

1997-2003



**HONDA**



The cover features a dark background with large, stylized gear illustrations. On the left side, there is a detailed line drawing of a motorcycle's front wheel and suspension assembly. The text is rendered in white and red against this background.

**SERVICE MANUAL**

**1997-2003 VT1100C  
SHADOW SPIRIT**

**1998-2001 VT1100T  
SHADOW 1100 A.C.E. TOURER**

## HOW TO USE THIS MANUAL

This service manual describes the service procedures for the VT1100C and VT1100T.

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

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

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

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

Most sections have an assembly or system illustration, service information and troubleshooting for the section.

The subsequent pages give detailed procedures.

If you do not know the source of the trouble, go to section 21, Troubleshooting.

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Honda Motor Co., Ltd.  
SERVICE PUBLICATION OFFICE

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## SYMBOLS

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

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

# 1. GENERAL INFORMATION

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## GENERAL SAFETY

### CARBON MONOXIDE

If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in an enclosed area.

#### ▲WARNING

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

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

### GASOLINE

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

#### ▲WARNING

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

### HOT COMPONENTS

#### ▲WARNING

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

### USED ENGINE/TRANSMISSION OIL

#### ▲WARNING

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

### BRAKE DUST

Never use an air hose or dry brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner or alternate method approved by OSHA, designed to minimize the hazard caused by airborne asbestos fibers.

#### ▲WARNING

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

### BRAKE FLUID

#### CAUTION:

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

## 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.*
- 

#### CAUTION:

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

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## 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. Tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown on pages 1-35 through 1-67, Cable & Harness routing.

### BATTERY HYDROGEN GAS & ELECTROLYTE

#### **▲WARNING**

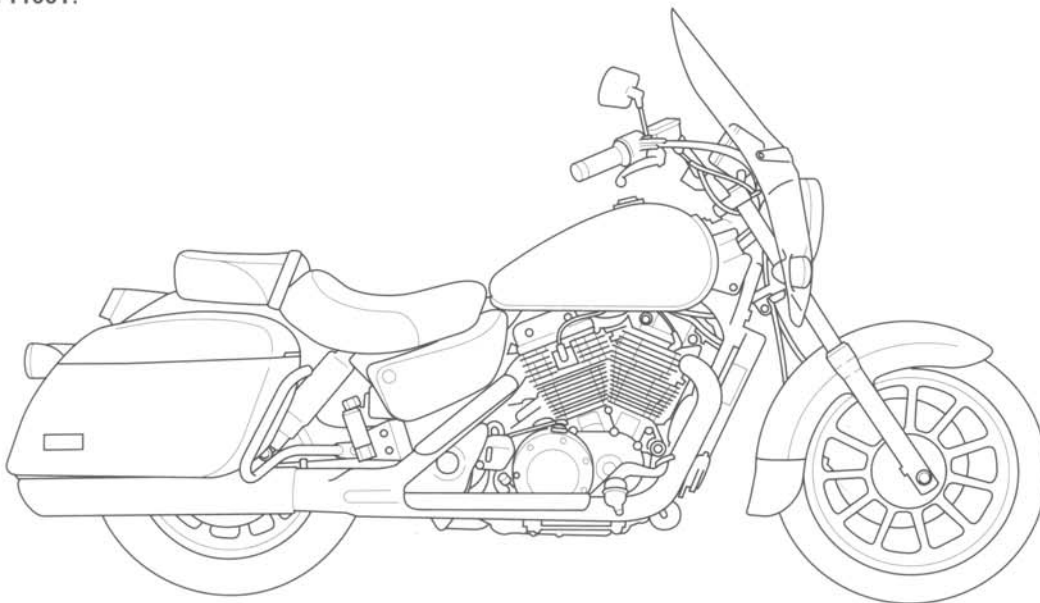
- *The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.*
  - *The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.*
    - *If electrolyte gets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

VT1100C:

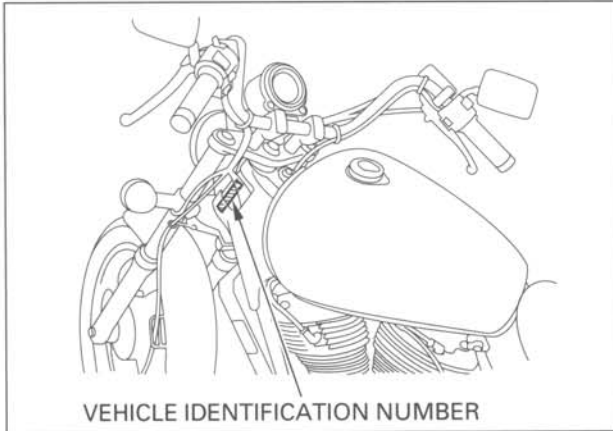


VT1100T:

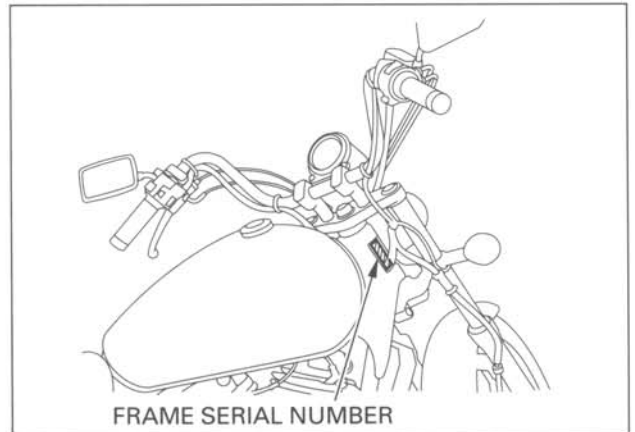


## GENERAL INFORMATION

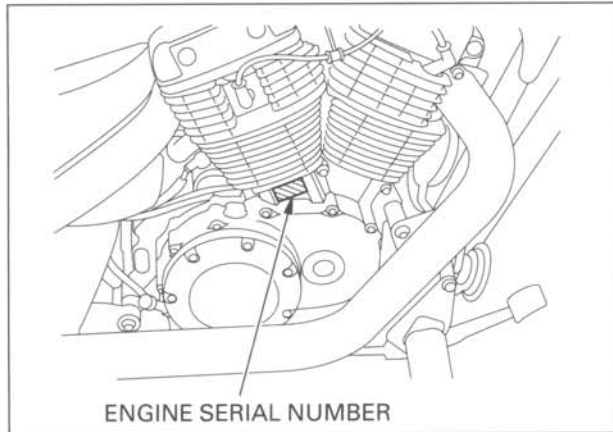
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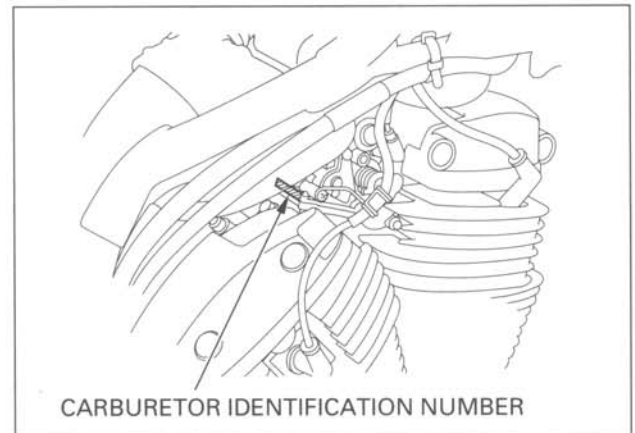
The vehicle identification number (VIN) is attached on the left side of the steering head.



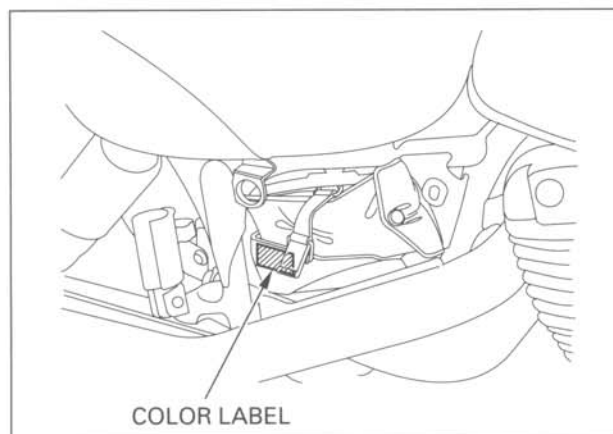
The frame serial number is stamped on the right side of the steering head.



The engine serial number is stamped on the right crankcase below the rear cylinder.



The carburetor identification number is stamped on the carburetor body intake side.



The color label is attached to the tool pocket under the right side cover.

**SPECIFICATIONS**

**GENERAL: VT1100C**

ITEM		SPECIFICATIONS
DIMENSIONS	Overall length Overall width Overall height Wheelbase Seat height Ground clearance Dry weight (49 state/Canada type) (California type) Curb weight (49 state/Canada type) (California type) Maximum weight capacity (49 state/California type) (Canada type)	2,380 mm (93.7 in) 880 mm (34.6 in) 1,220 mm (48.0 in) 1,650 mm (65.0 in) 730 mm (28.7 in) 140 mm (5.5 in) 251 kg (553 lbs) 252 kg (556 lbs) 270 kg (595 lbs) 271 kg (597 lbs) 164 kg (362 lbs) 168 kg (370 lbs)
FRAME	Frame type Front suspension Front wheel travel Rear suspension Rear wheel travel Front tire size Rear tire size Tire brand (Dunlop)      Front/Rear Front brake Rear brake Caster angle Trail length Fuel tank capacity Fuel tank reserve capacity	Double cradle Telescopic fork 135 mm (5.3 in) Swingarm 100 mm (3.9 in) 110/90 – 19 62H 170/80 – 15 M/C 77H F24 / K555 Hydraulic single disc Mechanical leading/trailing shoe 32°40' 152 mm (6.0 in) 15.8 ℓ (4.17 US gal , 3.48 Imp gal) 2.2 ℓ (0.58 US gal , 0.48 Imp gal)
ENGINE	Cylinder arrangement Bore and stroke Displacement Compression ratio Valve train Intake valve opens at 1mm lift Intake valve closes at 1mm lift Exhaust valve opens at 1mm lift Exhaust valve closes at 1mm lift Lubrication system Oil pump type Cooling system Air filtration Engine weight Firing order Cylinder number	2 cylinder 45° V transverse 87.5 × 91.4 mm (3.44 × 3.60 in) 1,099 cm <sup>3</sup> (67.0 cu-in) 8.0 : 1 Silent multi-link chain driven OHC with rocker arms Front: 5° BTDC    Rear: 2° BTDC 30° ABDC        33° ABDC Exhaust: 30° BBDC    37° BBDC 5° ATDC            -2° ATDC Forced pressure and wet sump Trochoid Liquid cooled Viscous paper element 96 kg (212 lbs) Front – 495° – Rear – 225° – Front – Front: # 2, Rear: # 1



## GENERAL INFORMATION

GENERAL: VT1100C (cont'd)		
	ITEM	SPECIFICATIONS
CARBURETOR	Carburetor type Throttle bore	Constant Venturi 36 mm (1.4 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Secondary reduction Third reduction (Output drive reduction) Final reduction Gear ratio 1st Gear ratio 2nd Gear ratio 3rd Gear ratio 4th Gear ratio 5th Gearshift pattern	Multi-plate, wet Cable operating 5 speeds 1.692 (66/39) 0.806 (29/36) 1.059 (18/17) 3.091 (34/11) 2.375 (38/16) 1.391 (32/23) 1.037 (28/27) 0.888 (32/36) 0.766 (23/30) Left foot operated return system 1-N-2-3-4-5
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	Full transistorized ignition Electric starter motor Triple phase output alternator SCR shorted/triple phase full-wave rectification Battery

GENERAL: VT1100T		
	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length Overall width Overall height Wheelbase Seat height Ground clearance Dry weight (49 state/Canada type) (California type) Curb weight (49 state/Canada type) (California type) Maximum weight capacity (49 state/California type) (Canada type)	2,480 mm (97.6 in) 965 mm (38.0 in) 1,430 mm (56.3 in) 1,655 mm (65.2 in) 730 mm (28.7 in) 150 mm (5.9 in) 284 kg (626 lbs) 285 kg (628 lbs) 296 kg (653 lbs) 297 kg (655 lbs) 173 kg (381 lbs) 177 kg (390 lbs)
FRAME	Frame type Front suspension Front wheel travel Rear suspension Rear wheel travel Front tire size Rear tire size Tire brand (Dunlop)      Front/Rear Front brake Rear brake Caster angle Trail length Fuel tank capacity Fuel tank reserve capacity	Double cradle Telescopic fork 124 mm (4.9 in) Swingarm 100 mm (3.9 in) 130/80R18 66H 170/70R16 75H D206F/D206A Hydraulic single disc Hydraulic single disc 32°15' 149 mm (5.9 in) 15.8 ℓ (4.17 US gal , 3.48 Imp gal) 2.2 ℓ (0.58 US gal , 0.48 Imp gal)
ENGINE	Cylinder arrangement Bore and stroke Displacement Compression ratio Valve train Intake valve opens at 1mm lift Intake valve closes at 1mm lift Exhaust valve opens at 1mm lift Exhaust valve closes at 1mm lift Lubrication system Oil pump type Cooling system Air filtration Engine weight Firing order Cylinder number	2 cylinder 45° V transverse 87.5 × 91.4 mm (3.44 × 3.60 in) 1,099 cm <sup>3</sup> (67.0 cu-in) 8.0 : 1 Silent multi-link chain driven OHC with rocker arms Front: 5° BTDC      Rear: 2° BTDC 30° ABDC              33° ABDC 30° BBDC              37° BBDC 5° ATDC              -2° ATDC Forced pressure and wet sump Trochoid Liquid cooled Viscous paper element 96 kg (212 lbs) Front—495°—Rear—225°—Front— Front: # 2, Rear: # 1

## GENERAL INFORMATION

GENERAL: VT1100T (cont'd)		
	ITEM	SPECIFICATIONS
CARBURETOR	Carburetor type Throttle bore	Constant Venturi 36 mm (1.4 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Secondary reduction Third reduction (Output drive reduction) Final reduction Gear ratio 1st Gear ratio 2nd Gear ratio 3rd Gear ratio 4th Gear ratio 5th Gearshift pattern	Multi-plate, wet Cable operating 5 speeds 1.692 (66/39) 0.939 (31/33) 1.059 (18/17) 3.091 (34/11) 2.375 (38/16) 1.391 (32/23) 1.037 (28/27) 0.888 (32/36) 0.766 (23/30) Left foot operated return system 1-N-2-3-4-5
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	Full transistorized ignition Electric starter motor Triple phase output alternator SCR shorted/triple phase full-wave rectification Battery

## GENERAL INFORMATION

Unit: mm (in)

<b>LUBRICATION SYSTEM</b>		<b>STANDARD</b>	<b>SERVICE LIMIT</b>
ITEM			
Engine oil capacity	at draining	2.9 ℓ (3.1 US qt , 2.6 Imp qt)	————
	at disassembly	3.8 ℓ (4.0 US qt , 3.3 Imp qt)	————
	at filter change	3.1 ℓ (3.3 US qt , 2.7 Imp qt)	————
Recommended engine oil		HONDA GN4 or HP4 4-stroke oil or equivalent motor oil API service classification: SF or SG Viscosity: SAE 10W-40	————
Oil pressure at oil pressure switch (80 °C/176 °F)		441 kPa (4.5 kgf/cm <sup>2</sup> , 64 psi) at 5,000 rpm	————
Oil pump rotor	tip clearance	0.15 (0.006)	0.20 (0.008)
	body clearance	0.15 – 0.22 (0.006 – 0.009)	0.35 (0.014)
	end clearance	0.02 – 0.07 (0.001 – 0.003)	0.10 (0.004)

<b>FUEL SYSTEM: VT1100C</b>		<b>SPECIFICATIONS</b>
ITEM		
Carburetor identification number	49 state/Canada type	VDKHA
	California type	VDKGA
Main jet		# 178
Slow jet		# 42
Pilot screw	initial/final opening	See page 5-19
	high altitude adjustment	See page 5-20
Float level		9.2 mm (0.36 in)
Idle speed		1,000 ± 100 rpm
Carburetor vacuum difference		Within 40 mm Hg (1.6 in Hg) base carburetor: No.1 (rear)
Throttle grip free play		2 – 6 mm (1/8 – 1/4 in)
Starting enrichment (SE) valve distance		10.0 – 11.0 mm (0.39 – 0.43 in)

<b>FUEL SYSTEM: VT1100T</b>		<b>SPECIFICATIONS</b>
ITEM		
Carburetor identification number	49 state/Canada type	VDKFA
	California type	VDKGA
Main jet	Front	# 175
	Rear	# 180
Slow jet		# 42
Pilot screw	initial/final opening	See page 5-19
	high altitude adjustment	See page 5-20
Float level		9.2 mm (0.36 in)
Idle speed		1,000 ± 100 rpm
Carburetor vacuum difference		Within 40 mm Hg (1.6 in Hg) base carburetor: No.1 (rear)
Throttle grip free play		2 – 6 mm (1/8 – 1/4 in)
Starting enrichment (SE) valve distance		10.0 – 11.0 mm (0.39 – 0.43 in)

<b>COOLING SYSTEM</b>		<b>SPECIFICATIONS</b>
ITEM		
Coolant capacity	radiator and engine	2.0 ℓ (2.1 US qt , 1.8 Imp qt)
	reserve tank	0.39 ℓ (0.41 US qt , 0.34 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (16 – 20 psi)
Thermostat	begins to open	80 – 84 °C (176 – 183 °F)
	fully open	95 °C (203 °F)
	valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors

## GENERAL INFORMATION

Unit: mm (in)

CYLINDER HEAD/VALVE ITEM				STANDARD	SERVICE LIMIT	
Cylinder compression				1,275 ± 196 kPa (13.0 ± 2.0 kgf/cm <sup>2</sup> , 185 ± 28 psi) – 300 rpm	—————	
Cylinder head	Warpage			—————	0.05 (0.002)	
Camshaft	Cam lobe height	IN		38.021 – 38.181 (1.4969 – 1.5032)	37.99 (1.496)	
		EX		38.027 – 38.187 (1.4971 – 1.5034)	38.00 (1.496)	
	Runout			—————	0.05 (0.002)	
	Oil clearance	A/B		0.050 – 0.111 (0.0020 – 0.0044)	0.130 (0.0051)	
		C		0.065 – 0.126 (0.0026 – 0.0050)	0.145 (0.0057)	
	Journal O. D.	A/B		23.949 – 23.970 (0.9429 – 0.9437)	23.92 (0.942)	
C			23.934 – 23.955 (0.9423 – 0.9431)	23.90 (0.941)		
Rocker arm and tappet	Rocker arm I. D.	IN/EX	13.750 – 13.768 (0.5413 – 0.5420)	13.778 (0.5424)		
	Rocker arm shaft O. D.	IN/EX	13.716 – 13.734 (0.5400 – 0.5407)	13.706 (0.5396)		
	Rocker arm-to-rocker arm shaft clearance	IN/EX	0.016 – 0.052 (0.0006 – 0.0020)	0.072 (0.0028)		
	Tappet adjuster assist spring free length			18.57 (0.731)	17.80 (0.701)	
	Tappet adjuster compression stroke with kerosene			—————	0.2 (0.01)	
Valve and valve guide	Valve clearance			Hydraulic adjusting	—————	
	Valve stem O. D.	IN		6.575 – 6.590 (0.2589 – 0.2594)	6.57 (0.259)	
		EX		6.555 – 6.570 (0.2581 – 0.2587)	6.54 (0.257)	
	Valve guide I. D.	IN		6.600 – 6.615 (0.2598 – 0.2604)	6.635 (0.2612)	
		EX		6.600 – 6.615 (0.2598 – 0.2604)	6.655 (0.2620)	
	Stem-to-guide clearance	IN		0.010 – 0.040 (0.0004 – 0.0016)	0.08 (0.003)	
		EX		0.030 – 0.060 (0.0012 – 0.0024)	0.12 (0.005)	
	Valve guide projection above cylinder head	IN		14.5 (0.57)	—————	
EX			15.5 (0.61)	—————		
Valve seat width			IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.50 (0.059)	
Valve spring	Free length	Inner	IN/EX	41.37 (1.629)	39.9 (1.57)	
		Outer	IN		45.70 (1.799)	43.90 (1.728)
			EX		43.50 (1.713)	41.80 (1.646)

## GENERAL INFORMATION

Unit: mm (in)

<b>CYLINDER/PISTON</b>				
<b>ITEM</b>			<b>STANDARD</b>	
			<b>SERVICE LIMIT</b>	
Cylinder	I. D.		87.500 – 87.515 (3.4449 – 3.4455)	
	Out of round		—————	
	Taper		—————	
	Warpage		—————	
Piston, piston ring and piston pin	Piston mark direction		"IN" mark toward the intake side	
	Piston O. D.		87.470 – 87.490 (3.4437 – 3.4445) at 10 (0.4) from the bottom	
	Piston pin hole I. D.		22.002 – 22.008 (0.8662 – 0.8665)	
	Piston pin O. D.		21.994 – 22.000 (0.8659 – 0.8661)	
	Connecting rod small end I. D.		22.020 – 22.041 (0.8669 – 0.8678)	
	Cylinder-to-piston clearance		0.010 – 0.045 (0.0004 – 0.0018)	
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	
	Connecting rod-to-piston pin clearance		0.020 – 0.047 (0.0008 – 0.0019)	
	Piston ring-to-groove clearance	Top	0.020 – 0.050 (0.0008 – 0.0020)	0.25 (0.010)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.20 (0.008)
	Piston ring end gap	Top/Second	0.20 – 0.35 (0.008 – 0.014)	0.50 (0.020)
		Oil (side rail)	0.30 – 0.90 (0.012 – 0.035)	1.1 (0.04)
Piston ring mark direction	Top/second	Marking facing up	—————	

Unit: mm (in)

<b>CLUTCH/GEARSHIFT LINKAGE</b>			
<b>ITEM</b>			<b>STANDARD</b>
			<b>SERVICE LIMIT</b>
Clutch lever free play			10 – 20 (3/8 – 3/4)
Clutch spring free length			44.0 (1.73)
Clutch disc thickness A/B			3.72 – 3.88 (0.146 – 0.153)
Clutch plate warpage			—————
Clutch outer guide I. D.			27.955 – 28.012 (1.1006 – 1.1028)
Mainshaft O. D. at clutch outer guide			27.980 – 27.993 (1.1016 – 1.1021)

## GENERAL INFORMATION

Unit: mm (in)

CRANKSHAFT/TRANSMISSION			STANDARD	SERVICE LIMIT
ITEM				
Crankshaft/ connecting rod	Connecting rod big end side clearance		0.10 – 0.25 (0.004 – 0.010)	0.28 (0.011)
	Crankpin oil clearance		0.038 – 0.062 (0.0015 – 0.0024)	0.070 (0.0028)
	Main journal oil clearance		0.030 – 0.046 (0.0012 – 0.0018)	0.060 (0.0024)
	Crankshaft runout		—	0.05 (0.002)
Transmission	Gear I. D.	M3, M5, C4	31.000 – 31.025 (1.2205 – 1.2215)	31.035 (1.2218)
		C1, C2	33.000 – 33.025 (1.2992 – 1.3002)	33.035 (1.3006)
	Gear bushing O. D.	M3, C4	30.970 – 30.995 (1.2193 – 1.2203)	30.94 (1.218)
		M5	30.950 – 30.975 (1.2185 – 1.2195)	30.94 (1.218)
		C1	32.950 – 32.975 (1.2972 – 1.2982)	32.94 (1.297)
		C2	32.955 – 32.980 (1.2974 – 1.2984)	32.94 (1.297)
	Gear bushing I. D.	M3, C4	28.000 – 28.021 (1.1024 – 1.1032)	28.04 (1.104)
		C2	29.985 – 30.006 (1.1805 – 1.1813)	30.03 (1.182)
	Mainshaft O. D.	at M3	27.959 – 27.980 (1.1007 – 1.1016)	27.94 (1.100)
	Countershaft O. D.	at C2	29.950 – 29.975 (1.1791 – 1.1801)	29.94 (1.179)
		at C4	27.967 – 27.980 (1.1011 – 1.1016)	27.95 (1.100)
	Gear-to-bushing clearance	M3, C4	0.005 – 0.055 (0.0002 – 0.0022)	0.075 (0.0030)
		M5, C1	0.025 – 0.075 (0.0010 – 0.0030)	0.095 (0.0037)
		C2	0.020 – 0.070 (0.0008 – 0.0028)	0.090 (0.0035)
	Gear bushing-to- shaft clearance	M3	0.020 – 0.062 (0.0008 – 0.0024)	0.082 (0.0032)
		C2	0.005 – 0.056 (0.0002 – 0.0022)	0.076 (0.0030)
C4		0.020 – 0.054 (0.0008 – 0.0021)	0.074 (0.0029)	
Shift fork/ shaft/drum	Fork claw thickness	L, *1C, *1R.	5.93 – 6.00 (0.233 – 0.236)	5.83 (0.230)
		*2C, *2R.	6.43 – 6.50 (0.253 – 0.256)	6.33 (0.249)
	Fork I. D.		14.000 – 14.021 (0.5512 – 0.5520)	14.04 (0.553)
	Shaft O. D.		13.966 – 13.984 (0.5498 – 0.5506)	13.956 (0.5494)
	Drum O. D. at left end		13.966 – 13.984 (0.5498 – 0.5506)	13.956 (0.5494)
	Drum journal (L. crankcase)		14.000 – 14.018 (0.5512 – 0.5519)	14.028 (0.5523)

\*1: After '00 VT1100C, \*2: VT1100T and '97 – '00 VT1100C

## GENERAL INFORMATION

Unit: mm (in)

CRANKSHAFT/TRANSMISSION (cont'd)				
ITEM			STANDARD	SERVICE LIMIT
Output drive train	Output gear I. D.		25.000 – 25.021 (0.9843 – 0.9851)	25.031 (0.9855)
	Output gear bushing	O. D.	24.959 – 24.980 (0.9826 – 0.9835)	24.949 (0.9822)
		I. D.	22.020 – 22.041 (0.8669 – 0.8678)	22.051 (0.8681)
	Output drive gear shaft O. D.		21.979 – 22.000 (0.8653 – 0.8661)	21.969 (0.8649)
	Gear-to-bushing clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.082 (0.0032)
	Gear bushing-to-shaft clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.082 (0.0032)
	Output gear damper spring free length		69.3 (2.73)	68.1 (2.68)
	Output drive gear backlash		0.08 – 0.23 (0.003 – 0.009)	0.40 (0.016)
Backlash difference between measurements		—	0.10 (0.004)	

Unit: mm (in)

FINAL DRIVE				
ITEM			STANDARD	SERVICE LIMIT
Recommended final drive oil			Hypoid gear oil, SAE # 80	—
Final drive oil capacity	at disassembly		150 cm <sup>3</sup> (5.1 US oz, 5.3 Imp oz)	—
	at draining		130 cm <sup>3</sup> (4.4 US oz, 4.6 Imp oz)	—
Final drive gear backlash			0.05 – 0.15 (0.002 – 0.006)	0.30 (0.012)
Backlash difference between measurements			—	0.10 (0.004)
Ring gear-to-stop pin clearance			0.30 – 0.60 (0.012 – 0.024)	—
Final drive gear assembly preload			0.2 – 0.4 N·m (2 – 4 kgf·cm, 1.7 – 3.5 lbf·in)	—

Unit: mm (in)

FRONT WHEEL/SUSPENSION/STEERING: VT1100C				
ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lbs) load		225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	—
	Up to maximum weight capacity		225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	—
Axle runout			—	0.20 (0.008)
Front wheel rim runout	Radial		—	2.0 (0.08)
	Axial		—	2.0 (0.08)
Wheel balance weight			—	60 g (2.1 oz) max.
Fork spring free length			459.4 (18.09)	450.2 (17.72)
Fork tube runout			—	0.20 (0.008)
Recommended fork fluid			Pro Honda Suspension Fluid SS-8	—
Fork fluid level			173 (6.8)	—
Fork fluid capacity			449 cm <sup>3</sup> (15.2 US oz, 15.8 Imp oz)	—
Steering bearing preload			0.9 – 1.3 kg (2.0 – 2.9 lbs)	—

Unit: mm (in)

FRONT WHEEL/SUSPENSION/STEERING: VT1100T				
ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			—	1.5 (0.06)
Cold tire pressure	Up to 90 kg (200 lbs) load		225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	—
	Up to maximum weight capacity		225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	—
Axle runout			—	0.20 (0.008)
Front wheel rim runout	Radial		—	2.0 (0.08)
	Axial		—	2.0 (0.08)
Wheel balance weight			—	60 g (2.1 oz) max.
Fork spring free length			475.9 (18.74)	466.4 (18.36)
Fork tube runout			—	0.20 (0.008)
Recommended fork fluid			Pro Honda Suspension Fluid SS-8	—
Fork fluid level			140 (5.5)	—
Fork fluid capacity			497 cm <sup>3</sup> (16.8 US oz, 17.5 Imp oz)	—
Steering bearing preload			0.9 – 1.3 kg (2.0 – 2.9 lbs)	—



## GENERAL INFORMATION

Unit: mm (in)

REAR WHEEL/BRAKE/SUSPENSION: VT1100C			
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		_____	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lbs) load	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	_____
	Up to maximum weight capacity	280 kPa (2.80 kgf/cm <sup>2</sup> , 41 psi)	_____
Axle runout		_____	0.20 (0.008)
Rear wheel rim runout	Radial	_____	2.0 (0.08)
	Axial	_____	2.0 (0.08)
Wheel balance weight		_____	70 g (2.5 oz) max.
Shock absorber spring adjuster standard position		Position "2"	_____
Rear brake pedal free play		20 – 30 (3/4 – 1-1/4)	_____
Brake drum I. D.		180.0 (7.09)	181 (7.1)
Brake lining thickness		5.0 (0.20)	2.0 (0.08)

Unit: mm (in)

REAR WHEEL/BRAKE/SUSPENSION: VT1100T			
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		_____	2.0 (0.08)
Cold tire pressure	Up to 90 kg (200 lbs) load	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)	_____
	Up to maximum weight capacity	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)	_____
Axle runout		_____	0.20 (0.008)
Rear wheel rim runout	Radial	_____	2.0 (0.08)
	Axial	_____	2.0 (0.08)
Wheel balance weight		_____	70 g (2.5 oz) max.
Shock absorber spring adjuster standard position		Position "2"	_____

Unit: mm (in)

HYDRAULIC DISC BRAKE			
ITEM		STANDARD	SERVICE LIMIT
Specified brake fluid		DOT 4 Brake Fluid	_____
Brake disc thickness		5.8 – 6.2 (0.23 – 0.24)	5.0 (0.20)
Brake disc runout		_____	0.30 (0.012)
Master cylinder I. D.		12.700 – 12.743 (0.5000 – 0.5017)	12.75 (0.502)
Master piston O. D.		12.657 – 12.684 (0.4983 – 0.4994)	12.64 (0.498)
Caliper cylinder I. D.	Front	27.000 – 27.050 (1.0630 – 1.0650)	27.06 (1.065)
	Rear (VT1100T)	38.180 – 38.230 (1.5031 – 1.5051)	38.24 (1.506)
Caliper piston O. D.	Front	26.935 – 26.968 (1.0604 – 1.0617)	26.91 (1.059)
	Rear (VT1100T)	38.115 – 38.148 (1.5006 – 1.5019)	38.09 (1.500)

## GENERAL INFORMATION

### CHARGING SYSTEM/ALTERNATOR: VT1100T and '97 - '00 VT1100C

ITEM		SPECIFICATIONS	
Alternator charging coil resistance (at 20 °C/68 °F)		0.3 - 0.5 Ω	
Battery	capacity	12V - 16AH	
	current leakage	1 mA max.	
	Specific gravity	Fully charged	1.270 - 1.290
		Needs charging	Below 1.260
Charging current		1.6 A max.	

### CHARGING SYSTEM/ALTERNATOR: After '00 VT1100C

ITEM		SPECIFICATIONS	
Alternator charging coil resistance (at 20 °C/68 °F)		0.3 - 0.5 Ω	
Battery	capacity	12V - 12AH	
	current leakage	0.1 mA max.	
	Specific gravity	Fully charged	13.0 - 13.2 V
		Needs charging	Below 12.3 V
Charging current	Normal	1.4 A/5 - 10 h	
	Quick	6.0 A/1.0 h	

### IGNITION SYSTEM

ITEM		SPECIFICATIONS
Spark plug	Standard	DPR7EA - 9 (NGK) X22EPR - U9 (DENSO)
	For cold climate/below 5 °C/41 °F	DPR6EA - 9 (NGK) X20EPR - U9 (DENSO)
	For extended high speed riding	DPR8EA - 9 (NGK) X24EPR - U9 (DENSO)
Spark plug gap		0.80 - 0.90 mm (0.031 - 0.035 in)
Ignition coil primary peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing "F" mark		12° BTDC at idle

### ELECTRIC STARTER/STARTER CLUTCH

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear O. D.	57.749 - 57.768 (2.2736 - 2.2743)	57.639 (2.2692)
Starter clutch housing I. D.	74.414 - 74.440 (2.9297 - 2.9307)	74.50 (2.933)
Starter motor brush length	12.5 - 13.0 (0.49 - 0.51)	6.5 (0.26)
Torque limiter slip torque	16 - 25 N·m (1.6 - 2.5 kgf·m , 12 - 18 lbf·ft)	_____

## GENERAL INFORMATION

LIGHTS/METERS/SWITCHES		ITEM	SPECIFICATIONS
Fuse	Main		30A
	Sub		10A × 5
Bulb	Headlight (high/low beam)		12V – 60/55W
	Tail/brake light		12V – 32/3CP × 2
	License light (VT1100T only)		12V – 4CP
	Front turn signal/running light		12V – 32/3CP × 2
	Rear turn signal light		12V – 32CP × 2
	Meter light		12V – 3W
	High beam indicator		12V – 3.4W
	Turn signal indicator		12V – 3.4W
	Neutral indicator		12V – 3.4W
Fuel pump flow capacity (minimum)			800 cm <sup>3</sup> (27.1 US oz, 28.2 Imp oz) /minute
Thermosensor resistance	80 °C/176 °F		47 – 57 Ω
	120 °C/248 °F		14 – 18 Ω
Fan motor switch	Closed (ON)		98 – 102 °C (208 – 216 °F)
	Open (OFF)		93 – 97 °C (199 – 207 °F)

## TORQUE VALUES (VT1100C)

### STANDARD

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 locking agent to the threads.
  3. Apply molybdenum oil solution to the threads.
  4. Apply grease to the threads and seating surface.
  5. Apply oil to the threads and seating surface.
  6. ALOC bolt. Do not reuse.
  7. Stake.
  8. Left hand threads.

### ENGINE (VT1100C)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>Lubrication:</b>				
Oil drain bolt	1	14	29 (3.0, 22)	
Oil filter cartridge	1	20	9.8 (1.0, 7)	Note 5
Oil pump driven sprocket bolt	1	6	18 (1.8, 13)	Note 2
Oil pump mounting bolt	3	6	12 (1.2, 9)	
Oil pump assembly bolt	2	6	13 (1.3, 9)	
Oil orifice bolt	1	6	9.8 (1.0, 7)	
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	Note 1
<b>Fuel System:</b>				
Carburetor insulator band screw	4	5	2.0 (0.2, 1.4)	
<b>Cooling System:</b>				
Water pump assembly and coolant drain bolt	2	6	13 (1.3, 9)	
Water pump mounting bolt	2	6	12 (1.2, 9)	
<b>Cylinder Head/Valve:</b>				
Spark plug	4	12	14 (1.4, 10)	
Spark plug sleeve	2	30	13 (1.3, 9)	Note 3
Assist shaft cap	6	14	22 (2.2, 16)	
Head cover shroud bolt	8	6	8.8 (0.9, 6.5)	
Cylinder head cover bolt	10	8	26 (2.7, 20)	
cap nut	4	8	26 (2.7, 20)	
	8	10	39 (4.0, 29)	
Rocker arm shaft hole plug	22	6	39 (4.0, 29)	
Cam sprocket bolt	4	7	18 (1.8, 13)	Note 2
Cam chain tensioner bolt	4	6	12 (1.2, 9)	

## GENERAL INFORMATION

ENGINE (VT1100C) [cont'd]					
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS	
<b>Clutch/Gearshift Linkage:</b>					
Clutch cover bolt	7	6	12 (1.2, 9)		
Clutch center lock nut	1	25	98 (10.0, 72)	Note 5, 7	
Clutch lifter plate bolt	5	6	12 (1.2, 9)		
Clutch cable lock nut	1	8	9.8 (1.0, 7)		
L. crankcase rear cover nut	1	6	12 (1.2, 9)		
Primary drive gear bolt	1	12	98 (10.0, 72)	Note 5	
Shift stopper arm pivot bolt	1	6	9.8 (1.0, 7)		
<b>Crankshaft/Transmission:</b>					
R. crankcase bolt	5	6	12 (1.2, 9)		
	10	8	26 (2.7, 20)		
	1	10	39 (4.0, 29)		
Output drive gear shaft bolt (R. crankcase)	1	10	49 (5.0, 36)	Note 2	
L. crankcase bolt	1	6	12 (1.2, 9)		
	2	8	26 (2.7, 20)		
Connecting rod bearing cap nut	4	10	59 (6.0, 43)	Note 5	
Output gear case mounting bolt	3	8	31 (3.2, 23)		
Output drive gear bearing holder bolt	2	8	31 (3.2, 23)	Note 5	
Output driven gear bearing holder bolt	4	8	31 (3.2, 23)	Note 5	
Output drive gear bearing lock nut					
	(inner)	1	30	74 (7.5, 54)	Note 5, 7
	(outer)	1	64	98 (10.0, 72)	Note 5, 7
Output driven gear bearing lock nut					
	(inner)	1	30	74 (7.5, 54)	Note 5, 7
	(outer)	1	64	98 (10.0, 72)	Note 5, 7
R. crankcase bearing setting plate screw	1	6	8.8 (0.9, 6.5)	Note 2	
bolt	4	6	12 (1.2, 9)	Note 2	
<b>Charging System/Alternator:</b>					
Flywheel bolt	1	12	137 (14.0, 101)	Note 5, 8	
<b>Ignition System:</b>					
Timing hole cap	1	45	18 (1.8, 13)	Note 4	
Ignition pulse generator wire clamp bolt (R. crankcase bolt)	1	8	26 (2.7, 20)		
<b>Electric Starter:</b>					
Starter motor terminal nut	2	6	6.9 (0.7, 5.1)		
Starter motor assembly bolt	3	5	4.9 (0.5, 3.6)		
Starter clutch housing bolt	6	8	23 (2.3, 17)	Note 2	
<b>Others:</b>					
6 mm flange bolt (8 mm head: Small flange)	—	—	9.8 (1.0, 7)		
6 mm flange bolt (8 mm head: Large flange)	—	—	12 (1.2, 9)		

**GENERAL INFORMATION**

<b>FRAME (VT1100C)</b>				
<b>ITEM</b>	<b>Q'TY</b>	<b>THREAD DIA. (mm)</b>	<b>TORQUE N-m (kgf-m, lbf-ft)</b>	<b>REMARKS</b>
<b>Frame/Body Panels/Exhaust System:</b>				
Back seat nut	3	6	12 (1.2 , 9)	Note 2
Rear fender bolt	2	10	64 (6.5 , 47)	Note 5
	4	8	26 (2.7 , 20)	
Rear shock absorber upper pivot (grab rail) bolt	2	14	108 (11.0 , 80)	Note 5
Exhaust pipe joint nut	4	8	25 (2.5 , 18)	
Front muffler mounting bolt	2	8	23 (2.3 , 17)	
Front/rear muffler joint bolt	2	8	26 (2.7 , 20)	
Muffler and exhaust pipe band bolt	5	8	20 (2.0 , 14)	
Exhaust pipe cover bolt	5	6	8.8 (0.9 , 6.5)	
Fuel tank mounting bolt (front)	1	6	12 (1.2 , 9)	
(rear)	1	8	26 (2.7 , 20)	
Fuel valve	1	22	34 (3.5 , 25)	
Front footpeg bracket bolt (left)	2	8	26 (2.7 , 20)	
(right)	2	10	39 (4.0 , 29)	
Gearshift arm pinch bolt	1	8	26 (2.7 , 20)	
Side stand pivot bolt	1	10	9.8 (1.0 , 7)	
nut	1	10	29 (3.0 , 22)	
<b>Engine Mount:</b>				
Front lower engine mounting nut	1	10	27 (2.8 , 20)	Note 5
Front upper engine mounting bolt	4	8	26 (2.7 , 20)	
Rear lower engine mounting nut	1	12	64 (6.5 , 47)	Note 5
Rear upper engine mounting nut	1	10	52 (5.3 , 38)	
Sub-frame bolt (front)	2	10	64 (6.5 , 47)	Note 5
(rear)	2	10	39 (4.0 , 29)	
(left)	1	8	26 (2.7 , 20)	
<b>Final Drive:</b>				
Final drive oil filler cap	1	30	12 (1.2 , 9)	
Final drive oil drain bolt	1	8	12 (1.2 , 9)	
Final gear case assembly mounting nut	4	10	64 (6.5 , 47)	
Dust guard plate bolt	1	6	9.8 (1.0 , 7)	
Gear case cover bolt	2	10	47 (4.8 , 35)	Note 2
	6	8	25 (2.6 , 19)	
Pinion gear shaft nut	1	16	108 (11.0 , 80)	Note 2
Pinion retainer lock tab bolt	1	6	9.8 (1.0 , 7)	
Pinion retainer	1	64	108 (11.0 , 80)	
<b>Front Wheel/Suspension/Steering:</b>				
Handlebar upper holder bolt	4	8	29 (3.0 , 22)	
Front axle bolt	1	14	59 (6.0 , 43)	
Front axle pinch bolt	4	8	22 (2.2 , 16)	
Front brake disc bolt	5	8	42 (4.3 , 31)	Note 6
Front turn signal stopper plate bolt	2	6	8.8 (0.9 , 6.5)	
Upper fork pinch bolt	2	7	11 (1.1 , 8)	
Lower fork pinch bolt	2	10	49 (5.0 , 36)	
Fork cap	2	37	23 (2.3 , 17)	
Fork socket bolt	4	8	20 (2.0 , 14)	Note 2
Steering stem nut	1	24	103 (10.5 , 76)	
Steering bearing adjustment nut	1	26	21 (2.1 , 15)	(page 13-29)

## GENERAL INFORMATION

FRAME (VT1100C) [cont'd]				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>Rear Wheel/Brake/Suspension:</b>				
Rear axle nut	1	18	88 (9.0 , 65)	
Rear axle pinch bolt	1	8	26 (2.7 , 20)	
Rear brake arm pinch bolt	1	8	26 (2.7 , 20)	
Rear brake pivot arm pinch bolt	1	8	26 (2.7 , 20)	
Rear brake stopper arm bolt	2	8	22 (2.2 , 16)	
Shock absorber upper mounting bolt	2	8	26 (2.7 , 20)	
lower mounting bolt (left)	1	8	23 (2.3 , 17)	
lower mounting bolt (right)	1	10	34 (3.5 , 25)	
Swingarm right pivot lock nut	1	30	113 (11.5 , 83)	
Swingarm pivot bolt (left)	1	30	103 (10.5 , 76)	
(right)	1	30	18 (1.8 , 13)	
<b>Hydraulic Disc Brake:</b>				
Caliper bleed valve	1	8	5.9 (0.6 , 4.3)	
Pad pin plug	1	10	2.9 (0.3 , 2.2)	
Pad pin	1	10	18 (1.8 , 13)	
Brake hose oil bolt	2	10	34 (3.5 , 25)	
Front brake lever pivot bolt	1	6	1.0 (0.1 , 0.7)	
nut	1	6	5.9 (0.6 , 4.3)	
Front master cylinder holder bolt	2	6	12 (1.2 , 9)	
Front master cylinder reservoir cap screw	2	4	2.0 (0.2 , 1.4)	
Front brake light switch screw	1	4	1.0 (0.1 , 0.7)	
Front caliper mounting bolt	2	10	45 (4.6 , 33)	Note 6
Front caliper bracket pin bolt	1	8	13 (1.3 , 9)	Note 2
Front caliper pin bolt	1	8	23 (2.3 , 17)	Note 2
<b>Lights/Meters/Switches:</b>				
Headlight attaching bolt	2	5	9.8 (1.0 , 7)	
Side stand switch bolt	1	6	9.8 (1.0 , 7)	
Fan motor switch	1	16	18 (1.8 , 13)	
Thermosensor	1	PT 1/8	8.8 (0.9 , 6.5)	Note 1
Neutral switch	1	10	12 (1.2 , 9)	
Ignition switch mounting bolt	2	6	9.8 (1.0 , 7)	
Horn mounting bolt	1	8	21 (2.1 , 15)	

## TORQUE VALUES (VT1100T)

### STANDARD

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 locking agent to the threads.
  3. Apply molybdenum oil solution to the threads.
  4. Apply grease to the threads and seating surface.
  5. Apply oil to the threads and seating surface.
  6. ALOC bolt. Do not reuse.
  7. Stake.
  8. Left hand threads.

### ENGINE (VT1100T)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>Lubrication:</b>				
Oil drain bolt	1	14	29 (3.0, 22)	
Oil filter cartridge	1	20	10 (1.0, 7)	Note 5
Oil pump driven sprocket bolt	1	6	18 (1.8, 13)	Note 2
Oil pump mounting bolt	3	6	12 (1.2, 9)	
Oil pump assembly bolt	2	6	13 (1.3, 9)	
Oil orifice bolt	1	6	10 (1.0, 7)	
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	Note 1
<b>Fuel System:</b>				
Carburetor insulator band screw	4	5	2 (0.2, 1.4)	
<b>Cooling System:</b>				
Water pump assembly and coolant drain bolt	2	6	13 (1.3, 9)	
Water pump mounting bolt	2	6	12 (1.2, 9)	
<b>Cylinder Head/Valve:</b>				
Spark plug	4	12	14 (1.4, 10)	
Spark plug sleeve	2	30	13 (1.3, 9)	Note 3
Assist shaft cap	6	14	22 (2.2, 16)	
Head cover shroud bolt	8	6	9 (0.9, 6.5)	
Cylinder head cover bolt	10	8	26 (2.7, 20)	
cap nut	4	8	26 (2.7, 20)	
	8	10	43 (4.4, 32)	
Rocker arm shaft hole plug	6	22	39 (4.0, 29)	
Cam sprocket bolt	4	7	18 (1.8, 13)	Note 2
Cam chain tensioner bolt	4	6	12 (1.2, 9)	



## GENERAL INFORMATION

ENGINE (VT1100T) [cont'd]				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>Clutch/Gearshift Linkage:</b>				
Clutch cover bolt	7	6	12 (1.2, 9)	
Clutch center lock nut				
VT1100T and '97 – '00 VT1100C:	1	25	98 (10.0, 72)	Note 5, 7
After '00 VT1100C:	1	25	127 (13.0, 94)	Note 5, 7
Clutch lifter plate bolt	5	6	12 (1.2, 9)	
Clutch cable lock nut	1	8	10 (1.0, 7)	
Left crankcase rear cover nut	1	6	12 (1.2, 9)	
Primary drive gear bolt	1	12	98 (10.0, 72)	Note 5
Shift stopper arm pivot bolt	1	6	10 (1.0, 7)	
<b>Crankshaft/Transmission:</b>				
Right crankcase bolt	5	6	12 (1.2, 9)	
	10	8	26 (2.7, 20)	
	1	10	39 (4.0, 29)	
Output drive gear shaft bolt (R. crankcase)	1	10	49 (5.0, 36)	Note 2
Left crankcase bolt	1	6	12 (1.2, 9)	
	2	8	26 (2.7, 20)	
Connecting rod bearing cap nut	4	10	59 (6.0, 43)	Note 5
Output gear case mounting bolt	3	8	31 (3.2, 23)	
Output drive gear bearing holder bolt	2	8	31 (3.2, 23)	Note 5
Output driven gear bearing holder bolt	4	8	31 (3.2, 23)	Note 5
Output drive gear bearing lock nut				
(inner)	1	30	74 (7.5, 54)	Note 5, 7
(outer)	1	64	98 (10.0, 72)	Note 5, 7
Output driven gear bearing lock nut				
(inner)	1	30	74 (7.5, 54)	Note 5, 7
(outer)	1	64	98 (10.0, 72)	Note 5, 7
Right crankcase bearing setting plate screw	1	6	9 (0.9, 6.5)	Note 2
bolt	4	6	12 (1.2, 9)	Note 2
<b>Charging System/Alternator:</b>				
Flywheel bolt	1	12	137 (14.0, 101)	Note 5, 8
<b>Ignition System:</b>				
Timing hole cap	1	45	18 (1.8, 13)	Note 4
Ignition pulse generator wire clamp bolt (R. crankcase bolt)	1	8	26 (2.7, 20)	
<b>Electric Starter:</b>				
Starter motor terminal nut	2	6	7 (0.7, 5.1)	
Starter motor assembly bolt	3	5	5 (0.5, 3.6)	
Starter clutch housing bolt	6	8	23 (2.3, 17)	Note 2
<b>Others:</b>				
6 mm flange bolt (8 mm head: Small flange)	—	—	10 (1.0, 7)	
6 mm flange bolt (8 mm head: Large flange)	—	—	12 (1.2, 9)	

FRAME (VT1100C)	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>Frame/Body Panels/Exhaust System:</b>				
Rear fender bolt	2	10	64 (6.5 , 47)	Note 5
	4	8	26 (2.7 , 20)	
Rear shock absorber upper pivot (grab rail) bolt	2	14	108 (11.0 , 80)	Note 5
Exhaust pipe joint nut	4	8	23 (2.3 , 17)	
Muffler mounting bolt	4	8	26 (2.7 , 20)	
Muffler band bolt	4	8	20 (2.0 , 14)	
Exhaust pipe cover bolt	3	6	8.8 (0.9 , 6.5)	
Fuel tank mounting bolt (front)	1	6	12 (1.2 , 9)	
(rear)	1	8	26 (2.7 , 20)	
Fuel valve	1	22	34 (3.5 , 25)	
Front footpeg bracket bolt	4	8	26 (2.7 , 20)	
Gearshift pedal pinch bolt	1	6	23 (2.3 , 17)	
Side stand pivot bolt	1	10	9.8 (1.0 , 7)	
nut	1	10	29 (3.0 , 22)	
<b>Engine Mount:</b>				
Front lower engine mounting nut	1	10	39 (4.0 , 29)	
Front upper engine mounting bolt	5	8	26 (2.7 , 20)	
Rear lower engine mounting nut	1	10	54 (5.5 , 40)	
Rear upper engine mounting nut	1	10	54 (5.5 , 40)	
Sub-frame bolt (front)	2	10	64 (6.5 , 47)	Note 5
(rear)	2	10	39 (4.0 , 29)	
(left)	2	8	26 (2.7 , 20)	
<b>Final Drive:</b>				
Final drive oil filler cap	1	30	12 (1.2 , 9)	
Final drive oil drain bolt	1	8	12 (1.2 , 9)	
Final gear case assembly mounting nut	4	10	64 (6.5 , 47)	
Dust guard plate bolt	1	6	9.8 (1.0 , 7)	
Gear case cover bolt	2	10	47 (4.8 , 35)	Note 2
	6	8	25 (2.6 , 19)	
Pinion gear shaft nut	1	16	108 (11.0 , 80)	Note 2
Pinion retainer lock tab bolt	1	6	9.8 (1.0 , 7)	
Pinion retainer	1	64	108 (11.0 , 80)	
<b>Front Wheel/Suspension/Steering:</b>				
Handlebar upper holder bolt	4	8	29 (3.0 , 22)	
Front axle bolt	1	14	59 (6.0 , 43)	
Front axle pinch bolt	4	8	22 (2.2 , 16)	
Front brake disc bolt	6	8	42 (4.3 , 31)	Note 6
Front turn signal stopper plate bolt	2	6	8.8 (0.9 , 6.5)	
Upper fork pinch bolt	2	7	11 (1.1 , 8)	
Lower fork pinch bolt	2	10	49 (5.0 , 36)	
Fork cap	2	37	23 (2.3 , 17)	
Fork socket bolt	2	8	22 (2.2 , 16)	Note 2
Steering stem nut	1	24	103 (10.5 , 76)	
Steering bearing adjustment nut	1	26	21 (2.1 , 15)	(page 13-29)
Front brake hose clamp bolt	2	6	12 (1.2 , 9)	

## GENERAL INFORMATION

FRAME (VT1100T) [cont'd]				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
<b>Rear Wheel/Brake/Suspension:</b>				
Rear axle nut	1	18	88 (9.0 , 65)	
Rear axle pinch bolt	1	8	26 (2.7 , 20)	
Rear brake disc bolt	6	8	42 (4.3 , 31)	Note 6
Damper holder plate bolt	5	6	20 (2.0 , 14)	Note 6
Shock absorber upper mounting bolt	2	8	26 (2.7 , 20)	
lower mounting bolt (left)	1	8	23 (2.3 , 17)	
(right)	1	10	34 (3.5 , 25)	
Rear brake hose clamp bolt	4	6	12 (1.2 , 9)	Note 6
Swingarm right pivot lock nut	1	30	113 (11.5 , 83)	
Swingarm pivot bolt (left)	1	30	103 (10.5 , 76)	
(right)	1	30	18 (1.8 , 13)	
<b>Hydraulic Disc Brake:</b>				
Caliper bleed valve	2	8	5.9 (0.6 , 4.3)	
Pad pin plug	2	10	2.9 (0.3 , 2.2)	
Pad pin	2	10	18 (1.8 , 13)	
Brake hose oil bolt	4	10	34 (3.5 , 25)	
Front brake lever pivot bolt	1	6	1.0 (0.1 , 0.7)	
nut	1	6	5.9 (0.6 , 4.3)	
Front master cylinder holder bolt	2	6	12 (1.2 , 9)	
Front master cylinder reservoir cap screw	2	4	2.0 (0.2 , 1.4)	
Front brake light switch screw	1	4	1.0 (0.1 , 0.7)	
Front caliper mounting bolt	2	8	30 (3.1 , 22)	Note 6
Front caliper bracket pin bolt	1	8	13 (1.3 , 9)	Note 2
Front caliper pin bolt	1	8	23 (2.3 , 17)	Note 2
Rear master cylinder reservoir cover bolt	1	6	1.0 (0.1 , 0.7)	
Rear master cylinder reservoir mounting bolt	1	6	12 (1.2 , 9)	
Rear master cylinder mounting bolt	2	6	12 (1.2 , 9)	
Rear master cylinder hose joint screw	1	4	2.0 (0.2 , 1.4)	Note 2
Rear master cylinder push rod lock nut	1	8	18 (1.8 , 13)	
Rear caliper stopper pin bolt	1	18	69 (7.0 , 51)	Note 6
Rear caliper pin bolt	1	12	27 (2.8 , 20)	Note 2
Rear caliper bracket bolt	1	8	23 (2.3 , 17)	
<b>Lights/Meters/Switches:</b>				
Headlight attaching bolt	2	5	3.9 (0.4 , 2.9)	
Side stand switch bolt	1	6	9.8 (1.0 , 7)	
Fan motor switch	1	16	18 (1.8 , 13)	
Thermosensor	1	PT 1/8	8.8 (0.9 , 6.5)	Note 1
Neutral switch	1	10	12 (1.2 , 9)	
Ignition switch mounting bolt	2	6	9.8 (1.0 , 7)	
Ignition switch cover screw	2	4	2.0 (0.2 , 1.4)	
Horn mounting bolt	1	8	21 (2.1 , 15)	

TOOLS

DESCRIPTION	TOOL NUMBER	ALTERNATIVE TOOL	TOOL NUMBER
Carburetor float level gauge	07401-0010000		
Oil pressure gauge	07506-3000000		
Oil pressure gauge attachment	07510-4220100		
Gear holder	07724-0010100		
Flywheel holder	07725-0040000		
Rotor puller	07733-0020001		07933-3290001 (U. S. A. only)
Adjustable bearing puller, 25-40 mm	07736-A01000B (U. S. A. only)		07736-A01000A (U. S. A. only)
Remover weight	07741-0010201	Remover weight	07936-371020A or 07936-3710200
Valve guide remover, 6.6 mm	07742-0010200	Valve guide remover, 6.6 mm	07942-6570100 (U. S. A. only)
Valve guide driver	07743-0020000		
Attachment, 32 × 35 mm	07746-0010100		
Attachment, 37 × 40 mm	07746-0010200		
Attachment, 42 × 47 mm	07746-0010300		
Attachment, 52 × 55 mm	07746-0010400		
Attachment, 62 × 68 mm	07746-0010500		
Attachment, 72 × 78 mm	07746-0010600		
Attachment, 24 × 26 mm	07746-0010700		
Driver, 40 mm I. D.	07746-0030100		
Attachment, 25 mm I. D.	07746-0030200		
Attachment, 30 mm I. D.	07746-0030300		
Pilot, 10 mm	07746-0040100		
Pilot, 17 mm	07746-0040400		
Pilot, 20 mm	07746-0040500		
Pilot, 30 mm	07746-0040700		
Pilot, 28 mm	07746-0041100		
Bearing remover shaft	07746-0050100		
Bearing remover head, 20 mm	07746-0050600		
Driver	07749-0010000		
Valve spring compressor	07757-0010000		
Valve seat cutter, 40 mm (45° EX)	07780-0010500	Equivalent commercially available in U. S. A.	
Valve seat cutter, 33 mm (45° IN)	07780-0010800		
Valve seat cutter, 35 mm (32° IN)	07780-0012300		
Valve seat cutter, 42 mm (32° EX)	07780-0013000		
Valve seat cutter, 37.5 mm (60° IN)	07780-0014100		
Valve seat cutter, 42 mm (60° EX)	07780-0014400		
Valve seat cutter holder	07781-0010202		
Pivot adjust wrench	07908-4690003	Pivot adjust wrench	07908-4690002
Pilot screw wrench	07908-4730001	Equivalent commercially available in U. S. A.	
Retainer wrench	07910-ME80000		
Snap ring pliers	07914-3230001		
Snap ring pliers	07914-5670101	Not available in U. S. A.	07914-5670100
Steering stem socket	07916-3710101	Steering stem socket	07916-3710100
Lock nut wrench, 30 × 64 mm	07916-MB00001	Lock nut wrench, 30 × 64 mm	07916-MB00000
Shaft holder	07923-6890101		

## GENERAL INFORMATION

DESCRIPTION	TOOL NUMBER	ALTERNATIVE TOOL	TOOL NUMBER
Pinion joint holder	07926—ME90000	Pinion holder plate Collar set "C"	07924—ME40010
Joint holder attachment	07HMB—MM80100		07924—ME40020
Fork tube holder attachment	07930—KA50100		
Bearing race insert attachment	07931—4630300		
Bearing puller & driver attachment	07934—MB00000	Bearing puller & driver attachment	07965—MB0010A or 07965—MB00100 (U. S. A. only)
Bearing remover set, 20 mm	07936—3710001	Not available in U. S. A.	
— remover handle	07936—3710100		
— bearing remover, 20 mm	07936—3710600		
— remover weight	07741—0010201	Remover weight	07936—3710200
Remover handle	07936—3710100		
Bearing remover, 17 mm	07936—3710300		
Bearing remover set, 10 mm	07936—GE00000	Equivalent commercially available in U. S. A.	
— remover shaft	07936—GE00100		
— bearing remover, 10 mm	07936—GE00200		
— remover weight	07741—0010201		
Valve guide driver, 6.6 mm	07942—6570100		
Attachment	07945—3330300		
Bearing remover	07946—3710500	Bearing remover	M9360—277—91774 (U. S. A. only)
Steering stem driver	07946—MB00000		
Fork seal driver body	07947—KA50100		
Fork seal driver attachment, 41 mm I. D.	07947—KF00100		
Bearing remover	07948—4630100		
Driver	07949—3710001		
Ball race remover	07953—MJ10000	Ball race remover	07953—MJ1000B or 07953—MJ1000A (U. S. A. only)
— remover attachment	07953—MJ10100		
— remover handle	07953—MJ10200		
Damper spring compressor	07964—ME90000	Assembly bolt Assembly collar	07965—1660200 07965—166030A or 07965—1660300
		Threaded adaptor Compressor seat	07965—KA30000 07967—9690200
Dis/assembly tool	07965—3710101		
Attachment	07965—MA10100		
Hydraulic tappet bleeder	07973—MJ00000		
Valve guide reamer, 6.6 mm	07984—ZE20001	Valve guide reamer, 6.6 mm	07984—ZE2000D (U. S. A. only)
Torque limiter attachment	07998—MG80000	Not available in U. S. A.	
Bearing driver attachment	07GAD—SD40101		
Oil filter wrench	07HAA—PJ70100		
Peak voltage adaptor	07HGJ—0020100	Peak voltage tester	(U. S. A. only)
Pinion puller set	07HMC—MM80100	Not available in U. S. A. Puller shaft 22 × 1.5 × 240 mm	07931—ME9010B (U. S. A. only)
Pinion puller set	07935—MB00000	Puller base "A"	07HMC—MM8011A (U. S. A. only)
Pinion puller attachment	07HMC—MM80200		
Clutch center holder	07JMB—MN50301	Clutch center holder	07HGB—001000A (U. S. A. only)
Vacuum gauge set	07LMJ—001000A	Vacuum gauge set	M937B—021—XXXXX (U. S. A. only)
Vacuum/Pressure pump	A937X—041—XXXXX	Vacuum pump	ST—AH—260—MC7 (U. S. A. only)
		Pressure pump	ST—AH—255—MC7 (U. S. A. only)

**LUBRICATION & SEAL POINTS (VT1100C)**

ENGINE (VT1100C) LOCATION	MATERIAL	REMARKS
Right – left crankcase mating surfaces Cylinder head – head cover mating surfaces  Camshaft plug seating surfaces Ignition pulse generator wire grommet seating surface Alternator wire grommet seating surface Oil pressure switch threads  Thermosensor thereads  Right crankcase cover bolt Left crankcase cover bolt	Liquid sealant	Do not apply around the hydraulic tappet holes.  Do not apply sealant to the thread head (page 4-3). Do not apply sealant to the sensor head. Only two bolts (page 10-12). Only one bolt (page 16-10).
Clutch outer sliding surface Clutch outer guide outer surface Rocker arm shaft sliding surfaces Rocker arm slipper surfaces Spark plug sleeve threads and O-ring grooves Camshaft journals and lobes Valve stem (valve guide sliding surface) Piston pin outer surface Piston pin hole Connecting rod small end inner surfaces Connecting rod bearing thrust surfaces Crankshaft main journal bearing thrust surfaces Transmission gearshift fork grooves Transmission gear spline bushing outer surfaces Transmission gear bushing inner and outer surfaces Transmission gearshift fork sliding surfaces Output gear bushing inner and outer surfaces Starter reduction gear shaft outer surface Other gear engaging portions and rotating surfaces	Molybdenum oil solution (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
Timing hole cap threads Oil seal lips	Multi-purpose grease	
Oil filter cartridge threads and O-ring Clutch center lock nut threads Clutch disc sliding surfaces Piston and piston ring outer surfaces Connecting rod bolt/nut threads and seating surfaces Output drive gear shaft bearing holder bolt threads Output driven gear shaft bearing holder bolt threads Output drive gear shaft bearing inner/outer lock nut threads Output driven gear shaft bearing inner/outer lock nut threads Flywheel bolt threads and seating surfaces Primary drive gear bolt threads and seating surface Bearings O-rings Other sliding and rotating surfaces	Engine oil	
Air cleaner connecting tube – housing mating portion	Honda bond A or equivalent	

**GENERAL INFORMATION**

ENGINE (VT1100C) [cont'd]		
LOCATION	MATERIAL	REMARKS
Oil filter boss threads (crankcase side only)	Locking agent	Coating width: 6.5 mm (0.26 in)
Oil pump driven sprocket bolt threads		
Cam sprocket bolt threads		
Clutch lifter arm holder mounting bolt threads		
Mainshaft and countershaft bearing setting plate bolt threads		
Gearshift drum setting plate screw and bolt threads		
Gearshift cam bolt threads		
Output drive gear shaft bolt (R. crankcase) threads		
Alternator stator bolt threads		
Starter clutch outer bolt threads		
		Only one bolt (page 10-9).

FRAME (VT1100C)		
LOCATION	MATERIAL	REMARKS
Final gear case – case cover mating surfaces	Liquid sealant	Do not apply around the dowel holes.
Final driven flange spline, O-ring and O-ring groove Final driven flange – final gear case O-ring guide joint portion Rear wheel hub – final driven flange mating surface, wheel hub O-ring and O-ring groove Final driven flange drive pins	Molybdenum disulfide paste	Apply 5 g. Apply 1 – 2 g. Apply 3 – 5 g.
Final drive pinion joint spline  Final drive shaft spline (universal joint) Output driven gear shaft spline (universal joint) Final drive shaft oil seal lip	Molybdenum disulfide grease	Apply 2 g.  Apply 1 g. Apply 1 g. Apply 0.5 g.
Front and rear footpeg pivot Side stand pivot Final gear case O-ring (3 places) Final gear case oil seal lips (3 places) Speedometer gear and pinion Front wheel dust seal lips Throttle grip pipe flange cable groove Clutch lever pivot Steering head bearing Steering head bearing dust seal lips Swingarm pivot bearing Swingarm pivot bearing dust seal lips Rear brake pedal pivot and dust seal lips Rear brake middle arm pivot Rear brake cam and anchor pin sliding surfaces Gearshift pedal pivot and dust seal lips Gearshift tie-rod ball joints	Multi-purpose grease	Fill up 3 g per each bearing.
Throttle cable Clutch cable Choke cable Speedometer cable	Cable lubricant	
Brake master piston and cup Caliper piston	DOT 4 brake fluid	
Brake lever pivot Front brake lever – piston contacting portion Caliper piston seals Caliper pin boot inside Caliper bracket pin boot inside	Silicone grease	
Rear fender 10 mm bolt threads Rear shock absorber upper pivot (grab rail) bolt threads Sub-frame bolt threads (right front side only) Front lower engine mounting nut threads Rear lower engine mounting nut threads Steering bearing adjustment nut threads	Engine oil	
Front fork dust seal lips Front fork oil seal lips	Pro Honda Suspension Fluid SS-8	



## GENERAL INFORMATION

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<b>FRAME (VT1100C) [cont'd]</b> <b>LOCATION</b>	<b>MATERIAL</b>	<b>REMARKS</b>
Left handlebar grip rubber Caliper pad retainer seating surface	Honda bond A or equivalent	
Back seat nut threads Final gear case cover 10 mm bolt threads Final drive pinion gear shaft nut threads Final gear case stud bolt threads (gear case side only) Front fork socket bolt threads Front caliper pin bolt threads Front caliper bracket pin bolt threads	Locking agent	

**LUBRICATION & SEAL POINTS (VT1100T)**

<b>ENGINE (VT1100T)</b>		
<b>LOCATION</b>	<b>MATERIAL</b>	<b>REMARKS</b>
Right – left crankcase mating surfaces Cylinder head – head cover mating surfaces  Camshaft plug seating surfaces Ignition pulse generator wire grommet seating surface Alternator wire grommet seating surface Oil pressure switch threads  Thermosensor threads  Right crankcase cover bolt Left crankcase cover bolt	Liquid sealant	Do not apply around the hydraulic tappet holes.  Do not apply sealant to the thread head (page 4-3). Do not apply sealant to the sensor head. Only two bolts (page 10-12). Only one bolt (page 16-10).
Clutch outer sliding surface Clutch outer guide outer surface Rocker arm shaft sliding surfaces Rocker arm slipper surfaces Spark plug sleeve threads and O-ring grooves Camshaft journals and lobes Valve stem (valve guide sliding surface) Piston pin outer surface Piston pin hole Connecting rod small end inner surfaces Connecting rod bearing thrust surfaces Crankshaft main journal bearing thrust surfaces Transmission gearshift fork grooves Transmission gear spline bushing outer surfaces Transmission gear bushing inner and outer surfaces Transmission gearshift fork sliding surfaces Output gear bushing inner and outer surfaces Starter reduction gear shaft outer surface Other gear engaging portions and rotating surfaces	Molybdenum oil solution (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
Timing hole cap threads Oil seal lips	Multi-purpose grease	
Oil filter cartridge threads and O-ring Clutch center lock nut threads Clutch disc sliding surfaces Piston and piston ring outer surfaces Connecting rod bolt/nut threads and seating surfaces Output drive gear shaft bearing holder bolt threads Output driven gear shaft bearing holder bolt threads Output drive gear shaft bearing inner/outer lock nut threads Output driven gear shaft bearing inner/outer lock nut threads Flywheel bolt threads and seating surfaces Primary drive gear bolt threads and seating surface Bearings O-rings Other sliding and rotating surfaces	Engine oil	
Air cleaner connecting tube – housing mating portion	Honda bond A or equivalent	

## GENERAL INFORMATION

ENGINE (VT1100T) [cont'd]		
LOCATION	MATERIAL	REMARKS
Oil filter boss threads (crankcase side only)	Locking agent	Coating width: 6.5 mm (0.26 in)
Oil pump driven sprocket bolt threads		
Cam sprocket bolt threads		
Clutch lifter arm holder mounting bolt threads		
Mainshaft and countershaft bearing setting plate bolt threads		
Gearshift drum setting plate screw and bolt threads		
Gearshift cam bolt threads		
Output drive gear shaft bolt (R. crankcase) threads		
Alternator stator bolt threads		
Starter clutch outer bolt threads		
		Only one bolt (page 10-9).

## GENERAL INFORMATION

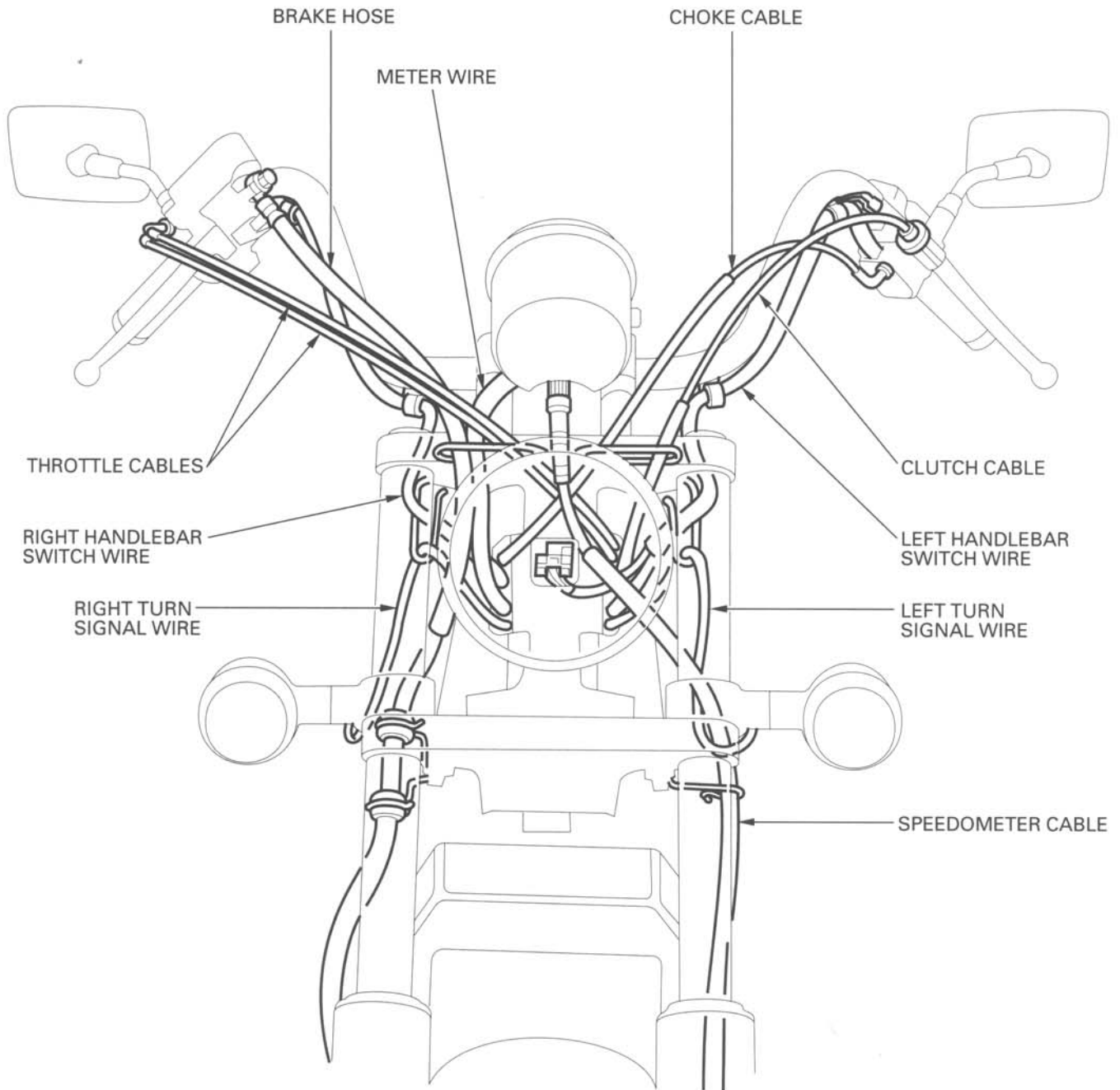
<b>FRAME (VT1100T)</b>		
LOCATION	MATERIAL	REMARKS
Final gear case – case cover mating surfaces	Liquid sealant	Do not apply around the dowel holes.
Final driven flange spline, O-ring and O-ring groove Final driven flange – final gear case O-ring guide joint portion Rear wheel hub – final driven flange mating surface, wheel hub O-ring and O-ring groove	Molybdenum disulfide paste	Apply 5 g. Apply 1–2 g. Apply 3 g to Hub End and 3 g to Driven Flange.
Final drive pinion joint spline Final drive shaft spline (universal joint) Output driven gear shaft spline (universal joint) Final drive shaft oil seal lip	Molybdenum disulfide grease	Apply 2 g. Apply 1 g. Apply 1 g. Apply 0.5 g.
Front and rear footpeg pivot Side stand pivot Final gear case O-ring (3 places) Final gear case oil seal lips (3 places) Speedometer gear and pinion Front wheel dust seal lips Throttle grip pipe flange cable groove Clutch lever pivot Steering head bearing Steering head bearing dust seal lips Swingarm pivot bearing Swingarm pivot bearing dust seal lips Rear brake pedal pivot and dust seal lips	Multi-purpose grease	Fill up 3 g per each bearing.
Throttle cable Clutch cable Choke cable Speedometer cable	Cable lubricant	
Brake master piston and cup Caliper piston	DOT 4 brake fluid	
Brake lever pivot Front brake lever – piston contacting portion Rear master cylinder push rod – piston contacting portion Caliper piston seals Caliper pin boot inside Caliper bracket pin boot inside	Silicone grease	
Rear fender 10 mm bolt threads Rear shock absorber upper pivot (grab rail) bolt threads Sub-frame bolt threads (right front side only) Steering bearing adjustment nut threads	Engine oil	
Front fork dust seal lips Front fork oil seal lips	Pro Honda Suspension Fluid SS-8	

## GENERAL INFORMATION

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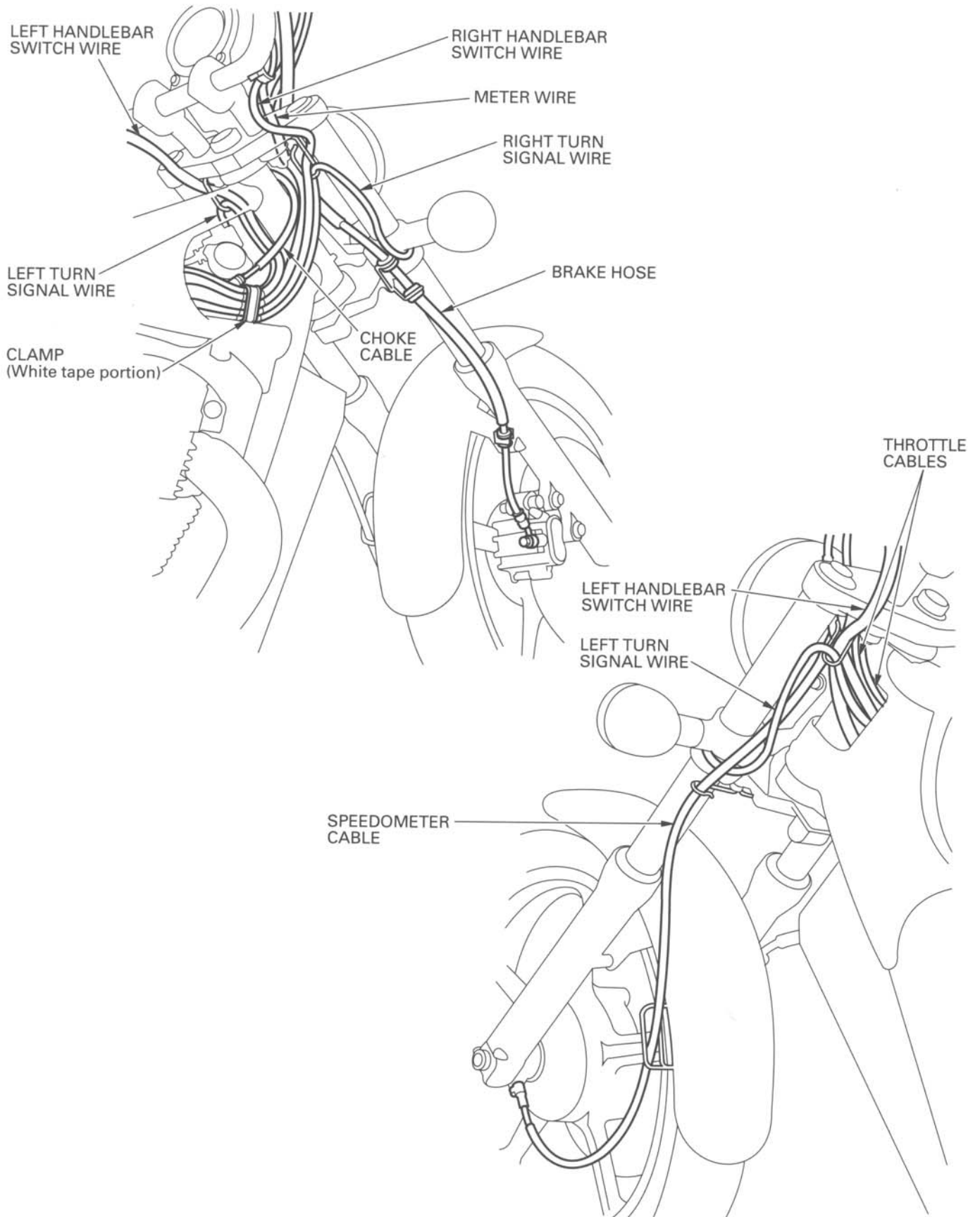
<b>FRAME (VT1100T) [cont'd]</b> <b>LOCATION</b>	<b>MATERIAL</b>	<b>REMARKS</b>
Left handlebar grip rubber Caliper pad retainer seating surface	Honda bond A or equivalent	
Final gear case cover 10 mm bolt threads Final drive pinion gear shaft nut threads Final gear case stud bolt threads (gear case side only) Front fork socket bolt threads Front caliper pin bolt threads Front caliper bracket pin bolt threads Rear master cylinder hose joint screw Rear caliper pin bolt threads	Locking agent	

CABLE & HARNESS ROUTING (VT1100C)

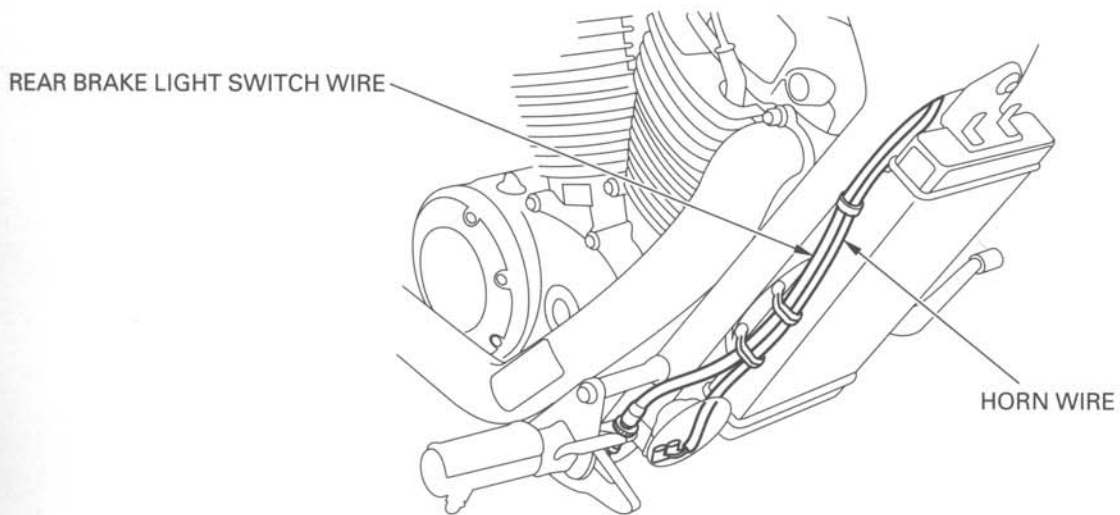
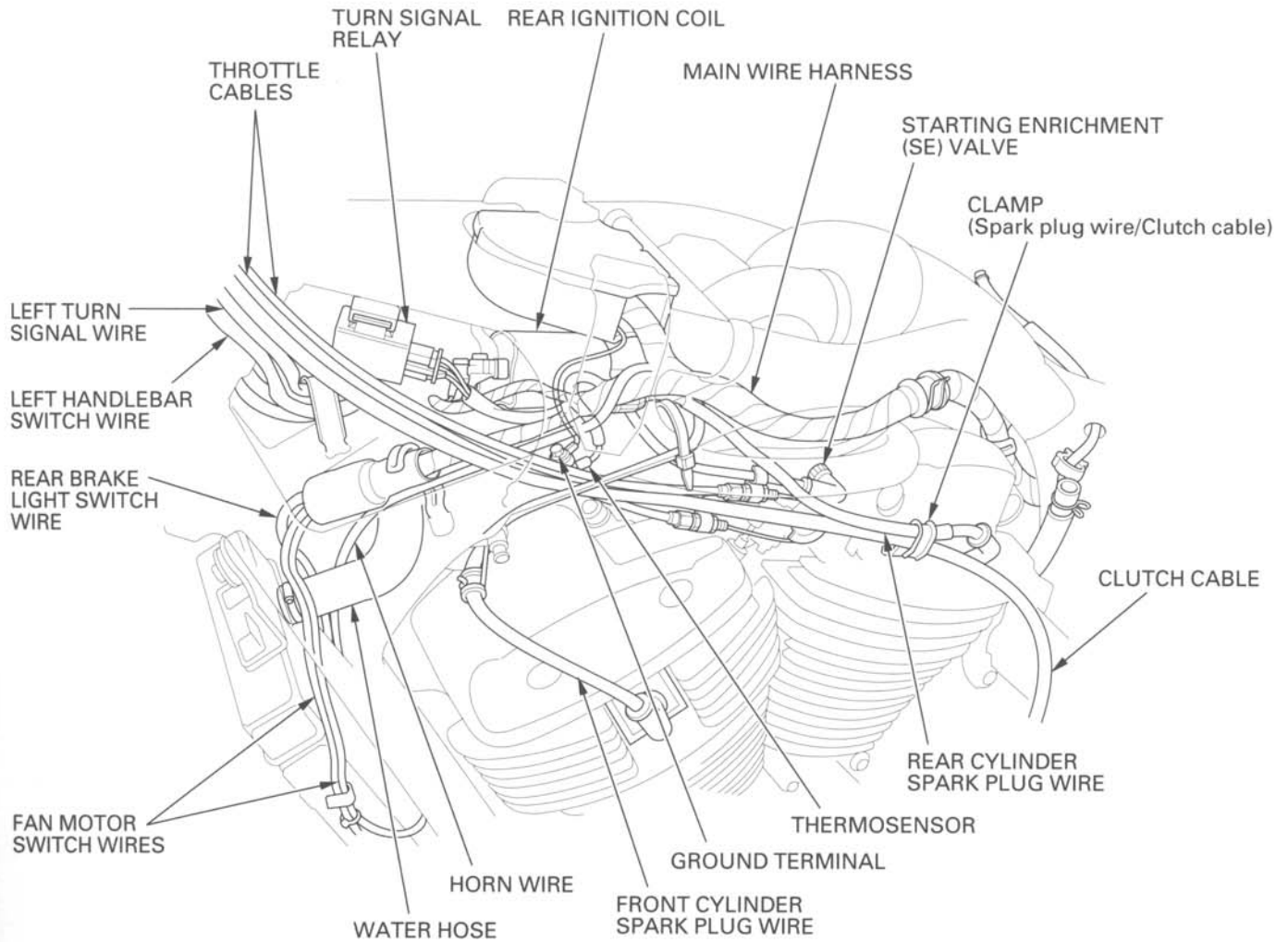


# GENERAL INFORMATION

## VT1100C:



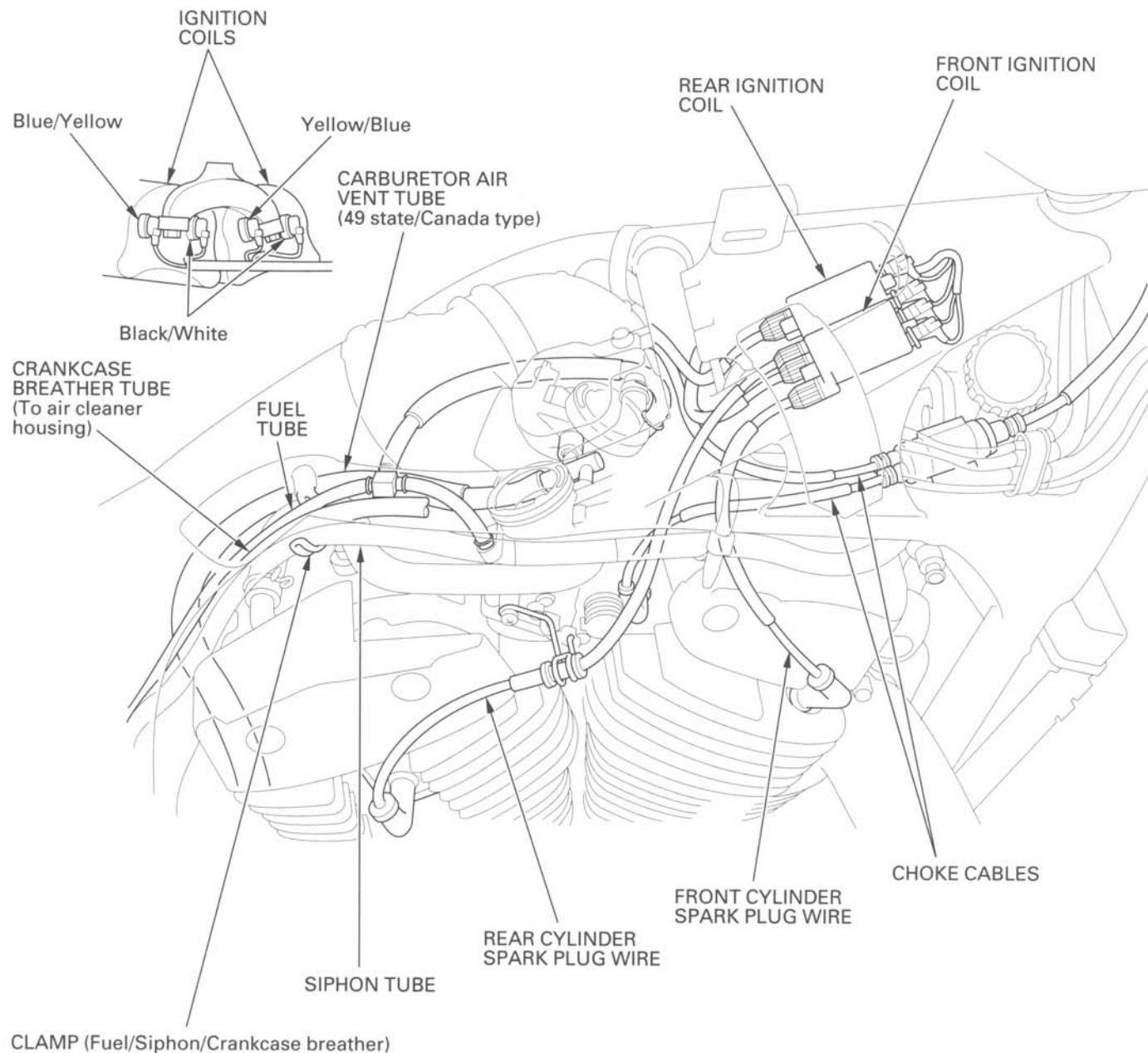
VT1100C:





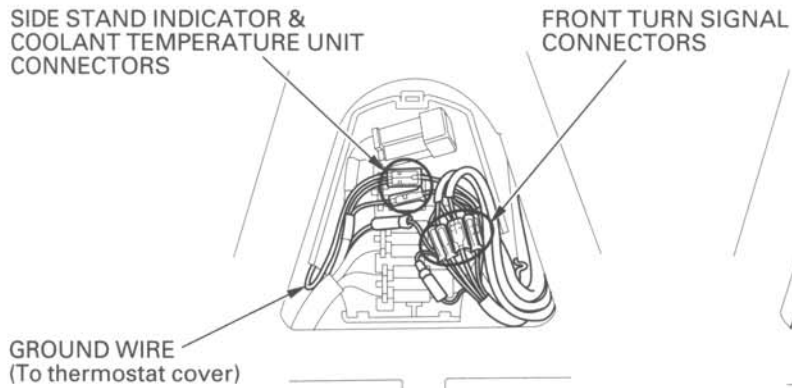
# GENERAL INFORMATION

## VT1100C:

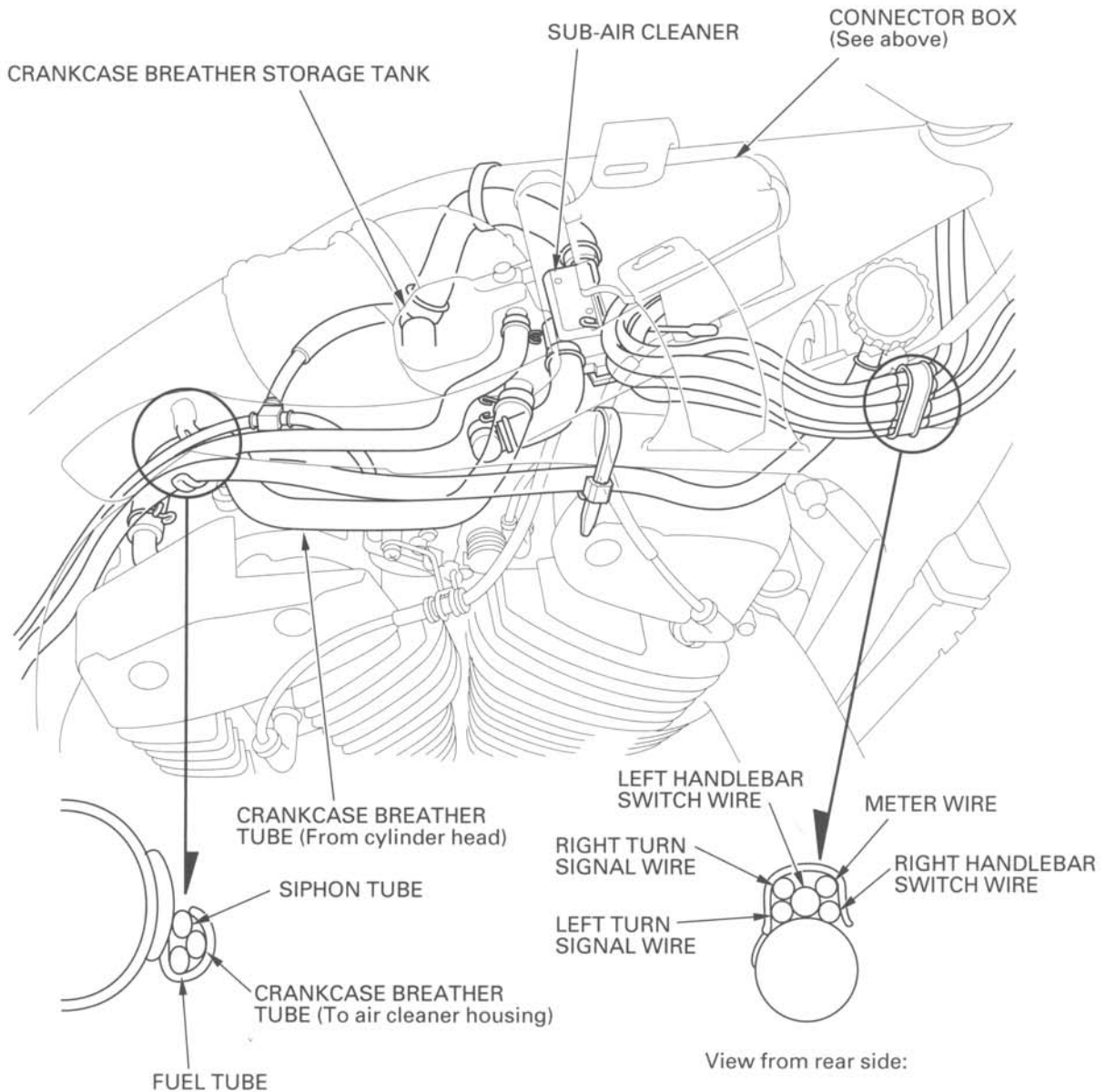
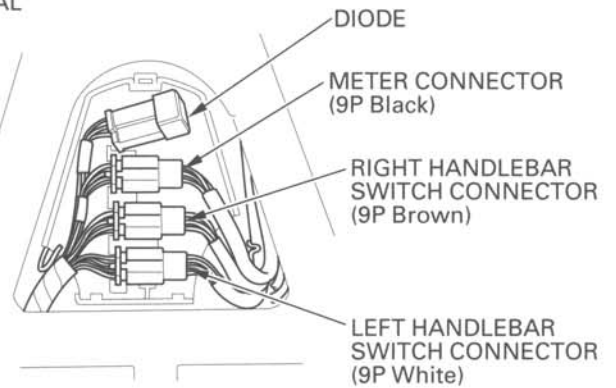


**'97 - '00 VT1100C:**

INSIDE CONNECTOR BOX:

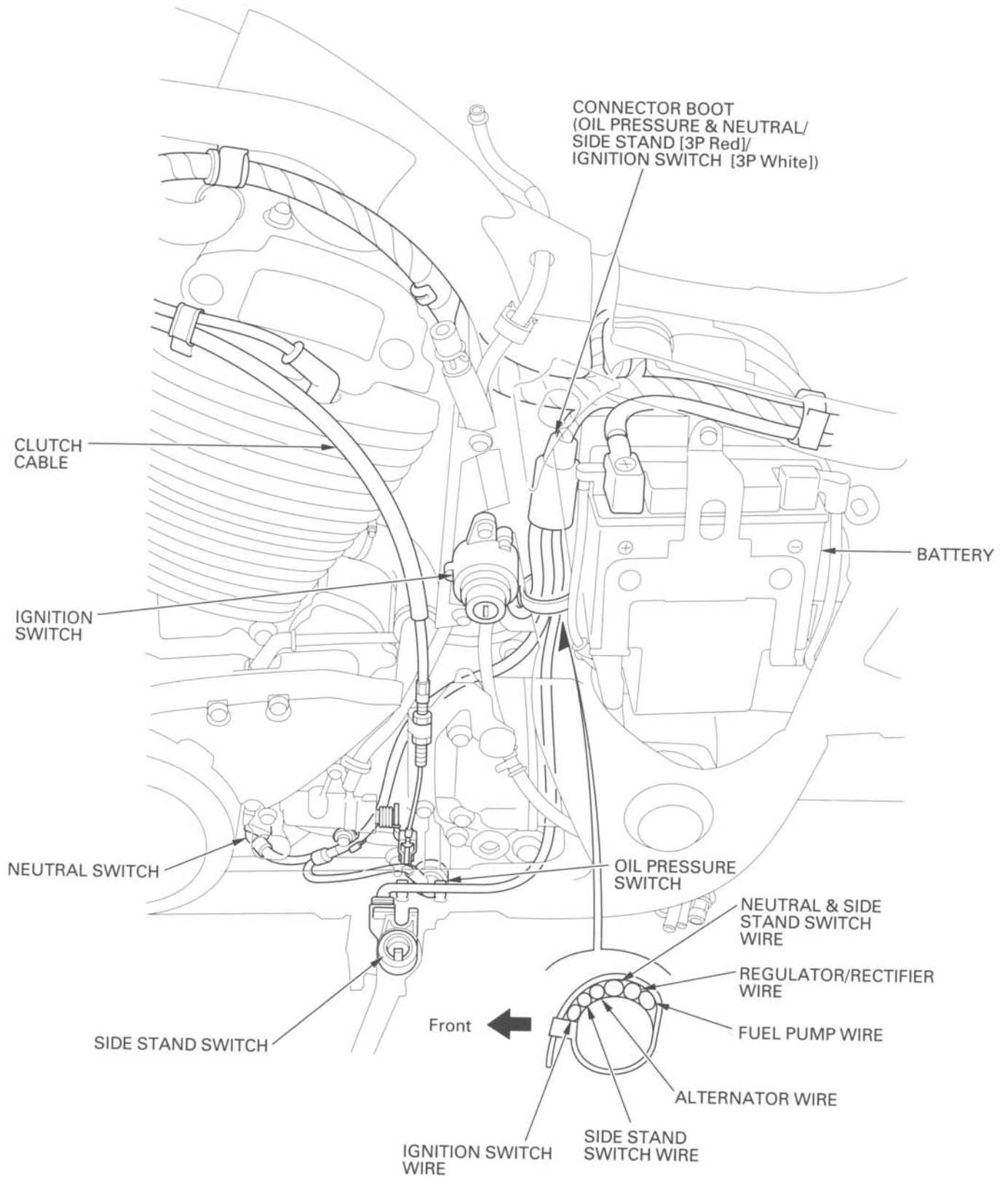


INSIDE CONNECTOR BOX:

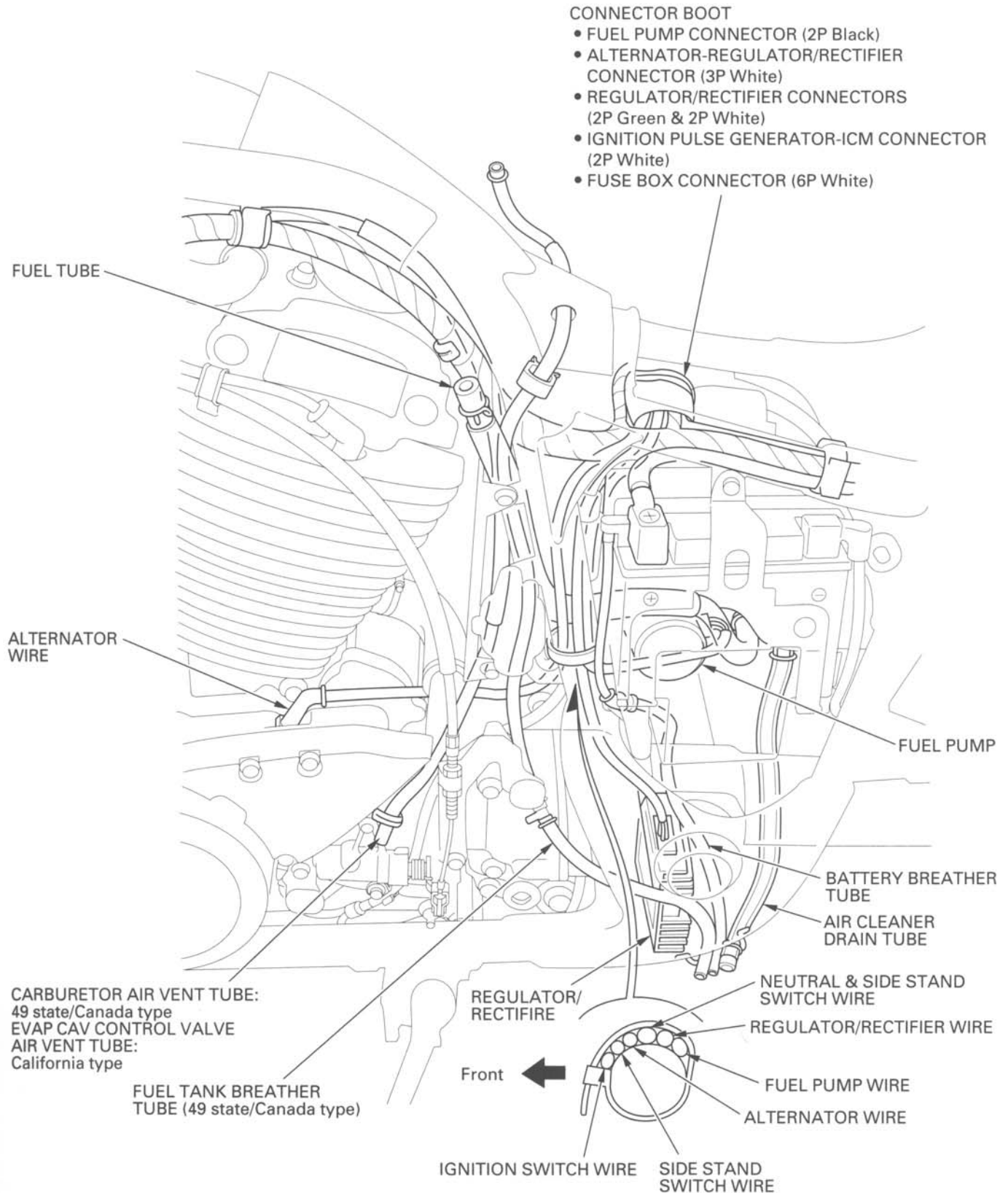


# GENERAL INFORMATION

'97 - '00 VT1100C:



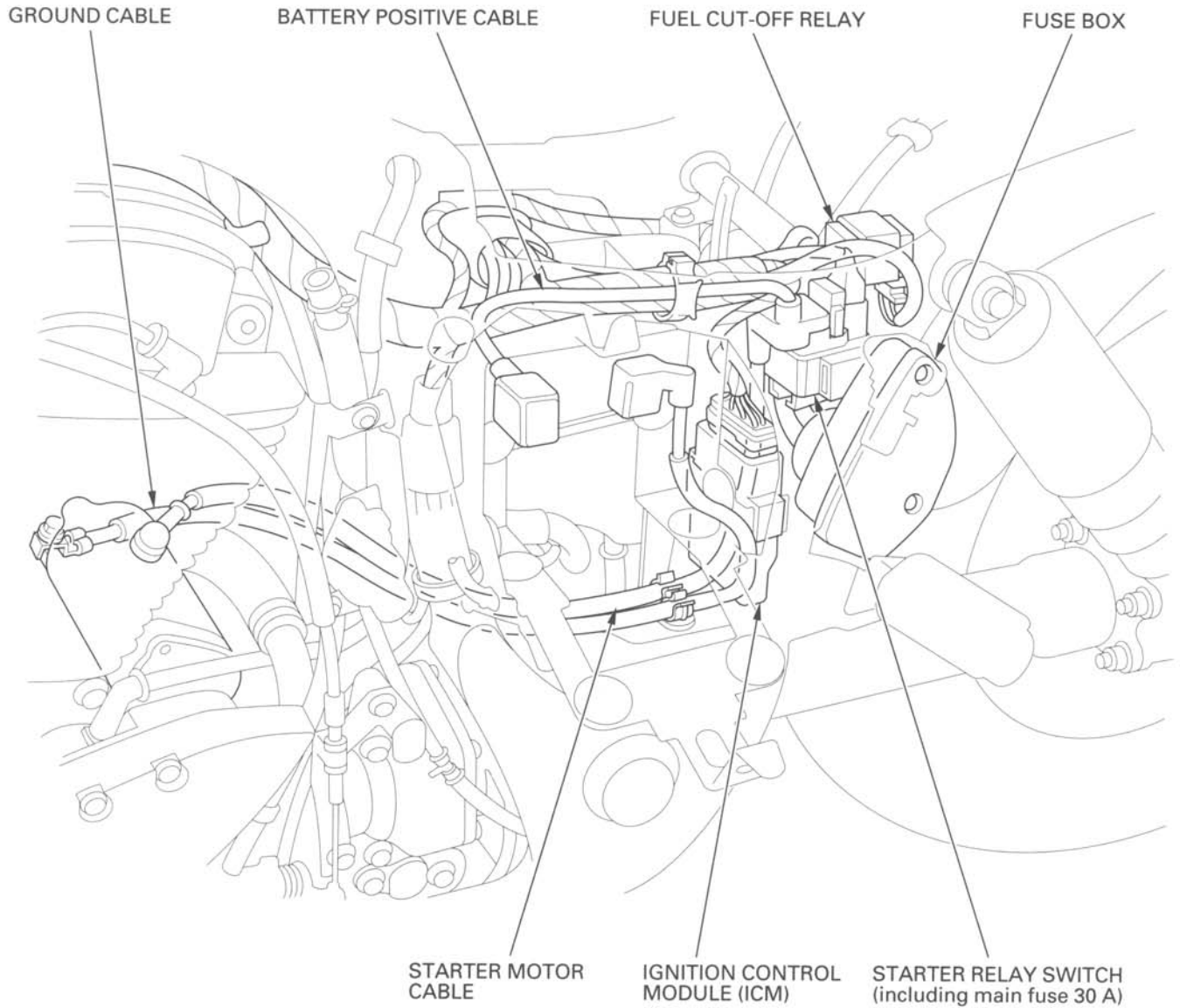
'97 - '00 VT1100C:



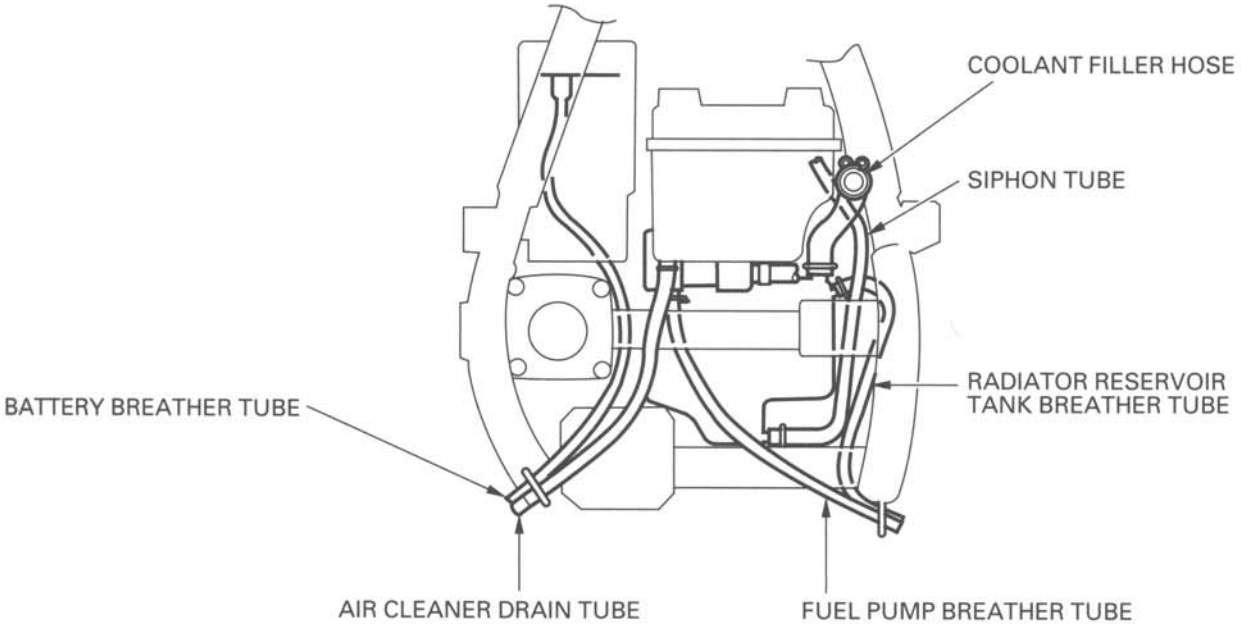
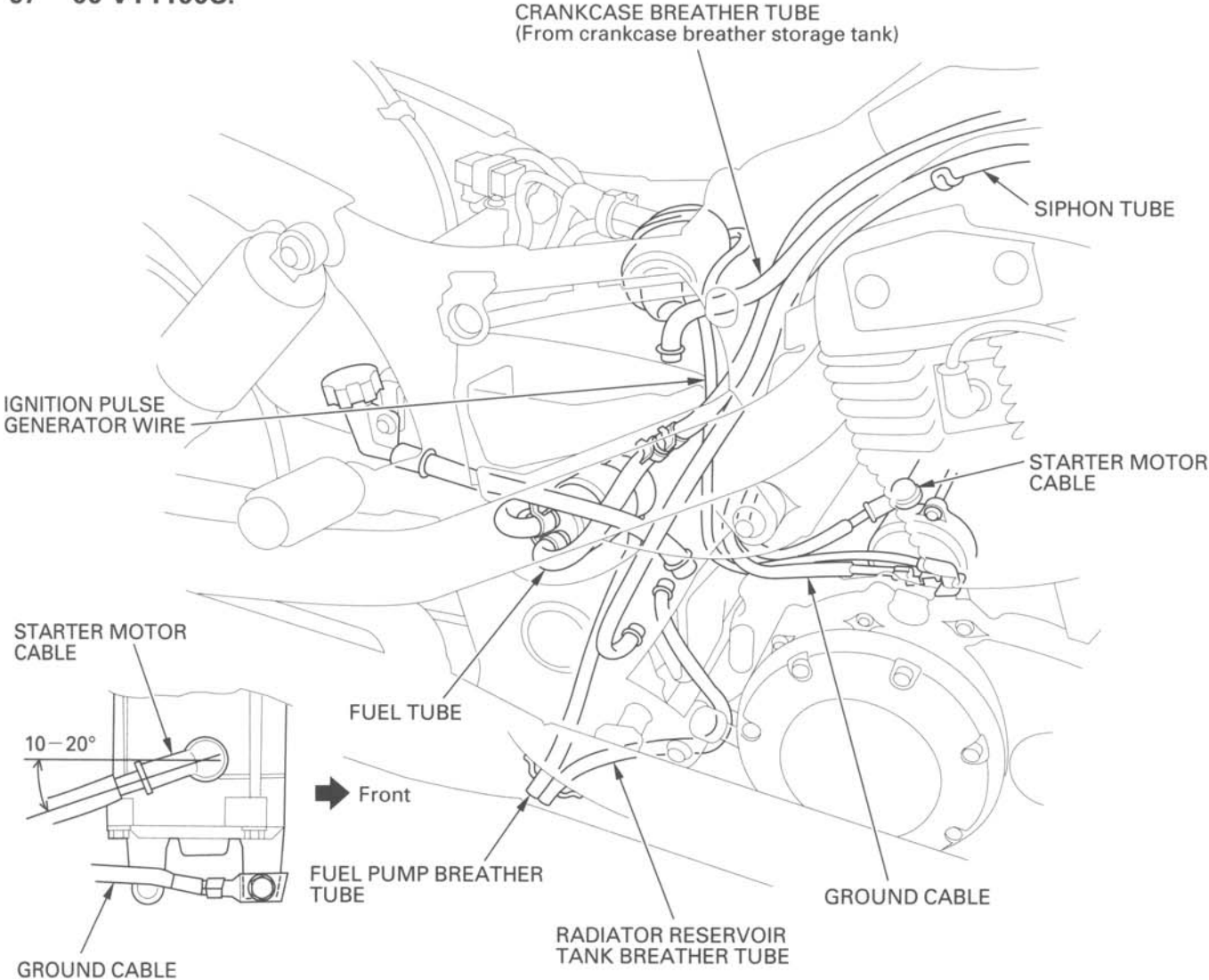
# GENERAL INFORMATION

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'97 - '00 VT1100C:

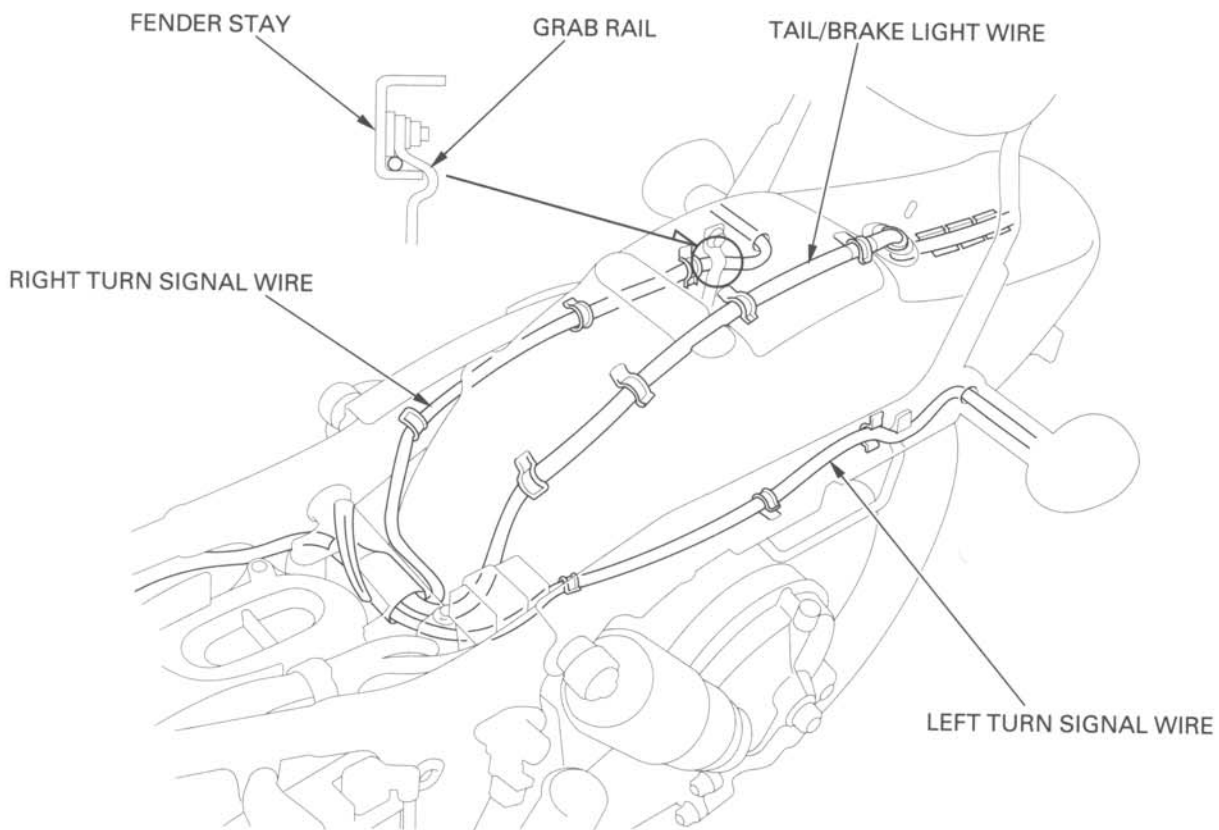
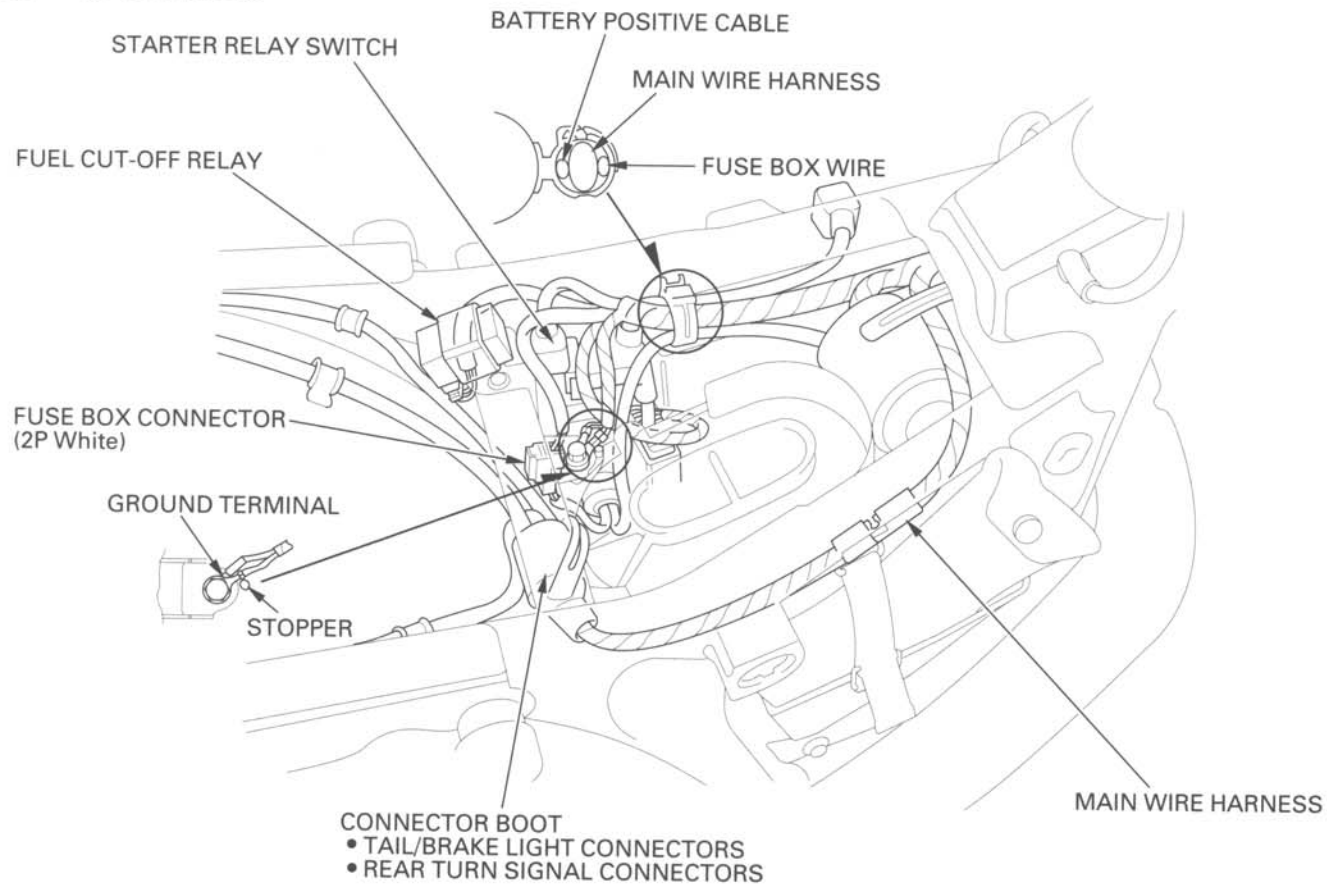


'97 - '00 VT1100C:

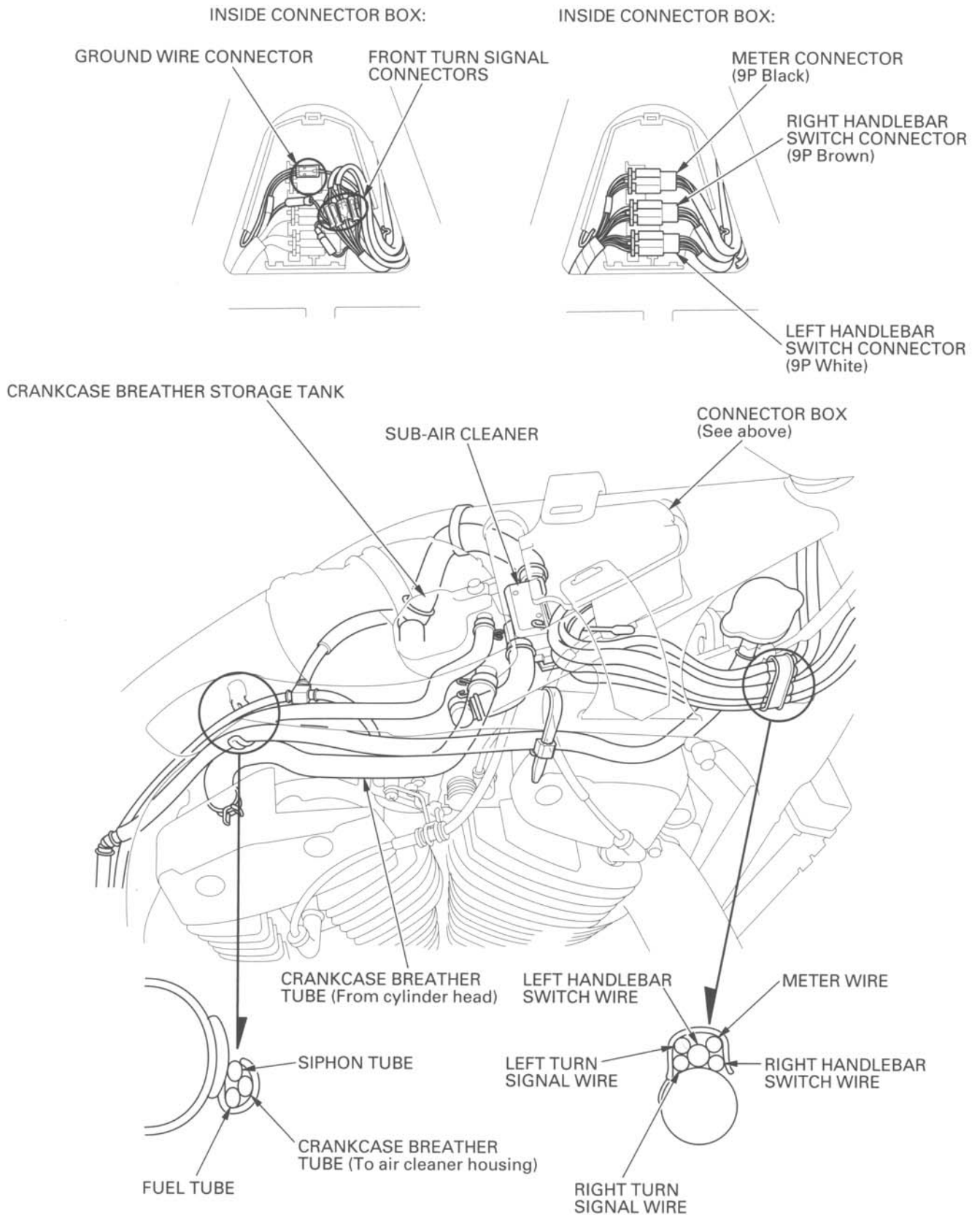


# GENERAL INFORMATION

'97-'00 VT1100C:



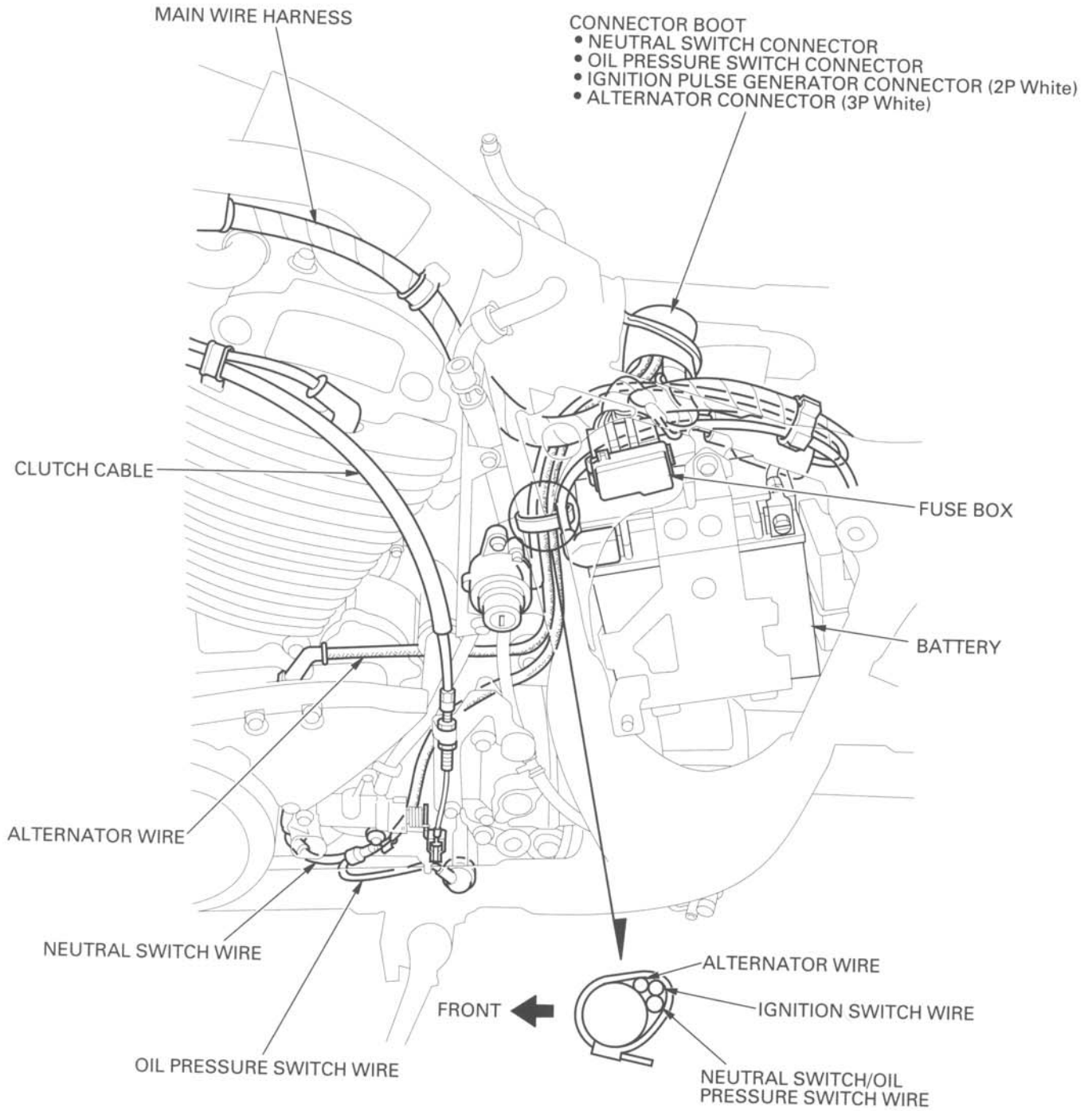
After '00 VT1100C:



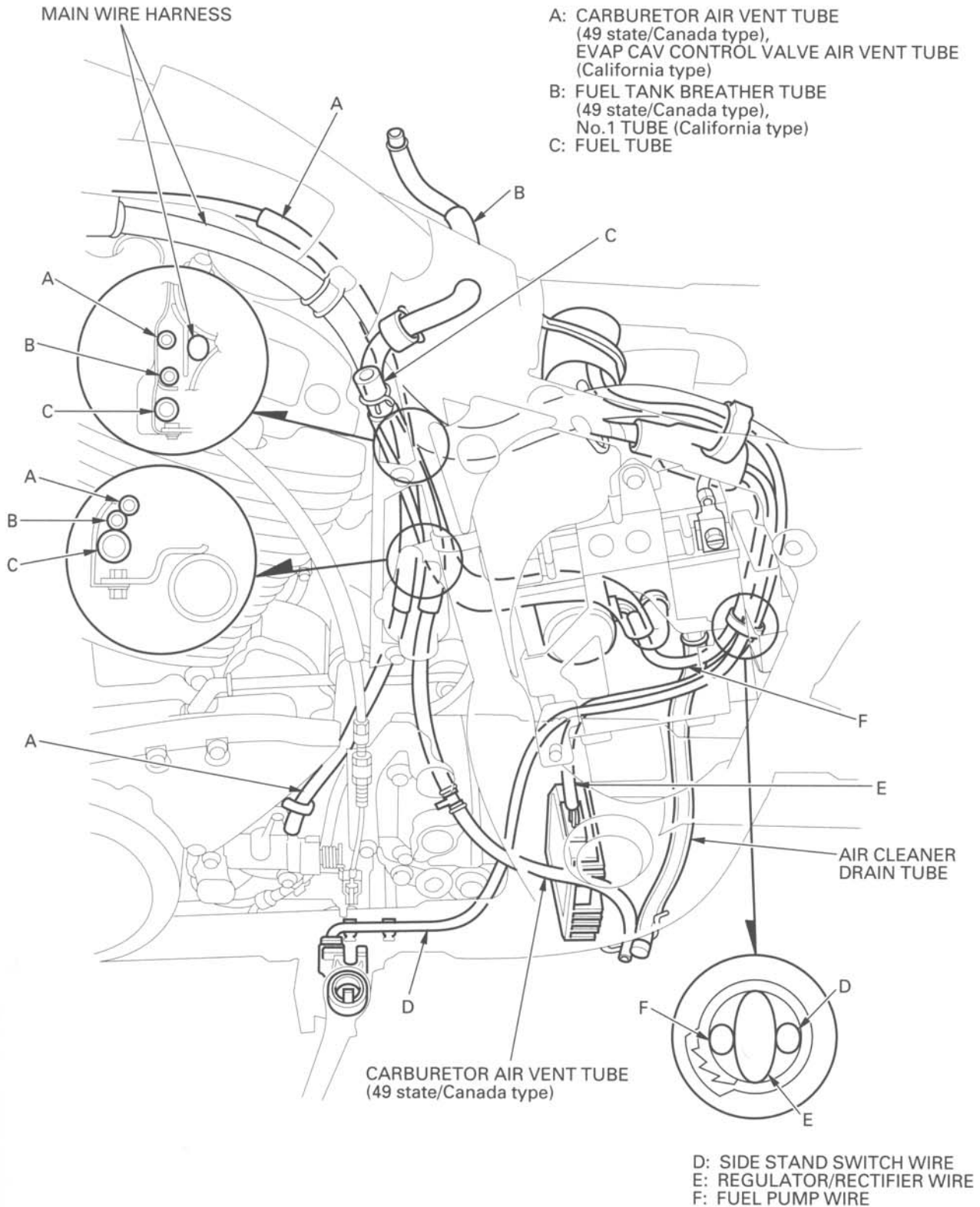


# GENERAL INFORMATION

After '00 VT1100C:



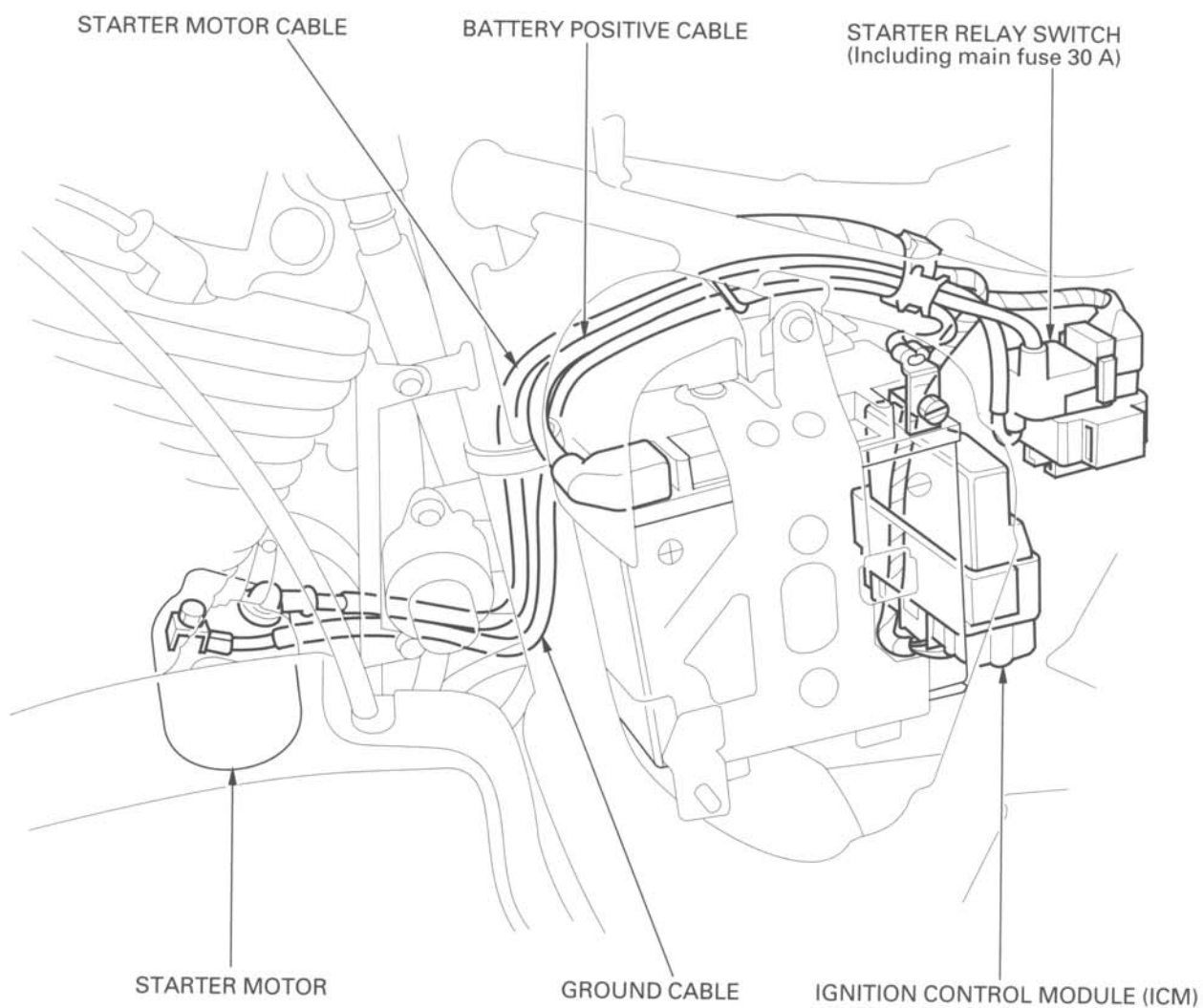
After '00 VT1100C:



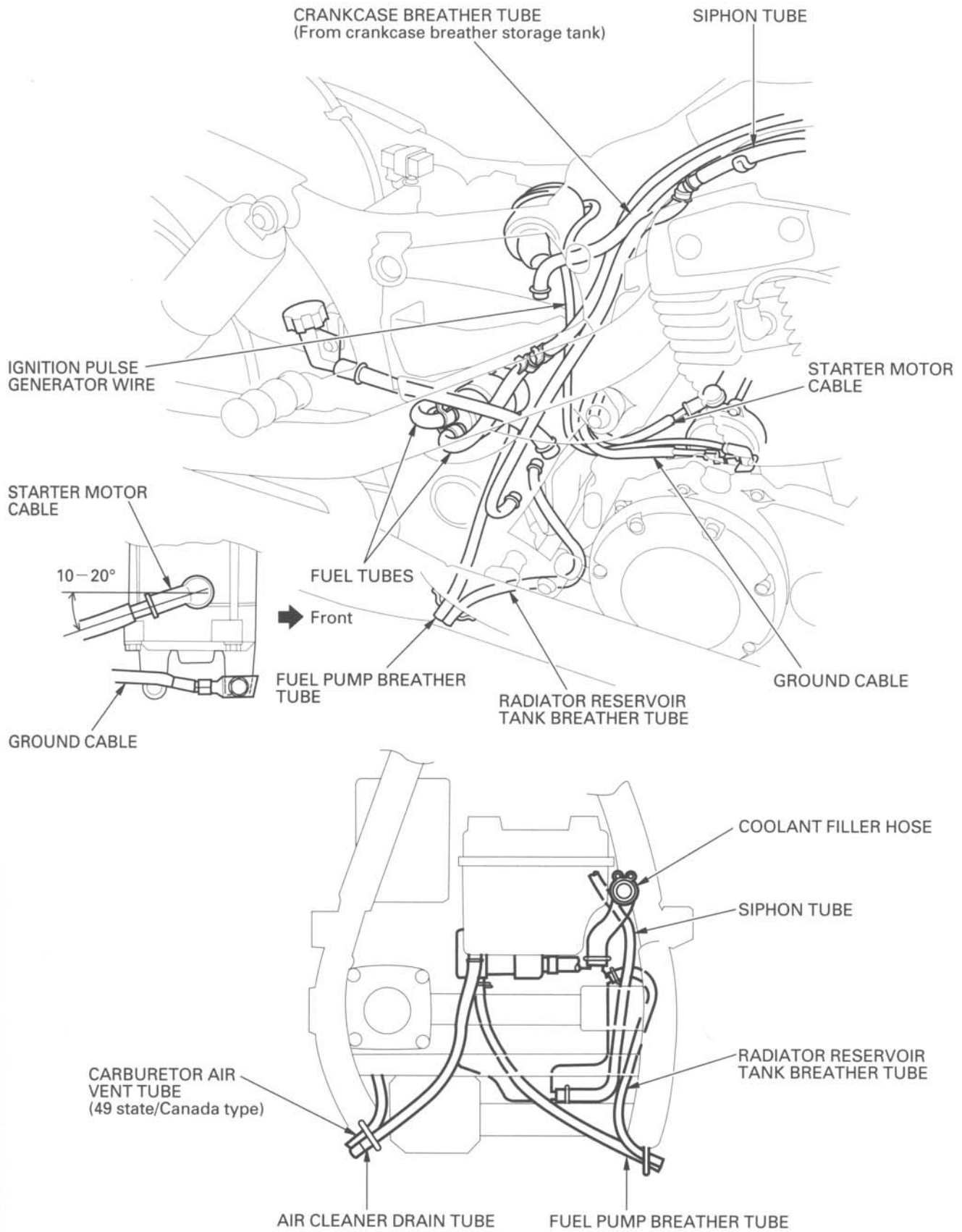
## GENERAL INFORMATION

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After '00 VT1100C:

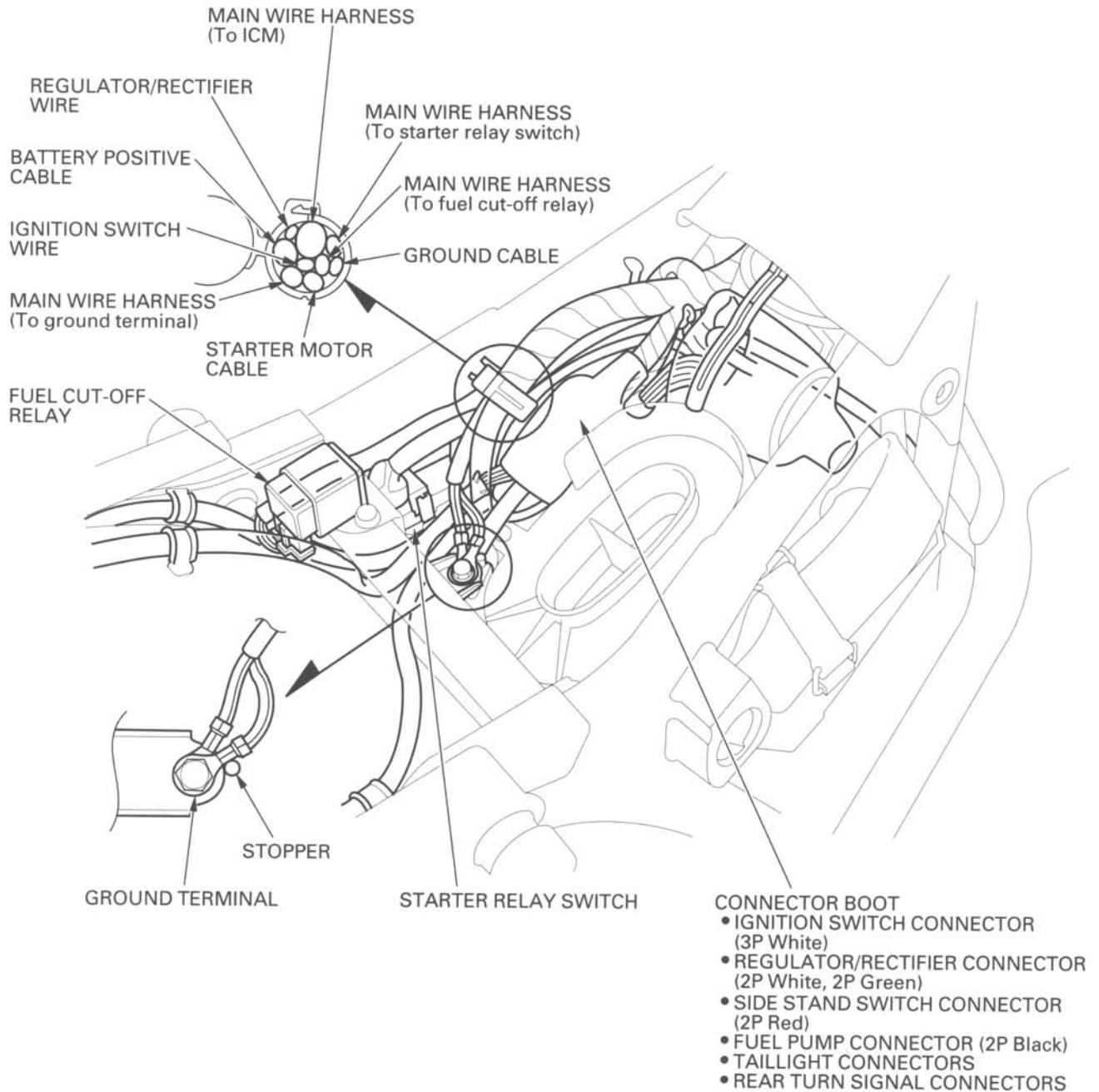


After '00 VT1100C:

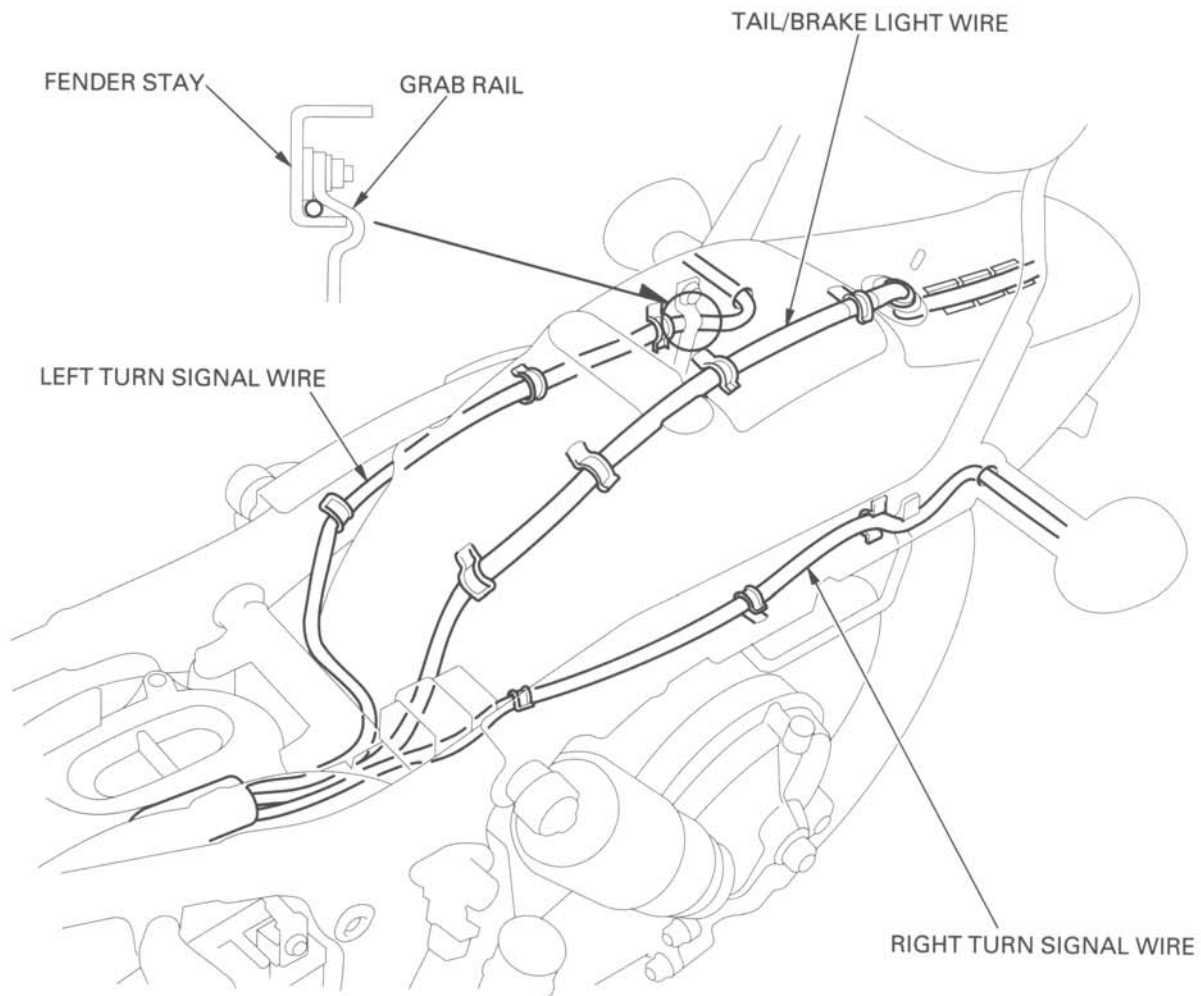


## GENERAL INFORMATION

After '00 VT1100C:



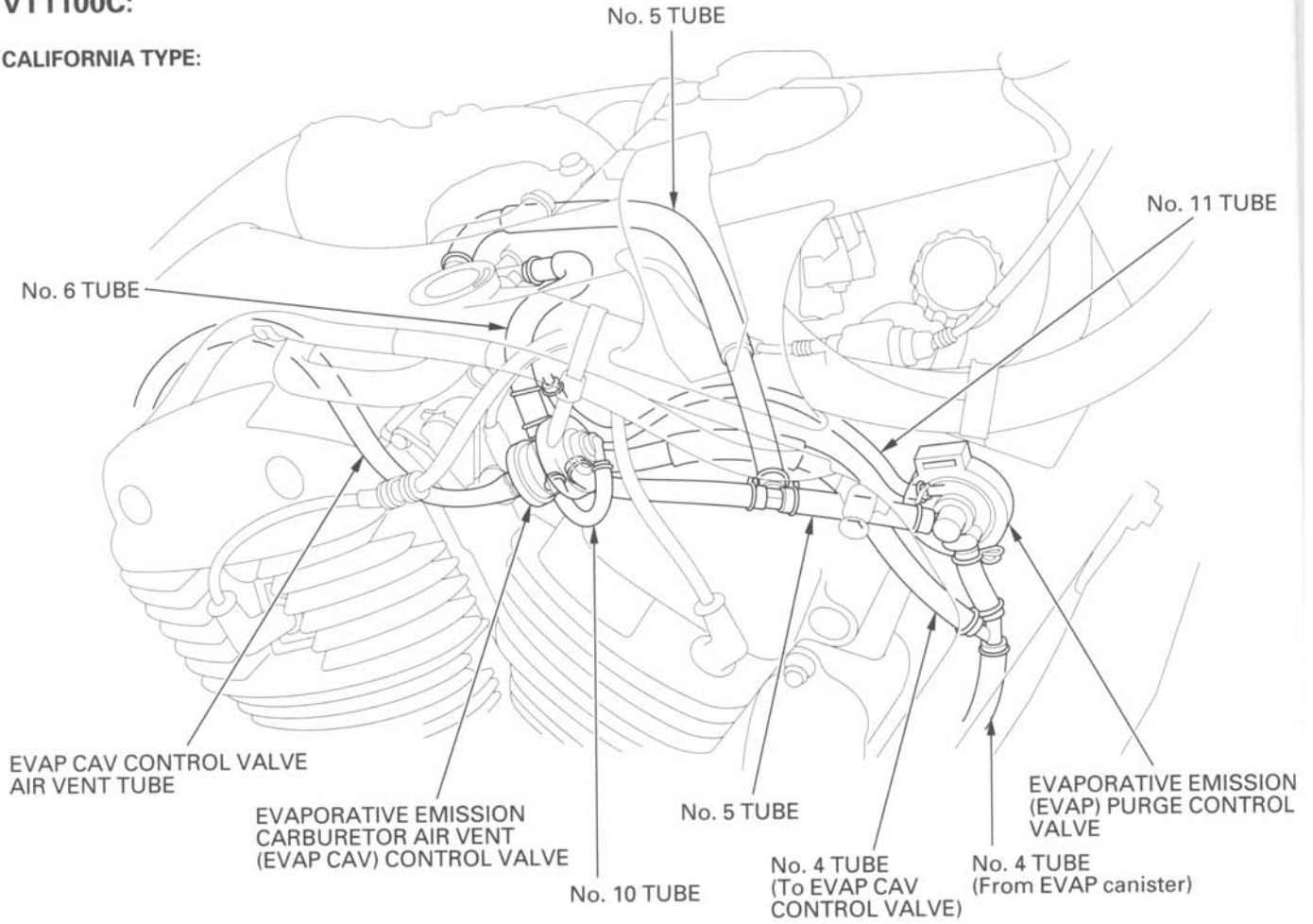
After '00 VT1100C:



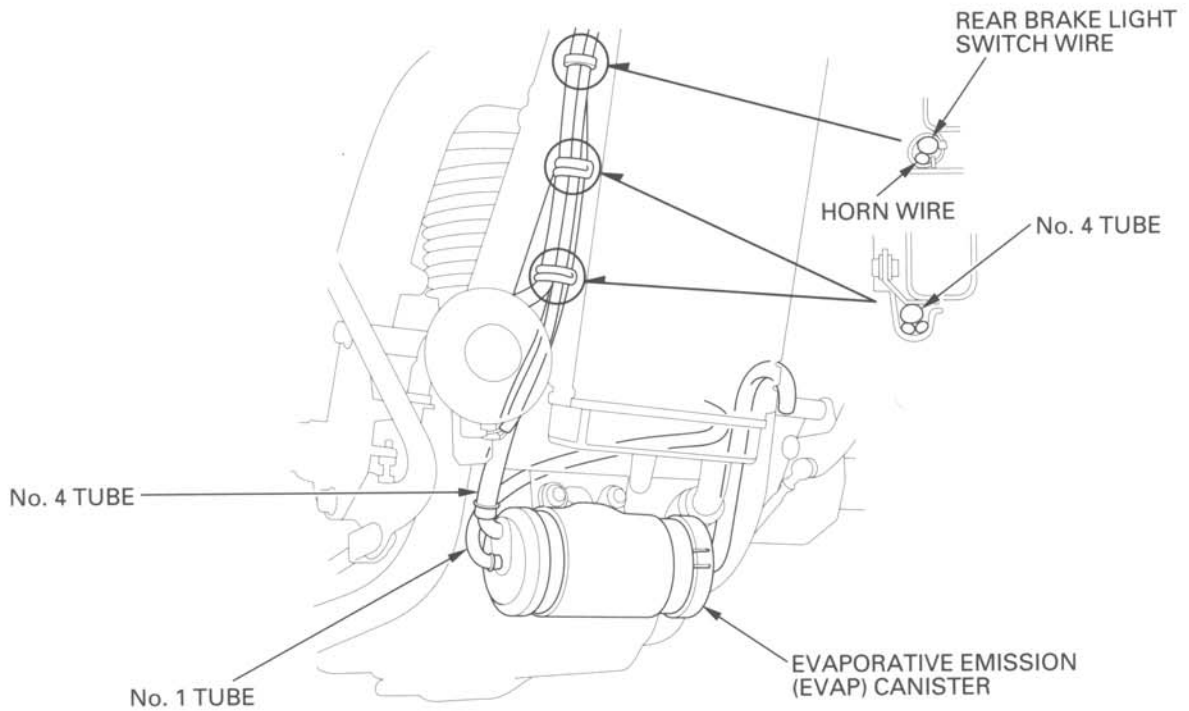
# GENERAL INFORMATION

## VT1100C:

CALIFORNIA TYPE:

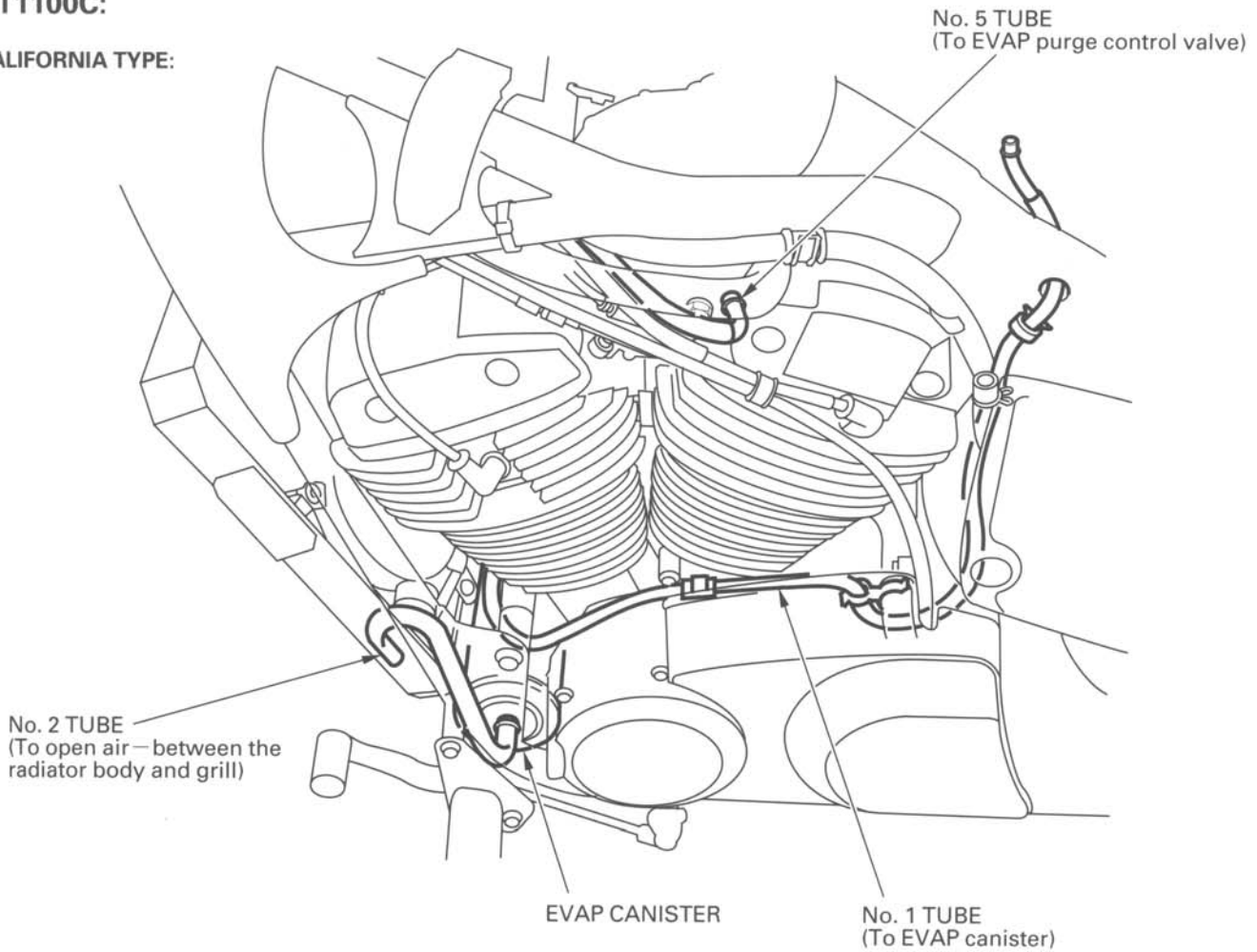


CALIFORNIA TYPE:

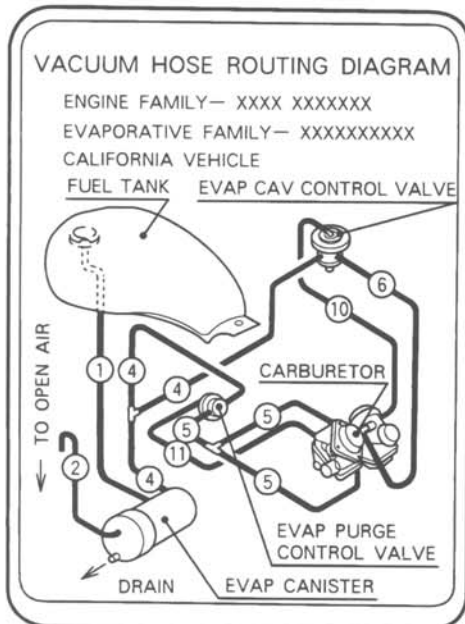


VT1100C:

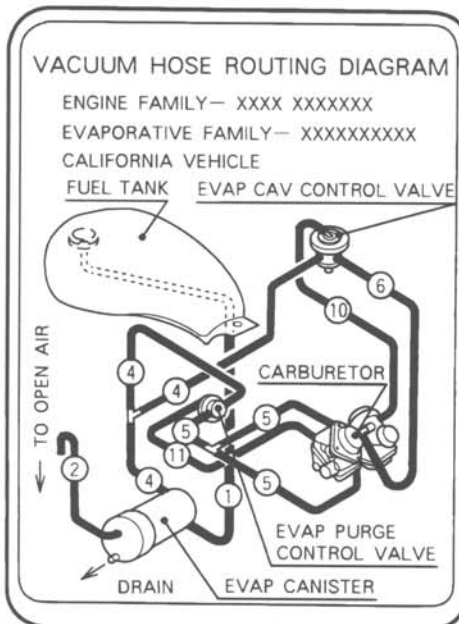
CALIFORNIA TYPE:



'97



After '97

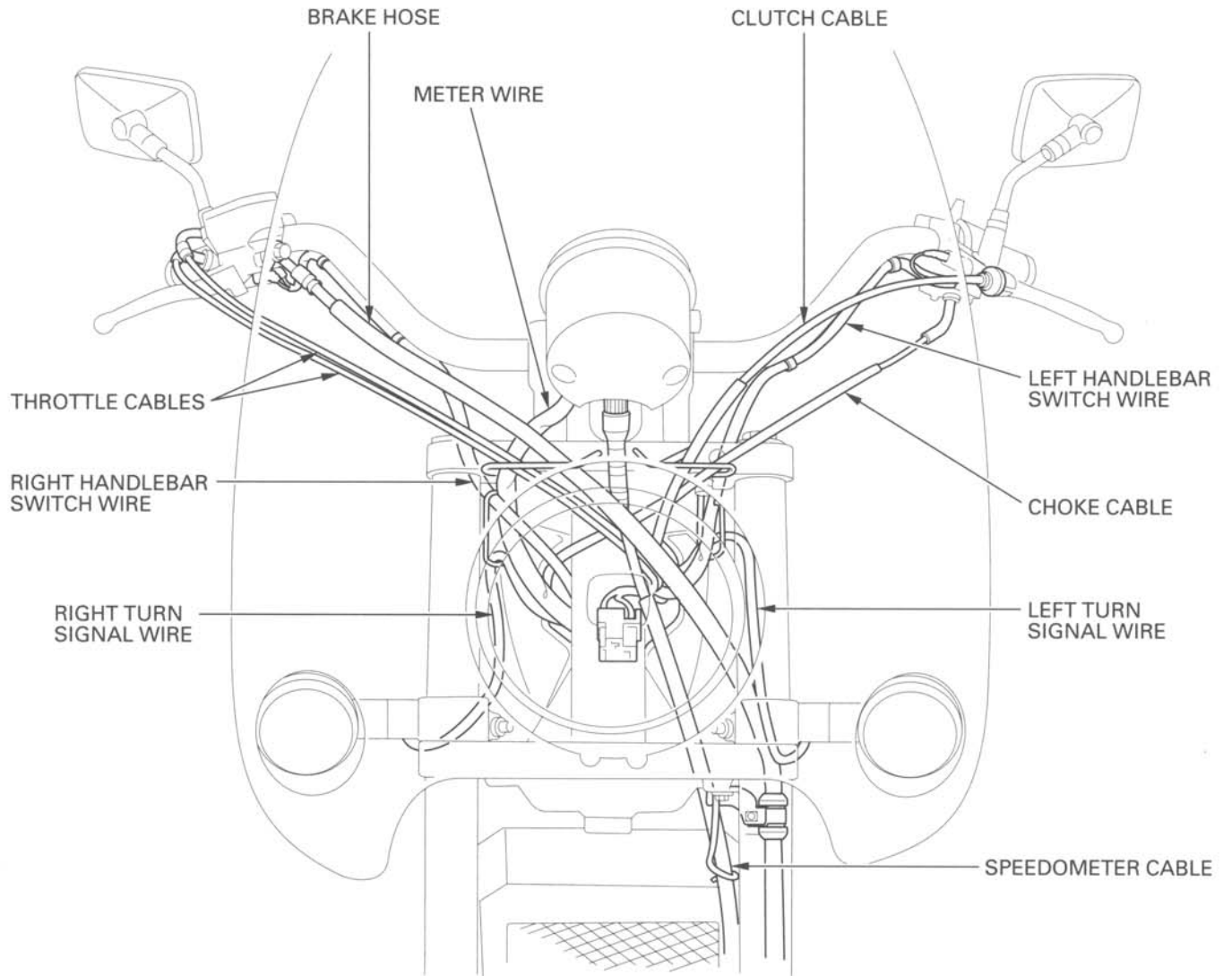


This label is located on the reverse side of the right side cover.

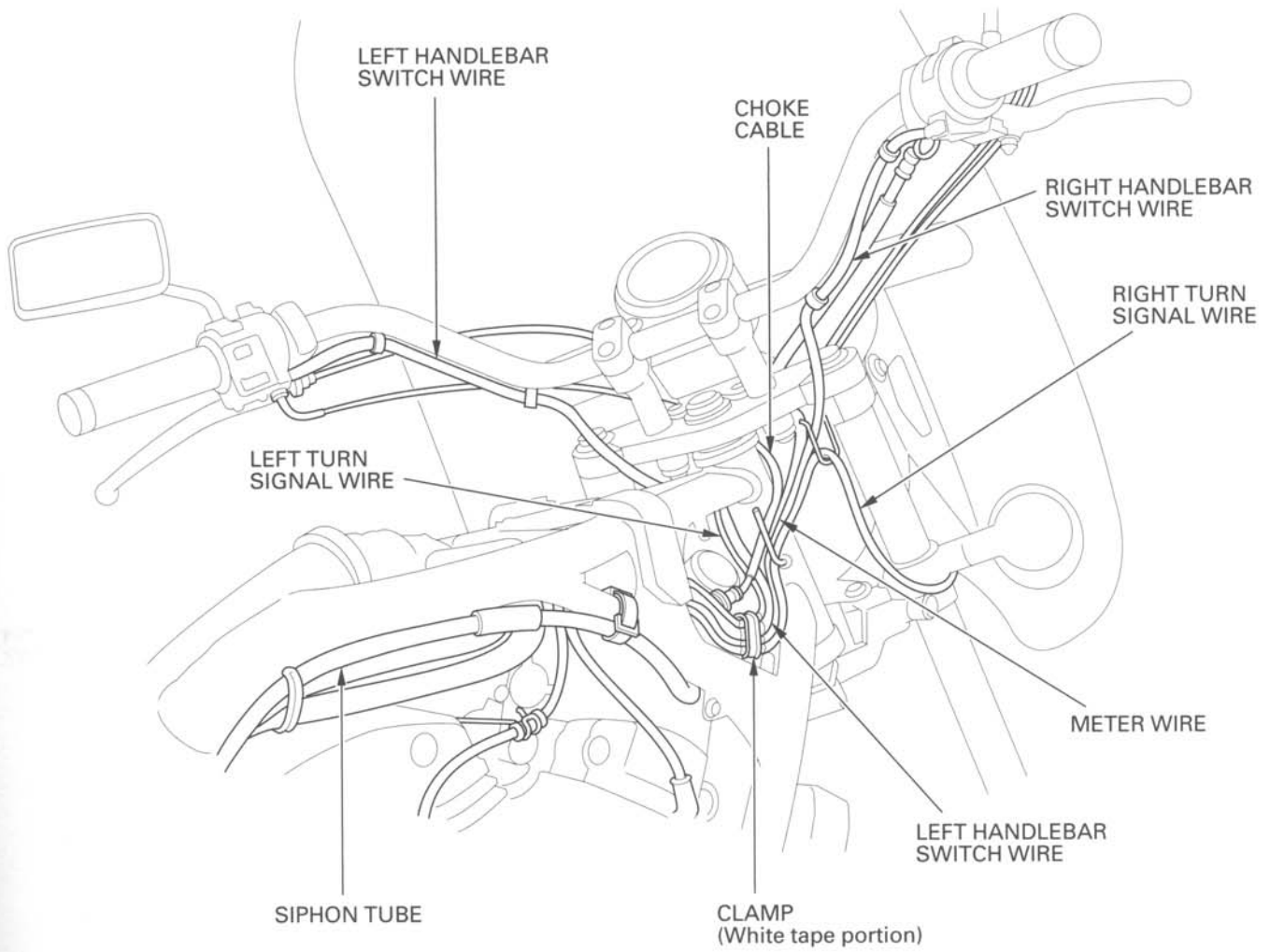


**GENERAL INFORMATION**

**CABLE & HARNESS ROUTING (VT1100T)**

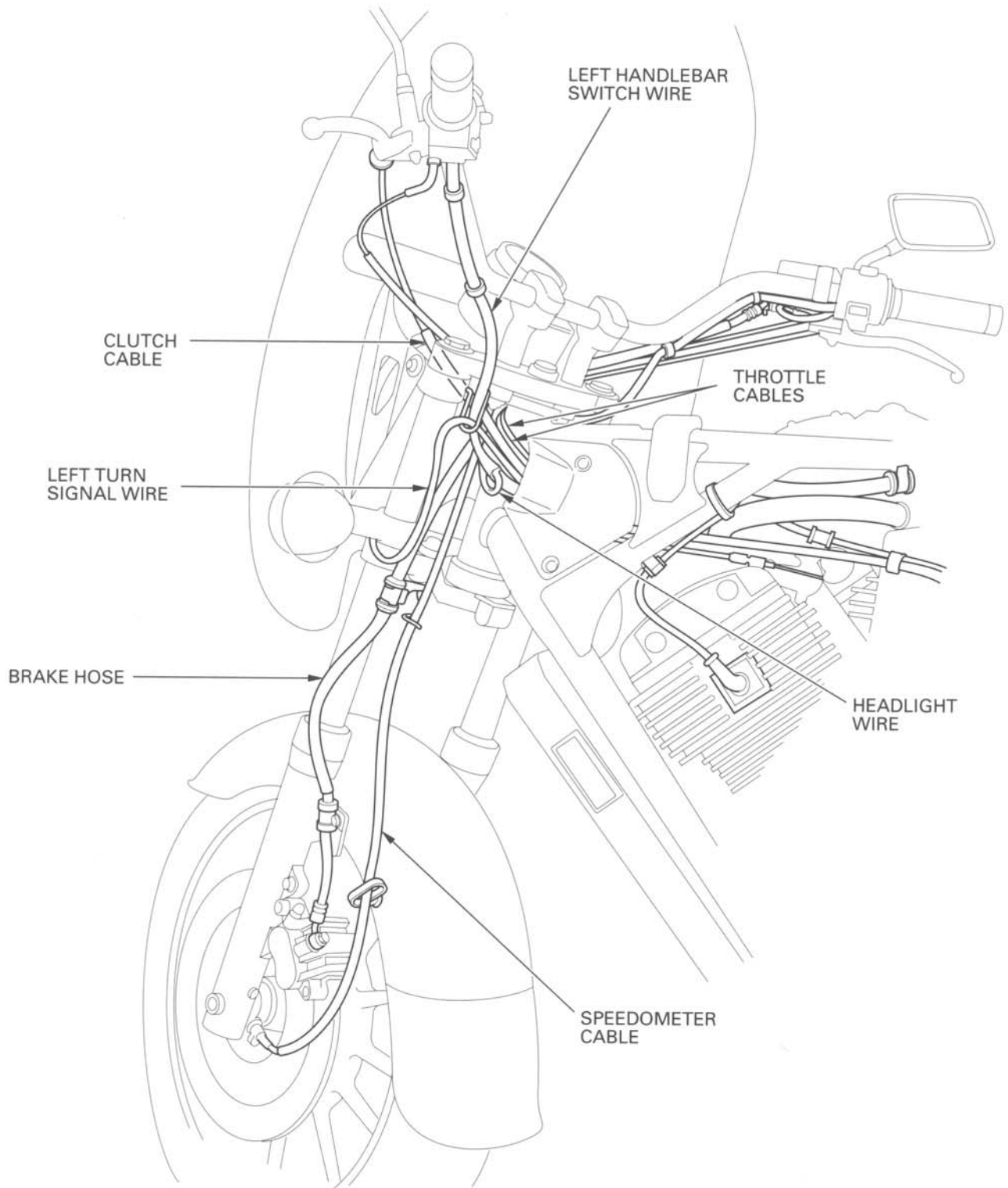


VT1100T:

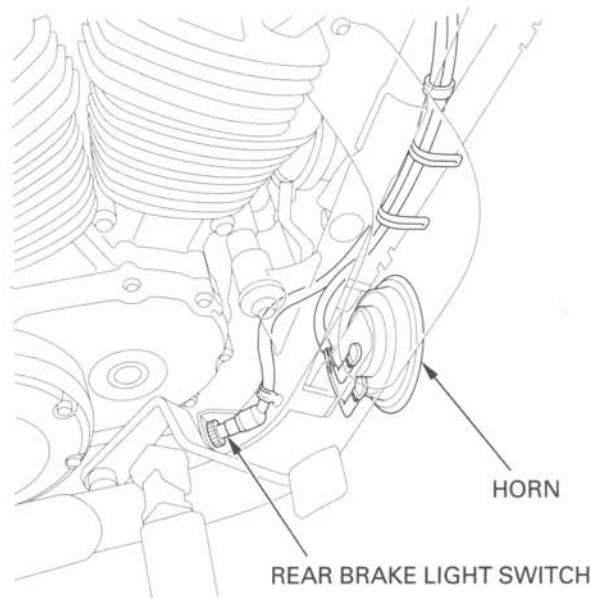
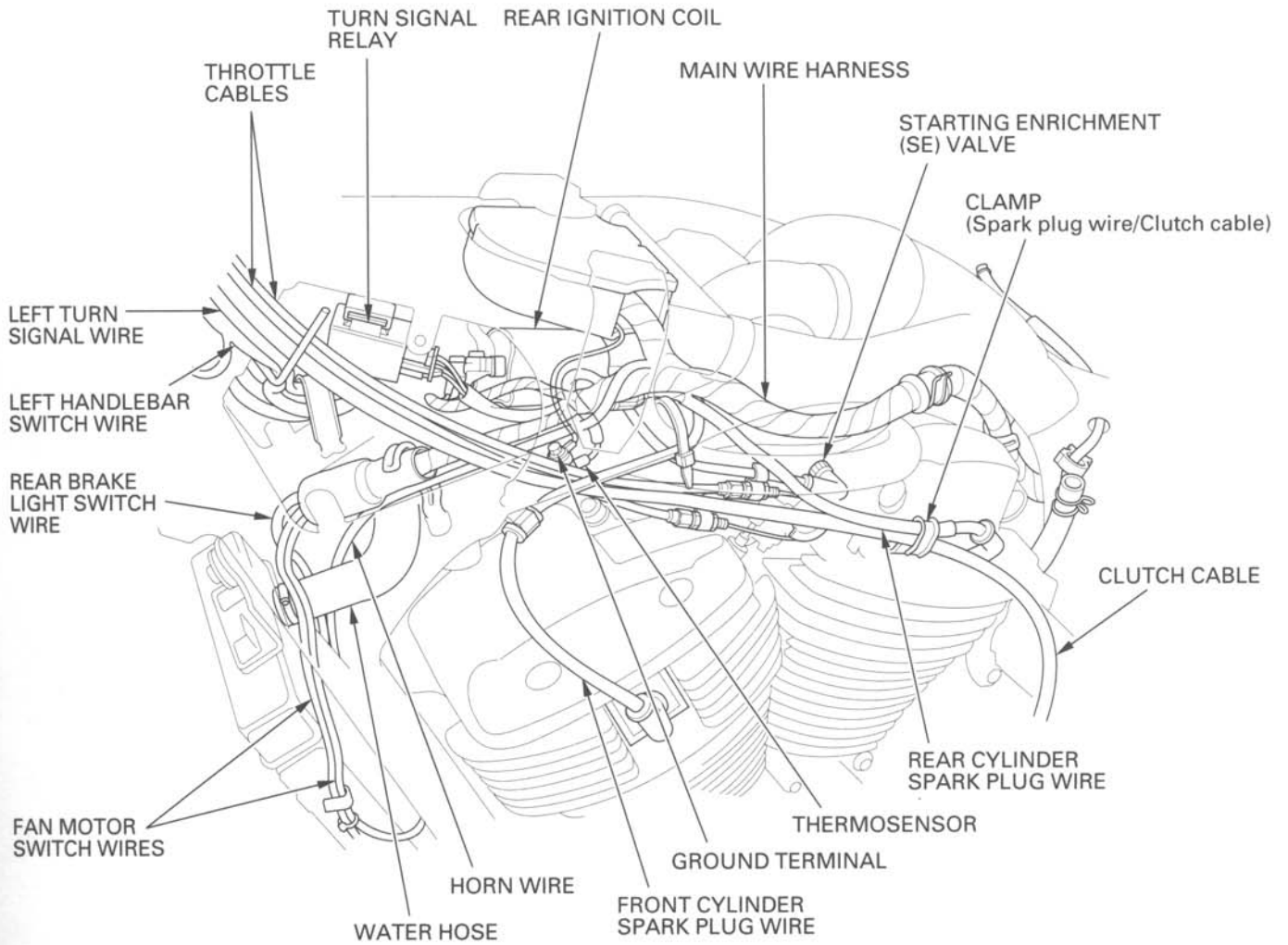


# GENERAL INFORMATION

VT1100T:

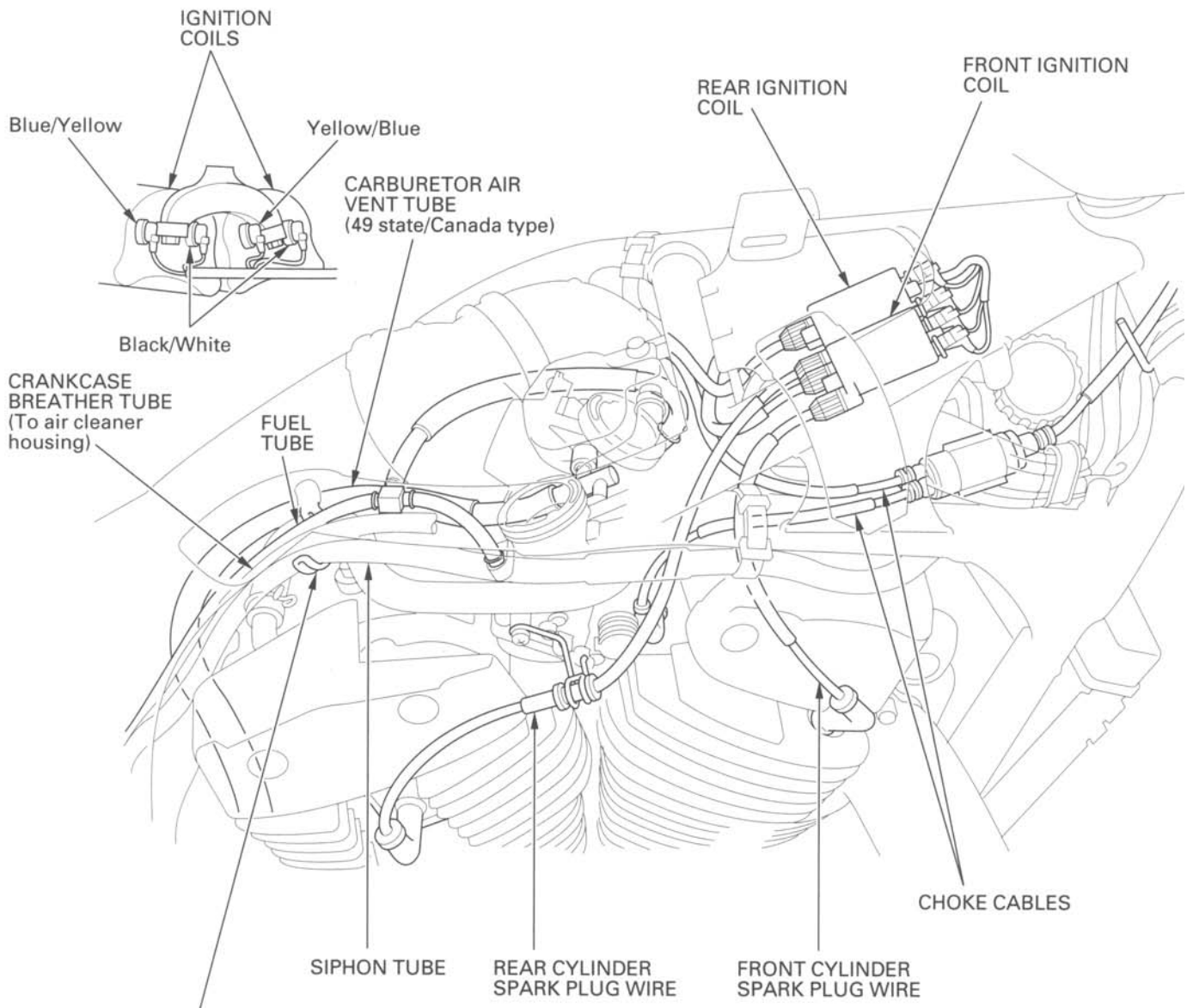


VT1100T:



**GENERAL INFORMATION**

**VT1100T:**



CLAMP (Fuel/Siphon/Crankcase breather)

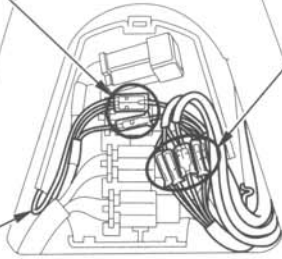
**VT1100T:**

INSIDE CONNECTOR BOX:

SIDE STAND INDICATOR &  
COOLANT TEMPERATURE UNIT  
CONNECTORS

FRONT TURN SIGNAL  
CONNECTORS

GROUND WIRE  
(To thermostat cover)



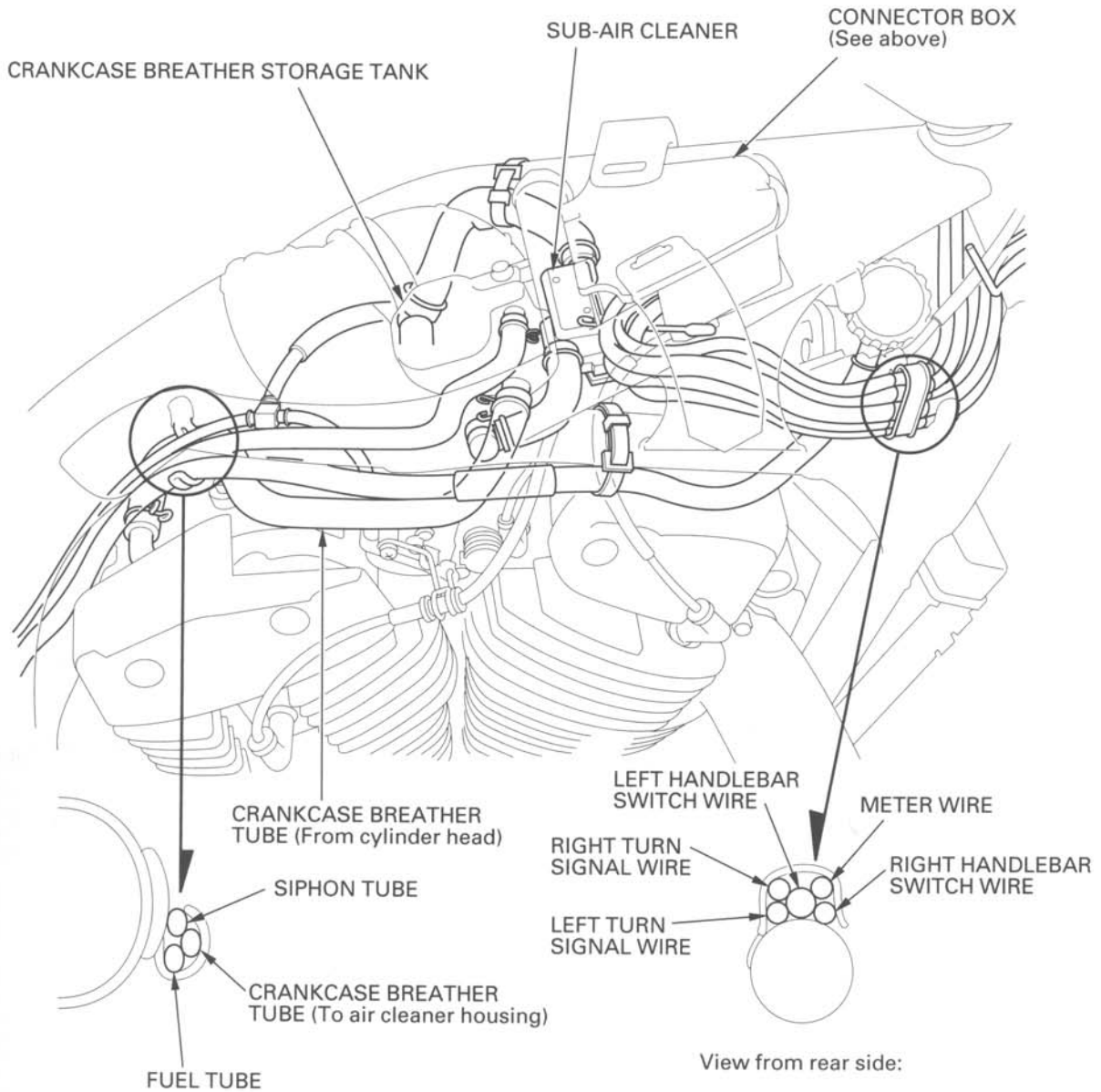
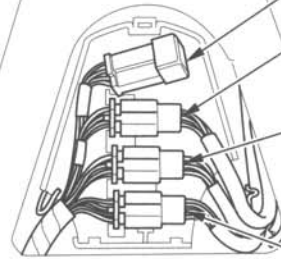
INSIDE CONNECTOR BOX:

DIODE

METER CONNECTOR  
(9P Black)

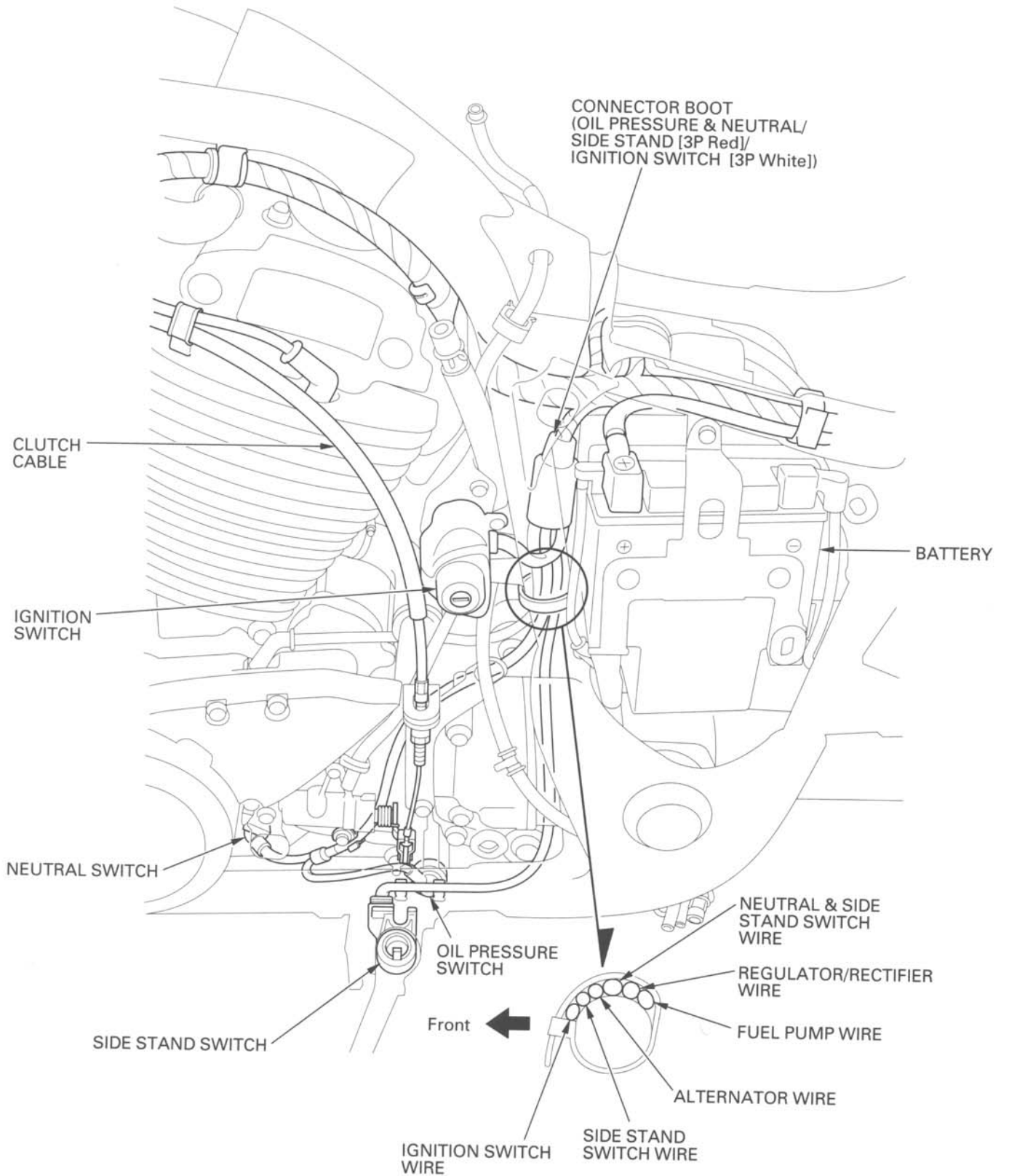
RIGHT HANDLEBAR  
SWITCH CONNECTOR  
(9P Brown)

LEFT HANDLEBAR  
SWITCH CONNECTOR  
(9P White)



# GENERAL INFORMATION

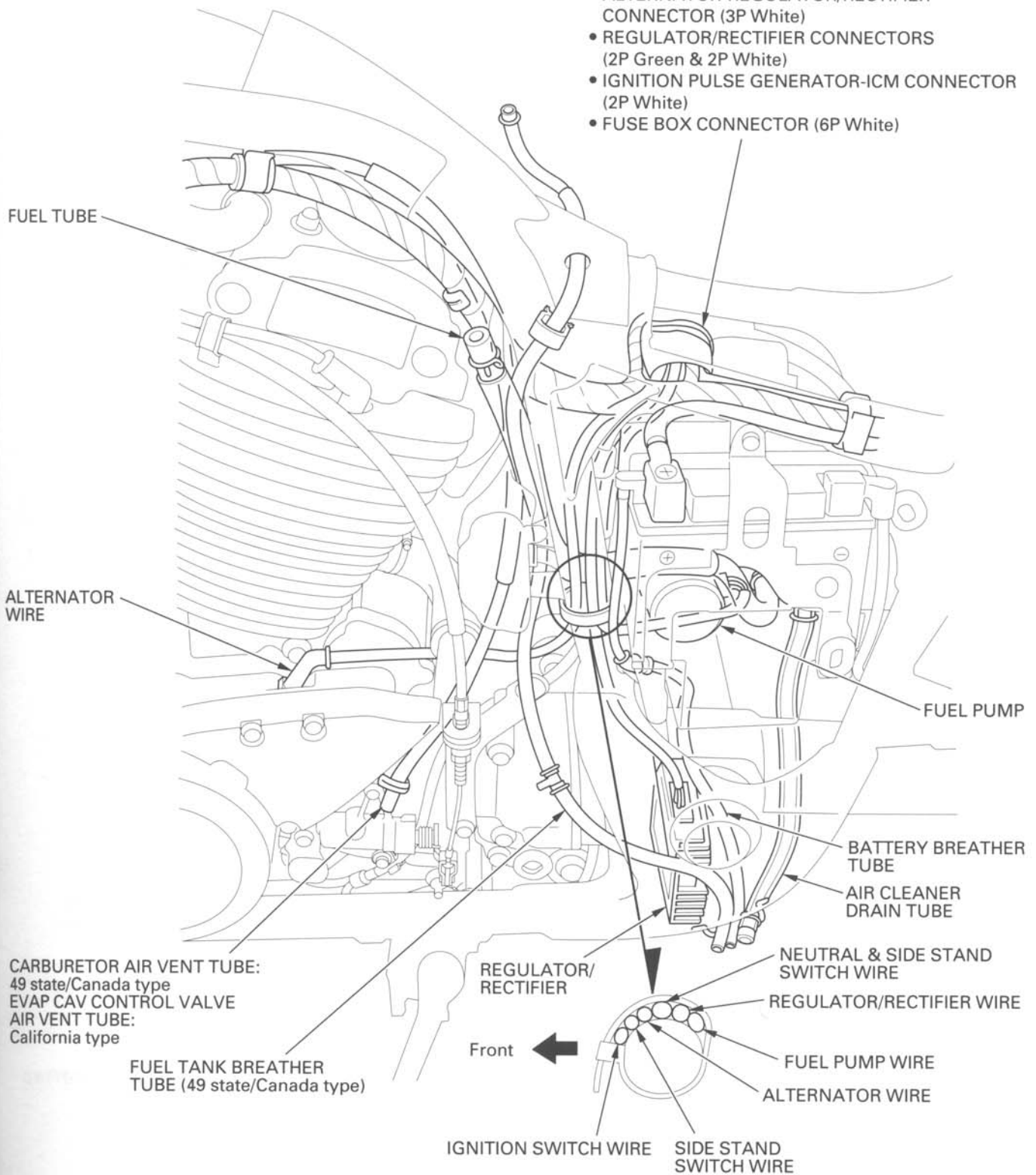
VT1100T:



VT1100T:

CONNECTOR BOOT

- FUEL PUMP CONNECTOR (2P Black)
- ALTERNATOR-REGULATOR/RECTIFIER CONNECTOR (3P White)
- REGULATOR/RECTIFIER CONNECTORS (2P Green & 2P White)
- IGNITION PULSE GENERATOR-ICM CONNECTOR (2P White)
- FUSE BOX CONNECTOR (6P White)

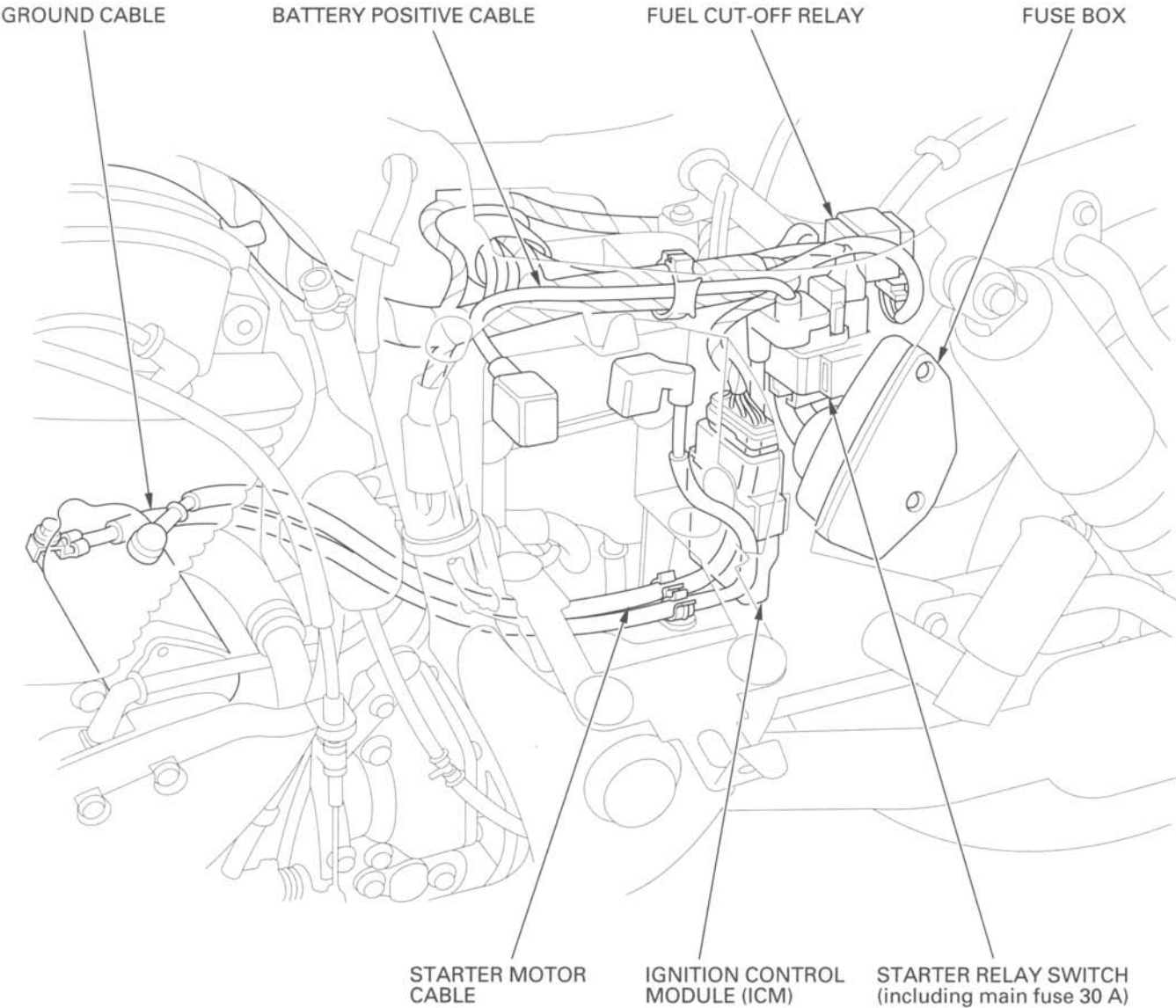




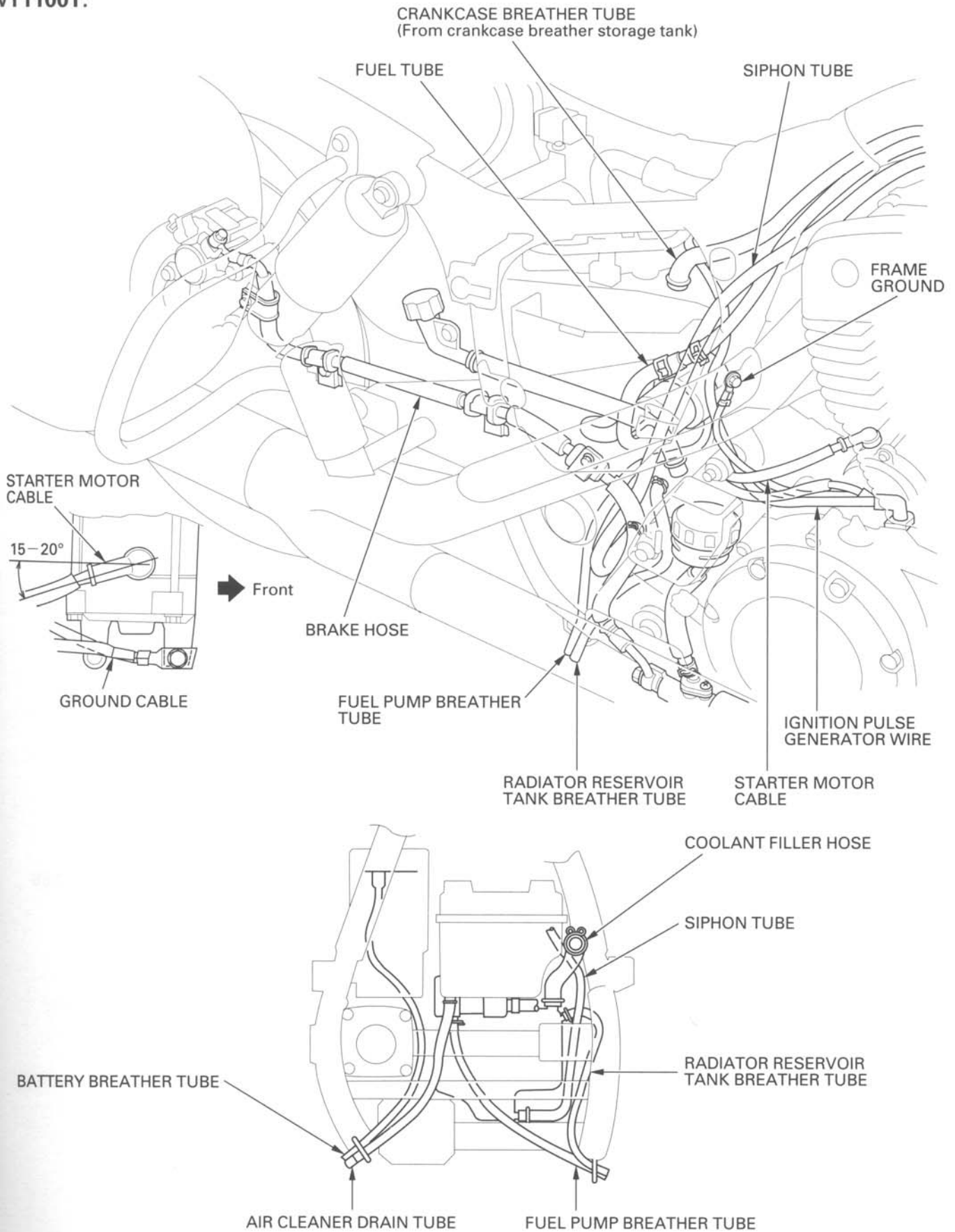
**GENERAL INFORMATION**

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**VT1100T:**

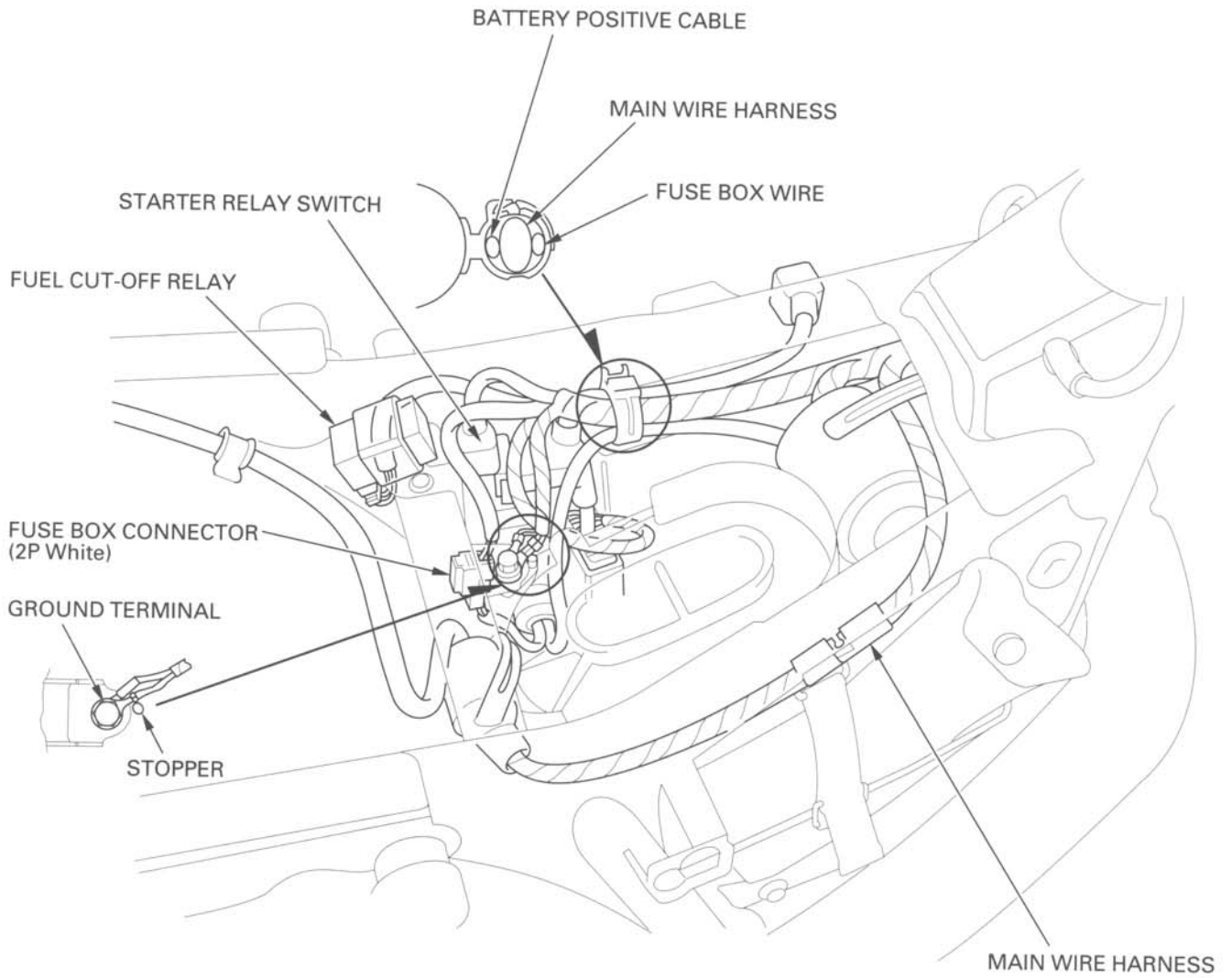


VT1100T:

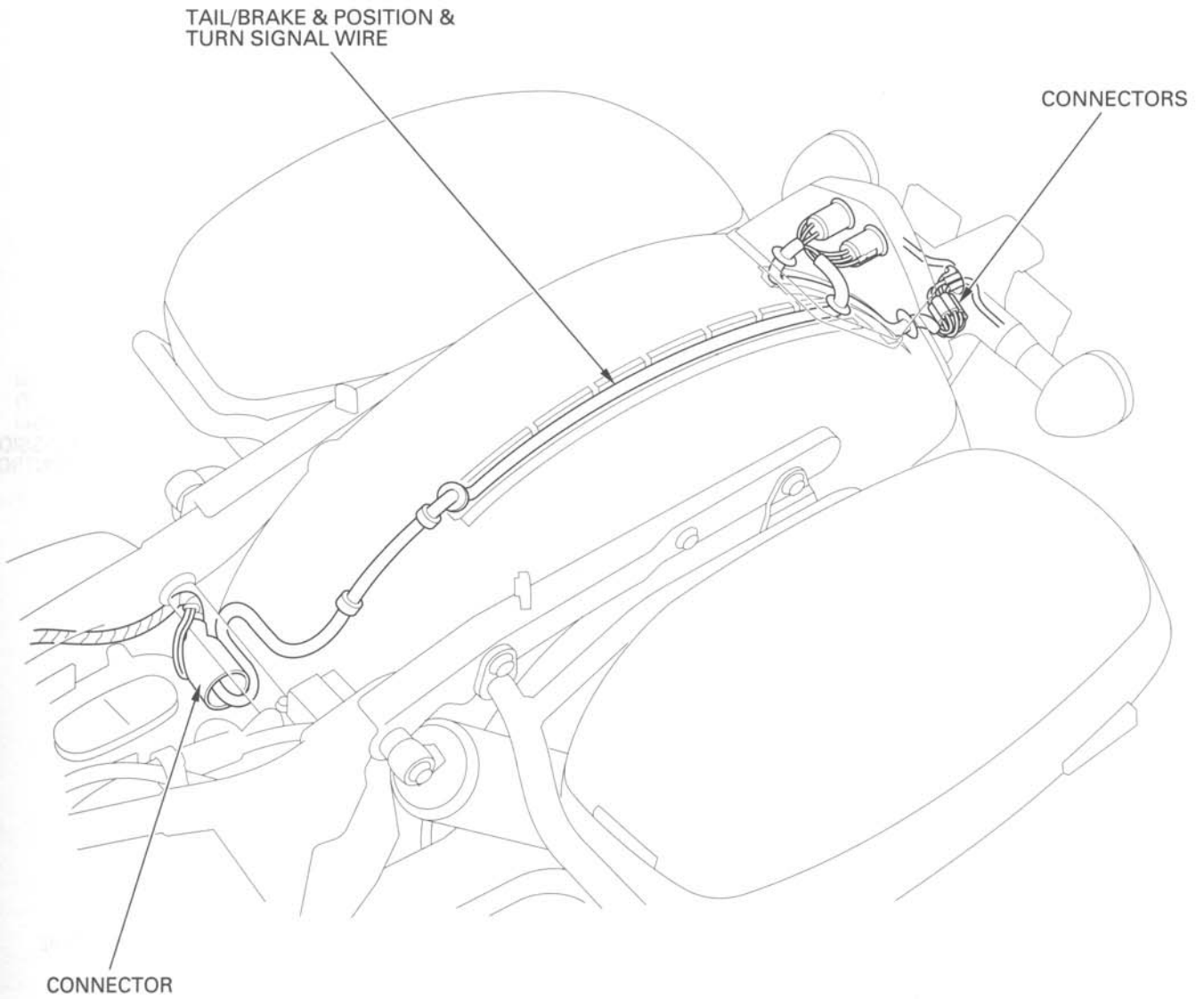


# GENERAL INFORMATION

VT1100T:



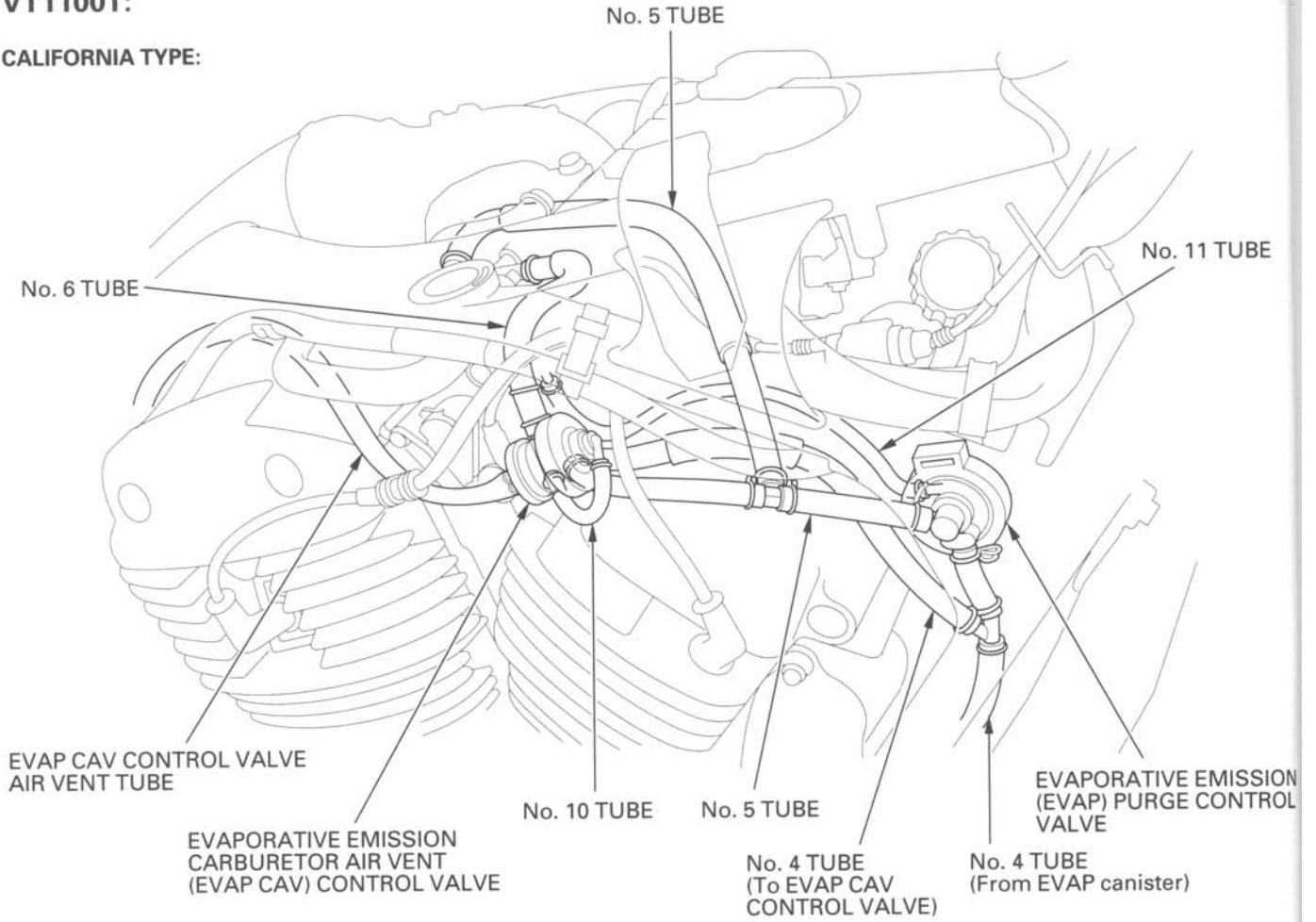
VT1100T:



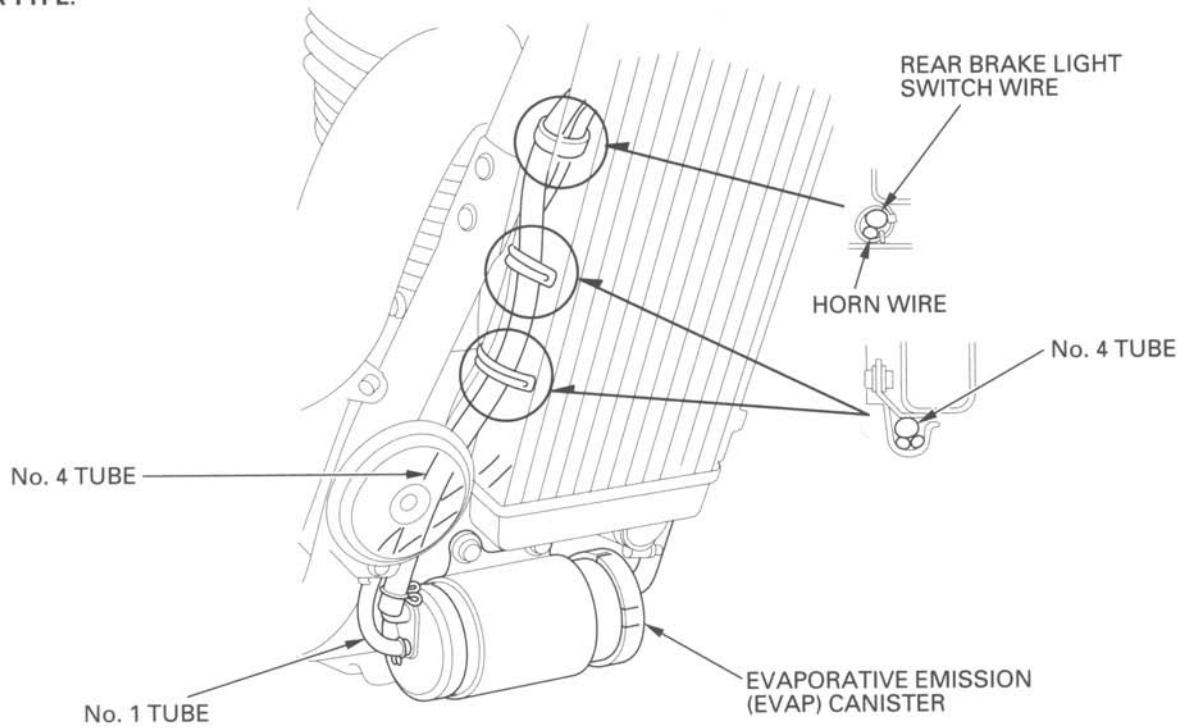
# GENERAL INFORMATION

## VT1100T:

### CALIFORNIA TYPE:



### CALIFORNIA TYPE:



## LEFT CRANKCASE REAR COVER

Remove the clip and washer (VT1100T: two clips and washers) from the front upper boss of the cover.

Remove the cover nut.  
Release the bosses from the grommets and remove the left crankcase rear cover while lowering the gearshift pedal to avoid interference the pedal (VT1100T only).

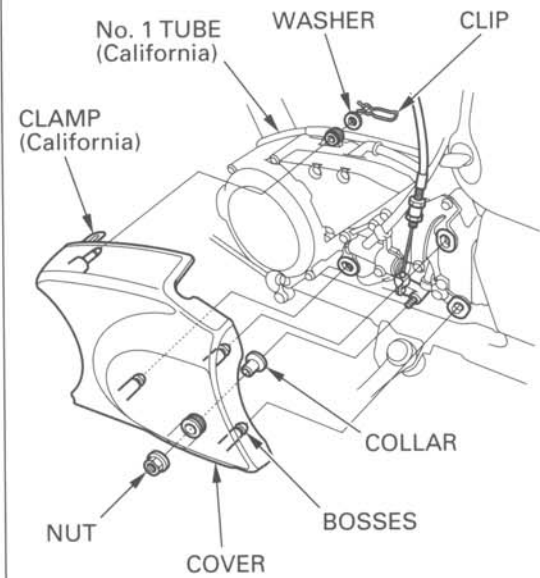
Installation is in the reverse order of removal.

*VT1100T only:* When installing the cover, insert the clutch cable grommet into the groove in the cover.

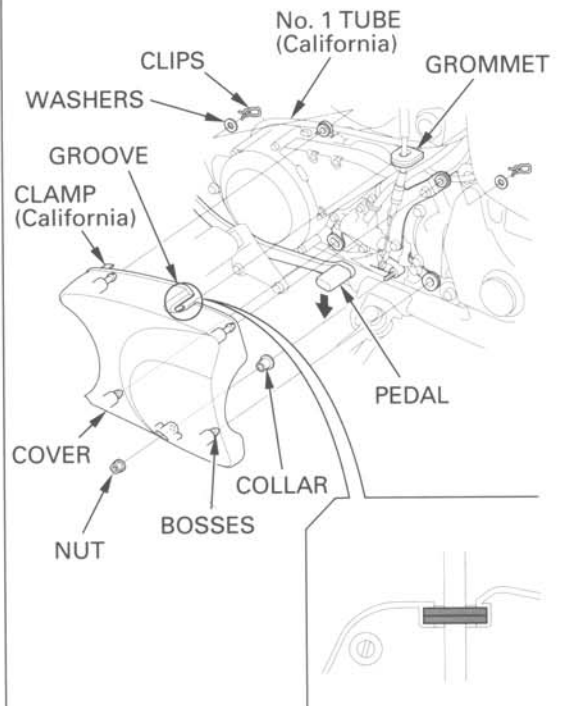
*California only:* Secure the No. 1 tube with the clamp after installing the cover.

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

VT1100C:



VT1100T:



VT1100T:

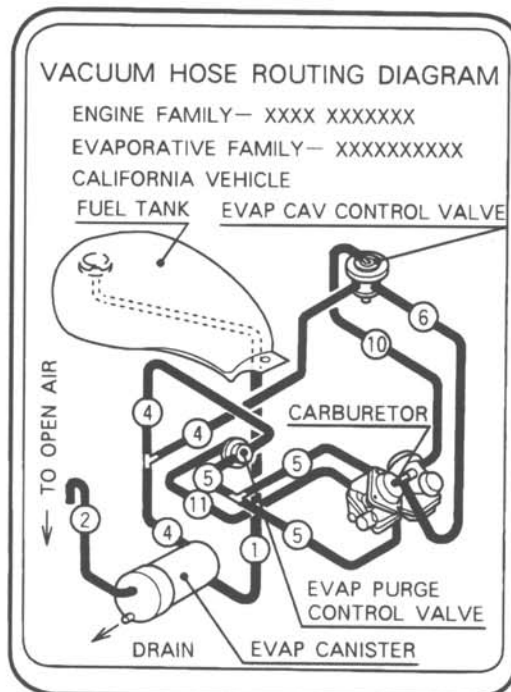
CALIFORNIA TYPE:

No. 5 TUBE  
(To EVAP purge control valve)

No. 2 TUBE  
(To open air — between the  
radiator body and grill)

EVAP CANISTER

No. 1 TUBE  
(To EVAP canister)



This label is located on the reverse side of the right side cover.

## 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.

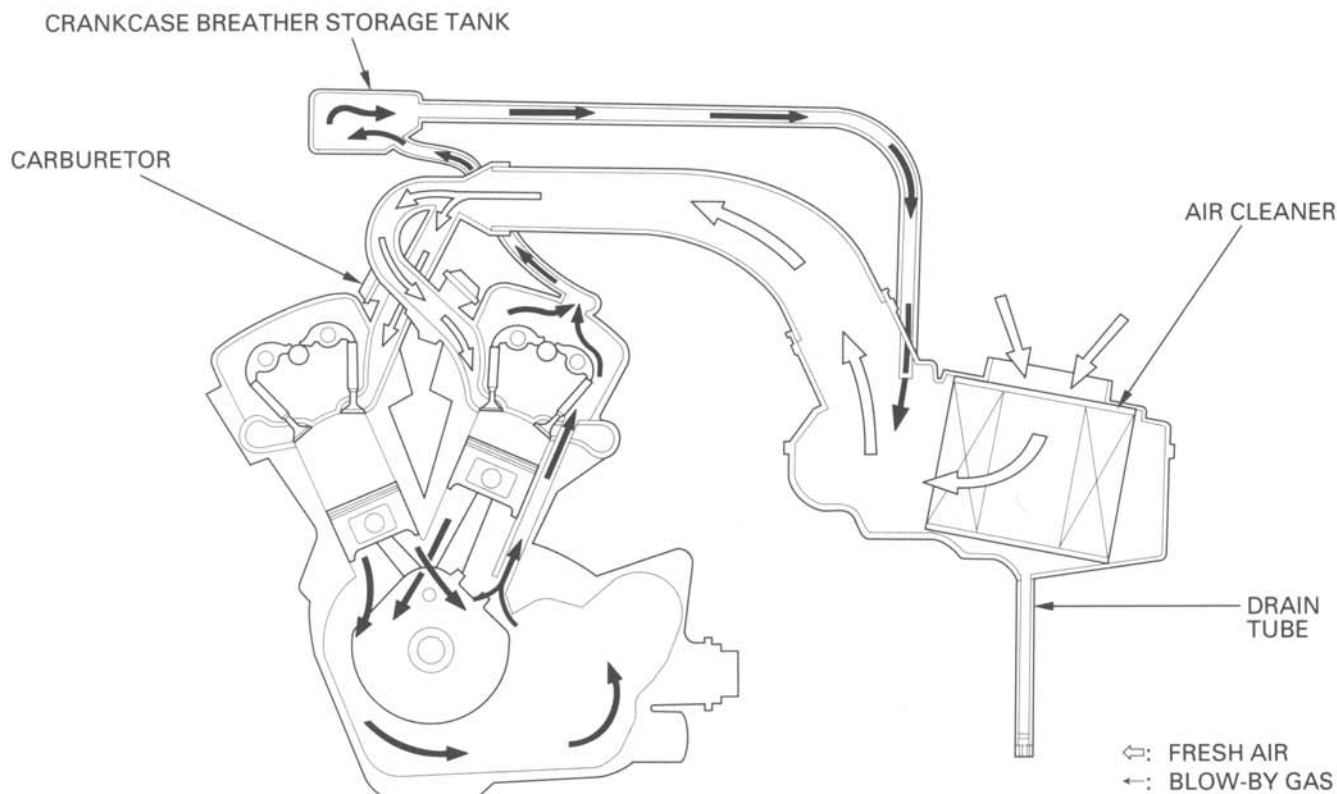
#### EXHAUST EMISSION CONTROL SYSTEM

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

#### CRANKCASE EMISSION CONTROL SYSTEM

The engine is equipped with a closed crankcase system which routes crankcase emissions through the air cleaner into the combustion chamber.

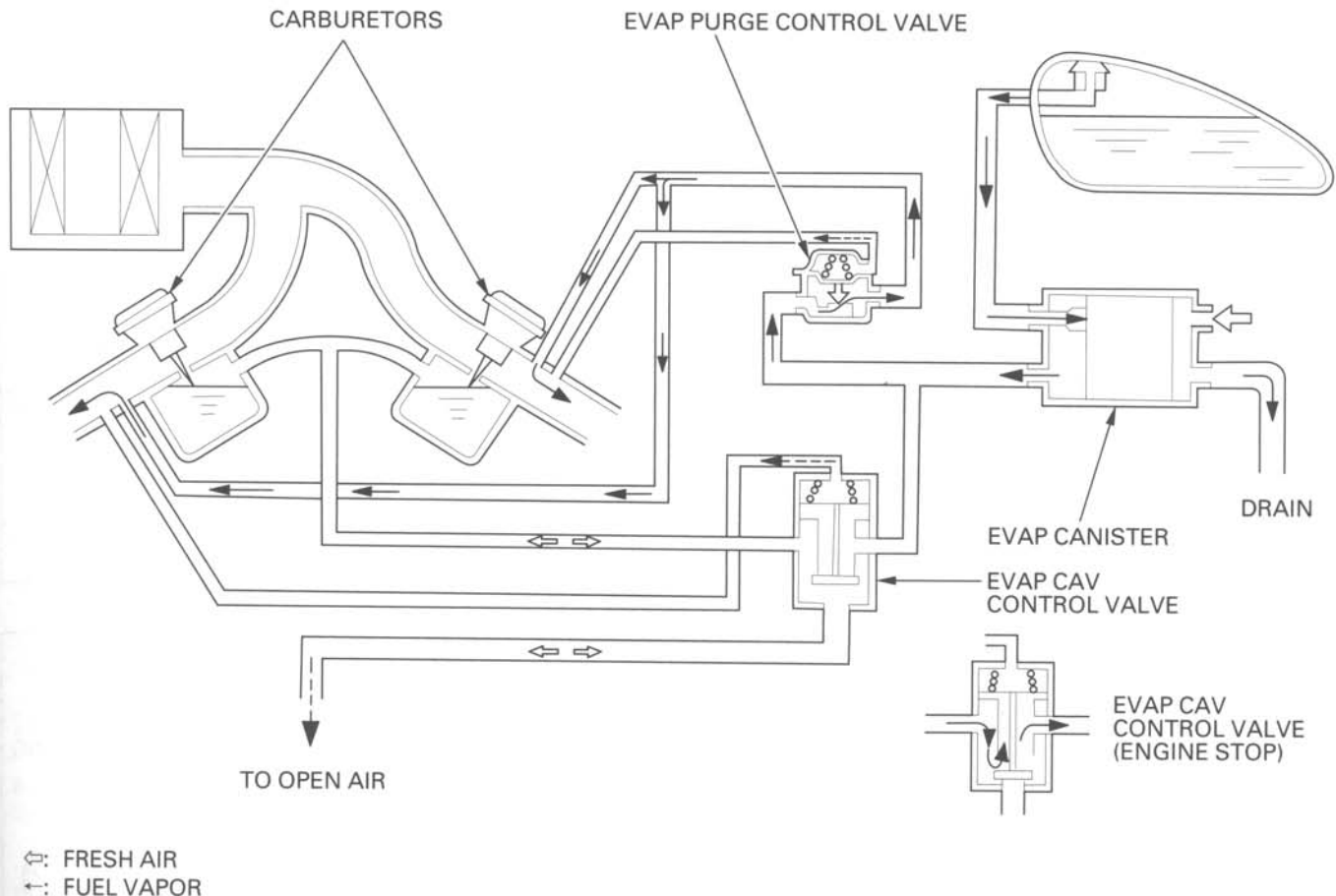
Condensed crankcase vapors are accumulated in a crankcase breather storage tank and drain tube which must be emptied periodically (page 3-3). The drain tube needs to be checked for oil accumulation more frequently if the machine has been consistently ridden at high speeds or in rain.





## 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 carburetor is directed into the evaporative emission (EVAP) canister where it is adsorbed 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.



## 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; or (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 conduct 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

### EMISSION CONTROL INFORMATION LABELS

An Emission Control Information Label is located on the reverse side of the left side cover as shown. The left side cover must be removed to read it. It gives basic tune-up specifications.

#### VEHICLE EMISSION CONTROL INFORMATION UPDATE LABEL

After making a high altitude carburetor adjustment, attach an update label on the reverse side of the left side cover as shown (page 5-20).

Instructions for obtaining the update label are given in Service Letter No. 132.

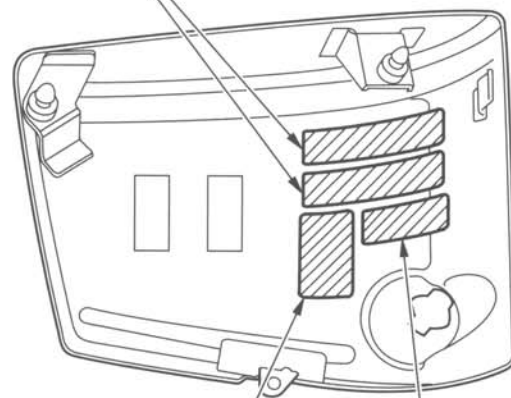
When readjusting the carburetors back to the low altitude specifications, be sure to remove this update label.

#### VACUUM HOSE ROUTING DIAGRAM LABEL (California type)

The Vacuum Hose Routing Diagram Label is on the reverse side of the left side cover as shown (page 1-53 or 1-67).

**VT1100C:**

EMISSION CONTROL INFORMATION LABEL  
(U.S.A. : 1 sheet/Canada 2 sheets)



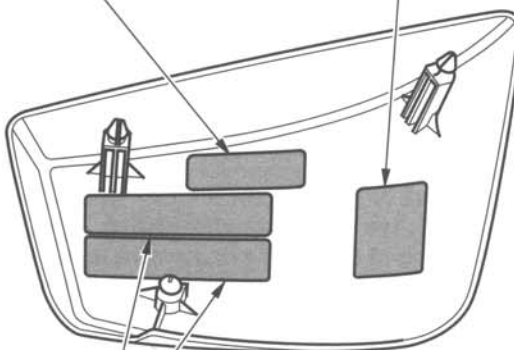
VACUUM HOSE ROUTING DIAGRAM LABEL  
(California only)

UPDATE LABEL

**VT1100T:**

UPDATE LABEL

VACUUM HOSE ROUTING DIAGRAM LABEL  
(California only)



EMISSION CONTROL INFORMATION LABEL  
(U.S.A. : 1 sheet/Canada 2 sheets)

# 2. FRAME/BODY PANELS/EXHAUST SYSTEM

SERVICE INFORMATION	2-1	REAR FENDER	2-7
TROUBLESHOOTING	2-1	GRAB RAIL	2-8
SEAT (VT1100C)	2-2	EXHAUST SYSTEM (VT1100C)	2-9
SEAT (VT1100T)	2-3	EXHAUST SYSTEM (VT1100T)	2-11
SIDE COVER (VT1100C)	2-4	WINDSHIELD (VT1100T only)	2-14
SIDE COVER (VT1100T)	2-5	SADDLEBAG (VT1100T only)	2-14
FUEL TANK	2-6	LEFT CRANKCASE REAR COVER	2-15
STEERING SIDE COVER	2-6		

## 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.

- This section covers removal and installation of the frame body panels, fuel tank and exhaust system.
- Work in a well ventilated area. Smoking or allowing flames or sparks in the working area or where gasoline is stored can cause a fire or explosion.
- Always replace the exhaust pipe gasket when removing the exhaust pipe from the engine.
- Always inspect the exhaust system for leaks after installation.

### TORQUE VALUES

Back seat nut (VT1100C only)	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply locking agent to the threads.
Rear fender bolt (10 mm)	64 N·m (6.5 kgf·m , 47 lbf·ft)	Apply oil to the threads and seating surface.
(8 mm)	26 N·m (2.7 kgf·m , 20 lbf·ft)	
Rear shock absorber upper pivot (grab rail) bolt	108 N·m (11.0 kgf·m , 80 lbf·ft)	Apply oil to the threads and seating surface.
Exhaust pipe joint nut (VT1100C)	25 N·m (2.5 kgf·m , 18 lbf·ft)	
(VT1100T)	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Front muffler mounting bolt (VT1100C)	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Front/rear muffler joint bolt (VT1100C only)	26 N·m (2.7 kgf·m , 20 lbf·ft)	
Muffler mounting bolt (VT1100T)	26 N·m (2.7 kgf·m , 20 lbf·ft)	
Muffler and exhaust pipe band bolt	20 N·m (2.0 kgf·m , 14 lbf·ft)	
Exhaust pipe cover bolt	8.8 N·m (0.9 kgf·m , 6.5 lbf·ft)	
Fuel tank mounting bolt (front)	12 N·m (1.2 kgf·m , 9 lbf·ft)	
(rear)	26 N·m (2.7 kgf·m , 20 lbf·ft)	
Fuel valve	34 N·m (3.5 kgf·m , 25 lbf·ft)	

## TROUBLESHOOTING

#### Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leaks

#### Poor performance

- Deformed exhaust system
- Exhaust gas leaks
- Clogged muffler

## SEAT (VT1100C)

### FRONT AND REAR SEAT

**CAUTION:**

*Be careful not to scratch the rear fender.*

**REMOVAL**

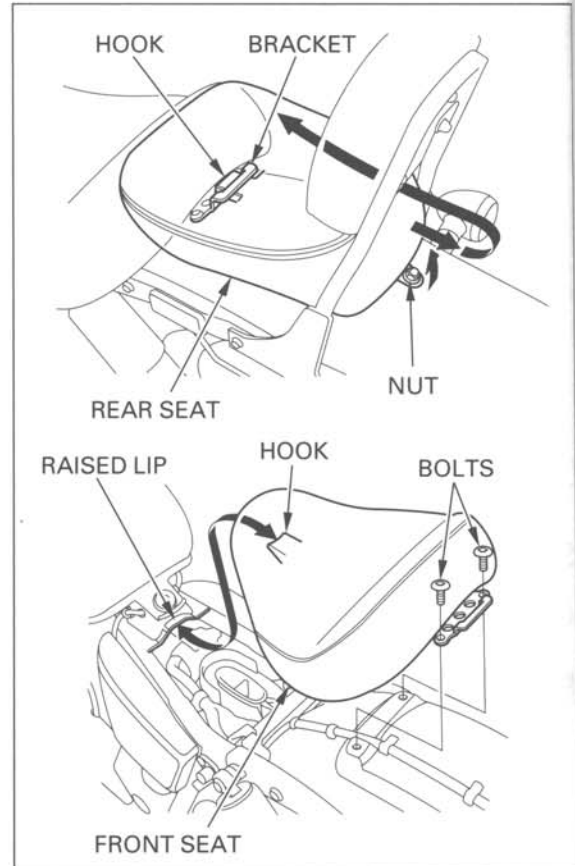
Remove the rear seat mounting nut.  
Raise the rear of the seat slightly and pull it rearward to release the hook of the seat from the bracket.  
Remove the rear seat to the front side.

Remove the front seat mounting bolts.  
Raise the rear of the seat and remove it.

**INSTALLATION**

**CAUTION:**

*The air cleaner intake port is located under the front seat. Do not remove the mounting rubbers from bottom of the seat or place foreign material (i. e. shop towel or rain wear etc.) onto the air cleaner housing cover.  
If the intake port is blocked, the engine may lack power.*



Install the front seat by inserting the hook of the seat under the raised lip of the frame cross member and push the seat forward. Align the bolt holes and tighten the mounting bolts.

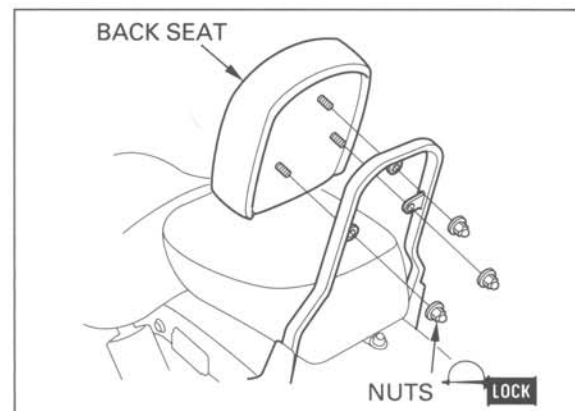
Place the rear seat between the back seat and rear fender, being careful not to scratch the rear fender. Align the hook of the seat with the bracket hole and the bolt hole in the seat stay with the stud bolt and tighten the mounting nut.

### BACK SEAT

Remove the nuts and the seat.

Apply locking agent to the nut threads and install the seat in the reverse order of removal.

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



## SEAT (VT1100T)

### FRONT AND REAR SEAT

**CAUTION:**

*Be careful not to scratch the rear fender.*

**REMOVAL**

Remove the three mounting bolts and the seat.

Remove the four nuts and joint bracket and separate the front and rear seats.

**INSTALLATION**

**CAUTION:**

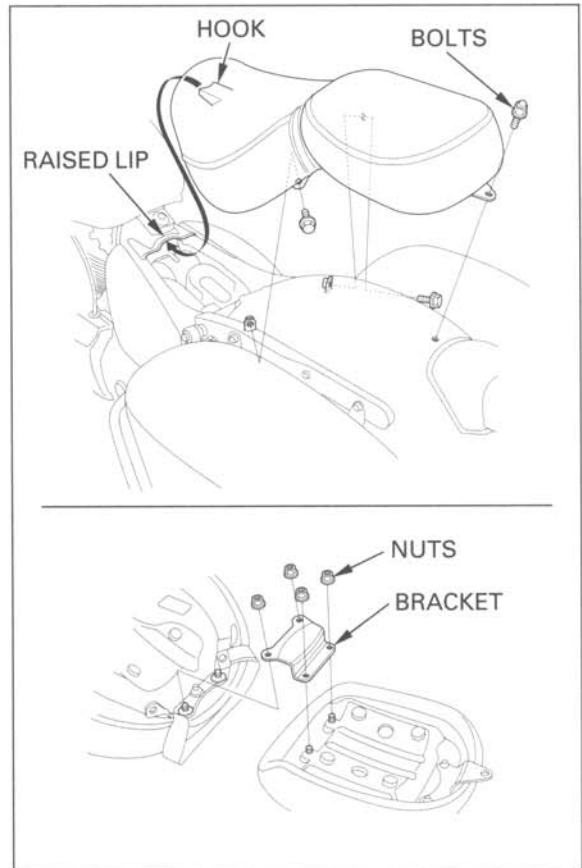
*The air cleaner intake port is located under the front seat. Do not remove the mounting rubbers from bottom of the seat or place foreign material (i. e. shop towel or rain wear etc.) onto the air cleaner housing cover.*

*If the intake port is blocked, the engine may lack power.*

Assemble the front and rear seats with the joint bracket by tightening the four nuts.

Install the seat by inserting the hook of the seat under the raised lip of the frame cross member and push the seat forward.

Align the bolt holes and tighten the mounting bolts.



## SIDE COVER (VT1100C)

**CAUTION:**

*Be careful not to break or deform the side cover bosses and tabs.*

### LEFT SIDE COVER

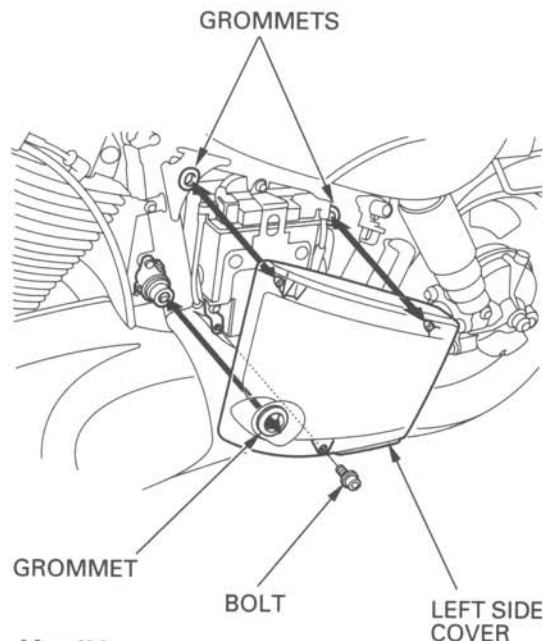
**REMOVAL**

'97-'00: Remove the socket bolt.  
After '00: Remove the cap nut.  
Release the side cover bosses from the grommets and remove the left side cover.

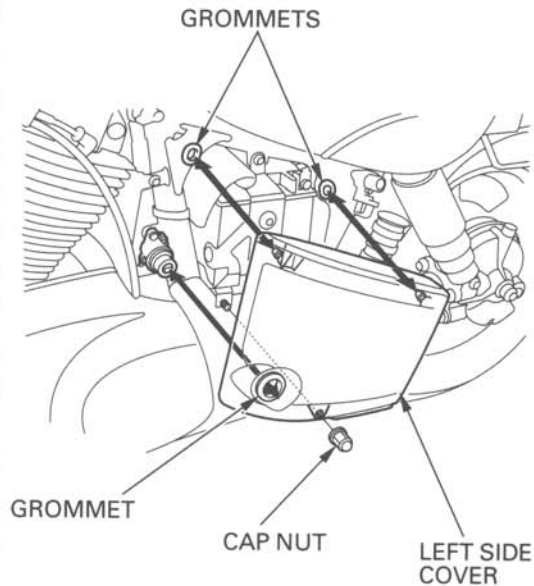
**INSTALLATION**

*Be careful not to dislodge the grommets.* Align the grommet of the cover with the ignition switch and install the bosses into the frame grommets.  
'97-'00: Install and tighten the socket bolt.  
After '00: Install and tighten the cap nut.

'97-'00:



After '00:



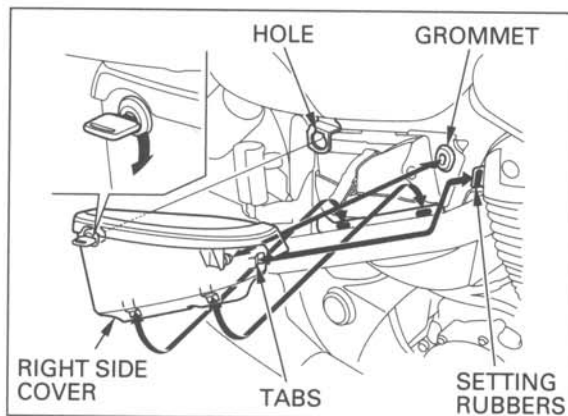
### RIGHT SIDE COVER

**REMOVAL**

Insert the ignition key into the cover lock and turn the key clockwise 90°. Release the side cover boss from the grommet and remove the right side cover.

**INSTALLATION**

*Be careful not to dislodge the grommet and setting rubbers.* Set the three tabs of the cover on the setting rubbers and install the boss into the grommet while aligning the key cylinder with the frame hole. Push the lock portion lightly to lock up the side cover.



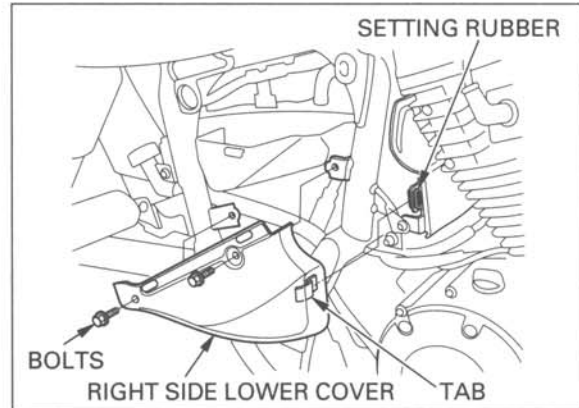
**RIGHT SIDE LOWER COVER**

Remove the right side cover.  
Remove the exhaust system (page 2-9).

Remove the two bolts and remove the lower cover by releasing the tab from the setting rubber.

*Be careful not to dislodge the setting rubbers.*

Installation is in the reverse order of removal.



**SIDE COVER (VT1100T)**

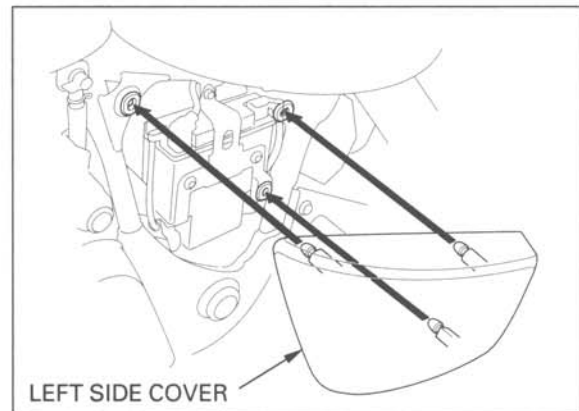
**CAUTION:**

*Be careful not to break or deform the side cover bosses.*

**LEFT SIDE COVER**

**REMOVAL/INSTALLATION**

Release the three side cover bosses from the grommets and remove the left side cover.



*Be careful not to dislodge the grommets in the frame.*

Installation is in the reverse order of removal.

**RIGHT SIDE COVER**

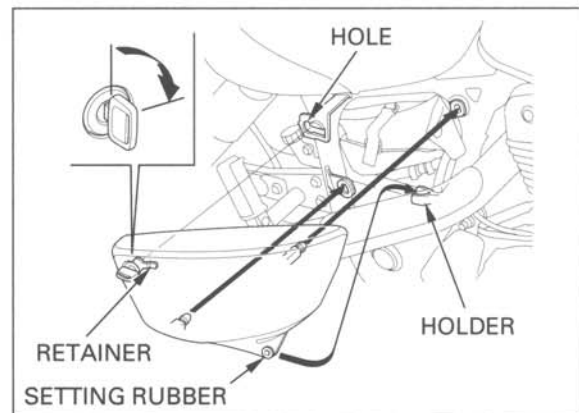
**REMOVAL**

Insert the ignition key into the cover lock and turn the key clockwise 90°. Release the two side cover bosses from the grommet and remove the right side cover.

**INSTALLATION**

*Be careful not to dislodge the grommets in the frame.*

Insert the setting rubber portion of the right side cover between the frame holder as shown, align the lock retainer with the frame hole and install the bosses into the frame grommets. Hold the cover lock portion lightly and turn the key counterclockwise 90°.



## FUEL TANK

**▲WARNING**

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

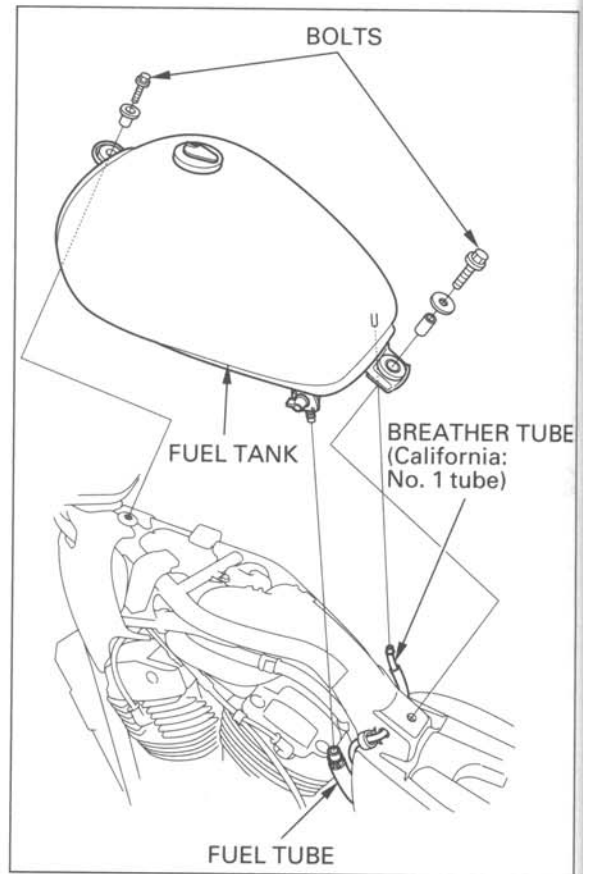
Remove the rear and front seat (page 2-2 or 2-3).

Turn the fuel valve OFF.  
 Remove the 6 mm bolt and collar.  
 Remove the 8 mm bolt, washer and collar.  
 Disconnect the fuel tube and breather tube (California: No. 1 tube).  
 Remove the fuel tank from the frame.

Installation is in the reverse order of removal.

**TORQUE: 8 mm:** 26 N·m (2.7 kgf·m , 20 lbf·ft)  
**6 mm:** 12 N·m (1.2 kgf·m , 9 lbf·ft)

After installation, turn the fuel valve ON and check the fuel line for leakage.



## STEERING SIDE COVER (VT1100C)

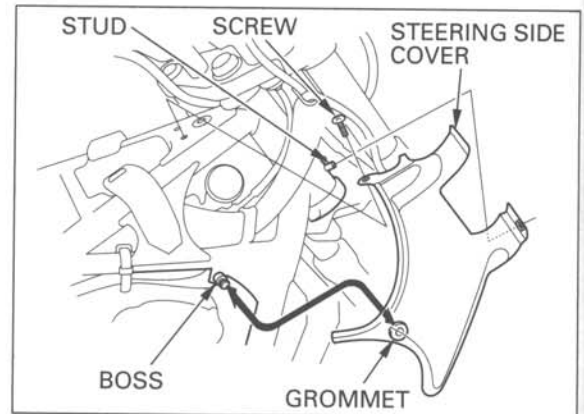
Remove the fuel tank (see above).

Remove the screw.

*If necessary, turn the handlebars away from the side cover being removed.*

Release the rear side grommet of the cover from the frame boss and remove the steering side cover from the stud on the steering head.

Install the steering side cover in the reverse order of removal, being careful not to dislodge the grommets.



## STEERING SIDE COVER (VT1100T)

### REMOVAL

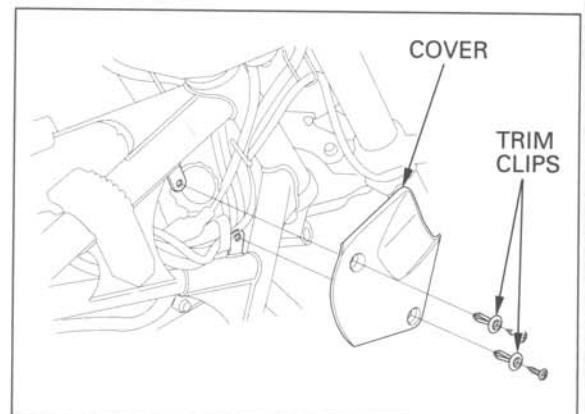
Remove the fuel tank (see above).

Remove the trim clips and the steering side cover.

### INSTALLATION

Install the steering side cover with the trim clips securely.

*When installing the trim clips, carefully align the clip holes in the frame and cover to avoid damaging the clips.*





## REAR FENDER

Remove the front and rear seats (page 2-2 or 2-3).

Disconnect the tail/brake light connectors inside the connector boot.

VT1100C only: Remove the four 8 mm bolts, washers and the back seat assembly.

*Be careful not to scratch the fender or deform the connector stay.*

VT1100T and '97-'00 VT1100C: Remove the two 10 mm bolts and place the rear fender onto the rear wheel. Remove the fuse box (2P White) connector from the stay on the fender and remove the rear fender.

After '00 VT1100C: Remove the two 10 mm bolts and the rear fender.

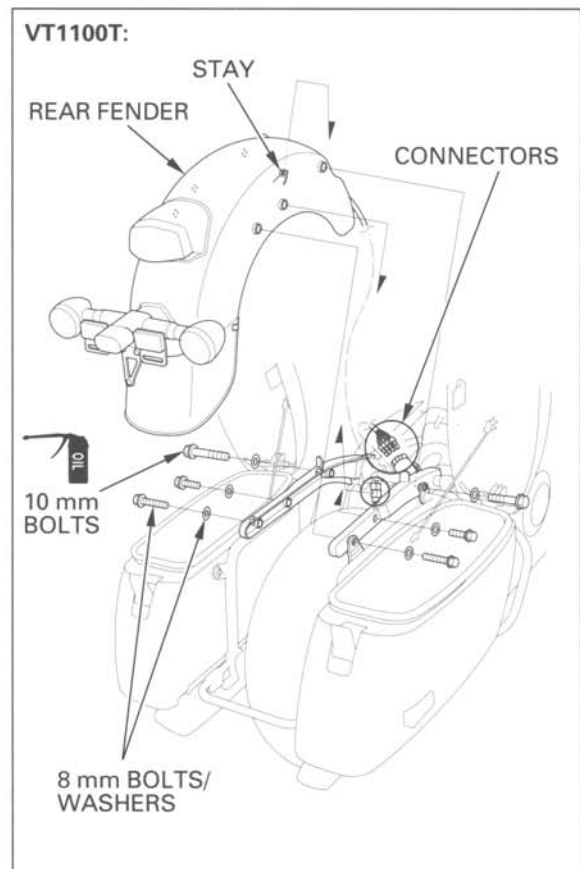
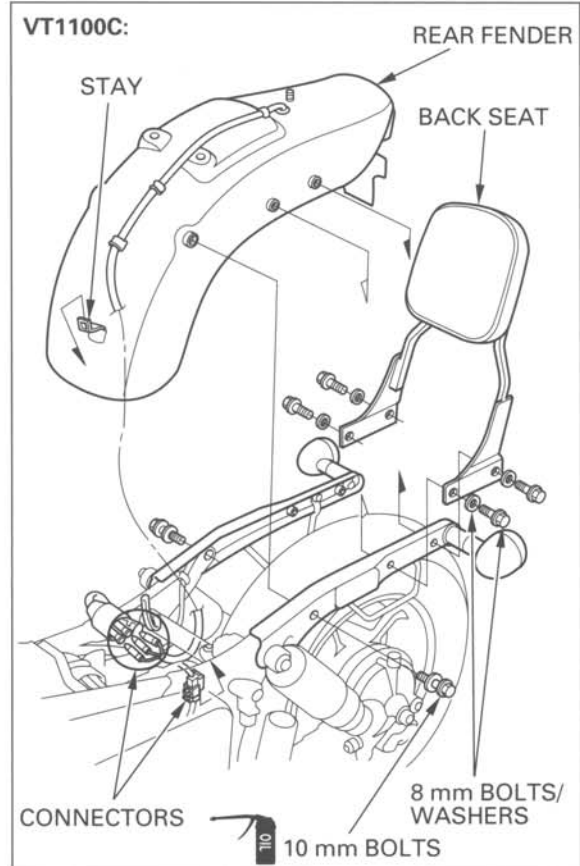
Installation is in the reverse order of removal.

### TORQUE:

**10 mm bolt:** 64 N·m (6.5 kgf·m , 47 lbf·ft)

Apply oil to the threads and seating surfaces.

**8 mm bolt:** 26 N·m (2.7 kgf·m , 20 lbf·ft)



## GRAB RAIL

Remove the rear fender (see previous page).  
Remove the rear shock absorber (page 14-26).

*VT1100C only:* Disconnect the turn signal connectors inside the connector boot and release the turn signal wire from the frame clamp.

Remove the 14 mm bolt and the grab rail.

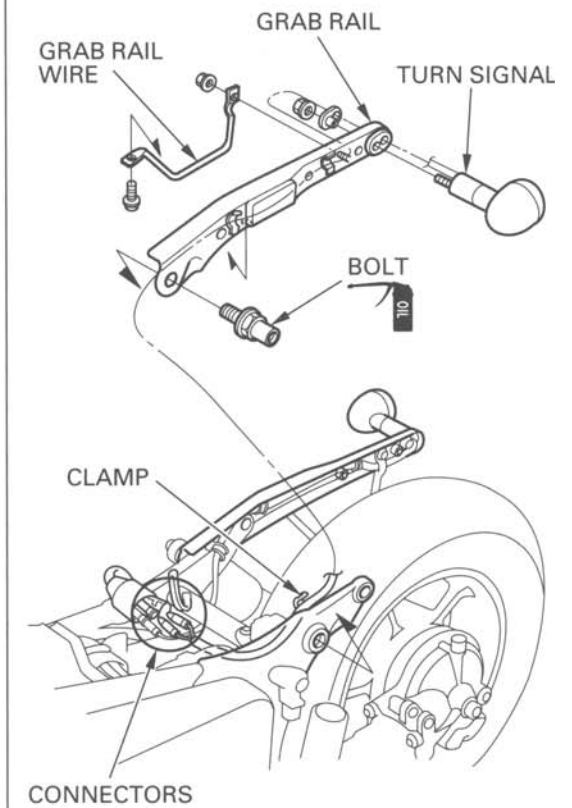
*VT1100C only:* To remove the rear turn signal;  
Remove the bolt, nut and the grab rail wire.  
Release the turn signal wire from the clamps.  
Remove the nut, setting plate and the rear turn signal assembly.

Installation is in the reverse order of removal.

### TORQUE:

**Shock absorber upper pivot bolt (14 mm):**  
108 N·m (11.0 kgf·m , 80 lbf·ft)  
Apply oil to the threads and seating surfaces.

VT1100C shown:



## EXHAUST SYSTEM (VT1100C)

### ▲WARNING

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

### REMOVAL

If the muffler will be separated, loosen the muffler joint bolts and muffler band bolts.

Remove the four exhaust pipe joint nuts.  
Remove the two mounting bolts/nuts and the exhaust pipe/muffler as an assembly.  
Remove the gaskets.

### INSTALLATION

It is important to follow these steps in order.

#### NOTE:

If the exhaust system will not be disassembled, steps 1 and 2 are not necessary.

Refer to the illustration below:

1. Before mounting the exhaust system, assemble the front and rear mufflers by tightening the muffler joint bolts ② and muffler band bolt ①.
2. Temporarily tighten the exhaust pipe band bolts ③/④.
3. Make sure that the new gaskets are installed in position.  
Insert the exhaust flange into the cylinder head studs with the flange "UP" mark facing up and loosely install the exhaust pipe joint nuts ⑤/⑥.
4. Hold the exhaust pipe/muffler assembly and loosely install the two mounting bolts and nuts ⑦.  
• After mounting the exhaust system, tighten each fastener in the sequence below.
5. Tighten the muffler band bolt ① and the muffler joint bolts ② to the specified torque.

**TORQUE: Band bolt:** 20 N·m (2.0 kgf·m , 14 lbf·ft)  
**Joint bolt:** 26 N·m (2.7 kgf·m , 20 lbf·ft)

6. Tighten the exhaust pipe band bolts ③/④ to the specified torque.

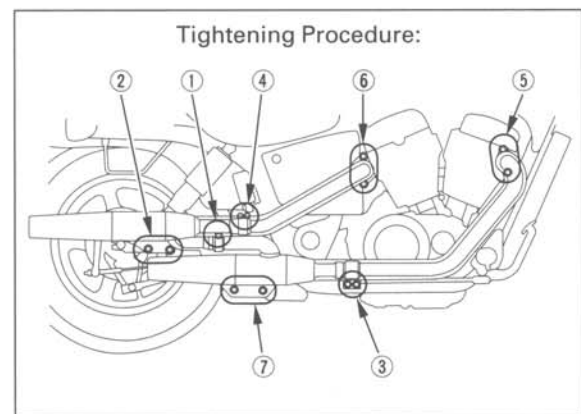
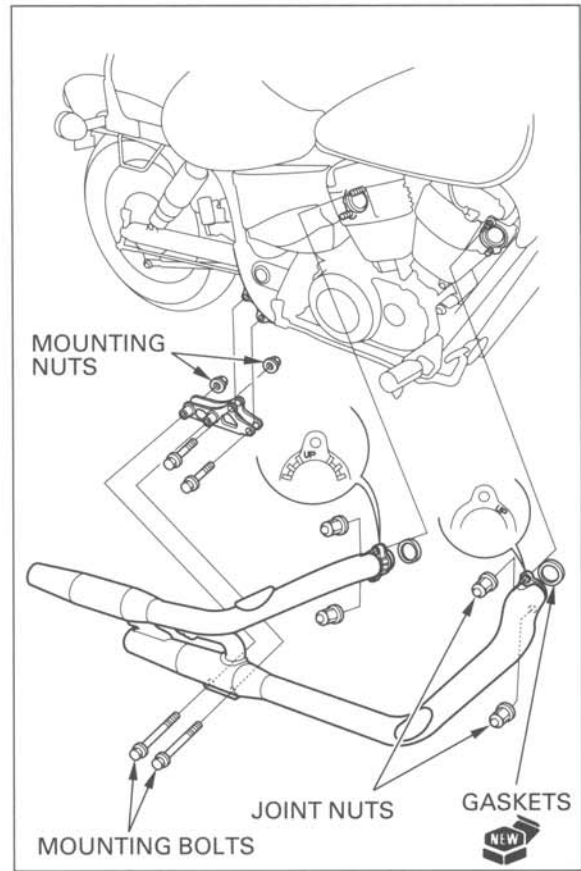
**TORQUE:** 20 N·m (2.0 kgf·m , 14 lbf·ft)

7. Tighten each pair of the exhaust pipe joint nuts ⑤/⑥ alternately in 2—3 steps.

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

8. Tighten the mounting bolts ⑦ to the specified torque.

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



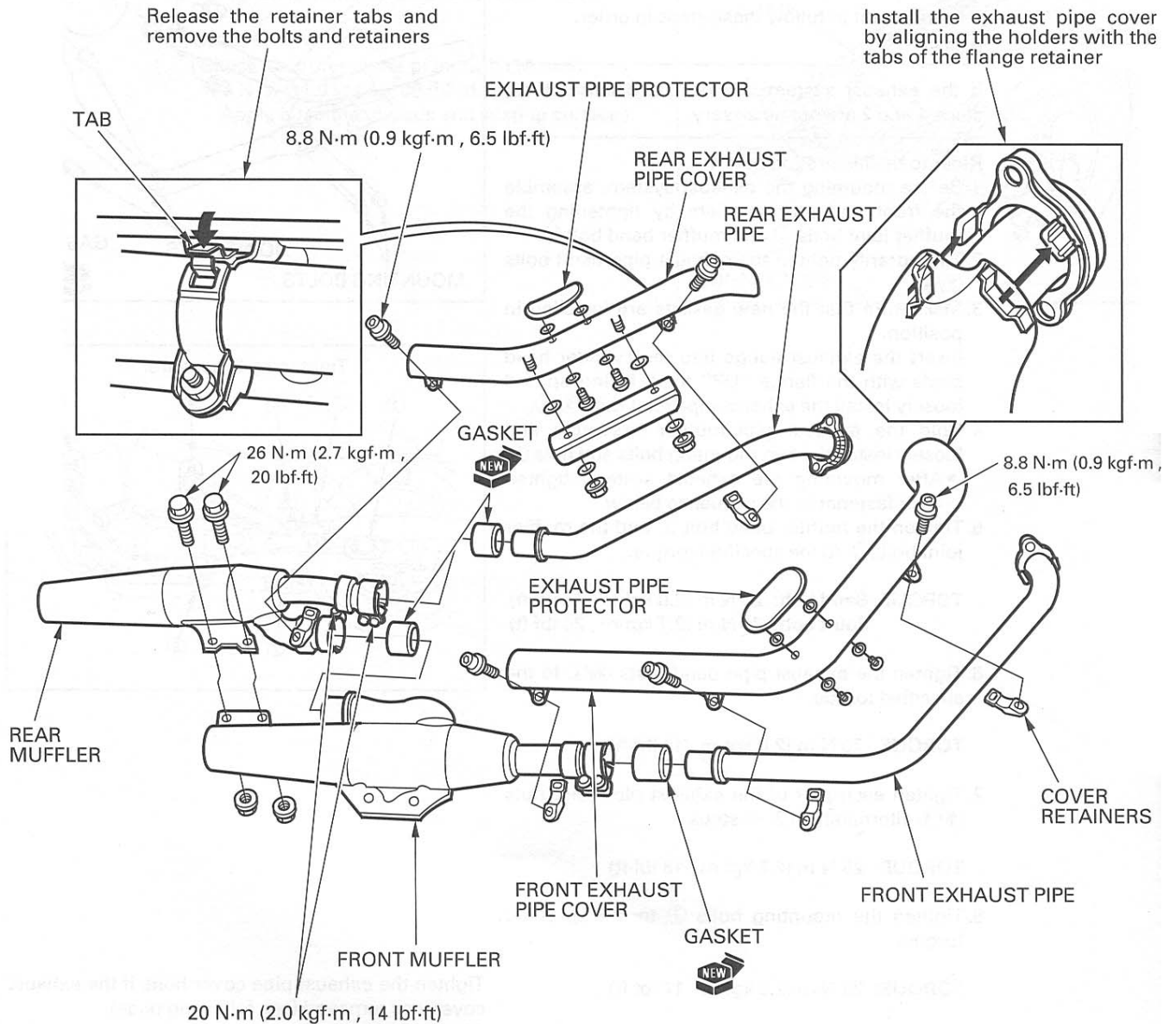
Tighten the exhaust pipe cover bolts if the exhaust cover was removed (see following page).  
After installation, inspect the exhaust system for leaks.

# FRAME/BODY PANELS/EXHAUST SYSTEM

## DISASSEMBLY/ASSEMBLY

### NOTE:

If the exhaust pipe covers were removed, temporarily install the exhaust pipe covers when installing the exhaust system onto the engine and tighten the cover bolts after installing the exhaust system.



## EXHAUST SYSTEM (VT1100T)

**▲WARNING**

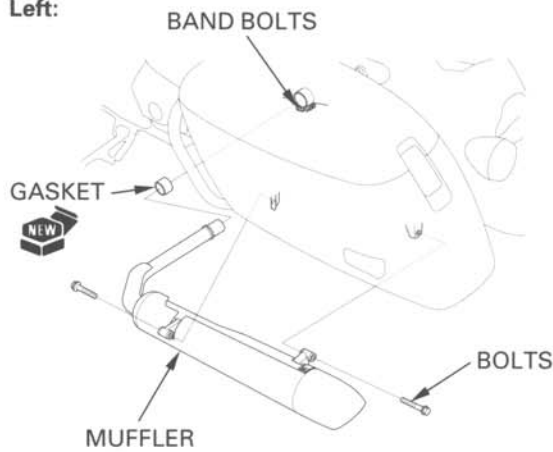
*Do not service the exhaust system while it is hot.*

### REMOVAL

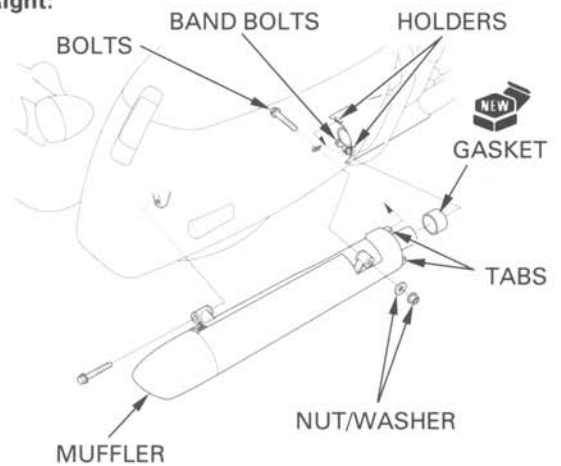
#### MUFFLER

Loosen the muffler band bolts.  
Remove the mounting nut, washer (right muffler only) and bolts and the muffler.  
Remove the gasket.

Left:

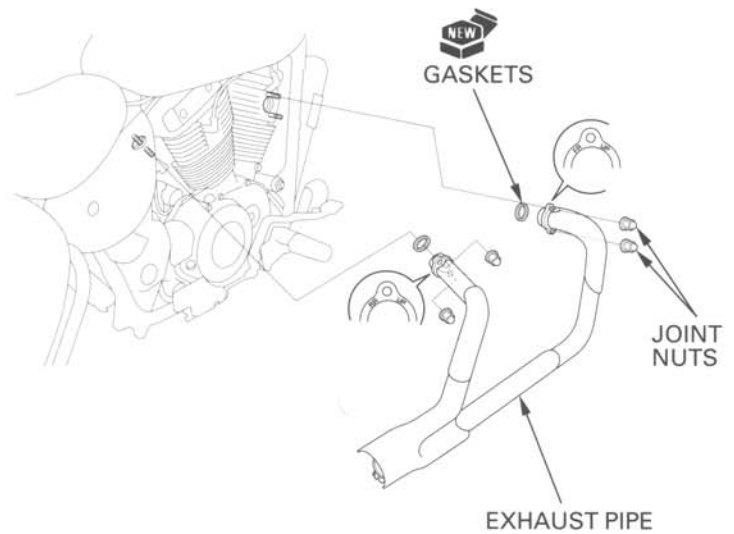


Right:



#### EXHAUST PIPE

Remove the right and left mufflers.  
Remove the four joint nuts and the exhaust pipe.  
Remove the gaskets.



## INSTALLATION

### EXHAUST PIPE

Install new gaskets into the exhaust ports.

Set the exhaust flanges of the exhaust pipes to the cylinder head studs with the "UP" mark facing up (Front: FR UP/Rear: RR UP) and temporarily tighten the joint nuts ①/②.

### MUFFLER

While holding the exhaust pipe, install the mufflers into the exhaust pipe with new gaskets (for the right muffler, align the tabs with the holders on the exhaust pipe cover) and temporarily tighten each muffler mounting bolts ⑤/⑥ and nut ⑤ with the washers.

- After mounting the exhaust system, tighten each fastener in the sequence below.

1. Tighten each pair of the joint nuts ①/② alternately in several steps.

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

2. Tighten the muffler band bolts ③/④.

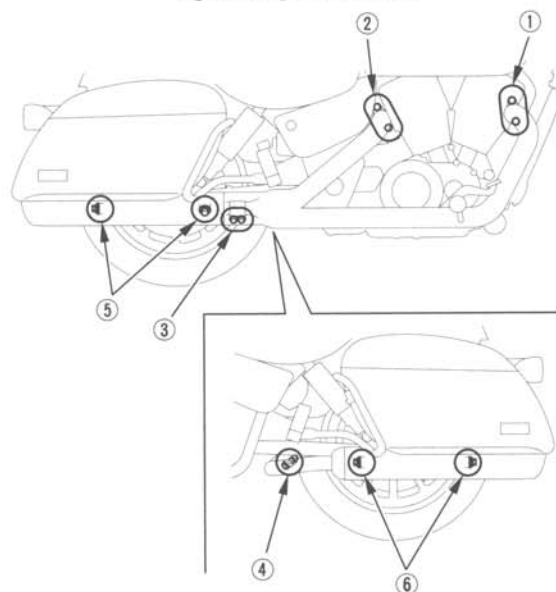
**TORQUE:** 20 N·m (2.0 kgf·m , 14 lbf·ft)

3. Tighten each mounting bolt ⑤/⑥.

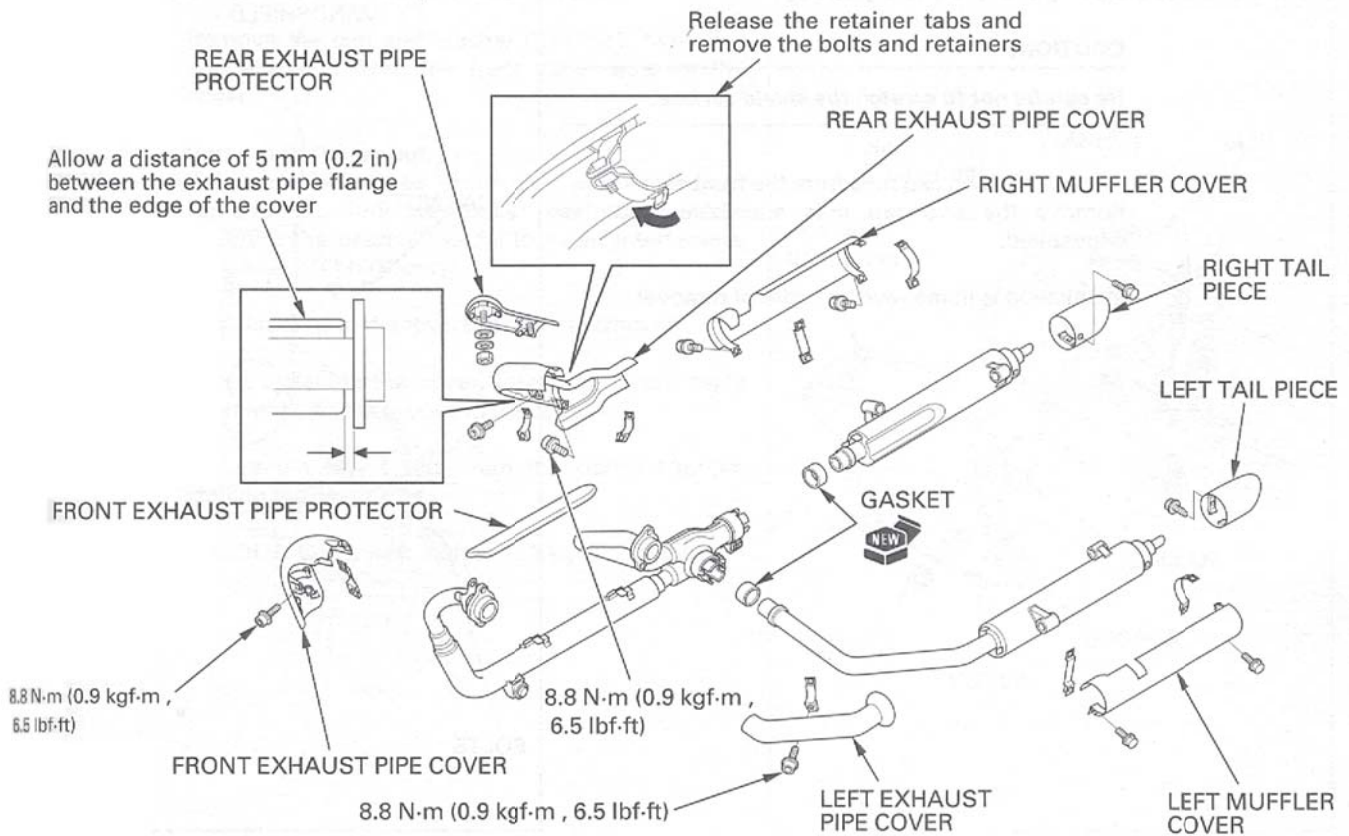
**TORQUE:** 26 N·m (2.7 kgf·m , 20 lbf·ft)

Tighten the exhaust pipe cover bolts if the exhaust cover was removed (see following page).  
After installation, inspect the exhaust system for leaks.

Tightening Procedure:



DISASSEMBLY/ASSEMBLY



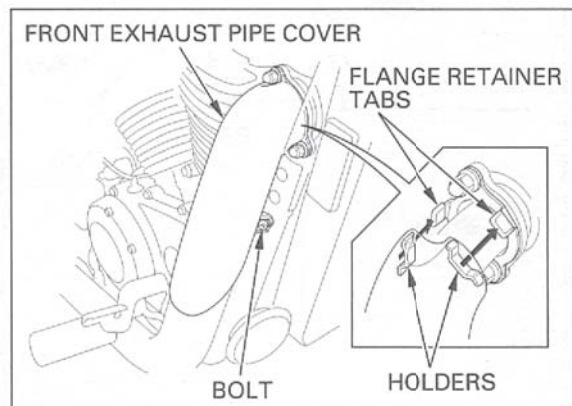
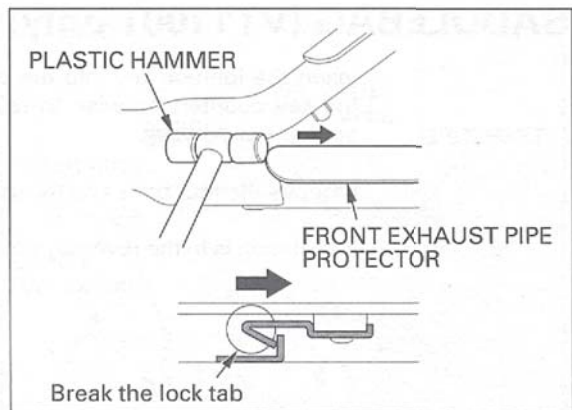
NOTE:

- The front exhaust pipe cover and front exhaust pipe protector can be removed without removing the exhaust system from the engine.
- If the rear exhaust pipe cover was removed, temporarily install the exhaust pipe cover and cover band bolts when installing the exhaust system onto the engine and tighten the cover bolts after installing the exhaust system.

**At front exhaust pipe protector removal:** Drive the rear end of the protector using the plastic hammer and break the lock tab (reverse side of the protector) and remove it.

Do not reuse the removed protector.

**At front exhaust cover installation:** After installing the exhaust system onto the engine, install the protector cover by aligning the holders with the tabs of the flange retainer. Then tighten the cover band bolt to the specified torque.



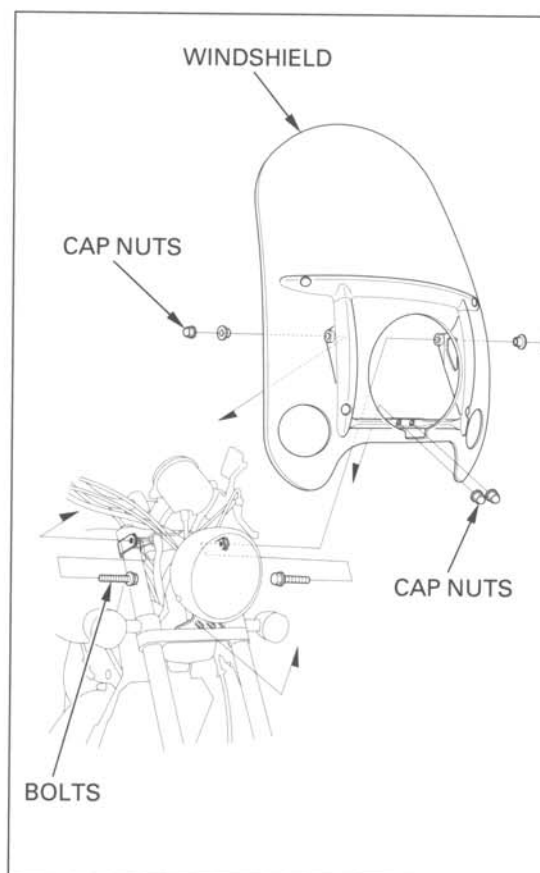
## **WINDSHIELD (VT1100T only)**

**CAUTION:**

*Be careful not to scratch the shield surface.*

Remove the two cap nuts from the front side.  
Remove the two cap nuts and bolts and the windshield.

Installation is in the reverse order of removal.

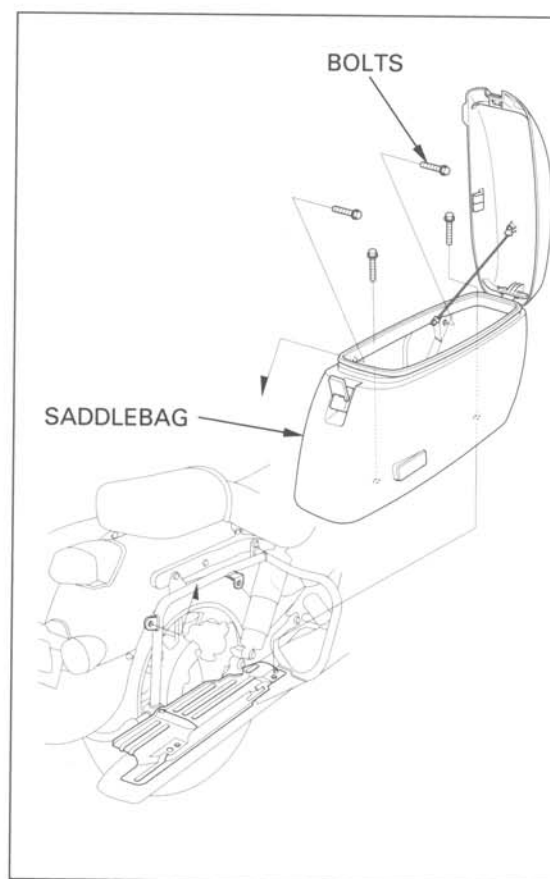


## **SADDLEBAG (VT1100T only)**

Insert the ignition key into the cover lock and turn the key counterclockwise to release the lock and open the saddlebag.

Remove the four bolts and the saddlebag.

Installation is in the reverse order of removal.





## LEFT CRANKCASE REAR COVER

Remove the clip and washer (VT1100T: two clips and washers) from the front upper boss of the cover.

Remove the cover nut.

Release the bosses from the grommets and remove the left crankcase rear cover while lowering the gearshift pedal to avoid interference the pedal (VT1100T only).

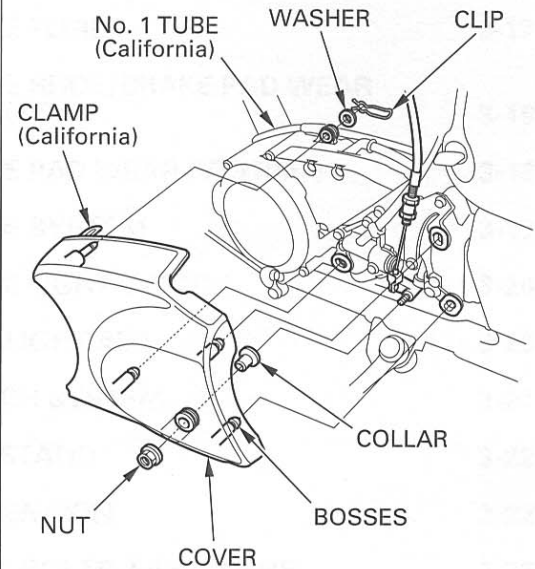
Installation is in the reverse order of removal.

*VT1100T only:* When installing the cover, insert the clutch cable grommet into the groove in the cover.

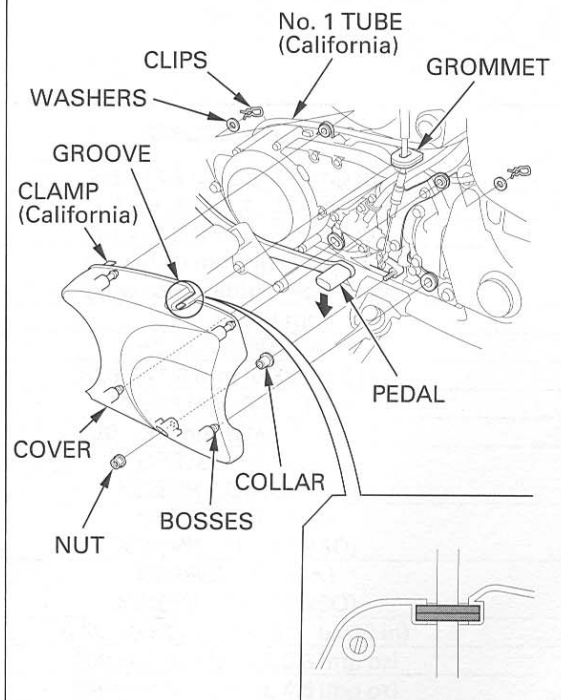
*California only:* Secure the No. 1 tube with the clamp after installing the cover.

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

VT1100C:



VT1100T:



# 3. MAINTENANCE

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EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)	3-14		

## SERVICE INFORMATION

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine oil capacity	at draining	2.9 l (3.1 US qt , 2.6 Imp qt)
	at disassembly	3.8 l (4.0 US qt , 3.3 Imp qt)
	at oil filter change	3.1 l (3.3 US qt , 2.7 Imp qt)
Carburetor vacuum difference		Within 40 mm Hg (1.6 in Hg) base carburetor: No.1 (rear)
Engine idle speed		1,000 ± 100 rpm
Throttle grip free play		2 – 6 mm (1/8 – 1/4 in)
Starting enrichment (SE) valve distance		10.0 – 11.0 mm (0.39 – 0.43 in)
Clutch lever free play		10 – 20 mm (3/8 – 3/4 in)
Rear brake pedal free play		20 – 30 mm (3/4 – 1-1/4 in)
Spark plug	Standard	DPR7EA – 9 (NGK) X22EPR – U9 (DENSO)
	For cold climate/below 5 °C/41 °F	DPR6EA – 9 (NGK) X20EPR – U9 (DENSO)
	For extended high speed riding	DPR8EA – 9 (NGK) X24EPR – U9 (DENSO)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Final drive oil capacity	at disassembly	150 cm <sup>3</sup> (5.1 US oz, 5.3 Imp oz)
	at draining	130 cm <sup>3</sup> (4.4 US oz, 4.6 Imp oz)

## MAINTENANCE

(cont'd)

		ITEM		SPECIFICATIONS
Cold tire pressure	VT1100C	Up to 90 kg (200 lbs) load	Front	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)
			Rear	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)
	VT1100T	Up to maximum weight capacity	Front	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)
			Rear	280 kPa (2.80 kgf/cm <sup>2</sup> , 41 psi)
		Up to 90 kg (200 lbs) load	Front	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)
			Rear	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)
Up to maximum weight capacity	Front	225 kPa (2.25 kgf/cm <sup>2</sup> , 33 psi)		
	Rear	250 kPa (2.50 kgf/cm <sup>2</sup> , 36 psi)		
Minimum tire tread depth		Front	1.5 mm (0.06 in)	
		Rear	2.0 mm (0.08 in)	
Tire size	VT1100C	Front	110/90 – 19 62H	
		Rear	170/80 – 15 M/C 77H	
	VT1100T	Front	130/80R18 66H	
		Rear	170/70R16 75H	
Tire brand (Dunlop)	VT1100C	Front	F24	
		Rear	K555	
	VT1100T	Front	D206F	
		Rear	D206A	

## TORQUE VALUES

Spark plug	14 N·m (1.4 kgf·m, 10 lbf·ft)
Engine oil drain bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)
Engine oil filter cartridge	9.8 N·m (1.0 kgf·m, 7 lbf·ft) Apply oil to the threads and seating surfaces
Final drive oil filler cap	12 N·m (1.2 kgf·m, 9 lbf·ft)
Final drive oil drain bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)

## TOOLS

Oil filter wrench	07HAA – PJ70100
Pilot screw wrench	07908 – 4730001 or equivalent commercially available in U. S. A.
Vacuum gauge set	07LMJ – 001000A or M937B – 021 – XXXXX (U. S. A. only)

# MAINTENANCE SCHEDULE

## VT1100C:

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 your authorized Honda dealer.

ITEM	FREQUENCY	WHICHEVER COMES FIRST ↓ 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	3-5	
	*	THROTTLE OPERATION				I		I		I	3-5	
	*	CARBURETOR CHOKE				I		I		I	3-7	
		AIR CLEANER	NOTE 2				R			R	3-8	
		CRANKCASE BREATHER	NOTE 3		C	C	C	C	C	C	3-8	
		SPARK PLUG			I	R	I	R	I	R	3-8	
		ENGINE OIL		R		R		R		R	3-10	
		ENGINE OIL FILTER		R		R		R		R	3-11	
	*	CARBURETOR SYNCHRONIZATION		I		I		I		I	3-12	
	*	ENGINE IDLE SPEED		I	I	I	I	I	I	I	3-13	
		RADIATOR COOLANT	NOTE 5			I		I		R	3-13	
	*	COOLING SYSTEM				I		I		I	3-14	
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 4				I			I	3-14	
	NON-EMISSION RELATED ITEMS		FINAL DRIVE OIL				I		I		R	3-15
			BATTERY	NOTE 6		I	I	I	I	I	I	3-16
		BRAKE FLUID	NOTE 5		I	I	R	I	I	R	3-17	
		BRAKE SHOE/BRAKE PAD WEAR			I	I	I	I	I	I	3-18	
		BRAKE SYSTEM		I		I		I		I	3-19	
*		BRAKE LIGHT SWITCH				I		I		I	3-20	
*		HEADLIGHT AIM				I		I		I	3-20	
		CLUTCH SYSTEM		I	I	I	I	I	I	I	3-21	
		SIDE STAND				I		I		I	3-22	
*		SUSPENSION				I		I		I	3-22	
*		NUTS, BOLTS, FASTENERS		I		I		I		I	3-23	
**	WHEELS/TIRES				I		I		I	3-23		
**	STEERING HEAD BEARINGS		I		I		I		I	3-23		

\* Should be serviced by your 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 your Honda dealer.

- NOTES:
- At higher odometer readings, repeat at the frequency interval established here.
  - Service more frequently when riding in unusually wet or dusty areas.
  - Service more frequently when riding in rain or at full throttle.
  - California type only.
  - Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.
  - '97-'00 only



## FUEL LINE

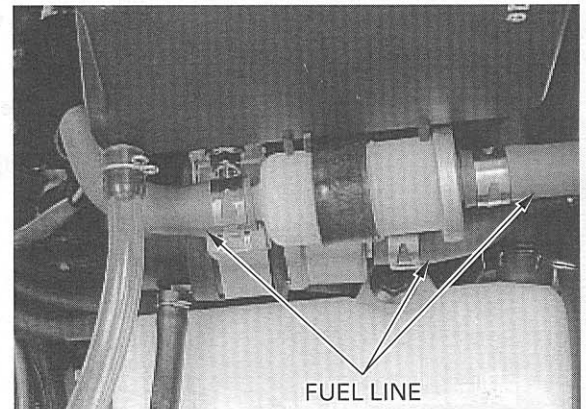
Remove the fuel tank (page 2-6).  
Remove the left and right side cover (page 2-4 or 2-5).

Remove the right side lower cover (page 2-4).



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

For the tube routing, see section 1.



## THROTTLE OPERATION

Check for any deterioration or damage to the throttle cables.

Check that the throttle grip for smooth operation.  
Check that the throttle opens and automatically closes in all steering positions.

If the throttle grip does not return properly, lubricate the throttle cable and overhaul and lubricate the throttle grip housing.

For the lubrication: Disconnect the throttle cables at their upper ends (page 13-6). Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant or a light weight oil.

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

### ▲WARNING

***Reusing a damaged or abnormally bent or kinked throttle cable can prevent proper throttle slide operation and may lead to a loss of throttle control while riding.***

With the engine idling, turn the handlebar all the way to the right and left to ensure that the idle speed does not change.

If idle speed increases, check the throttle grip free play and the throttle cable connection.

Measure throttle grip free play at the throttle grip flange.

**FREE PLAY:** 2–6 mm (1/8–1/4 in)



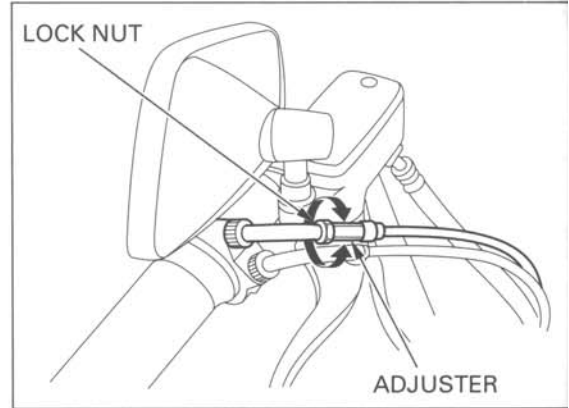
## MAINTENANCE

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Throttle grip free play can be adjusted at either end of the throttle cable. Minor adjustments are made with the upper adjuster.

Loosen the lock nut and turn the adjuster to obtain the free play.

Tighten the lock nut and reposition the adjuster boot properly after the adjustment has been made.



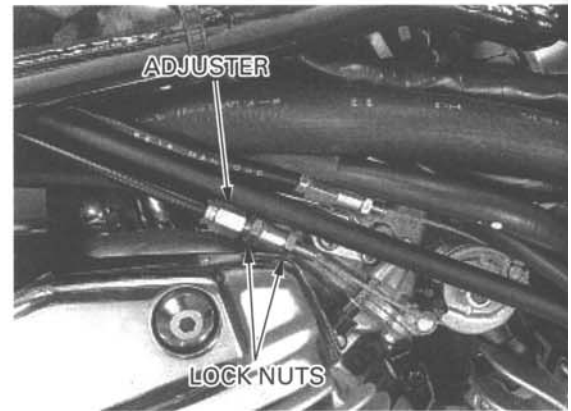
Major adjustments are made with the lower adjuster.

Remove the fuel tank (page 2-6).

Loosen the lock nuts and turn the adjuster to obtain the free play.

Tighten the lock nuts after the adjustment has been made.

Recheck the throttle free play.



## CARBURETOR CHOKE

### STARTING ENRICHMENT (SE) VALVE

Starting enrichment system operation can be checked by the way engine starts and runs:

- Difficulty in starting before the engine is warmed up (easy once it is warmed up): SE valve is not completely opened.
- Idle speed is erratic even after warm-up (imperfect combustion): SE valve is not completely closed.

When the above symptoms occur, inspect the SE valve using the following procedure.

Remove the fuel tank (page 2-6).

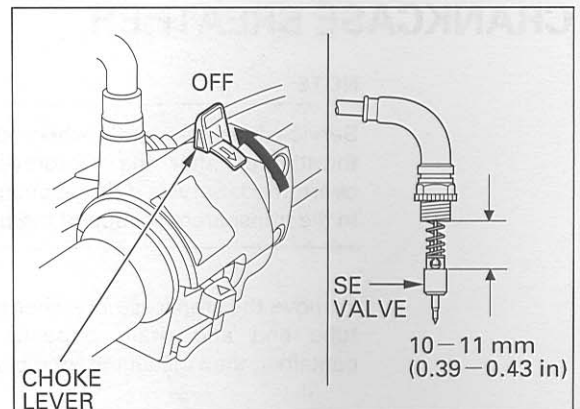
Remove the choke cable boots from the SE valve nuts.

Loosen the SE valve nuts and remove them from the carburetors.



Turn the choke lever fully close position (OFF) and measure the distance between the SE valve end and the cable threaded end as shown.

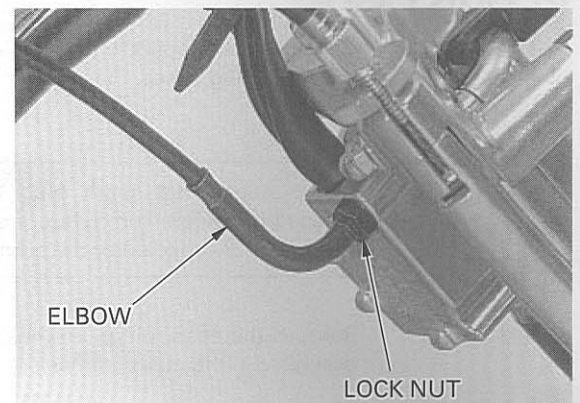
**DISTANCE:** 10.0–11.0 mm (0.39–0.43 in)



Fully turn the handlebar to right side.

Loosen the lock nut and turn the cable's elbow until the specified SE valve distance is obtained. Tighten the lock nut after the adjustment has been made.

Recheck the clearance and choke lever operation. Thread the SE valves in by hand and then tighten the SE valve nuts 1/4 turn with a 14 mm wrench.





## AIR CLEANER

**NOTE:**

- The viscous paper element type air cleaner cannot be cleaned because the element contains a dust adhesive.
- If the motorcycle is used in wet or dusty areas, more frequent inspections are required.

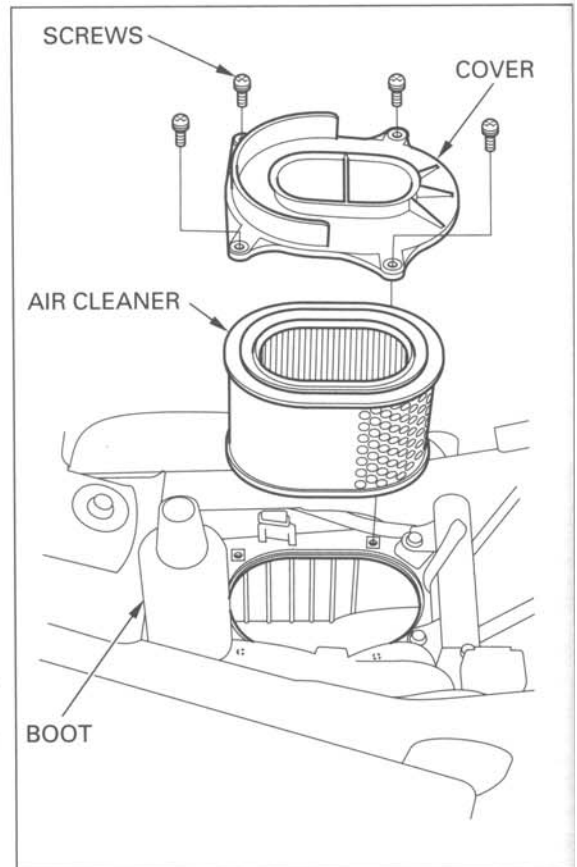
Remove the seat (page 2-2 or 2-3).

Release the connector boot from the frame clamp. Remove the four screws from the air cleaner housing cover and remove the cover.

Remove the air cleaner.

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

Install the air cleaner in the reverse order of removal. Secure the connector boot with the clamp (page 1-35 or 1-54).

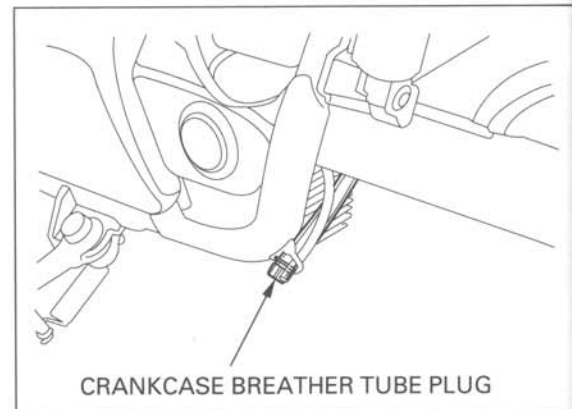


## CRANKCASE BREATHER

**NOTE:**

Service more frequently when ridden in rain, at full throttle, or after the motorcycle is washed or overturned. Service if the deposit level can be seen in the transparent section of the breather tube.

Remove the crankcase breather tube plug from the tube end and drain deposits into a suitable container, then install the tube plug securely.



## SPARK PLUG

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

**NOTE:**

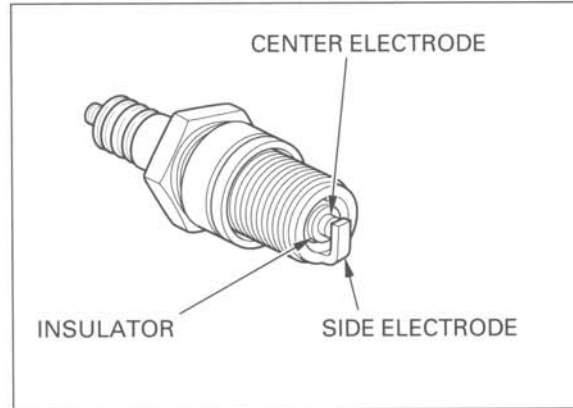
Clean around the spark plug bases with compressed air before removing, and be sure that no debris is allowed to enter the combustion chamber.

Remove the spark plugs and inspect or replace as described in the maintenance schedule.



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

- insulator for damage
- electrodes for wear
- burning condition, coloration;
  - dark to light brown indicates good condition.
  - excessive lightness indicates malfunctioning ignition system or lean mixture.
  - wet or black sooty deposit shows over-rich mixture.



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

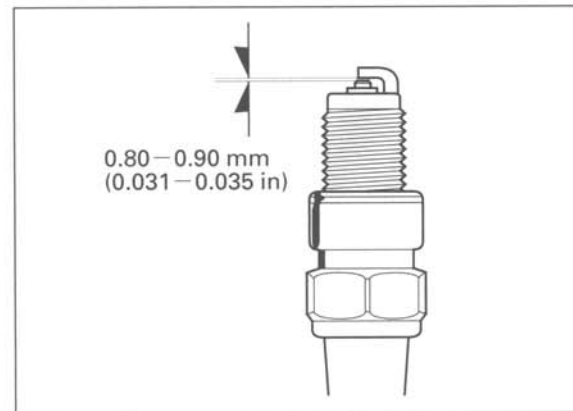
Check the gap between the center and side electrodes with a wire-type feeler gauge. If necessary, adjust the gap by bending the side electrode carefully.

**SPARK PLUG GAP:**

0.80–0.90 mm (0.031–0.035 in)

**CAUTION:**

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



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

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

Install the spark plug caps.

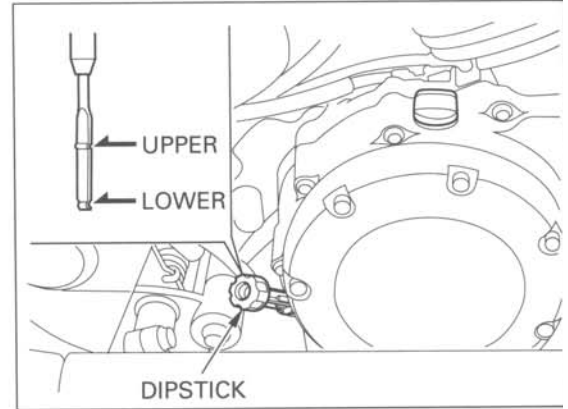
## MAINTENANCE

### ENGINE OIL

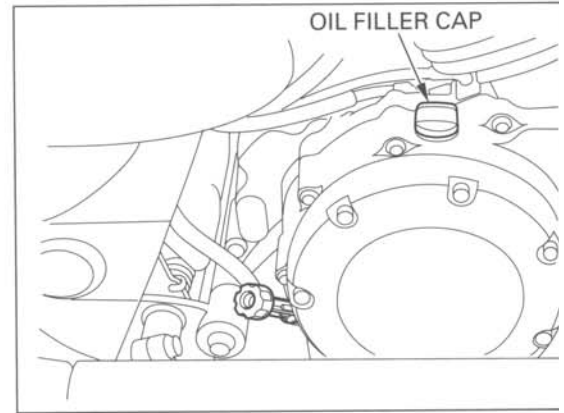
Start the engine and let it idle for a few minutes.

Stop the engine, remove the dipstick and wipe the oil from the dipstick with a clean cloth.

Two or three minutes after stopping the engine; with the motorcycle in an upright position, insert the dipstick into the stick hole without screwing it in.



If the oil level is below or near the lower level mark on the dipstick, remove the oil filler cap and add the recommended oil up to the upper level mark.



#### RECOMMENDED ENGINE OIL:

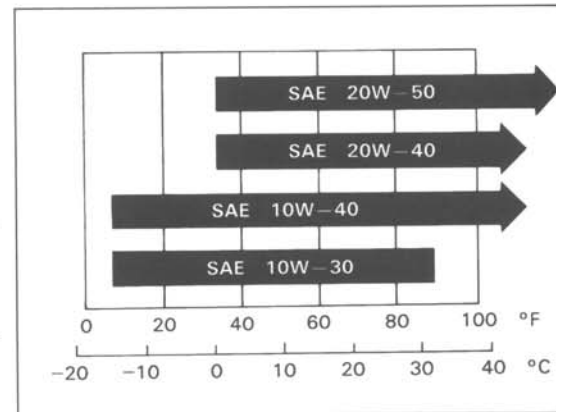
Honda GN4 or HP4 4-stroke oil or equivalent motor oil certified to meet API service classification: SF or SG  
Viscosity: SAE 10W-40

#### 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 dipstick.

For engine oil change, see following page.



# ENGINE OIL FILTER

**NOTE:**

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

**▲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.*

Remove the drain bolt and filler cap, and drain the oil.  
Remove and discard the oil filter cartridge.

**TOOL:**

**Oil filter wrench**                      07HAA-PJ70100

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

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

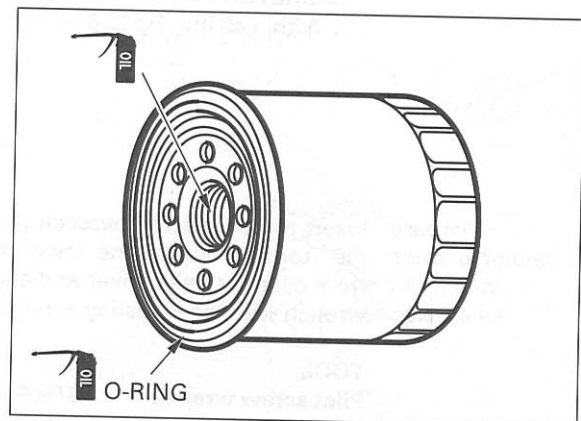
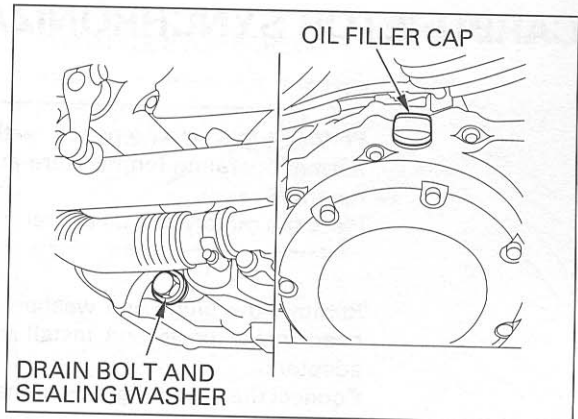
Apply oil to new oil filter O-ring and oil filter threads and install the oil filter cartridge.

**TORQUE:** 9.8 N·m (1.0 kgf·m , 7 lbf·ft)

Fill the crankcase with recommended oil (see previous page).

Install the oil filler cap.  
Start the engine and let it idle for 2–3 minutes.  
Stop the engine and check that the oil level is at the upper level mark on the dipstick (see previous page).

Make sure there are no oil leaks.



# CARBURETOR SYNCHRONIZATION

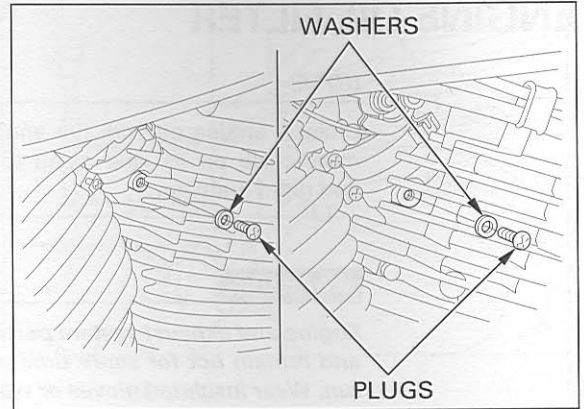
**NOTE:**

Perform this maintenance with the engine at normal operating temperature and transmission in neutral.

Place the motorcycle on a level surface.

Remove the plugs and washers from the cylinder head intake ports and install the vacuum gauge adaptors.

Connect the vacuum gauge to the adaptors.



**TOOLS:**

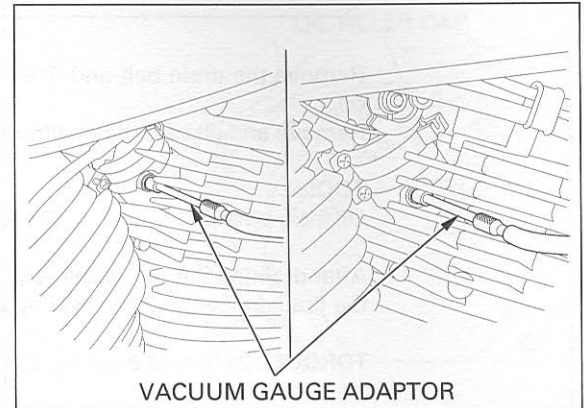
**Vacuum gauge** 07LMJ-001000A or M937B-021-XXXXX (U. S. A. only)

Remove the fuel tank mounting bolts (page 2-4) but do not disconnect the fuel tube.

1. Turn the fuel valve ON. Start the engine and adjust the idle speed to the specification.

**IDLE SPEED:** 1,000 ± 100 rpm

2. Check the difference in vacuum between each carburetor.



**CARBURETOR VACUUM DIFFERENCE:**

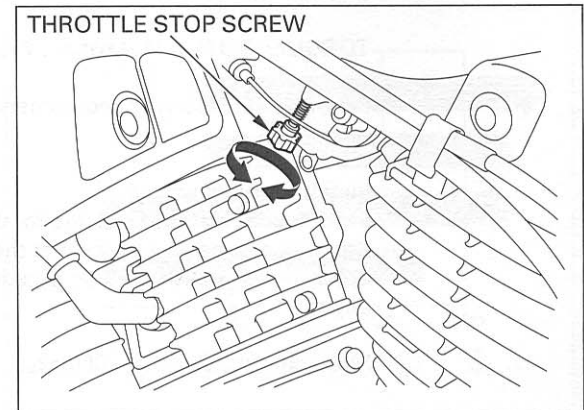
Within 40 mm Hg (1.6 in Hg)

*The base carburetor is the No. 1 (rear) carburetor.*

Insert the pilot screw wrench from the left side of the frame between the lower throttle cable and front cylinder head cover and align the edge of the wrench with the adjusting screw as shown.

**TOOL:**

**Pilot screw wrench** 07908-4730001 or equivalent commercially available in U. S. A.

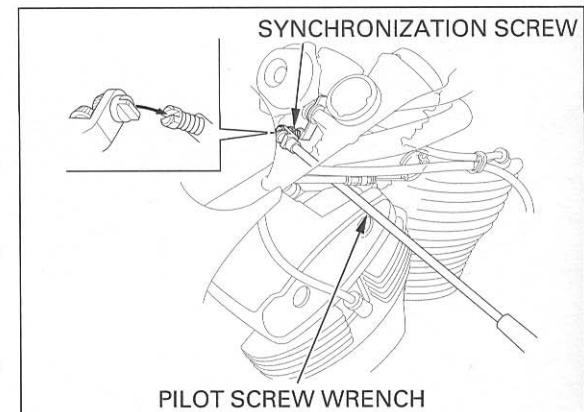


3. Turn the synchronization adjusting screw so that the difference between the each carburetor is below the specification.

4. Be sure that the synchronization is stable by snapping the throttle grip several times.

5. Snap the throttle grip several times and recheck the idle speed and difference in vacuum between each carburetor.

Disconnect the vacuum gauge and install the removed parts.



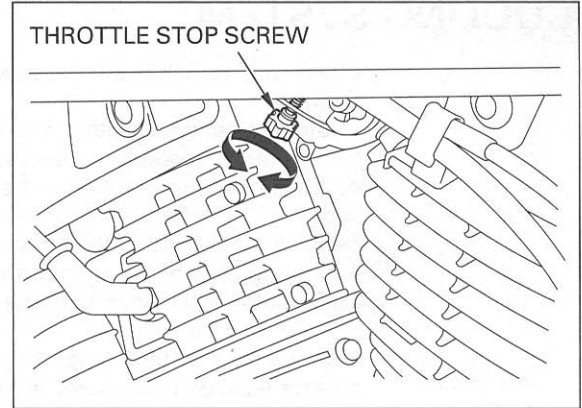
## ENGINE IDLE SPEED

**NOTE:**

- Inspect and adjust idle speed after all other engine adjustments are within specifications.
- Engine must be warm for accurate adjustment. Ten minutes of stop-and-go riding is sufficient.

Warm up the engine.  
Support the motorcycle on a level surface and shift the transmission into neutral.  
Check the idle speed and adjust by turning the throttle stop screw if necessary.

**IDLE SPEED:** 1,000 ± 100 rpm



## RADIATOR COOLANT

### LEVEL CHECK

Check the coolant level of the reserve tank with the engine running at normal operating temperature. The level should be between the "UPPER" and "LOWER" level lines with the motorcycle in a vertical position on a flat, level surface.

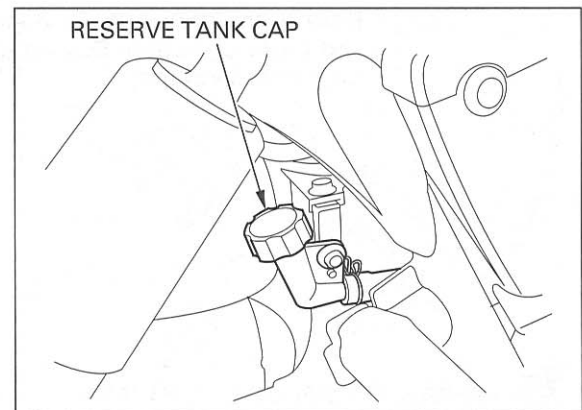
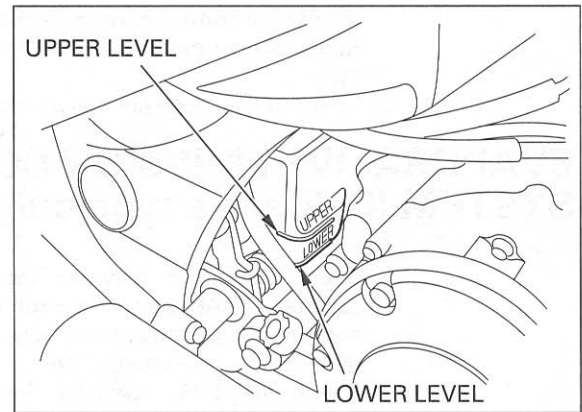
If necessary, remove the reserve tank cap and fill to the "UPPER" level line with a 50–50 solution of distilled water and recommended antifreeze (coolant mixture preparation: page 6-4).

### RECOMMENDED ANTIFREEZE

Pro Honda HP coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors

**CAUTION:**

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



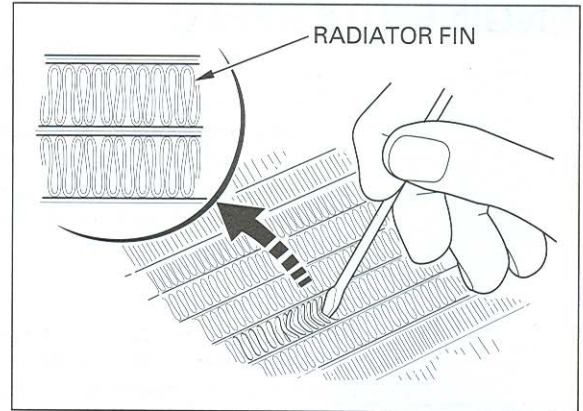
Check to see if there are any coolant leaks when the coolant level decreases very rapidly.

If the reserve tank becomes completely empty, there is a possibility of the air getting into the cooling system.  
Be sure to remove all air from the cooling system as described on page 6-4.

## COOLING SYSTEM

- Check the radiator 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 or low pressure water.  
Replace the radiator if the air flow is restricted over more than 20 % of the radiating surface.  
For radiator replacement, refer to page 6-9.

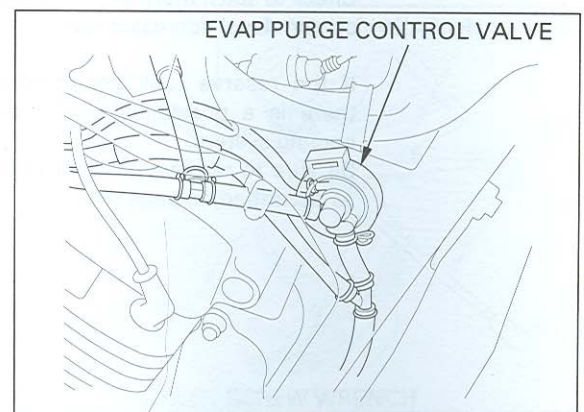
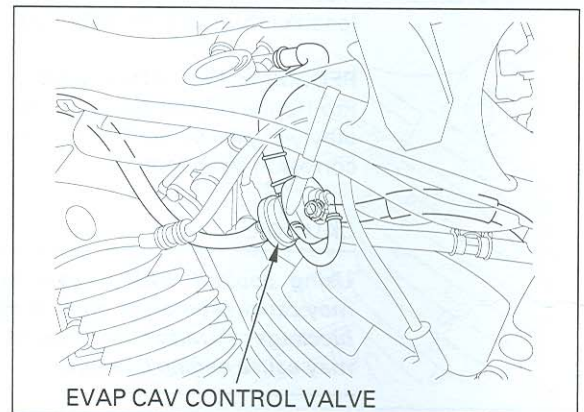
Remove the fuel tank (page 2-6) and check for any coolant leakage from water pump, water hose and hose joints.  
Make sure the hoses are in good condition; they should not show any signs of deterioration.  
Replace any hose that shows any sign of deterioration.  
Check that all hose clamps are tight.



## EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

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

Refer to the Vacuum Hose Routing Diagram label and Cable & Harness Routing (page 1-52 or 1-66) for tube connections.



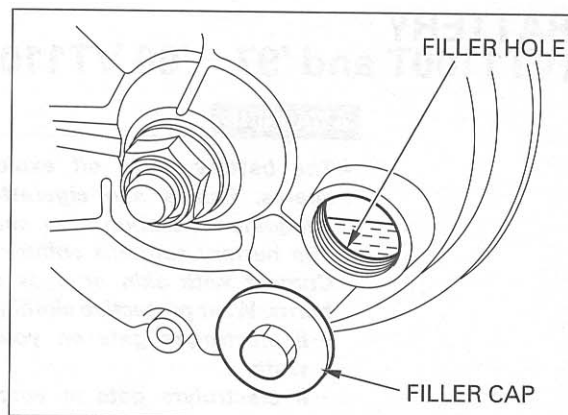
## FINAL DRIVE OIL

### LEVEL CHECK

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

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

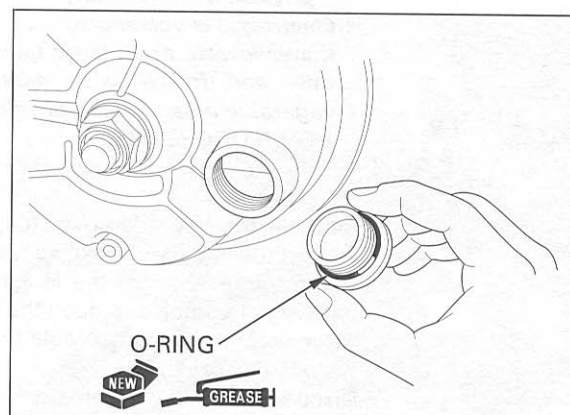
Check for leaks, if the oil level is low. Pour the recommended oil through the oil filler hole until it reaches the lower edge of the hole.



**RECOMMENDED OIL:** Hypoid gear oil, SAE # 80

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

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



### OIL CHANGE

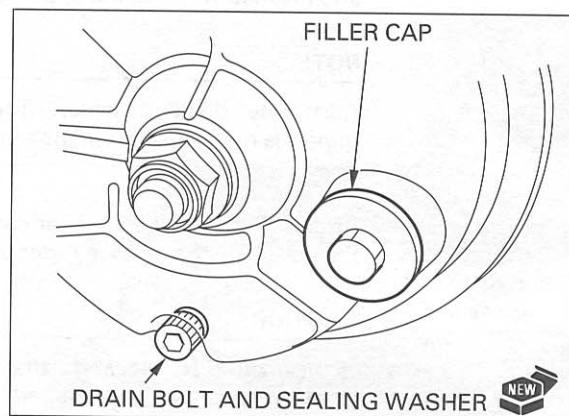
Place the motorcycle on its side stand on a level surface.

Remove the oil filler cap and drain bolt, slowly turn the rear wheel and drain the oil.  
When the oil is completely drained, clean the drain bolt, replace the sealing washer and tighten it.

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

Fill the gear case with the recommended oil up to correct level (see above).

**OIL CAPACITY:** 130 cm<sup>3</sup> (4.4 US oz, 4.6 Imp oz)  
at draining





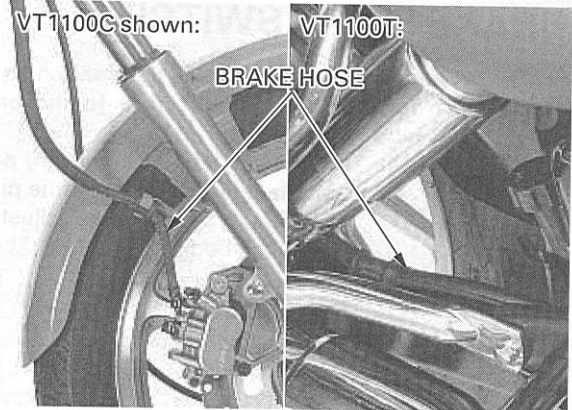
## BRAKE SYSTEM

### HYDRAULIC DISC BRAKE

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 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 15-3 for brake bleeding procedures.

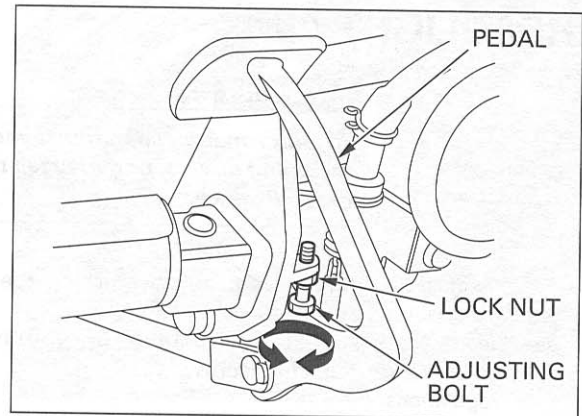


### REAR DRUM BRAKE (VT1100C)

#### PEDAL HEIGHT

Adjust the rear brake pedal to the desired height by loosening the lock nut and turning the adjusting bolt. After adjustment, tighten the lock nut securely.

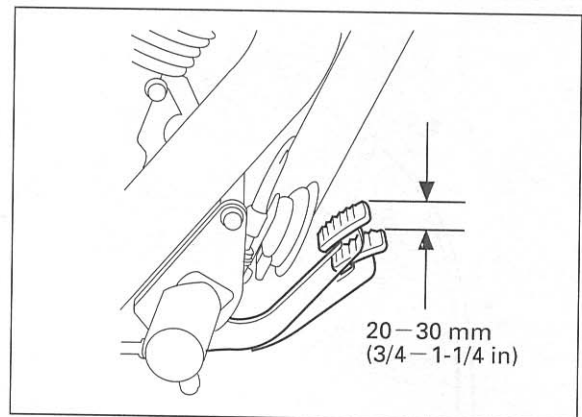
Perform the free play adjustment after adjusting the pedal height.



#### FREE PLAY

Check the rear brake pedal free play.

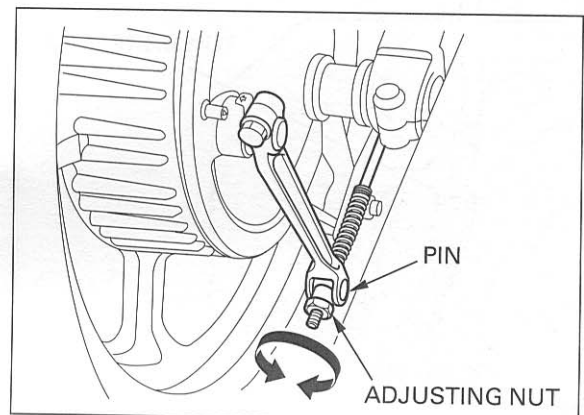
**FREE PLAY:** 20–30 mm (3/4–1-1/4 in)



Adjust the free play by turning the adjusting nut. Make sure the cut-out of the adjusting nut is seated on the brake arm pin.

#### NOTE:

After adjusting the free play, check the rear brake light switch operation (see below).



# BATTERY (VT1100T and '97 – '00 VT1100C only)

**▲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.*

Remove the left side cover (page 2-4 or 2-5) and inspect the battery electrolyte level. When the level nears the lower level, remove the battery holder bolt and open the holder. Disconnect the negative cable first, then disconnect the positive cable. Disconnect the battery breather tube. Pull the battery out, then remove the filler caps and add distilled water to the upper level line.

**NOTE:**

Add only distilled water. Tap water contains minerals that will shorten the life of the battery.

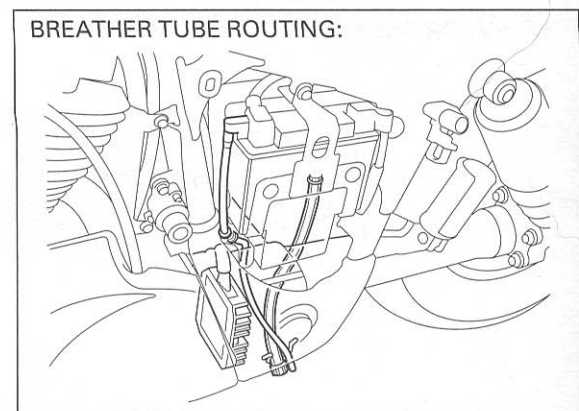
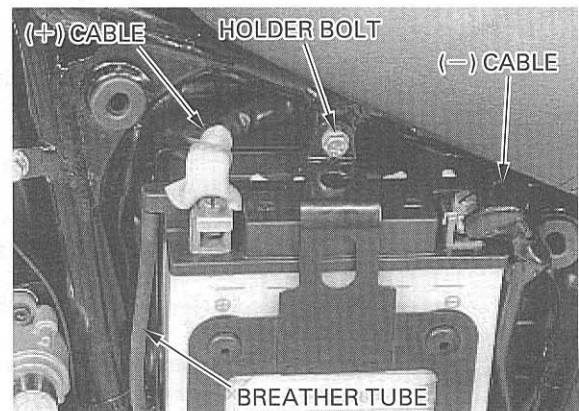
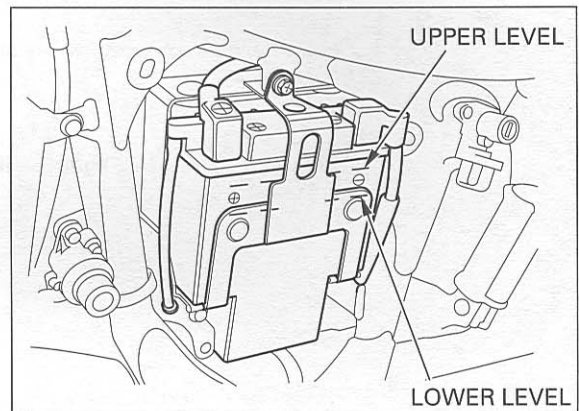
*Make sure that the battery breather tube is correctly positioned, and not kinked, trapped or bent in such a way as to obstruct the passage of the air.*

After filling, install each filler cap firmly and install the battery in the reverse order of removal.

**CAUTION:**

*If the tube is blocked, the battery's internal pressure will not be relieved, the breather may come off, or the battery could crack as a result.*

For the battery charging and specific gravity, see page 16-6.



## BRAKE FLUID

### CAUTION:

- Do not remove the cover or cap unless the reservoir is level because fluid may spill out.
- 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 in painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

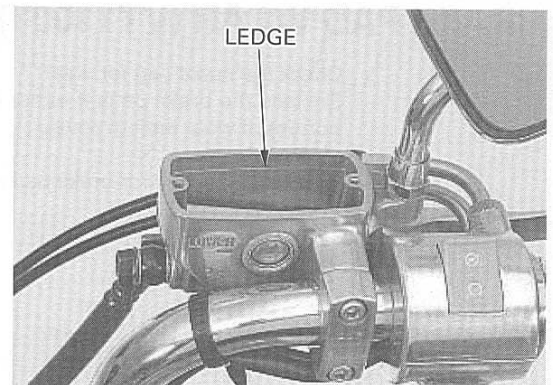
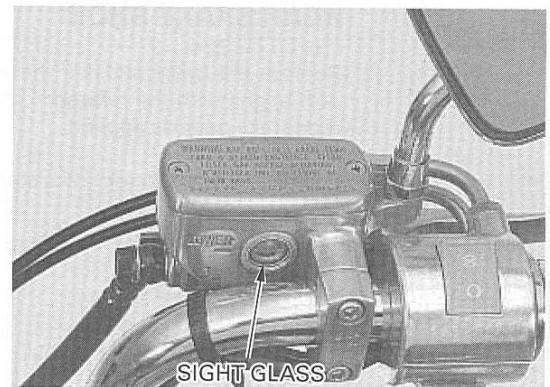
### NOTE:

- When the fluid level is low, check the brake pads for wear (see below). A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper piston is pushed out, and this accounts for a low reservoir level. If the brake pads are not worn and the fluid level is low, check entire system for leaks (page 3-19).
- Do not remove the level float from the reservoir when filling the brake fluid.

### FRONT BRAKE

Turn the handlebar to the left so that the reservoir is level and check the front brake reservoir level through the sight glass. If the level (float edge) is near the lower level mark, remove the cover, set plate and diaphragm and fill the reservoir with DOT 4 brake fluid from a sealed container to the casting ledge.

Refer to page 15-5 for brake fluid replacement/bleeding procedures.

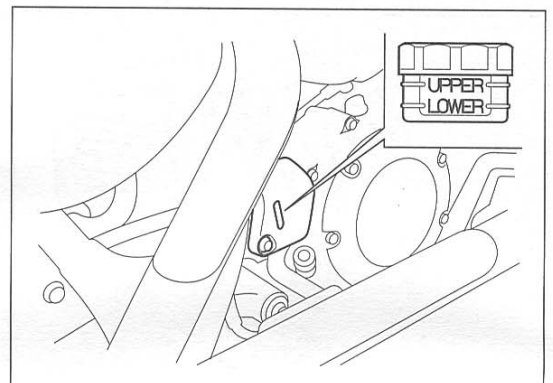


### REAR BRAKE (VT1100T only)

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

Check the rear brake fluid reservoir level through the sight hole. If the level (float edge) is near the lower level mark, remove the reservoir cover (page 15-20) and cap and fill the reservoir with DOT 4 brake fluid from a sealed container to the upper level mark.

Refer to page 15-5 for brake fluid replacement/bleeding procedures.

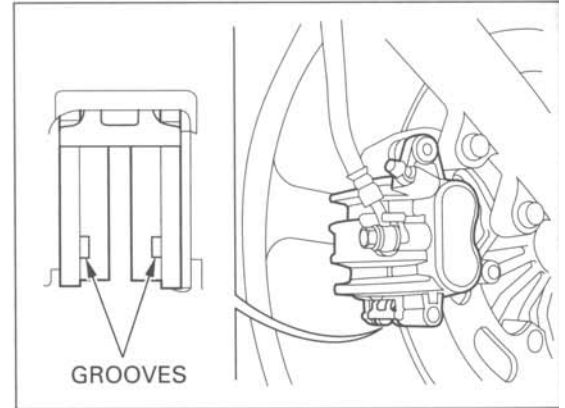


## BRAKE SHOE/BRAKE PAD WEAR (VT1100C)

### FRONT BRAKE PAD

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

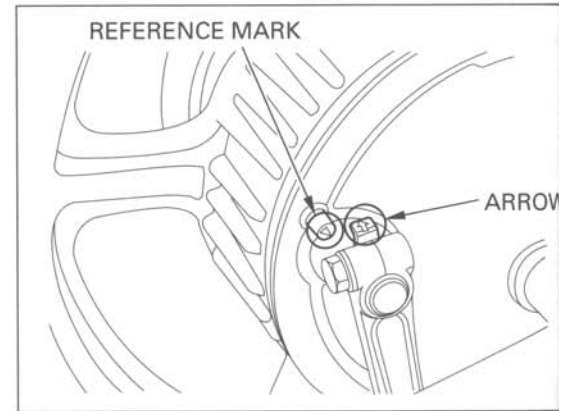
Refer to page 15-7 for brake pad replacement.



### REAR BRAKE SHOE

Replace the brake shoes if the arrow on the brake arm aligns with the reference mark "△" when the rear brake pedal is applied.

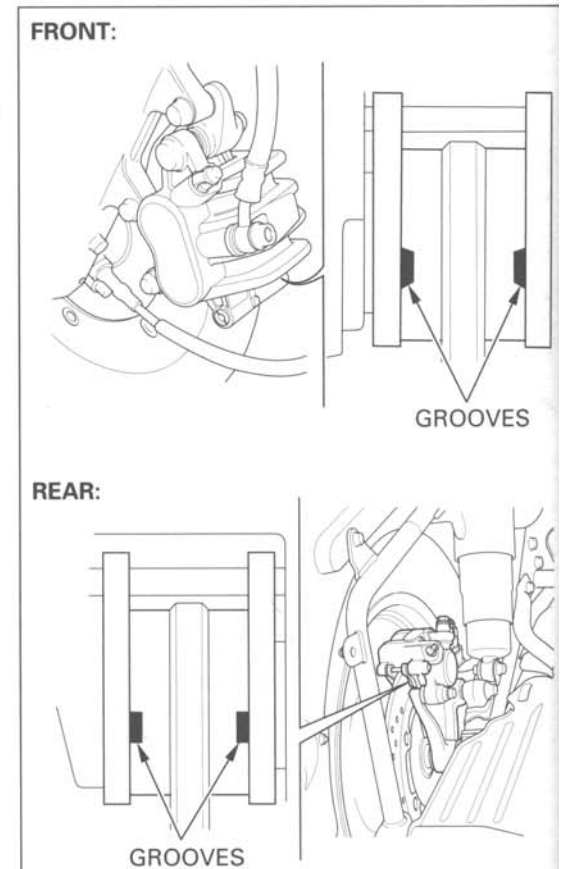
Refer to page 14-21 for brake shoe replacement.



## BRAKE PAD WEAR (VT1100T)

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 15-7 for brake pad replacement.



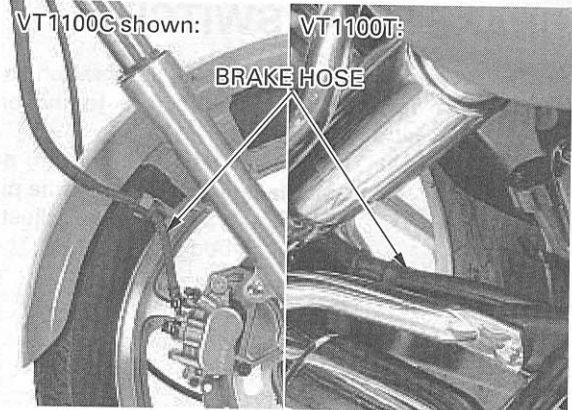
## BRAKE SYSTEM

### HYDRAULIC DISC BRAKE

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 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 15-3 for brake bleeding procedures.

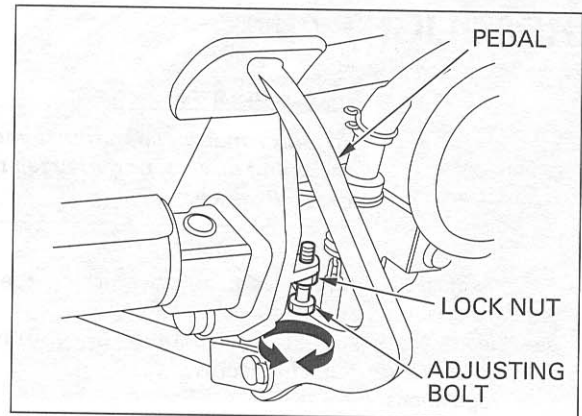


### REAR DRUM BRAKE (VT1100C)

#### PEDAL HEIGHT

Adjust the rear brake pedal to the desired height by loosening the lock nut and turning the adjusting bolt. After adjustment, tighten the lock nut securely.

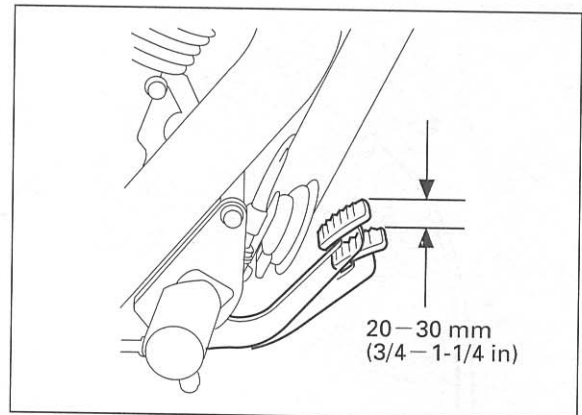
Perform the free play adjustment after adjusting the pedal height.



#### FREE PLAY

Check the rear brake pedal free play.

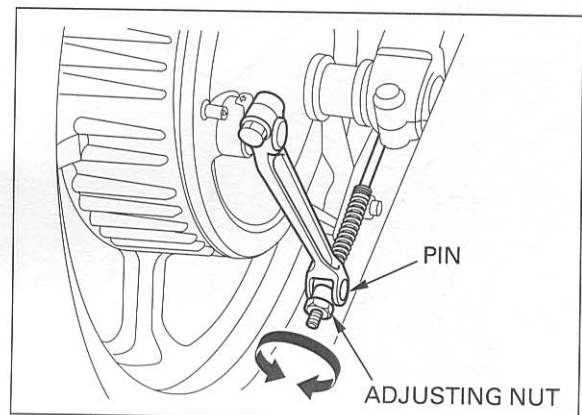
**FREE PLAY:** 20–30 mm (3/4–1-1/4 in)



Adjust the free play by turning the adjusting nut. Make sure the cut-out of the adjusting nut is seated on the brake arm pin.

#### NOTE:

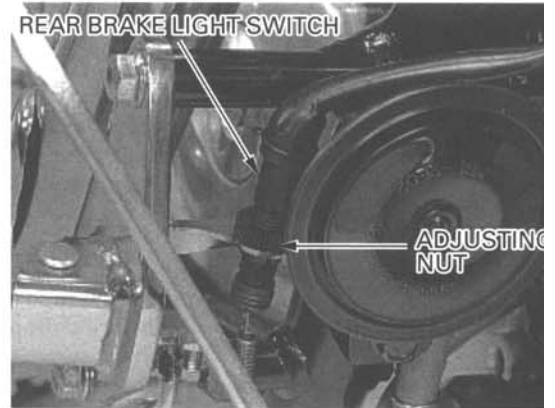
After adjusting the free play, check the rear brake light switch operation (see below).



## MAINTENANCE

### BRAKE LIGHT SWITCH

*The front brake light switch does not require adjustment.* Adjust the brake light switch so that the brake light comes on just prior to the brake actually being engaged. If the light fails to come on, adjust the switch so that the light comes on at the proper time. Hold the switch body and turn the adjusting nut. Do not turn the switch body.



### HEADLIGHT AIM

**▲WARNING**

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

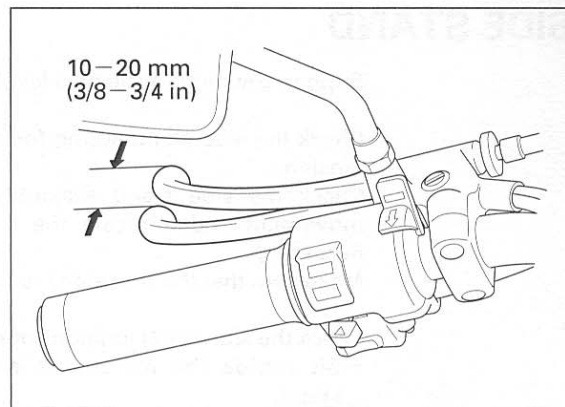
*Adjust the headlight beam as specified by local laws and regulations.* Adjust vertically by turning the vertical adjusting screw. Adjust horizontally by turning the horizontal adjusting screw.



## CLUTCH SYSTEM

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

**FREE PLAY:** 10–20 mm (3/8–3/4 in)



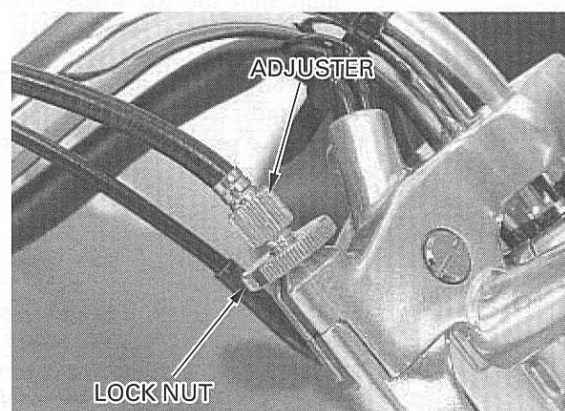
Adjust as follows:

Minor adjustments are made at the adjuster near the lever.

Loosen the lock nut and turn the adjuster. Tighten the lock nut.

**CAUTION:**

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



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

Major adjustments are performed at the clutch arm.

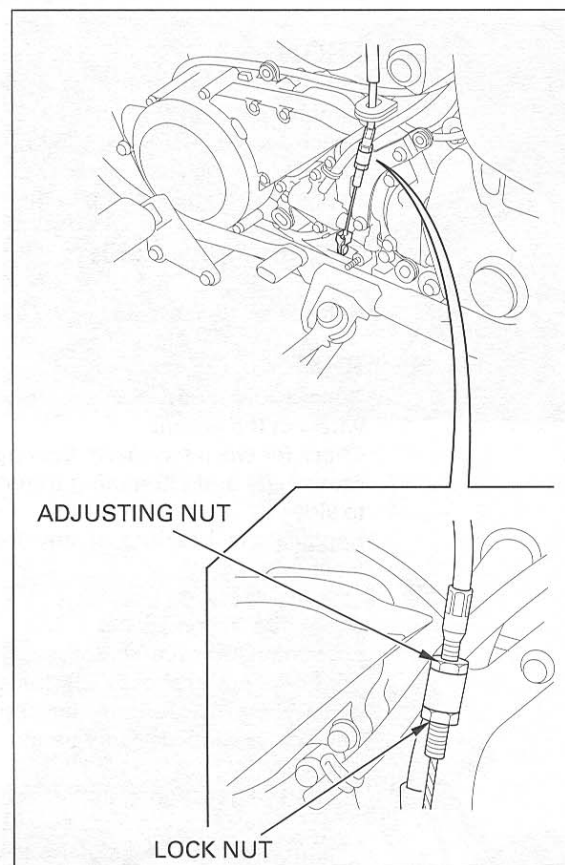
Remove the left crankcase rear cover (page 2-16).

Loosen the lock nut and turn the adjusting nut to adjust play. Hold the adjusting nut securely while tightening lock nut.

**TORQUE:** 9.8 N·m (1.0 kgf·m , 7 lbf·ft)

If proper free play cannot be obtained, or the clutch slips during the test ride, disassemble and inspect the clutch (see section 10).

Install the left crankcase rear cover (page 2-16).



## SIDE STAND

Support the motorcycle on a level surface.

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

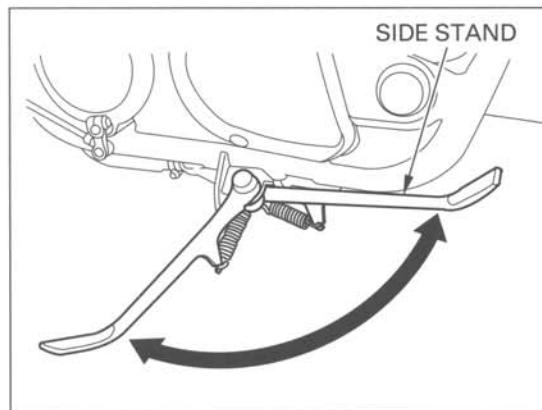
Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.

Make sure that the side stand is not bent.

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

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

Check the entire fork 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 front fork service.

### REAR

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

Check for worn swingarm bearings by grabbing the rear wheel and attempting to move the wheel side to side.

Replace the bearings if any looseness is noted (section 14).

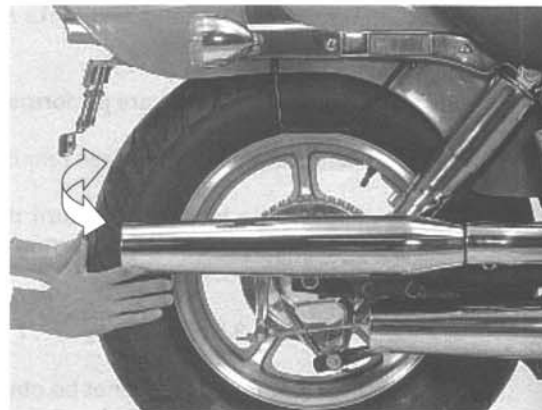
Check the action of the shock absorbers by compressing them several times.

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.





## NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-17 or 1-21).  
Check that all cotter pins, safety clips, hose clamps and cable stays are in place and properly secured.

## WHEELS/TIRES

**NOTE:**

Tire pressure should be checked when tires are COLD.

**RECOMMENDED TIRE PRESSURE AND TIRE SIZES:**

unit: kPa (kgf/cm<sup>2</sup>, psi)

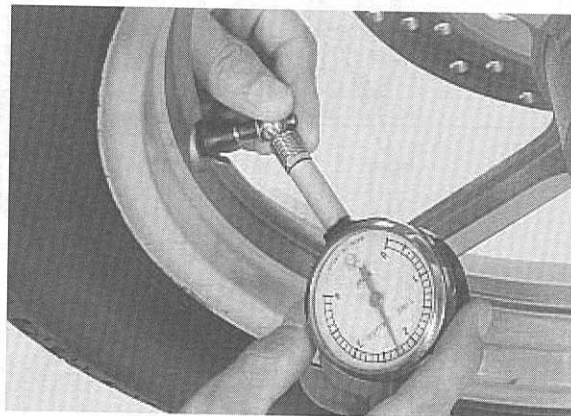
		VT1100C		VT1100T	
		Front	Rear	Front	Rear
Cold tire pressure	Up to 90 kg (200 lbs)	225 (2.25, 33)	225 (2.25, 33)	225 (2.25, 33)	225 (2.25, 33)
	Up to maximum weight capacity	225 (2.25, 33)	280 (2.80, 41)	225 (2.25, 33)	250 (2.50, 36)
Tire size		110/90-19 62H	170/80-15MC 77H	130/80R18 66H	170/70R16 75H
Tire brand (Dunlop)		F24	K555	D206F	D206A

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

Check the front and rear wheels for trueness (refer to sections 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

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

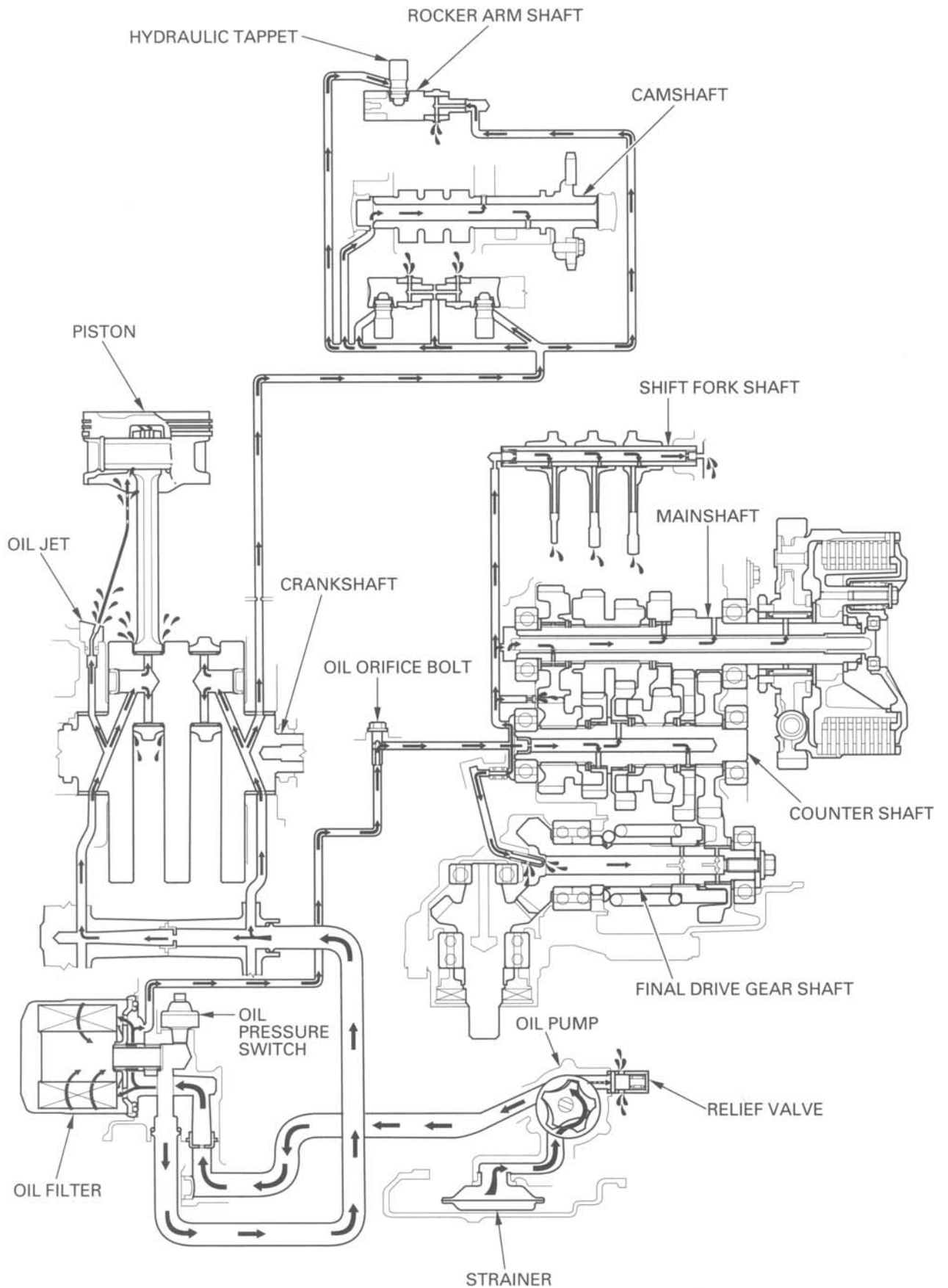
Support the motorcycle securely and raise the front wheel off ground.

Check that the handlebar moves freely from side to side.

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



# LUBRICATION SYSTEM



# 4. LUBRICATION SYSTEM

SERVICE INFORMATION	4-1	OIL PRESSURE CHECK	4-3
TROUBLESHOOTING	4-2	OIL PUMP & OIL STRAINER	4-4

## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

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

- The service procedures in this section can be performed with the engine in the frame.
- 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.
- For oil pressure indicator inspection, refer to section 19 of this manual.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Oil pressure at oil pressure switch (80 °C/176 °F)		441 kPa (4.5 kgf/cm <sup>2</sup> , 64 psi) at 5,000 rpm	_____
Oil pump rotor	tip clearance	0.15 (0.006)	0.20 (0.008)
	body clearance	0.15–0.22 (0.006–0.009)	0.35 (0.014)
	end clearance	0.02–0.07 (0.001–0.003)	0.10 (0.004)

### TORQUE VALUES

Oil pressure switch	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply sealant to the threads.
Oil pump driven sprocket bolt	18 N·m (1.8 kgf·m , 13 lbf·ft)	Apply locking agent to the threads.
Oil pump mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Oil pump assembly bolt	13 N·m (1.3 kgf·m , 9 lbf·ft)	
Oil orifice bolt	9.8 N·m (1.0 kgf·m , 7 lbf·ft) (page 11-0)	

### TOOLS

Oil pressure gauge	07506–3000000	□ or equivalent commercially available in U. S. A.
Oil pressure gauge attachment	07510–4220100	

### TROUBLESHOOTING

#### Oil level too low - high oil consumption

- External oil leaks
- Worn piston rings or incorrect piston ring installation
- Worn valve guide or seal

#### Oil contamination (white appearance)

- Coolant mixing with oil
  - Faulty head gasket
  - Water leak in crankcase

#### Low oil pressure

- Pressure relief valve stuck open
- Clogged oil filter screen
- Oil pump worn or damaged
- Internal oil leaks
- Incorrect oil being used
- Low oil level

#### High oil pressure

- Pressure relief valve stuck closed
- Plugged gallery, or metering orifice
- Incorrect oil being used

#### No oil pressure

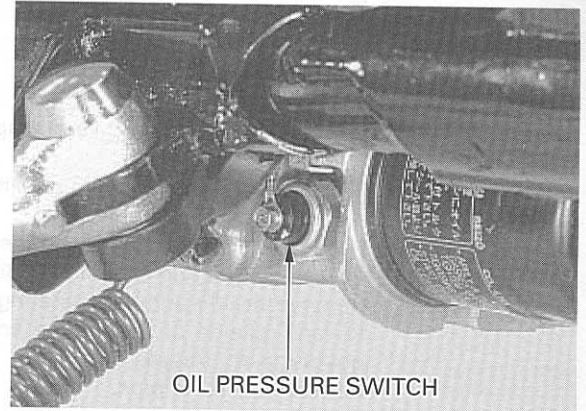
- Oil level too low
- Oil pump drive chain or drive/driven sprocket broken
- Oil pump damaged

## OIL PRESSURE CHECK

### NOTE:

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

Stop the engine.  
Remove the switch cover and disconnect the oil pressure switch wire by removing the screw.



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

### TOOLS:

**Oil pressure gauge attachment** 07510-4220100

**Oil pressure gauge** 07506-3000000  
or equivalent commercially available in U. S. A.

Check the oil level and add the recommended oil if necessary (page 3-10).

Start the engine and check the oil pressure at 5,000 rpm.

**OIL PRESSURE:** 441 kPa (4.5 kgf/cm<sup>2</sup>, 64 psi)  
at 5,000 rpm (80 °C/176 °F)

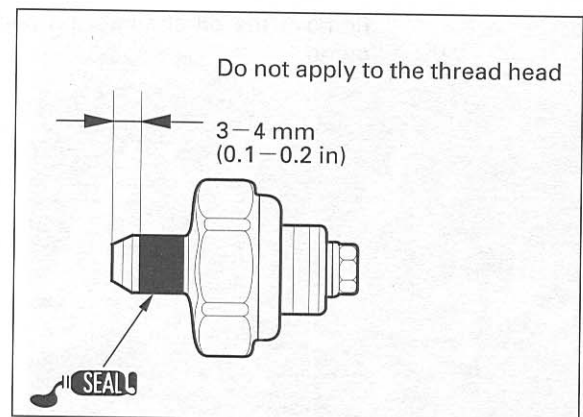
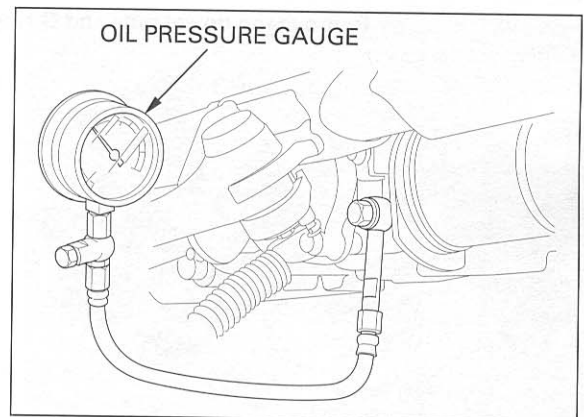
Stop the engine.

Apply sealant to the pressure switch threads as shown and install it.

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

Connect the oil pressure switch wire and install the switch cover.

Start the engine.  
Check that the oil pressure indicator goes out after one or two seconds. If the oil pressure indicator stays on, stop the engine immediately and determine the cause (page 19-14).



### OIL PUMP & STRAINER

#### REMOVAL

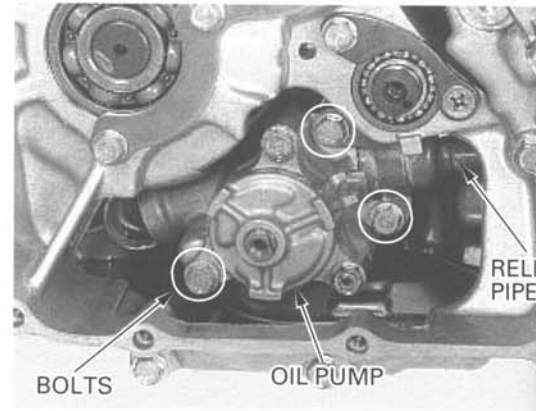
Remove the gearshift linkage (page 10-15).

Remove the three mounting bolts and pull the oil pump off the right crankcase.

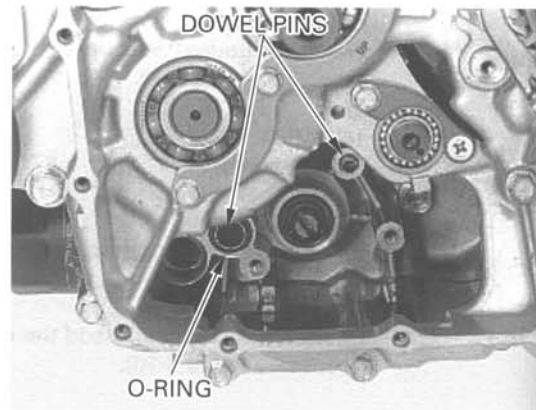
Separate the relief pipe from the oil pump by sliding to the right and rotating the pipe.

Remove the oil pump by rotating rear of the pump toward outside of the engine and slide the pump out of the crankcase.

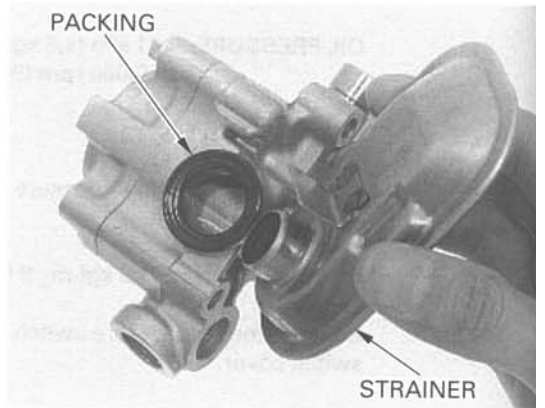
Remove the relief pipe.



Remove the dowel pins and O-ring.



Remove the oil strainer and packing from the oil pump.

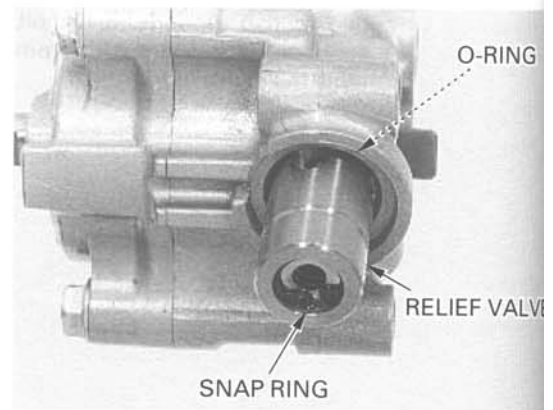


#### RELIEF VALVE CHECK

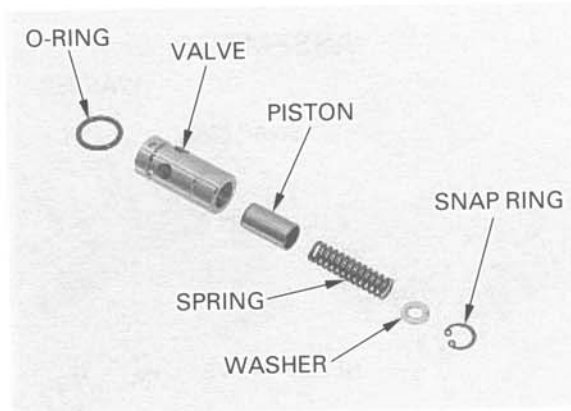
Remove the following:

- relief valve from the oil pump
- O-ring from the relief valve
- relief valve snap ring

Disassemble the relief valve.

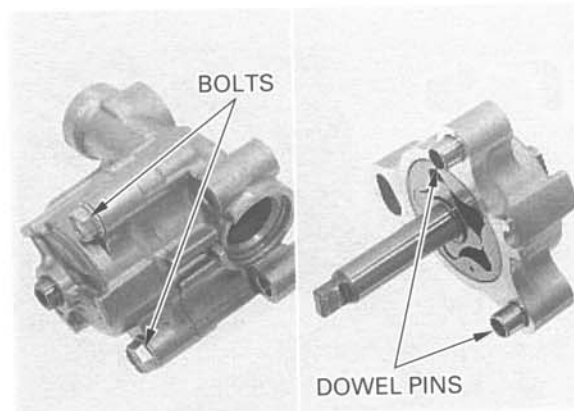


Check the spring and piston for wear or damage.  
Check the valve for clogging or damage.  
Assemble the parts in the reverse order of disassembly. Be sure to use a new O-ring.



### DISASSEMBLY

Remove the oil pump body cover by removing the bolts.  
Remove the dowel pins.

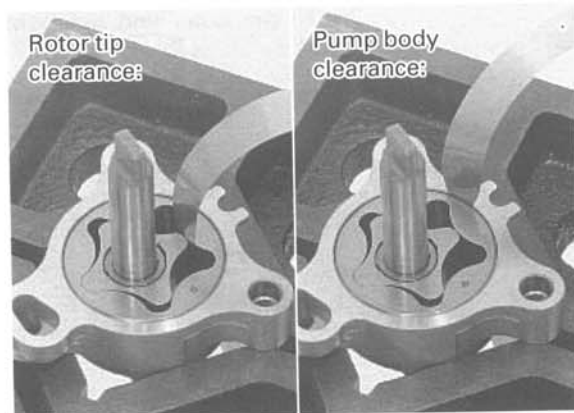


Measure the rotor tip clearance.

**SERVICE LIMIT:** 0.20 mm (0.008 in)

Measure the pump body clearance.

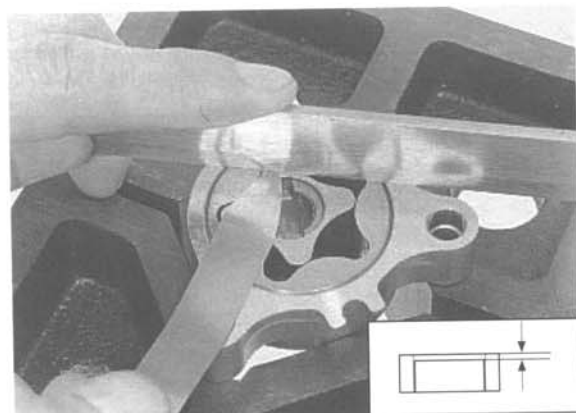
**SERVICE LIMIT:** 0.35 mm (0.014 in)



Remove the spacer, drive pin and rotor shaft.

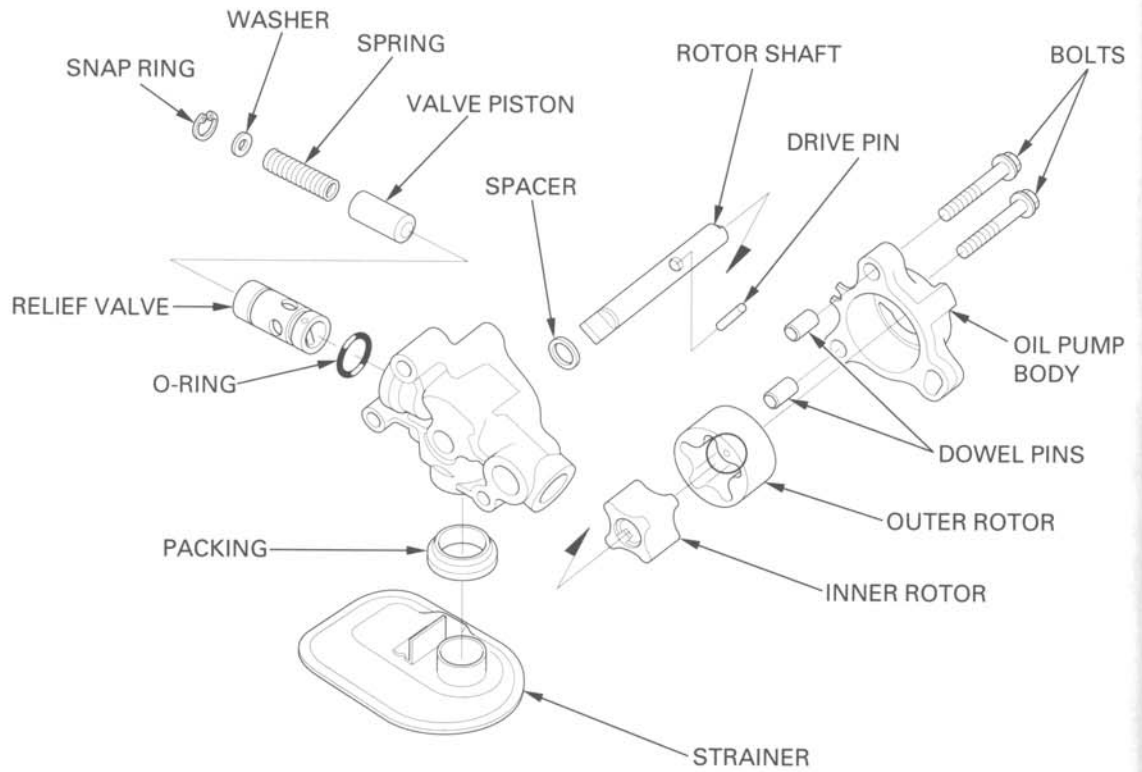
Measure the oil pump end clearance.

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

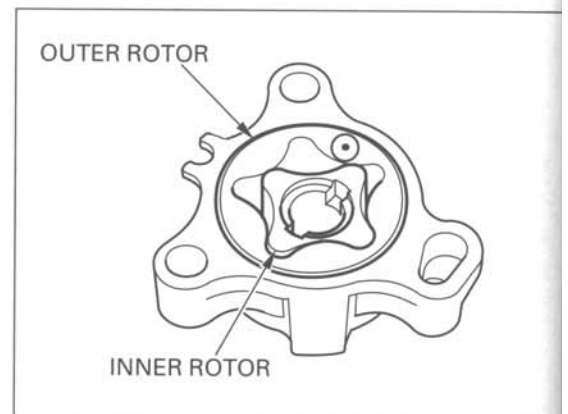


# LUBRICATION SYSTEM

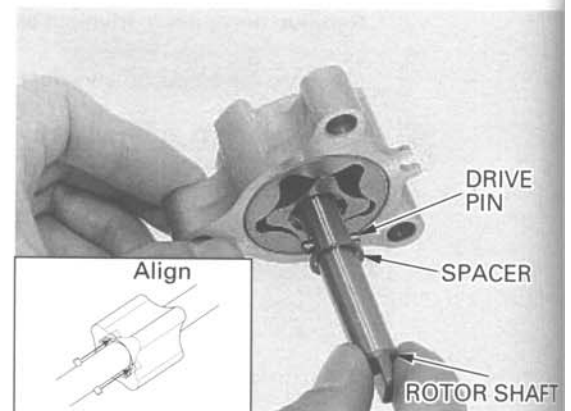
## ASSEMBLY



Install the outer and inner rotors into the pump body.



Insert the rotor shaft and install the drive pin by aligning the slots in the inner rotor. Place the spacer into the inner rotor groove.

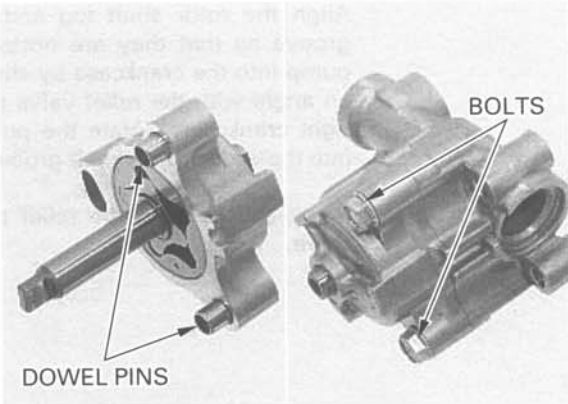




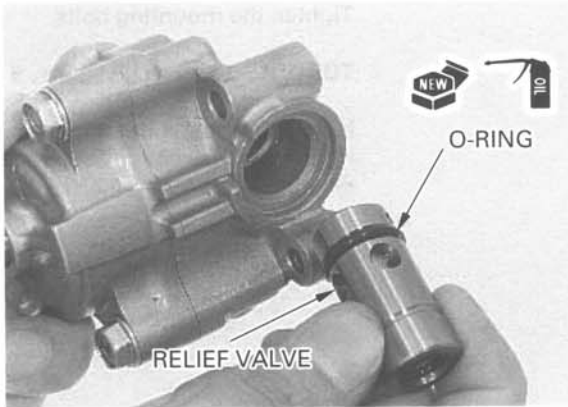
Install the dowel pins in the oil pump body.  
Install the oil pump cover onto the pump body with the bolts.

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

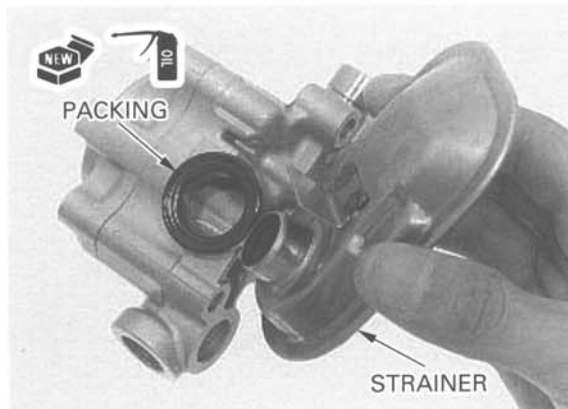
Make sure the rotor shaft is rotating smoothly.



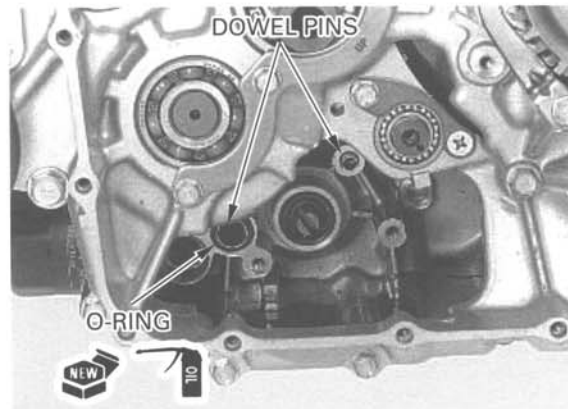
Coat a new O-ring with the engine oil and install the relief valve into the oil pump securely.



Coat a new packing with the engine oil and install it into the groove of the oil pump, and install the oil strainer into the oil pump.



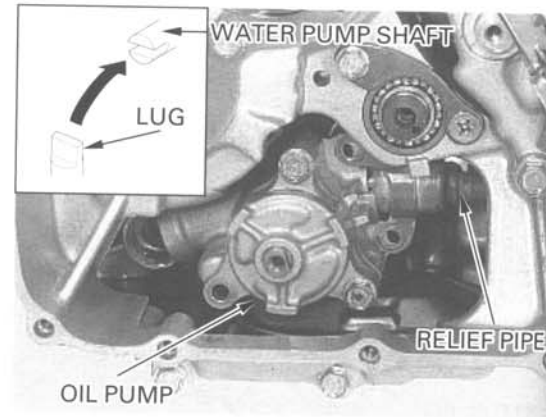
Install the dowel pins into the right crankcase.  
Coat a new O-ring with the engine oil and install it onto the dowel pin.



## LUBRICATION SYSTEM

Align the rotor shaft lug and water pump shaft groove so that they are horizontal. Place the oil pump into the crankcase by sliding the pump in at an angle with the relief valve pointing toward the right crankcase. Rotate the pump to seat the lug into the water pump shaft groove.

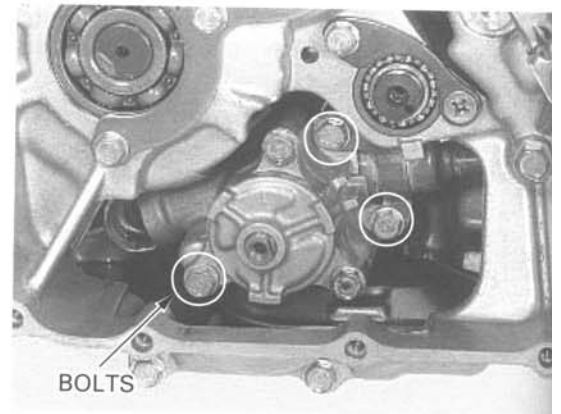
Insert and connect the relief pipe over the relief valve.



Tighten the mounting bolts.

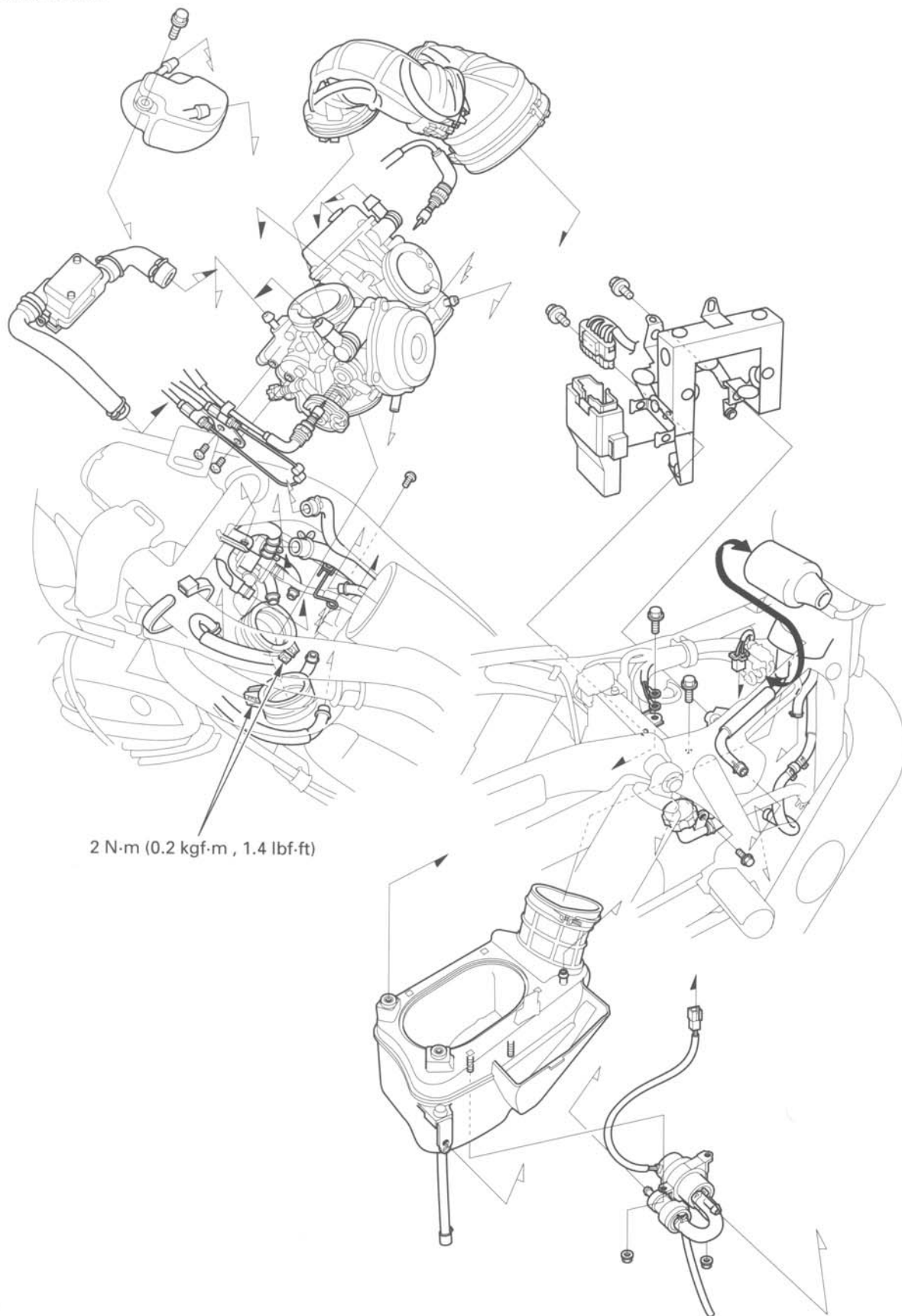
**TORQUE:** 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the gearshift linkage, clutch assembly and right crankcase cover (section 9).  
Install the sub-frame (section 7).



## FUEL SYSTEM

VT1100C shown:



# 5. FUEL SYSTEM

SERVICE INFORMATION	5-1	CARBURETOR CLEANING	5-14
TROUBLESHOOTING	5-3	CARBURETOR COMBINATION	5-14
CARBURETOR REMOVAL	5-4	CARBURETOR INSTALLATION	5-16
VACUUM CHAMBER	5-7	PILOT SCREW ADJUSTMENT	5-19
FLOAT CHAMBER	5-9	HIGH ALTITUDE ADJUSTMENT	5-20
PILOT SCREW	5-11	AIR CLEANER HOUSING	5-22
AIR CUT-OFF VALVE	5-13	EVAPORATIVE EMISSION CONTROL SYSTEM	
CARBURETOR SEPARATION	5-13	(California type only)	5-25

## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

- Gasoline is extremely flammable and is explosive under certain conditions. **KEEP OUT OF REACH OF CHILDREN.**
- When the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.
- 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.**

#### 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.

- For fuel tank removal and installation, refer to section 2.
- For fuel pump inspection, refer to section 19.
- Before disassembling the carburetor, place an approved fuel container under the carburetor drain screw, loosen the screw and drain the carburetor.
- When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- After removing the carburetor, wrap the intake port of the engine with a shop towel or cover it with a piece of tape to prevent any foreign material from dropping into the engine. Be sure to remove the cover when reinstalling the carburetor.
- All hoses used in the evaporative emission control system (California type only) are numbered for identification. When connecting one of these hoses, compare the hose number with the Vacuum Hose Routing Diagram Label on page 1-37, for its proper routing.

## FUEL SYSTEM

### SPECIFICATIONS

VT1100C		ITEM	SPECIFICATIONS
		Carburetor type	Constant Venturi
		Carburetor throttle bore	36 mm (1.4 in)
Carburetor identification number	49 state/Canada type		VDKHA
	California type		VDKJA
		Main jet	# 178
		Slow jet	# 42
Pilot screw	initial/final opening		See page 5-19
	high altitude adjustment		See page 5-20
		Float level	9.2 mm (0.36 in)
		Idle speed	1,000 ± 100 rpm

VT1100T		ITEM	SPECIFICATIONS
		Carburetor type	Constant Venturi
		Carburetor throttle bore	36 mm (1.4 in)
Carburetor identification number	49 state/Canada type		VDKFA
	California type		VDKGA
Main jet	Front		# 175
	Rear		# 180
		Slow jet	# 42
Pilot screw	initial/final opening		See page 5-19
	high altitude adjustment		See page 5-20
		Float level	9.2 mm (0.36 in)
		Idle speed	1,000 ± 100 rpm

### TORQUE VALUES

Carburetor insulator band screw      2.0 N·m (0.2 kgf·m , 1.4 lbf·ft)

### TOOLS

Carburetor float level gauge      07401-0010000  
Valve guide driver, 6.6 mm      07942-6570100  
Vacuum/Pressure pump      A937X-041-XXXXX or  
– Vacuum pump      ST-AH-260-MC7 (U. S. A. only)  
– Pressure pump      ST-AH-255-MC7 (U. S. A. only)

## TROUBLESHOOTING

### Engine cranks but won't start

- No fuel in tank
- No fuel to carburetor
  - Fuel filter clogged
  - Fuel line clogged
  - Fuel level misadjusted
  - Fuel tank breather tube restricted (49 state/Canada type)
  - Evaporative emission tube No. 1 restricted (California type)
- Too much fuel getting to the engine
  - Air cleaner clogged
  - Flooded carburetor
- Intake air leak
- Fuel contaminated/deteriorated
  - jets clogged
- Improper starting enrichment valve operation
- Starting enrichment valve circuit clogged
- Improper throttle operation
- No spark at plug (ignition system faulty)

### Lean mixture

- Fuel jets clogged
- Float valve faulty
- Float level too low
- Fuel line restricted
- Carburetor air vent tube clogged
- Intake air leak
- Vacuum piston faulty
- Throttle valve faulty
- Emission control system faulty (California type only)
  - Evaporative emission carburetor air vent control valve faulty
  - Hose of the emission control system faulty

### Rich mixture

- Starting enrichment valve open
- Float valve faulty
- Float level too high
- Air jets clogged
- Air cleaner clogged
- Flooded carburetor
- Vacuum piston faulty
- Emission control system faulty (California type only)
  - Evaporative emission purge control valve faulty
  - Hose of the emission control system faulty

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

- Fuel line restricted
- Fuel mixture too lean/rich
- Fuel contaminated/deteriorated
  - jets clogged
- Intake air leak
- Idle speed misadjusted
- Float level misadjusted
- Fuel tank breather tube restricted (49 state/Canada type)
- Evaporative emission tube No. 1 restricted (California type)
- Pilot screw misadjusted
- Starting enrichment valve circuit clogged
- Ignition system malfunction
- Emission control system faulty (California type only)
  - Evaporative emission carburetor air vent control valve faulty
  - Evaporative emission purge control valve faulty
  - Hose of the emission control system faulty

### Afterburn when engine braking is used

- Lean mixture in slow circuit
- Air cut-off valve malfunction
- ICM stops ignition intermittently to prevent over revolution (working over rev limiter function)

### Backfiring or misfiring during acceleration

- Ignition system malfunction
- Fuel mixture too lean
- ICM stops ignition intermittently to prevent over revolution (working over rev limiter function)

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

- Fuel system clogged
- Ignition system malfunction
- Emission control system faulty (California type only)
  - Evaporative emission carburetor air vent control valve faulty
  - Hose of the emission control system faulty

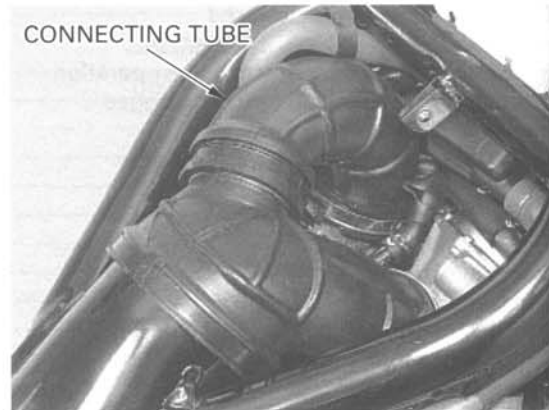
# CARBURETOR REMOVAL

Remove the fuel tank (page 2-6).  
Loosen the drain screws and drain the carburetors.

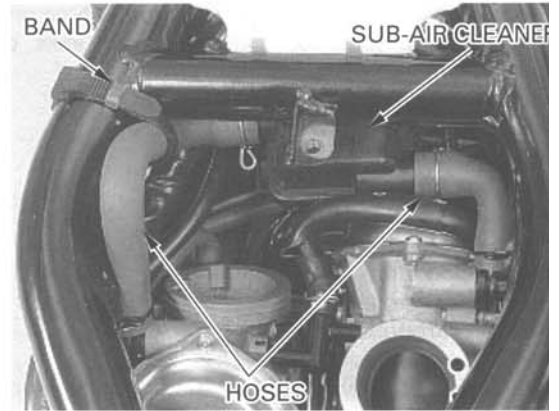
Disconnect the crankcase breather tubes from the crankcase breather storage tank.  
Remove the bolt and crankcase breather storage tank.



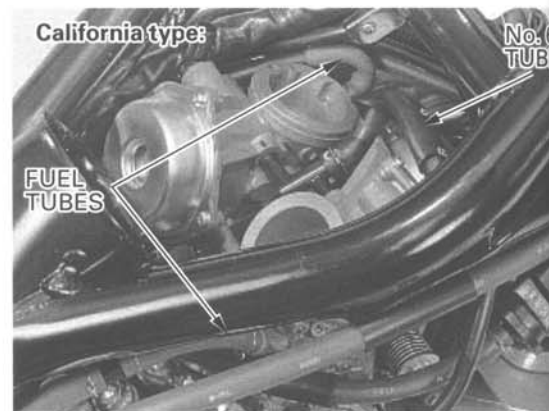
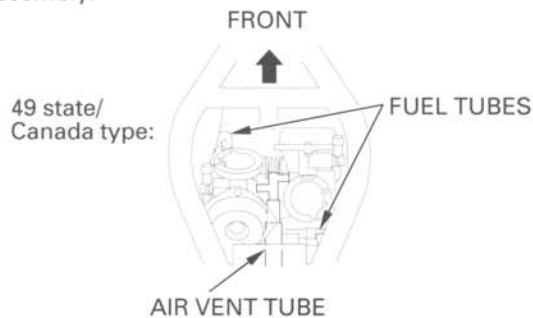
Loosen the three tube band screws and remove the connecting tube.



Release the hose band.  
Disconnect the two hoses from the carburetors and remove the sub-air cleaner.

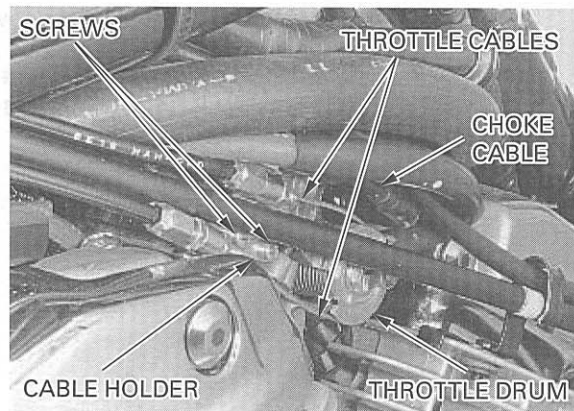


Disconnect the carburetor air vent tube (California: No. 6 tube) and the fuel tubes from the carburetor assembly.



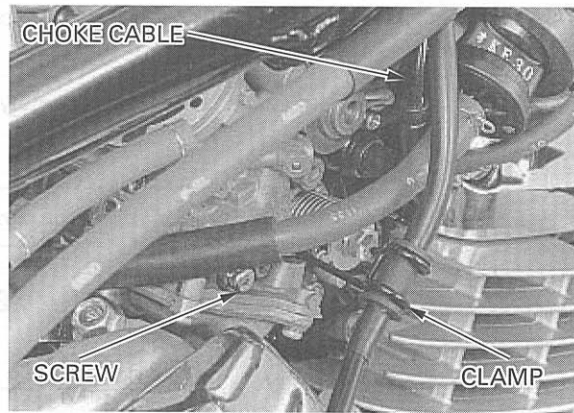
Disconnect the throttle cables from the throttle drum (Rotate the throttle grip if necessary to slack cable) and remove the two screws and cable holder. Disconnect the choke cable of the rear carburetor by turning the starting enrichment (SE) valve nut.

*Be careful not to lose SE valve and spring.*

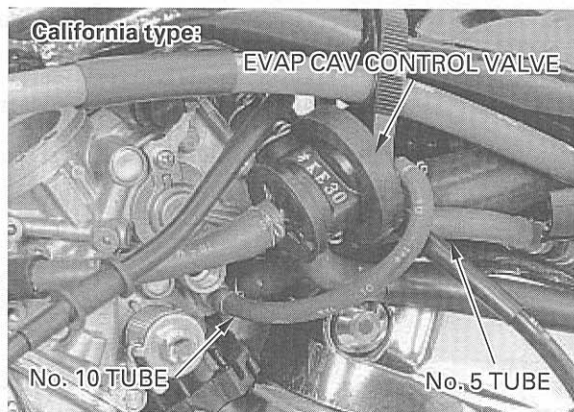


Remove the screw and spark plug wire clamp from the carburetor. Disconnect the choke cable of the front carburetor.

*Be careful not to lose SE valve and spring.*

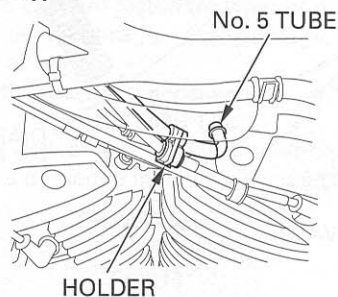


*California type only:* Disconnect the No. 10 and No. 5 tubes from the front carburetor. Remove the evaporative emission carburetor air vent (EVAP CAV) control valve from the carburetor stay.



*California type only:* Release the cable holder (VT1100T) and disconnect the No. 5 tube from the rear carburetor.

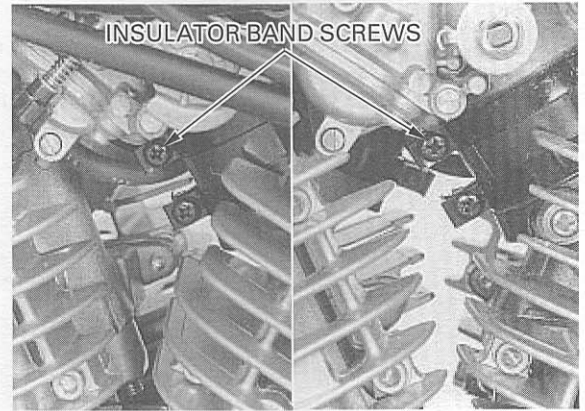
**California type (VT1100T):**





# FUEL SYSTEM

Loosen each insulator band screw at the carburetor side.  
 Release the carburetor outlet ports from the insulators while carefully raising the carburetor assembly.

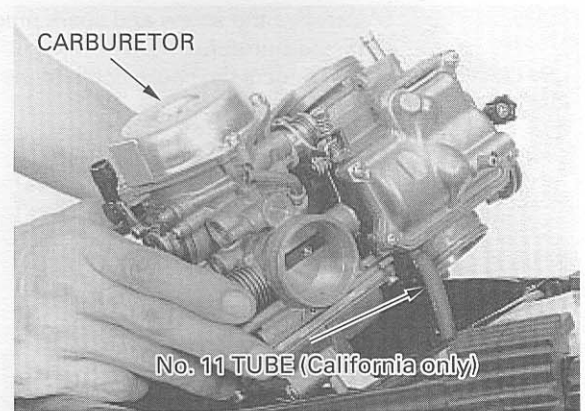


*California type only:* Raise the carburetor and disconnect the No. 11 tube.

Remove the carburetor assembly out of the frame.

**CAUTION:**

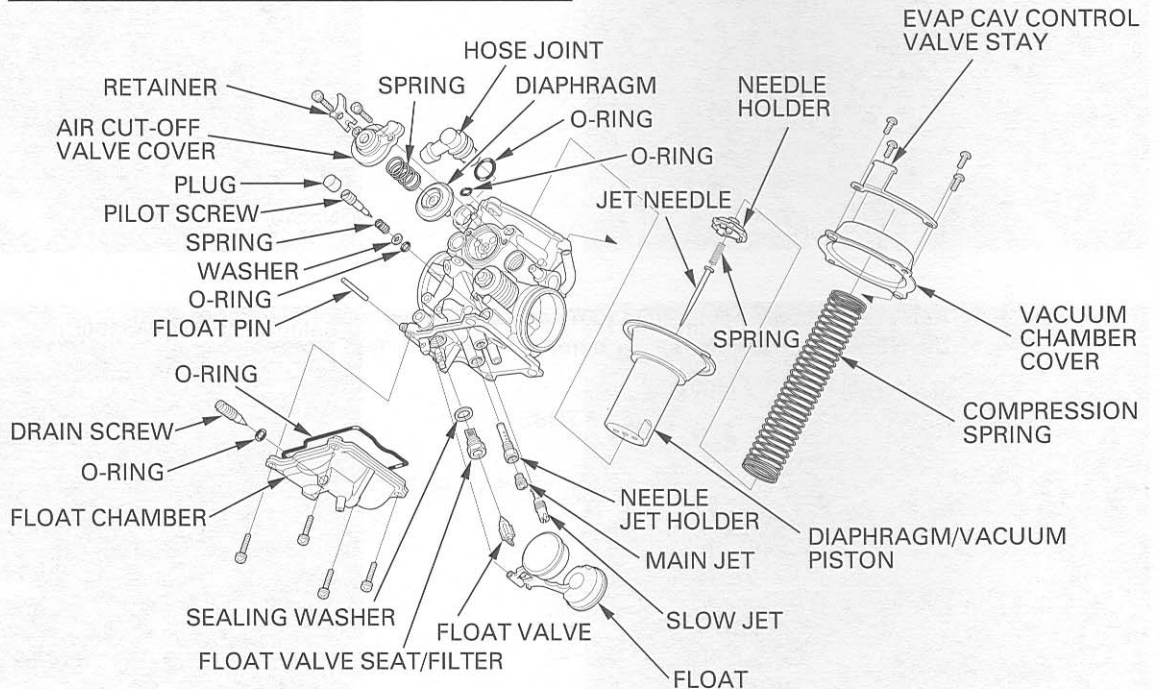
***Be careful not to damage the carburetor assembly.***



**DISASSEMBLY/ASSEMBLY**

**NOTE:**

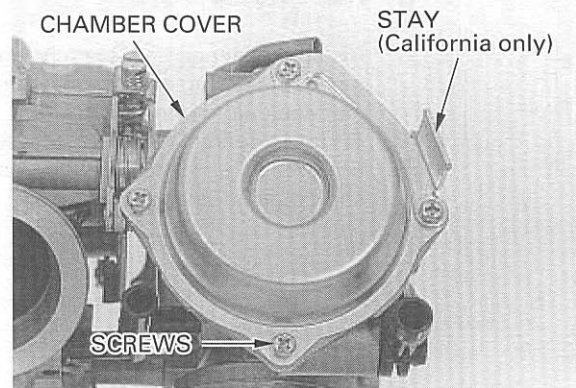
- Refer to following pages for service of each part.
- Vacuum chambers, float chambers, pilot screws and air cut off valves can be serviced without separating the carburetors.
- Keep each carburetor's parts separate from the other's so you can install the parts in their original positions.



## VACUUM CHAMBER

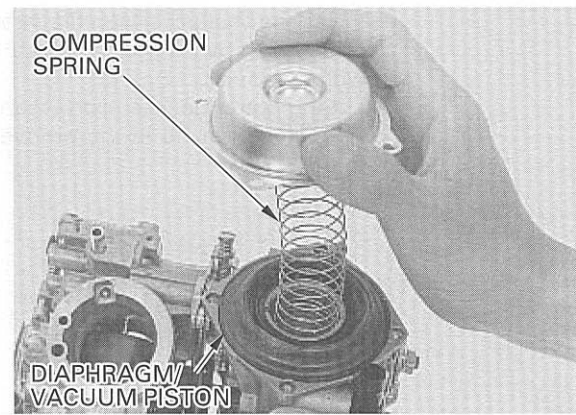
### REMOVAL

Remove the four screws, EVAP CAV control valve stay [front (# 2) carb. of California type] and vacuum chamber cover.

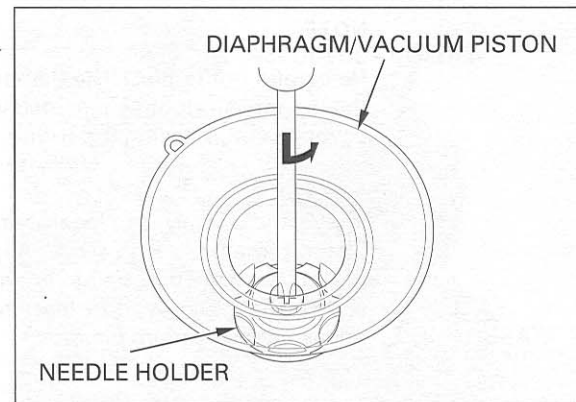


Remove the compression spring, diaphragm/vacuum piston.

Check the piston for smooth operation up and down in the carburetor body.



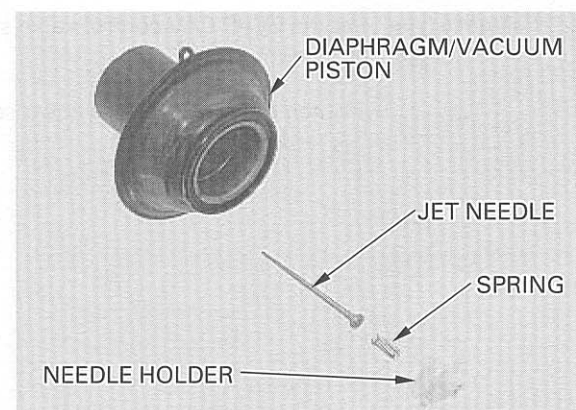
Turn the needle holder counterclockwise 60° while pressing it in and remove the holder flanges from the piston grooves. Remove the needle holder, spring and jet needle from the vacuum piston.



### INSPECTION

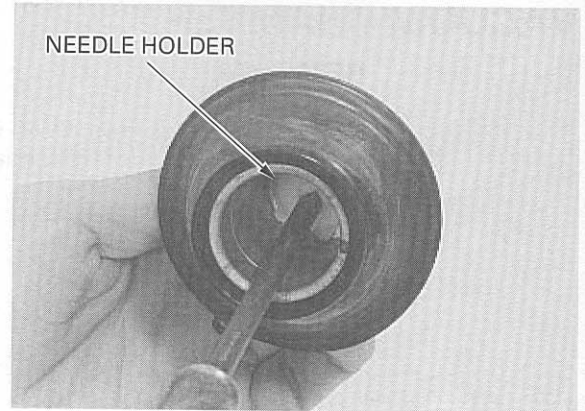
Check the jet needle for stepped wear. Check the vacuum piston for wear or damage. Check the diaphragm for damage, pin holes, wrinkles or bends. Replace these parts if necessary.

Air leaks out of the vacuum chamber if the diaphragm is damaged in any way—even a pin hole.

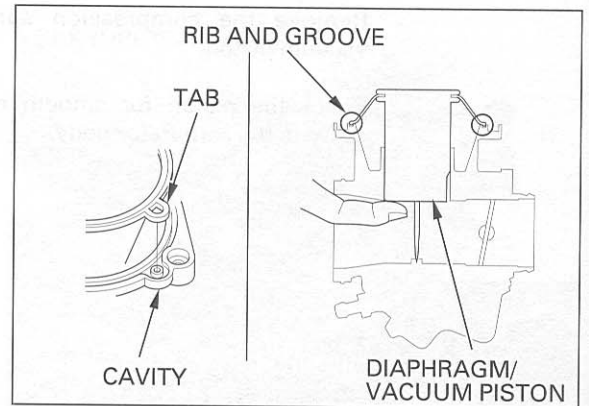


**INSTALLATION**

Install the jet needle into the vacuum piston.  
 Install the spring onto the needle holder and set the jet needle holder into the piston.  
 Turn the needle holder clockwise while pressing it until it locks. Holder flanges and piston grooves should be fitted after turning.



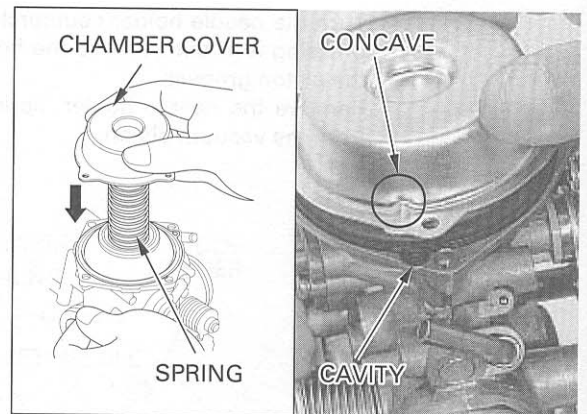
Install the vacuum piston/diaphragm into the carburetor body by aligning the tab of the diaphragm with the cavity.  
 Lift the bottom of the piston with your finger to set the diaphragm rib in the groove in the carburetor body.



**NOTE:**

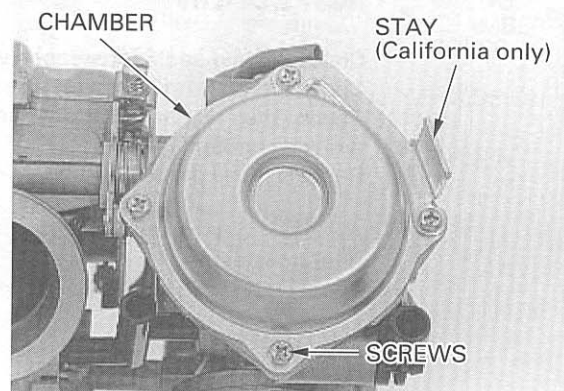
Be careful not to pinch the diaphragm, and to keep the spring straight when installing the chamber cover by compressing the spring.

Install the spring and chamber cover while the piston remains held in place. Align the concave of the cover with the cavity in the carburetor and secure the cover with at least two screws before releasing the vacuum piston.



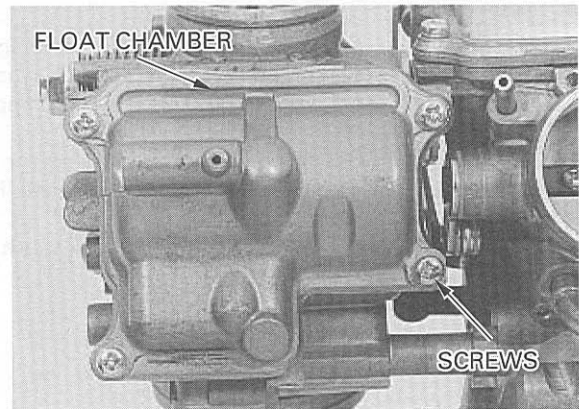
*California type only:* Set the EVAP CAV control valve stay in the position as shown.

Tighten the four chamber cover screws.

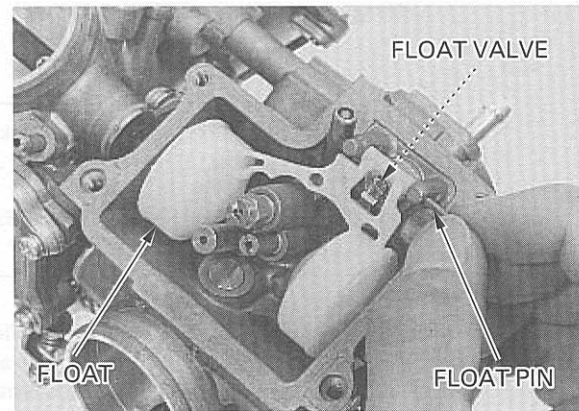


## FLOAT CHAMBER REMOVAL

Remove the four screws and the float chamber.



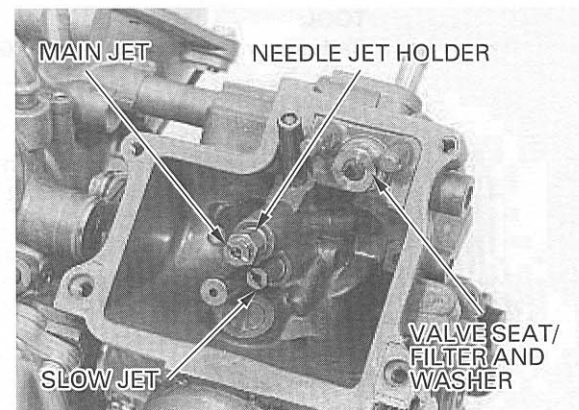
Remove the float pin, float and float valve.



### CAUTION:

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

Remove the main jet, needle jet holder and slow jet. Remove the float valve seat/filter and sealing washer.



## INSPECTION AND CLEANING

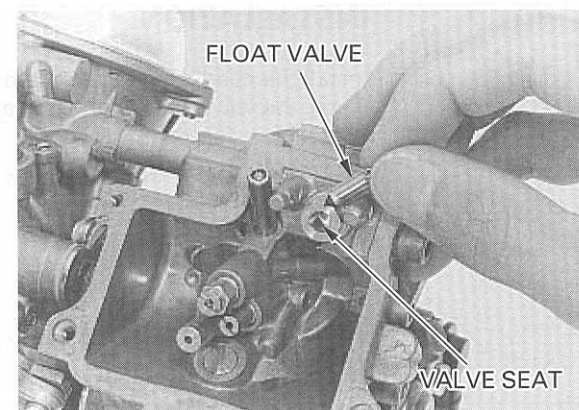
### FLOAT/VALVE

Check the float for damage, deterioration or fuel in the float.

Check the float valve and valve seat for scoring, scratches, clogging or damage.

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

A worn or contaminated valve does not seat properly and will eventually flood the carburetor.



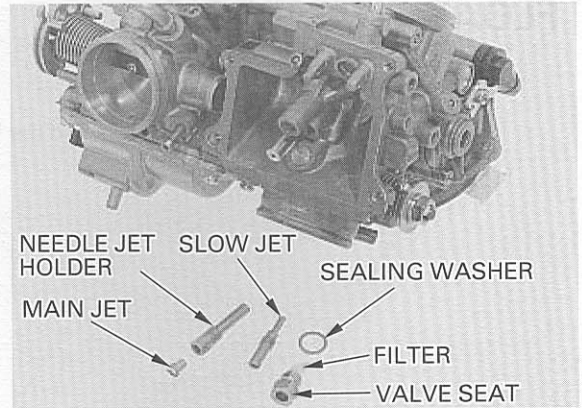
## FUEL SYSTEM

### JETS/FILTER

Check each jet for wear or damage.  
Clean the jets with non-flammable or high flash solvent and blow open with compressed air.

Check the filter for damage or clogging, and be sure the filter is securely installed onto the valve seat.

Clean the filter with low pressure compressed air.



### FLOAT LEVEL

#### NOTE:

- Check the float level after checking the float valve, valve seat and float.
- Set the float level gauge so that it is perpendicular to the float chamber face at the highest point of the float.

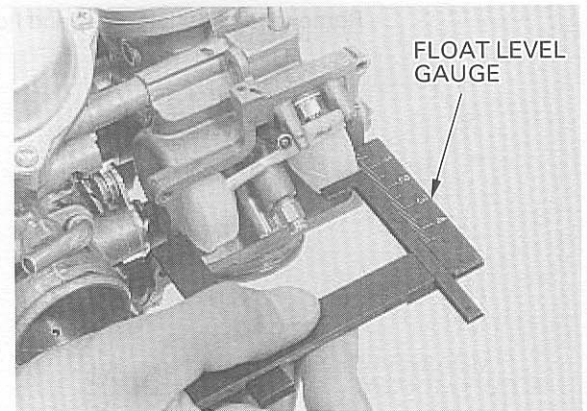
Set the carburetor so that the float valve end just contacts the float arm lip. Be sure that the float valve tip is securely in contact with the valve seat. Measure the float level with the float level gauge.

#### TOOL:

**Carburetor float level gauge** 07401-0010000

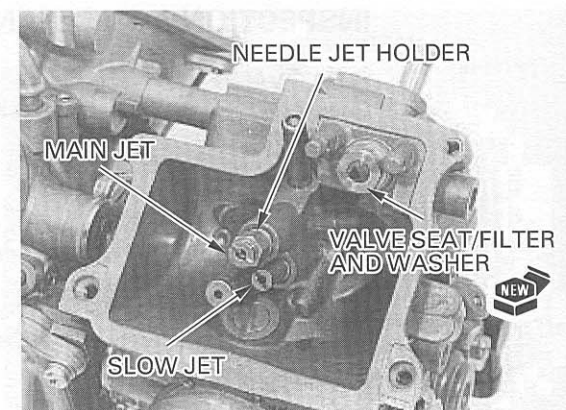
**FLOAT LEVEL:** 9.2 mm (0.36 in)

If the level is out of specification and the float arm lip can be bent, adjust the float level by carefully bending the lip.

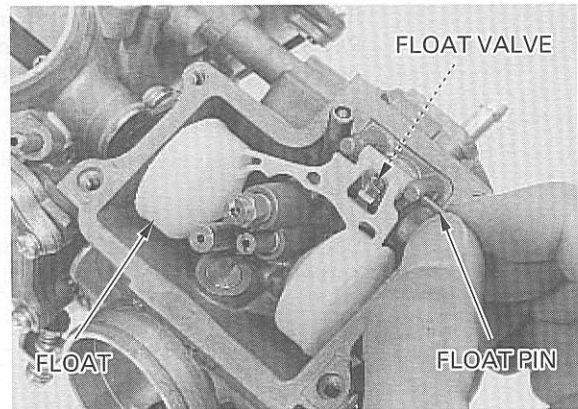


### INSTALLATION

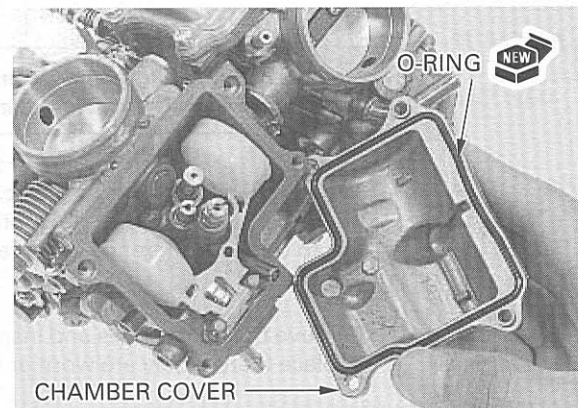
Install the needle jet holder, main jet and slow jet.  
Install the valve seat/filter with new sealing washer.



Hang the float valve onto the float arm lip.  
Install the float valve with the float in the carburetor body, then install the float pin through the body and float.



Install a new O-ring into the chamber cover groove.  
Install the chamber cover and tighten the four screws.



## PILOT SCREW

### REMOVAL

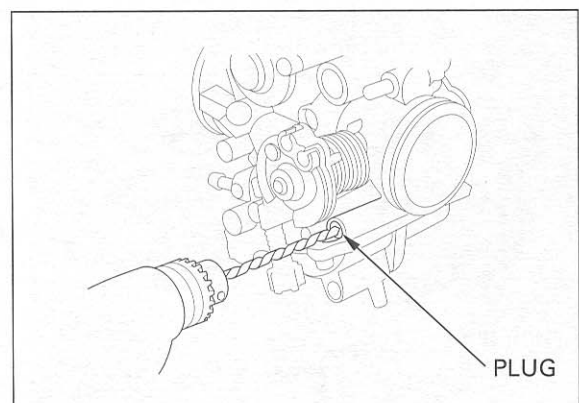
#### CAUTION:

- *Use extreme care when drilling into the pilot screw plug to avoid damaging the pilot screw.*
- *For proper pilot screw adjustment, both pilot screws must be replaced even if only one requires it.*

#### NOTE:

- The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled.
- The pilot screw plugs are factory installed to prevent pilot screw misadjustment. Do not remove the plugs unless the pilot screws are being removed.
- Cover all openings with tape to keep particles out when the plugs are drilled.

Center punch the pilot screw plug to center the drill point.  
Drill through the plug with a 4 mm (5/32 in) drill bit.  
Attach a drill stop to the bit 3 mm (1/8 in) from the end to prevent drilling into the pilot screw.

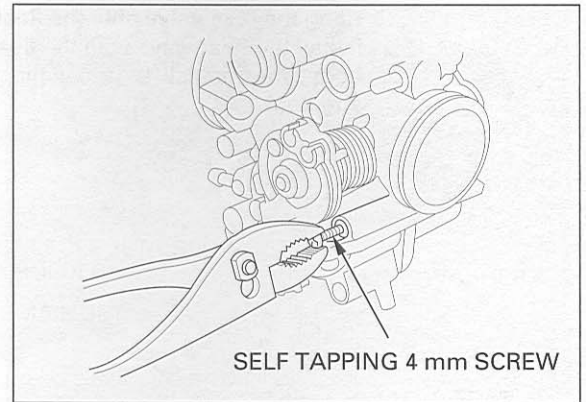


## FUEL SYSTEM

Force the self-tapping 4 mm screw (H/C 069399, P/N 93903–35410) into the drilled plug and continue turning the screw driver until the plug rotates with the screw.

Pull out the screw head with pliers to remove the plug.

Use compressed air to clean the pilot screw area and remove metal shavings.

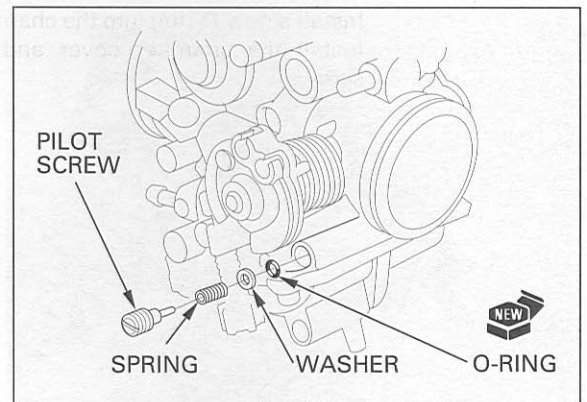


### CAUTION:

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

Turn each pilot screw in and carefully count the number of turns until seats lightly. Make a note of this to use as a reference when reinstalling the pilot screw.

Remove the pilot screws and inspect them. Replace them if they are worn or damaged.



## INSTALLATION

Install the pilot screws and return them to their original position as noted during removal. Perform pilot screw adjustment if new pilot screws are installed.

### NOTE:

Do not install new plugs in the pilot screw holes until after the new pilot screw adjustment has been made (page 5-19).

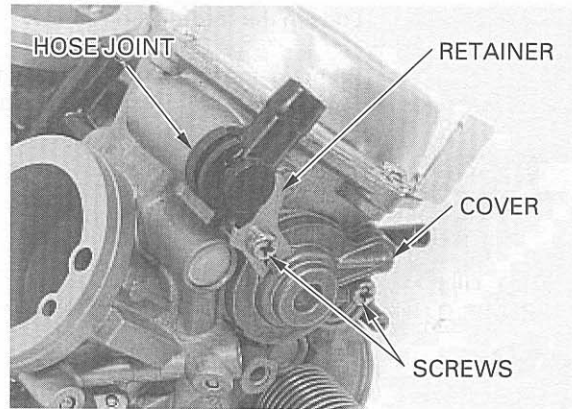
## AIR CUT-OFF VALVE

### REMOVAL

*The air cut-off valve cover is under spring pressure. Do not lose the spring and screws.*

Remove the two screws and retainer while holding the air cut-off valve cover, then remove the cover and spring.

Remove the diaphragm, O-ring and the sub-air cleaner hose joint.

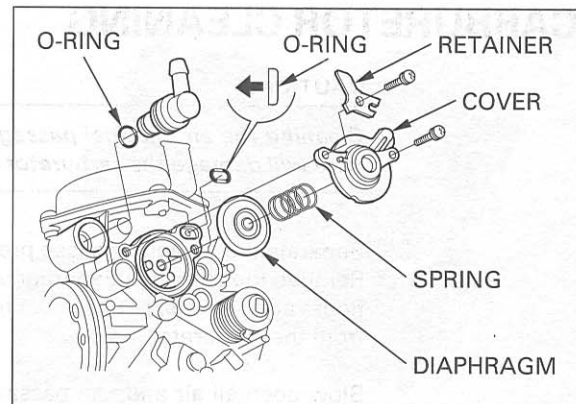


### INSPECTION

Visually check the following:

- the diaphragm for deterioration or pin holes
- the spring for deterioration
- the needle of diaphragm for excessive wear at the tip
- the orifice of the air vent for clogging or restriction
- the O-ring for damage.

Blow open air passages in the cover with compressed air.

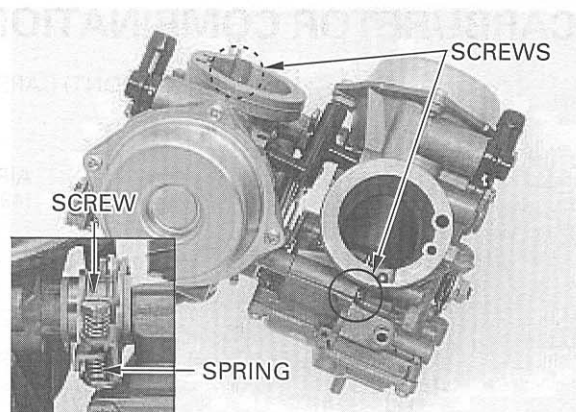


### INSTALLATION

Install the removed parts in the reverse order of removal.

#### NOTE:

Install the O-ring with the flat side facing the carburetor body. Be sure that the diaphragm and O-ring do not interfere with the cover.

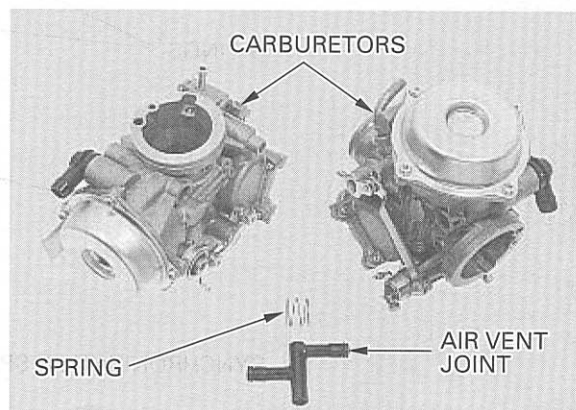


## CARBURETOR SEPARATION

Loosen the synchronization screw until there is no tension and remove the spring.

Remove the two connecting screws.

Carefully separate the carburetors then remove the thrust spring and air vent joint.

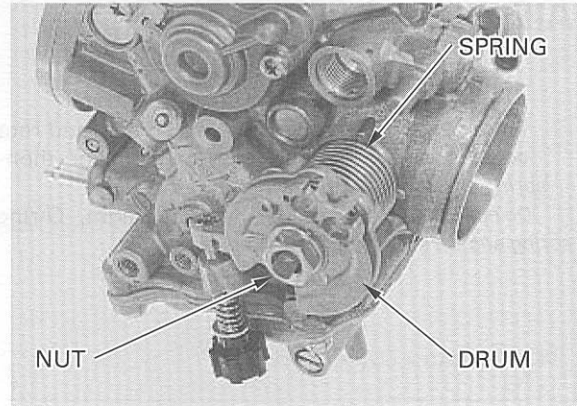




## FUEL SYSTEM

Loosen the throttle stop screw.

Remove the nut attaching the throttle drum and remove the throttle drum and return spring if necessary.



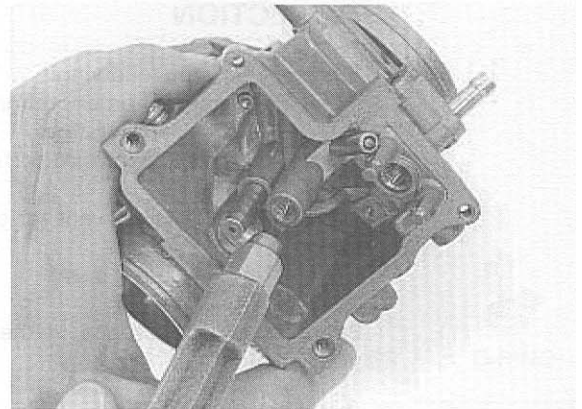
## CARBURETOR CLEANING

### CAUTION:

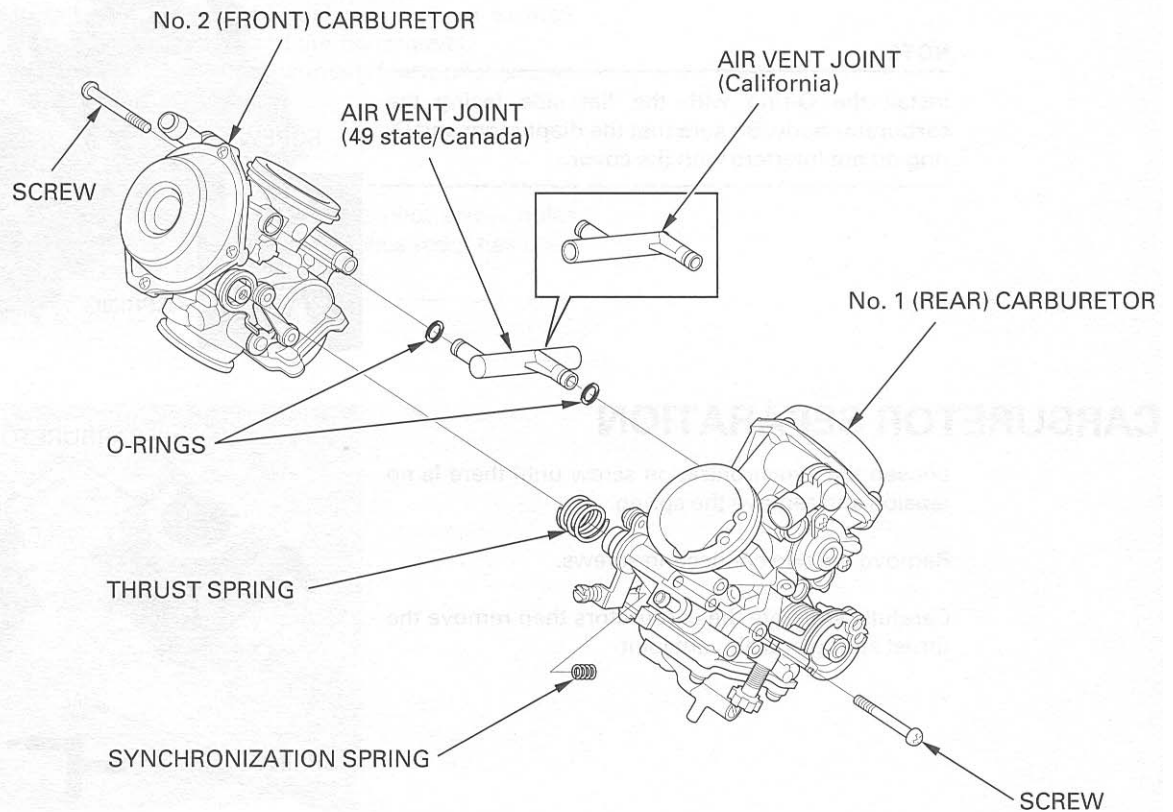
*Cleaning the air and fuel passages with a piece of wire will damage the carburetor body.*

Separate the carburetors (see previous page). Remove the all parts (diaphragm/vacuum chamber, float valve, all jets, pilot screw and air cut-off valve) from the carburetor.

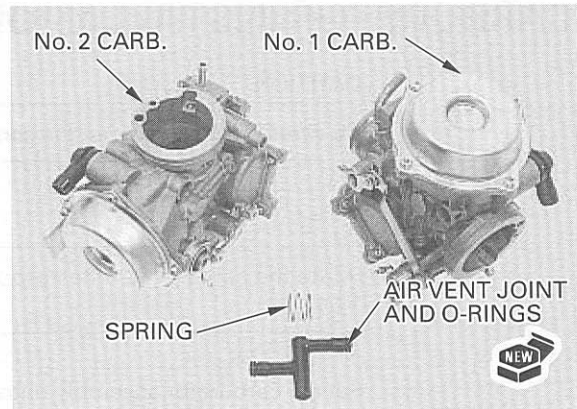
Blow open all air and fuel passages in the carburetor body with compressed air.



## CARBURETOR COMBINATION

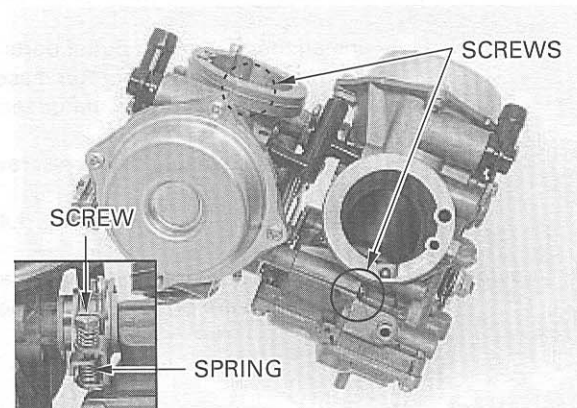


Coat new O-rings with oil and install them on the air vent joint pipe.  
 Assemble the No. 1 and No. 2 carburetors together with the air vent joint (Note the installation direction: see previous page) and thrust spring.

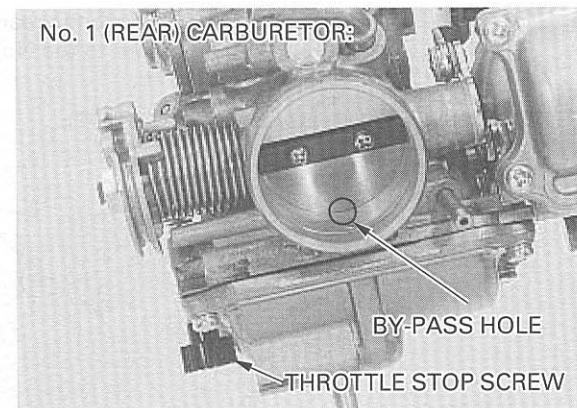


Be sure there is no clearance at the joint portion of the carburetor bodies.  
 Install and tighten the connecting screws alternately and gradually.

Install the synchronization spring.



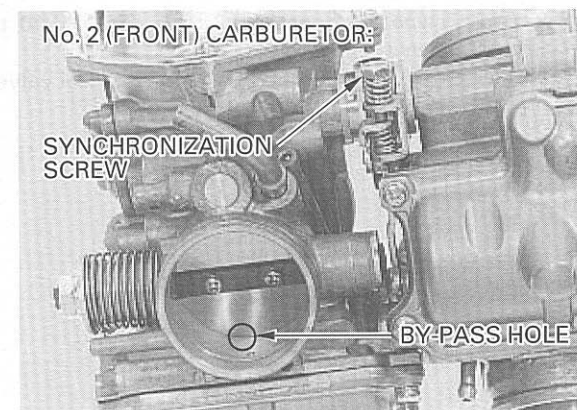
Turn the throttle stop screw to align the throttle valve with the edge of the outside by-pass hole in No. 1 (base) carburetor.



Align the No. 2 throttle valve with the outside by-pass hole edge by turning the synchronization adjusting screw.

Check for throttle operation as described below:

- Open the throttle valves slightly by pressing the throttle linkage and be sure that it returns smoothly.
- Rotate the throttle drum and be sure that each throttle valve opens and closes smoothly.



## FUEL SYSTEM

### CARBURETOR INSTALLATION

**CAUTION:**

*Be careful not to damage the carburetor assembly.*

**NOTE:**

Route the cables and tubes properly (page 1-35 or 1-54).

Set the carburetor assembly onto the engine.

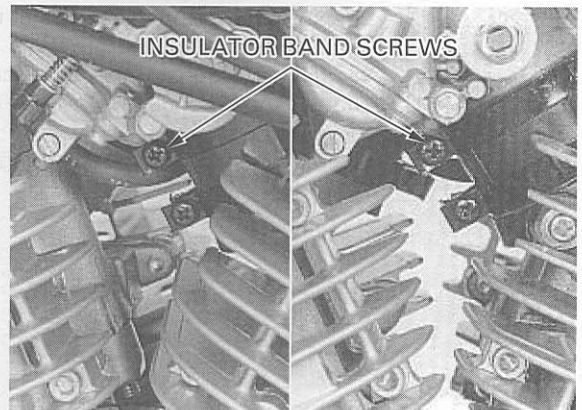
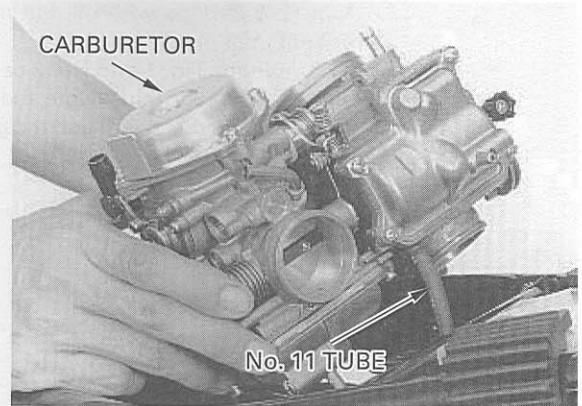
*California type only:* Connect the No. 11 tube to the carburetor.

Install the carburetor outlet ports into the insulators by pressing the carburetor assembly against the upper surface of the insulator securely.

Tighten each insulator band screw alternately.

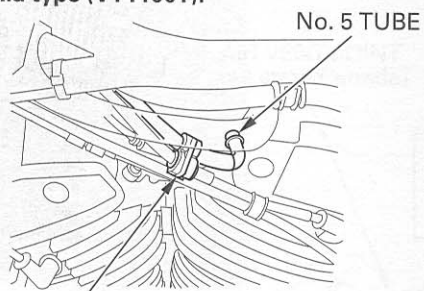
**TORQUE:** 2.0 N·m (0.2 kgf·m , 1.4 lbf·ft)

*California type only:* The tube numbers of the evaporative emission control system are printed on all tubes.



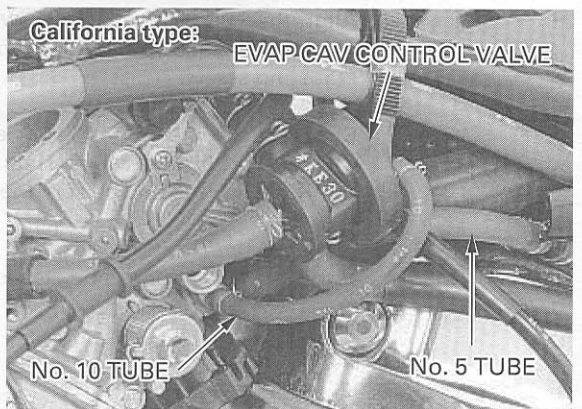
Connect the No. 5 tube to the rear carburetor. Install the cable holder to the No. 5 tube and spark plug wire (VT1100T).

**California type (VT1100T):**

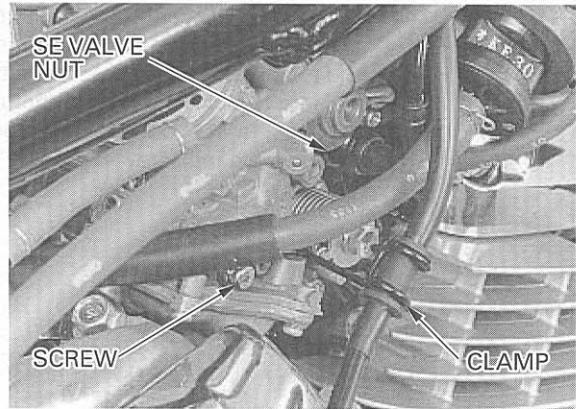


HOLDER

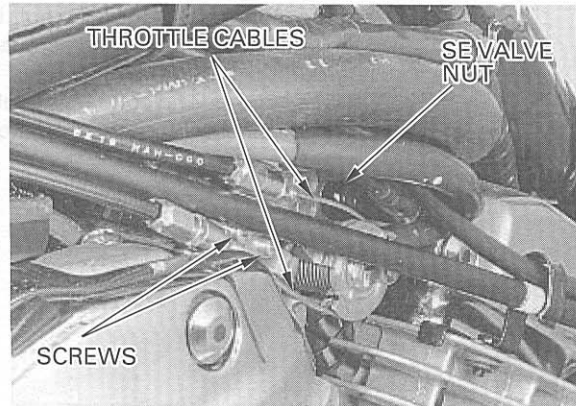
*California type only:* Connect the No. 5 and No. 10 tubes to the front carburetor. Install the EVAP CAV control valve to the stay.



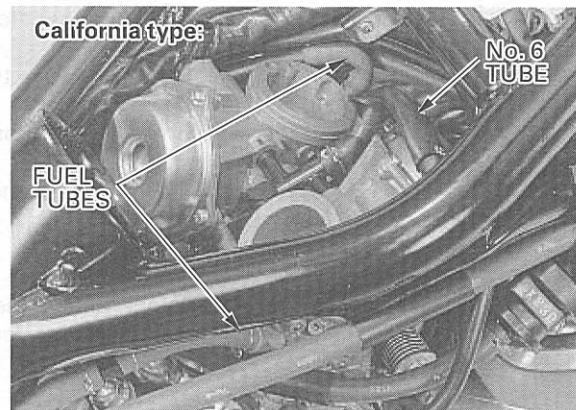
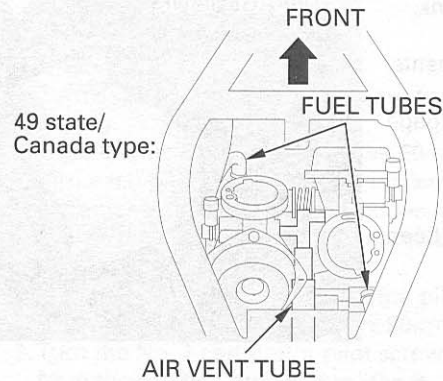
Thread the SE valves in by hand then tighten the SE valve nuts 1/4 turn with 14 mm wrench. Install the spark plug wire clamp onto the carburetor with the screw.



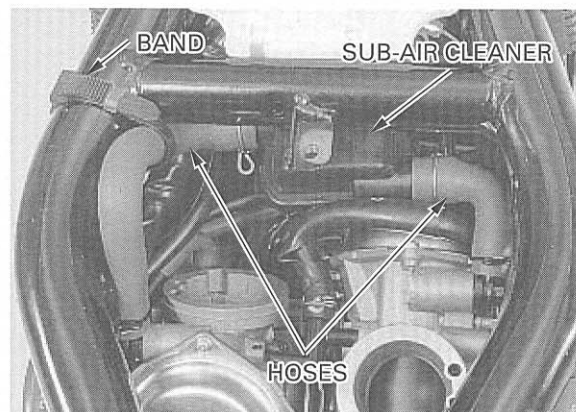
Connect the choke cable (see above). Install the throttle cable holder with the two screws. Connect the throttle cables to the throttle drum.



Connect the fuel tubes and air vent tube to (California: No. 6 tube) the carburetor.

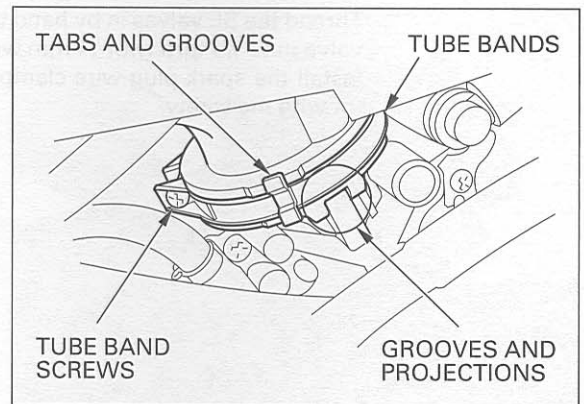


Connect the sub-air cleaner hoses to the carburetors. Secure the left side hose with the hose band.

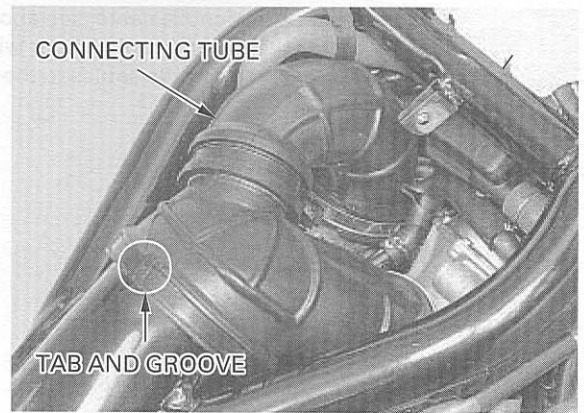


## FUEL SYSTEM

Install the connecting tube onto the carburetor inlet ports and frame opening by aligning the grooves in the tube with the projections on the carburetors. Be sure to align the tabs of the tube bands with the grooves in the connecting tube and tighten the three tube band screws.



If the connecting tube is not installed correctly, loosen the insulator band screws (page 5-16) at the carburetor side and tube band screws, and reset the carburetor and connecting tube. Tighten all band screws alternately and gradually.

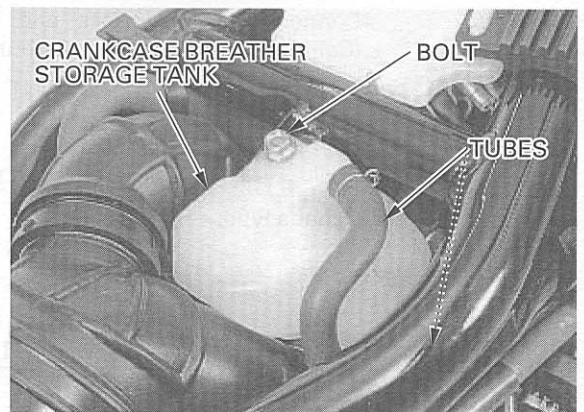


Install the crankcase breather storage tank with the bolt. Connect the crankcase breather tubes to the tank.

Perform the following inspections and adjustments.

- Throttle operation (page 3-5).
- Carburetor synchronization and idle speed (page 3-12).
- Carburetor choke (page 3-7).

After the inspections and adjustment have been made, install the fuel tank and seat (section 2).



## PILOT SCREW ADJUSTMENT

### IDLE DROP PROCEDURE

#### NOTE:

- Make sure the carburetor synchronization is within specification before pilot screw adjustment.
- The pilot screws are factory pre-set and no adjustment is necessary unless the pilot screws are replaced.
- Use tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

1. Turn each pilot screw clockwise until it seats lightly, then back it out to the specification given. This is an initial setting prior to the final pilot screw adjustment.

**INITIAL OPENING:** VT1100C: 2 turns out  
VT1100T: 2 – 1/2 turns out

#### CAUTION:

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

2. Warm up engine to operating temperature. Stop and go riding for 10 minutes is sufficient.
3. Attach the tachometer according to the tachometer manufacturer's instructions.
4. Adjust the idle speed to the specified rpm with the throttle stop screw.

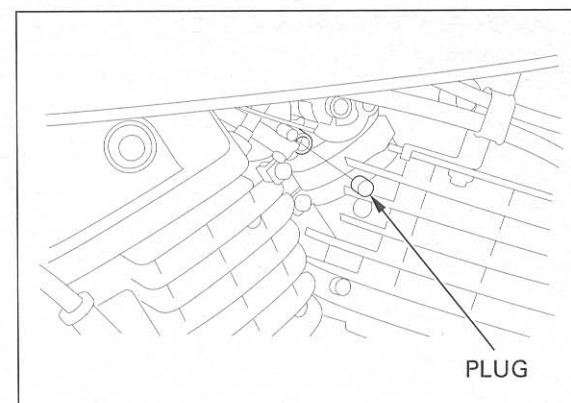
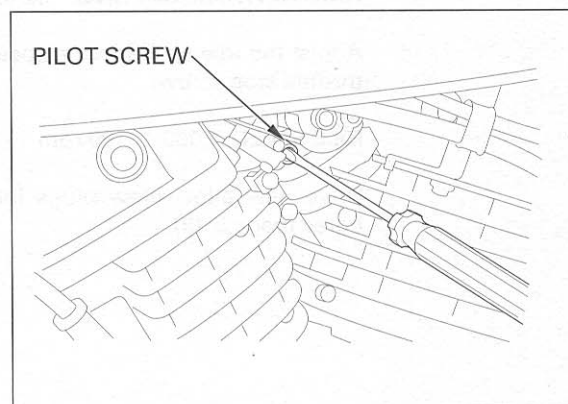
**IDLE SPEED:** 1,000 ± 100 rpm

5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increases by 50 rpm or more, turn each pilot screws out by successive 1/2 turn increments until engine speed does not increase.
7. Adjust the idle speed to the specified rpm with the throttle stop screw.
8. Turn the No. 1 (rear) carburetor pilot screw in until the engine speed drops by 50 rpm.
9. Turn the No. 1 carburetor pilot screw 3/4 turn out from the position obtained in step 8. This is the final opening position.
10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for the No. 2 (front) carburetor pilot screw.

Drive new pilot screw plugs into the pilot screw bores with the special tool. When fully seated, the plug surface will be recessed 1 mm.

#### TOOL:

Valve guide driver, 6.6 mm 07942 – 6570100



## HIGH ALTITUDE ADJUSTMENT

When the vehicle is to be operated continuously above 2,000 m (6,500 feet), the carburetor must be readjusted as described below to improve driveability and decrease exhaust emissions.

*These adjustments must be made at high altitude to ensure proper high altitude operation.*

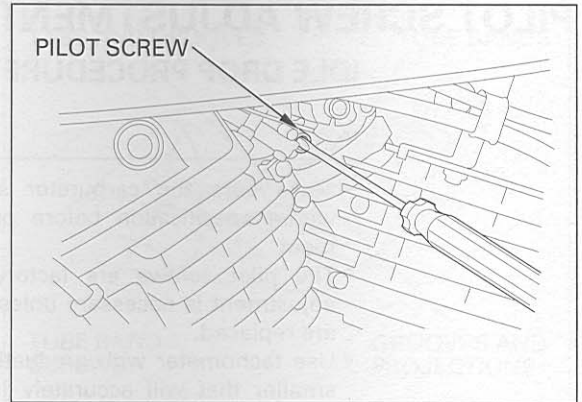
Remove the each pilot screw plug (page 5-11).  
Warm up the engine to operating temperature. Stop and go riding for 10 minutes is sufficient.  
Turn each pilot screw to the High Altitude Setting specified below.

**HIGH ALTITUDE SETTING:** 1/2 turn in

Adjust the idle speed to the specified rpm with the throttle stop screw.

**IDLE SPEED:** 1,000 ± 100 rpm

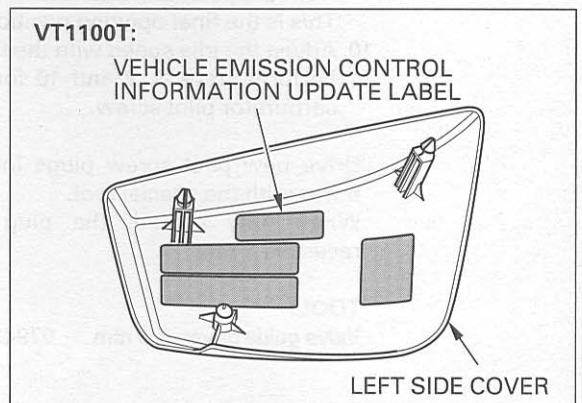
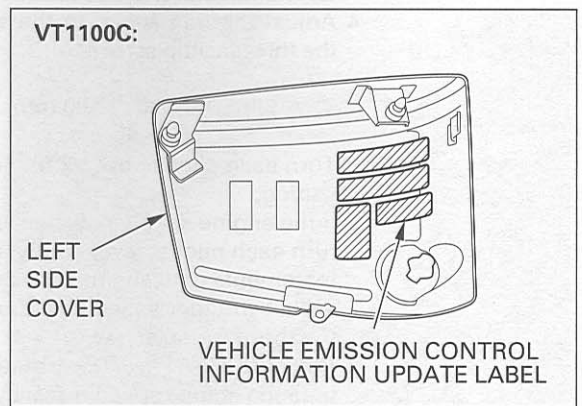
Drive new pilot screw plugs into the pilot screw bores (page 5-19).



Attach the Vehicle Emission Control Information Update label on the reverse side of the left side cover as shown. See Service Letter No. 132 for information on obtaining the label.

**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 over heating.*

When the vehicle is to be operated continuously below 1,500 m (5,000 feet), remove each pilot screw plug (page 5-11) and turn each pilot screw to the Low Altitude Setting specified below (its original position).

**LOW ALTITUDE SETTING:** 1/2 turn out

Adjust the idle speed to the specified rpm (1,000 ± 100 rpm).

Be sure to do these adjustments at low altitude with the engine at normal operating temperature.

Drive new pilot screw plugs into the pilot screw bores (page 5-19). Remove the Vehicle Emission Control Information Update label that is attached to the reverse side of the left side cover 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.



## AIR CLEANER HOUSING

### REMOVAL

**CAUTION:**

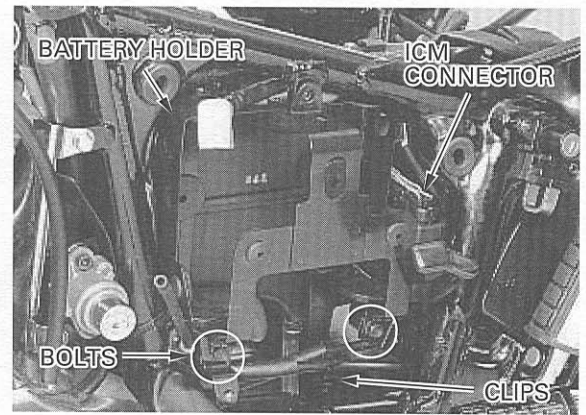
*Be careful not to damage or pinch the wire harness.*

Remove the following:

- battery (page 16-5).
- seat (page 2-2 or 2-3).

Remove the starter motor cable and ground cable from the clips on the battery holder.

Remove the two holder attaching bolts. Remove the battery holder from the frame and disconnect the ignition control module (ICM) connector, being careful not to damage the frame.



Remove the following:

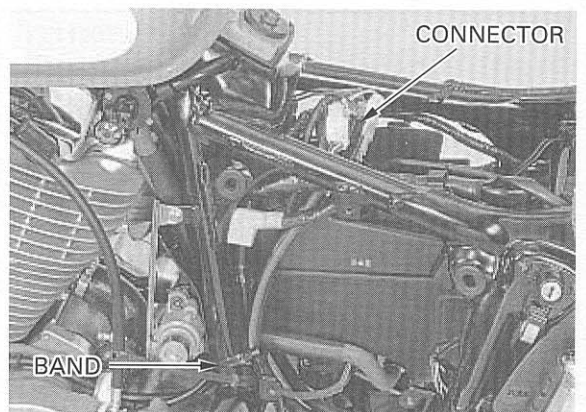
- right side cover (page 2-4 or 2-5)
- swingarm (page 14-27)

Disconnect the crankcase breather tube from the air cleaner housing.

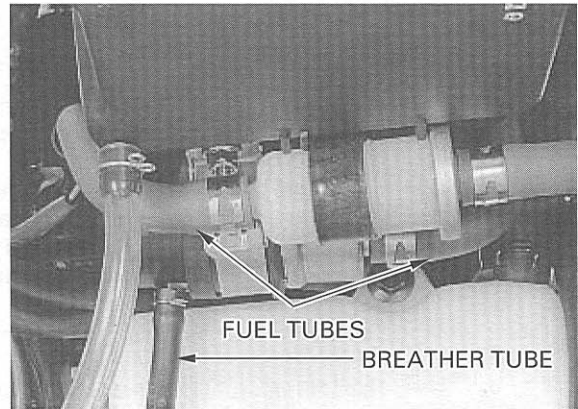
Remove the tool band.



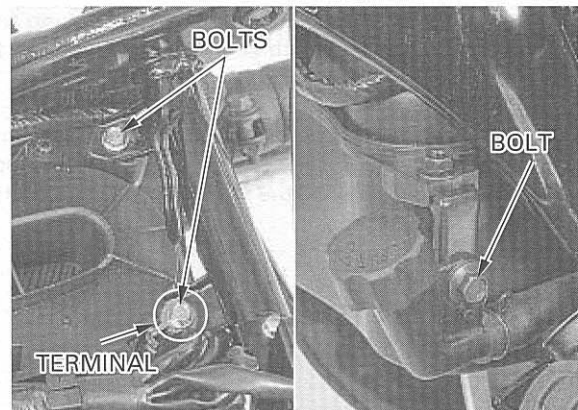
Disconnect the fuel pump connector 2P (Black) in the connector boot. Release the wire band.



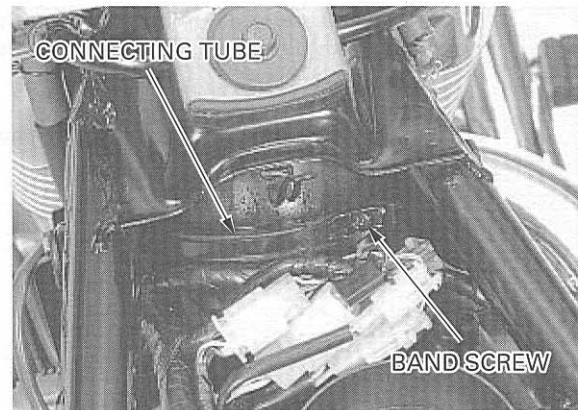
Remove the fuel pump breather tube from the frame clamp.  
Disconnect the fuel tubes from the fuel filter and fuel pump.



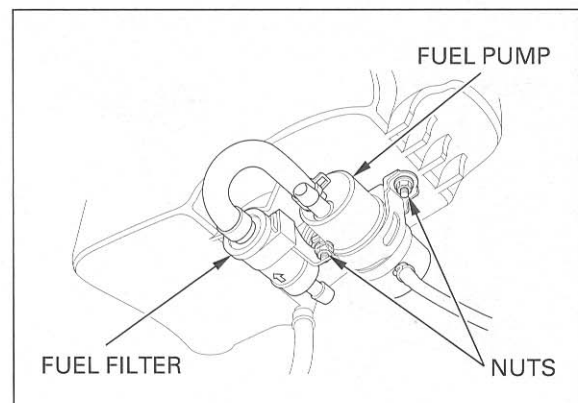
Remove the coolant filler neck bolt.  
Remove the two mounting bolts and ground terminal from the air cleaner housing.



Loosen the connecting tube band screw.  
Release the connecting tube from the frame opening and remove the air cleaner housing from the frame.



Remove the two nuts, and the fuel pump and filter as an assembly.



## INSTALLATION

### NOTE:

- Route the wires and tubes properly (page 1-35 or 1-54).
- If the connecting tube is removed from the air cleaner housing, apply a Honda Bond A or equivalent to the mating portion and install the tube by aligning the air cleaner housing groove with the tube tab.

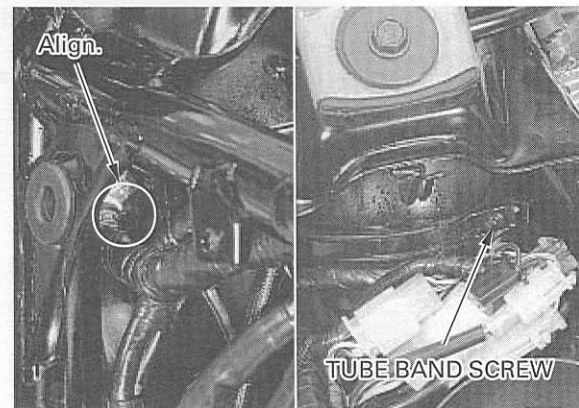
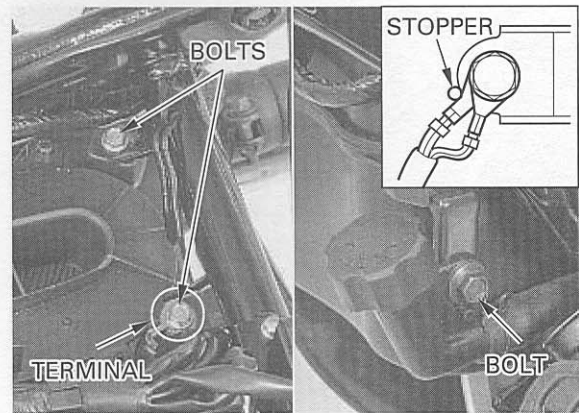
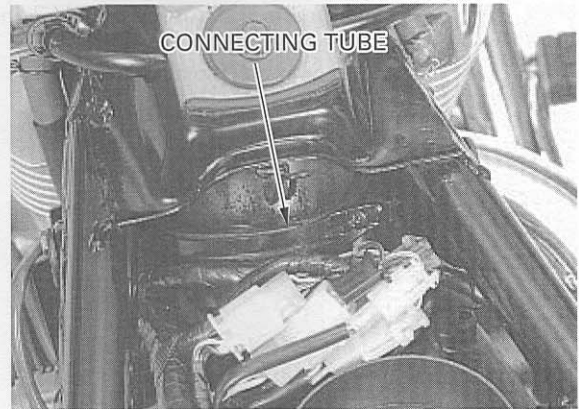
Install the fuel pump and filter and tighten the two nuts.

Place the air cleaner housing into the frame and install the connecting tube over the frame opening securely.

Install and tighten the mounting bolts with the ground terminal against the stopper. Install the coolant filler neck with the bolt.

Be sure to align the groove in the connecting tube with the tab of the tube band and tighten the tube band screw.

Install the removed parts in the reverse order of removal.



# EVAPORATIVE EMISSION CONTROL SYSTEM (California type only)

**NOTE:**

Refer to tubing diagram on page 1-53 or 1-67 for the tube connections.

## EVAPORATIVE EMISSION (EVAP) CANISTER

### REMOVAL/INSTALLATION

Remove the No. 2 tube from the radiator (between the radiator body and grill).

Disconnect the No. 1 and No. 4 tube from the EVAP canister.

Remove the two bolts and EVAP canister.

Installation is in the reverse order of removal.

## EVAPORATIVE EMISSION (EVAP) PURGE CONTROL VALVE:

### REMOVAL/INSTALLATION

Remove the EVAP purge control valve from the frame stay.

Disconnect the No. 11, No. 5 and No. 4 tube from their connections.

Installation is in the reverse order of removal.

## INSPECTION

**NOTE:**

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

Remove the EVAP purge control valve (see above). Connect a 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.

**TOOL:**

**Vacuum/Pressure pump** A937X-041-XXXXX or  
**Vacuum pump** ST-AH-260-MC7  
 (U. S. A. only)

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

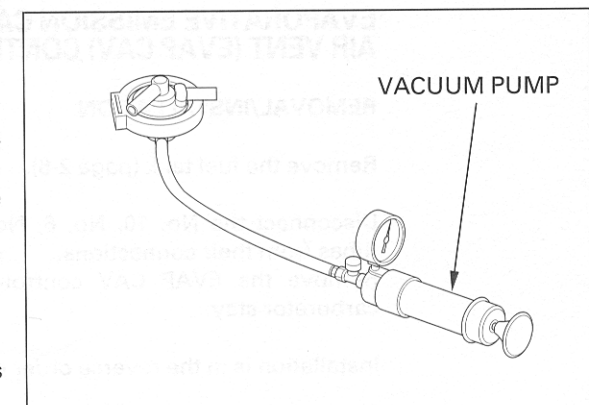
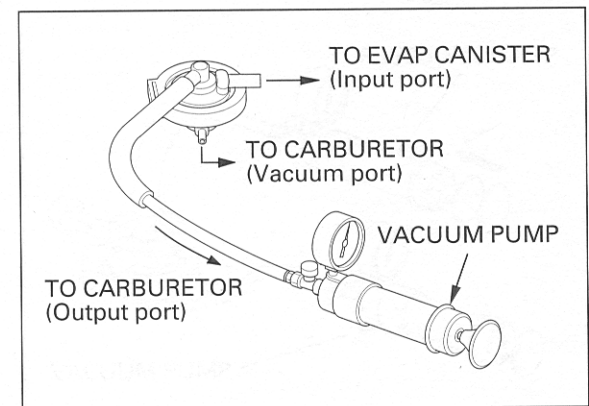
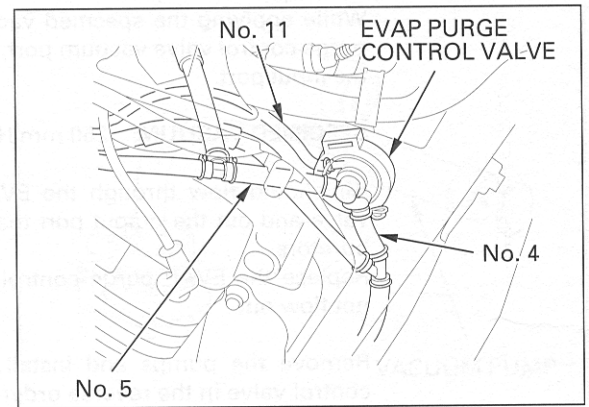
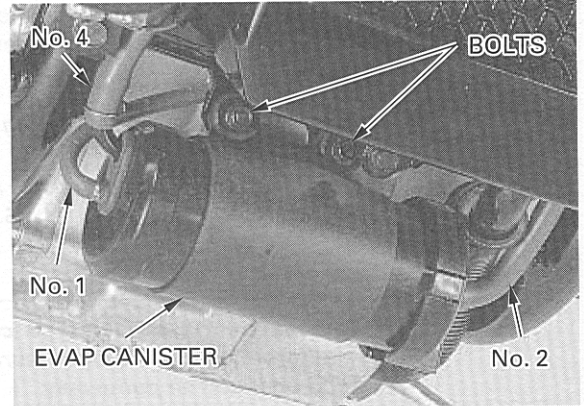
The specified vacuum should be maintained. Replace the EVAP purge control valve if vacuum is not maintained.

Remove the vacuum pump and connect it to the No. 11 tube fitting (vacuum port) goes to the rear 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.



## FUEL SYSTEM

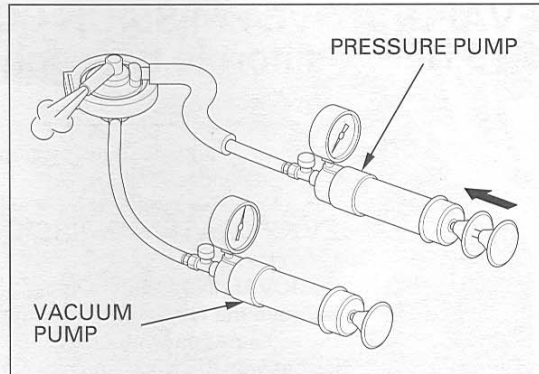
Connect a pressure pump to the No. 4 tube fitting (input port) goes to EVAP canister.

### TOOL:

**Vacuum/Pressure pump** A937X-041-XXXXX  
or  
**Pressure pump** ST-AH-255-MC7  
(U. S. A. only)

### 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 (page 5-25).

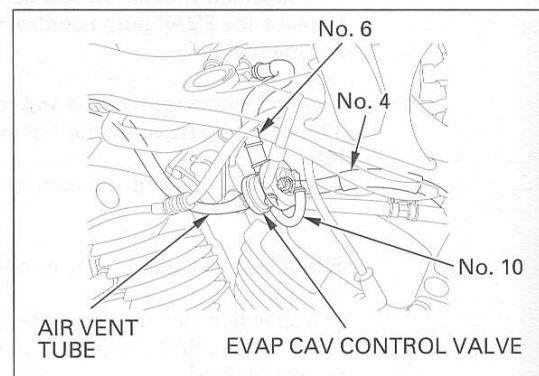
## EVAPORATIVE EMISSION CARBURETOR AIR VENT (EVAP CAV) CONTROL VALVE

### REMOVAL/INSTALLATION

Remove the fuel tank (page 2-6).

Disconnect the No. 10, No. 6, No. 4 and air vent tubes from their connections.  
Remove the EVAP CAV control valve from the carburetor stay.

Installation is in the reverse order of removal.

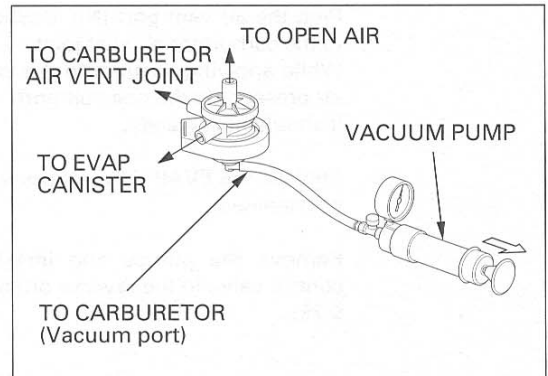


**INSPECTION**

**NOTE:**

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

Remove the EVAP CAV control valve (see previous page).  
 Connect a vacuum pump to the No. 10 tube fitting (vacuum port) that goes to the front carburetor.  
 Apply the specified vacuum to the EVAP CAV control valve.



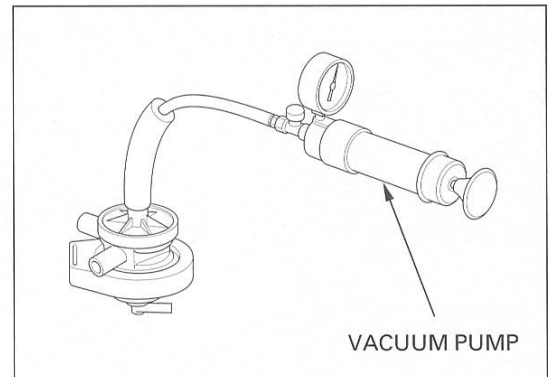
**TOOL:**

**Vacuum/Pressure pump** A937X-041-XXXXX  
 or  
**Vacuum pump** ST-AH-260-MC7  
 (U. S. A. only)

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

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

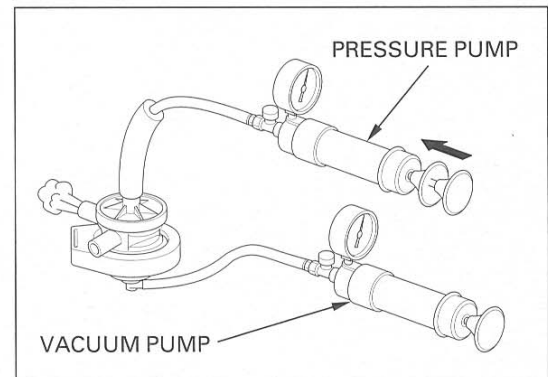
Remove the vacuum pump and connect it to the air vent tube fitting goes to open air.  
 Apply vacuum to the EVAP CAV control valve. The vacuum should hold steady.  
 Replace the EVAP CAV control valve if vacuum leaks.



Remove the vacuum pump and reconnect it to the No. 10 tube fitting (vacuum port).  
 Connect the pressure pump to the air vent tube fitting (open air port).

**TOOL:**

**Vacuum/Pressure pump** A937X-041-XXXXX  
 or  
**Pressure pump** ST-AH-255-MC7  
 (U. S. A. only)



**CAUTION:**

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

While applying vacuum to the EVAP CAV control valve vacuum port, pump air through the open air port.

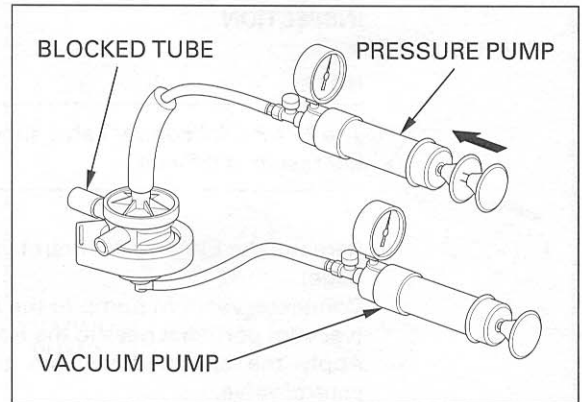
Air should flow through the EVAP CAV control valve and out the air vent port that goes to the carburetor air vent joint.

## FUEL SYSTEM

Plug the air vent port (No. 6 tube fitting) that goes to the carburetor air vent joint.  
While applying vacuum to the vacuum port, apply air pressure to the open air port.  
It should hold steady.

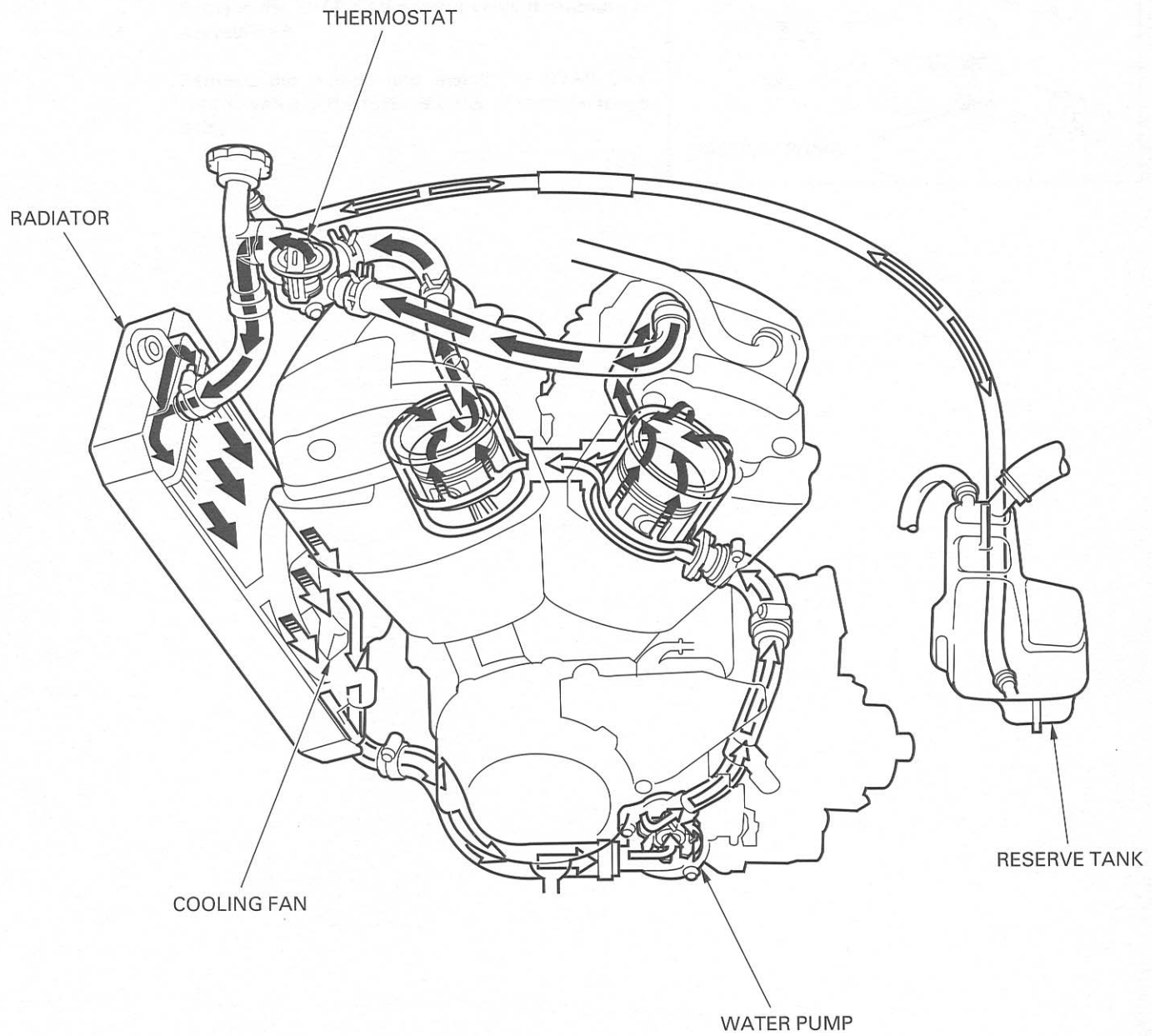
Replace the EVAP CAV control valve if pressure is not retained.

Remove the pumps and install the EVAP CAV control valve in the reverse order of removal (page 5-26).



# COOLING SYSTEM

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# 6. COOLING SYSTEM

SERVICE INFORMATION	6-1	THERMOSTAT	6-6
TROUBLESHOOTING	6-2	RADIATOR/COOLING FAN	6-9
SYSTEM TESTING	6-3	WATER PUMP	6-11
COOLANT REPLACEMENT	6-4	RADIATOR RESERVE TANK	6-13

## SERVICE INFORMATION

### GENERAL

#### ▲WARNING

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

#### CAUTION:

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

- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system service can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to section 19 for fan motor switch and thermosensor information.

### SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	radiator and engine	2.0 ℓ (2.1 US qt, 1.8 Imp qt)
	reserve tank	0.39 ℓ (0.41 US qt, 0.34 Imp qt)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm <sup>2</sup> , 16 – 20 psi)
Thermostat	begins to open	80 – 84 °C (176 – 183 °F)
	fully open	95 °C (203 °F)
	valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors

### TORQUE VALUES

Coolant drain bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	
Water pump assembly bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	
Water pump mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Fan motor switch	18 N·m (1.8 kgf·m, 13 lbf·ft)	(page 19-12)
Thermosensor	8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)	Apply sealant to the threads. (Do not apply sealant to the sensor head.) (page 19-16)

## TROUBLESHOOTING

### Engine temperature too high

- Faulty temperature unit (indicator) or thermosensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty cooling fan motor
- Faulty fan motor switch
- Faulty water pump

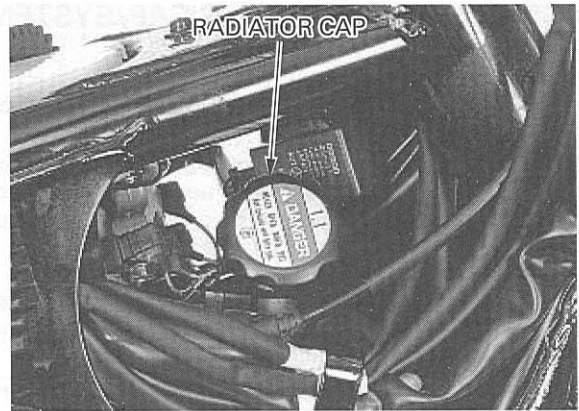
### Coolant leaks

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

## SYSTEM TESTING

**▲WARNING**

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

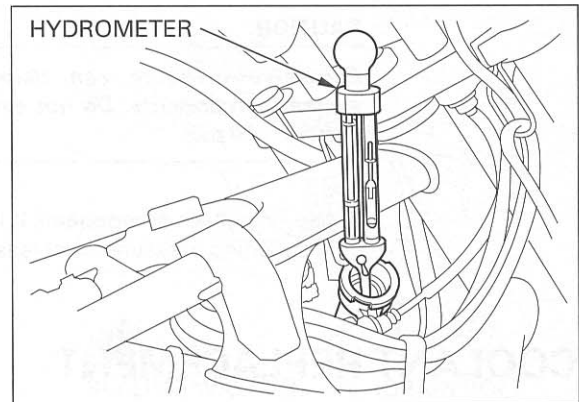


### COOLANT (HYDROMETER TEST)

Remove the right steering cover (page 2-6).

Remove the radiator cap.

Test the coolant mixture with 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). Lock for contamination and replace the coolant if necessary.



**Coolant specific gravity chart**

Coolant ratio %	Coolant temperature °C (°F)										
	0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	45 (113)	50 (122)
5	1.009	1.009	1.008	1.008	1.007	1.066	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

Remove the radiator cap (see previous page).

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

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)

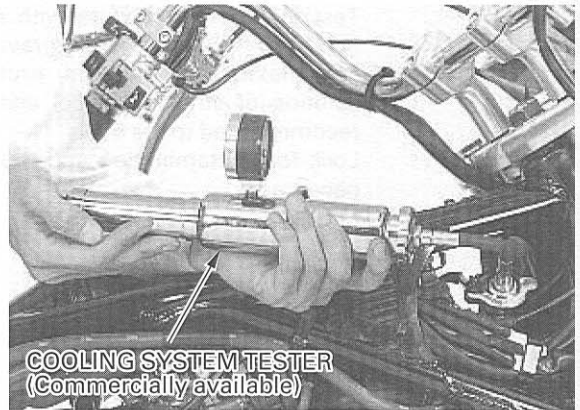
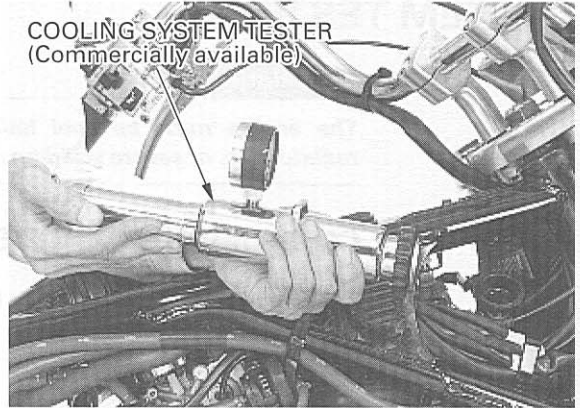
Pressure test the radiator, engine and hoses, and check for leaks.

#### 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.

COOLING SYSTEM TESTER  
(Commercially available)



COOLING SYSTEM TESTER  
(Commercially available)

## COOLANT REPLACEMENT

### PREPARATION

#### ▲ WARNING

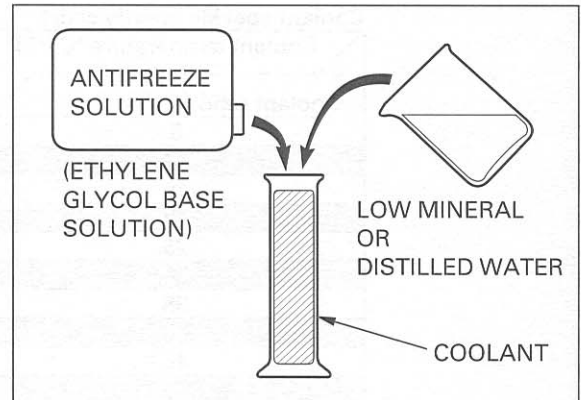
- **Radiator coolant is toxic. Keep it away from eyes, mouth, skin and clothes.**
  - If any coolant gets in your eyes, rinse them with water and consult a doctor immediately.
  - If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.
  - If any coolant gets on your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

#### CAUTION:

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

#### NOTE:

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



**RECOMMENDED ANTIFREEZE:**

Pro Honda HP coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors

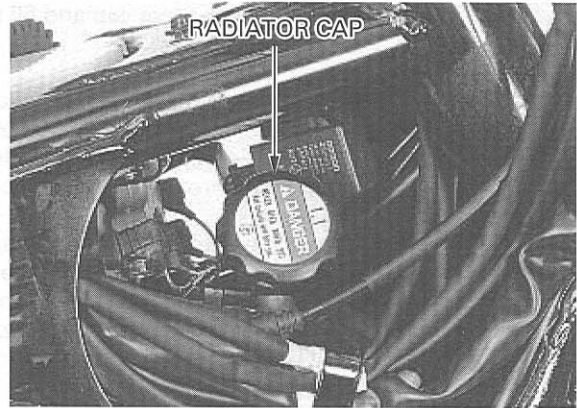
**RECOMMENDED MIXTURE:**

50—50 (Distilled water and recommended antifreeze)

**REPLACEMENT/AIR BLEEDING**

**▲WARNING**

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



**NOTE:**

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

Remove the right steering side cover (page 2-6).

Remove the radiator cap.

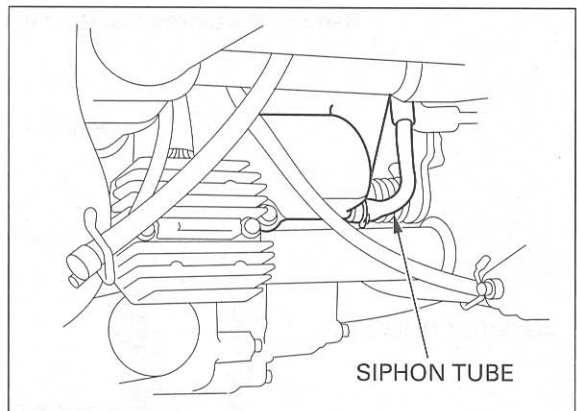
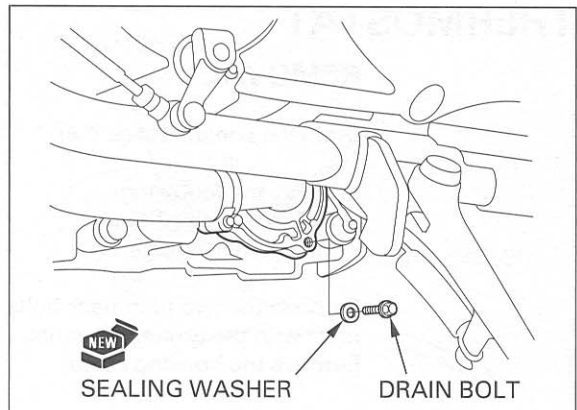
Remove the drain bolt on the water pump and drain the system coolant.

Reinstall the drain bolt with a new sealing washer.

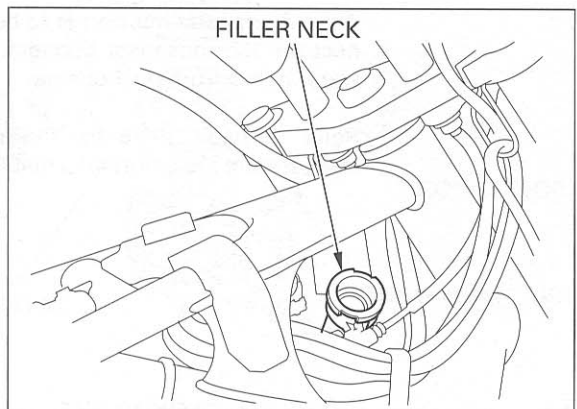
Place a suitable container under the siphon tube joint of the reserve tank. Disconnect the siphon tube from the reserve tank and drain the reserve coolant.

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

Reconnect the siphon tube.



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

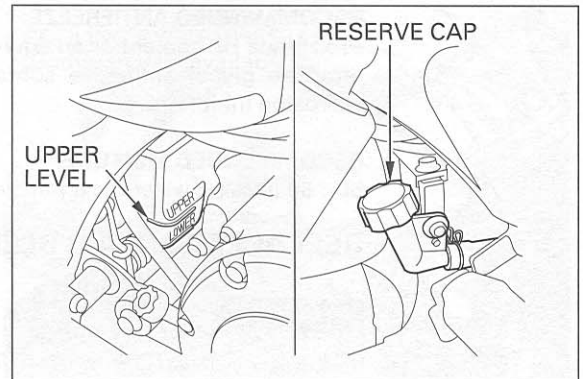


## COOLING SYSTEM

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

Bleed air from the system as follows:

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



## THERMOSTAT

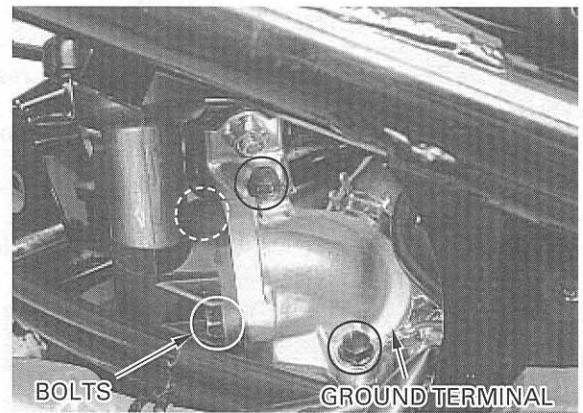
### REMOVAL

Drain the coolant (page 6-4).

Remove the following:

- fuel tank (page 2-6)
- ignition coils (page 17-7)

Remove the two filler neck bolts and housing cover bolts with the ground terminal.  
Remove the housing cover.

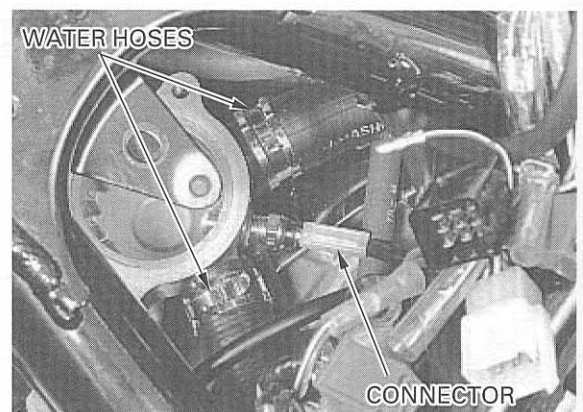


Remove the thermostat from the housing.



If the thermostat housing is to be removed, disconnect the thermosensor connector and remove the water hoses from the housing.

Refer to page 19-15 for thermosensor (Coolant temperature indicator) information.



INSPECTION

**▲WARNING**

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

Visually inspect the thermostat for damage.

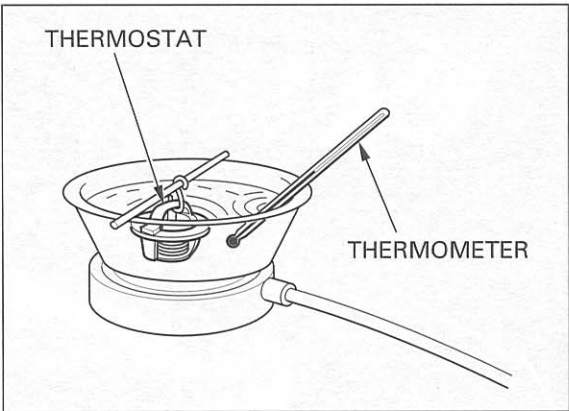
Heat the water with an electric heating element to operating temperature for 5 minutes.  
Suspend the thermostat in heated water to check its operation.

**NOTE:**

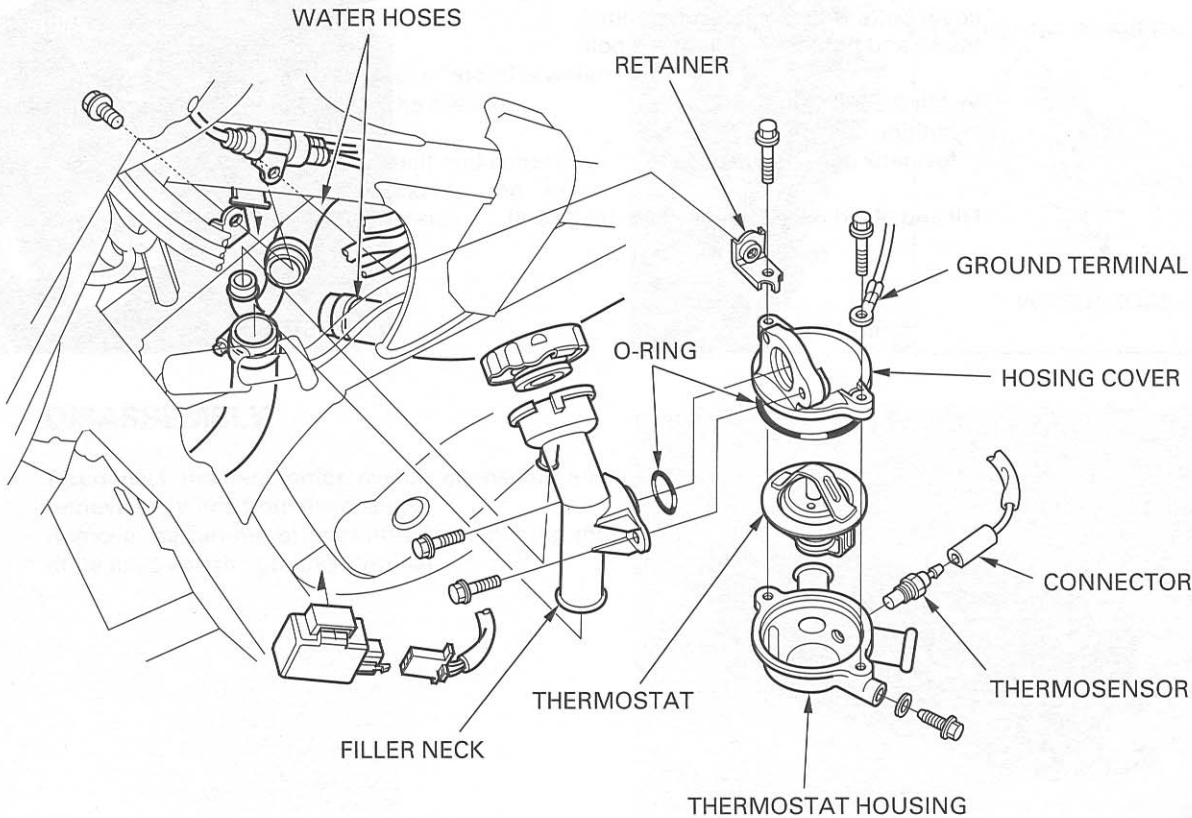
Do not let the thermostat or thermometer touch the pan, or you will get false readings.

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

**Thermostat begins to open:** 80–84 °C (176–183 °F)  
**valve lift:** 8 mm (0.3 in) minimum at 95 °C (203 °F)

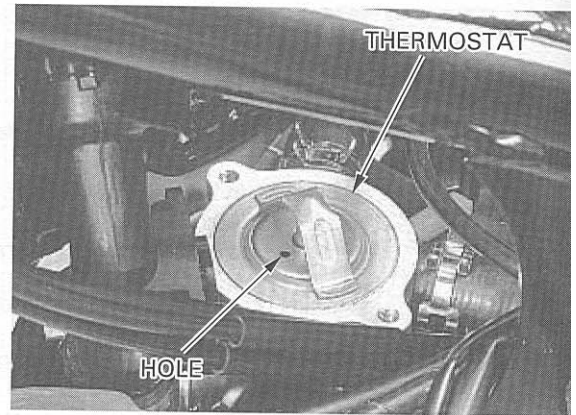


INSTALLATION

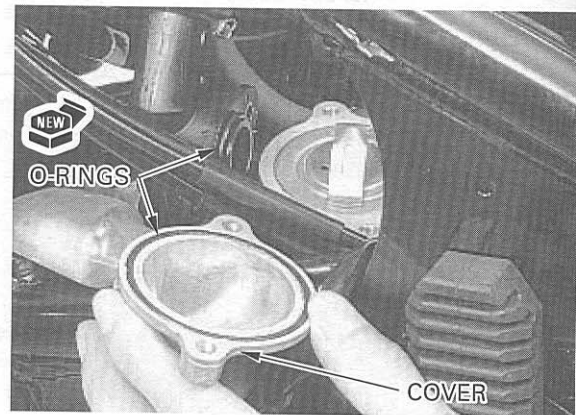


## COOLING SYSTEM

Install the thermostat into the housing with its hole facing the front side.  
Align the thermostat flange with the groove of the housing upper surface. Make sure the thermostat is securely installed.



Install new O-rings on the thermostat housing cover and filler neck.

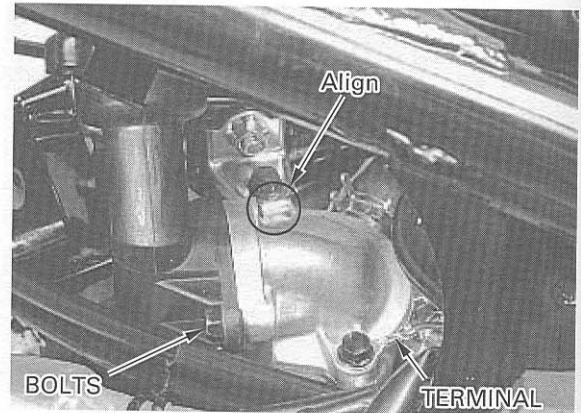


Install the thermostat housing cover by aligning the cover groove with retainer tab and tighten the cover bolts with the ground terminal. Install and tighten the filler neck bolt.

Install the following:

- ignition coil (page 17-7)
- fuel tank and seat (section 2)

Fill and bleed the cooling system (page 6-4).





## RADIATOR/COOLING FAN

**CAUTION:**

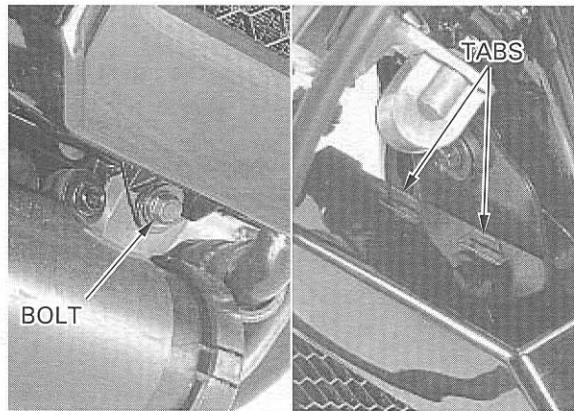
*Be careful not to damage the radiator fins while servicing the radiator and fan.*

**REMOVAL**

Drain the coolant (page 6-4).  
Remove the left steering side cover (page 2-6).

Disconnect the fan motor switch connector.

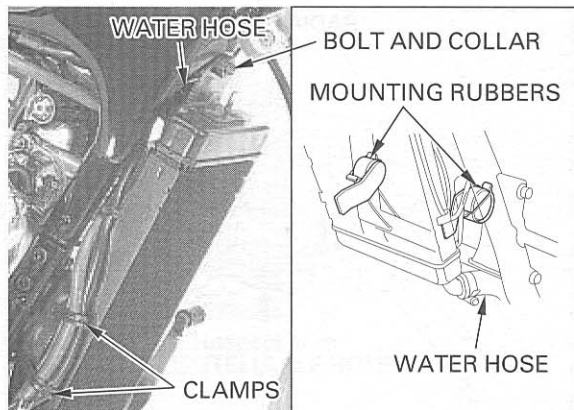
Remove the radiator grill bolt from the radiator bottom.  
Slide the grill upward and remove the grill from the radiator tabs.



Remove the No. 4 tube (California only), horn and rear brake light switch wires from the clamps on the radiator.

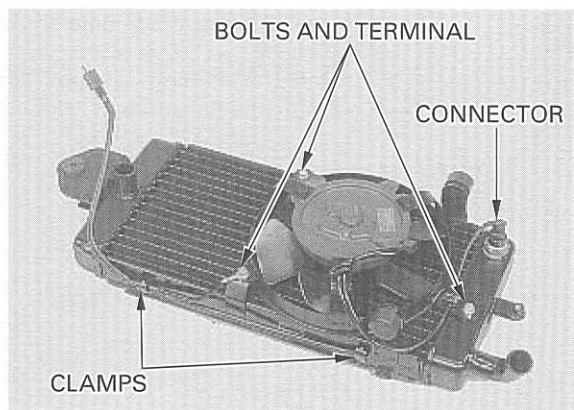
Disconnect the lower radiator hose from the water pump and the upper hose from the radiator.

Remove the radiator mounting bolt and collar then remove the radiator by releasing the lower mounting rubbers from the frame stays.



**DISASSEMBLY**

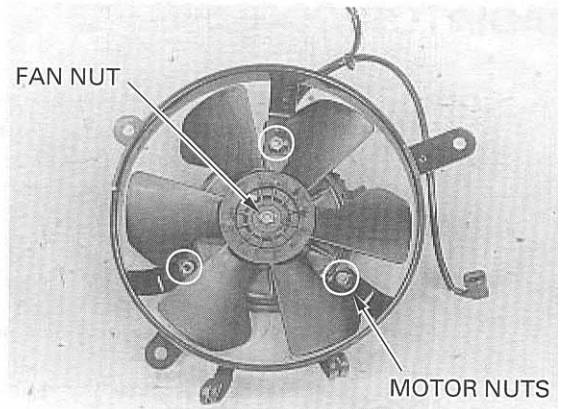
Disconnect the fan motor switch connector and remove the wires from the clamps.  
Remove the fan motor assembly by removing the three bolts and the ground terminal.



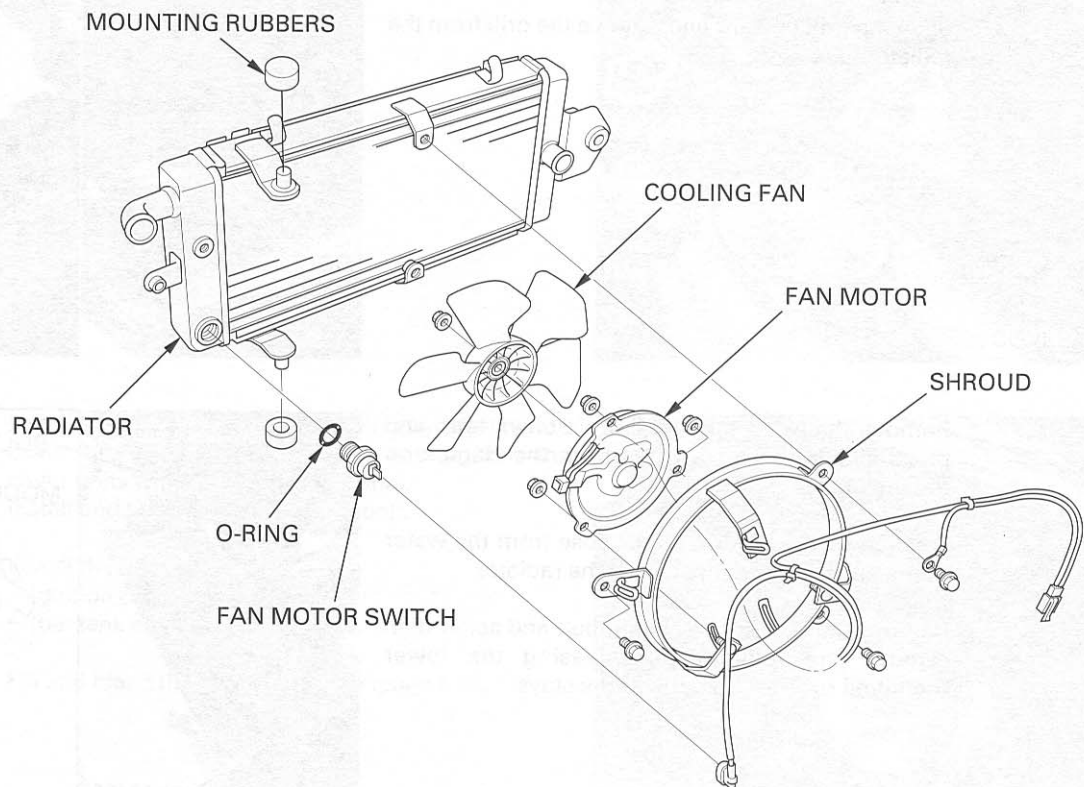
## COOLING SYSTEM

Remove the nut and the cooling fan.  
Remove the nuts and fan motor.

For fan motor switch information, refer to page 19-12.

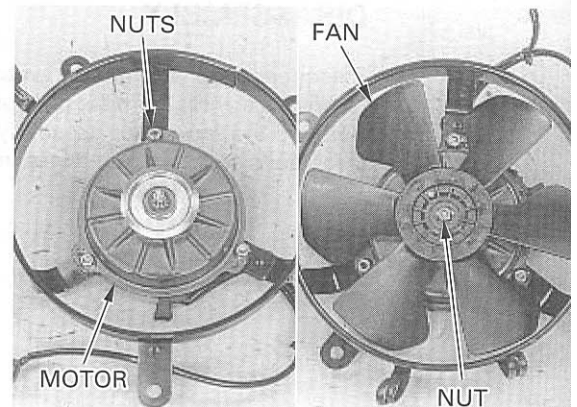


### ASSEMBLY



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

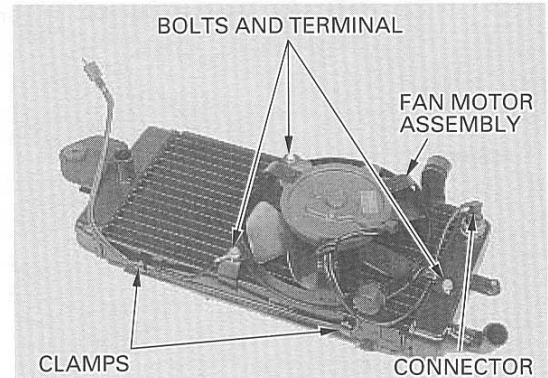
Install the cooling fan onto the motor shaft by aligning the flat surfaces. Tighten the fan nut.



## COOLING SYSTEM

Install the fan motor assembly onto the radiator and tighten the mounting bolts with the ground terminal.

Route the wires properly, clamp the wires and connect the switch connector.

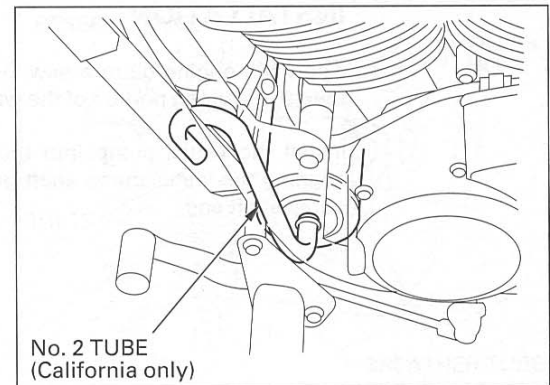


### INSTALLATION

Install the radiator in the reverse order of removal.

*California type only:* After installing the radiator, insert the No. 2 tube between the radiator body and grill. Make sure the No. 2 tube is not bent or clogged.

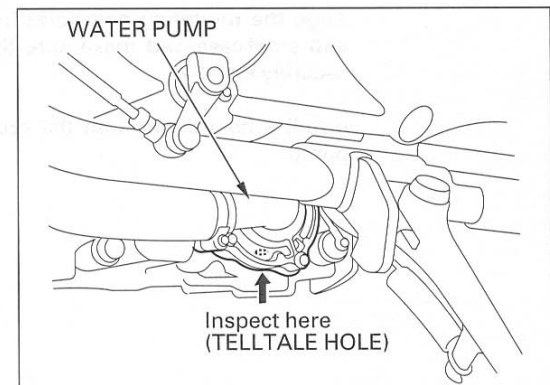
Fill and bleed the cooling system (page 6-4).



## WATER PUMP

### MECHANICAL SEAL INSPECTION

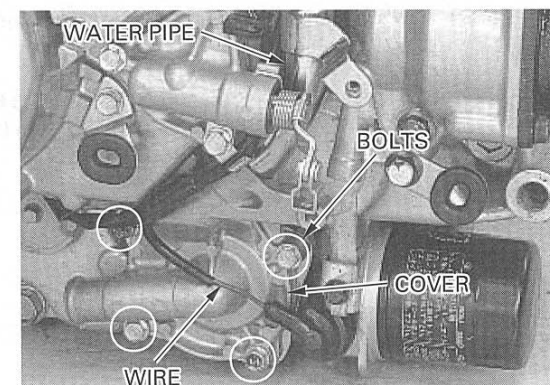
Inspect the telltale hole for signs of coolant leakage. If there is leakage, the mechanical seal is defective and replace the water pump as an assembly.



### REMOVAL

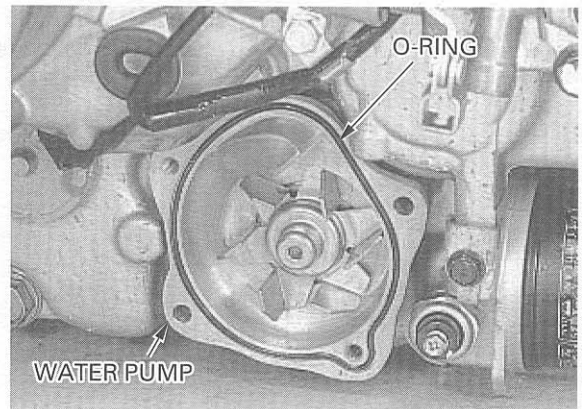
Remove the engine from the frame (section 7).

Remove the water pipe from the pump. Disconnect the oil pressure switch wire. Remove the four bolts and water pump cover.



## COOLING SYSTEM

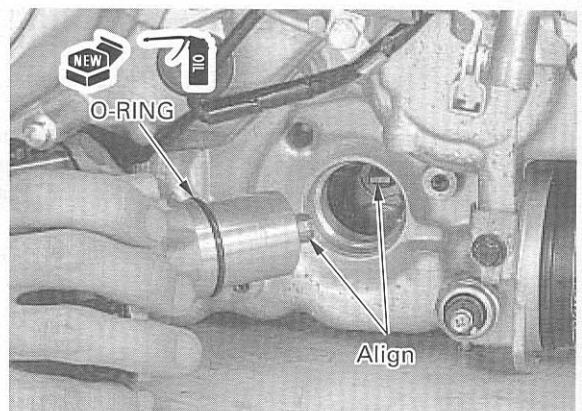
Remove the O-ring and water pump from the crankcase.



### INSTALLATION

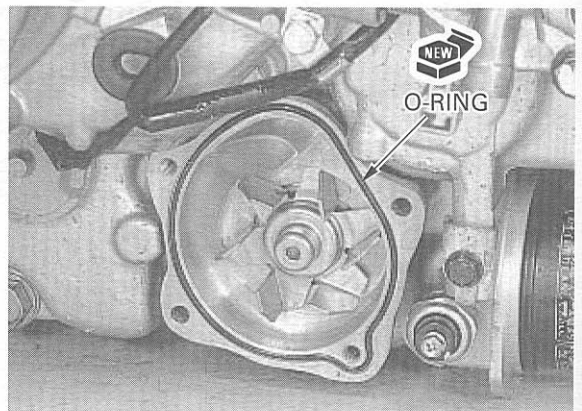
Apply the engine oil to a new O-ring and install it onto the stepped portion of the water pump.

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



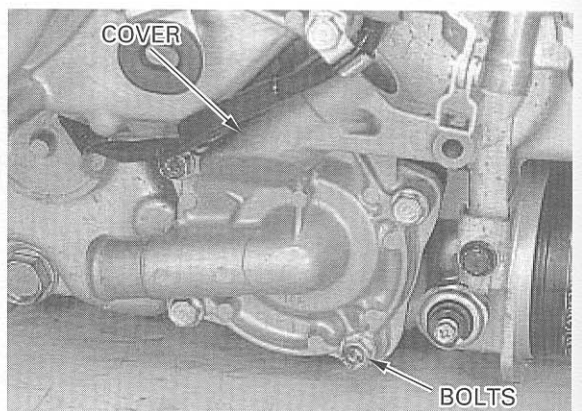
Align the mounting bolt holes in the water pump and crankcase and make sure the water pump is securely installed.

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



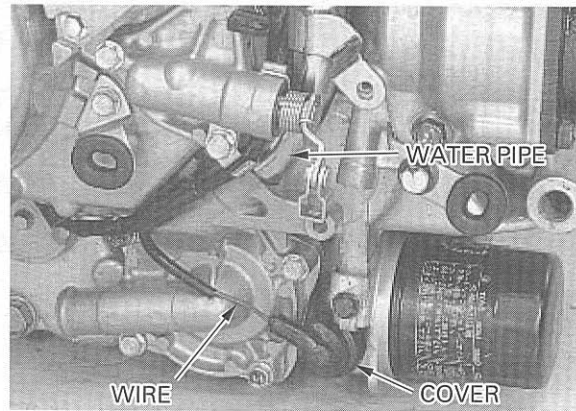
Install the water pump cover and tighten the four bolts.

**TORQUE: Cover bolt:** 13 N·m (1.3 kgf·m , 9 lbf·ft)  
**Mounting bolt:** 12 N·m (1.2 kgf·m , 9 lbf·ft)



Install the water pipe with a new O-ring.  
 Connect the oil pressure switch wire to the switch and install the terminal cover over the switch securely.

Install the engine in the frame (section 7).



## RADIATOR RESERVE TANK

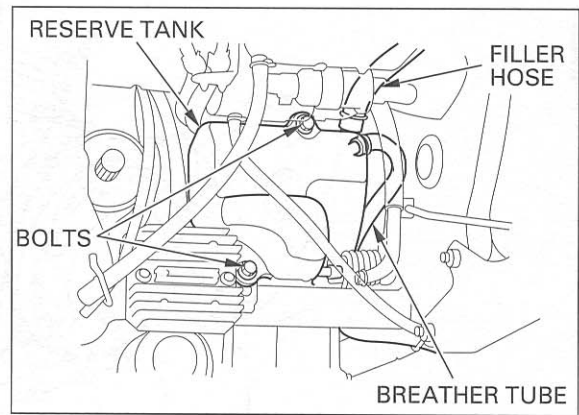
### REMOVAL/INSTALLATION

Remove the swingarm (page 14-27).  
 Drain the coolant from the reserve tank (page 6-5).  
 Remove the right side cover (page 2-3).  
 Remove the fuel pump breather tube from the frame clamp.

Remove the two mounting bolts.  
 Disconnect the filler tube and remove the breather tube from the frame clamp.  
 Remove the reserve tank out of the frame to the rear.

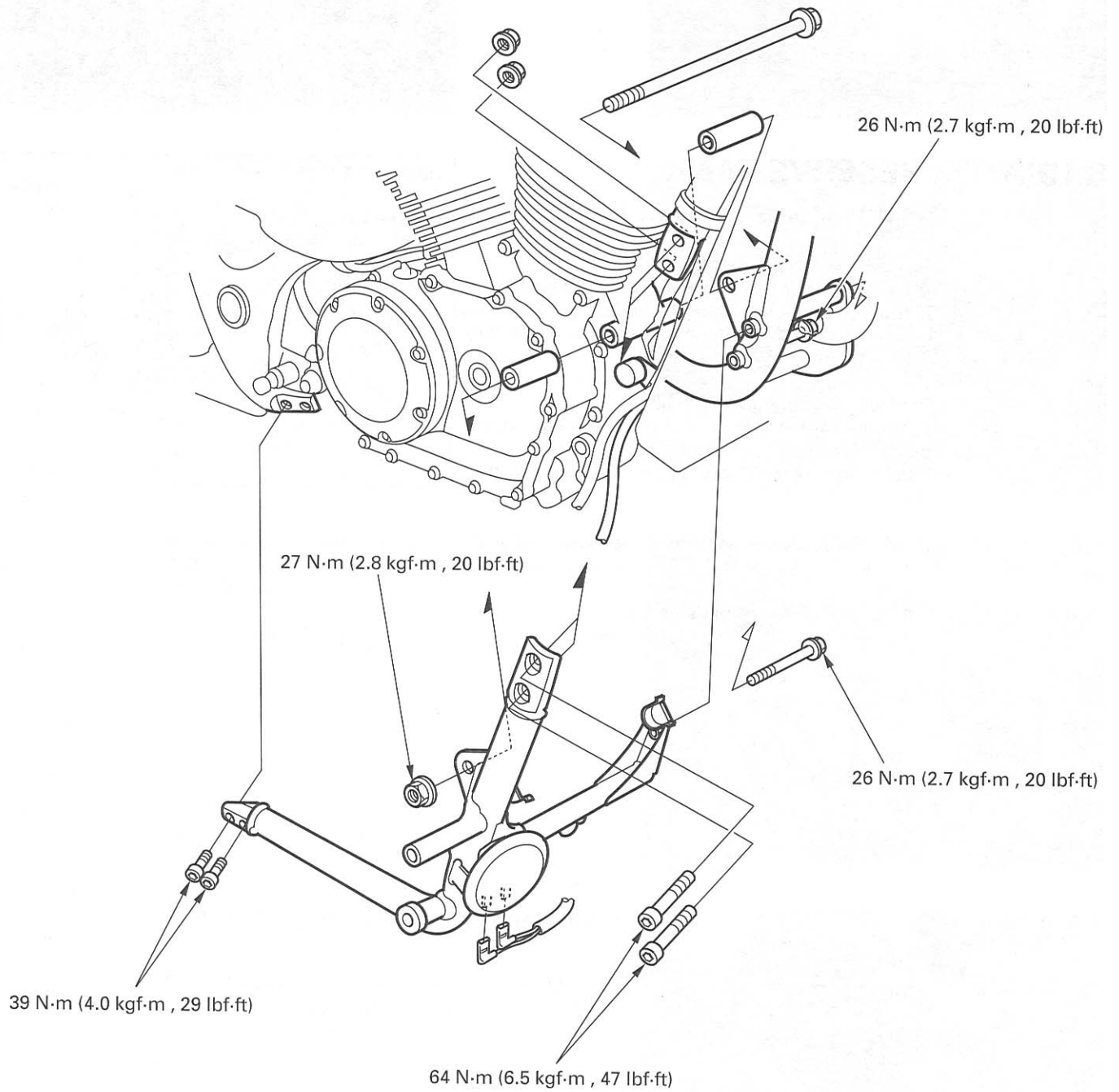
Install the removed parts in the reverse order of removal.

Fill the tank with coolant (page 6-4).



# ENGINE REMOVAL/INSTALLATION

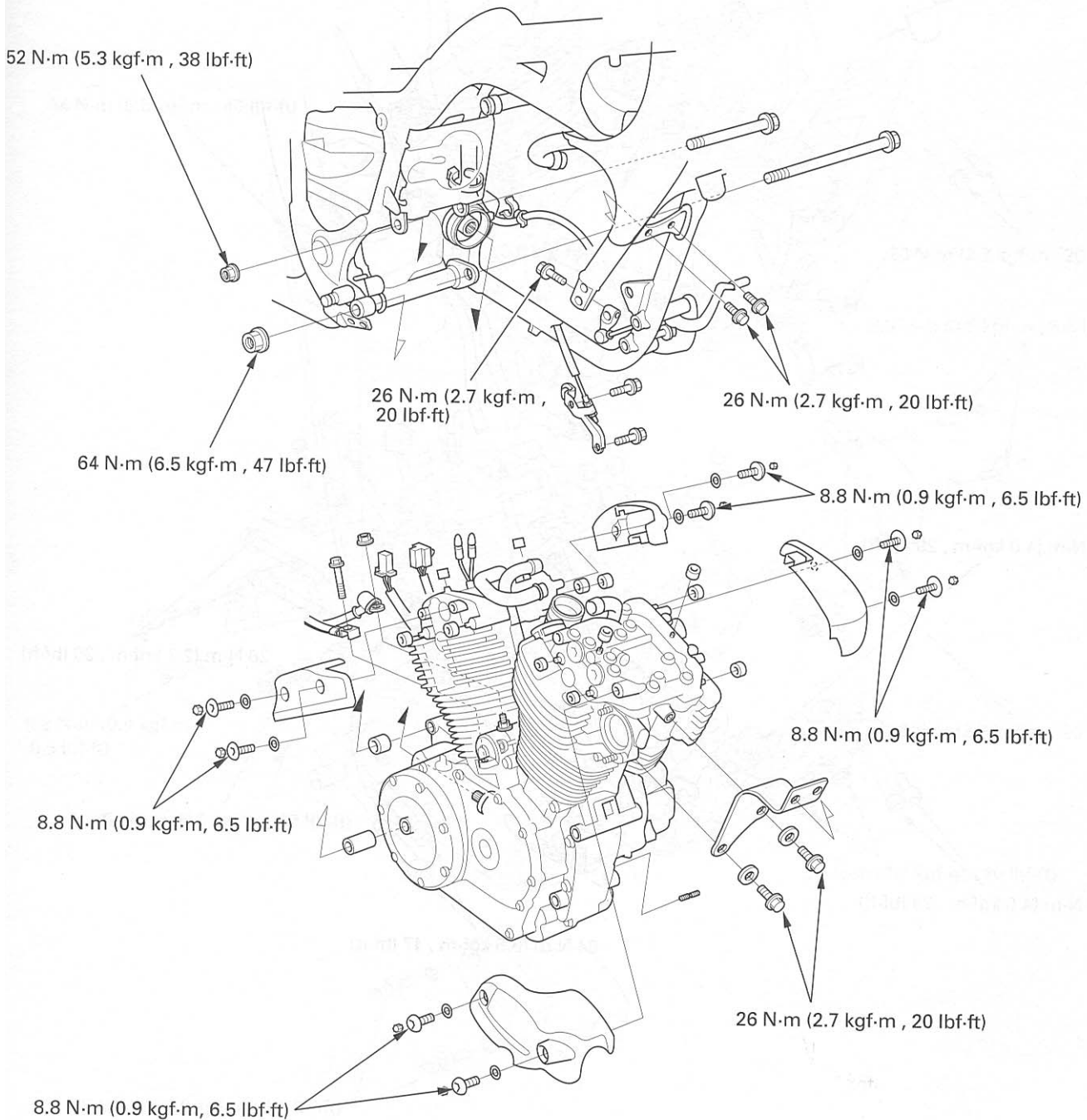
## VT1100C (Sub-frame) :



# 7. ENGINE REMOVAL/INSTALLATION

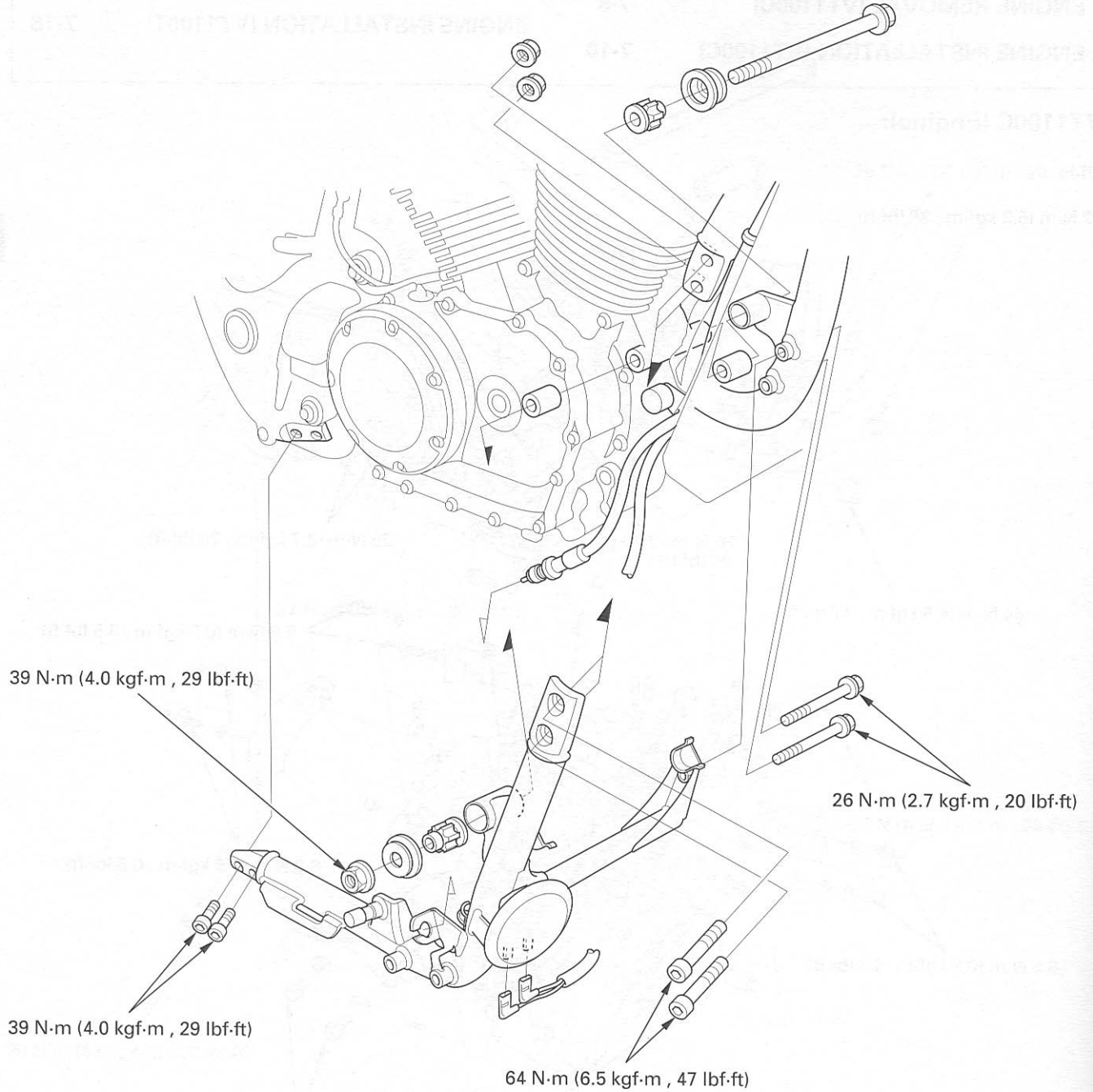
SERVICE INFORMATION	7-4	SUB-FRAME REMOVAL (VT1100T)	7-13
SUB-FRAME REMOVAL (VT1100C)	7-5	SUB-FRAME INSTALLATION (VT1100T)	7-14
SUB-FRAME INSTALLATION (VT1100C)	7-6	ENGINE REMOVAL (VT1100T)	7-16
ENGINE REMOVAL (VT1100C)	7-8	ENGINE INSTALLATION (VT1100T)	7-18
ENGINE INSTALLATION (VT1100C)	7-10		

## VT1100C (Engine):



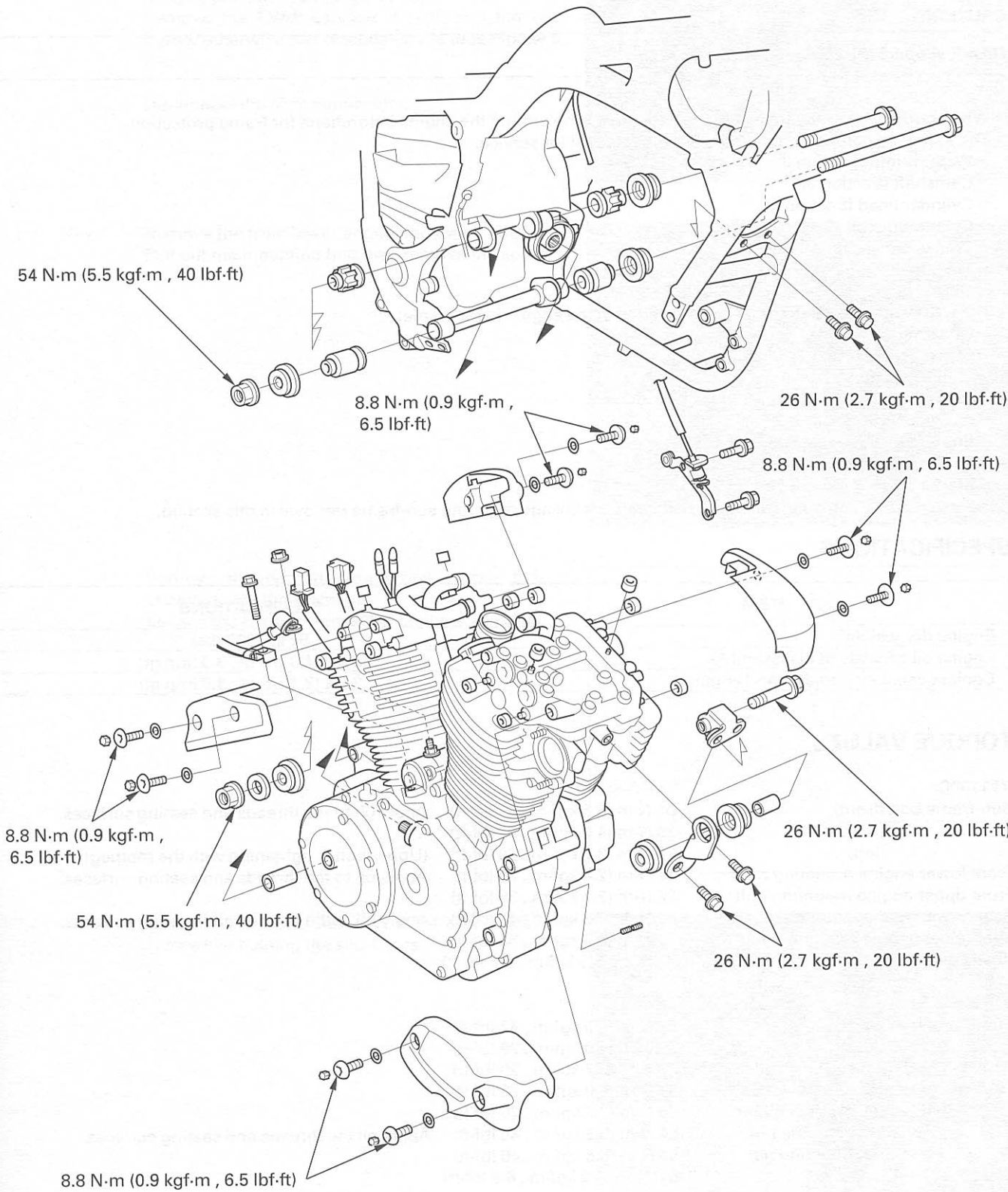
# ENGINE REMOVAL/INSTALLATION

## VT1100T (Sub-frame):





VT1100T (Engine) :

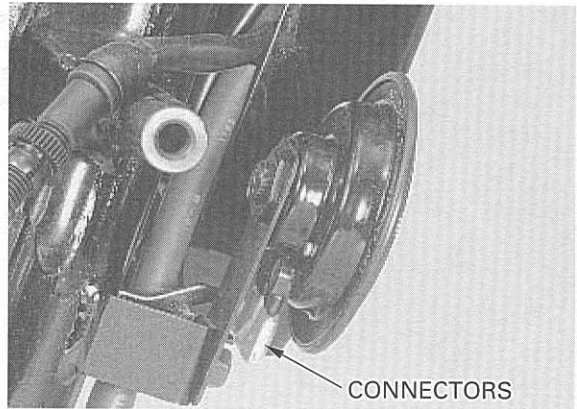




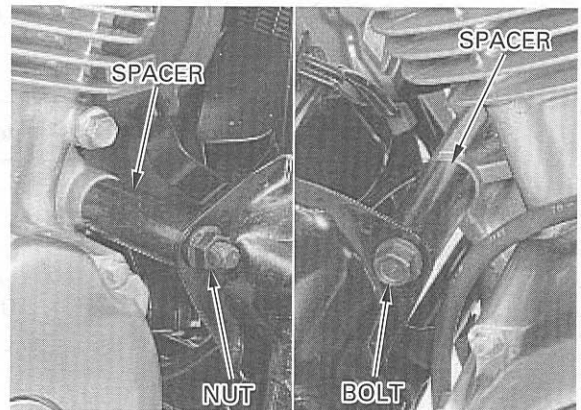
## SUB-FRAME REMOVAL (VT1100C)

Remove the exhaust system (page 2-9).  
 Loosen the rear brake pedal assembly. If replacing the sub-frame, remove the pedal, right front footpeg and push rod (page 14-23).  
 Remove the EVAP canister if replacing the sub-frame; otherwise just disconnect the tubes (page 5-25).

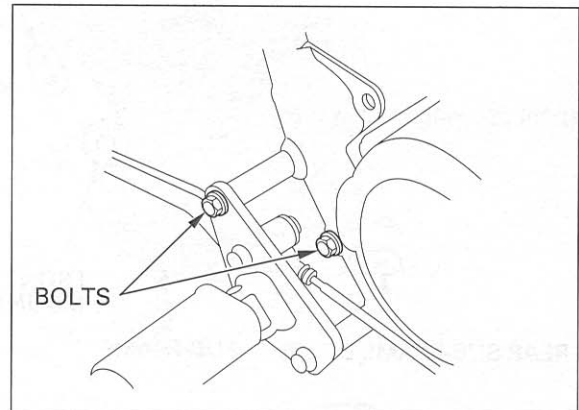
Disconnect the horn connectors.



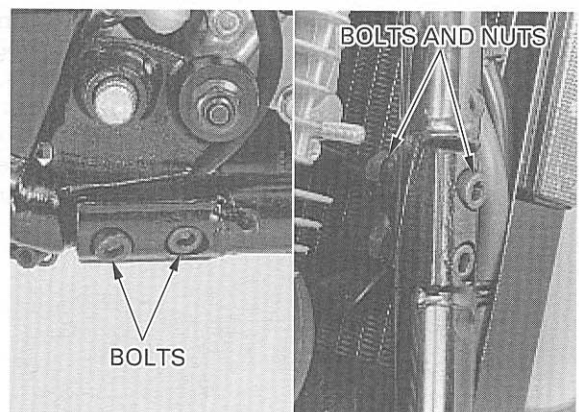
Remove the front lower engine mounting nut.  
 Pull out the mounting bolt then remove the spacers.



Remove the left sub-frame bolt (upper bolt is attached with the footpeg).  
 Loosen the left sub-frame bolt on the down tube.

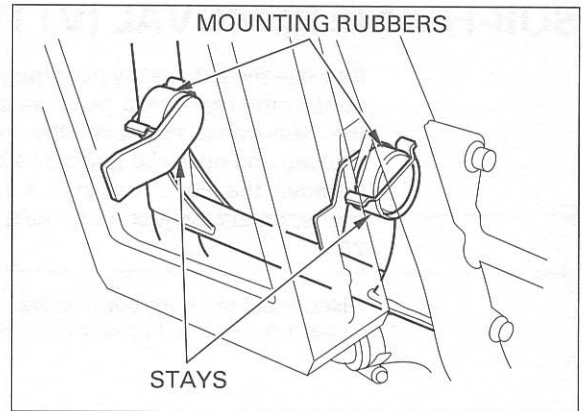


Remove the front and rear sub-frame bolts and nuts while holding the sub-frame.



## ENGINE REMOVAL/INSTALLATION

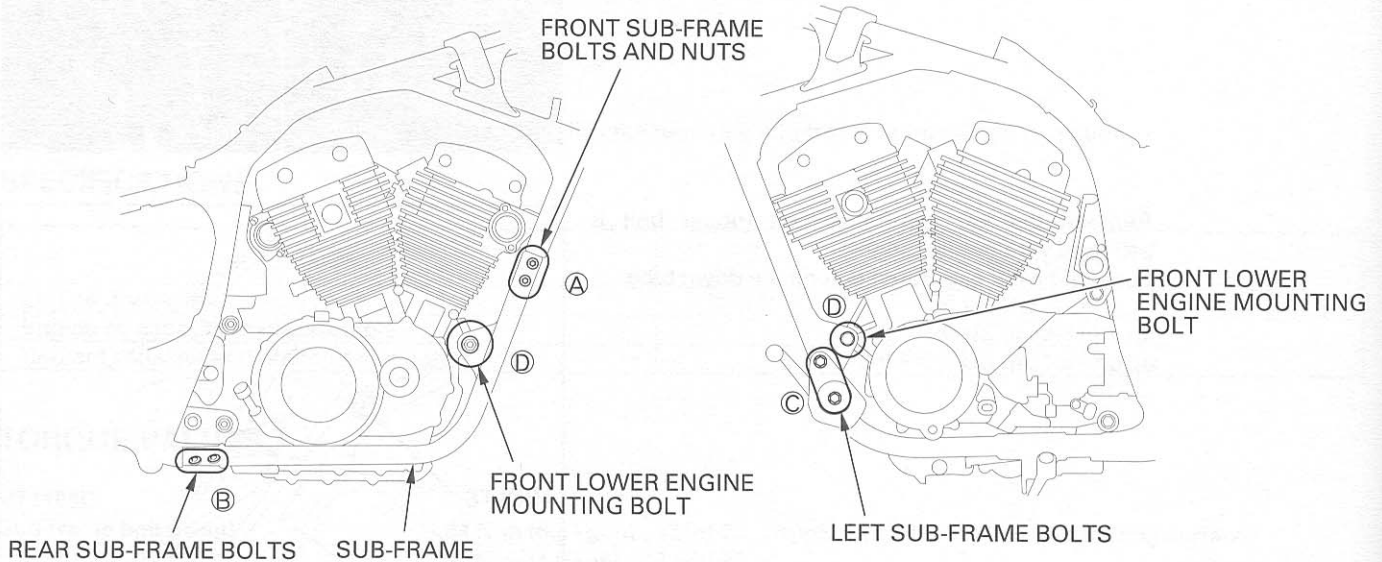
Remove the sub-frame while carefully releasing the radiator mounting stays of the sub-frame from the radiator lower mounting rubbers by slightly pulling down the front side of the sub-frame.



## SUB-FRAME INSTALLATION (VT1100C)

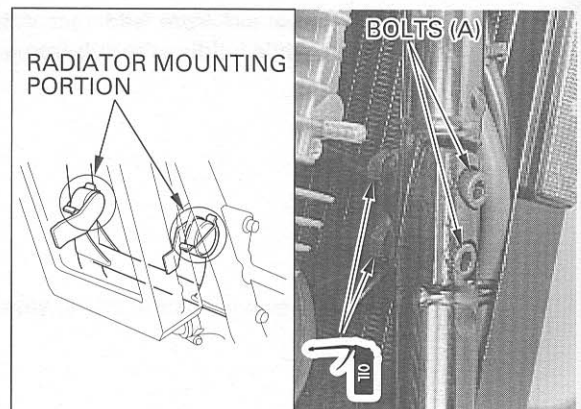
### CAUTION:

*Be careful not to damage the frame and radiator.*



Set the sub-frame onto the frame while carefully aligning the radiator mounting stays with the radiator lower mounting rubbers.

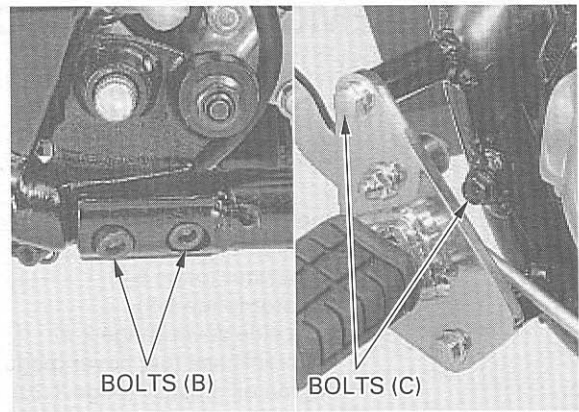
Be sure to align the radiator mounting portions, and all sub-frame connecting portions and temporarily install the front sub-frame bolts (A) [upper: long/lower: short] while holding the sub-frame in place.



**CAUTION:**

*Be careful not to cross-thread the sub-frame bolts.*

Temporarily install the rear sub-frame bolts (B) by threading the ends slightly.  
Temporarily install the left sub-frame bolts (C) by threading the ends slightly.  
Apply oil to the threads of the front sub-frame nuts (A) and loosely install them.



Insert the front lower engine mounting bolt (D) through the frame and engine with the spacers by aligning the bolt holes. Apply oil to the threads of the nut (D) and loosely install it.

Tighten the all bolts and nuts alternately and gradually until seating the bolts and nuts, and tighten them to the specified torque.

**TORQUE:**

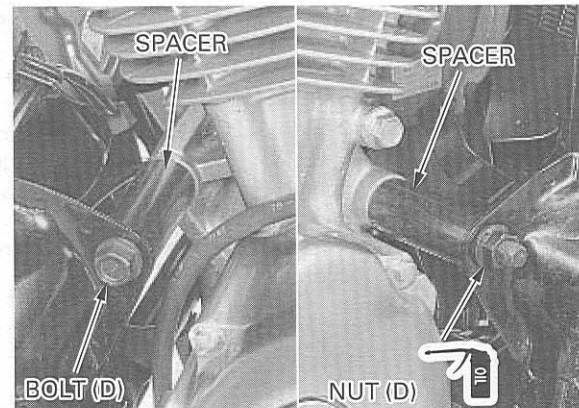
**Front lower engine mounting nut:**

27 N·m (2.8 kgf·m , 20 lbf·ft) Apply oil to the threads and seating surface.

**Sub-frame bolt (front):** 64 N·m (6.5 kgf·m , 47 lbf·ft)  
Apply oil to the threads and seating surface.

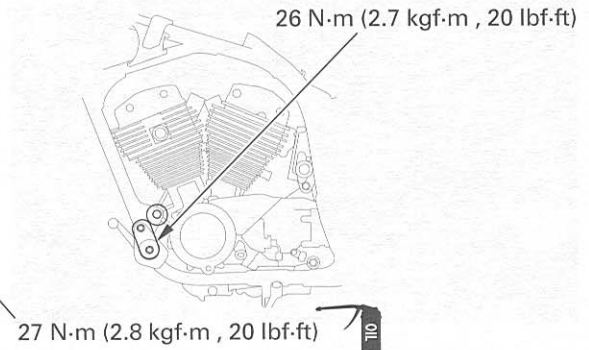
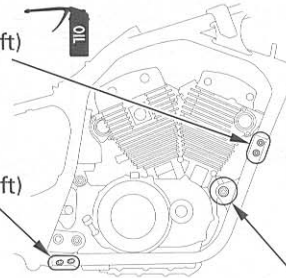
**(rear):** 39 N·m (4.0 kgf·m , 29 lbf·ft)

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



64 N·m (6.5 kgf·m , 47 lbf·ft)

39 N·m (4.0 kgf·m , 29 lbf·ft)



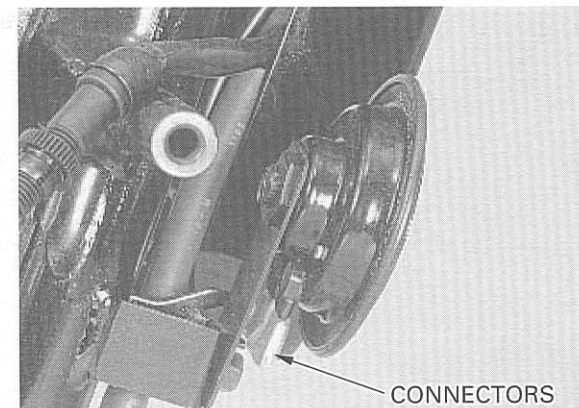
Connect the horn wires.

Install the removed/loosend parts:

- EVAP canister (page 5-25)
- rear brake pedal, right front footpeg and push rod (page 14-24)
- exhaust system (page 2-9)

Connect the starter motor and ground cables, if removed.

Perform the rear brake light switch adjustment (page 3-20).



### ENGINE REMOVAL (VT1100C)

Drain the engine oil (page 3-11) and coolant (page 6-4).

Support the motorcycle securely.

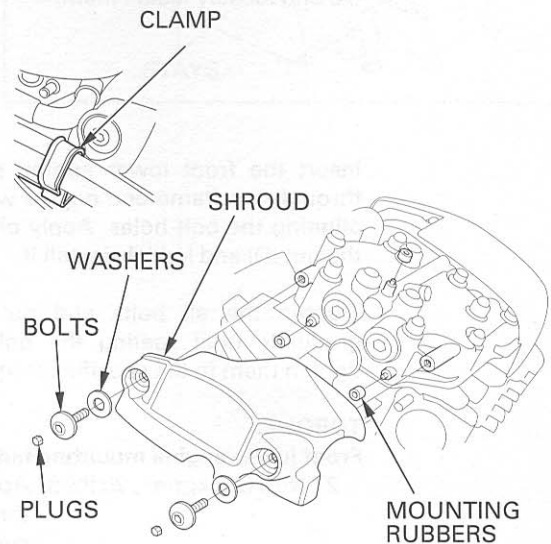
Remove the following:

- battery holder (page 5-22)
- carburetor (page 5-4)
- radiator (page 6-9)
- right side cover (page 2-4)
- left crankcase rear cover (page 2-15)
- engine oil dipstick (page 3-10)
- spark plug caps
- sub-frame (page 7-5)
- right side lower cover (page 2-4)

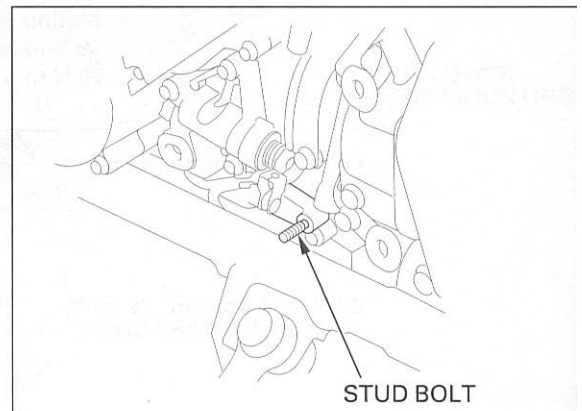
Remove the cable clamp from the rear cylinder head fin by removing the screw.

Remove the rubber plugs from the shroud bolt heads and remove the shroud bolts with the washers and the head cover shrouds.

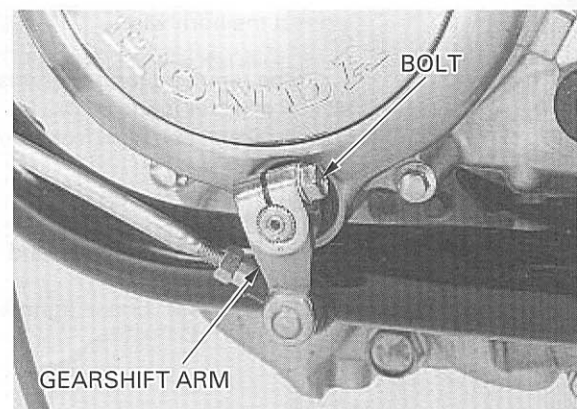
Remove the twelve mounting rubbers from each cylinder head.



Remove the stud bolt from the water pump cover to prevent damaging its threads. To remove the stud, thread two nuts onto the stud, tighten them together, and use a wrench on them to turn the stud bolt out.

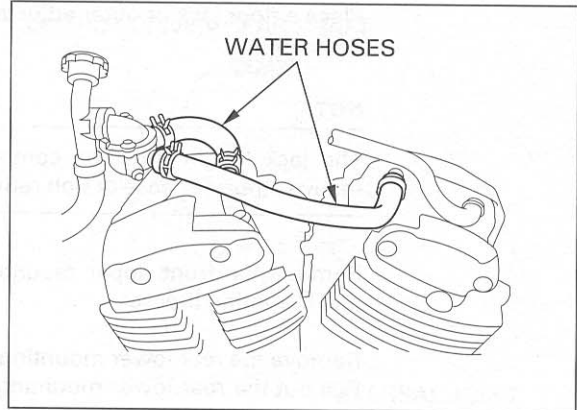


Remove the bolt and gearshift arm from the shift spindle.



## ENGINE REMOVAL/INSTALLATION

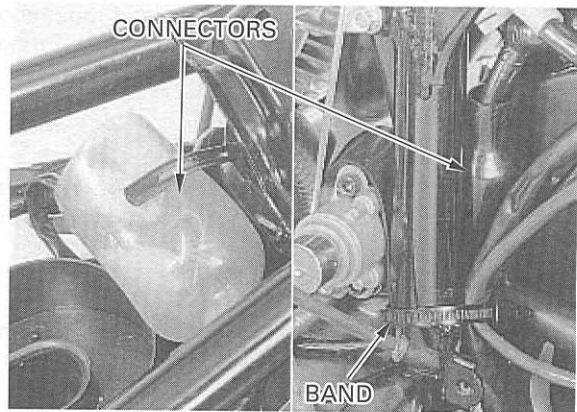
Disconnect the water hoses from the cylinder head covers.



Release the wire band.

Disconnect the ignition pulse generator (2P White) and alternator (3P White) connectors.

Disconnect the oil pressure switch and neutral switch connectors.



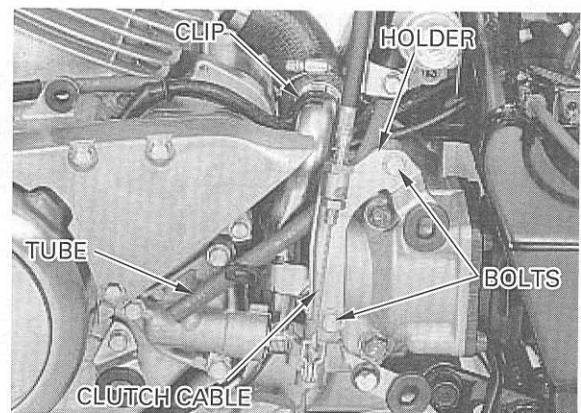
Remove the bolt and nut and disconnect the starter motor and ground cables.



Disconnect the clutch cable and remove the cable holder bolts, and holder.

Remove the carburetor air vent tube (California: EVAP CAV control valve air vent tube) from the clamp.

*California type only:* Remove tube clip from the water pipe and No. 1 tube.



## ENGINE REMOVAL/INSTALLATION

Place a floor jack or other adjustable support under the engine.

**NOTE:**

The jack height must be continually adjusted to relieve stress for ease of bolt removal.

Remove the front upper mounting bolts, washers and mounting bracket.

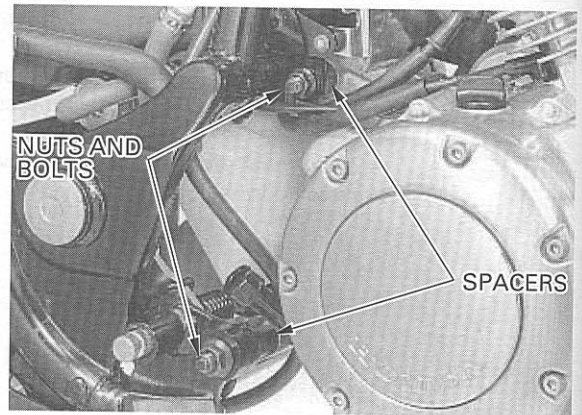
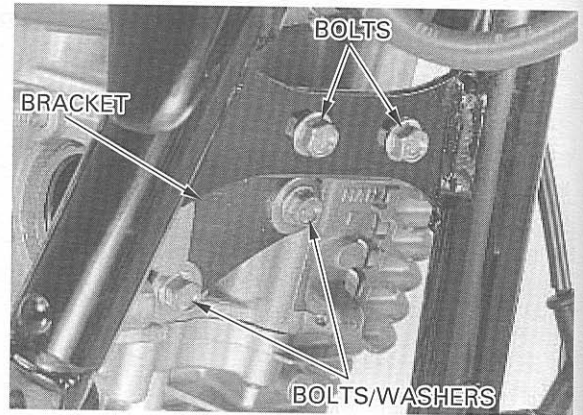
Remove the rear lower mounting nut.  
Pull out the rear lower mounting bolt to remove it, then remove the spacer.

Remove the rear upper mounting nut.  
Pull out the rear upper mounting bolt to remove it, then remove the spacer.

**CAUTION:**

*During engine assembly removal, hold the engine securely and be careful not to damage the frame and engine.*

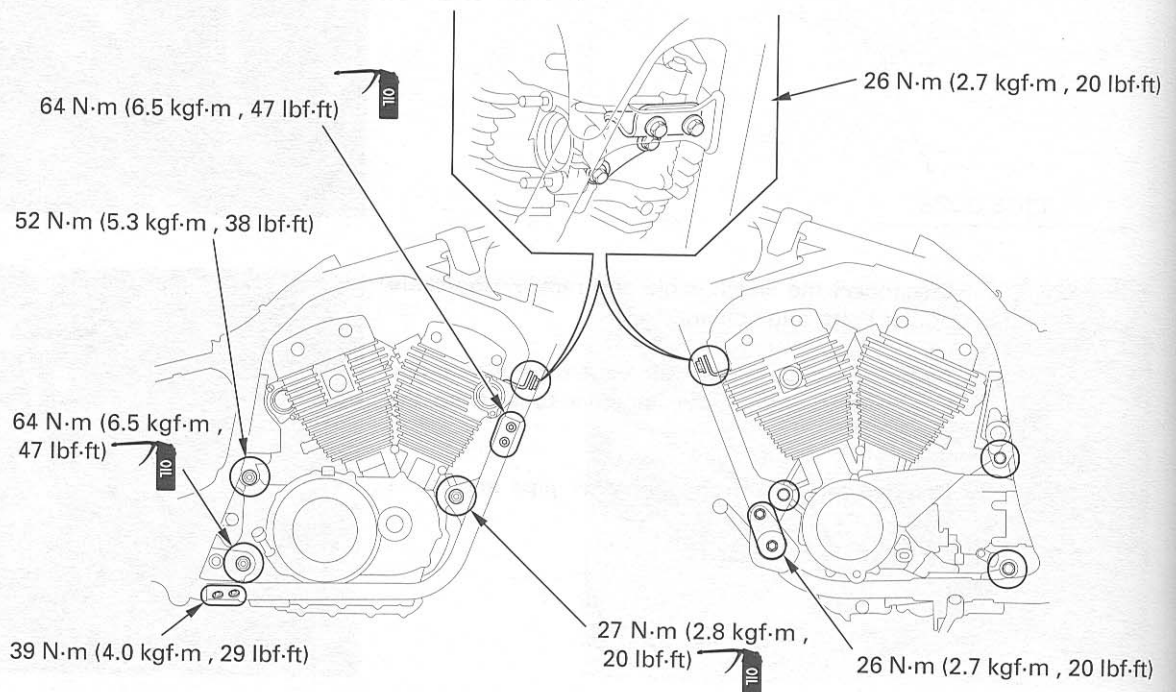
Remove the engine from the frame by releasing the output driven gear shaft from the universal joint in the swingarm.



## ENGINE INSTALLATION (VT1100C)

**NOTE:**

Before installing the engine, route the wires and tubes properly.



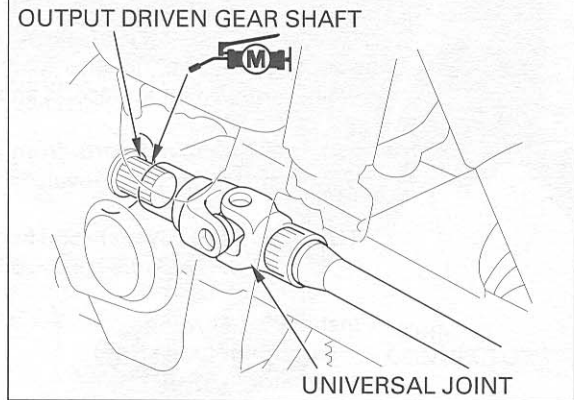


### CAUTION:

*Carefully align mounting points with the jack to prevent damage to engine, frame, wires and cables.*

Apply 1 g (0.04 oz) of molybdenum disulfide grease to the output driven gear shaft spline.

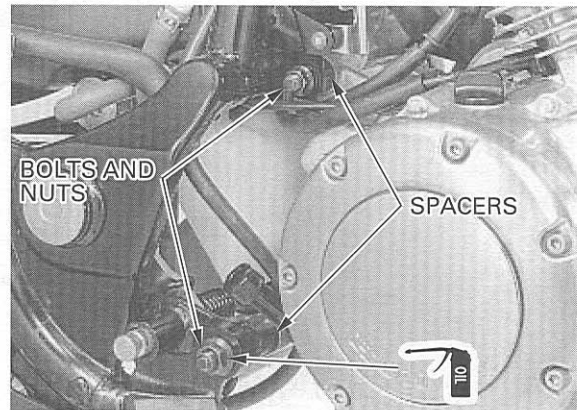
Use a floor jack or other adjustable support to carefully maneuver the engine into place and insert the output driven gear shaft into the universal joint in the swingarm.



Carefully align the bolt holes in the frame and engine then insert the rear upper mounting bolt from the left side and install the spacer (short one) between the right side frame stay and engine. Loosely install the rear upper mounting nut.

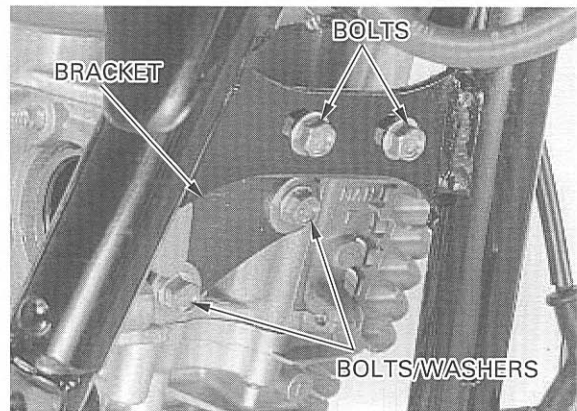
Insert the rear lower mounting bolt from the left side and install the spacer (long one) between the right side frame stay and engine.

Apply oil to the rear lower mounting nut and loosely install it.



Place the front upper mounting bracket into place and loosely install the mounting bolts with the washers.

Install the sub-frame and tighten all sub-frame fasteners to the specified torque (page 7-6).



After installing the sub-frame, tighten all engine mounting bolts and nuts to the specified torque.

### TORQUE:

#### Front lower engine mounting bolt:

27 N·m (2.8 kgf·m , 20 lbf·ft) Apply oil to the threads and seating surface.

#### Front upper engine mounting bolt:

26 N·m (2.7 kgf·m , 20 lbf·ft)

#### Rear lower engine mounting nut:

64 N·m (6.5 kgf·m , 47 lbf·ft) Apply oil to the threads and seating surface.

#### Rear upper engine mounting nut:

52 N·m (5.3 kgf·m , 38 lbf·ft)

## ENGINE REMOVAL/INSTALLATION

Clean the water pump cover stud bolt threads with contact cleaner, then install it. After installing, be sure to verify the distance from top of stud to the water pump cover surface as shown.

Install the removed parts from engine removal in the reverse order of removal.

**TORQUE: Head cover shroud bolt:**  
8.8 N-m (0.9 kgf-m , 6.5 lbf-ft)

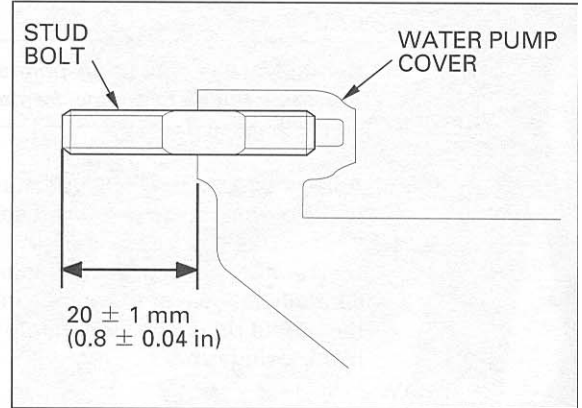
Install the following:

- carburetor (page 5-16)
- radiator (page 6-11)
- battery holder (page 5-22)
- right side lower cover (page 2-4)
- left and right side cover (page 2-4)
- gearshift arm (page 16-11)
- spark plug caps

Install the removed parts from sub-frame removal (page 7-7).

Fill the crankcase with engine oil (page 3-11).

Perform the clutch inspection (page 3-21).



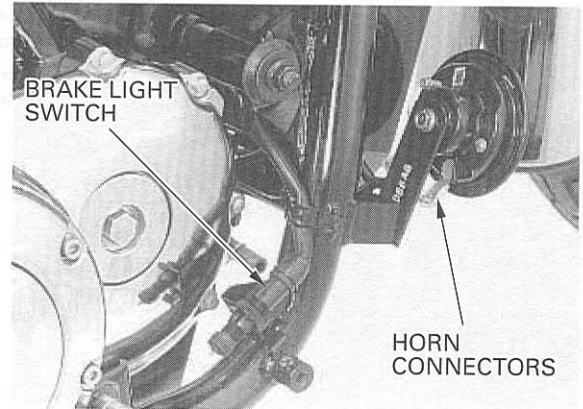
## SUB-FRAME REMOVAL (VT1100T)

Remove the following:

- exhaust system (page 2-11)
- rear brake pedal (page 15-24)
- rear master cylinder (page 15-17)
- EVAP canister if replacing the sub-frame; otherwise just disconnect the tubes (page 5-25).

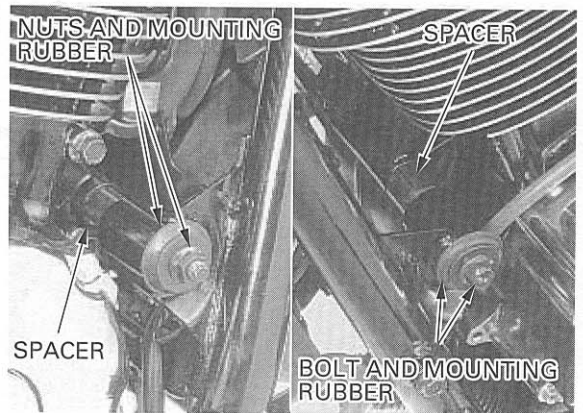
Remove the rear brake light switch from the stay and clamp.

Disconnect the horn connectors.

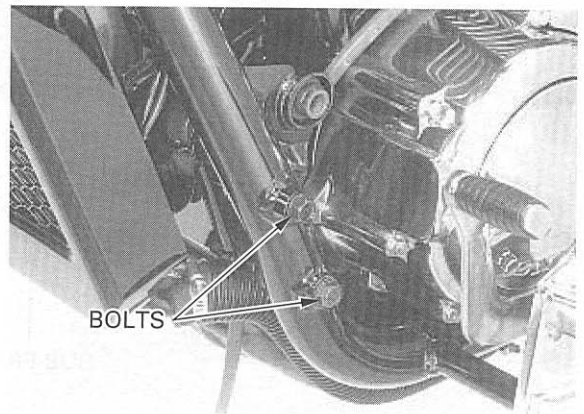


Remove the front lower engine mounting nut and mounting rubber.

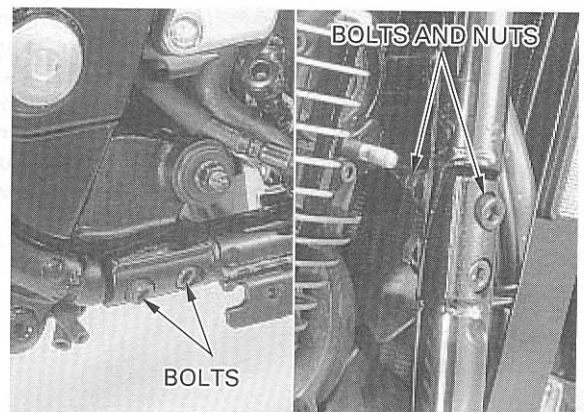
Pull out the mounting bolt with the mounting rubber then remove the spacers.



Remove the left sub-frame bolts from the down tube.

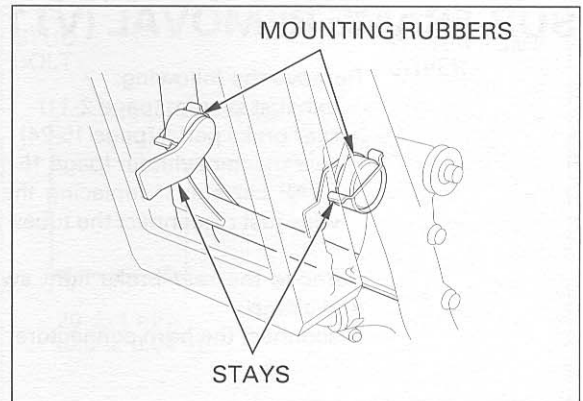


Remove the front and rear sub-frame bolts and nuts while holding the sub-frame.



## ENGINE REMOVAL/INSTALLATION

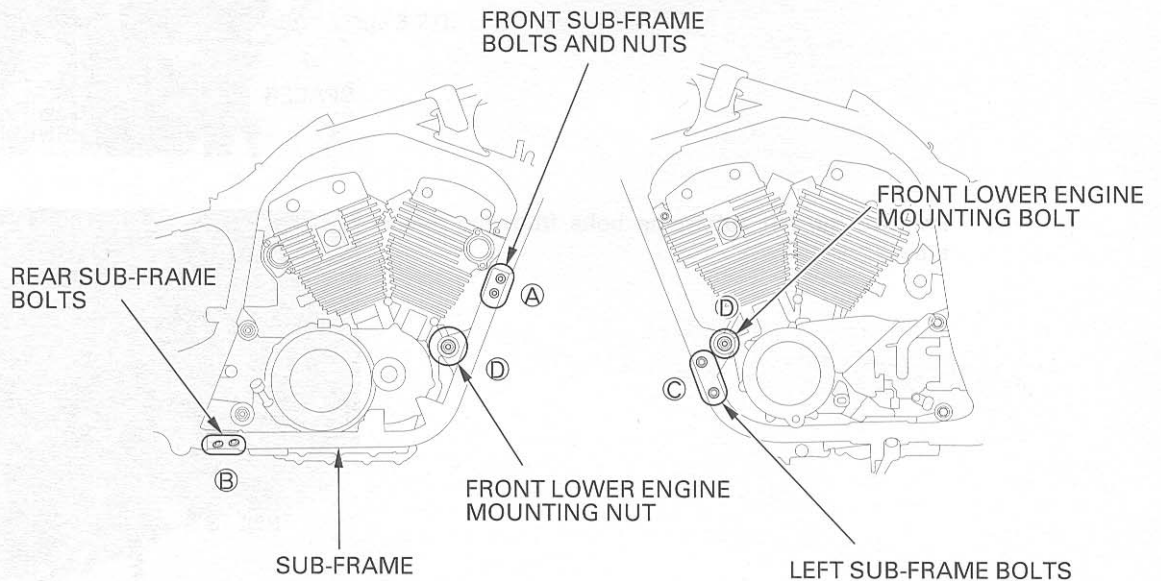
Remove the sub-frame while carefully releasing the radiator mounting stays of the sub-frame from the radiator lower mounting rubbers by slightly pulling down the front side of the sub-frame.



## SUB-FRAME INSTALLATION (VT1100T)

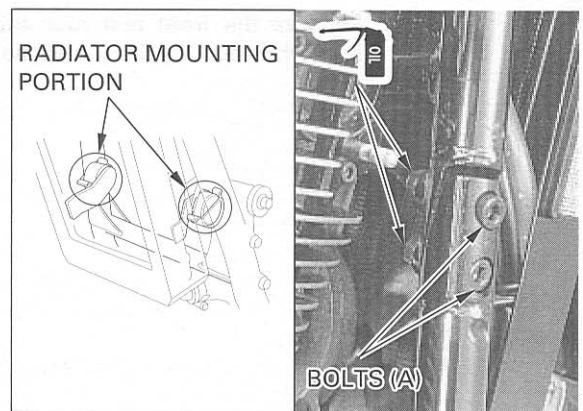
**CAUTION:**

*Be careful not to damage the frame and radiator.*



Set the sub-frame onto the frame while carefully aligning the radiator mounting stays with the radiator lower mounting rubbers.

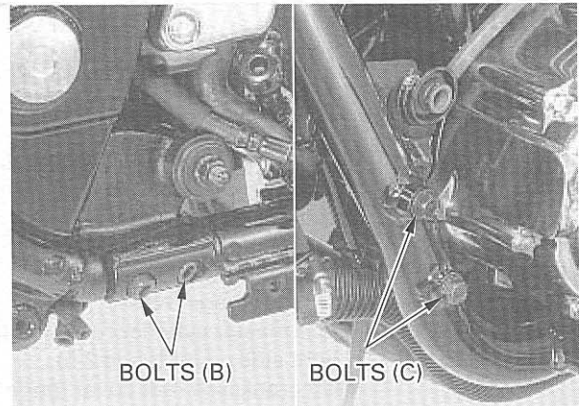
Be sure to align the radiator mounting portions, and all sub-frame connecting portions and temporarily install the front sub-frame bolts (A) [upper: long/lower: short] while holding the sub-frame in place.



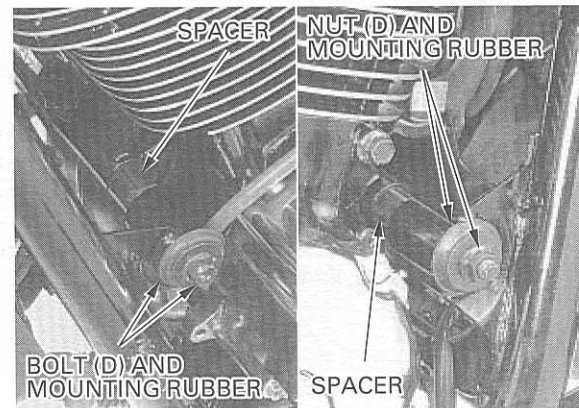
**CAUTION:**

***Be careful not to cross-thread the sub-frame bolts.***

Temporarily install the rear sub-frame bolts (B) by threading the ends slightly.  
Temporarily install the left sub-frame bolts (C) by threading the ends slightly.  
Apply oil to the threads of the front sub-frame nuts (A) and loosely install them.



Insert the front lower engine mounting bolt (D) through the frame and engine with the mounting rubber and spacers by aligning the bolt holes.  
Loosely install the nut (D) with the mounting rubber.



Tighten the all bolts and nuts alternately and gradually until seating the bolts and nuts, and tighten them to the specified torque.

**TORQUE:**

**Front lower engine mounting nut:**

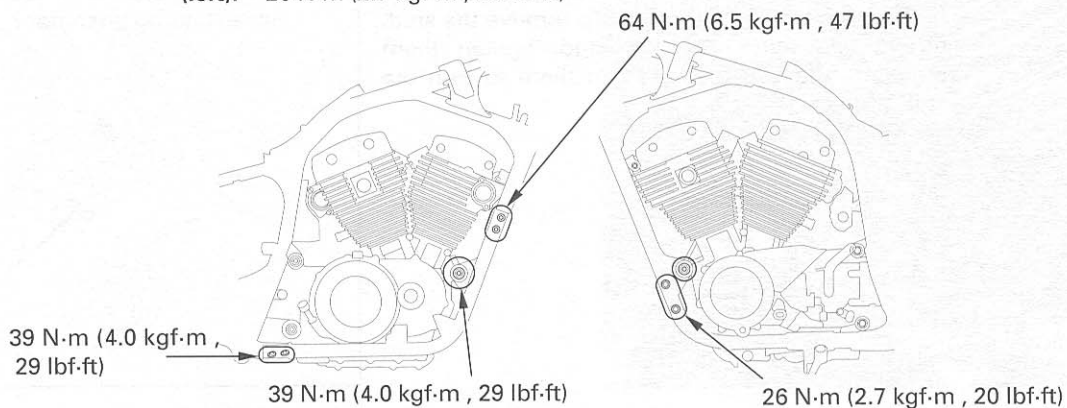
39 N·m (4.0 kgf·m , 29 lbf·ft)

**Sub-frame bolt (front) :** 64 N·m (6.5 kgf·m , 47 lbf·ft)

Apply oil to the threads and seating surface.

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

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

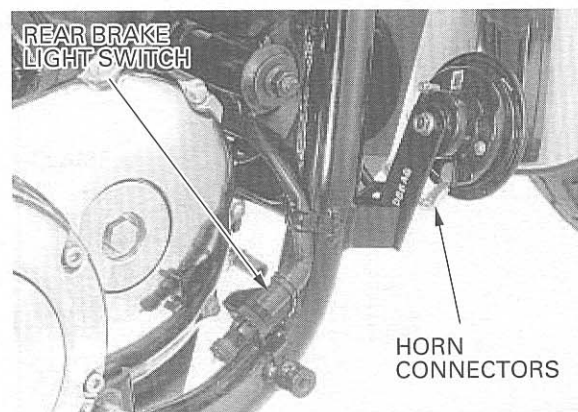


Connect the horn wires.  
Install the brake light switch and secure the wire with the clamp.

Install the removed parts:

- EVAP canister (page 5-25)
- rear master cylinder (page 15-18)
- rear brake pedal (page 15-25)
- exhaust system (page 2-11).

Connect the starter motor and ground cables, if removed.  
Perform the rear brake light switch adjustment (page 3-20).



## ENGINE REMOVAL (VT1100T)

Drain the engine oil (page 3-11) and coolant (page 6-4).

Support the motorcycle securely.

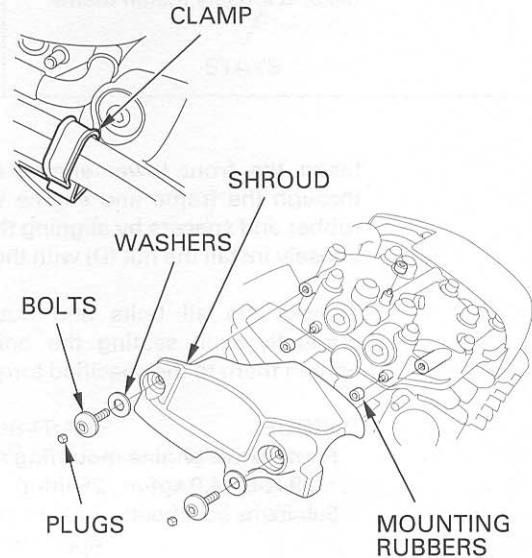
Remove the following:

- battery holder (page 5-22)
- carburetor (page 5-4)
- radiator (page 6-9)
- rear master cylinder reservoir (page 15-20)
- right side cover (page 2-5)
- left crankcase rear cover (page 2-15)
- engine oil dipstick (page 3-10)
- spark plug caps
- sub-frame (page 7-13)

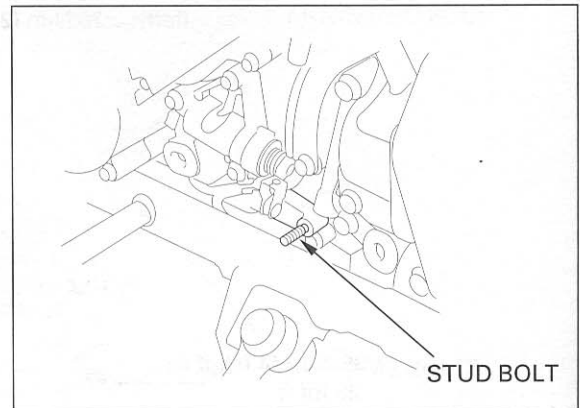
Remove the cable clamp from the rear cylinder head fin by removing the screw.

Remove the rubber plugs from the shroud bolt threads and remove the shroud bolts with the washers and the head cover shrouds.

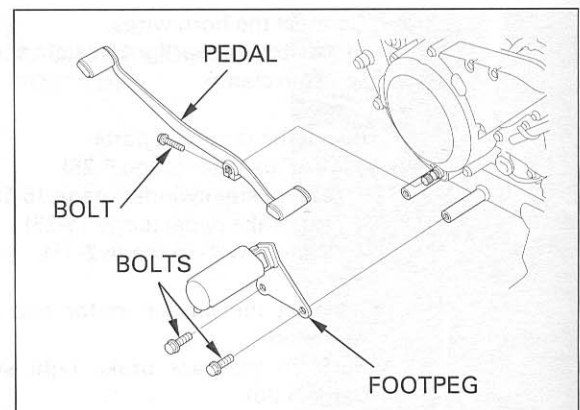
Remove the twelve mounting rubbers from each cylinder head.



Remove the stud bolt from the water pump cover to prevent damaging its threads. To remove the stud, thread two nuts onto the stud, tighten them together, and use a wrench on them to turn the stud bolt out.

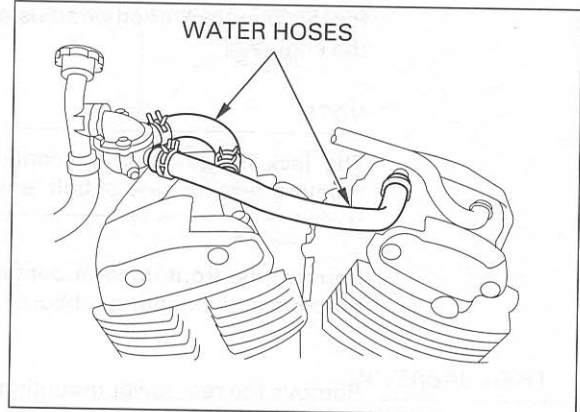


Remove the two bolts and the left footpeg. Remove the pedal pinch bolt and remove the gearshift pedal.



## ENGINE REMOVAL/INSTALLATION

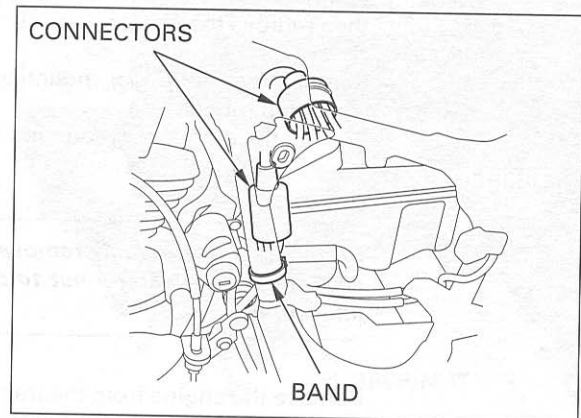
Disconnect the water hoses from the cylinder head covers.



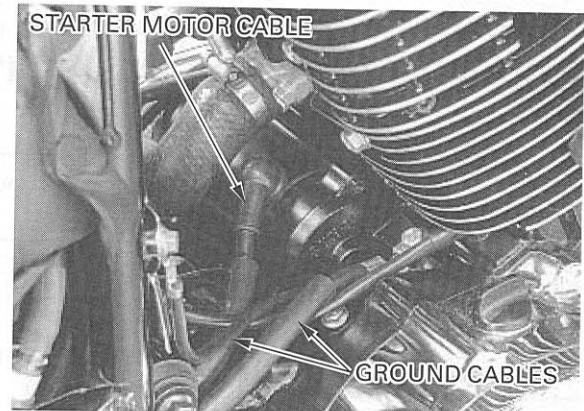
Release the wire band.

Disconnect the ignition pulse generator (2P White) and alternator (3P White) connectors.

Disconnect the oil pressure switch and neutral switch connectors.

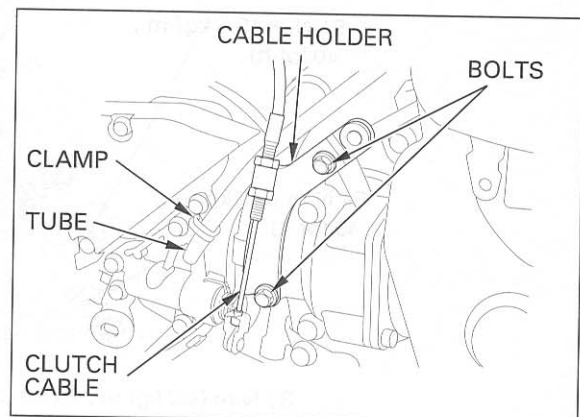


Remove the bolt and nut and disconnect the starter motor and ground cables.



Disconnect the clutch cable and remove the cable holder bolts, and holder.

Remove the carburetor air vent tube (California: EVAP CAV control valve air vent tube) from the clamp.



## ENGINE REMOVAL/INSTALLATION

Place a floor jack or other adjustable support under the engine.

**NOTE:**

The jack height must be continually adjusted to relieve stress for ease of bolt removal.

Remove the front upper mounting bolts, mounting brackets and mounting rubbers.

Remove the rear lower mounting nut and mounting rubber.

Pull out the rear lower mounting bolt to remove it, then remove the spacer.

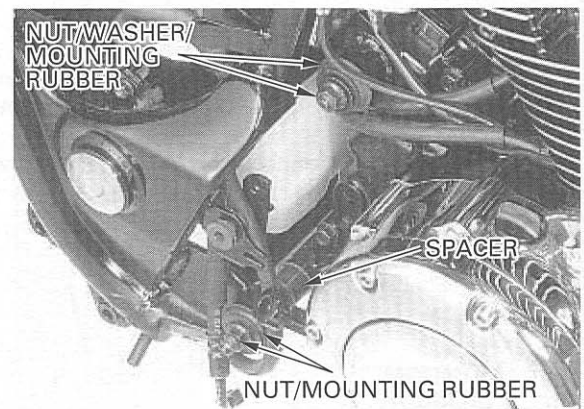
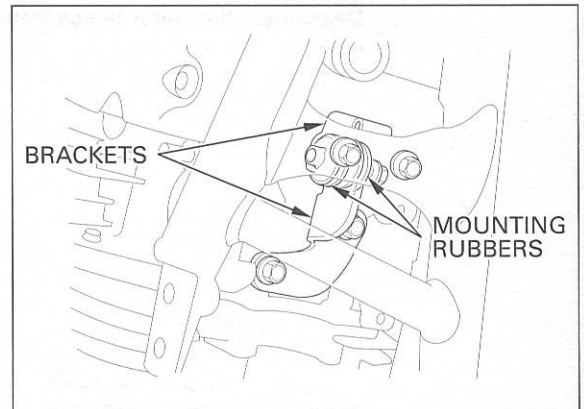
Remove the rear upper mounting nut, washer and mounting rubber.

Pull out the rear upper mounting bolt to remove it.

**CAUTION:**

*During engine assembly removal, hold the engine securely and be careful not to damage the frame and engine.*

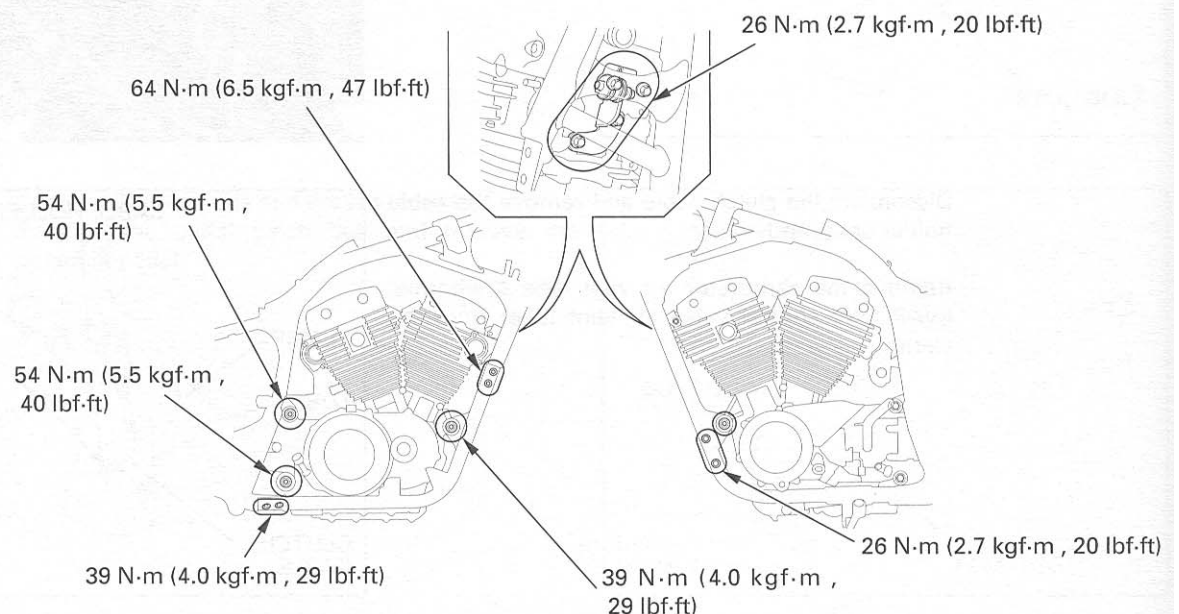
Remove the engine from the frame by releasing the output driven gear shaft from the universal joint in the swingarm.



## ENGINE INSTALLATION (VT1100T)

**NOTE:**

Before installing the engine, route the wires and tubes properly.





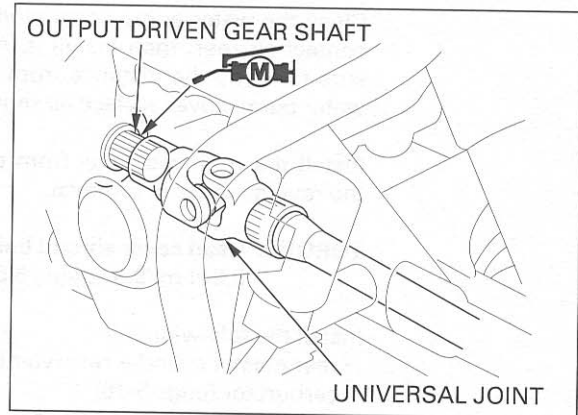
## ENGINE REMOVAL/INSTALLATION

### CAUTION:

**Carefully align mounting points with the jack to prevent damage to engine, frame, wires and cables.**

Apply 1 g (0.04 oz) of molybdenum disulfide grease to the output driven gear shaft spline.

Use a floor jack or other adjustable support to carefully maneuver the engine into place and insert the output driven gear shaft into the universal joint in the swingarm.

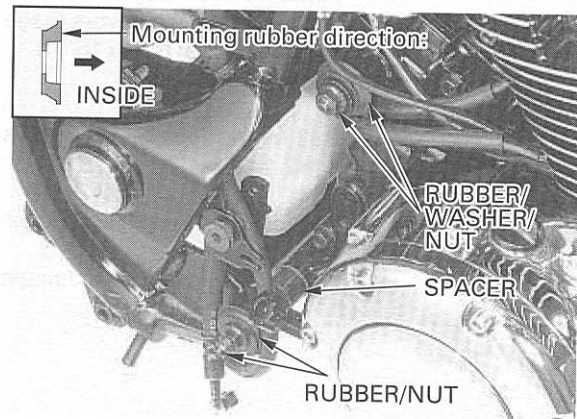


Carefully align the bolt holes in the frame and engine then insert the rear upper mounting bolt with the mounting rubber from the left side.

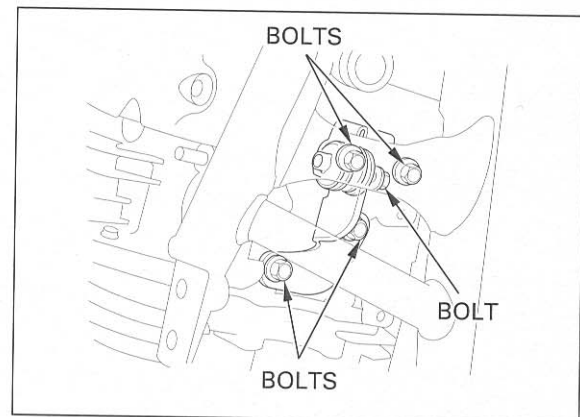
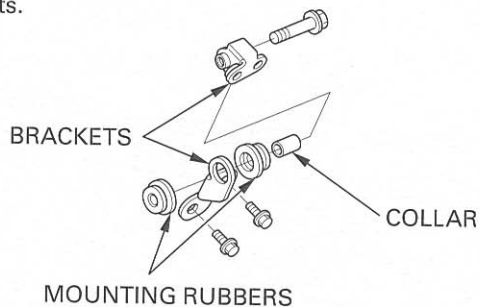
Loosely install the rear upper mounting nut with the mounting rubber and washer.

Insert the rear lower mounting bolt with the mounting rubber from the left side and install the spacer between the right side frame stay and engine.

Loosely install the rear upper mounting nut with the mounting rubber.



Place the front upper mounting brackets, collars and mounting rubbers (large I. D. side toward inside) into place and loosely install the mounting bolts.



Install the sub-frame and tighten all sub-frame fasteners to the specified torque (page 7-14).

After installing the sub-frame, tighten all engine mounting bolts and nuts to the specified torque.

### TORQUE:

**Front lower engine mounting bolt:**

39 N·m (4.0 kgf·m , 29 lbf·ft)

**Front upper engine mounting bolt:**

26 N·m (2.7 kgf·m , 20 lbf·ft)

**Rear lower engine mounting nut:**

54 N·m (5.5 kgf·m , 40 lbf·ft)

**Rear upper engine mounting nut:**

54 N·m (5.5 kgf·m , 40 lbf·ft)

## ENGINE REMOVAL/INSTALLATION

Clean the water pump cover stud bolt threads with contact cleaner, then install it. After installing, be sure to verify the distance from top of stud to the water pump cover surface as shown.

Install the removed parts from engine removal in the reverse order of removal.

**TORQUE: Head cover shroud bolt:**

8.8 N·m (0.9 kgf·m , 6.5 lbf·ft)

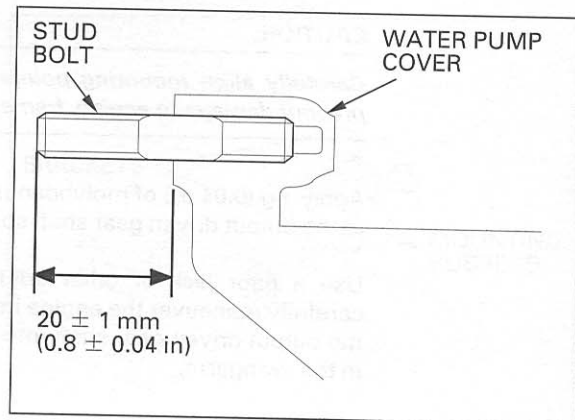
Install the following:

- rear master cylinder reservoir (page 15-21)
- carburetor (page 5-16)
- radiator (page 6-11)
- battery holder (page 5-22)
- left and right side covers (page 2-5)
- gearshift pedal (page 16-11)
- spark plug caps.

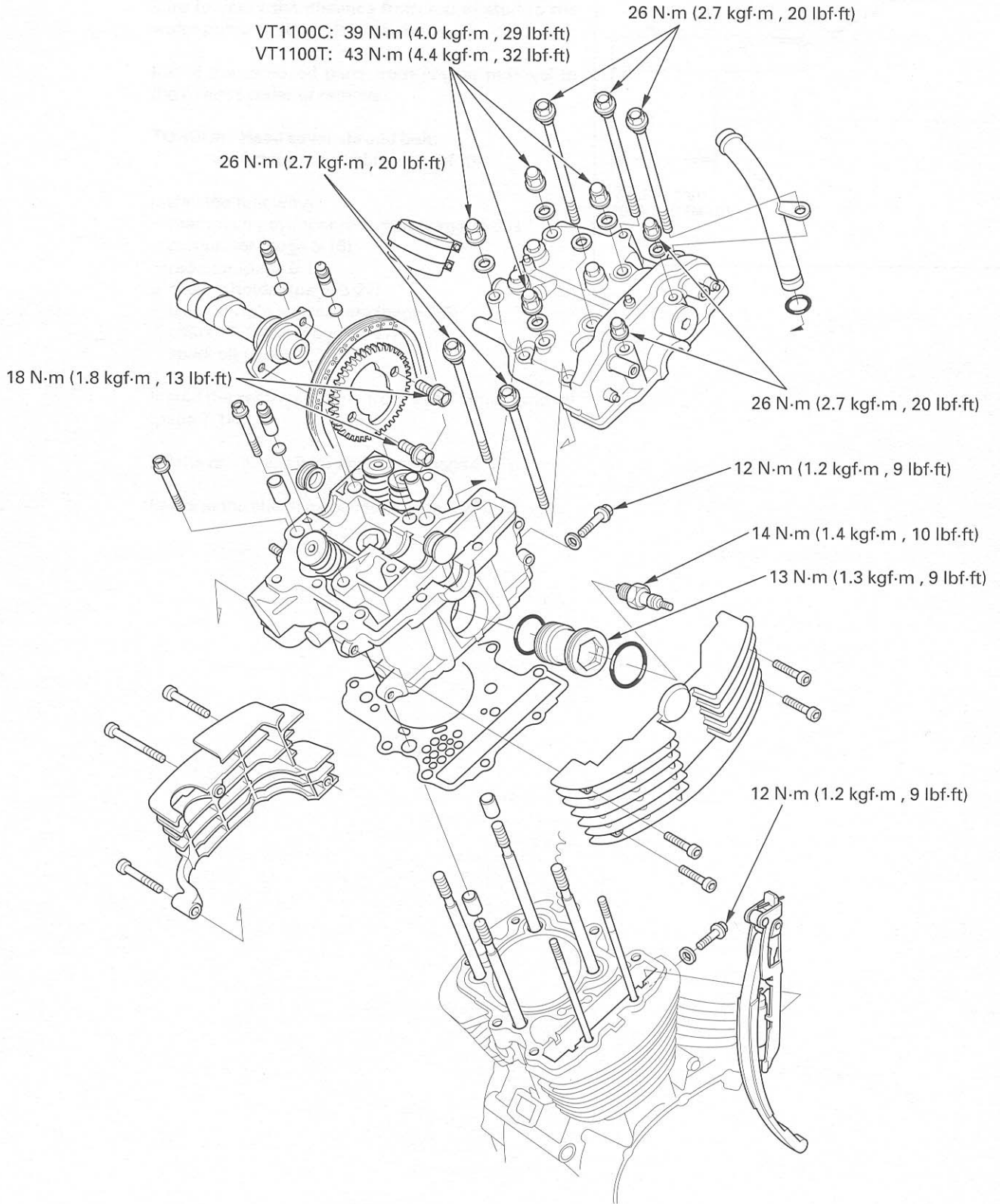
Install the removed parts from sub-frame removal (page 7-14).

Fill the crankcase with engine oil (page 3-11).

Perform the clutch inspection (page 3-21).



# CYLINDER HEAD/VALVE



# 8. CYLINDER HEAD/VALVE

SERVICE INFORMATION	8-1	VALVE GUIDE REPLACEMENT	8-14
TROUBLESHOOTING	8-3	VALVE SEAT INSPECTION/REFACING	8-15
CYLINDER COMPRESSION	8-4	CYLINDER HEAD ASSEMBLY	8-19
CYLINDER HEAD COVER REMOVAL	8-5	CYLINDER HEAD INSTALLATION	8-20
CAMSHAFT REMOVAL	8-5	CAMSHAFT INSTALLATION	8-22
CYLINDER HEAD COVER DISASSEMBLY	8-8	CYLINDER HEAD COVER ASSEMBLY	8-25
CYLINDER HEAD REMOVAL	8-10	CYLINDER HEAD COVER INSTALLATION	8-27
CYLINDER HEAD DISASSEMBLY	8-11		

## SERVICE INFORMATION

8

### GENERAL

- This section covers service of the cylinder head, valves, camshafts and rocker arms. To service these parts, the engine must be removed from the frame.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.
- Clean all disassembled parts with cleaning solvent and dry them by blowing them off with compressed air before inspection.
- Camshaft and rocker arm lubricating oil is fed through oil passages in the cylinder head and head cover. Clean the oil passages before assembling cylinder head and head cover.
- Pour clean engine oil into the oil pockets in the cylinder head during assembly to lubricate the camshaft.
- Be careful not to damage the mating surfaces when removing the head cover and cylinder head.

### SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,275 ± 196 kPa (13.0 ± 2.0 kgf/cm <sup>2</sup> , 185 ± 28 psi) – 300 rpm	—
Cylinder head	Warpage		—	0.05 (0.002)
Camshaft	Cam lobe height	IN	38.021 – 38.181 (1.4969 – 1.5032)	37.99 (1.496)
		EX	38.027 – 38.187 (1.4971 – 1.5034)	38.00 (1.496)
	Runout		—	0.05 (0.002)
	Oil clearance	A/B	0.050 – 0.111 (0.0020 – 0.0044)	0.130 (0.0051)
		C	0.065 – 0.126 (0.0026 – 0.0050)	0.145 (0.0057)
Journal O. D.	A/B	23.949 – 23.970 (0.9429 – 0.9437)	23.92 (0.942)	
	C	23.934 – 23.955 (0.9423 – 0.9431)	23.90 (0.941)	
Rocker arm and tappet	Rocker arm I. D.	IN/EX	13.750 – 13.768 (0.5413 – 0.5420)	13.778 (0.5424)
	Rocker arm shaft O. D.	IN/EX	13.716 – 13.734 (0.5400 – 0.5407)	13.706 (0.5396)
	Rocker arm-to-rocker arm shaft clearance	IN/EX	0.016 – 0.052 (0.0006 – 0.0020)	0.072 (0.0028)
	Tappet adjuster assist spring free length		18.57 (0.731)	17.80 (0.701)
	Tappet adjuster compression stroke with kerosene		—	0.2 (0.01)

# CYLINDER HEAD/VALVE

(cont'd)

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT	
Valve and valve guide	Valve clearance		Hydraulic adjusting	_____	
	Valve stem O. D.	IN	6.575—6.590 (0.2589—0.2594)	6.57 (0.259)	
		EX	6.555—6.570 (0.2581—0.2587)	6.54 (0.257)	
	Valve guide I. D.	IN	6.600—6.615 (0.2598—0.2604)	6.635 (0.2612)	
		EX	6.600—6.615 (0.2598—0.2604)	6.655 (0.2620)	
	Stem-to-guide clearance	IN	0.010—0.040 (0.0004—0.0016)	0.08 (0.003)	
		EX	0.030—0.060 (0.0012—0.0024)	0.12 (0.005)	
	Valve guide projection above cylinder head	IN	14.5 (0.57)	_____	
EX		15.5 (0.61)	_____		
Valve seat width	IN/EX		0.90—1.10 (0.035—0.043)	1.50 (0.059)	
	Valve spring	Free length	Inner	IN/EX	41.37 (1.629)
Outer			IN	45.70 (1.799)	43.90 (1.728)
			EX	43.50 (1.713)	41.80 (1.646)

## TORQUE VALUES

### VT1100C:

Spark plug	14 N·m (1.4 kgf·m , 10 lbf·ft)	
Spark plug sleeve	13 N·m (1.3 kgf·m , 9 lbf·ft)	Apply molybdenum oil solution to the threads.
Assist shaft cap	22 N·m (2.2 kgf·m , 16 lbf·ft)	
Cylinder head cover bolt		
	cap nut (8 mm)	26 N·m (2.7 kgf·m , 20 lbf·ft)
	(10 mm)	39 N·m (4.0 kgf·m , 29 lbf·ft)
Rocker arm shaft hole plug	39 N·m (4.0 kgf·m , 29 lbf·ft)	
Cam sprocket bolt	18 N·m (1.8 kgf·m , 13 lbf·ft)	Apply locking agent to the threads.
Cam chain tensioner bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Carburetor insulator band screw	2.0 N·m (0.2 kgf·m , 1.4 lbf·ft)	

### VT1100T:

Spark plug	14 N·m (1.4 kgf·m , 10 lbf·ft)	
Spark plug sleeve	13 N·m (1.3 kgf·m , 9 lbf·ft)	Apply molybdenum oil solution to the threads.
Assist shaft cap	22 N·m (2.2 kgf·m , 16 lbf·ft)	
Cylinder head cover bolt		
	cap nut (8 mm)	26 N·m (2.7 kgf·m , 20 lbf·ft)
	(10 mm)	43 N·m (4.4 kgf·m , 32 lbf·ft)
Rocker arm shaft hole plug	39 N·m (4.0 kgf·m , 29 lbf·ft)	
Cam sprocket bolt	18 N·m (1.8 kgf·m , 13 lbf·ft)	Apply locking agent to the threads.
Cam chain tensioner bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Carburetor insulator band screw	2.0 N·m (0.2 kgf·m , 1.4 lbf·ft)	

## TOOLS

Fork tube holder attachment	07930—KA50100
Hydraulic tappet bleeder	07973—MJ00000
Valve spring compressor	07757—0010000
Valve guide remover, 6.6 mm	07742—0010200 or 07942—6570100 (U. S. A. only)
Valve guide driver	07743—0020000 not available in U. S. A.
Valve guide reamer, 6.6 mm	07984—ZE20001 or 07984—ZE2000D (U. S. A. only)
Valve seat cutter holder	07781—0010202 or equivalent commercially available in U. S. A.
Valve seat cutter, 33 mm (45° IN)	07780—0010800
40 mm (45° EX)	07780—0010500
35 mm (32° IN)	07780—0012300
42 mm (32° EX)	07780—0013000
37.5 mm (60° IN)	07780—0014100
42 mm (60° EX)	07780—0014400

## TROUBLESHOOTING

Engine top-end problems usually affect engine performance. These can be diagnosed by a compression test, or by tracing top-end noise with a sounding rod or stethoscope. (See page 8-4 for engine compression testing.)

### Compression too low, Hard starting or Poor performance at low speed

- Hydraulic tappet
  - Incorrect tappet adjustment
  - Hydraulic tappet locked (engine will not start)
  - Collapsed hydraulic tappet (chatter noise)
  - Insufficient air bleeding, noise will stop after about 10 minutes
- Valves
  - Burned or bent valves
  - Incorrect valve timing
  - Broken valve springs
  - Uneven valve seating
  - Valve stuck open
- Cylinder head
  - Leaking or damaged cylinder head gasket
  - Warped or cracked cylinder head
  - Loose spark plug

### Compression too high

- Excessive carbon built-up on piston or combustion chamber

### Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal

### Excessive noise

- Hydraulic tappet
  - Worn or damaged tappet
  - Clogged oil hole or oil passage to cylinder head
  - Weak or damaged assist spring
  - Worn or damaged assist shaft
  - Air in oil passage caused by low oil level
- Valves
  - Sticking valve or broken valve spring
  - Excessive worn valve seat
- Cylinder head
  - Worn or damaged camshaft
  - Worn or damaged rocker arm and/or shaft
  - Worn rocker arm follower or valve stem end
  - Worn or damaged cam sprocket teeth
  - Loose or worn cam chain
  - Worn or damaged cam chain tensioner

### CYLINDER COMPRESSION

Warm up the engine to normal operating temperature.

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

**NOTE:**

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

Shift the transmission in neutral and turn the engine stop switch OFF.

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

**COMPRESSION PRESSURE:**

1,275 ± 196 kPa (13.0 ± 2.0 kgf/cm<sup>2</sup>,  
185 ± 28 psi)

If compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and/or the piston crown.

If compression is low, pour 3–5 cc (0.1–0.2 oz) of clean engine oil into the cylinder through the spark plug hole and recheck the compression.

If the compression increases from the previous value, check the cylinder, piston and piston rings.

If compression is the same as the previous value, check the valves for leakage.



## CYLINDER HEAD COVER REMOVAL

Remove the engine from the frame (page 7-8 or 7-16).

Loosen the two 8 mm, four 10 mm cap nuts and five 8 mm bolts.

Remove the nuts and bolts with the water pipe.

**NOTE:**

During removal of the head cover, tilt the engine about 45° to the side, away from the cam chain tower, to prevent the hydraulic tappets and shims from falling into the engine.

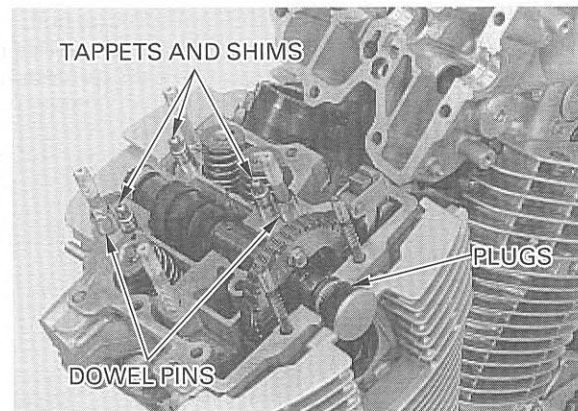
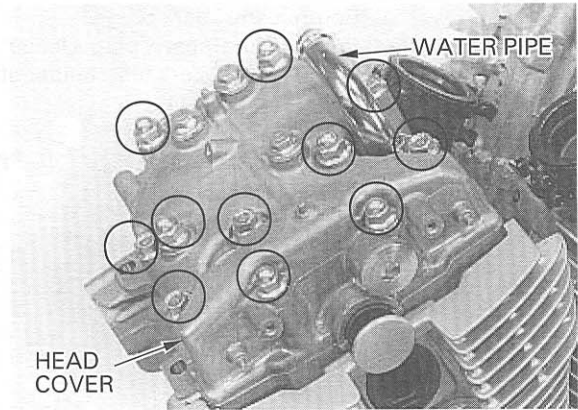
Remove the cylinder head cover gently to prevent dropping the hydraulic tappets and shims.

**CAUTION:**

*Do not strike or use excessive force to remove the tappets.*

Remove the hydraulic tappets and shims.

Remove the dowel pins and camshaft plugs.



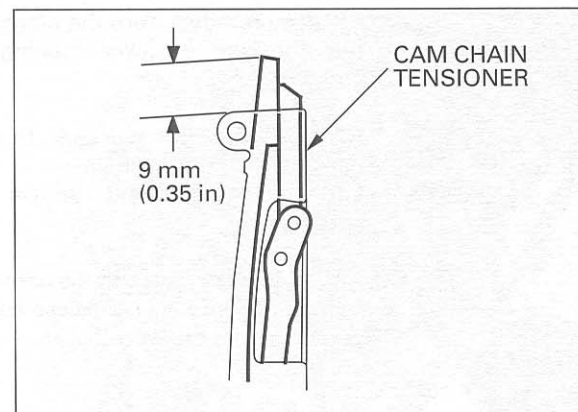
## CAMSHAFT REMOVAL

Before releasing the cam chain tensioner, measure the distance the cam chain tensioner projects above the bracket as shown.

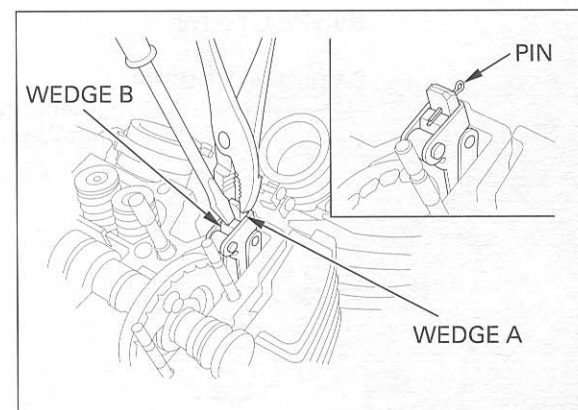
Replace the cam chain with a new one if the projection exceeds 9.0 mm (0.35 in).

To replace the cam chain, remove the following parts:

- cam sprocket (see below)
- Front cylinder: starter driven gear (section 18)
- Rear cylinder: primary drive gear (section 10)



Release the tensioner by pulling wedge A straight up while holding wedge B down then secure the wedge A with a 2 mm pin as shown.

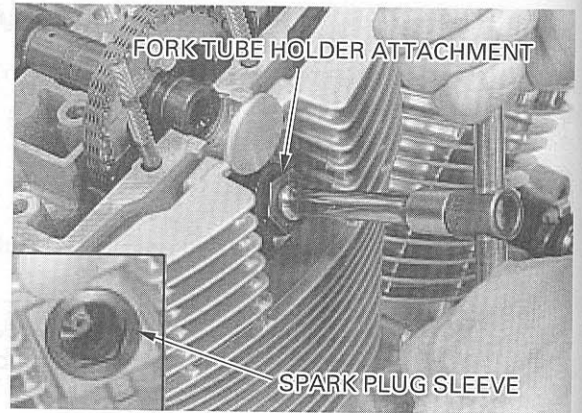




## CYLINDER HEAD/VALVE

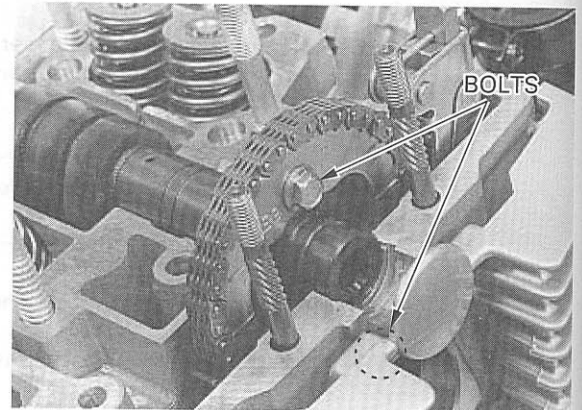
Remove the spark plug.  
Remove the spark plug sleeve on the cam chain side using the fork tube holder attachment.

**TOOL:**  
**Fork tube holder attachment** 07930—KA50100



*Be careful not to let the cam sprocket bolts fall into the crankcase.*

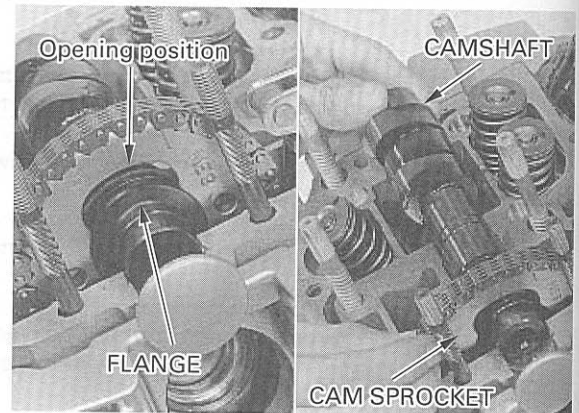
Remove the cam sprocket bolt.  
Rotate the crankshaft clockwise one turn (360°) and remove the other cam sprocket bolt.



For easy removal, turn the crankshaft clockwise so that the cam sprocket opening is positioned as shown.

Remove the cam sprocket from the cam shaft flange with the cam chain.  
Lift the camshaft and remove it from the cam sprocket.

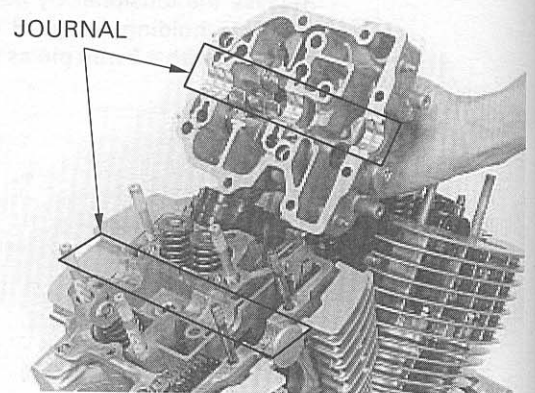
Attach a piece of wire to the cam chain to prevent it from falling into the crankcase and remove the cam sprocket from the cam chain.



## INSPECTION

### CAMSHAFT JOURNAL

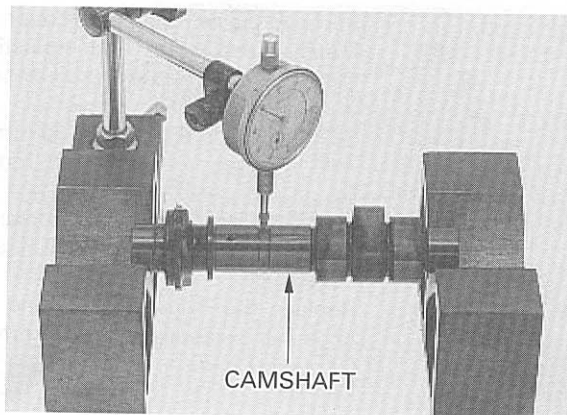
Inspect the camshaft journal surfaces for scoring or evidence of insufficient lubrication.



## CAMSHAFT RUNOUT

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

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



## CAM LOBE HEIGHT

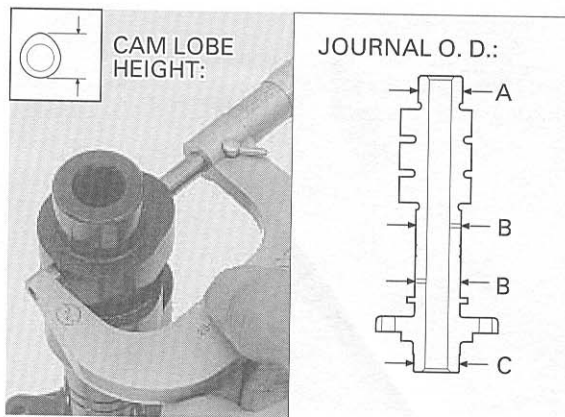
Measure the height of each cam lobe using a micrometer.

**SERVICE LIMITS:** IN: 37.99 mm (1.496 in)  
EX: 38.00 mm (1.496 in)

## CAMSHAFT JOURNAL O. D.

Measure the O. D. of each camshaft journal.

**SERVICE LIMITS:** A/B: 23.92 mm (0.942 in)  
C: 23.90 mm (0.941 in)



## CAMSHAFT OIL CLEARANCE

### NOTE:

Do not hook the cam chain suspension wire against the head cover mating surface.

Suspend the cam chain attaching wire through the spark plug sleeve hole and hook it.

Clean off any oil from the journals of the head cover, head and camshaft.

Put the cam shaft onto the cylinder head and lay a strip of plastigauge lengthwise on top of each camshaft journal.

### NOTE:

Do not rotate the camshaft during inspection.

Install the cylinder head cover carefully and tighten the bolts and nuts in a crisscross pattern in 2-3 steps.

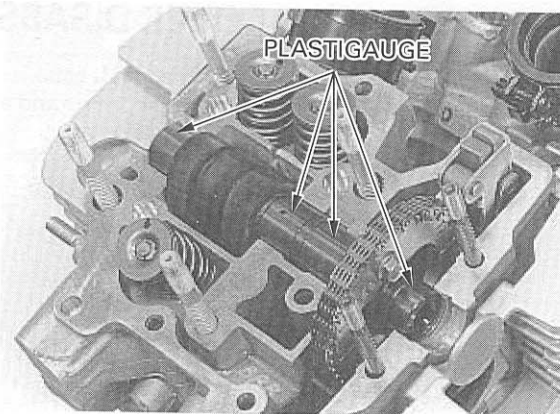
### TORQUE:

**8 mm bolt and cap nut:** 26 N·m (2.7 kgf·m, 20 lbf·ft)

**10 mm cap nut:**

**VT1100C:** 39 N·m (4.0 kgf·m, 29 lbf·ft)

**VT1100T:** 43 N·m (4.4 kgf·m, 32 lbf·ft)



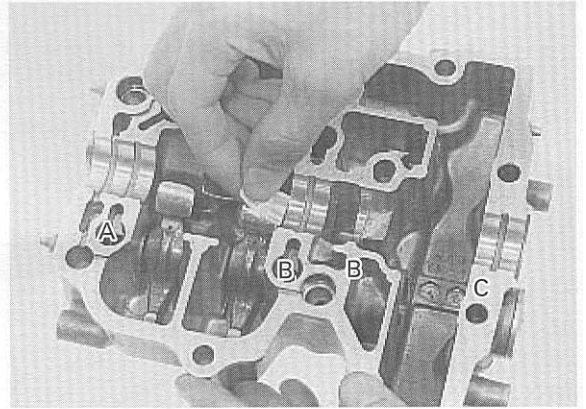
## CYLINDER HEAD/VALVE

Remove the cylinder head cover.  
Measure the width of each plastigauge. The widest thickness determines the oil clearance.

**SERVICE LIMITS:** A/B: 0.130 mm (0.0051 in)  
C: 0.145 mm (0.0057 in)

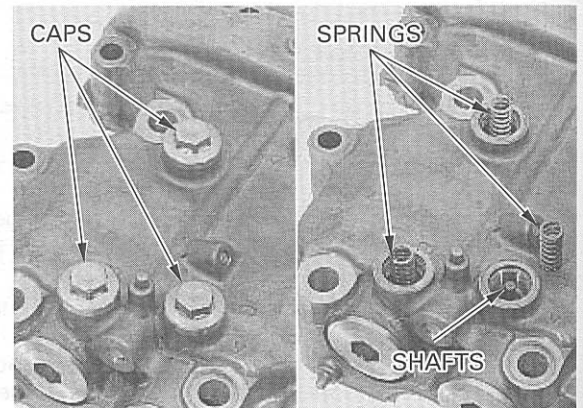
When the service limits are exceeded, replace the camshaft and recheck the oil clearance.

Replace the cylinder head and cover if the clearance still exceeds the service limit.

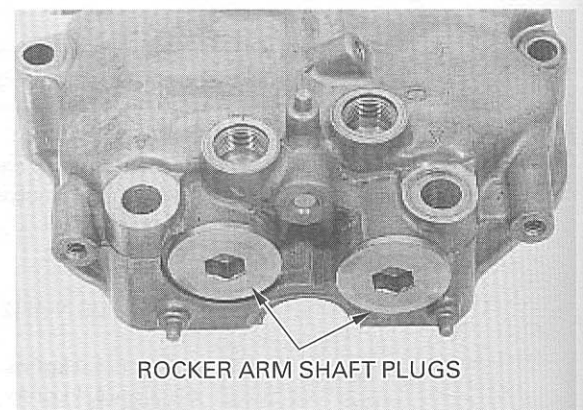


## CYLINDER HEAD COVER DISASSEMBLY

Remove the assist shaft caps.  
Remove the assist springs and assist shafts.

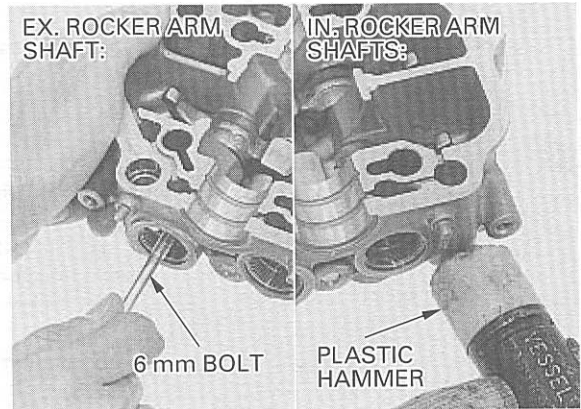


Remove the three rocker arm shaft hole plugs.



Thread a 6 mm bolt into the exhaust rocker arm shaft, and pull out and remove it.

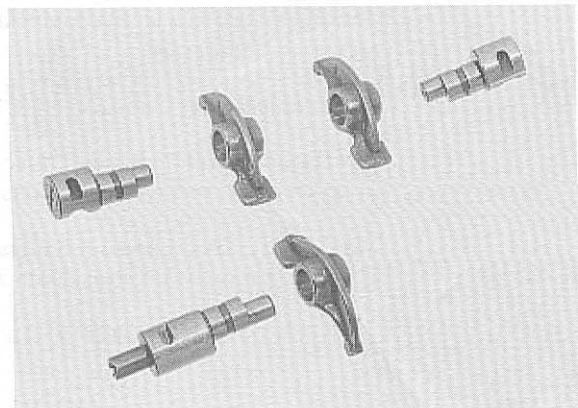
Remove the intake rocker arm shafts from the opposite side by tapping the head cover with a plastic hammer.



**INSPECTION**

**ROCKER ARM SHAFT/ROCKER ARM**

Inspect the rocker arm shafts and rocker arms for wear or damage.  
Check the rocker arm shafts and rocker arms for clogged oil holes.



Measure the O. D. of each rocker arm shaft.

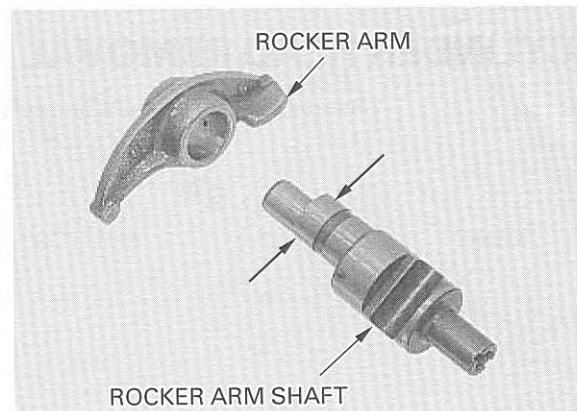
**SERVICE LIMIT:** 13.706 mm (0.5396 in)

Measure the I. D. of each rocker arm.

**SERVICE LIMIT:** 13.778 mm (0.5424 in)

Subtract each rocker arm shaft O. D. from the corresponding rocker arm I. D. to obtain the rocker arm-to-rocker arm shaft clearance.

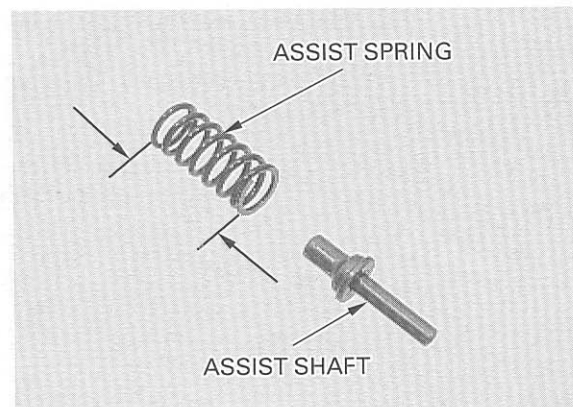
**SERVICE LIMIT:** 0.072 mm (0.0028 in)



**ASSIST SPRING AND SHAFT**

Inspect the assist springs and shafts for wear or damage.  
Measure the free length of each assist spring.

**SERVICE LIMIT:** 17.80 mm (0.701 in)



## CYLINDER HEAD/VALVE

### HYDRAULIC TAPPET

Inspect the hydraulic tappet for wear, damage and plugged holes.

#### NOTE:

- Keep the hydraulic tappet below the surface of the kerosene.
- Hold the hydraulic tappet upright while compressing and extending the tappet.

Measure the free length of each hydraulic tappets as follows:

Attach the Hydraulic Tappet Bleeder to the hydraulic tappet and compress and extend the hydraulic tappet slowly in a jar filled with kerosene.

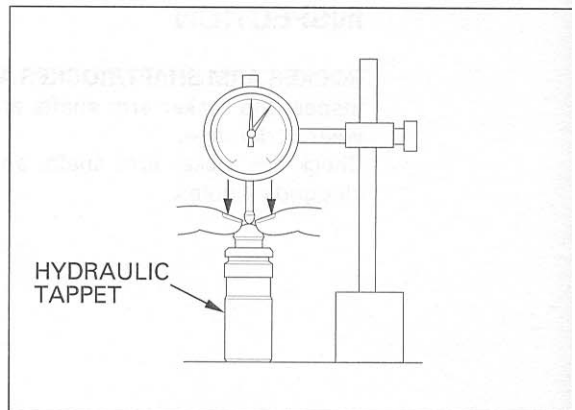
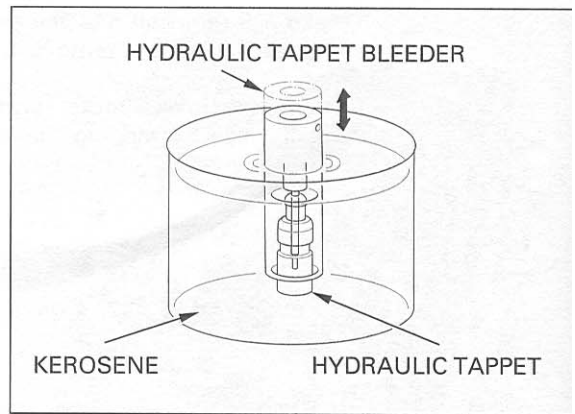
#### TOOL:

**Hydraulic tappet bleeder** 07973-MJ00000

Continue operating the hydraulic tappet until the air bubbles stop and the tappet no longer collapses.

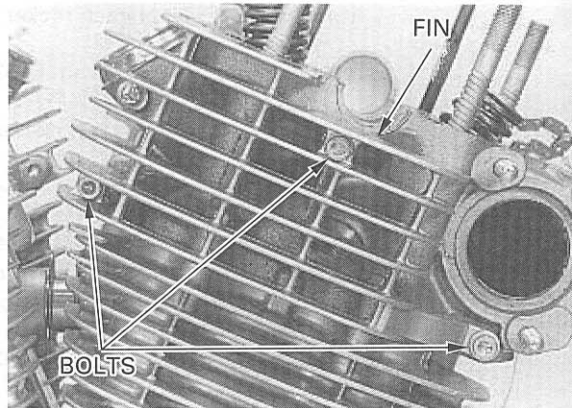
Quickly try to compress the tappet by hand. Measure the compression stroke with a dial gauge.

**COMPRESSION STROKE:** 0–0.2 mm (0.0–0.01 in)



## CYLINDER HEAD REMOVAL

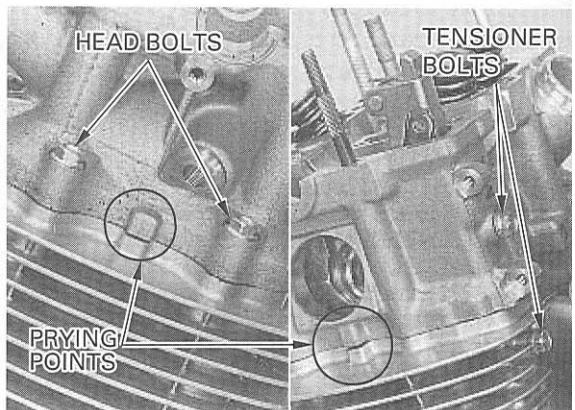
Remove the socket bolts and cylinder head fins.



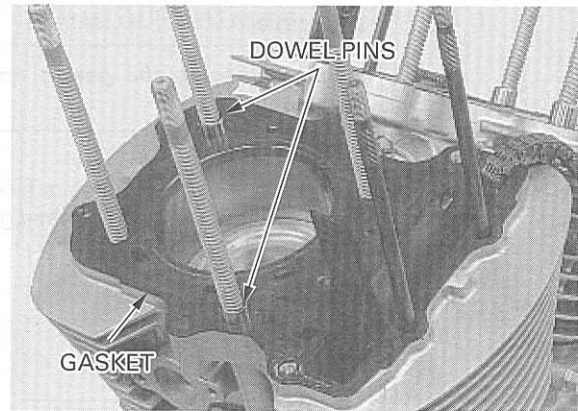
Remove the cylinder head bolts.

Remove the cam chain tensioner bolts, washer and the tensioner.

Pry the cylinder head at the prying points using a screwdriver and remove the cylinder head.



Remove the cylinder head gasket and dowel pins.



## CYLINDER HEAD DISASSEMBLY

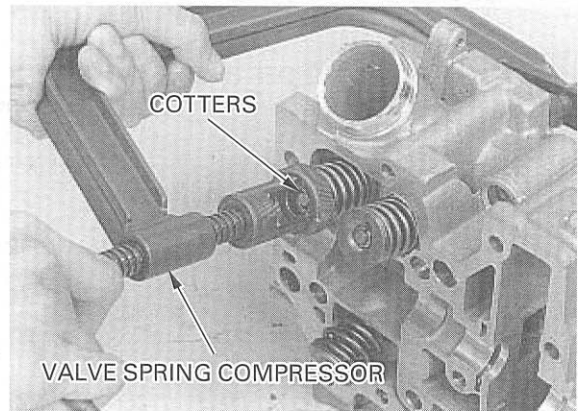
### NOTE:

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

Remove the valve spring cotters using the valve spring compressor.

### TOOL:

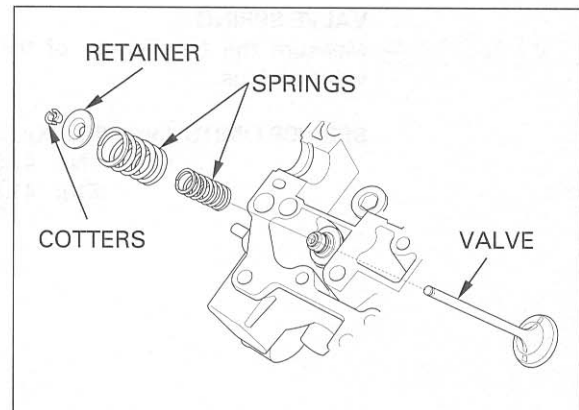
Valve spring compressor 07757-0010000



### CAUTION:

*Compressing the valve springs more than necessary will cause loss of valve spring tension.*

Remove the valve spring compressor, then remove the retainers, springs and valves.



Remove the stem seals and spring seats if necessary.  
Do not reuse a removed stem seal.



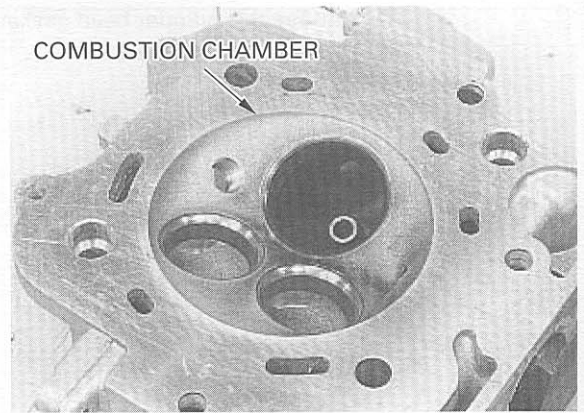
## CYLINDER HEAD/VALVE

### CAUTION:

**Avoid damaging the gasket and valve seat surfaces.**

*Gasket will come off easier if soaked in high flash point cleaning solvent.*

Remove the carbon deposits from the combustion chamber and clean off the head gasket surfaces.



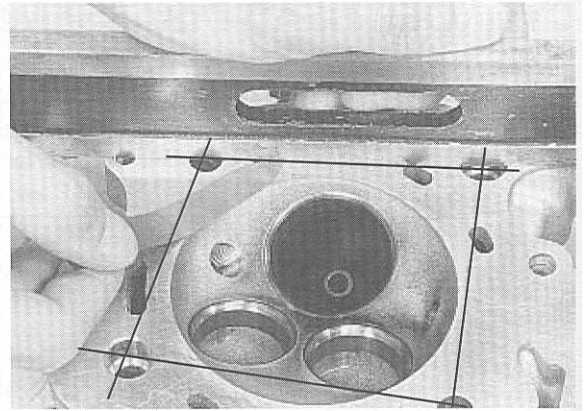
### INSPECTION

#### CYLINDER HEAD

Check the spark plug hole and valve areas for cracks.

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

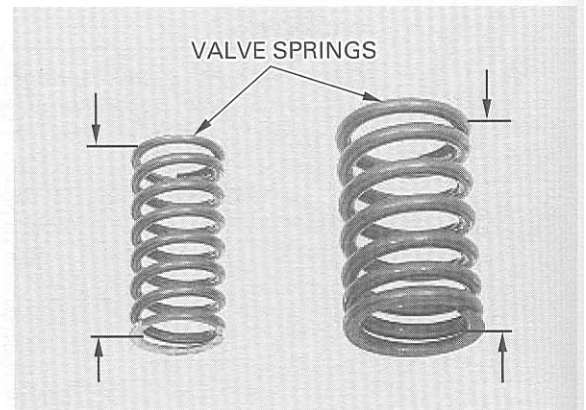
**SERVICE LIMIT:** 0.05 mm (0.002 in)



#### VALVE SPRING

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

**SERVICE LIMITS:** Inner (IN/EX): 39.9 mm (1.57 in)  
Outer (IN): 43.90 mm (1.728 in)  
(EX): 41.80 mm (1.646 in)



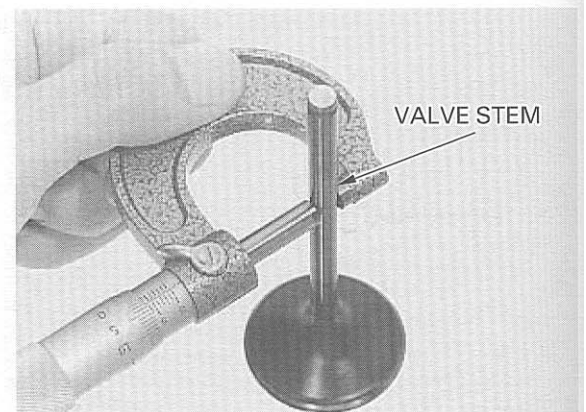
#### VALVE STEM-TO-GUIDE CLEARANCE

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

Insert the valves in their original positions in the cylinder head. Check that each valve moves up and down smoothly, without binding.

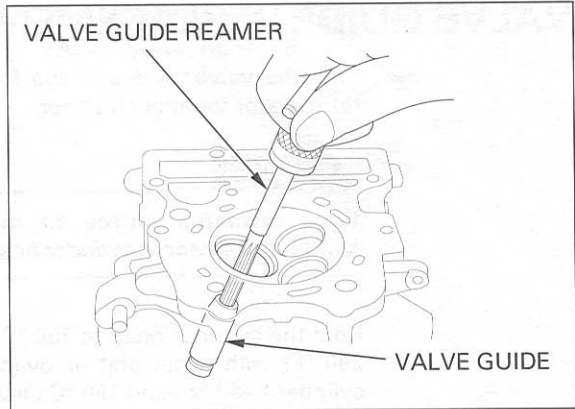
Measure the each valve stem O. D. and record it.

**SERVICE LIMITS:** IN: 6.57 mm (0.259 in)  
EX: 6.54 mm (0.257 in)



Ream the valve guide to remove any carbon build-up before measuring the guide.  
Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

**TOOL:**  
**Valve guide reamer,** 07984-ZE20001 or  
**6.6 mm** 07984-ZE2000D  
(U. S. A. only)



Measure each valve guide I. D. and record it.

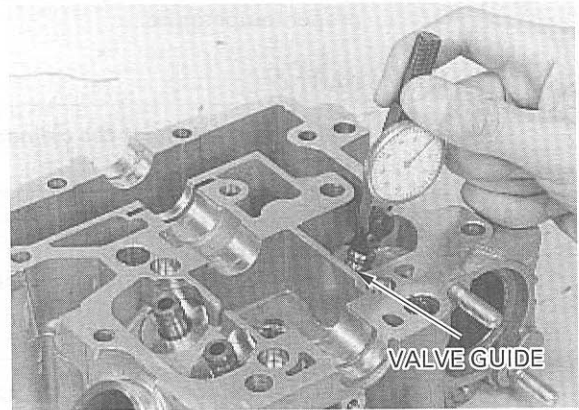
**SERVICE LIMITS: IN:** 6.635 mm (0.2612 in)  
**EX:** 6.655 mm (0.2620 in)

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

**SERVICE LIMITS: IN:** 0.08 mm (0.003 in)  
**EX:** 0.12 mm (0.005 in)

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

If the stem-to-guide clearance exceeds the service limit with new guide, also replace the valve.



**NOTE:**

Inspect and reface the valve seats whenever the valve guides are replaced (page 8-15).



## VALVE GUIDE REPLACEMENT

Chill the valve guides in the freezer section of a refrigerator for about an hour.

### ▲WARNING

***Wear insulated gloves to avoid burns when handling the heated cylinder head.***

Heat the cylinder head to 130 °C – 140 °C (275 °F – 290 °F) with a hot plate or oven. Do not heat the cylinder head beyond 150 °C (300 °F). Use temperature indicator sticks, available from welding supply stores, to be sure the cylinder head is heated to the proper temperature.

### CAUTION:

***Using a torch to heat the cylinder head may cause warping.***

Support the cylinder head and drive out the old guides from the combustion chamber side of the cylinder head.

### TOOL:

**Valve guide remover,** 07742 – 0010200 or  
6.6 mm 07942 – 6570100  
(U. S. A. only)

### CAUTION:

***Be careful not to damage the cylinder head.***

Drive the new guides in from the camshaft side of the cylinder head while the cylinder head is still heated.

### TOOL:

**Valve guide driver** 07743 – 0020000  
not available in U. S. A.

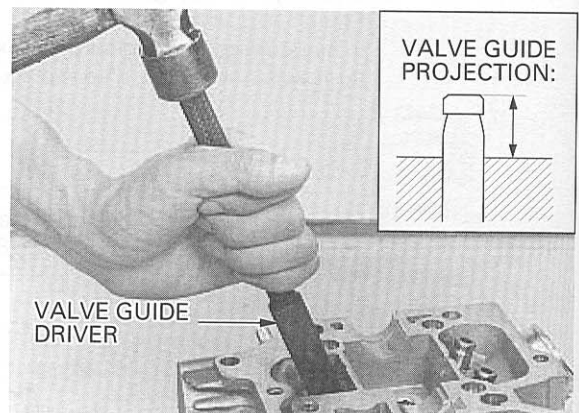
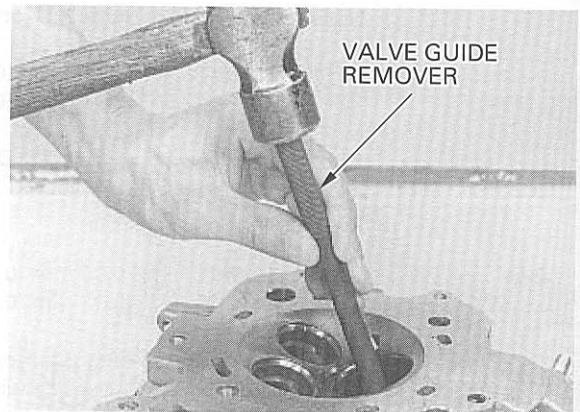
### VALVE GUIDE PROJECTION ABOVE CYLINDER HEAD:

IN: 14.5 mm (0.57 in)

EX: 15.5 mm (0.61 in)

### U. S. A. only procedure:

- using a marker, mark the valve guide with a line at the correct height as specified above.
- chill the guides.
- drive in the valve guide as shown to the line.
- check the projection height with calipers to verify they are within specification.



Let the cylinder head cool to room temperature, then ream the new valve guides.

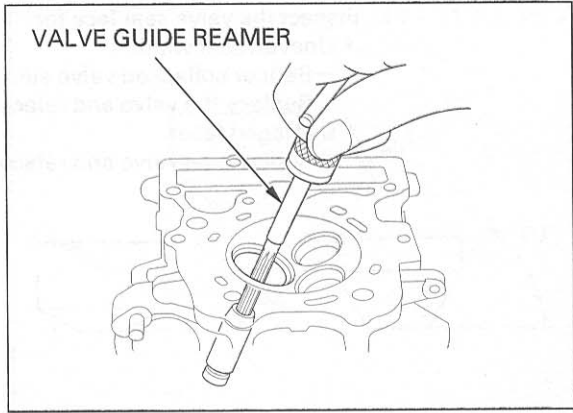
**TOOL:**

**Valve guide reamer, 6.6 mm**      07984-ZE20001 or  
 07984-ZE2000D  
 (U. S. A. only)

**NOTE:**

- Take care not to tilt or lean the reamer in the guide while reaming. Otherwise, the valve is installed slanted, that causes oil leaks from the stem seal and improper valve seat contact and results in the valve seat refacing not able to be performed.
- Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seat.



**VALVE SEAT INSPECTION/REFACING**

**INSPECTION**

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coating of Prussian Blue to each valve face.

Tap the valve against the valve seat several times using a hand-lapping tool, without rotating the valve, to make a clear pattern.

Remove the valve and inspect the valve seat face (see following page).

**NOTE:**

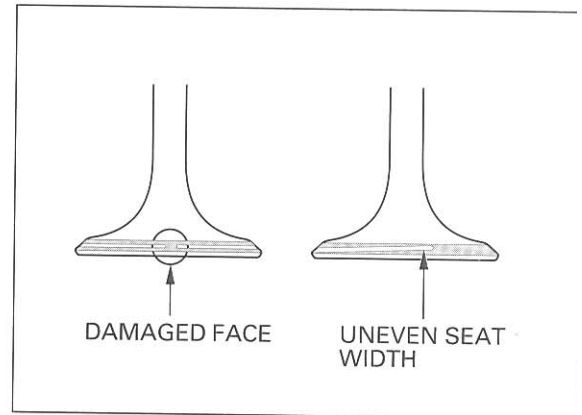
The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.



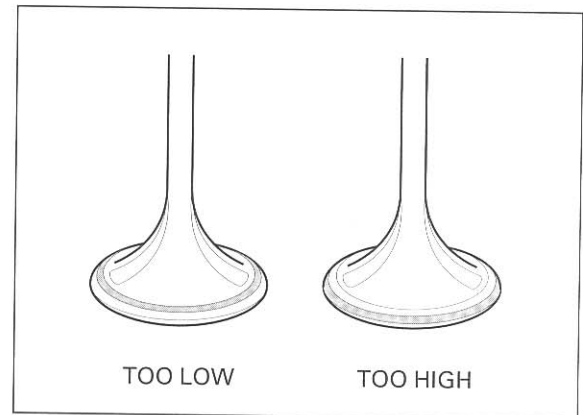
## CYLINDER HEAD/VALVE

Inspect the valve seat face for:

- Uneven seat width:
  - Bent or collapsed valve stem;
  - Replace the valve and reface the valve seat.
- Damaged face:
  - Replace the valve and reface the valve seat.



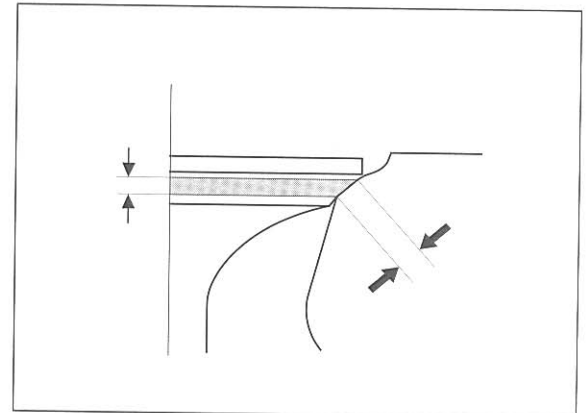
- Contact area (too high or too low area):
  - reface the valve seat



Inspect the width of valve seat.  
The valve seat contact should be within the specified width and even all around the circumference.

**STANDARD:** 0.90 – 1.10 mm (0.035 – 0.043 in)  
**SERVICE LIMIT:** 1.50 mm (0.059 in)

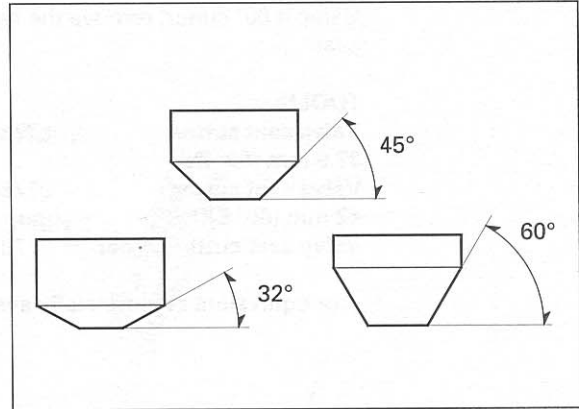
If the valve seat width is not within specification, reface the valve seat.



**VALVE SEAT REFACING**

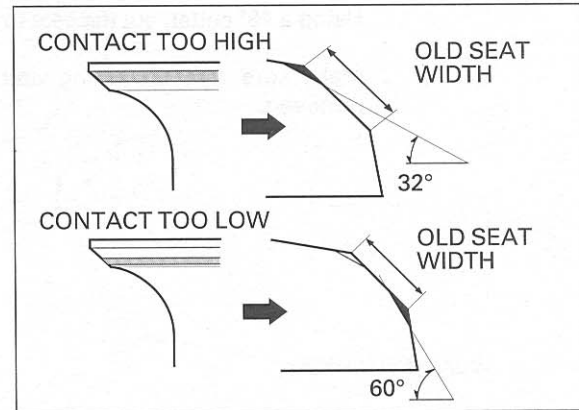
**NOTE:**

- Follow the refacer manufacturer's operating instructions.
- Be careful not to grind the seat more than necessary.



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

If the contact area is too low on the valve, the seat must be raised using a 60° inner cutter. Refinish the seat to specifications, using a 45° finish cutter.

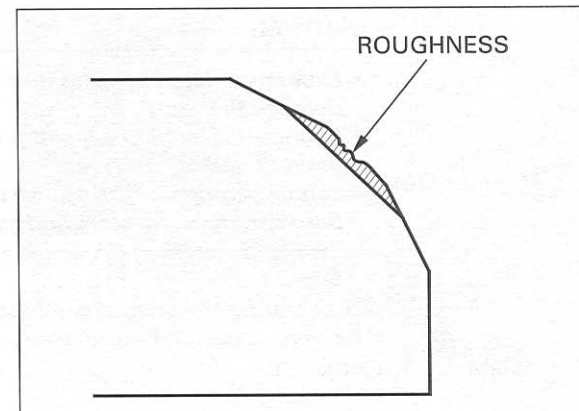


Using a 45° cutter, remove any roughness or irregularities from the seat.

**TOOLS:**

- Valve seat cutter, 33 mm (45° IN) 07780-0010800
- Valve seat cutter, 40 mm (45° EX) 07780-0010500
- Valve seat cutter holder 07781-0010202

or equivalent commercially available in U. S. A.

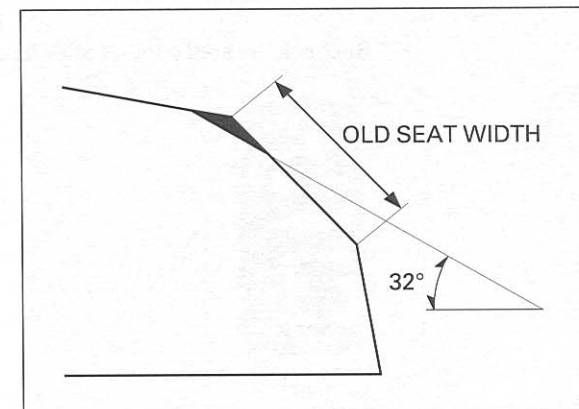


Using a 32° cutter, remove 1/4 of the existing valve seat material.

**TOOLS:**

- Valve seat cutter, 35 mm (32° IN) 07780-0012300
- Valve seat cutter, 42 mm (32° EX) 07780-0013000
- Valve seat cutter holder 07781-0010202

or equivalent commercially available in U. S. A.



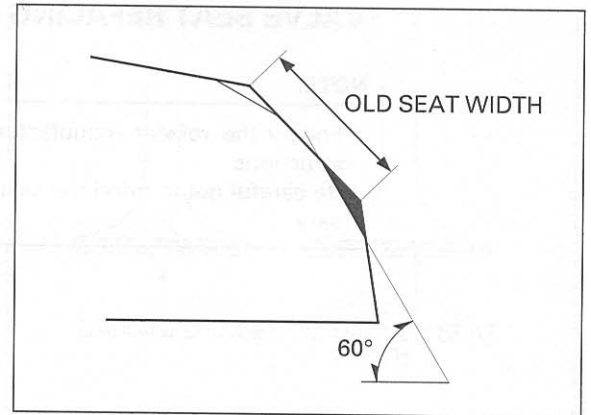
## CYLINDER HEAD/VALVE

Using a 60° cutter, remove the bottom 1/4 of the old seat.

### TOOLS:

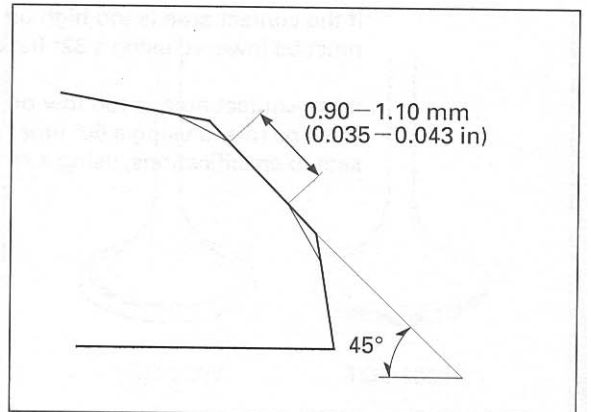
Valve seat cutter, 37.5 mm (60° IN)	07780-0014100
Valve seat cutter, 42 mm (60° EX)	07780-0014400
Valve seat cutter holder	07781-0010202

or equivalent commercially available in U. S. A.



Using a 45° cutter, cut the seat to the proper width.

Make sure that all pitting and irregularities are removed.



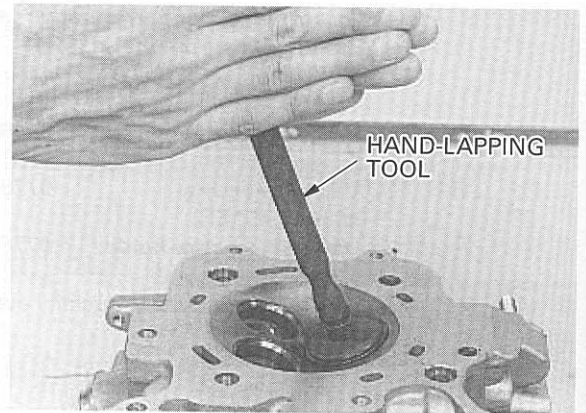
### CAUTION:

- Excessive lapping pressure may deform or damage the seat.
- Change the angle of lapping tool frequently to prevent uneven seat wear.
- Lapping compound can cause damage if it enters between the valve stem and guide.

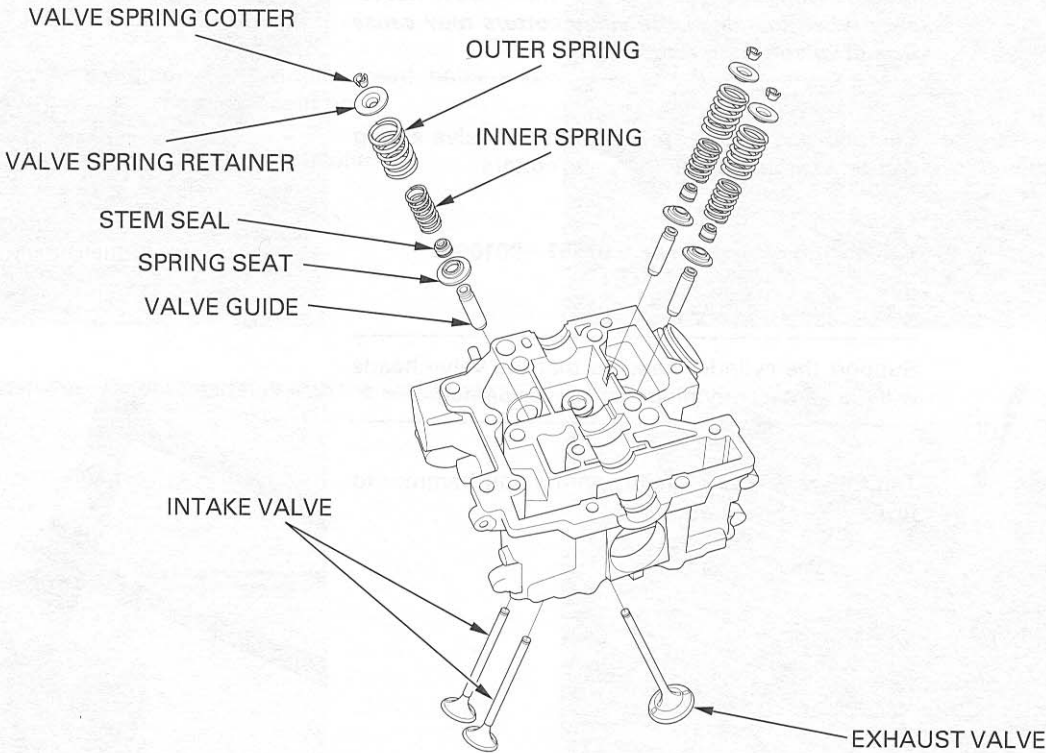
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

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

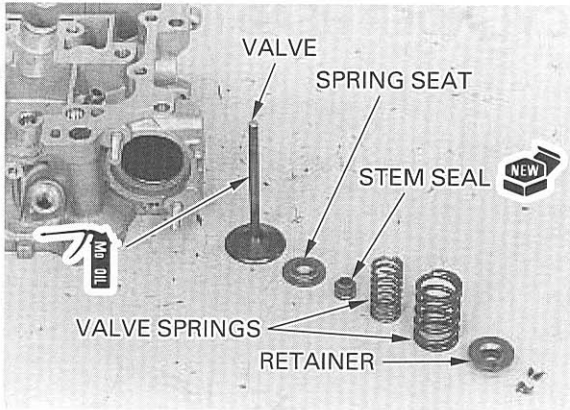
Recheck the seat contact after lapping.



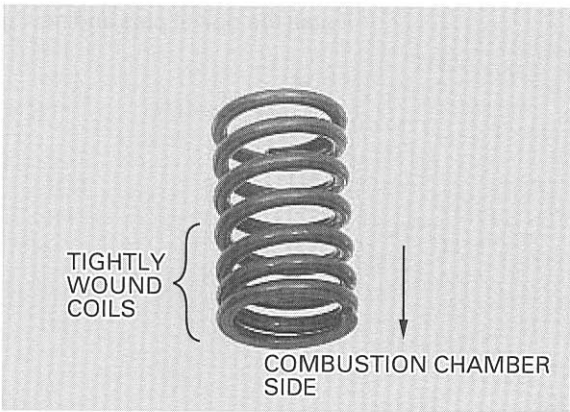
# CYLINDER HEAD ASSEMBLY



Install the spring seats and new stem seals. Lubricate each valve stem with molybdenum oil solution and insert the valves into the valve guides. To avoid damage to the stem seal, turn the valve slowly when inserting.



Install the valve springs and retainers. The outer spring's tightly wound coils should face toward the combustion chamber.



## CYLINDER HEAD/VALVE

### CAUTION:

*Compressing the valve spring more than necessary when installing the valve cotters may cause loss of valve spring tension.*

*To ease installation of the cotters, grease them first.*

Compress the valve springs with the valve spring compressor and install the valve cotters.

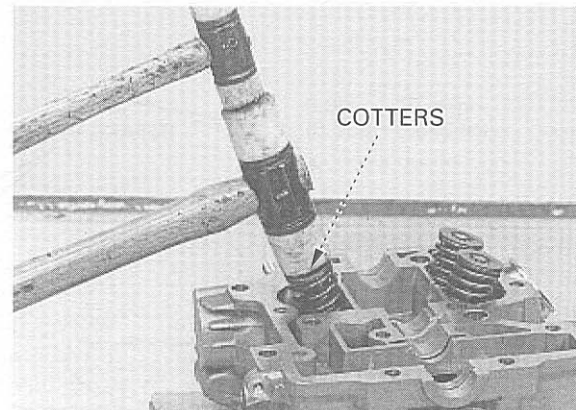
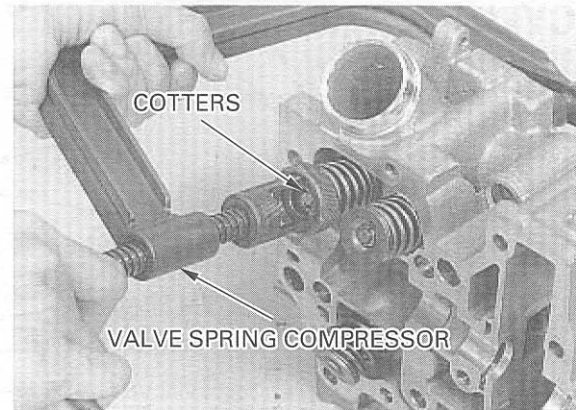
### TOOL:

**Valve spring compressor** 07757-0010000

### NOTE:

Support the cylinder head so that the valve heads will not contact anything that causes damage.

Tap the valve stems gently with a soft hammer to firmly seat the cotters.

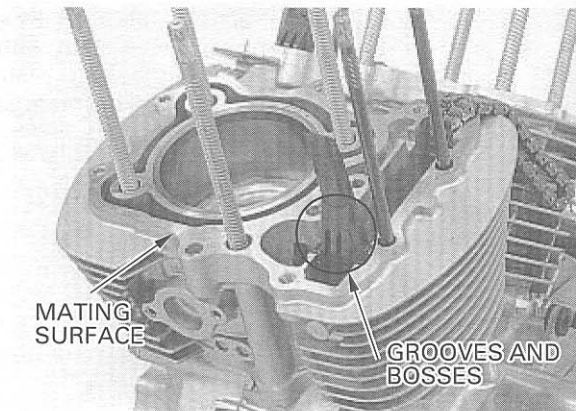


## CYLINDER HEAD INSTALLATION

Clean any gasket material from the cylinder mating surfaces.

Make sure that the cam chain guide bosses are in the grooves of the cylinder.

Install the dowel pins and new gasket.

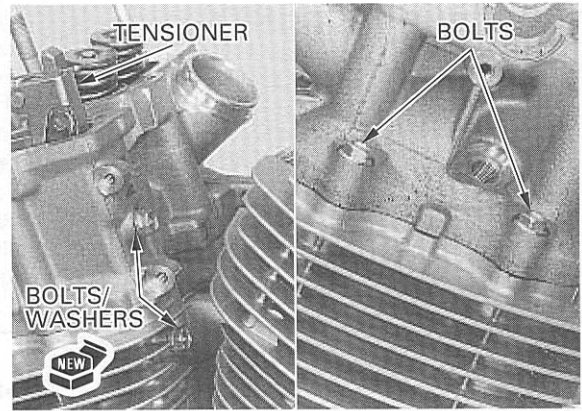


Install the cylinder head onto cylinder.

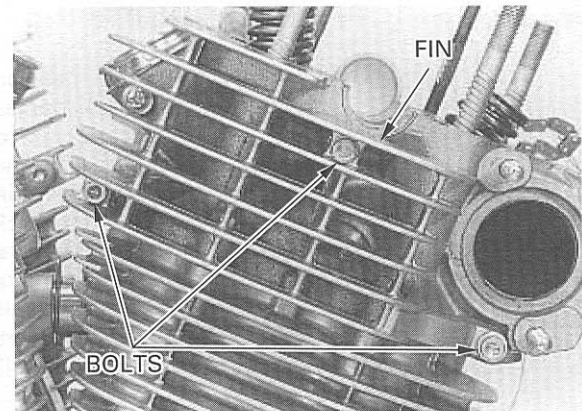
Install the cam chain tensioner with new washers and the bolts.

Install and tighten the cylinder head bolts and tighten the cam chain tensioner bolts.

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



Install the cylinder head fins with the socket bolts.



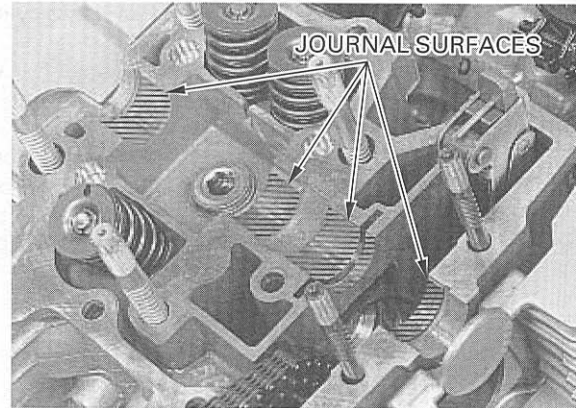


# CAMSHAFT INSTALLATION

**NOTE:**

- If both front and rear camshafts were removed, start the installation with the front cylinder at the point shown below.
- Even if you are servicing either the front or rear cylinder head, the other cylinder head cover must be removed and the other camshaft position must be checked.

Lubricate the camshaft journal surfaces of the cylinder head with molybdenum oil solution.



## FRONT CYLINDER

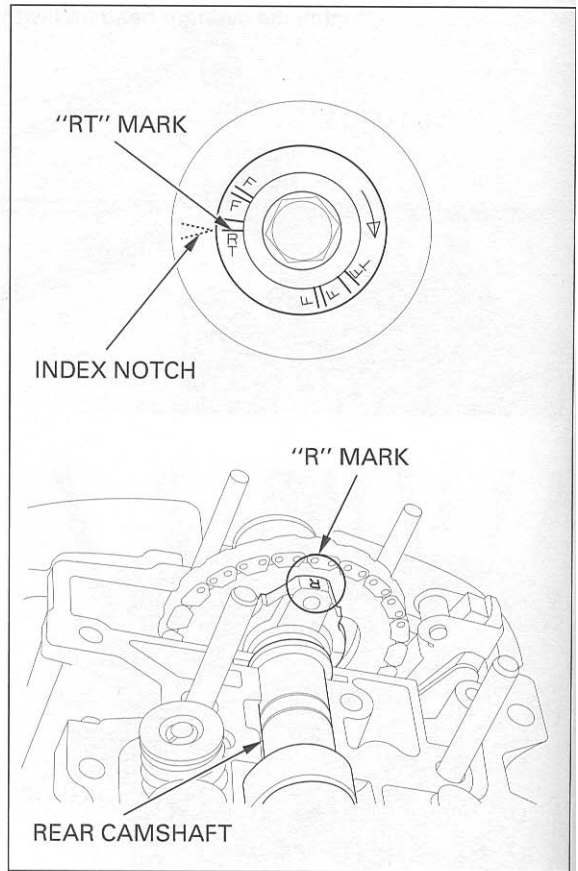
*The rear cylinder has not been serviced begin here:*

Remove the rear cylinder head cover and check the rear cylinder camshaft position as follows:

Remove the timing hole cap, turn the crankshaft clockwise and align the "RT" mark on the ignition pulse generator rotor with the index notch on the right crankcase cover, then check the identification mark "R" on the rear camshaft flange.

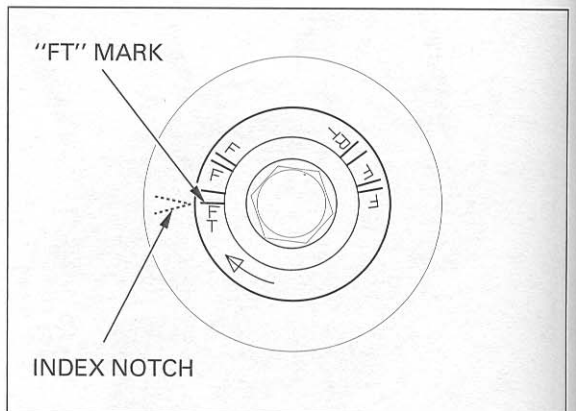
– If the "R" mark faces up, turn the crankshaft clockwise  $1\frac{3}{8}$  (495°) turn (align the "FT" mark on the ignition pulse generator rotor with the index notch) and begin installation of the front camshaft.

– If the "R" mark faces down (cannot be seen), turn the crankshaft clockwise  $\frac{3}{8}$  (135°) turn (align the "FT" mark with the index notch) and begin installation of the front camshaft.



*If both camshafts have been serviced, begin installation of the front camshaft here.*

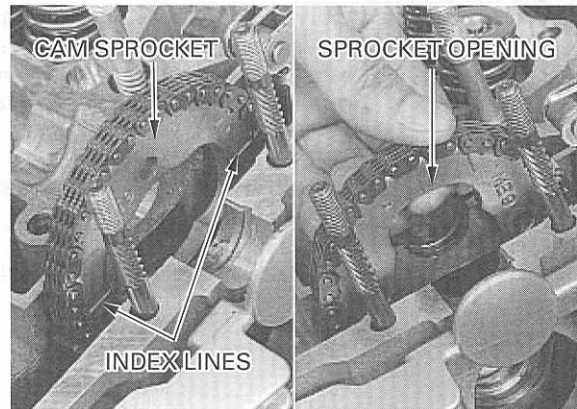
Align the "FT" mark on the ignition pulse generator rotor with the index notch on the right crankcase cover.



Install the cam sprocket onto the cam chain with the index lines facing outside and temporarily align the index lines with the upper surface of the cylinder head.

*Pressing on the tensioner with a flat blade screwdriver will make sprocket installation easier.*

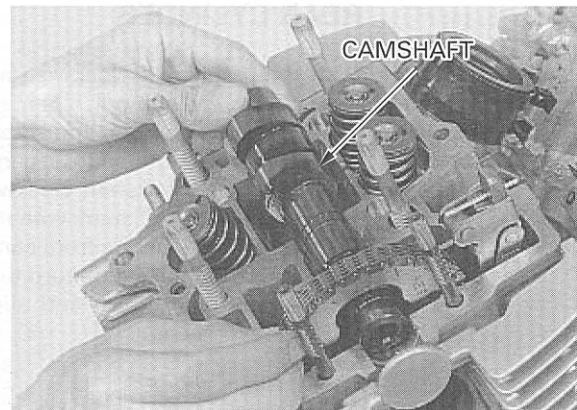
Turn the crankshaft clockwise half a turn (180°) so that the cam sprocket opening is in the position shown (cam sprocket turned a quarter of turn [90°]) while holding the sprocket.



**NOTE:**

The camshafts are identified by marks on their flanges.

- "F" : Front cylinder camshaft
- "R" : Rear cylinder camshaft



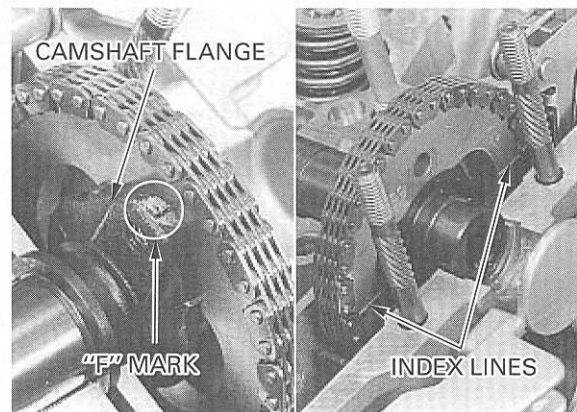
Install the camshaft onto the cylinder head through the cam sprocket.

Turn the crankshaft counterclockwise half a turn and realign the index lines with the upper surface of the cylinder head (see above).

Place the camshaft into its correct position with the "F" mark on the flange facing up and install the cam sprocket on the camshaft flange securely.

**NOTE:**

Be sure that the index lines on the cam sprocket align with the upper surface of the cylinder head when the "FT" mark on the ignition pulse generator rotor is aligned with the index notch on the right crankcase cover (page 8-22).

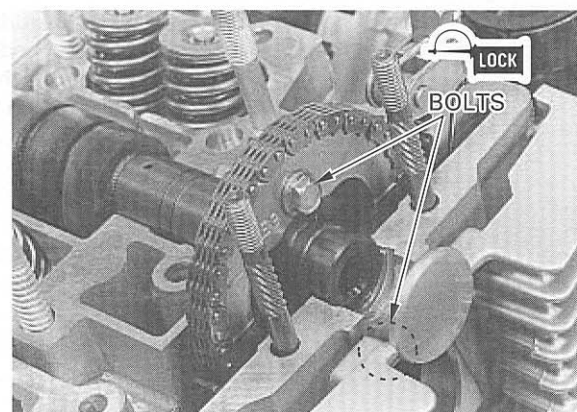


Apply locking agent to the sprocket bolt threads. Align the bolt holes in the sprocket and camshaft flange and install the cam sprocket bolt.

Turn the crankshaft one revolution. Apply locking agent to the remaining sprocket bolt threads and install the cam sprocket bolt. Tighten it to the specified torque.

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

Turn the crankshaft one revolution again and tighten the other bolt to the same torque.



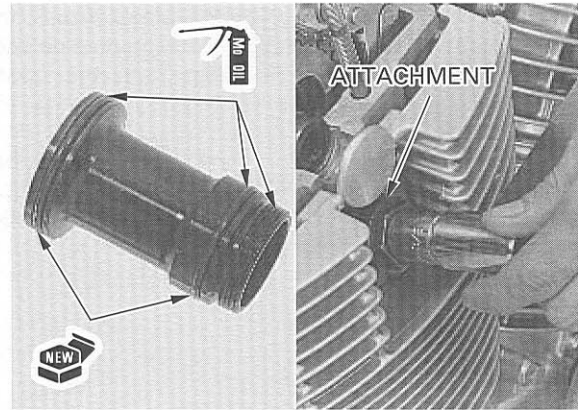
## CYLINDER HEAD/VALVE

Apply molybdenum oil solution to the spark plug sleeve threads and O-ring grooves.  
Install new O-rings into the sleeve grooves.  
Install the sleeve using the special tool.

**TOOL:**

**Fork tube holder attachment** 07930 – KA50100

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

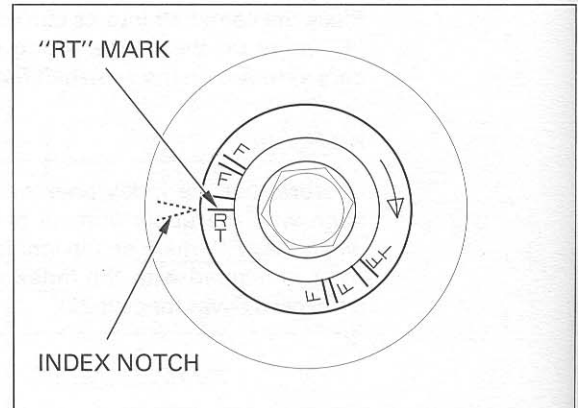
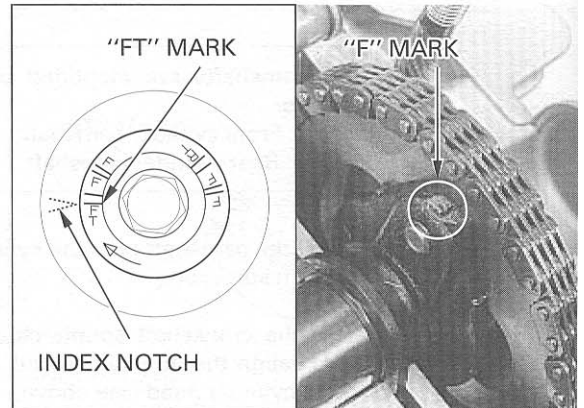


## REAR CYLINDER

*If the front cylinder has not been serviced, remove the front cylinder head cover and begin installation of the rear camshaft.*

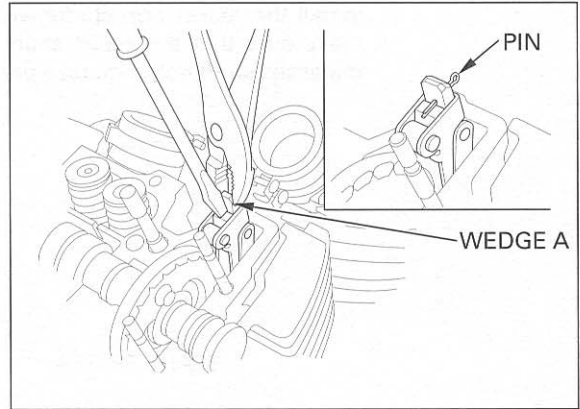
Turn the crankshaft clockwise and align the "FT" mark on the ignition pulse generator rotor with the index notch on the right crankcase cover.

- If the "F" mark on the front camshaft flange faces up, turn the crankshaft clockwise 5/8 (225°) turn and align the "RT" mark with the index notch.
- If the "F" mark on the front camshaft flange faces down (cannot be seen), turn the crankshaft clockwise 1-5/8 (585°) turn and align the "RT" mark with the index notch.

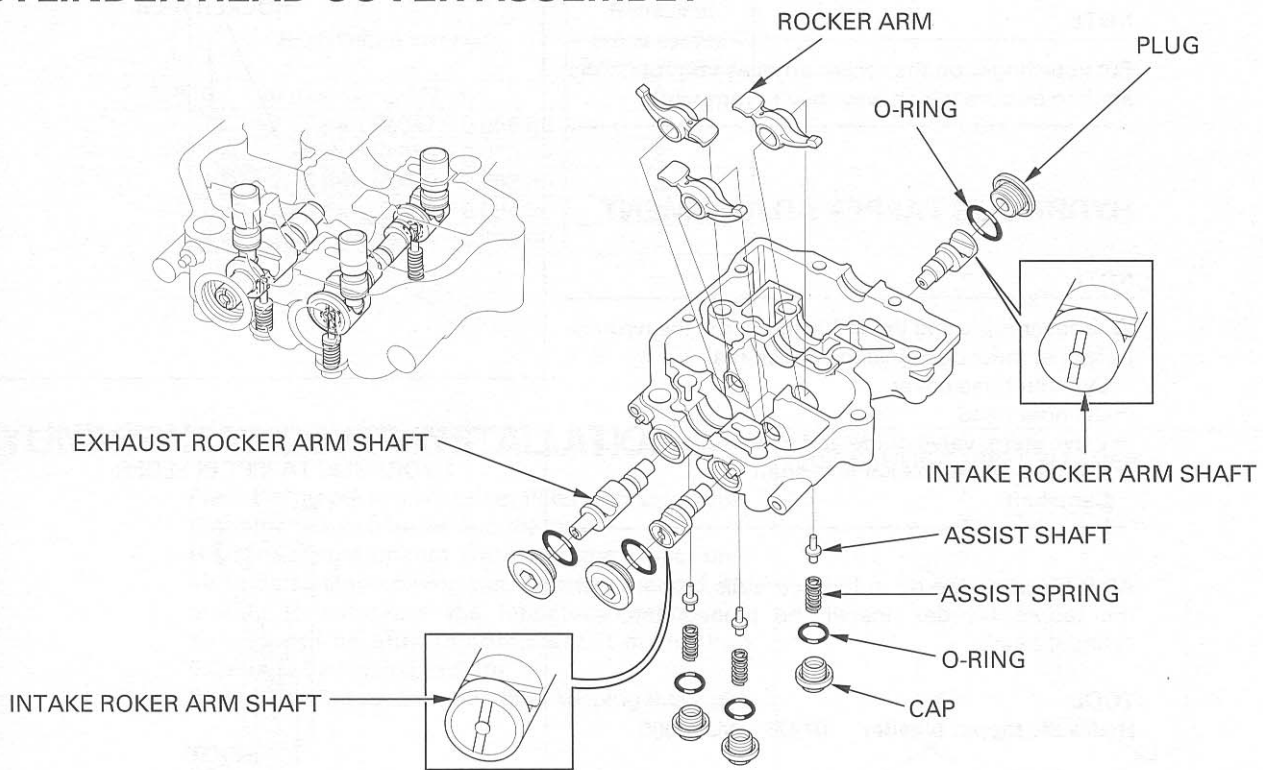


The remainder of the rear cylinder camshaft installation is the same as the procedures described on page 8-23 except the mark on the camshaft flange that should face up should be an "R".

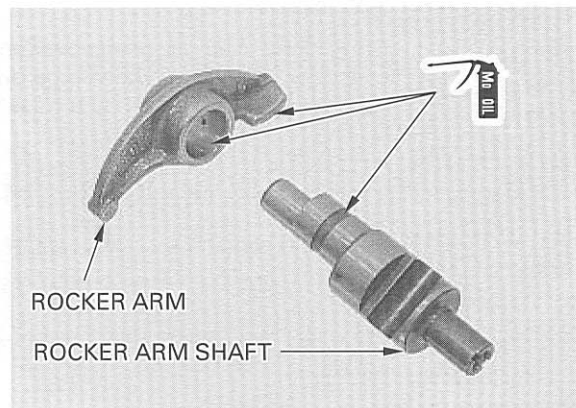
Remove the 2 mm pin holding the cam chain tensioner wedge A for both tensioners.



### CYLINDER HEAD COVER ASSEMBLY

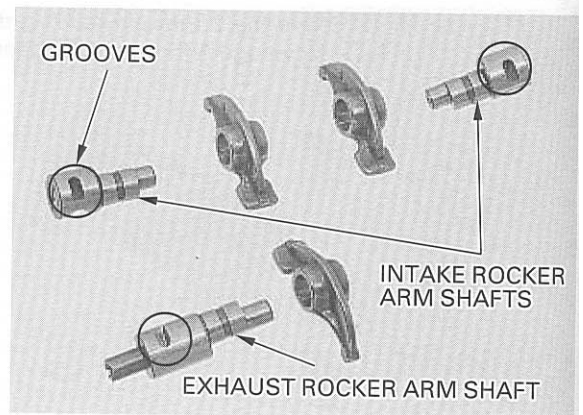


Apply molybdenum oil solution to the rocker arm slipper surfaces and rocker arm shaft sliding surfaces.



## CYLINDER HEAD/VALVE

Install the rocker arm shafts with the rocker arms, make sure that the assist shaft groove are facing the assist shaft hole side (see previous page).



Rotate each rocker arm shaft so that the arms are moved in toward the center of the cover.

### NOTE:

Put your finger on the rocker arms as you rotate the shaft to be sure which way they're moving.

## HYDRAULIC TAPPET ADJUSTMENT

### NOTE:

Whenever replacing the following parts, the hydraulic tappet must be adjusted with shims.

- Cylinder head cover
- Cylinder head
- Valve stem, valve guide and valve seat refacing
- Rocker arm and rocker arm shaft
- Camshaft

After bleeding the oil in the hydraulic tappets with the tappet bleeder, install the tappets into the cylinder head.

### TOOL:

**Hydraulic tappet bleeder** 07973-MJ00000

Rotate the crankshaft clockwise and align the "FT" mark ("RT" mark for rear cylinder) with the index notch (page 8-22 or 8-24), with the cam lobes facing down.

Install the cylinder head cover and tighten the bolts and nuts with the water pipe and washers (Install the washers indicated by the "▲" marks.)

### TORQUE:

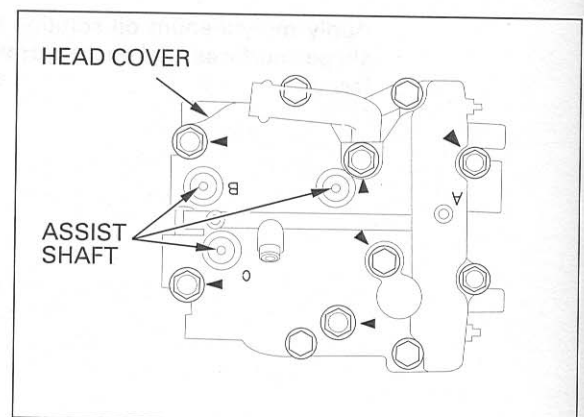
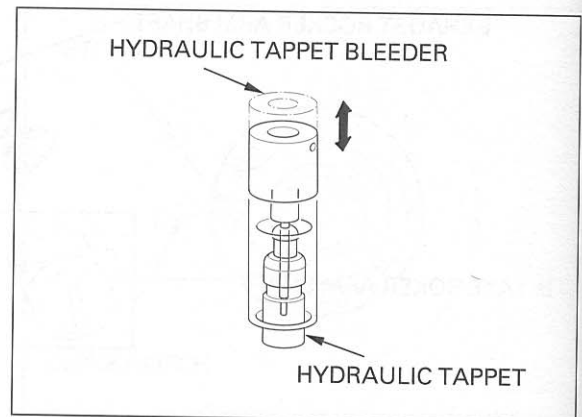
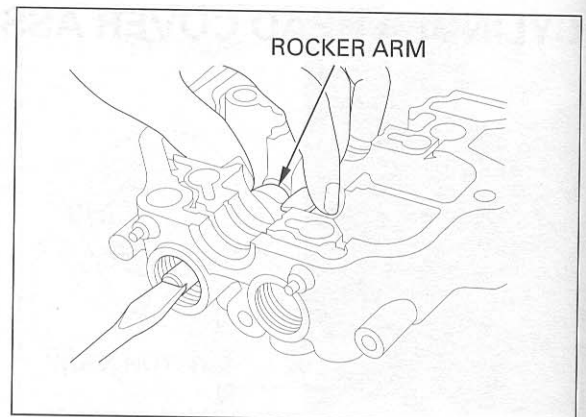
**8 mm bolt and nut:** 26 N·m (2.7 kgf·m, 20 lbf·ft)

**10 mm nut:**

**VT1100C:** 39 N·m (4.0 kgf·m, 29 lbf·ft)

**VT1100T:** 43 N·m (4.4 kgf·m, 32 lbf·ft)

Install the assist shafts into their holes in the cylinder head cover.



Install a suitable plate to the front or rear cylinder head cover for the magnetic base and place a dial indicator on the assist shaft.

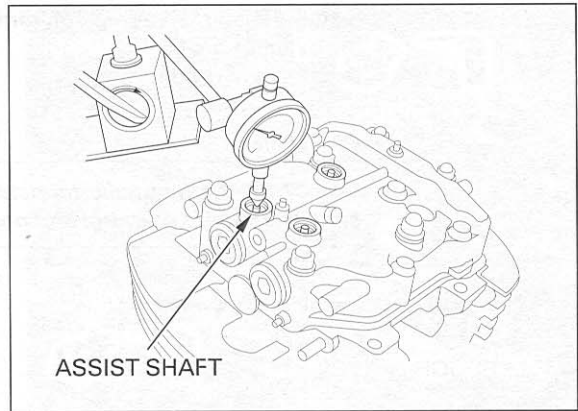
Measure the assist shaft stroke by rotating the crankshaft clockwise two times.

**NOTE:**

The amount of assist shaft stroke will determine the number of tappet shims needed.

Determine and record the number of shims required for each tappet according to the following chart.

Assist shaft stroke	Number of shims needed 0.5 mm (0.02 in)
0 – 1.20 mm (0 – 0.047 in)	0
1.20 – 1.50 mm (0.047 – 0.059 in)	1
1.50 – 1.80 mm (0.059 – 0.070 in)	2
1.80 – 2.10 mm (0.070 – 0.083 in)	3
2.10 – 2.40 mm (0.083 – 0.094 in)	4
2.40 – 2.70 mm (0.094 – 0.106 in)	5

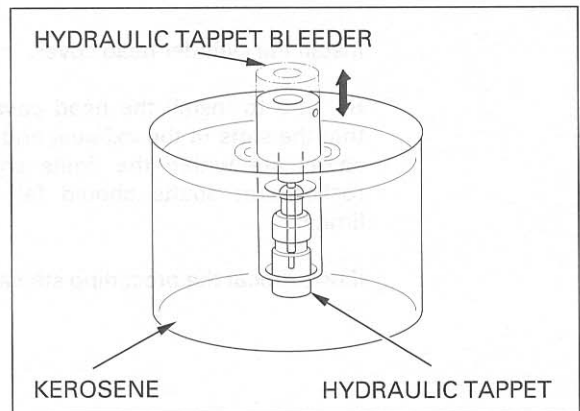


## CYLINDER HEAD COVER INSTALLATION

Place the tappet in a container filled with kerosene. Place the tappet bleeder into the tappet. Hold the tappet upright and pump the tappet until air bubbles stop coming out. Remove the tool, try quickly to compress the tappet by hand. You should not be able to compress it more than 0.2 mm (0.008 in) (page 8-10). Remove the tappet from the fluid keeping it upright.

**TOOL:**

**Hydraulic tappet bleeder** 07973 – MJ00000



Pour engine oil into the oil pocket in the cylinder head until the cam lobes are covered.



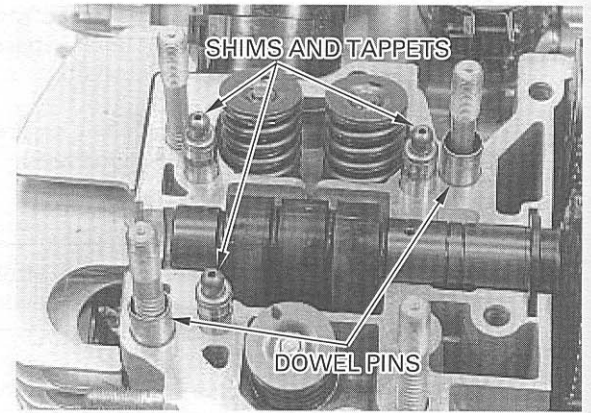
## CYLINDER HEAD/VALVE

Install the shims into each hydraulic tappet hole in the cylinder head.  
Install the hydraulic tappets.

### CAUTION:

*Do not tilt the hydraulic tappets more than necessary; keep them as upright as possible.*

Install the dowel pins.



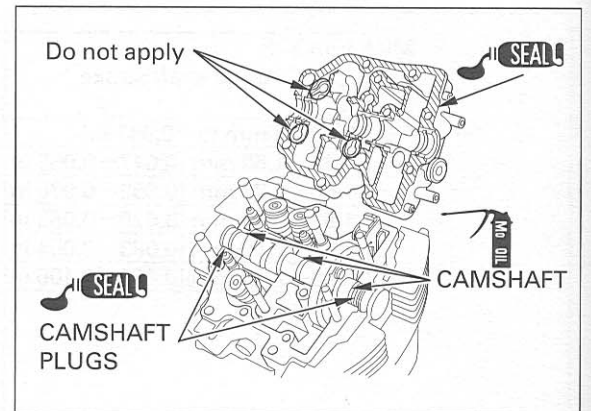
Rotate the crankshaft clockwise and align the "FT" mark ("RT" mark for rear cylinder) with the index notch, that is cam lobes facing down.

Apply liquid sealant to the camshaft plugs where they contact the cylinder head and install them.

Apply liquid sealant to the mating surface (shadowed area) of the cylinder head cover.

### NOTE:

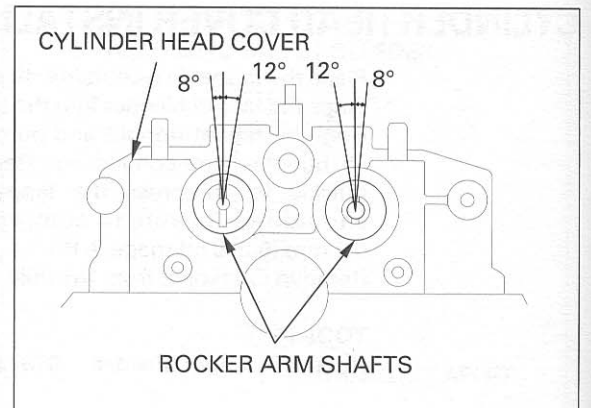
Do not apply sealant around the hydraulic tappet holes. Sealant in these locations could cause a hydraulic tappet failure.



Install the cylinder head cover.

Be sure to install the head cover securely, check that the slots in the exhaust and intake rocker arm shafts are within the limits shown (Both intake rocker arm shafts should fall within the same limits).

If not, repeat the preceding step and recheck.



Install the bolts and nuts with water pipe and washers (Install the washers indicated by the "▲" marks.) and tighten them in a crisscross pattern in 2-3 steps.

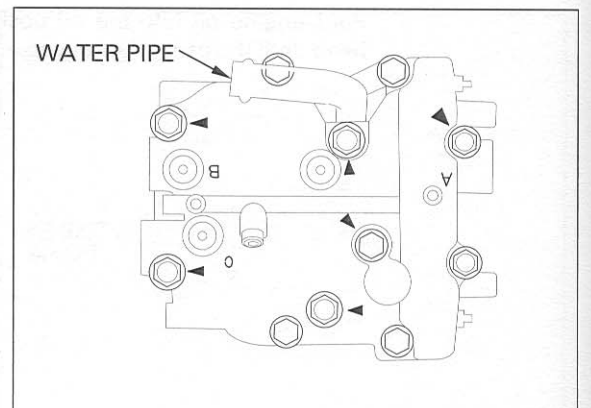
### TORQUE:

**8 mm bolt and nut:** 26 N·m (2.7 kgf·m , 20 lbf·ft)

**10 mm nut:**

**VT1100C:** 39 N·m (4.0 kgf·m , 29 lbf·ft)

**VT1100T:** 43 N·m (4.4 kgf·m , 32 lbf·ft)



Install the assist shafts into their holes in the cylinder head cover.

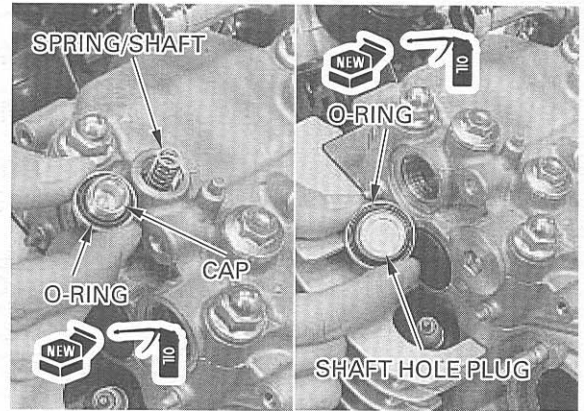
Install the assist springs onto the assist shaft.

Apply engine oil to new O-rings and install the assist shaft caps with the O-rings.

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

Apply engine oil to new O-rings and install the rocker arm shaft hole plugs with the O-rings.

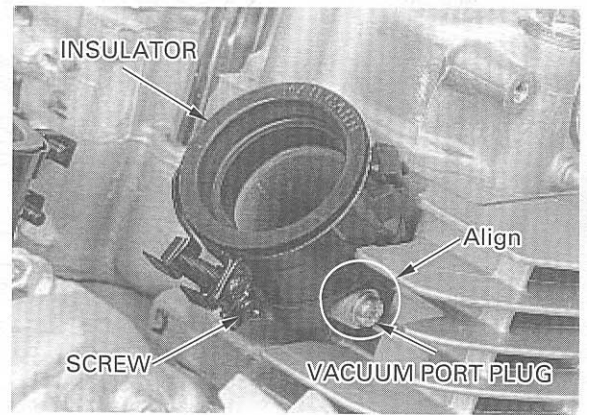
**TORQUE:** 39 N·m (4.0 kgf·m , 29 lbf·ft)



If the carburetor insulators are removed, install the insulators by aligning the groove in the insulator with the vacuum port plug on the intake port and tighten the band screws securely.

**TORQUE:** 2.0 N·m (0.2 kgf·m , 1.4 lbf·ft)

Install the engine in the frame (page 7-10 or 7-18).







# 9. CYLINDER/PISTON

SERVICE INFORMATION	9-1	PISTON RING INSTALLATION	9-8
TROUBLESHOOTING	9-2	PISTON INSTALLATION	9-8
CYLINDER REMOVAL	9-3	CYLINDER INSTALLATION	9-9
PISTON REMOVAL	9-4		

## SERVICE INFORMATION

### GENERAL

- To service the cylinder/piston, the engine must be removed from the frame.
- Take care not to damage the cylinder wall and piston.
- Be careful not to damage the mating surfaces when removing the cylinder.
- When removing the piston, clean carbon and sludge from the top of the cylinder.
- When disassembling, mark and store the disassembled parts to ensure that they are reinstalled in their original locations.

### SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cylinder	I. D.	87.500 – 87.515 (3.4449 – 3.4455)	87.545 (3.4466)	
	Out of round	—————	0.05 (0.002)	
	Taper	—————	0.05 (0.002)	
	Warpage	—————	0.05 (0.002)	
Piston, piston ring and piston pin	Piston mark direction	“IN” mark toward the intake side	—————	
	Piston O. D.	87.470 – 87.490 (3.4437 – 3.4445) at 10 (0.4) from the bottom	87.41 (3.441)	
	Piston pin hole I. D.	22.002 – 22.008 (0.8662 – 0.8665)	22.018 (0.8668)	
	Piston pin O. D.	21.994 – 22.000 (0.8659 – 0.8661)	21.984 (0.8655)	
	Connecting rod small end I. D.	22.020 – 22.041 (0.8669 – 0.8678)	22.051 (0.8681)	
	Cylinder-to-piston clearance	0.010 – 0.045 (0.0004 – 0.0018)	0.32 (0.013)	
	Piston-to-piston pin clearance	0.002 – 0.014 (0.0001 – 0.0006)	0.034 (0.0013)	
	Connecting rod-to-piston pin clearance	0.020 – 0.047 (0.0008 – 0.0019)	0.07 (0.003)	
	Piston ring-to-groove clearance	Top	0.020 – 0.050 (0.0008 – 0.0020)	0.25 (0.010)
		Second	0.015 – 0.045 (0.0006 – 0.0018)	0.20 (0.008)
	Piston ring end gap	Top/Second	0.20 – 0.35 (0.008 – 0.014)	0.50 (0.020)
		Oil (side rail)	0.30 – 0.90 (0.012 – 0.035)	1.1 (0.04)
	Piston ring mark direction	Top/second	Marking facing up	—————

### TROUBLESHOOTING

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

- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

#### **Compression too high, overheating or knocking**

- Excessive carbon built-up on piston or combustion chamber.

#### **Excessive smoke**

- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

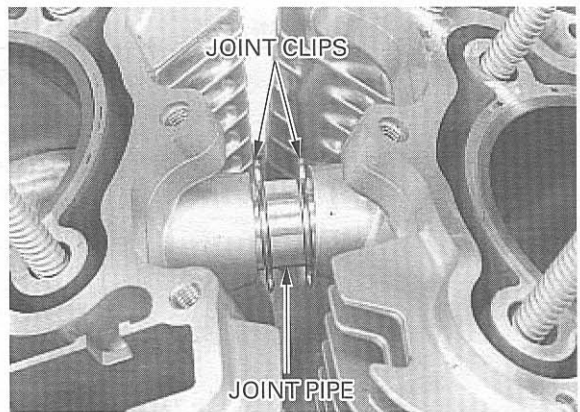
#### **Abnormal noise (piston)**

- Worn piston pin or piston pin hole
- Worn cylinder, piston or piston ring
- Worn connecting rod small end

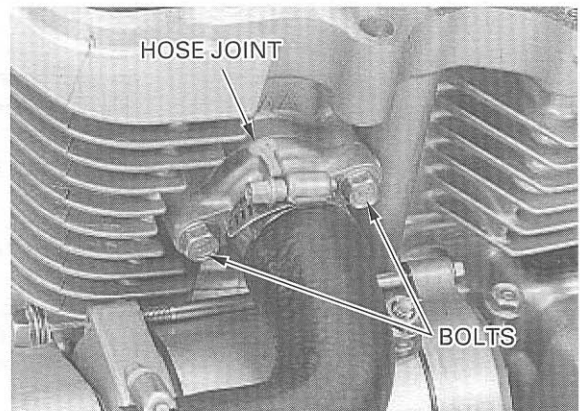
## CYLINDER REMOVAL

Remove the cylinder head (page 8-10).

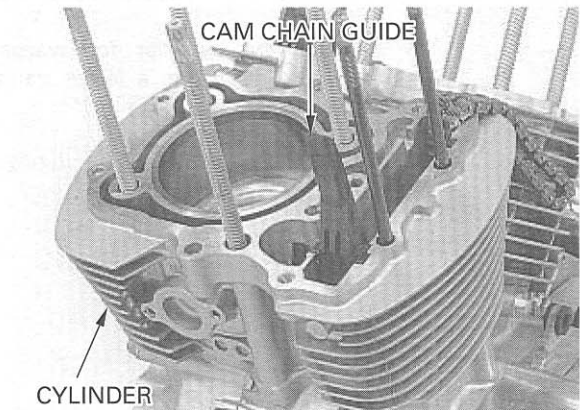
Remove the joint clip and disconnect the water joint pipe by sliding it.



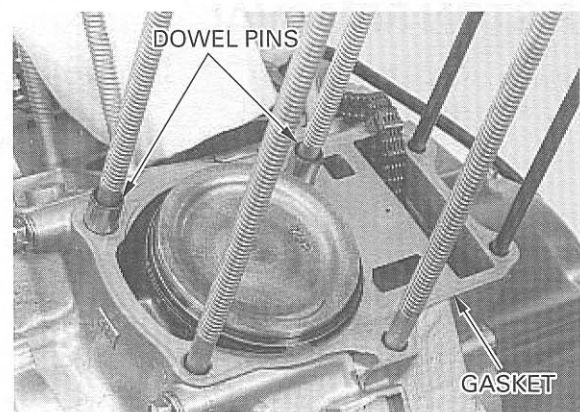
Rear cylinder only:  
Remove the two bolts and water hose joint.



Remove the cam chain guide.  
Remove the cylinder.



Remove the gasket and dowel pins.



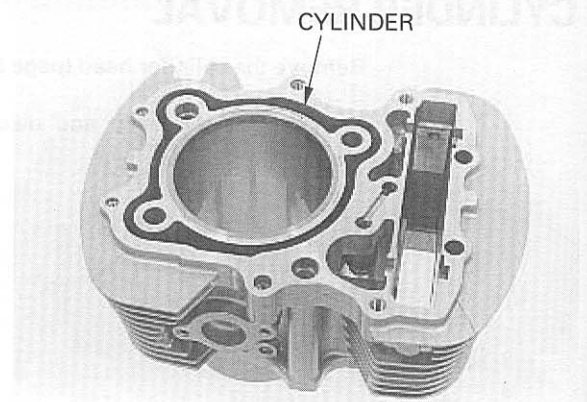
## CYLINDER/PISTON

### CAUTION:

**Avoid damaging the gasket surfaces.**

*The gasket will come off easier if it is soaked in solvent.*

Clean the top of the each cylinder thoroughly.



### CYLINDER INSPECTION

Inspect the cylinder bore for scratch or wear. Measure the cylinder I. D. at three levels in the X and Y axis. Take the maximum reading to determine the cylinder wear.

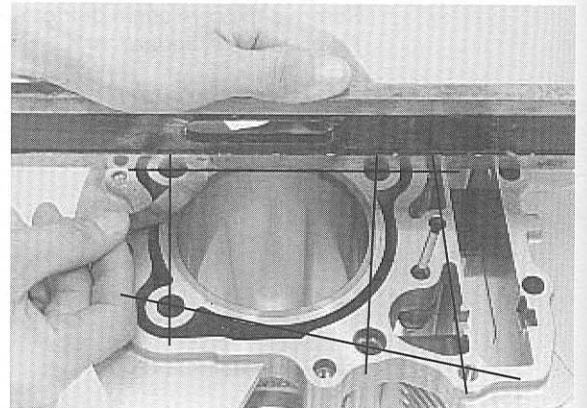
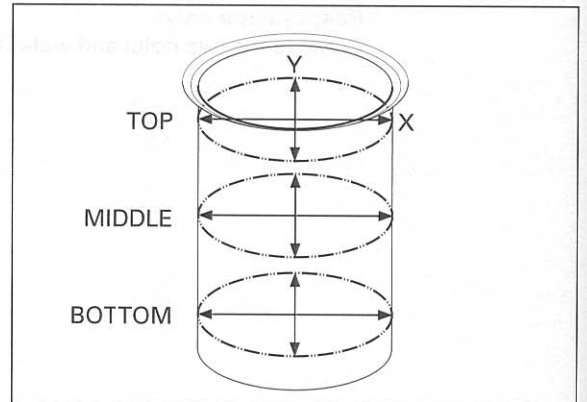
**SERVICE LIMIT:** 87.545 mm (3.4466 in)

Calculate the cylinder for taper and out of round at three levels in an X and Y axis. Take the maximum reading to determine the taper and out of round.

**SERVICE LIMIT: Taper:** 0.05 mm (0.002 in)  
**Out of round:** 0.05 mm (0.002 in)

Check the cylinder for warpage by placing a straight edge and a feeler gauge across the stud holes as shown.

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

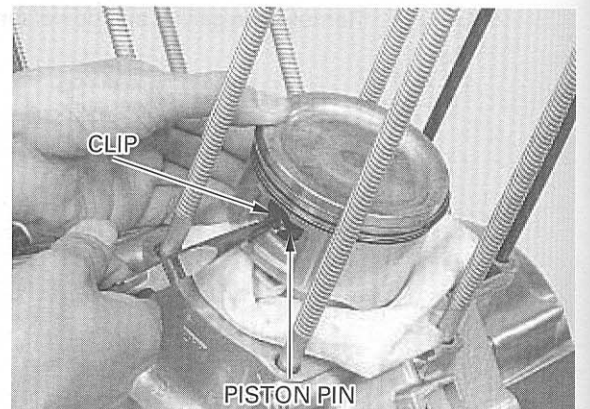


### PISTON REMOVAL

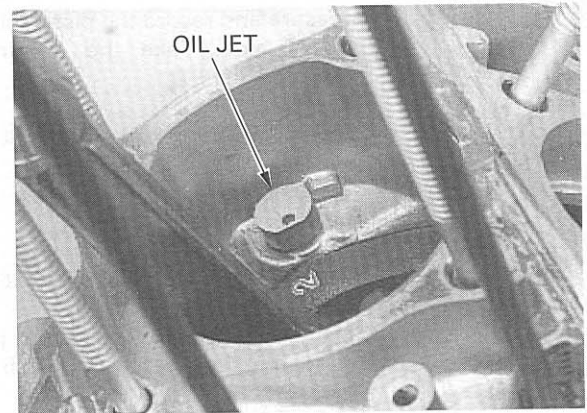
*Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.*

Remove the piston pin clip using a pair of pliers.

Remove the piston pin and remove the piston.



Remove the oil jets and check for clogging.



Inspect the piston rings for movement by rotating the rings. The rings should be able to move in their grooves without catching.

Spread each piston ring and remove it by lifting it up at a point just opposite the gap.



**CAUTION:**

**Do not damage the piston ring by spreading the ends too far.**

Clean carbon deposits from the piston ring grooves with a ring that will be discarded. Never use the wire brush; it will scratch the groove.

**PISTON/PISTON RING INSPECTION**

Measure and record the piston O. D.

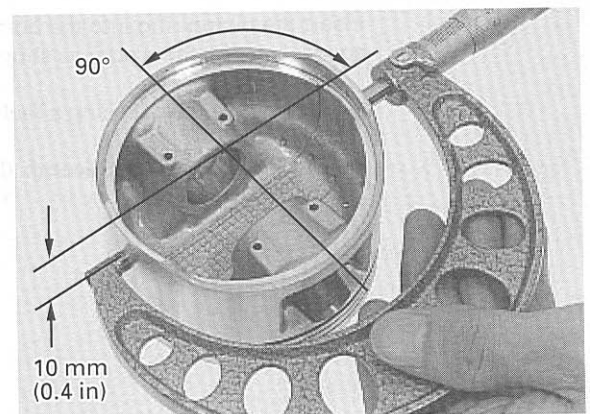
**NOTE:**

Take measurements 10 mm (0.4 in) from the bottom and at 90° to the piston pin hole.

**SERVICE LIMIT:** 87.41 mm (3.441 in)

Calculate the cylinder-to-piston clearance (cylinder I. D.: see previous page).

**SERVICE LIMIT:** 0.32 mm (0.013 in)



## CYLINDER/PISTON

Measure and record the piston pin hole I. D. in an X and Y axis. Take the maximum reading to determine the I. D.

**SERVICE LIMIT:** 22.018 mm (0.8668 in)

Measure and record the piston pin O. D. at three points.

**SERVICE LIMIT:** 21.984 mm (0.8655 in)

Calculate the piston-to-piston pin clearance by subtracting the piston pin O. D. from the piston pin hole I. D.

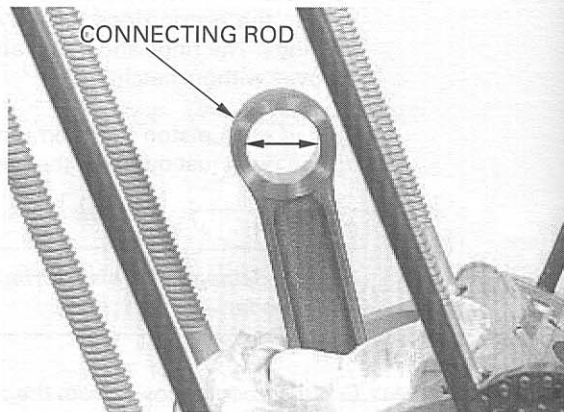
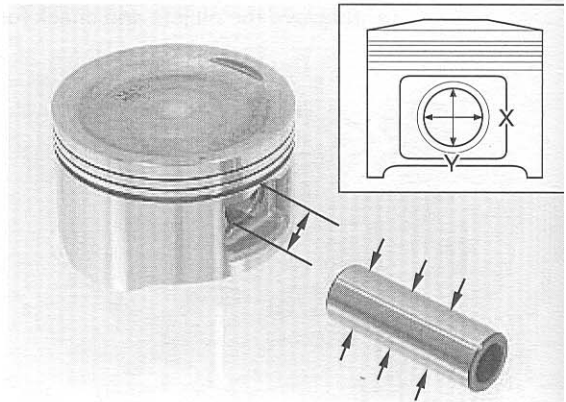
**SERVICE LIMIT:** 0.034 mm (0.0013 in)

Measure and record the connecting rod small end I. D.

**SERVICE LIMIT:** 22.051 mm (0.8681 in)

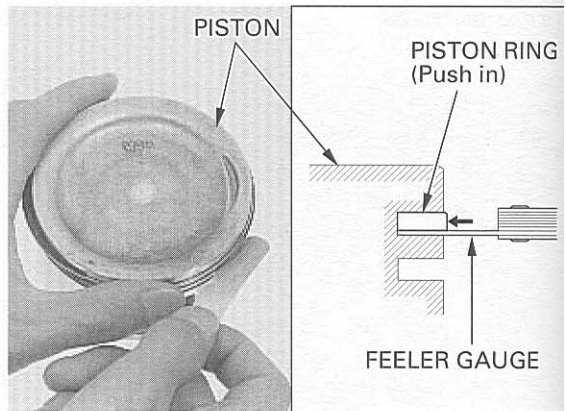
Calculate the connecting rod-to-piston pin clearance by subtracting the piston pin O. D. from the small end I. D.

**SERVICE LIMIT:** 0.07 mm (0.003 in)



Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the clearance using a feeler gauge.

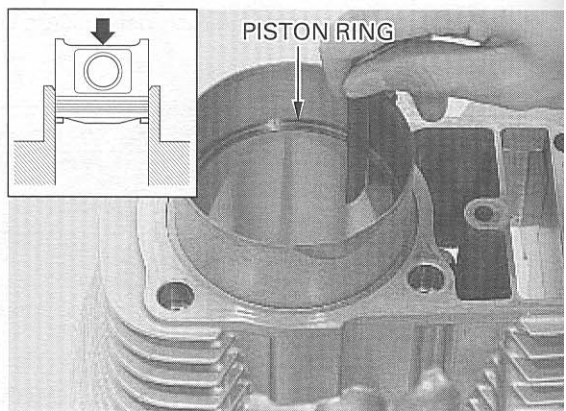
**SERVICE LIMITS:** Top: 0.25 mm (0.010 in)  
Second: 0.20 mm (0.008 in)



Insert the piston ring into the bottom of the cylinder squarely using the piston as shown.

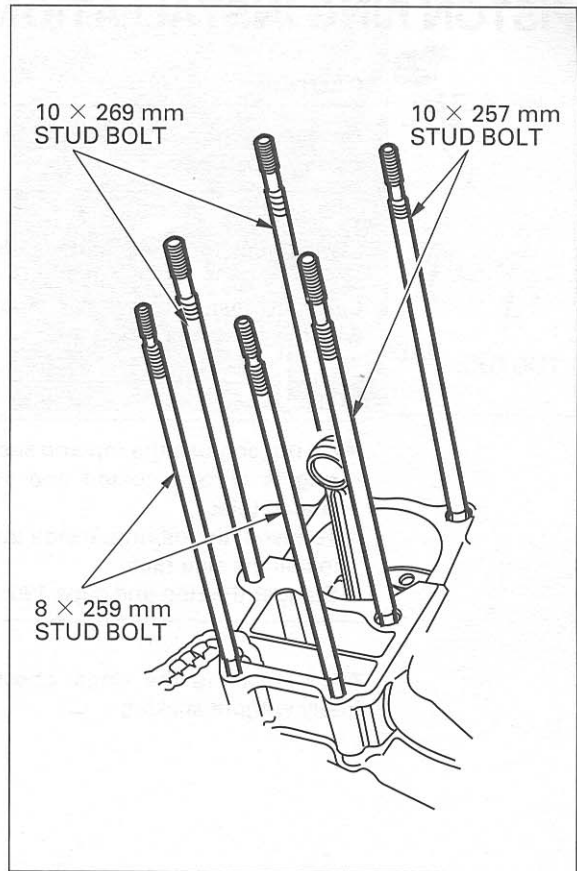
Measure the end gap using a feeler gauge.

**SERVICE LIMITS:** Top/Second: 0.50 mm (0.020 in)  
Oil: 1.1 mm (0.04 in)



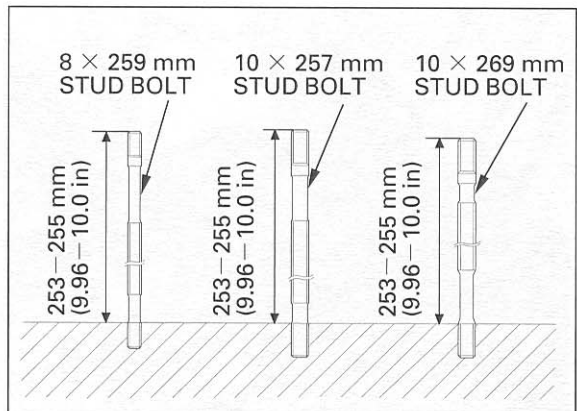
**CYLINDER STUD BOLT REPLACEMENT**

If you will replace the stud bolts, remove the stud bolts from the crankcase.



Install the stud bolts.

After installing, be sure to measure the distance from top of each stud to the crankcase surface as shown.





# PISTON RING INSTALLATION

**CAUTION:**

*Be careful not to damage the piston and rings during assembly.*

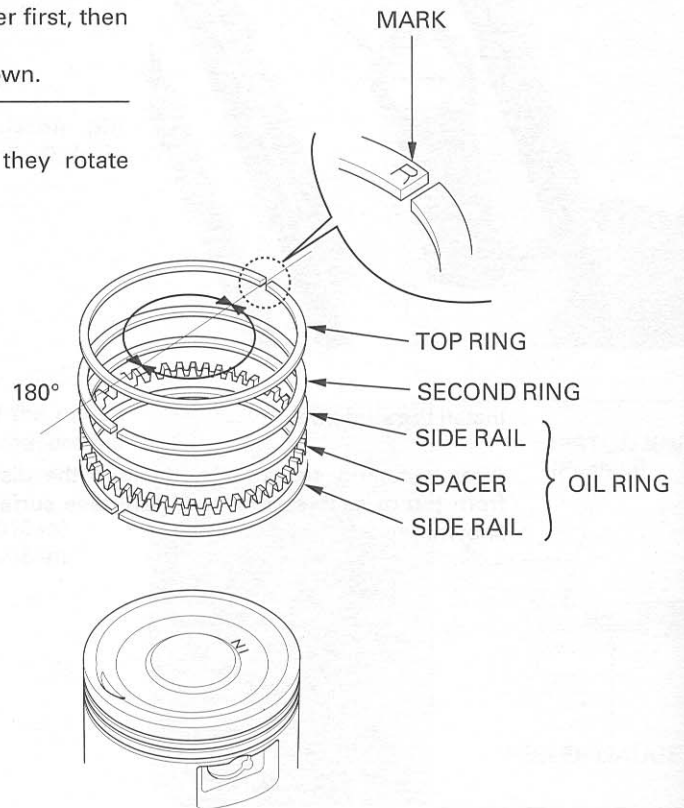
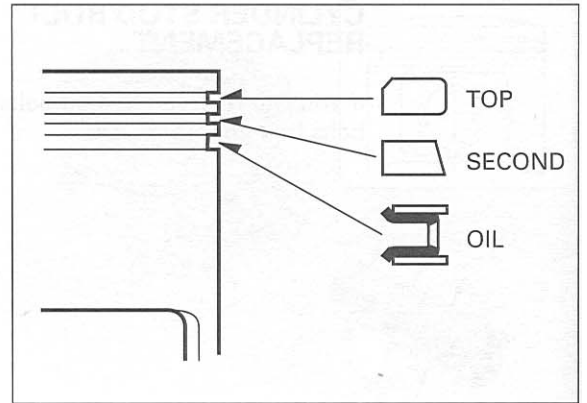
Clean the piston heads, ring lands and skirts.

Carefully install the piston rings onto the piston with the markings facing up.

**NOTE:**

- Do not confuse the top and second rings: The top ring is chrome-coated and second ring is not coated (black).
- To install the oil ring, install the spacer first, then install the side rails.
- Stagger the ring end gaps 180° as shown.

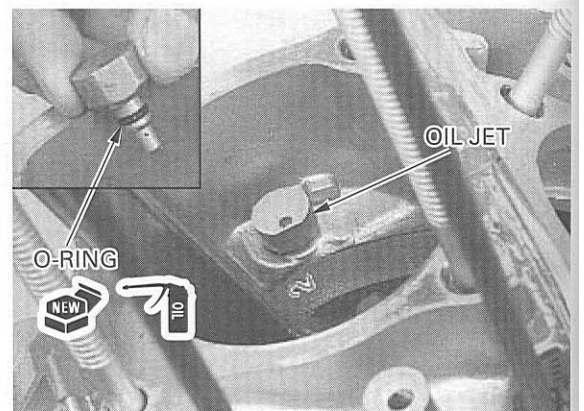
After installing the rings, check that they rotate freely without sticking.



# PISTON INSTALLATION

Apply engine oil to new O-rings and install them onto the oil jets.

Install the oil jets into the crankcase properly as shown (jet hole side facing toward the connecting rod side).



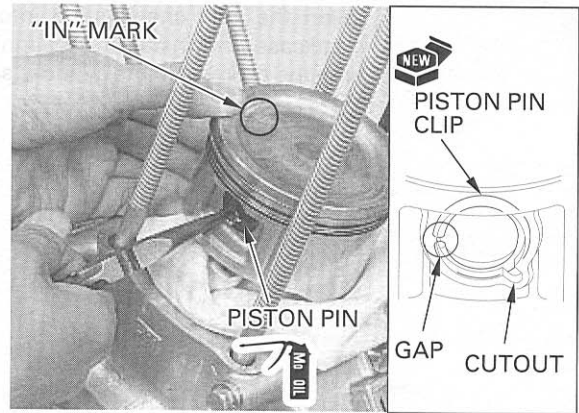
**NOTE:**

Place a clean shop towel over the crankcase to prevent the clip from falling into the crankcase.

Apply molybdenum oil solution to the piston pin outer surface.  
Set the piston over the connecting rod with the "IN" mark facing towards the intake side and install the piston pin through the piston and connecting rod.

*Make sure that the piston pin clips are seated properly and their end gaps are not aligned with the cutouts in the position.*

Install new piston pin clips.

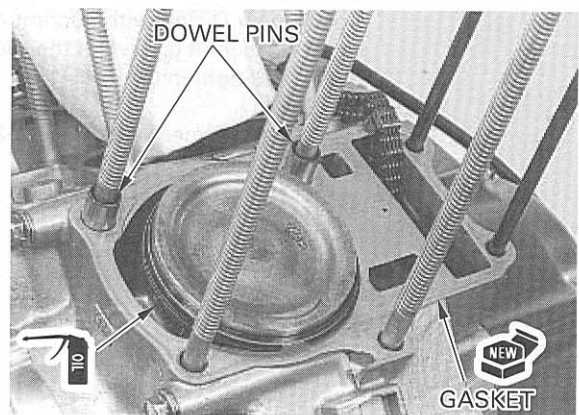


**CYLINDER INSTALLATION**

Clean the gasket surface of the crankcase thoroughly, being careful not to damage it, and careful not to allow gasket material into the crankcase.

Install a new gasket and the dowel pins.

Apply engine oil to the cylinder wall, piston and piston ring outer surfaces.

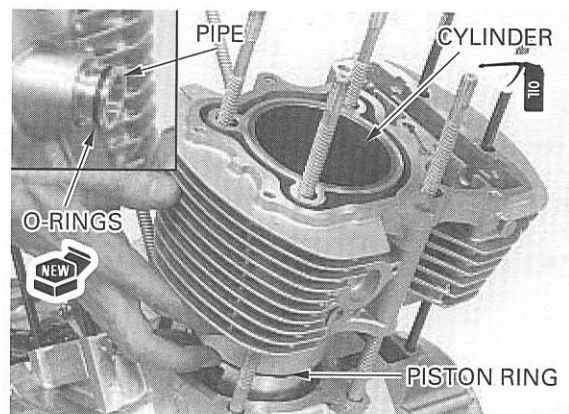


Before installing the cylinder, coat new O-rings with coolant and install them into the end grooves in the water joint pipe and install the joint pipe into the cylinder.

**CAUTION:**

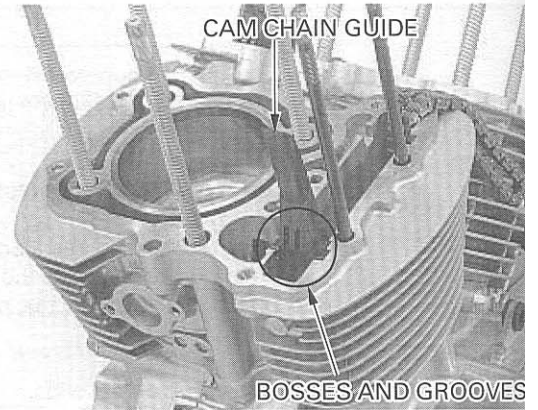
***Be careful not to damage the piston rings and cylinder wall.***

Route the cam chain through the cylinder and install the cylinder over the piston while compressing the piston rings with your fingers.

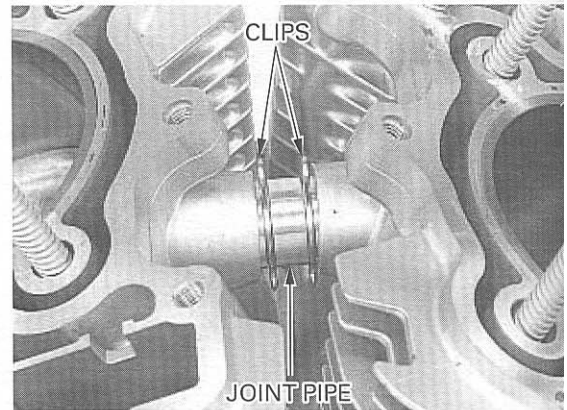


## CYLINDER/PISTON

Insert the cam chain guide into the cylinder and crankcase and install it by aligning the its bosses with the grooves in the cylinder securely.

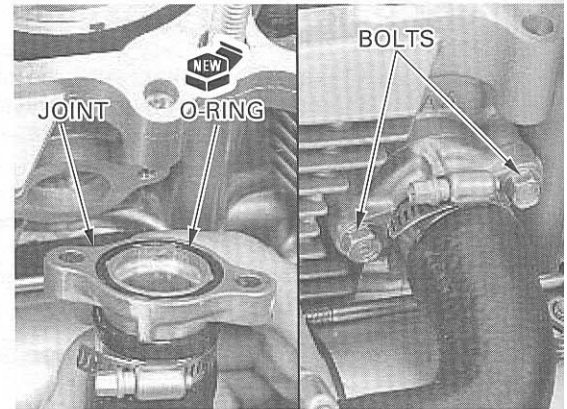


Slide the water joint pipe in position and connect the cylinders.  
Install the joint clips in the joint grooves.

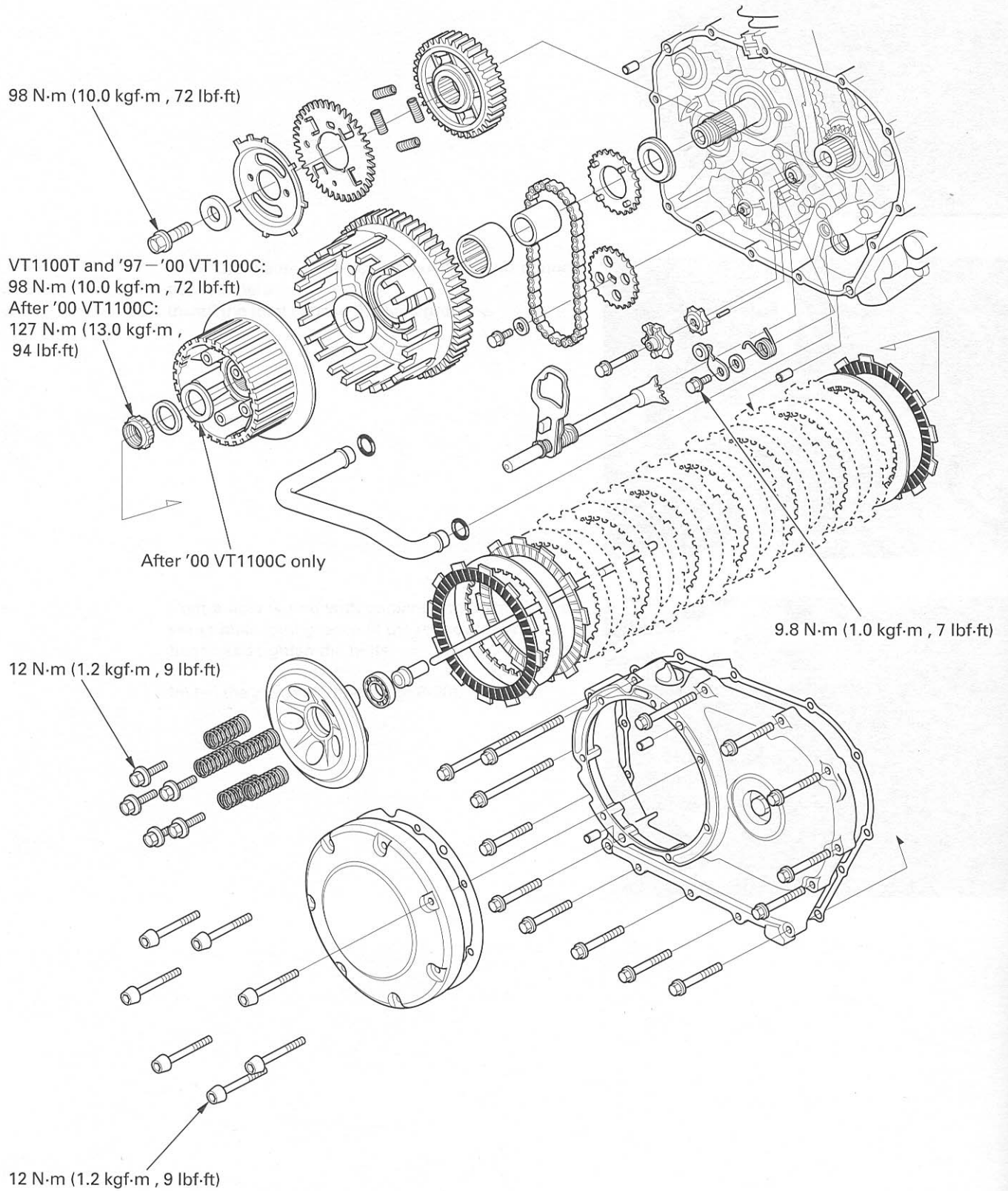


Coat a new O-ring with coolant and install it in the water hose joint groove of the rear cylinder.  
Install and tighten the bolts.

Install the cylinder head (page 8-20).



# CLUTCH/GEARSHIFT LINKAGE



# 10. CLUTCH/GEARSHIFT LINKAGE

SERVICE INFORMATION	10-1	CLUTCH LIFTER ARM	10-8
TROUBLESHOOTING	10-2	CLUTCH OUTER	10-10
CLUTCH REMOVAL	10-3	PRIMARY DRIVE GEAR	10-13
CLUTCH INSTALLATION	10-6	GEARSHIFT LINKAGE	10-15

## SERVICE INFORMATION

### GENERAL

- The clutch and gearshift linkage parts can be serviced with the engine installed in the frame.
- Engine oil viscosity and level and the use of oil additives have an effect on clutch disengagement. Oil additives of any kind are specifically not recommended. When the clutch does not disengage or the motorcycle creeps with the clutch disengaged, inspect the engine oil viscosity and level before servicing the clutch system.
- The crankcase must be separated when the transmission, shift drum and shift forks require service (section 11).

### SPECIFICATIONS

Unit: mm(in)

ITEM	STANDARD	SERVICE LIMIT
Clutch lever free play	10 – 20 (3/8 – 3/4)	—
Clutch spring free length	44.0 (1.73)	42.5 (1.67)
Clutch disc thickness A/B	3.72 – 3.88 (0.146 – 0.153)	3.1 (0.12)
Clutch plate warpage	—	0.30 (0.012)
Clutch outer guide I. D.	27.955 – 28.012 (1.1006 – 1.1028)	28.08 (1.106)
Mainshaft O. D. at clutch outer guide	27.980 – 27.993 (1.1016 – 1.1021)	27.93 (1.100)

10

### TORQUE VALUES

Clutch cover bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Clutch center lock nut		
VT1100T and '97 – '00 VT1100C:	98 N·m (10.0 kgf·m , 72 lbf·ft)	Apply oil to the threads and seating surface. Stake.
After '00 VT1100C:	127 N·m (13.0 kgf·m , 94 lbf·ft)	
Clutch lifter plate bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Primary drive gear bolt	98 N·m (10.0 kgf·m , 72 lbf·ft)	
Shift stopper arm pivot bolt	9.8 N·m (1.0 kgf·m , 7 lbf·ft)	Apply oil to the threads and seating surface.

### TOOLS

Clutch center holder	07JMB – MN50301 or 07HGB – 001000A (U. S. A. only) or
Holder plate	07HGB – 001010B or _____ (U. S. A. only)
	07HGB – 001010A _____
	and
Holder collars "A"	07HGB – 001020B or _____
(set of 4)	07HGB – 001020A _____
Gear holder	07724 – 0010100 not available in U. S. A.
Driver	07749 – 0010000
Attachment, 32 × 35 mm	07746 – 0010100
Pilot, 17 mm	07746 – 0040400

### TROUBLESHOOTING

#### Clutch lever too hard

- Damaged, kinked or dirty clutch cable
- Improperly routed clutch cable
- Damaged clutch lifter mechanism
- Faulty clutch lifter plate bearing

#### Clutch will not disengage or motorcycle creeps with clutch disengaged

- Too much clutch lever free play
- Warped plate
- Loose clutch lock nut
- Engine oil level too high, improper oil viscosity or oil additive used

#### Clutch slips

- Clutch lifter sticking
- Worn clutch discs
- Weak clutch springs
- No clutch lever free play
- Engine oil level too low or oil additive used

#### Hard to shift

- Improper clutch operation
- Incorrect engine oil viscosity
- Incorrect clutch adjustment
- Bent or damaged gearshift spindle
- Damaged shift drum cam grooves
- Bent shift forks or fork shaft (section 11)

#### Transmission jumps out of gear

- Broken shift drum stopper arm
- Broken shift linkage return springs
- Damaged shift drum cam grooves
- Bent shift fork shaft (section 11)
- Worn or bent shift forks (section 11)
- Worn gear dogs or slots (section 11)

## CLUTCH REMOVAL

**NOTE:**

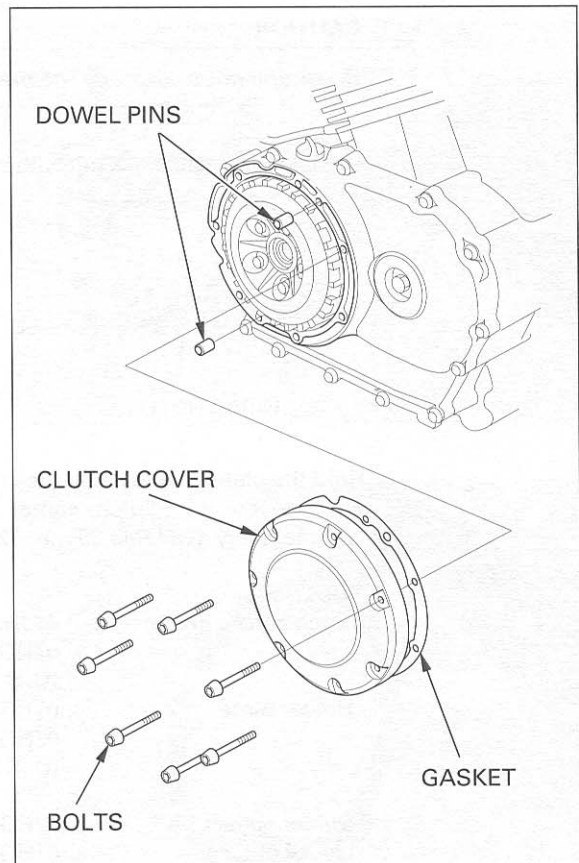
All clutch components except the clutch outer can be serviced by removing the clutch cover. For the clutch outer service, remove the right crankcase cover (page 10-10).

### CLUTCH COVER REMOVAL

Drain the engine oil (page 3-11).  
Remove the exhaust system (page 2-9 or 2-11).

Remove the seven bolts and the clutch cover.

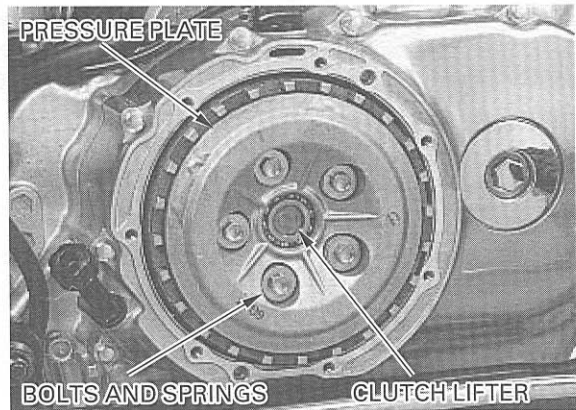
Remove the gasket and dowel pins.



### DISASSEMBLY

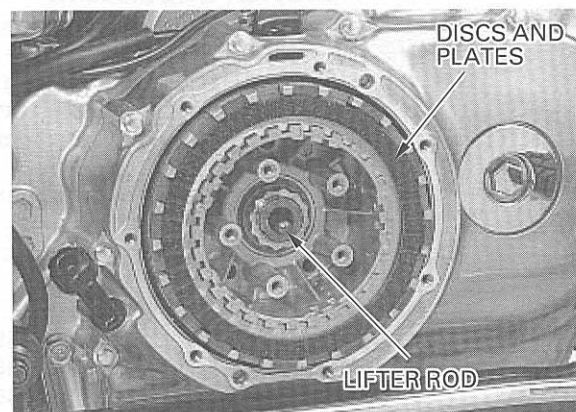
Loosen the pressure plate bolts in a crisscross pattern in 2 or 3 steps, and remove the bolts and clutch springs.

Remove the pressure plate with the clutch lifter.



Remove the lifter rod.

Remove the nine clutch discs and eight clutch plates.

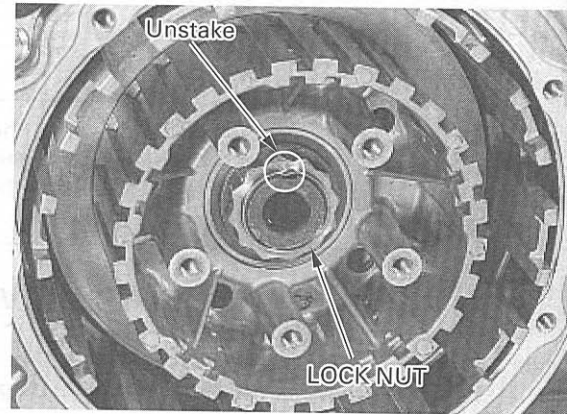


# CLUTCH/GEARSHIFT LINKAGE

## CAUTION:

***Be careful not to damage the mainshaft threads.***

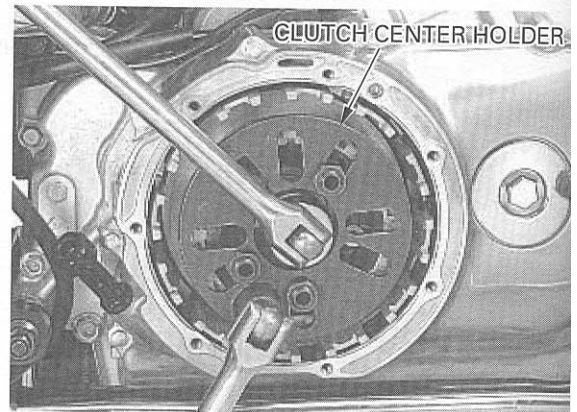
Unstake the clutch lock nut with a drill or grinder.



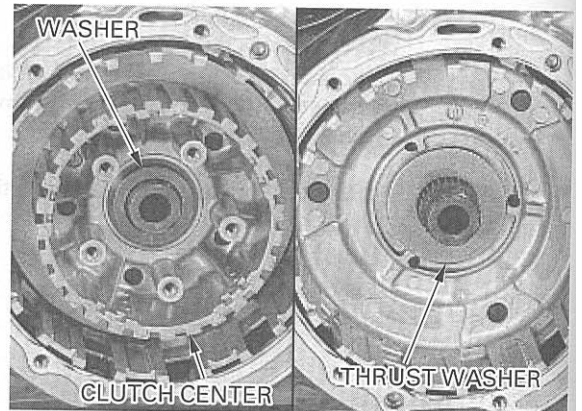
Hold the clutch center with the clutch center holder and loosen the clutch center lock nut with a commercially available 30 mm 12-point socket.

## TOOL:

<b>Clutch center holder</b>	07JMB-MN50301 or 07HGB-001000A (U. S. A. only) or 07HGB-001010B or 07HGB-001010A (U. S. A. only)
<b>Holder plate</b>	and
<b>Holder collars "A" (set of 4)</b>	07HGB-001020B or 07HGB-001020A (U. S. A. only)



Remove the lock nut and lock washer.  
After '00 VT1100C only: Remove the plain washer.  
Remove the clutch center and thrust washer.



## INSPECTION

### PRESSURE PLATE BEARING

Remove the clutch lifter from the pressure plate.

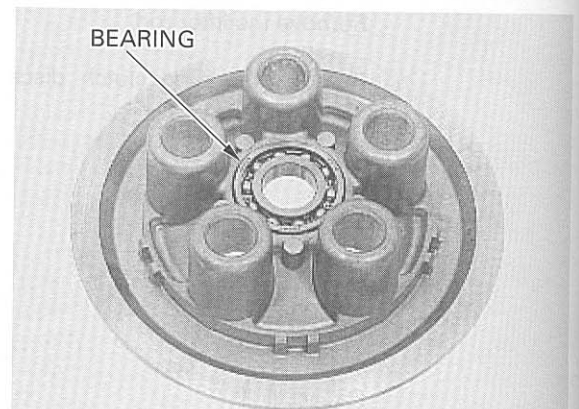
Check the pressure plate bearing for damage. Turn the bearing inner race with your finger. The bearing should turn smoothly and quietly without play.

Also check that the bearing outer race fits tightly in the plate.

Replace the bearing if necessary.

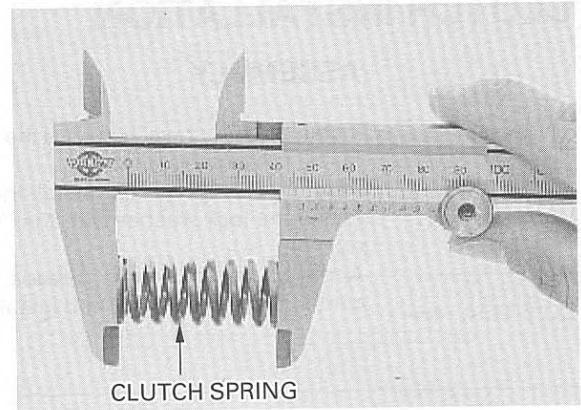
## TOOLS:

<b>Driver</b>	07749-0010000
<b>Attachment, 32 × 35 mm</b>	07746-0010100
<b>Pilot, 17 mm</b>	07746-0040400

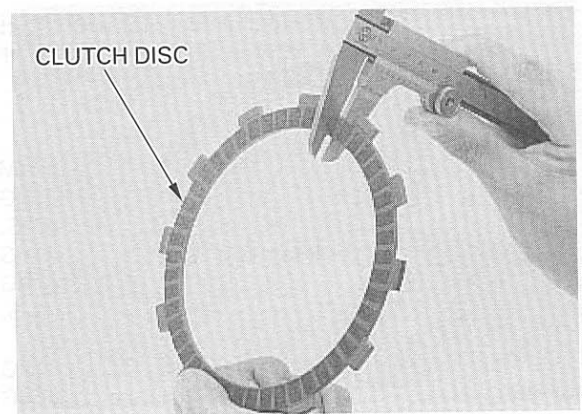




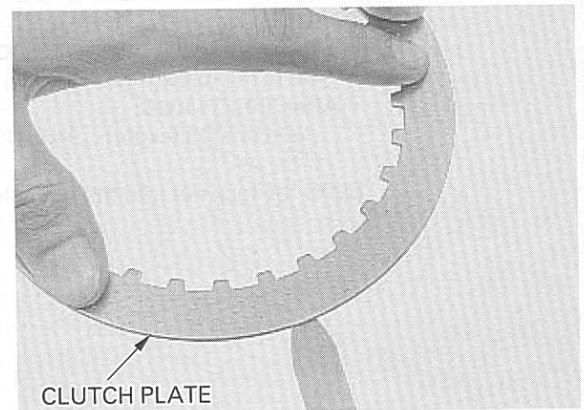
**CLUTCH SPRING**  
Replace the clutch springs as a set.  
Measure the spring free length.  
**SERVICE LIMIT:** 42.5 mm (1.67 in)



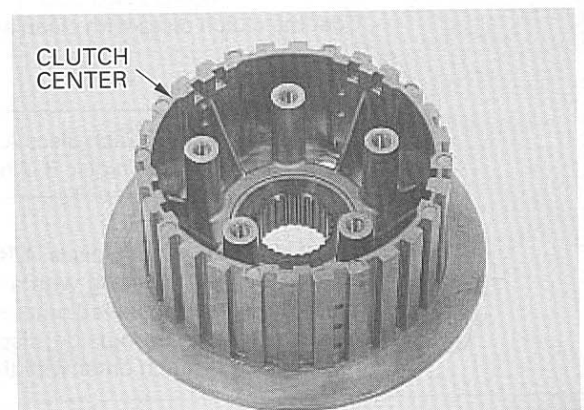
**CLUTCH DISC**  
Check the clutch discs for signs of scoring or discoloration.  
Replace the discs and plates as a set.  
Measure the thickness of discs A and B.  
**SERVICE LIMIT: (A/B) :** 3.1 mm (0.12 in)



**CLUTCH PLATE**  
Check the plate for excessive warpage or discoloration.  
Check the plate warpage on a surface plate using a feeler gauge.  
**SERVICE LIMIT:** 0.30 mm (0.012 in)



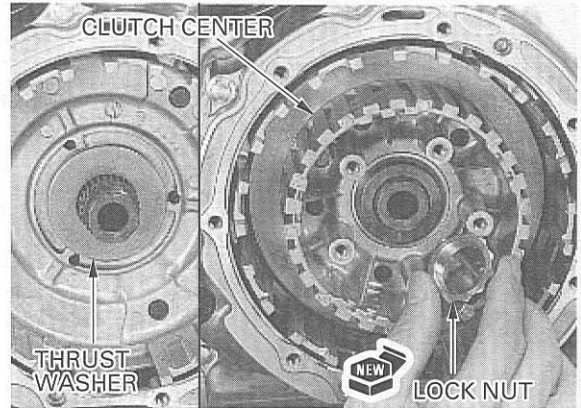
**CLUTCH CENTER**  
Check the clutch center for nicks, indentations or abnormal wear made by the clutch plates.



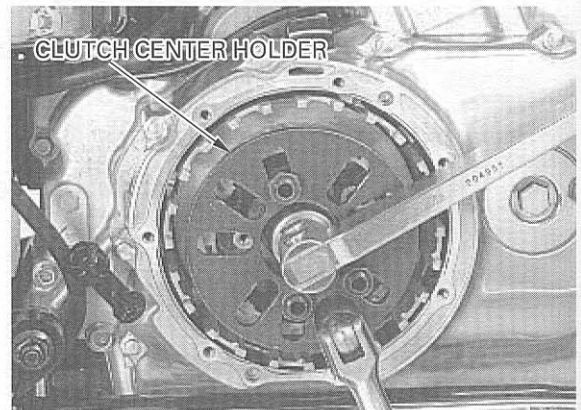
# CLUTCH INSTALLATION

## ASSEMBLY

Install the thrust washer onto the mainshaft.  
 Install the clutch center.  
 After '00 VT1100C only: Install the plain washer.  
 Install the lock washer with the "OUT" mark facing outside.  
 Apply engine oil to the threads of the new clutch center lock nut threads, and install and tighten it.



Hold the clutch center with the clutch center holder and tighten the lock nut with a commercially available 30 mm 12-point socket.



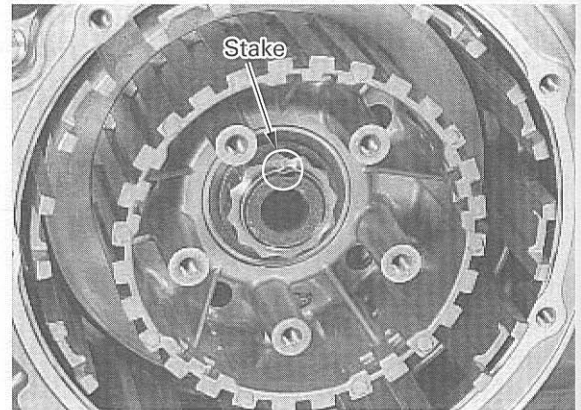
**TOOL:**

- |  |   |
|--|---|
| <b>Clutch center holder</b>              | 07JMB-MN50301 or<br>07HGB-001000A<br>(U. S. A. only) or     |
| <b>Holder plate</b>                      | 07HGB-001010B or<br>07HGB-001010A<br>(U. S. A. only)<br>and |
| <b>Holder collars "A"<br/>(set of 4)</b> | 07HGB-001020B or<br>07HGB-001020A<br>(U. S. A. only)        |

**TORQUE:**

- VT1100T and '97 - '00 VT1100C:**  
 98 N·m (10.0 kgf·m , 72 lbf·ft)  
**After '00 VT1100C:**  
 127 N·m (13.0 kgf·m , 94 lbf·ft)

Stake the lock nut into the mainshaft groove.

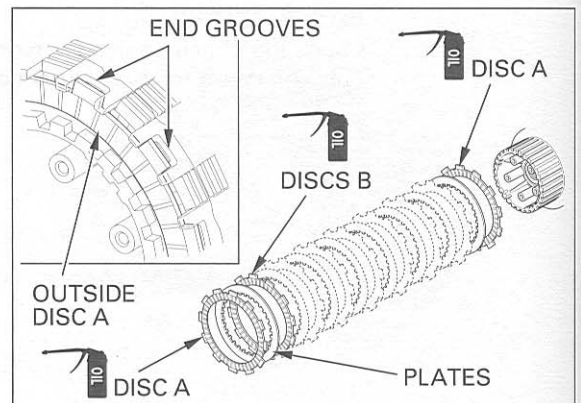


Coat the clutch discs with clean engine oil.

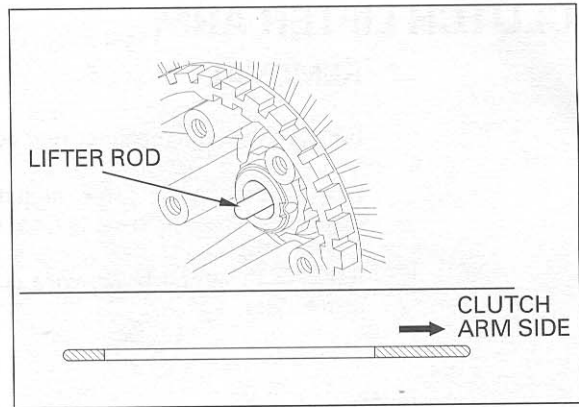
**NOTE:**

Do not confuse the clutch discs A and B:  
 The disc A is Black and disc B is brown.

Install the nine clutch discs A/B and eight clutch plate alternately, starting with a disc (A), (The two clutch discs A are installed onto each end.)  
 When installing the outside disc A, align the end grooves in the clutch outer with the tabs of disc.

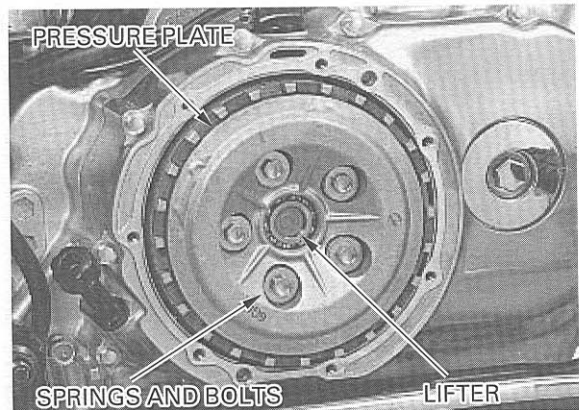


Note the lifter rod installation direction and install it into the mainshaft.



Install the clutch lifter into the pressure plate bearing.  
Install the pressure plate and install the bolts with clutch springs.  
Tighten the bolts in a crisscross pattern in 2–3 steps.

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



### CLUTCH COVER INSTALLATION

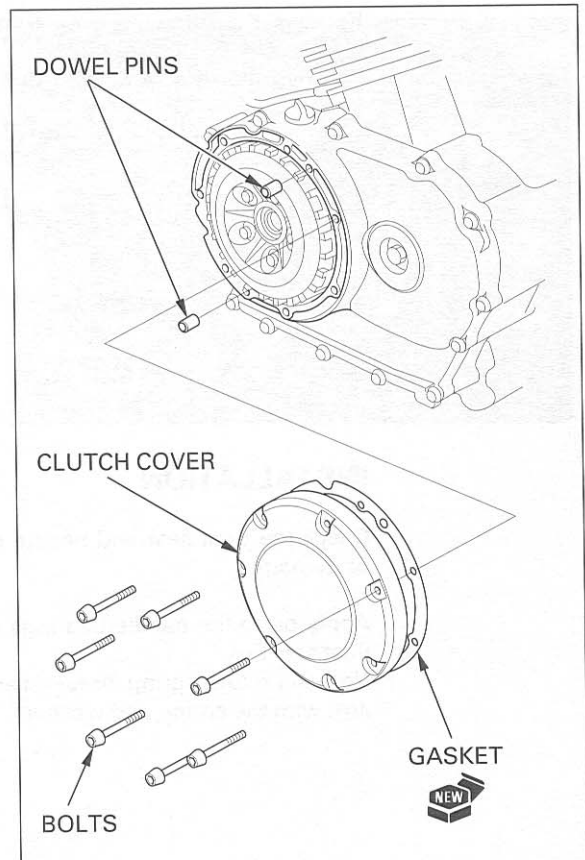
Install the dowel pins and new gasket.

Install the clutch cover and tighten the socket bolts.

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

Install the exhaust system (page 2-9 or 2-11).

After the clutch system service, fill the crankcase with the recommended engine oil (page 3-11) and perform the clutch adjustment (page 3-21).



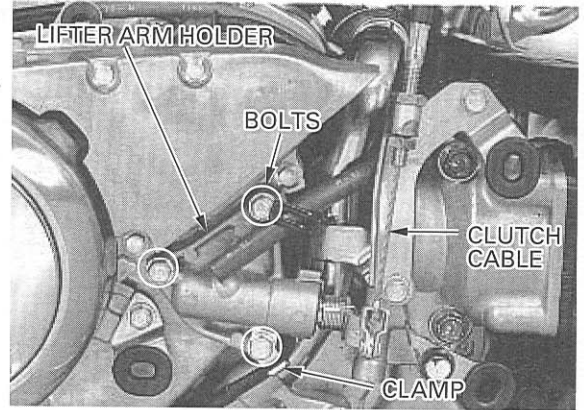
**CLUTCH LIFTER ARM**

**REMOVAL**

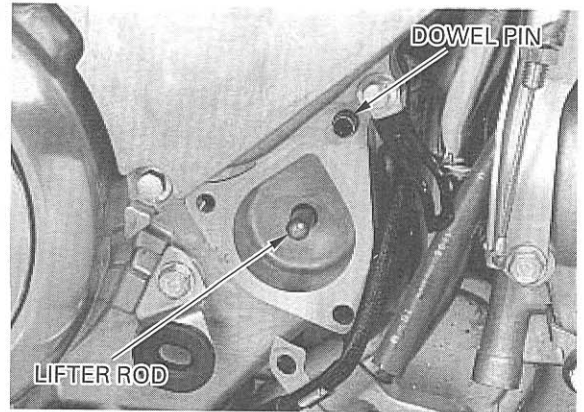
Remove the left crankcase rear cover (page 2-15).

Loosen the clutch cable adjuster lock nuts and disconnect the clutch cable from the lifter arm.

Remove the three bolts, wire clamp and the lifter arm holder.

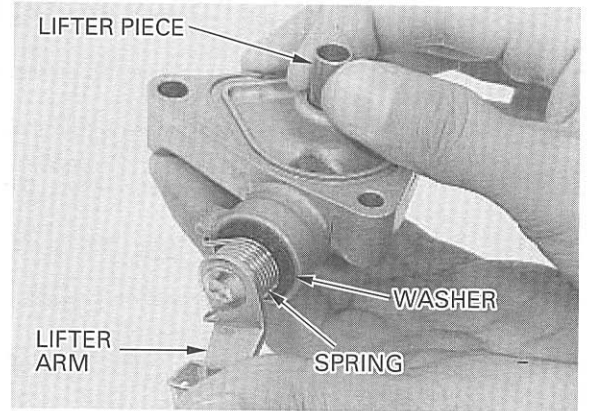


Remove the dowel pin and lifter rod.



Remove the lifter piece by turning the lifter arm clockwise.

Remove the lifter arm with the return spring and washer.

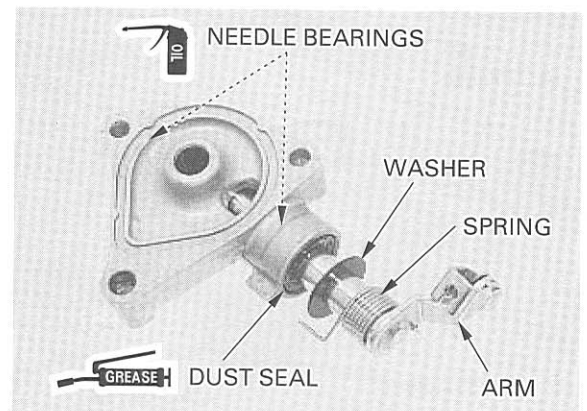


**INSTALLATION**

Check the dust seal and needle bearings for wear or damage.

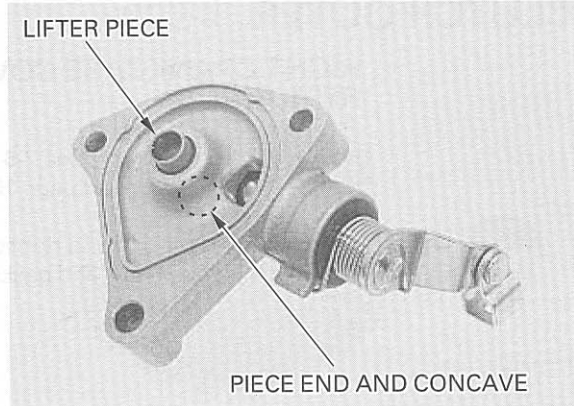
Apply oil to the needle bearings and grease to the dust seal lips.

Note the return spring direction and install the lifter arm with the spring and washer.



## CLUTCH/GEARSHIFT LINKAGE

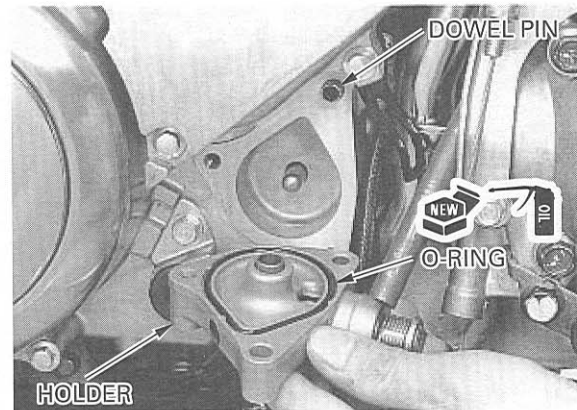
Install the lifter piece with the closed end facing the lifter arm shaft by turning the lifter arm clockwise and align the lifter piece end with the arm shaft concave.



Install the lifter rod (installation direction: page 10-7).

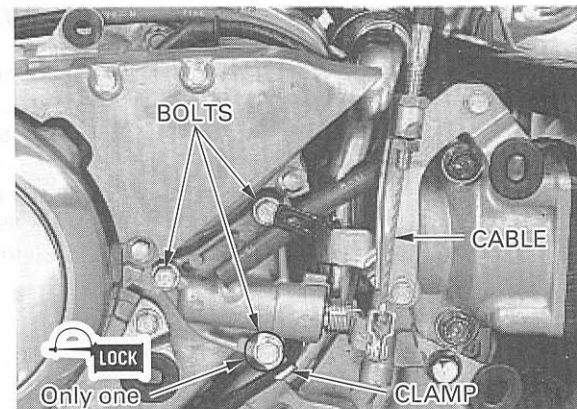
Coat a new O-ring with clean engine oil and install it into the groove in the lifter arm holder.

Install the dowel pin and the clutch arm holder onto the crankcase.



Apply locking agent to the holder bolt threads as shown and tighten the holder bolts with the clamp. Connect the clutch cable to the lifter arm.

After the clutch system service has been made, fill the crankcase with the recommended engine oil (page 3-11) and perform the clutch adjustment (page 3-21).

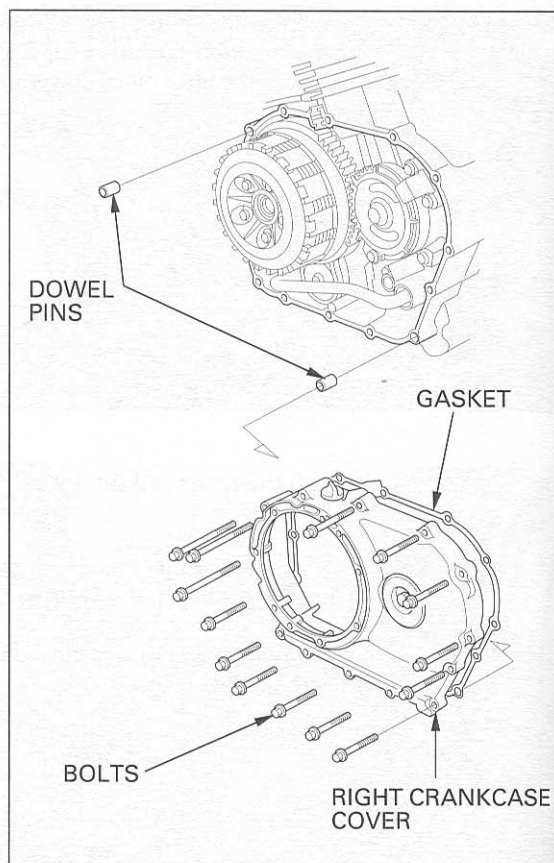


## CLUTCH OUTER

### RIGHT CRANKCASE COVER REMOVAL

Remove the sub-frame (page 7-5 or 7-13).  
Remove the clutch cover (page 10-3).

Remove the cover bolt and right crankcase cover.  
Remove the dowel pins and gasket.

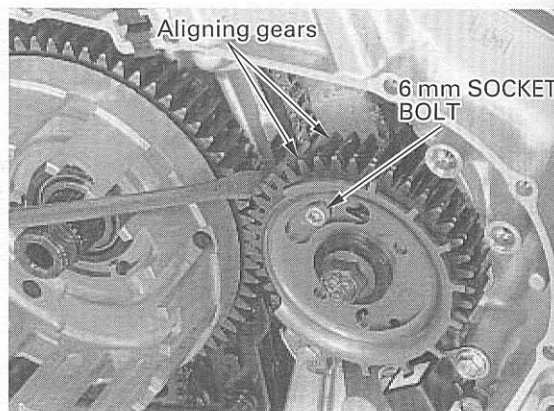


### CLUTCH OUTER REMOVAL

Remove the clutch center (page 10-3).

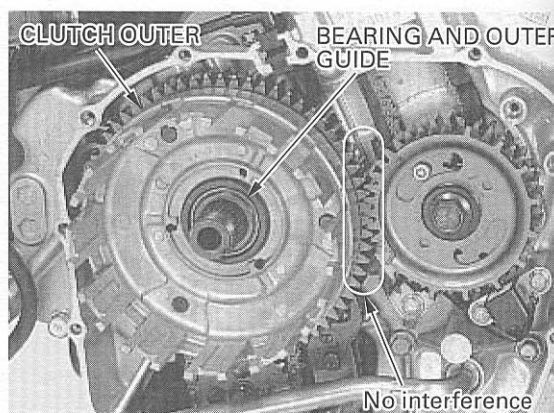
Prepare the no flanged 6 mm socket bolt (threads length 20 mm max.).

Install the 6 mm socket bolt into the scissors gears (primary drive gear and sub-gear) and tighten it while aligning gear teeth by prying the gears.



Turn the primary drive gear until the clutch outer can be removed so that the ignition pulse generator rotor tips do not interfere with the primary driven gear teeth of the clutch outer.

Remove the clutch outer, needle bearing and outer guide.



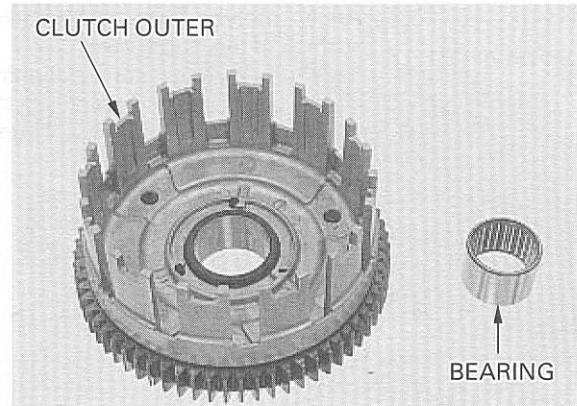
### INSPECTION

#### CLUTCH OUTER

Check the primary driven gear teeth for wear or damage.

Check the slots in the clutch outer for nicks, indentations or abnormal wear made by the clutch discs.

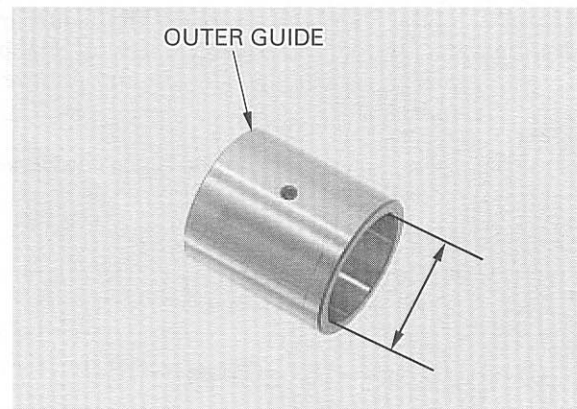
Check the needle bearing for wear or damage.



#### CLUTCH OUTER GUIDE

Measure the clutch outer guide I. D.

**SERVICE LIMIT:** 28.08 mm (1.106 in)



#### MAINSHAFT

Measure the mainshaft O. D. at clutch outer guide.

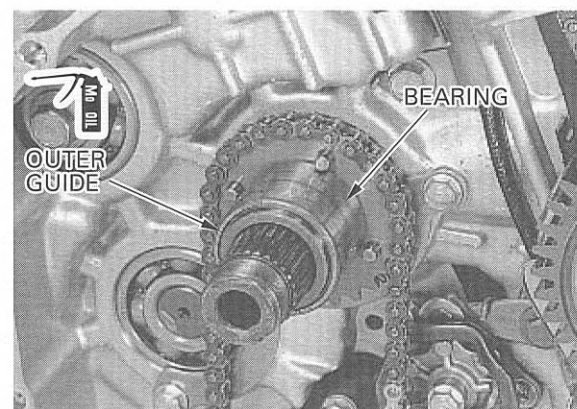
**SERVICE LIMIT:** 27.93 mm (1.100 in)



### CLUTCH OUTER INSTALLATION

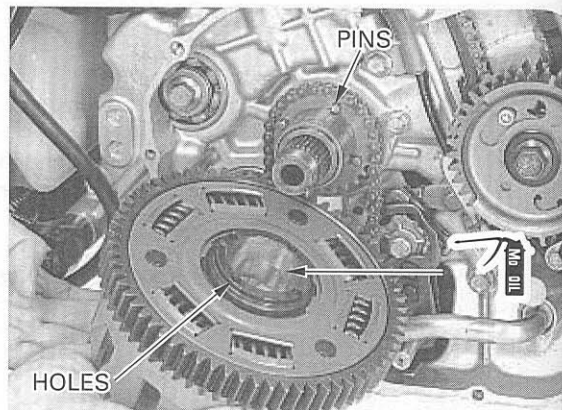
Apply molybdenum oil solution to the outer surface of the clutch outer guide and install it into the oil pump drive sprocket inner diameter securely.

Install the needle bearing onto the outer guide.



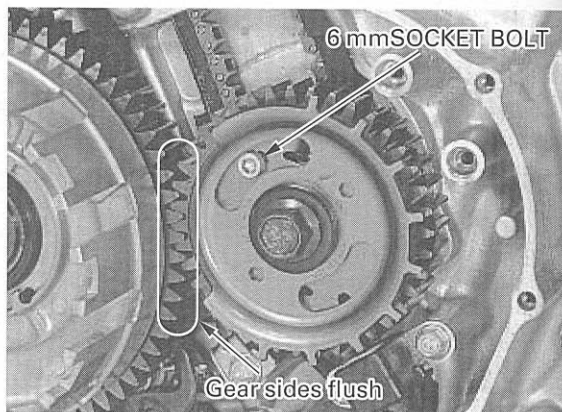
## CLUTCH/GEARSHIFT LINKAGE

Apply molybdenum oil solution to the sliding surface of the clutch outer.  
Install the clutch outer by aligning the holes in the clutch outer with the pins on the oil pump drive sprocket while turning the oil pump driven sprocket.



Be sure to install the clutch outer securely (i.e. aligned side surfaces of the primary drive and driven gears flush) and remove the 6 mm socket bolt.

Assemble the all clutch components (page 10-6).

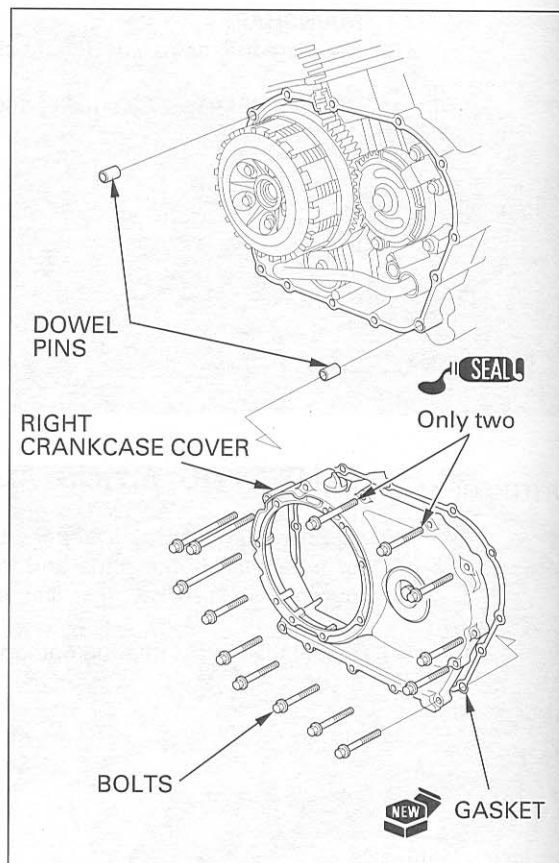


## RIGHT CRANKCASE COVER INSTALLATION

Install the dowel pins and new gasket onto the crankcase.

Apply liquid sealant to the crankcase cover bolt threads as shown.  
Install the right crankcase cover and tighten the cover bolts securely.

Install the clutch cover (page 10-7).  
Install the sub-frame (page 7-6 or 7-14).





## PRIMARY DRIVE GEAR

**CAUTION:**

*Be careful not to damage the ignition pulse generator.*

### REMOVAL

Remove the right crankcase cover (page 10-10).

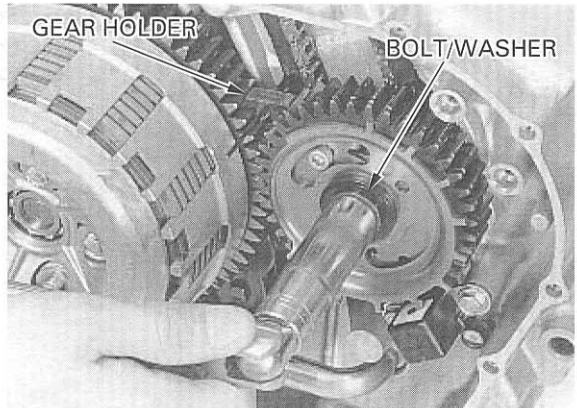
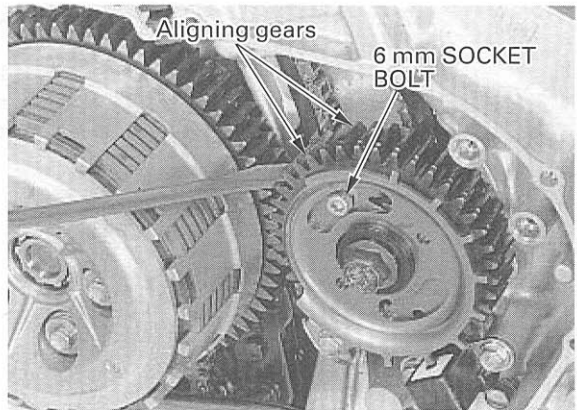
Use a 6 mm socket bolt without a flange (threads length: 20 mm max.).

Install the 6 mm socket bolt into the scissors gears (primary drive gear and sub-gear) and tighten it while aligning the gear teeth by prying the gears.

Insert the gear holder as shown. Loosen the primary drive gear bolt and remove the bolt and washer.

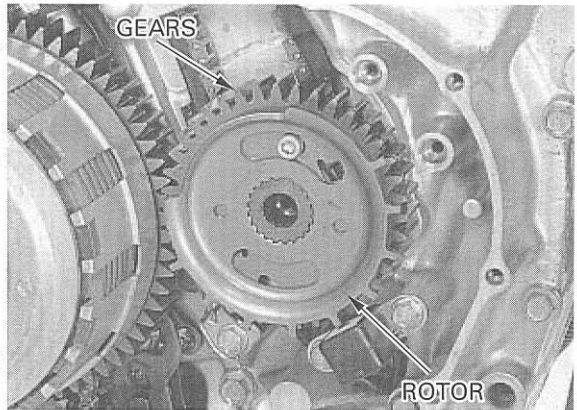
**TOOL:**

**Gear holder** 07724-0010100  
not available in U. S. A.



Remove the ignition pulse generator rotor and primary drive gear assembly.

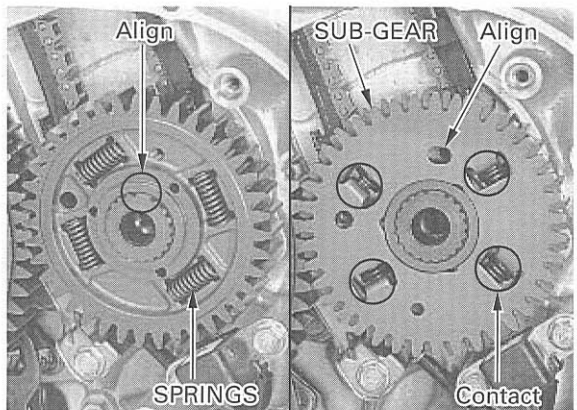
Remove the 6 mm socket bolt and disassemble the primary drive gear.



### INSTALLATION

Install the primary drive gear with the springs by aligning the wide groove with the wide tooth.

Be sure to install the springs into the grooves securely and set the sub-gear onto drive gear boss by aligning the threaded hole in the drive gear with the slot in the sub-gear, and contacting the sub-gear tabs against the springs.

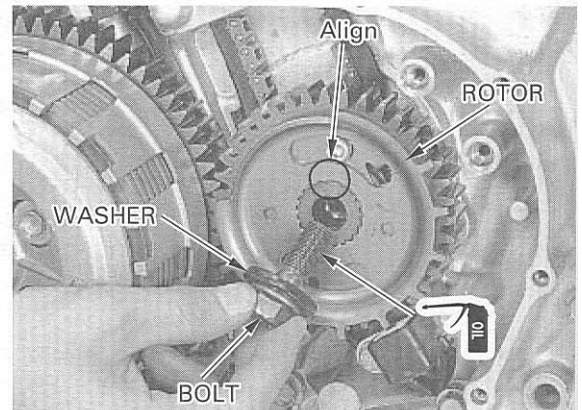


## CLUTCH/GEARSHIFT LINKAGE

Loosely install the 6 mm socket bolt into the primary drive gears.  
Align the primary drive gear with sub-gear teeth by prying the gears, being careful not to come off the springs, then tighten the 6 mm socket bolt.



Install the ignition pulse generator rotor by aligning the wide groove with the wide tooth.  
Apply engine oil to the threads of the primary drive gear bolt and install it with the washer.



Insert the gear holder as shown and tighten the primary drive gear bolt to the specified torque.

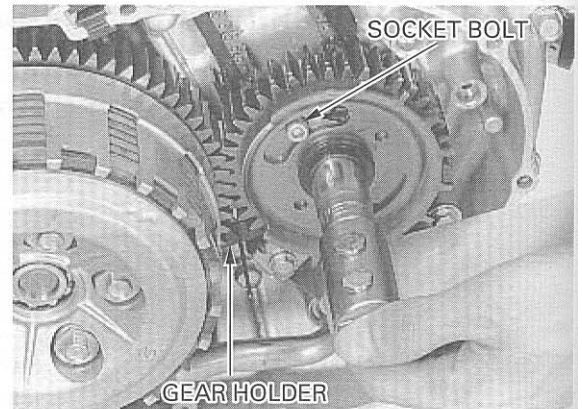
### TOOL:

**Gear holder** 07724-0010100  
not available in U. S. A.

**TORQUE:** 98 N·m (10.0 kgf·m , 72 lbf·ft)

Remove the 6 mm socket bolt from the primary drive gears.

Install the right crankcase cover (page 10-12).

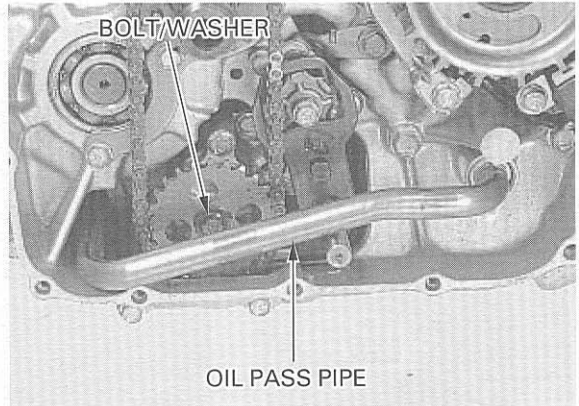


## GEARSHIFT LINKAGE

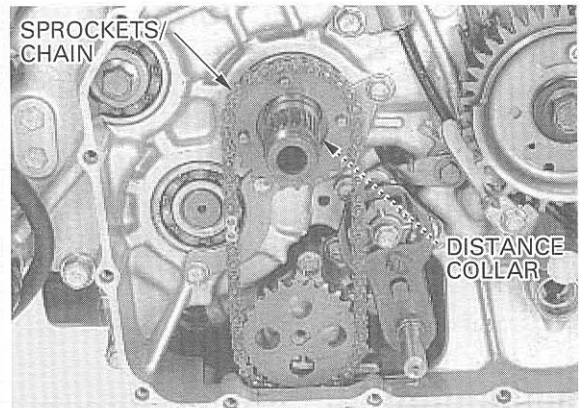
### REMOVAL

Shift the transmission into neutral.  
Remove the clutch outer (page 10-10).

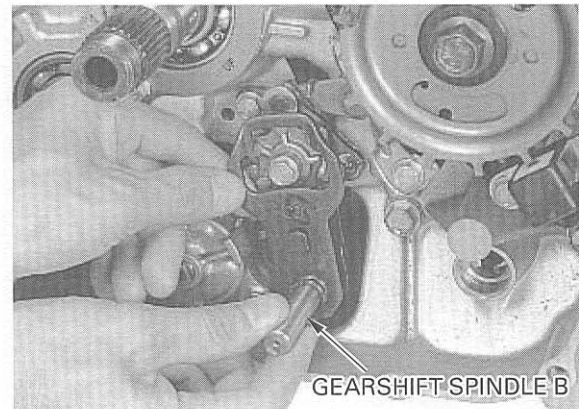
Remove the oil pass pipe with the O-rings.  
Remove the oil pump driven sprocket bolt and washer.



Remove the oil pump drive and driven sprockets and chain as a set.  
Remove the distance collar.



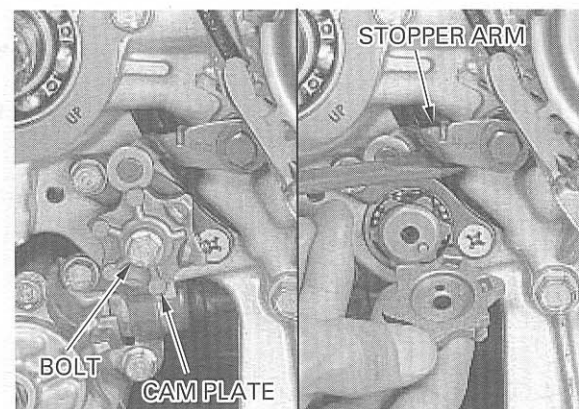
Pull out the spindle shaft and remove the gearshift spindle B.



**CAUTION:**

*Be careful not to damage the crankcase.*

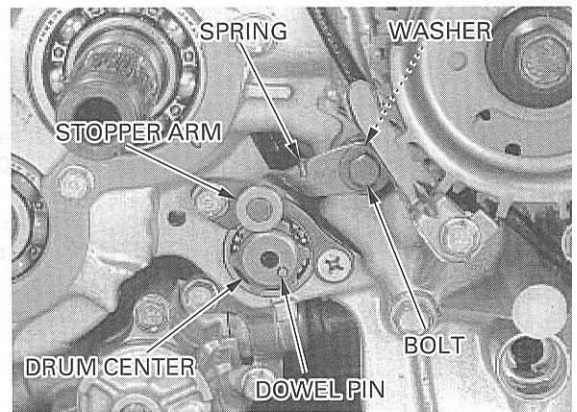
Remove the cam plate bolt.  
Lift up the stopper arm using a screw driver and remove the cam plate.



## CLUTCH/GEARSHIFT LINKAGE

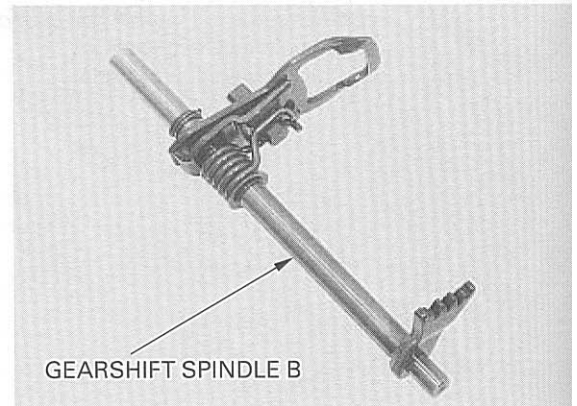
Remove the stopper arm bolt, return spring, washer and arm.  
Remove the drum center with dowel pin.

For the gearshift spindle A removal, refer to page 18-10 "Flywheel/Starter Clutch".



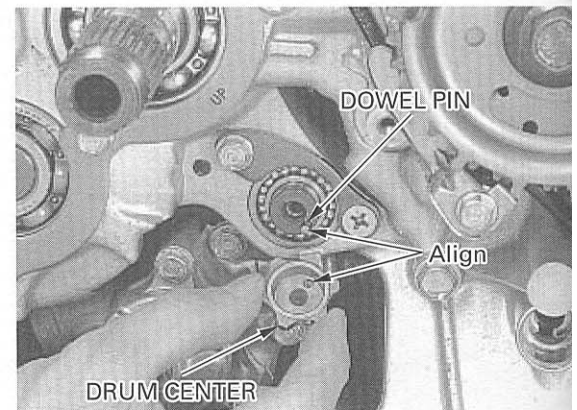
### INSPECTION

Check the gearshift spindle for wear or damage.



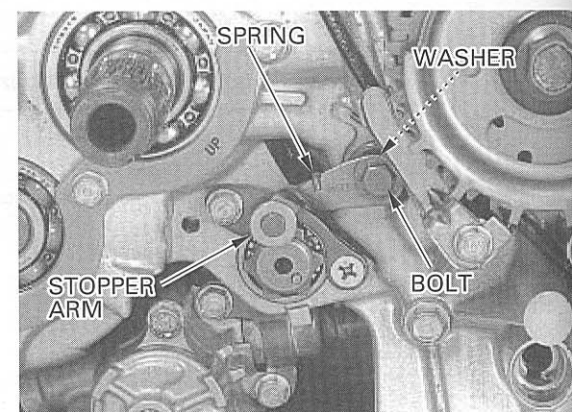
### INSTALLATION

Install the dowel pin into the shift drum.  
Align the hole in the drum center with the dowel pin and install the drum center to the shift drum.



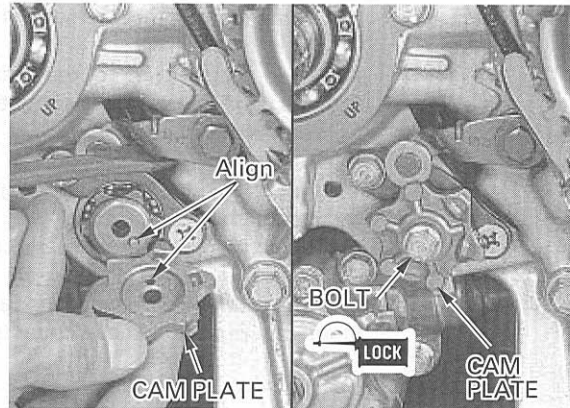
Install the stopper arm with the washer (between the spring and arm) and return spring and tighten the stopper arm bolt in half-way.  
Be sure to hook the return spring to the stopper arm and tighten the bolt.

**TORQUE:** 9.8 N·m (1.0 kgf·m , 7 lbf·ft)



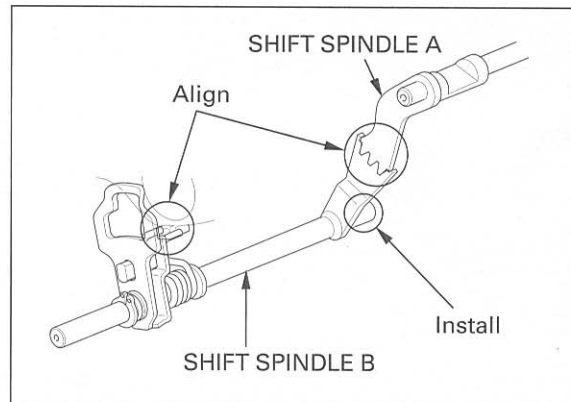
## CLUTCH/GEARSHIFT LINKAGE

Install the cam plate by aligning the hole in the cam plate with the dowel pin while lift up the stopper arm with a screw driver. Apply locking agent to the cam plate bolt threads and tighten the cam plate bolt securely.

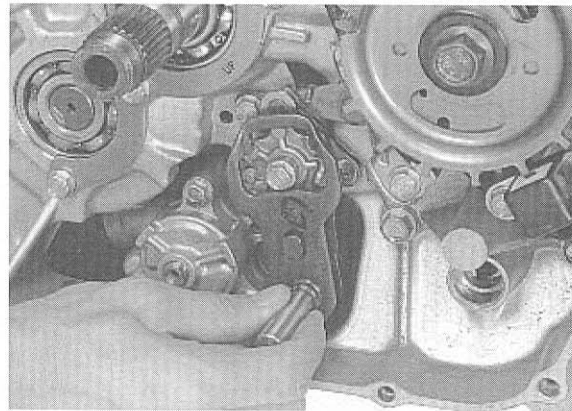


Be sure that the cam plate is shifted into neutral position as shown in the photograph above.

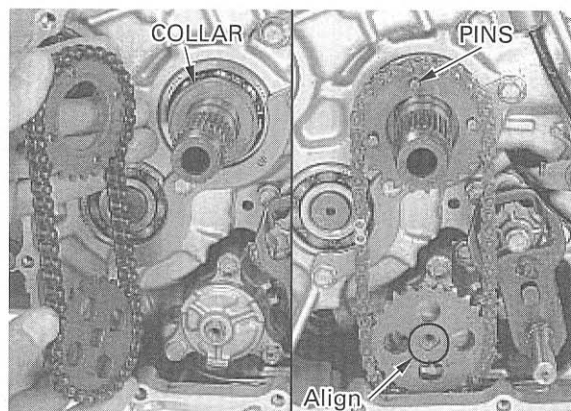
Install the shift spindle B into the hole of the crankcase by aligning the teeth of the spindle A and B, and the return spring ends with the right crankcase lug.



Move the gearshift pedal and check the shift mechanism for smooth operation.



Install the distance collar over the mainshaft. Install the oil pump drive and driven sprocket and chain as an assembly with the long pins side of the drive sprocket facing out. Align the flat surfaces of the driven sprocket hole and oil pump shaft end.



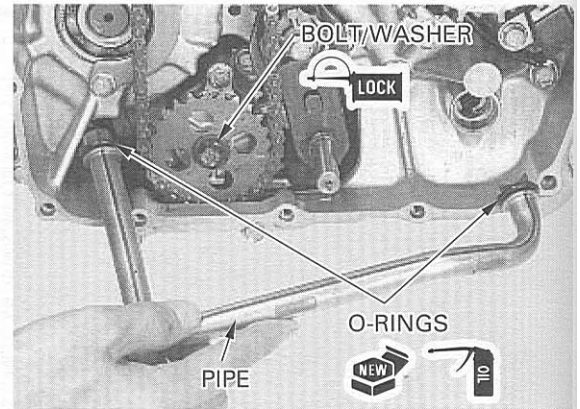
## CLUTCH/GEARSHIFT LINKAGE

Install the clutch outer (page 10-11).

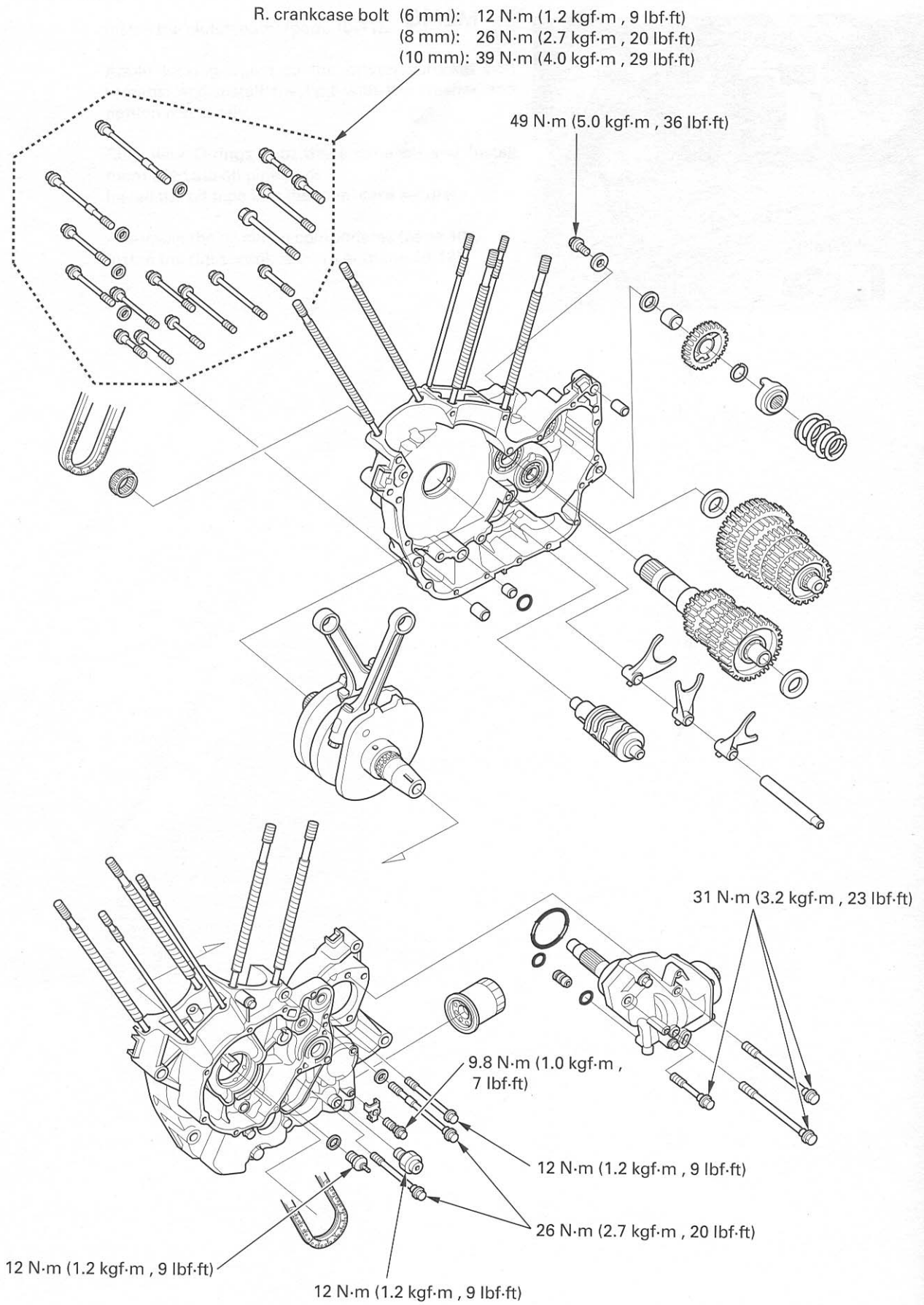
Apply locking agent to the driven sprocket bolt threads, and install the bolt with the washer and tighten it securely.

Coat new O-rings with the engine oil and install them onto the oil pipe ends.  
Install the oil pipe into the crankcase securely.

Assemble the all clutch components (page 10-6).  
Install the right crankcase cover (page 10-12).



# CRANKSHAFT/TRANSMISSION



# 11. CRANKSHAFT/TRANSMISSION

SERVICE INFORMATION	11-1	OUTPUT GEAR	11-18
TROUBLESHOOTING	11-4	CRANKCASE BEARING REPLACEMENT	11-34
CRANKCASE SEPARATION	11-5	CRANKCASE ASSEMBLY	11-36
CRANKSHAFT/CONNECTING ROD	11-6		
TRANSMISSION	11-12		

## SERVICE INFORMATION

### GENERAL

- The crankcase halves must be separated to service the connecting rod, crankshaft, transmission (including the shift fork and shift drum) and output gear. To service these parts, the engine must be removed from the frame (section 7).
- The following parts must be removed before disassembling the crankcase.
  - Cylinder head (section 8)
  - Cylinder and piston (section 9)
  - Clutch, primary drive gear and gearshift linkage (section 10)
  - Ignition pulse generator (section 17)
  - Oil pump (section 4)
  - Water pump (section 6)
  - Starter motor and starter drive gear (section 18)
  - Flywheel and starter clutch (section 18)
- Be careful not to damage the crankcase mating surfaces when servicing.
- Mark and store the connecting rod and bearings to be sure of their correct locations. If the bearings are improperly installed they will block the oil holes, causing insufficient lubrication and eventual engine seizure.
- Be careful not to damage the main journal bearing inserts during crankshaft removal and installation.
- Connecting rod bearing inserts are select fitted and are identified by color code. Select replacement bearings from the code table. Check the oil clearance using a plastigauge after replacing bearing inserts.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.
- Replace the output drive gear and driven gear as a set.
- Whenever you replace the output driven/drive gears, bearings, bearing holder or gear case, perform the gear contact pattern and backlash inspection and adjust the shim. The extension lines from the gear engagement surfaces should intersect at one point.
- When using the lock nut wrench for the output gear case, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench. Do not over tighten the lock nuts. The specification later in the text gives both actual and indicated.
- Protect the output gear case with a shop towel or soft jaws while holding it in vise. Do not clamp it too tight as it could damage the gear case.



# CRANKSHAFT/TRANSMISSION

## SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Crankshaft/ connecting rod	Connecting rod big end side clearance	0.10—0.25 (0.004—0.010)	0.28 (0.011)	
	Crankpin oil clearance	0.038—0.062 (0.0015—0.0024)	0.070 (0.0028)	
	Main journal oil clearance	0.030—0.046 (0.0012—0.0018)	0.060 (0.0024)	
	Crankshaft runout		0.05 (0.002)	
Transmission	Gear I. D.	M3, M5, C4	31.000—31.025 (1.2205—1.2215)	31.035 (1.2218)
		C1, C2	33.000—33.025 (1.2992—1.3002)	33.035 (1.3006)
	Gear bushing O. D.	M3, C4	30.970—30.995 (1.2193—1.2203)	30.94 (1.218)
		M5	30.950—30.975 (1.2185—1.2195)	30.94 (1.218)
		C1	32.950—32.975 (1.2972—1.2982)	32.94 (1.297)
		C2	32.955—32.980 (1.2974—1.2984)	32.94 (1.297)
	Gear bushing I. D.	M3, C4	28.000—28.021 (1.1024—1.1032)	28.04 (1.104)
		C2	29.985—30.006 (1.1805—1.1813)	30.03 (1.182)
	Mainshaft O. D.	at M3	27.959—27.980 (1.1007—1.1016)	27.94 (1.100)
	Countershaft O. D.	at C2	29.950—29.975 (1.1791—1.1801)	29.94 (1.179)
		at C4	27.967—27.980 (1.1011—1.1016)	27.95 (1.100)
	Gear-to-bushing clearance	M3, C4	0.005—0.055 (0.0002—0.0022)	0.075 (0.0030)
		M5, C1	0.025—0.075 (0.0010—0.0030)	0.095 (0.0037)
		C2	0.020—0.070 (0.0008—0.0028)	0.090 (0.0035)
	Gear bushing-to- shaft clearance	M3	0.020—0.062 (0.0008—0.0024)	0.082 (0.0032)
C2		0.005—0.056 (0.0002—0.0022)	0.076 (0.0030)	
C4		0.020—0.054 (0.0008—0.0021)	0.074 (0.0029)	
Shift fork/ shaft/ drum	Fork claw thickness	L.	5.93—6.00 (0.233—0.236)	5.83 (0.230)
		C., R.	6.43—6.50 (0.253—0.256)	6.33 (0.249)
	Fork I. D.	14.000—14.021 (0.5512—0.5520)	14.04 (0.553)	
	Shaft O. D.	13.966—13.984 (0.5498—0.5506)	13.956 (0.5494)	
	Drum O. D. at left end	13.966—13.984 (0.5498—0.5506)	13.956 (0.5494)	
	Drum journal (L. crankcase)	14.000—14.018 (0.5512—0.5519)	14.028 (0.5523)	
Output drive train	Output gear I. D.	25.000—25.021 (0.9843—0.9851)	25.031 (0.9855)	
	Output gear bushing	L., * <sup>1</sup> C., * <sup>1</sup> R.	24.959—24.980 (0.9826—0.9835)	24.949 (0.9822)
		* <sup>2</sup> C., * <sup>2</sup> R.	22.020—22.041 (0.8669—0.8678)	22.051 (0.8681)
	Output drive gear shaft O. D.	21.979—22.000 (0.8653—0.8661)	21.969 (0.8649)	
	Gear-to-bushing clearance	0.020—0.062 (0.0008—0.0024)	0.082 (0.0032)	
	Gear bushing-to-shaft clearance	0.020—0.062 (0.0008—0.0024)	0.082 (0.0032)	
	Output gear damper spring free length	69.3 (2.73)	68.1 (2.68)	
	Output drive gear backlash	0.08—0.23 (0.003—0.009)	0.40 (0.016)	
Backlash difference between measurements		0.10 (0.004)		

\*<sup>1</sup>: After '00 VT1100C, \*<sup>2</sup>: VT1100T and '97—'00 VT1100C

**TORQUE VALUES**

R. crankcase bolt (6 mm)	12 N·m (1.2 kgf·m , 9 lbf·ft)	
(8 mm)	26 N·m (2.7 kgf·m , 20 lbf·ft)	
(10 mm)	39 N·m (4.0 kgf·m , 29 lbf·ft)	
Output drive gear shaft bolt (R. crankcase)	49 N·m (5.0 kgf·m , 36 lbf·ft)	Apply locking agent to the threads.
L. crankcase bolt (6 mm)	12 N·m (1.2 kgf·m , 9 lbf·ft)	
(8 mm)	26 N·m (2.7 kgf·m , 20 lbf·ft)	
Connecting rod bearing cap nut	59 N·m (6.0 kgf·m , 43 lbf·ft)	Apply oil to the threads and seating surface.
Output gear case mounting bolt	31 N·m (3.2 kgf·m , 23 lbf·ft)	
Output drive gear bearing holder bolt	31 N·m (3.2 kgf·m , 23 lbf·ft)	Apply oil to the threads and seating surface.
Output driven gear bearing holder bolt	31 N·m (3.2 kgf·m , 23 lbf·ft)	Apply oil to the threads and seating surface.
Output drive/driven gear bearing lock nut		
(inner)	74 N·m (7.5 kgf·m , 54 lbf·ft)	Apply oil to the threads. Stake.
(outer)	98 N·m (10.0 kgf·m , 72 lbf·ft)	Apply oil to the threads. Stake.
R. crankcase bearing setting plate screw	8.8 N·m (0.9 kgf·m , 6.5 lbf·ft)	Apply locking agent to the threads.
bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply locking agent to the threads.

**TOOLS**

Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Attachment, 42 × 47 mm	07746-0010300
Attachment, 52 × 55 mm	07746-0010400
Attachment, 62 × 68 mm	07746-0010500
Attachment, 30 mm I. D.	07746-0030300
Pilot, 17 mm	07746-0040400
Pilot, 20 mm	07746-0040500
Pilot, 28 mm	07746-0041100
Pilot, 30 mm	07746-0040700
Driver, 40 mm I. D.	07746-0030100
Shaft holder	07923-6890101
Damper spring compressor	07964-ME90000 (not available in U. S. A.) or
Assembly bolt	07965-1660200
Assembly collar	07965-166030A or 07965-1660300
Compressor seat	07967-9690200
Threaded adaptor	07965-KA30000
Snap ring pliers	07914-5670101 (not available in U. S. A.) or 07914-5670100
Lock nut wrench, 30 × 64 mm	07916-MB00001 or 07916-MB00000
Dis/assembly tool	07965-3710101
Bearing remover, 17 mm	07936-3710300
Remover handle	07936-3710100
Remover weight	07741-0010201 or 07936-371020A or 07936-3710200
Bearing remover set, 20 mm	07936-3710001 not available in U. S. A.
-bearing remover, 20 mm	07936-3710600
-remover handle	07936-3710100
-remover weight	07741-0010201 or 07936-371020A or 07936-3710200

### TROUBLESHOOTING

#### Excessive noise

- Worn crankshaft main journal bearings
- Worn connecting rod bearings
- Worn connecting rod small end
- Worn, seized or chipped transmission gear
- Worn or damaged transmission bearing

#### Hard to shift

- Bent shift fork
- Bent shift fork shaft
- Damaged shift drum guide groove
- Damaged shift fork guide pin

#### Transmission jumps out of gear

- Worn gear dogs or slots
- Worn shift drum guide groove
- Worn shift fork guide pin
- Worn shift fork groove in gear

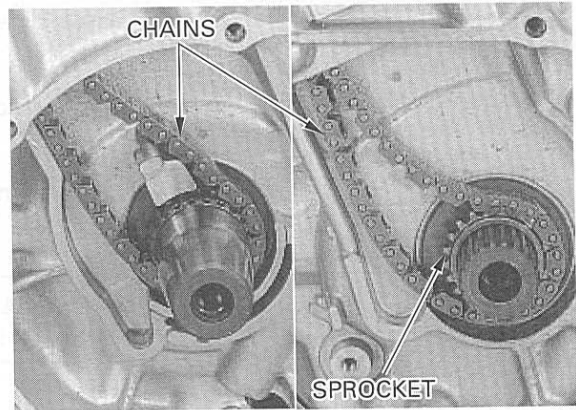
#### Excessive output gear noise

- Worn or damaged output drive and driven gears
- Worn or damaged gear case bearings
- Excessive backlash between output drive and driven gears
- Incorrect adjustment shim

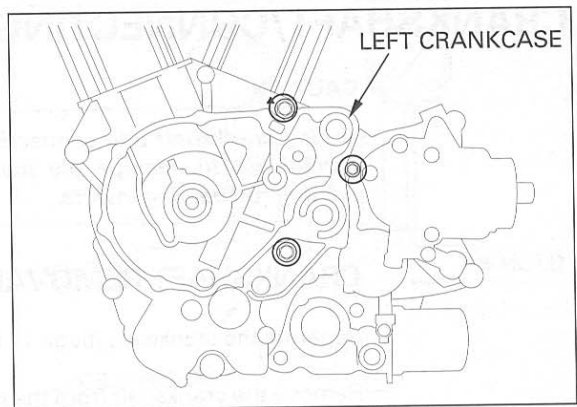
## CRANKCASE SEPARATION

Refer to Service Information (page 11-1) for removal of necessary parts before disassembling the crankcase.

Remove the cam chains and the rear cam chain drive sprocket.



Remove the 6 mm bolt and two 8 mm bolts with the washer.

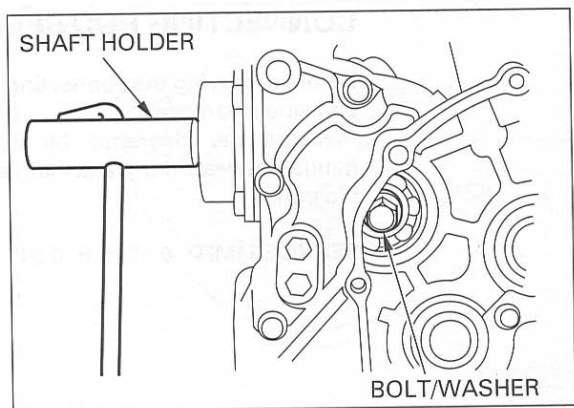


Hold the output driven gear shaft using the shaft holder, loosen the output drive gear shaft bolt and remove it with the washer.

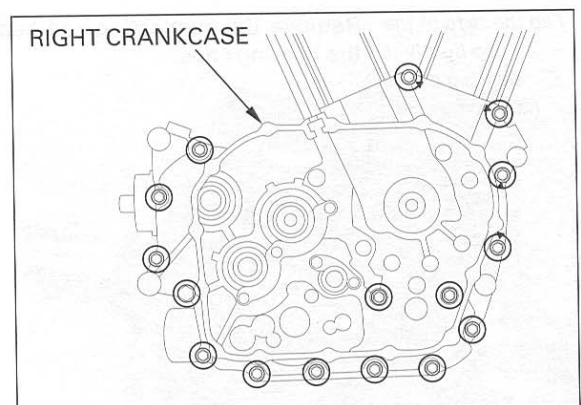
**TOOL:**

**Shaft holder**

07923 - 6890101



Loosen the five 6 mm bolts and ten 8 mm bolts and 10 mm bolt and remove them with the four washers.



## CRANKSHAFT/TRANSMISSION

Place the crankcase assembly with the right side down.

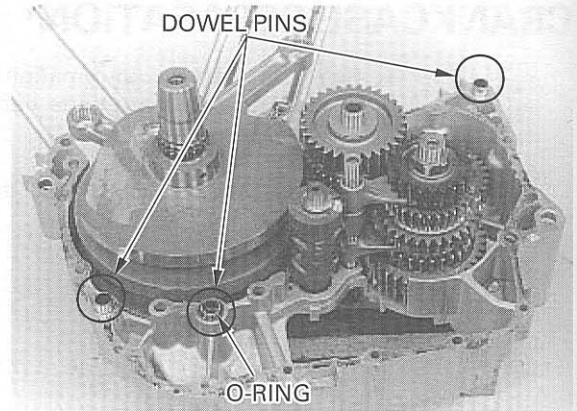
*Use the pry slots at the front and rear of the crankcase if necessary.*

Carefully separate the left crankcase from the right crankcase.

Remove the dowel pins and O-ring.

### NOTE:

Refer to following pages for service of the each part. For the crankcase assembly, see page 11-36.



## CRANKSHAFT/CONNECTING ROD

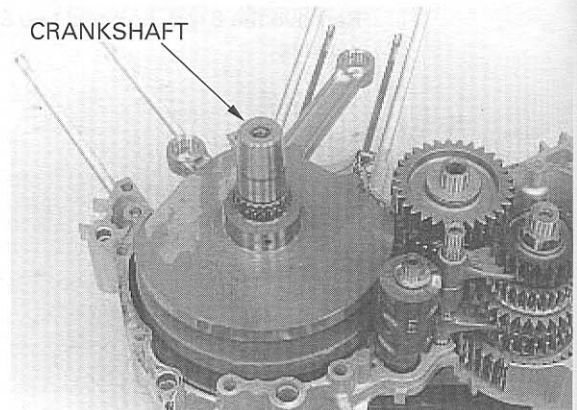
### CAUTION:

*During crankshaft and connecting rod service, be careful not to damage the main journal or connecting rod bearing inserts.*

### CRANKSHAFT REMOVAL

Separate the crankcase (page 11-5).

Remove the crankshaft from the right crankcase.



### CONNECTING ROD REMOVAL

Before removing the connecting rods, check the big end side clearance.

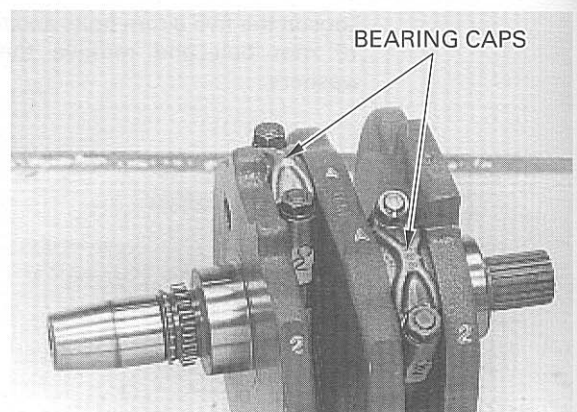
Measure the clearance by inserting the feeler gauge between the crankshaft and connecting rod big end.

**SERVICE LIMIT:** 0.28 mm (0.011 in)



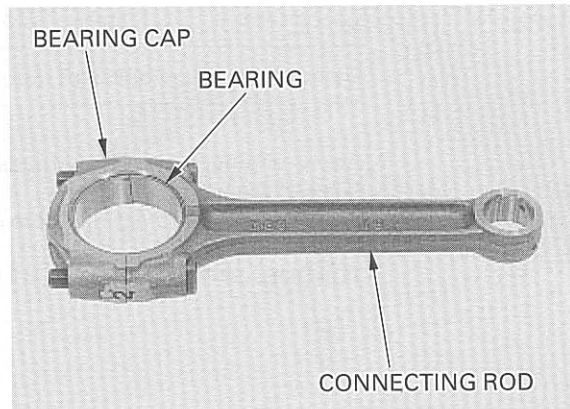
*Tap the side of the cap lightly if bearing cap is hard to remove.*

Remove the connecting rod bearing cap nuts and the bearing caps.



Mark the rods, bearings and caps as you remove them to indicate the correct cylinder and position on the crankpins for reassembly.

For the connecting rod small end inspection, see page 9-6.

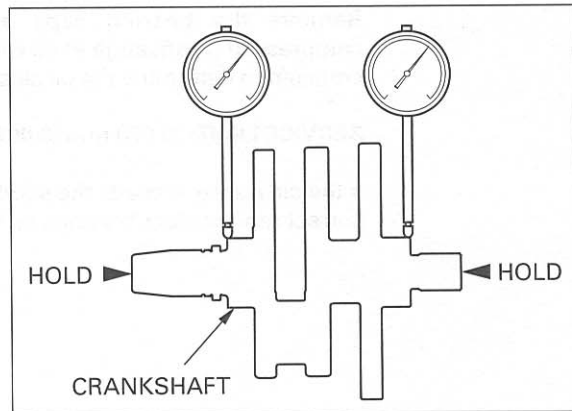


### CRANKSHAFT INSPECTION

#### CRANKSHAFT RUNOUT

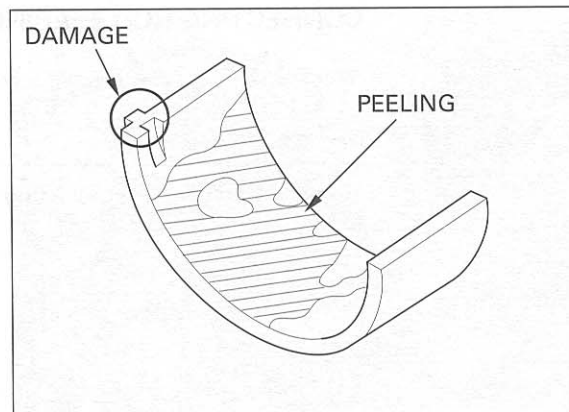
Place the crankshaft on a stand or V-blocks. Set a dial indicator on the main journals. Rotate the crankshaft two revolutions and read the runout.

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



### CONNECTING ROD BEARING INSPECTION

Inspect the bearing inserts for unusual wear, damage or peeling and replace as necessary.

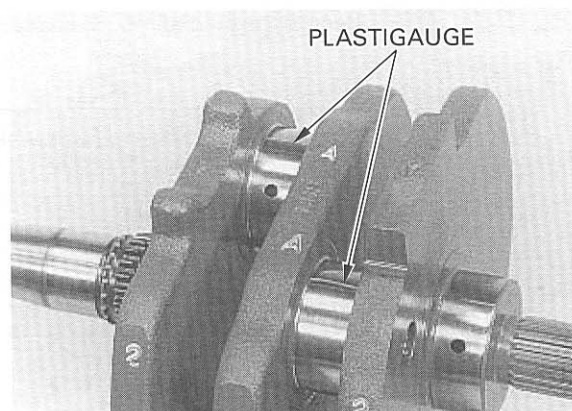


### OIL CLEARANCE INSPECTION

Clean off any oil from the bearing inserts and crankpins.

Put a strip of plastigauge lengthwise on each crankpin avoiding the oil hole.

Carefully install the connecting rods and bearing caps on the correct crankpins.



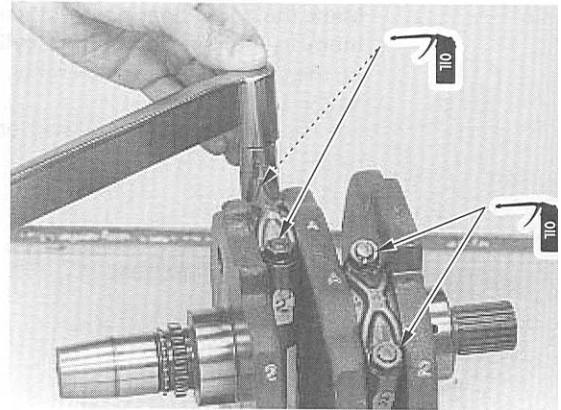
## CRANKSHAFT/TRANSMISSION

**NOTE:**

Do not rotate the crankshaft during inspection.

Apply engine oil to the threads and seating surfaces of the bearing cap nuts.  
Install the nuts and tighten them evenly.

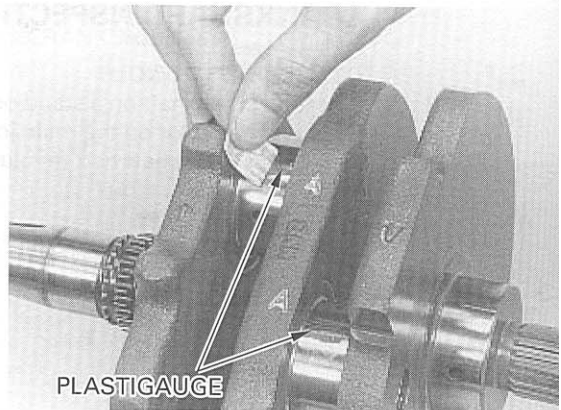
**TORQUE:** 59 N·m (6.0 kgf·m , 43 lbf·ft)



Remove the bearing caps and measure the compressed plastigauge at its widest point on each crankpin to determine the oil clearance.

**SERVICE LIMIT:** 0.070 mm (0.0028 in)

If the clearance exceeds the service limit, select the correct replacement bearings as follows.

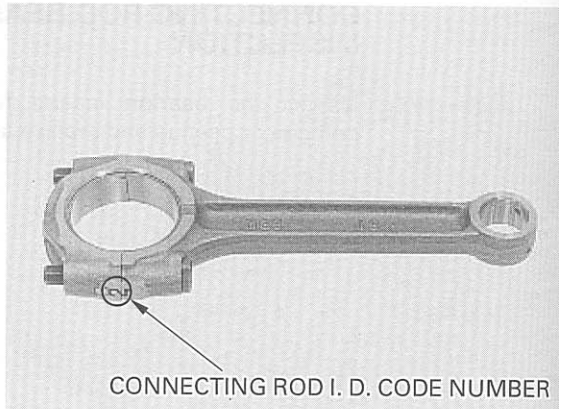


### CONNECTING ROD BEARING SELECTION

Record the connecting rod I. D. code number.

**NOTE:**

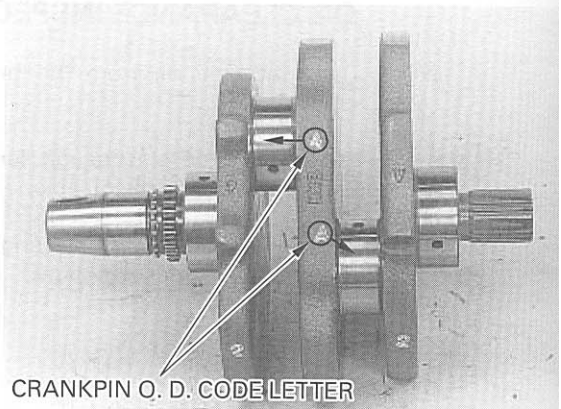
Number 1 or 2 on the connecting rod is the code for the connecting rod I. D.



Record the crankpin O. D. code letter.

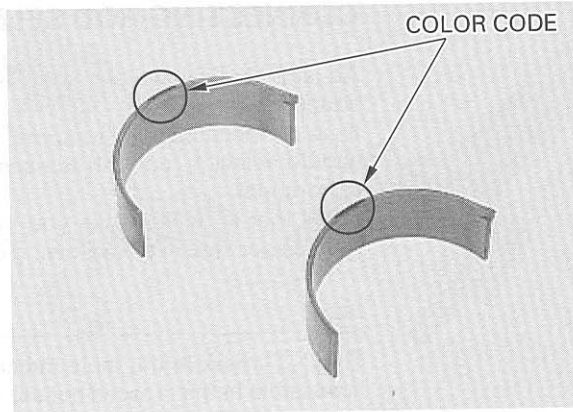
**NOTE:**

Letters A or B on each crank weight is the code for the crankpin O. D.



Cross reference the connecting rod and crankpin codes to determine the replacement bearing color code.

Connecting rod I.D. code		1	2
		51.000 – 51.008 mm (2.0079 – 2.0082 in)	51.008 – 51.016 mm (2.0082 – 2.0085 in)
Crankpin O.D. code			
A	47.982 – 47.990 mm (1.8891 – 1.8894 in)	Pink	Yellow
B	47.974 – 47.982 mm (1.8887 – 1.8891 in)	Yellow	Green



### Coonecting rod bearing thickness:

**Green:**

1.495 – 1.499 mm (0.0589 – 0.0590 in) ↑ Thick

**Yellow:**

1.491 – 1.495 mm (0.0587 – 0.0589 in)

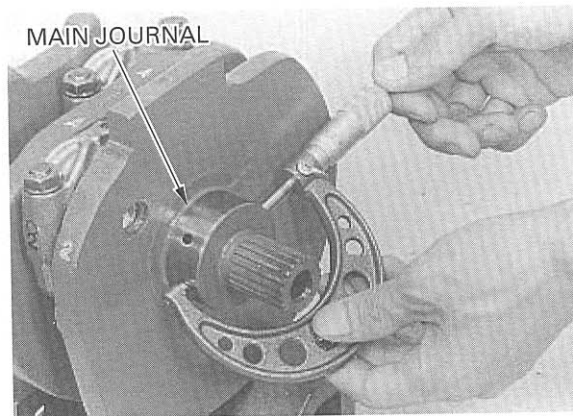
**Pink:**

1.487 – 1.491 mm (0.0585 – 0.0587 in) ↓ Thin

## MAIN BEARING INSPECTION

Clean off any oil from the bearings and the crankshaft journals.

Measure and record the crankshaft main journal O. D.



Measure and record the main bearing I. D. in the crankcase.

**NOTE:**

Be carefull not to damage the inside of the bearing while inspection.

Calculate the clearance between the main journal and main bearing.

**SERVICE LIMIT:** 0.060 mm (0.0024 in)

If the oil clearance exceeds the service limit, replace the crankcase.





**CONNECTING ROD SELECTION**

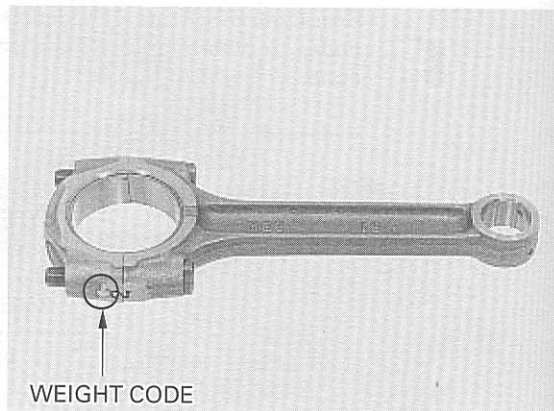
An alphabetical weight code is stamped on the connecting rod.

If a connecting rod requires replacement, you should select a rod with the same weight code as the original.

But if that is unavailable, you may use one of the others specified in the following chart.

**NOTE:**

The "○" mark in the table indicates that matching is possible in the crossed codes.



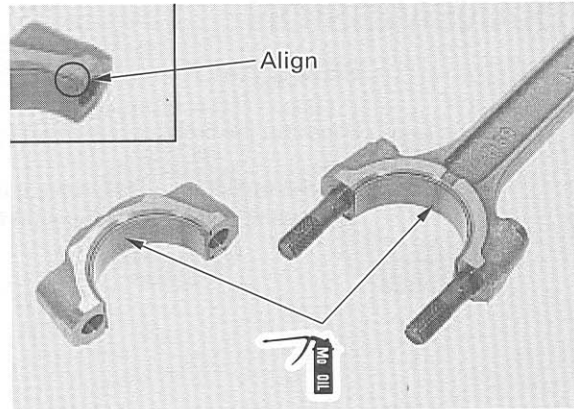
Rear rod code	A	B	C	D	E
Front rod code					
A	○	○			
B	○	○	○		
C		○	○	○	
D			○	○	○
E				○	○

**CONNECTING ROD INSTALLATION**

Wipe any oil off from the connecting rod, cap and bearing inserts.

Install the bearing inserts on the connecting rods and caps by aligning the tab with the groove.

Apply molybdenum oil solution to the thrust surface of the bearings.

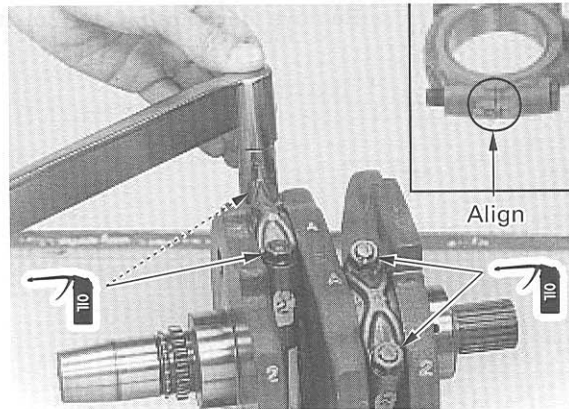


Install the rods and caps on the crankshaft by aligning the I. D. code on the rod and cap. Be sure each part is installed in its original position, as noted during removal.

Apply engine oil to the bearing cap nut threads and tighten them in two or more steps alternately.

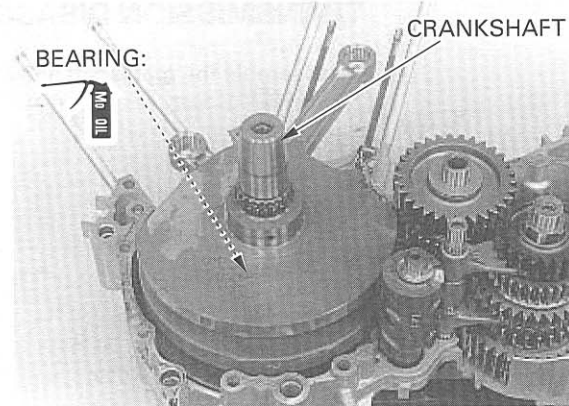
**TORQUE:** 59 N·m (6.0 kgf·m , 43 lbf·ft)

After tightening the nuts, check that the connecting rods move freely without binding.



Apply molybdenum oil solution to the main bearing inserts and install the crankshaft into the right crankcase.

Assemble the crankcase (page 11-36).

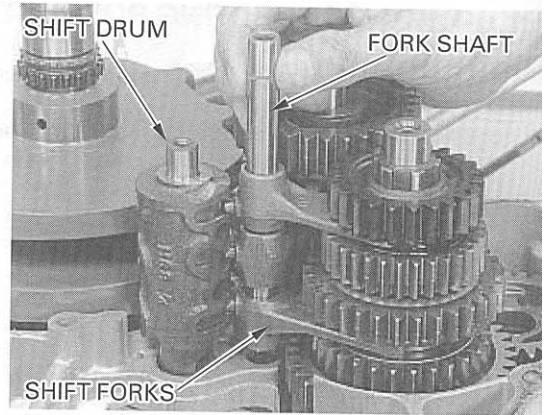


## TRANSMISSION

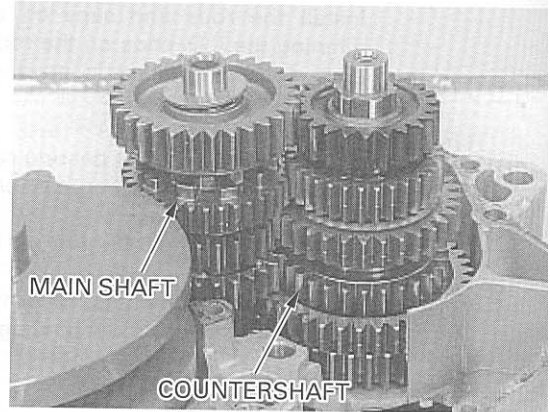
### REMOVAL

Separate the crankcase (page 11-5).

Pull the fork shaft and remove it from the shift forks.  
Remove the shift drum and shift forks.

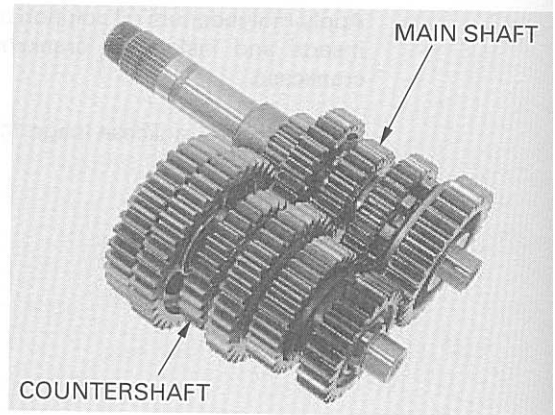


Remove the mainshaft and countershaft together.



### TRANSMISSION DISASSEMBLY

Disassemble the mainshaft and countershaft.



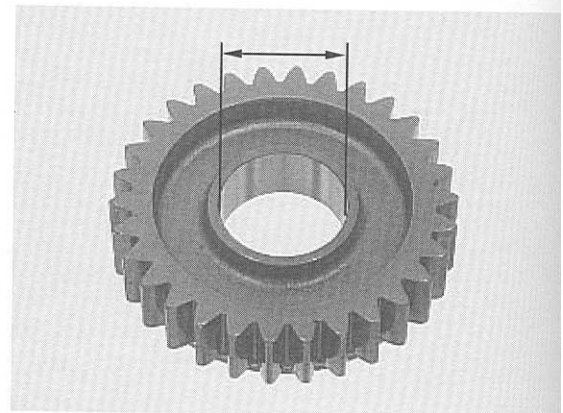
### INSPECTION

#### GEARS

Check the gear dogs, dog holes and teeth for damage or excessive wear.  
Measure the I. D. of each gear.

#### SERVICE LIMITS:

- M3, M5, M4 gears: 31.035 mm (1.2218 in)
- C1, C2 gears: 33.035 mm (1.3006 in)



**BUSHINGS**

Check the bushings for wear or damage.  
Measure O. D. of each bushing.

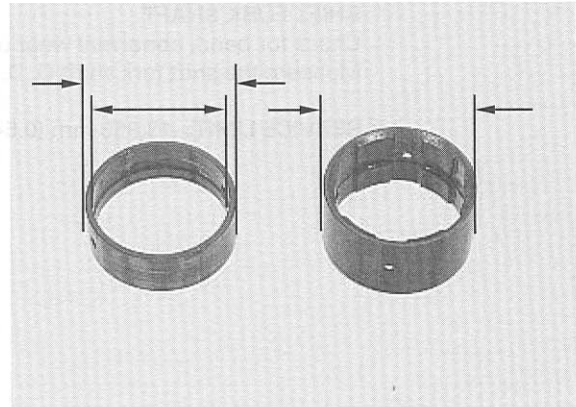
**SERVICE LIMITS:**

- M3, M5, M4 gear bushing:** 30.94 mm (1.218 in)
- C1, C2 gear bushing:** 32.94 mm (1.297 in)

Measure I. D. of each bushing.

**SERVICE LIMITS:**

- M3, C4 gear bushing:** 28.04 mm (1.104 in)
- C2 gear bushing:** 30.03 mm (1.182 in)

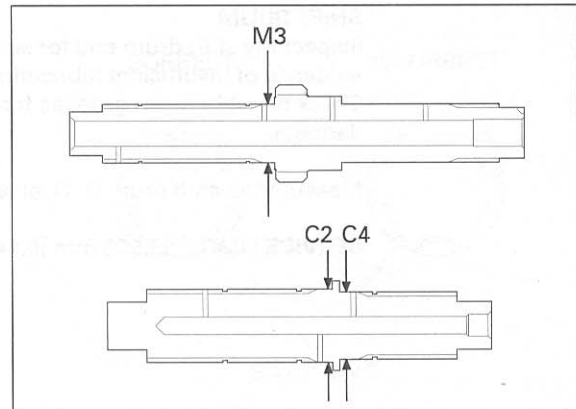


**MAINSHAFT/COUNTERSHAFT**

Check the spline grooves and sliding surfaces for abnormal wear or damage.  
Measure the O. D. of the mainshaft and countershaft at the gear and bushing sliding areas.

**SERVICE LIMITS:**

- Main shaft (at M3 gear bushing):**  
27.94 mm (1.100 in)
- Counter shaft (at C2 gear bushing):**  
29.94 mm (1.179 in)
- (at C4 gear bushing):**  
27.95 mm (1.100 in)



Calculate the gear-to-bushing and bushing-to-shaft clearance.

**SERVICE LIMITS:**

- Gear-to-bushing (M3, C4):** 0.075 mm (0.0030 in)
- (M5, C1):** 0.095 mm (0.0037 in)
- (C2):** 0.090 mm (0.0035 in)
- Bushing-to-shaft (M3):** 0.082 mm (0.0032 in)
- (C2):** 0.076 mm (0.0030 in)
- (C4):** 0.074 mm (0.0029 in)

**SHIFT FORK**

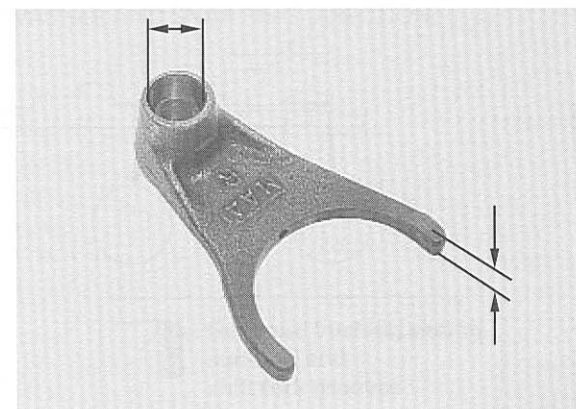
Check for deformation or abnormal wear.  
Measure the shift fork claw thickness.

**SERVICE LIMITS:**

- Left fork:** 5.83 mm (0.230 in)
- Center and Right forks:**
- VT1100T and '97 - '00 VT1100C:**  
6.33 mm (0.249 in)
- After '00 VT1100C:** 5.83 mm (0.230 in)

Measure the shift fork I. D.

**SERVICE LIMIT:** 14.04 mm (0.553 in)

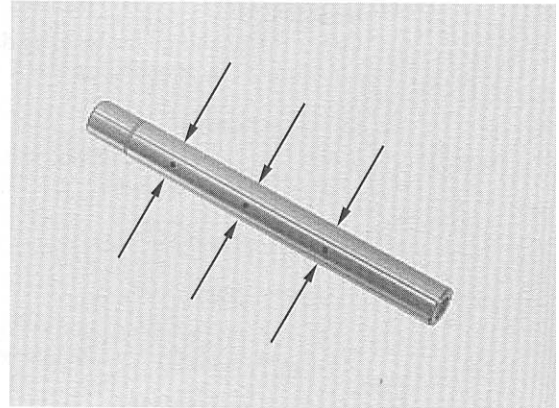


## CRANKSHAFT/TRANSMISSION

### SHIFT FORK SHAFT

Check for bend, abnormal wear or damage.  
Measure the shift fork shaft O. D.

**SERVICE LIMIT:** 13.956 mm (0.5494 in)

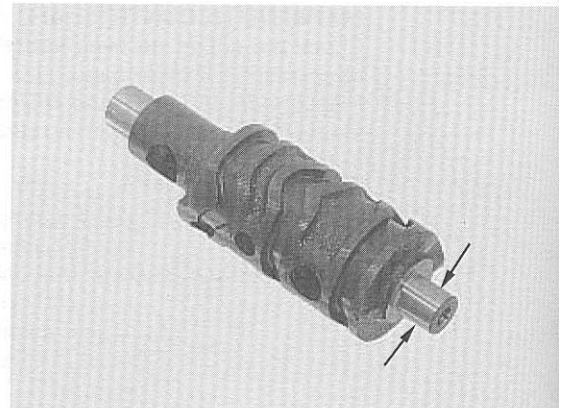


### SHIFT DRUM

Inspect the shift drum end for scoring, scratches, or evidence of insufficient lubrication.  
Check the shift drum grooves for abnormal wear or damage.

Measure the shift drum O. D. at left end.

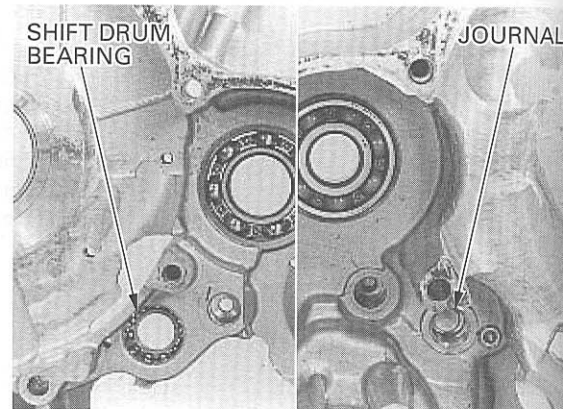
**SERVICE LIMIT:** 13.956 mm (0.5494 in)



### SHIFT DRUM BEARING AND JOURNAL

Check the shift drum bearing on the right crankcase for excessive play or damage.  
Check the shift drum journal in the left crankcase for excessive wear or damage.  
Measure the shift drum journal I. D.

**SERVICE LIMIT:** 14.028 mm (0.5523 in)



**TRANSMISSION ASSEMBLY**

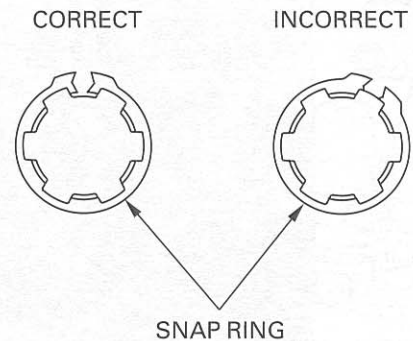
Clean all parts in solvent.

Apply molybdenum oil solution to the gear and bushing sliding surface and shift fork grooves to ensure initial lubrication.

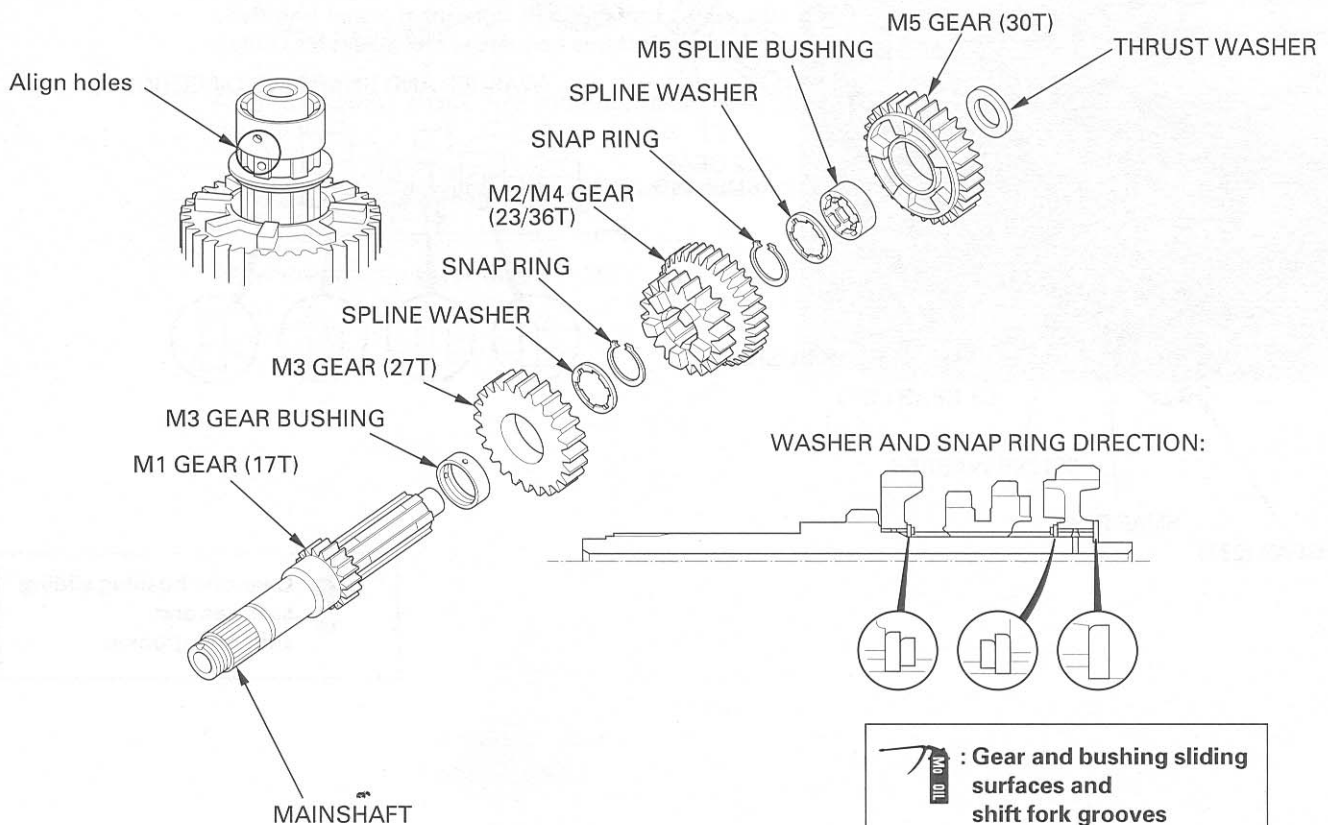
Assemble all parts into their original positions.


**NOTE:**

- Check the gears for freedom of movement or rotation on the shaft.
- Install the washers and snap rings with the chamfered edges facing the thrust road side. Do not reuse worn snap ring which could easily spin in the groove.
- Check that the snap rings are seated in the grooves and align their end gaps with the grooves of the spline.
- Align the oil holes in the M5 gear bushing and mainshaft, and the C1 gear bushing and countershaft.



**MAIN SHAFT**



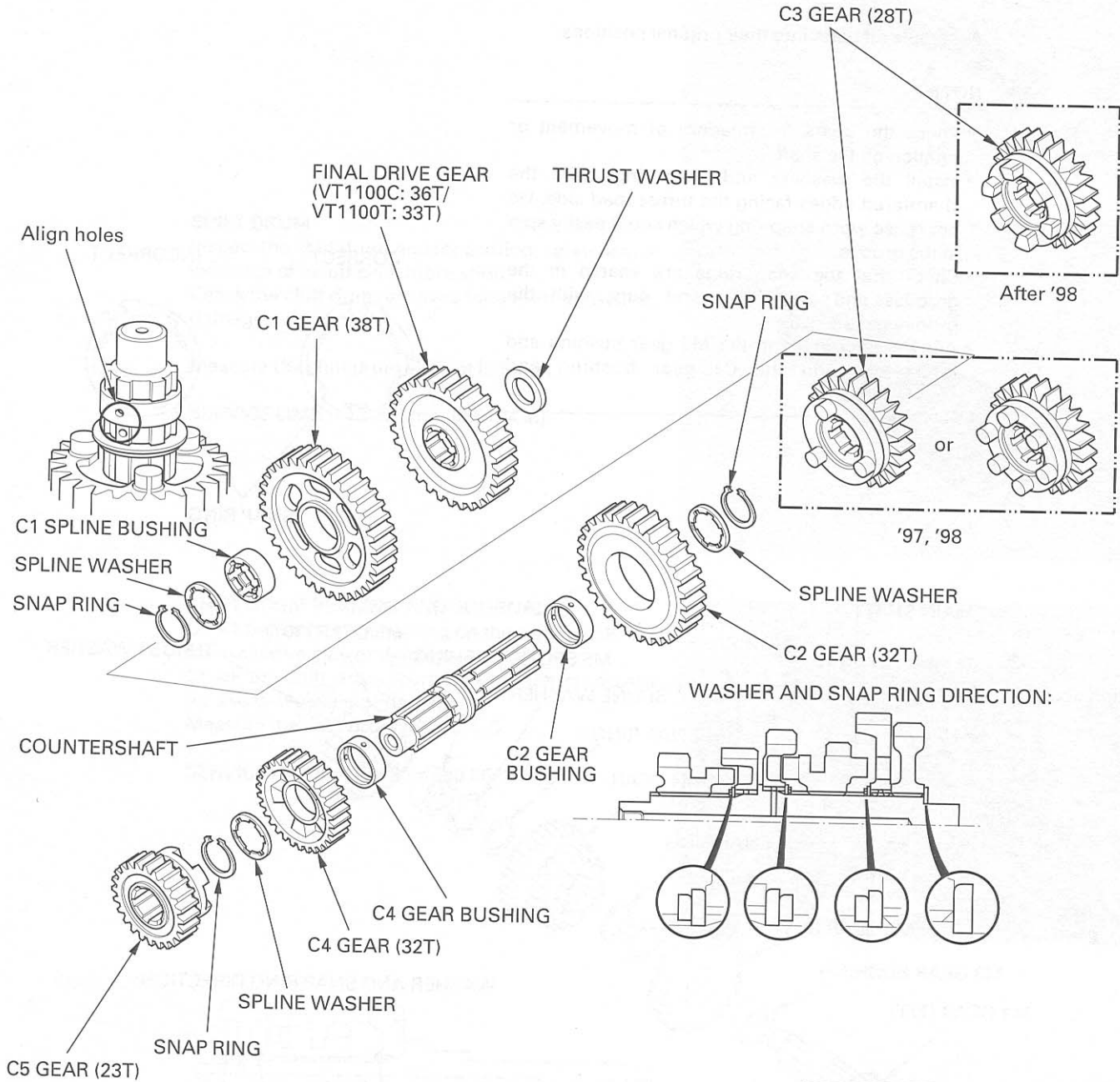
 : Gear and bushing sliding surfaces and shift fork grooves


# CRANKSHAFT/TRANSMISSION

## COUNTERSHAFT

### NOTE:

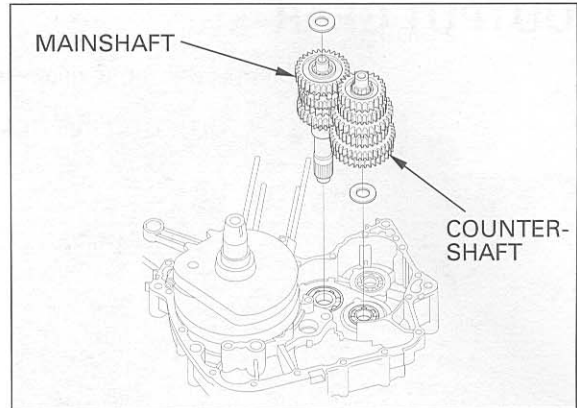
The C2 and C3 gears on After '98 model are different from those on '97 and '98 models.



 : Gear and bushing sliding surfaces and shift fork grooves

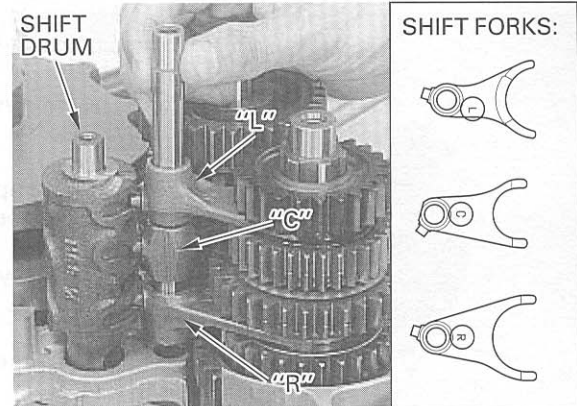
## INSTALLATION

Install the mainshaft and countershaft together into the right crankcase. Be sure to install the two end washers as shown.



Install the shift forks into the shifter gear grooves with the markings facing down (right crankcase side).

Install the shift drum by aligning the shift fork guide pins with the shift drum guide grooves.

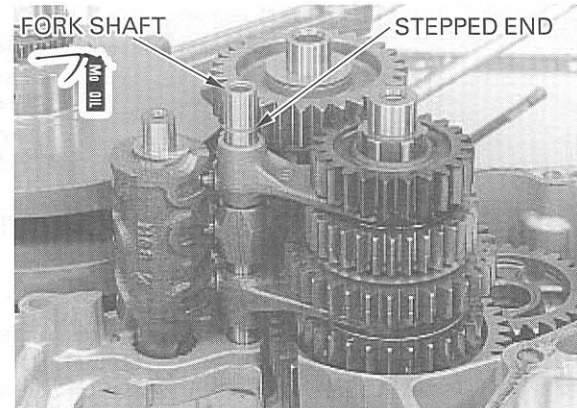


Apply molybdenum oil solution to the shift fork shaft and insert it through the shift forks into the right crankcase with the stepped end facing up.

After installing, check for smooth transmission operation.

Install the output gear, bushing and thrust washer if removed (page 11-18).

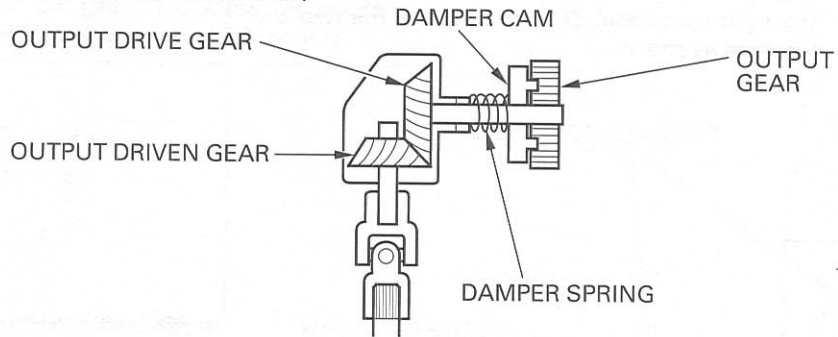
Assemble the crankcase (page 11-36).





OUTPUT GEAR

Description of the output gear assembly:



REMOVAL

Separate the crankcase (page 11-5).

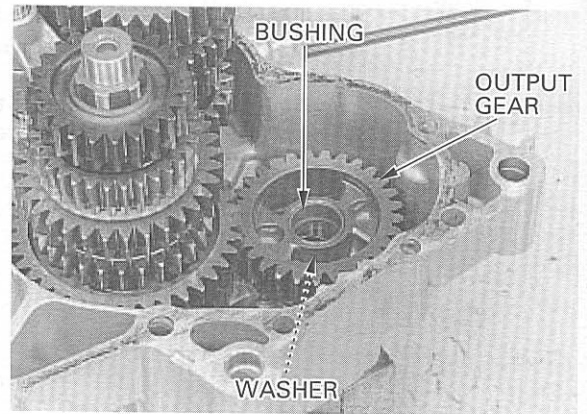
Remove the output gear, bushing and thrust washer from the right crankcase.

Set the damper spring compressor onto the damper cam and output drive gear shaft.

Compress the damper spring by turning the compressor bolt clockwise until the snap ring can be removed.

Remove the snap ring from the drive gear shaft groove.

Loosen and remove the compressor.



TOOLS:

- Damper spring compressor 07964 – ME90000  
not available in U. S. A.
- Snap ring pliers 07914 – 5670101  
not available in U. S. A. or  
07914 – 5670100

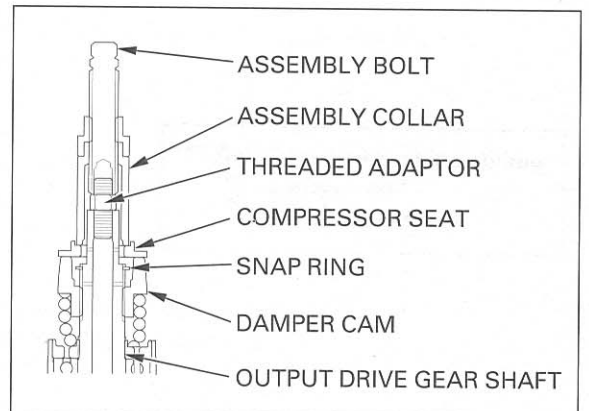
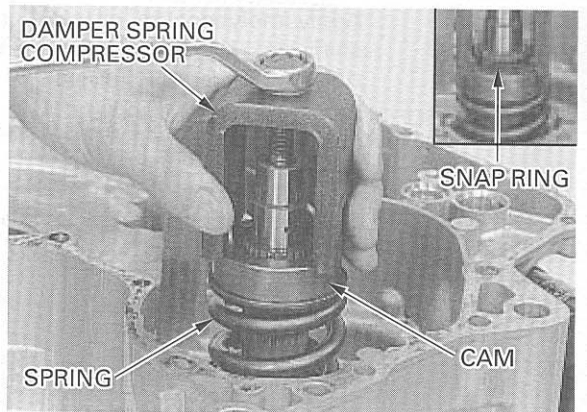
Remove the snap ring, damper cam and spring from the drive gear shaft.

(U. S. A. only)

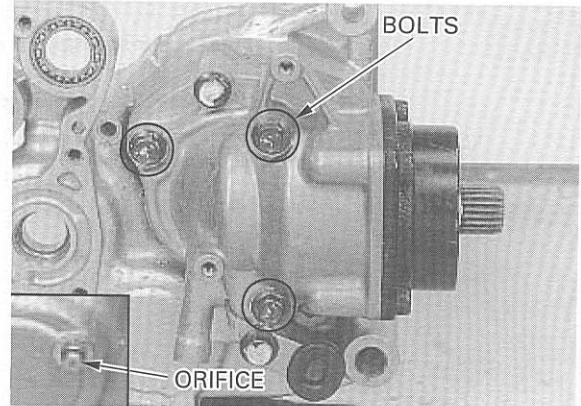
Place the threaded adaptor in the end of the output drive gear shaft and tighten.  
Place the compressor seat over the threaded adaptor with the stepped side facing upward.  
Install the assembly bolt through the assembly collar and attach it to the threaded adaptor.  
Center the compressor seat with the damper cam then begin to tighten the 24 mm nut of the collar until the snap ring is visible so it can be removed.

TOOLS:

- Assembly bolt 07965 – 1660200
- Assembly collar 07965 – 166030A or  
07965 – 1660300
- Compressor seat 07967 – 9690200
- Threaded adaptor 07965 – KA30000
- Snap ring pliers 07914 – 5670101  
not available in U. S. A. or  
07914 – 5670100



Remove the three bolts and the output gear assembly.  
Remove the oil orifice and O-rings.

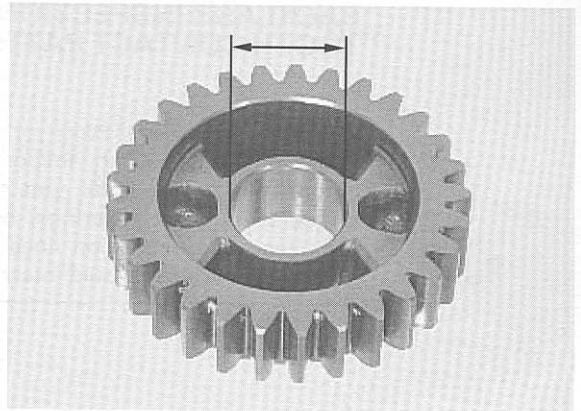


### INSPECTION

#### OUTPUT GEAR

Check the gear teeth for damage or excessive wear, and the gear dog holes for damage.  
Measure the output gear I. D.

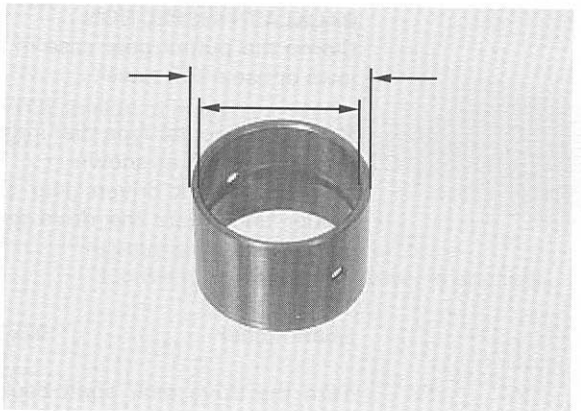
**SERVICE LIMIT:** 25.031 mm (0.9855 in)



#### BUSHING

Check the bushing for wear or damage.  
Measure the bushing I. D. and O. D.

**SERVICE LIMIT: O. D. :** 24.949 mm (0.9822 in)  
**I. D. :** 22.051 mm (0.8681 in)



#### OUTPUT DRIVE GEAR SHAFT

Measure the O. D. of the output drive gear shaft at the sliding area.

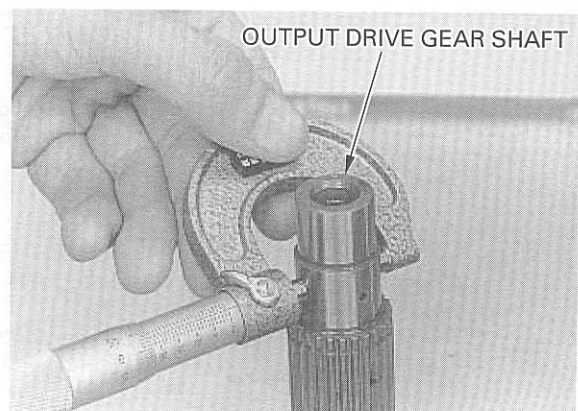
**SERVICE LIMIT:** 21.969 mm (0.8649 in)

Calculate the gear-to-bushing and bushing-to-shaft clearance.

#### SERVICE LIMIT:

**Gear-to-bushing:** 0.082 mm (0.0032 in)

**Bushing-to-shaft:** 0.082 mm (0.0032 in)

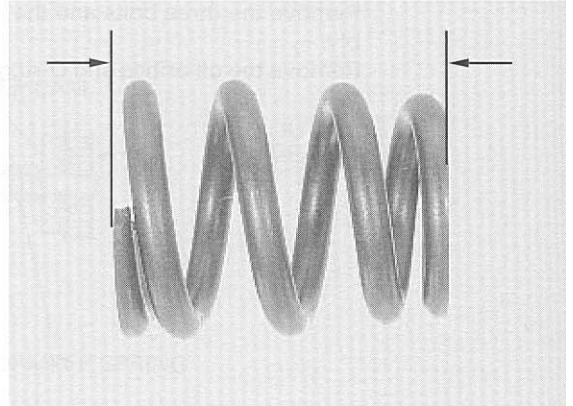


## CRANKSHAFT/TRANSMISSION

### DAMPER SPRING

Measure the damper spring free length.

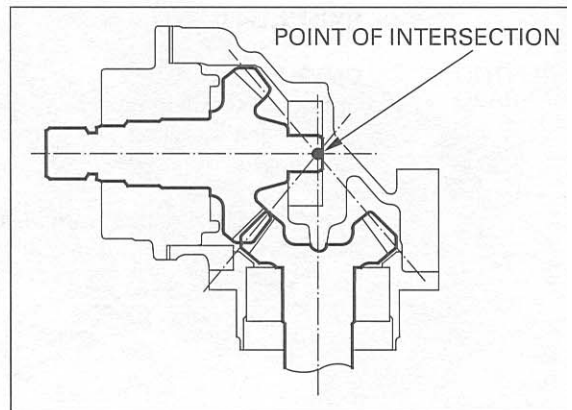
**SERVICE LIMIT:** 68.1 mm (2.68 in)



### BACKLASH INSPECTION/GEAR TOOTH CONTACT PATTERN CHECK

#### NOTE:

Perform the backlash inspection and contact pattern check whenever you replace the output driven/drive gears, bearings, bearing holder and gear case. The extension lines from the gear engagement surfaces should intersect at one point.



### BACKLASH INSPECTION

Clamp the output gear case in a vise that has soft jaws or use a soft towel.

Set the horizontal type dial indicator on the output drive gear shaft as shown.

Hold the output driven gear shaft with the shaft holder and rotate the drive gear shaft until gear slack is taken up.

#### TOOL:

**Shaft holder** 07923-6890101

Turn the drive gear shaft back and forth to read backlash.

**STANDARD:** 0.08–0.23 mm (0.003–0.009 in)

**SERVICE LIMIT:** 0.40 mm (0.016 in)

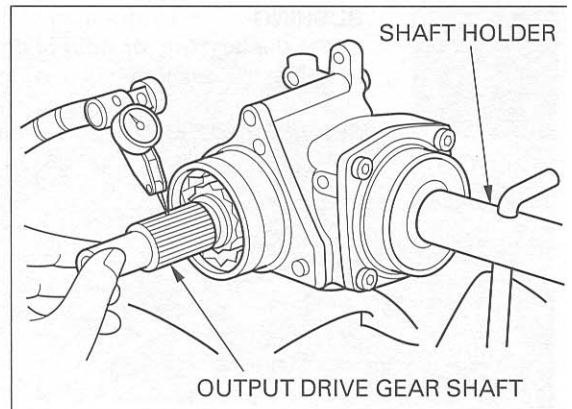
Remove the dial indicator. Turn the drive gear shaft 120° and measure backlash. Repeat this procedure once more.

Compare the difference of the three measurements.

#### Backlash difference between measurements

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

If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely. Inspect the bearings and reinstall if necessary.

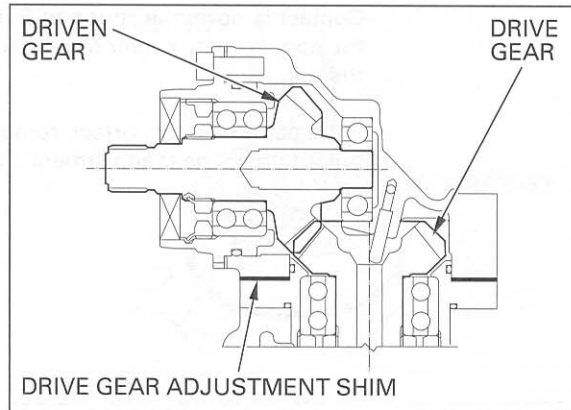


If the backlash is excessive, replace the output drive gear adjustment shim with a thinner one.  
If the backlash is too small, replace the output drive gear adjustment shim with a thicker one.

Backlash is changed by about 0.06 – 0.07 mm (0.002 – 0.003 in) when shim thickness is changed by 0.10 mm (0.004 in).

**Output drive gear adjustment shims:**

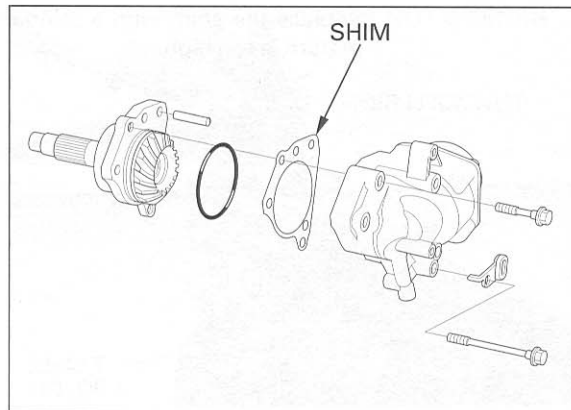
- A: 0.40 mm (0.016 in)
- B: 0.45 mm (0.018 in)
- C: 0.50 mm (0.020 in) — Standard
- D: 0.55 mm (0.022 in)
- E: 0.60 mm (0.024 in)



To replace the shim, remove the drive gear and bearing holder as an assembly from the gear case.

After replacing the shim, install the drive gear assembly (page 11-25).

After the backlash adjustments has been made, check the gear tooth contact pattern described below.

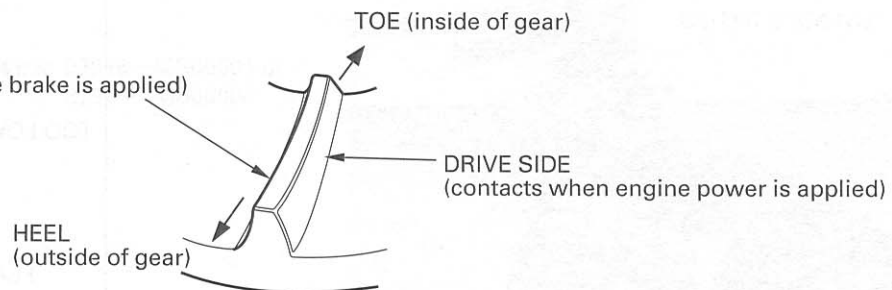


**GEAR TOOTH CONTACT PATTERN CHECK**

Description of the tooth:

**COAST SIDE**

(contacts when engine brake is applied)

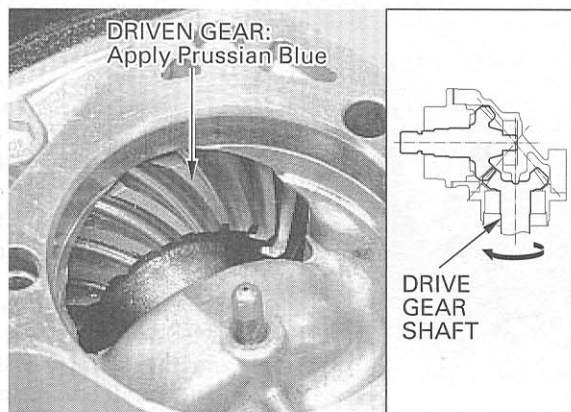


Remove the drive gear assembly from the gear case (see above).  
Apply Prussian Blue to the output driven gear teeth.

Reinstall the drive gear with the shim (page 11-25).

Rotate the drive gear shaft several times in the normal direction of rotation.

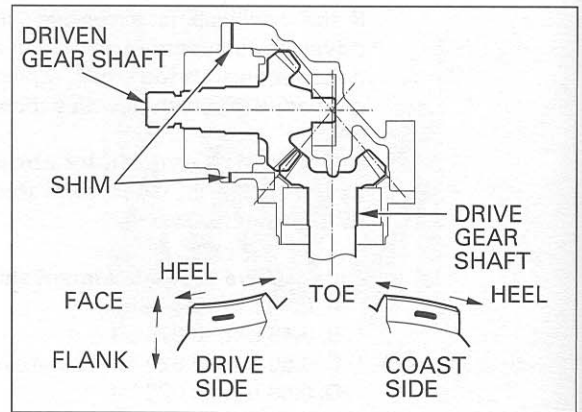
Remove the drive gear assembly and check the gear tooth contact pattern as described following page.



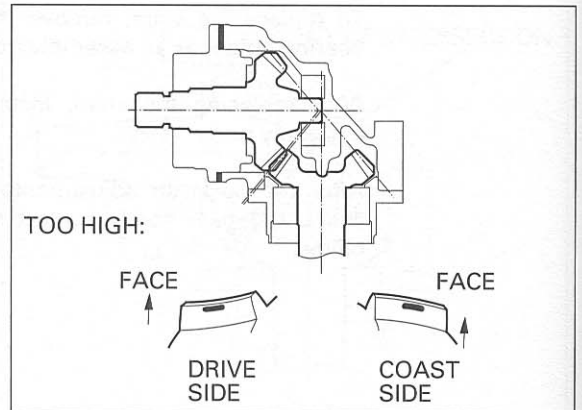
## CRANKSHAFT/TRANSMISSION

Contact is normal if Prussian Blue is transferred to the approximate center of each tooth and slightly to the toe.

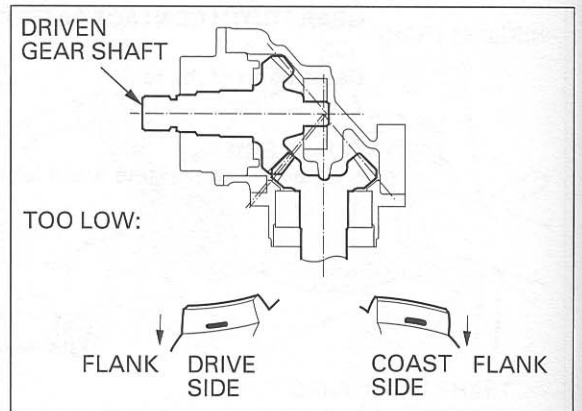
If the pattern is not correct, remove and replace the output driven gear adjustment shim.



Replace the shim with a thinner one if the contact pattern is too high.



Replace the shim with a thicker one if the contact pattern is too low.

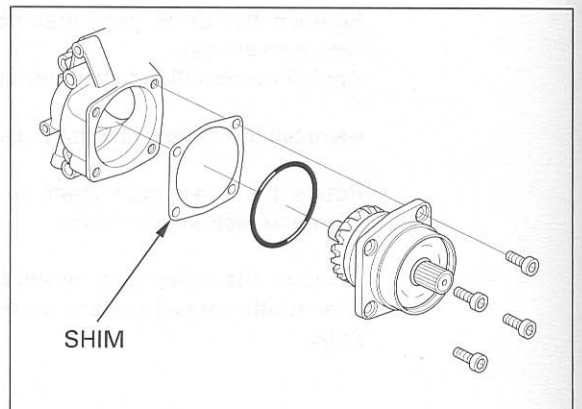


The pattern will shift about 1.5–2.0 mm (0.06–0.08 in) when the shim thickness is changed by 0.10 mm (0.04 in).

### Output driven gear adjustment shims:

A: 0.20 mm (0.008 in)	F: 0.45 mm (0.018 in)
B: 0.25 mm (0.010 in)	G: 0.50 mm (0.020 in)
C: 0.30 mm (0.012 in)	H: 0.55 mm (0.022 in)
D: 0.35 mm (0.014 in)	I: 0.60 mm (0.024 in)
E: 0.40 mm (0.016 in)—Standard	

To replace the shim, remove the driven gear and bearing holder as an assembly from the gear case. After replacing the shim, install the driven gear assembly and tighten the bolts (page 11-31).



**OUTPUT DRIVE GEAR DISASSEMBLY**

**CAUTION:**

*Be careful not to distort or damage the gear case.*

Place the output gear case in a vise with soft jaws, being careful not to distort it.

Install the shaft holder on the driven gear shaft, wedging it against the vise to lock the shaft.

**TOOL:**

**Shaft holder** 07923-6890101

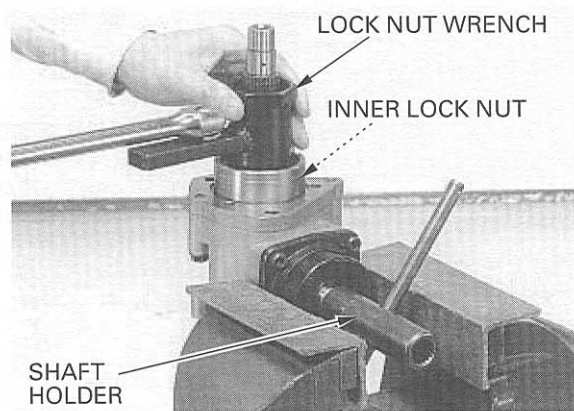
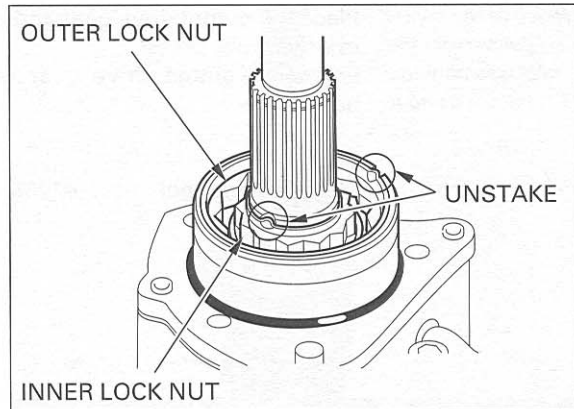
Unstake the bearing inner lock nut with a drill or grinder. Be careful that material particles do not enter the bearing and the threads on the shaft are not damaged.

Remove the bearing inner lock nut and discard it.

**TOOLS:**

**Shaft holder** 07923-6890101  
**Lock nut wrench, 30 × 64 mm** 07916-MB00001 or 07916-MB00000

Remove the shaft holder.

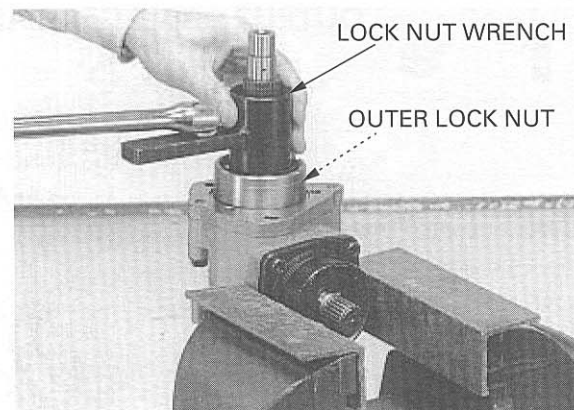


Unstake the bearing outer lock nut with a punch.

Remove the bearing outer lock nut and discard it.

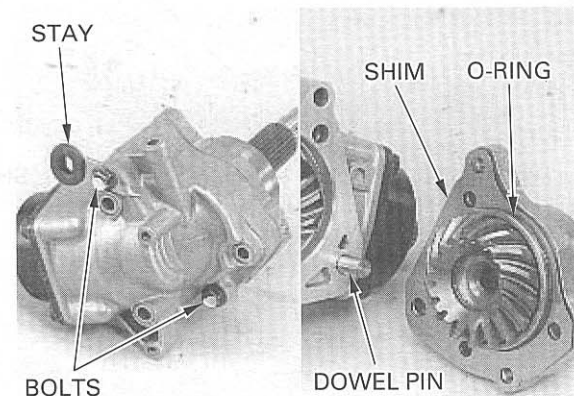
**TOOL:**

**Lock nut wrench, 30 × 64 mm** 07916-MB00001 or 07916-MB00000



Remove the two bolts with the stay and the drive gear bearing holder from the gear case.

Remove the adjustment shim and O-ring from the gear holder and remove the dowel pin from the gear case.

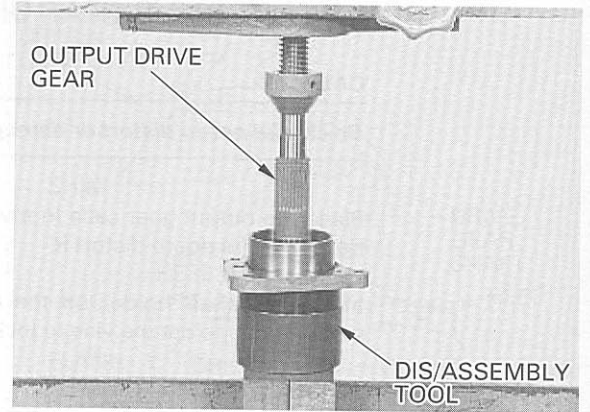


## CRANKSHAFT/TRANSMISSION

Remove the center guide from the dis/assembly tool before using it.

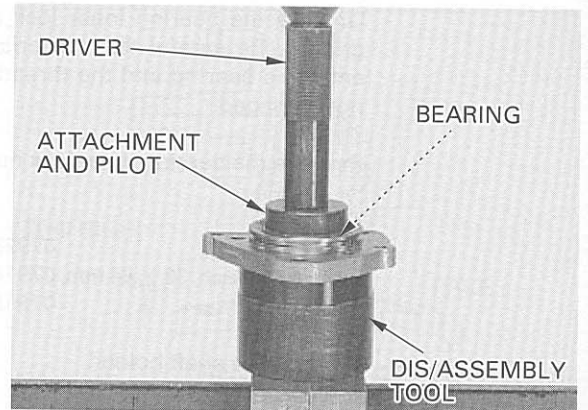
Place the output drive gear and a dis/assembly tool in a hydraulic press. Press the output drive gear out of the bearing holder.

**TOOL:**  
**Dis/assembly tool**      07965-3710101

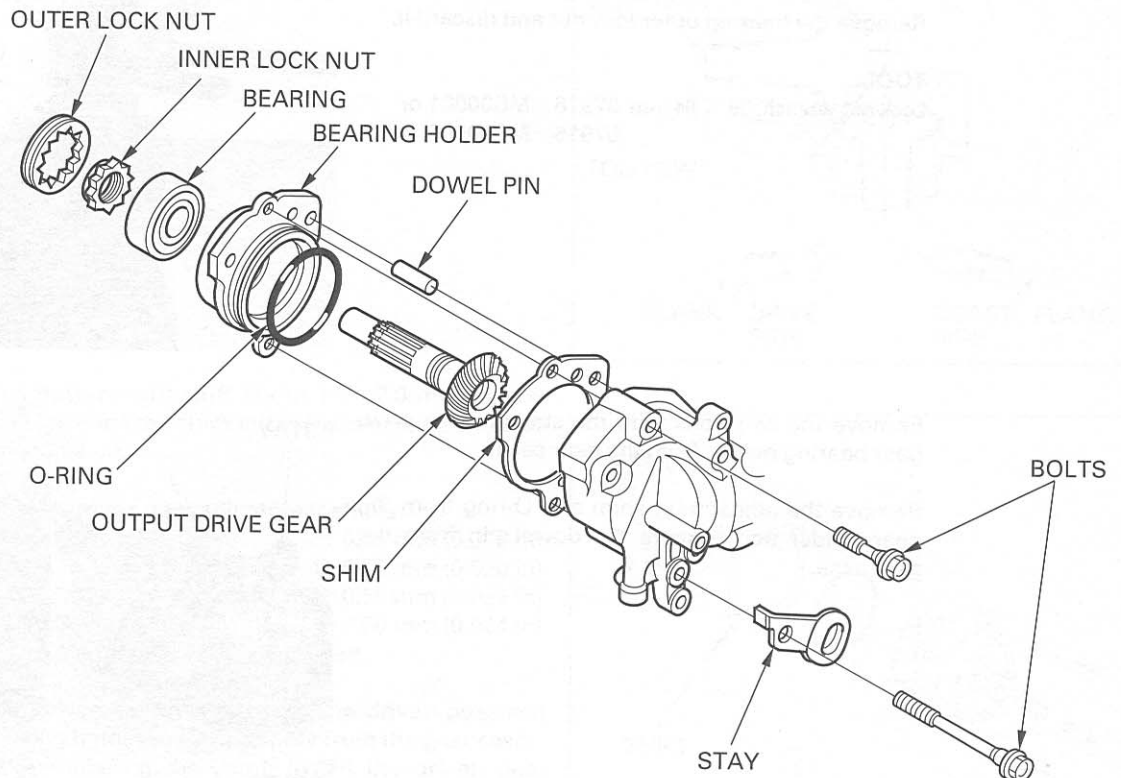


Remove the drive gear bearing using a hydraulic press.

**TOOLS:**  
**Dis/assembly tool**      07965-3710101  
**Driver**                    07749-0010000  
**Attachment, 52 × 55 mm**   07746-0010400  
**Pilot, 30 mm**              07746-0040700



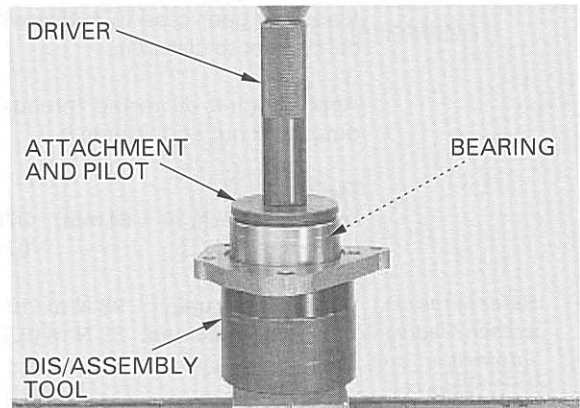
### OUTPUT DRIVE GEAR ASSEMBLY



Press a new bearing into the bearing holder.

**TOOLS:**

<b>Dis/assembly tool</b>	07965-3710101
<b>Driver</b>	07749-0010000
<b>Attachment, 62 × 68 mm</b>	07746-0010500
<b>Pilot, 30 mm</b>	07746-0040700



If the output drive gear requires replacement, the drive and driven gears must be replaced as a set.

Support the bearing inner race and press the output drive gear with a pilot.

**NOTE:**  
Place the pilot's threaded end into the drive shaft.

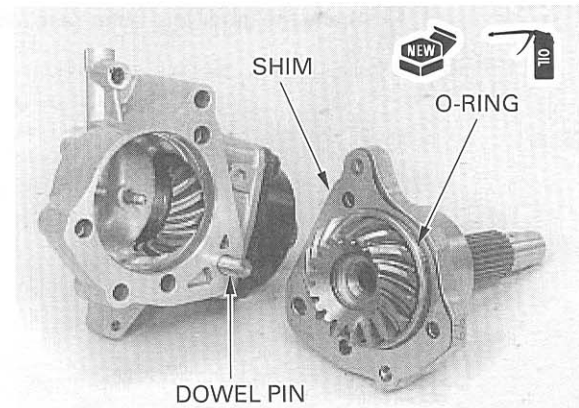
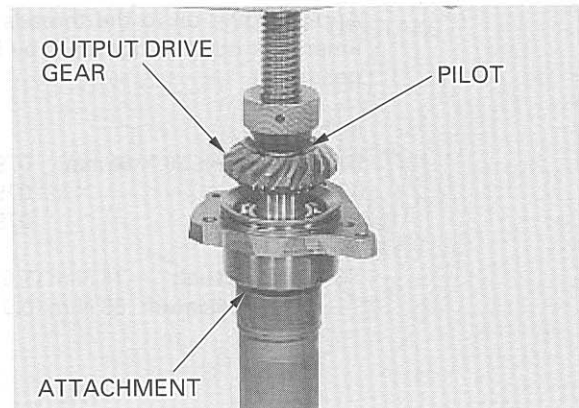
**TOOLS:**

<b>Driver, 40 mm I. D.</b>	07746-0030100
<b>Attachment, 30 mm I. D.</b>	07746-0030300
<b>Pilot, 20 mm</b>	07746-0040500

**NOTE:**

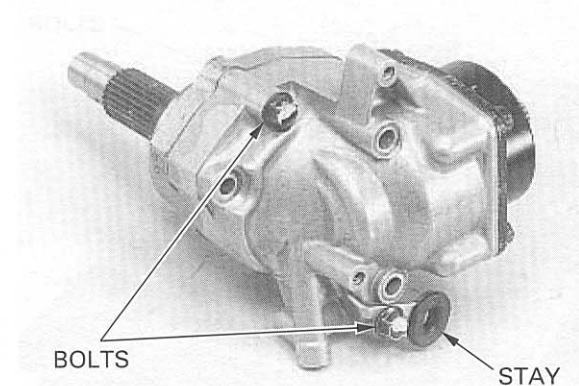
If the bearing, gear, holder and/or case is replaced, a new adjustment shim must be selected (page 11-20, Backlash Inspection).

Install the dowel pin into the gear case.  
Coat a new gear holder O-ring with engine oil and install it into the gear holder groove.  
Install the adjustment shim over the bearing holder.



Set the bearing holder into the gear case.  
Apply engine oil to the gear holder bolt threads and seating surfaces and install them with the left crankcase rear cover stay in position as shown.  
Tighten the gear holder bolts.

**TORQUE:** 31 N·m (3.2 kgf·m, 23 lbf·ft)





## CRANKSHAFT/TRANSMISSION

Place the gear case in a vise with soft jaws, being careful not to distort it.

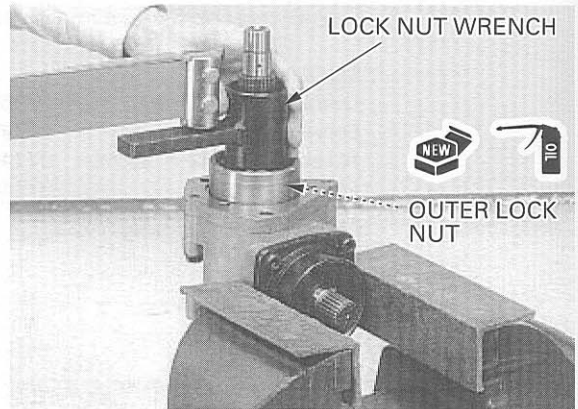
Apply engine oil to the threads of a new bearing outer lock nut and tighten it.

**TOOL:**

**Lock nut wrench, 30 × 64 mm** 07916-MB00001 or 07916-MB00000

*Refer to torque wrench reading information, on page 11-1 "Service Information".*

**TORQUE: Actual:** 98 N·m (10.0 kgf·m, 72 lbf·ft)  
**Indicated:** 89 N·m (9.1 kgf·m, 66 lbf·ft)



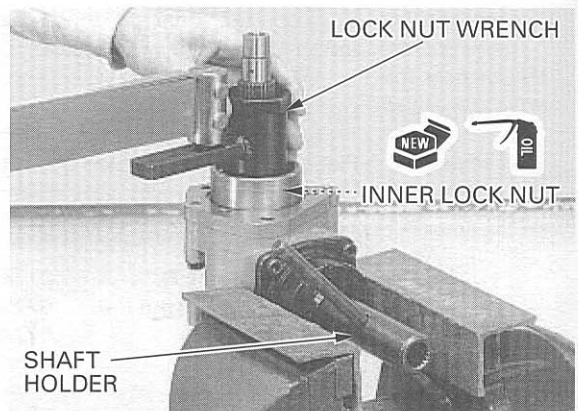
Apply engine oil to the threads of a new bearing inner lock nut and tighten it by holding the driven gear shaft.

**TOOLS:**

**Lock nut wrench, 30 × 64 mm** 07916-MB00001 or 07916-MB00000

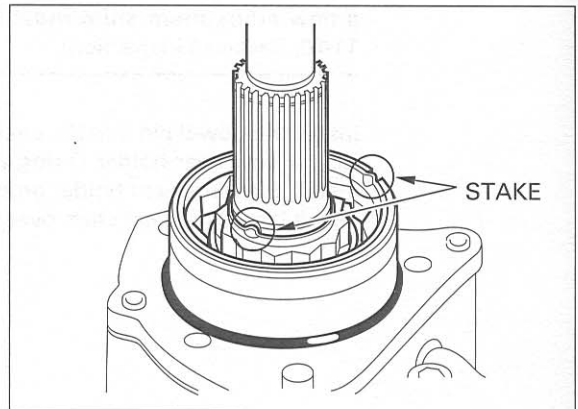
**Shaft holder** 07923-6890101

**TORQUE: Actual:** 74 N·m (7.5 kgf·m, 54 lbf·ft)  
**Indicated:** 68 N·m (6.9 kgf·m, 50 lbf·ft)



Stake the inner and outer race lock nuts.

Remove the shaft holder.



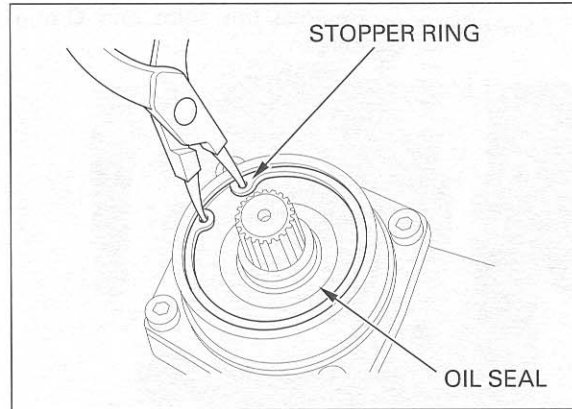
**OUTPUT DRIVEN GEAR DISASSEMBLY**

**CAUTION:**

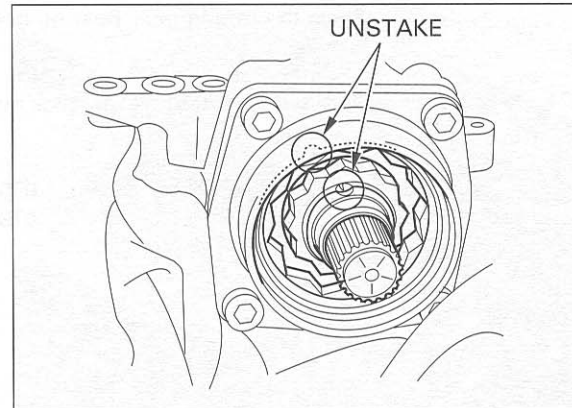
*Be careful not to damage the bearing holder and gear case mating surface.*

Place the output gear case in a vise with soft jaws, being careful not to damage it.

Remove the stopper ring out of the gear holder groove.  
Remove the driven gear oil seal.



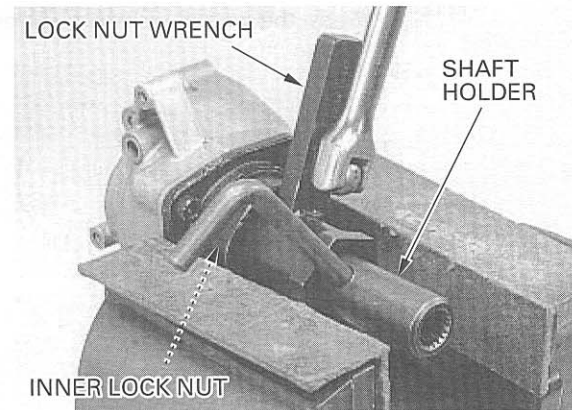
Unstake the bearing inner and outer race lock nuts by prying or drilling.



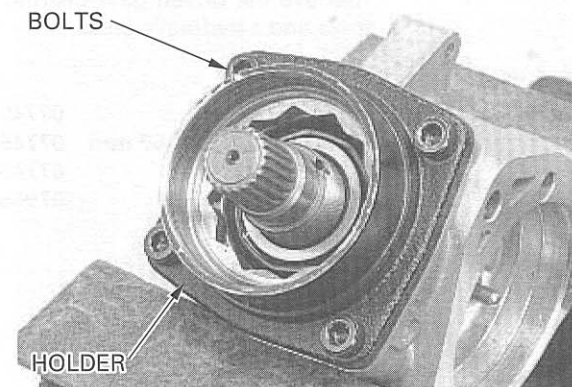
Hold the driven gear shaft and remove the bearing inner race lock nut and discard it.

**TOOLS:**

**Shaft holder** 07923-6890101  
**Lock nut wrench, 30 × 64 mm** 07916-MB00001 or 07916-MB00000

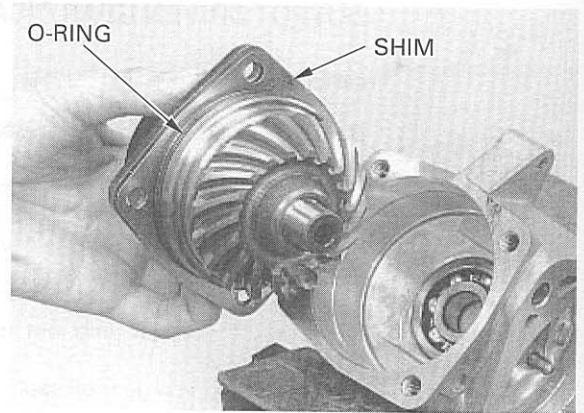


Remove the driven gear bearing holder bolts and the holder from the gear case.



## CRANKSHAFT/TRANSMISSION

Remove the shim and O-ring from the bearing holder.

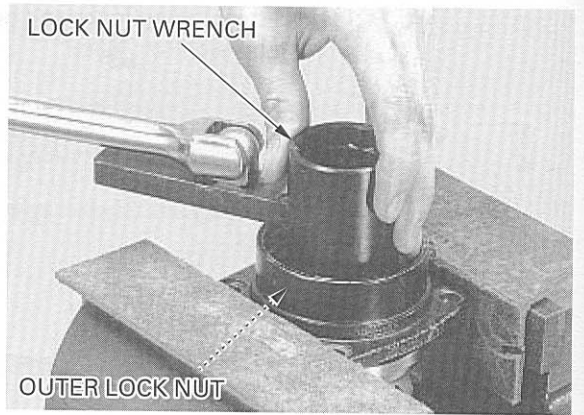


Place the driven gear bearing holder in a vise with soft jaws.

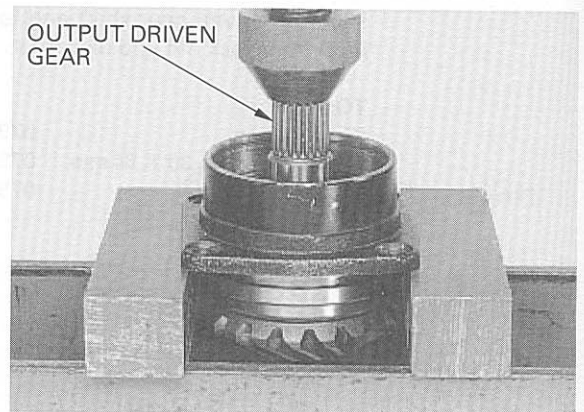
Remove the bearing outer lock nut and discard it.

**TOOL:**

Lock nut wrench, 30 × 64 mm 07916-MB00001 or  
07916-MB00000



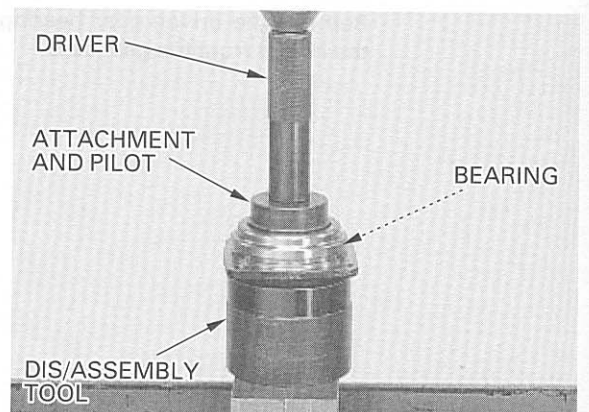
Press the output driven gear out of the bearing holder.



Remove the driven gear bearing using the special tools and a hydraulic press.

**TOOLS:**

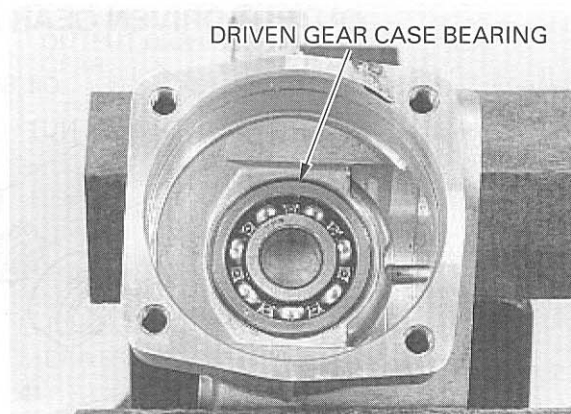
Driver 07749-0010000  
Attachment, 52 × 55 mm 07746-0010400  
Pilot, 30 mm 07746-0040700  
Dis/assembly tool 07965-3710101



**CAUTION:**

*Always wear insulated gloves when handling a heated gear case.*

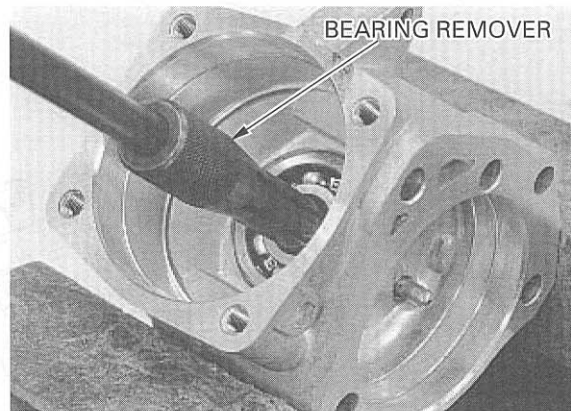
Heat the output gear case around the driven gear case bearing 80 °C (176 °F).



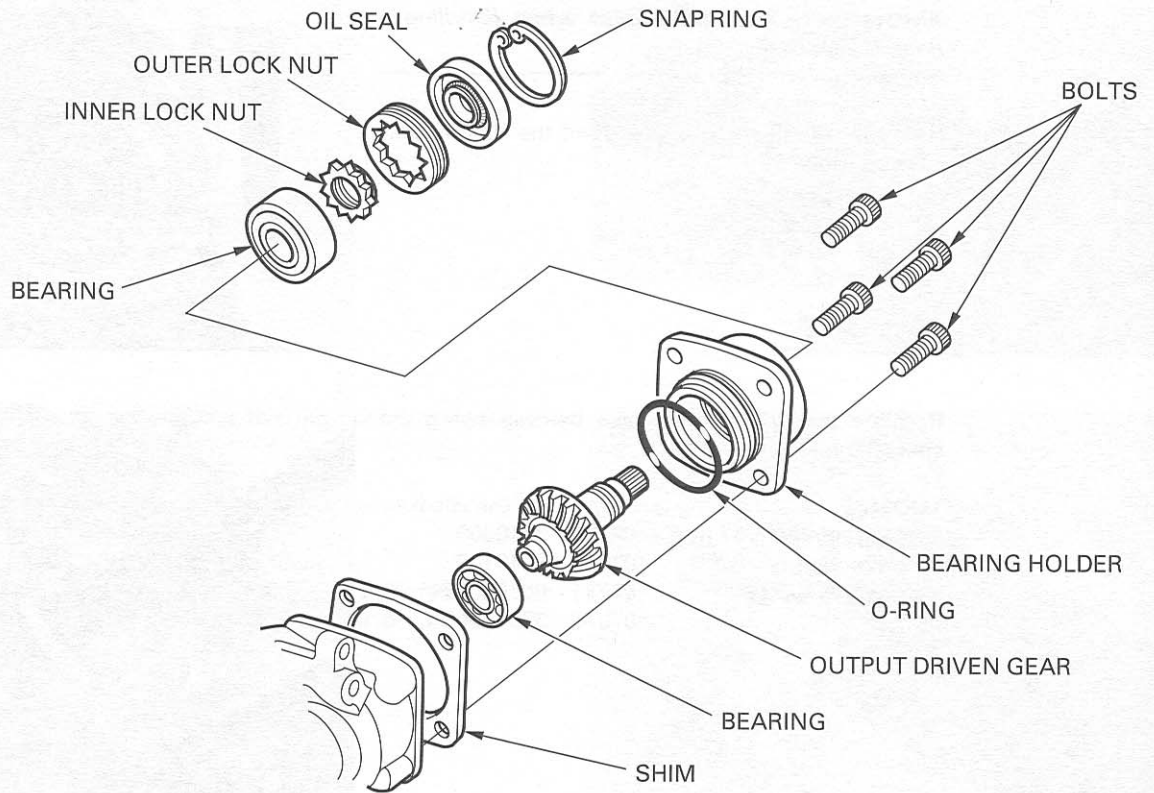
Remove the driven gear case bearing using the special tools.

**TOOLS:**

<b>Bearing remover, 17 mm</b>	07736-3710300
<b>Remover handle</b>	07936-3710100
<b>Remover weight</b>	07741-0010201 or 07936-3710200



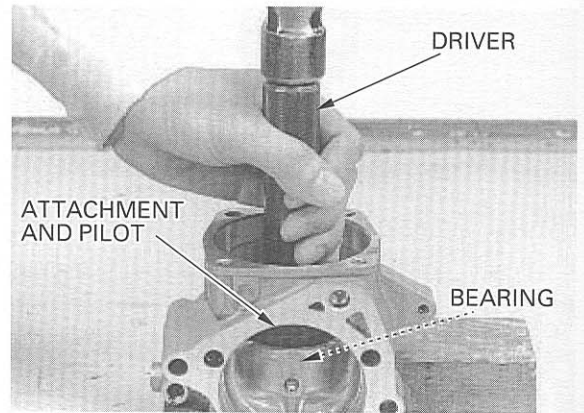
OUTPUT DRIVEN GEAR ASSEMBLY



Drive a new bearing into the gear case using the special tools as shown.

**TOOLS:**

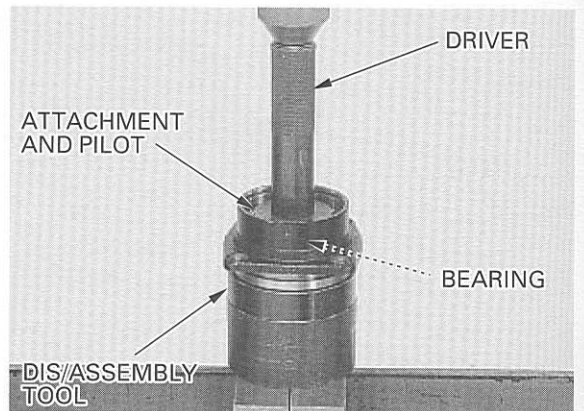
- Driver** 07749-0010000
- Attachment, 42 × 47 mm** 07746-0010300
- Pilot, 17 mm** 07746-0040400



Press a new bearing into bearing holder using the special tools and make sure it rotates freely after installation.

**TOOLS:**

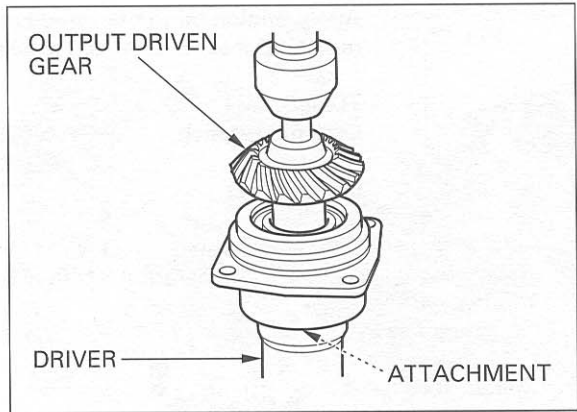
- Driver** 07749-0010000
- Attachment, 52 × 55 mm** 07746-0010400
- Pilot, 30 mm** 07746-0040700
- Dis/assembly tool** 07965-3710101



If the output driven gear requires replacement, the driven and drive gear must be replaced as a set.

Support the bearing inner race and press the output driven gear into the bearing holder using the special tools.

**TOOLS:**  
**Driver, 40 mm I. D.** 07746-0030100  
**Attachment, 30 mm I. D.** 07746-0030300



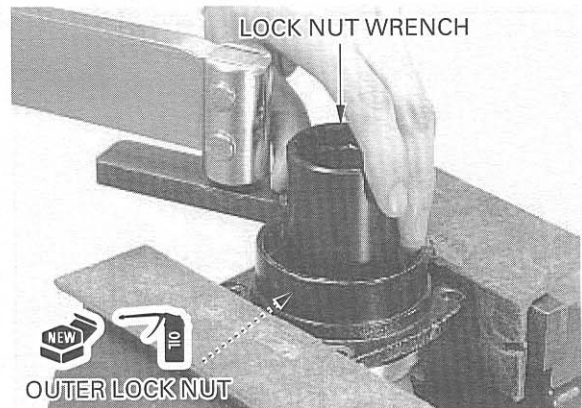
Place the bearing holder in a vise with soft jaws.

Apply engine oil to the threads of a new bearing outer lock nut and tighten it to the specified torque using the special tool.

**TOOL:**  
**Lock nut wrench** 07916-MB00001 or 07916-MB00000

Refer to torque wrench reading information, on page 11-1 "Service Information".

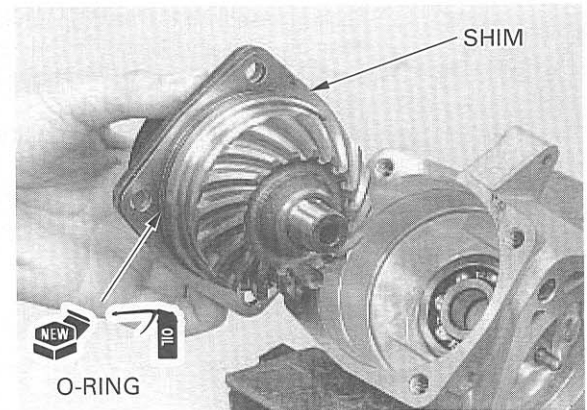
**TORQUE: Actual:** 98 N·m (10.0 kgf·m, 72 lbf·ft)  
**Indicated:** 89 N·m (9.1 kgf·m, 66 lbf·ft)



Coat a new gear holder O-ring with engine oil and install it into gear holder groove. Install the adjustment shim over the bearing holder.

**NOTE:**

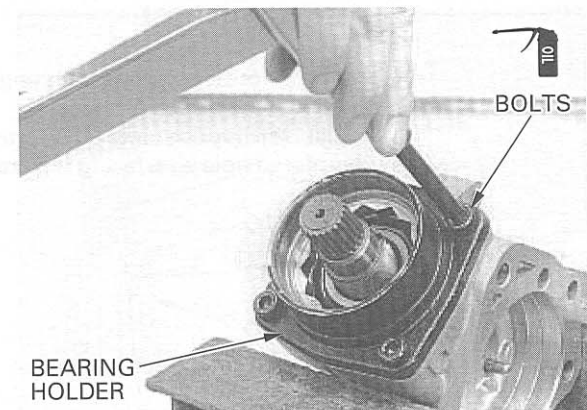
When the bearing, gear, holder and/or case have been replaced, use the 0.40 mm (0.016 in) shim for initial reference.



Align the bolt holes in the gear holder and shim and install them into the gear case.

Apply engine oil to the threads and seating surface of the bearing holder bolts and tighten them.

**TORQUE:** 31 N·m (3.2 kgf·m, 23 lbf·ft)



# CRANKSHAFT/TRANSMISSION

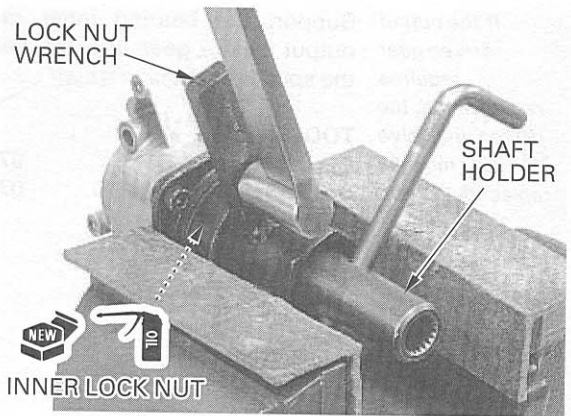
Apply engine oil to the threads of a new inner lock nut and tighten it using the special tools.

**TOOLS:**

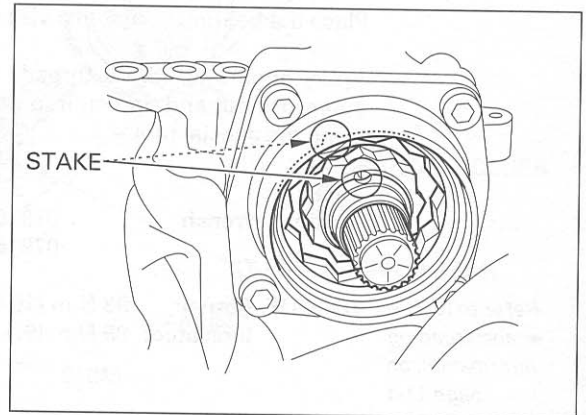
- Lock nut wrench**                    07916—MB00001 or  
   07916—MB00000
- Shaft holder**                         07923—6890101

*Refer to torque wrench reading information, on page 11-1 "Service Information".*

**TORQUE: Actual:**    74 N·m (7.5 kgf·m , 54 lbf·ft)  
**Indicated:**        68 N·m (6.9 kgf·m, 50 lbf·ft)

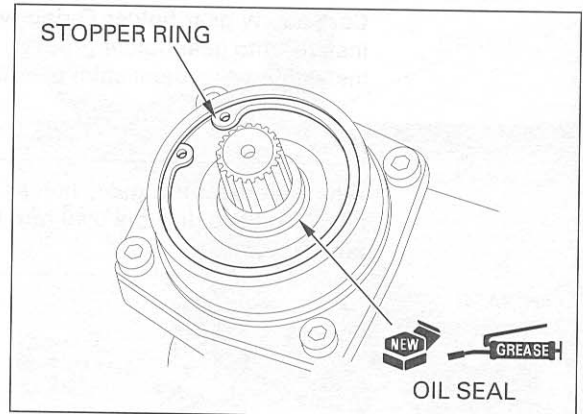


Stake the inner and outer lock nuts.



Pack grease into the seal lip cavity of a new driven gear oil seal and install it until the ring groove is visible so the stopper ring can be installed.

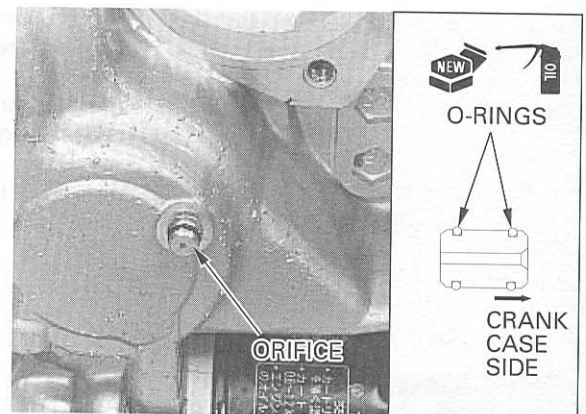
Install the stopper ring into the bearing holder groove securely.



## INSTALLATION

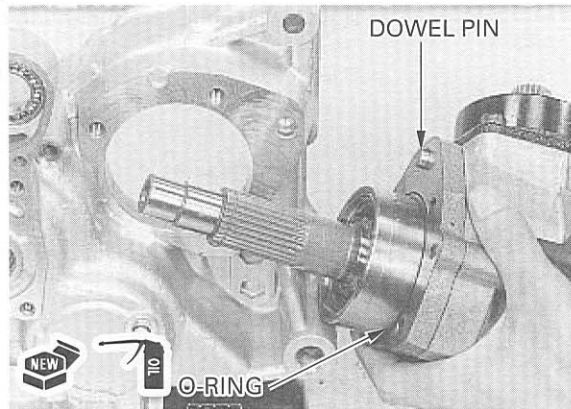
Coat new orifice O-rings with engine oil and install them into the orifice grooves.

Install the orifice into the crankcase with the chamfered hole side facing the crankcase.



Coat a new O-ring with engine oil and install it into the groove in the bearing holder.  
Be sure to install the dowel pin in the bearing holder and install the output gear assembly onto the left crankcase.

Temporarily tighten the gear case mounting bolts.



Install the damper spring over the drive gear shaft with the closely wound coil facing the left crankcase.

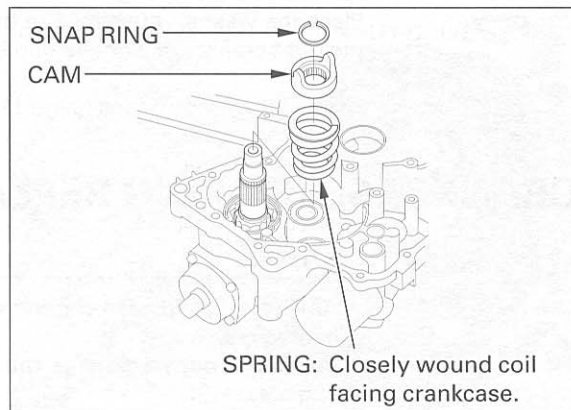
Install the damper cam onto the drive gear shaft and place the snap ring onto the damper cam.

Set the damper spring compressor onto the damper cam and drive gear shaft.

Compress the damper spring by turning the compressor bolt clockwise until the snap ring groove is visible.

Install the snap ring into groove in the shaft securely.

Loosen and remove the compressor.



**TOOLS:**

- Damper spring compressor** 07964 – ME90000  
not available in U. S. A.
- Snap ring pliers** 07914 – 5670101  
not available in U. S. A.  
or  
07914 – 5670100

**(U. S. A. only)**

Place the threaded adaptor in the end of the output drive shaft and tighten.

Place the compressor seat over the threaded adaptor with the stepped side facing upward.

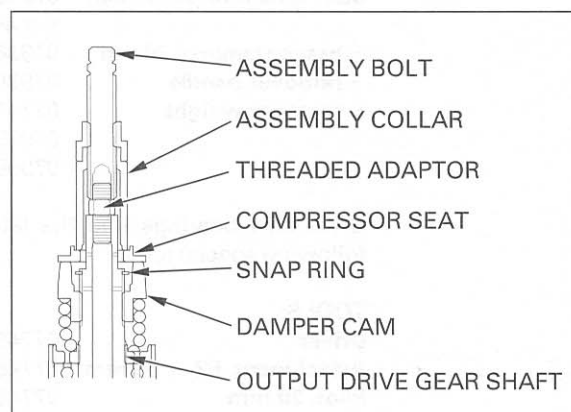
Install the assembly bolt through the assembly collar and attach it to the threaded adaptor.

Center the compressor seat with the damper cam then begin to tighten the 24 mm nut of the collar until the snap ring groove is visible so the snap ring can be installed into the groove.



**TOOLS:**

- Assembly bolt** 07965 – 1660200
- Assembly collar** 07965 – 166030A or  
07965 – 1660300
- Compressor seat** 07967 – 9690200
- Threaded adaptor** 07965 – KA30000
- Snap ring pliers** 07914 – 5670101  
not available in U. S. A.  
or  
07914 – 5670100

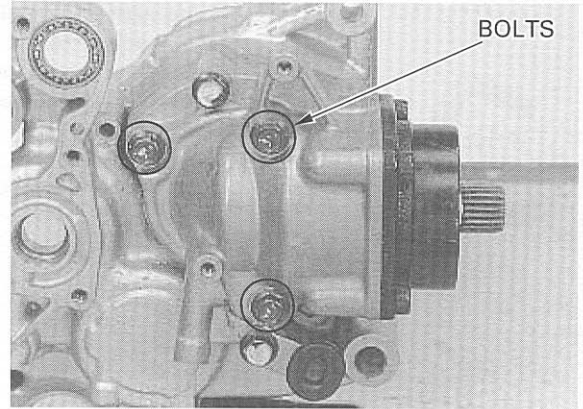




## CRANKSHAFT/TRANSMISSION

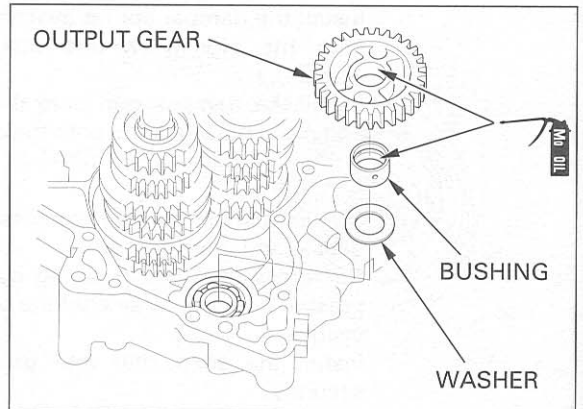
Tighten the gear case mounting bolts.

**TORQUE:** 31 N·m (3.2 kgf·m , 23 lbf·ft)



Apply molybdenum oil solution to the sliding surface of the output gear and bushing. Place the washer, bushing and the output gear into the right crankcase with the dog holes facing up.

Assemble the crankcase (page 11-36).



## CRANKCASE BEARING REPLACEMENT

### CAUTION:

- *Always wear insulated gloves when handling a heated crankcase.*
- *Be careful not to damage the crankcase mating surfaces.*

### NOTE:

Before removing the bearings, heat the crankcase around the bearings to 80 °C (176 °F).

### LEFT CRANKCASE BEARINGS

Remove the output gear case assembly (page 11-18).

Remove the mainshaft and countershaft bearings with the following special tools.

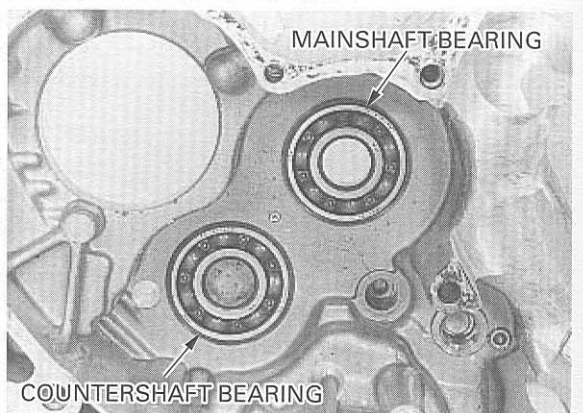
#### TOOLS:

Bearing remover set, 20 mm	07936-3710001 not available in U. S. A.
- bearing remover, 20 mm	07936-3710600
- remover handle	07936-3710100
- remover weight	07741-0010201 or 07936-371020A or 07936-3710200

Drive new bearings into the left crankcase using following special tools:

#### TOOLS:

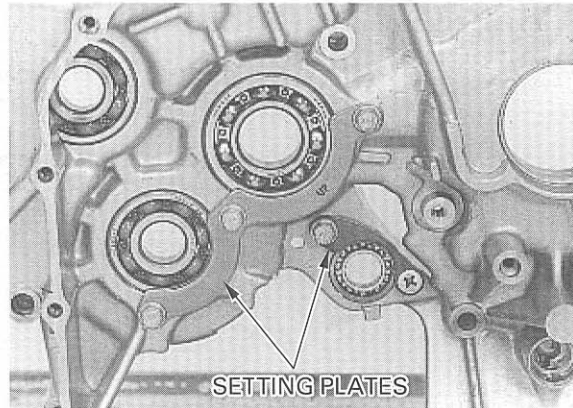
Driver	07749-0010000
Attachment, 52 × 55 mm	07746-0010400
Pilot, 20 mm	07746-0040500



**RIGHT CRANKCASE BEARINGS**

Remove the crankshaft (page 11-6), transmission (page 11-12) and output drive gear (page 11-18).

Remove the bearing setting plates from the crankcase.



Drive the bearings out of the right crankcase.

Drive new bearings into the right crankcase with the following special tools:

**TOOLS:**

**Mainshaft bearing:**

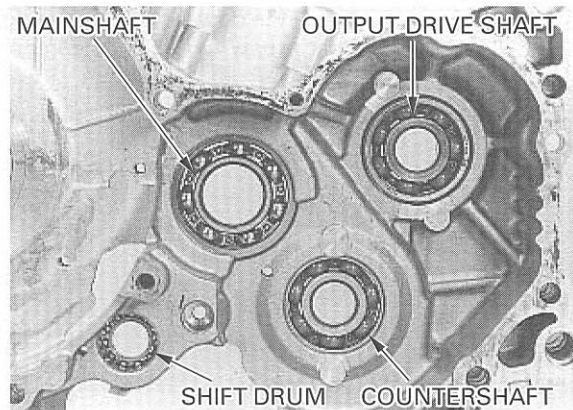
- Driver** 07749-0010000
- Attachment, 62 × 68 mm** 07746-0010500
- Pilot, 28 mm** 07746-0041100

**Countershaft and output drive gear shaft bearings:**

- Driver** 07749-0010000
- Attachment, 52 × 55 mm** 07746-0010400
- Pilot, 20 mm** 07746-0040500

**Shift drum bearing:**

- Driver** 07749-0010000
- Attachment, 32 × 35 mm** 07746-0010100
- Pilot, 17 mm** 07746-0040400



After installing the bearings, apply locking agent to the threads of the setting plate screw and bolts, and install the setting plates by tightening the bolts and screw.

**TORQUE:**

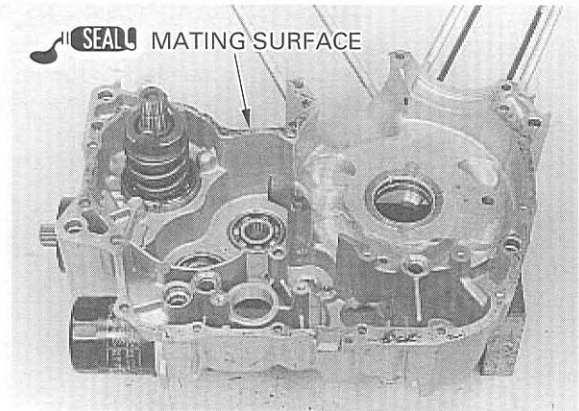
- Setting plate screw:** 8.8 N·m (0.9 kgf·m , 6.5 lbf·ft)
- Setting plate bolt:** 12 N·m (1.2 kgf·m , 9 lbf·ft)

# CRANKCASE ASSEMBLY

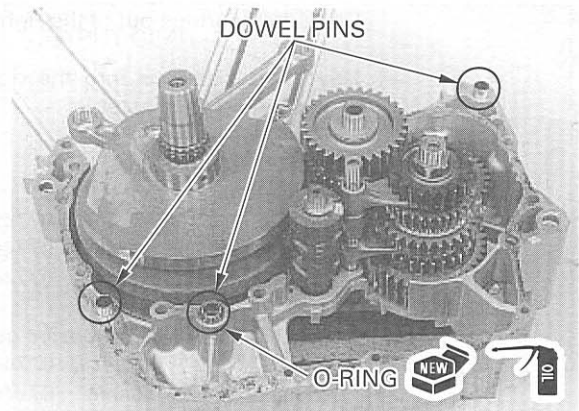
Clean the left and right crankcase mating surfaces thoroughly, being careful not to damage them.

Make sure the all parts are installed in the left and right crankcases.

Apply liquid sealant to the crankcase mating surfaces.

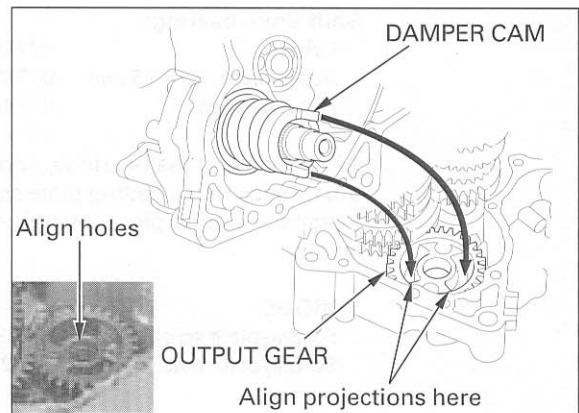


Install the dowel pins into the right crankcase. Coat a new O-ring with engine oil and install it to the dowel pin.



Align the holes of the output gear bushing, thrust washer (between the bearing and gear) and bearing.

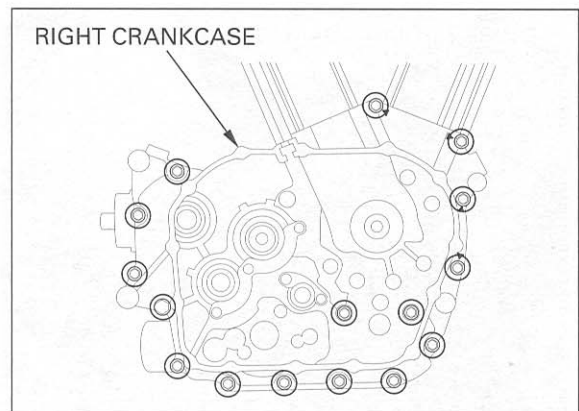
Align the damper cam projections and output gear concaves and install the left crankcase over the right crankcase while inserting the output drive gear shaft into the output gear, washer and right crankcase.



Install the right crankcase bolts with the four washers (washer position is indicated by the "▲" marks).

Tighten the bolts in a crisscross pattern in 2-3 steps.

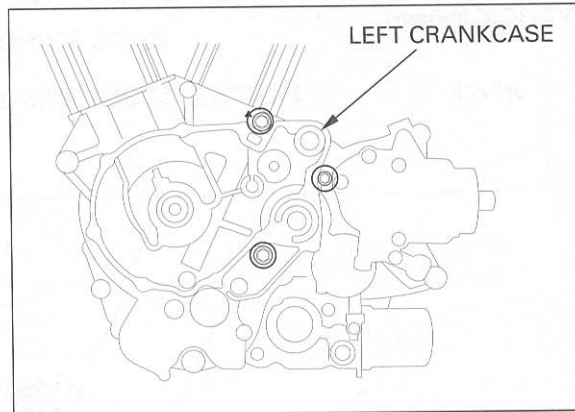
- TORQUE: 6 mm:** 12 N·m (1.2 kgf·m , 9 lbf·ft)
- 8 mm:** 26 N·m (2.7 kgf·m , 20 lbf·ft)
- 10 mm:** 39 N·m (4.0 kgf·m , 29 lbf·ft)



## CRANKSHAFT/TRANSMISSION

Install the left crankcase cover bolts with the washer and tighten the bolts in 2–3 steps.

**TORQUE:** 6 mm: 12 N·m (1.2 kgf·m , 9 lbf·ft)  
8 mm: 26 N·m (2.7 kgf·m , 20 lbf·ft)

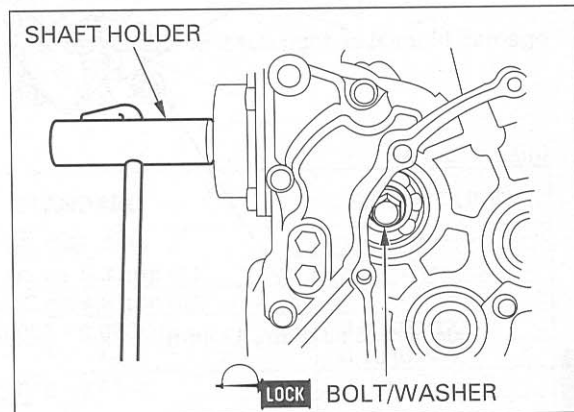


Apply locking agent to the threads of the output drive gear shaft bolt.  
Install and tighten the bolt by holding the output driven gear shaft using the shaft holder.

**TOOL:**  
Shaft holder 07923–6890101

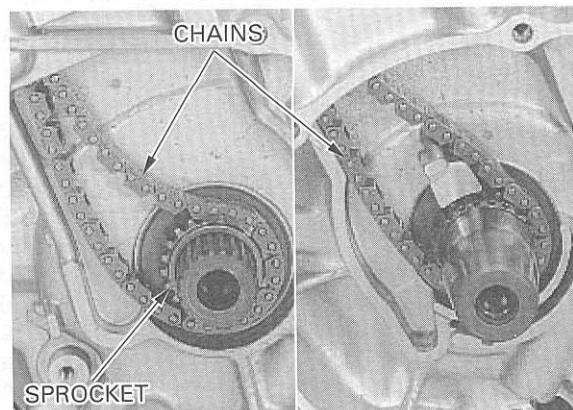
**TORQUE:** 49 N·m (5.0 kgf·m , 36 lbf·ft)

Recheck the all crankcase bolt torque values.



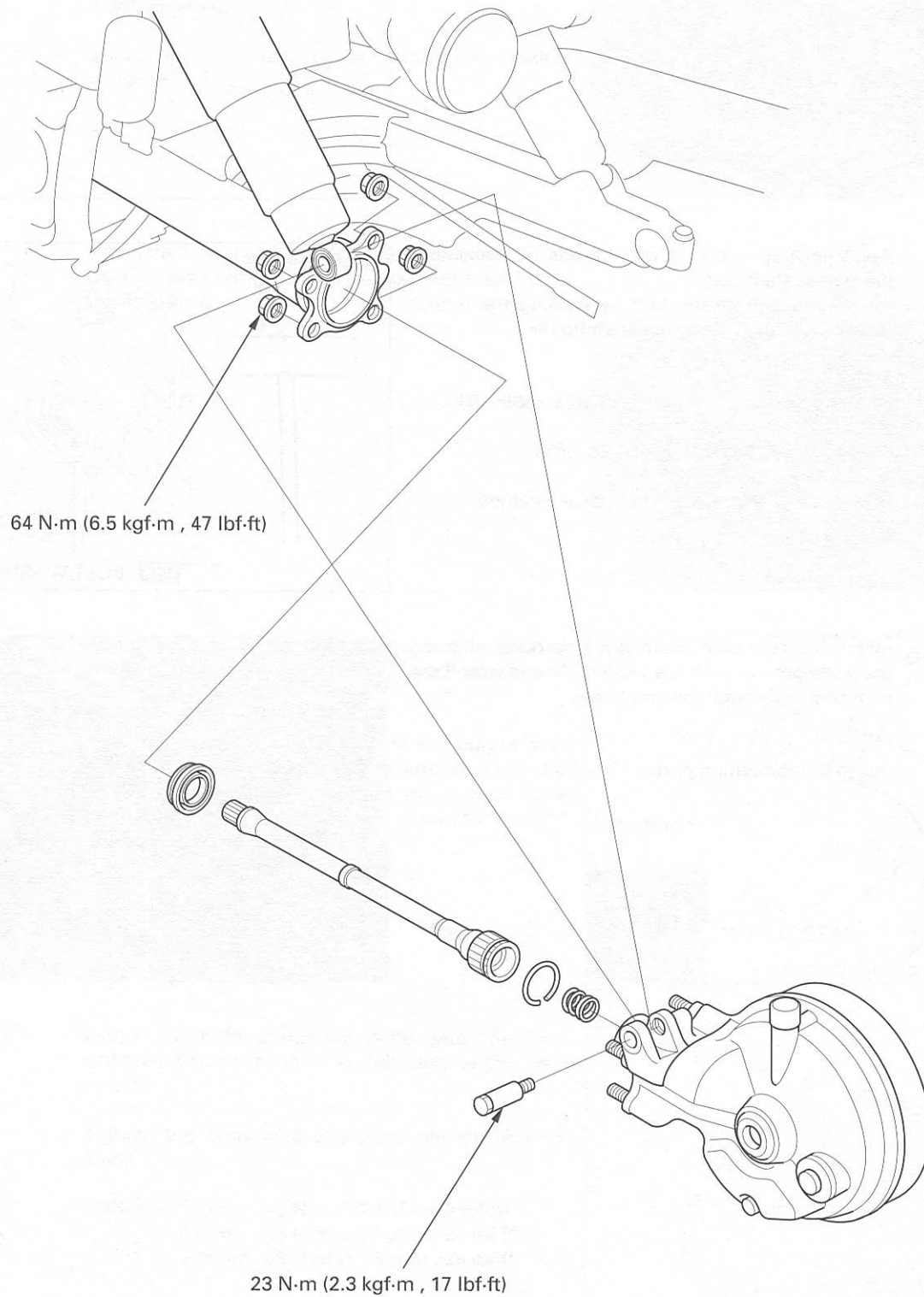
Install the rear cam chain drive sprocket aligning the wide groove with the wide teeth and install the cam chains through the crankcase.

Install the remaining parts.



## FINAL DRIVE

VT1100C shown:



# 12. FINAL DRIVE

SERVICE INFORMATION	12-1	FINAL DRIVE GEAR	12-5
TROUBLESHOOTING	12-2	FINAL DRIVE INSTALLATION	12-18
FINAL DRIVE REMOVAL	12-3		

## SERVICE INFORMATION

### GENERAL

- The final drive gear assembly and final drive shaft must be removed together.
- Replace the ring and pinion gears as a set.
- Perform the gear contact pattern and backlash inspection whenever you replace the bearings, gears or gear case. The extension lines from the gear engagement surfaces should intersect at one point.
- Protect the gear case with a shop towel or soft jaws while holding it in vise. Do not clamp it too tight as it could damage the gear case.

### SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Recommended final drive oil	Hypoid gear oil, SAE # 80	—————
Final drive oil capacity	at disassembly	150 cm <sup>3</sup> (5.1 US oz, 5.3 Imp oz)
	at draining	130 cm <sup>3</sup> (4.4 US oz, 4.6 Imp oz)
Final drive gear backlash	0.05–0.15 (0.002–0.006)	0.30 (0.012)
Backlash difference between measurements	—————	0.10 (0.004)
Ring gear-to-stop pin clearance	0.30–0.60 (0.012–0.024)	—————
Final drive gear assembly preload	0.2–0.4 N.m (2–4 kgf·cm, 1.7–3.5 lbf·in)	—————




12

### TORQUE VALUES

Final drive oil filler cap	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Final drive oil drain bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Final gear case assembly mounting nut	64 N·m (6.5 kgf·m , 47 lbf·ft)	
Shock absorber lower mounting bolt (left)	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Dust guard plate bolt	9.8 N·m (1.0 kgf·m , 7 lbf·ft)	
Gear case cover bolt (10 mm)	47 N·m (4.8 kgf·m , 35 lbf·ft)	Apply locking agent to the threads.
	(8 mm)	
Pinion joint nut	108 N·m (11.0 kgf·m , 80 lbf·ft)	Apply locking agent to the threads.
Pinion retainer lock tab bolt	9.8 N·m (1.0 kgf·m , 7 lbf·ft)	
Pinion retainer	108 N·m (11.0 kgf·m , 80 lbf·ft)	

## FINAL DRIVE

### TOOLS

Driver	07749-0010000
Attachment, 42 × 47 mm	07746-0010300
Attachment, 52 × 55 mm	07746-0010400
Attachment, 72 × 78 mm	07746-0010600
Attachment	07965-MA10100
Driver 40 mm I. D.	07746-0030100
Attachment, 25 mm I. D.	07746-0030200
Bearing puller & driver attachment	07934-MB00000 or 07965-MB0010A or 07965-MB00100 (U. S. A. only)
Bearing driver attachment	07GAD-SD40101
Pinion joint holder	07926-ME90000
Joint holder attachment	07HMB-MM80100  or
Pinion holder plate	07924-ME40010
Collar set "C"	07924-ME40020
Retainer wrench	07910-ME80000
Pinion puller set	07HMC-MM80100 or  not available in U. S. A.
Pinion puller set	07935-MB00000
Pinion puller attachment	07HMC-MM80200 or 
Puller base "A"	07HMC-MM8011A (U. S. A. only)
Puller shaft 22 × 1.5 × 240 mm	07931-ME9010B (U. S. A. only)
Attachment	07945-3330300
Bearing remover	07948-4630100 or
Adjustable bearing puller, 25-40 mm	07736-A01000B or 07736-A01000A use with commercially available 3/8 × 16 (U. S. A. only) slide hammer
Bearing race insert attachment	07931-4630300

### TROUBLESHOOTING

#### Excessive noise

- Worn or scored ring gear shaft and driven flange
- Scored driven flange and wheel hub
- Worn or scored drive pinion and splines
- Worn pinion and ring gears
- Excessive backlash between pinion and ring gear
- Oil level too low

#### Oil leak

- Clogged breather
- Oil level too high
- Seals damaged

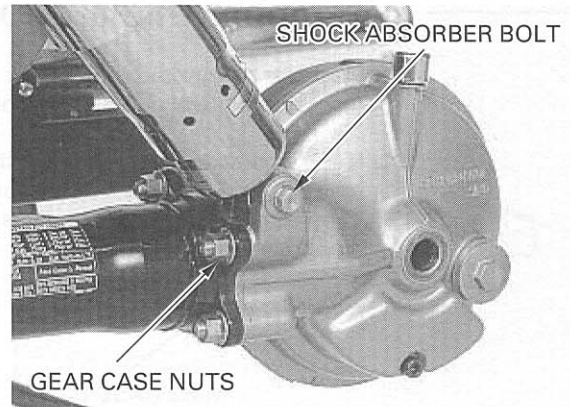
## FINAL DRIVE REMOVAL

### REMOVAL

Drain the final drive oil (page 3-15).

Remove the rear wheel (page 14-5 or 14-12).

Support the swingarm and remove the shock absorber lower mounting bolt. Remove the gear case mounting nuts then remove the final gear case.



### DRIVE SHAFT REMOVAL/ DISASSEMBLY

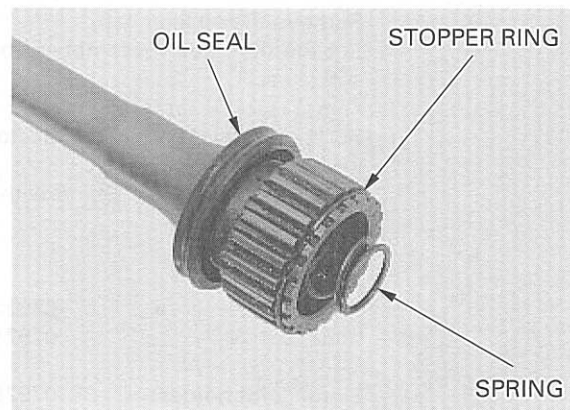
Separate the drive shaft from the gear case by gently turning the drive shaft and pulling.



Remove the spring, oil seal and stopper ring from the drive shaft.

Check the splines of the drive shaft for damage or wear.

If the splines are damaged, check the universal joint splines also.

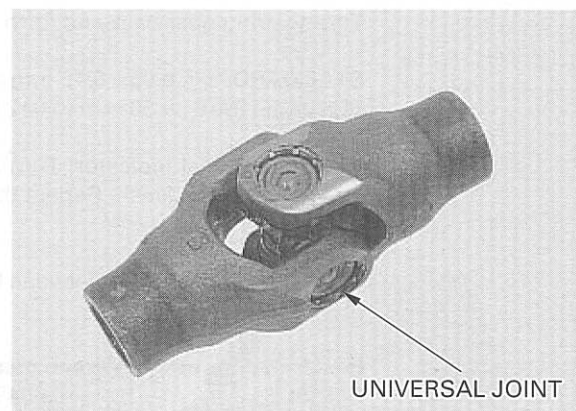


### UNIVERSAL JOINT REMOVAL

Remove the swingarm (page 14-27) and remove the universal joint from the swingarm.

Check that the universal joint moves smoothly without binding or noise.

Check the splines for wear or damage.

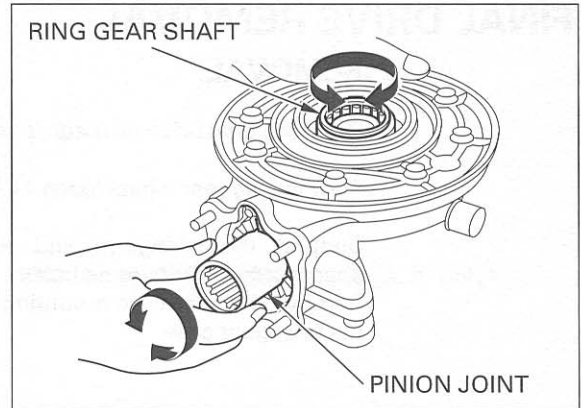




**FINAL DRIVE INSPECTION**

Turn the pinion joint and check that the ring gear turns smoothly and quietly without binding.

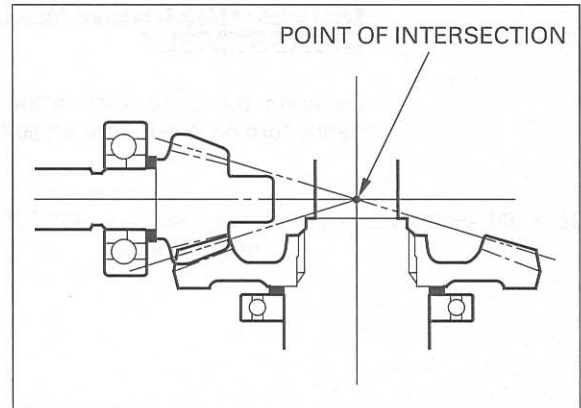
If the gears do not turn smoothly or quietly, the bearings and/or gears may be damaged or faulty. They must be checked after disassembly; replace them if necessary.



**BACKLASH INSPECTION**

**NOTE:**

Perform the backlash inspection and tooth contact pattern check (page 12-10) whenever you replace the gear set, bearings or gear case. The extension lines from the gear engagement surfaces should intersect at one point.

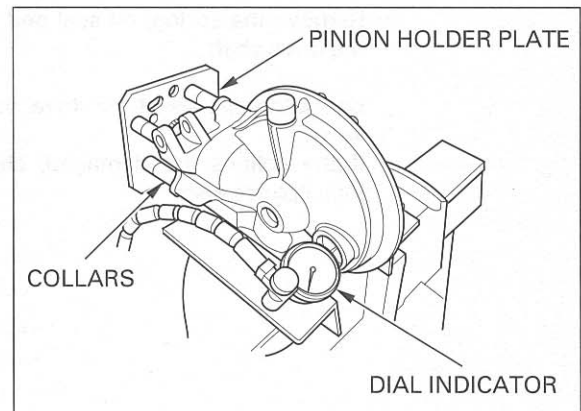


Remove the oil filler cap.  
Set the final gear assembly into a jig or vise with soft jaws.

Set a horizontal type dial indicator on the ring gear, through the oil filler hole.  
Hold the pinion gear spline with the pinion holder plate and collars.

**TOOLS:**

- |                                |               |
|--------------------------------|---------------|
| <b>Pinion holder plate</b>     | 07924-ME40010 |
| <b>Collar set "C"</b>          | 07924-ME40020 |
|                                | or            |
| <b>Pinion joint holder</b>     | 07926-ME90000 |
| <b>Joint holder attachment</b> | 07HMB-MM80100 |



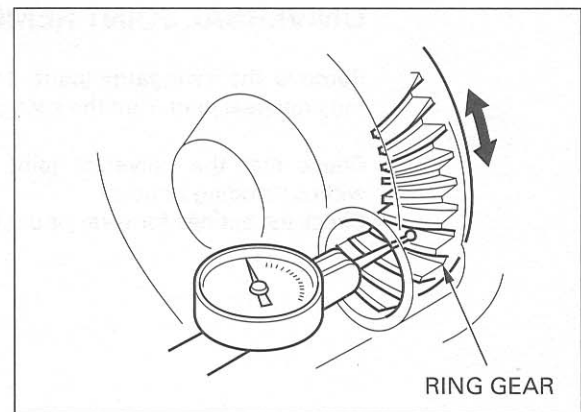
Turn the ring gear back and forth to read backlash.

- STANDARD:** 0.05–0.15 mm (0.002–0.006 in)  
**SERVICE LIMIT:** 0.30 mm (0.012 in)

Remove the dial indicator. Turn the ring gear 120° and measure backlash. Repeat this procedure once more.

Compare the difference between the three measurements.

- Backlash difference between measurements:**  
**SERVICE LIMIT:** 0.10 mm (0.004 in)



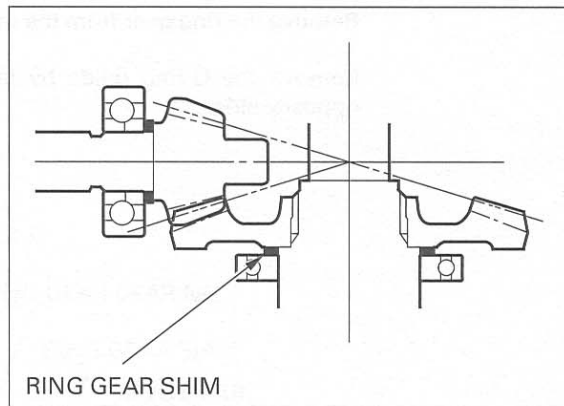
If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely. Inspect the bearings and install if necessary.

If backlash is excessive, replace the ring gear shim with a thicker one.

If the backlash is too small, replace the ring gear shim with a thinner one.

**Ring gear shim:**

- |                                  |                       |
|----------------------------------|-----------------------|
| A: 1.82 mm (0.072 in)            | G: 2.18 mm (0.086 in) |
| B: 1.88 mm (0.074 in)            | H: 2.24 mm (0.088 in) |
| C: 1.94 mm (0.076 in)            | I: 2.30 mm (0.091 in) |
| D: 2.00 mm (0.079 in) — Standard |                       |
| E: 2.06 mm (0.081 in)            |                       |
| F: 2.12 mm (0.083 in)            |                       |

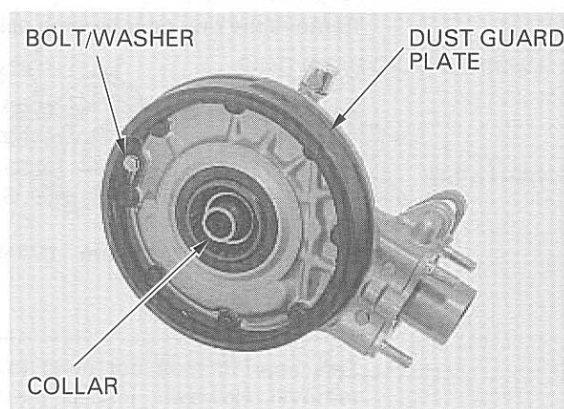


## FINAL DRIVE GEAR

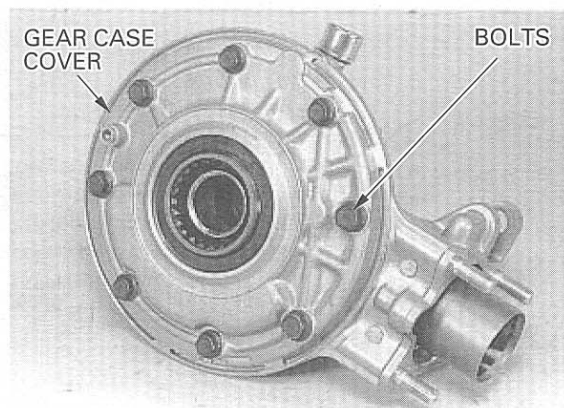
### RING GEAR REMOVAL/SHIM REPLACEMENT

Remove the distance collar.

Remove the dust guard plate bolt with the washer and remove the dust guard plate by turning it clockwise.



Remove the eight case cover bolts and the gear case cover.

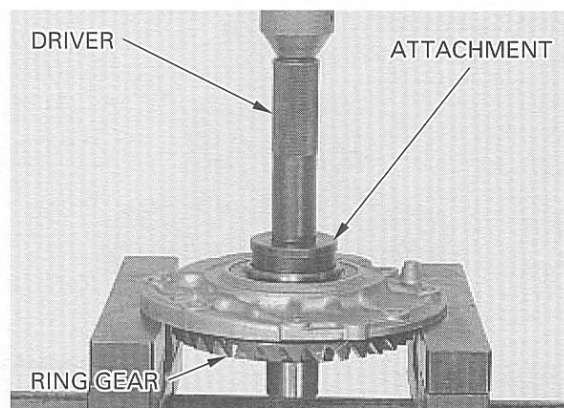


If the ring gear stays in the cover.

Support the cover horizontally with the ring gear facing down and press the gear out using the special tools and hydraulic press.

**TOOLS:**

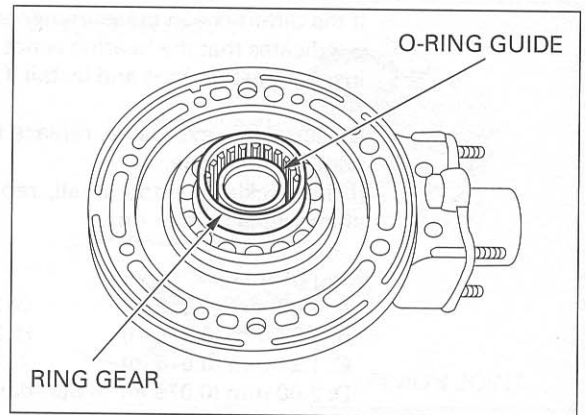
- |                               |               |
|-------------------------------|---------------|
| <b>Driver</b>                 | 07749-0010000 |
| <b>Attachment, 52 × 55 mm</b> | 07746-0010400 |



## FINAL DRIVE

Remove the ring gear from the gear case.

Remove the O-ring guide by tapping it from the opposite side.



Remove the ring gear bearing using the special tool.

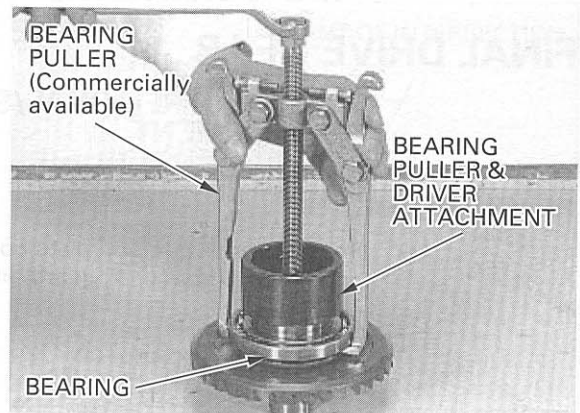
**TOOL:**

**Bearing puller & driver attachment** 07934-MB00000 or  
07934-MB0010A or  
07934-MB00100  
(U. S. A. only)  
or

**Attachment, 52 × 55 mm** 07746-0010400

**NOTE:**

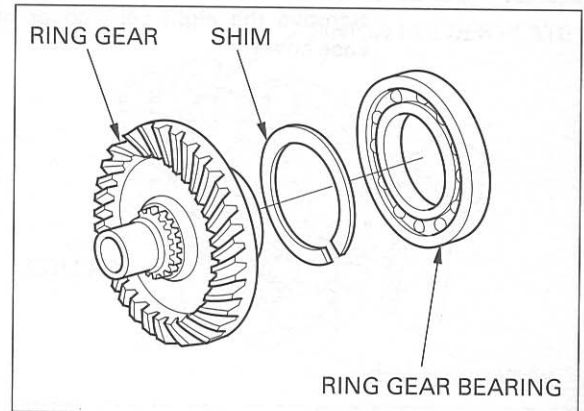
This bearing may not need to be replaced after removal. However, inspect the bearing for excessive play after removal.



Replace the ring gear shim.

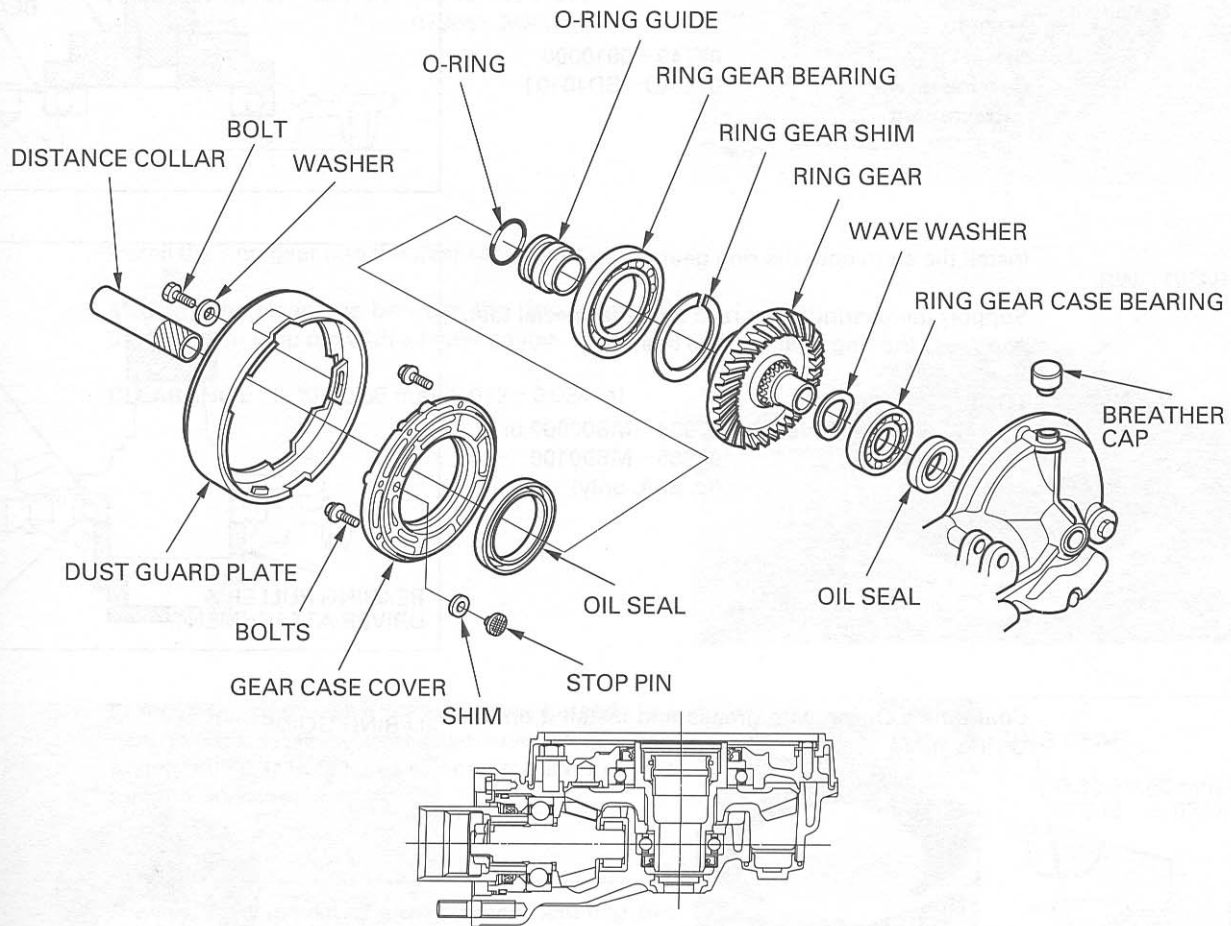
**NOTE:**

If the gear set, pinion bearing, ring gear bearing and/or gear case are replaced, install a 2.00 mm (0.079 in) thick shim (standard).



## RING GEAR INSTALLATION

For the case bearing replacement and breather hole cleaning, see page 12-16.

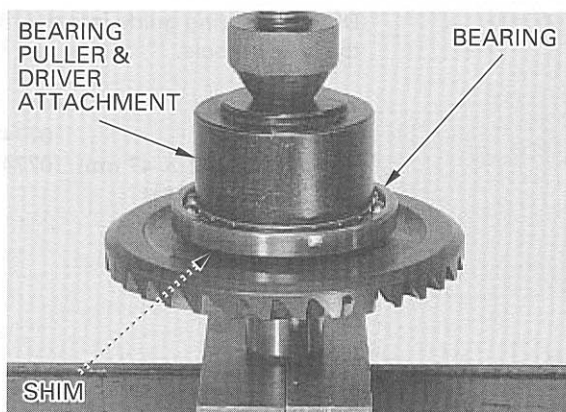


If the ring gear assembly was loose against the cover (if it didn't stay in the cover), do the following:

Place the ring gear shim onto the ring gear (page 12-6).  
Press the bearing onto the shaft.

**TOOL:**  
**Bearing puller & driver attachment**

07934 - MB00000 or  
07965 - MB0010A or  
07965 - MB00100  
(U. S. A. only)



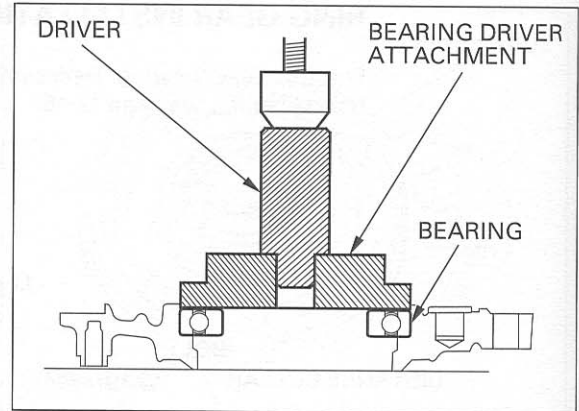
## FINAL DRIVE

If the ring gear remained in the cover, do the following:

Remove the case cover oil seal (see following page).  
Press the ring gear bearing into the cover using the special tools.

**TOOLS:**

**Driver** 07749-0010000  
**Bearing driver attachment** 07GAD-SD40101

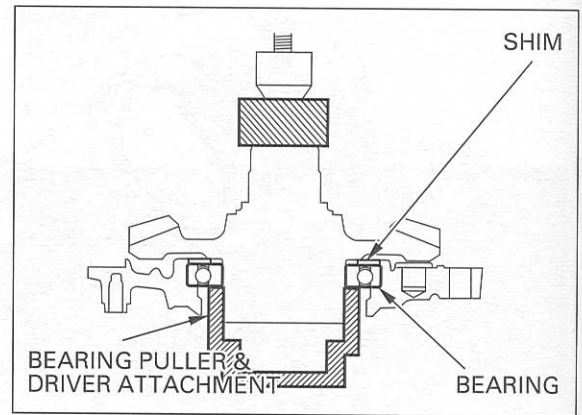


Install the shim onto the ring gear (page 12-6).

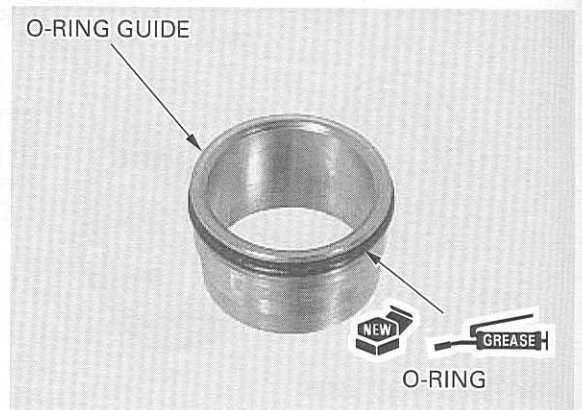
Support the bearing inner race with the special tool, and press the ring gear into the bearing.

**TOOL:**

**Bearing puller & driver attachment** 07934-MB00000 or 07965-MB00100 (U. S. A. only)



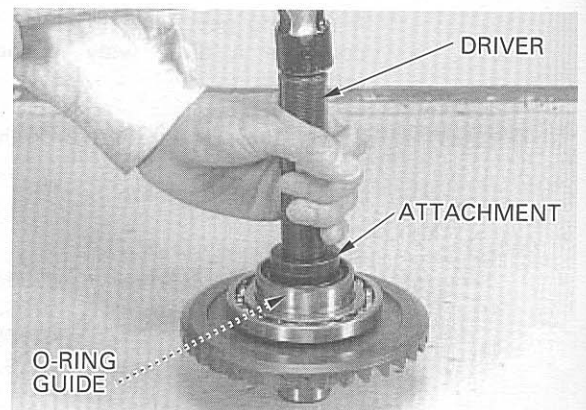
Coat a new O-ring with grease and install it on the O-ring guide.



Drive the O-ring guide into the ring gear shaft using the special tools.

**TOOLS:**

**Driver** 07749-0010000  
**Attachment, 42 × 47 mm** 07746-0010300

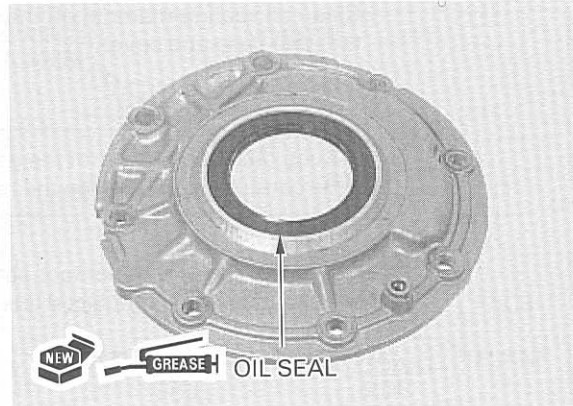


Remove and discard the case cover oil seal.

Install a new oil seal and apply grease to the seal lips.

**TOOLS:**

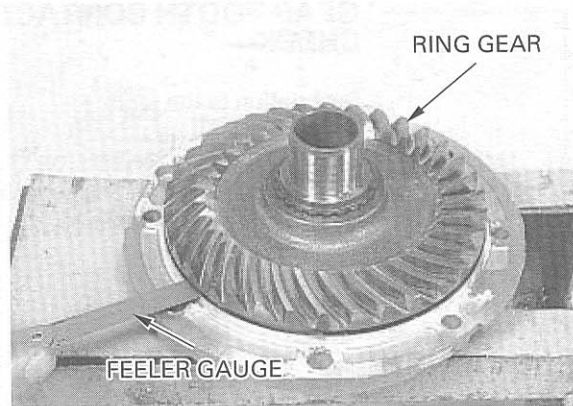
<b>Driver</b>	07749-0010000
<b>Attachment, 72 × 78 mm</b>	07746-0010600
<b>Attachment</b>	07965-MA10100



Install the ring gear into the gear case cover.

Measure the clearance between the ring gear and the ring gear stop pin with a feeler gauge.

**CLEARANCE:** 0.30–0.60 mm (0.012–0.024 in)



Remove the ring gear if the clearance exceeds the service limit. Heat the gear case cover to approximately 80 °C (176 °F) and remove the stop pin by tapping the cover.

**▲WARNING**

*Always wear insulated gloves when handling the gear case cover after it has been heated.*

Heat the case cover evenly and slowly to prevent warpage.  
Do not heat small areas individually.

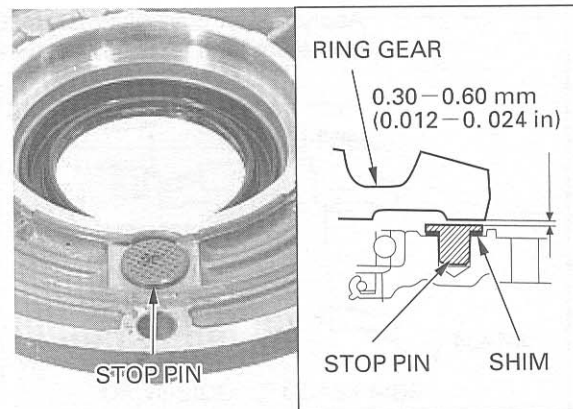
**CAUTION:**

*Case cover warpage can occur if the cover is not heated properly.*

Install a stop pin shim to obtain the correct clearance.

**SHIM THICKNESS: A:** 0.10 mm (0.004 in)  
**B:** 0.15 mm (0.006 in)

Install the shim and drive the stop pin into the case cover.



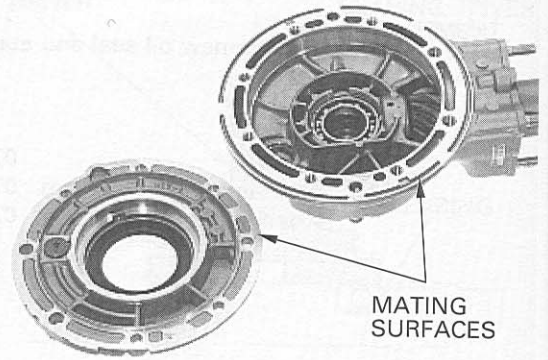
## FINAL DRIVE

Clean all sealing material off the mating surfaces of the gear case and cover.

### NOTE:

- Keep dust and dirt out of the gear case.
- Be careful not to damage the mating surfaces.

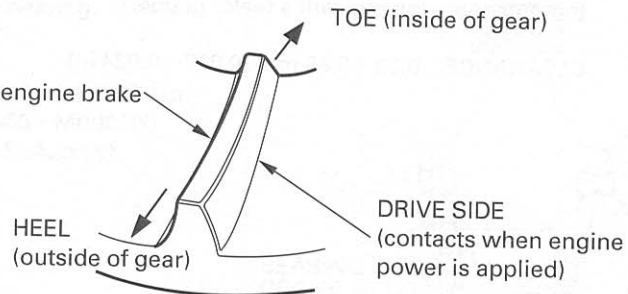
Check the gear tooth contact pattern after the ring gear shim has been replaced (see below).



## GEAR TOOTH CONTACT PATTERN CHECK

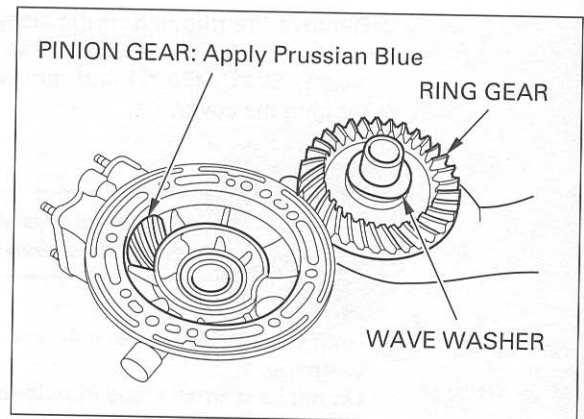
Description of the tooth:

COAST SIDE  
(contacts when engine brake  
is applied.)



Apply a thin coat of Prussian Blue to the pinion gear teeth for a tooth contact pattern check.

Place the wave washer and ring gear into the gear case.

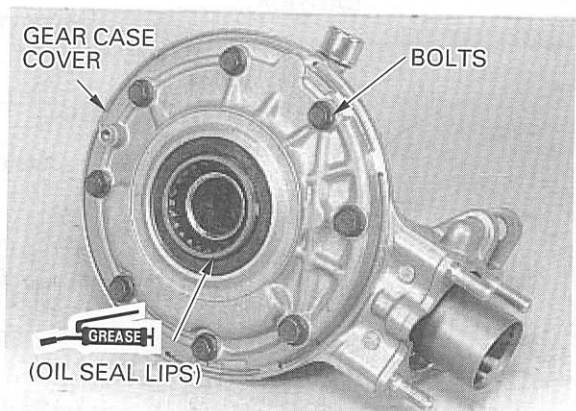


Pack grease into the seal lip cavity of the case cover oil seal and install the gear case cover.

Tighten the cover bolts in 2–3 steps until the cover evenly touches the gear case, then tighten the 8 mm bolts to the specified torque in a crisscross pattern in two or more steps.

Next tighten the 10 mm bolts to the specified torque.

**TORQUE: 8 mm :** 25 N·m (2.6 kgf·m , 19 lbf·ft)  
**10 mm :** 47 N·m (4.8 kgf·m , 35 lbf·ft)



Remove the oil filler cap from the final gear case.

Rotate the ring gear several times in the normal direction of rotation.

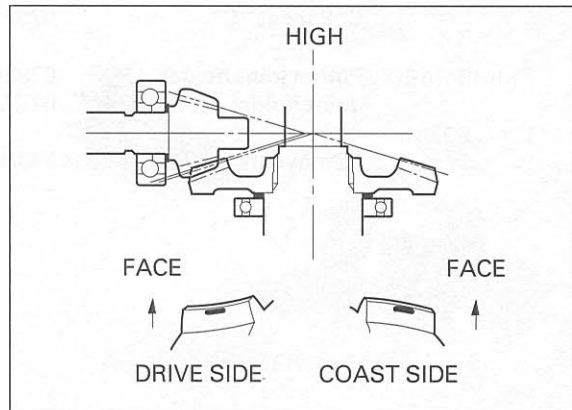
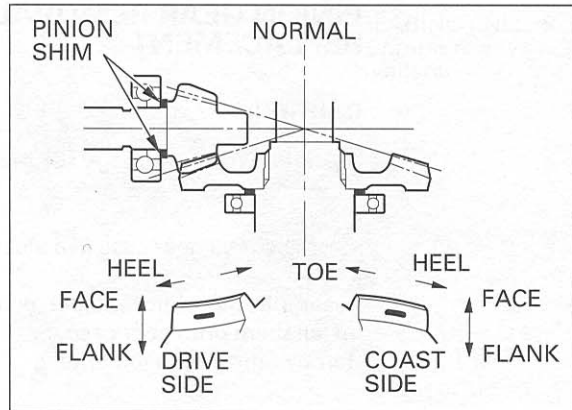
Check the gear tooth contact pattern through the oil filler hole.

The pattern is indicated by the Prussian Blue applied to the pinion.

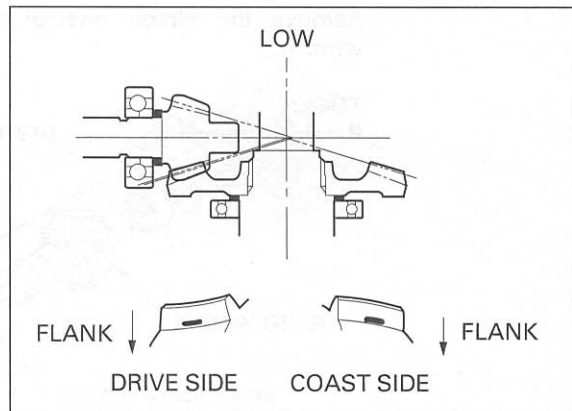
Contact is normal if the Prussian Blue is transferred to the approximate center of each tooth and slightly towards the face.

If the pattern are not correct, remove and change the pinion shim.

Replace the pinion shim with a thicker one if the contact pattern is too high.



Replace the pinion shim with a thinner one if the contact pattern is too low.



The patterns will shift about 1.5–2.0 mm (0.06–0.08 in) when the thickness of the shim is changed by 0.1 mm (0.004 in).

**Pinion spacer:**

- A: 1.82 mm (0.072 in)
- B: 1.88 mm (0.074 in)
- C: 1.94 mm (0.076 in)
- D: 2.00 mm (0.079 in) – Standard
- E: 2.06 mm (0.081 in)
- F: 2.12 mm (0.083 in)
- G: 2.18 mm (0.086 in)

For the gear case assembly, see page 12-17.



**PINION GEAR REMOVAL/SHIM REPLACEMENT**

**CAUTION:**

*Be careful not to damage the gear case.*

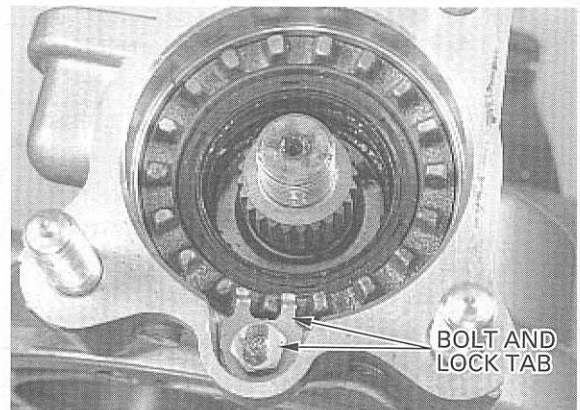
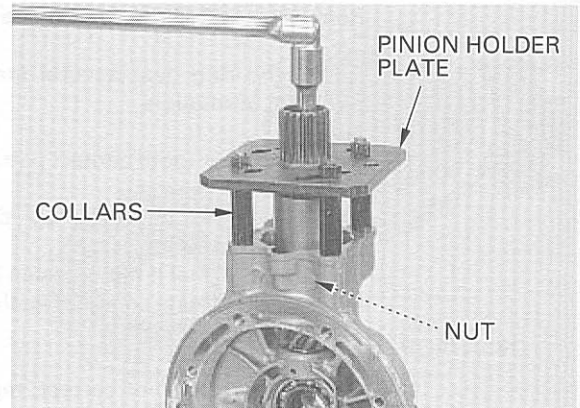
Place the final gear case in a vise with soft jaws.

Assemble the pinion holder plate and collars and install them onto gear case.  
Remove the pinion joint nut.

**TOOLS:**

- |                                |               |
|--------------------------------|---------------|
| <b>Pinion holder plate</b>     | 07924—ME40010 |
| <b>Collar set "C"</b>          | 07924—ME40020 |
|                                | or            |
| <b>Pinion joint holder</b>     | 07926—ME90000 |
| <b>Joint holder attachment</b> | 07HMB—MM80100 |

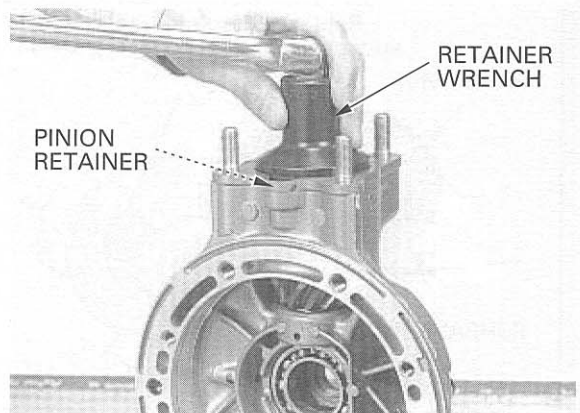
Remove the bolt and retainer lock tab.



Remove the pinion retainer with the retainer wrench.

**TOOL:**

- |                        |               |
|------------------------|---------------|
| <b>Retainer wrench</b> | 07910—ME80000 |
|------------------------|---------------|



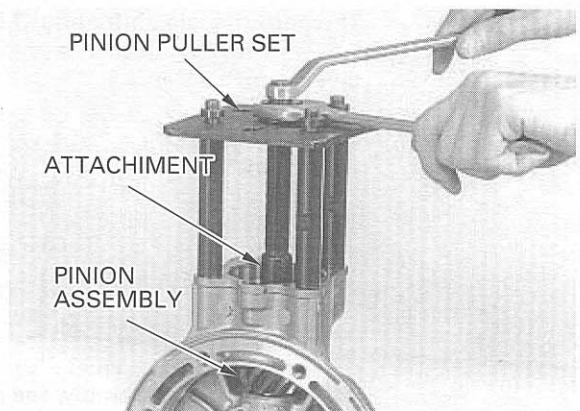
Assemble the pinion puller set as shown.  
Pull out the pinion assembly off with the pinion puller.

**TOOLS:**

- |                                 |                  |
|---------------------------------|------------------|
| <b>Pinion puller set</b>        | 07HMC—MM80100 or |
| <b>Pinion puller set</b>        | 07935—MB00000    |
| <b>Pinion puller attachment</b> | 07HMC—MM80200    |

not available in U. S. A. or

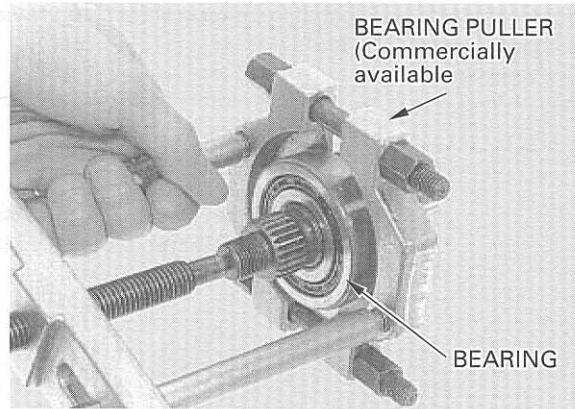
- |                                       |                                  |
|---------------------------------------|----------------------------------|
| <b>Puller base "A"</b>                | 07HMC—MM8011A<br>(U. S. A. only) |
| <b>Puller shaft 22 × 1.5 × 240 mm</b> | 07931—ME9010B<br>(U. S. A. only) |



Pull the bearing outer and inner races from the shaft with the bearing puller.

**NOTE:**

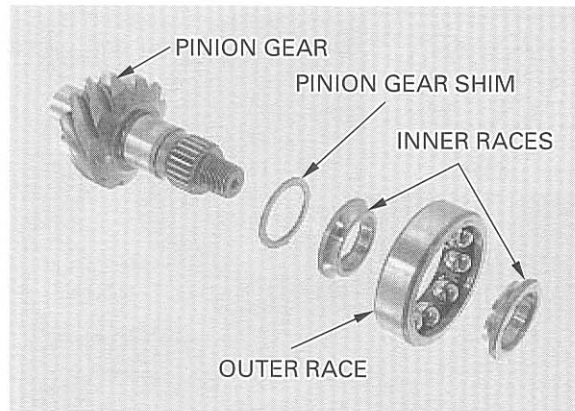
This bearing may not need to be replaced after removal. However, inspect the bearing for excessive play after removal.



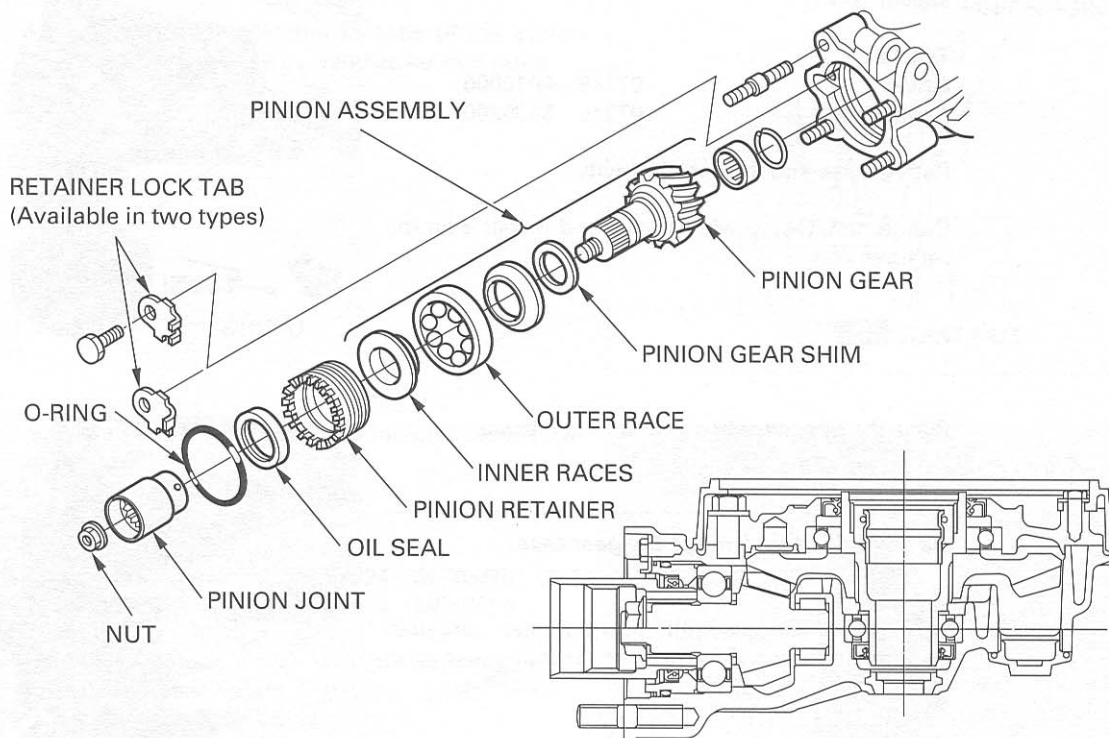
Remove the pinion shim.

**NOTE:**

If the gear set, pinion bearing, ring gear bearing and/or gear case are replaced, install a 2.00 mm (0.79 in) thick shim (standard) for initial reference.



**PINION GEAR INSTALLATION**



## FINAL DRIVE

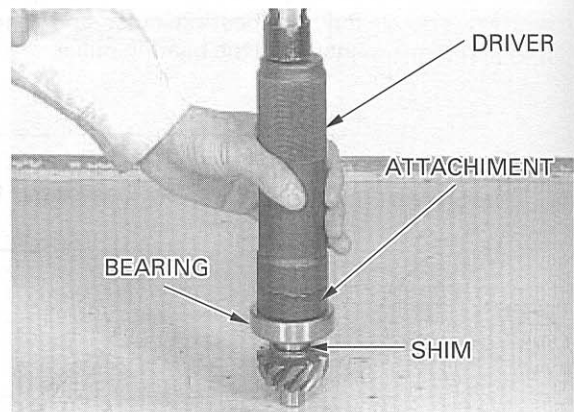
Install the pinion shim (see previous page) on the pinion gear.

Drive the pinion gear bearing onto the pinion gear using the special tool.

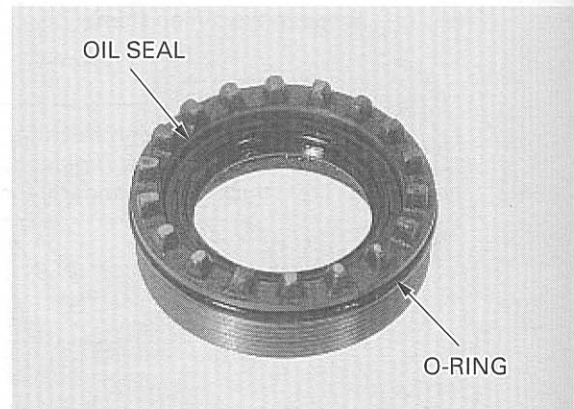
**TOOLS:**

**Driver, 40 mm I. D.** 07746-0030100

**Attachment, 25 mm I. D.** 07746-0030200



Remove the O-ring and oil seal from the pinion retainer.



Drive a new oil seal into the retainer using the special tools.

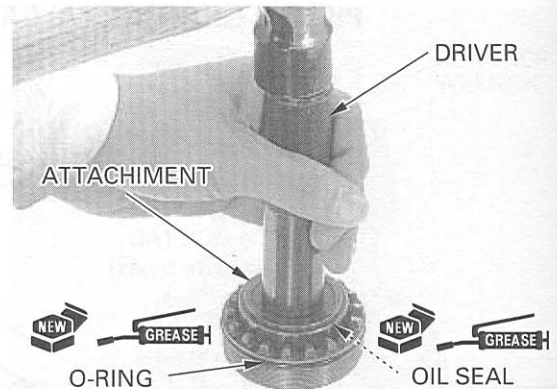
**TOOLS:**

**Driver** 07749-0010000

**Attachment** 07945-3330300

Pack grease into the seal lip cavity.

Coat a new O-ring with grease and install it on the retainer.



Place the gear case in a vise with soft jaws.

**CAUTION:**

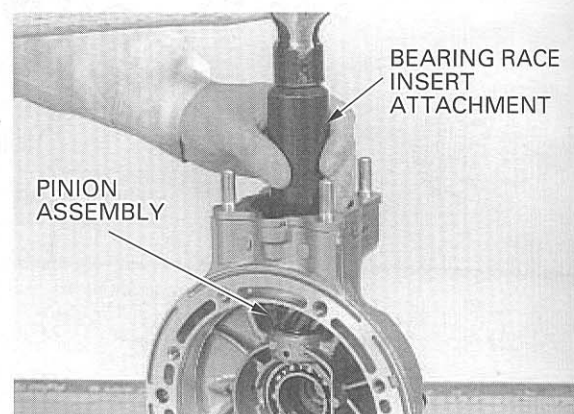
*Be careful not to damage the gear case.*

Drive the pinion assembly into the gear case until enough threads are visible to accept the pinion retainer.

**TOOL:**

**Bearing race insert attachment** 07931-4630300 or

**Driver, 40 mm I. D.** 07746-0030100

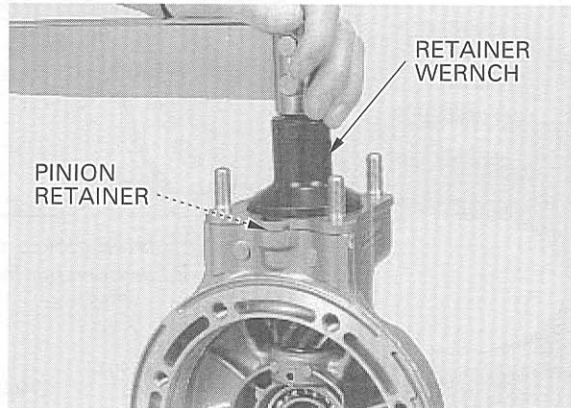


Screw the pinion retainer in, pressing the pinion bearing in place then tighten retainer to the specified torque.

**TOOL:**

**Retainer wrench** 07910—ME80000

**TORQUE:** 108 N·m (11.0 kgf·m , 80 lbf·ft)



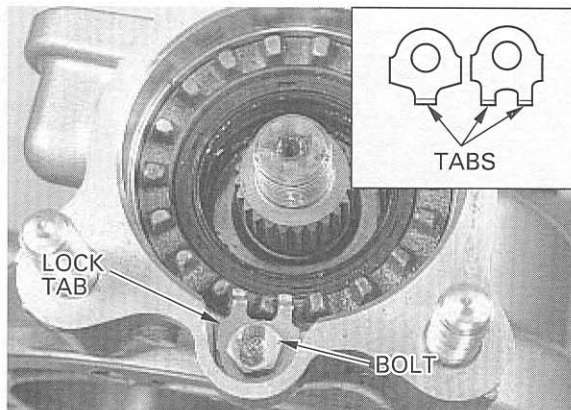
Install a lock tab, depending on the position of the pinion retainer grooves in relation to the lock tabs.

**NOTE:**

The lock tab plate is available in the two types shown.

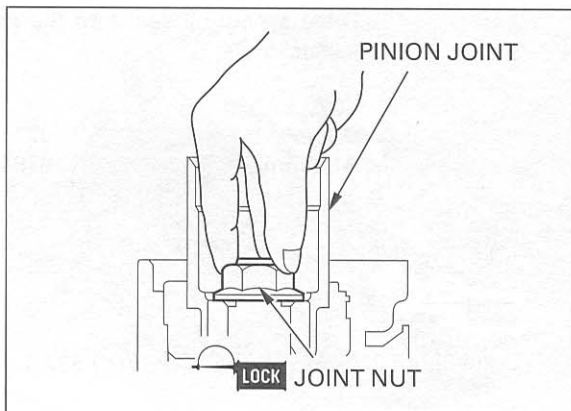
Install and tighten the lock tab bolt.

**TORQUE:** 9.8 N·m (1.0 kgf·m , 7 lbf·ft)



Install the pinion joint to the pinion gear shaft.

Apply locking agent to the threads of the pinion joint nut and screw in it by hand as far as it goes.



Hold the pinion joint using the pinion holder plate and collars.  
Tighten the pinion joint nut.

**TOOLS:**

**Pinion holder plate** 07924—ME40010

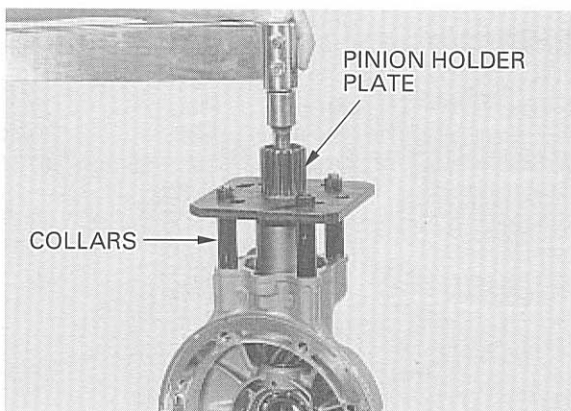
**Collar set "C"** 07924—ME40020

or

**Pinion joint holder** 07926—ME90000

**Joint holder attachment** 07HMB—MM80100

**TORQUE:** 108 N·m (11.0 kgf·m , 80 lbf·ft)



**CASE BEARING REPLACEMENT**

Remove the ring gear and pinion gear.  
Heat the gear case 80 °C (176 °F) evenly using a heat gun.

**▲WARNING**

*Always wear insulated gloves when handling the gear case after it has been heated.*

**TOOL:**

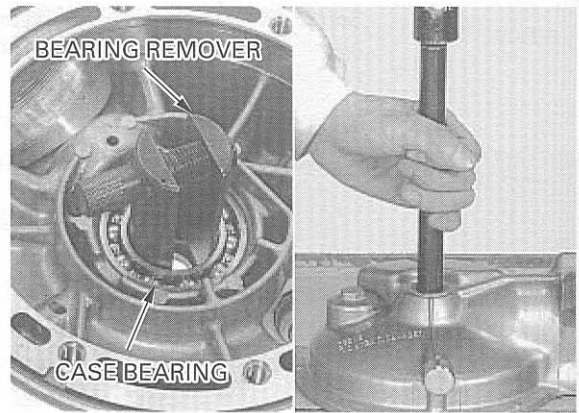
**Bearing remover** 07948 – 4630100  
not available in U. S. A.

or

**Adjustable bearing puller, 25 – 40 mm** 07736 – A01000B  
07736 – A01000A  
(U. S. A. only)

**Slide hammer, 3/8 × 16** Commercially available

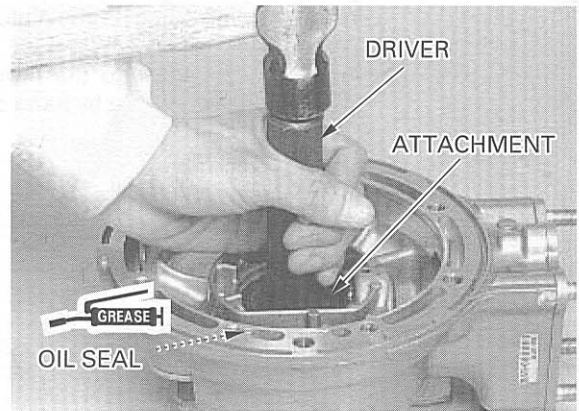
Remove the oil seal and discard it.



Drive a new oil seal into the gear case using the special tools.

**TOOLS:**

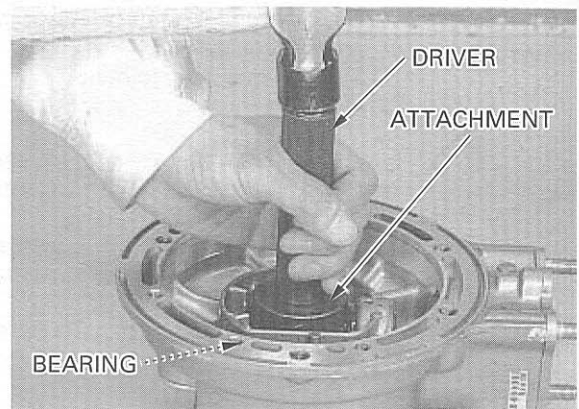
**Driver** 07749 – 0010000  
**Attachment** 07945 – 3330300



Drive a new ring gear bearing into the gear case using the special tools.

**TOOLS:**

**Driver** 07749 – 0010000  
**Attachment, 52 × 55 mm** 07746 – 0010400

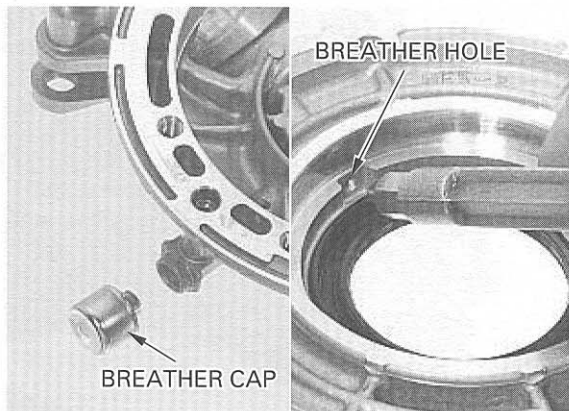


## BREATHER HOLE CLEANING

**CAUTION:**

*Be careful not to deform or damage the breather cap.*

Remove the breather cap and blow compressed air through the breather hole.



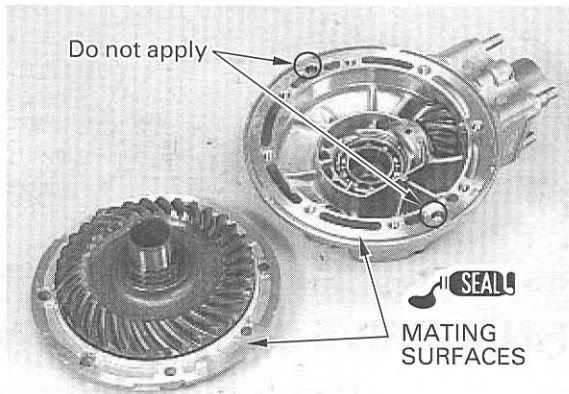
## GEAR CASE ASSEMBLY

Clean all sealing material off the mating surfaces of the gear case cover.

**NOTE:**

- Keep dust and dirt out of the gear case.
- Be careful not to damage the mating surfaces.

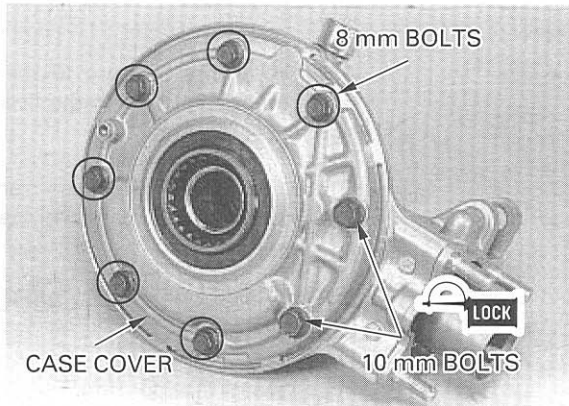
Apply liquid sealant to the mating surface of the gear case and cover. Do not apply sealant around the dowel holes.



Install the ring gear and gear case cover with the wave washer.

Tighten the cover bolts in 2–3 steps until the cover evenly touches the gear case, then tighten the 8 mm bolts to the specified torque in a crisscross pattern in two or more steps. Next, apply locking agent to the 10 mm bolt threads and tighten them to the specified torque.

**TORQUE: 8 mm:** 25 N·m (2.6 kgf·m , 19 lbf·ft)  
**10 mm:** 47 N·m (4.8 kgf·m , 35 lbf·ft)

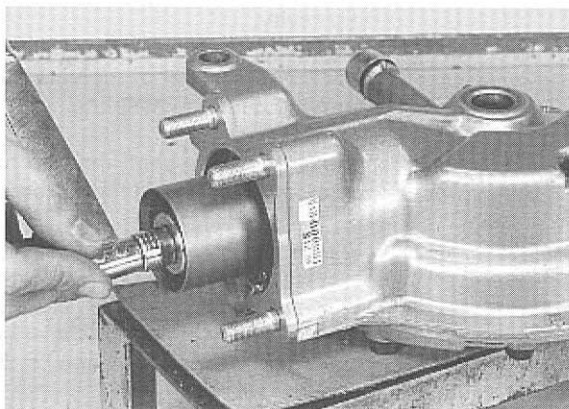


Make sure that the gear assembly rotates smoothly without binding.

Measure the final gear assembly preload.

**PRELOAD:** 0.2–0.4 N·m (2–4 kgf·cm,  
 1.7–3.5 lbf·in)

If the preload reading does not fall within the limit, disassemble the final gear and check the bearings for proper installation.



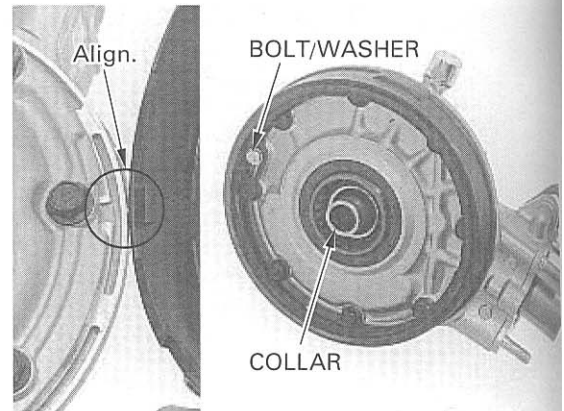
## FINAL DRIVE

Install the dust guard plate by aligning the plate tabs with the case cover grooves and turn it counterclockwise to lock.

Tighten the guard plate bolt with the washer.

**TORQUE:** 9.8 N·m (1.0 kgf·m , 7 lbf·ft)

Install the distance collar with the polished side facing the gear case.



## FINAL DRIVE INSTALLATION

Check that the final gear case stud bolts are tight. If any are loose, remove them, clean their threads with contact cleaner, then install them using locking agent.

After installing, be sure to measure the distance from top of each stud to the final gear case surface as shown.

If the universal joint was removed, install the universal joint and swingarm (page 14-30).

### DRIVE SHAFT ASSEMBLY/ INSTALLATION

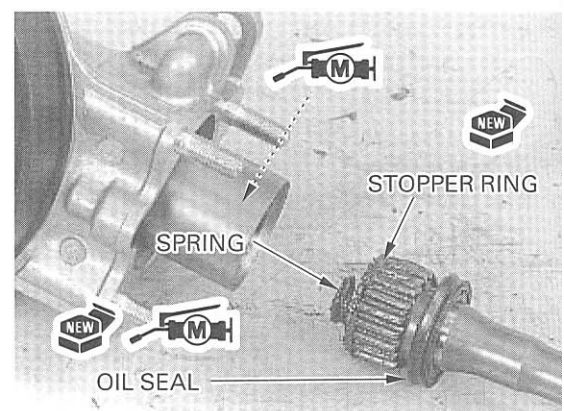
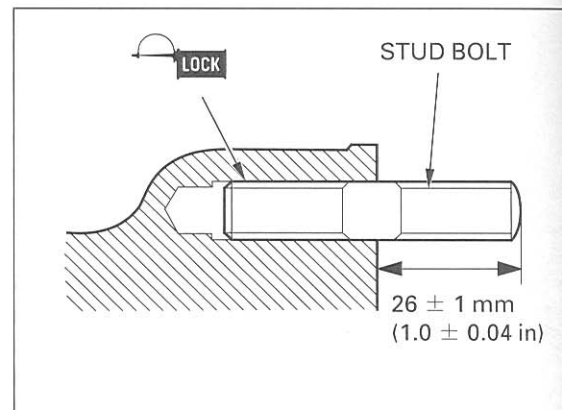
Install a new stopper ring. Install the spring and new oil seal and pack 0.5 g (0.02 oz) of molybdenum disulfide grease into seal lip cavity.

Pack 2 g (0.08 oz) of molybdenum disulfide grease into the pinion joint spline.

Install the drive shaft into the pinion joint until the stopper ring seats in the pinion joint spline groove.

#### NOTE:

- Make sure that the stopper ring is seated properly by pulling on the drive shaft lightly.
- Be careful not to damage the drive shaft oil seal.



Pack 1 g (0.04 oz) of molybdenum disulfide grease into the drive shaft spline.

Insert the final drive assembly into the swingarm and align the splines with the universal joint by holding the swingarm.

*Tighten these nuts and bolt when installing the rear wheel.*

Install the gear case mounting nuts and shock absorber lower bolt.

Install the rear wheel (page 14-10 or 14-19).

Fill the gear case with recommended final drive oil (page 3-14).

**OIL CAPACITY:** 150 cm<sup>3</sup> (5.1 US oz, 5.3 Imp oz) at disassembly

