

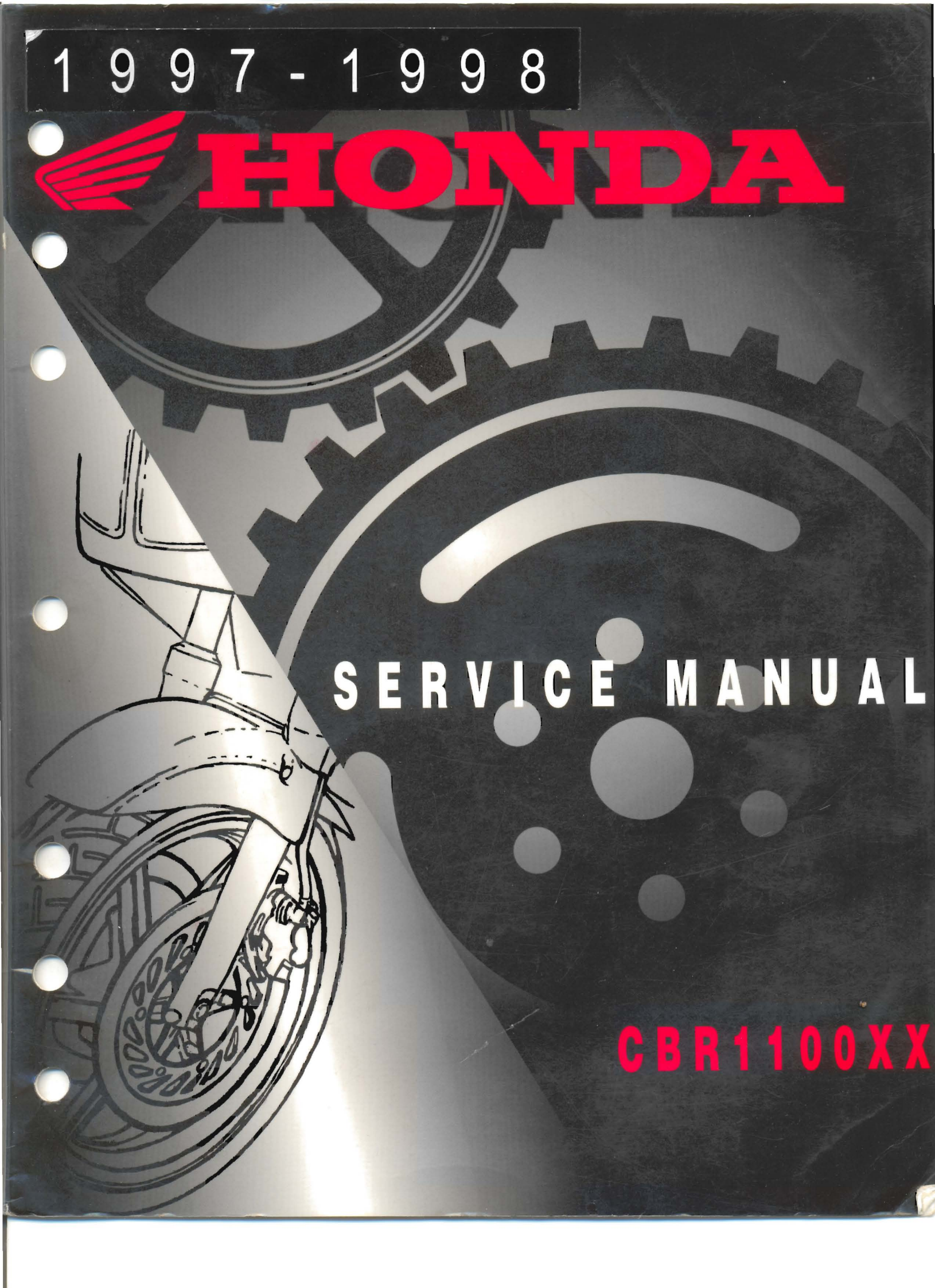
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**HONDA**

**SERVICE MANUAL**

**CBR1100XX**





## IMPORTANT SAFETY NOTICE

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

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

**NOTE:** Gives helpful information.

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



## 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.

	<p>Replace the part(s) with new one(s) before assembly.</p>
	<p>Use recommended engine oil, unless otherwise specified.</p>
	<p>Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1).</p>
	<p>Use multi-purpose grease (Lithium based multi-purpose grease NLGI # 2 or equivalent).</p>
	<p>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</p>
	<p>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</p>
	<p>Use silicone grease.</p>
	<p>Apply a locking agent. Use a middle strength locking agent unless otherwise specified.</p>
	<p>Apply sealant.</p>
	<p>Use DOT 4 brake fluid. Use the recommended brake fluid unless otherwise specified.</p>
	<p>Use Fork or Suspension Fluid.</p>



# 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 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.*



## GENERAL INFORMATION

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### COOLANT

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

#### ▲WARNING

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

### BATTERY HYDROGEN GAS & ELECTROLYTE

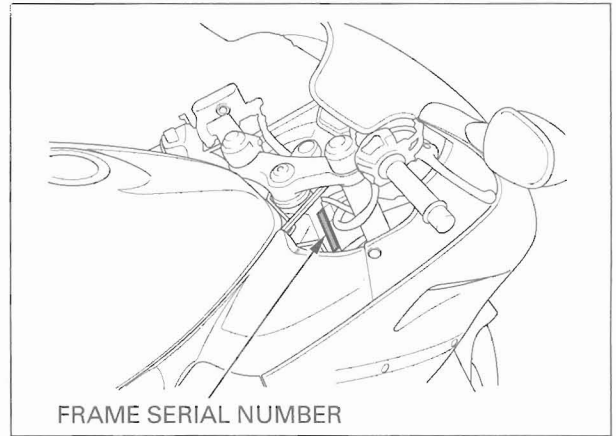
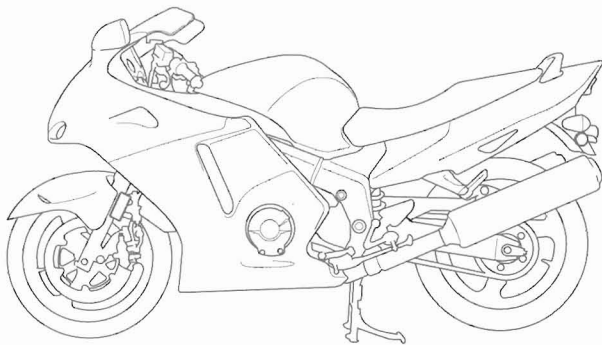
#### ▲WARNING

- *The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.*
- *The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.*
  - *If electrolyte gets on your skin, flush with water.*
  - *If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.*
- *Electrolyte is poisonous.*
  - *If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician. KEEP OUT OF REACH OF CHILDREN.*

## SERVICE RULES

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

## MODEL IDENTIFICATION



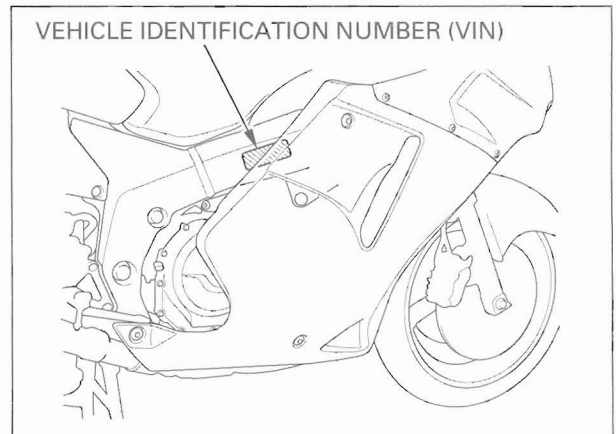
FRAME SERIAL NUMBER

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



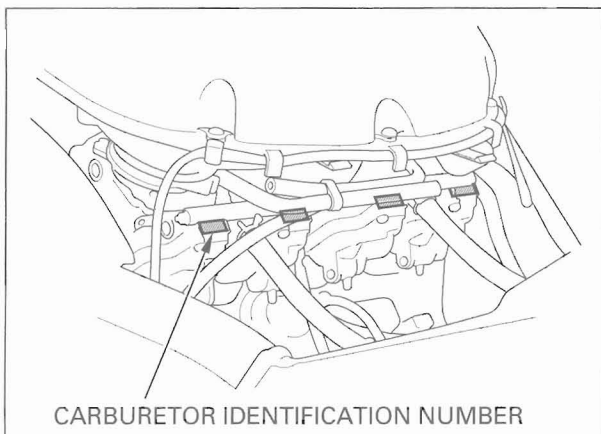
ENGINE SERIAL NUMBER

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



VEHICLE IDENTIFICATION NUMBER (VIN)

- (3) The Vehicle Identification Number (VIN) is located on right side of the frame near the steering head on the Safety Certification Label.



CARBURETOR IDENTIFICATION NUMBER

- (4) The carburetor identification numbers are stamped on the intake side of the carburetor body as shown.



COLOR LABEL

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

**GENERAL INFORMATION**

**SPECIFICATIONS**

GENERAL		
	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length	2,160 mm (85.0 in)
	Overall width	720 mm (28.3 in)
	Overall height	1,170 mm (46.1 in)
	Wheelbase	1,485 mm (58.5 in)
	Seat height	810 mm (31.9 in)
	Footpeg height	372 mm (14.6 in)
	Ground clearance	130 mm (5.1 in)
	Dry weight	
	49 states/Canada type	223 kg (492 lbs)
	California type	225 kg (496 lbs)
	Curb weight	
	49 states/Canada type	250 kg (551 lbs)
	California type	252 kg (556 lbs)
	Maximum weight capacity	
49 states/California type	174 kg (384 lbs)	
Canada type	178 kg (393 lbs)	
FRAME	Frame type	Diamond
	Front suspension	Telescopic fork
	Front wheel travel	109 mm (4.3 in)
	Rear suspension	Swingarm
	Rear wheel travel	120 mm (4.7 in)
	Rear damper	Nitrogen gas filled damper
	Front tire size	120/70 ZR17 (Radial)
	Rear tire size	180/55 ZR17 (Radial)
	Tire brand	
	Bridgestone	Front: BT57F RADIAL G/ Rear: BT57R RADIAL G
	Dunlop	Front: D205FJ/ Rear: D205G
	Michelin	Front: MACADAM 90X S/ Rear: MACADAM 90X S
	Front brake	Hydraulic double disc brake with 3 pots caliper
	Rear brake	Hydraulic single disc brake with 3 pots caliper
	Caster angle	25°
Trail length	99 mm (3.9 in)	
Fuel tank capacity	22.0 ℓ (5.81 US gal , 4.84 Imp gal)	
Fuel tank reserve capacity	3.0 ℓ (0.79 US gal , 0.66 Imp gal)	
ENGINE	Bore and stroke	79.0 × 58.0 mm (3.11 × 2.28 in)
	Displacement	1,137 cm <sup>3</sup> (69.4 cu-in)
	Compression ratio	11.0 : 1
	Valve train	Chain drive and DOHC
	Intake valve	opens — at 1 mm
		closes — (0.04 in)
	Exhaust valve	opens — lift
		closes —
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid/double rotor
	Cooling system	Liquid cooled
	Air filtration	Paper filter
	Crankshaft type	Unit type
Engine dry weight	83.0 kg (183.0 lbs)	
Cylinder arrangement	Four cylinder, inline 30° inclined from vertical	



GENERAL (Cont'd)		
	ITEM	SPECIFICATIONS
CARBURETOR	Carburetor type Throttle bore	CV (Constant Velocity) type, with flat valve 42 mm (1.7 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Final reduction Gear ratio 1st 2nd 3rd 4th 5th 6th  Gearshift pattern	Multi-plate, wet Hydraulic operated type Constant mesh, 6-speed 1.571 (88/56) 2.647 (45/17) 2.769 (36/13) 2.000 (32/16) 1.579 (30/19) 1.333 (28/21) 1.167 (28/24) 1.042 (25/24)  Left foot operated return system, 1-N-2-3-4-5-6
ELECTRICAL	Ignition system  Starting system Charging system Regulator/rectifier Lighting system	Computer-controlled digital transistorized with electric advance Electric starter motor Triple phase output alternator SCR shorted/triple phase, full wave rectification Battery

## GENERAL INFORMATION

Unit: mm (in)

LUBRICATION SYSTEM			STANDARD	SERVICE LIMIT
ITEM				
Engine oil capacity	At draining		3.8 ℓ (4.0 US qt , 3.3 Imp qt)	————
	At disassembly		4.6 ℓ (4.9 US qt , 4.0 Imp qt)	————
	At oil filter change		3.9 ℓ (4.1 US qt , 3.4 Imp qt)	————
Recommended engine oil			HONDA 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/cm <sup>2</sup> , 71 psi) at 5,400 rpm / (176 °F/80 °C)	————
Oil pump rotor	Feed pump	Tip clearance	0.15 (0.006) max.	0.20 (0.008)
		Body clearance	0.15–0.21 (0.006–0.008)	0.35 (0.014)
		Side clearance	0.04–0.09 (0.002–0.004)	0.12 (0.005)
	Cooler pump	Tip clearance	0.15 (0.006) max.	0.20 (0.008)
		Body clearance	0.15–0.21 (0.006–0.008)	0.35 (0.014)
		Side clearance	0.04–0.09 (0.002–0.004)	0.12 (0.005)

FUEL SYSTEM			SPECIFICATIONS
ITEM			
Carburetor identification number	49 states/Canada type		VPS2A
	California type		VPS1A
Main jet	No. 1, 4: # 140/No. 2, 3: # 142		
Slow jet	# 42		
Jet needle number	49 states/Canada type		J5FZ
	California type		J5FU
Pilot screw initial opening	49 states/Canada type		2-3/4 turns out
	California type		2-1/2 turns out
Float level	13.7 mm (0.54 in)		
Idle speed	1,100 ± 100 rpm		
Throttle grip free play	2–6 mm (1/12–1/4 in)		

COOLING SYSTEM		SPECIFICATIONS
ITEM		
Coolant capacity	Radiator and engine	3.2 ℓ (0.85 US gal , 0.70 Imp gal)
	Reserve tank	1.1 ℓ (0.29 US gal , 0.24 Imp gal)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm <sup>2</sup> , 16 – 20 psi)
Thermostat	Begin to open	176 – 183 °F (80 – 84 °C)
	Fully open	203 °F (95 °C)
	Valve lift	8 mm (0.3 in) minimum

Unit: mm (in)

CYLINDER HEAD/VALVES			STANDARD	SERVICE LIMIT
ITEM				
Cylinder compression			1,275 kPa (13.0 kgf/cm <sup>2</sup> , 185 psi) at 350 rpm	—————
Cylinder head warpage			—————	0.10 (0.004)
Valve, valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	—————
		EX	0.22 ± 0.03 (0.009 ± 0.001)	—————
	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1955)
		EX	4.960 – 4.975 (0.1953 – 0.1959)	4.950 (0.1949)
	Valve guide I.D.	IN	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
		EX	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	—————
		EX	0.025 – 0.052 (0.0010 – 0.0020)	—————
	Valve guide projection above cylinder head	IN	16.3 – 16.5 (0.64 – 0.65)	—————
		EX	16.3 – 16.5 (0.64 – 0.65)	—————
Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)	
Valve spring free length	Inner	IN/EX	37.4 (1.47)	35.4 (1.39)
	Outer	IN/EX	40.6 (1.60)	38.6 (1.52)
Valve lifter	Valve lifter O.D.	IN/EX	25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.	IN/EX	26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Camshaft	Cam lobe height	IN	38.54 – 38.78 (1.517 – 1.527)	38.24 (1.506)
		EX	38.30 – 38.54 (1.508 – 1.517)	38.00 (1.496)
	Runout		—————	0.05 (0.002)
	Oil clearance		0.020 – 0.074 (0.0008 – 0.0029)	0.10 (0.004)

## GENERAL INFORMATION

Unit: mm (in)

CLUTCH/GEARSHIFT LINKAGE			STANDARD	SERVICE LIMIT
ITEM				
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 spring free length			53.1 (2.09)	50.1 (1.97)
Clutch disc thickness	A		3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	B		3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
Clutch plate warpage				0.30 (0.012)
Clutch outer guide	I. D.		28.000 – 28.021 (1.1024 – 1.1032)	28.031 (1.1036)
	O. D.		34.975 – 34.991 (1.3770 – 1.3776)	34.965 (1.3766)
Mainshaft O. D. at clutch outer guide			27.980 – 27.993 (1.1016 – 1.1021)	27.970 (1.1012)
Shift fork, fork shaft	Fork	I. D.	12.000 – 12.021 (0.4724 – 0.4733)	12.03 (0.474)
		Claw thickness	5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
	Fork shaft O. D.		11.957 – 11.968 (0.4707 – 0.4712)	11.95 (0.470)

Unit: mm (in)

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

Unit: mm (in)

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



Unit: mm (in)

CRANKSHAFT/TRANSMISSION/BALANCER			STANDARD	SERVICE LIMIT
ITEM				
Crankshaft	Side clearance		0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)
	Runout			0.30 (0.012)
	Main journal oil clearance		0.017 – 0.035 (0.0007 – 0.0014)	0.045 (0.0018)
Transmission	Gear I. D.	M5, 6	31.000 – 31.025 (1.2205 – 1.2215)	31.04 (1.222)
		C1	26.000 – 26.021 (1.0236 – 1.0244)	26.04 (1.025)
		C2, 3, 4,	33.000 – 33.025 (1.2992 – 1.3002)	33.04 (1.301)
	Bushing O. D.	M5, 6	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
		C2	32.955 – 32.980 (1.2974 – 1.2984)	32.93 (1.296)
		C3, 4	32.950 – 32.975 (1.2972 – 1.2982)	32.93 (1.296)
	Bushing I. D.	M5	27.985 – 28.006 (1.1018 – 1.1026)	28.02 (1.103)
		C2	29.985 – 30.006 (1.1805 – 1.1813)	30.02 (1.182)
	Gear-to-bushing clearance	M5, 6	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C2	0.020 – 0.070 (0.0008 – 0.0028)	0.11 (0.004)
		C3, 4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Mainshaft O. D.	M5	27.967 – 27.980 (1.1011 – 1.1016)	27.957 (1.1007)
		Clutch outer guide	27.980 – 27.993 (1.1016 – 1.1021)	27.970 (1.1012)
	Countershaft O. D.	C2	29.967 – 29.980 (1.1798 – 1.1803)	27.957 (1.1007)
	Bushing-to-shaft clearance	M5	0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)
C2		0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)	

## GENERAL INFORMATION

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	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	_____
	Up to maximum weight capacity	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	_____
Axle runout		_____	0.20 (0.008)
Wheel rim runout	Radial	_____	2.0 (0.08)
	Axial	_____	2.0 (0.08)
Fork	Spring free length	237.9 (9.37)	233.1 (9.18)
	Spring direction	With the tapered end facing down	_____
	Tube runout	_____	0.20 (0.008)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8	_____
	Fluid level	154 (6.1)	_____
	Fluid capacity	486 ± 2.5 cm <sup>3</sup> (16.4 ± 0.08 US oz, 17.1 ± 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/cm <sup>2</sup> , 42 psi)	_____
	Up to maximum weight capacity	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	_____
Axle runout		_____	0.20 (0.008)
Wheel rim runout	Radial	_____	2.0 (0.08)
	Axial	_____	2.0 (0.08)
Caliper piston O. D.	Size/link	DID	DID50ZVS-110LE
		RK	RK50LFOZ1-110LE
	Slack	25 – 35 (1.0 – 1.4)	50 (1.97)
Shock absorber spring pre-load length		209.1 (8.23)	_____

Unit: mm (in)

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

## GENERAL INFORMATION

BATTERY/CHARGING SYSTEM			SPECIFICATIONS
ITEM			
Battery	Capacity		12V – 10AH
	Current leakage		0.2 mA max.
	Voltage (68°F/20°C)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.9 A/5 – 10 h
Quick		4.0 A/0.5 h	
Alternator	Capacity		0.39 kw/5,000 rpm
	Charging coil resistance (68°F/20°C)		0.22 – 0.26 Ω
Regulator/rectifier regulated voltage			14.7 – 15.5 V/5,000 rpm

IGNITION SYSTEM		SPECIFICATIONS
ITEM		
Spark plug		CR9EHVX – 9 (NGK)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		9° BTDC at idle

ELECTRIC STARTER		Unit: mm (in)	
ITEM		STANDARD	SERVICE LIMIT
Starter motor brush length		12.0 – 13.0 (0.47 – 0.51)	4.5 (0.18)

LIGHTS/METERS/SWITCHES			SPECIFICATIONS
ITEM			
Bulbs	Headlight	High beam	12V – 55W
		Low beam	12V – 55W
	Brake/Tail light		12V – 32/3CP × 2
	Front turn signal/running light		12V – 32/3CP × 2
	Rear turn signal light		12V – 32CP × 2
	License light		12V – 4CP
	Instrument light		12V – 1.7W × 4
	Turn signal indicator		12V – 3W × 2
	High beam indicator		12V – 3W
	Neutral indicator		12V – 3W
	Oil pressure indicator		12V – 3W
	Side stand indicator		12V – 3W
	Fuse	Main fuse	
Sub fuse		20A × 1, 10A × 5	
Fan motor switch	Start to close (ON)		208 – 216 °F (98 – 102 °C)
	Stop to open		199 – 207 °F (93 – 97 °C)
Coolant temperature sensor resistance (68°F/20°C)			45 – 60 Ω



## TORQUE VALUES

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

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

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

ENGINE	ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
	<b>MAINTENANCE:</b>				
	Spark plug	4	10	12 (1.2 , 9)	
	Crankshaft hole cap	1	45	18 (1.8 , 13)	NOTE 3
	<b>LUBRICATION SYSTEM:</b>				
	Oil drain bolt	1	14	29 (3.0 , 22)	
	Oil filter boss	1	20	18 (1.8 , 13)	NOTE 2
	Oil pump assembly flange bolt	2	6	13 (1.3 , 9)	NOTE 10
	Oil pump driven sprocket bolt	1	6	15 (1.5 , 11)	NOTE 2
	Oil strainer nut	1	6	12 (1.2 , 9)	NOTE 8
	Oil return pipe bracket bolt	1	6	12 (1.2 , 9)	NOTE 10
	Oil filter cartridge	1	20	10 (1.0 , 7)	NOTE 7
	Oil pressure switch	1	PT 1/8	12 (1.2 , 9)	NOTE 1
	Oil pressure switch wire terminal screw	1	4	2 (0.2 , 1.4)	
	<b>FUEL SYSTEM:</b>				
	Carburetor assembly nut, 5 mm	1	5	5 (0.5 , 3.6)	
	6 mm	1	6	9 (0.9 , 6.5)	
	Vacuum plug for synchronization	3	5	3 (0.3 , 2.2)	
	Boost joint for auto fuel valve	1	5	2 (0.25 , 1.8)	
	Carburetor insulator band screw	8	5	See page 1-15	
	<b>COOLING SYSTEM:</b>				
	Water pump cover bolt	3	6	13 (1.3 , 9)	NOTE 10
	Water joint flange bolt	2	6	12 (1.2 , 9)	
	Coolant temperature sensor	1	PT 1/8	10 (1.0 , 7)	NOTE 1

## GENERAL INFORMATION

<b>ENGINE (Cont'd)</b>				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
<b>ENGINE MOUNTING:</b>				
Drive sprocket cover bolt	2	6	12 (1.2, 9)	
Drive sprocket cover damper mounting bolt	2	6	12 (1.2, 9)	NOTE 2, 10
Wire clamp flange bolt	1	6	12 (1.2, 9)	NOTE 2, 10
Drive sprocket special bolt	1	10	54 (5.5, 40)	
<b>CYLINDER HEAD/VALVES:</b>				
Cylinder head cover bolt	6	6	10 (1.0, 7)	
Breather plate flange bolt	5	6	12 (1.2, 9)	NOTE 2, 10
Camshaft holder flange bolt	10	6	12 (1.2, 9)	NOTE 5
Cylinder head sealing bolt	1	18	32 (3.3, 24)	NOTE 2
Cylinder head SH bolt	2	6	10 (1.0, 7)	
Cylinder head mounting bolt	10	10	67 (6.8, 49)	NOTE 6
Cam sprocket bolt	4	7	20 (2.0, 14)	NOTE 2
Cam chain tensioner cap nut	1	6	12 (1.2, 9)	
Cam chain tensioner lifter mounting bolt	2	6	12 (1.2, 9)	
Cam chain tensioner lifter sealing bolt	1	6	12 (1.2, 9)	
Cam chain guide A mounting bolt	1	6	12 (1.2, 9)	
Cylinder head stud bolt	8	8	See page 1-15	
PAIR check valve cover flange bolt	4	6	10 (1.0, 7)	
<b>CLUTCH/GEARSHIFT LINKAGE:</b>				
Clutch center lock nut	1	25	127 (13.0, 94)	NOTE 4, 5
Clutch spring bolt/washer	5	6	12 (1.2, 9)	
Clutch slave cylinder bleeder screw	1	8	9 (0.9, 6.5)	
Clutch slave cylinder mounting bolt	3	6	10 (1.0, 7)	
Right crankcase cover SH bolt	11	6	12 (1.2, 9)	
Right crankcase cover center bolt	1	6	12 (1.2, 9)	
Shift drum center socket bolt	1	8	23 (2.3, 17)	NOTE 2
Shift drum stopper pivot bolt	1	6	12 (1.2, 9)	
Gearshift return spring pin	1	8	23 (2.3, 17)	
<b>ALTERNATOR/STARTER CLUTCH:</b>				
Alternator cover SH bolt	10	6	12 (1.2, 9)	
Alternator wire holder socket bolt	1	6	10 (1.0, 7)	
Flywheel flange bolt	1	10	103 (10.5, 76)	NOTE 5
Stator mounting socket bolt	4	6	12 (1.2, 9)	
Starter one-way clutch socket bolt	6	6	16 (1.6, 12)	NOTE 2
<b>CRANKCASE/PISTON/CYLINDER:</b>				
Crankcase bolt, 10 mm	1	10	39 (4.0, 29)	
9 mm	10	9	37 (3.8, 27)	NOTE 5
8 mm	10	8	25 (2.5, 18)	
7 mm	7	7	18 (1.8, 13)	
6 mm	6	6	12 (1.2, 9)	
Connecting rod nut	8	8	41 (4.2, 30)	NOTE 5
Lower crankcase flange bolt	1	10	29 (3.0, 22)	NOTE 2
Lower crankcase sealing bolt, 20 mm	1	20	29 (3.0, 22)	NOTE 2
8 mm	1	8	22 (2.2, 16)	NOTE 2
<b>CRANKSHAFT/TRANSMISSION/BALANCER:</b>				
Mainshaft bearing set plate bolt	2	6	12 (1.2, 9)	NOTE 2
Balancer timing hole cap	1	30	7 (0.7, 5.1)	NOTE 3
Balancer shaft holder flange bolt (front/rear)	2	8	27 (2.8, 20)	
Balancer shaft pinch bolt	3	6	12 (1.2, 9)	
Balancer idle shaft holder flange bolt	1	8	27 (2.8, 20)	
Balancer idle shaft bolt	1	6	12 (1.2, 9)	NOTE 2

## TORQUE VALUES

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

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

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

ENGINE	ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
	<b>MAINTENANCE:</b>				
	Spark plug	4	10	12 (1.2 , 9)	
	Crankshaft hole cap	1	45	18 (1.8 , 13)	NOTE 3
	<b>LUBRICATION SYSTEM:</b>				
	Oil drain bolt	1	14	29 (3.0 , 22)	
	Oil filter boss	1	20	18 (1.8 , 13)	NOTE 2
	Oil pump assembly flange bolt	2	6	13 (1.3 , 9)	NOTE 10
	Oil pump driven sprocket bolt	1	6	15 (1.5 , 11)	NOTE 2
	Oil strainer nut	1	6	12 (1.2 , 9)	NOTE 8
	Oil return pipe bracket bolt	1	6	12 (1.2 , 9)	NOTE 10
	Oil filter cartridge	1	20	10 (1.0 , 7)	NOTE 7
	Oil pressure switch	1	PT 1/8	12 (1.2 , 9)	NOTE 1
	Oil pressure switch wire terminal screw	1	4	2 (0.2 , 1.4)	
	<b>FUEL SYSTEM:</b>				
	Carburetor assembly nut, 5 mm	1	5	5 (0.5 , 3.6)	
	6 mm	1	6	9 (0.9 , 6.5)	
	Vacuum plug for synchronization	3	5	3 (0.3 , 2.2)	
	Boost joint for auto fuel valve	1	5	2 (0.25 , 1.8)	
	Carburetor insulator band screw	8	5	See page 1-15	
	<b>COOLING SYSTEM:</b>				
	Water pump cover bolt	3	6	13 (1.3 , 9)	NOTE 10
	Water joint flange bolt	2	6	12 (1.2 , 9)	
	Coolant temperature sensor	1	PT 1/8	10 (1.0 , 7)	NOTE 1

## GENERAL INFORMATION

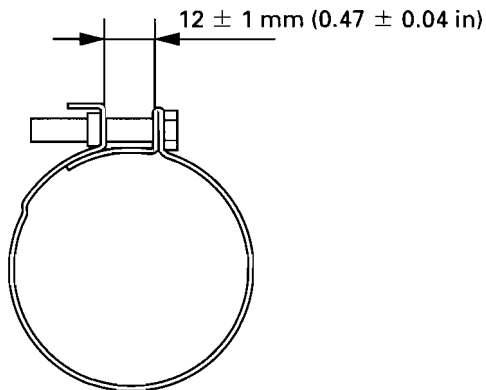
<b>ENGINE (Cont'd)</b>				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>ENGINE MOUNTING:</b>				
Drive sprocket cover bolt	2	6	12 (1.2, 9)	
Drive sprocket cover damper mounting bolt	2	6	12 (1.2, 9)	NOTE 2, 10
Wire clamp flange bolt	1	6	12 (1.2, 9)	NOTE 2, 10
Drive sprocket special bolt	1	10	54 (5.5, 40)	
<b>CYLINDER HEAD/VALVES:</b>				
Cylinder head cover bolt	6	6	10 (1.0, 7)	
Breather plate flange bolt	5	6	12 (1.2, 9)	NOTE 2, 10
Camshaft holder flange bolt	10	6	12 (1.2, 9)	NOTE 5
Cylinder head sealing bolt	1	18	32 (3.3, 24)	NOTE 2
Cylinder head SH bolt	2	6	10 (1.0, 7)	
Cylinder head mounting bolt	10	10	67 (6.8, 49)	NOTE 6
Cam sprocket bolt	4	7	20 (2.0, 14)	NOTE 2
Cam chain tensioner cap nut	1	6	12 (1.2, 9)	
Cam chain tensioner lifter mounting bolt	2	6	12 (1.2, 9)	
Cam chain tensioner lifter sealing bolt	1	6	12 (1.2, 9)	
Cam chain guide A mounting bolt	1	6	12 (1.2, 9)	
Cylinder head stud bolt	8	8	See page 1-15	
PAIR check valve cover flange bolt	4	6	10 (1.0, 7)	
<b>CLUTCH/GEARSHIFT LINKAGE:</b>				
Clutch center lock nut	1	25	127 (13.0, 94)	NOTE 4, 5
Clutch spring bolt/washer	5	6	12 (1.2, 9)	
Clutch slave cylinder bleeder screw	1	8	9 (0.9, 6.5)	
Clutch slave cylinder mounting bolt	3	6	10 (1.0, 7)	
Right crankcase cover SH bolt	11	6	12 (1.2, 9)	
Right crankcase cover center bolt	1	6	12 (1.2, 9)	
Shift drum center socket bolt	1	8	23 (2.3, 17)	NOTE 2
Shift drum stopper pivot bolt	1	6	12 (1.2, 9)	
Gearshift return spring pin	1	8	23 (2.3, 17)	
<b>ALTERNATOR/STARTER CLUTCH:</b>				
Alternator cover SH bolt	10	6	12 (1.2, 9)	
Alternator wire holder socket bolt	1	6	10 (1.0, 7)	
Flywheel flange bolt	1	10	103 (10.5, 76)	NOTE 5
Stator mounting socket bolt	4	6	12 (1.2, 9)	
Starter one-way clutch socket bolt	6	6	16 (1.6, 12)	NOTE 2
<b>CRANKCASE/PISTON/CYLINDER:</b>				
Crankcase bolt, 10 mm	1	10	39 (4.0, 29)	
9 mm	10	9	37 (3.8, 27)	NOTE 5
8 mm	10	8	25 (2.5, 18)	
7 mm	7	7	18 (1.8, 13)	
6 mm	6	6	12 (1.2, 9)	
Connecting rod nut	8	8	41 (4.2, 30)	NOTE 5
Lower crankcase flange bolt	1	10	29 (3.0, 22)	NOTE 2
Lower crankcase sealing bolt, 20 mm	1	20	29 (3.0, 22)	NOTE 2
8 mm	1	8	22 (2.2, 16)	NOTE 2
<b>CRANKSHAFT/TRANSMISSION/BALANCER:</b>				
Mainshaft bearing set plate bolt	2	6	12 (1.2, 9)	NOTE 2
Balancer timing hole cap	1	30	7 (0.7, 5.1)	NOTE 3
Balancer shaft holder flange bolt (front/rear)	2	8	27 (2.8, 20)	
Balancer shaft pinch bolt	3	6	12 (1.2, 9)	
Balancer idle shaft holder flange bolt	1	8	27 (2.8, 20)	
Balancer idle shaft bolt	1	6	12 (1.2, 9)	NOTE 2



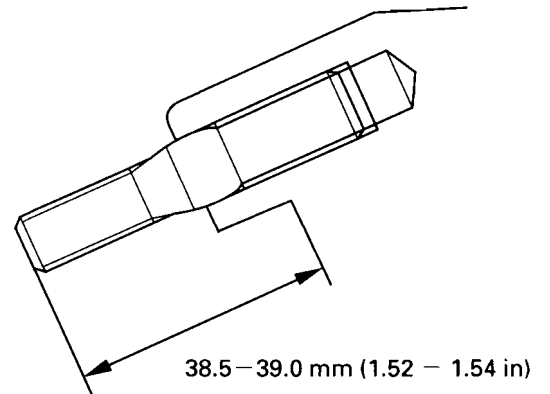
**ENGINE (Cont'd)**

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

**Carburetor insulator clamp:**



**Exhaust pipe stud bolt:**



# GENERAL INFORMATION

FRAME	ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
<b>FRAME BODY PANELS/EXHAUST SYSTEM:</b>					
	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	54 (5.5 , 40)	
	Side stand switch mounting bolt	1	6	10 (1.0 , 7)	NOTE 9
	Main stand mounting bolt	1	10	54 (5.5 , 40)	NOTE 9
	Main footpeg holder socket bolt	4	8	26 (2.7 , 20)	
	Pillion footpeg holder bolt	4	8	26 (2.7 , 20)	
	Bank sensor	2	8	22 (2.2 , 16)	
	Exhaust pipe joint nut	8	7	21 (2.1 , 15)	
	Muffler band bolt	4	8	26 (2.7 , 20)	
	Muffler bracket bolt	2	8	26 (2.7 , 20)	
	Seat rail mounting bolt	4	10	39 (4.0 , 29)	
<b>ENGINE MOUNTING:</b>					
	Engine hanger nut (Rear/upper)	1	12	64 (6.5 , 47)	
	Engine hanger nut (Rear/lower)	1	12	64 (6.5 , 47)	
	Engine hanger bolt	3	10	39 (4.0 , 29)	
	Engine hanger adjusting bolt	2	22	11 (1.1 , 8)	
	Engine hanger adjusting bolt lock nut	2	22	54 (5.5 , 40)	
<b>CLUTCH/GEARSHIFT LINKAGE:</b>					
	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 , 0.9)	
	Gearshift pedal bolt	1	6	10 (1.0 , 7)	
<b>FRONT WHEEL/SUSPENSION/STEERING:</b>					
	Handlebar pinch bolt	2	8	26 (2.7 , 20)	
	Handlebar weight mounting screw	2	6	10 (1.0 , 7)	NOTE 9
	Steering stem nut	1	24	103 (10.5 , 76)	See page 13-31
	Steering stem adjusting nut	1	26	26 (2.7 , 20)	
	Steering stem lock nut	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 9
	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)	
<b>REAR WHEEL/SUSPENSION:</b>					
	Rear axle nut	1	18	93 (9.5 , 69)	NOTE 8
	Rear brake disc mounting bolt	4	8	42 (4.3 , 31)	NOTE 9
	Driven sprocket nut	5	12	108 (11.0 , 80)	NOTE 8
	Shock absorber upper mounting nut	2	10	42 (4.3 , 31)	NOTE 8
	Shock link bolt (frame side)	1	10	59 (6.0 , 43)	NOTE 8
	Shock link nut (shock arm plate side)	1	10	42 (4.3 , 31)	NOTE 8
	Shock arm plate nut (swingarm side)	1	10	42 (4.3 , 31)	NOTE 8
	Swingarm pivot adjusting bolt	1	30	15 (1.5 , 11)	See page 14-19
	Swingarm pivot lock nut	1	30	64 (6.5 , 47)	
	Swingarm pivot nut	1	18	93 (9.5 , 69)	NOTE 8
	Drive chain slider bolt	2	6	9 (0.9 , 6.5)	NOTE 9

FRAME (Cont'd)				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>HYDRAULIC BRAKE:</b>				
Front brake master cylinder holder bolt	2	6	12 (1.2, 9)	
Front brake master cylinder cap screw	2	4	1 (0.15, 1.1)	
Brake lever pivot bolt	1	6	1 (0.1, 0.7)	
Brake lever pivot nut	1	6	6 (0.6, 4.3)	
Brake lever adjuster	1	5	4 (0.4, 2.9)	
Front brake switch screw	1	4	1 (0.12, 0.9)	
Right front brake caliper mounting bolt	2	8	31 (3.2, 23)	NOTE 9
Left front brake caliper pivot bolt	1	8	31 (3.2, 23)	NOTE 9
Left front brake caliper bolt (second master joint)	1	8	25 (2.6, 19)	NOTE 9
Caliper body B bolt	9	8	32 (3.3, 24)	NOTE 9
Front brake caliper slide pin (main)	3	12	23 (2.3, 17)	NOTE 2
Front brake caliper slide pin (sub)	3	8	13 (1.3, 9)	NOTE 2
Pad pin	3	10	18 (1.8, 13)	
Brake caliper bleeder	6	8	6 (0.6, 4.3)	
Second master cylinder mounting bolt	2	8	31 (3.2, 23)	NOTE 9
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 guide 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)	
<b>IGNITION SYSTEM:</b>				
Ignition coil mounting nut	4	6	16 (1.6, 12)	
Ignition coil mounting nut	2	6	10 (1.0, 7)	
<b>LIGHTS/METERS/SWITCHES:</b>				
Ignition switch mounting bolt	2	8	25 (2.5, 18)	

## GENERAL INFORMATION

### TOOLS

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

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Carburetor float level gauge	07401-0010000		5
Oil pressure gauge	07506-3000000		4
Oil pressure gauge attachment	07510-4220100		4
Clutch center holder	07724-0050002		9
Flywheel holder	07725-0040000	NOTE 1	10
Rotor puller	07733-0020001	NOTE 3: 07933-3950000	10
Adjustable valve guide driver	07743-0020000		8
Attachment, 37 × 40 mm	07746-0010200		9, 14
Attachment, 42 × 47 mm	07746-0010300		9, 13
Attachment, 52 × 55 mm	07746-0010400		14
Attachment, 62 × 68 mm	07746-0010500		14
Attachment, 24 × 26 mm	07746-0010700		14
Driver, 40 mm I. D.	07746-0030100		12
Attachment, 30 mm	07746-0030300		12
Pilot, 17 mm	07746-0040400		14
Pilot, 20 mm	07746-0040500		13, 14
Pilot, 25 mm	07746-0040600		14
Pilot, 35 mm	07746-0040800		9
Pilot, 28 mm	07746-0041100	NOTE 1	14
Bearing remover shaft	07746-0050100	NOTE 1	13, 14
Bearing remover head, 20 mm	07746-0050600		13, 14
Driver	07749-0010000		9, 13, 14
Valve spring compressor	07757-0010000	NOTE 1	8
Valve seat cutter			8
Seat cutter, 27.5 mm (45° EX)	07780-0010200		
Seat cutter, 33 mm (45° IN)	07780-0010800		
Flat cutter, 28 mm (32° EX)	07780-0012100		
Flat cutter, 33 mm (32° IN)	07780-0012900		
Interior cutter, 30 mm (60° EX)	07780-0014000		
Interior cutter, 37.5 mm (60° IN)	07780-0014100		
Cutter holder, 5 mm	07781-0010400		
Pivot adjusting wrench	07908-4690003		14
Snap ring pliers	07914-3230001		15
Steering stem socket	07916-3710101		13
Bearing remover set	07936-3710001		14
Remover handle	07936-3710100		
Remover set	07936-3710600		
Remover weight	07741-0010201		
Valve guide driver	07942-MA60000		8
Ball race remover set	07946-KM90001		13
Driver attachment, A	07946-KM90100		
Driver attachment, B	07946-KM90200		
Driver shaft assembly	07946-KM90300		
Bearing remover, A	07946-KM90401		
Bearing remover, B	07946-KM90500		
Assembly base	07946-KM90600		
Steering stem driver	07946-MB00000		13
Driver shaft	07946-MJ00100		14

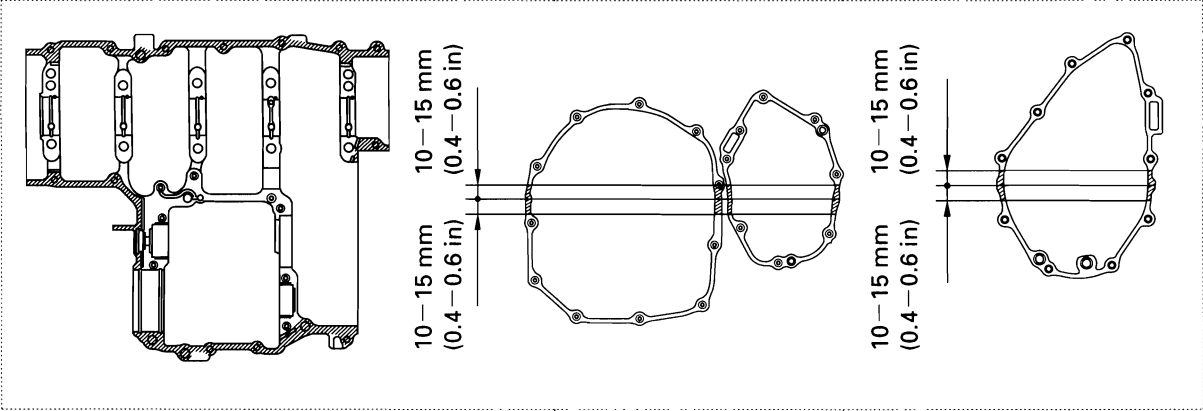
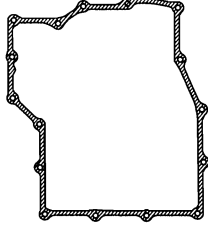
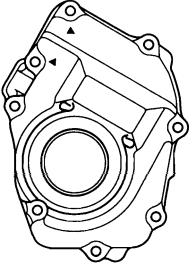
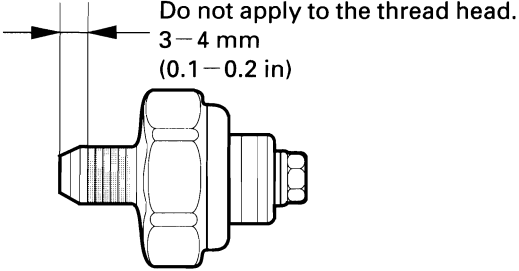
## GENERAL INFORMATION

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Oil seal driver	07947 – KA40200	NOTE 3: 07NMD-KZ3010A (U.S.A. only)	13
Slider weight	07947 – KA50100		13
Valve spring compressor attachment	07959 – KM30101		8
Driver shaft	07964 – MB00200		12
Valve guide reamer, 5.0 mm	07984 – MA60001	NOTE 3: 07984-MA6000 C (U. S. A. only)	8
Pin driver	07GMD – KT80100		14
Inspection adaptor	07GMJ – ML80100	NOTE 3:	17
Oil filter wrench	07HAA – PJ70100	Peak voltage tester	3
Peak voltage adaptor	07HGJ – 0020100	(U.S.A. only)	17, 19
Needle bearing remover, 28 mm	07HMC – MR70100		14
Tappet hole protector	07HMG – MR70002		8
Drive chain tool set	07HMH – MR10103	NOTE 4	3
Pilot screw wrench	07KMA – MN90100		5
Needle bearing remover	07LMC – KV30100	NOTE 5	14
Compression gauge attachment	07RMJ – MY50100		8
Lock nut wrench	07VMA – MAT0100		7

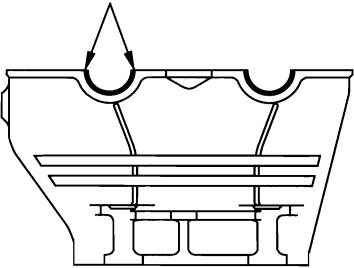
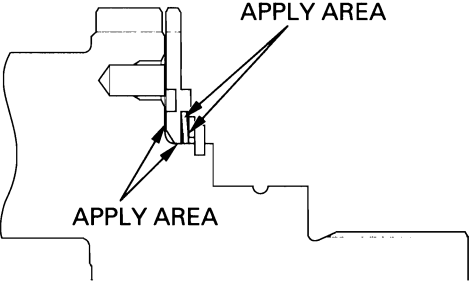


**GENERAL INFORMATION**


**LUBRICATION & SEAL POINTS**

ENGINE	LOCATION	MATERIAL	REMARKS
	<p>Crankcase mating surface</p> 	<p>Liquid sealant (Three Bond 1207B, Hondabond 4 or equivalent)</p>	
	<p>Oil pan mating surface</p>  <p>Ignition pulse generator cover bolt threads (marked "△")</p>  <p>Oil pressure switch threads</p>  <p>Thermo unit threads</p>	<p>Coating width: 6.5 ± 1 mm</p>	

ENGINE (Cont'd)

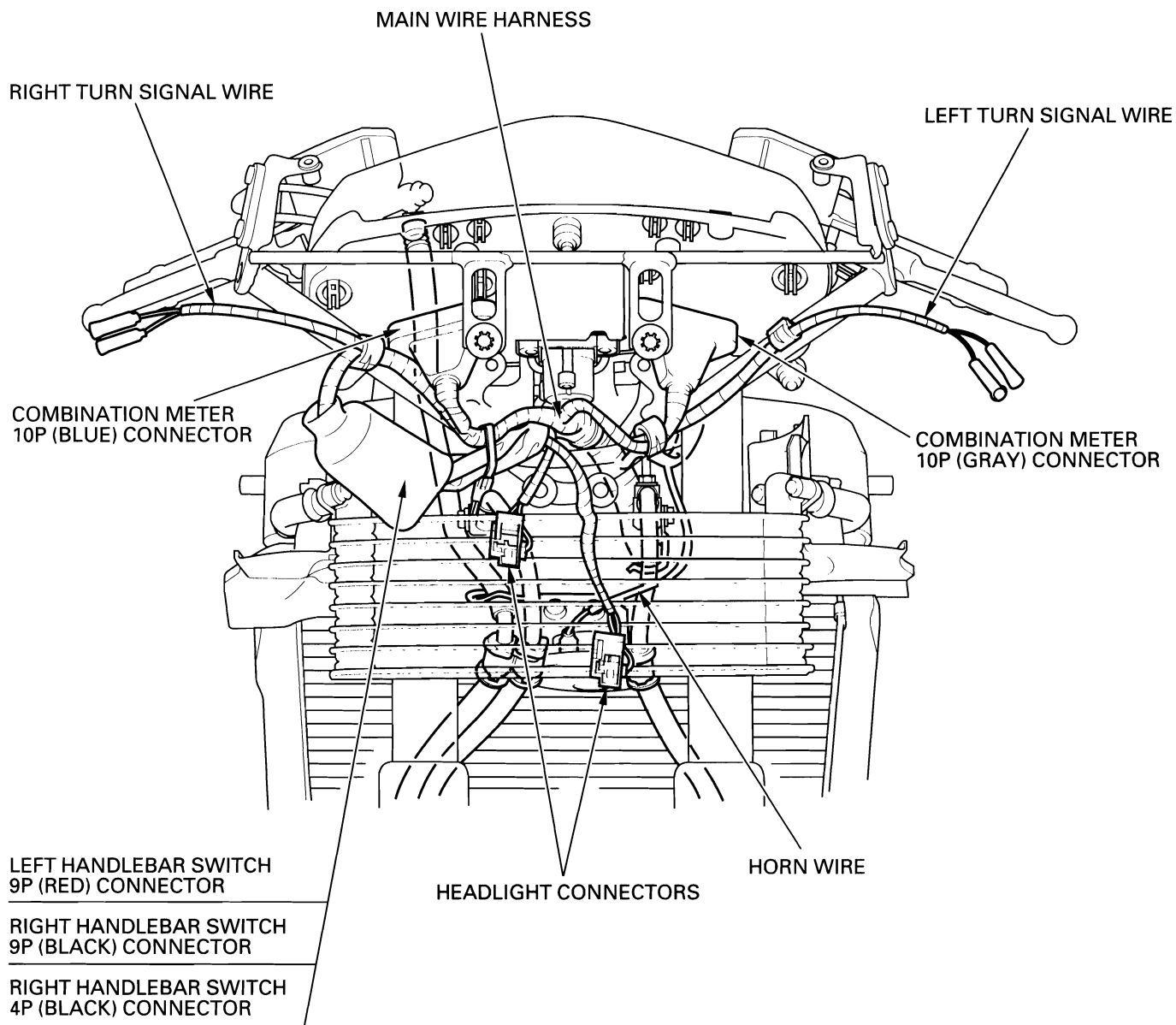
LOCATION	MATERIAL	REMARKS
<p>Cylinder head semi-circular cut-out</p> 	<p>Sealant</p>	
<p>Camshaft lobes/journals            Valve lifter outer sliding surface            Valve stem (valve guide sliding surface)            Piston pin sliding surface            Main journal bearing surface            Connecting rod bearing surface            Crankshaft journals            M3/4, C5, C6 shifter gear (shift fork grooves)            Clutch outer guide sliding surface            Starter reduction gear outer surface            Cylinder head 10 mm bolt (after removing anti-rust oil additive)            Primary drive gear and sub gear sliding surface</p> 	<p>Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)</p>	
<p>Piston ring sliding area            Main journal 9 mm bolt threads and seating surface (after removing anti-rust oil additive)            Oil strainer packing            Oil filter cartridge threads and O-ring            Flywheel bolt threads and seating surface            Starter one-way clutch sliding surface            Connecting rod nut threads            Clutch joint piece sliding surface            Clutch lifter rod surface            Clutch center lock nut threads            Clutch disc surface            Each gear teeth and rotating surface            Each bearing            Each O-ring            Other rotating area and sliding surface</p>	<p>Engine oil</p>	

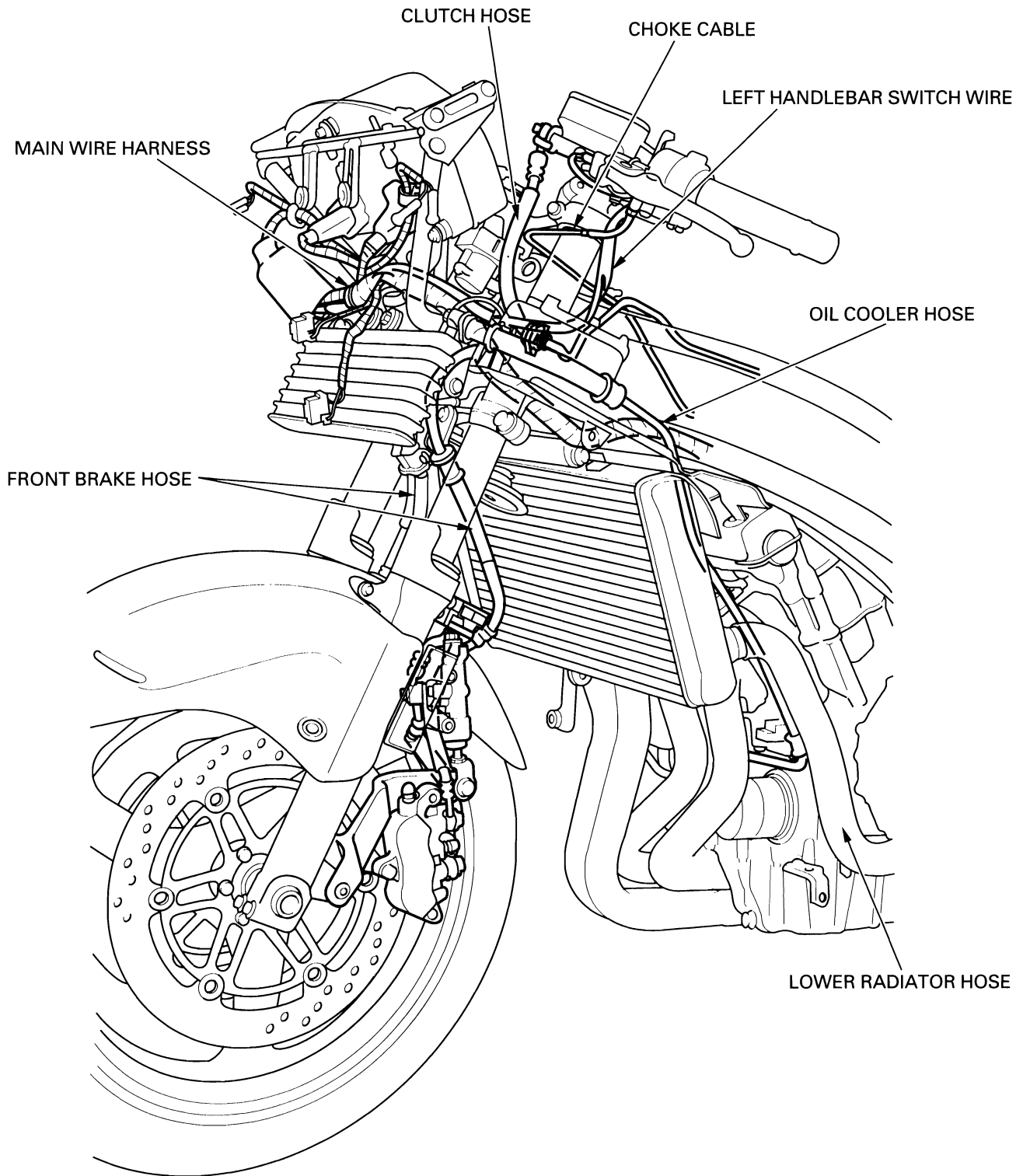
## GENERAL INFORMATION

ENGINE (Cont'd)		
LOCATION	MATERIAL	REMARKS
Crankshaft hole cap threads Balancer damper rubber fitting area Balancer timing hole cap threads Oil seal lips	Multi-purpose grease	
Cylinder head sealing bolt threads Cylinder head cover breather joint threads Balancer idle shaft set plate bolt threads Drive sprocket cover damper rubber bolt threads Lower crankcase sealing bolt threads Starter one-way clutch outer bolt threads Oil pump driven sprocket bolt threads Oil pass pipe bolt threads Oil filter boss threads Drive sprocket cover wire clamp bolt threads Shift drum set plate bolt threads Shift drum center bolt threads Mainshaft bearing set plate bolt threads Cam sprocket bolt threads Cylinder head cover breather plate bolt threads	Locking agent 	Coating width: $6.5 \pm 1$ mm $(0.26 \pm 0.04$ in)

FRAME	LOCATION	MATERIAL	REMARKS
	Steering head bearing sliding surface Steering head dust seal lips Swingarm pivot bearing Swingarm pivot dust seal lips Front wheel dust seal lips Rear wheel dust seal lips Rear wheel side collar inner surface Shock absorber needle bearing Shock absorber dust seal lips Shock link needle bearing Shock link dust seal lips Footpeg sliding area Passenger footpeg sliding area Left front brake caliper pivot bearing sliding surface Left front brake caliper pivot oil seal sliding surface Left fork needle bearing sliding surface Left fork dust seal sliding surface Throttle pipe sliding area Seat catch hook	Multi-purpose grease	
	Side stand pivot surface Main stand pivot surface	Molybdenum disulfide grease	
	Shock absorber spring adjuster cam surface	Molybdenum paste	
	Steering stem top thread Throttle cable 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	
	Brake caliper slide pin threads Rear master cylinder hose joint screw threads Fork socket bolt threads Driven sprocket stud bolt threads	Locking agent	
	Handle grip rubber inside	Honda Bond A or Honda Hand Grip Cement (U.S.A. only)	
	Fork cap O-ring Fork oil seal lips	Pro-Honda Suspension Fluid SS-8	

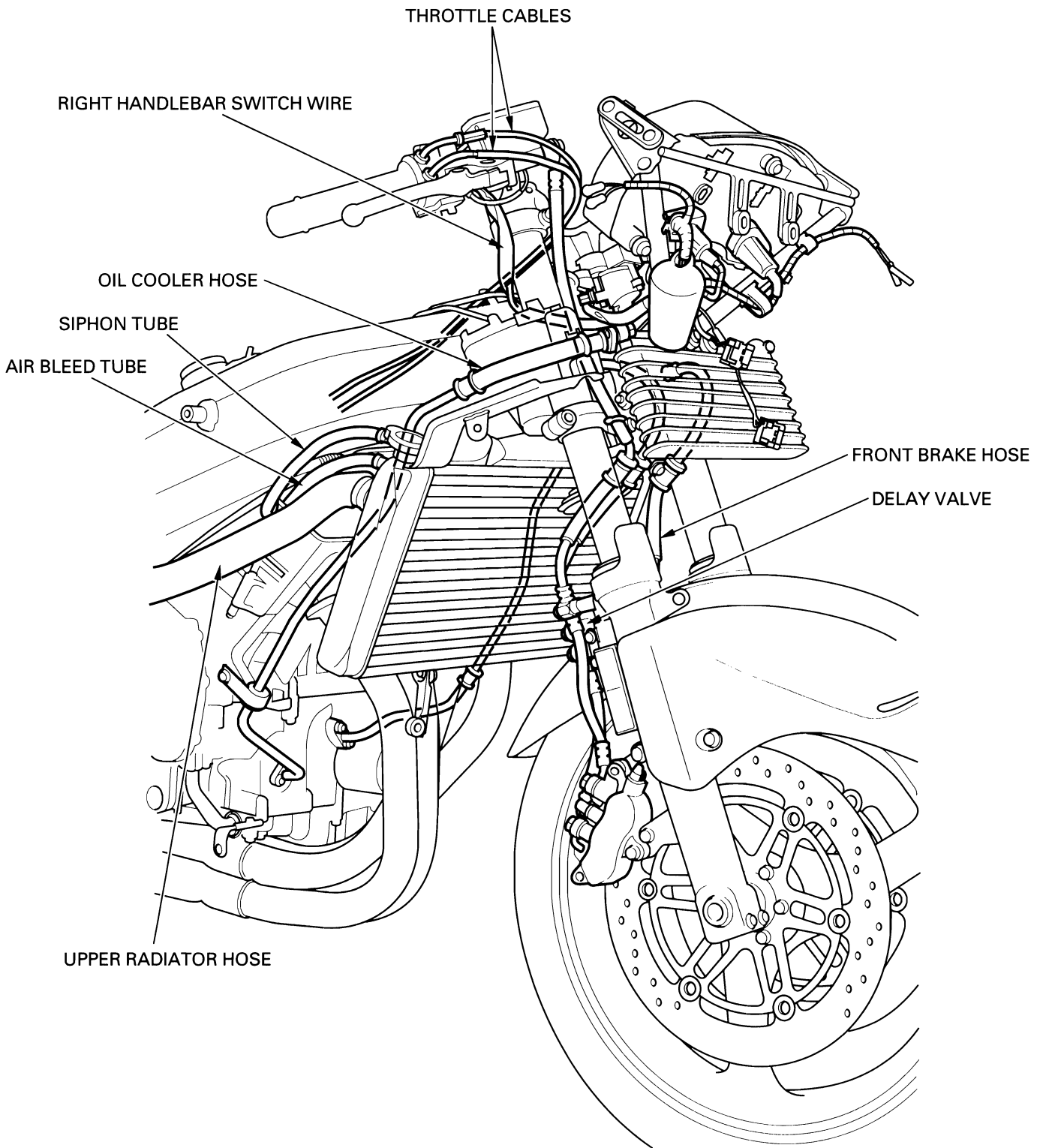
CABLE & HARNESS ROUTING



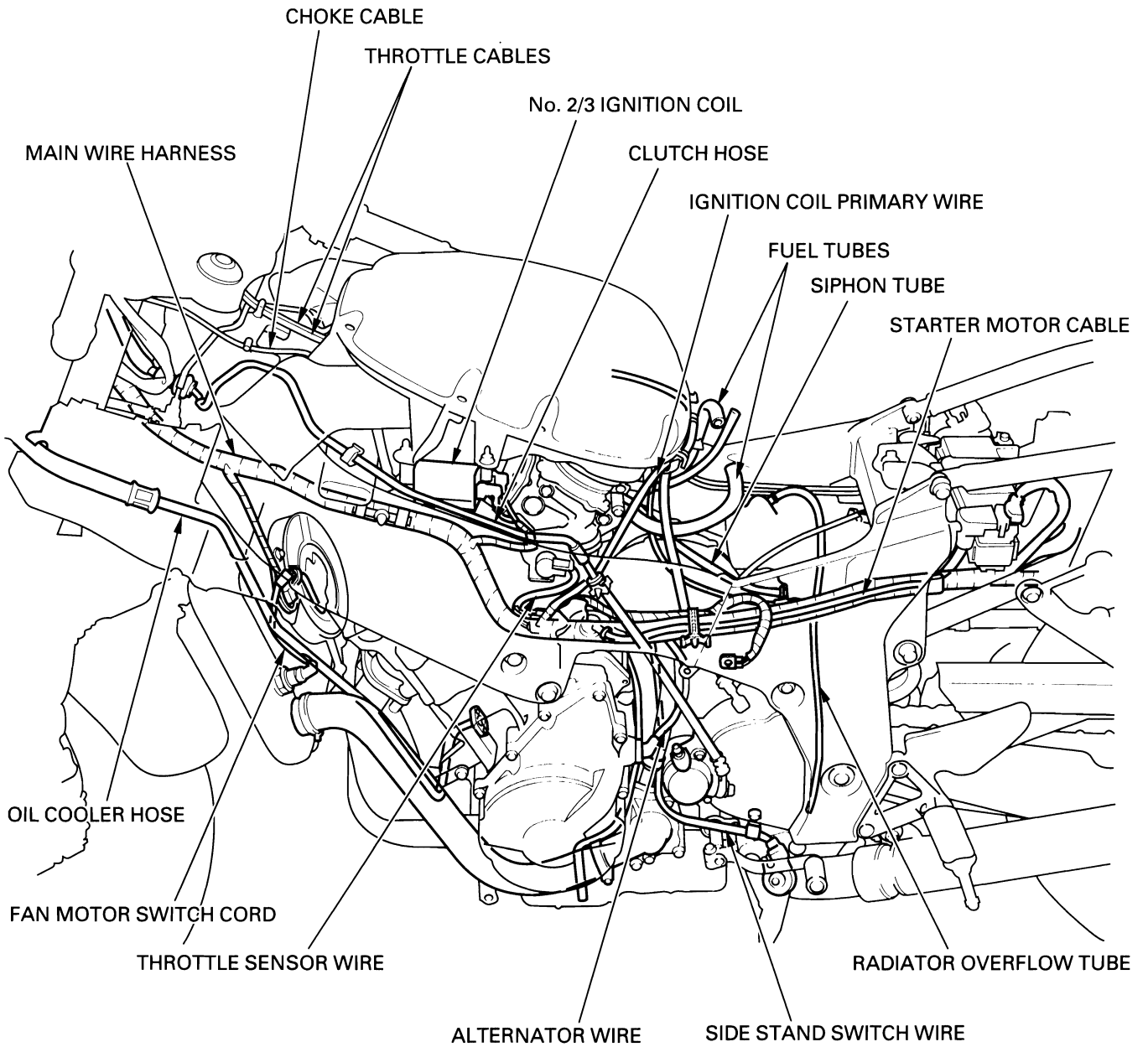


## GENERAL INFORMATION

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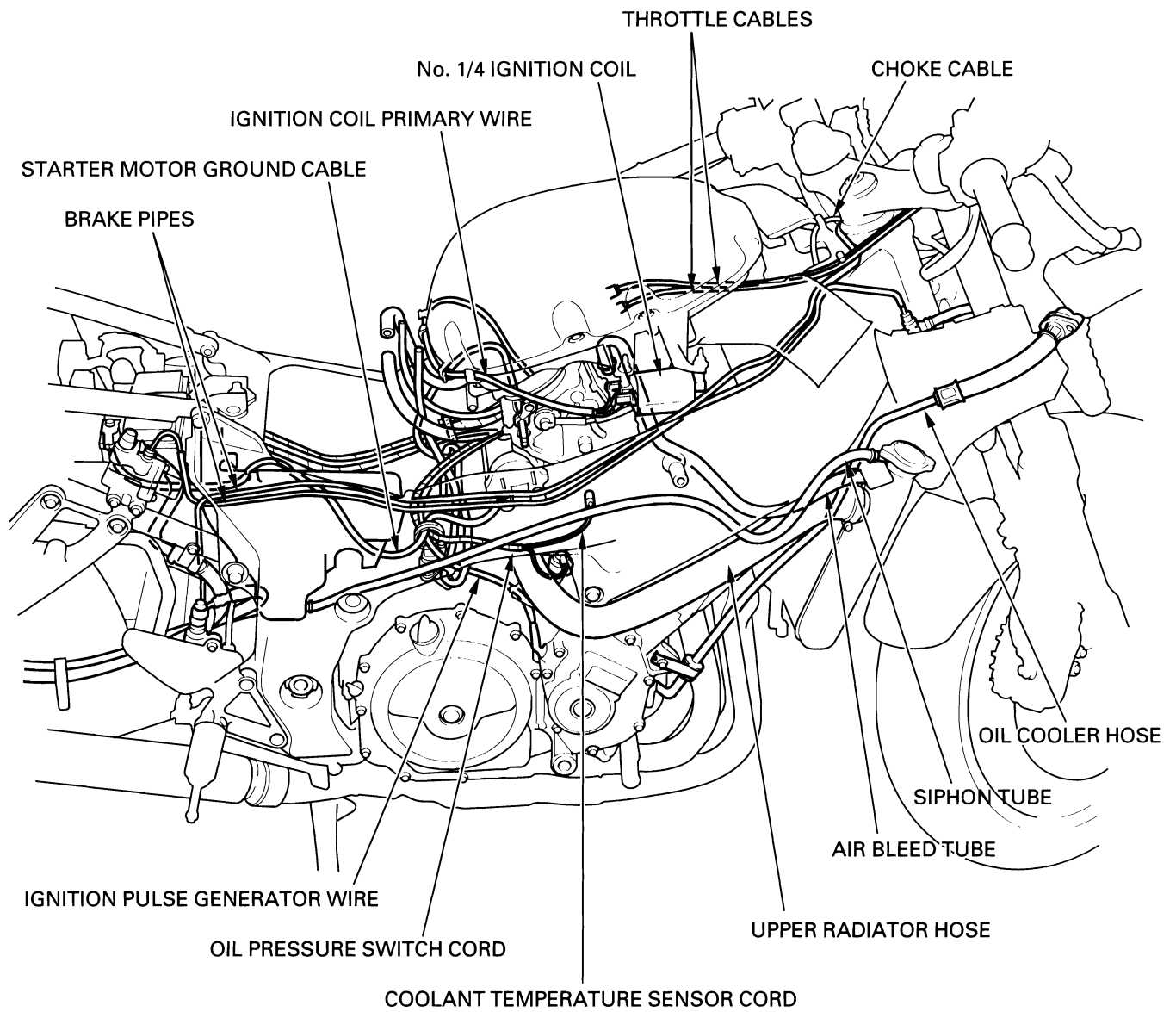


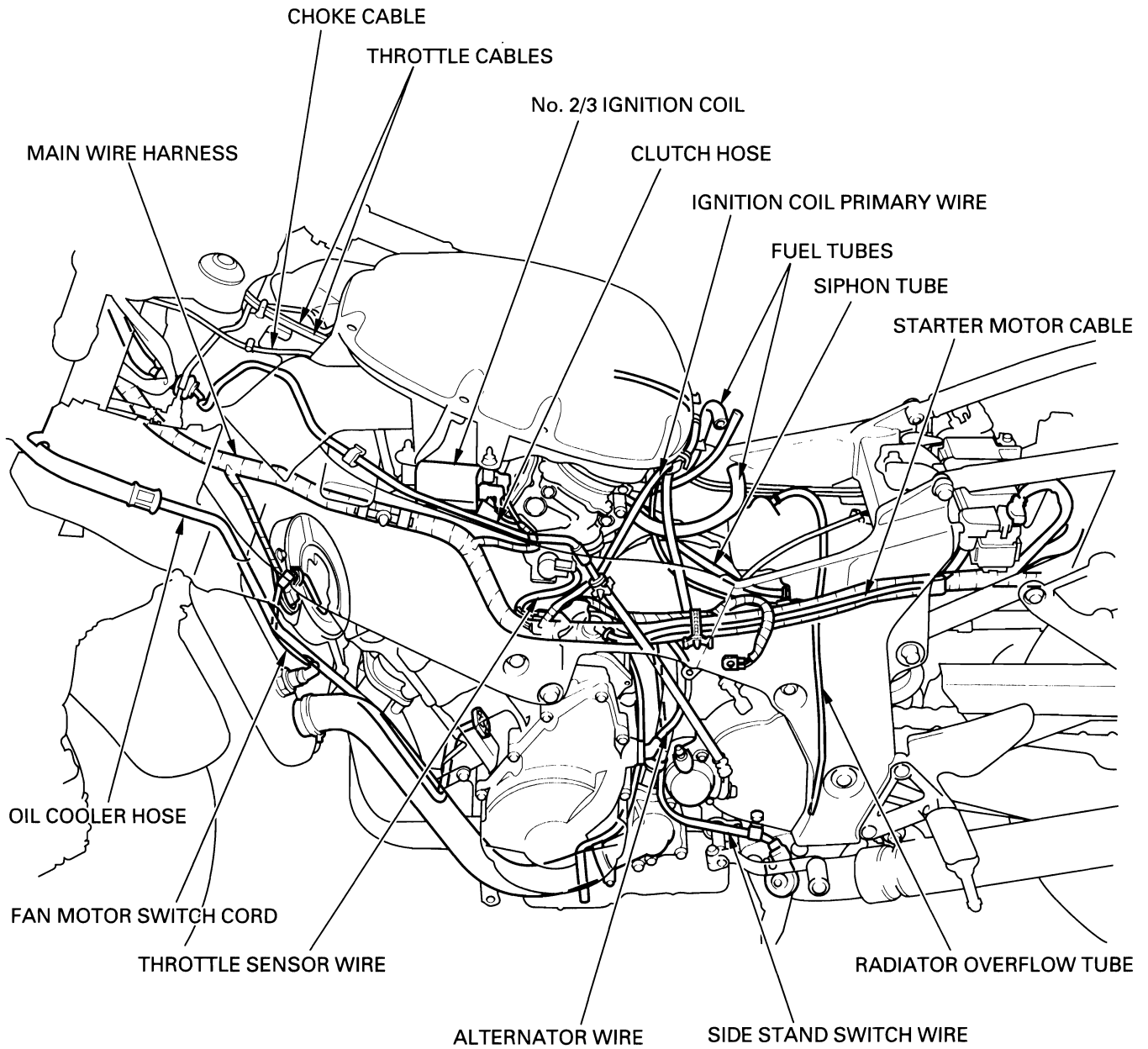




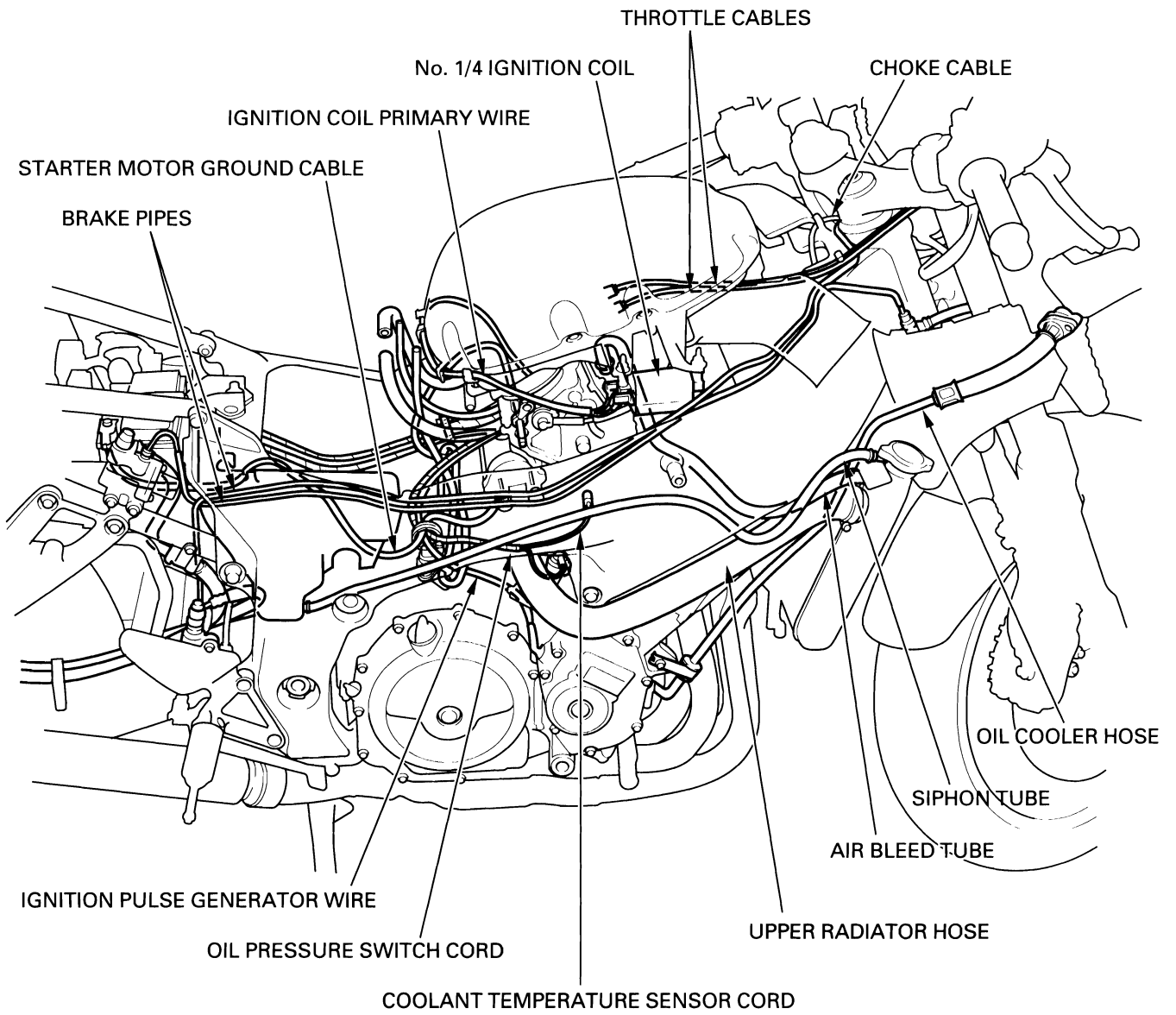
## GENERAL INFORMATION

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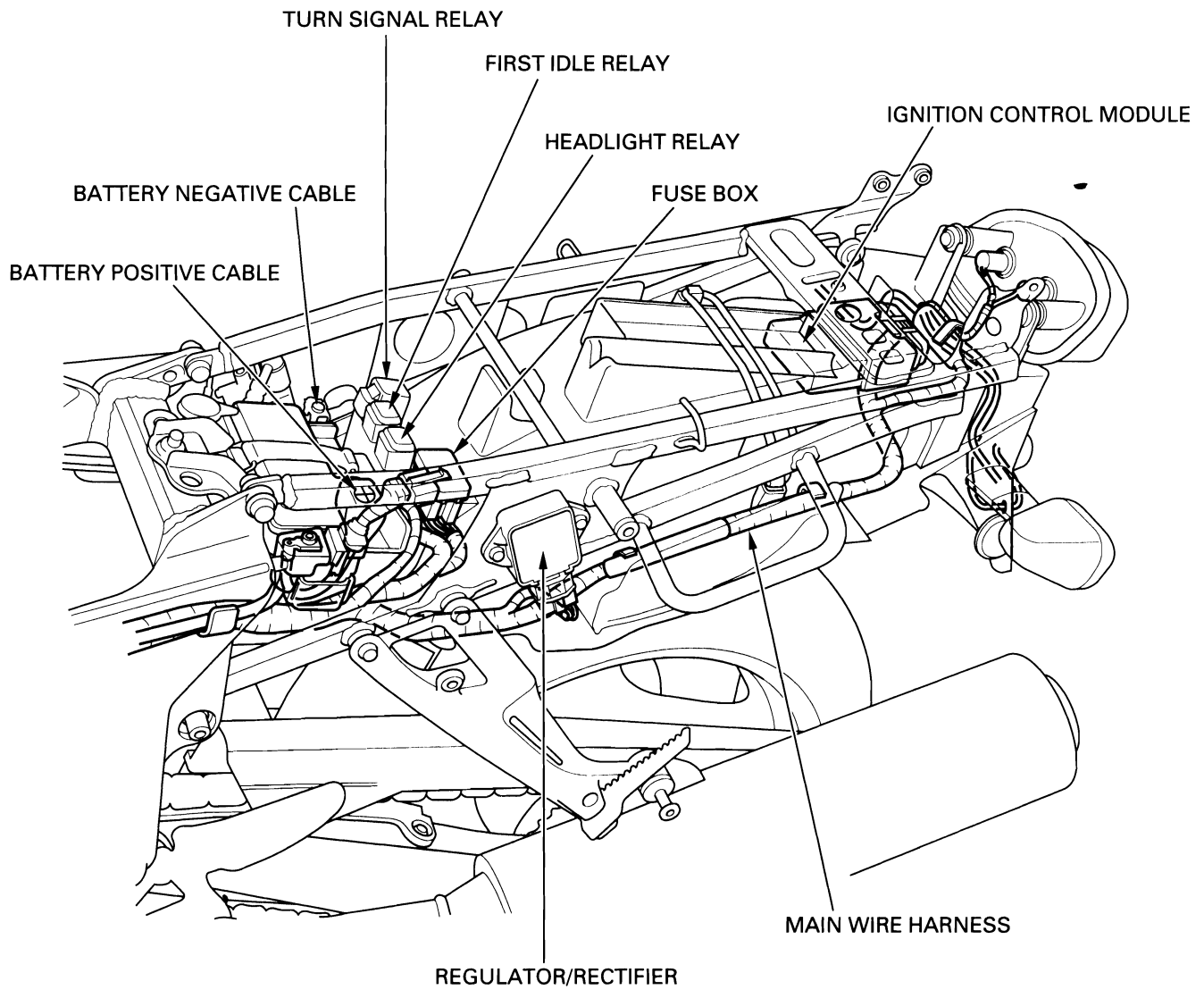


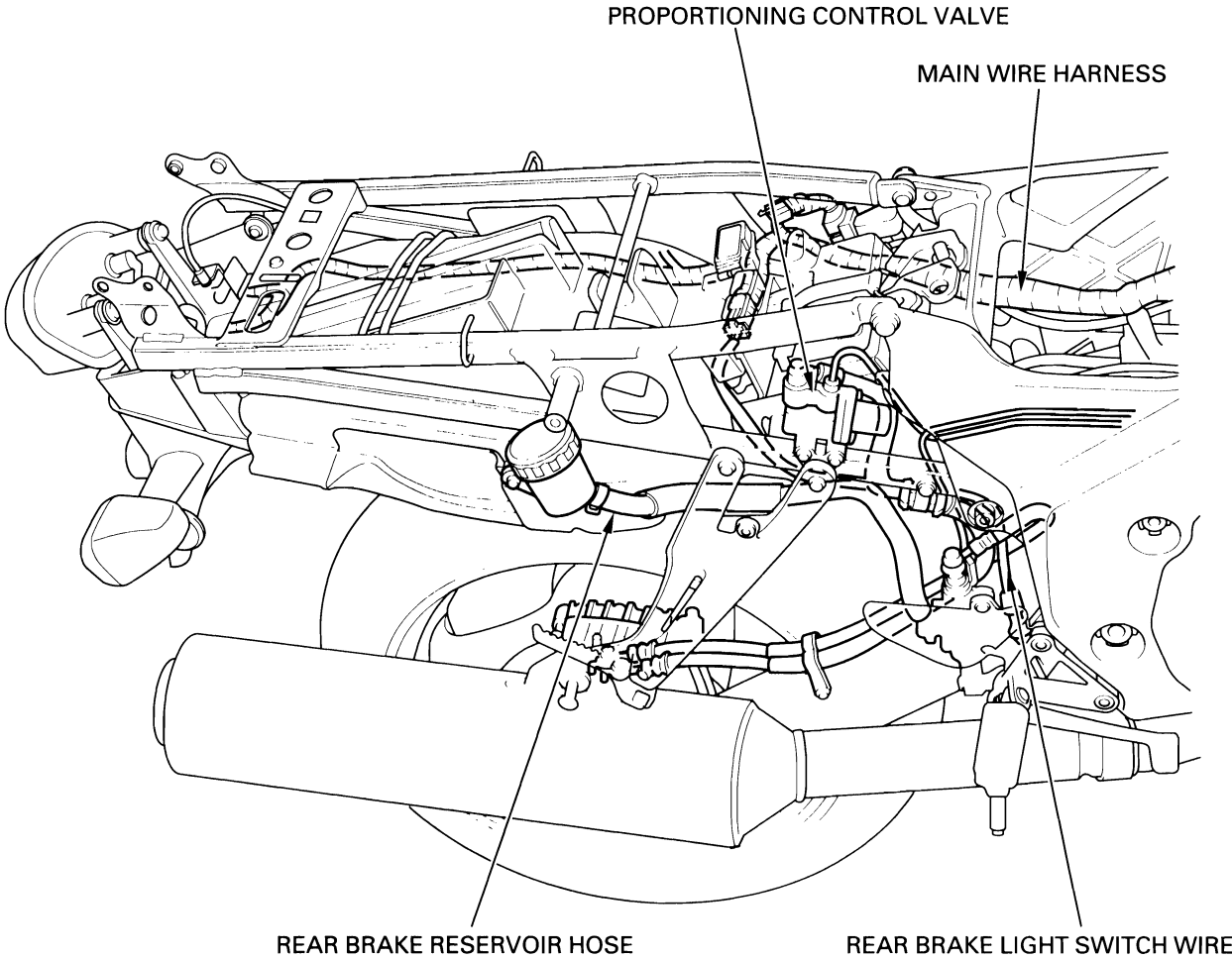
# GENERAL INFORMATION



# GENERAL INFORMATION

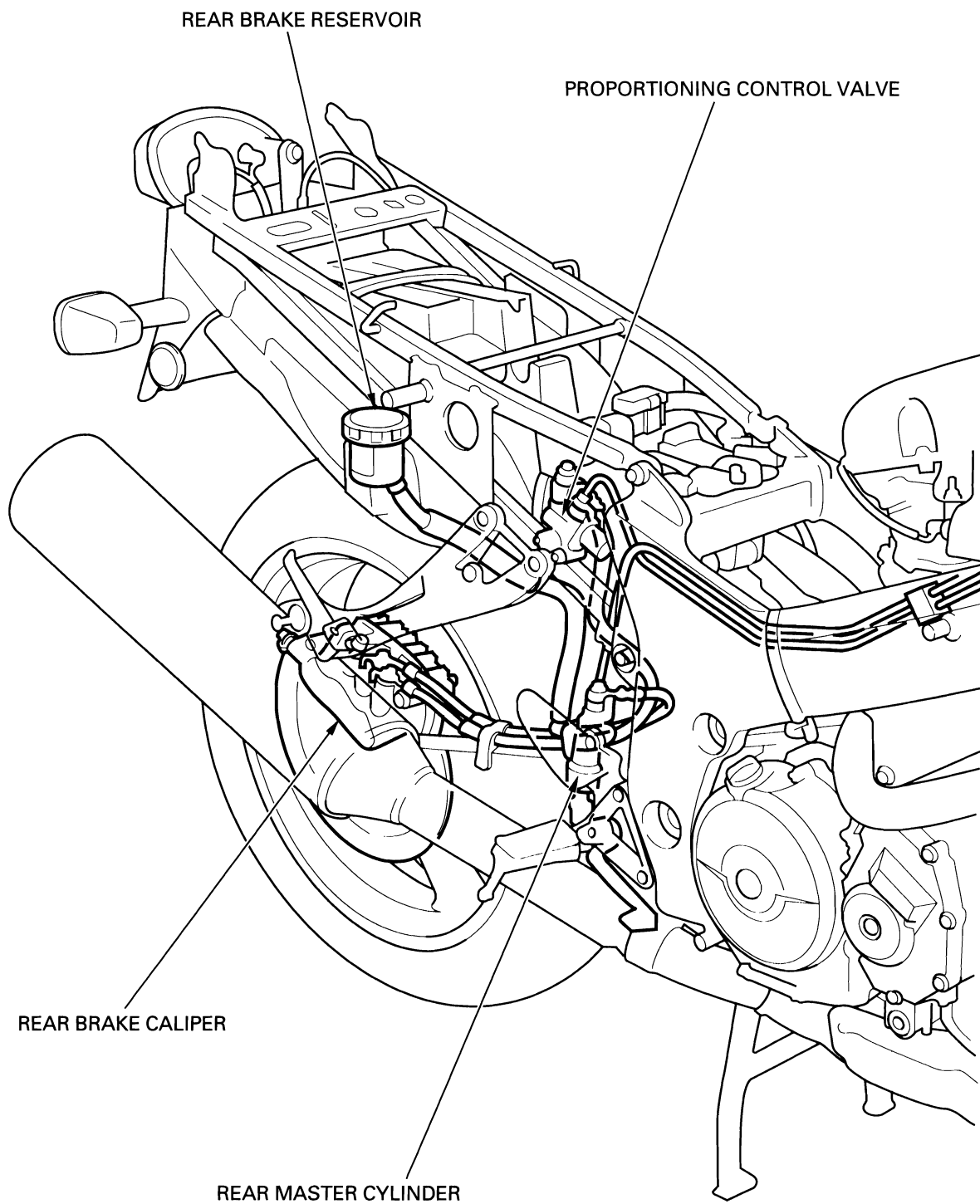
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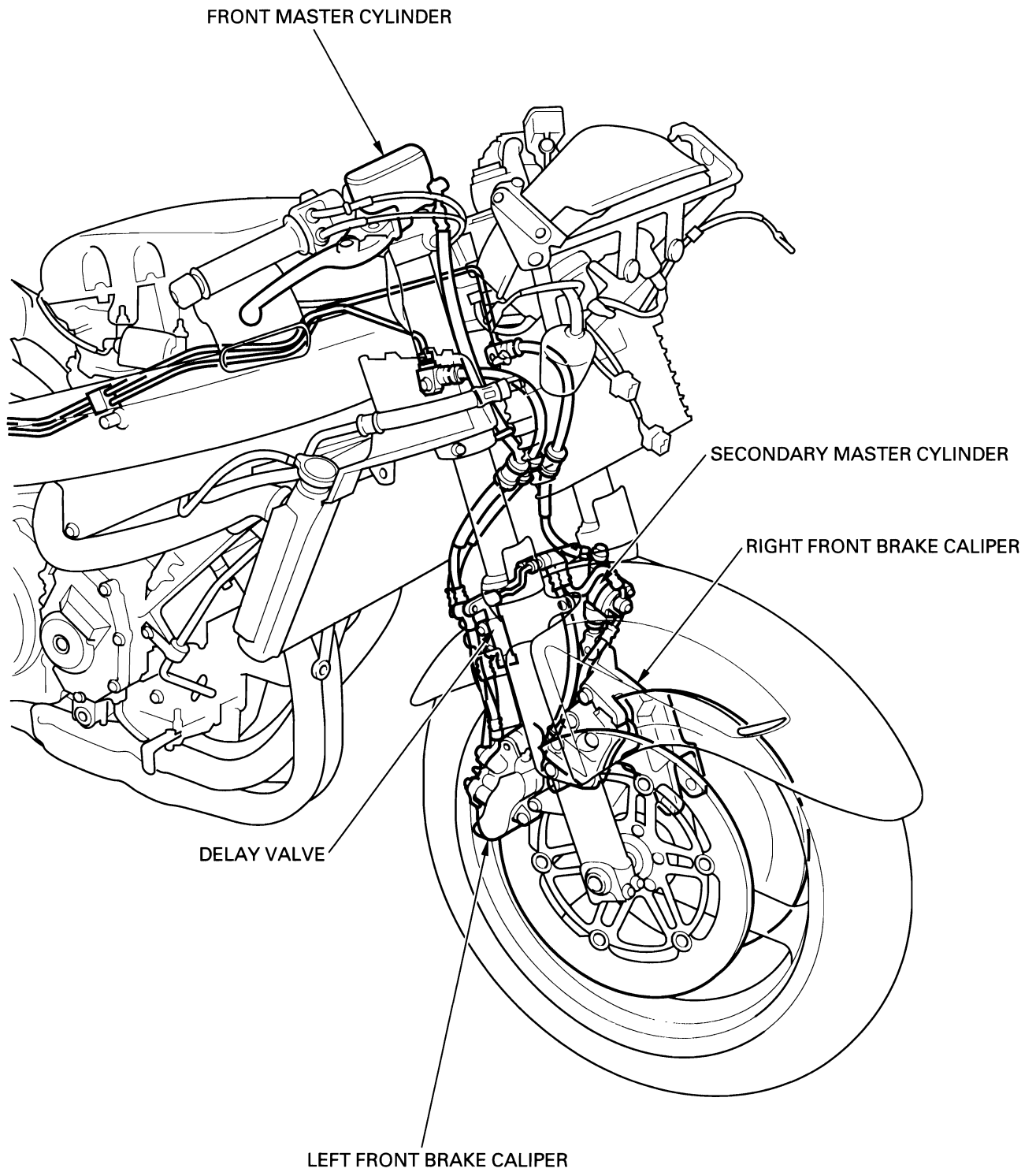


## GENERAL INFORMATION

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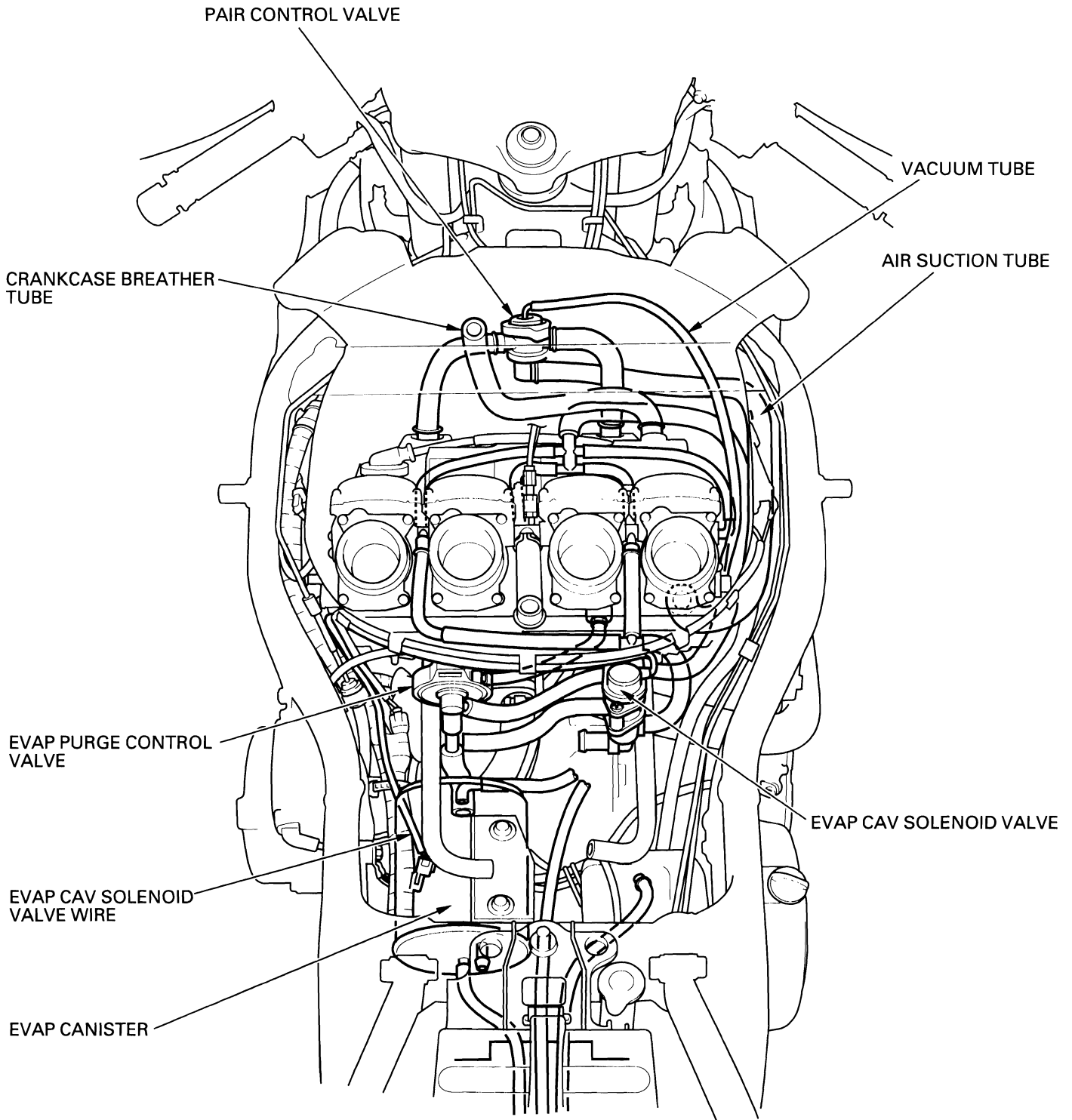


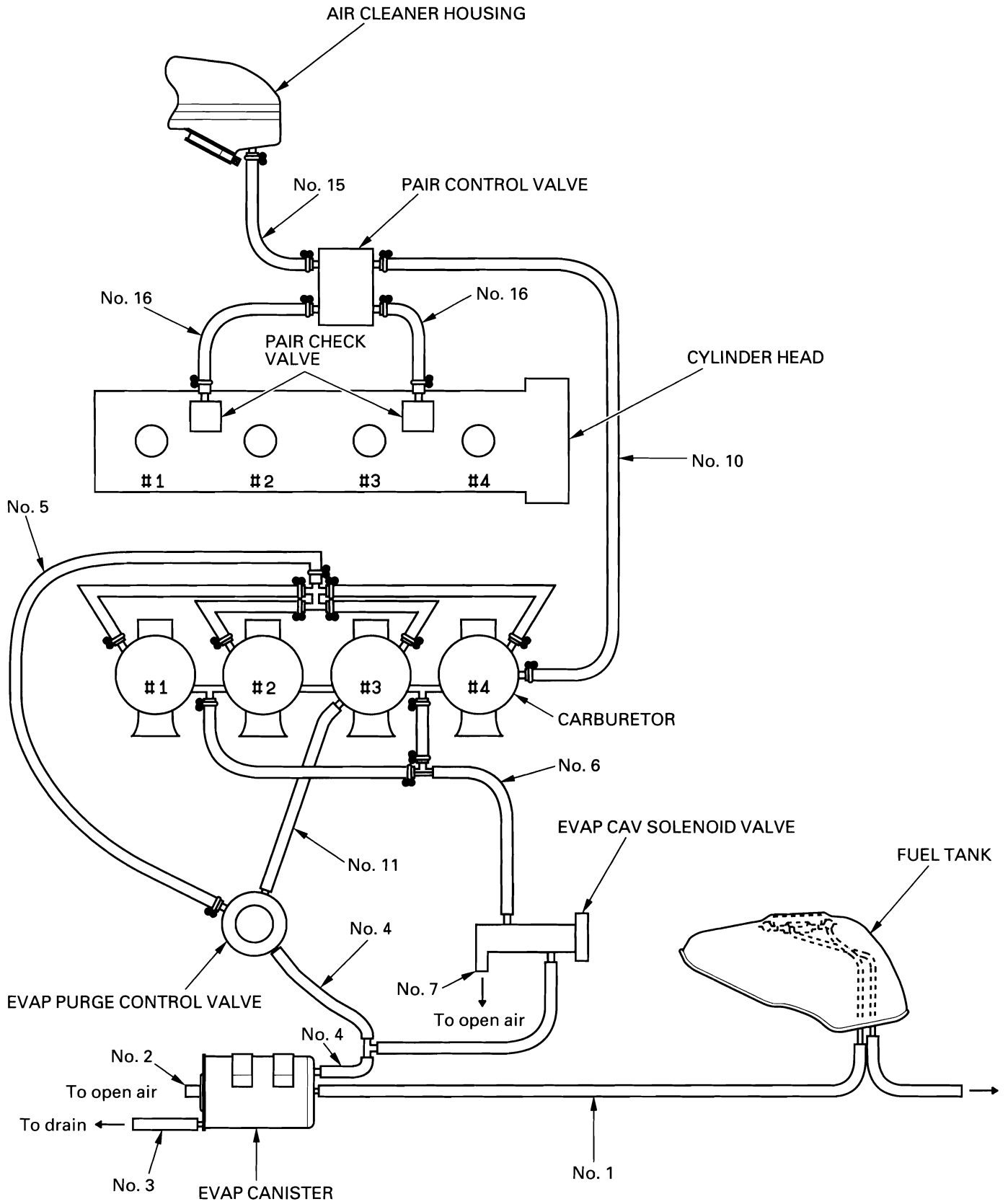




# GENERAL INFORMATION

## CALIFORNIA TYPE:





## GENERAL INFORMATION

### EMISSION CONTROL SYSTEMS

The U.S. Environmental Protection Agency and California Air Resources Board (CARB) 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.

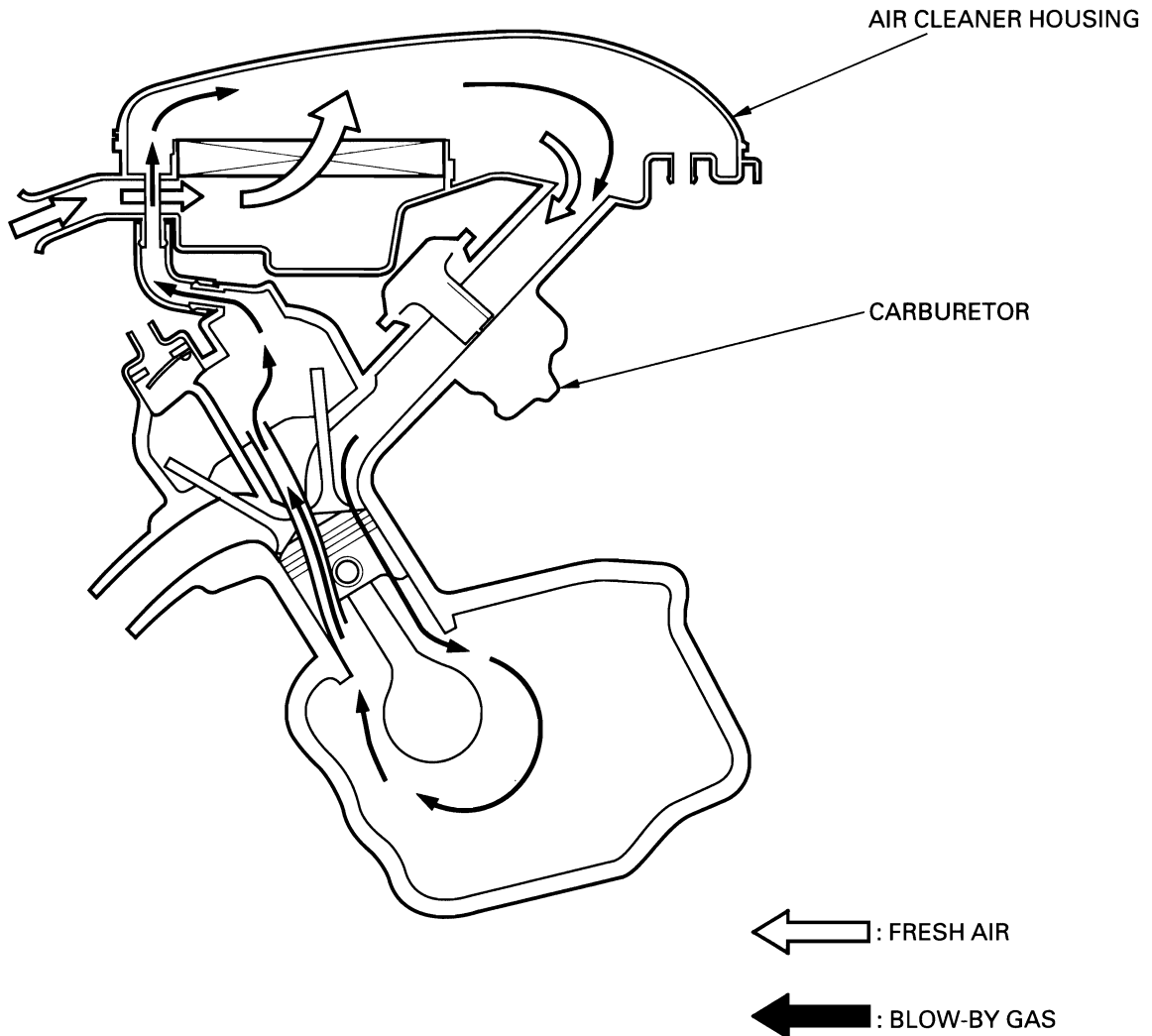
#### SOURCE OF EMISSIONS

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 carburetor settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

#### CRANKCASE EMISSION CONTROL SYSTEM

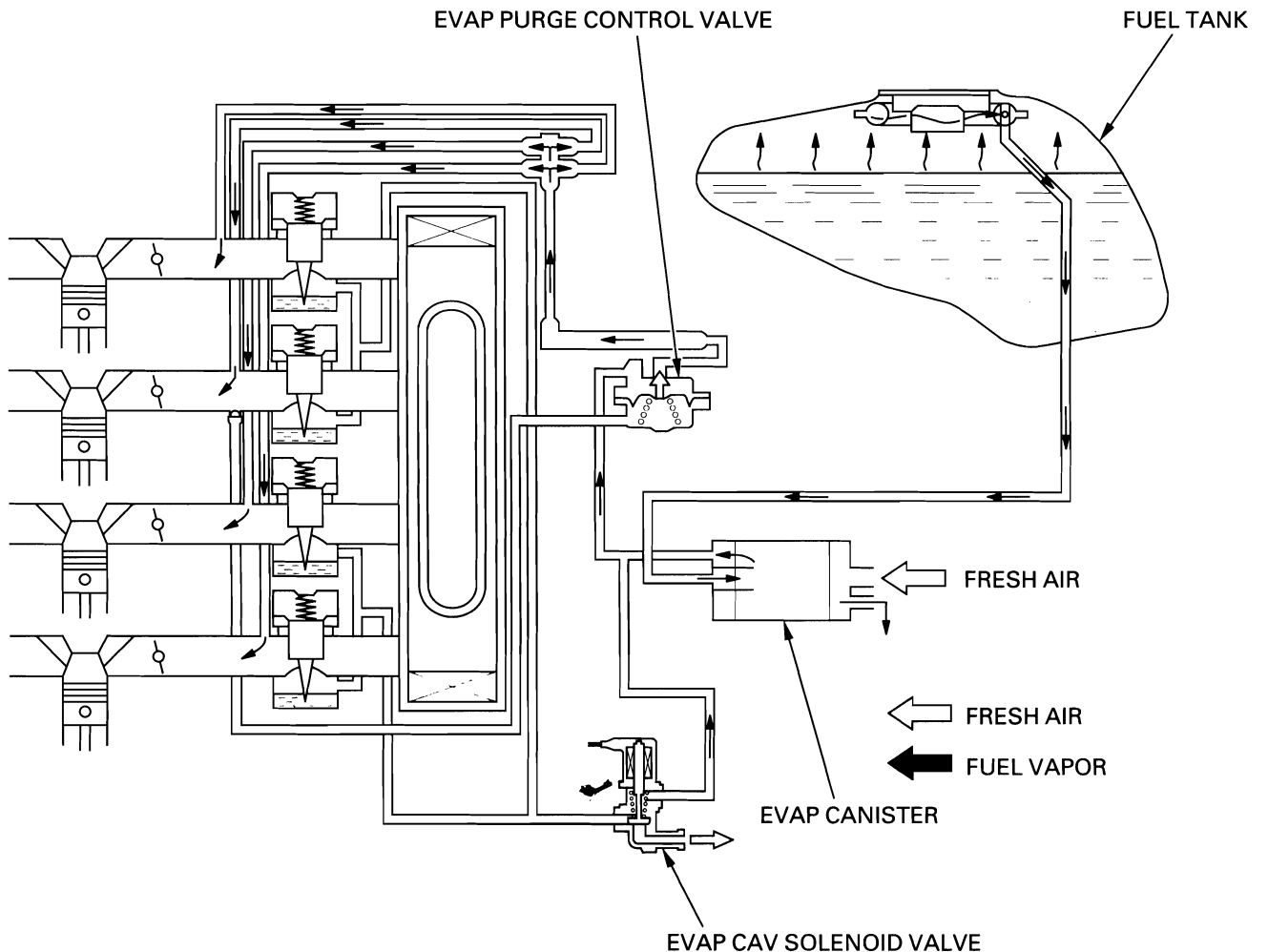
The engine is equipped with a closed crankcase system to prevent discharging crankcase emissions into the atmosphere. Blow-by gas is returned to the combustion chamber through the air cleaner and carburetor.



**EVAPORATIVE EMISSION CONTROL SYSTEM (CALIFORNIA TYPE ONLY)**

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

Fuel vapor from the fuel tank and carburetors 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 valve is open, fuel vapor in the EVAP canister is drawn into the engine through the carburetor. At the same time, the EVAP carburetor air vent (CAV) solenoid valve is open and air is drawn into the carburetor through the valve.



**NOISE EMISSION CONTROL SYSTEM**

**TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED:** Federal 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.

## GENERAL INFORMATION

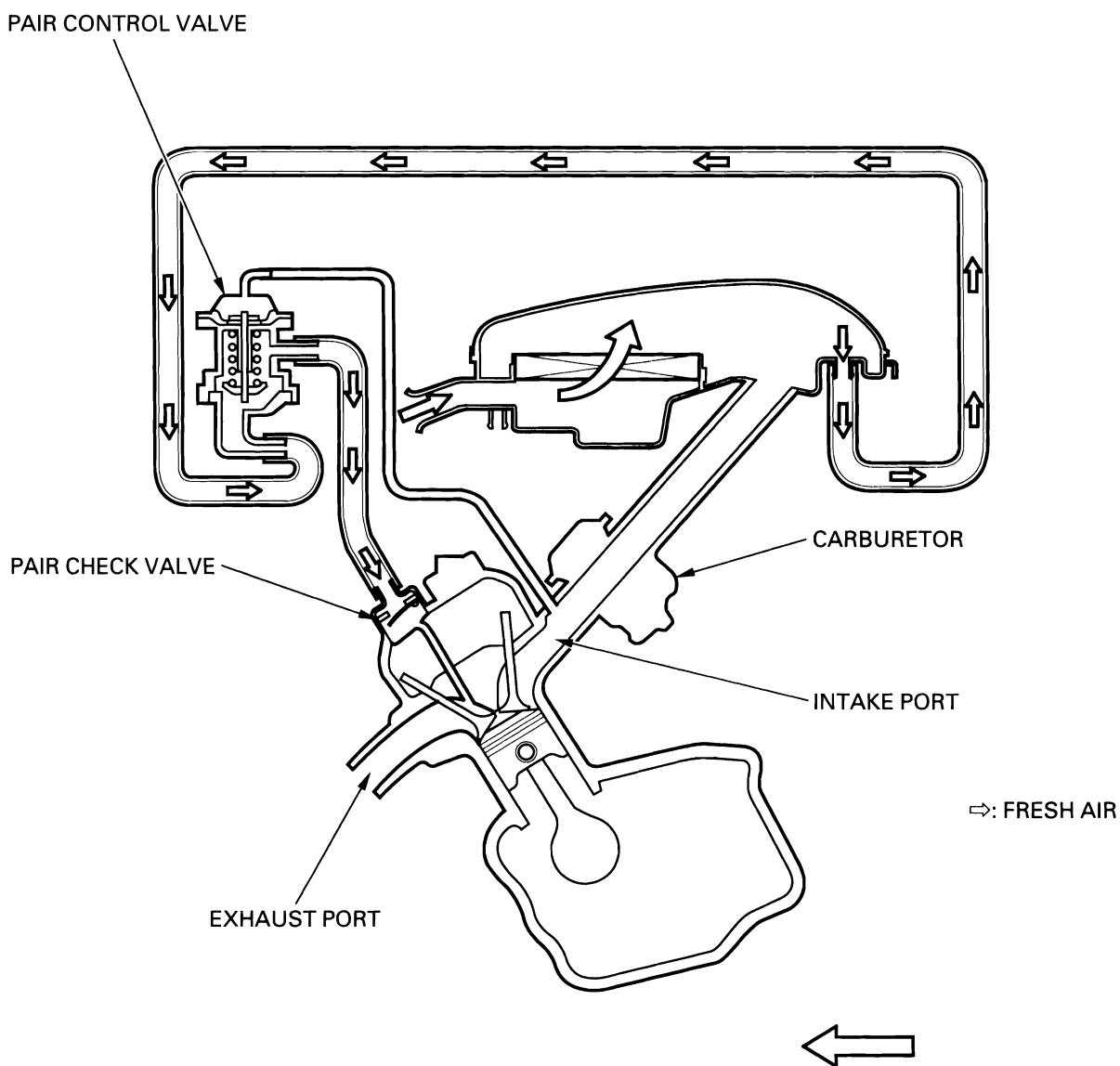
### EXHAUST EMISSION CONTROL SYSTEM (PULSE SECONDARY AIR INJECTION SYSTEM)

The exhaust emission control system uses a lean carburetor setting and no adjustment should be made except idle speed adjustment with the throttle stop screw.

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 whenever there is a negative pressure pulse in the exhaust system. 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.

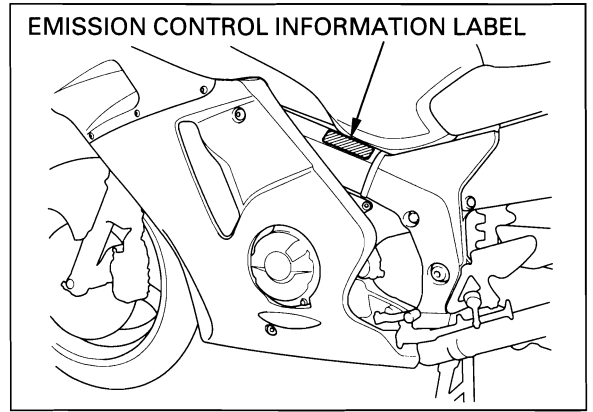
This model has the pulse secondary air injection (PAIR) control valve; it consists of check valves built into the cylinder head cover. A pulse secondary air injection (PAIR) check valve prevents reverse air flow through the system. The pulse secondary air injection (PAIR) control valve reacts to high intake manifold vacuum and will cut off the supply of fresh air during engine deceleration, thereby preventing afterburn in the exhaust system.

No adjustment to the pulse secondary air injection system should be made, although periodic inspection of the components is recommended.



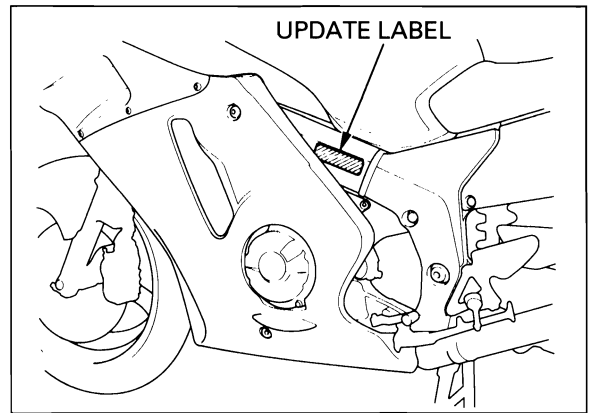
## EMISSION CONTROL INFORMATION LABELS

An Emission Control Information Label is located on the left side of the main frame as shown. It gives base tune-up specifications.



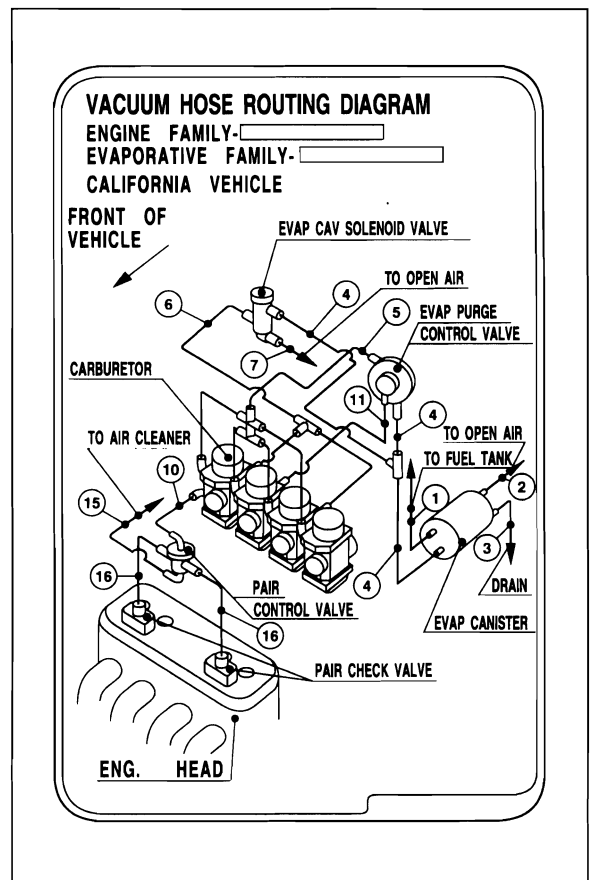
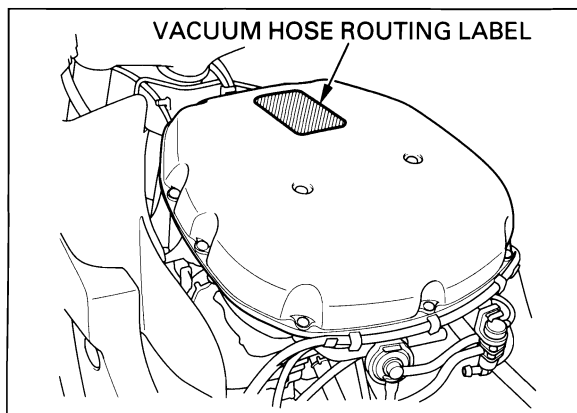
## VEHICLE EMISSION CONTROL INFORMATION UPDATE LABEL

After making a high altitude carburetor adjustment, attach an update label on the right side of the main frame as shown. Instructions for obtaining the update label are given in Service Letter No. 132. When readjusting the carburetors back to the low altitude specifications, be sure to remove this update label.

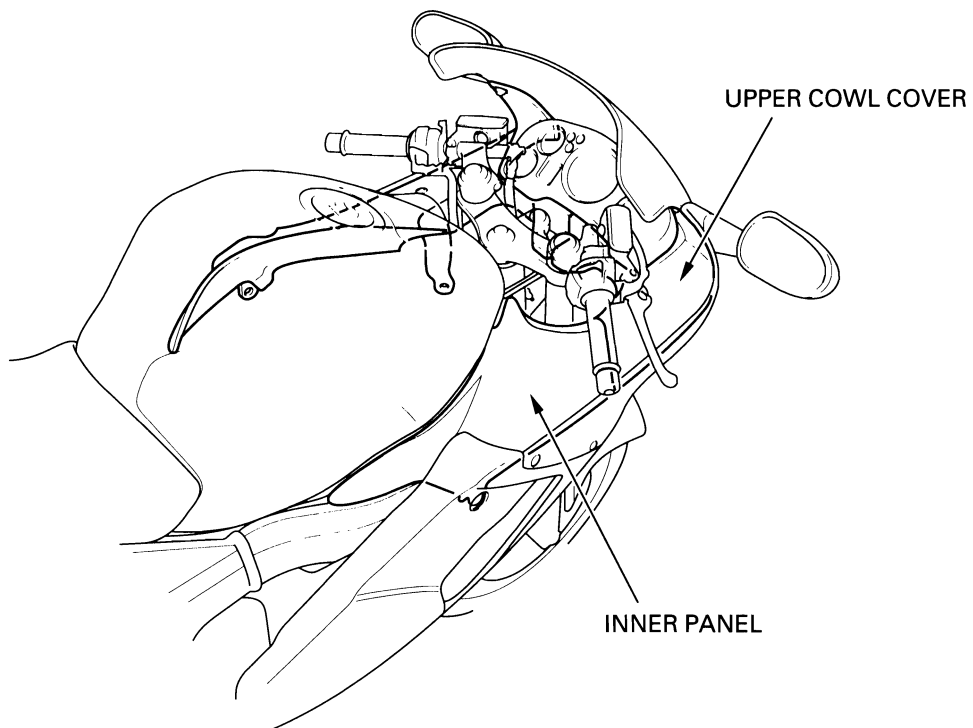
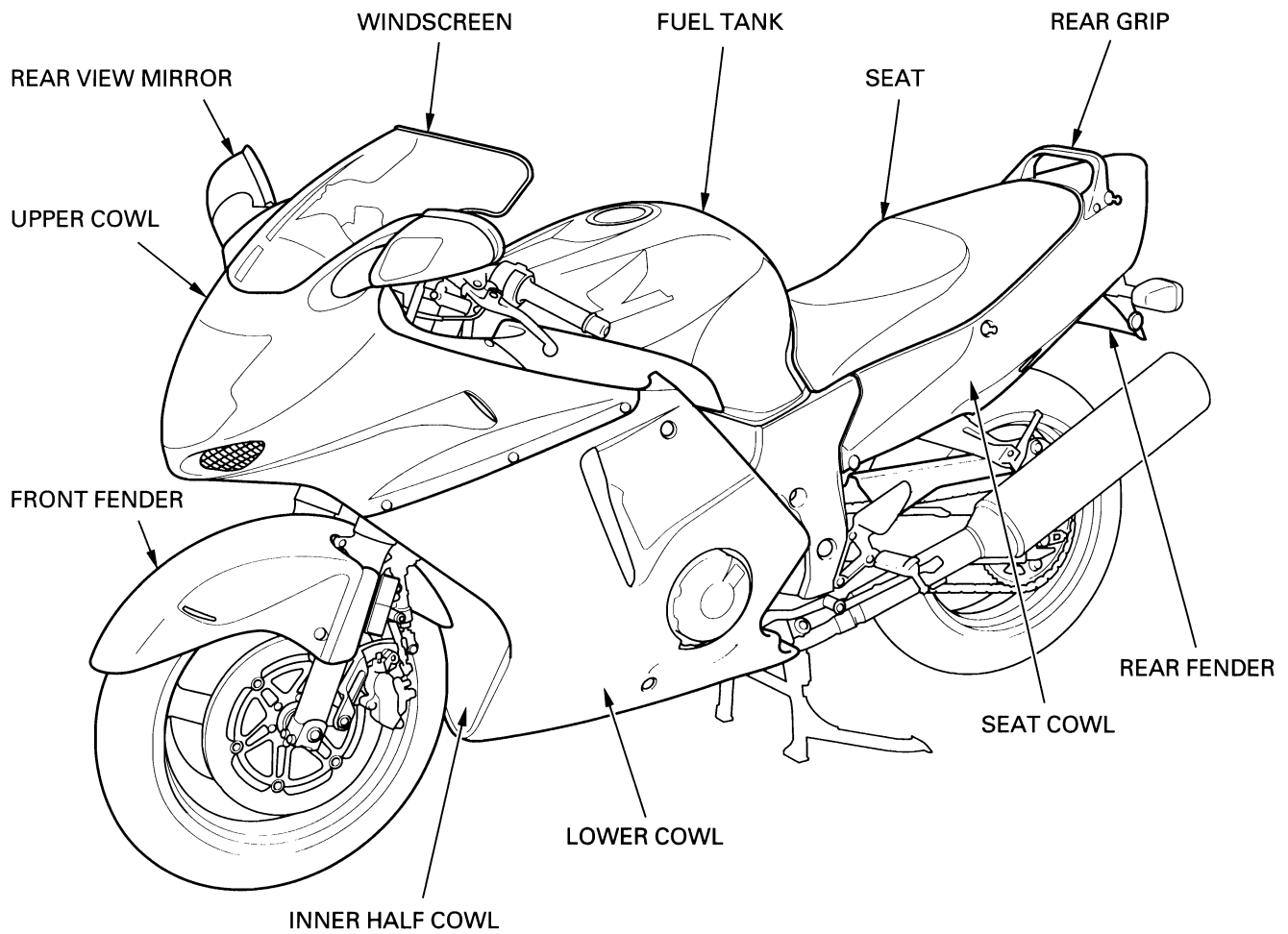


## VACUUM HOSE ROUTING DIAGRAM LABEL (CALIFORNIA TYPE ONLY)

The Vacuum Hose Routing Diagram Label is on the air cleaner housing cover as shown. The fuel tank must be removed to read it. Refer to page 2-2 for fuel tank removal.



BODY PANEL LOCATIONS





# 2. FRAME/BODY PANELS/EXHAUST SYSTEM

BODY PANEL LOCATIONS	2-0	UPPER COWL COVER/INNER PANEL	2-8
SERVICE INFORMATION	2-1	UPPER COWL	2-11
TROUBLESHOOTING	2-1	FRONT FENDER	2-15
SEAT/FUEL TANK	2-2	REAR FENDER	2-16
SEAT COWL	2-5	SEAT RAIL	2-19
LOWER COWL	2-7	MUFFLER/EXHAUST PIPE	2-21

## SERVICE INFORMATION

### GENERAL

**▲WARNING**

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

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

### TORQUE VALUES

Main footpeg holder socket bolt	26 N·m (2.7 kgf·m , 20 lbf·ft)
Pillion footpeg holder bolt	26 N·m (2.7 kgf·m , 20 lbf·ft)
Bank sensor	22 N·m (2.2 kgf·m , 16 lbf·ft)
Exhaust pipe joint nut	21 N·m (2.1 kgf·m , 15 lbf·ft)
Muffler band bolt	26 N·m (2.7 kgf·m , 20 lbf·ft)
Muffler bracket bolt	26 N·m (2.7 kgf·m , 20 lbf·ft)
Seat rail mounting bolt	39 N·m (4.0 kgf·m , 29 lbf·ft)

## TROUBLESHOOTING

#### Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

#### Poor performance

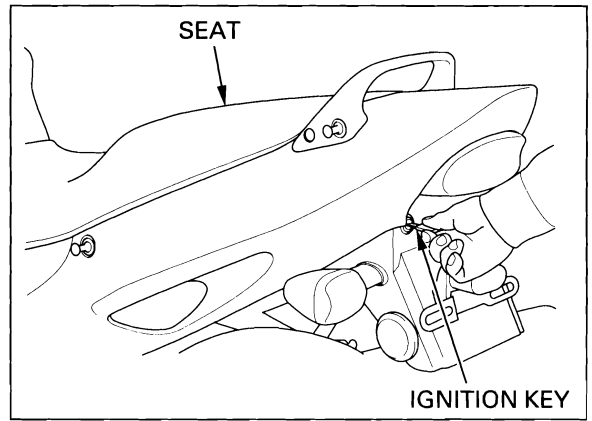
- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

## SEAT/FUEL TANK

### REMOVAL

Unlock the seat using the ignition key.

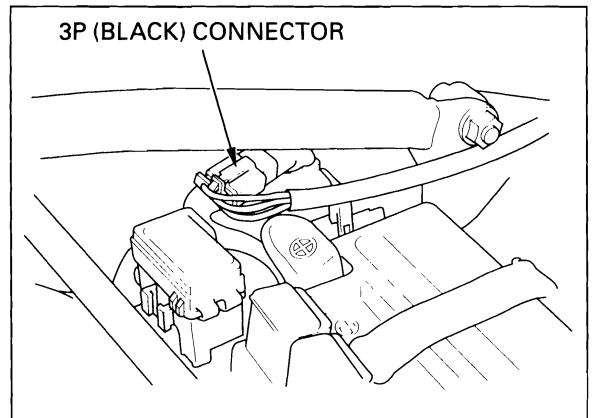
Remove the seat by sliding it rearward.



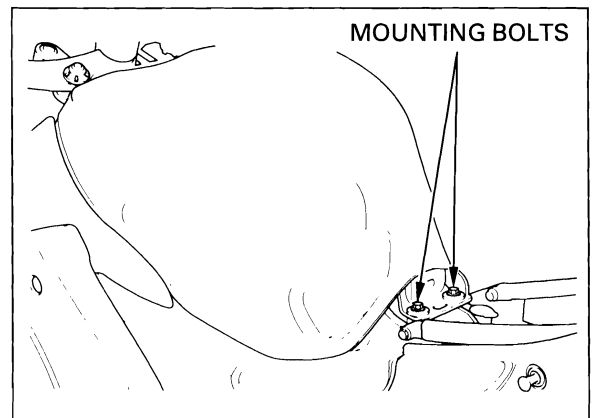
### ▲WARNING

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

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



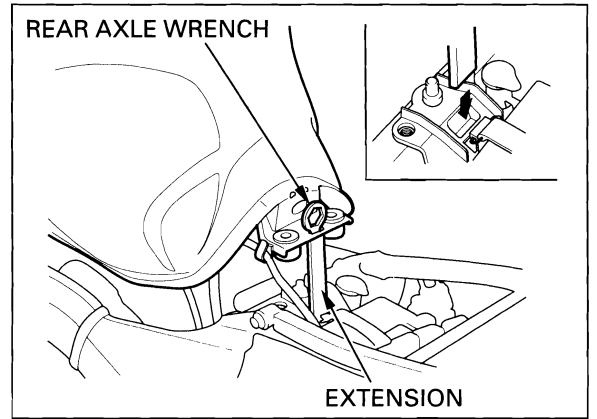
Remove the fuel tank mounting bolts.



Release the inner panel bosses from the fuel tank.



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

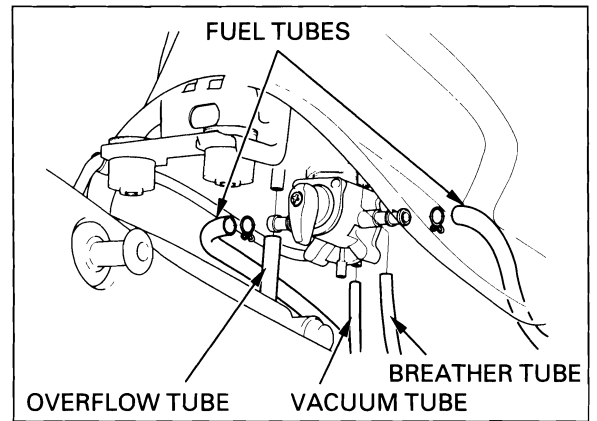


Turn the fuel valve OFF.

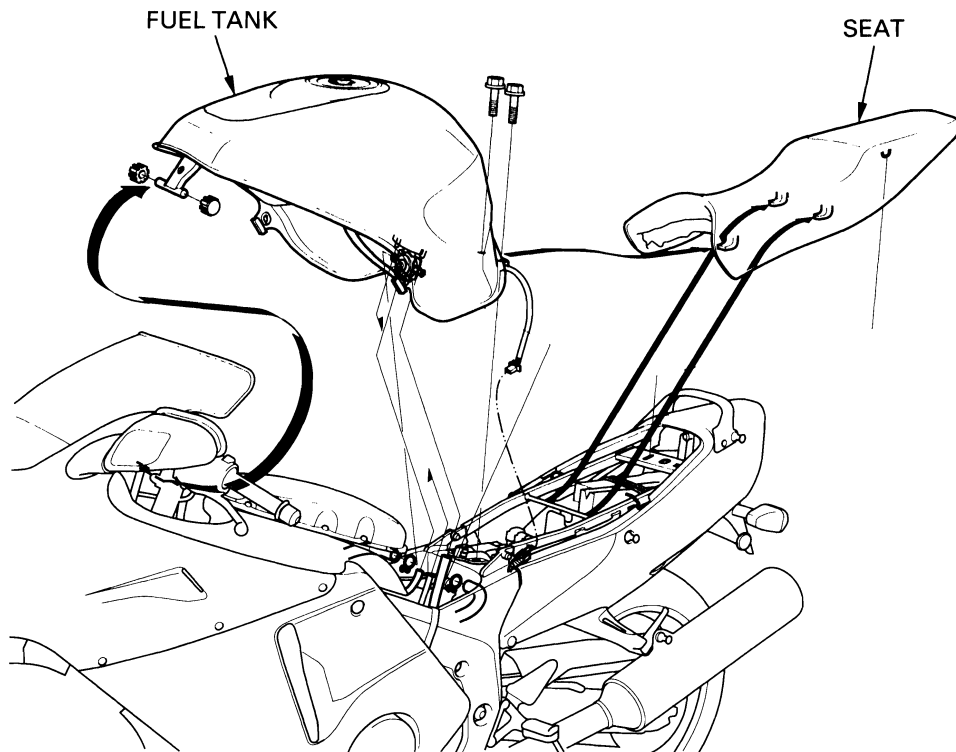
Disconnect the following:

- Fuel tubes
- Fuel valve vacuum tube
- Fuel tank overflow tube
- Fuel tank breather tube

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



## INSTALLATION

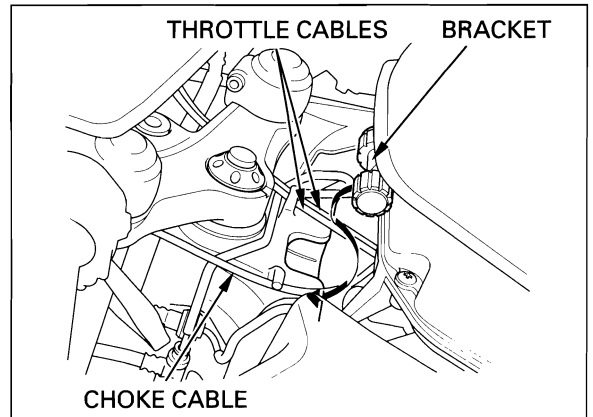


## FRAME/BODY PANELS/EXHAUST SYSTEM

Install the fuel tank front bracket into the frame.

**CAUTION:**

***Be careful not to pinch the choke and throttle cables.***

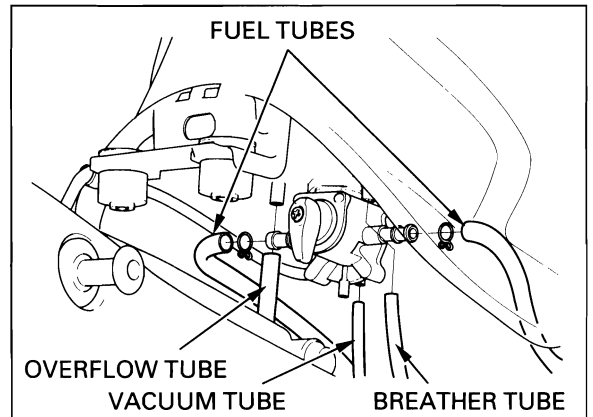


Support the fuel tank and connect the following:

- Fuel tank breather tube
- Fuel tank overflow tube
- Fuel valve vacuum tube
- Fuel tubes

**NOTE:**

- Route the tubes properly.
- After installation, turn the fuel valve ON and make sure there are no fuel leaks.

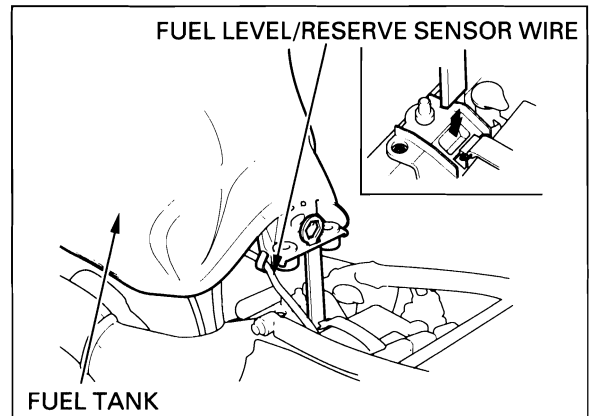


Route the fuel level/reserve sensor unit wire.

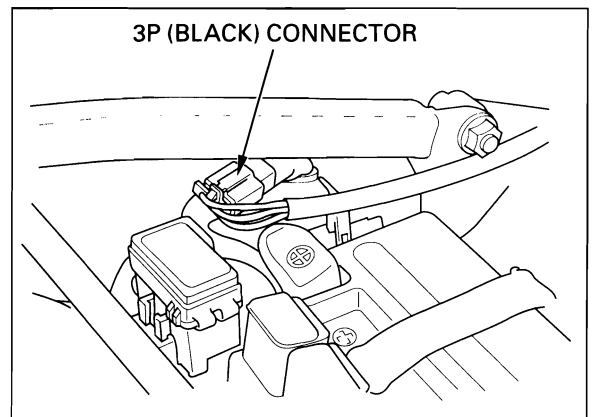
Remove the fuel tank support and lower the fuel tank.

**CAUTION:**

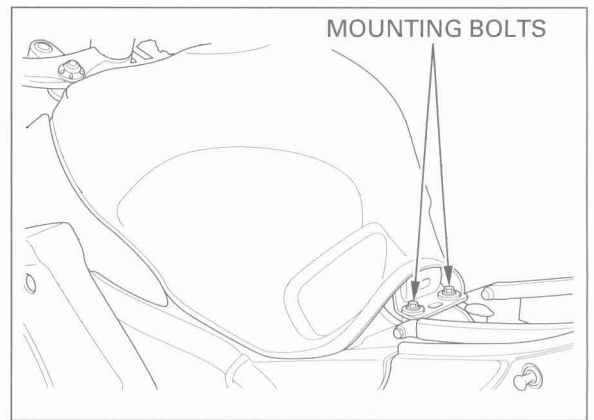
***Be careful not to damage the inner panel bosses.***



Connect the fuel level/reserve sensor 3P (Black) connector.



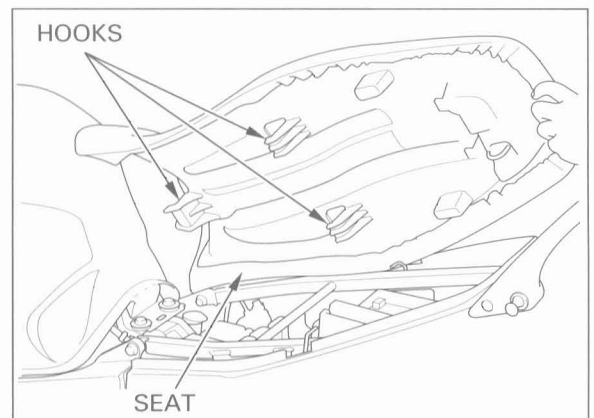
Install and tighten the fuel tank mounting bolts.



Install the inner panel bosses into the fuel tank grommets.



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



## SEAT COWL

### REMOVAL

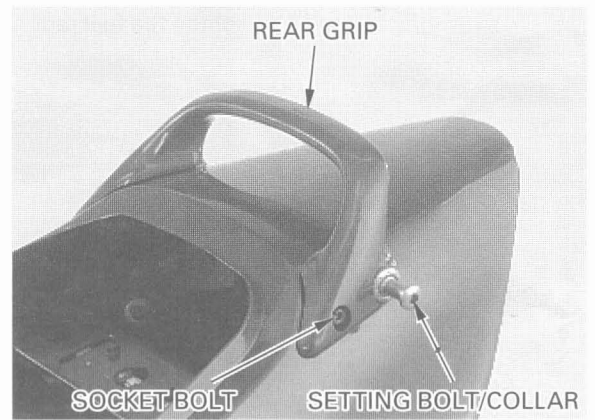
Remove the seat (page 2-2).

Remove the rear grip mounting bolt caps.



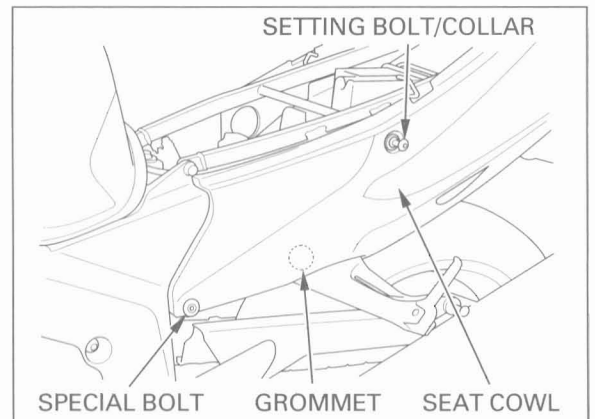
## FRAME/BODY PANELS/EXHAUST SYSTEM

Remove the two socket bolts  
Remove the setting bolts, collars and rear grip.



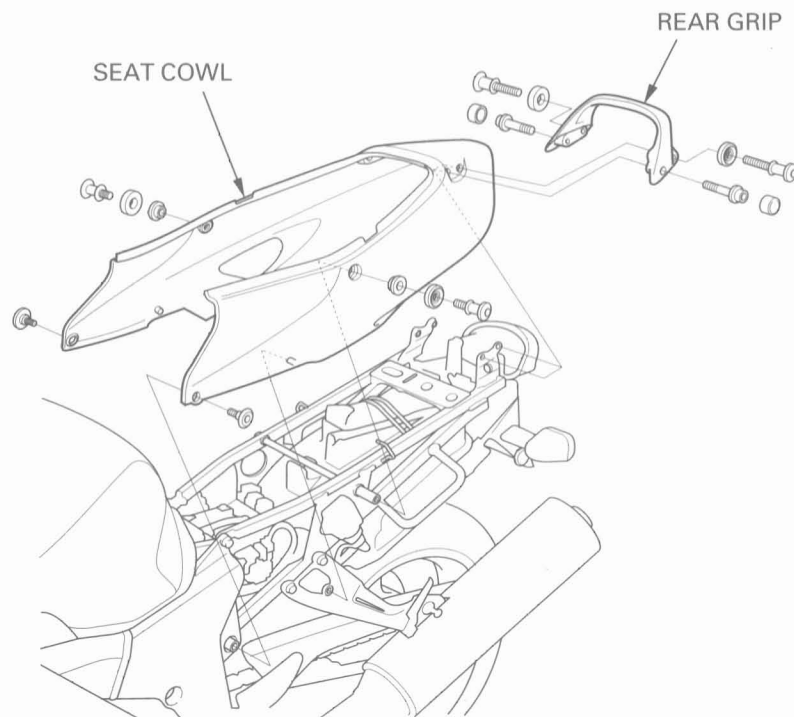
Remove the following:  
— Special bolts  
— Setting bolts/collars/spacers

Release the tabs from the frame grommets, and remove the seat cowl rearward.



## INSTALLATION

Installation is in the reverse order of removal.



## LOWER COWL

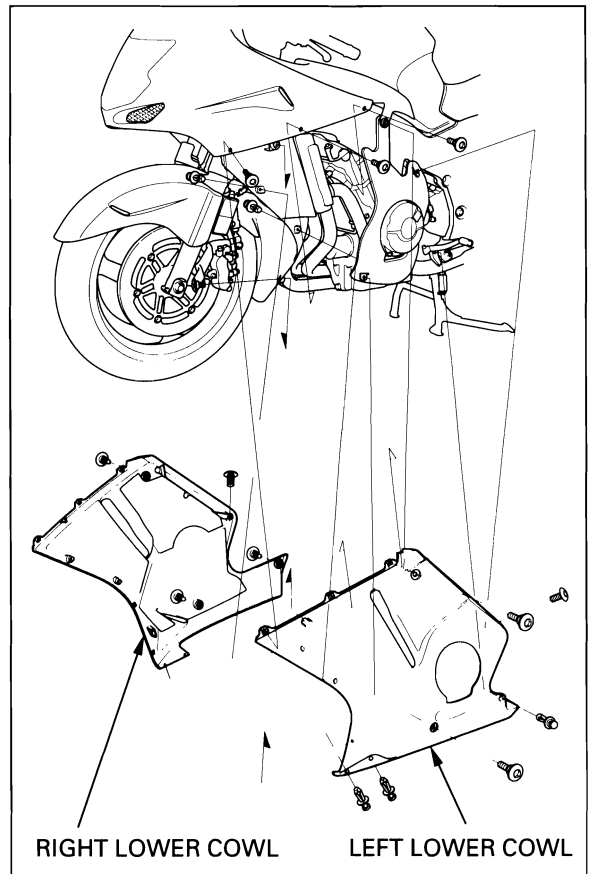
### REMOVAL

**NOTE:**

The right and left lower cowls can be removed individually.

Remove the six trim clips between the right and left lower cowl and center lower cowl.

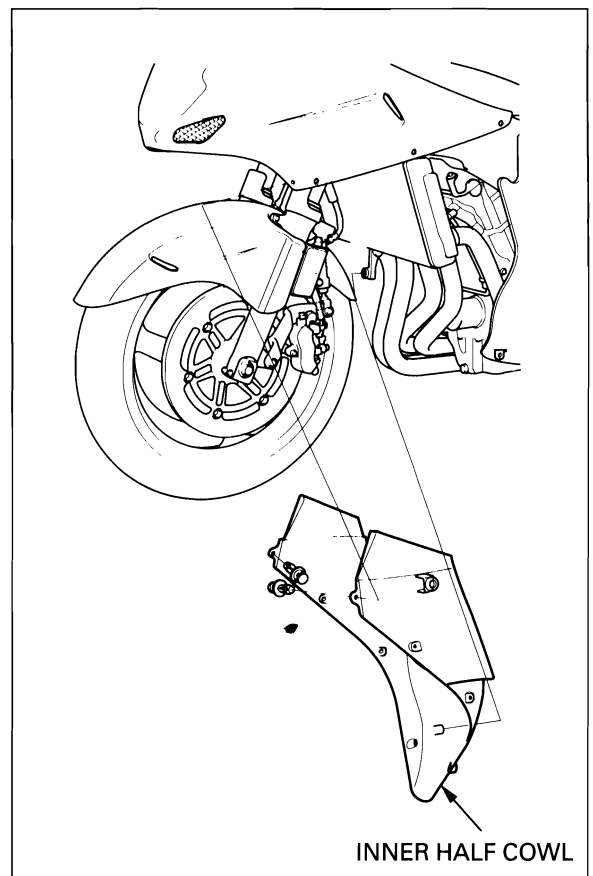
Remove the trim clip and special bolts, and then separate and remove the right and left lower cowls.



Remove the two trim clips.

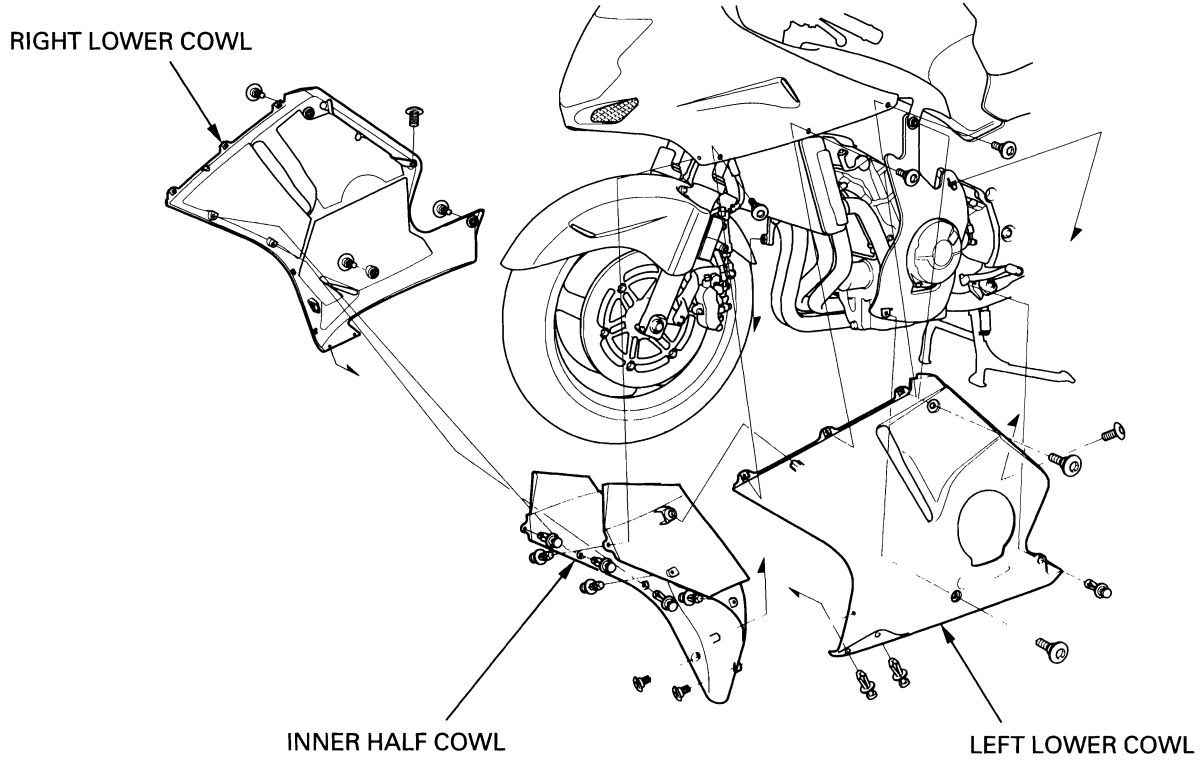
Release the grommet from the bracket and remove the inner half cowl.

Carefully pull the inner panel boss and remove the sound proof insulators on both sides.



**INSTALLATION**

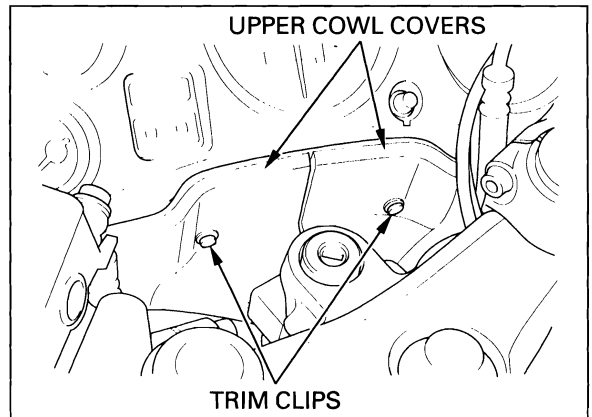
Installation is in the reverse order of removal.



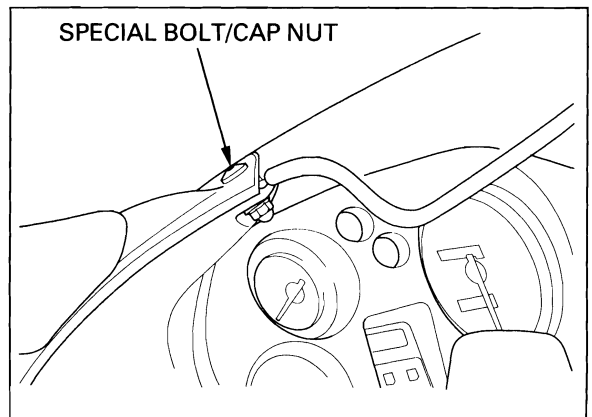
**UPPER COWL COVER/INNER PANEL**

**REMOVAL**

Remove the upper cowl cover trim clips.



Remove the windscreen upper end special bolts/cap nuts.



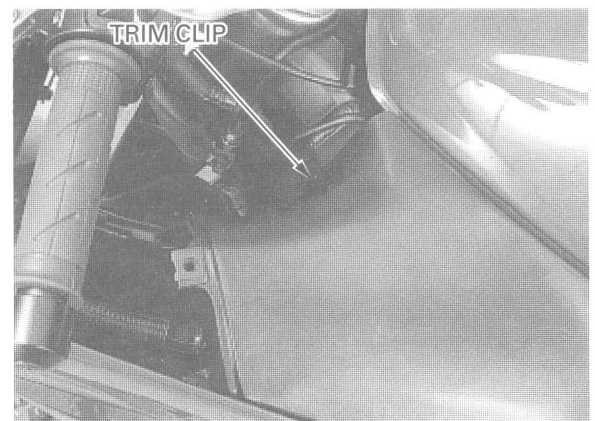


Remove the special bolts and upper cowl covers.

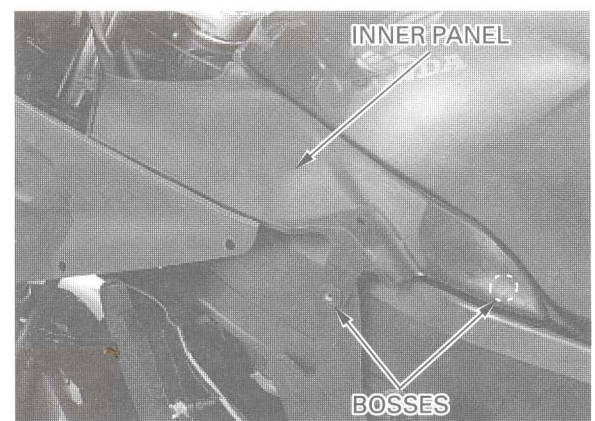


Remove the lower cowl (page 2-7).

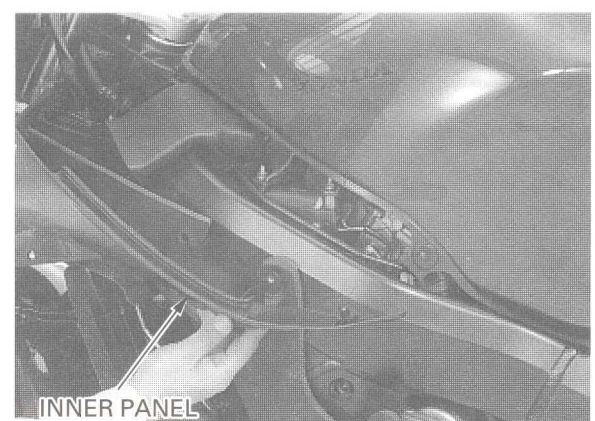
Remove the inner panel trim clips.



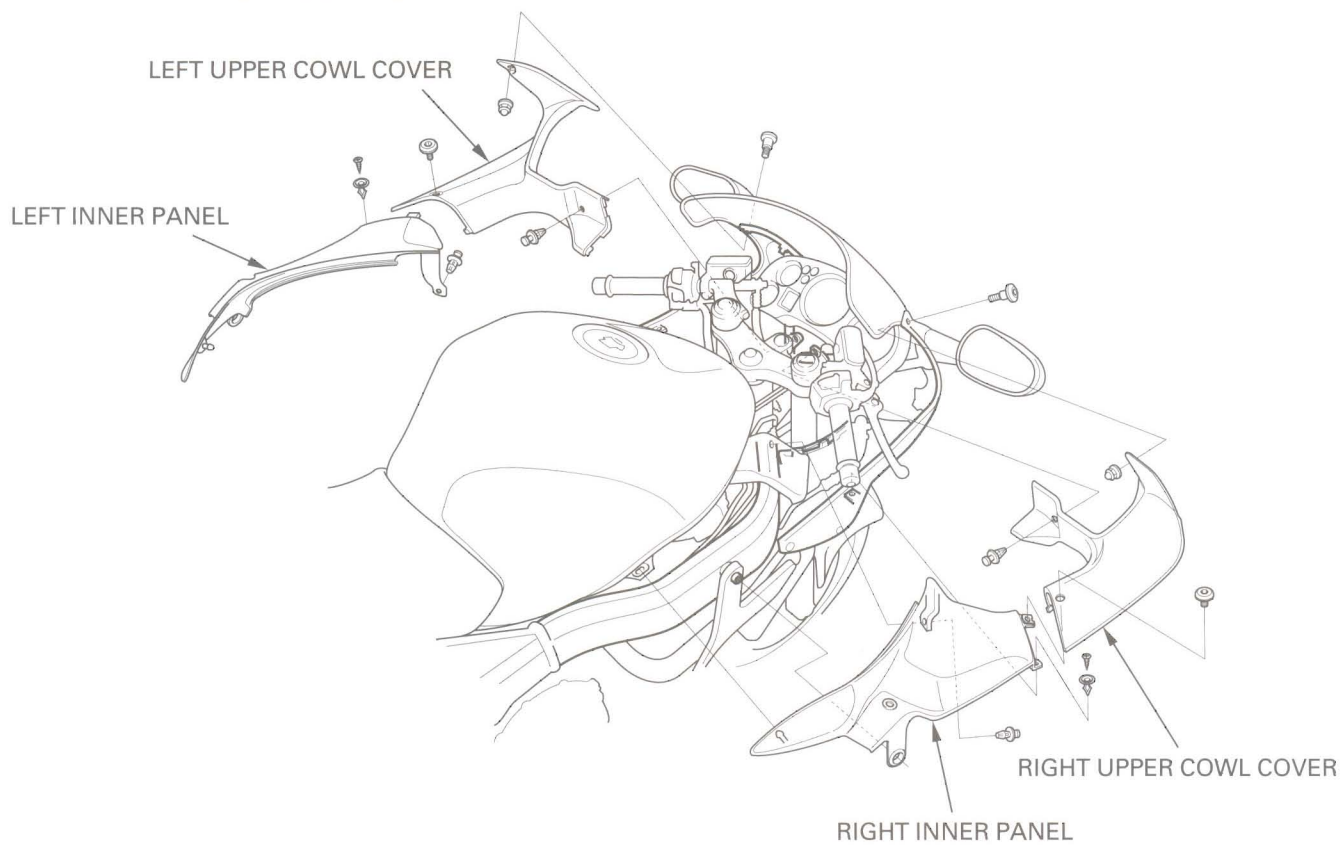
Release the inner panel from the frame boss.  
Release the inner panel boss from the fuel tank.



Remove the inner panel.



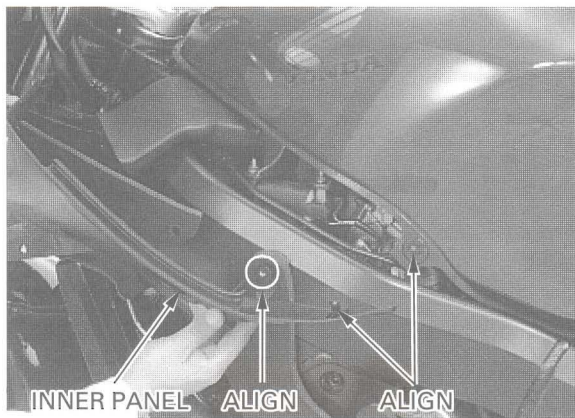
INSTALLATION



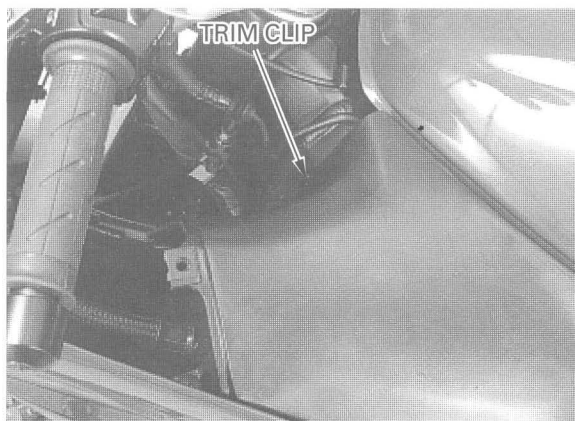
Install the inner panel.

NOTE:

Align the inner panel with the frame boss and lower edge of the fuel tank, then install the boss into the fuel tank grommet.



Install the trim clip.



Install the both upper cowl cover.

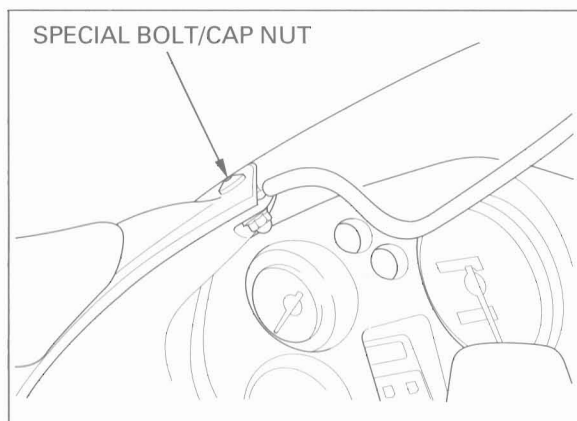
**NOTE:**

Align the upper cowl covers with the meter panel bosses.

Temporarily install the special bolts.

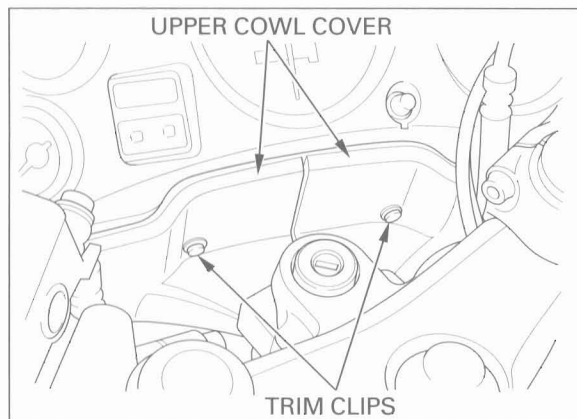


Install the upper ends of the windscreen special bolts/cap nuts.



Install the trim clips.

Tighten the cap nuts while holding the special bolts.  
Tighten the special bolts.



## UPPER COWL

### WINDSCREEN REPLACEMENT

Remove the windscreen mounting bolts, cap nuts and windscreen by lifting out one side of the wind screen and sliding it out to the side.





## FRAME/BODY PANELS/EXHAUST SYSTEM

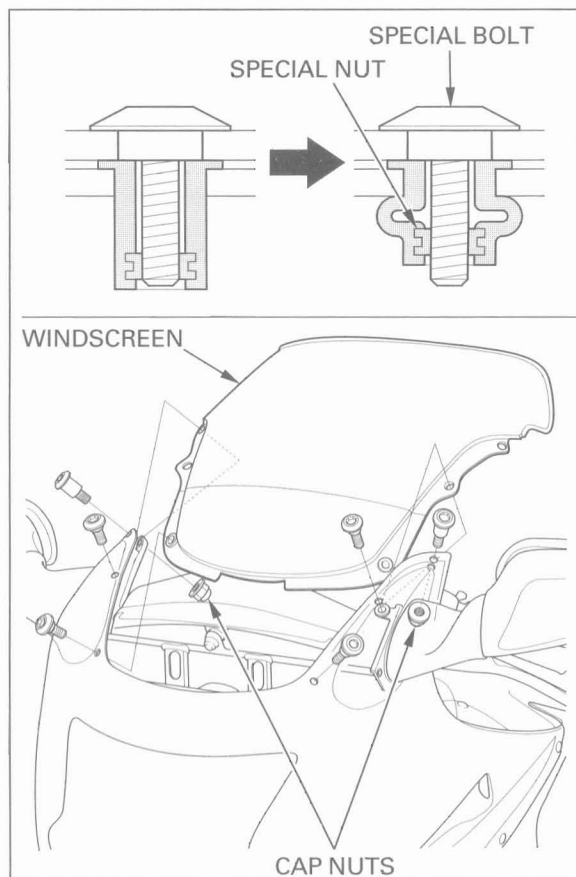
Install the collar and special nut onto the windscreen.

Install the windscreen into the upper cowl.

Install the six special bolts, two collars and two cap nuts as shown.

Tighten the special bolts.

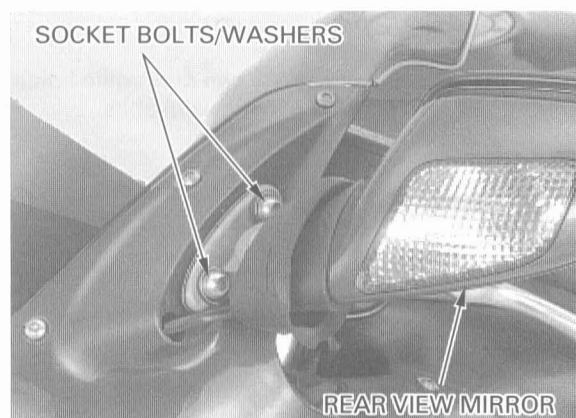
Tighten the cap nuts while holding the special bolts.



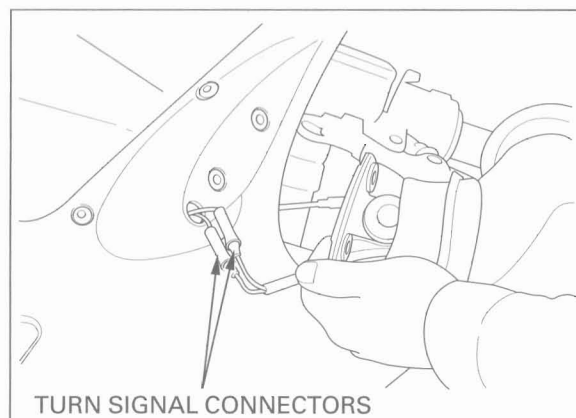
## REARVIEW MIRROR REMOVAL

Remove the rearview mirror pivot boot.

- Remove the following:
- Socket bolts/washers
  - Rearview mirror
  - Rubber cushion
  - Mirror plate



Pull out and disconnect the front turn signal connectors and remove the rearview mirror.



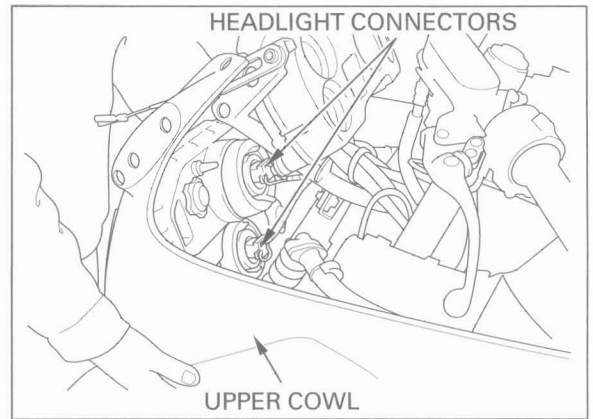
### UPPER COWL REMOVAL

Remove the upper cowl cover and inner panel (page 2-8).

Remove the two trim clips that connect to air guide (see installation illustration below).

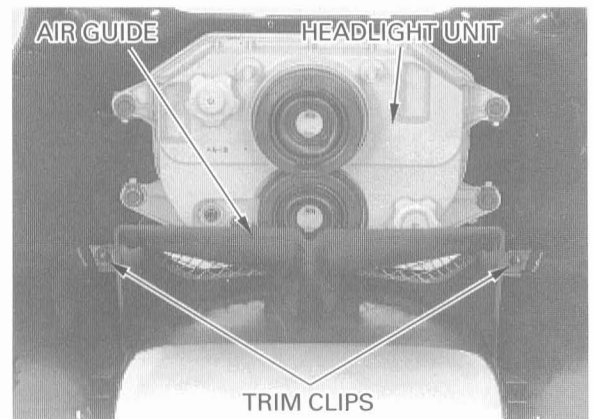
Release the upper cowl from the rearview mirror bracket and pull the upper cowl forward.

Disconnect the headlight connectors, and then remove the upper cowl.



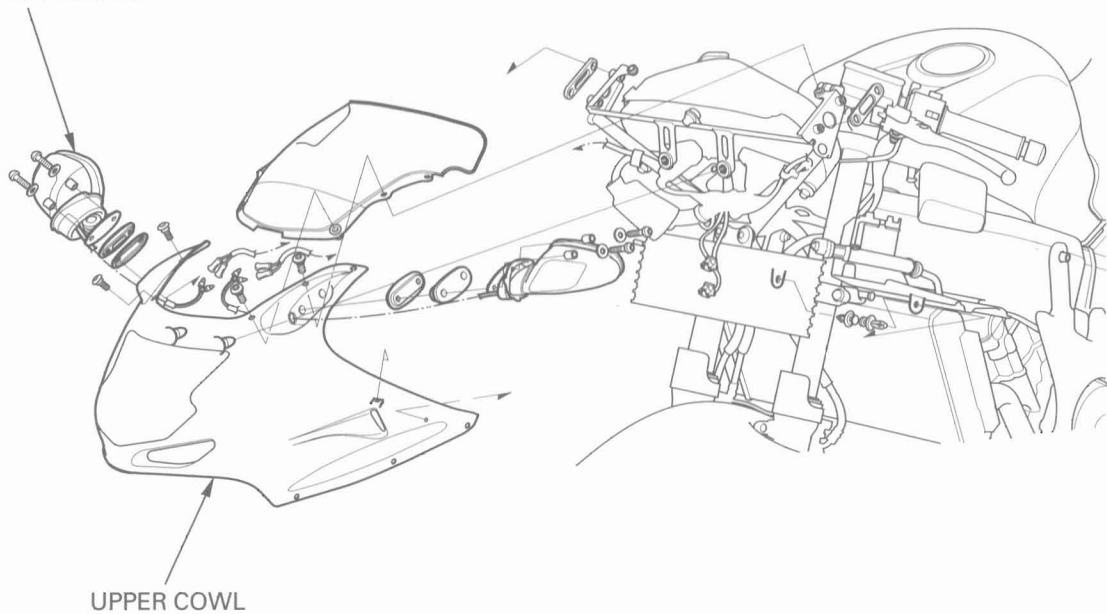
Remove the trim clips and air guide.

Remove the headlight unit (page 19-5).



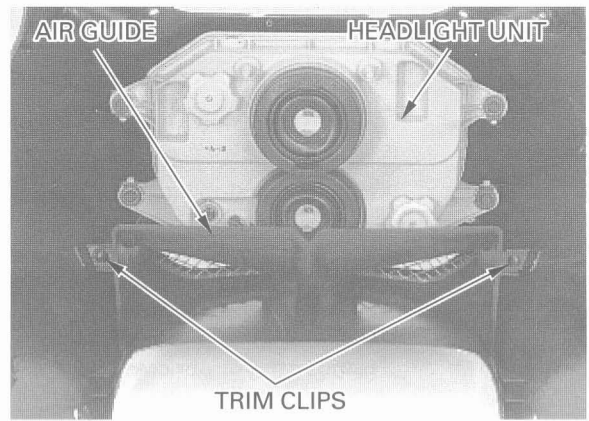
### UPPER COWL INSTALLATION

REAR VIEW MIRROR



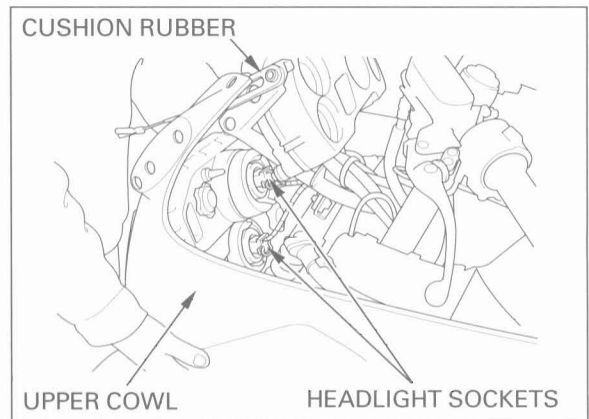
Install the headlight unit (page 19-5).

Install the air guide and secure it with two trim clips.



Install the cushion rubbers onto the rearview mirror bracket.

Place the upper cowl onto the cowl stay and connect the headlight sockets.



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

**NOTE:**

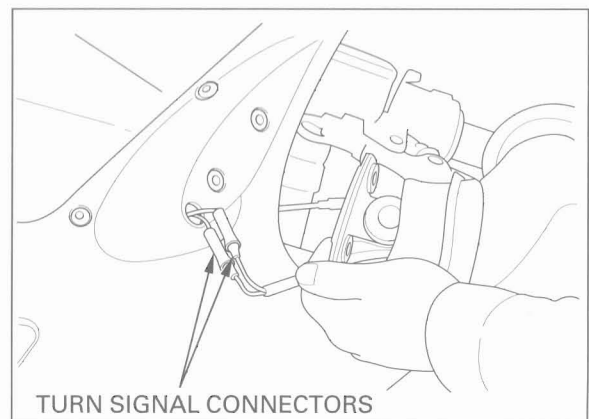
Align the rearview mirror holes on the upper cowl with the bosses on the upper cowl stay.

Install the two trim clips that connect to air guide.



### REARVIEW MIRROR INSTALLATION

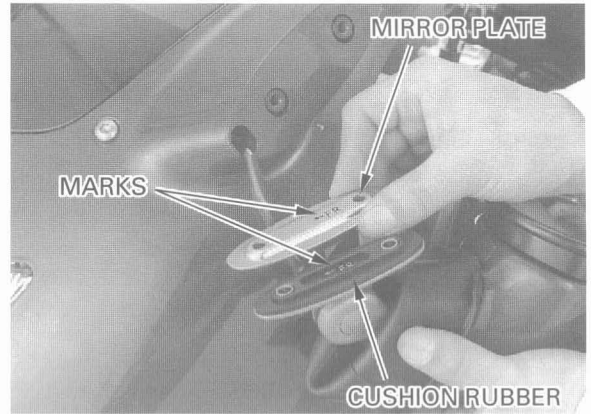
Route the turn signal wires.  
Connect the front turn signal connectors.



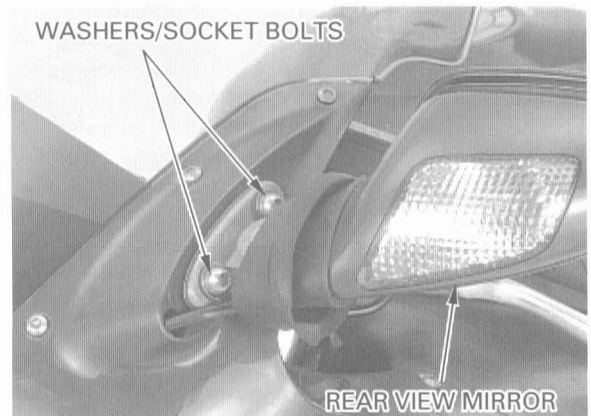
Set the cushion rubber and mirror plate onto the rearview mirror pivot.

**NOTE:**

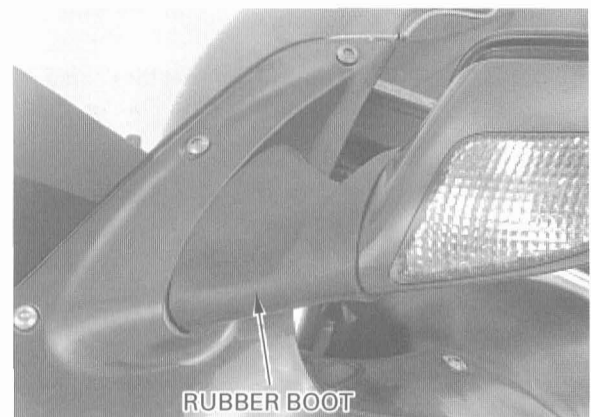
Install the cushion and mirror plate with their "←FR" marks facing forward.



Install the washers and socket bolts, then tighten the bolts securely.



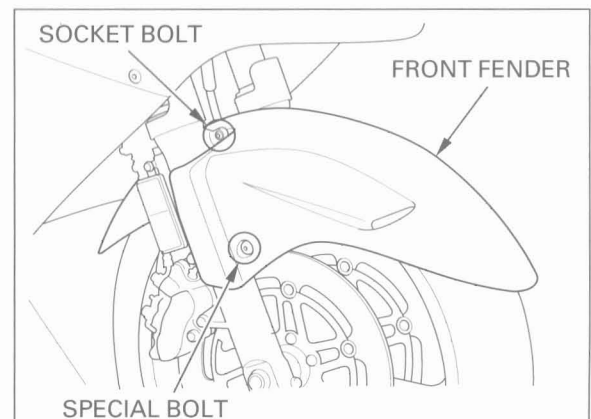
Install the rubber boot into the mirror plate properly.



## FRONT FENDER

### REMOVAL

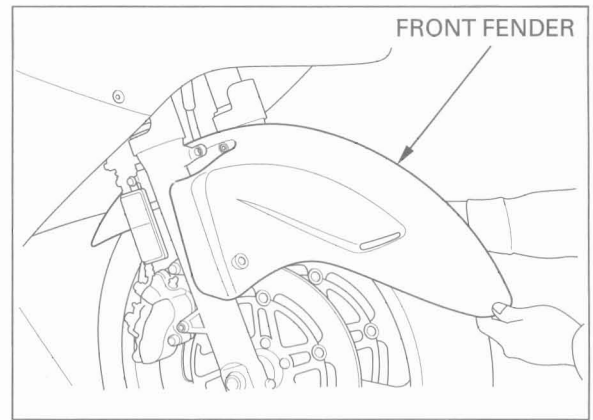
Remove the special bolts and socket bolts.



Remove the front fender forward.

### INSTALLATION

Installation is in the reverse order of removal.



## REAR FENDER

### REMOVAL

Remove the following:

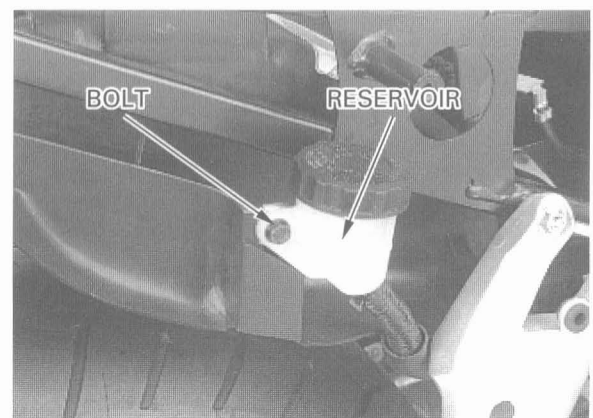
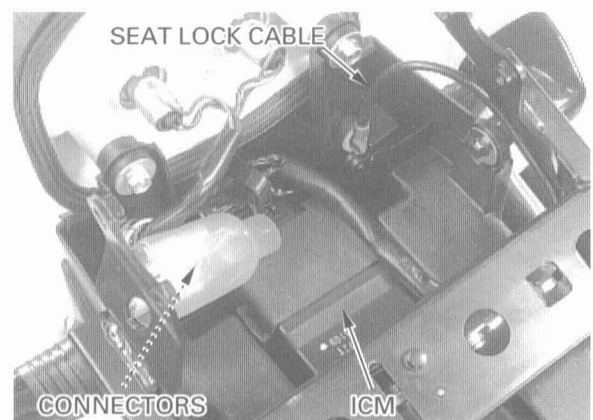
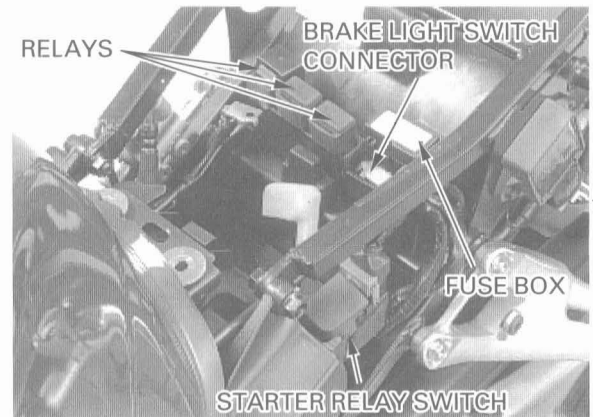
- Seat cowl (page 2-5)
- Fuel tank mounting bolts (page 2-3)
- Battery (page 16-5)
- Turn signal relay
- Headlight relay
- Starter relay switch
- First idle relay

Unhook the retaining tab and remove the fuse box. Disconnect the rear brake light switch 2P (White) connector.

Disconnect the seat lock cable. Disconnect the tail/brake light and license light connectors.

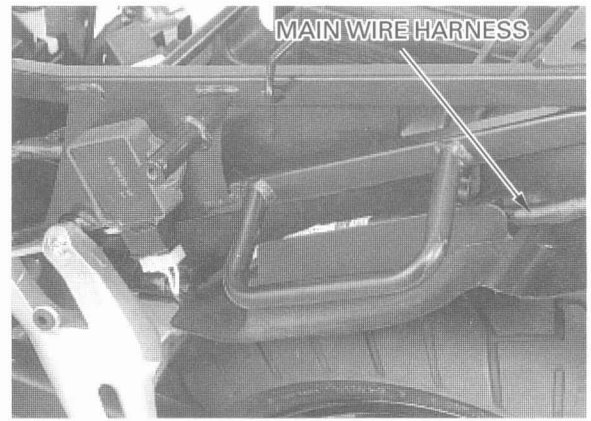
Remove the ICM (Ignition Control Module) and disconnect the multi-connector by pinching middle of connector and pulling apart.

Remove the bolt and rear brake reservoir.

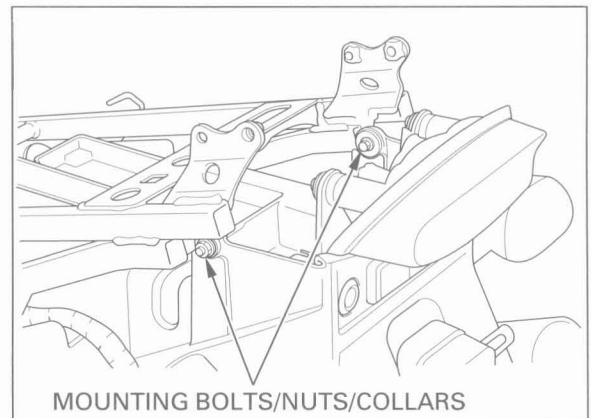




Release the main wire harness from the rear fender harness guides.

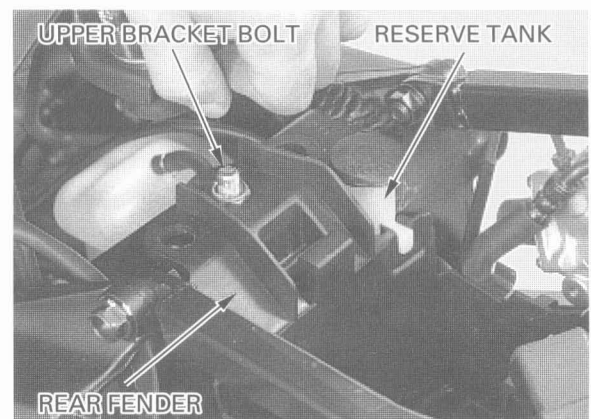


Remove the rear fender mounting bolts, nuts and collars.

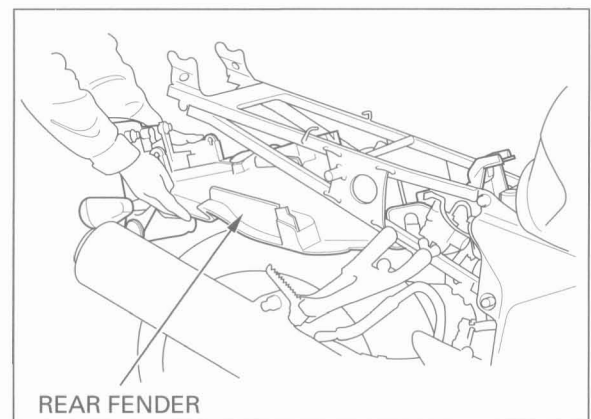


Lift the rear end of the fuel tank.

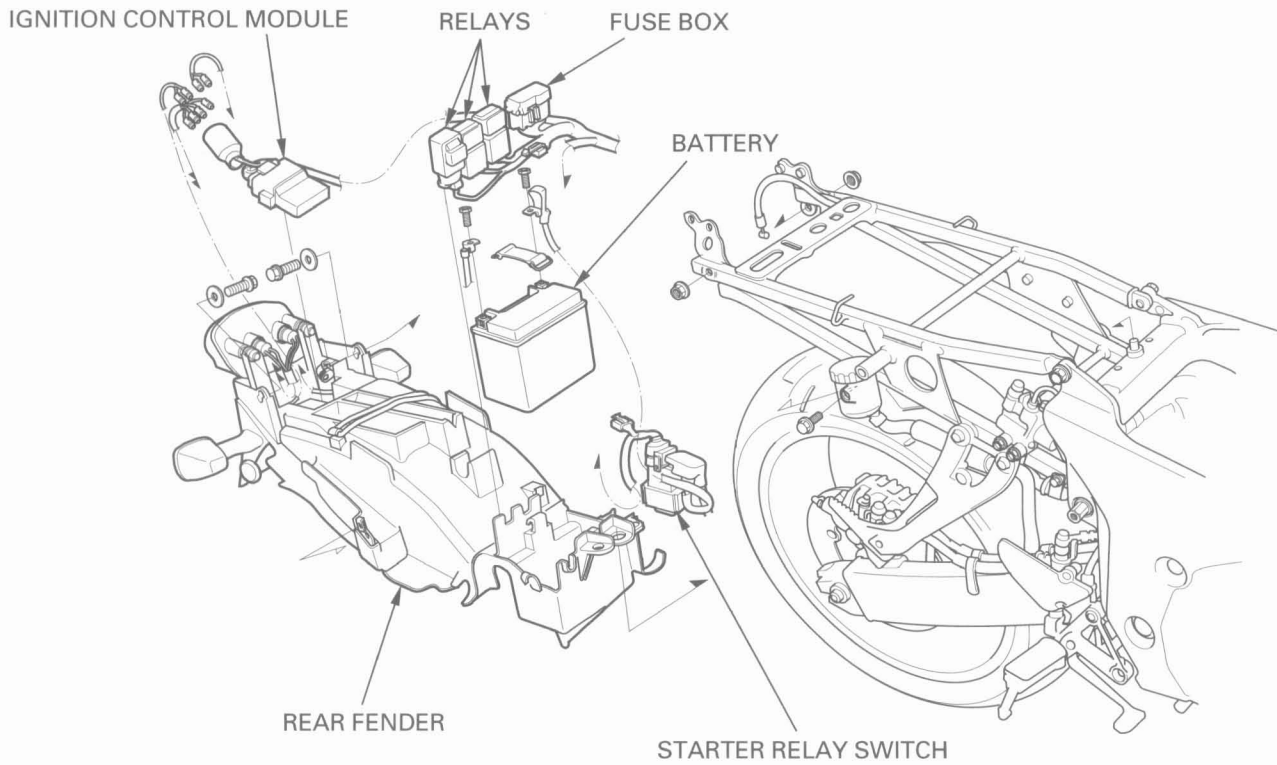
Pull up the front end of the rear fender and release the rear fender from the rear shock absorber upper bracket bolt and radiator reserve tank.



Release the rear fender from the seat rail, then remove it rearward.



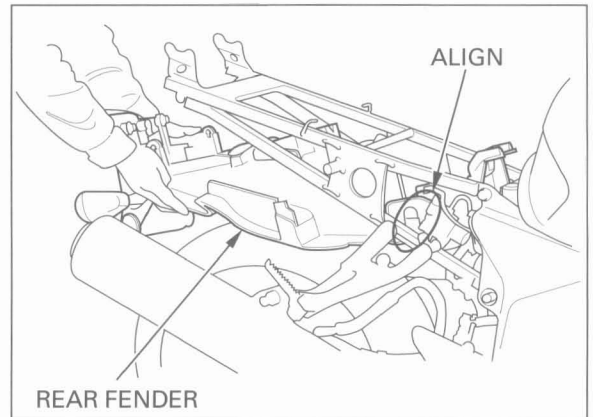
INSTALLATION



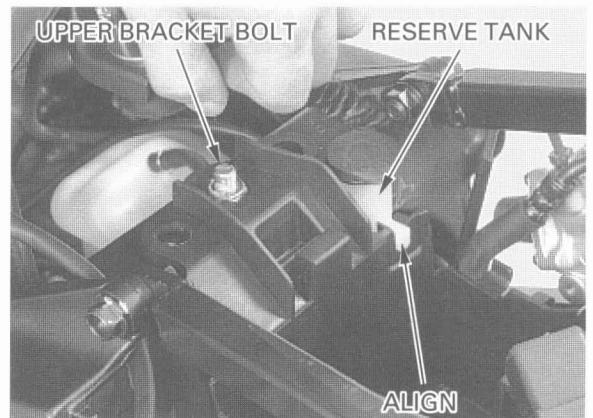
Install the rear fender into the seat rail, while aligning the front groove of the rear fender with the seat rail.

NOTE:

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

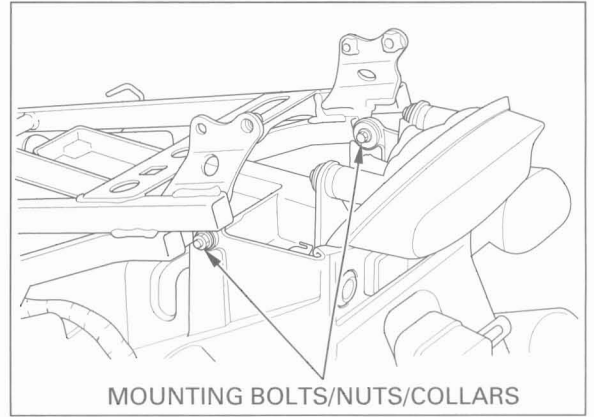


Install the front end of the rear fender onto the rear shock absorber upper bracket bolt and radiator reserve tank.



Install and tighten the rear fender mounting bolts.

Install the removed parts in the reverse order of removal.



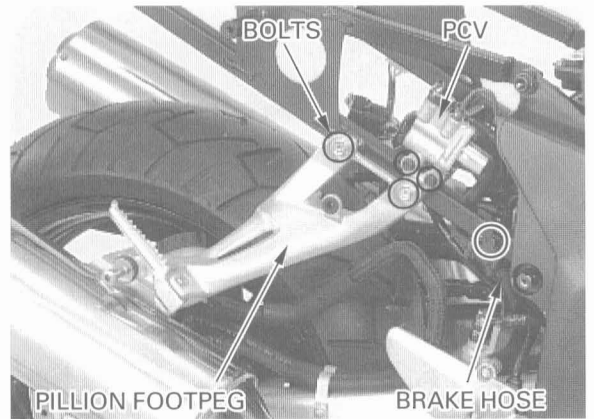
## SEAT RAIL

### REMOVAL

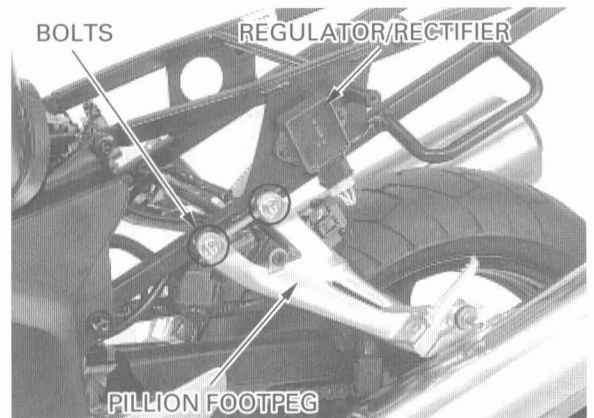
Remove the rear fender (page 2-16).

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

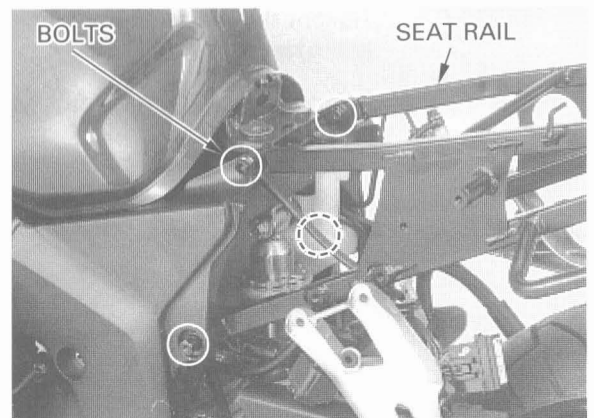
Remove the right pillion footpeg mounting bolts.



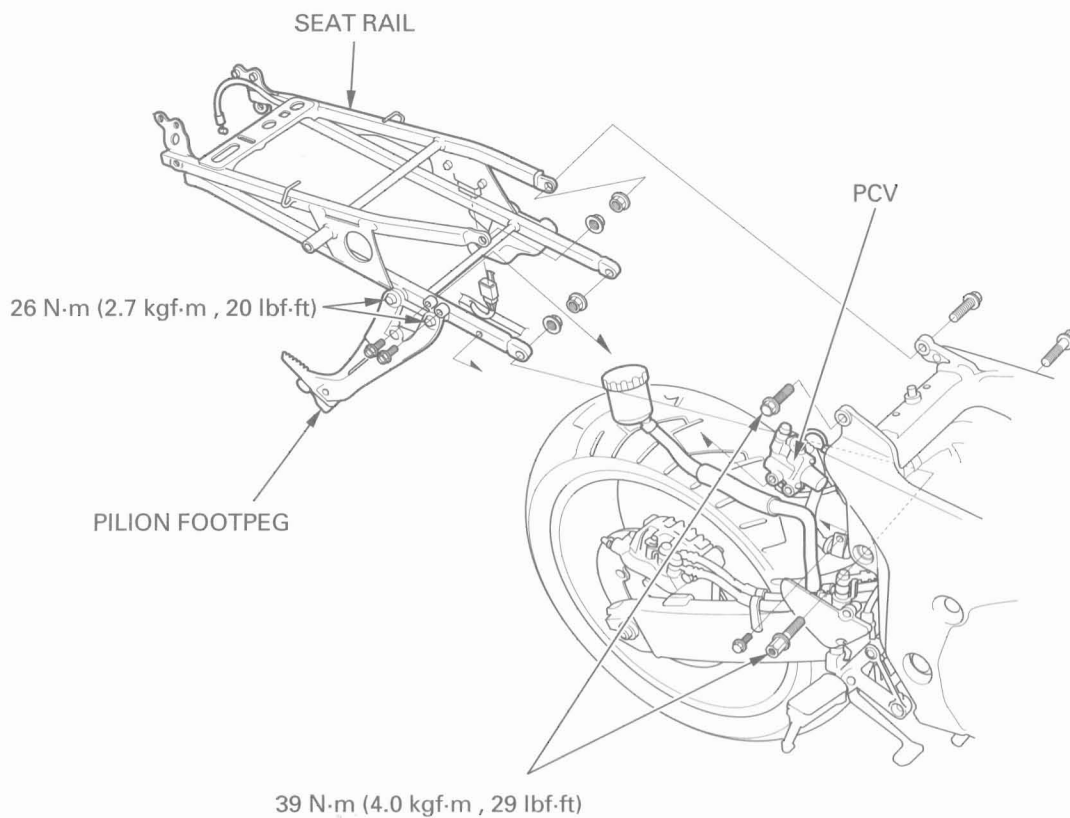
Remove the left pillion footpeg mounting bolts.  
Remove the bolts and regulator/rectifier.



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

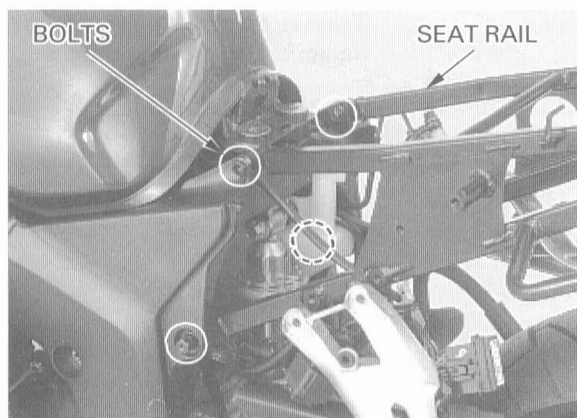


INSTALLATION



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

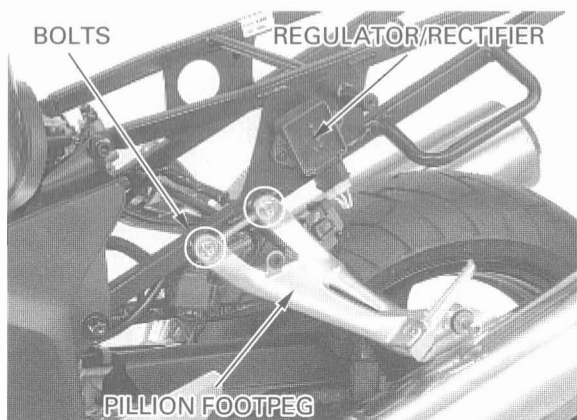
**TORQUE:** 39 N·m (4.0 kgf·m , 29 lbf·ft)



Tighten the pillion footpeg holder mounting bolts to the specified torque.

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

Install the removed parts in the reverse order of removal.



## MUFFLER/EXHAUST PIPE

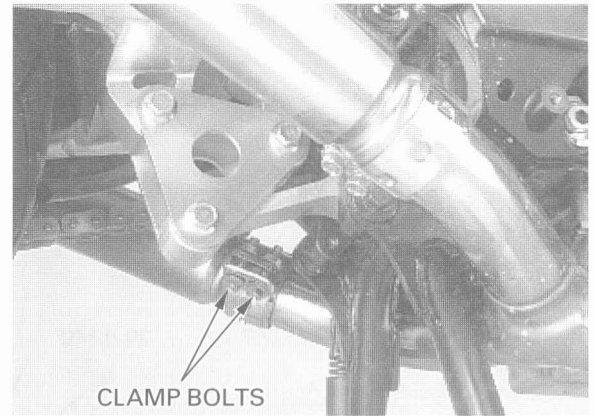
### REMOVAL

**▲WARNING**

*Do not service the exhaust system while it is hot.*

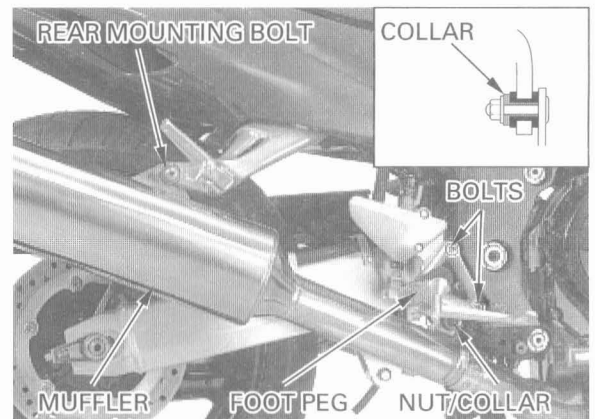
Remove the lower cowl (page 2-7).

Loosen the exhaust pipe/muffler clamp bolts.



Remove the following:

- Exhaust pipe mounting nut and collar
- Footpeg holder mounting bolts and footpeg
- Muffler mounting bolt/nut/collar
- Muffler
- Muffler gasket

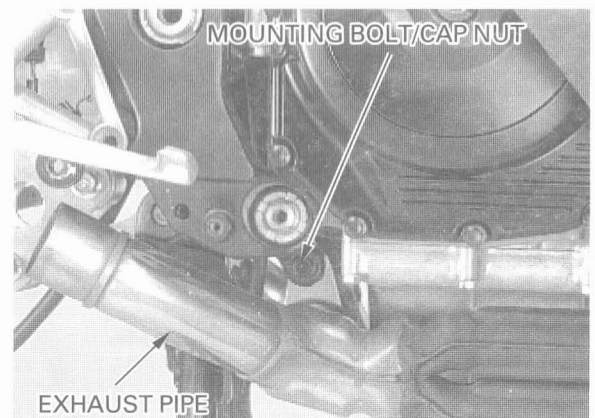


Remove the exhaust pipe joint nuts.

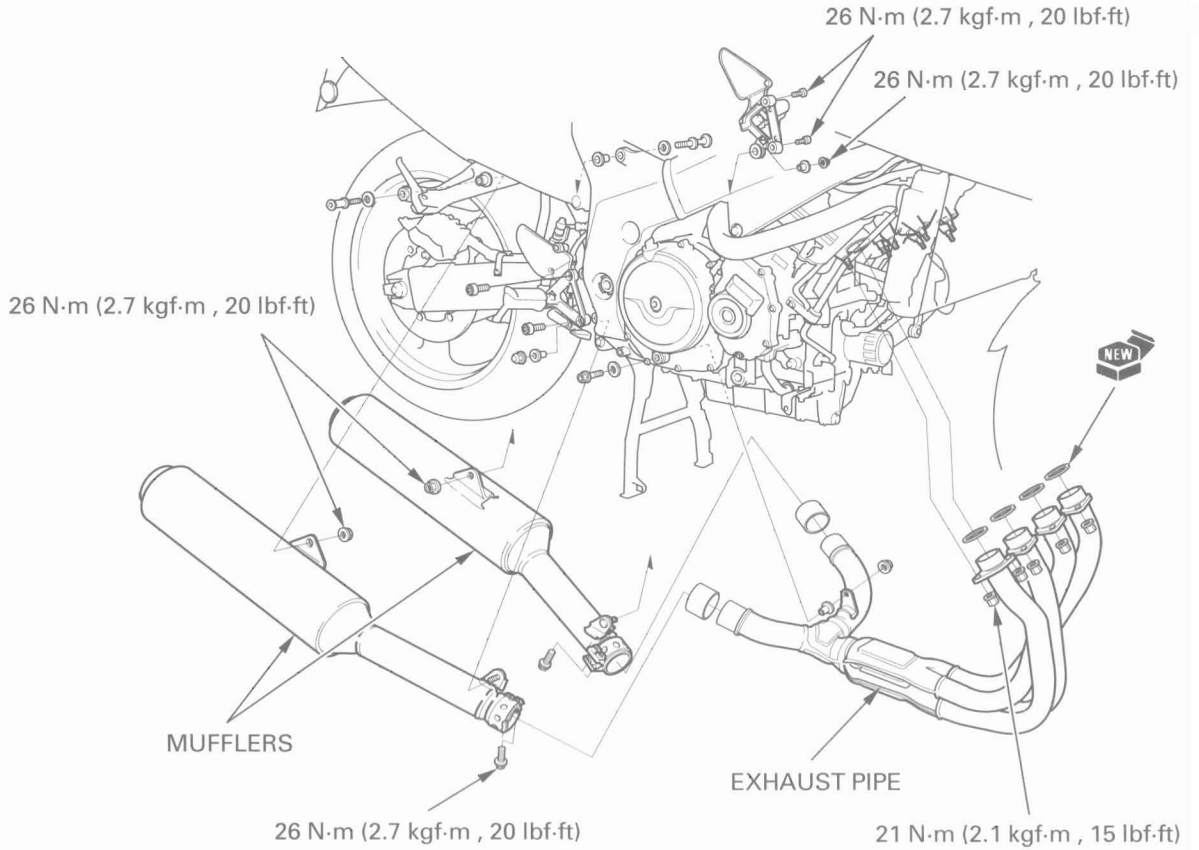


Remove the following:

- Exhaust pipe mounting bolt/cap nut
- Washer
- Collar
- Exhaust pipe
- Exhaust pipe gaskets



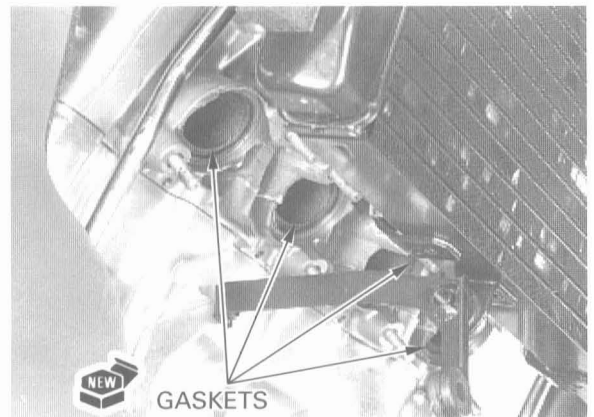
INSTALLATION



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

NOTE:

Always replace the exhaust pipe gaskets with new ones.



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

NOTE:

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

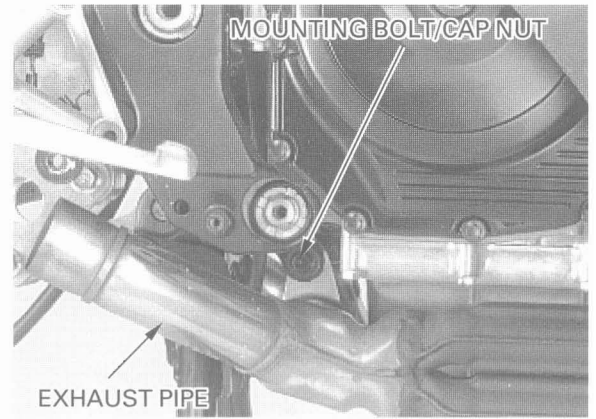
First tighten the exhaust pipe joint nuts to the specified torque.

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

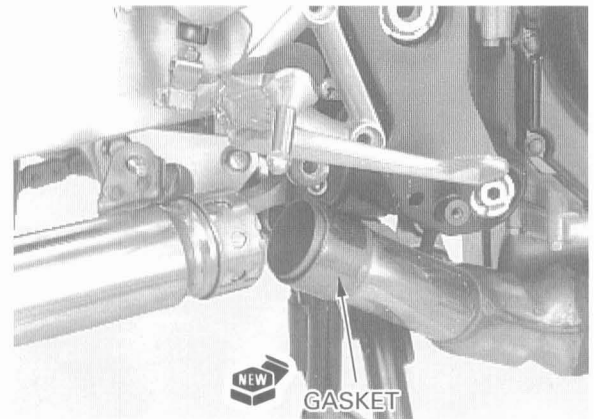




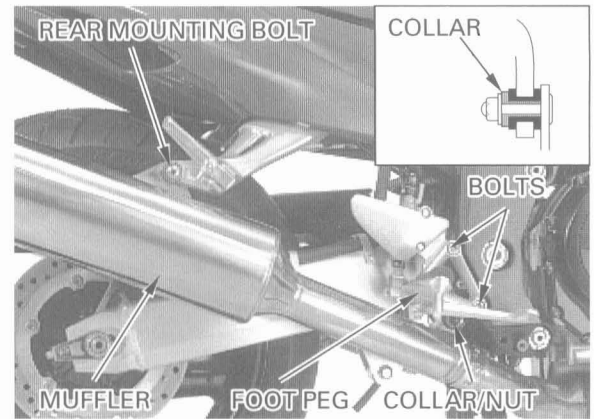
Tighten the exhaust pipe mounting bolt/nut.



Install the new gasket onto the exhaust pipe.



Install the mufflers.  
Temporarily install the rear muffler mounting bolt/nut.



Install the main footpeg holders and tighten the mounting bolts to the specified torque.

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

Install the collar and tighten the muffler mounting nut to the specified torque.

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

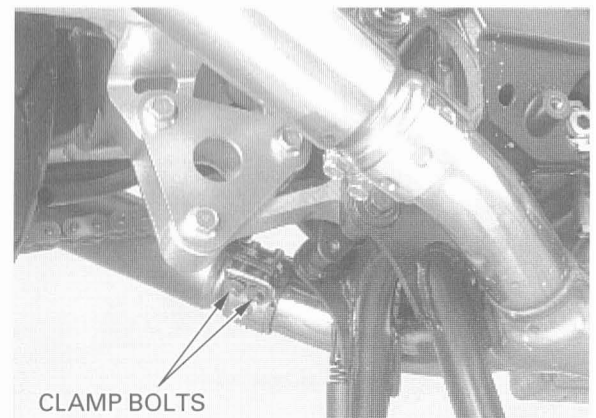
Tighten the rear muffler mounting bolt/nut to the specified torque.

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

Tighten the exhaust pipe/muffler clamp bolts to the specified torque.

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

Install the lower cowl (page 2-8).



---

MEMO





# 3. MAINTENANCE

SERVICE INFORMATION	3-1	DRIVE CHAIN	3-20
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SPARK PLUG	3-5	CLUTCH SYSTEM	3-27
VALVE CLEARANCE	3-8	CLUTCH FLUID	3-27
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EVAPORATIVE EMISSION CONTROL SYSTEM (CALIFORNIA TYPE ONLY)	3-19		

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

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

### SPECIFICATIONS

Unit: mm (in)

ITEM		SPECIFICATIONS
Throttle grip free play		2–6 (1/12–1/4)
Spark plug		CR9EHVX–9 (NGK)
Spark plug gap		0.80–0.90 (0.031–0.035)
Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)
	EX	0.22 ± 0.03 (0.009 ± 0.001)

## MAINTENANCE

ITEM		SPECIFICATIONS	
Engine oil capacity	At draining	3.8 ℓ (4.0 US qt, 3.3 Imp qt)	
	At oil filter change	3.9 ℓ (4.1 US qt, 3.4 Imp qt)	
Recommended engine oil		HONDA GN4 4-stroke oil or equivalent motor oil API service classification SF or SG Viscosity: SAE 10W-40	
Engine idle speed		1,100 ± 100 rpm	
Drive chain slack		25-35 mm (1-1-3/8 in)	
Recommended brake fluid		DOT 4	
Tire size	Front	120/70 ZR17 (58W)	
	Rear	180/55 ZR17 (73W)	
Tire brand	Bridgestone	Front	BT57F RADIAL G
		Rear	BT57R RADIAL G
	Dunlop	Front	D205FJ
		Rear	D205G
	Michelin	Front	MACADAM 90X S
		Rear	MACADAM 90X S
Tire air pressure	Up to 90 kg (200 lb) load	Front	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)
		Rear	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)
	Up to maximum weight capacity	Front	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)
		Rear	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)
Minimum tire tread depth	Front	1.5 mm (0.06 in)	
	Rear	2.0 mm (0.08 in)	

## TORQUE VALUES

Crankshaft hole cap	18 N·m (1.8 kgf·m, 13 lbf·ft)	Apply grease to the threads
Spark plug	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Cam chain tensioner lifter sealing bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Oil drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Oil filter cartridge	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply clean engine oil to the O-ring
Rear axle nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Rear master cylinder push rod nut	18 N·m (1.8 kgf·m, 13 lbf·ft)	

## TOOLS

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

# MAINTENANCE SCHEDULE

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

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

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

ITEMS	FREQUENCY	NOTE ↓	ODOMETER READING (NOTE 1)								REFER TO PAGE					
			× 1,000 mi	0.6	4	8	12	16	20	24						
			× 100 km	10	64	128	192	256	320	384						
EMISSION RELATED ITEMS	*	FUEL LINE				I		I		I				3-4		
	*	THROTTLE OPERATION				I		I		I				3-4		
	*	CARBURETOR CHOKE				I		I		I				3-5		
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	*	VALVE CLEARANCE									I				3-8	
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	*	BRAKE LIGHT SWITCH												I	I	3-26
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		SIDE STAND												I	I	3-28
	*	SUSPENSION												I	I	3-28
	*	NUTS, BOLTS, FASTENERS												I	I	3-30
	**	WHEELS/TIRES												I	I	3-30
	**	STEERING HEAD BEARINGS												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.

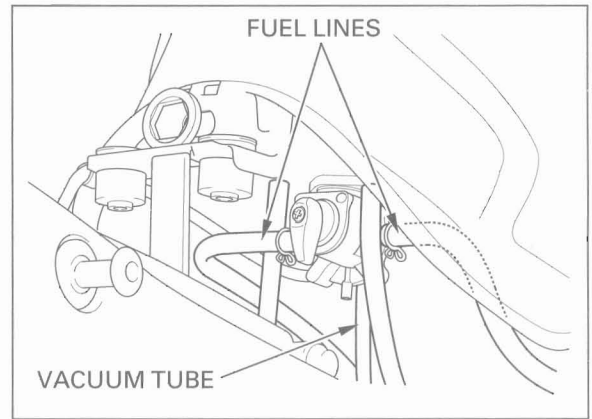
## MAINTENANCE

### FUEL LINE

Remove the fuel tank rear mounting bolts, and support the rear end of the fuel tank (page 2-2).

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

Also check the fuel valve vacuum tube for damage. Replace the vacuum tube if necessary.

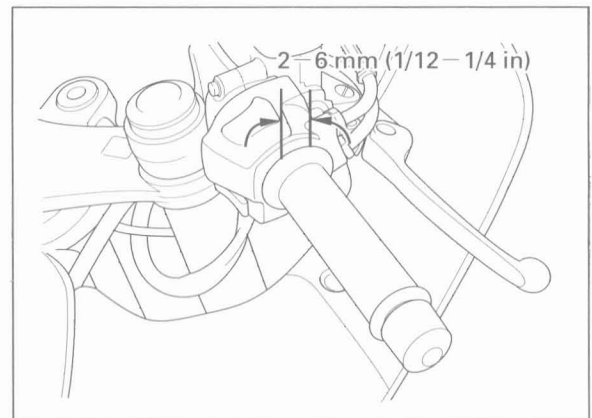


### THROTTLE OPERATION

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.

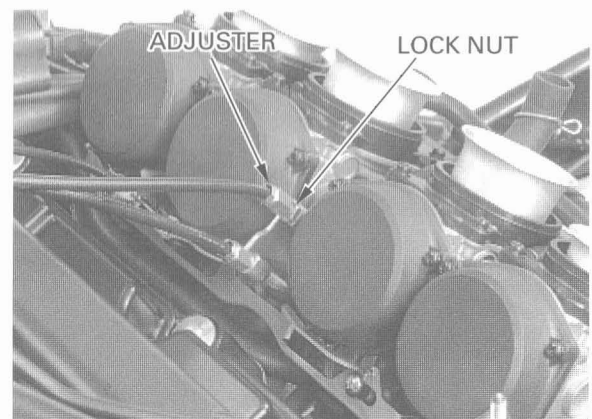
Minor adjustments are made with the upper adjuster. Adjust the free play by loosening the lock nut and turning the adjuster.



Major adjustments are made with the lower adjuster.

Remove the air cleaner housing (page 5-4).

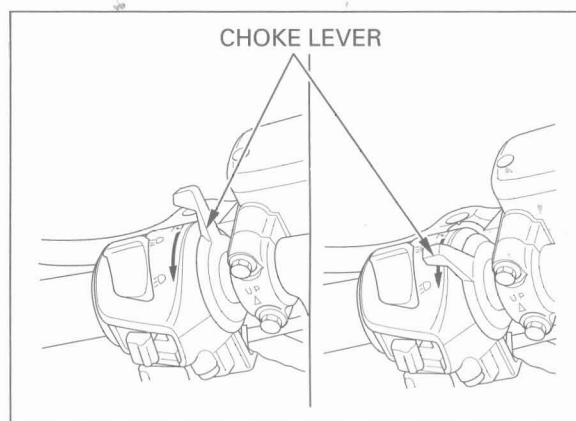
Adjust the free play by loosening the lock nut and turning the adjuster. After adjustment, tighten the lock nut securely. Recheck the throttle operation. Replace any damaged parts, if necessary.



## CARBURETOR CHOKE

The choke system uses a fuel enrichment circuit controlled by a starting enrichment (SE) valve. The SE valve opens the enrichment circuit via a cable when the choke lever on the left handlebar switch.

Check for smooth choke lever operation and lubricate the choke cable if required. Inspect the cable for cracks which could allow moisture to enter. Replace the cable if necessary.



## AIR CLEANER

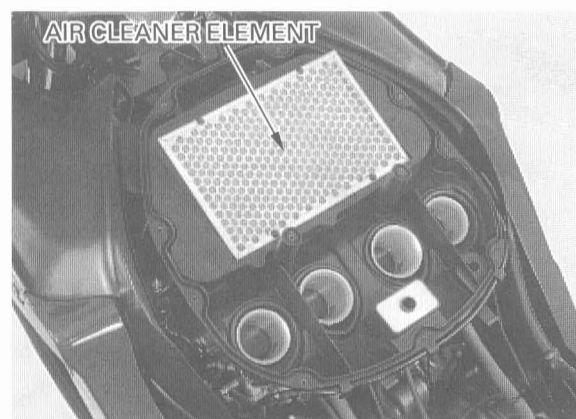
Remove the fuel tank (page 2-2).

Remove the eleven screws and air cleaner housing cover.



Remove and discard the air cleaner element in accordance with the maintenance schedule. Also replace the air cleaner element any time it is excessively dirty or damaged.

Install the removed parts in the reverse order of removal.

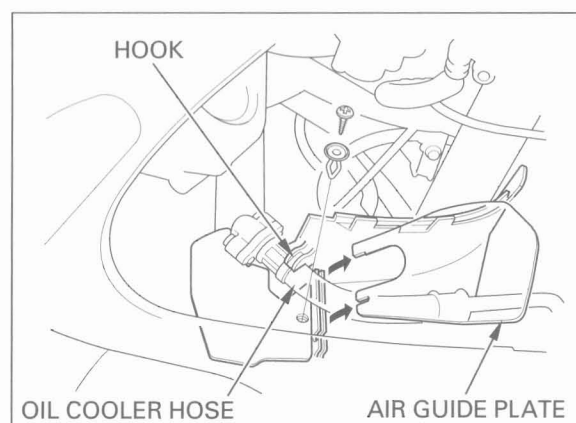


## SPARK PLUG

### REMOVAL

Remove the following:  
 —Lower cowl (page 2-7)  
 —Upper cowl cover/inner panel (page 2-8)

Remove the air guide plates. Release the air guide hooks from the oil cooler hoses.

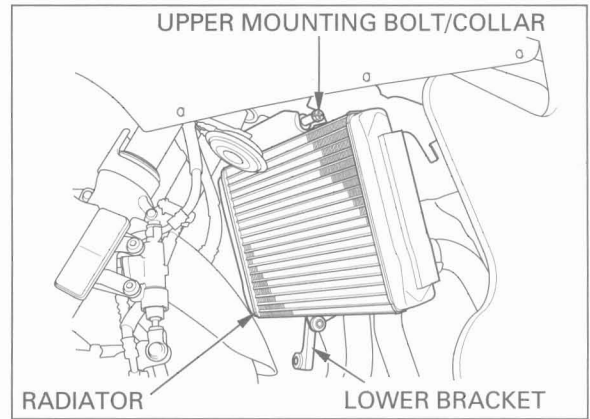


## MAINTENANCE

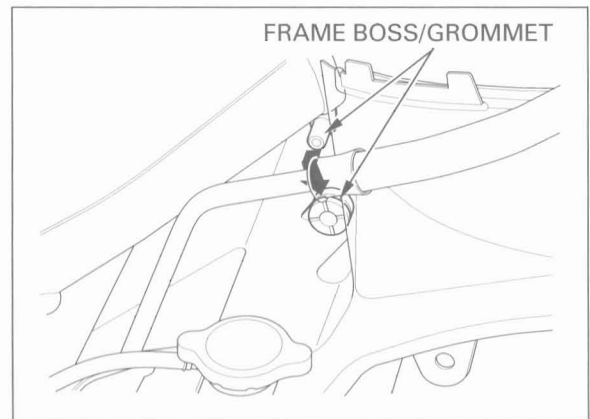
Disconnect the radiator fan motor connector.

Remove the radiator upper mounting bolt and collar.

Remove the radiator from the lower bracket.



Remove the radiator from the frame boss, then move the radiator/air guide assembly forward.



Disconnect the spark plug caps.

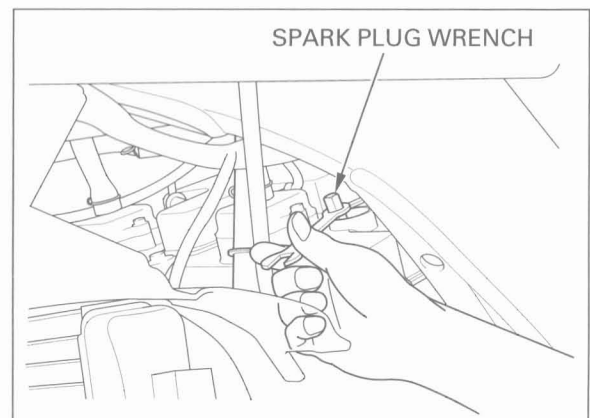
### NOTE:

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



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

Inspect or replace as described in the maintenance schedule.



## INSPECTION

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

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

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

### CAUTION:

- *This motorcycle's spark plug equipped with platinum type electrodes. Do not use wire brush to clean the electrodes.*
- *The plug cleaner should be used with the air pressure of less than 6 kgf/cm<sup>2</sup> (85 psi) and for less than 20 seconds.*

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

*Always use specified spark plugs on this motorcycle.*

**Specified spark plug:** CR9EHVX-9 (NGK)

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

### CAUTION:

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

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

### CAUTION:

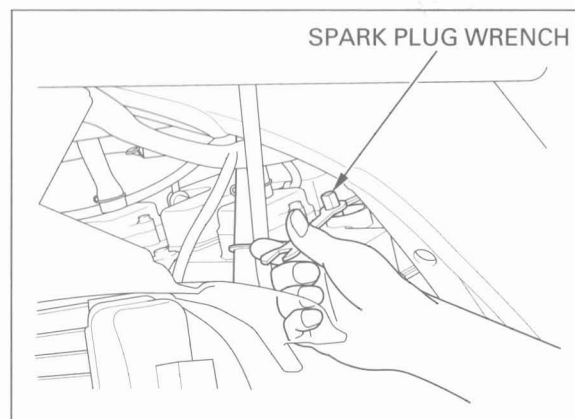
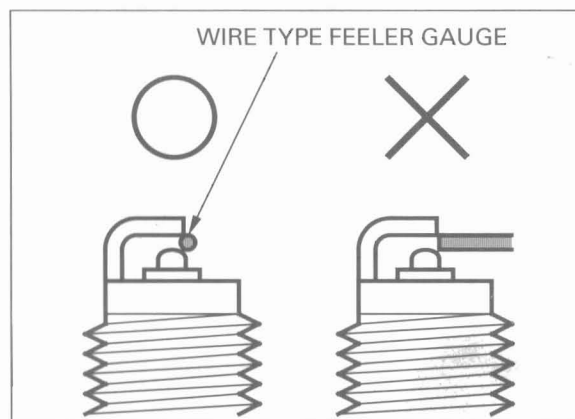
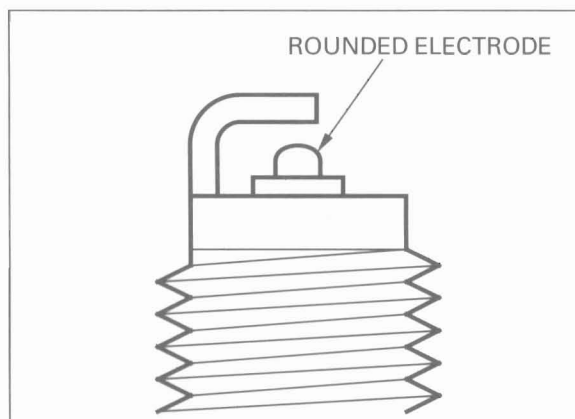
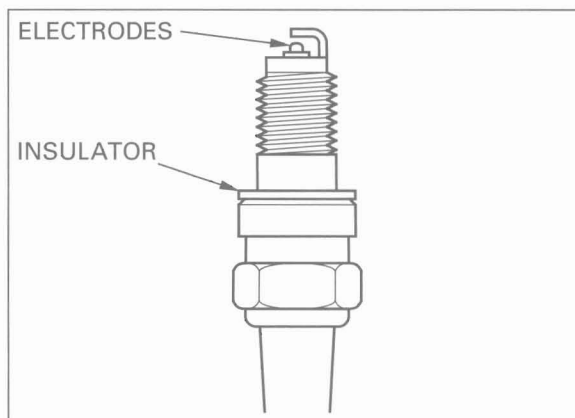
*Do not adjust the spark plug gap. If the gap is out of specification, replace with a new one.*

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

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

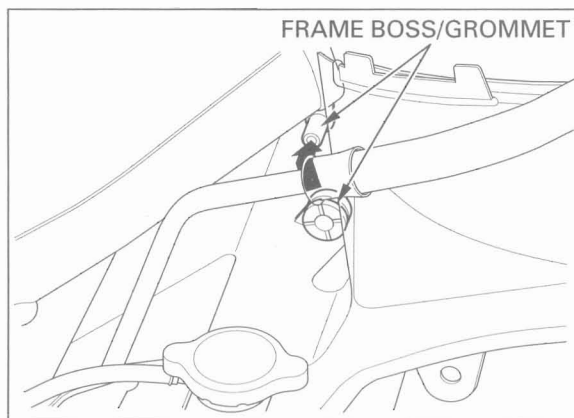
If using the new plug, install as follows: Install and hand tighten the new spark plug, then tighten it about 1/2 turn after the sealing washer contacts the seat of the plug hole.

Install the spark plug caps.

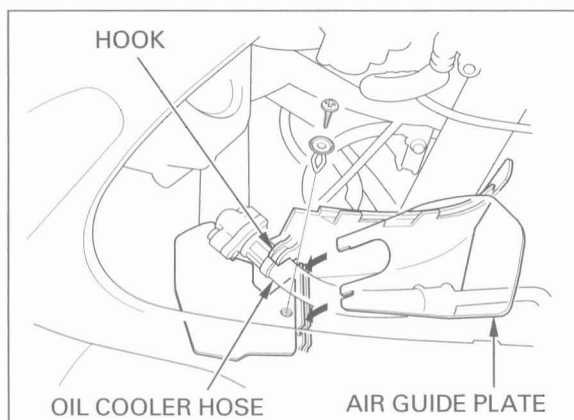


## MAINTENANCE

Install the radiator by aligning its grommet with the boss on the frame.



Set the air guide hooks onto the oil cooler hoses. Install the air guide plates.



Install the distance collar and upper mounting bolt.

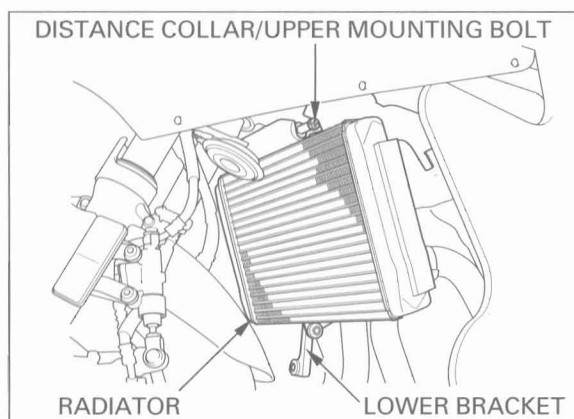
### CAUTION:

***Be careful not to damage the main wire harness.***

Install the radiator lower bracket.  
Connect the fan motor connector.

Install the following:

- Upper cowl cover/inner panel (page 2-8)
- Lower cowl (page 2-7)



## VALVE CLEARANCE

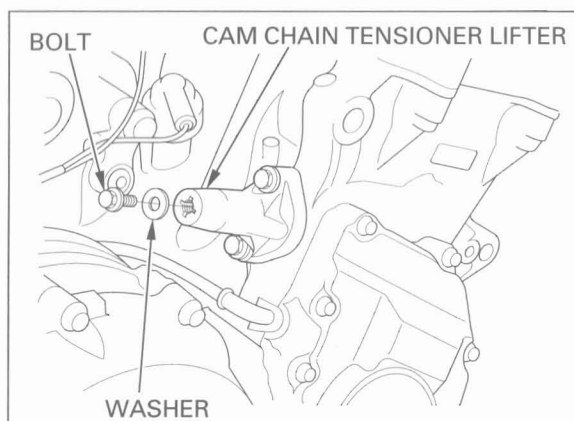
### INSPECTION

#### NOTE:

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

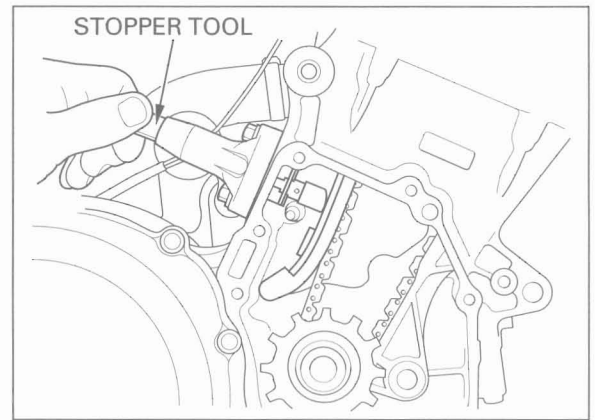
Remove the lower cowl (page 2-7).  
Remove the cylinder head cover (page 8-4).

Remove the cam chain tensioner lifter sealing bolt and washer.

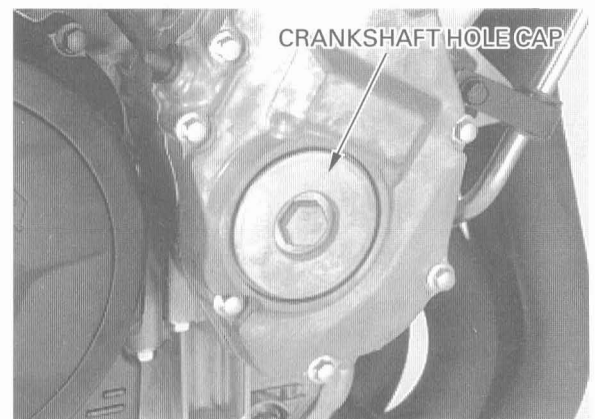




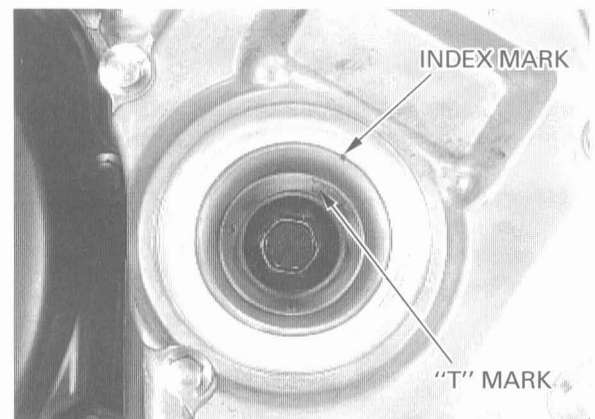
Turn the cam chain tensioner lifter shaft fully and secure it using the mechanic's tensioner stopper tool (page 8-6).



Remove the crankshaft hole cap and O-ring.

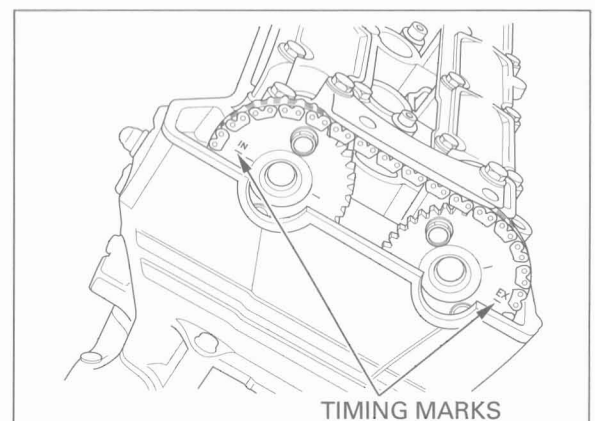


Turn the crankshaft clockwise, align the "T" mark on the ignition pulse generator rotor with the index mark on the ignition pulse generator rotor cover.



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

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



## MAINTENANCE

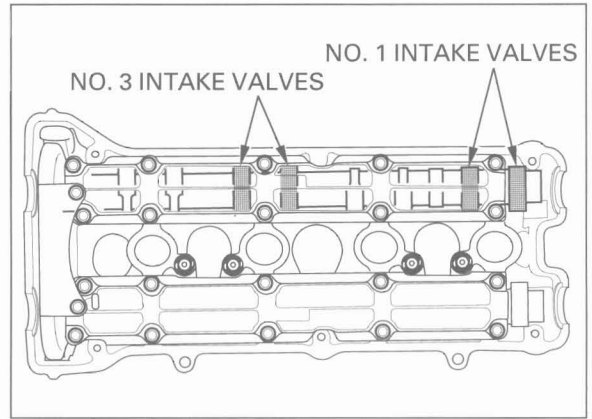
Insert the feeler gauge between the valve lifter and the cam lobe.

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

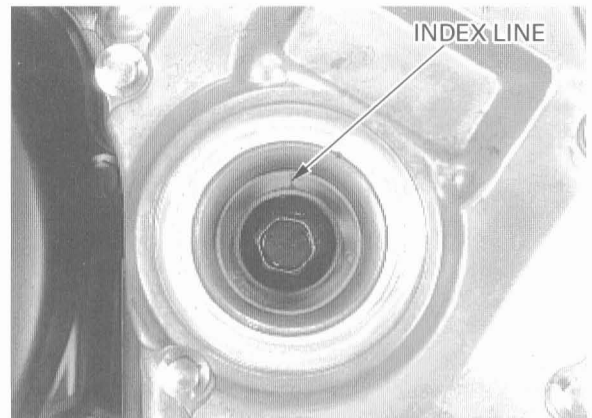
*Record the clearance for each valve for reference in shim selection if adjustment is required.*

### VALVE CLEARANCE:

**IN:**  $0.16 \pm 0.03$  mm ( $0.006 \pm 0.001$  in)



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

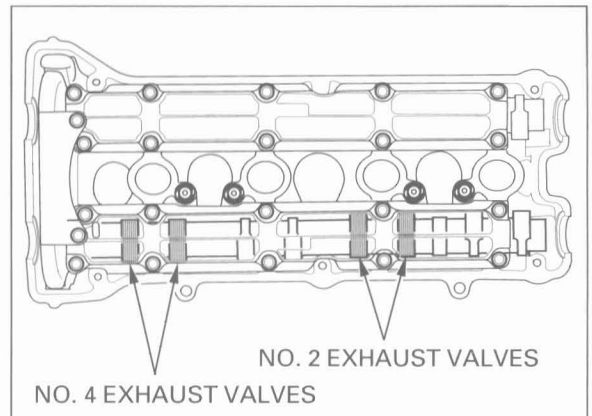


Check the valve clearance for the No. 2 and No. 4 cylinder exhaust valves using a feeler gauge.

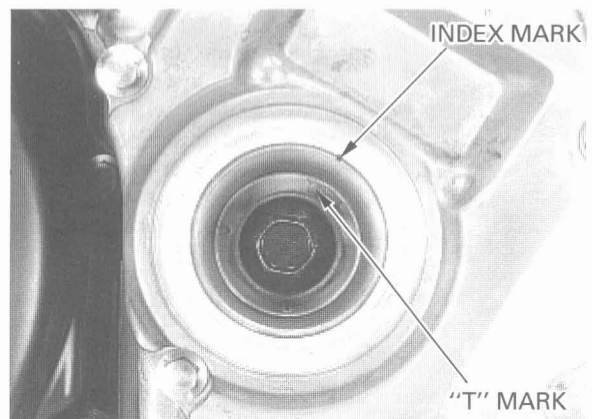
*Record the clearance for each valve for reference in shim selection if adjustment is required.*

### VALVE CLEARANCE:

**EX:**  $0.22 \pm 0.03$  mm ( $0.009 \pm 0.001$  in)



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

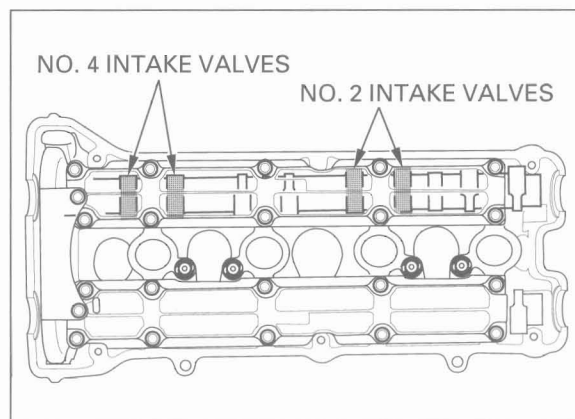


Check the valve clearance for the No. 2 and No. 4 cylinder intake valves using feeler gauge.

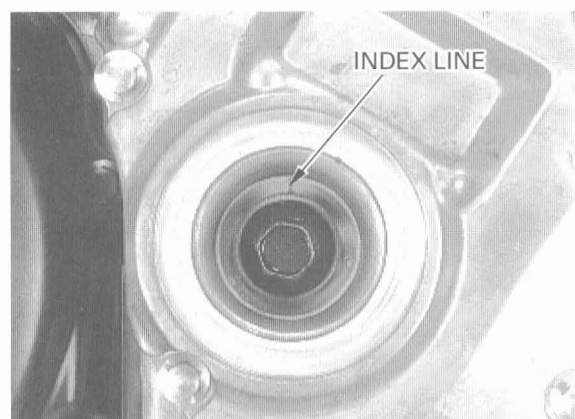
*Record the clearance for each valve for reference in shim selection if adjustment is required.*

**VALVE CLEARANCE:**

**IN:**  $0.16 \pm 0.03$  mm ( $0.006 \pm 0.001$  in)



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

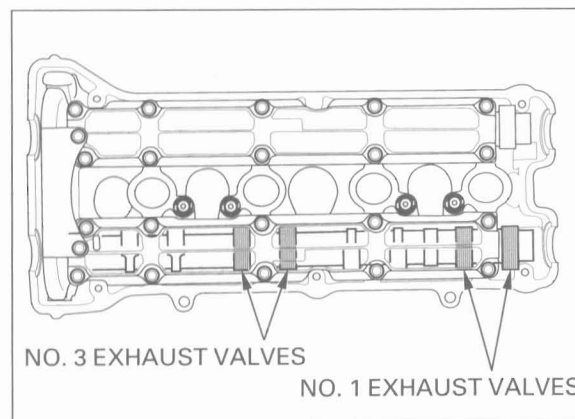


Check the valve clearance for the No. 1 and No. 3 cylinder exhaust valves using a feeler gauge.

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

**VALVE CLEARANCE:**

**EX:**  $0.22 \pm 0.03$  mm ( $0.009 \pm 0.001$  in)

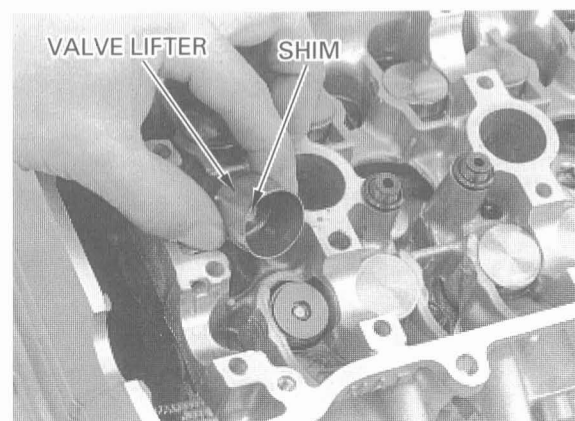


**ADJUSTMENT**

Remove the camshaft (page 8-5).  
Remove the valve lifters and shims.

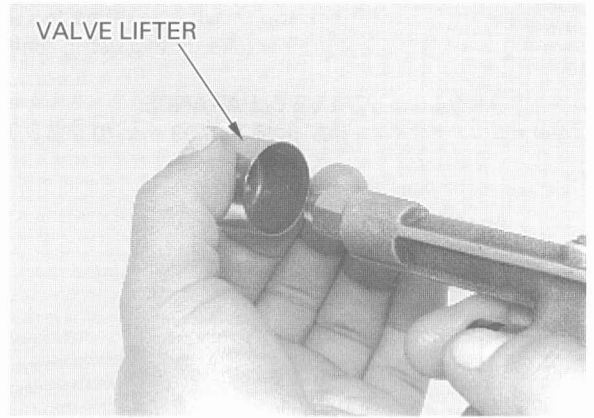
**NOTE:**

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



## MAINTENANCE

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

Install the newly selected shim on the valve retainer.

Apply molybdenum disulfide oil to the valve lifters. Install the valve lifters into the valve lifter holes.

**NOTE:**

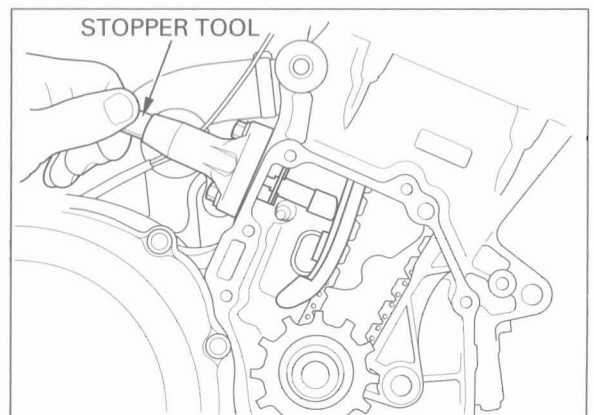
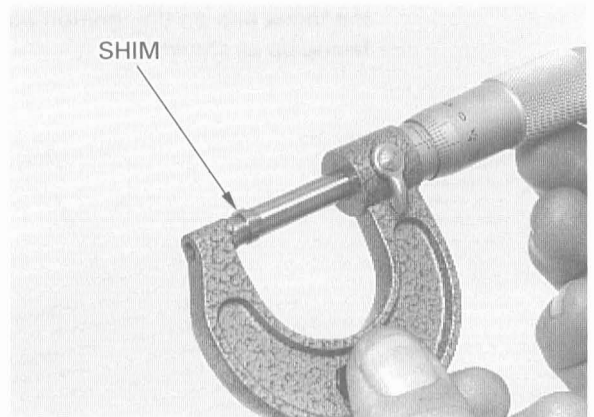
Install the shims and valve lifters in their original locations.

Install the camshaft (page 8-20).

Rotate the camshafts by rotating the crankshaft clockwise several times.

Recheck the valve clearance.

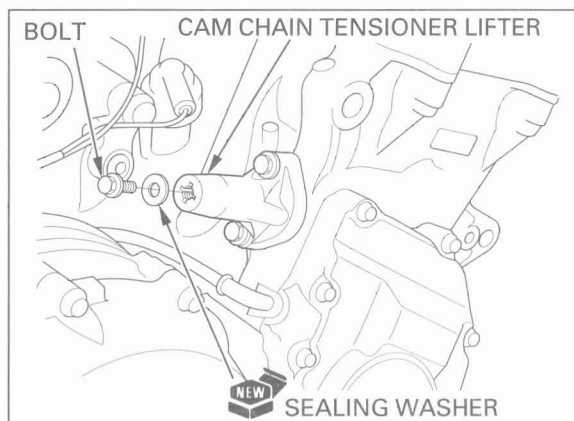
Remove the cam chain tensioner stopper tool.



Install the new sealing washer and cam chain tensioner lifter sealing bolt.  
Tighten the bolt to the specified torque.

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

Install the removed parts in the reverse order of removal.



## ENGINE OIL/OIL FILTER

### OIL LEVEL INSPECTION

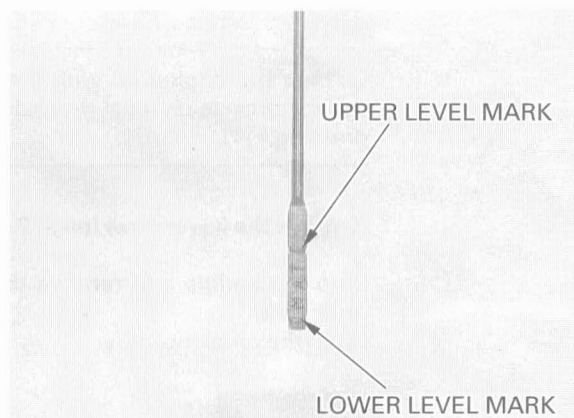
Start the engine and let it idle for 2 – 3 minutes.  
Turn off the engine and support the motorcycle on its center stand.

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

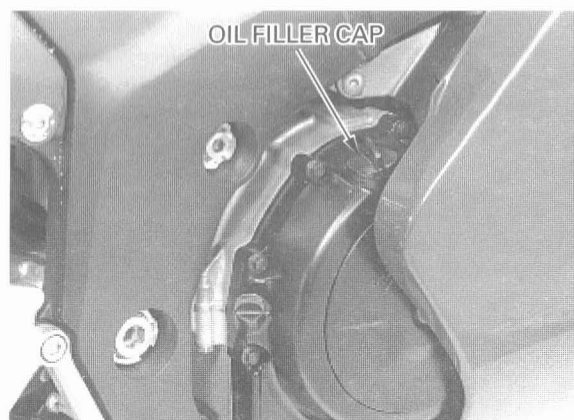


Remove the oil level dipstick and check the oil level.

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



Remove the oil filler cap.



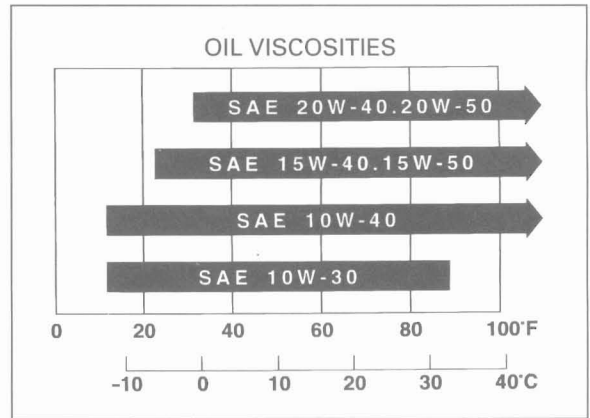
Fill the recommended engine oil up to the upper level mark.

**RECOMMENDED ENGINE OIL:**

HONDA 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 filler cap and dipstick.

## ENGINE OIL & FILTER CHANGE

**▲WARNING**

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

Warm up the engine.

**NOTE:**

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

Remove the lower cowl (page 2-7).

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

Drain the oil completely.

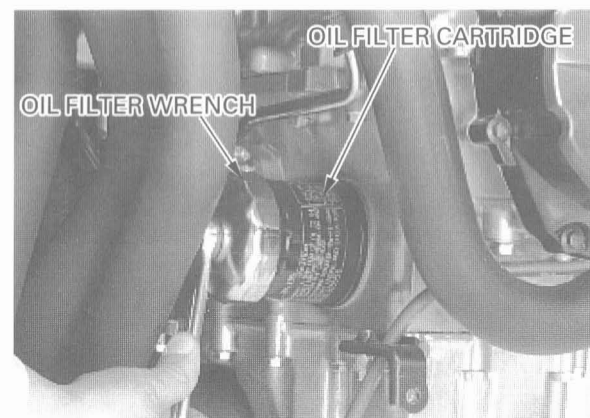
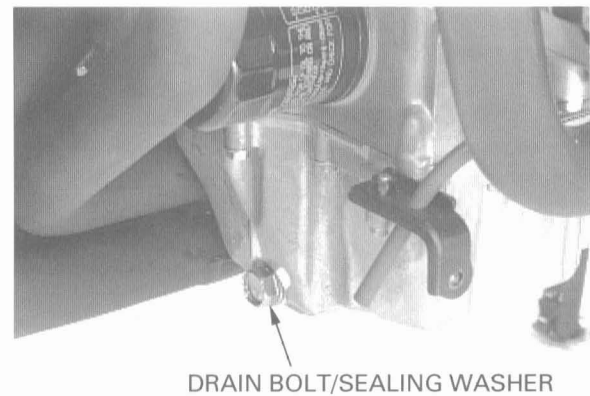
**▲WARNING**

*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.*

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

**TOOL:**

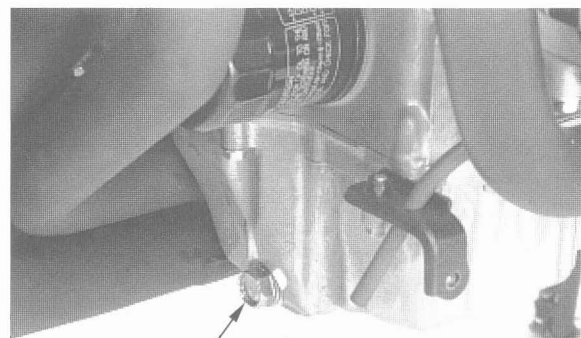
Oil filter wrench                      07HAA-PJ70100





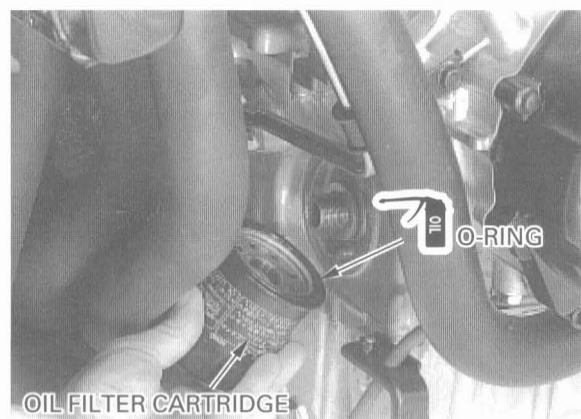
Check that the sealing washer on the drain bolt is in good condition, and replace if necessary. Install and tighten the drain bolt.

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



OIL DRAIN BOLT/  SEALING WASHER

Apply oil to the new oil filter O-ring.

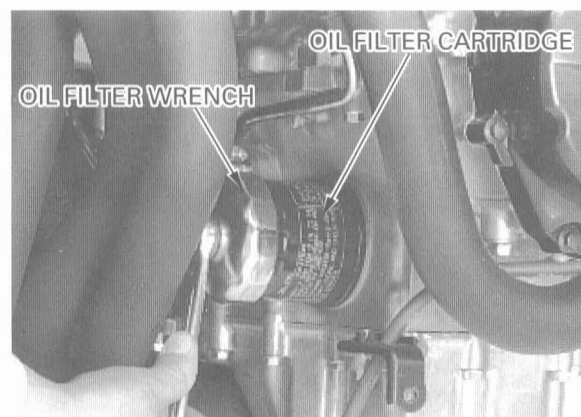


OIL FILTER CARTRIDGE

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

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

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



OIL FILTER WRENCH

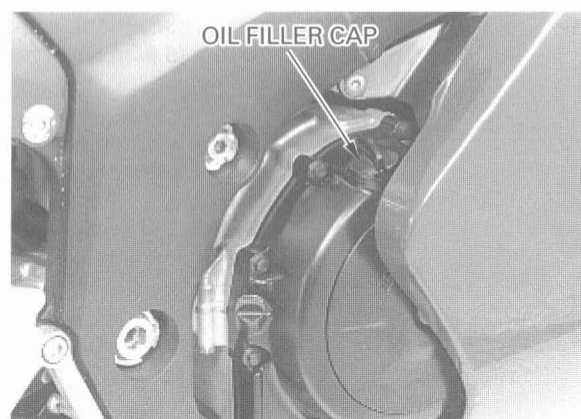
OIL FILTER CARTRIDGE

Fill the crankcase with recommended engine oil.

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

Install the oil filler cap.

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



OIL FILLER CAP

## CARBURETOR SYNCHRONIZATION

**NOTE:**

Synchronize the carburetors with the engine at normal operating temperature, transmission is in neutral and the motorcycle supported securely on a level surface.

Remove the following:

- Fuel tank (page 2-2)
- Lower cowl (page 2-7)

Remove the vacuum plugs from the engine intake ports.

Screw the adaptors in the intake ports. Install the 3-way joint to the fuel valve vacuum tube. Connect the fuel tube and vacuum tube to the fuel tank.

Connect the vacuum gauge tubes to the adaptors and 3-way joint.

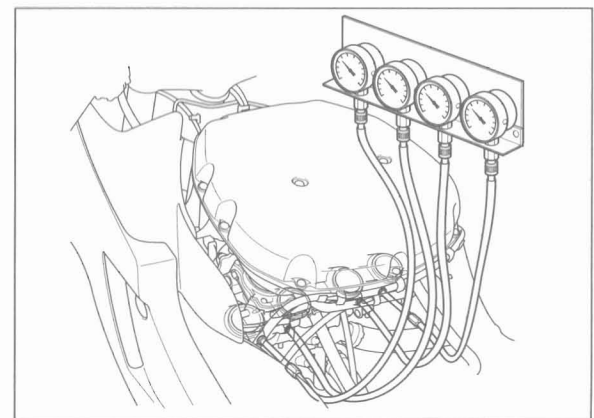
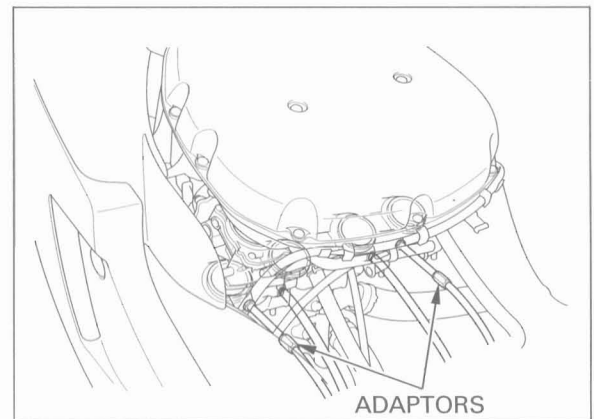
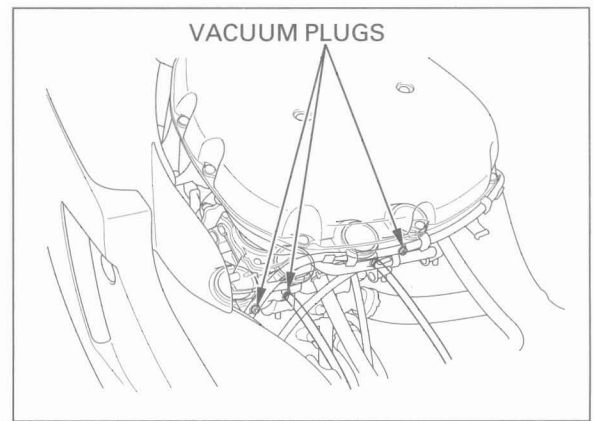
Start the engine and adjust the idle speed by turning the throttle stop screw.

**IDLE SPEED:** 1,100 ± 100 rpm

Check the each carburetor intake vacuum pressure is within 20 mm (0.8 in) Hg of the base carburetor.

**NOTE:**

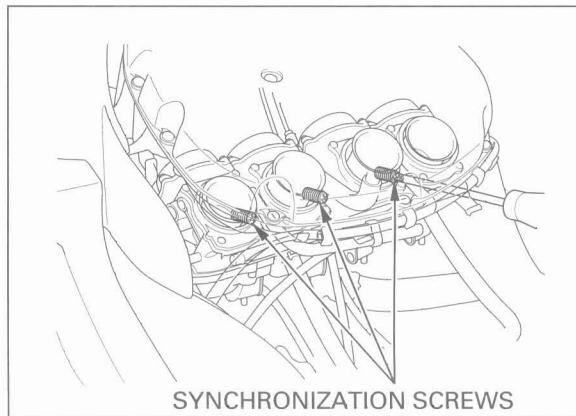
- The No. 3 carburetor cannot be adjusted; it is the base carburetor.
- The No. 3 cylinder intake vacuum pressure is the base vacuum pressure.





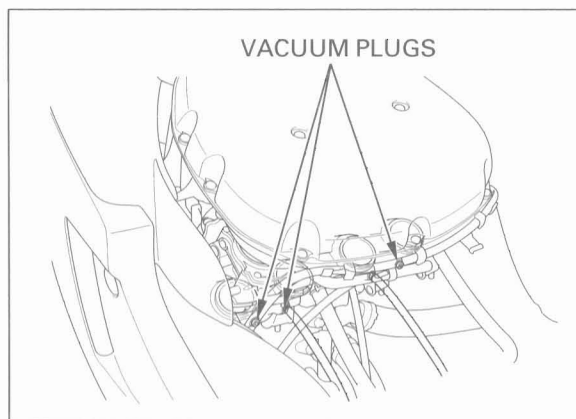
Synchronize to specification by turning the adjusting screw with the phillips screwdriver as shown.

Recheck the idle speed and each cylinder intake vacuum pressure so it is within 20 mm (0.8 in) Hg of the base carburetor reading after snapping the throttle grip 3 – 4 times.



Remove the vacuum gauge tubes.

Install the vacuum plugs into the intake ports, and tighten them securely.



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

**NOTE:**

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

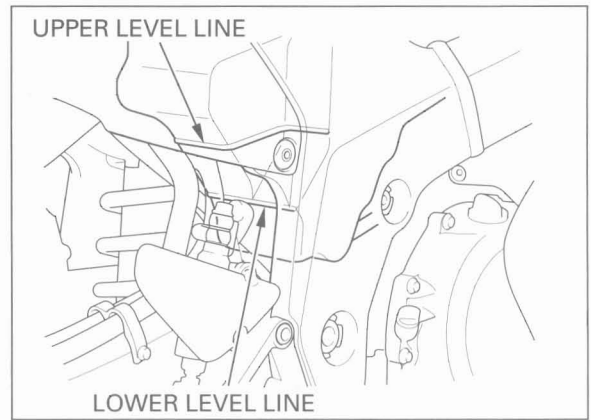
Warm up the engine for about ten minutes. Turn the throttle stop screw as required to obtain the specified idle speed.

**IDLE SPEED:** 1,100 ± 100 rpm



## RADIATOR COOLANT

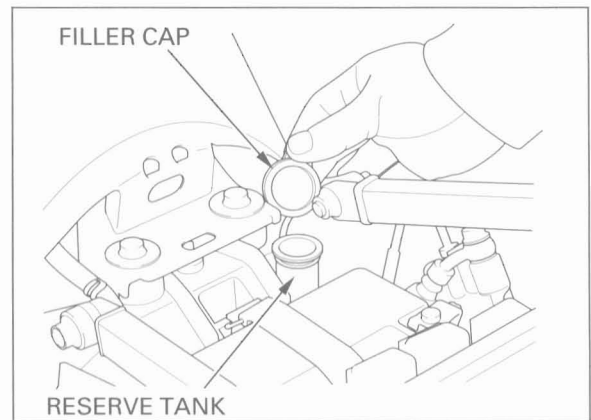
Check the coolant level of the reserve tank with the engine running at normal operating temperature. The level should be between the "UPPER" and "LOWER" level lines.



If necessary, add recommended coolant.

Remove the seat (page 2-2).

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



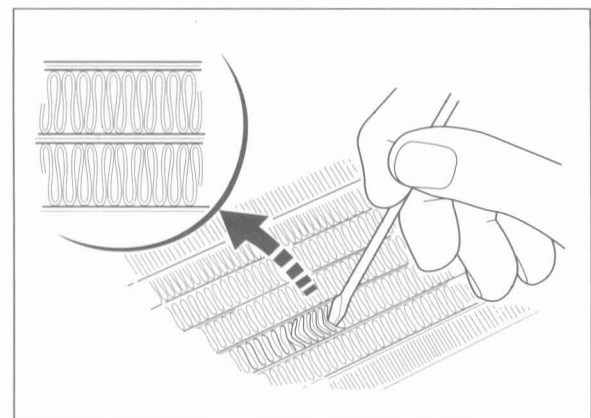
## COOLING SYSTEM

Remove the lower cowl (page 2-7).

Check the radiator air passages for clogging or damage.

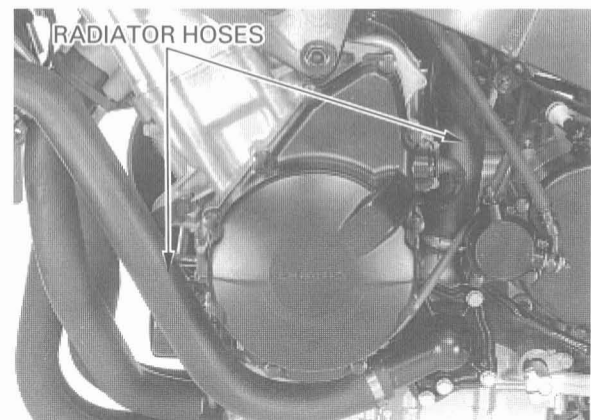
Straighten bent fins, and remove insects, mud or other obstructions with compressed air or low water pressure.

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

Remove the following:

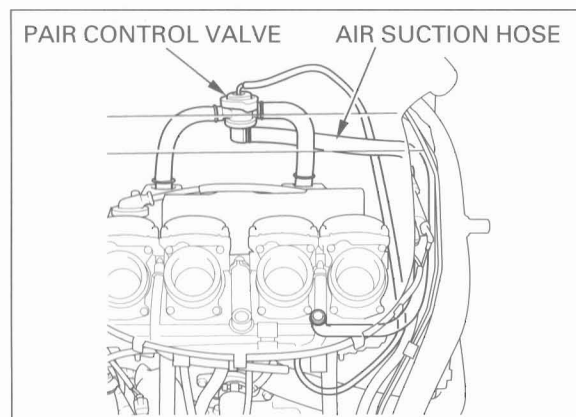
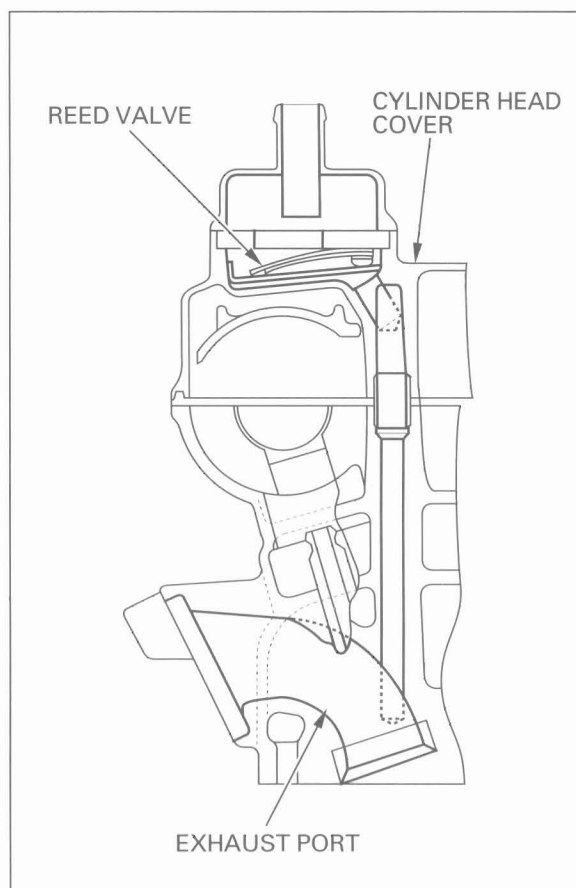
- Fuel tank (page 2-2)
- Lower cowl (page 2-7)

Check the air injection hoses between the pulse secondary air injection (PAIR) control 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 control valve for damage.

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

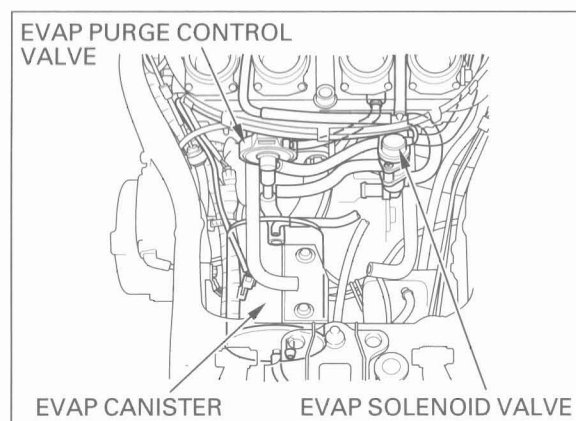


## EVAPORATIVE EMISSION CONTROL SYSTEM (CALIFORNIA TYPE ONLY)

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

Check the EVAP canister for cracks or other damage.

Refer to the Vacuum Hose Routing Diagram Label (page 1-38) 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 side stand and shift the transmission into neutral.

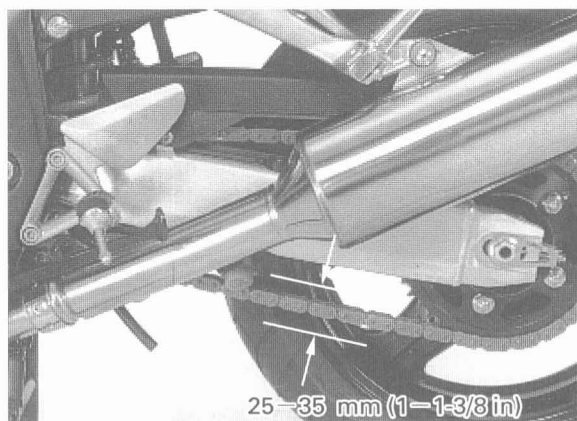
Check the slack in the drive chain lower run midway between the sprockets.

**CHAIN SLACK:** 25–35 mm (1–1-3/8)

**CAUTION:**

*Excessive chain slack, 50 mm (1.97 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

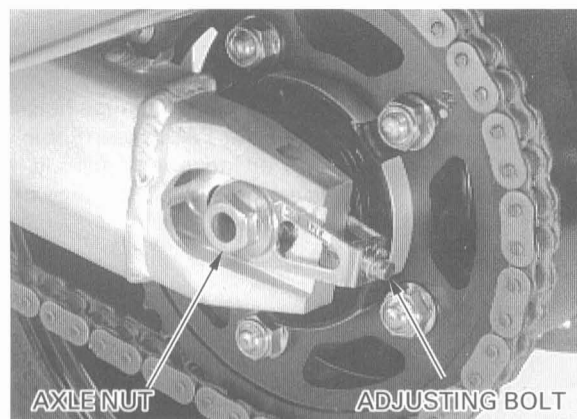
Loosen the rear axle nut.

Turn both adjusting bolts until the correct drive chain slack is obtained.

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

Tighten the rear axle nut to the specified torque.

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

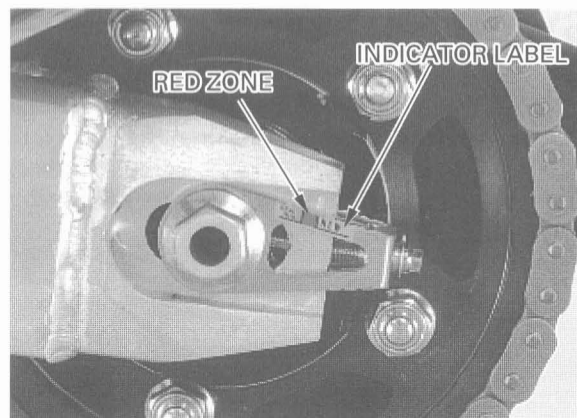


Recheck the drive chain slack and free wheel rotation.

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

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

If the red zone of the indicator label reaches the end of the swingarm, replace the drive chain with a new one (page 3-22).



**CLEANING AND LUBRICATION**

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

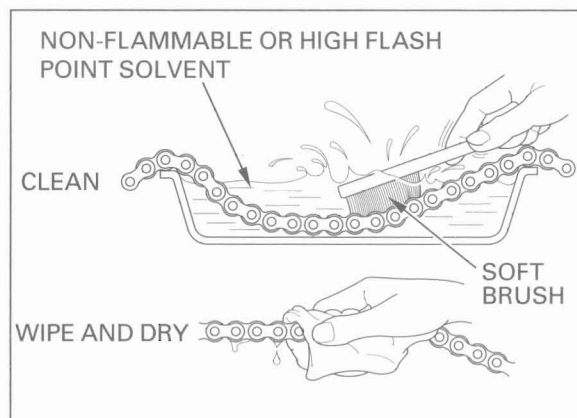
Be sure the chain has dried completely before lubricating.

Inspect the drive chain for possible damage or wear.

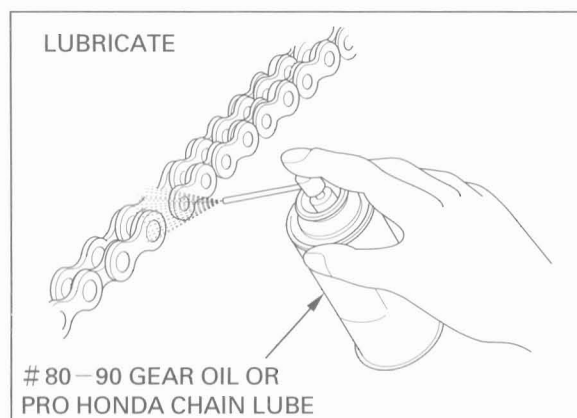
Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.

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

Inspect and replace sprocket as necessary.



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

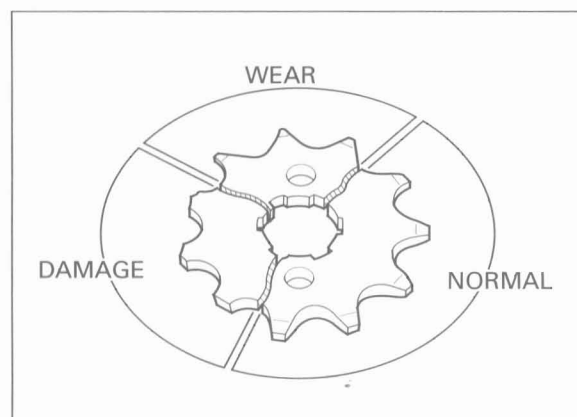


**SPROCKET INSPECTION**

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

Never use a new drive chain on worn sprockets.

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



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

If any are loose, torque them.

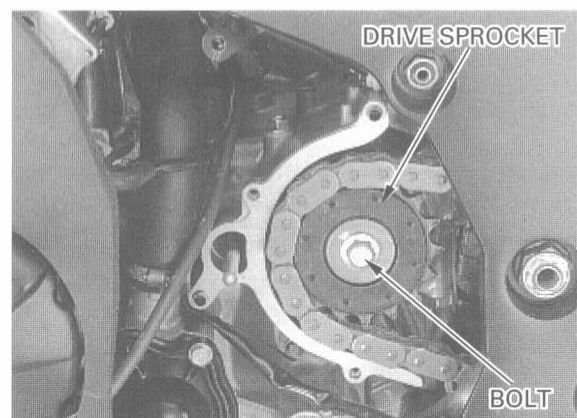
**TORQUE:**

**Drive sprocket bolt:**

54 N·m (5.5 kgf·m , 40 lbf·ft)

**Driven sprocket nut:**

108 N·m (11.0 kgf·m , 80 lbf·ft)

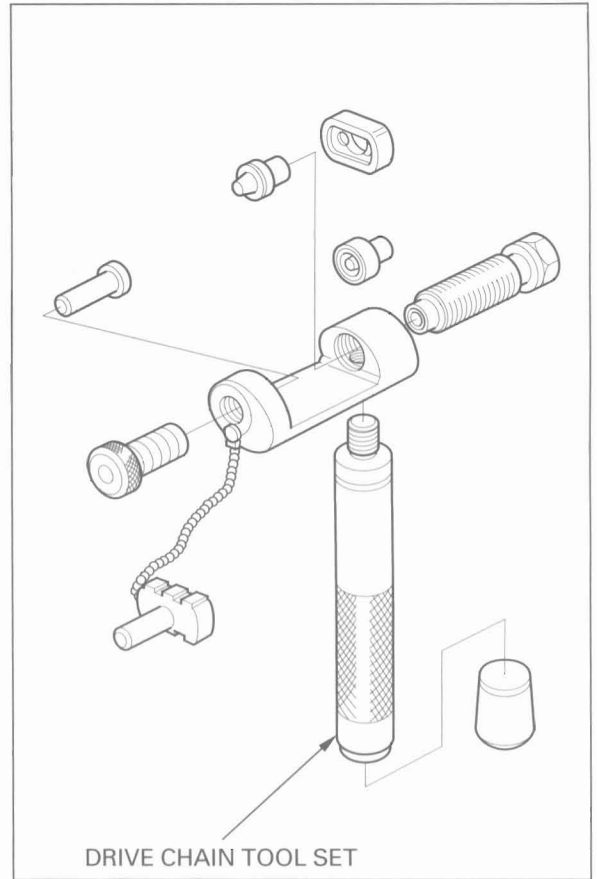


**REPLACEMENT**

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

**TOOL:**  
**Drive chain tool set**      07HMH-MR10103

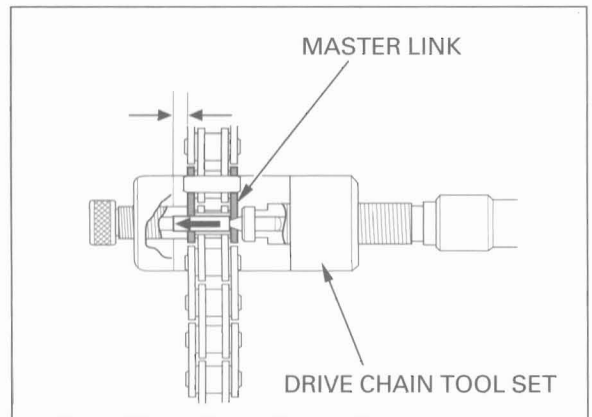
**NOTE:**  
 When using the special tool, follow the manufacturer's instruction.



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

**TOOL:**  
**Drive chain tool set**      07HMH-MR10103

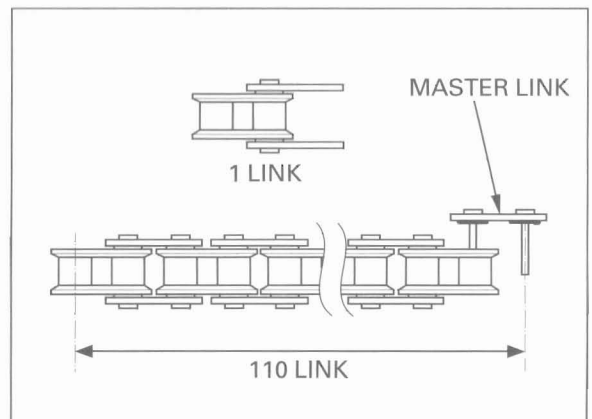
Remove the drive chain.



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

**NOTE:**  
 Include the master link when you count the drive chain links.

**STANDARD LINKS:** 110 links  
**REPLACEMENT CHAIN:**  
**DID:** DID50ZVS-120ZB  
**RK:** RK50LFOZ1-120LJ-FZ



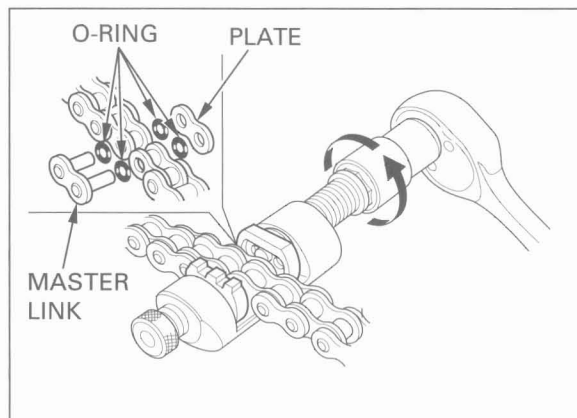
**CAUTION:**

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

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

**CAUTION:**

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



Assemble and set the drive chain tool set.

**TOOL:**

**Drive chain tool set** 07HMH-MR10103

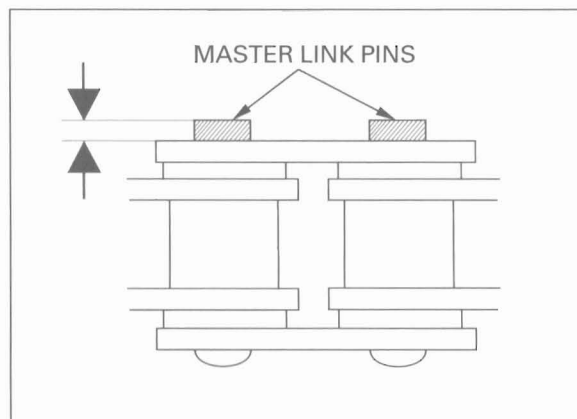
Make sure that the master link pins are installed properly.  
Measure the master link pin length projected from the plate.

**STANDARD LENGTH:**

**DID:** 1.15 – 1.55 mm (0.045 – 0.061 in)

**RK:** 1.20 – 1.40 mm (0.047 – 0.055 in)

Stake the master link pins.

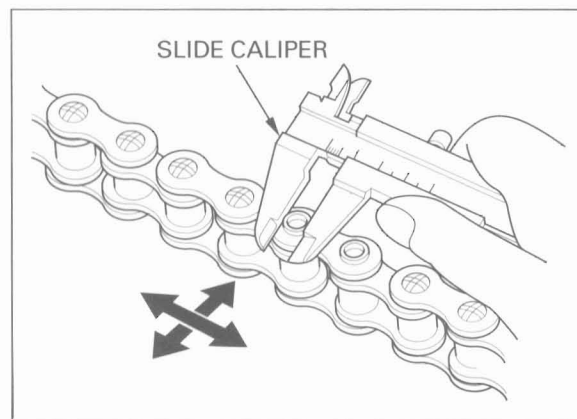


Make sure that the pins are staked properly by measuring the diameter of the staked area using a slide caliper.

**DIAMETER OF THE STAKED AREA:**

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

**RK:** 5.55 – 5.85 mm (0.219 – 0.230 in)

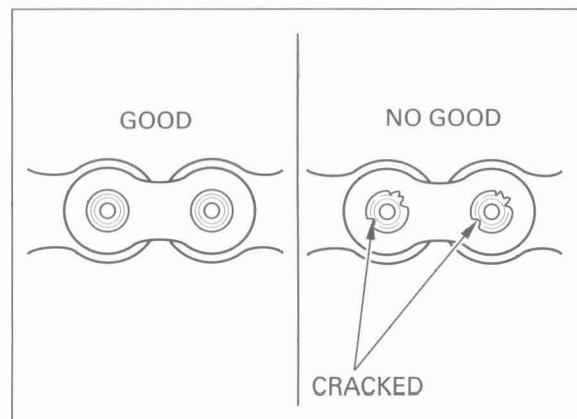


After staking, check the staked area of the master link for cracks.

If there is any cracking, replace the master link, O-rings and plate.

**CAUTION:**

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





## 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:**

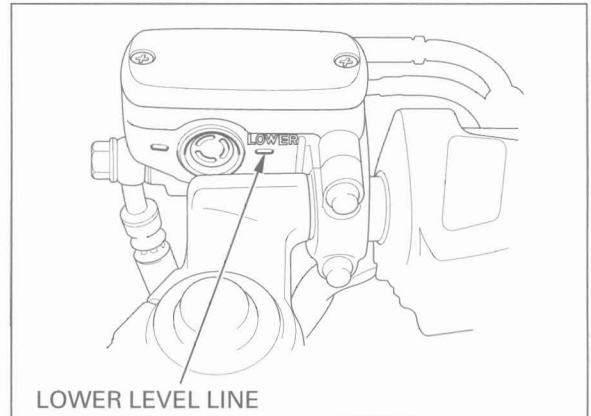
When the fluid level is low, check the brake pads for wear (see next page). A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper piston is pushed out, and this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check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

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

Refer to page 15-10 for brake pad replacement.

### REAR BRAKE PADS

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

Refer to page 15-11 for brake pad replacement.



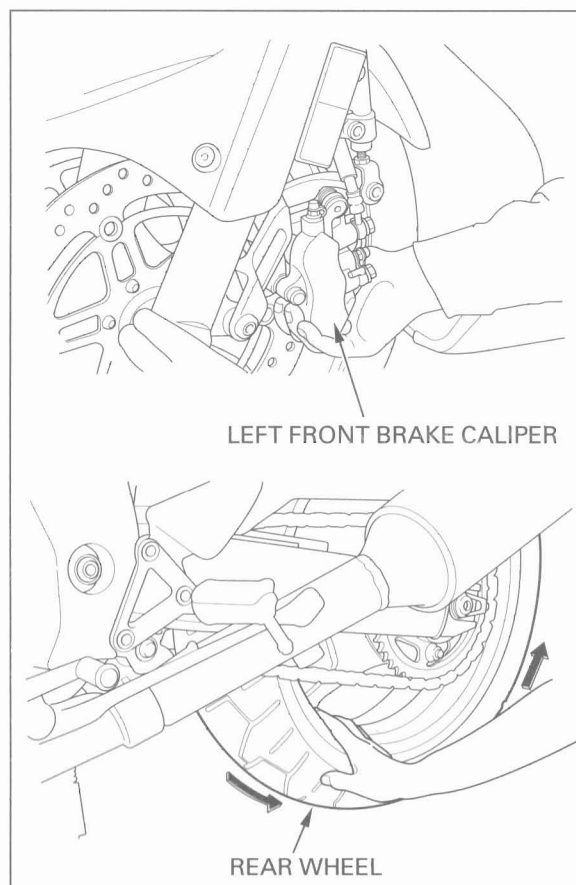


## BRAKE SYSTEM

### INSPECTION

This model is equipped with a 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.

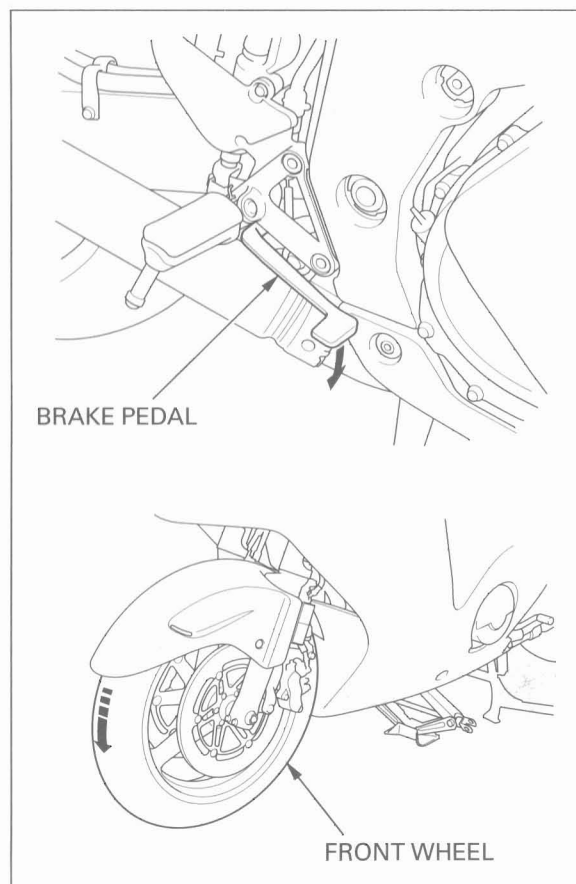


Jack-up the motorcycle to raise the front wheel off the ground.

### 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.

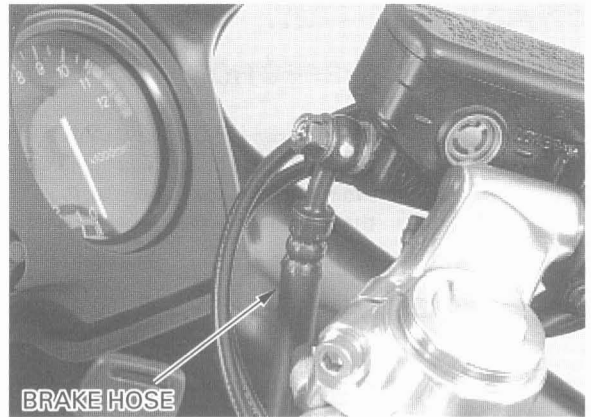


## MAINTENANCE

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

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

Refer to page 15-5 for brake bleeding procedures.



### BRAKE LEVER ADJUSTMENT

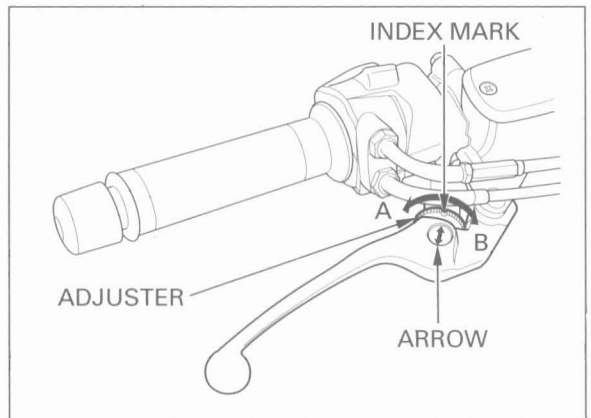
The distance between the top of the brake lever and the grip can be adjusted by turning the adjuster.

**DIRECTION A:** Brake lever further away from the grip

**DIRECTION B:** Brake lever closer to the grip

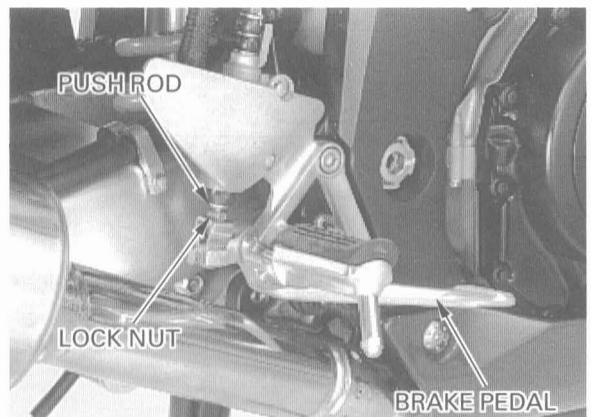
**CAUTION:**

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



### BRAKE PEDAL HEIGHT ADJUSTMENT

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



### BRAKE LIGHT SWITCH

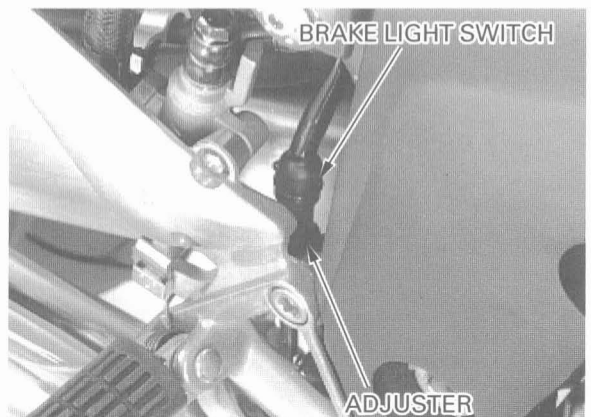
**NOTE:**

The front brake light switch does not require adjustment.

Adjust the brake light switch so that the brake light comes on just prior to the brake actually being engaged.

If the light fails to come on, adjust the switch so that the light comes on at the proper time.

Hold the switch body and turn the adjuster. Do not turn the switch body.



## HEADLIGHT AIM

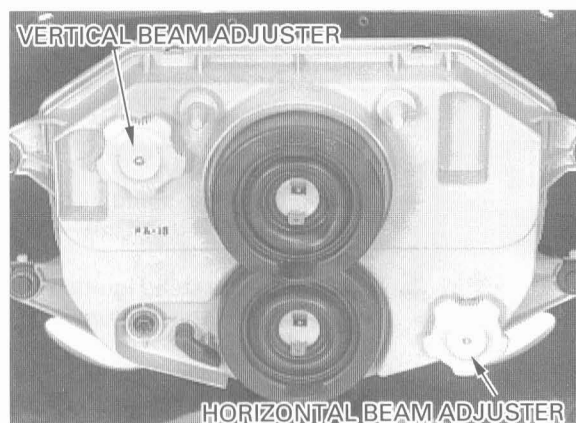
**▲WARNING**

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

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

Place the motorcycle on a level surface.  
Adjust the headlight beam vertically by turning the vertical beam adjuster.  
A clockwise rotation moves the beam up.

Horizontal beam adjustments are made using the horizontal beam adjuster.  
A clockwise rotation moves the beam toward the right side of the rider.



## CLUTCH SYSTEM

### CLUTCH LEVER ADJUSTMENT

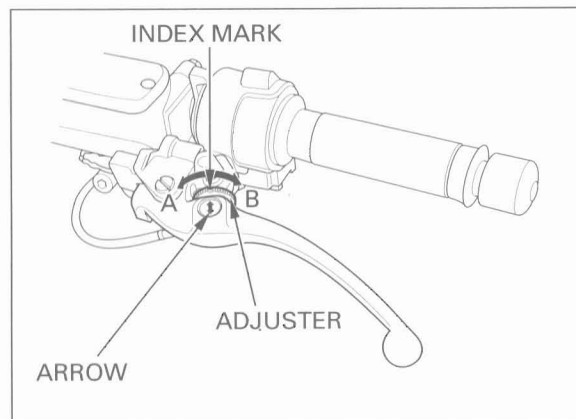
The distance between the top of the clutch lever and the grip can be adjusted by turning the adjuster.

**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

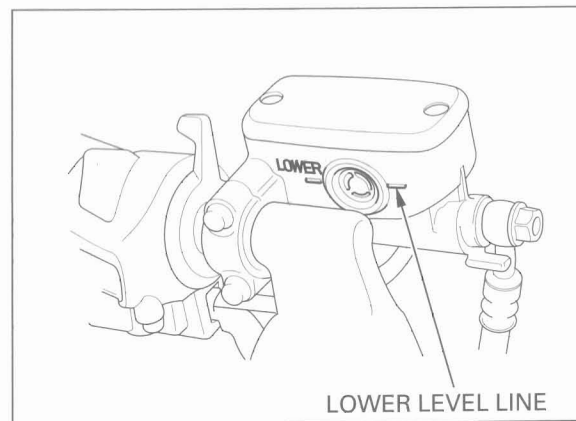
**CAUTION:**

- 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.

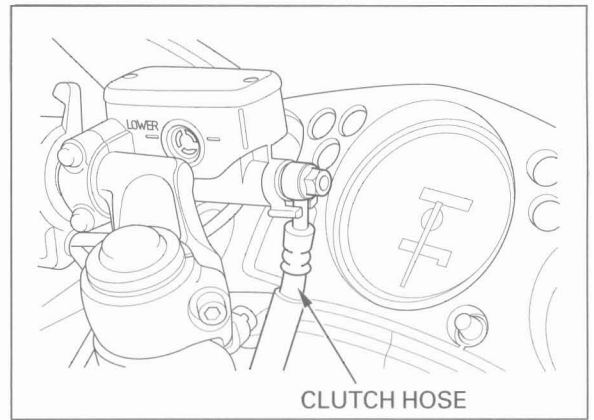
Turn the handlebar to the right so that the reservoir is level and check the clutch fluid reservoir level through the sight glass.



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 fitting as required.

Refer to page 9-3 for hydraulic clutch bleeding procedures.



## SIDE STAND

Support the motorcycle on its center stand.

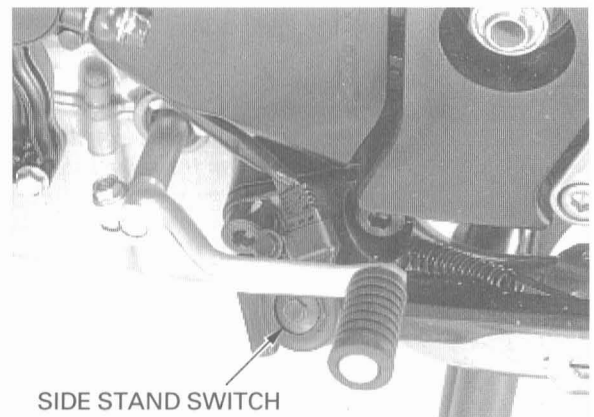
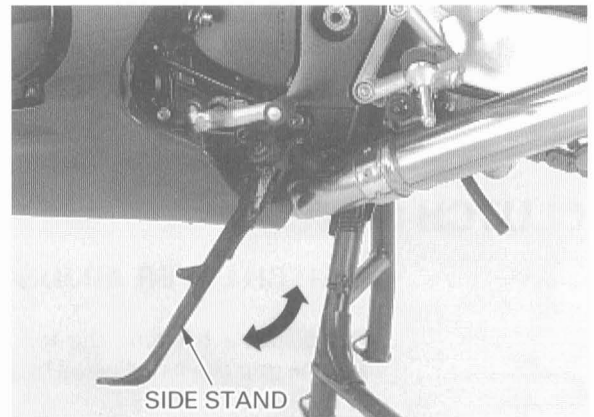
Check the side stand spring for damage or loss of tension.

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

Check the side stand ignition cut-off system:

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

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



## SUSPENSION

### ▲WARNING

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

### FRONT SUSPENSION INSPECTION

Check the action of the forks by operating the front brakes and compressing the front suspension several times.

Check the entire assembly for signs of leaks, damage or loose fasteners.

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

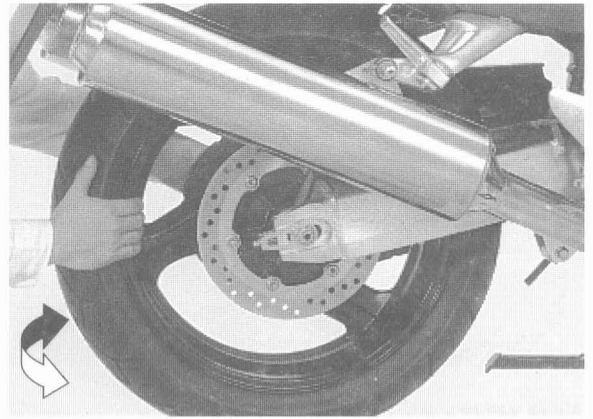
Refer to section 13 for fork service.



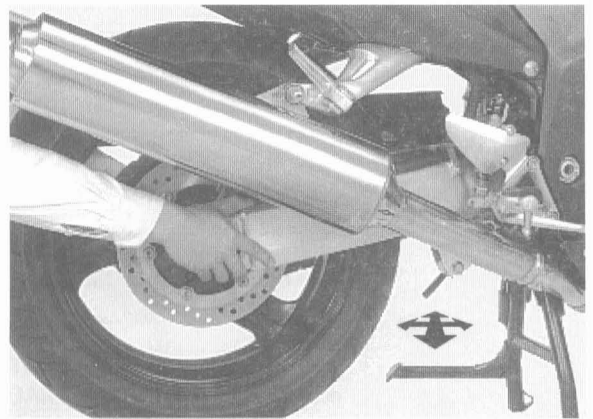
## REAR SUSPENSION INSPECTION

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

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



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

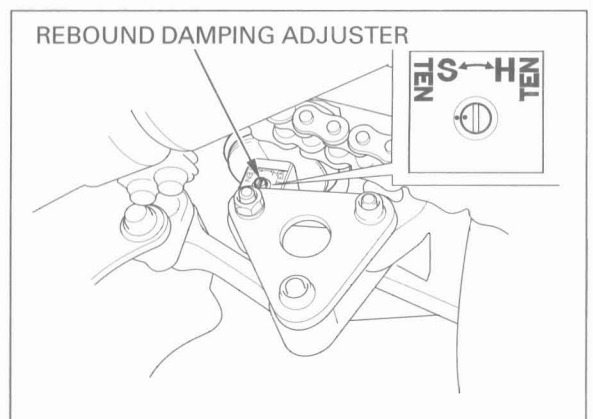
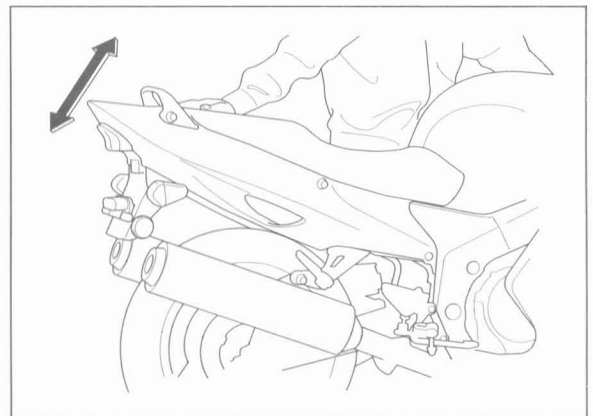
**DIRECTION H:** Increase the damping force

**DIRECTION S:** Decrease the damping force

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

#### REBOUND ADJUSTER STANDARD POSITION:

1 turn out from full hard



## NUTS, BOLTS, FASTENERS

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

## WHEELS/TIRES

**NOTE:**

Tire pressure should be checked when the tires are COLD.

**RECOMMENDED TIRE PRESSURE AND TIRE SIZE:**

		FRONT	REAR
Tire pressure kPa (kg/cm <sup>2</sup> , psi)		290 (2.90 , 42)	290 (2.90 , 42)
Tire size		120/70 ZR17	180/55 ZR17
Tire brand	Bridgestone	BT57F RADIAL G	BT57R RADIAL G
	Dunlop	D205FJ	D205G
	Michelin	MACADAM 90 X S	MACADAM 90 X S



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

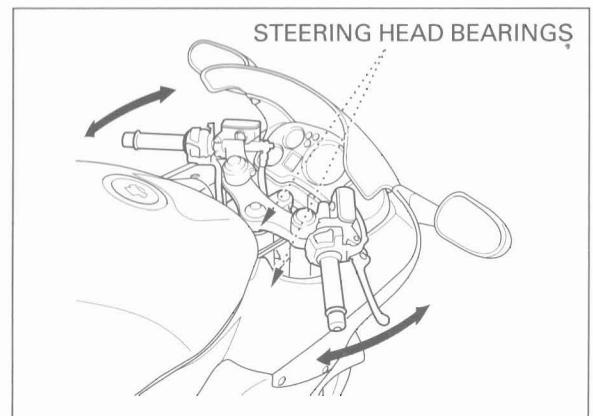
**NOTE:**

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.

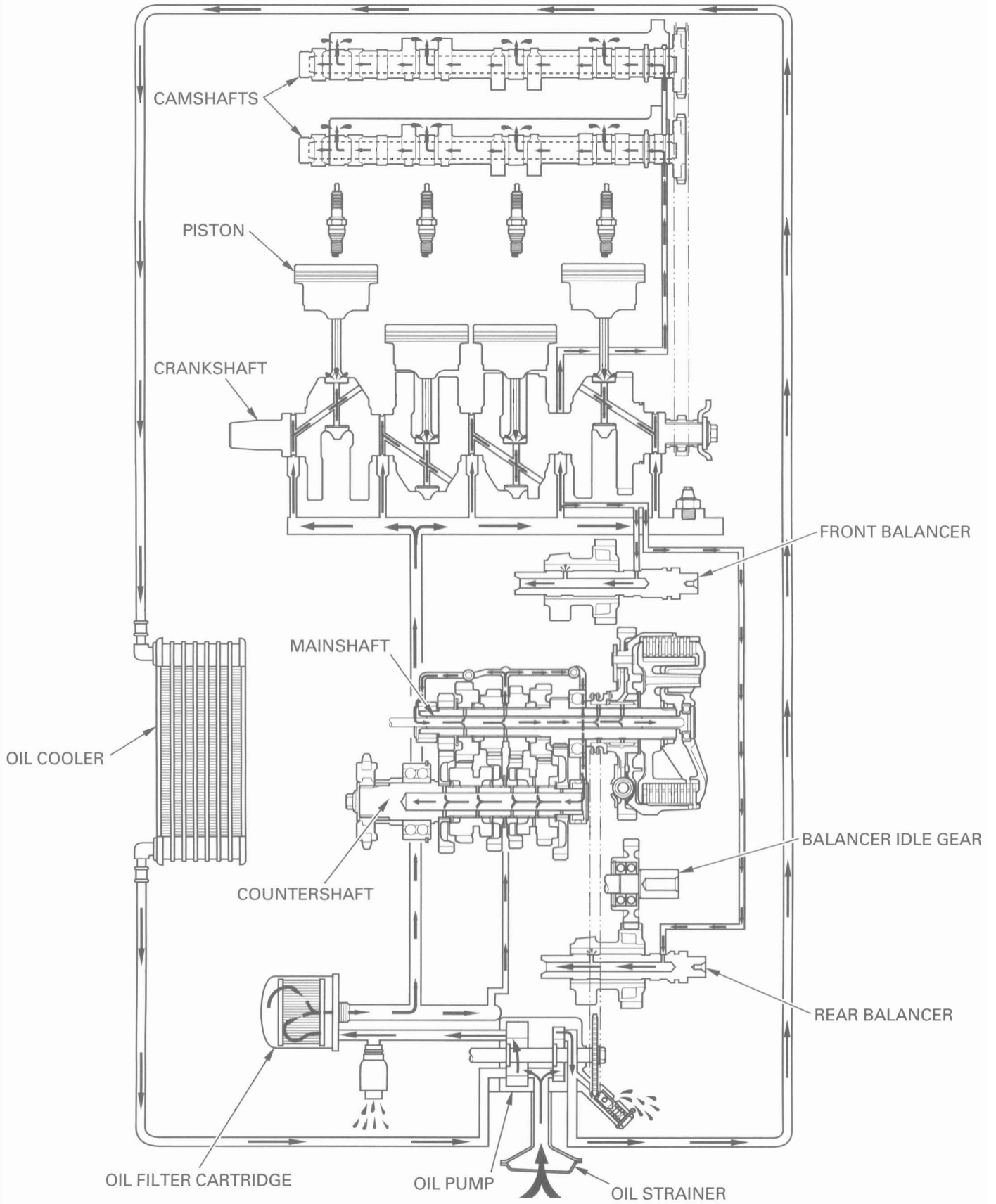
If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (Section 13).



DATE	MILES	MEMO
2/13/05	16,000	carb sync, new 16 tooth sprocket on front. change coolant, change clutch fluid, opened pilots 3 turn change front+rear brake fluid, tank painted
4/16/05	17,350	17 tooth OEM Front sprocket, oil + filter
5/06/05	17,900	New Front + Rear BT 020 FJR OEM'S
7/01/05	19,750	New Rear Pirelli Strada for trip oil + filter
7/17/05	24,400	New Plugs + Air Filter, Oil + Filter Castrol GTX 10-40
8/13/05	25,400	New Front Brake - Honda STM
9/19/05	27,000	Oil + Filter Shell Rotella SE 15-40
2/07/06	28,100	Reinstalled BT 20
3/11/06	28,213	Oil + Filter, Shell Rotella 5-40 Full Synthetic
3/24/06	28,480	New Front sprocket - Parts Unlimited (J.T.) 17 tooth
5/2/06	30,400	New Rear sprocket + Chain - Parts Unlimited, EK, J.T. New Pirelli Strada Front + Rear Front BT 020 lasted 12,500 miles (trip miles 4500) FJR OEM Back BT 020 lasted 4,150 miles FJR OEM DID Chain lasted 30,400 miles Stock sprocket lasted 30,400 (rear) Pirelli Strada Rear lasted 8350 (trip miles 4500)
6/07/06	31,660	Oil + Filter, Rotella 5-40 Full Synthetic
8/01/06	34,260	New Rear Avon 46 ST (Pirelli Strada lasted 3840 mi)
8/18/06	35,900	Oil + Filter, Rotella 5-40 Full Synthetic
8/26/06	36,160	New Plugs, Carb Sync



LUBRICATION SYSTEM DIAGRAM





# 4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM	4-0	OIL STRAINER/PRESSURE RELIEF VALVE	4-4
SERVICE INFORMATION	4-1	OIL PUMP	4-8
TROUBLESHOOTING	4-2	OIL COOLER	4-13
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 may cause loss of consciousness and may lead to death. Run the engine in an open area or with an exhaust evacuation system in enclosed area.
- Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil. **KEEP OUT OF REACH OF CHILDREN.**

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

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Engine oil capacity	At draining	3.8 ℓ (4.0 US qt, 3.3 Imp qt)	————	
	At disassembly	4.6 ℓ (4.9 US qt, 4.0 Imp qt)	————	
	At oil filter change	3.9 ℓ (4.1 US qt, 3.4 Imp qt)	————	
Recommended engine oil		HONDA 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/cm <sup>2</sup> , 71 psi) at 5,400 rpm/(176°F/80°C)	————	
Oil pump rotor	Feed pump	Tip clearance	0.15 (0.006) max.	0.20 (0.008)
		Body clearance	0.15–0.21 (0.006–0.008)	0.35 (0.014)
		Side clearance	0.04–0.09 (0.002–0.004)	0.12 (0.005)
	Cooler pump	Tip clearance	0.15 (0.006) max.	0.20 (0.008)
		Body clearance	0.15–0.21 (0.006–0.008)	0.35 (0.014)
		Side clearance	0.04–0.09 (0.002–0.004)	0.12 (0.005)

## LUBRICATION SYSTEM

---

### TORQUE VALUES

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

### TOOLS

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

## TROUBLESHOOTING

#### Engine oil level too low

- Oil consumption
- External oil leak
- Worn piston ring or incorrect piston ring installation
- Worn valve guide or seal

#### Low or no oil pressure

- Clogged oil orifice
- Incorrect oil being used

#### No oil pressure

- Oil level too low
- Oil pump drive sprocket broken
- Oil pump damaged (pump shaft)
- Internal oil leak

#### Low oil pressure

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

#### High oil pressure

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

## OIL PRESSURE INSPECTION

### NOTE:

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

Check the oil level (page 3-13).

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

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

### TOOLS:

<b>Oil pressure gauge</b>	07506-300000 (Equivalent commercially available in U.S.A.)
<b>Oil pressure gauge attachment</b>	07510-4220100 (Equivalent commercially available in U.S.A.)

Start the engine and increase the rpm to 5,400 rpm and read the oil pressure.

### OIL PRESSURE:

490 kPa (5.0 kgf/cm<sup>2</sup>, 71 psi) at 5,400 rpm (176°F/80°C)

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

Install and tighten it to the specified torque.

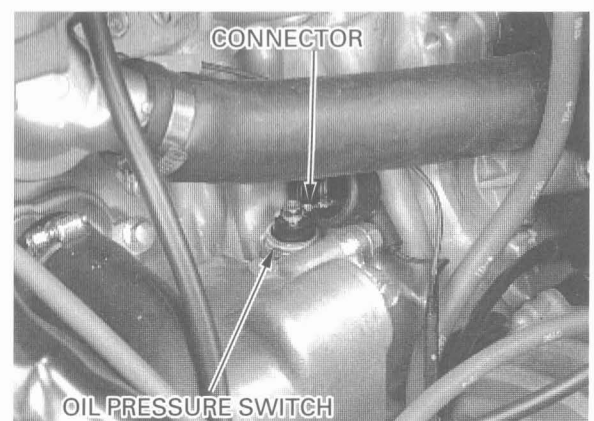
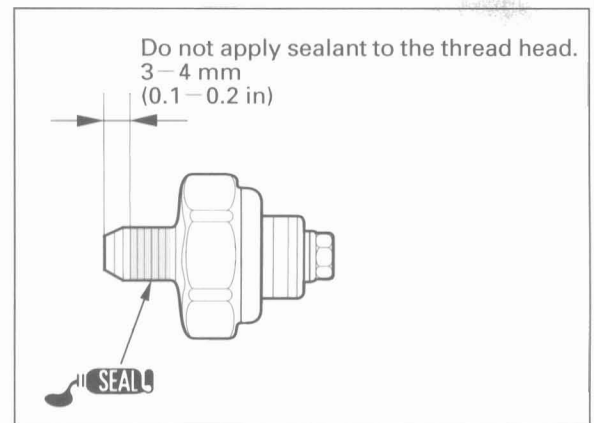
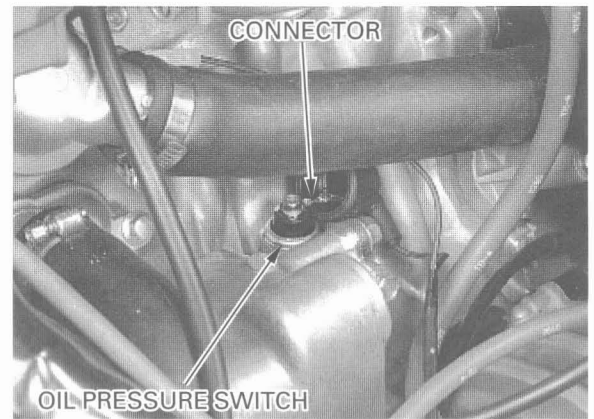
**TORQUE:** 12 N·m (1.2 kgf·m, 9 lbf·ft)

### CAUTION:

*To prevent crankcase damage, do not overtighten the switch.*

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

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

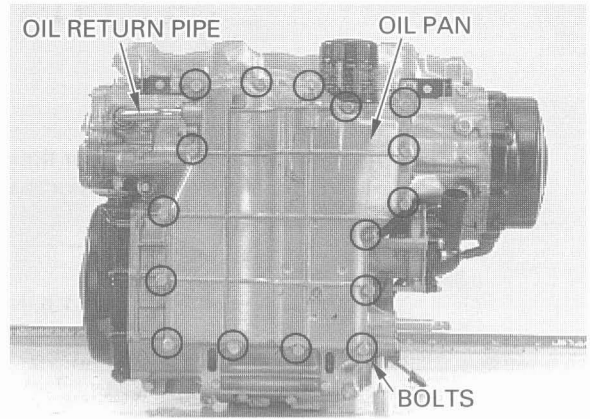


# OIL STRAINER/PRESSURE RELIEF VALVE

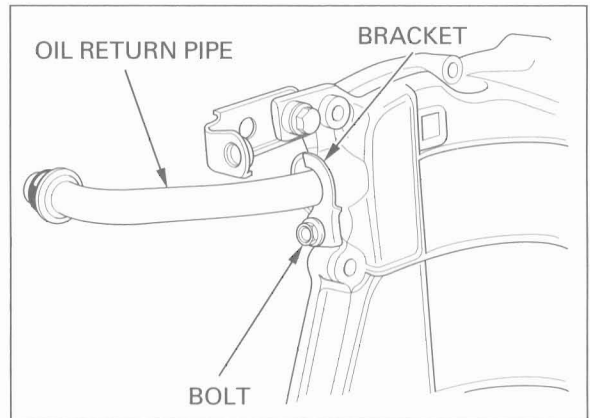
## REMOVAL

Drain the engine oil (page 3-14).  
Remove the exhaust pipe (page 2-21).

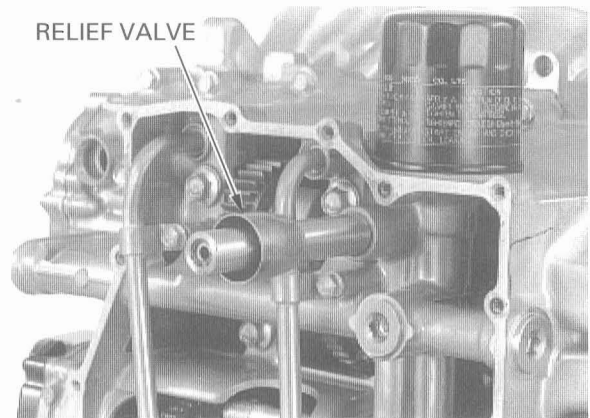
Remove the oil pan flange bolts.  
Disconnect the oil return pipe from the lower crankcase and remove the oil pan.



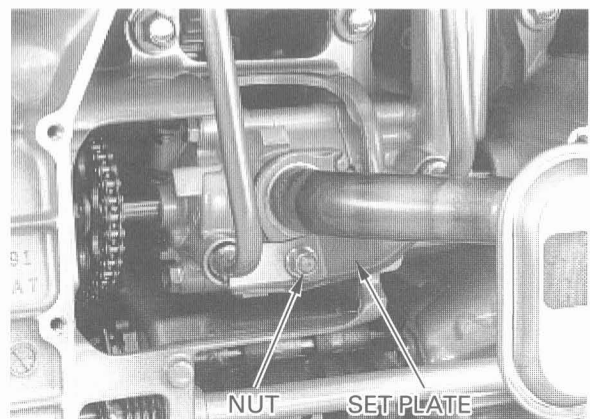
Remove the bolt and oil return pipe bracket.  
Remove the oil return pipe and O-rings.



Remove the pressure relief valve and O-ring.

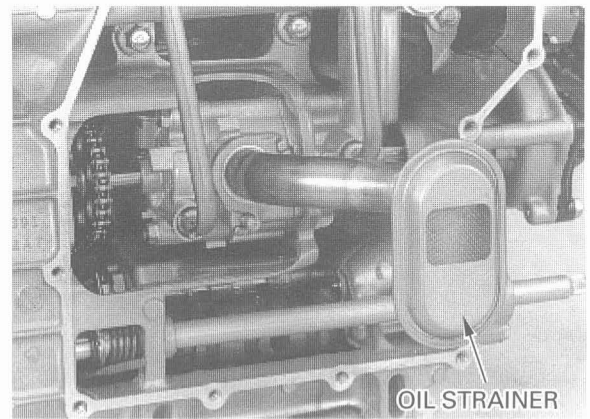


Remove the oil strainer and oil pipe set plate nut and plate.

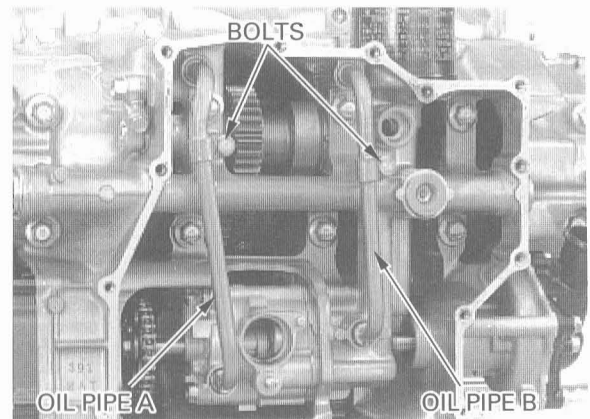


Remove the oil strainer and gasket.

Clean the oil strainer screen.



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



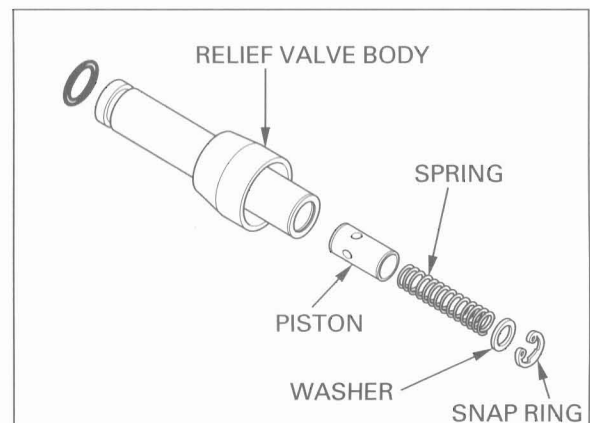
### INSPECTION

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

Disassemble the relief valve by removing the snap ring.

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

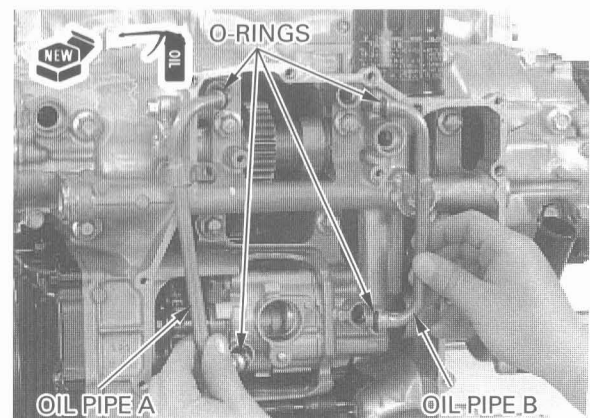
Assemble the relief valve in the reverse order of disassembly.



### INSTALLATION

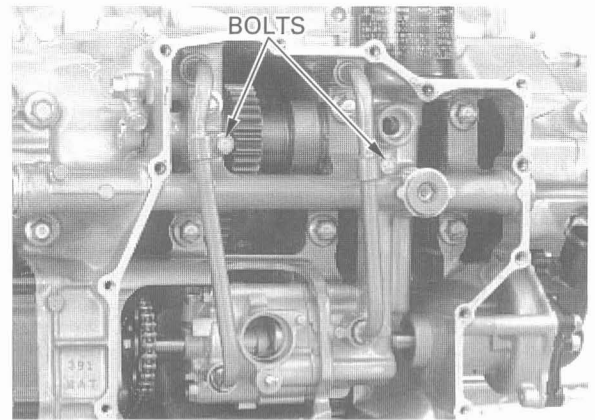
Apply oil to the new O-rings and install them onto the oil pipe A and B.

Install the oil pipe A and B into the crankcase.



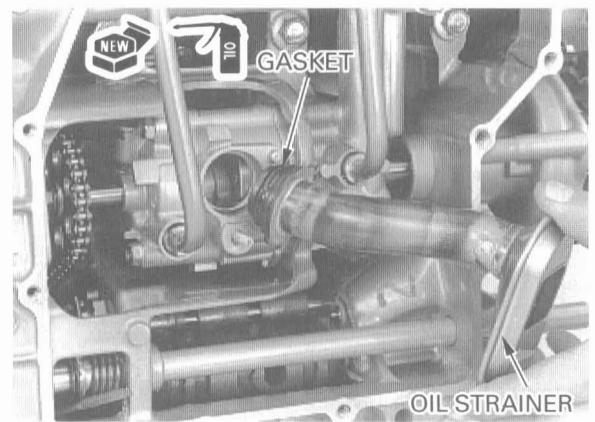
## LUBRICATION SYSTEM

Install and tighten the oil pipe mounting bolts.



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

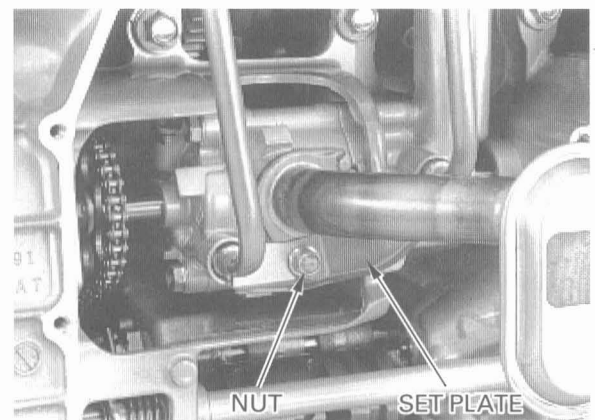
Install the oil strainer into the crankcase while aligning its grooves with the boss and stud bolt in the oil pump body.



Install the oil strainer set plate aligning its cut-outs with the oil pipes.

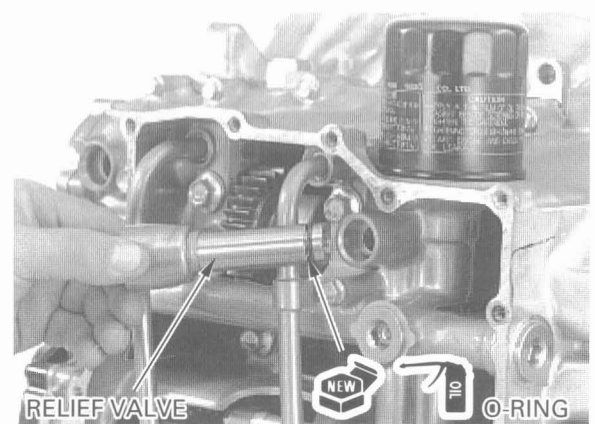
Tighten the nut to the specified torque.

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

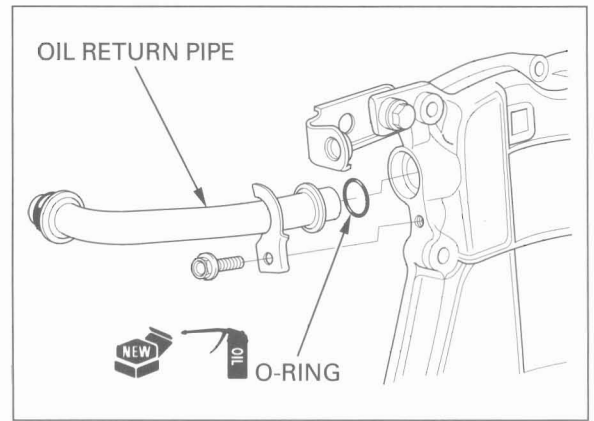


Apply oil to the new O-ring and install it onto the relief valve.

Install the relief valve into the crankcase.

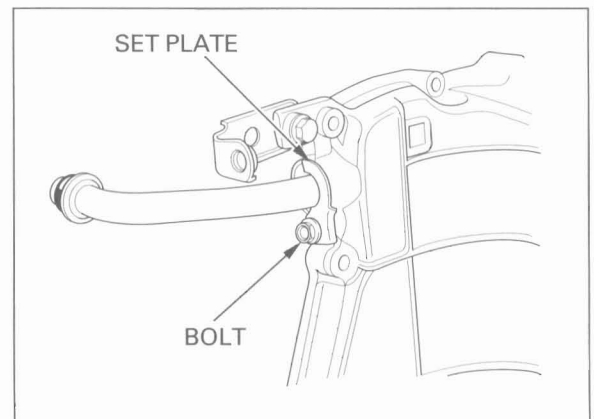


Install the new O-rings onto the oil return pipe and install it into the oil pan.



Install the set plate and tighten the bolt to the specified torque.

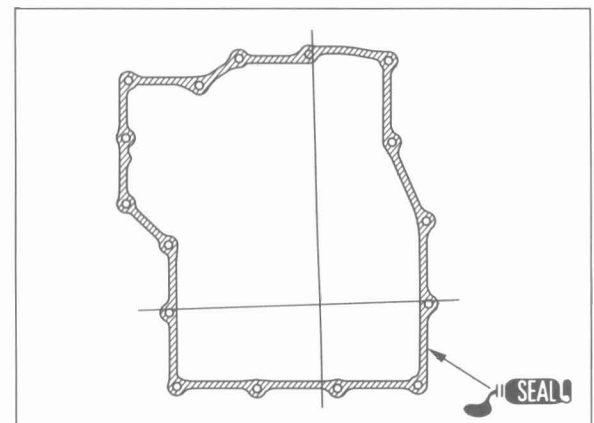
**TORQUE:** 12 N·m (1.2 kgf·m , 9 lbf·ft)



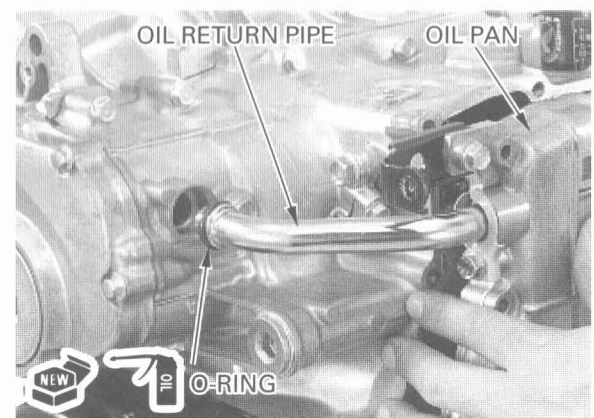
Clean the oil pan mating surface thoroughly. Apply Three Bond 1207B or an equivalent to the mating surface.

**CAUTION:**

*Do not apply sealant more than necessary.*



Apply oil to the new O-ring and install it onto the oil return pipe. Install the oil pan while aligning the oil return pipe with the hole in the lower crankcase.





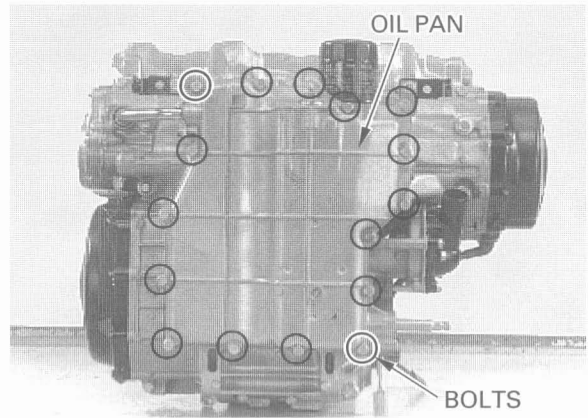
## LUBRICATION SYSTEM

Temporarily tighten the two bolts first, then tighten the all bolts in a crisscross pattern in 2-3 steps.

Install the exhaust pipe (page 2-22).  
Fill the crankcase with recommended oil (page 3-13).

**NOTE:**

After installation, check that there are no oil leaks.



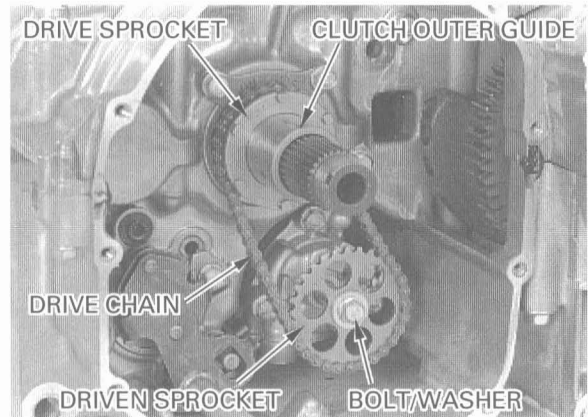
## OIL PUMP

### REMOVAL

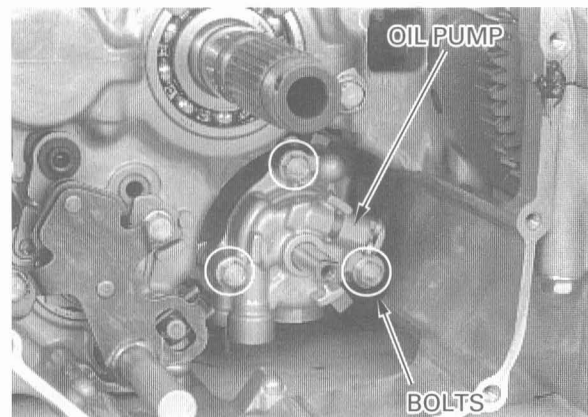
Remove the following:

- Clutch assembly (page 9-12)
- Oil strainer and oil pipes (page 4-4)

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



Remove the three flange bolts and oil pump assembly.



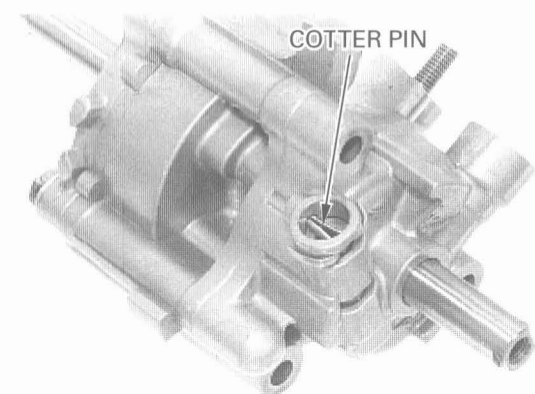
### DISASSEMBLY

**NOTE:**

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

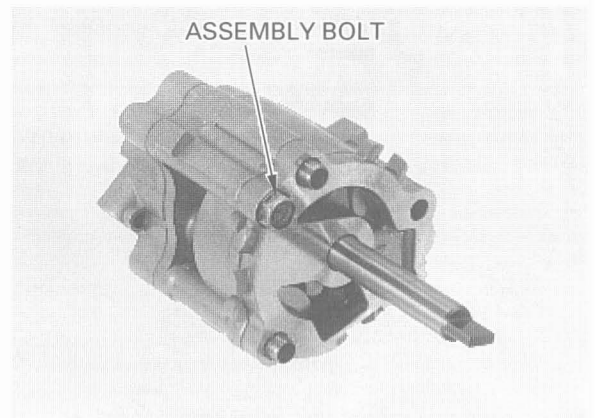
Straighten and remove the cotter pin.  
Remove the valve seat, spring and pressure relief valve.

Check the pressure relief valve for wear or damage.





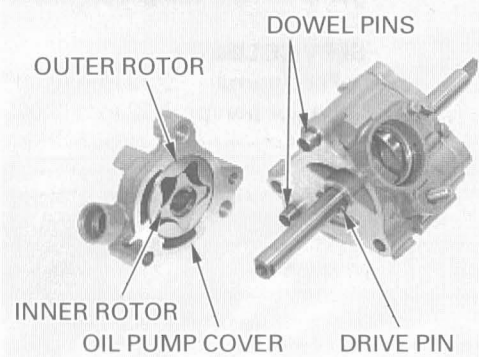
Remove the oil pump assembly bolt.



Remove the oil pump cover and dowel pins.

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

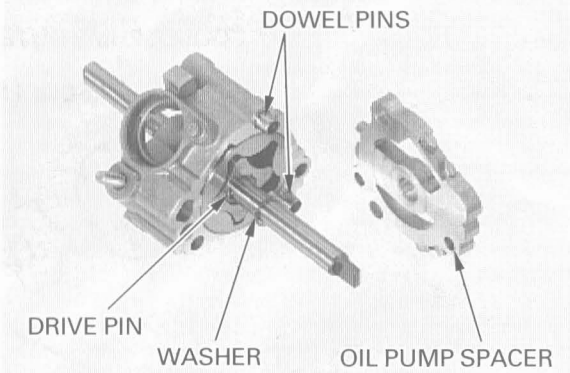
**COOLER PUMP SIDE:**



Remove the oil pump spacer and dowel pins.

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

**FEED PUMP SIDE:**



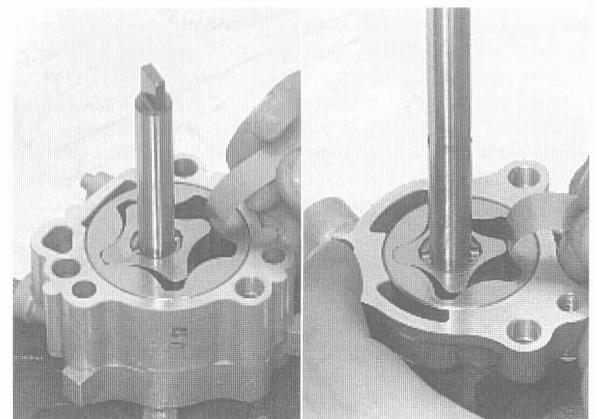
**INSPECTION**

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)



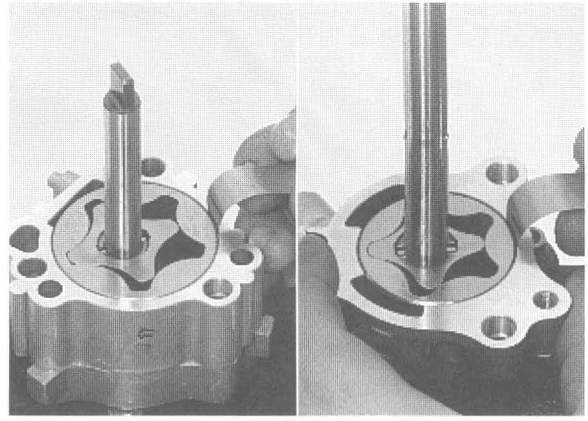
# LUBRICATION SYSTEM

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

**SERVICE LIMITS:**

**Feed pump:** 0.35 mm (0.014 in)

**Cooler pump:** 0.35 mm (0.014 in)

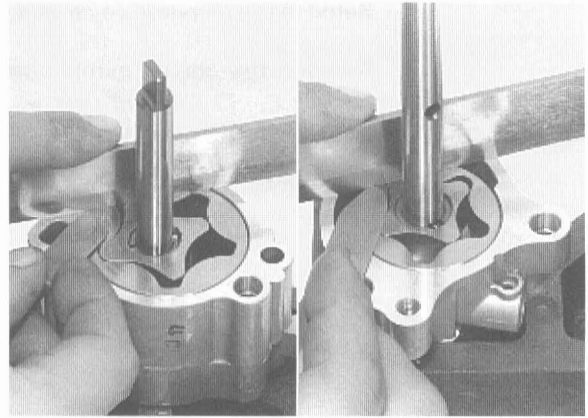


Measure the side clearance for the feed and cooler pump using a straight edge and feeler gauge.

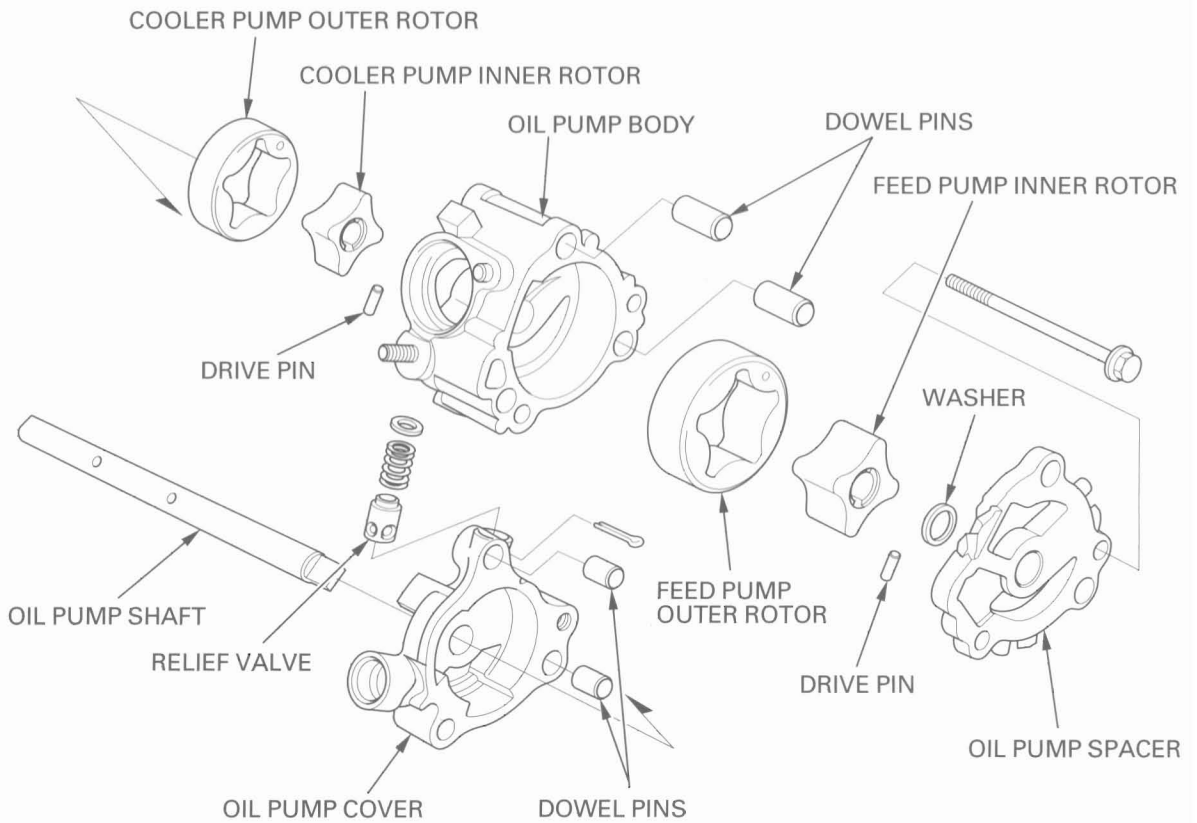
**SERVICE LIMITS:**

**Feed pump:** 0.12 mm (0.005 in)

**Cooler pump:** 0.12 mm (0.005 in)



## ASSEMBLY

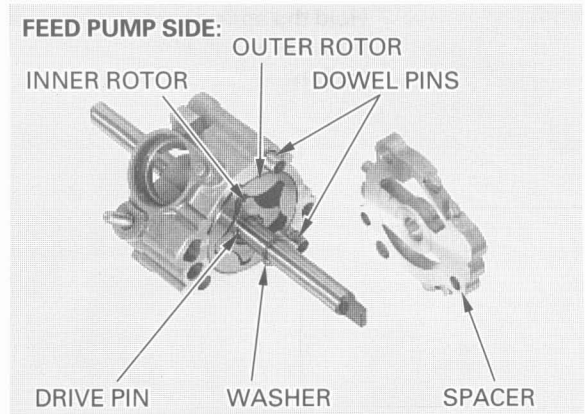


Install the feed pump outer and inner rotors into the oil pump body.  
 Install the oil pump shaft through the oil pump body and inner rotor.

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

Install the thrust washer.

Install the dowel pins and oil pump spacer.

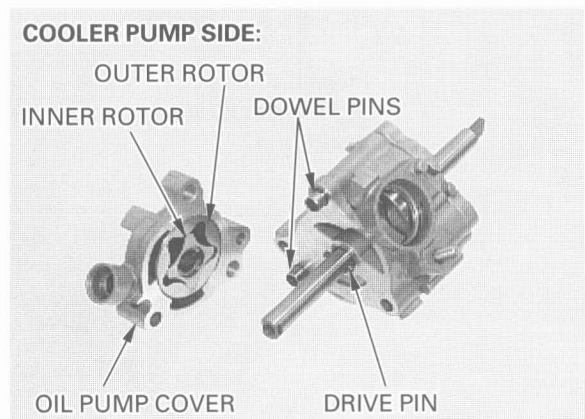


Install the drive pin into the hole in the pump shaft.

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

Install the dowel pins.

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

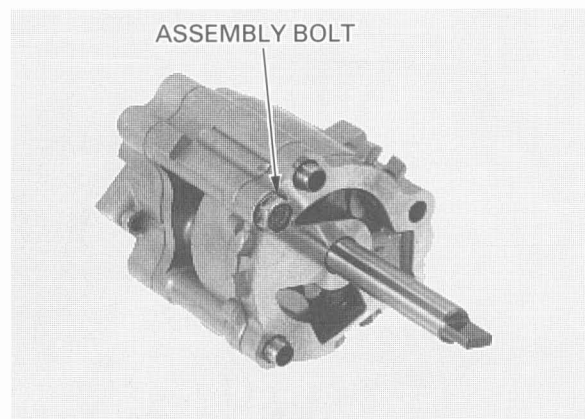


Install and tighten the assembly bolt to the specified torque.

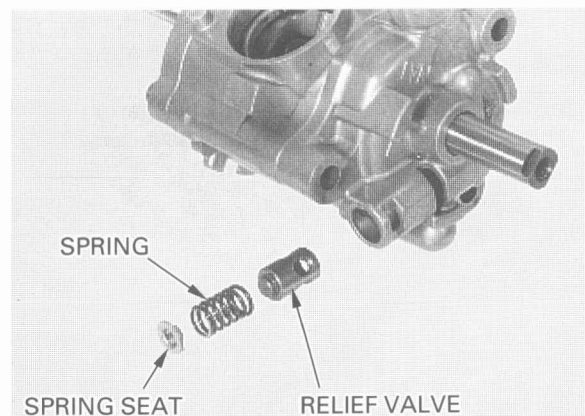
**TORQUE:** 13 N·m (1.3 kgf·m , 9 lbf·ft)

Check the oil pump operation by turning the pump shaft.

If necessary, reassemble the oil pump.

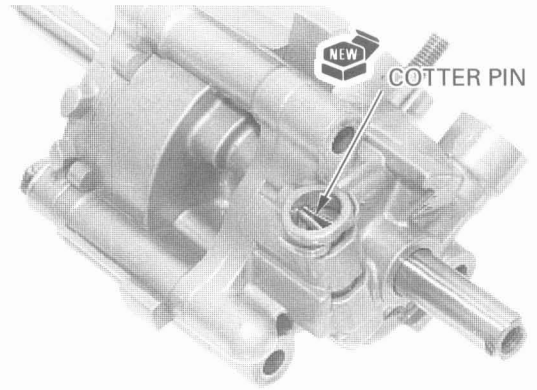


Install the oil pressure relief valve with its small O.D. side facing the spring.  
 Install the spring and spring seat.



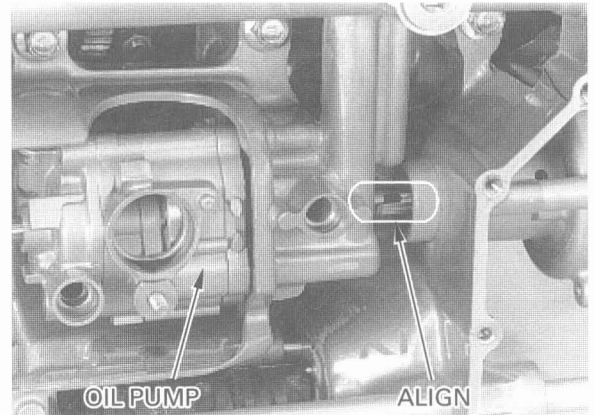
# LUBRICATION SYSTEM

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

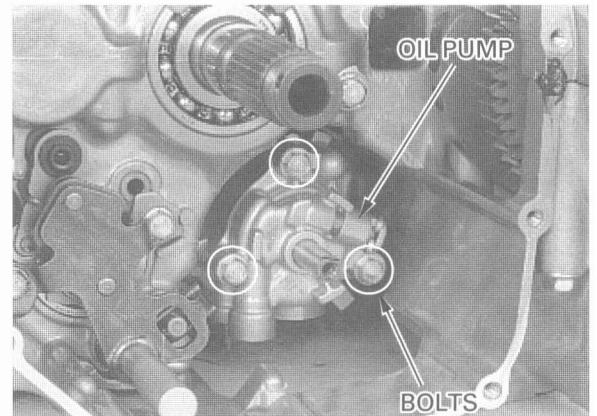


## INSTALLATION

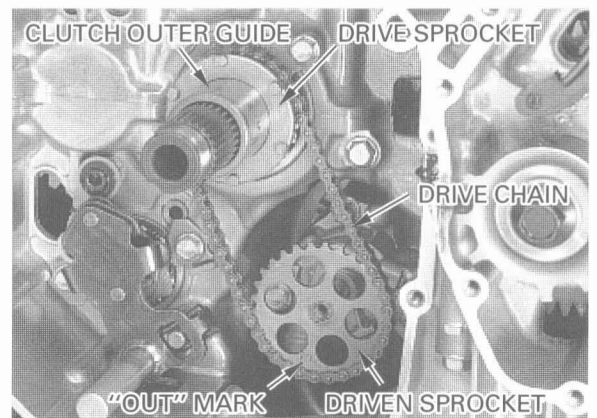
Install the oil pump into the crankcase while aligning the pump shaft lug with the water pump shaft groove.



Install and tighten the three flange bolts securely.



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



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

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

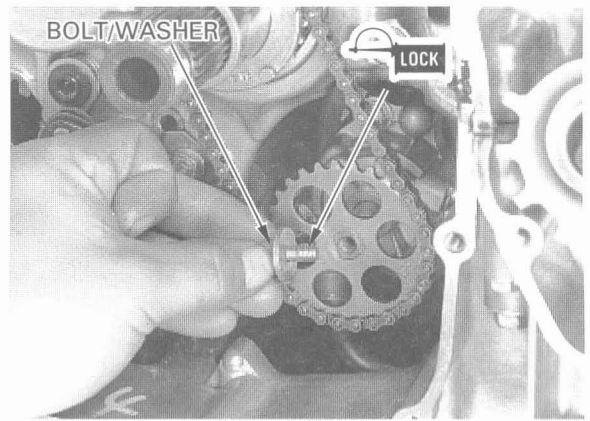
Apply a locking agent to the oil pump driven sprocket bolt threads.  
Install and tighten the driven sprocket bolt/washer to the specified torque.

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

Install the following:

- Oil strainer/oil pipe and oil pan (page 4-5)
- Clutch assembly (page 9-17)

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

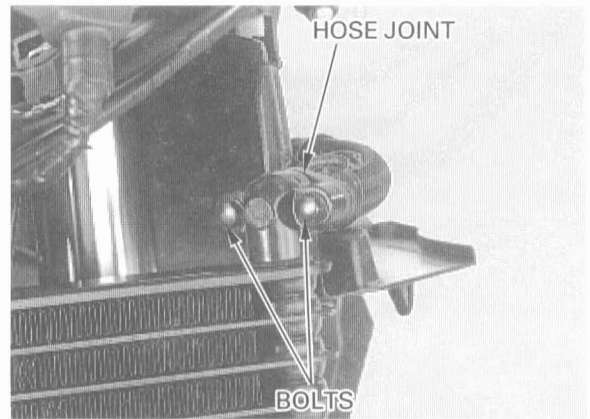


## OIL COOLER

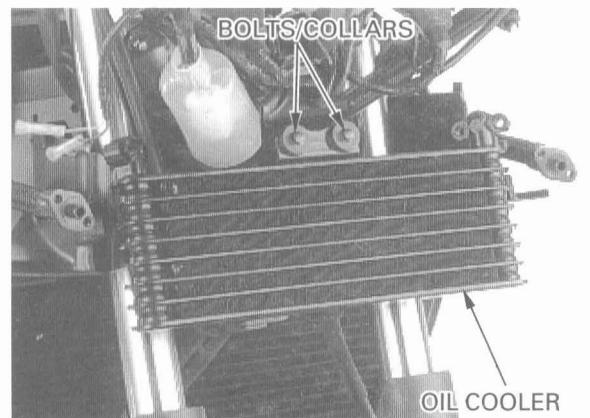
### REMOVAL

Drain the engine oil (page 3-14).  
Remove the lower and upper cowls (Section 2).

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



Remove the mounting bolts, collars and oil cooler.

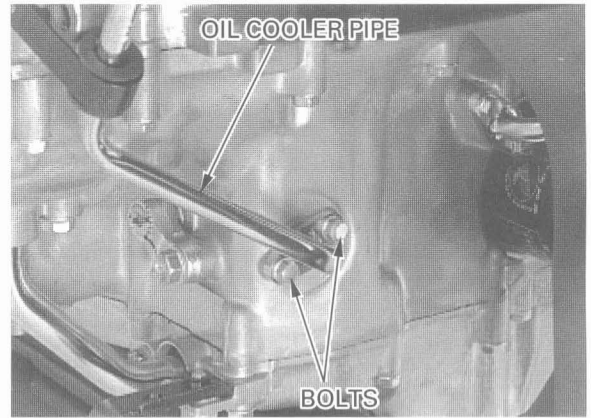


Remove the oil pipe guide mounting bolt.



## LUBRICATION SYSTEM

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

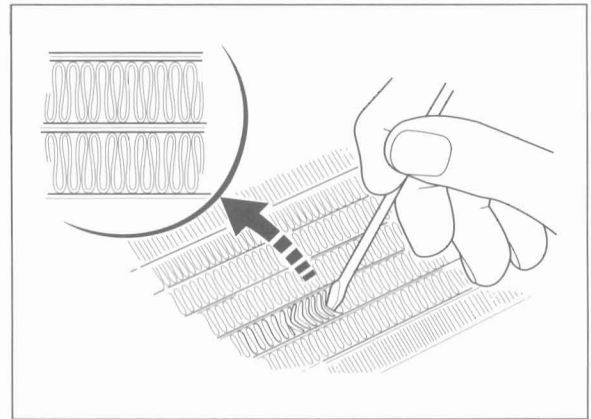


### INSPECTION

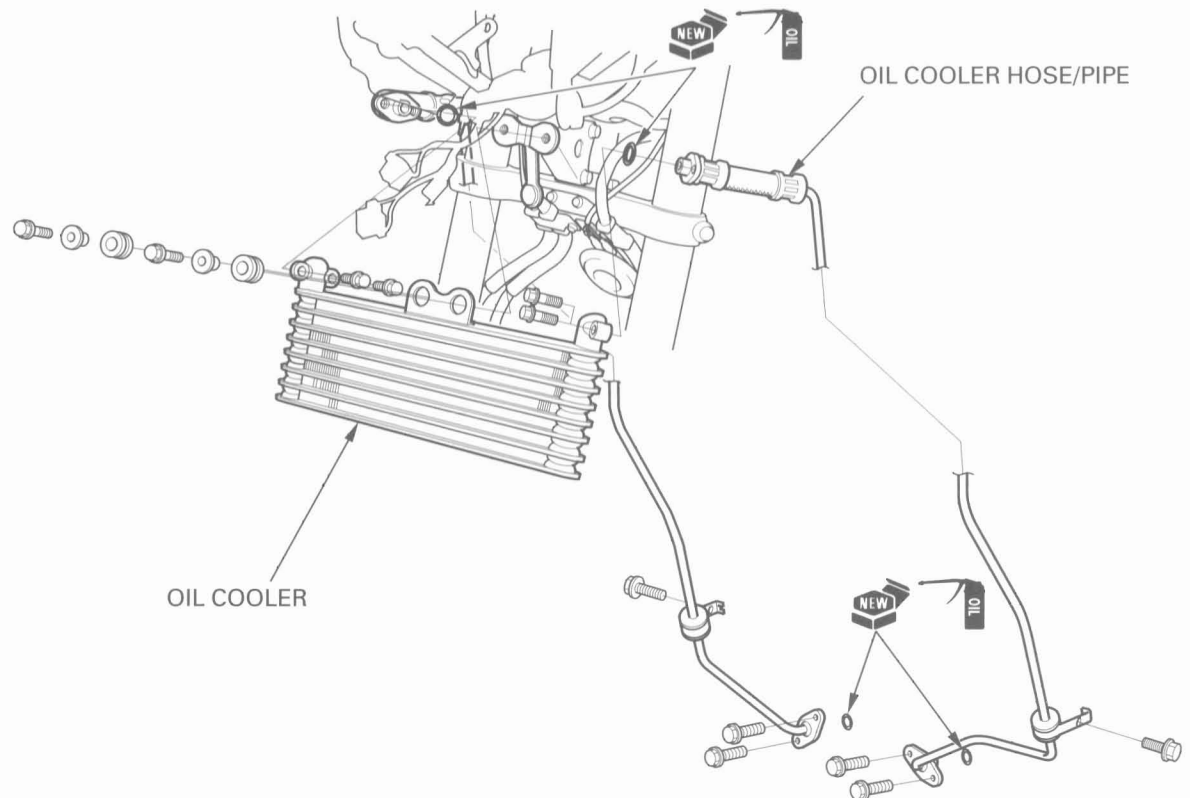
Check the oil cooler air passage for clogging or damage.

Straighten bent fins with a small, flat blade screwdriver and remove insects, mud or other obstructions with compressed air.

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



### INSTALLATION

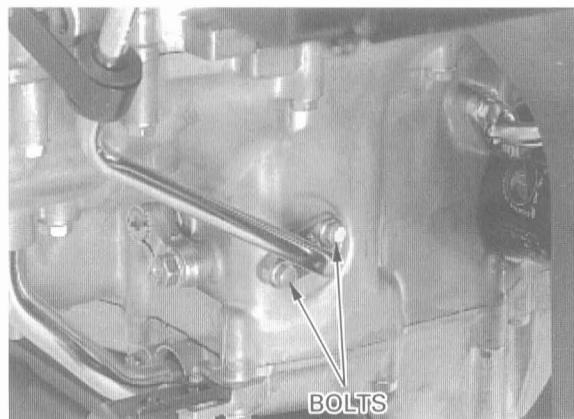




Apply clean engine oil to the new O-rings, and install them onto the oil cooler pipes. Install the oil cooler pipes into the lower crankcase.



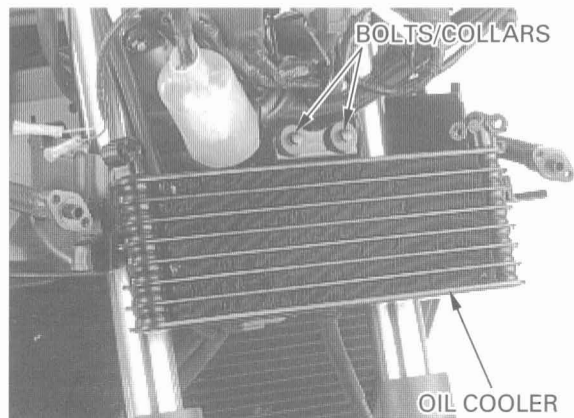
Install and tighten the SH bolts.



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

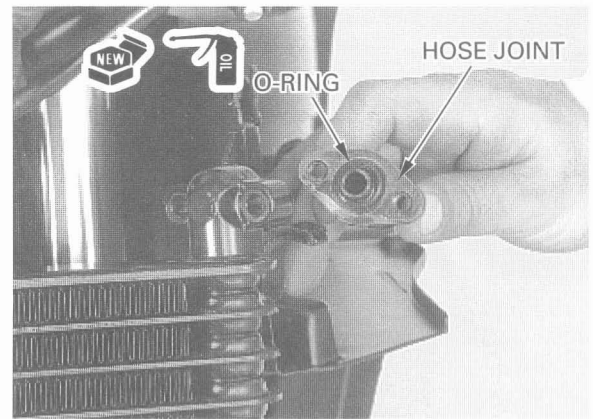


Install the oil cooler to the upper cowl stay. Install the collars and tighten the mounting bolt securely.



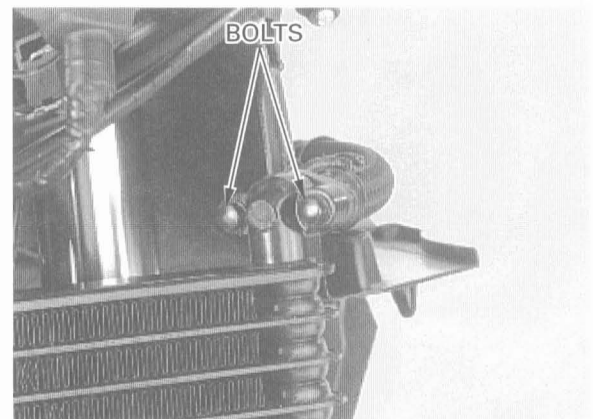
## LUBRICATION SYSTEM

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



Install the oil hoses and tighten the bolts securely.

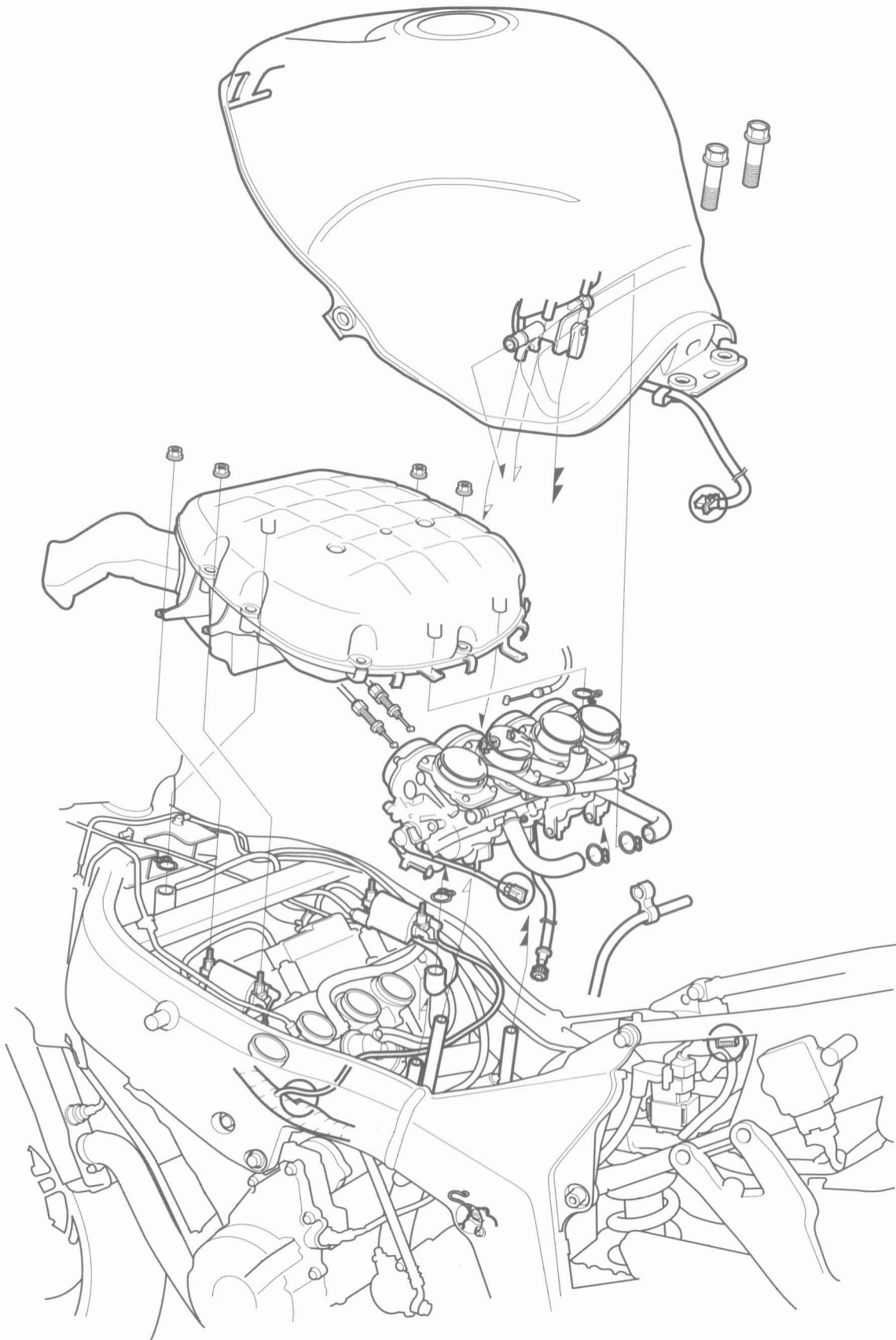
Fill the crankcase with recommended engine oil (page 3-13), and check for oil leaks.





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MEMO



# 5. FUEL SYSTEM

SERVICE INFORMATION	5-1	CARBURETOR COMBINATION	5-16
TROUBLESHOOTING	5-3	CARBURETOR INSTALLATION	5-20
AIR CLEANER HOUSING	5-4	PILOT SCREW ADJUSTMENT	5-21
CARBURETOR REMOVAL	5-5	HIGH ALTITUDE ADJUSTMENT	5-22
CARBURETOR SEPARATION	5-6	SECONDARY AIR SUPPLY SYSTEM	5-23
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## SERVICE INFORMATION

### GENERAL

#### ▲ WARNING

- Gasoline is extremely flammable and is explosive under certain conditions. **KEEP OUT OF REACH OF CHILDREN.**
- Bending or twisting the control cables will impair smooth operation and could cause the cable 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:

*Be sure to remove the diaphragms before cleaning air and fuel passages with compressed air. The diaphragms might be damaged.*

- Refer to section 2 for fuel tank removal and installation.
- When disassembling fuel system parts, note the location of the O-rings. Replace them with new ones on reassembly.
- Before disassembling the carburetor, place the suitable container under the carburetor drain bolt. Loosen the bolt and drain the carburetor.
- After removing the carburetor, wrap the intake ports of the engine with a shop towel or cover it with piece of tape to prevent any foreign material from dropping into the engine.
- The vacuum chamber and float chamber can be serviced with the carburetors assembled.

#### NOTE:

If the vehicle is to be stored for more than one month, drain the float bowls. Fuel left in the float bowls may cause clogged jets, resulting in hard starting or poor driveability.

## FUEL SYSTEM

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number	49 states/Canada type	VPS2A
	California type	VPS1A
Main jet		No. 1, 4: # 140/No. 2, 3: # 142
Slow jet		# 42
Jet needle number	49 states/Canada type	J5FZ
	California type	J5FU
Pilot screw initial opening	49 states/Canada type	2-3/4 turns out
	California type	2-1/2 turns out
Float level		13.7 mm (0.54 in)
Idle speed		1,100 ± 100 rpm
Throttle grip free play		2–6 mm (1/12–1/4 in)

### TORQUE VALUES

Carburetor assembly nut, 5 mm	5 N·m (0.5 kgf·m , 3.6 lbf·ft)
6 mm	9 N·m (0.9 kgf·m , 6.5 lbf·ft)
Boost joint for fuel auto valve	2 N·m (0.25 kgf·m , 1.8 lbf·ft)
Vacuum plug for synchronization	3 N·m (0.3 kgf·m , 2.2 lbf·ft)

### TOOLS

Carburetor float level gauge	07401–0010000
Pilot screw wrench	07KMA–MN90100

## TROUBLESHOOTING

### Engine won't to start

- Too much fuel getting to the engine
  - Air cleaner clogged
  - Flooded carburetors
- Intake air leak
- Fuel contaminated/deteriorated
- No fuel to carburetor
  - Fuel strainer clogged
  - Fuel tube clogged
  - Fuel valve vacuum tube clogged
  - Disconnected fuel valve vacuum tube
  - Float level misadjusted
  - Fuel tank breather tube clogged

### Lean mixture

- Fuel jets clogged
- Float valve faulty
- Float level too low
- Fuel line restricted
- Carburetor air vent tube clogged
- Intake air leak
- Throttle valve faulty
- Vacuum piston faulty

### Rich mixture

- Starting enrichment valve in ON position
- Float valve faulty
- Float level too high
- Air jets clogged
- Air cleaner element contaminated
- Flooded carburetor

### Engine stall, hard to start, rough idling

- Fuel line restricted
- Ignition malfunction
- Fuel mixture too lean/rich
- Fuel contaminated/deteriorated
- Intake air leak
- Idle speed misadjusted
- Float level misadjusted
- Fuel tank breather tube clogged
- Pilot screw misadjusted
- Slow circuit or starting enrichment circuit clogged
- Emission control system malfunction

### Afterburn when engine braking is used

- Lean mixture in slow circuit
- Air cut-off valve malfunction
- Emission control system is malfunction
  - Secondary air supply system faulty
  - Loose, disconnected or deteriorated hoses of the emission control system

### Backfiring or misfiring during acceleration

- Ignition system malfunction
- Fuel mixture too lean

### Poor performance (driveability) and poor fuel economy

- Fuel system clogged
- Ignition system malfunction
- Emission control system malfunction
  - Secondary air supply system faulty
  - Loose, disconnected or deteriorated hoses of the emission control system

## AIR CLEANER HOUSING

### REMOVAL

**NOTE:**

Refer to page 3-5 for air cleaner element replacement.

Remove the fuel tank (page 2-2).

Remove the No. 1, 4 ignition coil mounting nuts and collars.  
Derail the primary wire from the air cleaner housing wire guide.

Disconnect the crankcase breather tube from the air cleaner housing.  
Remove the No. 2, 3 ignition coil mounting nuts and collars.

*California type only*

Remove the EVAP purge control valve and EVAP CAV solenoid valve from the air cleaner housing.  
Remove the pulse secondary air injection control valve tube from the air cleaner housing.

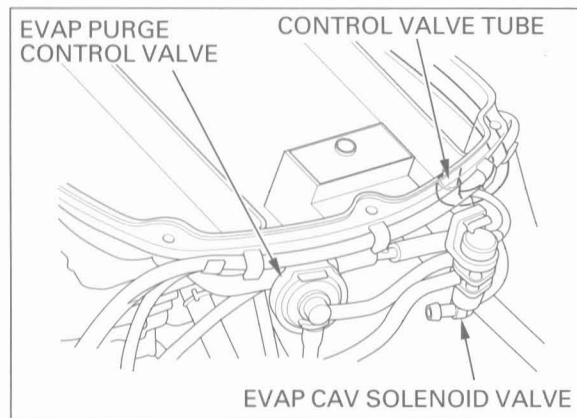
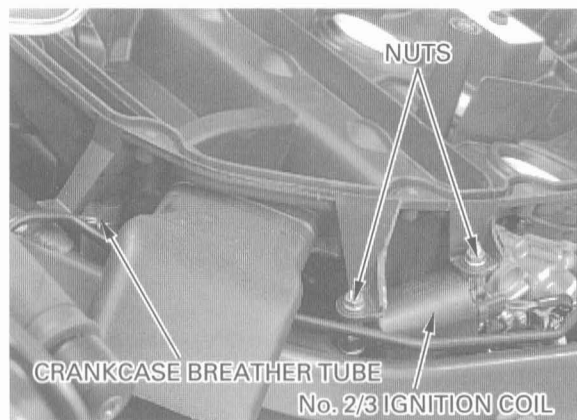
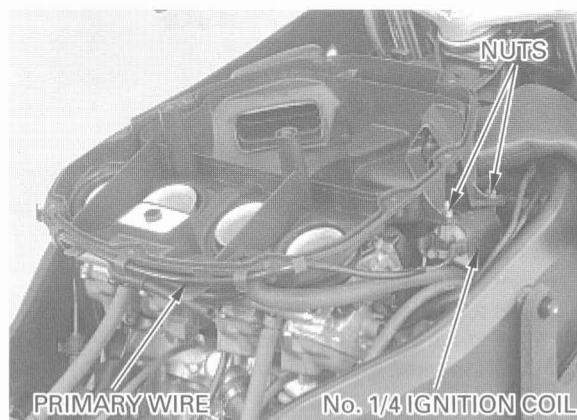
Loosen the carburetor connecting tube band screws.  
Remove the air cleaner housing.  
Disconnect the carburetor air tube from the air cleaner housing.

### INSTALLATION

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

**NOTE:**

Route the wires and hoses properly (page 1-24).



## CARBURETOR REMOVAL

**▲WARNING**

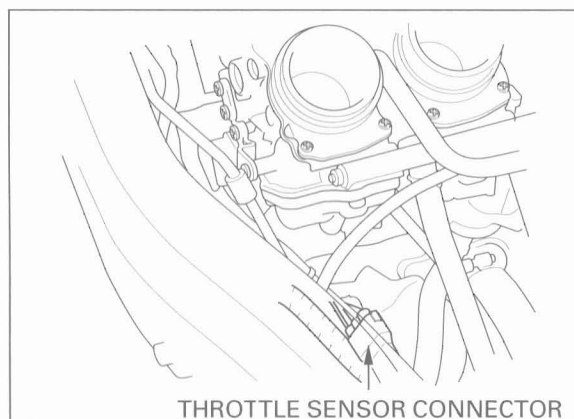
*Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.*

Remove the air cleaner housing (page 5-4).

Remove the throttle stop screw from the bracket.

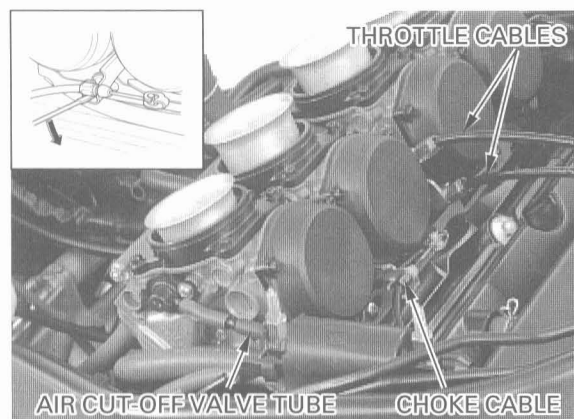


Disconnect the throttle sensor connector.



Disconnect the throttle cables from the throttle drum.

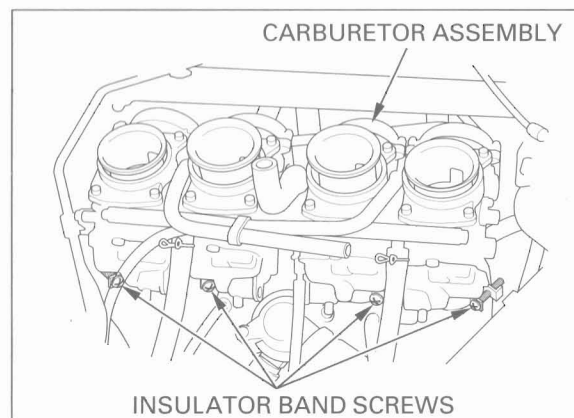
Remove the choke cable from the cable holder using a flat blade screwdriver as shown and disconnect the choke cable from the carburetor.



*California type only*

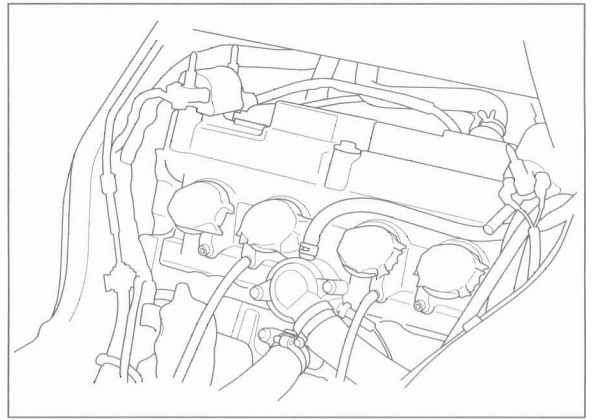
Disconnect the air cut-off valve tube from the carburetor.

Loosen the engine side insulator band screws and remove the carburetor assembly.



**NOTE:**

- After removing the carburetor assembly, do not place it upside down or the air intake might be deformed.
- Seal the cylinder head intake ports with a shop towel or cover it with piece of tape to prevent any foreign material from dropping into the engine.

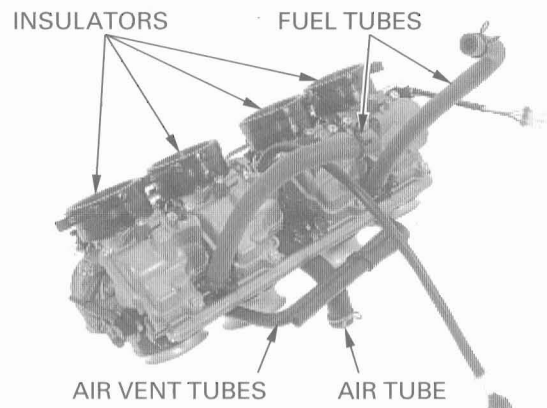


## CARBURETOR SEPARATION

*The vacuum chamber and float chamber can be serviced without separating the carburetors.*

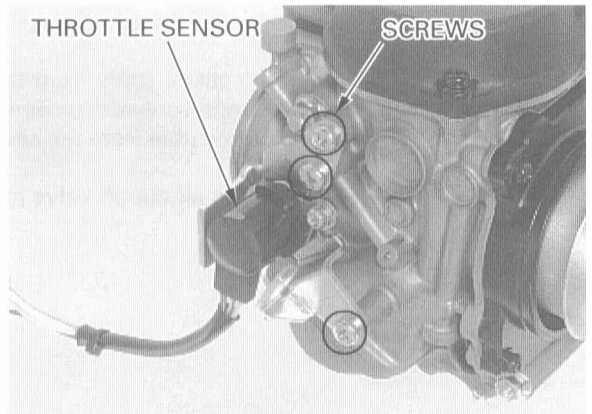
Loosen the screws and remove the insulators.

Disconnect the fuel tubes from the fuel joint.  
Disconnect the air vent tubes and air tubes.

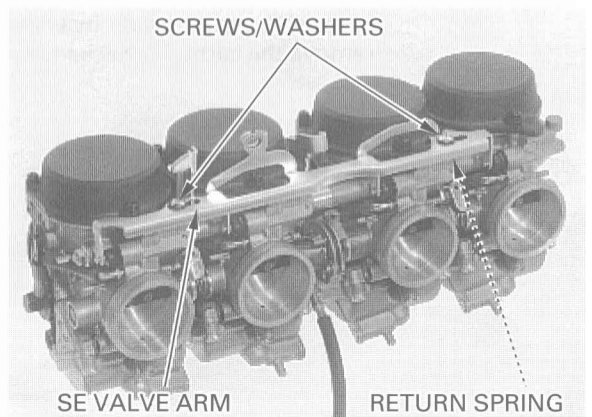


*At carburetor separation, it is not necessary to remove the throttle sensor from the carburetor body.*

If necessary, remove the screws and throttle sensor from the carburetor body.

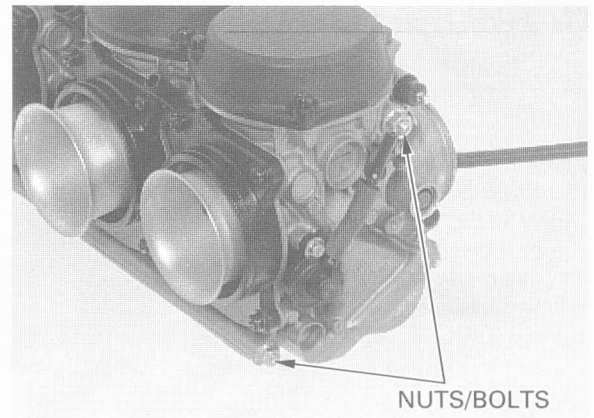


Remove the starting enrichment (SE) valve arm screws and washers.  
Remove the SE valve arm, return spring and plastic collars.





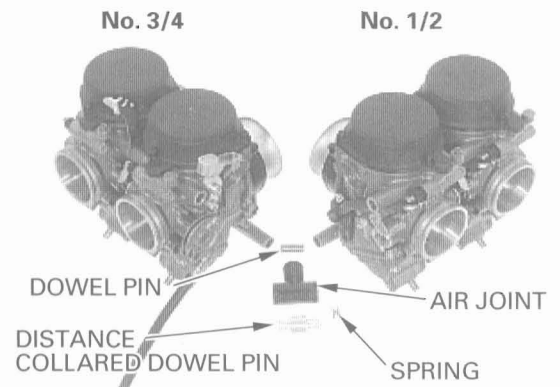
Loosen the nuts gradually and alternately. Loosen and remove the carburetor connecting nuts.



Separate the No. 3/4 carburetors from the No. 1/2 carburetors.

Remove the following:

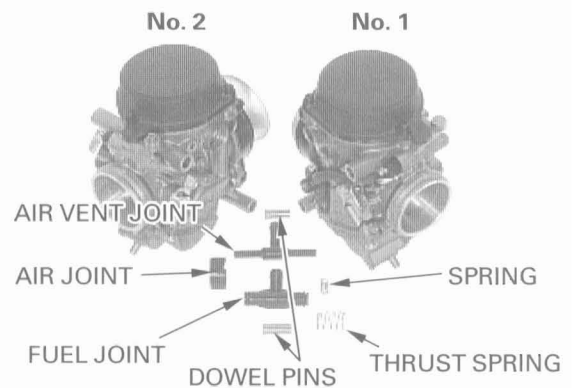
- No. 2 carburetor synchronization spring
- 3-way air joint pipe/O-rings
- Dowel pin (5 mm bolt side)
- Distance collared dowel pin (6 mm bolt side)



Separate the No. 1 carburetor from the No. 2 carburetor.

Remove the following:

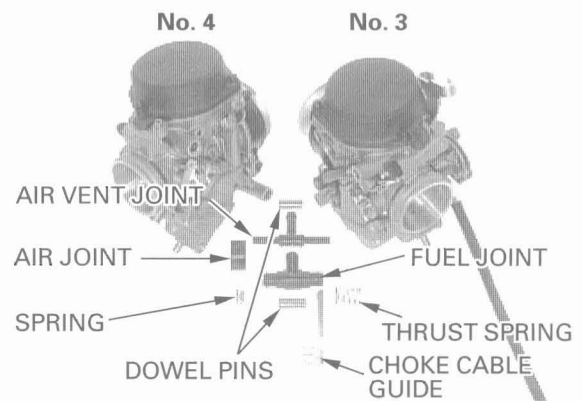
- No. 1 carburetor synchronization spring
- Thrust spring
- Air joint rubber pipe
- 3-way air vent joint pipe/O-rings
- 3-way fuel joint pipe/O-rings
- Dowel pin (5 mm bolt side)
- Dowel pin (6 mm bolt side)



Separate the No. 3 carburetor from the No. 4 carburetor.

Remove the following:

- Choke cable guide
- No. 4 carburetor synchronization spring
- Thrust spring
- Air joint rubber pipe
- 3-way air vent joint pipe/O-rings
- 3-way fuel joint pipe/O-rings
- Dowel pin (5 mm bolt side)
- Dowel pin (6 mm bolt side)



## CARBURETOR DISASSEMBLY

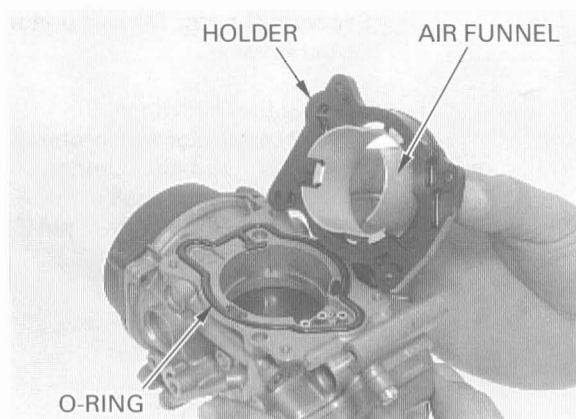
### AIR FUNNEL

*Note the location of each carburetor part so they can be replaced in their original locations.*

Remove the screws and air funnel holder.



Remove the air funnel from the holder.  
Remove the O-ring from the carburetor body.

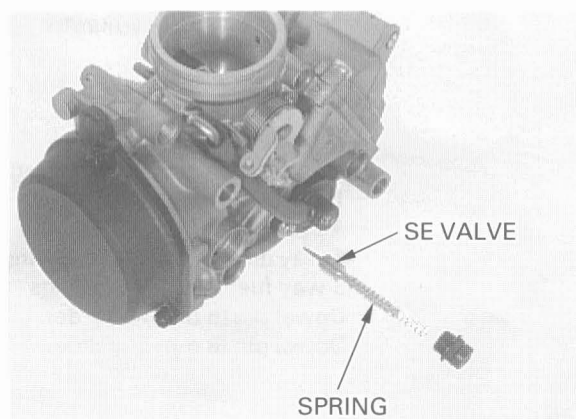


### STARTING ENRICHMENT VALVE

Remove the SE valve nut.

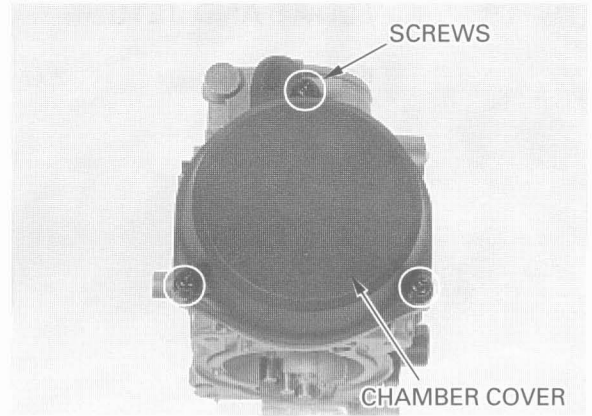


Remove the spring and SE valve.

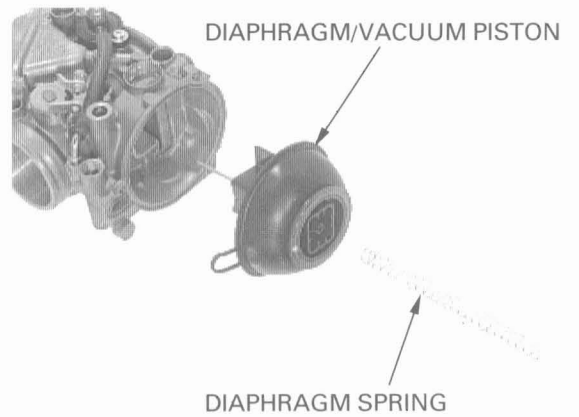


### DIAPHRAGM/VACUUM PISTON

Remove the screws and vacuum chamber cover.



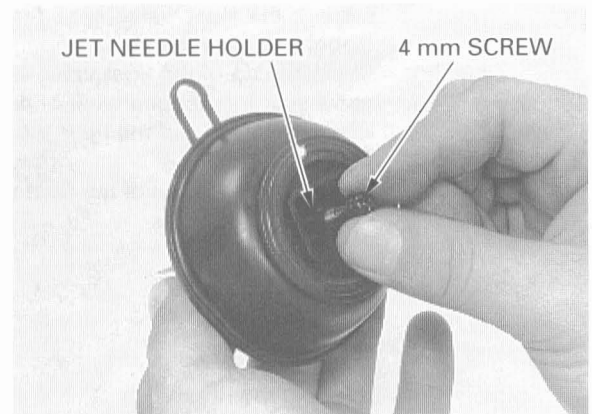
Remove the diaphragm spring and diaphragm/vacuum piston from the carburetor body.



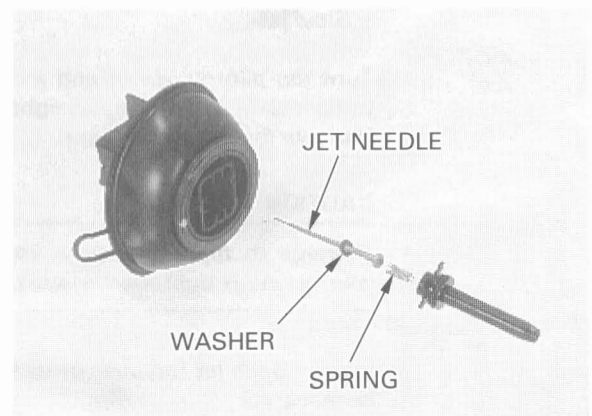
Temporarily install a 4 mm screw (example; vacuum chamber screw) into the jet needle holder. Pull the screw and remove the jet needle holder.

**CAUTION:**

- **Be careful not to damage the diaphragm.**
- **Do not remove the jet needle holder by pushing the jet needle.**

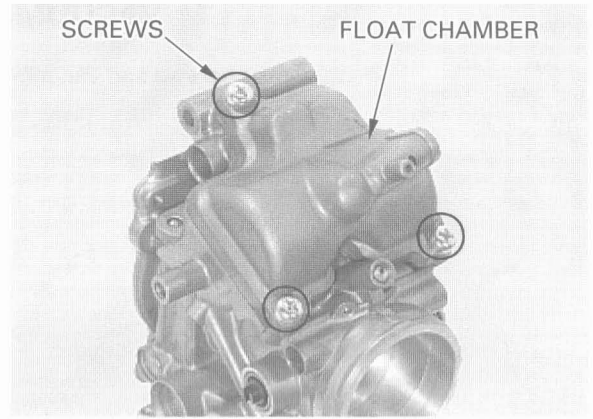


Remove the spring, jet needle and washer from the vacuum piston.



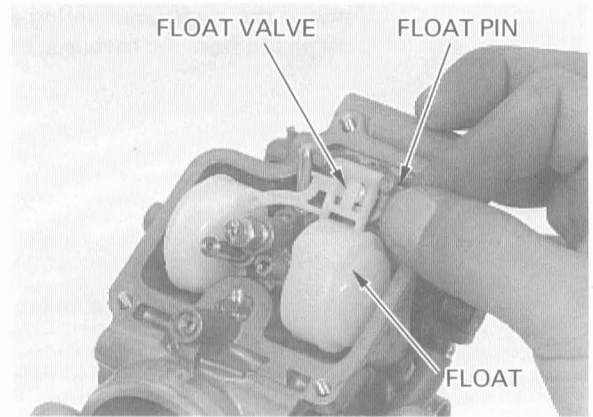
### FLOAT AND JETS

Remove the screws and float chamber.



Remove the float pin, float and float valve.

Inspect the float for deformation or damage.

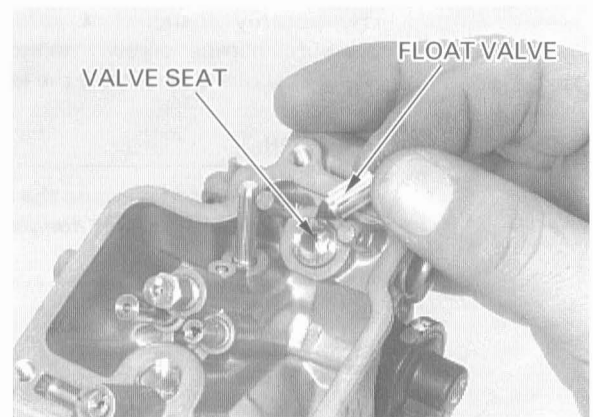


Inspect the float valve seat for scores, scratches, clogging and damage.

Check the tip of the float valve where it contacts the valve seat for stepped wear or contamination.

Replace the valve if the tip is worn or contaminated.

Check the operation of the float valve.



Remove the following:

- Main jet
- Needle jet holder
- Slow jet

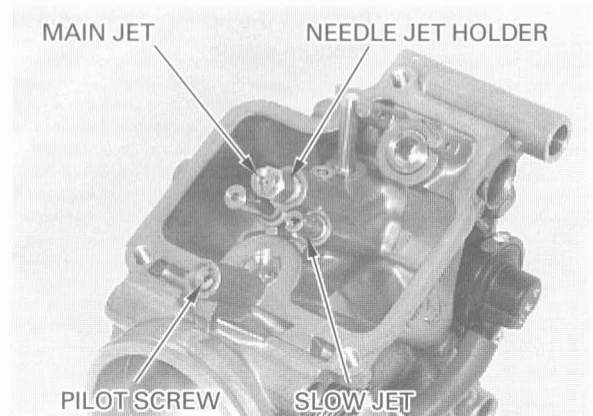
Turn the pilot screw in and record the number of turns it takes before it seats lightly.

Remove the pilot screw, spring, washer and O-ring.

#### CAUTION:

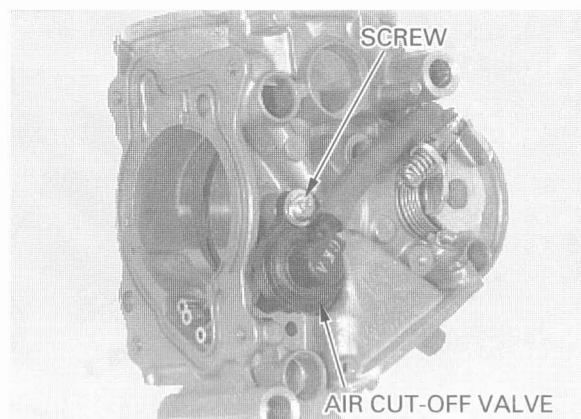
***Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.***

Inspect each jet for wear or damage and replace if necessary.

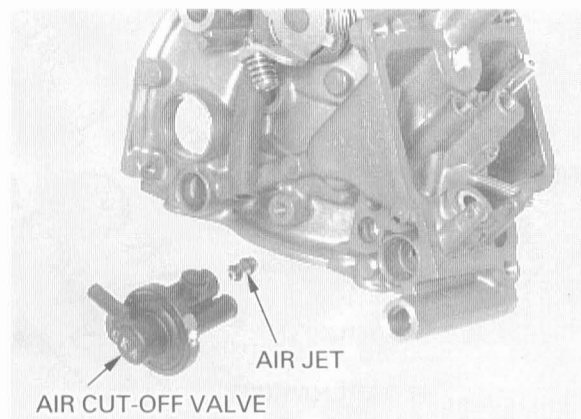


**AIR CUT-OFF VALVE  
(CALIFORNIA TYPE ONLY)**

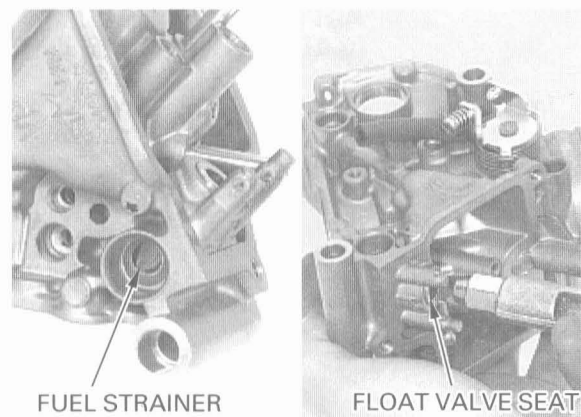
Remove the air cut-off valve mounting screw.



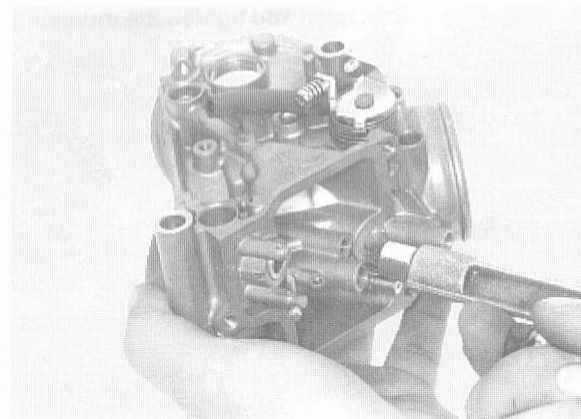
Remove the air cut-off valve, air jet and O-rings.



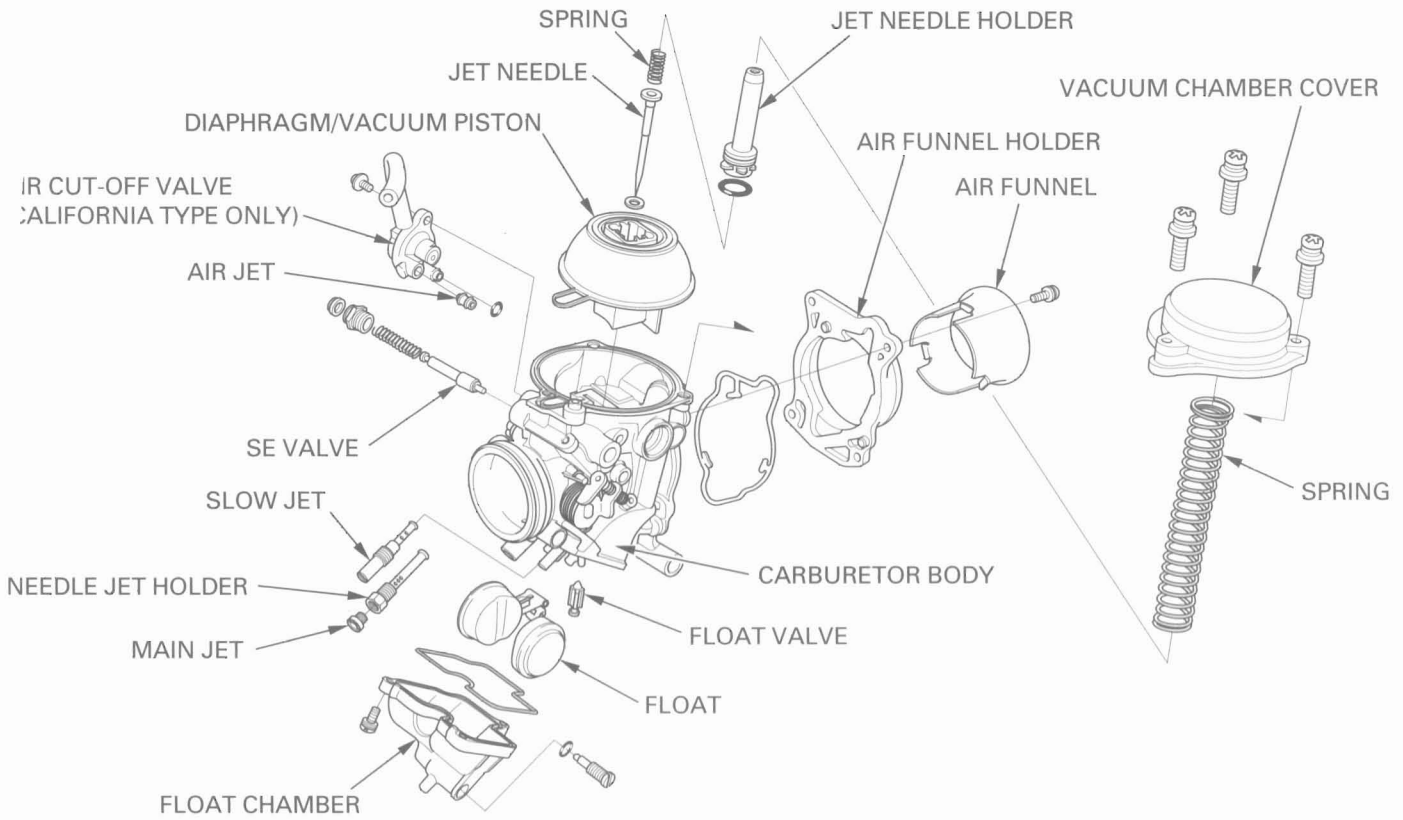
Clean the fuel strainer in the float valve seat using the compressed air from the float valve seat side.



Blow open the air and fuel passages in the carburetor body with compressed air.



# ARBURETOR ASSEMBLY

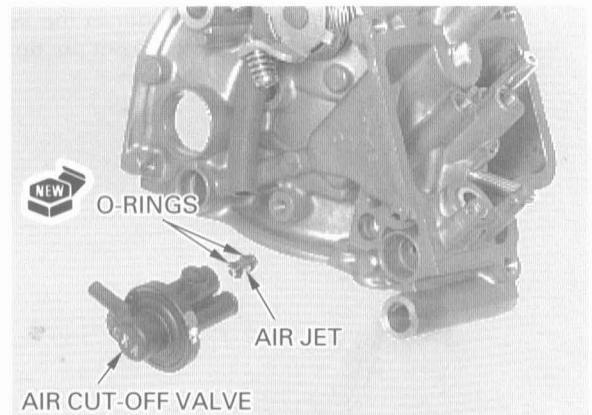


## AIR CUT-OFF VALVE (CALIFORNIA TYPE ONLY)

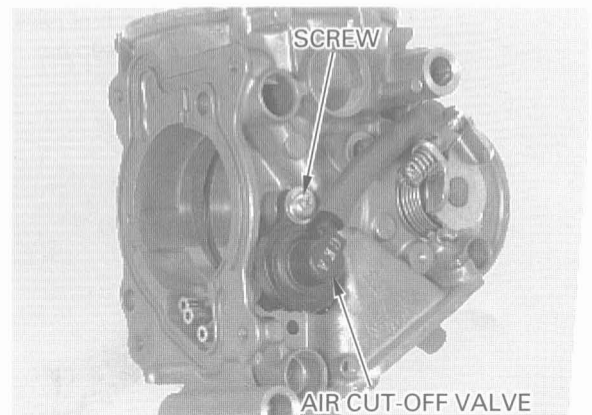
Install the air jet with its small end facing the carburetor body.

Install the O-ring onto the air jet and air cut-off valve as shown.

Install the air jet and air cut-off valve onto the carburetor.



Install and tighten the mounting screw.



## FLOAT AND JETS

Install the following:

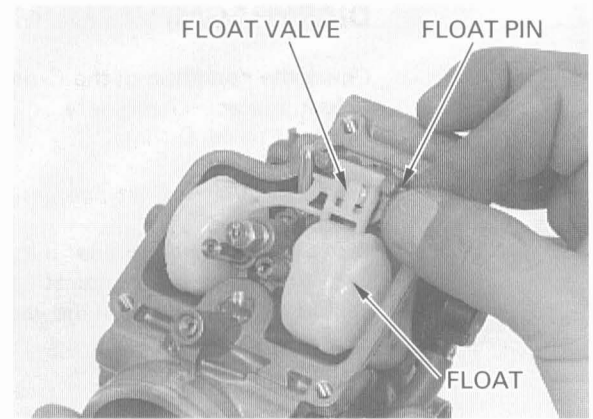
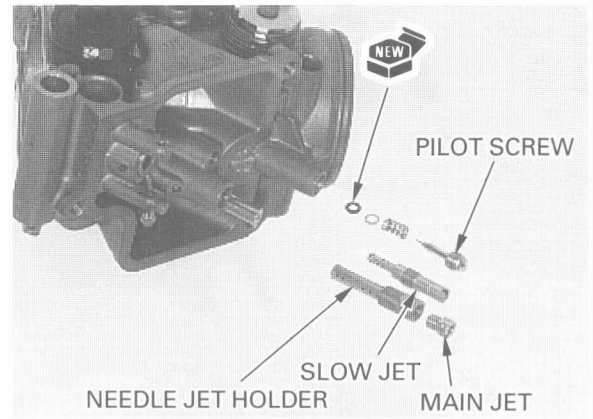
- Slow jet
- Needle jet holder
- Main jet

**CAUTION:**

*Handle all jets with care. They can easily be scored or scratched.*

Install the pilot screw and return it to its original position as noted during removal. Perform the pilot screw adjustment procedure if a new pilot screw is installed (page 5-21).

Install the float and float valve in the carburetor body, then install the float pin through the body and float.



**FLOAT LEVEL INSPECTION**

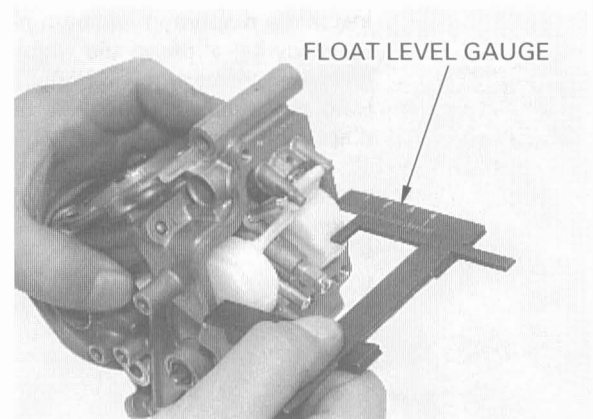
With the float valve seated and the float arm just touching the valve, measure the float level with the special tool as shown.

**FLOAT LEVEL:** 13.7 mm (0.54 in)

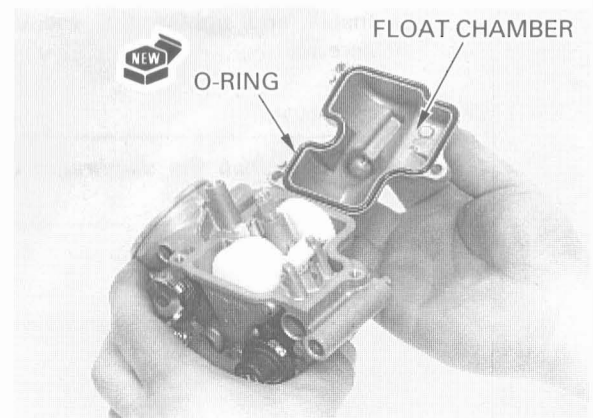
**TOOL:**

**Carburetor float level gauge** 07401-0010000

The float cannot be adjusted. Replace the float assembly if the float level is out of specification.

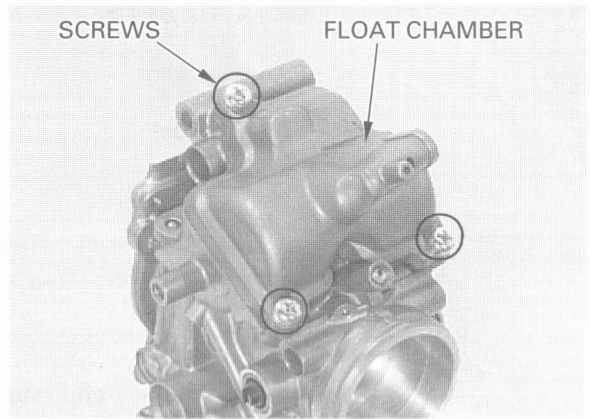


Install a new O-ring in the float chamber.  
Install the float chamber.





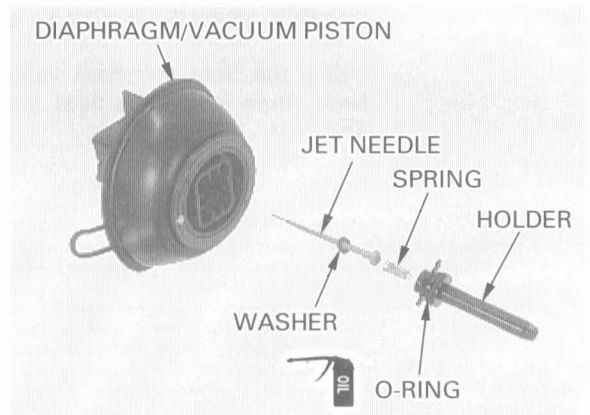
Install and tighten the three float chamber screws.



## DIAPHRAGM/VACUUM PISTON

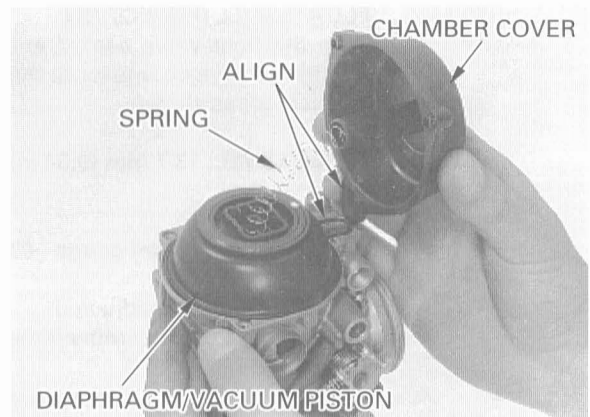
Check the condition of the O-ring on the jet needle holder, replace if necessary. Apply oil to the O-ring.

Install the washer, jet needle and spring into the vacuum piston. Press the jet needle holder into the vacuum piston until you feel a click indicating that the O-ring is seated into the groove in the vacuum piston.



Install the diaphragm/vacuum piston in the carburetor body by aligning the diaphragm tab with the groove of the carburetor body. Hold the vacuum piston almost full open so the diaphragm is not pinched by the chamber cover.

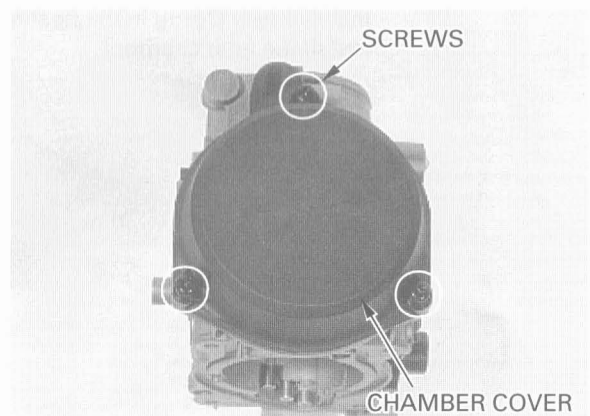
Install the chamber cover with the spring, being careful not to damage the spring.



Install and tighten the vacuum chamber cover screws.

### CAUTION:

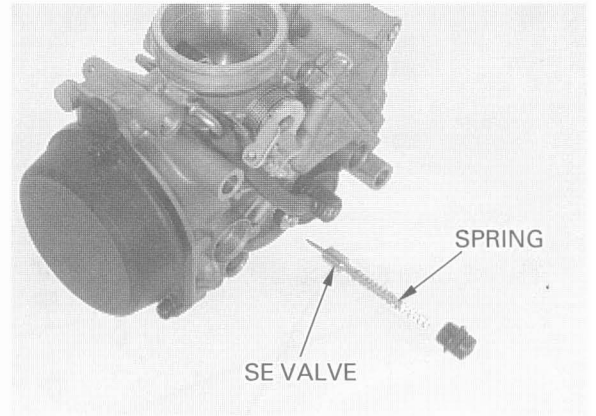
*Do not pinch the diaphragm under the chamber cover.*





### STARTING ENRICHMENT VALVE

Install the SE valve and spring.

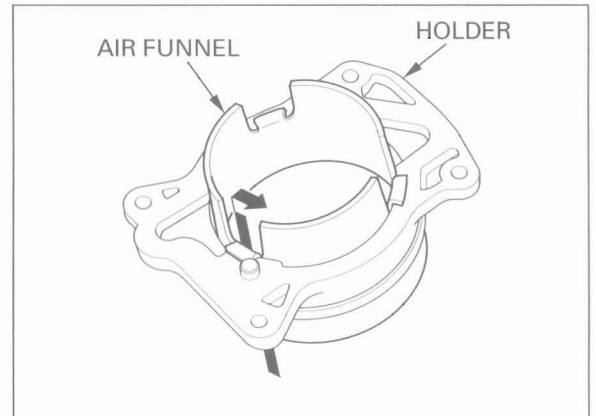


Install the SE valve nut and tighten it securely.



### AIR FUNNEL

Install the air funnel into the holder as shown.

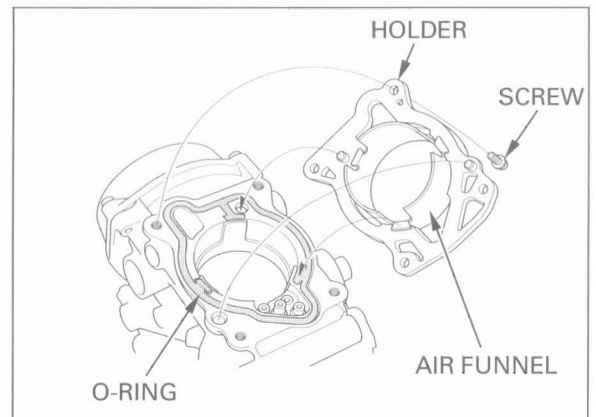


Check that the O-ring is in good condition, replace if necessary.

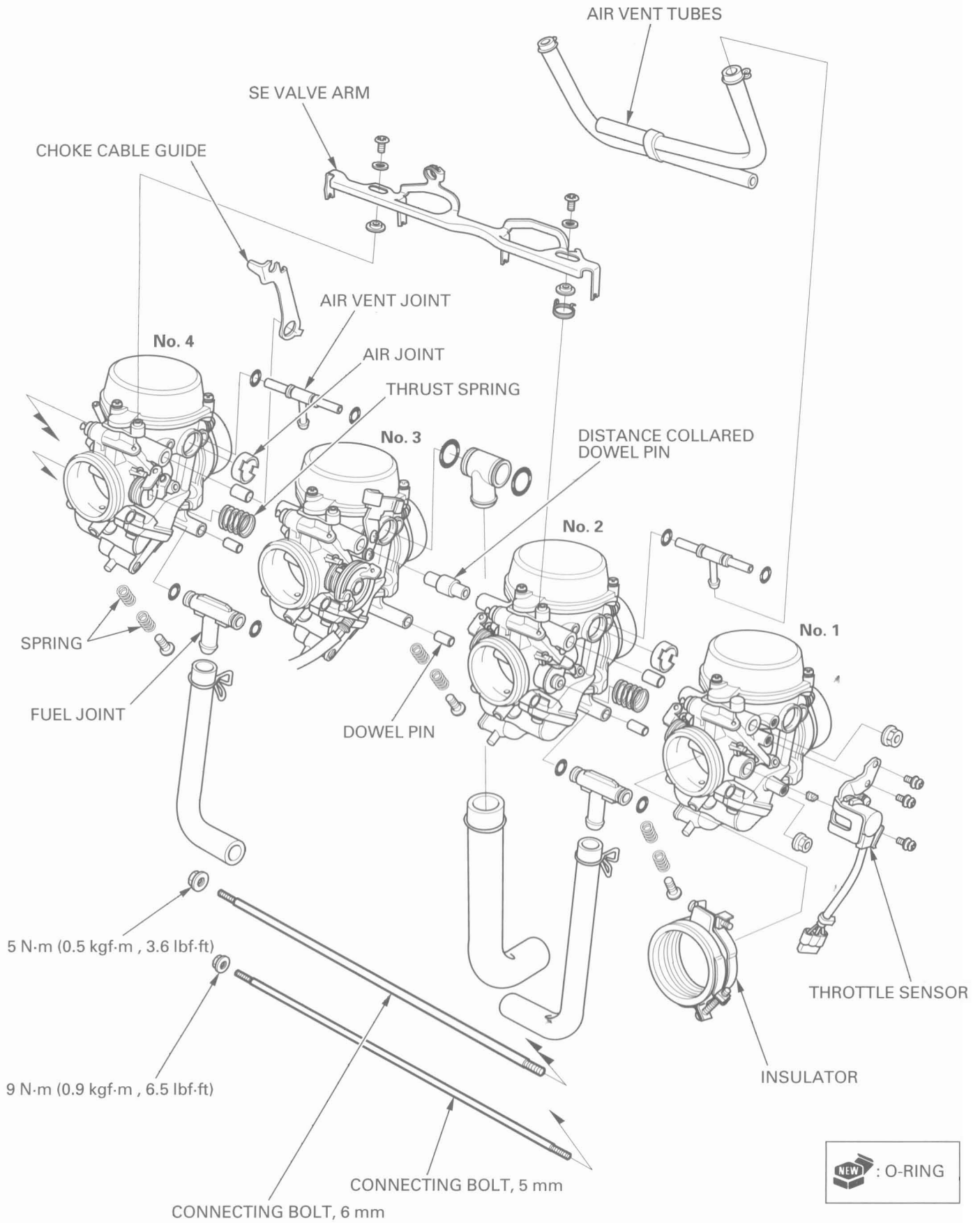
Install the O-ring into the groove of the carburetor body.

Align the cut-out on the air funnel with the groove in the carburetor body, then install the air funnel/holder.

Install and tighten the holder screws.



CARBURETOR COMBINATION



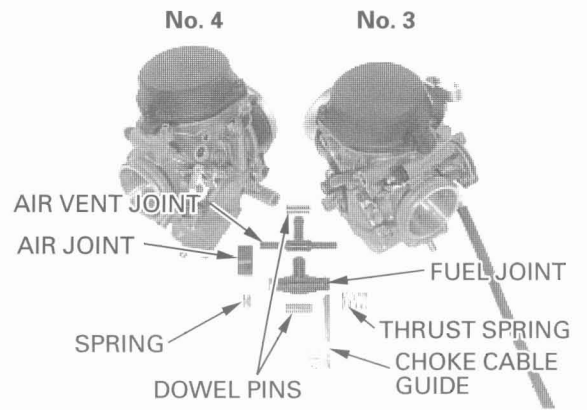
**NOTE:**

Always replace the O-ring with new ones.

Install the following:

- Dowel pin (5 mm bolt side)
- Dowel pin (6 mm bolt side)
- 3-way fuel joint pipe/new O-rings
- 3-way air vent joint pipe/new O-rings
- Air joint rubber pipe
- Thrust spring
- No. 4 carburetor synchronization spring
- Choke cable guide

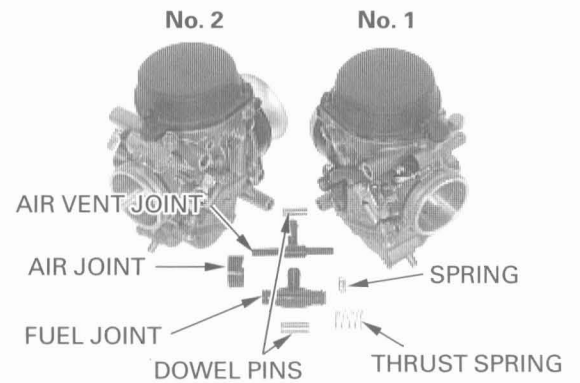
Assemble the No. 3 and the No. 4 carburetors.



Install the following:

- Dowel pin (5 mm bolt side)
- Dowel pin (6 mm bolt side)
- 3-way fuel joint pipe/new O-rings
- 3-way air vent joint pipe/new O-rings
- Air joint rubber pipe
- Thrust spring
- No.1 carburetor synchronization spring

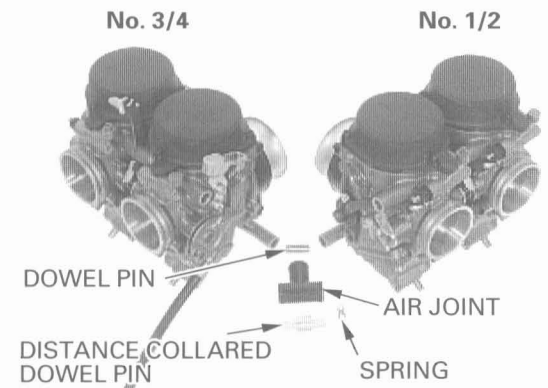
Assemble the No. 1 and the No. 2 carburetors.



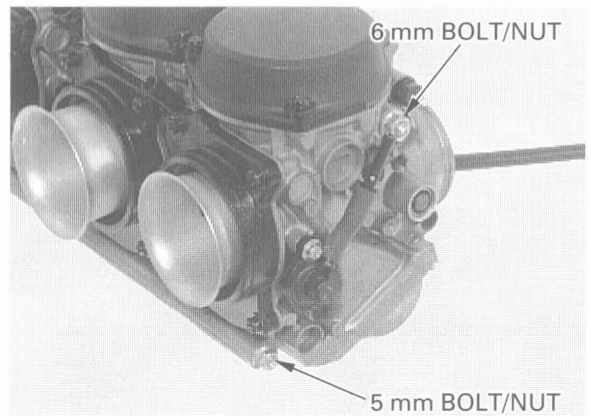
Install the following:

- Dowel pin (5 mm bolt side)
- Distance collared dowel pin (6 mm bolt side)
- 3-way air joint pipe/O-rings
- No. 2 carburetor synchronization spring

Assemble the No. 3/4 and the No. 1/2 carburetors.



Install the 5 mm and 6 mm carburetor connecting bolts through the carburetors.



## FUEL SYSTEM

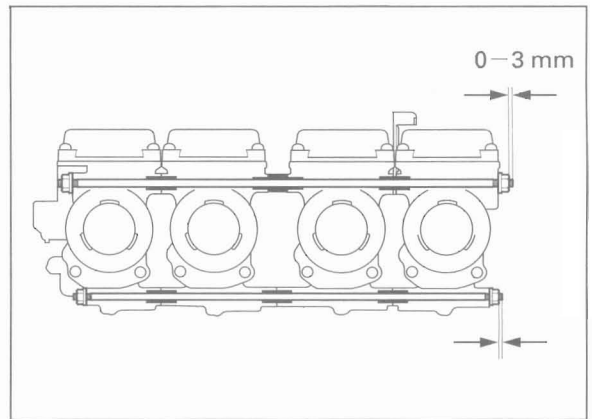
*Before tightening the carburetor connecting nuts, check there is no clearance between each of the carburetor joints.*

Tighten the each connecting nuts gradually and alternately, be sure the bolt thread projections are equal height. Hold the nut and tighten the nut on other side to the specified torque.

**TORQUE:**

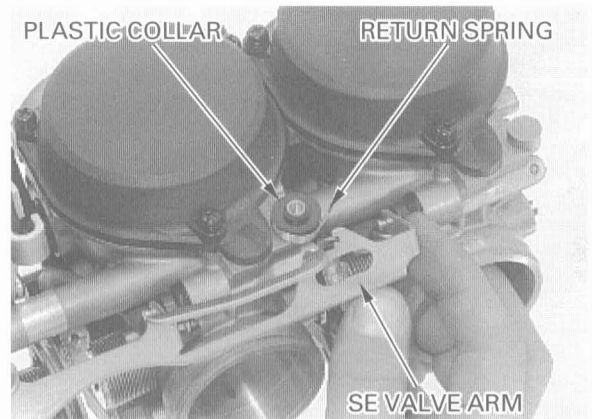
**5 mm nut:** 5 N·m (0.5 kgf·m , 3.6 lbf·ft)

**6 mm nut:** 9 N·m (0.9 kgf·m , 6.5 lbf·ft)

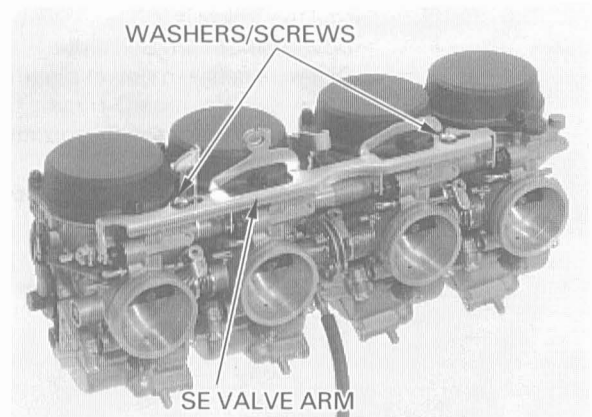


Install the plastic collars onto the No. 2 and No. 4 carburetor bodies.

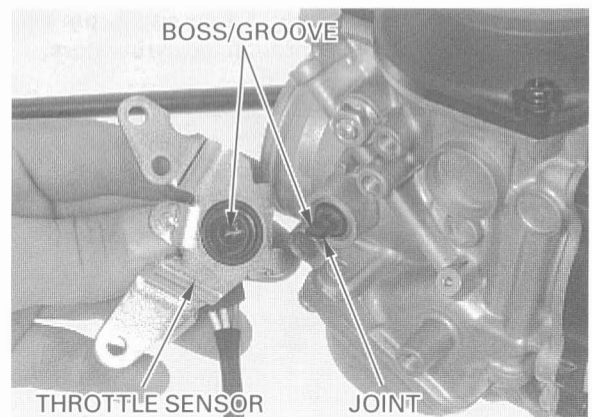
Set the return spring and install the SE valve arm aligning its ends with the SE valve heads.



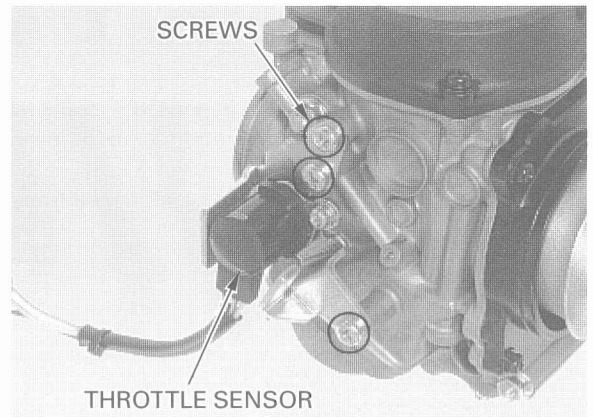
Install the plastic washers and tighten the SE valve arm screws securely.



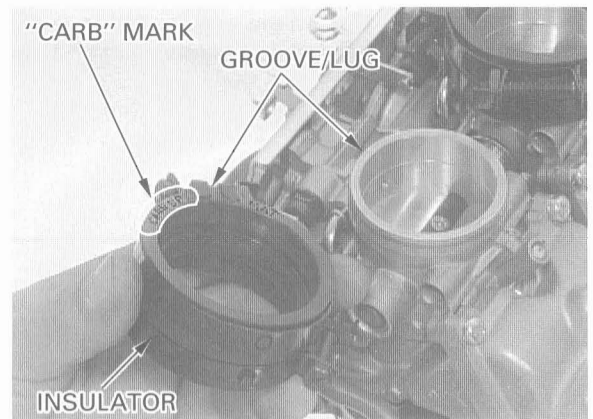
If the throttle sensor is removed, install the throttle sensor shaft joint onto the shaft. Install the throttle sensor aligning its groove with the boss on the sensor shaft joint.



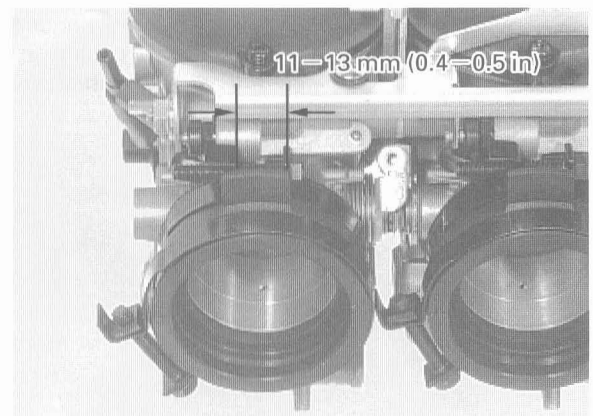
Install and tighten the throttle sensor mounting screws.



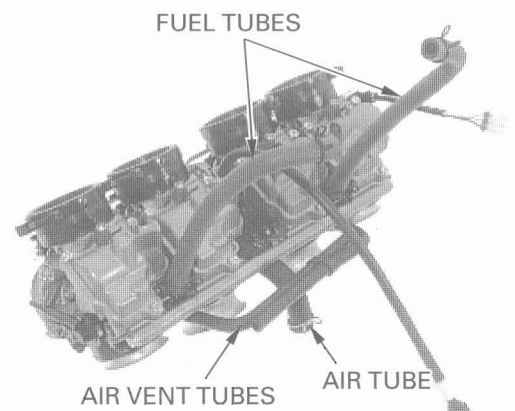
*Install the insulator with its "CARB" mark side facing the carburetor.* Install the each insulator onto the carburetor by aligning its groove with the lug of the carburetor.



Align the band hole with the insulator boss. Tighten the carburetor side insulator screws so that the band ends clearance is 11–13 mm (0.4–0.5 in).



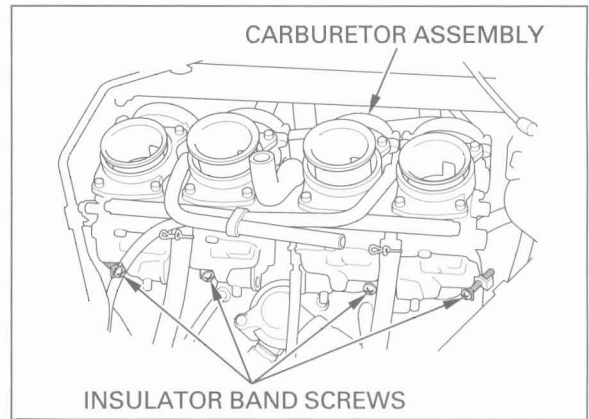
Install the air vent tube, air tube and fuel tubes.



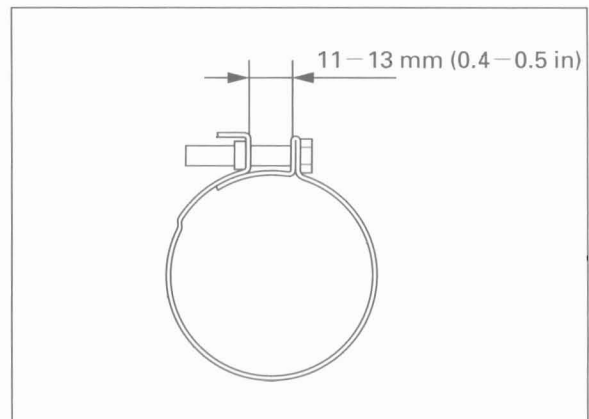
## CARBURETOR INSTALLATION

Coat the inside of the carburetor insulators with clean engine oil for ease of installation.

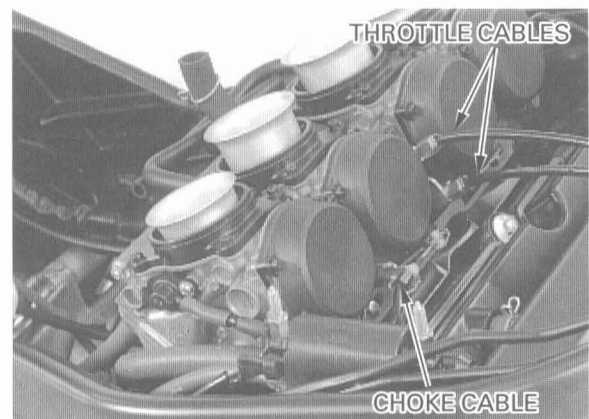
Install the carburetor assembly onto the cylinder head.



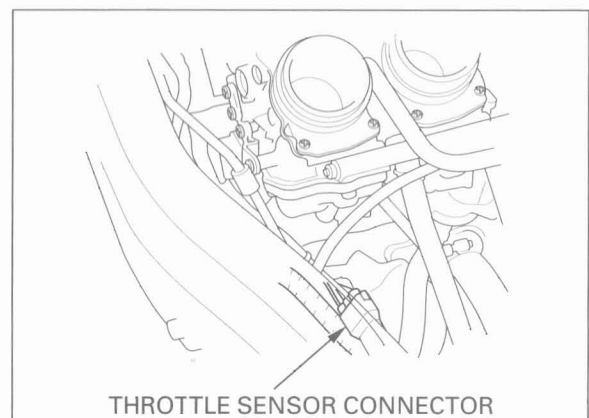
Tighten the engine side insulator screws so that the band ends clearance is 11–13 mm (0.4–0.5 in).



Connect the throttle cable ends to the throttle drum and install the throttle cables on to the cable holder. Connect the choke cable end to the starting enrichment valve arm.



Connect the throttle sensor connector.



Install the throttle stop screw into the guide.

Install the removed parts in the reverse order of removal.



## PILOT SCREW ADJUSTMENT

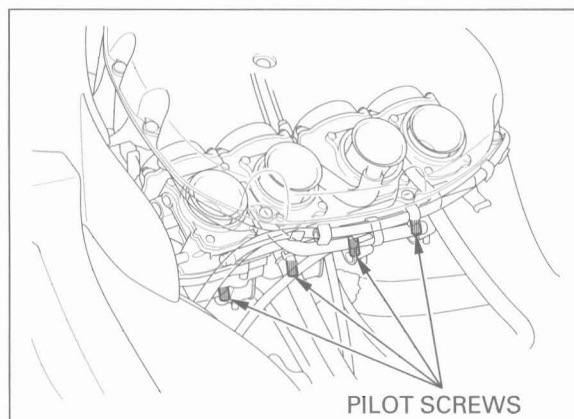
### IDLE DROP PROCEDURE

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

**NOTE:**

- Make sure the carburetor synchronization is within specification before pilot screw adjustment (page 3-16).
- The pilot screws are factory pre-set. Adjustment is not necessary unless the carburetors are overhauled or new pilot screws are installed.
- The engine must be warm for accurate adjustment. Ten minutes of stop-and-go riding is sufficient.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate 50 rpm change.



1. Turn the pilot screw clockwise until it seats lightly, and then back it out to the specification given below.

**CAUTION:**

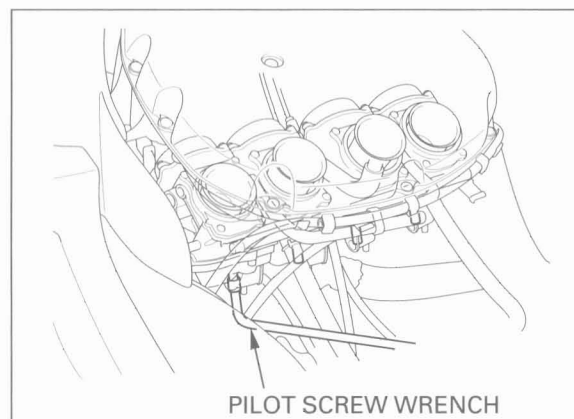
*Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.*

**TOOL:**

Pilot screw wrench 07KMA – MN90100

**INITIAL OPENING:**

**49 states/Canada type:** 2-3/4 turns out  
**California type:** 2-1/2 turns out





## FUEL SYSTEM

2. Warm the engine up to operating temperature.
3. Stop the engine and connect a tachometer according to the tachometer manufacturer's instructions.
4. Start the engine and adjust the idle speed with the throttle stop screw to the specification shown below.

**IDLE SPEED:** 1,100 ± 100 rpm

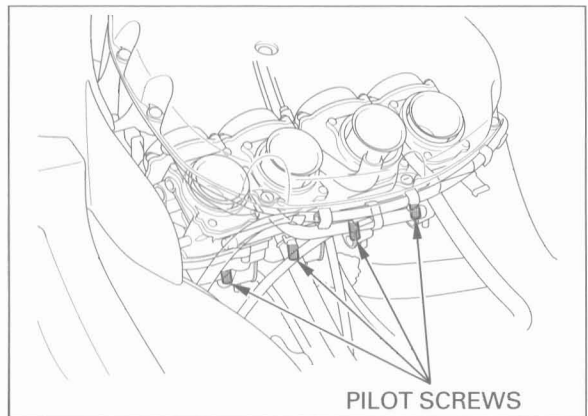
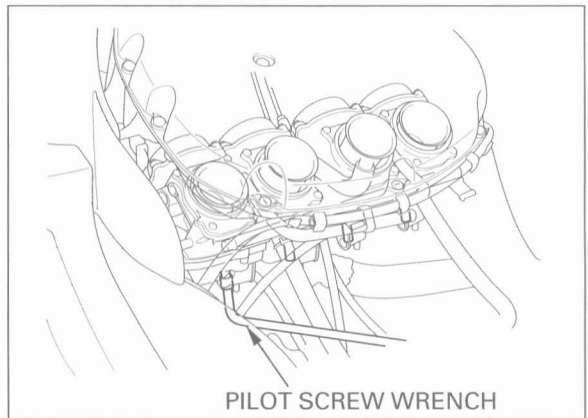
5. Turn the No. 3 pilot screw in or out slowly to obtain the highest engine speed.
6. Perform step 5 for all the carburetor pilot screws.
7. Lightly open the throttle 2–3 times, adjust the idle speed to the specification above with the throttle stop screw.
8. Turn No. 3 carburetor pilot screw in gradually until the engine speed drops 50 rpm.
9. Adjust the idle speed to the specification above with the throttle stop screw.
10. Turn the No. 3 carburetor pilot screw in until the engine speed drops 50 rpm.
11. Then turn the No. 3 pilot screw counterclockwise (out) the number of turns shown below from the position in step 10.

**FINAL OPENING:**

**49 states/Canada type:** 3/4 turns out

**California type:** 1 turn out

12. Perform steps 10 and 11 for the No. 1, 2 and 4 carburetor pilot screws.



## HIGH ALTITUDE ADJUSTMENT

*This adjustment must be made at high altitude to ensure proper high altitude operation.*

When the vehicle is to be operated continuously above 2,000 m (6,500 feet), the carburetors must be readjusted as follows to improve diveability and decrease exhaust emissions.

Warm up the engine to operating temperature. Stop and go riding for 10 minutes is sufficient. Turn each pilot screw clockwise 3/4 turn.

**HIGH ALTITUDE SETTING:** 3/4 turn in

Adjust the idle speed with the throttle stop screw.

**IDLE SPEED:** 1,100 ± 100 rpm





Attach a Vehicle Emission Control Information Update Label on the side wall of the storage compartment as shown in the label position illustration.

**NOTE:**

Do not attach the label to any part that can be easily removed from the vehicle.

**▲WARNING**

*Sustained operation at an altitude lower than 1,500 m (5,000 feet) with the carburetor adjusted for high altitude may cause the engine to idle roughly and the engine stall in traffic. It may also cause engine damage due to overheating.*

When the vehicle is to be operated continuously below 1,500 m (5,000 feet), turn each pilot screw counterclockwise 1/2 turn to its original position and adjust the idle speed.

**IDLE SPEED:** 1,100 ± 100 rpm

Be sure to make these adjustments at low altitude. Remove the Vehicle Emission Control Information Update Label that is attached to the right side of the main frame after adjusting for low altitude.

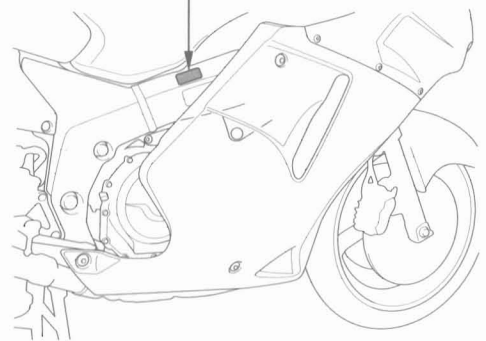
VEHICLE EMISSION CONTROL INFORMATION UPDATE  
· HONDA MOTOR CO.,LTD

THIS VEHICLE HAS BEEN ADJUSTED TO IMPROVE EMISSION CONTROL PERFORMANCE WHEN OPERATED AT HIGH ALTITUDE.

ALTITUDE PERFORMANCE ADJUSTMENT INSTRUCTIONS ARE AVAILABLE AT YOUR AUTHORIZED HONDA DEALER.



EMISSION CONTROL INFORMATION UPDATE LABEL



## SECONDARY AIR SUPPLY SYSTEM

### SYSTEM INSPECTION

Start the engine and warm it up to normal operating temperature.

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

Check that the secondary air intake ports are clean and free carbon deposits.

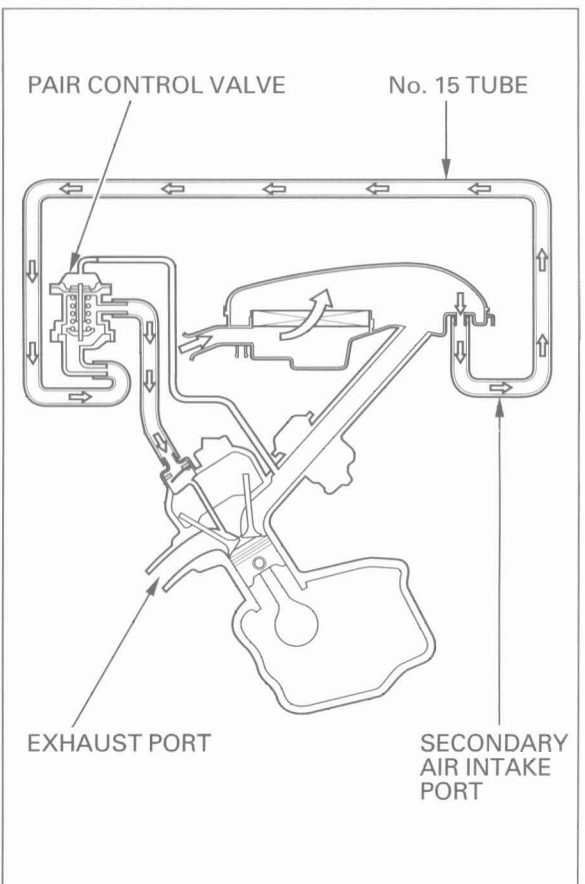
If the ports are carbon fouled, check the pulse secondary air injection (PAIR) control valve.

Disconnect the air cleaner housing-to-PAIR control valve tube (No. 15) from the air cleaner housing.

Disconnect the PAIR control valve vacuum tube from the control valve and plug it to keep air from entering. Connect the vacuum pump to the PAIR control valve.

**TOOL:**  
**VACUUM PUMP**

Commercially available in U.S.A.



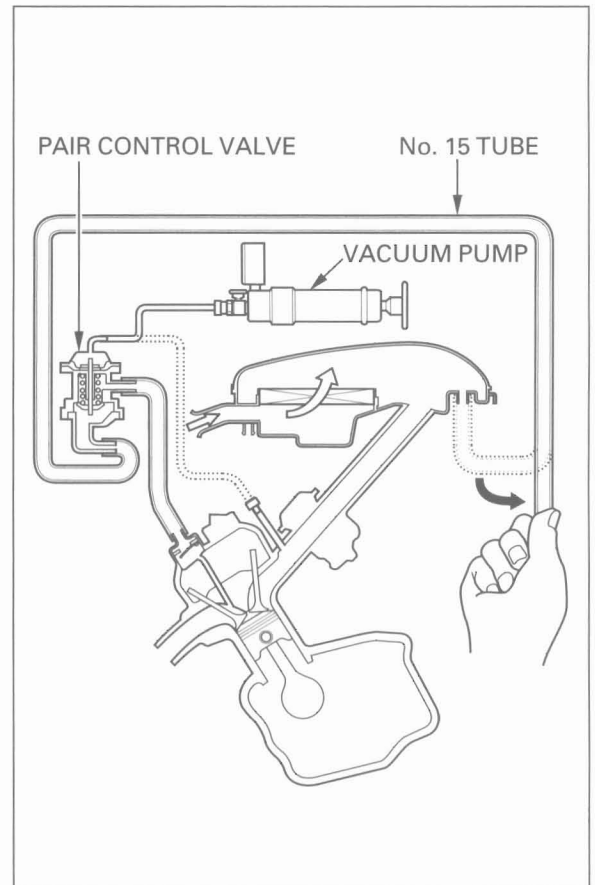
## FUEL SYSTEM

Start the engine and open the throttle slightly to be certain that air is sucked in through the No. 15 vacuum tube.  
If the air is not drawn in, check the No. 15 tube for clogging.

With the engine running, gradually apply vacuum to the PAIR control valve.  
Check that the air intake port stops drawing air, and that the vacuum does not bleed.

**SPECIFIED VACUUM:** 40 mm Hg

If the air drawn in, or if the specified vacuum is not maintained, install a new PAIR control valve.  
If afterburn occurs on deceleration, even when the secondary air supply system is normal, check the air cut-off valve.



## EVAPORATIVE EMISSION CONTROL SYSTEM (CALIFORNIA TYPE ONLY)

### NOTE:

Refer to the Vacuum Hose Routing Diagram on page 1-38 for the tube connection.

### EVAPORATIVE EMISSION (EVAP) CANISTER REMOVAL/INSTALLATION

Remove the two bolts, disconnect the No. 1 and No. 4 tubes from the EVAP canister and remove the EVAP canister.

Install the EVAP canister in the reverse order of removal.

### EVAP PURGE CONTROL VALVE INSPECTION

### NOTE:

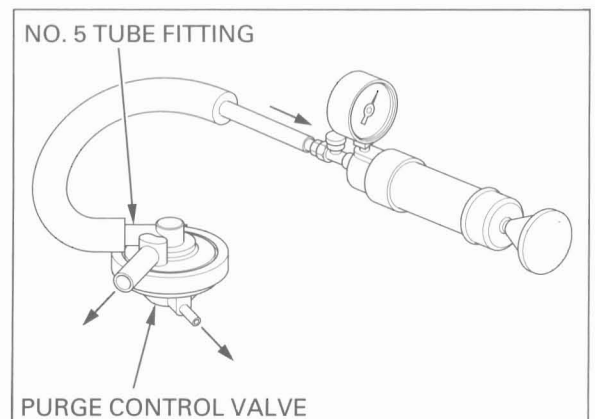
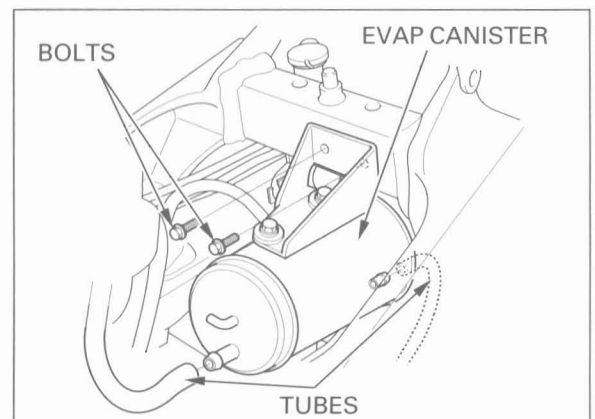
The EVAP purge control valve should be inspected if hot restart is difficult.

Remove the EVAP purge control valve from the air cleaner housing.

Connect the vacuum pump to the No. 5 tube fitting (output port) that goes to the carburetors. Apply the specified vacuum to the EVAP purge control valve.

**SPECIFIED VACUUM:** 250 mm Hg (9.8 in Hg)

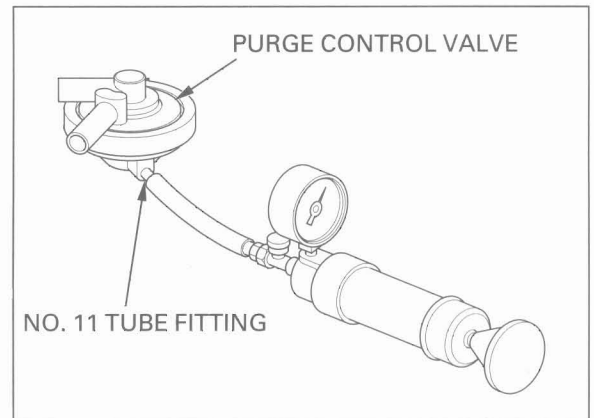
The specified vacuum should be maintained.  
Replace the EVAP purge control valve if vacuum is not maintained.



Remove the vacuum pump and connect it to the No. 11 tube fitting (vacuum port) that goes to the No. 3 carburetor. Apply the specified vacuum to the EVAP purge control valve.

**SPECIFIED VACUUM:** 250 mm Hg (9.8 in Hg)

The specified vacuum should be maintained. Replace the EVAP purge control valve if vacuum is not maintained.



Connect a pressure pump to the No. 4 tube fitting (input port) that goes to EVAP canister.

**CAUTION:**

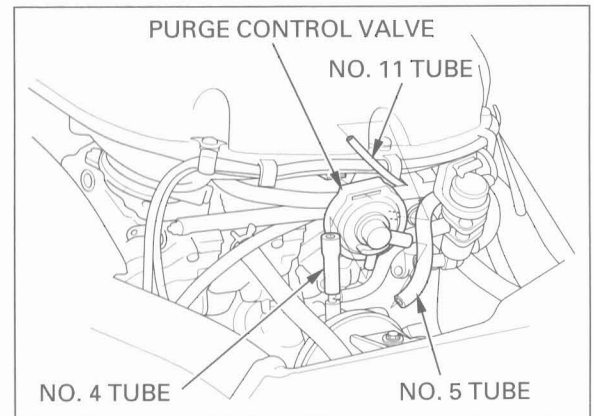
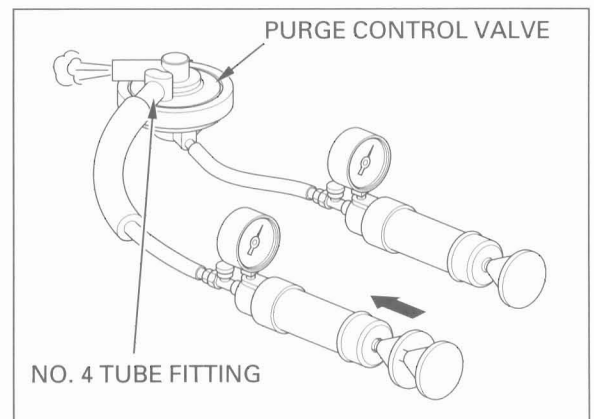
*Damage to the EVAP purge control valve may result from use of a high pressure air source. Use a hand-operated air pump only.*

While applying the specified vacuum to the EVAP purge control valve vacuum port, pump air through the input port.

**SPECIFIED VACUUM:** 250 mm Hg (9.8 in Hg)

Air should flow through the EVAP purge control valve and out the output port that goes to the carburetors. Replace the EVAP purge control valve if air does not flow out.

Remove the pumps and install the EVAP purge control valve in the reverse order of removal.

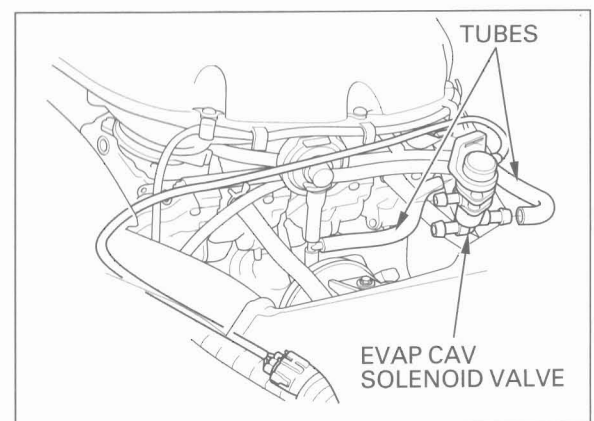


**EVAP CARBURETOR AIR VENT (CAV) SOLENOID VALVE INSPECTION**

**NOTE:**

The EVAP CAV solenoid valve should be inspected if hot restart is difficult.

Disconnect the No. 4, 6, 7 tubes from the EVAP CAV solenoid valve.



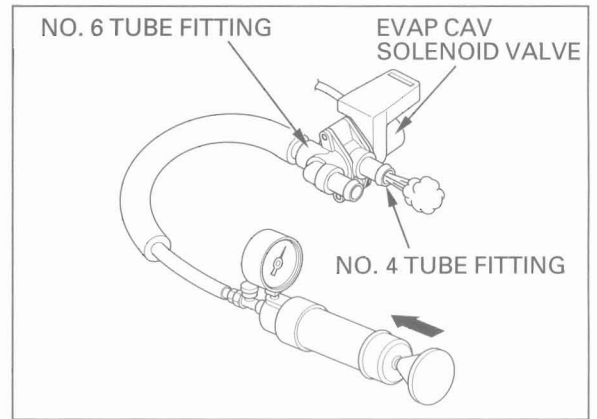
## FUEL SYSTEM

Connect a pressure pump to the No. 6 tube fitting that goes to carburetor.

### CAUTION:

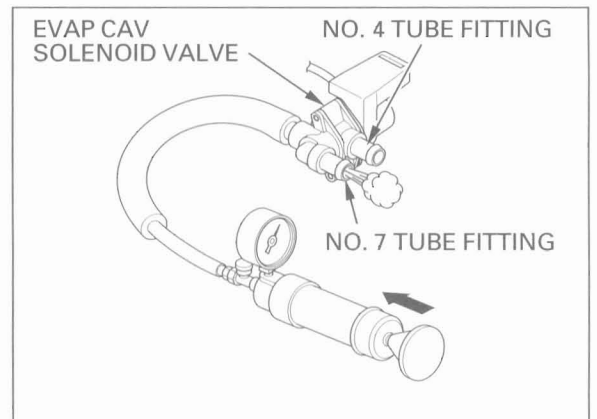
*Damage to the EVAP CAV solenoid valve may result from use of high pressure air source. Use a hand operated air pump only.*

With the ignition switch OFF, pump air through the No. 6 tube fitting.  
Make sure the air flow out from No. 4 fitting, and does not flow out from No. 7 fitting.



Turn the ignition switch ON, pump air through the No. 6 tube fitting.  
Make sure the air flow out from No. 7 fitting, and does not flow out from No. 4 fitting.

If the air flow is not correct, check the EVAP CAV solenoid valve input voltage.

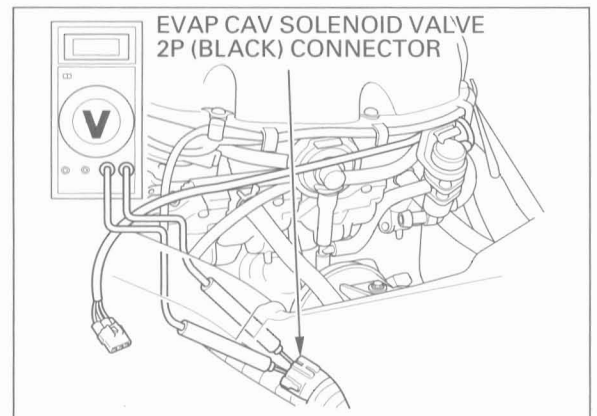


## INPUT VOLTAGE INSPECTION

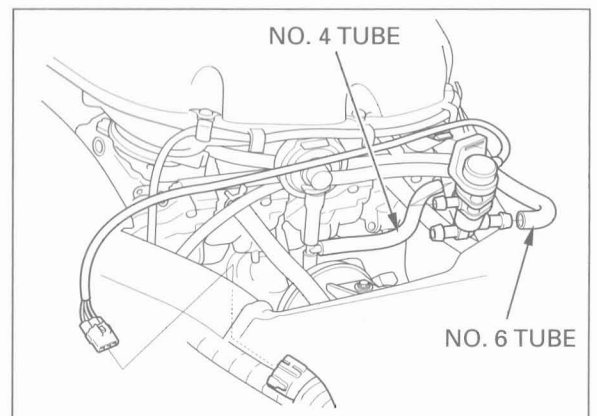
Disconnect the EVAP CAV solenoid valve 2P (Black) connector.  
Turn the ignition switch ON and measure the voltage between the terminals.

**CONNECTION:** Black/Brown (+) – Green (-)  
**STANDARD:** Battery voltage

If there is battery voltage, replace the EVAP CAV solenoid valve.  
If there is no battery voltage, check the wire harness.



Install the tubes to the EVAP CAV solenoid valve and connect the 2P (Black) connector.



## FUEL VALVE

### FUEL AUTO VALVE INSPECTION

Remove the fuel tank (page 2-2).

Connect the fuel tube to the fuel valve and place the suitable gasoline container under the fuel tube.

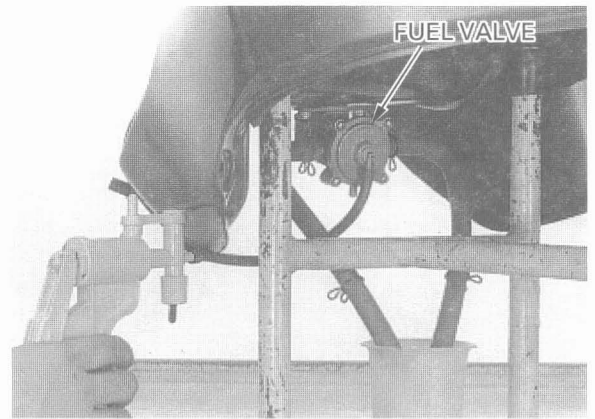
Turn the fuel valve ON.

If the fuel comes out of the fuel tube, replace the diaphragm.

Connect a commercially available vacuum pump to the diaphragm vacuum outlet.

Fuel should flow out from the fuel tube when vacuum is applied.

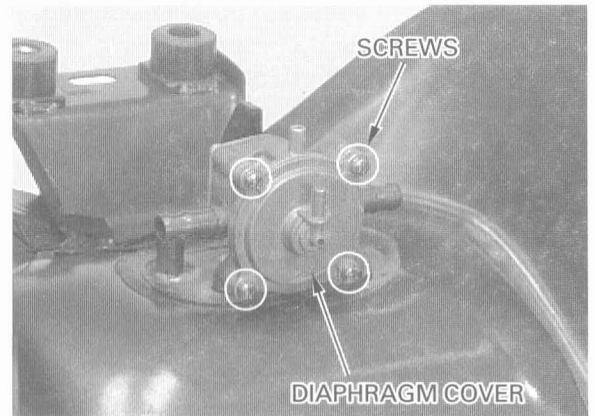
If fuel flow is restricted, replace the diaphragm.



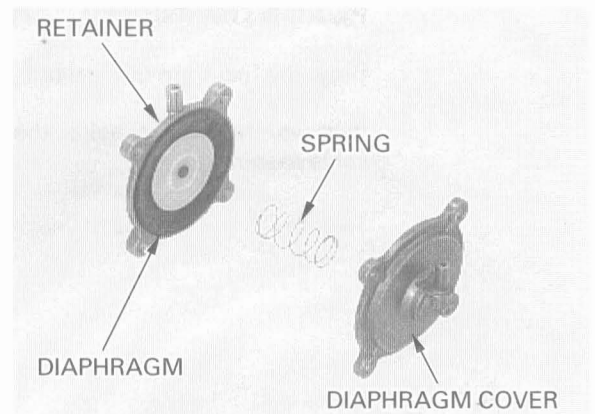
### DIAPHRAGM REPLACEMENT

Drain the fuel from the fuel tank.

Remove the four screws and diaphragm assembly.



Replace the diaphragm cover, spring, diaphragm and retainer as a set.

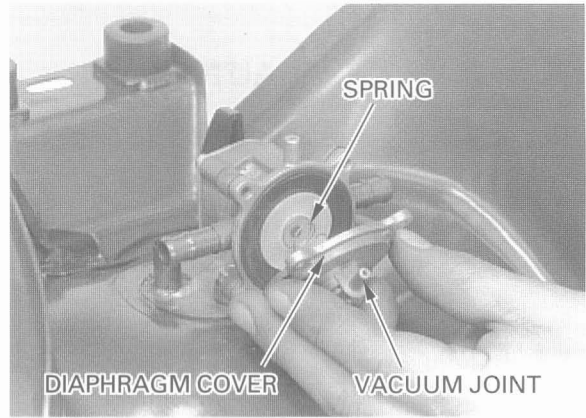


Install the diaphragm assembly so that the air vent pipe of the retainer facing down (after the fuel tank installed).

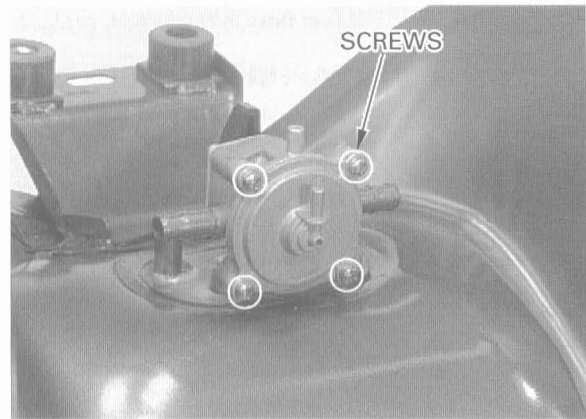


## FUEL SYSTEM

Install the diaphragm cover so that the vacuum joint of the cover facing to the same direction as the retainer air vent pipe.



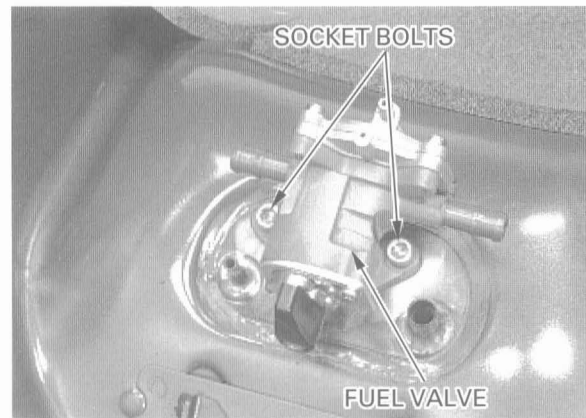
Install and tighten the screws.



### FUEL STRAINER CLEANING

Drain the fuel from the fuel tank.

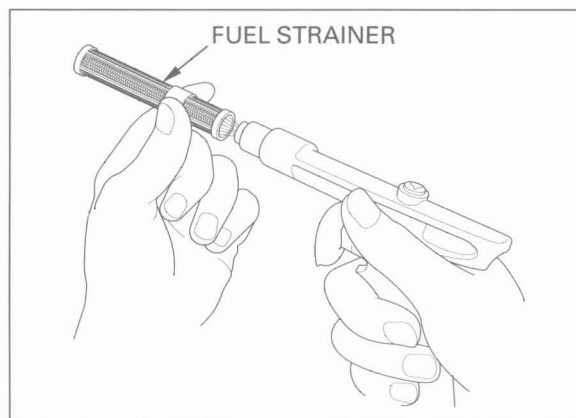
Remove the socket bolts, then remove the fuel valve assembly.



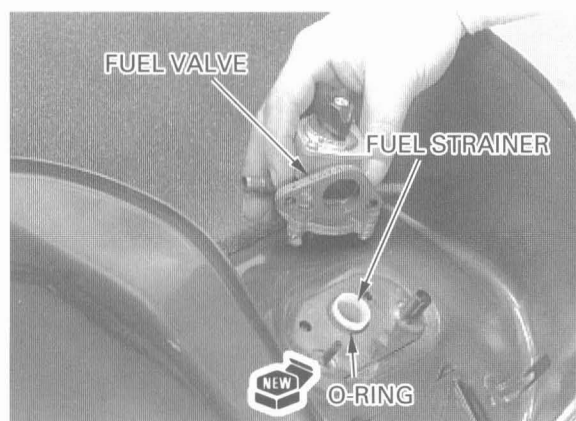
Remove the fuel strainer and O-ring.



Clean the fuel strainer with compressed air.



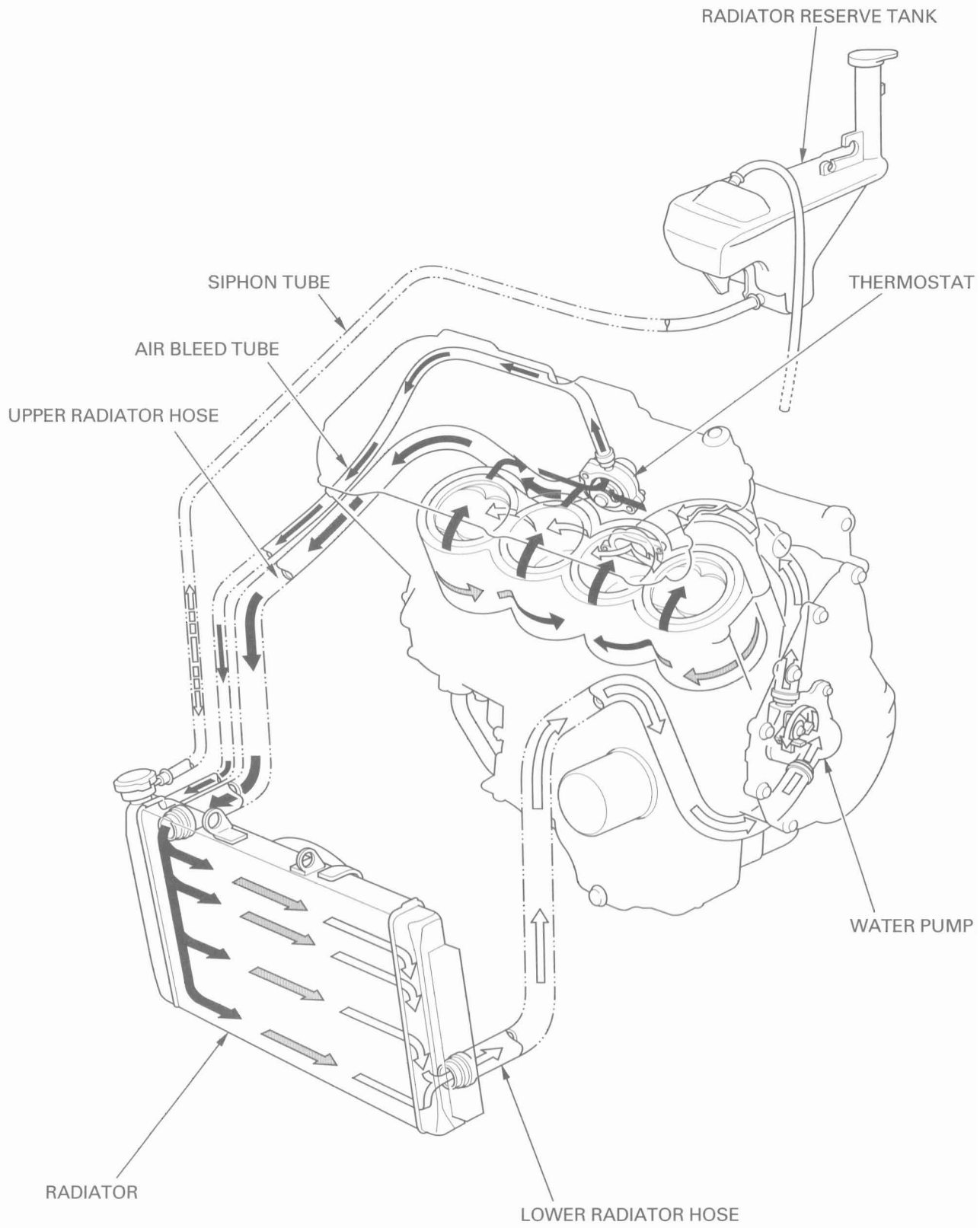
Install a new O-ring onto the fuel strainer and install it into the fuel tank.  
Install the fuel valve onto the fuel tank.



Install and tighten the socket bolts securely.  
Install the fuel tank (page 2-2).  
Fill the fuel tank and make sure there are no fuel leaks.



SYSTEM FLOW PATTERN





# 6. COOLING SYSTEM

SYSTEM FLOW PATTERN	6-0	THERMOSTAT	6-6
SERVICE INFORMATION	6-1	RADIATOR	6-7
TROUBLESHOOTING	6-2	WATER PUMP	6-13
SYSTEM TESTING	6-3	RADIATOR RESERVE TANK	6-15
COOLANT REPLACEMENT	6-4		

## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

- *Wait until the engine is cool before slowly removing the radiator cap. Removing the cap while the engine is hot and the coolant is under pressure may cause serious scalding.*
- *Radiator coolant is toxic. Keep it away from eyes, mouth, skin and clothes.*
  - *If any coolant gets in your eyes, rinse them with water and consult a doctor immediately.*
  - *If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.*
  - *If any coolant gets on your skin or clothes, rinse thoroughly with plenty of water.*
- **KEEP OUT OF REACH OF CHILDREN.**

- Use only distilled water and ethylene glycol the cooling system. A 50–50 mixture is recommended for maximum corrosion protection. Do not use alcol-based antifreeze.
- Add cooling system at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to section 19 for fan motor switch and coolant temperature sensor inspection.

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	3.2 ℓ (0.85 US gal , 0.70 Imp gal)
	Reserve tank	1.1 ℓ (0.29 US gal , 0.24 Imp gal)
Radiator cap relief pressure		108–137 kPa (1.1–1.4 kgf/cm <sup>2</sup> , 16–20 psi)
Thermostat	Begin to open	176–183 °F (80–84 °C)
	Fully open	203 °F (95 °C)
	Valve lift	8 mm (0.3 in) minimum

### TORQUE VALUES

Water pump cover bolt	13 N·m (1.3 kgf·m , 9 lbf·ft)	
Coolant temperature sensor	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Fan motor nut	2 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**

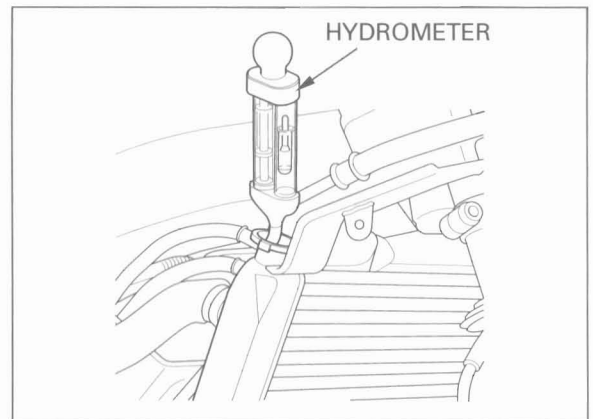
*The engine must be cool before removing the radiator cap, or severe scalding may result.*

### COOLANT (HYDROMETER TEST)

Remove the inner panel (page 2-8).

Remove the radiator cap.

Test the coolant gravity using a hydrometer (see below for "Coolant specific gravity chart"). For maximum corrosion protection, a 50–50 solution of ethylene glycol and distilled water is recommended (page 6-4). Look for contamination and replace the coolant if necessary.



**Coolant specific gravity chart**

Coolant temperature °F (°C)	Coolant ratio %										
	32 (0)	41 (5)	50 (10)	59 (15)	68 (20)	77 (25)	86 (30)	95 (35)	104 (40)	113 (45)	122 (50)
5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
30	1.053	1.052	1.051	1.049	1.047	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

## COOLING SYSTEM

### RADIATOR CAP/SYSTEM PRESSURE INSPECTION

*Before installing the cap in the tester, wet the sealing surfaces.*

Remove the radiator cap (see above).

Pressure test the radiator cap.

Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low.

It must hold specified pressure for at least 6 seconds.

#### RADIATOR CAP RELIEF PRESSURE:

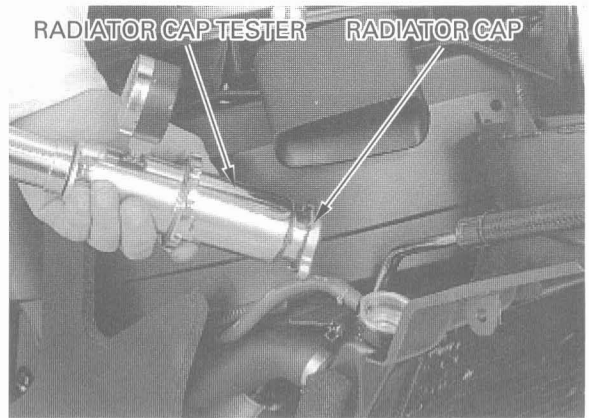
108–137 kPa (1.1–1.4 kgf/cm<sup>2</sup>, 16–20 psi)

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/cm<sup>2</sup>, 20 psi).*

Repair or replace components if the system will not hold specified pressure for at least 6 seconds.



## COOLANT REPLACEMENT

### PREPARATION

#### ⚠ WARNING

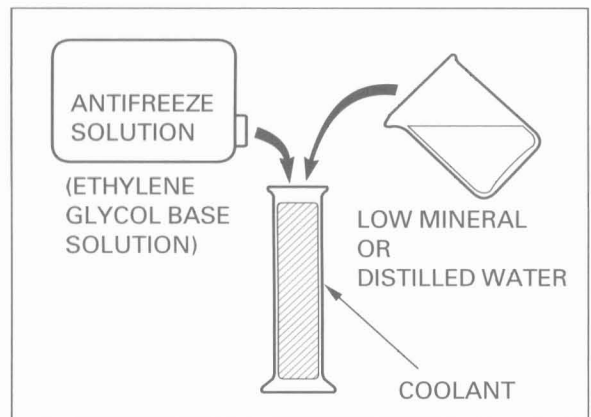
- **Radiator coolant is toxic. Keep it away from eyes, mouth, skin and clothes.**
  - If any coolant gets in your eyes, rinse them with water and consult a doctor immediately.
  - If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.
  - If any coolant gets on your skin or clothes, rinse thoroughly with plenty of water.
- **KEEP OUT OF REACH OF CHILDREN.**

#### 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 anti-freeze.

#### RECOMMENDED MIXTURE:

50–50 (Distilled water and anti-freeze)



REPLACEMENT/AIR BLEEDING

**▲WARNING**

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

NOTE:

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

Remove the radiator cap.

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

Reinstall the drain bolt with the new sealing washer.

Remove the following:

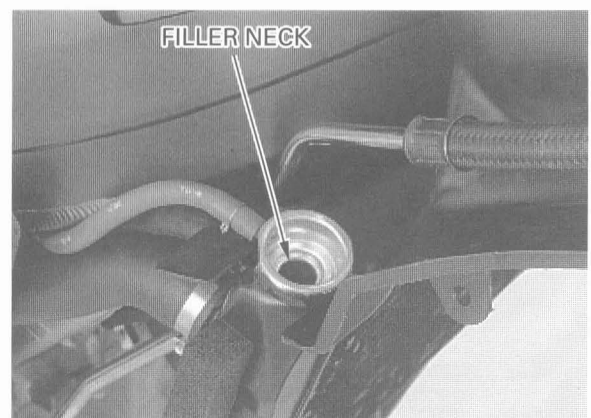
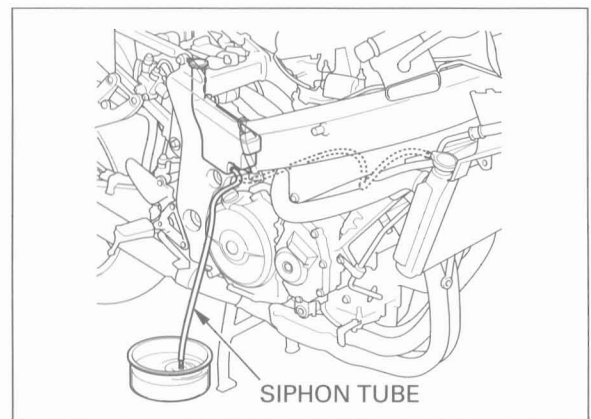
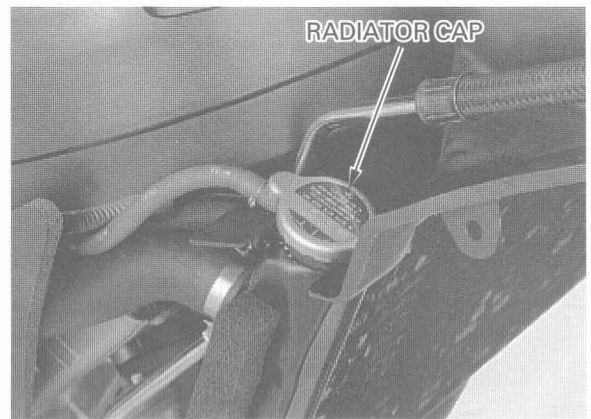
- Fuel tank (page 2-2)
- Inner panel (page 2-8)

Disconnect the siphon tube from the radiator.

Drain the reserve tank coolant.  
Empty the coolant and rinse the inside of the reserve tank with water.

Reinstall the radiator siphon tube.

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

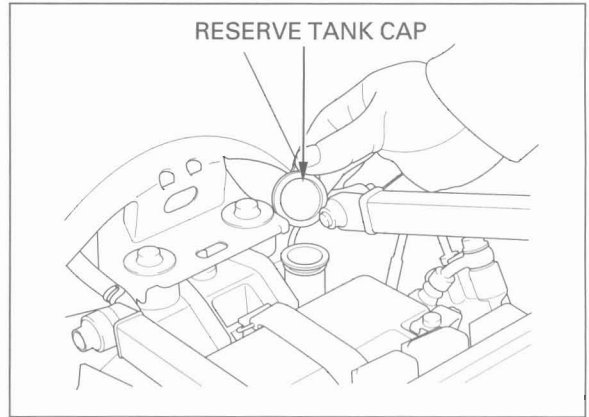


## COOLING SYSTEM

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

Bleed air from the system as follow:

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

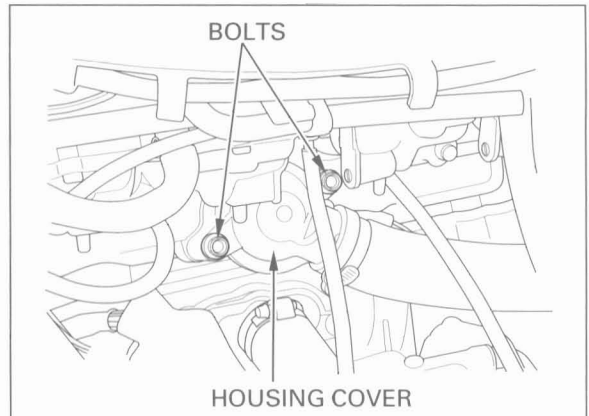


## THERMOSTAT

### REMOVAL

Drain the coolant (page 6-4).

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



Remove the thermostat and housing.

### INSPECTION

#### ▲WARNING

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

Visually inspect the thermostat for damage.

Heat the water with an electric heating element to operating temperature for 5 minutes.

Suspend the thermostat in heated water to check its operation.

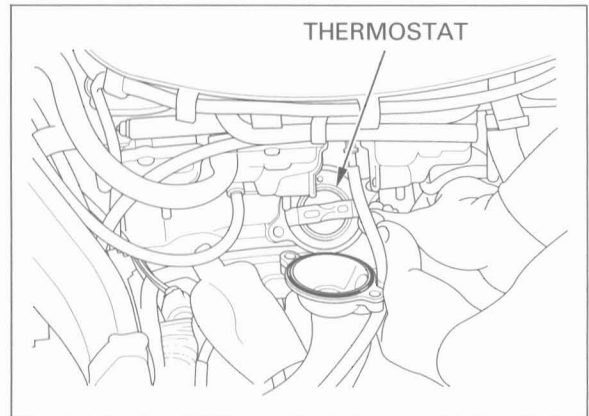
Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.

#### THERMOSTAT BEGIN TO OPEN:

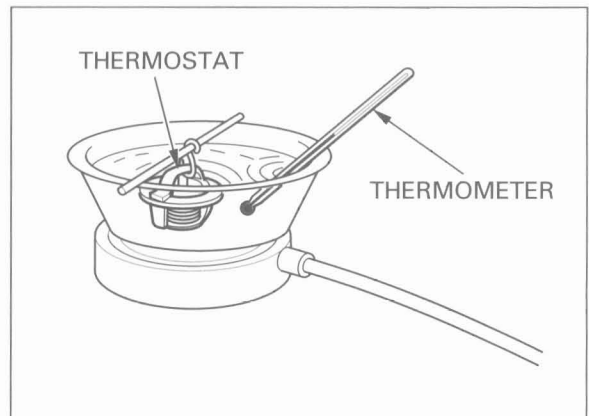
176–183 °F (80–84 °C)

#### VALVE LIFT:

8 mm (0.3 in) minimum at 203 °F (95 °C)

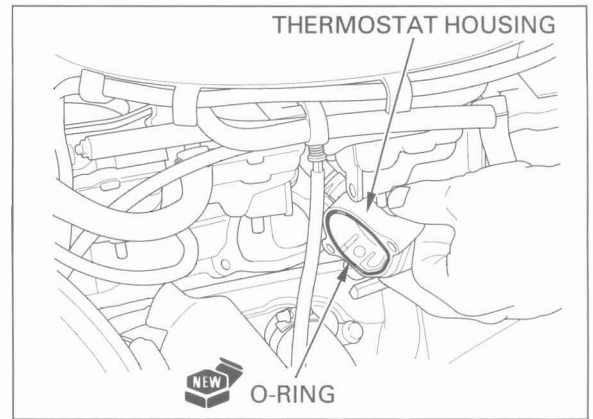


*Do not let the thermostat or thermometer touch the pan, or you will get false reading.*



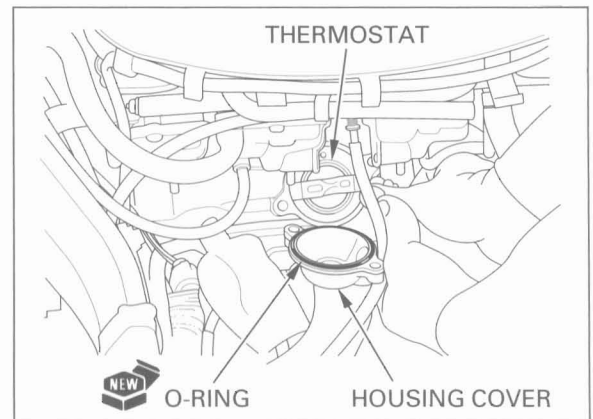
**INSTALLATION**

Install a new O-ring into the thermostat housing groove.  
Install the thermostat housing onto the cylinder head.



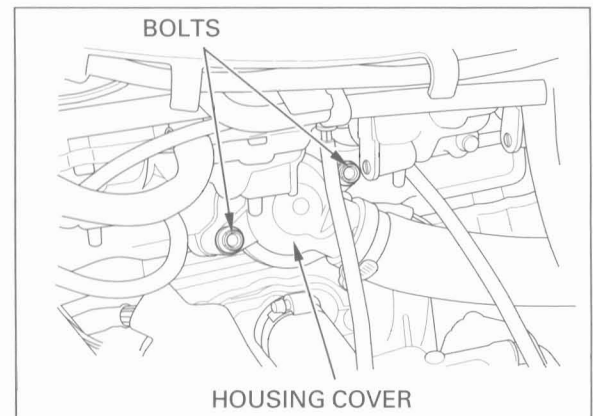
Install the thermostat into the housing with its hole facing upward.

Install a new O-ring into the groove of the thermostat housing cover.



Install and tighten the housing cover bolts.

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

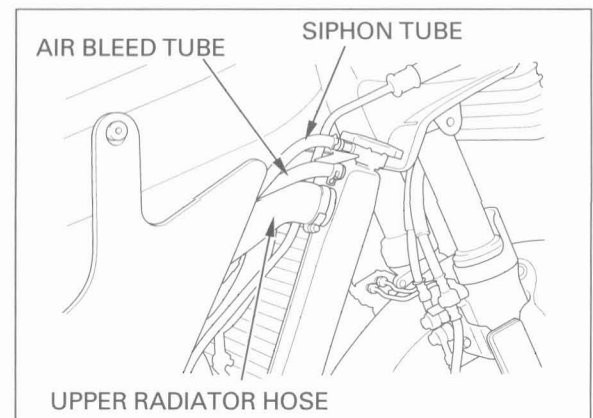


**RADIATOR**

**REMOVAL**

Drain the coolant (page 6-4).  
Remove the lower cowls and inner half cowl (Section 2).

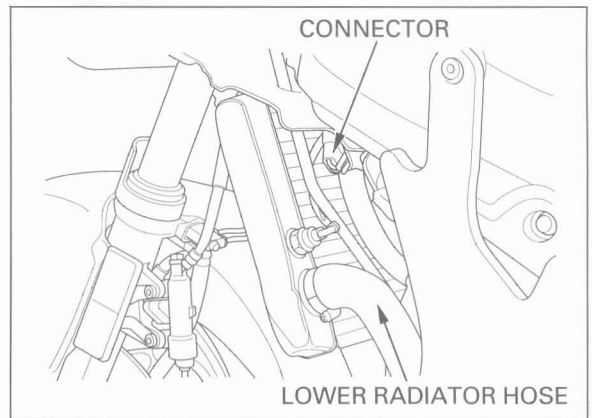
Disconnect the siphon tube and air bleed tube from the radiator.  
Disconnect the upper radiator hose.



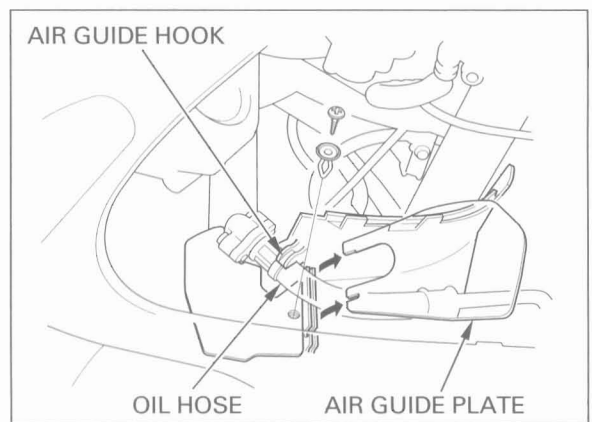
## COOLING SYSTEM

Disconnect the fan motor switch 3P (White) connector.

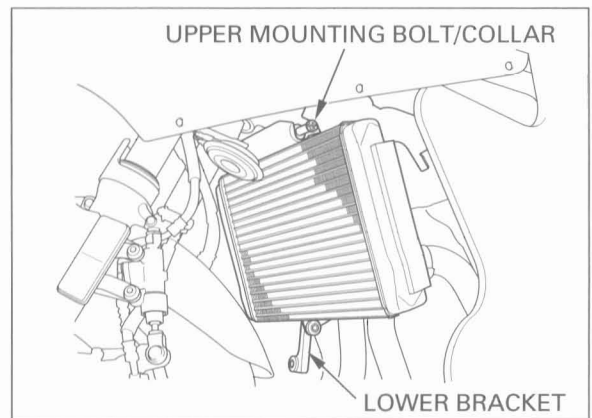
Disconnect the lower radiator hose.



Release the air guide hooks from the oil cooler hoses.



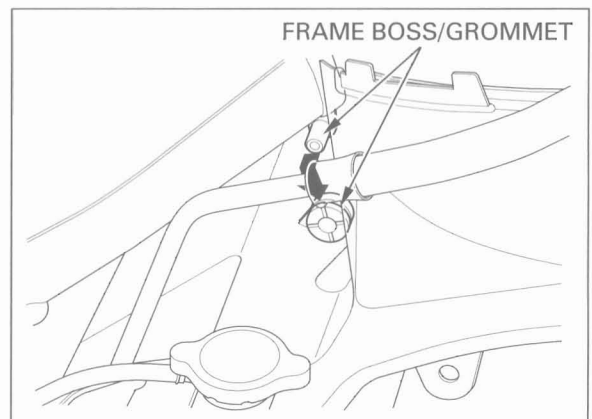
Remove the upper mounting bolt and collar.  
Release the radiator from the lower bracket.



Lower the left side of the radiator down and slide the radiator rightward, then release the grommet from the frame boss.  
Remove the radiator and air guide as an assembly.

**CAUTION:**

***Be careful not to damage the radiator core.***



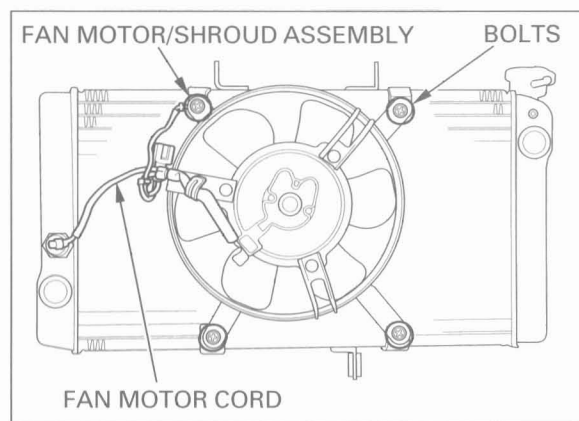


**DISASSEMBLY**

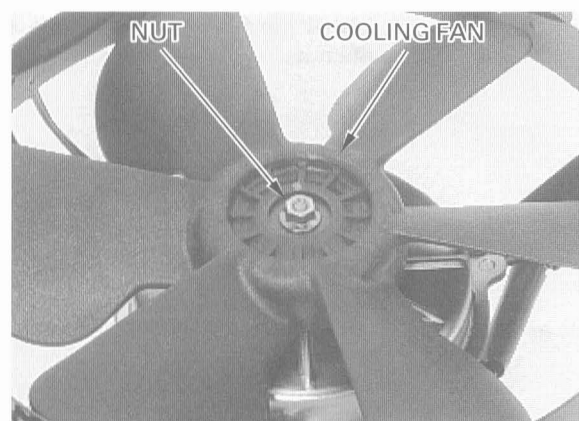
Remove the grommets and air guide from the radiator.



Disconnect the fan motor switch connector and release the cord from the clamps. Remove the four bolts, ground eyelet and fan motor/shroud assembly.

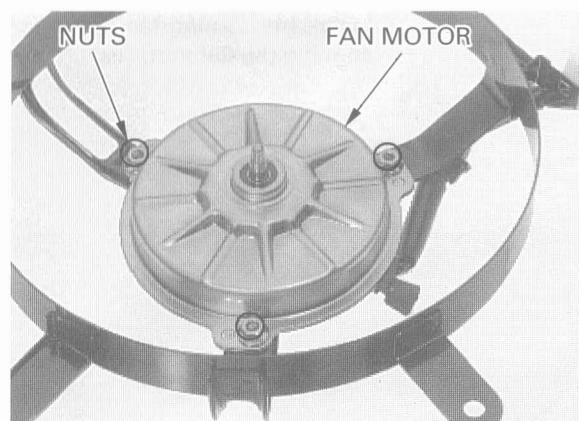


Remove the nut and cooling fan.

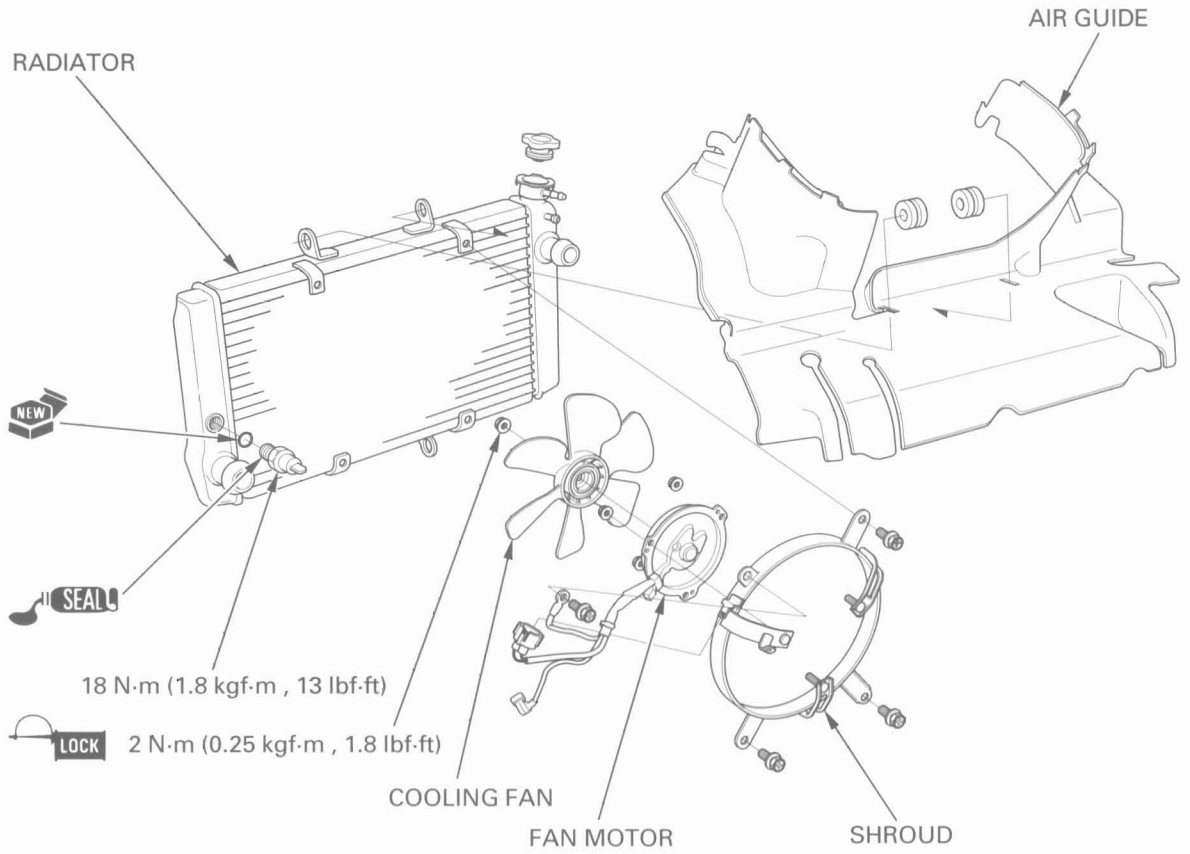


Remove the flange nuts and fan motor.

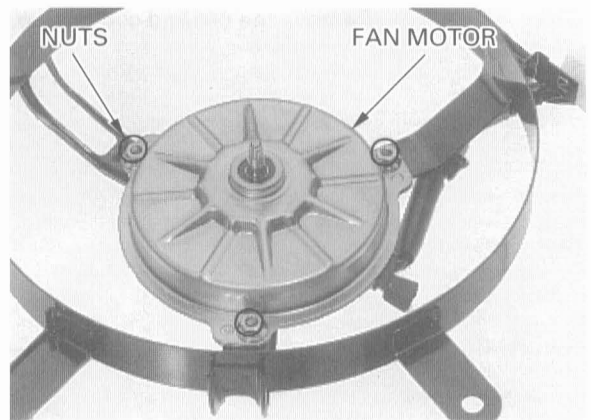
For fan motor switch information, refer to page 19-15.



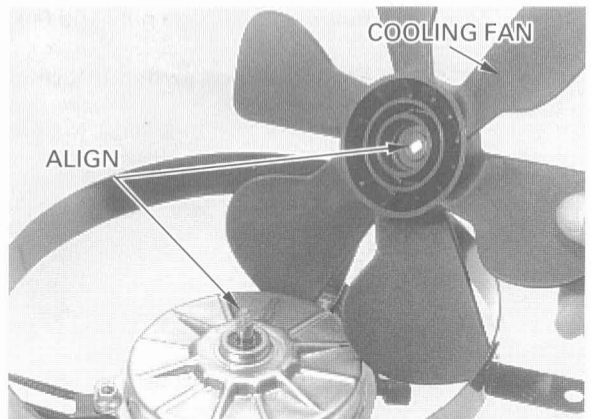
ASSEMBLY



Install the fan motor onto the shroud and tighten the nuts.

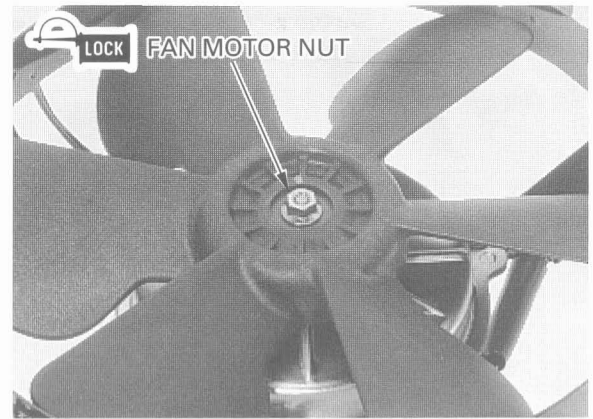


Install the cooling fan onto the fan motor shaft by aligning the flat surfaces.



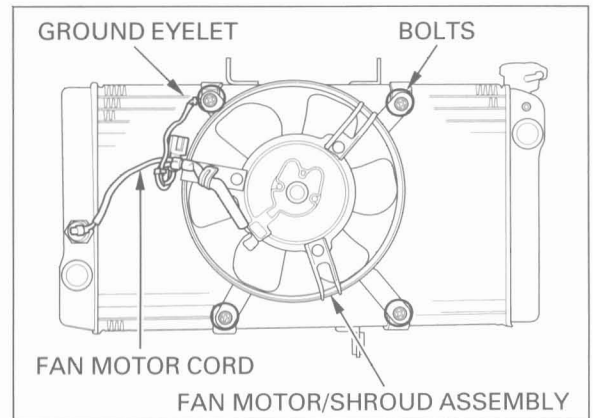
Apply a locking agent to the cooling fan nut threads. Install and tighten the nut to the specified torque.

**TORQUE:** 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 bolts.

Connect the fan motor switch cord to the fan motor switch and clamp it as shown.



Install the air guide and radiator upper mounting grommets.

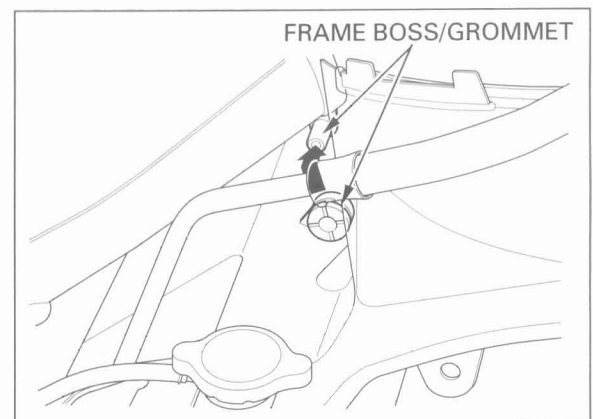


**INSTALLATION**

**CAUTION:**

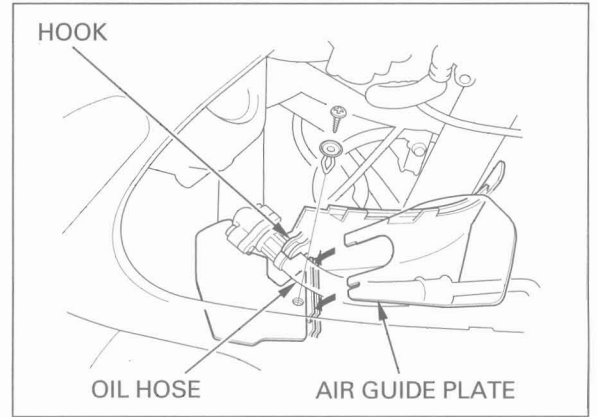
*Be careful not to damage the radiator core.*

Install the radiator and air guide assembly, aligning its grommet with the boss on the frame.



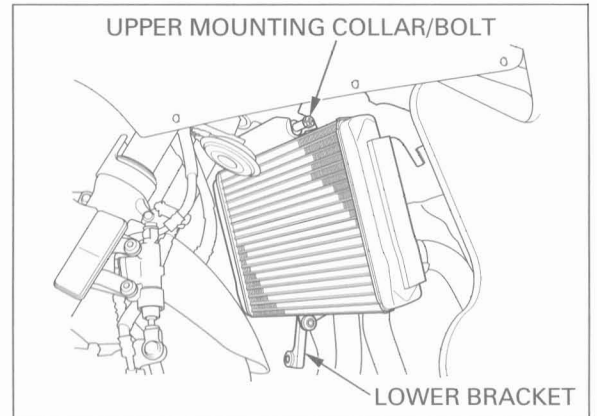
## COOLING SYSTEM

Set the air guide hook onto the oil cooler hoses.  
Install the air guide plate.

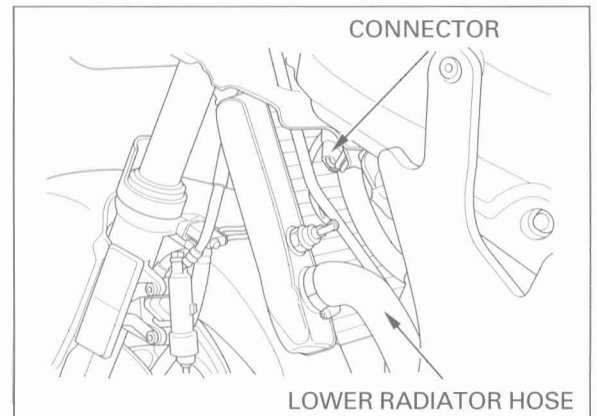


Install the upper mounting collars and bolts.

Install the radiator lower mounting bracket to the radiator.  
Tighten the upper mounting bolt securely.

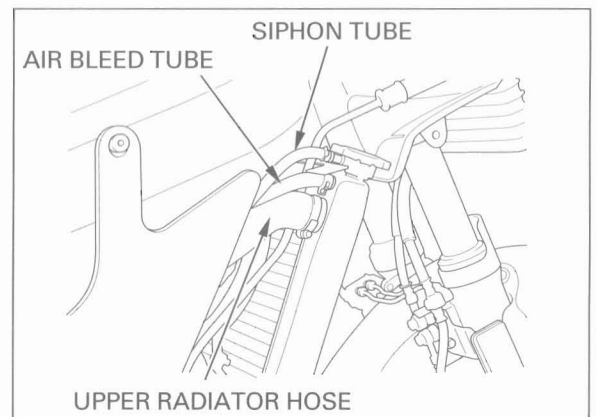


Connect the fan motor connector.  
Connect the lower radiator hose.



Connect the upper radiator hose.  
Connect the siphon tube and air bleed tube to the radiator.

Fill the system with recommended coolant (page 6-5).  
Install the lower cowls (page 2-8).

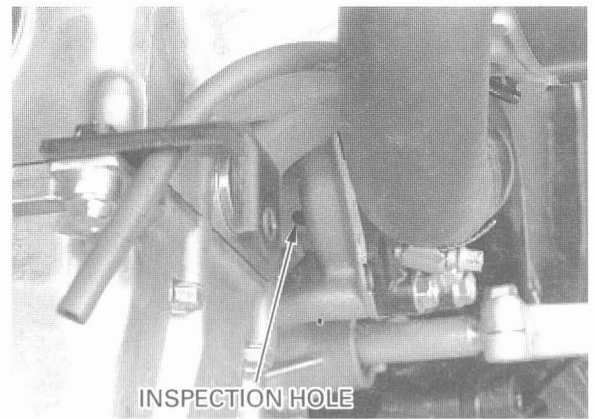


## WATER PUMP

### MECHANICAL SEAL INSPECTION

Inspect the inspection hole for signs of coolant leakage.

If there is leakage, the mechanical seal is defective and replace the water pump as an assembly.

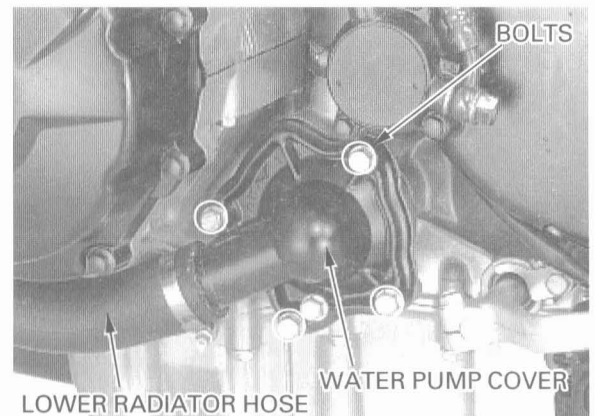


### REMOVAL

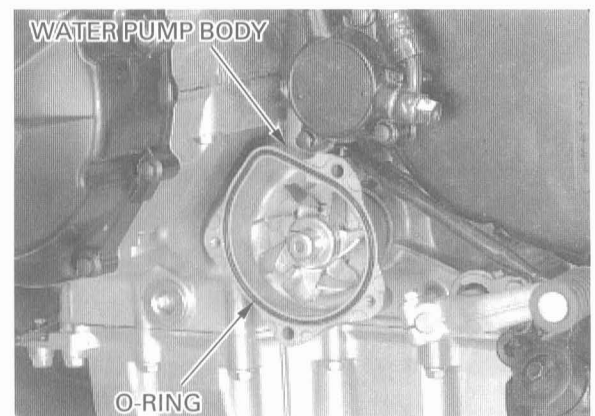
Drain the coolant (page 6-4).

Disconnect the lower radiator hose from the water pump cover.

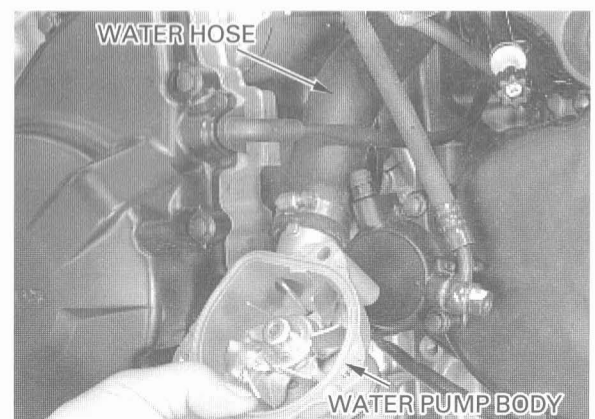
Remove the four flange bolts and water pump cover.



Remove the O-ring from the water pump body.  
Remove the water pump body from the crankcase.

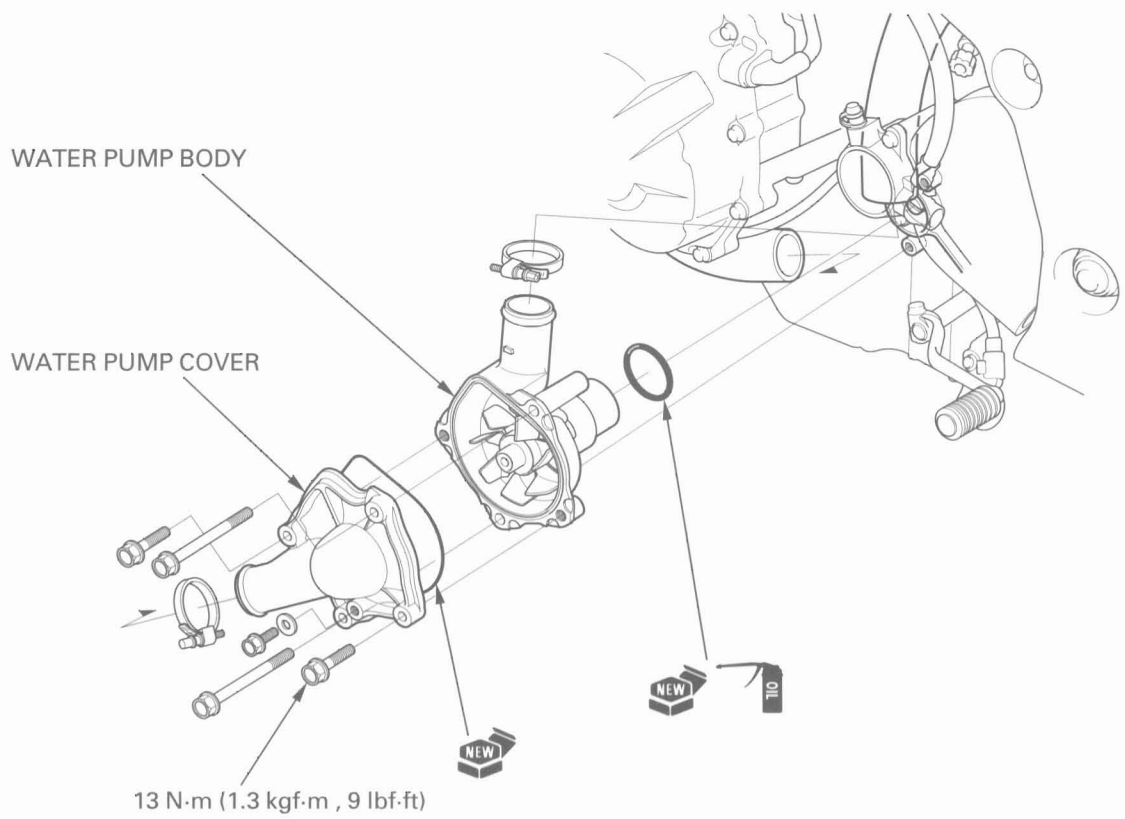


Disconnect the water pump-to-water joint hose from the water pump body.



# COOLING SYSTEM

## INSTALLATION



Connect the water pump-to-water joint hose to the water pump body and tighten the clamp screw.

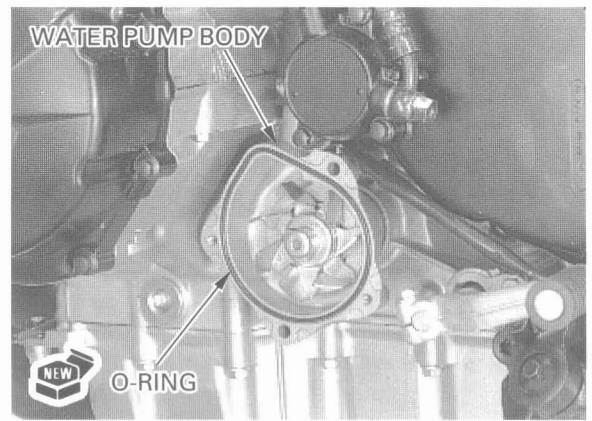


Apply engine oil to a new O-ring and install it onto the stepped portion of the water pump. Install the water pump into the crankcase while aligning the water pump shaft groove with the oil pump shaft end.



Align the mounting bolt holes in the water pump body and crankcase and make sure the water pump is securely installed.

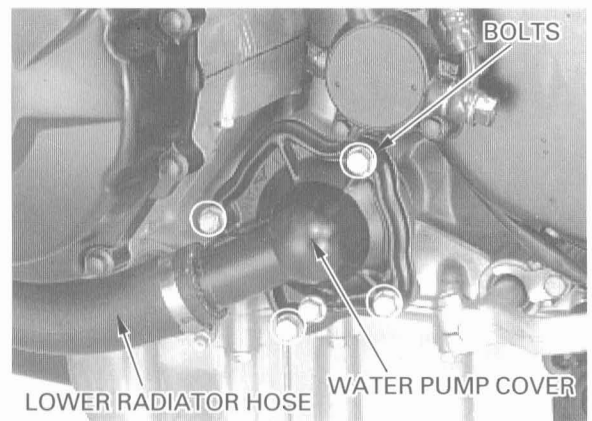
Install a new O-ring into the groove in the water pump body.



Install the water pump cover and tighten the four flange bolts to the specified torque.

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

Connect the lower radiator hose then tighten the clamp screw.

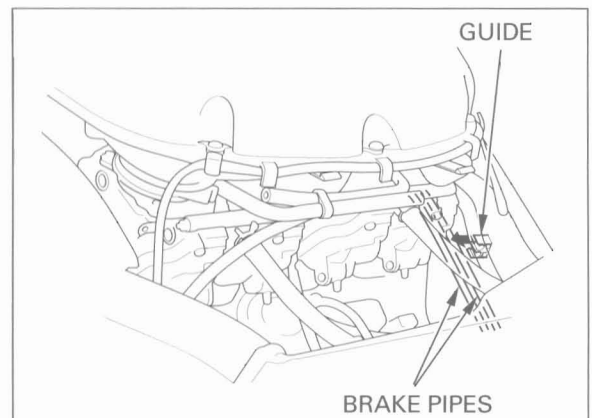


## RADIATOR RESERVE TANK

### REMOVAL

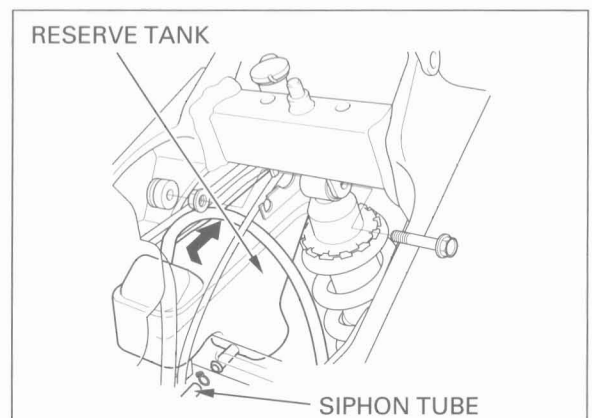
- Remove the following:
- Rear fender (page 2-16)
  - Seat rail (page 2-19)

Remove the brake pipe from the guide on the frame.



Remove the shock absorber (page 14-9).

Release the hook from the engine mounting collar, then remove the reserve tank backward. Disconnect the siphon tube and drain the coolant from the reserve tank.



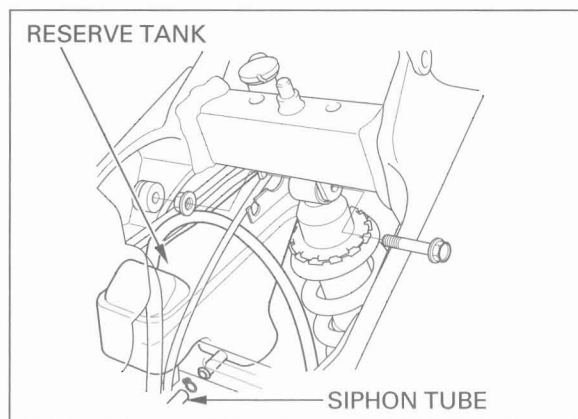
## COOLING SYSTEM

### INSTALLATION

Connect the siphon tube to the radiator and install the radiator reserve tank aligning its hook with the engine mounting collar.

*At rear fender installation, align the cut-out of the rear fender with the reserve tank filler neck boss.*

Install the removed parts in the reverse order of removal.



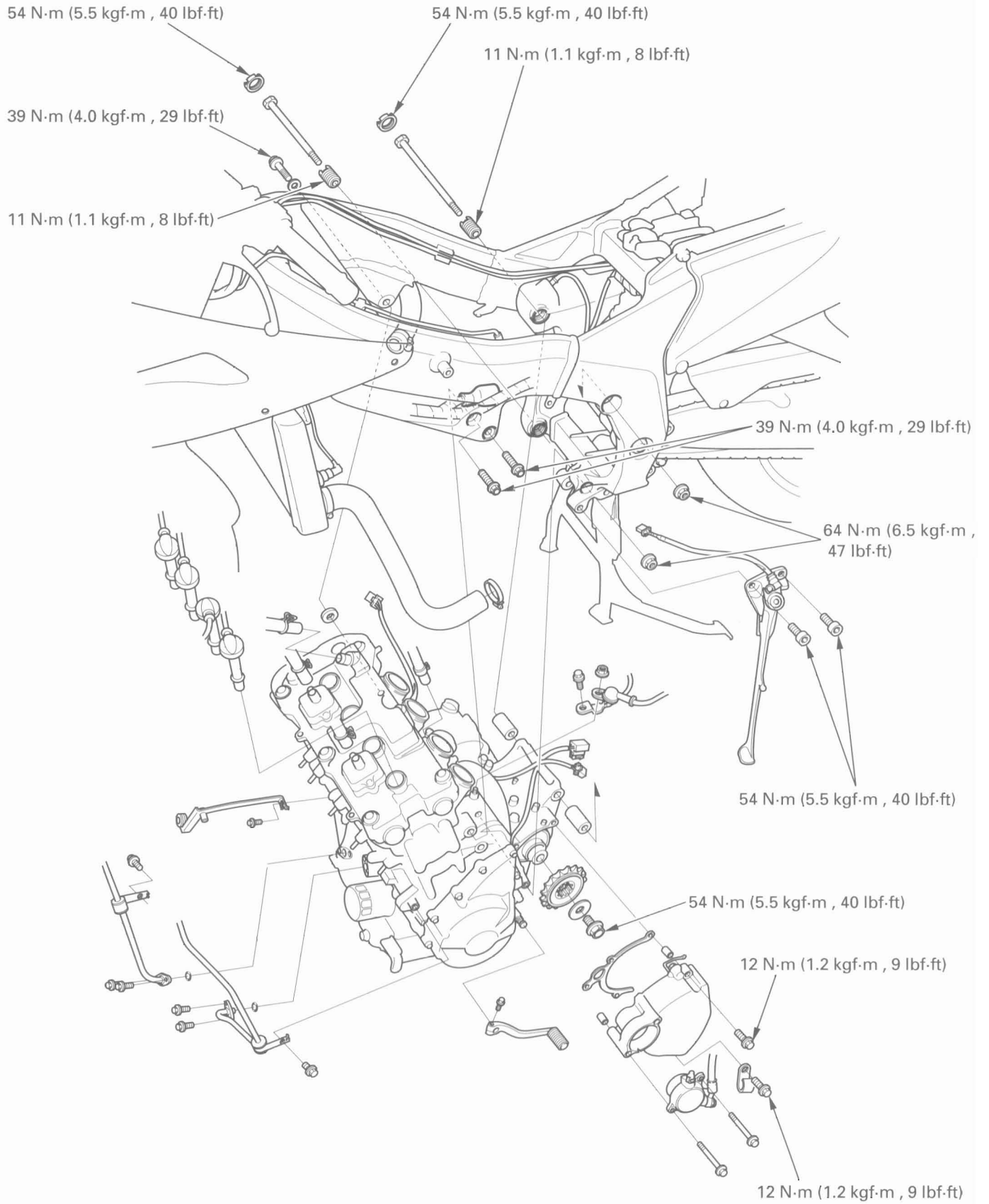


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MEMO

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# ENGINE REMOVAL/INSTALLATION



# 7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION	7-1	ENGINE INSTALLATION	7-5
ENGINE REMOVAL	7-2		

## SERVICE INFORMATION

### GENERAL

- During engine removal and installation, support the motorcycle on its center stand.
- Support the engine using a jack or other adjustable support to ease of engine hanger bolts removal.

### CAUTION:

***Do not use the oil filter as a jacking point.***

- The following components can be serviced with the engine installed in the frame.
  - Alternator (Section 10)
  - Clutch (Section 9)
  - Cylinder head/valves (Section 8)
  - Front balancer (Section 12)
  - Gearshift linkage (Section 9)
  - Oil cooler (Section 4)
  - Oil pump (Section 4)
  - Shift forks/shift drum (Section 9)
  - Water pump (Section 6)
- The following components require engine removal for service.
  - Crankshaft/transmission (Section 12)
  - Piston/cylinder (Section 11)
  - Rear balancer (Section 12)

## SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine dry weight		83.0 kg (183.0 lbs)
Coolant capacity	Radiator and engine	3.2 ℓ (0.85 US gal , 0.70 Imp gal)
Engine oil capacity	At disassembly	4.6 ℓ (4.9 US qt , 4.0 Imp qt)

## TORQUE VALUES

Engine hanger bolt	39 N·m (4.0 kgf·m , 29 lbf·ft)
Engine hanger nut (Rear/upper)	64 N·m (6.5 kgf·m , 47 lbf·ft)
(Rear/lower)	64 N·m (6.5 kgf·m , 47 lbf·ft)
Engine hanger adjusting bolt	11 N·m (1.1 kgf·m , 8 lbf·ft)
Engine hanger adjusting bolt lock nut	54 N·m (5.5 kgf·m , 40 lbf·ft)
Drive sprocket cover bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)
Drive sprocket damper mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft) Apply a locking agent to the threads CT bolt
Wire clamp flange bolt	12 N·m (1.2 kgf·m , 9 lbf·ft) Apply a locking agent to the threads CT bolt
Drive sprocket special bolt	54 N·m (5.5 kgf·m , 40 lbf·ft)

## TOOL

Lock nut wrench	07VMA-MAT0100
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## ENGINE REMOVAL

Support the motorcycle securely on its center stand.  
Drain the engine oil (page 3-14).  
Drain the coolant (page 6-4).

Remove the following:

- Lower cowl (page 2-7)
- Fuel tank (page 2-2)
- Carburetor (page 5-5)
- Ignition coil (page 17-6)

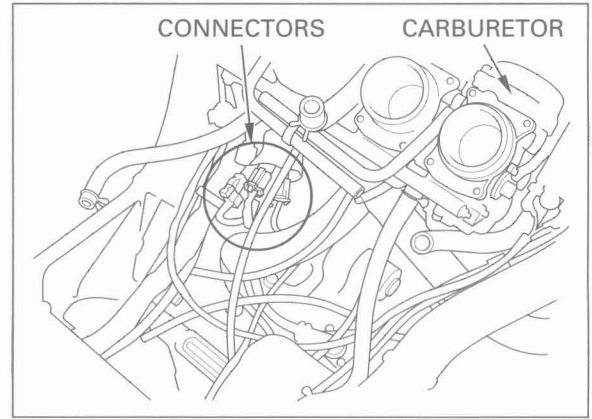
Disconnect the following connectors:

- Alternator 3P (White) connector
- Ignition pulse generator 2P (Red) connector
- Speed sensor 3P (White) connector
- Side stand switch 3P (Green) connector
- Engine sub-harness 3P (Black) connector

Disconnect the spark plug caps.

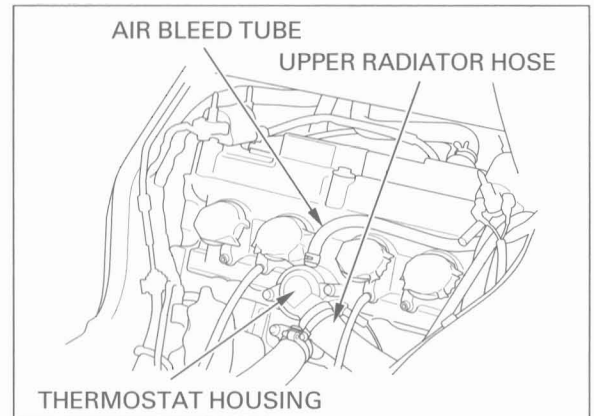
Disconnect the air tubes from the PAIR check valve cover and disconnect the vacuum tube from the intake port.

Remove the PAIR control valve assembly.



Disconnect the air bleed tube and upper radiator hose from the thermostat housing cover.

Remove the starter motor cable and ground cable (page 18-4).

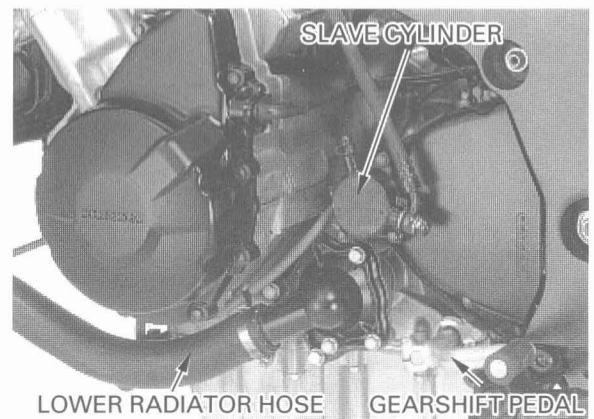


Disconnect the lower radiator hose from the water pump cover.

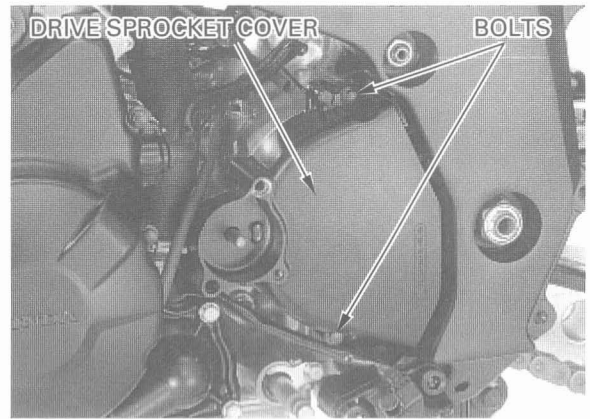
Remove the following:

- Muffler/exhaust pipe (page 2-21)
- Oil pipes (page 4-13)
- Radiator (page 6-7)
- Clutch slave cylinder (page 9-9)

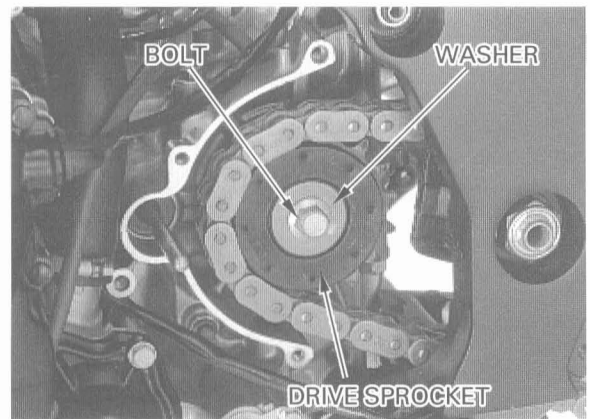
Remove the bolt and gearshift pedal.



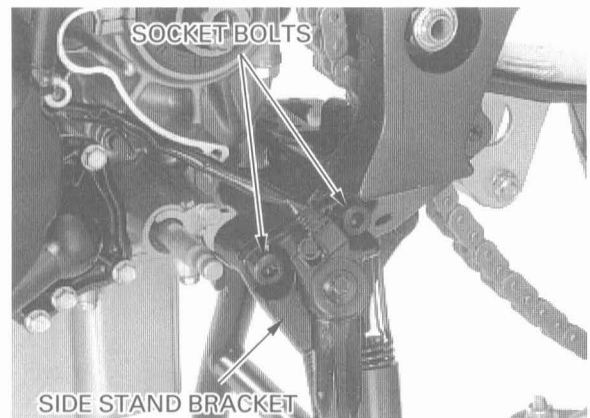
Remove the SH bolts, side stand wire clamp, drive sprocket cover and guide plate.



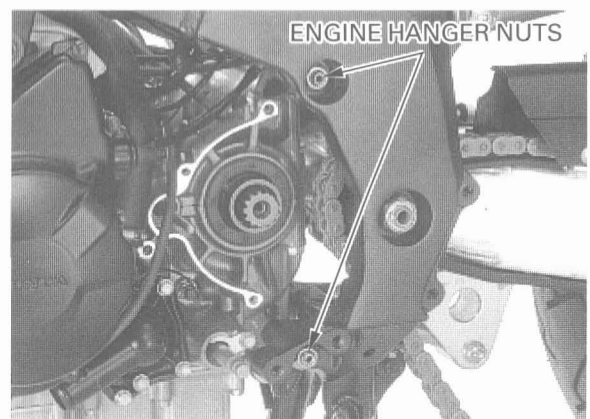
Loosen the rear axle nut and make the drive chain slack fully.  
Shift the transmission into 6th gear and apply rear brake.  
Remove the bolt, washer and drive sprocket.



Remove the socket bolts and side stand bracket assembly.



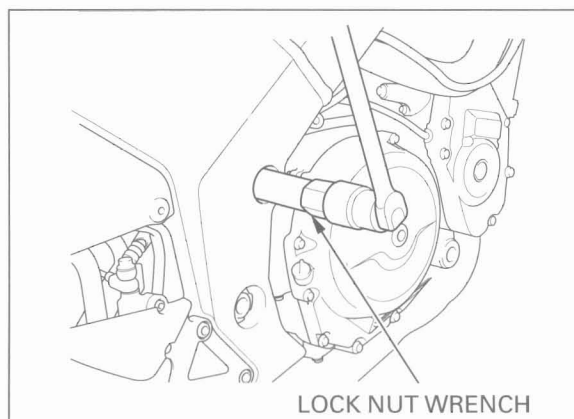
Remove the rear/upper and rear/lower engine hanger nuts.



## ENGINE REMOVAL/INSTALLATION

Loosen the rear/upper engine hanger adjusting bolt lock nut using the special tool.

**TOOL:**  
**Lock nut wrench**                      07VMA-MAT0100

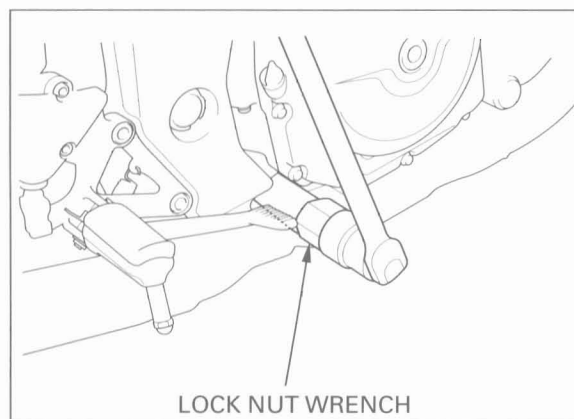


Turn the adjusting bolt with the engine hanger bolt counterclockwise to release the adjusting bolt from the engine.

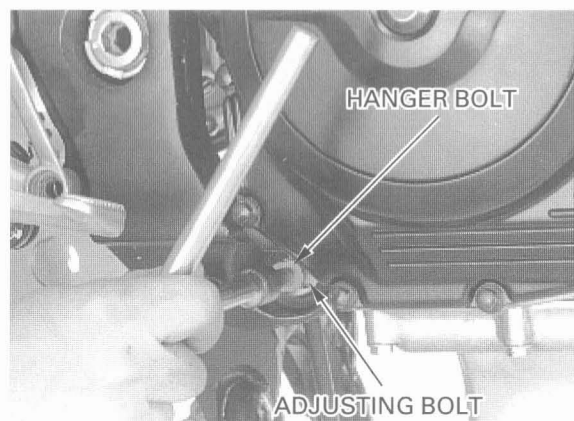


Loosen the rear lower engine hanger adjusting bolt lock nut using the special tool.

**TOOL:**  
**Lock nut wrench**                      07VMA-MAT0100



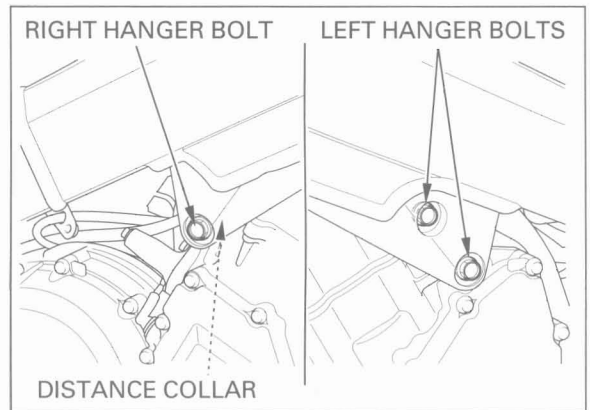
Turn the adjusting bolt with the engine hanger bolt counterclockwise to release the adjusting bolt from the engine.



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

Remove the right engine hanger bolt and distance collar.

Remove the left engine hanger bolts.



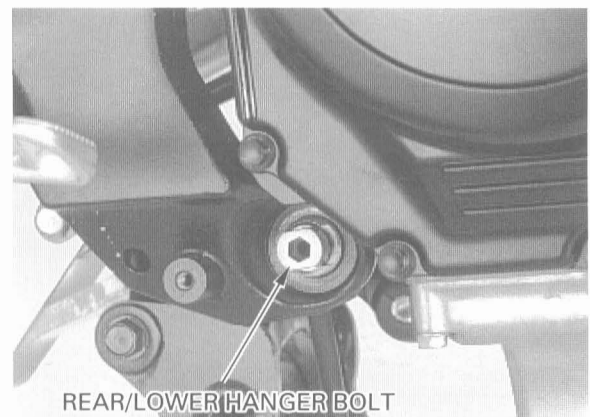
Remove the rear/upper engine hanger bolt, distance collars and spacer.



Remove the rear/lower engine hanger bolt, then remove the engine from the frame.

**CAUTION:**

*Be careful not to damage the lower cowl bracket bosses.*



## ENGINE INSTALLATION

**NOTE:**

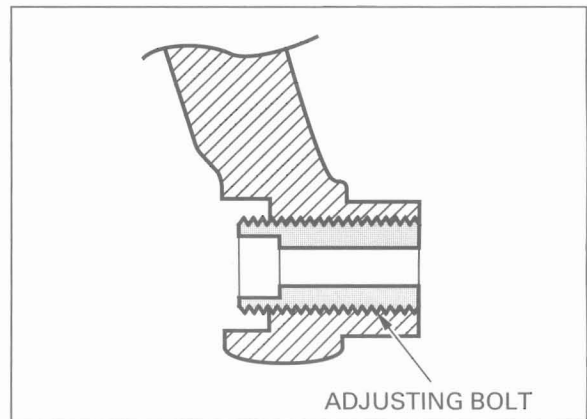
- Note the direction of the hanger bolts.
- Use a floor jack or other adjustable support to carefully maneuver the engine into place.



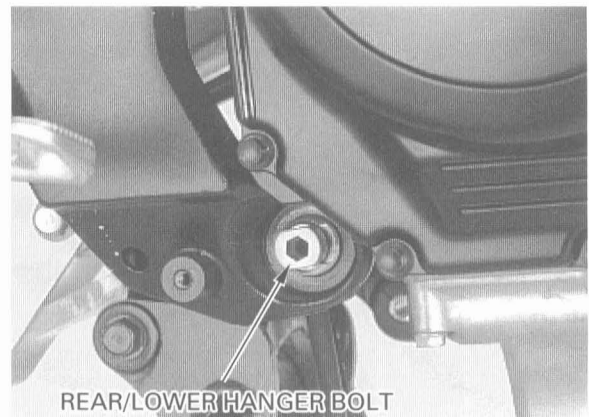
## ENGINE REMOVAL/INSTALLATION

Install the engine hanger adjusting bolts so that the adjusting bolts does not projected inside surface of the frame.

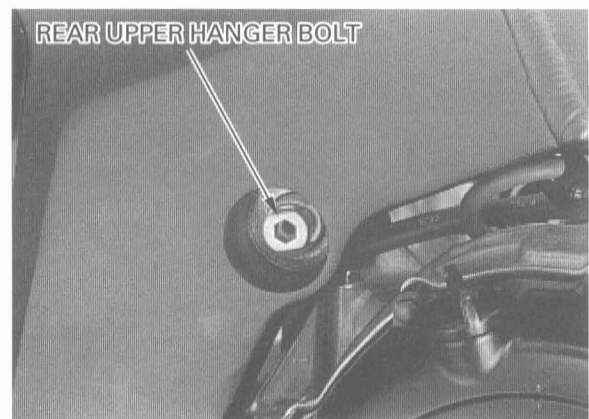
Install the engine into the frame.



Install the rear/lower engine hanger bolt.



Install the rear upper engine hanger with the distance collars.

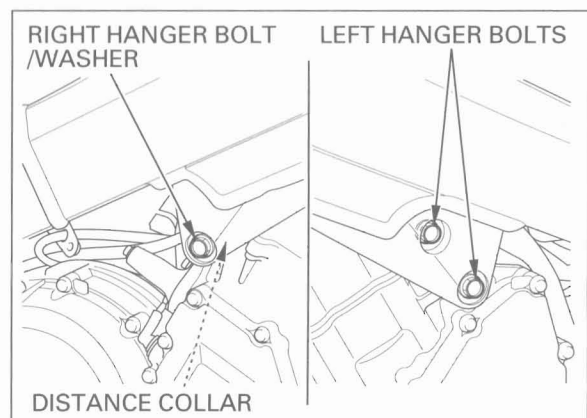


Install the distance collar and right engine hanger bolt.

Install the left engine hanger bolts.

### CAUTION:

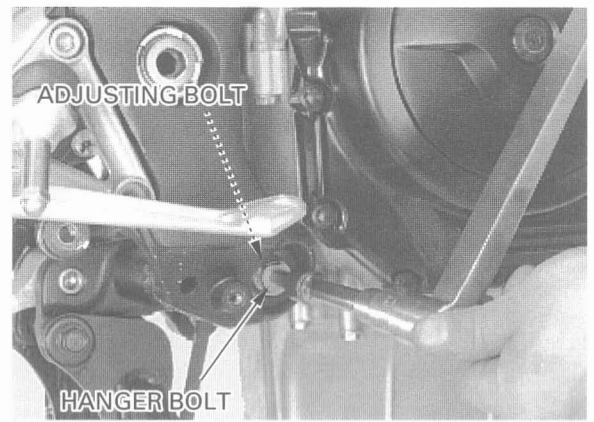
***Install the right and left front engine hanger bolts in their proper locations. Improper installation will damage the cylinder head.***





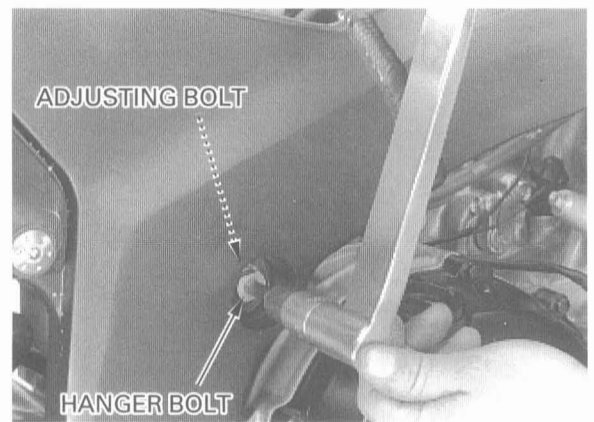
Tighten the rear/lower engine hanger adjusting bolt to the specified torque.

**TORQUE:** 11 N·m (1.1 kgf·m , 8 lbf·ft)



Tighten the rear/upper engine hanger adjusting bolt to the specified torque.

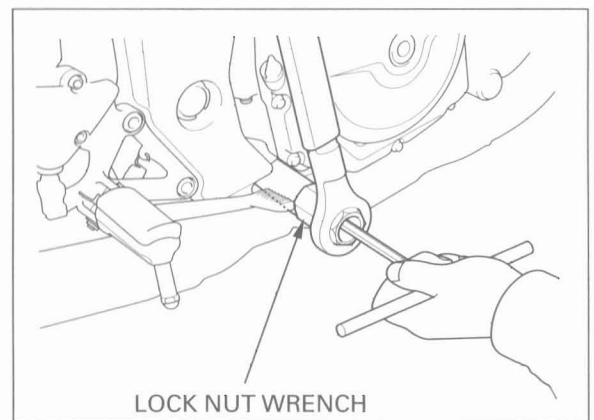
**TORQUE:** 11 N·m (1.1 kgf·m , 8 lbf·ft)



Hold the rear/lower engine hanger adjusting bolt and tighten the adjusting bolt lock nut to the specified torque using the special tool.

**TOOL:**  
**Lock nut wrench** 07VMA-MAT0100

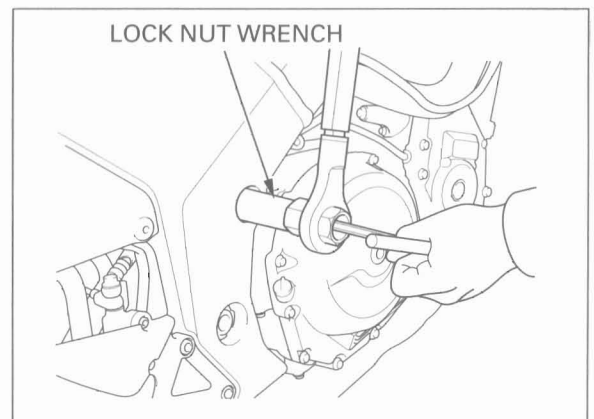
**TORQUE:** 54 N·m (5.5 kgf·m , 40 lbf·ft)



Hold the rear/upper engine hanger adjusting bolt and tighten the adjusting bolt lock nut to the specified torque using the special tool.

**TOOL:**  
**Lock nut wrench** 07VMA-MAT0100

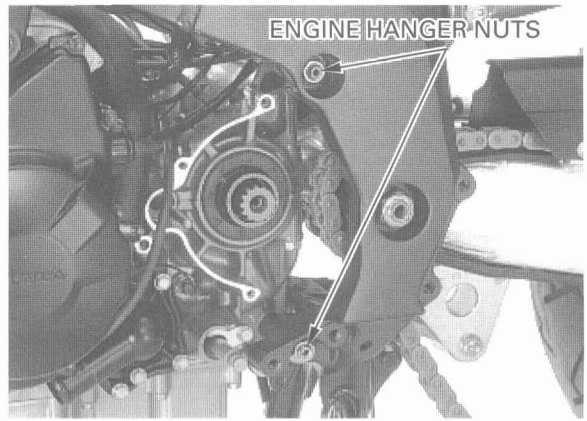
**TORQUE:** 54 N·m (5.5 kgf·m , 40 lbf·ft)



## ENGINE REMOVAL/INSTALLATION

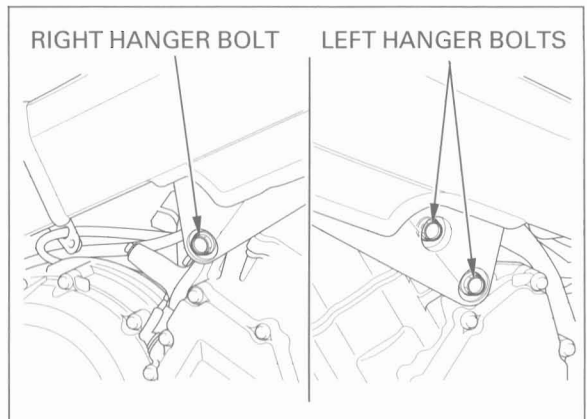
Install the rear/lower and rear/upper engine hanger nuts to the specified torque.

**TORQUE:** 64 N·m (6.5 kgf·m , 47 lbf·ft)



Tighten front/right and front/left engine hanger bolts to the specified torque.

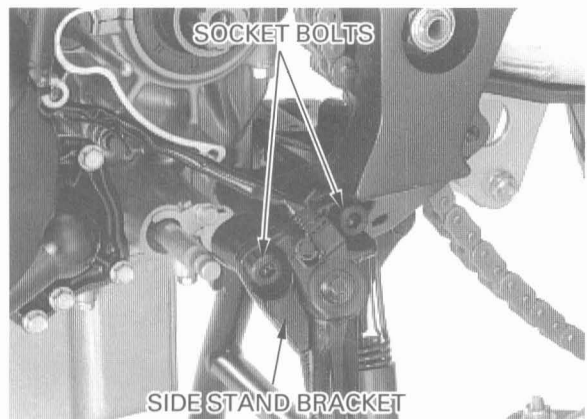
**TORQUE:** 39 N·m (4.0 kgf·m , 29 lbf·ft)



Route the side stand switch wire properly (page 1-24).

Install the side stand bracket assembly and tighten the socket bolts to the specified torque.

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

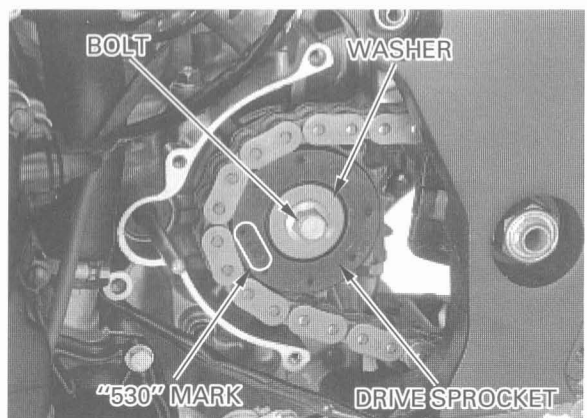


Install the drive sprocket with its "530" mark facing outward.

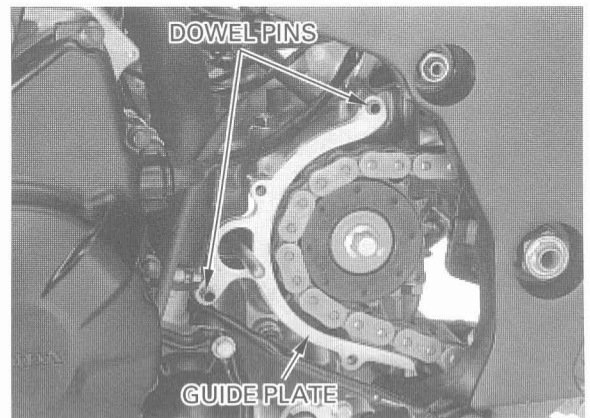
Shift the transmission into 6th gear and apply rear brake.

Install the washer and tighten the bolt to the specified torque.

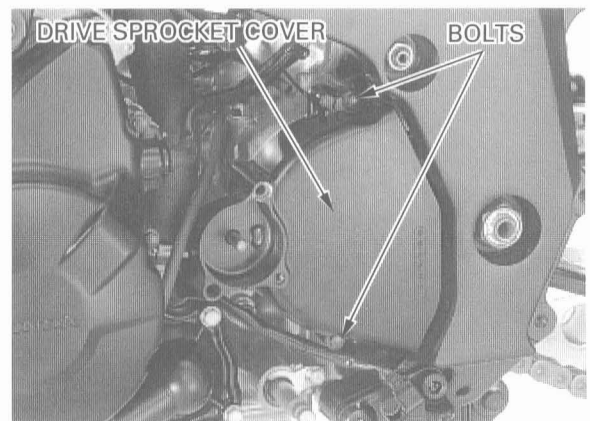
**TORQUE:** 54 N·m (5.5 kgf·m , 40 lbf·ft)



Install the dowel pins and drive chain guide plate.



Install the drive sprocket cover, side stand wire clamp and tighten the SH bolts.



Install the clutch slave cylinder (page 9-11).

Install the gearshift pedal aligning its slit with the punch mark on the gearshift spindle. Tighten the bolt securely.

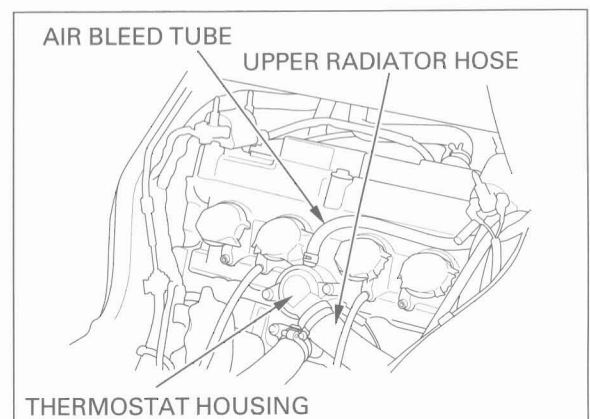
Install the radiator (page 6-11) and connect the lower radiator hose and tighten the clamp screw.

Install the muffler/exhaust pipe (page 2-22). Connect the oil pipes (page 4-14).



Route the starter motor cable and ground cables. Tighten the starter motor cable nut and ground cable bolt (page 18-9).

Install the water joint to the cylinder block and tighten the bolts. Connect the air bleed tube and upper radiator hose to the thermostat housing cover (page 18-9).

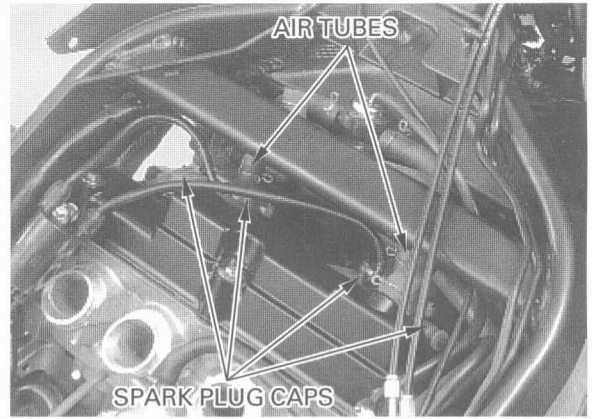


## ENGINE REMOVAL/INSTALLATION

Install the PAIR control valve assembly into the frame.

Connect the air tubes to the PAIR check valve covers and connect the vacuum tube to the intake port air joint.

Install the spark plug caps.



Connect the following connector:

- Alternator 3P (White) connector
- Ignition pulse generator 2P (Red) connector
- Speed sensor 3P (White) connector
- Side stand switch 3P (Green) connector
- Engine sub-harness 3P (Black) connector

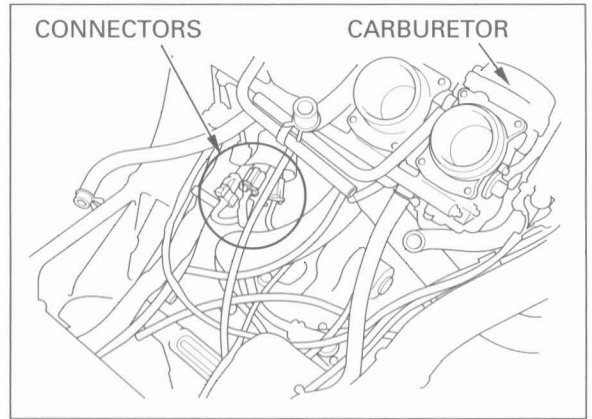
Install the following:

- Ignition coil (page 17-6)
- Carburetor (page 5-20)
- Fuel tank (page 2-2)
- Lower cowl (page 2-8)

Adjust the drive chain slack (page 3-20).

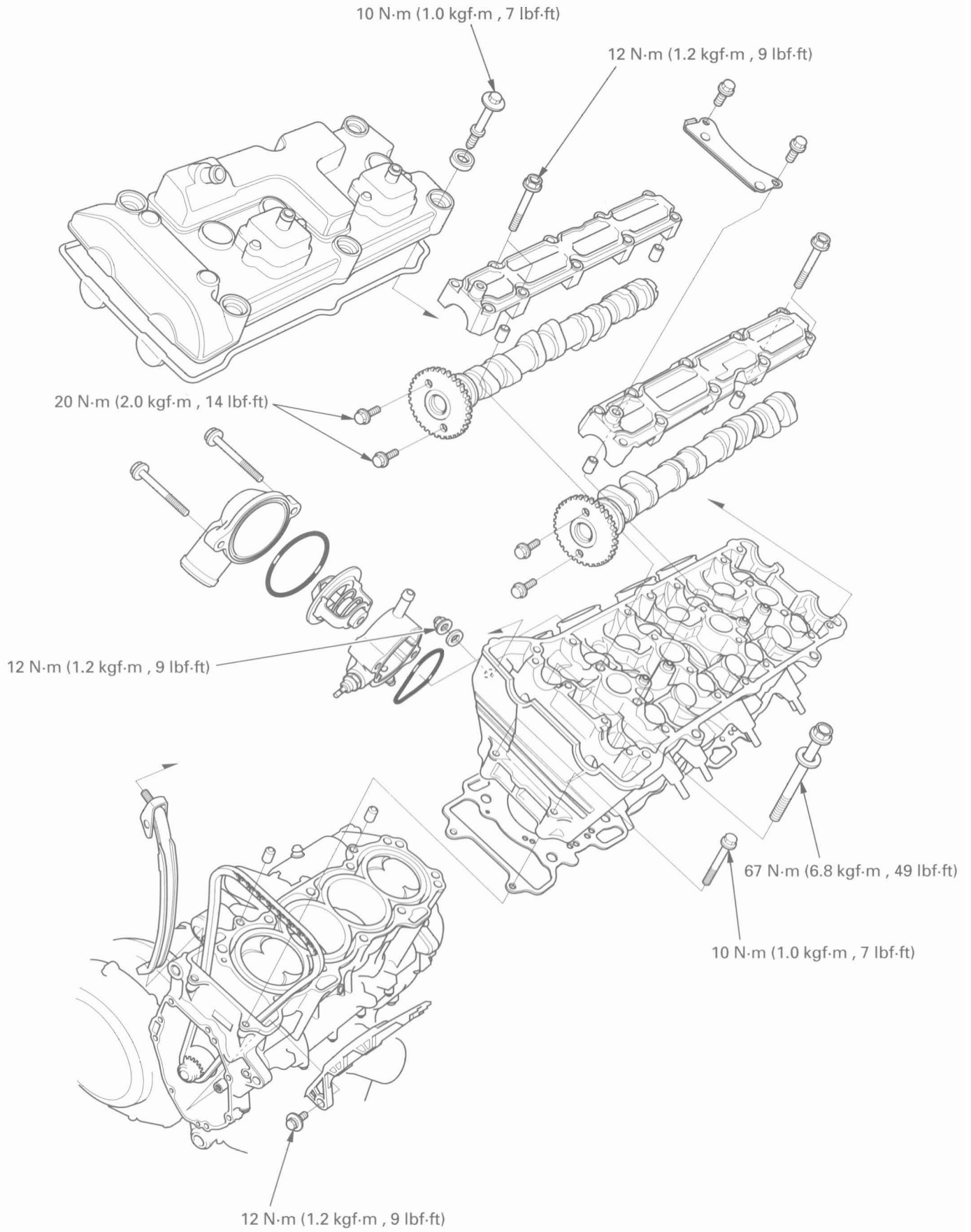
Pour recommended engine oil up to the proper level (page 3-13).

Fill the cooling system with recommended coolant and bleed the air (page 6-4).



MEMO

# CYLINDER HEAD/VALVES



# 8. CYLINDER HEAD/VALVES

<b>SERVICE INFORMATION</b>	<b>8-1</b>	<b>VALVE GUIDE REPLACEMENT</b>	<b>8-15</b>
<b>TROUBLESHOOTING</b>	<b>8-3</b>	<b>VALVE SEAT INSPECTION/ REFACING</b>	<b>8-16</b>
<b>CYLINDER COMPRESSION TEST</b>	<b>8-4</b>	<b>CYLINDER HEAD ASSEMBLY</b>	<b>8-19</b>
<b>CYLINDER HEAD COVER REMOVAL</b>	<b>8-5</b>	<b>CYLINDER HEAD INSTALLATION</b>	<b>8-21</b>
<b>CYLINDER HEAD COVER DISASSEMBLY</b>	<b>8-6</b>	<b>CAMSHAFT INSTALLATION</b>	<b>8-22</b>
<b>CAMSHAFT REMOVAL</b>	<b>8-6</b>	<b>CYLINDER HEAD COVER ASSEMBLY</b>	<b>8-25</b>
<b>CYLINDER HEAD REMOVAL</b>	<b>8-10</b>	<b>CYLINDER HEAD COVER INSTALLATION</b>	<b>8-26</b>
<b>CYLINDER HEAD DISASSEMBLY</b>	<b>8-12</b>	<b>CAM CHAIN TENSIONER LIFTER</b>	<b>8-28</b>
<b>CYLINDER HEAD INSPECTION</b>	<b>8-13</b>		

## SERVICE INFORMATION

### GENERAL

- This section covers service of the cylinder head, valves and camshaft.
- The camshaft services can be done with the engine installed in the frame. The cylinder head service required engine removal.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling the cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

## CYLINDER HEAD/VALVES

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cylinder compression		1,275 kPa (13.0 kgf/cm <sup>2</sup> , 185 psi) at 350 rpm	—	
Cylinder head warpage		—	0.10 (0.004)	
Valve, valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	
		EX	0.22 ± 0.03 (0.009 ± 0.001)	
	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)	4.965 (0.1955)
		EX	4.960 – 4.975 (0.1953 – 0.1959)	4.950 (0.1949)
	Valve guide I.D.	IN	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
		EX	5.000 – 5.012 (0.1969 – 0.1973)	5.040 (0.1984)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	—
		EX	0.025 – 0.052 (0.0010 – 0.0020)	—
Valve guide projection above cylinder head	IN	16.3 – 16.5 (0.64 – 0.65)	—	
	EX	16.3 – 16.5 (0.64 – 0.65)	—	
Valve seat width		IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.5 (0.06)
Valve spring free length	Inner	IN/EX	37.4 (1.47)	35.4 (1.39)
	Outer	IN/EX	40.6 (1.60)	38.6 (1.52)
Valve lifter	Valve lifter O.D.	IN/EX	25.978 – 25.993 (1.0228 – 1.0233)	25.97 (1.022)
	Valve lifter bore I.D.	IN/EX	26.010 – 26.026 (1.0240 – 1.0246)	26.04 (1.025)
Camshaft	Cam lobe height	IN	38.54 – 38.78 (1.517 – 1.527)	38.24 (1.506)
		EX	38.30 – 38.54 (1.508 – 1.517)	38.00 (1.496)
	Runout		—	0.05 (0.002)
	Oil clearance		0.020 – 0.074 (0.0008 – 0.0029)	0.10 (0.004)

### TORQUE VALUES

Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Breather plate flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads CT bolt
Camshaft holder flange bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply oil to the threads
Cylinder head sealing bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	Apply a locking agent to the threads
Cylinder head SH bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Cylinder head mounting bolt	67 N·m (6.8 kgf·m, 49 lbf·ft)	Apply molybdenum disulfide oil to the threads (after removing anti-rust oil additive)
Cam sprocket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply a locking agent to the threads
Cam chain tensioner cap nut	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Cam chain tensioner lifter mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Cam chain tensioner lifter sealing bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Cam chain guide A mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Cylinder head stud bolt	See page 1-15	
PAIR check valve cover flange bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	



## TOOLS

Compression gauge attachment	07RMJ—MY50100	Equivalent commercially available in U.S.A.
Valve spring compressor	07757—0010000	
Valve spring compressor attachment	07959—KM30101	
Tappet hole protector	07HMG—MR70002	
Valve guide driver	07942—MA60000	
Adjustable valve guide driver	07743—0020000	
Valve guide reamer, 5.0 mm	07984—MA60001	or 07984—MA6000C (U.S.A. only)
Valve seat cutters		— these are commercially available in U.S.A.
Seat cutter, 33 mm (45° IN)	07780—0010800	
Seat cutter, 27.5 mm (45° EX)	07780—0010200	
Flat cutter, 33 mm (32° IN)	07780—0012900	
Flat cutter, 28 mm (32° EX)	07780—0012100	
Interior cutter, 37.5 mm (60° IN/EX)	07780—0014100	
Interior cutter, 30 mm (60° EX)	07780—0014000	
Cutter holder, 5 mm	07781—0010400	

## TROUBLESHOOTING

- Engine top-end problems usually affect engine performance. These problem can be diagnosed by a compression test or by tracing engine noises to the top-end with a sounding rod stethoscope.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smoky, check for a seized piston ring (Section 11).

### Compression too low, hard starting or poor performance at low speed

- Valves:
  - Incorrect valve adjustment
  - Burned or bent valve
  - Incorrect valve timing
  - Broken valve spring
  - Uneven valve seating
- Cylinder head:
  - Leaking or damaged head gasket
  - Warped or cracked cylinder head
- Worn cylinder, piston or piston rings (Section 11)

### Compression too high, overheating or knocking

- Excessive carbon build-up on piston crown or on combustion chamber

### Excessive smoke

- Cylinder head:
  - Worn valve stem or valve guide
  - Damaged stem seal
- Worn cylinder, piston or piston rings (Section 11)

### Excessive noise

- Cylinder head:
  - Incorrect valve adjustment
  - Sticking valve or broken valve spring
  - Damaged or worn camshaft
  - Loose or worn cam chain
  - Worn or damaged cam chain
  - Worn or damaged cam chain tensioner
  - Worn cam sprocket teeth
- Worn cylinder, piston or piston rings (Section 11)

### Rough idle

- Low cylinder compression

# CYLINDER COMPRESSION TEST

### ▲WARNING

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

Warm up the engine to normal operating temperature.

Stop the engine and remove the all spark plug caps and remove the one spark plug at a time.

### NOTE:

To measure the cylinder compression of each cylinder, remove only one plug at a time.

Install a compression gauge.

### 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:

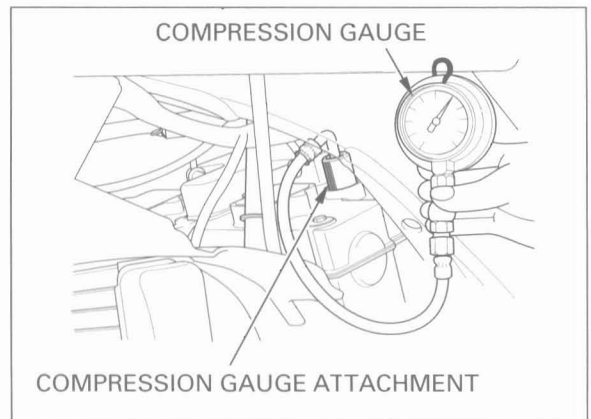
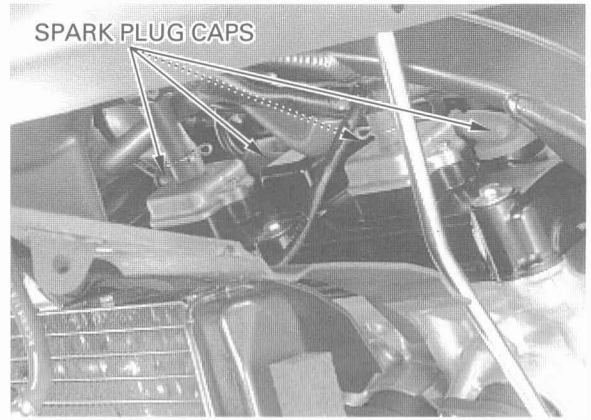
1,275 kPa (13.0 kgf/cm<sup>2</sup>, 185 psi) at 350 rpm

Low compression can be caused by:

- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

High compression can be caused by:

- Carbon deposits in combustion chamber or on piston head



## CYLINDER HEAD COVER REMOVAL

Remove the following:

- Fuel tank (page 2-2)
- Air cleaner housing (page 5-4)
- Carburetor (page 5-5)

Remove the spark plug caps.

Disconnect the crankcase breather tube.



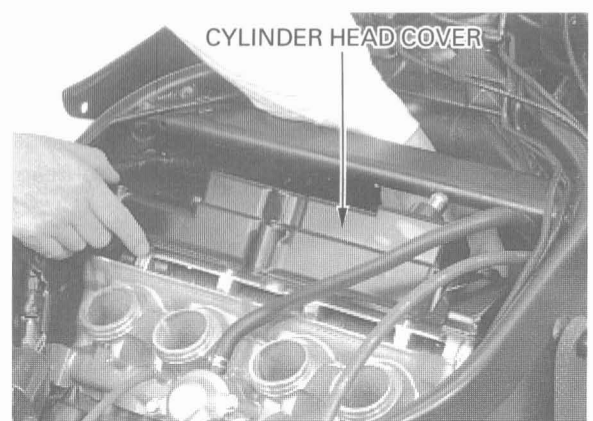
Disconnect the PAIR control valve air tube, vacuum tube and remove the PAIR control valve assembly. Remove the SH bolts and PAIR check valve covers from the cylinder head cover.



Remove the cylinder head cover bolts and washers.

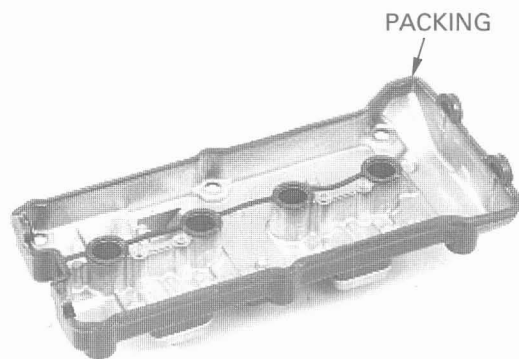


Remove the cylinder head cover rearward.

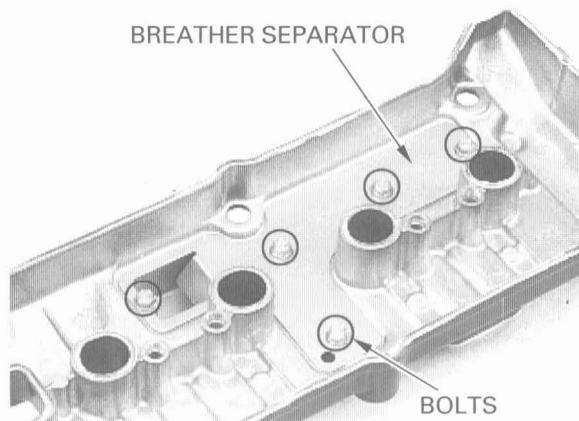


## CYLINDER HEAD COVER DISASSEMBLY

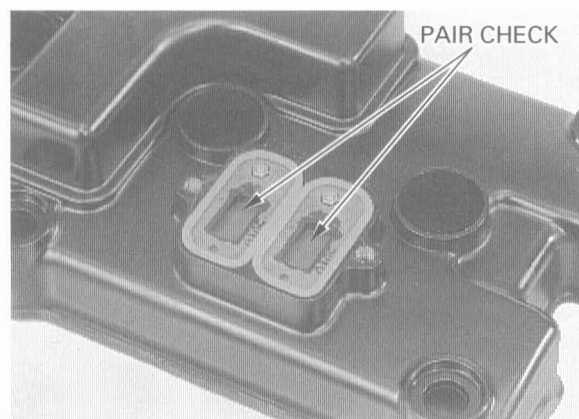
Remove the cylinder head cover packing.



Remove bolts and breather separator and gasket.



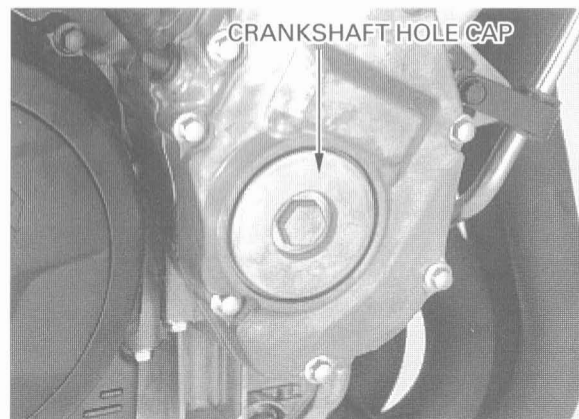
Check the PAIR check valve for wear or damage.  
Replace if necessary.



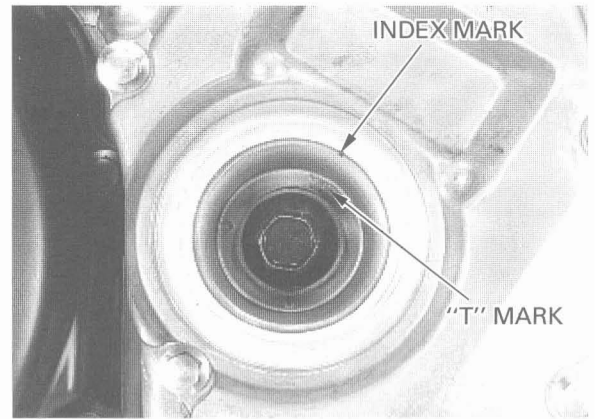
## CAMSHAFT REMOVAL

Remove the cylinder head cover (page 8-4).

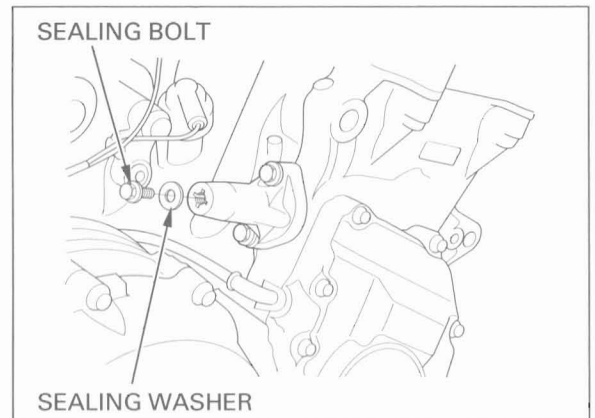
Remove the crankshaft hole cap and O-ring.



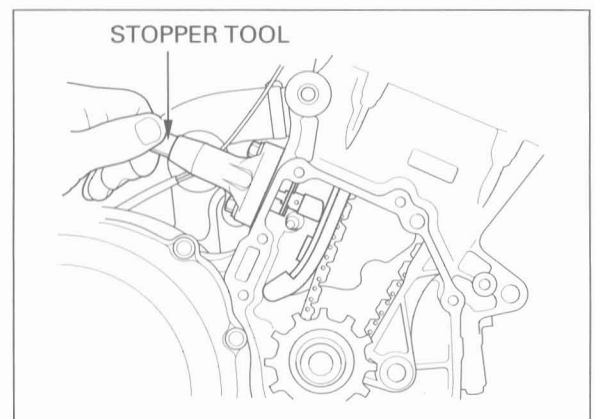
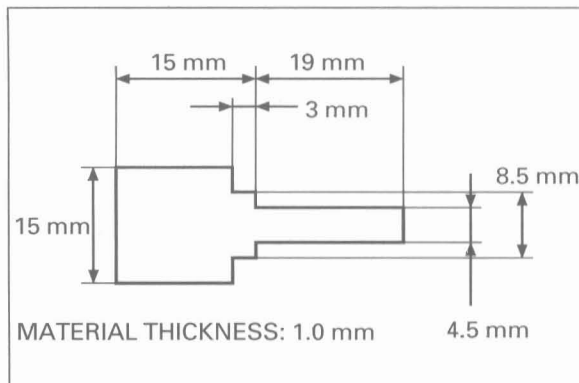
Turn the crankshaft clockwise, align the "T" mark on the ignition pulse generator rotor with the index mark on the ignition pulse generator rotor cover. Make sure the No. 1 piston is at TDC (Top Dead Center) on the compression stroke.



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



Turn the tensioner lifter shaft fully in (clockwise) and secure it using the stopper tool. This tool can easily be made from a thin (1 mm thickness) piece of steel.



If you plan to replace the camshaft and/or cam sprocket, loosen the cam sprocket bolts as follows:

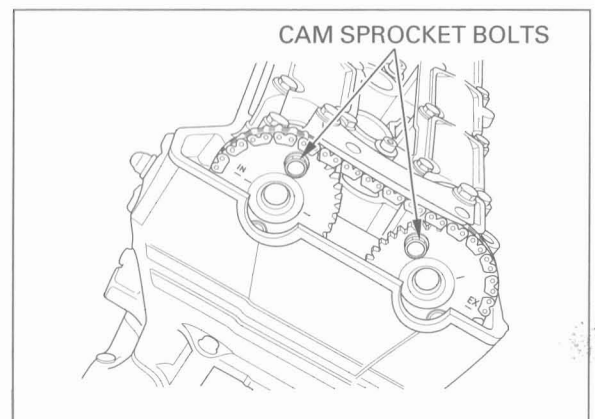
**NOTE:**

It is not necessary to remove the cam sprocket from the camshaft except when replacing the camshaft and/or cam sprocket.

- Remove the cam sprocket bolts from intake and exhaust camshafts.

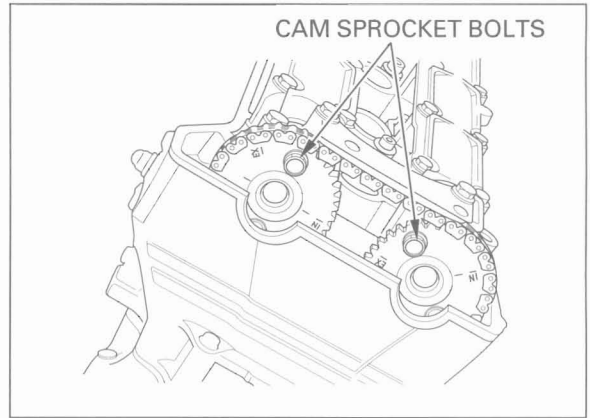
**NOTE:**

Be careful not to drop the cam sprocket bolts into the crankcase.

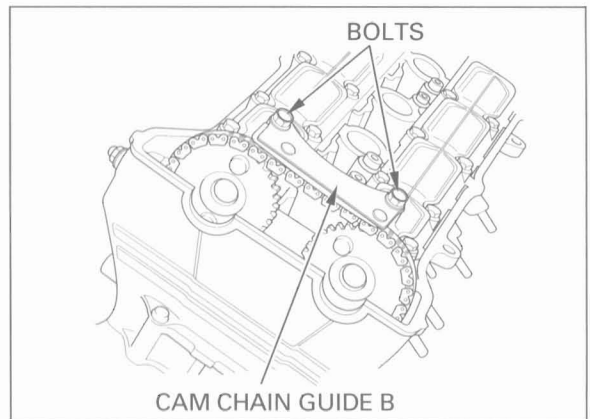


## CYLINDER HEAD/VALVES

- Turn the crankshaft one full turn (360°), remove the other cam sprocket bolt from the camshafts.



- Remove the bolts and cam chain guide B.
- Remove the cam sprocket from the camshaft.



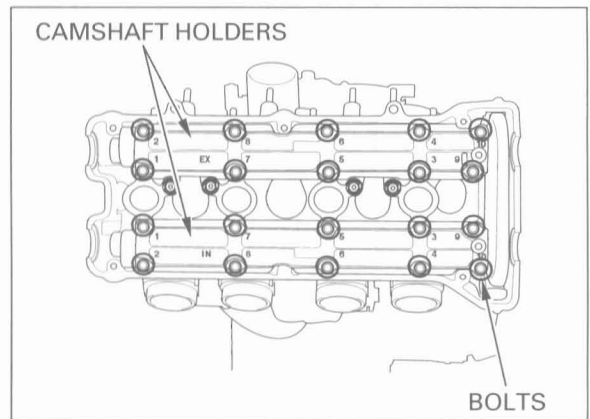
Loosen and remove the camshaft holder bolts, then remove the camshaft holders and camshafts.

### CAUTION:

*From outside to inside, loosen the bolts in a criss-cross pattern in several steps or the camshaft holder might break.*

### NOTE:

- Suspend the cam chain with a piece of wire to prevent the chain from falling into the crankcase.
- It is not necessary to remove the dowel pins from the camshaft holders.



Remove the valve lifters and shims.

### NOTE:

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

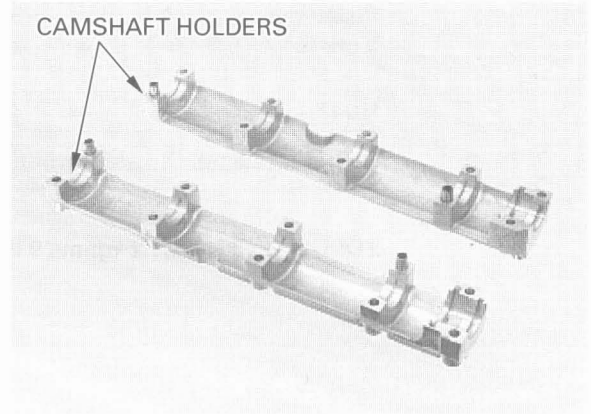


**INSPECTION**

**CAMSHAFT HOLDER**

Inspect the bearing surface of the camshaft holder for scoring, scratches, or evidence of insufficient lubrication.

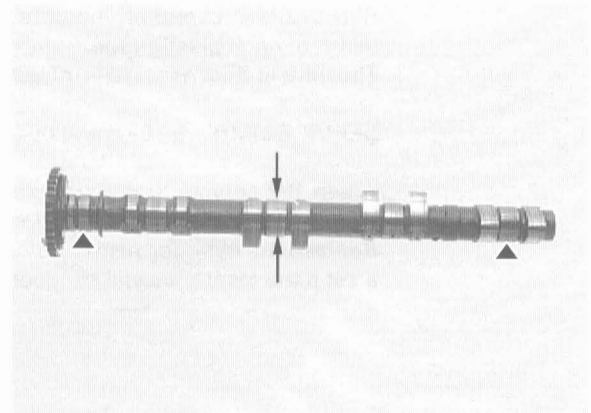
Inspect the oil orifices of the holders for clogging.



**CAMSHAFT RUNOUT**

Support both ends of the camshaft with V-blocks and check the camshaft runout with a dial gauge.

**SERVICE LIMIT:** 0.05 mm (0.002 in)



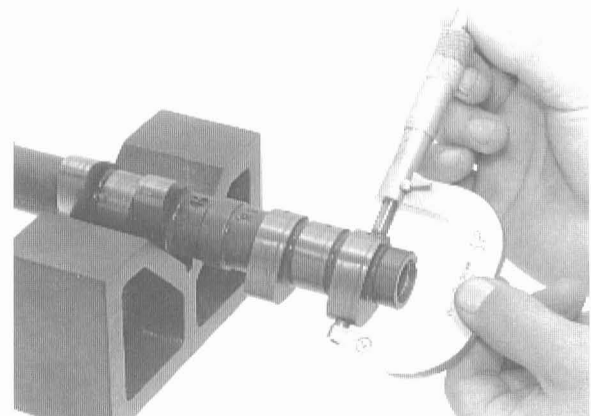
**CAM LOBE HEIGHT**

Using a micrometer, measure each cam lobe height.

**SERVICE LIMITS:**

**IN:** 38.24 mm (1.506 in)

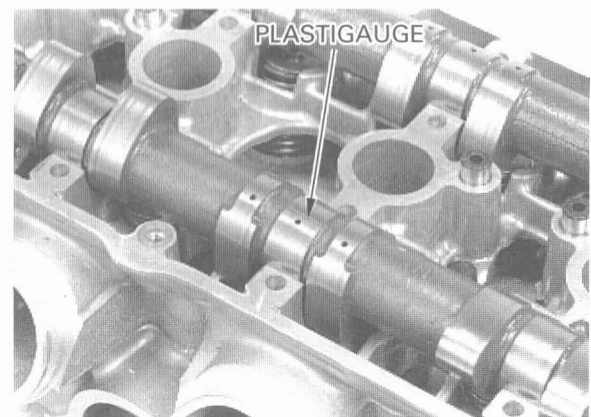
**EX:** 38.00 mm (1.496 in)



**CAMSHAFT OIL CLEARANCE**

Wipe any oil from the journals of the camshaft, cylinder head and camshaft holders.

Lay a strip of plastigauge lengthwise on top of each camshaft journal.





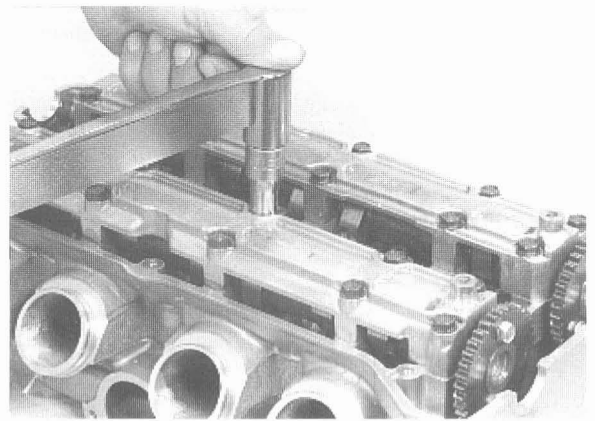
## CYLINDER HEAD/VALVES

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

### NOTE:

Do not rotate the camshaft when using plastigauge.

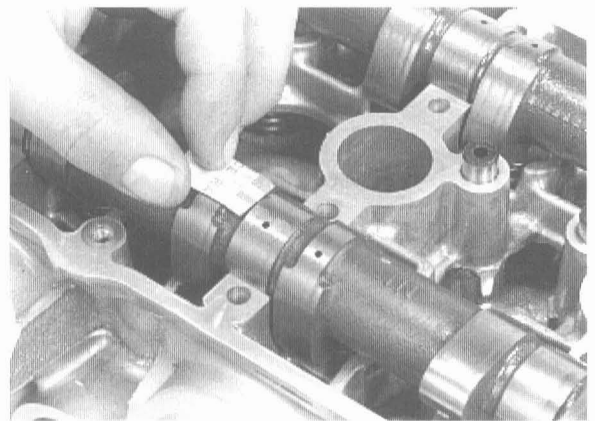
**TORQUE:** 12 N·m (1.2 kgf·m , 9 lbf·ft)



Remove the camshaft holders and measure the width of each plastigauge. The widest thickness determines the oil clearance.

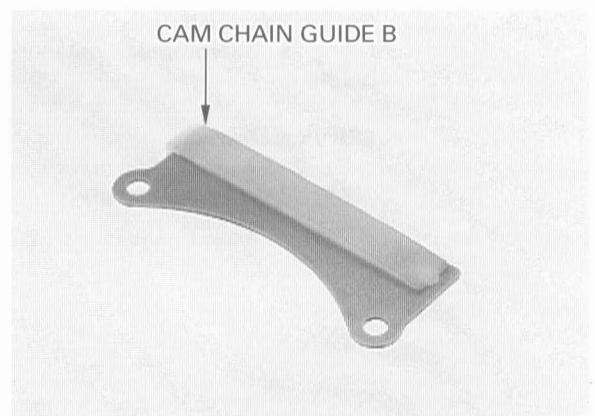
**SERVICE LIMIT:** 0.10 mm (0.004 in)

When the service limits are exceeded, replace the camshaft and recheck the oil clearance. Replace the cylinder head and camshaft holders as a set if the clearance still exceeds the service limit.



### CAM CHAIN GUIDE B

Inspect the cam chain slipper surface of the cam chain guide for wear or damage.

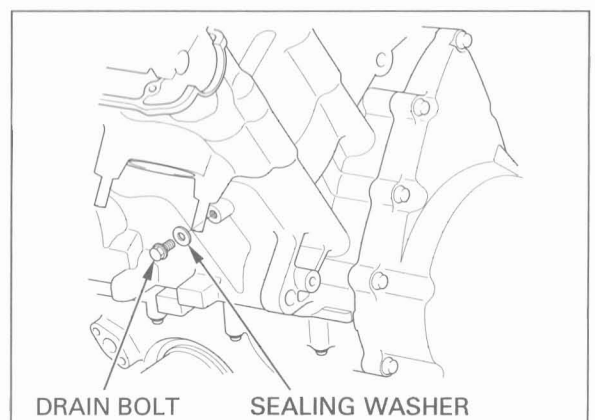


## CYLINDER HEAD REMOVAL

Remove the engine from the frame (page 7-2).  
Remove the camshaft (page 8-6).

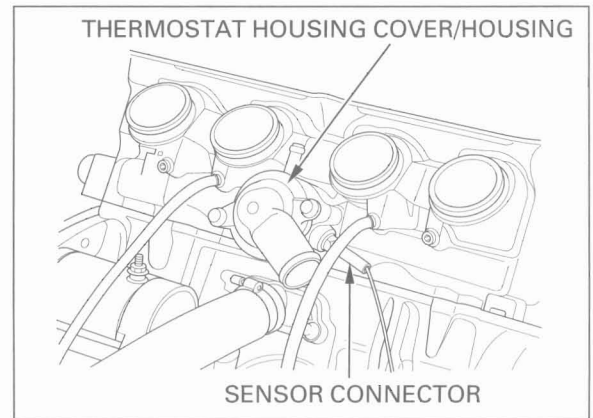
Remove the cylinder drain bolt and sealing washer. Drain coolant from cylinder head and cylinder block.

Check the sealing washer is in good condition, replace if necessary.  
Reinstall the sealing washer and drain bolt.

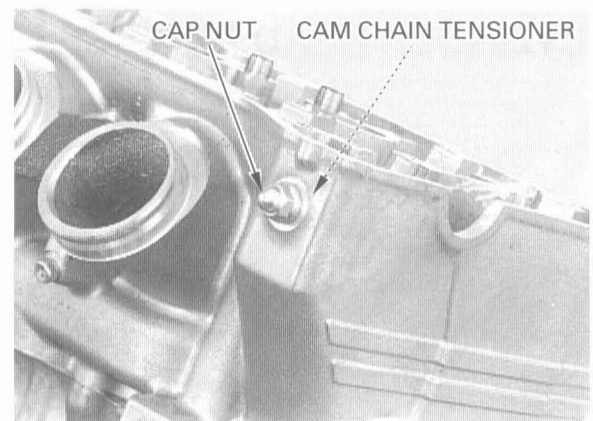




Disconnect the coolant temperature sensor connector.  
Remove the thermostat housing cover and housing from the cylinder head (page 6-6).

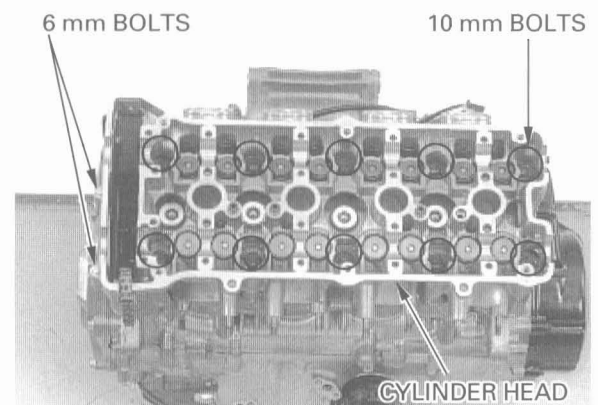


Remove the cam chain tensioner mounting cap nut and sealing washer.  
Remove the cam chain tensioner.

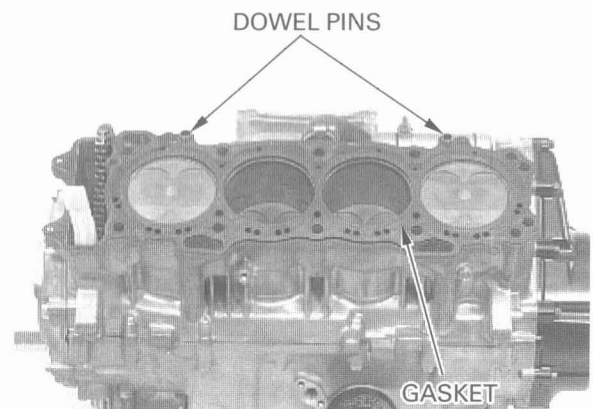


Remove the two 6 mm flange bolts.  
Remove the ten 10 mm bolts and washers.  
Remove the cylinder head.

*Loosen the 10 mm bolts in a crisscross pattern in 2-3 steps.*



Remove the dowel pins and cylinder head gasket.

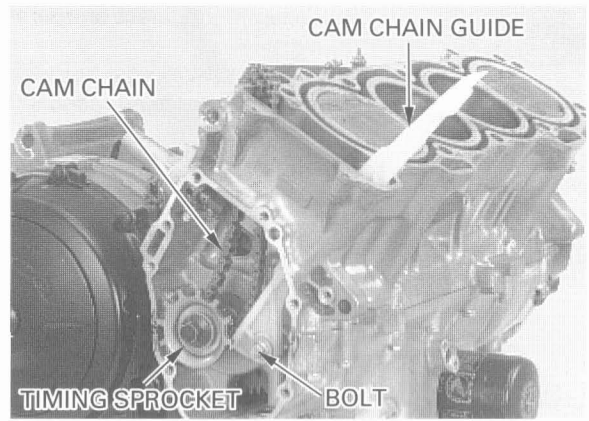


## CYLINDER HEAD/VALVES

Remove the ignition pulse generator rotor cover and ignition pulse generator rotor (page 17-6).

Remove the bolt, cam chain guide and collar.

Remove the cam chain and timing sprocket from the crankshaft.



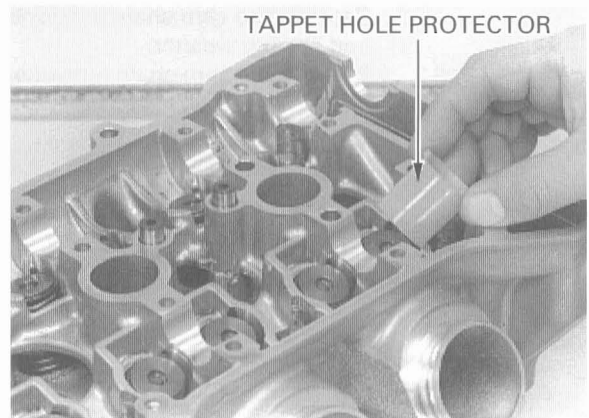
## CYLINDER HEAD DISASSEMBLY

Remove the spark plugs from the cylinder head.

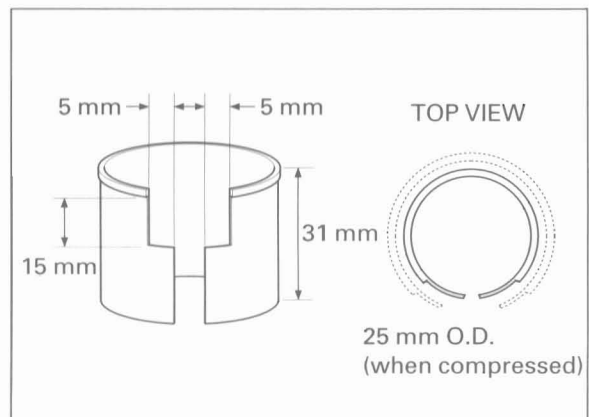
Install the tappet hole protector into the valve lifter bore.

**TOOL:**

**Tappet hole protector**      07HMG-MR70002



An equivalent tool can easily be made from a plastic 35 mm film container as shown.



Remove the valve spring cotters using the special tools as shown.

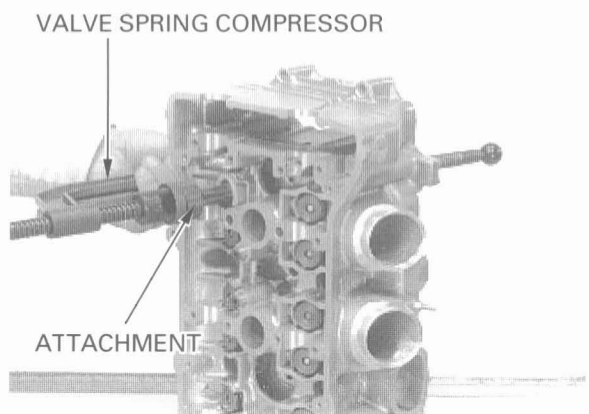
**TOOLS:**

**Valve spring compressor**      07757-0010000

**Valve spring compressor attachment**  
07959-KM30101

**CAUTION:**

*To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.*

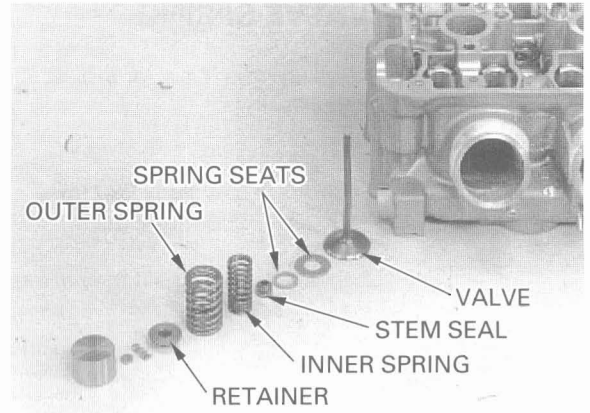


Remove the following:

- Spring retainer
- Outer and inner valve springs
- Valve
- Stem seal
- Inner and outer valve spring seats

NOTE:

Mark all parts during disassembly so they can be placed back in their original locations.



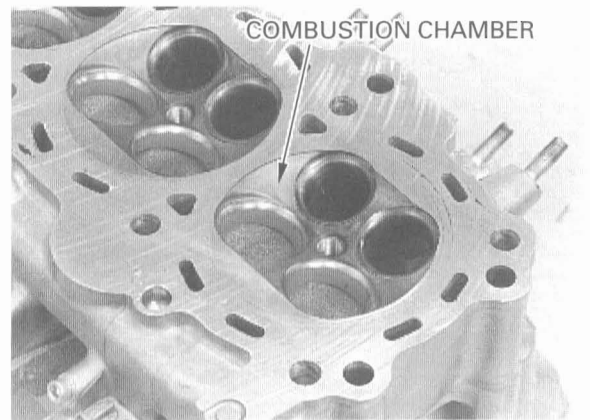
## CYLINDER HEAD INSPECTION

### CYLINDER HEAD

Remove carbon deposits from the combustion chambers.  
Check the spark plug hole and valve areas for cracks.

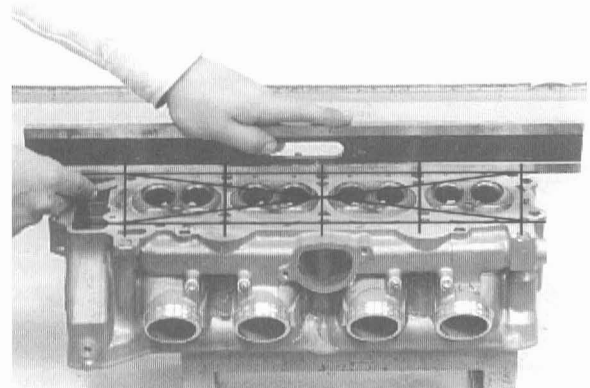
NOTE:

Avoid damaging the gasket surface.



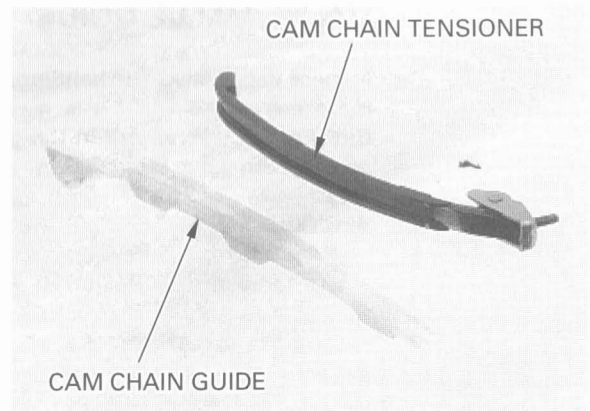
Check the cylinder head for warpage with a straight edge and feeler gauge.

**SERVICE LIMIT:** 0.10 mm (0.004 in)



### CAM CHAIN TENSIONER/CAM CHAIN GUIDE

Inspect the cam chain tensioner and guide for excessive wear or damage, replace if necessary.



### VALVE SPRING

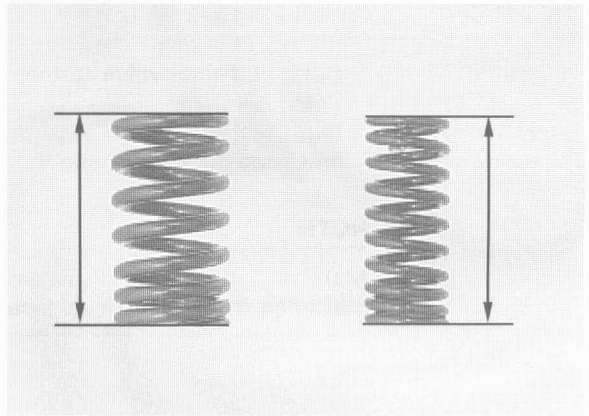
Measure the free length of the inner and outer valve springs.

**SERVICE LIMITS:**

**Inner:** 35.4 mm (1.39 in)

**Outer:** 38.6 mm (1.52 in)

Replace the springs if they are shorter than the service limits.

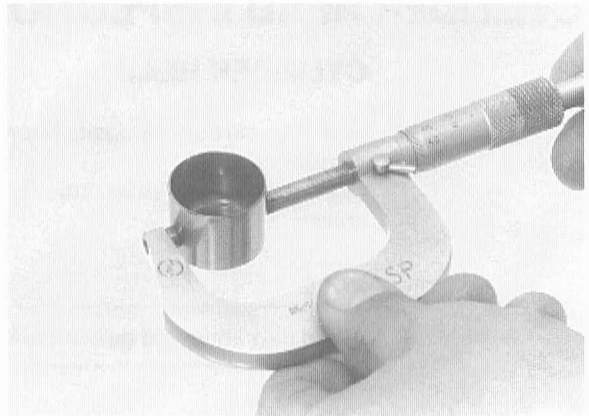


### VALVE LIFTER

Inspect each valve lifter for scratches or abnormal wear.

Measure the each valve lifter O.D.

**SERVICE LIMIT:** 25.97 mm (1.022 in)

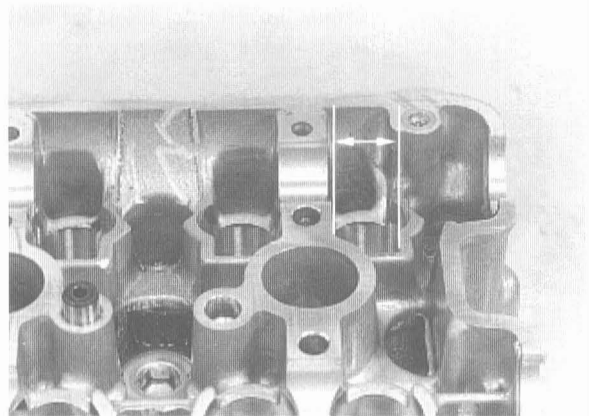


### VALVE LIFTER BORE

Inspect each valve lifter bore for scratches or abnormal wear.

Measure the each valve lifter bore I.D.

**SERVICE LIMIT:** 26.04 mm (1.025 in)



### VALVE/VALVE GUIDE

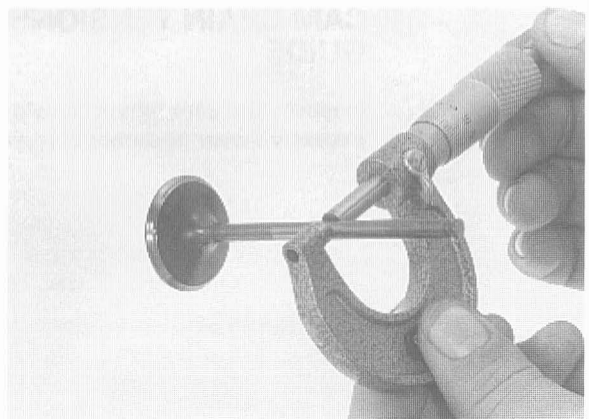
Inspect each valve for bending, burning or abnormal stem wear.

Check valve movement in the guide, measure and record each valve stem O.D.

**SERVICE LIMITS:**

**IN:** 4.965 mm (0.1955 in)

**EX:** 4.950 mm (0.1949 in)



Ream the guides to remove any carbon deposits before checking clearances. Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

**TOOL:**

**Valve guide reamer, 5.0 mm** 07984-MA60001 or  
07984-MA6000C  
(U.S.A. only)

Measure and record each valve guide I.D.

**SERVICE LIMIT: IN/EX:** 5.040 mm (0.1984 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

**STANDARDS:**

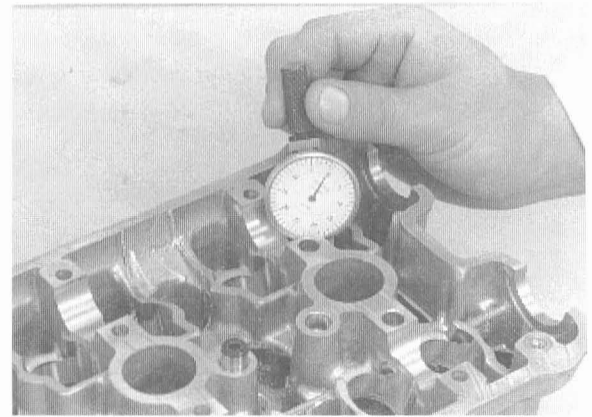
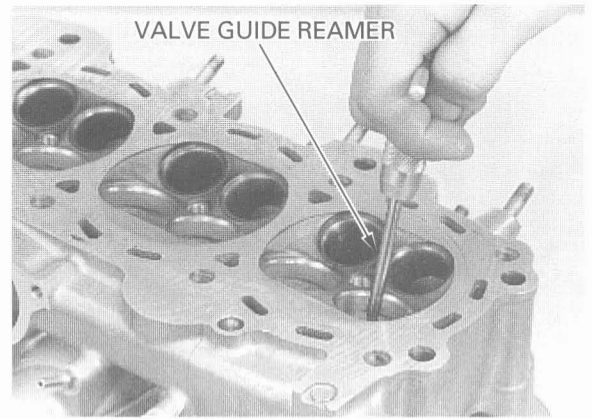
**IN:** 0.010-0.037 mm (0.0004-0.0015 in)

**EX:** 0.025-0.052 mm (0.0010-0.0020 in)

If the stem-to-guide clearance is out of standard, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit. If the stem-to-guide clearance is out of standard with the new guides, replace the valves and guides.

**NOTE:**

Reface the valve seats whenever the valve guides are replaced (page 8-16).



**VALVE GUIDE REPLACEMENT**

Chill the replacement valve guides in the freezer section of a refrigerator for about an hour. Heat the cylinder head to 212-300°F (100-150°C) with a hot plate or oven.

**▲WARNING**

*To avoid burns, wear heavy gloves when handling the heated cylinder head.*

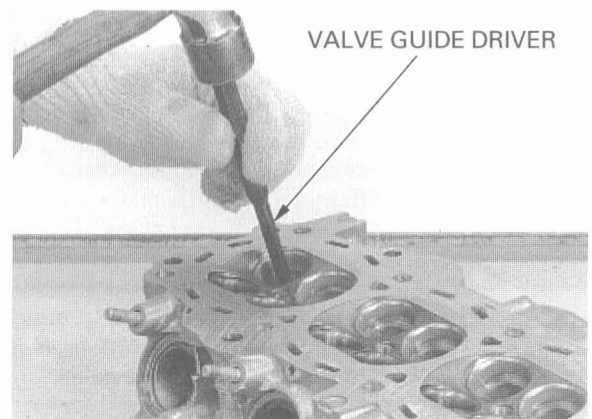
**CAUTION:**

*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** 07942-MA60000



## CYLINDER HEAD/VALVES

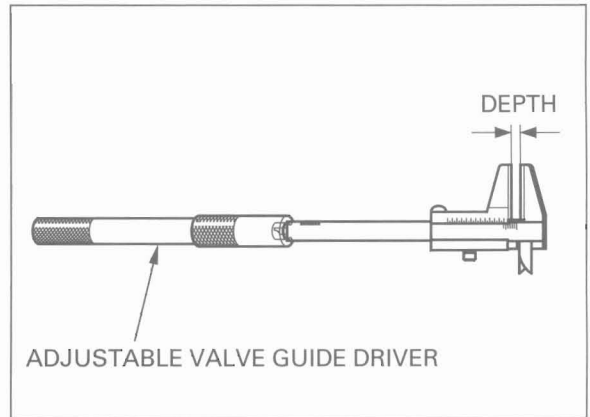
Adjust the tool setting depth with a pair of vernier calipers as shown.

**DEPTH:**

**IN/EX:** 16.3–16.5 mm (0.64–0.65 in)

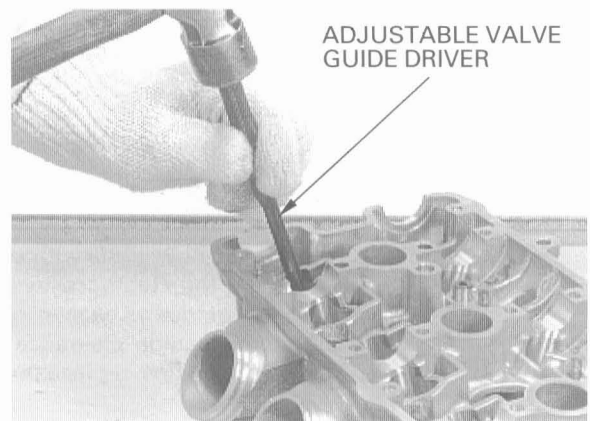
**TOOL:**

**Adjustable valve guide driver** 07743–0020000



Drive in the guide from the top of the head.

Let the cylinder head cool to room temperature.



Ream the new valve guide after installation.  
Insert the reamer from the camshaft side of the head and also always rotate the reamer clockwise.

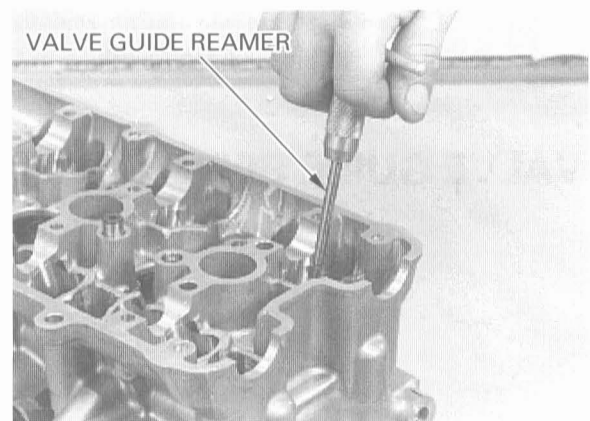
**TOOL:**

**Valve guide reamer, 5.0 mm** 07984–MA60001 or  
07984–MA6000C  
(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 below).

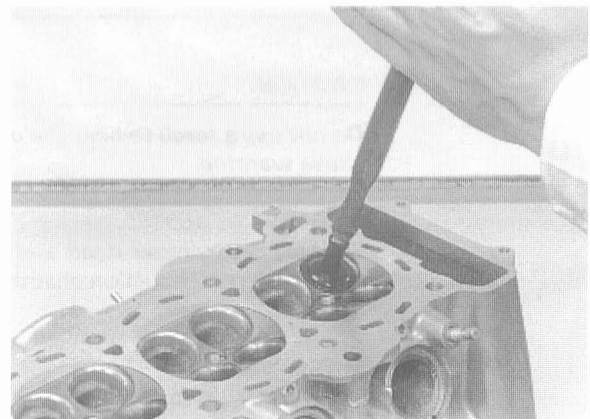


## VALVE SEAT INSPECTION/REFACING

Clean the intake and exhaust valve thoroughly to remove carbon deposits.  
Apply a light coating of Prussian Blue to the valve seats. Lap the valves and seats using a rubber hose or other hand-lapping tool.  
Remove and inspect the valves.

**CAUTION:**

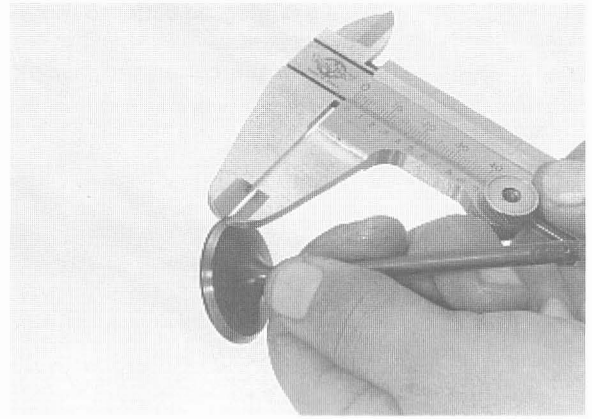
*The valves cannot be ground. If a valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.*



Inspect the width of each valve seat.

**STANDARD:** 0.90–1.10 mm (0.035–0.043 in)  
**SERVICE LIMIT:** 1.5 mm (0.06 in)

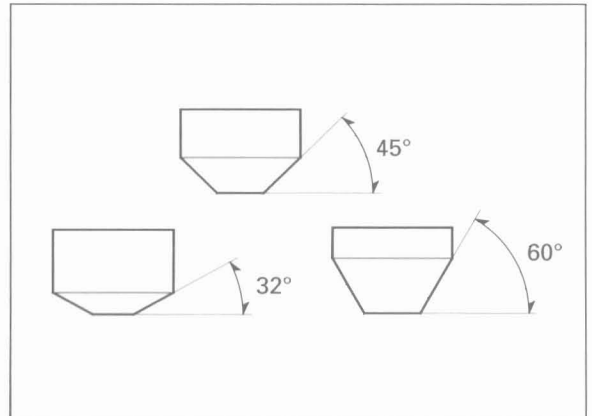
If the seat is too wide, too narrow or has low spots, the seat must be ground.



**VALVE SEAT REFACING**

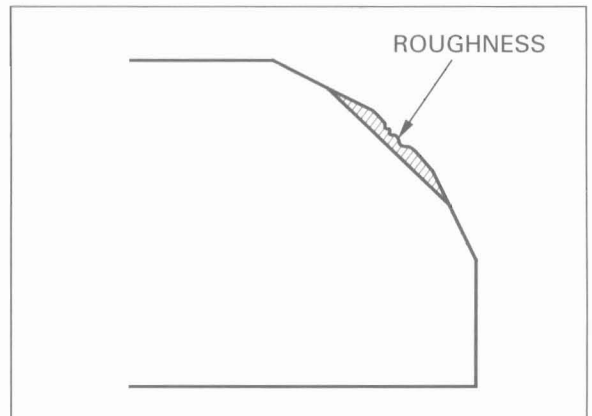
*Follow the refacing manufacturer's operating instructions.*

Valve seat cutters/grinders or equivalent valve seat refacing equipment are recommended to correct worn valve seats.

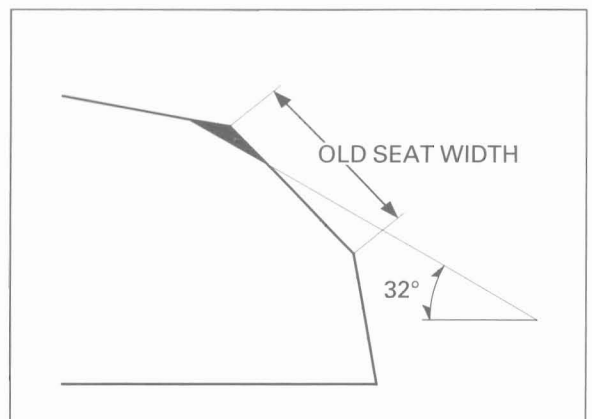


*Reface the seat with a 45-degree cutter whenever a valve guide is replaced.*

Use a 45-degree cutter to remove any roughness or irregularities from the seat.



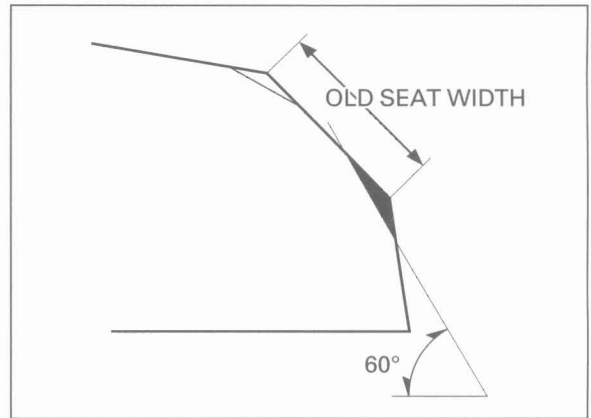
Use a 32-degree cutter to remove the top 1/4 of the existing valve seat material.



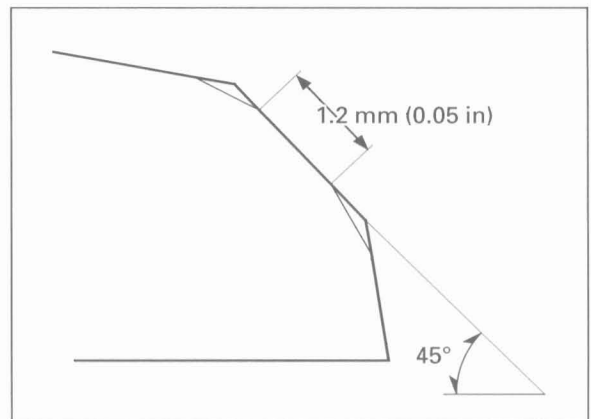


## CYLINDER HEAD/VALVES

Use a 60-degree cutter to remove the bottom 1/4 of the old seat.  
Remove the cutter and inspect the area you have refaced.



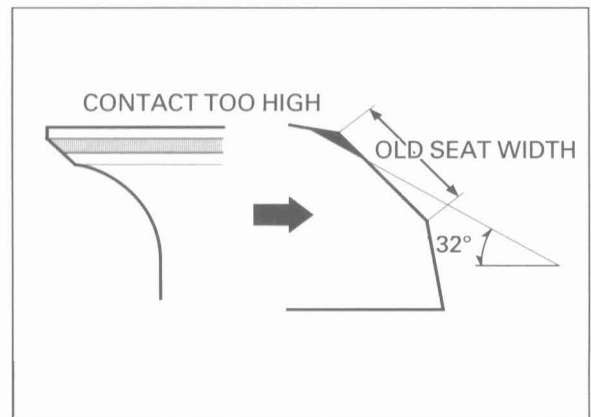
Install a 45-degree finish cutter and cut the seat to the proper width.  
Make sure that all pitting and irregularities are removed.  
Refinish if necessary.



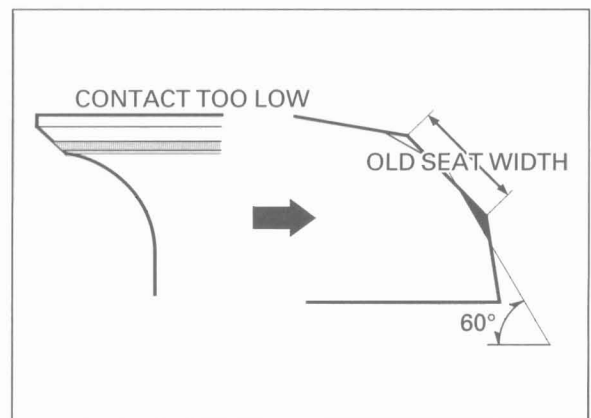
*The location of the valve seat in relation to the valve face is very important for good sealing.*

Apply a thin coating of Prussian Blue to the valve seat.  
Press the valve through the valve guide and onto the seat to make a clear pattern.

If the contact area is too high on the valve, the seat must be lowered using a 32 degrees flat cutter.



If the contact area is too low on the valve, the seat must be raised using a 60-degree inner cutter.

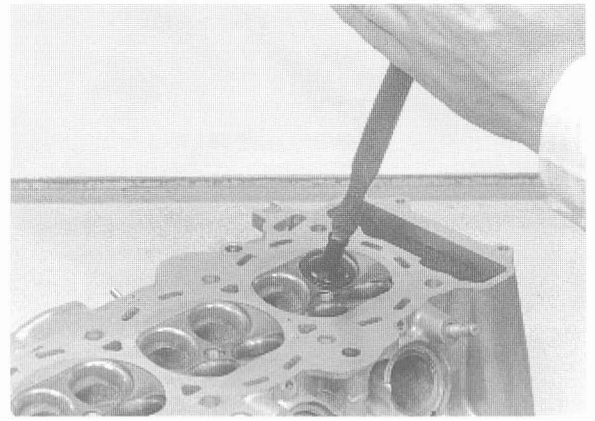




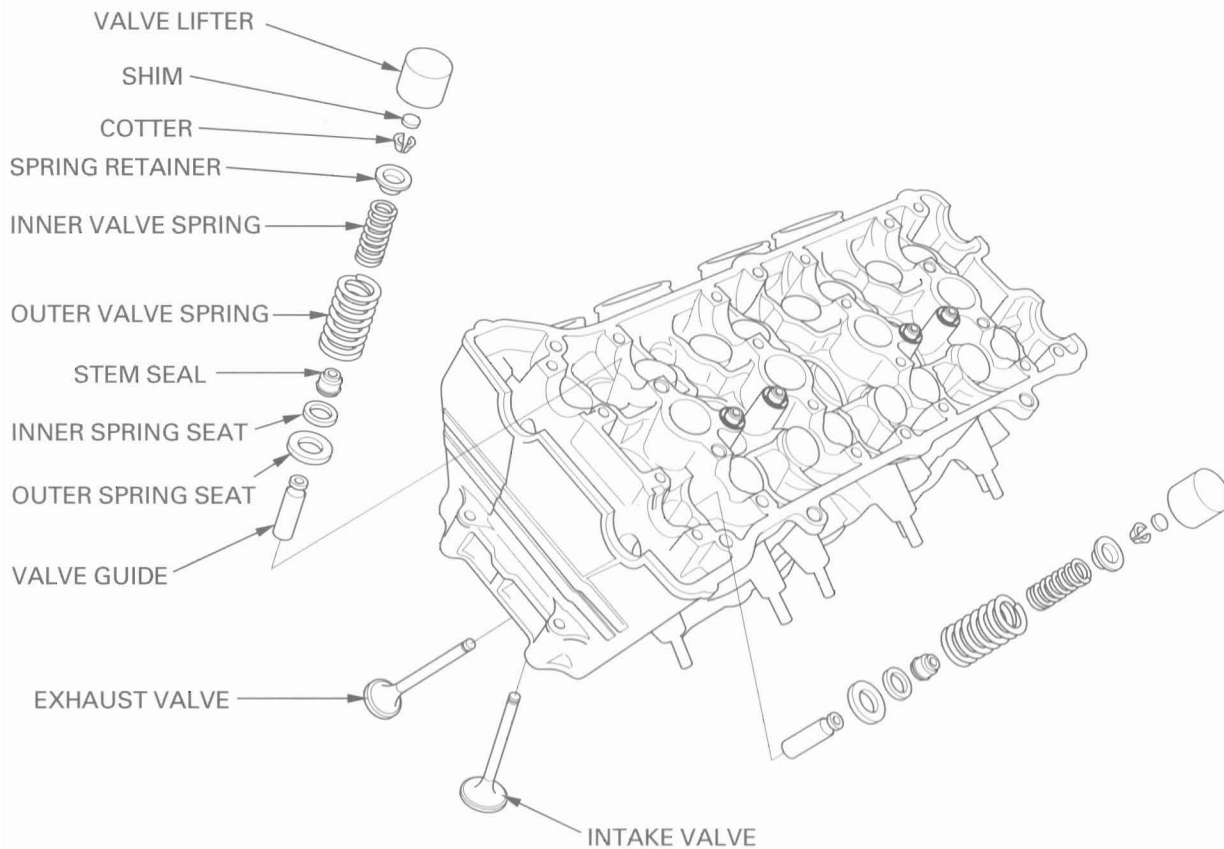
Refinish the seat to specifications, using a 45-degree finish cutter.  
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

*Do not allow lapping compound to enter the guides.*

After lapping, wash all residual compound off the cylinder head and valve.



## CYLINDER HEAD ASSEMBLY

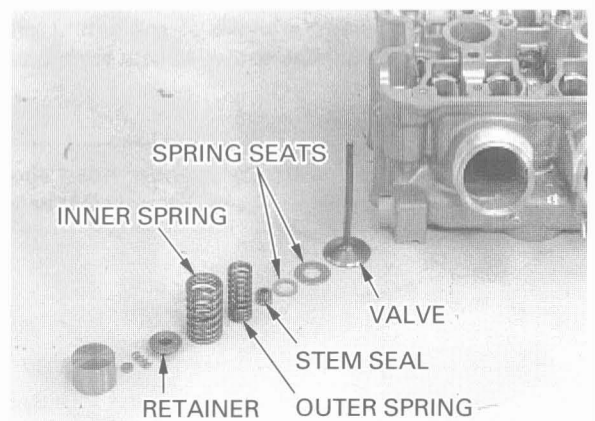


Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.

Install the inner and outer valve spring seats.  
Install the new stem seals.

Lubricate the valve stems with molybdenum disulfide oil and insert the valve into the valve guide.

To avoid damage to the stem seal, turn the valve slowly when inserting.

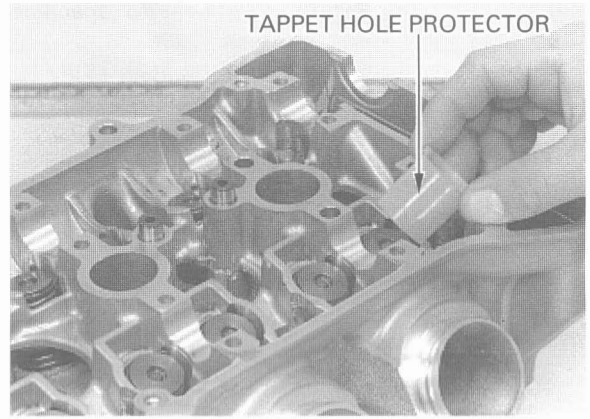


## CYLINDER HEAD/VALVES

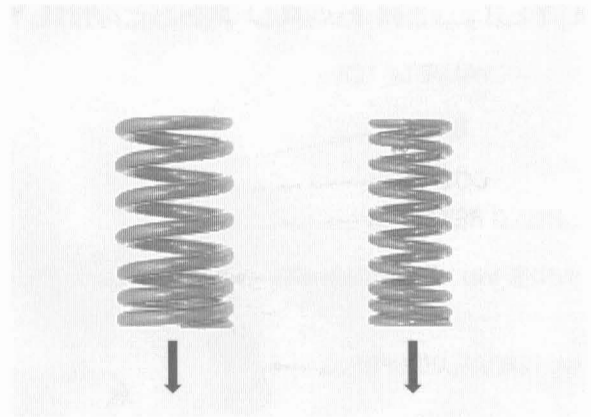
Install the tappet hole protector into the valve lifter bore.

**TOOL:**

**Tappet hole protector**      07HMG—MR70002



Install the valve springs with the tightly wound coils facing the combustion chamber.  
Install the valve spring retainer.

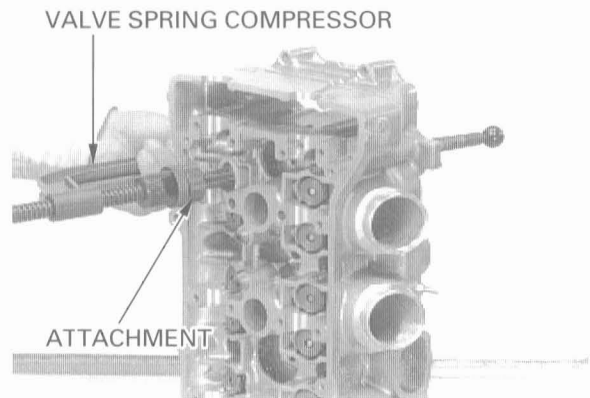


Install the valve cotters using the special tool as shown.  
To prevent loss of tension, do not compress the valve spring more than necessary.

**TOOLS:**

**Valve spring compressor**    07757—0010000

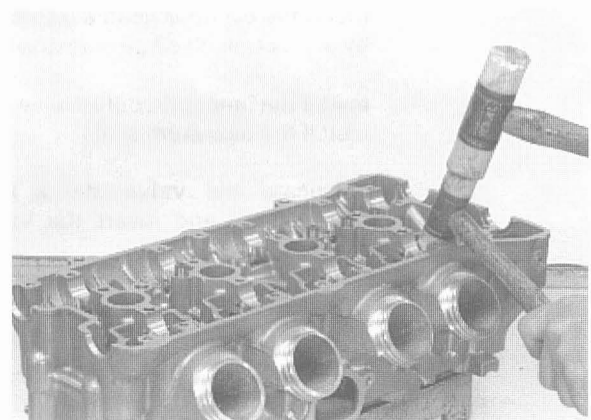
**Valve spring compressor attachment**  
07959—KM30101



Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly.

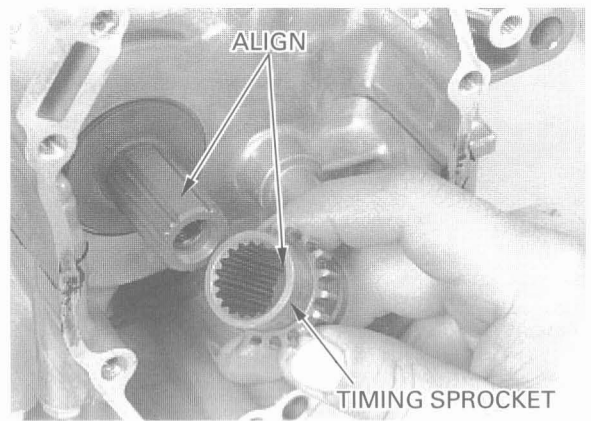
**CAUTION:**

*Support the cylinder head above the work bench surface to prevent possible valve damage.*

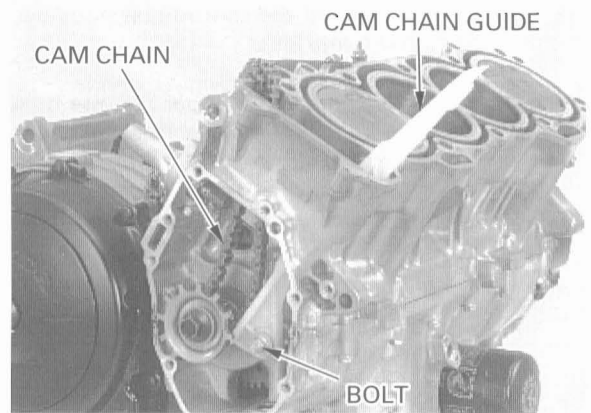


## CYLINDER HEAD INSTALLATION

Install the timing sprocket by aligning the wide teeth between the crankshaft and sprocket.

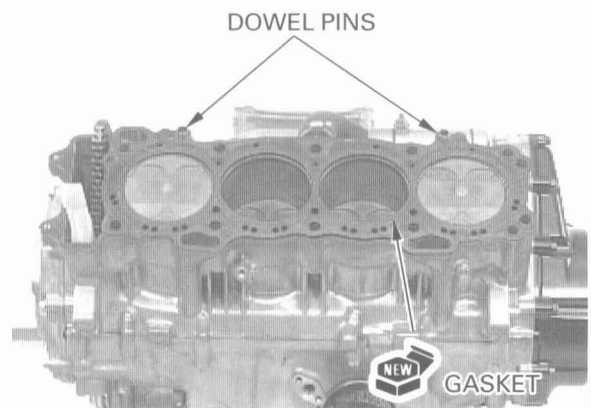


Install the cam chain.  
Install the cam chain guide and tighten the bolt/washer.



Install the ignition pulse generator rotor and ignition pulse generator rotor cover (page 17-8).

Install the dowel pins and a new cylinder head gasket as shown.



Install the cylinder head.

If using the new bolt, remove anti-rust additive from the bolt.

Apply molybdenum disulfide oil to the threads and seating surface of the 10 mm bolts/washers and install them.

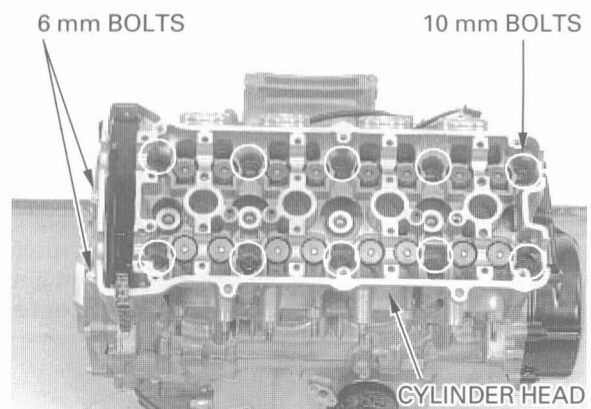
Install the two 6 mm flange bolts.

Tighten the 10 mm bolts in a crisscross pattern in 2–3 steps to the specified torque.

**TORQUE:** 67 N·m (6.8 kgf·m , 49 lbf·ft)

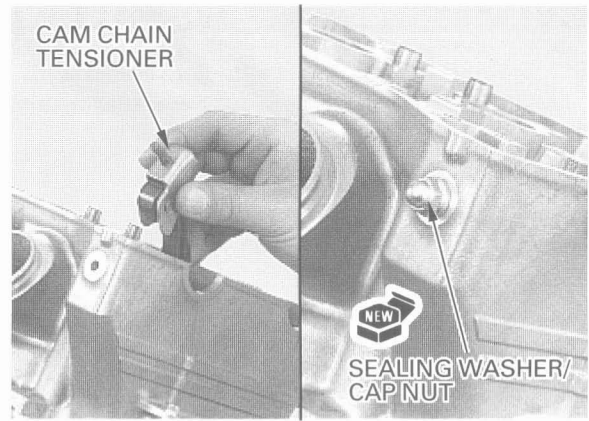
Tighten the 6 mm flange bolts to the specified torque.

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



## CYLINDER HEAD/VALVES

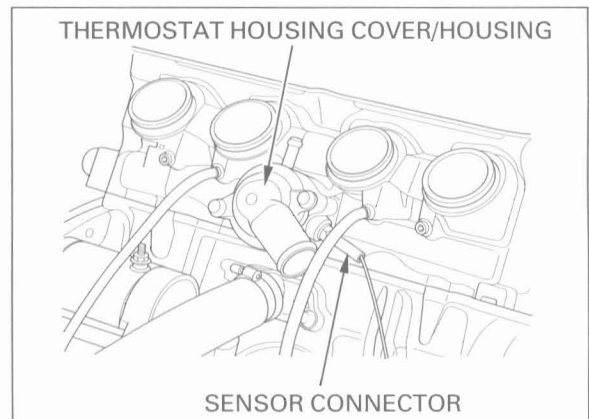
Install the cam chain tensioner into the cylinder head.  
Install the new sealing washer and tighten the nut.



Install the thermostat housing and housing cover (page 6-6).

Connect the upper radiator hose and air bleed tube to the thermostat housing cover.  
Connect the coolant temperature sensor connector.

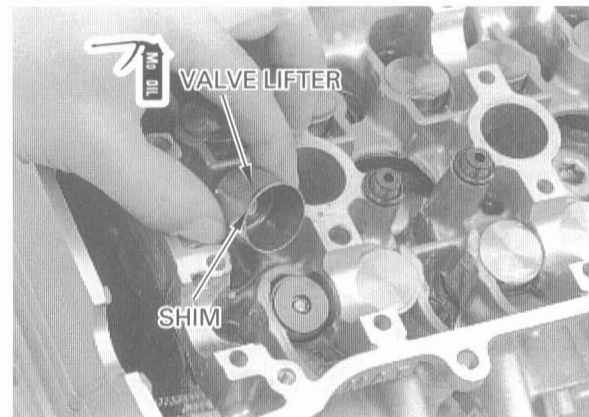
Install the engine into the frame (page 7-5).



## CAMSHAFT INSTALLATION

Apply molybdenum disulfide oil to the outer surface of the each valve lifter.

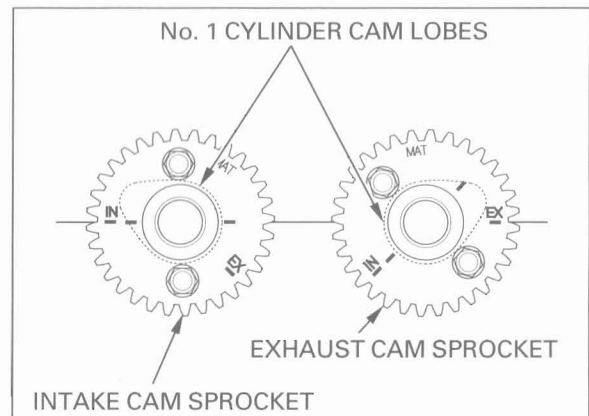
Install the shims and valve lifters into the valve lifter bores.



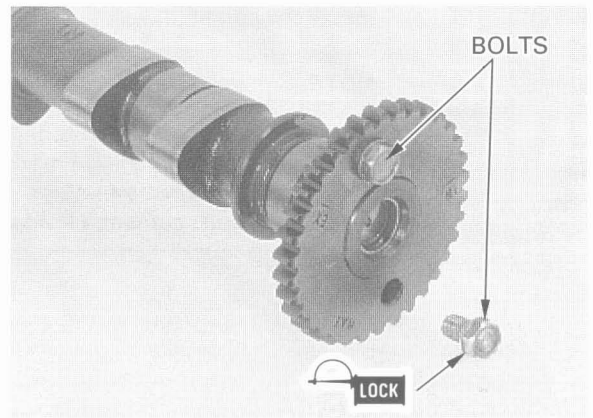
If the cam sprockets are removed, install the cam sprockets onto the camshafts.

### NOTE:

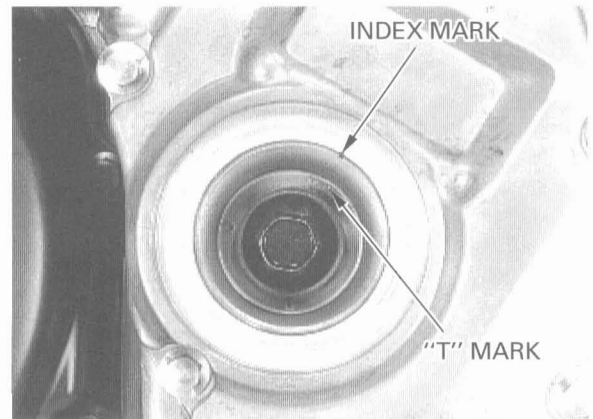
- Install the intake cam sprocket with the timing mark (IN) facing outward and the No. 1 cylinder cam lobes facing up and out as shown.
- Install the exhaust cam sprocket with the timing mark (EX) facing outward and the No. 1 cylinder cam lobes facing up and out as shown.



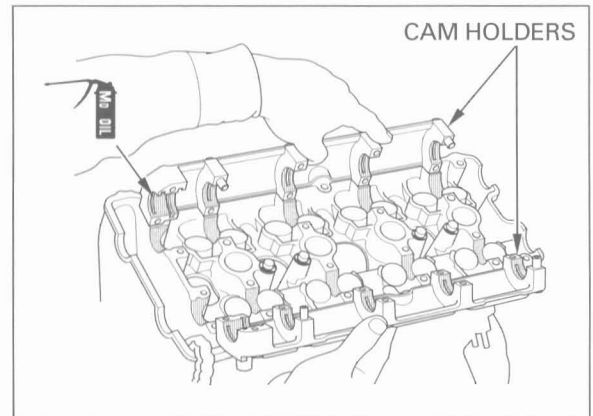
Clean and apply a locking agent to the cam sprocket bolt threads.  
Install the cam sprocket bolts.



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



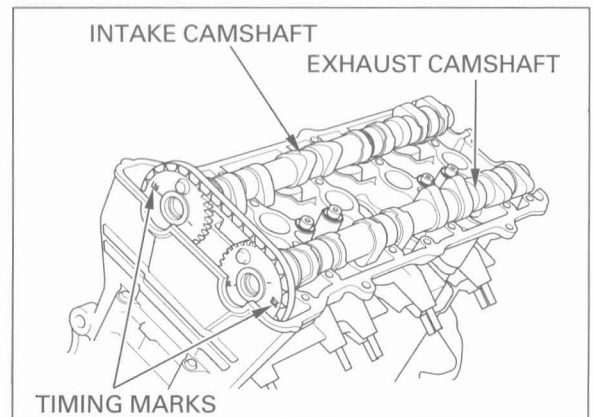
Apply molybdenum disulfide oil to the camshaft journals of the cylinder head and camshaft holder.



Install the cam chain over the cam sprockets and then install the intake and exhaust camshafts.

**NOTE:**

- Install the each camshaft to the correct locations with the identification marks.  
"IN": Intake camshaft  
"EX": Exhaust camshaft
- Make sure that the timing marks on the cam sprockets are facing outward and flush with the cylinder head upper surface as shown.



## CYLINDER HEAD/VALVES

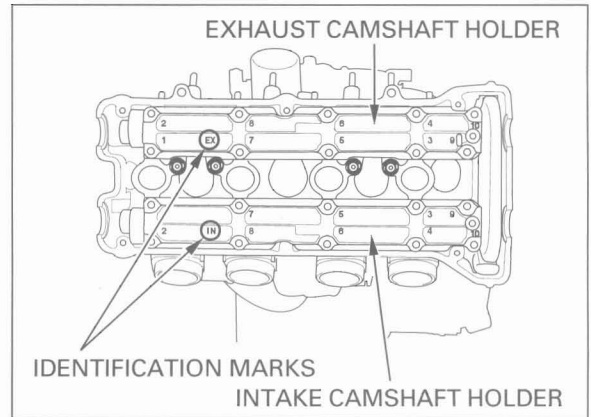
Install the camshaft holders onto the camshafts.

**NOTE:**

Install the each camshaft holder to the correct locations with the identification marks.

“IN”: Intake camshaft holder

“EX”: Exhaust camshaft holder

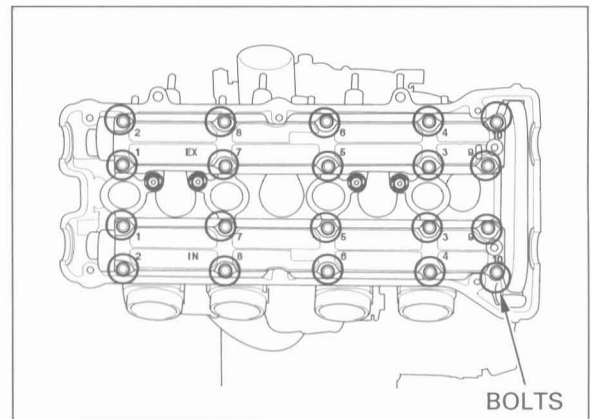


Apply oil to the camshaft holder bolt threads and seating surface.

Temporarily install the holder bolts until the cam holders lightly contact the cylinder head surface.

**CAUTION:**

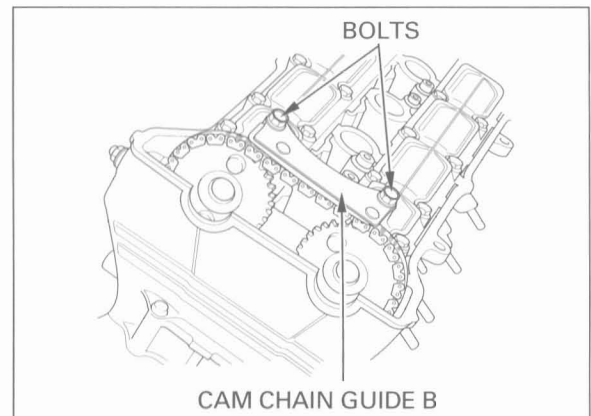
*Tightening the camshaft holder bolts on only one side might cause a camshaft holder to break.*



Tighten all camshaft holder bolts in the numerical order cast on the camshaft holder.

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

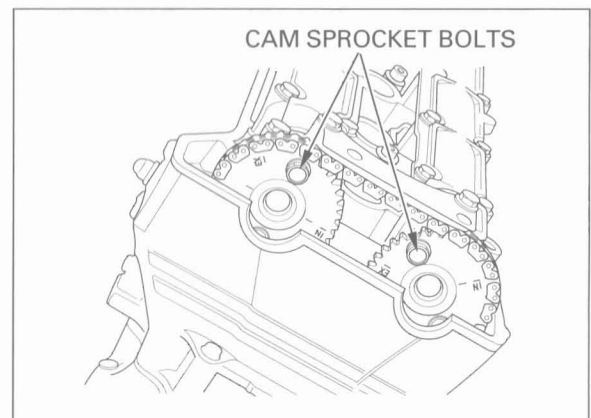
Install the cam chain guide B, and tighten the bolts.



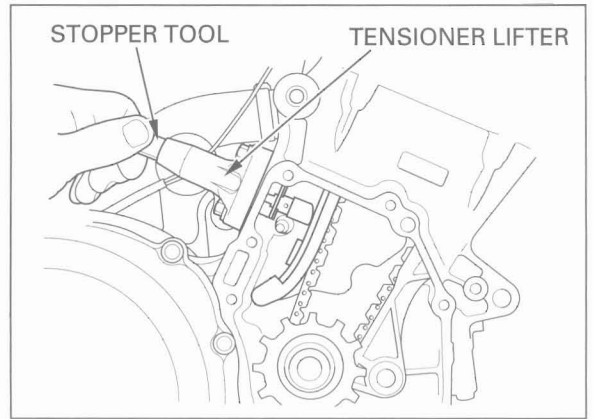
In case the cam sprockets were removed, tighten the cam sprocket bolts to the specified torque.

**TORQUE:** 20 N·m (2.0 kgf·m , 14 lbf·ft)

Turn the crankshaft clockwise one full turn (360°) and tighten the other cam sprocket bolts.

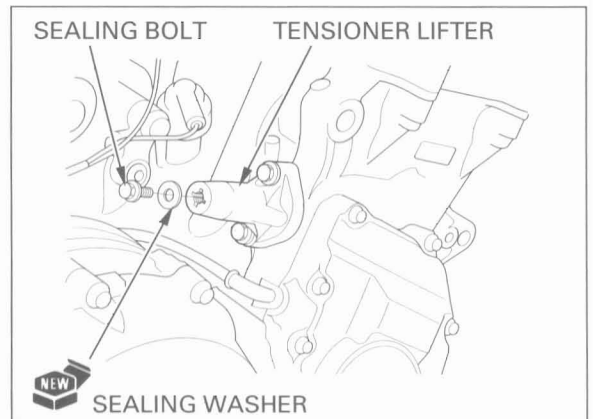


Remove the stopper tool from the cam chain tensioner lifter.



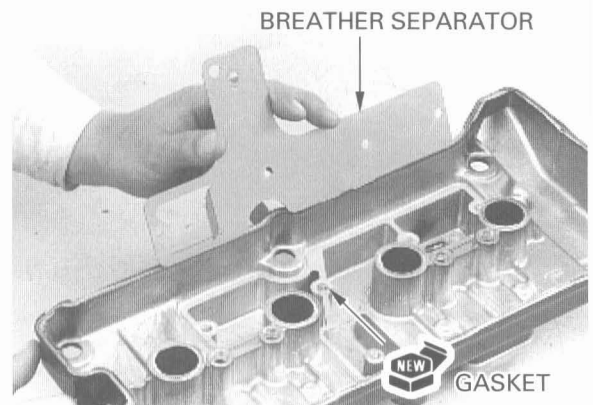
Install a new sealing washer and tighten the sealing bolt.

Recheck the valve timing.



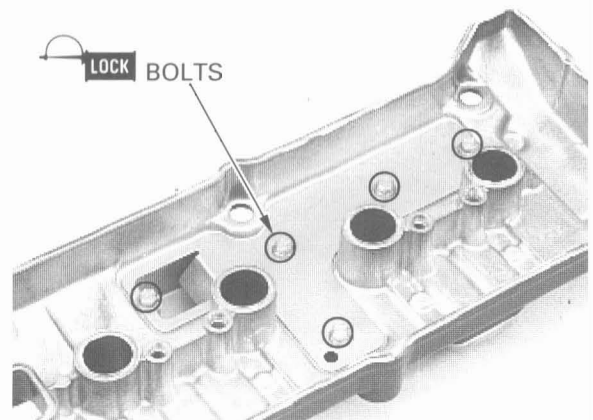
## CYLINDER HEAD COVER ASSEMBLY

Install the new gasket and crankcase breather separator to the cylinder head cover.



Apply a locking agent to the crankcase breather separator mounting bolt threads. Tighten the bolts to the specified torque.

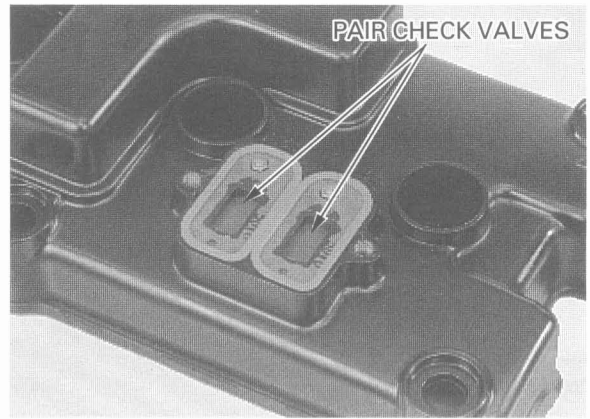
**TORQUE:** 12 N·m (1.2 kgf·m , 9 lbf·ft)





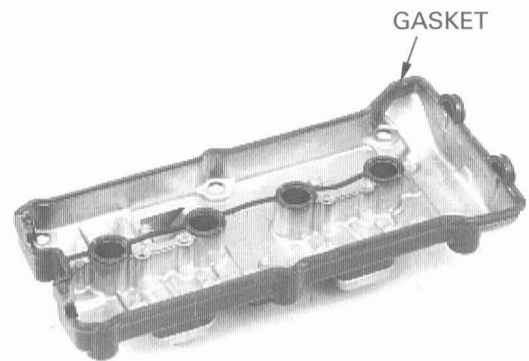
## CYLINDER HEAD/VALVES

Install the PAIR check valves into the cylinder head cover.

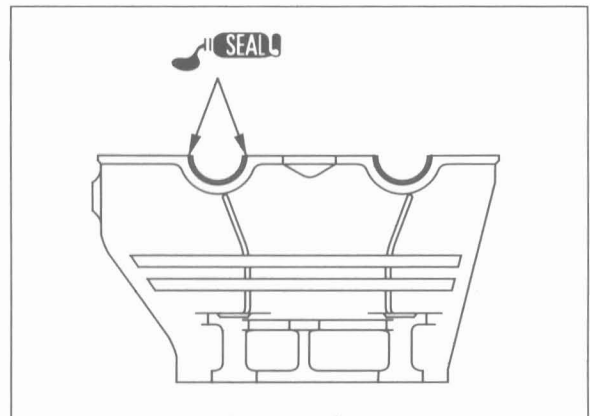


## CYLINDER HEAD COVER INSTALLATION

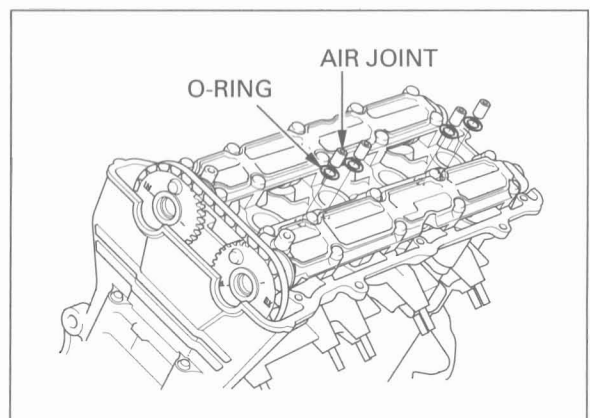
Install the cylinder head gasket into the groove of the cylinder head cover.



Apply sealant to the cylinder head semi-circular cutouts as shown.

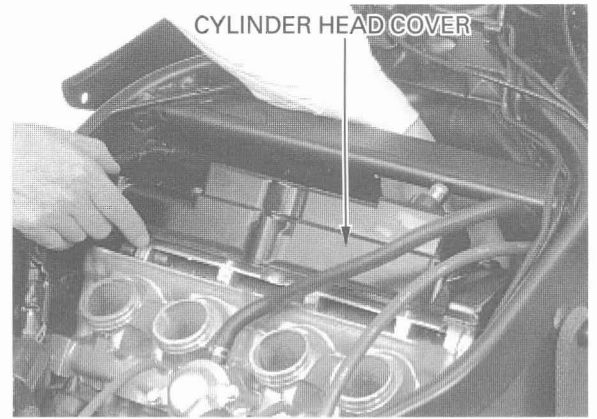


Install the air joints and O-rings.





Install the cylinder head cover onto the cylinder head.



Install the washers with their "UP" mark facing up.



Install and tighten the cylinder head cover special bolts to the specified torque.

**NOTE:**

Tighten the "△" marked side bolts first.

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

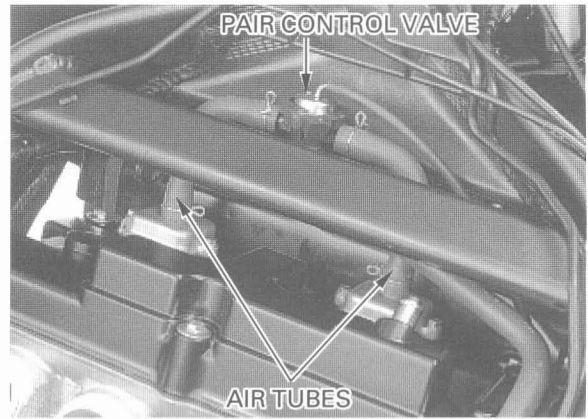


Install the PAIR check valve covers and tighten the SH bolts.



## CYLINDER HEAD/VALVES

Install the PAIR control valve and connect the tubes to the PAIR check valve cover.  
Install the PAIR control valve vacuum tube to the intake port air joint.



Connect the crankcase breather tube.  
Install the ignition coil and spark plug caps.

Install the following:

- Carburetor (page 5-20)
- Air cleaner housing (page 5-4)
- Inner panel (page 2-10)
- Lower cowl (page 2-8)
- Fuel tank (page 2-2)

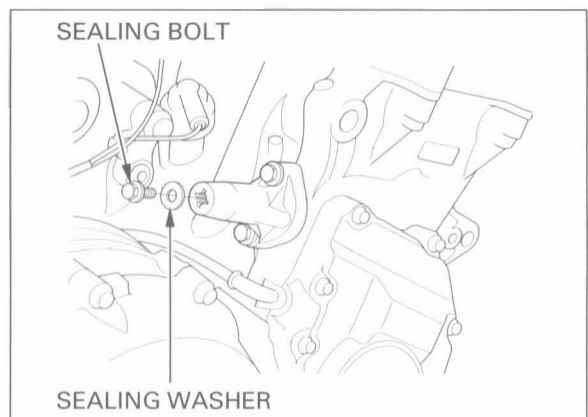


## CAM CHAIN TENSIONER LIFTER

### REMOVAL

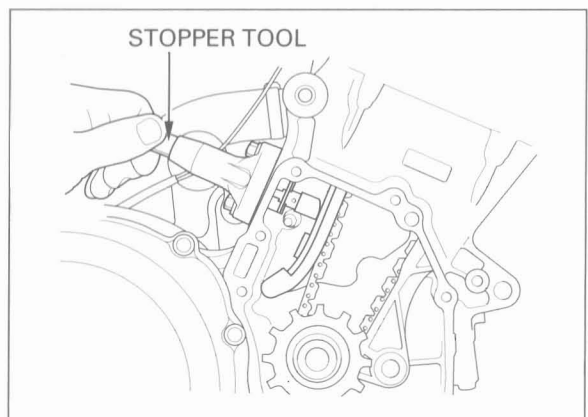
Remove the lower cowl (page 2-7).

Remove the cam chain tensioner sealing bolt and sealing washer.

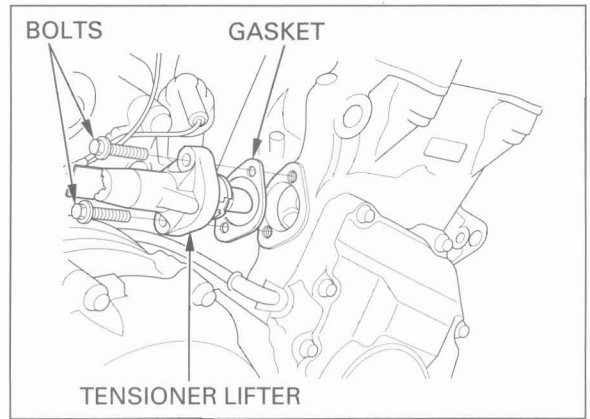


Turn the tensioner shaft fully in (clockwise) and secure it using the stopper tool to prevent damaging the cam chain.

See page 8-7 for detail of the tool.



Remove the bolts, sealing washers and cam chain tensioner lifter.  
Remove the gasket.



**INSTALLATION**

Install the new gasket onto the cam chain tensioner lifter.

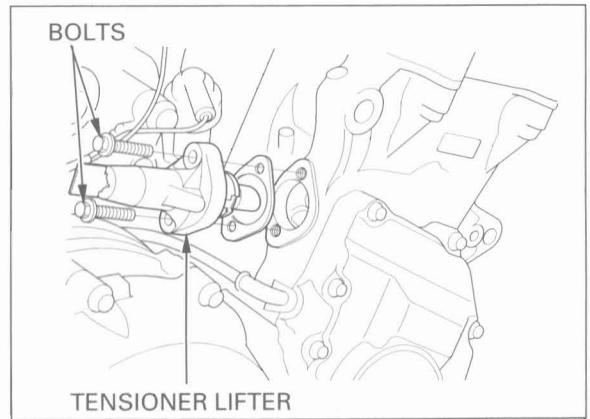
**NOTE:**

Note the direction of the gasket.

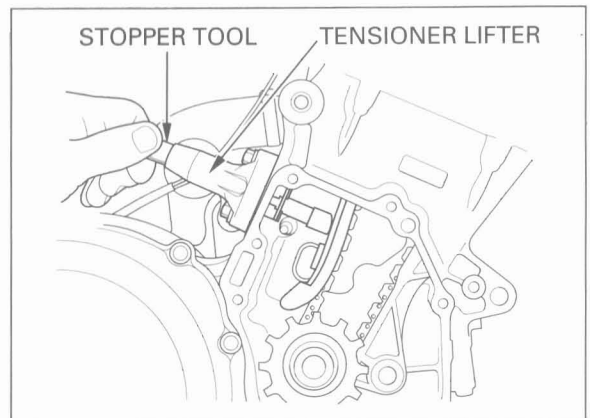


Install the cam chain tensioner lifter into the cylinder block.  
Install the new sealing washers and bolts, then tighten the bolts to the specified torque.

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



Remove the stopper tool.

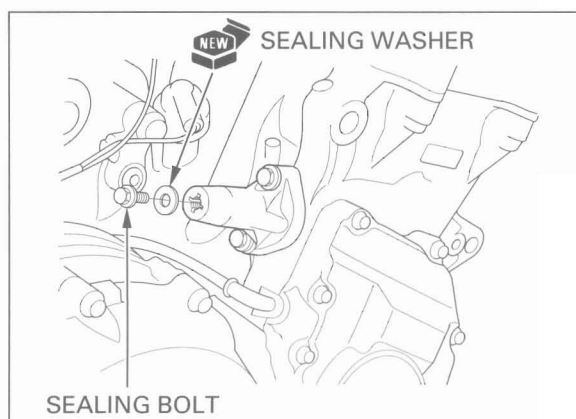


## CYLINDER HEAD/VALVES

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Install a new sealing washer and tighten the sealing bolt securely.

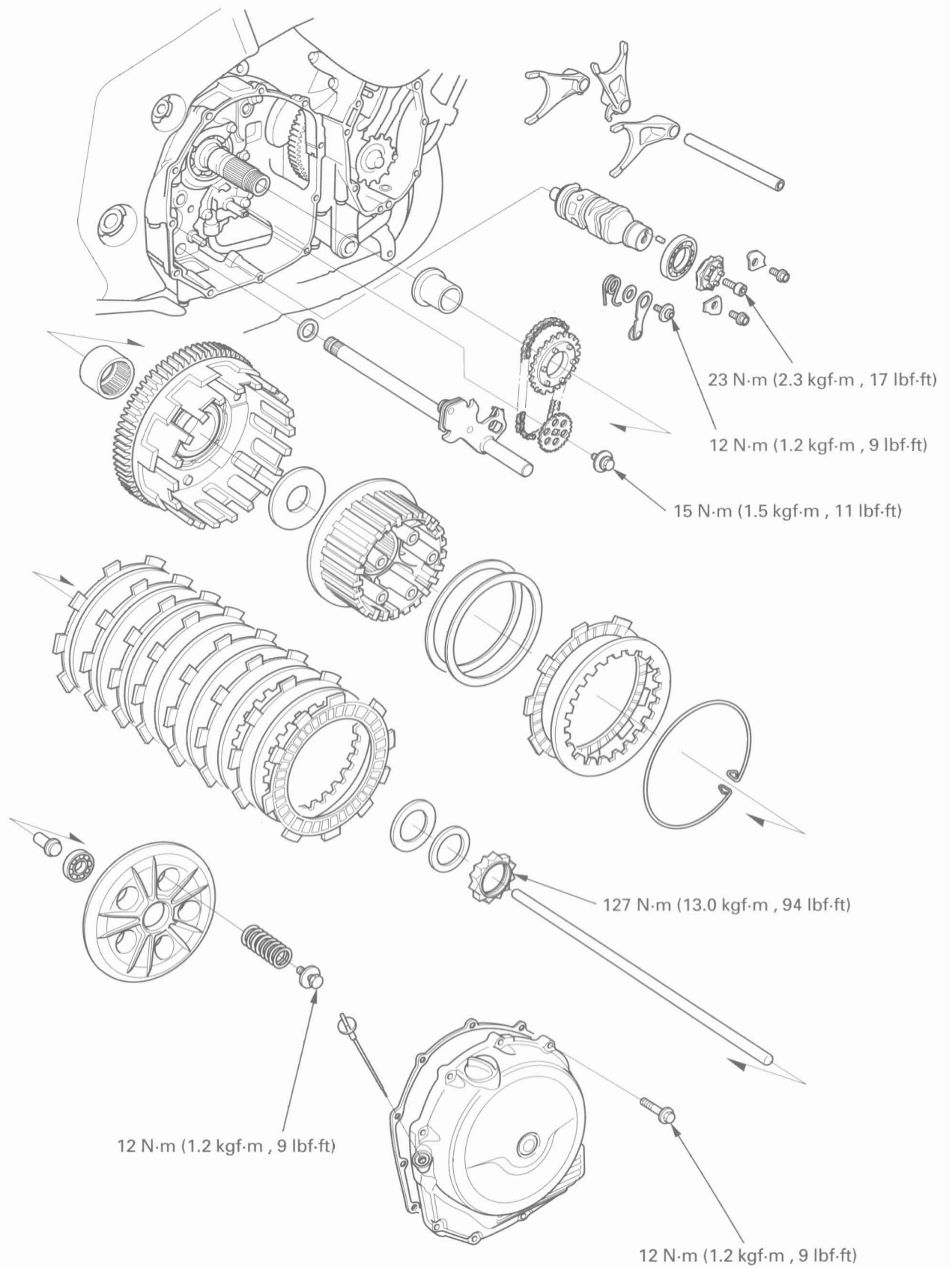
Install the lower cowl (page 2-8).



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MEMO

# CLUTCH/GEARSHIFT LINKAGE



# 9. CLUTCH/GEARSHIFT LINKAGE

SERVICE INFORMATION	9-1	RIGHT CRANKCASE COVER REMOVAL	9-11
TROUBLESHOOTING	9-2	CLUTCH	9-12
CLUTCH FLUID REPLACEMENT/ AIR BLEEDING	9-3	GEARSHIFT LINKAGE	9-21
CLUTCH MASTER CYLINDER	9-5	RIGHT CRANKCASE COVER INSTALLATION	9-26
CLUTCH SLAVE CYLINDER	9-9		

## SERVICE INFORMATION

### GENERAL

- This section covers service of the clutch, gearshift linkage, shift drum and shift forks. All service can be done with the engine installed in the frame.
- 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 contaminants (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 spring free length		53.1 (2.09)	50.1 (1.97)
Clutch disc thickness	A	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	B	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
Clutch plate warpage		—	0.30 (0.012)
Clutch outer guide	I.D.	28.000 – 28.021 (1.1024 – 1.1032)	28.031 (1.1036)
	O.D.	34.975 – 34.991 (1.3770 – 1.3776)	34.965 (1.3766)
Mainshaft O.D. at clutch outer guide		27.980 – 27.993 (1.1016 – 1.1021)	27.970 (1.1012)
Shift fork, fork shaft	Fork	I.D.	12.000 – 12.021 (0.4724 – 0.4733)
		Claw thickness	5.93 – 6.00 (0.233 – 0.236)
	Fork shaft O.D.	11.957 – 11.968 (0.4707 – 0.4712)	11.95 (0.470)

## CLUTCH/GEARSHIFT LINKAGE

### TORQUE VALUES

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 , 0.9 lbf·ft)	
Clutch center lock nut	127 N·m (13.0 kgf·m , 94 lbf·ft)	Apply oil to the threads, Stake the nut
Clutch spring bolt/washer	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Clutch slave cylinder bleeder screw	9 N·m (0.9 kgf·m , 6.5 lbf·ft)	
Clutch slave cylinder mounting bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Right crankcase cover SH bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Right crankcase cover center bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Shift drum center socket bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply a locking agent to the threads
Shift drum stopper pivot bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Gearshift return spring pin	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Gearshift drum bearing set plate flange bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply a locking agent to the threads
Gearshift pedal bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	

### TOOLS

Clutch center holder	07724—0050002	Equivalent commercially available in U.S.A.
Driver	07749—0010000	
Attachment, 37 × 40 mm	07746—0010200	
Attachment, 42 × 47 mm	07746—0010300	
Pilot, 35 mm	07746—0040800	

## 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
- 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



## 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

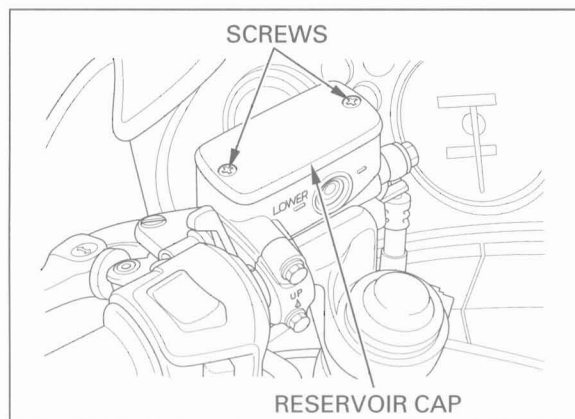
Support the motorcycle on its center stand. Turn the handlebar to the right until the reservoir is parallel to the ground, before removing the reservoir cap.

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:

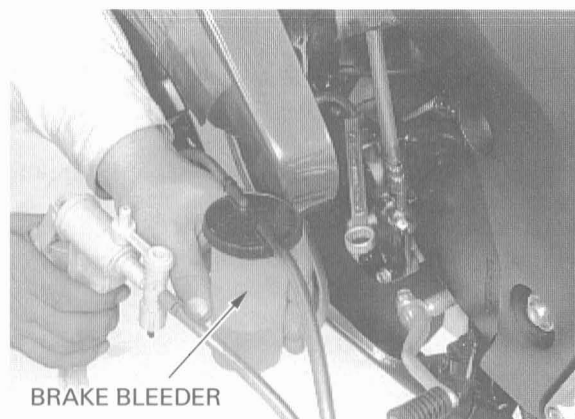
*Do not mix different types of fluid. They are not compatible.*

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 brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



## CLUTCH/GEARSHIFT LINKAGE

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.

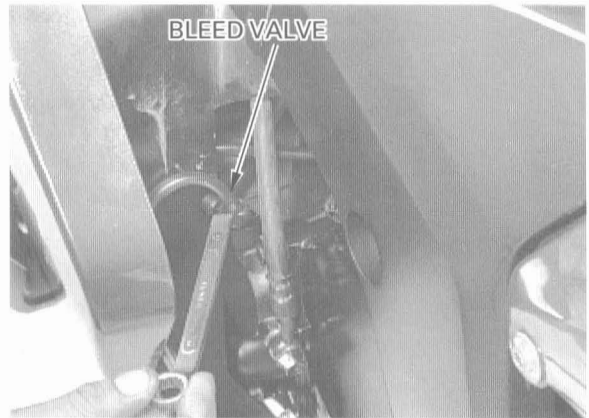


If a brake bleeder is not available, use the following procedure:

Connect a transparent bleed hose to the bleed valve and place the other 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 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 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.

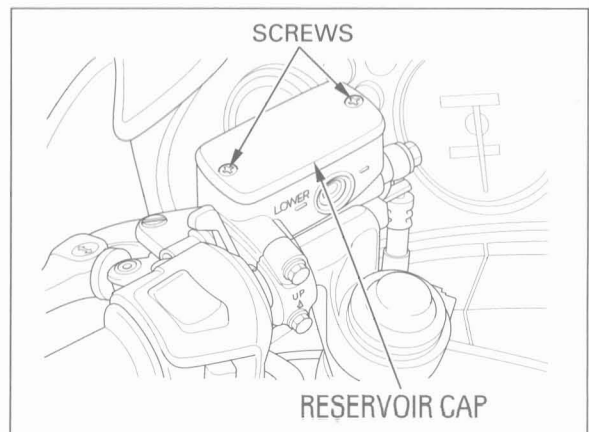
After bleeding air completely and tighten the bleed valves to the specified torque.

**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 3-27).



## CLUTCH MASTER CYLINDER

### REMOVAL

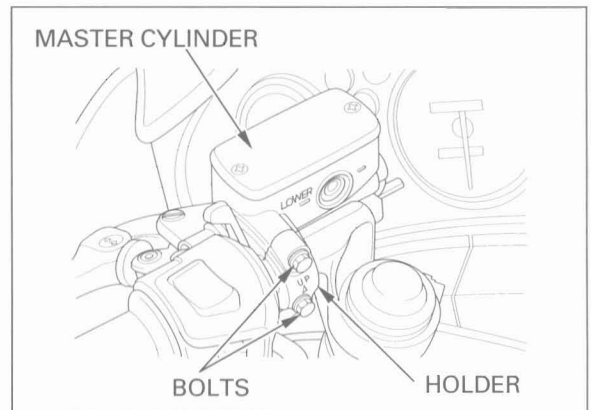
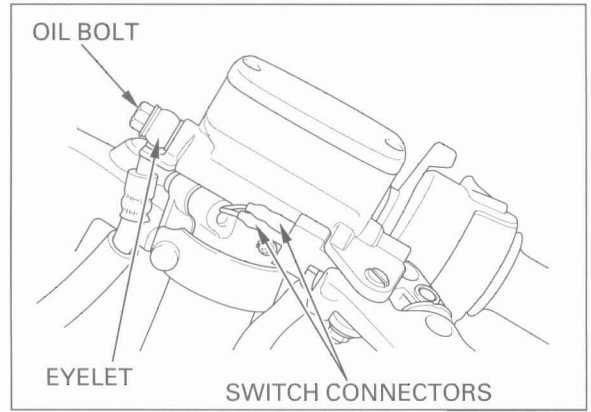
Drain the clutch hydraulic system (page 9-3).

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.**

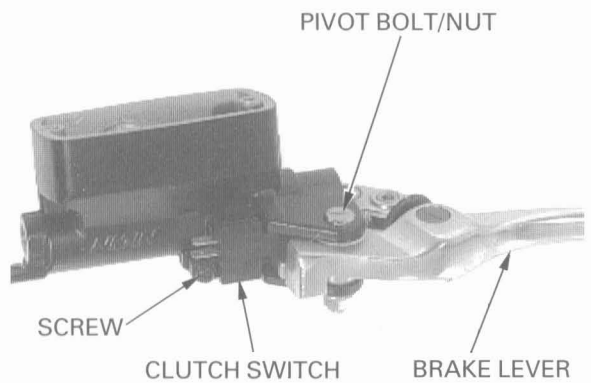
Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



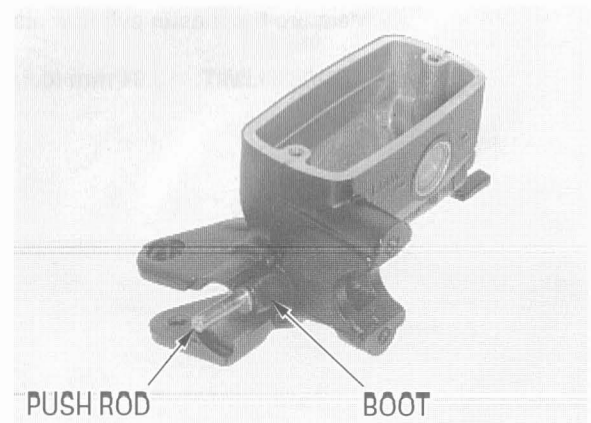
### DISASSEMBLY

Remove the pivot bolt/nut and clutch lever assembly.

Remove the screw and clutch switch.



Remove the boot and push rod.



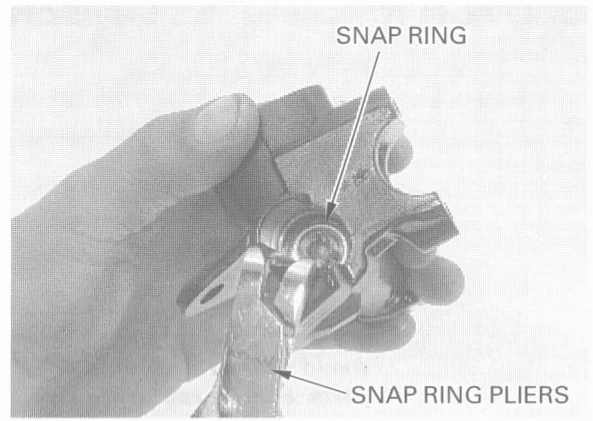
## CLUTCH/GEARSHIFT LINKAGE

Remove the snap ring from the master cylinder body using the special tool as shown.

**TOOL:**

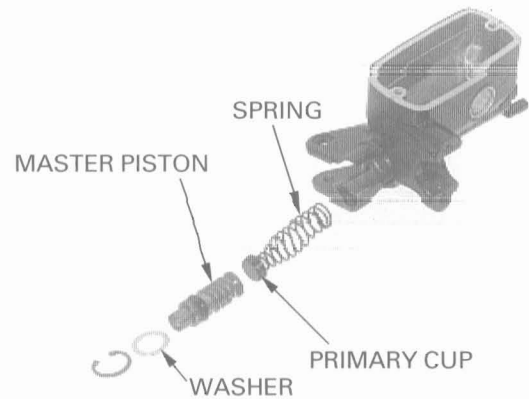
**Snap ring pliers**

07914-3230001



Remove the washer, master piston, primary cup and spring.

Clean the inside of the cylinder and reservoir with brake fluid.



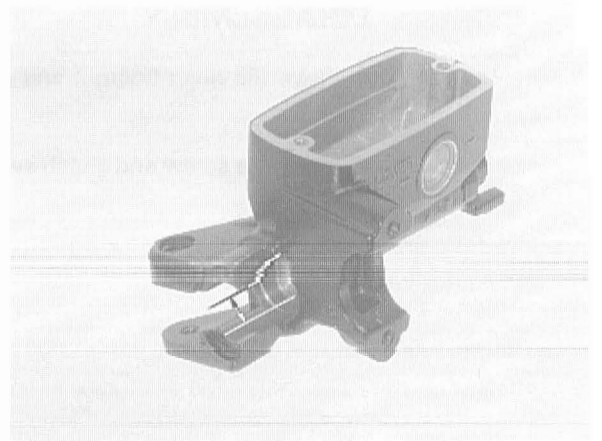
### INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.

Check the master cylinder and piston for abnormal scratches.

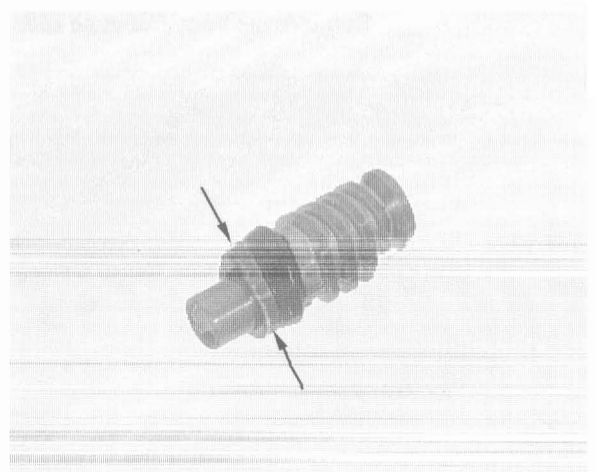
Measure the master cylinder I.D.

**SERVICE LIMIT:** 14.06 mm (0.554 in)

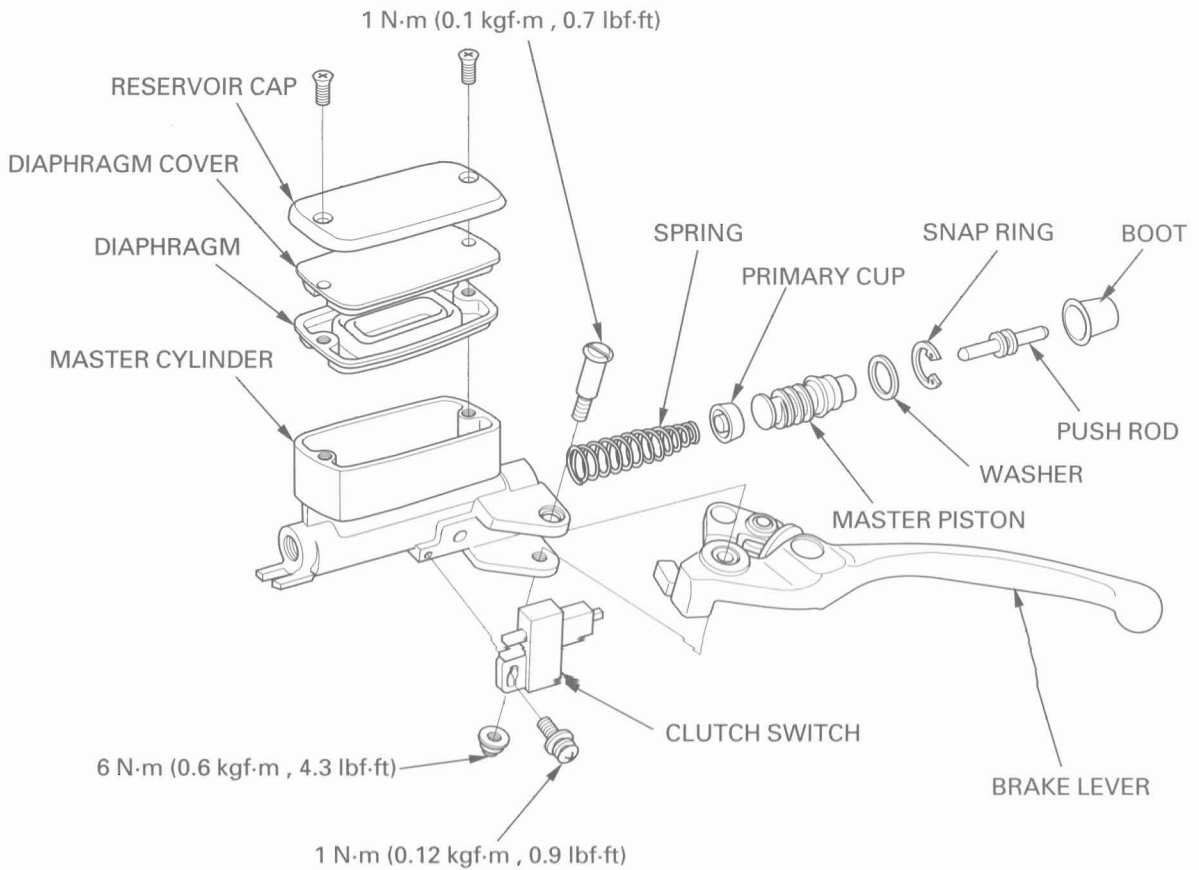


Measure the master cylinder piston O.D.

**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.

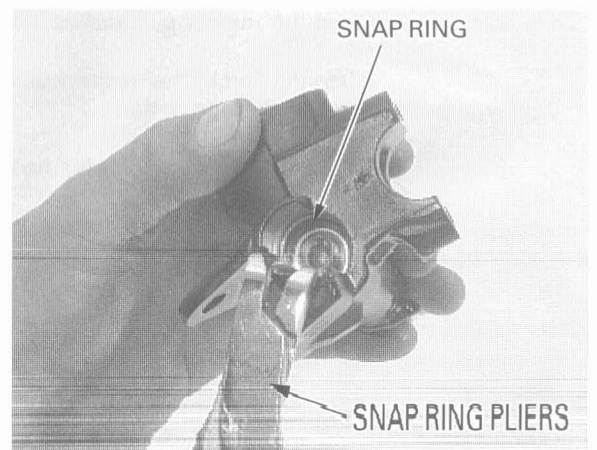
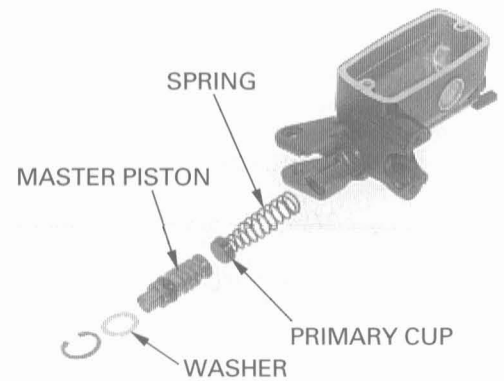
**CAUTION:**

*Be certain the snap ring is firmly seated in the groove.*

**TOOL:**

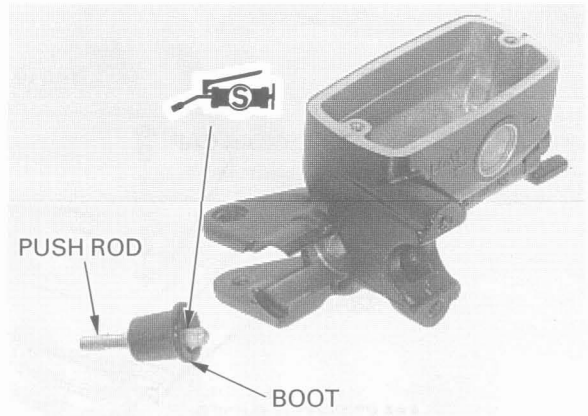
**Snap ring pliers**

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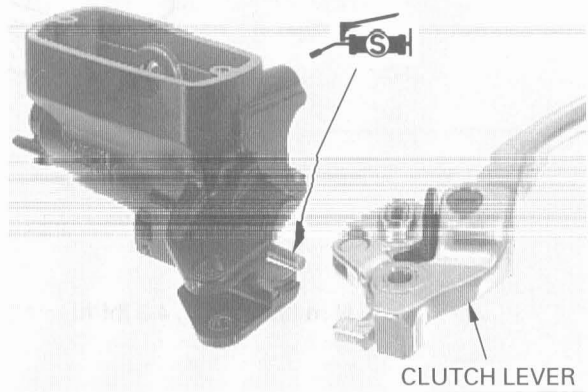


## CLUTCH/GEARSHIFT LINKAGE

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.

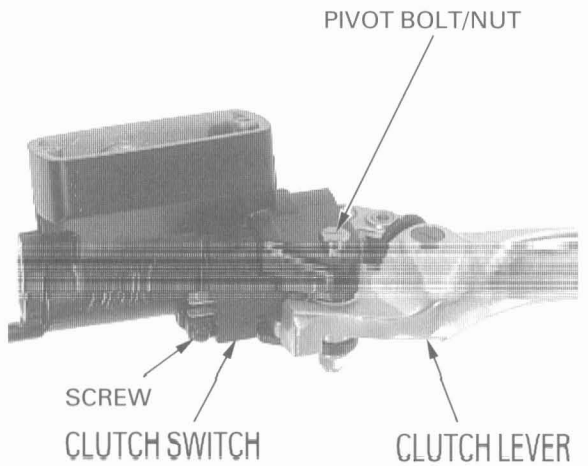
**TORQUE:** 1 N·m (0.1 kgf·m , 0.7 lbf·ft)

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 , 0.9 lbf·ft)



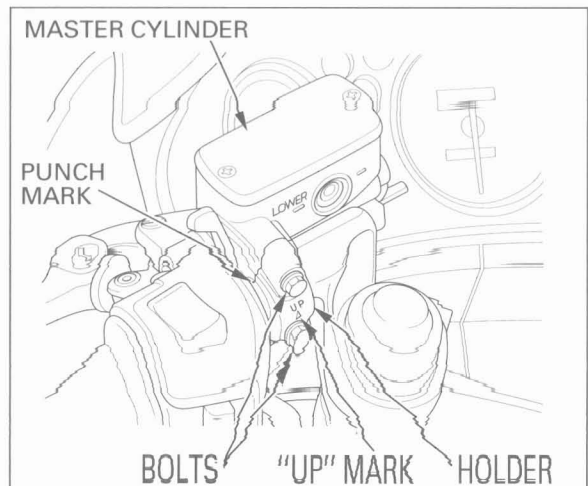
Place the master cylinder assembly on the handlebar.

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)



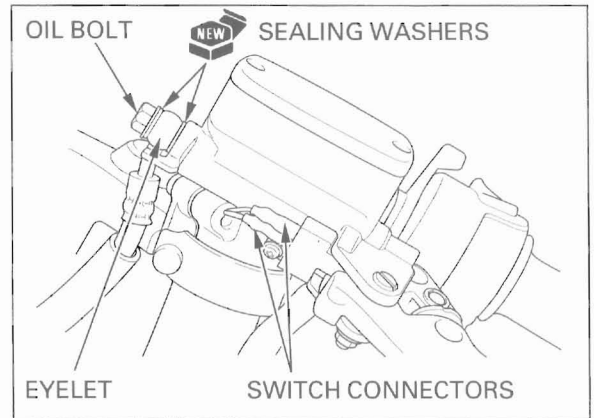
Install the clutch hose eyelet with the oil bolt and new sealing washers.

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 9-3).



## CLUTCH SLAVE CYLINDER

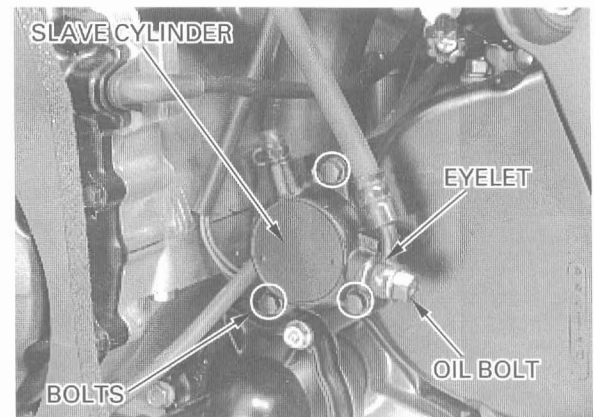
### REMOVAL

Drain the clutch hydraulic system (page 9-3).

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.

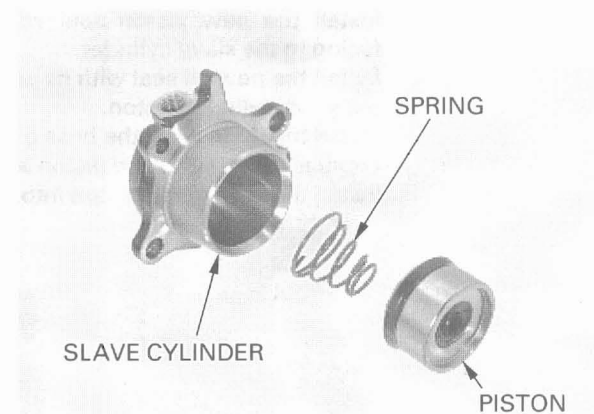
If the piston is hard to remove, remove the following:

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 piston.

#### ▲WARNING

*Do not use high pressure air or bring the nozzle too close to the inlet.*





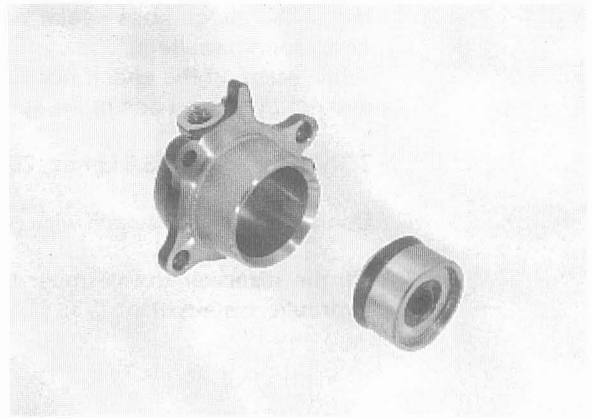
## INSPECTION

Check the piston spring for weakness or damage. Inspect the oil and piston seals for damage or deterioration.

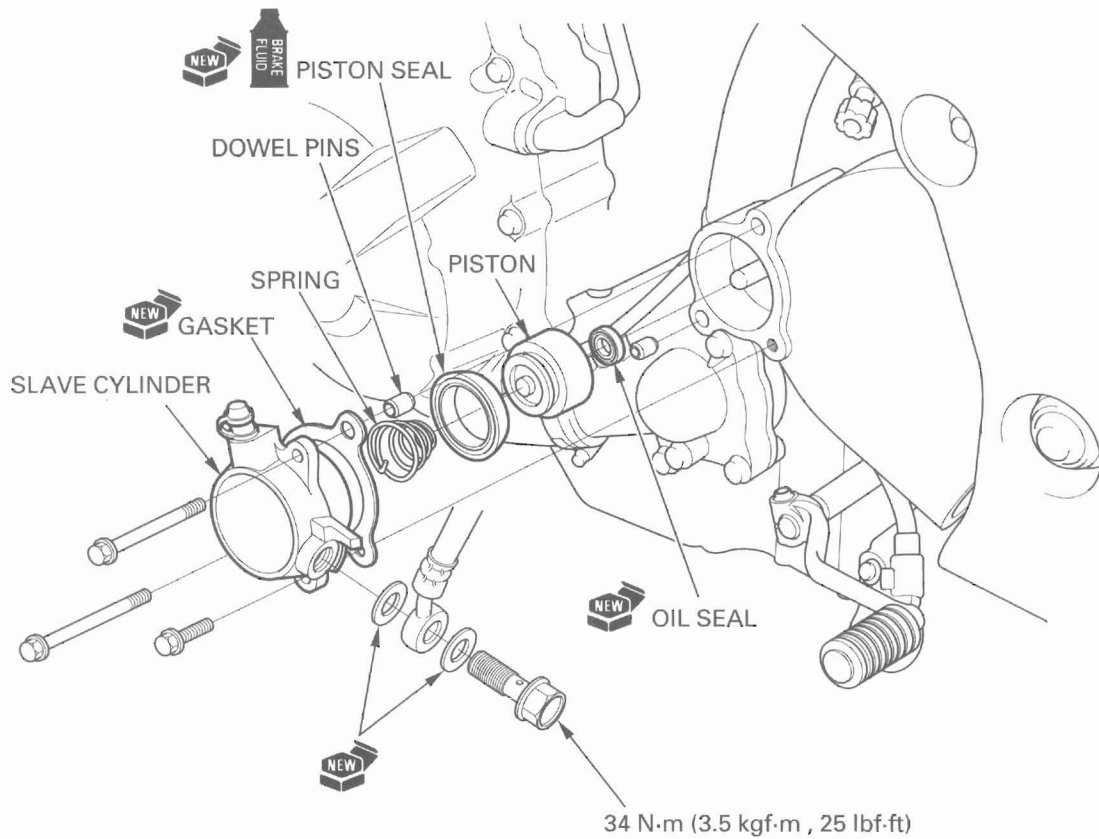
Replace the oil seal and piston seal if necessary. Clean the seal grooves with clean brake fluid.

Check the slave cylinder for scoring or other damage.

Check the slave cylinder piston for scratches, scoring or other damage.



## ASSEMBLY



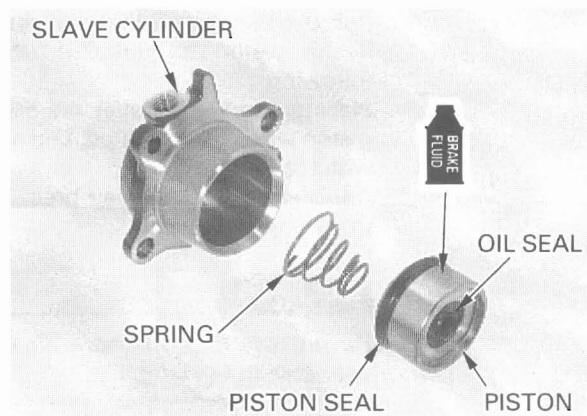
Install the new piston seal with its groove side facing to the slave cylinder.

Install the new oil seal with its groove side facing to the slave cylinder piston.

Install the spring into the boss of the piston.

Lubricate the piston and piston seal with brake fluid.

Install the spring and piston into the slave cylinder.





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.

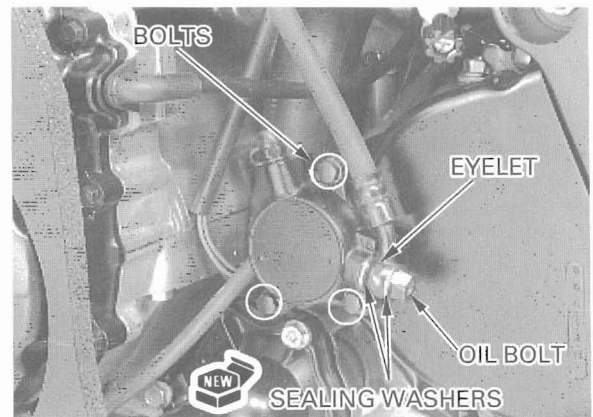


Install and tighten the SH bolts.

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)

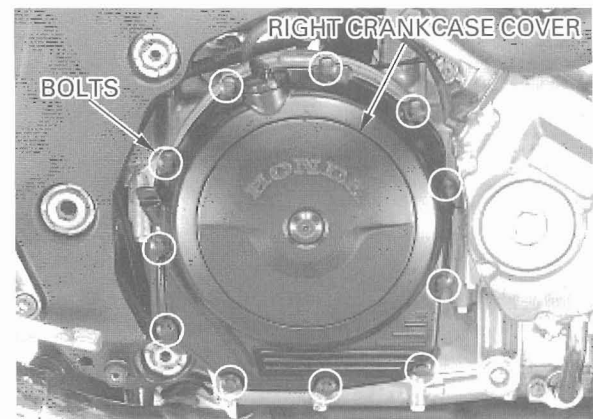
Fill the reservoir to the upper level and bleed the hydraulic system (page 9-3).



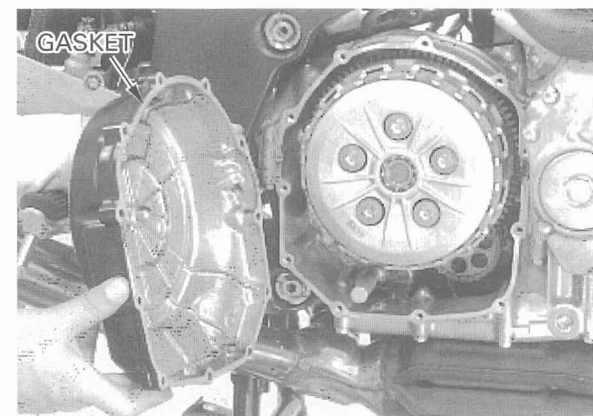
## RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-14).

Remove the eleven right crankcase cover SH bolts and right crankcase cover.



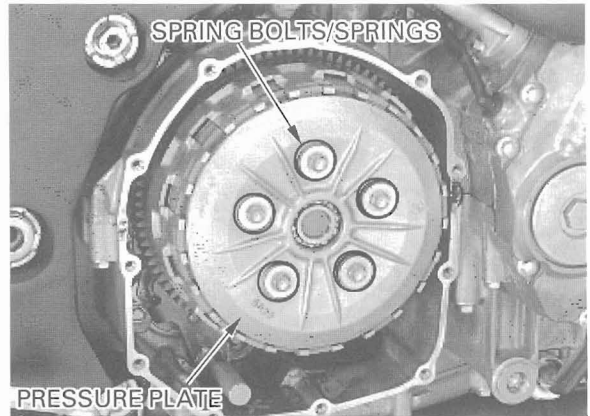
Remove the gasket.



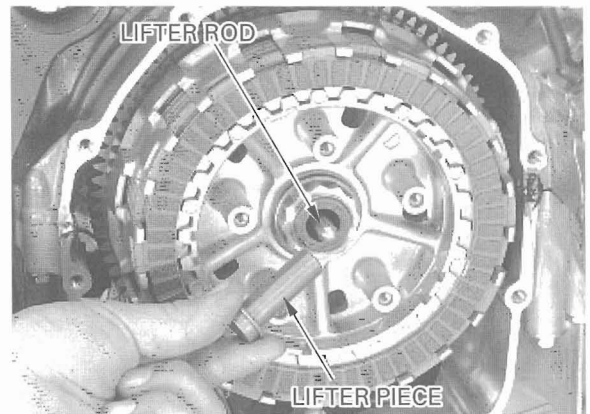
### CLUTCH

#### REMOVAL

Loosen the clutch spring bolts in a crisscross pattern, then remove the clutch spring bolts, springs and pressure plate.

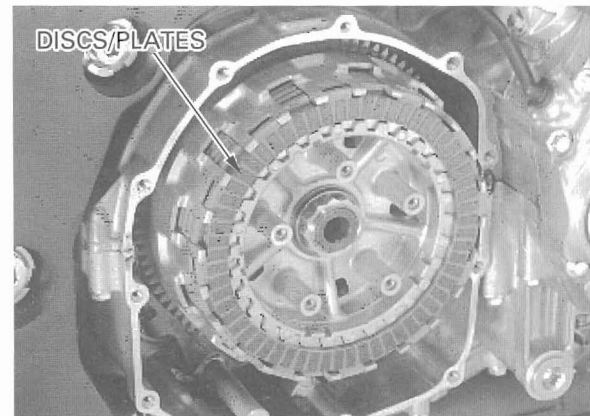


Remove the clutch lifter piece and lifter rod.



Remove the following:

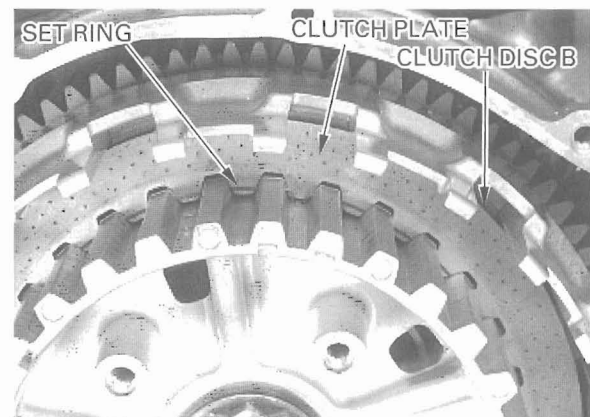
- Eight clutch discs
- Seven clutch plates



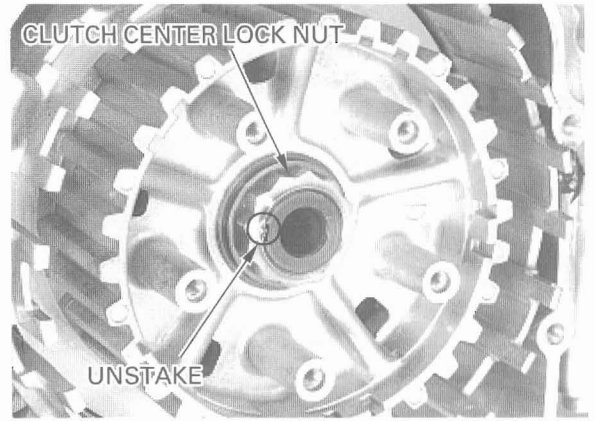
Remove the set ring from the clutch center and discard it.

Remove the following:

- Clutch plate
- Clutch disc B
- Judder spring
- Spring seat



Unstake the clutch center lock nut.



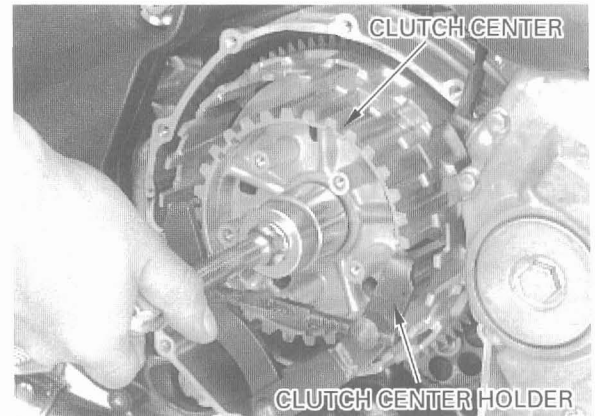
Hold the clutch center with the clutch center holder, then remove the lock nut using the special tool as shown.

**TOOL:**

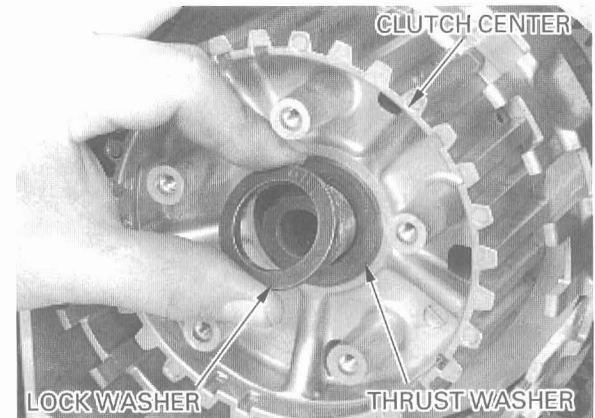
**Clutch center holder**

07724-0050002  
(Equivalent commercially available in U.S.A.)

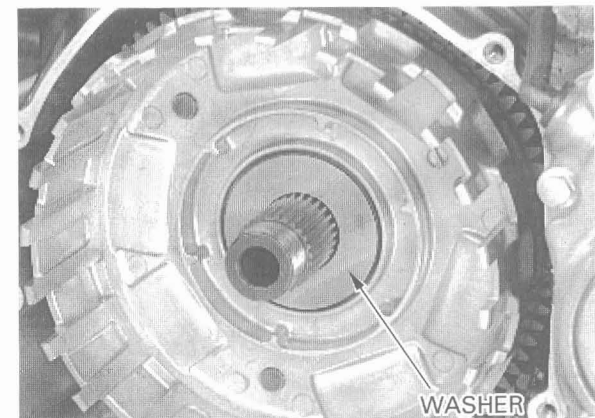
Discard the lock nut.



Remove the lock washer, thrust washer and clutch center.



Remove the washer.



## CLUTCH/GEARSHIFT LINKAGE

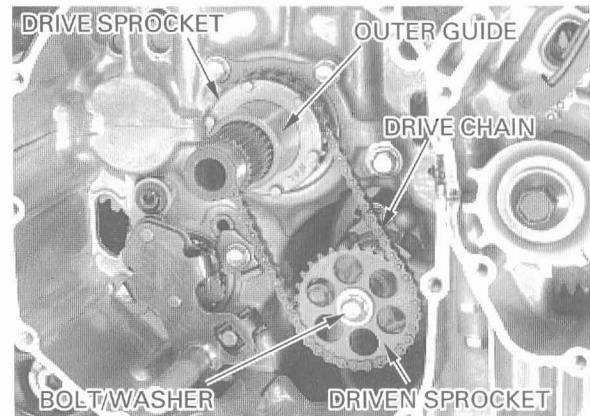
Remove the ignition pulse generator rotor cover (page 17-7).

Align the primary drive gear and sub-gear teeth by inserting a screwdriver between primary drive gear /sub-gear and center case boss.

Pull out the clutch outer.



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



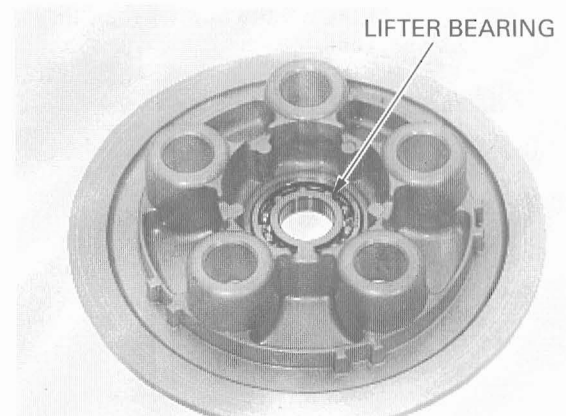
## INSPECTION

### Clutch lifter bearing

Turn the inner race of the lifter bearing with your finger.

The bearing should turn smoothly and freely without excessive play.

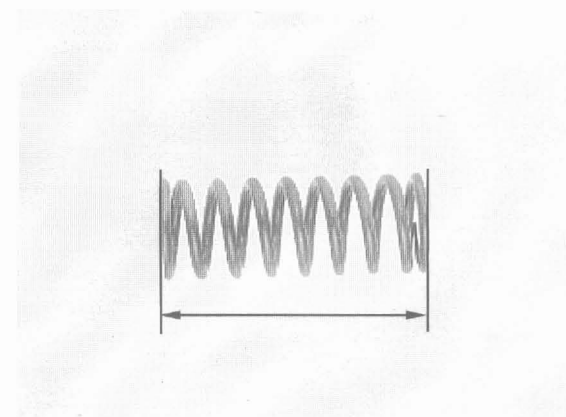
If necessary replace the bearing.



### Clutch spring

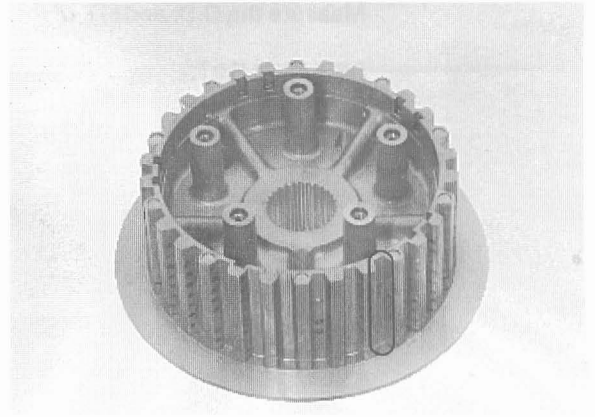
Measure the clutch spring free length.

**SERVICE LIMIT:** 50.1 mm (1.97 in)



### Clutch center

Check the grooves of the clutch center for damage or wear caused by the clutch plates. Replace if necessary.

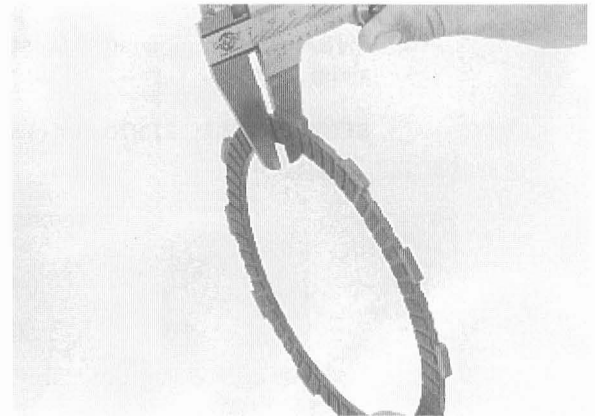


### Clutch disc

Replace the clutch discs if they show signs of scoring or discoloration.

Measure the disc thickness of each disc.

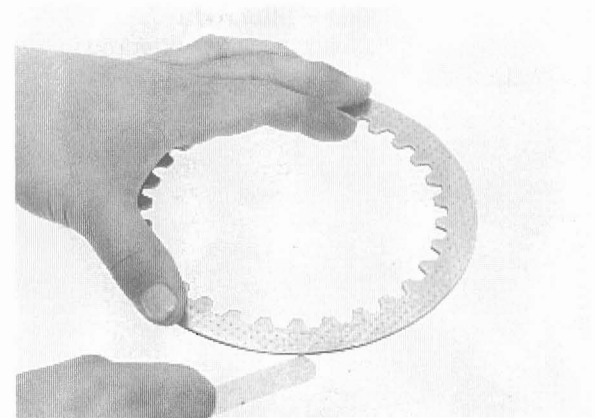
**SERVICE LIMIT:** 3.5 mm (0.14 in)



### Clutch plate

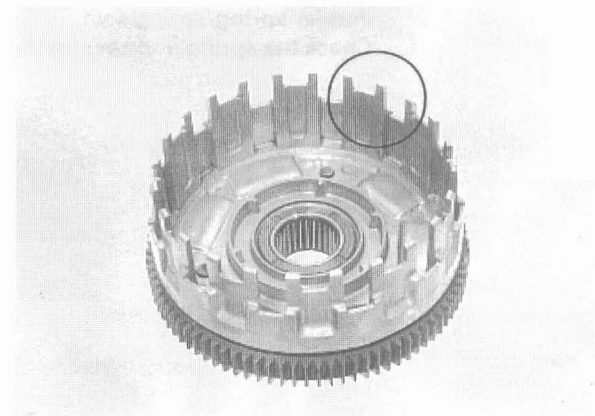
Check each disc plate for warpage on a surface plate using a feeler gauge.

**SERVICE LIMIT:** 0.30 mm (0.012 in)



### Clutch outer/clutch outer guide

Check the slots of the clutch outer for damage or wear caused by the clutch discs. Replace if necessary.



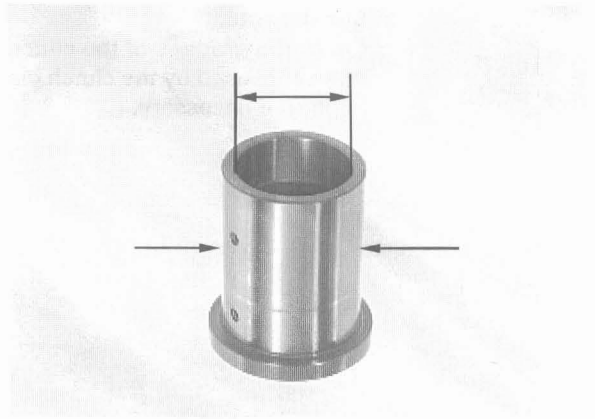
## CLUTCH/GEARSHIFT LINKAGE

Measure the O.D. and I.D. of the clutch outer guide.

**SERVICE LIMITS:**

**O.D.:** 34.965 mm (1.3766 in)

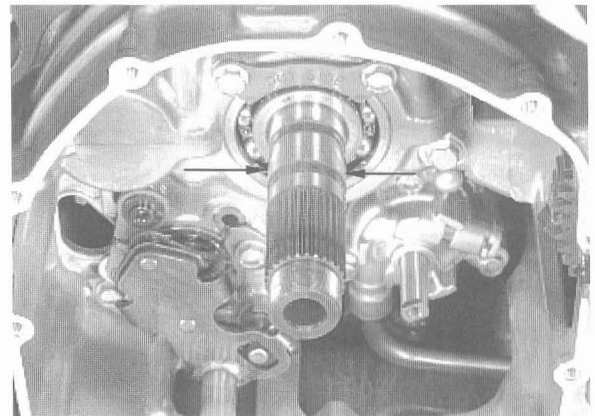
**I.D.:** 28.031 mm (1.1036 in)



**Mainshaft**

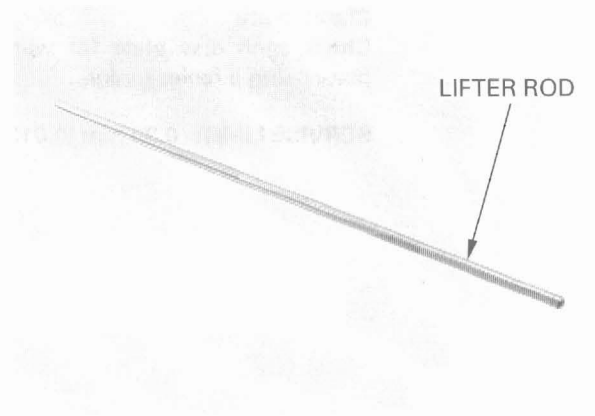
Measure the mainshaft O.D. at clutch outer guide sliding surface.

**SERVICE LIMIT:** 27.970 mm (1.1012 in)



**Clutch lifter rod**

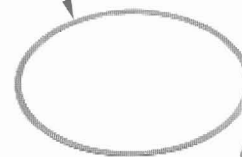
Check the clutch lifter rod for wear and trueness.



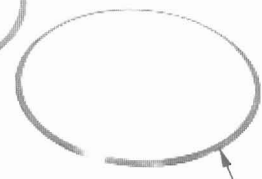
**Judder spring/spring seat**

Check the spring and seat for damage or warpage.

SPRING SEAT



JUDDER SPRING

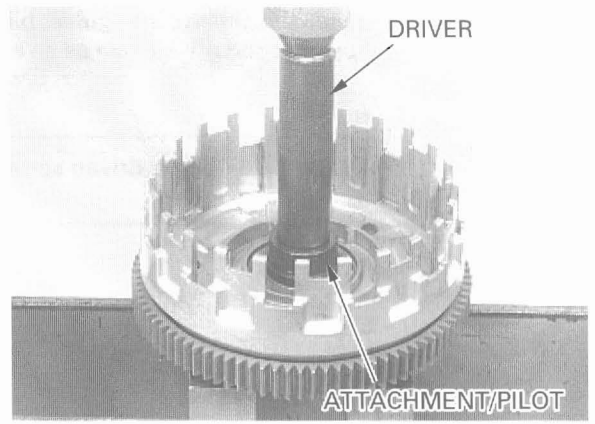


**CLUTCH OUTER NEEDLE BEARING REPLACEMENT**

Press the needle bearing out of the clutch outer using the special tools as shown.

**TOOLS:**

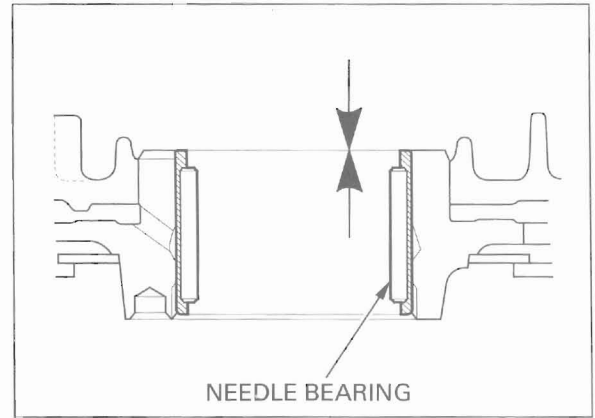
- Driver** 07749-0010000
- Attachment, 37 × 40 mm** 07746-0010200
- Pilot, 35 mm** 07746-0040800



Press a new needle bearing into the clutch outer so that the casing of the needle bearing is flush with the clutch outer surface using the special tools as shown.

**NOTE:**

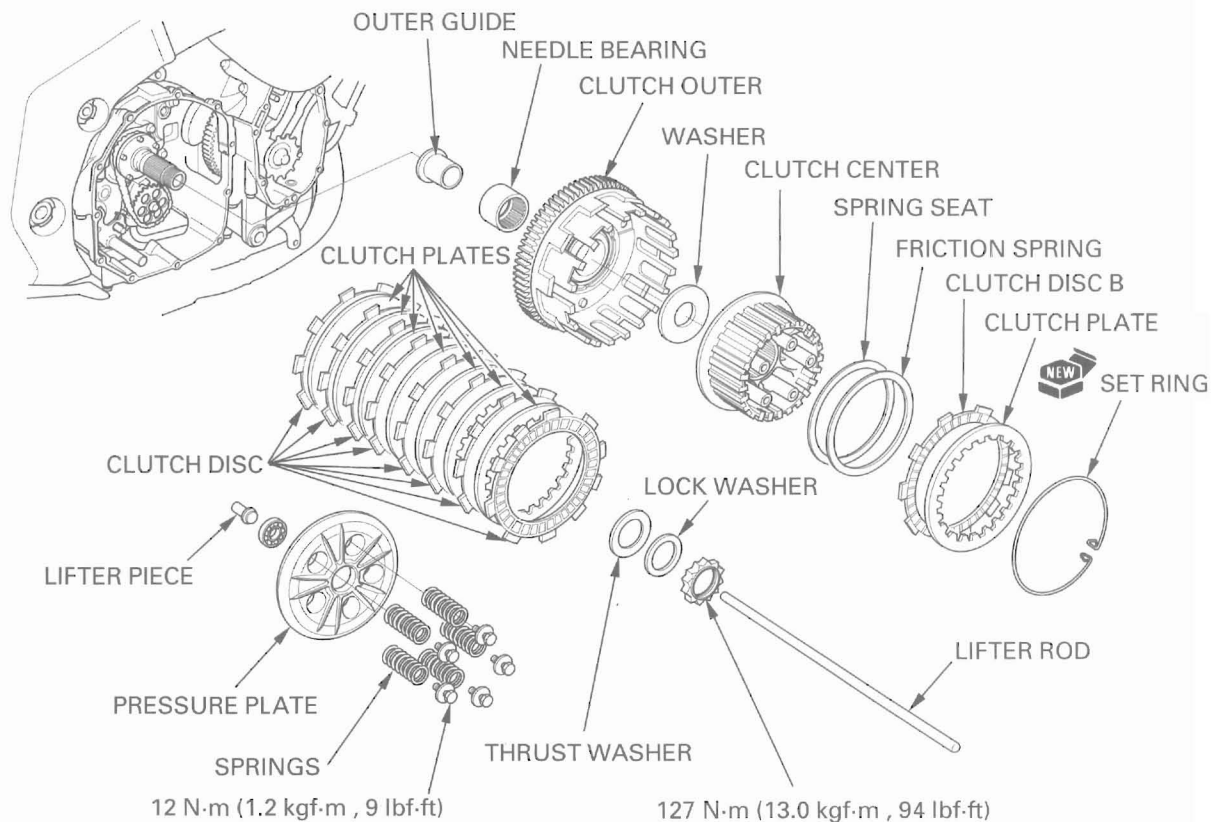
Press the needle bearing into the clutch outer with the marked side facing up.



**TOOLS:**

- Driver** 07749-0010000
- Attachment, 42 × 47 mm** 07746-0010300
- Pilot, 35 mm** 07746-0040800

**INSTALLATION**



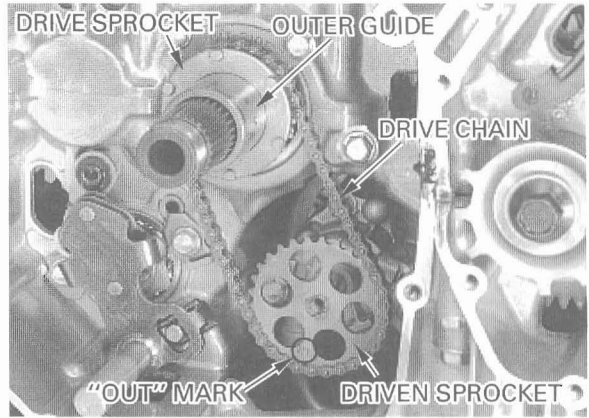


## CLUTCH/GEARSHIFT LINKAGE

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

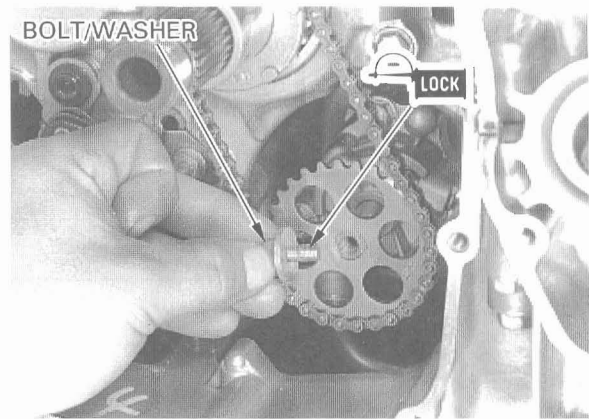
**NOTE:**

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



Apply a locking agent to the threads of the oil pump driven sprocket bolt/washer. Tighten the driven sprocket bolt/washer to the specified torque.

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

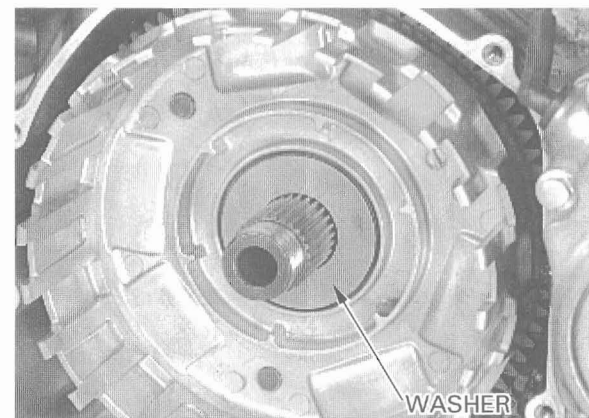


Align the primary drive gear and sub-gear teeth with a screwdriver as shown.

Install the clutch outer.



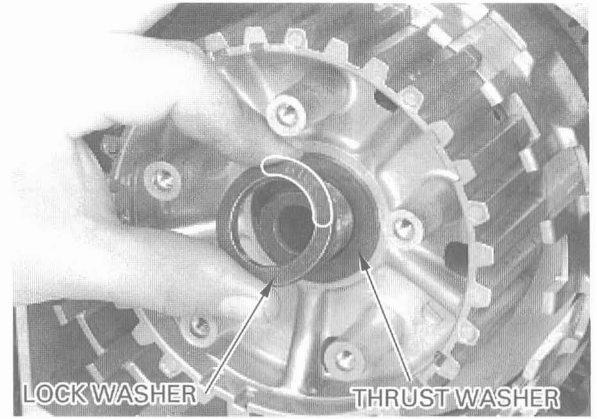
Install the washer onto the clutch outer.





Install the clutch center.

Install the thrust washer.  
Install the lock washer with its "OUTSIDE" mark facing out.



Install the new lock nut.

Hold the clutch center with the clutch center holder, then tighten the lock nut to the specified torque using the tool as shown.

**TOOL:**  
**Clutch center holder** 07724-0050002  
(Equivalent commercially available in U.S.A.)

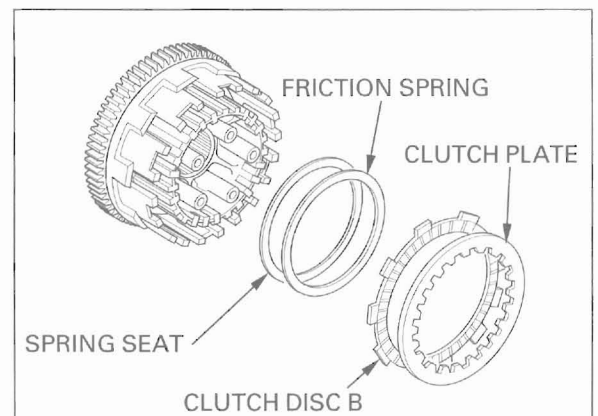
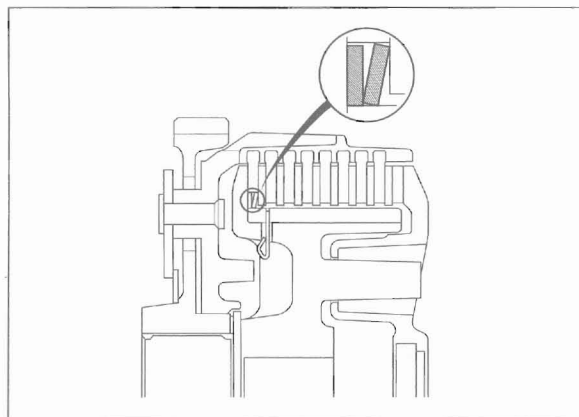
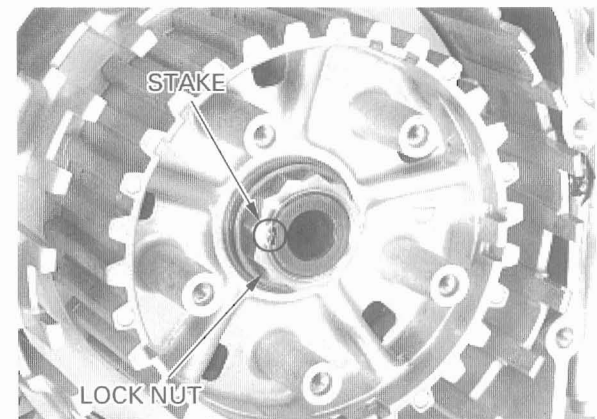
**TORQUE:** 127 N·m (13.0 kgf·m , 94 lbf·ft)



Stake lock nut into the mainshaft groove with a punch.

Coat the clutch discs and plates with clean engine oil.

Install the spring seat and judder spring onto the clutch center as shown.  
Install the clutch disc B (larger I.D. disc) into the clutch outer.  
Install the clutch plate.



## CLUTCH/GEARSHIFT LINKAGE

Secure the clutch plate using a new set ring.

**NOTE:**

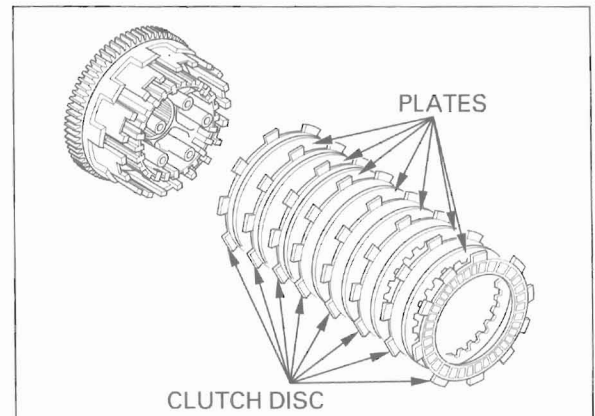
Always replace the set ring with a new one whenever it is removed.



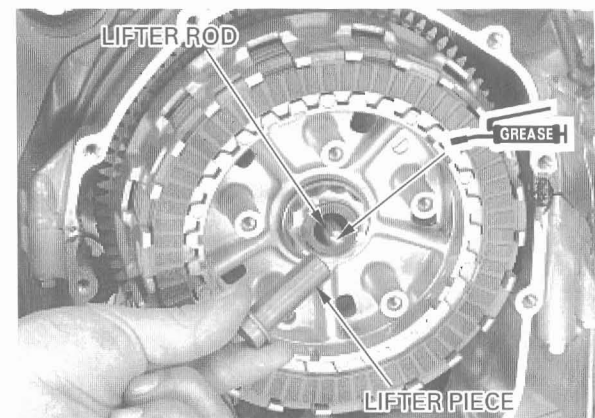
Stack the clutch discs and plates alternately.

**NOTE:**

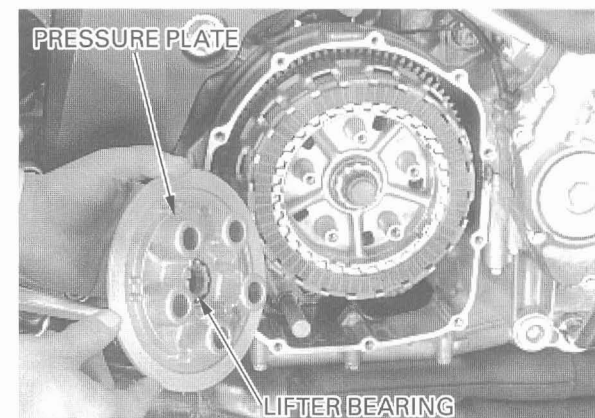
Install the outer clutch disc in the shallow slot on the clutch outer.



Install the clutch lifter rod into the mainshaft. Apply grease to the tip of the lifter rod and install clutch lifter piece into the mainshaft.



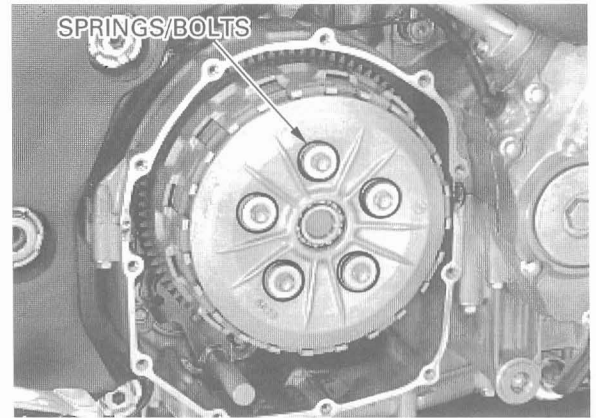
Install the lifter bearing into the pressure plate. Install the pressure plate.



Install the clutch springs and spring bolts. Tighten the bolts in a crisscross pattern in 2 – 3 steps to the specified torque.

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

Install the right crankcase cover (page 9-26).



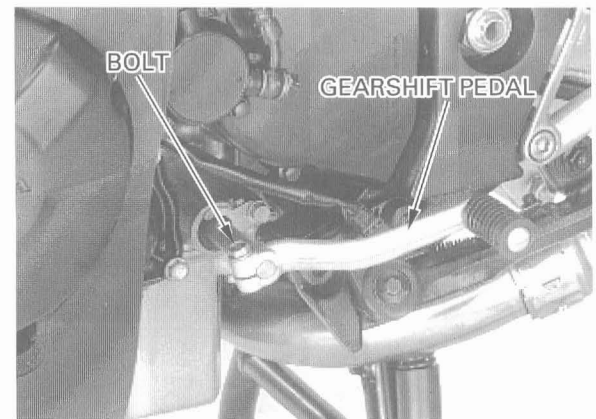
## GEARSHIFT LINKAGE

### GEARSHIFT LINKAGE REMOVAL

Remove the following:

- Right crankcase cover (page 9-11)
- Clutch assembly (page 9-12)

Remove the bolt and gearshift pedal.



Pull the gearshift spindle assembly and thrust washer out of the crankcase.



Remove the following:

- Stopper arm socket bolt
- Stopper arm
- Return spring
- Washer
- Socket bolt
- Gearshift cam
- Dowel pin



## CLUTCH/GEARSHIFT LINKAGE

### GEARSHIFT LINKAGE INSPECTION

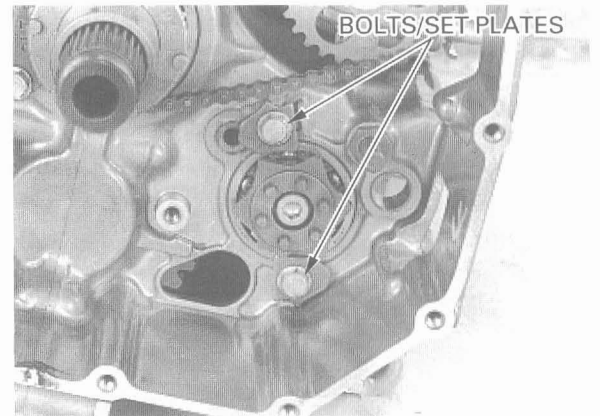
Check the gearshift spindle for wear, damage or bending.  
Check the return spring for fatigue or damage.



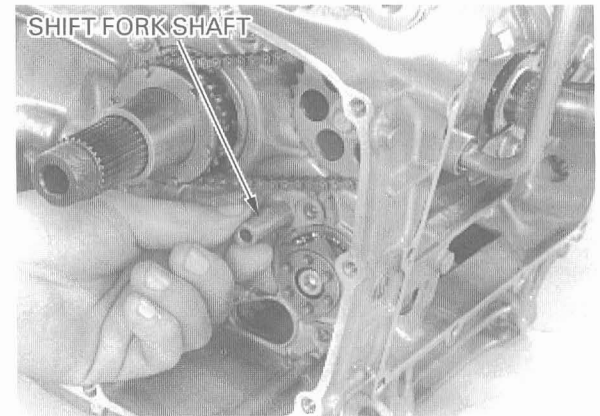
### SHIFT DRUM/SHIFT FORK REMOVAL

Remove the following:  
— Gearshift linkage (page 9-21)  
— Oil pan (page 4-4)

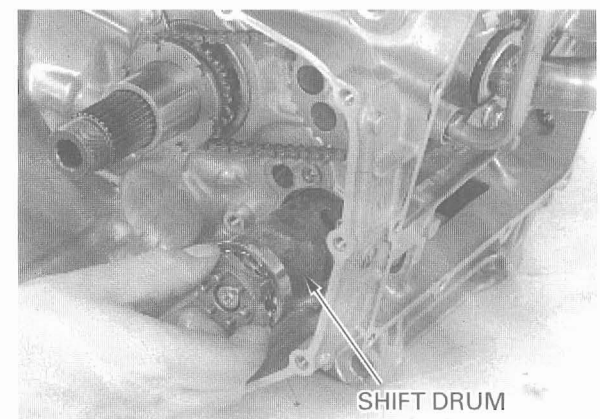
Remove the bolts and shift drum bearing set plates.



Remove the shift fork shaft and shift forks.



Remove the shift drum bearing and shift drum.



**SHIFT DRUM/SHIFT FORK INSPECTION**

Check the shift fork and fork shaft for wear or damage.

Measure the I.D. of the shift fork.

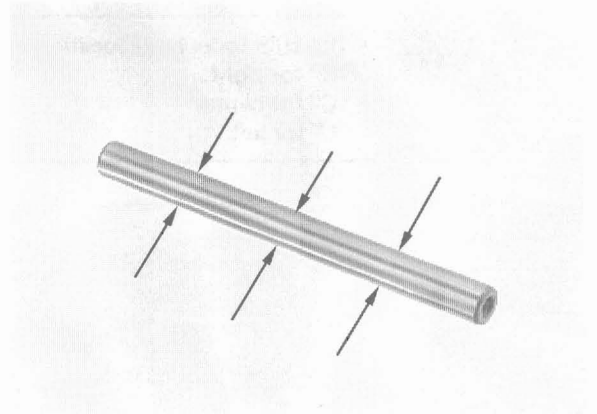
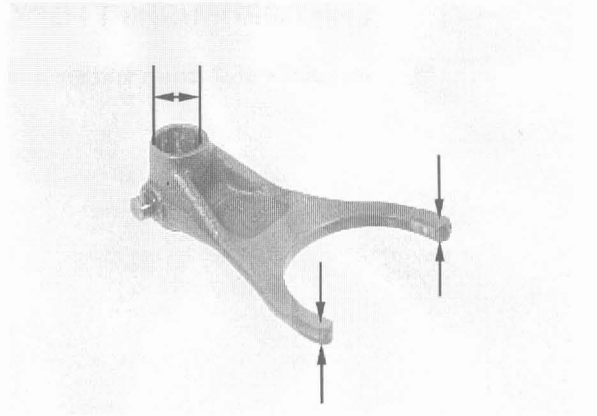
**SERVICE LIMIT:** 12.03 mm (0.474 in)

Measure the shift fork claw thickness.

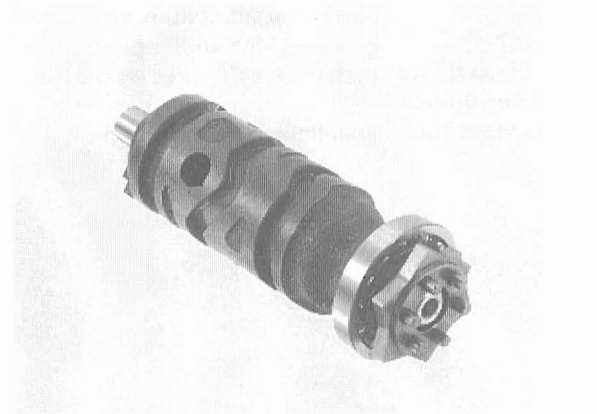
**SERVICE LIMIT:** 5.9 mm (0.23 in)

Measure the O.D. of the shift fork shaft.

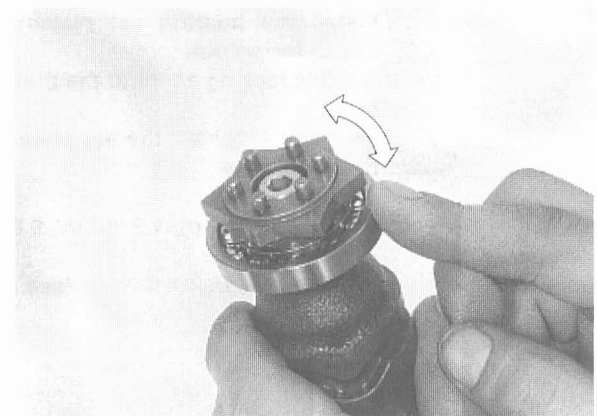
**SERVICE LIMIT:** 11.95 mm (0.470 in)



Inspect the shift drum grooves for wear or damage.

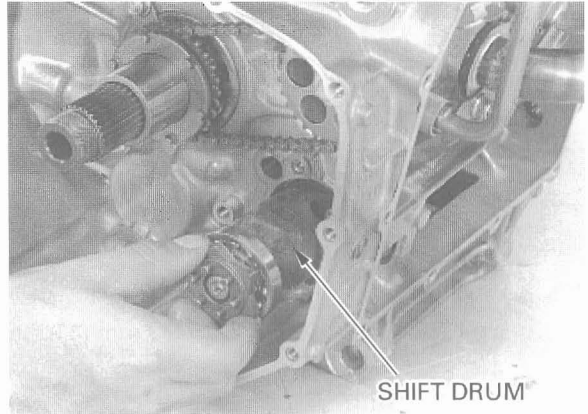


Turn the outer race of the shift drum bearing with your finger.  
The bearing should turn smoothly and freely without excessive play.  
If necessary replace the bearing.



## SHIFT DRUM/SHIFT FORK INSTALLATION

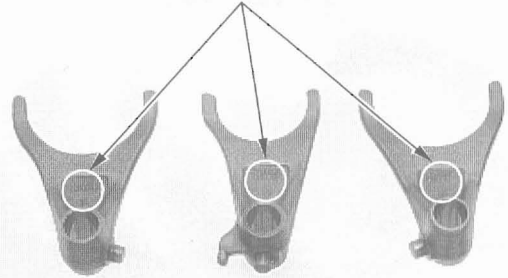
Install the shift drum and shift drum bearing.



### NOTE:

- The shift forks have location marks.  
"R" for right  
"C" for center  
"L" for left

### IDENTIFICATION MARKS

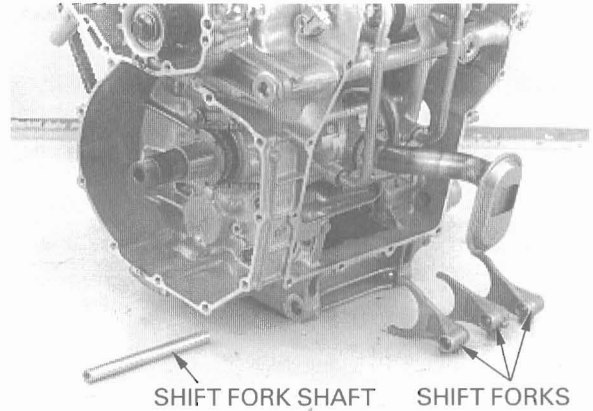


*Face the shift fork identification marks to the right.*

Apply molybdenum disulfide oil to shifter fork groove of the shifter gears.

Install the shift forks on the transmission.

Install the shift fork shaft.



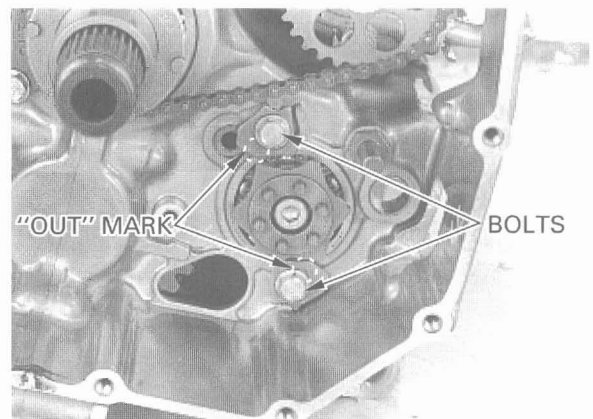
Install the bearing set plates with their "OUT" marks facing out.

Apply a locking agent to the threads of the set plate bolts.

Install and tighten the set plate bolts to the specified torque.

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

Install the gearshift linkage (see next page).



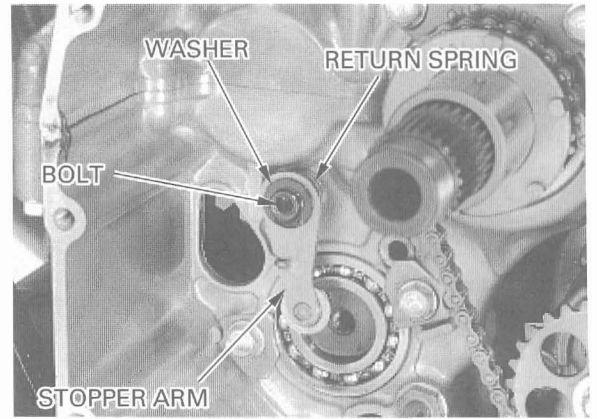


**GEARSHIFT LINKAGE INSTALLATION**

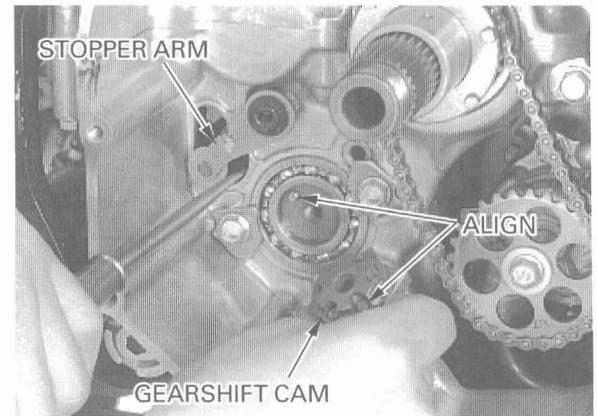
Install the following:

- Washer
- Return spring
- Stopper arm

Tighten the stopper arm socket bolt.

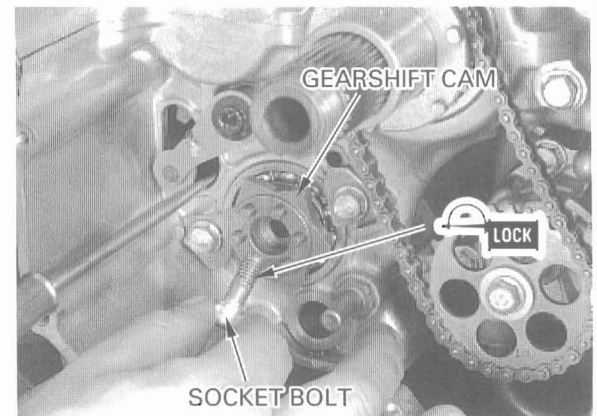


Install the dowel pin onto the shift drum.  
Install the gearshift cam while holding the stopper arm using a screwdriver as shown.

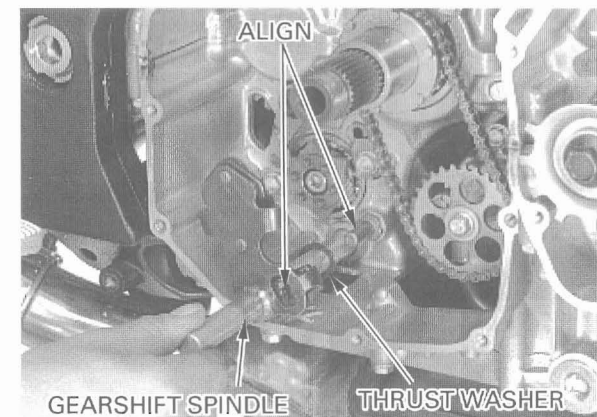


Apply a locking agent to the gearshift cam socket bolt threads.  
Install and tighten the socket bolt to the specified torque.

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



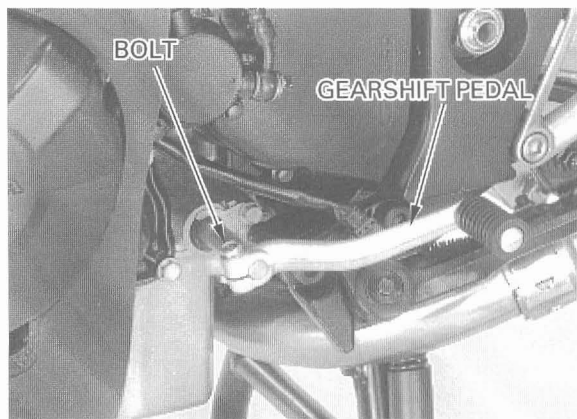
Install the thrust washer and gearshift spindle assembly into the crankcase while aligning the spring ends with the crankcase stopper pin.



## CLUTCH/GEARSHIFT LINKAGE

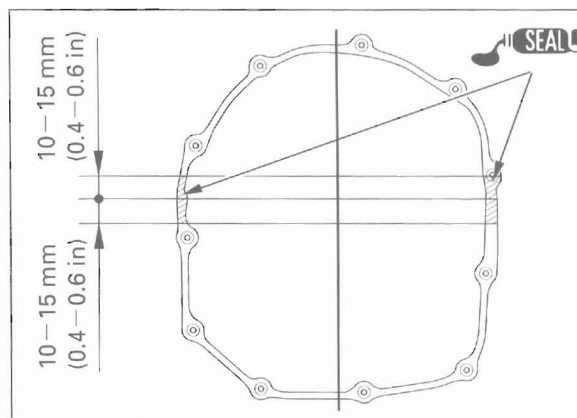
Install the gearshift pedal aligning its slit with the punch mark on the gearshift spindle.  
Install and tighten the pinch bolt to the specified torque.

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



## RIGHT CRANKCASE COVER INSTALLATION

Apply a sealant to the mating surfaces of the crankcase as shown.



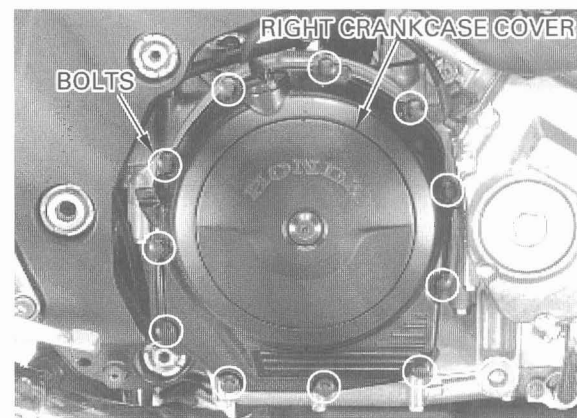
Install a new gasket onto the right crankcase cover.



Install the right crankcase cover.  
Install and tighten the eleven right crankcase cover SH bolts to the specified torque.

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

Pour the recommended engine oil (page 3-13).



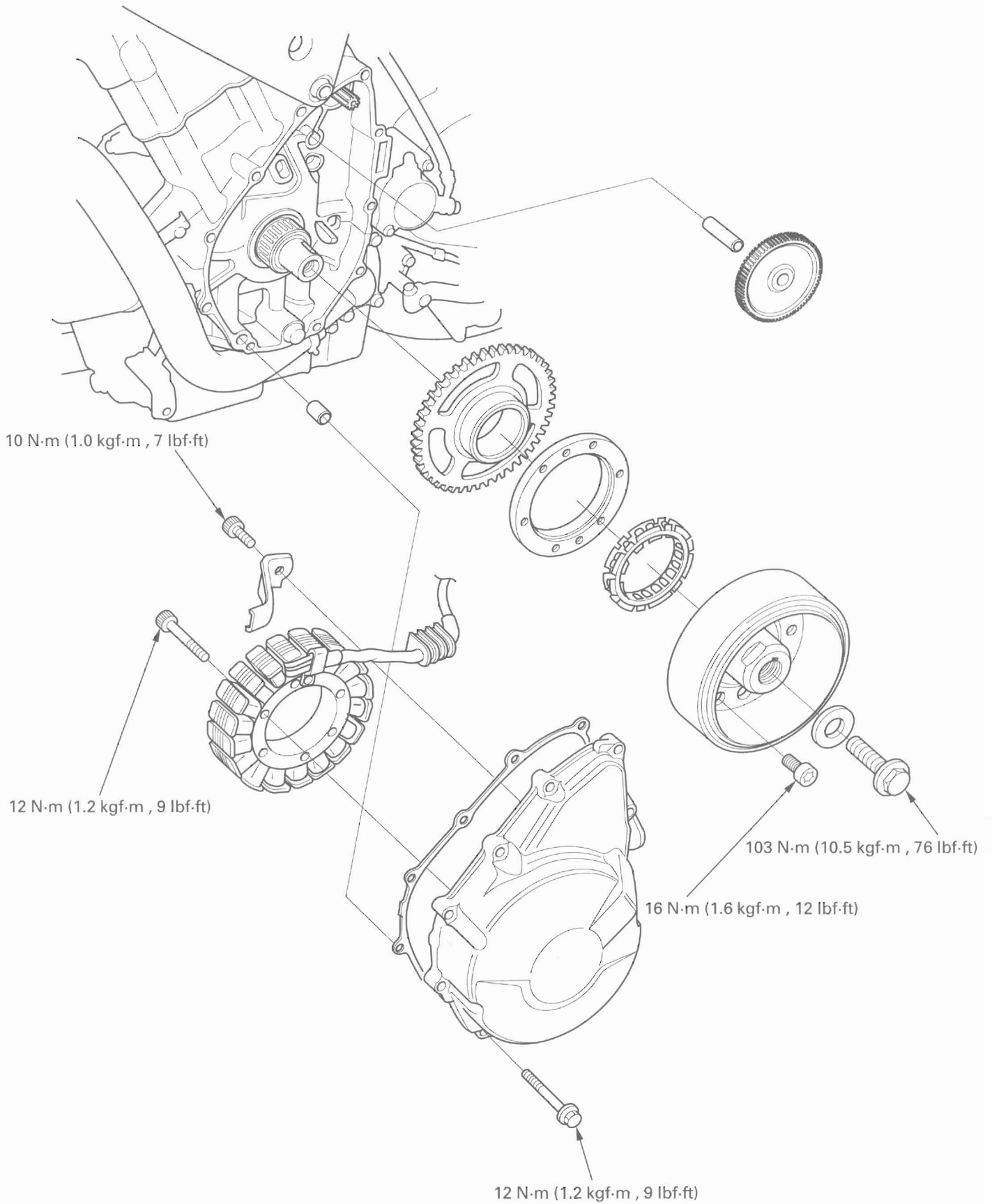


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MEMO



# ALTERNATOR/STARTER CLUTCH



# 10. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION	10-1	FLYWHEEL REMOVAL	10-3
TROUBLESHOOTING	10-1	STARTER CLUTCH	10-5
ALTERNATOR COVER REMOVAL	10-2	FLYWHEEL INSTALLATION	10-7
STATOR	10-2	ALTERNATOR COVER INSTALLATION	10-8

## SERVICE INFORMATION

### GENERAL

- This section covers service of the alternator, flywheel and starter clutch. All service can be done with the engine installed in the frame.
- Refer to section 16 for alternator stator inspection.

### SPECIFICATIONS

Unit: mm (in)

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

10

### TORQUE VALUES

Alternator cover SH bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Flywheel flange bolt	103 N·m (10.5 kgf·m , 76 lbf·ft)	Apply oil to the threads
Stator mounting socket bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Alternator wire holder socket bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Starter one-way clutch socket bolt	16 N·m (1.6 kgf·m , 12 lbf·ft)	Apply a locking agent to the threads

### TOOLS

Flywheel holder	07725 – 0040000	Equivalent commercially available
Rotor puller	07733 – 0020001	or 07933-3950000

## TROUBLESHOOTING

### Engine does not turn

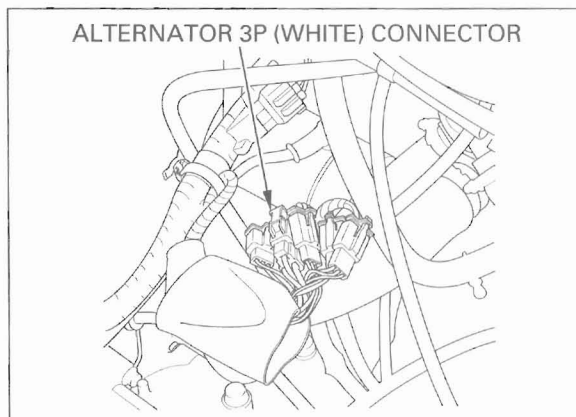
- Faulty starter clutch
- Damaged idle gear/shaft

### ALTERNATOR COVER REMOVAL

Remove the following:

- Fuel tank (page 2-2)
- Lower cowl (page 2-7)

Disconnect the alternator 3P (White) connector.



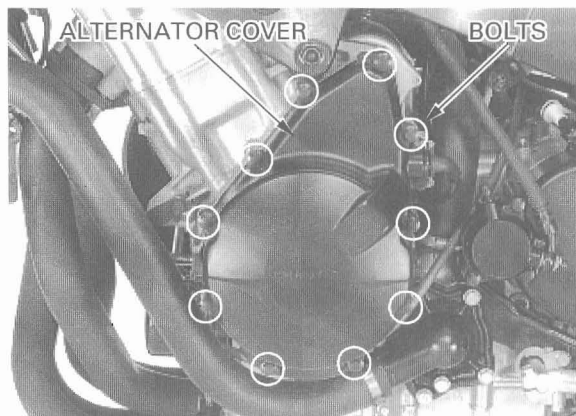
Remove the alternator cover SH bolts and alternator cover.

#### CAUTION:

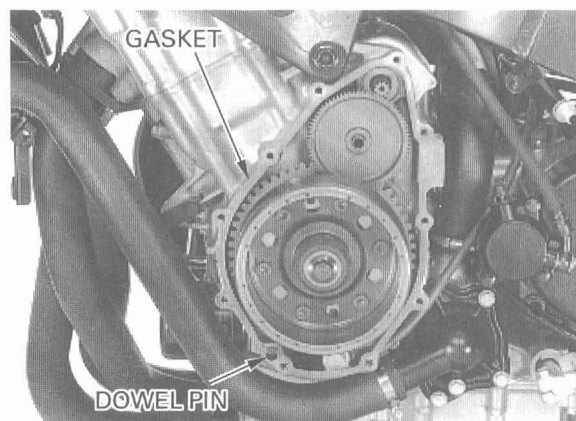
*The alternator cover (stator) is magnetically attached to the flywheel, be careful during removal.*

#### NOTE:

The engine oil will run out when the alternator cover is removed. Set a clean oil pan under the engine and add the recommended oil to the specified level after installation.



Remove the gasket and dowel pin.



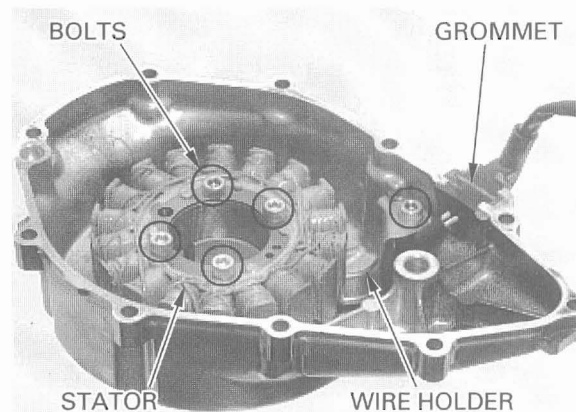
### STATOR

#### REMOVAL

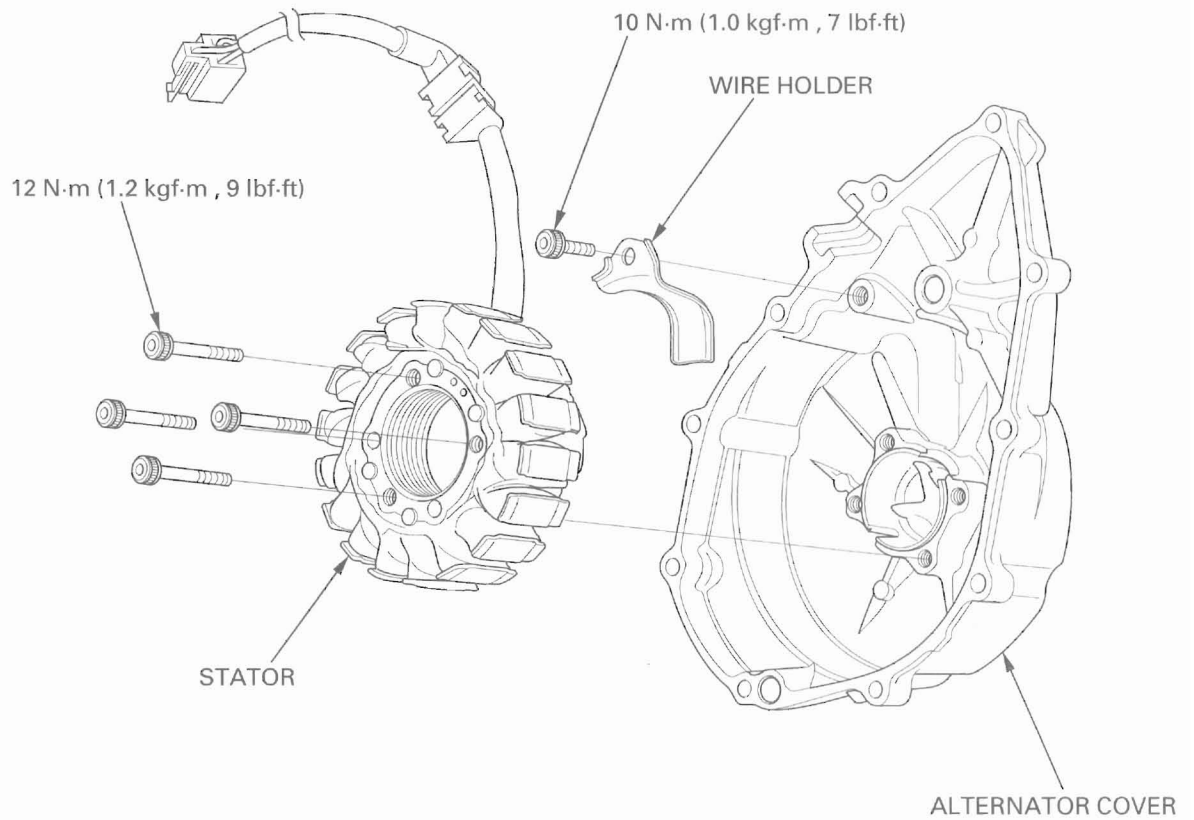
Remove the alternator wire grommet from the alternator cover.

Remove the socket bolt and stator wire holder.

Remove the socket bolts and stator.



INSTALLATION



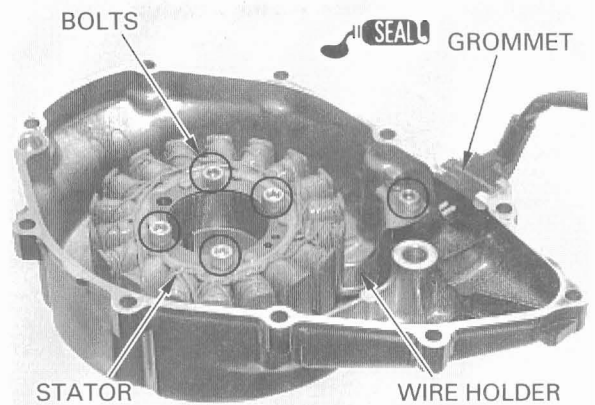
Install the stator into the alternator cover.

Apply sealant to the wire grommet, then install the wire grommet into the alternator groove securely. Install and tighten the socket bolts to the specified torque.

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

Install the wire holder and tighten the socket bolt to the specified torque.

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



FLYWHEEL REMOVAL

Remove the alternator cover (page 10-2).

Remove the starter idle gear shaft and idle gear.



## ALTERNATOR/STARTER CLUTCH

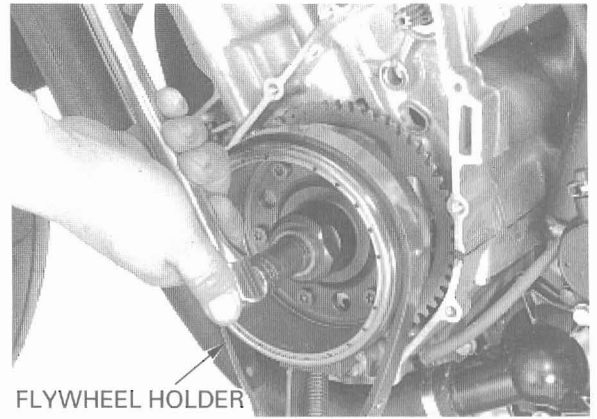
Hold the flywheel using the tool, then remove the flywheel bolt.

**TOOL:**

**Flywheel holder**

07725-0040000  
(Equivalent commercially available in U.S.A.)

Remove the washer.

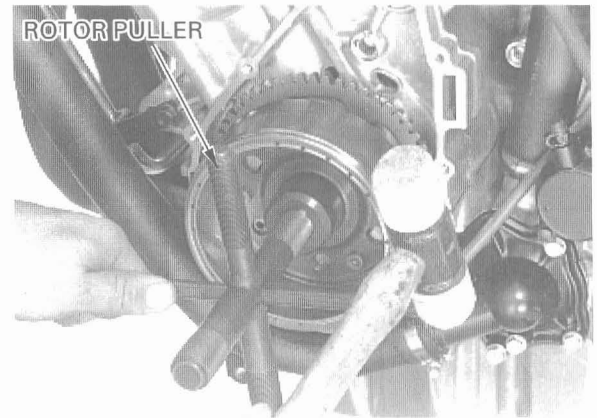


Remove the flywheel using the special tool as shown.

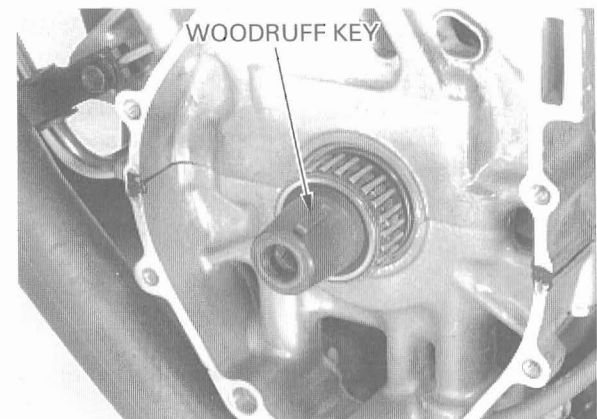
**TOOL:**

**Rotor puller**

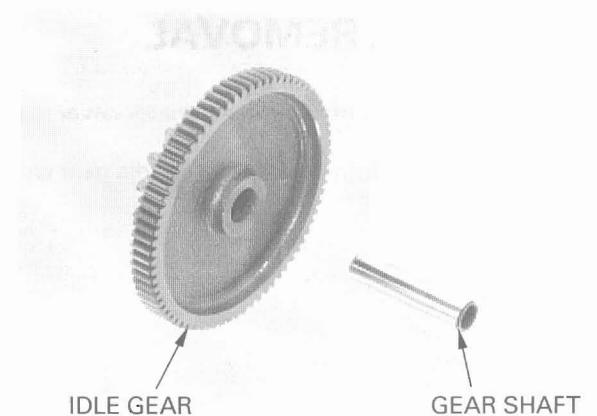
07733-0020001 or  
07933-3950000



Remove the woodruff key.



Check the starter idle gear and shaft for wear or damage.



## STARTER CLUTCH

### INSPECTION

Check the operation of the one-way clutch by turning the driven gear. You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.

### DISASSEMBLY

Remove the starter driven gear by turning it counterclockwise.

Hold the flywheel with a flywheel holder, and remove the starter clutch mounting torx bolts.

#### TOOL:

**Flywheel holder**

07725-004000  
(Equivalent commercially available in U.S.A.)

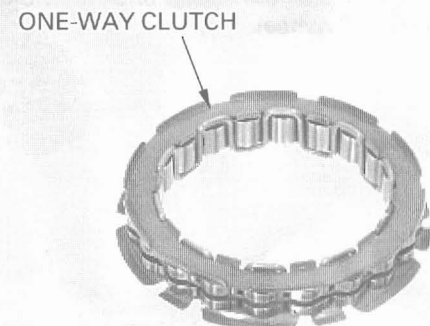
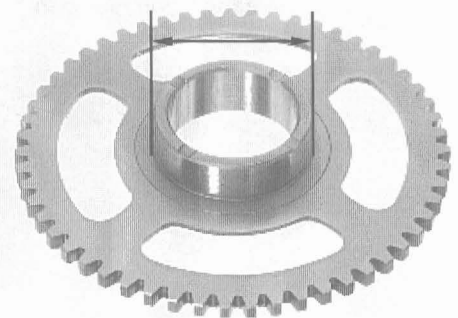
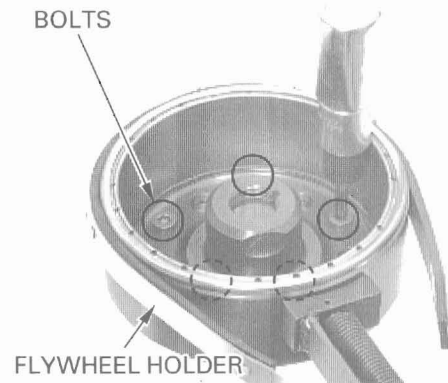
Remove the starter one-way clutch assembly.

Check the starter driven gear for abnormal wear or damage.

Measure the starter driven gear boss O.D.

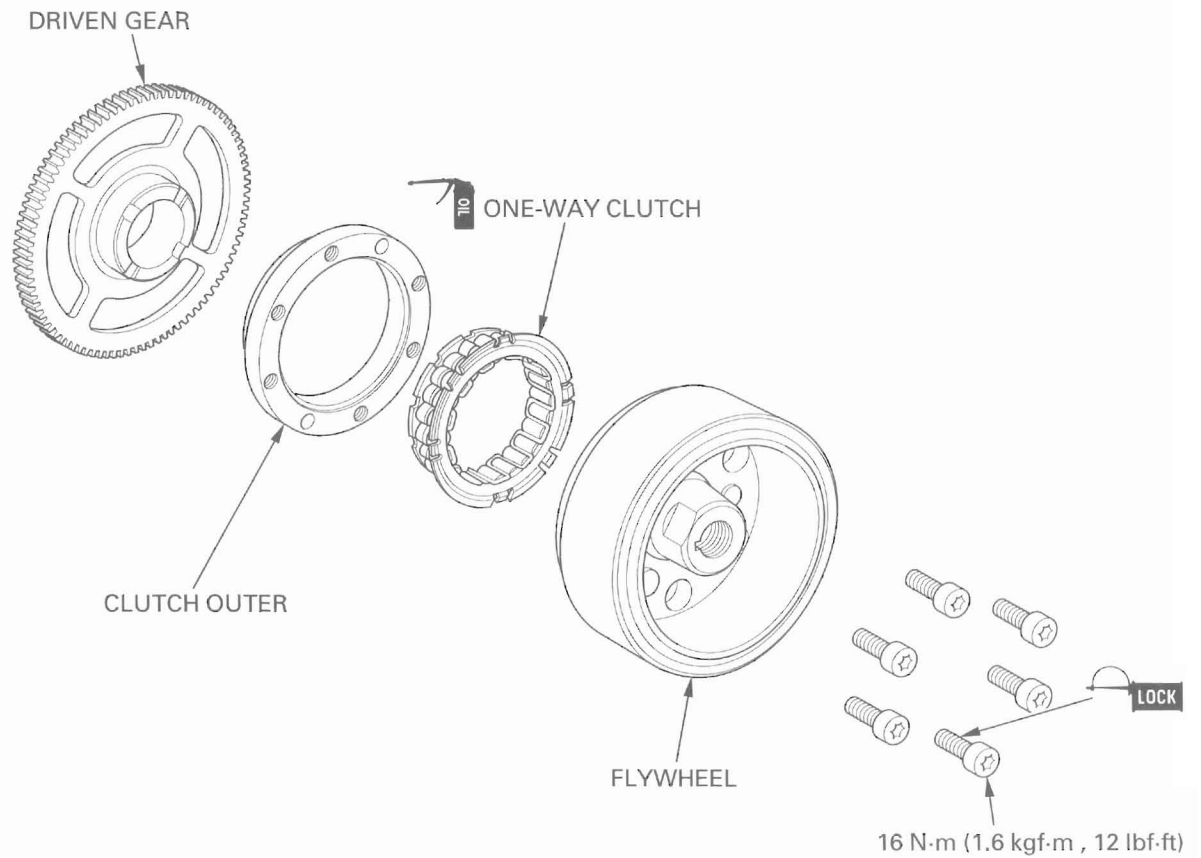
**SERVICE LIMIT:** 51.684 mm (2.0348 in)

Check the one-way clutch for wear or damage and replace if necessary.



# ALTERNATOR/STARTER CLUTCH

## ASSEMBLY



Apply oil to the starter one-way clutch.  
Install the one-way clutch into the clutch outer with the flange side facing in.



Install the starter one-way clutch assembly onto the flywheel.

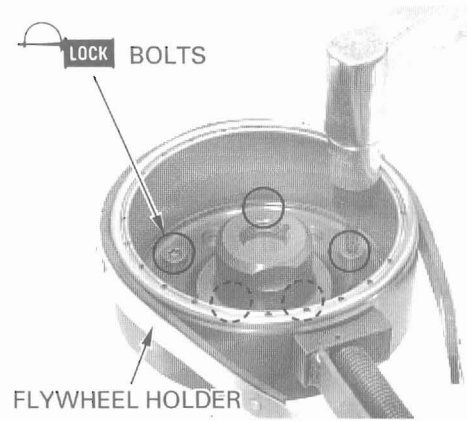




Apply a locking agent to the starter clutch outer mounting bolt threads.  
Hold the flywheel with a flywheel holder, and tighten the starter clutch mounting torx bolts.

**TOOL:**  
**Flywheel holder** 07725-0040000  
(Equivalent commercially available in U.S.A.)

**TORQUE:** 16 N·m (1.6 kgf·m , 12 lbf·ft)



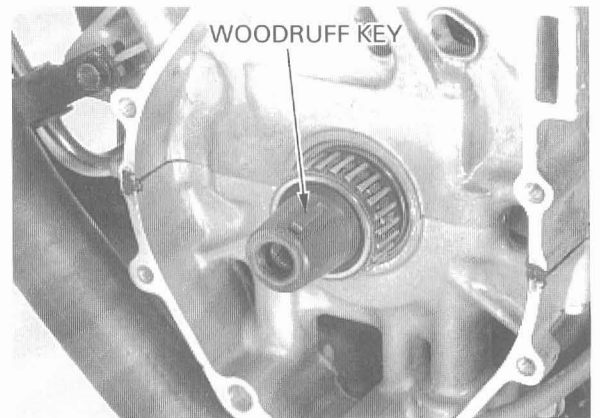
Install the starter driven gear into the one-way clutch.

Recheck the one-way clutch operation. You should be able to turn the driven gear counter-clockwise smoothly, but the gear should not turn clockwise.



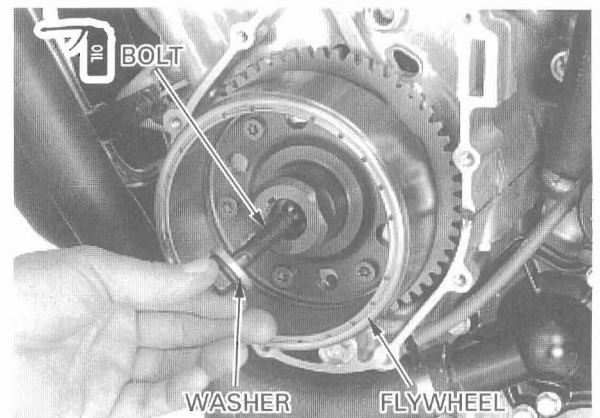
**FLYWHEEL INSTALLATION**

Clean any oil off from the crankshaft taper. Install the woodruff key on the crankshaft.



Install the flywheel aligning the key way in the flywheel with the woodruff key on the crankshaft.

Apply oil to the flywheel bolt threads and seating surface. Install the washer and flywheel bolt.

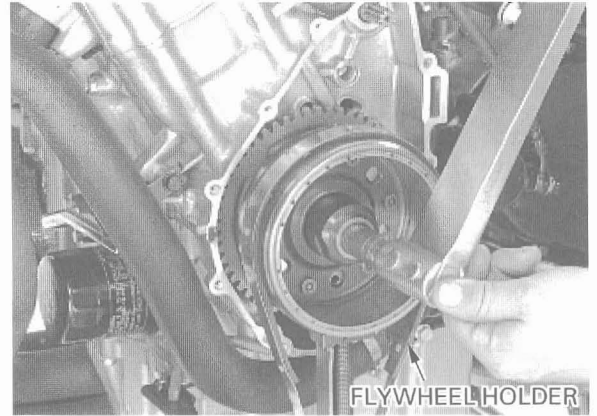


## ALTERNATOR/STARTER CLUTCH

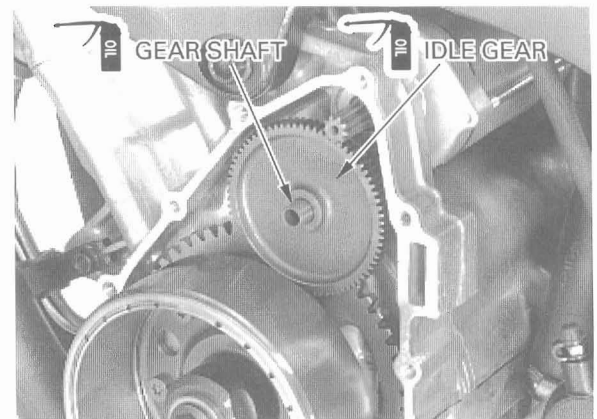
Hold the flywheel using the flywheel holder, then tighten the bolt to the specified torque.

**TOOL:**  
**Flywheel holder** 07725-0040000  
(Equivalent commercially available in U.S.A.)

**TORQUE:** 103 N·m (10.5 kgf·m , 76 lbf·ft)

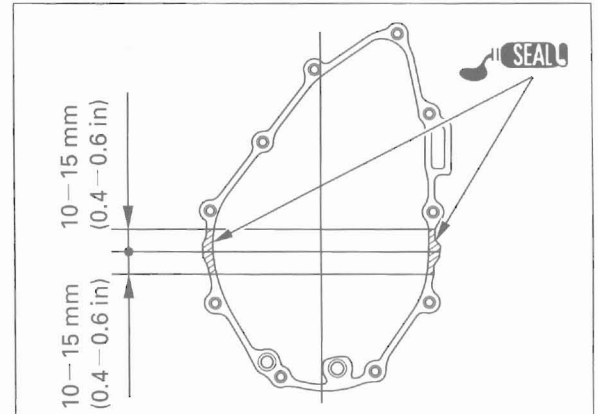


Apply oil to the starter idle gear and gear shaft, and install them.

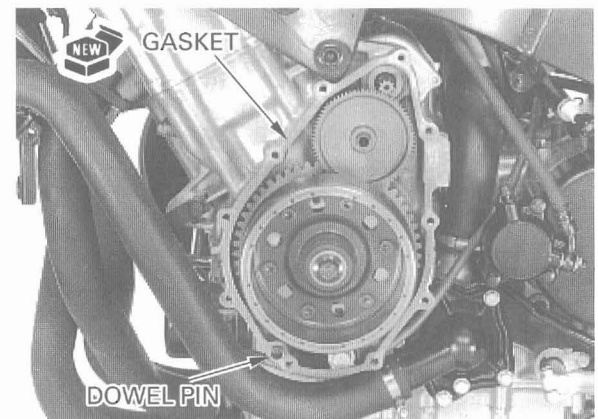


## ALTERNATOR COVER INSTALLATION

Apply sealant to the mating surface of the crankcase as shown.



Install the dowel pin and new gasket.



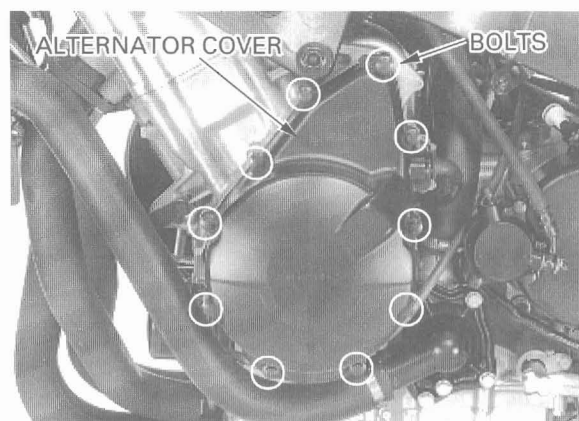
Install the alternator cover.

**CAUTION:**

*The alternator cover (stator) is magnetically attached to the flywheel, be careful during installation.*

Install and tighten the SH bolts to the specified torque.

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

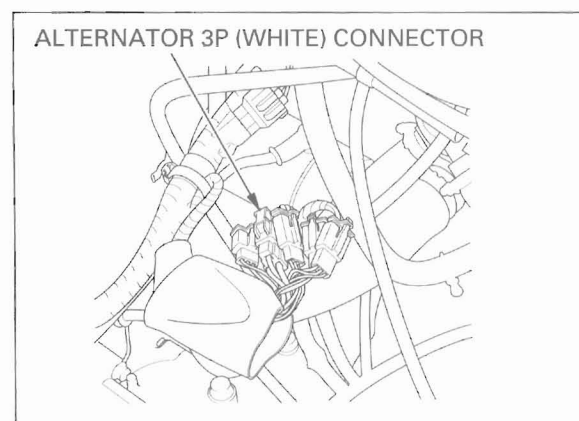


Connect the alternator 3P (White) connector.

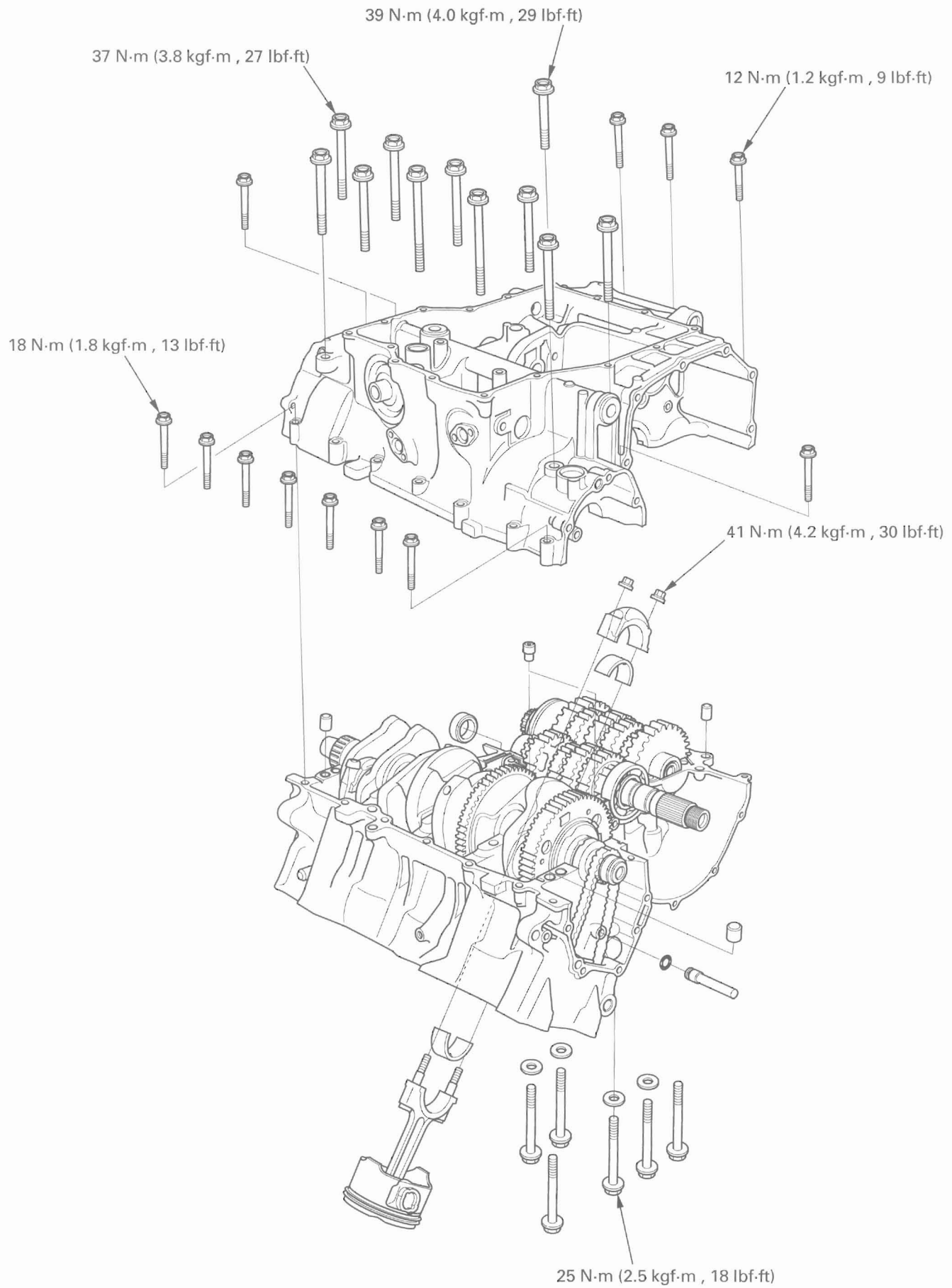
Add the recommended oil up to proper level (page 3-13).

Install the following:

- Fuel tank (page 2-2)
- Lower cowl (page 2-8)



# CRANKCASE/PISTON/CYLINDER



# 11. CRANKCASE/PISTON/CYLINDER

SERVICE INFORMATION	11-1	PISTON/CONNECTING ROD	11-4
TROUBLESHOOTING	11-2	CRANKCASE COMBINATION	11-12
CRANKCASE SEPARATION	11-3		

## SERVICE INFORMATION

### GENERAL

- This section covers crankcase separation for service of the crankshaft and piston.
- The following parts must be removed before separating the crankcase.
  - Alternator/flywheel (Section 10)
  - Clutch/gearshift linkage (Section 9)
  - Cylinder head (Section 8)
  - Engine (Section 7)
  - Oil pump (Section 4)
- Mark and store the disassemble parts to ensure that they are installed in their original locations.
- Mark and store the bearing inserts to be sure of their correct locations for reassembly. If the inserts are improperly installed, they will block the oil hole, causing insufficient lubrication and eventual engine seizure.
- The connecting rod bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After installing new bearings, recheck them with plastigauge to verify clearance. Apply molybdenum disulfide oil to the crank pin during assembly.

### SPECIFICATIONS

Unit: mm (in)

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

## CRANKCASE/PISTON/CYLINDER

### TORQUE VALUES

Crankcase bolt, 10 mm	39 N·m (4.0 kgf·m , 29 lbf·ft)	
9 mm	37 N·m (3.8 kgf·m , 27 lbf·ft)	Apply oil to the threads
8 mm	25 N·m (2.5 kgf·m , 18 lbf·ft)	
7 mm	18 N·m (1.8 kgf·m , 13 lbf·ft)	
6 mm	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Connecting rod nut	41 N·m (4.2 kgf·m , 30 lbf·ft)	Apply oil to the threads
Lower crankcase flange bolt	29 N·m (3.0 kgf·m , 22 lbf·ft)	Apply a locking agent to the threads
Lower crankcase sealing bolt, 20 mm	29 N·m (3.0 kgf·m , 22 lbf·ft)	Apply a locking agent to the threads
8 mm	22 N·m (2.2 kgf·m , 16 lbf·ft)	Apply a locking agent to the threads

### TROUBLESHOOTING

#### Cylinder compression is too low, or engine is hard to start

- Blown cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder or piston
- Bent valve, or bent and deteriorated valve seat

#### Cylinder compression is too high, or engine overheats or knocks

- Carbon deposits on the cylinder head and/or piston crown

#### Piston sounds

- Worn cylinder, piston and/or piston ring
- Worn piston pin hole and piston pin
- Worn connecting rod small end

#### Excessive smoke

- Worn, stuck or broken piston ring
- Worn valve stem seal

#### Excessive noise

- Worn connecting rod big end bearing
- Bent connecting rod
- Worn crankshaft main journal bearing
- Worn transmission bearing

#### Engine vibration

- Excessive crankshaft runout

## CRANKCASE SEPARATION

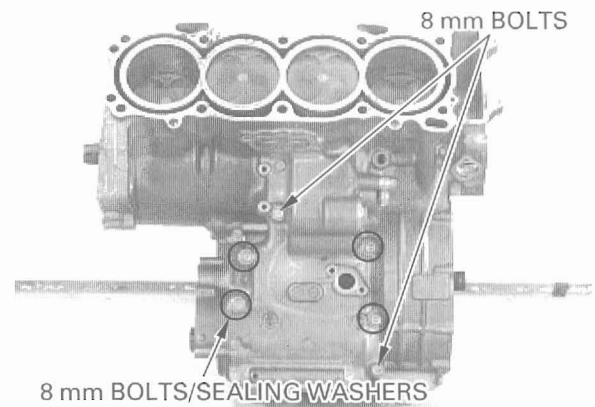
**NOTE:**

Refer to Service Information (page 11-1) for removal of necessary parts before separating the crankcase.

Remove the sealing plug and O-ring.

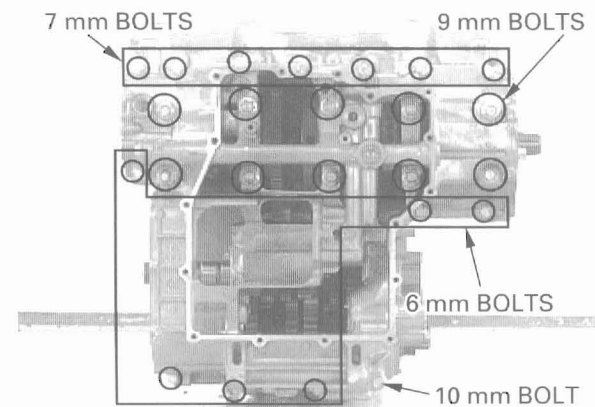


Remove the upper crankcase 8 mm bolts/sealing washers.

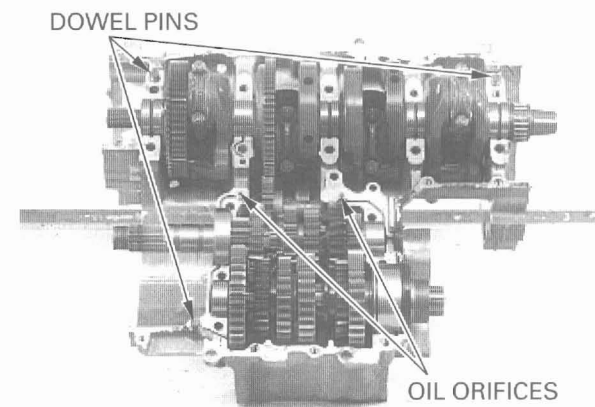


Remove the lower crankcase 6 mm bolts (six), 7 mm bolts (seven) and 10 mm bolt. Loosen the ten lower crankcase 9 mm bolts in a crisscross pattern in 2–3 steps, then remove the bolts and sealing washers.

Separate the lower crankcase from the upper crankcase.



Remove the dowel pins and oil orifices.



## PISTON/CONNECTING ROD

### PISTON/CONNECTING ROD REMOVAL

**CAUTION:**

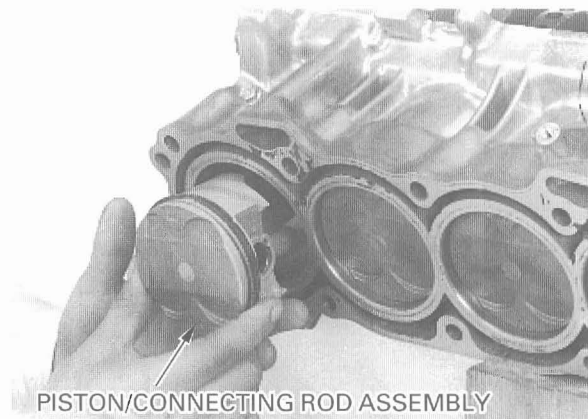
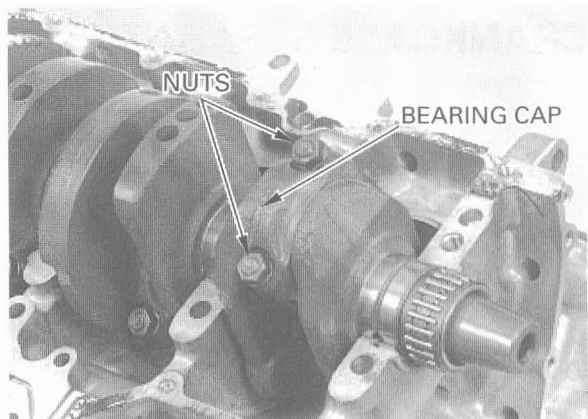
*Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.*

**NOTE:**

Mark all parts during removal so they can be replaced in their original locations.

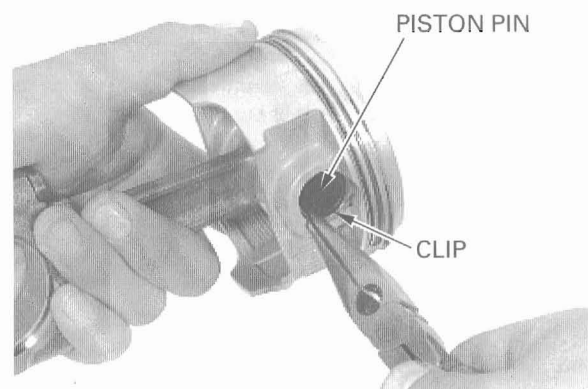
Remove the nuts and connecting rod bearing cap.

Remove the piston/connecting rod assembly from the top of the cylinder.



### PISTON REMOVAL

Remove the piston pin clip with pliers. Press the piston pin out of the piston and remove the piston from the connecting rod.

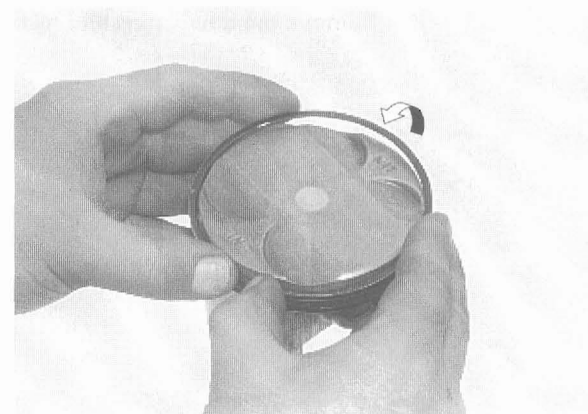


### PISTON DISASSEMBLY

Remove the piston rings.

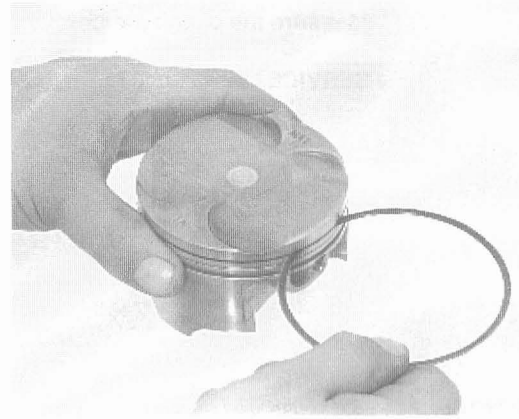
**NOTE:**

Do not damage the piston rings during removal.





Remove any carbon deposits from the piston ring grooves, using an old piston ring as shown.



**PISTON INSPECTION**

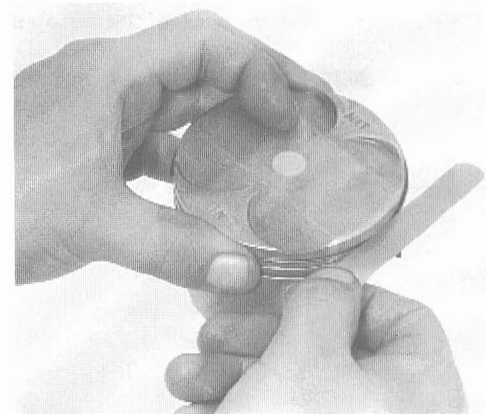
Temporarily install the piston rings to their proper position with the mark facing up.

Measure the piston ring-to-ring groove clearance with the rings pushed into the grooves.

**SERVICE LIMITS:**

- Top:** 0.08 mm (0.003 in)
- Second:** 0.06 mm (0.002 in)

Inspect the piston for wear or damage.



Insert the piston ring squarely into the bottom of the cylinder and measure the ring end gap.

**NOTE:**

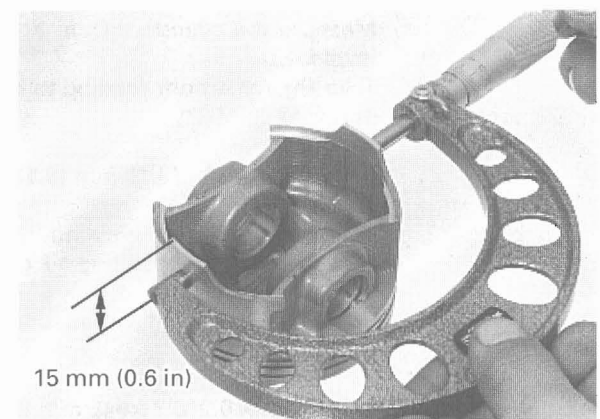
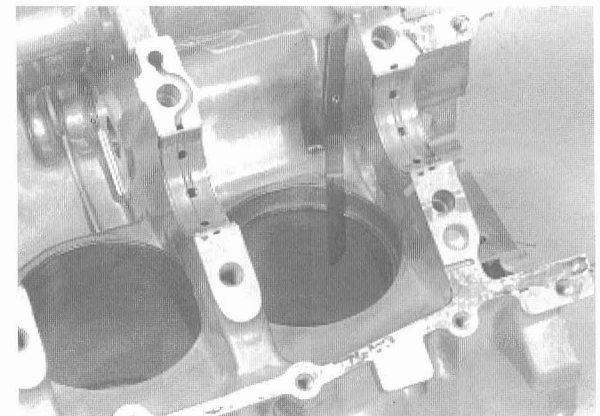
Push the rings into the cylinder with the top of the piston to be sure they are squarely in the cylinder.

**SERVICE LIMITS:**

- Top:** 0.5 mm (0.02 in)
- Second:** 0.7 mm (0.03 in)
- Oil (side rail):** 1.0 mm (0.04 in)

Measure the diameter of the piston at 15 mm (0.6 in) from the bottom and 90 degrees to the piston pin hole.

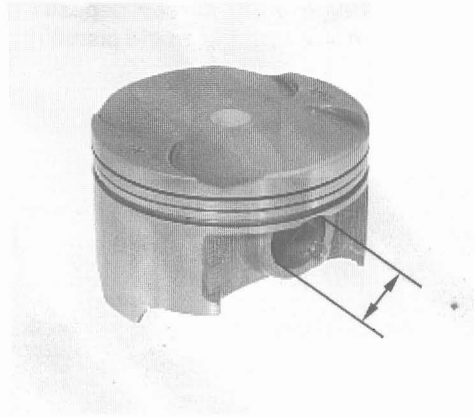
**SERVICE LIMIT:** 78.90 mm (3.106 in)



## CRANKCASE/PISTON/CYLINDER

Measure the piston pin bore.

**SERVICE LIMIT:** 19.03 mm (0.749 in)

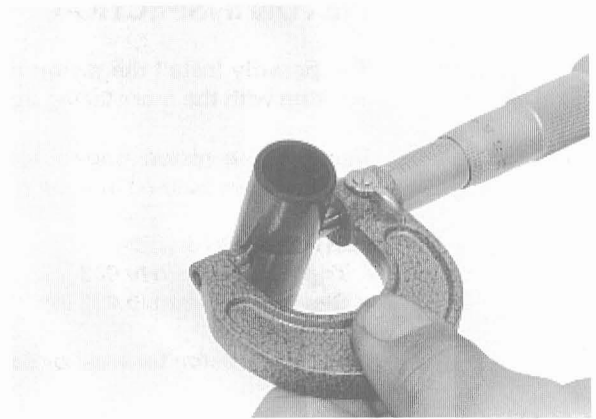


Measure the O.D. of the piston pin.

**SERVICE LIMIT:** 18.984 mm (0.7474 in)

Calculate the piston-to-piston pin clearance.

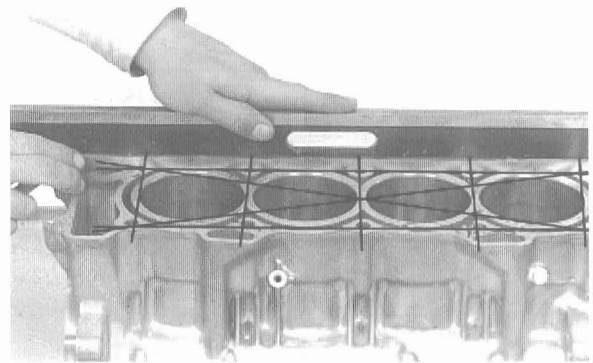
**STANDARD:** 0.002–0.014 mm (0.0001–0.0006 in)



### CYLINDER INSPECTION

Inspect the top of the cylinder for warpage.

**SERVICE LIMIT:** 0.05 mm (0.002 in)

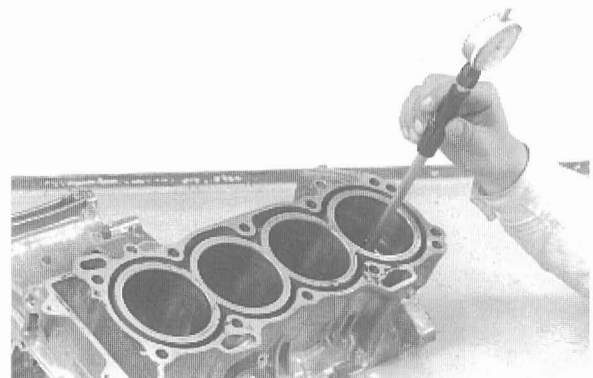


Inspect the cylinder bore for wear or damage.  
Measure the cylinder I.D. in X and Y axis at three levels.  
Take the maximum reading to determine the cylinder wear.

**SERVICE LIMIT:** 79.10 mm (3.114 in)

Calculate the piston-to-cylinder clearance.  
Take a maximum reading to determine the clearance.  
Refer to page 11-5 for measurement of the piston O.D.

**STANDARD:** 0.010–0.045 mm (0.0004–0.0018 in)



Calculate the taper and out of round at three levels in X and Y axis. Take the maximum reading to determine them.

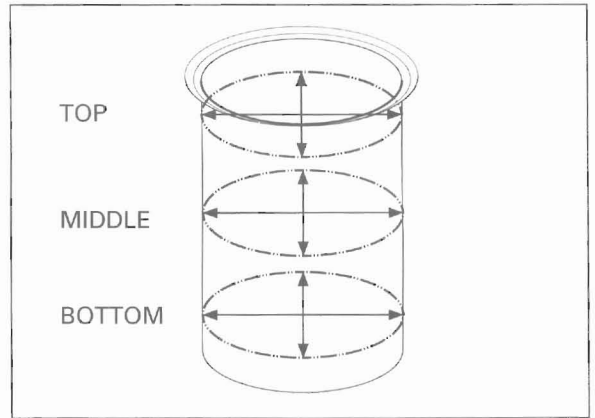
**SERVICE LIMITS:**

- Taper:** 0.10 mm (0.004 in)
- Out of round:** 0.10 mm (0.004 in)

The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

The following oversize pistons are available:  
0.50 mm (0.020 in)

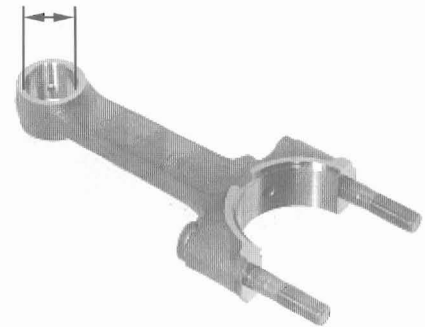
The piston to cylinder clearance for the oversize piston must be: 0.015–0.050 mm (0.0006–0.0020 in).



**CONNECTING ROD INSPECTION**

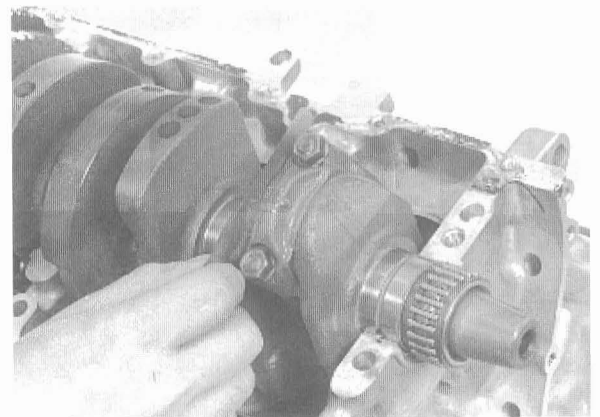
Measure the connecting rod small end I.D.

**SERVICE LIMIT:** 19.061 mm (0.7504 in)



Temporarily install the connecting rod to the crankshaft.  
Install the bearing inserts and bearing cap, and tighten the bolts.  
Measure the connecting rod side clearance.

**SERVICE LIMIT:** 0.30 mm (0.012 in)

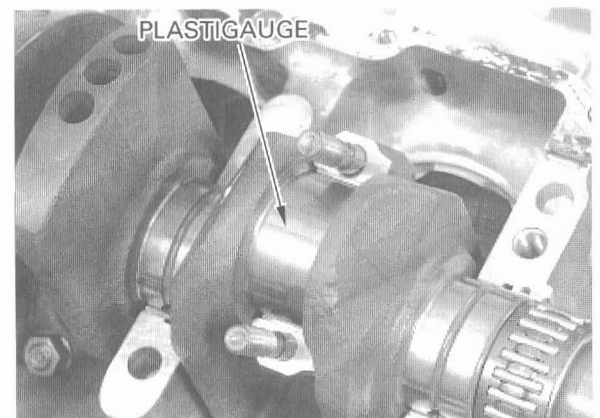


**CRANKPIN BEARING INSPECTION**

Wipe all oil from the bearing inserts and crankpins.  
Put a piece of plastigauge on each crankpin.

**NOTE:**

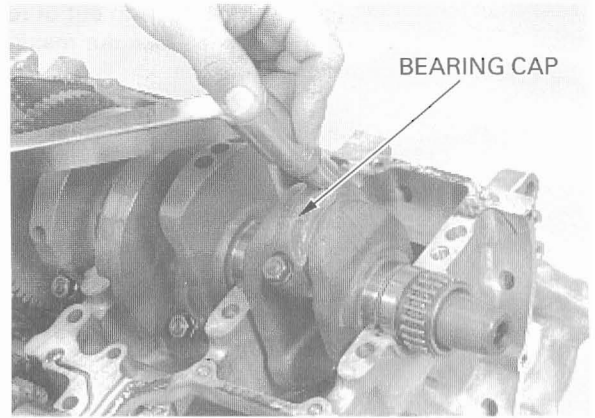
- Do not put the plastigauge over the oil hole in the crankpin.
- Do not rotate the crankshaft during inspection.



## CRANKCASE/PISTON/CYLINDER

Install the bearing caps, and connecting rods on a correct crankpins, and tighten the cap nuts to the specified torque.

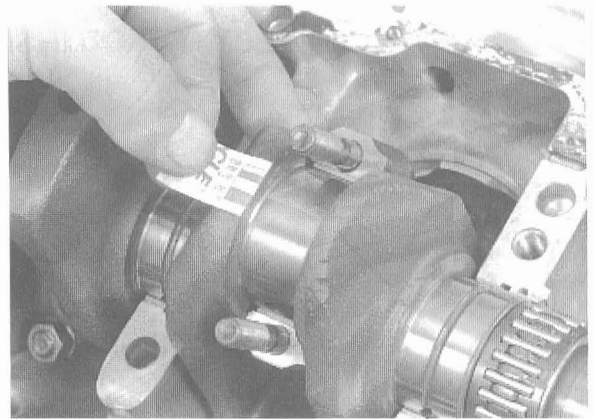
**TORQUE:** 41 N·m (4.2 kgf·m , 30 lbf·ft)



Remove the connecting rod caps and measure the compressed plastigauge on each crankpin.

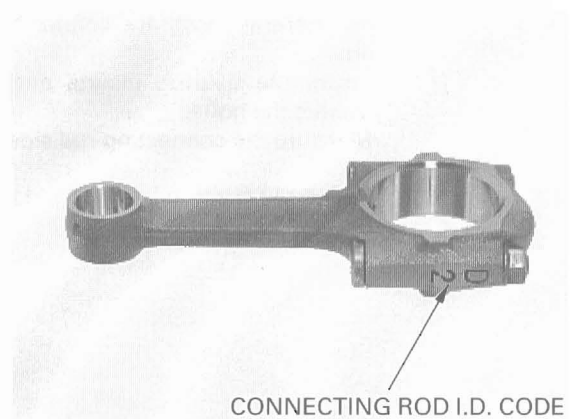
**SERVICE LIMIT:** 0.062 mm (0.0024 in)

If the connecting rod bearing clearance is beyond tolerance, select replacement bearing.



### CRANKPIN BEARING SELECTION

Record the connecting rod I.D. code number (1 or 2) or measure the I.D. with the bearing cap installed without bearing inserts.

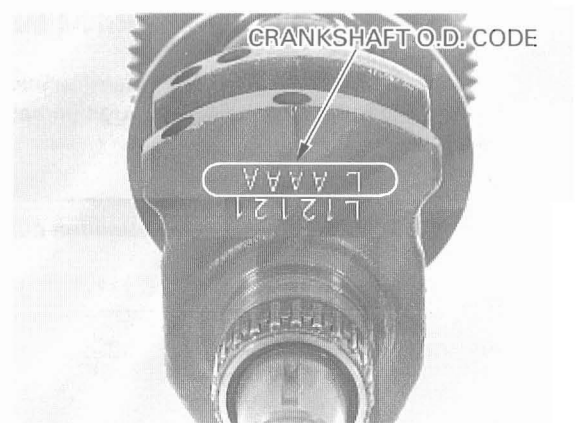


If you are replacing the crankshaft, record the corresponding crankpin O.D. code number (A or B).

**NOTE:**

Numbers (A, 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.



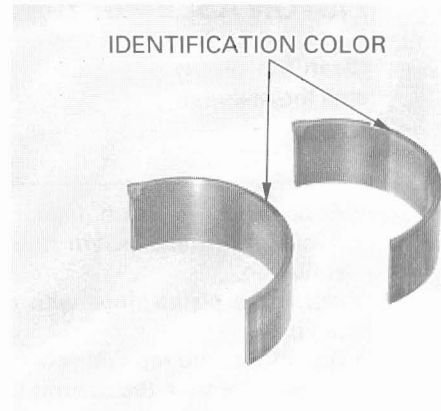
Cross-reference the crankpin and rod codes to determine the replacement bearing color.

**BEARING THICKNESS:**

**A (Brown): Thick**

**B (Green):**

**C (Yellow): Thin**



**CRANKPIN BEARING SELECTION TABLE**

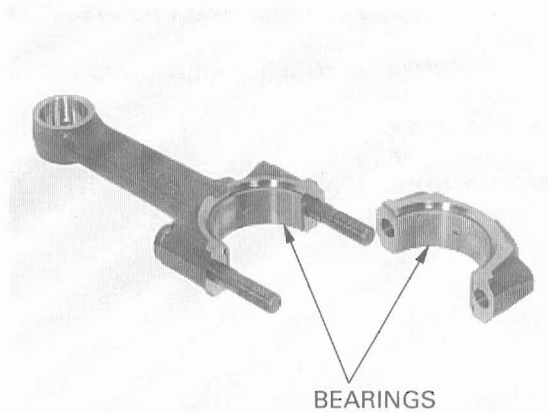
Unit: mm (in)

		CONNECTING ROD I.D. CODE	
		1	2
		43.000 – 43.008 (1.6929 – 1.6932)	43.008 – 43.016 (1.6932 – 1.6935)
CRANKPIN O.D. CODE LETTER	A	39.995 – 40.003 (1.5746 – 1.5749)	C (Yellow)
	B	39.987 – 39.995 (1.5743 – 1.5746)	B (Green)
			B (Green)
			A (Brown)

Install the bearing inserts into the connecting rod and bearing cap.

**NOTE:**

Align the oil hole between the connecting rod and bearing, and also align the bearing tabs with the groove in the connecting rod and bearing cap.



## PISTON ASSEMBLY

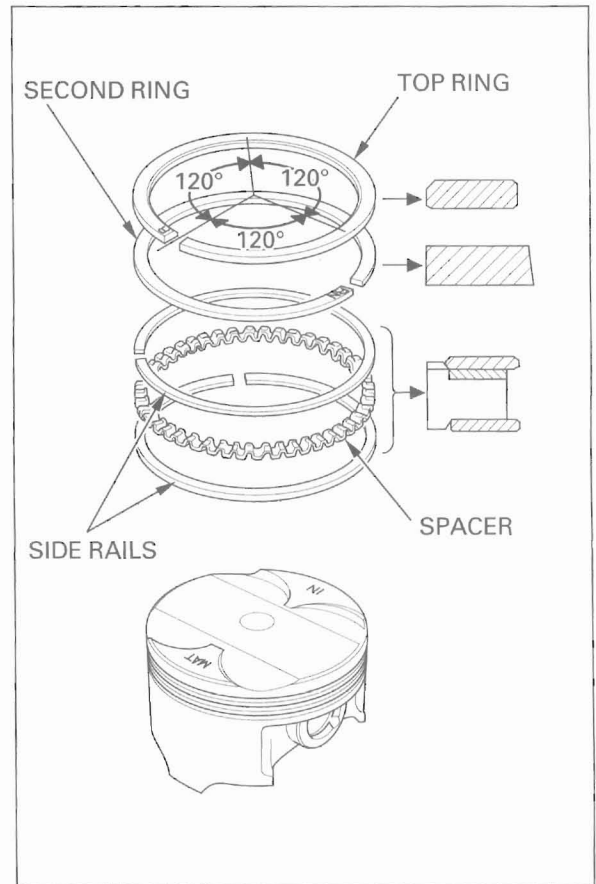
Clean the piston ring grooves thoroughly and install the piston rings.

### NOTE:

- Apply oil to the piston rings.
- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marking (R) facing up.
- Do not mix the top and second rings; the top ring is narrower than the second ring in width.

Space the piston ring end gaps 120 degrees apart. Do not align the gaps in the oil rings (side rails).

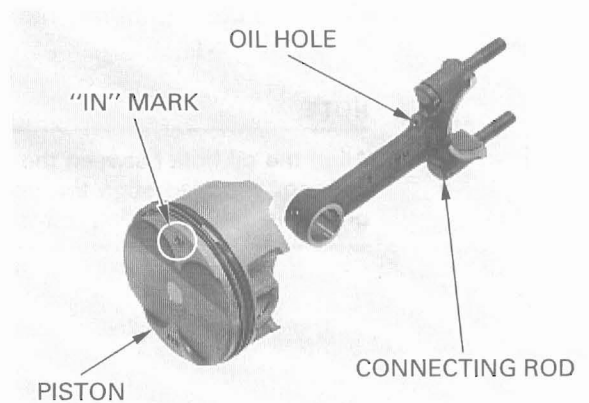
After installation, the rings should rotate freely in the ring grooves.



## PISTON INSTALLATION

*Install the connecting rod with its oil hole side facing the "IN" mark on the piston crown.*

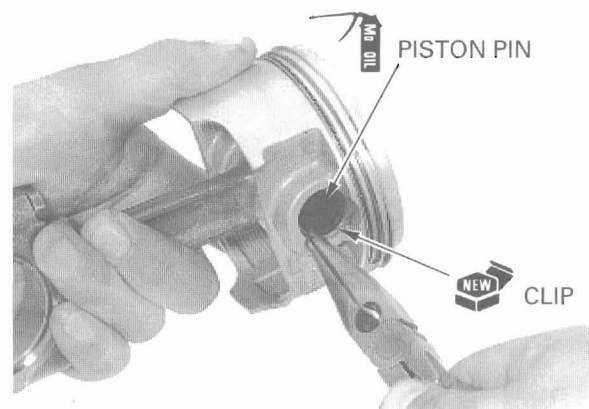
Assemble the piston and connecting rod.



*Do not align the piston pin clips end gap with the piston cut-out.*

Apply molybdenum disulfide oil to the piston pin outer surface.

Install the piston pin, and secure it using a new piston pin clips.



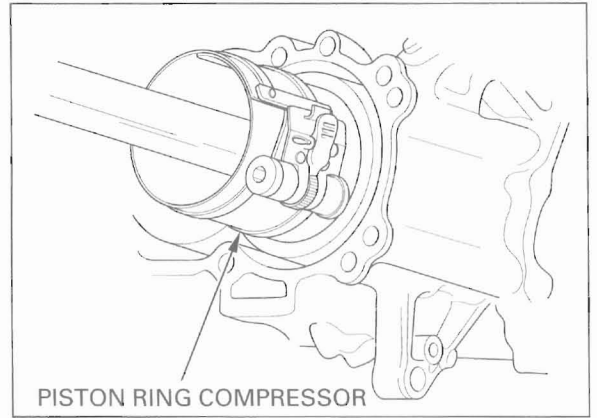
Apply oil to the cylinder sleeves and piston rings.

*Install the piston/ connecting rod assembly with the piston "IN" mark facing to the intake side.*

Install the piston/connecting rod assembly into the cylinder using a commercially available piston ring compressor tool.

**CAUTION:**

- **While installing the piston, being careful not to damage the top surface of the cylinder, especially around the cylinder bore.**
- **Be careful not to damage the cylinder sleeve and crankpin with the connecting rod bolt threads.**

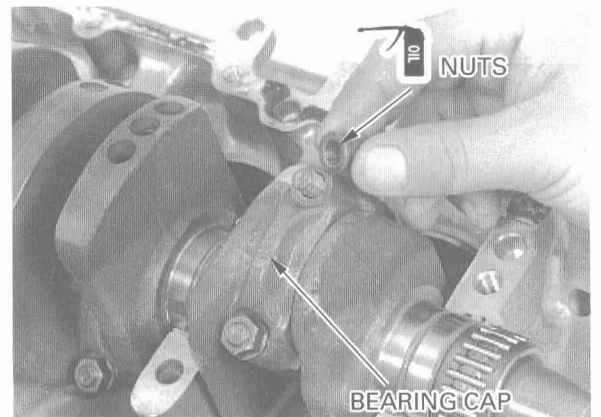


*Make sure ring compressor tool sits flush with top surface of the cylinder.*

Use the handle of a plastic hammer to tap the piston into the cylinder.

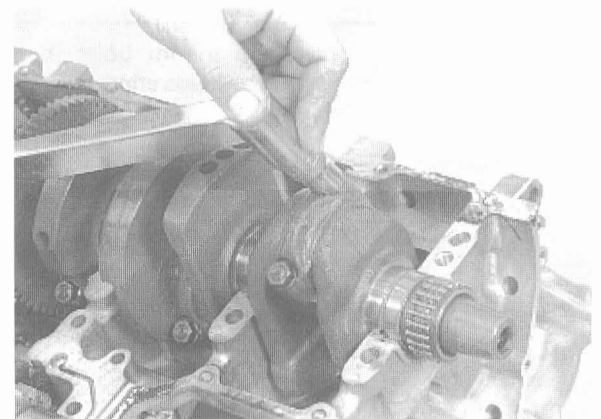
Apply molybdenum disulfide oil to the crankpin bearing surfaces.  
Install the bearing cap.  
Insure that the marks on the caps are aligned with the marks on the connecting rods.

Apply oil to the connecting rod nut threads and seating surfaces.



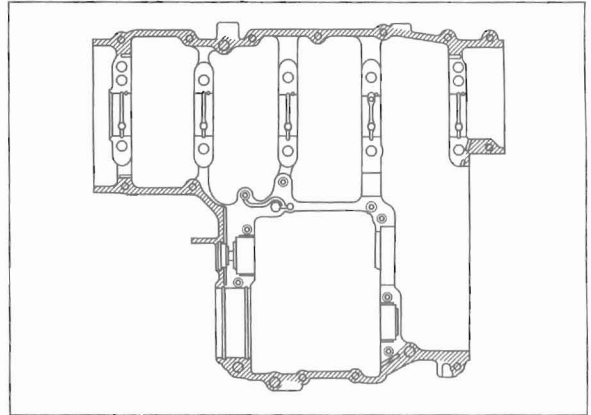
Install the connecting rod nuts and tighten the nuts gradually and alternately.

**TORQUE:** 41 N·m (4.2 kgf·m , 30 lbf·ft)

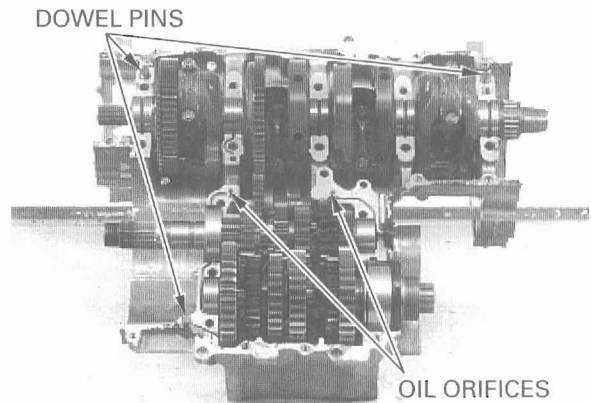


## CRANKCASE COMBINATION

Apply a light, but thorough, coating of liquid sealant to the crankcase mating surface except to the main bearing journal bolt (lower crankcase bolt, 9 mm) area and the oil passage area as shown.



Install the three dowel pins.  
Install oil orifices aligning their cut-out with the groove in the upper crankcase.



Install the lower crankcase onto the upper crankcase.  
Clean the crankcase 9 mm bolts thoroughly with solvent and blow them dry.  
Apply clean engine oil to the 9 mm bolt threads and seating surface and install them.

Loosely install all the lower crankcase bolts.  
Make sure the upper and lower crankcases are seated securely.

From the inside to outside, tighten the lower crankcase 9 mm bolts in a crisscross pattern in 2–3 steps.

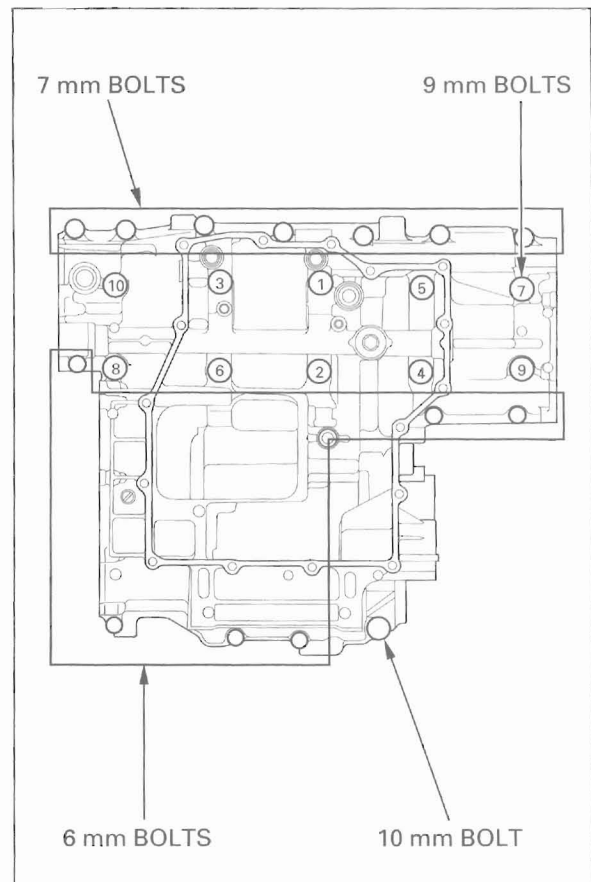
**NOTE:**

Tighten the 9 mm bolts in numerical order as shown in the illustration.

**TORQUE:** 37 N·m (3.8 kgf·m , 27 lbf·ft)

Tighten the 10 mm bolt, and then the 6 mm bolts and 7 mm bolts.

**TORQUE:** 10 mm bolt: 39 N·m (4.0 kgf·m , 29 lbf·ft)  
7 mm bolt: 18 N·m (1.8 kgf·m , 13 lbf·ft)  
6 mm bolt: 12 N·m (1.2 kgf·m , 9 lbf·ft)





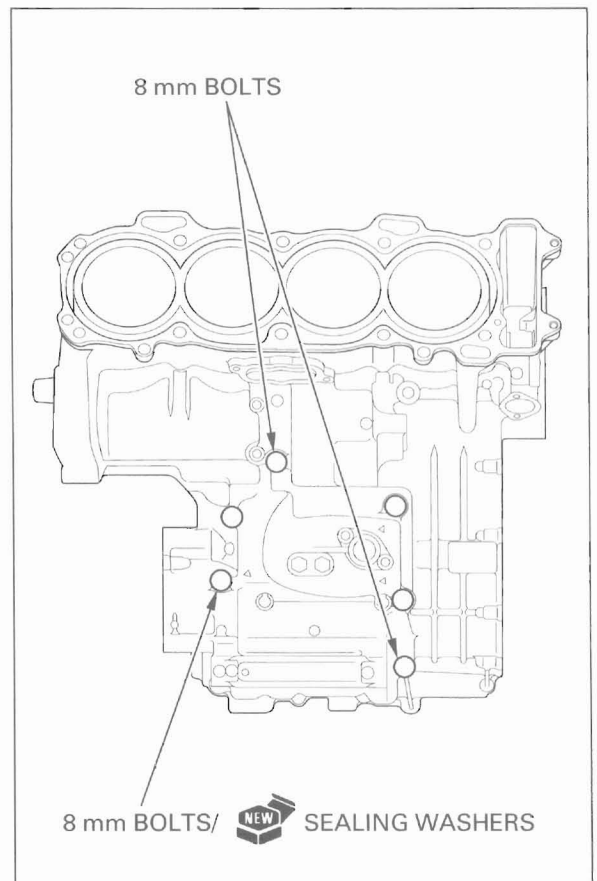
Install the upper crankcase 8 mm bolts and sealing washers.

**NOTE:**

The sealing washer locations are indicated on the upper crankcase using the "△" mark.

Tighten the 8 mm bolts to the specified torque.

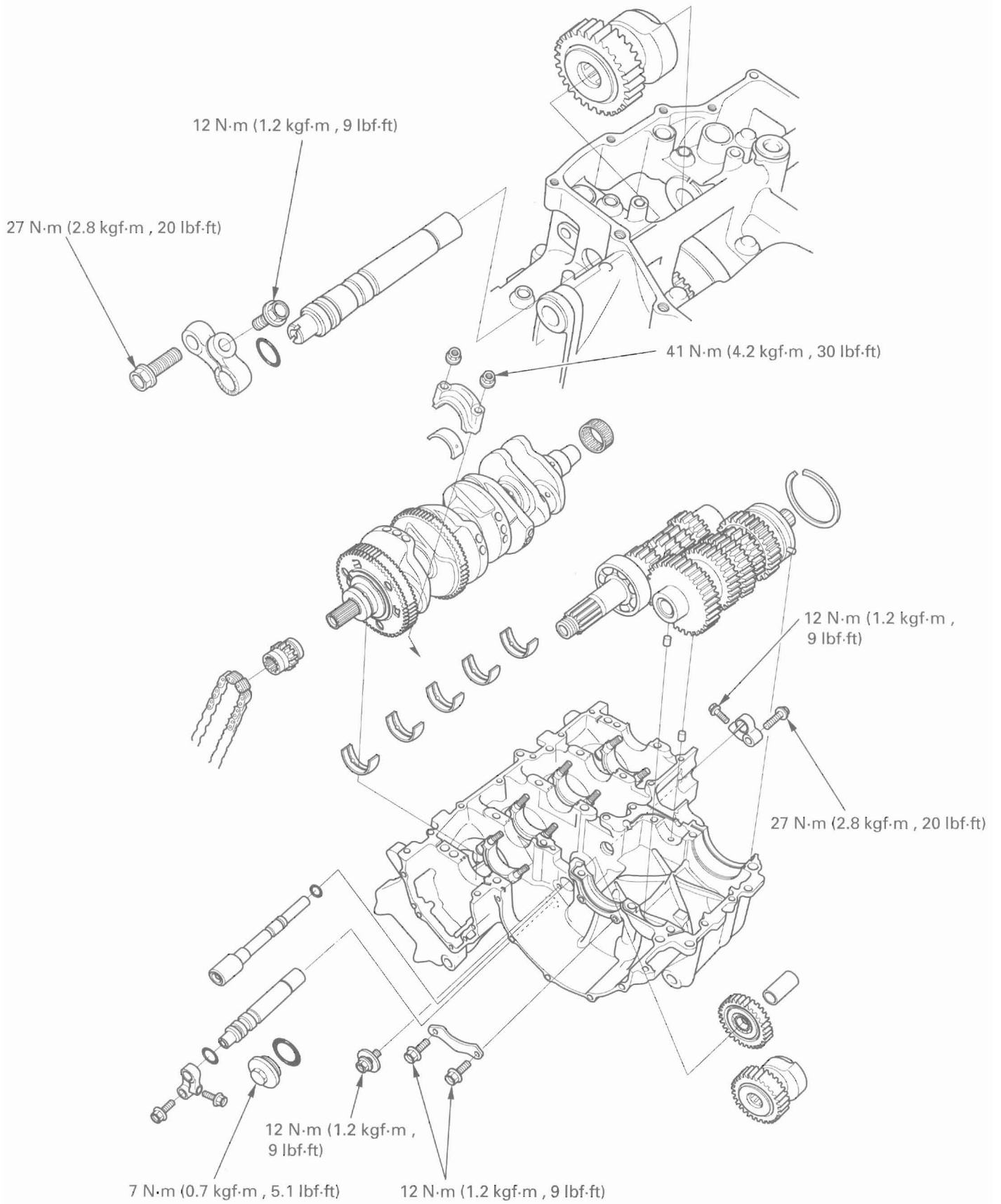
**TORQUE:** 25 N·m (2.5 kgf·m , 18 lbf·ft)



Install the new O-ring and sealing plug.



# CRANKSHAFT/TRANSMISSION/BALANCER



# 12. CRANKSHAFT/TRANSMISSION/BALANCER

SERVICE INFORMATION	12-1	TRANSMISSION	12-9
TROUBLESHOOTING	12-2	BALANCER	12-13
CRANKSHAFT	12-3		

## SERVICE INFORMATION

### GENERAL

- The crankcase must be separated to service the crankshaft, transmission and balancer. Refer to section 11 for crankcase separation/assembly.
- Be careful not to damage the crankshaft main journal and journal bearing while removing or installing the crankshaft.
- Mark and store the disassembled parts to ensure that they are installed in their original locations.
- Mark and store the bearing inserts to ensure that the parts are in their correct locations during reassembly. If the inserts are improperly installed, they will block the oil hole, causing insufficient lubrication and eventual engine seizure.
- The main journal bearing inserts are a select fit and are identified by color codes. Select replacement bearings from the code tables. After installing new bearings, recheck them with a plastigauge to verify clearance. Apply molybdenum disulfide oil to the main journal during assembly.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Crankshaft	Side clearance	0.05 – 0.20 (0.002 – 0.008)	0.30 (0.012)	
	Runout	—	0.30 (0.012)	
	Main journal oil clearance	0.017 – 0.035 (0.0007 – 0.0014)	0.045 (0.0018)	
Transmission	Gear I.D.	M5, 6	31.000 – 31.025 (1.2205 – 1.2215)	31.04 (1.222)
		C1	26.000 – 26.021 (1.0236 – 1.0244)	26.04 (1.025)
		C2, 3, 4	33.000 – 33.025 (1.2992 – 1.3002)	33.04 (1.301)
	Bushing O.D.	M5, 6	30.950 – 30.975 (1.2185 – 1.2195)	30.93 (1.218)
		C2	32.955 – 32.980 (1.2974 – 1.2984)	32.93 (1.296)
		C3, 4	32.950 – 32.975 (1.2972 – 1.2982)	32.93 (1.296)
	Bushing I.D.	M5	27.985 – 28.006 (1.1018 – 1.1026)	28.02 (1.103)
		C2	29.985 – 30.006 (1.1805 – 1.1813)	30.02 (1.182)
	Gear-to-bushing clearance	M5, 6	0.020 – 0.062 (0.0008 – 0.0024)	0.10 (0.004)
		C2	0.020 – 0.070 (0.0008 – 0.0028)	0.11 (0.004)
		C3, 4	0.025 – 0.075 (0.0010 – 0.0030)	0.11 (0.004)
	Mainshaft O.D.	M5	27.967 – 27.980 (1.1011 – 1.1016)	27.957 (1.1007)
		Clutch outer guide	27.980 – 27.993 (1.1016 – 1.1021)	27.970 (1.1012)
	Countershaft O.D.	C2	29.967 – 29.980 (1.1798 – 1.1803)	27.957 (1.1007)
	Bushing-to-shaft clearance	M5	0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)
C2		0.005 – 0.039 (0.0002 – 0.0015)	0.08 (0.003)	

## CRANKSHAFT/TRANSMISSION/BALANCER

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### TORQUE VALUES

Connecting rod nut	41 N·m (4.2 kgf·m , 30 lbf·ft)	Apply oil to the threads and seating surface
Mainshaft bearing set plate bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Balancer timing hole cap	7 N·m (0.7 kgf·m , 5.1 lbf·ft)	
Balancer shaft holder flange bolt (front/rear)	27 N·m (2.8 kgf·m , 20 lbf·ft)	
Balancer shaft pinch bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Balancer idle shaft holder bolt	27 N·m (2.8 kgf·m , 20 lbf·ft)	
Balancer idle shaft bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply a locking agent to the threads

### TOOLS

Driver, 40 mm I. D.	07746-0030100
Attachment, 30 mm	07746-0030300
Driver shaft	07964-MB00200
Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 15 mm	07746-0040300

## TROUBLESHOOTING

#### Excessive noise

- Worn connecting rod big end bearing
- Bent connecting rod
- Worn crankshaft main journal bearing
- Worn transmission bearing
- Worn balancer bearing
- Incorrect balancer backlash adjustment

#### Hard to shift

- Improper clutch operation
- Incorrect transmission oil weight
- Incorrect clutch adjustment
- Bent shift fork
- Bent fork shaft
- Bent fork claw
- Damaged shift drum cam groove
- Bent shift spindle

#### Transmission jumps out of gear

- Worn gear dogs and slots
- Bent fork shaft
- Broken shift drum stopper
- Worn or bent shift forks
- Broken shift linkage return spring

#### Engine vibration

- Excessive crankshaft runout
- Incorrect balancer timing

## CRANKSHAFT

### REMOVAL

Separate the crankcase halves (page 11-3).

Remove the connecting rod bearing cap nuts and bearing caps.

### CAUTION:

*Before removal, position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod bolt threads.*

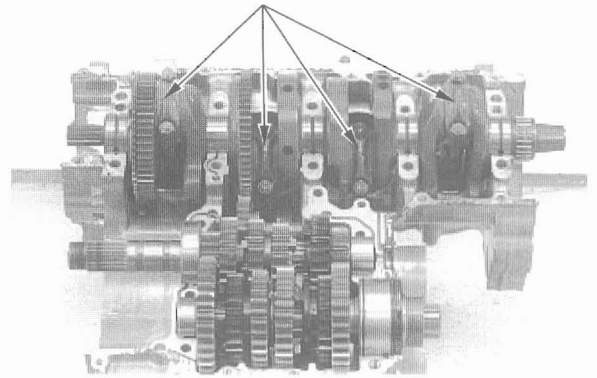
Remove the crankshaft.

Remove the main journal bearings from both the crankcases.

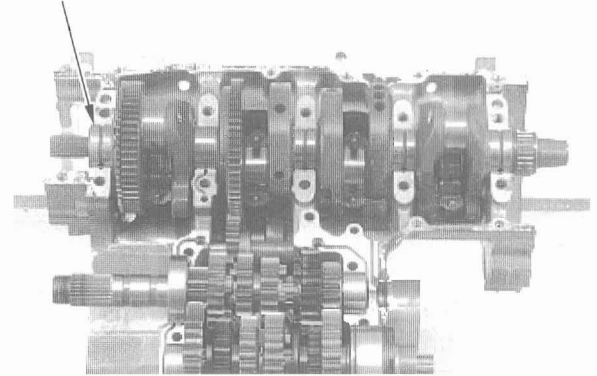
### PRIMARY DRIVE SUB-GEAR REMOVAL

Remove the special snap ring, washer and friction spring.

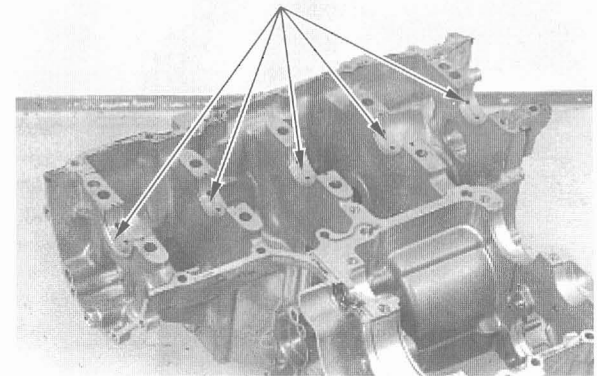
BEARING CAPS



CRANKSHAFT



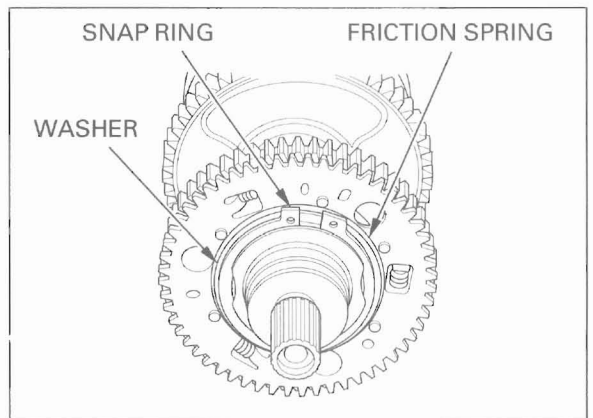
MAIN JORNAL BEARINGS



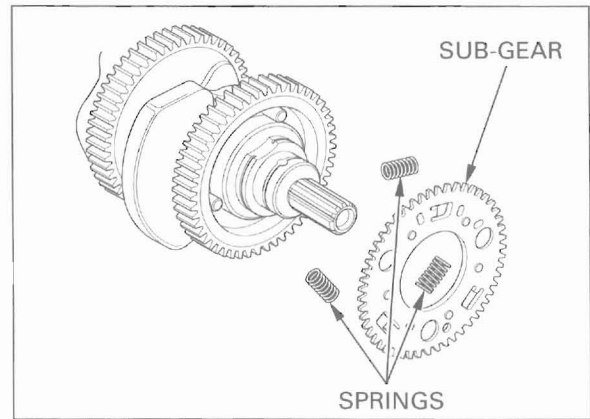
SNAP RING

FRICITION SPRING

WASHER

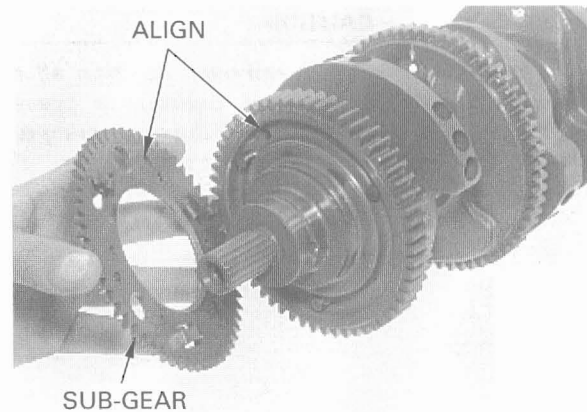


Remove the primary drive sub-gear and springs.



## PRIMARY DRIVE SUB-GEAR INSTALLATION

Install the primary drive sub-gear onto the primary drive gear, aligning the holes between the gear.

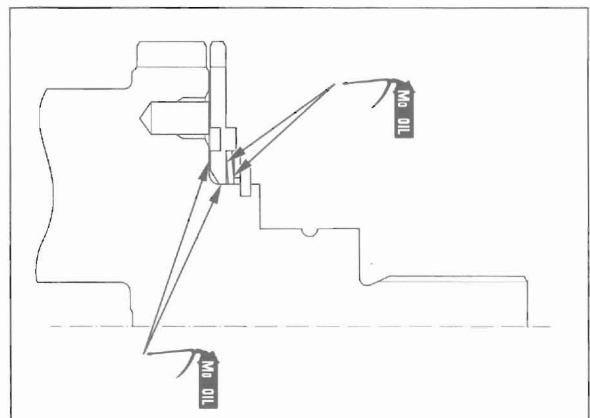
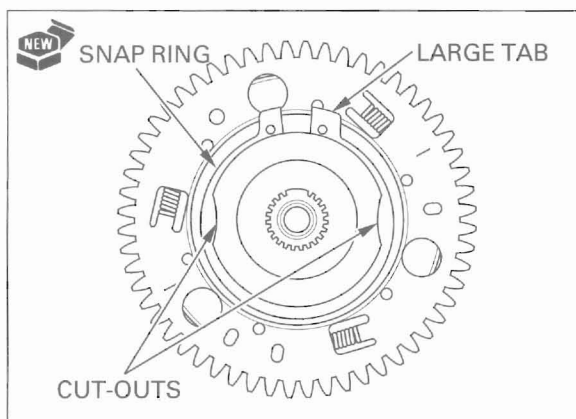
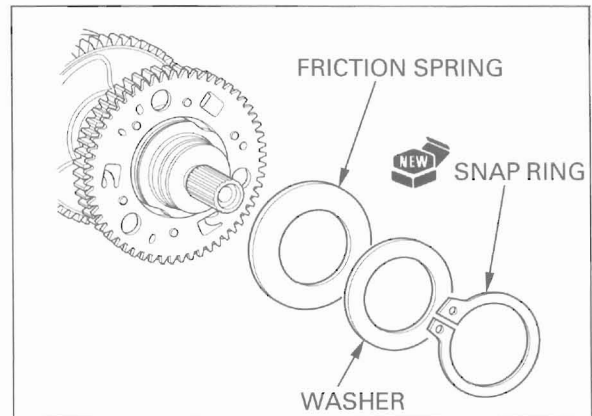


Apply molybdenum disulfide oil to the area shown in the illustration.

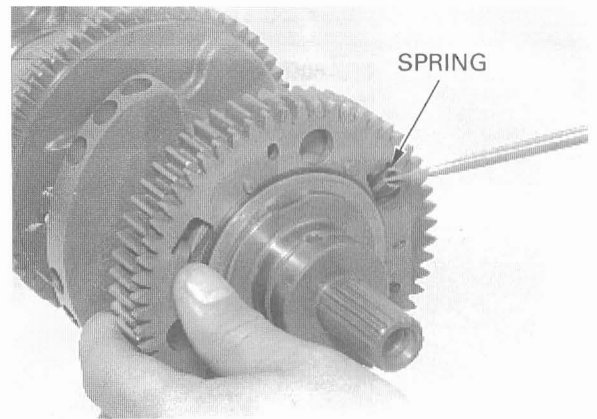
Install the friction spring, washer and new special snap ring.

### CAUTION:

- **You must use the new special snap ring. Using a snap ring other than specified or reusing the snap ring can cause severe engine damage.**
- **Install the new special snap ring with its large tab facing to the right and the chamfered side facing in.**
- **Make sure the new special snap ring end gap is aligned with the right angle of the crankshaft cut-outs as shown.**



Install the springs into the primary drive gear as shown.

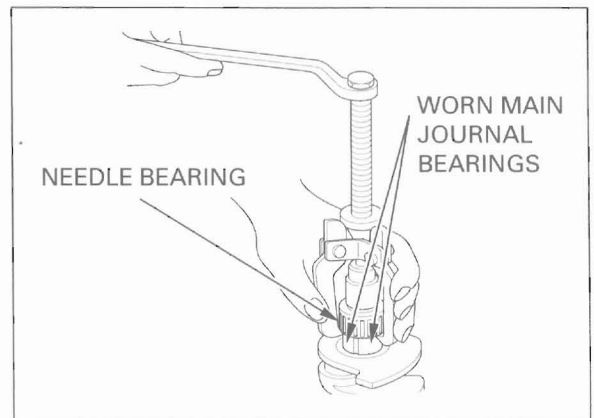


**STARTER CLUTCH NEEDLE BEARING REPLACEMENT**

Remove the needle bearing with a commercially available universal bearing puller.

**CAUTION:**

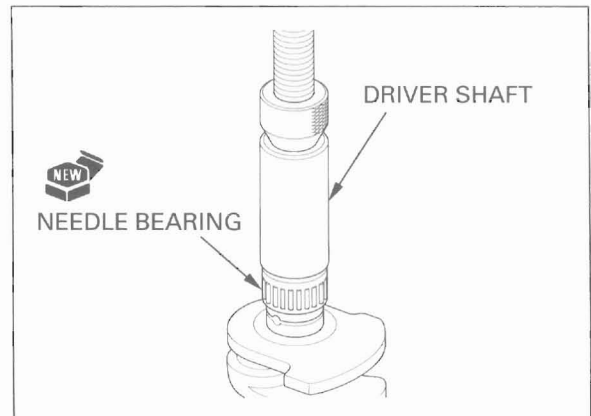
*To protect the crankshaft main journal from the bearing puller claws, cover the main journal properly; worn main journal bearings are usable as protectors.*



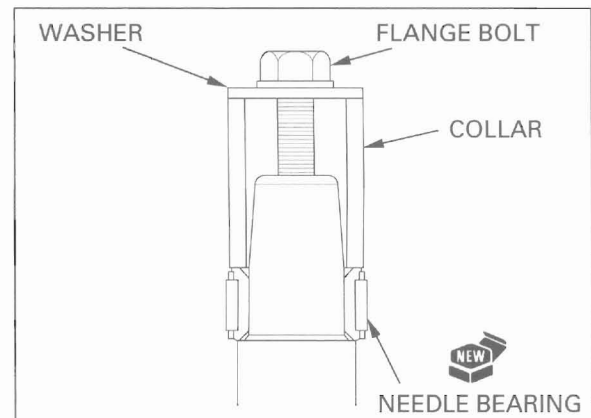
Press a new needle bearing onto the crankshaft using a hydraulic press and special tool.

**TOOL:**

**Driver shaft** 07964 – MB00200



If the special tool is not available, prepare a suitable collar, washer and 10 mm flange bolt (example; flywheel bolt) for the bearing installation. Assemble the above items, and screw the bolt gradually, then install the new needle bearing.

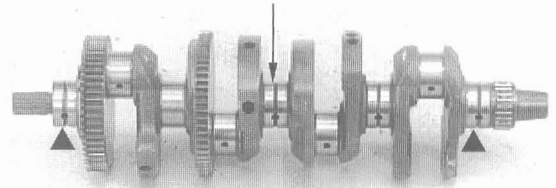


### INSPECTION

#### CRANKSHAFT RUNOUT

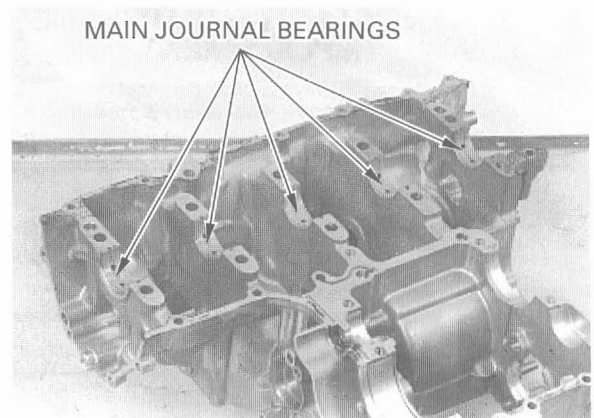
Hold the crankshaft both end.  
Set a dial indicator on the center main journal of the crankshaft.  
Rotate the crankshaft two revolutions and read runout at the center journal.

**SERVICE LIMIT:** 0.30 mm (0.012 in)



#### MAIN JOURNAL BEARING

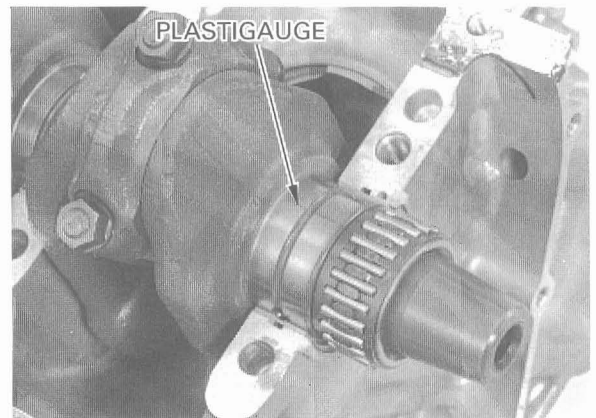
Inspect the main journal bearing inserts for damage or separation.



Wipe the oil from the bearing inserts and journals.  
Reinstall the upper crankcase's main journal bearing inserts, then carefully lower the crankshaft in place.  
Put a piece of plastigauge on each journals.

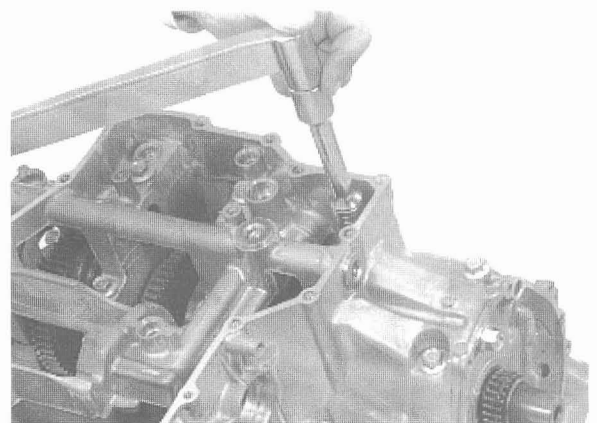
#### NOTE:

- Do not put the plastigauge over the oil hole in the main bearing journal of the crankshaft.
- Do not rotate the crankshaft during inspection.



Assemble the crankcase halves.  
Tighten the 9 mm bolts to the specified torque.

**TORQUE:** 37 N·m (3.8 kgf·m , 27 lbf·ft)

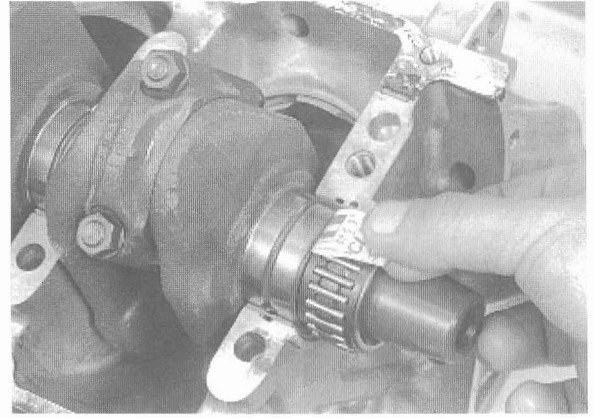




Remove the 9 mm bolts and lower crankcase.  
Measure the compressed plastigauge on each journal.

**SERVICE LIMIT:** 0.045 mm (0.0018 in)

If main bearing clearance is beyond tolerance, select a replacement bearing.

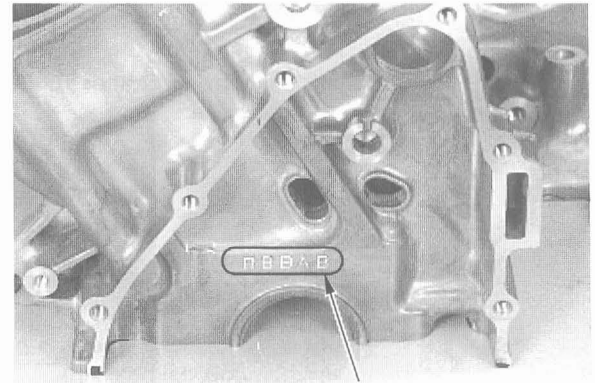


**MAIN JOURNAL BEARING SELECTION**

Record the crankcase I.D. letters from the pad on the left side of the upper crankcase as shown.

**NOTE:**

The letters (A, B or C) on the upper crankcase are the codes for the main journal I.D.s from left to right.



CRANKCASE I.D. CODE

Record the corresponding main journal O.D. code numbers from the crank weight.

**NOTE:**

The numbers (1, 2 or 3) on the crank weight are the codes for the main journal O.D.s from left to right.



MAIN JOURNAL O.D. CODE

Cross reference the case and journal codes to determine the replacement bearing color codes.

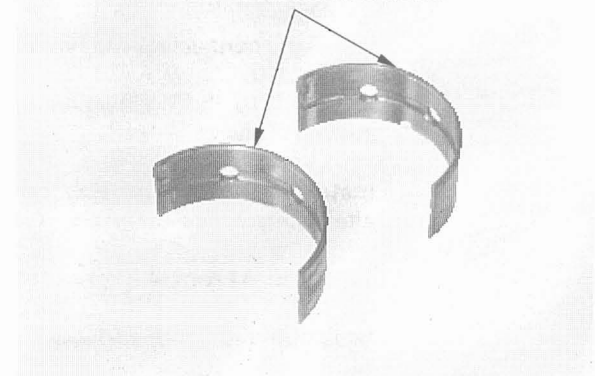
**BEARING THICKNESS:**

- A (Black): Thick
- B (Blown): ↑
- C (Green): ↓
- D (Yellow): ↓
- E (Pink): Thin

**CAUTION:**

*After selecting new bearings, recheck the clearance with a plastigauge. Incorrect clearance can cause severe engine damage.*

**IDENTIFICATION COLOR**



# CRANKSHAFT/TRANSMISSION/BALANCER

## MAIN JOURNAL BEARING SELECTION TABLE

Unit: mm (in)

			CRANKCASE I.D. CODE		
			A	B	C
			43.000 – 43.006 (1.6929 – 1.6931)	43.006 – 43.012 (1.6931 – 1.6934)	43.012 – 43.018 (1.6934 – 1.6936)
CRANKSHAFT O.D. CODE	1	40.000 – 40.006 (1.5748 – 1.5750)	E (Pink)	D (Yellow)	C (Green)
	2	39.994 – 40.000 (1.5746 – 1.5748)	D (Yellow)	C (Green)	B (Brown)
	3	39.988 – 39.994 (1.5743 – 1.5746)	C (Green)	B (Brown)	A (Black)

## INSTALLATION

Install the main journal bearings into the upper and lower crankcase.

### NOTE:

The bearing tabs should be aligned with the grooves in the case.

Apply molybdenum disulfide oil to the upper and lower main journal bearings.

Install the crankshaft.

### CAUTION:

***Before installation, position all the pistons at TDC (Top Dead Center) to prevent damaging the crankpin with the connecting rod bolt threads.***

Apply molybdenum disulfide oil to the bearing surfaces.

Install the connecting rod bearing caps.

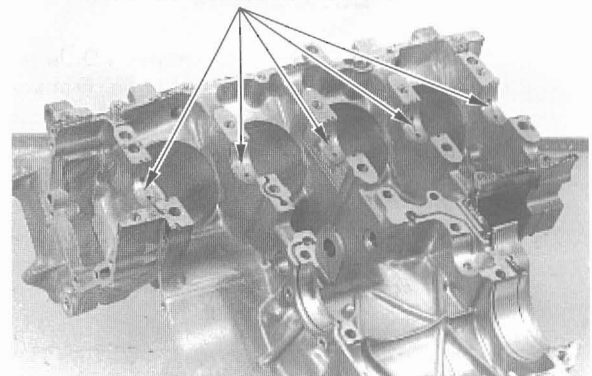
Apply oil to the connecting rod nut threads and seating surfaces.

Install and tighten the nuts gradually and alternately.

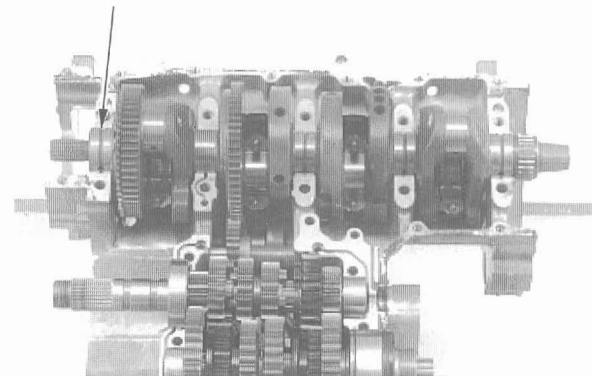
**TORQUE:** 41 N·m (4.2 kgf·m, 30 lbf·ft)

Assemble the upper and lower crankcase (page 11-12).

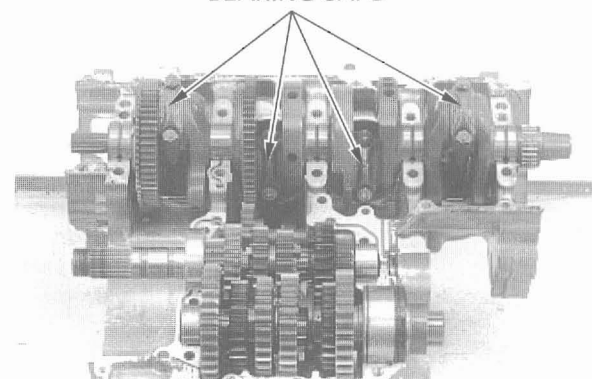
MAIN JOURNAL BEARINGS



CRANKSHAFT



BEARING CAPS

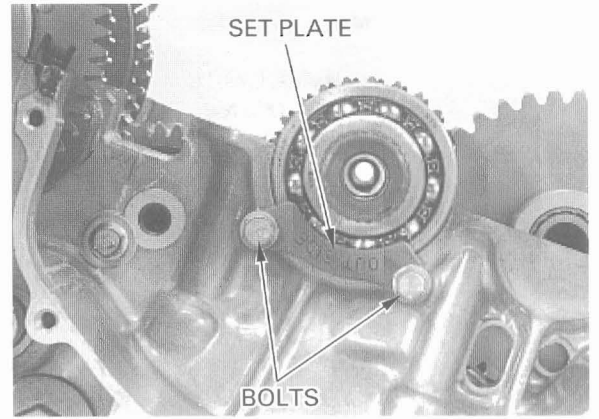


## TRANSMISSION

### REMOVAL/DISASSEMBLY

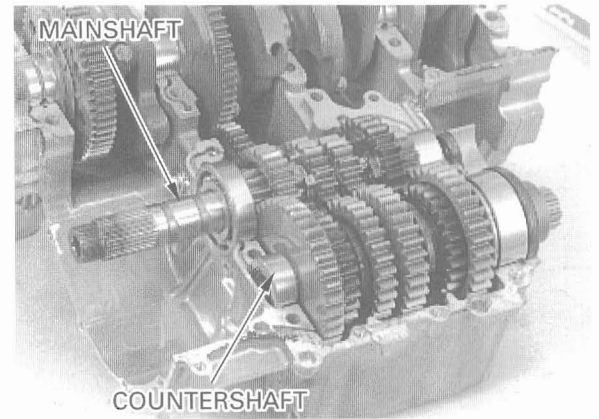
Separate the crankcase halves (page 11-3).

Remove the bolts and mainshaft bearing set plate.



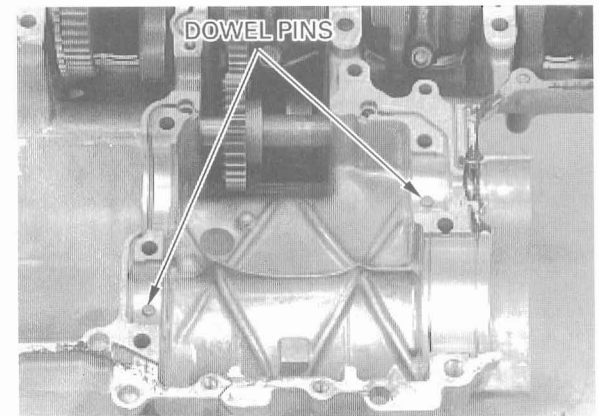
Remove the mainshaft and countershaft assembly.

Remove the oil seal.



Remove the dowel pins.

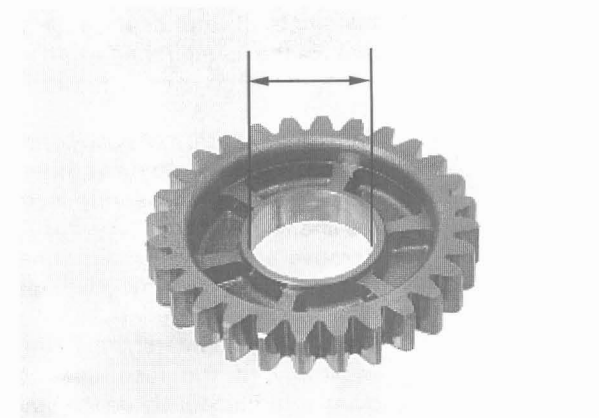
Disassemble the mainshaft and countershaft.



Check the gear dogs, dog holes and teeth for abnormal wear or lack of lubrication. Measure the I.D. of each gear.

#### SERVICE LIMITS:

<b>M5, M6:</b>	31.04 mm (1.222 in)
<b>C1:</b>	26.04 mm (1.025 in)
<b>C2, C3, C4:</b>	33.04 mm (1.301 in)

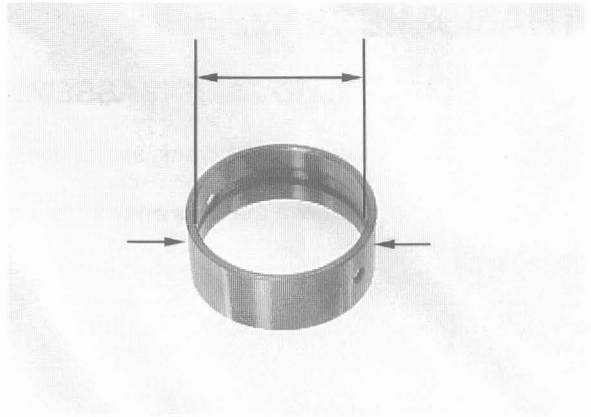


## CRANKSHAFT/TRANSMISSION/BALANCER

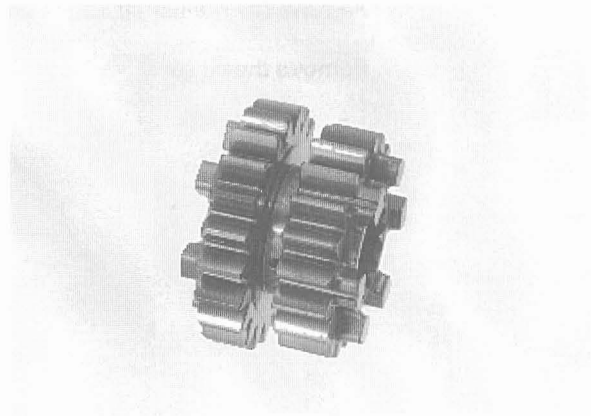
Measure the I.D. and O.D. of each gear bushing.

### SERVICE LIMITS:

<b>O.D.: M5, M6:</b>	30.93 mm (1.218 in)
<b>C2:</b>	32.93 mm (1.296 in)
<b>C3, C4:</b>	32.93 mm (1.296 in)
<b>I.D.: M5:</b>	28.02 mm (1.103 in)
<b>C2:</b>	30.02 mm (1.182 in)



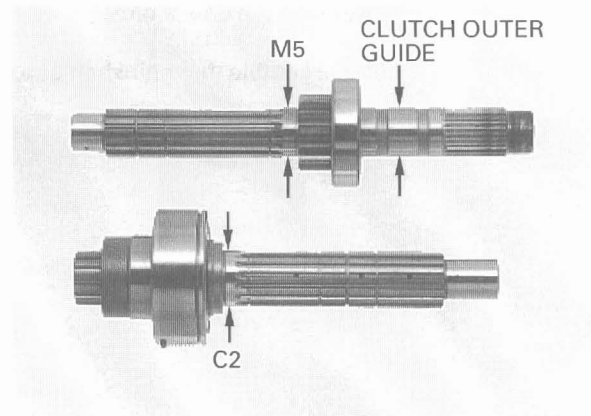
Check the shift fork groove of the shifter gear for excessive wear or damage.



Measure the O.D. of the mainshaft and countershaft.

### SERVICE LIMITS:

<b>M5:</b>	27.957 mm (1.1007 in)
<b>Clutch outer guide:</b>	27.970 mm (1.1012 in)
<b>C2:</b>	27.957 mm (1.1007 in)



## BEARING REPLACEMENT

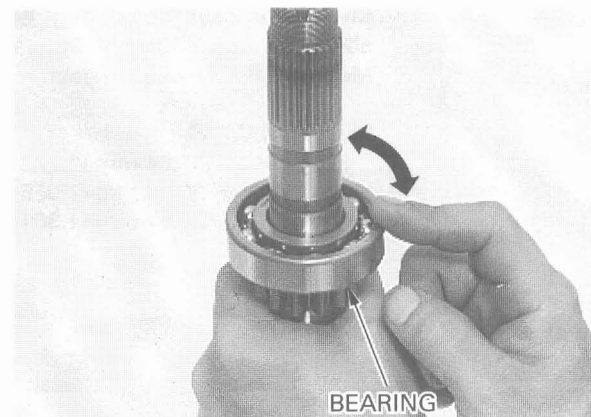
### NOTE:

Do not try to remove the countershaft bearing from the shaft. If the bearing is worn or damaged, replace the countershaft as an assembly.

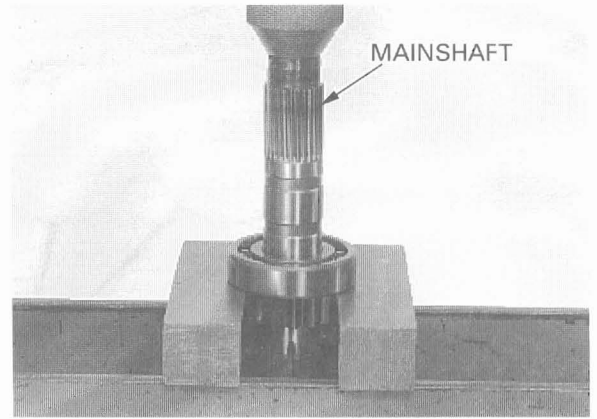
Turn the outer race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the shaft.

Remove and discard the mainshaft bearing, if the race does not turn smoothly, quietly, or fits loosely on the mainshaft.

Replace the countershaft, collar, and bearing as an assembly, if the race does not turn smoothly, quietly, or fits loosely on the countershaft.

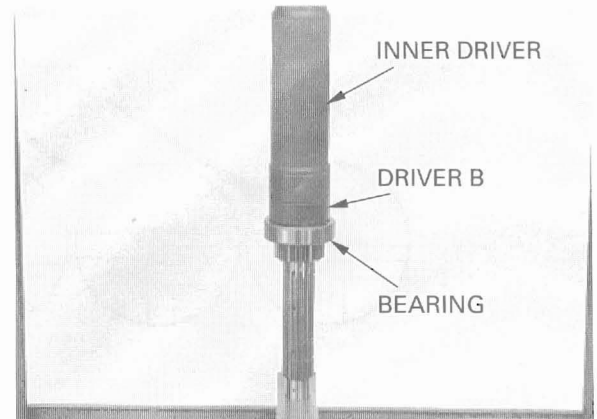


Press out the mainshaft from the bearing using a hydraulic press.

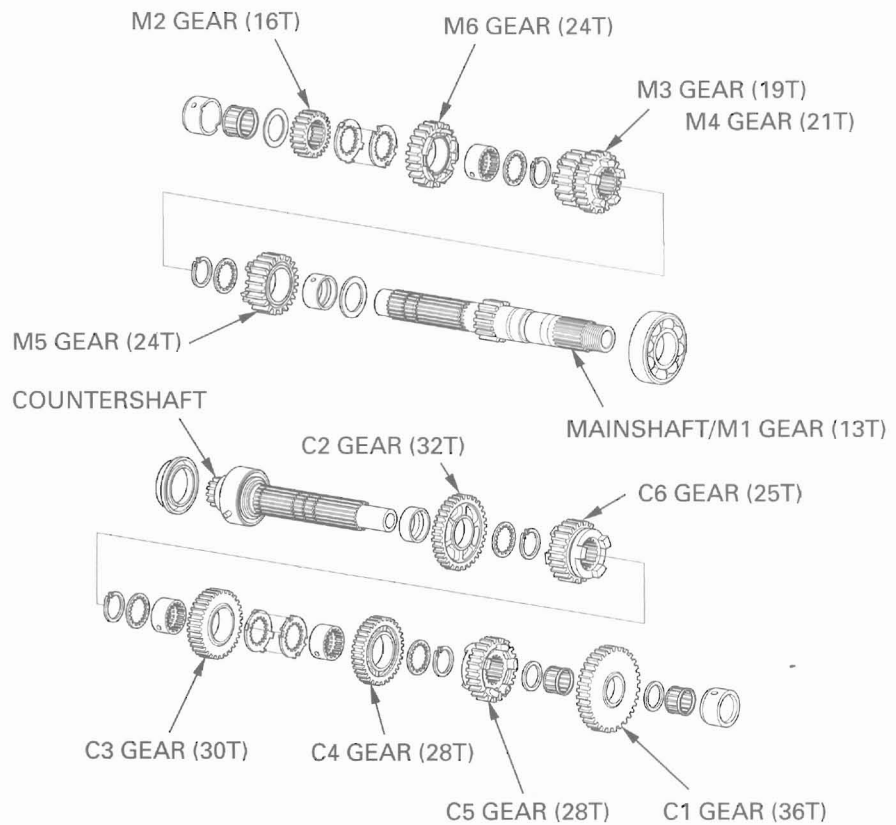


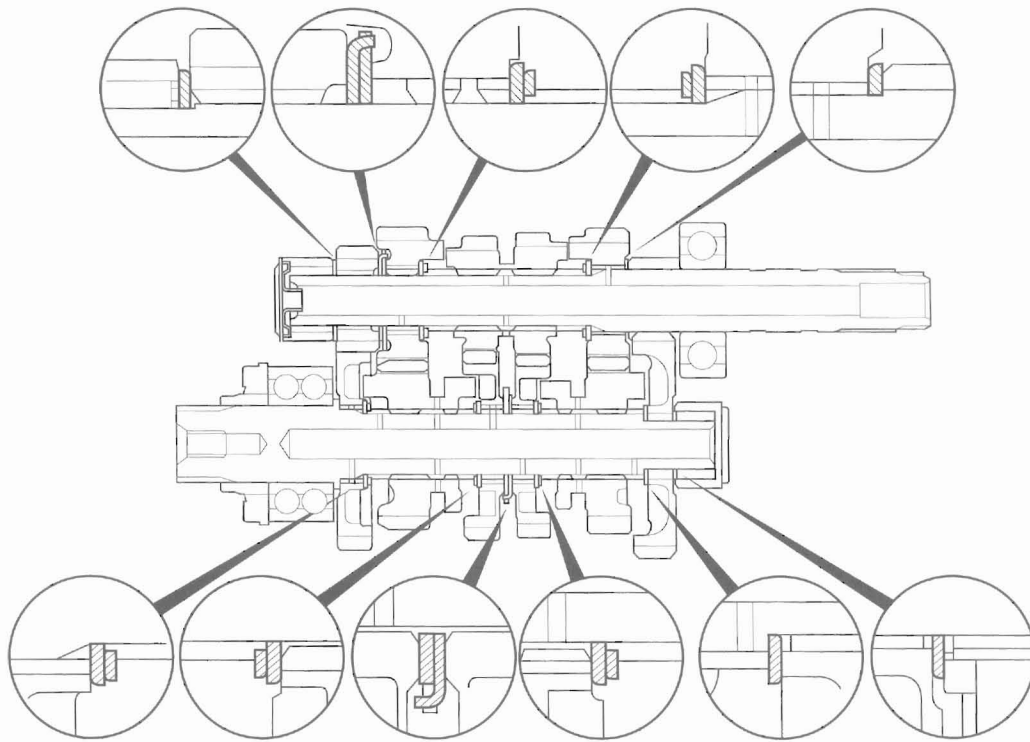
Install a new mainshaft bearing onto the mainshaft by pressing the mainshaft bearing inner race using the special tool.

**TOOLS:**  
**Driver, 40 mm I. D.** 07746-0030100  
**Attachment, 30 mm** 07746-0030300



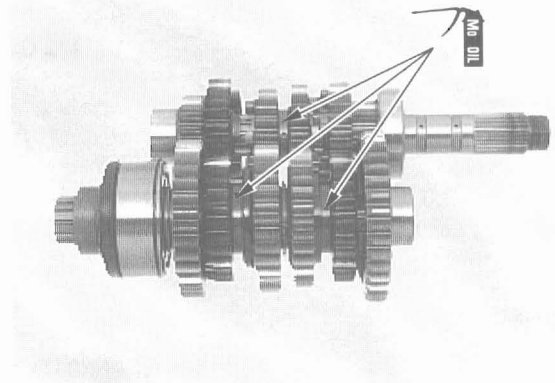
**ASSEMBLY**





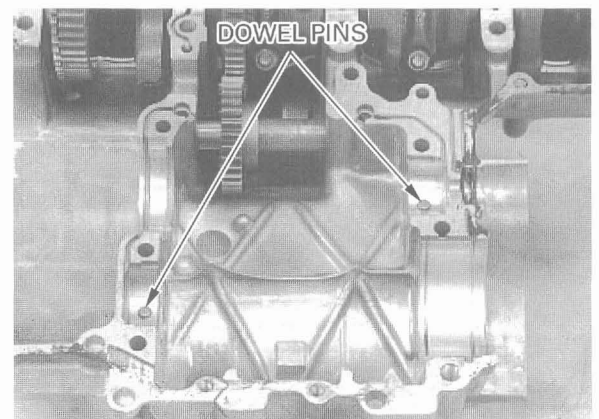
Assemble the transmission gear and shafts.  
Coat each gear with clean engine oil and check for smooth movement.

Apply molybdenum disulfide oil to the shift fork grooves in the M3/4, C5 and C6 gear.

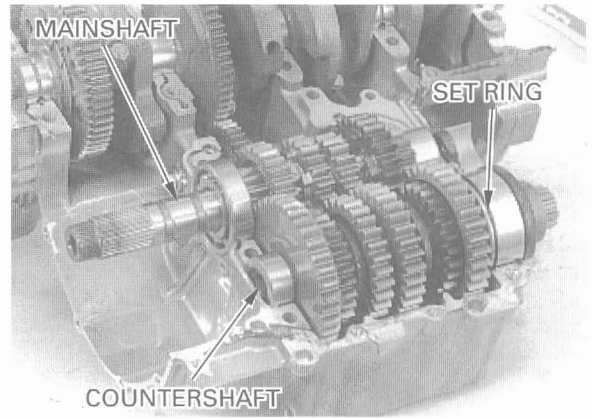


## INSTALLATION

Install the dowel pins on the upper crankcase holes.

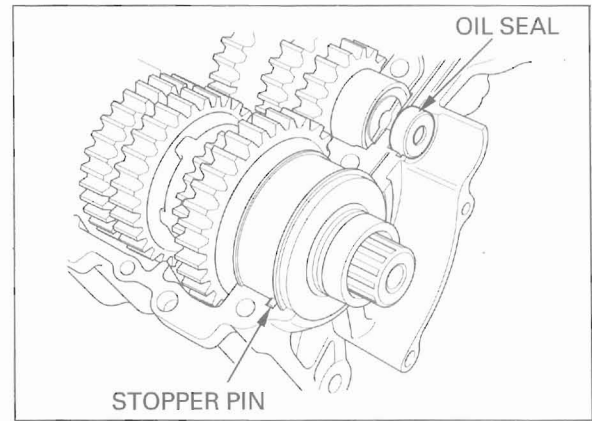


Install the mainshaft and countershaft by aligning the countershaft bearing set ring with the groove on the crankcase, and aligning the bearing cap holes with the dowel pins.



Also align the countershaft bearing stopper pin with the groove in the crankcase.

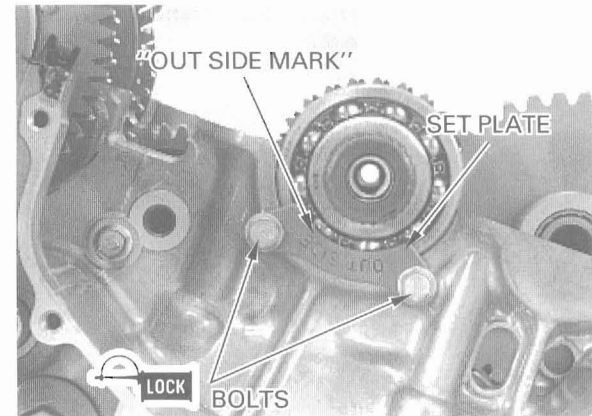
Install the oil seal.



Apply a locking agent to the mainshaft bearing set plate bolt threads. Install the mainshaft bearing set plate with its "OUT SIDE" mark facing out and tighten the bolts to the specified torque.

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

Assemble the crankcase (page 11-12).

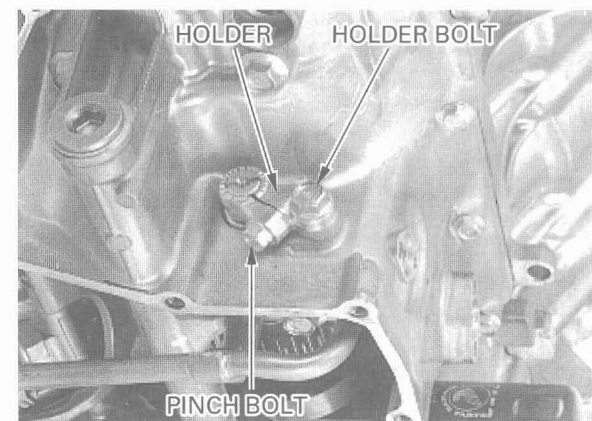


## **BALANCER**

### **FRONT BALANCER REMOVAL**

Remove the oil pan (page 4-4).

Remove the front balancer shaft holder bolt. Loosen the pinch bolt and remove the holder.





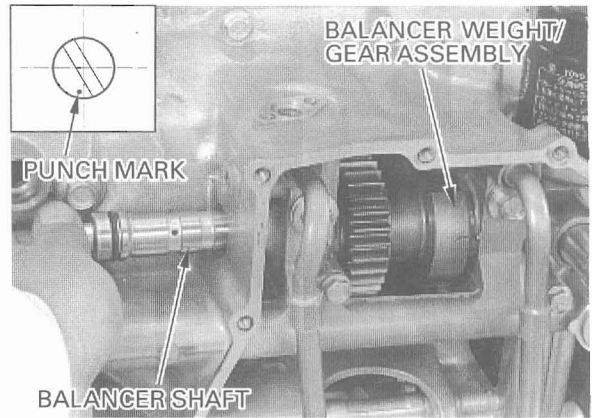
## CRANKSHAFT/TRANSMISSION/BALANCER

Rotate the balancer shaft and place the punch mark on the shaft facing down.

*The balancer shaft will only come out from one particular position.*

*Rotate it until it comes out easily; do not force it out.*

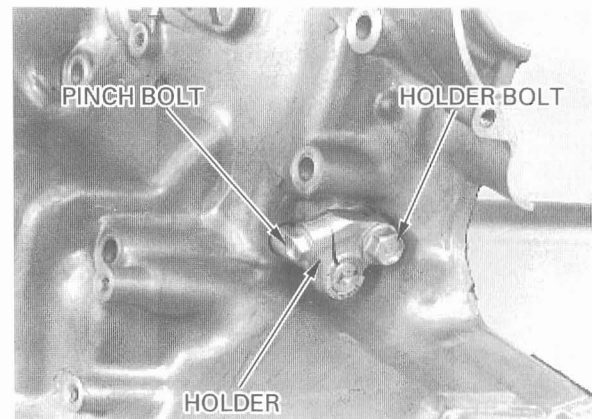
Pull the balancer shaft out and remove the balancer weight/gear assembly.



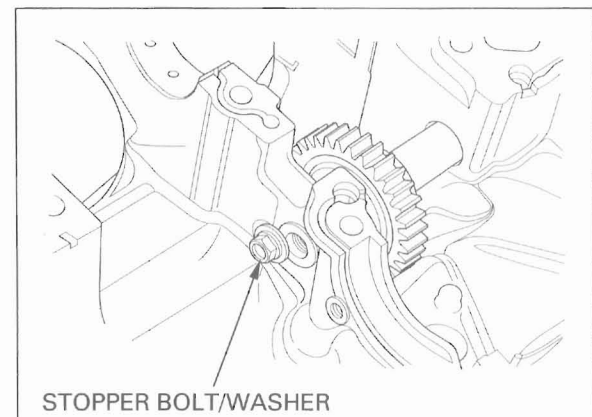
### REAR BALANCER REMOVAL

Separate the crankcase (Section 11) and remove the crankshaft and transmission.

Remove the balancer idle gear shaft holder bolt. Loosen the pinch bolt and remove the holder.



Remove the balancer idle gear shaft stopper bolt/washer.

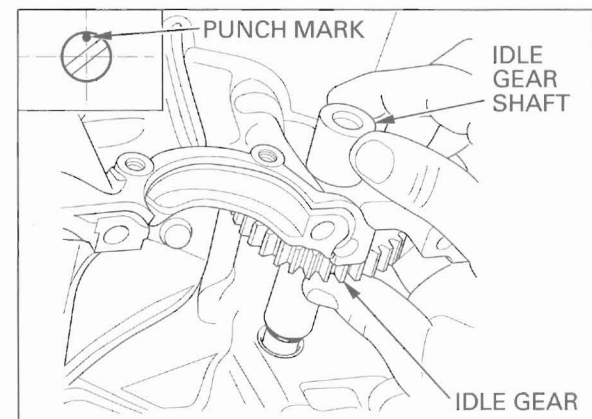


Rotate the balancer shaft and place the punch mark on the shaft facing up.

*The balancer idle gear shaft will only come out from one particular position.*

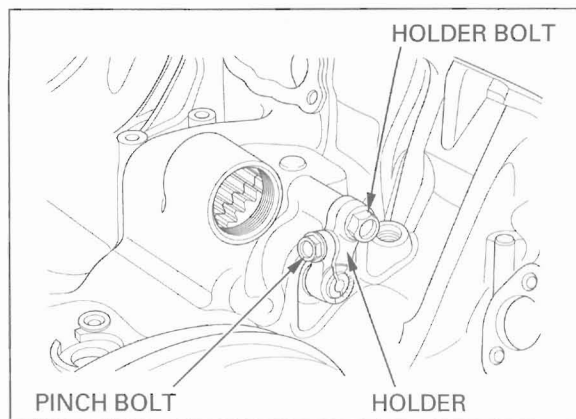
*Rotate it until it comes out easily; do not force it out.*

Pull out the balancer idle gear shaft and remove the distance collar and idle gear.





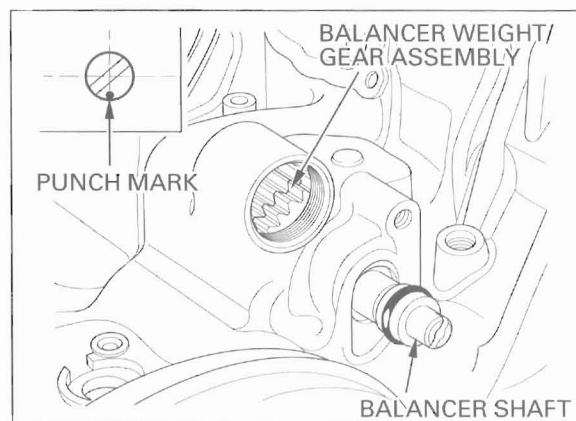
Remove the rear balancer shaft holder bolt.  
Loosen the pinch bolt and remove the holder.



Rotate the balancer shaft and place the punch mark on the shaft facing down.

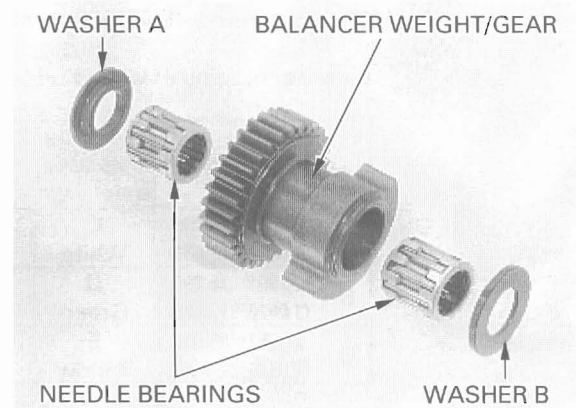
*The balancer shaft will only come out from one particular position. Rotate it until it comes out easily; do not force it out.*

Pull the balancer shaft out and remove the balancer weight/gear assembly.

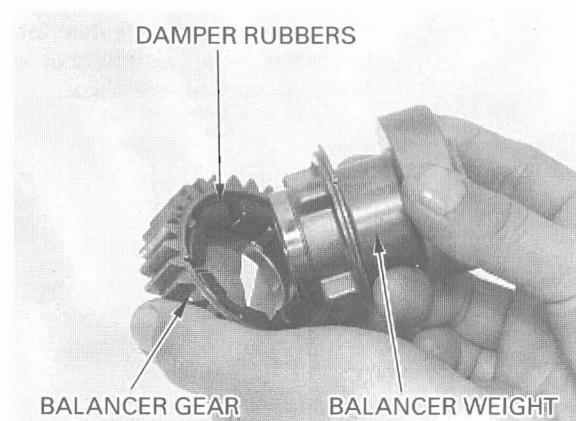


## DISASSEMBLY

Remove the side washer A, B and needle bearings from the balancer weight.



Remove the balancer gear and dumper rubbers from the balancer weight.



**INSPECTION**

**NOTE:**

- Replace the balancer weight, shaft and needle bearings as an assembly.
- The balancer weight, shaft and needle bearings are select fitted (selection table; see below).

Check the needle bearing sliding surfaces of the balancer weight for wear, damage or excessive scratches.

Check the needle bearing sliding surfaces of the balancer shaft for wear, damage or excessive scratches.

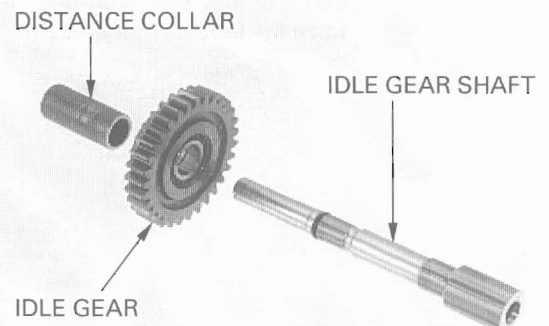
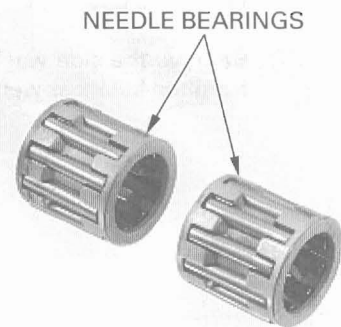
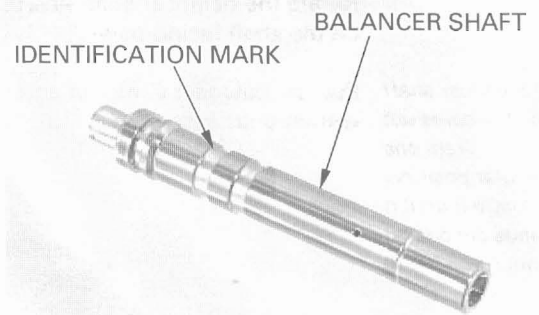
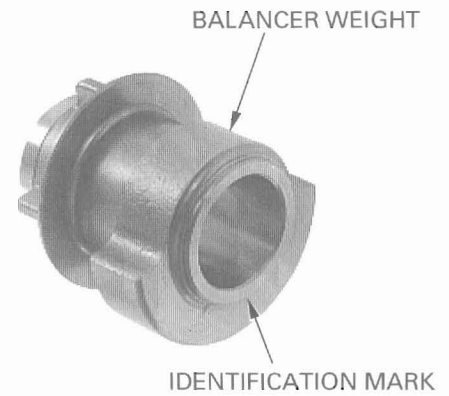
Check the needle bearing for smooth operation.

**Balancer bearing selection table:**

Unit: mm (in)

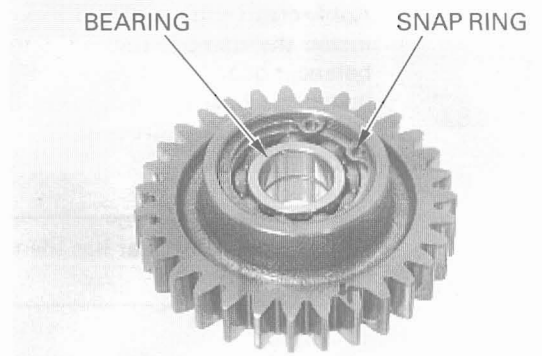
BALANCER WEIGHT I.D. CODE		BALANCER SHAFT O.D. CODE		
		1 or Blue (0.7085 - 0.7087)	2 or Black (0.7083 - 0.7085)	3 or Red (0.7081 - 0.7083)
A	26.996 - 27.000 (1.0628 - 1.0630)	C White	B Blue	A Red
B	26.991 - 26.996 (1.0626 - 1.0628)	D Green	C White	B Blue
C	26.987 - 26.991 (1.0625 - 1.0626)	E Yellow	D Green	C White

Check the balancer idle gear for wear or damage.  
Check the balancer idle gear shaft for wear, damage or excessive scratches.



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 gear. Remove and discard the bearing, if the race does not turn smoothly, quietly, or fits loosely in the gear.

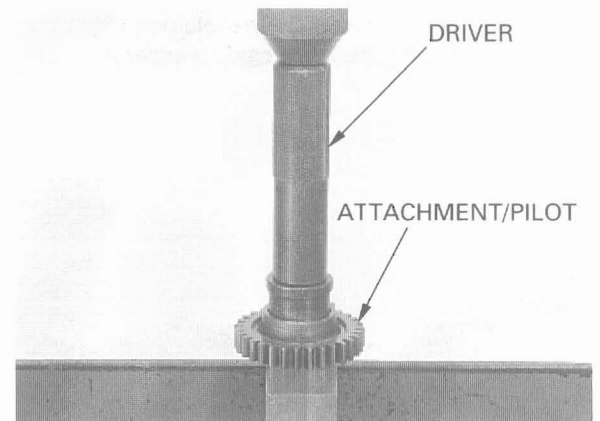
Remove the snap ring.  
Drive the bearings out of the idle gear.



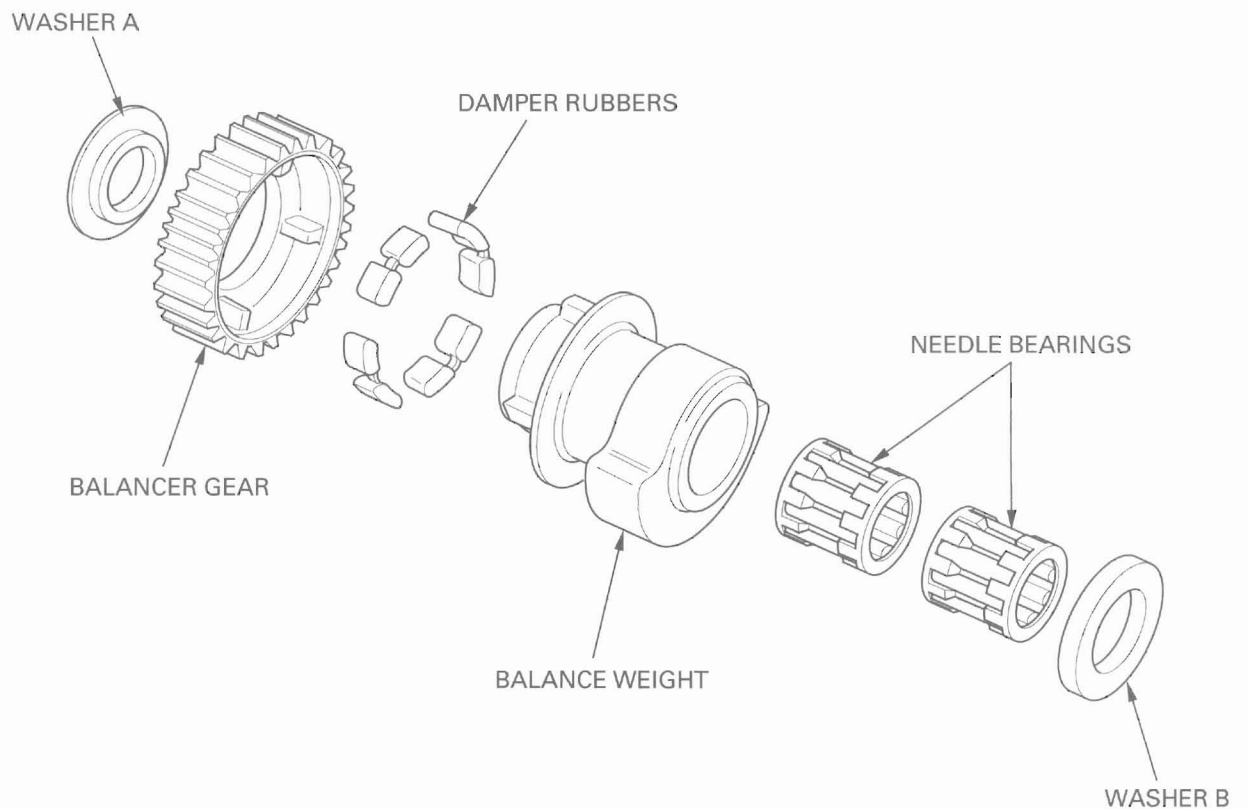
Press the new idle gear bearing into the idle gear using the special tools as shown.

**TOOLS:**  
**Driver** 07749-0010000  
**Attachment, 32 × 35 mm** 07746-0010100  
**Pilot, 15 mm** 07746-0040300

Install the snap ring into the gear groove securely.



**ASSEMBLY**

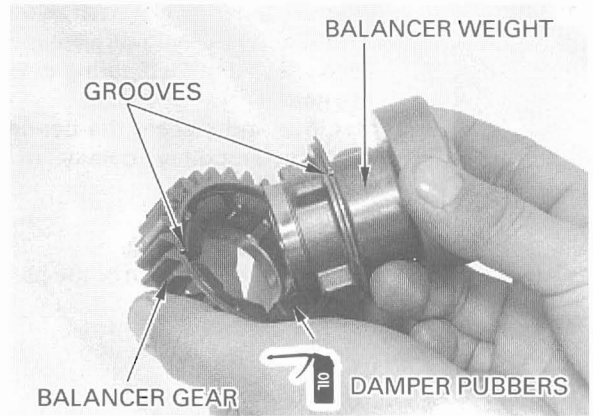


## CRANKSHAFT/TRANSMISSION/BALANCER

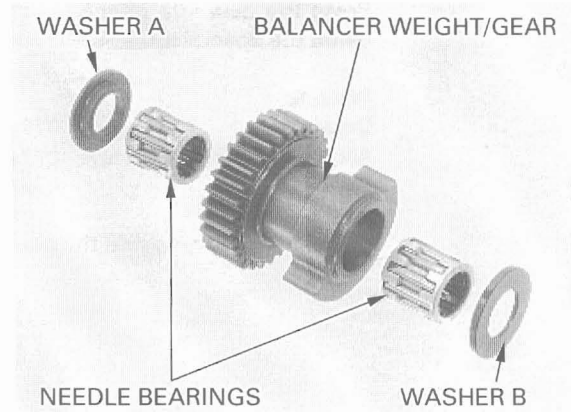
Apply clean engine oil to the damper rubbers.  
Install the damper rubbers into the groove of the balancer gear.  
Install the balancer gear onto the balancer weight while aligning the grooves.

### NOTE:

The rear balancer gear has identification groove on the gear teeth.



Install the needle bearings into the balancer weight.  
Install the side washer A and B.

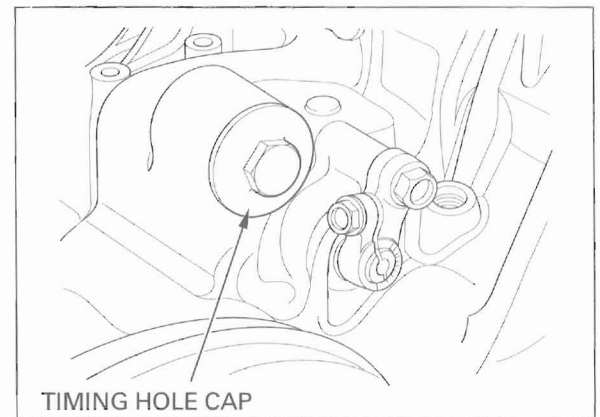


## BALANCER INSTALLATION

### NOTE:

Always adjust the backlash after the balancer installation.

Remove the rear balancer timing hole cap.

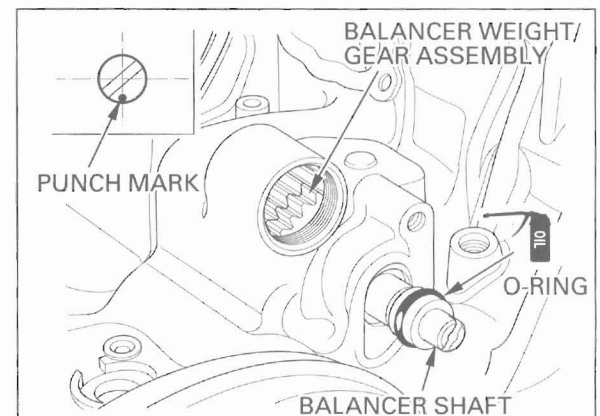


Install a new O-ring into the groove of the rear balancer shaft.  
Apply small amount of oil to the O-ring.

Set the rear balancer assembly into the upper crankcase, then install the rear balancer shaft with its punch mark facing down.

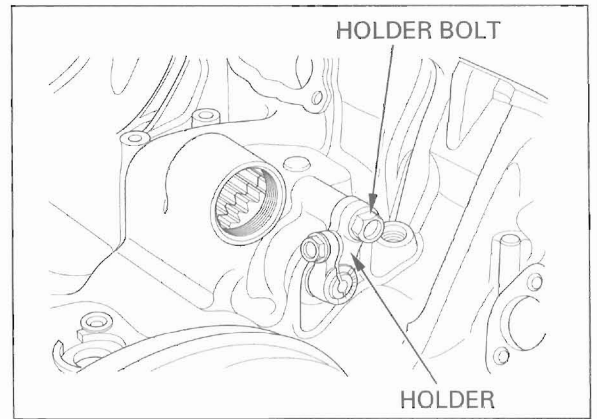
### NOTE:

The balancer shaft will only installed one particular position. Rotate it until it installed easily; do not force it in.



Install the rear balancer shaft holder and tighten the holder bolt to the specified torque.

**TORQUE:** 27 N·m (2.8 kgf·m , 20 lbf·ft)

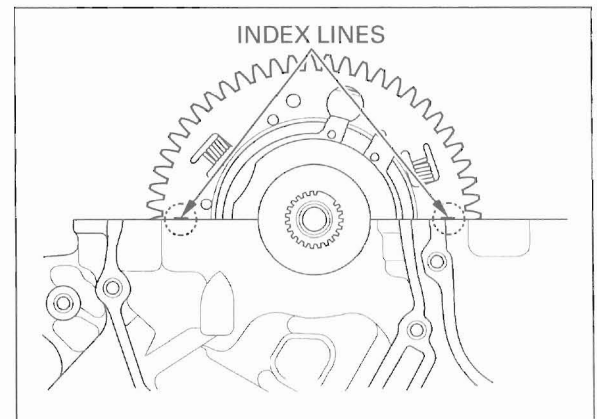


Install the crankshaft (page 11-8).

Turn the crankshaft clockwise and make sure the No. 1 piston at TDC (Top Dead Center).

**NOTE:**

Make sure the index lines on the primary drive sub-gear are aligned with the mating surface of the crankcase.

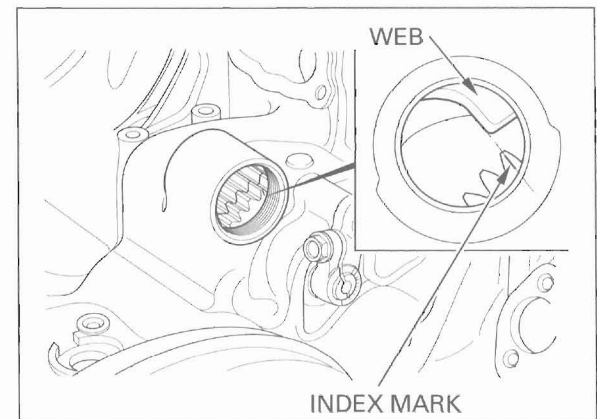


Turn the rear balancer and align the index mark on the balancer gear tooth with the web on the upper crankcase as seen through the timing hole.

Set the balancer idle gear onto the rear balancer gear and crankshaft drive gear.

**NOTE:**

Make sure the No. 1 piston at TDC, and the rear balancer index line and crankcase web are aligned.

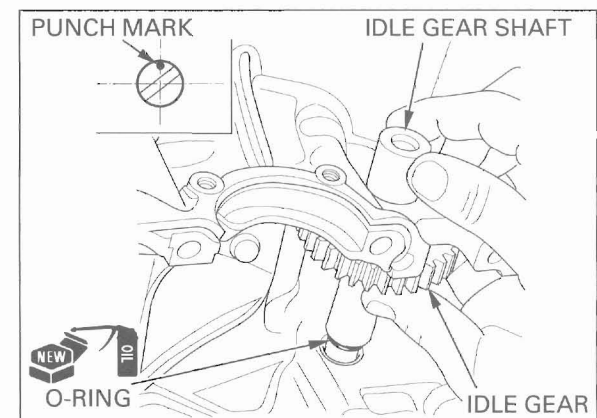


Install a new O-ring into the groove of the balancer idle gear shaft.  
Apply small amount of oil to the O-ring.

Install the distance collar, then install the balancer idle gear shaft with its punch mark facing down.

**NOTE:**

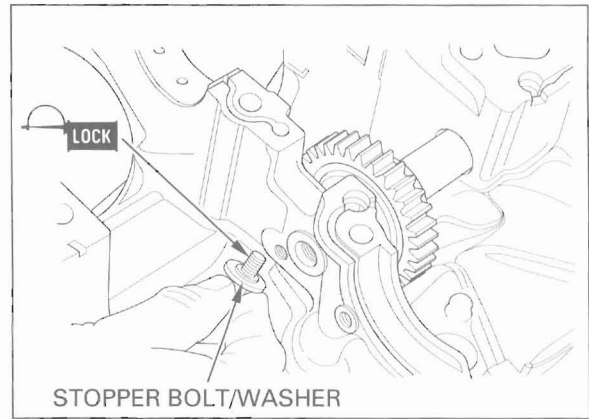
The balancer idle gear shaft will only installed one particular position. Rotate it until it installed easily; do not force it in.



## CRANKSHAFT/TRANSMISSION/BALANCER

Apply a locking agent to the stopper bolt threads. Install and tighten the balancer idle gear shaft stopper bolt/washer to the specified torque.

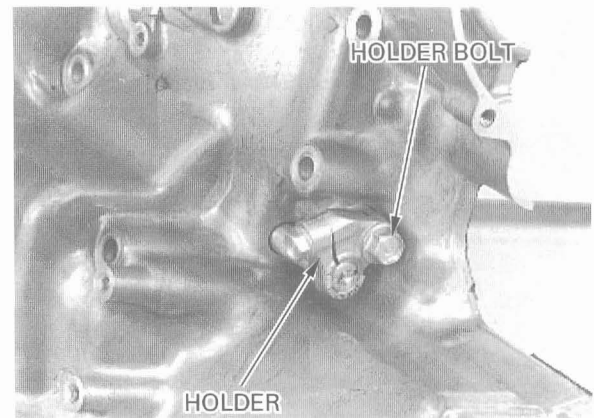
**TORQUE:** 12 N·m (1.2 kgf·m , 9 lbf·ft)



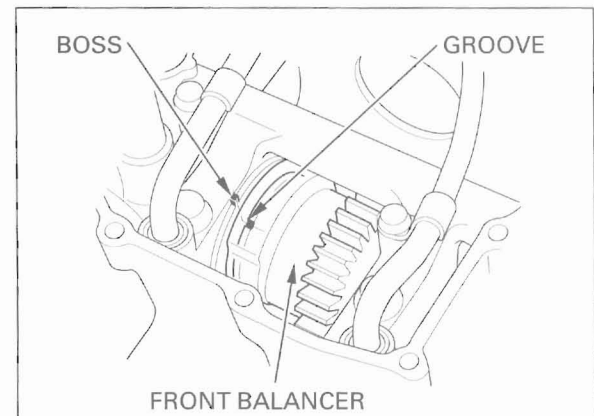
Install the balancer idle gear shaft holder and tighten the holder bolt to the specified torque.

**TORQUE:** 27 N·m (2.8 kgf·m , 20 lbf·ft)

Assemble the crankcase (page 11-12).

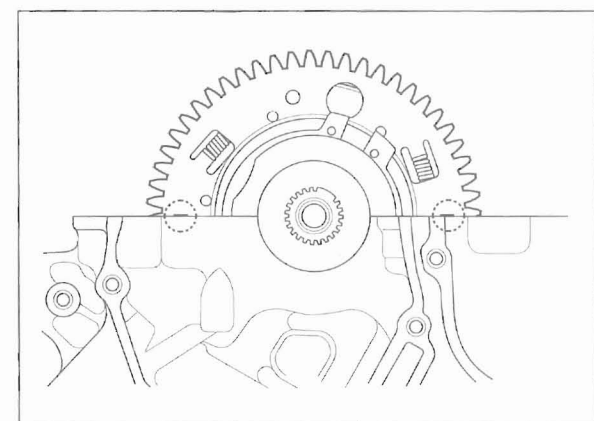


Set the front balancer assembly onto the crankshaft drive gear while aligning its index groove with the boss on the lower crankcase.



**NOTE:**

Make sure the No. 1 piston at TDC.



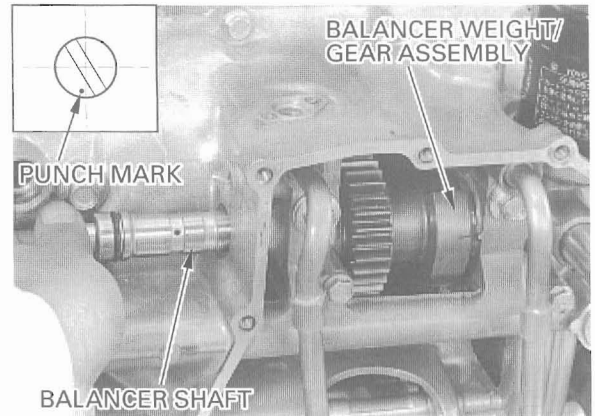
Install a new O-ring into the groove of the front balancer shaft.

Apply small amount of oil to the O-ring.

Install the front balancer shaft with its punch mark facing down.

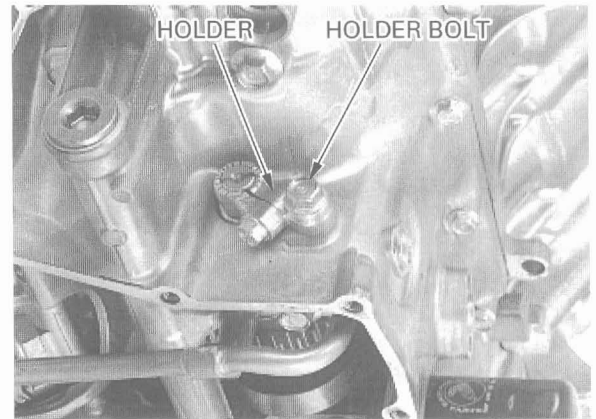
**NOTE:**

The balancer shaft will only installed one particular position. Rotate it until it installed easily; do not force it in.



Install the front balancer shaft holder and tighten the holder bolt to the specified torque.

**TORQUE:** 27 N·m (2.8 kgf·m , 20 lbf·ft)

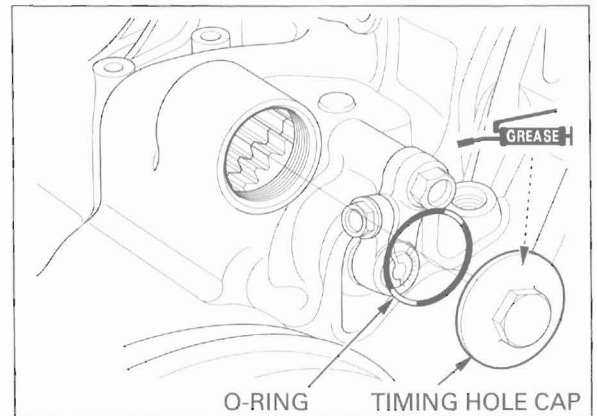


Apply grease to the threads of rear balancer timing hole cap.

Check the O-ring is in good condition, install the rear balancer timing hole cap.

Tighten the cap to the specified torque.

**TORQUE:** 7 N·m (0.7 kgf·m , 5.1 lbf·ft)

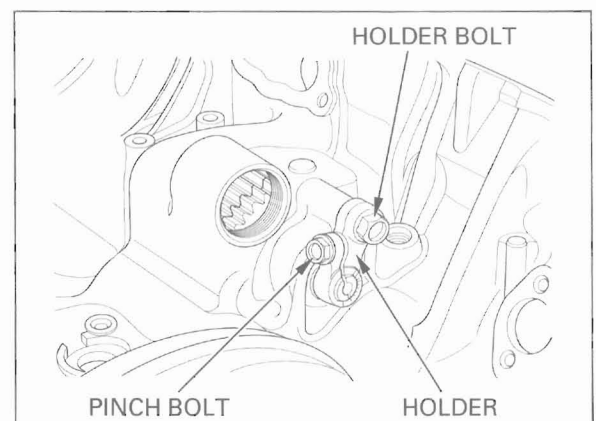


### BACKLASH ADJUSTMENT

**NOTE:**

Adjust the backlash while the engine is cold (below 95°F/35°C) and the engine stopped.

Remove the balancer shaft holder pinch bolts and the idle gear shaft holder pinch bolt.

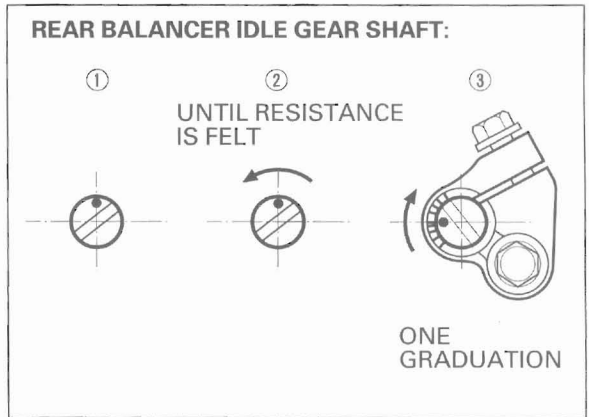


## CRANKSHAFT/TRANSMISSION/BALANCER

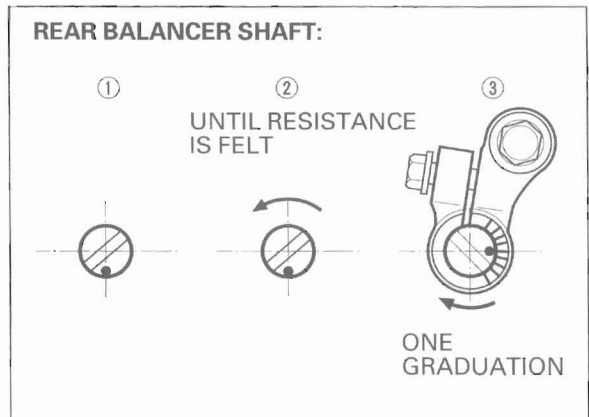
Turn the rear balancer idle gear shaft counterclockwise until the resistance is felt, then back it off one graduation using the punch mark as a measure.

### CAUTION:

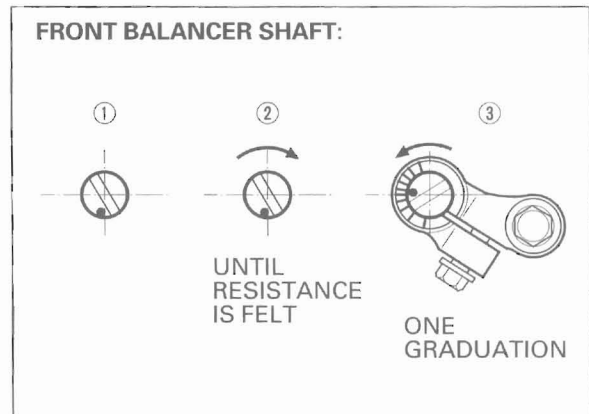
**Excessive force can cause a balancer gear, bearing and shaft damage. Do not turn the shaft more than necessary.**



Turn the rear balancer shaft counterclockwise until the resistance is felt, then back it off one graduation using the punch mark as a measure.



Remove the front balancer shaft holder pinch bolt. Turn the front balancer shaft clockwise until the resistance is felt, then back it off one graduation using the punch mark as a measure.



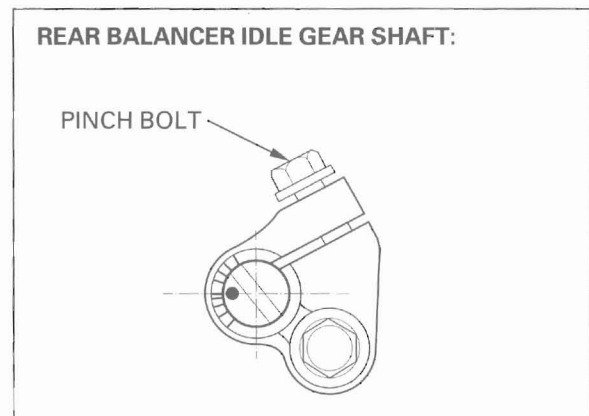
Warm up engine and let it idle.

If the balancer gear noises excessive, adjust the balancer backlash as follows:

1. Turn the rear balancer idle gear shaft clockwise until the gears begin to make a "whining" noise. Then, turn the gear shaft counterclockwise until the gear "whine" noise disappears.

Tighten the gear shaft pinch bolt to the specified torque.

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





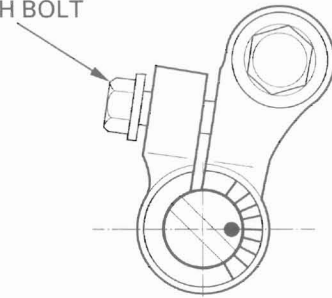
- Turn the rear balancer shaft counterclockwise until the gears begin to make a "whining" noise. Then, turn the gear shaft clockwise until the gear "whine" noise disappears.

Tighten the gear shaft pinch bolt to the specified torque.

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

### REAR BALANCER SHAFT:

PINCH BOLT



- Turn the front balancer shaft clockwise until the gears begin to make a "whining" noise. Then, turn the gear shaft counterclockwise until the gear "whine" noise disappears.

Tighten the gear shaft pinch bolt to the specified torque.

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

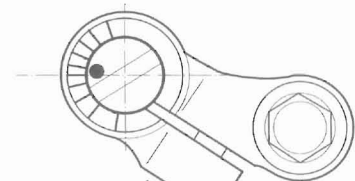
After all gear backlash adjustments are done, snap the throttle and make sure the gear noises is not excessive.

If the gear "whine" noise is excessive, the backlash is too small.

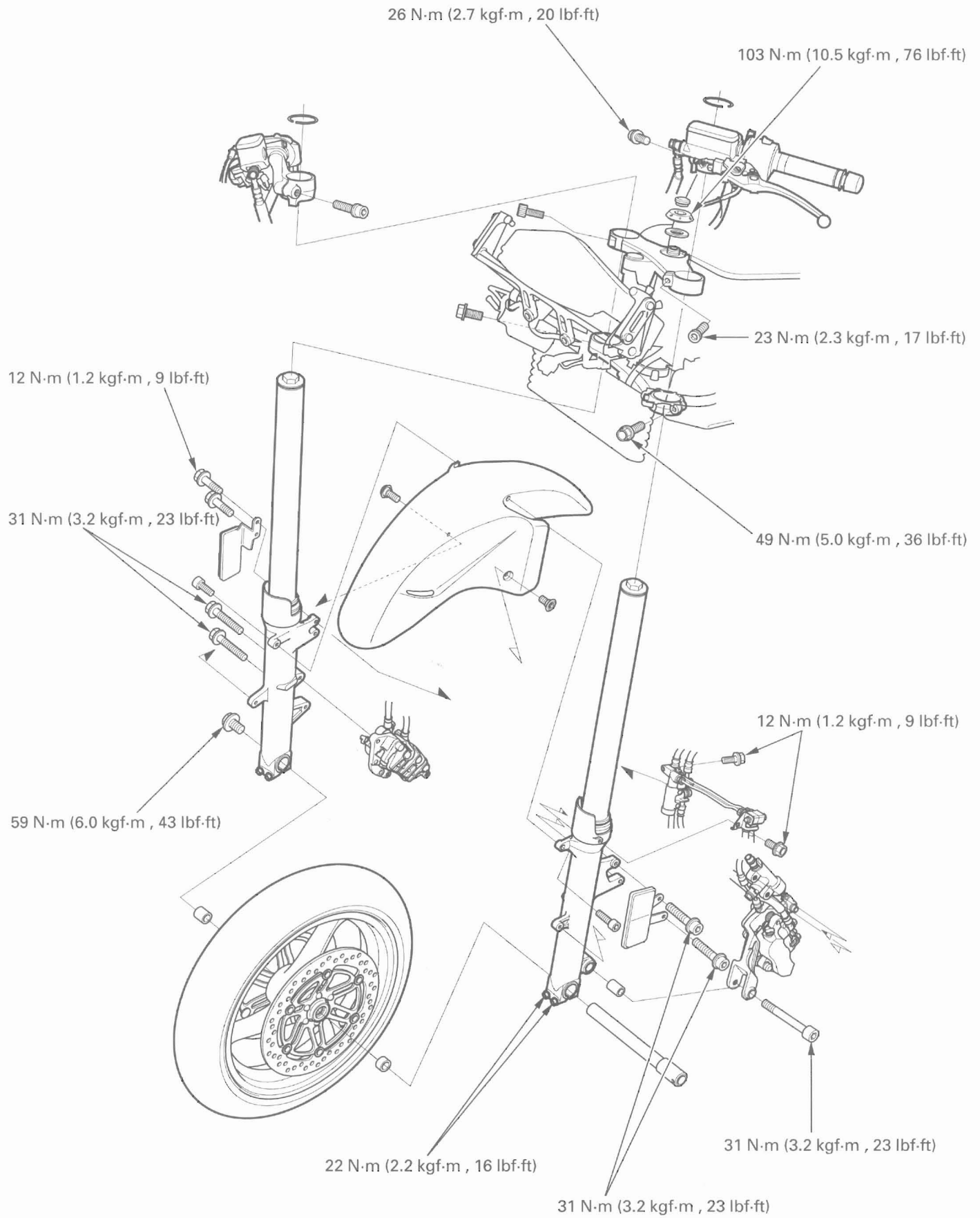
If the gear "rattling" noise is excessive, the backlash is excessive.

### FRONT BALANCER SHAFT:

PINCH BOLT



# FRONT WHEEL/SUSPENSION/STEERING



# 13. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	13-1	FRONT WHEEL	13-9
TROUBLESHOOTING	13-2	FORK	13-15
HANDLEBARS	13-3	STEERING STEM	13-26

## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After the front wheel installation, check the brake operation by applying the brake lever and pedal.

- When servicing the front wheel, fork or steering stem, support the motorcycle using a safety stand or hoist.
- Refer to section 15 for brake system information.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—————	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lb) load	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	—————
	Up to maximum weight capacity	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)	—————
Axle runout		—————	0.20 (0.008)
Wheel rim runout	Radial	—————	2.0 (0.08)
	Axial	—————	2.0 (0.08)
Fork	Spring free length	237.9 (9.37)	233.1 (9.18)
	Spring direction	With the tapered end facing down	—————
	Tube runout	—————	0.20 (0.008)
	Recommended fork fluid	Pro Honda Suspension Fluid SS-8	—————
	Fluid level	154 (6.1)	—————
	Fluid capacity	486 ± 2.5 cm <sup>3</sup> (16.4 ± 0.08 US oz, 17.1 ± 0.09 Imp oz)	—————
Steering head bearing pre-load		1.0 – 1.5 kg (2.2 – 3.3 lbs)	—————

13

### 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)	
Steering stem nut	103 N·m (10.5 kgf·m , 76 lbf·ft)	} ALOC bolt See page 13-31
Steering stem bearing adjusting nut A	26 N·m (2.7 kgf·m , 20 lbf·ft)	
Steering stem bearing adjusting nut B	—————	
Fork top bridge pinch bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Fork bottom bridge pinch bolt	49 N·m (5.0 kgf·m , 36 lbf·ft)	
Front axle bolt	59 N·m (6.0 kgf·m , 43 lbf·ft)	
Front axle holder bolt	22 N·m (2.2 kgf·m , 16 lbf·ft)	
Front brake disc mounting bolt	20 N·m (2.0 kgf·m , 14 lbf·ft)	ALOC bolt
Fork cap	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Fork socket bolt	20 N·m (2.0 kgf·m , 14 lbf·ft)	} Apply a locking agent to the threads
Fork damper lock nut	20 N·m (2.0 kgf·m , 14 lbf·ft)	

## FRONT WHEEL/SUSPENSION/STEERING

---

### TOOLS

Steering stem socket	07916-3710101
Ball race remover set	07946-KM90001
– Driver attachment, A	07946-KM90100
– Driver attachment, B	07946-KM90200
– Driver shaft assembly	07946-KM90300
– Bearing remover, A	07946-KM90401
– Bearing remover, B	07946-KM90500
– Assembly base	07946-KM90600
Steering stem driver	07946-MB00000
Oil seal driver	07947-KA40200
Slider weight	07947-KA50100
Driver	07749-0010000
Attachment, 42 × 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500
Bearing remover shaft	07746-0050100
Bearing remover head, 20 mm	07746-0050600

Equivalent commercially available in U.S.A.

### TROUBLESHOOTING

#### Hard steering

- Faulty or damaged steering head bearings
- Insufficient tire pressure
- Steering head bearing adjustment nut too tight

#### Steers to one side or does not track straight

- Unevenly adjusted right and left fork legs
- Bent fork
- Bent axle
- Wheel installed incorrectly
- Faulty steering head bearings
- Bent frame
- Worn wheel bearing
- Worn swingarm pivot components

#### Front wheel wobbling

- Bent rim
- Worn front wheel bearings
- Faulty tire
- Unbalanced tire and wheel

#### Wheel turns hard

- Faulty wheel bearing
- Faulty speedometer gear
- Bent front axle
- Brake drag

#### Soft suspension

- Insufficient fluid in fork
- Weak fork springs
- Tire pressure too low

#### Hard suspension

- Incorrect fluid weight
- Bent fork tubes
- Clogged fork fluid passage

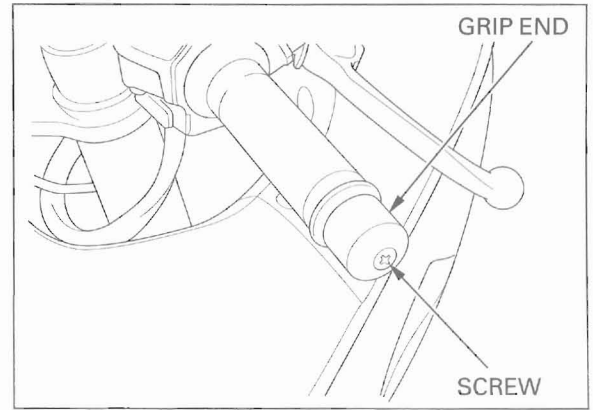
#### Front suspension noisy

- Insufficient fluid in fork
- Loose fork fasteners

## HANDLEBARS

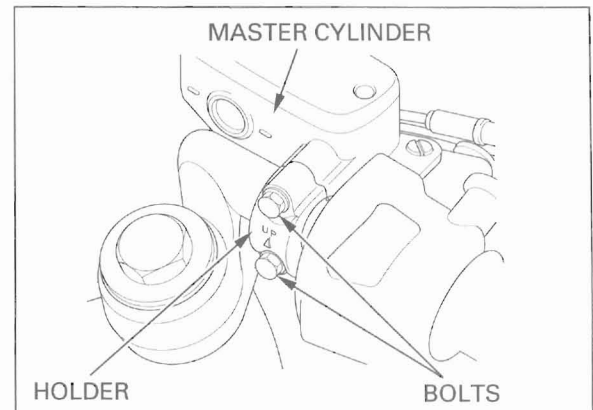
### RIGHT HANDLEBAR REMOVAL

Remove the screw and the handlebar grip end.

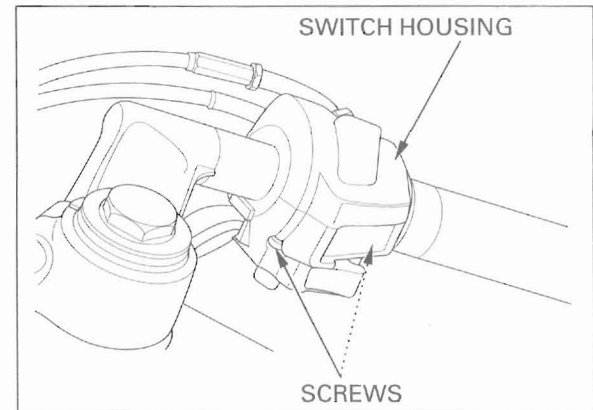


Disconnect the front brake switch wires connectors from the switch.

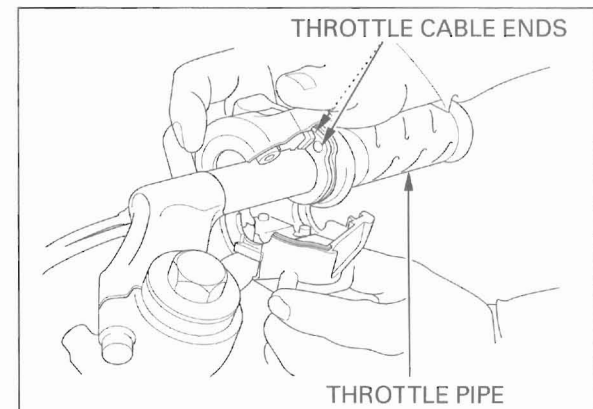
Remove the master cylinder holder bolts, holder and master cylinder assembly.



Remove the right handlebar switch/throttle housing screws.



Disconnect the throttle cable ends from the throttle pipe and remove the housing.  
Remove the throttle pipe from the right handlebar.



## FRONT WHEEL/SUSPENSION/STEERING

Remove the stop ring from the fork pipe.

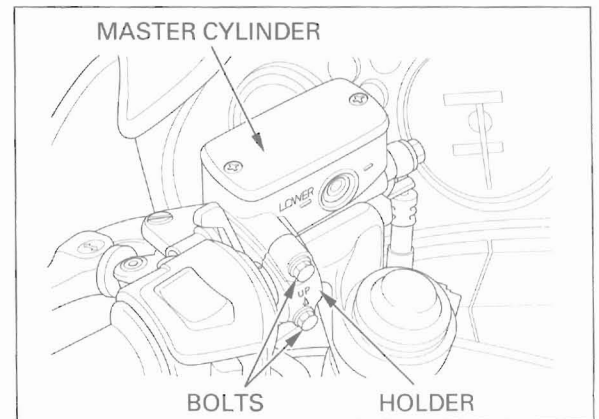
Loosen the right handlebar pinch bolt and remove the handlebar.



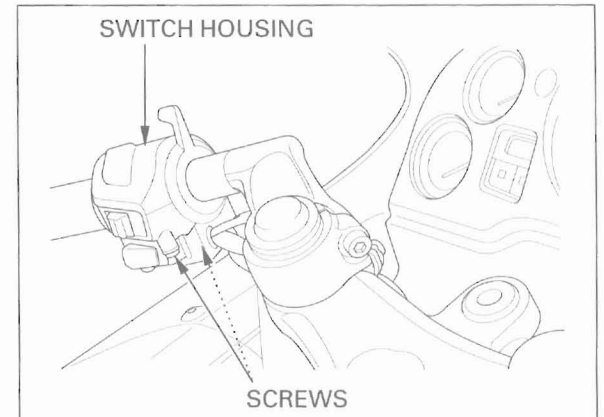
### LEFT HANDLEBAR REMOVAL

Disconnect the clutch switch wire connectors from the switch.

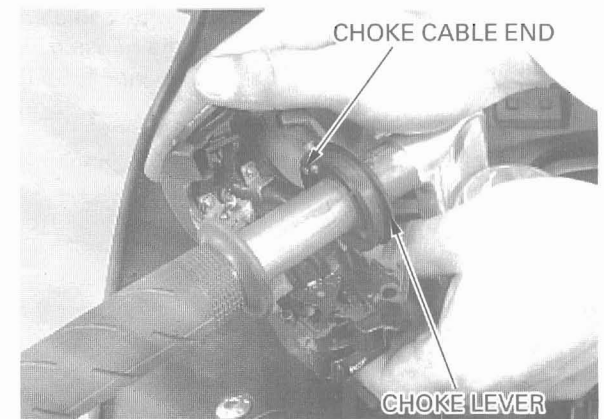
Remove the clutch master cylinder holder bolts, holder and clutch master cylinder assembly.



Remove the left handlebar switch housing screw.

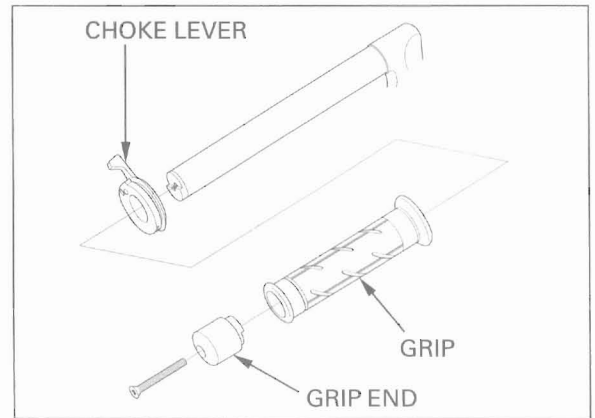


Disconnect the choke cable end from the choke lever and remove the left handlebar switch housing.



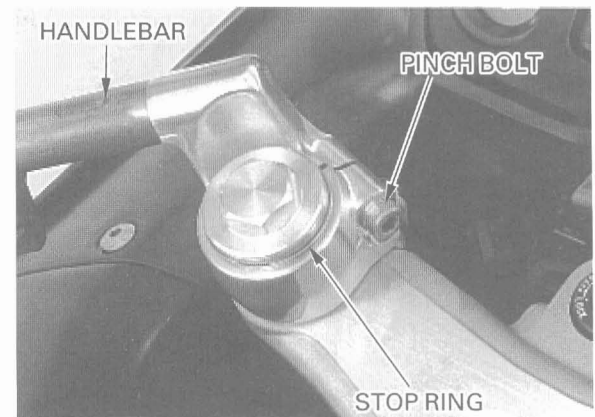
Remove the screw and handlebar grip end.  
Remove the handle grip from the handlebar.

Remove the choke lever from the handlebar.



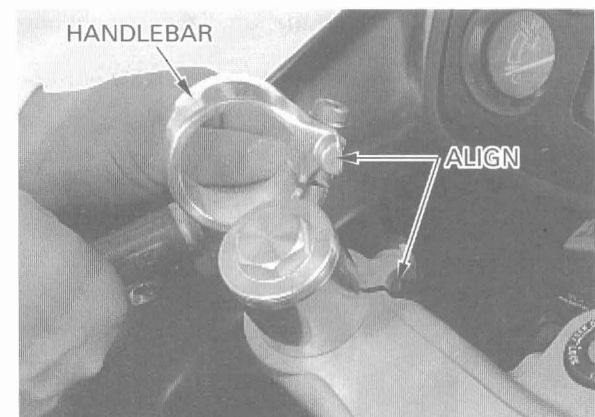
Remove the stop ring from the fork pipe.

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 a stop ring into the groove of the fork tube.

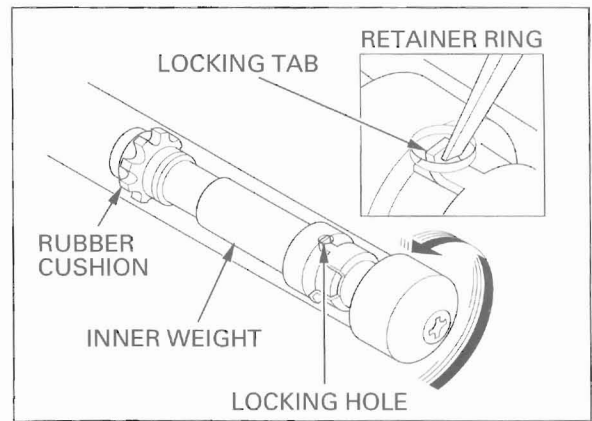


## FRONT WHEEL/SUSPENSION/STEERING

### HANDLEBAR WEIGHT REPLACEMENT

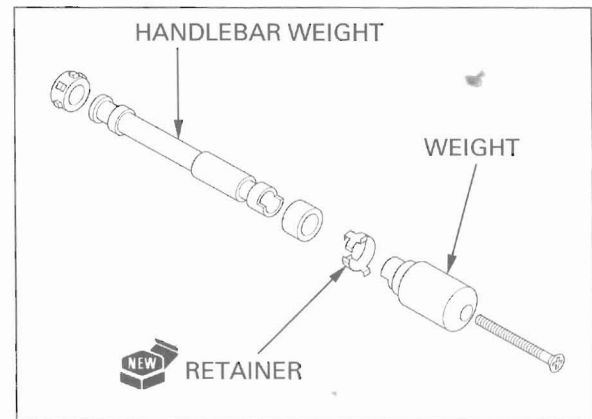
Remove the grip from the handlebar.  
Straighten the weight retainer tab by the screwdriver or punch.

*Apply lubricant spray through the tab locking hole to the rubber for easy removal.* Temporarily install the grip end and screw, then remove the handlebar weight by turning the grip end.

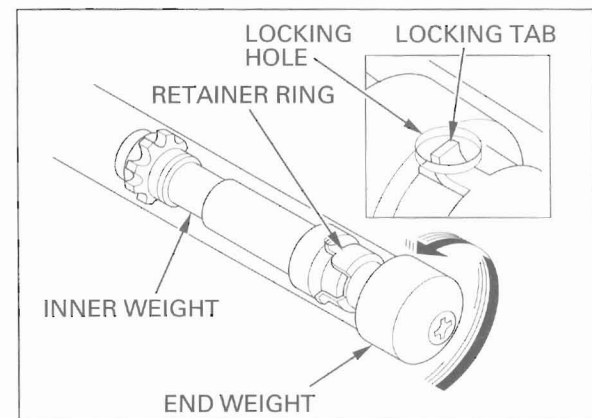


Remove the grip end from the handlebar weight.  
Discard the retainer.

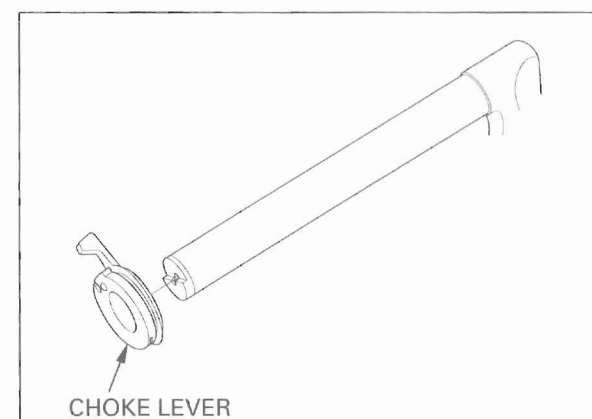
Install the new retainer onto the handlebar weight.  
Install the grip end onto the handlebar weight aligning its boss with the slot in the handlebar weight.  
Install a new mounting screw.



Insert the handlebar weight assembly into the handlebar.  
Turn the handlebar weight and hook the retainer tab with the hole in the handlebar.



Install the choke lever onto the left handlebar.

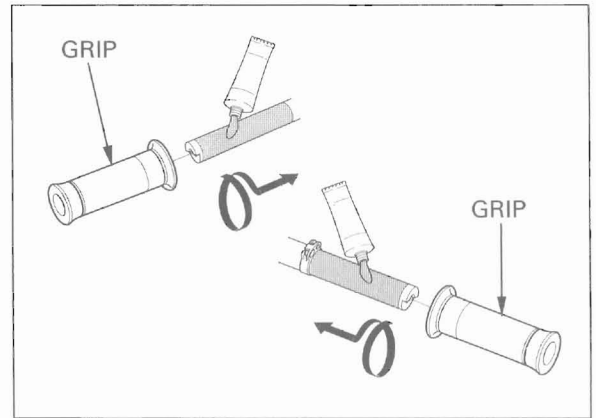




Apply Honda Bond A or Honda Hand Grip Cement (U.S.A. only) to the inside of the grip and to the clean surfaces of the left handlebar and throttle grip.

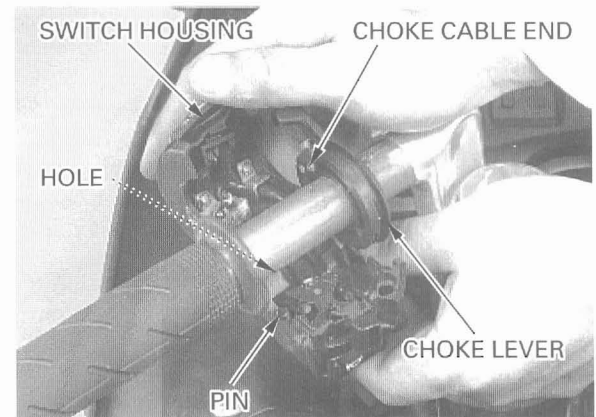
Wait 3–5 minutes and install the grip.  
Rotate the grip for even application of the adhesive.

*Allow the adhesive to dry for an hour before using.*

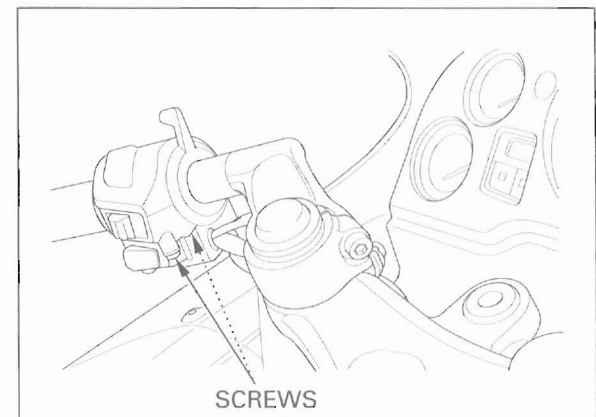


Apply clean grease to the choke cable sliding surface.  
Connect the choke cable end to the choke lever.

Install the left handlebar switch aligning its locating pin with the hole in the handlebar.



Tighten the forward screw first, then the rear screw.



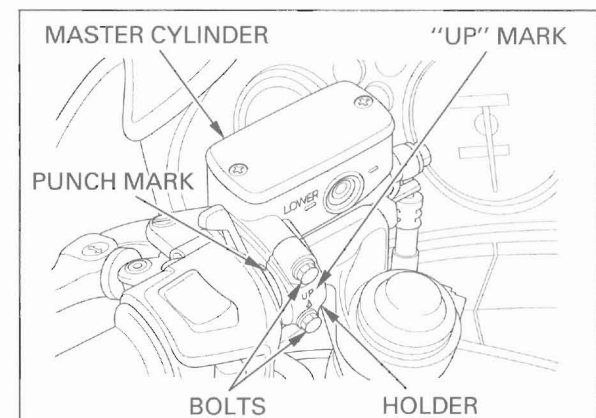
Install the clutch master cylinder assembly by aligning the end of the master cylinder with the punch mark on the handlebar.

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

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.

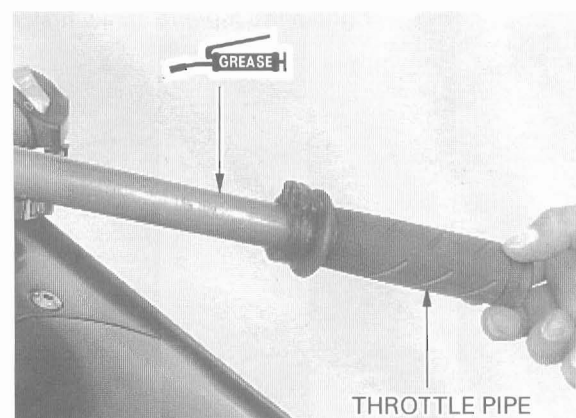
**TORQUE:** 26 N·m (2.7 kgf·m , 20 lbf·ft)

Install a stop ring into the groove of the fork tube.



Apply grease to the sliding surface of the throttle pipe.

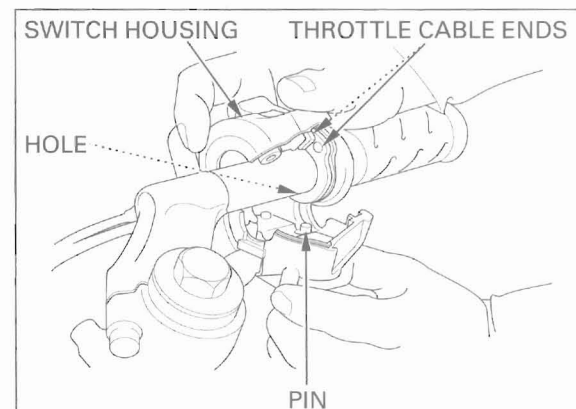
Install the throttle pipe on the right handlebar.



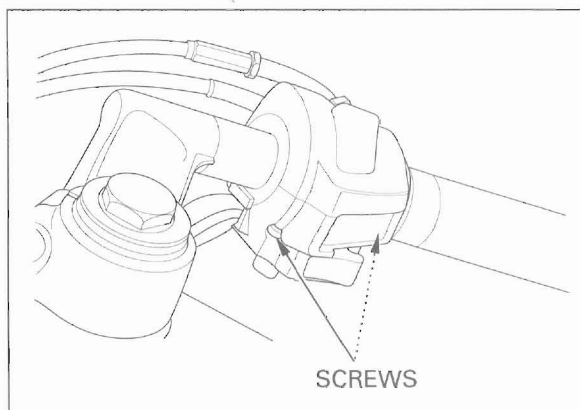
Apply grease to the throttle cable ends and sliding surface.

Connect the throttle cables to the throttle pipe.

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.



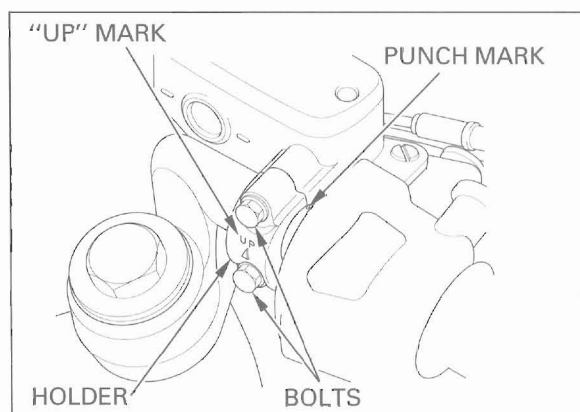
Install the master cylinder by aligning the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with its "UP" mark facing up.

Tighten the upper bolt first, then the lower bolt.

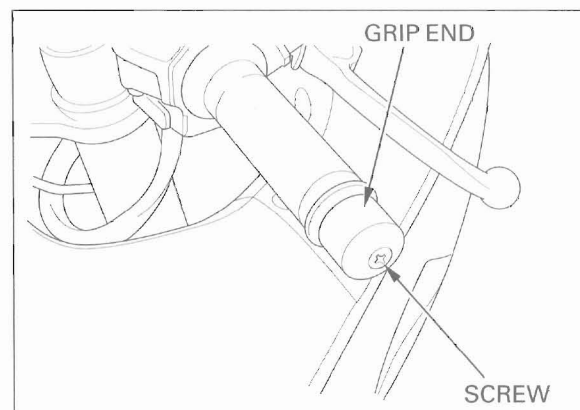
**TORQUE:** 12 N·m (1.2 kgf·m , 9 lbf·ft)

Connect the brake switch wires.



Install the grip end and tighten the new mounting screw to the specified torque.

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



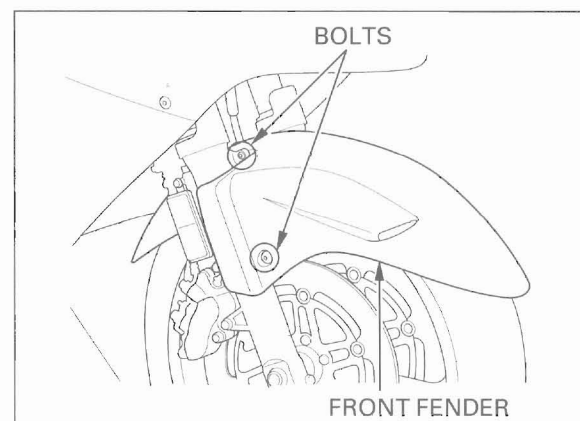
## FRONT WHEEL

### REMOVAL

**▲WARNING**

*A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*

Support the motorcycle securely using a safety stand or a hoist.  
Remove the bolts and front fender.



## FRONT WHEEL/SUSPENSION/STEERING

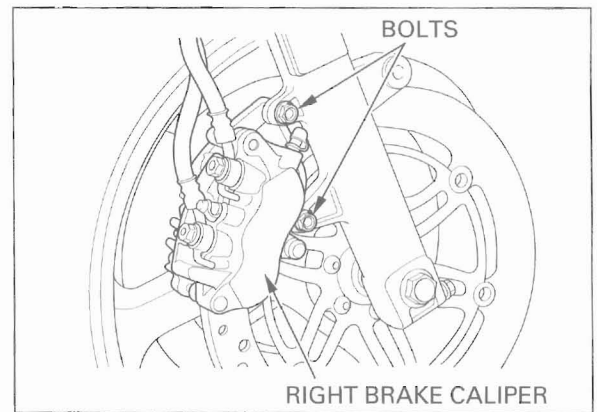
Remove the mounting bolts and right brake caliper.

**CAUTION:**

*Support the brake caliper with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.*

**NOTE:**

Do not operate the brake lever or pedal after the brake caliper is removed.



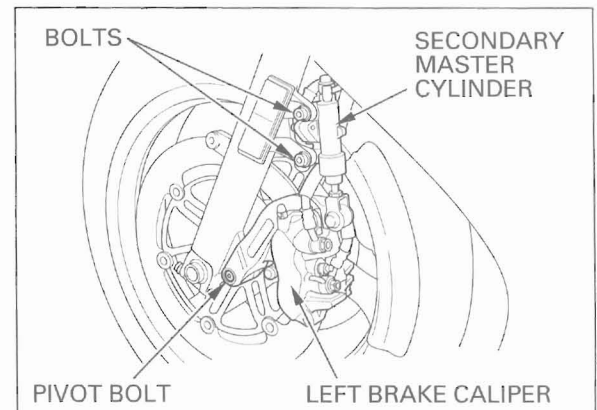
Remove the secondary master cylinder mounting bolts, reflector, left brake caliper pivot bolt and slide the assembly out of the way.

**CAUTION:**

*Support the brake caliper and secondary master cylinder with a piece of wire so that it does not hang from the brake hose. Do not twist the brake hose.*

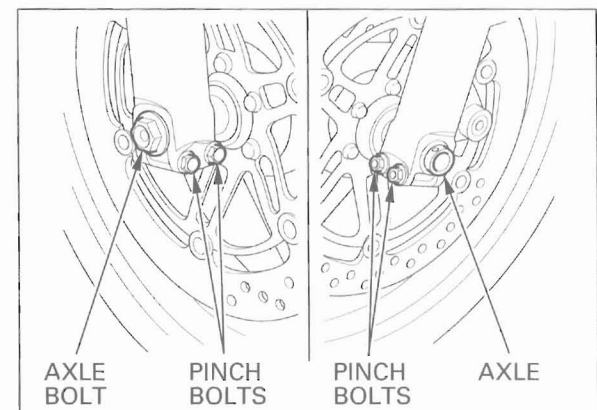
**NOTE:**

Do not operate the brake lever or pedal after the brake caliper is removed.

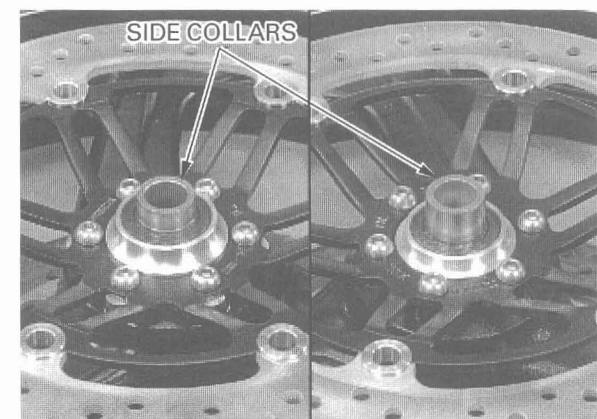


Loosen the right axle pinch bolts.  
Remove the axle bolt.

Loosen the left axle pinch bolts.  
Remove the axle and the front wheel.



Remove the side collars.

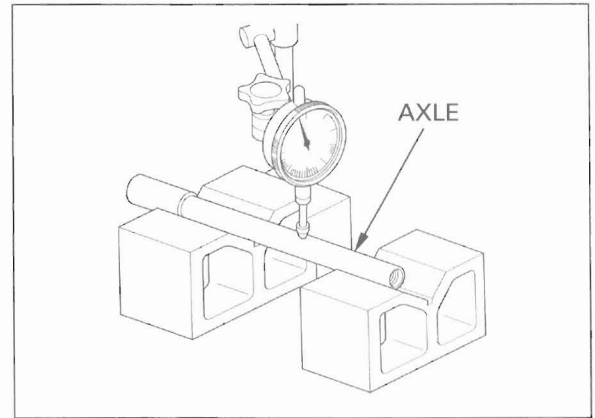


**INSPECTION**

**Axle**

Set the axle in V-blocks and measure the runout. Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT:** 0.20 mm (0.008 in)



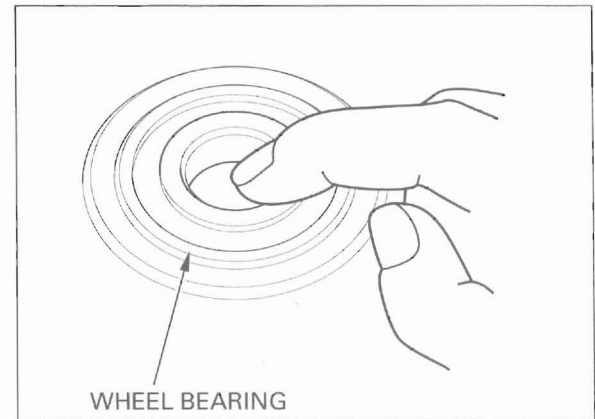
**Wheel bearing**

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

*Replace the bearings in pairs.*

Remove and discard the bearings if they do not turn smoothly, quietly, or if they fit loosely in the hub.

Install the new bearings into the hub using the special tools (page 13-12).



**Wheel rim runout**

Check the rim runout by placing the wheel in a turning stand.

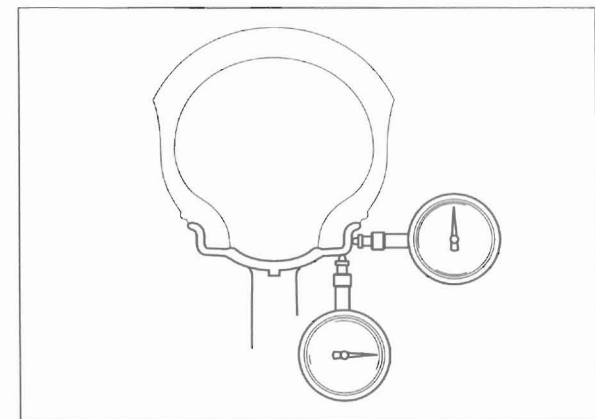
Spin the wheel by hand, and read the runout using a dial indicator.

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**

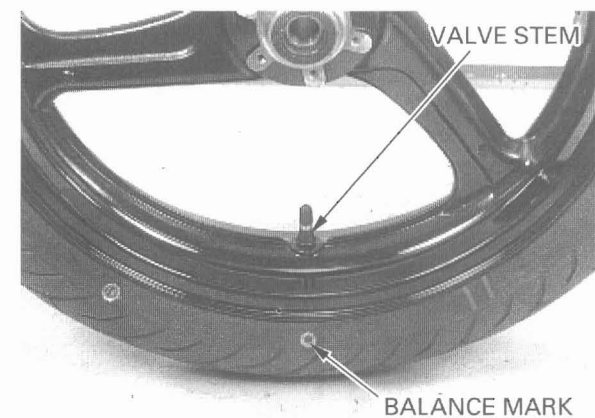
**CAUTION:**

*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.*

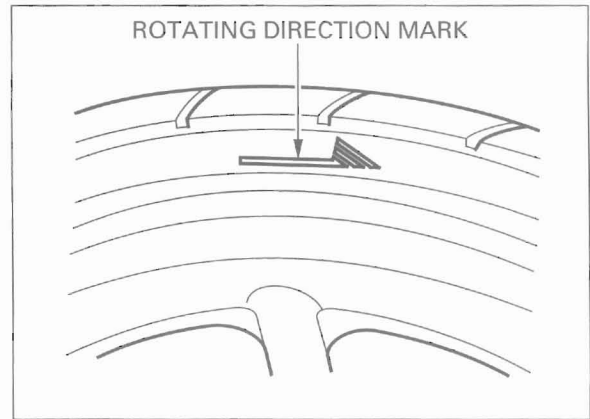
**NOTE:**

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.



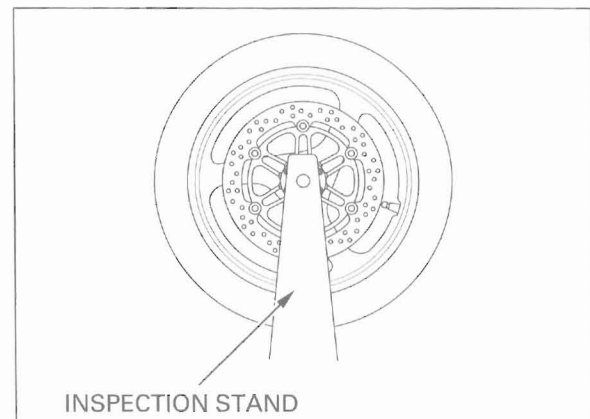
## FRONT WHEEL/SUSPENSION/STEERING

Note the rotating direction marks on the tire.



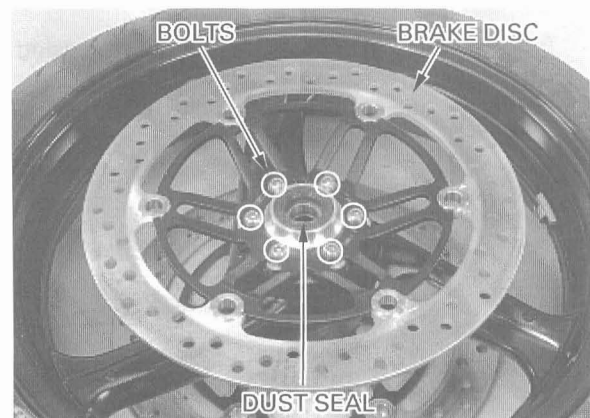
Remove the dust seals from the wheel.  
Mount the wheel, tire and brake discs assembly in an inspection stand.  
Spin the wheel, allow it to stop, and mark the lowest (heaviest) point of the wheel with a chalk.  
Do this two or three times to verify the heaviest area.  
If the wheel is balanced, it will not stop consistently in the same position.

To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 60 grams to the wheel.



### DISASSEMBLY

Remove the bolts and brake discs.  
Remove the dust seals.

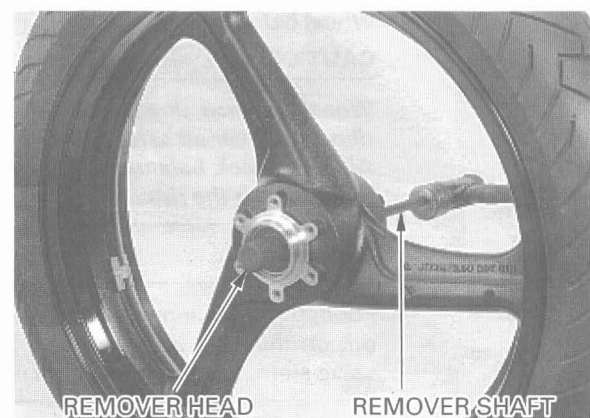


Install the bearing remover head into the bearing.  
From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub.  
Remove the distance collar and drive out the other bearing.

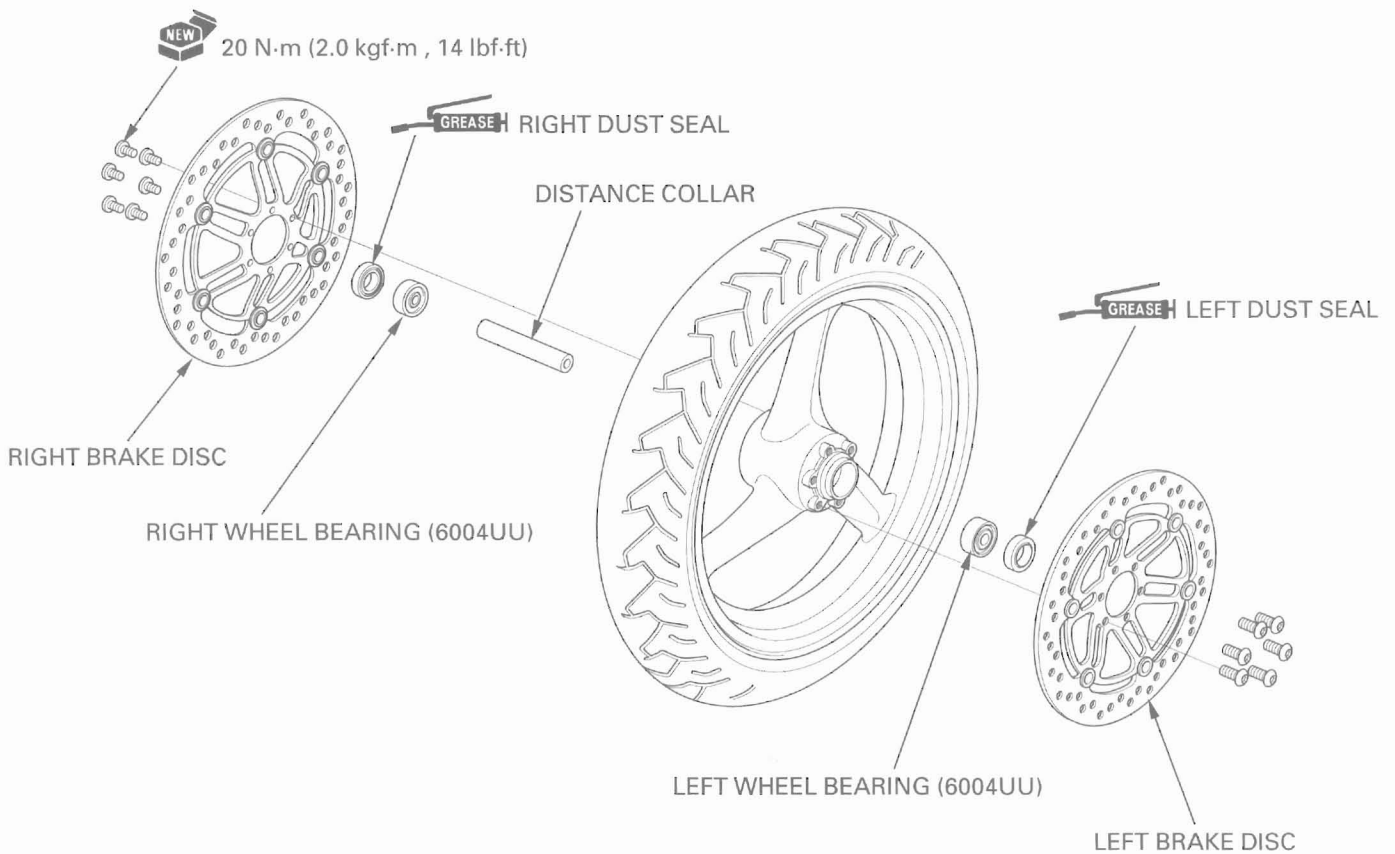
#### TOOLS:

**Bearing remover head, 20 mm** 07746-0050600  
(Equivalent commercially available in U.S.A.)

**Bearing remover shaft** 07746-0050100  
(Equivalent commercially available in U.S.A.)



ASSEMBLY



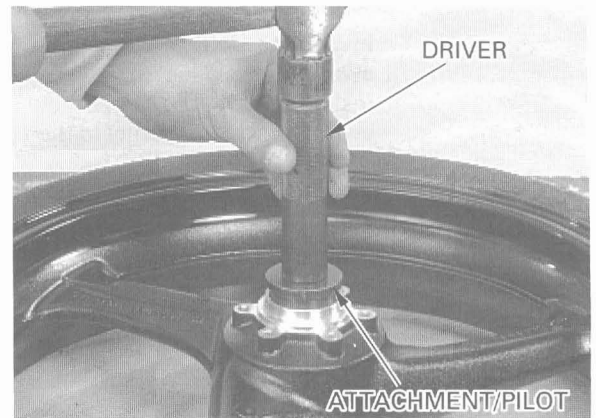
CAUTION:

*Never install the old bearings. Once the bearings has been removed, the bearing must be replaced with new ones.*

Drive in a new right bearing squarely. Install the distance collar, then drive in the left bearing using the special tool.

TOOLS:

Driver	07749-0010000
Attachment, 42 × 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500



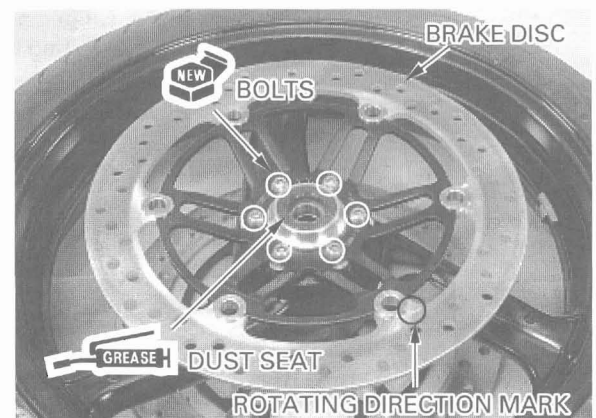
**▲WARNING**

*Do not get grease on the brake discs or stopping power will be reduced.*

Install the brake discs on the wheel hub with its rotating direction mark (→) facing out. Install and tighten the new mounting bolts to the specified torque.

**TORQUE:** 20 N·m (2.0 kgf·m, 14 lbf·ft)

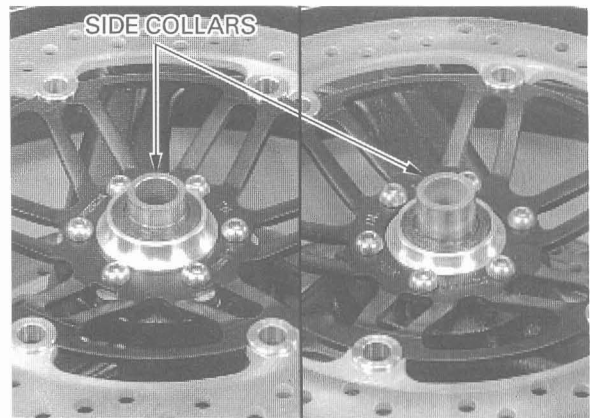
Apply grease to the dust seal lips, then install them into the wheel hub.





## INSTALLATION

Install the side collars.



Install the front wheel between the fork legs while aligning the left brake disc between the left brake caliper pads.

Apply thin layer of grease to the front axle surface. Install the front axle from the left side.

Hold the axle and tighten the axle bolt to the specified torque.

**TORQUE:** 59 N·m (6.0 kgf·m , 43 lbf·ft)

Tighten the right axle pinch bolts to the specified torque.

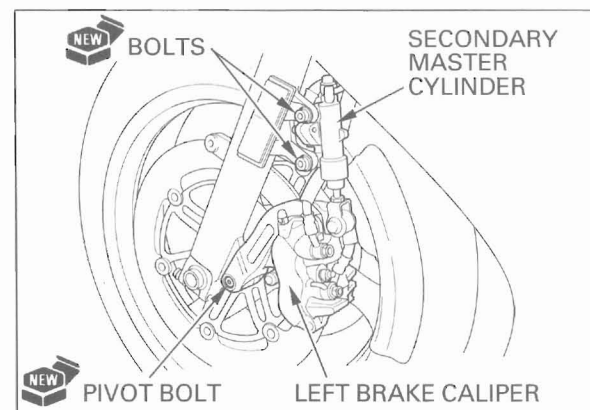
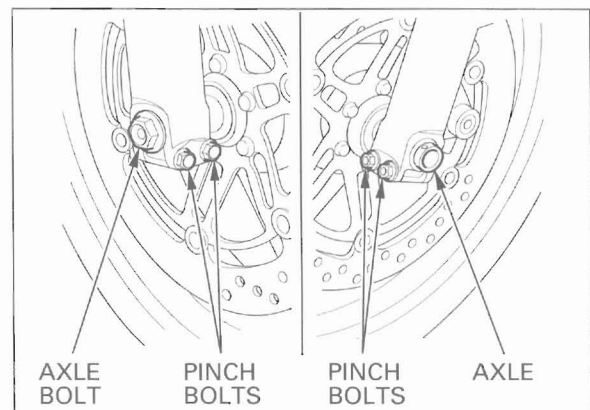
**TORQUE:** 22 N·m (2.2 kgf·m , 16 lbf·ft)

Install the left brake caliper, secondary master cylinder and reflector. Install and tighten the new secondary master cylinder mounting bolts to the specified torque.

**TORQUE:** 31 N·m (3.2 kgf·m , 23 lbf·ft)

Install and tighten the new left brake caliper pivot bolt to the specified torque.

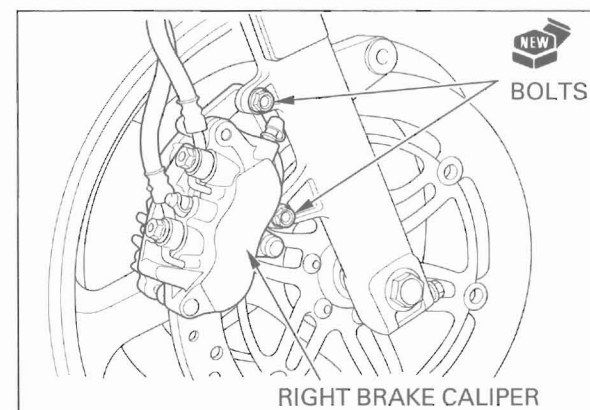
**TORQUE:** 31 N·m (3.2 kgf·m , 23 lbf·ft)



Install the right brake caliper and tighten the new mounting bolts to the specified torque.

**TORQUE:** 31 N·m (3.2 kgf·m , 23 lbf·ft)

Install the front fender (page 2-15).

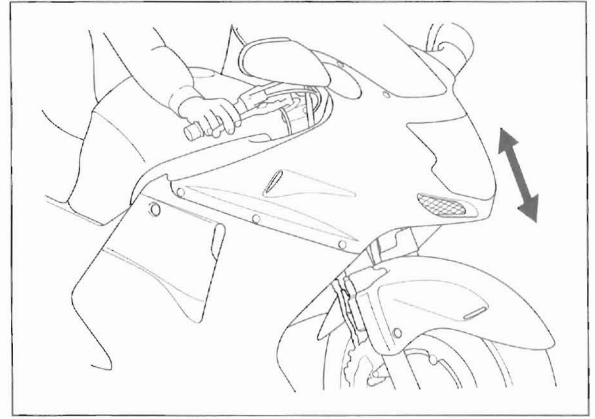




With the front brake applied, pump the fork up and down several times to seat the axle.

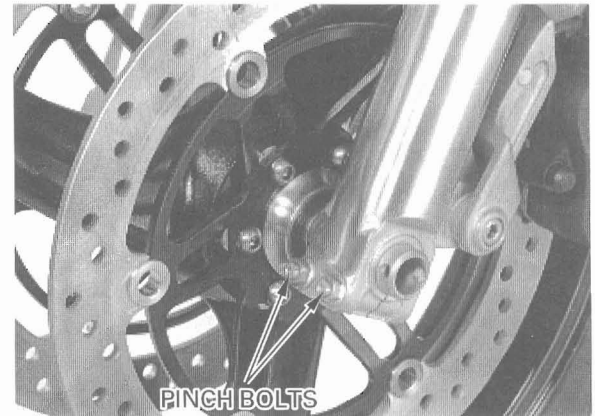
**▲WARNING**

*Check the brake operation by applying the brake lever and pedal.*

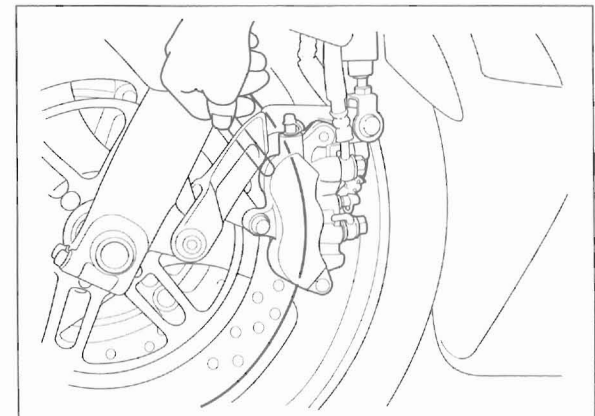


Tighten the left axle holder pinch bolts to the specified torque.

**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**

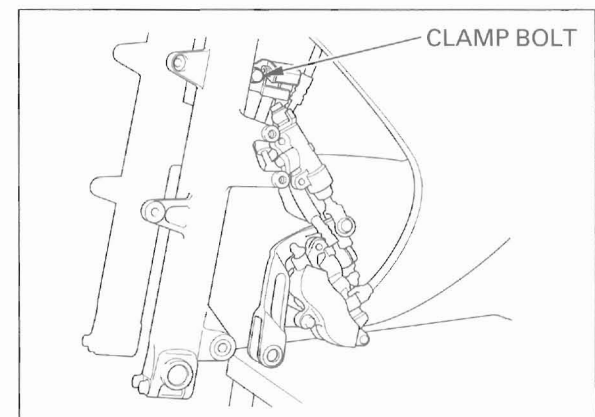
**REMOVAL**

- Remove the following:
- Front wheel (page 13-9)
  - Handlebars (page 13-3)

**CAUTION:**

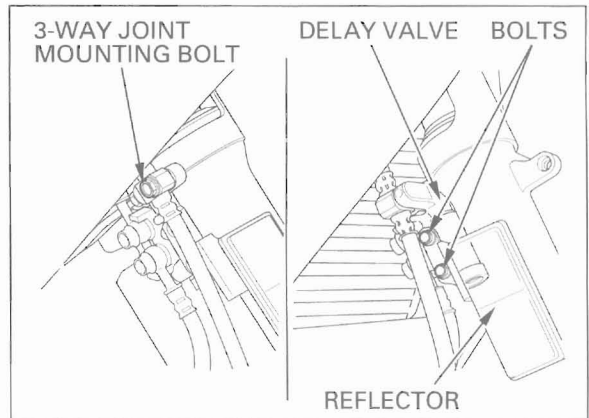
*Keep the brake and clutch master cylinders upright.*

For the left fork leg removal, remove the brake hose clamp bolt.



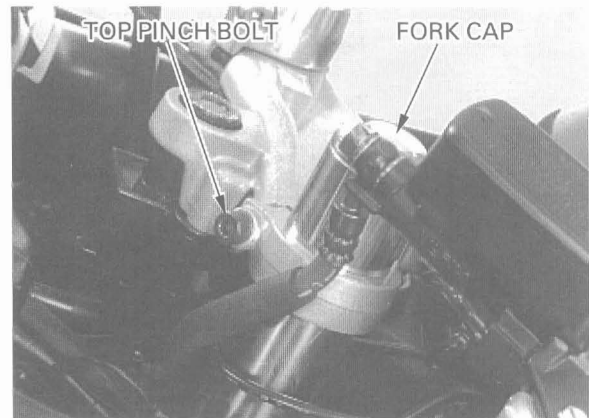
## FRONT WHEEL/SUSPENSION/STEERING

*It is not necessary to remove the oil bolts and oil pipe from the delay valve.* For the right fork leg removal, remove the brake pipe 3-way joint mounting bolt, delay valve mounting bolts and reflector (page 15-25).

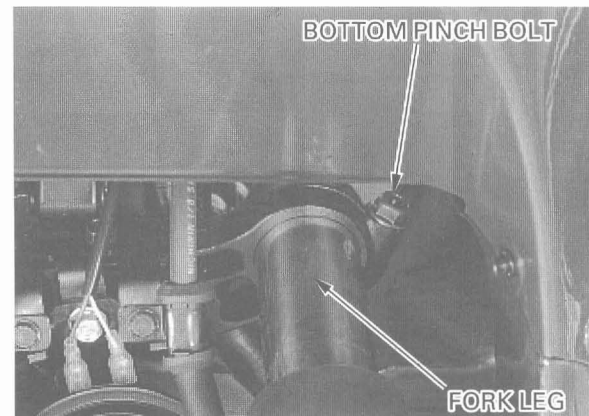


Loosen the top bridge pinch bolt.

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 handlebar, fork top bridge and steering stem.

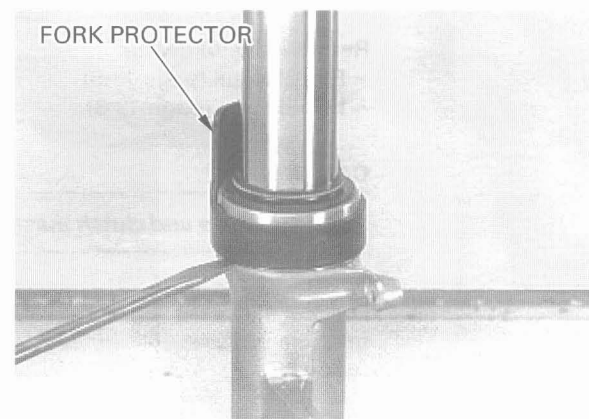


### DISASSEMBLY

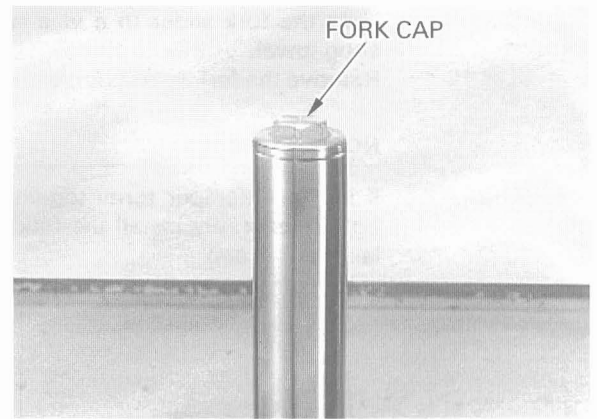
#### CAUTION:

***Be careful not to scratch the fork tube or damage the dust seal.***

Remove the fork protector from the fork slider by lifting at the three pry points.

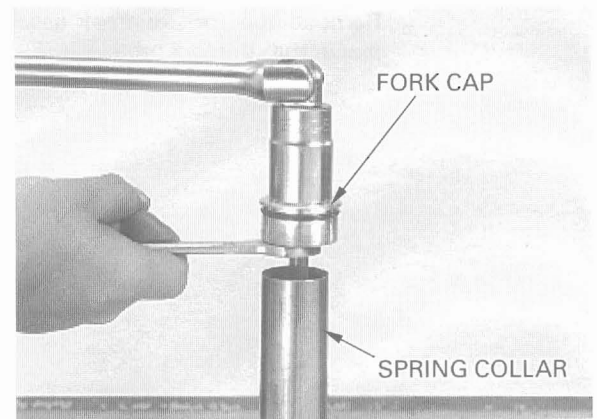


Remove the fork cap from the fork tube.

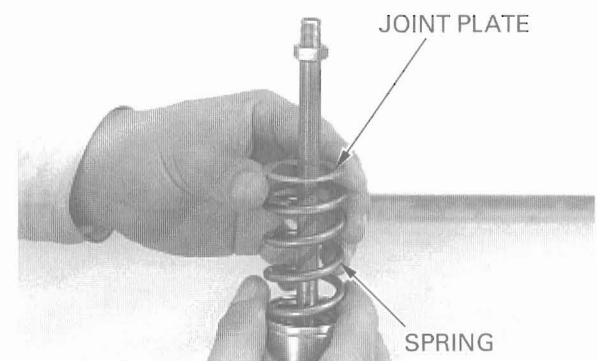


Hold the damper rod lock nut with a 14 mm spanner, then loosen and remove the fork cap from the damper rod.

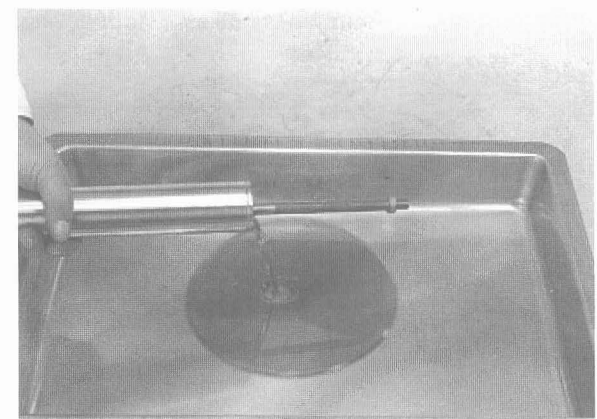
Remove the spring collar.



Remove the spring joint plate and fork spring.



Pour out the fork fluid by pumping the fork tube up and down several times.

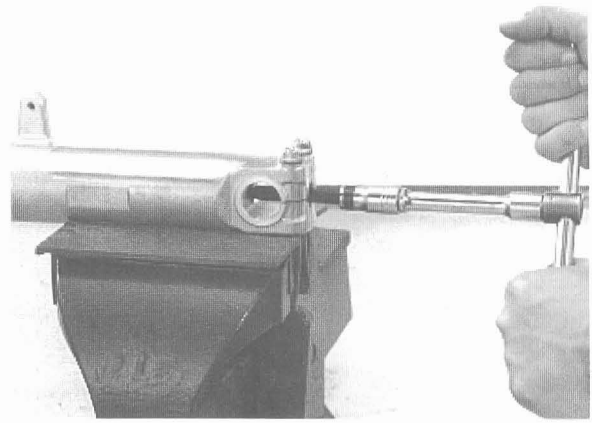


## FRONT WHEEL/SUSPENSION/STEERING

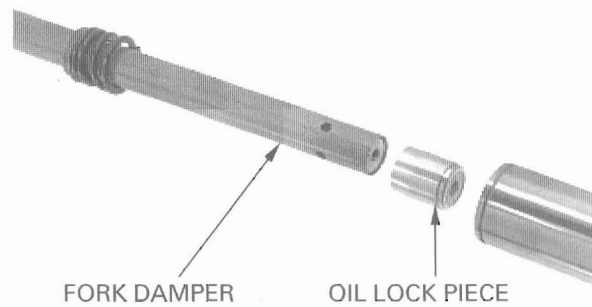
Hold the fork slider in a vice with soft jaws or a shop towel.  
Remove the fork socket bolt with a hex wrench.

**NOTE:**

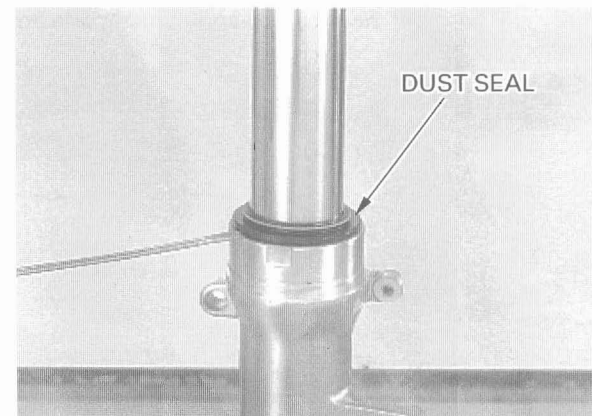
If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring collar and fork cap.



Remove the fork damper assembly and oil lock piece from the fork tube.



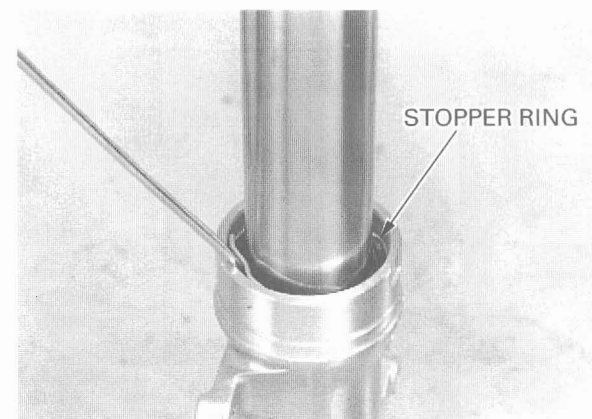
Remove the dust seal.



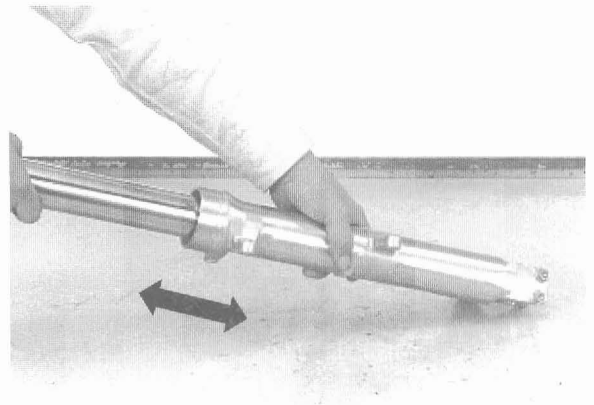
Remove the oil seal stopper ring.

**CAUTION:**

*Do not scratch the fork tube sliding surface.*



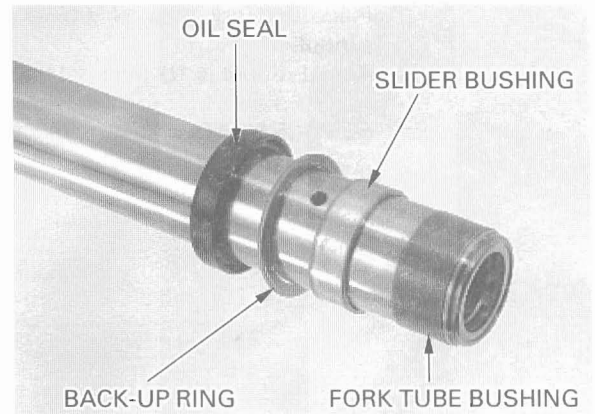
Pull the fork tube out until you feel resistance from the slider bushing. Then move it in and out, tapping the bushing lightly until the fork tube separates from the fork slider. The slider bushing will be forced out by the fork tube bushing.



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.

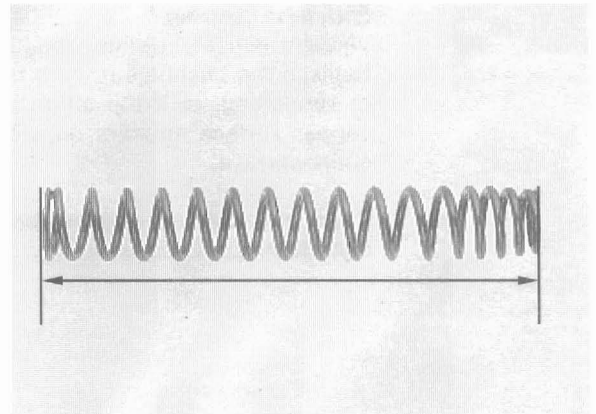


### INSPECTION

**Fork spring**

Measure the fork spring free length.

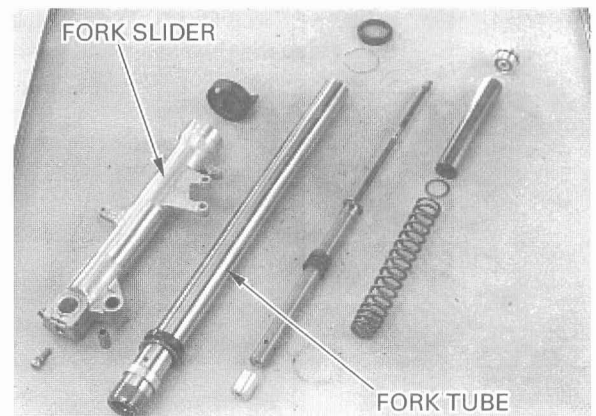
**SERVICE LIMIT:** 233.1 mm (9.18 in)



**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.

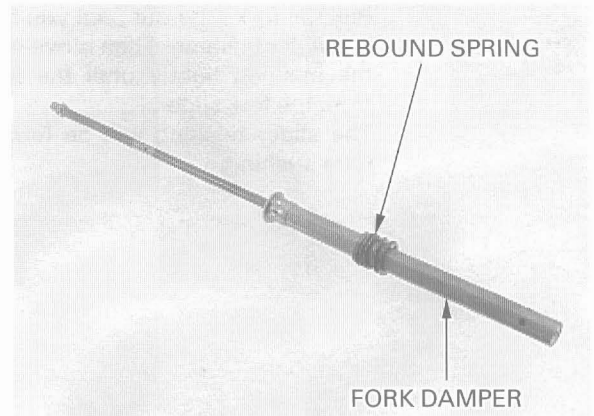


## FRONT WHEEL/SUSPENSION/STEERING

### Fork damper

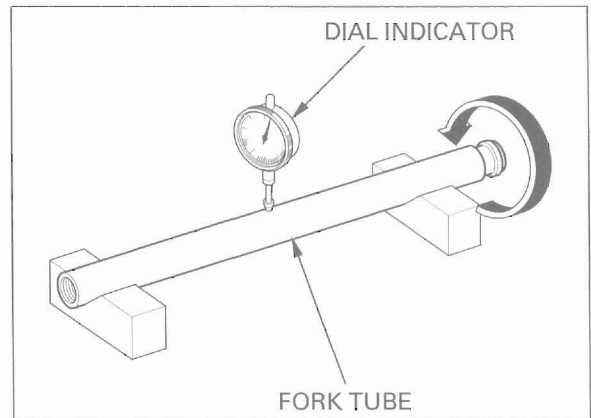
Check the fork damper for damage.  
Check the rebound spring for fatigue or damage.

Replace the fork damper assembly, if any component are damaged.



Place the fork tube in V-blocks and measure the runout.  
Actual runout is 1/2 the total indicator reading.

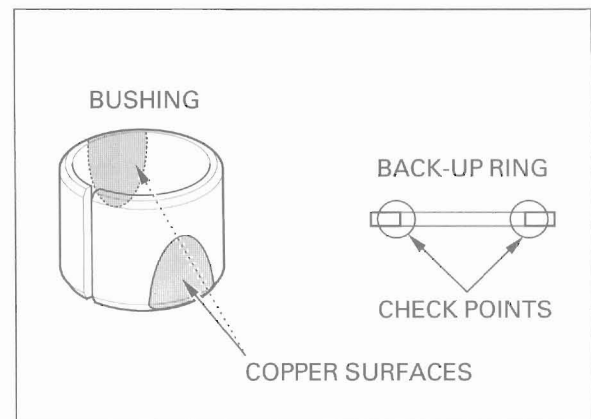
**SERVICE LIMIT:** 0.20 mm (0.008 in)



### Fork tube bushing

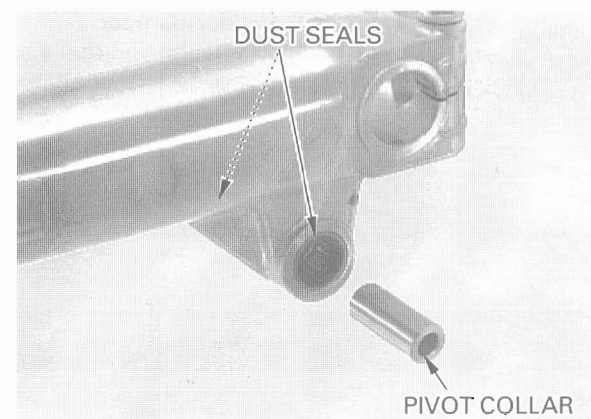
Visually inspect the slider and fork tube bushings.  
Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

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.

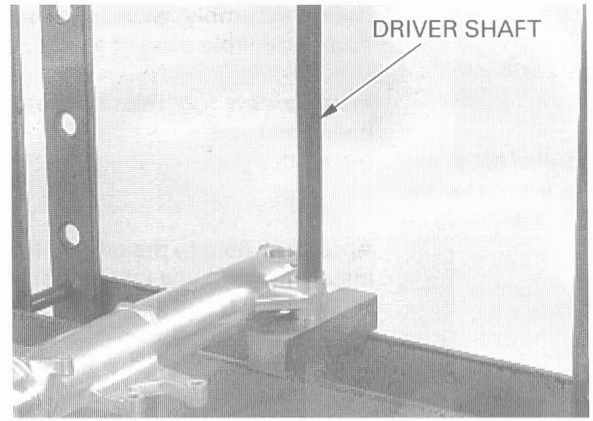


Press out the pivot bearing using the special tool.

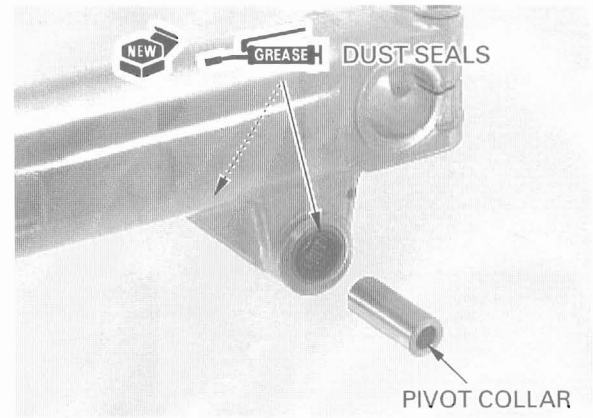
**TOOL:**  
**Driver shaft** 07946-KA50000

Apply grease to the pivot bearing.  
 Press the needle bearing into the fork slider using the same tool.

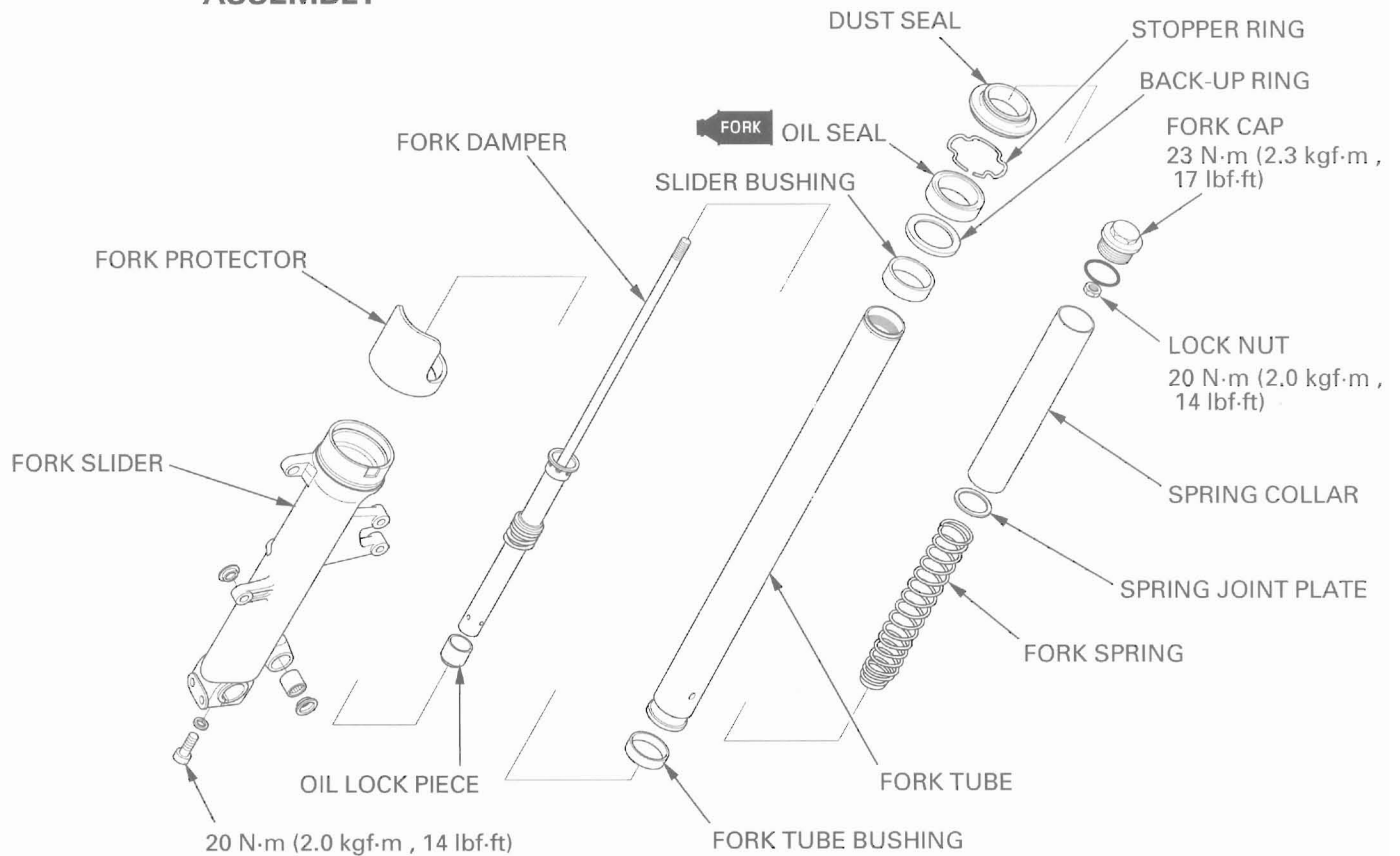
**NOTE:**  
 Install the bearing so that the bearing cage below 3.5 mm (0.14 in) from the pivot surface.



Apply grease to the new dust seal lips.  
 Install the dust seals and pivot collar.



**ASSEMBLY**





## FRONT WHEEL/SUSPENSION/STEERING

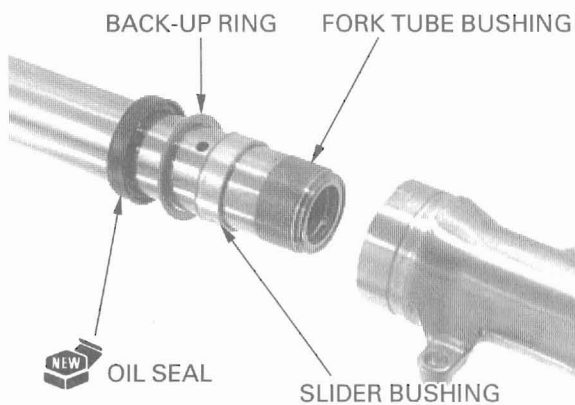
Before assembly, wash all parts with a high flash or non-flammable solvent and wipe them dry.

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**

**Oil seal driver**

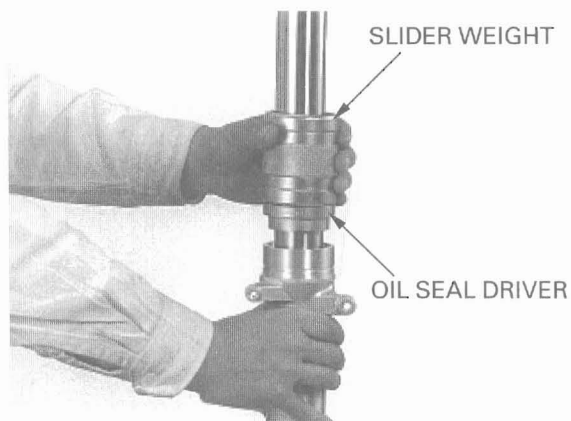
**Fork seal driver**

07947 - KA50100

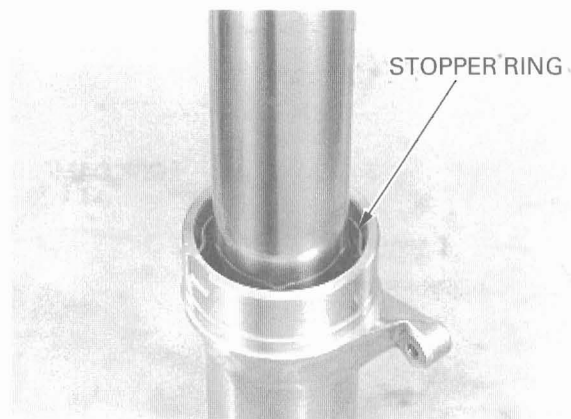
07947 - KA40200

07NMD - KZ3010A

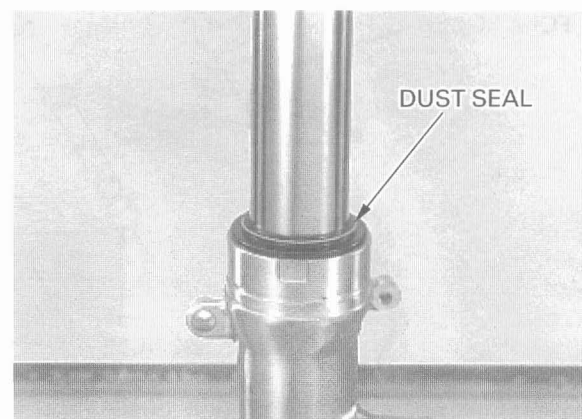
(U.S.A. only)



Install the stopper ring into the fork slider groove securely.

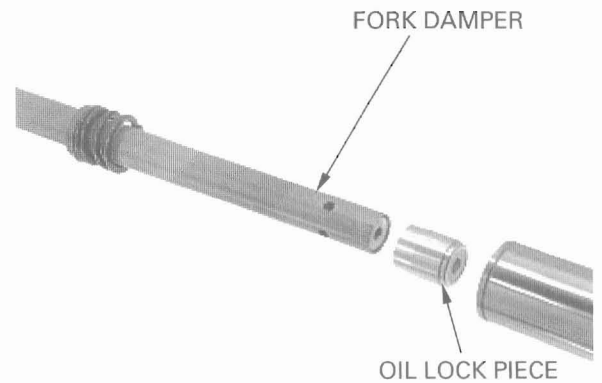


Install the dust seal.

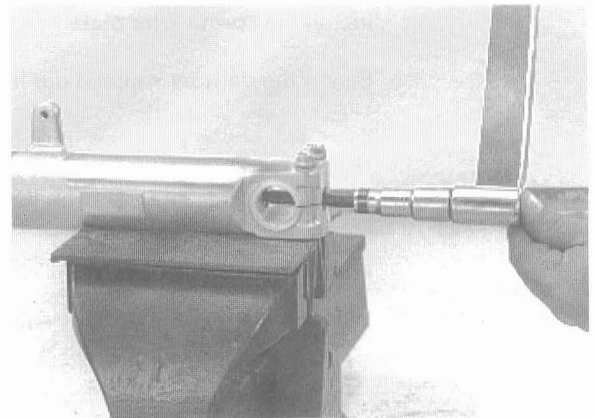




Install the oil lock piece onto the end of the fork damper.  
Install the fork damper assembly into the fork tube.



Hold the fork slider in a vise with soft jaws or a shop towel.  
Apply a locking agent to the fork socket bolt threads.  
Install the socket bolt with a new sealing washer, then tighten the bolt to the specified torque.



**NOTE:**

If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring collar and fork bolt.

**TORQUE:** 20 N·m (2.0 kgf·m , 14 lbf·ft)

Pour the specified amount of recommended fork fluid into the fork tube.

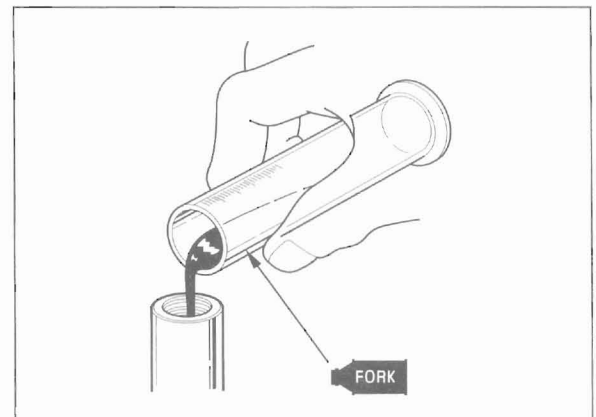
**RECOMMENDED FORK FLUID:**

Pro Honda Suspension Fluid SS-8

**FORK FLUID CAPACITY:**

$486 \pm 2.5 \text{ cm}^3$  (16.4  $\pm$  0.08 US oz,  
17.1  $\pm$  0.09 Imp oz)

Pump the damper rod several times.

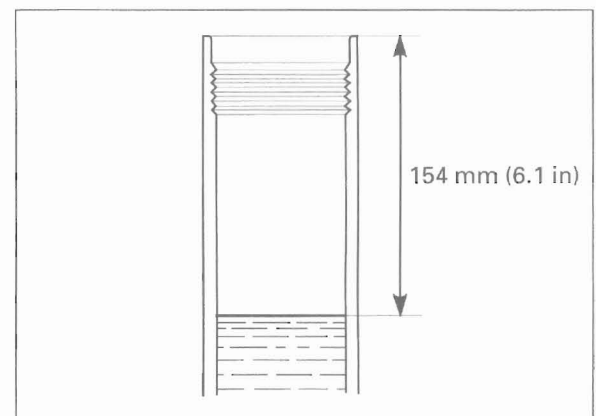


Measure the oil level from the top of the fork tube while compressing the tube all the way after stroking the fork tube slowly more than 5 times and the damper rod more than 10 times.

**NOTE:**

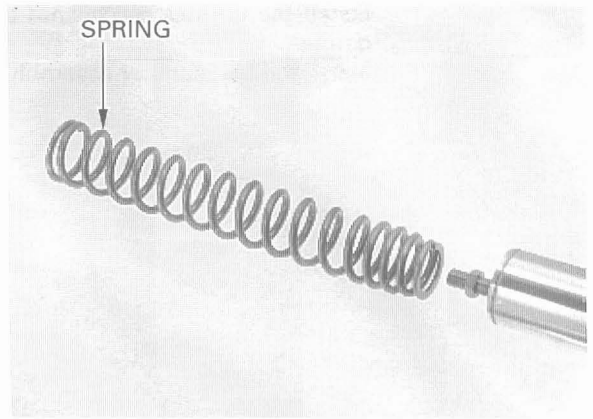
Be sure the oil level is the same in the both forks.

**FORK OIL LEVEL:** 154 mm (6.1 in)



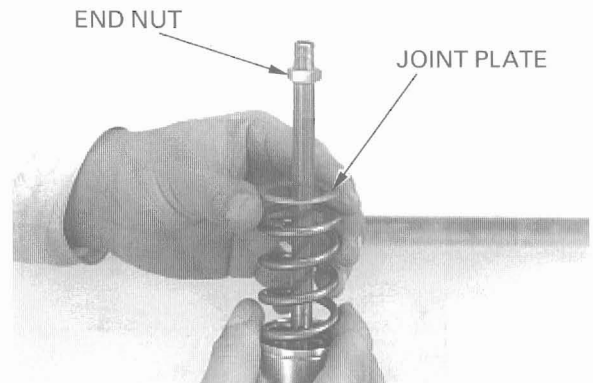
## FRONT WHEEL/SUSPENSION/STEERING

Pull the damper rod up and install the fork spring with the tapered end facing down.



Install the spring joint plate.

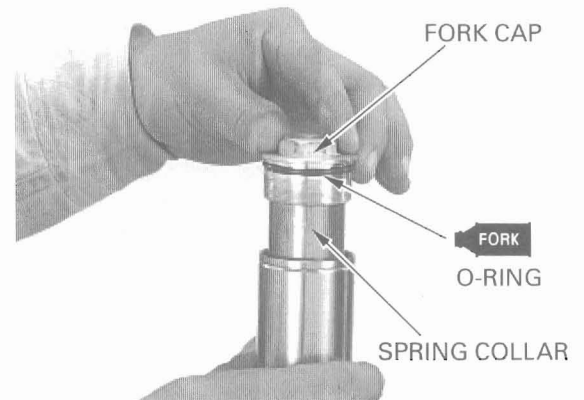
Screw the damper rod end nut fully by hand.



Install the spring collar.

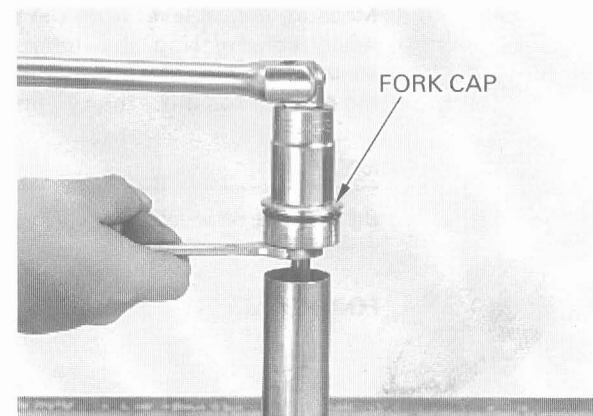
Install new O-rings onto the fork cap.  
Apply fork fluid to the new O-rings.

Hold the damper rod and screw the fork cap onto the damper rod until it seats on the damper rod lock nut.

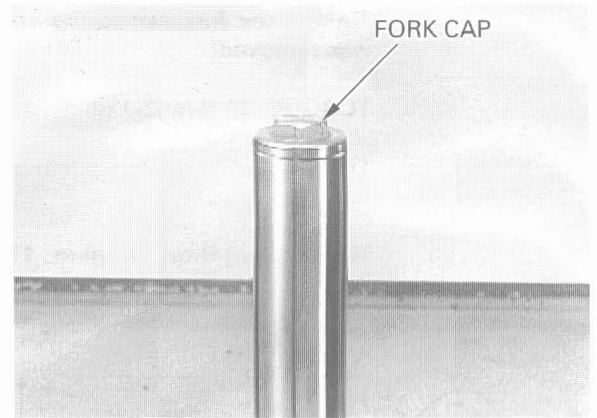


Hold the fork cap and tighten the lock nut to the specified torque.

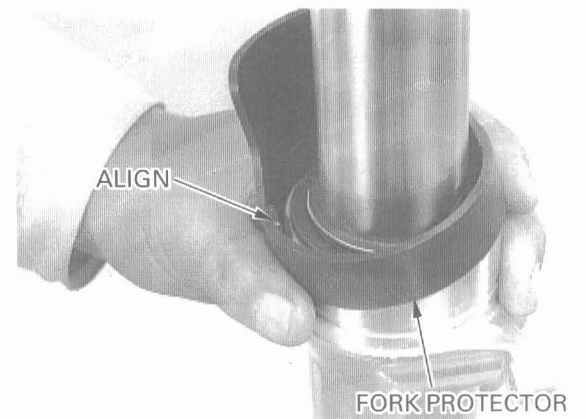
**TORQUE:** 20 N·m (2.0 kgf·m , 14 lbf·ft)



Screw the fork cap into the fork tube.



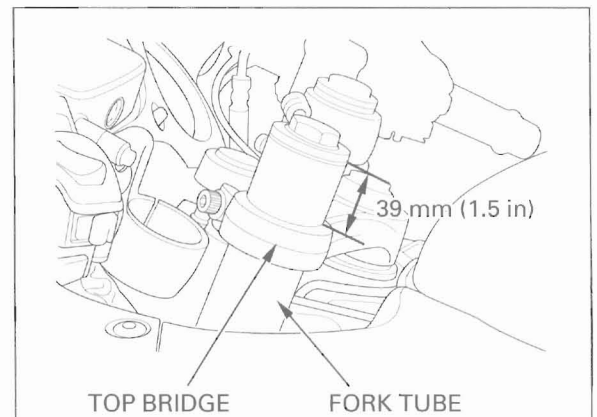
Install the fork protector onto the fork slider aligning the protector boss with the groove in the fork slider.



### INSTALLATION

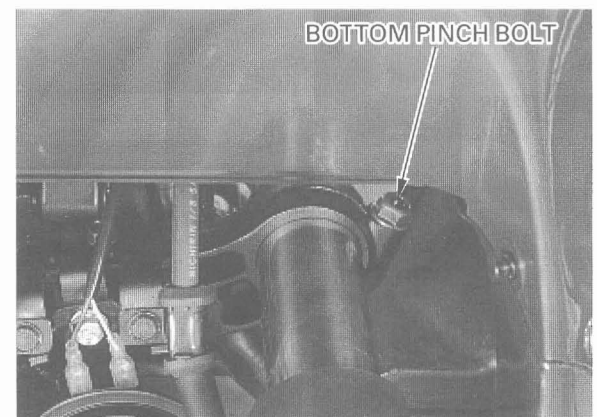
Install the fork legs into the steering stem and fork top bridge.

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)



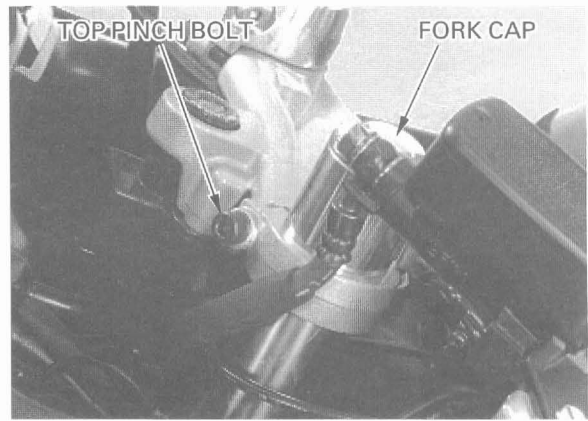
## FRONT WHEEL/SUSPENSION/STEERING

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)

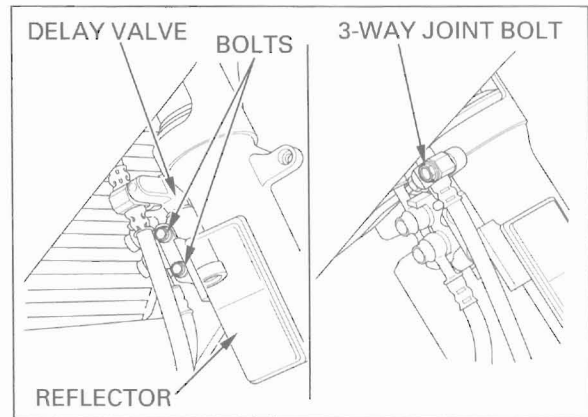


Install the delay valve onto the right fork leg and tighten the mounting bolts to the specified torque.

**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)

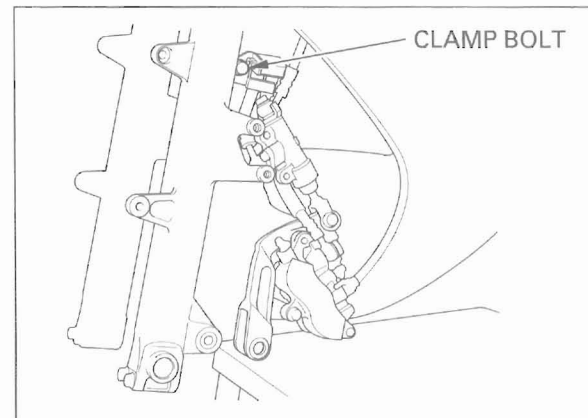


Install and tighten the brake hose clamp bolt to the specified torque.

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

Install the following:

- Handlebar (page 13-5)
- Front wheel (page 13-14)



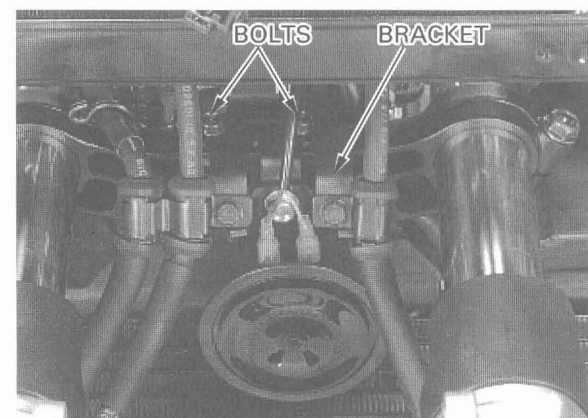
## STEERING STEM

### REMOVAL

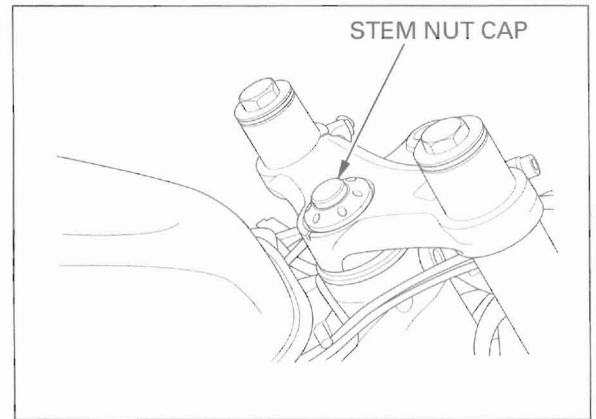
Remove the following:

- Front wheel (page 13-9)
- Handlebar (page 13-3)

Remove the bolts and front brake hose/horn mounting bracket.



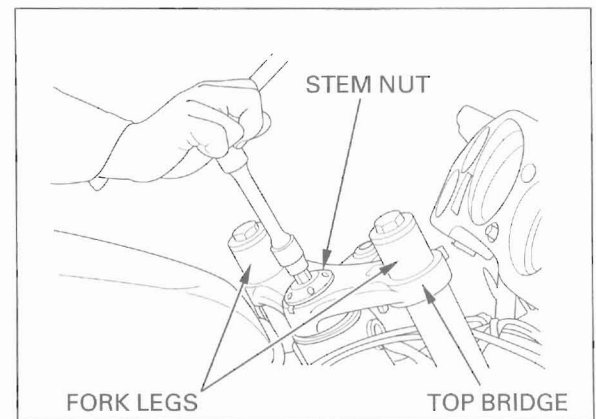
Remove the steering stem nut cap.



Loosen the steering stem nut and washer.

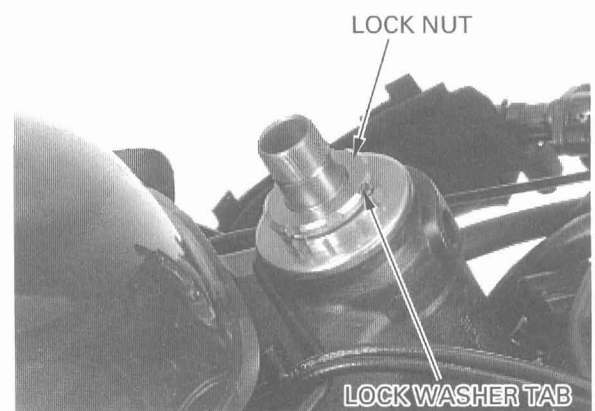
Remove the fork legs (page 13-15).

Remove the stem nut and the top bridge.



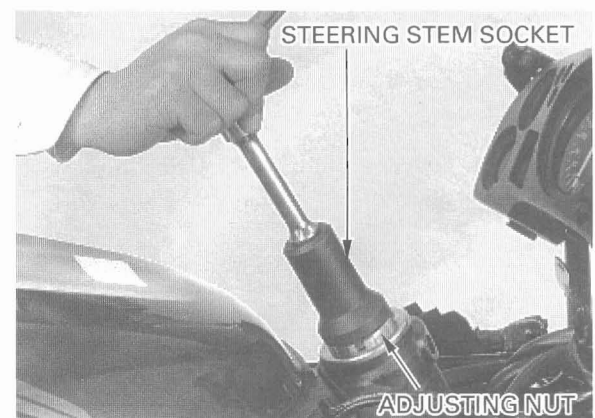
Straighten the tabs of the lock washer.

Remove the lock nut and lock washer.



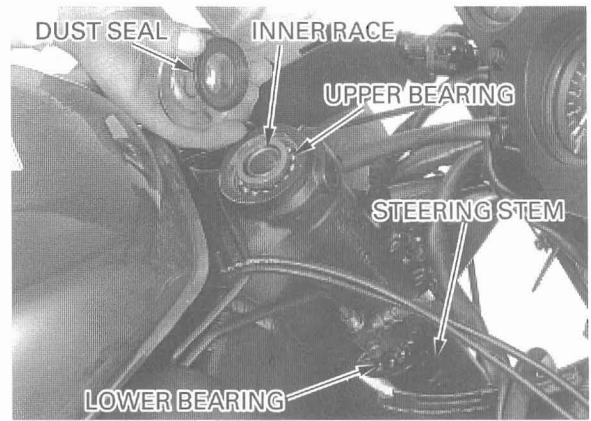
Remove the steering stem bearing adjusting nut using the special tool.

**TOOL:**  
**Steering stem socket**      07916-3710101



Remove the following:

- Dust seal
- Upper bearing inner race
- Upper bearing
- Steering stem
- Lower bearing



## BEARING REPLACEMENT

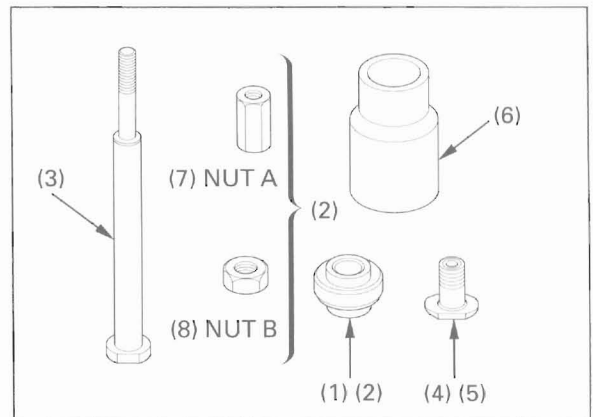
*Always replace the bearings and races as a set.*

Replace the races using the Ball Race Remover Set as described in the following procedure.

### TOOLS:

#### Ball race remover set

- |                             |               |
|-----------------------------|---------------|
| - Driver attachment, A (1)  | 07946-KM90001 |
| - Driver attachment, B (2)  | 07946-KM90100 |
| - Driver shaft assembly (2) | 07946-KM90200 |
| - Bearing remover, A (4)    | 07946-KM90300 |
| - Bearing remover, B (5)    | 07946-KM90401 |
| - Assembly base (6)         | 07946-KM90500 |
|                             | 07946-KM90600 |



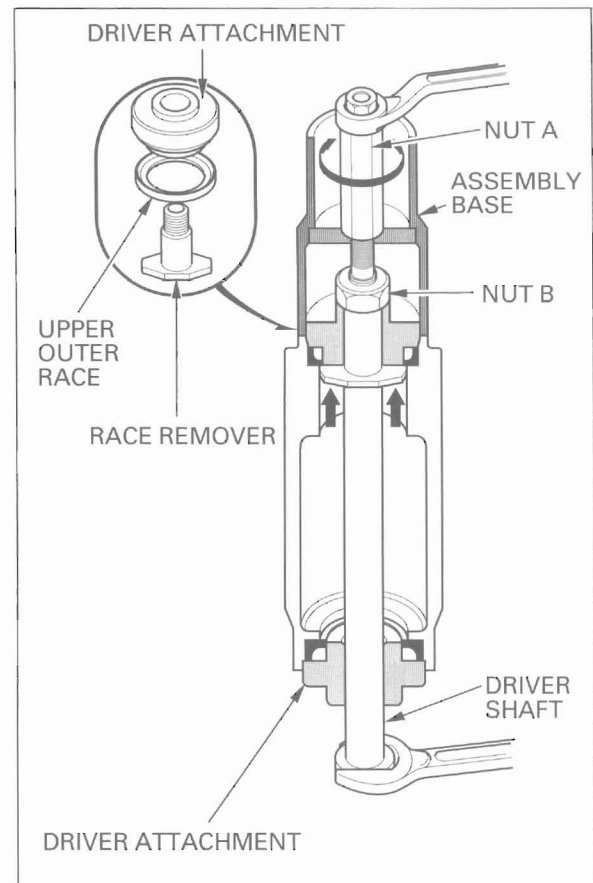
Install the ball race remover into the head pipe as shown.

Align bearing remover A with the groove in the steering head.

Lightly tighten nut B with a wrench.

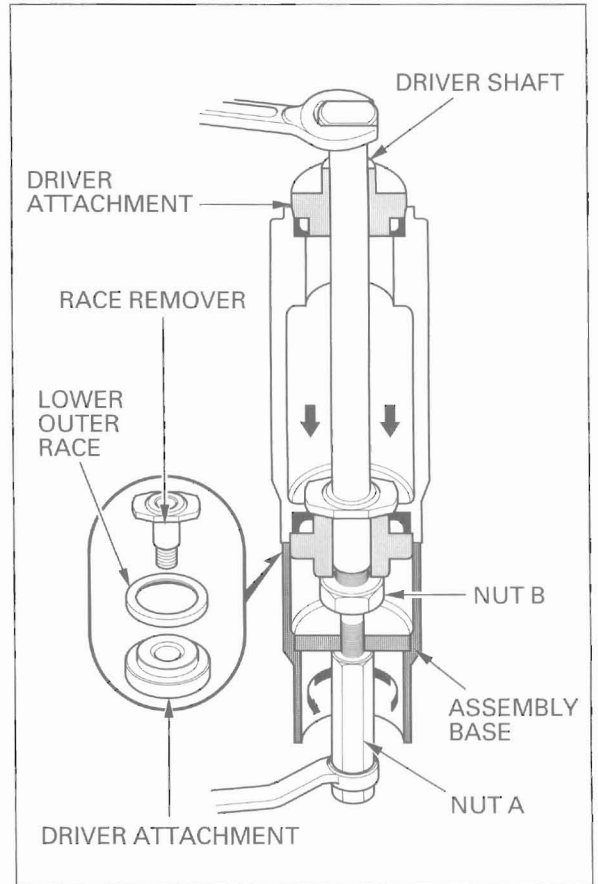
Holding the driver shaft with a wrench, turn nut A gradually to remove the upper outer race.

*Note the installation direction of the assembly base.*



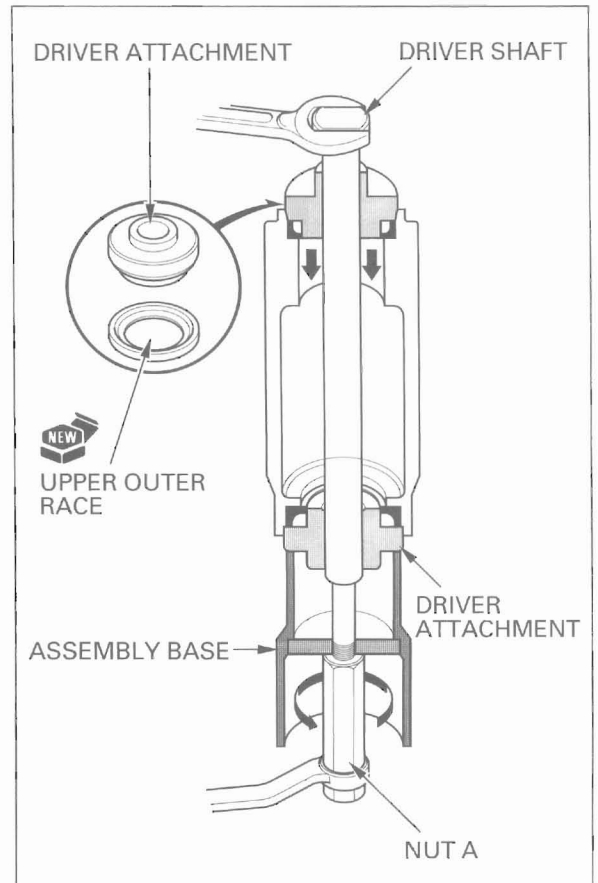
Install ball race remover B as shown and remove the lower outer race using the same procedure as for the upper outer race.

Align the bearing remover with the groove in the steering head.



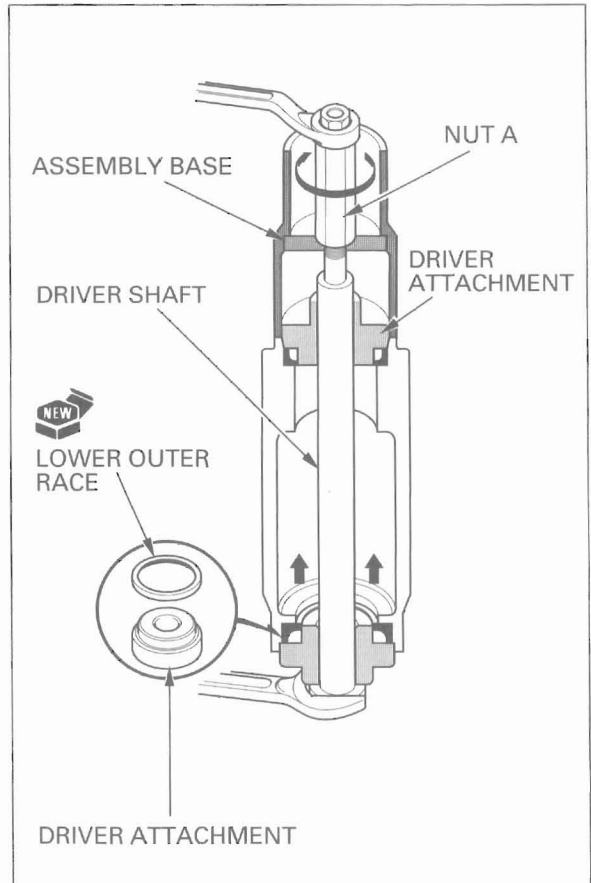
Install a new upper outer race and the ball race remover as shown.

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.



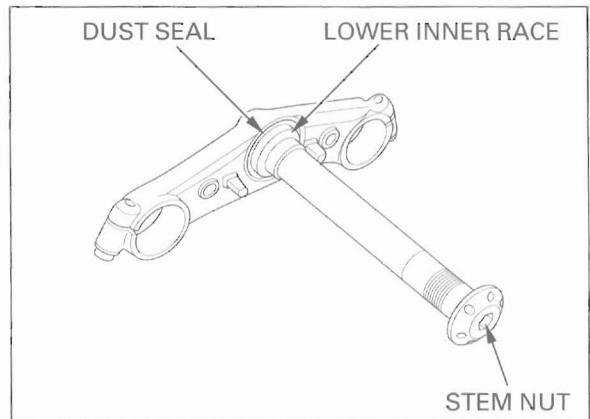
## FRONT WHEEL/SUSPENSION/STEERING

Install a new lower outer race and ball race remover as shown.  
Holding the driver shaft with a wrench, turn nut A gradually until the groove in driver attachment B aligns with the upper end of the steering head. This will allow you to install the lower outer race.



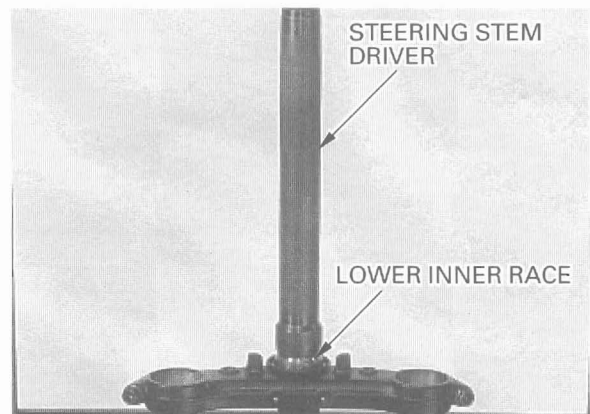
Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.  
Remove the dust seal.



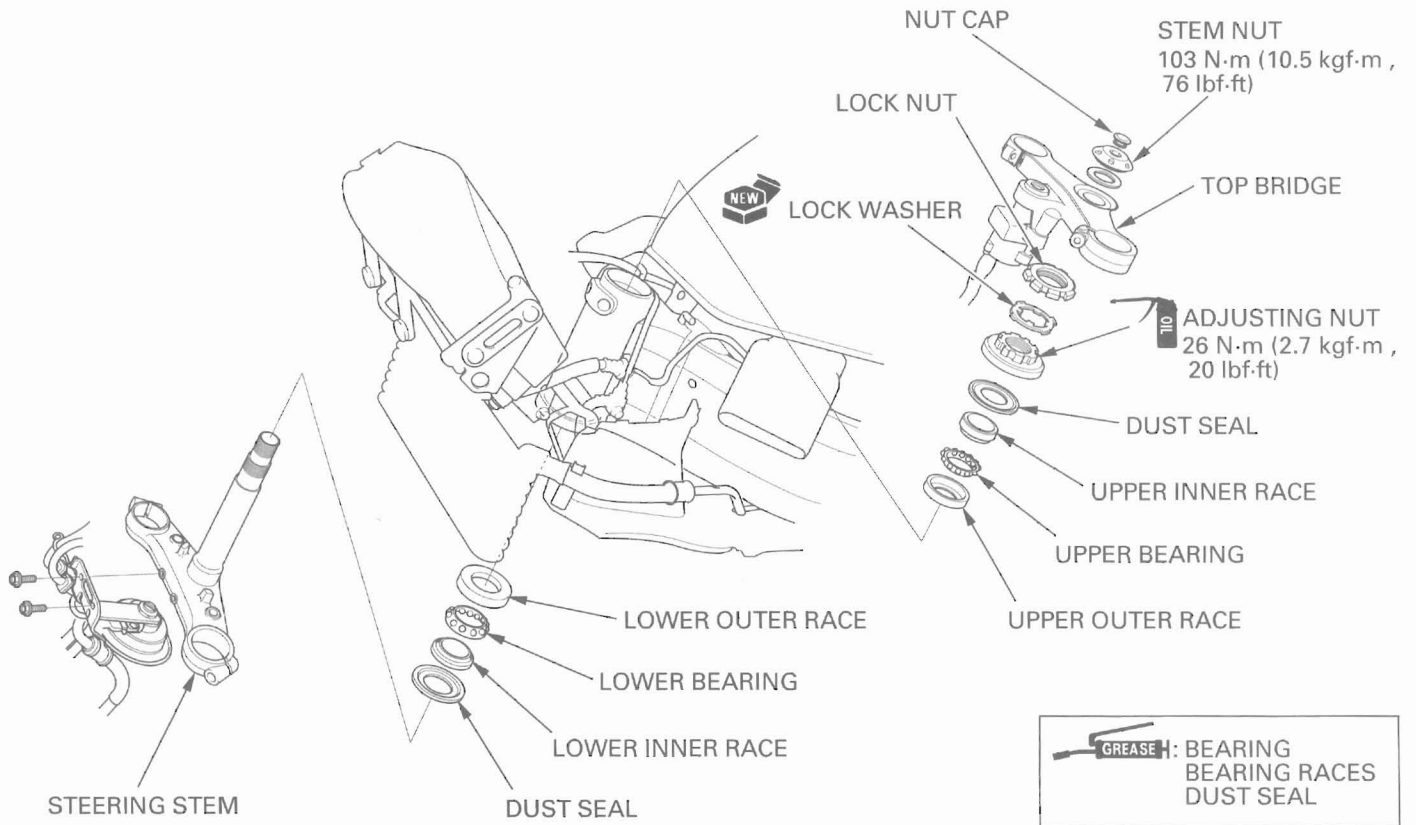
Apply grease to new dust seal lips and install it over the steering stem.  
Install a new lower bearing inner race using a special tool and a hydraulic press.

**TOOL:**  
**Steering stem driver**                      07946-MB00000





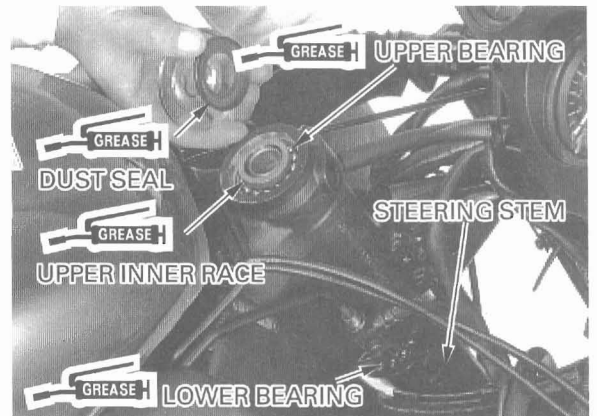
INSTALLATION



Apply grease to upper and lower bearings and bearing races.

Install the lower bearing onto the steering stem. Insert the steering stem into the steering head pipe.

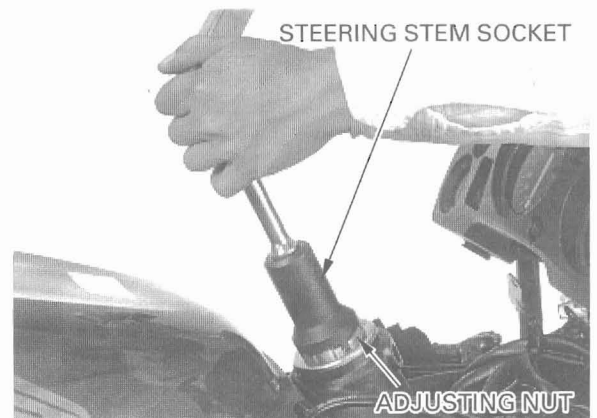
Install upper bearing, inner race and dust seal.



Apply oil to the bearing adjustment nut threads. Install and tighten the stem bearing adjusting nut to the initial torque.

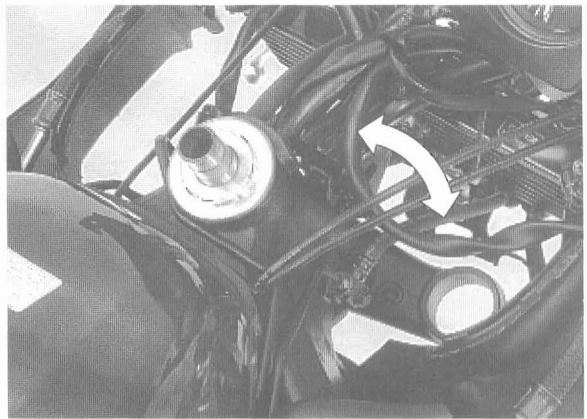
**TOOL:**  
Steering stem socket 07916-3710101

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



## FRONT WHEEL/SUSPENSION/STEERING

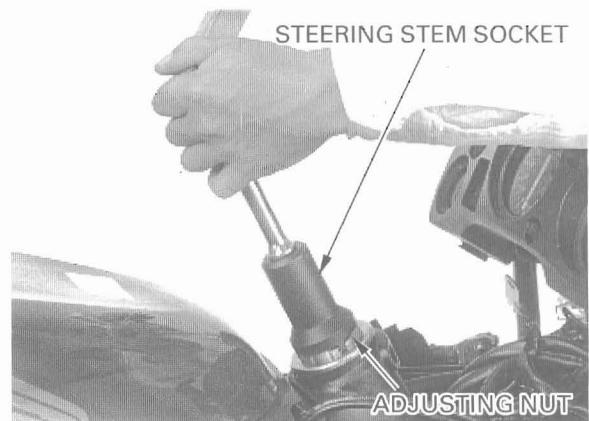
Move the steering stem right and left, lock-to-lock, five times to seat the bearings. Make sure that the steering stem moves smoothly, without play or binding; then loosen the bearing adjusting nut.



Retighten the bearing adjusting nut to the specified torque.

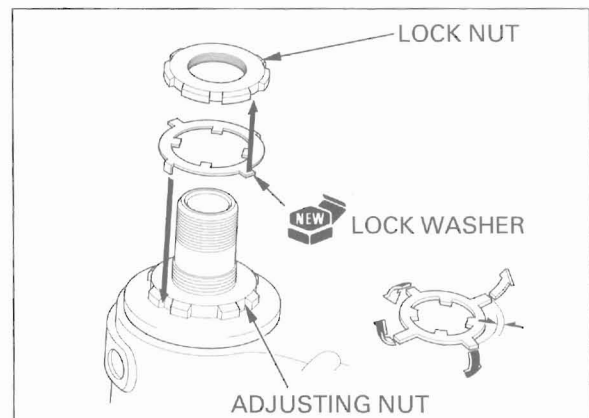
**TORQUE:** 26 N·m (2.7 kgf·m , 20 lbf·ft)

Recheck that the steering stem moves smoothly without play or binding.



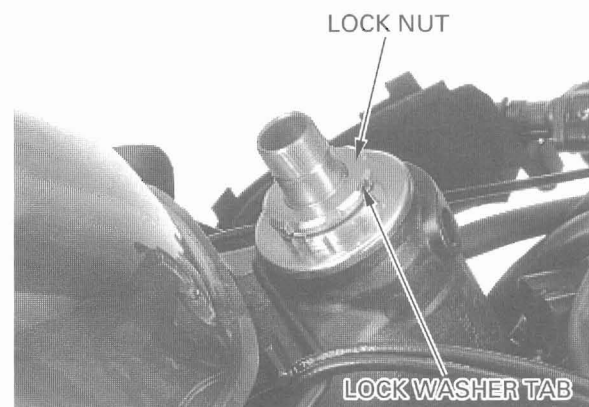
Install the new lock washer onto the steering stem.

Align the tabs of the lock washer with the grooves in the adjustment nut and bend two opposite tabs (shorter) down into the adjusting nut groove.



Install and finger tighten the lock nut. Hold the lock nut and further tighten the lock nut within 1/4 turn (90°) enough to align its grooves with the lock washer tabs.

Bent the lock washer tabs up into the lock nut groove.

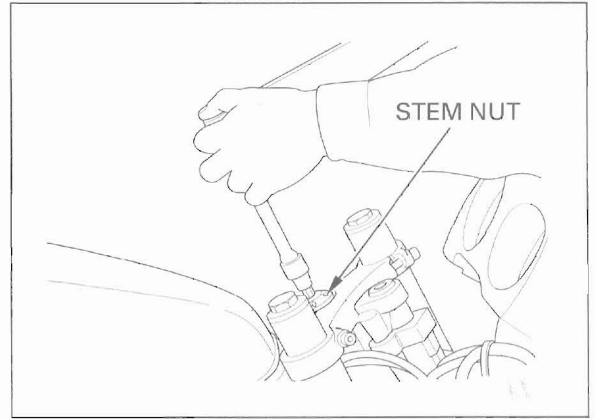


Install the top bridge.

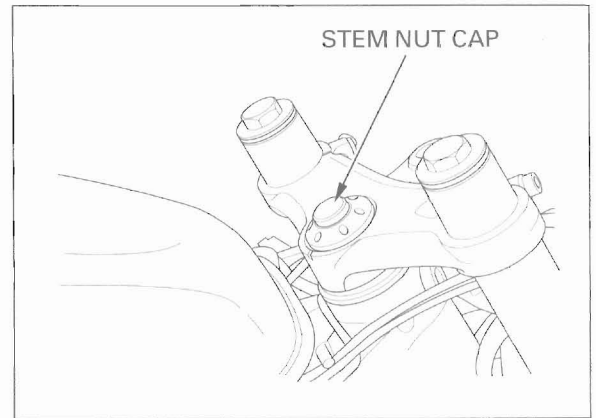
Install the fork legs (page 13-25).

Install the washer and steering stem nut.  
Tighten the steering stem nut to the specified torque.

**TORQUE:** 103 N·m (10.5 kgf·m , 76 lbf·ft)

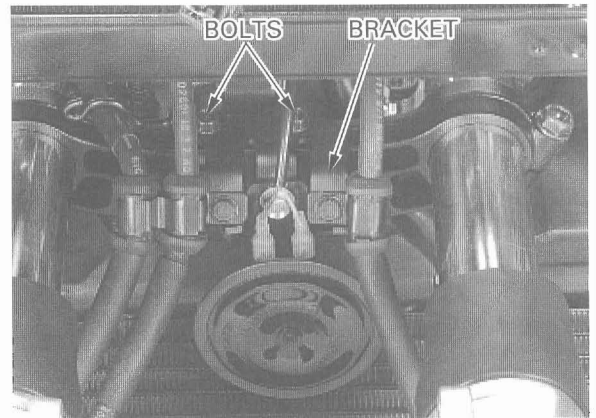


Install the steering stem nut cap.



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.

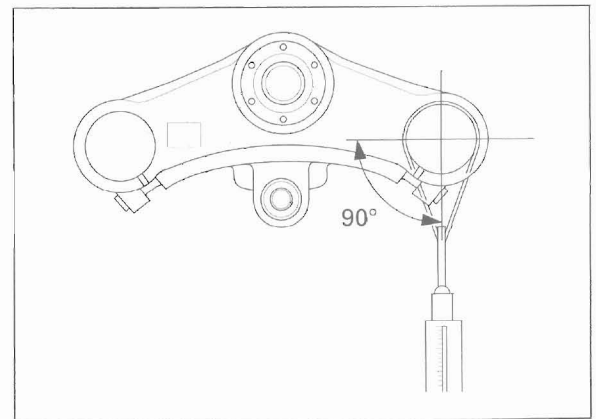
Position the steering stem to the straight ahead position.

Hook a spring scale to the fork tube and measure the steering head bearing pre-load.

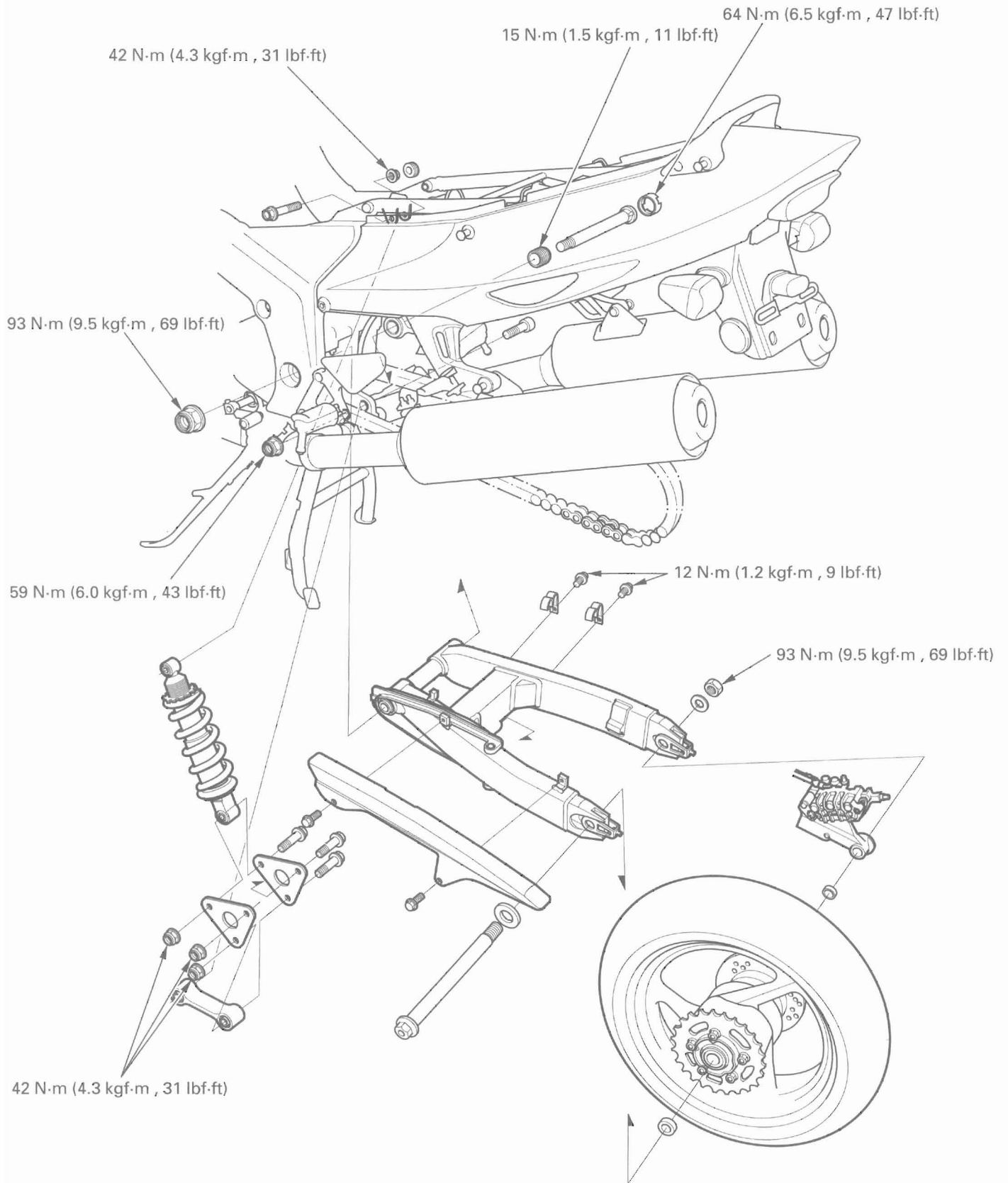
The pre-load should be within 1.0–1.5 kgf (2.2–3.3 lbf).

If the readings do not fall within the limits, lower the front wheel to the ground and adjust the steering bearing adjusting nut.

*Make sure that there is no cable or wire harness interference.*



# REAR WHEEL/SUSPENSION



# 14. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	14-1	SHOCK ABSORBER	14-9
TROUBLESHOOTING	14-2	SUSPENSION LINKAGE	14-11
REAR WHEEL	14-3	SWINGARM	14-12

## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- After the rear wheel installation, check the brake operation by applying the brake lever and pedal.
- The shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.
- Before disposal of the shock absorber, release the nitrogen (page 14-10).

- When servicing the rear wheel, support the motorcycle using a safety stand or hoist.
- Refer to section 15 for brake system information.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".
- Use genuine Honda replacement bolts and nuts for all suspension pivot and mounting point.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD		SERVICE LIMIT
Minimum tire tread depth		—————		2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lb) load	290 kPa (2.90 kgf/cm <sup>2</sup> , 42 psi)		—————
	Up to maximum weight capacity	290 kPa (2.90 kgf/cm <sup>2</sup> , 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	DID50ZVS-110LE	—————
		RK	RK50LFOZ1-110LE	—————
	Slack	25–35 (1.0–1.4)		50 (1.97)
Shock absorber spring pre-load length		209.1 (8.23)		—————

### TORQUE VALUES

Rear axle nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Rear brake disc mounting bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt
Driven sprocket nut	108 N·m (11.0 kgf·m, 80 lbf·ft)	U-nut
Shock absorber upper 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
Swingarm pivot adjusting bolt	15 N·m (1.5 kgf·m, 11 lbf·ft)	See page 14-18
Swingarm pivot lock nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	
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)	
Drive sprocket special bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)	
Brake hose guide bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

## REAR WHEEL/SUSPENSION

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### TOOLS

Pivot adjusting wrench	07908-4690003	
Bearing remover set	07936-3710001	
—Remover handle	07936-3710100	
—Remover set	07936-3710600	
—Remover weight	07741-0010201	
Pin driver	07GMD-KT80100	
Needle bearing remover, 28 mm	07HMC-MR70100	
Needle bearing remover	07LMC-KV30100	
Driver shaft	07946-MJ00100	
Driver	07749-0010000	
Attachment, 37 × 40 mm	07746-0010200	
Attachment, 42 × 47 mm	07746-0010300	
Attachment, 52 × 55 mm	07746-0010400	
Attachment, 24 × 26 mm	07746-0010700	
Pilot, 17 mm	07746-0040400	
Pilot, 20 mm	07746-0040500	
Pilot, 28 mm	07746-0041100	
Bearing remover shaft	07746-0050100	Equivalent commercially available in U.S.A.
Bearing remover head, 20 mm	07746-0050600	

### TROUBLESHOOTING

#### Soft suspension

- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Tire pressure too low

#### Hard suspension

- Damaged shock absorber mounting bearing
- Bent damper rod
- Damaged swingarm pivot bearings
- Bent swingarm pivot
- Incorrect suspension adjustment
- Tire pressure too high

#### Steers to one side or does not track straight

- Bent rear axle
- Axle alignment/chain adjustment not equal on both sides

#### Rear wheel wobbling

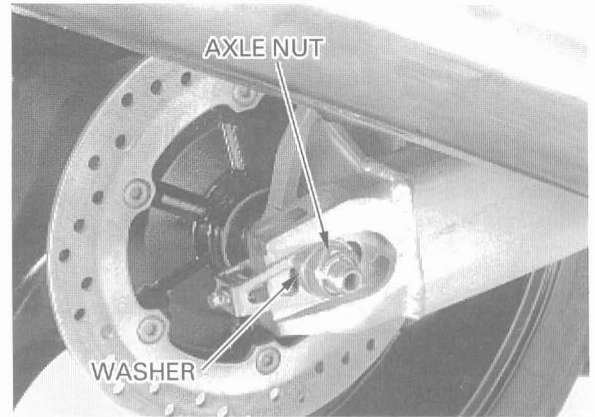
- Bent rim
- Worn rear wheel bearings
- Faulty tire
- Unbalanced tire and wheel
- Tire pressure too low
- Faulty swingarm pivot bearings

## REAR WHEEL

### REMOVAL

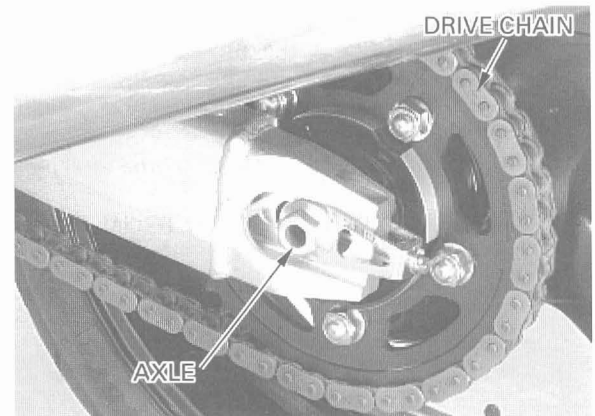
Support the motorcycle securely using a hoist or equivalent.

Remove the axle nut and washer.

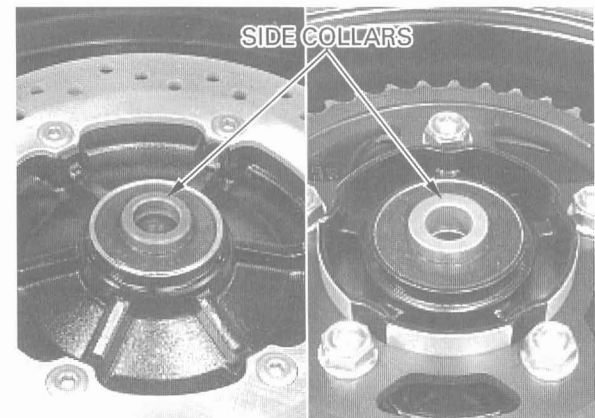


Push the rear wheel forward.  
Derail the drive chain from the driven sprocket.

Remove the axle and washer from the left side and remove the rear wheel.



Remove the side collars.

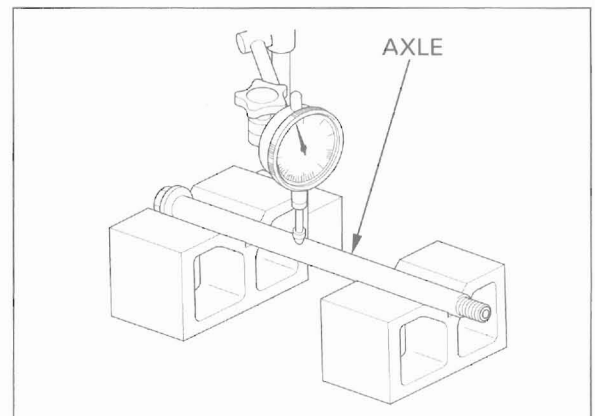


### INSPECTION

#### Axle

Place the axle in V-blocks and measure the runout. Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT:** 0.20 mm (0.008 in)



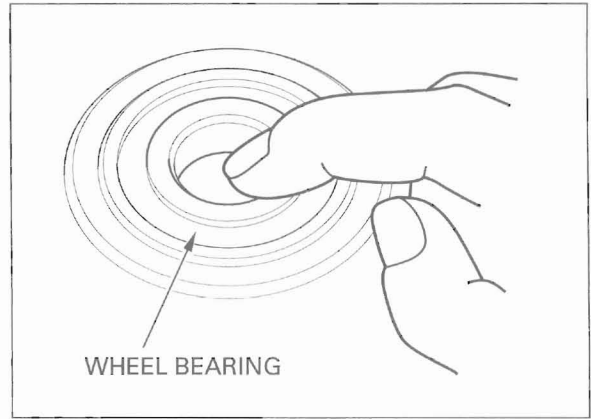
## REAR WHEEL/SUSPENSION

### Wheel bearing

Turn the inner race of each bearing with your finger. Bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

*Replace the wheel bearings in pairs.*

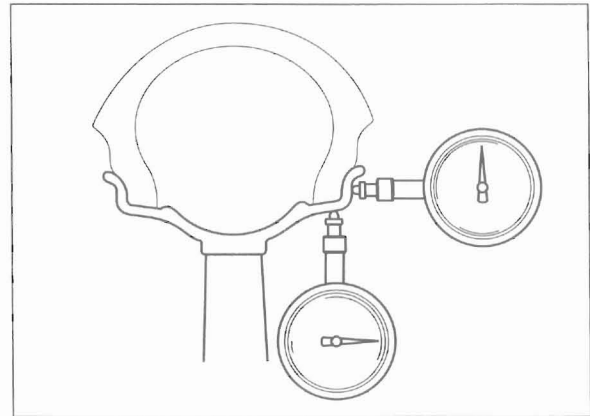
Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub.



### Wheel rim runout

Check the rim runout by placing the wheel in a turning stand. Spin the wheel slowly and read the runout using a dial indicator. Actual runout is 1/2 the total indicator reading.

**SERVICE LIMITS:** Radial: 2.0 mm (0.08 in)  
Axial: 2.0 mm (0.08 in)

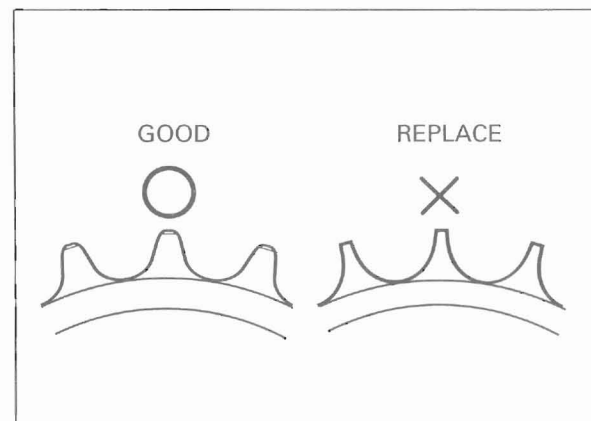


### Driven sprocket

Check the condition of the final driven sprocket teeth. Replace the sprocket if worn or damaged.

#### NOTE:

- If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the replacement chain or sprocket will wear rapidly.

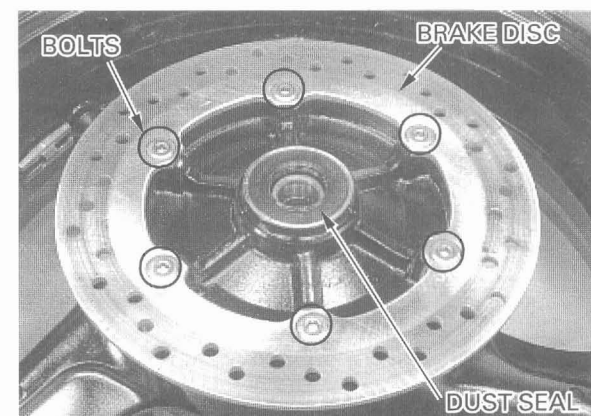


### Wheel balance

See page 13-11 for wheel balance.

### DISASSEMBLY

Remove the bolts and brake disc.  
Remove the right dust seal.





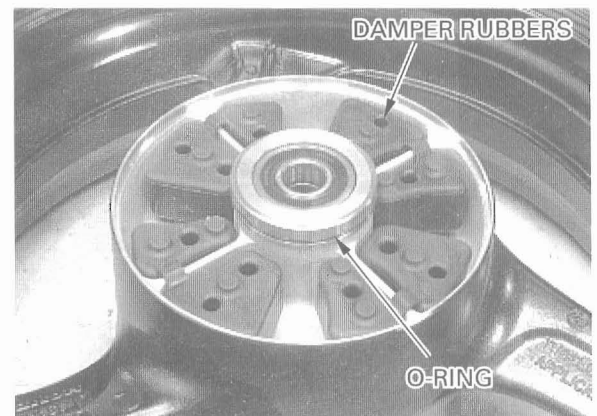
Remove the driven flange assembly from the left wheel hub.

**NOTE:**

If you will be disassemble the driven flange, loosen the driven sprocket nuts before removing the driven flange from the wheel hub.



Remove the wheel damper rubbers.  
Remove the O-ring.

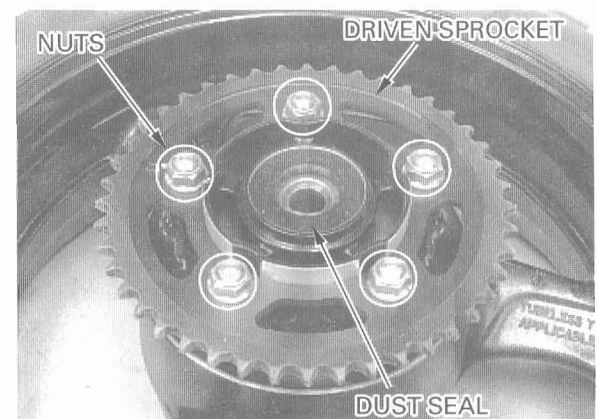


**Driven flange bearing removal**

Loosen the driven sprocket nuts.

Remove the driven flange from the wheel hub, then remove the driven sprocket nuts and sprocket.

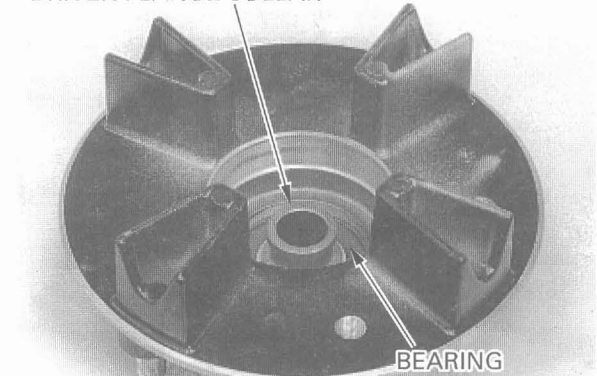
Remove the dust seal.



Remove the driven flange collar.

Drive out the driven flange bearing.

**DRIVEN FLANGE COLLAR**



## REAR WHEEL/SUSPENSION

### Wheel bearing removal

Install the bearing remover head into the bearing. From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

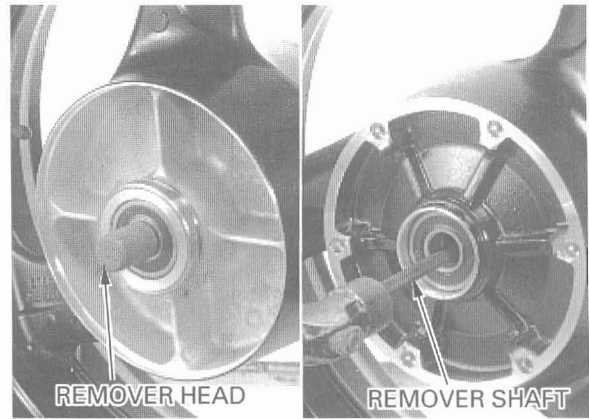
#### TOOLS:

**Bearing remover head, 20 mm**

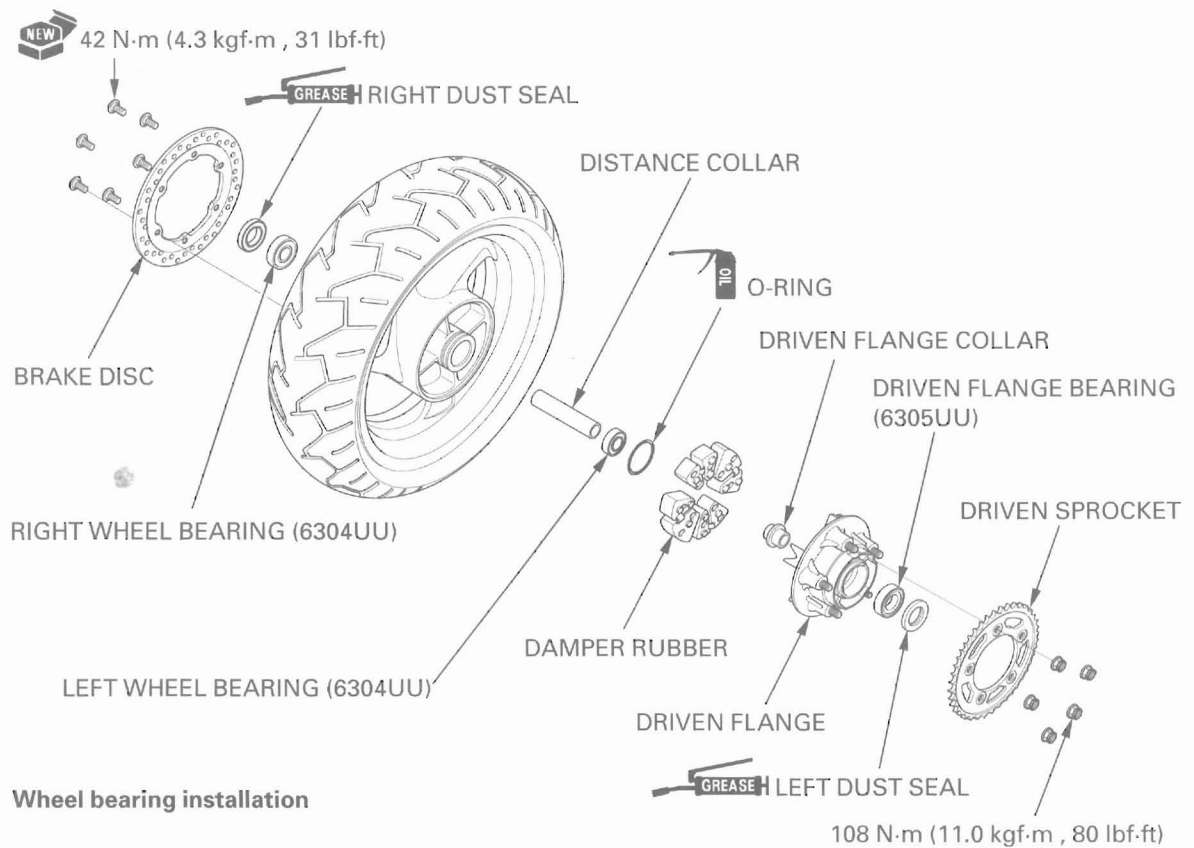
07746-0050600  
(Equivalent commercially available in U.S.A.)

**Bearing remover shaft**

07746-0050100  
(Equivalent commercially available in U.S.A.)



### ASSEMBLY



#### Wheel bearing installation

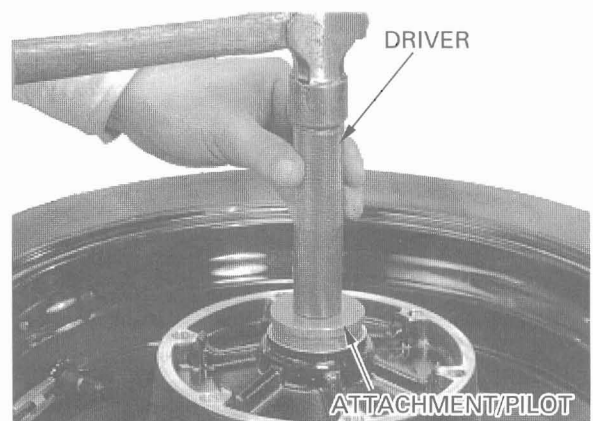
#### CAUTION:

**Never install the old bearings, once the bearings has been removed, the bearing must be replaced with new ones.**

Drive in a new right bearing squarely. Install the distance collar, then drive in the left side bearing.

#### TOOLS:

**Driver** 07749-0010000  
**Attachment, 52 × 55 mm** 07746-0010400  
**Pilot, 20 mm** 07746-0040500

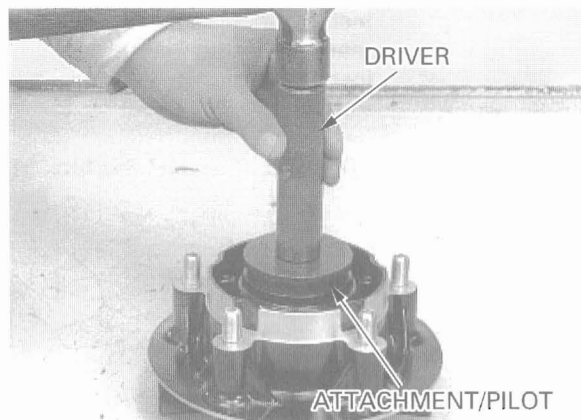


**Driven flange bearing installation**

Drive the new driven flange bearing into the driven flange using the special tools.

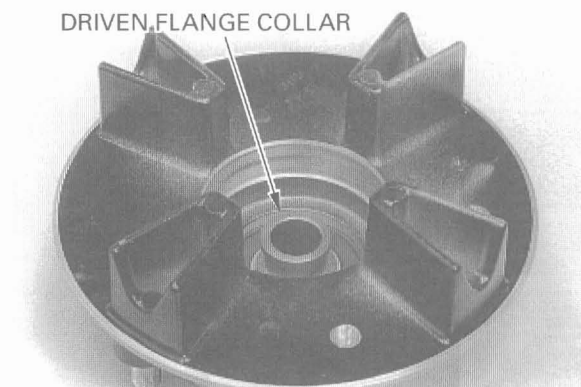
**TOOLS:**

- Driver** 07749-0010000
- Attachment, 62 × 68 mm** 07746-0010500
- Pilot, 25 mm** 07746-0040600



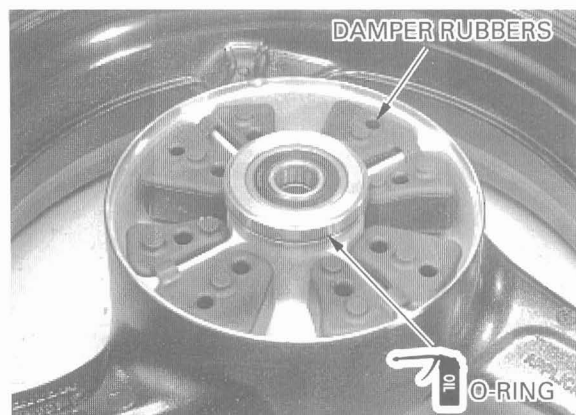
Install the driven flange collar.

DRIVEN FLANGE COLLAR



Install the wheel damper rubbers into the wheel hub.

Apply oil to the new O-ring and install it into the groove of the wheel hub.

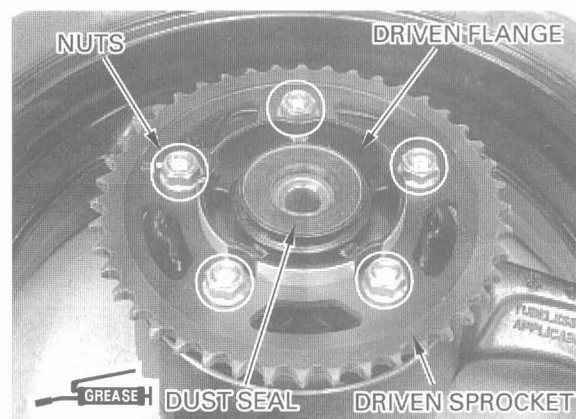


Install the driven flange assembly into the left wheel hub.

If the driven sprocket was removed, install the driven sprocket and tighten the nuts.

**TORQUE:** 108 N·m (11.0 kgf·m , 80 lbf·ft)

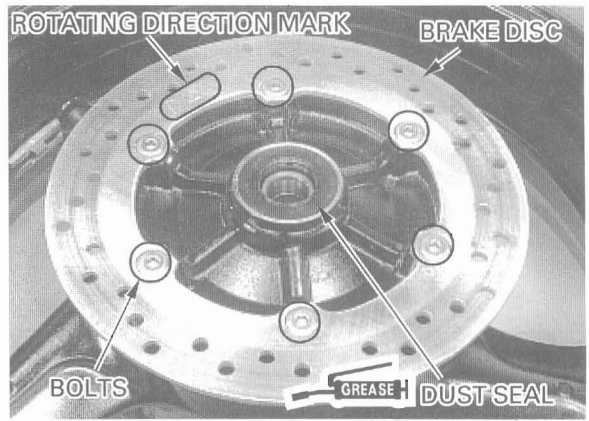
Apply grease to the dust seal lips, then install it into the driven flange.



## REAR WHEEL/SUSPENSION

Install the brake disc with its rotating direction mark (→) facing out.  
Install and tighten the new bolts to the specified torque.

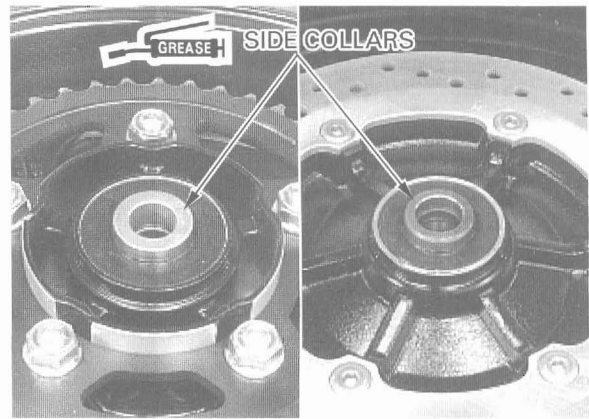
**TORQUE:** 42 N·m (4.3 kgf·m , 31 lbf·ft)



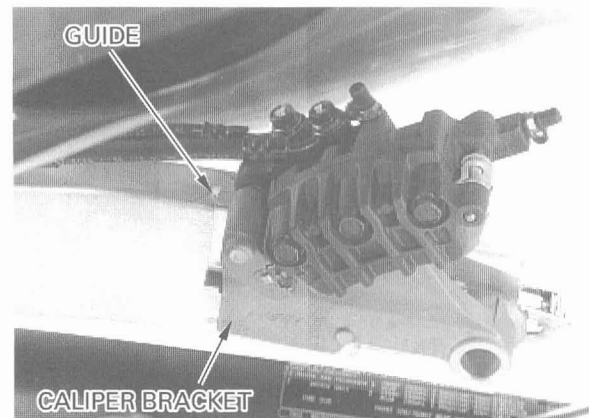
### INSTALLATION

Apply grease to the side collar inside and grooves.

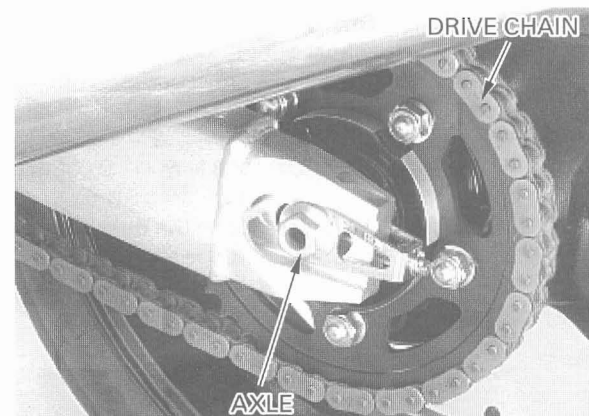
Install the side collars.



Install the rear brake caliper bracket onto the guide of the swingarm.



Place the rear wheel into the swingarm.  
Install the drive chain over the driven sprocket.  
Install the axle with washer from the left side.



Install the washer and loosely install the axle nut.

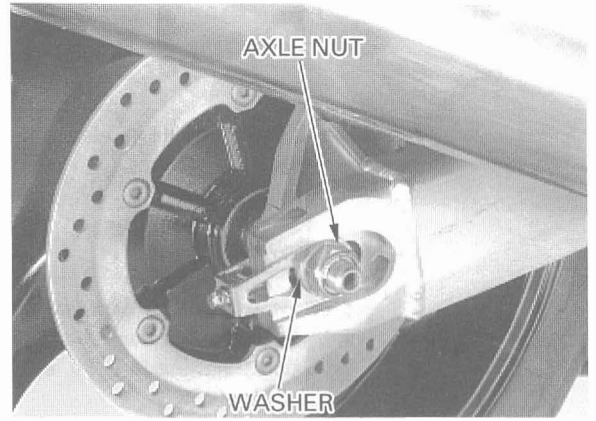
Adjust the drive chain slack (page 3-20).

Tighten the axle nut to the specified torque.

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

**▲WARNING**

*After the rear wheel installation, check the brake operation by applying the brake pedal and lever.*



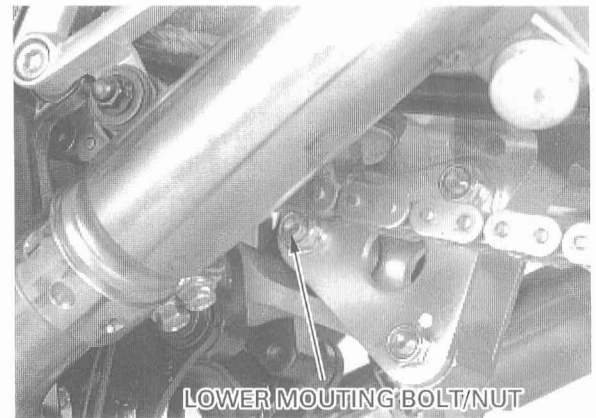
## SHOCK ABSORBER

### REMOVAL

Place the motorcycle on its center stand.

Remove the seat and fuel tank (page 2-2).

Remove the shock absorber lower mounting bolt/nut.



Remove the upper mounting bolt/nut and shock absorber.



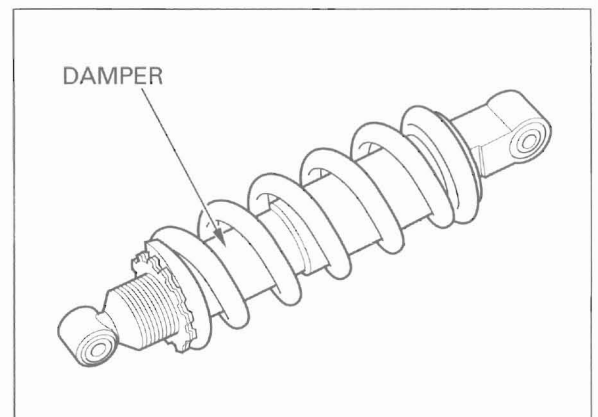
### INSPECTION

Visually inspect the shock absorber for damage.

Check for the:

- Damper rod for bend or damage
- Damper unit for deformation or oil leaks
- Bump rubber for wear or damage

Inspect all the other parts for wear or damage. If necessary, replace the shock absorber as an assembly.



## REAR WHEEL/SUSPENSION

### SHOCK ABSORBER DISPOSAL PROCEDURE

Center punch the damper to mark the drilling point.

Wrap the damper unit inside a plastic bag.

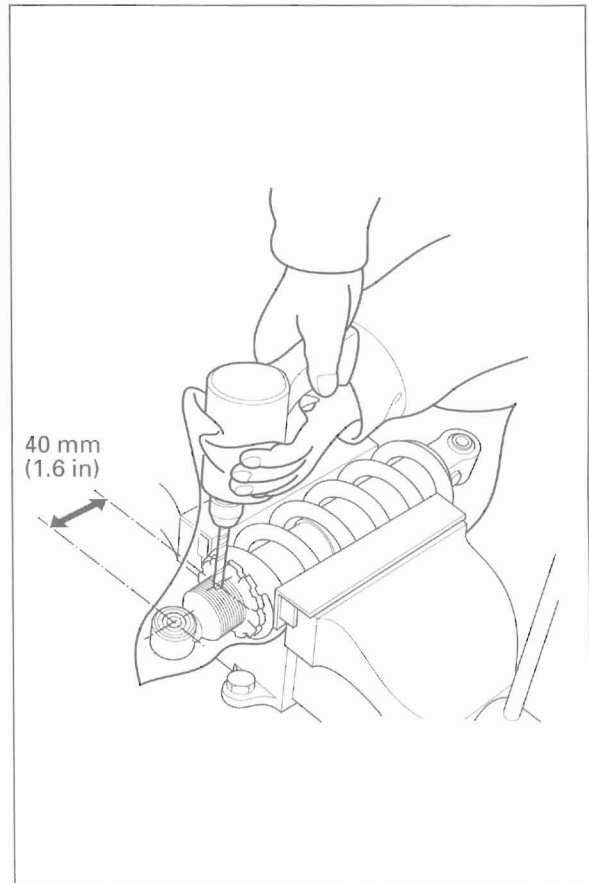
Support the damper in a vise as shown.

Through the open end of the bag, insert a drill motor with a sharp 2–3 mm (5/64–1/8 in) drill bit.

#### ▲WARNING

- *Do not use a dull drill bit which could cause a build-up of excessive heat and pressure inside the damper, leading to explosion and severe personal injury.*
- *The shock absorber contains nitrogen gas and oil under high pressure. Do not drill any farther down the damper case than the measurement given above, or you may drill into the oil chamber; oil escaping under high pressure may cause serious personal injury.*
- *Always wear eye protection to avoid getting metal shaving in your eyes when the gas pressure is released. The plastic bag is only intended to shield you from the escaping gas.*

Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from getting caught in the bit when you start.



### INSTALLATION

Install the shock absorber into the frame with the rebound damping adjuster facing to the right.

Install the upper mounting bolt and nut by aligning the radiator reserve tank grommet hole.

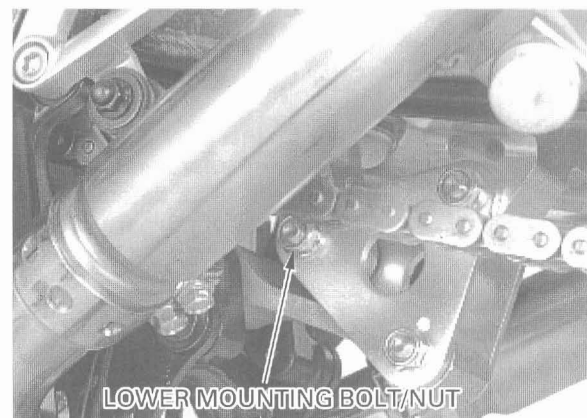
Tighten the upper mounting bolts/nuts to the specified torque.

**TORQUE:** 42 N·m (4.3 kgf·m , 31 lbf·ft)



Install and tighten the lower mounting bolts/nuts to the specified torque.

**TORQUE:** 42 N·m (4.3 kgf·m , 31 lbf·ft)





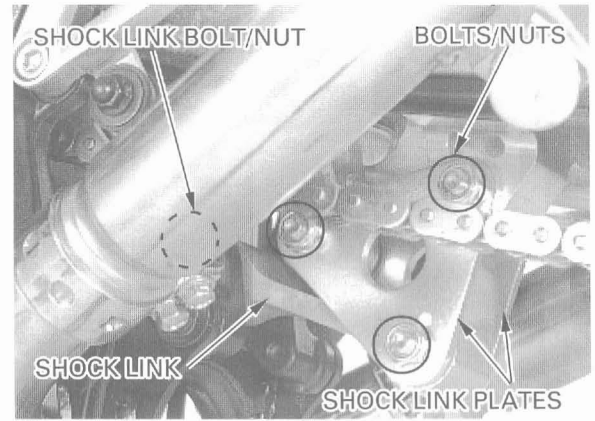
## SUSPENSION LINKAGE

### REMOVAL/INSTALLATION

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



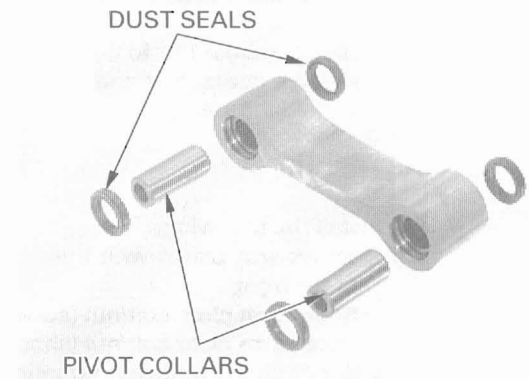
Remove the pivot collars and dust seals from the shock link.

### 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.

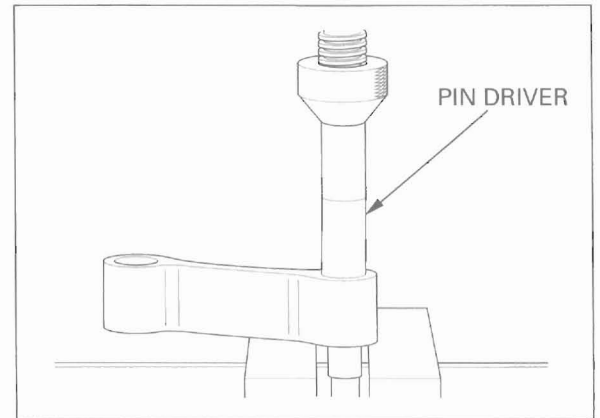


### SHOCK LINK NEEDLE BEARING REPLACEMENT

Press the needle bearing out of the shock link using special tools and a hydraulic press.

#### TOOL:

**Pin driver** 07GMD-KT80100



Pack a new needle bearing with multi-purpose grease.

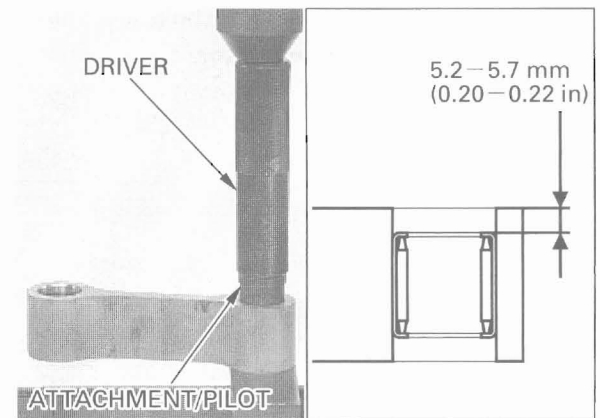
Press a new needle bearing into the shock link so that the needle bearing surface is lower 5.2–5.7 mm (0.20–0.22 in) from the end of the shock link surface.

#### NOTE:

Press the needle bearing into the shock link with the marked side facing out.

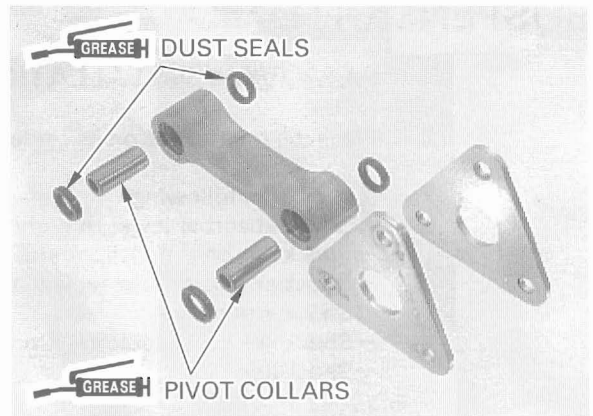
#### TOOLS:

<b>Driver</b>	07749-0010000
<b>Attachment, 24 × 26 mm</b>	07746-0010700
<b>Pilot, 17 mm</b>	07746-0040400



## REAR WHEEL/SUSPENSION

Apply grease to the dust seal lips, then install the dust seals and pivot collars.



### INSTALLATION

Install the shock link to the frame.  
Install the socket bolt and nut, tighten the nut to the specified torque.

**TORQUE:** 59 N·m (6.0 kgf·m , 43 lbf·ft)

Install the following:

- 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 all nuts to the specified torque.

**TORQUE:** 42 N·m (4.3 kgf·m , 31 lbf·ft)



## SWINGARM

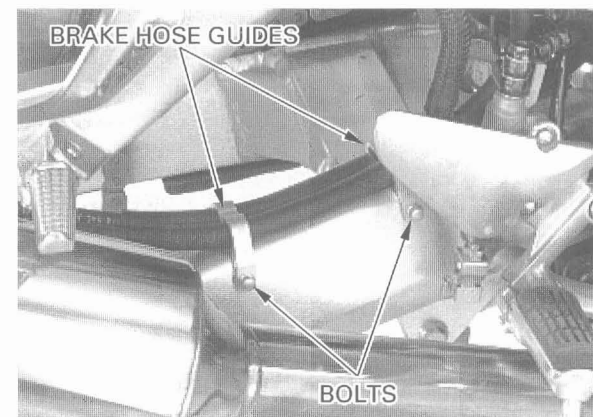
### REMOVAL

Remove the rear wheel (page 14-3).

Remove the socket bolts and drive chain case.

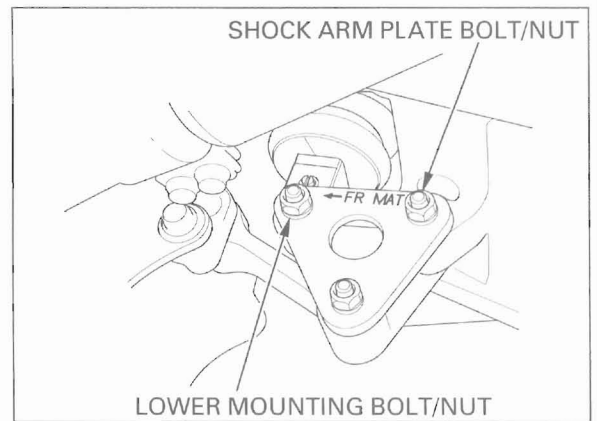


Remove the SH bolts and brake hose guides.

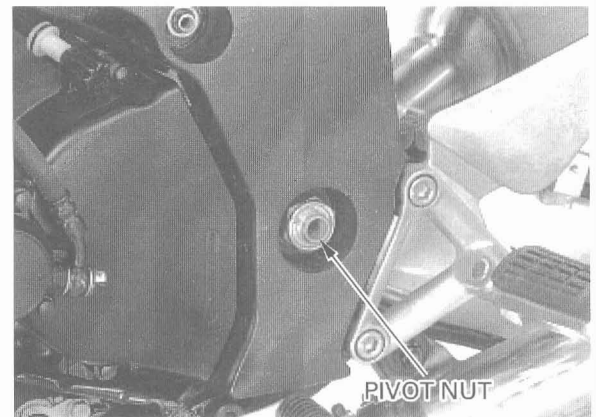




Remove the shock absorber lower mounting bolt/nut.  
Remove the shock arm plate bolt/nut (swingarm side).



Remove the swingarm pivot nut.

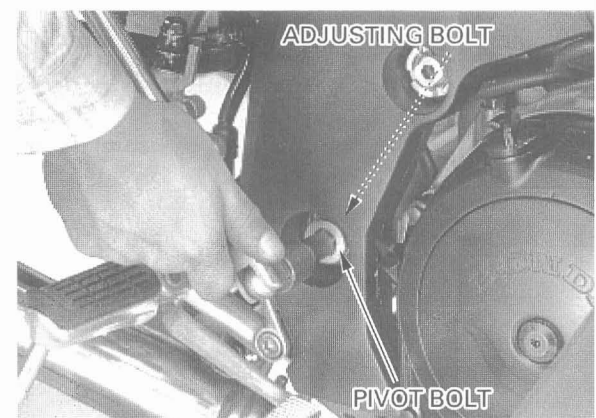


Remove the swingarm pivot lock nut while holding the pivot bolt.

**TOOL:**  
**Pivot adjusting wrench**      07908-4690003



Loosen the swingarm adjusting bolt by turning the pivot bolt.  
Remove the pivot bolt and swingarm.

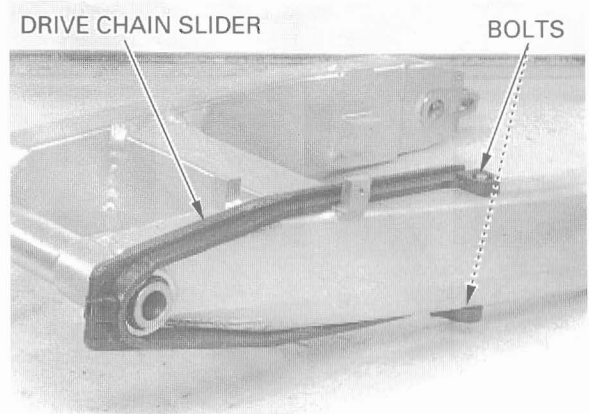


### DISASSEMBLY/INSPECTION

Remove the following:

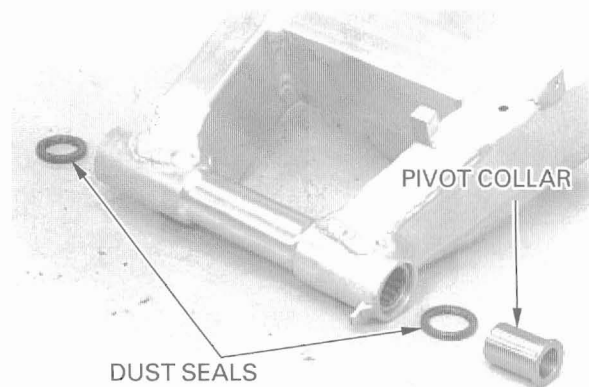
- Drive chain slider
- Drive chain adjusters

Check the drive chain slider for wear or damage.



Remove the pivot collar and dust seals from the swingarm pivot.

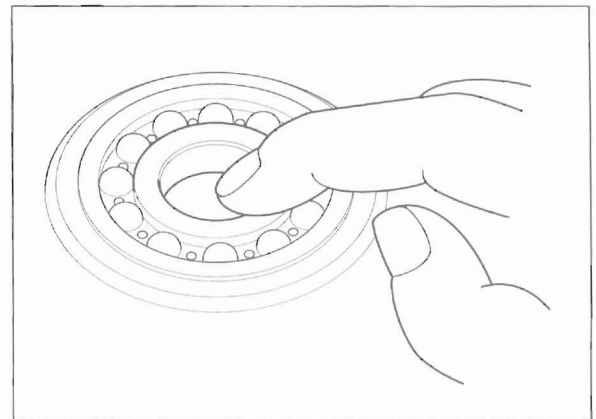
Check the dust seals and collar for damage or fatigue.



Turn the inner race of right pivot bearings with your finger.

The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the pivot.

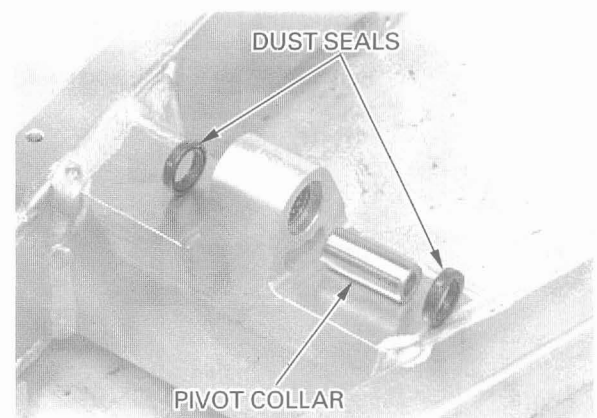
Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the pivot.



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.



**PIVOT BEARING REPLACEMENT**

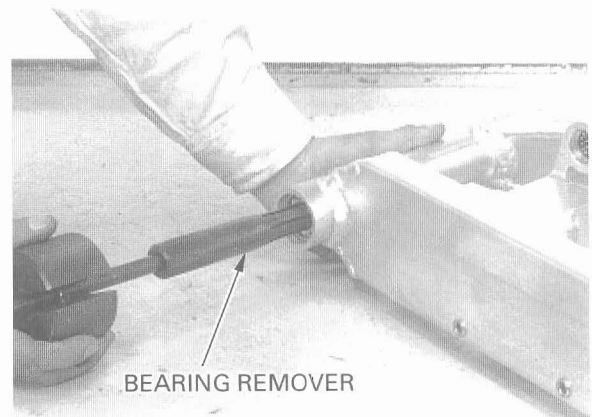
Remove the snap ring.



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

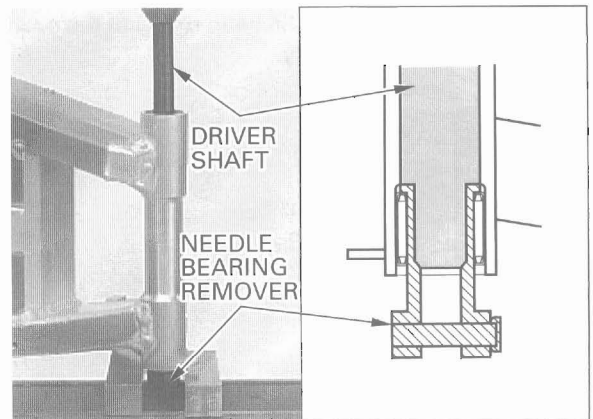


Remove the distance collar.

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



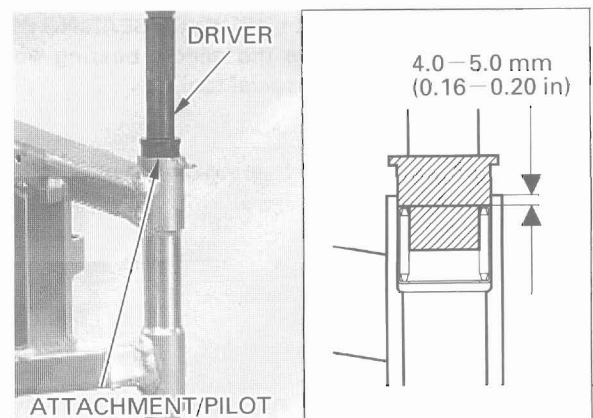
Press a new left pivot bearing (needle bearing) into the swingarm pivot so that the needle bearing surface is lower 4.0–5.0 mm (0.16–0.20 in) from the end of the swingarm pivot surface using the special tools.

**NOTE:**

Press the needle bearing into the swingarm with the marked side facing out.

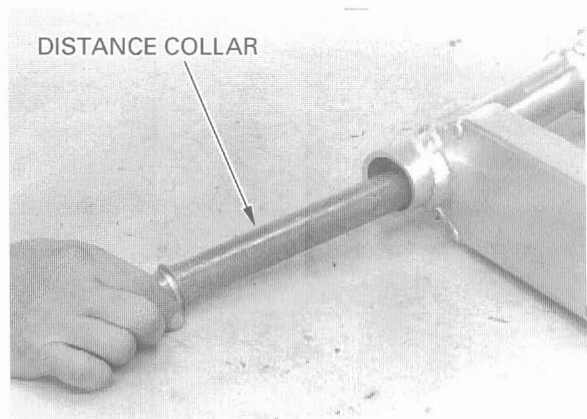
**TOOLS:**

- Driver** 07749-0010000
- Attachment, 37 × 40 mm** 07746-0010200
- Pilot, 28 mm** 07746-0041100



## REAR WHEEL/SUSPENSION

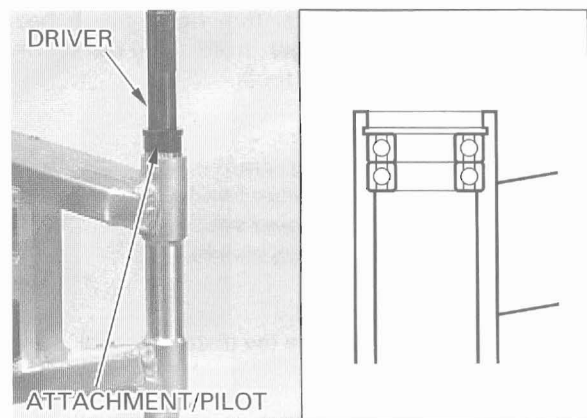
Install the distance collar.



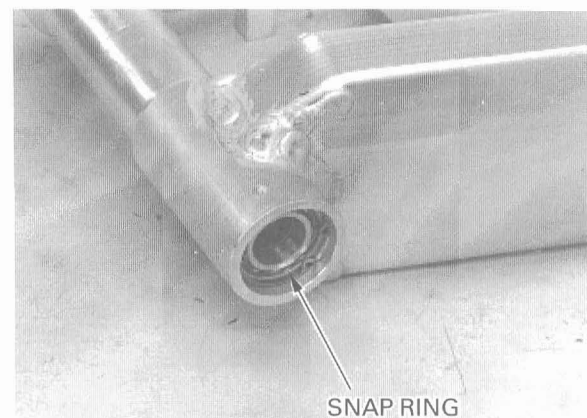
Press new right pivot bearings (radial ball bearing) into the swingarm pivot one at a time using the special tools.

**TOOLS:**

<b>Driver</b>	07749-0010000
<b>Attachment, 37 × 40 mm</b>	07746-0010200
<b>Pilot, 20 mm</b>	07746-0040500



Install the snap ring into the swingarm pivot groove securely.

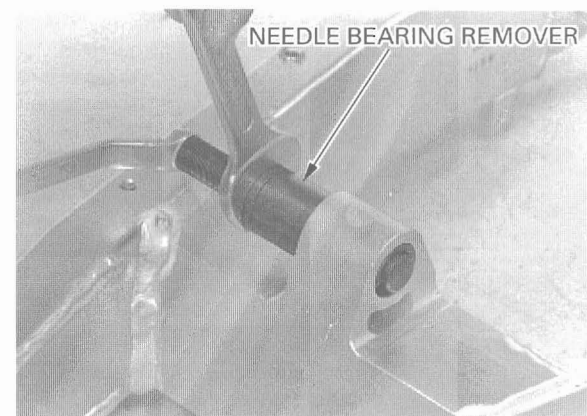


**SHOCK LINK PIVOT BEARING REPLACEMENT**

Remove the needle bearing out of the shock link using special tool.

**TOOL:**

<b>Needle bearing remover</b>	07LMC-KV30100
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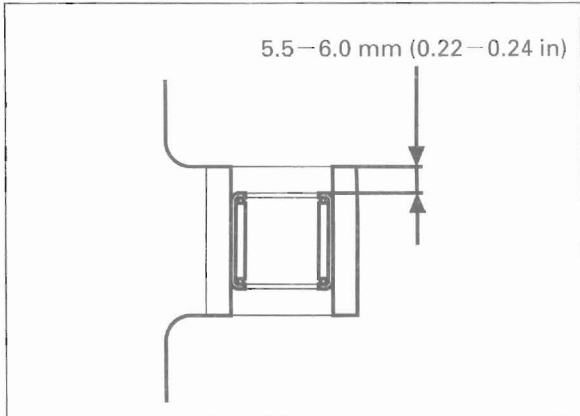


Pack a new needle bearing with multi-purpose grease.

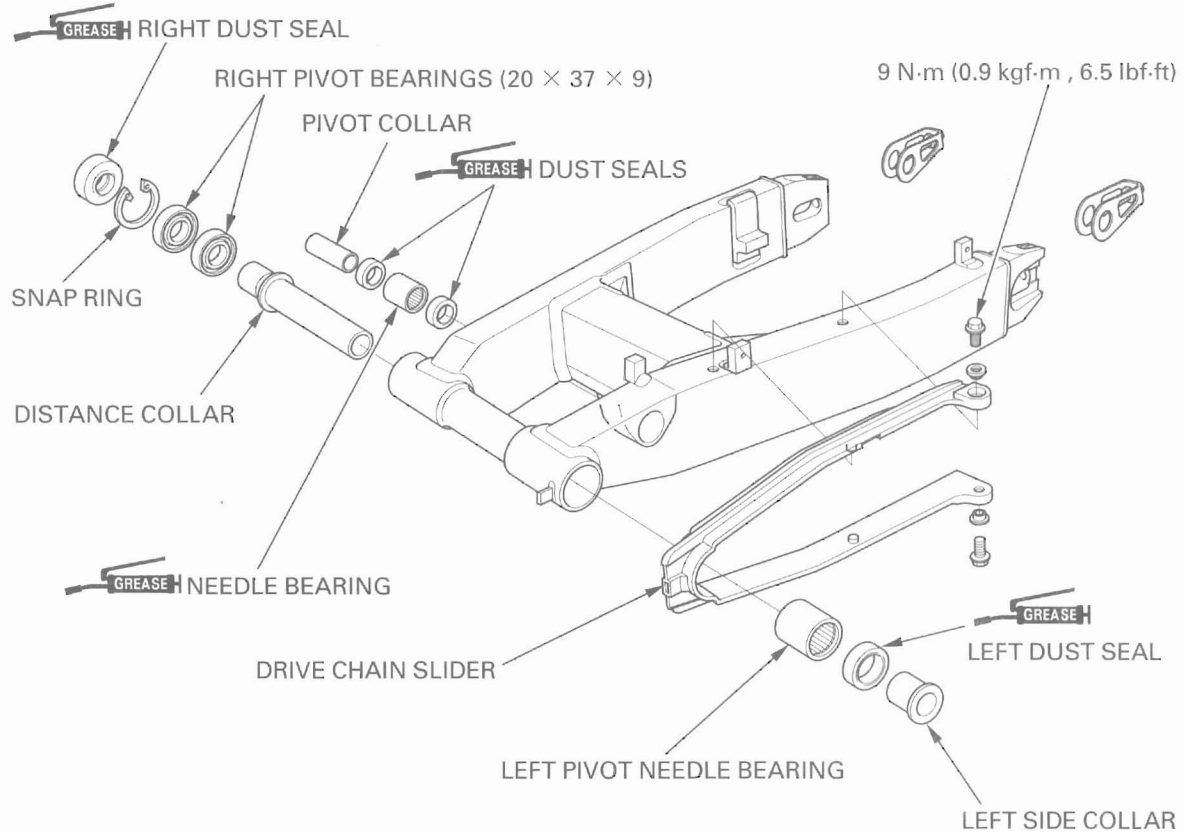
*Press the needle bearing into the shock link with the marked side facing out.*

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.

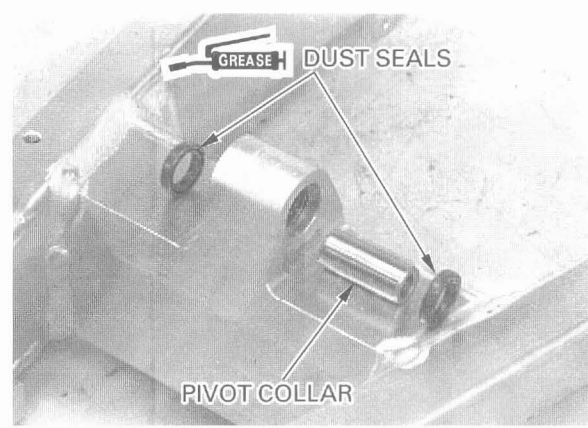
**TOOL:**  
Needle bearing remover 07LMC-KV30100



**ASSEMBLY**



Apply grease to the dust seal lips, then install the dust seals and pivot collar into the shock link pivot.



## REAR WHEEL/SUSPENSION

Apply grease to the dust seal lips, then install the dust seals and pivot collar into the swingarm pivot.



Install the drive chain slider.  
Apply a locking agent to the drive chain slider bolt threads.  
Install the collars and bolts, then tighten the bolts to the specified torque.

**TORQUE:** 9 N·m (0.9 kgf·m , 6.5 lbf·ft)

Install the drive chain adjusters.



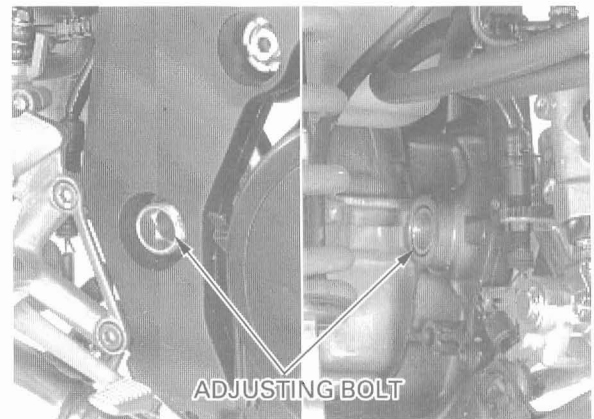
### INSTALLATION

Install the drive chain onto the drive sprocket (if removed).

Install the swingarm adjusting bolt.

Be sure that the tip of the bolt does not protrude inside the frame.

*If the end of the adjusting bolt does protrude, it will not be possible to install the swingarm.*



Apply thin coat of grease to the swingarm pivot bolt surface.

Install the swingarm and pivot bolt.

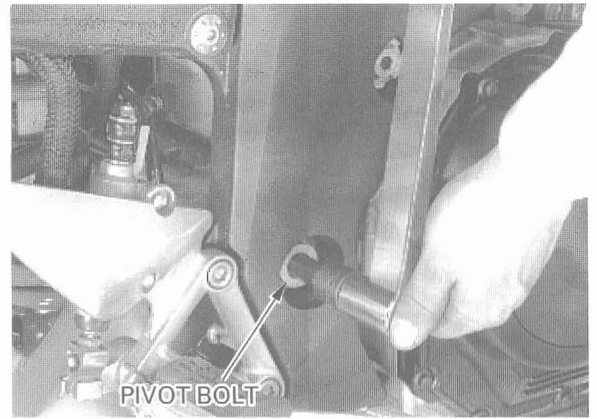
Push the pivot bolt's hex shank into the adjusting bolt's socket head.

Screw the adjusting bolt by turning the pivot bolt.



Tighten the swingarm pivot adjusting bolt with the pivot bolt.

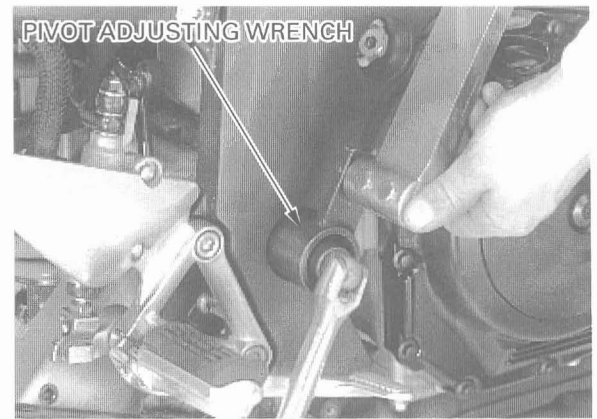
**TORQUE:** 15 N·m (1.5 kgf·m , 11 lbf·ft)



Install and tighten the swingarm pivot adjusting bolt lock nut fully by hand, then tighten the lock nut to the specified torque while holding the pivot bolt using the special tool.

**TOOL:**  
**Pivot adjusting wrench**      07908-4690003

**TORQUE:** 64 N·m (6.5 kgf·m , 47 lbf·ft)



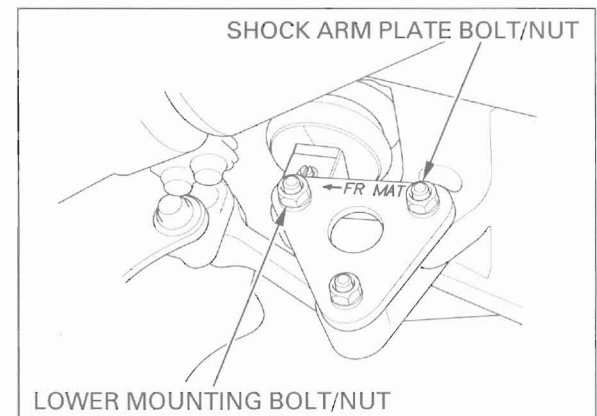
Tighten the swingarm pivot nut to the specified torque.

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



Install and tighten the shock arm plate bolt/nut (swingarm side) and shock absorber lower mounting bolt/nut to the specified torque.

**TORQUE:** 42 N·m (4.3 kgf·m , 31 lbf·ft)

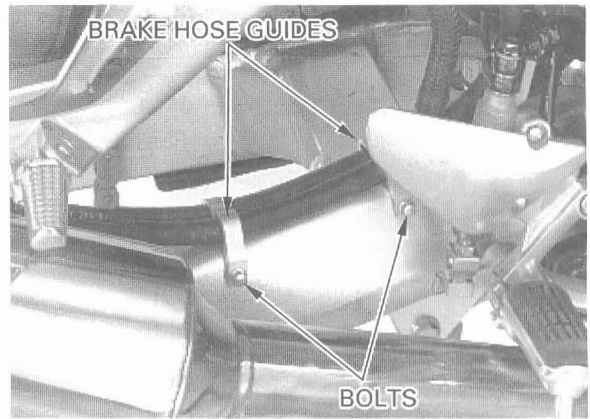




## REAR WHEEL/SUSPENSION

Route the brake hose properly, tighten the brake hose guide bolts to the specified torque.

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



Install the drive chain case and tighten the socket bolts.

Install the rear wheel (page 14-8).



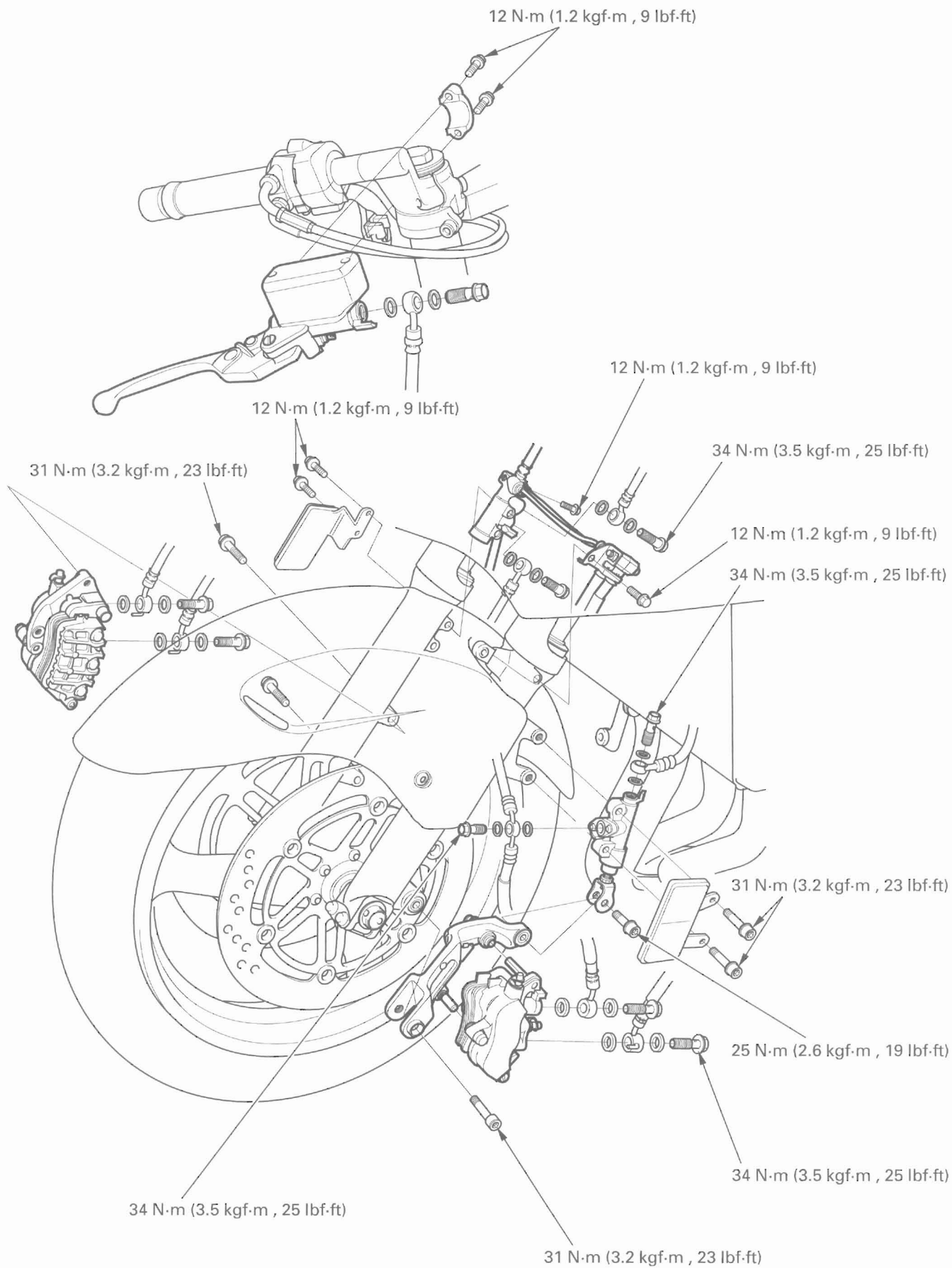


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**MEMO**

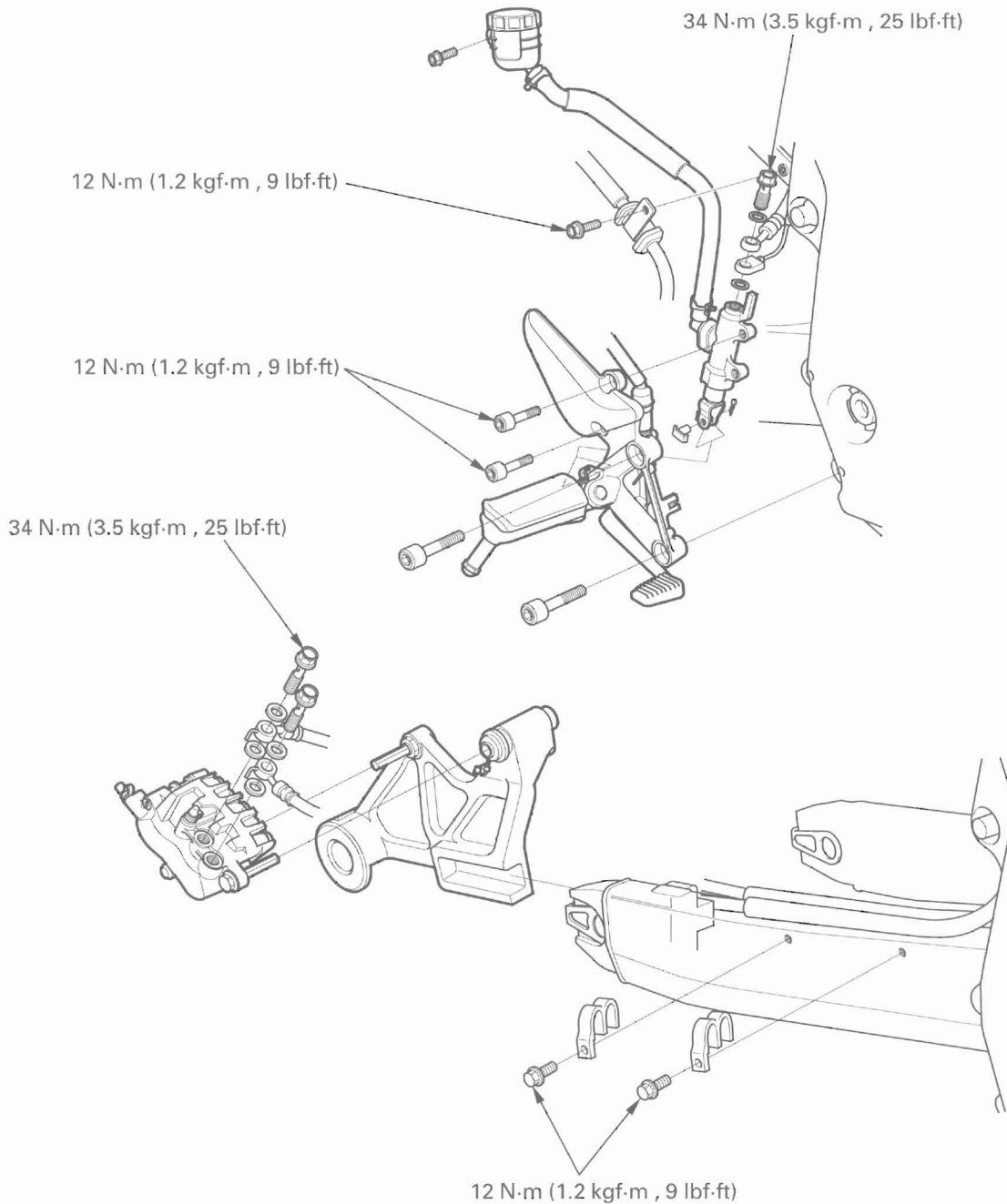


# HYDRAULIC BRAKE



# 15. HYDRAULIC BRAKE

SERVICE INFORMATION	15-2	REAR MASTER CYLINDER	15-21
TROUBLESHOOTING	15-4	PROPORTIONAL CONTROL VALVE	15-25
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15-5	DELAY VALVE	15-25
BRAKE PAD/DISC	15-10	FRONT BRAKE CALIPER	15-27
FRONT MASTER CYLINDER	15-13	REAR BRAKE CALIPER	15-32
SECONDARY MASTER CYLINDER	15-18	BRAKE PEDAL	15-36



## HYDRAULIC BRAKE

# SERVICE INFORMATION

## GENERAL

### ▲WARNING

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.
- Check the brake system by applying the brake lever and pedal after the air bleeding.

### CAUTION:

- This model equipped with a Linked Braking System. Must be follow the system air bleeding procedure (page 15-5) if you disconnect or service any part of the brake hydraulic system.
- Do not disassemble the secondary master cylinder push rod or the correct brake performance will not be obtained.

- Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the front reservoir is horizontal first.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid they may not be compatible.
- Always check brake operation before riding the motorcycle.

## SPECIFICATIONS

Unit: mm (in)

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

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Rear	Specified brake fluid	DOT 4	_____	
	Brake pedal height	65 (2.6)	_____	
	Brake disc thickness	5.0 (0.20)	4.0 (0.16)	
	Brake disc runout	_____	0.30 (0.012)	
	Master cylinder I.D.	17.460 – 17.503 (0.6874 – 0.6891)	17.515 (0.6896)	
	Master piston O.D.	17.417 – 17.444 (0.6857 – 0.6868)	17.405 (0.6852)	
	Caliper cylinder I.D.	Front	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
		Center	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
		Rear	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
	Caliper piston O.D.	Front	22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)
Center		25.318 – 25.368 (0.9968 – 0.9987)	25.310 (0.9965)	
Rear		22.585 – 22.618 (0.8892 – 0.8905)	22.560 (0.8882)	

**TORQUE VALUES**

Front brake master cylinder holder bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Front brake master cylinder cap screw	1 N·m (0.15 kgf·m , 1.1 lbf·ft)	
Brake lever pivot bolt	1 N·m (0.1 kgf·m , 0.7 lbf·ft)	
Brake lever pivot nut	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Brake lever adjuster	4 N·m (0.4 kgf·m , 2.9 lbf·ft)	
Front brake switch screw	1 N·m (0.12 kgf·m , 0.9 lbf·ft)	
Right front brake caliper mounting bolt	31 N·m (3.2 kgf·m , 23 lbf·ft)	ALOC bolt
Left front brake caliper pivot bolt	31 N·m (3.2 kgf·m , 23 lbf·ft)	ALOC bolt
Left front brake caliper bolt (secondary master joint)	25 N·m (2.6 kgf·m , 19 lbf·ft)	ALOC bolt
Caliper body B bolt	32 N·m (3.3 kgf·m , 24 lbf·ft)	ALOC bolt
Front brake caliper slide pin (main)	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply a locking agent to the threads
Front brake caliper slide pin (sub)	13 N·m (1.3 kgf·m , 9 lbf·ft)	Apply a locking agent to the threads
Pad pin	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Brake caliper bleeder	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Secondary master cylinder mounting bolt	31 N·m (3.2 kgf·m , 23 lbf·ft)	ALOC bolt
Secondary master cylinder push rod nut	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Secondary master cylinder connector	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Rear master cylinder mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Rear master cylinder reservoir mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Rear master cylinder push rod nut	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Rear master cylinder hose joint screw	1 N·m (0.15 kgf·m , 1.1 lbf·ft)	Apply a locking agent to the threads
Brake hose oil bolt	34 N·m (3.5 kgf·m , 25 lbf·ft)	
Brake pipe joint	17 N·m (1.7 kgf·m , 12 lbf·ft)	Apply oil to the threads
Brake pipe 2/3 way joint	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Brake hose guide bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Delay valve mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
PCV (Proportional Control Valve) mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Right brake hose clamp bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	

### TOOL

Snap ring pliers

07914—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.

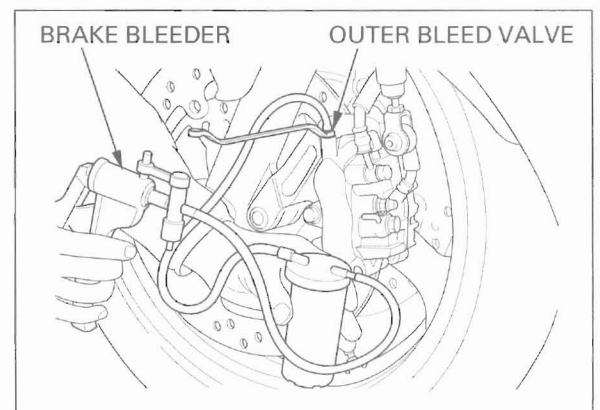
Remove the screws, reservoir cap, set plate and diaphragm.



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.



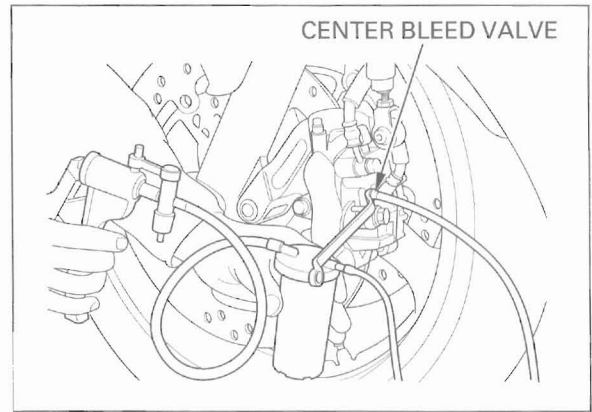
## HYDRAULIC BRAKE

### Pedal brake line

Connect a commercially available brake bleeder to the front brake caliper center bleed valve.

Loosen the bleed valve and pump the brake bleeder.

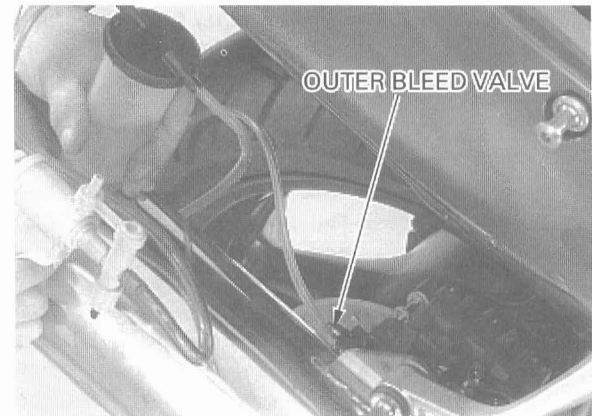
Stop pumping the bleeder when no more fluid flows out of the bleed valve.



Connect a commercially available brake bleeder to the rear brake caliper outer bleed valve.

Loosen the bleed valve and pump the brake bleeder.

Stop pumping the bleeder when no more fluid flows out of the bleed valve.



Connect a commercially available brake bleeder to the rear brake caliper center bleed valve.

Loosen the bleed valve and pump the brake bleeder.

Stop pumping the bleeder when no more fluid flows out of the bleed valve.



## BRAKE FLUID FILLING/AIR BLEEDING

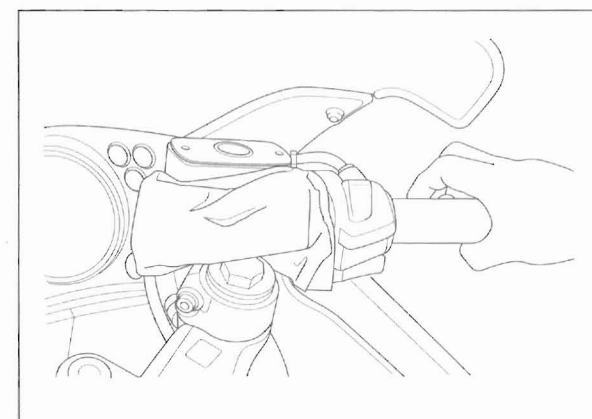
### Lever brake line

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

#### CAUTION:

- *Use only DOT 4 brake fluid from a sealed container.*
- *Do not mix different types of fluid. They are not compatible.*

Operate the brake lever several times to bleed air from the master cylinder.



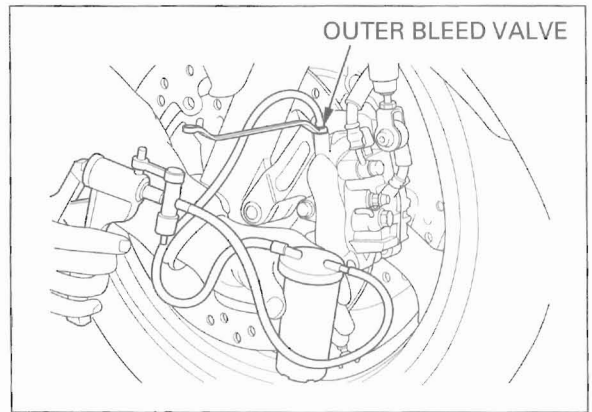


Connect a commercially available brake bleeder to the outer bleed valve.

Pump the brake bleeder and loosen the bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

**NOTE:**

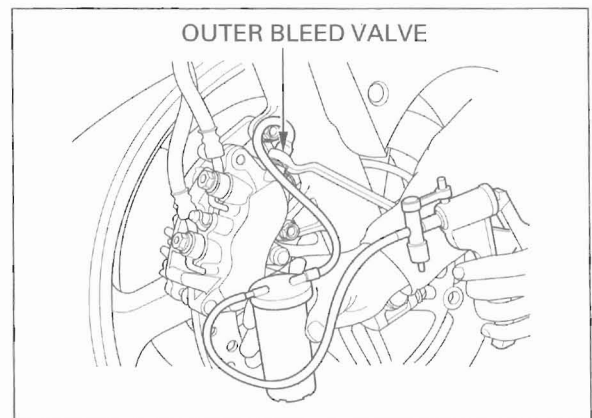
- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



*If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.*

Repeat the above step procedures until air bubbles do not appear in the plastic hose.

Close the bleed valve. Operate the brake lever and check brake operation. If it still feels spongy, bleed the lever system again.



If a brake bleeder is not available, use the following procedure:

Connect a transparent bleed hose to the bleed valve and place the outer end of the hose in a container.

Loosen the bleed valve 1/4 turn and pump the brake lever until the brake fluid flows out from the bleed valve.

1. Pump the brake lever several times, then squeeze the brake lever all the way and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.

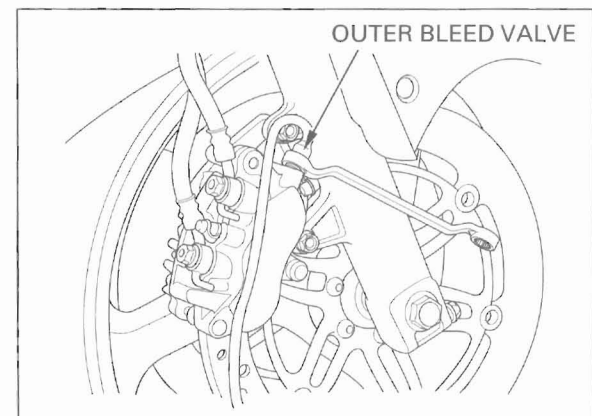
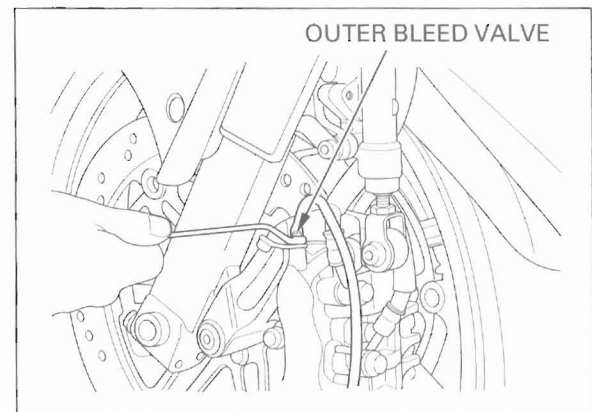
**NOTE:**

Do not release the brake lever until the bleed valve has been closed.

2. Release the brake lever slowly until the bleed valve has been closed.
3. Repeat the steps 1–2 until there are no air bubbles in the bleed hose.

After bleeding air completely, tighten the bleed valves to the specified torque.

**TORQUE:** 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

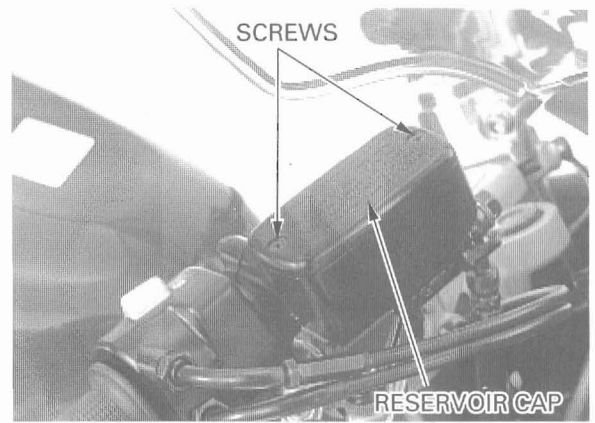


## HYDRAULIC BRAKE

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)

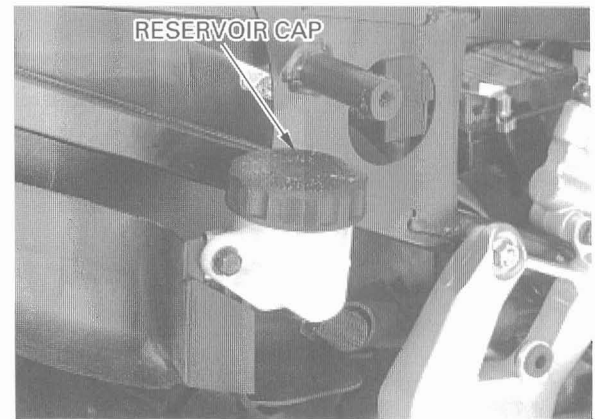
Check the front brake operation (page 3-25).



### Pedal brake line

#### NOTE:

- Before performing this service, prepare the brake fluid 500 cm<sup>3</sup> (16.9 US oz, 14.1 Imp oz) or more, because the brake line is long.
- Fill with fluids and bleed air from the brake pedal line in the sequence shown below:
  1. Right front caliper center bleed valve
  2. Left front caliper center bleed valve
  3. Rear caliper center bleed valve
  4. Rear caliper outer bleed valve



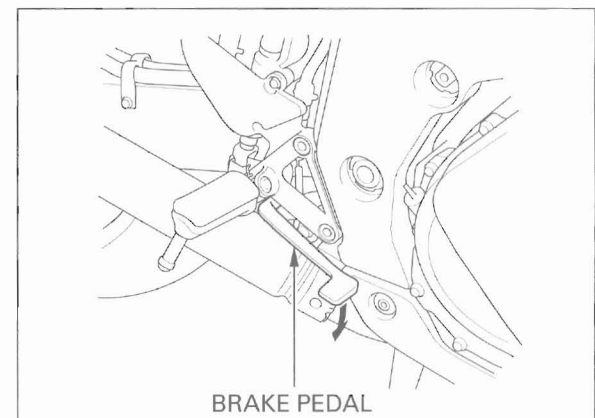
Remove the seat cowl (page 2-5).

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.



1. Connect a commercially available brake bleeder to the right front brake caliper center bleed valve.

**NOTE:**

When using a brake bleeder, follow the manufacturer's operating instructions.

Pump the brake bleeder and loosen the bleed valve.  
 Operate the brake bleeder and feed the brake fluid until fluid flows out from the bleeder valve.  
 Close the bleeder valve.

2. Feed the brake fluid at the left front brake caliper center bleeder valve using the same procedure in step 1.
3. Feed the brake fluid at the rear brake caliper center bleeder valve using the same procedure in step 1.
4. Feed the brake fluid at the rear brake caliper outer bleeder valve using the same procedure in step 1.
5. Repeat steps 1–4 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 push the brake pedal down all the way.

**NOTE:**

Do not release the brake pedal while opening the bleed valve.

Close the bleed valve.

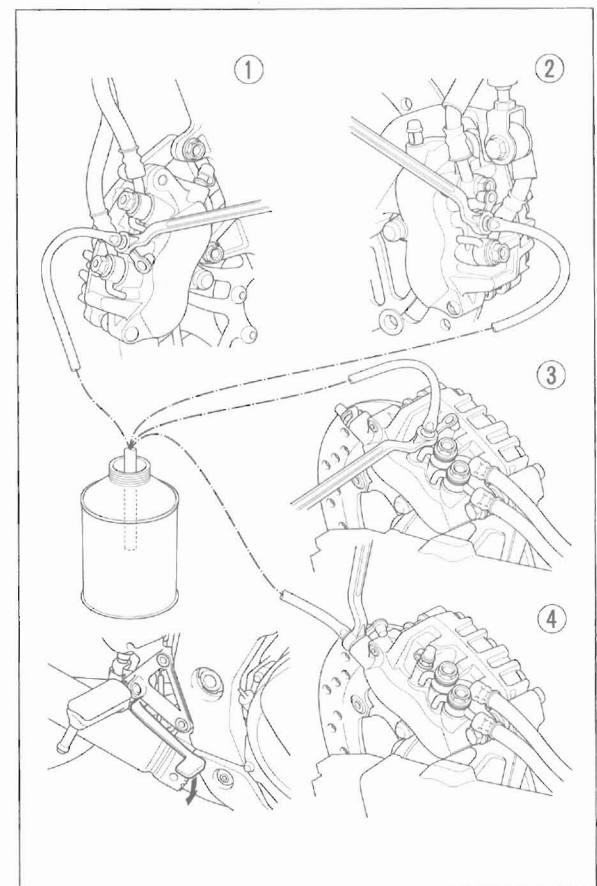
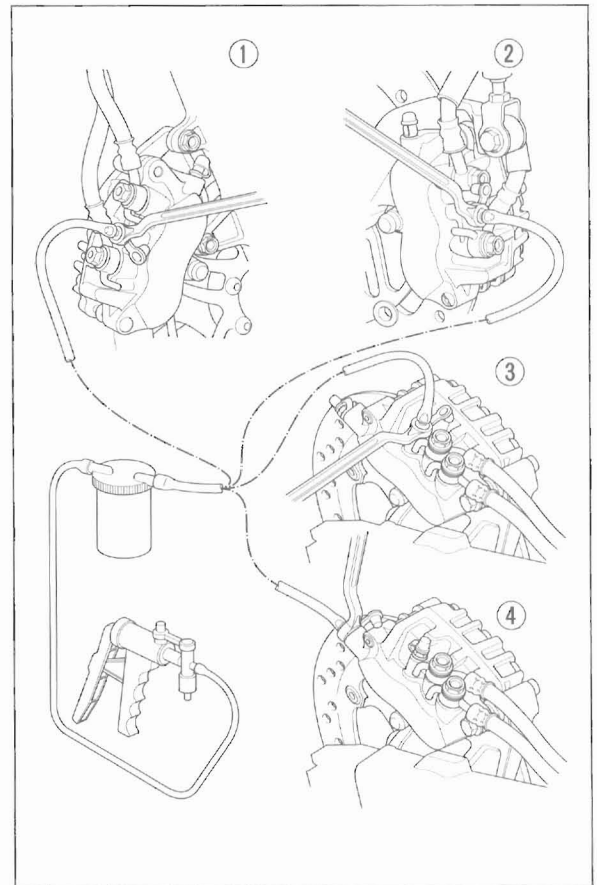
2. Release the brake pedal slowly and wait several seconds after it reaches the end of its travel.
3. Repeat above steps 1 and 2 until bubbles cease to appear in the fluid at the end of the bleed tube and pedal resistance is felt.

**NOTE:**

- After the bubbles cease to appear in the fluid, repeat air bleeding procedure about 2–3 times.
- Carefully bleed the air from the rear brake caliper outer 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)



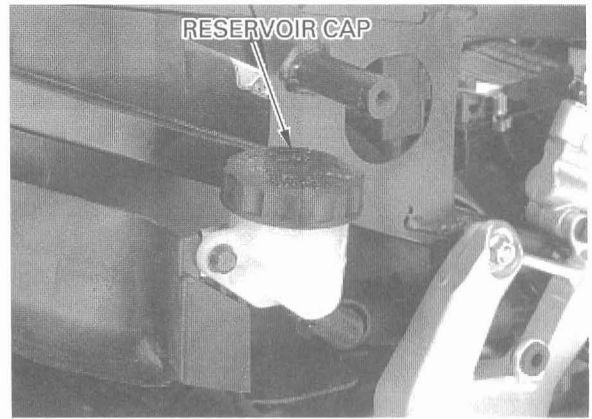
## HYDRAULIC BRAKE

Fill the reservoir up to the "UPPER" level.

**SPECIFIED BRAKE FLUID:** DOT 4 brake fluid

Install the diaphragm, set plate and reservoir cap.

*Keep Res. on Straight-Up  
Remove Windshield*



## BRAKE PAD/DISC

### FRONT BRAKE PAD REPLACEMENT

#### **⚠ WARNING**

**After the brake pad replacement, check the brake operation by applying the brake lever and pedal.**

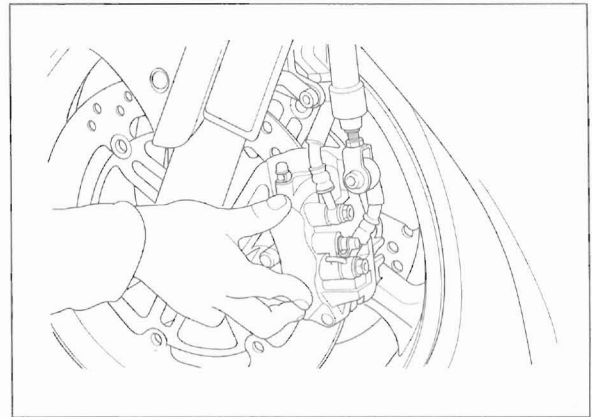
*Always replace the  
brake pads in  
pairs to assure  
even disc pressure.*

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.

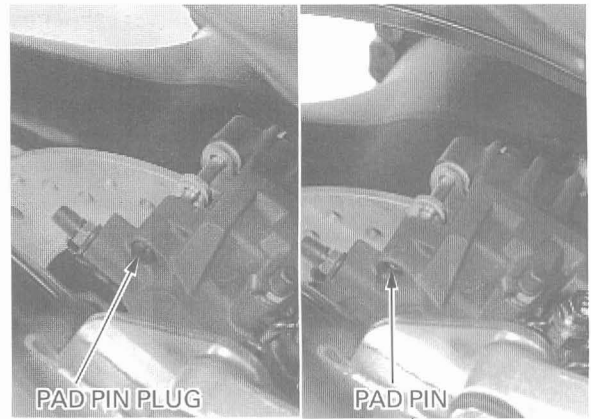
### NOTE:

Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

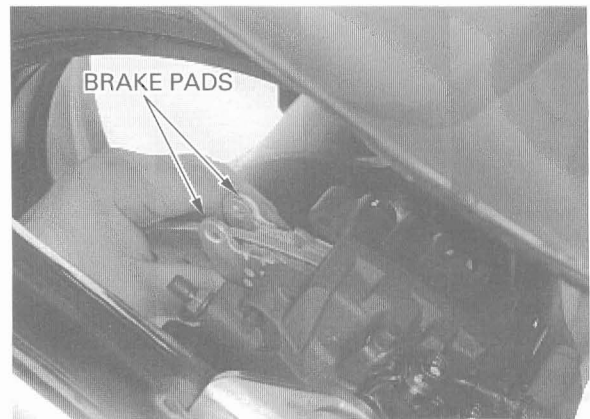


## HYDRAULIC BRAKE

Remove the pad pin plug and loosen the pad pin.

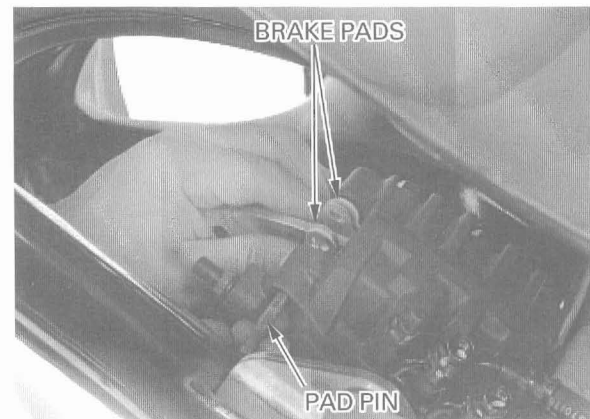


Remove the pad pin and brake pads.



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.

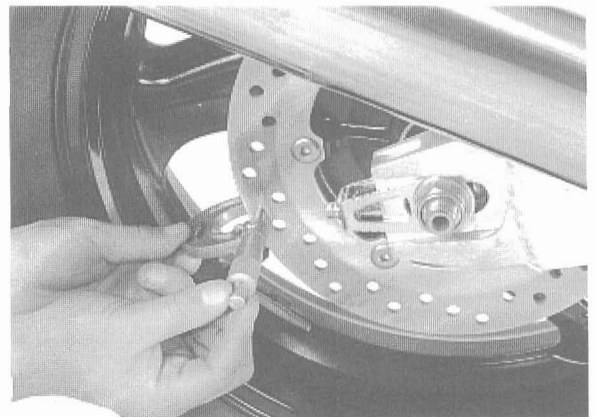
Measure the brake disc thickness with a micrometer.

**SERVICE LIMITS:**

**FRONT:** 4.0 mm (0.16 in)

**REAR:** 4.0 mm (0.16 in)

Replace the brake disc if the smallest measurement is less than the service limit.

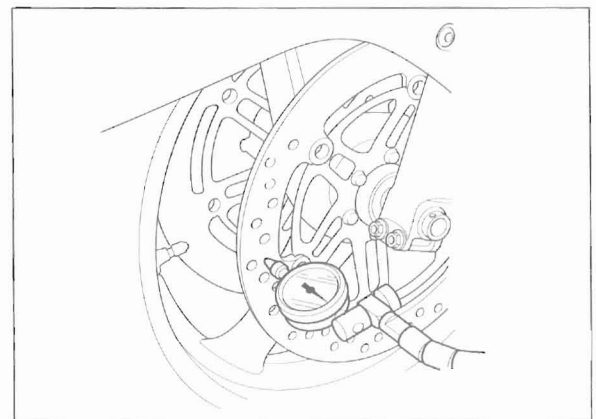


Measure the brake disc warpage with a dial indicator.

**SERVICE LIMIT:** 0.30 mm (0.012 in)

Check the wheel bearings for excessive play, if the warpage exceeds the service limit.

Replace the brake disc if the wheel bearings are normal.



## FRONT MASTER CYLINDER

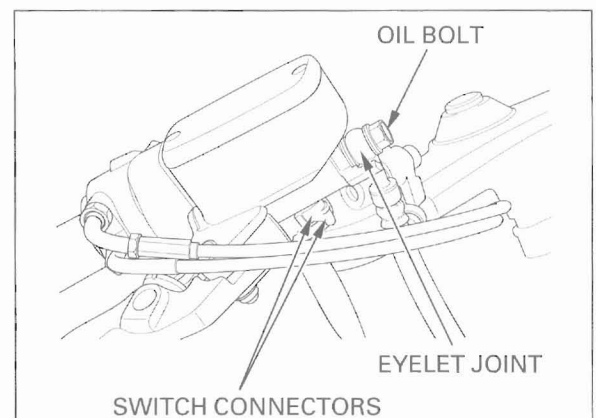
### REMOVAL

Drain the lever brake hydraulic system (page 15-5).

Disconnect the brake light switch wire connectors. Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

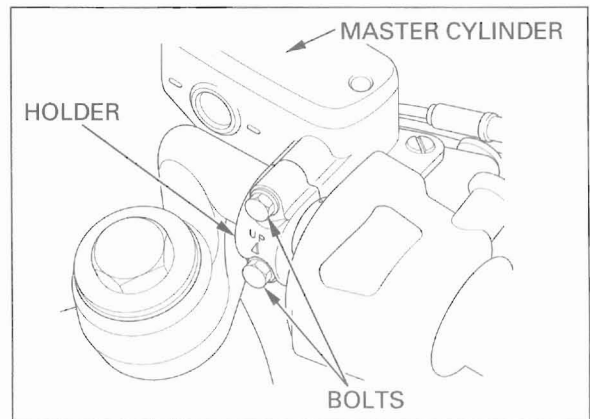
**CAUTION:**

*Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*



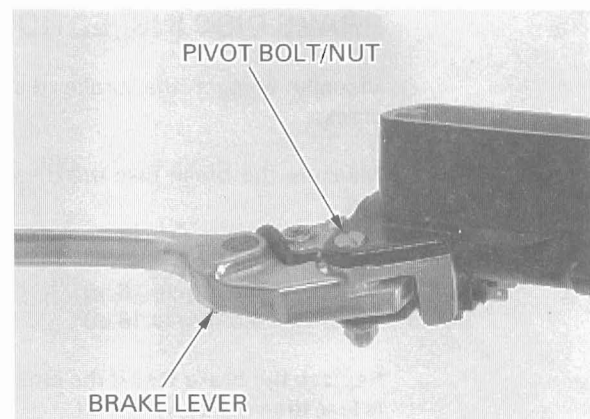
## HYDRAULIC BRAKE

Remove the bolts from the master cylinder holder and remove the master cylinder assembly.



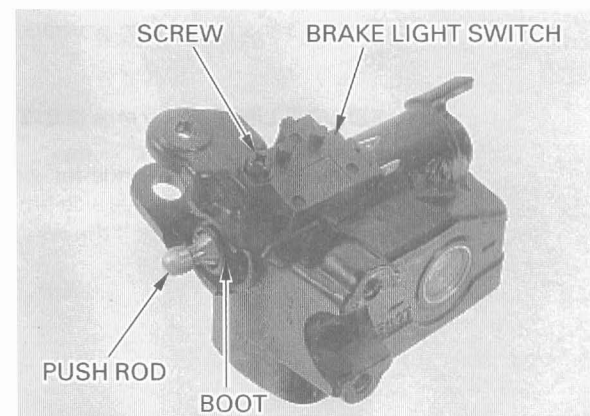
### DISASSEMBLY

Remove the pivot bolt/nut and brake lever assembly.



Remove the screw and brake light switch.

Remove the boot and push rod.



Remove the snap ring from the master cylinder body using the special tool as shown.

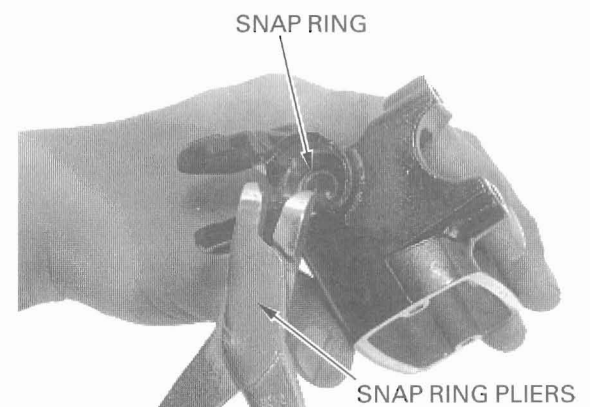
#### TOOL:

**Snap ring pliers**

07914-3230001

Remove the master piston and spring.

Clean the inside of the cylinder and reservoir with brake fluid.

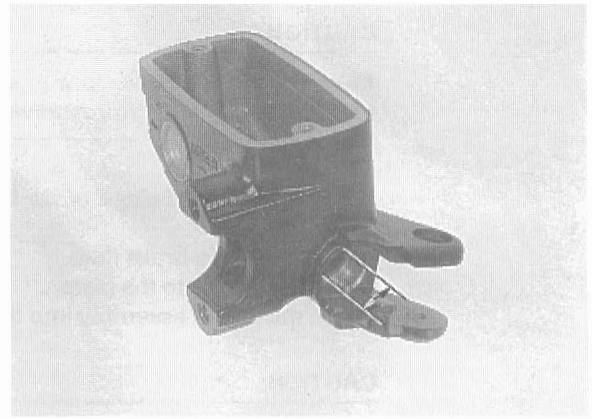




**INSPECTION**

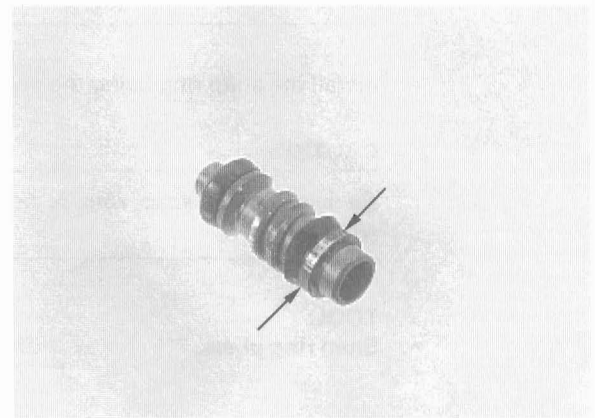
Check the piston boot, primary cup and secondary cup for fatigue or damage.  
 Check the master cylinder and piston for abnormal scratches.  
 Measure the master cylinder I.D.

**SERVICE LIMIT:** 12.76 mm (0.502 in)

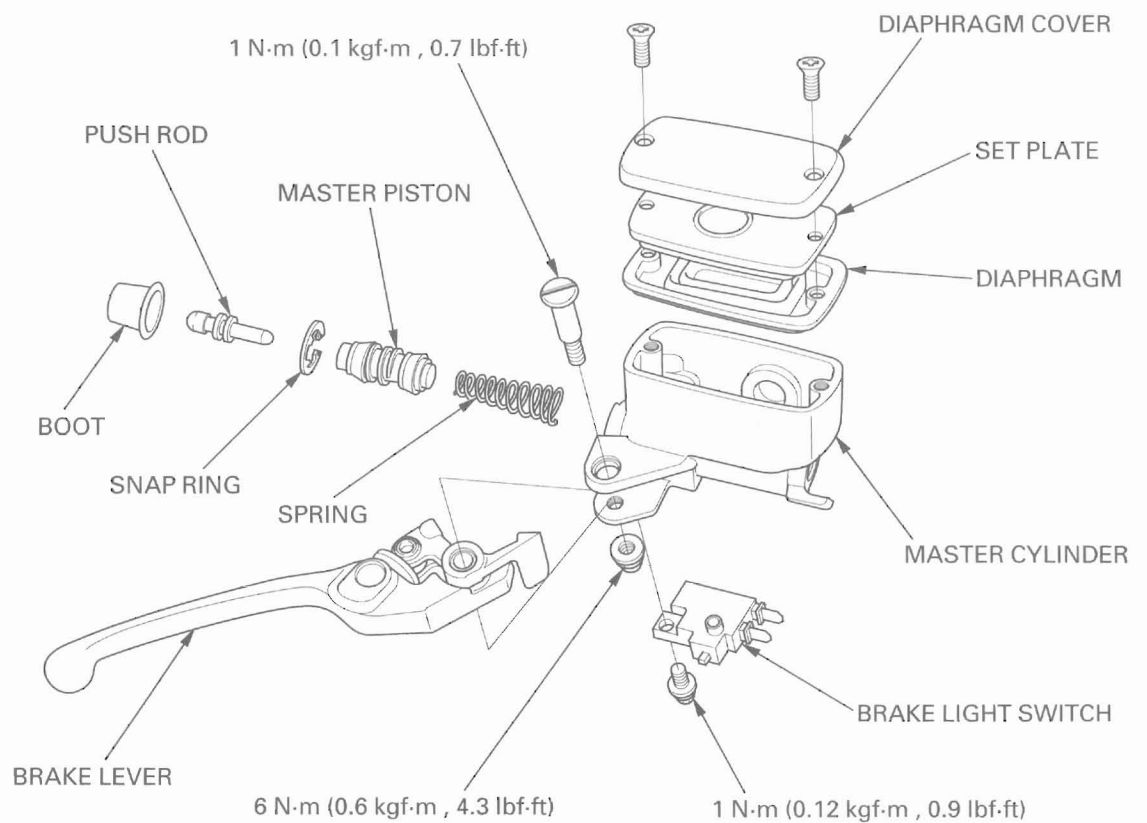


Measure the master cylinder piston O.D.

**SERVICE LIMIT:** 12.65 mm (0.498 in)



**ASSEMBLY**



## HYDRAULIC BRAKE

### 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

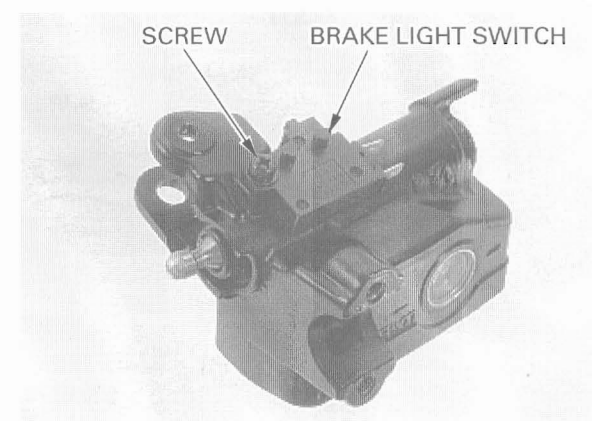
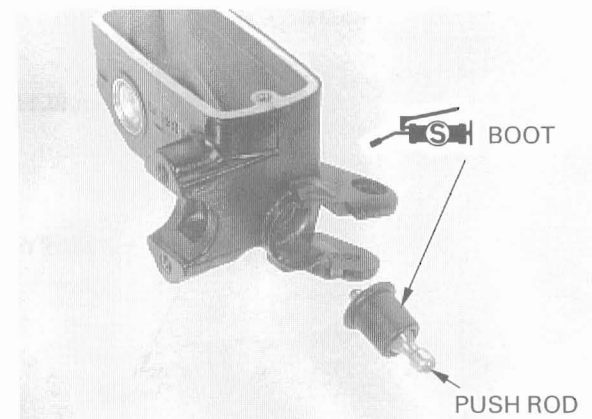
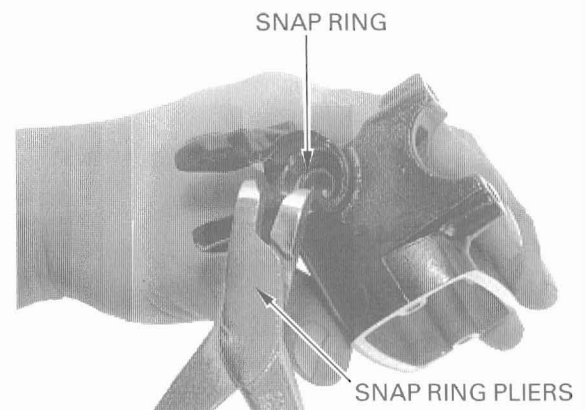
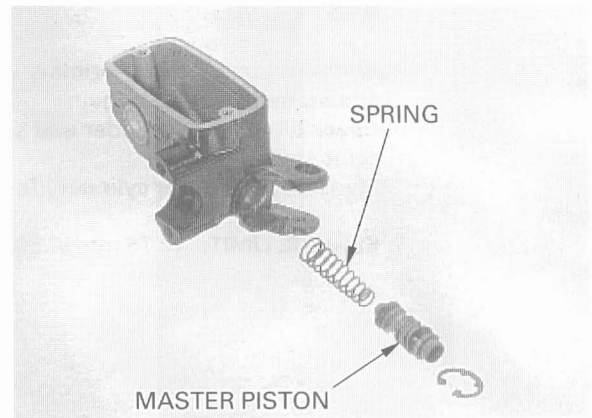
07914—3230001

Apply silicone grease to the inside of the boot and push rod tip.

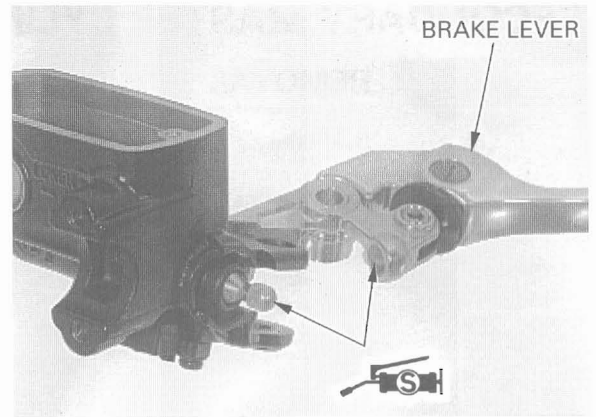
Install the push rod and boot.

Install the brake light switch and tighten the screw to the specified torque.

**TORQUE:** 1 N·m (0.12 kgf·m , 0.9 lbf·ft)



Apply silicone grease to the tip of the push rod, then install the brake lever assembly.

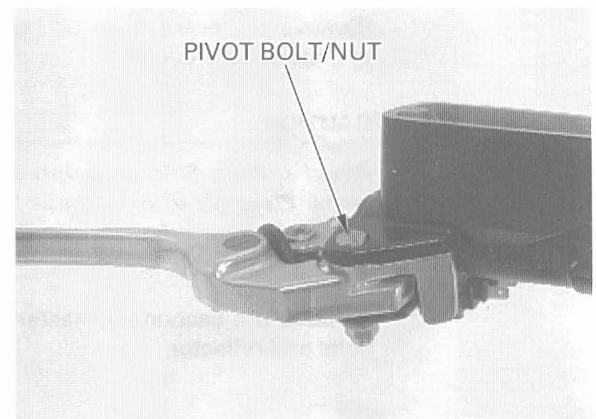


Install and tighten the pivot bolt to the specified torque.

**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)



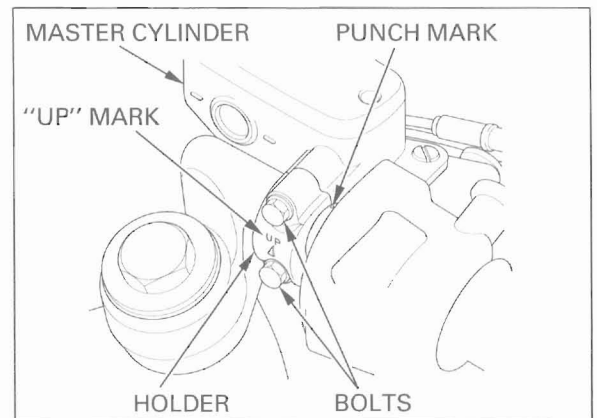
Place the master cylinder assembly on the handlebar.

Align the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with its "UP" mark facing up.

Tighten the upper bolt first, then the lower bolt.

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



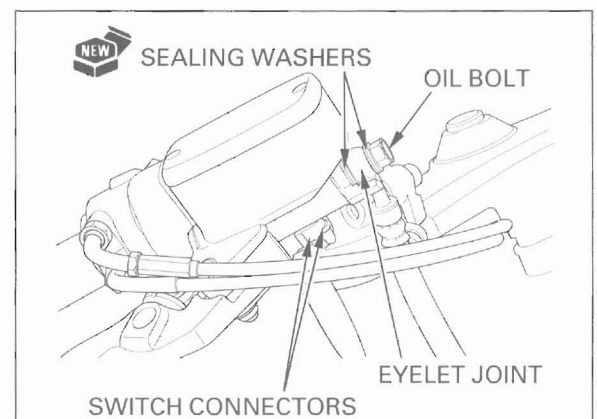
Install the brake hose eyelet with the oil bolt and new sealing washers.

Adjust the brake hose angle, 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 15-6).

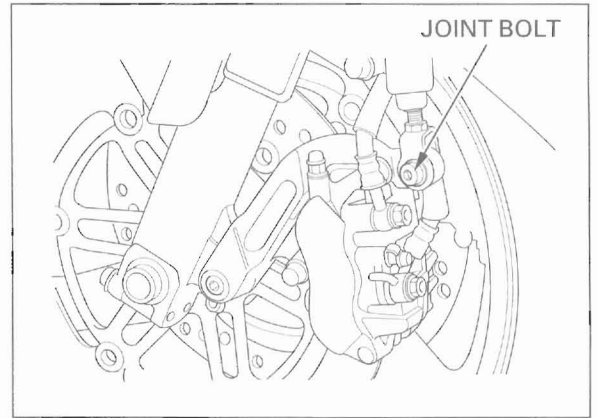


## SECONDARY MASTER CYLINDER

### REMOVAL

Drain the pedal brake hydraulic system (page 15-5).

Remove the left front brake caliper joint bolt.

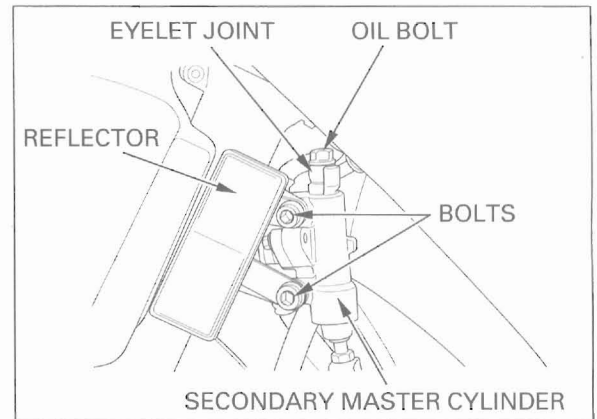


Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

#### CAUTION:

*Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*

Remove the secondary master cylinder mounting bolts and reflector.



Remove the oil bolt, sealing washers and secondary master cylinder.



Remove the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

#### TOOL:

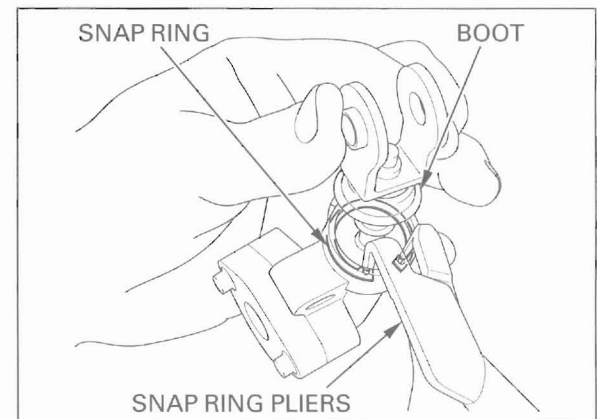
**Snap ring pliers** 07914-3230001

Remove the push rod, master piston and spring.

Clean the inside of the cylinder with brake fluid.

#### ▲WARNING

*Do not disassemble the secondary master cylinder push rod or the correct brake performance is not obtained.*

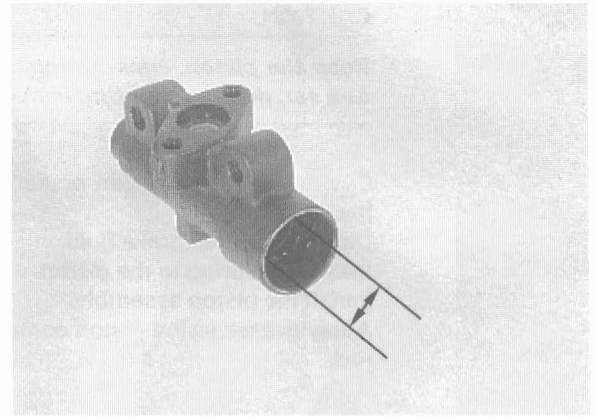


**INSPECTION**

Check the piston boot, primary cup and secondary cup for fatigue or damage.  
 Check the master cylinder and piston for abnormal scratches.

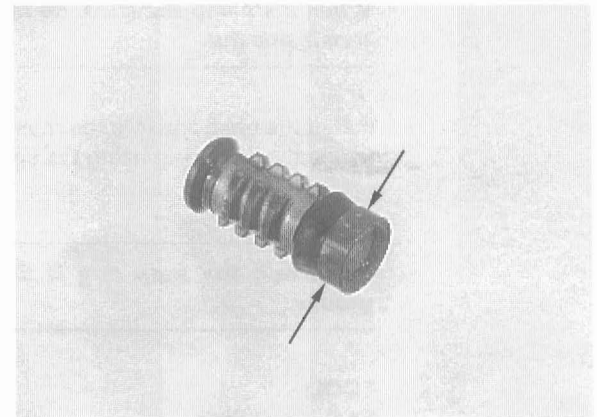
Measure the master cylinder I.D.

**SERVICE LIMIT:** 14.055 mm (0.5533 in)

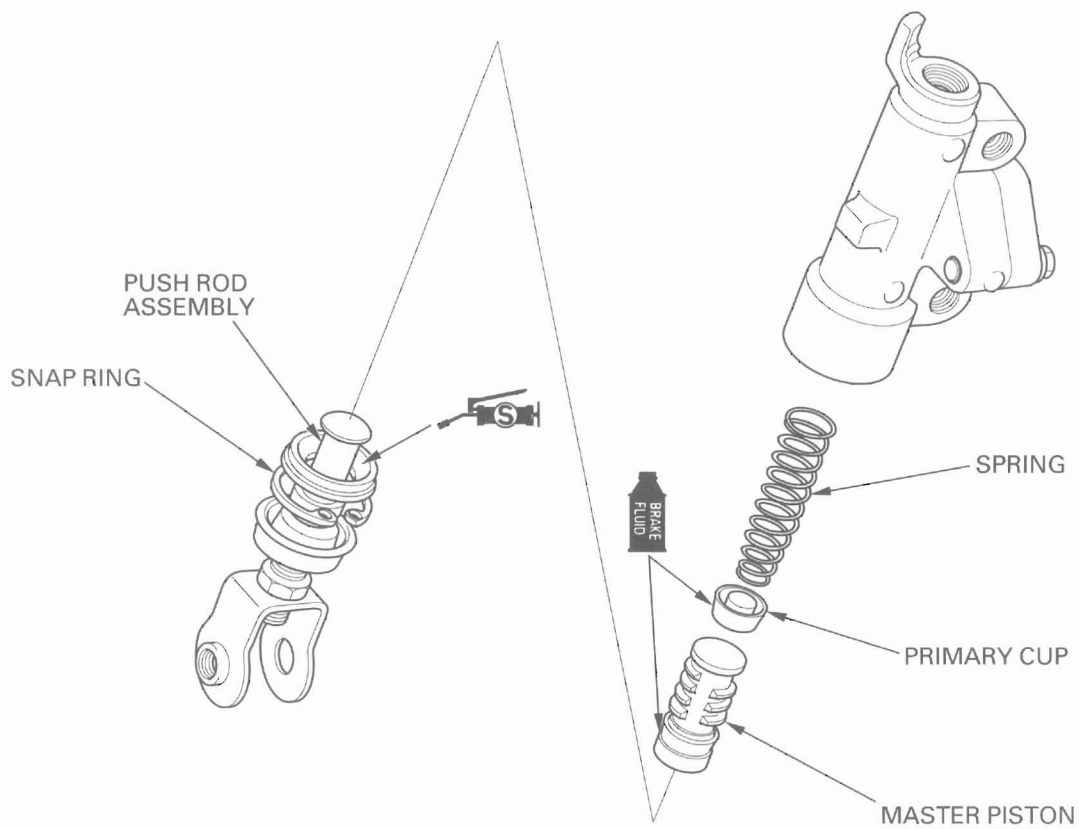


Measure the master cylinder piston O.D.

**SERVICE LIMIT:** 13.945 mm (0.5490 in)



**ASSEMBLY**



## HYDRAULIC BRAKE

### CAUTION:

*Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.*

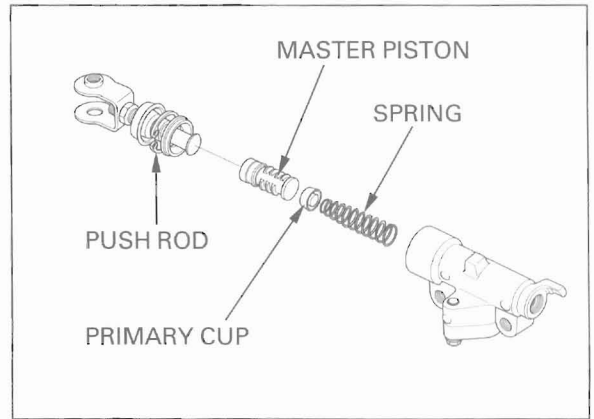
Coat all parts with clean brake fluid before assembly.

Dip the piston in brake fluid.

Install the spring to the piston.

Install the piston assembly.

Apply grease to the piston contact area of the push rod.

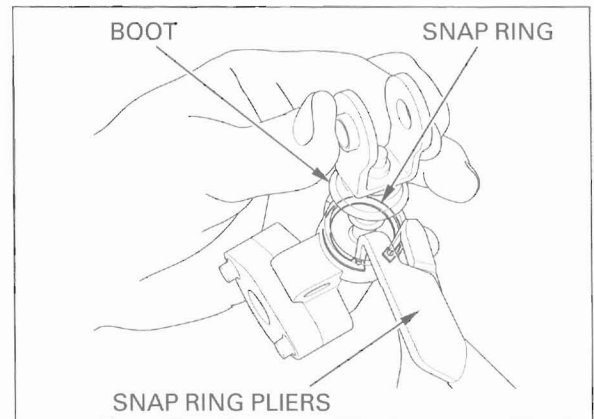


### CAUTION:

*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** 07914-3230001

Install the boot.

Install the brake hose eyelet with the oil bolt and new sealing washers.

Tighten the oil bolt to the specified torque.

**TORQUE:** 34 N·m (3.5 kgf·m , 25 lbf·ft)



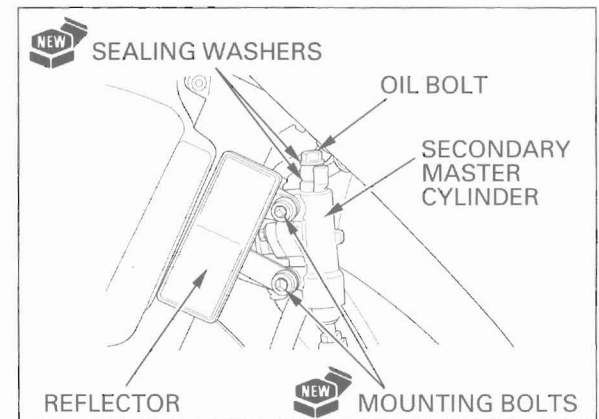
Place the secondary master cylinder and reflector onto the fork leg, then tighten the new mounting bolts.

**TORQUE:** 31 N·m (3.2 kgf·m , 23 lbf·ft)

Install the brake hose with the oil bolt and new sealing washers.

Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

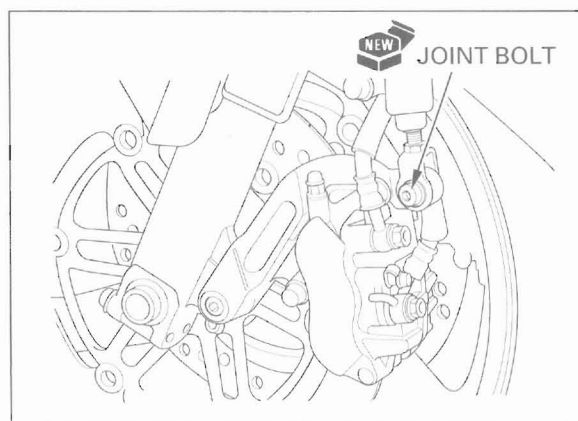
**TORQUE:** 34 N·m (3.5 kgf·m , 25 lbf·ft)



Install and tighten the new left front brake caliper joint bolt to the specified torque.

**TORQUE:** 25 N·m (2.6 kgf·m , 19 lbf·ft)

Bleed the air from pedal brake line (page 15-8).



## REAR MASTER CYLINDER

### REMOVAL

Drain the pedal brake hydraulic system (page 15-6).

Remove the brake hose oil bolt, sealing washers and brake hose.

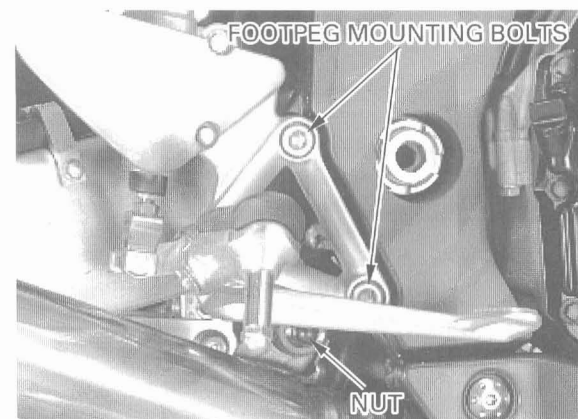
#### CAUTION:

*Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*



Loosen the rear master cylinder mounting bolts.

Remove the exhaust pipe mounting nut, main footpeg mounting bolts and main footpeg.



Remove and discard the brake pedal joint cotter pin. Remove the joint pin.

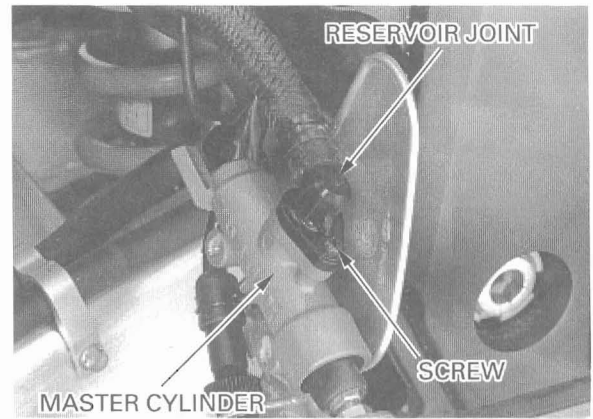




## HYDRAULIC BRAKE

Remove the screw and reservoir joint from the master cylinder.

Remove the mounting bolts and master cylinder from the main footpeg.



### DISASSEMBLY

Remove the boot.

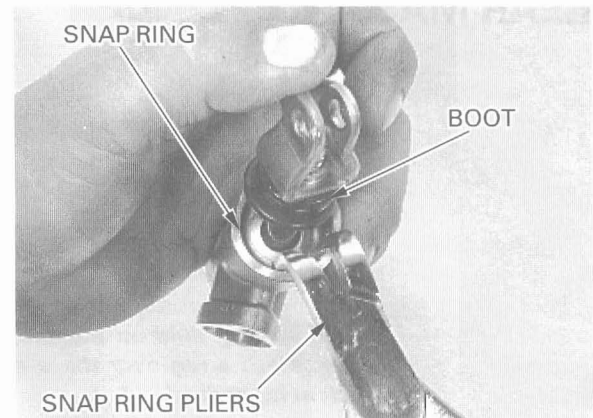
Remove the snap ring from the master cylinder body using the special tool as shown.

**TOOL:**

**Snap ring pliers** 07914-3230001

Remove the push rod, master piston and spring.

Clean the inside of the cylinder with brake fluid.

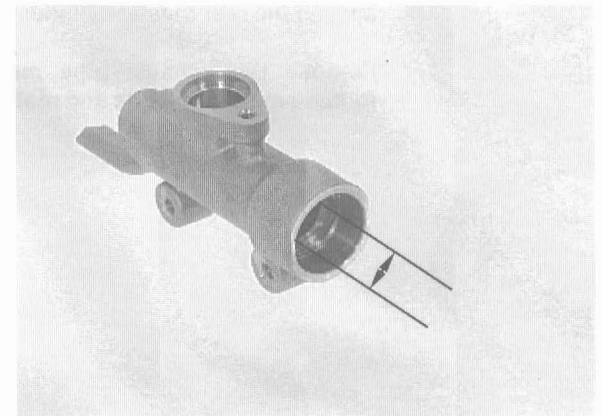


### INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.  
Check the master cylinder and piston for abnormal scratches.

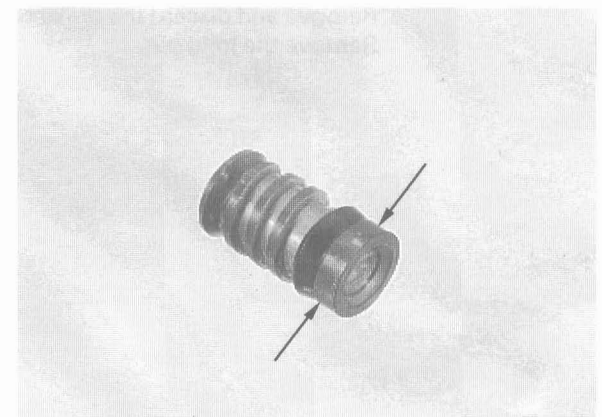
Measure the master cylinder I.D.

**SERVICE LIMIT:** 17.515 mm (0.6896 in)



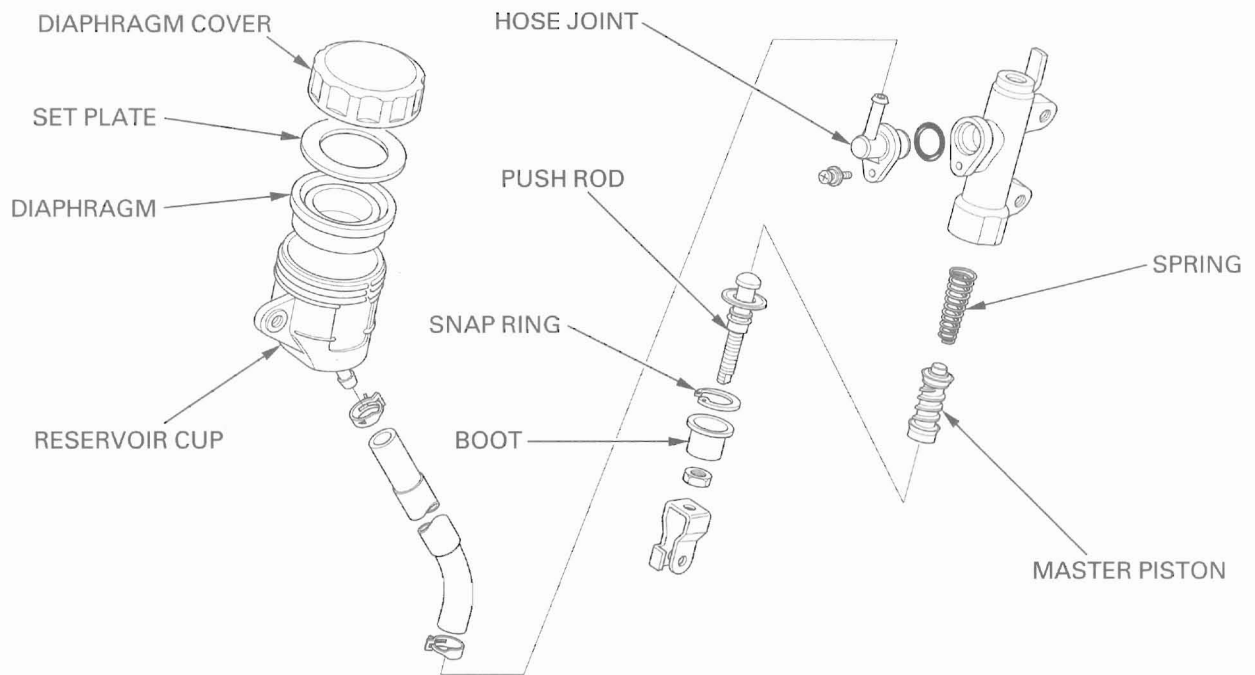
Measure the master cylinder piston O.D.

**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:**

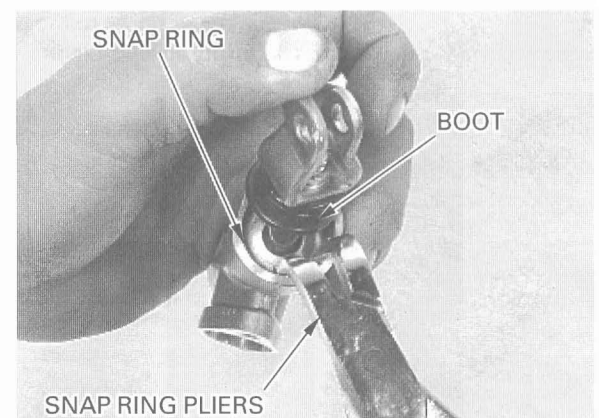
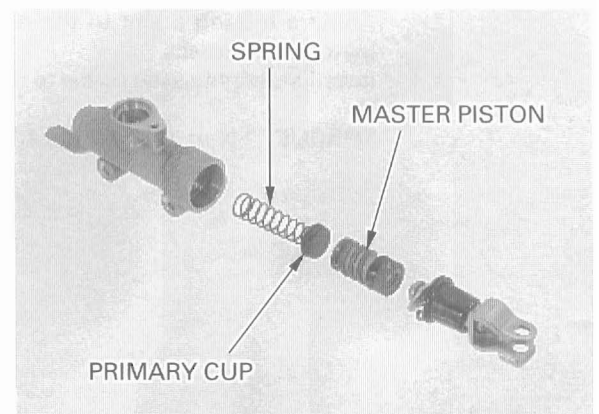
*Be certain the snap ring is firmly seated in the groove.*

**TOOL:**

Snap ring pliers

07914 - 3230001

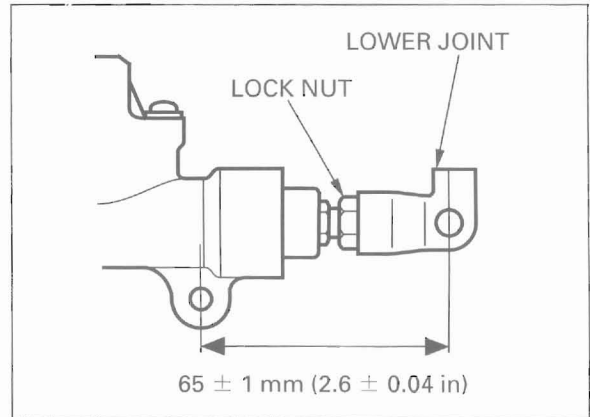
Install the boot.



## HYDRAULIC BRAKE

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)

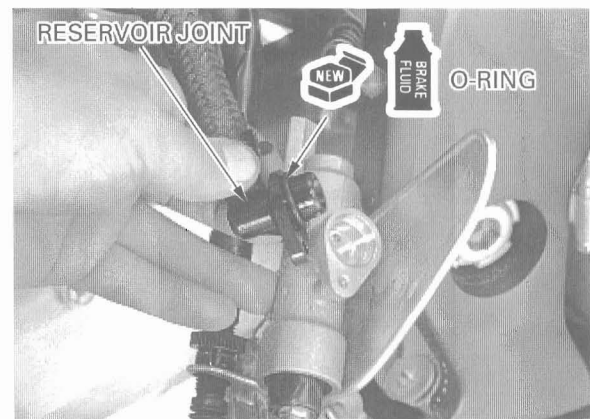


### INSTALLATION

Place the master cylinder onto the main footpeg and temporarily tighten the mounting bolts.

Apply brake fluid to a new O-ring and install it onto the reservoir joint.

Install the reservoir joint into the master cylinder.



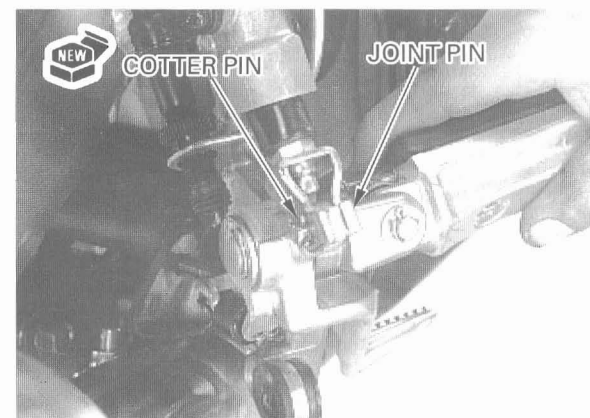
Apply a locking agent to the rear master cylinder joint screw threads.

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.



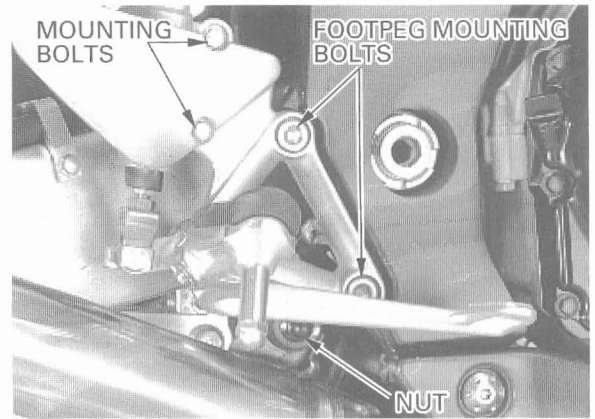
Install the main footpeg and tighten the mounting bolts to the specified torque.

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

Install and tighten the exhaust pipe mounting nut.

Tighten the rear master cylinder mounting bolts.

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



Install the brake hose with the oil bolt and new sealing washers.

Push the eyelet 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 15-8).



## PROPORTIONAL CONTROL VALVE

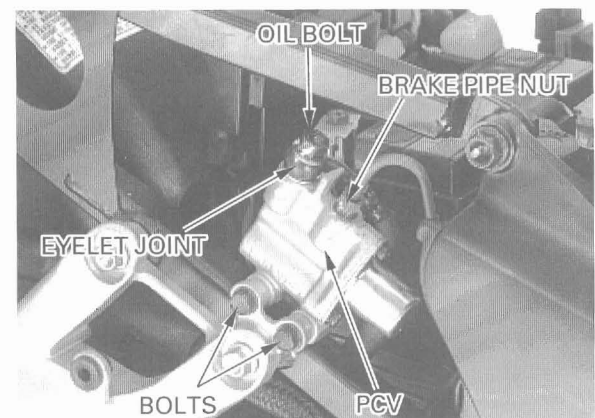
### REMOVAL/INSTALLATION

Remove the oil bolt, sealing washers and brake hose eyelet from the PCV (Proportional Control Valve).

Loosen the oil pipe nut and remove the oil pipe.

Remove the two mounting bolts and PCV.

Installation is in the reverse order of removal.

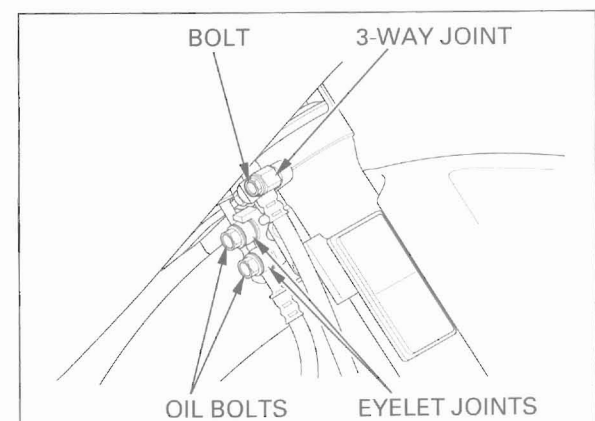


## DELAY VALVE

### REMOVAL

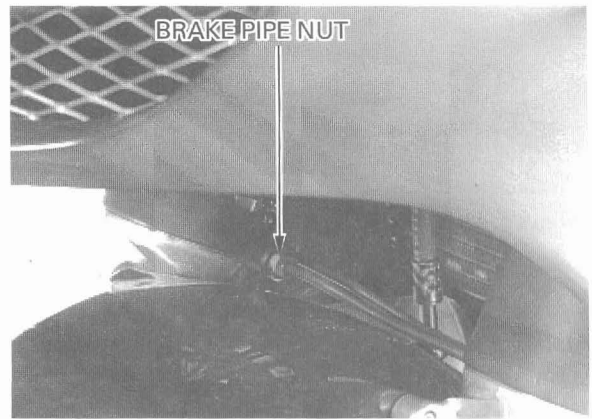
Remove the oil bolts, sealing washers and brake hose eyelets from the delay valve.

Remove the brake 3-way joint mounting bolt.

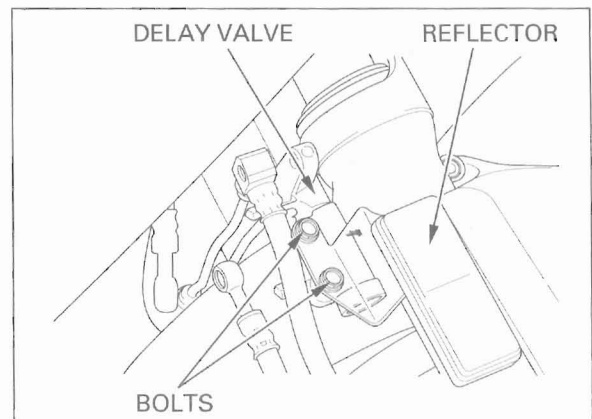


## HYDRAULIC BRAKE

Remove the brake pipe joint nut.



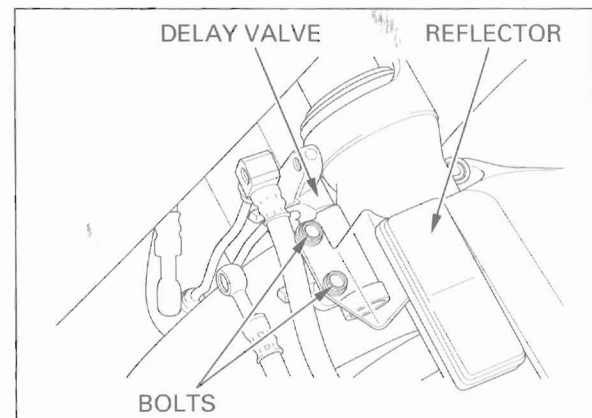
Remove the two mounting bolts and delay valve.



### INSTALLATION

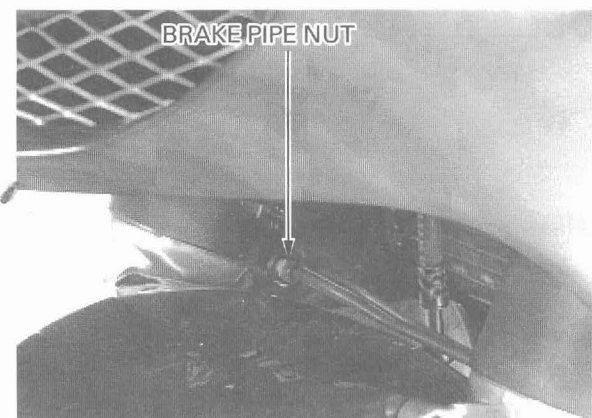
Install the delay valve onto the right fork slider while installing the brake pipe into the delay valve. Install and tighten the delay valve mounting bolts to the specified torque.

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



Tighten the brake pipe joint nut to the specified torque.

**TORQUE:** 17 N·m (1.7 kgf·m , 12 lbf·ft)



Install the 3-way joint and tighten the bolt to the specified torque.

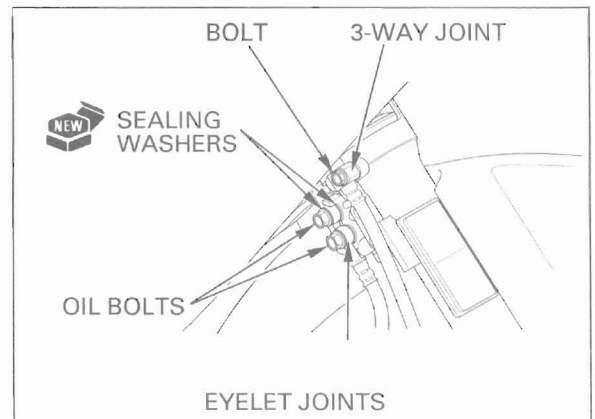
**TORQUE:** 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the brake hose with the oil bolt and new sealing washers.

Push the eyelet joint against the stopper, then tighten the oil bolt to the specified torque.

**TORQUE:** 34 N·m (3.5 kgf·m , 25 lbf·ft)

Fill the reservoir to the upper level and bleed the pedal brake line (page 15-8).



## FRONT BRAKE CALIPER

### LEFT CALIPER REMOVAL

**CAUTION:**

*Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*

Drain the lever and pedal brake line hydraulic system (page 15-5).

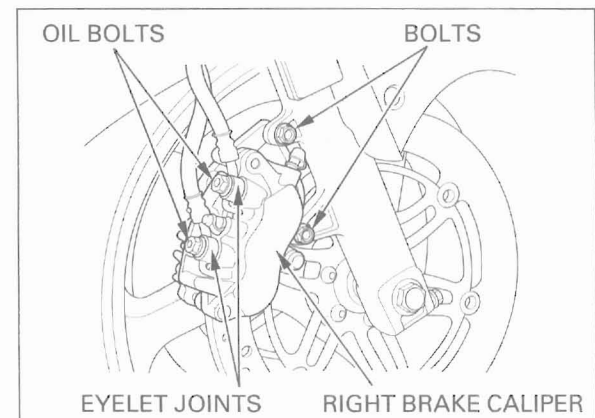
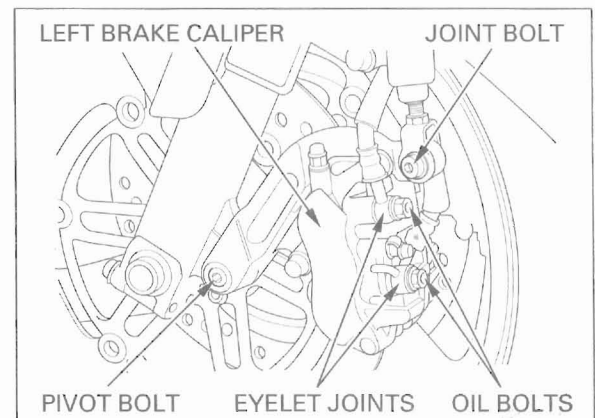
Remove the oil bolts, sealing washers and brake hose eyelet joints.

Remove the secondary master cylinder joint bolt and caliper pivot bolt, then remove the caliper/bracket as an assembly.

### RIGHT CALIPER REMOVAL

Remove the oil bolts, sealing washers and brake hose eyelet joints.

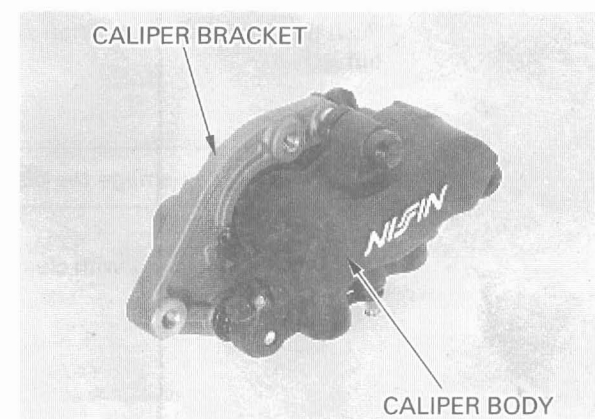
Remove the caliper bracket mounting bolts and then remove the caliper/bracket assembly.



### DISASSEMBLY

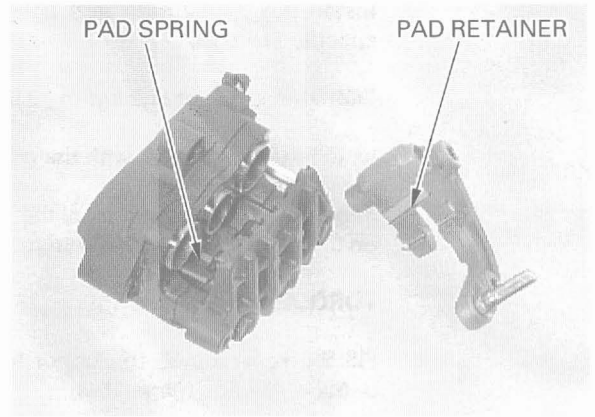
Remove the brake pads (page 15-10).

Remove the caliper bracket from the caliper body.

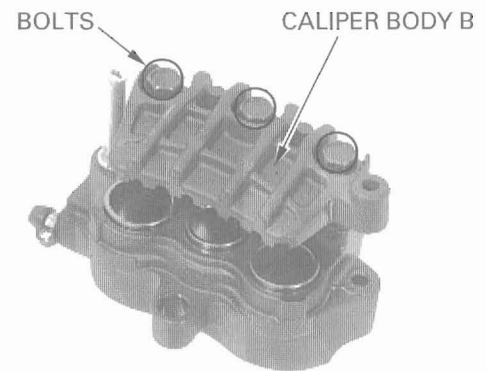


## HYDRAULIC BRAKE

Remove the brake pad spring from the caliper body. Remove the brake pad retainer from the caliper bracket.



Remove the bolts and caliper body B.



Place the piece of wood sheet under the caliper pistons.

*Mark the pistons to ensure correct reassembly.*

Apply small squirts of air pressure to the fluid inlet to remove the pistons.

**▲WARNING**

***Do not use high pressure air or bring the nozzle too close to the inlet.***

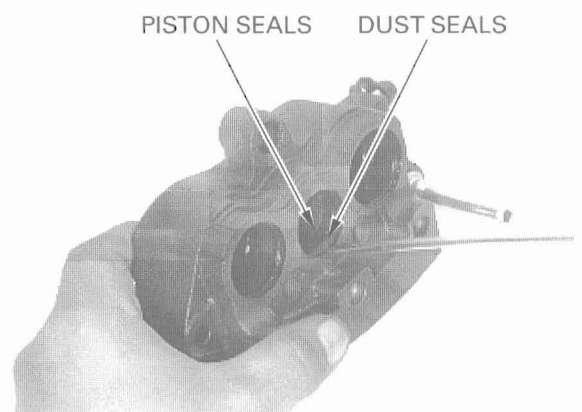


Push the dust seals and piston seals in and lift them out.

**CAUTION:**

***Be careful not to damage the piston sliding surface.***

Clean the seal grooves with clean brake fluid.



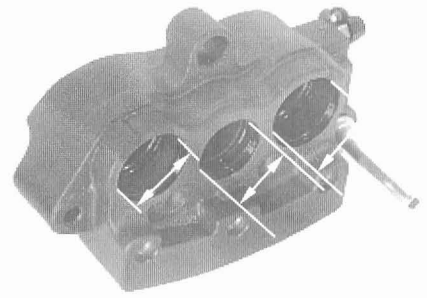
**INSPECTION**

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)

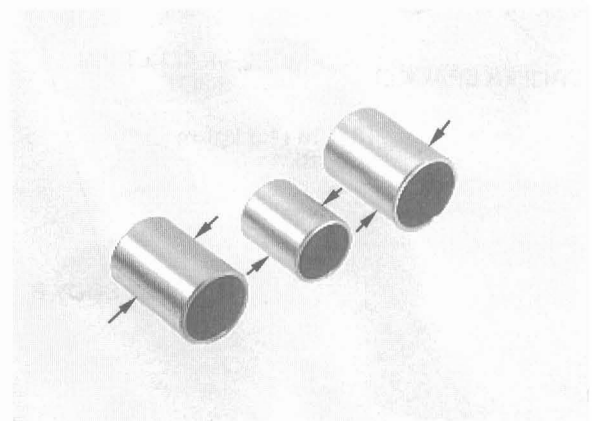


Check the caliper pistons for scratches, scoring or other damage.

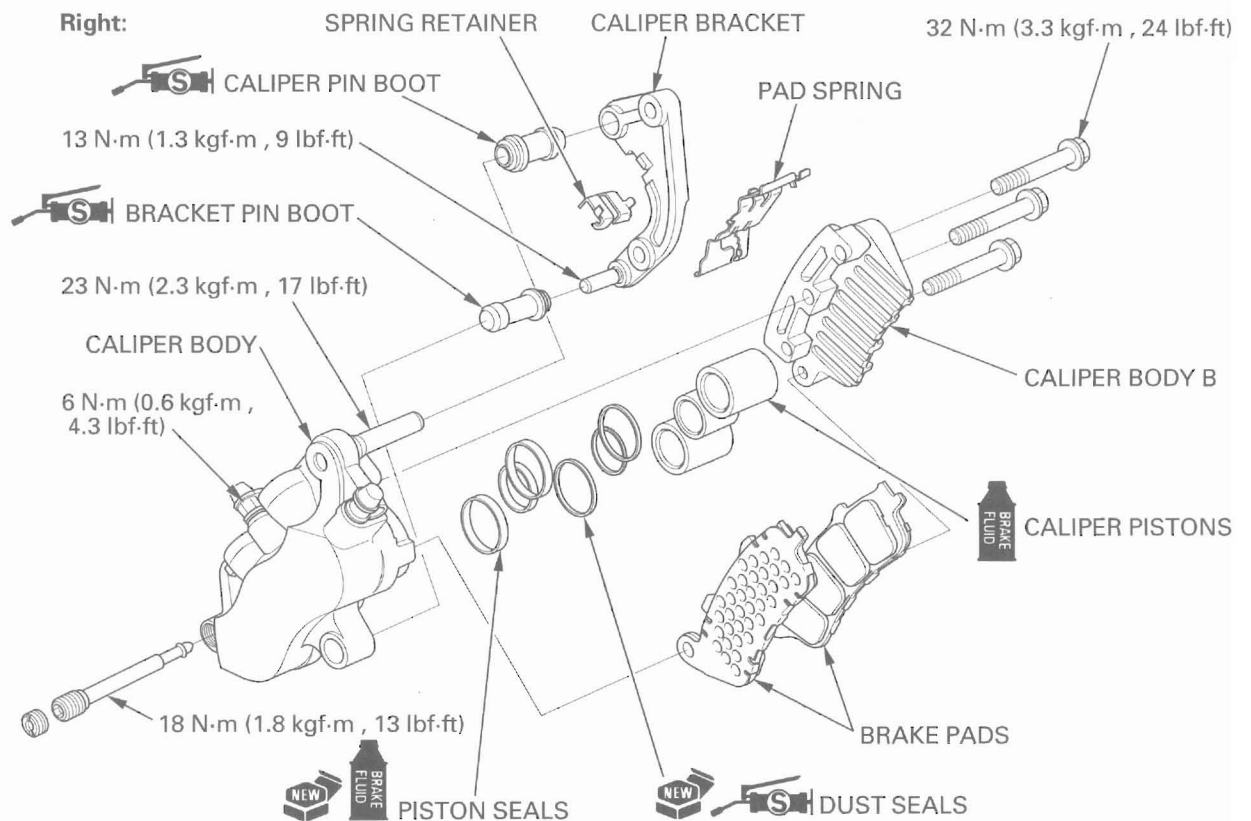
Measure the caliper piston O.D.

**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)

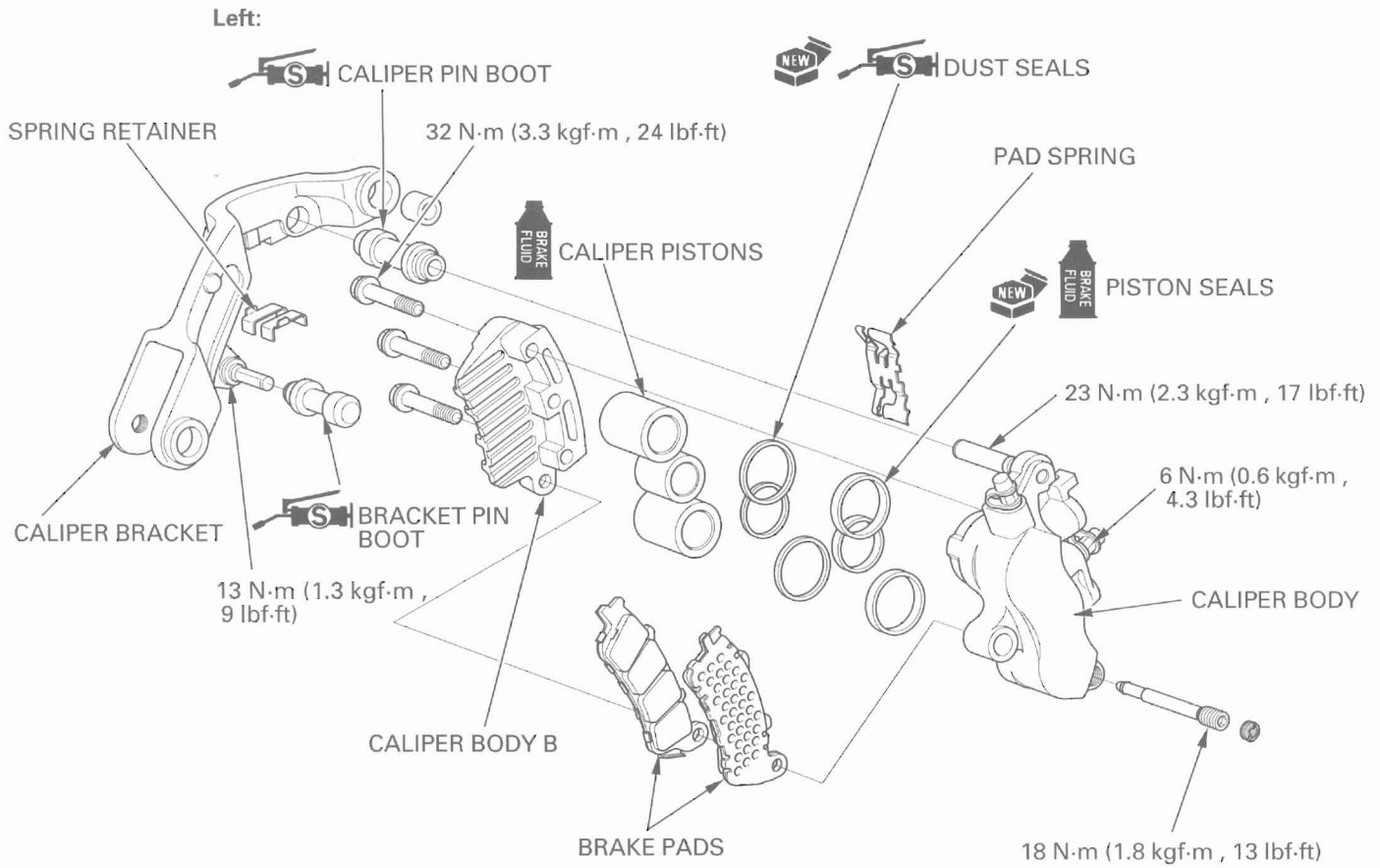


**ASSEMBLY**





# HYDRAULIC BRAKE

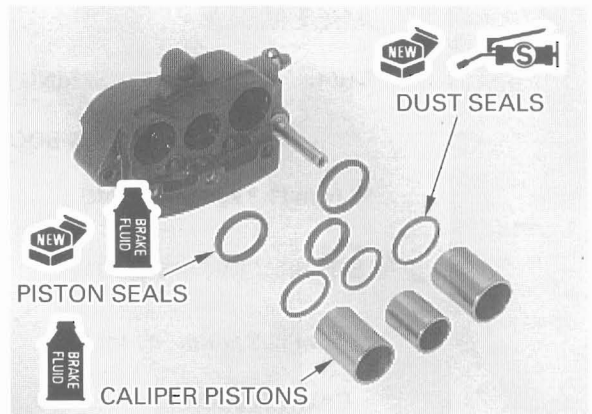


Coat the new piston seals with clean brake fluid.  
Coat the new dust seals with silicone grease.

Install the pistons and dust seals into the groove of the caliper body.

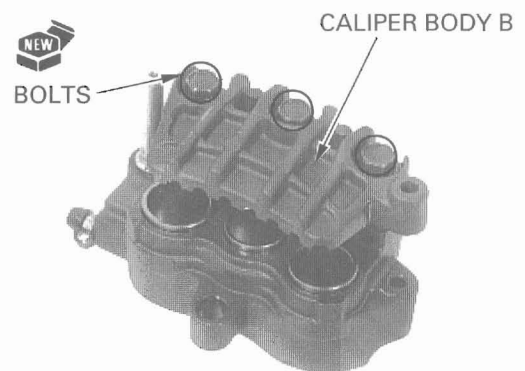
*Install the each piston seal, dust seal and caliper piston in their proper locations.*

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their opening ends toward the pad.



Install the caliper body B and tighten the new bolts to the specified torque.

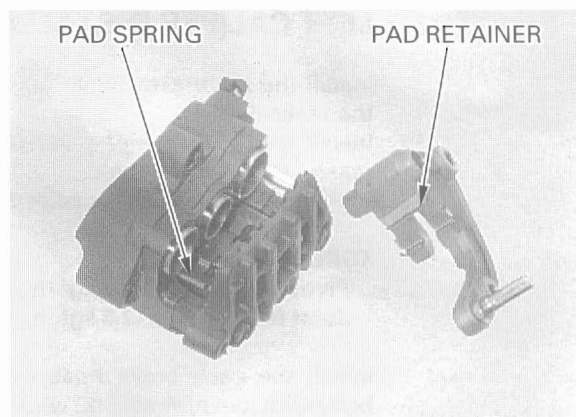
**TORQUE:** 32 N·m (3.3 kgf·m , 24 lbf·ft)



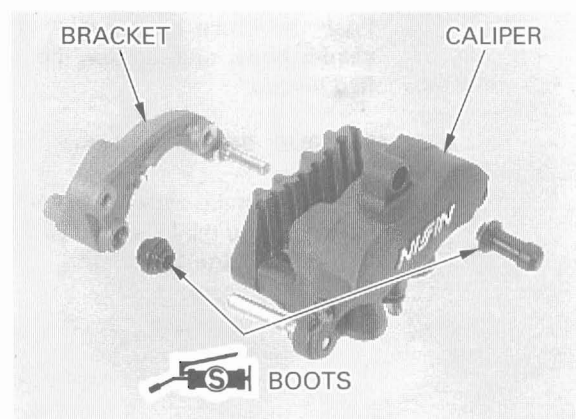


*Note the installation direction of the pad spring.*

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.



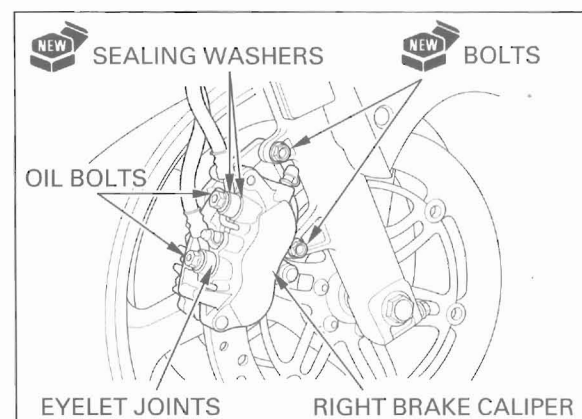
## RIGHT CALIPER INSTALLATION

Install the brake pads (page 15-10).

Install the right brake caliper/bracket assembly over the brake disc.  
Install and tighten the new caliper mounting bolts.

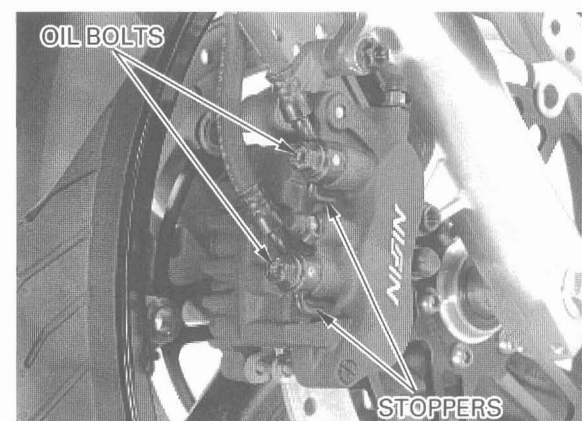
**TORQUE:** 31 N·m (3.2 kgf·m , 23 lbf·ft)

Install each brake hose eyelet to the caliper body with two new sealing washers and oil bolt.



Push the brake hose eyelet stoppers against the caliper body, then tighten the oil bolt to the specified torque.

**TORQUE:** 34 N·m (3.5 kgf·m , 25 lbf·ft)



## HYDRAULIC BRAKE

### LEFT CALIPER INSTALLATION

Install the left brake caliper/bracket assembly over the brake disc.

Install the new caliper pivot bolt and secondary master cylinder joint bolt.

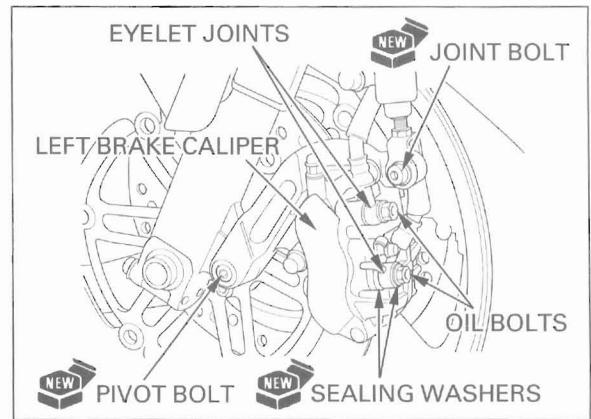
Tighten the bolts to the specified torque.

#### TORQUE:

**Pivot bolt:** 31 N·m (3.2 kgf·m , 23 lbf·ft)

**Joint bolt:** 25 N·m (2.6 kgf·m , 19 lbf·ft)

Install the each brake hose eyelet to the caliper body with two new sealing washers and oil bolt.

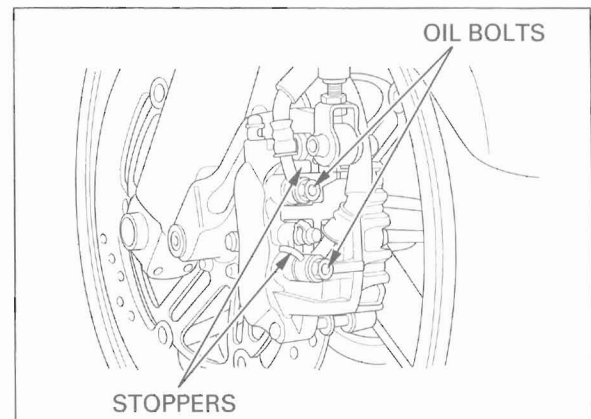


Push the brake hose eyelet stoppers against the caliper body, then tighten the oil bolt to the specified torque.

**TORQUE:** 34 N·m (3.5 kgf·m , 25 lbf·ft)

Install the brake pads (page 15-10).

Fill and bleed the lever and pedal line brake hydraulic system (page 15-8).



## REAR BRAKE CALIPER

### REMOVAL

Drain the pedal line brake hydraulic system (page 15-5).

Loosen the oil bolts, then remove the rear wheel (page 14-3).

Remove the oil bolts, sealing washers and brake hose eyelet joints.

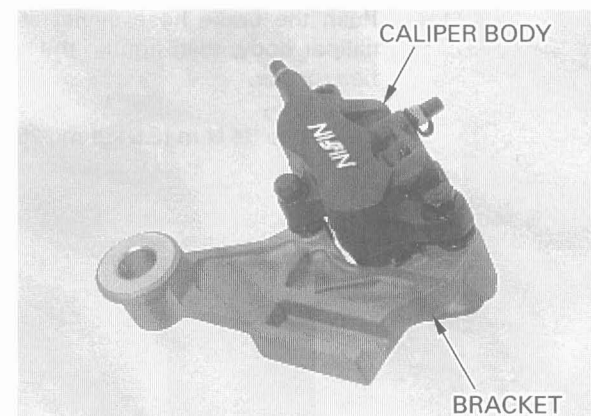
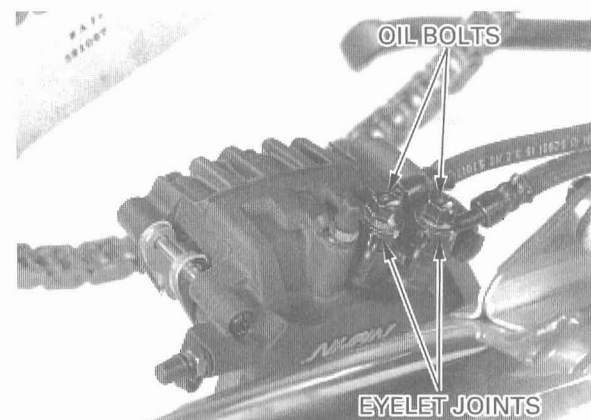
#### CAUTION:

*Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*

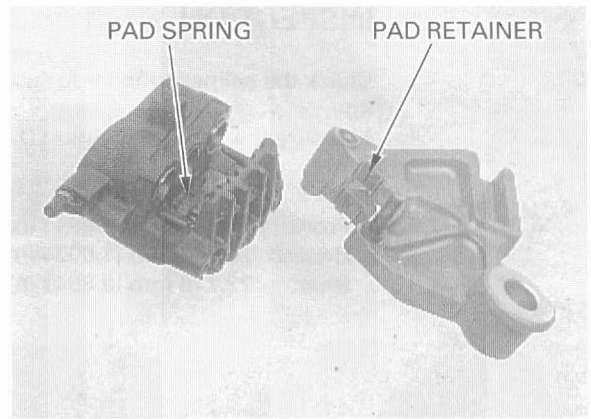
### DISASSEMBLY

Remove the rear brake pads (page 15-11).

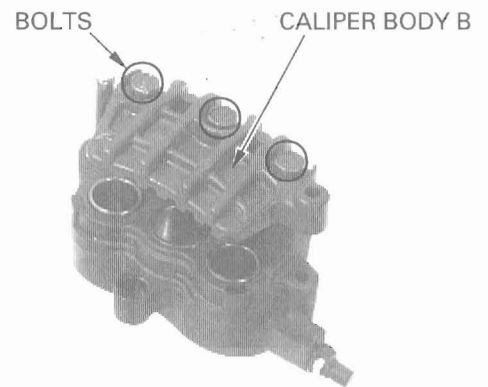
Remove the caliper bracket from the caliper body.



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.***

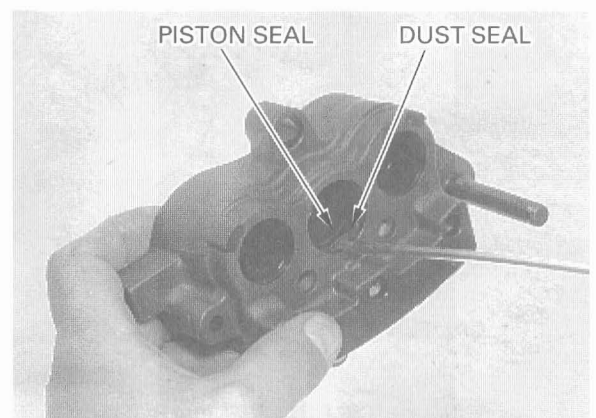


Push the dust seals and piston seals in and lift them out.

**CAUTION:**

***Be careful not to damage the piston sliding surface.***

Clean the seal grooves with clean brake fluid.



# HYDRAULIC BRAKE

## INSPECTION

Check the caliper cylinder for scoring or other damage.

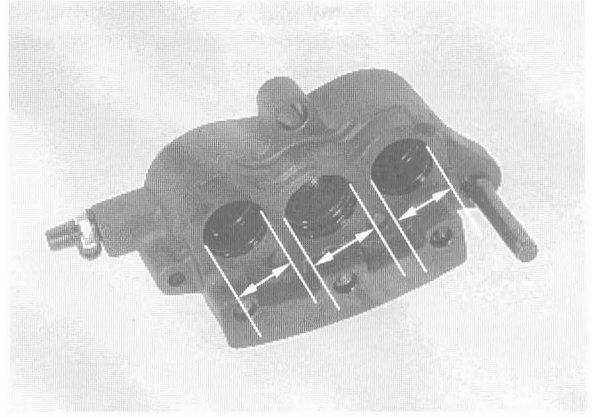
Measure the caliper cylinder I.D.

### SERVICE LIMITS:

**Front:** 22.710 mm (0.8941 in)

**Center:** 25.460 mm (1.0024 in)

**Rear:** 22.710 mm (0.8941 in)



Check the caliper pistons for scratches, scoring or other damage.

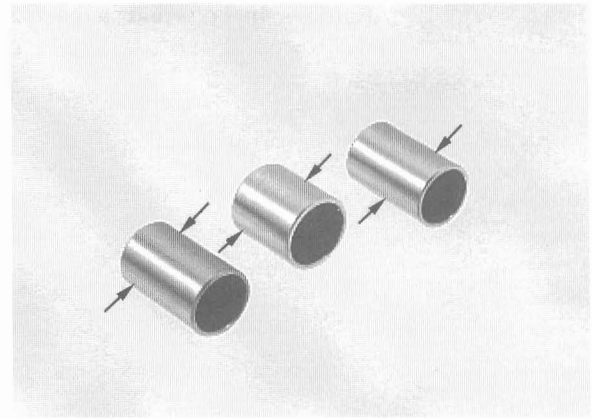
Measure the caliper piston O.D.

### SERVICE LIMITS:

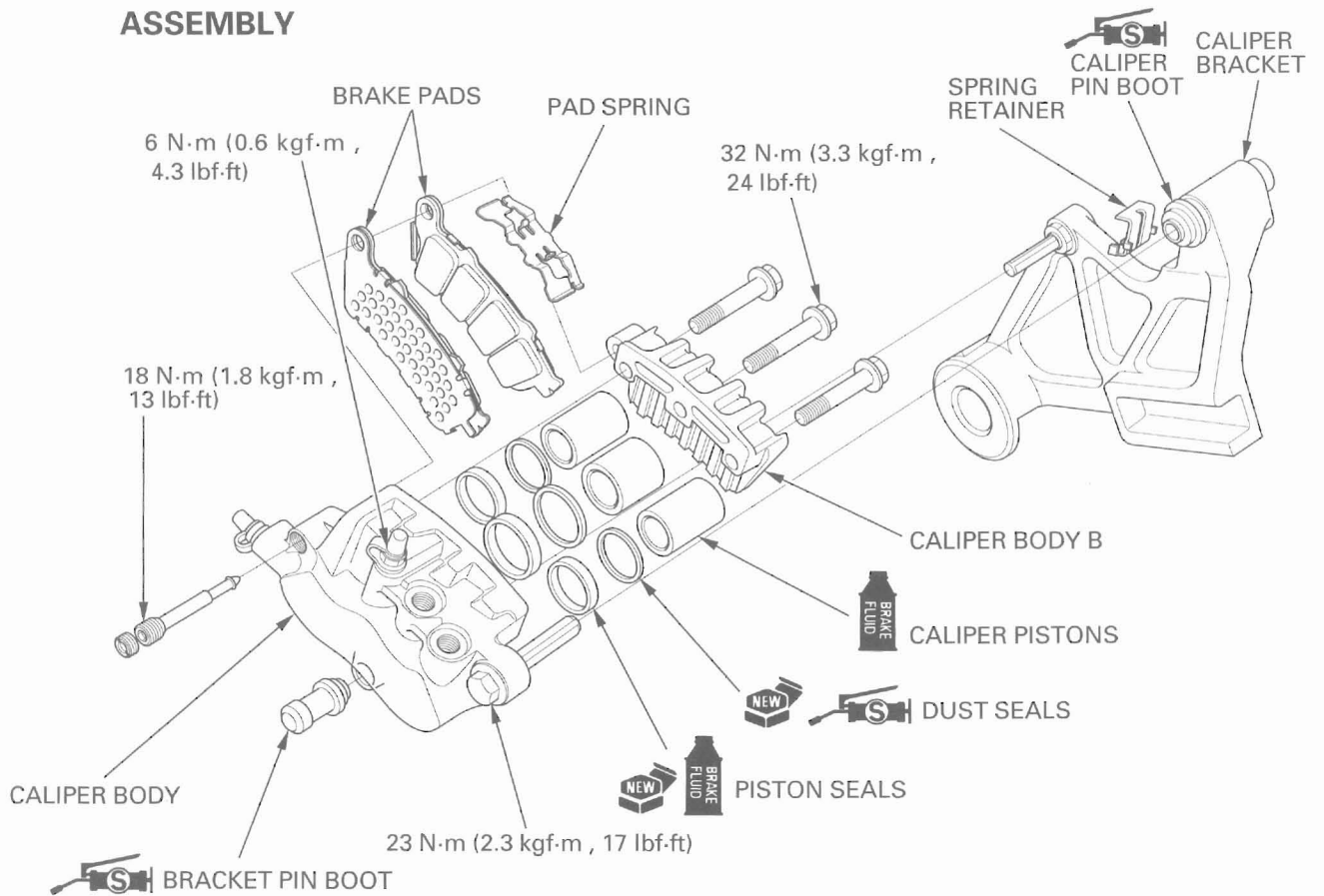
**Front:** 22.560 mm (0.8882 in)

**Center:** 25.310 mm (0.9965 in)

**Rear:** 22.560 mm (0.8882 in)



## ASSEMBLY

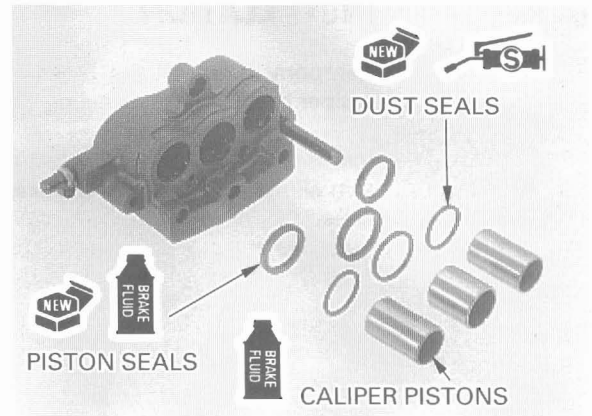


Coat the new piston seals with clean brake fluid.  
Coat the new dust seals with silicone grease.

Install the pistons and dust seals into the groove of the caliper body.

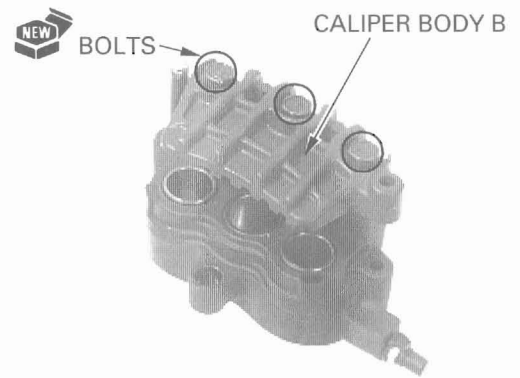
*Install the each piston seal, dust seal and caliper piston in their proper locations.*

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their opening ends toward the pad.



Install the caliper body B and tighten the new bolts to the specified torque.

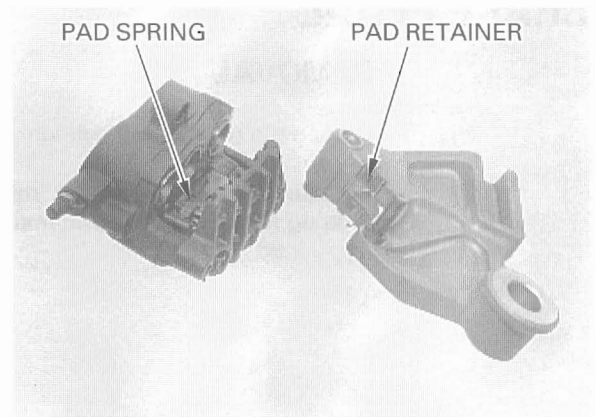
**TORQUE:** 32 N·m (3.3 kgf·m , 24 lbf·ft)



Install the brake pad retainer onto the caliper bracket.

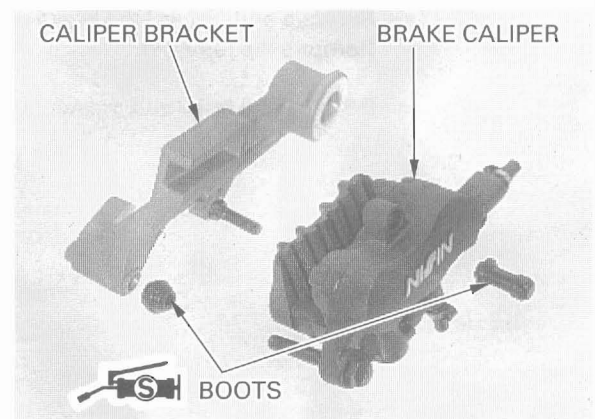
*Note the installation direction of the pad spring.*

Install the pad spring into the caliper body.



Apply silicone grease to the boot inside then install them.  
Assemble the caliper and bracket.

Install the rear brake pads (page 15-11).

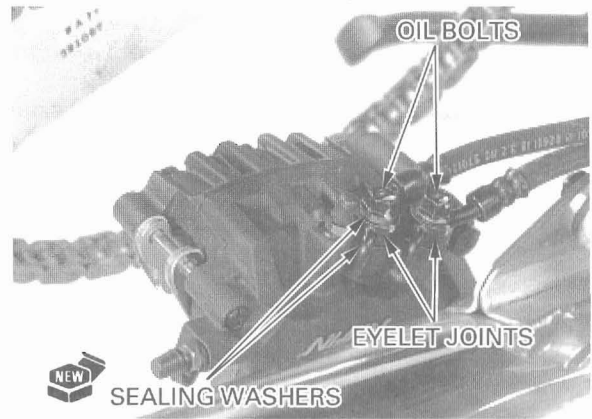


## HYDRAULIC BRAKE

### INSTALLATION

Temporarily install the brake hose eyelets to the caliper body with new sealing washers and oil bolts.

Install the caliper/bracket assembly onto the swing-arm aligning the bracket groove with the swingarm boss.

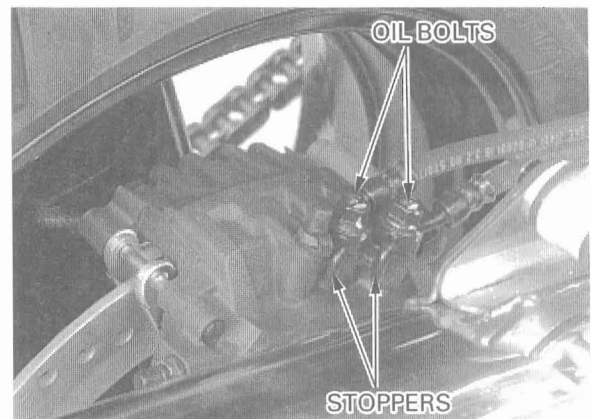


Install the rear wheel (page 14-8).

Push the brake hose eyelet stoppers against the caliper body, then tighten the oil bolts to the specified torque.

**TORQUE:** 34 N·m (3.5 kgf·m , 25 lbf·ft)

Fill and bleed the pedal brake line hydraulic system (page 15-8).

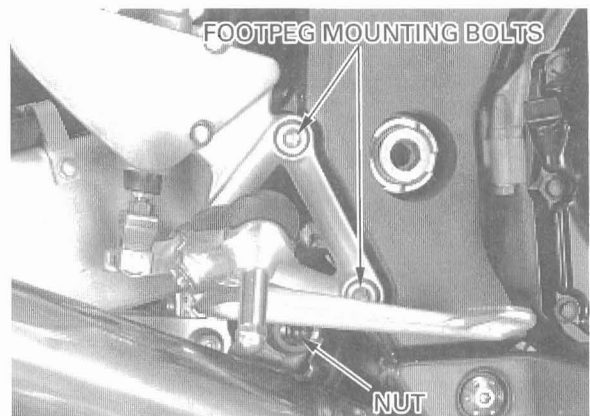


## BRAKE PEDAL

### REMOVAL

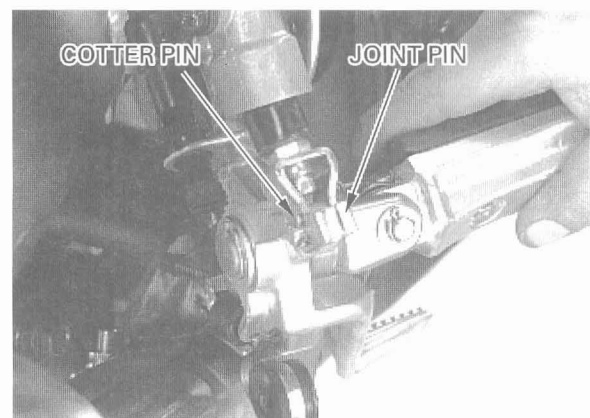
Loosen the rear master cylinder mounting bolts.

Remove the exhaust pipe mounting nut, main footpeg mounting bolts and main footpeg.



Remove and discard the brake pedal joint cotter pin. Remove the joint pin.

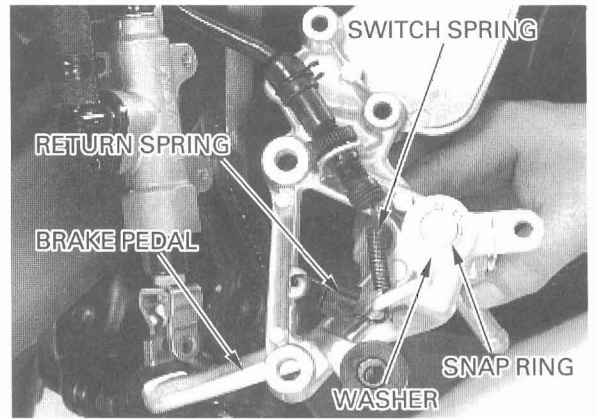
Remove the bolts and master cylinder assembly.



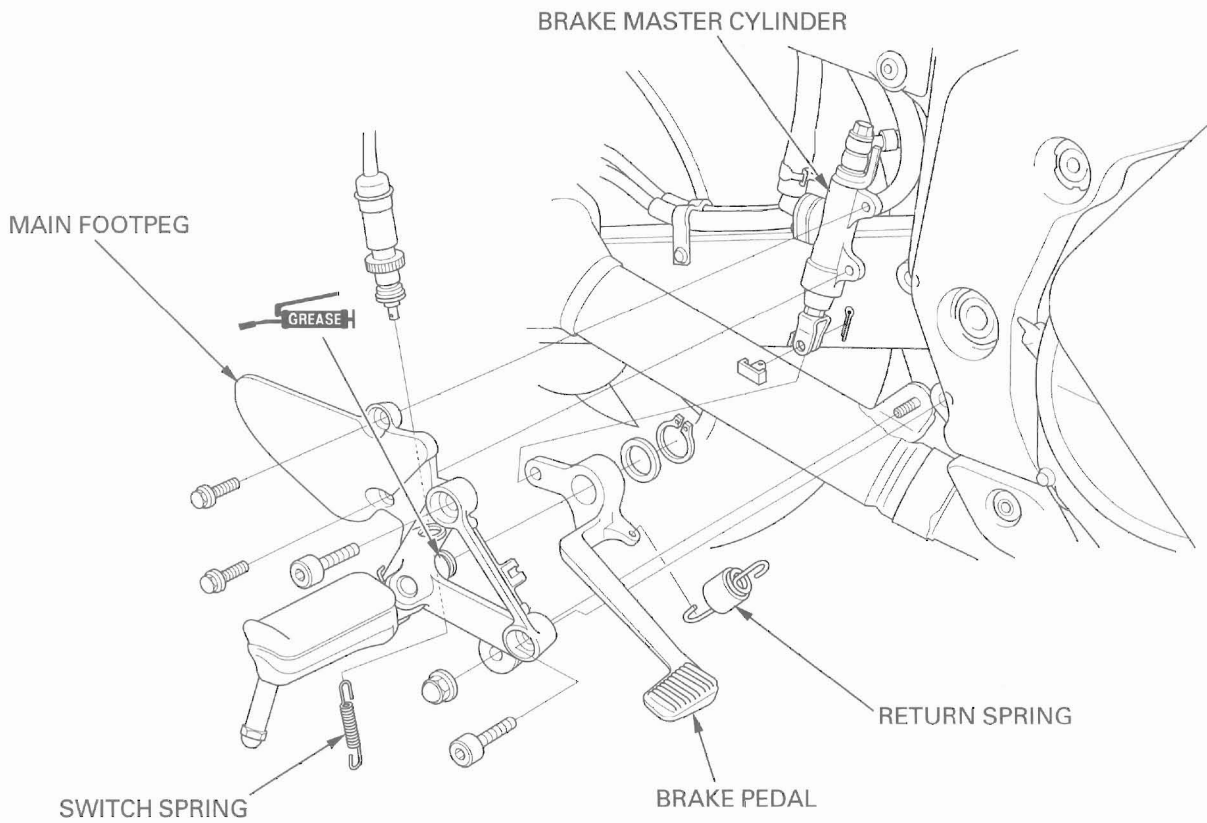


Unhook the switch spring and remove the brake light switch from the step holder.  
Unhook the brake pedal return spring.

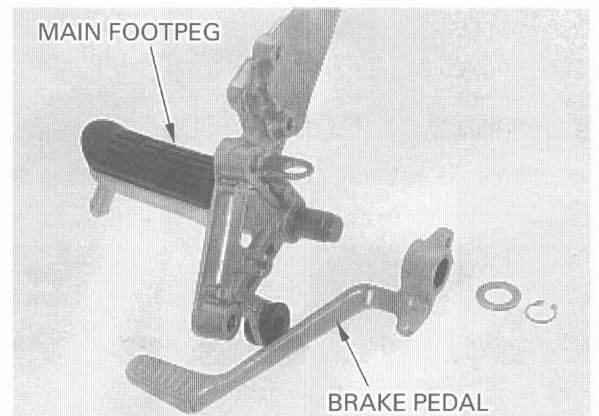
Remove the snap ring, washer and brake pedal from the footpeg.



**INSTALLATION**



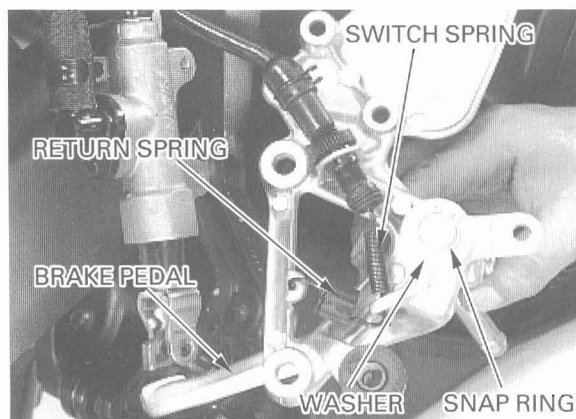
Assemble the brake pedal, footpeg and washer.



## HYDRAULIC BRAKE

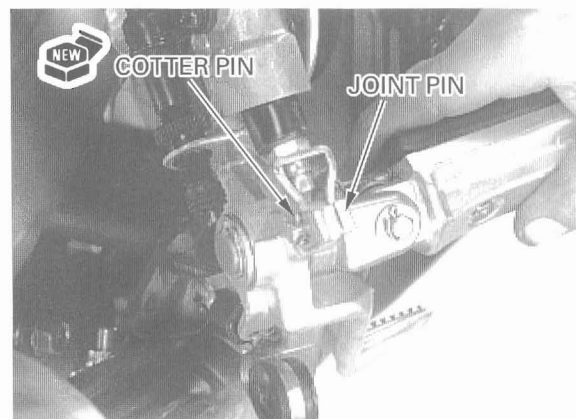
Secure the brake pedal with a snap ring.

Hook the brake pedal return spring.  
Install the brake light switch and hook the switch spring.



Install the master cylinder and mounting bolts.

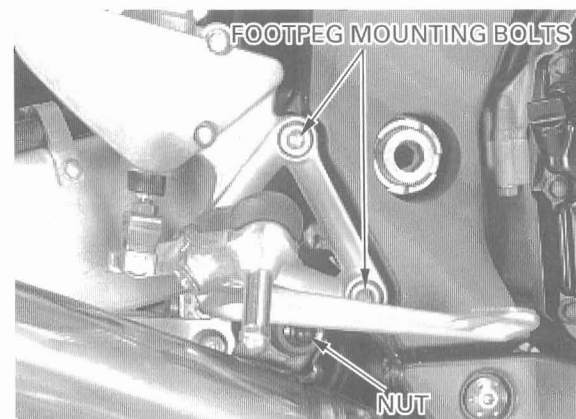
Install the brake pedal joint pin and secure it with a new cotter pin.



Install the right footpeg assembly onto the frame.  
Install and tighten the right main footpeg holder socket bolts to the specified torque.

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

Install and tighten the exhaust pipe mounting nut.



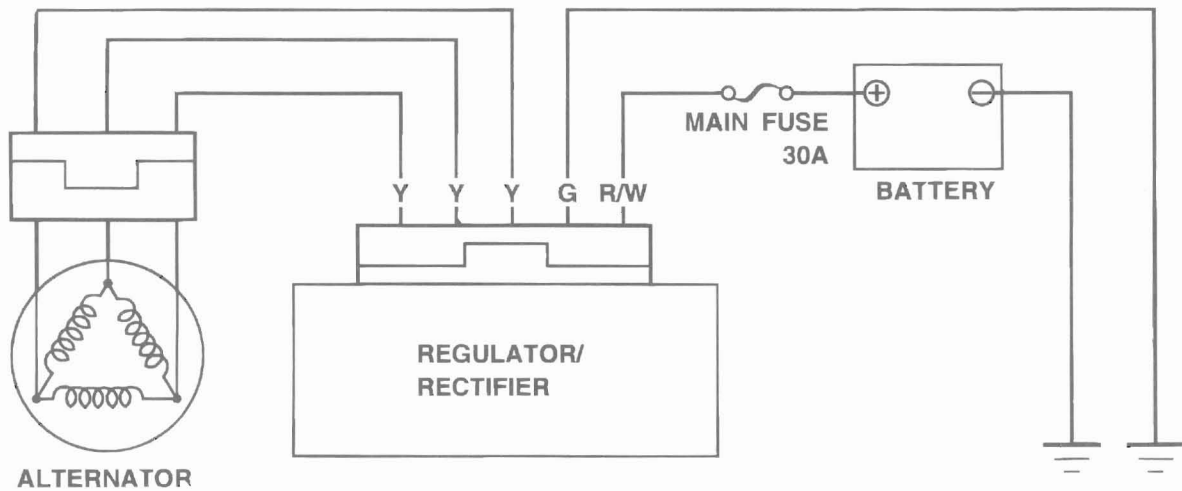
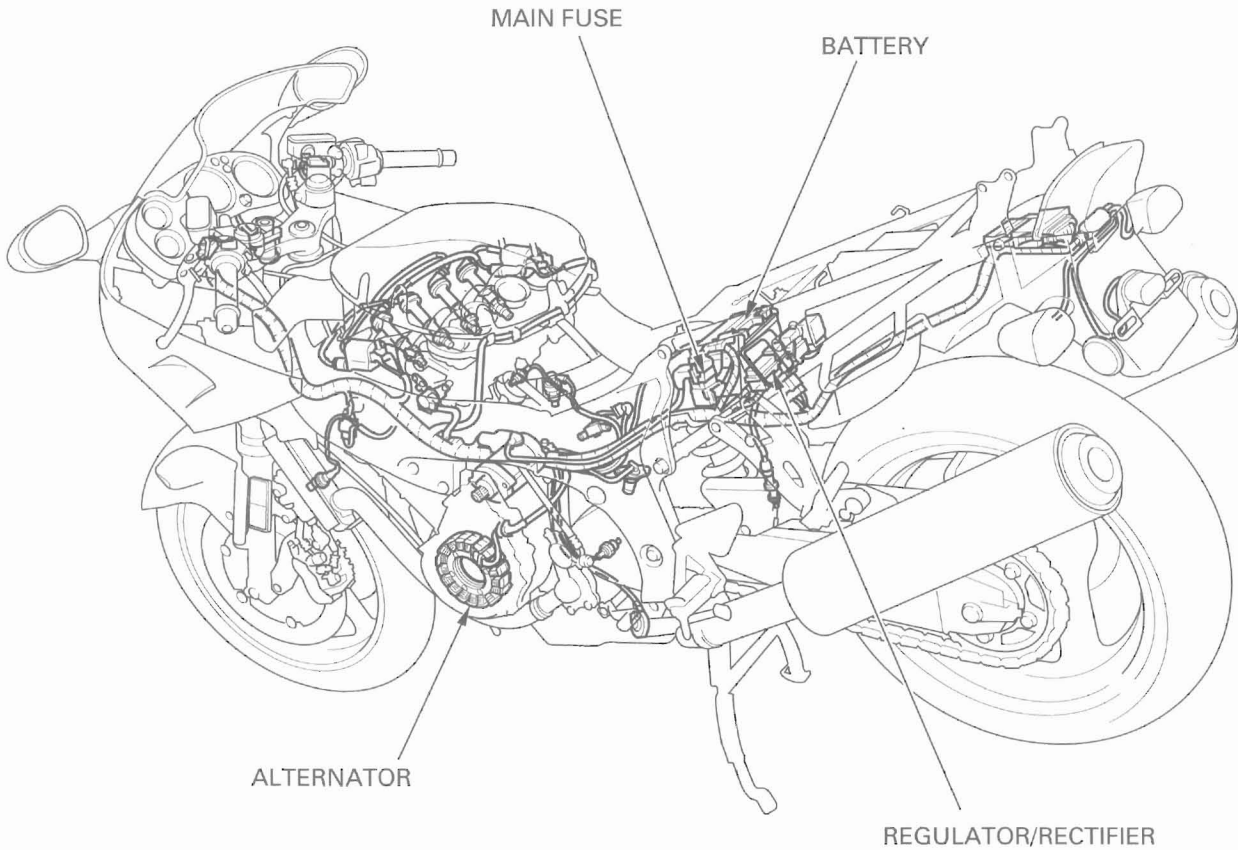


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MEMO

# BATTERY/CHARGING SYSTEM

## SYSTEM DIAGRAM



- Y ..... YELLOW
- G ..... GREEN
- R ..... RED
- W ..... WHITE

# 16. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM	16-0	CHARGING SYSTEM INSPECTION	16-6
SERVICE INFORMATION	16-1	ALTERNATOR CHARGING COIL	16-8
TROUBLESHOOTING	16-3	REGULATOR/RECTIFIER	16-9
BATTERY	16-5		

## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

- *The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.*
- *The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.*
  - *If electrolyte gets on your skin, flush with water.*
  - *If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician immediately.*
- *Electrolyte is poisonous.*
  - *If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician. KEEP OUT OF REACH OF CHILDREN.*

- Always turn off the ignition switch before disconnecting any electrical component.

#### CAUTION:

*Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.*

- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.

#### NOTE:

The maintenance free battery must be replaced when it reaches the end of its service life.

#### CAUTION:

*The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.*

- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2–3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.

## BATTERY/CHARGING SYSTEM

- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring .
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 16-3).

### Battery charging

This model comes with a maintenance -free (MF) battery. Remember the following about MF batteries.

- Use only the electrolyte that comes with the battery
- Use all of the electrolyte
- Seal the battery properly
- Never open the seals again

### CAUTION:

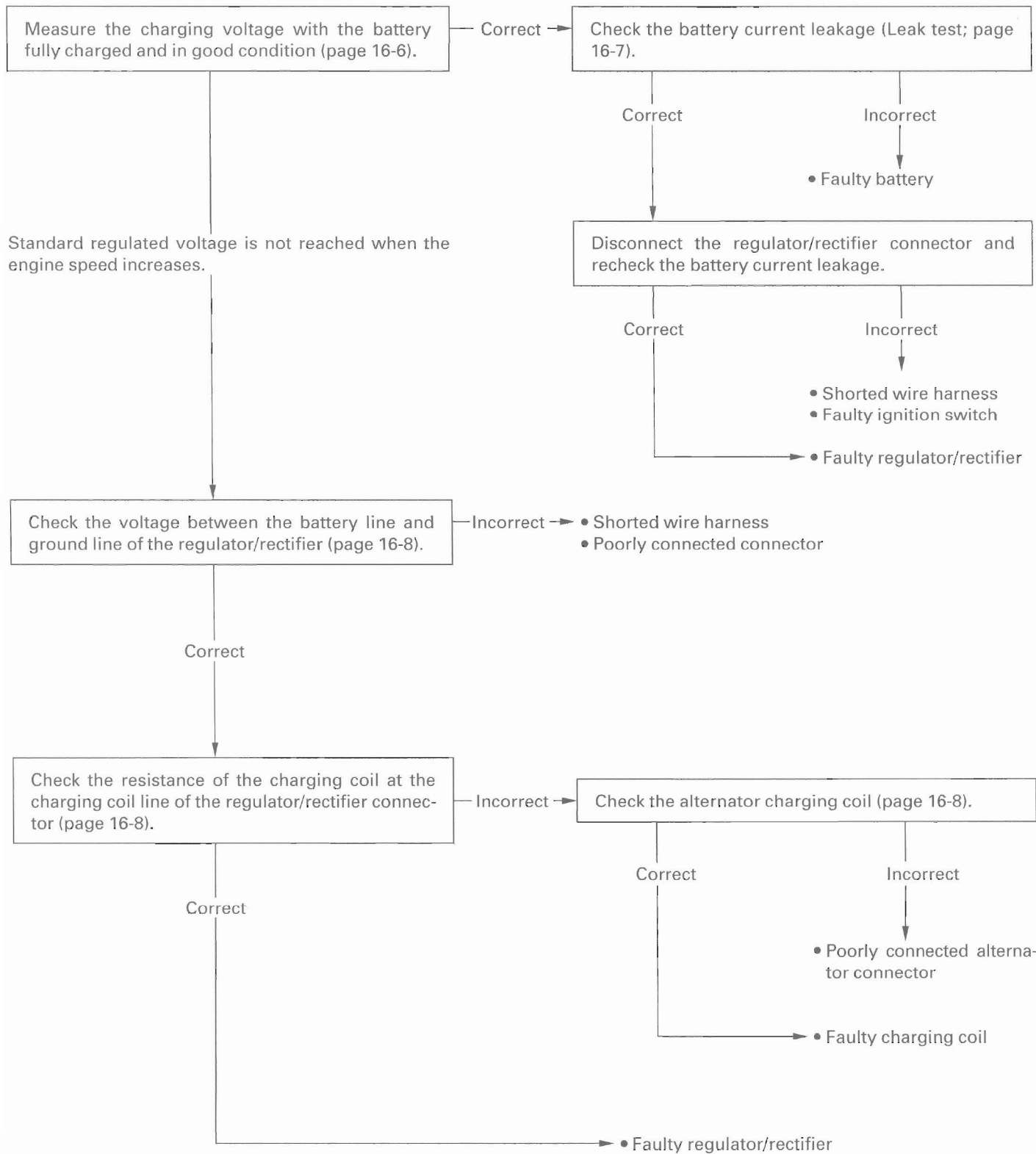
*For battery charging, do not exceed the charging current and time specified on the battery. Use of excessive current or charging time may damage the battery.*

## SPECIFICATIONS

ITEM		SPECIFICATIONS	
Battery	Capacity	12V – 10AH	
	Current leakage	0.2 mA max.	
	Voltage (68°F/20°C)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
Charging current	Normal	0.9 A/5 – 10 h	
	Quick	4.0 A/0.5 h	
Alternator	Capacity	0.39 kw/5,000 rpm	
	Charging coil resistance (68°F/20°C)	0.22 – 0.26 $\Omega$	
Regulator/rectifier regulated voltage		14.7 – 15.5 V/5,000 rpm	

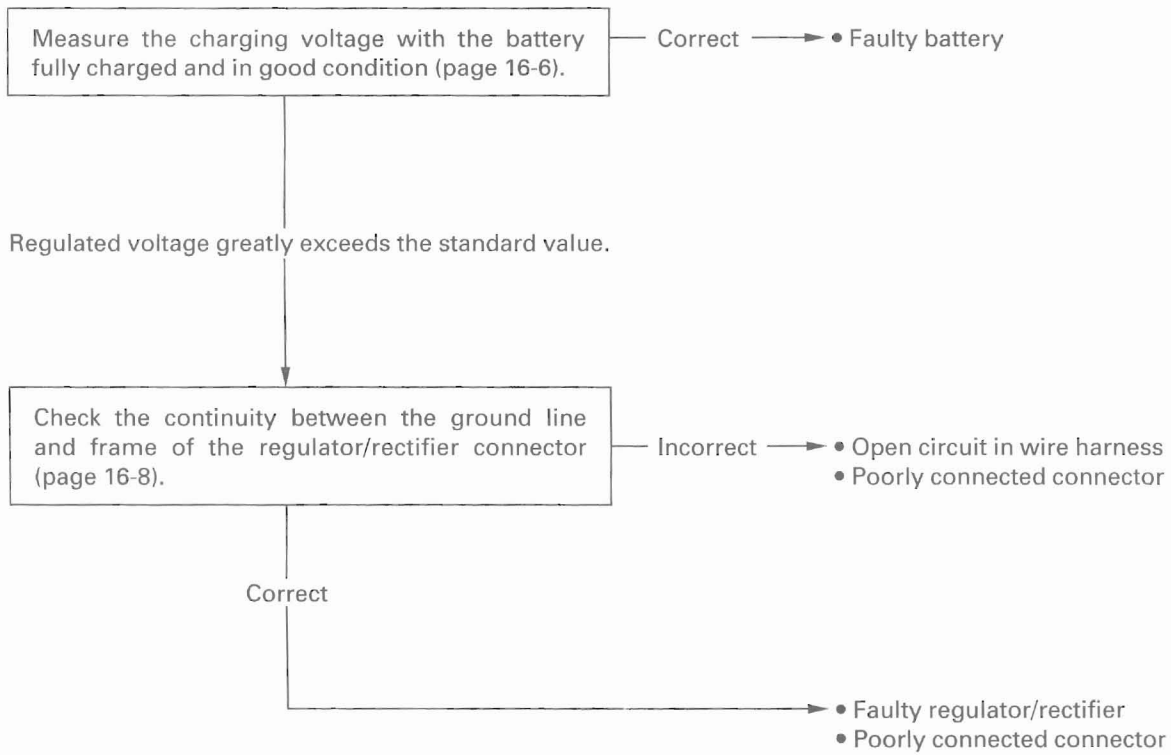
# TROUBLESHOOTING

## 1. Battery undercharging (Voltage not raised to regulated voltage).



## BATTERY/CHARGING SYSTEM

### 2. Battery overcharging (regulated voltage too high).



# BATTERY

## REMOVAL/INSTALLATION

Remove the seat (page 2-2).

Remove the battery holder band.  
Disconnect the negative cable and then the positive cable, and remove the battery.

Install the battery in the reverse order of removal with the proper wiring as shown.

**NOTE:**

Connect the positive terminal first and then the negative cable.

After installing the battery, coat the terminals with clean grease.  
Reinstall the removed parts.

## VOLTAGE INSPECTION

Measure the battery voltage using a digital multimeter.

**VOLTAGE:**

- Fully charged: 13.0–13.2 V
- Under charged: Below 12.3 V

**TOOL:**

Digital multimeter                      Commercially available

## BATTERY CHARGING

**▲WARNING**

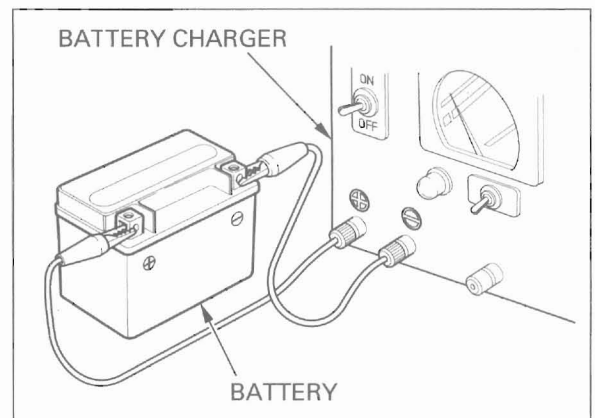
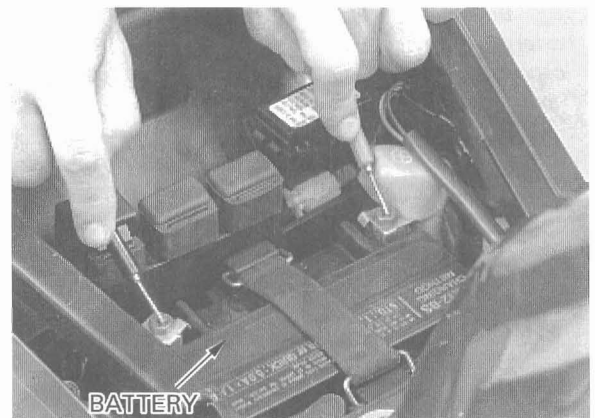
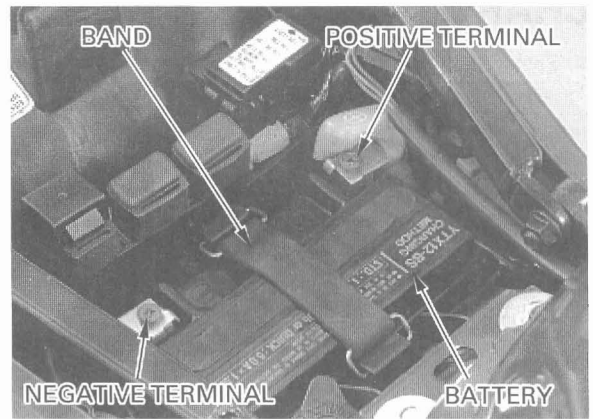
- *The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.*
- *Turn power ON/OFF at the charger, not at the battery terminal.*

Remove the battery (see above).

Connect the charger positive (+) cable to the battery positive (+) terminal.  
Connect the charger negative (–) cable to the battery negative (–) terminal.

**CAUTION:**

- *Quick-charging should only be done in an emergency; slow charging is preferred.*
- *For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.*



# CHARGING SYSTEM INSPECTION

### NOTE:

- When inspecting the charging system, check the system components and lines step-by-step according to the troubleshooting on page 16-3.
- Measuring circuits with a large capacity that exceeds the capacity of the tester may cause damage to the tester. Before starting each test, set the tester at the highest capacity range first, then gradually lower the capacity ranges until you have the correct range.
- When measuring small capacity circuits, keep the ignition switch off. If the switch is suddenly turned on during a test, the tester fuse may blow.

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

*Be sure the battery is in good condition before performing this test.*

Warm up the engine to normal operating temperature. Stop the engine, and connect the multimeter as shown.

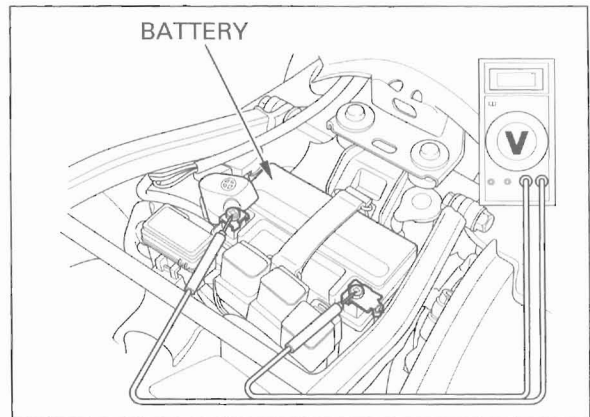
### CAUTION:

- *To prevent a short, make absolutely certain which are the positive and negative terminals or cable.*
- *Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.*

Restart the engine.

With the headlight on Hi beam, measure the voltage on the multimeter when the engine runs at 5,000 rpm.

**Standard:** 14.7 – 15.5 V/5,000 rpm





The battery is normal if the specified regulated voltage is displayed on the multimeter.

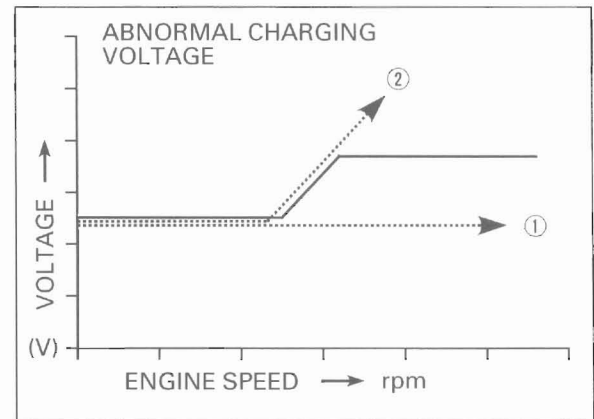
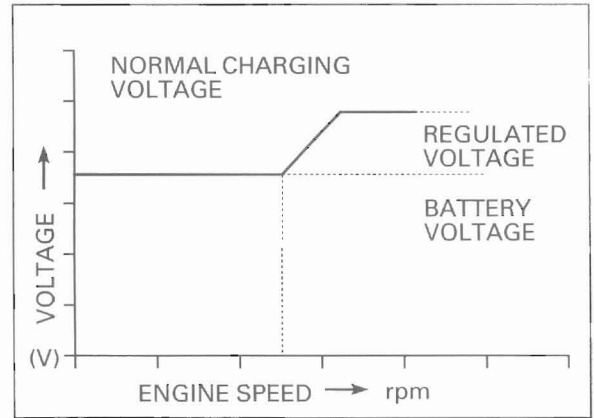
**NOTE:**

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 16-4):
  - 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 16-5).
  - Poorly grounded voltage regulator/rectifier.
  - Faulty battery.
  - Faulty regulator/rectifier.



## CURRENT LEAKAGE INSPECTION

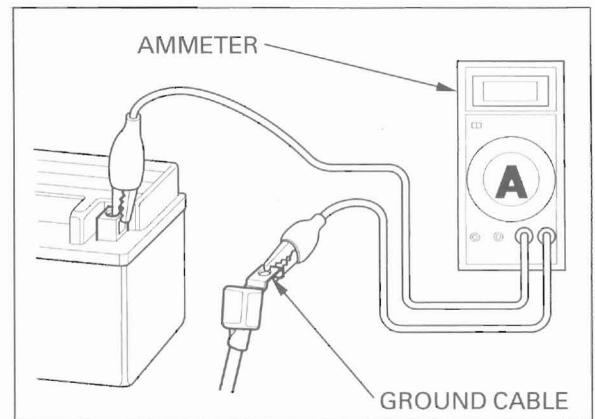
Turn the ignition switch off and disconnect the negative battery cable from the battery.

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:** 0.2 mA max.

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.

## ALTERNATOR CHARGING COIL

**NOTE:**

It is not necessary to remove the stator coil to make this test.

### INSPECTION

Remove the seat cowl (page 2-5).

Disconnect the regulator/rectifier 6P connector.

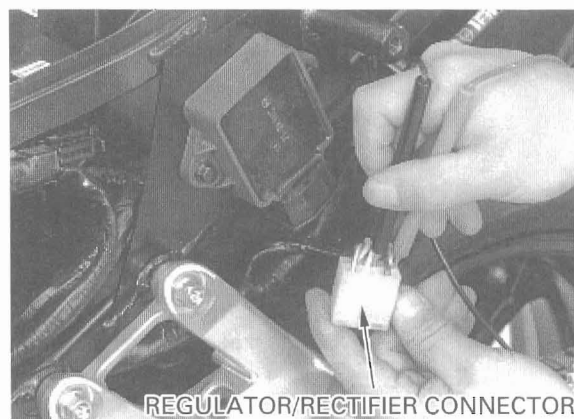


Check the resistance between all three Yellow terminals.

**STANDARD:** 0.22 – 0.26  $\Omega$  (at 68°F/20°C)

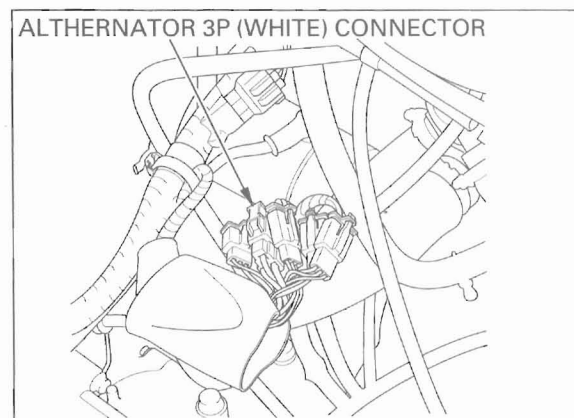
Check for continuity between all three Yellow terminals and Ground.

There should be no continuity.



If the reading is out of specification, remove the fuel tank (page 2-2) and check the resistance at the alternator connector.

Disconnect the alternator 3P (White) connector.



Check the resistance between all three Yellow terminals.

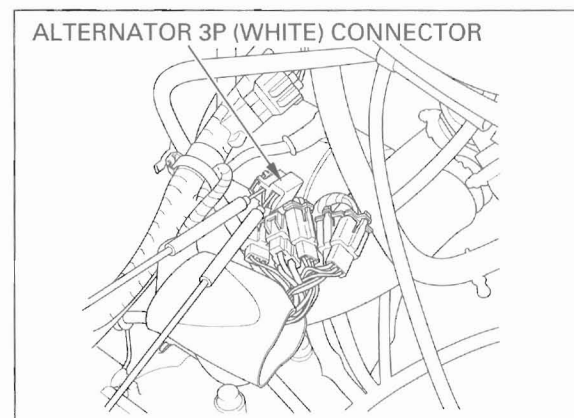
**STANDARD:** 0.22 – 0.26  $\Omega$  (at 68°F/20°C)

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.

Refer to section 10 for stator removal.

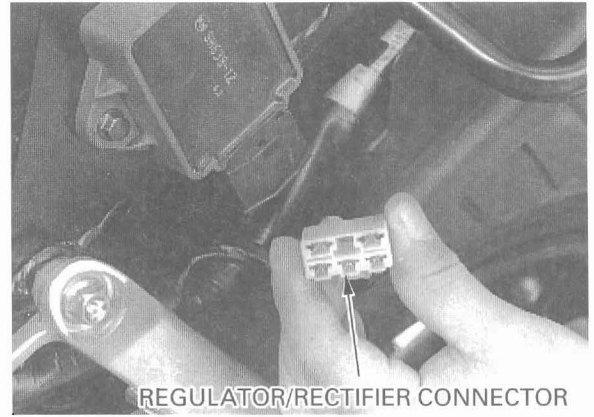


# REGULATOR/RECTIFIER

## SYSTEM INSPECTION

Remove the seat cowl (page 2-5).

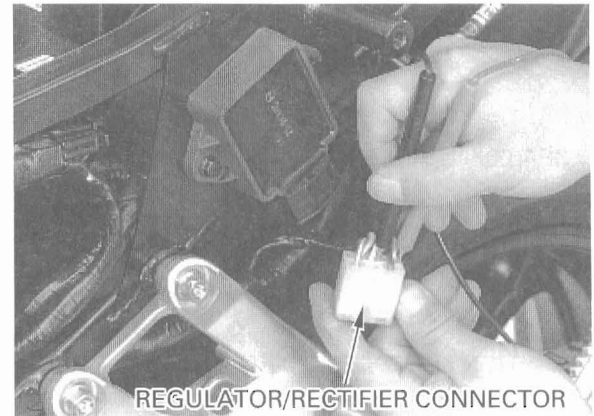
Disconnect the regulator/rectifier connector, and check it for loose contact or corroded terminals.



REGULATOR/RECTIFIER CONNECTOR

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	0.22 – 0.26 Ω (at 68°F/20°C)
Ground line	Green and ground	Continuity should exist



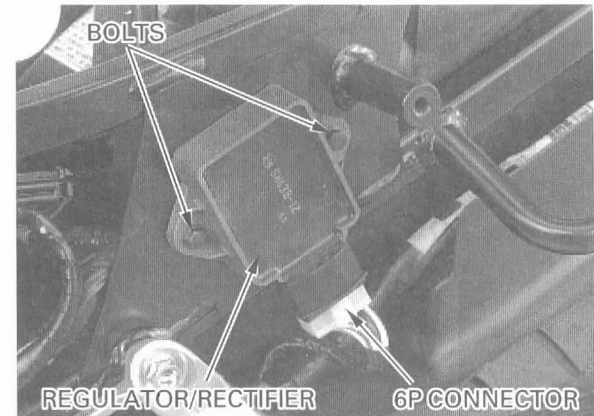
REGULATOR/RECTIFIER CONNECTOR

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

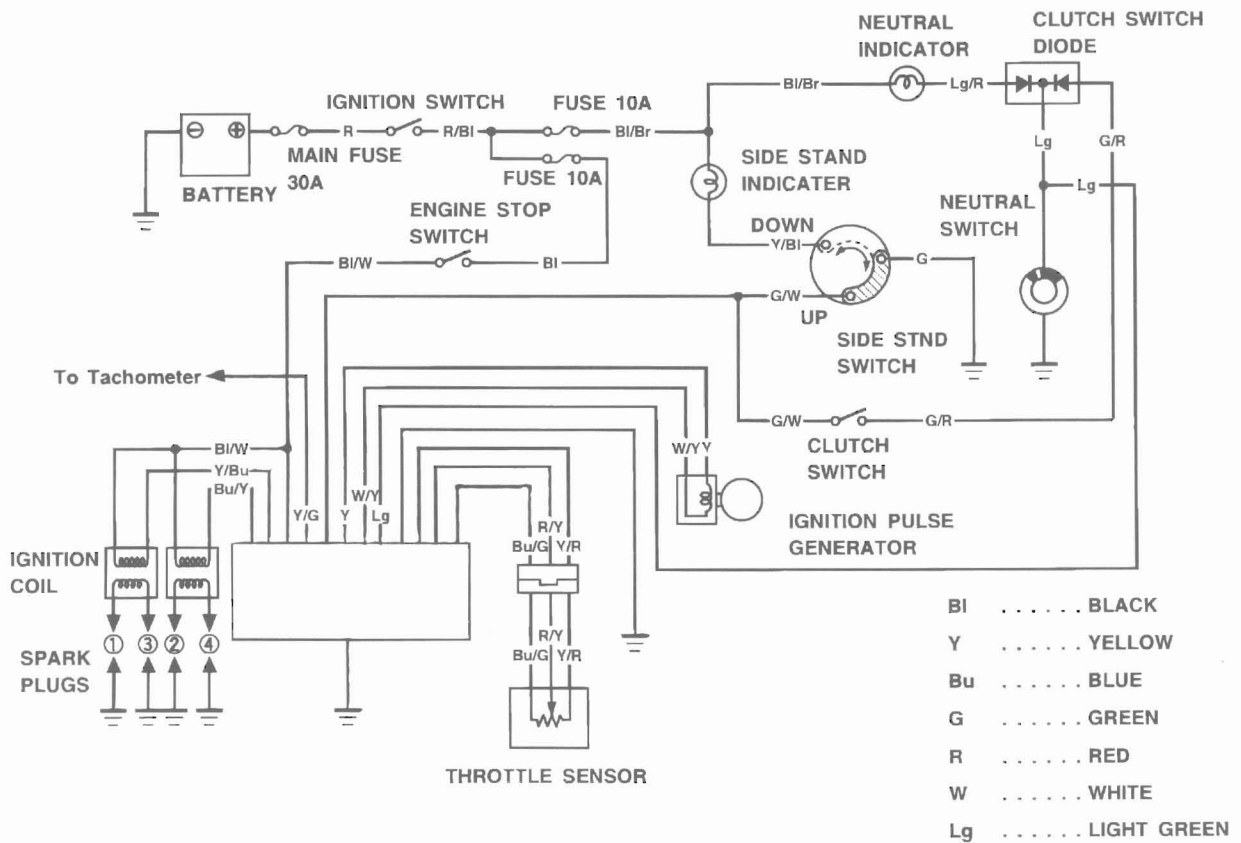
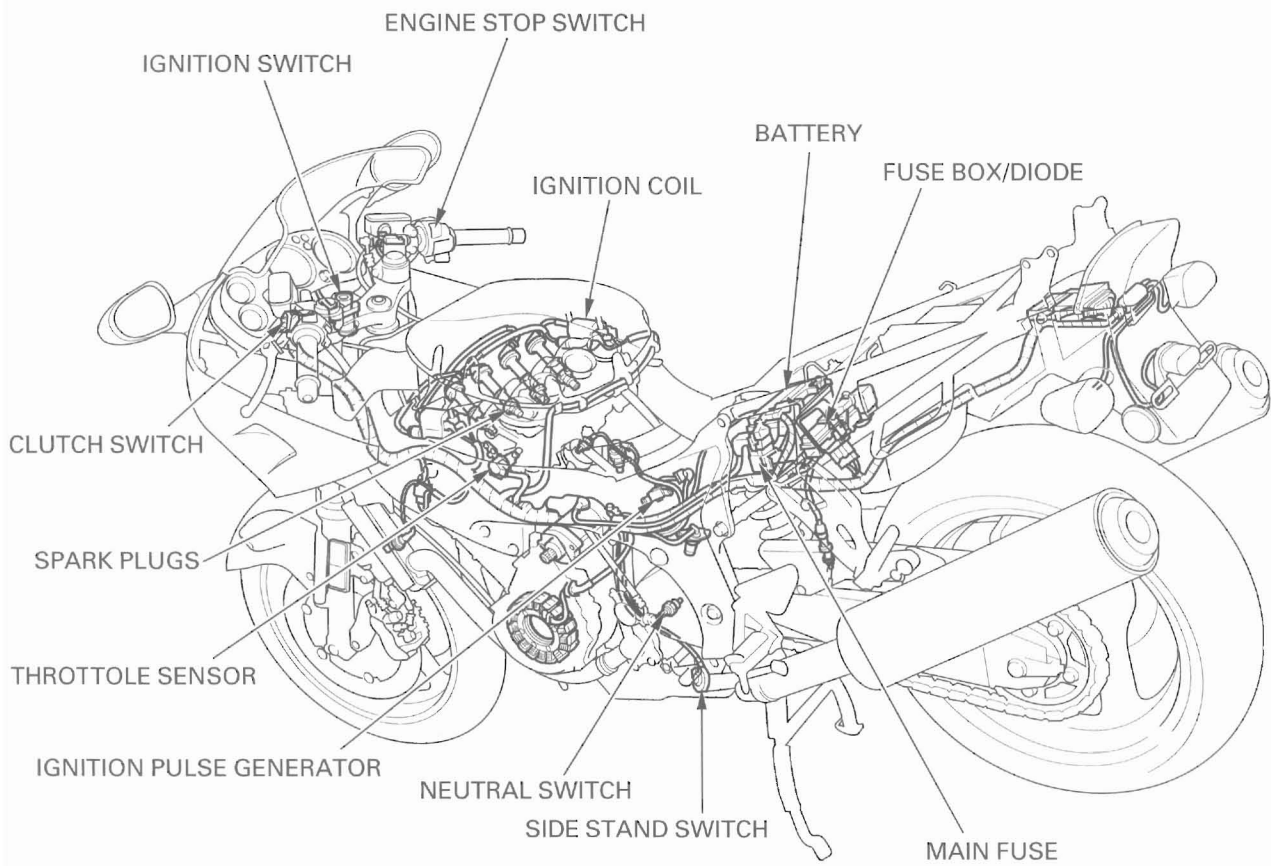
Disconnect the connector. Remove the regulator/rectifier unit mounting bolts, nuts and regulator/rectifier.

Install the regulator/rectifier unit in the reverse order of removal.



BOLTS  
REGULATOR/RECTIFIER  
6P CONNECTOR

SYSTEM DIAGRAM



# 17. IGNITION SYSTEM

SYSTEM DIAGRAM	17-0	IGNITION PULSE GENERATOR	17-6
SERVICE INFORMATION	17-1	THROTTLE SENSOR	17-10
TROUBLESHOOTING	17-3	IGNITION CONTROL MODULE	17-11
IGNITION SYSTEM INSPECTION	17-4	IGNITION TIMING	17-11
IGNITION COIL	17-6		

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

#### CAUTION:

*Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.*

- When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 17-3.
- The ignition timing does not normally need to be adjusted since the Ignition Control Module (ICM) is factory preset.
- The ICM 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.

### SPECIFICATIONS

ITEM	SPECIFICATIONS
Spark plug	CR9EHVX-9 (NGK)
Spark plug gap	0.80-0.90 mm (0.031-0.035 in)
Ignition coil peak voltage	100 V minimum
Ignition pulse generator peak voltage	0.7 V minimum
Ignition timing ("F" mark)	9° BTDC at idle

## IGNITION SYSTEM

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### TORQUE VALUES

Crankshaft hole cap	18 N·m (1.8 kgf·m , 13 lbf·ft)	Apply grease to the threads
Spark plug	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Ignition pulse generator rotor special bolt	59 N·m (6.0 kgf·m , 43 lbf·ft)	Apply oil to the threads
Ignition pulse generator cover SH bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply sealant to the threads (2 places)

### TOOLS

Peak voltage tester (U.S.A. only) or Peak voltage adapter	07HGJ—0020100 with Commercially available digital multimeter (impedance 10 M $\Omega$ /DCV minimum)
Inspection adaptor	07GMJ—ML80100

## 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).

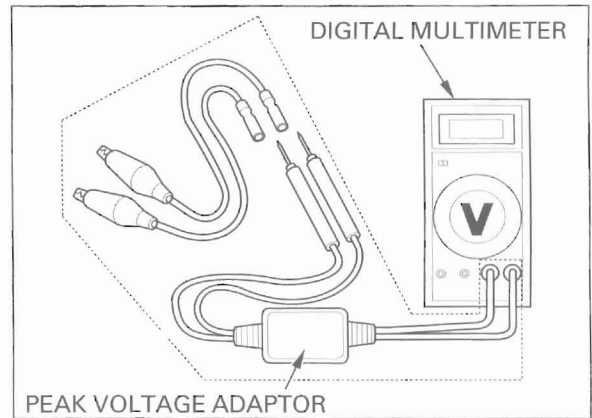
## No spark at all plugs

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)	<ol style="list-style-type: none"> <li>1. Faulty engine stop switch.</li> <li>2. An open circuit in Black/White wire between the ignition coil and engine stop switch.</li> <li>3. Faulty ICM (in case when the initial voltage is normal while disconnecting ICM connector).</li> </ol>
	Initial voltage is normal, but it drops down to 2–4 V while cranking the engine.	<ol style="list-style-type: none"> <li>1. Incorrect peak voltage adaptor connections.</li> <li>2. Undercharged battery.</li> <li>3. No voltage between the Black/White (+) and Body ground (–) at the ICM multi-connector or loosen ICM connection.</li> <li>4. An open circuit or loose connection in Green wire.</li> <li>5. An open circuit or loose connection in Yellow/Blue and Blue/Yellow wires between the ignition coils and ICM.</li> <li>6. Short circuit in ignition primary coil.</li> <li>7. Faulty side stand switch or neutral switch.</li> <li>8. An open circuit or loose connection in No. 7 related circuit wires.               <ul style="list-style-type: none"> <li>• Side stand switch line: Green/White wire</li> <li>• Neutral switch line: Light Green and Light Green/Red wire</li> </ul> </li> <li>9. Faulty ignition pulse generator (measure the peak voltage).</li> <li>10. Faulty ICM (in case when above No. 1–9 are normal).</li> </ol>
	Initial voltage is normal, but no peak voltage while cranking the engine.	<ol style="list-style-type: none"> <li>1. Faulty peak voltage adaptor connections.</li> <li>2. Faulty peak voltage adaptor.</li> <li>3. Faulty ICM (in case when above No. 1, 2 are normal).</li> </ol>
	Initial voltage is normal, but peak voltage is lower than standard value	<ol style="list-style-type: none"> <li>1. The multimeter impedance is too low; below 10 M<math>\Omega</math>/DCV.</li> <li>2. Cranking speed is too low (battery under-charged).</li> <li>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).</li> <li>4. Faulty ICM (in case when above No. 1–3 are normal).</li> </ol>
	Initial and peak voltage are normal, but does not spark.	<ol style="list-style-type: none"> <li>1. Faulty spark plug or leaking ignition coil secondary current ampere.</li> <li>2. Faulty ignition coil.</li> </ol>
Ignition pulse generator	Peak voltage is lower than standard value.	<ol style="list-style-type: none"> <li>1. The multimeter impedance is too low; below 10 M<math>\Omega</math>/DCV.</li> <li>2. Cranking speed is too low (battery under charged).</li> <li>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).</li> <li>4. Faulty ICM (in case when above No. 1–3 are normal).</li> </ol>
	No peak voltage.	<ol style="list-style-type: none"> <li>1. Faulty peak voltage adaptor.</li> <li>2. Faulty ignition pulse generator.</li> </ol>

### 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 M $\Omega$ /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.



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 M $\Omega$ /DCV minimum)**

### IGNITION COIL PRIMARY PEAK VOLTAGE

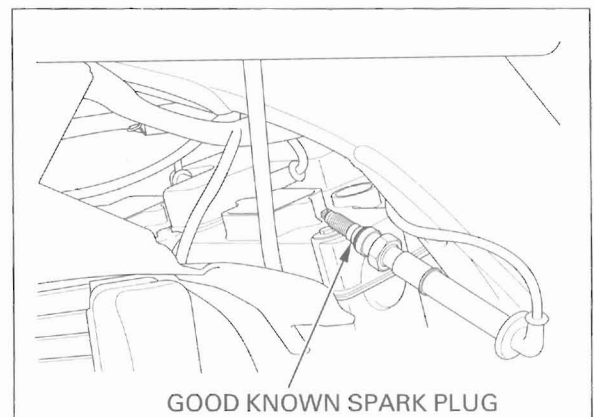
#### **▲WARNING**

*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 head as done in a spark test.





With the ignition coil primary wire connected, connect the peak voltage adaptor or peak voltage tester (U.S.A. only) to the ignition coil.

**CONNECTION:**

**No. 1/4 coil:** Yellow/Blue terminal (+) – Body ground (–)

**No. 2/3 coil:** Blue/Yellow terminal (+) – Body ground (–)

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

Check for initial voltage at this time.

The battery voltage should be measured.

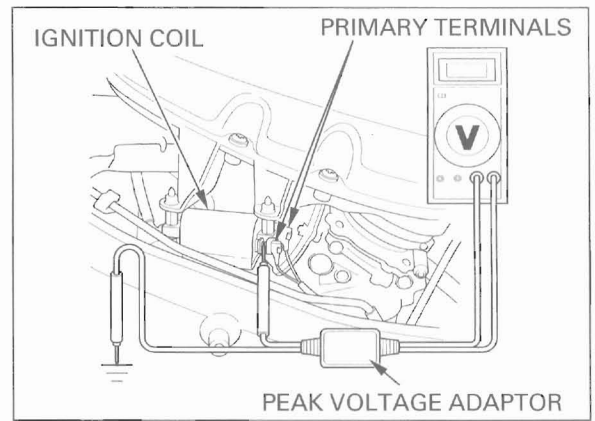
If the initial voltage cannot be measured, check the power supply circuit (refer to the troubleshooting, page 17-3).

Crank the engine with the starter motor and read ignition coil primary peak voltage.

**PEAK VOLTAGE:** 100 V minimum

If the peak voltage is abnormal, check for an open circuit or poor connection in Yellow/Blue and Black/White wires.

If not defects are found in the harness, refer to the troubleshooting chart on page 17-3.



**IGNITION PULSE GENERATOR PEAK VOLTAGE**

**NOTE:**

Check cylinder compression and check that the spark plugs are installed correctly.

Remove the seat (page 2-2).

Disconnect the multi-connector from the ICM. Connect the peak voltage adaptor or peak voltage tester (U.S.A. only) probes to the connector terminals of the wire harness side.

**TOOLS:**

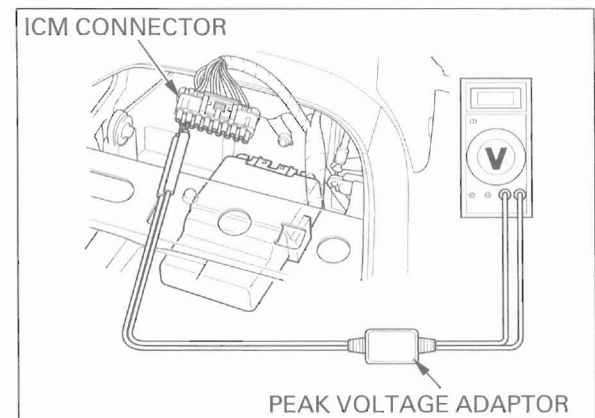
**Peak voltage tester (U.S.A. only) or Peak voltage adaptor** 07HGJ-0020100  
**with Commercially available digital multimeter (impedance 10 MΩ /DCV minimum)**

**CONNECTION:**

Yellow Terminal (+) – White/Yellow Terminal (–)

Crank the engine with the starter motor and read the peak voltage.

**PEAK BOLTAGE:** 0.7 V minimum

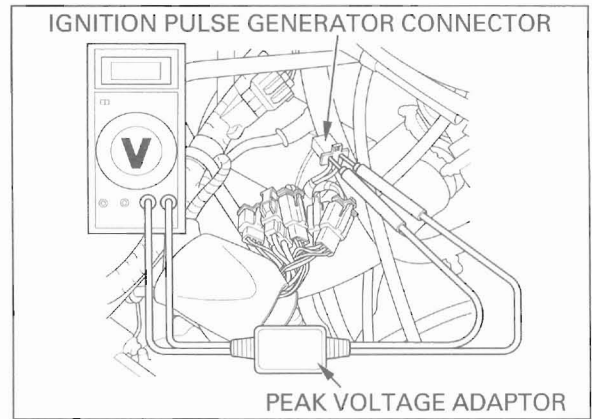


## IGNITION SYSTEM

If the peak voltage measured at ICM multi-connector is abnormal, measure the peak voltage at the pulse generator connector.

Remove the fuel tank (page 2-2).  
Disconnect the ignition pulse generator 2P (Black) connector and connect the tester probes to the terminal (Yellow and White/Yellow).  
In the same manner as at the ICM connector, measure the peak voltage and compare it to the voltage measured at the ICM connector.

- If the peak voltage measured at the ICM 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 below for ignition pulse generator replacement.



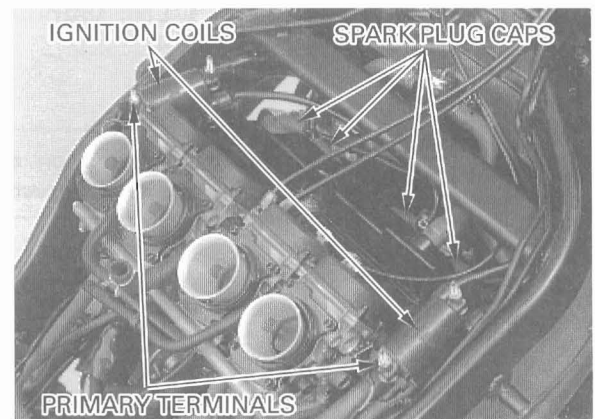
## IGNITION COIL

### REMOVAL/INSTALLATION

Remove the air cleaner housing (page 5-4).

Disconnect the primary wires from the ignition coils.  
Disconnect the spark plug caps from the plugs, then remove the ignition coil assembly.

Installation is in the reverse order of removal.

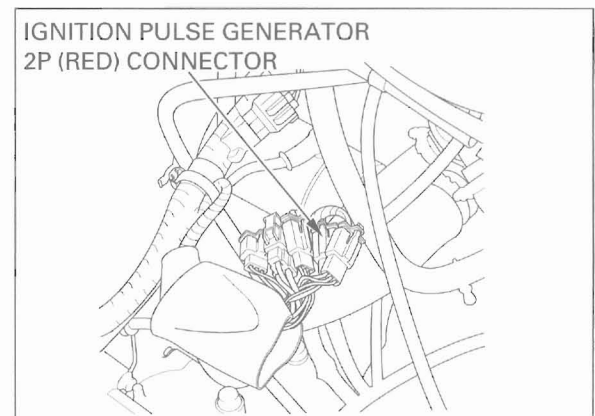


## IGNITION PULSE GENERATOR

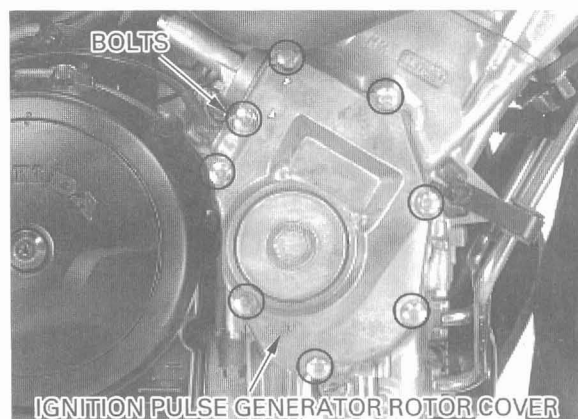
### REMOVAL

Remove the following:  
— Fuel tank (page 2-2)  
— Lower cowl (page 2-7)

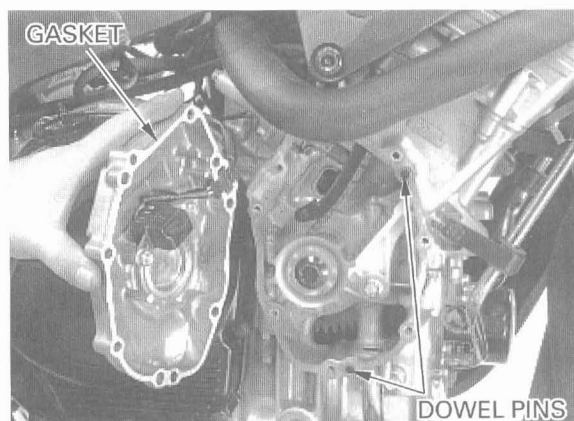
Disconnect the ignition pulse generator 2P (Red) connector.  
Release the wire from the wire clamp.



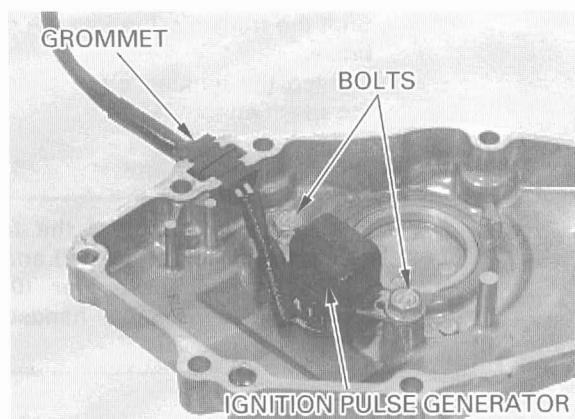
Remove the SH bolts and ignition pulse generator rotor cover.



Remove the gasket and dowel pins.



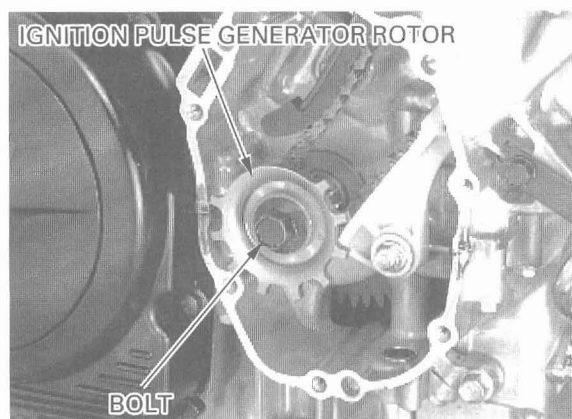
Remove the wire grommet from the cover.  
Remove the bolts and ignition pulse generator.



Shift the transmission into 6th gear and apply rear brake.  
Remove the ignition pulse generator rotor bolt.

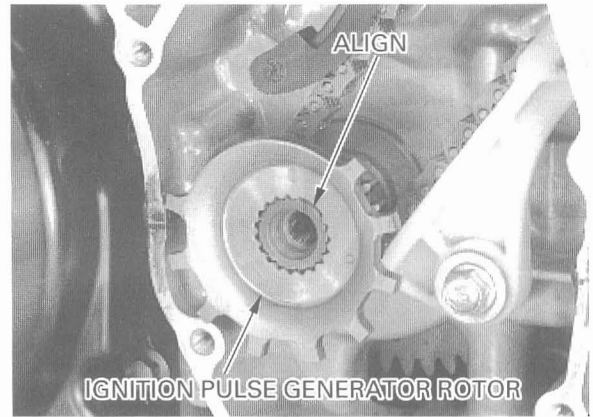
**NOTE:**

If the engine is out of the frame, remove the alternator cover (page 10-2) and hold the flywheel with the flywheel holder (07725-0040000 or commercially available handstrap wrench), then remove the bolt.

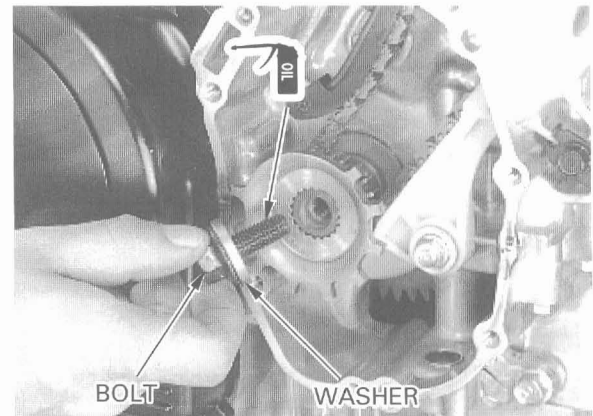


### INSTALLATION

Install the ignition pulse generator rotor by aligning the wide groove with the wide teeth of the crankshaft.

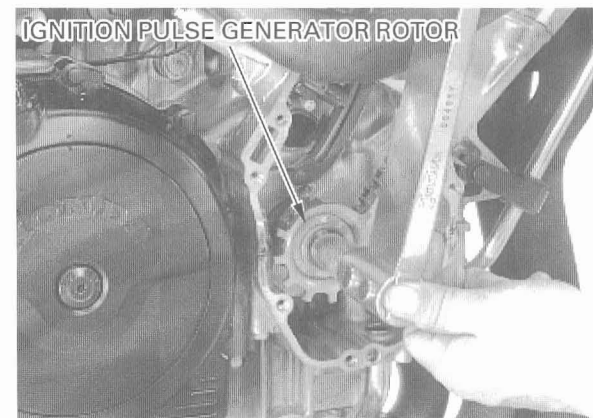


Apply oil to the ignition pulse generator rotor bolt threads, then install the washer and rotor bolt.



Shift the transmission into 6th gear and apply rear brake.

Tighten the ignition pulse generator rotor bolt to the specified torque.

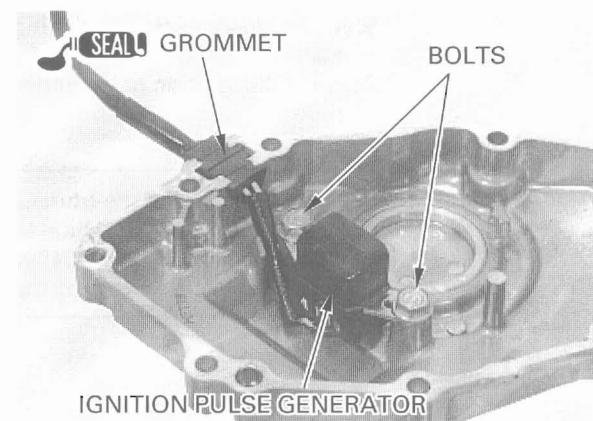


#### NOTE:

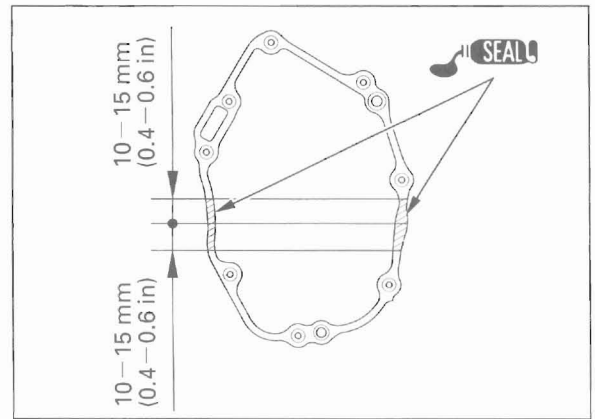
If the engine is out of the frame, remove the alternator cover (page 10-2) and hold the flywheel with the flywheel holder (07725-0040000 or commercially available handstrap wrench), then tighten the bolt.

**TORQUE:** 59 N·m (6.0 kgf·m , 43 lbf·ft)

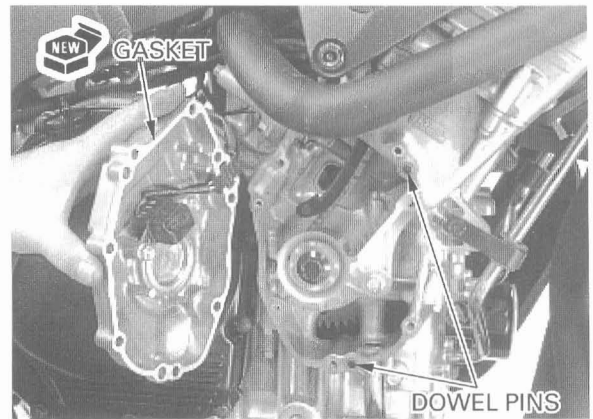
Install the ignition pulse generator into the cover. Apply sealant to the wire grommet, then install it into the groove of the cover. Install and tighten the ignition pulse generator bolts.



Apply liquid sealant to the mating surface of the crankcase as shown.

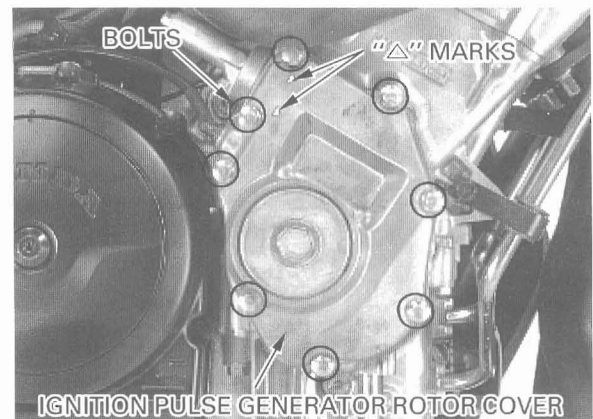


Install the dowel pins and a new gasket.



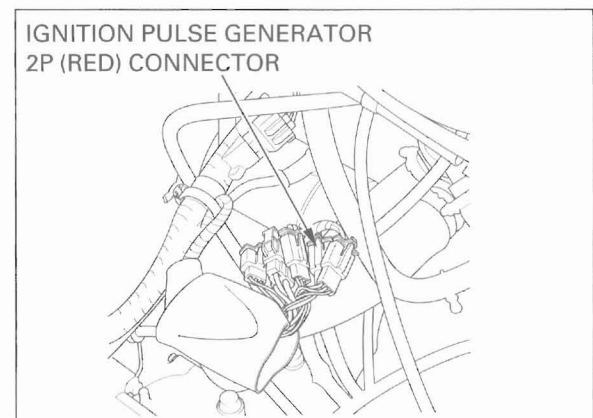
Apply sealant to the threads of the two bolts indicated by "△" mark on the cover. Install the ignition pulse generator rotor cover and tighten the SH bolt to the specified torque.

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



Route the ignition pulse generator wire properly, connect the 2P (Red) connector. Clamp the wire with the band.

Install the removed parts in the reverse order of removal.

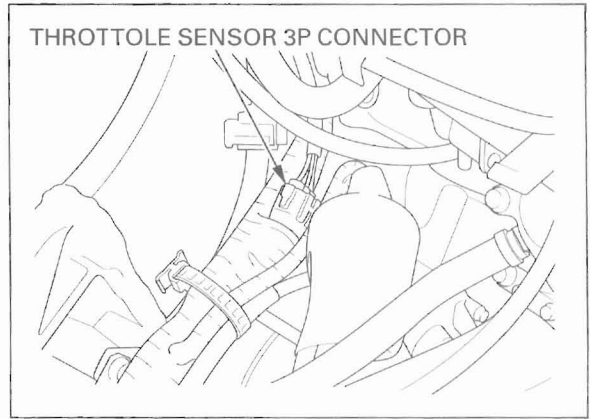


## THROTTLE SENSOR

### INSPECTION

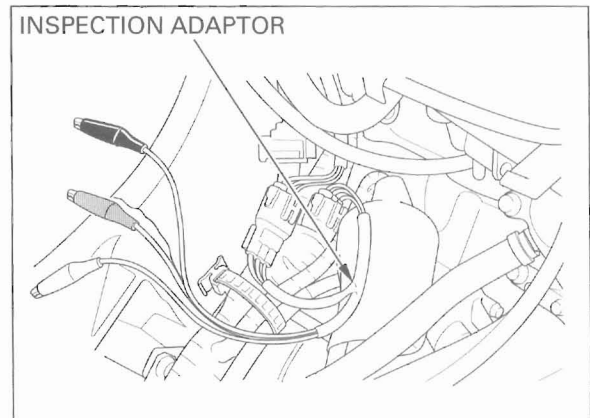
Remove the fuel tank (page 2-2).

Disconnect the throttle sensor 3P connector.  
Check the connector for loose or corroded terminals.



Connect the inspection adaptor between the throttle sensor connectors.

**TOOL:**  
Inspection adaptor 07GMJ-ML80100



#### 1. INPUT VOLTAGE INSPECTION

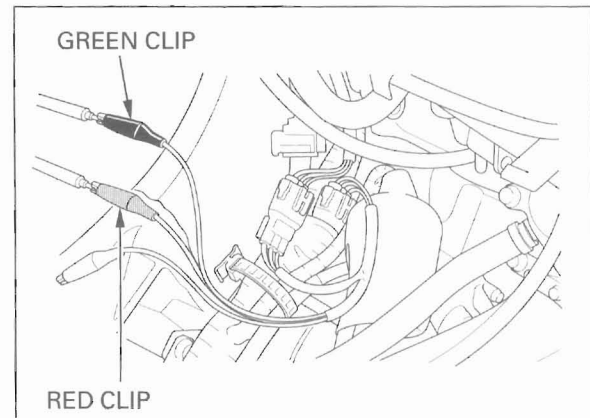
Turn the ignition switch ON and measure and record the input voltage at the inspection adaptor terminals using a digital multimeter.

#### CONNECTION:

Red clip (+) – Green clip (-)  
Standard: 4.5–5.5 V

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

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



#### 2. OUTPUT VOLTAGE INSPECTION WITH THROTTLE FULLY OPEN

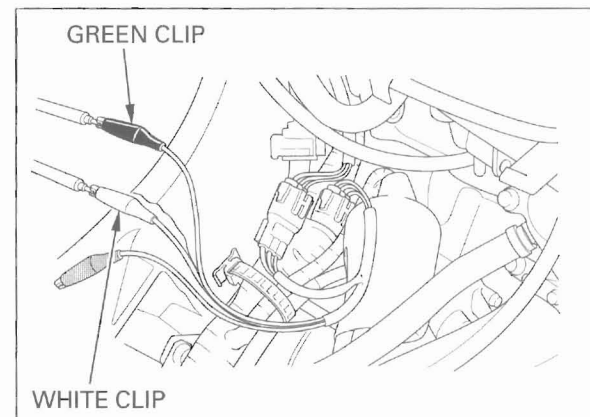
Turn the ignition switch ON and Measure and record the output voltage at the inspection adaptor terminals using a digital multimeter with the throttle fully open.

#### CONNECTION:

White clip (+) – Green clip (-)

#### MEASURING CONDITION:

At throttle fully open.



**3. OUTPUT VOLTAGE INSPECTION WITH THROTTLE CLOSED**

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

**CONNECTION:**

white clip (+) – Green clip (-)

**MEASURING CONDITION:**

With the throttle fully closed and the throttle stop screw fully turned out.

**4. CALCULATED RESULT COMPARISON**

Compare this measurement to the result of the following calculation.

With throttle fully open:

**Measured input voltage in step 1  $\times 0.824 = V_o$**

The sensor is normal if the full throttle open output voltage measured in step 2 is within  $\pm 10\%$  of  $V_o$ .

With the throttle fully closed:

**Measured input voltage in step 1  $\times 0.1 = V_c$**

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

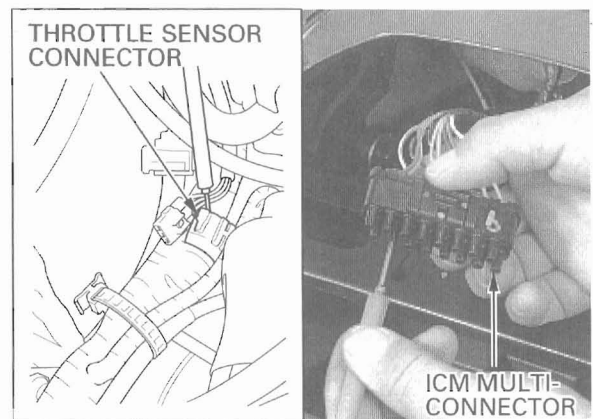
Using an analog meter, check that the needle of the voltmeter swings slowly when the throttle is opened gradually.

**CONTINUITY INSPECTION**

Disconnect the ICM multi-connector and the throttle sensor 3P connector.

Check for continuity between the ICM and throttle sensor.

If there is no continuity, check for an open or short circuit in wire harness.



**IGNITION CONTROL MODULE  
REMOVAL/INSTALLATION**

Remove the seat (page 2-2).

Disconnect the ignition control module multi-connector.

Remove the ignition control module from the rear fender.

Installation is in the reverse order of removal.





## IGNITION TIMING

### ▲WARNING

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

*Read the instructions for timing light operation.*

Warm up the engine.  
Stop the engine and remove the crankshaft hole cap.

Connect the timing light to the No. 1 spark plug wire.

Start the engine and let it idle.

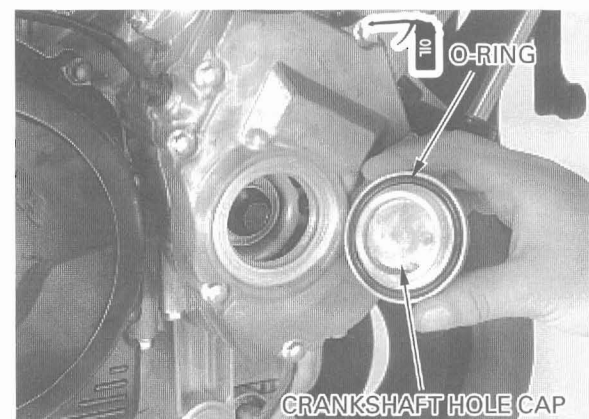
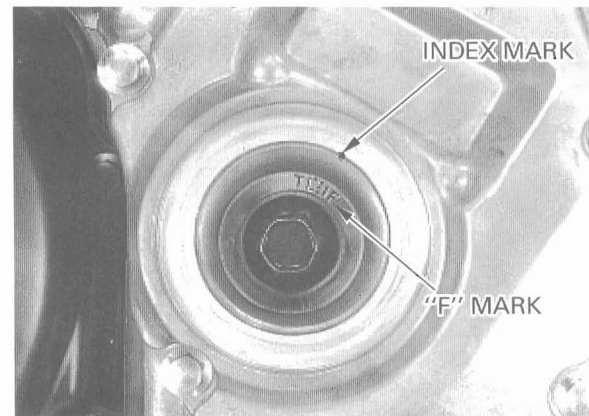
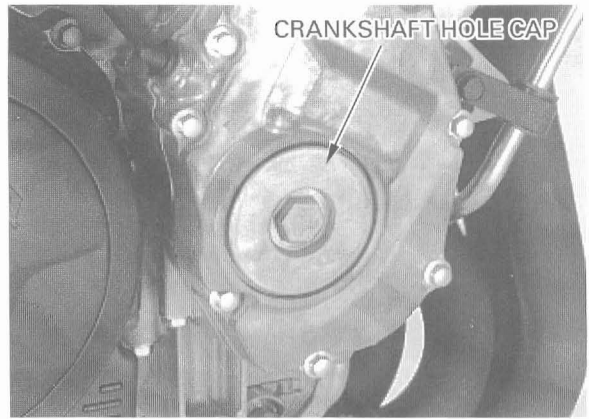
**IDLE SPEED:** 1,100 ± 100 rpm

The ignition timing is correct if the "F" mark (three punch marks) aligns with the index mark on the ignition pulse generator rotor cover.

Increase the engine speed by turning the throttle stop screw and make sure the "F" mark begins to move counterclockwise when the engine speed at approximately 1,500 rpm.

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

Apply oil to the O-ring and install and tighten the crankshaft hole cap.

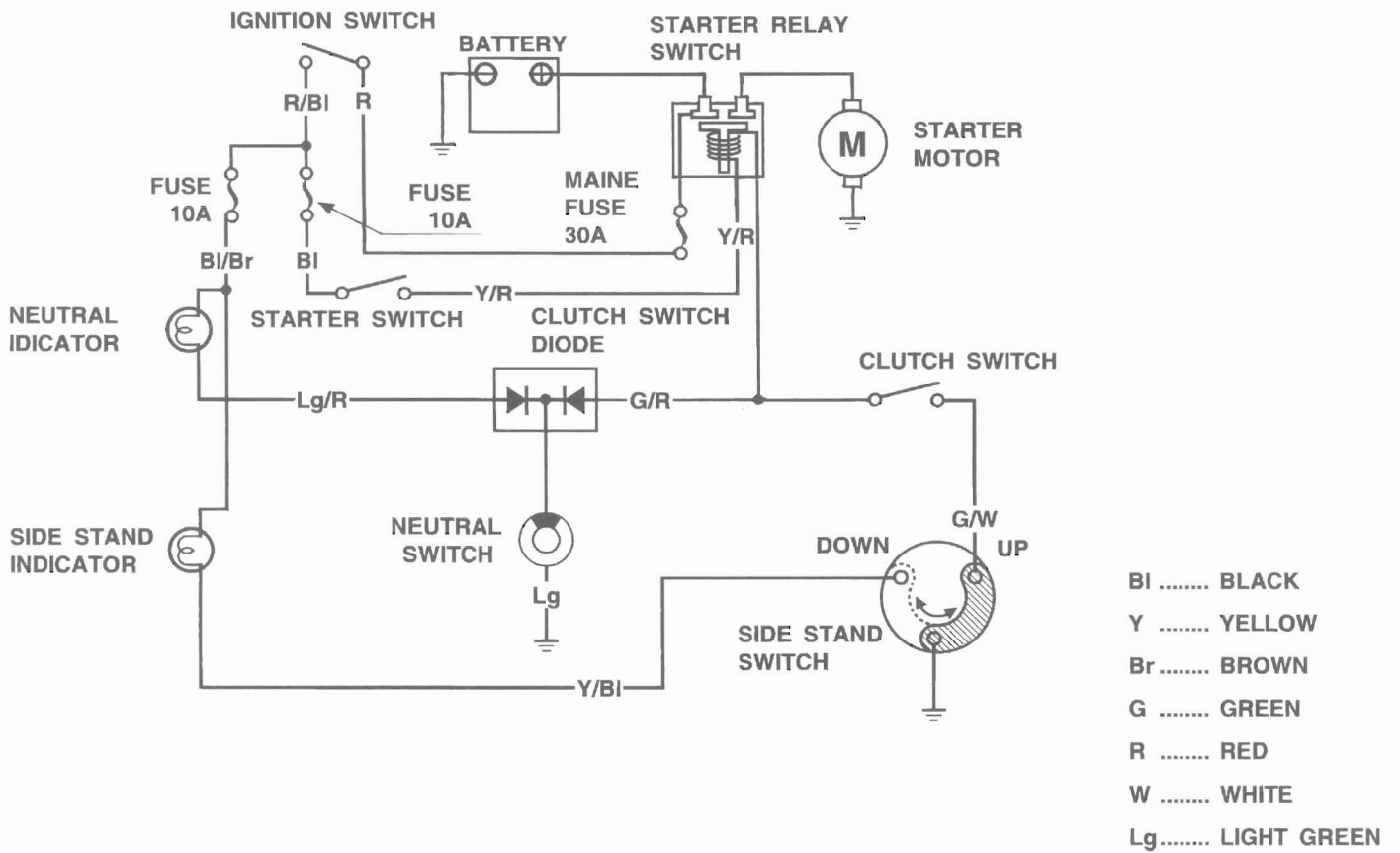
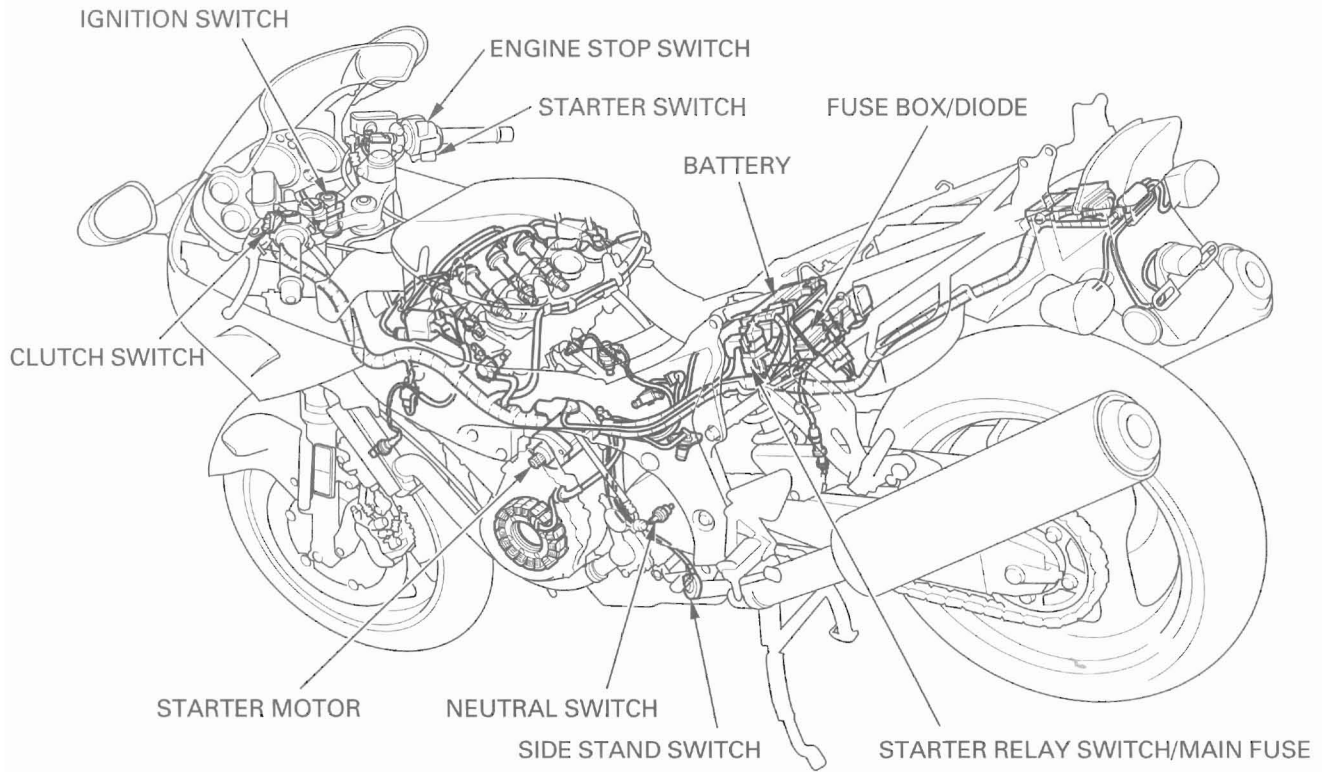




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MEMO

SYSTEM DIAGRAM



# 18. ELECTRIC STARTER

SYSTEM DIAGRAM	18-0	STARTER MOTOR	18-4
SERVICE INFORMATION	18-1	STARTER RELAY SWITCH	18-10
TROUBLESHOOTING	18-2	DIODE	18-11

## SERVICE INFORMATION

### GENERAL

- The starter motor can be removed with the engine in the frame.
- For the starter drive and driven gear removal/installation, see section 10.

### SPECIFICATION

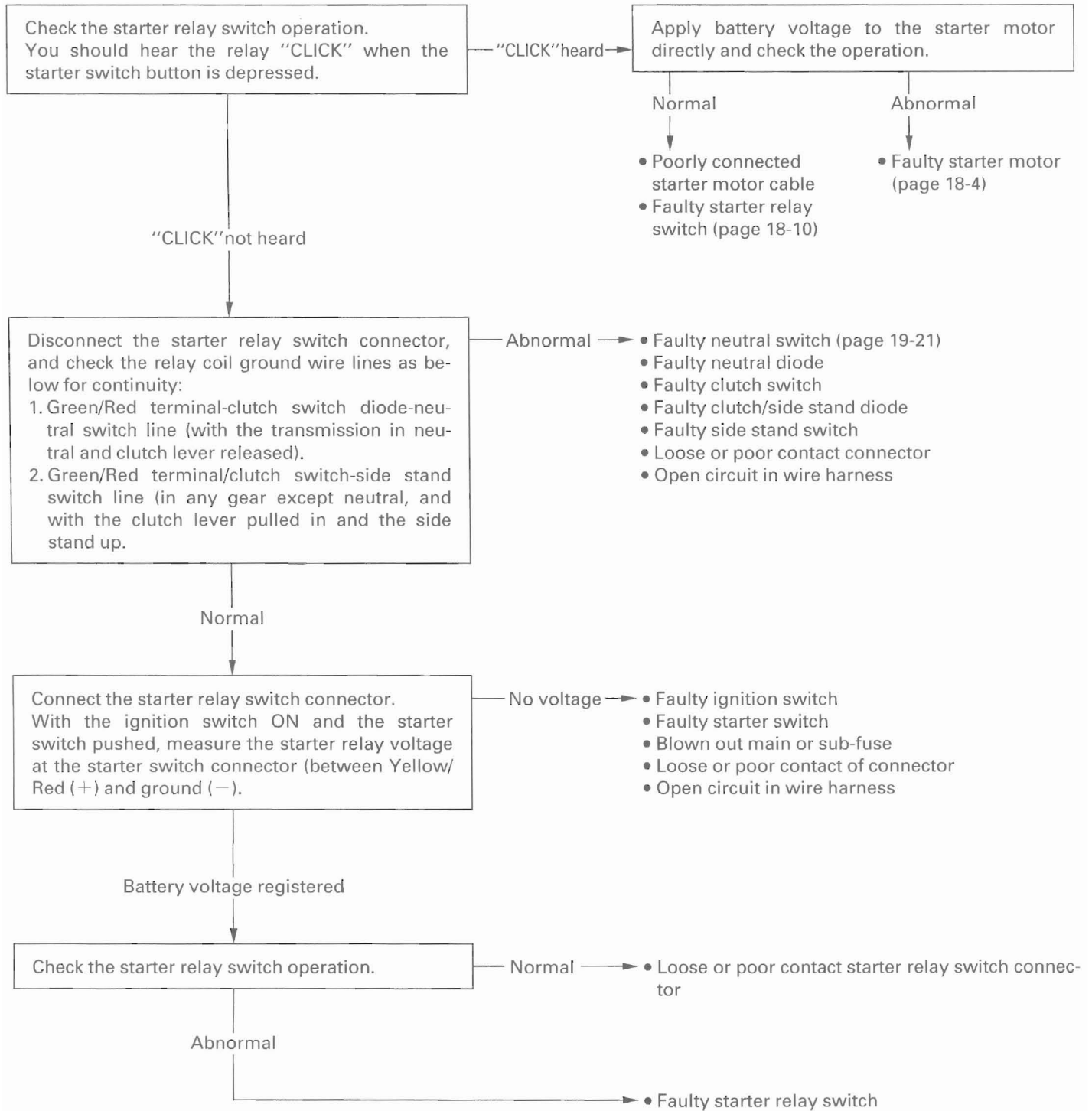
Unit: mm (in)

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

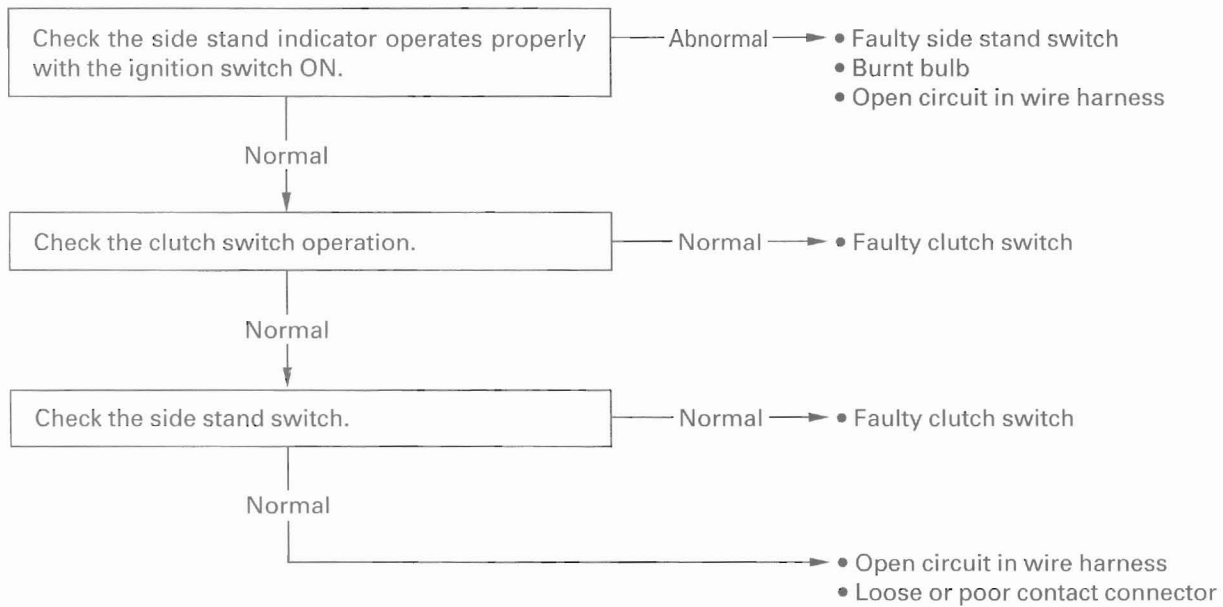
**TROUBLESHOOTING**

**Starter motor does not turn**

- Check for a blown main or sub fuses before servicing.
- Make sure the battery is fully charged and in good condition.



The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the side stand up and the clutch lever pulled in.



### Starter motor turns engine slowly

- Low battery voltage
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poorly connected battery ground cable

### Starter motor turns, but engine does not turn

- Starter motor is running backwards
  - Case assembled improperly
  - Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter drive gear

### Starter relay switch "Clicks", but engine does not turn over

- Crankshaft does not turn due to engine problems

## STARTER MOTOR

### REMOVAL

**▲WARNING**

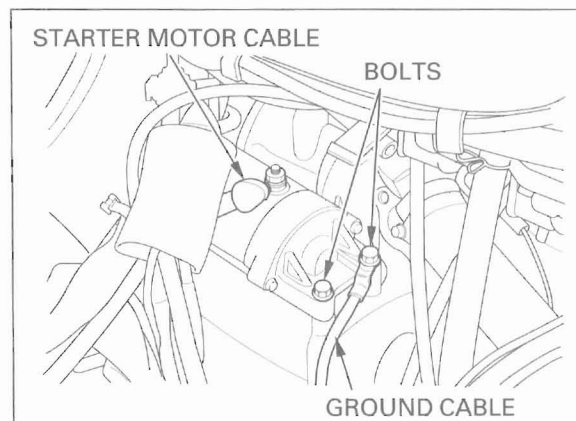
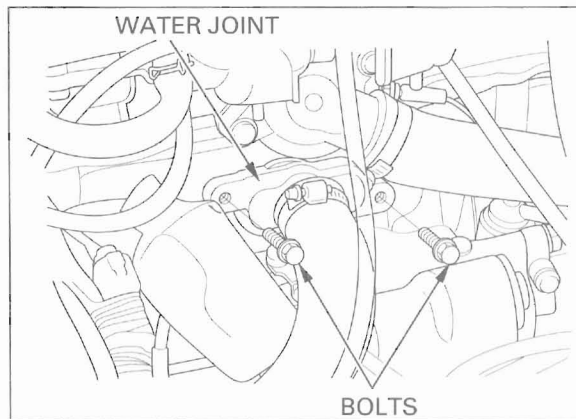
*With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.*

Remove the fuel tank (page 2-2).  
Drain the coolant (page 6-4).

Remove the two SH bolts and water joint.

Remove the nut and the starter motor cable from the starter motor.  
Remove the starter motor mounting bolts, ground wire, wire clamp.

Pull the starter motor out of the crankcase.

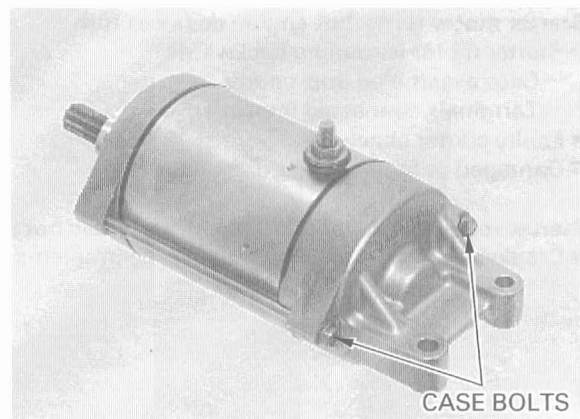


### DISASSEMBLY

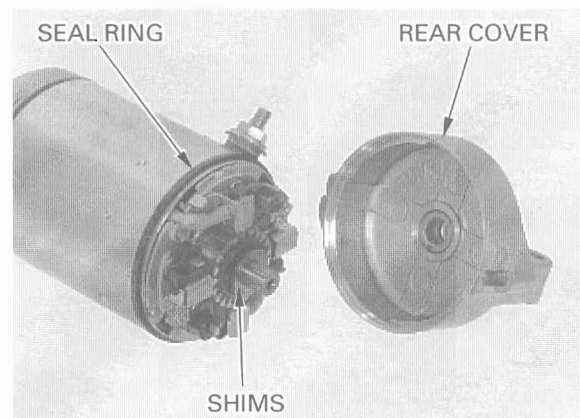
**NOTE:**

Record the location and number of shims.

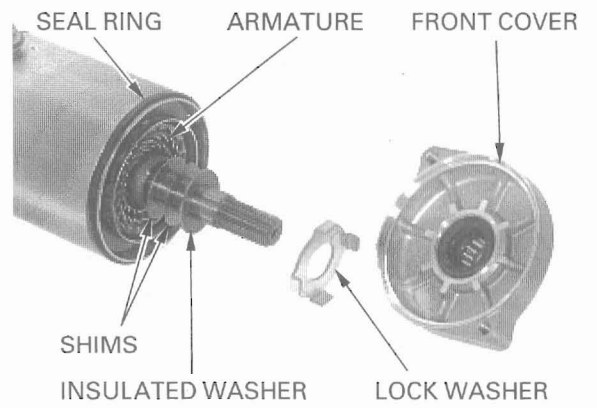
Remove the following:  
– Starter motor case bolts



- Rear cover assembly
- Seal ring
- Shims

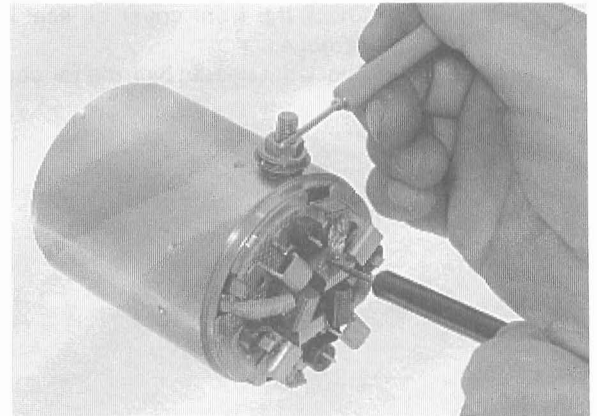


- Front cover assembly
- Seal ring
- Lock washer
- Insulated washer
- Shims
- Armature

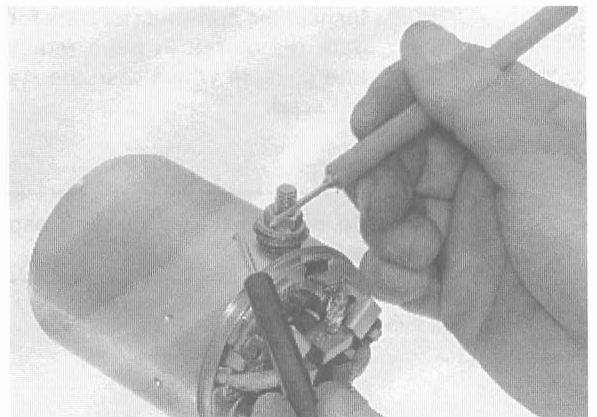


**INSPECTION**

Check for continuity between the cable terminal and the brush wire (the indigo colored wire or the insulated brush holder). There should be continuity.

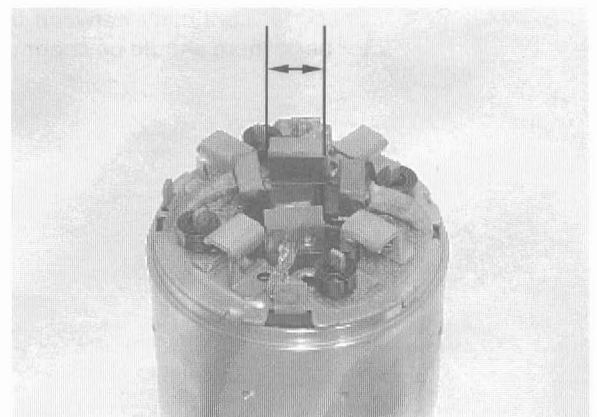


Check for continuity between the motor case and the cable terminal. There should be no continuity.



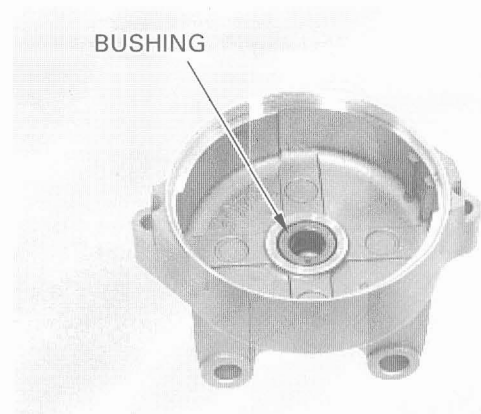
Inspect the brushes for damage and measure the brush length.

**SERVICE LIMIT:** 4.5 mm (0.18 in)

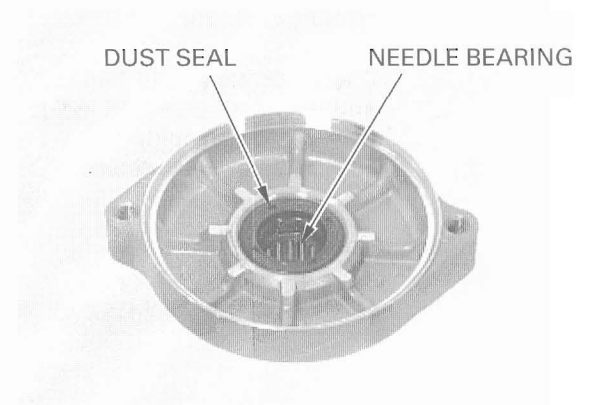


## ELECTRIC STARTER

Check the bushing of the rear cover for wear or damage.



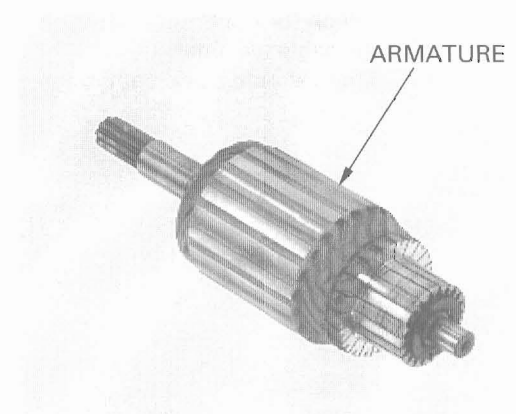
Check the front cover oil seal for fatigue or other damage.  
Check the needle bearing for damage.



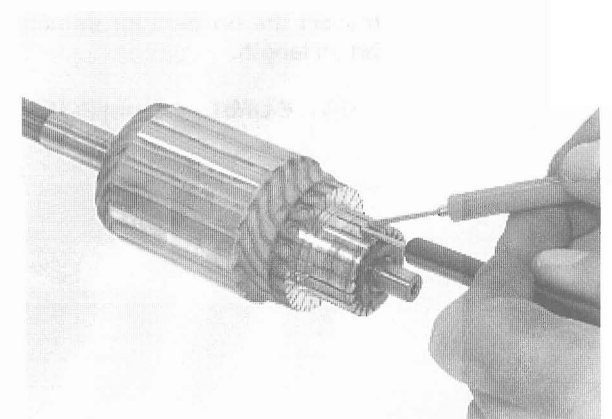
Inspect the commutator bars for discoloration.  
Bars discolored in pairs indicate grounded armature coils, in which case the starter motor must be replaced.

**NOTE:**

Do not use emery or sand paper on the commutator.

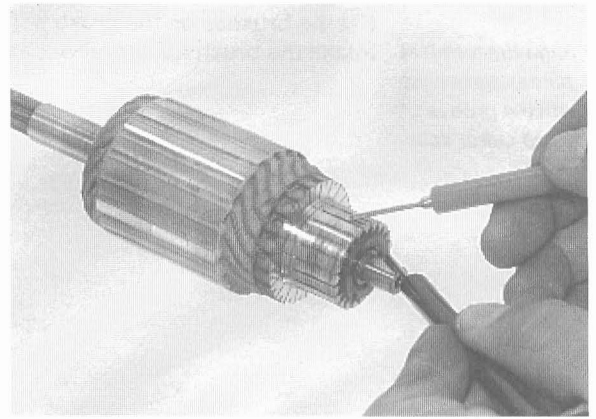


Check for continuity between individual commutator bars; there should be continuity.



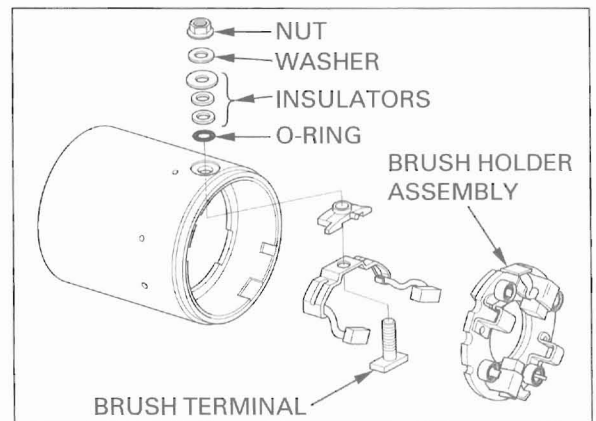


Also, check for continuity between individual commutator bars and the armature shaft; there should be no continuity.

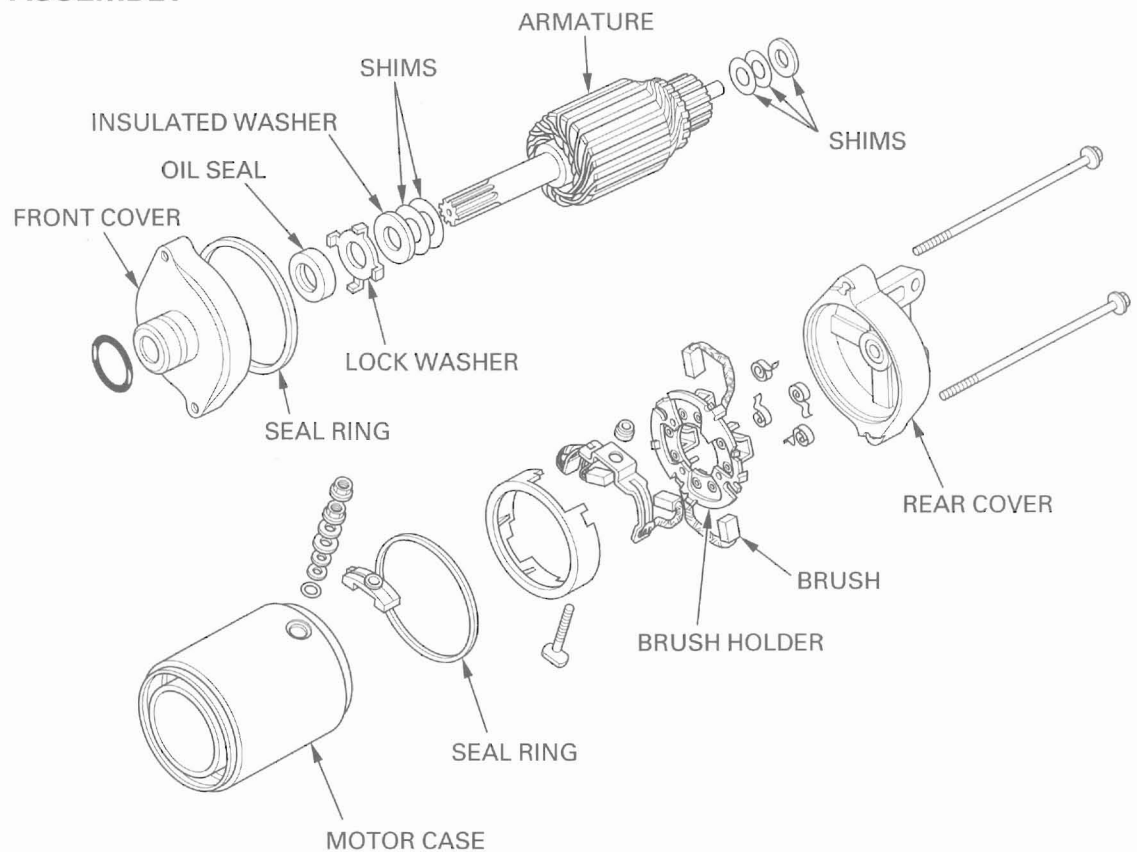


Remove the following:

- Nut
- Washer
- Insulators
- O-ring
- Brush holder assembly
- Brush/terminal



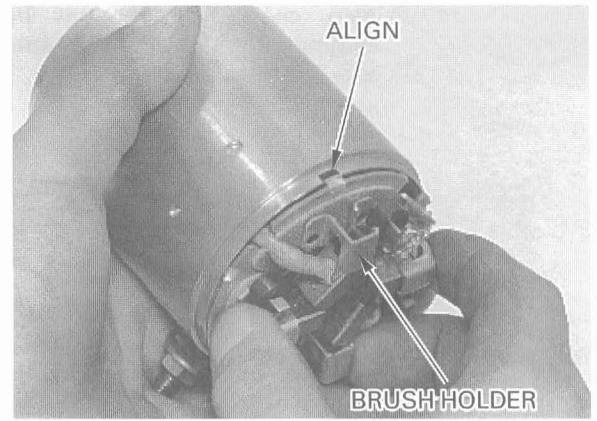
**ASSEMBLY**



# ELECTRIC STARTER

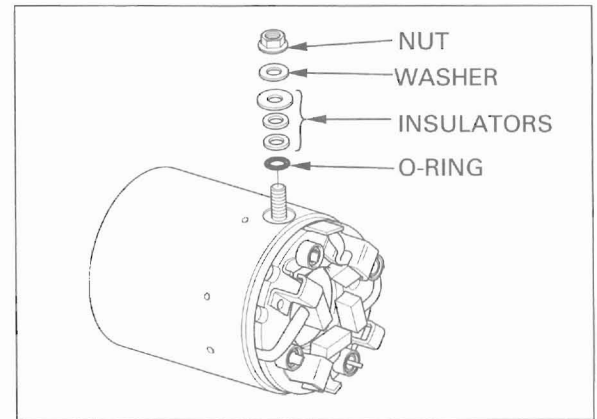
*Align the terminal holder plate boss with the groove of the motor case.*

Set the brushes on the brush holder.  
Install the brush holder onto the motor case.



*Install the insulators properly as noted during removal.*

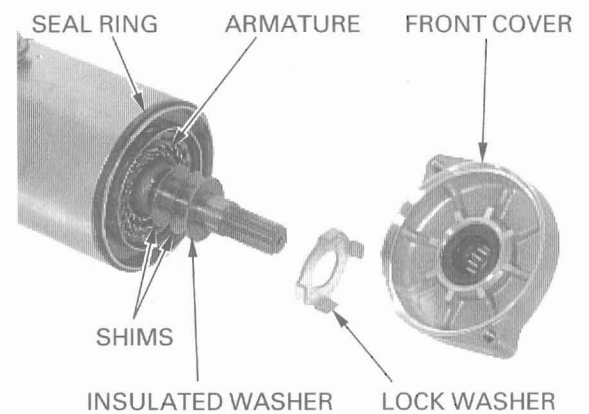
Install the following:  
- O-ring  
- Insulators  
- Washer  
- Nut



Install the armature in the motor case.

*Install the insulators properly as noted during removal.*

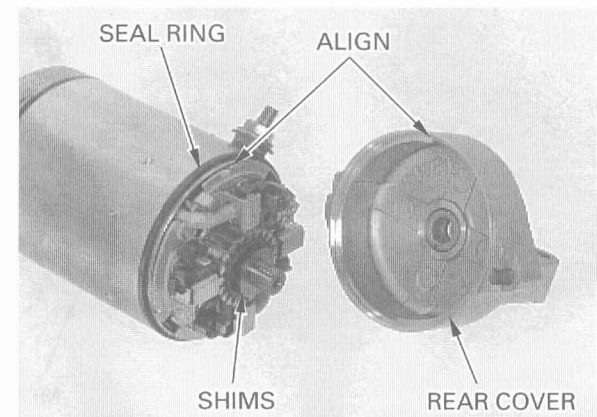
Install the shims on the armature shaft.  
Install the insulated washer and lock washer on the armature shaft.



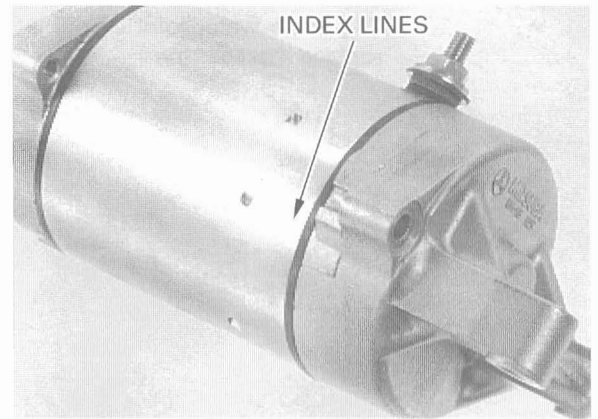
Install the seal ring onto the motor case.

*Install the insulators properly as noted during removal.*

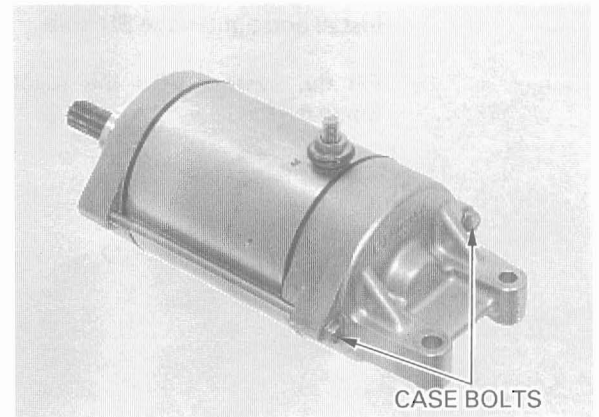
Install the seal ring on the motor case.  
Install the shims on the armature shaft.  
Assemble the motor case and rear cover, aligning the brush holder boss with the groove in the rear cover.



Install the front cover to the motor case.  
Make sure the index lines are aligned.



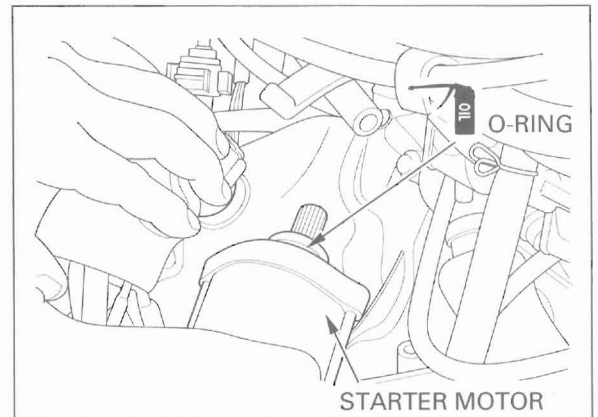
Install and tighten the case bolts securely.



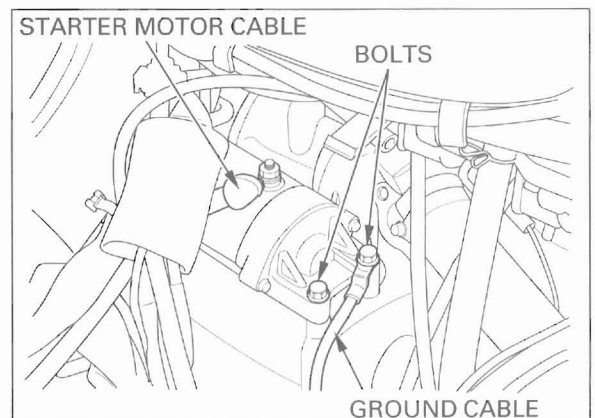
## INSTALLATION

Apply clean engine oil to the new O-ring.  
Install a new O-ring onto the starter motor boss.

Install the starter motor into the crankcase.



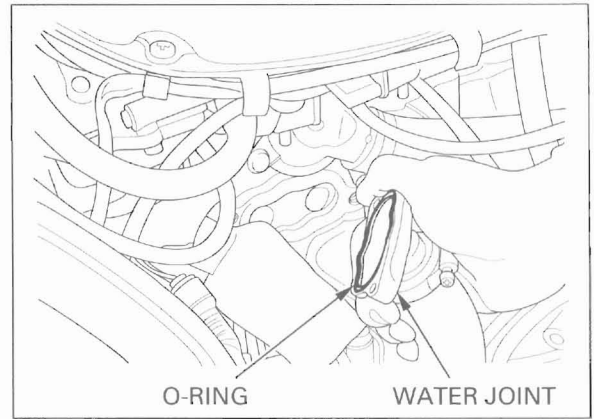
Route the starter motor cable and ground cable.  
Install the cables and wire clamp, then tighten the bolts and nut securely.



## ELECTRIC STARTER

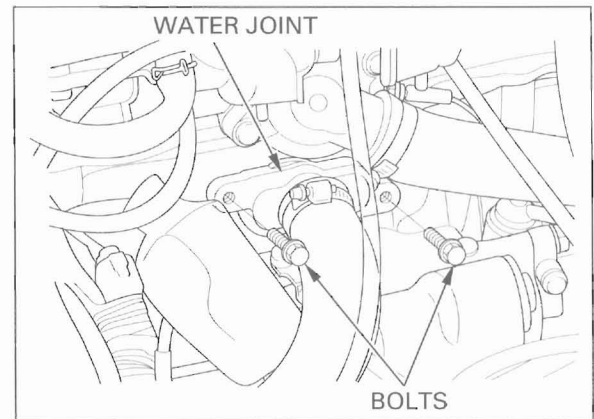
Check the water joint O-ring is in good condition, replace if necessary.

Install the water joint to the cylinder block.



Install and tighten the SH bolts.

Fill the system with the recommended coolant (page 6-4).



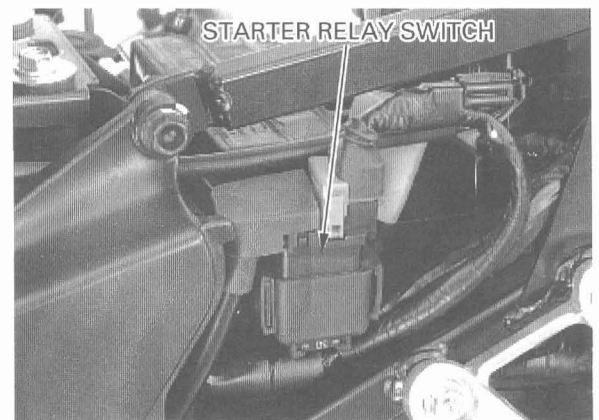
## STARTER RELAY SWITCH

### OPERATION INSPECTION

Remove the seat cowl (page 2-5).

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.

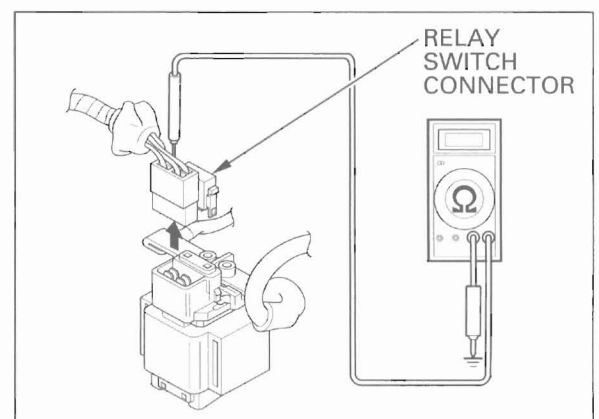
If the switch "CLICK" is not heard, inspect the relay switch using the procedure below.



### 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).

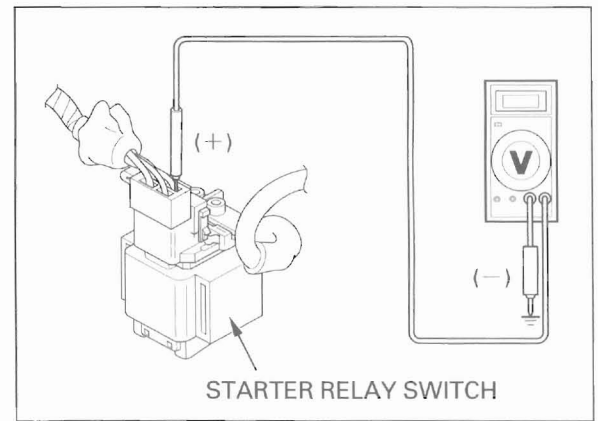


### VOLTAGE INSPECTION

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.



STARTER RELAY SWITCH

### CONTINUITY INSPECTION

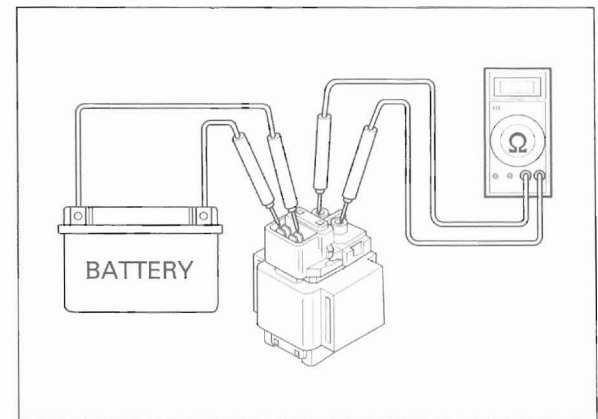
Disconnect the starter relay connector and cables.

Connect an ohmmeter to the starter relay switch large terminals.

Connect a fully charged 12 V battery to the starter relay switch connector terminals (Yellow/Red and Green/Red).

Check for continuity between the starter relay switch terminals.

There should be continuity while 12 V battery is connected to the starter relay switch connector terminals and should be no continuity when the battery is disconnected.

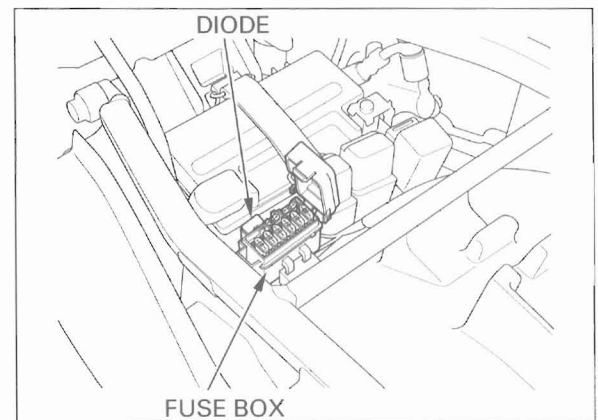


## DIODE

### REMOVAL

Remove the seat (page 2-2).

Open the fuse box and remove the diode.



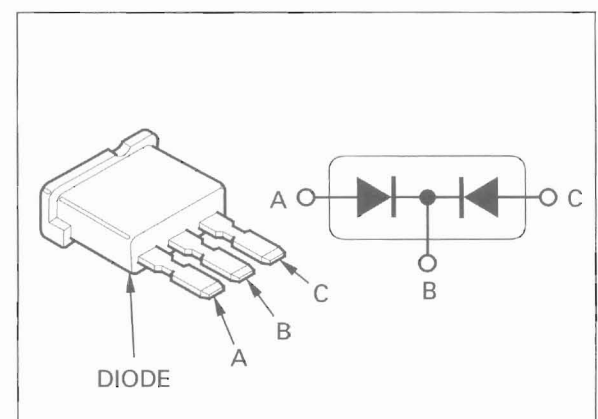
### INSPECTION

Check for continuity with an ohmmeter.

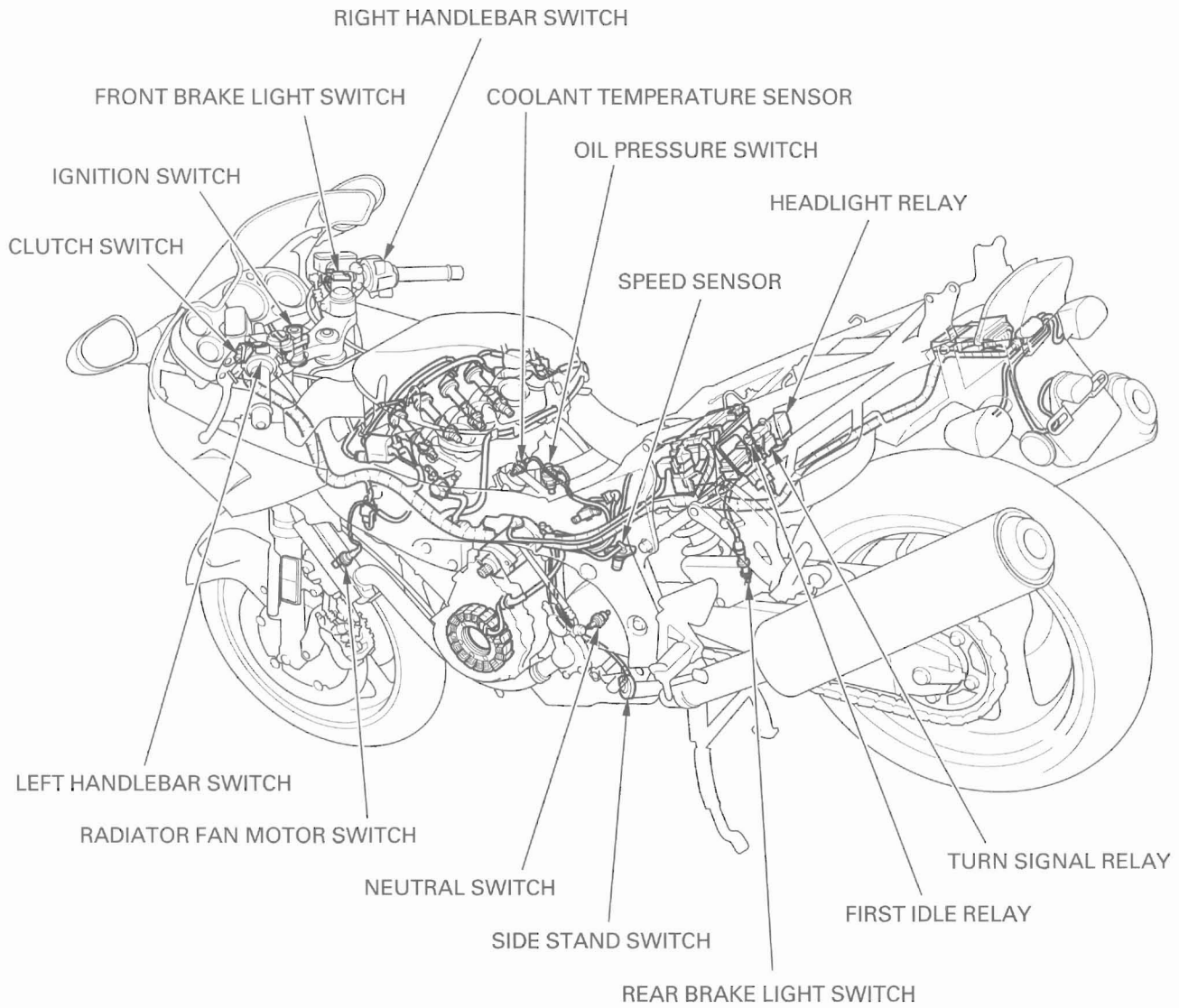
**Normal direction:** Continuity  
**Reverse direction:** No continuity

### INSTALLATION

Install the diode in the reverse order of removal.



SYSTEM LOCATION



# 19. LIGHTS/METERS/SWITCHES

SYSTEM LOCATION	19-0	FIRST IDLE SENSOR SYSTEM	19-15
SERVICE INFORMATION	19-1	OIL PRESSURE SWITCH	19-16
TROUBLESHOOTING	19-3	FUEL LEVEL SENSOR/RESERVE SENSOR	19-17
HEADLIGHT	19-4	IGNITION SWITCH	19-19
TURN SIGNAL	19-5	HANDLEBAR SWITCHES	19-20
LICENSE LIGHT	19-7	BRAKE LIGHT SWITCH	19-21
TAIL/BRAKE LIGHT	19-7	CLUTCH SWITCH	19-21
COMBINATION METER	19-8	NEUTRAL SWITCH	19-21
SPEEDOMETER/SPEED SENSOR	19-10	SIDE STAND SWITCH	19-22
TACHOMETER	19-12	HORN	19-23
COOLANT TEMPERATURE GAUGE/SENSOR	19-13	TURN SIGNAL RELAY	19-23
COOLING FAN MOTOR SWITCH	19-15		

## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

- *A halogen headlight bulb becomes very hot while the headlight is ON, and remains hot for a while after it is turned OFF. Be sure to let it cool down before servicing.*
- *Use an electric heating element to heat the water/coolant mixture for the fan motor switch inspection. Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.*

- Note the following when replacing the halogen headlight bulb.
  - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
  - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
  - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes are used throughout this section.

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

# LIGHTS/METERS/SWITCHES

## SPECIFICATIONS

ITEM		SPECIFICATIONS	
Bulbs	Headlight	High beam	12V – 55W
		Low beam	12V – 55W
	Brake/tail light		12V – 32/3CP × 2
	Front turn signal/running light		12V – 32/3CP × 2
	Rear turn signal light		12V – 32CP × 2
	License light		12V – 4CP
	Instrument light		12V – 1.7W × 4
	Turn signal indicator		12V – 3W × 2
	High beam indicator		12V – 3W
	Neutral indicator		12V – 3W
	Oil pressure indicator		12V – 3W
	Side stand indicator		12V – 3W
Fuse	Main fuse		30A
	Sub fuse		20A × 1, 10A × 5
Fan motor switch	Start to close (ON)		208 – 216 °F (98 – 102 °C)
	Stop to open		199 – 207 °F (93 – 97 °C)
Coolant temperature sensor resistance (68°F/20°C)		45 – 60 Ω	

## 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 switch mounting bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	ALOC bolt
Side stand bracket bolt	54 N·m (5.5 kgf·m , 40 lbf·ft)	ALOC bolt
Ignition switch mounting bolt	25 N·m (2.5 kgf·m , 18 lbf·ft)	
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
Oil pressure switch wire terminal screw	2 N·m (0.2 kgf·m , 1.4 lbf·ft)	



# TROUBLESHOOTING

## SPEED SENSOR/SPEEDOMETER

The odometer/trip meter operate normally, but the speedometer does not operate

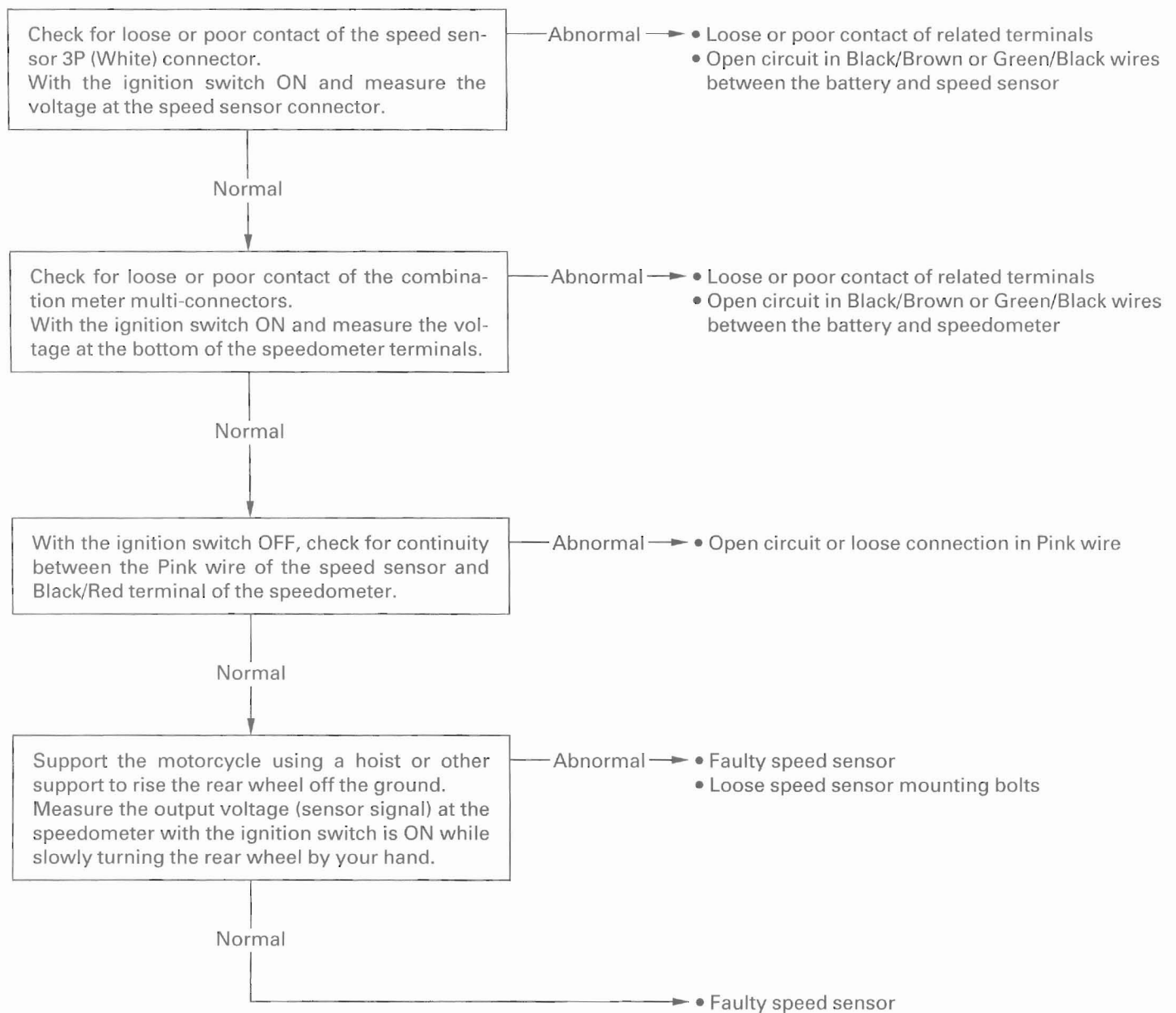
- Faulty speedometer

The speedometer operate normally, but the odometer/trip meter does not operate

- Faulty odometer/trip meter

The speedometer operate is abnormal

- Check for the following before diagnosing.
  - Blown main or sub fuses
  - Loose or corroded terminals of the connectors
  - Discharged battery



## HEADLIGHT

### BULB REPLACEMENT

**▲WARNING**

*A halogen headlight bulb becomes very hot while the headlight is ON, and remains hot for a while after it is turned OFF. Be sure to let it cool down before servicing.*

Remove the upper cowl covers (page 2-8).

Remove the headlight bulb connectors.  
Remove the dust cover.

Unhook the bulb retainer and remove the headlight bulb/socket.

**CAUTION:**

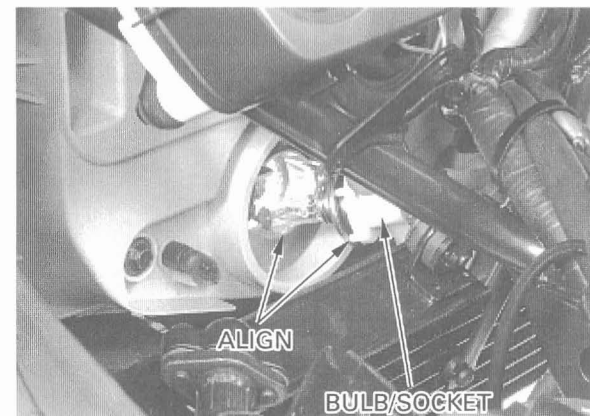
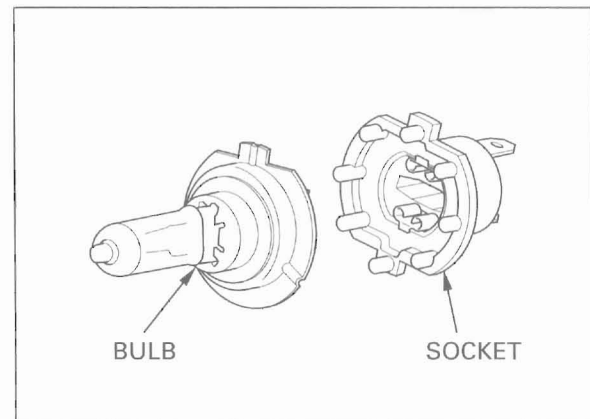
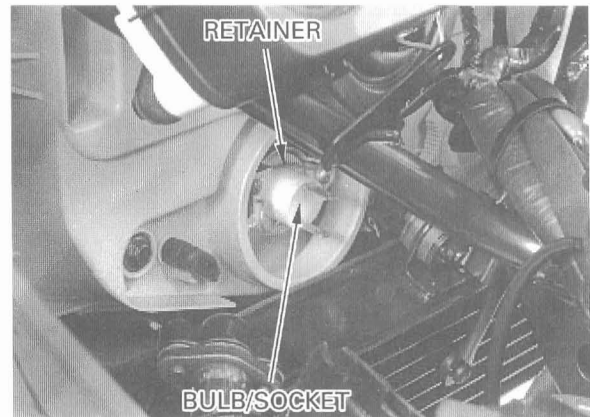
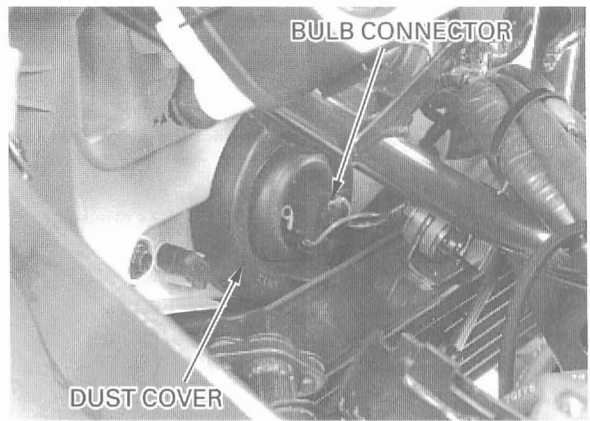
*Avoid touching halogen headlight bulbs. Finger prints can create hot spots that cause a bulb to break.*

If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.

Remove the headlight bulb from the socket.

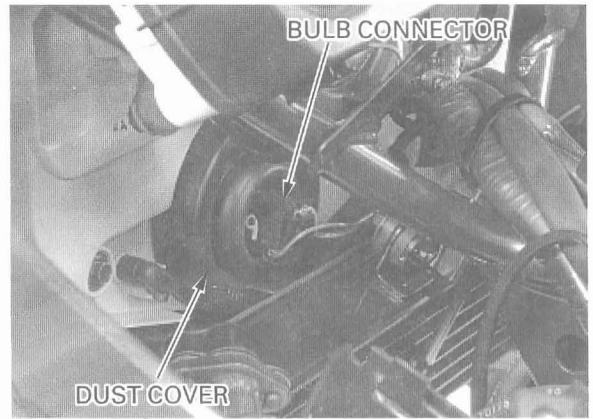
Install a new bulb into the socket.

Install the headlight bulb/socket aligning its tabs with the groove in the headlight unit.



Install the dust cover tightly against the headlight with its "TOP" mark facing up.

Connect the headlight connectors.

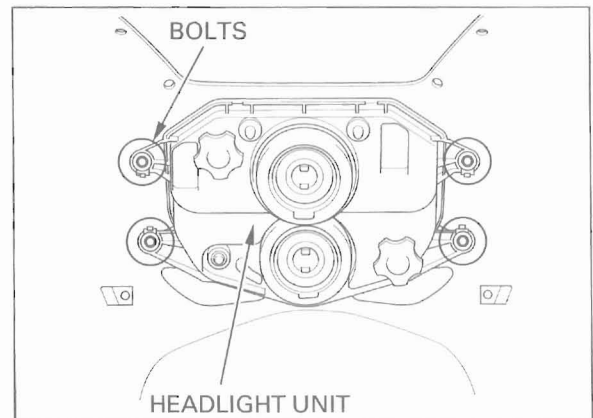


### REMOVAL/INSTALLATION

Remove the upper cowl (page 2-11).

Remove the four bolts and headlight unit.

Installation is in the reverse order of removal.



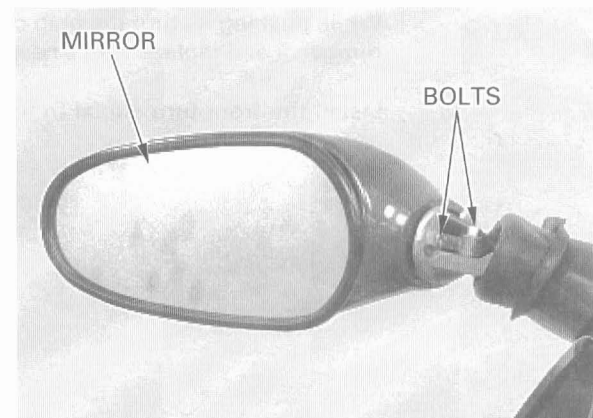
## TURN SIGNAL

### BULB REPLACEMENT

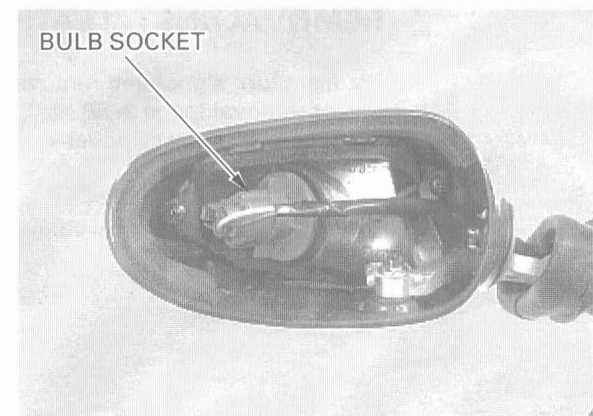
#### Front

Remove the rearview mirror boot.

Remove the bolts and mirror.



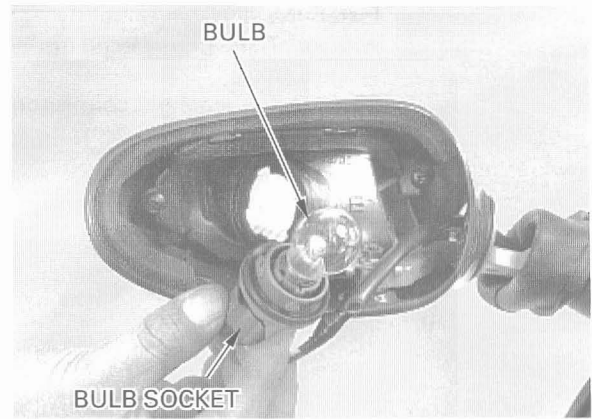
Turn the bulb socket counterclockwise and remove it.



## LIGHTS/METERS/SWITCHES

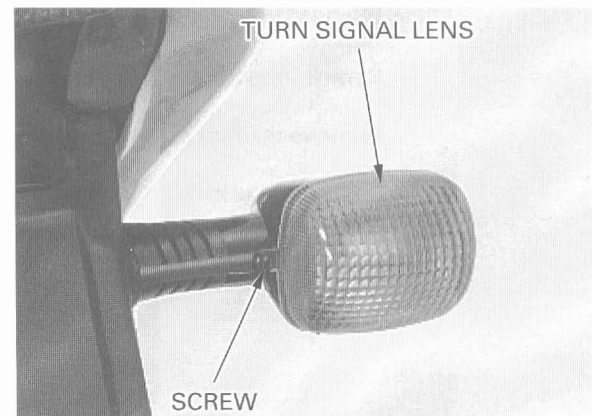
While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.

Install the front turn signal in the reverse order of removal.



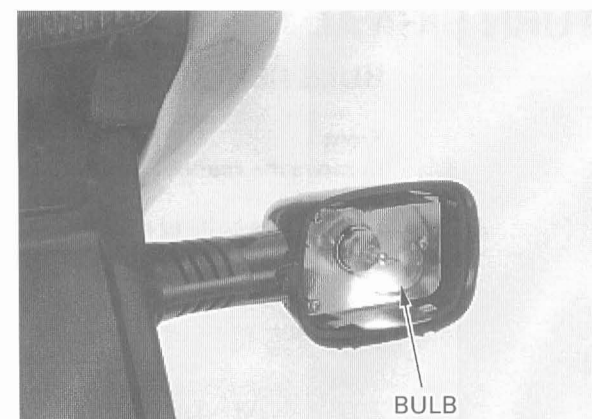
### Rear

Remove the screw and turn signal lens.



While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.

Install the front turn signal in the reverse order of removal.



## REMOVAL/INSTALLATION

For front turn signal unit removal, refer to rearview mirror removal (page 2-12).

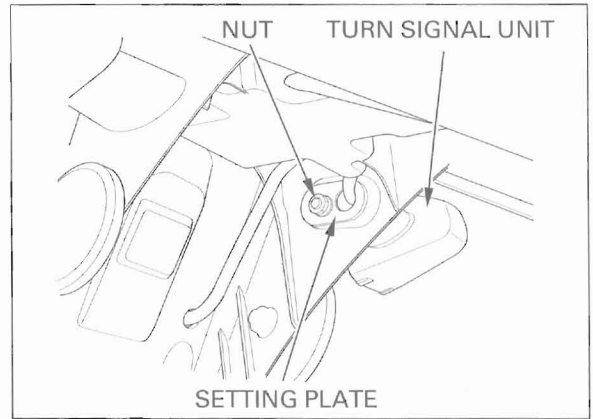
For rear turn signal removal, remove the seat (page 2-2).

Disconnect the turn signal connectors.



Remove the nut and setting plate.  
Release the turn signal wire and remove the turn signal unit.

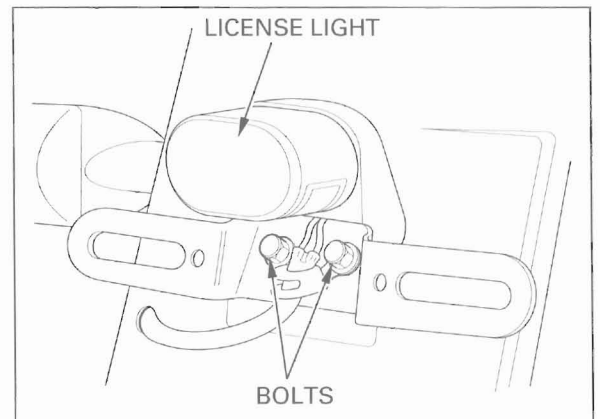
*Route the turn signal wire properly (page 1-21).* Install the turn signal unit in the reverse order of removal.



## LICENSE LIGHT

### BULB REPLACEMENT

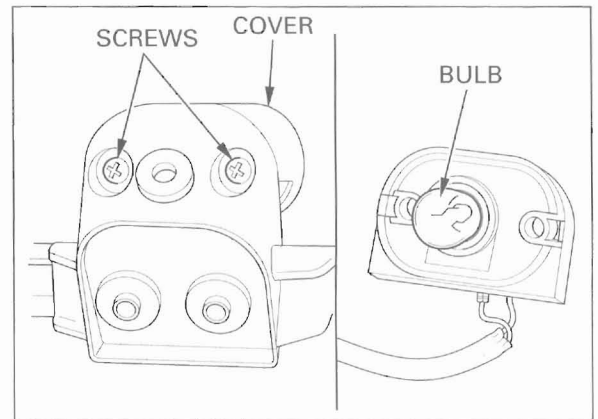
Remove the license light bracket bolts and the license light assembly.



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.



## TAIL/BRAKE LIGHT

### BULB REPLACEMENT

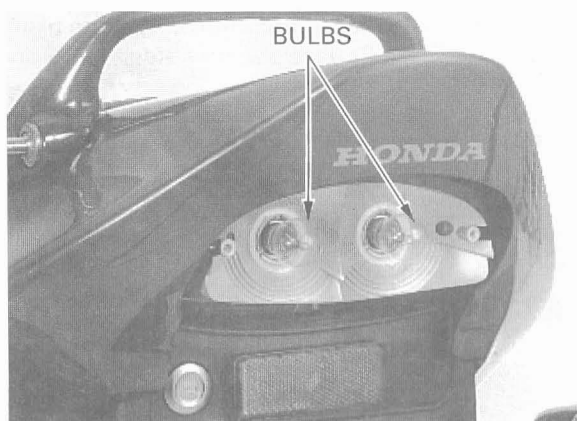
Remove the screws and tail/brake light lens.



## LIGHTS/METERS/SWITCHES

While pushing in, turn the bulbs counterclockwise to remove it and replace with new ones.

Install the tail/brake light lens in the reverse order of removal.

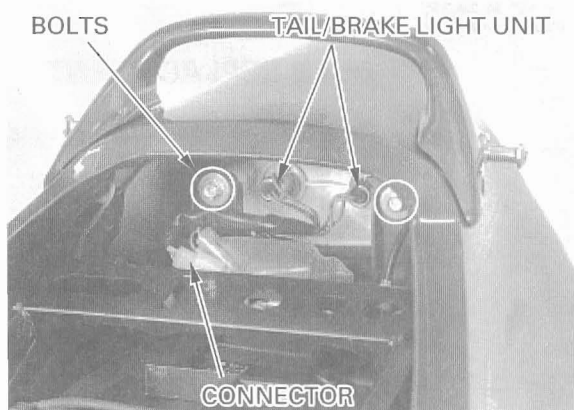


### REMOVAL/INSTALLATION

Remove the seat (page 2-2).

Disconnect the tail/brake light connector.  
Remove the bolts and tail/brake light unit.

Installation is in the reverse order of removal.



## COMBINATION METER

### BULB REPLACEMENT

Remove the windscreen (page 2-11).

Pull the indicator lamp socket out of the combination meter.

Remove the bulb from the socket and replace it with a new one.

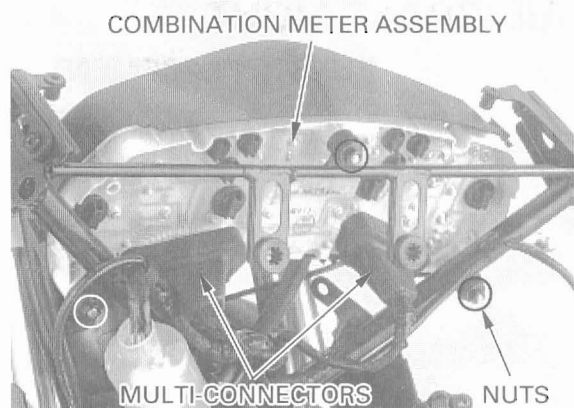


### REMOVAL

Remove the upper cowl (page 2-11).

Disconnect the combination meter multi-connectors.

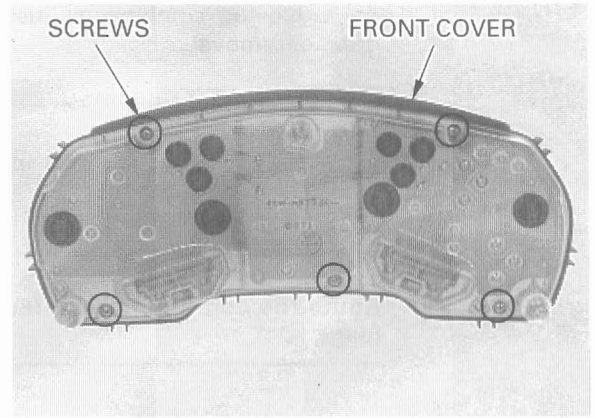
Remove the three mounting nuts and combination meter assembly.



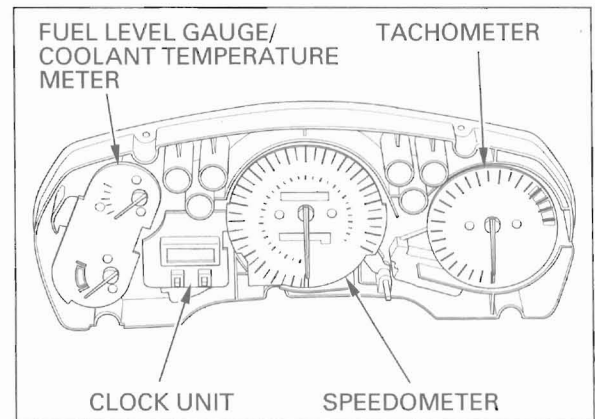
**DISASSEMBLY**

Remove the screws and front cover.

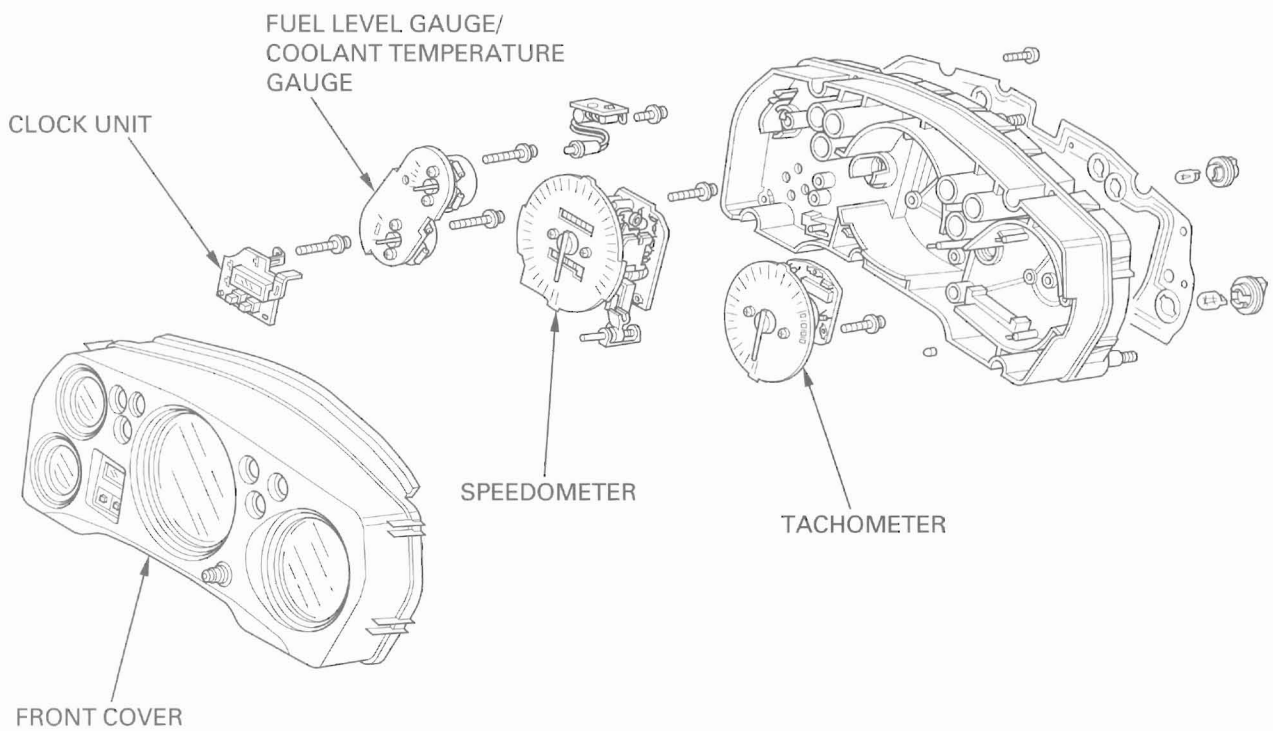
Remove the meter mounting screws.



Remove the speedometer, tachometer, fuel level gauge/coolant temperature meter and clock unit.



**ASSEMBLY**





## LIGHTS/METERS/SWITCHES

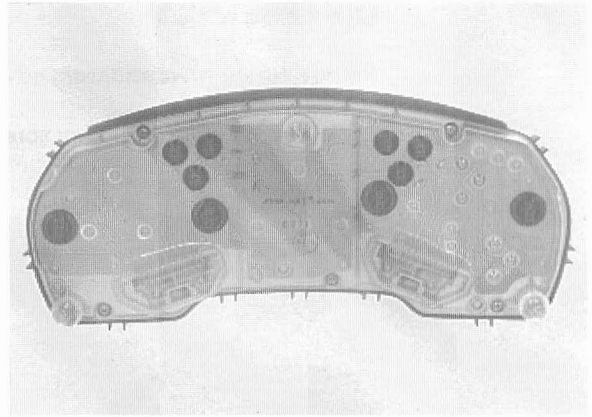
Assemble the combination meter in the reverse order of removal.

### INSTALLATION

Install the combination meter in the reverse order of removal.

#### NOTE:

Route the combination meter wire properly (page 1-21).



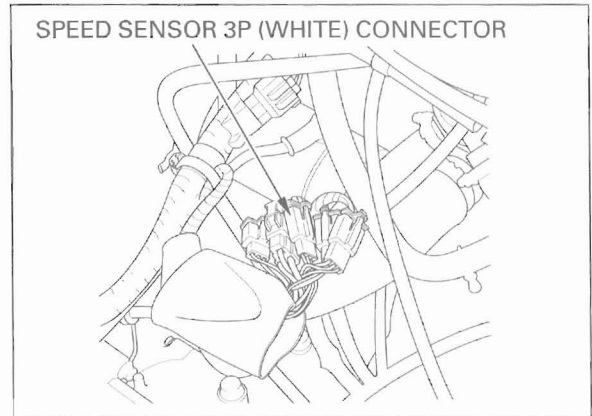
## SPEEDOMETER/SPEED SENSOR

### VOLTAGE INSPECTION

Remove the fuel tank (page 2-2).

Disconnect the speed sensor 3P (White) connector and check for loose or poor contact of the connector.

SPEED SENSOR 3P (WHITE) CONNECTOR



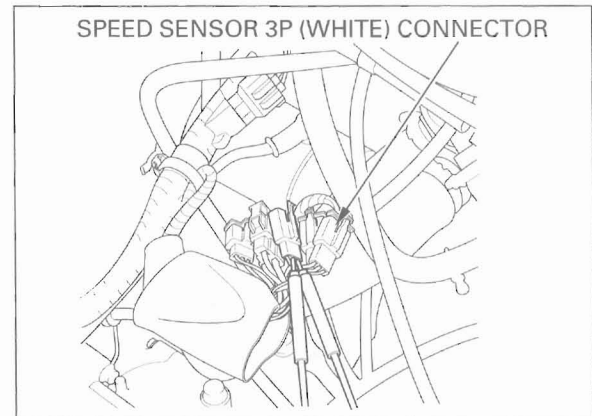
With the ignition switch is ON and measure the voltage at the 3P (White) connector of the wire harness side.

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

**Standard:** Battery voltage

If there is no voltage, replace and repair the wire harness.

SPEED SENSOR 3P (WHITE) CONNECTOR



Remove the upper cowl (page 2-11).

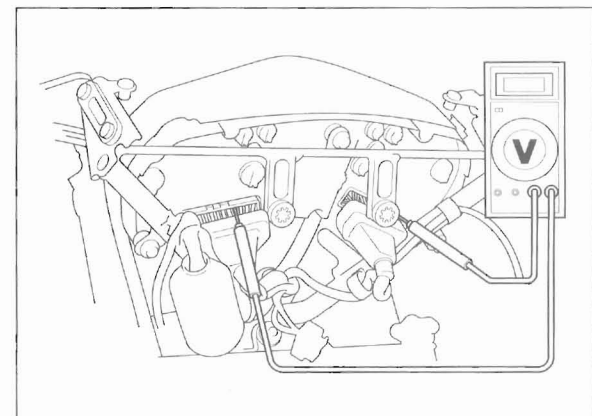
Check for loose or poor connection of the combination meter multi-connectors.

With the ignition switch is ON and measure the voltage at the bottom of the combination meter terminal.

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

**Standard:** Battery voltage

If there is no voltage, replace and repair the wire harness.





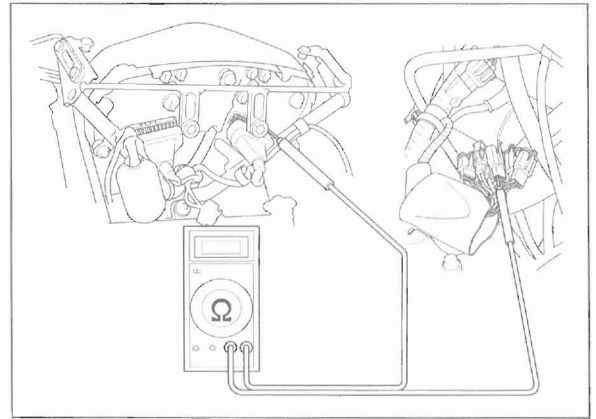
**OUTPUT SIGNAL INSPECTION**

Remove the upper cowl (page 2-7).

With the ignition switch is OFF, check for continuity of the Pink/Green wire between the speed sensor connector and combination meter terminal.

There should be continuity.

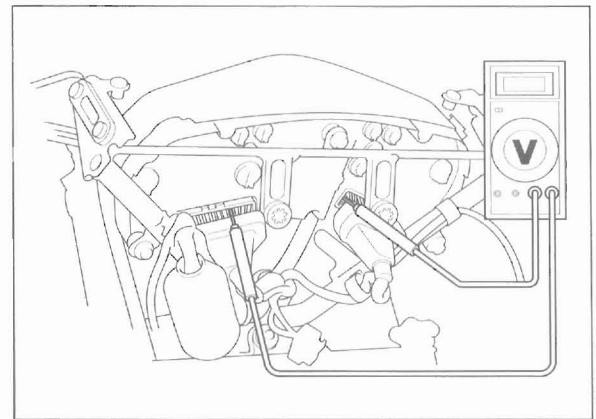
If there is no continuity, replace and repair the wire harness.



Connect the speed sensor 3P (White) connector. Measure the voltage at the combination meter terminals with the ignition switch is ON while slowly turning the rear wheel by hand.

**CONNECTION:** Pink (+) – Green/Black (–)  
**STANDARD:** Repeat 0 to 5V

If the measurement is out of specification, inspect the open circuit in wire harness.

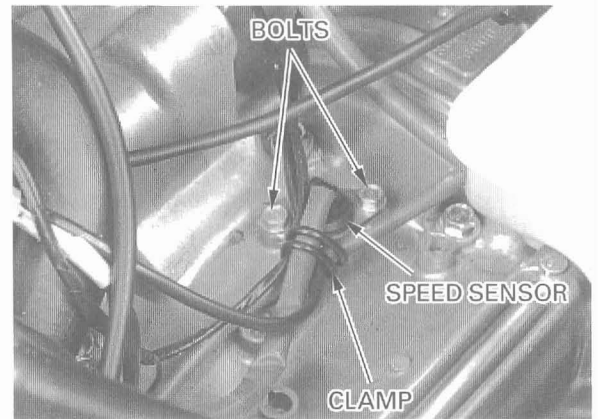


**REMOVAL/INSTALLATION**

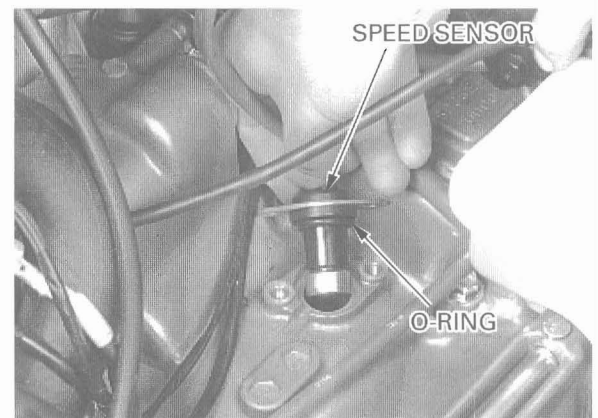
Remove the fuel tank (page 2-2).

Disconnect the speed sensor 3P (White) connector.

Release the speed sensor wire from the clamp. Remove the bolts and speed sensor.

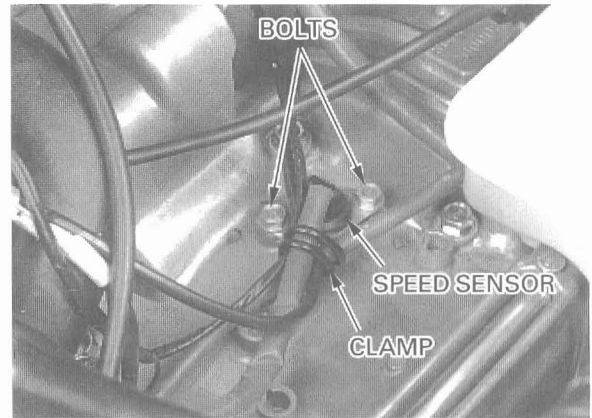


Check the O-ring is in good condition, replace if necessary. Install the speed sensor into the upper crankcase.

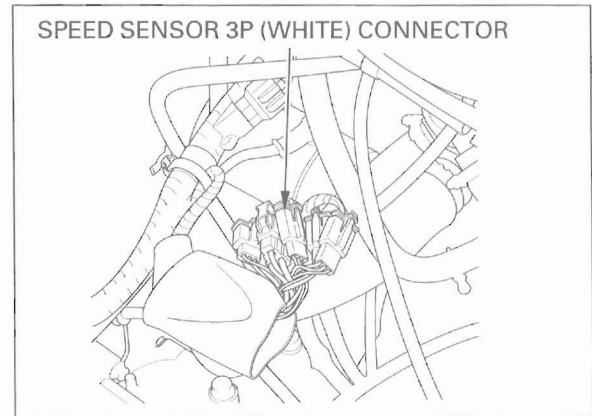


## LIGHTS/METERS/SWITCHES

Install and tighten the mounting bolts securely.  
Route the sensor wire and clamp it.



Connect the speed sensor 3P (White) connector.



## TACHOMETER

### INSPECTION

Remove the upper cowl (page 2-11).

Check for loose or poor contact terminals of the combination meter.

Connect the peak voltage adaptor to the tachometer Black/Yellow terminal and ground.

### TOOLS:

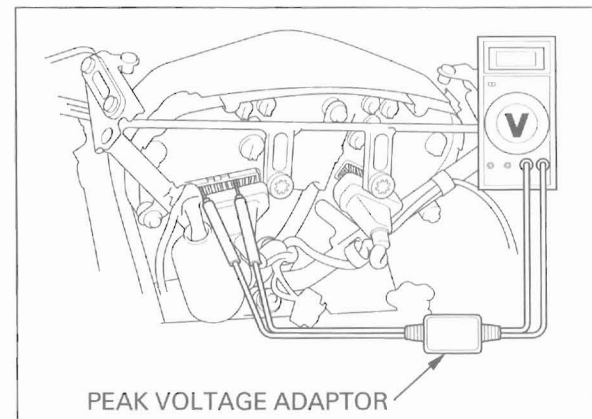
**Peak voltage tester (U.S.A only) or  
Peak voltage adaptor 07HGJ-0020100  
with Commercially available digital multimeter  
(impedance 10 M $\Omega$  /DCV minimum)**

**CONNECTION:** Yellow/Green (+) and Ground (-)

Start the engine and measure the tachometer input voltage.

**PEAK VOLTAGE:** 10.5 V minimum

If the value is normal, replace the tachometer.  
If the measured value is below 10.5 V, replace the ignition control module (ICM).



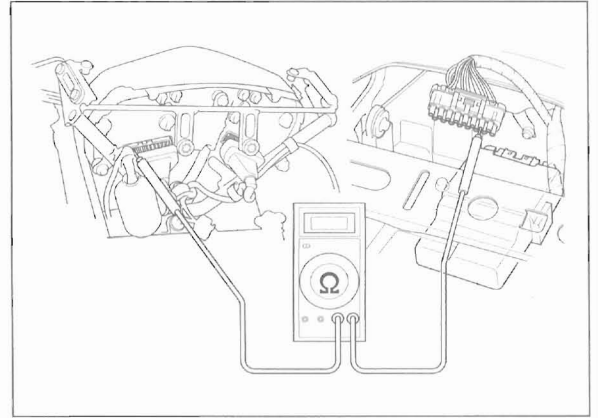
If the value is 0 V, perform the following:  
Remove the seat (page 2-2) and disconnect the ICM multi-connector.

Check for continuity between the tachometer terminal and the ICM multi-connector Yellow/Green terminals.

If there is no continuity, check the wire harness for an open circuit.

If there is continuity, replace the tachometer unit.

For tachometer replacement, see 19-8; combination meter disassembly and assembly.



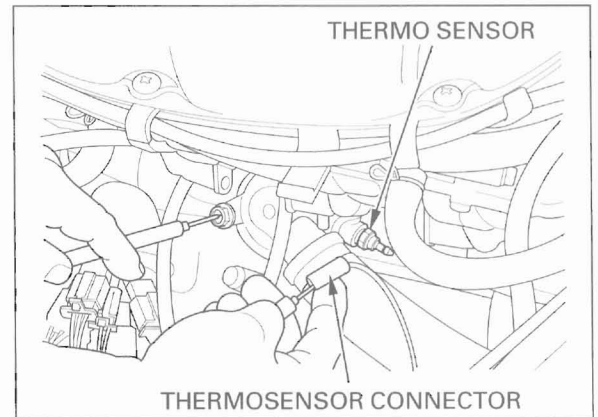
## COOLANT TEMPERATURE GAUGE/SENSOR

### INSPECTION

Remove the fuel tank (page 2-2).

Disconnect the thermo sensor wire connector from the sensor.

Ground the thermo sensor wire with a jumper wire.



Turn the ignition switch ON and check the coolant temperature gauge.

Disconnect the thermo sensor wire connector from the ground immediately if the gauge needle moves fully to H.

### CAUTION:

***Immediately disconnect the sensor wire connector from the ground when the needle moves to H (hot) to prevent damage to the gauge.***

If the needle moves, check the thermo sensor unit.

If the needle does not move, check for voltage between the sensor wire connector and ground.

If the voltage is measured, the coolant temperature gauge unit is faulty.

If there is no voltage, check for voltage between the Black/Brown and Green/Blue wire terminals.

If there is no voltage between the terminal, coolant temperature gauge unit is faulty.

If a voltage is measured, check the wire harness.



**THERMO SENSOR UNIT INSPECTION**

**▲WARNING**

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

Drain the coolant (page 6-3).

Disconnect the wire connector from the coolant temperature sensor and remove the sensor.

Suspend the thermo sensor in a pan of coolant (50–50 mixture) an electric heating element and measure the resistance through the sensor as the coolant heats up.

**NOTE:**

- Soak the thermo sensor in coolant up to its threads with at least 40 mm (1.57 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 thermo sensor touch the pan.

Temperature	68°F (80°C)	248°F (120°C)
Resistance	45 – 60 Ω	10 – 20 Ω

Replace the sensor if it is out of specification by more than 10% at any temperature listed.

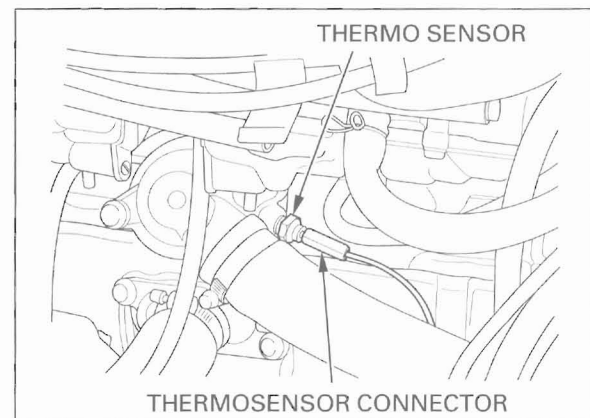
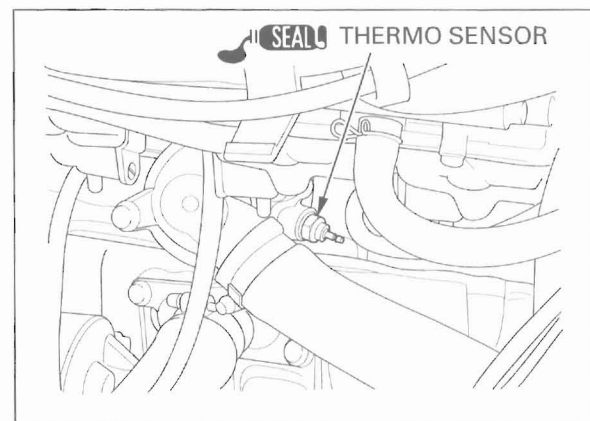
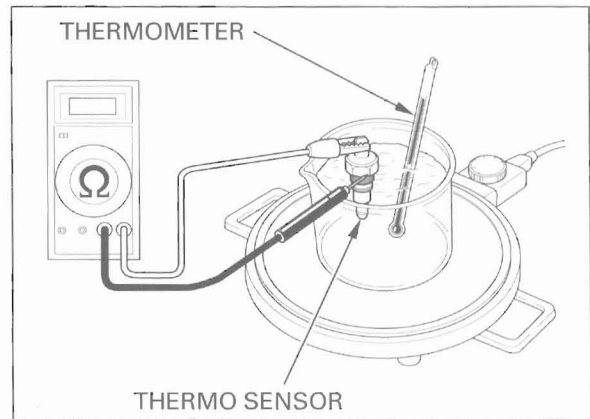
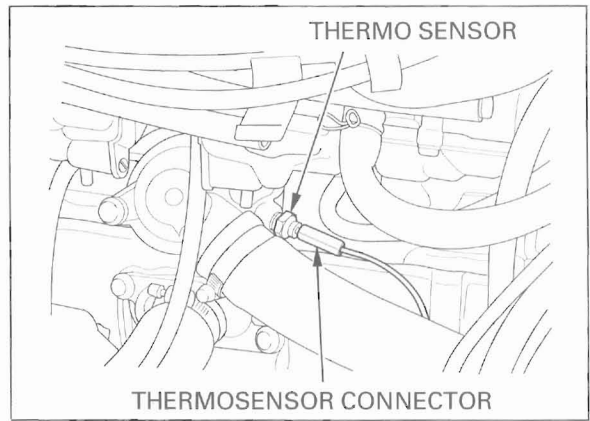
Apply sealant to the thermo sensor threads. Do not apply sealant to the sensor head.

Install and tighten the thermo sensor.

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

Connect the thermo sensor connector.

Fill the system and bleed the air (page 6-4).



## 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.

If it is OK, replace the fan motor switch.

If the motor does not start, check for voltage between the fan motor switch connector and ground.

If battery voltage is measured, replace fan motor.

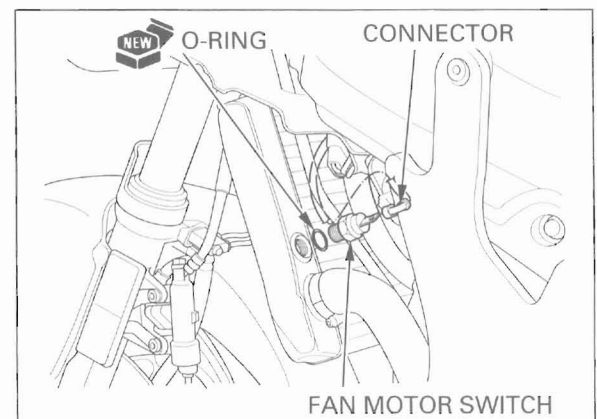
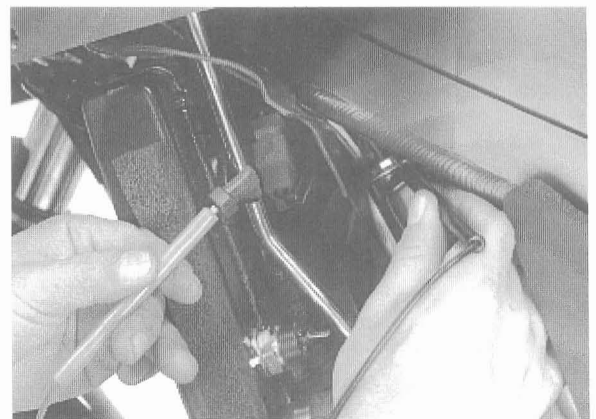
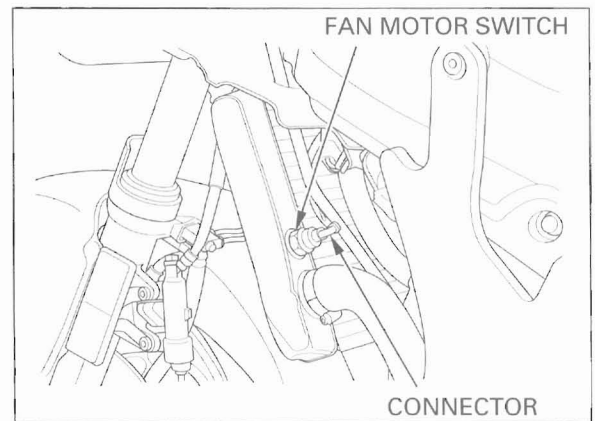
If there is no battery voltage, check for poor connection of the connector or broken wire harness.

### REMOVAL/INSTALLATION

Disconnect the fan motor switch connector and remove the switch.

Install a new O-ring onto the fan motor switch. Install and tighten the fan motor switch.

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



## FIRST IDLE SENSOR SYSTEM

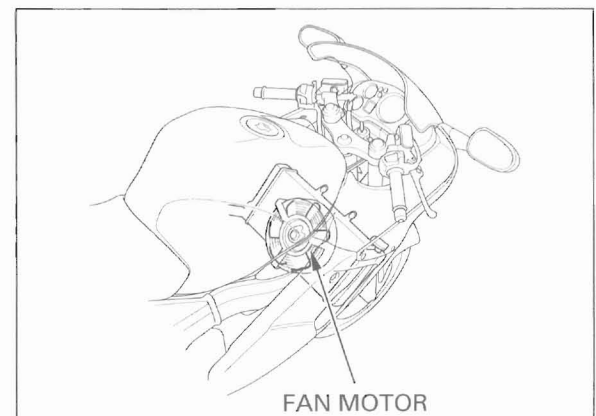
### NOTE:

The cooling fan motor will run automatically after 10 seconds, if the engine revs above 2,000 rpm with the transmission in neutral.

### SYSTEM INSPECTION

Shift the transmission is in neutral, and start the engine and let is idle.

Make sure that the cooling fan runs after about 10 seconds.



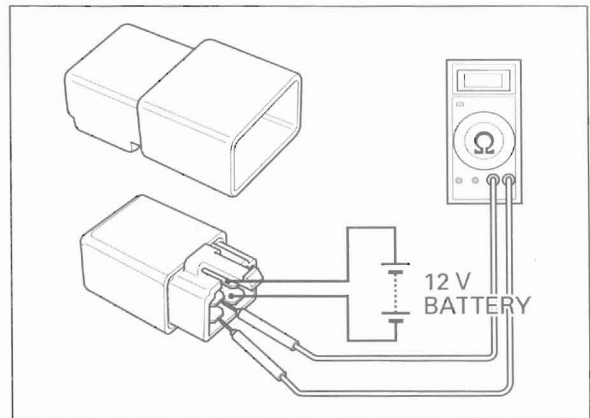
## LIGHTS/METERS/SWITCHES

If the cooling fan does not run, check cooling fan motor function.  
The cooling fan is OK, remove the first idle relay.



Connect an ohmmeter to the first idle relay Black (+) and Green (-) terminals.  
Connect a fully charged 12 V battery to the first idle relay terminals (Black/White and Green/Orange).  
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.

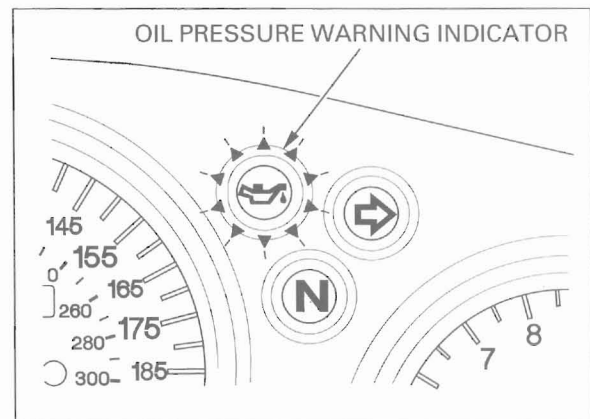


## OIL PRESSURE SWITCH

### 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.

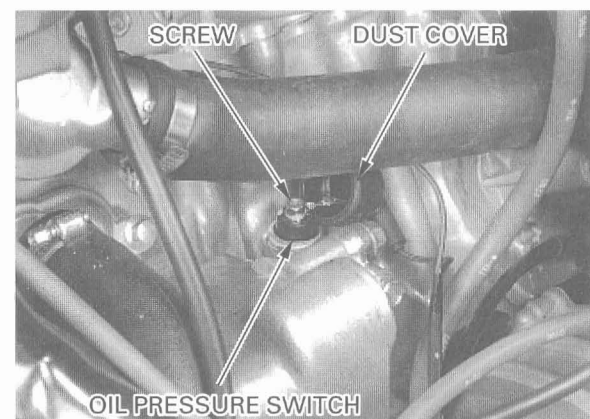


If the indicator does not come on, inspect as follows:

Remove the lower cowl (page 2-7).

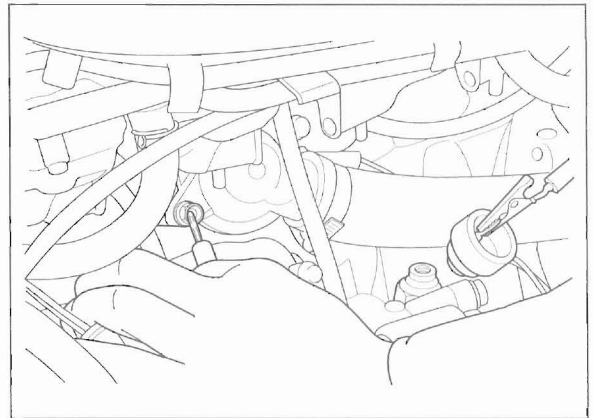
Remove the dust cover.

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 come on, check the sub-fuse (10A) and wires for a loose connection or an open circuit.

Start the engine and make sure that the light goes out.  
 If the light does not go out, check the oil pressure (page 4-3).  
 If the oil pressure is normal, replace the oil pressure switch (page 4-3).



## FUEL LEVEL SENSOR/RESERVE SENSOR

### REMOVAL

Remove the fuel tank (page 2-2).

Remove the nuts and fuel level sensor/reserve sensor unit from the fuel tank.

### CAUTION:

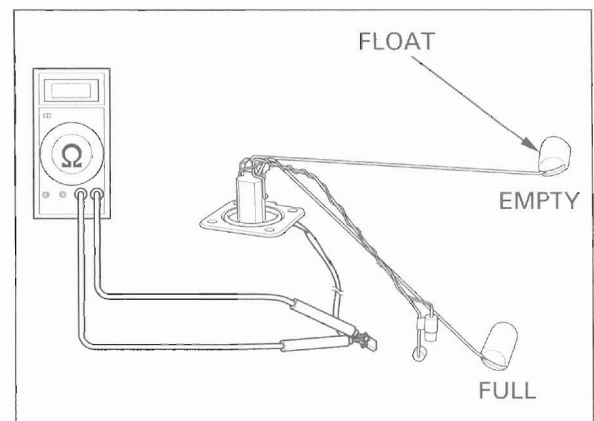
*Be careful not to damage the float arm.*



### FUEL SENSOR INSPECTION

Connect the ohmmeter to the fuel sensor Gray/Black and Green/Black connector.  
 Inspect the resistance of the float at the top and bottom positions.

	FULL	EMPTY
Resistance (68 °F/20 °C)	4–10 Ω	81–91 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 indication.

If the fuel meter does not indicate properly, check for open or short circuit in wire harness.  
 If the wire harness is good, replace the fuel meter with a new one (page 19-8).





### FUEL RESERVE SENSOR INSPECTION

Connect the fuel reserve sensor 3P (Black) connector.

Turn the ignition switch is ON and make sure the fuel reserve indicator comes ON.

If the fuel reserve indicator does not indicate properly, check for the following:



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

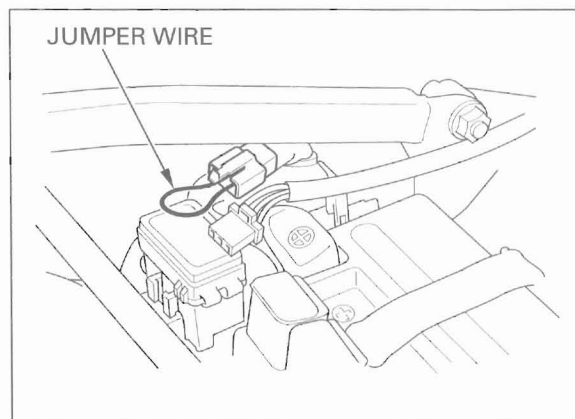
Short the wire harness side connector Brown/Black and Green/Black terminals with a jumper wire.

Turn the ignition switch is ON and make sure the fuel reserve indicator comes ON.

If the indicator come ON, replace the fuel unit.

If the indicator still does not comes ON, check for open or short circuit in wire harness.

If the wire harness is OK, replace the fuel meter unit (page 19-8).



### INSTALLATION

Check that the O-ring is in good condition.

Install the fuel unit into the fuel tank.

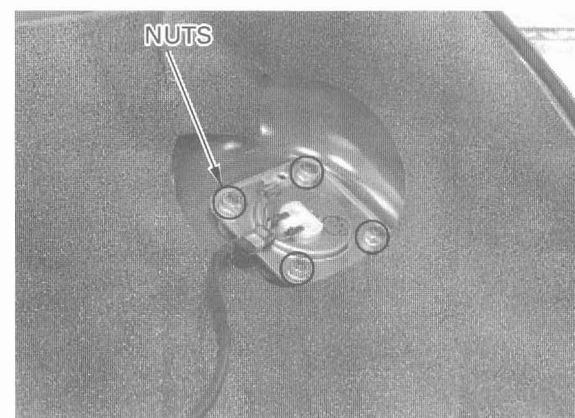
#### CAUTION:

***Be careful not to damage the float arm.***



Install and tighten the nuts securely.

Install the fuel tank (page 2-2).





# IGNITION SWITCH

## INSPECTION

Remove the upper cowl (page 2-11).

Disconnect the ignition switch wire 3P (White) connectors.

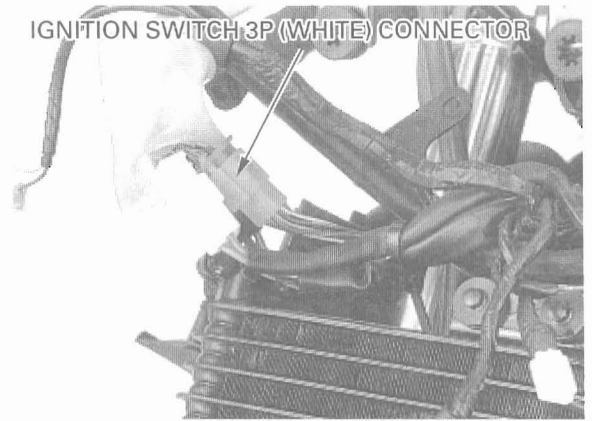
Check for continuity between the wire terminals of the ignition switch connector in each switch position.

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/BI	R	—

IGNITION SWITCH 3P (WHITE) CONNECTOR



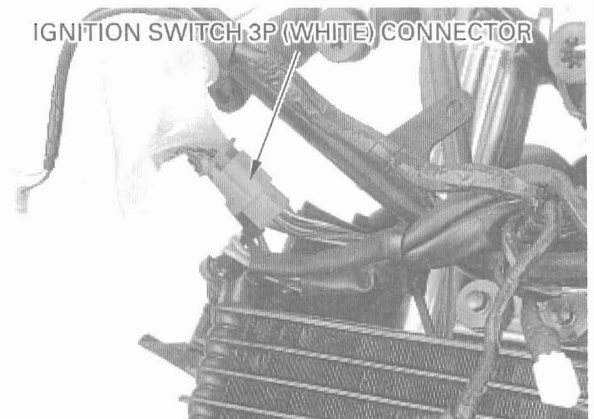
IGNITION SWITCH



## REMOVAL/INSTALLATION

Disconnect the ignition switch wire 3P (White) connector.

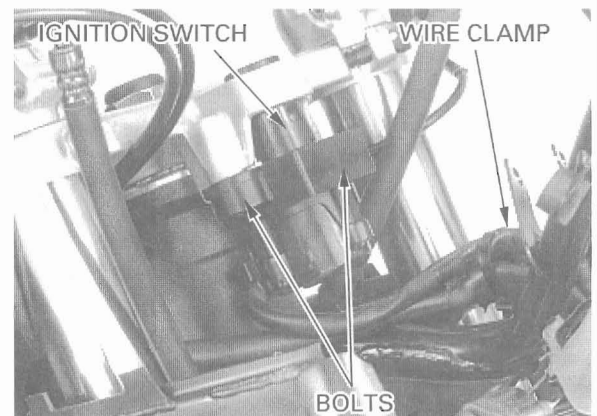
IGNITION SWITCH 3P (WHITE) CONNECTOR



Remove the wire clamp.  
Remove the bolts and ignition switch.

Install the ignition switch in the reverse order of removal.

IGNITION SWITCH WIRE CLAMP



# HANDLEBAR SWITCHES

Disconnect the handlebar switch connectors.

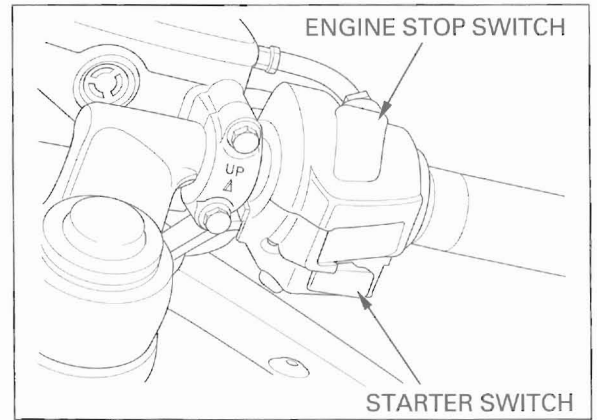
Check for continuity between the wire terminals of the handlebar switch connector. Continuity should exist between the color coded wire terminals as follows:

### ENGINE STOP SWITCH

	IG	BAT2
OFF		
RUN	○	○
COLOR	BI	BI/W

### STARTER SWITCH

	ST	BAT2	HL
FREE		○	○
PUSH	○	○	
COLOR	BI/W	Y/R	B/R



### TURN SIGNAL SWITCH

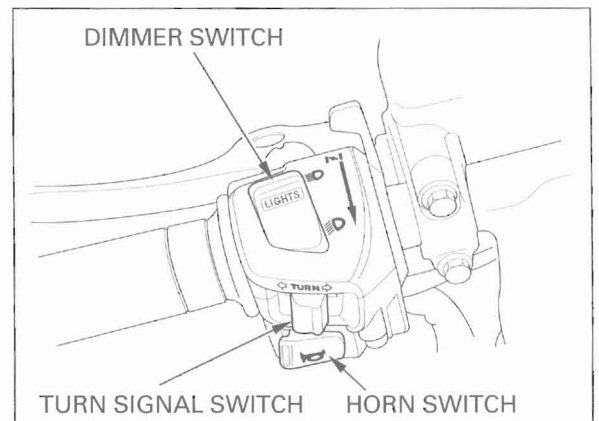
	W	R	L	BAT3	OR	PL
R	○	○		○		○
N				○	○	○
L	○		○	○	○	
COLOR	GR	SB	O	B/Br	SB/W	O/W

### DIMMER SWITCH

	HL	Lo	Hi
Lo	○	○	
(N)	○	○	○
Hi	○		○
COLOR	Bu/W	W	Bu

### HORN SWITCH

	Ho	BAT3
FREE		
PUSH	○	○
COLOR	Bu/G	BI



## 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.

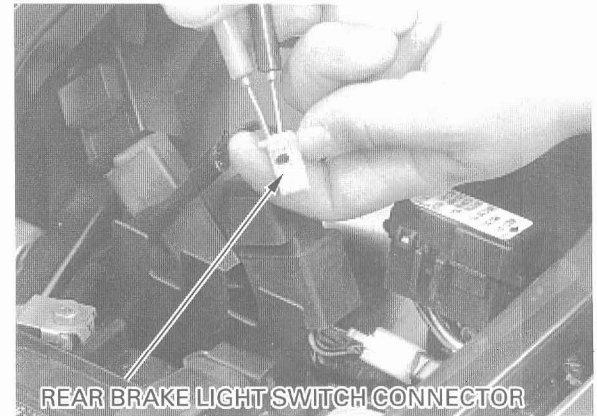


### REAR

Remove the seat (page 2-2).  
Remove the relays and fuse box from the rear fender (page 2-16).

Disconnect the rear brake light switch connector and check for continuity between the terminals.

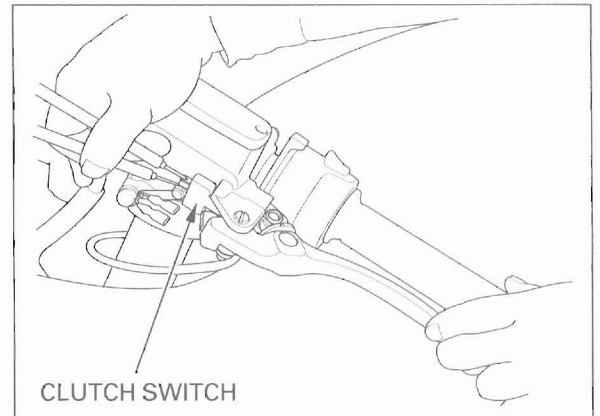
There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal is released.



## CLUTCH SWITCH

Disconnect the clutch switch connectors.

There should be continuity with the clutch lever applied, and there should be no continuity with the clutch lever is released.



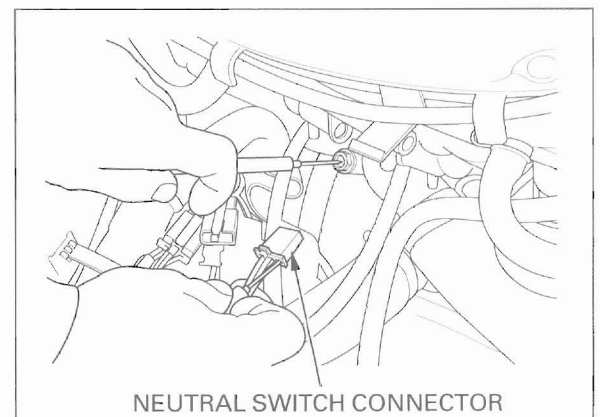
## NEUTRAL SWITCH

Remove the fuel tank (page 2-2).

Disconnect the engine sub-harness 3P (Black) 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.

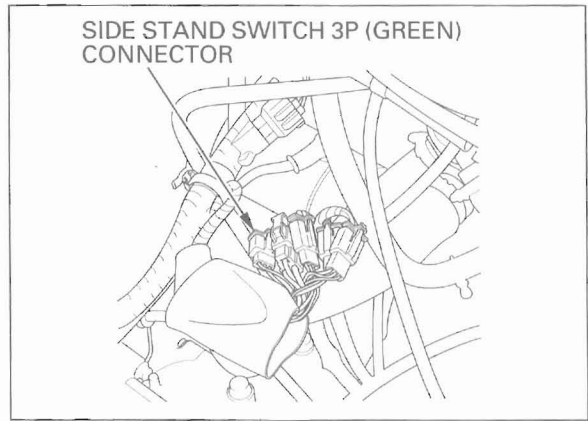


# SIDE STAND SWITCH

## INSPECTION

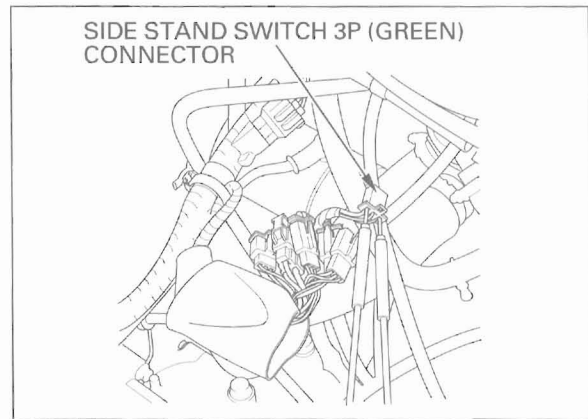
Remove the fuel tank (page 2-2).

Disconnect the side stand switch 3P (Green) connector.



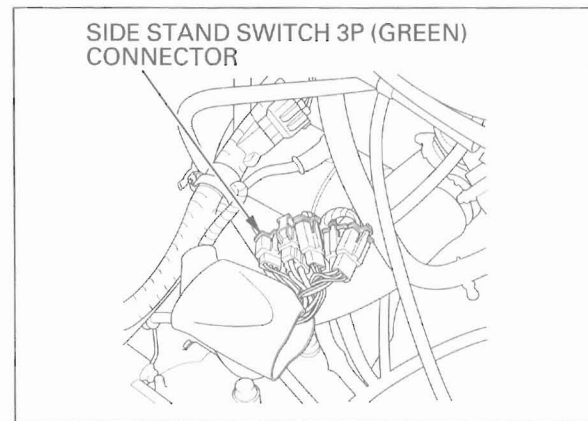
Check for continuity between the wire terminals of the side stand switch connector. Continuity should exist between the color coded wire terminals as follows:

	G/W	Y/BI	G
Side stand down		○ — ○	○
Side stand up	○ —		○

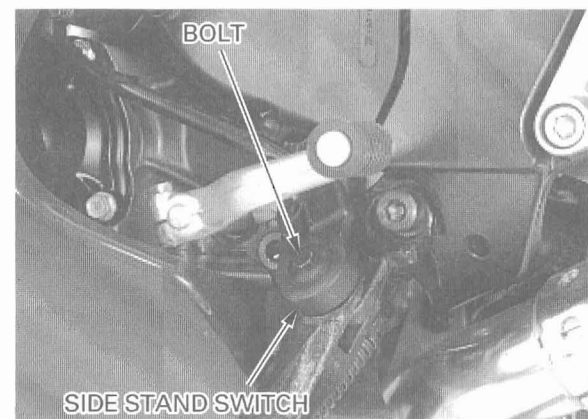


## REMOVAL

Disconnect the side stand switch 3P (Green) connector.

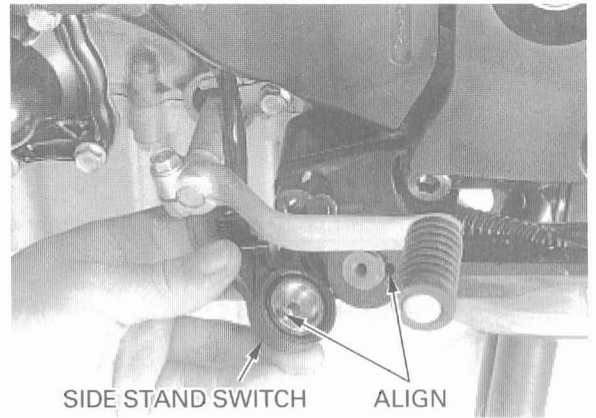


Remove the bolt and side stand switch.



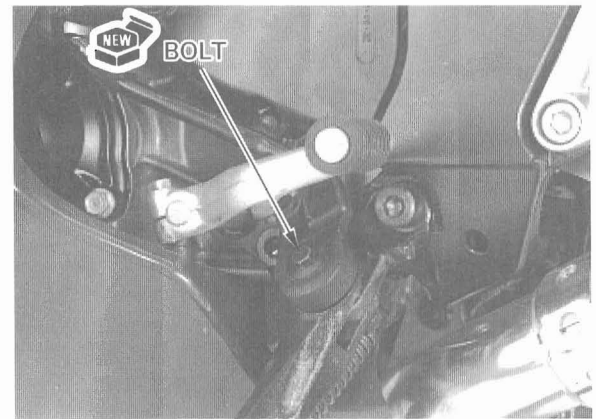
## INSTALLATION

Install the side stand switch by aligning the switch pin with the side stand hole and the switch groove with the return spring holding pin.



Secure the side stand switch with a new bolt.

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

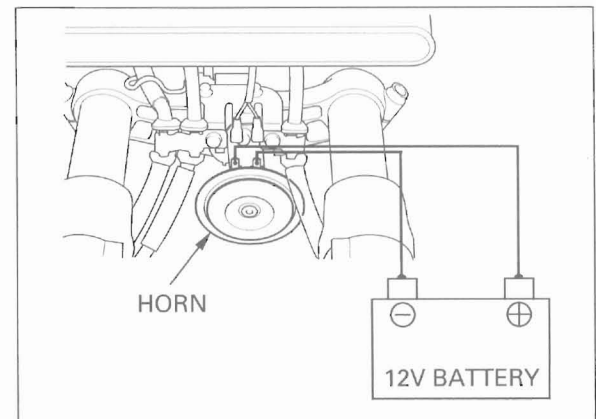


## HORN

Disconnect the wire connectors from the horn.

Connect the 12 V battery to the horn terminal directly.

The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



## TURN SIGNAL RELAY

### INSPECTION

Check the following:

- Battery condition
- Burned out bulb or non-specified wattage
- Burned fuse
- Ignition switch and turn signal switch function
- Loose connectors

If the above items are all normal, check the following:

Disconnect the turn signal connectors from the relay.



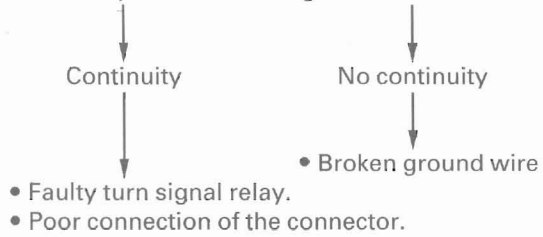
## LIGHTS/METERS/SWITCHES

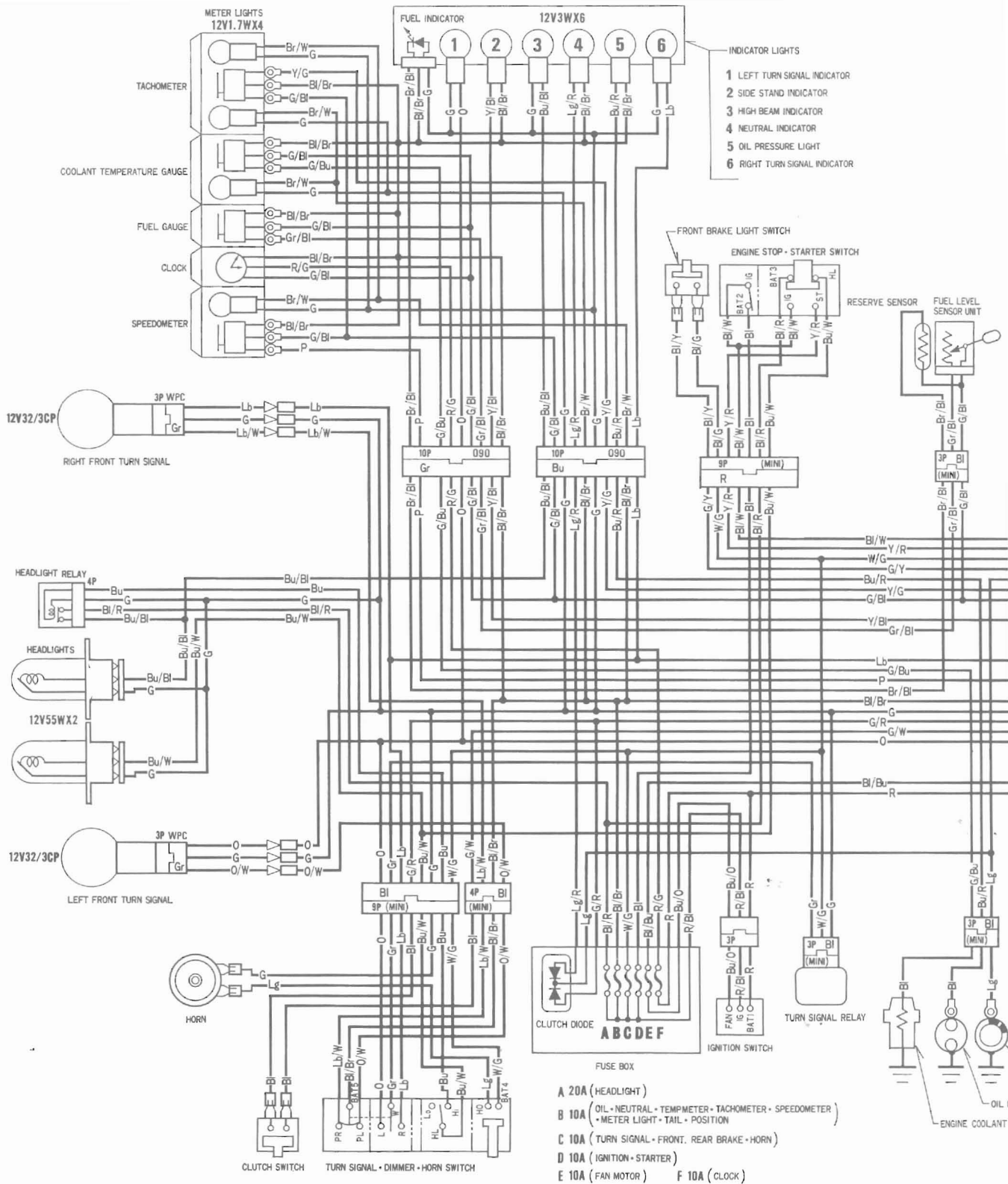
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1. Short the black and gray terminals of the turn signal relay connector with a jumper wire. Start the engine and check the turn signal light by turning the switch ON.



2. Check for continuity between the green terminal of the relay connector and ground.

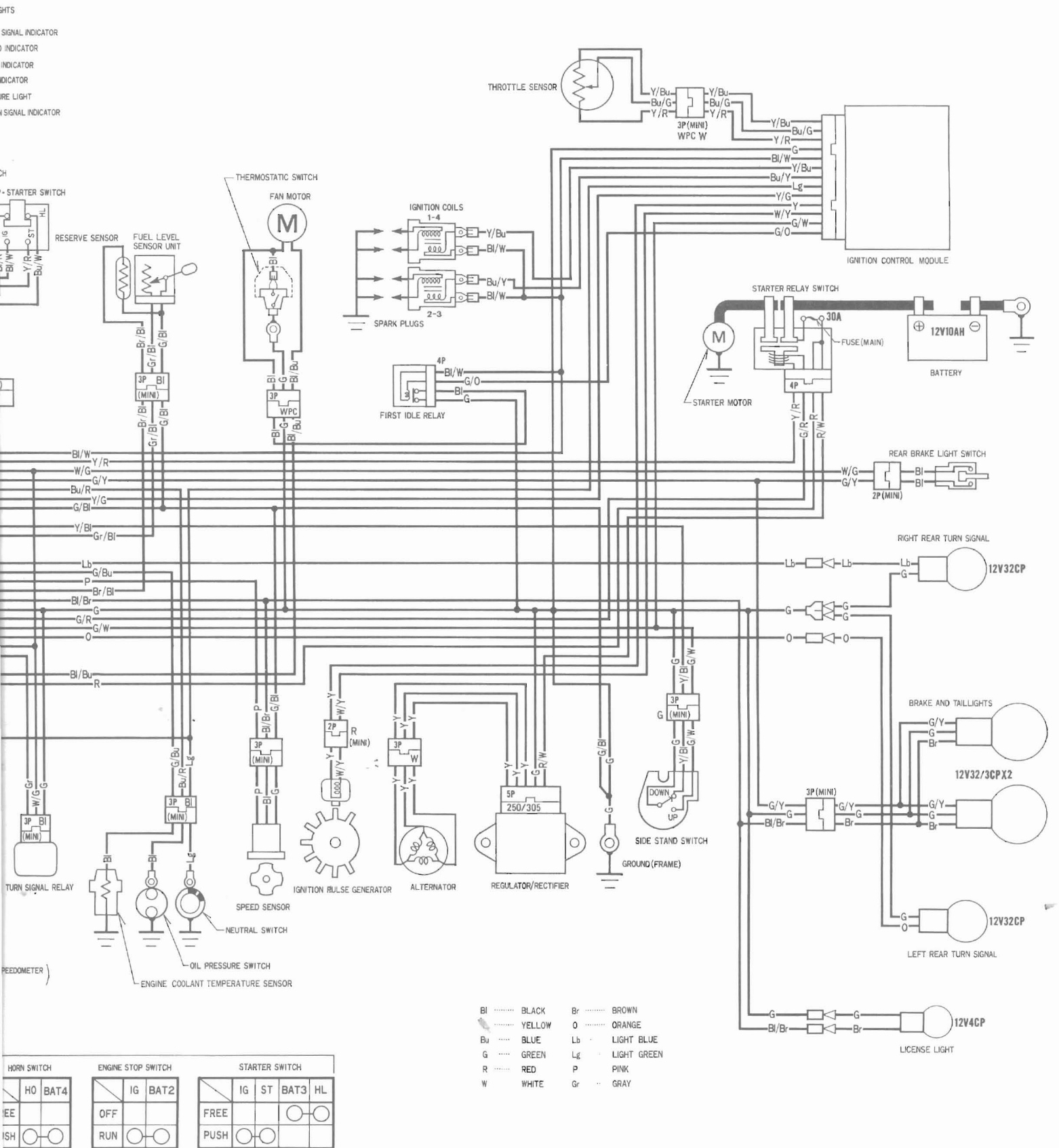




SWITCH CONTINUITY

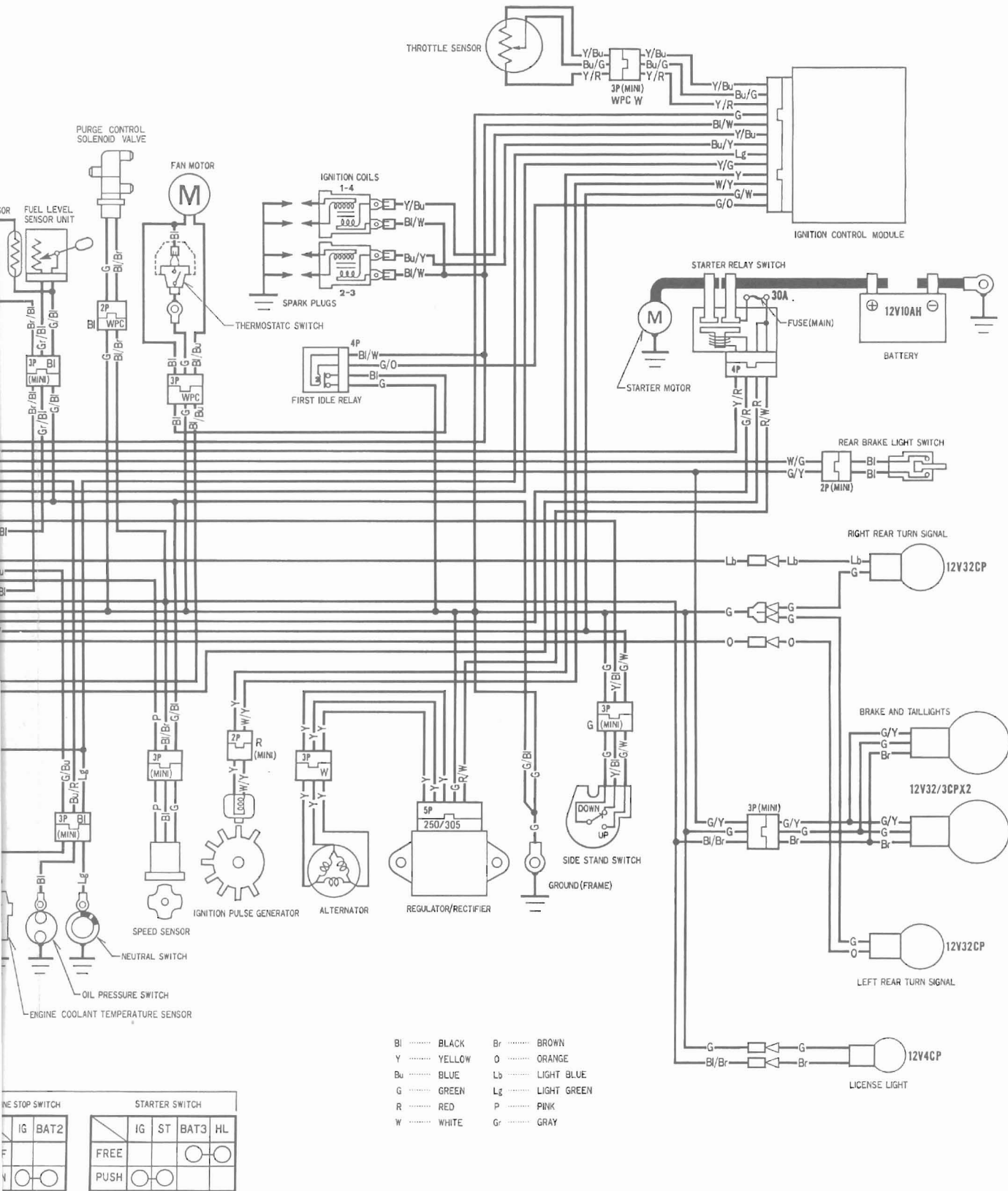
IGNITION SWITCH			TURN SIGNAL SWITCH				DIMMER SWITCH			HORN SWITCH		ENGINE STOP SWITCH				
	FAN	IG	BAT1	W	R	L	BAT5	PR	PL	HL	Lo	Hi	HO	BAT4	IG	BAT2
ON	○	○	○	R	○	○	○	○	○	Lo	○	○	FREE	○	○	○
OFF				N	○	○	○	○	○	(N)	○	○	PUSH	○	○	○
LOCK				L	○	○	○	○	○	Hi	○	○		○	○	○

# 20. WIRING DIAGRAMS



0030Z-MAT-6700

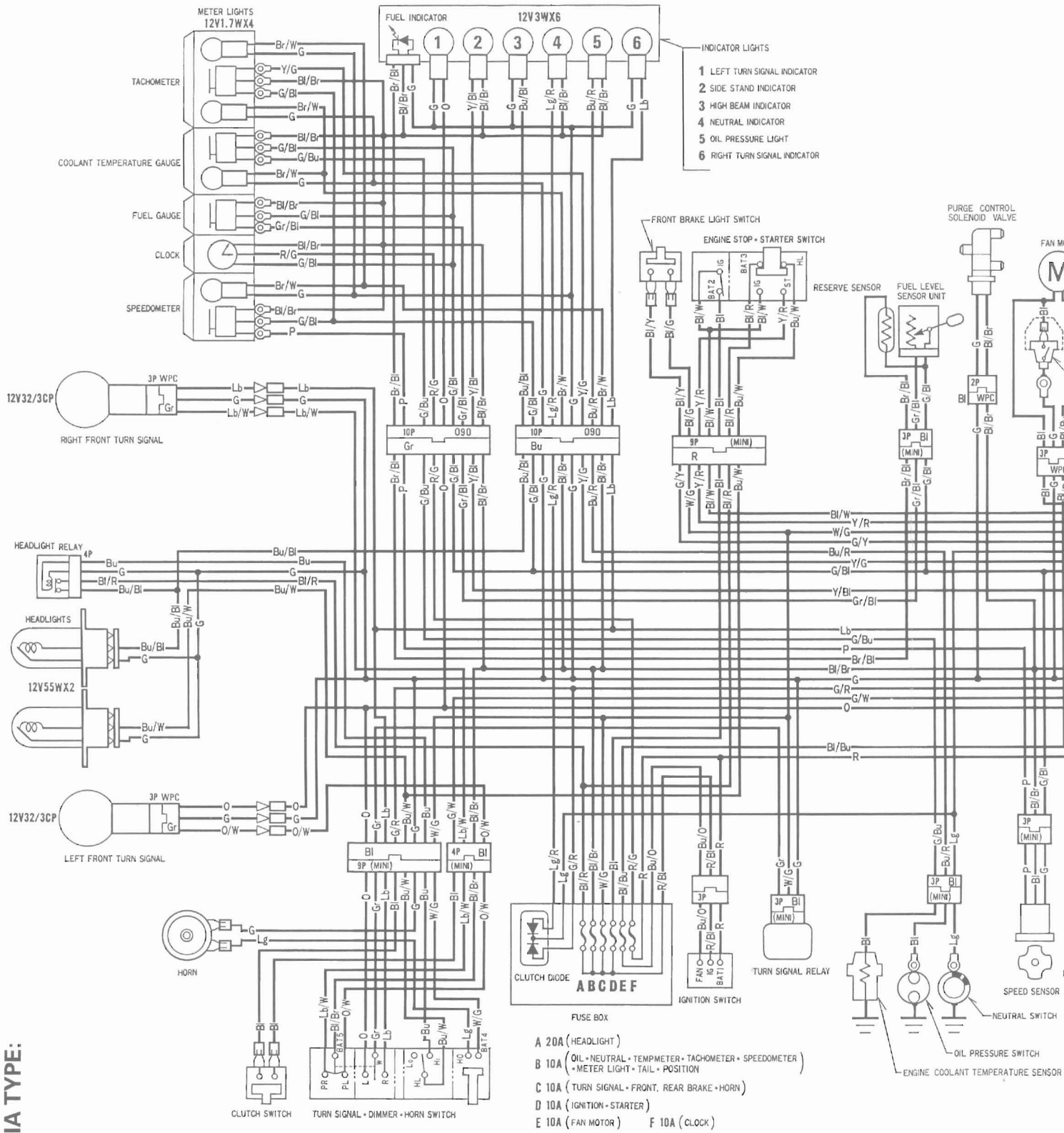




**0030Z-MAT-7500**

# WIRING DIAGRAMS

CALIFORNIA TYPE:



— SWITCH CONTINUITY —

IGNITION SWITCH		TURN SIGNAL SWITCH				DIMMER SWITCH			HORN SWITCH		ENGINE STOP SWITCH		STARTER SWITCH						
	FAN	IG	BATI	W	R	L	BATS	PR	PL	HL	Lo	Hi	FREE	IG	BAT2	FREE	IG	ST	BAT
ON	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
OFF				○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
LOCK				○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

# 21. TECHNICAL FEATURES

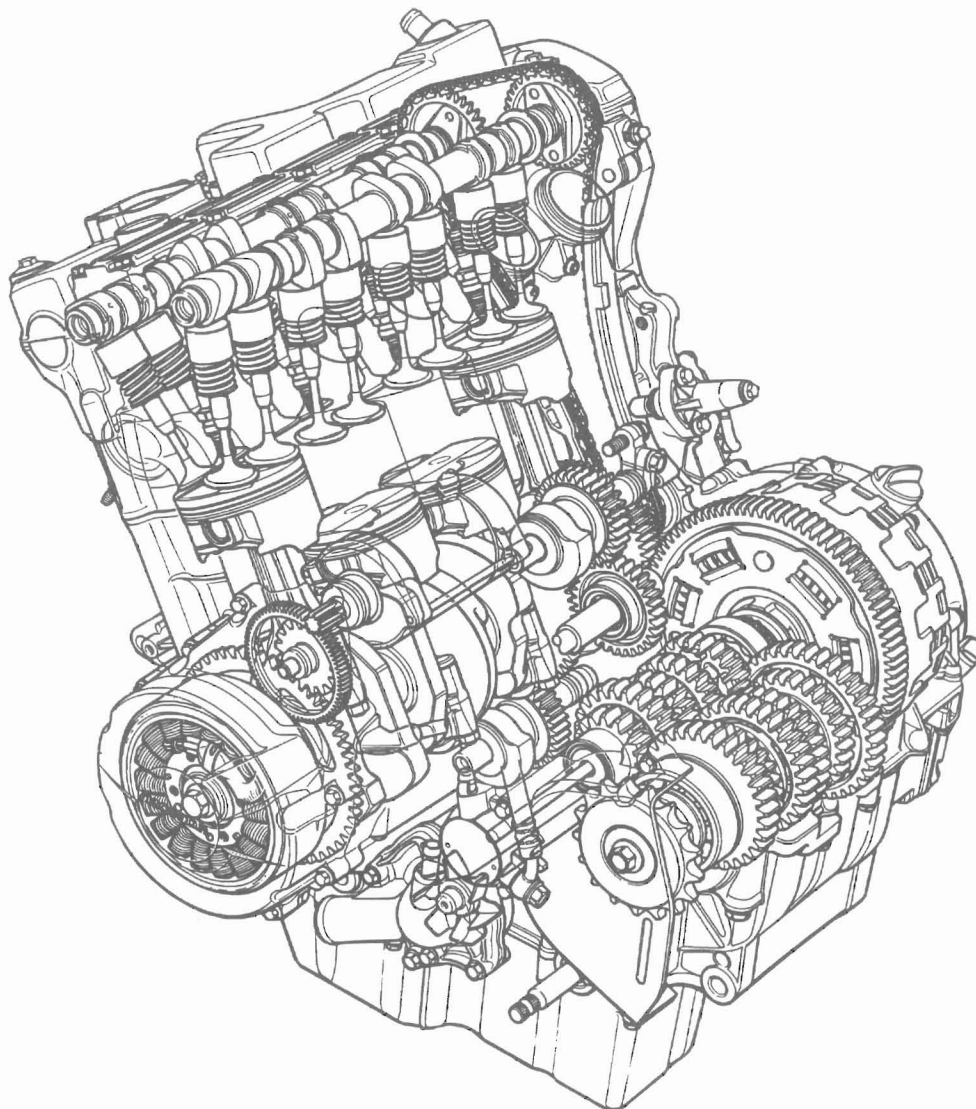
DUAL SHAFT BALANCER

21-1

LBS (LINKED BRAKING SYSTEM)

21-3

## DUAL SHAFT BALANCER

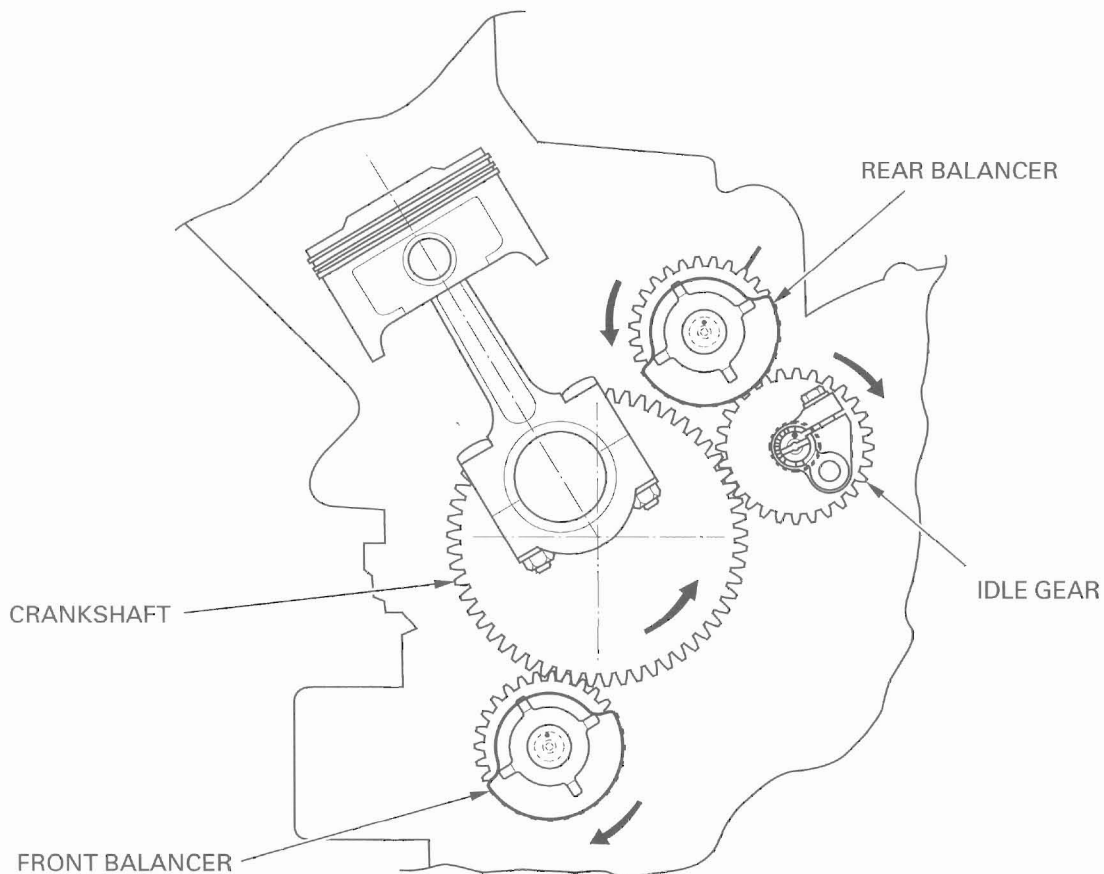


For the high power output engine, elimination of annoying high frequency engine vibration is very important. The engine uses a dual shaft balancer in that two balancer shafts are rotated in the opposite direction to each other through an idle gear, eliminating the engine's secondary vibration. The location of the two balancer shafts was carefully determined in relation to the engine mount through computer analysis. This dual shaft balancer plus a rigid engine mount combines to minimize high frequency engine vibration at high speed while ensuring safer, more responsive control.

21

## TECHNICAL FEATURES

### BALANCER LAYOUT



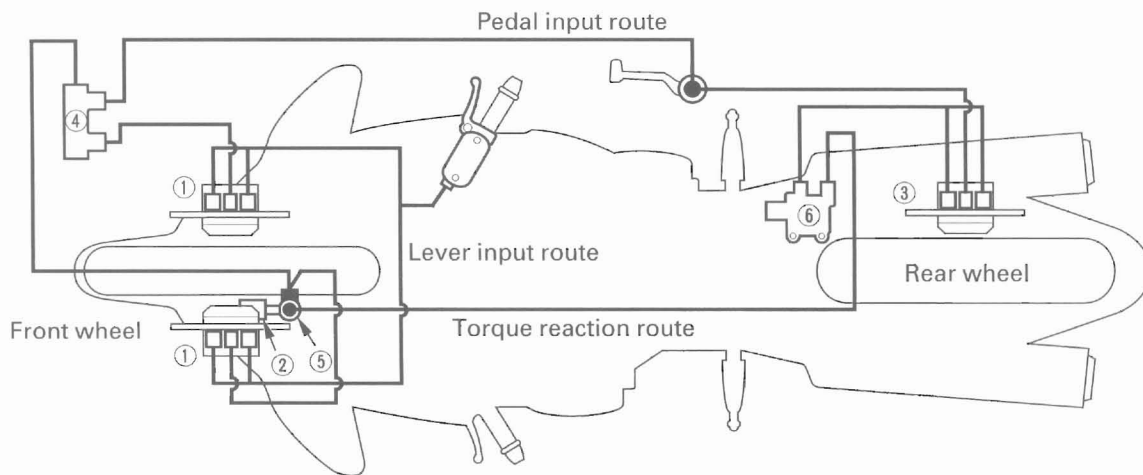
The first (front) balancer is located at the front of the crankshaft and is gear-driven in the opposite direction to the crankshaft. The second (rear) balancer is located above and behind the crankshaft where an idle gear causes it to rotate in the opposite direction to the first gear. The combination of these two shafts almost totally eliminates the effects of engine's secondary vibration and balancer's self-generated vibration to realize smooth performance through the entire speed range of the engine.

## 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/or the brake pedal is used. Featuring no electronic control, 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 Link mechanism

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

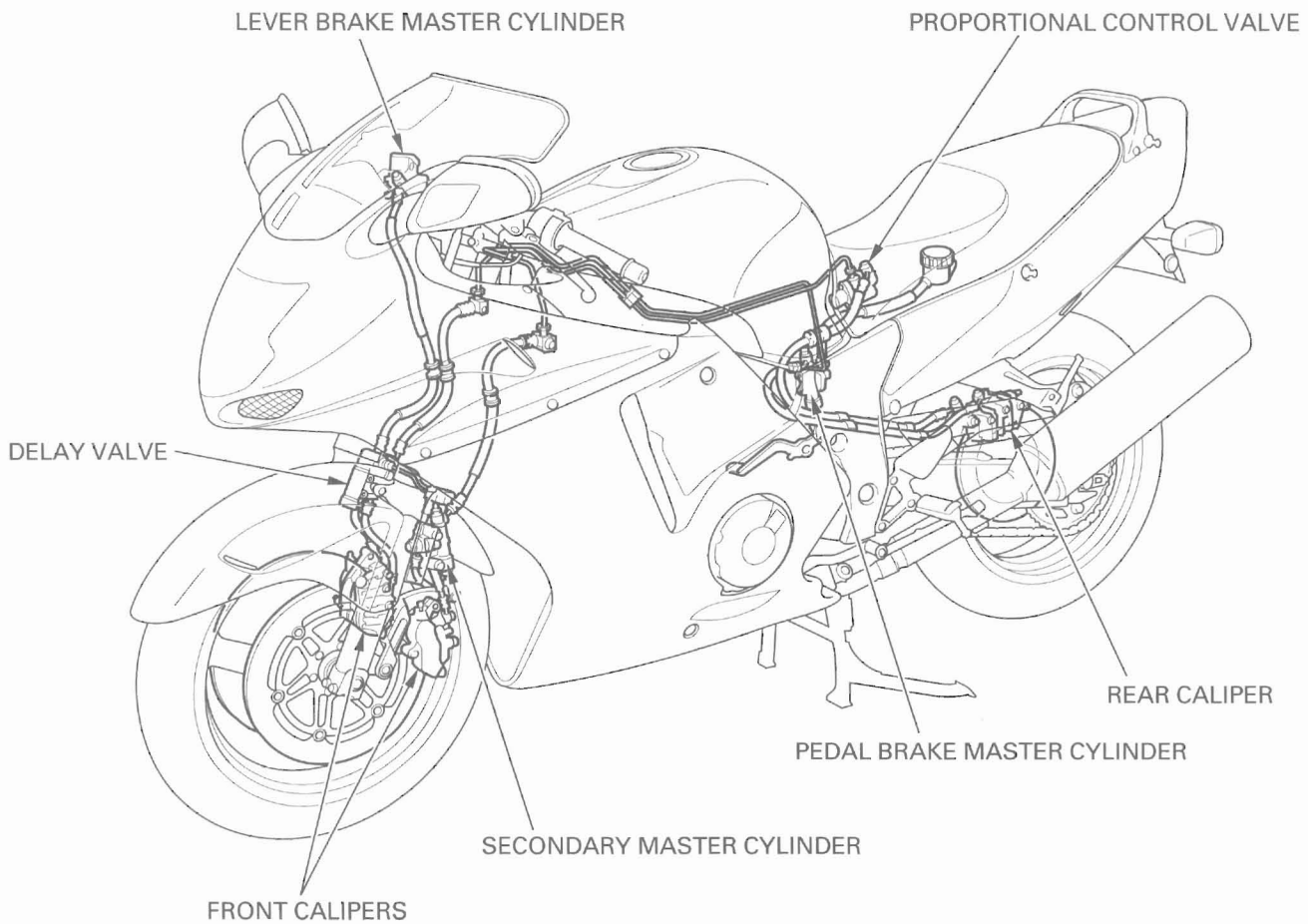
Transmits the rotational torque exerted on the front caliper to the rear brake caliper by way of the Proportional Control Valve (PCV).

⑥ Proportional control valve (PCV)

Regulates the rear caliper hydraulic pressure from the secondary master cylinder.

## TECHNICAL FEATURES

### SYSTEM CONSTRUCTION



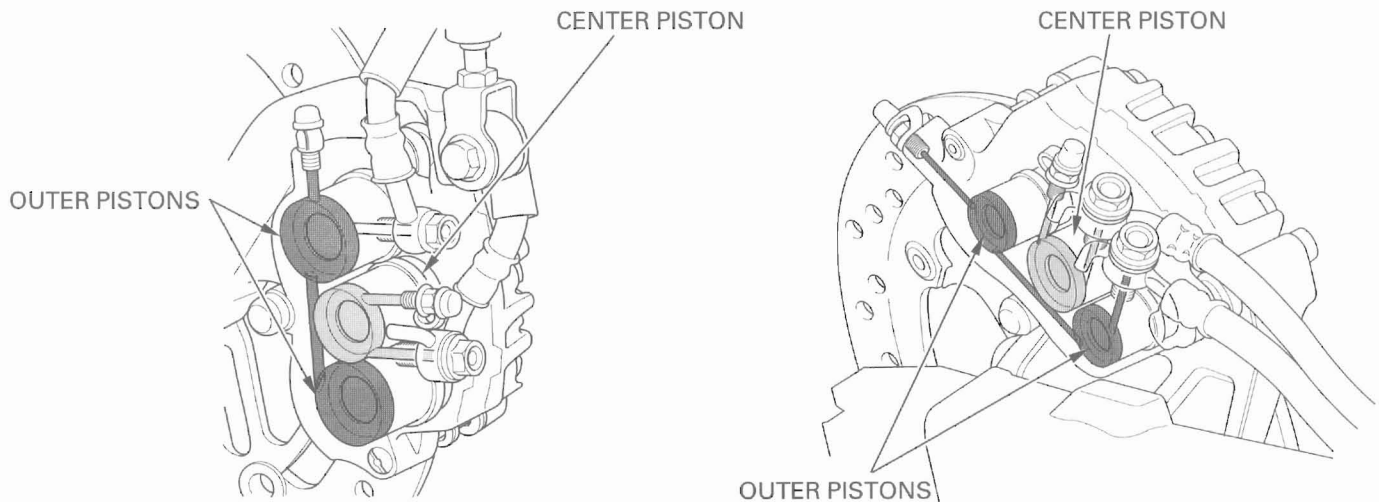
#### 3-PISTON CALIPER

A set of three 3-piston calipers are controlled by two independent hydraulic systems.

The center piston of all three calipers are operated directly by the brake pedal.

The two outer pistons of the front calipers are controlled by the brake lever, and the two in the rear are controlled by the servomechanism-actuated secondary master cylinder.

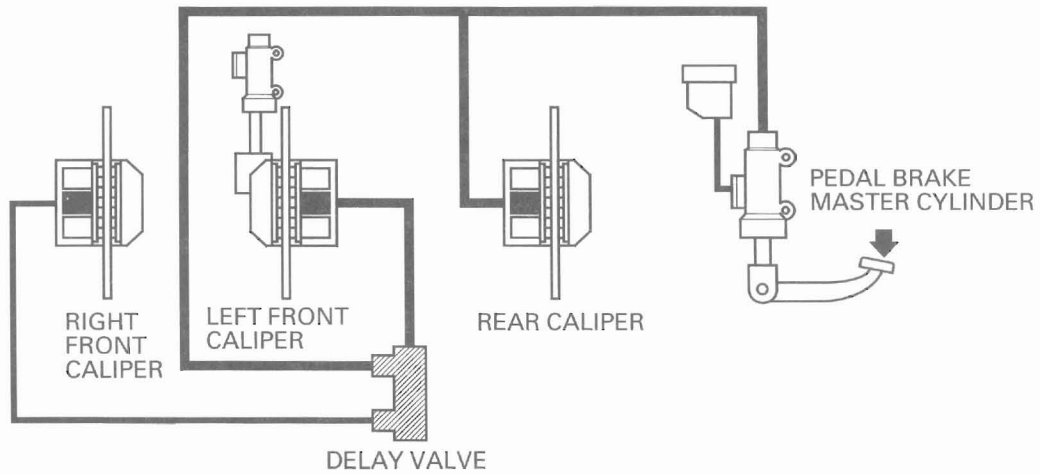
This arrangement delivers a broad, yet easily controlled range of braking force, depending on which either or both of the two (lever and pedal) brakes are engaged.



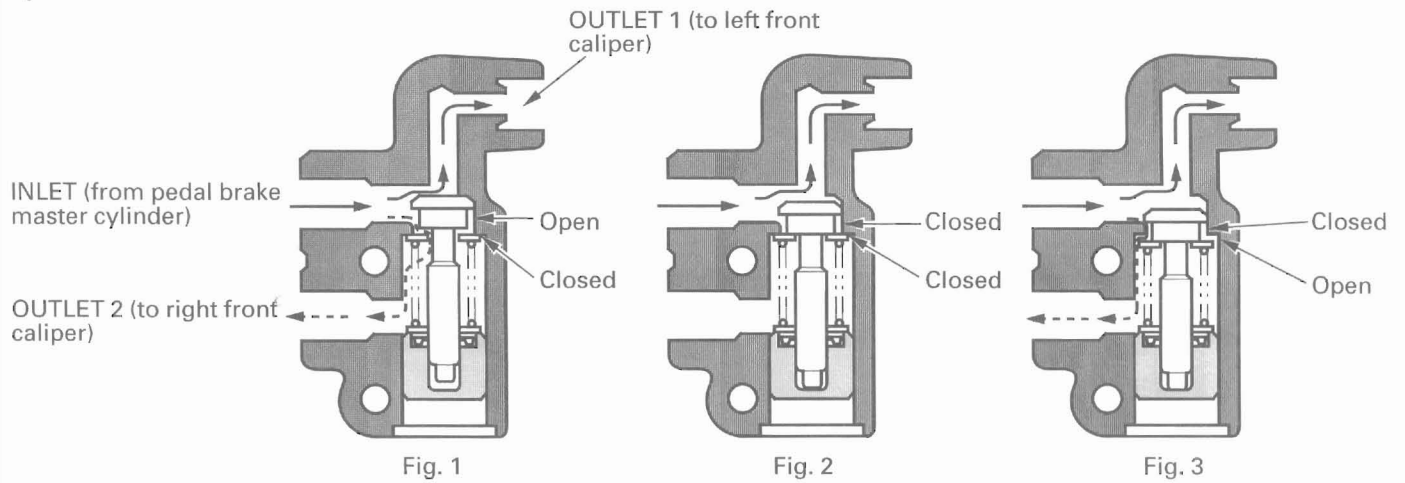
**DELAY VALVE**

The delay valve 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 deceleration that begins at the rear, with little of the rapid forward dive that is usually brought on when the front brakes are suddenly applied.

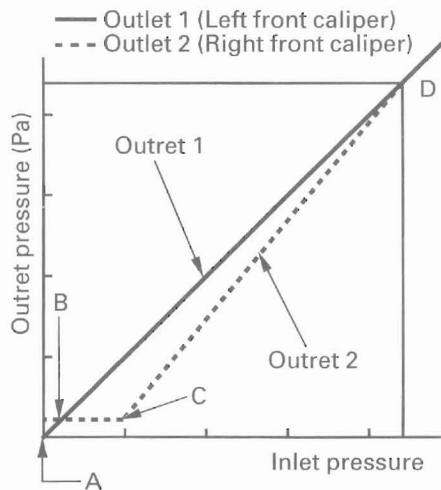
**System diagram**



**Operation**



**Operating characteristics**

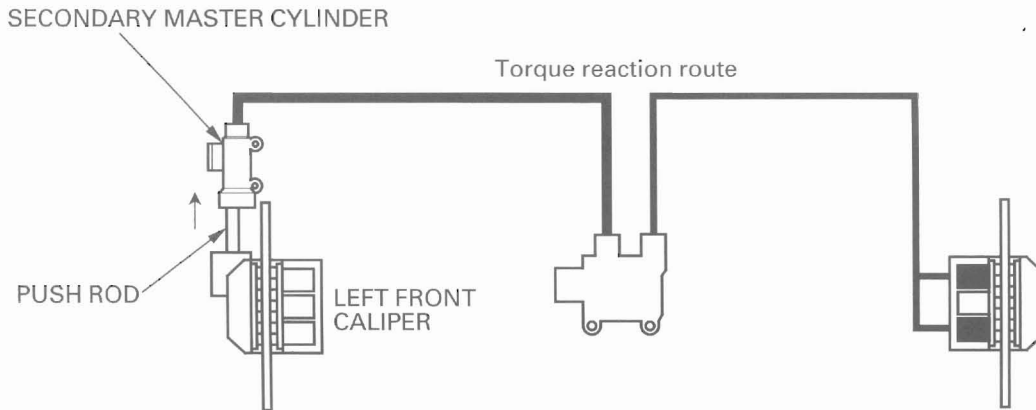


Line A–B: Fig. 1  
 Line B–C: Fig. 2  
 Line C–D: Alternating  
 Fig. 2 & 3  
 Line D : Fig. 3

## TECHNICAL FEATURES

### 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.



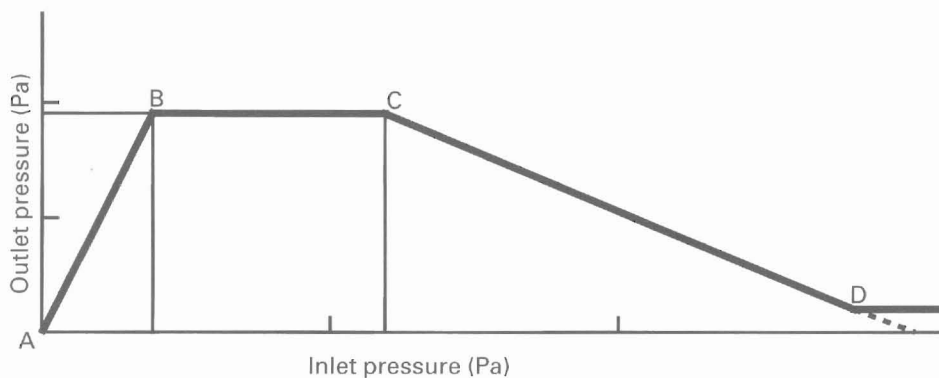
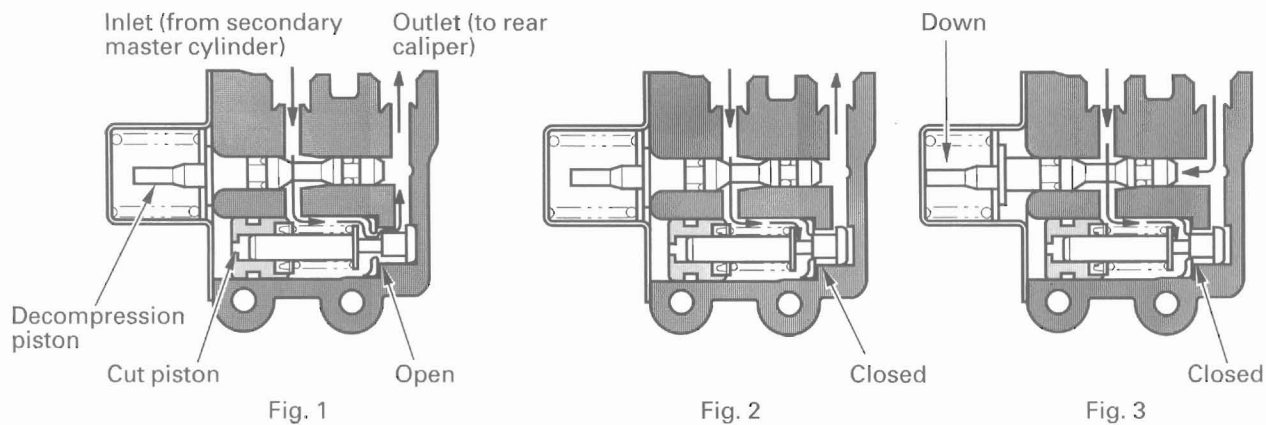
### PROPORTIONAL CONTROL VALVE (PCV)

The PCV installed between the secondary master cylinder and the outer pistons 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).



Line A-B: Fig. 1  
Line B-C: Fig. 2  
Line C-D: Fig. 3

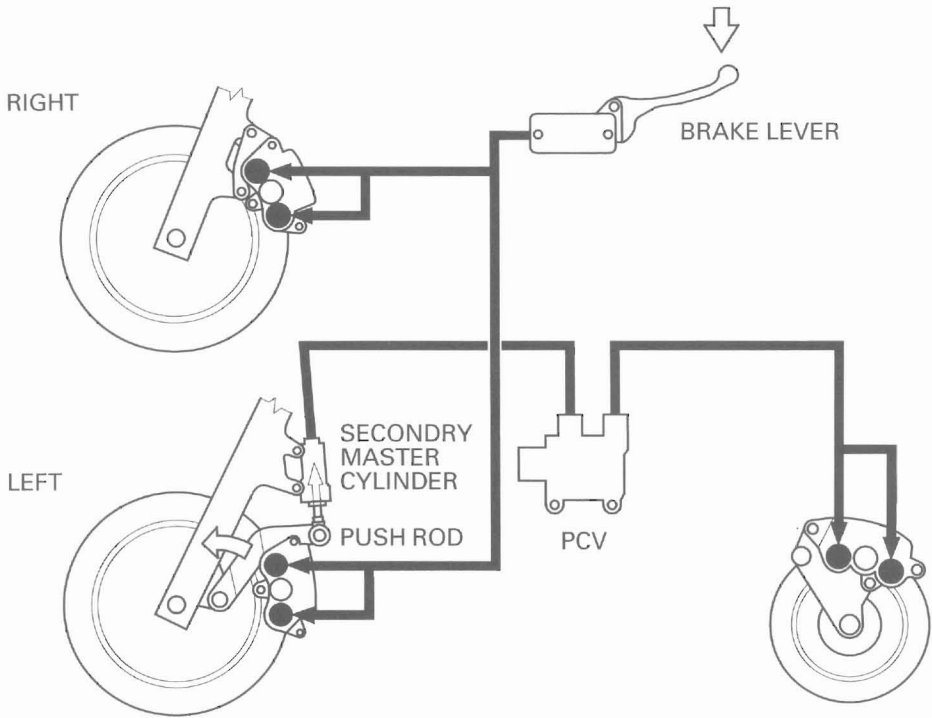
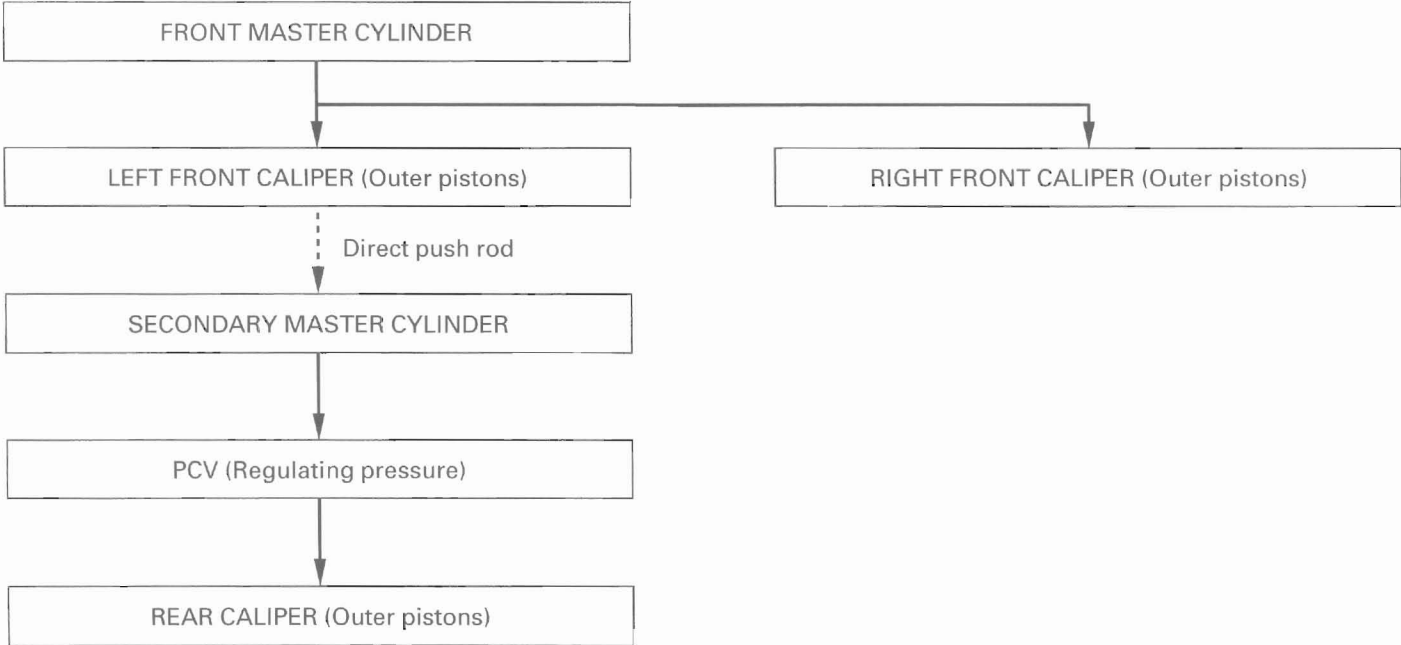


LBS OPERATION

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.

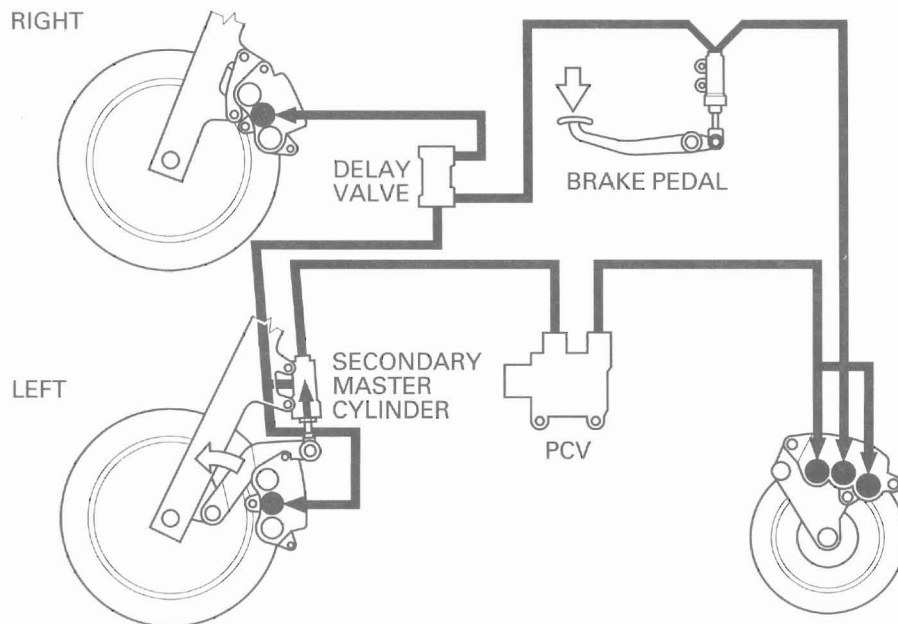
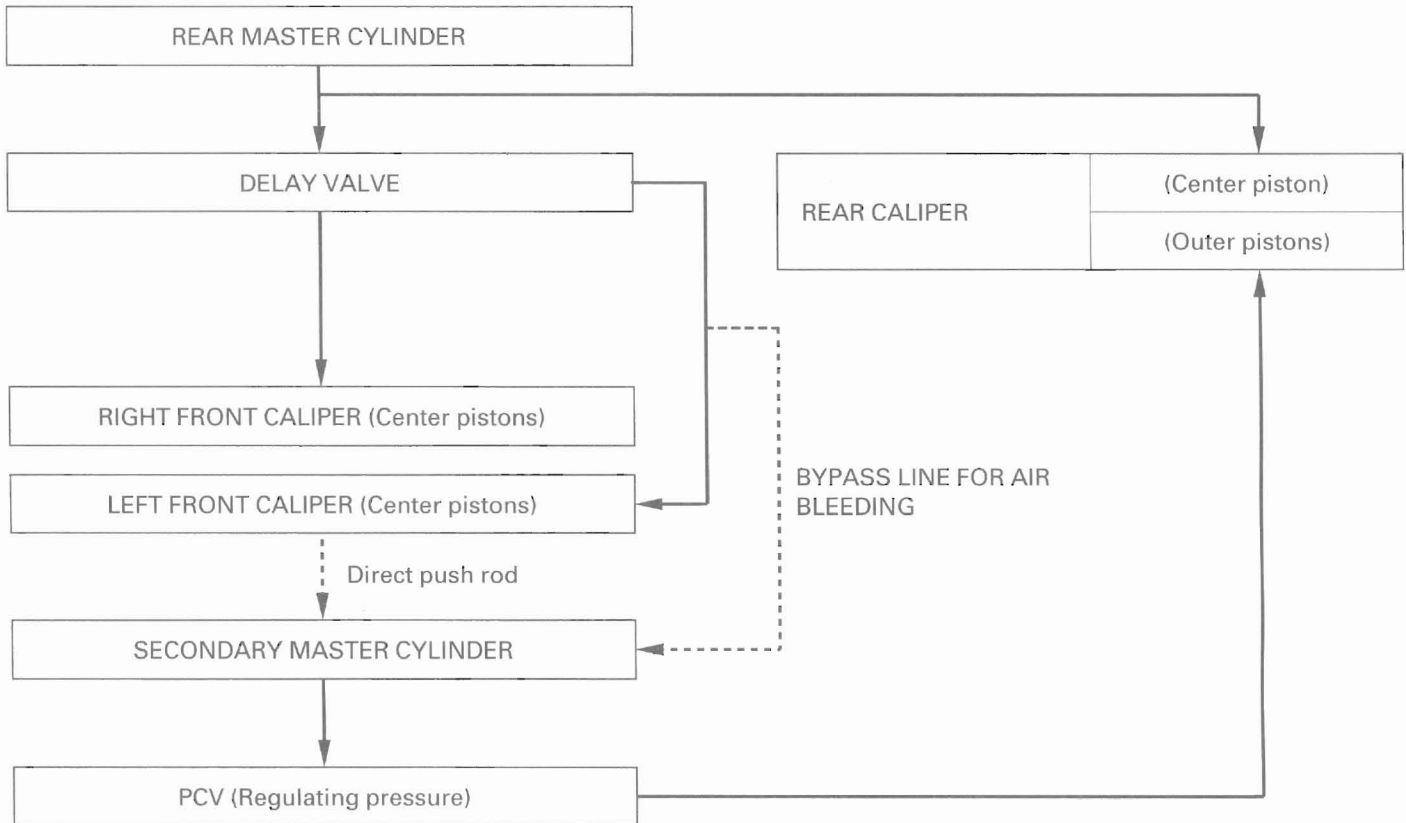
In response to the braking force applied by the front caliper onto the spinning brake rotor, the caliper is pulled in the direction of wheel rotation, around its lower caliper pivot. This forward caliper motion also acts on the push rod which is connected to the secondary master cylinder. This direct pressure on the secondary master cylinder is regulated by the PCV then transmits its hydraulic pressure to the outer pistons of the rear caliper.



## TECHNICAL FEATURES

### When foot brake is applied:

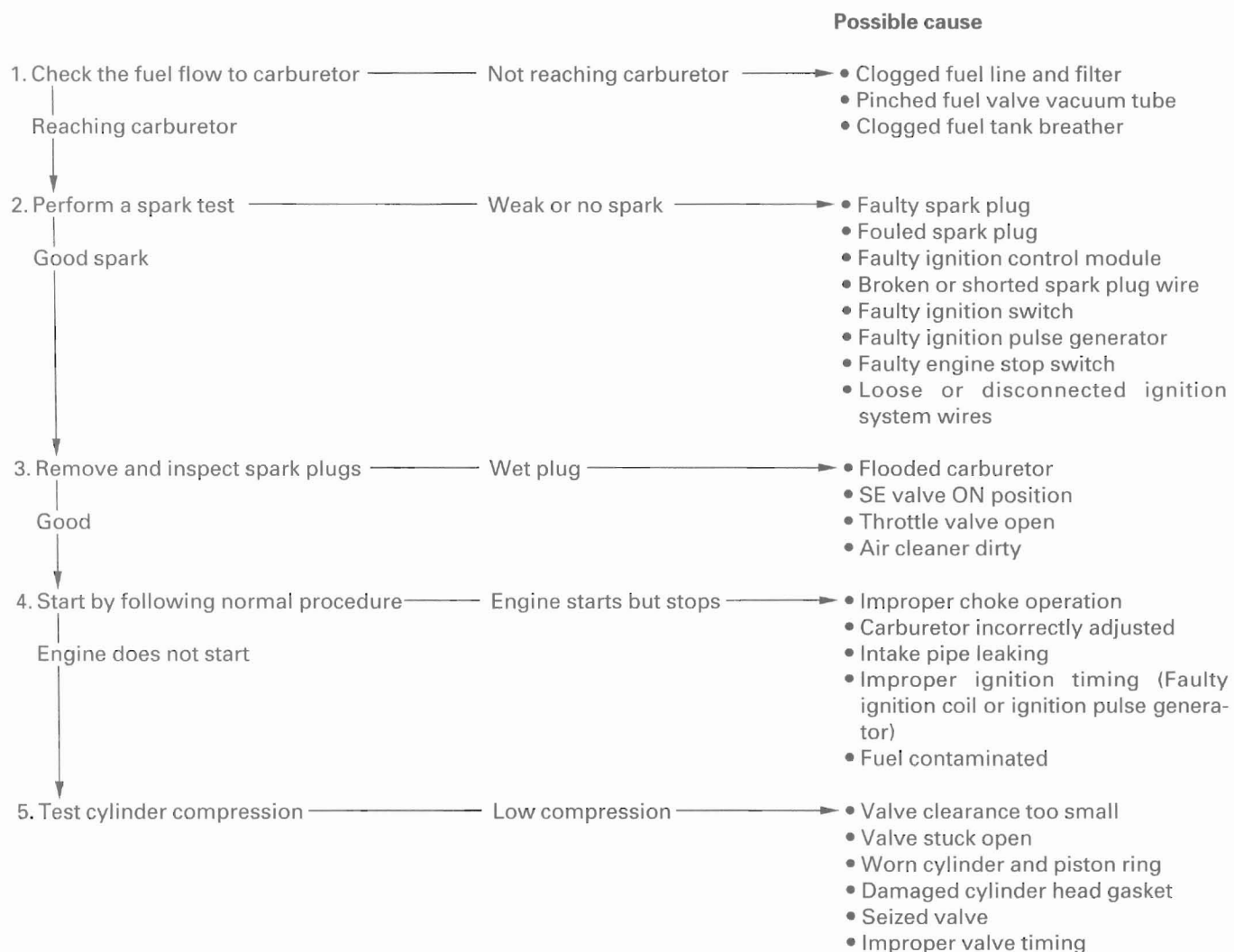
When the brake pedal is pressed, hydraulic pressure from the rear master cylinder is routed through two lines. One connects directly to the rear caliper and acts on the center piston. The other line runs to the center pistons of the front calipers by way of the delay valve that slows front brake engagement 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 outer pistons of the rear caliper. Because hydraulic pressure from the rear master cylinder is also being applied by the rear caliper's center piston, the braking force applied to the rear wheel is greater than that applied when using the brake lever only.



# 22. TROUBLESHOOTING

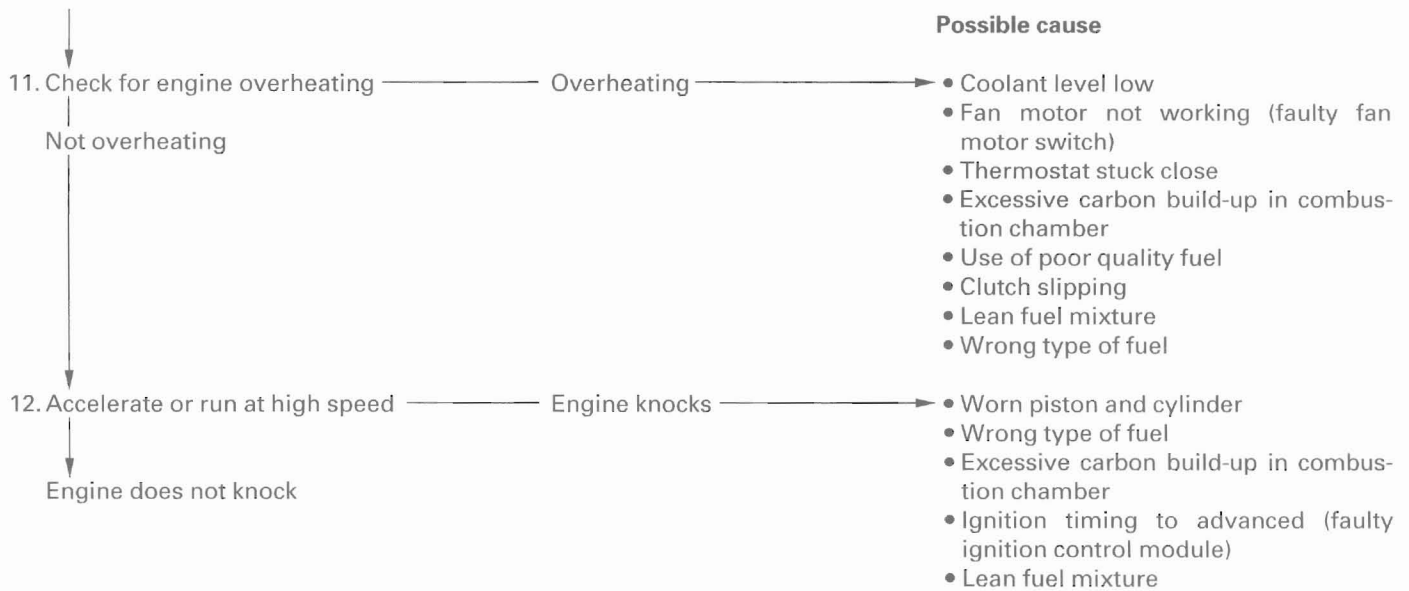
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ENGINE LACKS POWER	22-2	POOR HANDLING	22-4
POOR PERFORMANCE AT LOW AND IDLE SPEED	22-3		

## ENGINE DOES NOT START OR IS HARD TO START

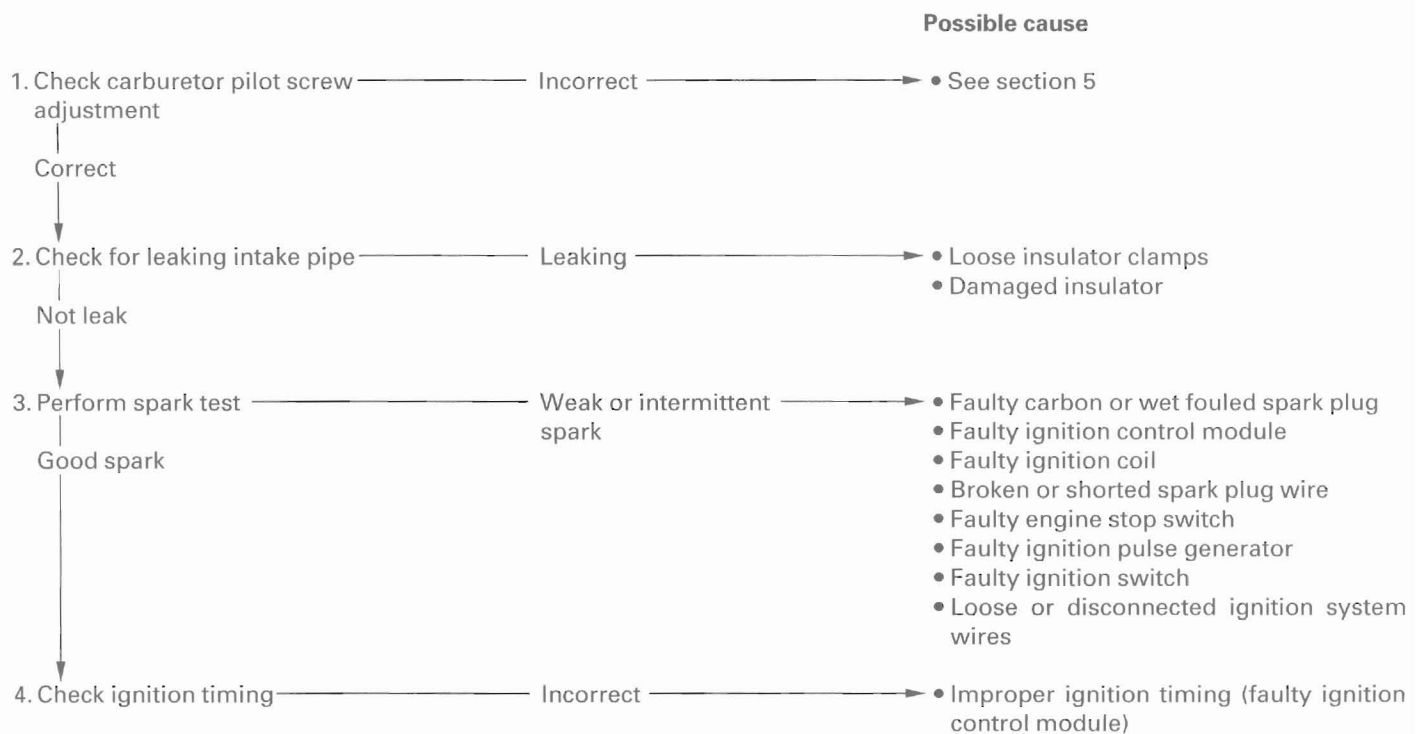


**ENGINE LACKS POWER**



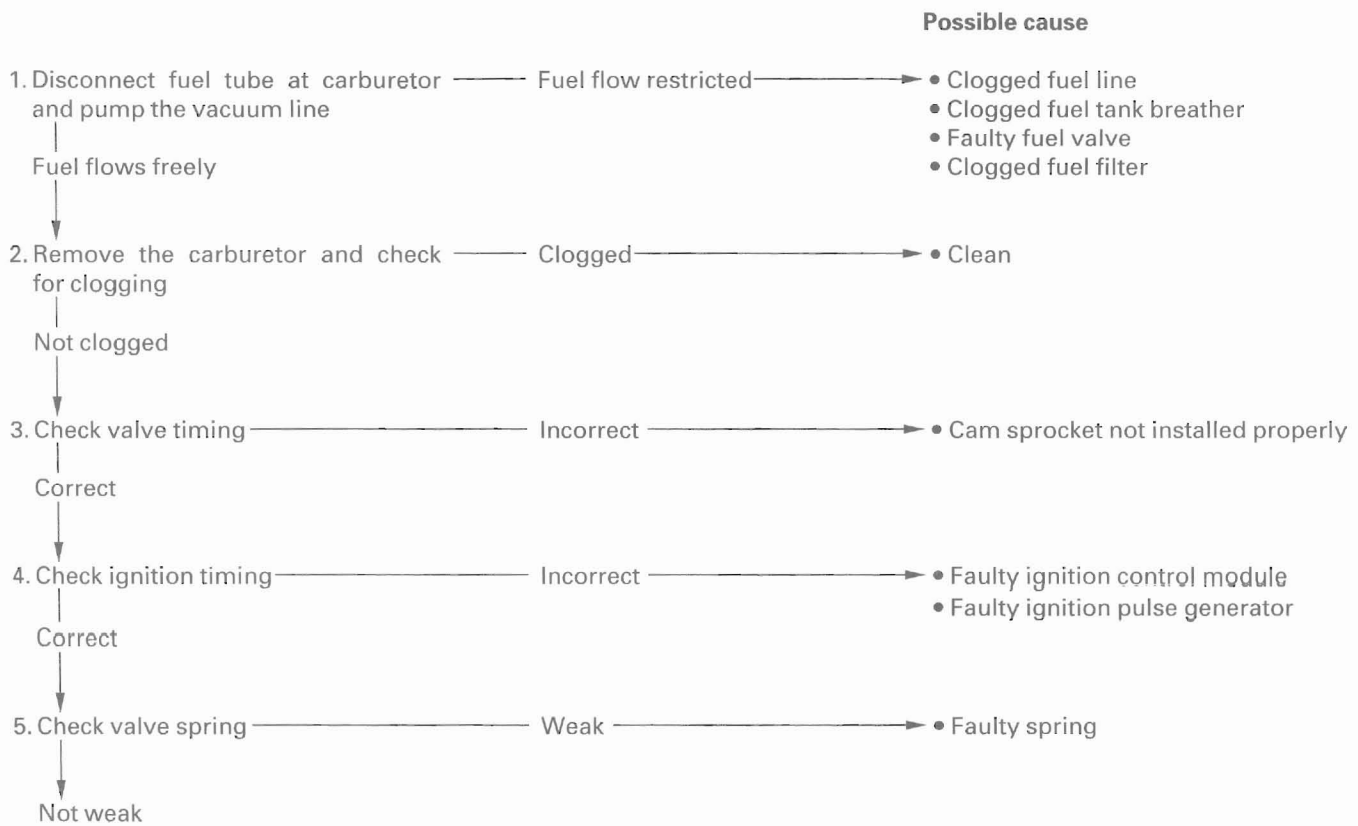


## POOR PERFORMANCE AT LOW AND IDLE SPEED

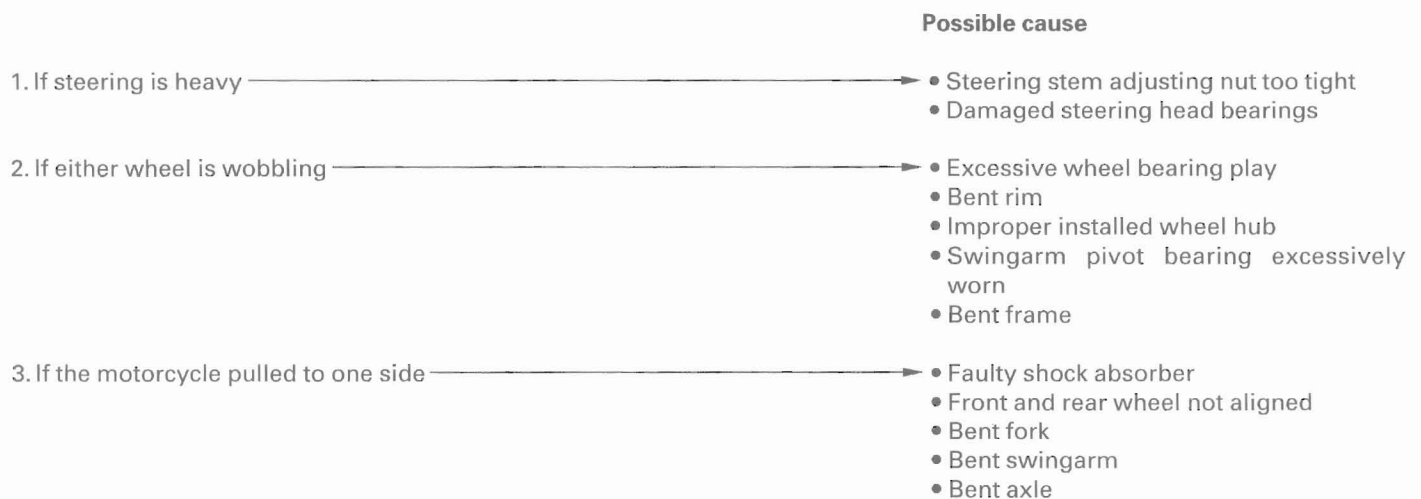


## TROUBLESHOOTING

### POOR PERFORMANCE AT HIGH SPEED



### POOR HANDLING



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