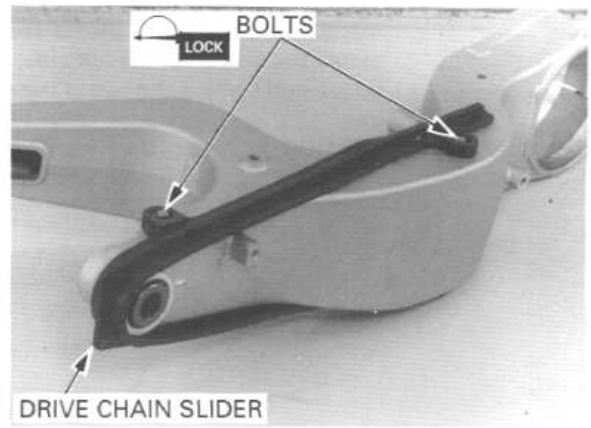


Install the drive chain slider aligning its bosses with the holes in the swingarm.



Apply a locking agent to the drive chain slider bolt threads.
Install the collars and bolts, then tighten the bolts to the specified torque.

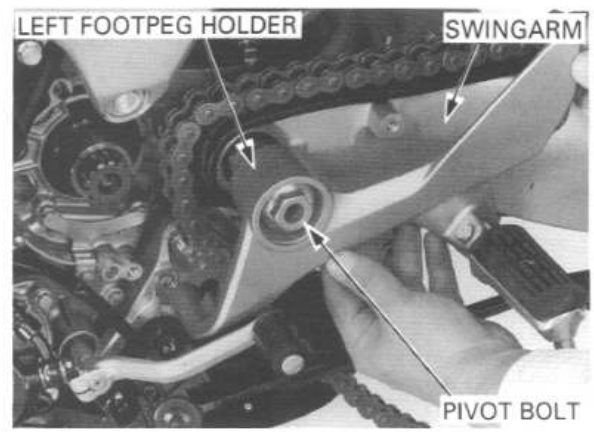
TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)



INSTALLATION

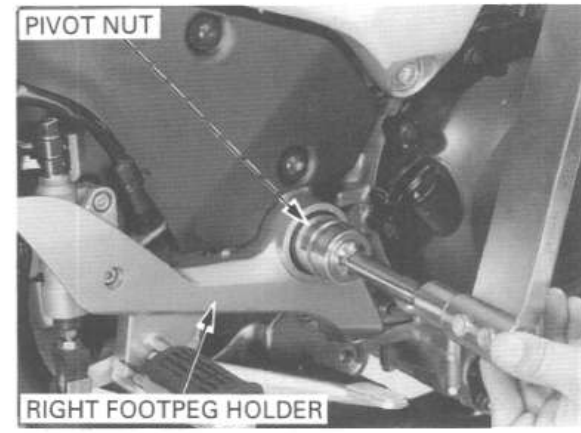
Install the swingarm onto the engine.
Install the left footpeg holder aligning its hole with the location bolt on the lower suspension bracket.

Apply thin coat of grease to the swingarm pivot bolt surface.
Install the swingarm pivot bolt from the left side.

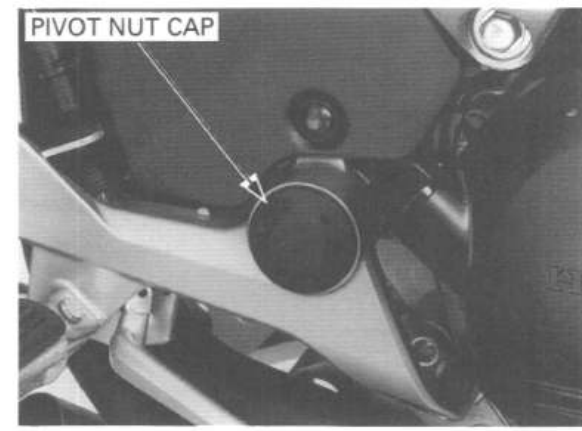


Install the right footpeg holder aligning its hole with the location bolt on the lower suspension bracket.
Install and tighten the swingarm pivot nut to the specified torque.

TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)

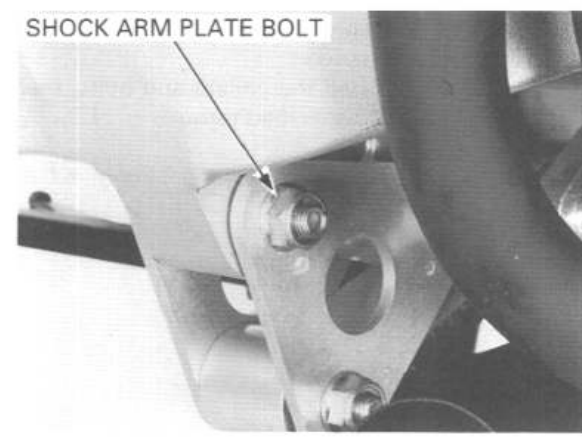


Install the swingarm pivot nut caps.



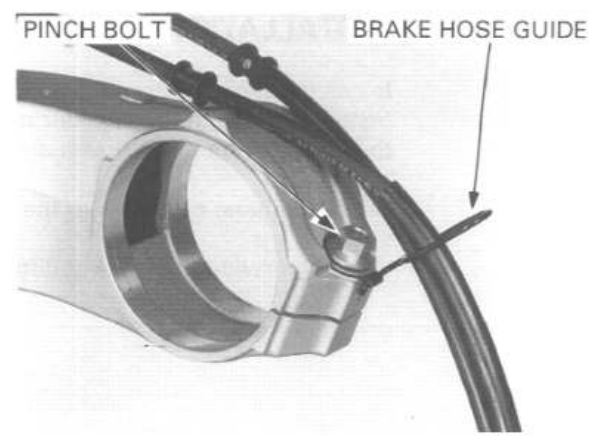
Install the shock arm plates to the swingarm, then install the bolt from the left side.
Install and tighten the nut to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

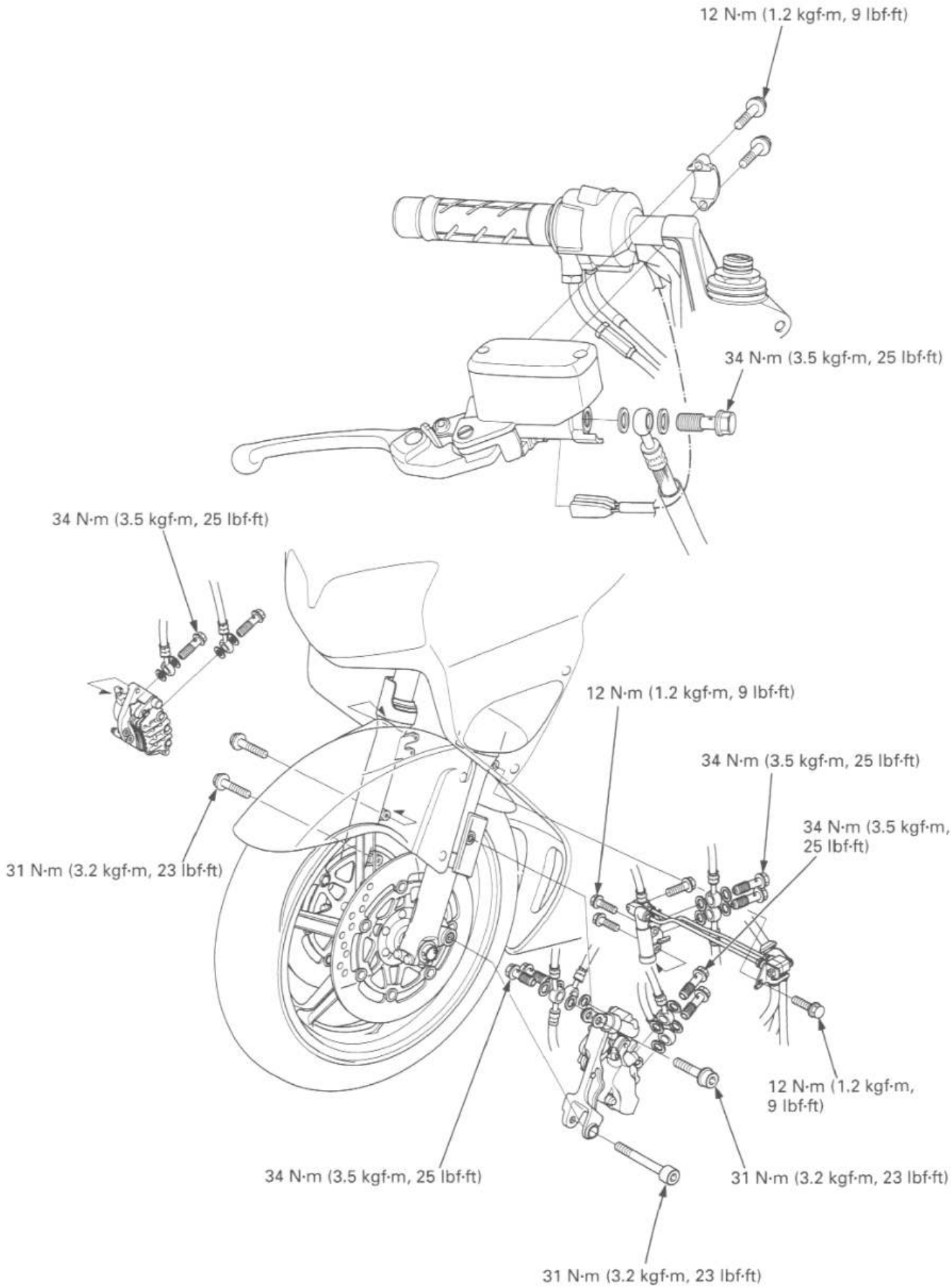


Install the brake hose guide and rear axle bearing holder pinch bolt.

Install the removed parts in the reverse order of removal.

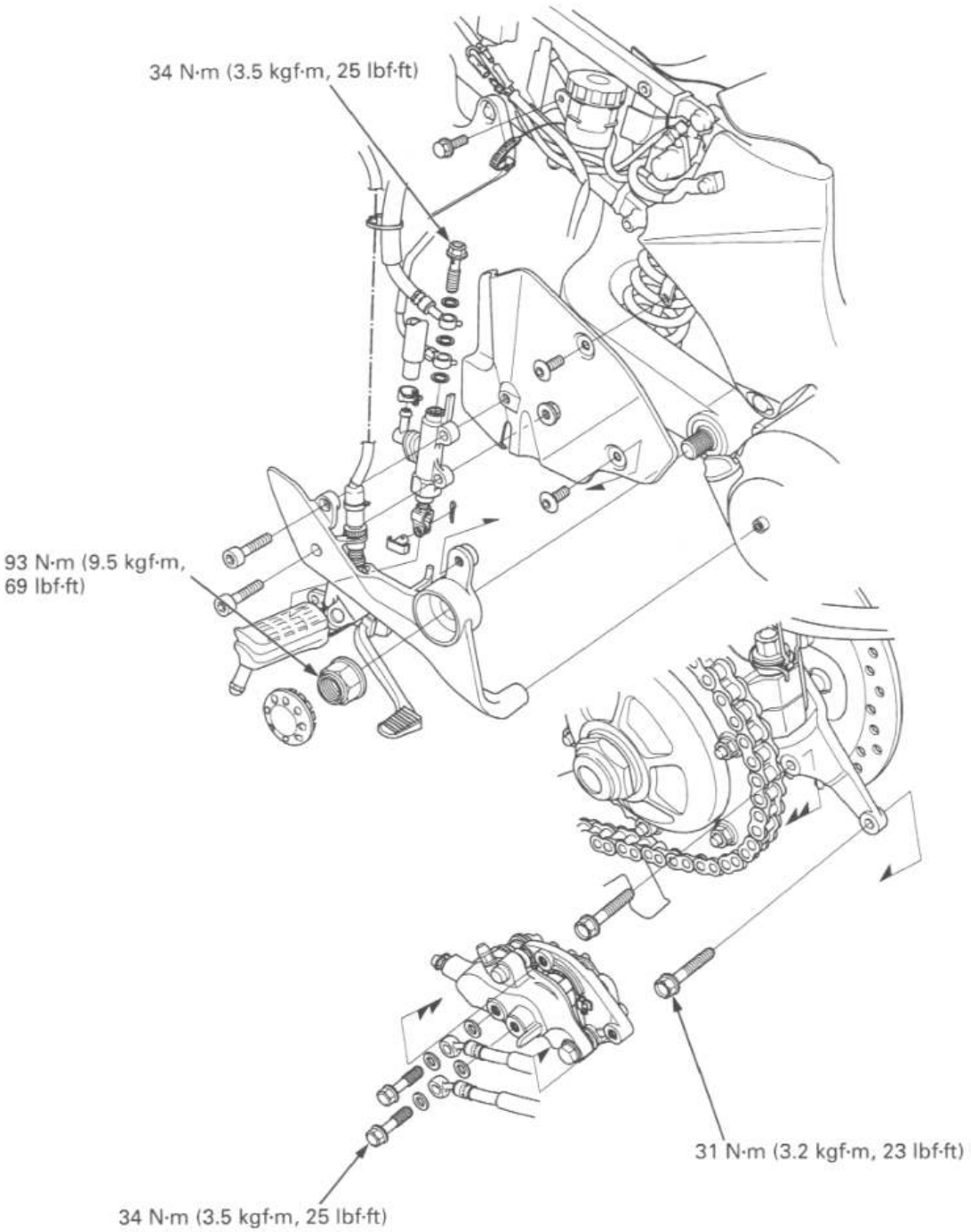


MEMO


12 N·m (1.2 kgf·m, 9 lbf·ft)
34 N·m (3.5 kgf·m, 25 lbf·ft)
34 N·m (3.5 kgf·m, 25 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)
34 N·m (3.5 kgf·m, 25 lbf·ft)
34 N·m (3.5 kgf·m, 25 lbf·ft)
31 N·m (3.2 kgf·m, 23 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)
31 N·m (3.2 kgf·m, 23 lbf·ft)

15. HYDRAULIC BRAKE

SERVICE INFORMATION	15-2	REAR MASTER CYLINDER	15-24
TROUBLESHOOTING	15-4	PROPORTIONAL CONTROL VALVE	15-29
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15-5	DELAY VALVE	15-29
BRAKE PAD/DISC	15-14	FRONT BRAKE CALIPER	15-31
FRONT MASTER CYLINDER	15-18	REAR BRAKE CALIPER	15-36
SECONDARY MASTER CYLINDER	15-22	BRAKE PEDAL	15-41



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 is equipped with a Linked Braking System. Follw 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

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 – 12.043 (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.			12.700 – 12.043 (0.5000 – 0.5017)	12.76 (0.502)
	Secondary master piston O.D.			12.657 – 12.684 (0.4983 – 0.4994)	12.65 (0.498)
	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	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
			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	25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)
			Lower	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)

ITEM			STANDARD	SERVICE LIMIT
Rear	Specified brake fluid		DOT 4	———
	Brake pedal height		67.5 (2.66)	———
	Brake disc thickness		6.0 (0.24)	5.0 (0.20)
	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	27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)
		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	26.916 – 26.968 (1.0597 – 1.0617)	26.910 (1.0594)
		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, 0.8 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)	31 N·m (3.2 kgf·m, 23 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 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)	
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 clamp 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)	
Rear brake caliper mounting bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	ALOC bolt

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

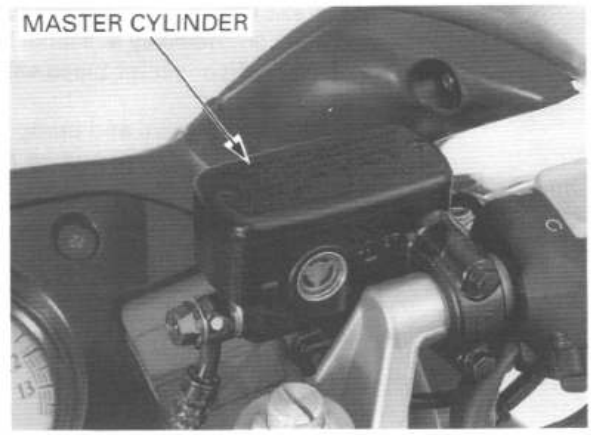
Above items are normal but the brake system still has poor performance, check for nose dive during braking. If the nose dive excessive, check for secondary master cylinder hydraulic system.

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:

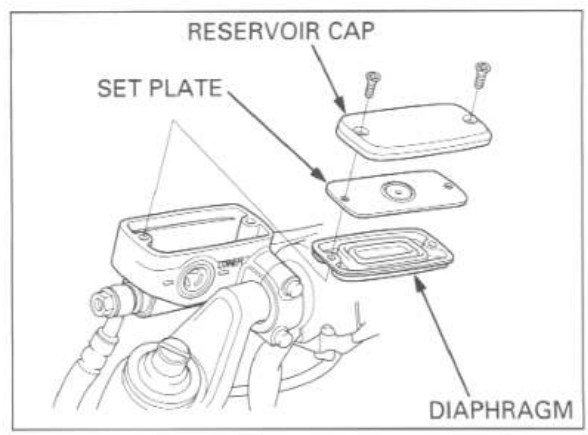
- The lever brake line air bleeding procedure is performed in the same manner as in the ordinal air bleeding procedure.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- When using a commercially available brake bleeder, follow the manufacturer's operating instructions.

BRAKE FLUID DRAINING

Lever brake line

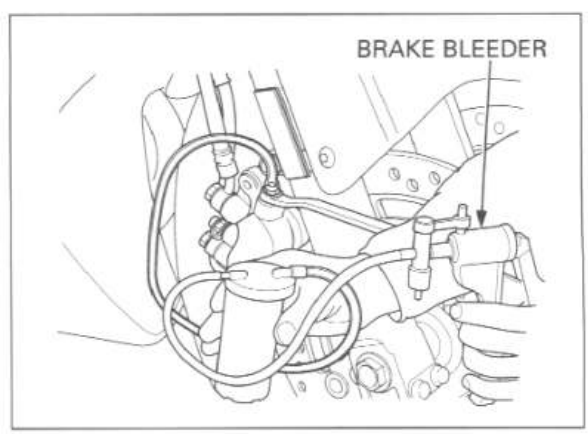
Support the motorcycle on its center stand.
Turn the handlebar to the left until the reservoir is parallel to the ground, before removing the reservoir cap.

Remove the screws, reservoir cap, set plate and diaphragm.



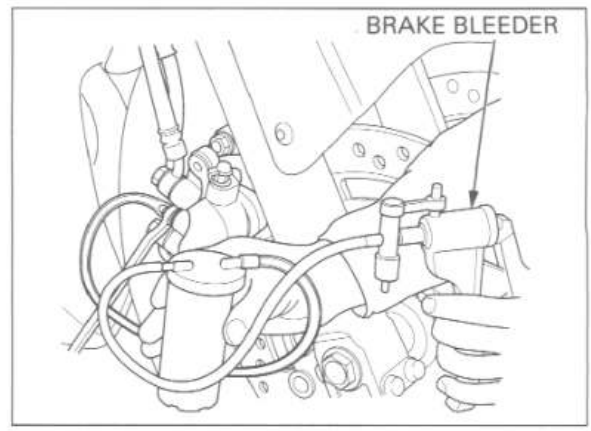
Connect a commercially available brake bleeder to the front brake caliper outer bleed valve.

Loosen the bleed valve and pump the brake bleeder. Stop pumping the bleeder when no more fluid flows out of the bleed valve.

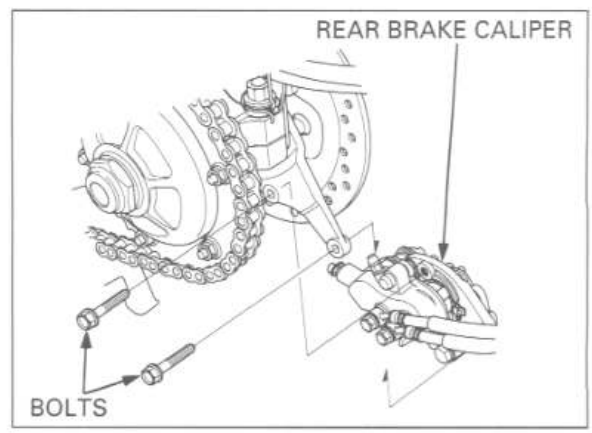


Pedal brake line
Connect a commercially available brake bleeder to the front brake caliper center bleed valve.

Loosen the bleed valve and pump the brake bleeder. Stop pumping the bleeder when no more fluid flows out of the bleed valve.

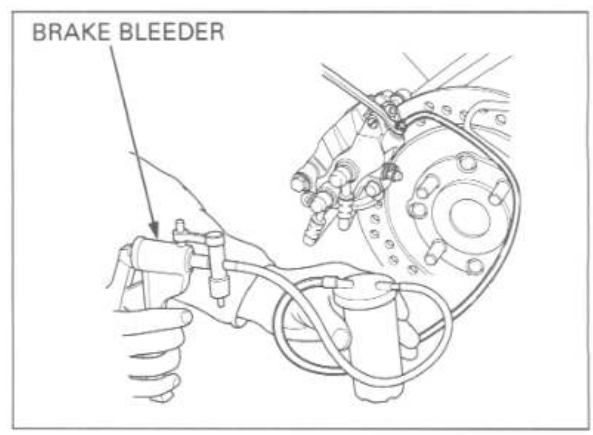


Remove the bolts and rear brake caliper from the bracket.
Reinstall the brake caliper onto the brake disc.



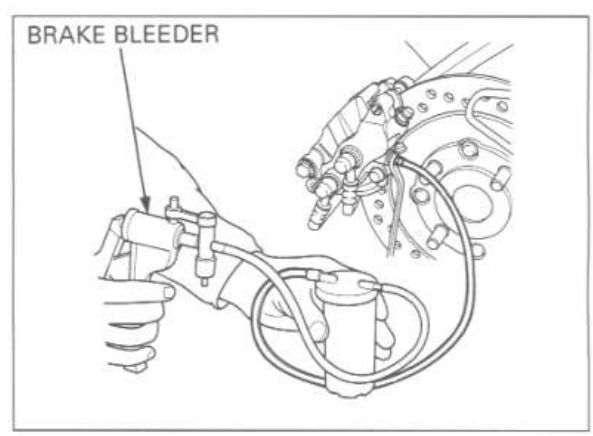
Connect a commercially available brake bleeder to the rear brake caliper outer bleed valve.

Loosen the bleed valve and pump the brake bleeder. Stop pumping the bleeder when no more fluid flows out of the bleed valve.



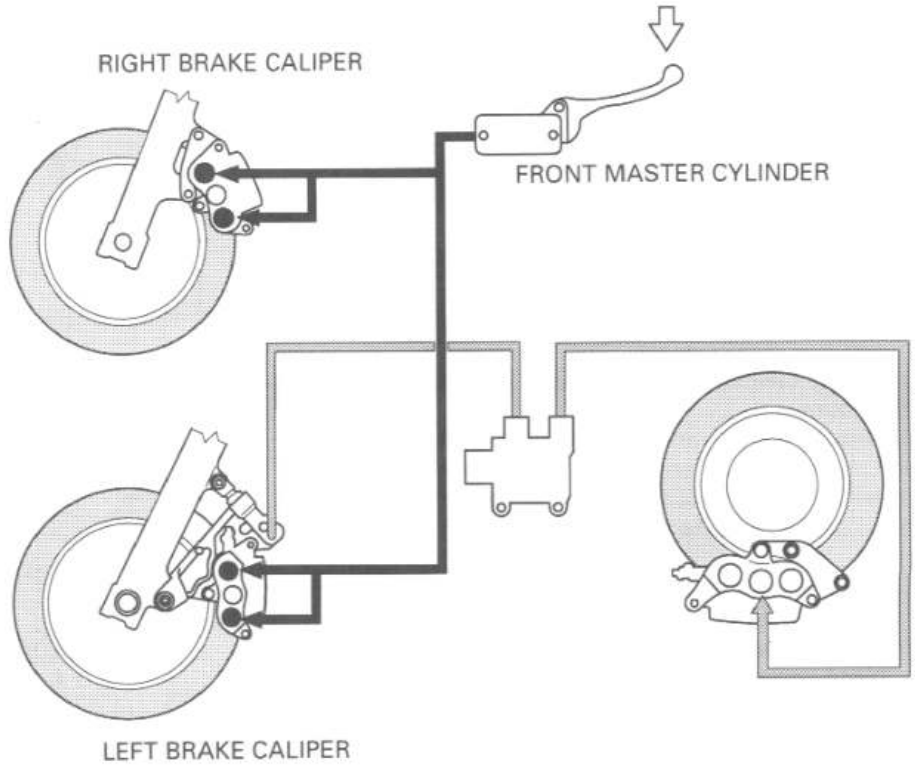
Connect a commercially available brake bleeder to the rear brake caliper center bleed valve.

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

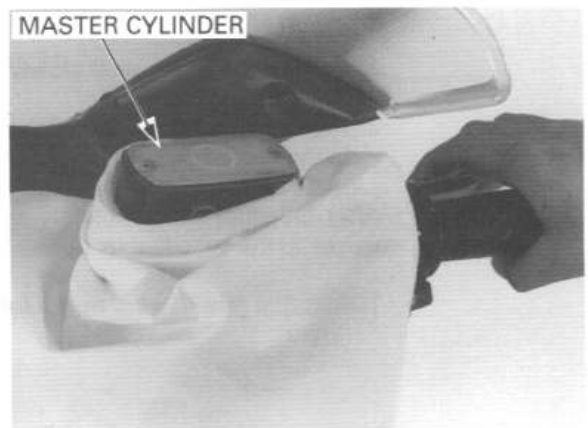


Fill the reservoir with DOT 4 brake fluid from a sealed container.

CAUTION:

- ***Use only DOT 4 brake fluid from a sealed container.***
- ***Do not mix different types of fluid. They are not compatible.***

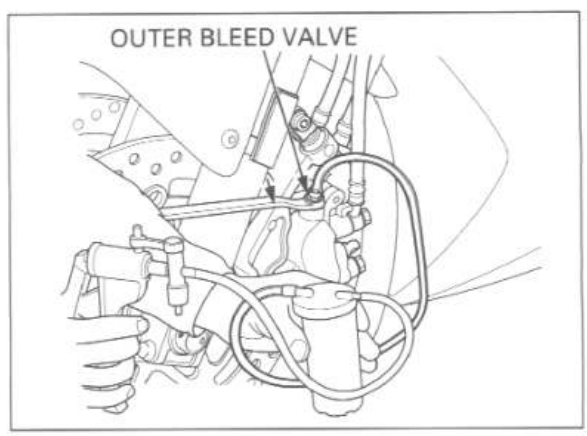
Operate the brake lever several times to bleed air from the master cylinder.



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:

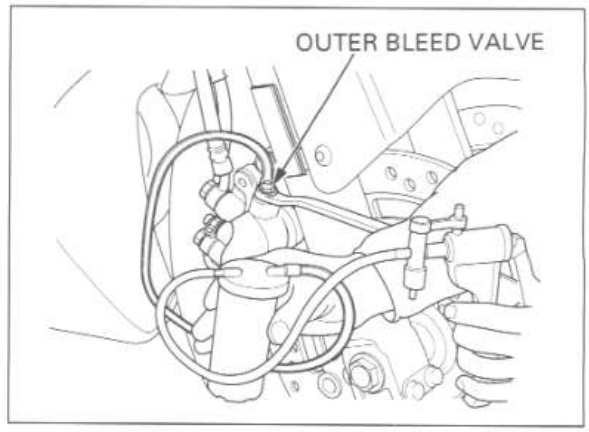
- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



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.

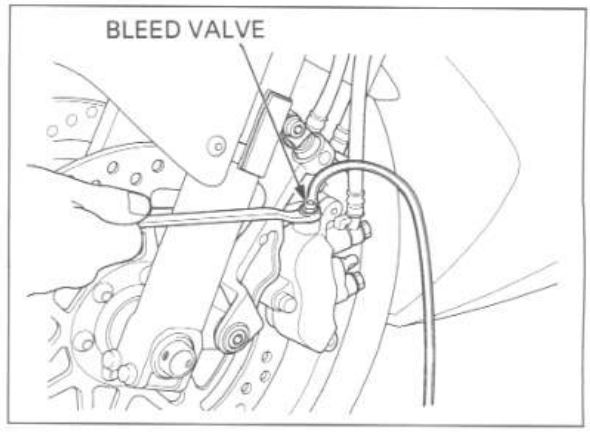


If a brake bleeder is not available, use the following procedure:
Connect a transparent bleed hose to the bleed valve and place the outer end of the hose in a container.
Loosen the bleed valve 1/4 turn and pump the brake lever until the brake fluid flows out from the bleed valve.

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:

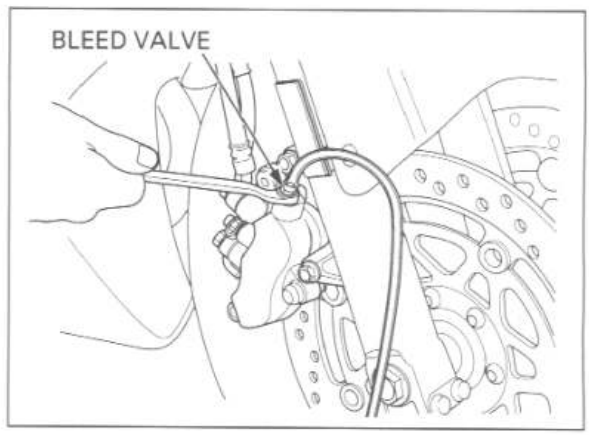
Do not release the brake lever until the bleed valve has been closed.



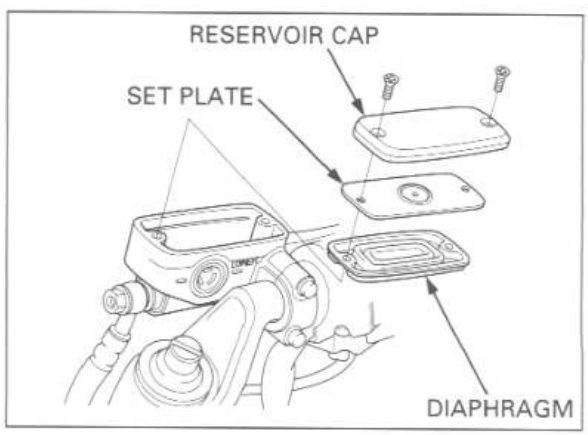
2. Release the brake lever slowly until the bleed valve has been closed.
3. Repeat the steps 1 – 2 until there are no air bubbles in the bleed hose.

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)



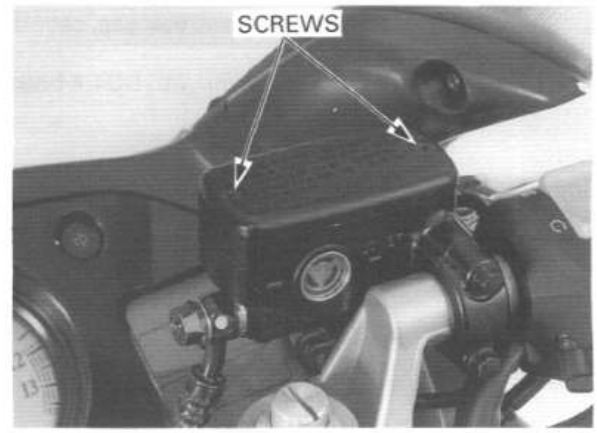
Fill the reservoir to the casting ledge with DOT 4 brake fluid from a sealed container.
Install the diaphragm, set plate and reservoir cap.



Tighten the reservoir cap screws to the specified torque.

TORQUE: 1 N·m (0.15 kgf·m, 1.1 lbf·ft)

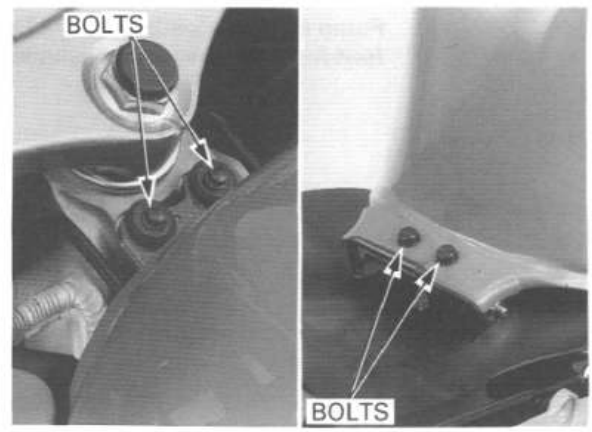
Check the front brake operation (page 3-23).



Pedal brake line

NOTE:

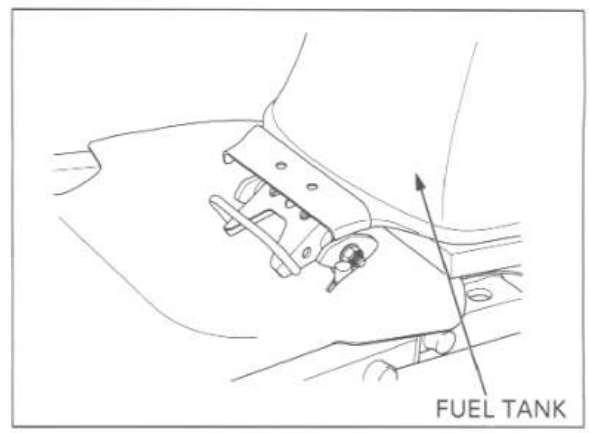
- Before performing this service, prepare the brake fluid 500 cc (16.9 US oz, 14.1 Imp oz) or more, because the brake line is long.
- Fluid filling and bleed air from the brake pedal line in the sequence as follow:
  1. Right front caliper center bleed valve
  2. Left front caliper center bleed valve
  3. PCV bleed valve
  4. Rear caliper center bleed valve
  5. Rear caliper outer bleed valve



Remove the rear cowl (page 2-5).

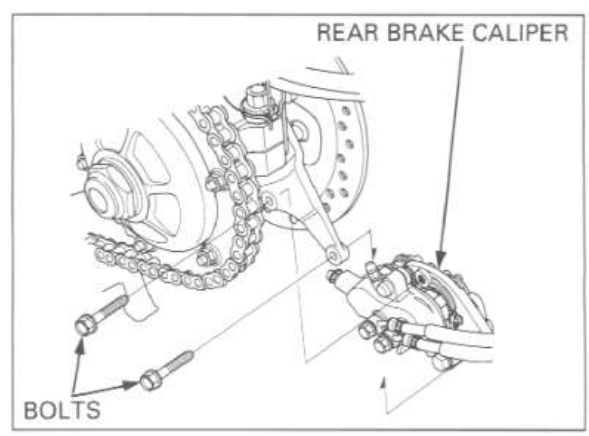
Remove the fuel tank front and rear mounting bolts.

Move the fuel tank upward and support it.



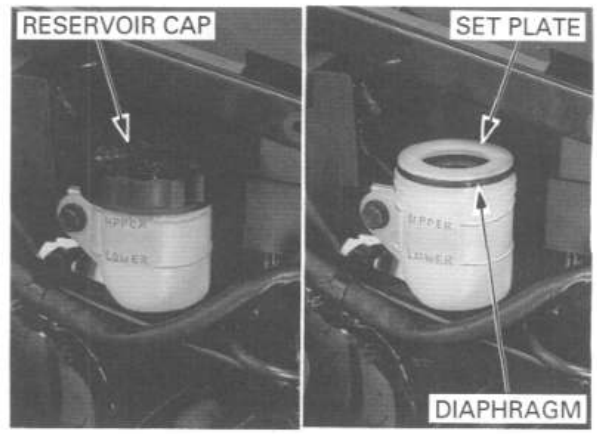
Remove the rear wheel (page 14-3).

Remove the bolts and rear brake caliper from the bracket.
Reinstall the brake caliper onto the brake disc.

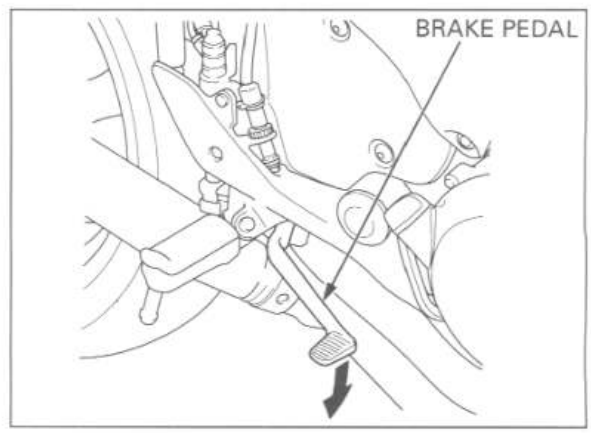


Remove the reservoir cap, set plate and diaphragm.

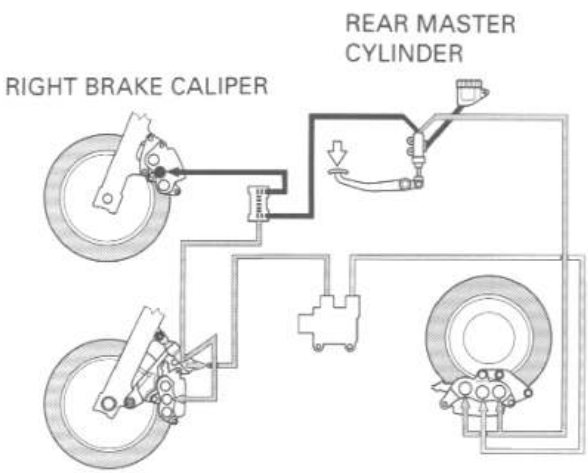
Fill the reservoir with DOT 4 brake fluid.

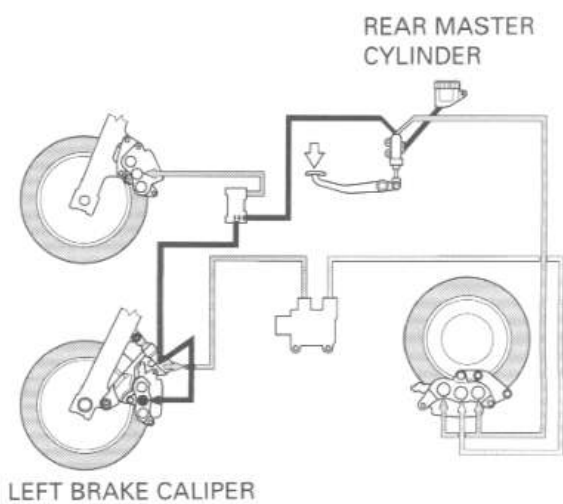


Pump the brake pedal while filling the brake fluid and feed fluid into the master cylinder.



Rear master cylinder to front brake caliper line:

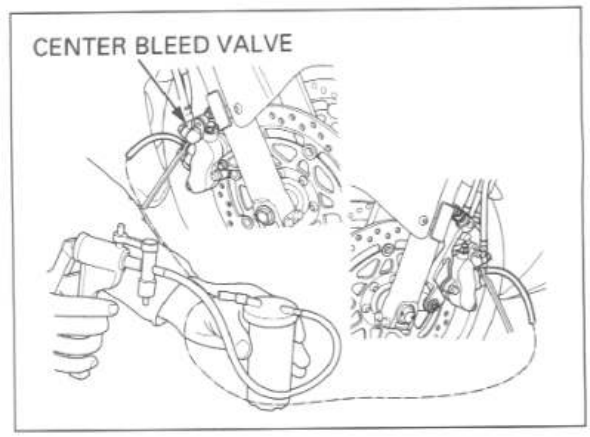




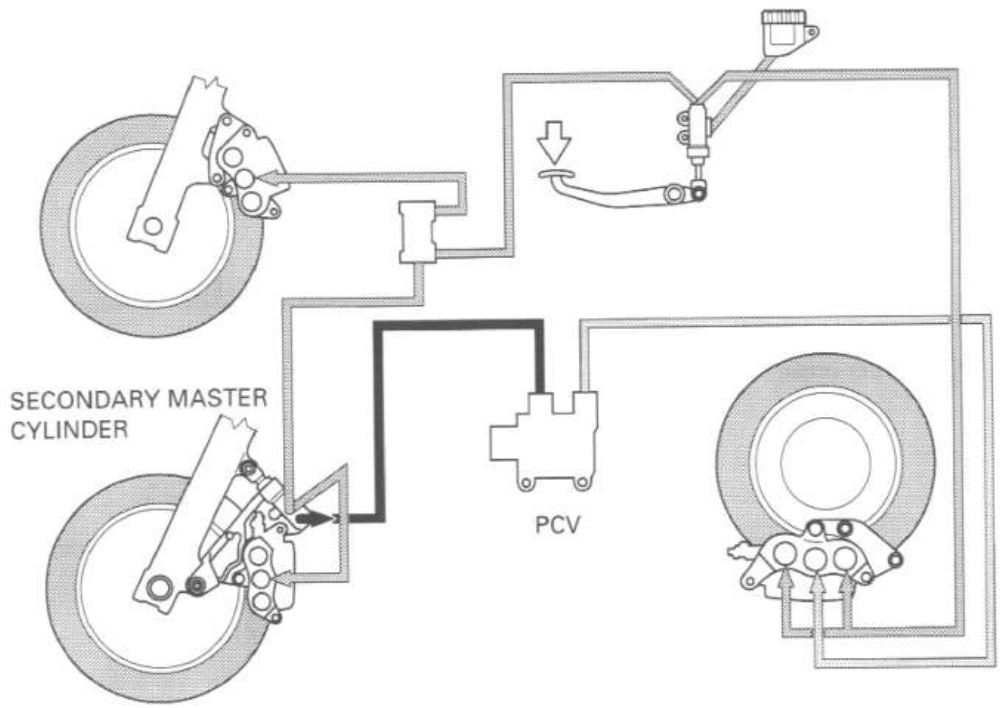
When using a brake bleeder, follow the manufacturer's operating instructions.

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.

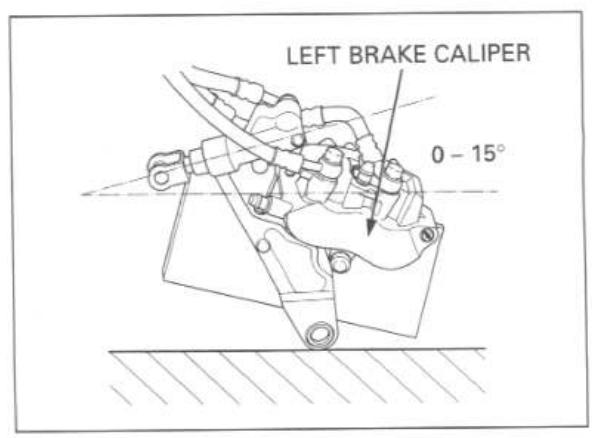
2. Feed the brake fluid at the left front brake caliper center bleeder valve as same procedure in step 1.



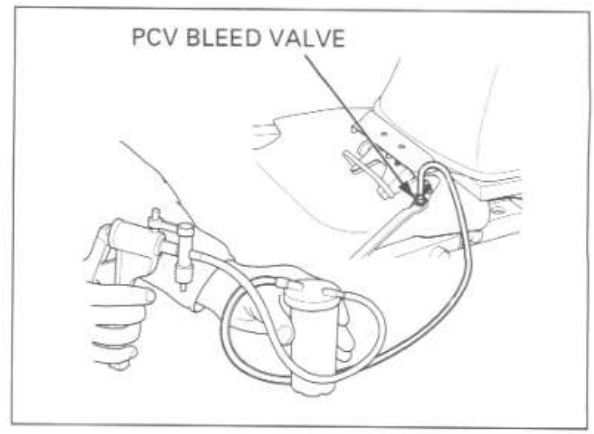
Secondary master cylinder to PCV line:



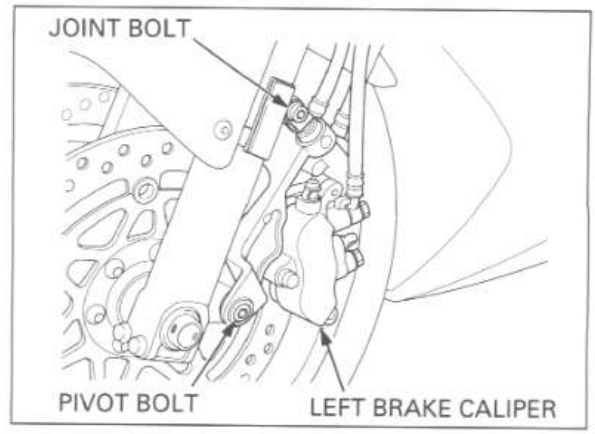
3. Remove the left front caliper, tilt the caliper about 0 – 15 degree from the ground line as shown.



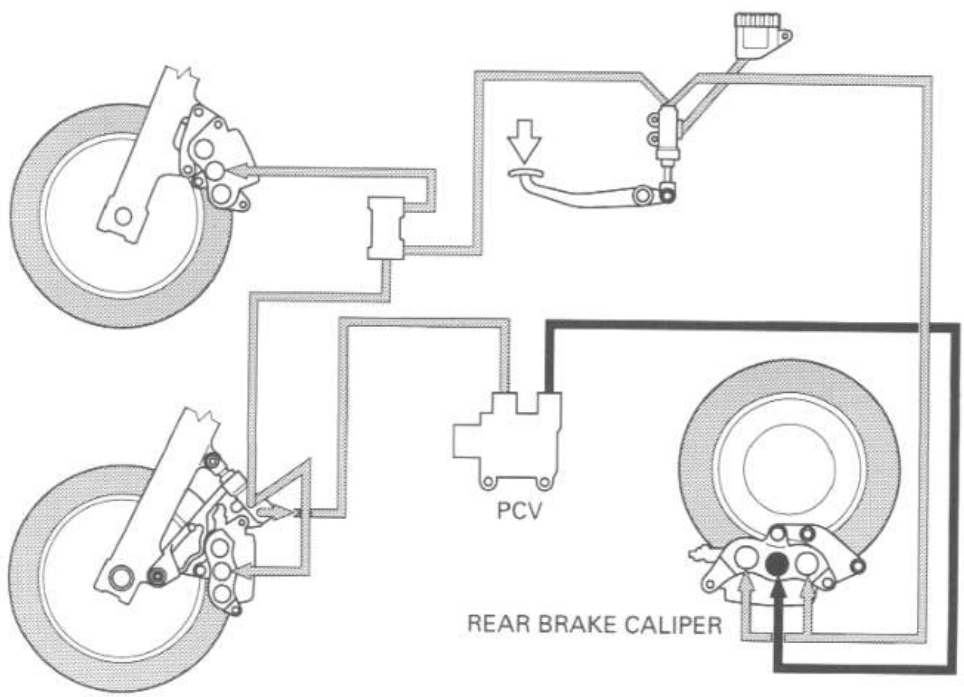
4. Feed the brake fluid at the PCV bleeder valve as same procedure in step 1.



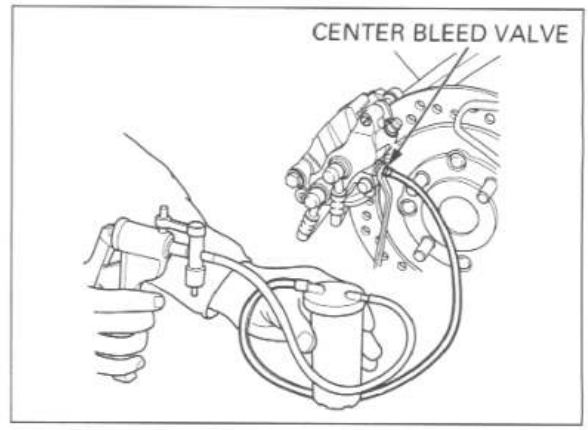
5. Reinstall the left brake caliper and tighten the mounting bolts.



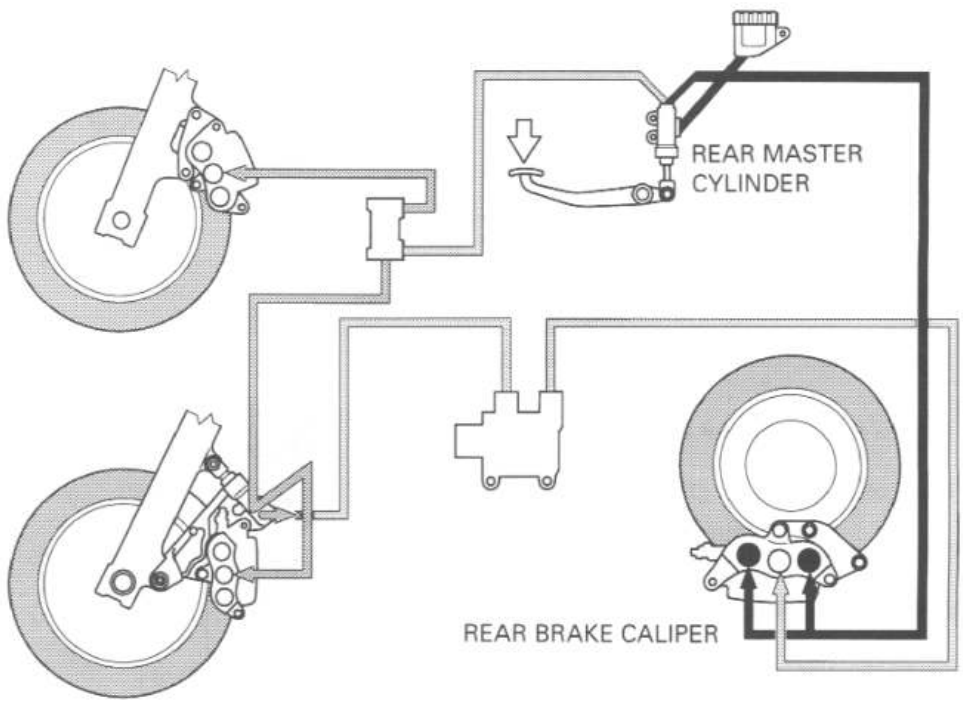
PCV to rear brake caliper line:



6. Feed the brake fluid at the rear brake caliper center bleeder valve as same procedure in step 1.

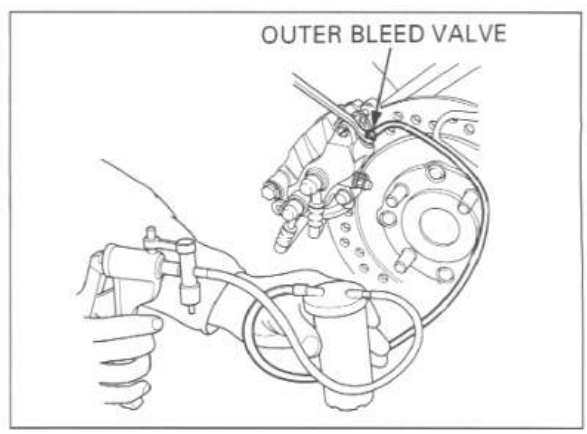


Rear master cylinder to rear brake caliper line:



7. Feed the brake fluid at the rear brake caliper outer bleeder valve as same procedure in step 1.

8. Repeat step 1–7 until the pedal resistance is felt.



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:

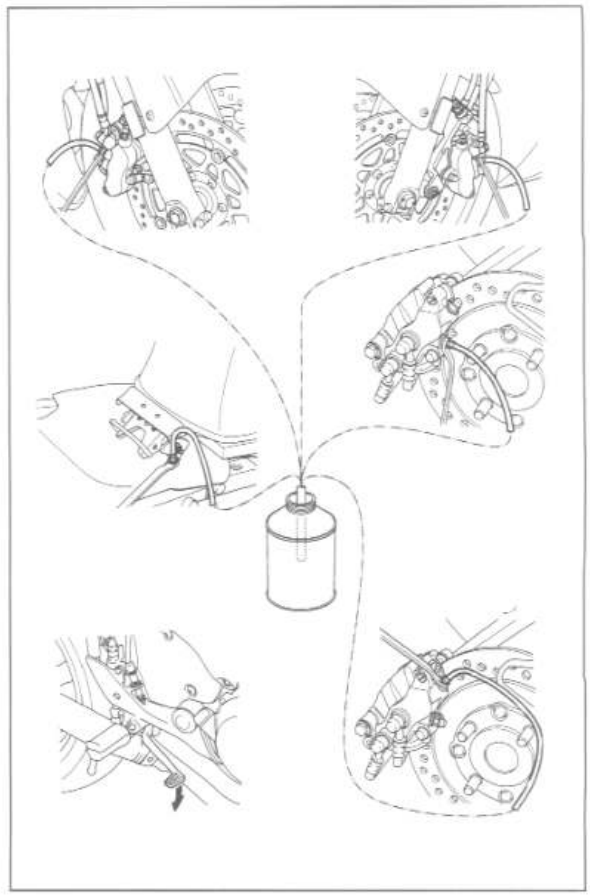
Do not release the brake pedal while opening the bleed valve.

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).



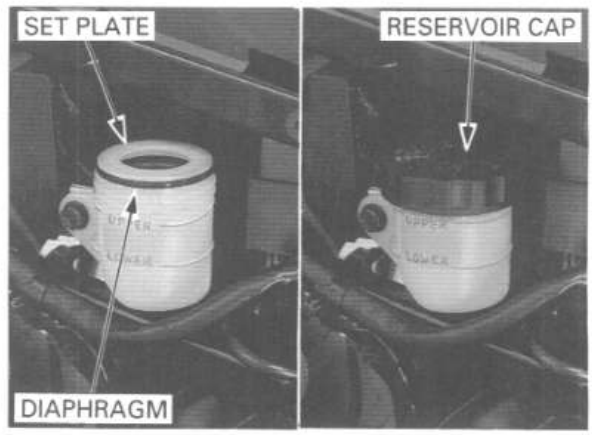
Tighten the each bleed valve to the specified torque.

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.

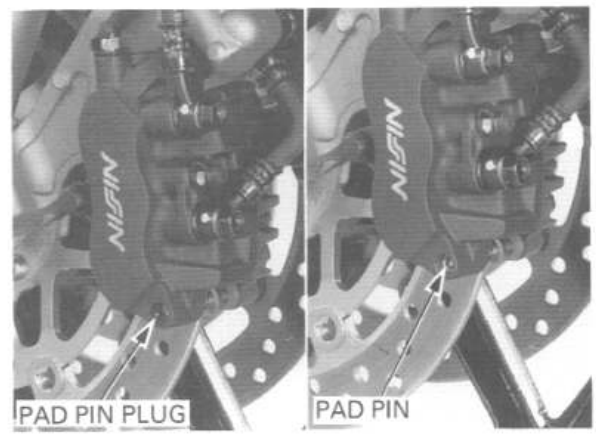
Push the caliper pistons all the way in to allow installation of new brake pads.

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 and loosen the pad pin.

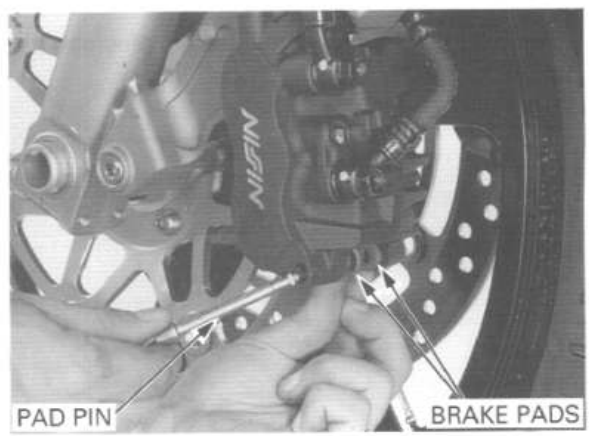


Remove the pad pin and brake pads.



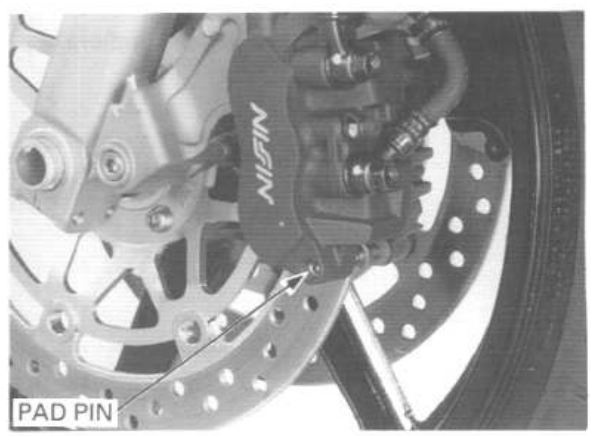
Clean the inside of the caliper especially around the caliper pistons.

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.

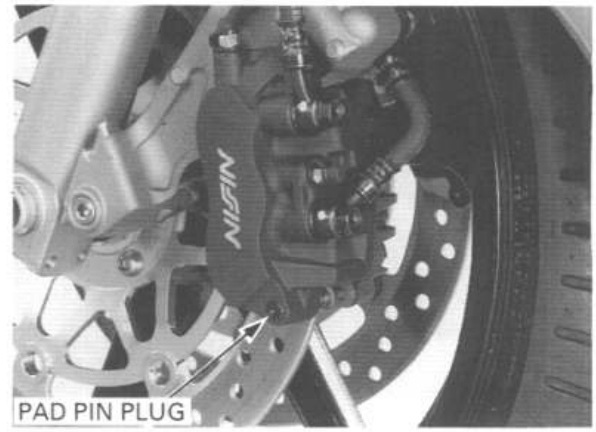


Tighten the pad pin to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



Install and tighten the pad pin plug.



REAR BRAKE PAD REPLACEMENT

⚠ WARNING

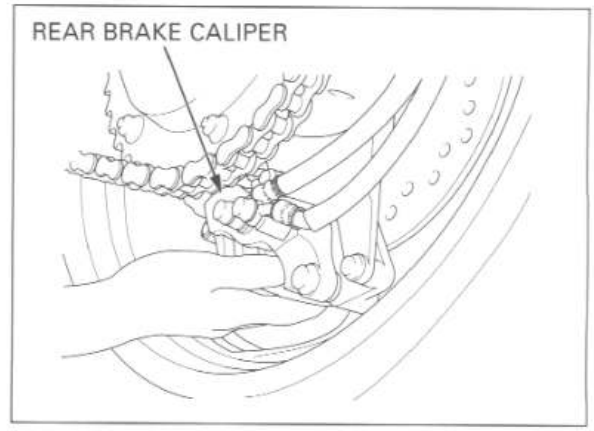
After the brake pad replacement, check the brake operation by applying the brake lever and pedal.

Always replace the brake pads in pairs to assure even disc pressure.

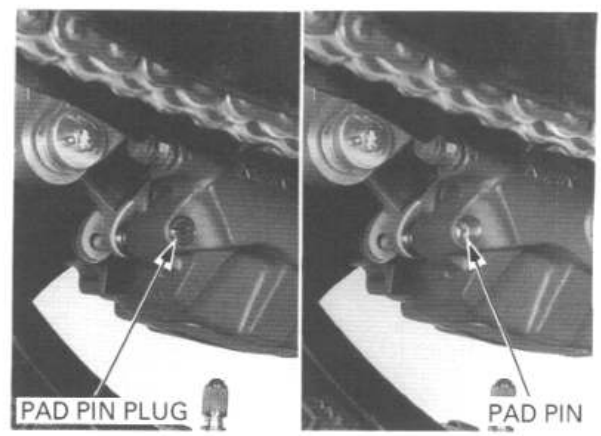
Push the caliper pistons all the way in by pushing the caliper body inward to allow installation of new brake pads.

NOTE:

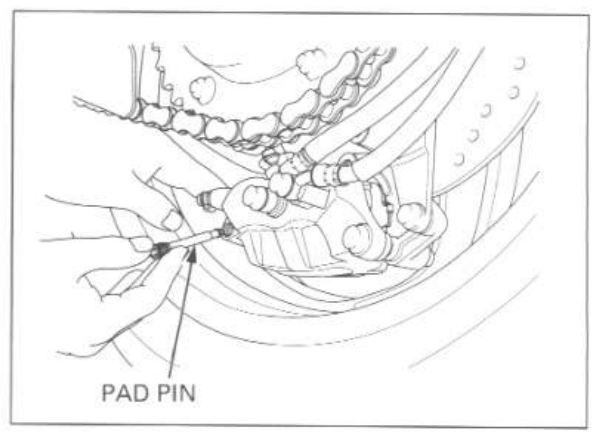
Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.



Remove the pad pin plug and loosen the pad pin.

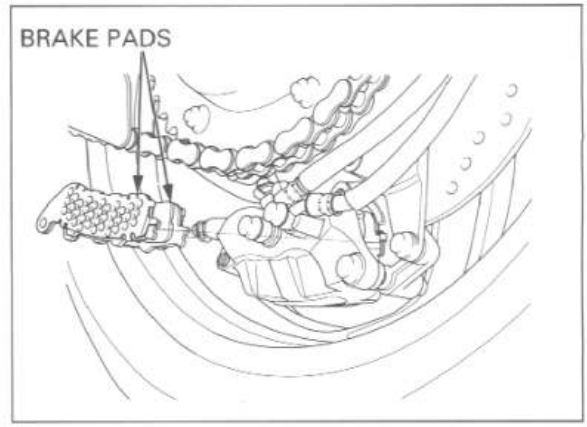


Remove the pad pin and brake pads.



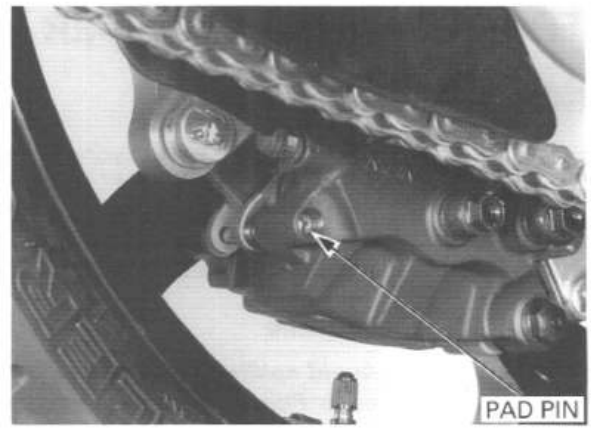
Clean the inside of the caliper especially around the caliper pistons.

Make sure the brake pad spring is in place.
Install the new brake pads and pad pin.

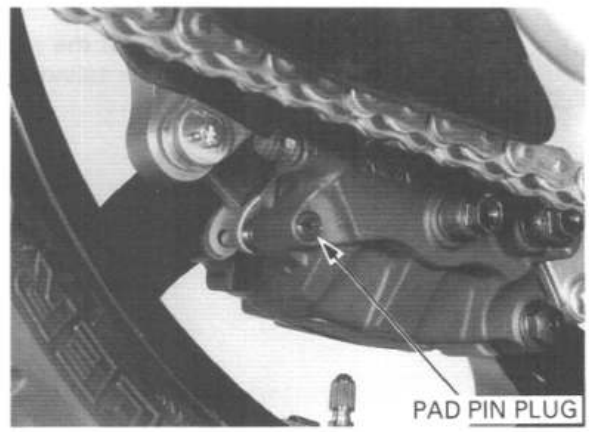


Tighten the pad pin to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



Install and tighten the pad pin plug.



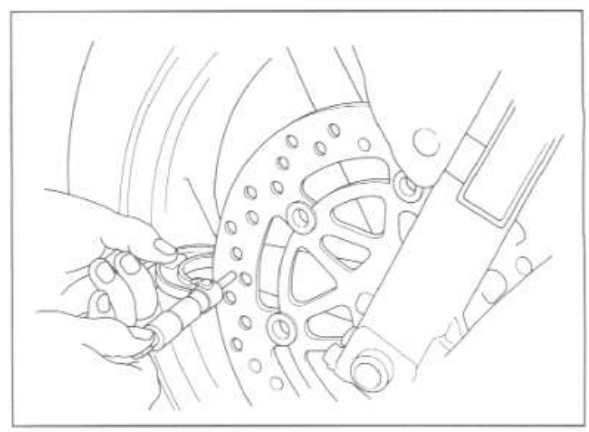
BRAKE DISC INSPECTION

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: 5.0 mm (0.20 in)

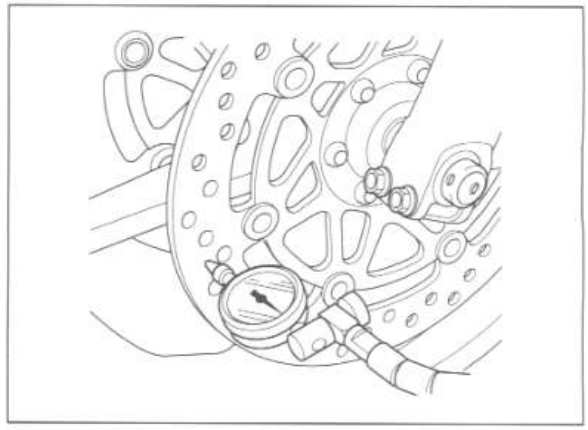
Replace the brake disc if the smallest measurement is less than the service limit.



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

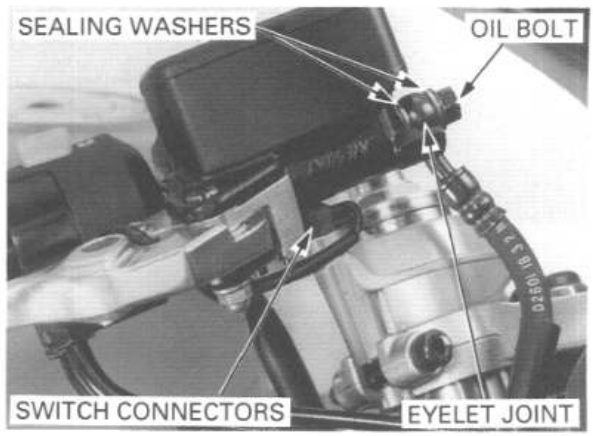
REMOVAL

Drain the lever brake hydraulic system (page 15-5).

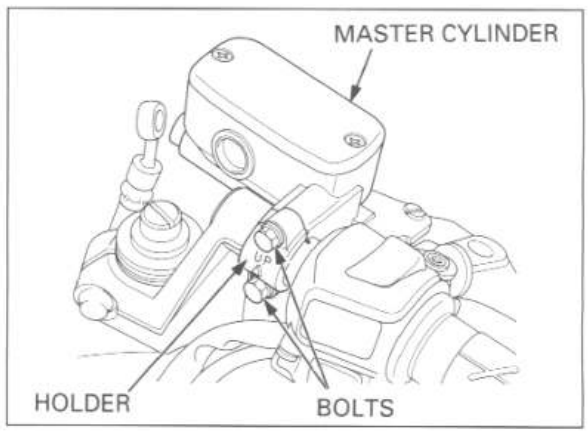
Disconnect the brake light switch wire connectors.
Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

CAUTION:

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

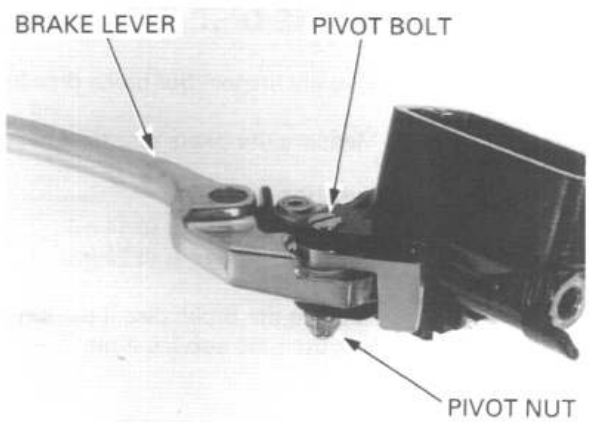


Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



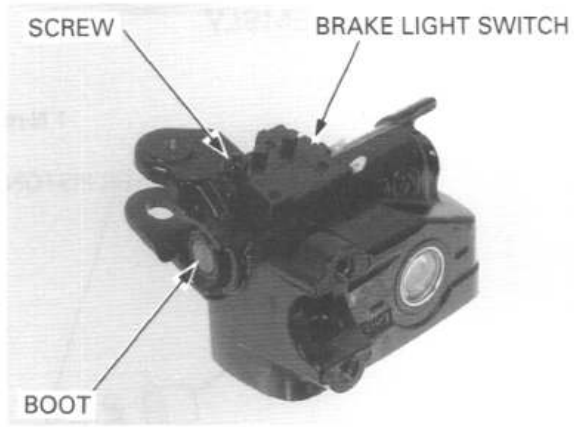
DISASSEMBLY

Remove the pivot bolt/nut and brake lever assembly.



Remove the screw and brake light switch.

Remove the boot.



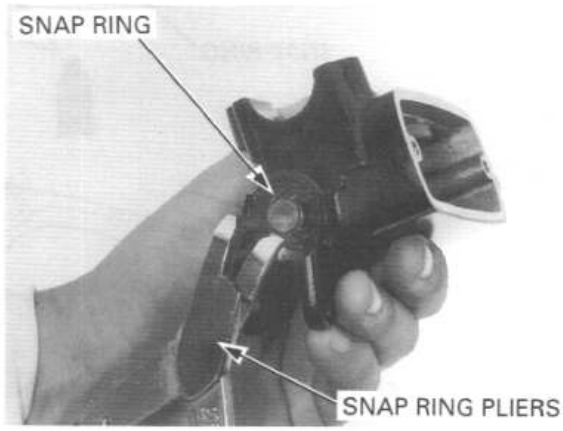
Remove the snap ring from the master cylinder body using the special tool as shown.

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 damages.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

SERVICE LIMIT: 12.76 mm (0.502 in)

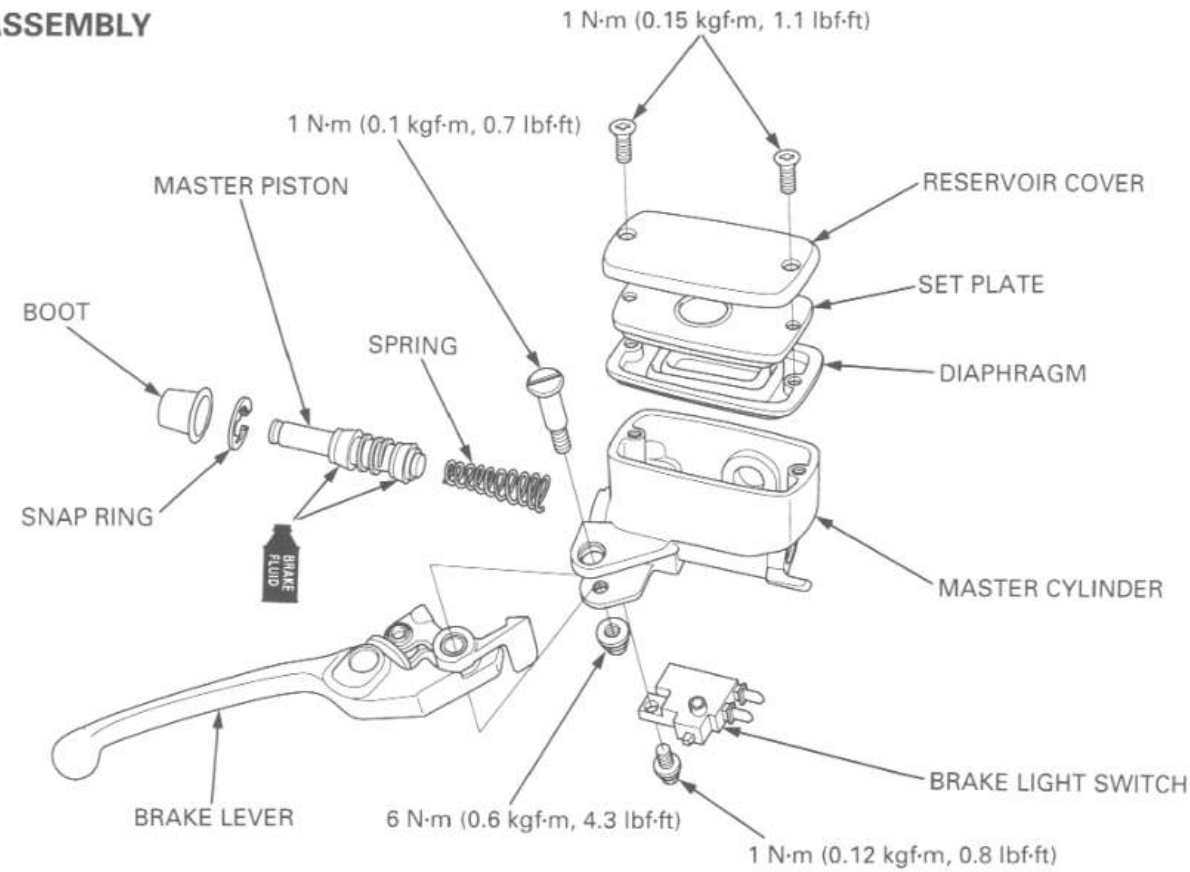


Measure the master cylinder piston O.D.

SERVICE LIMIT: 12.65 mm (0.498 in)



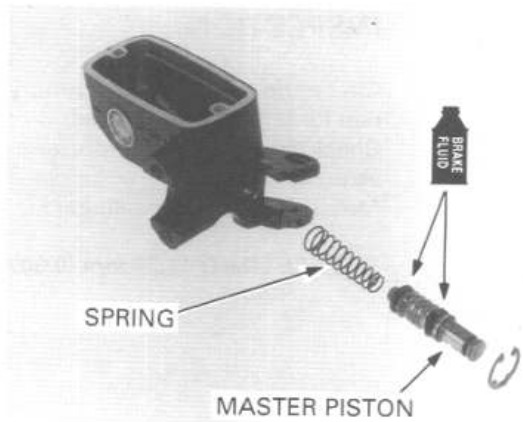
ASSEMBLY



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.

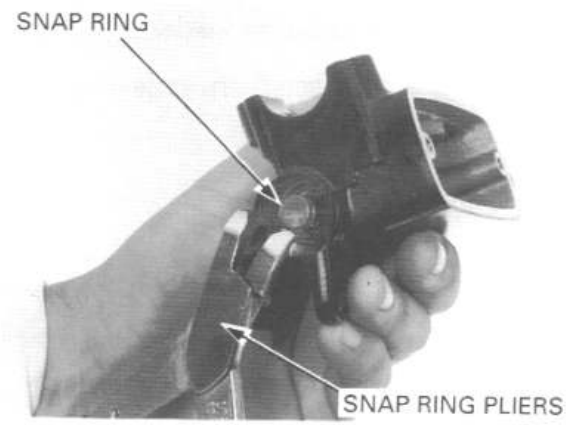
Install the snap ring using the special tool.

CAUTION:

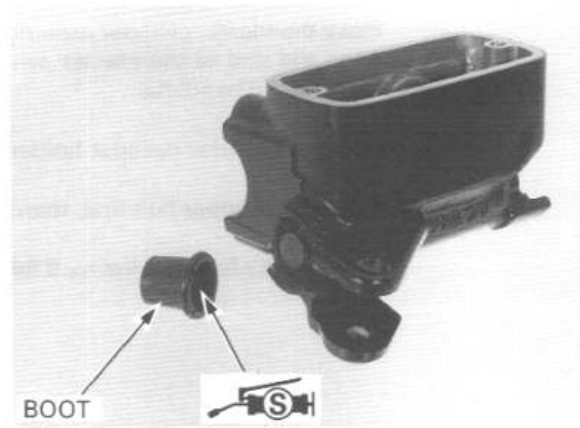
Be certain the snap ring is firmly seated in the groove.

TOOL:

Snap ring pliers	**07914 – SA50001 or 07914 – 3230001**

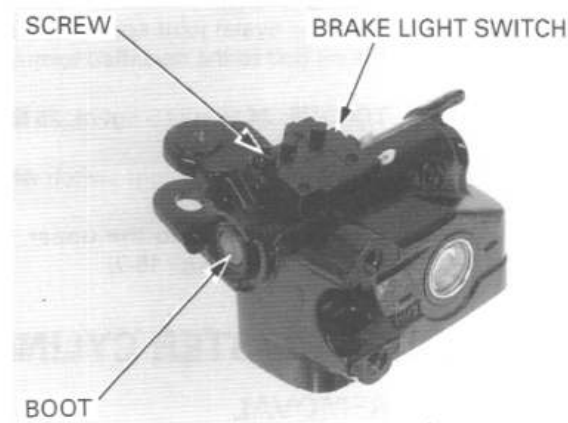


Apply silicone grease to the inside of the boot and master piston tip.
Install the boot.

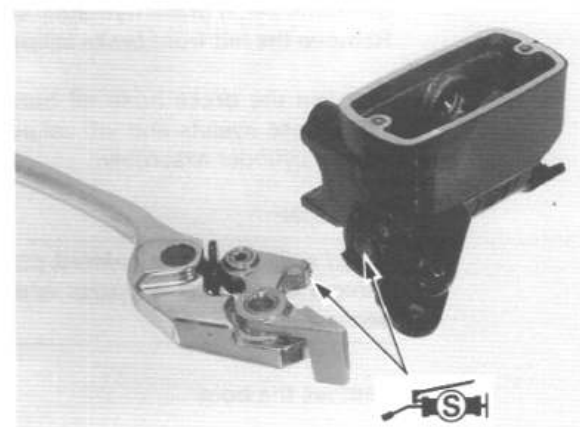


Install the brake light switch and tighten the screw to the specified torque.

TORQUE: 1 N·m (0.12 kgf·m, 0.8 lbf·ft)



Apply silicone grease to the contact surface of the master piston, then install the brake lever assembly.

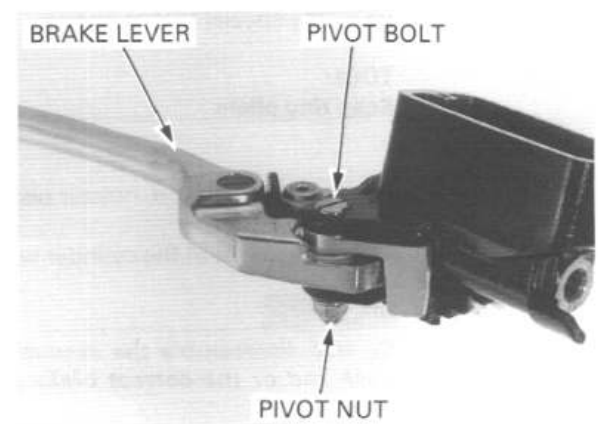


Install and tighten the pivot bolt to the specified torque.

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.

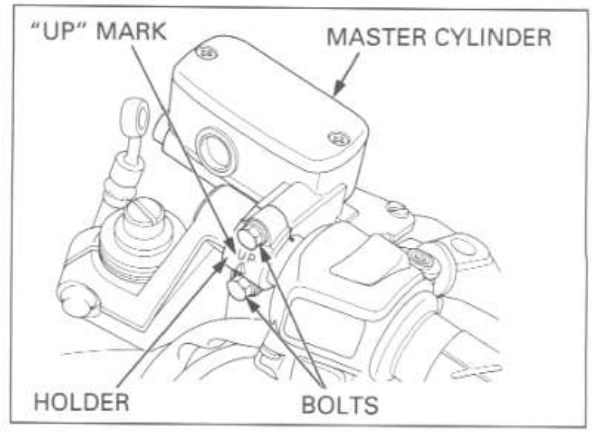
TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



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)

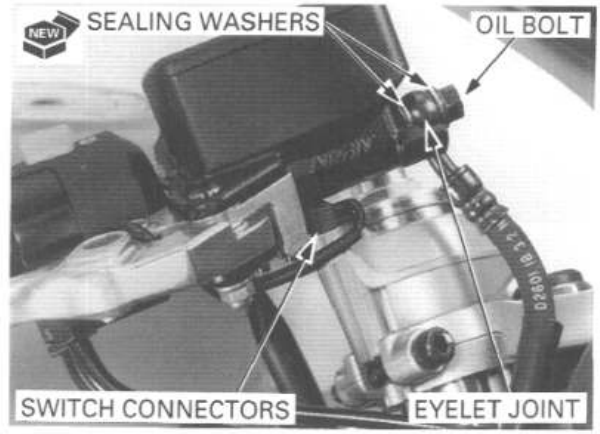


Install the brake hose eyelet with the oil bolt and new sealing washers.
Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

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

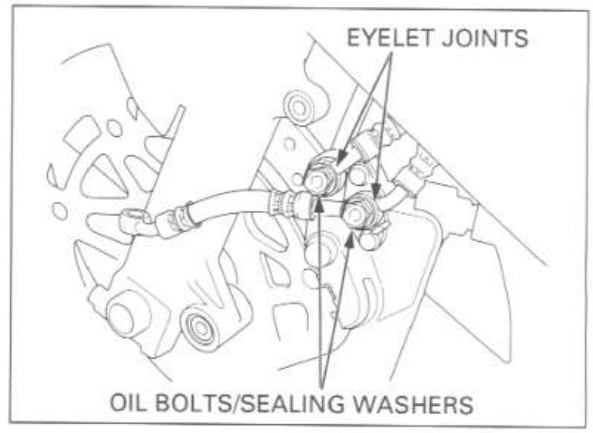
REMOVAL

Drain the pedal brake hydraulic system (page 15-5).
Remove the left front brake caliper (page 15-31).

Remove the brake hose oil bolts, sealing washers, brake hose eyelets and left caliper bracket/secondary master cylinder assembly.

CAUTION:

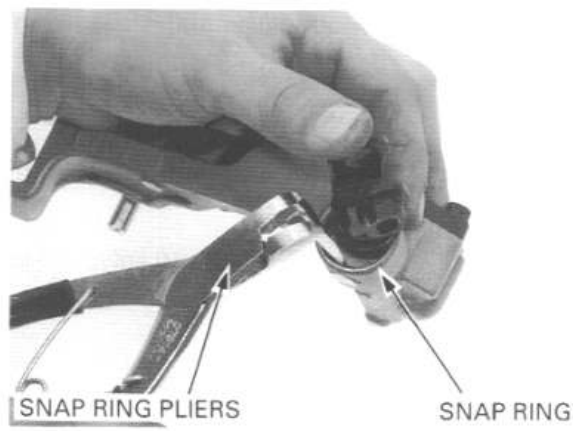
Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.



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.

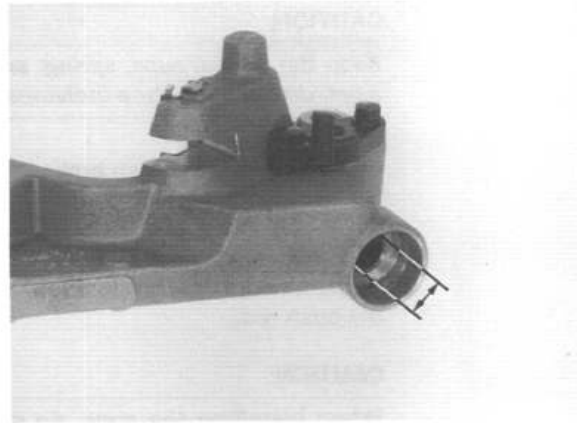
⚠ WARNING

Do not disassemble the secondary master cylinder push rod or the correct brake performance is not obtained.

INSPECTION

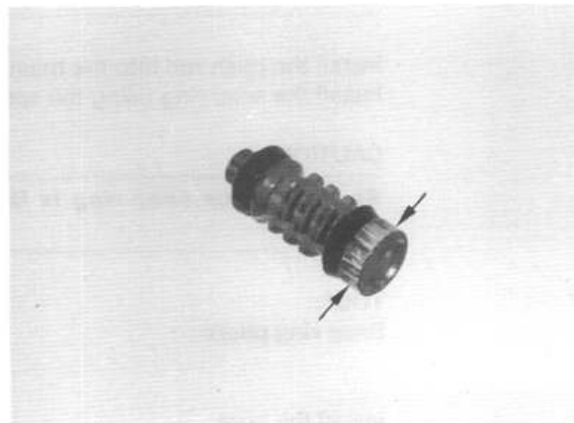
Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

SERVICE LIMIT: 12.76 mm (0.504 in)

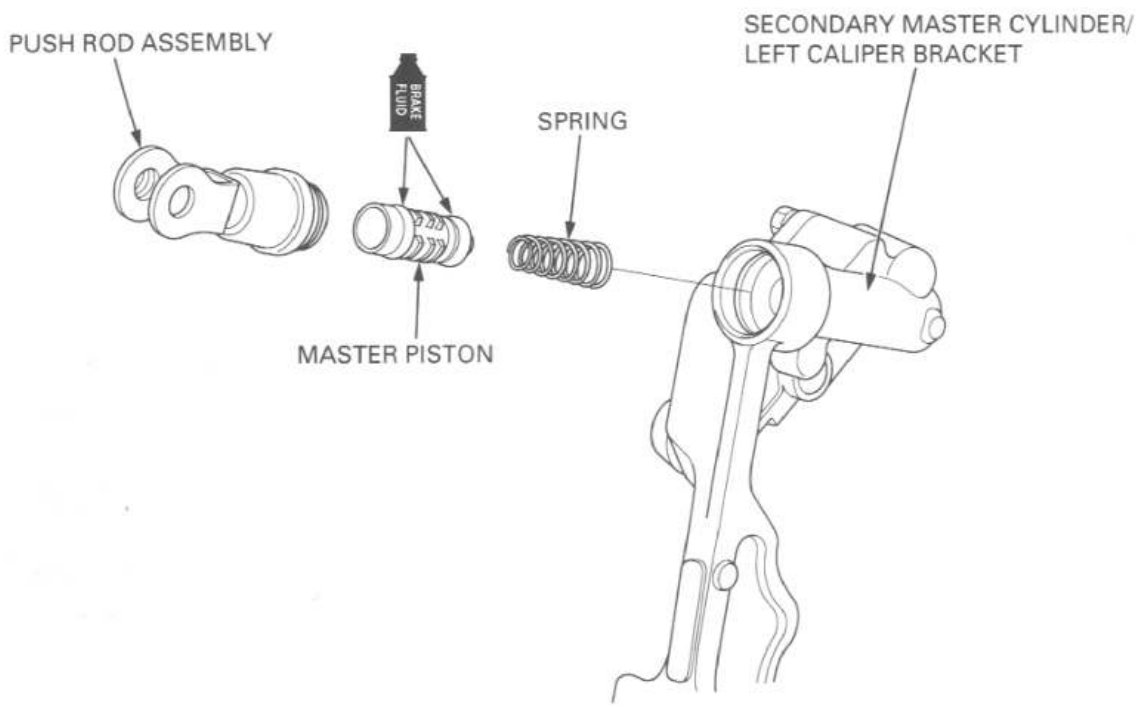


Measure the master cylinder piston O.D.

SERVICE LIMIT: 12.65 mm (0.498 in)



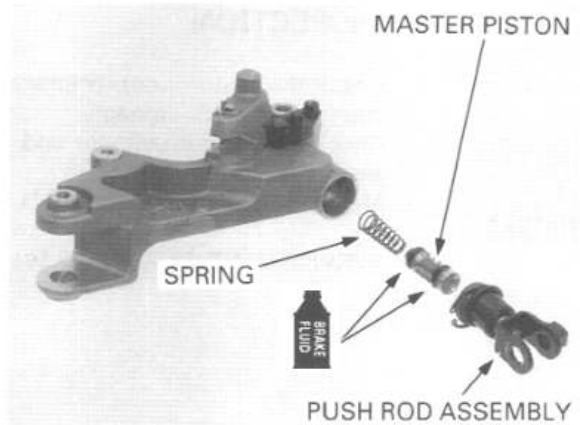
ASSEMBLY



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.
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.

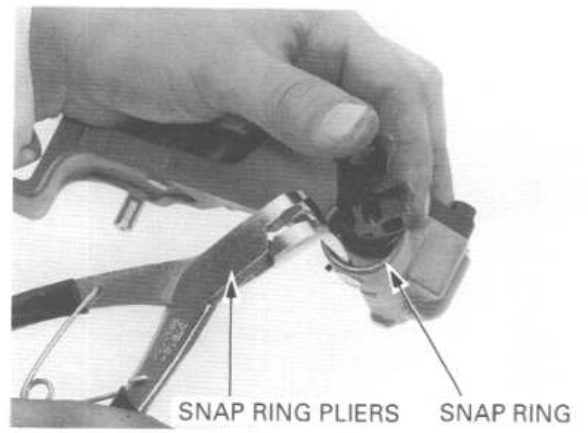
Install the push rod into the master cylinder.
Install the snap ring using the special tool.

CAUTION:

Be certain the snap ring is firmly seated in the groove.

TOOL:

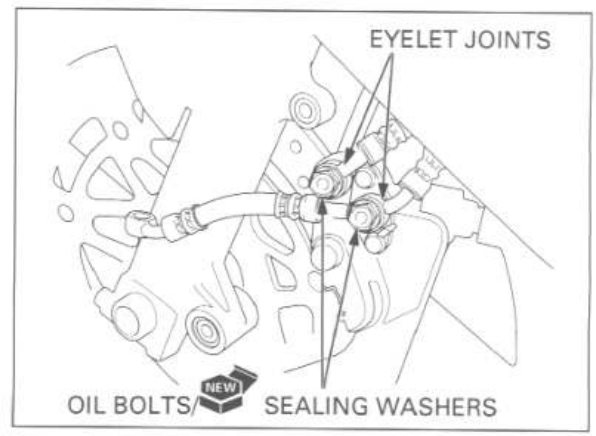
Snap ring pliers	**07914 – SA50001 or 07914 – 3230001**



Install the boot.

Install the brake hose eyelets with the oil bolts and new sealing washers.
Tighten the oil bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



Install the left front brake caliper (page 15-36).
Bleed the air from lever and pedal brake line (page 15-7).

REAR MASTER CYLINDER

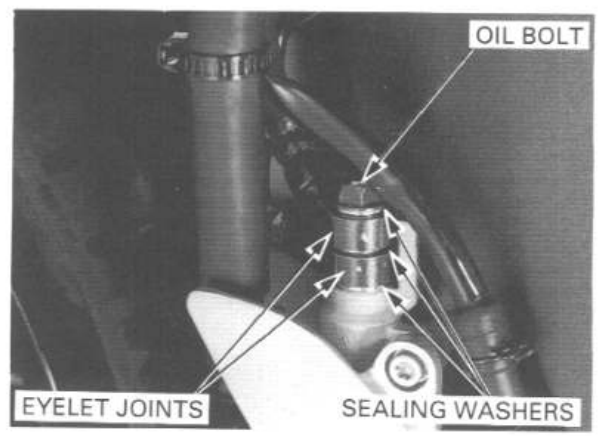
REMOVAL

Drain the pedal brake hydraulic system (page 15-5).

Remove the brake hose oil bolt, sealing washers and brake hose eyelets.

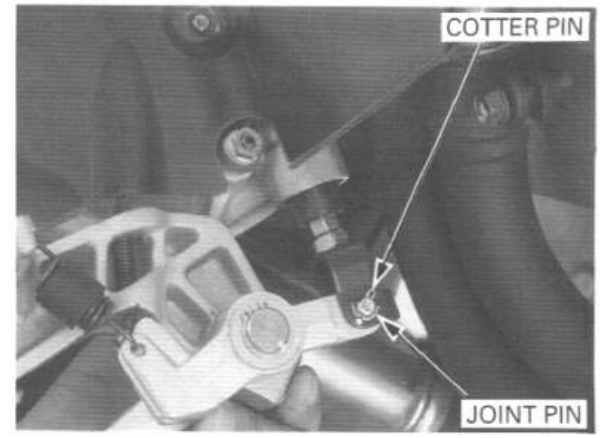
CAUTION:

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

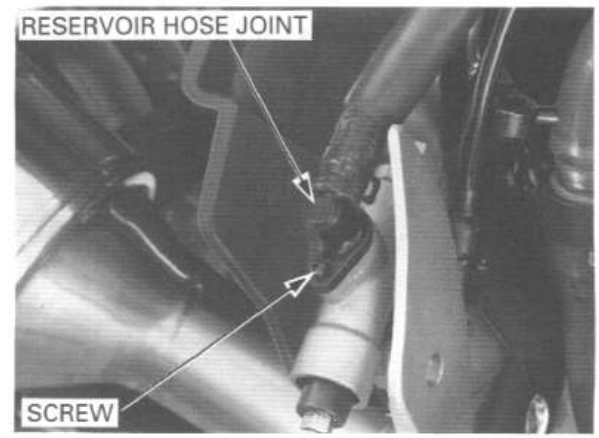


Remove the right footpeg holder assembly (page 14-26).

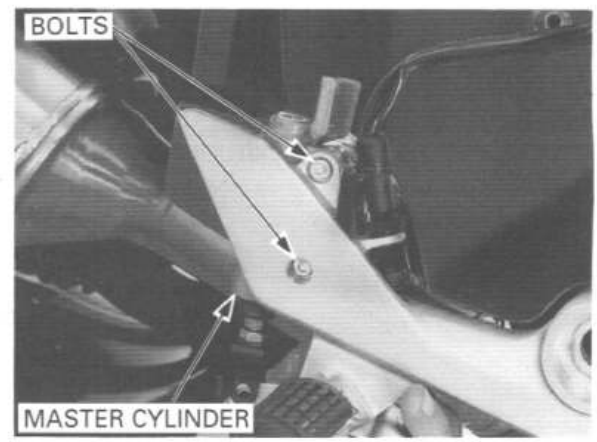
Remove and discard the brake pedal joint cotter pin. Remove the joint pin.



Remove the screw and reservoir hose joint from the master cylinder.



Remove the mounting bolts, nut and rear master cylinder.



DISASSEMBLY

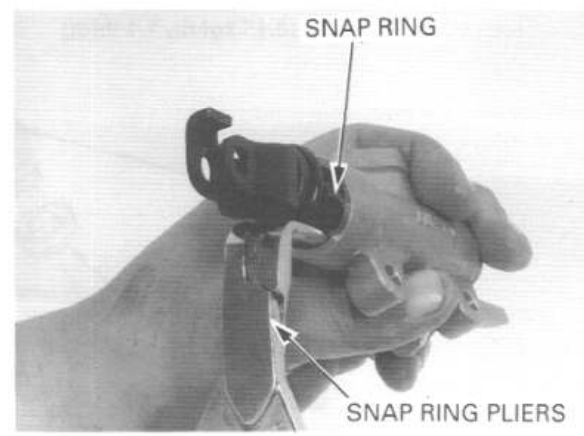
Remove the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:

Snap ring pliers	**07914 – SA50001 or 07914 – 3230001**

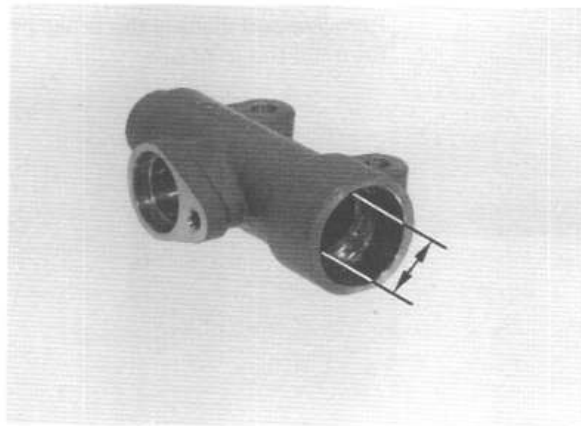
Remove the push rod, master piston and spring. Clean the inside of the cylinder with brake fluid.



INSPECTION

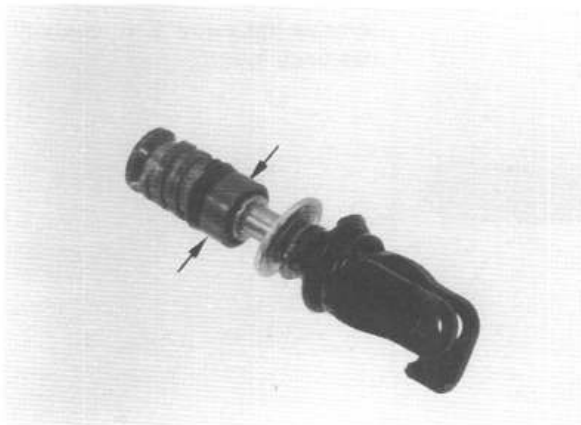
Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

SERVICE LIMIT: 17.515 mm (0.6896 in)

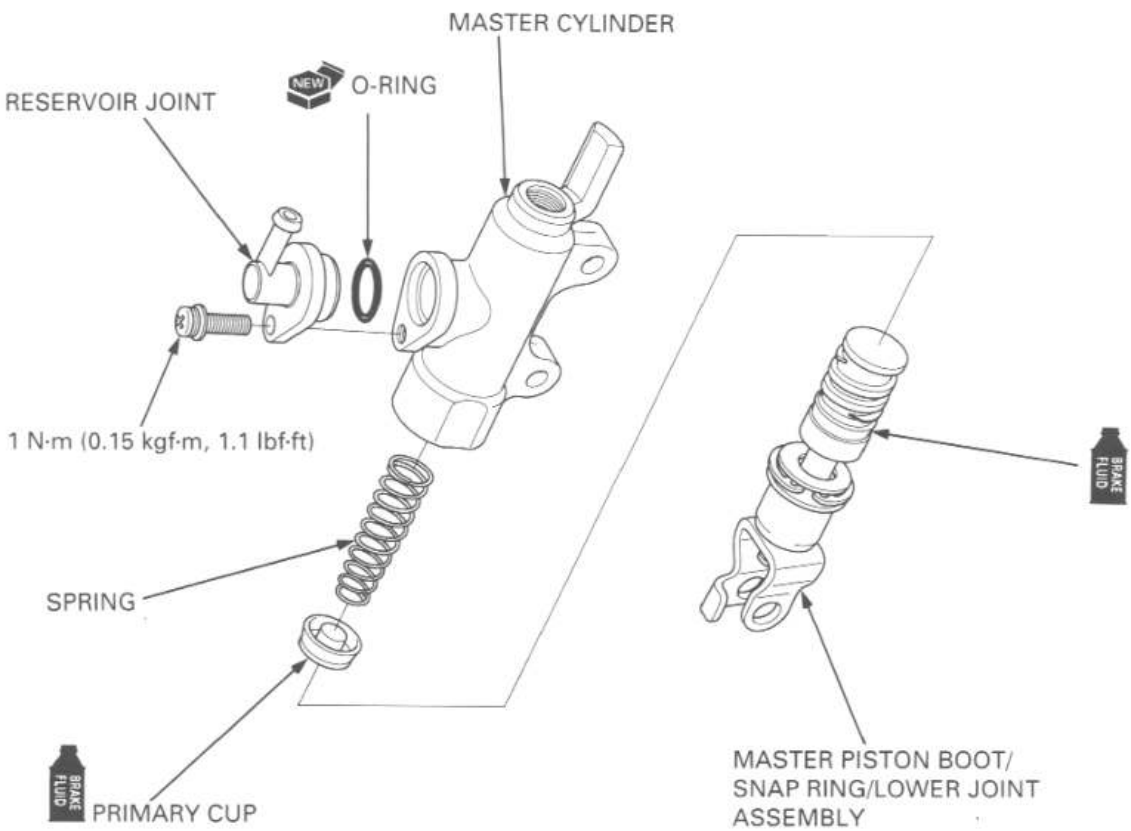


Measure the master cylinder piston O.D.

SERVICE LIMIT: 17.405 mm (0.6852 in)



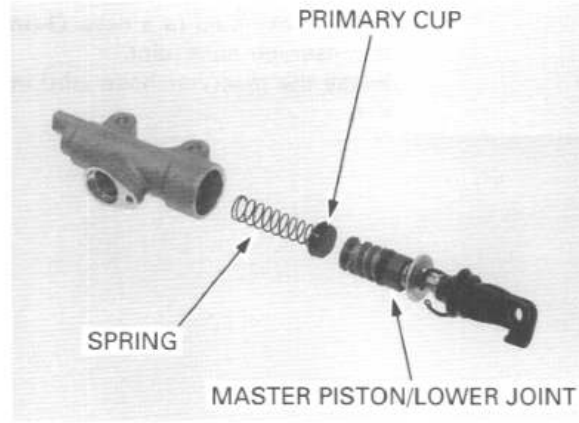
ASSEMBLY



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.

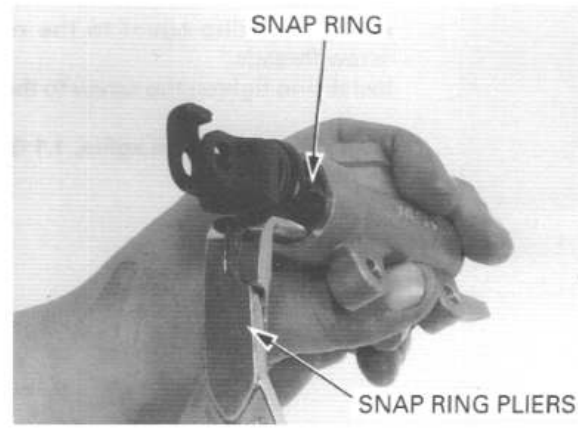
Install the push rod into the master cylinder.
Install the snap ring using the special tool.

CAUTION:

Be certain the snap ring is firmly seated in the groove.

TOOL:

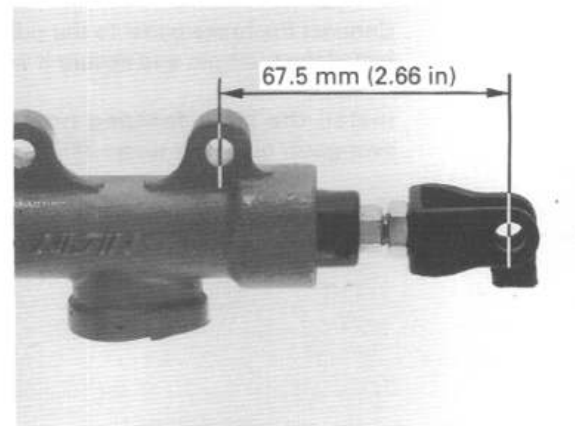
Snap ring pliers	**07914 – SA50001 or 07914 – 3230001**



Install the boot.

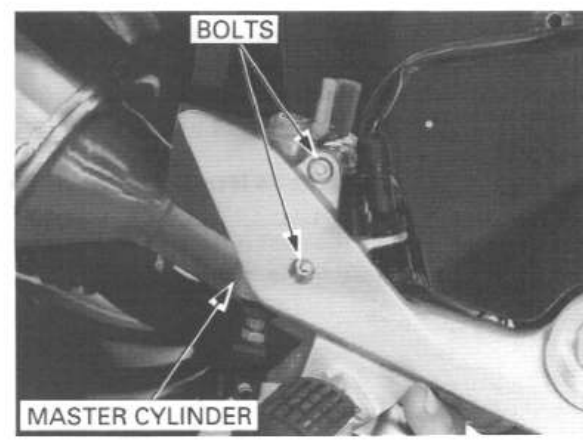
If the push rod is disassembled, adjust the push rod length as shown.
After adjustment, tighten the lock nut to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

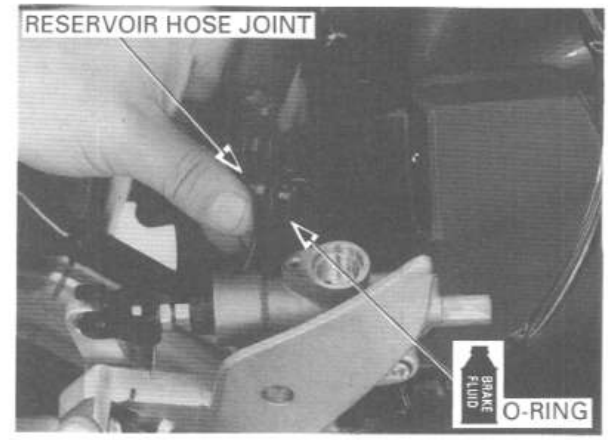


INSTALLATION

Place the master cylinder onto the main footpeg and temporarily tighten the mounting bolts and nut.

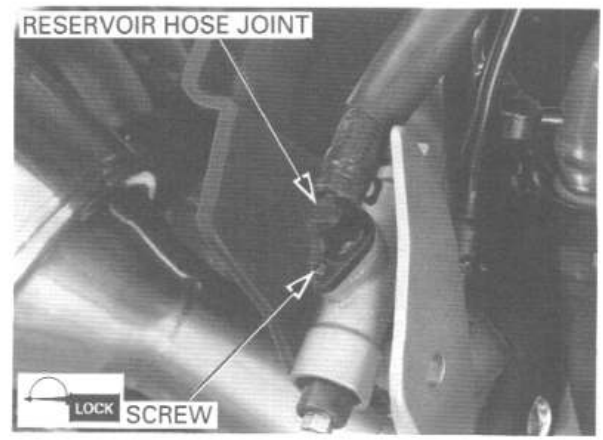


Apply brake fluid to a new- O-ring and install it onto the reservoir hose joint.
Install the reservoir hose joint into the master cylinder.



Apply a locking agent to the reservoir hose joint screw threads.
Install and tighten the screw to the specified torque.

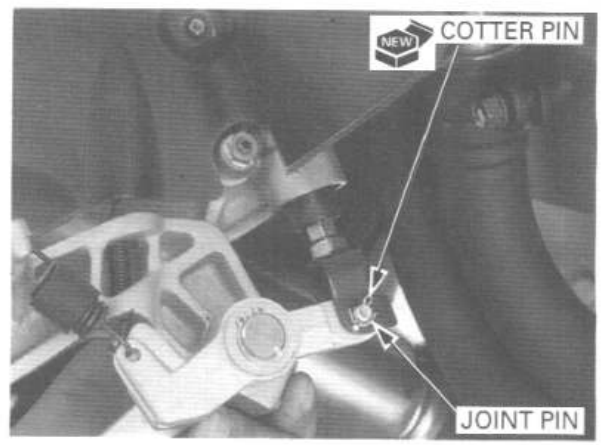
TORQUE: 1 N·m (0.15 kgf·m, 1.1 lbf·ft)



Connect the brake pedal to the push rod lower joint.
Install the joint pin and secure it with a new cotter pin.

Install the right footpeg holder and tighten the swingarm pivot nut (page 14-32).

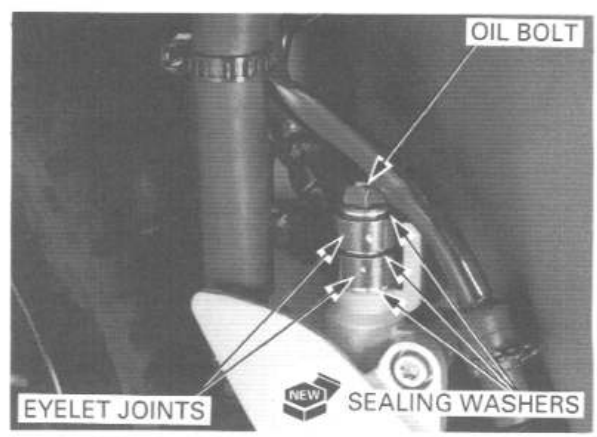
Install and tighten the heat guard plate mounting bolt.



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).



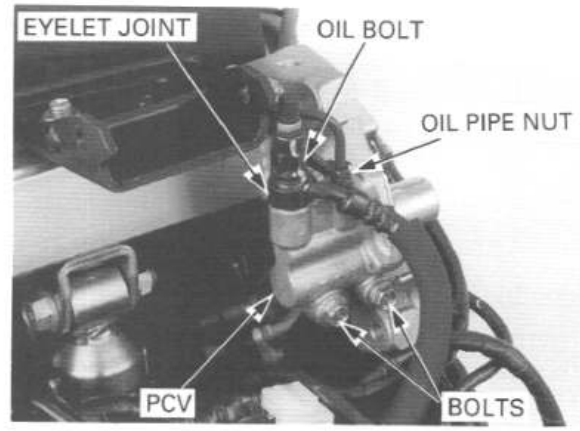
PROPORTIONAL CONTROL VALVE

REMOVAL/INSTALLATION

Remove the seat rail/rear fender (page 2-12).

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.

NOTE:

Tighten the oil bolt while pushing the brake hose eyelet joint against the stopper on the PCV.

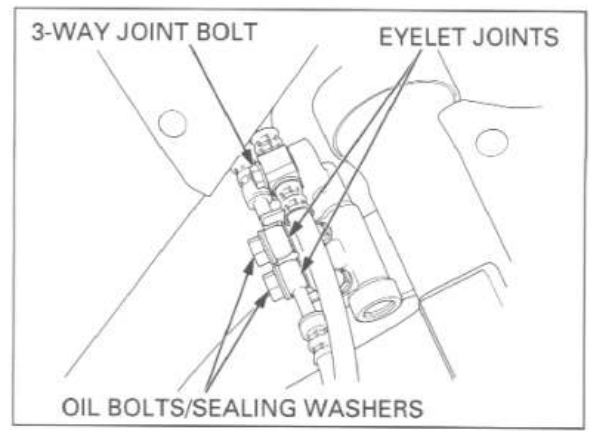


DELAY VALVE

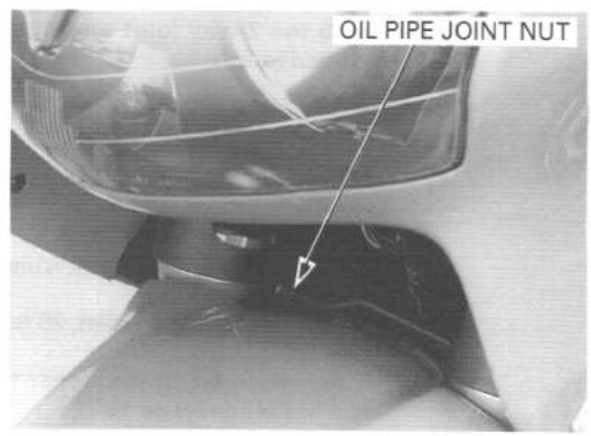
REMOVAL

Remove the oil bolts, sealing washers and brake hose eyelets from the delay valve.

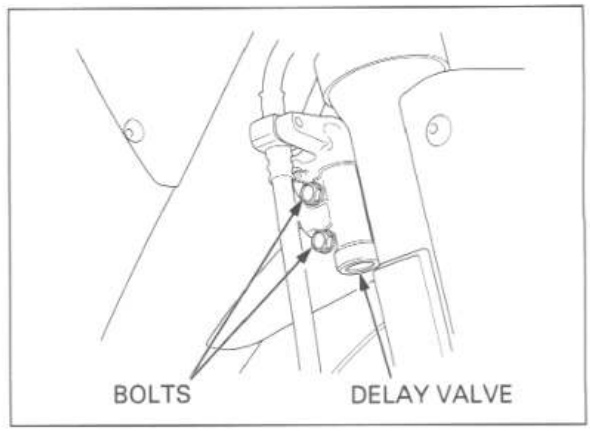
Remove the brake 3-way joint mounting bolt.



Remove the brake pipe joint nut.



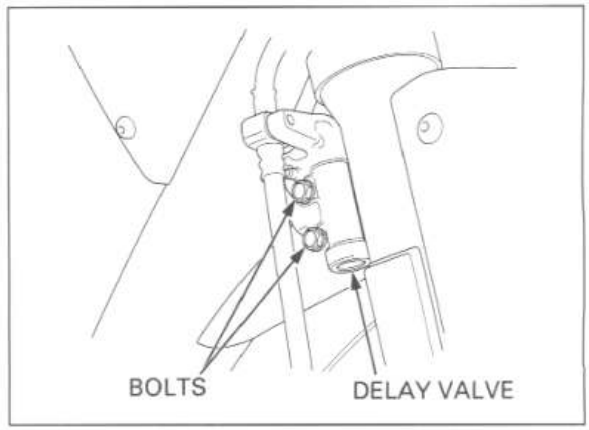
Remove the two mounting bolts and delay valve.



INSTALLATION

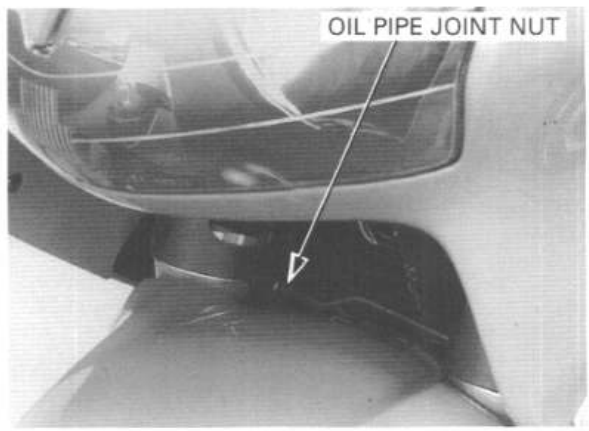
Install the delay valve onto the right fork slider while installing the brake pipe into the delay valve.
Install and tighten the delay valve mounting bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Apply oil to the brake pipe joint nut threads.
Tighten the brake pipe joint nut to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)



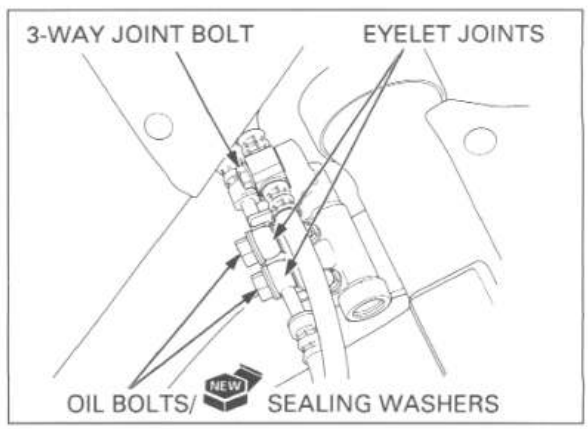
Install the 3-way joint and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the brake hose eyelet joints with the oil bolts and new sealing washers.
Push the eyelet joints against the stoppers, then tighten the oil bolts 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).



FRONT BRAKE CALIPER

LEFT CALIPER REMOVAL

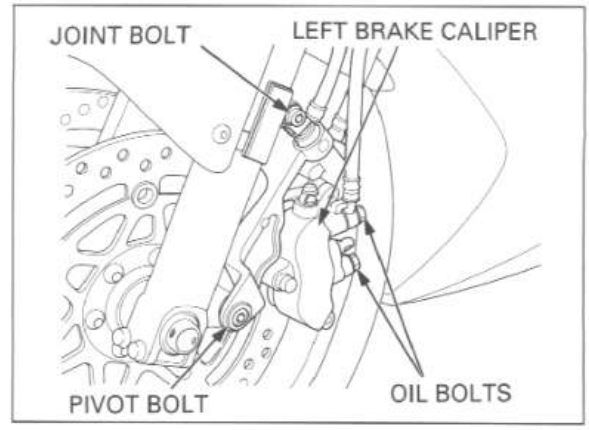
CAUTION:

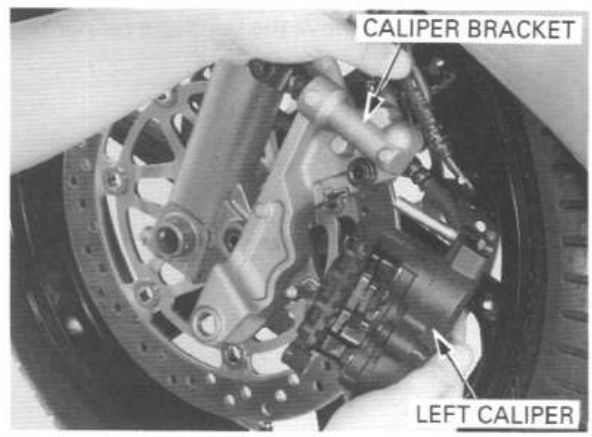
Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

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.

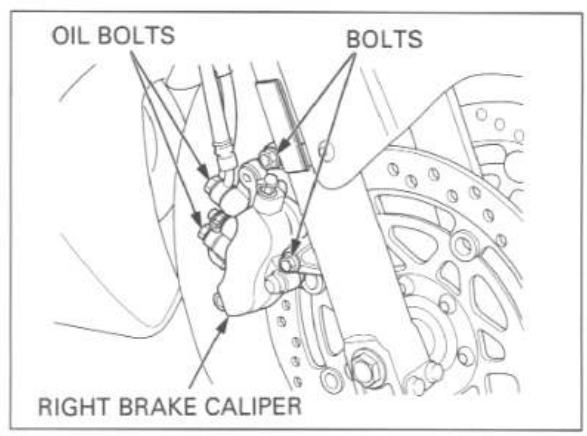
Remove the caliper from the bracket.





RIGHT CALIPER REMOVAL

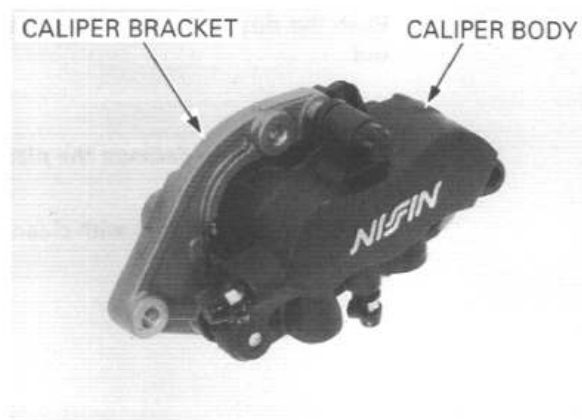
Remove the oil bolts, sealing washers and brake hose eyelet joints.
Remove the caliper bracket mounting bolts and then remove the caliper/bracket assembly.



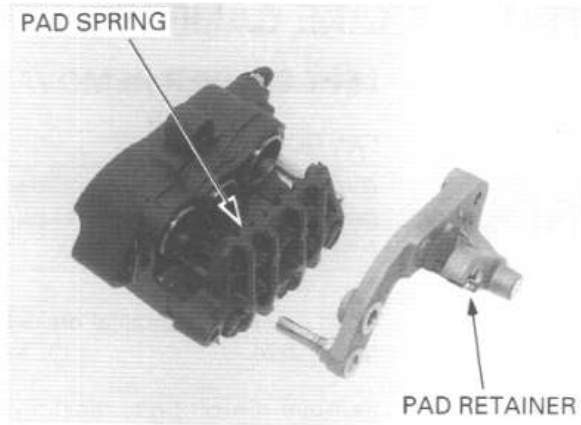
DISASSEMBLY

Remove the brake pads (page 15-14).

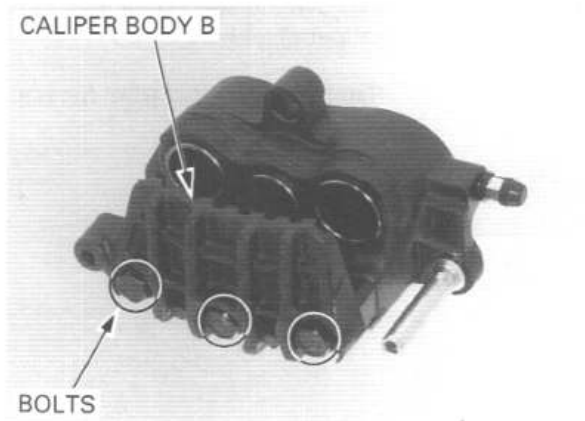
Remove the caliper bracket from the caliper body.



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.

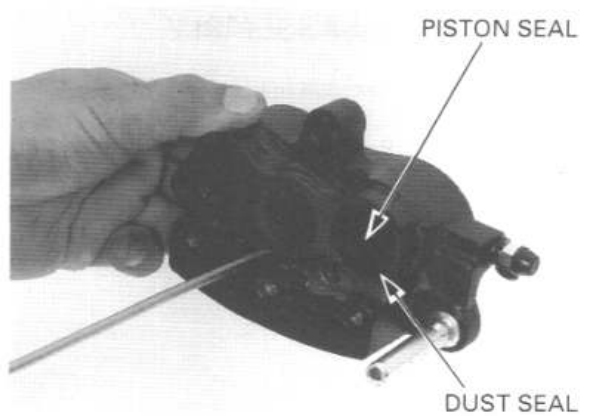


Push the dust seals and piston seals in and lift them out.

CAUTION:

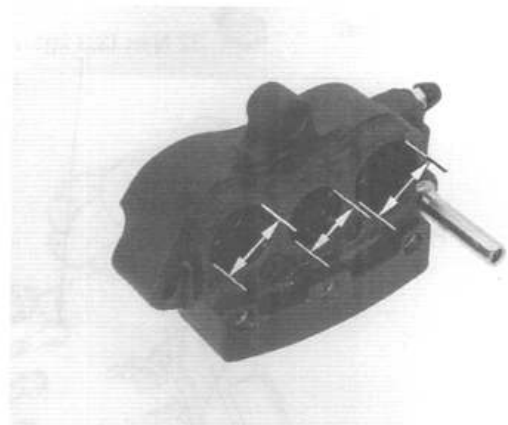
Be careful not to damage the piston sliding surface.

Clean the seal grooves with clean brake fluid.



INSPECTION

Check the caliper cylinder for scoring or other damage.
Measure the caliper cylinder I.D.

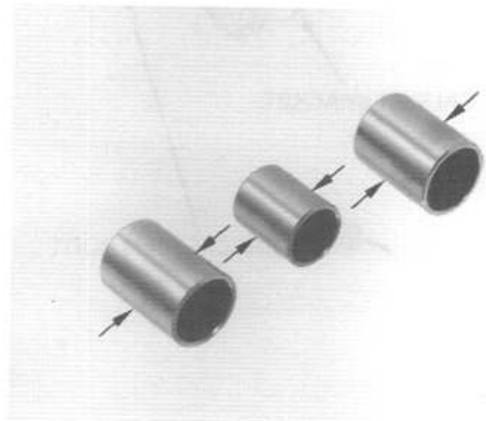


SERVICE LIMITS:

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.

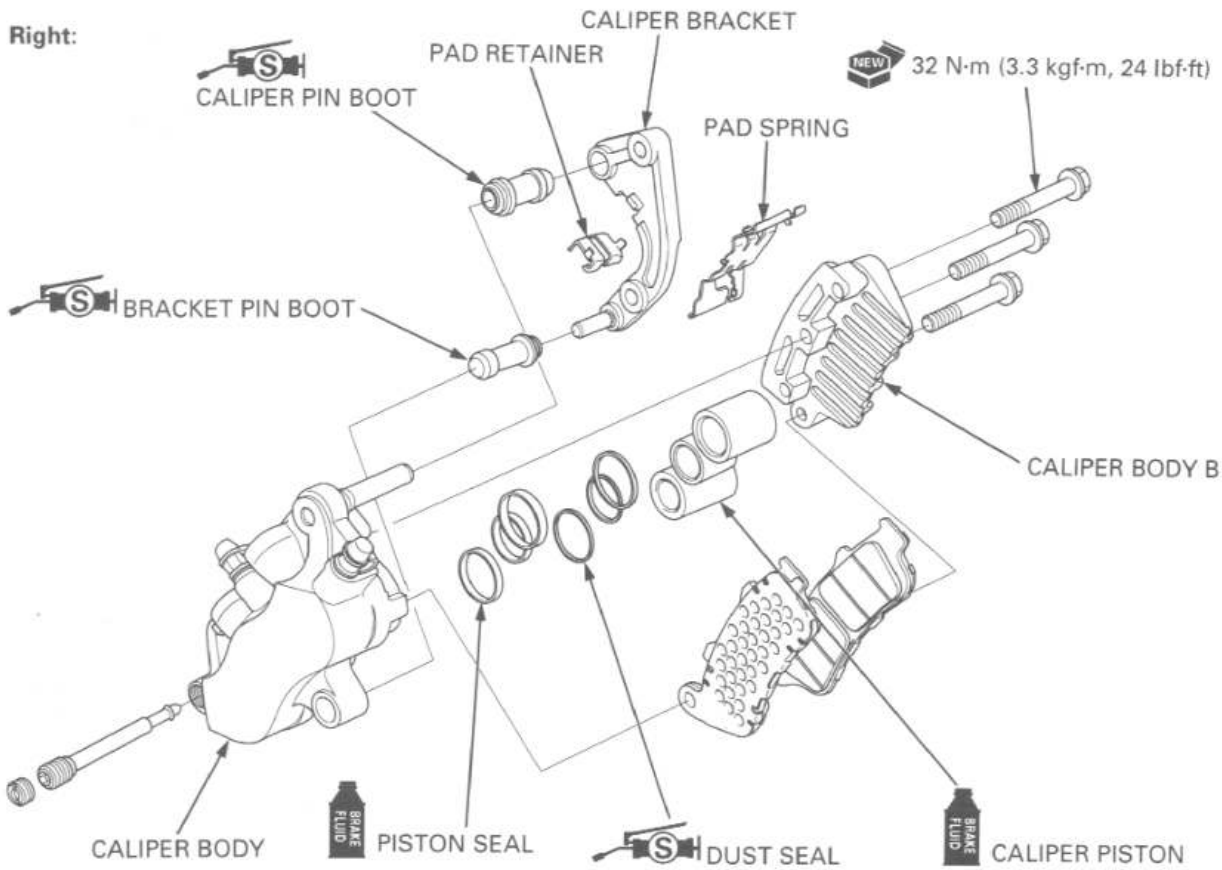


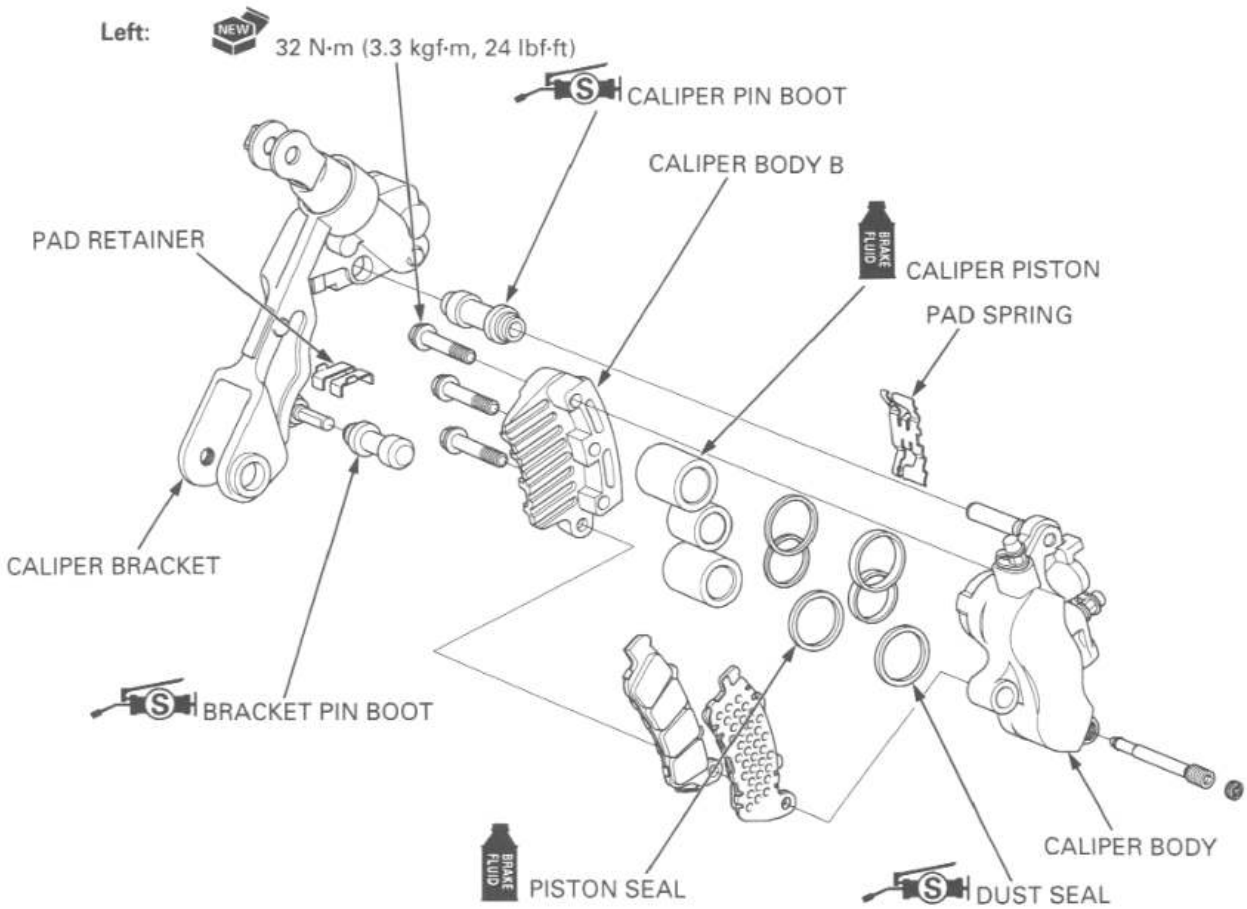
SERVICE LIMITS:

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:



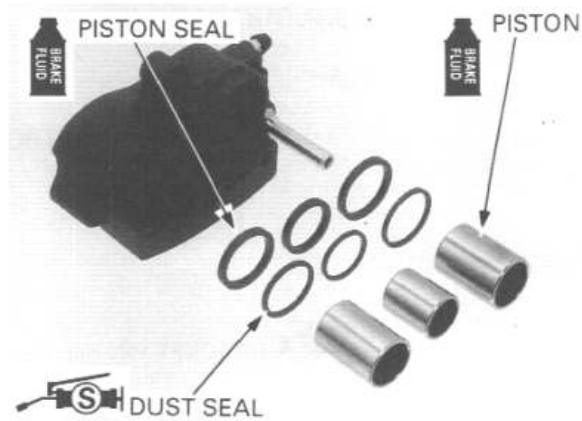


Coat the new piston seals with clean brake fluid.
Coat the new dust seals with silicone grease.

Install the each piston seal, dust seal and caliper piston in their proper locations.

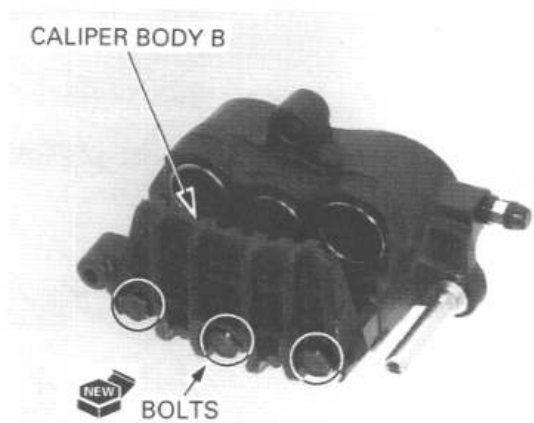
Install the piston seals and dust seals into the groove of the caliper body.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their opening ends toward the pad.



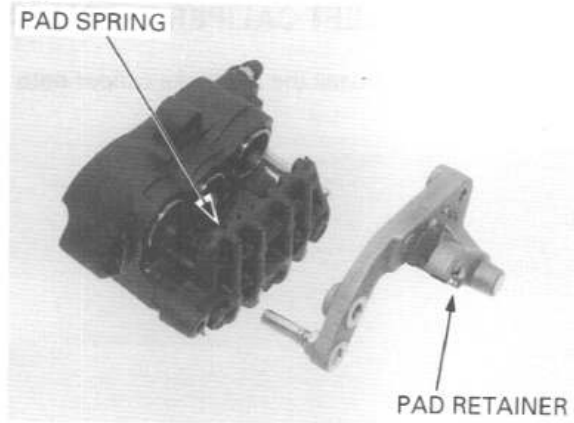
Install the caliper body B and tighten the new bolts to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)

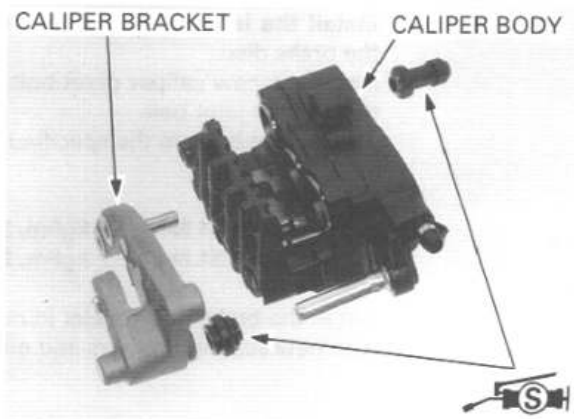


Note the installation direction of the pad spring.

Install the brake pad retainer onto the caliper bracket.
Install the pad spring into the caliper body.



Apply silicone grease to the boot inside then install them.
Assemble the caliper and bracket.



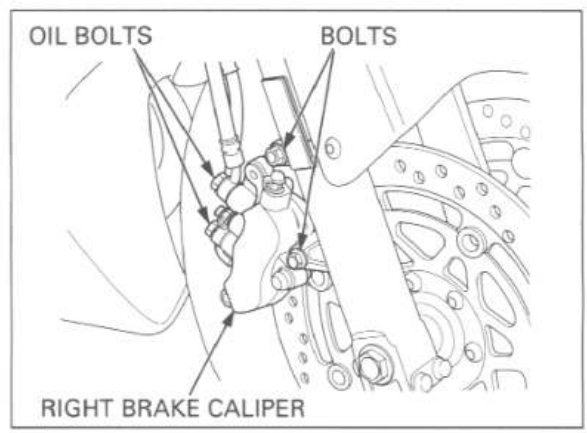
RIGHT CALIPER INSTALLATION

Install the brake pads (page 15-14).

Install the right brake caliper/bracket assembly over the brake disc.
Install and tighten the new caliper mounting bolts.

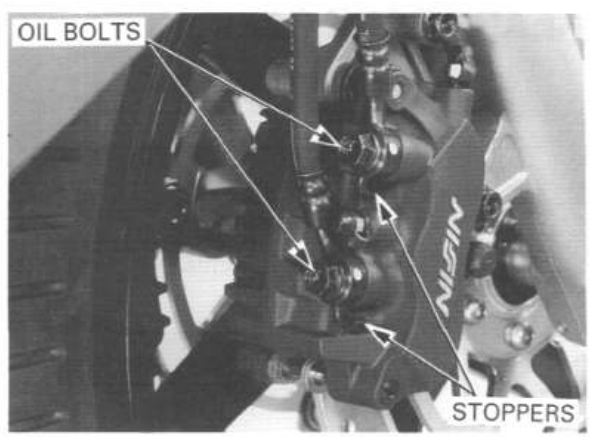
TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

Install the brake hose eyelet joints to the caliper body with new sealing washers and oil bolts.



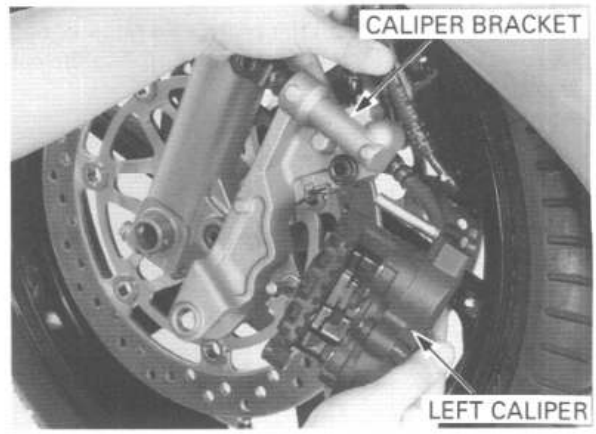
Push the brake hose eyelet joints to the stoppers on the caliper body, then tighten the oil bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



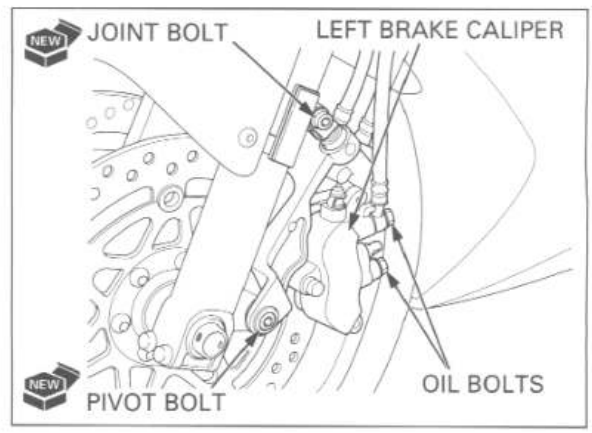
LEFT CALIPER INSTALLATION

Install the left brake caliper onto the bracket.



Install the left brake caliper/bracket assembly over the brake disc.
Install the new caliper pivot bolt and secondary master cylinder joint bolt.
Tighten the bolts to the specified torque.

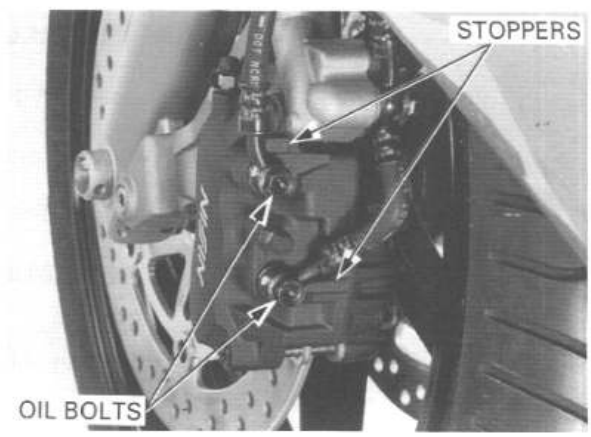
TORQUE:
Pivot bolt: 31 N·m (3.2 kgf·m, 23 lbf·ft)
Joint bolt: 31 N·m (3.2 kgf·m, 23 lbf·ft)



Install the brake hose eyelet joints to the caliper body with new sealing washers and oil bolts.

Push the brake hose eyelet joints to the stoppers on the caliper, then tighten the oil bolts to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)



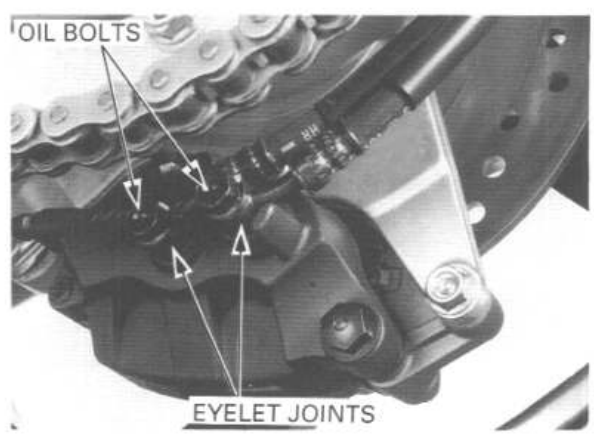
Install the brake pads (page 15-14).
Fill and bleed the lever and pedal line brake hydraulic system (page 15-7).

REAR BRAKE CALIPER

REMOVAL

Remove the rear wheel (page 14-3).
Drain the pedal line brake hydraulic system (page 15-5).

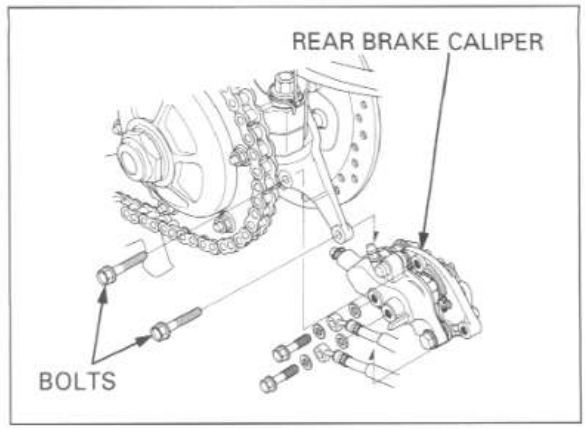
Remove the oil bolts, sealing washers and brake hose eyelet joints.



Remove the caliper mounting bolts and brake caliper/ bracket assembly.

CAUTION:

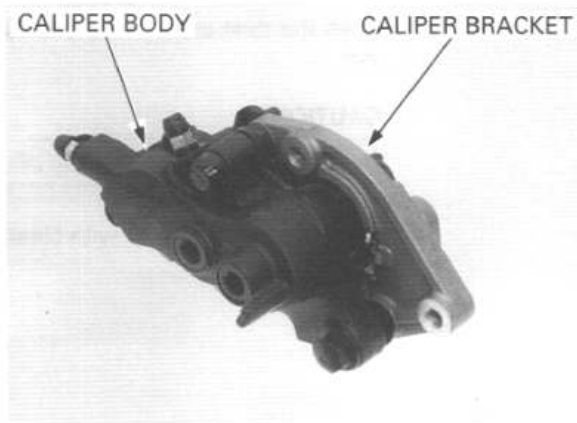
Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.



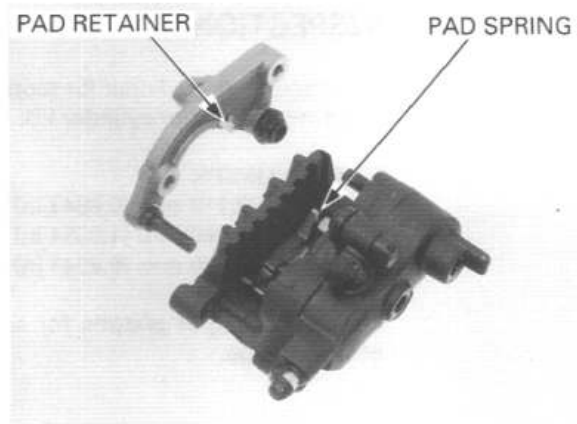
DISASSEMBLY

Remove the rear brake pads (page 15-16).

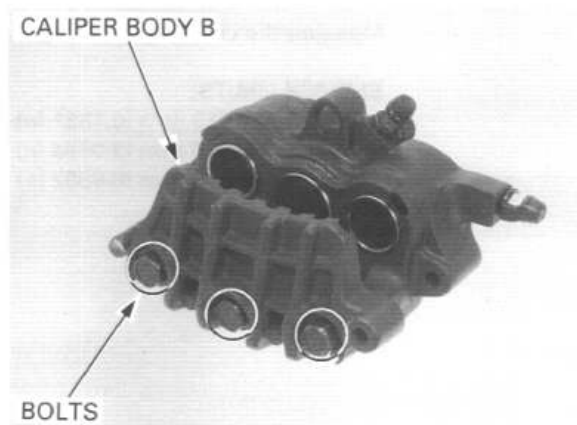
Remove the caliper bracket from the caliper body.



Remove the brake pad spring from the caliper body.
Remove the brake pad retainer from the caliper bracket.



Remove the 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.

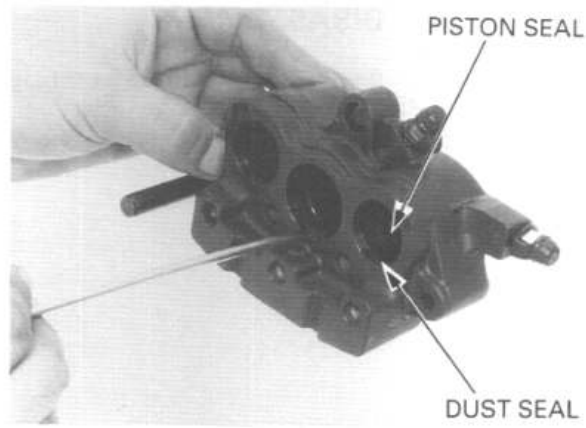


Push the dust seals and piston seals in and lift them out.

CAUTION:

Be careful not to damage the piston sliding surface.

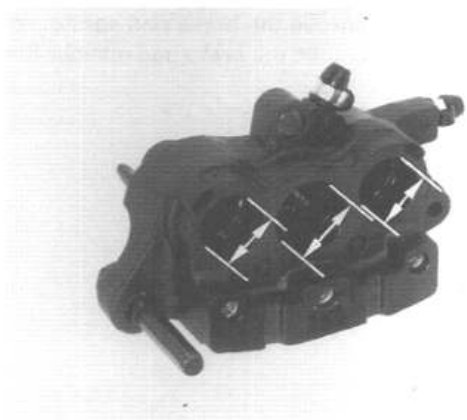
Clean the seal grooves with clean brake fluid.



INSPECTION

Check the caliper cylinder for scoring or other damage. Measure the caliper cylinder I.D.

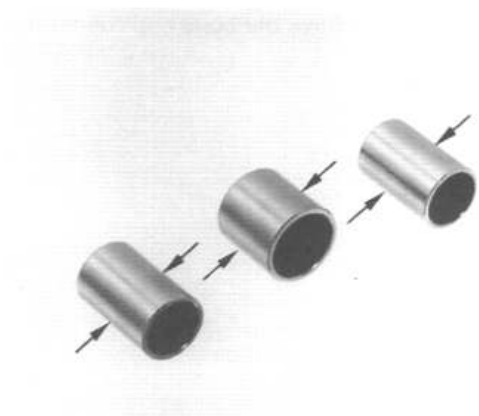
SERVICE LIMITS:
Front: 22.710 mm (0.8941 in)
Center: 27.060 mm (1.0654 in)
Rear: 22.710 mm (0.8941 in)



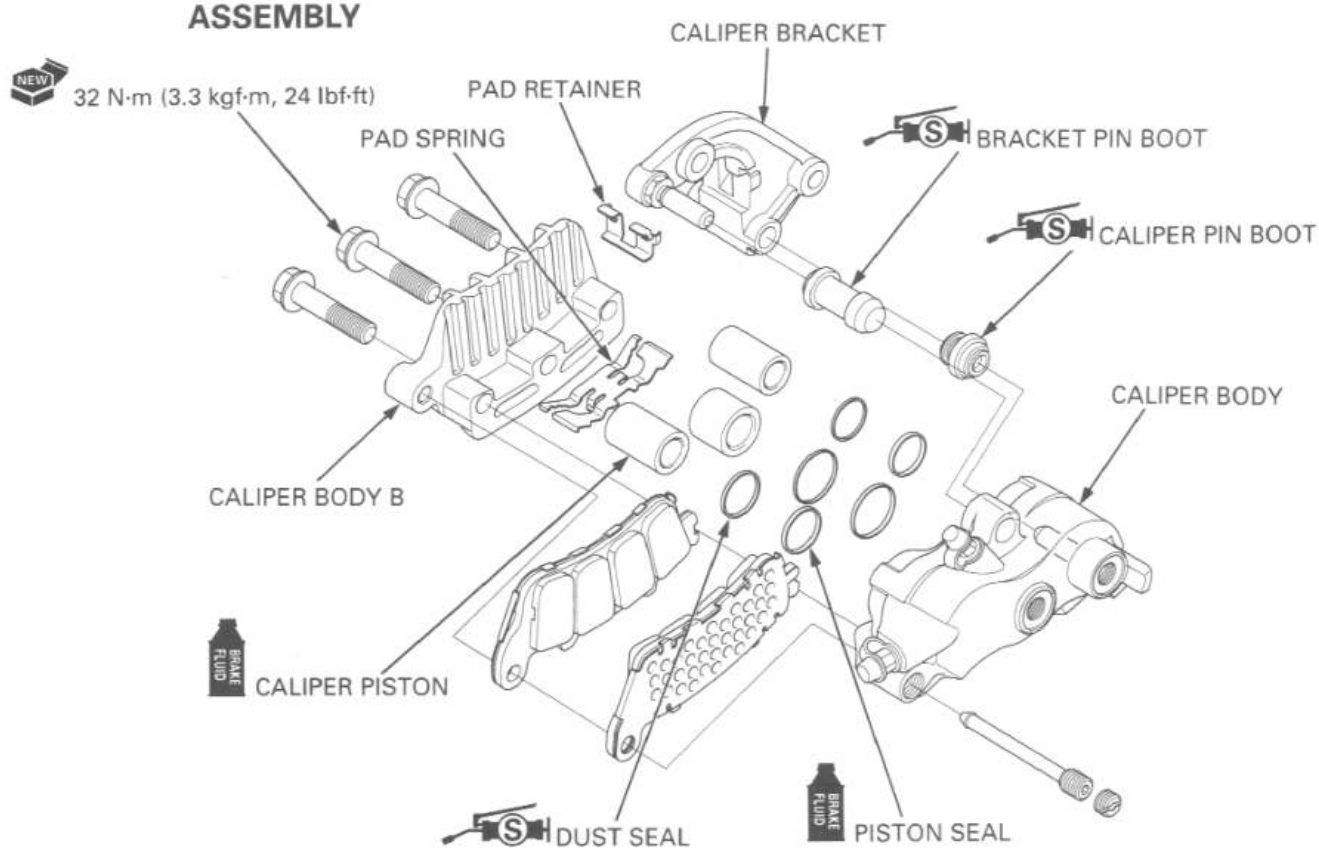
Check the caliper pistons for scratches, scoring or other damage.

Measure the caliper piston O.D.

SERVICE LIMITS:
Front: 22.560 mm (0.8882 in)
Center: 26.910 mm (1.0594 in)
Rear: 22.560 mm (0.8882 in)



ASSEMBLY

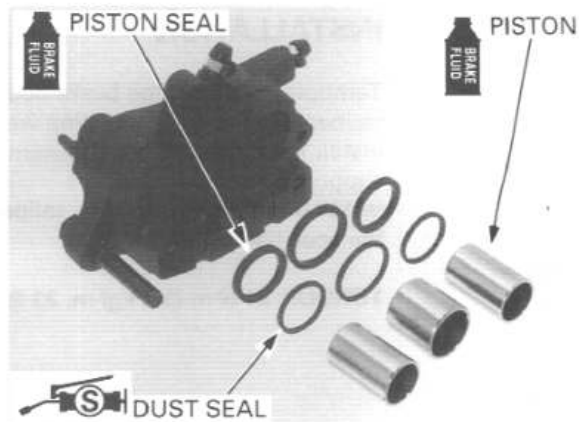


Coat the new piston seals with clean brake fluid.
Coat the new dust seals with silicone grease.

Install the piston seals and dust seals into the groove of the caliper body.

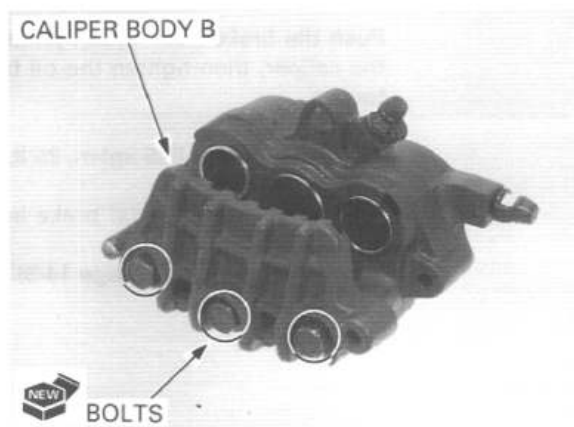
Install the each piston seal, dust seal and caliper piston in their proper locations.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their opening ends toward the pad.



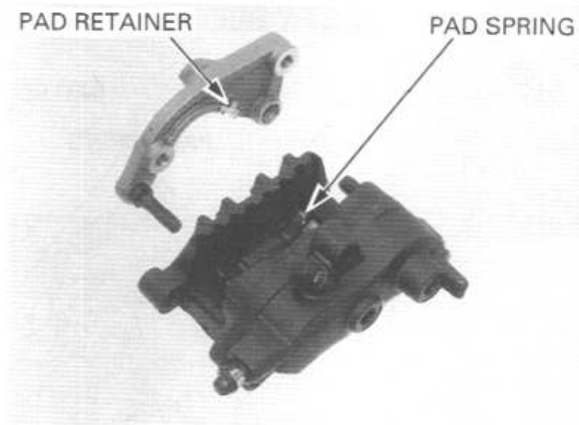
Install the caliper body B and tighten the new bolts to the specified torque.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)



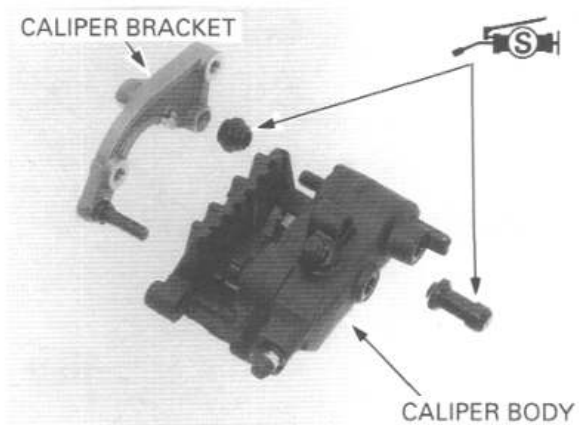
Note the installation direction of the pad spring.

Install the brake pad retainer onto the caliper bracket.
Install the pad spring into the caliper body.



Apply silicone grease to the boot inside then install them.
Assemble the caliper and bracket.

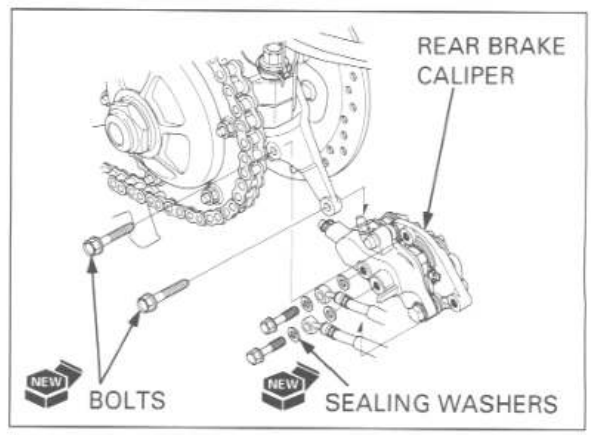
Install the rear brake pads (page 15-13).



INSTALLATION

Temporarily install the brake hose eyelet joints to the caliper body with new sealing washers and oil bolts.
Install the caliper/bracket assembly onto the caliper support.
Install and tighten the new caliper mounting bolts to the specified torque.

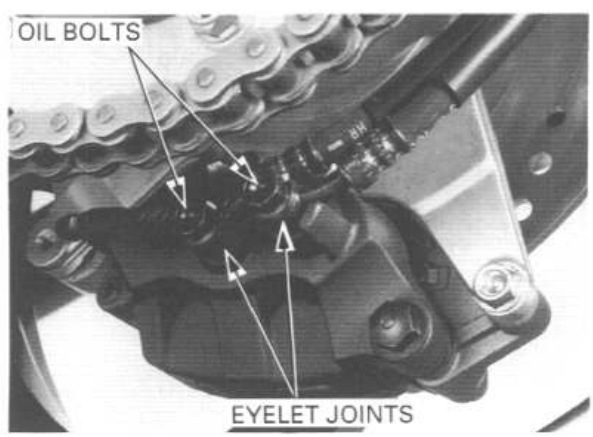
TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)



Push the brake hose eyelet joints to the stoppers on the caliper, then tighten the oil bolts to the specified torque.

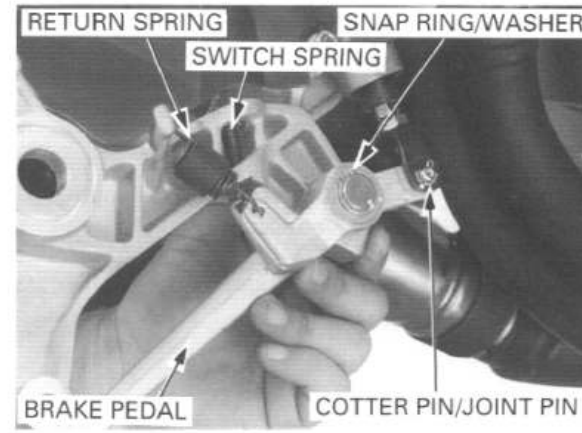
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the pedal brake line hydraulic system (page 15-7).
Install the rear wheel (page 14-3).



BRAKE PEDAL

REMOVAL

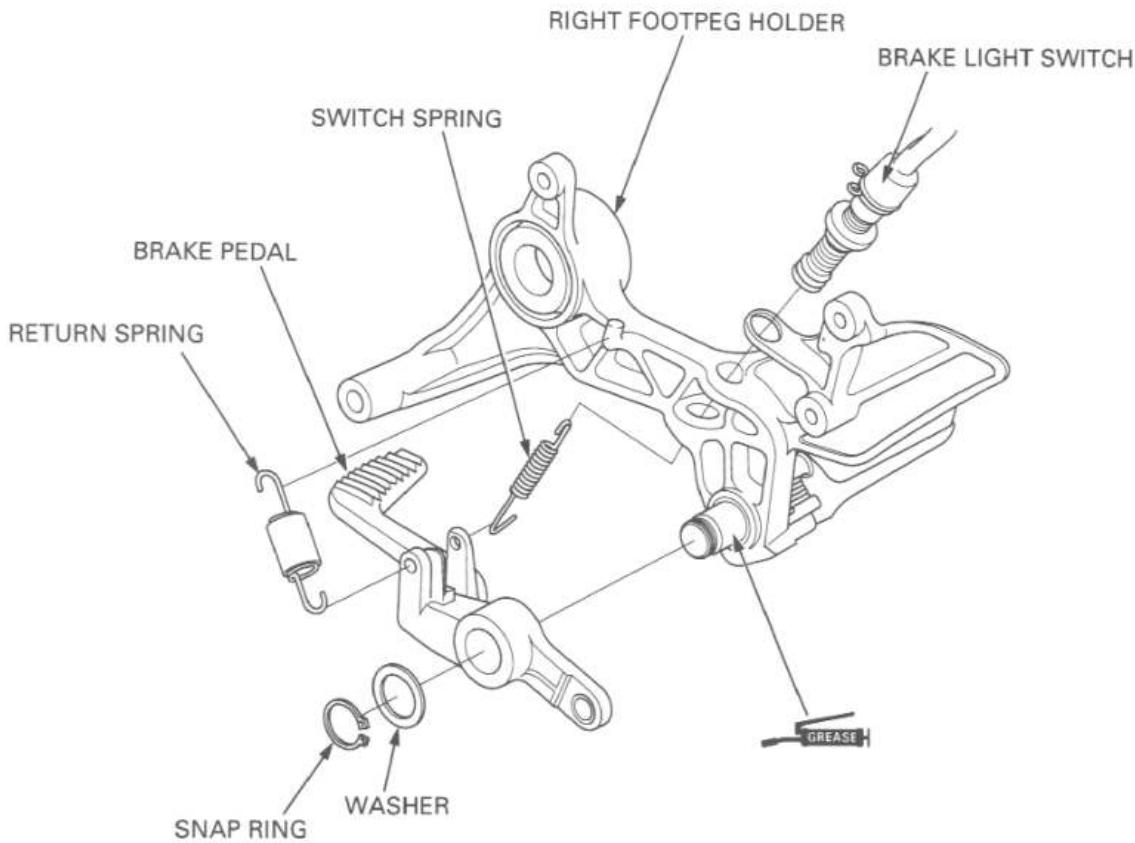


Remove the right footpeg holder assembly (page 14-26).

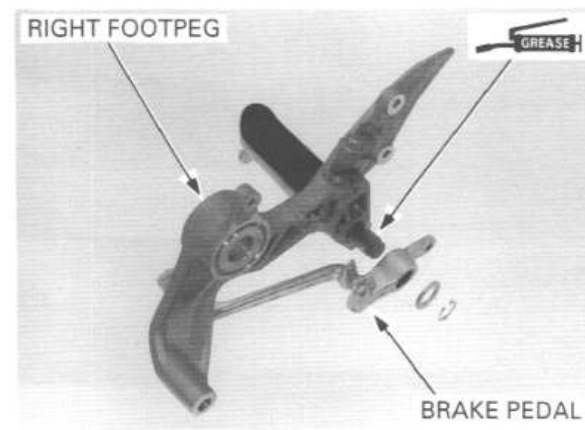
Unhook the brake light switch spring and brake pedal return spring from the brake pedal.

Remove and discard the brake pedal joint cotter pin.
Remove the joint pin.
Remove the snap ring, washer and brake pedal from the footpeg.

INSTALLATION



Apply grease to the sliding surface of the brake pedal and footpeg.
Install the brake pedal and washer onto the right footpeg.

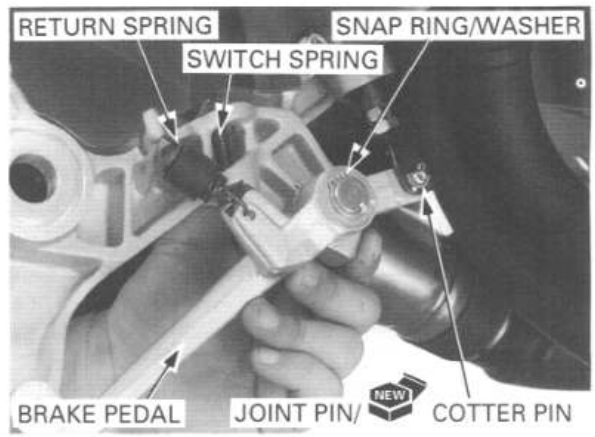


Secure the brake pedal with a snap ring.

Hook the brake pedal return spring.
Install the brake light switch and hook the switch spring.

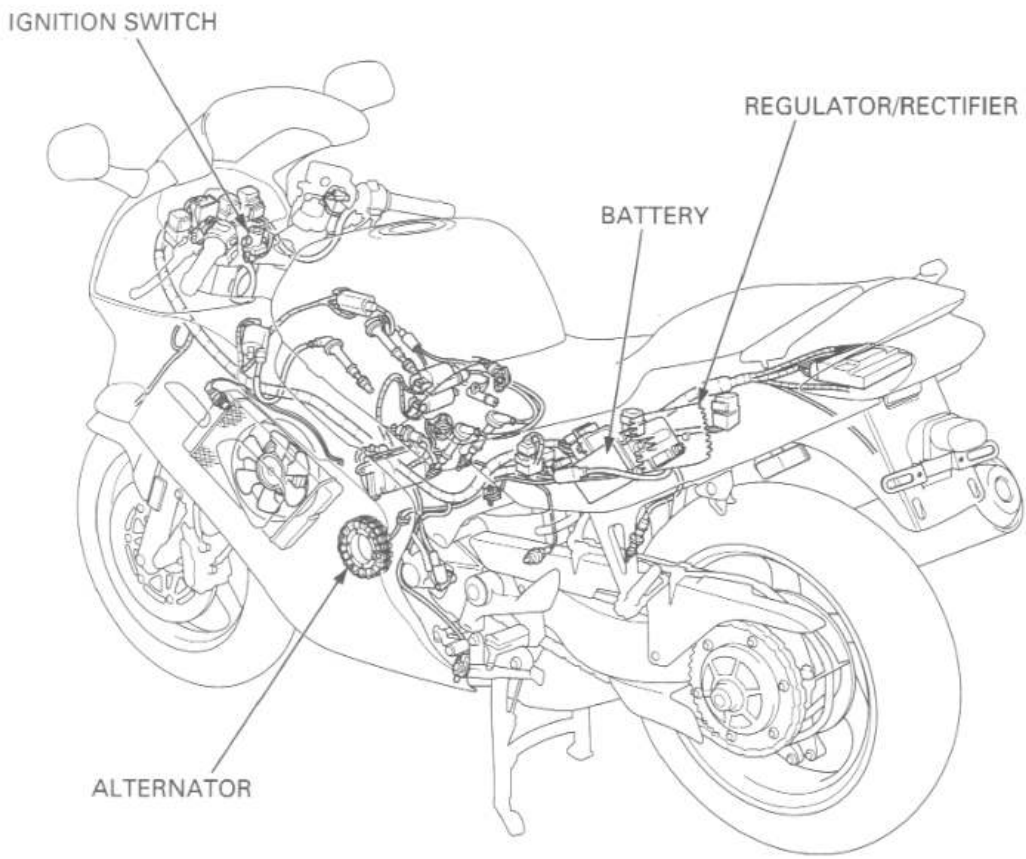
Install the brake pedal joint pin and secure it with a new cotter pin.

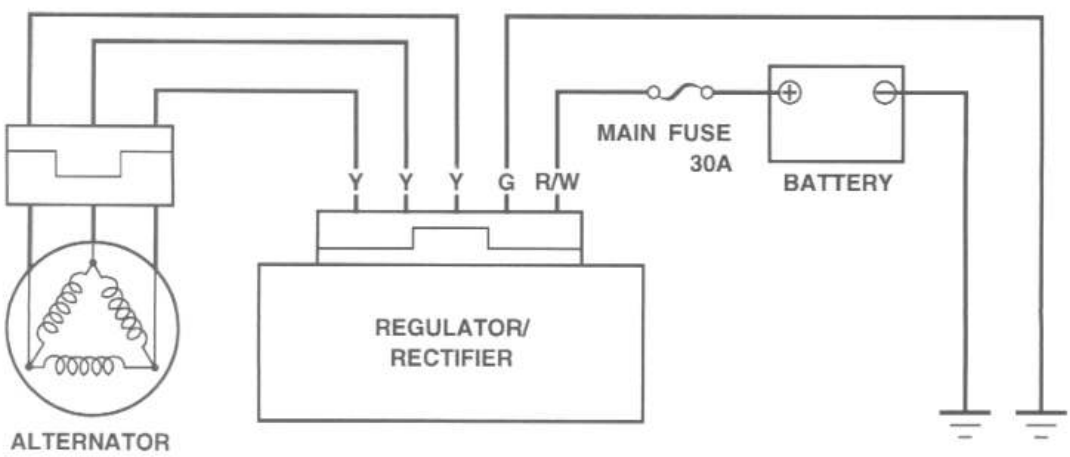
Install the right footpeg holder assembly (page 14-32).



MEMO

SYSTEM DIAGRAM





R ..... RED
G ..... GREEN
Y ..... YELLOW
W ..... WHITE

16. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM	16-0	ALTERNATOR COVER REMOVAL	16-8
SERVICE INFORMATION	16-1	STATOR	16-9
TROUBLESHOOTING	16-3	FLYWHEEL	16-10
BATTERY	16-5	ALTERNATOR COVER INSTALLATION	16-11
CHARGING SYSTEM INSPECTION	16-6	REGULATOR/RECTIFIER	16-12
ALTERNATOR INSPECTION	16-8		

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.***
- ***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 of overcharged or undercharged, or of left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2–3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.

- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- 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.

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12 V – 10 Ah
	Current leakage		1.2 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.2 A/5 – 10 h
		Quick	5.0 A/1.0 h
Alternator	Capacity		0.47 kW/5,000 rpm
	Charging coil resistance (20°C/68°F)		0.1 – 1.0 Ω
Regulator/rectifier regulated voltage			14.0 – 14.8 V/5,000 rpm

TORQUE VALUES

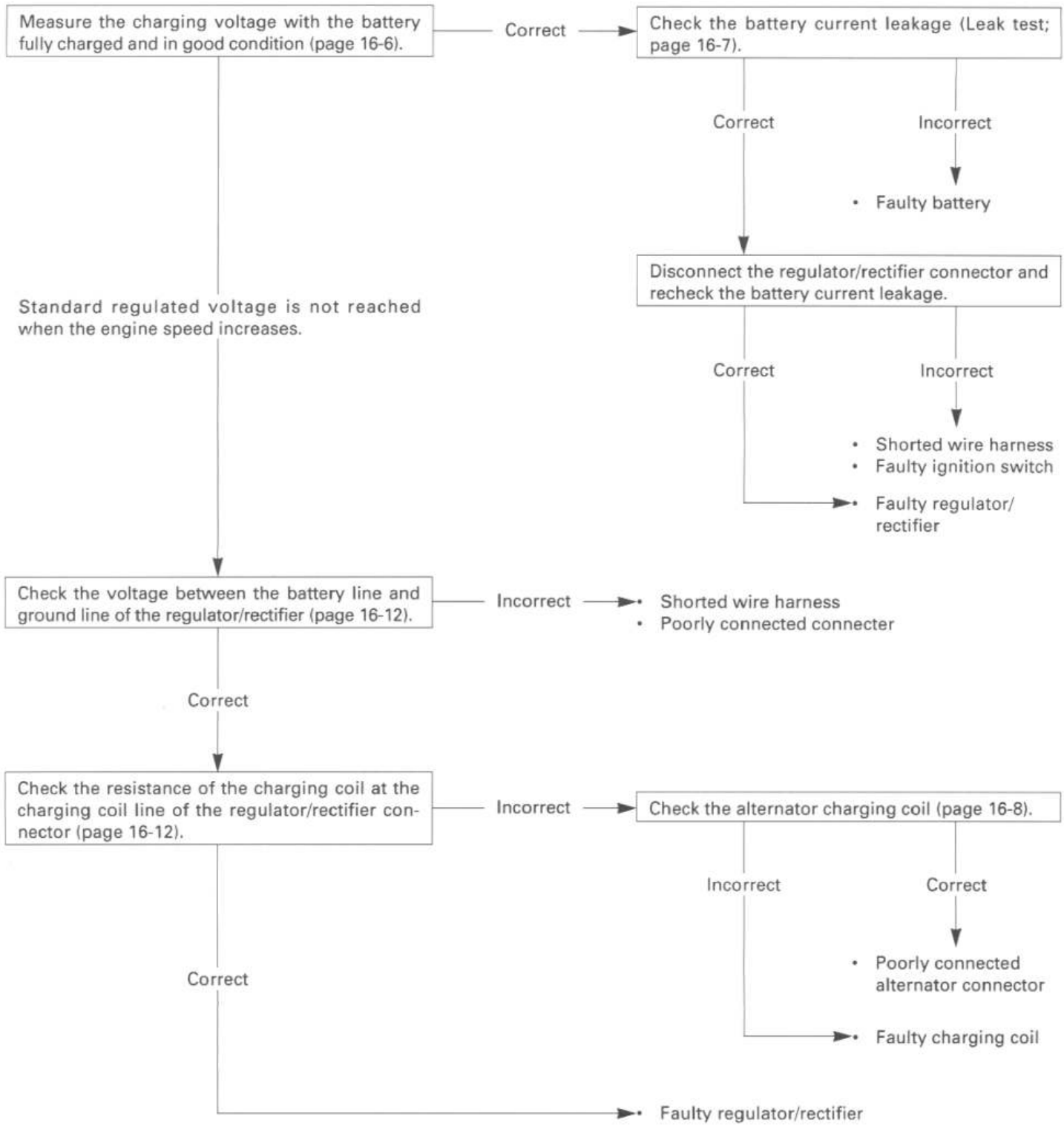
Flywheel flange bolt	103 N·m (10.5 kgf·m, 76 lbf·ft)	Apply oil to the threads and flange surface
Stator mounting torx bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Alternator wire clamp socket bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Alternator cover SH bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

TOOLS

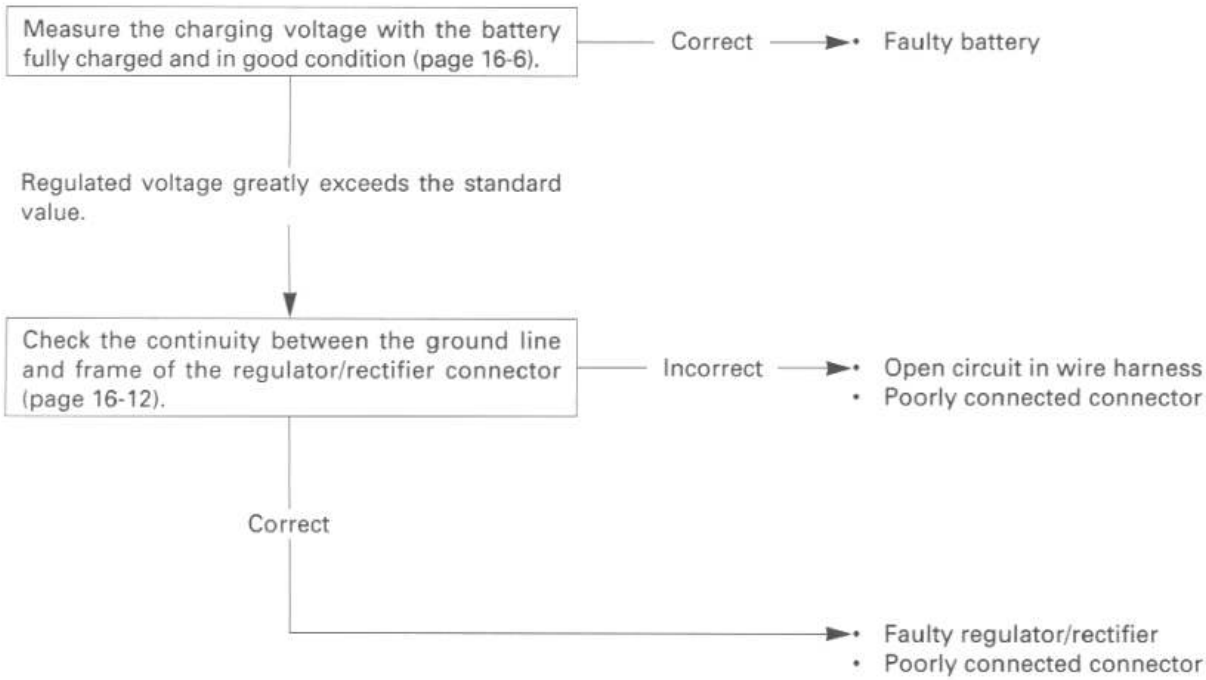
Flywheel holder	07725 – 0040000	Equivalent commercially available in U.S.A.
Rotor puller	07733 – 0020001	or 07933 – 3950000

TROUBLESHOOTING

1. Battery undercharging (Voltage not raised to regulated voltage).



2. Battery overcharging (regulated voltage too high).



BATTERY

REMOVAL/INSTALLATION

Always turn the ignition switch OFF before removing the battery.

Remove the seat (page 2-3).

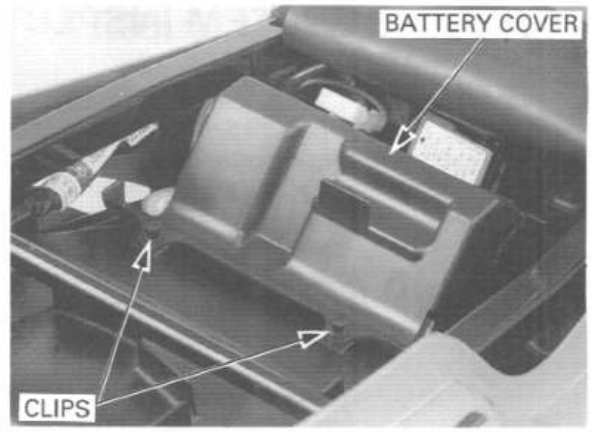
Remove the two clips and battery cover.
Disconnect the negative cable and then the positive cable, and remove the battery.

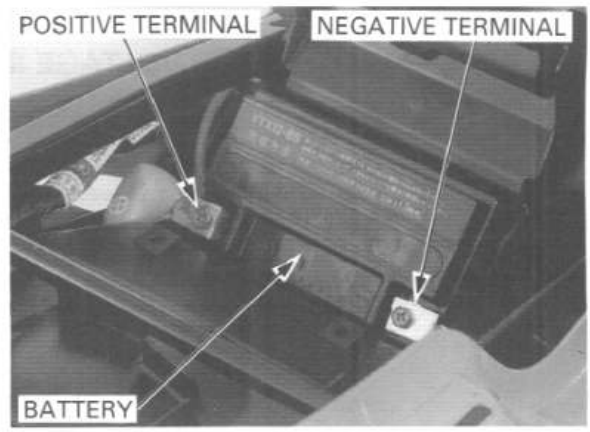
Install the battery in the reverse order of removal with the proper wiring as shown.

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.



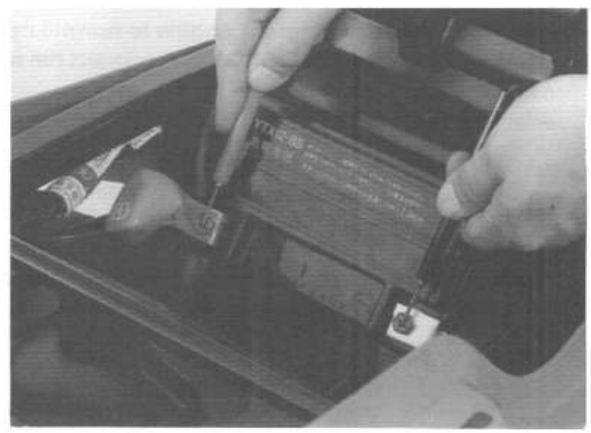


VOLTAGE INSPECTION

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 in U.S.A.**



BATTERY CHARGING

⚠ WARNING

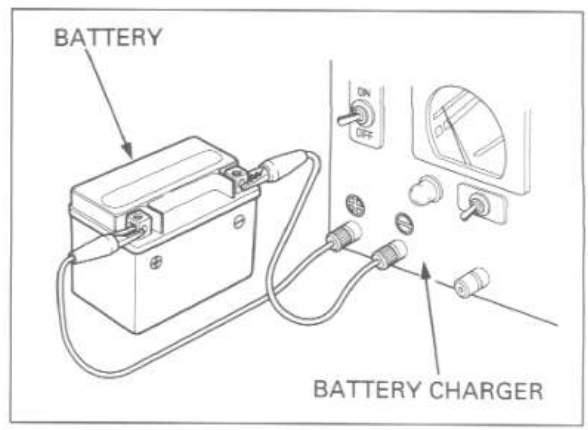
- ***The battery gives off explosive gases; keep sparks, flames, and cigarettes away. Provide adequate ventilation when charging.***
- ***Turn power ON/OFF at the charger, not at the battery terminal.***

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.

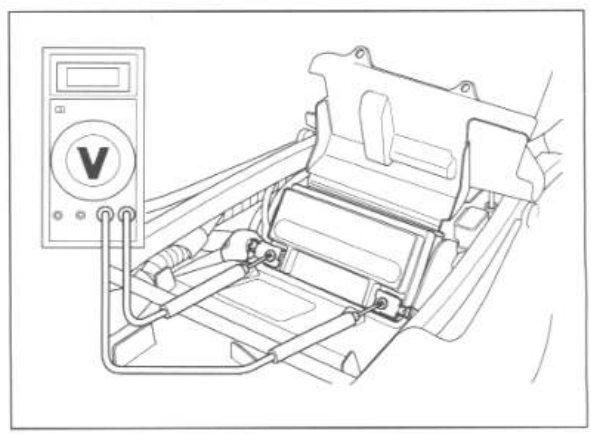
REGULATED VOLTAGE INSPECTION

⚠ 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 may lead to death.

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 rpm.

Standard: 14.0 – 14.8 V at 5,000 rpm

The battery is normal if the specified regulated voltage is displayed on the multimeter.

NOTE:

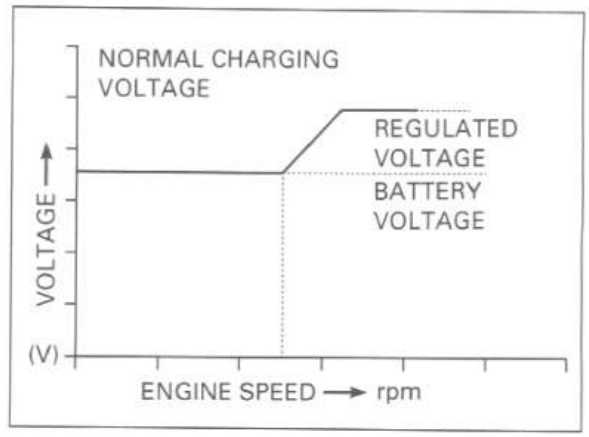
The speed at which the voltage starts to rise cannot be checked as it varies with the temperature and loads of the generator.

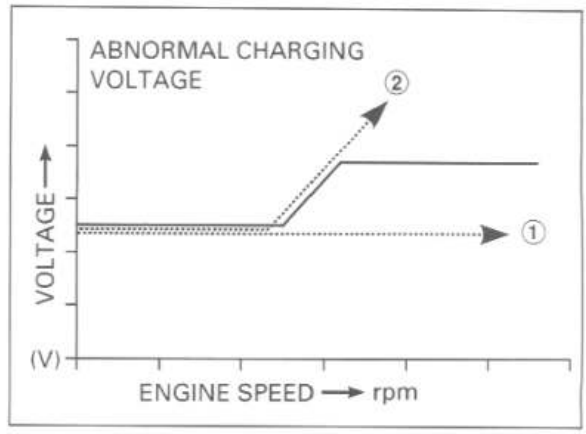
A frequently discharged battery is an indication that it is deteriorated even if it proves normal in the regulated voltage inspection.

The charging circuit may be abnormal if any of the following symptoms is encountered.

① Voltage not raised to regulated voltage (page 16-3):
- Open or short circuit in the charging system wire harness or poorly connected connector.
- Open or short of the alternator.
- Faulty regulator/rectifier.

② Regulated voltage too high (page 16-4):
- Poorly grounded voltage regulator/rectifier.
- Faulty battery.
- Faulty regulator/rectifier.





CURRENT LEAKAGE INSPECTION

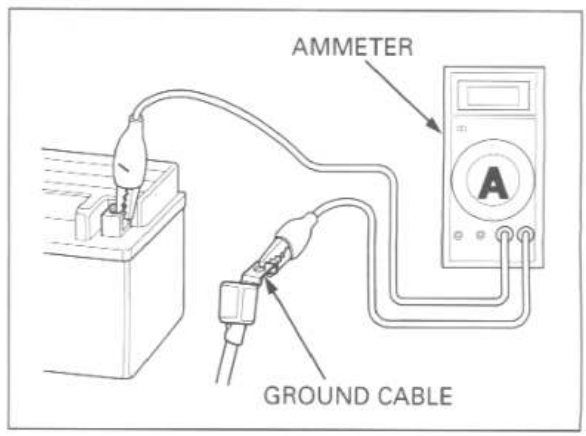
Turn the ignition switch off and disconnect the negative battery cable from the battery.
Connect the ammeter (+) probe to the ground cable and the ammeter (–) probe to the battery (–) terminal.
With the ignition switch off, check for current leakage.

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: 1.2 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.

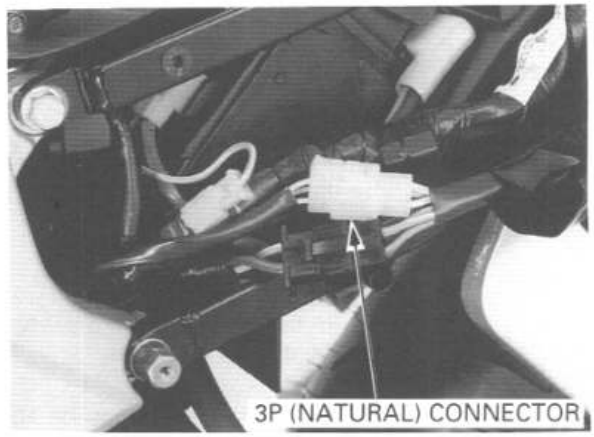


ALTERNATOR INSPECTION

It is not necessary to remove the stator coil to make this test.

Remove the rear cowl (page 2-3).

Remove the wire band.
Disconnect the regulator/rectifier 3P (Natural) connector.

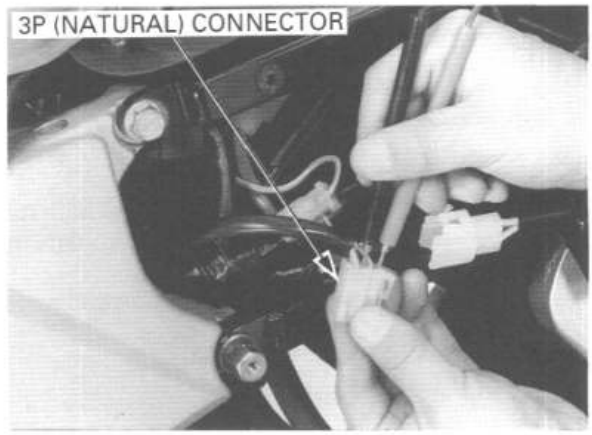


Check the resistance between all three Yellow terminals.

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.

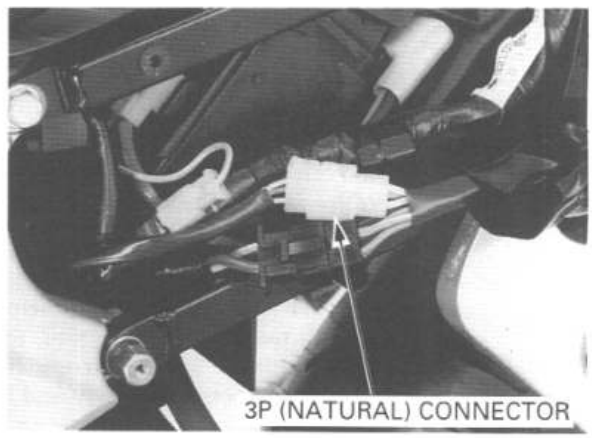
If readings are still far beyond the standard, or if any wire has continuity to ground, replace the alternator stator.



ALTERNATOR COVER REMOVAL

Remove the following:
— Side cowl (page 2-6)
— Rear cowl (page 2-3)
— Radiator reserve tank (page 6-15)

Remove the wire band.
Disconnect the alternator 3P (Natural) connector.
Remove the alternator wire out of the frame.



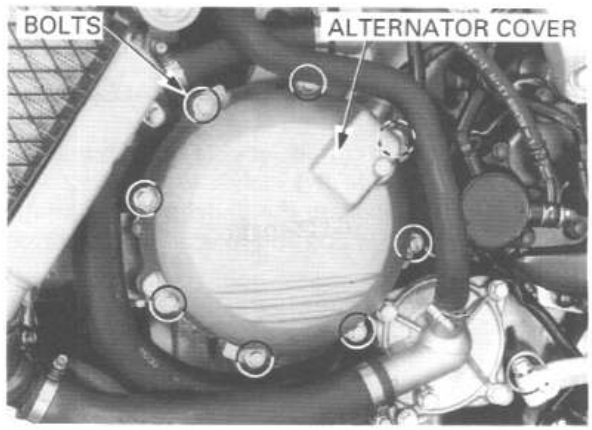
Remove the alternator cover SH bolts and alternator cover.

CAUTION:

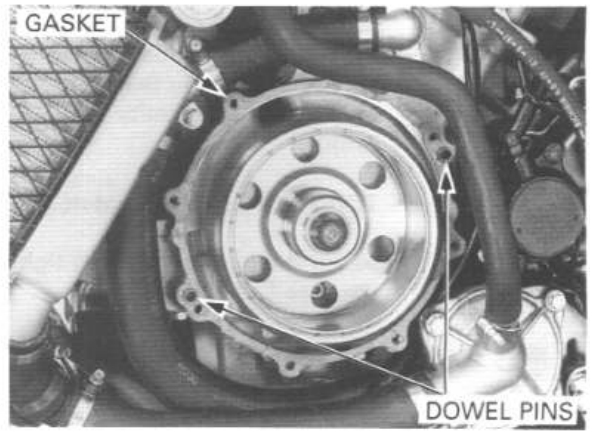
The alternator cover (stator) is magnetically attached to the flywheel, be careful during removal.

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.



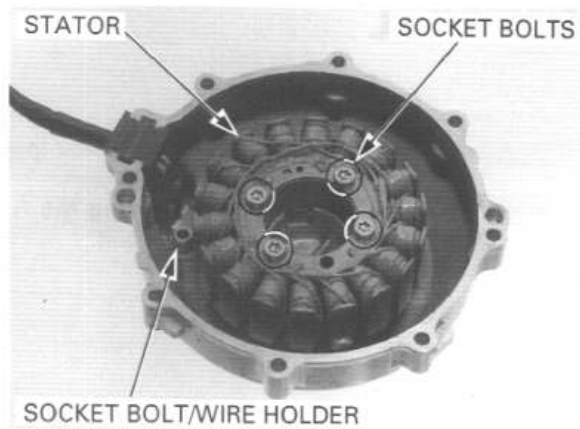
Remove the gasket and dowel pin.



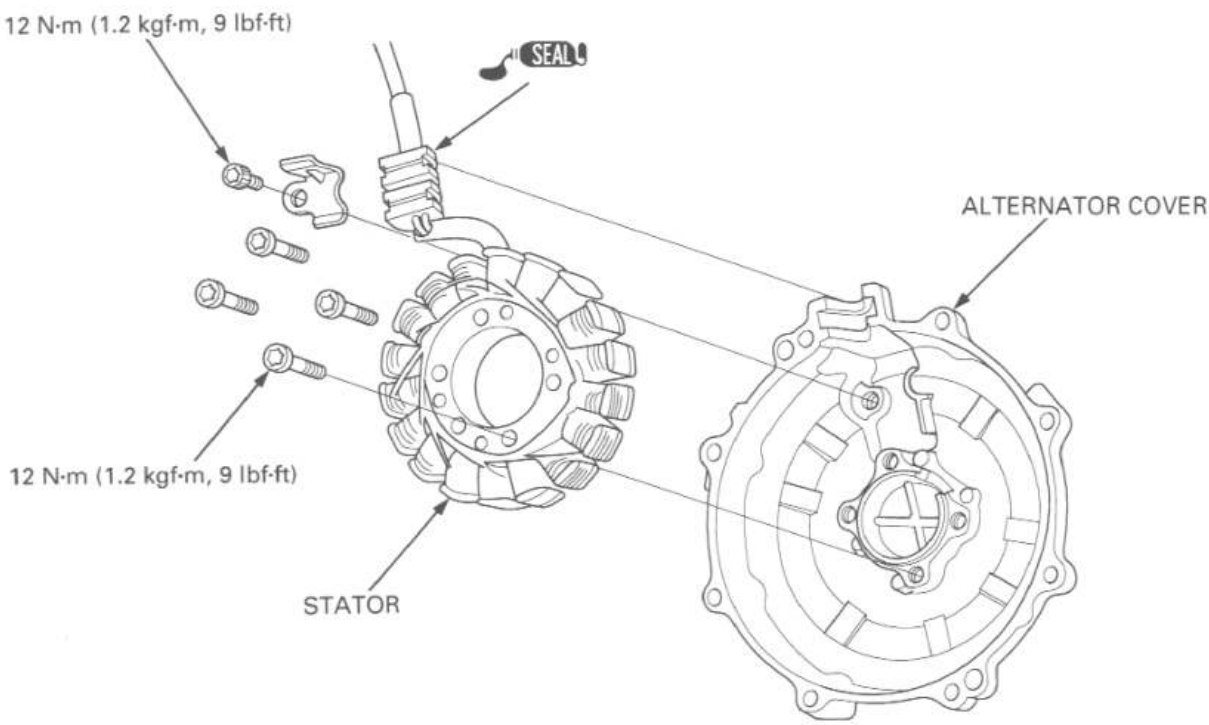
STATOR

REMOVAL

Remove the socket bolt and stator wire holder.
Remove the alternator wire grommet from the alternator cover.
Remove the socket bolts and stator.



INSTALLATION

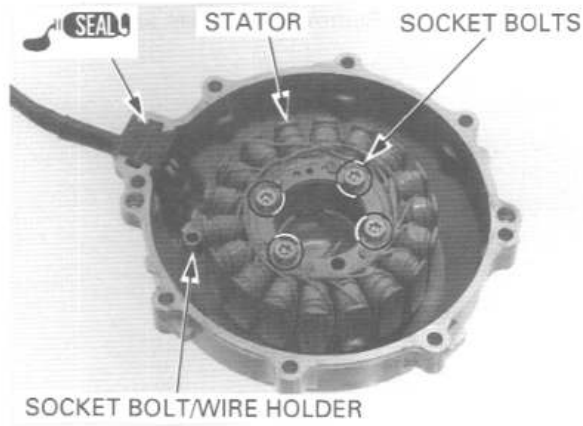


Install the stator into the alternator cover.
Apply sealant to the wire grommet, then install the wire grommet into the alternator groove securely.
Install and tighten the socket bolts to the specified torque.

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: 12 N·m (1.2 kgf·m, 9 lbf·ft)



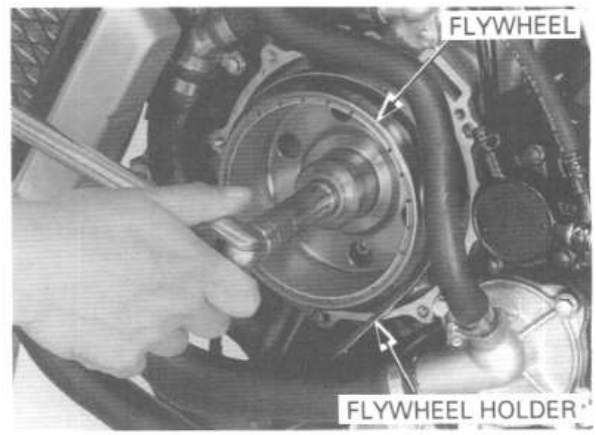
FLYWHEEL

REMOVAL

Remove the alternator cover (page 16-8).

Hold the flywheel using the flywheel holder, then remove the flywheel bolt.

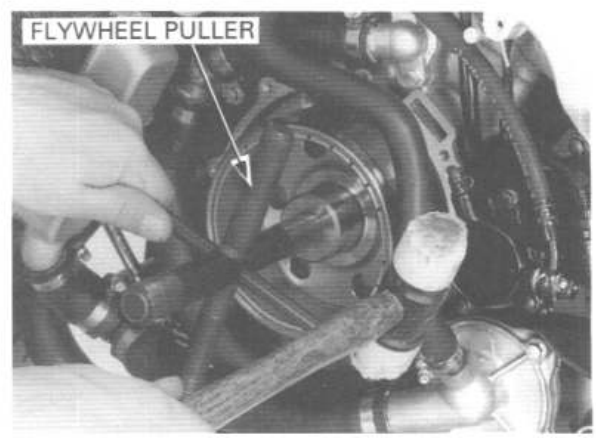
TOOL:
Flywheel holder — **07725 – 0040000 (Equivalent commercially available in U.S.A.)**



Remove the washer.

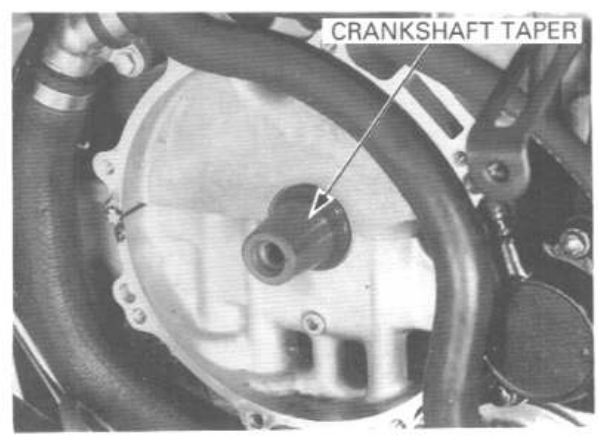
Remove the flywheel using the special tool.

TOOL:
Rotor puller — **07733 – 0020001 or 07933 – 3950000**



INSTALLATION

Clean any oil from the crankshaft taper and mating surface of the flywheel.



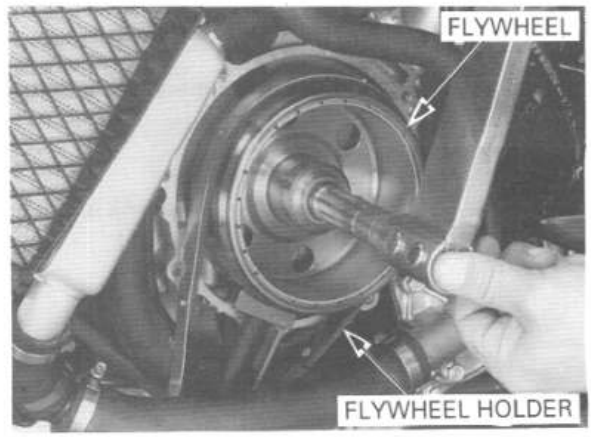
Install the flywheel.
Apply oil to the flywheel bolt threads and seating surface.
Install the washer and flywheel bolt.

Hold the flywheel using the flywheel holder, then tighten the bolt to the specified torque.

TOOL:

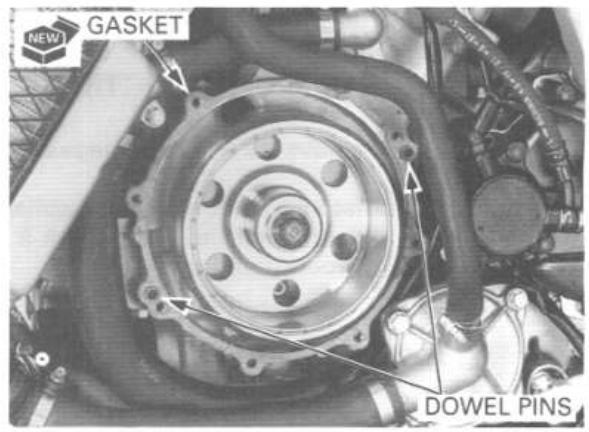
Flywheel holder	**07725 – 0040000 (Equivalent commercially available in U.S.A.)**

TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)



ALTERNATOR COVER INSTALLATION

Install the dowel pins and new gasket.



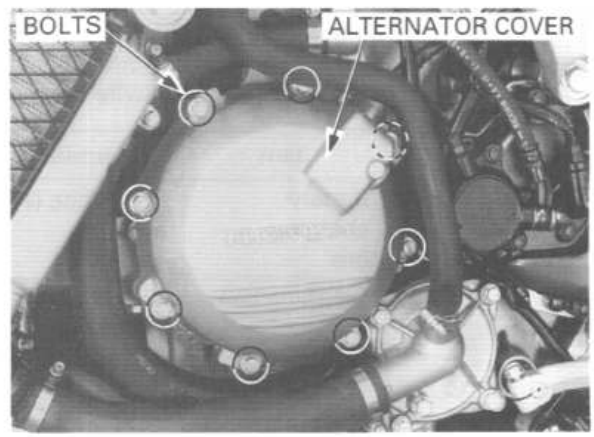
Install the alternator cover.

CAUTION:

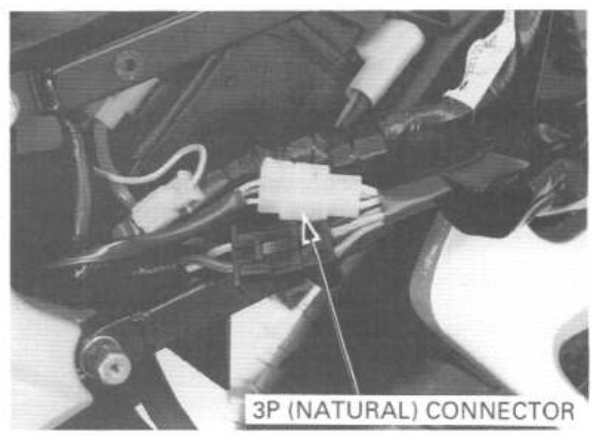
The alternator cover (stator) is magnetically attached to the flywheel, be careful during installation.

Install and tighten the SH bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



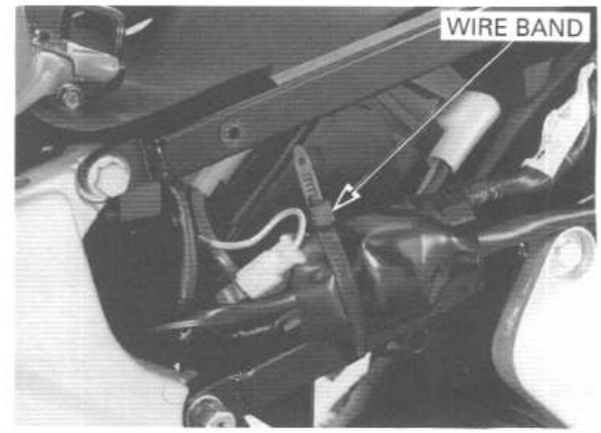
Route the alternator wire into the frame, connect the alternator 3P (Natural) connector.



Install the wire band.

Add the recommended oil up to proper level (page 3-13).

Install the following:
— Radiator reserve tank (page 6-15)
— Rear cowl (page 2-4)
— Side cowl (page 2-7)

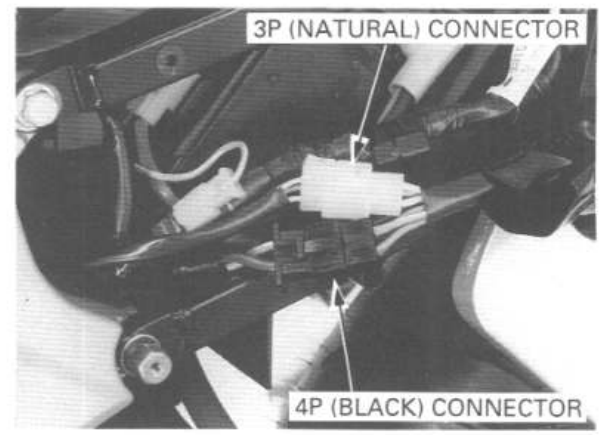


REGULATOR/RECTIFIER

SYSTEM INSPECTION

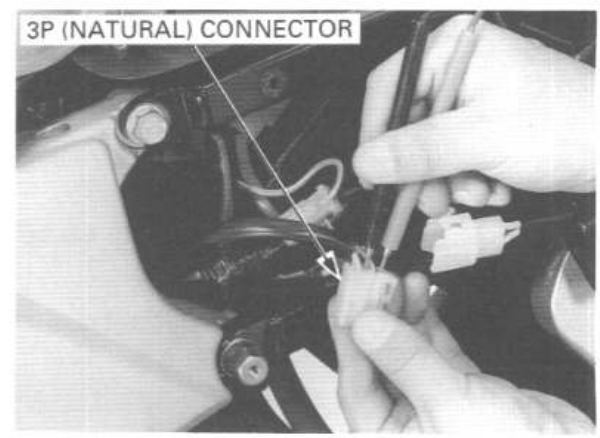
Remove the rear cowl (page 2-3).

Disconnect the regulator/rectifier 3P (Natural) and 4P (Black) connector, 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

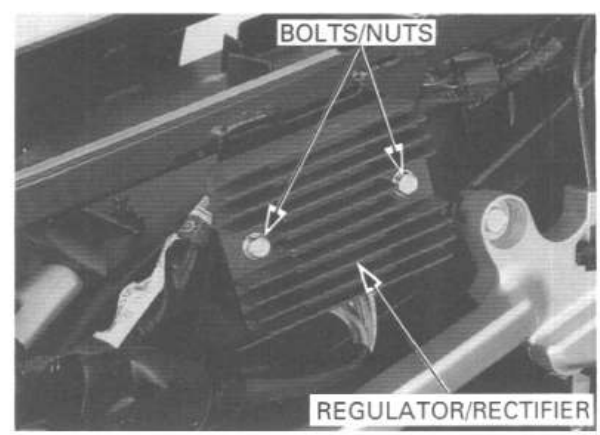


If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connectors, replace the regulator/rectifier unit.

REMOVAL/INSTALLATION

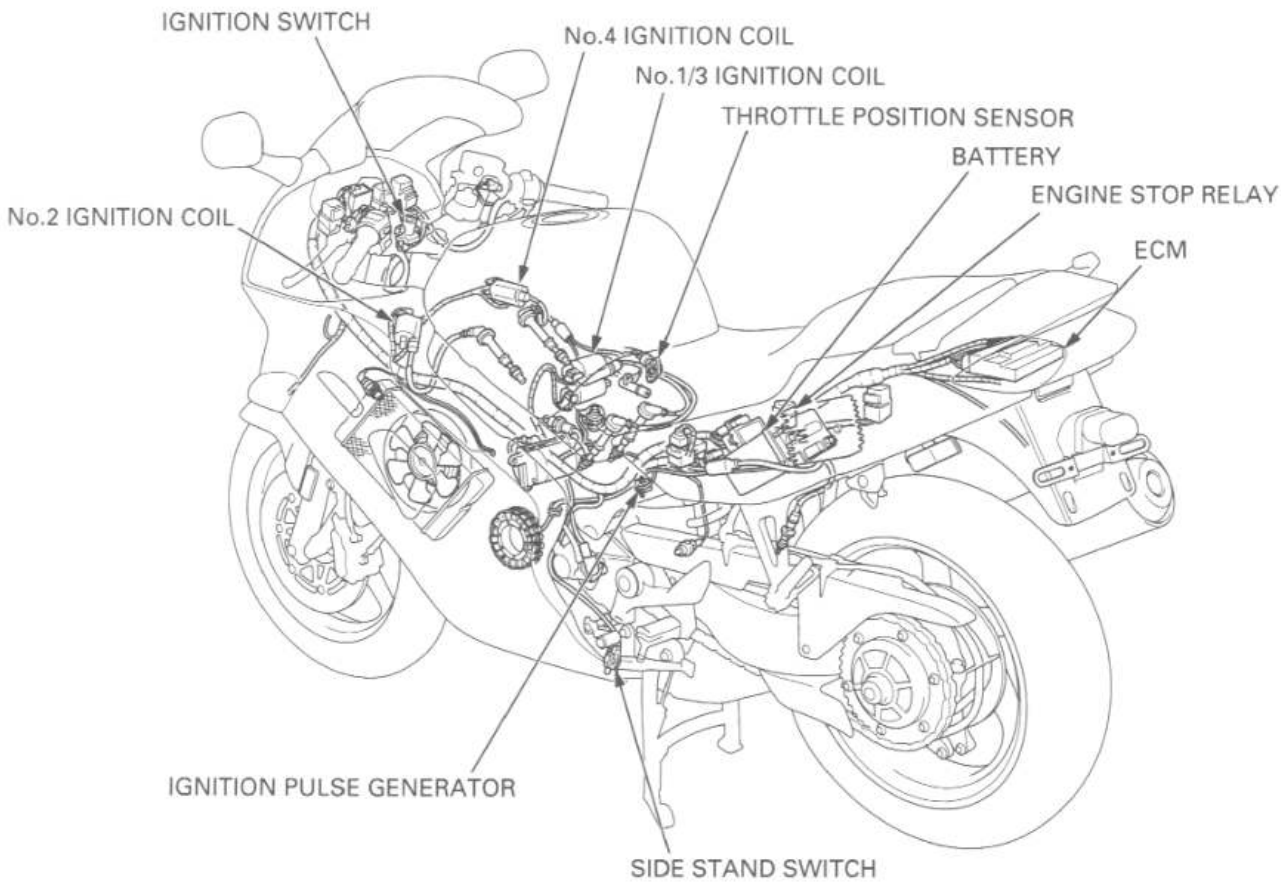
Disconnect the connector.
Remove the regulator/rectifier unit mounting bolts, nuts and regulator/rectifier.

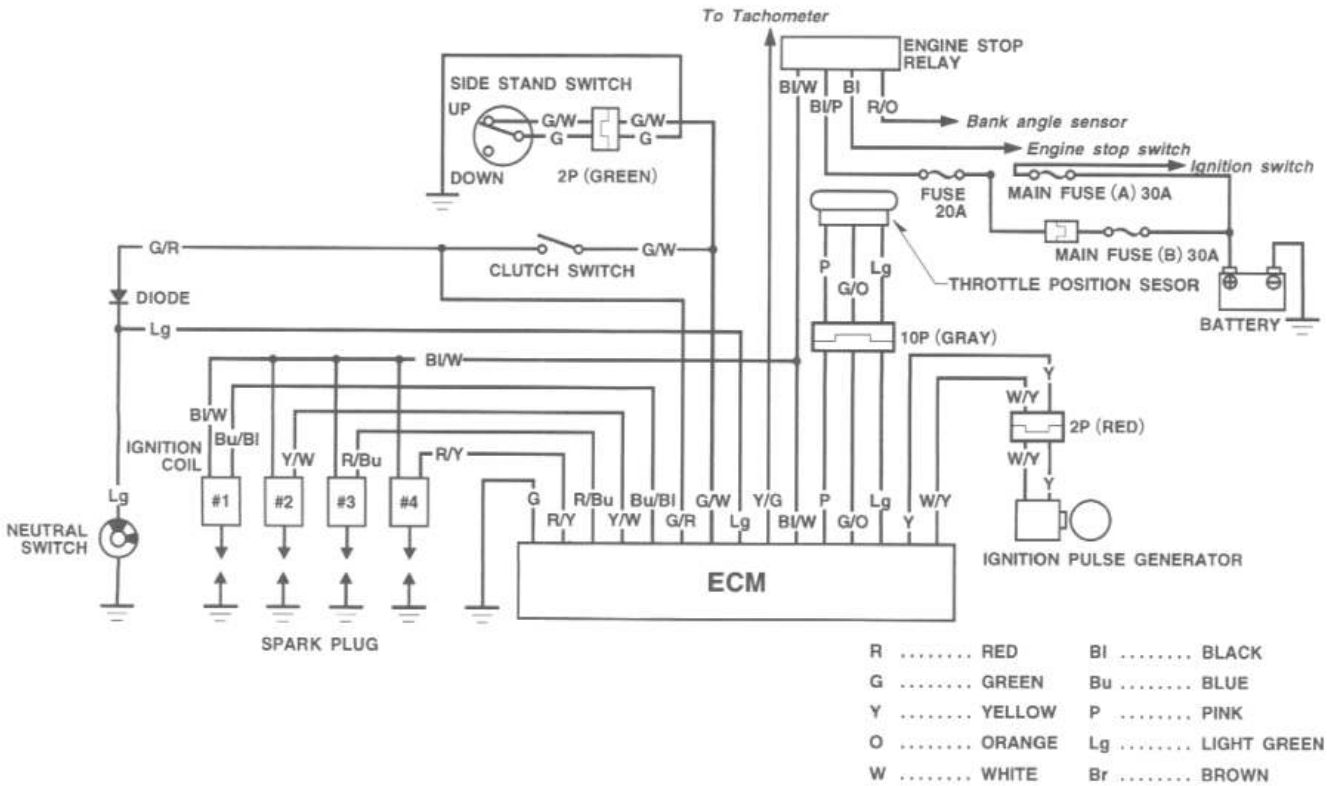
Install the regulator/rectifier unit in the reverse order of removal.



MEMO

SYSTEM DIAGRAM





17. IGNITION SYSTEM

SYSTEM DIAGRAM	17-0	IGNITION COIL	17-7
SERVICE INFORMATION	17-1	IGNITION PULSE GENERATOR	17-7
TROUBLESHOOTING	17-3	IGNITION TIMING	17-8
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 may lead to death.

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.
- The Ignition Control Module (ICM) is built into the ECM.
- The ignition timing does not normally need to be adjusted since the ECM is factory preset.
- The ECM may be damaged if dropped. Also if the connector is disconnected when current is flowing, the excessive voltage may damage the module. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding. Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- Refer to section 5 for throttle position sensor and ECM inspection.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug	NGK	CR9EH-9
	DENSO	U27FER9
Spark plug gap		0.8 – 0.9 mm (0.03 – 0.04 in)
Ignition coil peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)	49 states/Canada type	15° BTDC at idle
	California type	10° BTDC at idle

TORQUE VALUES

Spark plug	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Timing hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply grease to the threads
Ignition pulse generator rotor special bolt	103 N·m (10.5 kgf·m, 76 lbf·ft)	Apply oil to the threads
Ignition pulse generator SH bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

TOOLS

Peak voltage tester (U.S.A only) or Peak voltage adaptor	07HGJ – 0020100 with Commercially available digital multimeter (impedance 10 MΩ/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 wire 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 Blue/Black, Yellow/White, Red/Blue and Red/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

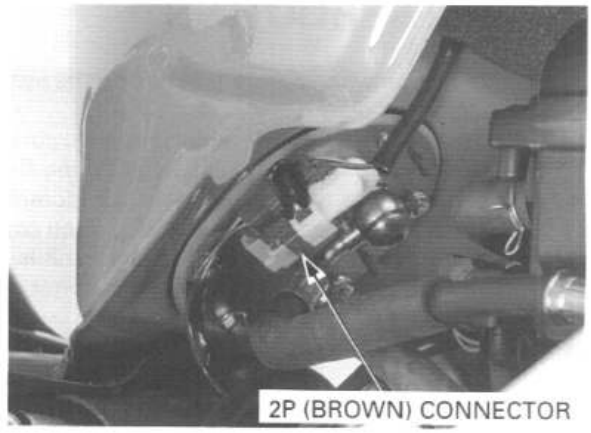
NOTE:

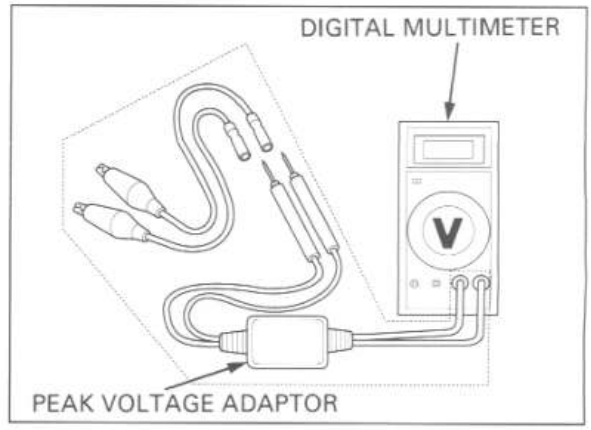
- If there is no spark at any plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use recommended digital multimeter or commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If using peak voltage tester (U.S.A. only), follow the manufacturer's instructions.
- Disconnect the fuel pump connector before measuring the peak voltage.

Disconnect the fuel pump 2P (Brown) connector.

Connect the peak voltage adaptor to the digital multimeter, or use the Imrie diagnostic tester.

TOOLS:
Peak voltage tester (U.S.A. only) or
Peak voltage adaptor 07HGJ – 0020100
with commercially available digital multimeter
(impedance 10 MΩ/DCV minimum)





IGNITION COIL PRIMARY PEAK VOLTAGE

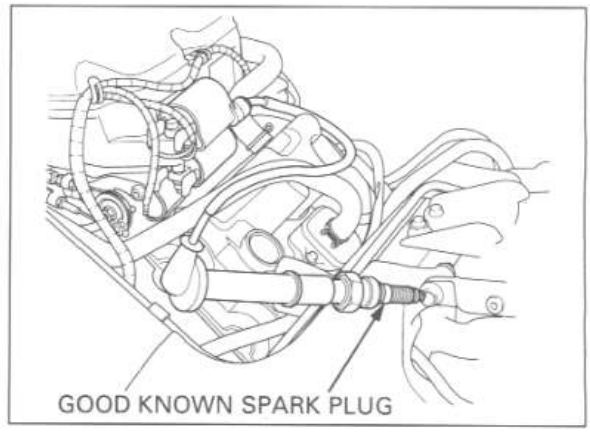
⚠ WARNING

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.



Do not disconnect the ignition coil primary wires.

With the ignition coil primary wire connected, connect the peak voltage adaptor or Imrie tester to the ignition coil.

CONNECTION:
No. 1 coil:
Blue/Black terminal (+) – Body ground (–)
No. 2 coil:
Yellow/White terminal (+) – Body ground (–)
No. 3 coil:
Red/Blue terminal (+) – Body ground (–)
No. 4 coil:
Red/Yellow terminal (+) – Body ground (–)

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.

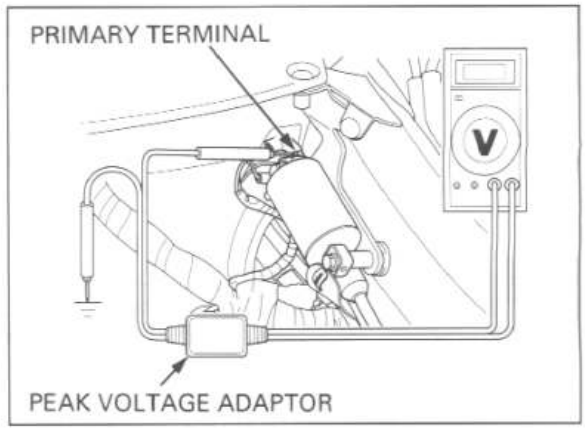
PEAK VOLTAGE: 100 V minimum

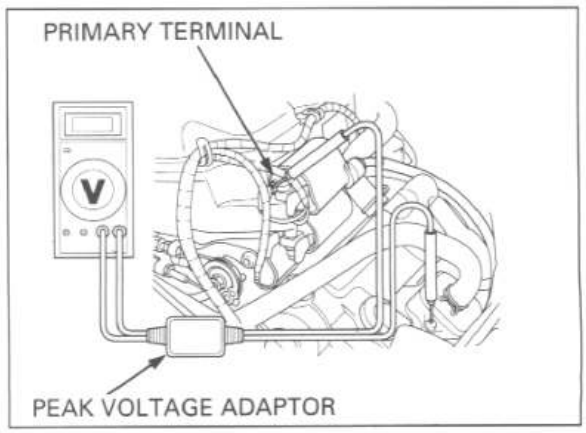
NOTE:

Although measured values are different for each ignition coil, they are normal as long as the voltage is higher than the standard value.

If the peak voltage is lower than the standard value, abnormal, refer to the troubleshooting chart on page 17-3.

Install the removed parts in the reverse order of removal.





IGNITION PULSE GENERATOR PEAK VOLTAGE

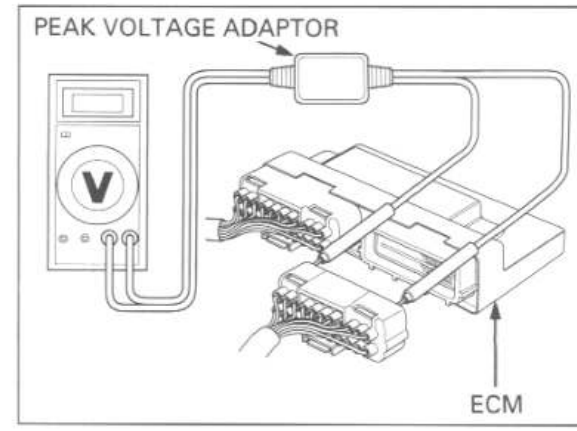
⚠ WARNING

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.

Remove the seat (page 2-3).
Disconnect the 22P (Light gray) connector from the ECM.
Connect the peak voltage adaptor or peak voltage tester probes to the connector terminals of the wire harness side.



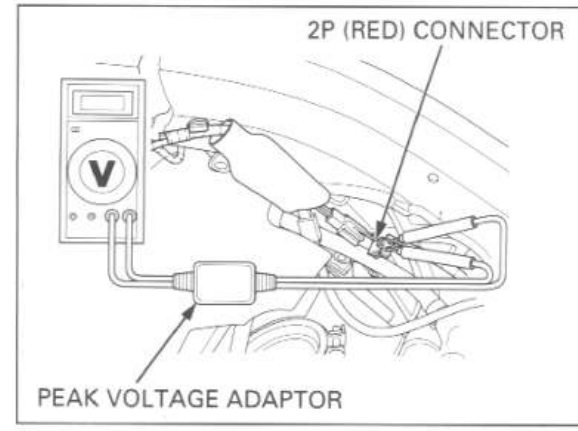
TOOLS:
Peak voltage tester (U.S.A. only) or
Peak voltage adaptor 07HGJ – 0020100
with commercially available digital multimeter
(impedance 10 MΩ/DCV minimum)

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.



Remove the air cleaner housing (page 5-53).
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.

Install the removed parts in the reverse order of removal.

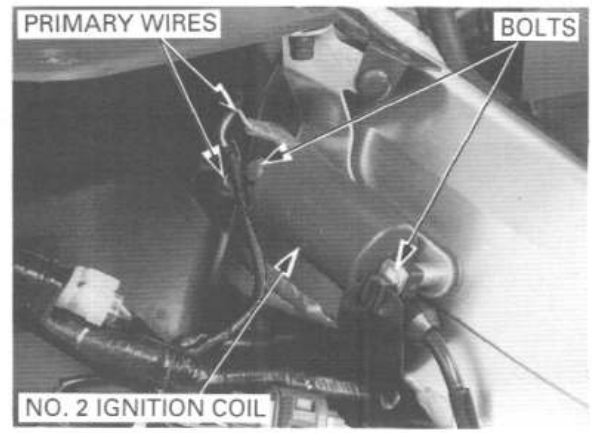
IGNITION COIL

REMOVAL/INSTALLATION

No.2:
Remove the side cowl (page 2-6).
Disconnect the spark plug cap from the plug (page 3-7).

Disconnect the primary wires from the terminals.
Remove the bolts and ignition coil.

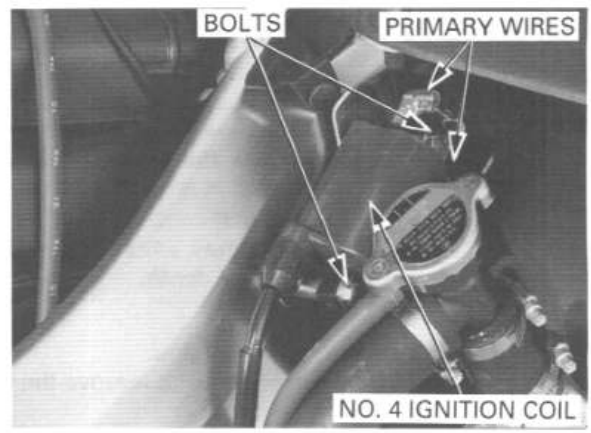
Installation is in the reverse order of removal.



No.4:
Remove the side cowl (page 2-6).
Disconnect the spark plug cap from the plug (page 3-7).

Disconnect the primary wires from the terminals.
Remove the bolts and ignition coil.

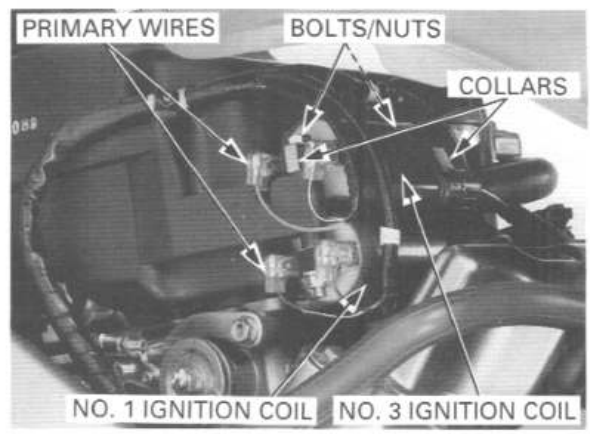
Installation is in the reverse order of removal.



No.1/3:
Remove the seat (page 2-3).
Open and support the fuel tank (page 3-4).
Disconnect the spark plug cap from the plug (page 3-7).

Disconnect the primary wires from the terminals.
Remove the nuts, bolts, collars and ignition coils.

Installation is in the reverse order of removal.

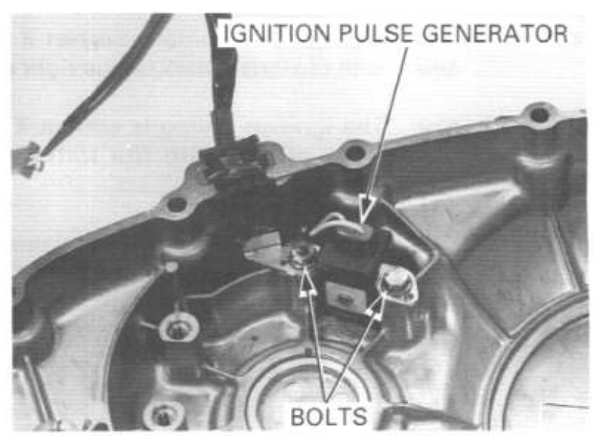


IGNITION PULSE GENERATOR

REMOVAL

Remove the right crankcase cover (page 9-12).

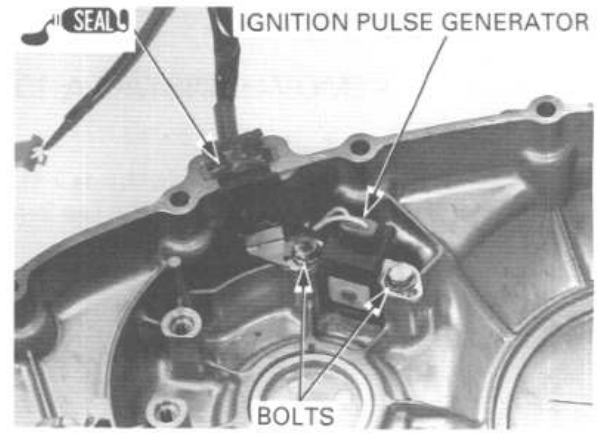
Remove the ignition pulse generator socket bolts.
Release the wire grommet from the right crankcase cover groove, then remove the ignition pulse generator.



Installation is in the reverse order of removal.
Tighten the SH bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the right crankcase cover (page 9-23).

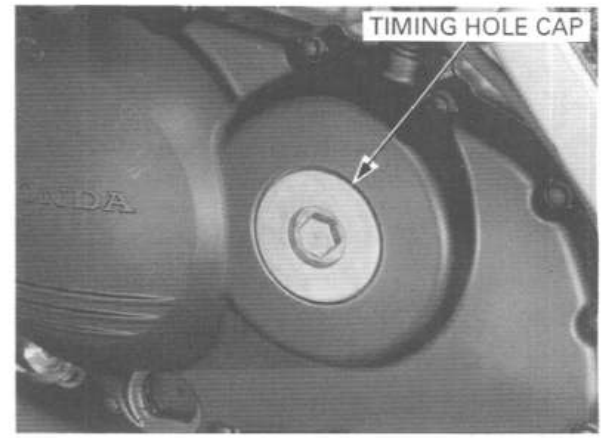


IGNITION TIMING

⚠ 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.***

Warm up the engine.
Stop the engine and remove the timing hole cap.

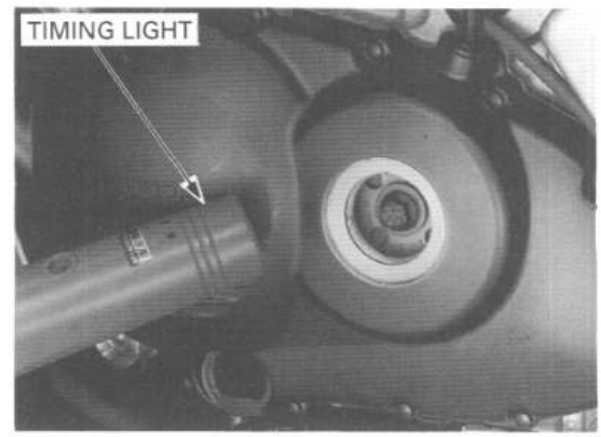


Read the instructions for timing light operation.

Connect the timing light to the No.1 spark plug wire.

Start the engine and let it idle.

IDLE SPEED:
49 states/Canada type: 1,200 ± 100 rpm
California type: 1,300 ± 100 rpm



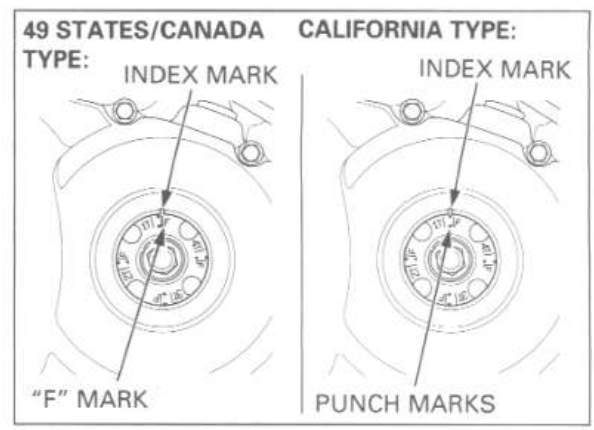
49 states/canada type

The ignition timing is correct if the "F" mark aligns with the index mark on the right crankcase cover.

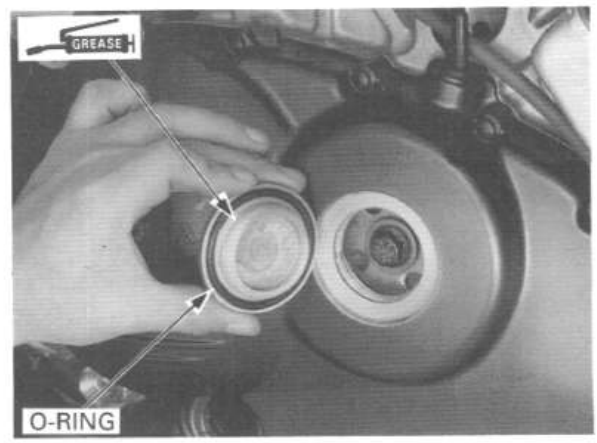
California type

The ignition timing is correct if the "punch marks" mark aligns with the index mark on the right crankcase cover.

Increase the engine speed by turning the throttle stop screw and make sure the "F mark" or "punch marks" begins to move counterclockwise when the engine speed at approximately 2,000 rpm.

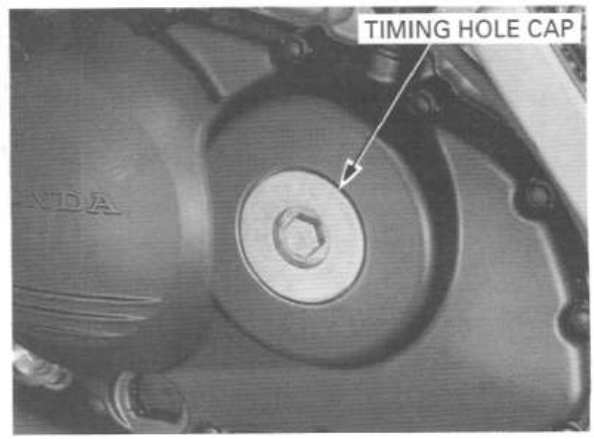


Check the O-ring is in good condition, replace if necessary.
Apply grease to the timing hole cap threads.

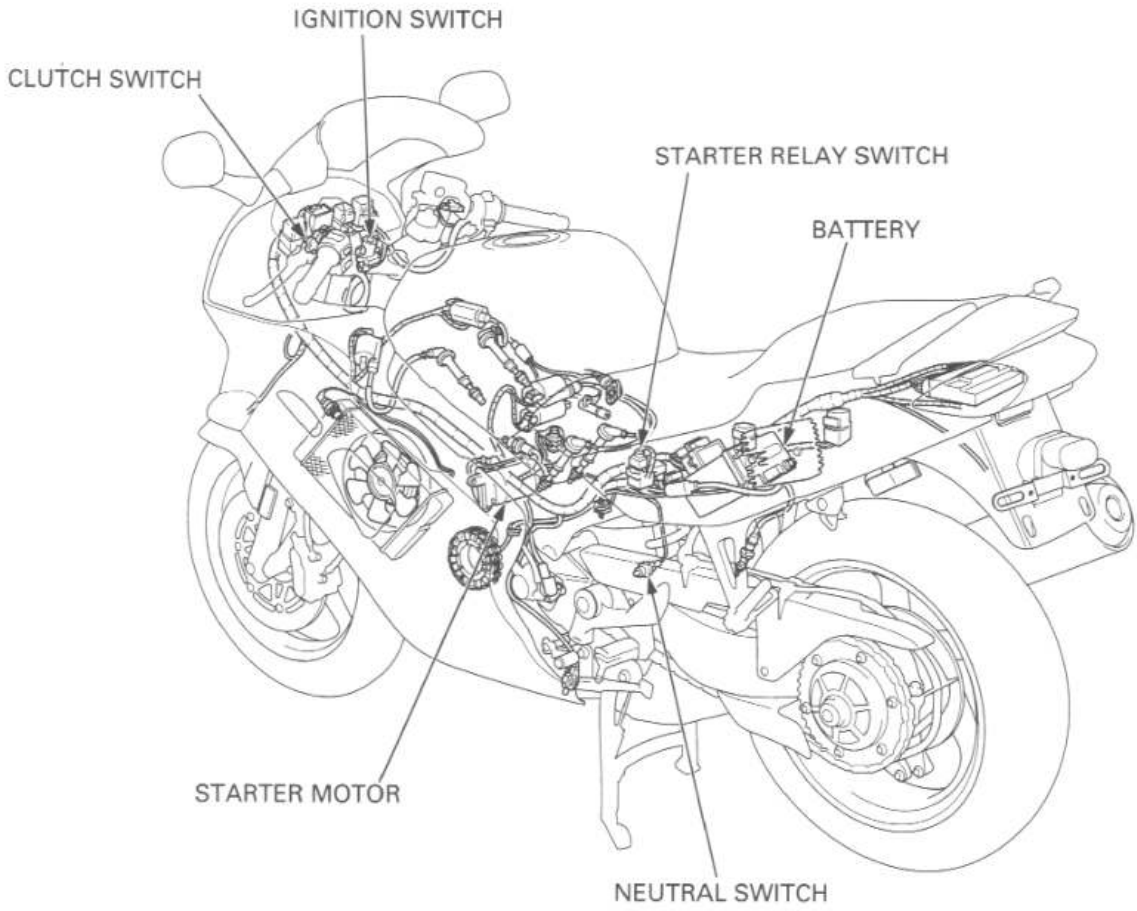


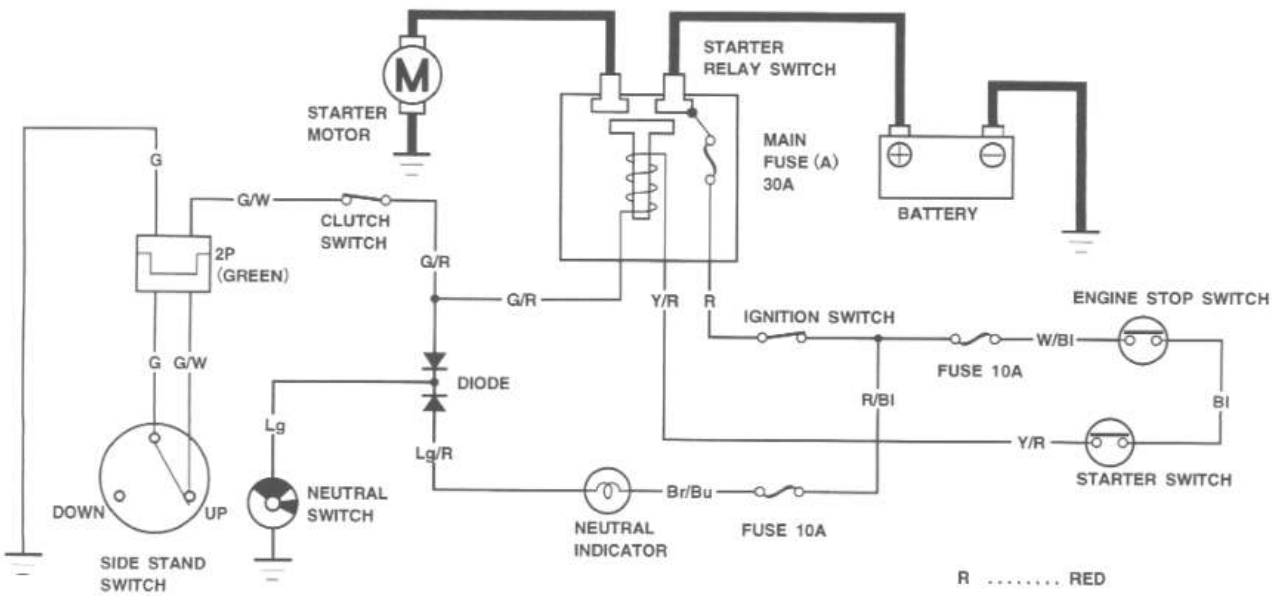
Install and tighten the timing hole cap to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)



SYSTEM DIAGRAM





18. ELECTRIC STARTER/STARTER CLUTCH

SYSTEM DIAGRAM	18-0	STARTER CLUTCH	18-9
SERVICE INFORMATION	18-1	STARTER RELAY SWITCH	18-15
TROUBLESHOOTING	18-2	DIODE	18-16
STARTER MOTOR	18-4		

SERVICE INFORMATION

GENERAL

- The starter motor can be removed with the engine in the frame.

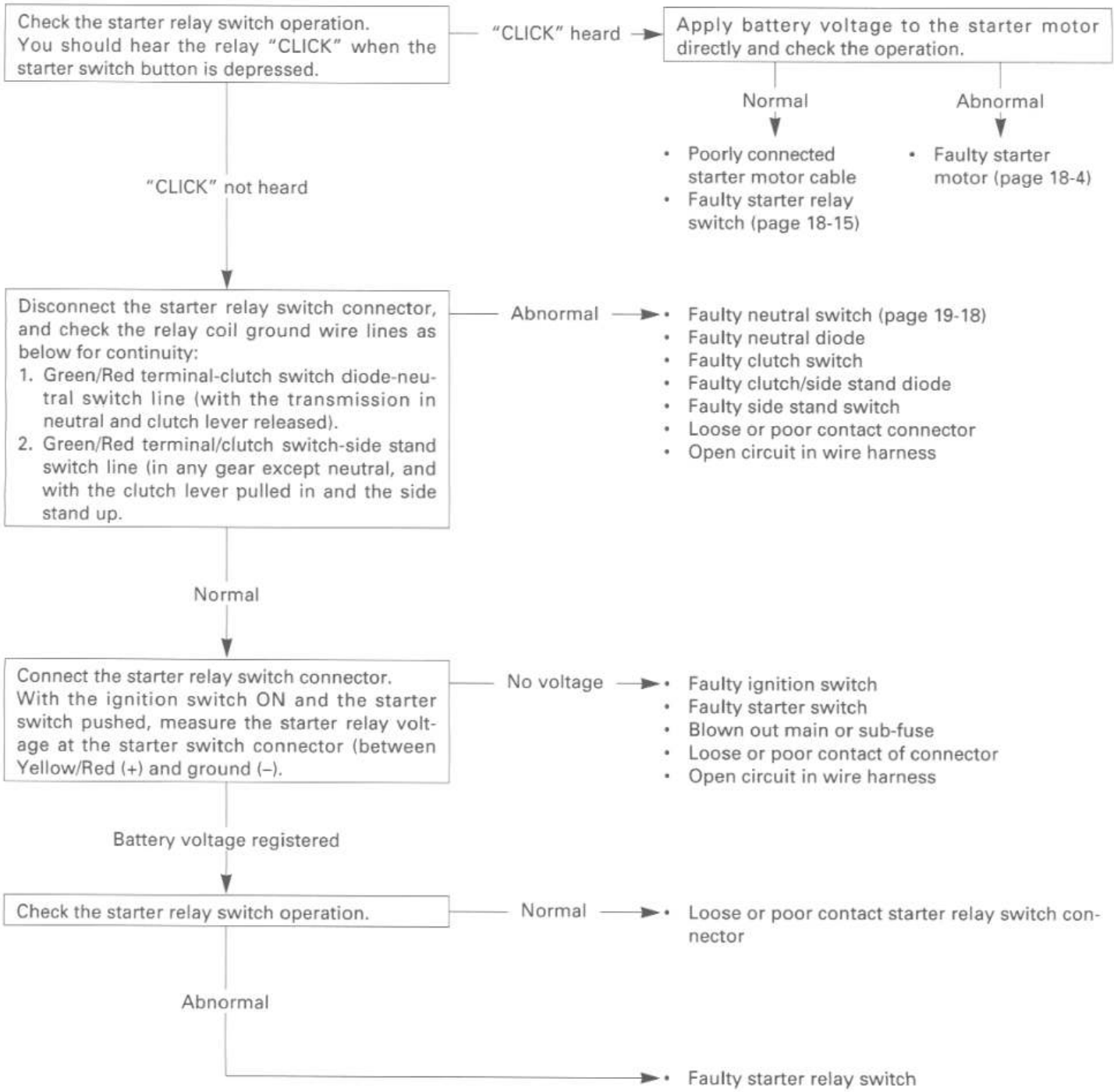
SPECIFICATION

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	4.5 (0.18)
Starter driven gear O.D.	45.657 – 45.673 (1.7975 – 1.7981)	45.64 (1.797)

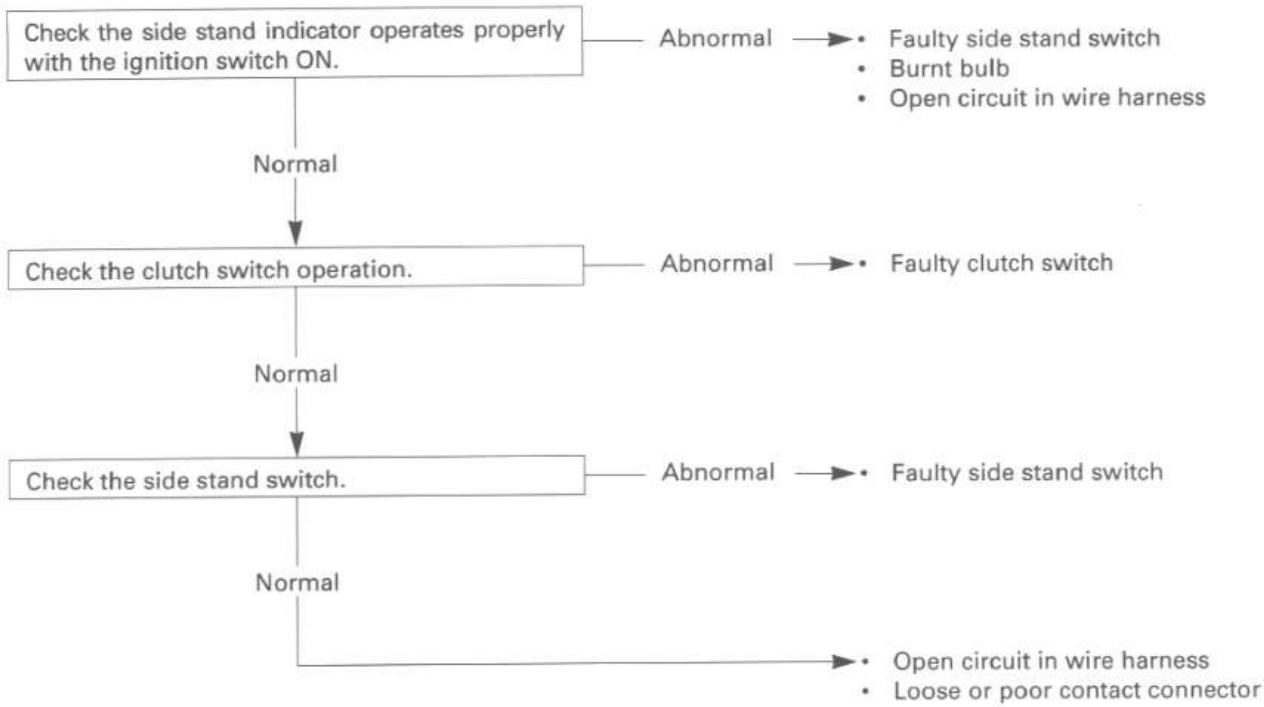
TROUBLESHOOTING

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.



The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the side stand up and the clutch lever pulled in.



Starter motor turns engine slowly
- Low battery voltage
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poor connected battery ground cable

Starter motor turns, but engine does not turn
- Starter motor is running backwards
  - — Case assembled improperly
  - — Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter drive gear

Starter relay switch "Clicks", but engine does not turn over
- Crankshaft does not turn due to engine problems

STARTER MOTOR

REMOVAL

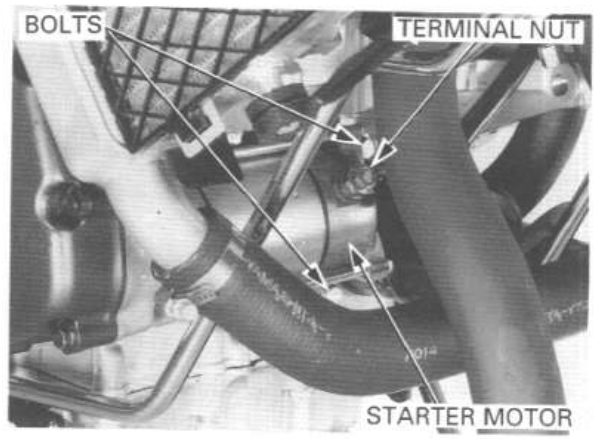
⚠ WARNING

With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Remove the side cowl and inner half cowl (page 2-3).

Remove the nut and the starter motor cable from the starter motor.
Remove the starter motor mounting bolts.

Pull the starter motor out of the crankcase.

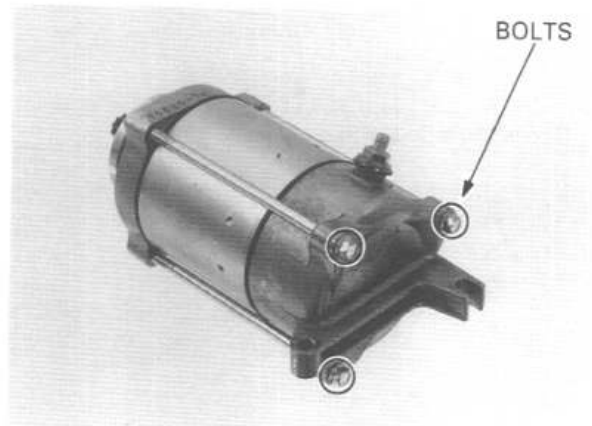


DISASSEMBLY

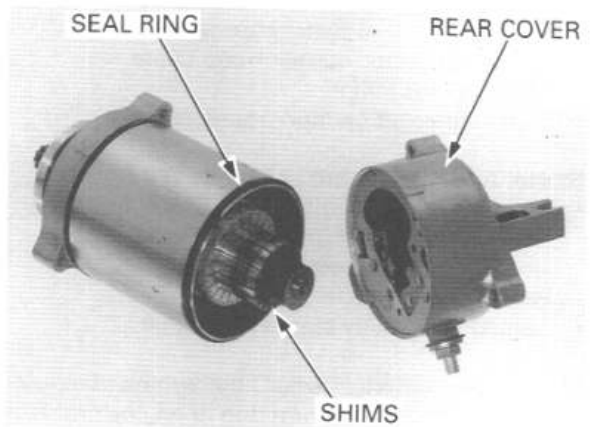
NOTE:

Record the location and number of shims.

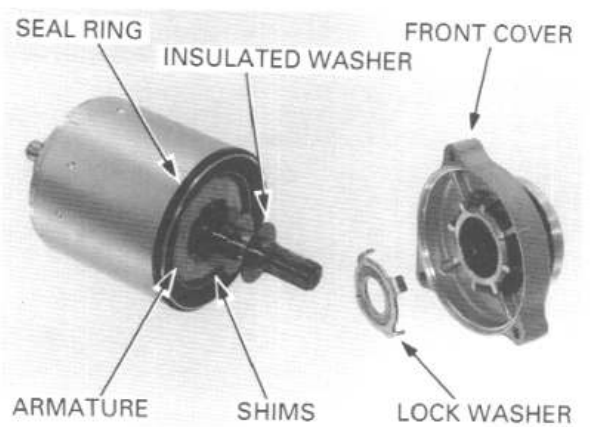
Remove the following:
— Starter motor case bolts



— Rear cover assembly
— Seal ring
— Shims

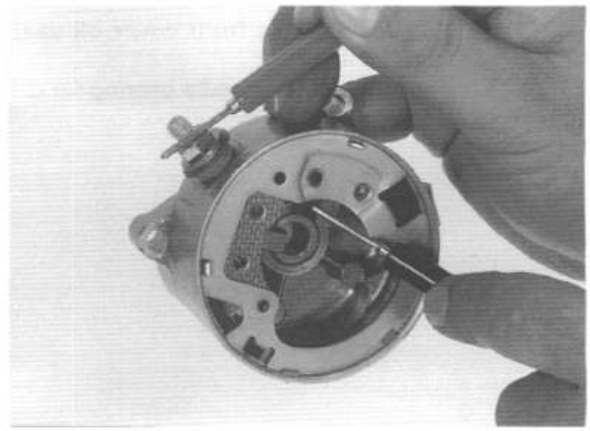


— Front cover assembly
— Seal ring
— Lock washer
— Insulated washer
— Shims
— Armature

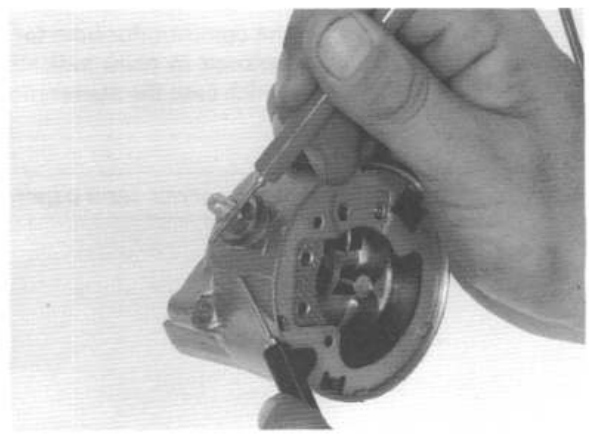


INSPECTION

Check for continuity between the cable terminal and the brush wire (the indigo colored wire or the insulated brush holder).
There should be continuity.

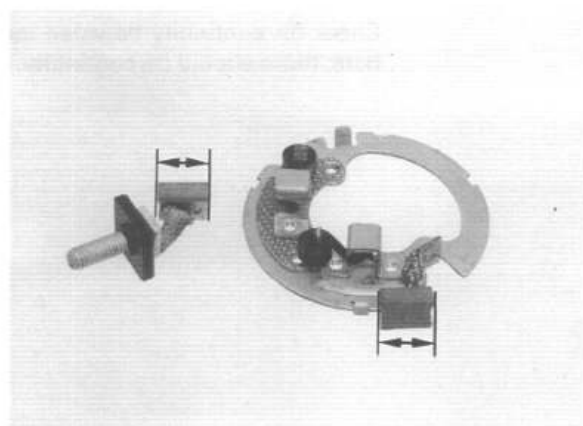


Check for continuity between the motor case and the cable terminal.
There should be no continuity.

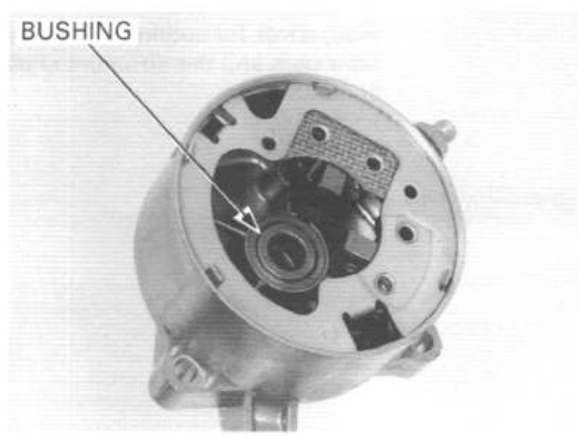


Inspect the brushes for damage and measure the brush length.

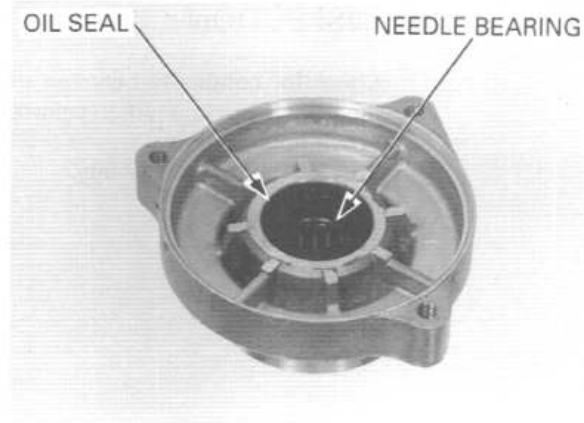
SERVICE LIMIT: 4.5 mm (0.18 in)



Check the bushing of the rear cover for wear or damage.



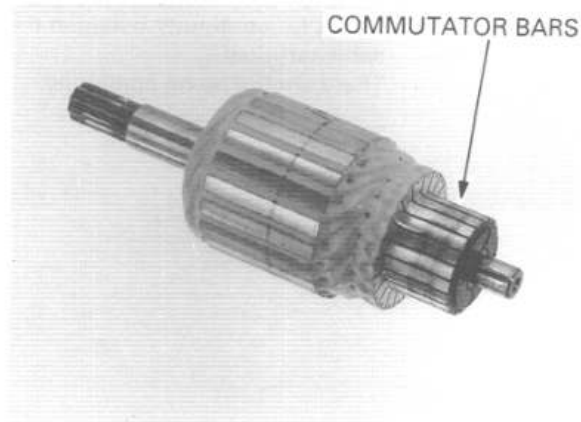
Check the front cover oil seal for fatigue or other damage.
Check the needle bearing for damage.



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.



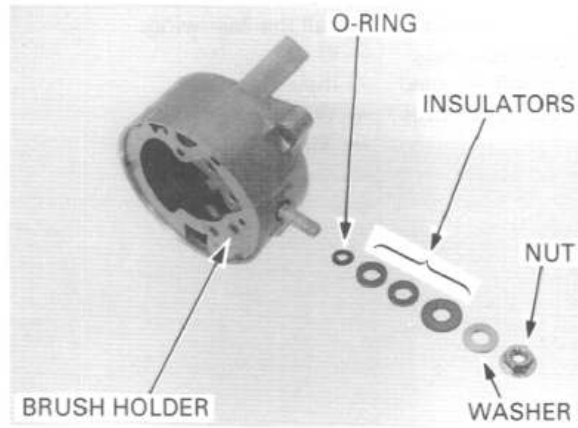
Check for continuity between individual commutator bars; there should be continuity.



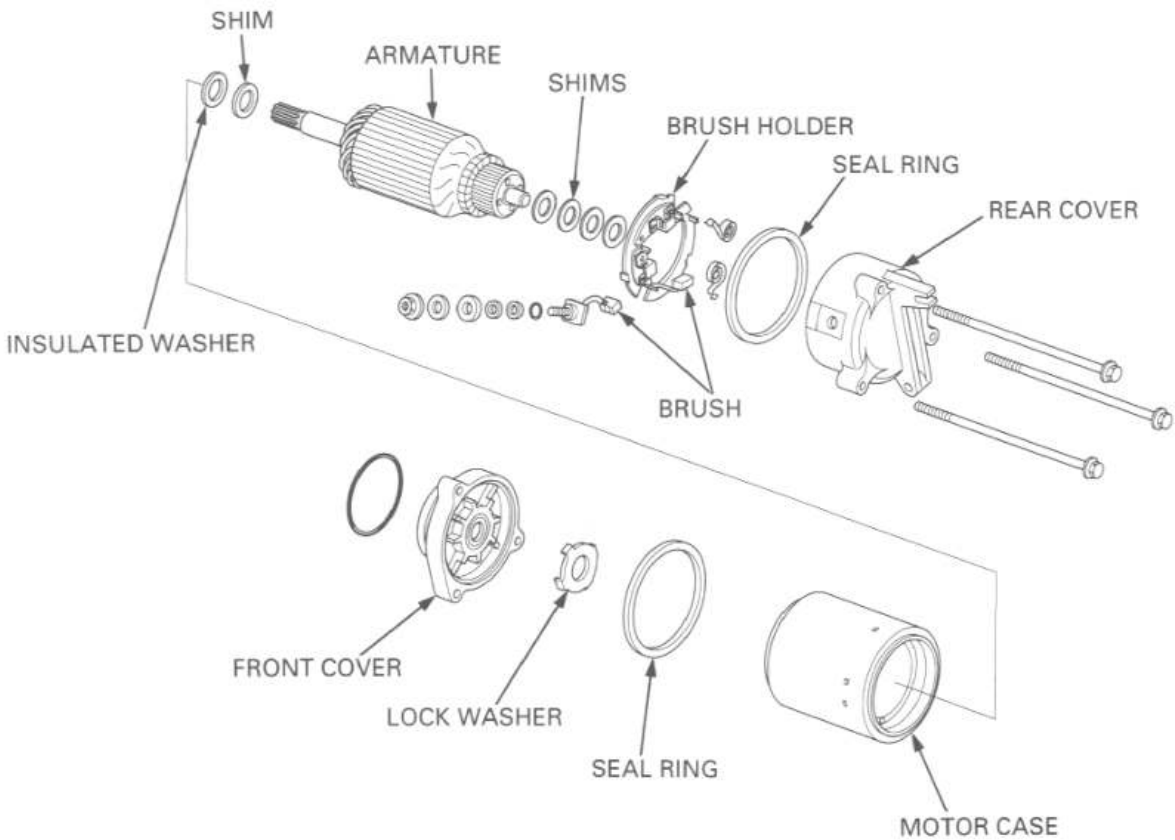
Also, check for continuity between individual commutator bars and the armature shaft; there should be no continuity.



Remove the following:
— Nut
— Washer
— Insulators
— O-ring
— Brush holder assembly
— Brush/terminal

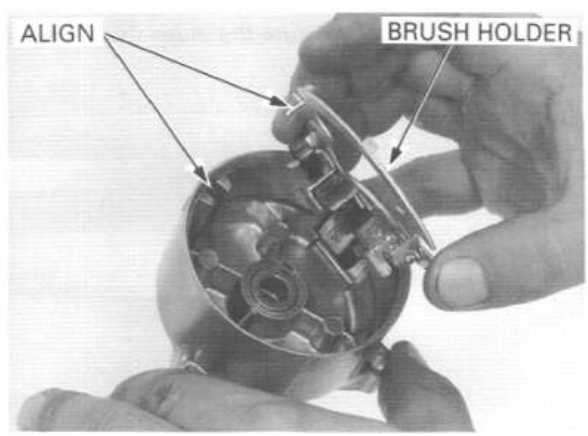


ASSEMBLY



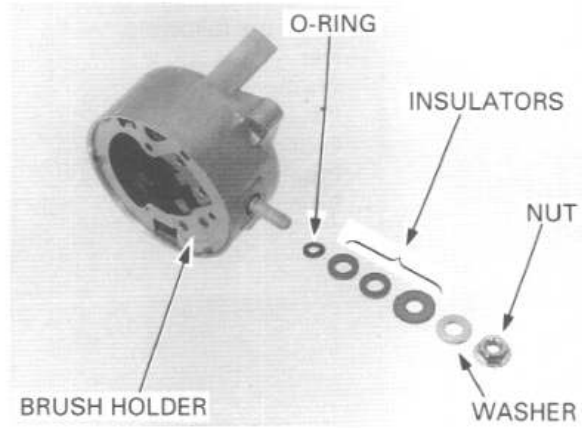
Set the brushes on the brush holder.
Install the brush holder onto the rear cover.

Align the terminal holder plate boss with the groove of the motor case.



Install the insulators properly as noted during removal.

Install the following:
— O-ring
— Insulators
— Washer
— Nut



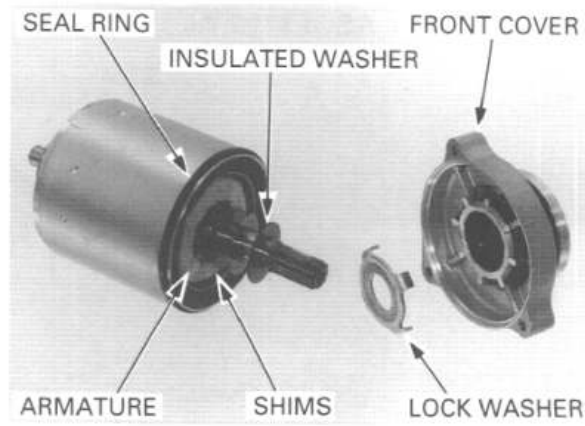
Install the armature in the motor case.

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.
Assemble the front cover and motor case.

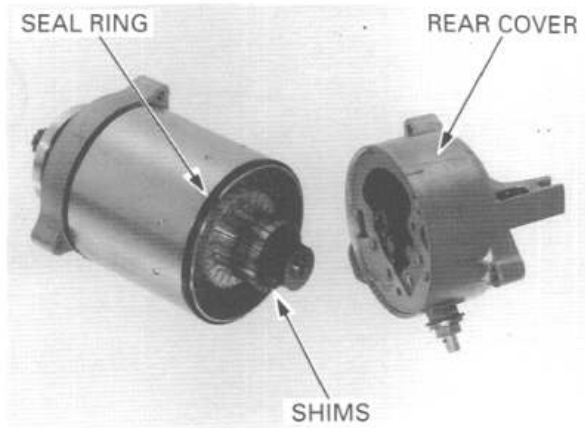


Install the seal ring on the motor case.

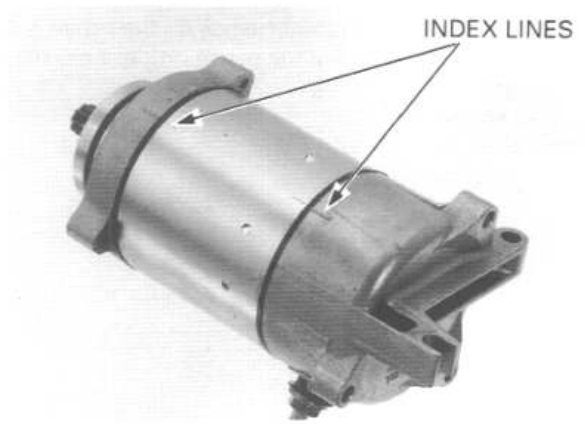
Install the shims properly as noted during removal.

Install the shims on the armature shaft.

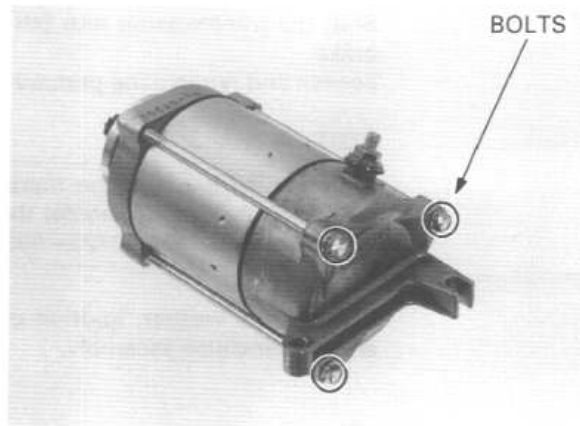
Assemble the motor case and rear cover, aligning the brush holder boss with the groove in the rear cover.



Make sure the index lines are aligned.



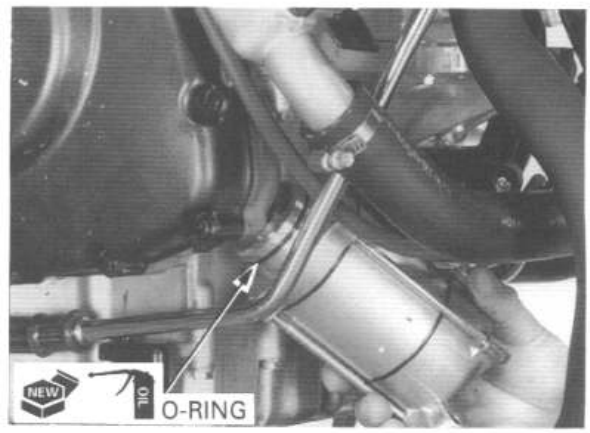
Install and tighten the case bolts securely.



INSTALLATION

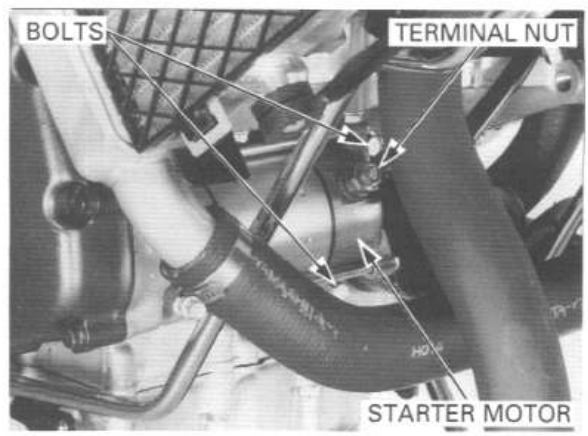
Apply clean engine oil to the new O-ring.
Install a new O-ring onto the starter motor boss.

Install the starter motor into the crankcase.



Install and tighten the starter motor mounting bolts.
Route the starter motor cable.
Install the starter motor cable to the terminal, then tighten the nut securely.

Install the removed parts in the reverse order of removal.

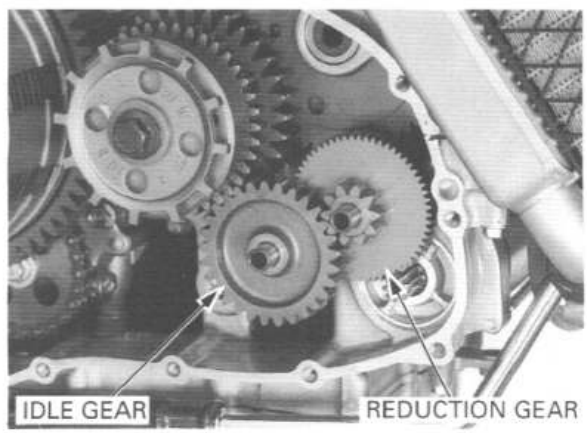


STARTER CLUTCH

REMOVAL

Remove the right crankcase cover (page 9-12).

Remove the starter idle gear shaft and reduction gear shaft.
Remove the starter idle gear and reduction gear.

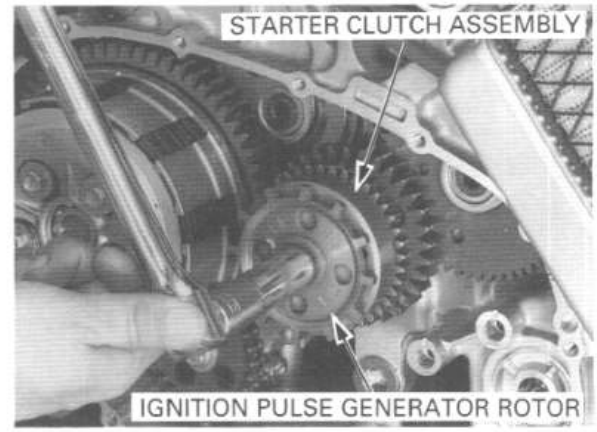


Shift the transmission into 6th gear and apply rear brake.
Loosen and remove the primary drive gear bolt.

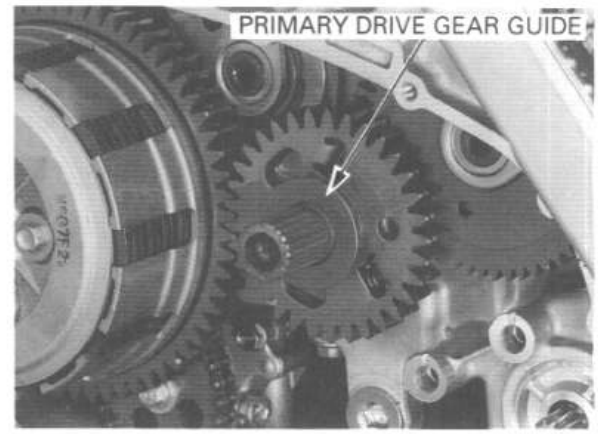
NOTE:

If the engine is out of the frame, shift the transmission into 6th gear and holder the drive sprocket with the universal holder (07725 – 0030000).

Remove the washer, ignition pulse generator rotor and starter clutch assembly.

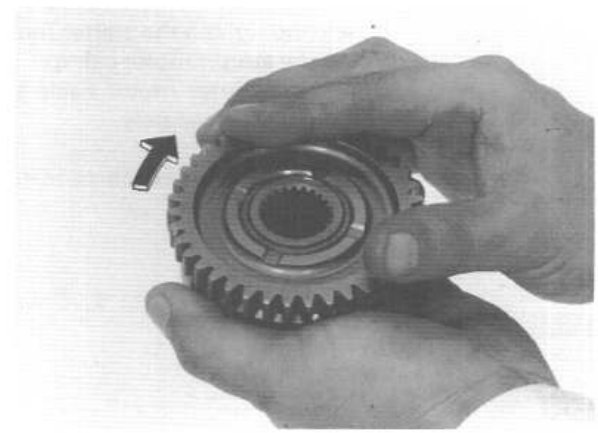


Remove the primary drive gear guide.

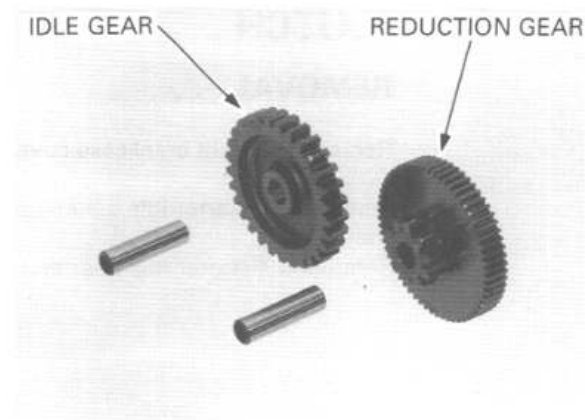


INSPECTION

Check the operation of the one-way clutch by turning the driven gear.
You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.



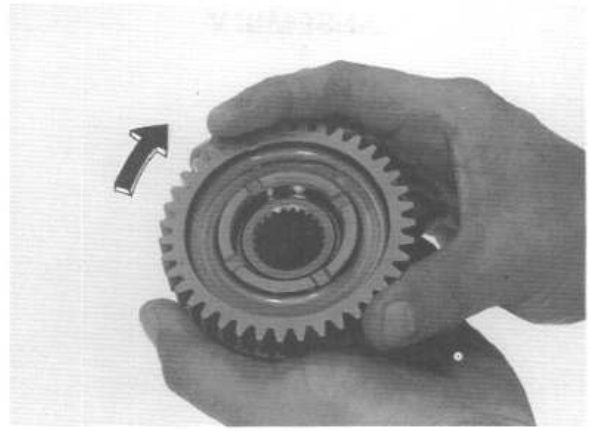
Check the starter reduction gear, idle gear and shaft for wear or other damage.



DISASSEMBLY

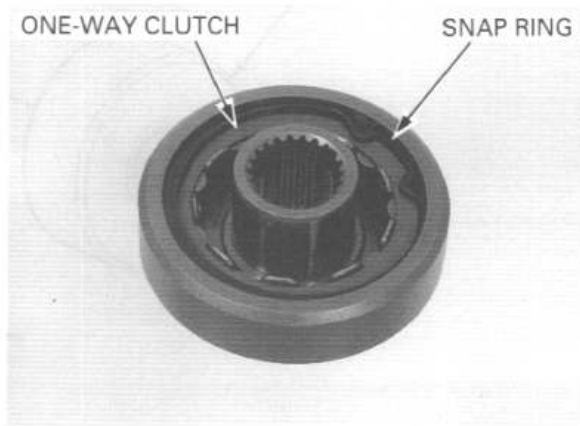
Remove the starter driven gear while rotating it clockwise.

Remove the needle bearing.



Remove the snap ring.

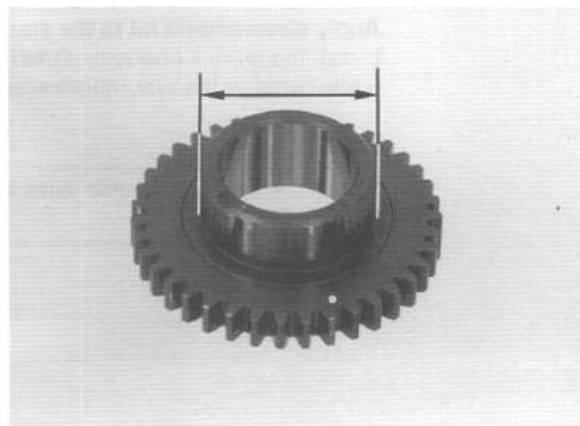
Remove the one-way clutch from the clutch outer by turning it counterclockwise.



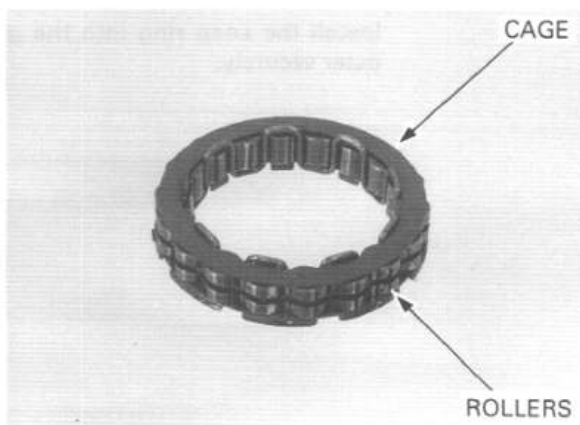
Check the starter driven gear and needle bearing for abnormal wear or damage.

Measure the starter drive gear boss O.D.

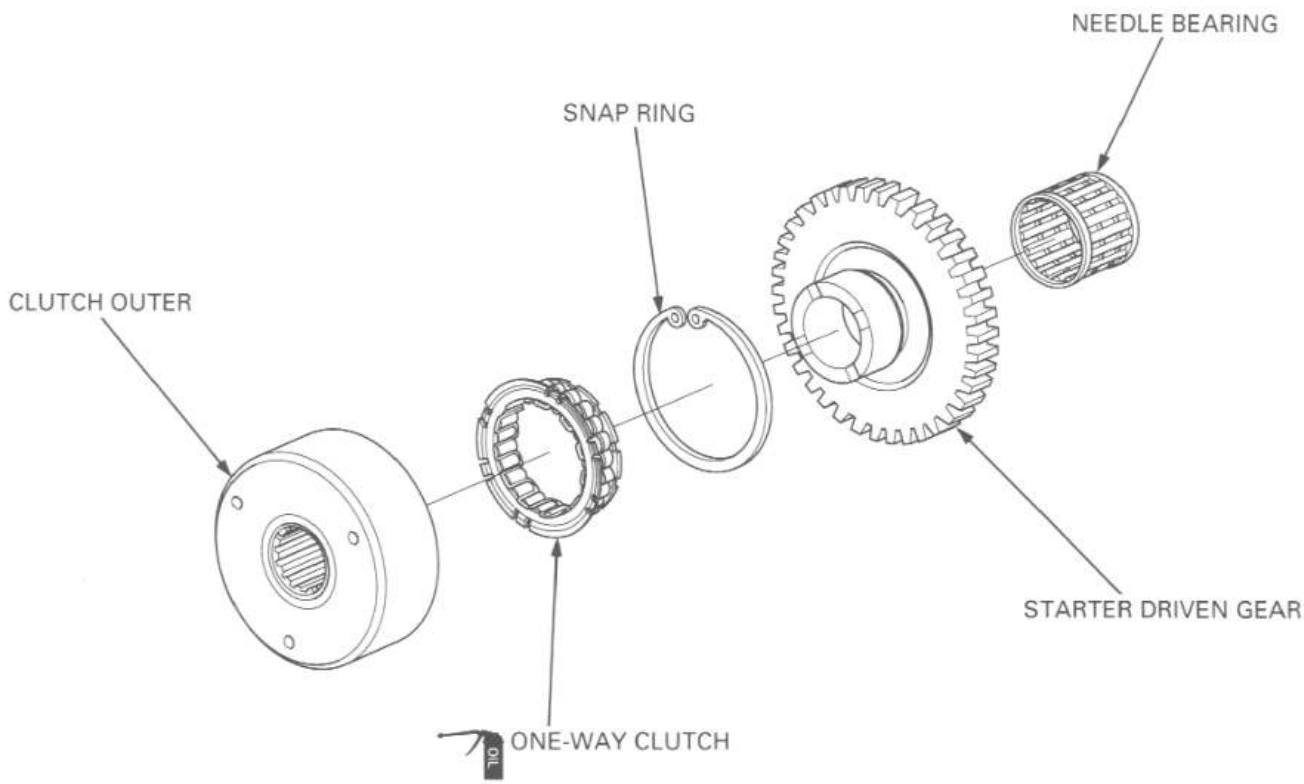
SERVICE LIMIT: 45.64 mm (1.797 in)



Check the one-way clutch roller for freedom of movement.
Check the rollers and cage for wear or damage, replace if necessary.



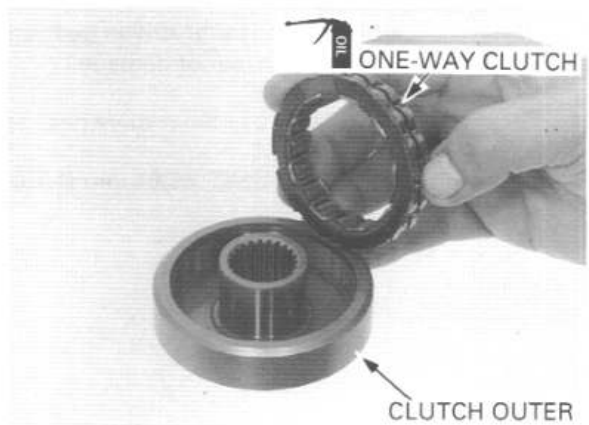
ASSEMBLY



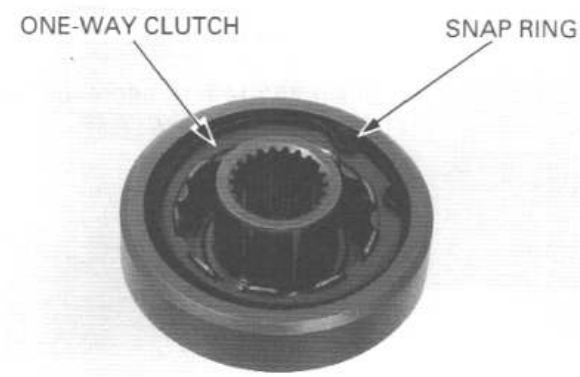
Apply clean engine oil to the starter one-way clutch. Install the starter one-way clutch into the clutch outer while rotating it counterclockwise.

NOTE:

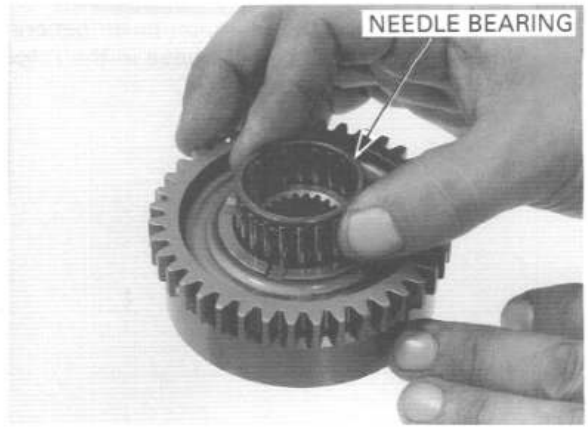
Install the one-way clutch with its flange side facing in.



Install the snap ring into the groove of the clutch outer securely.

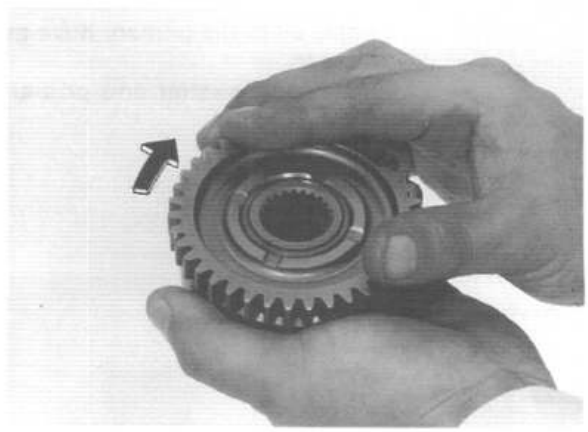


Install the needle bearing.



Install the starter driven gear while rotating it clockwise.

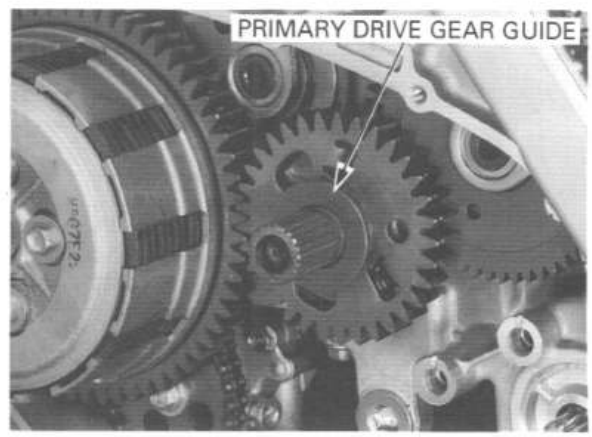
Recheck the one-way clutch operation.
You should be able to turn the driven gear clockwise smoothly, but the gear should not turn counterclockwise.



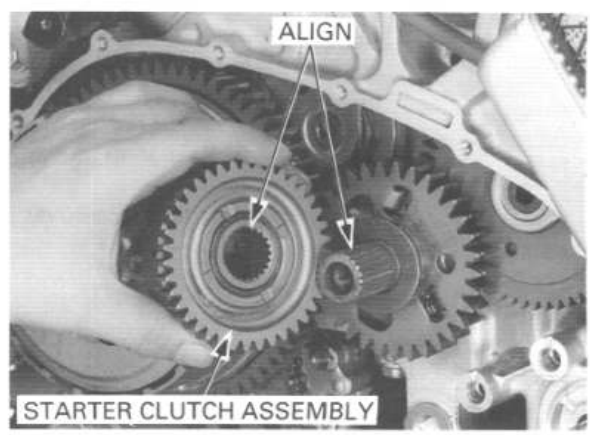
INSTALLATION

Note the installation direction of the primary drive gear guide.

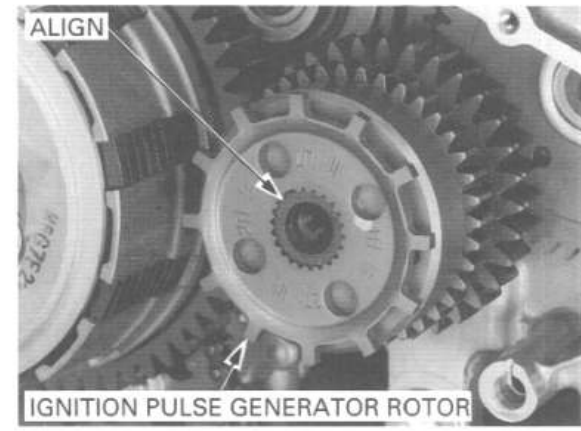
Install the primary drive gear guide onto the crankshaft.



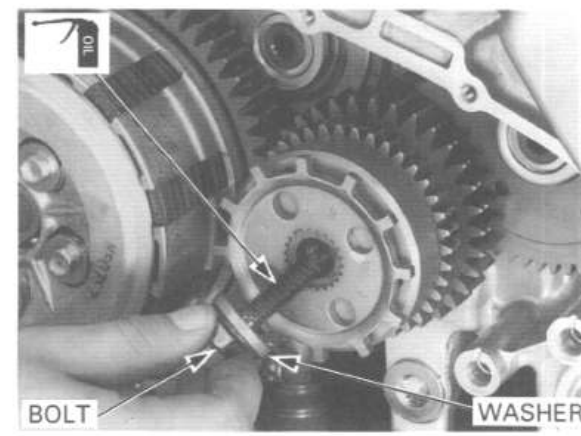
Install the starter clutch assembly while aligning the wide groove in the starter clutch outer with the wide tooth on the crankshaft.



Install the ignition pulse generator rotor while aligning the wide groove in the rotor with the wide tooth on the crankshaft.



Apply oil to the primary drive gear/starter clutch bolt threads.
Install the washer and primary drive gear/starter clutch bolt.

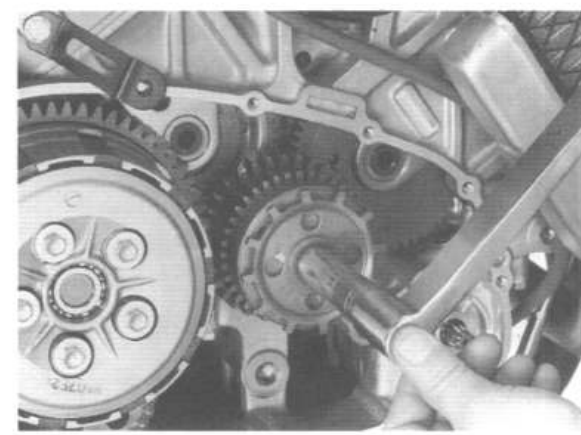


Shift the transmission into 6th gear and apply rear brake.
Tighten the primary drive gear bolt to the specified torque.

NOTE:

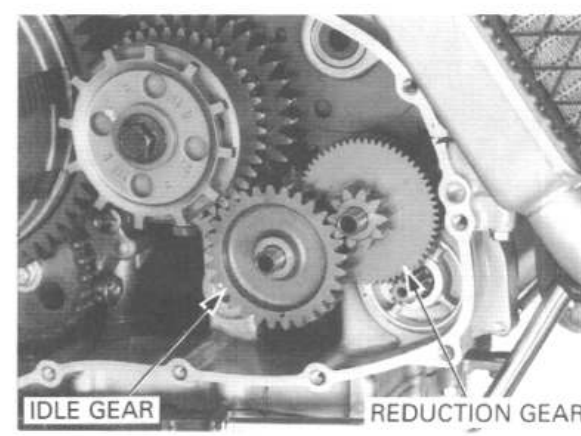
If the engine is out of the frame, shift the transmission into 6th gear and holder the drive sprocket with the universal holder (07725 – 0030000).

TORQUE: 103 N·m (10.5 kgf·m, 76 lbf·ft)



Apply oil to the starter reduction gear, idle gear and shafts.
Install the starter reduction gear shaft and reduction gear onto the crankcase.
Install the idle gear shaft and idle gear.

Install the right crankcase cover (page 9-23).



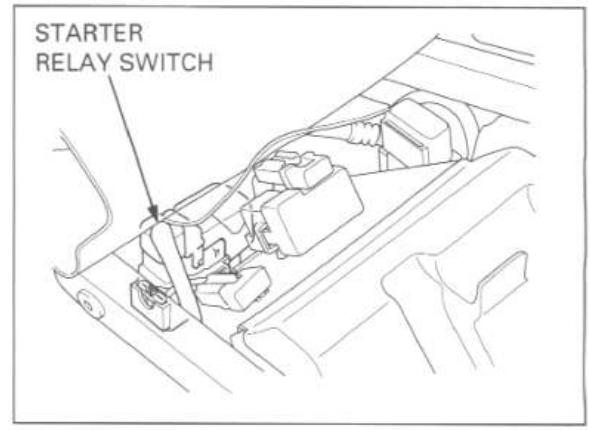
STARTER RELAY SWITCH

OPERATION INSPECTION

Remove the rear cowl (page 2-3).

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.

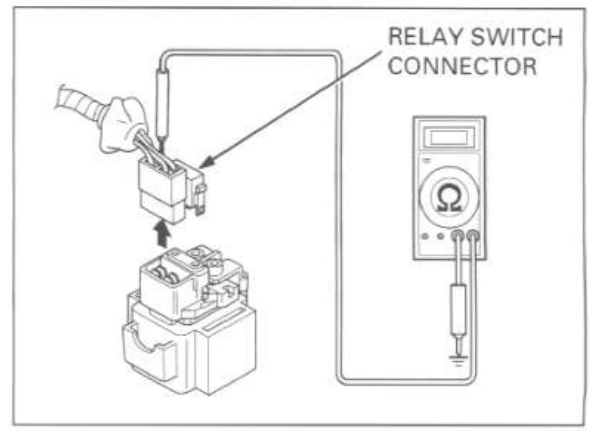
If the switch "CLICK" is not heard, inspect the relay switch using the procedure below.



GROUND LINE INSPECTION

Disconnect the relay connector.

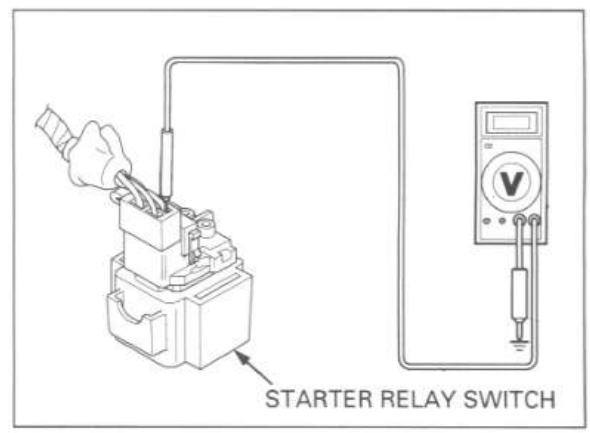
Check for continuity between the Green/Red wire and ground.
If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand switch is up, the ground circuit is normal (in neutral, there is a slight resistance due to the diode).



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.

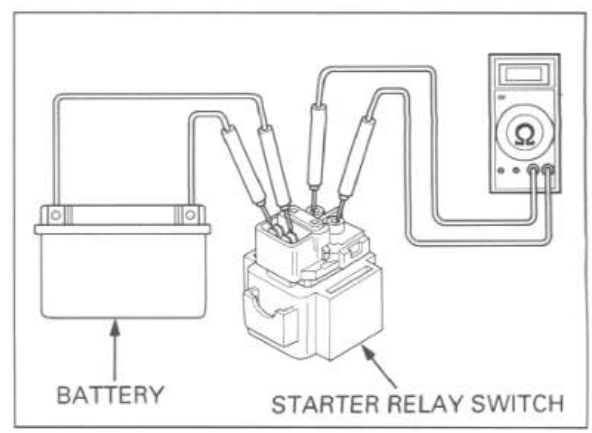


CONTINUITY INSPECTION

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.

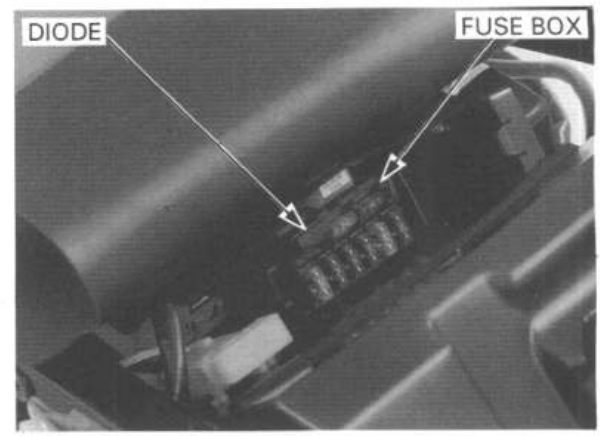


DIODE

REMOVAL

Remove seat (page 2-3).

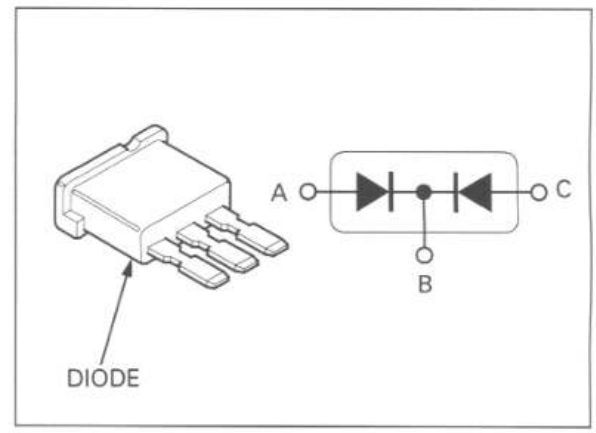
Open the fuse box and remove the diode.



INSPECTION

Check for continuity with an ohmmeter.

Normal direction: Continuity
Reverse direction: No continuity

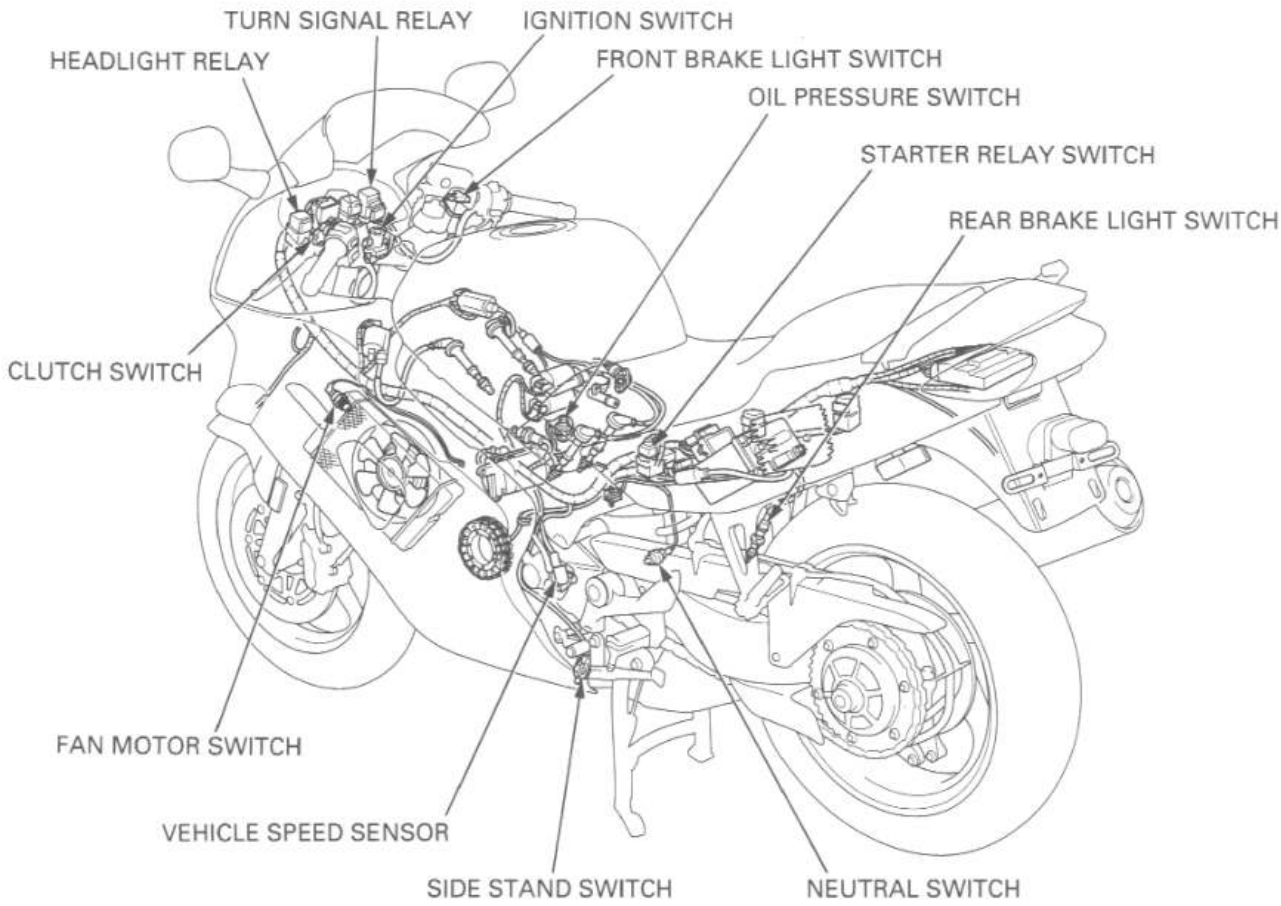


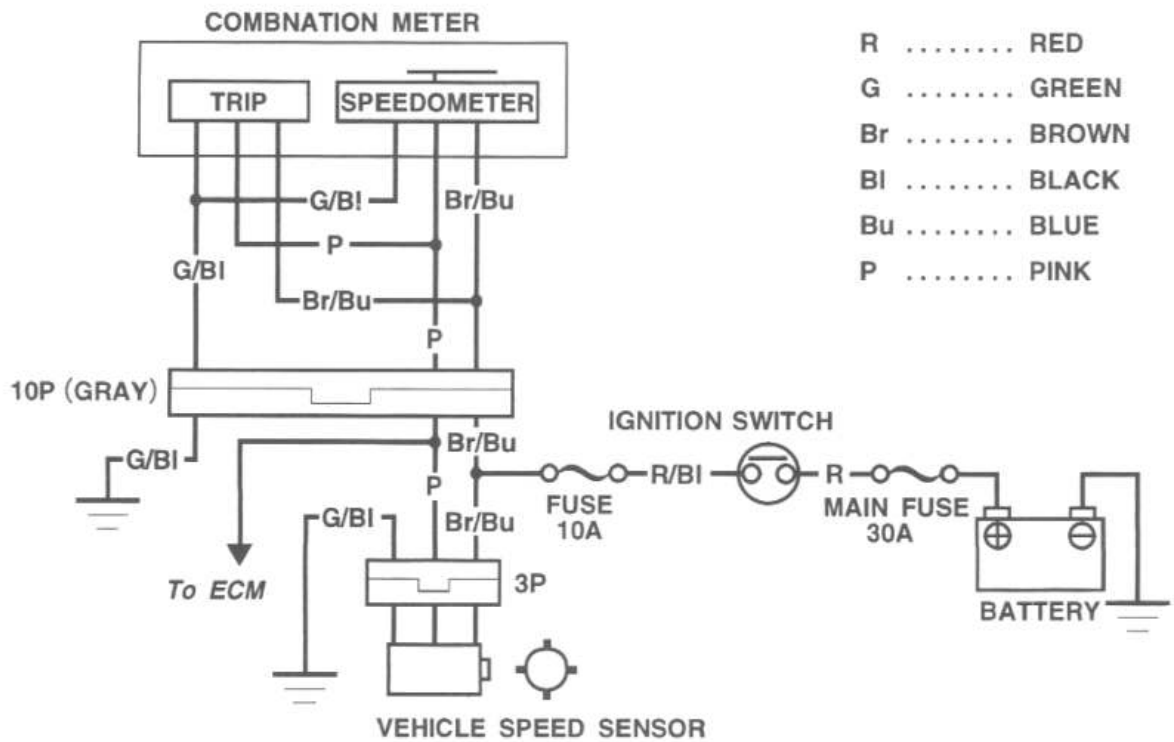
INSTALLATION

Install the diode in the reverse order of removal.

MEMO

SYSTEM DIAGRAM





19. LIGHTS/METERS/SWITCHES

SYSTEM DIAGRAM	19-0	OIL PRESSURE SWITCH	19-17
SERVICE INFORMATION	19-1	FUEL LEVEL SENSOR	19-19
TROUBLESHOOTING	19-3	IGNITION SWITCH	19-21
HEADLIGHT	19-6	HANDLEBAR SWITCHES	19-22
TURN SIGNAL	19-7	BRAKE LIGHT SWITCH	19-23
TAIL/BRAKE LIGHT	19-8	CLUTCH SWITCH	19-23
LICENSE LIGHT	19-9	NEUTRAL SWITCH	19-23
COMBINATION METER	19-9	SIDE STAND SWITCH	19-24
SPEEDOMETER/VEHICLE SPEED SENSOR	19-12	HORN	19-25
TACHOMETER	19-15	HEADLIGHT RELAY	19-25
COOLANT TEMPERATURE SENSOR	19-15	TURN SIGNAL RELAY	19-26
COOLING FAN MOTOR SWITCH	19-16		

SERVICE INFORMATION

GENERAL

⚠ WARNING

- ***A halogen headlight bulb becomes very hot while the headlight is ON, and remain hot for a while after it is turned OFF. Be sure to let it cool down before servicing.***
- ***Use an electric heating element to heat the water/coolant mixture for the fan motor switch inspection. Keep 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	Sb = Sky Blue
Bl = Black	Gr = Gray	O = Orange	W = White	
Br = Brown	Lb = Light Blue	P = Pink	Y = Yellow	

SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight (Hi/Lo)		12 V – 45/45 W x 2
	Brake/taillight		12 V – 21/5 W x 2
	Front turn signal/running light		12 V – 21/5 W x 2
	Rear turn signal light		12 V – 21 W x 2
	License light		12 V – 8 W
	Instrument light		12 V – 1.7 W x 5
	Turn signal indicator		12 V – 3.4 W x 2
	High beam indicator		12 V – 1.7 W
	Neutral indicator		12 V – 1.7 W
	Oil pressure indicator		12 V – 1.7 W
	PGM-FI malfunction indicator		12 V – 1.7 W
Fuse	Main fuse	A	30 A
		B	30 A
	Sub fuse		20 A x 2, 10 A x 5
Coolant temperature sensor resistance (at 50°C/122°F)			6.8 – 7.2 Ω
Fan motor switch	Start to close (ON)		98 – 102°C (208 – 216°F)
	Stop to open		93 – 97°C (199 – 207°F)

TORQUE VALUES

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	44 N·m (4.5 kgf·m, 33 lbf·ft)	ALOC bolt
Ignition switch mounting bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)	Apply a locking agent to the threads
Coolant temperature sensor	10 N·m (1.0 kgf·m, 7 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

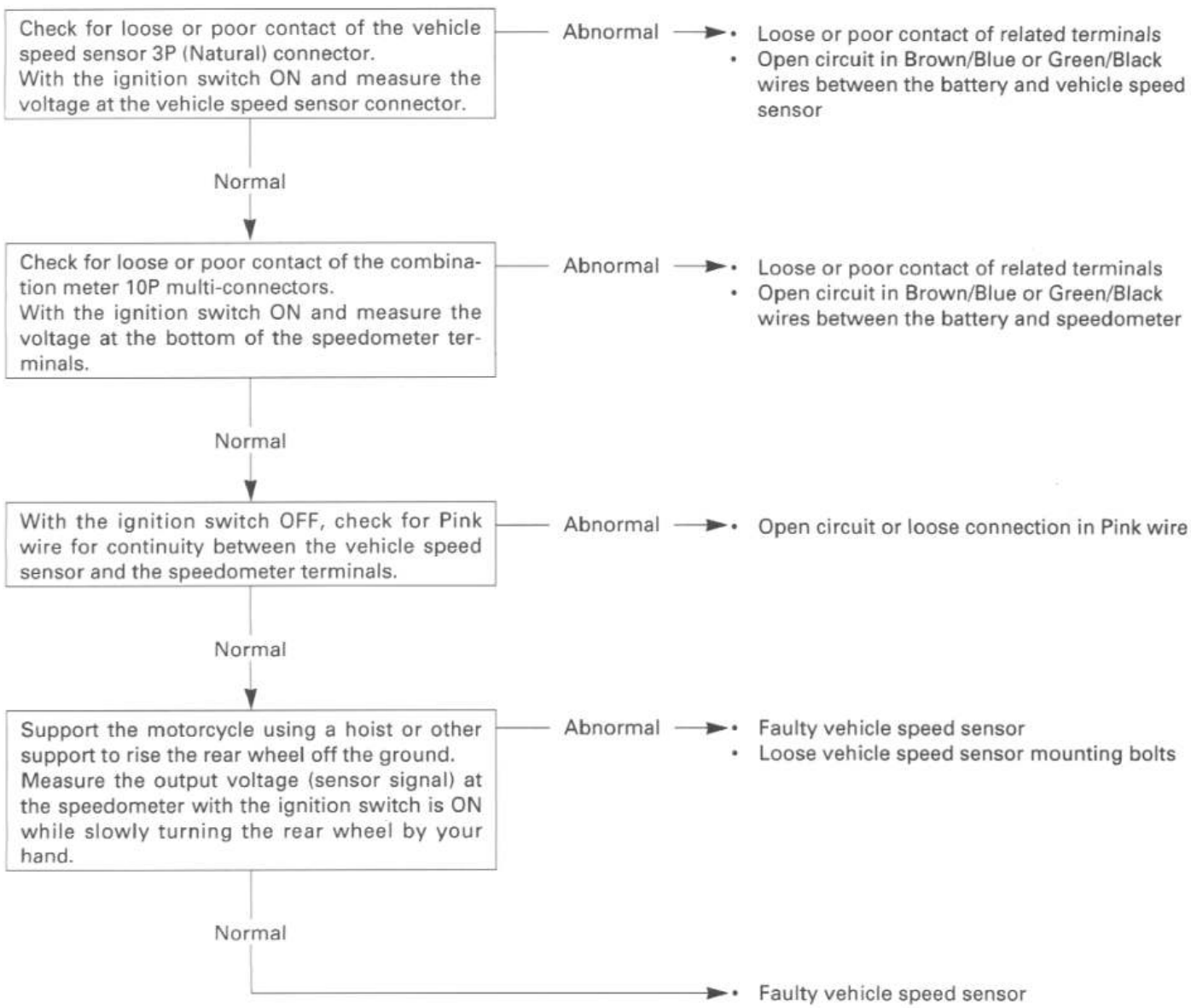
TROUBLESHOOTING

SPEEDOMETER/VEHICLE SPEED SENSOR

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



THERMOSENSOR/DIGITAL COOLANT GAUGE

NOTE:

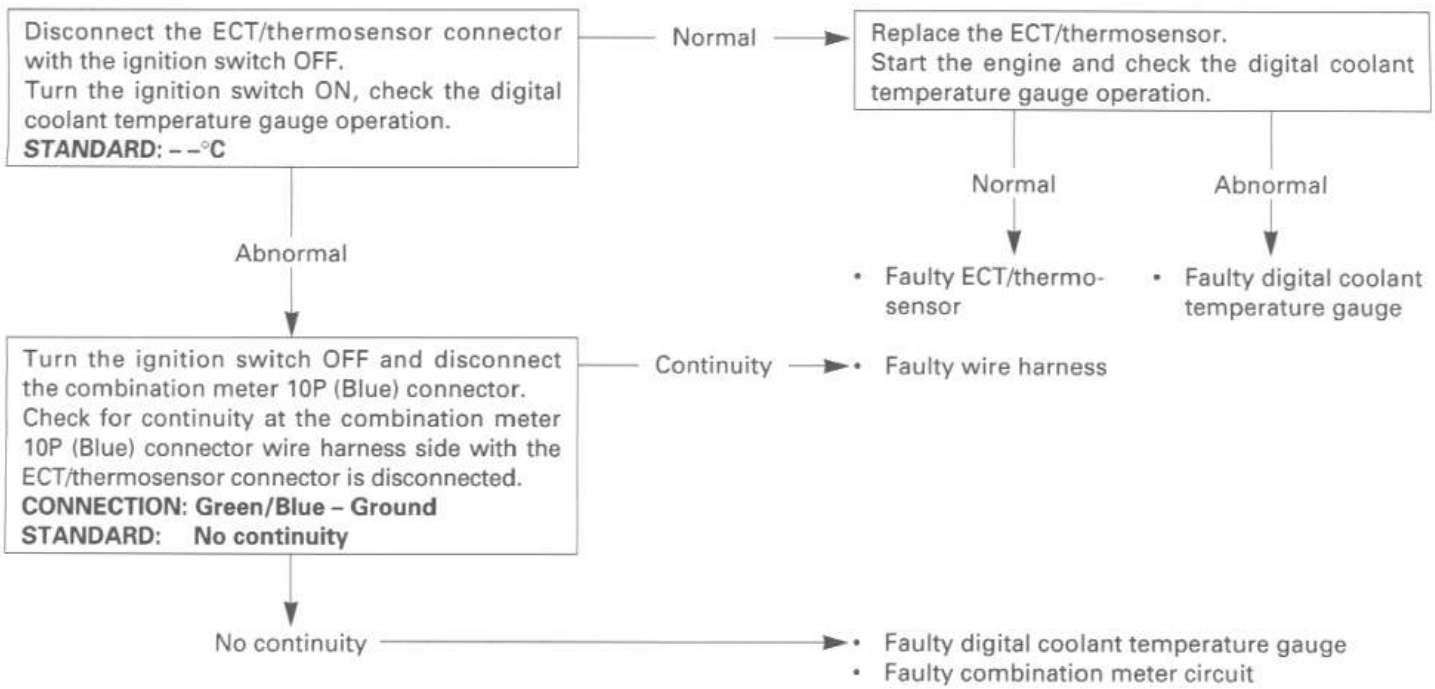
- The coolant temperature gauge is to be displayed only in a range from 35°C to 132°C (95°F to 270°F).
- When checking the digital coolant temperature gauge, always follow the steps in the troubleshooting chart below.

Coolant temperature	Displayed
Below 34°C (93°F)	– –°C
35 – 121°C (95 – 250°F)	35 – 121°C
Above 122 – 132°C (252 – 270°F)	122 – 132°C Displayed figures blink and red line appears on the display.

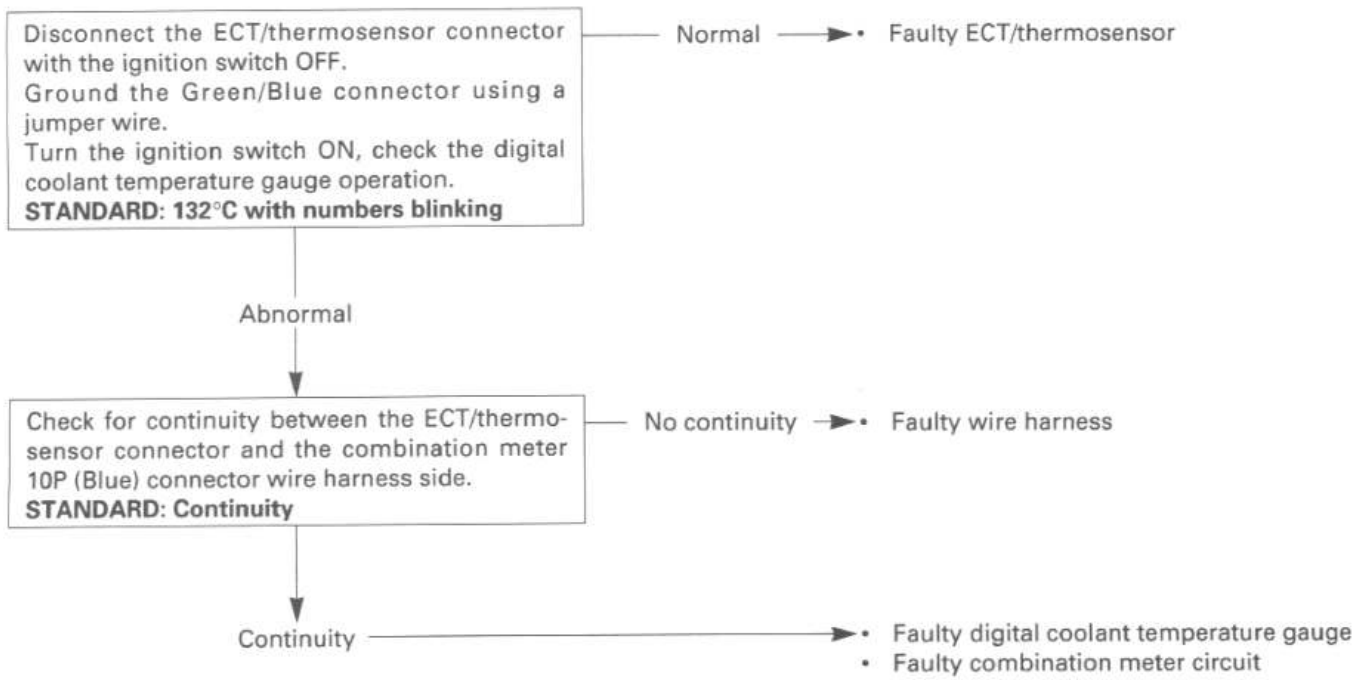
Turn the ignition switch ON, but the digital coolant temperature gauge does not indicate

- Replace the sub fuse when the neutral indicator and side stand indicator does not operate

The digital coolant temperature gauge displayed "122 – 132°C" with figures blinking when the engine is cold



The digital coolant temperature gauge displayed "– –°C" when the engine is warming up



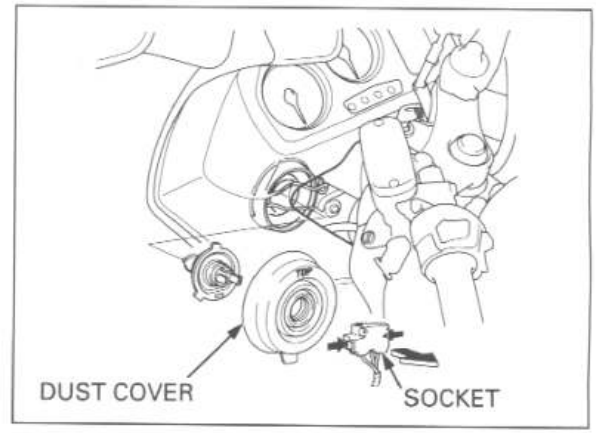
HEADLIGHT

BULB REPLACEMENT

⚠ WARNING

A halogen headlight bulb becomes very hot while the headlight is ON, and remain hot for a while after it is turned OFF. Be sure to let it cool down before servicing.

Remove the headlight bulb sockets.
Remove the dust cover.



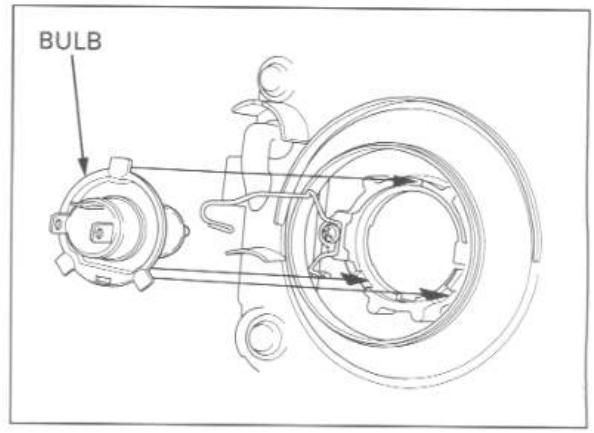
Unhook the bulb retainer and remove the headlight bulb.

CAUTION:

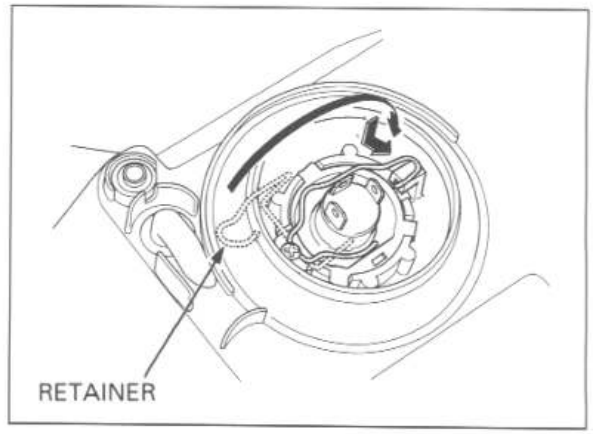
Avoid touching halogen headlight bulbs. Finger prints can create hot spots that cause a bulb to break.

If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.

Install a new bulb into the headlight unit.

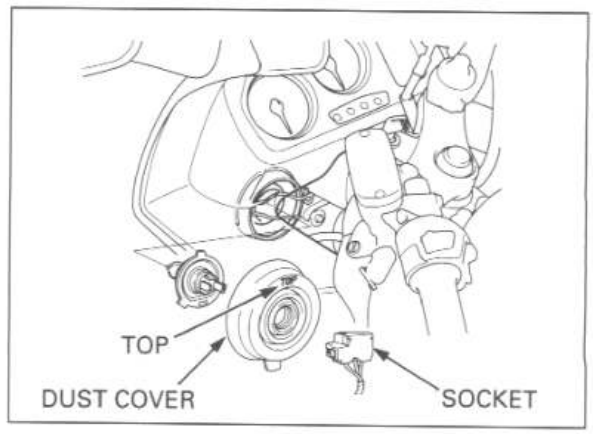


Install the headlight bulb aligning its tabs with the grooves in the headlight unit.
Hook the bulb retainer.



Install the dust cover tightly against the headlight with its "TOP" mark facing up.

Connect the headlight sockets.

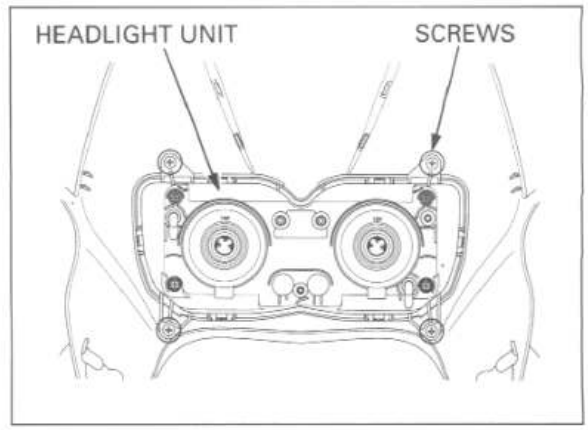


REMOVAL/INSTALLATION

Remove the upper cowl (page 2-7).

Remove the four screws and headlight unit.

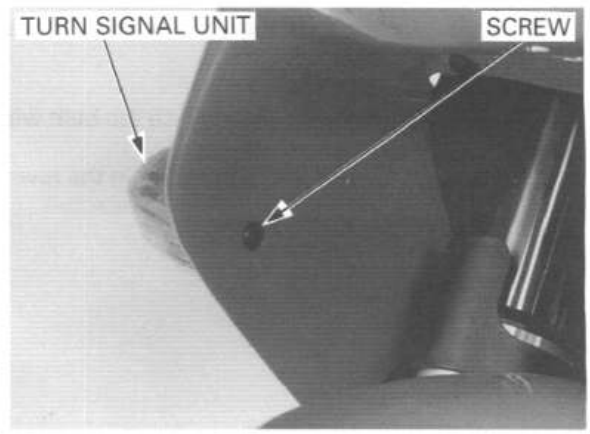
Installation is in the reverse order of removal.



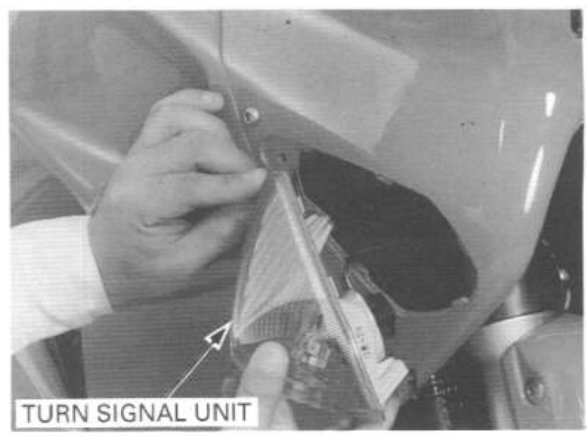
TURN SIGNAL

BULB REPLACEMENT

Front
Remove the turn signal unit mounting screw.



Remove the front turn signal unit from the upper cowl.

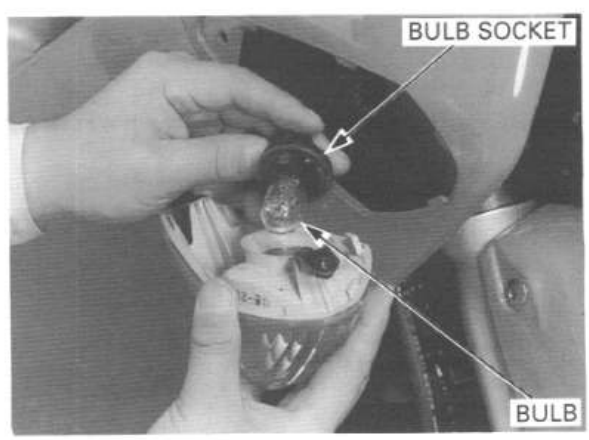


Turn the bulb socket counterclockwise and remove it. Replace the bulb with a new one.

Install the front turn signal unit in the reverse order of removal.

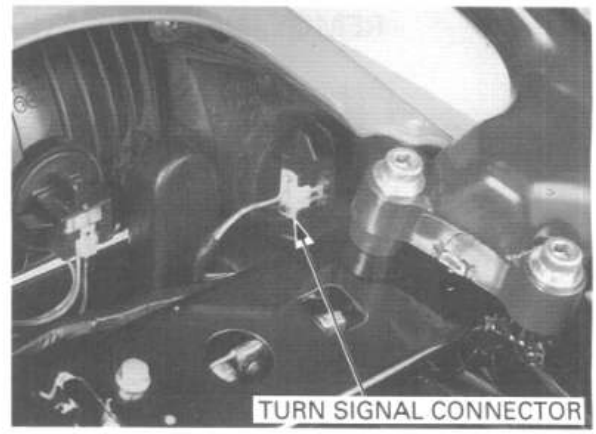
NOTE:

At turn signal unit installation, install the retainer to the upper cowl securely.



Rear
Remove the seat (page 2-3).

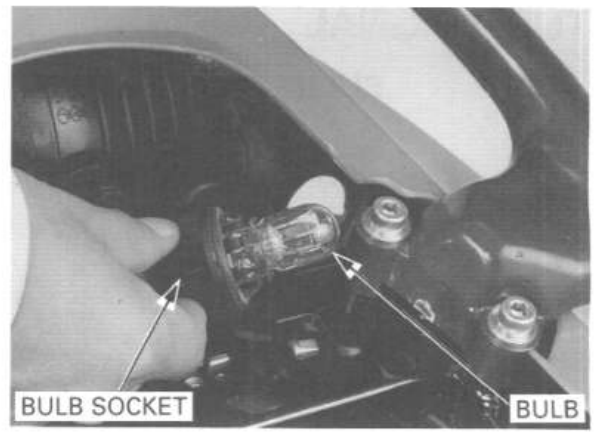
Disconnect the turn signal connectors.



Remove the bulb socket by turning it counterclockwise.

Remove and replace the bulb with a new one.

Install the bulb socket in the reverse order of removal.

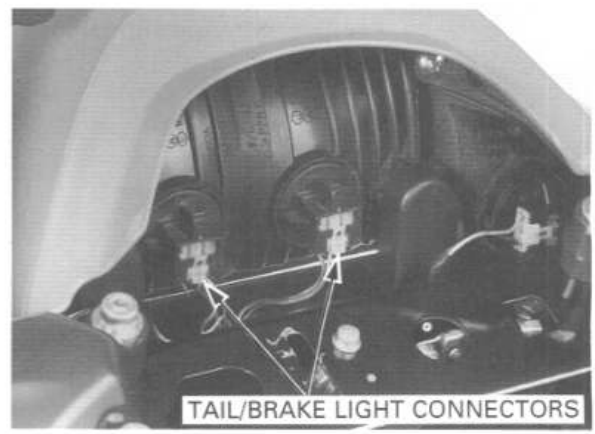


TAIL/BRAKE LIGHT

BULB REPLACEMENT

Remove the seat (page 2-3).

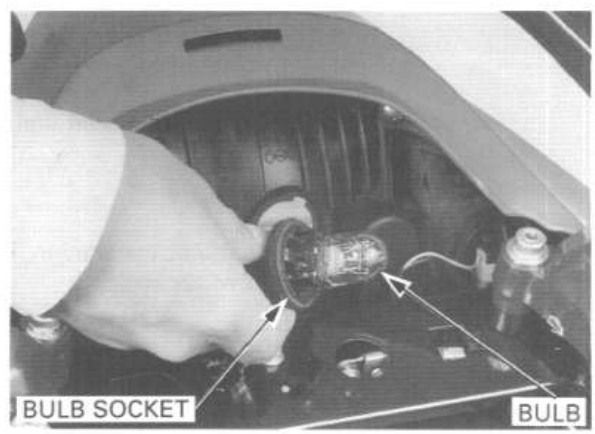
Disconnect the tail/brake light connectors.



Remove the bulb socket by turning it counterclockwise.

Remove and replace the bulb with a new one.

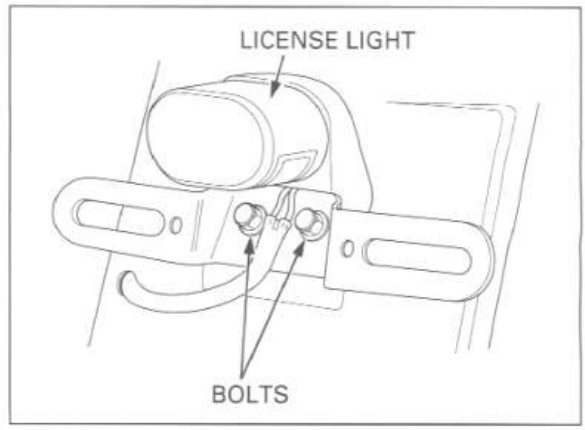
Install the bulb socket in the reverse order of removal.



LICENSE LIGHT

BULB REPLACEMENT

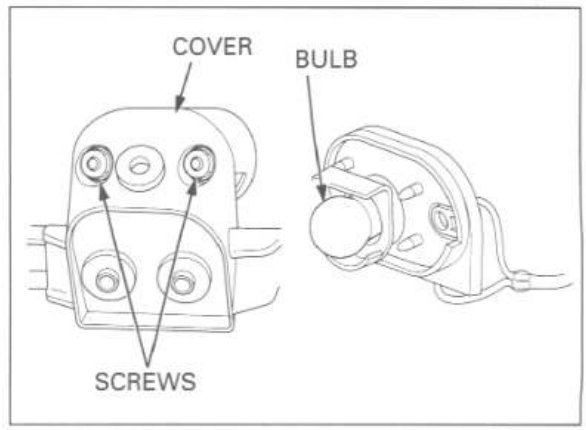
Remove license light bracket bolts and the license light assembly.



Remove the screws, license light cover and lens.

While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.

Install the license light assembly in the reverse order of removal.



COMBINATION METER

BULB REPLACEMENT

Remove the upper cowl (page 2-7).

Pull the indicator bulb socket out of the combination meter.

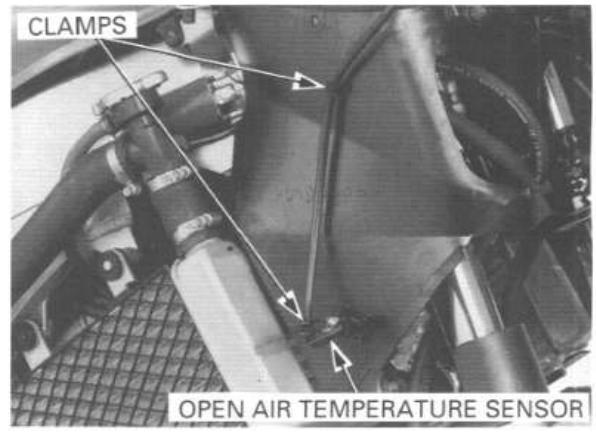


Remove the bulb from the socket and replace it with a new one.

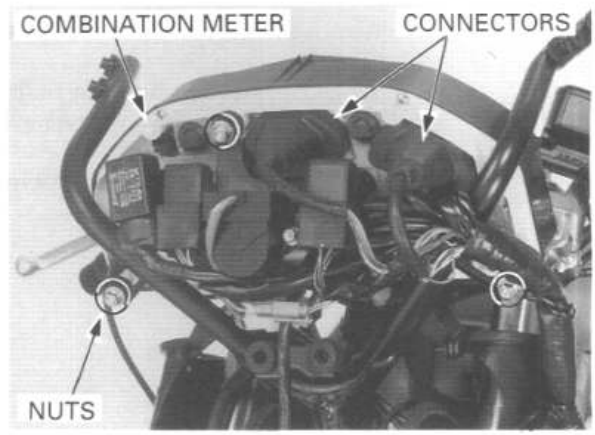


REMOVAL

Open the right side cover and remove the open air temperature sensor from the case by unhooking top and bottom of retainer and rotating retainer to the side.
Remove the open air temperature sensor wire from the clamps.

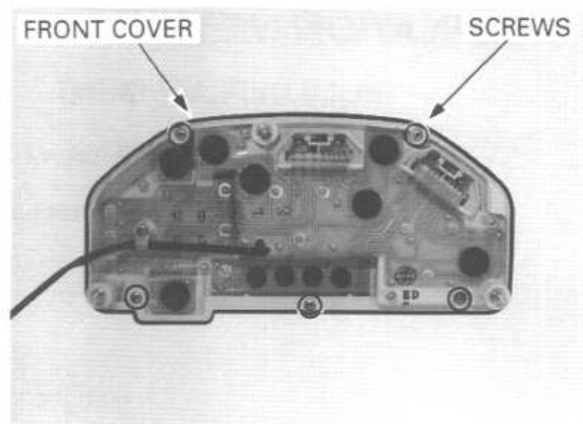


Disconnect the combination meter 10P (Blue) and 10P (Gray) connectors.
Remove the three mounting nuts, washers, wire clamp and combination meter assembly.

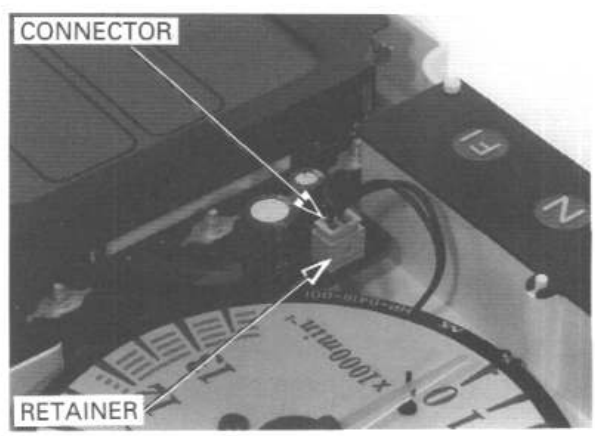


DISASSEMBLY

Remove the screws and front cover.

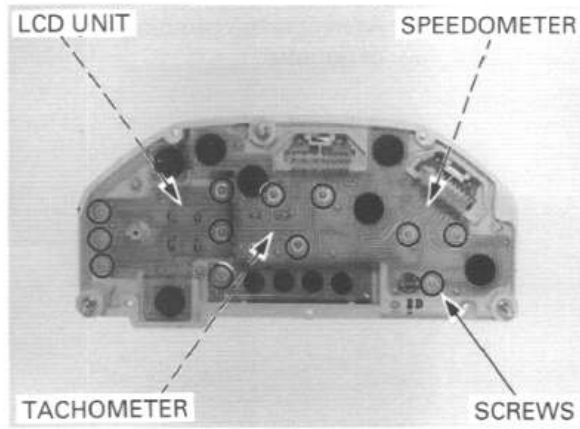


Disconnect the open air temperature sensor mini connector while pushing the retainer.



Remove the meter mounting screws.

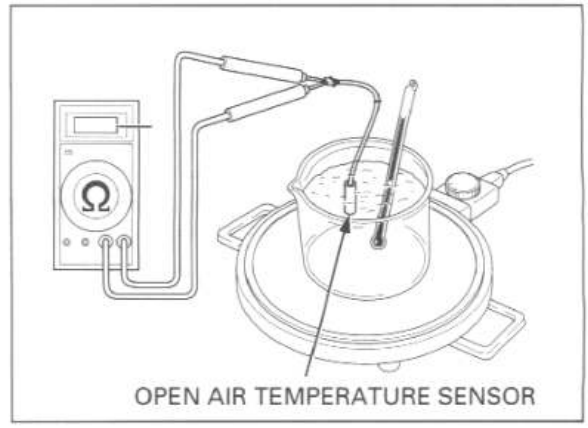
Remove the speedometer, tachometer, LCD (Liquid Crystal Display) unit.



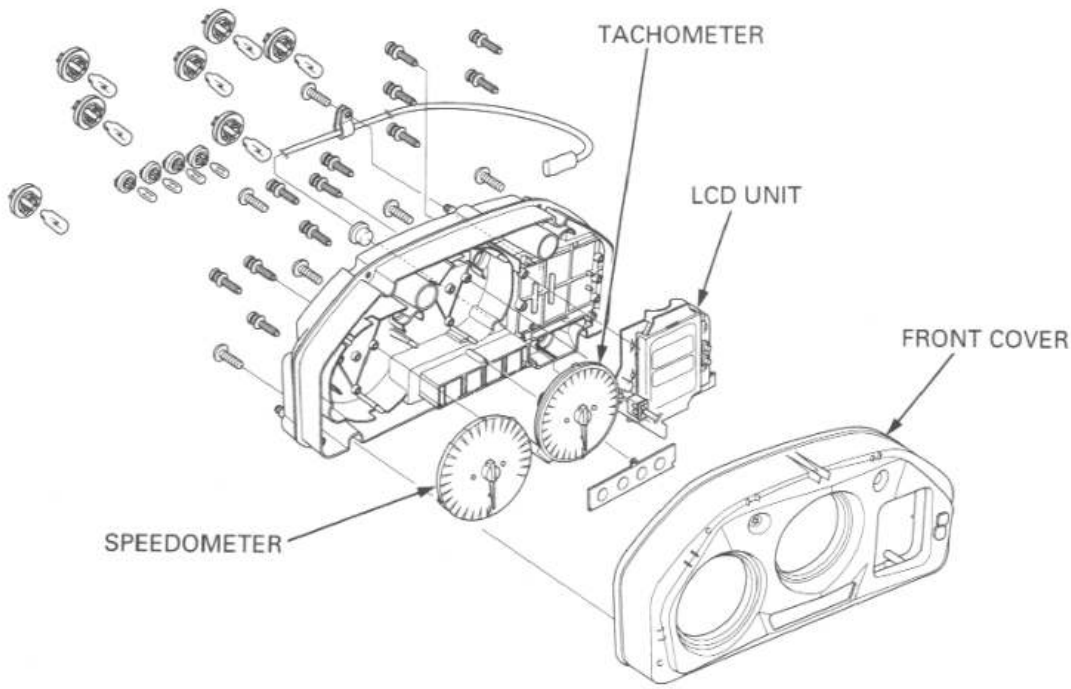
OPEN AIR TEMPERATURE SENSOR INSPECTION

Measure the resistance between the open air temperature sensor terminals.

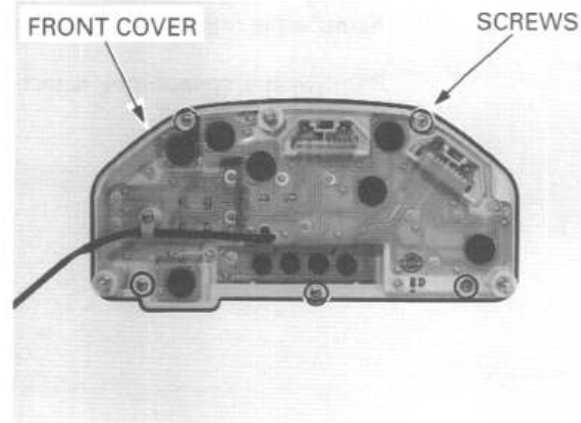
STANDARD: 4.8 – 5.2 kΩ (25°C/77°F)



ASSEMBLY

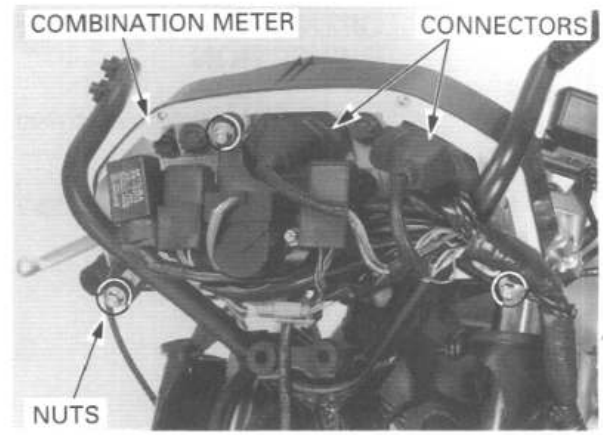


Assemble the combination meter in the reverse order of removal.



INSTALLATION

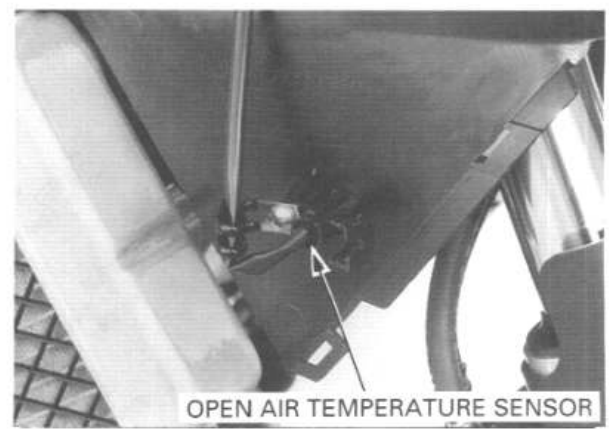
Install the combination meter onto the upper cowl stay.
Install the washers, wire clamp and mounting nuts, tighten the nuts securely.
Connect the combination meter 10P (Blue) and 10P (Gray) connectors.



Install the open air temperature sensor into the case and close the case cover.
Clamp the open air temperature wire to the wire clamps.

NOTE:

Route the open air temperature sensor wire properly.

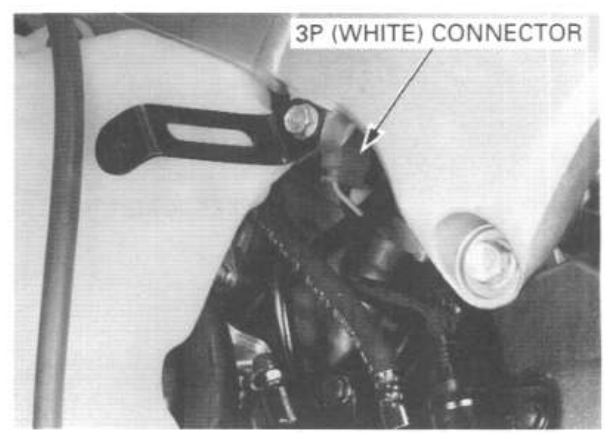


SPEEDOMETER/VEHICLE SPEED SENSOR

VOLTAGE INSPECTION

Remove the side cowl (page 2-6).

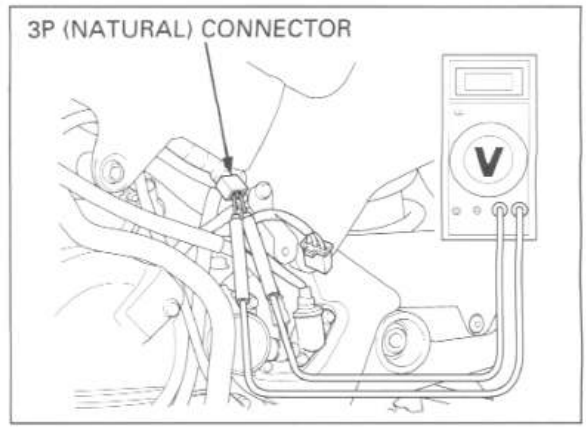
Disconnect the vehicle speed sensor 3P (Natural) connector and check for loose or poor contact of the connector.



With the ignition switch is ON and measure the voltage at the 3P (Natural) connector of the wire harness side.

Connection: Brown/Blue (+) – Green/Black (–)
Standard: Battery voltage

If there is no voltage, replace or repair the wire harness.



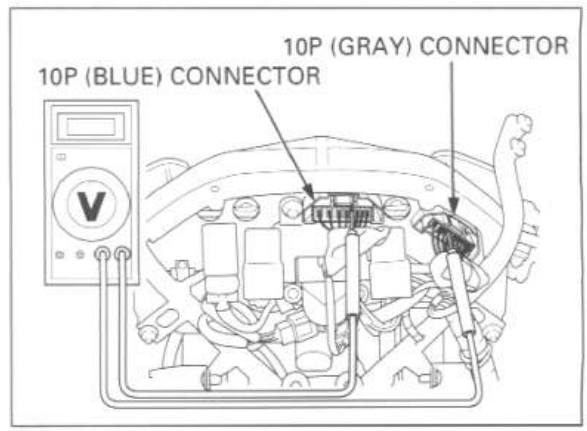
Remove the upper cowl (page 2-7).

Check for loose or poor connection of the combination meter multi-connectors.

With the ignition switch is ON and measure the voltage at the bottom of the combination meter terminal.

Connection: Brown/Blue (+) – Green/Black (–)
Standard: Battery voltage

If there is no voltage, replace or repair the wire harness.



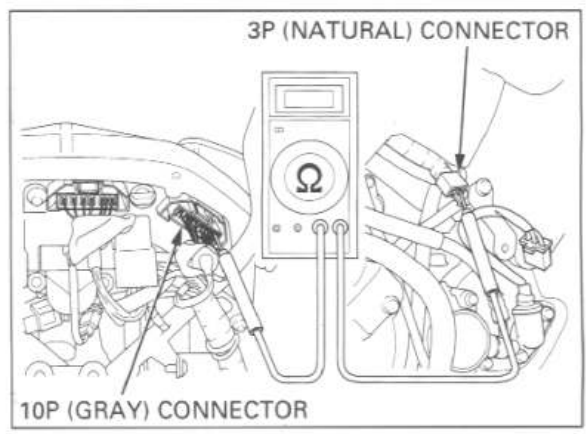
OUTPUT SIGNAL INSPECTION

Remove the upper cowl (page 2-7).

With the ignition switch is OFF, check for continuity of the Pink wire between the vehicle speed sensor 3P (Natural) connector and combination meter 10P (Gray) connector terminals.

There should be continuity.

If there is no continuity, replace or repair the wire harness.

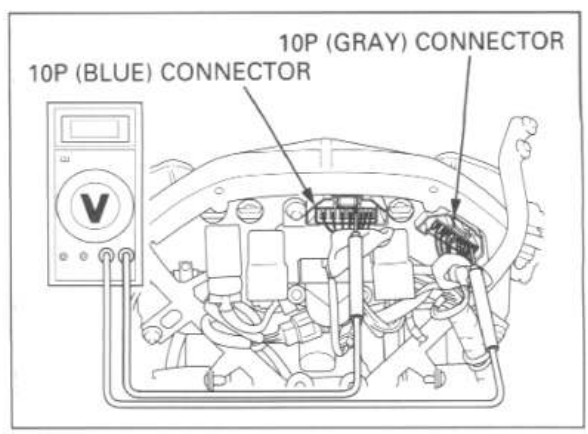


Support the motorcycle on its center stand.

Connect vehicle speed sensor 3P (Natural) connector. Measure the voltage at the combination meter terminals with the ignition switch is ON while slowly turning the rear wheel by hand.

CONNECTION: Pink (+) – Green/Black (–)
STANDARD: Repeat 0 to 12 V

If the measurement is out of specification, inspect the open circuit in wire harness.



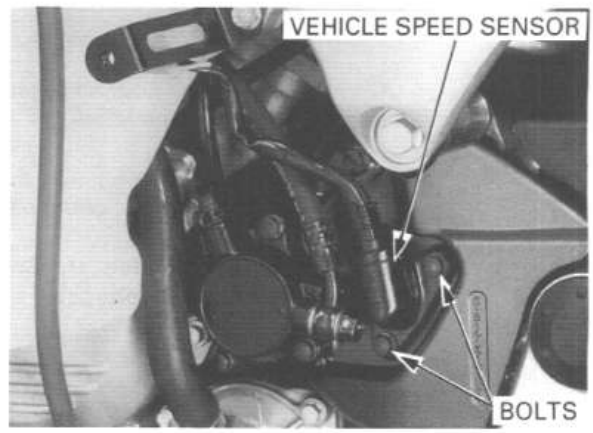
REMOVAL

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

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



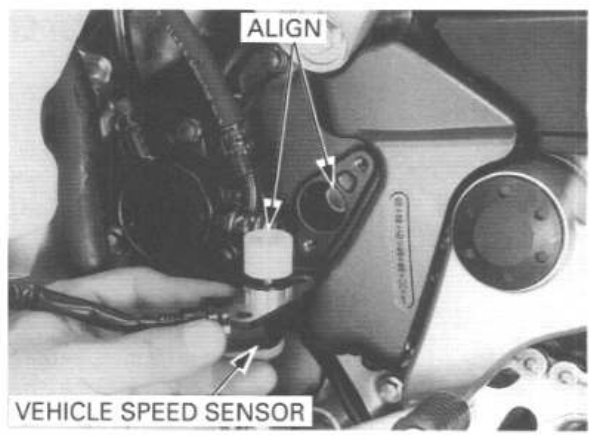
Remove the bolts and vehicle speed sensor.



INSTALLATION

Install the vehicle speed sensor onto the drive sprocket cover, aligning it hexagonal portion with the drive sprocket bolt.

Install and tighten the mounting bolts securely.



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



TACHOMETER

INSPECTION

Remove the upper cowl (page 2-7).

Check for loose or poor contact terminals of the combination meter connectors.

Connect the peak voltage adaptor to the tachometer Yellow/Green terminal and ground.

TOOLS:
Peak voltage tester (U.S.A. only) or
Peak voltage adaptor 07HGJ – 0020100
with commercially available digital multimeter
(impedance 10 MΩ/DCV minimum)

CONNECTION: Yellow/Green (+) and Ground (–)

Start the engine and measure the tachometer input voltage.

PEAK VOLTAGE: 10.5 V minimum

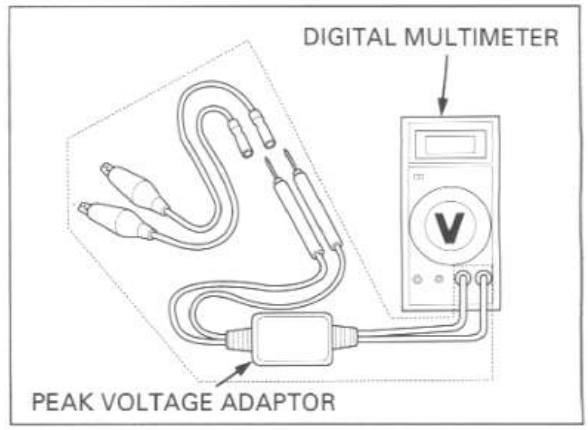
If the valve is normal, replace the tachometer.
If the measured value is below 10.5 V, replace the ECM.

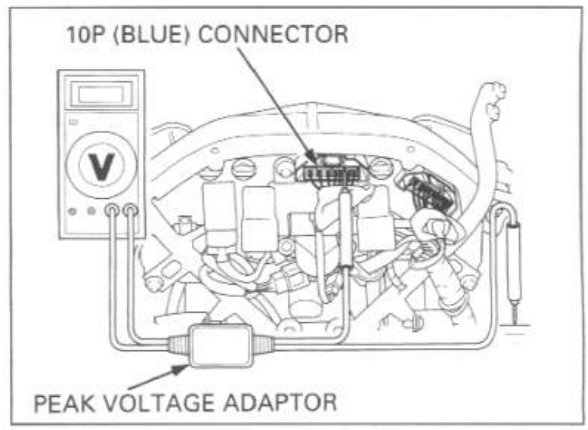
If the value is 0 V, perform the following:
Remove the seat (page 2-3) and disconnect the ECM multi-connector.

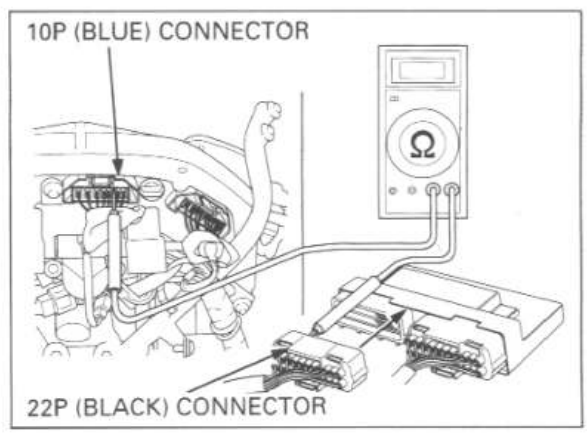
Check for continuity between the tachometer connector terminal and the ECM multi-connector Yellow/Green terminals.
If there is no continuity, check the wire harness for an open circuit.

If there is continuity, replace the tachometer unit.

For tachometer replacement, see 19-10; combination meter disassembly and assembly.







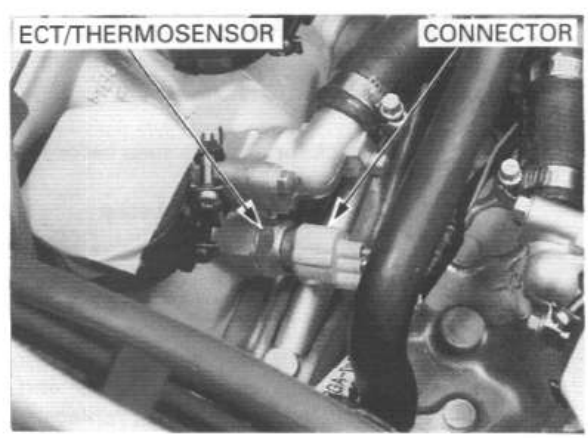
COOLANT TEMPERATURE SENSOR

INSPECTION

NOTE:

Follow the troubleshooting chart on page 19-2 for digital coolant temperature gauge/sensor system inspection.

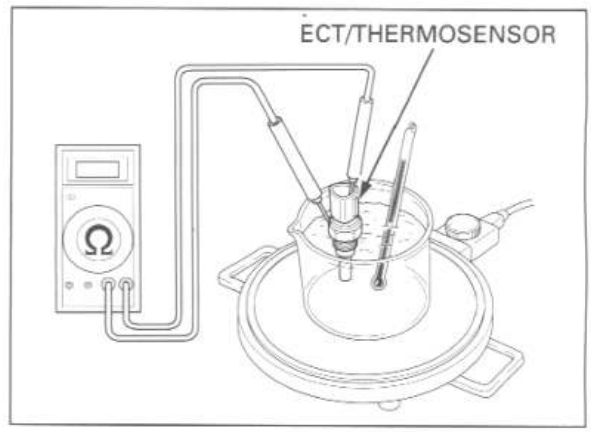
Remove the ECT/thermosensor connector and sensor from the front cylinder head.



⚠ WARNING

- ***Wear insulated gloves ad adequate eye protection.***
- ***Keep flammable materials away from the electric heating element.***

Suspend the ECT/thermosensor in a pan of coolant (50 – 50 mixture) an electric heating element and measure the resistance through the sensor as the coolant heats up.

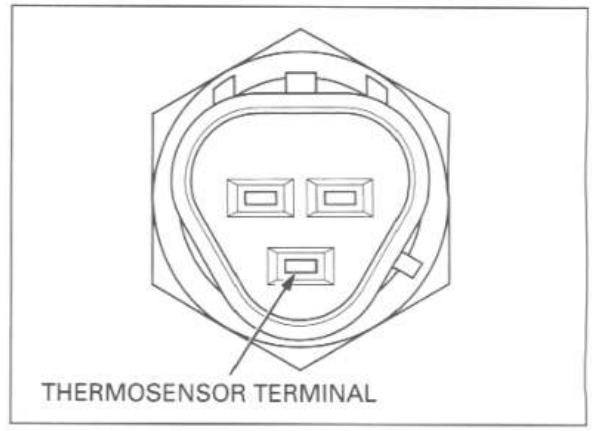


NOTE:

- Soak the ECT/thermosensor in coolant up to its threads with at least 40 mm (1.57 in) from the bottom of the pan to the bottom of the 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/thermosensor touch the pan.

Temperature	80°C (68°F)	120°C (248°F)
Resistance	2.1 – 2.6 kΩ	0.62 – 0.76 kΩ

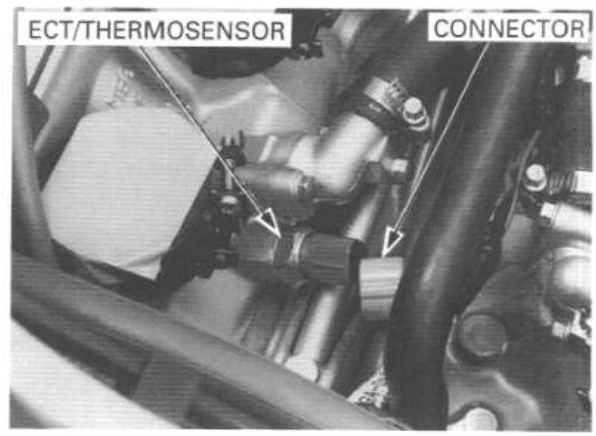
Replace the sensor if it is out of specification by more than 10% at any temperature listed.



Install the ECT/thermosensor with a new sealing washer, tighten the ECT/thermosensor to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Connect the ECT/thermosensor connector.



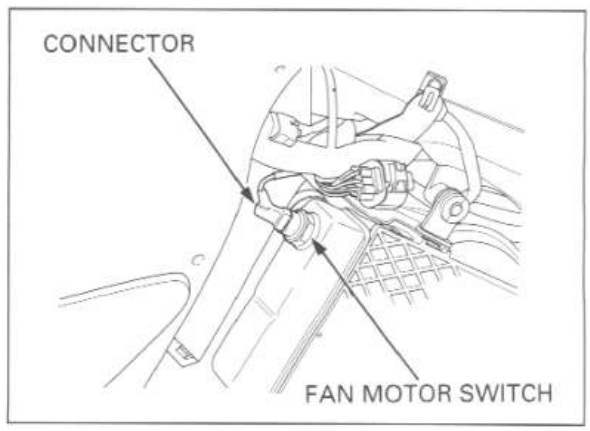
COOLING FAN MOTOR SWITCH

INSPECTION

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.

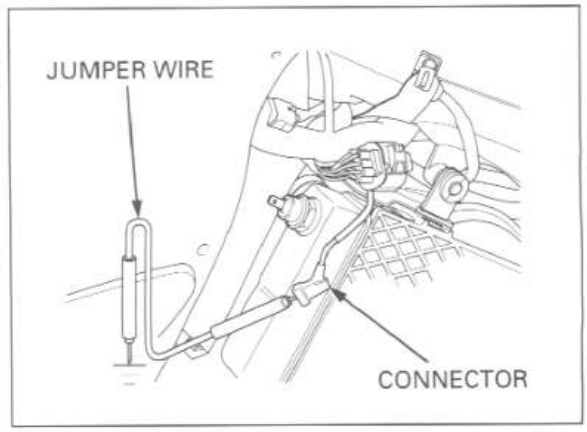
If the fan motor does not stop, check for a shorted wire between the fan motor and switch.
If the fan motor stops, replace the fan motor switch.



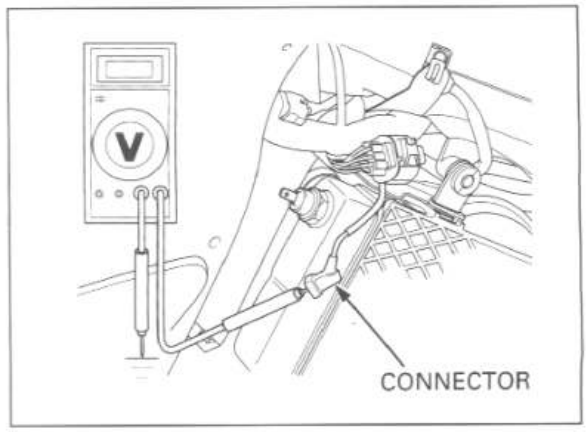
Fan motor does not start
Before testing, warm up the engine to operating temperature.

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.

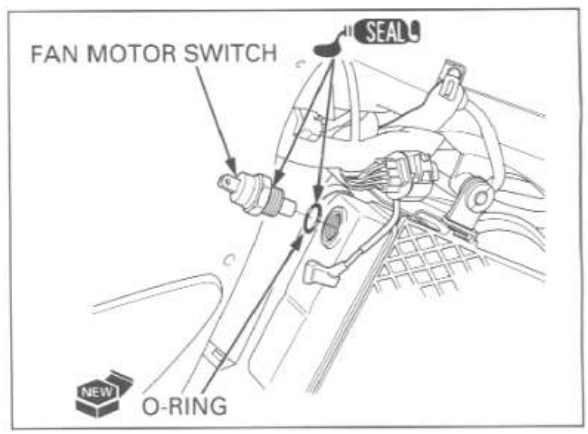


REMOVAL/INSTALLATION

Disconnect the fan motor switch connector and remove the switch.

Install a new O-ring onto the fan motor switch.
Apply sealant to the fan motor switch threads and O-ring.
Install and tighten the fan motor switch to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

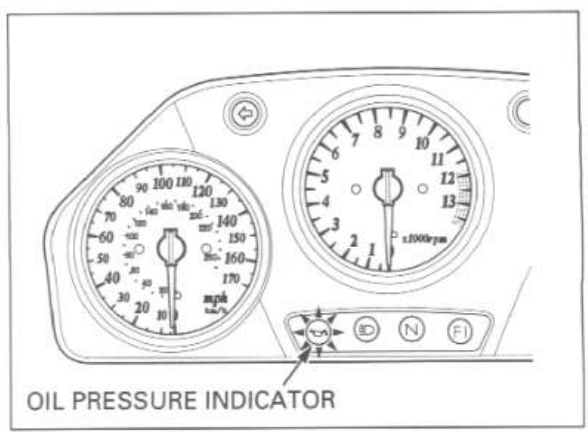


OIL PRESSURE SWITCH

INSPECTION

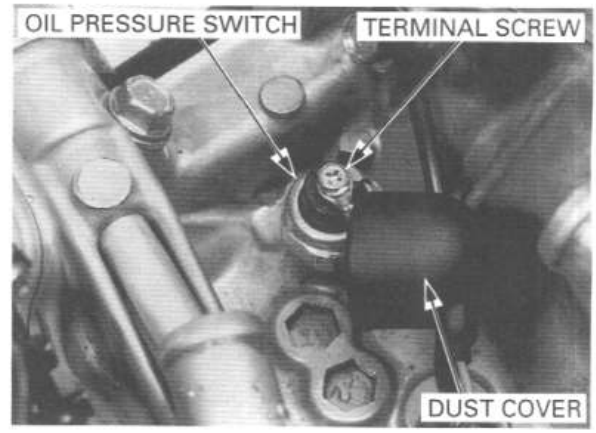
If the oil pressure warning indicator stays on while the engine running, check the engine oil level before inspection.

Make sure that the oil pressure warning indicator come on with the ignition switch ON.



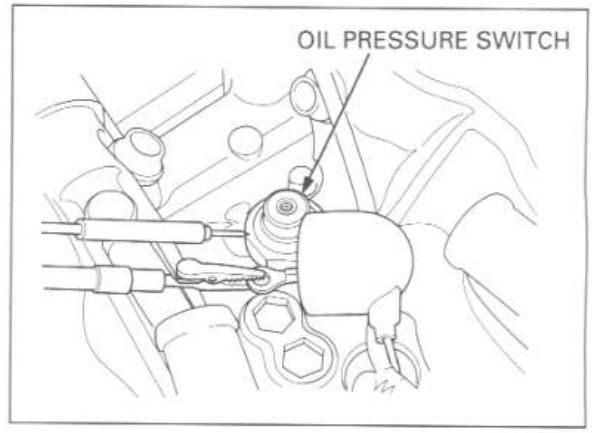
If the indicator does not come on, inspect as follow:
Remove the throttle body (page 5-56).

Remove the dust cover.
Remove the screw and oil pressure switch terminal.



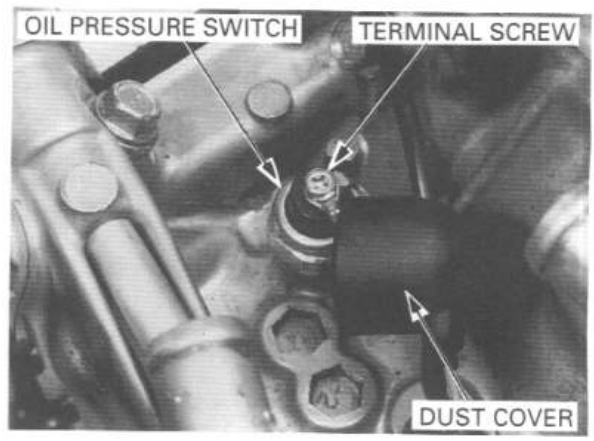
Short the oil pressure switch wire terminal with the ground using a jumper wire.
The oil pressure warning indicator comes on with the ignition switch is ON.
If the light does not comes on, check the sub-fuse (10 A) and wires for a loose connection or an open circuit.

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.



REMOVAL

Remove the dust cover.
Remove the screw and oil pressure switch terminal.
Remove the oil pressure switch from the cylinder block.

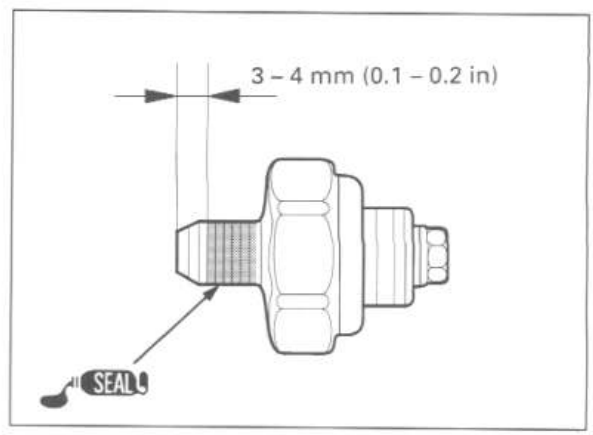


INSTALLATION

Apply sealant to the threads of the oil pressure switch.

CAUTION:

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



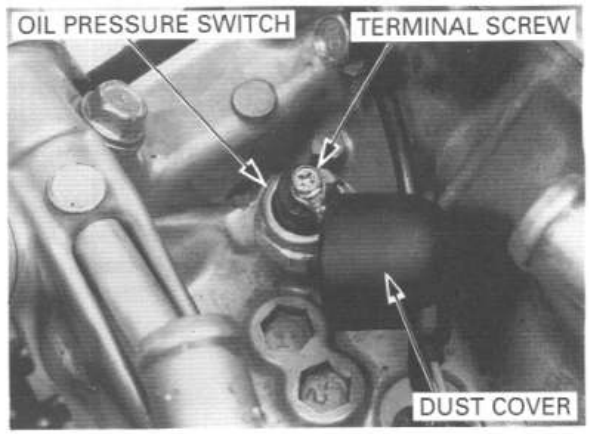
Install and tighten the oil pressure switch to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

CAUTION:

To prevent cylinder block damage, do not overtighten the switch.

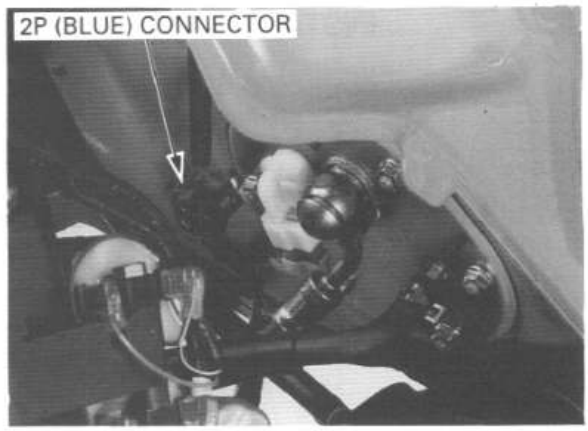
Connect the oil pressure switch connector, tighten the terminal screw.



FUEL LEVEL SENSOR

REMOVAL

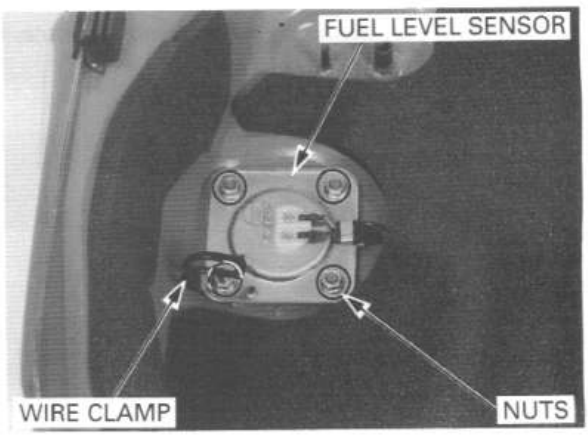
Disconnect the fuel level sensor unit 2P (Blue) connector.
Remove the fuel tank without disconnecting the fuel lines (page 8-4).



Remove the nuts, wire clamp and fuel level sensor unit from the fuel tank.

CAUTION:

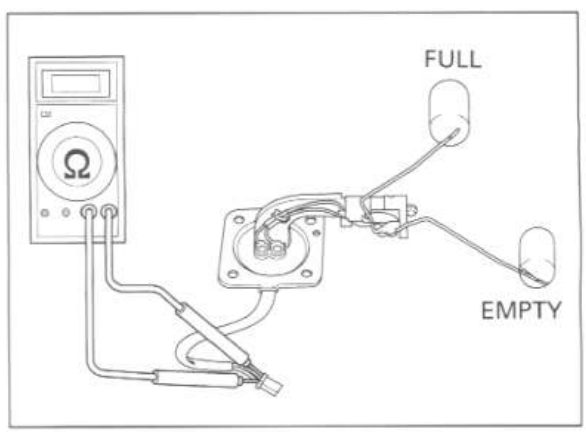
Be careful not to damage the float arm.



FUEL LEVEL SENSOR INSPECTION

Connect the ohmmeter to the fuel level sensor Gray/Black and Green/Black connector.
Inspect the resistance of the float at the top and bottom positions.

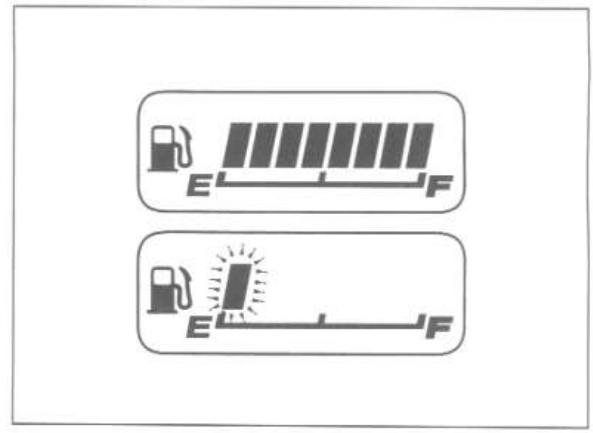
	FULL	EMPTY
Resistance	1 – 5 Ω	92 – 96 Ω



FUEL METER INSPECTION

Connect the fuel sensor connector to the wire harness and move the float from empty to full to check the fuel meter display indication.

If the fuel meter does not indicate properly, check for open or short circuit in wire harness.
If the wire harness is good, replace the LCD unit with a new one (page 19-10).

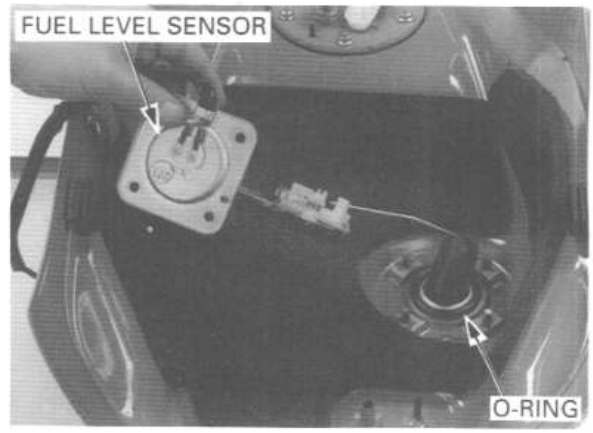


INSTALLATION

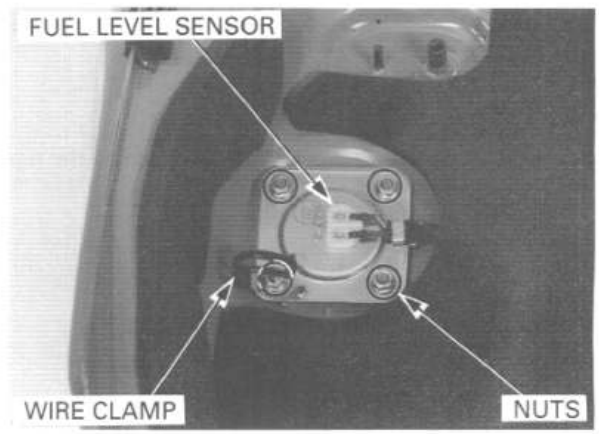
Check the O-ring is in good condition.
Install the fuel unit into the fuel tank.

CAUTION:

Be careful not to damage the float arm.

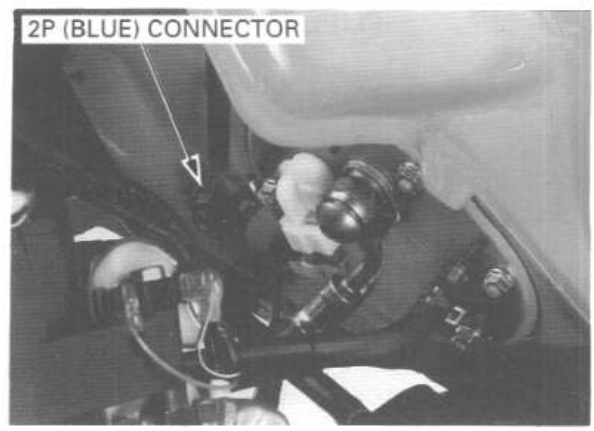


Install the wire clamp and nuts, then tighten the nuts securely.



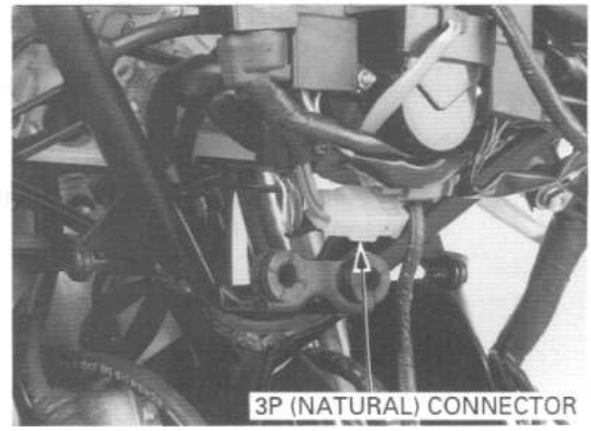
Install the fuel tank (page 8-51).

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



IGNITION SWITCH

INSPECTION



Remove the upper cowl (page 2-7).

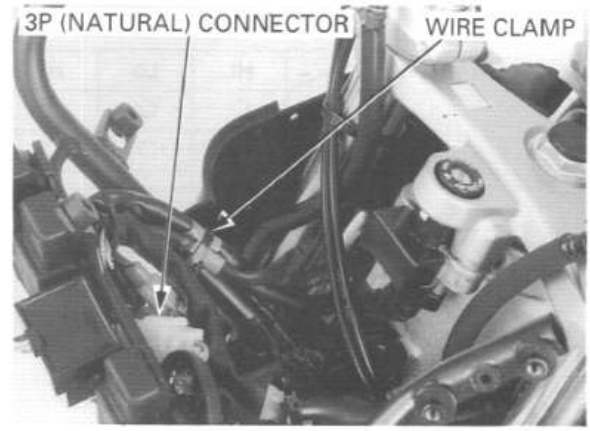
Disconnect the ignition switch wire 3P (Natural) connectors.

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

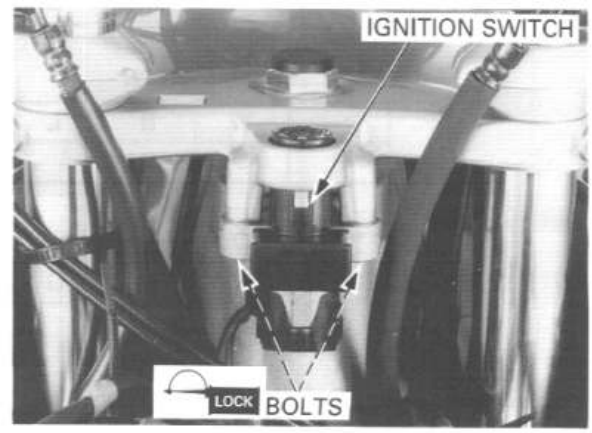
	FAN	IG	BAT1	KEY
ON	○	○	○	KEY ON
OFF				KEY OFF
LOCK				KEY OFF LOCK PIN
COLOR	Bu/O	R/Bl	R	———

REMOVAL/INSTALLATION



Remove the combination meter (page 19-9).

Disconnect the ignition switch wire 3P (Natural) connector.
Remove the wire clamp.



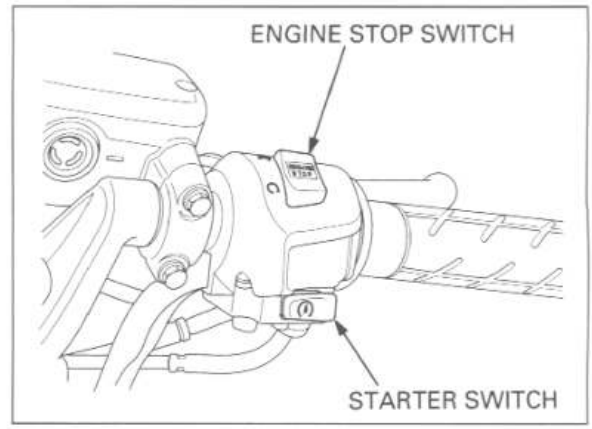
Remove the bolts and ignition switch.

Install the ignition switch in the reverse order of removal.

NOTE:

Apply a locking agent to the mounting bolt threads.

HANDLEBAR SWITCHES



Disconnect the handlebar switch connectors.

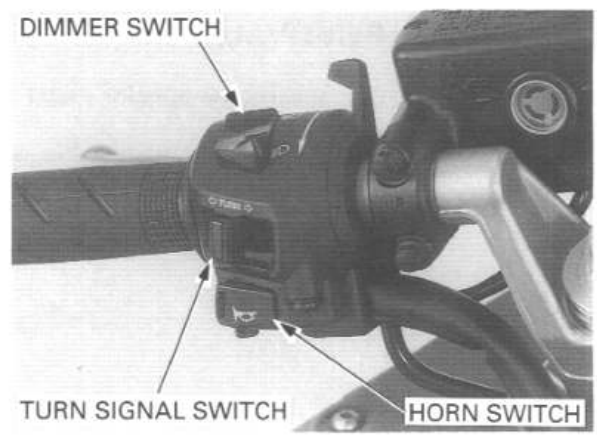
Check for continuity between the wire terminals of the handlebar switch connector.
Continuity should exist between the color coded wire terminals as follows:

ENGINE STOP SWITCH

	IG	BAT
OFF		
RUN	○—○	
COLOR	Bl	W/Bl

STARTER SWITCH

	ST	IG	BAT	HL
FREE			○—○	
PUSH	○—○			
COLOR	Y/R	Bl/W	Br/Bu	Bu/W



DIMMER SWITCH

	HL	Lo	HI
Lo	○—○		
(N)	○—○	○	
Hi	○		○
COLOR	Bu/W	W	Bu

HORN SWITCH

	Ho	BAT
FREE		
PUSH	○—○	
COLOR	Lg	Bl/Br

TURN SIGNAL SWITCH

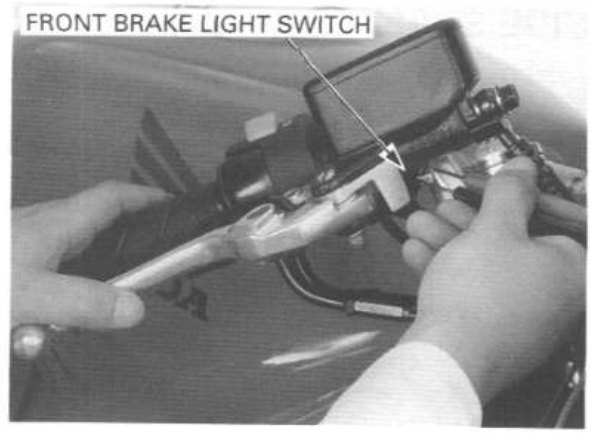
	W	R	L	BAT	PR	PL
R	○—○			○		○
N				○	○	○
L	○		○	○	○	
COLOR	Gr	Sb	O	Br/Bu	Sb/W	O/W

BRAKE LIGHT SWITCH

FRONT

Disconnect the front brake light switch connectors.

There should be continuity with the brake lever applied, and there should be no continuity with the brake lever is released.

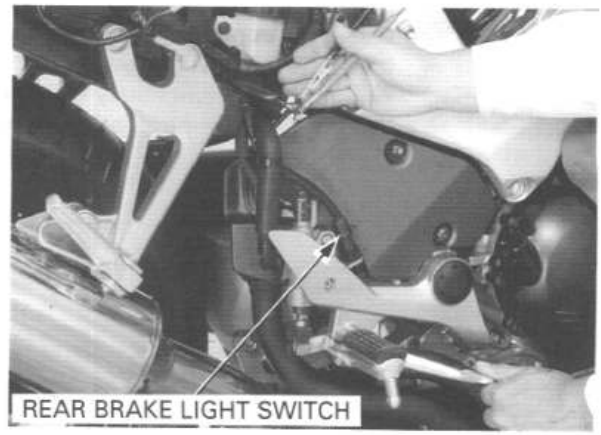


REAR

Remove the rear cowl (page 2-3).

Disconnect the rear brake light switch connectors and check for continuity between the terminals.

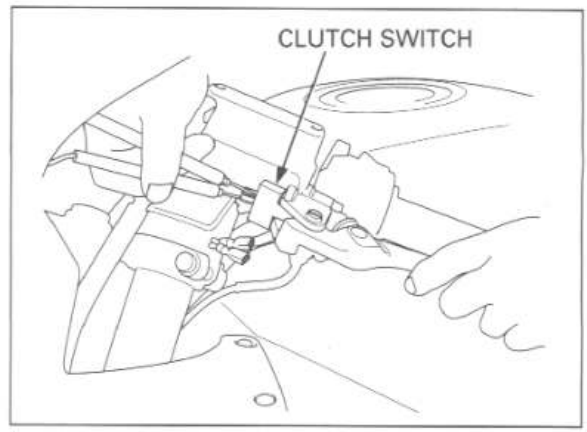
There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal is released.



CLUTCH SWITCH

Disconnect the clutch switch connectors.

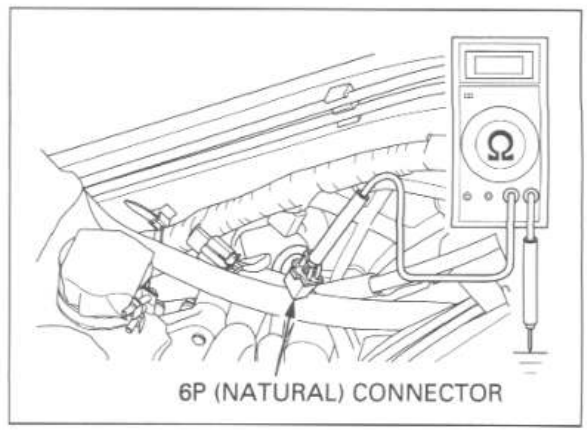
There should be continuity with the clutch lever applied, and there should be no continuity with the clutch lever is released.



NEUTRAL SWITCH

Remove the throttle body (page 5-56).

Disconnect the engine sub-harness 6P (Natural) connector.
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.

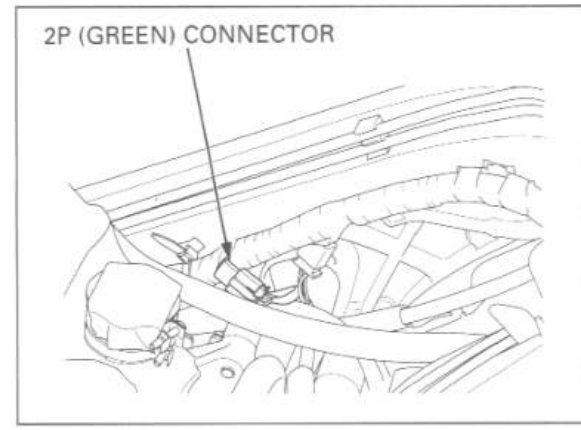


SIDE STAND SWITCH

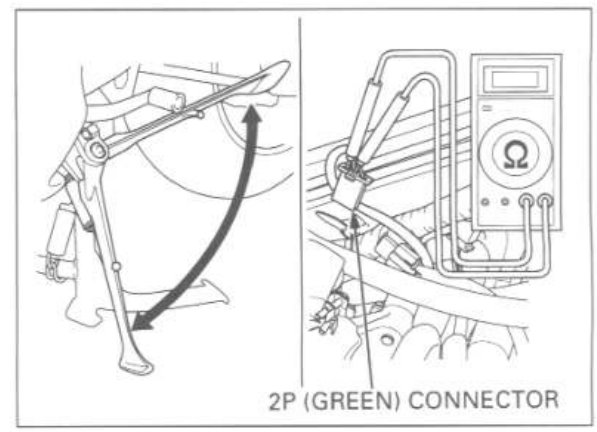
INSPECTION

Remove the throttle body (page 5-56).

Disconnect the side stand switch 2P (Green) connector.



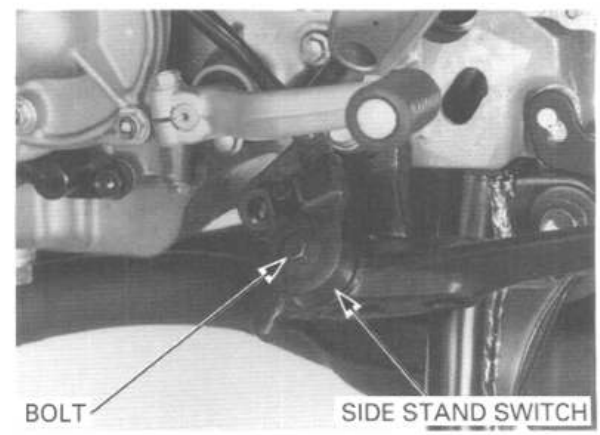
Check for continuity between the wire terminals of the side stand switch connector.
There should be continuity with the side stand UP and there should be no continuity with the side stand DOWN.



REMOVAL

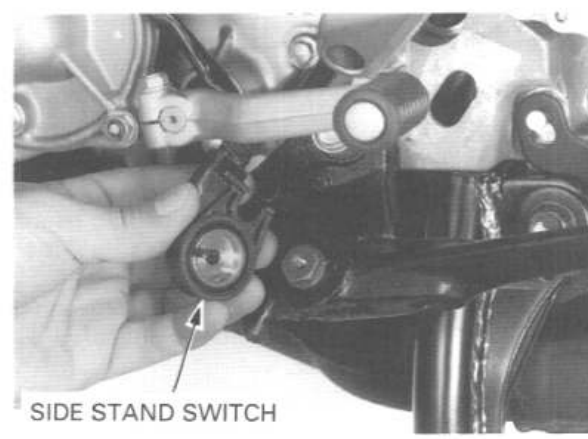
Disconnect the side stand switch 2P (Green) connector.

Remove the bolt and side stand switch.



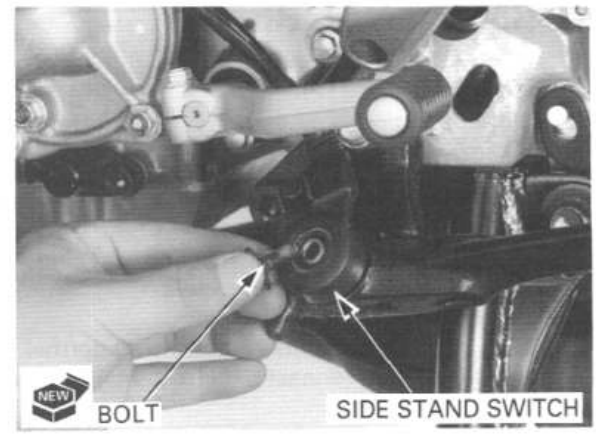
INSTALLATION

Install the side stand switch by aligning the switch pin with the side stand hole and the switch groove with the return spring holding pin.



Secure the side stand switch with a new bolt.

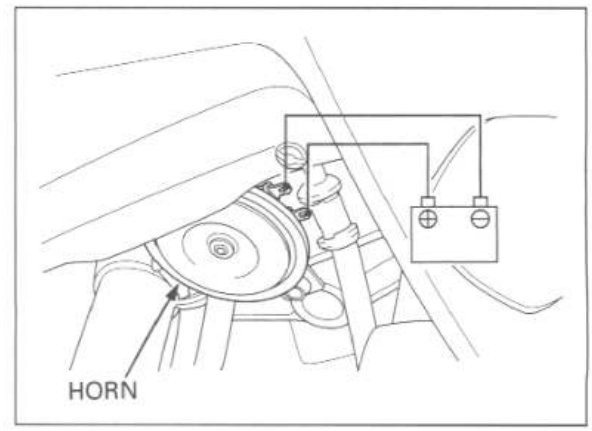
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



HORN

Disconnect the wire connectors from the horn.

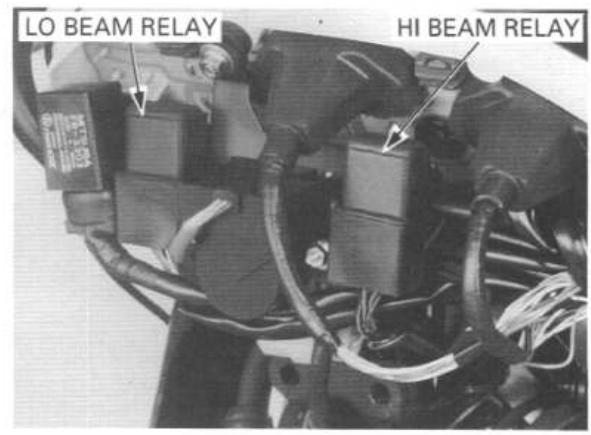
Connect the 12 V battery to the horn terminal directly. The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



HEADLIGHT RELAY

INSPECTION

Disconnect the headlight relay 4P connector, remove the headlight relay.



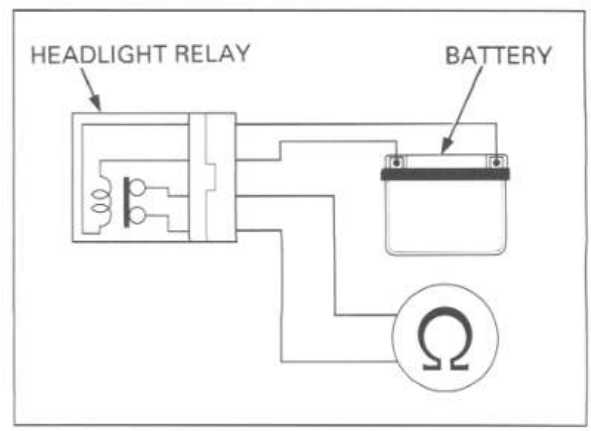
Connect the ohmmeter to the headlight relay connector terminals.

CONNECTION:
Hi beam relay: Blue/Black – Black/Red
Lo beam relay: White/Black – Black/Red

Connect the 12 V battery to the following headlight relay connector terminals.

CONNECTION:
Hi beam relay: Blue – Green
Lo beam relay: White – Green

There should be no continuity only when the 12 V battery is connected.
If the continuity is exist when the 12 V battery is connected, replace the headlight relay.



TURN SIGNAL RELAY



INSPECTION

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

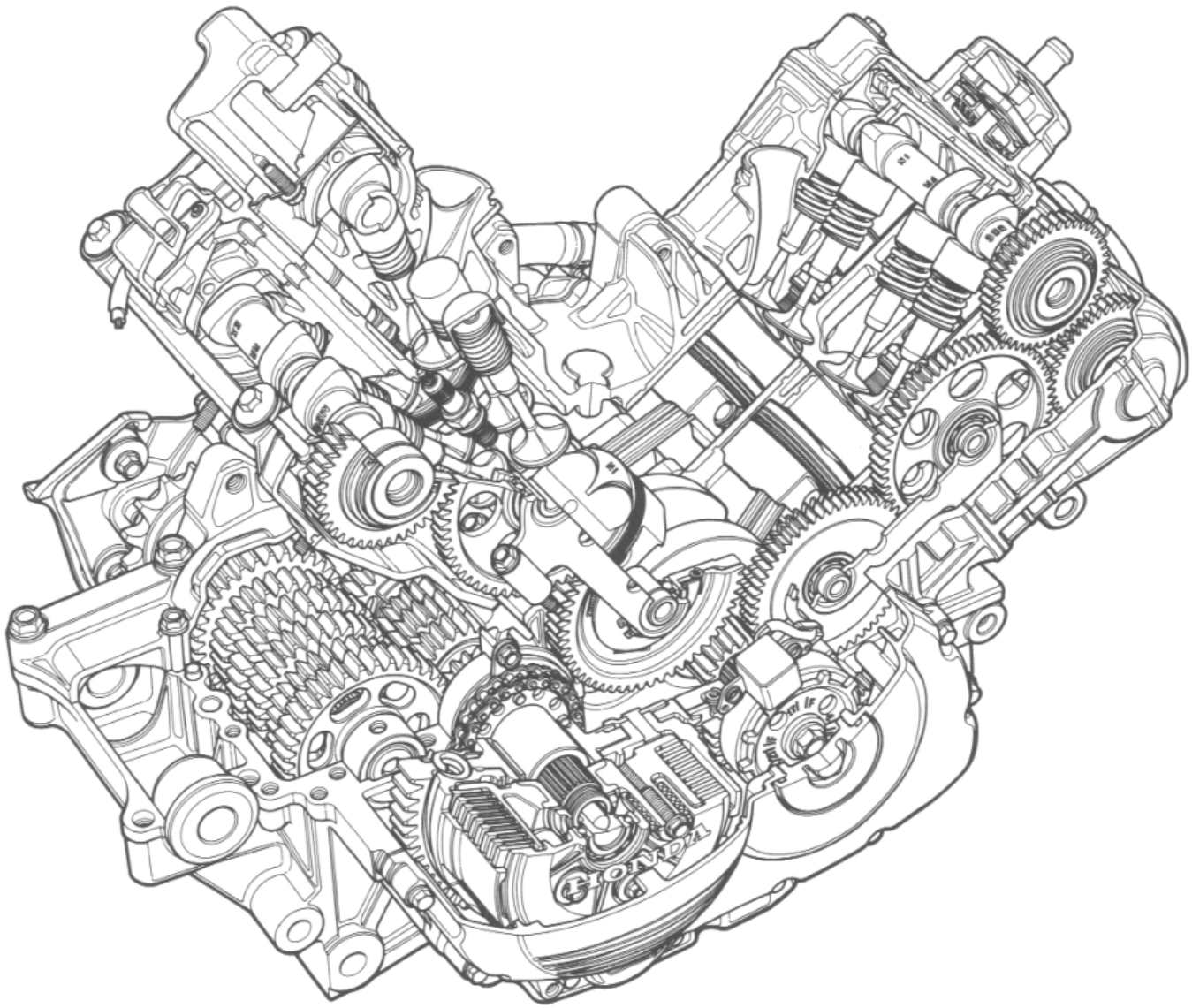
- Broken ground wire

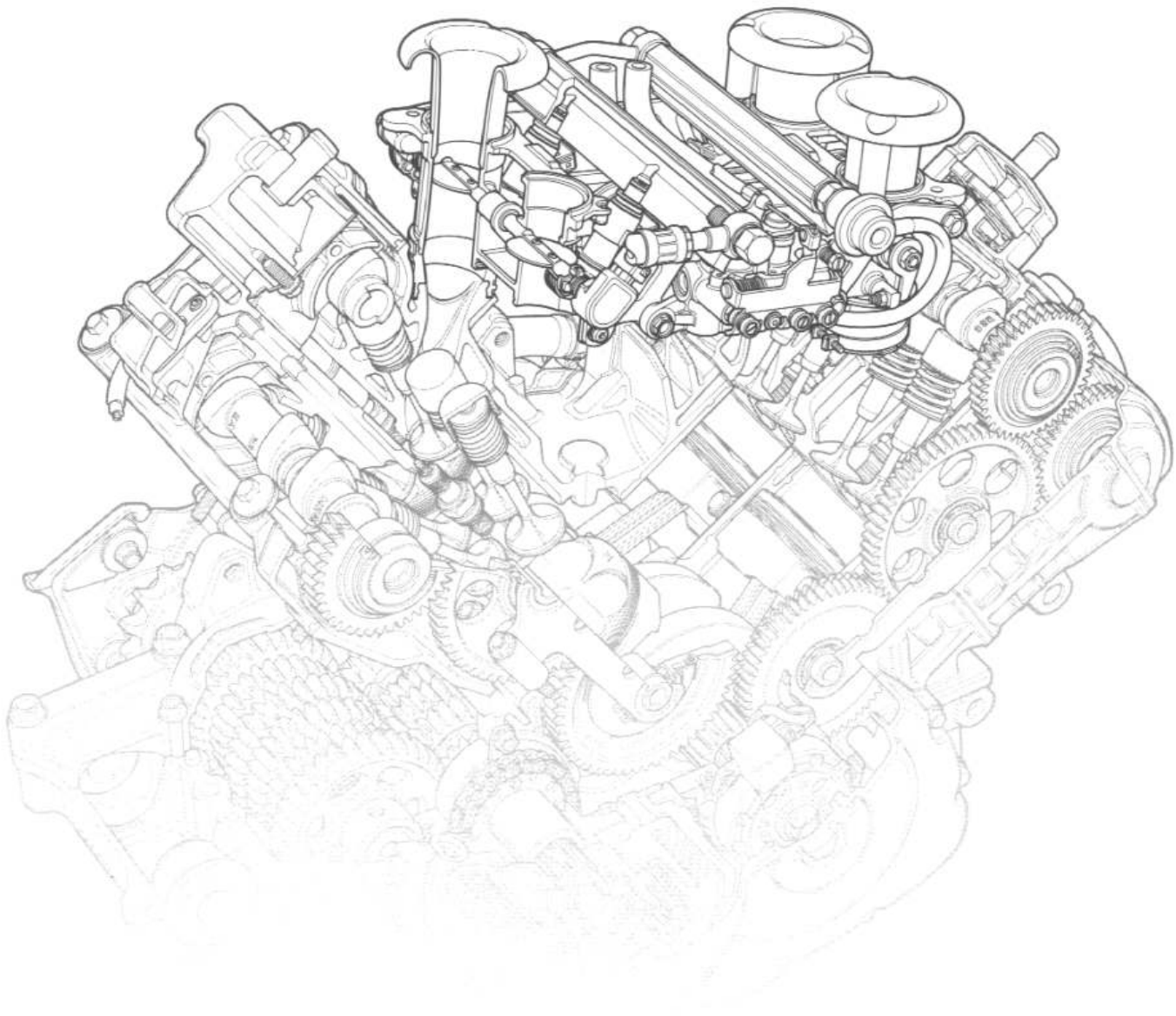
- Faulty turn signal relay.
- Poor connection of the connector.

21. TECHNICAL FEATURES

LIGHTWEIGHT, COMPACT V4 ENGINE	21-2	LBS (LINKED BRAKING SYSTEM)	21-30
PGM-FI (PROGRAMMED FUEL INJECTION)	21-6		

LIGHTWEIGHT, COMPACT V4 ENGINE

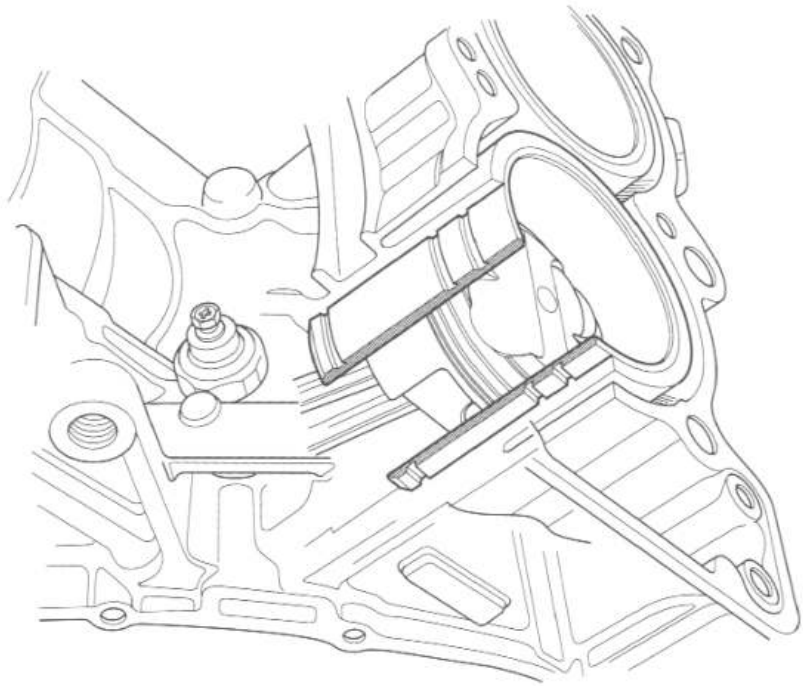


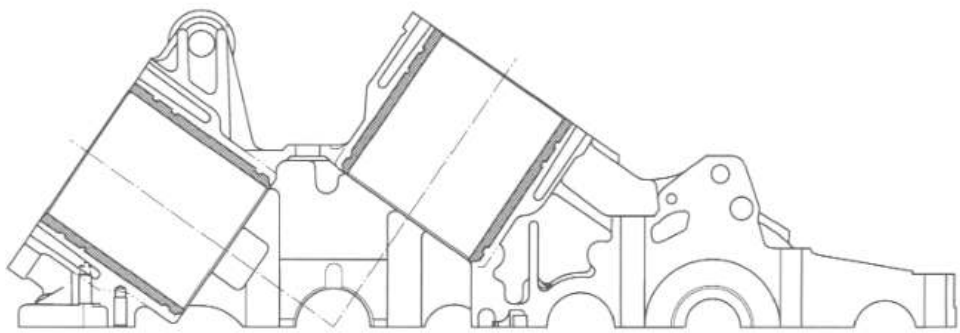


The following new features have been incorporated in this engine to achieve lightweight, compact dimensions and high performance.

- Lightweight aluminum P/M (Powder Metal) composite sleeves which enable a high compression ratio through enhanced cooling performance.
- Intake/exhaust layout adapted to high revolution speed.
- 3 main journal bearings which achieve low friction.
- Side cam gear train layout which provides compact engine dimensions.
- PGM-FI, attaining high response and enabling detailed setting throughout all speed ranges.

ALUMINUM P/M (POWDER METAL) COMPOSITE SLEEVE

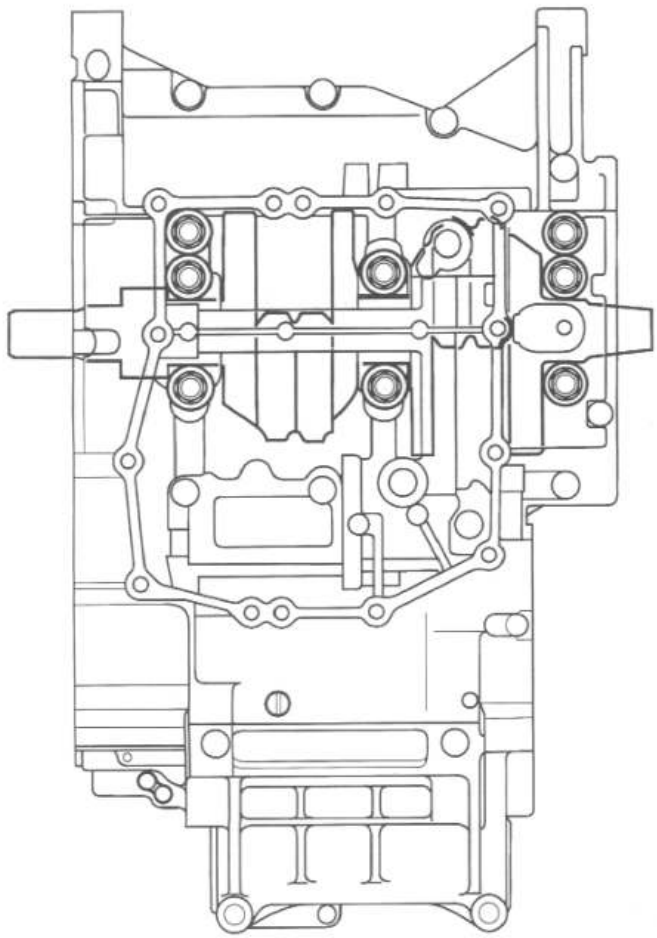


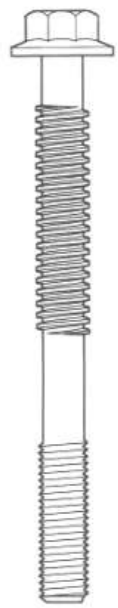




An aluminum P/M (Powder Metal) composite sleeve is used in place of a conventional case iron sleeve. It is composed of a mixture of powdered argil (alloy of silicone, iron, copper and magnesium), aluminum oxide and graphite (semicrystalline carbon).
The sleeve is produced by a hot extrusion process, and cast into the cylinder block as with a conventional type of sleeve.
The adoption of this aluminum P/M (Powder Metal) composite sleeve contributes to lower engine weight, along with the other innovations, and enhances cooling efficiency around the engine (by lowering temperature through enhanced heat radiation efficiency), enabling a higher compression ratio.
If the temperature is managed correctly, the sleeves can be rebored in the same manner as conventional sleeves. During crankshaft and piston assembly and disassembly, make sure that the big end of the connecting rod does not contact or damage the inside surface of the sleeve.

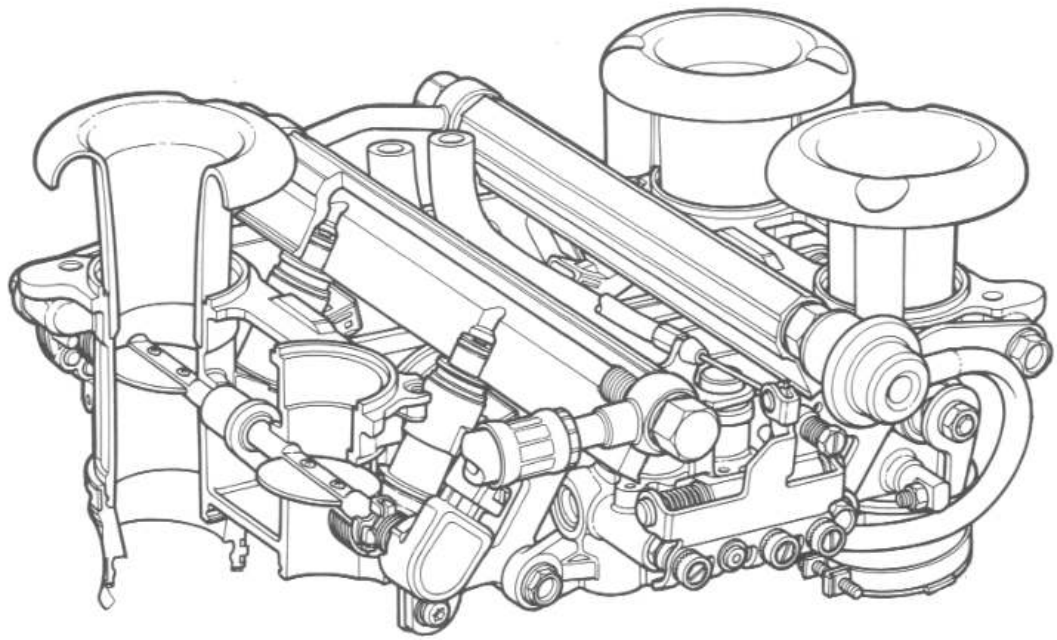
LOW-FRICTION 3 MAIN JOURNAL BEARING CRANKCASE

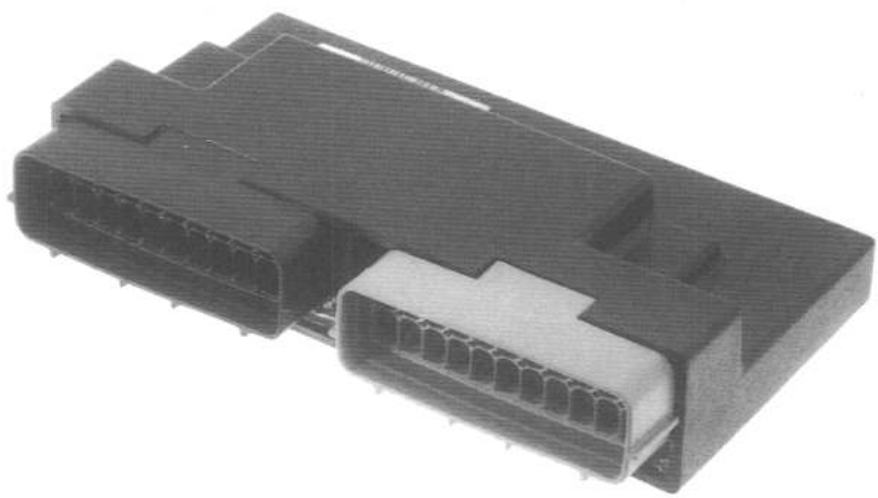




A side cam gear train was incorporated to reduce the engine size. Three main journal bearings support the crankshaft to optimize engine performance at high revolutions by reducing friction.
Because there are fewer crankshaft support points, the conventional elastic region tightening method has been replaced by the plastic region angle method to ensure the main journal bolts are secured correctly.
After the crankcase has been split, always replace the main journal bolts with new ones. Be sure to use the plastic region angle method to tighten the bolts.

PGM-FI (PROGRAMMED FUEL INJECTION)



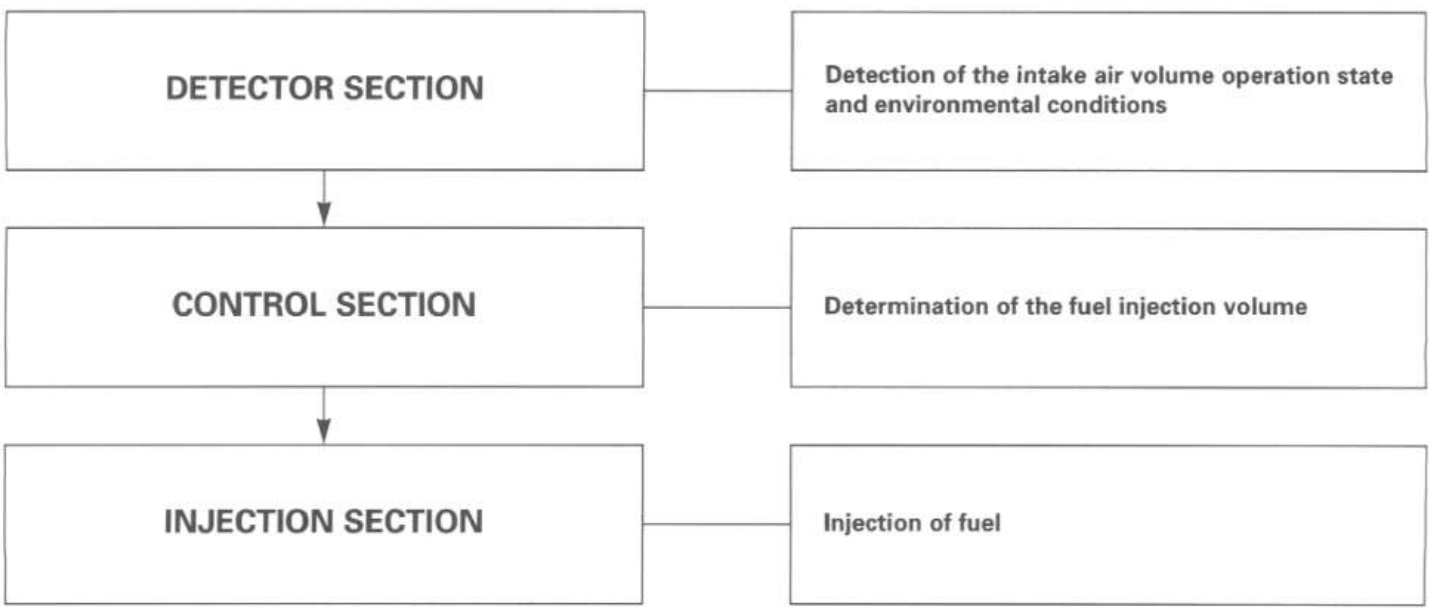


OUTLINE

The PGM-FI (Programmed Fuel Injection) consists of calculating, by means of a computer, the quantity of fuel to be supplied, based on information provided by sensors, and injecting fuel by means of the fuel injector.

In carburetor system, there are 3 functions, (detection of the intake air volume, determination of the fuel volume, and flow of the fuel) that are closely related to each other are performed at the same time.
The PGM-FI system is characterized by independent control of the 3 functions: Intake air volume is detected by means of sensor, the fuel volume is computed by the ECM based on information provided by sensors, and the computed volume of fuel is injected by means of the fuel injector. Thus, the precision of each function can be improved with ease, and the air/fuel ratio can be controlled in a more accurate way.

The construction of the PGM-FI can be divided in 2 major parts, the "fuel flow" and the "electronic components".
The "fuel flow" consists of the fuel pump, pressure regulator and fuel injector.
The "electronic components" consist of the "detector section: which inputs information into the ECM, and the "control section" which controls the said information at the ECM, and generates the fuel injection commands.



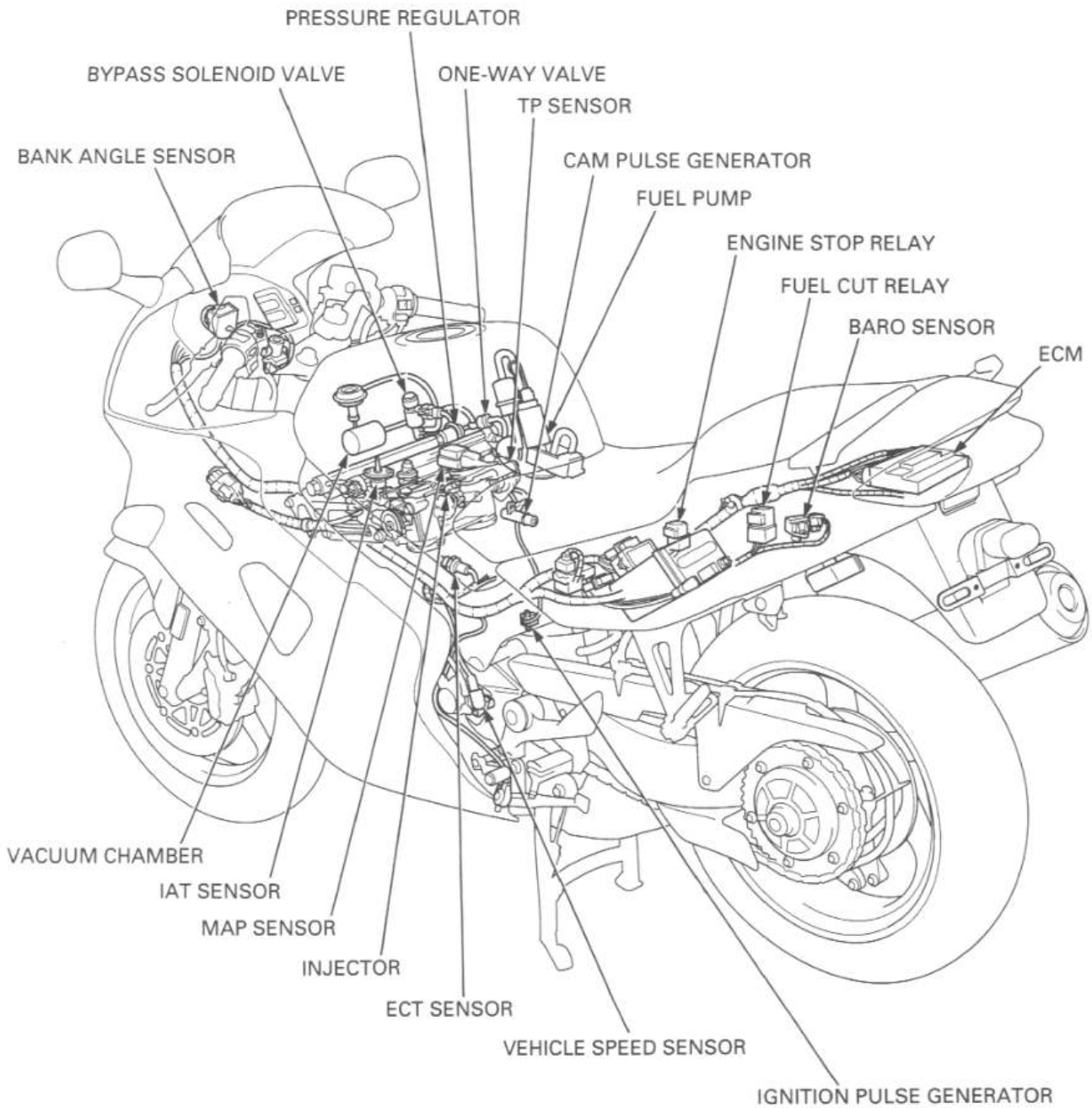
BASIC OPERATION

The PGM-FI system detects the following from the sensors and decides the volume of fuel to be injected as computed by the map in the ECM.

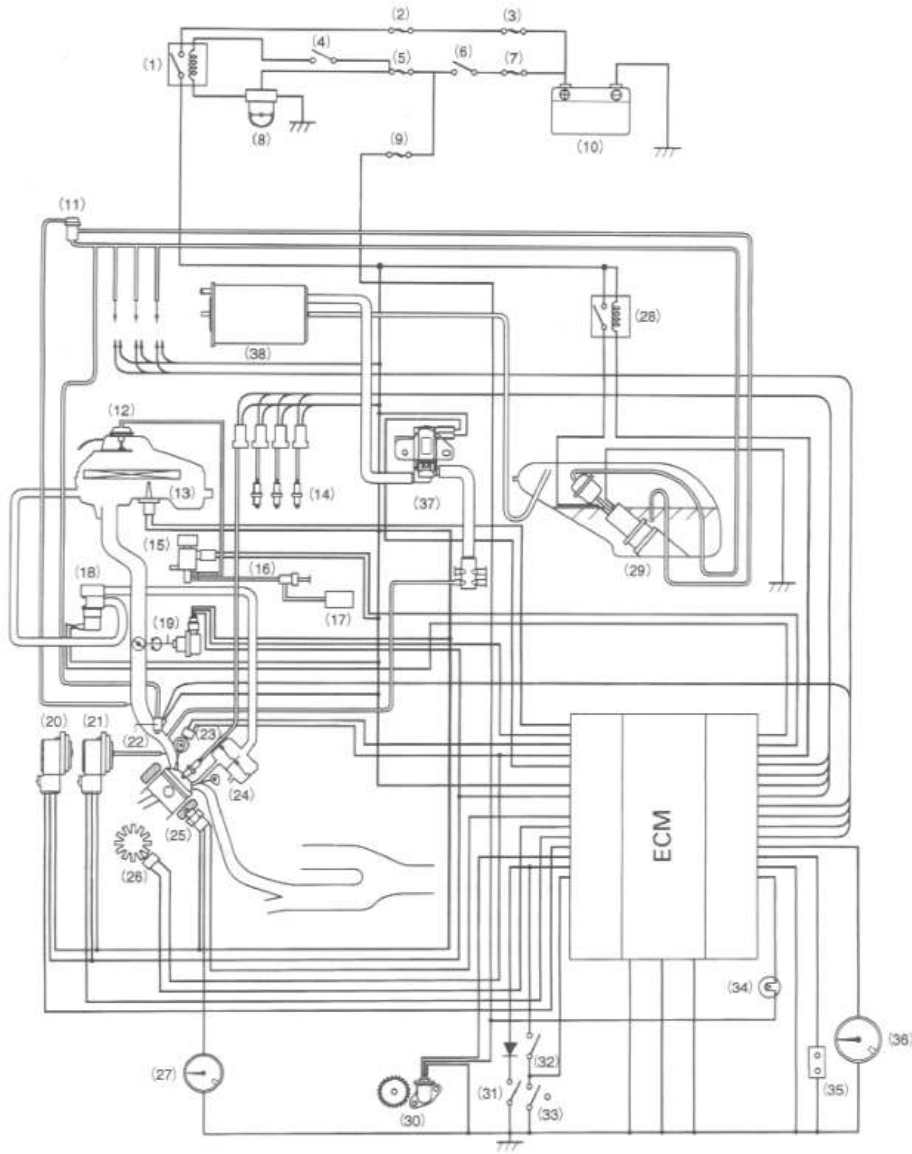
- Throttle valve operation (Throttle position sensor)
- Coolant temperature (ECT sensor)
- Intake air temperature (IAT sensor)
- Barometric pressure (BARO sensor)
- Intake manifold negative pressure (MAP sensor)
- Engine revolution speed (Ignition pulse generator)
- Cylinder identification (Cam pulse generator)

In the ECM, fuel pumped by the fuel pump is injected from the fuel injector into the intake manifold by changing the valve opening time of the fuel injector.
Fuel injected in the intake manifold is mixed with air, atomized, and set to the combustion chamber.

PGM-FI PARTS LAYOUT DIAGRAM



PGM-FI SYSTEM DIAGRAM



(1)	Engine stop relay
(2)	Sub-fuse (20 A)
(3)	Main fuse B (30 A)
(4)	Engine stop switch
(5)	Sub-fuse (10 A)
(6)	Ignition switch
(7)	Main fuse A (30 A)
(8)	Engine stop sensor
(9)	Sub-fuse (10 A)
(10)	Battery
(11)	Pressure regulator
(12)	Variable intake port diaphragm
(13)	IAT sensor
(14)	Spark plug
(15)	Bypass control solenoid valve
(16)	One-way valve
(17)	Vacuum chamber
(18)	PAIR solenoid valve
(19)	Throttle position sensor

(20)	BARO sensor
(21)	MAP sensor
(22)	Injector
(23)	Cam pulse generator
(24)	PAIR check valve
(25)	ECT sensor
(26)	Ignition pulse generator
(27)	Water temperature meter
(28)	Fuel cut relay
(29)	Fuel pump
(30)	Vehicle speed sensor
(31)	Neutral switch
(32)	Clutch switch
(33)	Side stand switch
(34)	Malfunction indicator
(35)	Service check connector
(36)	Tachometer
(37)	EVAP purge control valve
(38)	EVAP canister

ECM



Outline

The ECM uses a 16-bit one-chip microcomputer to upgrade the arithmetic processing capacity, thereby making it possible to realize high revolution speed and high response.

The permissible revolution speed of the system was upgraded thanks to these improvements, and it is possible to cope with engine revolution speeds up to approximately 16,000 rpm with independent sequential processing for all cylinders.

The program map contained in the ECM must carry out optimum fuel-air mixture control according to the operating state of the each cylinder, in order to realize high revolution speed, high output power and upgrade the riding performance.

Thus, 2 program maps are set for the individual cylinder.

The ECM also contains the ignition control module.

Construction

The ECM, which is the brain of the fuel injection control system and ignition control system, is installed inside the rear cowl.

The ECM features superior response characteristics thanks to the adoption of a 16-bit digital computer, and consists of the CPU (Central Processing Unit), memory (storage unit) and I/O (Input/Output).

The signals from the sensors are sent to the ECM, and are sent to the CPU.

At the CPU, the volume of fuel to be injected is calculated, based on the signals sent by the sensors, making use of the program map, and the operation signal of the fuel injector is sent to the output unit.

The operating signal is sent from the output unit to the fuel injector.

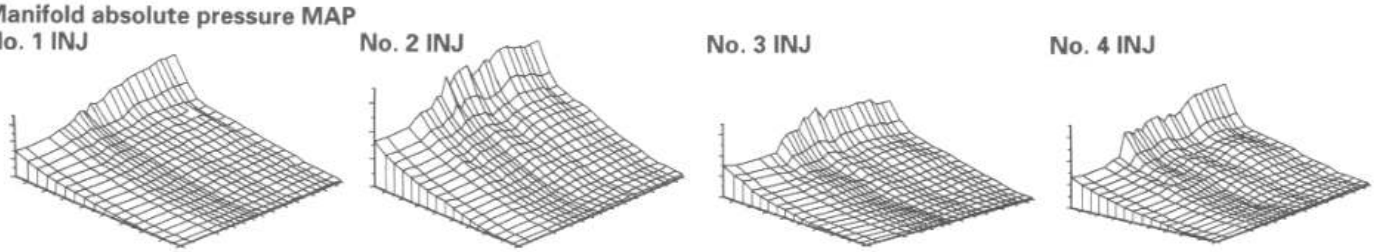
Each cylinder had an independent program map/two map system

Since there are differences in the cooling performance and the intake/exhaust systems of the each cylinder in view of the layout characteristics of the engine, the program maps are independent, so as to determine the optimum fuel injection volume of each cylinder.

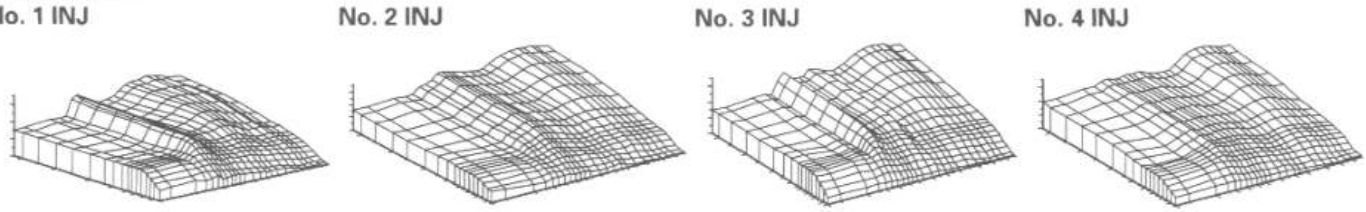
The negative pressure of the intake manifold can not be obtained accurately when the throttle valve is widely open, because of the multiple throttle body construction and because of the large valve overlap of the engine.

On the other hand, throttle sensor precision becomes low when the throttle valve is narrowly open. Thus, the fuel injection volume is accurately determined by using of 2 different program maps for each cylinder depending on the engine load conditions.

Manifold absolute pressure MAP



Throttle MAP



Basic injection volume

When the throttle is narrowly open:

The optimum value of the basic fuel injection volume corresponding to the operating conditions of the engine is determined by the program maps contained in the ECM, by using the intake manifold negative pressure (MAP) detected by the manifold absolute pressure sensor and the engine revolution speed (Ne) detected by the ignition pulse generator as a base, and by making compensations according to the signals of the various sensors.

When the throttle is widely open:

The optimum value of the basic fuel injection volume corresponding the operating conditions of the engine is determined by the program maps contained in the ECM, by using the throttle opening detected by the throttle position sensor (TPS) and the engine revolution speed (Ne) detected by the ignition pulse generator as a base, and by compensations according to the signals of the various sensors.

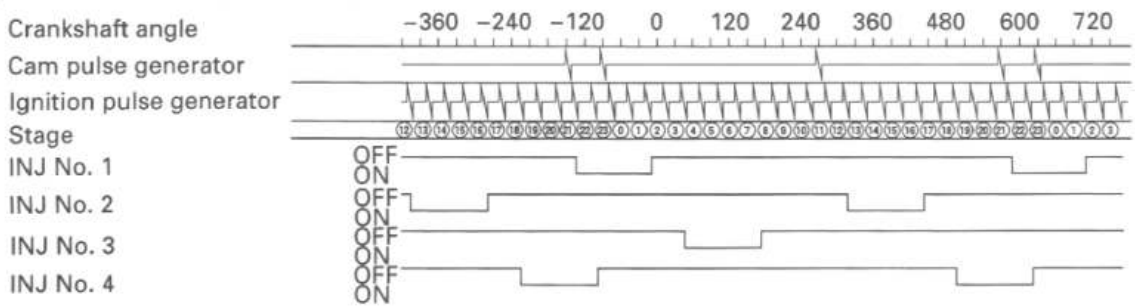
Compensation of the injection volume

The sensors used to make compensations in the volume of the fuel to be injected and the corresponding compensation items are shown in the following table.

Compensation item	Related sensor and input information	Contents
Intake air temperature	IAT (Intake air temperature) sensor	The volume of fuel to be injected is compensated according to the intake air temperature.
Coolant temperature	ECT (Engine coolant temperature) sensor	The volume of fuel to be injected is compensated according to the coolant temperature.
Barometric pressure	BARO (Barometric pressure) sensor	The volume of fuel to be injected is compensated according to the barometric pressure.
Feeding voltage	Battery voltage	The volume of fuel to be injected is compensated when the feeding voltage of the battery is low.
During acceleration	TP (Throttle position) sensor	The volume of fuel to be injected is compensated when the throttle opening degree is suddenly increased.

Injection system

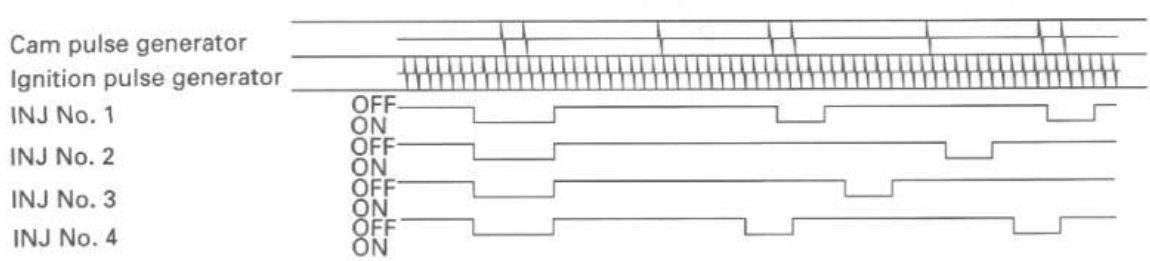
The injection system consists of injecting fuel in sequence to the various cylinders by means of the fuel injector, by detecting the quantity of fuel to be injected in each cylinder by means of the cam pulse generator and ignition pulse generator (all-cylinder independent sequential injection system). The cam pulse generator carries out the identification of each individual cylinder, and the ignition pulse generator detects the fuel injection timing of the various cylinders and the engine revolution speed, and these information are entered in the ECM.



Control when stating the engine

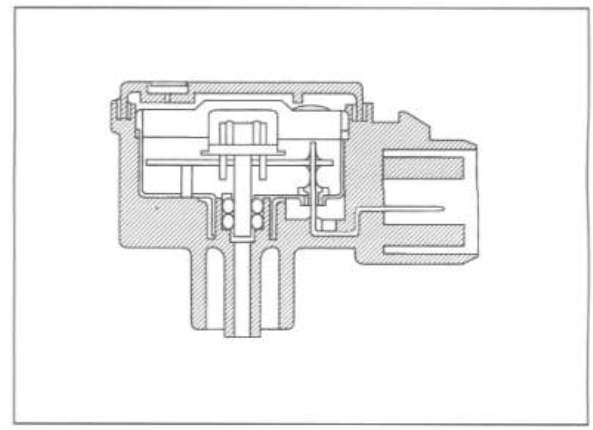
A signal from the cam pulse generator and ignition pulse generator is entered into the ECM when the starter is actuated and the crankshaft is rotated. The ECM sends signals to all fuel injectors, and causes them to inject fuel at the same time.

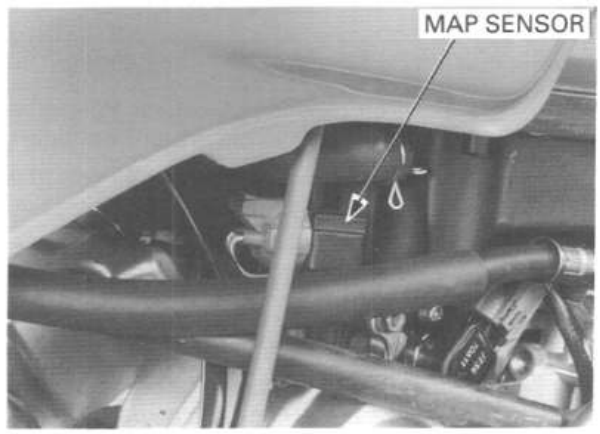
The crankshaft rotates, and the operation mode is switched to sequential injection from the second revolution.

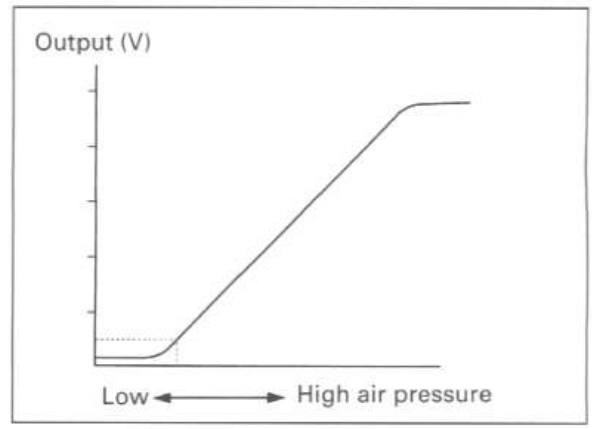


SENSORS

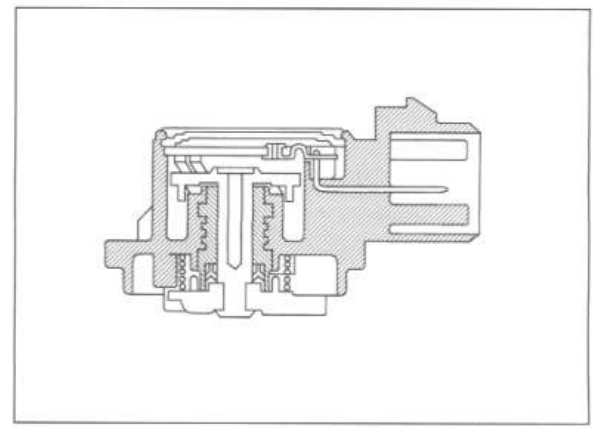
Manifold absolute pressure sensor (MAP sensor)
The manifold absolute pressure sensors (MAP sensor) is installed at the right side of the air cleaner housing, and the vacuum tube is connected to the throttle body.
Pressure prevailing inside the intake manifold is detected, the detected pressure is converted into a voltage signal, and is sent to the ECM.
The basic fuel injection volume of the MAP map is determined according to the intake manifold pressure given by this signal.

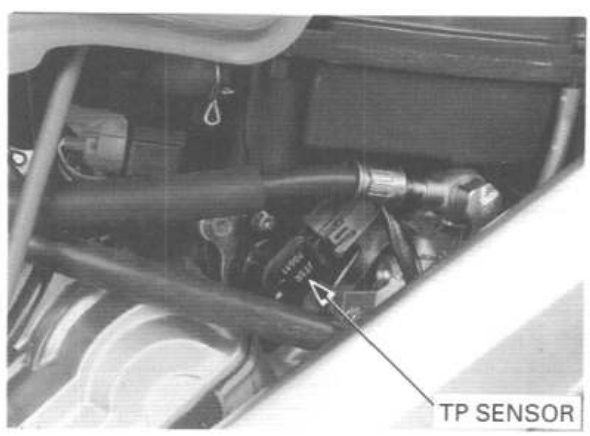


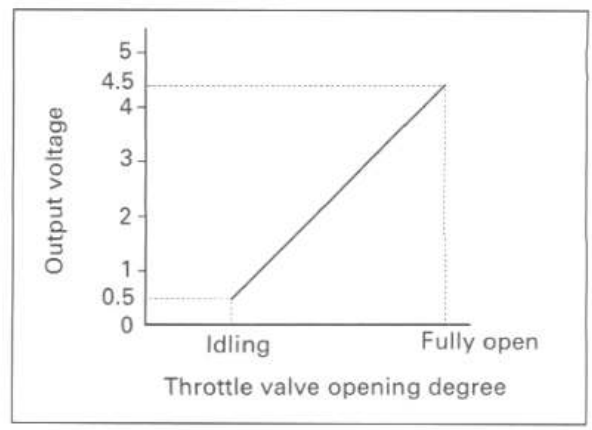




Throttle position sensor (TP sensor)
The throttle position sensor (TP sensor) is install on the throttle body.
The opening degree of the throttle valve is detected as a resistance value.
That value is converted into voltage signal which is sent to the ECM.
The basic fuel injection volume of the TP map is determined and the compensation corresponding to the acceleration is carried out by making use of the said signal.





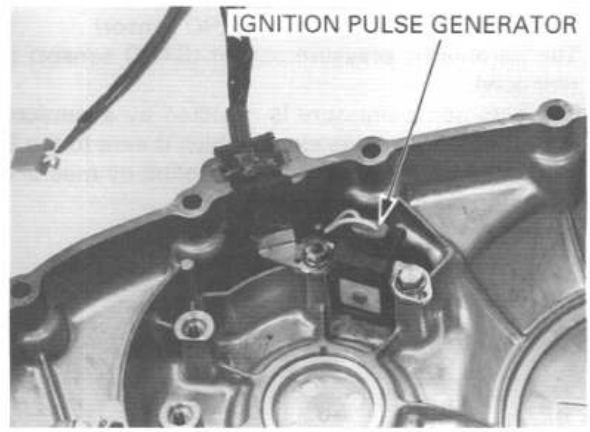


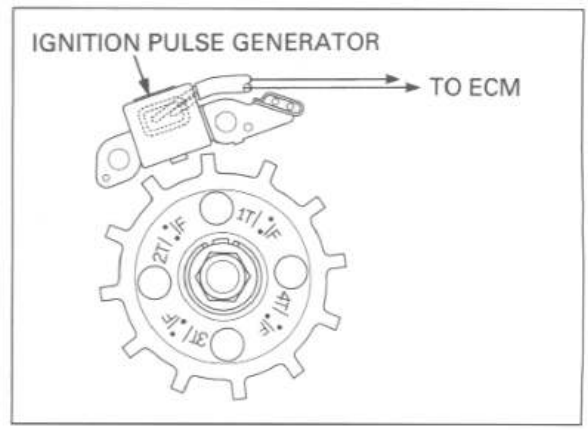
Ignition pulse generator

A rotor is installed at the right-hand side of the crankshaft, and the pick-up coil is installed inside the right crankcase cover.

When the engine starts and the crankshaft rotates, the magnetic flux inside the coil changes, generating the pulse signal, which is transmitted to the ECM.

The fuel injection timing and the revolution speed of the engine are identified by this signal.





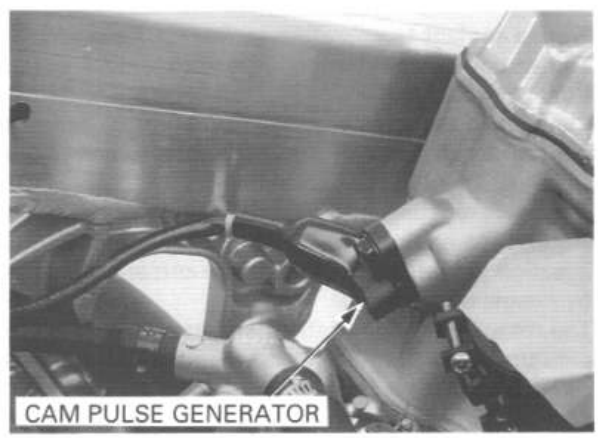
Cam pulse generator

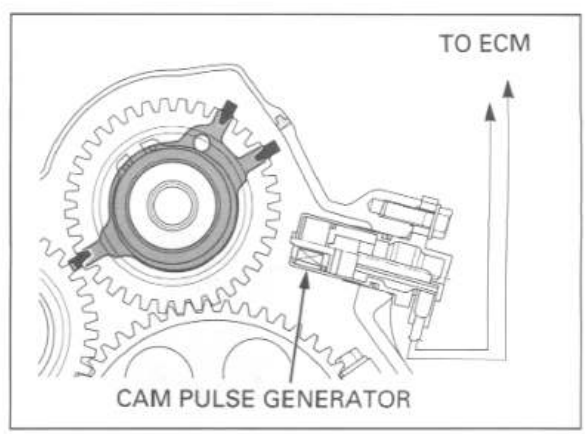
The cam pulse generator is installed on the rear cylinder head.

The rotor is installed on the intake side camshaft, and the pick-up coil is installed on the cylinder head.

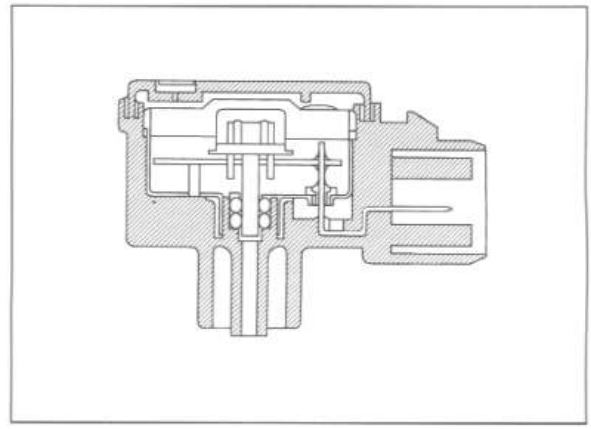
When the engine starts and the camshaft rotates, the magnetic flux inside the pick-up coil changes, generating the pulse signal, which is transmitted to the ECM.

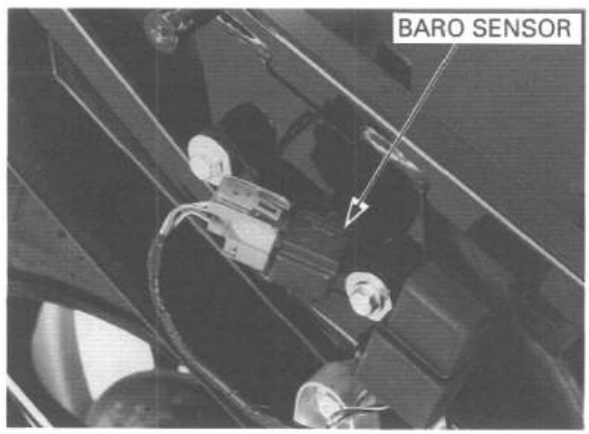
The cylinder is identified by this signal, and then the sequential fuel injection is carried out.

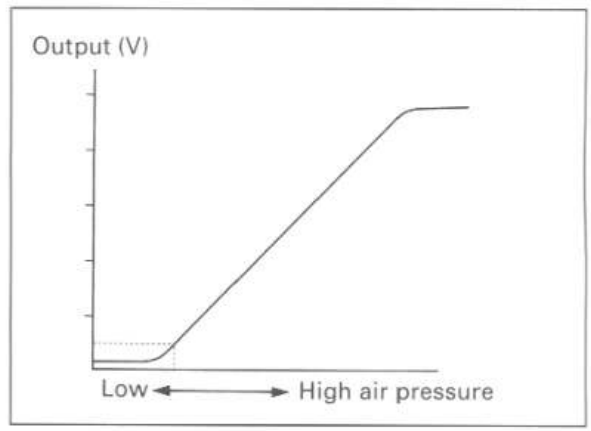




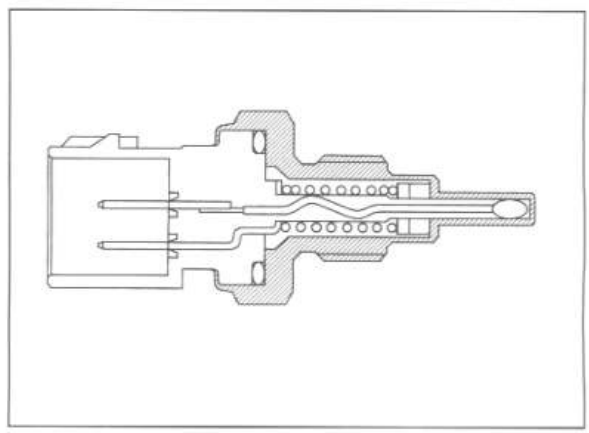
Barometric pressure sensor (BARO sensor)
The barometric pressure sensor (BARO sensor) is installed inside the rear cowl.
The barometric pressure is detected by a semiconductor detector and converted into voltage signal which is sent to the ECM.
The fuel injection volume is controlled by means of this signal, according to the barometric pressure.

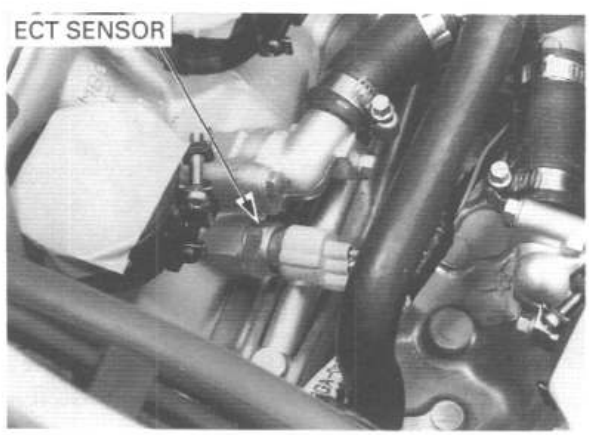


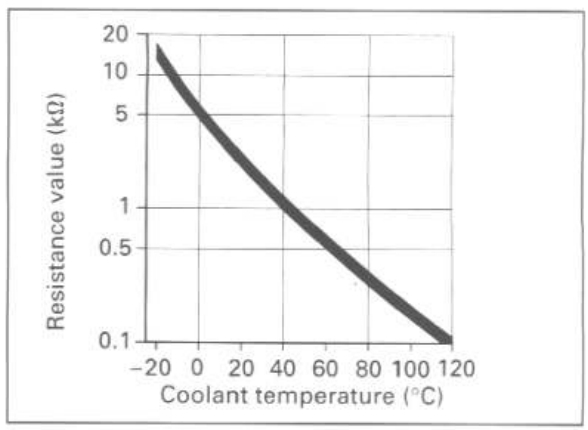




Engine coolant temperature sensor (ECT sensor)
The engine coolant temperature sensor (ECT sensor) is installed in the front cylinder head.
Changes in the engine coolant temperature are detected by changes in the resistance value of the thermistor, which is converted into voltage signal and sent to the ECM.
The determination of the basic volume of the fuel to be injected when starting the engine and the compensation to be made in the basic fuel injection volume, according to the coolant temperature, are carried out by means of this signal.
The resistance value of the thermistor increases when the coolant temperature is low, and decrease when the coolant temperature is high.







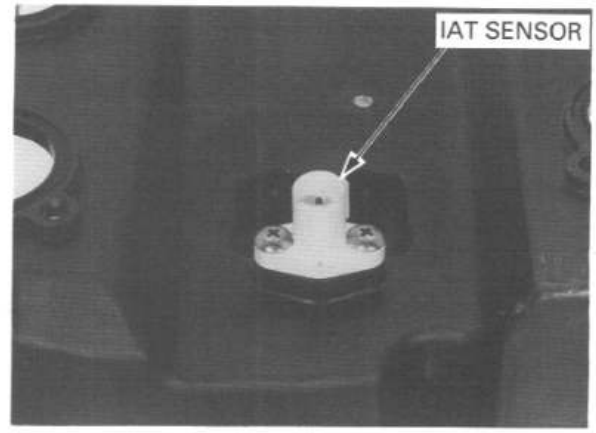
Intake air temperature sensor (IAT sensor)

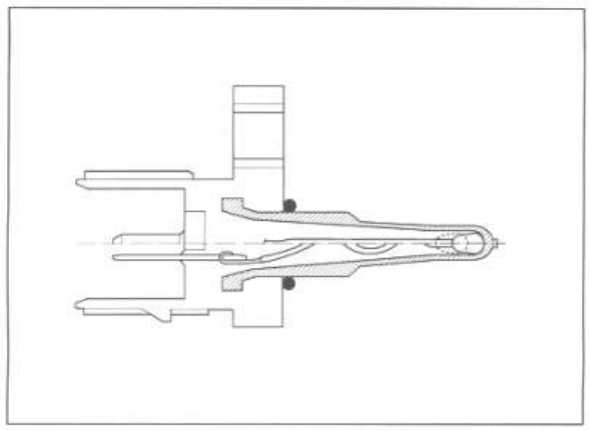
The intake air temperature sensor (IAT sensor) is installed at the lower left side of the air cleaner housing. Changes in the intake air temperature are detected by changes in the thermistor resistance value, which is converted into voltage signal and sent to the ECM.

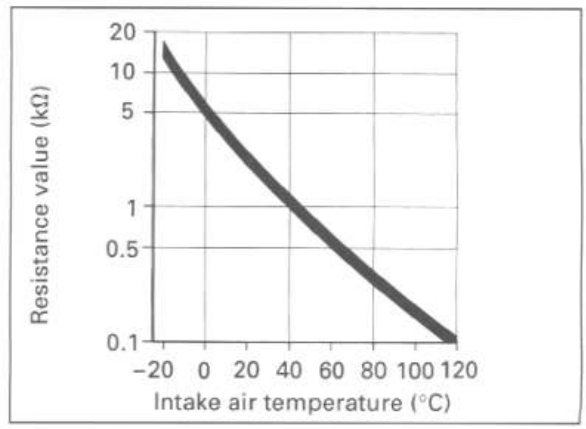
The basic fuel injection volume compensation is carried out by this signal.

The thermistor resistance value increases when the intake air temperature is high.

The response characteristic is improved by adopting thermistor with sensing unit having a heat capacity as small as possible.

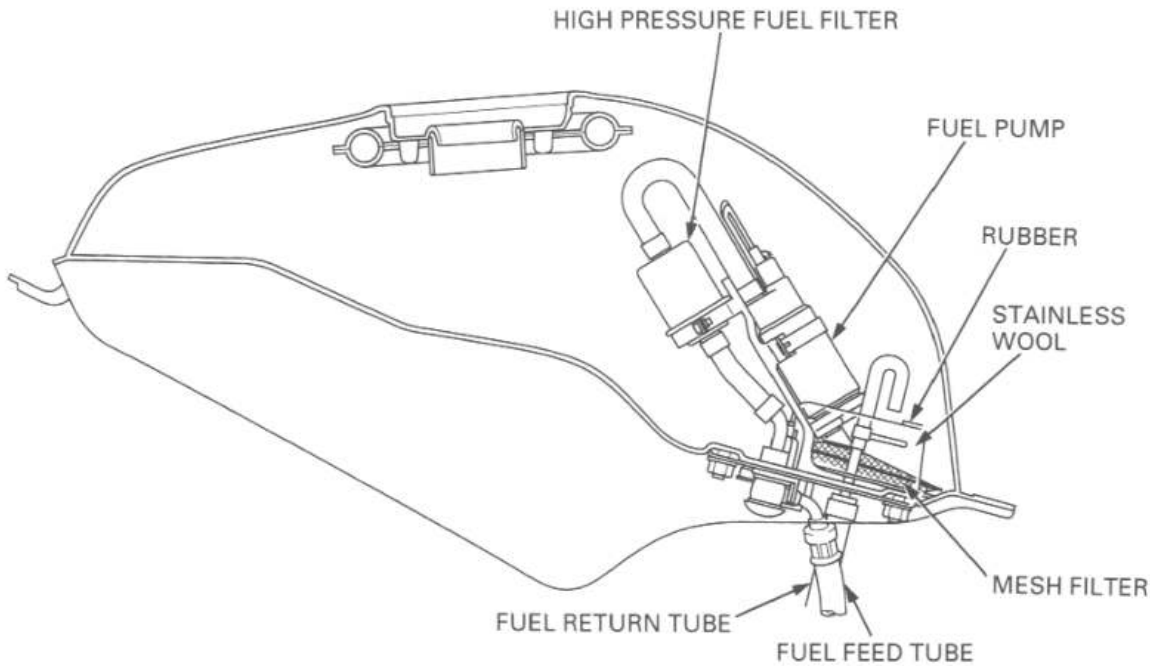


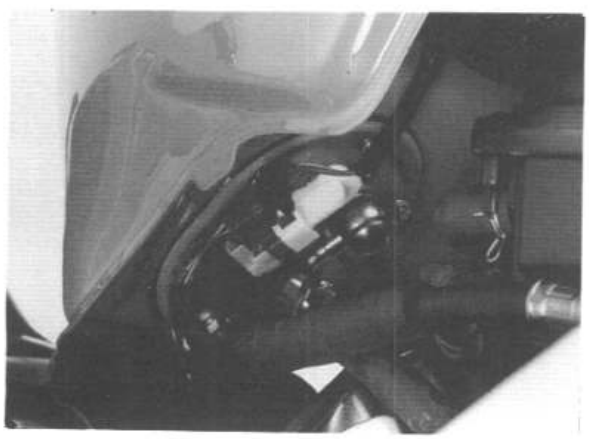




FUEL FEEDING SYSTEM

Broadly speaking, the fuel feeding system of PGM-FI consists of the fuel pump which pumps fuel, the pressure regulator which keeps the fuel pressure constant, the injector which injects fuel, and the throttle body which controls the intake air volume.



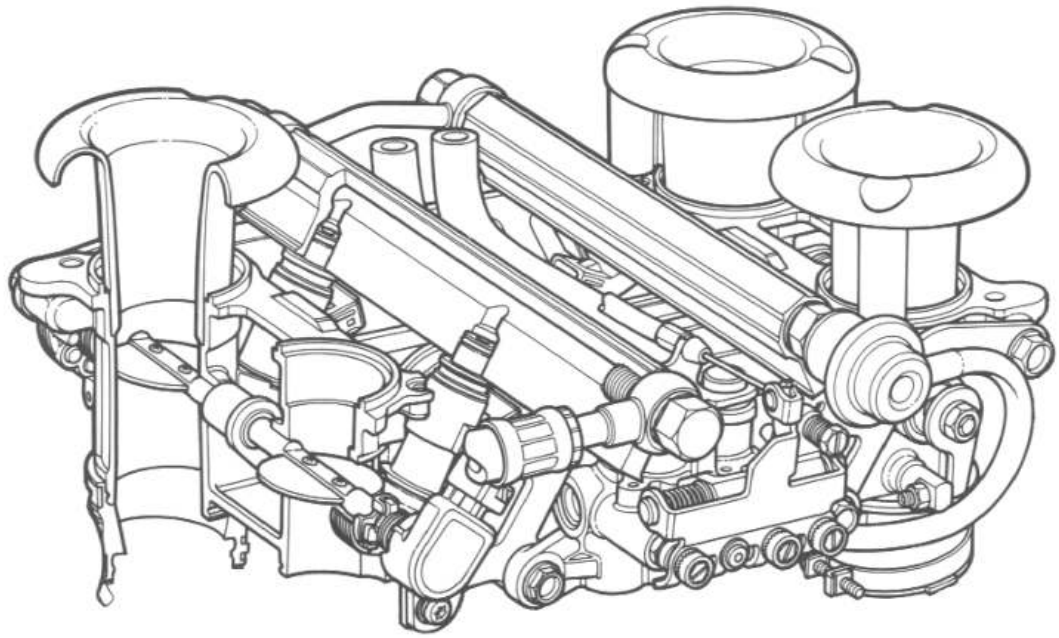


The fuel pump is built into the fuel tank with the object of compacting the construction of the PGM-FI system.

The suction port of the pump is arranged at the lowermost part of the fuel tank, and mesh filter is provided.
The periphery of the mesh filter is surrounded by a fuel tank, so as to prevent the influence of changes in the fuel level during acceleration, curve negotiation, etc.
High pressure filter is provided at the fuel discharged port to filter the fuel.

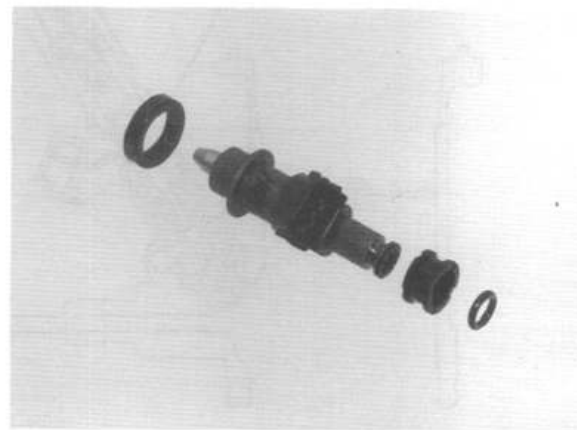
The fuel tank has opening construction hinged at the rear side to facilitate the maintenance.

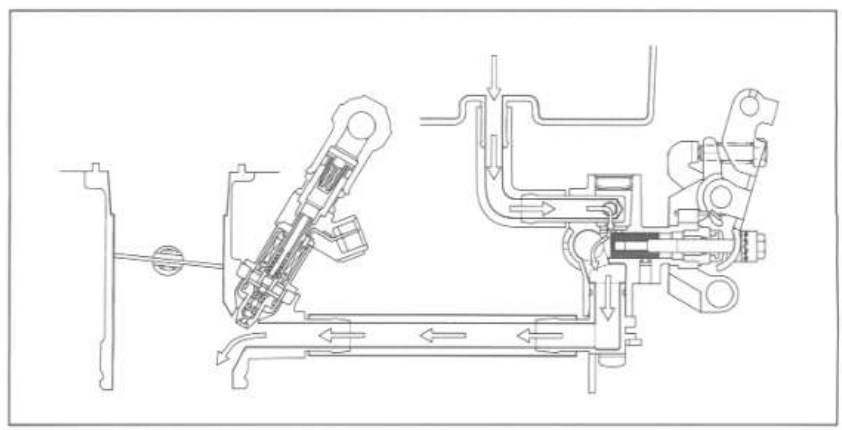
Throttle body



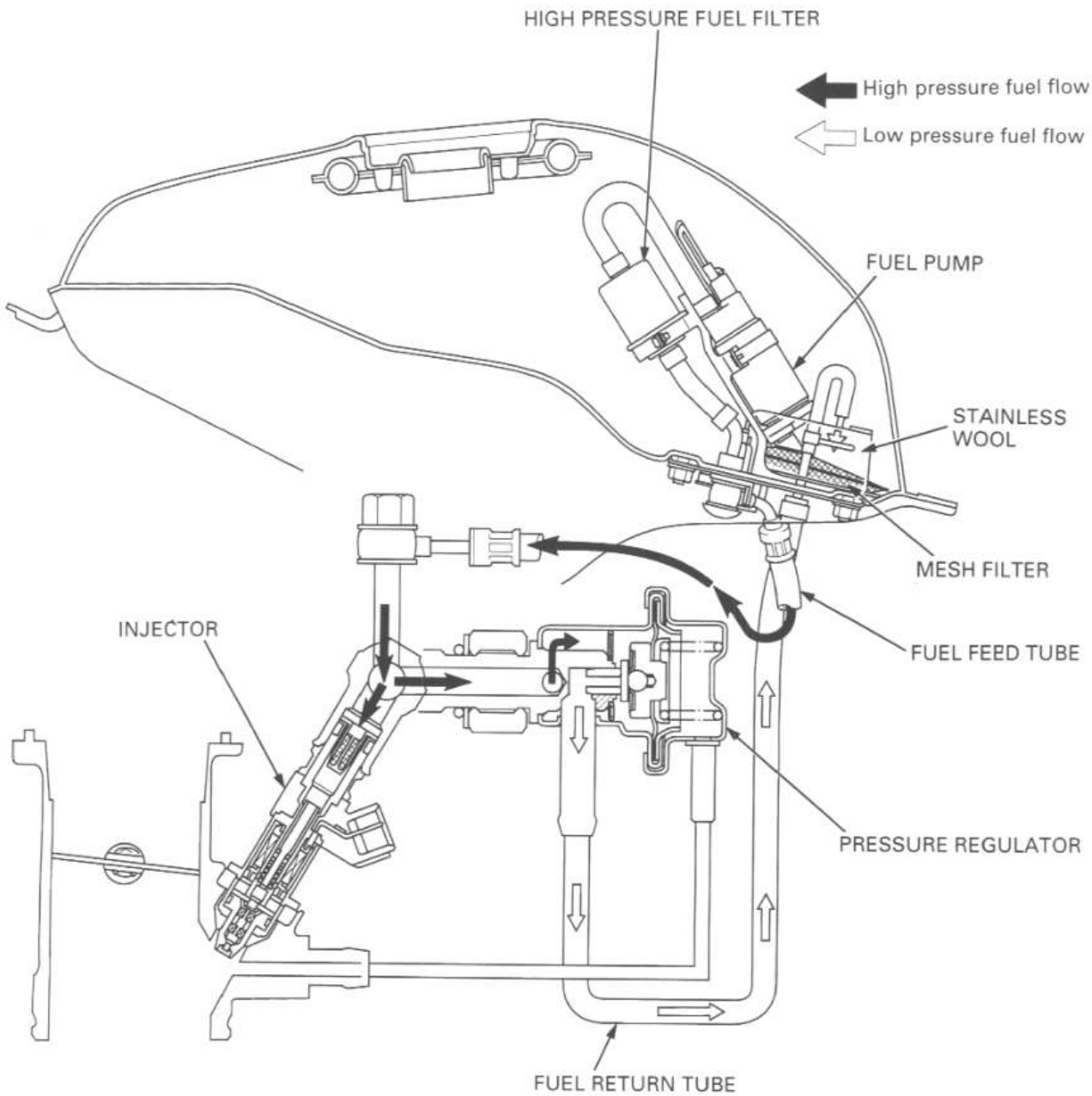
The delivery pipes, or the passages the fuel flows through, are arranged at the throttle body center, and the fuel injector and pressure regulator are also concentrated at the throttle body center with the object of compacting the construction of the throttle body so as to fit in the space between the V-banks of the engine.

One starter valve corresponding to each cylinder is arranged in the bypass route located in the throttle body, and these starter valves regulate the air flow when starting the engine and during idling operation. Fine adjustment of the air intake negative pressure is possible by adjusting the synchronization of the 4 starter valves.





Fuel system flow



Fuel filtered by the mesh filter located at the lower extremity of the fuel pump is pumped by the fuel pump.
Pumped fuel is filtered once again by the high pressure fuel filter located inside the tank, passes through the high pressure fuel tube, and is pumped to the throttle body.

Fuel pressure inside the fuel passage is always kept 250 kPa (2.55 kgf/cm^2, 36 psi) above the negative pressure prevailing inside the intake manifold by means of the pressure regulator.

The fuel injector receives the injection signal from the ECM and injects an appropriate quantity of fuel with appropriate timing, according to the conditions of the engine, in the intake manifold.

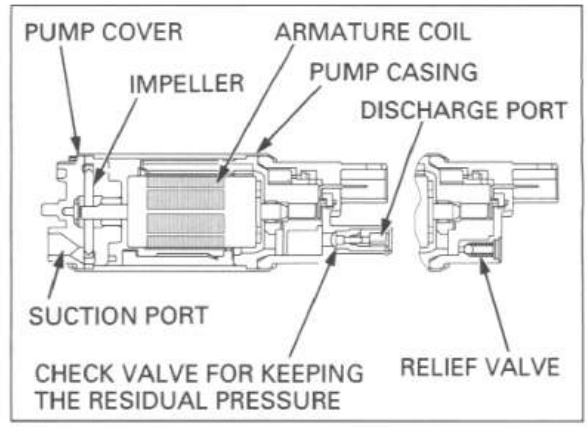
Fuel not injected by the fuel injector is returned to the fuel tank via fuel return tube, by opening the relief valve located inside the pressure regulator.

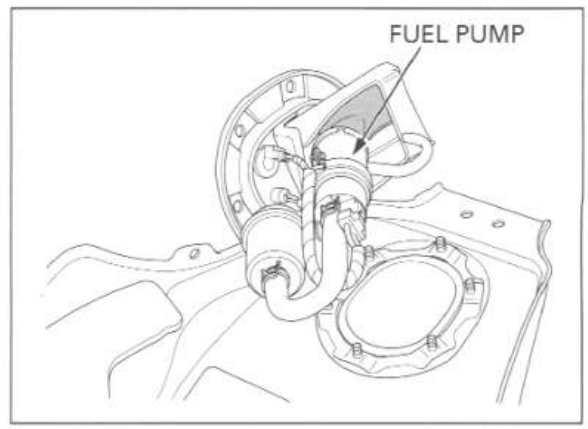
Fuel pump

- **Construction of the fuel pump**

The fuel pump is built into the fuel tank, and has the function of pumping fuel contained in the tank to the fuel injector.

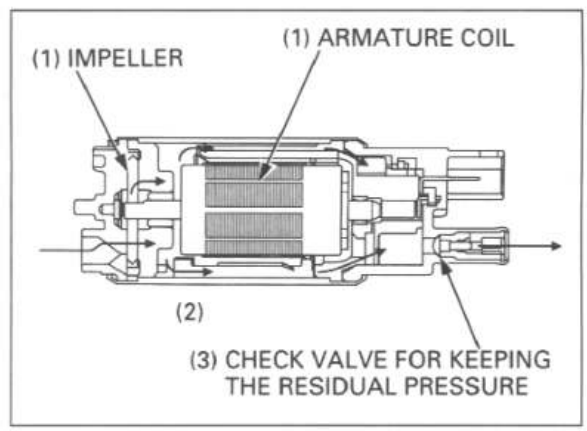
The fuel pump consists of the armature coil, pump unit, relief valve, check valve for keeping the residual pressure, suction port and discharge port.
The pump unit consists of the impeller driven by the armature coil and the pump casing and pump cover composing the pump chamber.



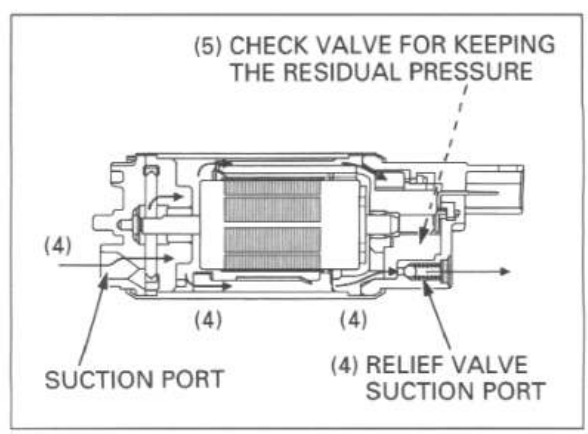


- **Operation of the fuel pump**

(1) The pump is actuated by the engine stop relay and the fuel cut relay, and the impeller begins to rotate together with the armature when the ignition switch is turned ON.
(2) The fuel is pressurized and vortex is generated inside the pump when the step (1) above is carried out repeatedly.
(3) Fuel entering the suction port circulates inside the pump through the pump chamber, and is pumped from the discharge port to the fuel tube via check valve.



(4) When fuel is not discharged due to any abnormality at the fuel tube side, the relief valve opens to circulate fuel through the Suction port – Pump – Relief valve – Suction port to prevent fuel pressure from increasing abnormally.
(5) The operation of the pump stops automatically, due to the action of the engine stop relay and the fuel cut relay, when the engine is stopped. After stopping the pump, the check valve for keeping residual pressure is closed by the force of the spring, thereby leaving residual pressure in the high pressure fuel route to facilitate the restart of the engine.



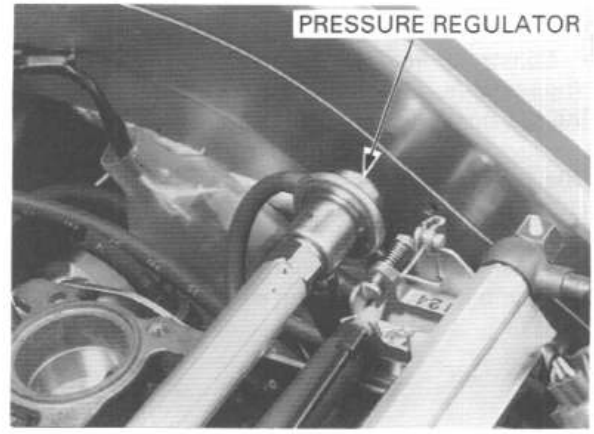
Pressure regulator

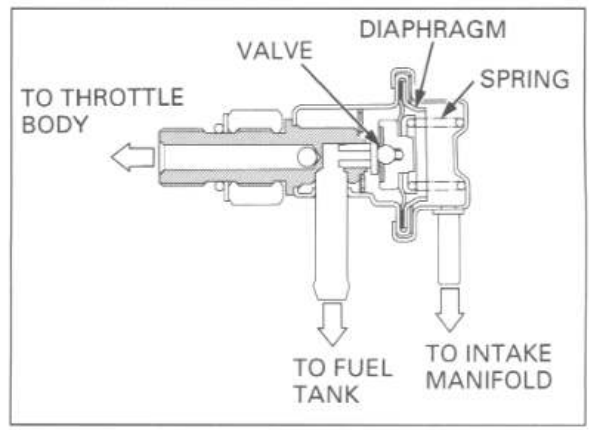
- **Construction of the pressure regulator**

The pressure regulator is mounted on the throttle body, and has the function of keeping the fuel pressure, working on the various fuel injectors, constant with regard to the pressure prevailing inside the intake manifold.

The pressure regulator consists of the valve, diaphragm and spring.

The spring chamber side, partitioned by the diaphragm, is connected with the interior of the intake manifold of the throttle body, and the fuel pressure actuating on the fuel injector is always kept 250 kPa (2.55 kgf/cm², 36 psi) higher than the intake manifold pressure even when the negative pressure of the intake manifold fluctuates.

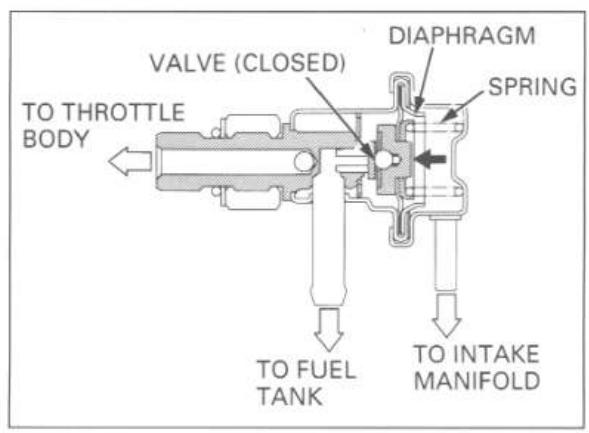




- **Operation of the pressure regulator**

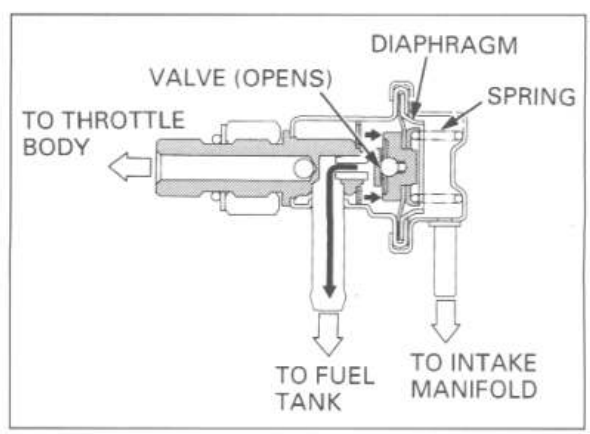
(1) The pressure regulator is connected to the fuel passage of the throttle body, and fuel pumped by the fuel pump enters therein.
The spring side of the diaphragm is connected to the intake manifold by means of the negative pressure tube.

(2) When the differential pressure between the interior of the intake manifold and the fuel pressure falls below a prescribed value (less than 250 kPa (2.55 kgf/cm², 36 psi) or more), the diaphragm is pushed down by the force of the spring, and the valve of the pressure regulator is closed.



(3) When the differential pressure between the interior of the intake manifold and the fuel pressure rises above the prescribed value (less than 250 kPa (2.55 kgf/cm², 36 psi) or more), the fuel pressure pushes the diaphragm down and opens the valve of the pressure regulator

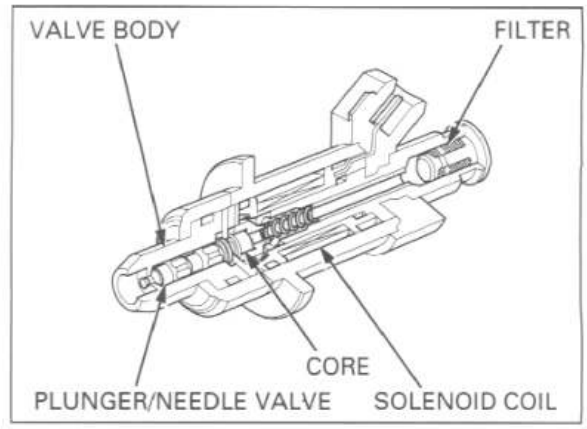
(4) Fuel in excess is returned to the fuel tank via fuel return tube.

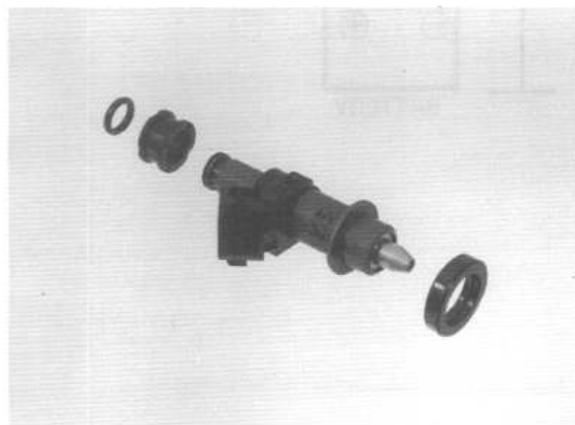


Fuel injector

- **Construction of the fuel injector**

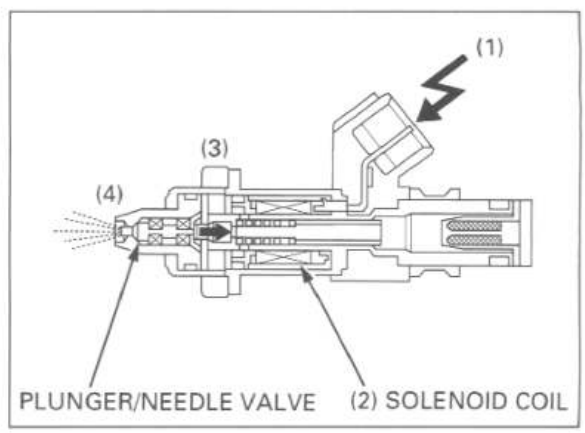
The fuel injector receives the injection signal from the ECM and injects fuel in the intake manifold.
The fuel injector consists of the needle valve, plunger, solenoid coil and spring.
Since the opening stroke of the needle valve is always constant and the fuel pressure inside the fuel passage is always kept constant by the pressure regulator, the volume of the fuel to be injected is increase/decrease by charging the opening time of the needle valve.



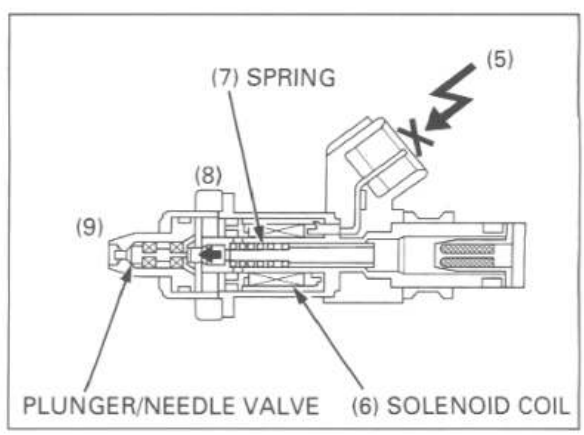


- **Operation of the fuel injector**

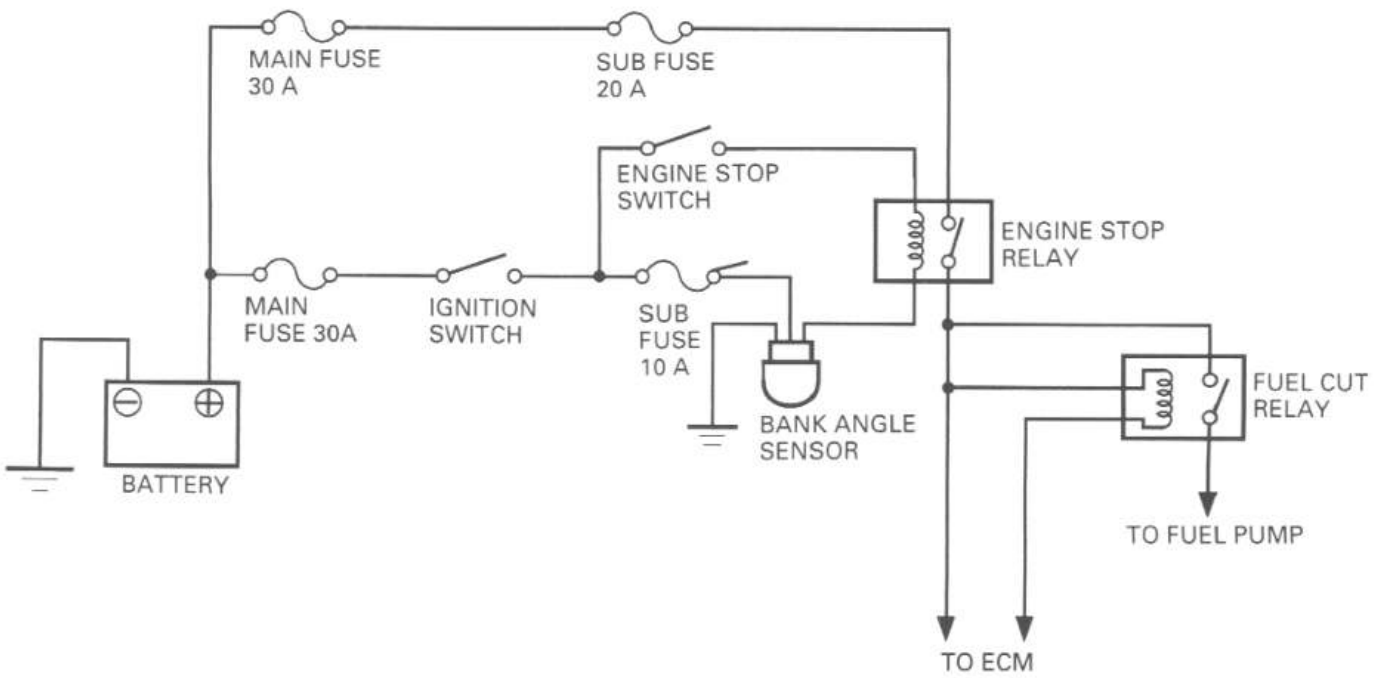
(1) The solenoid coil of the fuel injector is energized when the duration of the injection time and the injection timing is determined by the ECM.
(2) The energized solenoid coil functions as an electromagnet and attracts the plunger.
(3) The plunger/needle valve assembly is attracted to the coil side.
(4) The injection port is opened by the needle valve, and the injection of fuel starts.



(5) When the fuel injection time ends the ECM deenergized the solenoid coil of the fuel injector by stopping the electric current passing through it.
(6) The solenoid loses its magnetism, and stops attaching the plunger.
(7) The plunger is pushed back by the force of the spring.
(8) The needle valve, in one body with the plunger, is also pushed back by the force of the spring.
(9) The injection port is closed by the needle valve, and the injection of the fuel ends.



FUEL PUMP OPERATING SYSTEM



- **Operating procedure**

(1) Turn the engine stop switch and the ignition switch ON.
(2) The current of the battery is grounded via main fuse (30 A), engine stop switch, coil side of the engine stop relay, and bank angle sensor.
(3) The engine stop relay turns ON as a result of the step (2) above, and current passes through the main fuse (30 A), sub-fuse (20 A) and the coil side of the fuel cut relay.
(4) The fuel cut relay turns ON, current flows through the fuel pump, and the fuel pump operates.

- **Stopping procedure**

(When the engine stop switch and ignition switch are turned OFF)
(1) Current ceases flowing through the engine stop relay coil side, and the engine stop relay turns OFF.
(2) Current ceases flowing through the fuel cut relay, and the fuel cut relay turns OFF.
(3) Current ceases flowing through the fuel pump, and its operation stops.

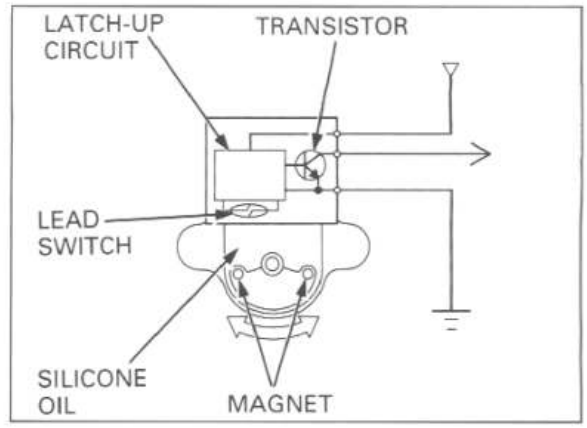
(When the bank angle sensor turns OFF)
(1) Current ceases flowing through the engine stop relay, and the relay turns OFF.
(2) Current ceases flowing through the fuel cut relay, and the fuel cut relay turns OFF.
(3) Current ceases flowing through the fuel pump, and its operation stops.

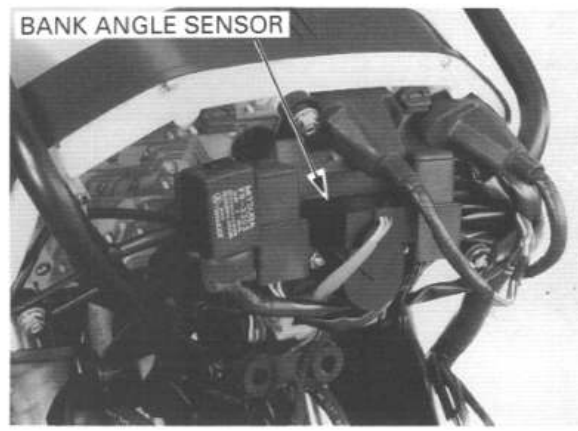
(When the ECM stops the pump)
(1) The earth circuit of the fuel cut relay is turned OFF in the ECM.
(2) Current ceases flowing through the fuel cut relay coil side, and the fuel cut relay turns OFF.
(3) Current ceases flowing through the fuel pump, and its operation stops.

Bank angle sensor

- **Construction of the bank angle sensor**

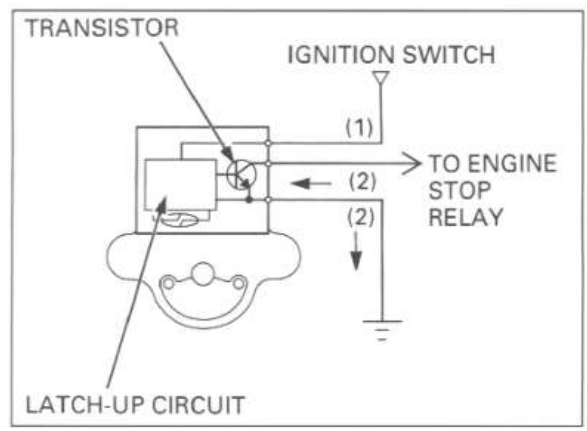
The bank angle sensor is installed onto the upper cowl bracket, and has the function of controlling the engine stop relay and the fuel cut relay.



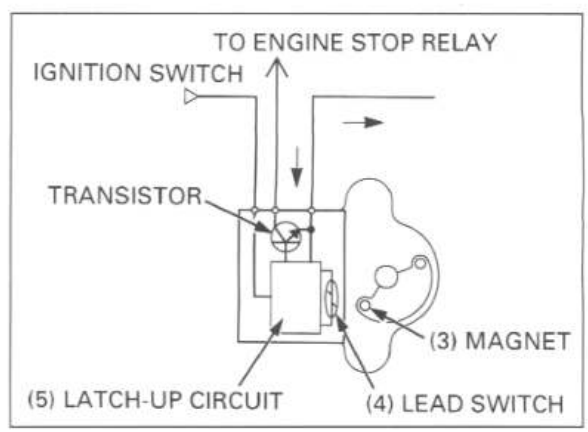


- **Operation of the bank angle sensor**

(1) Current flows through the latch-up circuit and the transistor is turned ON when the ignition switch is turned ON.
(2) Current flows through the coil of the engine stop relay and it is grounded when the transistor turns ON.



(3) The lead switch is attracted by the magnet and turns ON when the angle of inclination of the motorcycle body becomes 60 ± 5° or more.
(4) The transistor turns ON when the lead switch turns ON.
(5) The transistor turns ON even when the motorcycle body is returned to its normal position, because the latch-up circuit is actuated.
(6) The latch-up circuit is released when the main switch is turned OFF once.

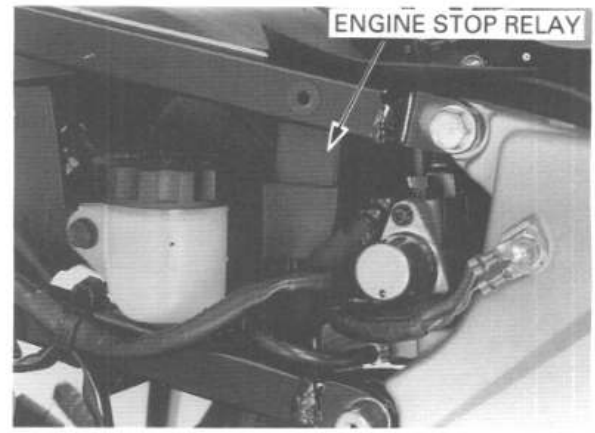


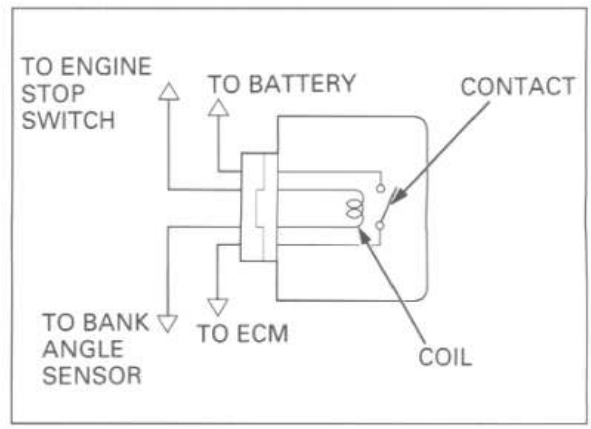
Engine stop relay

The engine stop relay, together with the ignition switch, the engine stop switch and the bank angle sensor, has the function of the controlling the operation of the fuel cut relay and the fuel pump.

Current flows from the engine stop switch side, and the coil becomes and electromagnet.

Current flowing through the coil closes the contact, and current from the battery passes through the contact and flows to the fuel cut relay.



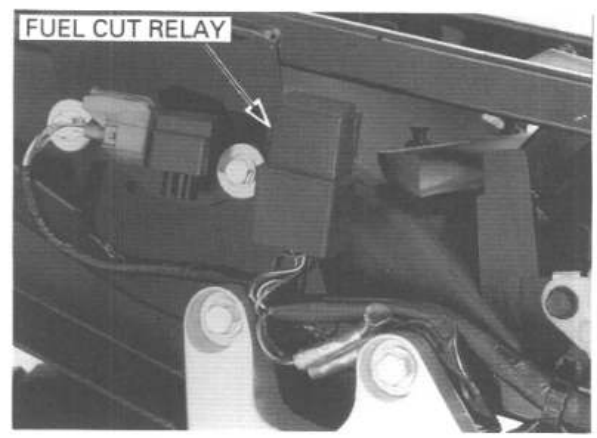


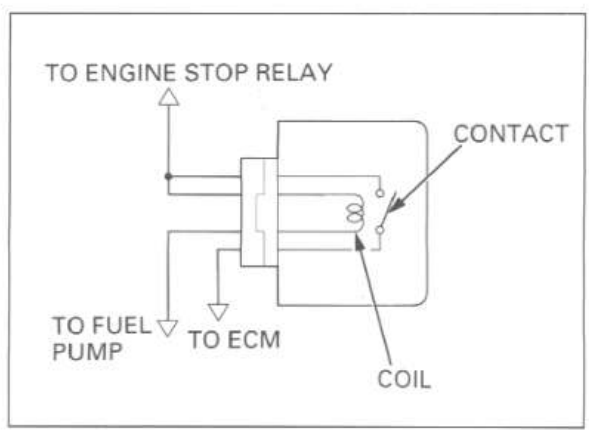
Fuel cut relay

The fuel cut relay has the function of controlling the operation of the fuel pump.

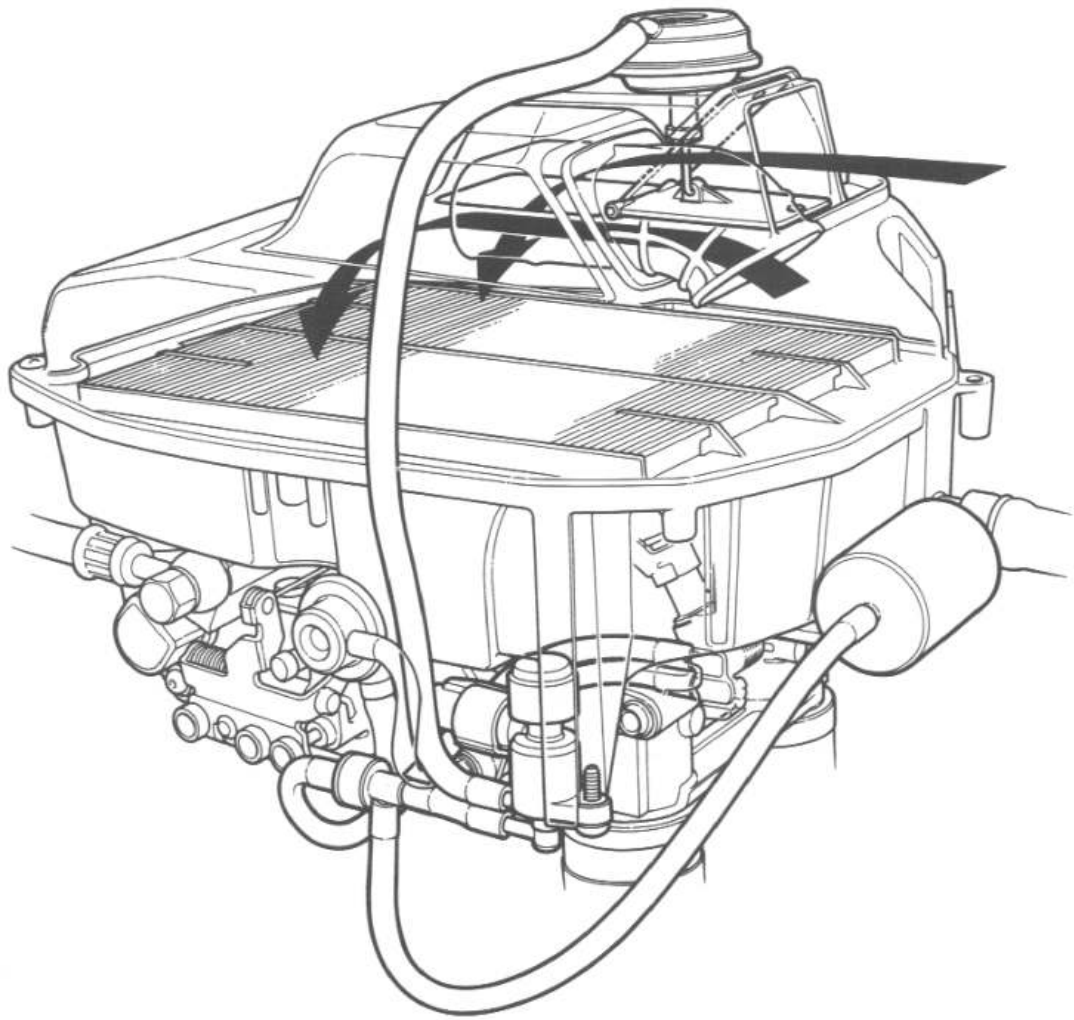
The fuel cut relay is controlled by the engine stop relay.

The magnetized coil closes the contact, current from the engine stop relay passes through the contact, and flows to the fuel pump.





VARIABLE AIR INTAKE SYSTEM



Outline

The intake area and the intake duct length are changed according to the engine revolution speed by opening/closing the variable intake duct, thereby contributing to upgrade the engine output.

From low speeds to medium speeds the intake is controlled by closing the variable intake duct to reduce the intake area, thereby realizing high efficiency intake through upgraded inertial effect and pulsation effect of the intake air, and contributing to upgrade the low- and medium-speed output.

From medium speeds to high speeds the intake duct is opened to supply large volume of air to the engine, thereby contributing to the high revolution speed and high power operation of the engine.

Intake solenoid valve

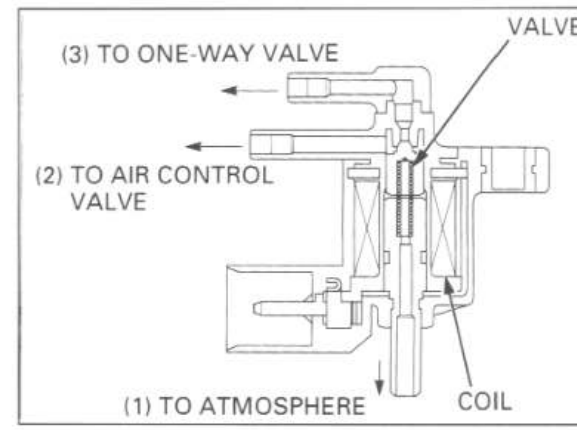
- **Construction**

The intake solenoid valve is controlled by the ECM, and the variable intake duct is opened/closed according the running conditions (engine revolution speed).

The intake solenoid valve consists of the coil and the valve and has 3 passages.

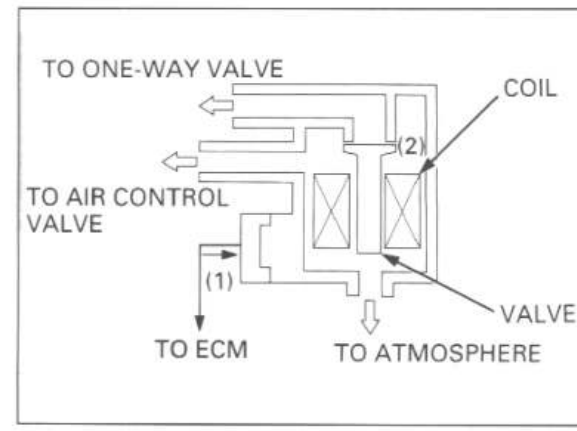
1. Opening to the atmosphere
2. Connection to the diaphragm of the air control valve
3. Connection to the check valve

The air control valve is open to the atmosphere when the coil is not energized.



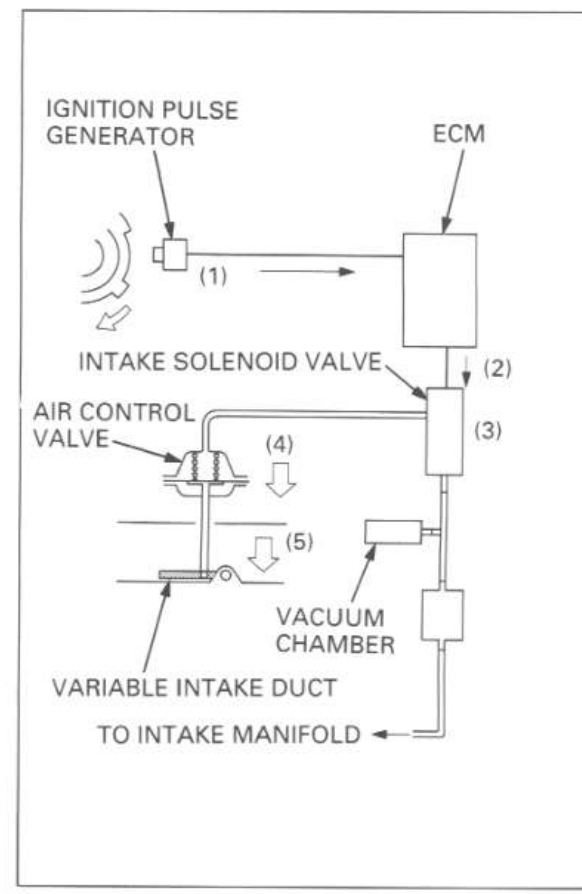
- **Operation**

(1) The signal (current) from the ECM enter the coil, and the coil becomes an electromagnet.
(2) The valve is attracted by the electromagnet, and the valve opens.
(3) The passage, the one-way valve, and the passage to the air control valve are interconnected with each other.



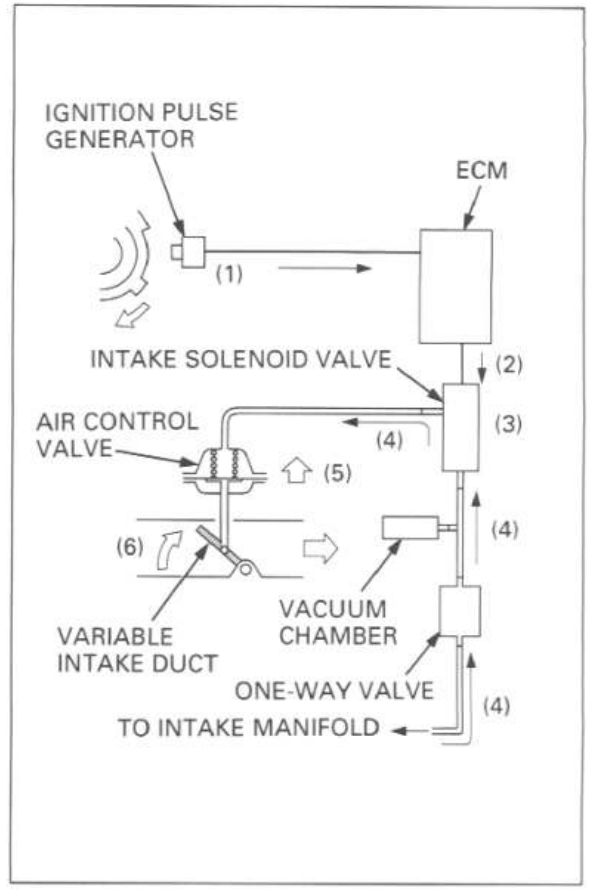
Over starting revolution

(1) The revolution speed signal from the ignition pulse generator is entered in the ECM.
(2) The "OFF" signal is entered from the ECM to the intake solenoid valve.
(3) The intake solenoid valve turns OFF, and the valve closes.
(4) The diaphragm of the air control valve is pushed back by the spring.
(5) The variable intake duct is opened by the rod connected to the diaphragm of the air control valve.

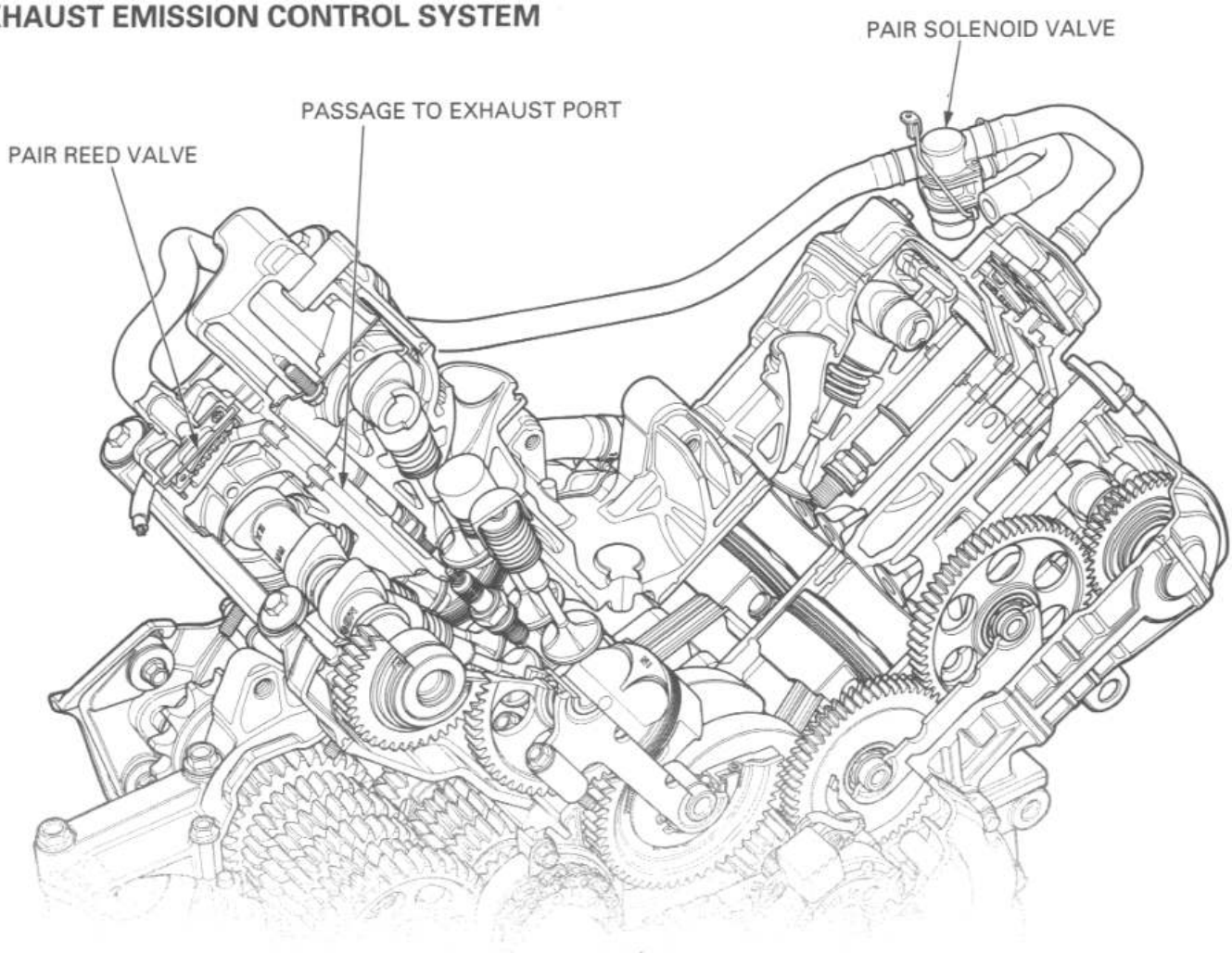


Under starting revolution

(1) The revolution speed signal from the ignition pulse generator is entered in the ECM.
(2) The "ON" signal is entered from the ECM to the intake solenoid valve.
(3) The intake solenoid valve turns ON, and the valve opens.
(4) The intake manifold and the diaphragm of the control valve open.
(5) The diaphragm of the air control valve is attracted by the negative pressure of the intake manifold.
(6) The variable intake duct is closed by the rod connected to the diaphragm of the air control valve.



EXHAUST EMISSION CONTROL SYSTEM



Pulse Secondary Air Injection (PAIR) control solenoid

The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port.

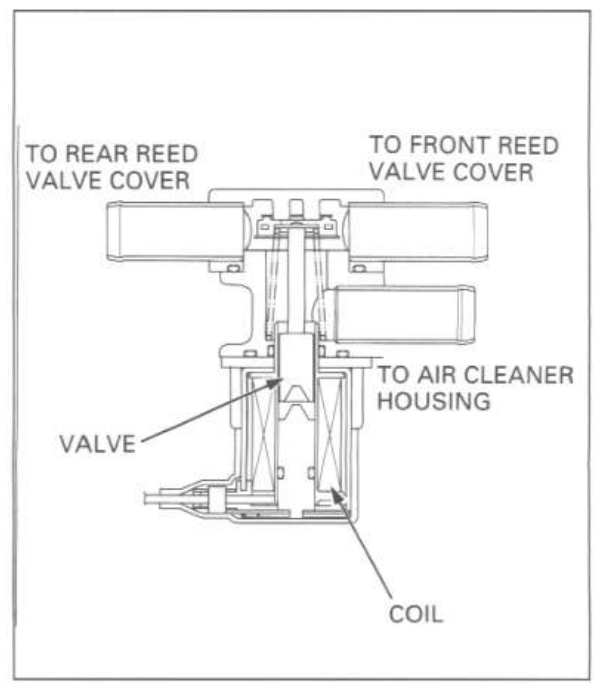
The PAIR control valve is operated by the solenoid valve.

The solenoid valve is controlled by the ECM, and the fresh air passage is opened/closed according the running condition (ECT/IAT/TP/MAP sensor and engine revolution).

The PAIR solenoid valve consists of the coil and the valve and has 3 passages.

1. Opening to the air cleaner housing (fresh air intake)
2. Opening to the front cylinder head reed valve cover
3. Opening to the rear cylinder head reed valve cover

The air control valve is open when the coil is not energized.



Operation

(1) When the signal (current) from the ECM does not enter the coil, the valve is opened and the fresh air is drawn to the front and rear cylinder exhaust ports.

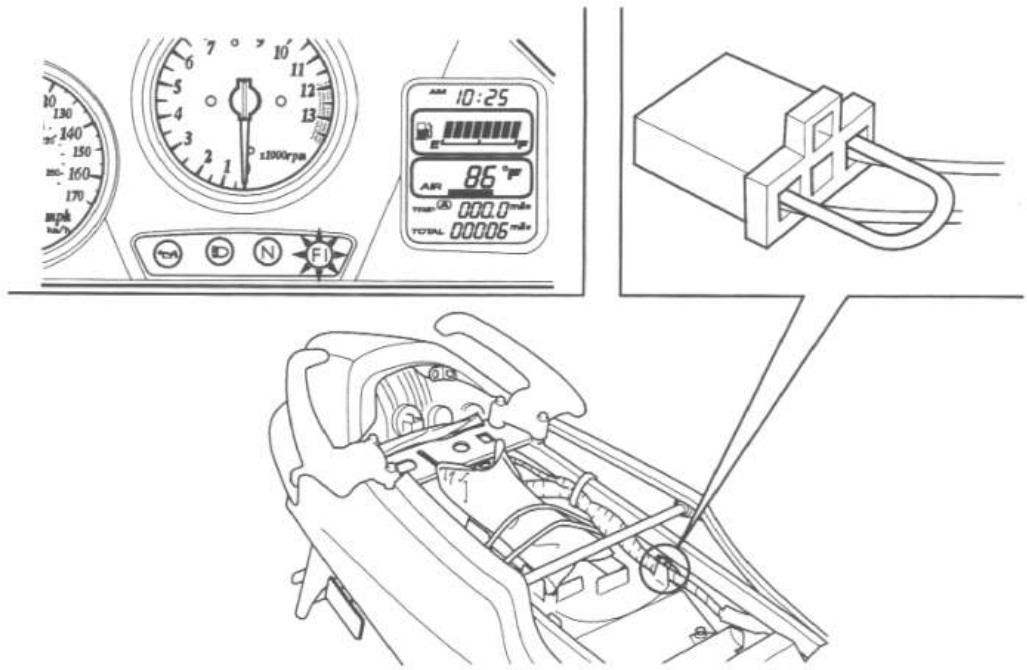
(2) When the signal (current) from the ECM enters the coil, the coil becomes an electromagnet.

(3) The valve is attracted by the electromagnet, and the valve closes, so the fresh air does not route to the exhaust ports.

SELF-DIAGNOSIS FUNCTION OF THE PGM-FI SYSTEM

The ECM has a self-diagnosis function, and the malfunction indicator lamp (MIL) of the combination meter lights up when any abnormality is detected in the input/output system.
The malfunction indicator lamp operates with the side stand down and the engine revolution speed below 5,000 rpm, or by short-circuiting the service check connector located under the seat, and blinks a variable number of times depending on the place with abnormality.
The trouble location can be diagnosed by checking the number of times the malfunction indicator lamp blinks.

When there are abnormalities at various places simultaneously, the malfunction indicator lamp repeats the blinking cyclically in correspondence to each abnormality, beginning from that one with the smallest number of times and switching the increasing order (When 10 or more blinks are needed, one long blink corresponds to 10 short blinks).



Fail-safe
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 the simulated program map.

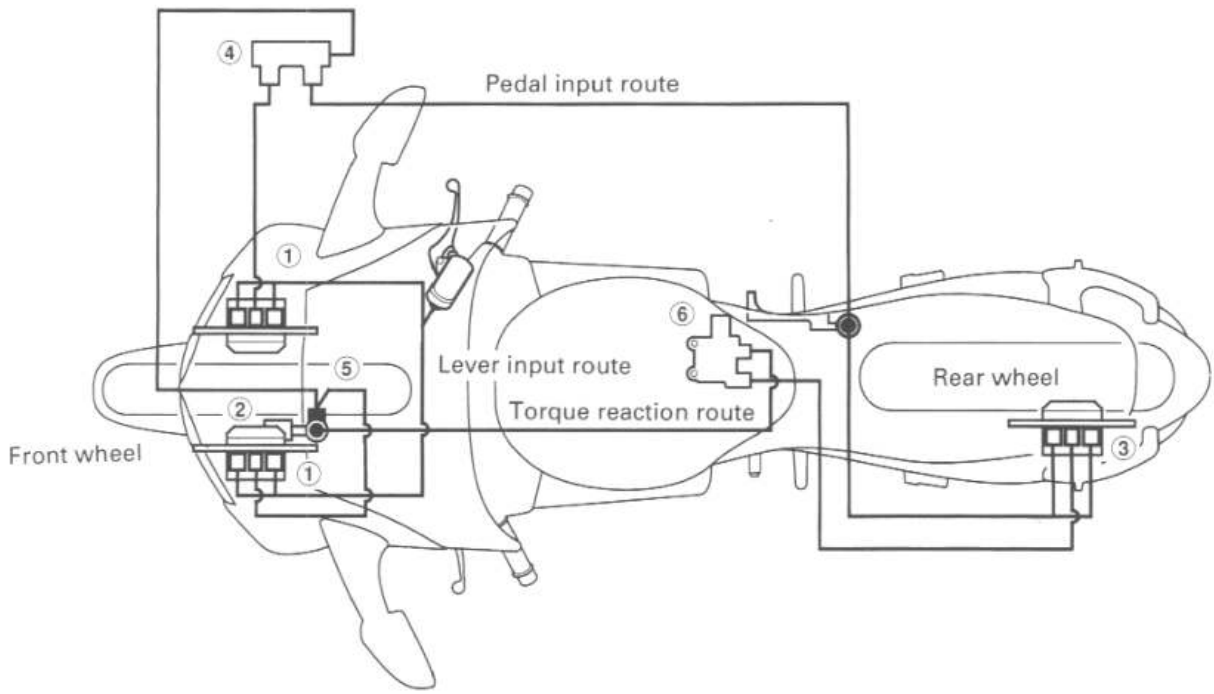
It must be remembered, however, that when any abnormality is detected in the injector, ignition pulse generator and/or the cam pulse generator, the fail-safe function stops the engine from the standpoint of protecting it.

Faulty item	Causes	Substitute
MAP sensor	• Open or short circuit in the MAP sensor wire • Disconnected or leak in the MAP sensor vacuum tube	Simulated MAP map
ECT sensor	• Open or short circuit in the ECT sensor wire • Output voltage is down in running	80°C (176°F)
TP sensor	• Open or short circuit in the TP sensor wire	Throttle opens 0°
IAT sensor	• Open or short circuit in IAT sensor wire	20°C (68°F)
BARO sensor	• Open or short circuit in the BARO sensor	760 mmHg/1,030 hPa

LBS (LINKED BRAKING SYSTEM)

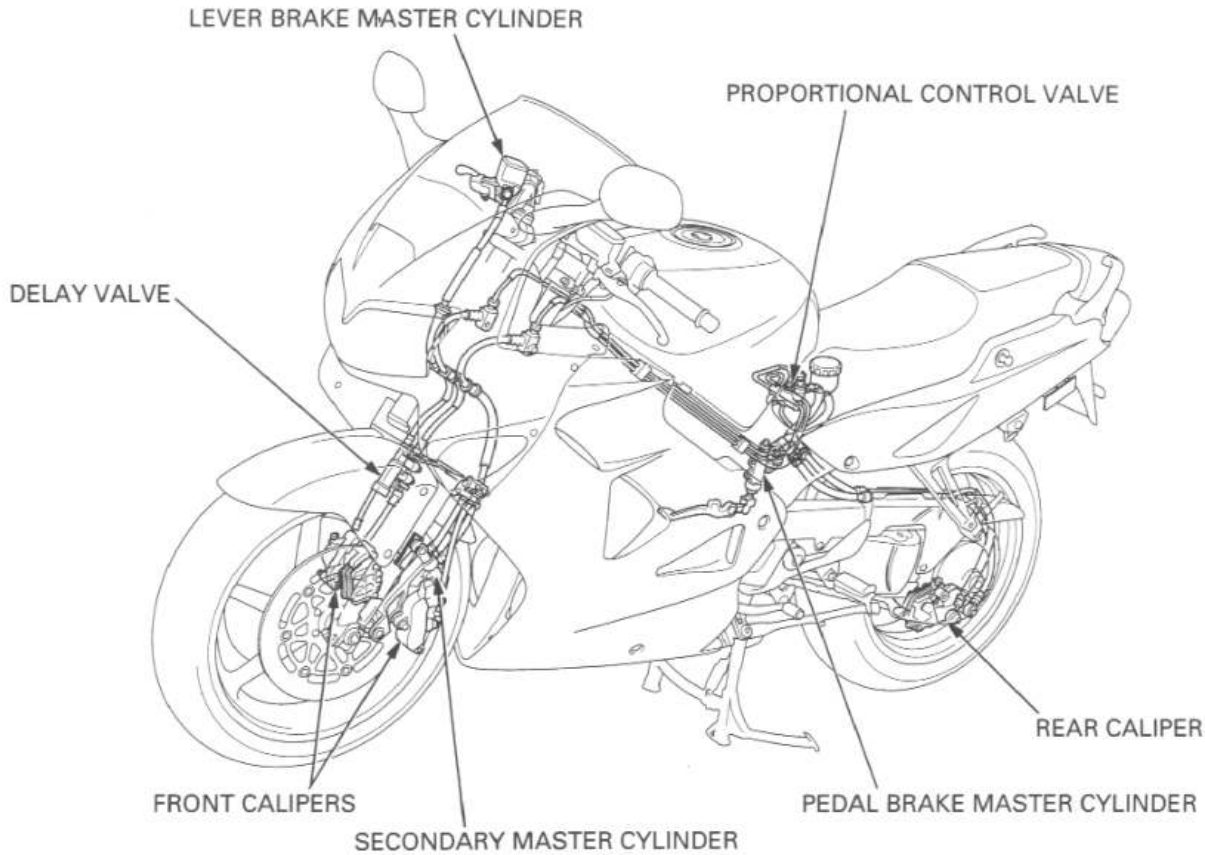
SUMMARY

The LBS (Linked Braking System) was designed to engage both front and rear brakes when either the front brake lever or rear brake pedal is used.
Not merely a linked system that divides pedal braking force between the rear caliper and one of the front calipers, this system features a set of 3-piston calipers that are connected to two independent hydraulic systems. These combine to provide an optimal balance of front and rear braking forces whenever either the brake lever and and/or the brake pedal is used. Featuring no electronic controls the completely hydraulic LBS's key component is a mechanical that transmits front caliper braking force to a secondary master cylinder mounted on the left fork slider.



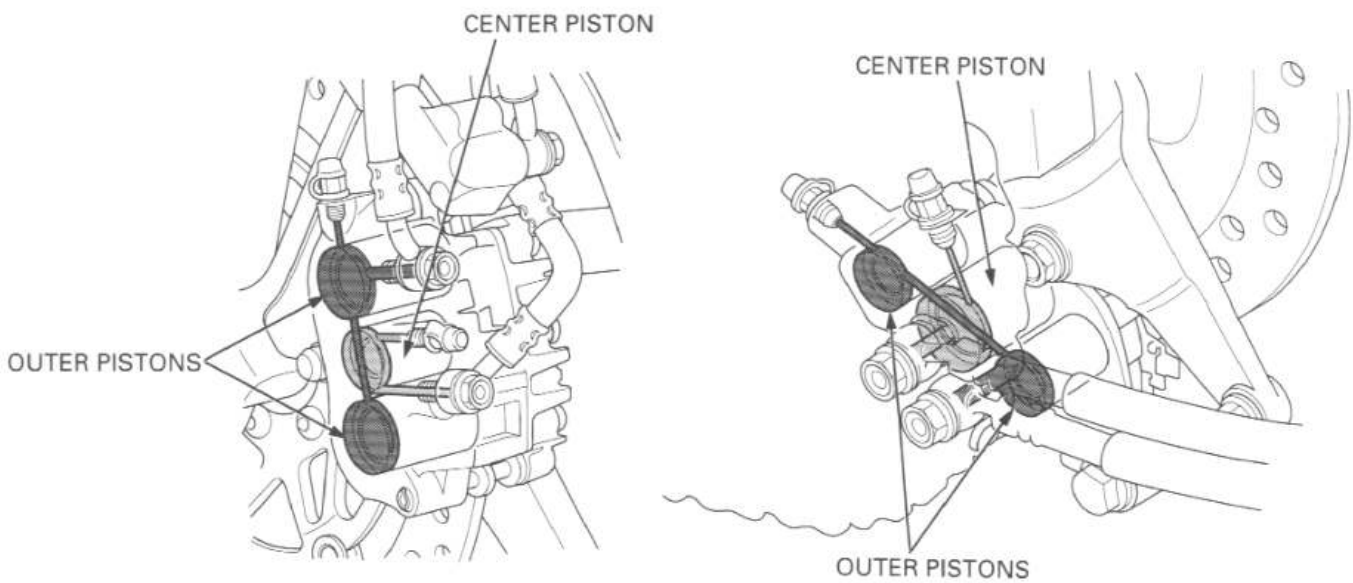
① Front calipers (3-pistons)
② Direct push rod
③ Rear caliper (3-pistons)
④ Delay valve
Slows front brake engagement to minimize its associated dive when performing minor speed corrections with only the brake pedal.
⑤ Secondary master cylinder
Transmits the rotational torque exerted on the front caliper to the rear brake caliper by way of the Proportional Control Valve (PCV).
⑥ Proportional control valve (PCV)
Regulates the rear caliper hydraulic pressure from the secondary master cylinder.

SYSTEM CONSTRUCTION



3-PISTON CALIPER

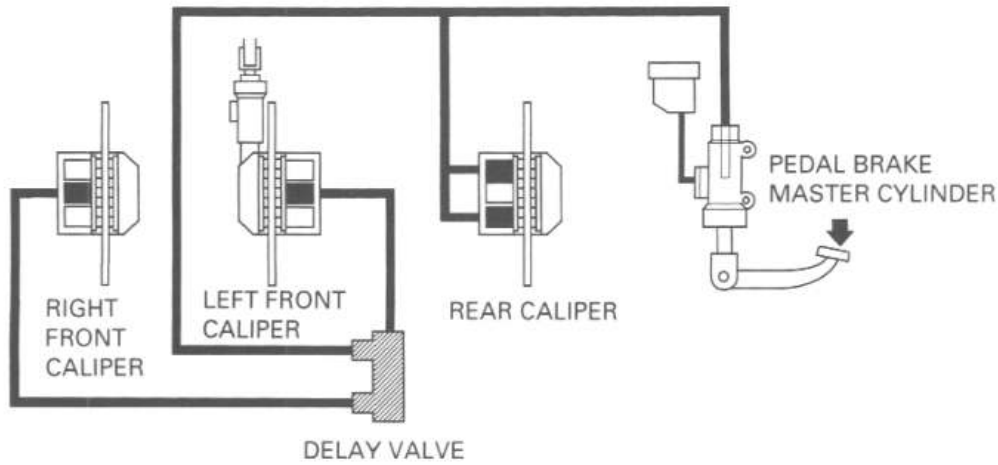
A set of three 3-piston calipers are controlled by two independent hydraulic systems.
The center piston of the front calipers and outer pistons of the rear caliper are operated directly by the brake pedal.
The two outer pistons of the front calipers are controlled by the brake lever, and the center piston of the rear caliper is controlled by the servomechanism-actuated secondary master cylinder.
This arrangement delivers a broad, yet easily controlled range of braking force, depending on either or both of the two (lever and pedal) brake are engaged.



DELAY VALVE

The delay valve is positioned between the pedal brake master cylinder and the center pistons of the front calipers. The delay valve engages only the left front caliper at first, effectively reducing the initial front wheel braking force (Fig. 1-2).
As pedal *pressure gradually* increases, the delay valve introduces pressure to the right front caliper, which increases to match the pressure to the left front caliper at a predetermined level (Fig. 3). The resulting feel is of comfortable, even during decelation, that begins at the rear, with little of the rapid forward dive that is usually brought on when the front brakes are suddenly applied.

System diagram



Operation

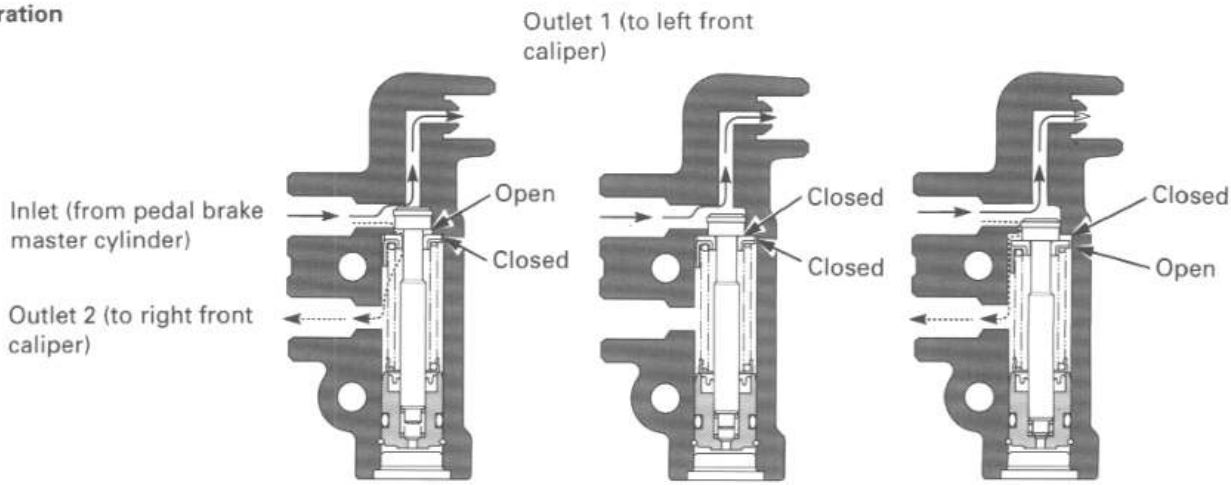
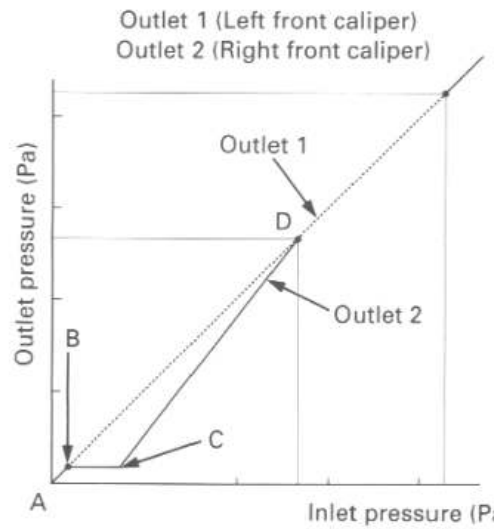


Fig. 1 Fig. 2 Fig. 3

Operating characteristics

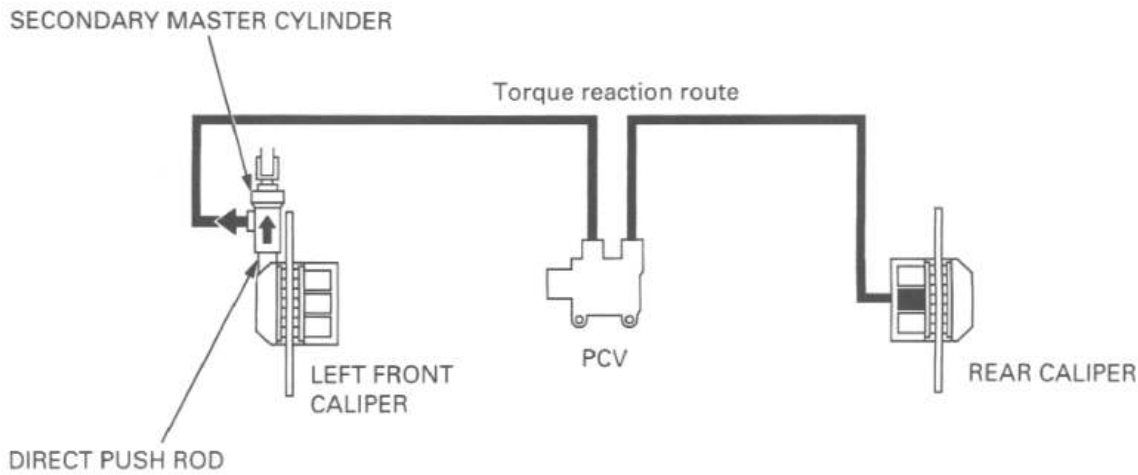


Line A – B: Fig. 1
Line B – C: Fig. 2
Line C – D: Alternating Fig. 2 & 3
Line D – : Fig. 3

LINK MECHANISM/SECONDARY MASTER CYLINDER

The system's servomechanism uses the rotational torque exerted on the front caliper when they are engaged to actuate a secondary master cylinder then applies a corresponding amount of pressure to the rear brake caliper.

System diagram



PROPORTIONAL CONTROL VALVE (PCV)

The PCV installed between the secondary master cylinder and the center piston of the rear caliper, regulates pressure in three stages of operation.

Initially, the PCV's output pressure increases in direct proportion to the increasing input pressure originating from the secondary master cylinder (Fig. 1).

As input pressure continues increase, the cut piston activates, closing the valve and causing the output pressure to holder (Fig. 2).

A further increase in input pressure forces the decompression piston down, which expands a sub-chamber that draws pressure off the output side of the PCV (Fig. 3).

Operation

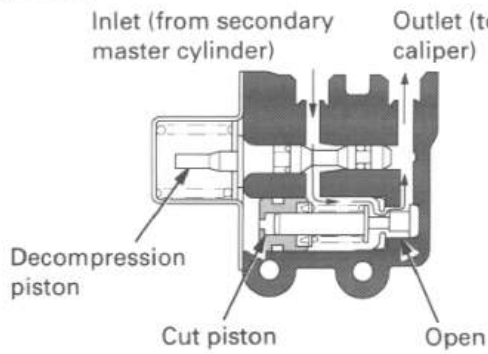


Fig. 1

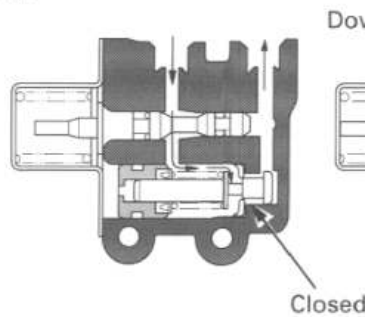


Fig. 2

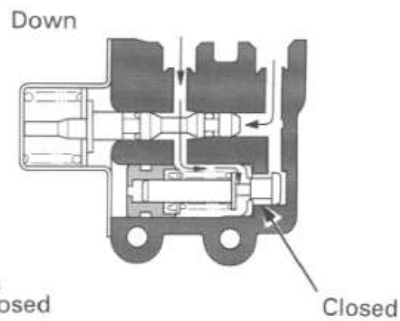
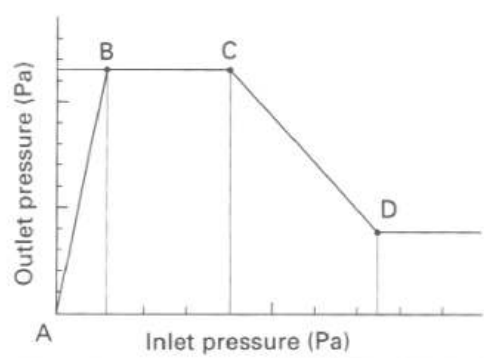


Fig. 3

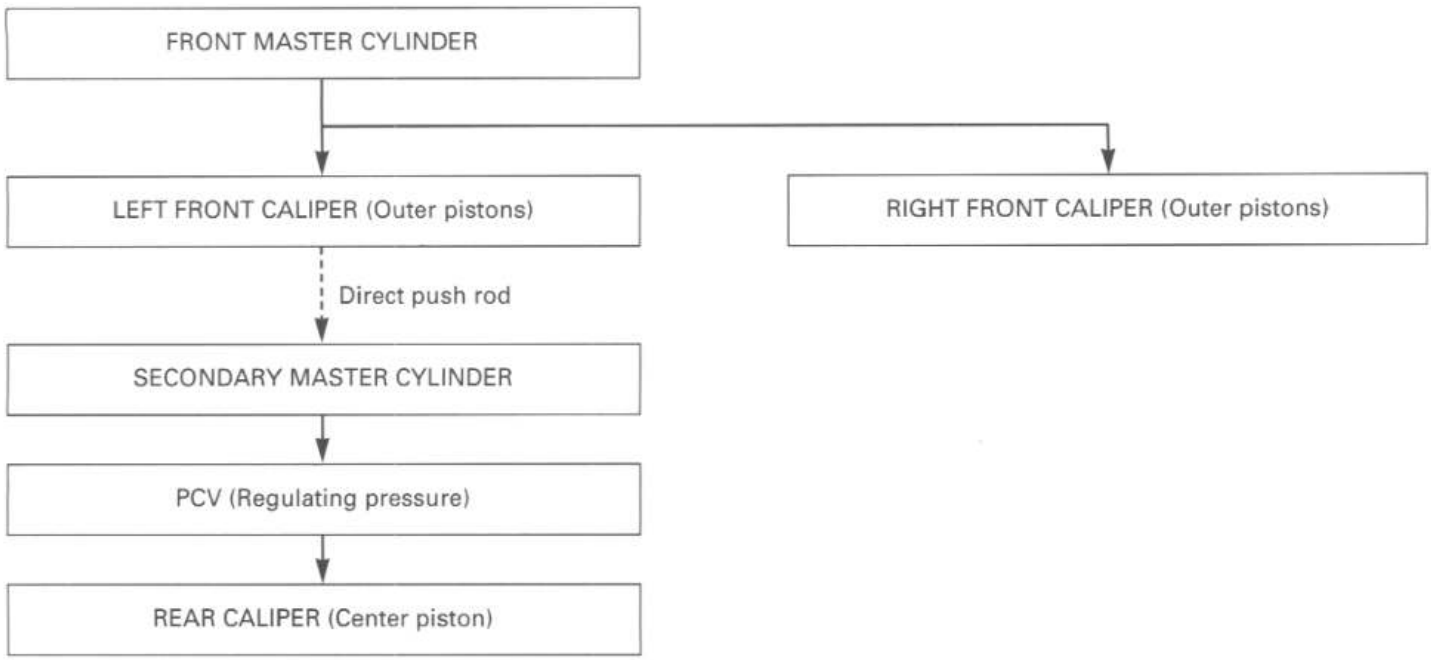
Operating characteristics

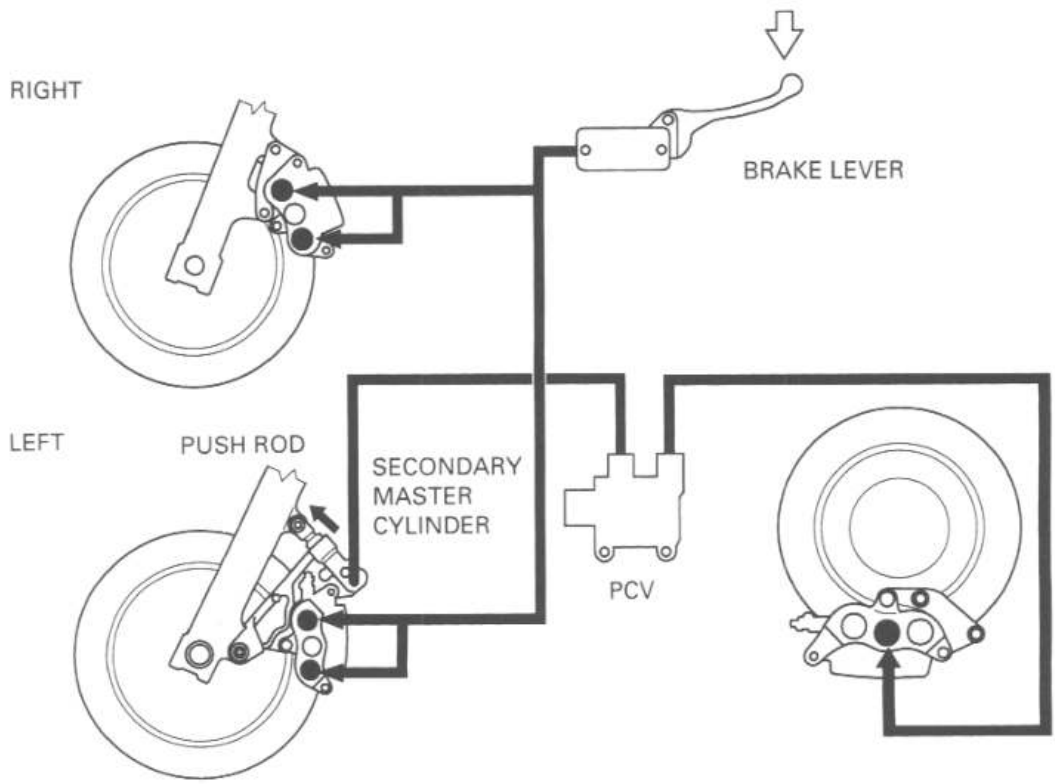


Line A – B: Fig. 1
Line B – C: Fig. 2
Line C – D: Fig. 3

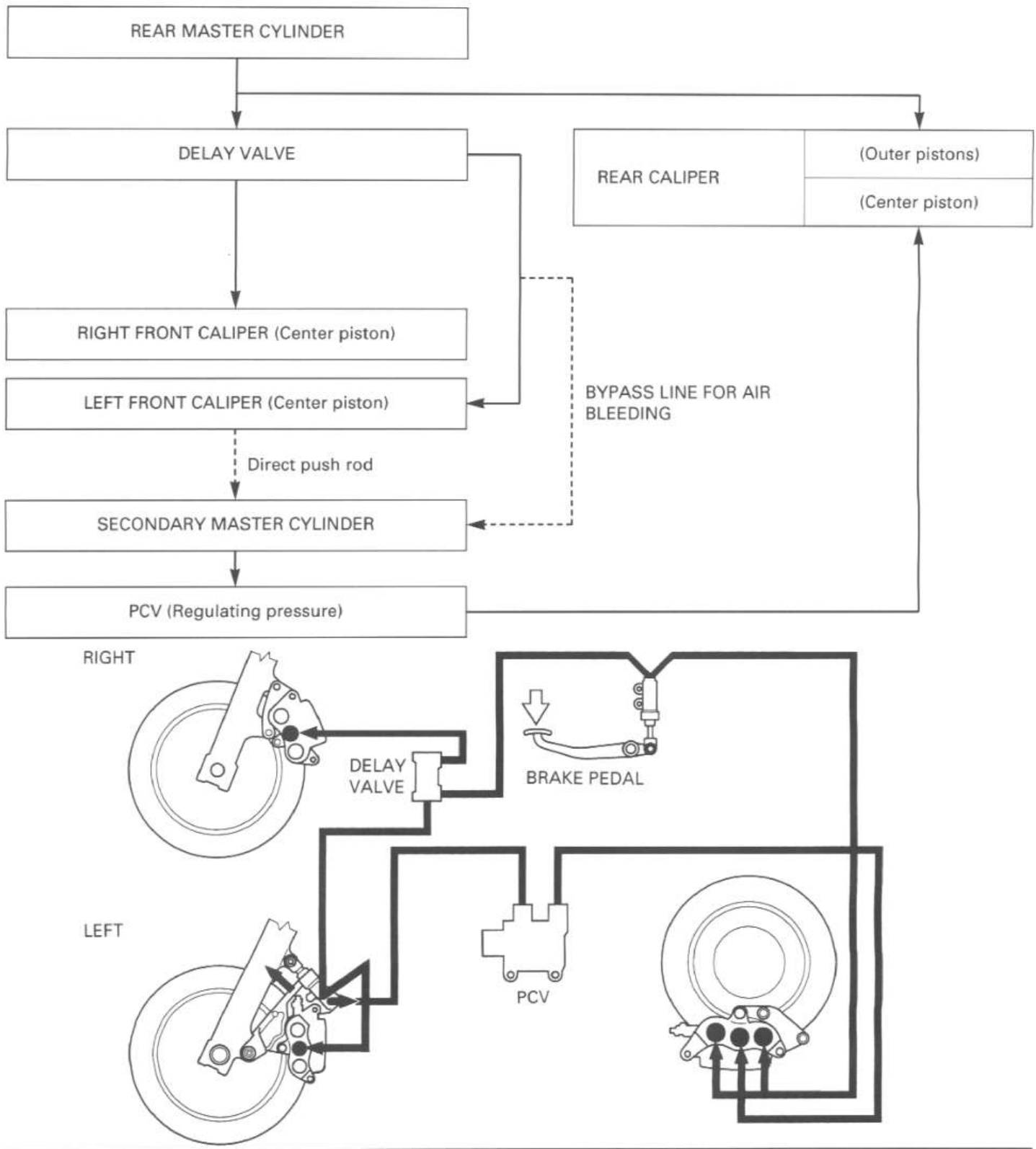
LBS OPERATION

When hand brake is applied:
On initial operation, the hand brake works like any conventional motorcycle front brake system. A squeeze on the brake lever pressurizes the master cylinder which transmits its increased hydraulic pressure to the two outer pistons of the front calipers, causing a corresponding braking force to be applied to the front wheel.
In response to the braking force applied by the front caliper onto the spinning brake rotor, the caliper is pulled in the direction of wheel rotation, around its lower caliper pivot. This forward caliper motion also acts on the push rod which is connected to the secondary master cylinder. This direct pressure on the secondary master cylinder is regulated by the PCV then transmits its hydraulic pressure to the center piston of the rear caliper.

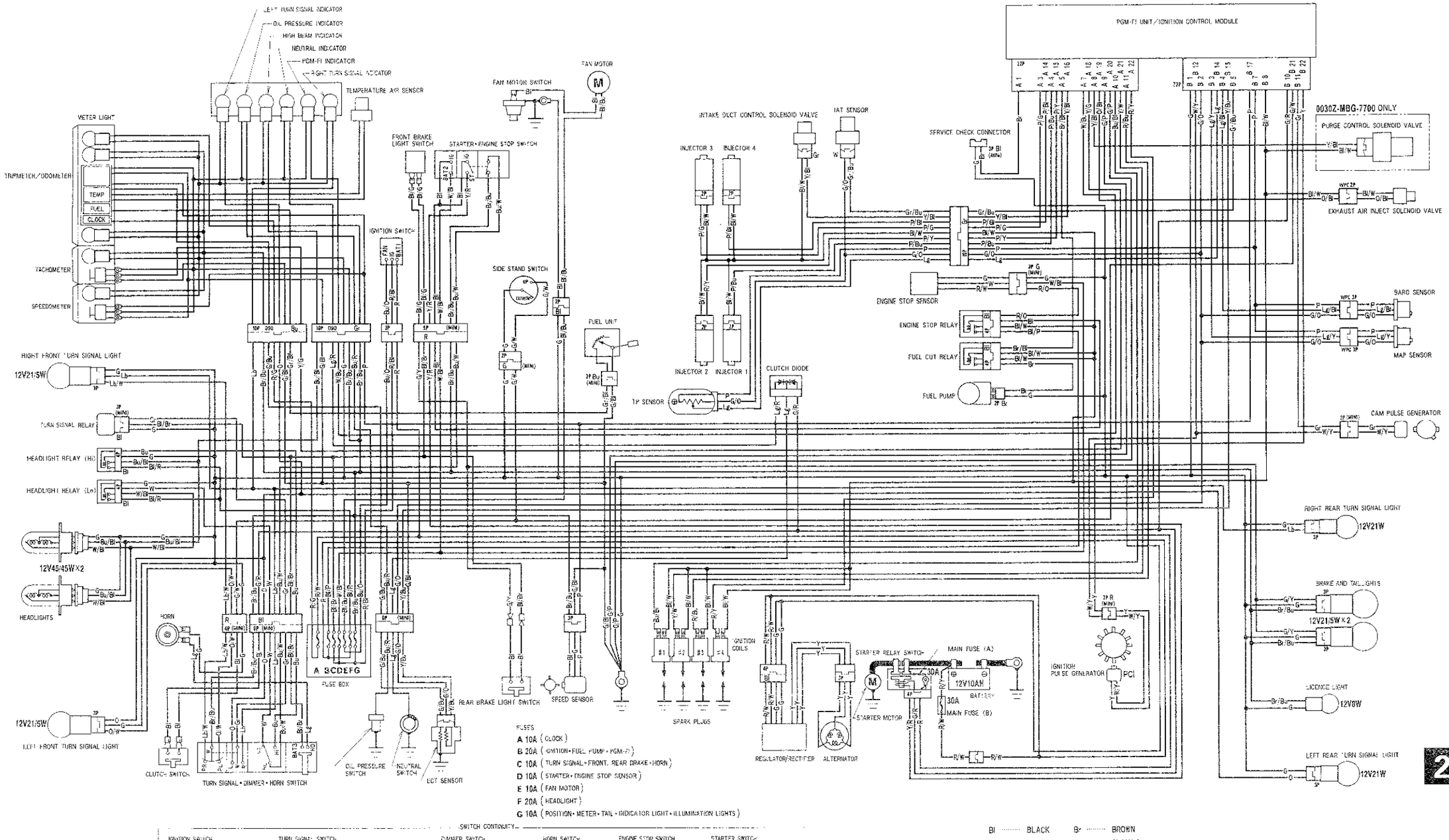




When foot brake is applied:
When the brake pedal is pressed, hydraulic pressure from the rear master cylinder is routed through two lines. One connects directly to the rear caliper and acts on the outer pistons. The other line runs to the center pistons of the front calipers by way of the delay valve that slows front brake engagement to minimize its associated dive. As during hand brake operation, hydraulic pressure from the secondary master cylinder passes through the PCV, and acts on the center piston of the rear caliper. Because hydraulic pressure from the rear master cylinder is also being applied by the rear caliper's outer pistons, the braking force applied to the rear wheel is greater than that applied when using the brake lever only.



MEMO



FUSES
- A 10A (CLOCK)
- B 20A (IGNITION • FUEL PUMP • PGM-FI)
- C 10A (TURN SIGNAL • FRONT, REAR BRAKE • HORN)
- D 10A (STARTER • ENGINE STOP SENSOR)
- E 10A (FAN MOTOR)
- F 20A (HEADLIGHT)
- G 10A (POSITION • METER • TAIL • INDICATOR LIGHT • ILLUMINATION LIGHTS)

SWITCH CONTINUITY

IGNITION SWITCH

	FAN	IG	BAT1
ON	○	○	○
OFF			
LOCK			
COLOR	Bu/O	R/Bl	R

TURN SIGNAL SWITCH

	W	R	L	BAT	PR	PL
R	○	○			—	—
N					—	—
L			○	—	—	—
COLOR	Gr	Lb	O	Br/Bu	Lb/W	O/W

DIMMER SWITCH

	HL	Lo	Hi
Lo	○	○	
N	○	○	○
Hi	○		○
COLOR	Bu/W	W	Bu

HORN SWITCH

	HO	BAT
FREE		
PUSH	○	○
COLOR	Lg	Bl/Br

ENGINE STOP SWITCH

	IG	BAT
OFF		
RUN	○	○
COLOR	Bl	W/Bl

STARTER SWITCH

	ST	IG	BAT	HL
FREE			○	○
PUSH	○	○		
COLOR	Y/R	Bl	Br/Bu	Bu/W

Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

DWG. NO.	DESTINATION
0030Z-MBG-6700	A, CM
0030Z-MBG-7700	AC

0030Z-MBG-6700
-7700

20

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 choke 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	• Choke closed • Throttle valve open • Clogged air cleaner

ENGINE LACKS POWER

			Possible cause
1.	Raise wheel off the ground and spin by hand Wheel pins freely	Wheels do not spin freely	• Brake dragging • Worn or damaged wheel bearing
2.	Check tire pressure Pressure normal	Pressure low	• Faulty tire valve • Punctured tire
3.	Accelerate rapidly from low to second Engine speed reduced when clutch is released	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
4.	Accelerate lightly Engine speed increase	Engine speed does not increase	• Air cleaner dirty • Restricted fuel flow • Clogged muffler • Pinched fuel tank breather
5.	Check ignition timing Correct	Incorrect	• Faulty ECM • Faulty ignition pulse generator
6.	Test cylinder compression Normal	Incorrect	• Valve stuck open • Worn cylinder and piston rings • Leaking head gasket • Improper valve timing
7.	Inspect fuel flow Normal	Abnormal	• Faulty pressure regulator (Section 5)
8.	Inspect the fuel injector Normal	Abnormal	• See section 5
9.	Remove spark plugs Not fouled or discolored	Fouled or discolored	• Faulty spark plug
10.	Check oil level and condition Correct	Incorrect	• Oil level too high • Oil level too low • Contaminated oil
11.	Remove cylinder head cover and inspect lubrication Valve train lubricated properly	Valve train not lubricated properly	• Clogged oil passage • Clogged oil control orifice

		Possible cause
11. 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		
12. 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 the operation of the variable air intake port	Abnormal	• Faulty air control solenoid valve • Faulty one-way valve • Clogged or disconnected vacuum tube
Normal		
2. Check ignition timing	Incorrect	• Faulty ECM
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 valve timing	Incorrect	• Camshaft not installed properly
Correct		
6. 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

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