

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the CBR150R.

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.

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

Sections 1 and 3 apply to the whole motorcycle. Section 2 illustrates procedures for removal/installation of components that may be required to perform service described in the following sections. Section 4 through 21 describe parts of the motorcycle, grouped according to location.

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

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

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

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Honda Motor Co., Ltd.
SERVICE PUBLICATION OFFICE

CONTENTS

	GENERAL INFORMATION	1
	FRAME/BODY PANELS/EXHAUST SYSTEM	2
	MAINTENANCE	3
ENGINE & DRIVE TRAIN	LUBRICATION SYSTEM	4
	FUEL SYSTEM	5
	COOLING SYSTEM	6
	ENGINE REMOVAL/INSTALLATION	7
	CLUTCH/GEARSHIFT LINKAGE	8
	ALTERNATOR/STARTER CLUTCH	9
	CYLINDER HEAD/VALVES	10
	CYLINDER/PISTON	11
	TRANSMISSION	12
	CRANKSHAFT/BALANCER	13
CHASSIS	FRONT WHEEL/SUSPENSION/STEERING	14
	REAR WHEEL/SUSPENSION	15
	BRAKE SYSTEM	16
ELECTRICAL	CHARGING SYSTEM	17
	IGNITION SYSTEM	18
	ELECTRIC STARTER	19
	LIGHTS/METERS/SWITCHES	20
	WIRING DIAGRAM	21
	TROUBLESHOOTING	22
	INDEX	23

IMPORTANT SAFETY NOTICE



WARNING

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












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

NOTE: Gives helpful information.

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

SYMBOLS

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

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

1. GENERAL INFORMATION

1

GENERAL SAFETY	1-1	TOOLS	1-14
SERVICE RULES	1-2	LUBRICATION & SEAL POINTS	1-15
MODEL IDENTIFICATION	1-3	CABLE & HARNESS ROUTING	1-17
SPECIFICATIONS	1-4	EMISSION CONTROL SYSTEMS	1-24
TORQUE VALUES	1-12		

GENERAL SAFETY

CARBON MONOXIDE

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

⚠ WARNING

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

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

GASOLINE

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

⚠ WARNING

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

HOT COMPONENTS

⚠ WARNING

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

USED ENGINE OIL

⚠ WARNING

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

BRAKE FLUID

CAUTION:

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

BATTERY HYDROGEN GAS & ELECTROLYTE

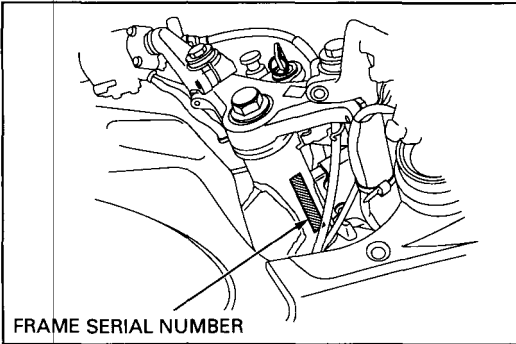
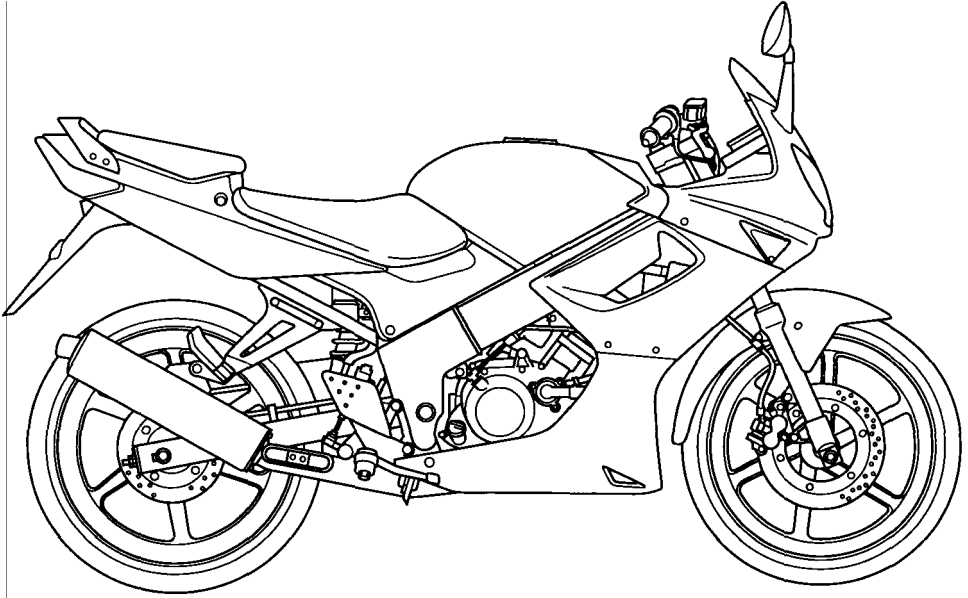
⚠ WARNING

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

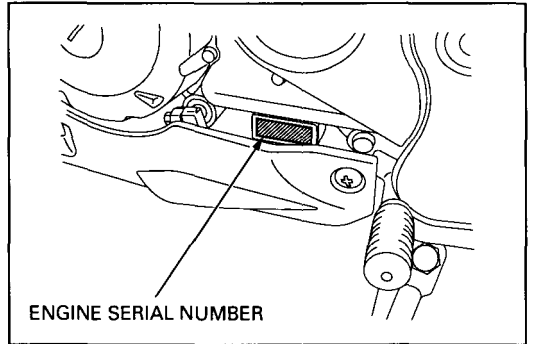
SERVICE RULES

1. Use genuine Honda or Honda-recommended parts and lubricants or their equivalents. Parts that don't meet HONDA's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as show on pages 1-17 through 1-23, Cable and Harness Routing.

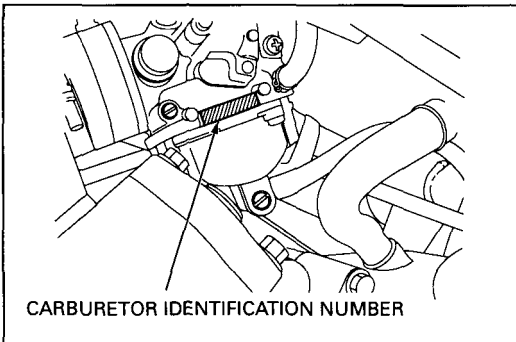
MODEL IDENTIFICATION



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



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

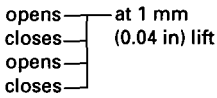


The carburetor identification number is stamped on the left side of the carburetor body.

GENERAL INFORMATION

SPECIFICATIONS

GENERAL	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length Overall width Overall height Wheelbase Seat height Footpeg height Ground clearance Dry weight Curb weight	1,910 mm (75.2 in) 652 mm (25.7 in) 1,065 mm (41.9 in) 1,286 mm (50.6 in) 776 mm (30.6 in) 312 mm (12.3 in) 172 mm (6.8 in) 115 kg (253.53 lbs) 123 kg (271.17 lbs)
FRAME	Frame type Front suspension Front axle travel Rear suspension Rear axle travel Rear damper Front tire size Rear tire size Tire brand Front brake Rear brake Caster angle Trail length Fuel tank capacity	Diamond type Telescopic fork 190 mm (4.29 in) Swingarm 120 mm (4.72 in) Single effected tube type 80/90-17M/C 44P 100/80-17M/C 52P Front/Rear: IRC Hydraulic disc brake Hydraulic disc brake 25° 88 mm (3.46 in) 10.0 liter (2.64 US gal, 2.2 Imp gal)
ENGINE	Bore and stroke Displacement Compression ratio Valve train Intake valve Exhaust valve Lubrication system Oil pump type Cooling system Air filtration Crankshaft type Engine dry weight Cylinder arrangement	63.5 x 47.2 mm (2.50 x 1.86 in) 149.4 cm ³ (9.1 cu-in) 11.0: 1 Multi link chain drive and DOHC 5° BTDC 35° ABDC 30° BBDC 0° ATDC Forced pressure and wet sump Trochoid Liquid cooled Paper filter Assembled type 26.1 kg (57.55 lbs) Single cylinder inclined 40° from vertical



GENERAL (Cont'd)		
	ITEM	SPECIFICATIONS
CARBURETOR	Carburetor type Venturi dia.	CV (Constant velocity) type 25 mm (0.98 in) or equivalent
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Final reduction Gear ratio 1st 2nd 3rd 4th 5th 6th Gearshift pattern	Multi-plate, wet Mechanical type Constant mesh, 6-speed 3.260 (75/23) 2.933 (44/15) 3.083 (37/12) 1.941 (33/17) 1.500 (30/20) 1.227 (27/22) 1.041 (25/24) 0.923 (24/26) Left foot operated return system 1-N-2-3-4-5-6
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	Condenser Discharged Ignition (CDI) Electric starter motor Single phase output alternator SCR shorted/single phase, half wave rectification Alternator

GENERAL INFORMATION

Unit: mm (in)

LUBRICATION SYSTEM		STANDARD	SERVICE LIMIT
ITEM			
Engine oil capacity	At draining	1.0 liter (1.06 US qt, 0.88 Imp qt)	-----
	At disassembly	1.3 liter (1.37 US qt, 1.14 Imp qt)	-----
Recommended engine oil		Honda 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-30	-----
Oil pump rotor	Tip clearance	-----	0.20 (0.008)
	Body clearance	0.150 - 0.210 (0.0059 - 0.0083)	0.26 (0.010)
	Side clearance	0.050 - 0.100 (0.0020 - 0.0040)	0.15 (0.006)

FUEL SYSTEM		SPECIFICATIONS
ITEM		
Carburetor identification number		VK6AA
Main jet		#115
Slow jet		#35
Pilot screw opening		See page 5-14
Float level		13 mm (0.5 in)
Idle speed		1,400 ± 100 min ⁻¹ (rpm)
Throttle grip free play		2 - 6 mm (1/12 - 1/4 in)

COOLING SYSTEM		SPECIFICATIONS
ITEM		
Coolant capacity	Radiator and engine	0.76 liter (0.20 US qt, 0.17 Imp qt)
	Reserve tank	0.24 liter (0.06 US qt, 0.05 Imp qt)
Radiator cap relief pressure		108 kPa (1.1 kgf/cm ² , 16 psi)
Thermostat	Begin to open	69.5 - 72.5°C (157.1 - 162.5°F)
	Fully open	80°C (176°F)
	Valve lift	3.5 mm (0.14 in) minimum

Unit: mm (in)

CLUTCH/GEARSHIFT LINKAGE			STANDARD	SERVICE LIMIT
ITEM				
Clutch	Lever free play		10 - 20 (3/8 - 13/16)	-----
	Spring free length		37.6 (1.48)	36.6 (1.44)
	Disc thickness	A	3.5 - 3.6 (0.138 - 0.142)	3.1 (0.12)
		B	2.92 - 3.08 (0.115 - 0.121)	2.60 (0.102)
	Plate warpage		-----	0.2 (0.008)
	Outer guide	O.D.	22.959 - 22.980 (0.9039 - 0.9047)	22.93 (0.903)
		I.D.	16.991 - 17.009 (0.6689 - 0.6696)	17.04 (0.671)
Outer I.D.		23.000 - 23.013 (0.9055 - 0.9060)	23.06 (0.908)	
Mainshaft O.D. at clutch outer guide			16.996 - 16.984 (0.6680 - 0.6687)	16.935 (0.6667)

Unit: mm (in)

CYLINDER HEAD/V VALVES			STANDARD	SERVICE LIMIT
ITEM				
Cylinder compression			1,370 kpa (13.9 kgf/cm ² , 197.7 psi) at 680 min ⁻¹ (rpm)	—
Cylinder head warpage			—	0.05 (0.002)
Valve, valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	—
		EX	0.25 ± 0.03 (0.010 ± 0.001)	—
	Valve stem O.D.	IN	3.775 – 3.790 (0.1486 – 0.1492)	3.7 (0.15)
		EX	3.765 – 3.780 (0.1482 – 0.1488)	3.7 (0.15)
	Valve guide I.D.	IN/EX	3.800 – 3.812 (0.1496 – 0.1501)	3.89 (0.153)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.075 (0.0029)
		EX	0.020 – 0.047 (0.0008 – 0.0019)	0.085 (0.0033)
	Valve guide projection above cylinder head	IN	15.5 (0.61)	—
EX		13.1 (0.52)	—	
Valve seat width	IN/EX	1.2 – 1.6 (0.05 – 0.06)	1.9 (0.07)	
Valve spring free length		IN/EX	39.7 (1.56)	38.5 (1.52)
Valve lifter	O.D.		22.478 – 22.493 (0.8850 – 0.8855)	22.47 (0.885)
	Bore I.D.		22.510 – 22.526 (0.8862 – 0.8869)	22.5 (0.89)
Camshaft	Cam lobe height	IN	35.12 – 35.20 (1.383 – 1.386)	35.073 (1.3808)
		EX	34.71 – 34.79 (1.367 – 1.370)	34.662 (1.3646)
	Runout		—	0.02 (0.001)
	Camshaft holder I.D.	IN/EX	17.000 – 17.018 (0.6693 – 0.6700)	17.02 (0.6703)
	Camshaft O.D.	IN/EX	16.966 – 16.984 (0.6680 – 0.6687)	16.960 (0.6677)
	Camshaft-to-camshaft holder clearance (right side)	IN/EX	0.016 – 0.052 (0.0006 – 0.0020)	0.067 (0.0026)

Unit: mm (in)

CYLINDER/PISTON			STANDARD	SERVICE LIMIT
ITEM				
Cylinder	I.D.		63.50 – 63.51 (2.5000 – 2.5004)	63.55 (2.502)
	Out of round		—	0.10 (0.004)
	Taper		—	0.10 (0.004)
	Warpage		—	0.05 (0.002)
Piston, piston rings	Piston mark direction		"IN" mark facing toward the intake side	—
	Piston O.D.		63.47 – 63.49 (2.4988 – 2.4996)	63.40 (2.496)
	Piston O.D. measurement point		6.5 (0.36) from bottom of skirt	—
	Piston pin bore I.D.		15.002 – 15.008 (0.5960 – 0.5969)	15.055 (0.5927)
	Piston pin O.D.		14.994 – 15.000 (0.5903 – 0.5906)	14.98 (0.590)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.0016)
	Piston ring-to-ring groove clearance	Top	0.045 – 0.075 (0.0018 – 0.0030)	0.10 (0.004)
		Second	0.015 – 0.050 (0.0006 – 0.0020)	0.08 (0.003)
	Piston ring end gap	Top	0.05 – 0.20 (0.002 – 0.008)	0.3 (0.01)
		Second	0.15 – 0.30 (0.004 – 0.010)	0.7 (0.030)
Oil (side rail)		0.20 – 0.70 (0.008 – 0.028)	1.1 (0.04)	
Cylinder-to-piston clearance			0.01 – 0.04 (0.0004 – 0.0016)	0.90 (0.035)
Connecting rod small end I.D.			15.010 – 15.028 (0.5909 – 0.5917)	15.09 (0.594)
Connecting rod small end-to-piston pin clearance			0.010 – 0.034 (0.0004 – 0.0013)	0.075 (0.0030)

GENERAL INFORMATION

Unit: mm (in)

TRANSMISSION			STANDARD	SERVICE LIMIT
ITEM				
Transmission	Gear I.D.	M5, M6	17.016 – 17.034 (0.6699 – 0.6706)	17.08 (6.724)
		C1	18.000 – 18.021 (0.7087 – 0.7095)	18.07 (0.711)
		C2	23.020 – 23.041 (0.9063 – 0.9071)	23.09 (0.909)
		C3, C4	22.020 – 22.041 (0.8669 – 0.8678)	22.1 (0.87)
	Bushing I.D.	C1	15.000 – 15.018 (0.590 – 0.591)	15.1 (0.59)
		C2	20.020 – 20.041 (0.7882 – 0.7890)	20.10 (0.791)
	Bushing O.D.	C1	17.969 – 17.980 (0.7074 – 0.7079)	17.9 (0.70)
		C2	22.984 – 23.005 (0.9049 – 0.9057)	22.9 (0.90)
	Gear-to-bushing clearance	C1	0.020 – 0.052 (0.0008 – 0.0020)	0.10 (0.004)
		C2	0.036 – 0.057 (0.0014 – 0.0022)	0.10 (0.004)
	Mainshaft O.D.	M5	16.966 – 16.984 (0.6680 – 0.6687)	16.93 (0.667)
	Countershaft O.D.	C1 gear bushing	14.966 – 14.984 (0.5892 – 0.5899)	14.90 (0.587)
		C2 gear bushing	19.978 – 19.989 (0.7866 – 0.7870)	19.92 (0.784)
	Gear-to-shaft clearance	M5	0.032 – 0.068 (0.0012 – 0.0027)	0.10 (0.004)
Bushing-to-shaft clearance	C1	0.016 – 0.052 (0.0001 – 0.0020)	0.10 (0.004)	
	C2	0.031 – 0.063 (0.0012 – 0.0025)	0.10 (0.004)	
Shift fork	Shaft O.D.		9.986 – 9.995 (0.3931 – 0.3935)	9.93 (0.391)
	Fork I.D.		10.000 – 10.018 (0.3937 – 0.3944)	10.03 (0.395)
	Fork claw thickness		4.93 – 5.00 (0.194 – 0.197)	4.90 (0.193)
	Shift drum O.D. at right end		25.959 – 25.980 (1.0220 – 1.0228)	25.90 (1.020)
	Shift drum journal (R.crankcase)		26.000 – 26.021 (1.0236 – 1.0244)	25.08 (0.987)

Unit: mm (in)

CRANKSHAFT/BARANCER			STANDARD	SERVICE LIMIT
ITEM				
Connecting rod	Big end side clearance		—	0.6 (0.02)
	Big end radial clearance		—	0.05 (0.002)
Crankshaft runout			—	0.03 (0.001)

Unit: mm (in)

FRONT WHEEL/SUSPENSION/STEERING			
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	To the indicator
Cold tire pressure	Driver only	200 kPa (2.00 kgf/cm ² , 29 psi)	—
	Driver and passenger	200 kPa (2.00 kgf/cm ² , 29 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balancer weight		—	60 g (2.1 oz) max.
Fork	Spring free length	412.4 (16.24)	404.1 (15.91)
	Spring direction	With the tightly wound end facing down	—
	Pipe runout	—	0.20 (0.008)
	Recommended fork fluid	Honda Ultra Cushion Oil No.10	—
	Fluid level	131 (5.2)	—
	Fluid capacity	206 ± 2.5 cm ³ (7.0 ± 0.08 US oz, 7.3 ± 0.09 Imp oz)	—

Unit: mm (in)

REAR WHEEL/SUSPENSION			
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	To the indicator
Cold tire pressure	Driver only	200 kPa (2.00 kgf/cm ² , 29 psi)	—
	Driver and passenger	225 kPa (2.25 kgf/cm ² , 33 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balancer weight		—	60 g (2.1 oz) max.
Drive chain	Size/link	DID428VI3-124LE	—
	Slack	25 – 35 (1.0 – 1.4)	—

GENERAL INFORMATION

Unit: mm (in)

BRAKE SYSTEM		STANDARD	SERVICE LIMIT
ITEM			
Front	Specified brake fluid	DOT 3 or DOT 4	—
	Brake pad wear indicator	—	To groove
	Brake disc thickness	3.8 – 4.2 (0.15 – 0.17)	3.0 (0.12)
	Brake disc runout	—	0.1 (0.004)
	Master cylinder I.D.	12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
	Master piston O.D.	12.657 – 12.684 (0.4983 – 0.4994)	12.640 (0.4976)
	Caliper cylinder I.D.	25.400 – 25.405 (1.0000 – 1.0002)	25.450 (1.0020)
	Caliper piston O.D.	25.318 – 25.368 (0.9968 – 0.9987)	25.300 (0.9960)
Rear	Specified brake fluid	DOT 3 or DOT 4	—
	Brake pad wear indicator	—	To groove
	Brake disc thickness	3.8 – 4.2 (0.15 – 0.17)	3.0 (0.12)
	Brake disc runout	—	0.1 (0.004)
	Master cylinder I.D.	12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
	Master piston O.D.	12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
	Caliper cylinder I.D.	32.030 – 32.080 (1.2610 – 1.2630)	32.090 (1.2634)
	Caliper piston O.D.	31.948 – 31.998 (1.2578 – 1.2598)	31.94 (1.257)

CHARGING SYSTEM/ALTERNATOR			SPECIFICATIONS
ITEM			
Battery	Capacity		12 V – 5 Ah
	Current leakage		0.1 mA max
	Specific gravity	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.5 A x 5 – 10 h
Quick		2.5 A x 1 h	
Alternator	Capacity		155 W/ 5,000 min ⁻¹ (rpm)
	Charging coil resistance (20°C/68°F)		0.2 – 1.0 Ω
	Lighting coil resistance (20°C/68°F)		0.1 – 0.8 Ω

IGNITION SYSTEM		SPECIFICATIONS	
ITEM			
Spark plug		NGK	DENSO
	Standard	CR8E	U24ESR - N
	Optional	CR9E	U27ESR - N
Spark plug gap		0.7 - 0.8 mm (0.028 - 0.032 in)	
Ignition coil peak voltage		100 V minimum	
Ignition pulse generator peak voltage		0.7 V minimum	
Ignition timing		12° BTDC at 1,400 ± 100 min ⁻¹ (rpm)	

Unit: mm (in)

ELECTRIC STARTER		
ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	10.00 - 10.05 (0.393 - 0.396)	3.5 (0.14)

LIGHTS/METERS/SWITCHES		SPECIFICATIONS
ITEM		
Bulbs	Headlight (Hi/low beam)	12 V - 18/18 W x 2
	Brake/tail light	12 V - 10/5 W x 2
	License light	12 V - 5 W
	Front turn signal light	12 V - 10 W x 2
	Rear turn signal light	12 V - 10 W x 2
	Instrument light	12 V - 1.7 W x 4
	Turn signal indicator	12 V - 1.7 W
	High-beam indicator	12 V - 1.7 W
	Neutral indicator	12 V - 1.7 W
Fuse	Main	20 A
	Sub	10 A x 2
Thermosensor resistance	50°C (122°F)	133.9 - 178.9 Ω
	120°C (248°F)	14.9 - 17.3 Ω

TORQUE VALUES

STANDARD			
FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm bolt and nut	5 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
6 mm bolt and nut (Include SH flange bolt)	10 (1.0, 7)	6 mm screw	9 (0.9, 6.5)
8 mm bolt and nut	22 (2.2, 16)	6 mm flange bolt and nut (Include NSHF)	12 (1.2, 9)
10 mm bolt and nut	34 (3.5, 25)	8 mm flange bolt and nut	26 (2.7, 20)
12 mm bolt and nut	54 (5.5, 40)	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 engine oil to the threads and flange surface.
 2. Apply molybdenum disulfide oil to the threads and flange surface.
 3. Apply locking agent to the threads.
 4. Apply sealant to the threads.
 5. Stake.
 6. UBS bolt.
 7. U-nut.
 8. ALOC bolt.

ENGINE				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
MAINTENANCE:				
Spark plug	1	10	12 (1.2, 9)	
Crankshaft hole cap	1	30	7.9 (0.8, 5.8)	
Timing hole cap	1	14	5.9 (0.6, 4.3)	
Oil drain bolt	1	12	25 (2.5, 18)	
LUBRICATION SYSTEM:				
Oil pump bolt	3	5	5.2 (0.53, 3.8)	
COOLING SYSTEM:				
Water pump impeller	1	7	10 (1.0, 7)	
CYLINDER HEAD/VALVE:				
Cylinder head cover bolt	2	6	10 (1.0, 7)	
Cylinder head nut	4	8	30 (3.1, 22)	NOTE 1
Cylinder head bolt	2	12	32 (3.3, 24)	
Cam sprocket bolt	2	5	8.8 (0.9, 6.5)	NOTE 3
Cam chain tensioner plug	1	6	4.2 (0.43, 3.1)	
Camshaft holder bolt	8	6	12 (1.2, 9)	NOTE 1
CLUTCH/GEARSHIFT LINKAGE:				
Clutch center lock nut	1	14	74 (7.5, 54)	NOTE 1
Primary drive gear lock nut	1	14	64 (6.5, 47)	NOTE 1
Gearshift cam plate bolt	1	6	12 (1.2, 9)	NOTE 3
Shift drum stopper arm bolt	1	6	12 (1.2, 9)	
ALTERNATOR/STARTER CLUTCH:				
Flywheel nut	1	12	64 (6.5, 47)	NOTE 1
Stator bolt	3	6	10 (1.0, 7)	NOTE 3
Ignition pulse generator bolt	3	5	5.2 (0.53, 3.8)	NOTE 3
Starter clutch bolt	3	8	30 (3.1, 22)	NOTE 3
OTHER FASTENERS:				
Reed valve cover bolt	2	5	5.2 (0.53, 3.8)	

FRAME	ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
FRAME/BODY PANELS/EXHAUST SYSTEM:					
	Muffler mounting nut	1	6	13 (1.3, 9)	
	Exhaust pipe cover bolt	3	6	13 (1.3, 9)	
ENGINE REMOVAL/INSTALLATION:					
	Engine hanger nut	3	10	59 (6.0, 43)	
	Drive sprocket fixing plate bolt	2	6	10 (1.0, 7)	NOTE 3
FRONT WHEEL/SUSPENSION/STEERING:					
	Steering stem nut	1	24	88 (9, 65)	
	Top thread	1	26	See page 14-22	
	Handlebar pinch bolt	2	8	27 (2.8, 20)	
	Top bridge pinch bolt	2	8	23 (2.3, 17)	
	Bottom bridge pinch bolt	2	8	26 (2.7, 20)	
	Front axle nut	1	12	59 (6.0, 43)	NOTE 7
	Fork bolt	2	27	23 (2.3, 17)	
	Fork socket bolt	2	8	20 (2.0, 14)	NOTE 3
	Front brake disk bolt	8	6	42 (4.3, 31)	NOTE 8
	Grip end screw	2	6	8.8 (0.9, 6.5)	
REAR WHEEL/SUSPENSION:					
	Rear axle nut	1	12	59 (6.0, 43)	NOTE 7
	Driven sprocket nut	4	10	64 (6.5, 47)	NOTE 7
	Rear brake disc bolt	4	8	42 (4.3, 31)	NOTE 8
	Shock absorber upper mounting bolt	1	10	39 (4.0, 29)	
	Shock absorber lower mounting nut	1	10	44 (4.5, 33)	NOTE 7
	Swingarm pivot nut	1	12	88 (9.0, 65)	NOTE 7
BRAKE SYSTEM:					
	Brake hose bolt	1	10	34 (3.5, 25)	
	Front master cylinder cover screw	2	4	1.5 (0.15, 1.1)	
	Front brake light switch screw	1	4	1.2 (0.12, 0.9)	
	Brake lever pivot nut	1	6	5.9 (0.6, 4.3)	
	Front brake caliper mounting bolt	2	8	30 (3.1, 22)	NOTE 8
	Brake caliper pad pin	1	8	17 (1.7, 12)	
	Bleed valve	2	8	5.4 (0.6, 4)	
	Rear brake reservoir cover screw	2	4	1.5 (0.15, 1.1)	
	Rear master cylinder mounting bolts	2	6	12 (1.2, 9)	
	Rear master cylinder push rod nut	1	8	17 (1.7, 12)	
	Main step holder mounting bolt	4	8	27 (2.8, 20)	
OTHER FASTENERS:					
	Chain slider screw	2	6	5.9 (0.6, 4.3)	

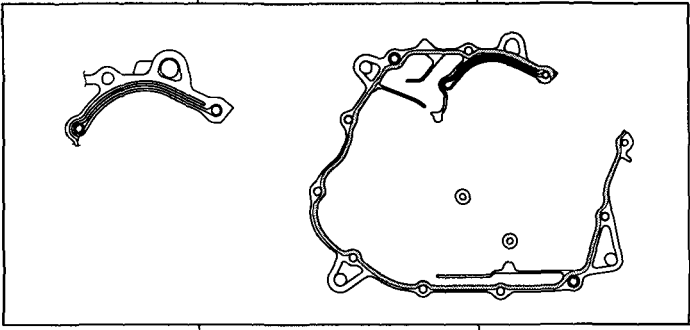
GENERAL INFORMATION

TOOLS

NOTES: 1. Equivalent commercially available.
2. Alternative tool.

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Float level gauge	07401 - 0010000		5
Universal bearing puller	07631 - 0010000		13
Lock nut wrench, 20 x 24 mm	07716 - 0020100		8
Flywheel holder	07725 - 0040000		9
Bearing remover weight	07741 - 0010201		12
Attachment, 32 x 35 mm	07746 - 0010100		12, 13
Attachment, 37 x 40 mm	07746 - 0010200		12, 13, 14, 15
Attachment, 42 x 47 mm	07746 - 0010300		12, 14
Attachment, 72 x 75 mm	07746 - 0010600		13
Pilot, 12 mm	07746 - 0040200		13, 14, 15
Pilot, 15 mm	07746 - 0040300		12
Pilot, 17 mm	07746 - 0040400		12
Pilot, 20 mm	07746 - 0040500		12
Pilot, 35 mm	07746 - 0040800		13
Bearing remover shaft	07746 - 0050100		14, 15
Bearing remover head, 12 mm	07746 - 0050300		14, 15
Fork seal driver	07747 - 0010100		14
Fork seal driver attachment	07747 - 0010300		14
Oil seal remover	07748 - 0010001		14
Driver	07749 - 0010000		12, 13, 14, 15
Valve spring compressor	07757 - 0010000		10
Valve seat cutter		NOTE 1	10
Seat cutter, 27.5 mm (45° IN)	07780 - 0010200		
Seat cutter, 24 mm (45° EX)	07780 - 0010600		
Flat cutter, 24 mm (32° IN)	07780 - 0012500		
Flat cutter, 27 mm (32° EX)	07780 - 0013300		
Interior cutter, 30 mm (60° IN)	07780 - 0014000		
Interior cutter, 26 mm (60° EX)	07780 - 0014500		
Cutter holder, 3.8 mm	07JMH - KY20200		
Snap ring pliers	07914 - SA50001		16
Steering stem socket	07916 - 3710101		14
Bearing remover head, 12 mm	07936 - 1660110		12
Bearing remover shaft	07936 - 1660120		12
Bearing remover shaft	07936 - KC10100		12
Bearing remover head, 15 mm	07936 - KC10200		12
Attachment, 36 mm	07945 - 4150400		6
Steering stem driver	07946 - 4300101		14
Assembly collar	07965 - VM00100		13
Assembly shaft	07965 - VM00200		13
Clutch center holder	07GMB - KT70101		8
Ball race remover	07GMD - KS40100		14
Valve guide driver	07GMD - KT70100		10
Peak voltage adaptor	07HGJ - 0020100		18
Valve spring compressor attachment	07JME - KY20100	NOTE 2: Imrie diagnostic tester	10
Tapet hole protector	07JMG - KY20100	(model 625)	10
Valve guide reamer	07JMH - KY20100		10
Rotor puller	07KMC - HE00100		9

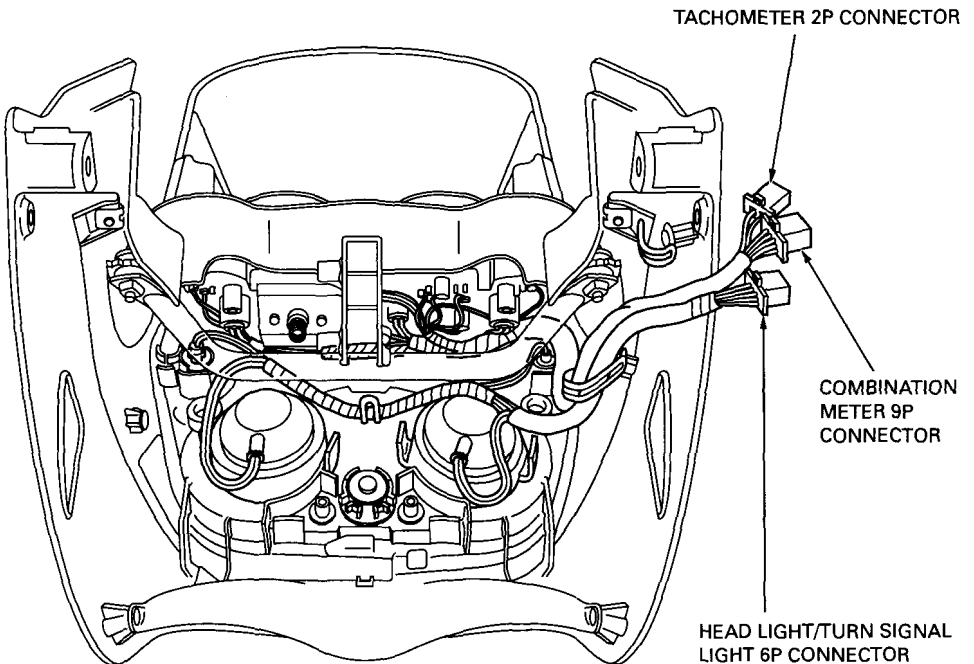
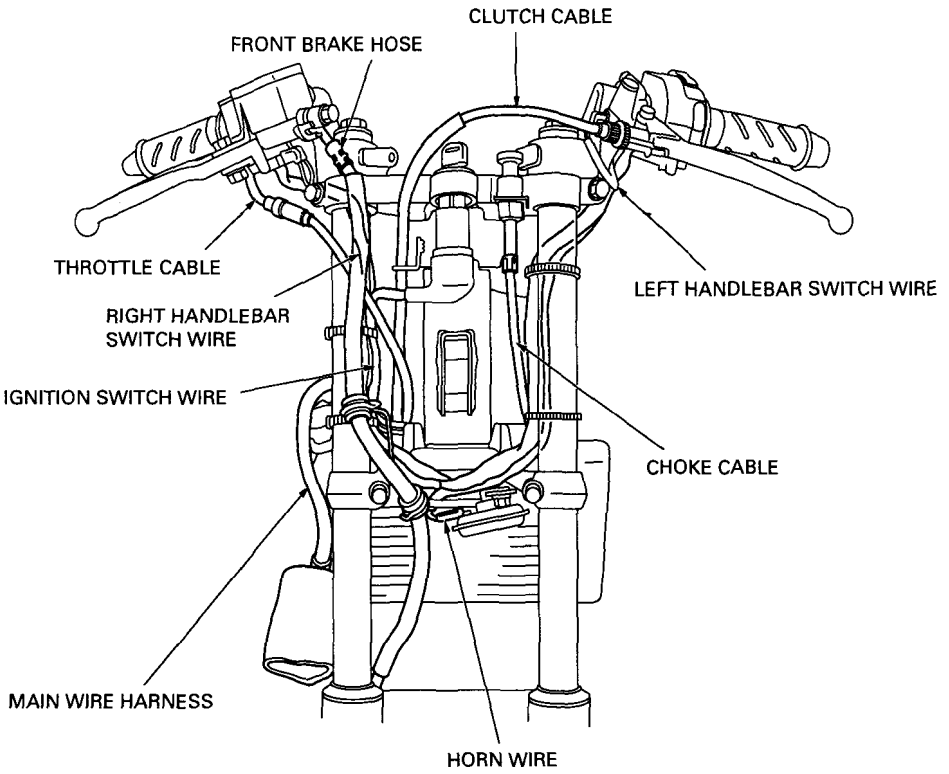
LUBRICATION & SEAL POINTS

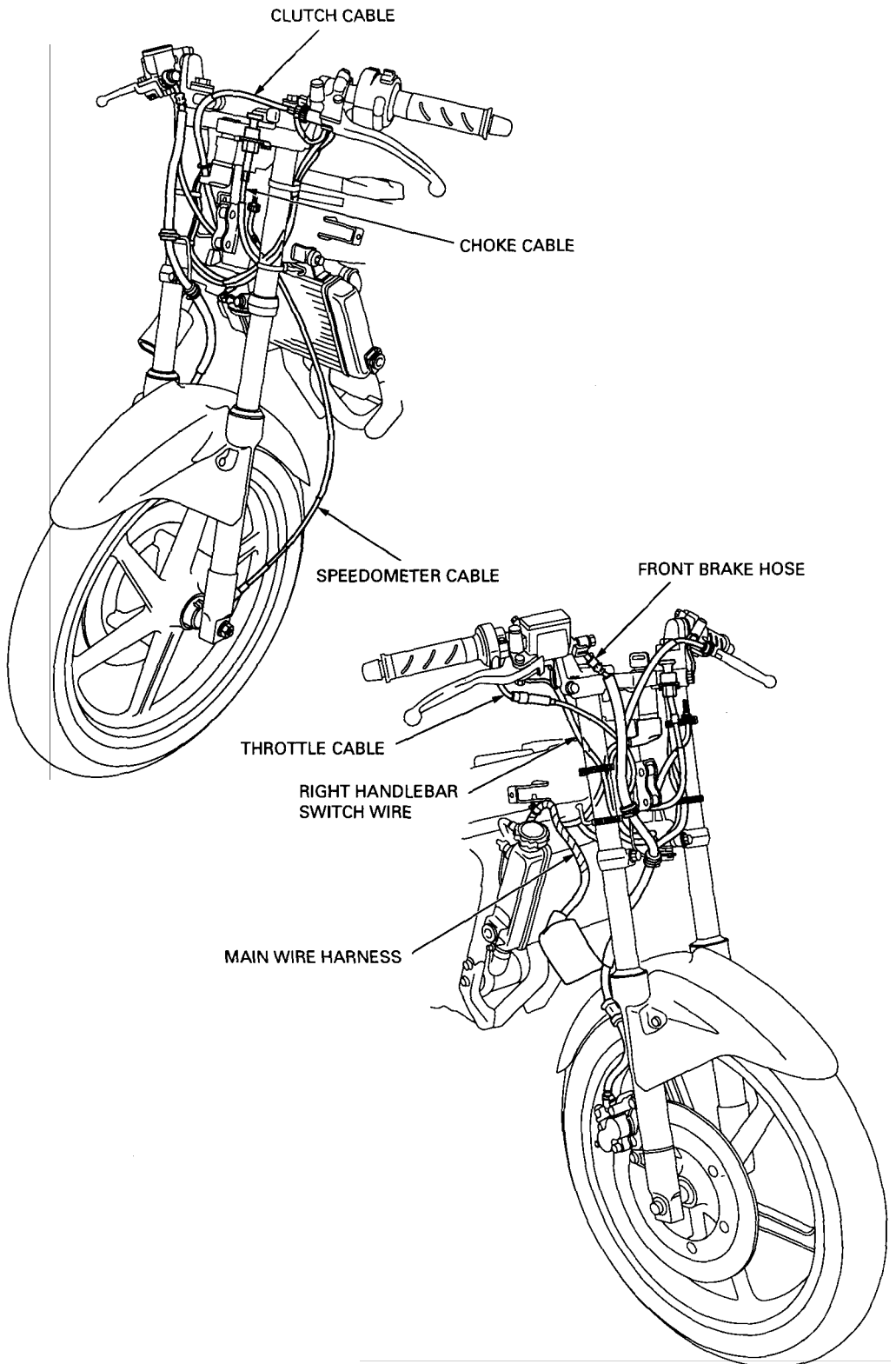
ENGINE	LOCATION	MATERIAL	REMARKS
	Valve stem (valve guide sliding surface) Clutch outer guide outer surfaces Piston pin outer surface Connecting rod small end inner surface Shift fork shaft Transmission gear rotating surfaces Transmission gear shift fork grooves C1, C2 gear bushing Balancer driven gear inner surface Clutch lifter arm spindle Gearshift spindle outer surface Shift drum journal outer surface Camshaft	Molybdenum oil solution (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
	Cam chain Camshaft holder bolt threads and seating surface Piston outer surface Piston rings Cylinder head nut threads and seating surface Valve lifter sliding surfaces Clutch disc lining surface Clutch center lock nut threads and seating surface Clutch lifter piece Crankshaft thrust surfaces Primary drive gear nut threads and seating surface Flywheel nut threads and seating surface Shift drum grooves Starter clutch rolling surface Starter reduction gear Oil pump inner and outer rotor Each bearing rotating area Each O-ring whole surface Each oil seal lip Water pump shaft	Engine oil	
	Each oil seal lip (clutch lifter arm spindle, gearshift spindle) Timing hole cap threads Crankshaft hole cap threads	Multi-purpose grease	
	Gearshift cam plate bolt threads Ignition pulse generator bolt threads Mainshaft bearing setting plate bolt threads Starter clutch bolt threads Camsprocket bolt threads	Locking agent	
	Alternator/ignition pulse generator wire grommet seating surface R./L. Crankcase mating surface except the oil passage area.	Liquid sealant	

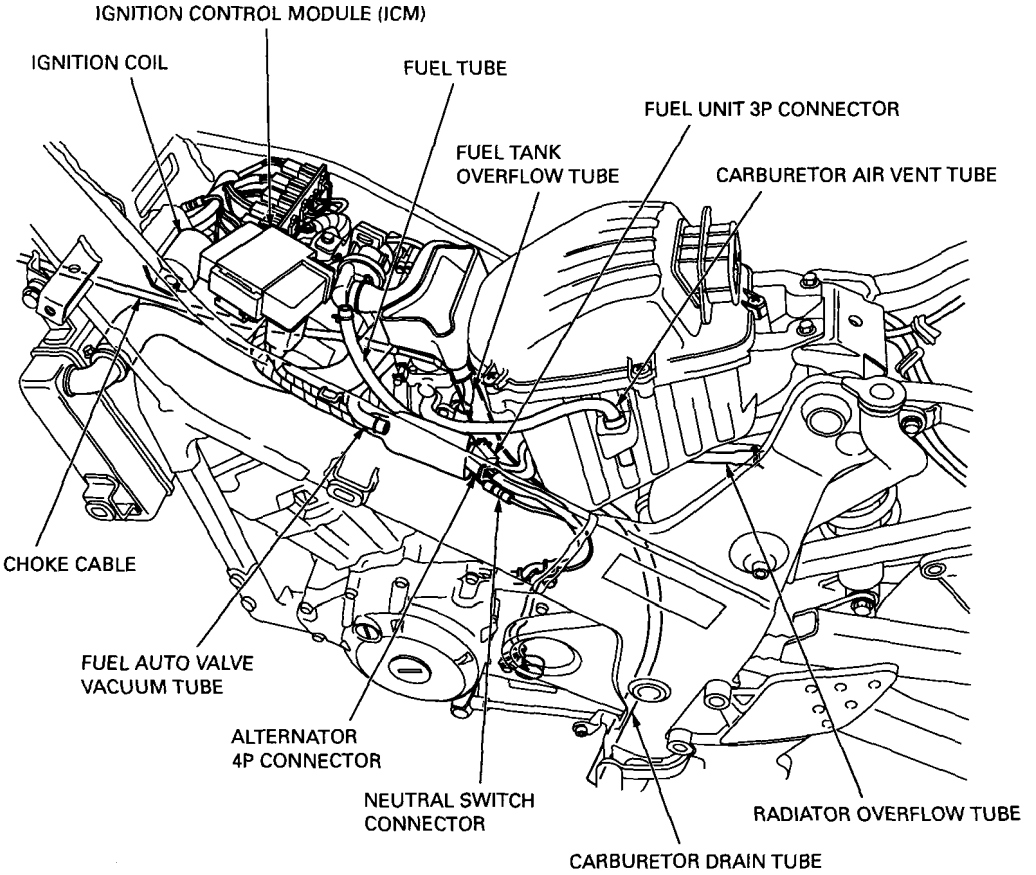
GENERAL INFORMATION

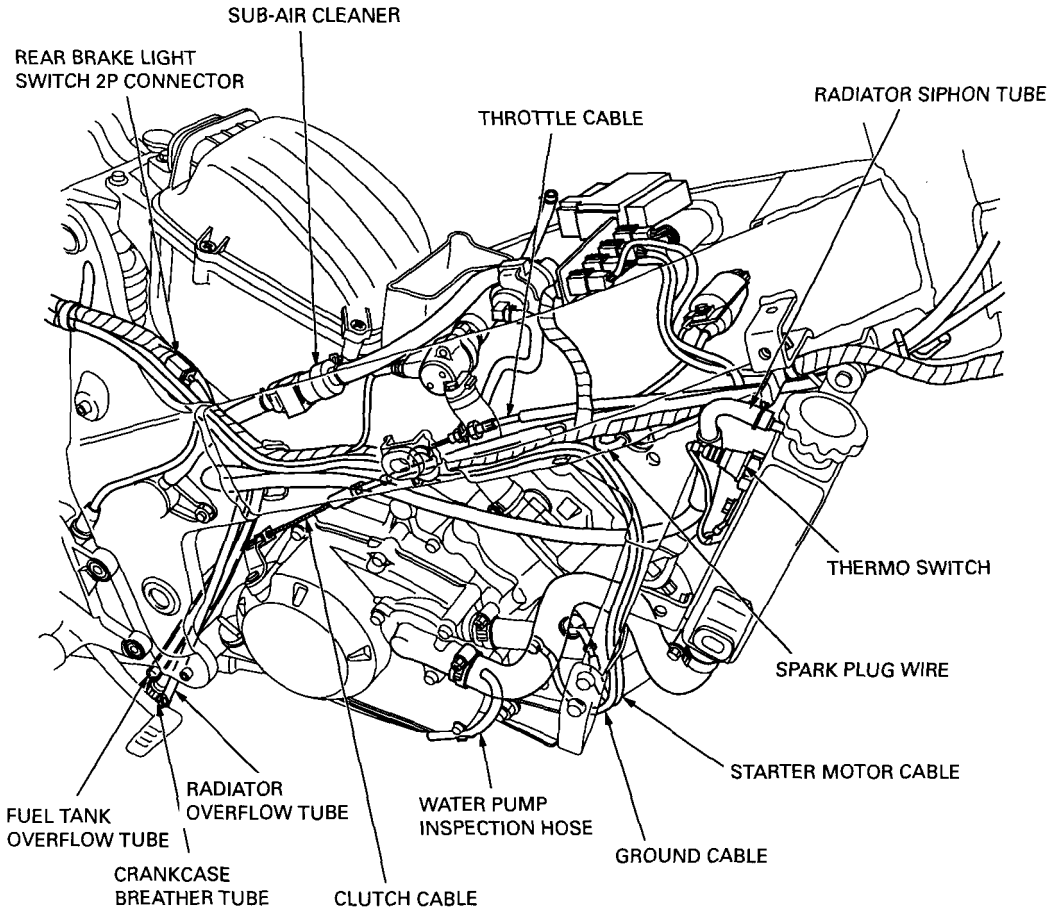
FRAME	LOCATION	MATERIAL	REMARKS
	Steering head bearing sliding surface Steering head bearing dust seal lips Front fork oil seal lips Front wheel dust seal lips Rear wheel dust seal lips Rear wheel hub O-ring Clutch lever pivot bolt sliding surface Speedometer gear and pinion gear teeth Speedometer gear/pinion sliding surface Side stand pivot surface Throttle grip sliding surface Speedometer outer cable inside Seat lock sliding surface Brake pad pin sliding surface	Multi-purpose grease	
	Brake caliper pin bolt Brake lever pivot bolt sliding surface Brake lever-to-master piston contacting area Rear brake master piston-to-push rod contacting area Throttle cable inside	Silicone grease	
	Clutch inner cable surface Choke inner cable surface	Molybdenum compound oil	
	Fork socket bolt threads Cooling fan motor shaft threads	Locking agent	
	Handle grip rubber inside	Honda Bond A or equivalent	
	Brake master piston and cups Brake caliper piston and piston seals Brake caliper dust seal	DOT 3 or 4 brake fluid	
	Fork inside	Honda Ultra Cushion Oil No.10	
	Air cleaner housing tube joint	Sealant	

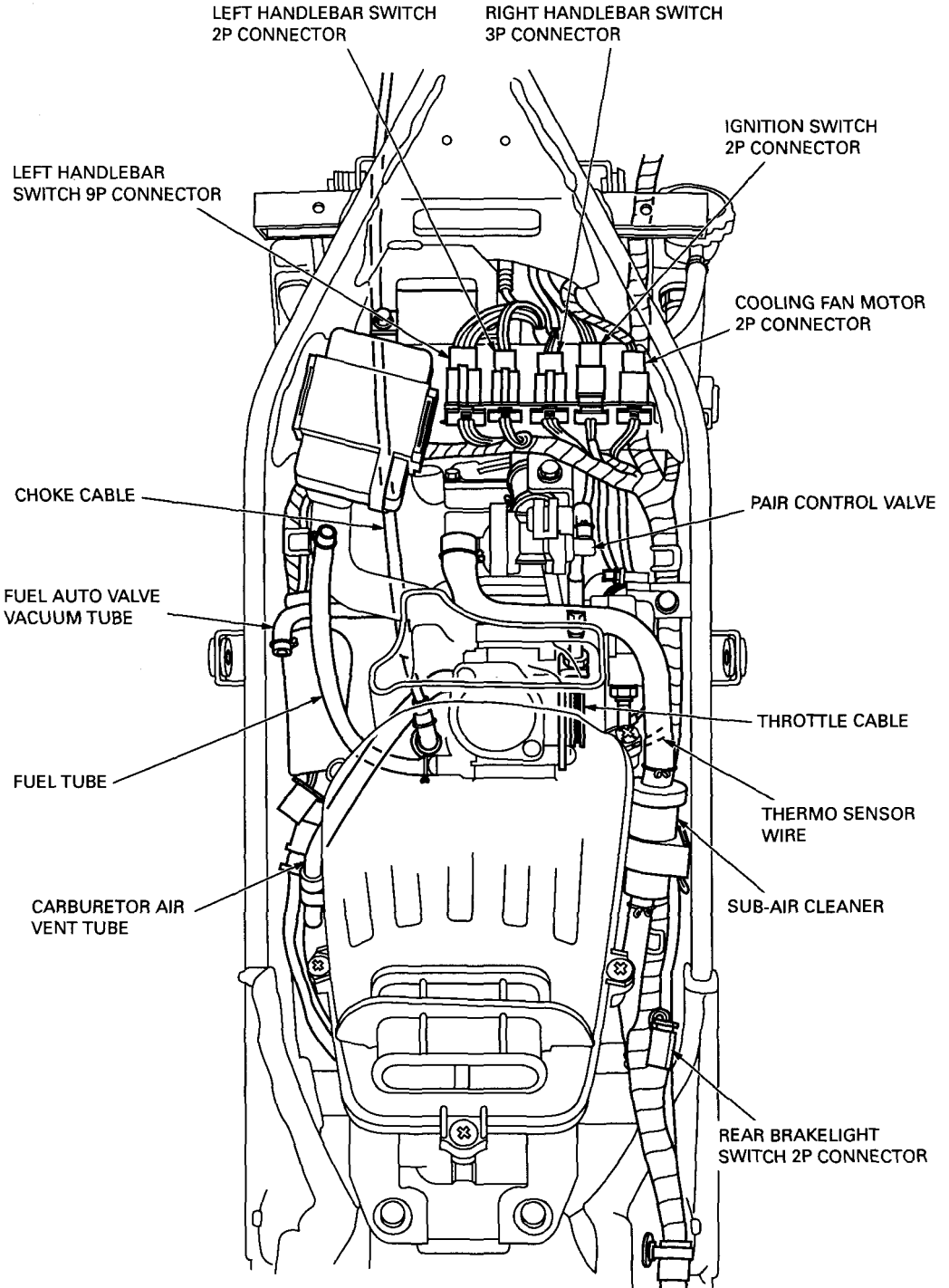
CABLE & HARNESS ROUTING

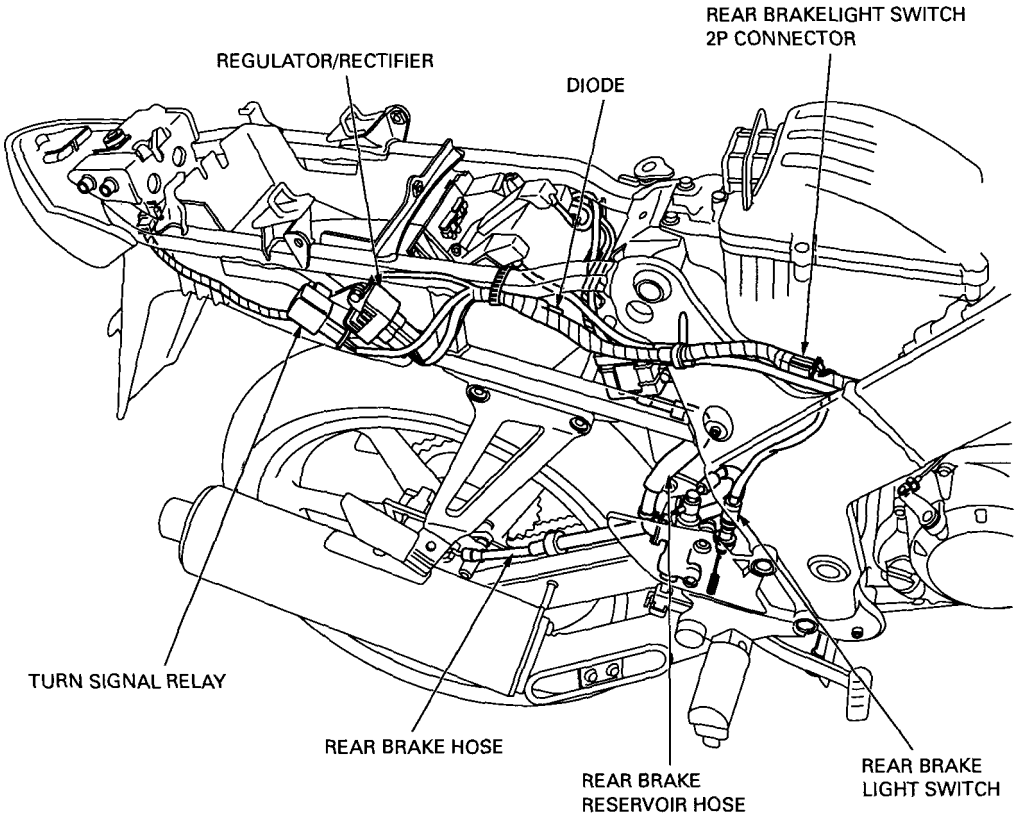


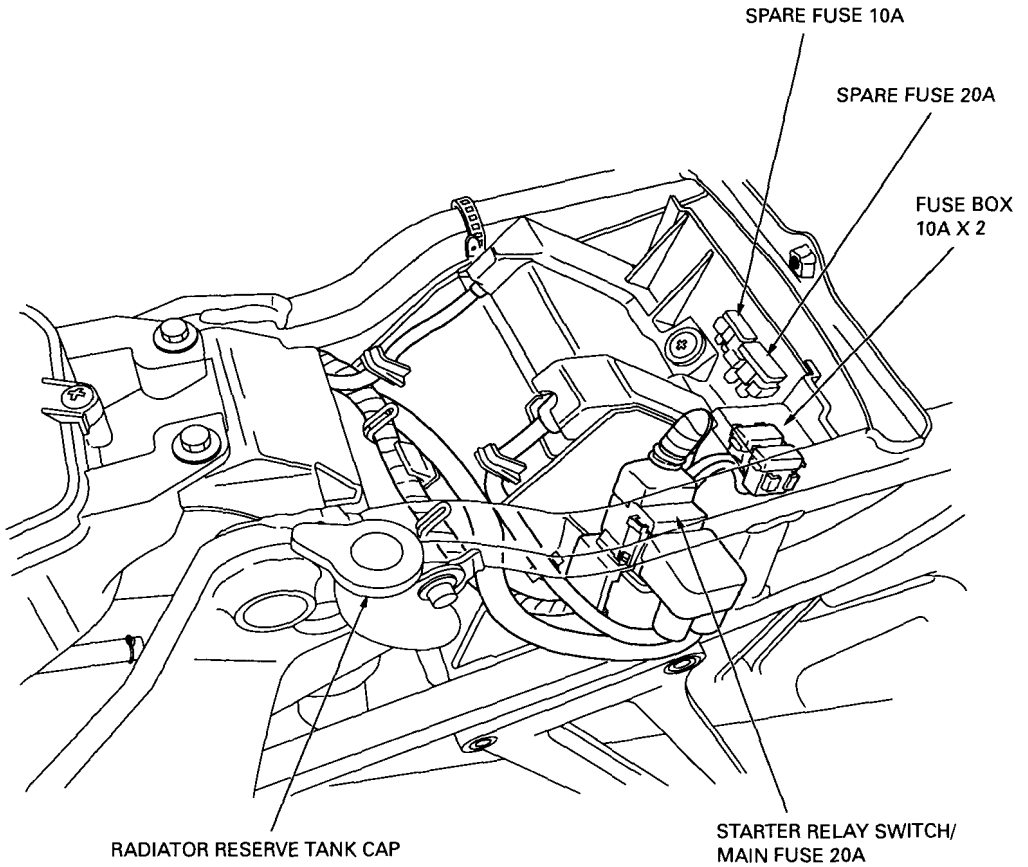












EMISSION CONTROL SYSTEMS

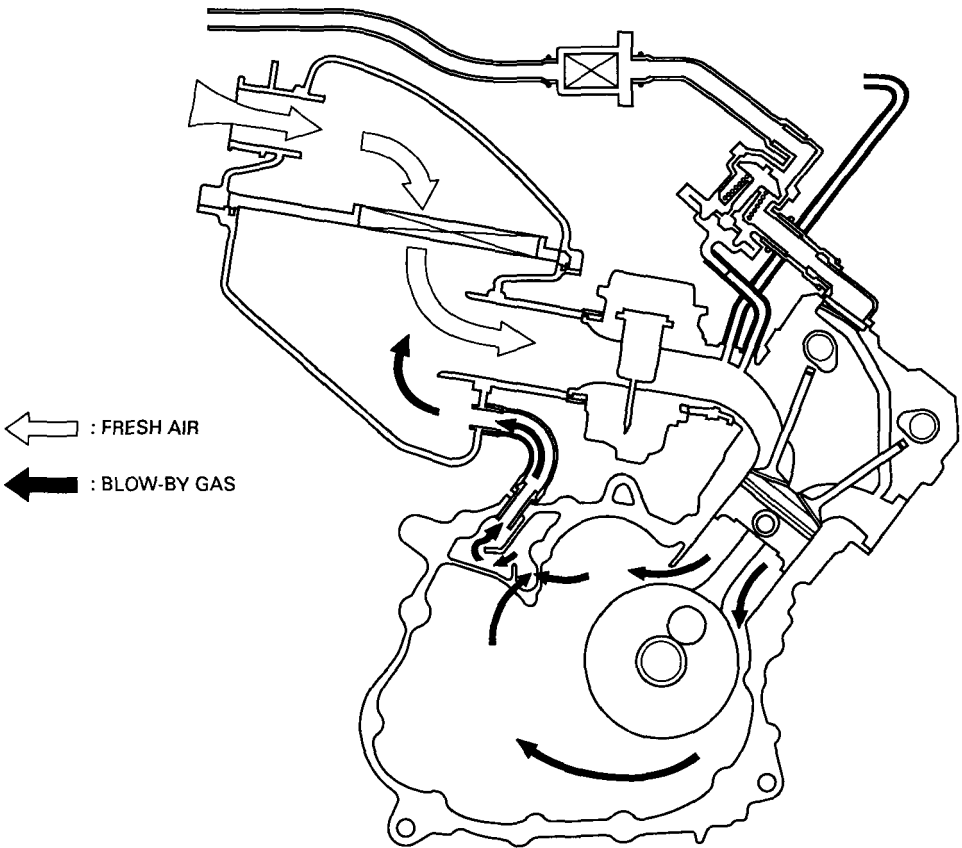
SOURCE OF EMISSIONS

The combustion process produces carbon monoxide and hydrocarbons. Controlling hydrocarbon emission is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

Honda Motor Co., Ltd. utilizes lean carburetor settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

CRANKCASE EMISSION CONTROL SYSTEM

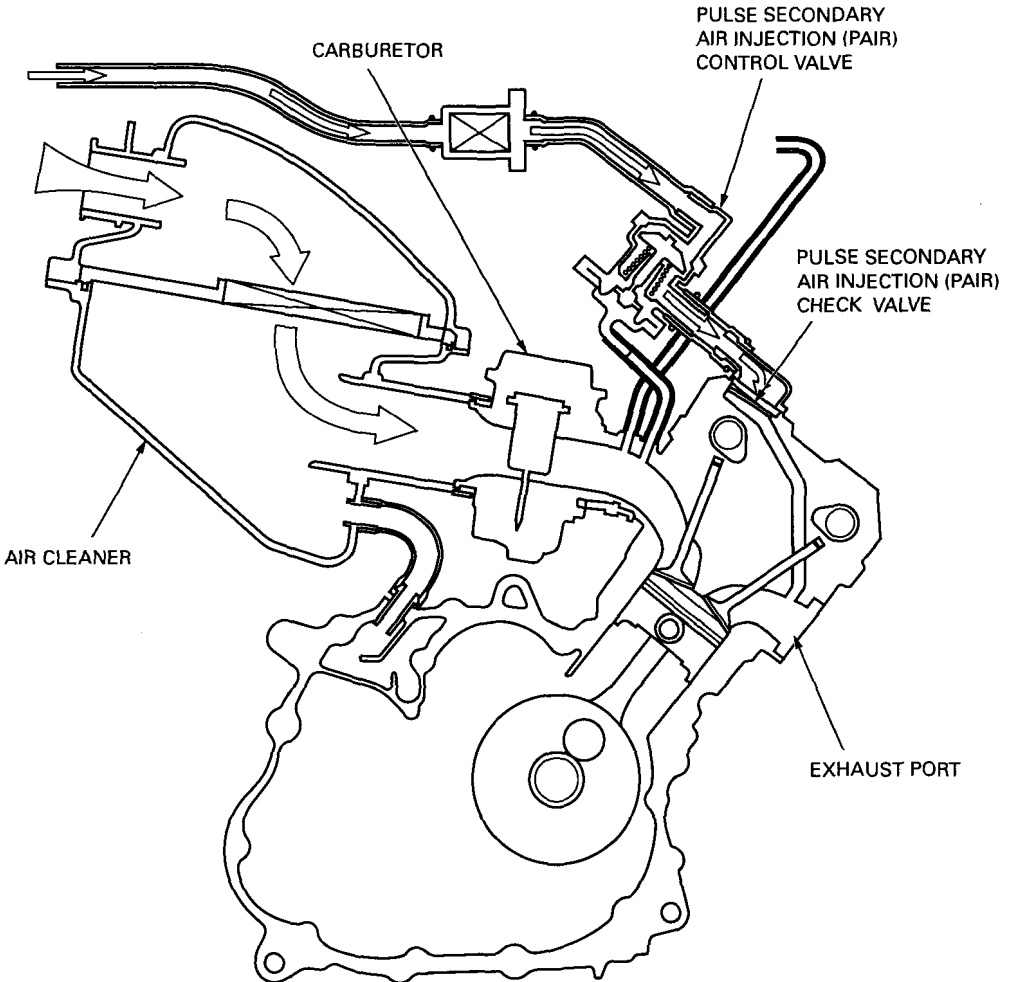
The engine is equipped with a closed crankcase system to prevent discharging crankcase emissions into the atmosphere. Blow-by gas is returned to the combustion chamber through the air cleaner and carburetor.



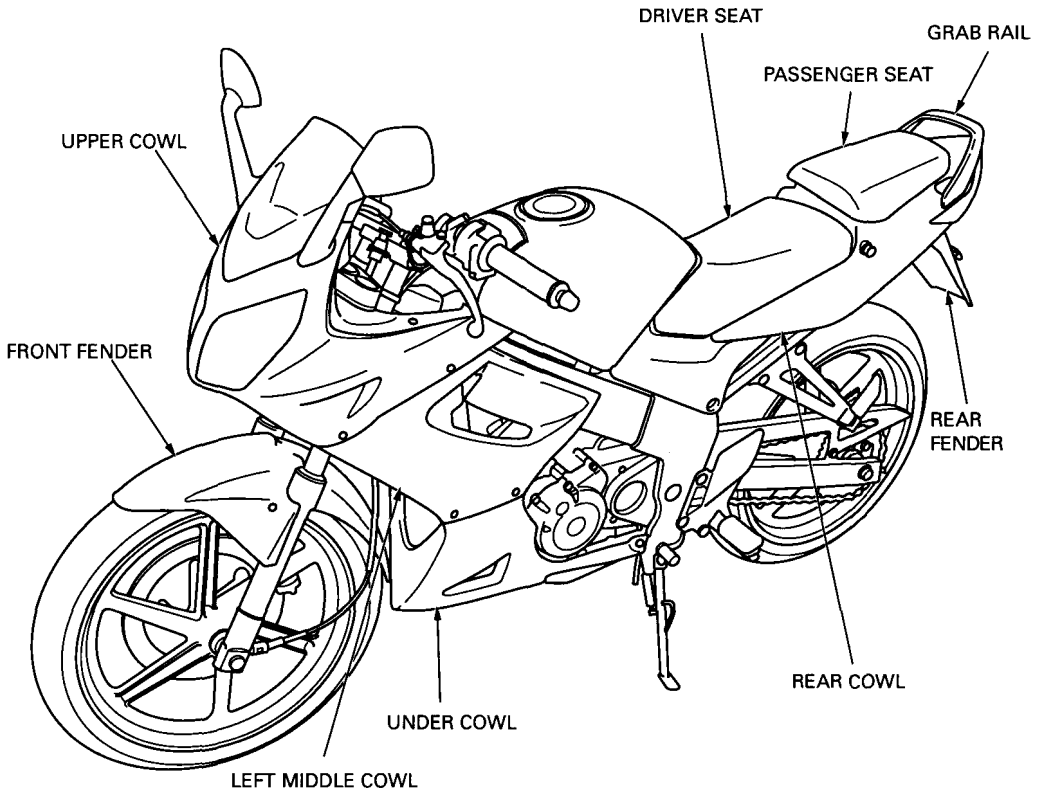
EXHAUST EMISSION CONTROL SYSTEM (PULSE SECONDARY AIR INJECTION SYSTEM)

The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust system whenever there is a negative pressure pulse in the exhaust system. This charge of fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor. This model has the pulse secondary air injection (PAIR) control valve and PAIR check valve. Pair check valve prevents reverse air flow through the system. The PAIR control valve reacts to high intake manifold vacuum and will cut off the supply of the fresh air during engine deceleration, thereby preventing afterburn in the exhaust system.

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



BODY PANEL LOCATIONS



2. FRAME/BODY PANELS/EXHAUST SYSTEM

BODY PANEL LOCATIONS	2-0	REAR FENDER	2-3
SERVICE INFORMATION	2-1	UNDER COWL	2-3
TROUBLESHOOTING	2-1	MIDDLE COWL	2-4
PASSENGER SEAT	2-2	FRONT FENDER	2-4
DRIVER SEAT	2-2	UPPER COWL	2-5
GRAB RAIL	2-2	EXHAUST SYSTEM	2-5
REAR COWL	2-2		

SERVICE INFORMATION

GENERAL

⚠ WARNING

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 body panels and exhaust system.
- Always replace the exhaust pipe gaskets after removing the exhaust pipe from the engine.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

Muffler mounting nut	13 N·m (1.3 kgf·m, 9 lbf·ft)
Exhaust pipe cover bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)

TROUBLESHOOTING

Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

Poor performance

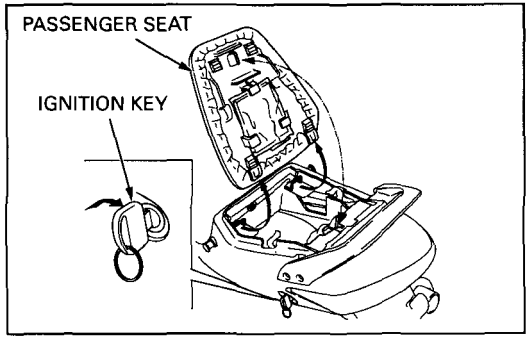
- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler

PASSENGER SEAT

REMOVAL/INSTALLATION

Unlock the passenger seat with the ignition key.
Remove the passenger seat.

Installation is in the reverse order of removal.



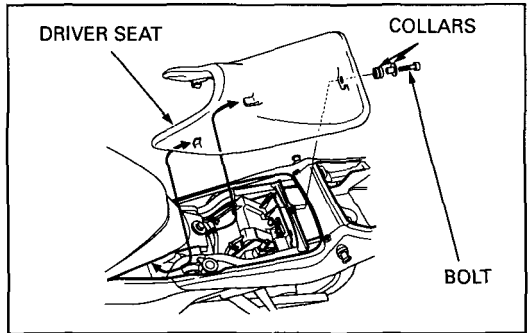
DRIVER SEAT

REMOVAL/INSTALLATION

Remove the driver seat (See above).

Remove the mounting bolt and collars.
Raise the rear of the seat and remove the seat backward.

Installation is in the reverse order of removal.

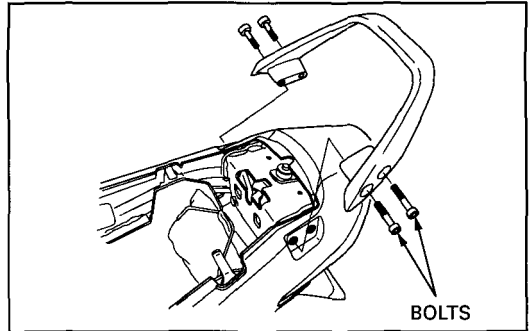


GRAB RAIL

REMOVAL/INSTALLATION

Remove the four bolts and grab rail.

Installation is in the reverse order of removal.



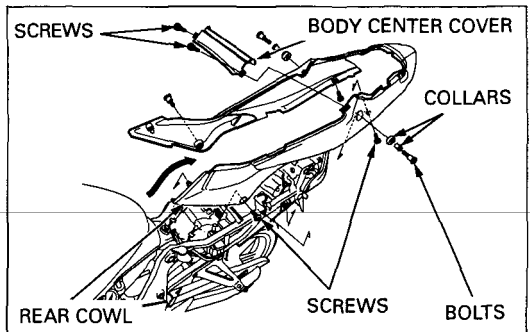
REAR COWL

REMOVAL/INSTALLATION

Remove the grab rail (See above).

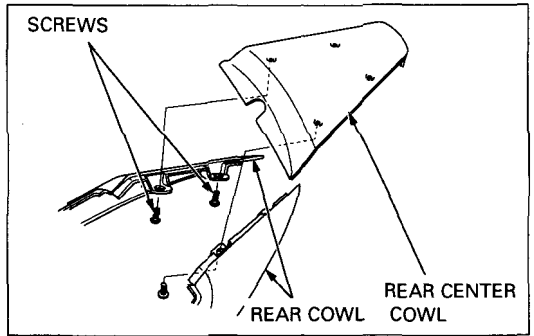
Remove the two screws and body center cover.
Remove the bolts and collars.
Remove the screws.

Spread the front of the rear cowls carefully and release the rear cowl bosses from the fuel tank grommets.
Remove the rear cowls as an assembly.



Remove the four screws and rear center cowl from the rear cowls.

Installation is in the reverse order of removal.

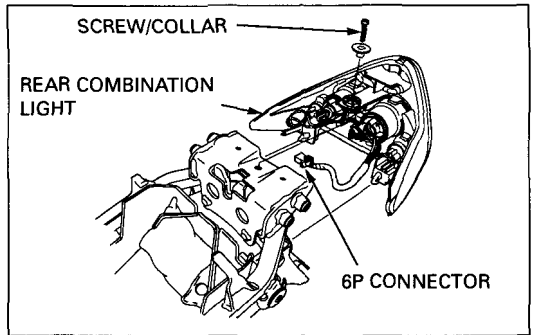


REAR FENDER

REMOVAL/INSTALLATION

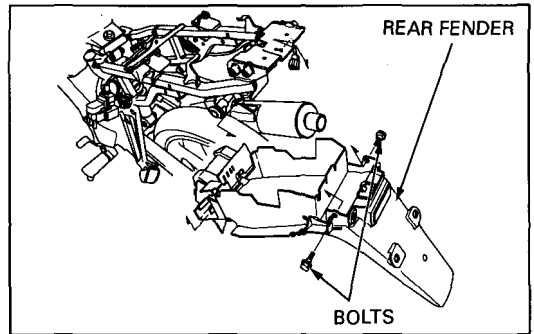
Remove the following:
 — battery (page 17-4)
 — rear cowl (page 2-2)
 — starter relay switch and fuses

Disconnect the rear combination light 6P connector.
 Remove the screw and collar.
 Release the rear combination light bosses from frame grommets, then remove the rear combination light.



Remove the two bolts and rear fender.

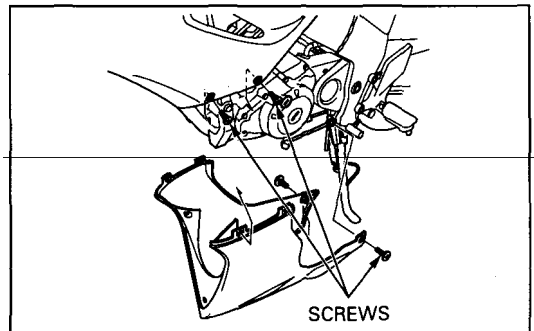
Installation is in the reverse order of removal.



UNDER COWL

REMOVAL/INSTALLATION

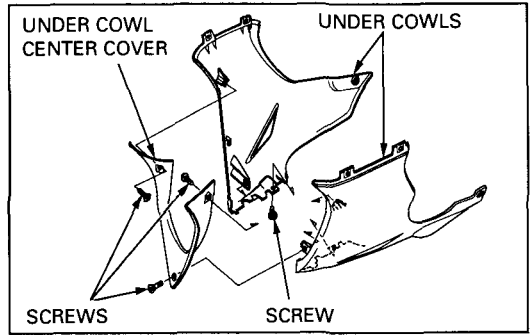
Hold the lower cowl securely and remove the six screws from the both sides.
 Remove the under cowls as an assembly.



FRAME/BODY PANELS/EXHAUST SYSTEM

Remove the three screws and under cowl center cover. Remove the screw and separate the right and left under cowls.

Installation is in the reverse order of removal.



MIDDLE COWL

REMOVAL/INSTALLATION

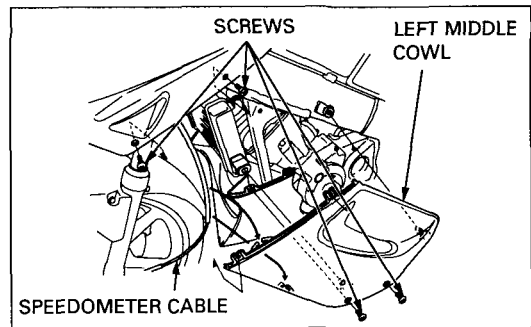
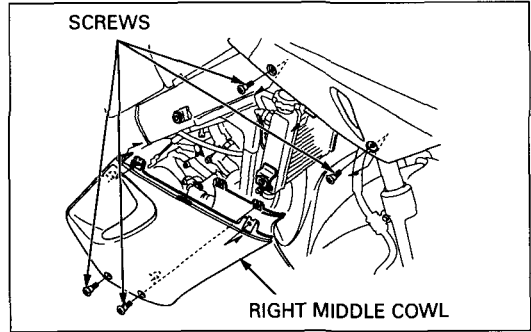
At first, remove the screws and then release the bosses of the middle cowl from the grommets of the frame and radiator.

Release the speedometer cable from the guide (left middle cowl only) and remove the middle cowl.

NOTE:

Do not damage the tabs of the upper cowl and speedometer cable guide of the left middle cowl.

Installation is in the reverse order of removal.

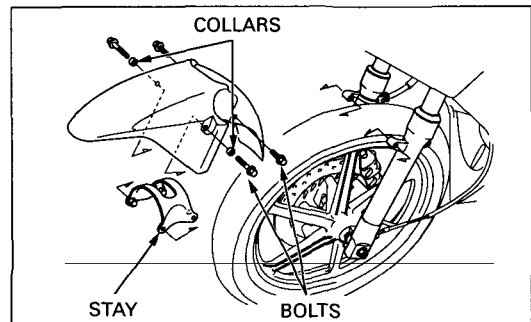


FRONT FENDER

REMOVAL/INSTALLATION

Remove the bolts, collars, front fender and stay.

Installation is in the reverse order of removal.

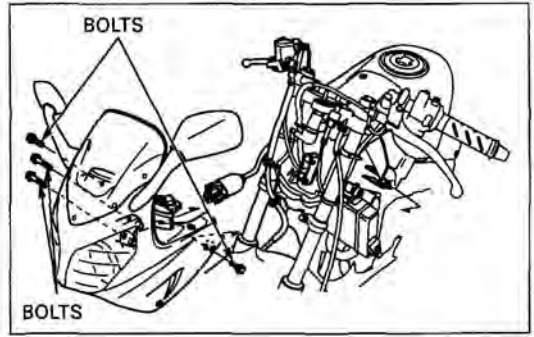


UPPER COWL

REMOVAL/INSTALLATION

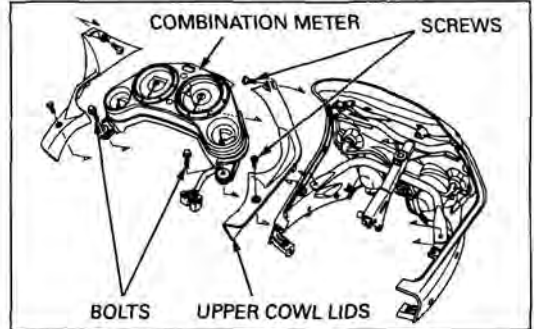
Remove the middle cowl (page 2-4).
Disconnect the combination meter 9P, headlight/turn signal light 6P and tachometer 2P connectors.

Remove the bolts and upper cowl as an assembly.



DISASSEMBLY/ASSEMBLY/INSTALLATION

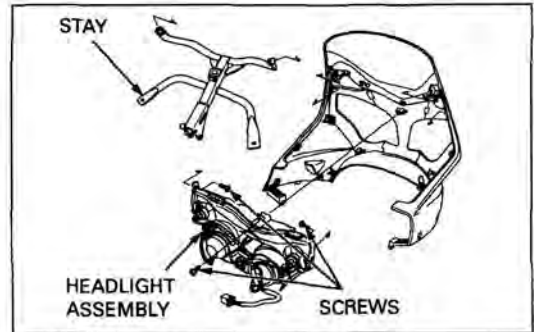
Remove the rear view mirrors.
Remove the screws and upper cowl lids.
Remove the two bolts and combination meter.



Remove the stay.
Remove the three screws and head light assembly.

Assembly is in the reverse order of removal.

Install the removed parts in the reverse order of removal.



EXHAUST SYSTEM

▲ WARNING

Do not service the exhaust system while it is hot.

REMOVAL

Remove the under cowl (page 2-3).

Remove the exhaust pipe joint nuts.



FRAME/BODY PANELS/EXHAUST SYSTEM

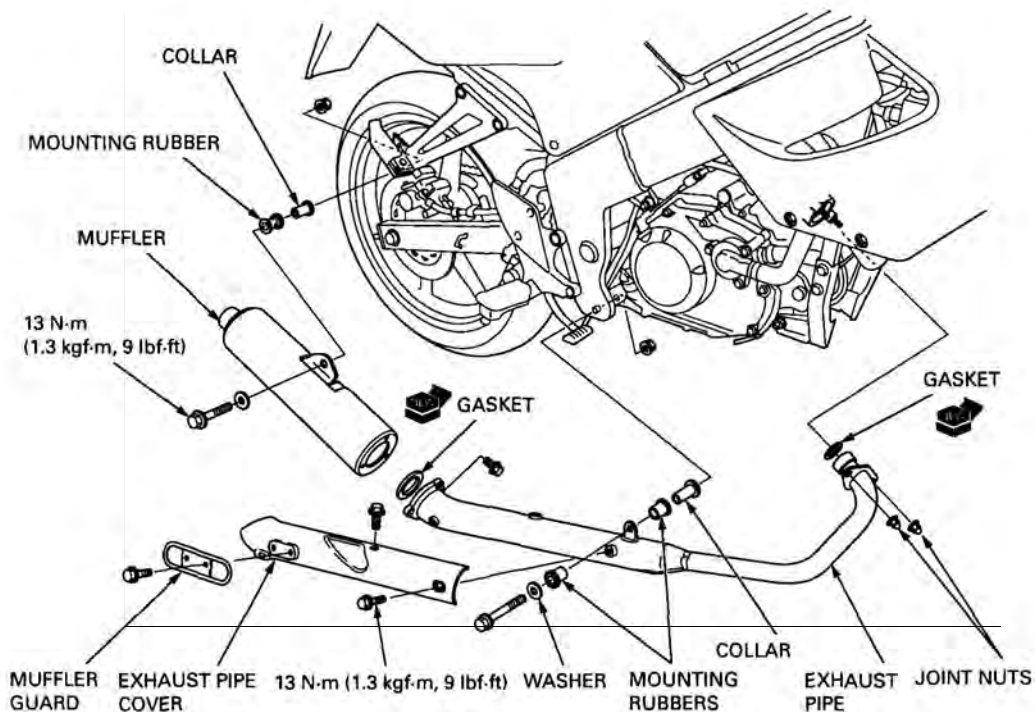
Remove the muffler mounting bolt, collar and mounting rubber.



Remove the exhaust pipe mounting bolt, nut, washer, collar and mounting rubbers.
Remove the muffler and exhaust pipe as assembly.
Remove the exhaust pipe gasket.



DISASSEMBLY/ASSEMBLY



INSTALLATION

Install the new gasket.
install the muffler and exhaust pipe assembly, then temporarily install the all mounting fasteners.

Tighten the exhaust pipe joint nuts.



Tighten the exhaust pipe mounting bolt.



Tighten the muffler mounting bolt to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)



3. MAINTENANCE

SERVICE INFORMATION	3-1	SECONDARY AIR SUPPLY SYSTEM	3-14
MAINTENANCE SCHEDULE	3-3	DRIVE CHAIN	3-15
FUEL LINE	3-4	BRAKE FLUID	3-17
THROTTLE OPERATION	3-4	BRAKE PAD WEAR	3-18
CARBURETOR CHOKE	3-5	BRAKE SYSTEM	3-18
AIR CLEANER	3-5	BRAKE LIGHT SWITCH	3-18
CRANKCASE BREATHER	3-6	HEADLIGHT AIM	3-19
SPARK PLUG	3-6	CLUTCH SYSTEM	3-19
VALVE CLEARANCE	3-8	SIDE STAND	3-20
ENGINE OIL	3-10	SUSPENSION	3-20
ENGINE OIL STRAINER SCREEN	3-12	NUTS, BOLTS, FASTENERS	3-21
ENGINE IDLE SPEED	3-12	WHEELS/TIRES	3-21
RADIATOR COOLANT	3-13	STEERING HEAD BEARINGS	3-22
COOLING SYSTEM	3-14		

SERVICE INFORMATION

GENERAL

▲ WARNING

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

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

SPECIFICATIONS

ITEM		SPECIFICATIONS	
Throttle grip free play		2 – 6 mm (1/12 – 1/4 in)	
Spark plug		NGK	DENSO
	Standard	CR8E	U24ESR-N
	Optional	CR9E	U27ESR-N
Spark plug gap		0.7 – 0.8 mm (0.028– 0.032 in)	

MAINTENANCE

ITEM		SPECIFICATIONS	
Engine oil capacity	At draining	1.0 liter (1.06 US qt, 0.88 Imp qt)	
	At disassembly	1.3 liter (1.37 US qt, 1.14 Imp qt)	
Recommended engine oil		Honda 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-30	
Engine idle speed		1,400 ± 100 min ⁻¹ (rpm)	
Valve clearance	IN	0.16 ± 0.03 mm (0.006 ± 0.001 in)	
	EX	0.25 ± 0.03 mm (0.010 ± 0.001 in)	
Drive chain slack		25 – 35 mm (1.0 – 1.4 in)	
Drive chain size/link		DID428VI3 – 124LE	
Brake fluid		DOT3 or DOT4	
Clutch lever free play		10 – 20 mm (3/8 – 13/16 in)	
Tire size	Front	80/90-17M/C 44P	
	Rear	100/80-17M/C 52P	
Tire air pressure	Driver only	Front	200 kPa (2.00 kg/cm ² , 29 psi)
		Rear	200 kPa (2.00 kg/cm ² , 29 psi)
	Driver and passenger	Front	200 kPa (2.00 kg/cm ² , 29 psi)
		Rear	225 kPa (2.25 kg/cm ² , 33 psi)
Minimum tire tread depth	Front	To the indicator	
	Rear	To the indicator	

TORQUE VALUES

Oil drain bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)
Spark plug	12 N·m (1.2 kgf·m, 9 lbf·ft)
Rear axle nut	59 N·m (6.0 kgf·m, 43 lbf·ft)
Crankshaft hole cap	7.9 N·m (0.8 kgf·m, 5.8 lbf·ft)
Timing hole cap	5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)
Drive sprocket fixing plate bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Driven sprocket nut	64 N·m (6.5 kgf·m, 47 lbf·ft) U-nut
Front master cylinder cover screw	1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)
Rear brake reservoir cover screw	1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)

MAINTENANCE SCHEDULE

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

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

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

ITEM	FREQUENCY	WHICHEVER COMES FIRST ↓	⇔ ODOMETER READING (NOTE 1)					REFER TO PAGE	
			X1,000 km	1	4	8	12		
			X1,000 mi	0.6	2.5	5	7.5		
			MONTH		6	12	18		
* FUEL LINE									3-4
* THROTTLE OPERATION									3-4
* CHOKE OPERATION									3-5
AIR CLEANER		NOTE 2			C	C	R		3-5
CRANKCASE BREATHER		NOTE 3			C	C	C		3-6
SPARK PLUG						R			3-6
* VALVE CLEARANCE					EVERY 24,000 km (16,000 mi): I				3-8
ENGINE OIL				R		R			3-10
** ENGINE OIL STRAINER SCREEN							C		3-12
* ENGINE IDLE SPEED									3-12
RADIATOR COOLANT		NOTE 4							3-13
* COOLING SYSTEM									3-14
* SECONDARY AIR SUPPLY SYSTEM		NOTE 5							3-14
DRIVE CHAIN				EVERY 1,000 km (600 mi): I, L					3-15
BRAKE FLUID		NOTE 4							3-17
BRAKE PADS WEAR									3-18
BRAKE SYSTEM									3-18
* BRAKE LIGHT SWITCH									3-18
* HEADLIGHT AIM									3-19
CLUTCH SYSTEM									3-19
SIDE STAND									3-20
* SUSPENSION									3-20
* NUTS, BOLTS, FASTENERS									3-21
** WHEELS/TIRES									3-21
** STEERING HEAD BEARINGS									3-22

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

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

NOTES: 1. For higher odometer readings, repeat at the frequency interval established here.

2. Service more frequently when riding in unusually wet or dusty areas.

3. Service more frequently when riding in rain at full throttle.

4. Replace every 2 years. Replacement requires mechanical skill.

5. Replace every 3 years or 24,000 km. Replacement requires mechanical skill.

MAINTENANCE

FUEL LINE

Remove the fuel tank (page 5-3).

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

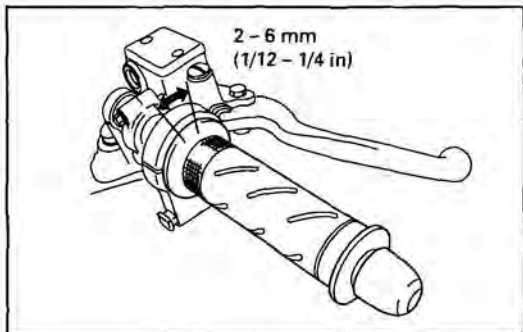


THROTTLE OPERATION

Check for smooth throttle grip full operating and automatic full closing in all steering positions.
Check the throttle cable and replace it if it is deteriorated, kinked or damaged.
Lubricate the throttle cable, if throttle operation is not smooth.

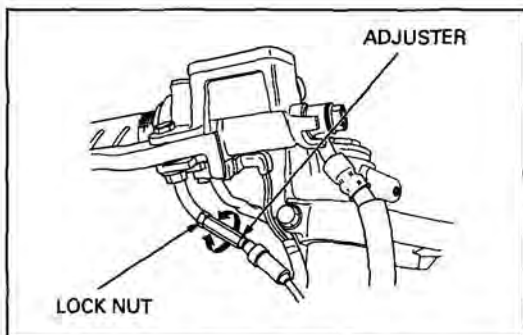
Measure the free play at the throttle grip flange.

FREE PLAY: 2 - 6 mm (1/12 - 1/4 in)



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

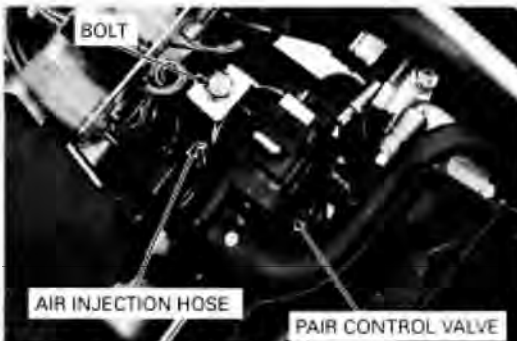
Minor adjustment are made with the upper adjuster.
Adjust the free play by loosening the lock nut and turning the adjuster.



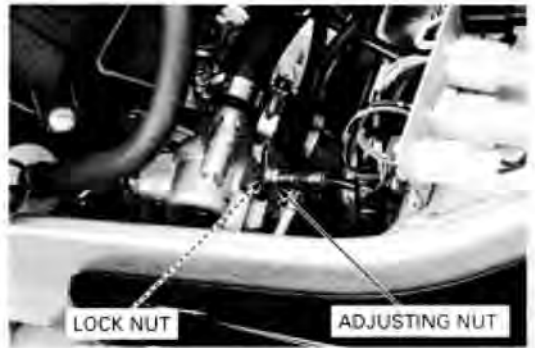
Major adjustments are made with the lower adjuster.

Remove the fuel tank (page 5-3).

Remove the bolt and PAIR control valve with tubes connected.
Disconnect the air injection hose from the cylinder head cover.



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



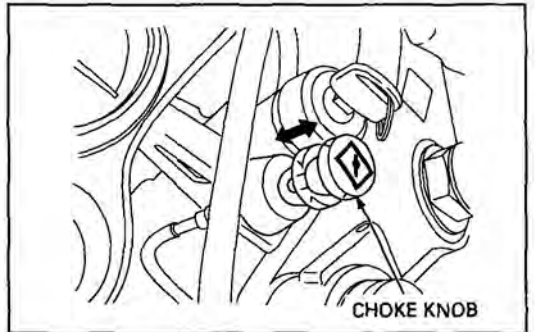
CARBURETOR CHOKE

This model's choke system uses a fuel enriching circuit controlled by a starting enrichment (SE) valve. The SE valve opens the enriching circuit via a cable when the choke knob on the fork top bridge is pulled.

Check for smooth choke knob operation and lubricate the choke cable if required.

Inspect the cable for cracks which could allow moisture to enter.

Replace the cable if necessary.



AIR CLEANER

Remove the fuel tank (page 5-3).

Remove the five screws and air cleaner housing cover.



Remove and clean the air cleaner element in accordance with the maintenance schedule.

Also replace the air cleaner element any time it is excessively dirty or damaged.



MAINTENANCE

If the surface of the element is dirty, remove the dust first by tapping the element gently. Then, blow away any remaining dust on the surface of the filter with compressed air from the inside toward outside.

Replace the element, if the surface of it is still dirty after cleaning.

Install the air cleaner element and removed parts in the reverse order of removal.

Tighten the air cleaner cover screws.

Install the fuel tank (page 5-3).



CRANKCASE BREATHER

Remove the cap from the crankcase breather tube and drain deposits into a suitable container. Install the cap to the tube securely.

NOTE:

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

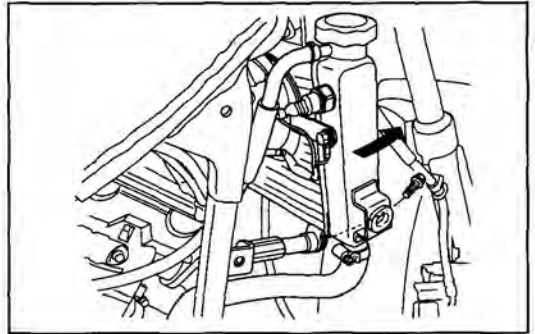


SPARK PLUG

REMOVAL

Remove the right middle cowl (page 2-4).

Remove the radiator lower mounting bolt and move the bottom of radiator forward.



Disconnect the spark plug cap.



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

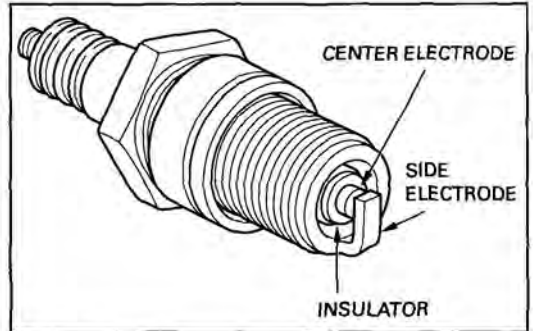
Inspect or replace as described in the maintenance schedule (page 3-3).



INSPECTION

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

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

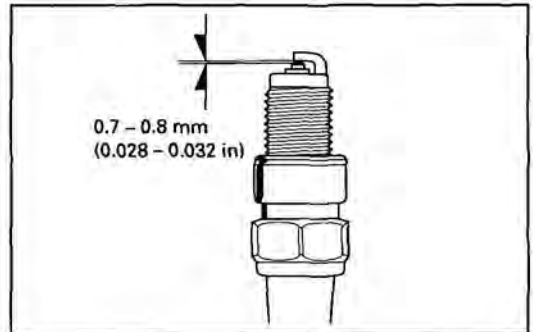


REUSING A SPARK PLUG

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

Check the gap between the center and side electrodes. If necessary, adjust the gap by bending the side electrode carefully.

SPARK PLUG GAP: 0.7 – 0.8 mm (0.028 – 0.032 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: 12 N·m (1.2 kgf·m, 9 lbf·ft)



MAINTENANCE

REPLACING A SPARK PLUG

CAUTION:

Do not overtighten the spark plug.

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

Connect the spark plug cap and install the removed parts in the reverse order of removal.



VALVE CLEARANCE

INSPECTION

NOTE:

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

Remove the cylinder head cover (page 10-4).

Remove the timing hole cap and crankshaft hole cap.



Rotate the crankshaft counterclockwise and align the index line of the "T" mark on the flywheel with the index notch on left crankcase cover.



The index lines on the cam sprockets must be flush with the cylinder head surface as shown.

Make sure the piston is at TDC (Top dead center) on the compression stroke.

If the index lines are not flush, rotate the crankshaft counterclockwise 360° (1 full turn) and align the index lines of the "T" mark with the index notch.



Measure the cylinder valve clearance by inserting a feeler gauge between the valve lifter and cam lobe.

VALVE CLEARANCE:

- IN: 0.16± 0.03 mm (0.006± 0.001 in)
- EX: 0.25± 0.03 mm (0.010± 0.001 in)



ADJUSTMENT

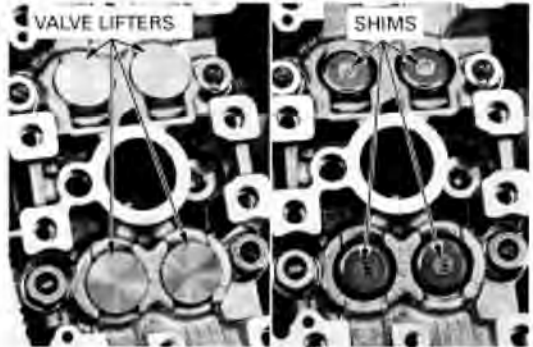
Remove the camshaft (page 10-5).

Remove the valve lifters and shims.

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

NOTE:

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



Measure the shim thickness and record it.

NOTE:

Sixty-nine different thickness shims are available from the thinnest (1.200 mm thickness) shim to the thickest (2.900 mm thickness) in intervals of 0.025 mm.

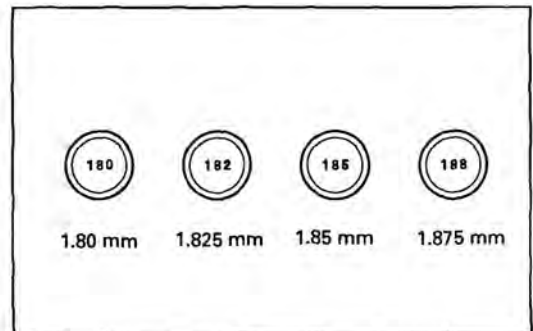
Calculate the new shim thickness using the equation below.

$$A = (B - C) + D$$

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

NOTE:

- Make sure of the correct shim thickness by measuring the shim with the micrometer.
- Reface the valve seat if carbon deposits result in a calculated dimension of over 2.900 mm.



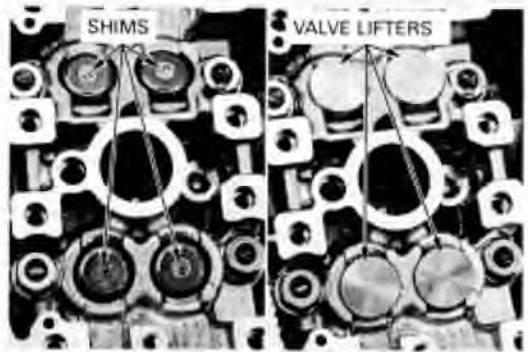
MAINTENANCE

Install the newly selected shims on the valve retainers.

Install the valve lifters and camshafts (page 10-19).

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

Install the cylinder head cover (page 10-22).



Coat a new O-ring with oil and install it onto the crankshaft hole cap.
Apply grease the crankshaft hole cap threads.
Install and tighten the crankshaft hole cap.

TORQUE: 7.9 N·m (0.8 kgf·m, 5.8 lbf·ft)

Coat a new O-ring with oil and install it onto the timing hole cap.
Apply grease the timing hole cap threads.
Install and tighten the timing hole cap.

TORQUE: 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)



ENGINE OIL

OIL LEVEL INSPECTION

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

Stop the engine, support the motorcycle upright on a level surface.
Wait for a few minutes.

Remove the oil filler cap/dipstick and wipe off the oil from the dipstick with a clean cloth.

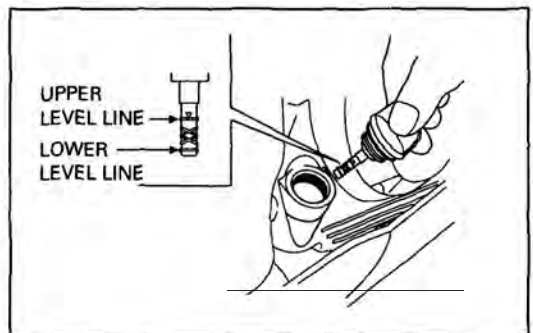
With the motorcycle upright on level ground, insert the oil filler cap/dipstick into the stick hole without screwing it in.

Remove the oil filler cap/dipstick and check the oil level.

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

RECOMMENDED ENGINE OIL:

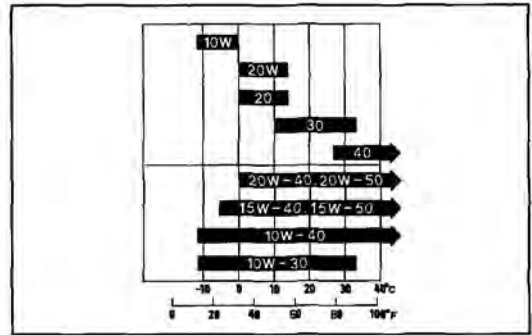
Honda 4-stroke oil or equivalent motor oil
API service classification: SE, SF or SG
Viscosity: 10W-30



NOTE:

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

Reinstall the oil filler cap/dipstick.



ENGINE OIL CHANGE

⚠ WARNING

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

Warm up the engine.

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



⚠ WARNING

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

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

TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Fill the crankcase with recommended engine oil.

OIL CAPACITY:

1.0 liter (1.06 US qt, 0.88 Imp qt) at draining

Install the oil filler cap/dipstick.

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



ENGINE OIL STRAINER SCREEN

Remove the right crankcase cover (page 8-3).

Remove the oil strainer screen and clean it.

Reinstall the oil strainer screen and right crankcase cover (page 8-14).

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



ENGINE IDLE SPEED

⚠ WARNING

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

NOTE:

- Inspect and adjust the idle speed after all other engine maintenance items have been performed and are within specifications.
- The engine must be warm for accurate idle speed inspection and adjustment. Ten minutes of stop-and-go riding is sufficient.

Warm up the engine for about ten minutes.

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

IDLE SPEED: $1,400 \pm 100 \text{ min}^{-1}$ (rpm)



RADIATOR COOLANT

LEVEL CHECK

▲ WARNING

- *Wait until the engine is cool before removing the radiator cap. Remove the cap while the engine is hot and coolant is under pressure may cause serious scalding.*
- *Radiator coolant is poisonous. Take care to avoid getting coolant in your eyes, on your skin, or on your clothes.*
- *If coolant gets in your eyes, flush repeatedly with water and contact a doctor immediately.*
- *If coolant is accidentally swallowed, induce vomiting and contact a doctor immediately.*
- **KEEP OUT REACH OF CHILDREN.**

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 driver seat (page 2-2), then 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).

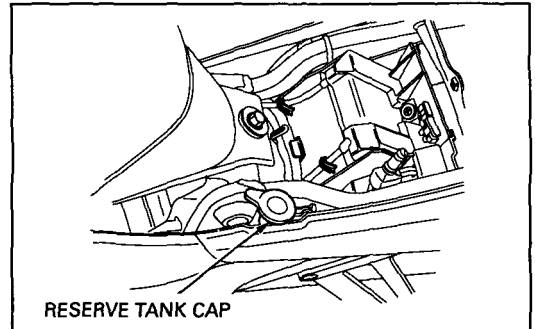
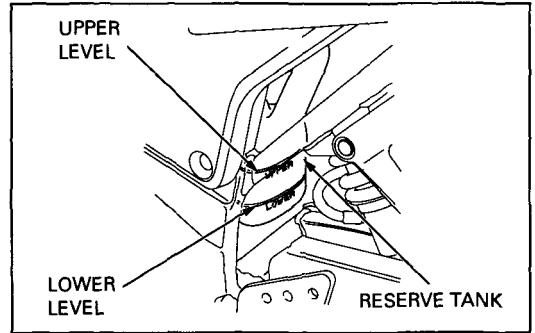
CAUTION:

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

Using tap water may cause engine damage.

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

If the reserve tank becomes completely empty, there is a possibility of air getting into the cooling system. Be sure to remove all air from the cooling system as described on page 6-5.



COOLING SYSTEM

▲ WARNING

To prevent injury, keep your hands and clothing away from the cooling fan. It may start automatically, without warning.

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 flows is restricted over more than 20% of the radiating surface.



For radiator replacement, refer to page 6-8.

Remove the right middle cowl (page 2-4).

Check for any coolant leakage from the water pump (page 6-12), 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.



Install the right middle cowl (page 2-4).

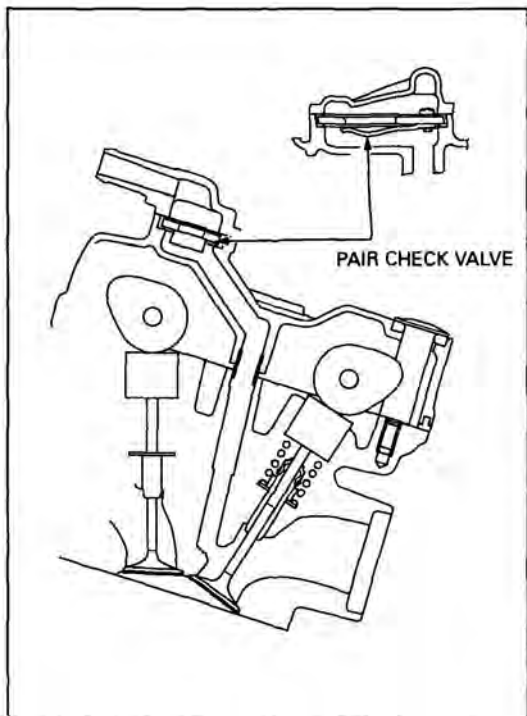
SECONDARY AIR SUPPLY SYSTEM

NOTE:

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

Remove the fuel tank (page 5-3).

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

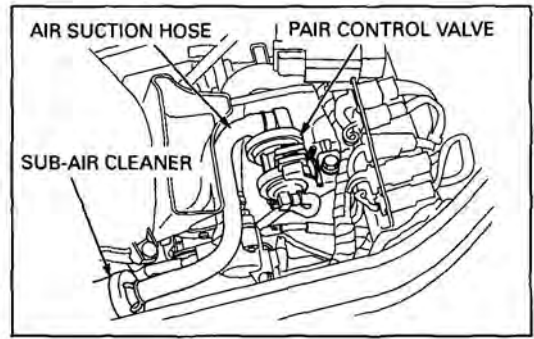


NOTE:

If the hoses show any signs of heat damage, inspect the PAIR check valves (page 5-17).

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

For PAIR control valve inspection, see page 5-15.



DRIVE CHAIN

DRIVE CHAIN SLACK INSPECTION

⚠ WARNING

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

Turn off the engine, place the motorcycle on its side stand and shift the transmission into neutral.

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

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



ADJUSTMENT

Loosen the rear axle nut.

Loosen both lock nuts and turn both adjusting nuts until the correct drive chain slack is obtained.

Make sure the index lines on the both adjusters are aligned with the rear edges of the axle slots in the swingarm.

Tighten both lock nuts.

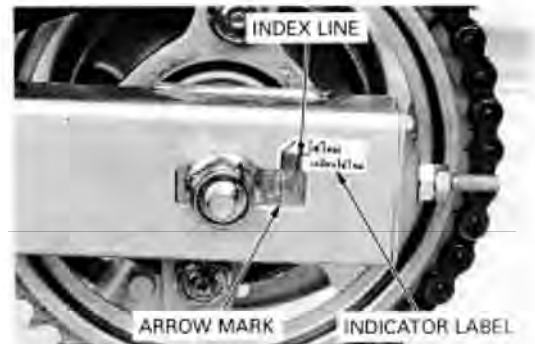
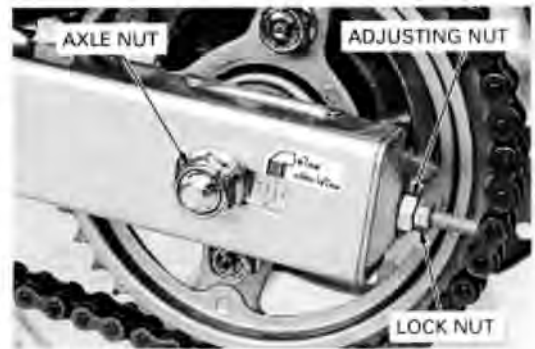
Tighten the rear axle nut to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

Recheck the drive chain slack and free wheel rotation.

Check the drive chain wear indicator label.

If the arrow mark of the chain adjuster reaches the red zone on the label, replace the drive chain with a new one (page 3-17).



MAINTENANCE

CLEANING AND LUBRICATION

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

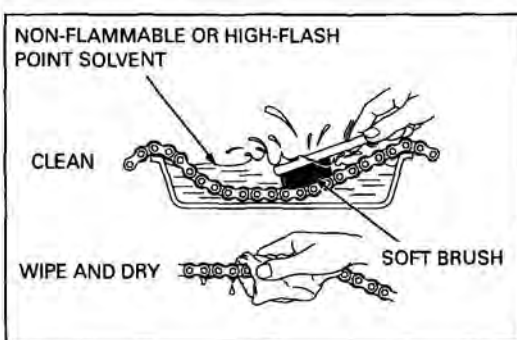
Be sure the chain has dried completely before lubricating.

Inspect the drive chain for possible damage or wear.

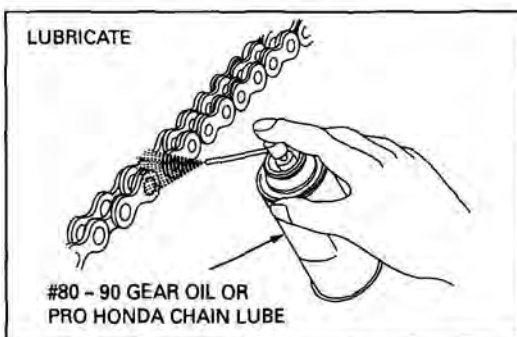
Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable.

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

Inspect and replace sprocket as necessary.



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

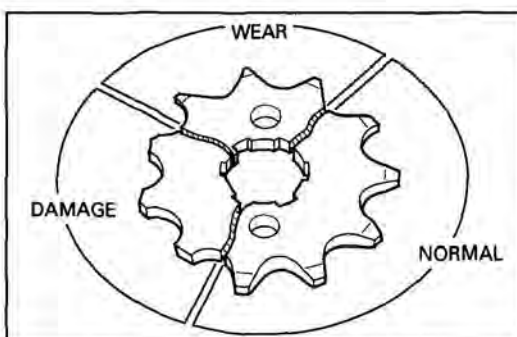


SPROCKETS INSPECTION

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

Never use a new drive chain on worn sprockets.

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



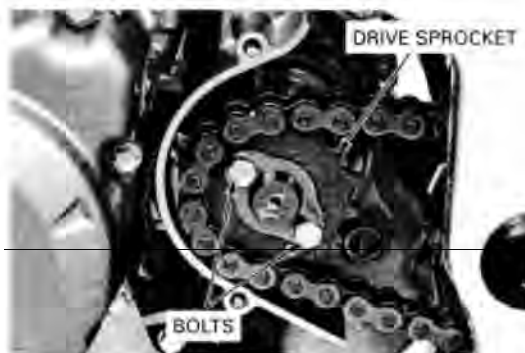
Check the attaching bolts and nuts on the drive and driven sprockets.

If any are loose, torque them.

TORQUE:

Drive sprocket fixing plate bolt : 10 N·m (1.0 kgf·m, 7 lbf·ft)

Driven sprocket nut : 64 N·m (6.5 kgf·m, 47 lbf·ft)



REPLACEMENT

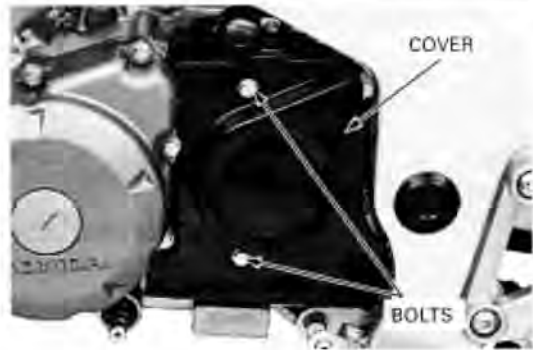
Remove the swingarm (page 15-10).

Remove the two bolts and drive sprocket cover.
Remove the drive chain.
Install the new drive chain.

REPLACEMENT CHAIN: DID428VI3-124LE

Install the drive sprocket cover and tighten the bolts.

Install the swingarm (page 15-13).



BRAKE FLUID

CAUTION:

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

NOTE:

When the fluid level is low, check the brake pads for wear (page 3-20). A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper pistons are 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 3-20).



FRONT BRAKE

Turn the handlebar to the left side so that the reservoir is level and check the fluid through the sight glass. If the level is near the lower level mark, remove the screws, cover, set plate and diaphragm, and fill the reservoir with DOT 3 or 4 brake fluid from a sealed container to the upper level.

Install the diaphragm, set plate and cover and tighten the screws.

TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)



REAR BRAKE

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

Check the fluid level in the rear brake reservoir. If the level is near the lower level line, remove the bolt and reservoir with the brake hose connected. Remove the screws, cover, set plate and diaphragm and fill the reservoir with DOT 3 or 4 brake fluid from a sealed container to the upper level line.

Install the diaphragm, set plate, cover and tighten the screws to the specified torque.

TORQUE: 1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)



Install the reservoir tank onto the stay and tighten the bolt.

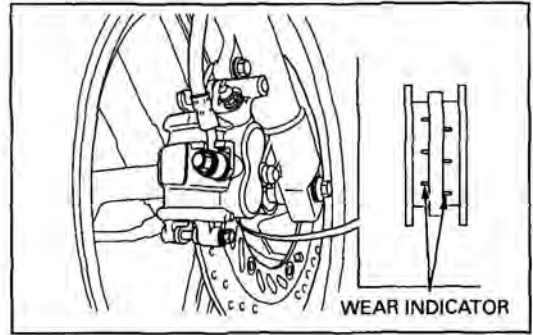
MAINTENANCE

BRAKE PAD WEAR

FRONT BRAKE PAD

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

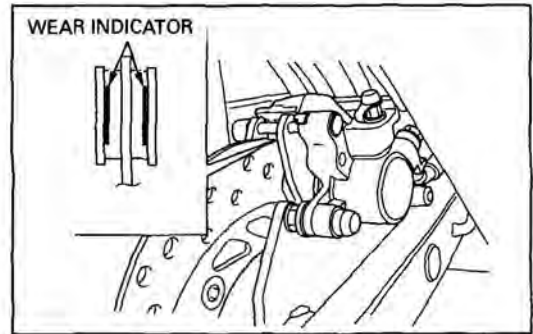
Refer to page 16-5 for front brake pad replacement.



REAR BRAKE PAD

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

Refer to page 16-6 for rear brake pad replacement.



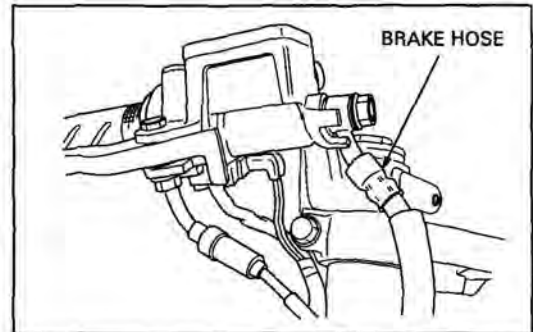
BRAKE SYSTEM

INSPECTION

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

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

Refer to page 16-3 for brake bleeding procedures.



BRAKE LIGHT SWITCH

NOTE:

The front brake light switch does not require adjustment.

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



HEADLIGHT AIM

⚠ WARNING

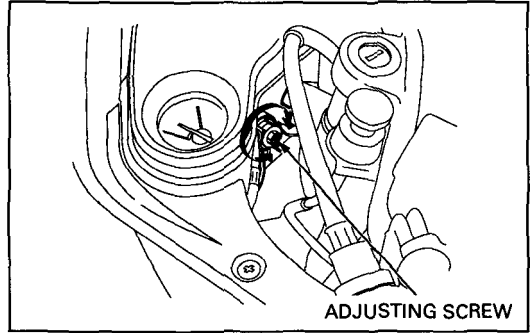
An improperly adjusted headlight may blind on-coming drivers, or it may fall to light the road for a safe distance.

NOTE:

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

Place the motorcycle on a level ground.

Adjust the headlight beam vertically by loosening the screw and move the headlight unit.

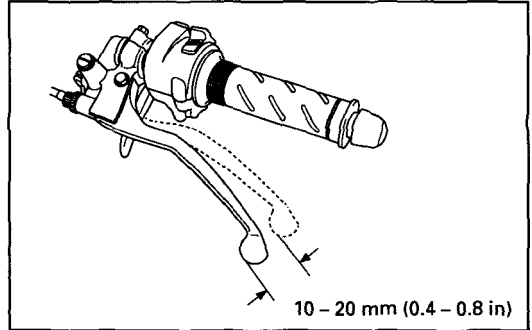


CLUTCH SYSTEM

Check the cable and clutch lever for loose connections, excessive play, or other damage. Replace or repair if necessary. Inspect the clutch cable for kinks or damage, and lubricate the cable.

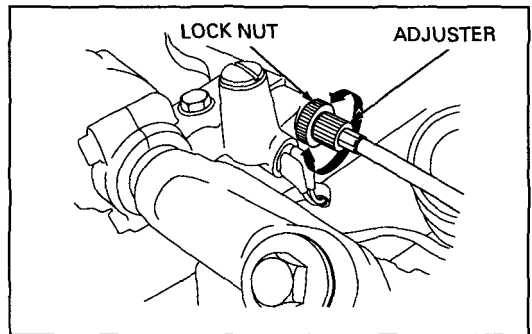
Measure the free play at the tip of the clutch lever.

FREE PLAY: 10 – 20 mm (3/8 – 13/16 in)



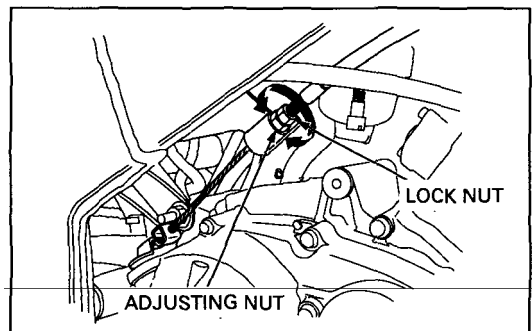
Adjust as follows:

Minor adjustment can be done with the upper adjuster. Loosen the lock nut and turn the adjuster. After adjustment, tighten the lock nut.



Major adjustment are made with the lower adjusting nut. If the major adjustment is required, turn the upper adjuster all the way in and back out 1 turn. Loosen the lock nut and adjusting nut and turn the adjusting nut to adjust free play. Tighten the upper and lower lock nuts. Check the clutch operation.

If the free play cannot be obtained, or the clutch slips during test ride, disassemble and inspect the clutch (section 8).



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.



SUSPENSION

▲ WARNING

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

FRONT SUSPENSION INSPECTION

Check the action of the forks by operating the front brake and compressing the front suspension several times. Check the entire assembly for signs of leaks, damage or loose fasteners. Replace damaged components which cannot be repaired. Tighten all nuts and bolts. Refer to section 14 for fork service.



REAR SUSPENSION INSPECTION

Check the action of the rear shock absorber by compressing the rear end several times. Check the entire shock absorber assembly for leaks or damage. Tighten all nut and bolts.



Support the motorcycle securely and raise the rear wheel off the ground. Check for worn swingarm bushings by grabbing the rear wheel and attempting to move the wheel side to side. Replace the swingarm if any looseness is noted.



Check for worn wheel bearing by grabbing the rear wheel, and attempting to move the wheel side to side.
 Replace the bearings if any looseness is noted (page 15-6).



NUTS, BOLTS, FASTENERS

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

WHEELS/TIRES

NOTE:

Tire pressure should be checked when the tires are **COLD**.

RECOMMENDED TIRE PRESSURE AND TIRE SIZE:

Driver only:

Front: 200 kpa (2.00 kgf/cm², 29 psi)

Rear: 200 kpa (2.00 kgf/cm², 29 psi)

Driver and passenger:

Front: 200 kpa (2.00 kgf/cm², 29 psi)

Rear: 225 kpa (2.25 kgf/cm², 33 psi)

Check the tires for cuts, embedded nails, or other damage.
 Check the front and rear wheels for trueness (refer to section 14 and 15).

Check the tread depth.

Replace the tires when the tread depth reaches the following limits.

MINIMUM TREAD DEPTH: To the indicator



STEERING HEAD BEARINGS

NOTE:

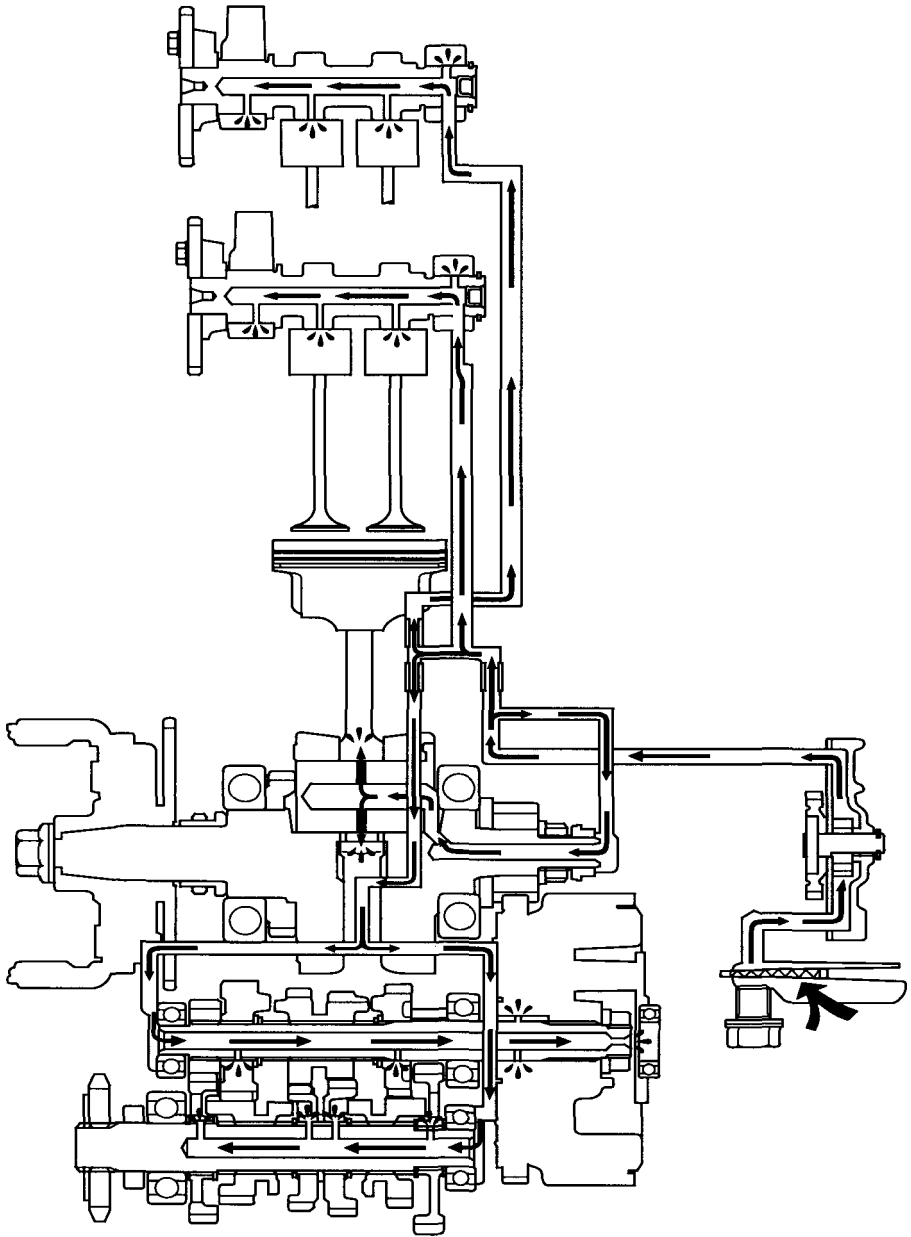
Check that the control cables do not interfere with handlebar rotation.

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

Check that the handlebar moves freely from side to side. If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (Section 14).



LUBRICATION SYSTEM DIAGRAM



4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM	4-0	TROUBLESHOOTING	4-1
SERVICE INFORMATION	4-1	OIL PUMP	4-2

SERVICE INFORMATION

GENERAL

▲ WARNING

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

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

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	1.0 liter (1.06 US qt, 0.88 Imp qt)	—
	At disassembly	1.3 liter (1.37 US qt, 1.14 Imp qt)	—
Recommended engine oil		Honda 4-stroke oil or equivalent <i>motor oil</i> API service classification SE, SF or SG Viscosity: SAE 10W-30	—
Oil pump rotor	Tip clearance	—	0.20 (0.008)
	Body clearance	0.150 – 0.210 (0.0059 – 0.0083)	0.26 (0.010)
	Side clearance	0.050 – 0.100 (0.0020 – 0.0040)	0.15 (0.006)

TORQUE VALUES

Oil pump bolt 5.2 N·m (0.53 kgf·m, 3.8 lbf·ft)

TROUBLESHOOTING

Engine oil level too low

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

Oil contamination

- External oil leak
- Worn piston ring or incorrect piston ring installation
- Worn valve guide or seal
- Clogged oil strainer screen

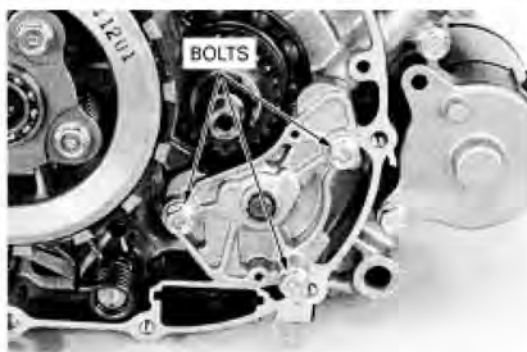
OIL PUMP

REMOVAL

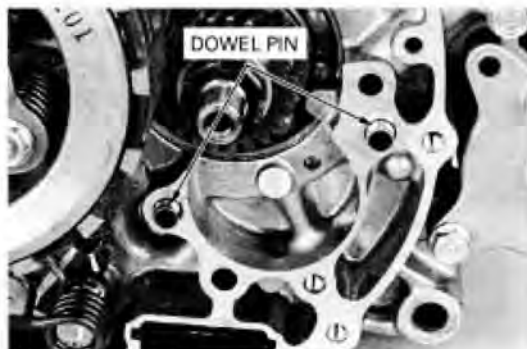
Drain the engine oil (page 3-11).

Remove the right crankcase cover (page 8-3)

Remove the three bolts and oil pump assembly.



Remove the dowel pins.

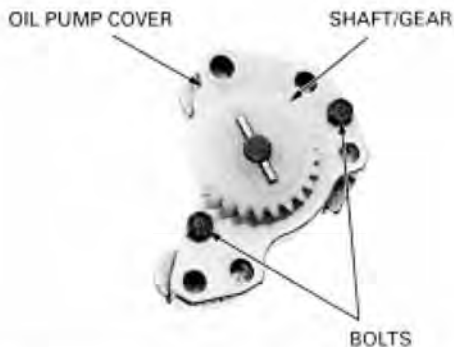


DISASSEMBLY

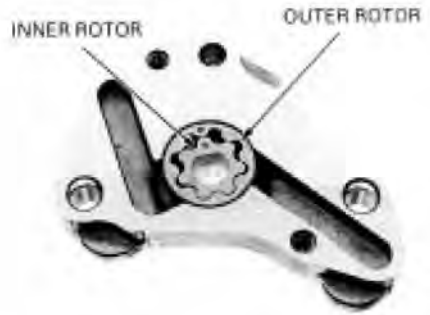
Remove the E-clip.



Remove the oil pump shaft and gear.
Remove the two bolts and oil pump cover.



Remove the inner and outer rotors.



INSPECTION

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

Measure the tip clearance between the inner and outer rotors.

SERVICE LIMIT: 0.20 mm (0.008 in)



Measure the body clearance between the outer rotor and pump body.

SERVICE LIMIT: 0.26 mm (0.010 in)

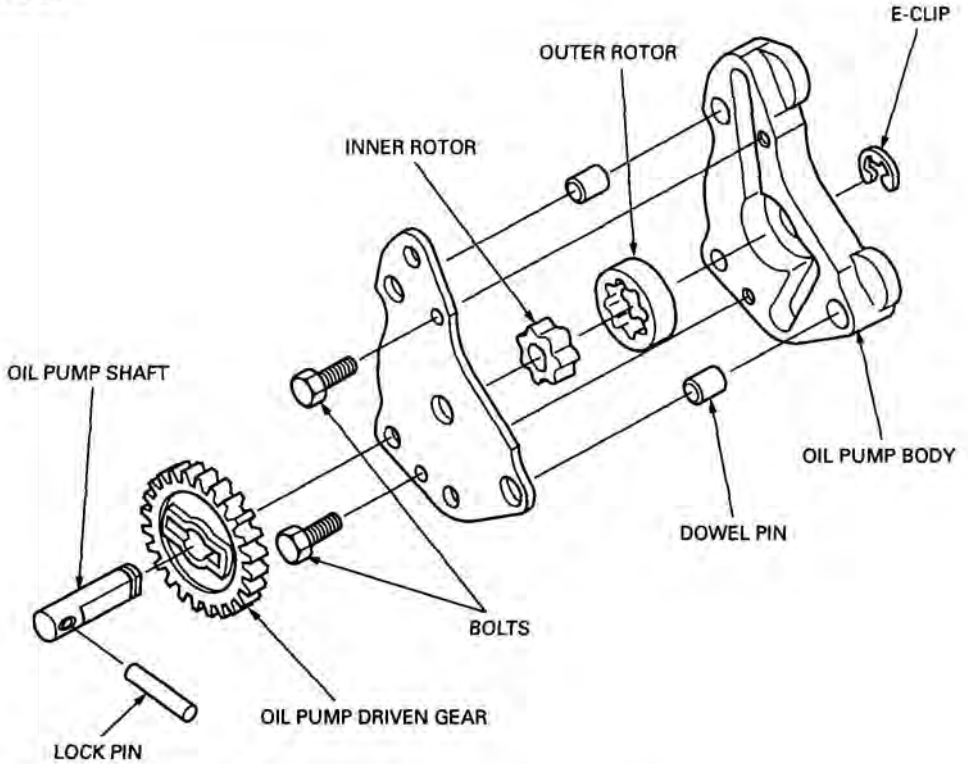


Measure the side clearance using a straight edge and feeler gauge.

SERVICE LIMIT: 0.15 mm (0.006 in)



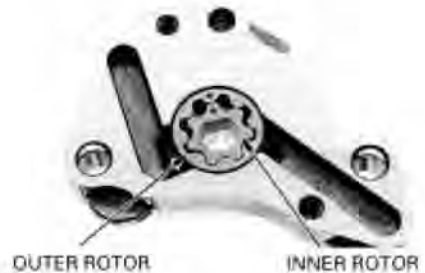
ASSEMBLY



Install the oil pump shaft lock pin into the oil pump shaft.
Install the oil pump shaft into the oil pump driven gear.

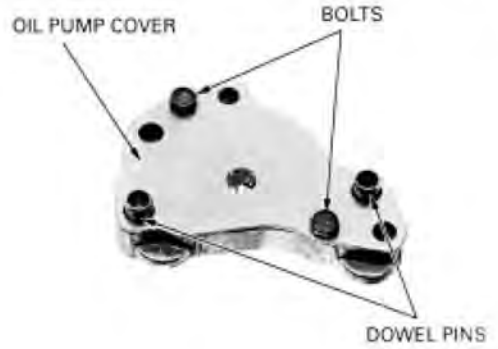


Install the outer rotor and inner rotor.
Fill the oil pump with engine oil.

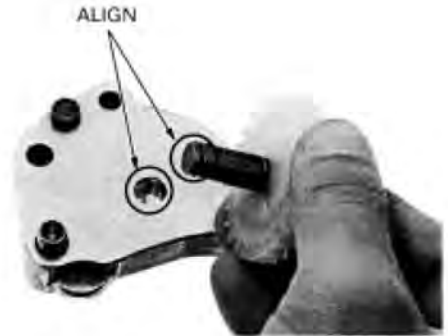


Install the oil pump cover onto the oil pump body.
Temporarily install the dowel pins and tighten the two bolts to the specified torque.

TORQUE: 5.2 N·m (0.53 kgf·m, 3.8 lbf·ft)



Install the oil pump shaft into the oil pump body aligning the flats between the shaft and inner rotor.

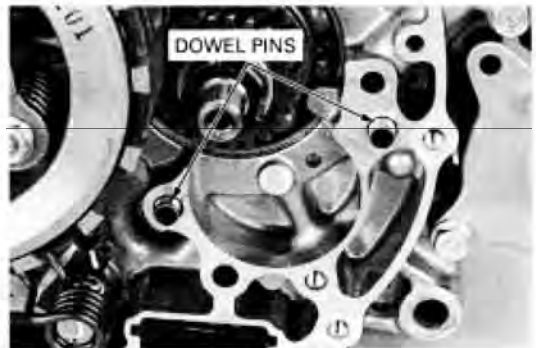


Secure the oil pump shaft with E-clip.



INSTALLATION

Install the dowel pins.



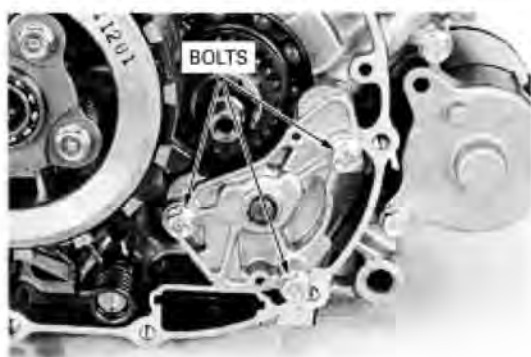
LUBRICATION SYSTEM

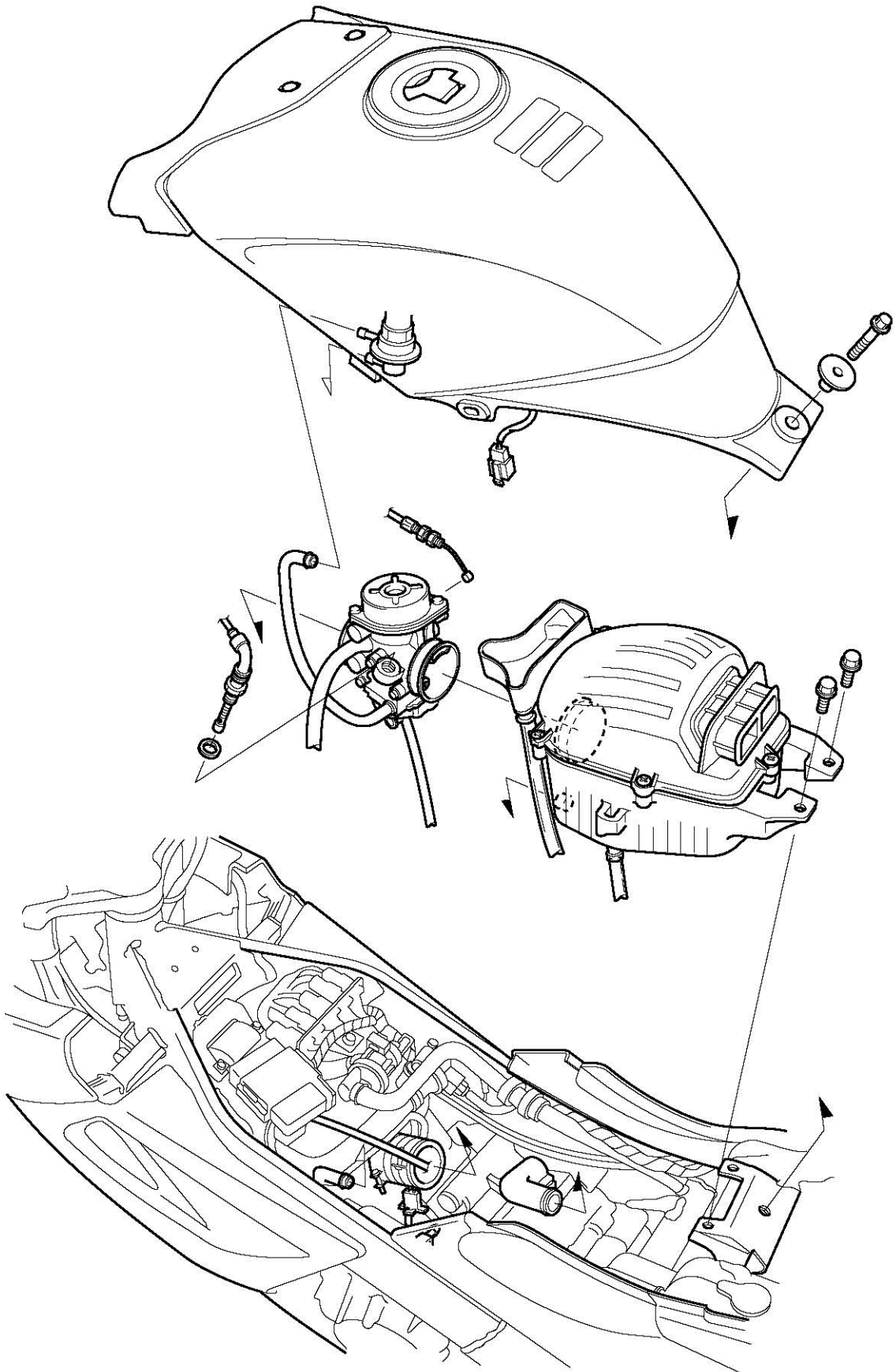
Install and tighten the three bolts securely.

Clean the oil strainer screen (page 3-12).

Install the right crankcase cover (page 8-14)

After installation, fill the crankcase with recommended oil (page 3-10) and check that there are no oil leaks.





SERVICE INFORMATION	5-1	CARBURETOR DISASSEMBLY	5-6
TROUBLESHOOTING	5-2	CARBURETOR ASSEMBLY	5-9
FUEL TANK	5-3	CARBURETOR INSTALLATION	5-13
AIR CLEANER HOUSING	5-4	PILOT SCREW ADJUSTMENT	5-14
SUB-AIR CLEANER	5-4	SECONDARY AIR SUPPLY SYSTEM	5-15
CARBURETOR REMOVAL	5-4		

SERVICE INFORMATION

GENERAL

▲ WARNING

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

- 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.*
- *Do not remove the sub-air cleaner tube joint except the replacement.*

- Before disassembling the carburetor, place an approved fuel container under the float chamber, loosen the drain screw and drain the carburetor.
- After removing the carburetor, cover the intake port of the cylinder head with shop towel to prevent any foreign material from dropping into the engine.
- When disassembling the fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- The float chamber can be serviced with the carburetors combined.

SPECIFICATIONS

ITEM	SPECIFICATIONS
Carburetor identification number	VK6AA
Main jet	#115
Slow jet	#35
Pilot screw opening	See page 5-14
Float level	13 mm (0.5 in)
Idle speed	1,400 ± 100 min ⁻¹ (rpm)
Throttle grip free play	2 – 6 mm (1/12 – 1/4 in)

TORQUE VALUES

Reed valve cover bolt 5.2 N·m (0.53 kgf·m, 3.8 lbf·ft)

TOOL

Float level gauge 07401 – 0010000

TROUBLESHOOTING

Engine cranks but won't start

- No fuel in tank
- No fuel to carburetor
 - Clogged fuel strainer
 - Clogged fuel line
- Too much fuel getting to the engine
 - Clogged air cleaner
 - Flooded carburetor
- Intake air leak
- Contaminated/deteriorated fuel
- Improper choke operation
- Improper throttle operation
- No spark at plug (faulty ignition system-section 18)

Lean mixture

- Clogged fuel jets
- Faulty float valve
- Float level too low
- Restricted fuel line
- Clogged carburetor air vent tube
- Intake air leak
- Faulty vacuum piston

Rich mixture

- Starting enrichment valve open
- Clogged air jets
- Faulty float valve
- Float level too high
- Dirty air cleaner
- Faulty vacuum piston

Engine stalls, hard to start, rough idling

- Restricted fuel line
- Fuel mixture too lean/rich
- Contaminated/deteriorated fuel
- Intake air leak
- Misadjusted idle speed
- Misadjusted pilot screw
- Clogged air cleaner
- Clogged slow circuit
- Starting enrichment valve open
- Faulty ignition system (section 18)

Afterburn when engine braking is used

- Lean mixture in slow circuit
- Faulty ignition system (section 18)

Backfiring or misfiring during acceleration

- Lean mixture
- Faulty ignition system (section 18)

Poor performance (driveability) and poor fuel economy

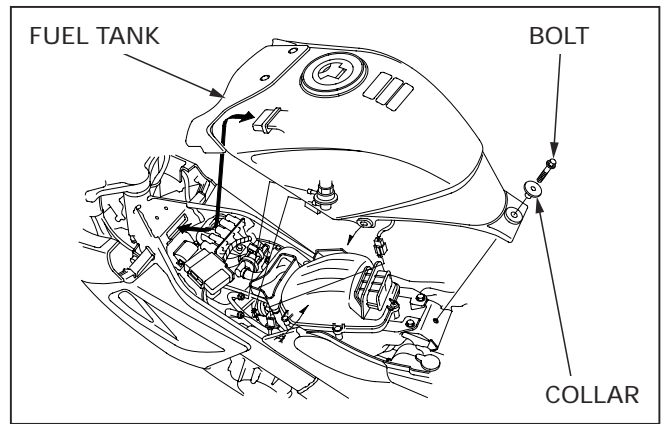
- Clogged fuel system
- Faulty ignition system (section 18)

FUEL TANK

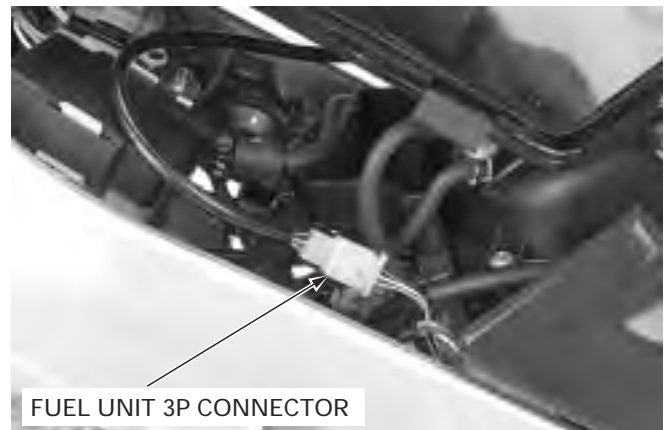
REMOVAL/INSTALLATION

Remove the driver seat (page 2-2).

Remove the bolt and collar.
 Raise the rear of fuel tank while releasing the bosses of the rear cowl from the grommets of the fuel tank.
 Pull the fuel tank backward and support it.

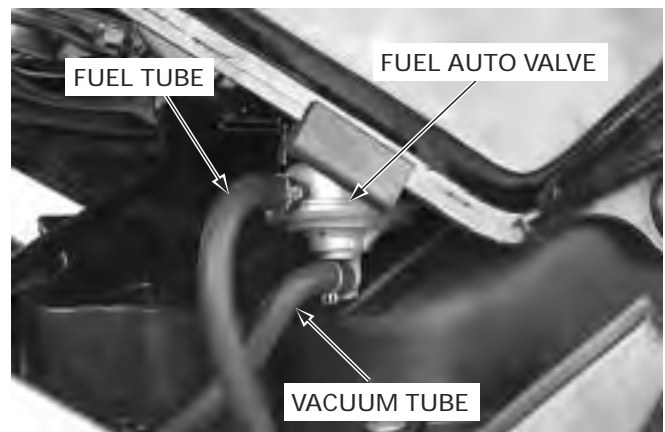


Disconnect the fuel unit 3P connector.



Disconnect the fuel and vacuum tube from the fuel auto valve.

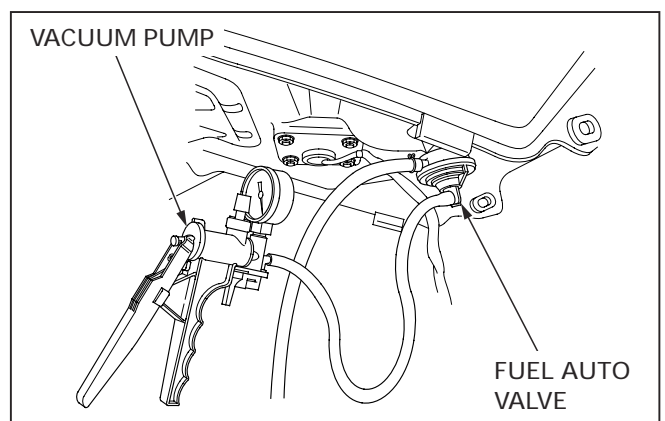
Installation is in the reverse order of removal.



FUEL AUTO VALVE INSPECTION

Remove the fuel tank (See above).

Connect a commercially available vacuum pump to the diaphragm vacuum outlet.
 Fuel should flow out from the fuel tube when vacuum is applied.
 If fuel flow is restricted, replace the fuel auto valve.



AIR CLEANER HOUSING

REMOVAL/INSTALLATION

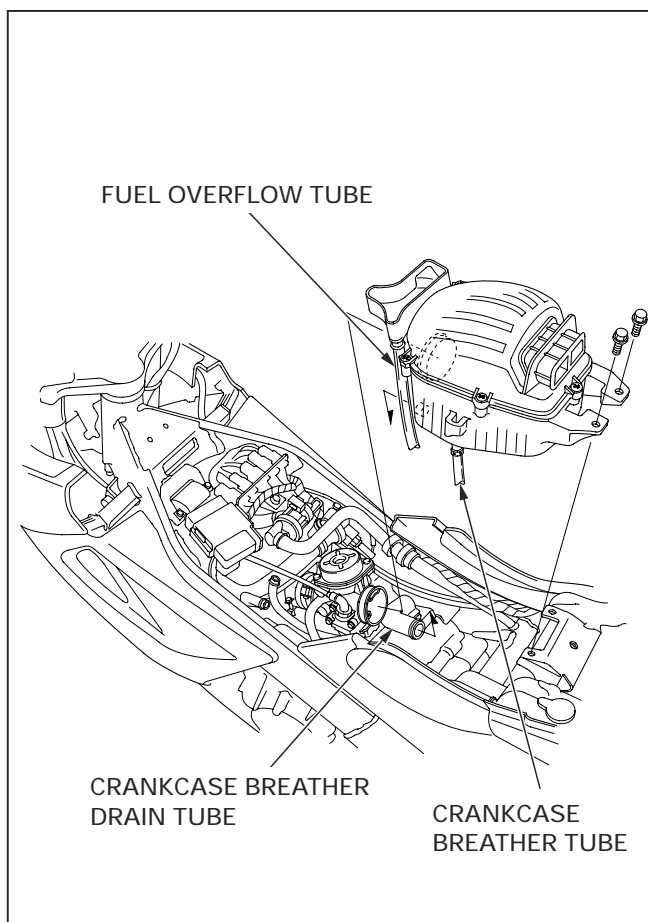
Remove the fuel tank (page 5-3).

Disconnect the crankcase breather, crankcase breather drain and fuel overflow tubes.

Loosen the carburetor connecting tube band screw and disconnect the connecting tube from the carburetor.

Remove the air cleaner mounting bolts and air cleaner housing.

Installation is in the reverse order of removal.



SUB-AIR CLEANER

REMOVAL/INSTALLATION

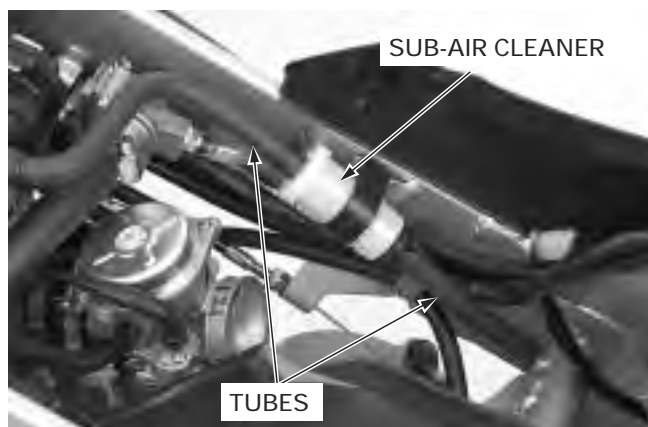
Remove the following:

- fuel tank (page 5-3)
- air cleaner housing (See above)

Disconnect the tubes.

Remove the sub-air cleaner from the frame.

Check the element and replace if necessary.



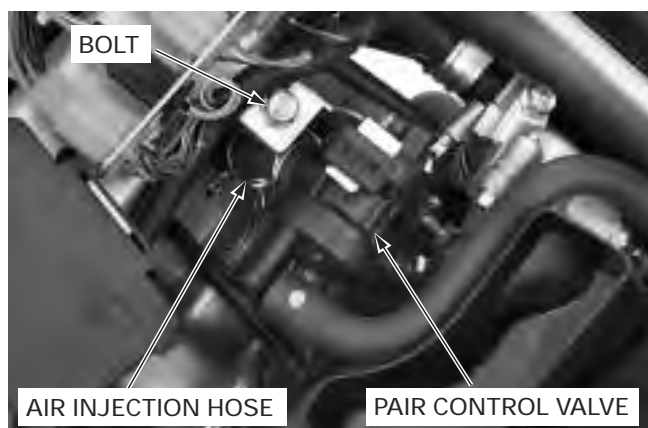
CARBURETOR REMOVAL

Remove the following:

- fuel tank (page 5-3)
- air cleaner housing (See above)

Remove the mounting bolt and PAIR control valve with the tubes connected.

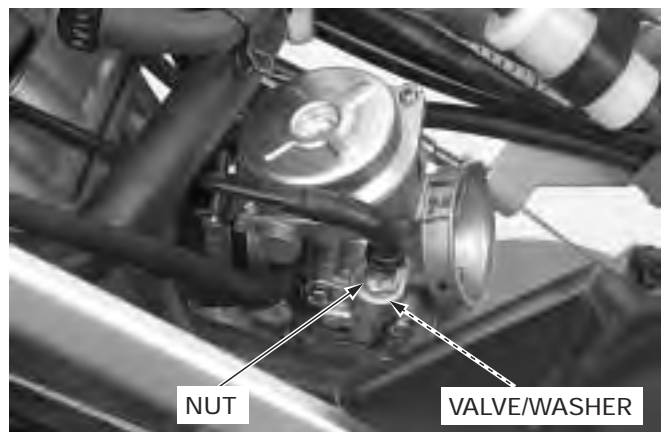
Disconnect the air injection hose from the cylinder head cover.



Loosen the throttle cable adjusting nut and disconnect the throttle cable end from the throttle drum.



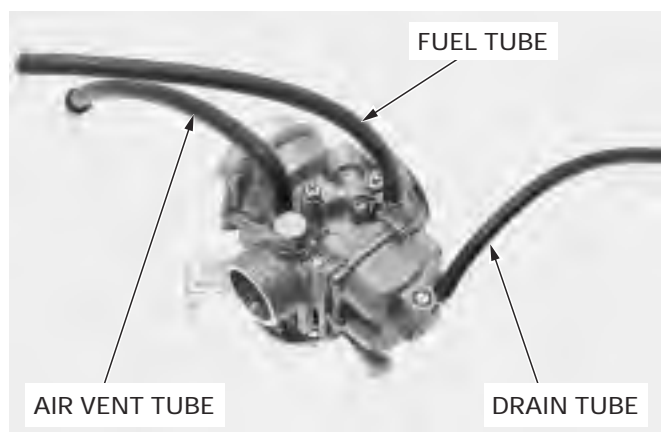
Loosen the nut and remove the starting enrichment (SE) valve and washer from the carburetor body.



Loosen the insulator band screw. Remove the carburetor.



Disconnect the fuel, air vent and drain tubes.



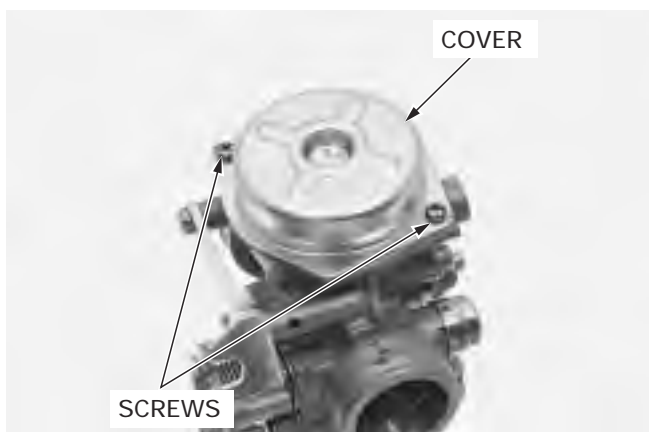
CARBURETOR DISASSEMBLY

VACUUM CHAMBER

Remove the two screws and vacuum chamber cover.

NOTE:

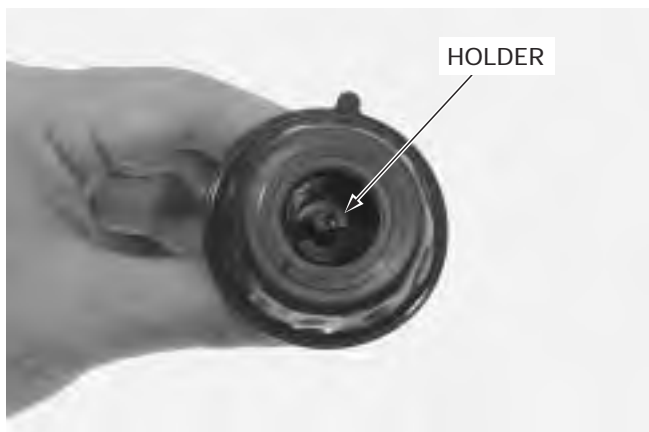
As the compression spring is very long, it will jump out of the carburetor when the cover is removed.



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



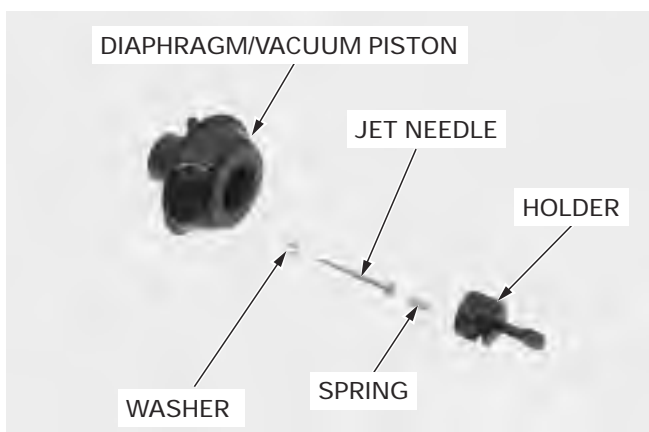
Remove the needle holder.
Remove the spring, jet needle and washer from the vacuum piston.



Check the following:
— jet needle for stepped wear
— vacuum piston for wear or damage
— diaphragm for pin holes, deterioration or damage

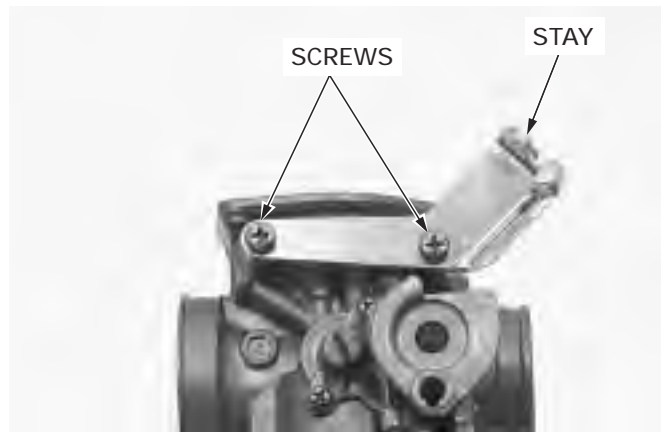
NOTE:

Air can leak out of the vacuum chamber if the diaphragm is damaged in any way, even if only a pin hole.



Throttle cable stay

Remove the two screws and throttle cable stay.



Air cut-off valve

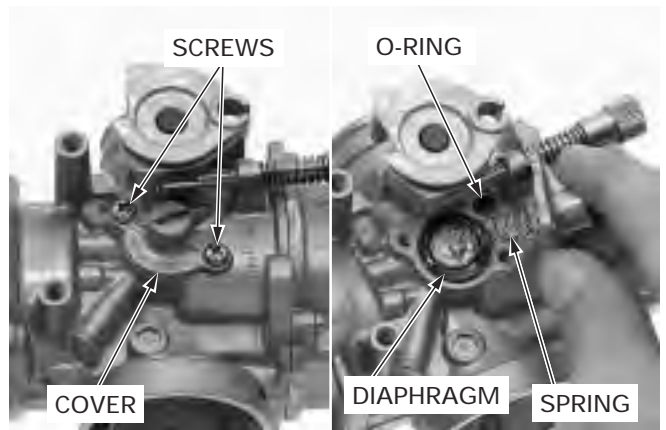
Remove the two screws.
Remove the valve cover, spring, O-ring and diaphragm.

NOTE:

The air cut-off valve cover is under spring pressure.

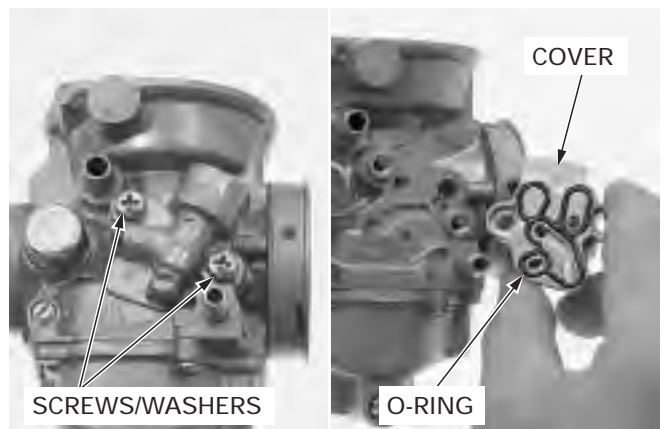
Check the following:

- diaphragm for pin holes, deterioration or damage
- spring for deterioration
- needle of diaphragm for wear
- air passages for clogging



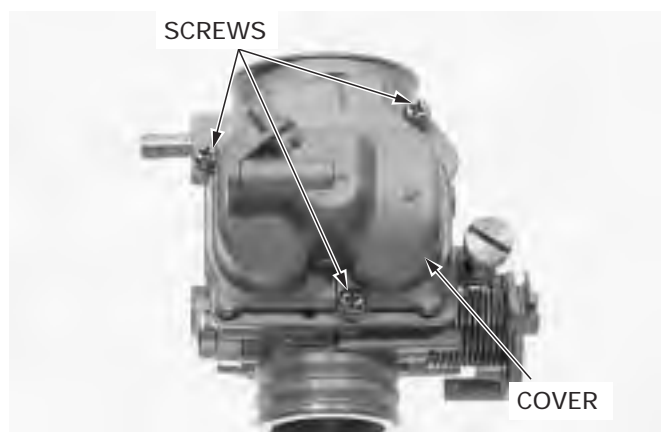
Starting enrichment (SE) valve cover

Remove the two screws/washers.
Remove the valve cover and O-ring.



FLOAT CHAMBER

Remove the three screws and float chamber cover.



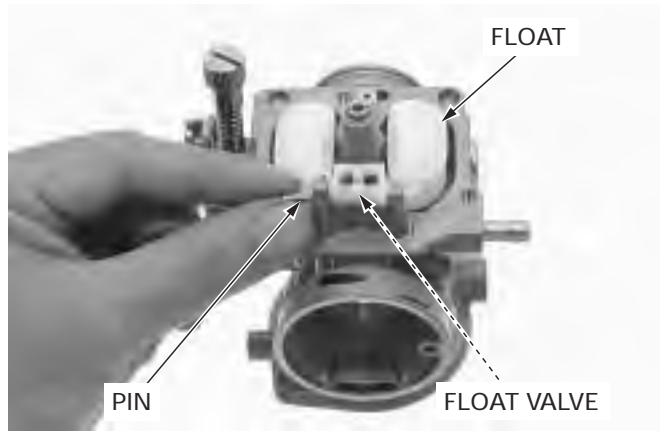
FUEL SYSTEM

Remove the float pin, float and float valve.

Check the float for damage or fuel in the float.

Check the following:

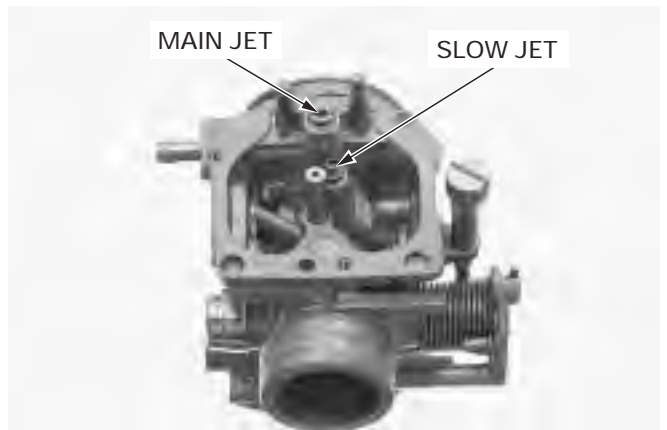
- valve and valve seat for scoring, scratches, clogging or damage.
- tip of the float valve, where it contacts the valve seat, for stepped wear or contamination.
- operation of the float valve.



Remove the main jet, needle jet and slow jet.

CAUTION:

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

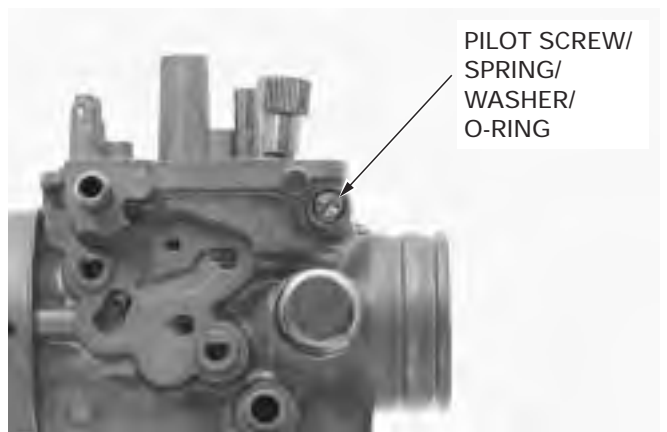


Turn the pilot screw in and carefully count the number of turns until it seats lightly. Make a note of this to use as a reference when reinstalling the pilot screw.

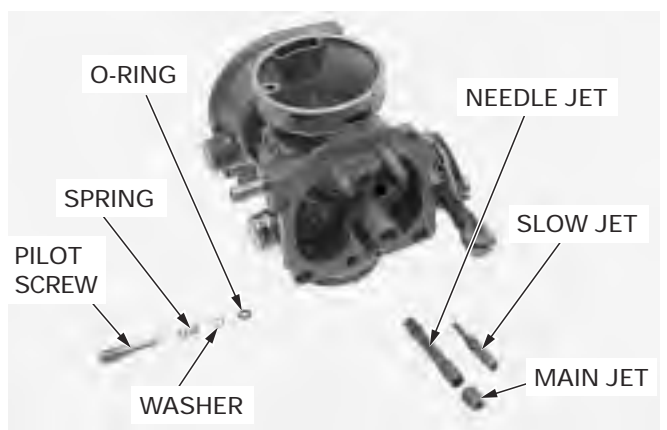
CAUTION:

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

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



Check each jet for wear or damage.
Check the pilot screw for wear or damage.



CARBURETOR CLEANING

Remove the following:

- diaphragm/vacuum piston
- main jet, needle jet and slow jet
- pilot screw
- air cut-off valve

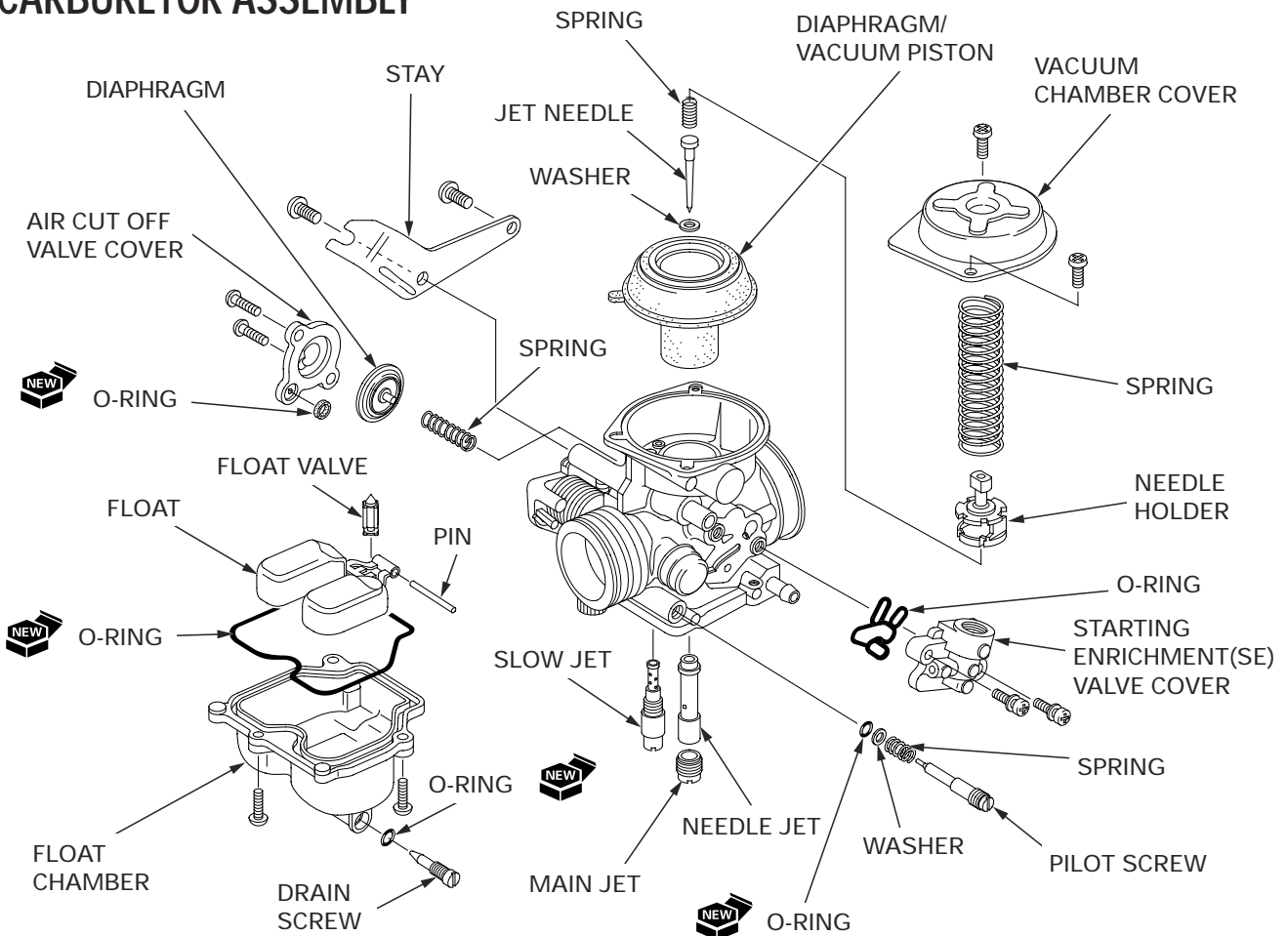
CAUTION:

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

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



CARBURETOR ASSEMBLY



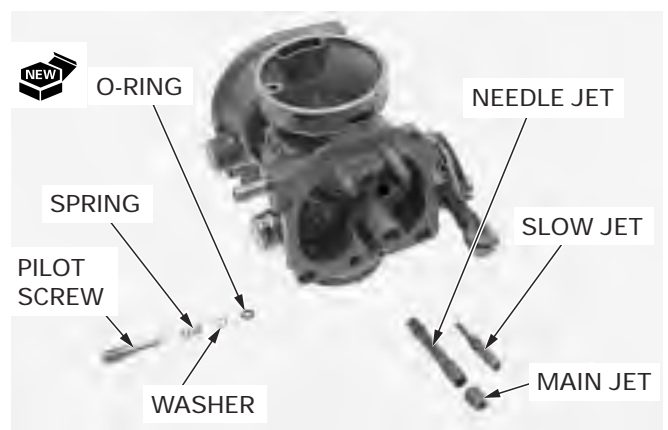
FLOAT CHAMBER

Install the pilot screw and return it to its original position as noted during removal. Perform the pilot screw adjustment if new pilot screw is installed (page 5-14).

CAUTION:

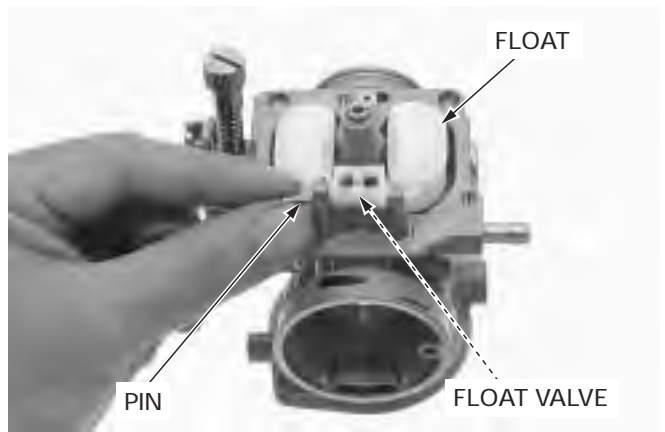
- *Damage to pilot screw seat will occur if the pilot screw is tightened against the seat.*
- *Handle the jets with care. They easily be scored or scratched*

Install the needle jet, main jet and slow jet.



FUEL SYSTEM

Hang the float valve onto the float arm lip.
Install the float valve, float and float pin.



FLOAT LEVEL INSPECTION

NOTE:

Set the float level gauge so that it is perpendicular to the float chamber face at the highest position of the float.

With the float valve seated and the float arm just touching the valve, measure the float level with the float level gauge.

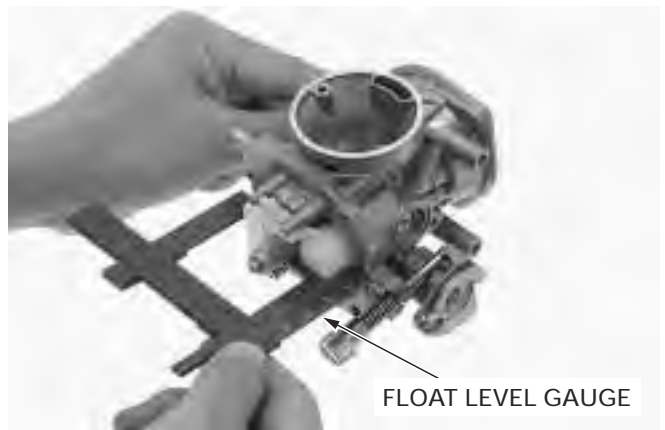
TOOL:

Float level gauge 07401 - 0010000

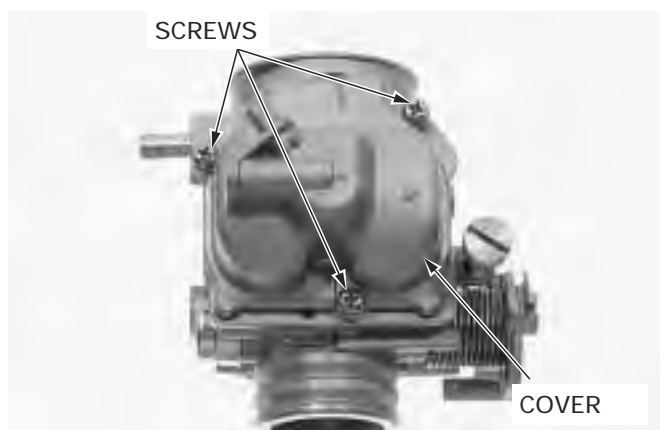
FLOAT LEVEL: 13 mm (0.5 in)

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

Install a new O-ring into the groove in the float chamber cover.

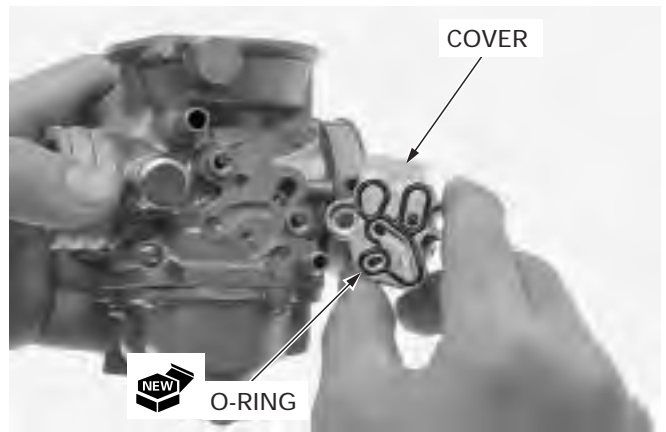


Install the float chamber cover and tighten the three screws.



Starting enrichment (SE) valve cover

Install a new O-ring to the valve cover.
Install the valve cover to the carburetor body.

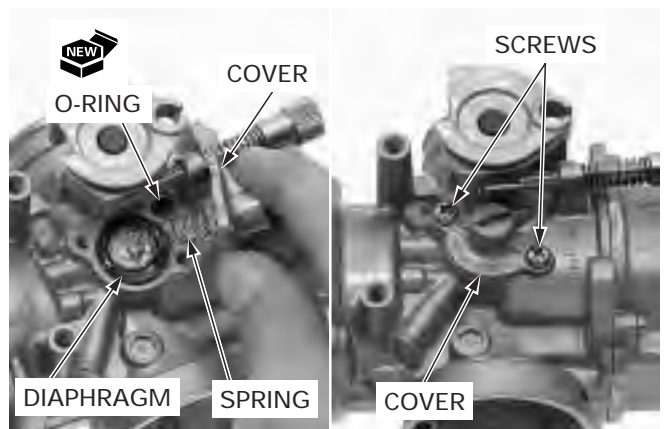


Install and tighten the two screws/washers securely.



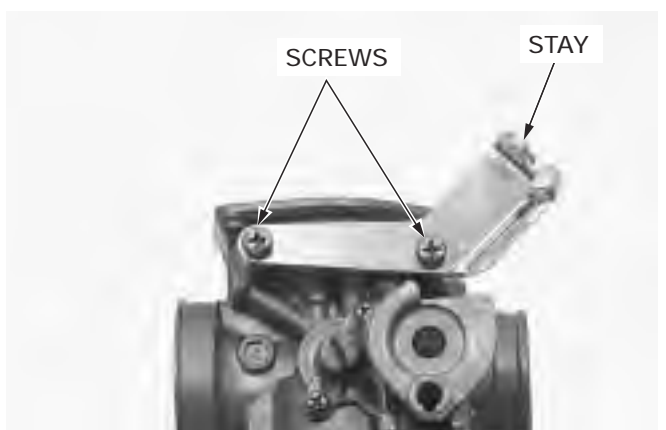
Air cut-off valve

Install the diaphragm to the carburetor body.
Install a new O-ring, spring and cover.
Tighten the screws securely.



Throttle cable stay

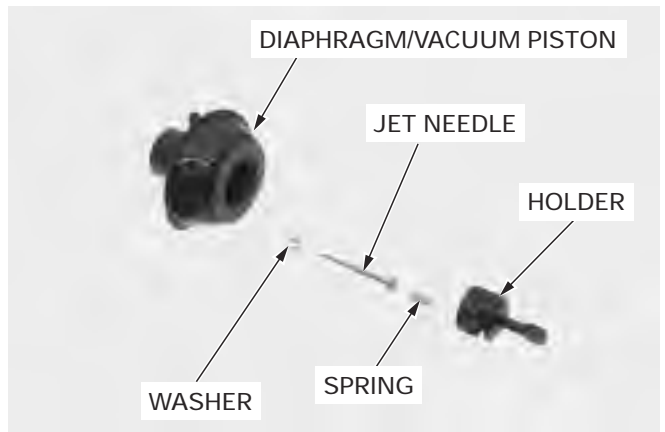
Install the throttle cable stay and tighten the two screws securely.



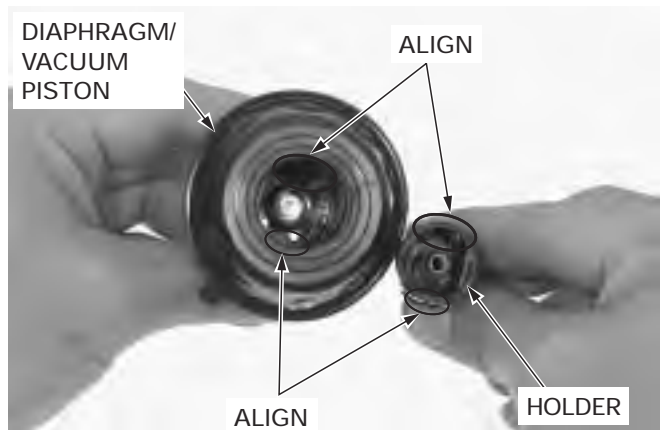
FUEL SYSTEM

VACUUM CHAMBER

Install the jet needle with washer into the vacuum piston. Install the spring onto the needle holder and set the needle holder into the vacuum piston.



Install the needle holder by aligning the cut-out of the holder and boss of the vacuum piston.

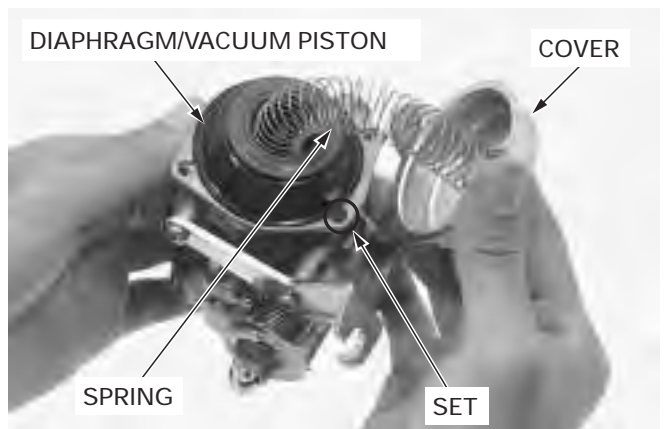


Install the diaphragm/vacuum piston into the carburetor body.

Lift the bottom of the piston with your finger to set the diaphragm rib in the groove in the carburetor body, and install the spring and vacuum chamber cover.

CAUTION:

Be careful not to pinch the diaphragm under the chamber cover.

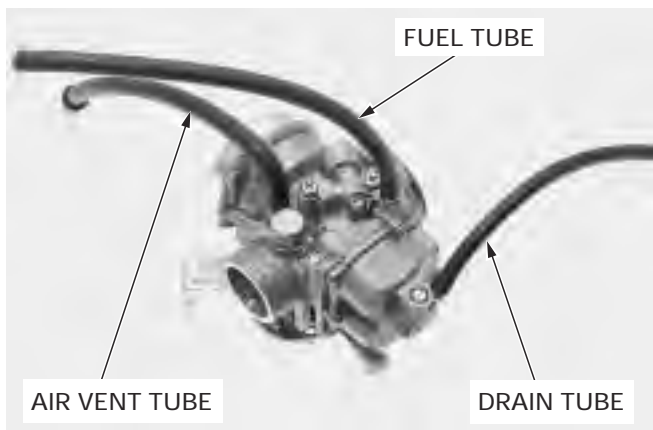


Install and tighten the two screws securely.

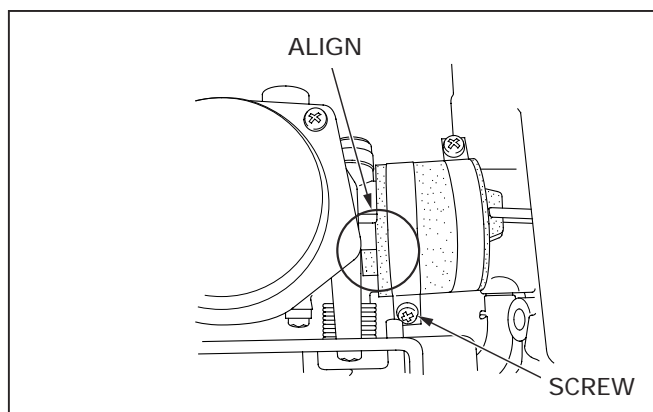


CARBURETOR INSTALLATION

Connect the fuel, air vent and fuel drain tubes.



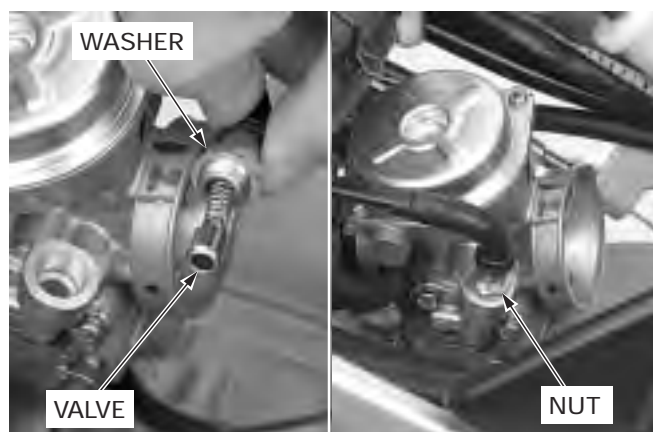
Install the carburetor into the insulator by aligning the carburetor boss with insulator boss. Tighten the insulator band screw.



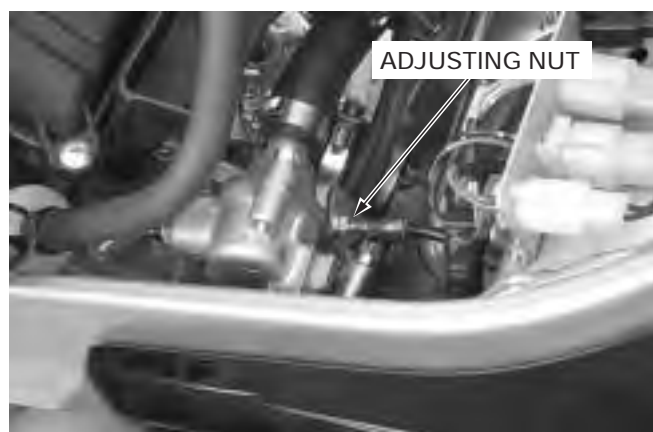
Check the starting enrichment (SE) valve for scoring, scratches or wear. Check the seat at the tip of the SE valve for stepped wear. Replace the SE valve set if necessary.

Installation is in the reverse order of removal.

After the installation, check for the smooth operation of the choke lever (page 3-5).



Connect the throttle cable end to the throttle drum and tighten the adjusting nut.



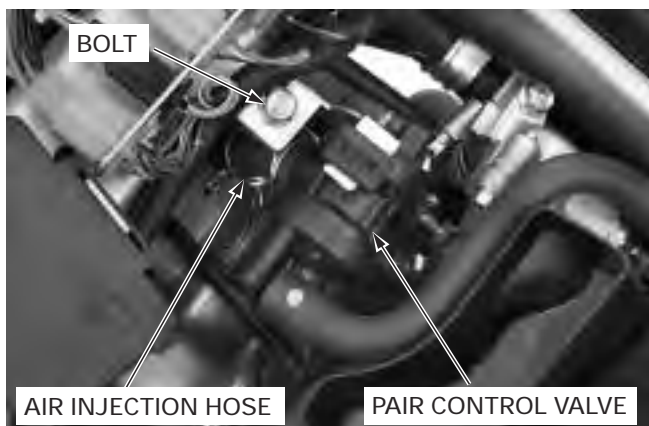
FUEL SYSTEM

Connect the air injection hose to the cylinder head cover. Install the PAIR control valve and tighten the bolt.

Install the following:

- air cleaner housing (page 5-4)
- fuel tank (page 5-3)

Adjust the throttle grip free-play (page 3-4).



PILOT SCREW ADJUSTMENT

IDLE DROP PROCEDURE

NOTE:

- The pilot screw is factory pre-set and no adjustment is necessary unless the carburetor is overhauled or the pilot screw is replaced.
- Use a tachometer with graduations of 50 min^{-1} (rpm) or smaller that will accurately indicate a 50 min^{-1} (rpm) change.

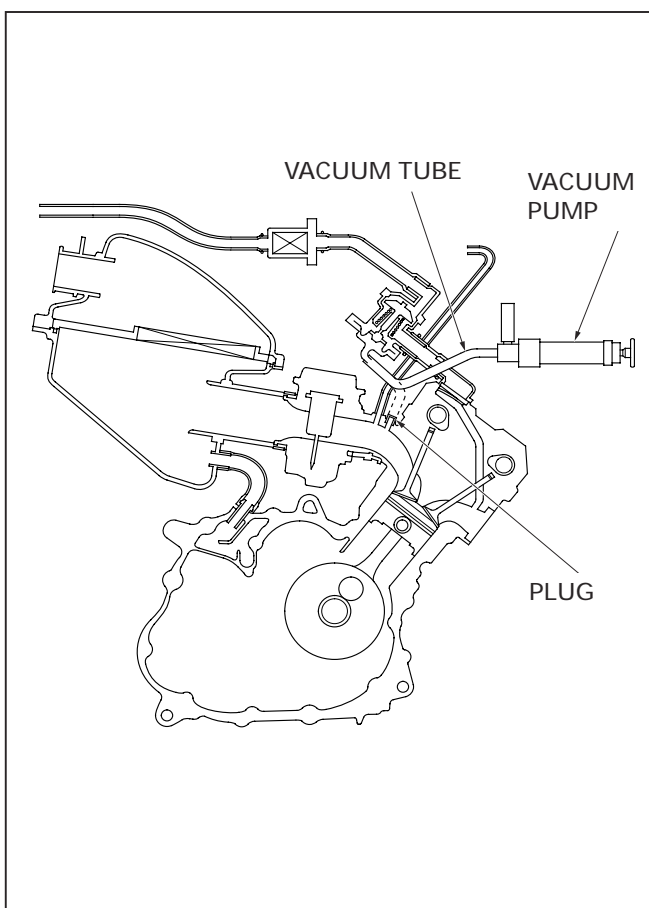
1. Turn the pilot screw until it seats lightly, then back it out to the specification given.
This is an initial setting prior to the final pilot screw adjustment .

CAUTION:

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

INITIAL OPENING: 2-1/8 turns out

2. Warm up the engine to operating temperature.
Stop and go riding for 10 minutes is sufficient.
3. Stop the engine and connect the tachometer, according to the manufacturer's instructions.
4. Disconnect the vacuum tube of PAIR control valve, then it connect the vacuum pump and plug the vacuum port.
5. Apply the specified vacuum to the PAIR control valve vacuum tube more than 37 kPa (280 mmHg).



6. Start the engine and adjust the idle speed with the throttle stop screw.

TENTATIVE IDLE SPEED: 1,400 ± 100 min⁻¹ (rpm)

7. Turn the pilot screw in or out slowly to obtain the highest engine speed.
8. Lightly open the throttle 2 or 3 times, then adjust the idle speed with the throttle stop screw.
9. Turn the pilot screw in until the engine speed drops by 50 min⁻¹ (rpm)

FINAL OPENING: 3/4 turns out

10. Disconnect the plug from the vacuum port, then remove the vacuum pump and connect the vacuum tube of PAIR control valve.
11. Readjust the idle speed with the throttle stop screw.

IDLE SPEED: 1,400 ± 100 min⁻¹ (rpm)



SECONDARY AIR SUPPLY SYSTEM

SYSTEM INSPECTION

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

Remove the fuel tank (page 5-3).

Check that the secondary air intake port is clean and free of carbon deposits.

Check the pulse secondary air injection (PAIR) check valves if the port is carbon fouled.

Disconnect the PAIR control valve vacuum tube from the cylinder head.

Connect the vacuum pump to the PAIR control valve vacuum tube.

Start the engine and open the throttle slightly to be certain that air is sucked in through the air supply hose.

If the air is not drawn in, check the air supply hose for clogging.

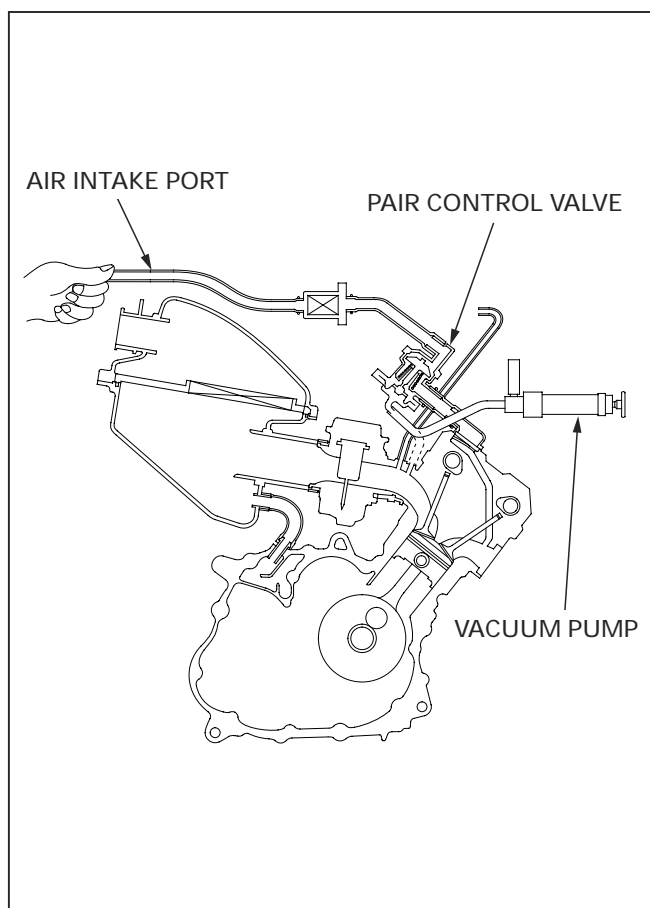
With the engine running, gradually apply vacuum to the PAIR control valve vacuum tube.

Check that the air supply hose stops drawing air, and that the vacuum does not bleed.

SPECIFIED VACUUM: 37 kPa (280 mmHg)

If the air is drawn in or if the specified vacuum is not maintained, install a new PAIR control valve.

If afterburn occurs on deceleration, even when the secondary air supply system is normal, check the air cut-off valve.



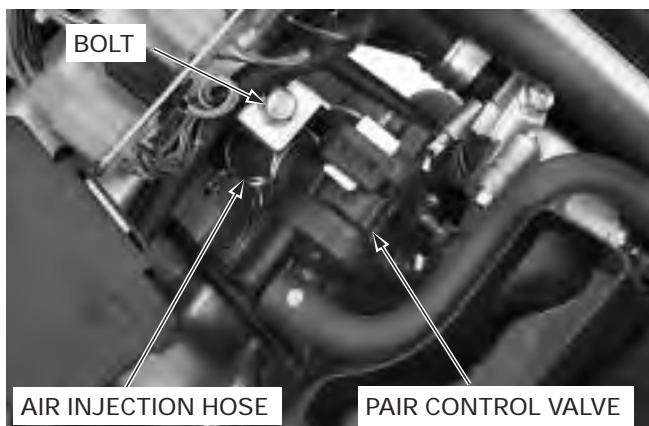
PAIR CHECK VALVE INSPECTION

Remove the following:

- fuel tank (page 5-3)
- air cleaner housing (page 5-4)

Remove the bolt and PAIR control valve with the tubes connected.

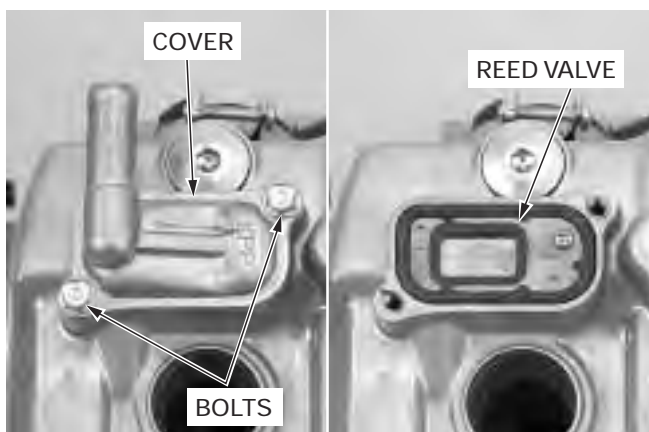
Disconnect the air injection hose from PAIR check valve cover.



Remove the two bolts and PAIR check valve cover from the cylinder head.

Check the reed for damage or fatigue. Replace if necessary.

Replace the PAIR check valve if the seat rubber is cracked, deteriorated or damaged, or if there is clearance between the reed and seat.

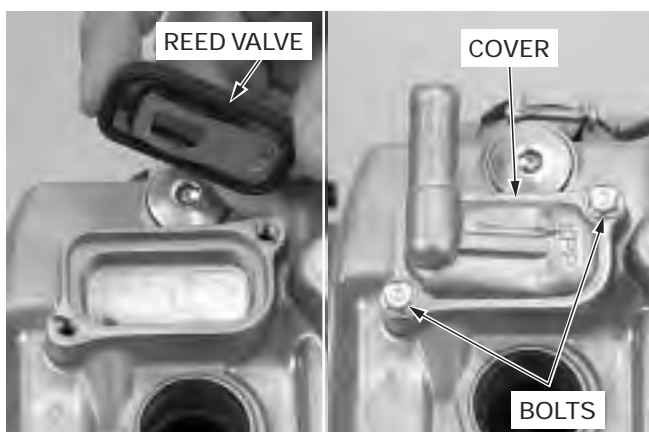


Install the PAIR check valve and cover onto the cylinder head cover.

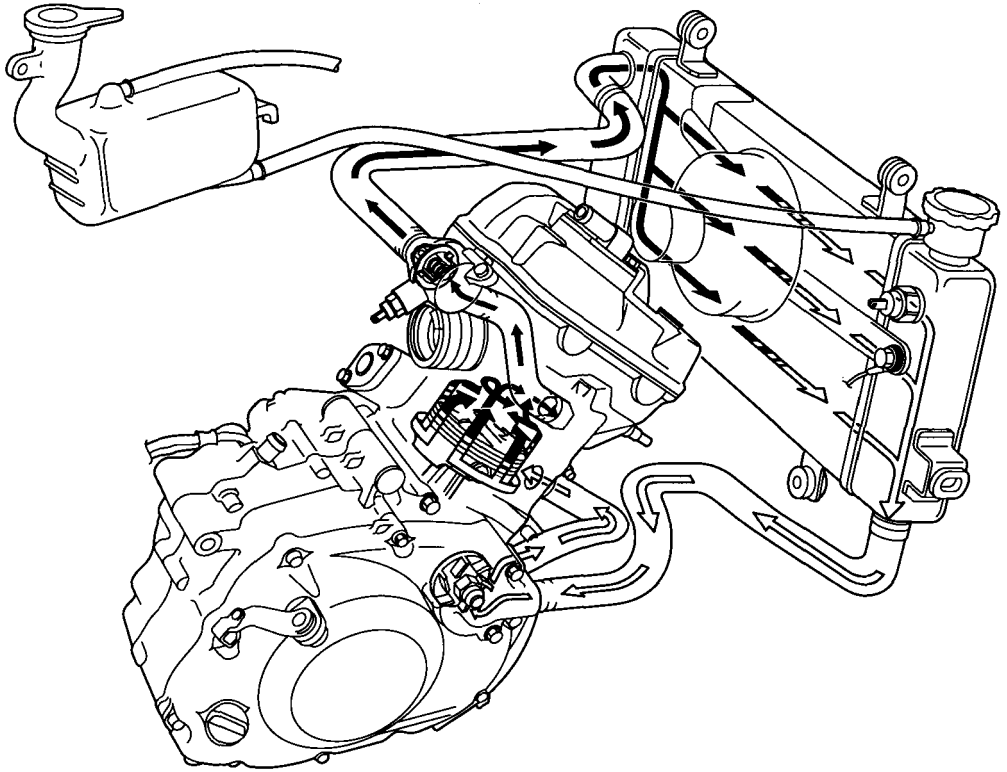
Install and tighten the two bolts to the specified torque.

TORQUE: 5.2 N·m (0.53 kgf·m, 3.8 lbf·ft)

Install the removed parts in the reverse order of removal.



SYSTEM FLOW PATTERN



6. COOLING SYSTEM

SYSTEM FLOW PATTERN	6-0	THERMOSTAT	6-6
SERVICE INFORMATION	6-1	RADIATOR/COOLING FAN	6-8
TROUBLESHOOTING	6-2	RADIATOR RESERVE TANK	6-12
SYSTEM TESTING	6-3	WATER PUMP	6-12
COOLANT REPLACEMENT	6-4		

SERVICE INFORMATION

GENERAL

⚠ WARNING

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

CAUTION:

Using Coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passages.

Using tap water may cause engine damage.

- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- All cooling system services can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to Section 20 for fan motor switch and thermosensor inspection.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	0.76 liter (0.20 US qt, 0.17 Imp qt)
	Reserve tank	0.24 liter (0.06 US qt, 0.05 Imp qt)
Radiator cap relief pressure		108 kPa (1.1 kgf/cm ² , 16 psi)
Thermostat	Begin to open	69.5 – 72.5°C (157.1 – 162.5°F)
	Fully open	80°C (176°F)
	Valve lift	3.5 mm (0.14 in) minimum

COOLING SYSTEM

TORQUE VALUES

Water pump impeller 10 N·m (10 kgf·m, 7 lbf·ft)

TOOLS

Driver 07749 – 0010000
Attachment, 36 mm 07945 – 4150400

TROUBLESHOOTING

Engine temperature too high

- Faulty temperature indicator or thermo switch (section 20)
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses or water jacket
- Air in system
- Faulty water pump
- Thermostat stuck closed
- Faulty cooling fan motor
- Faulty fan motor switch

Engine temperature too low

- Faulty temperature indicator or thermo switch (section 20)
- Thermostat stuck open
- Faulty cooling fan motor switch

Coolant leaks

- Faulty water pump mechanical seal
- Deteriorated O-ring
- Damaged or deteriorated gasket
- Loose hose connection or clamp
- Damaged or deteriorated hose
- Faulty radiator cap

SYSTEM TESTING

COOLANT (HYDROMETER TEST)

▲ WARNING

Be sure the engine is cool before removing the cap or you may be severely scalded.

Remove the following:

- right middle cowl (page 2-4)
- upper cowl (page 2-5)

Remove the radiator cap.



Check the coolant gravity using a hydrometer.

STANDARD COOLANT CONCENTRATION: 50%

Look for contamination and replace the coolant if necessary.



Coolant gravity chart

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

NOTE:

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

Pressure test the radiator cap using the tester.

Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low, it must hold specified pressure for at least 6 seconds.

RADIATOR CAP RELIEF PRESSURE:

108 kPa (1.1 kgf/cm², 16 psi)

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

CAUTION:

Excessive pressure can damage the cooling system components. Do not exceed 137 kPa (1.4 kgf/cm², 20 psi).

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



COOLANT REPLACEMENT

PREPARATION

▲ WARNING

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

CAUTION:

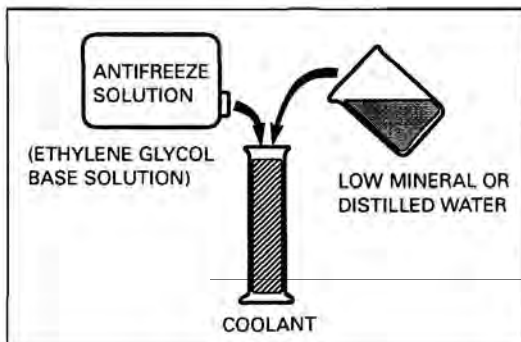
Using coolant with silicate inhibitors may cause premature wear of water pump seals or blockage of radiator passage. Using tap water may cause engine damage.

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 MIXTURE:

50 — 50 (Distilled water and antifreeze)



REPLACEMENT/AIR BLEEDING

▲ WARNING

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

NOTE:

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

Remove the following:

- under cowl (page 2-3)
- right middle cowl (page 2-4)

Remove the radiator cap.

Remove the drain bolt and sealing washer on the water pump and drain the coolant from the system.



Remove the reserve tank cap.

Disconnect the siphon tube from the radiator and drain the coolant from the reserve tank.

Connect the siphon tube.

Install the drain bolt with new sealing washer.

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

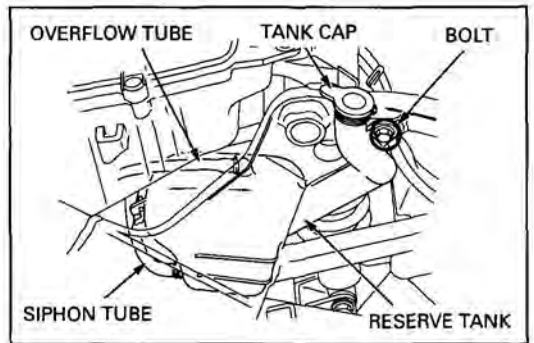
Fill the reserve tank to the upper level line.

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 filler neck.
Reinstall the radiator cap.
4. Check the level of coolant in the reserve tank and fill to the upper level if it is low.

Install the following:

- right middle cowl (page 2-4)
- under cowl (page 2-5)



THERMOSTAT

REMOVAL

Drain the coolant (page 6-5).

Remove the following:

- fuel tank (page 5-3)
- air cleaner housing (page 5-4)

Remove the two bolts and thermostat housing cover.



Remove the thermostat from the housing.

NOTE:

The thermostat, may be damaged if dropped or conflicted to shock.

If dropped or conflicted, inspect the thermostat and replace if necessary.



INSPECTION

⚠ WARNING

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

NOTE:

- Do not let the thermostat or thermometer touch the pan, or you will get false readings.
- Replace the thermostat if valve stays open at room temperature, or if it responds at temperatures other than those specified.

Visually inspect the thermostat for damage.

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

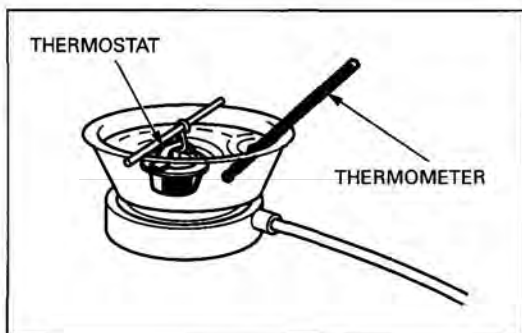
Suspended the thermostat in heated water to check its operation.

THERMOSTAT BEGINS TO OPEN:

69.5 – 72.5°C (157.1 – 162°F)

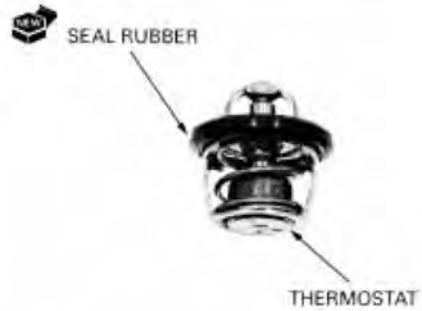
VALVE LIFT:

3.5 mm (0.14 in) minimum at 80°C (176°F)



INSTALLATION

Apply coolant to the new seal rubber and install it to the thermostat flange.



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



Install the thermostat housing cover and two bolts. Tighten the bolts securely.

Fill and bleed the cooling system (page 6-5).



RADIATOR/COOLING FAN

REMOVAL

Drain the coolant (page 6-5).

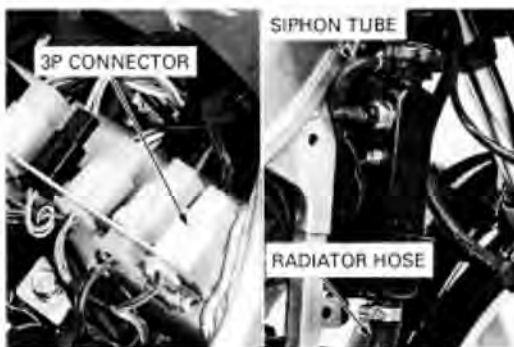
Remove the following:

- fuel tank (page 5-3)
- left middle cowl (page 2-4)

Disconnect the fan motor 3P connector.

Disconnect the siphon tube from the radiator.

Loosen the hose band screw and disconnect the lower radiator hose.



Loosen the hose band screw and disconnect the upper radiator hose.



Remove the radiator mounting bolts and collars.

Slide the radiator to the right side, then release the upper grommet from the frame boss.

Remove the radiator assembly.

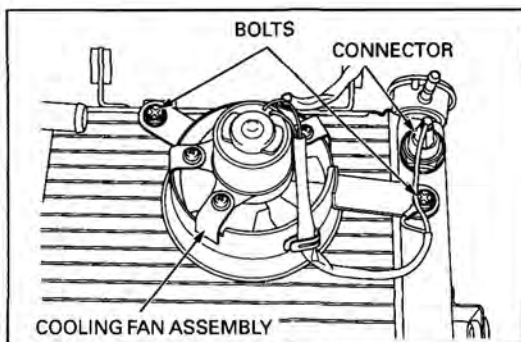


DISASSEMBLY

Disconnect the fan motor switch connector.

Remove the two bolts and ground terminal.

Remove the cooling fan assembly from the radiator.



Remove the nut and cooling fan.

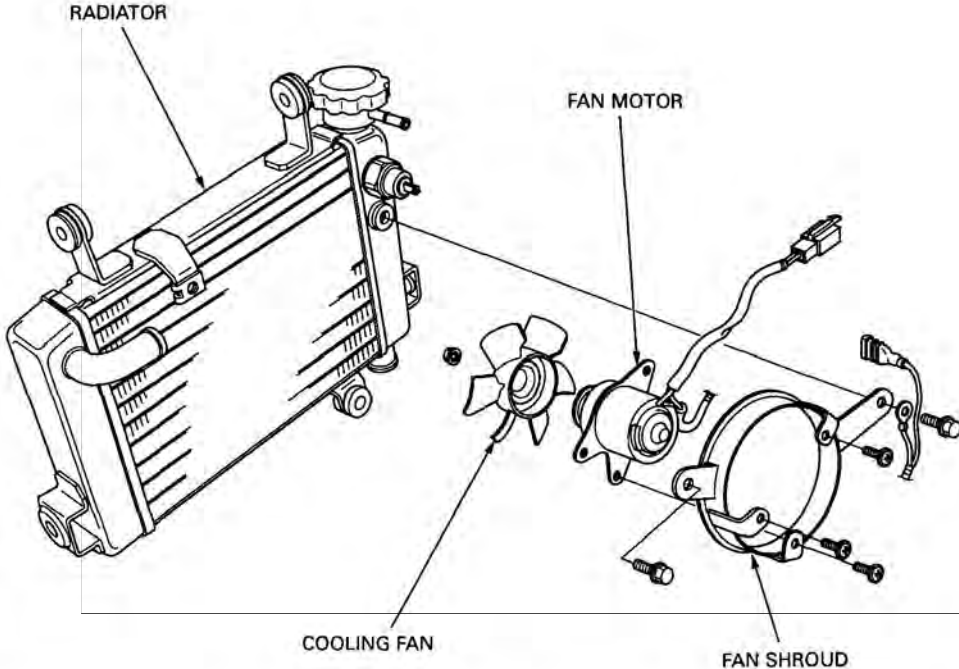


Release the motor wire from the clamp.
Remove the screws and washers.

Remove the fan motor from the shroud.



ASSEMBLY



COOLING SYSTEM

Install the fan motor to the shroud.

Install and tighten the washers/screws securely.

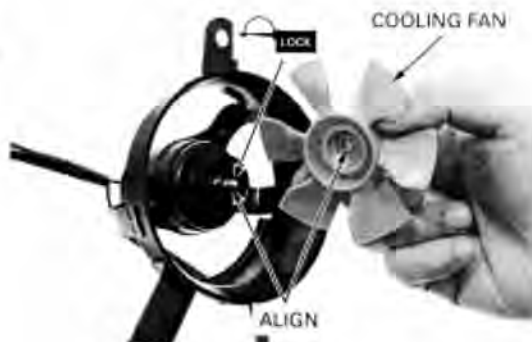
Install the motor wires to the clamp.

FAN MOTOR



Apply locking agent to the motor shaft threads.

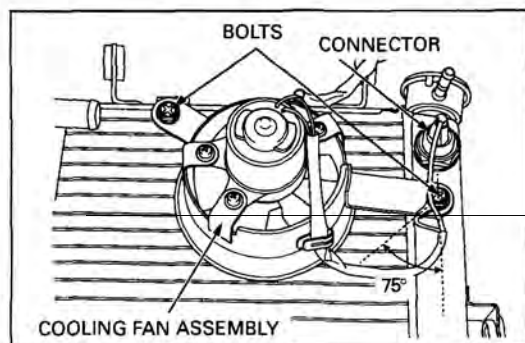
Install the cooling fan onto the motor shaft by aligning the flat surfaces.



Install and tighten the nut securely.



Install the cooling fan assembly to the radiator.
Install and tighten the bolts and ground terminal as shown.
Connect the fan motor switch connector.



INSTALLATION

Install the radiator assembly by aligning its grommet with the frame boss.
Install the collars and mounting bolts.

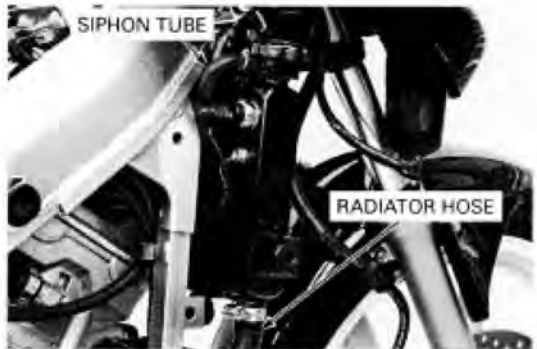


Install the upper radiator hose and tighten the band screw securely.



Install the lower radiator hose and tighten the band screw securely.

Connect the siphon tube.



Connect the fan motor 3P connector.

Fill and bleed the cooling system (page 6-5).

Install the following:
— left middle cowl (page 2-4)
— fuel tank (page 5-3)



RADIATOR RESERVE TANK

REMOVAL/INSTALLATION

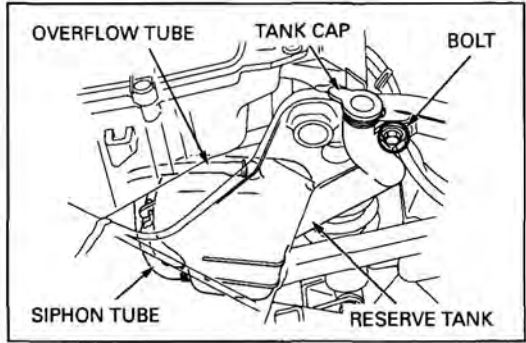
Remove the rear cowl (page 2-2).
Drain the coolant from the reserve tank (page 6-5).

Disconnect the over flow and siphon tubes.
Remove the bolt and radiator reserve tank from the frame.

Installation is in the reverse order of removal.

NOTE:

Route the tubes properly (page 1-19, 1-20).



Fill the reserve tank with recommended coolant to the upper level line (page 6-5).

WATER PUMP

MECHANICAL SEAL INSPECTION

Remove the under cowl (page 2-3).

Check the inspection hose for signs of coolant leakage. If there is leakage, the mechanical seal is defective and it should be replaced (page 6-13).

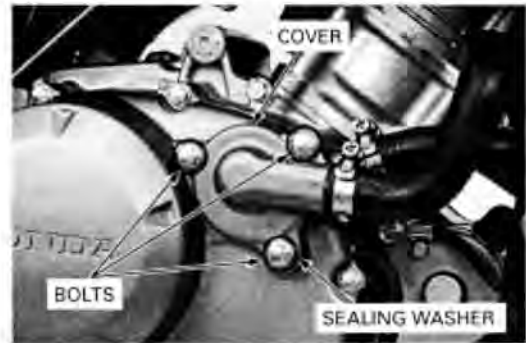
Install the under cowl (page 2-3).



WATER PUMP COVER REMOVAL/INSTALLATION

Drain the coolant (page 6-5).

Remove the three bolts, sealing washer and water pump cover.



Apply coolant to the new O-ring and install it to the water pump cover.



Install the water pump cover, sealing washer and three bolts.
Tighten the three bolts securely.

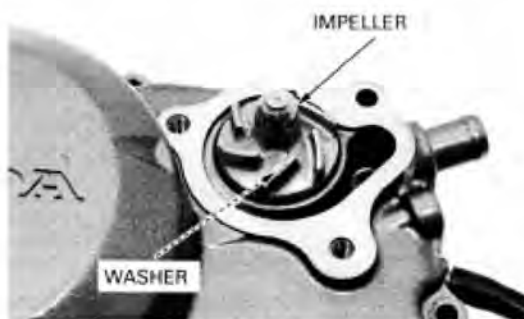
Fill and bleed the cooling system (page 6-5).



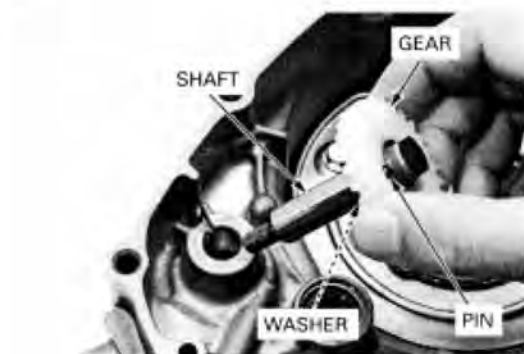
DISASSEMBLY

Remove the right crankcase cover (page 8-3).

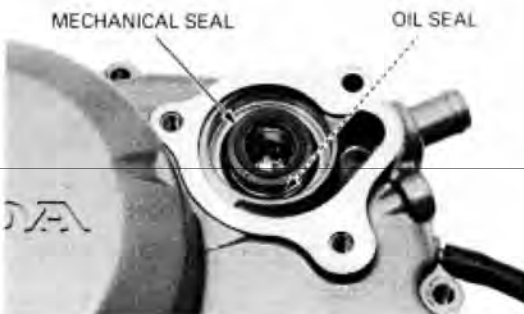
Hold the water pump shaft and remove the impeller and washer.



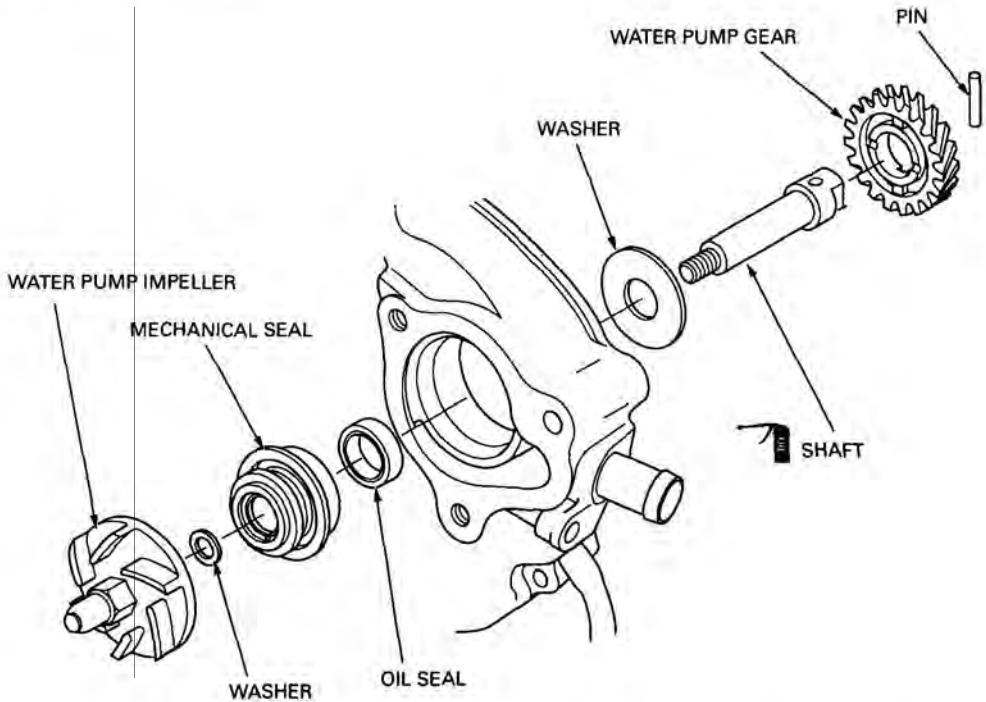
Remove the water pump shaft, washer, gear and pin from the right crankcase cover.



Remove the mechanical seal and oil seal from the right crankcase cover.



ASSEMBLY



Install the new oil seal into the right crankcase cover.
Apply sealant to the new mechanical seal flange and drive it into the right crankcase cover using the special tools.

TOOLS:

Driver
Attachment, 36 mm

07749 - 0010000
07945- 4150400



INSTALLATION

Check the water pump shaft for damage.
Check the water pump gear for damage of the teeth.

Install the pin to the water pump shaft.
Install the water pump gear and washer to the water pump shaft.

Apply engine oil to the water pump shaft.
Install the water pump shaft to the right crankcase cover.



Install the washer and impeller to the shaft.



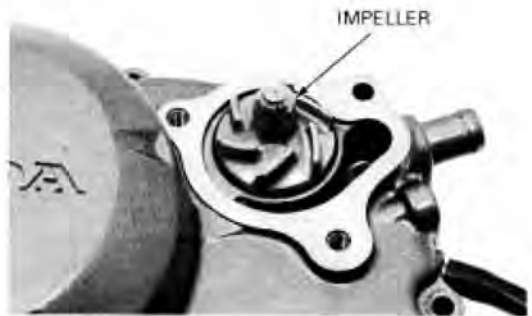
Hold the water pump shaft and tighten the impeller to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the following:

- right crankcase cover (page 8-14)
- water pump cover (page 6-12)

Fill and bleed the cooling system (page 6-5).
Fill the engine oil (page 3-10).



7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION	7-1	ENGINE INST ALLATION	7-4
ENGINE REMOV AL	7-2		

SERVICE INFORMATION

GENERAL

- During engine removal and installation, support the motorcycle securely using a hoist.
- Support the engine using a jack or other adjustable support to ease of engine hanger bolts removal.
- The following components can be serviced with the engine installed in the frame:
 - Oil pump (section 4)
 - Clutch/gearshift linkage (section 8)
 - Alternator/starter clutch (section 9)
 - Cylinder head/valves (section 10)
 - Cylinder/piston (section 11)
 - Starter motor (section 19)
- The following components require engine removal for service.
 - Transmission (section 12)
 - Crankshaft/balancer (section 13)

SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine dry weight		26.1 kg (57.55 lbs)
Engine oil capacity	At draining	1.0 liter (1.06 US qt, 0.88 Imp qt)
	At disassembly	1.3 liter (1.37 US qt, 1.14 Imp qt)
Recommended engine oil		Honda 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-30

TORQUE VALUES

Drive sprocket fixing plate bolt	9.8 N-m (1.0 kgf-m, 7 lbf-ft)	Apply a locking agent to the threads
Engine hanger nut	59 N-m (6.0 kgf-m, 43 lbf-ft)	
Rear axle nut	59 N-m (6.0 kgf-m, 43 lbf-ft)	U-nut

ENGINE REMOVAL

Drain the coolant (page 6-5).
Drain the engine oil (page 3-11).

Remove the following:

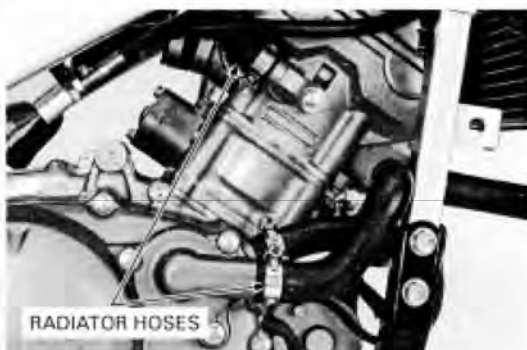
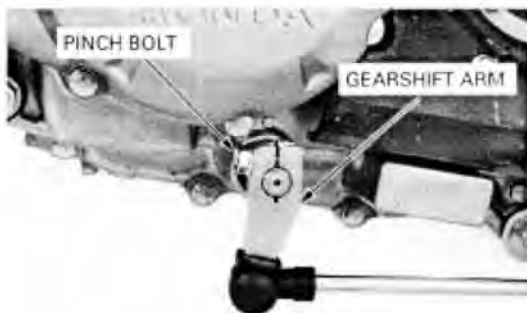
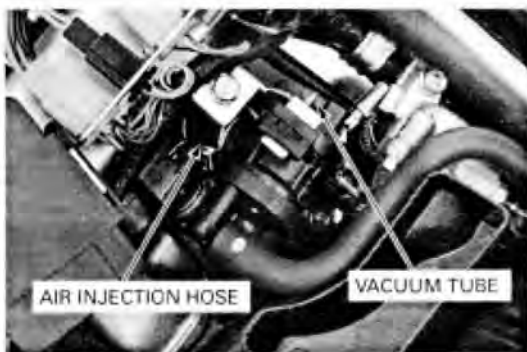
- exhaust system (page 2-5)
- spark plug cap (page 3-6)
- left middle cowl (page 2-4)
- fuel tank (page 5-3)
- air cleaner housing (page 5-4)
- carburetor (page 5-4)
- starter motor terminal and ground cable (page 19-4)

Disconnect the vacuum tube from the PAIR control valve and air injection hose from the PAIR check valve cover.

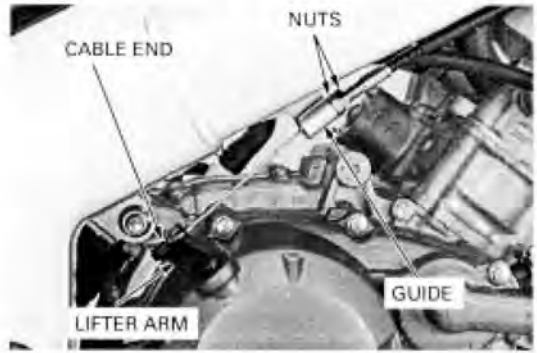
Disconnect the neutral switch and alternator 4P connectors.

Remove the pinch bolt and gearshift arm from the gear shift spindle.

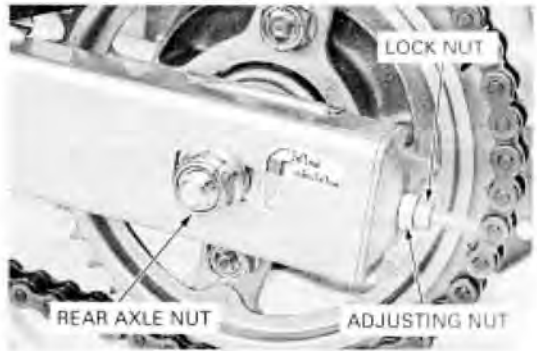
Loosen the hose band screws and disconnect the radiator hoses.



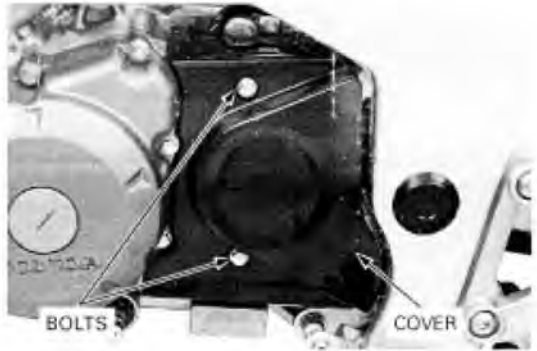
Loosen the lock nut and adjusting nut, then remove the clutch cable from the clutch cable guide.
Disconnect the clutch cable end from the clutch lifter arm.



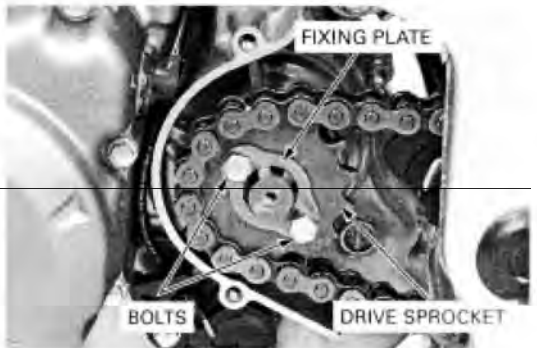
Loosen the rear axle nut, R/L drive chain adjusting lock nuts and adjusting nuts.
Push the rear wheel forward and make a drive chain slack fully.



Remove the two bolts and sprocket cover.



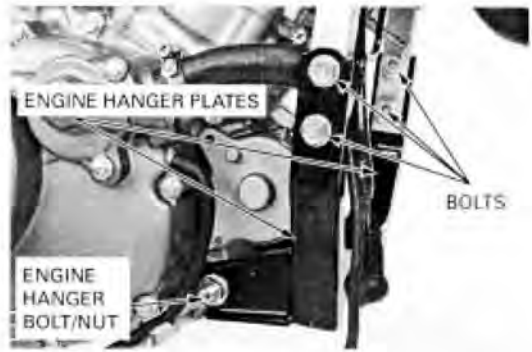
Remove the fixing plate bolts, fixing plate and drive sprocket.



ENGINE REMOVAL/INSTALLATION

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

Remove the front engine hanger nut and bolt.
Remove the four bolts and engine hanger plates.



Loosen the rear engine hanger nuts.

Remove the rear engine hanger bolts/nuts and engine from the frame.



Note the direction of the hanger bolts.



ENGINE INSTALLATION

NOTE:

Use a floor jack or other adjustable support to carefully maneuver the engine into place.

Place the engine into the frame, and install the rear engine hanger bolts from the left side.
Temporarily, install the rear engine hanger nuts.

CAUTION:

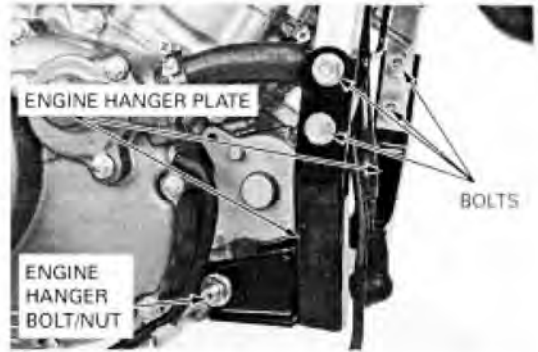
Be careful not to damage the frame.



Install the engine hanger plates and four bolts, and tighten the bolts.

Install the front engine hanger bolt and nut, and tighten the nut to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

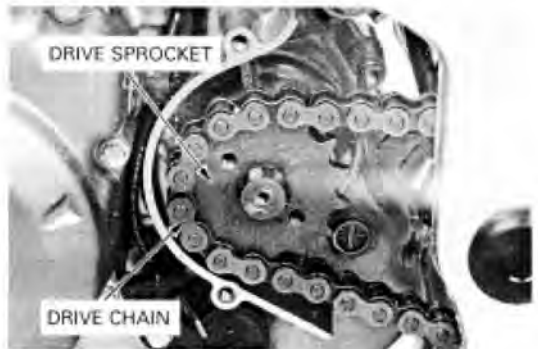


Tighten the rear engine hanger nuts to the specified torque.

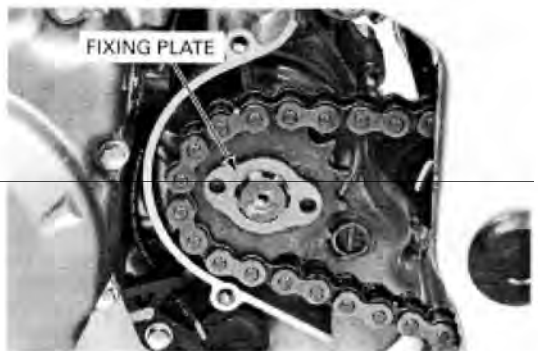
TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)



Install the drive sprocket onto the countershaft.
Install the drive chain onto the drive sprocket.



Install the fixing plate and lock the plate by turning it.

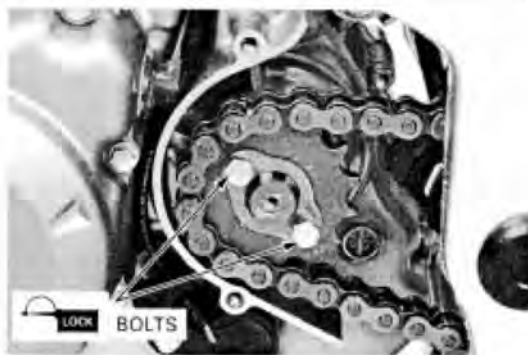


ENGINE REMOVAL/INSTALLATION

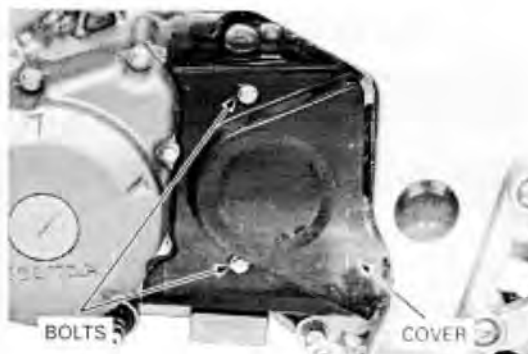
Apply locking agent to the threads of the fixing plate bolts.

Tighten the fixing plate bolts to the specified torque.

TORQUE: 9.8 N·m (1.0 kgf·m, 7 lbf·ft)



Set the drive sprocket cover to the left crankcase.
Tighten the cover bolts securely.



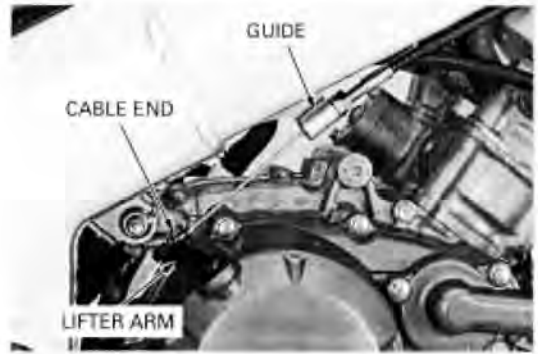
Adjust the drive chain slack (page 3-15).

Tighten the rear axle nut to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)



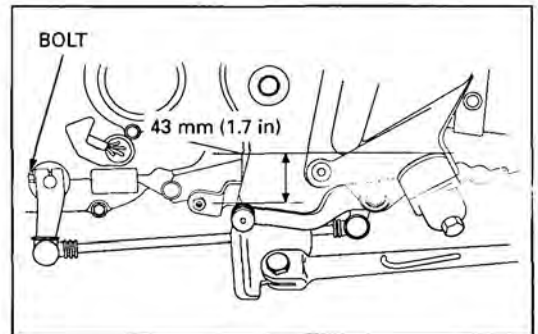
Connect the clutch cable end to the clutch lifter arm, then install the clutch cable to the clutch cable guide.



Install the radiator hoses and tighten the band screws.



Install the gearshift arm by adjusting the change pedal height as shown.
Install and tighten the gearshift arm pinch bolt.



ENGINE REMOVAL/INSTALLATION

Connect the neutral switch and alternator connectors.



Connect the vacuum tube to the PAIR control valve and air injection hose to the PAIR check valve cover.

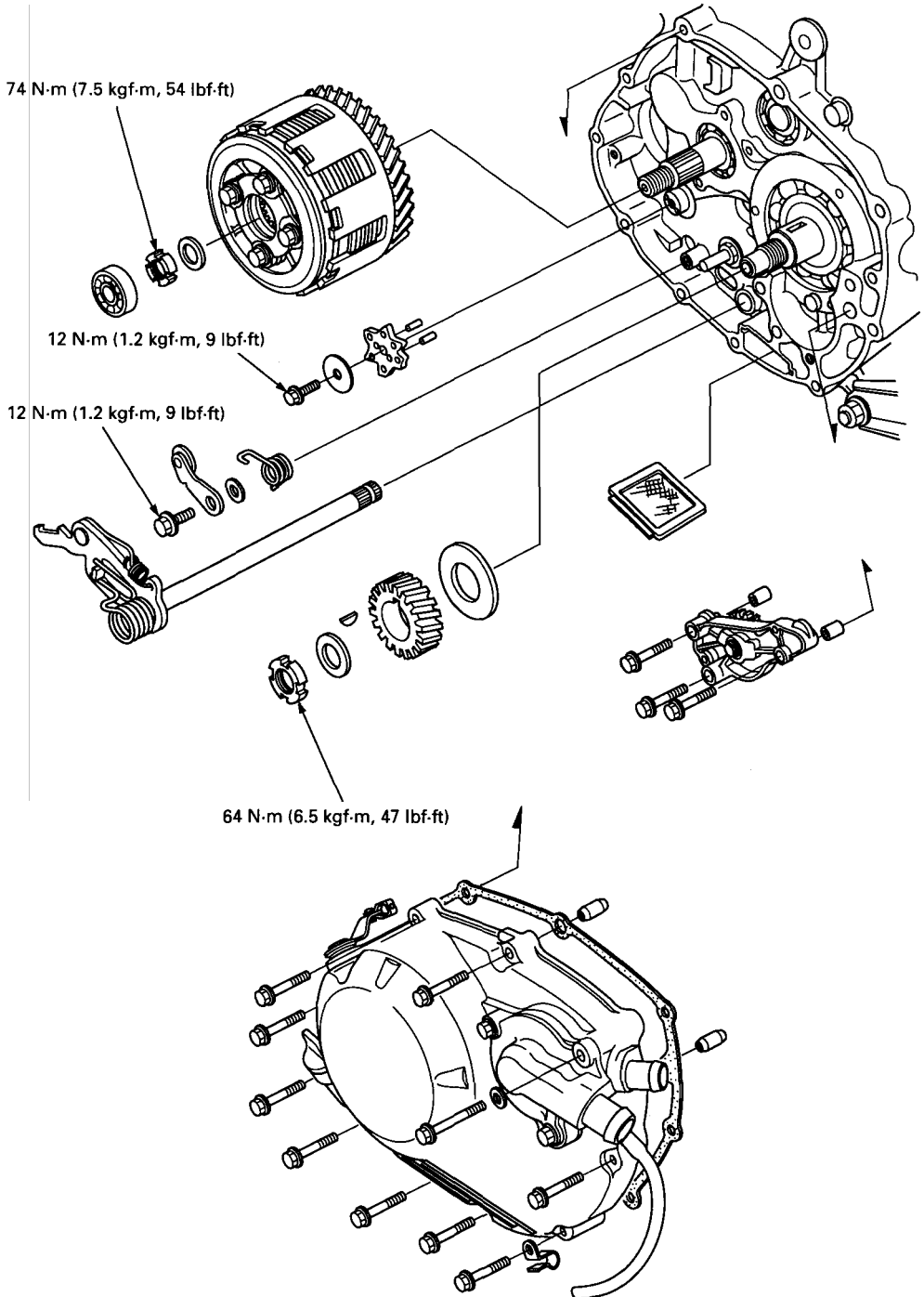
Install the following:

- starter motor terminal and ground cable (page 19-9)
- carburetor (page 5-13)
- air cleaner housing (page 5-4)
- fuel tank (page 5-3)
- left middle cowl (page 2-4)
- spark plug cap (page 3-8)
- exhaust system (page 2-7)

Fill and bleed the cooling system (page 6-5).
Adjust the clutch lever free play (page 3-21).



CLUTCH/GEARSHIFT LINKAGE



8. CLUTCH/GEARSHIFT LINKAGE

SERVICE INFORMATION	8-1	GEARSHIFT LINKAGE	8-10
TROUBLESHOOTING	8-2	PRIMARY DRIVE GEAR	8-12
RIGHT CRANKCASE COVER REMOVAL	8-3	CLUTCH LIFTER ARM INSTALLATION	8-13
CLUTCH	8-4	RIGHT CRANKCASE COVER INSTALLATION	8-13

SERVICE INFORMATION

GENERAL

- This section covers service of the clutch and gearshift linkage. All service can be done with the engine installed in the frame.
- Transmission oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the transmission oil level before servicing the clutch system.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Clutch	Lever free play	10 – 20 (3/8 – 13/16)	—	
	Spring free length	37.6 (1.48)	36.6 (1.44)	
	Disc thickness	A	3.5 – 3.6 (0.138 – 0.142)	3.1 (0.12)
		B	2.92 – 3.08 (0.115 – 0.121)	2.60 (0.102)
	Plate warpage	—	0.2 (0.008)	
	Outer guide	O.D.	22.959 – 22.980 (0.9039 – 0.9047)	22.93 (0.903)
		I.D.	16.991 – 17.009 (0.6689 – 0.6696)	17.04 (0.671)
Outer I.D.	30.000 – 30.021 (1.1811 – 1.1819)	23.06 (0.908)		
Mainshaft O.D. at clutch outer guide		16.996 – 16.984 (0.6680 – 0.6687)	16.935 (0.6667)	

TORQUE VALUES

Shift drum stopper arm bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Gearshift cam plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
Clutch center lock nut	74 N·m (7.5 kgf·m, 54 lbf·ft)	Apply oil to the threads and seating surface
Primary drive gear lock nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	Apply oil to the threads and seating surface

CLUTCH/GEARSHIFT LINKAGE

TOOLS

Clutch center holder
Lock nut wrench, 20 x 24 mm

07GMB – KT70101
07716 – 0020100

TROUBLESHOOTING

Faulty clutch operation can usually be corrected by adjusting the clutch system.

Clutch slips when accelerating

- Incorrect clutch adjustment
- Worn clutch disc
- Weak clutch springs

Motorcycle creeps with clutch disengaged

- Incorrect clutch adjustment
- Clutch plate warped
- Faulty clutch lifter

Hard to shift

- Damaged gearshift spindle
- Damaged stopper plate and pin
- Loose stopper plate bolt
- Incorrect clutch adjustment

Transmission jumps out of gear

- Damaged stopper arm
- Damaged stopper plate
- Loose stopper plate bolt

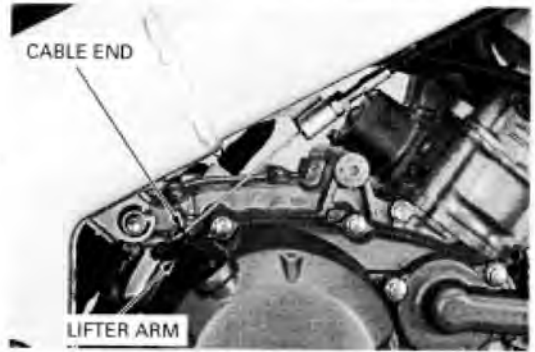
Gearshift pedal will not return

- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-11).
Drain the coolant (page 6-5).

Disconnect the clutch cable end from the clutch lifter arm.



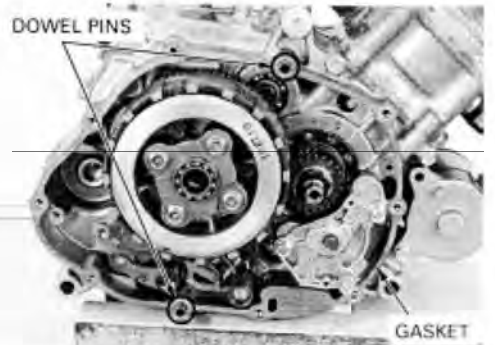
Loosen the hose band screws and disconnect the radiator hoses.



Remove the ten bolts, clamp and right crankcase cover.



Remove the gasket and dowel pins.



CLUTCH/GEARSHIFT LINKAGE

CLUTCH LIFTER ARM

Remove the lifter piece and return spring.



Remove the clutch lifter arm/spindle.

Check the following:

- lifter arm spindle for wear or damage
- return spring for fatigue or damage

Replace the dust seal if necessary.



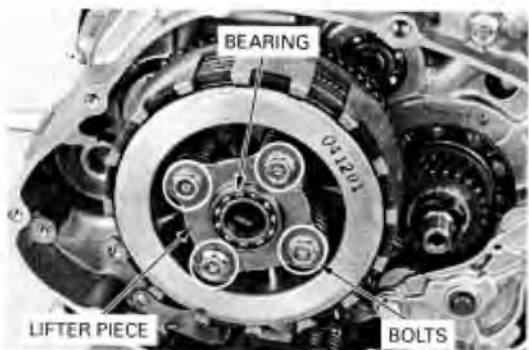
CLUTCH

REMOVAL

Remove the clutch lifter bearing and clutch lifter plate bolts.

NOTE:

Loosen the clutch lifter plate bolts in a cirsscross pattern in 2 – 3 steps.



Remove the lifter plate and clutch springs.

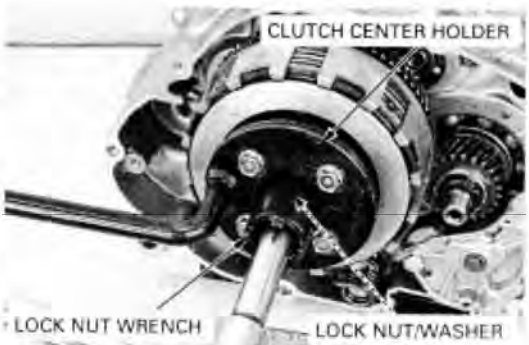
Install the clutch center holder and tighten the four bolts. Hold the clutch assembly.

Remove the clutch center lock nut and washer using the special tool.

TOOLS:

Clutch center holder 07GMB – KT70101
Lock nut wrench, 20 x 24 mm 07716 – 0020100

Remove the four bolts, clutch center holder and clutch assembly.



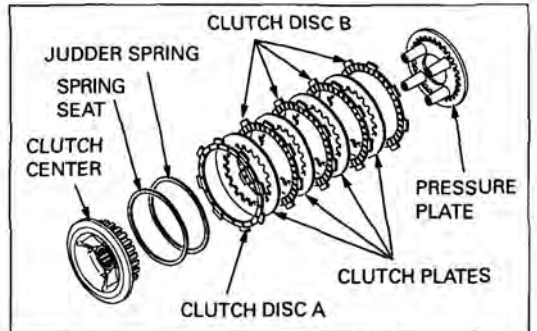
Remove the clutch outer guide and washer from mainshaft.



DISASSEMBLY

Remove the clutch center, washer, judder spring, spring seat, clutch discs and plates.

Remove the pressure plate.



INSPECTION

Clutch lifter bearing

Turn the inner race of the lifter bearing with your finger. The bearing should turn smoothly and freely without excessive play.

If necessary, replace the bearing.

LIFTER BEARING



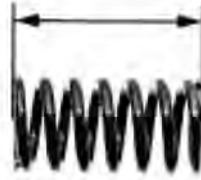
CLUTCH/GEARSHIFT LINKAGE

Clutch spring

Check the clutch spring for fatigue or other damage.

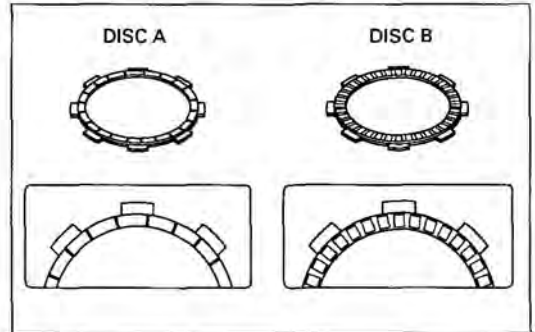
Measure the clutch spring free length.

SERVICE LIMIT: 36.6 mm (1.44 in)



Clutch disc

Check the clutch discs for signs of scoring or discoloration.



Measure the thickness of the discs.

SERVICE LIMITS: Disc A — 3.1 mm (0.12 in)
Disc B — 2.60 mm (0.102 in)

NOTE:

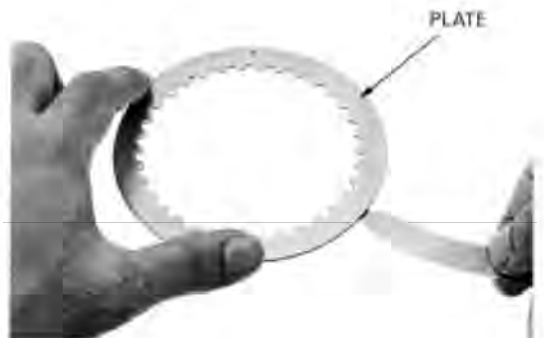
Replace the discs and plates as a set.



Clutch plate

Check the plate for excessive warpage or discoloration.
Check the plate warpage on a surface using a feeler gauge.

SERVICE LIMIT: 0.2 mm (0.008 in)



Clutch center

Check the grooves of the clutch center for damage or wear caused by the clutch plates.
Replace if necessary.

CLUTCH CENTER

**Clutch outer**

Check the clutch outer for nicks, indentations or abnormal wear made by the clutch discs.
Check the serrated teeth of the primary driven gear for wear or damage.

Clutch outer guide

Measure the clutch outer guide.

SERVICE LIMIT: I.D.: 17.04 mm (0.671 in)
O.D.: 22.93 mm (0.903 in)

CLUTCH OUTER



OUTER GUIDE

Judder spring, spring seat

Check the judder spring and spring seat for distortion, wear or damage.



SPRING SEAT



JUDDER SPRING

Mainshaft

Measure the mainshaft O.D. at the clutch outer guide.

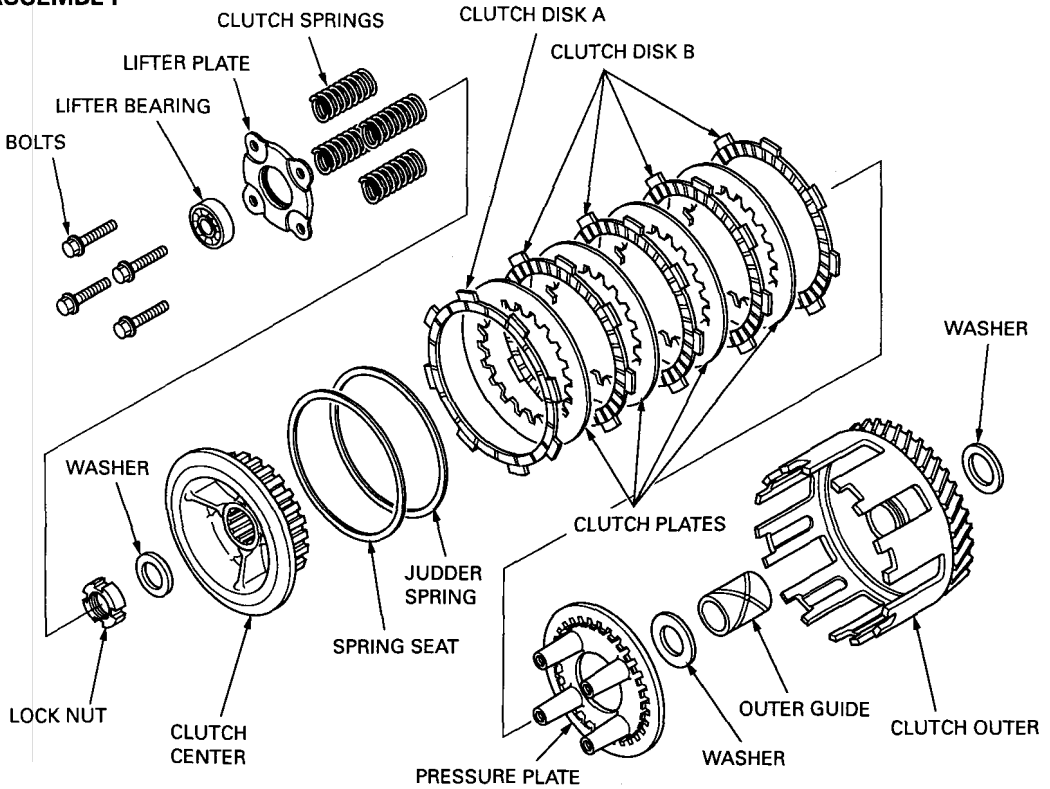
SERVICE LIMIT: 16.935 mm (0.6667 in)



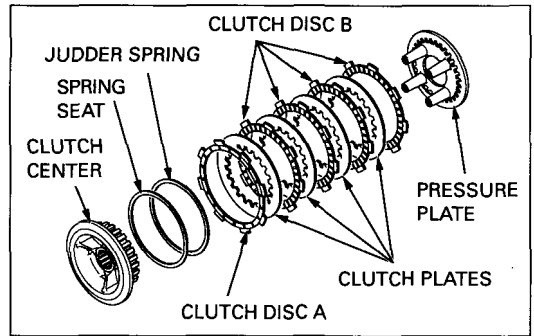
MAIN SHAFT

CLUTCH/GEARSHIFT LINKAGE

ASSEMBLY



- Install the pressure plate in the clutch outer.
- Install the clutch discs and plates alternately in the clutch outer.
- Install the tabs of outside clutch disc A into the shallow slots of the clutch outer. (Disc A has larger I.D. than Disc B)
- Install the judder spring with its tapered side facing out.
- Install the spring seat, washer and clutch center.



INSTALLATION

Install the washer.
Apply molybdenum oil solution to the clutch outer guide.
Install the washer and clutch outer guide to the main shaft.



Install the clutch assembly.

Install the clutch center holder and tighten the four bolts.
Install the washer and lock nut.
Hold the clutch assembly and tighten the lock nut to the specified torque.

TOOLS:

Clutch center holder 07GMB - KT70101

Lock nut wrench, 20 x 24 mm 07716 - 0020100

TORQUE: 74 N·m (7.5 kgf·m, 54 lbf·ft)

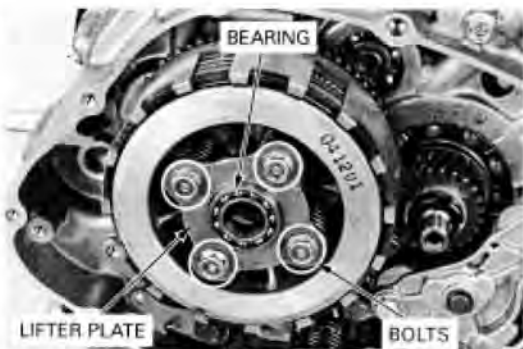
Remove the four bolts and clutch center holder.



Install the clutch springs, lifter plate, four bolts and clutch lifter bearing.

NOTE:

Tighten the lifter plate bolts in a crisscross pattern in 2 - 3 steps.



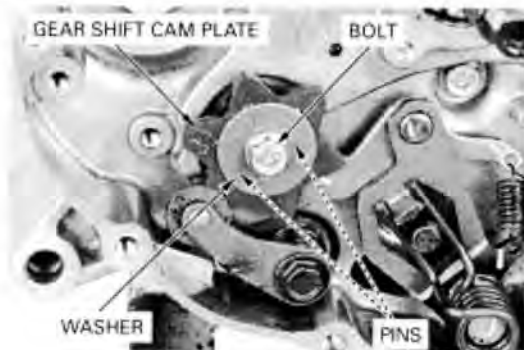
GEARSHIFT LINKAGE

REMOVAL

Remove the following:

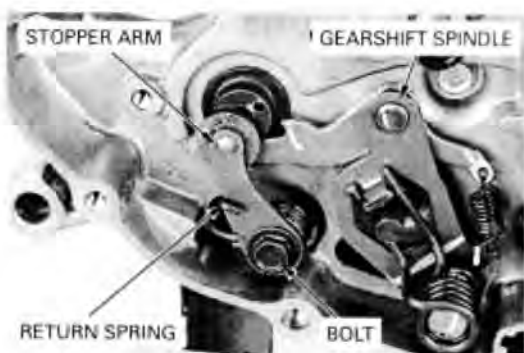
- gearshift arm
- right crankcase cover (page 8-3)
- clutch assembly (page 8-4)

Remove the bolt, washer and gearshift cam plate.
Remove the pins from the shift drum.



Remove the bolt, washer, stopper arm and return spring.
Remove the gearshift spindle.

Check the gearshift cam plate and stopper arm for wear or damage.
Check the stopper arm return spring for fatigue or damage.



Check the gearshift spindle for vent or damage.



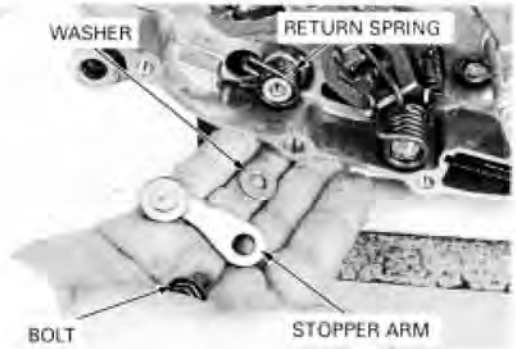
INSTALLATION

Apply molybdenum oil solution to the gearshift spindle shaft and install the gearshift spindle to the gearshift return spring pin.

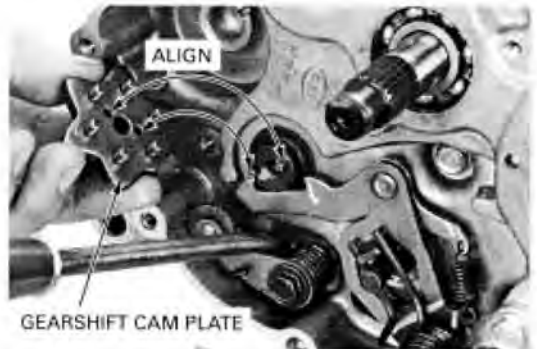


Install the return spring, washer (between the arm and spring), stopper arm and bolt, and tighten the bolt to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Lower the stopper arm and install the pins. Install the gearshift cam plate by aligning the pin hole in the cam plate with the pin.

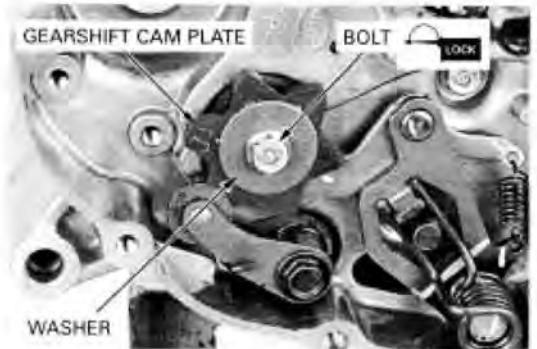


Apply locking agent to the gearshift cam plate bolt threads. Install the bolt and tighten it to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the following:

- clutch assembly (page 8-9)
- right crankcase cover (page 8-14)
- gearshift arm



PRIMARY DRIVE GEAR

REMOVAL

Remove the oil pump (page 4-3).

Remove the four bolts, lifter plate and clutch springs. Install the clutch center holder and tighten the bolts.

Remove the primary drive gear lock nut and washer while holding the clutch center holder.

TOOL:

Clutch center holder G7GMB – KT70101
Lock nut wrench, 20 x 24 mm 07716 – 0020100

Remove the clutch assembly (page 8-4).

Remove the primary drive gear.

Remove the woodruff key.

INSTALLATION

Install the washer.

Install the woodruff key onto the crankshaft.

Install the primary drive gear by aligning the groove with the woodruff key.

Install the clutch assembly (page 8-9).

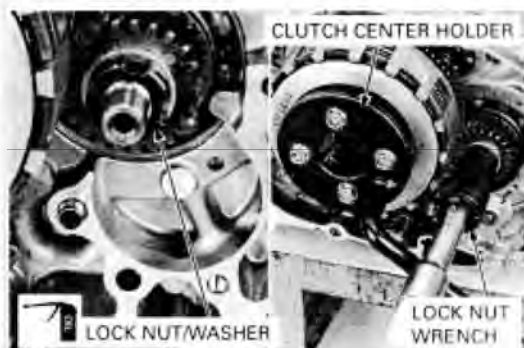
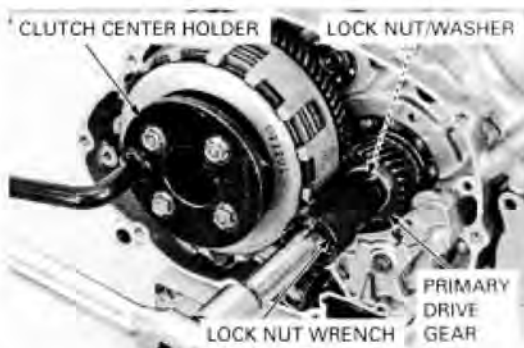
Apply engine oil to the threads and seating surface of the primary drive gear lock nut and install it with the washer. Hold the clutch assembly using the clutch center holder. Tighten the primary drive gear lock nut to the specified torque.

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

Remove the four bolts and clutch center holder. Install the clutch springs and lifter plate. Tighten the four bolts.

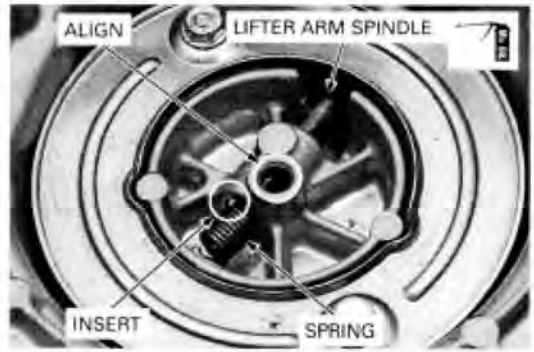
Install the following:

- oil pump (page 4-6)
- right crankcase cover (page 8-14)

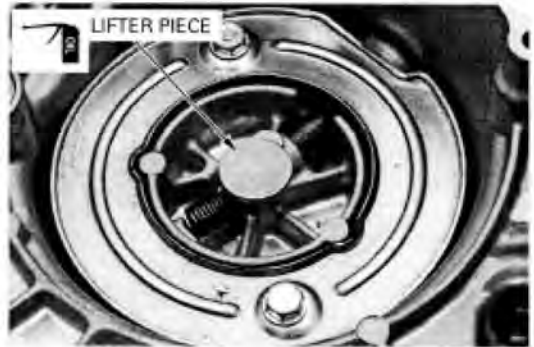


CLUTCH LIFTER ARM INSTALLATION

Apply molybdenum oil solution to the lifter arm spindle. Insert the return spring to the lifter arm spindle. Align the cover hole and cut-out of the lifter arm spindle by turning the lifter arm spindle.

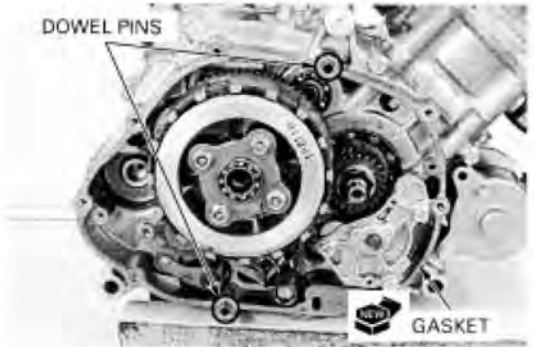


Apply engine oil to the lifter piece. Insert the lifter piece to the cover hole and lifter arm spindle.



RIGHT CRANKCASE COVER INSTALLATION

Install the new gasket and dowel pins.



Install the right crankcase cover, clamp and ten bolts. Tighten the bolts securely.



CLUTCH/GEARSHIFT LINKAGE

Connect the water hoses and tighten the hose band screws.



Connect the clutch cable end to the lifter arm.
Adjust the clutch lever free play (page 3-2).

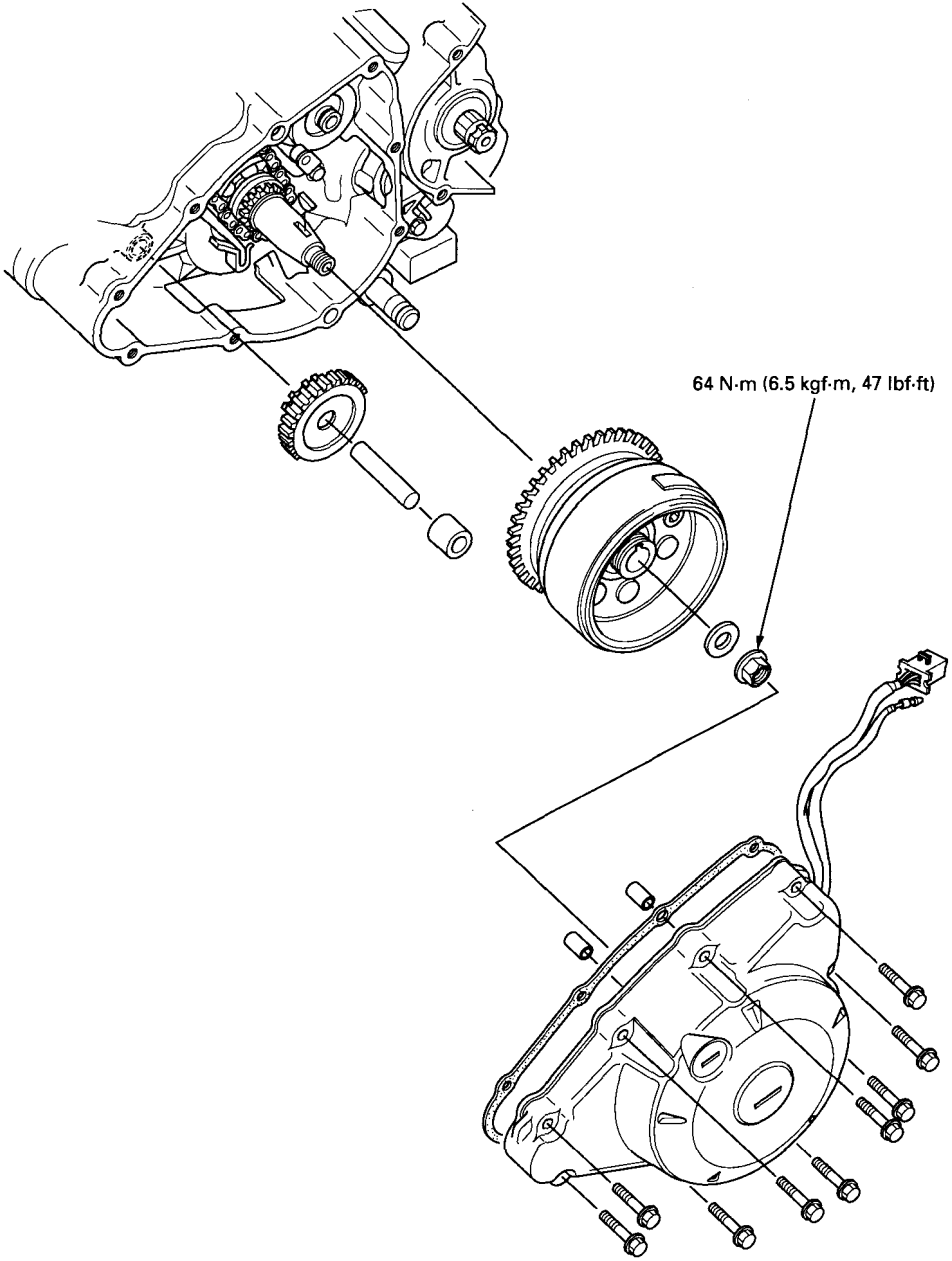
Install the under cowl (page 2-3).

Fill and bleed the cooling system (page 6-5).

Fill the recommended engine oil (page 3-10).



SYSTEM DIAGRAM



9. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION	9-1	STARTER CLUTCH	9-4
TROUBLESHOOTING	9-1	FLYWHEEL INSTALLATION	9-7
LEFT CRANKCASE COVER REMOVAL	9-2	LEFT CRANKCASE COVER INSTALLATION	9-8
ALTERNATOR/STATOR	9-2		
FLYWHEEL REMOVAL	9-3		

SERVICE INFORMATION

GENERAL

- This section covers service of the alternator stator, flywheel and starter clutch. All service can be done with the engine installed in the frame.
- Refer to section 17 for alternator stator inspection.
- Refer to section 19 for starter motor servicing.

TORQUE VALUES

Stator bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply a locking agent to the threads
Flywheel nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	Apply oil to the threads and seating surface
Starter clutch bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	Apply a locking agent to the threads
Ignition pulse generator bolt	5.2 N·m (0.53 kgf·m, 3.8 lbf·ft)	Apply a locking agent to the threads

TOOLS

Flywheel holder	07725-0040000
Rotor puller	07KMC-HE00100

TROUBLESHOOTING

Engine does not turn

- Faulty starter clutch.
- Damaged reduction gear/shaft.

LEFT CRANKCASE COVER REMOVAL

Disconnect the alternator 4P connector (page 17-7).
Remove the drive sprocket cover (page 7-3).
Remove the bolts, washer and left crankcase cover.



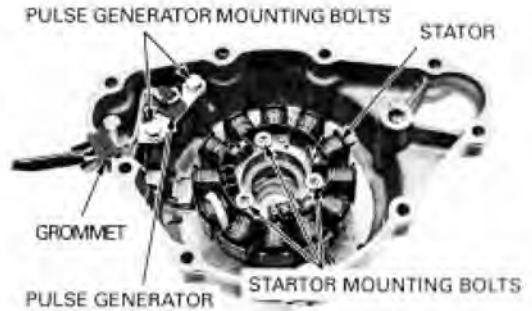
Remove the gasket and dowel pins.



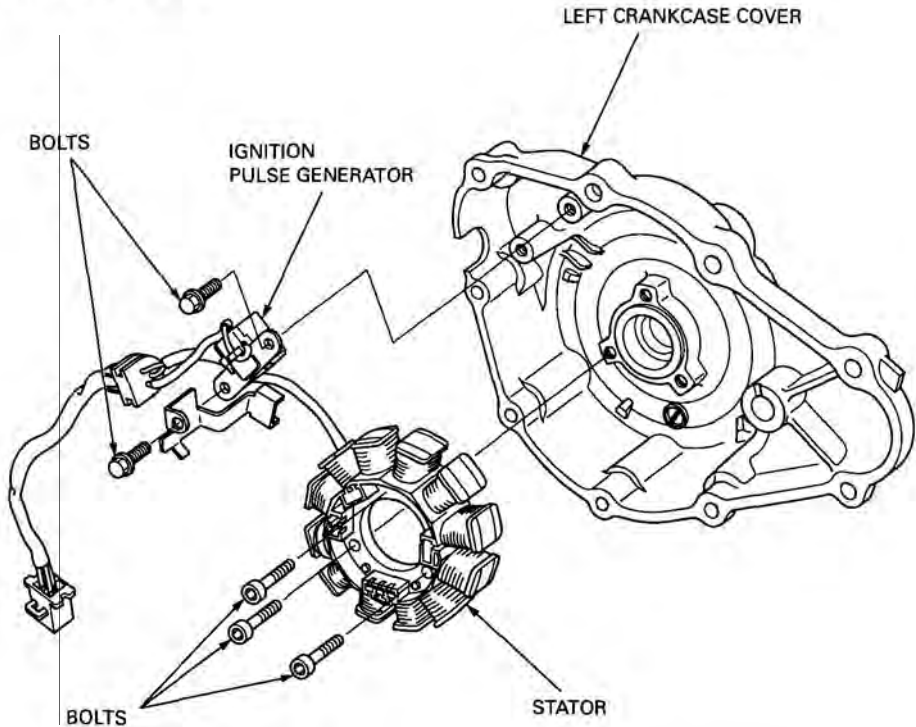
ALTERNATOR/STATOR

STATOR REMOVAL

Remove the two ignition pulse generator mounting bolts and ignition pulse generator.
Remove the three stator mounting bolts and wire grommet, then remove the stator from the left crankcase cover.



STATOR INSTALLATION



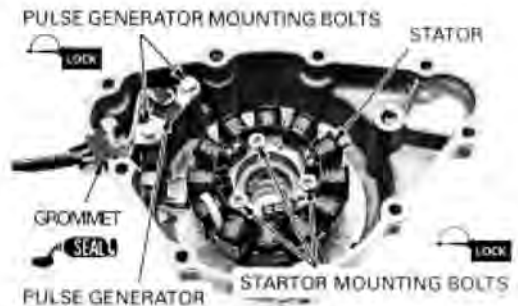
Place the stator into the left crankcase cover.
Apply liquid sealant to the wire grommet seating surface and install the grommet into the cover groove.

Apply locking agent to the ignition pulse generator and stator mounting bolts threads.
Route the wire properly and tighten the two ignition pulse generator mounting bolts.

TORQUE: 5.2 N·m (0.53 kgf·m, 3.8 lbf·ft)

Tighten the three stator mounting bolts.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



FLYWHEEL REMOVAL

Remove the left crankcase cover (page 9-2).

Hold the flywheel with the special tool and loosen the flywheel nut.

TOOL:

Flywheel holder 07725 - 0040000

Remove the flywheel nut and washer.



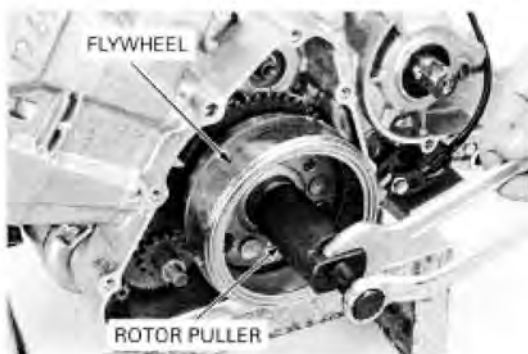
ALTERNATOR/STARTER CLUTCH

Remove the flywheel using the special tool.

TOOL:

Rotor puller

07KMC - HE00100



Remove the woodruff key.



STARTER CLUTCH

REMOVAL

Remove the flywheel (page 9-3).

Remove the starter reduction gear.



Remove the starter driven gear while turning it counterclockwise.



Hold the flywheel with the special tool and remove the starter clutch bolts.

TOOL:

Flywheel holder

07725 - 0040000

Remove the starter clutch assembly from the flywheel.

Remove the sprag clutch from the starter clutch outer.

**INSPECTION**

Check the starter reduction gear for wear or damage.

REDUCTION GEAR



Check the starter clutch outer and sprag clutch for abnormal wear or damage.

CLUTCH OUTER

SPRAG CLUTCH



Check the starter driven gear teeth for wear or damage.

STARTER DRIVEN GEAR



ALTERNATOR/STARTER CLUTCH

INSTALLATION

Apply engine oil to the sprag clutch rolling surface.
Install the sprag clutch into the starter clutch outer with the flange side facing the flywheel side.



Apply locking agent to the starter clutch bolt threads.
Install the starter clutch assembly onto the flywheel and install the bolts.
Hold the flywheel with the special tool and tighten the bolts to the specified torque.

TOOL:
Flywheel holder 07725 - 0040000

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)



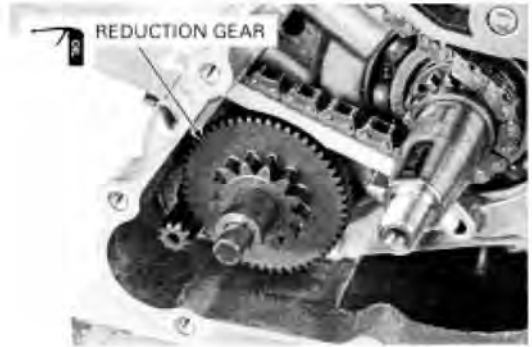
Install the starter driven gear while turning it counterclockwise.

Make sure that the starter driven gear turns counterclockwise smoothly and does not turn clockwise.

Install the flywheel (page 9-7).



Apply engine oil to the starter reduction gear both journal.
Install the starter reduction gear.



FLYWHEEL INSTALLATION

Clean any oil from the tapered portions of the crankshaft and flywheel.

Install the woodruff key in the crankshaft key groove.



Install the flywheel on the crankshaft, aligning the key way with the woodruff key.

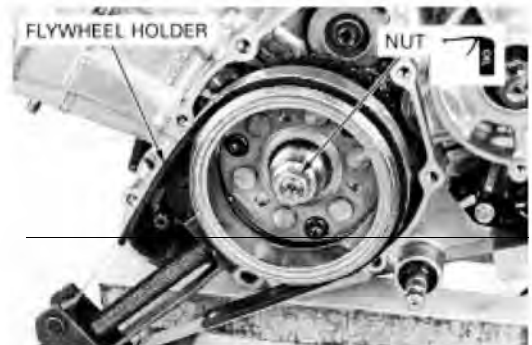


Apply oil to the flywheel nut threads and seating surface,
and install the washer and nut.
Hold the flywheel with the special tool and tighten the nut
to the specified torque.

TOOL:
Flywheel holder 07725 - 0040000

TORQUE: 64 N·m (6.5 kgf·m, 47 lbf·ft)

Install the left crankcase cover (page 9-8).



LEFT CRANKCASE COVER INSTALLATION

Install the dowel pin and a new gasket.

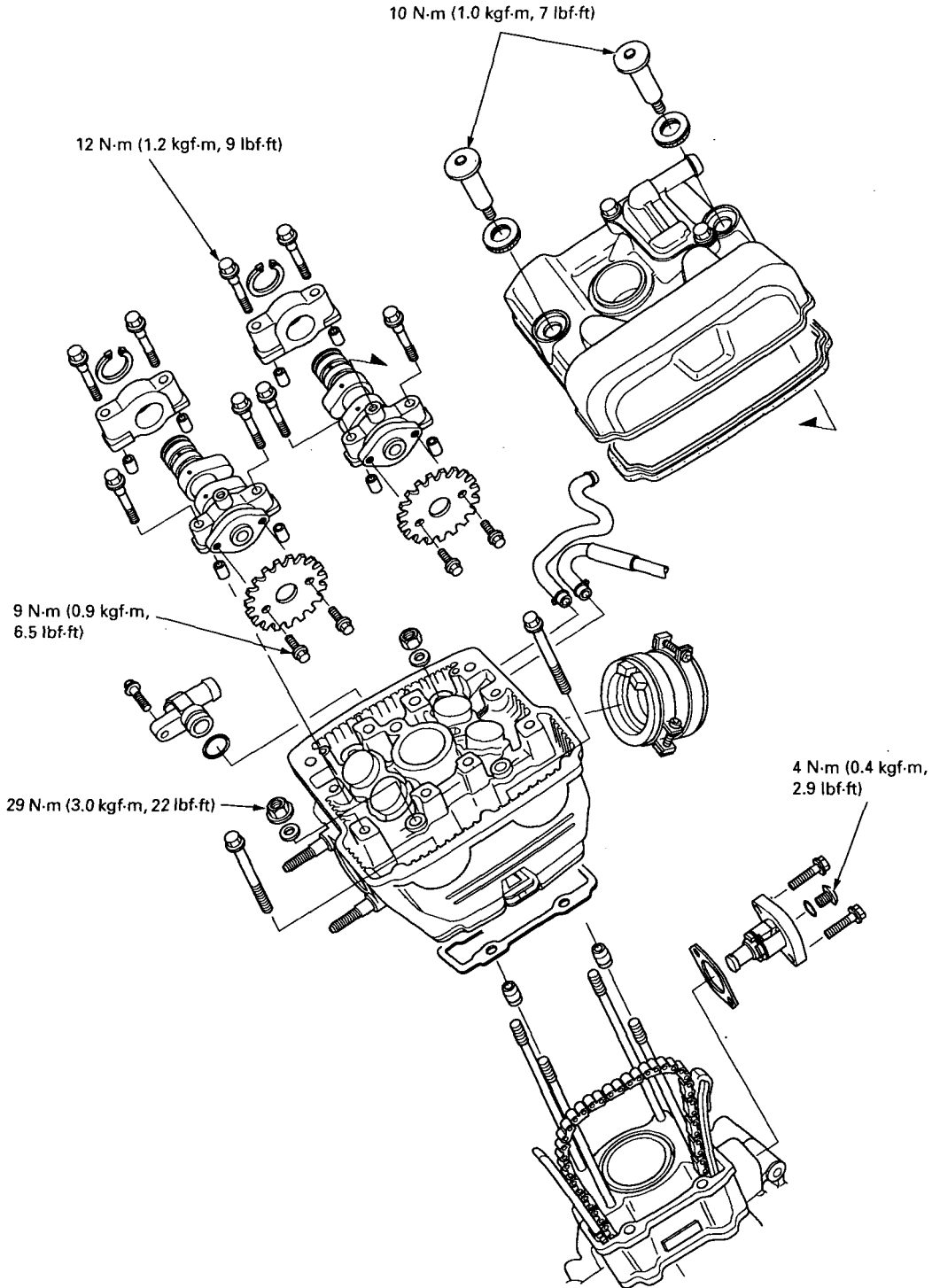


Install the left crankcase cover.
Install the washer and bolts, and tighten them securely.

Install the drive sprocket cover (page 7-6).
Connect the alternator 4P connector (page 17-7).



CYLINDER HEAD/VALVES



10. CYLINDER HEAD/VALVES

SERVICE INFORMATION	10-1	VALVE GUIDE REPLACEMENT	10-13
TROUBLESHOOTING	10-2	VALVE SEAT INSPECTION	10-14
CYLINDER COMPRESSION	10-3	VALVE SEAT REFACING	10-15
CYLINDER HEAD REMOVAL	10-4	CYLINDER HEAD ASSEMBLY	10-17
CAM CHAIN TENSIONER LIFTER	10-7	CYLINDER HEAD INSTALLATION	10-19
CYLINDER HEAD DISASSEMBLY	10-8		

SERVICE INFORMATION

GENERAL

- This section covers service of the cylinder head, valves.
- The cylinder head and valves services can be done with the engine installed in 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.
- Clean the oil passages before assembling cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cylinder compression		1,370 kpa (13.9 kgf/cm ² , 197.7 psi) at 680 min ⁻¹ (rpm)	—	
Cylinder head warpage		—	0.05 (0.002)	
Valve, valve guide	Valve clearance	IN	0.16 ± 0.03 (0.006 ± 0.001)	
		EX	0.25 ± 0.03 (0.010 ± 0.001)	
	Valve stem O.D.	IN	3.775 – 3.790 (0.1486 – 0.1492)	3.7 (0.15)
		EX	3.765 – 3.780 (0.1482 – 0.1488)	3.7 (0.15)
	Valve guide I.D.	IN/EX	3.800 – 3.812 (0.1496 – 0.1501)	3.89 (0.153)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.075 (0.0029)
		EX	0.020 – 0.047 (0.0008 – 0.0019)	0.085 (0.0033)
	Valve guide projection above cylinder head	IN	15.5 (0.61)	—
EX		13.1 (0.52)	—	
Valve seat width	IN/EX	1.2 – 1.6 (0.05 – 0.06)	1.9 (0.07)	
Valve spring free length		IN/EX	39.7 (1.56)	38.5 (1.52)
Valve lifter	O.D.	22.478 – 22.493 (0.8850 – 0.8855)		22.47 (0.885)
	Bore I.D.	21.1 – 21.3 (0.83 – 0.84)		22.5 (0.89)
Camshaft	Cam lobe height	IN	35.12 – 35.20 (1.383 – 1.386)	35.073 (1.3808)
		EX	34.71 – 34.79 (1.367 – 1.370)	34.662 (1.3646)
	Runout	—		0.02 (0.001)
	Camshaft holder I.D.	IN/EX	17.000 – 17.018 (0.6693 – 0.6700)	17.027 (0.6703)
	Camshaft O.D.	IN/EX	16.966 – 16.984 (0.6680 – 0.6687)	16.960 (0.6677)
	Camshaft-to-camshaft holder clearance	IN/EX	0.016 – 0.052 (0.0006 – 0.0020)	0.067 (0.0026)

CYLINDER HEAD/VALVES

TORQUE VALUES

Cylinder head cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)
Cam sprocket bolt	8.8 N·m (0.9 kgf·m, 6.5 lbf·ft) Apply a locking agent to the threads
Cam chain tensioner plug	4.2 N·m (0.43 kgf·m, 3.1 lbf·ft)
Camshaft holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft) Apply oil to the threads and seating surface
Cylinder head nut	30 N·m (3.1 kgf·m, 22 lbf·ft) Apply oil to the threads and seating surface

TOOLS

Valve spring compressor	07757 – 0010000
Attachment	07JME – KY20100
Valve guide driver, 3.8 mm	07GMD – KT70100
Valve guide reamer	07JMH – KY20100
Valve seat cutter	
Seat cutter, 24 mm (45° EX)	07780 – 0010600
Seat cutter, 27.5 mm (45° IN)	07780 – 0010200
Flat cutter, 24 mm (32° EX)	07780 – 0012500
Flat cutter, 27 mm (32° IN)	07780 – 0013300
Interior cutter, 26 mm (60° IN)	07780 – 0014500
Interior cutter, 30 mm (60° EX)	07780 – 0014000
Cutter holder, 3.8 mm	07JMH – KY20200
Tapet hole protector	07JMG – KY20100

TROUBLESHOOTING

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

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

- Valves
 - Incorrect valve adjustment
 - Burned or bent valves
 - Incorrect valve timing
 - Broken valve spring
 - Weak valve spring
- Cylinder head
 - Leaking or damaged cylinder head gasket
 - Warped or cracked cylinder head

Compression too high, overheating or knocking

- Excessive carbon build-up in cylinder head or on top of piston

Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Faulty cylinder, piston or piston rings (section 11)

Excessive noise

- Cylinder Head
 - Incorrect valve clearance
 - Sticking valve or broken valve spring
- Faulty cylinder or piston (section 11)

Rough idle

- Low cylinder compression
- Intake air leak

CYLINDER COMPRESSION

▲ WARNING

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

Warm up the engine to normal operating temperature.
Stop the engine.

Remove the spark plug (page 3-6).

Install the compression gauge into the spark plug hole. Open the throttle all the way and crank the engine with the starter motor until the gauge reading stops rising.

STANDARD: 1,370 kPa (13.9 kgf/cm², 197.7) at 680 rpm

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.

- Leaking cylinder head gasket
- Worn piston ring
- Worn cylinder and piston

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



CYLINDER HEAD REMOVAL

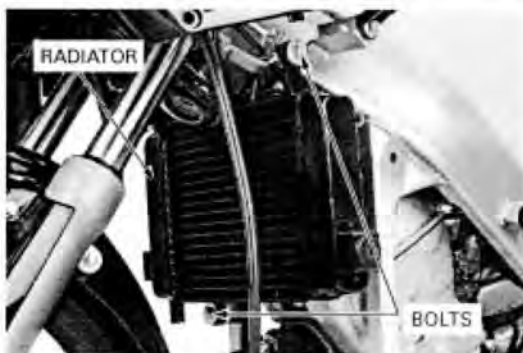
CYLINDER HEAD COVER REMOVAL

Remove the following:

- right and left middle cowl (page 2-4)
- fuel tank (page 5-3)

Remove the two bolts and radiator with water hoses installed.

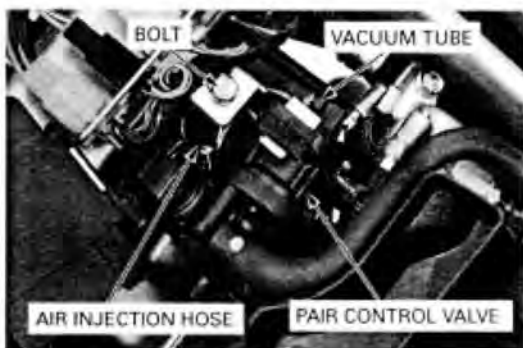
Disconnect the upper radiator hose from the cylinder head.



Disconnect the vacuum tube.

Remove the bolt and PAIR control valve.

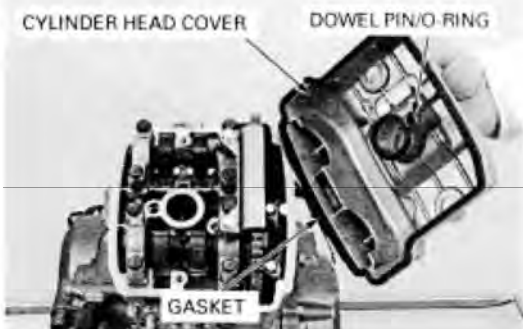
Disconnect the air injection hose from the PAIR check valve cover.



Remove the two bolts and rubber washers.



Remove the cylinder head cover, gasket, dowel pin and O-ring.



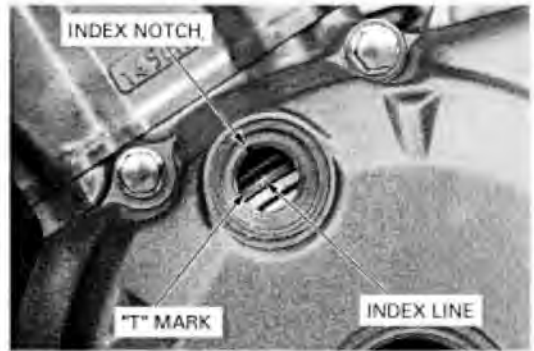
CAMSHAFT REMOVAL

Remove the following:

- under cowl (page 2-3)
- cylinder head cover (page 10-4)

Remove the timing hole cap and crankshaft hole cap.

Turn the crankshaft counterclockwise and align the index line of the "T" mark on the flywheel with the index notch on the left crankcase cover.



The index lines on the cam sprockets must be flush with the cylinder head surface as shown.

Make sure the piston is at TDC (Top Dead Center) on the compression stroke.

If the piston is at TDC on the exhaust stroke, rotate the crankshaft counterclockwise 360° (1 full turn) and align the "T" mark with index notch.



Remove the cam chain tensioner lifter plug.

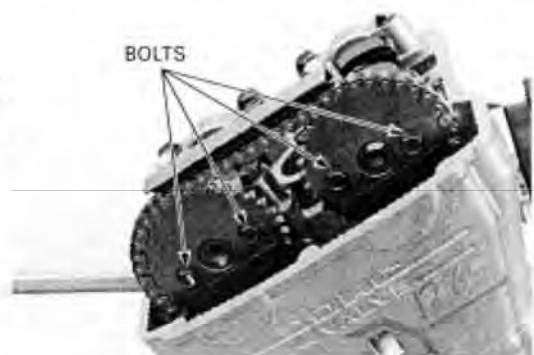
Turn the tensioner shaft clockwise with the stopper tool (page 10-8) to retract the tensioner, then insert the stopper fully to hold the tensioner in the fully retracted position.



Remove the cam sprocket bolts.

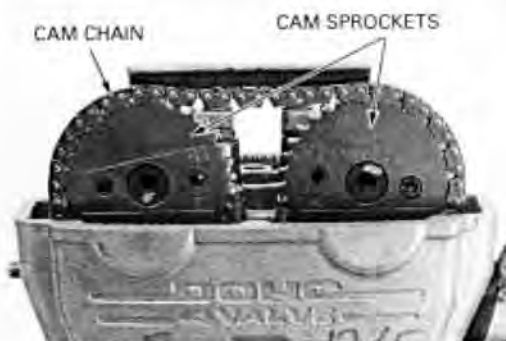
NOTE:

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



CYLINDER HEAD/VALVES

Remove the cam sprockets off the camshaft flanges.
Remove the sprockets from the cam chain.
Attach a piece of wire to the cam chain to prevent it from falling into the crankcase.



Remove the two bolts and cam chain guide.

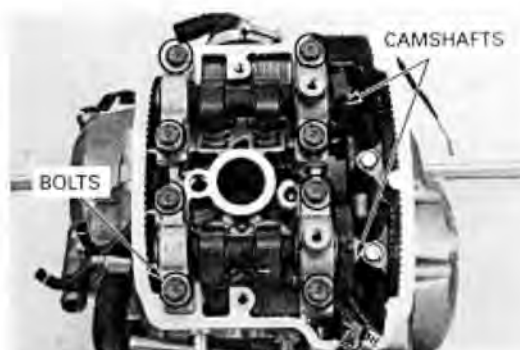
Inspect the cam chain slipper surface of the cam chain guide for wear or damage and replace if necessary.



Remove the camshaft holder bolts, camshaft holders, dowel pins and camshafts.

NOTE:

Do not forcibly remove the dowel pins from the camshaft holders.



CYLINDER HEAD REMOVAL

Drain the coolant (page 6-5).
Remove the radiator (page 6-8).

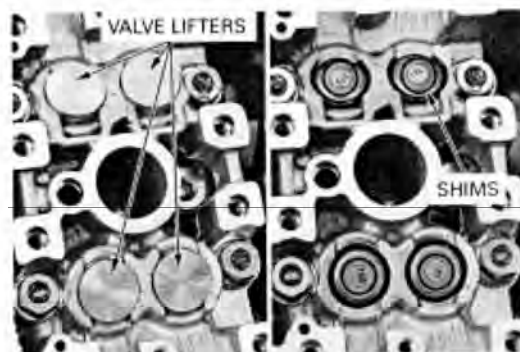
Remove the following:

- camshaft (page 10-5)
- exhaust system (page 2-5)
- carburetor assembly (page 5-4)

Remove the valve lifters and shims.

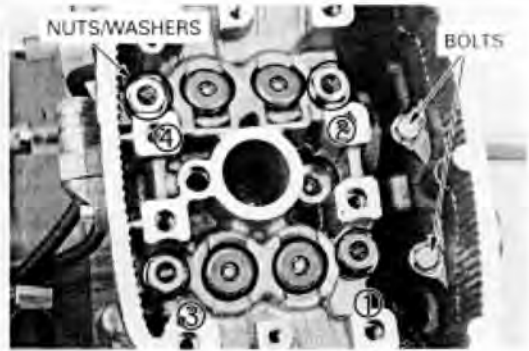
NOTE:

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

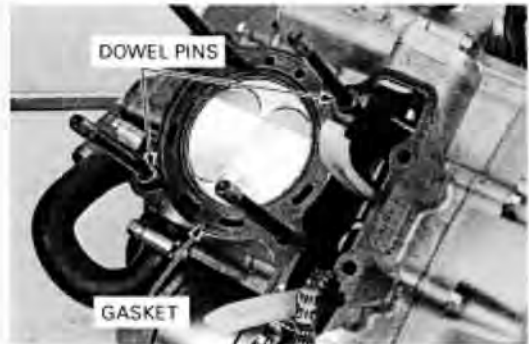


Remove the cylinder head bolts.
Loosen the cylinder head nuts in a crisscross pattern in 2 to 3 steps, and remove them and washers.

Remove the cylinder head.



Remove the gasket and dowel pins.



CAM CHAIN TENSIONER LIFTER

REMOVAL

Remove the two bolts and cam chain tensioner lifter.

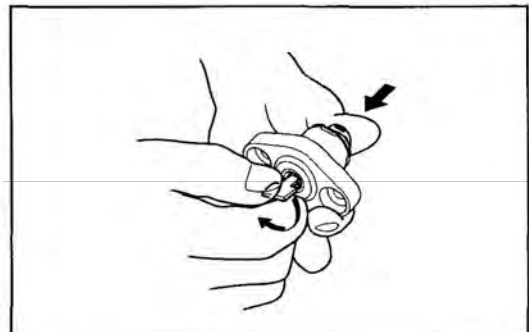


INSPECTION

Remove the tensioner lifter plug.

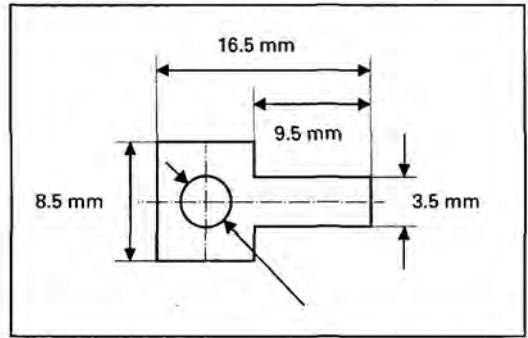
Check the lifter operation:

- The tensioner shaft should not go into the body when it is pushed.
- When it is turned clockwise with a screwdriver, the tensioner shaft should be pulled into the body. The shaft *spring out of the body as soon as the screwdriver is released.*



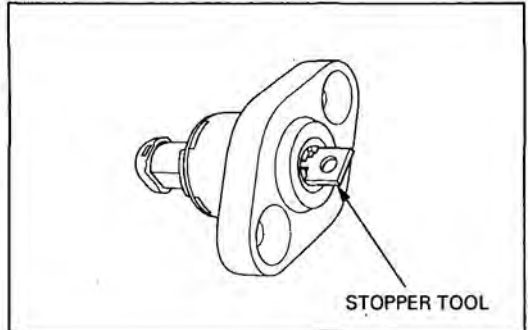
CYLINDER HEAD/VALVES

Make a tensioner shaft stopper tool out of a thin piece of steel (0.8 mm thick) using the diagram.



INSTALLATION

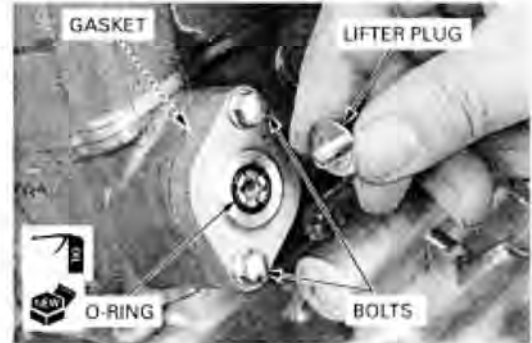
Turn the tensioner shaft clockwise with the stopper tool to retract the tensioner, then insert the stopper fully to hold the tensioner in the fully retracted position.



Install a new gasket on the cam chain tensioner lifter. Install the tensioner lifter into the cylinder and tighten the mounting bolts.

Remove the stopper tool from the tensioner lifter. Apply oil to the new O-ring. Install the lifter plug with a new O-ring and tighten it.

TORQUE: 4.2 N-m (0.43 kgf-m, 3.1 lbf-ft)



CYLINDER HEAD DISASSEMBLY

Loosen the band screw and remove the carburetor insulator. Disconnect the vacuum tubes.



Remove the bolt, radiator hose joint and O-ring.



While compressing the valve spring with the valve spring compressor, remove the valve cotters.

CAUTION:

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

TOOL:

- Valve spring compressor 07757 - 0010000
- Valve spring compressor attachment 07JME- KY20100
- Tapet hole protector 07JMG- KY20100

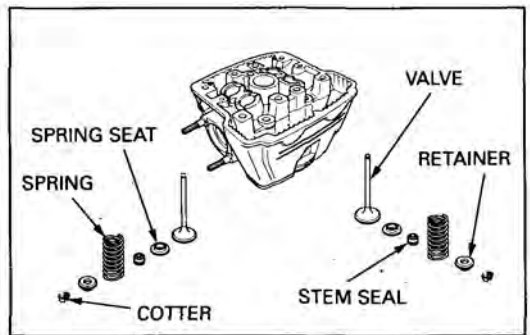


Loosen the valve spring compressor and remove the following:

- spring retainers
- valve springs
- spring seats
- intake and exhaust valve
- valve stem seal

NOTE:

Mark all disassembled parts to ensure correct reassembly.



Remove the carbon deposits from the combustion chamber.
Clean off any gasket materials from the cylinder head surface.

NOTE:

Being careful not to damage the gasket surface.



CYLINDER HEAD/VALVES

INSPECTION

Camshaft/camshaft holder

Remove the snap ring and right camshaft holder.



Measure the camshaft holder I.D.

SERVICE LIMIT: 17.027 mm (0.6703 in)



Measure the camshaft O.D.

Calculate the camshaft-to-camshaft holder clearance.

SERVICE LIMIT: 16.960 mm (0.6677 in)

If the camshaft-to-camshaft holder clearance exceeds the service limit, replace the camshaft and left camshaft holder as a set and recheck the camshaft clearance.

Replace the right camshaft holder if the camshaft clearance still exceeds the service limit.

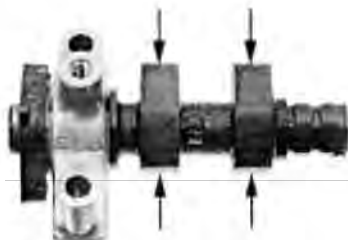


Measure the height of each cam lobe.

SERVICE LIMIT:

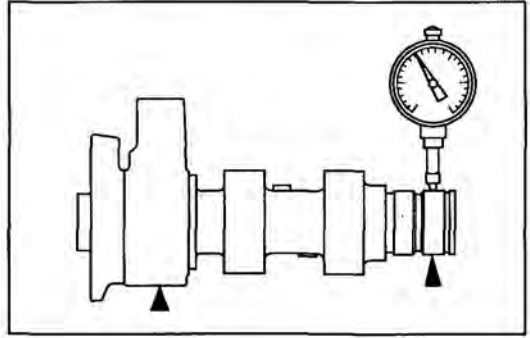
IN: 35.073 mm (1.3808 in)

EX: 34.662 mm (1.3646 in)



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

SERVICE LIMIT: 0.02 mm (0.001 in)



Valve lifter

Check the valve lifter bore for scoring, scratches or damage. Measure the each valve lifter bore I.D.

SERVICE LIMIT: 22.5 mm (0.89 in)



Check the valve lifter for scoring, scratches or damage. Measure the each valve lifter O.D.

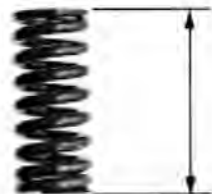
SERVICE LIMIT: 22.47 mm (0.885 in)



Valve spring

Measure the valve spring length.

SERVICE LIMIT: 38.5 mm (1.52 in)



CYLINDER HEAD/VALVES

Cylinder head

Check the spark plug hole and valve area for cracks. Check the cylinder head for warpage with a straight edge and a feeler gauge.

SERVICE LIMIT: 0.05 mm (0.002 in)

NOTE:

Be careful not to damage the gasket surface.



Valve

Inspect the valve for trueness, burning, scratches or abnormal stem wear. Measure the valve stem O.D.

SERVICE LIMIT: IN/EX: 3.7 mm (0.15 in)

Insert each valve into the valve guide and check the valve movement in the guide.



Valve guide

NOTE:

- Ream the valve guide to remove the carbon build-up before checking the valve guide.
- Always rotate the reamer clockwise, never counterclockwise when installing, removing and reaming.

TOOL:

Valve guide reamer **07JMH – KY20100**

Measure and record each valve guide I.D. with a ball gauge or inside micrometer.

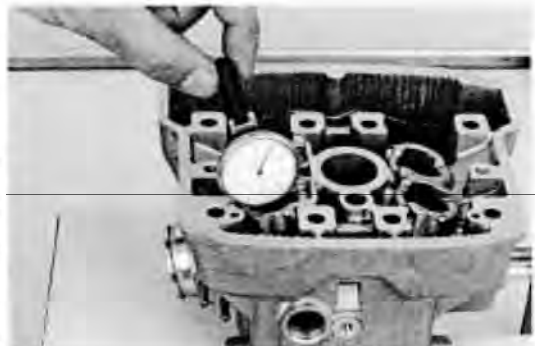
SERVICE LIMIT: IN/EX: 3.89 mm (0.153 in)

Calculate the stem-to-guide clearance.

SERVICE LIMIT: IN: 0.075 mm (0.0029 in)
EX: 0.085 mm (0.0033 in)

NOTE:

- 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 the guides as necessary and ream to fit.
- If the stem-to-guide clearance still exceeds the service limit with new guides, replace the valve and guide.
- Reface the valve seat whenever new valve guides are installed.



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.**
- **Be careful not to damage the mating surface.**

Support the cylinder head and drive the valve guides out of the cylinder head from the combustion chamber side.

TOOL:

Valve guide driver, 3.8 mm 07GMD- KT70100

While the cylinder head is still heated, drive new valve guides in the cylinder head from the camshaft side until the exposed height is following dimensions.

TOOL:

Valve guide driver, 3.8 mm 07GMD- KT70100

VALVE GUIDE PROJECTION:

IN: 15.5 mm (0.61 in)

EX: 13.1 mm (0.52 in)

Let the cylinder head cool to room temperature.

Ream the new valve guides.

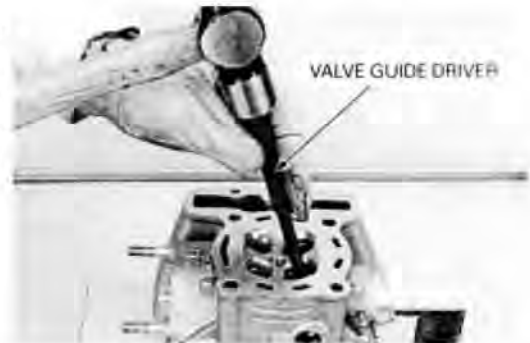
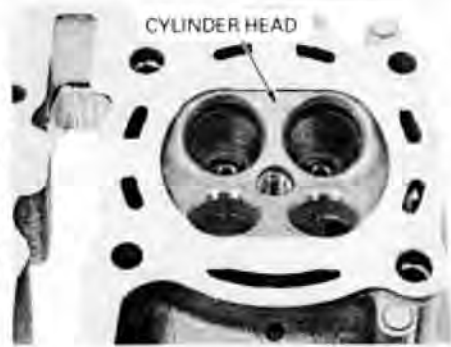
TOOL:

Valve guide reamer 07JMH- KY20100

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.
- Use cutting oil on the reamer during this operation.

Clean the cylinder head thoroughly to remove any metal particles after reaming and reface the valve seat.



VALVE SEAT INSPECTION

Clean the intake and exhaust valves thoroughly to remove the carbon deposits.

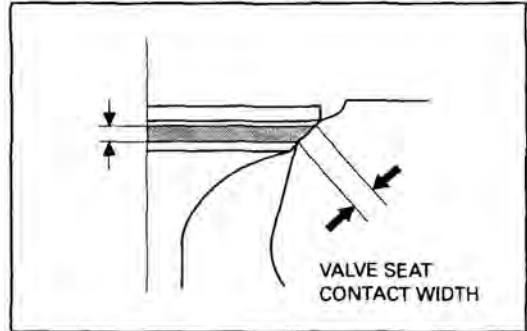
Apply light coating of Prussian Blue to the valve seats. Lap the valves and seats using a rubber hose or other hand lapping tool.



Remove the valve and inspect the width of each valve seat.

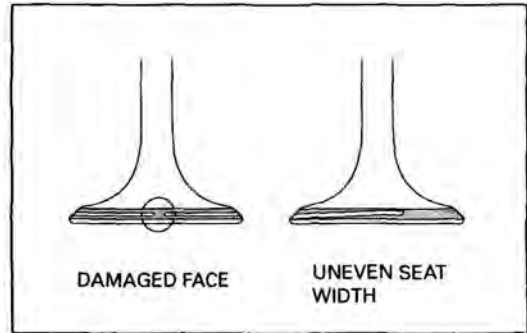
STANDARD: 1.2 – 1.6 mm (0.05 – 0.06 in)
SERVICE LIMIT: 1.9 mm (0.07 in)

Valve seat width is not within specification, reface the valve seat (page 10-15).



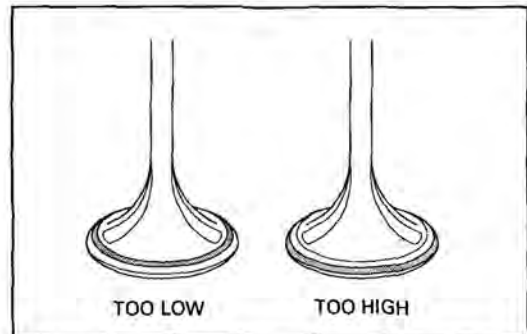
CAUTION:

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



If the valve seat is following conditions, the seat must be ground.

- 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.

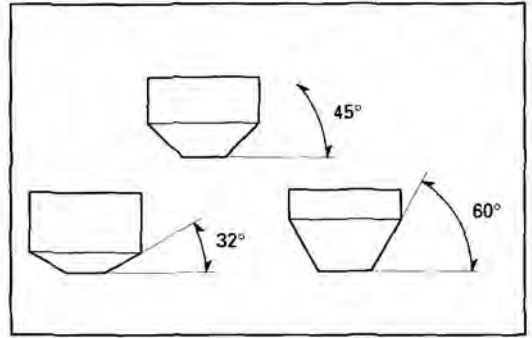


VALVE SEAT REFACING

Honda Valve Seat Cutters, a grinder or equivalent valve seat refacing equipment are recommended to correct a worn valve seat.

NOTE:

- Follow the refacer manufacture's operating instructions.
- Be careful not to go grind the seat more than necessary.



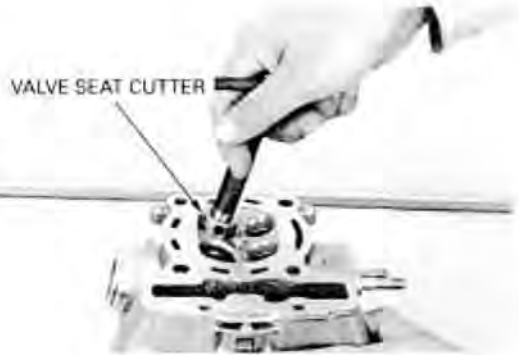
Use a 45 degree cutter to remove the roughness or irregularities from the seat.

NOTE:

Reface the valve seat with a 45 degree cutter when a valve guide is replaced.

TOOLS:

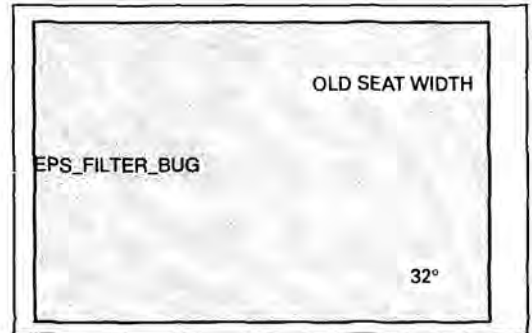
Seat cutter, 24 mm (EX)	07780- 0010600
Seat cutter, 27.5 mm (IN)	07780- 0010200
Cutter holder, 3.8 mm	07JMH- KY20200



Using 32 degree cutter, remove 1/4 of the existing valve seat material.

TOOLS:

Flat cutter, 24 mm (EX)	07780- 0012500
Flat cutter, 27 mm (IN)	07780- 0013300
Cutter holder, 3.8 mm	07JMH- KY20200

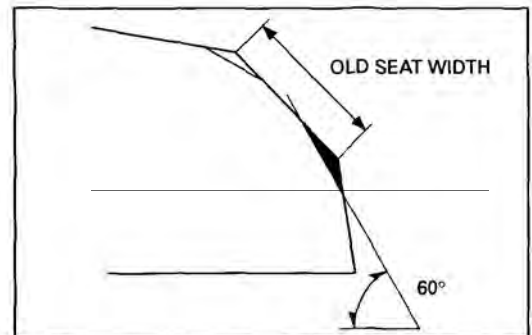


Using 60 degree cutter, remove the bottom 1/4 of the oil seat.

Remove the cutter and inspect the area you have just removed.

TOOLS:

Interior cutter, 26 mm (EX)	07780- 0014500
Interior cutter, 30 mm (IN)	07780- 0014000
Cutter holder, 3.8 mm	07JMH- KY20200

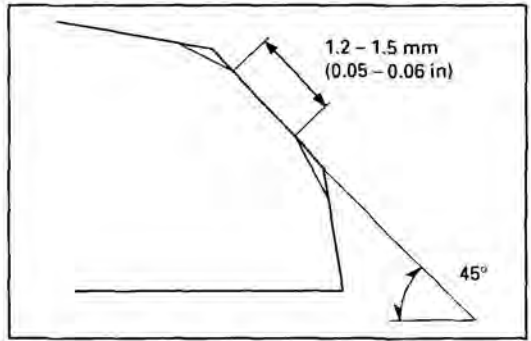


CYLINDER HEAD/VALVES

Install a 45 degree seat cutter and cut the seat to proper width.

Make sure that all pitting and irregularities are removed. Refinish if necessary.

STANDARD SEAT WIDTH: 1.2 – 1.6 mm (0.05 – 0.06 in)



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

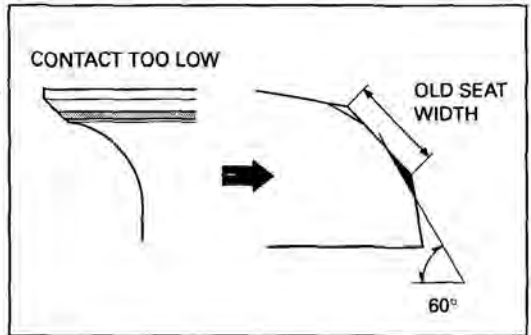
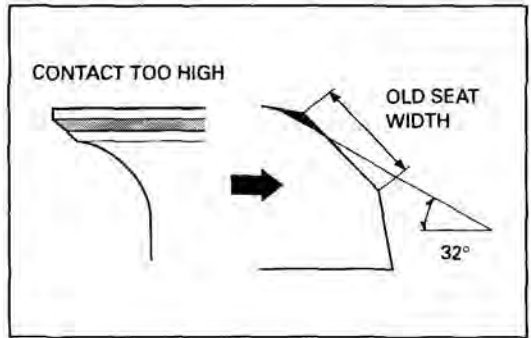
NOTE:

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

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

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

Refinish the seat to specifications, using a 45 degree seat cutter.



CAUTION:

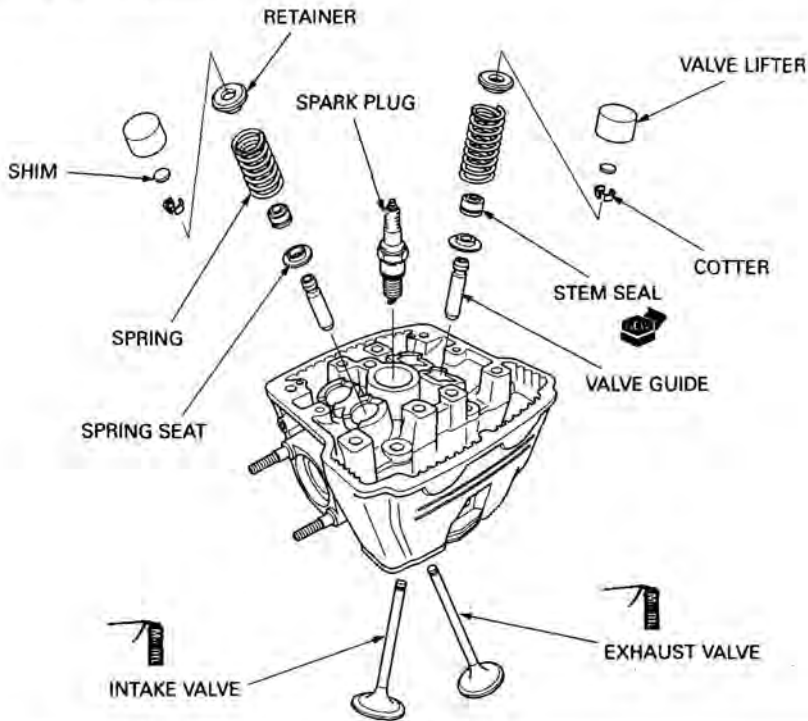
- Excessive lapping pressure may deform or damage the seat.
- Change the angle of lapping tool frequently to prevent uneven seat wear.
- Lapping compound can cause damage if it enters between the valve stem and guide.

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.

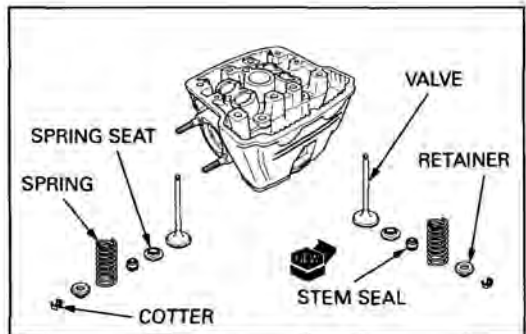


CYLINDER HEAD ASSEMBLY



Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.
 Install the valve spring seat and new valve stem seal.
 Lubricate each valve stem with molybdenum oil.
 Insert the intake and exhaust valve into the valve guides.

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



Install the valve springs with the blue painted side facing up and the springs tightly wound coils should face toward the combustion chamber.
 Install the retainers.



CYLINDER HEAD/VALVES

Compress the valve spring and install the valve cotters.

CAUTION:

To prevent loss of tension, do not compress the valve spring more than necessary.

TOOL:

Valve spring compressor	07757 - 0010000
Attachment	07JME- KY20100
Tapet hole protector	07JMG- KY20100



Tap the stems gently with two plastic hammer to firmly seat the cotters.

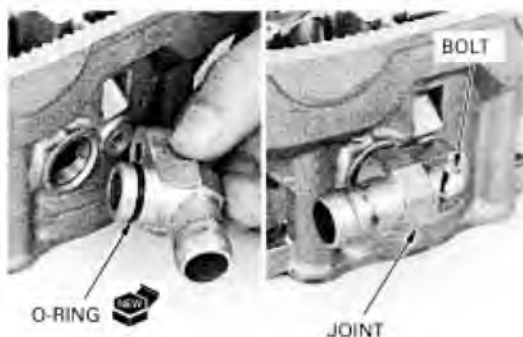
CAUTION:

Support the cylinder head above the work bench surface to prevent valve damage.



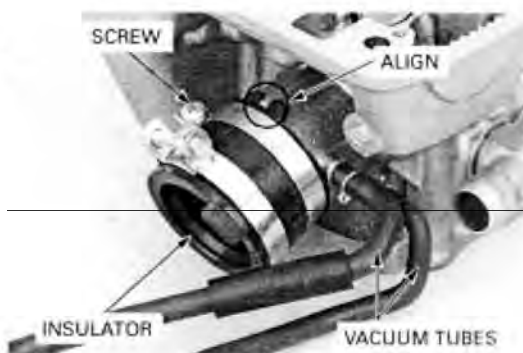
Apply coolant to the new O-ring and install it to the radiator hose joint.

Install the radiator hose joint to the cylinder head and tighten the bolt.



Connect the vacuum tubes.

Install the carburetor insulator to the cylinder head by aligning the insulator groove with cylinder head boss and tighten the insulator band screw.



CYLINDER HEAD INSTALLATION

Clean any gasket material from the cylinder mating surfaces.

NOTE:

Do not allow dust and dirt to enter the engine.

Make sure that the cam chain guide bosses are in the grooves of the cylinder.

Install the dowel pins and new gasket.

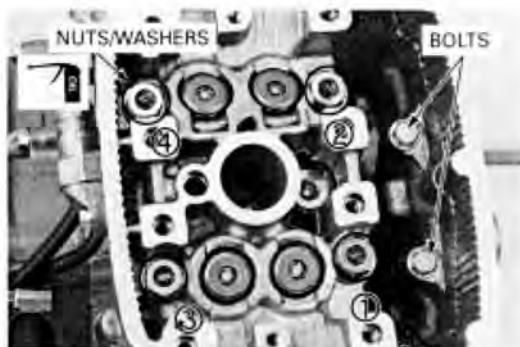


Route the cam chain through the cylinder head and install the cylinder head onto the cylinder. Apply oil to the threads and seating surface of the four nuts and install them and washers.

Tighten the nuts to the specified torque in the specified sequence as shown.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Install and tighten the two bolts.



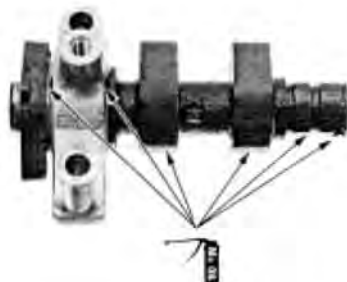
Install the valve shims in their original locations.

Coat the outer surfaces of the valve lifters with oil. Install the valve lifters in their original lifter bores, being careful not to damage the sliding surfaces of the lifters and bores.



CAMSHAFT INSTALLATION

Apply molybdenum oil solution to the camshaft journals and cam lobes.



CYLINDER HEAD/VALVES

Install the camshaft into the right camshaft holder in their proper locations.

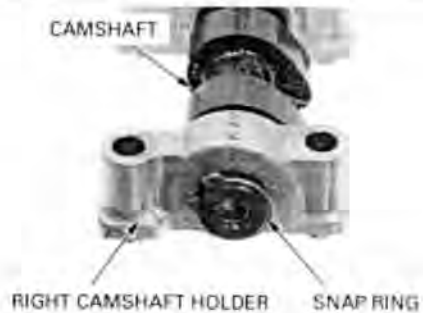
NOTE:

The camshaft holders have the following identification marks:

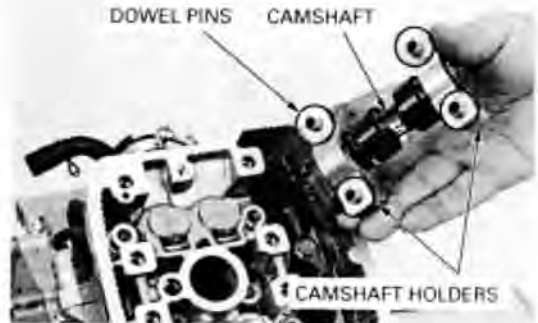
IN: Intake camshaft holder

EX: Exhaust camshaft holder

Install the snap ring.



Install the dowel pins, camshaft holders and camshafts in their proper locations.



Apply oil to the threads and seating surface of the camshaft holder bolts.

Install the bolts and tighten them in a crisscross pattern in 2 or 3 steps.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Turn the camshaft by your hand with the cam lobe facing up.

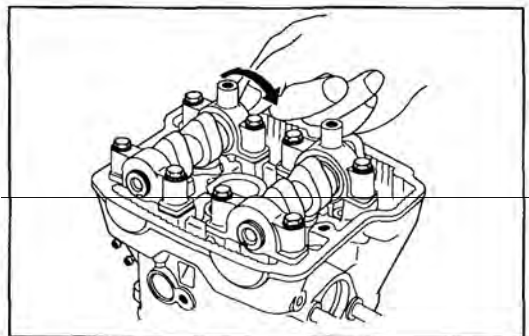
The camshafts should turn smoothly.

Remove the bolts, camshaft holders and camshafts if the camshafts do not turn smoothly.

Reinstall the camshaft, camshaft holders and bolts and retighten the bolts (see above).

Recheck the camshaft rotation.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



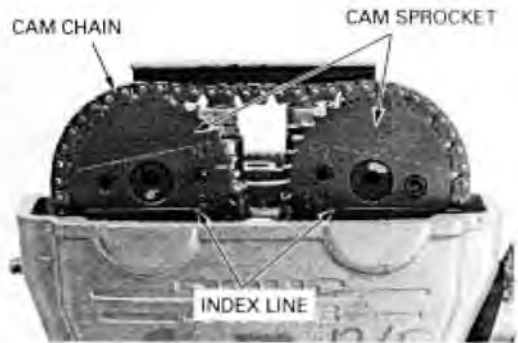
Install the cam chain guide.
Tighten the two bolts.



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



Attach the cam sprockets to the cam chain by aligning the cam sprocket marks with the cylinder head surface as shown.
Temporarily align the index line on the sprockets with the surface of the cylinder head without moving the cam chain.

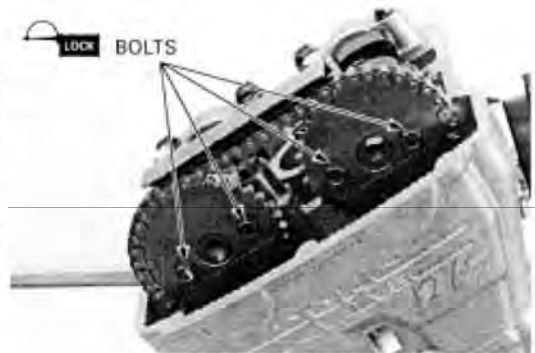


Install the cam sprockets onto the camshafts.

NOTE:

Be sure that the index lines on the cam sprocket align with the surface of the cylinder head when the index line of the "T" mark on the flywheel is aligned with the index notch on the crankcase cover.

Apply locking agent to the cam sprocket bolt threads.
Align the bolt holes in the cam sprocket with camshaft flange.
Install the cam sprocket bolts and tighten them to the specified torque.



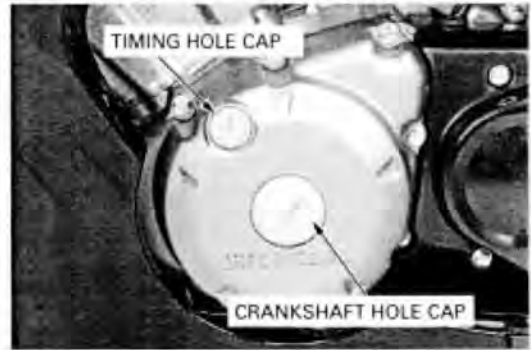
TORQUE: 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)

CYLINDER HEAD/VALVES

Install the timing hole cap and crankshaft hole cap (page 3-10).

Install the following:

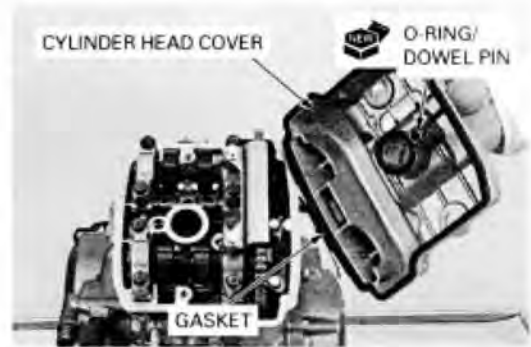
- exhaust system (page 2-7)
- under cowl (page 2-3)
- carburetor assembly (page 5-13)



CYLINDER HEAD COVER INSTALLATION

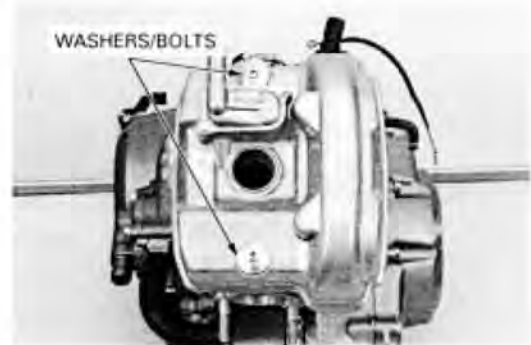
Install the gasket, new O-ring and dowel pin to the cylinder head cover.

Install the cylinder head cover onto the cylinder head.



Install the rubber washers with the "UP" marks facing up. Install and tighten the head cover bolts to the specified torque.

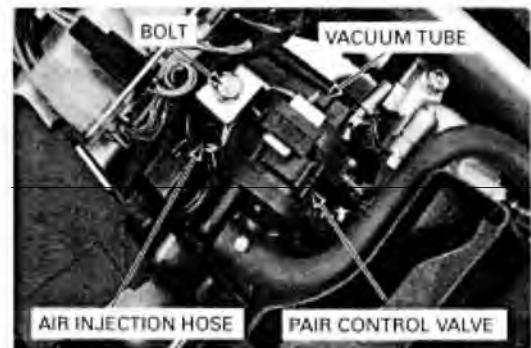
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)



Connect the air injection hose into the PAIR check valve cover.

Connect the vacuum tube.

Install the PAIR control valve and bolt.



Connect the upper radiator hose to the cylinder head.
Install the radiator and two bolts.
Tighten the bolts.

Install the following:

- right and left middle cowl (page 2-4)
- air cleaner housing (page 5-4)
- fuel tank (page 5-3)

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



11. CYLINDER/PISTON

SERVICE INFORMATION	11-1	PISTON REMOVAL	11-4
TROUBLESHOOTING	11-2	PISTON INSTALLATION	11-7
CYLINDER REMOVAL	11-3	CYLINDER INSTALLATION	11-8

SERVICE INFORMATION

GENERAL

- The service procedures in this section can be performed with the engine installed in the frame.
- Take care not to damage the cylinder wall and piston.
- Be careful not to damage the mating surfaces by using the screw driver when removing 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.	63.50 – 63.51 (2.5000 – 2.5004)	63.55 (2.502)	
	Out of round	—	0.10 (0.004)	
	Taper	—	0.10 (0.004)	
	Warpage	—	0.05 (0.002)	
Piston, piston rings	Piston mark direction	"IN" mark facing toward the intake side	—	
	Piston O.D.	63.47 – 63.49 (2.4988 – 2.4996)	63.40 (2.496)	
	Piston O.D. measurement point	6.5 (0.36) from bottom of skirt	—	
	Piston pin bore I.D.	15.002 – 15.008 (0.5960 – 0.5909)	15.055 (0.5927)	
	Piston pin O.D.	14.994 – 15.000 (0.5903 – 0.5906)	14.98 (0.590)	
	Piston-to-piston pin clearance	0.002 – 0.014 (0.0001 – 0.0006)	0.04 (0.0016)	
	Piston ring-to-ring groove clearance	Top	0.045 – 0.075 (0.0018 – 0.0030)	0.10 (0.004)
		Second	0.015 – 0.050 (0.0006 – 0.0020)	0.08 (0.003)
	Piston ring end gap	Top	0.05 – 0.20 (0.002 – 0.008)	0.3 (0.01)
		Second	0.15 – 0.30 (0.004 – 0.010)	0.7 (0.030)
Oil (side rail)		0.20 – 0.70 (0.008 – 0.028)	1.1 (0.04)	
Cylinder-to-piston clearance		0.01 – 0.04 (0.0004 – 0.0016)	0.90 (0.035)	
Connecting rod small end I.D.		15.010 – 15.028 (0.5909 – 0.5917)	15.09 (0.594)	
Connecting rod small end-to-piston pin clearance		0.010 – 0.034 (0.0004 – 0.0013)	0.075 (0.0030)	

11

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 10-4).

Loosen the band screw and disconnect the water hose.
Remove the cam chain guide.

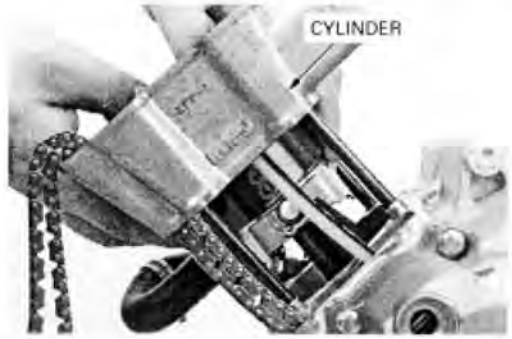


Remove the cylinder.

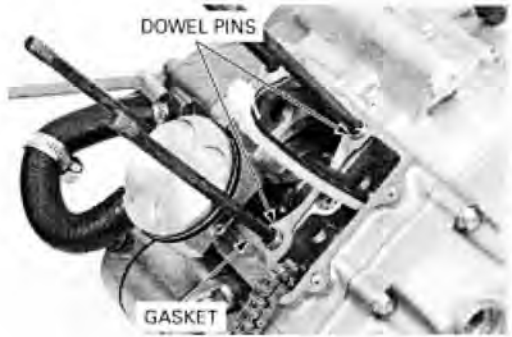
Clean the top of the cylinder thoroughly.

CAUTION:

Avoid damaging the gasket surfaces.



Remove the dowel pins and gasket.



CYLINDER/PISTON

INSPECTION

Inspect the cylinder wall for scratches and wear. Measure and record the cylinder I.D. at three levels in both the X and Y axis. Take the maximum reading to determine the cylinder wear.

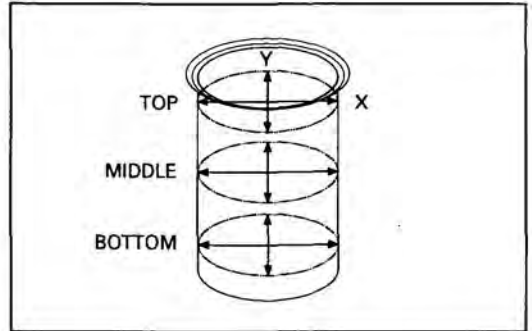
SERVICE LIMIT: 63.55 mm (2.502 in)

Calculate the cylinder for out of round at the three levels in an X and Y axis. Take the maximum reading to determine the out of round.

SERVICE LIMIT: 0.10 mm (0.004 in)

Calculate the cylinder for taper at three levels in an X and Y axis. Take the maximum reading to determine the taper.

SERVICE LIMIT: 0.10 mm (0.004 in)



Check the cylinder for warpage by placing a straight edge and a feeler gauge across the bolt holes as shown.

SERVICE LIMIT: 0.05 mm (0.002 in)



PISTON REMOVAL

NOTE:

Place a clean shop towel over the crankcase opening to prevent piston pin clips from falling into the crankcase.

Remove the piston pin clip using the pliers.

Remove the piston pin out and remove the piston.

Inspect the piston rings for movement by pressing the rings. The rings should be able to move in its groove 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.*
- *Be careful not to damage the piston when the piston ring removal.*



Clean carbon deposits from the piston.

NOTE:

Clean carbon deposits from the piston ring grooves with a ring that will be discarded. Never use a wire brush; it will scratch the grooves.

**INSPECTION**

Inspect the piston for cracks or other damage.

Inspect the ring grooves for excessive wear and carbon build-up.

Measure each piston O.D.

NOTE:

Take measurements 6.5 mm (0.36 in) from the bottom, and 90° to the piston pin hole.

SERVICE LIMIT: 63.40 mm (2.496 in)

Calculate the cylinder-to-piston clearance. Take the maximum reading to determine the clearance (Cylinder I.D.: page 11-4).

SERVICE LIMIT: 0.90 mm (0.035 in)

Measure each piston pin bore I.D. in an X and Y axis. Take the maximum reading to determine I.D.

SERVICE LIMIT: 15.055 mm (0.5927 in)



CYLINDER/PISTON

Measure the piston pin O.D. at three points.

SERVICE LIMIT: 63.40 mm (2.496 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.04 mm (0.0016 in)



Measure the connecting rod small end I.D.

SERVICE LIMIT: 15.09 mm (0.594 in)

Calculate the connecting rod small end-to-piston pin clearance.

SERVICE LIMIT: 0.075 mm (0.0030 in)



NOTE:

Always replace the piston rings as a set.

Inspect the piston ring, and replace them if they are worn.

Temporarily install the piston rings (page 11-7) into the piston grooves.

Push in 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 LIMIT:

Top: 0.10 mm (0.004 in)

Second: 0.08 mm (0.03 in)

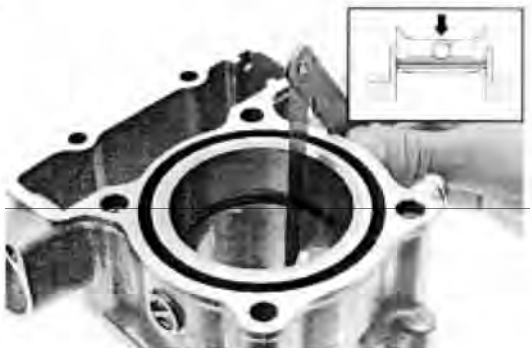
Using a piston, push the ring securely into the cylinder and measure the end gap using a feeler gauge.

SERVICE LIMIT:

Top: 0.3 mm (0.01 in)

Second: 0.7 mm (0.03 in)

Oil: 1.1 mm (0.04 in)



PISTON INSTALLATION

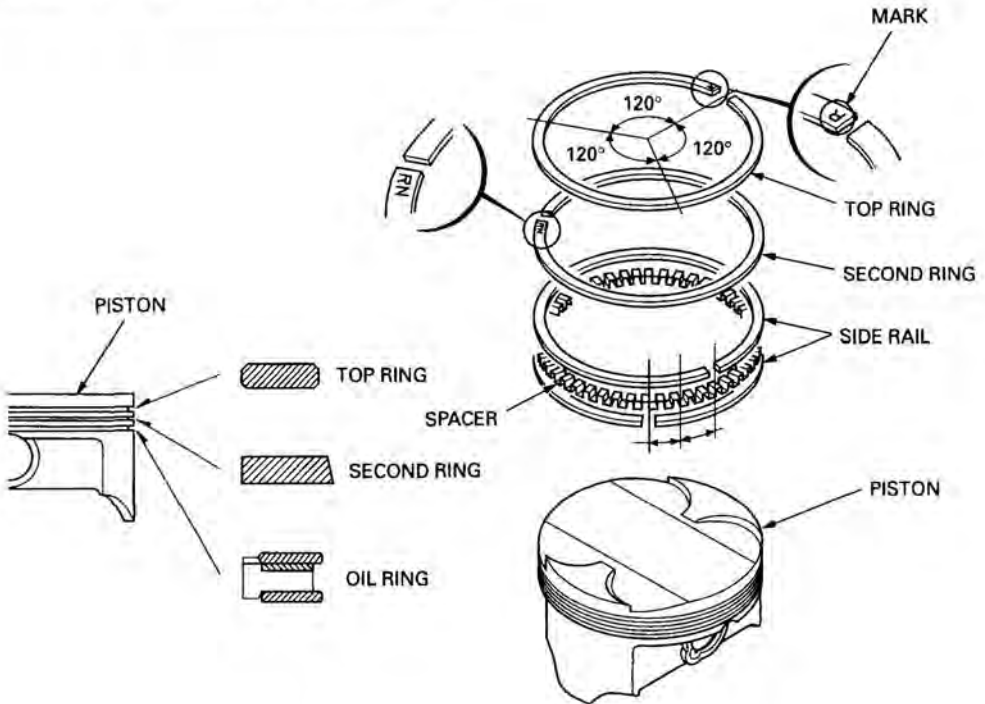
Clean the piston heads, ring lands and skirts.
Carefully install the piston rings onto the piston with their markings facing up.

CAUTION:

- Do not damage the piston ring by spreading the ends too far.
- Be careful not to damage the piston when the piston ring installation.

NOTE:

- Do not confuse the top and second rings.
- After installing the rings they should rotate freely, without sticking.
- Space the ring end gaps 120 degrees apart.



NOTE:

When cleaning the cylinder mating surface, place a shop towel over the cylinder and cam chain openings to prevent dust or dirt enter the engine.

Clean any gasket material from the cylinder mating surface of the crankcase.

Clean the oil orifices of the right crankcase.



CYLINDER/PISTON

Apply molybdenum solution to the piston pin outer surfaces and connecting rod small end inner surfaces. Apply engine oil to the piston pin hole. Install the piston with its "IN" mark facing the intake side. Install the piston pin.

Install the new piston pin clips.

CAUTION:

Always use new piston pin clips. Reinstalling used piston pin clips may lead to serious engine damage.

NOTE:

- Place a shop towel over the crankcase opening to prevent piston pin clips from falling into the crankcase.
- Set the piston pin clip in the groove properly.
- Do not align the clip's end gap with the piston cut-out.



CYLINDER INSTALLATION

NOTE:

- Do not reuse the gasket, replace with new one.

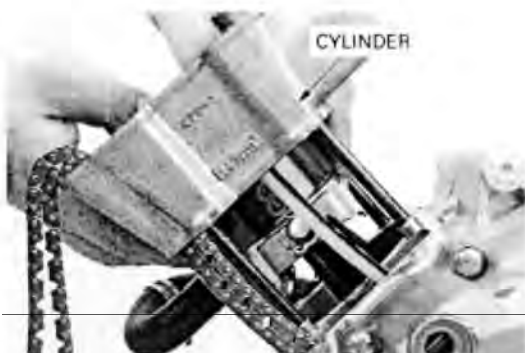
Install the dowel pins and a new gasket.



CAUTION:

Be careful not to damage the piston rings and cylinder wall.

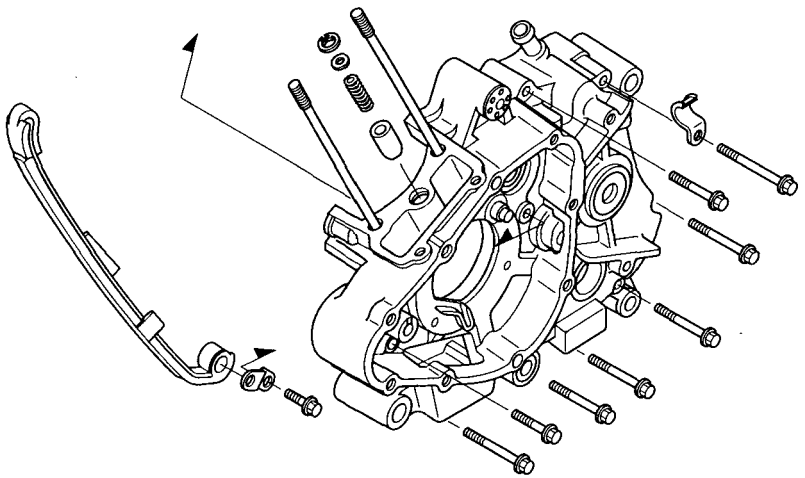
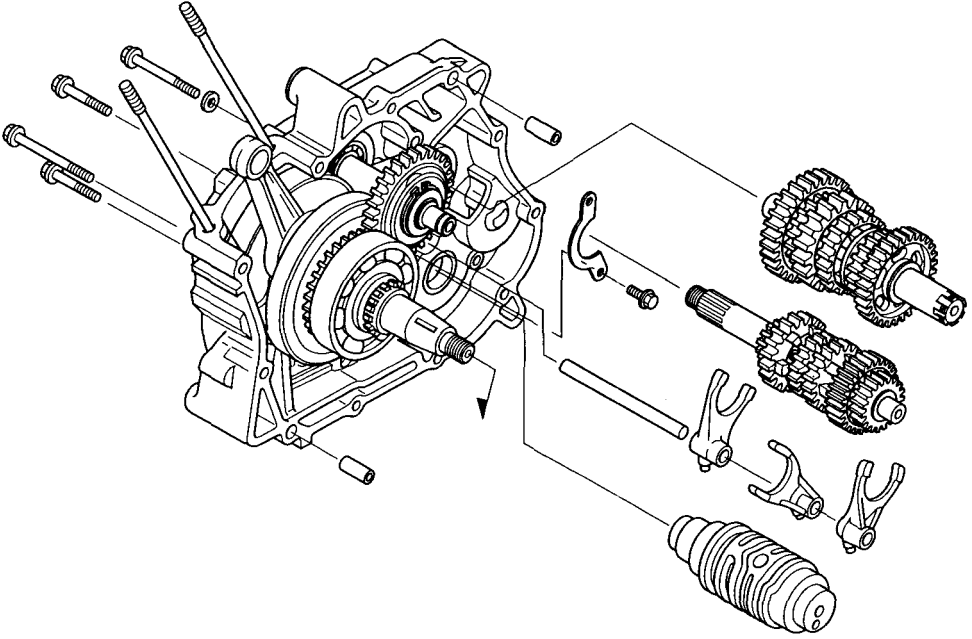
Apply engine oil to the cylinder and piston. Route the cam chain through the cylinder and install the cylinder over the piston while compressing the piston rings with your fingers.



Insert the cam chain guide into cylinder and crankcase. Install it by aligning the its bosses with the grooves in the cylinder and crankcase securely.

Install the cylinder head (page 10-19).





12. TRANSMISSION

SERVICE INFORMATION	12-1	INSPECTION	12-5
TROUBLESHOOTING	12-2	TRANSMISSION ASSEMBLY	12-10
TRANSMISSION DISASSEMBLY	12-3	CRANKCASE ASSEMBLY	12-13

SERVICE INFORMATION

GENERAL

- This section covers service of the transmission (including the shift fork and shift drum). For crankshaft and balancer service, refer to section 13.
- The crankcase halves must be separated to service the transmission. 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 10)
 - Cylinder and piston (section 11)
 - Clutch, primary drive gear, gearshift linkage (section 8)
 - Oil pump (section 4)
 - Flywheel (section 9)
- Be careful not to damage the crankcase mating surfaces when servicing.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Transmission	Gear I.D.	M5, M6	17.016 – 17.034 (0.6699 – 0.6706)	17.08 (6.724)
		C1	18.000 – 18.021 (0.7087 – 0.7095)	18.07 (0.711)
		C2	23.020 – 23.041 (0.9063 – 0.9071)	23.09 (0.909)
		C3, C4	22.020 – 22.041 (0.8669 – 0.8678)	22.1 (0.87)
	Bushing I.D.	C1	15.000 – 15.018 (0.590 – 0.591)	15.1 (0.59)
		C2	20.020 – 20.041 (0.7882 – 0.7890)	20.10 (0.791)
	Bushing O.D.	C1	17.969 – 17.980 (0.7074 – 0.7079)	17.9 (0.70)
		C2	22.984 – 23.005 (0.9049 – 0.9057)	22.9 (0.90)
	Gear-to-bushing clearance	C1	0.020 – 0.052 (0.0008 – 0.0020)	0.10 (0.004)
		C2	0.036 – 0.057 (0.0014 – 0.0022)	0.10 (0.004)
	Mainshaft O.D.	M5	16.966 – 16.984 (0.6680 – 0.6687)	16.93 (0.667)
	Countershaft O.D.	C1 gear bushing	14.966 – 14.984 (0.5892 – 0.5899)	14.90 (0.587)
		C2 gear bushing	19.978 – 19.989 (0.7866 – 0.7870)	19.92 (0.784)
	Gear-to-shaft clearance	M5	0.032 – 0.068 (0.0012 – 0.0027)	0.10 (0.004)
Bushing-to-shaft clearance	C1	0.016 – 0.052 (0.0001 – 0.0020)	0.10 (0.004)	
	C2	0.031 – 0.063 (0.0012 – 0.0025)	0.10 (0.004)	
Shift fork	Shaft O.D.		9.986 – 9.995 (0.3931 – 0.3935)	9.93 (0.391)
	Fork I.D.		10.000 – 10.018 (0.3937 – 0.3944)	10.03 (0.395)
	Fork claw thickness		4.93 – 5.00 (0.194 – 0.197)	4.90 (0.193)
	Shift drum O.D. at right end		25.959 – 25.980 (1.0220 – 1.0228)	25.90 (1.020)
	Shift drum journal (R.crankcase)		26.000 – 26.021 (1.0236 – 1.0244)	25.08 (0.987)

TRANSMISSION

TOOLS

Bearing remover head, 15 mm	07936 – KC10200
Bearing remover shaft	07936 – KC10100
Bearing remover weight	07741 – 0010201
Driver	07749 – 0010000
Attachment, 37 x 40 mm	07746 – 0010200
Attachment, 42 x 47 mm	07746 – 0010300
Attachment, 32 x 35 mm	07746 – 0010100
Pilot, 17 mm	07746 – 0040400
Pilot, 15 mm	07746 – 0040300
Pilot, 20 mm	07746 – 0040500
Pilot, 12 mm	07746 – 0040200
Bearing remover head, 12 mm	07936 – 1660110
Bearing remover shaft	07936 – 1660120
Bearing remover weight	07741 – 0010201

TROUBLESHOOTING

Excessive noise

- Worn, sized 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

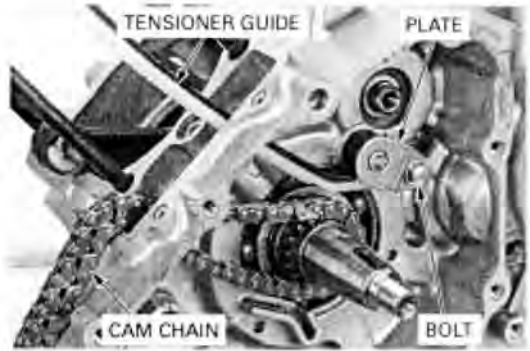
- Worn gear dogs or slots
- Worn shift drum guide groove
- Worn shift fork guide pin
- Worn shift fork groove in gear

TRANSMISSION DISASSEMBLY

Refer to Service Information (page 12-1) for removal of necessary parts before disassembling the crankcase.

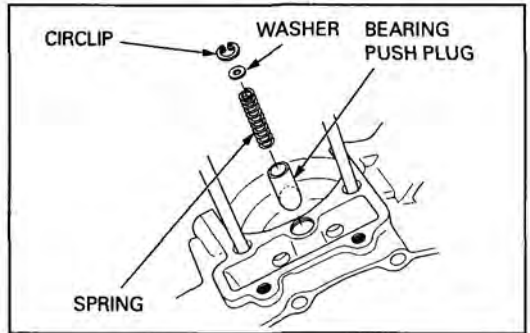
Remove the cam chain.

Remove the cam chain tensioner plate bolt, plate and tensioner guide.

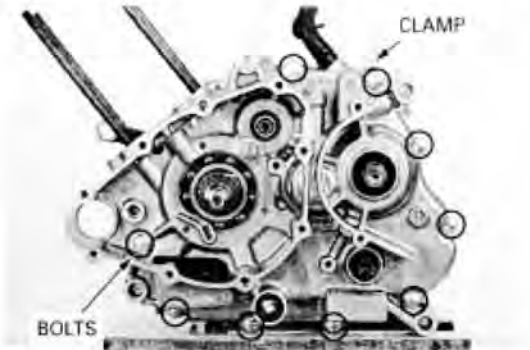


Remove the circlip, washer, spring and bearing push plug from the left crankcase.

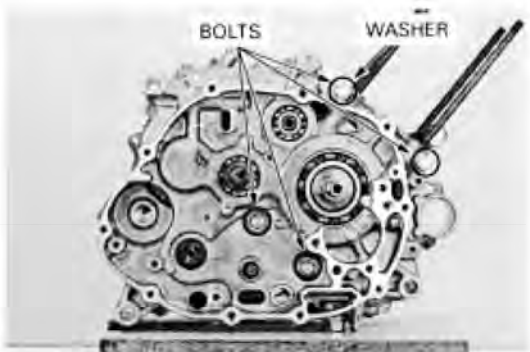
Check for the bearing push plug for wear or damage and replace if necessary.



Remove the left crankcase bolts and clamp.



Remove the right crankcase bolts and washer.



Place the crankcase assembly with the right side down.

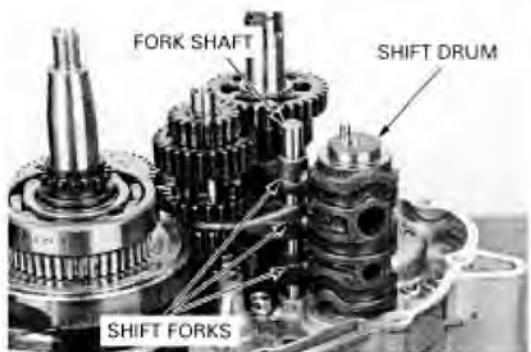
Carefully separate the left crankcase from the right crankcase while tapping them at several locations with a soft hammer. Do not pry the crankcase halves.



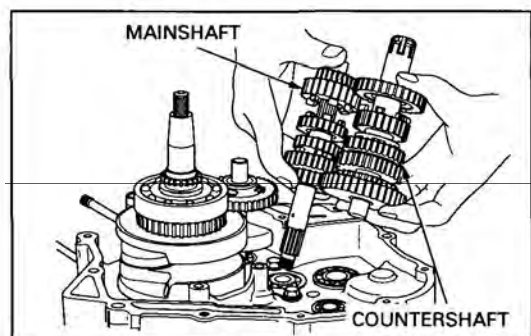
Remove the dowel pins.



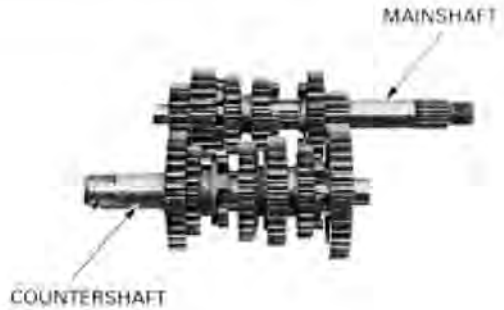
Pull the fork shaft and remove it from the shift forks. Remove the shift drum and shift forks.



Remove the mainshaft and countershaft as an assembly.



Disassemble the mainshaft and countershaft.



INSPECTION

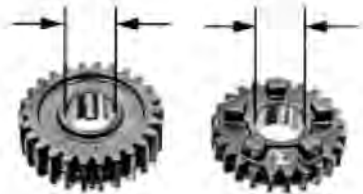
Gears

Check the gear dogs, dog holes and teeth for damage or excessive wear.

Measure the I.D. of each gear.

SERVICE LIMITS:

M5, M6:	17.08 mm (0.6724 in)
C1:	18.07 mm (0.711 in)
C2:	23.09 mm (0.909 in)



Bushings

Check the bushings for wear or damage.

Measure the O.D. of each bushing.

SERVICE LIMITS:

C1:	17.9 mm (0.70 in)
C2:	22.9 mm (0.90 in)

Measure the I.D. of each bushing.

SERVICE LIMITS:

C1:	18.10 mm (0.713 in)
C2:	20.10 mm (0.791 in)



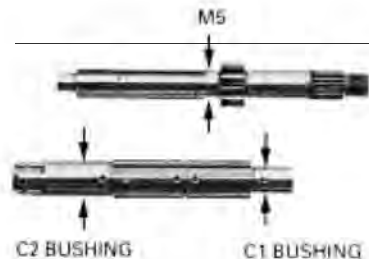
Mainshaft/Countershaft

Check the spline grooves and sliding surfaces for abnormal wear or damage.

Measure the O.D. of the mainshaft and countershaft at the gear and bushing sliding areas.

SERVICE LIMITS:

Mainshaft (at M5 gear):	16.93 mm (0.067 in)
Countershaft (at C1 gear bushing):	14.90 mm (0.587 in)
(at C2 gear bushing):	19.92 mm (0.784 in)



TRANSMISSION

Calculate the gear-to-bushing, gear-to-shaft and bushing-to-shaft clearance.

SERVICE LIMITS:

Gear-to-Bushing: C1/C2:	0.10 mm (0.004 in)
Gear-to-Shaft: M5:	0.10 mm (0.004 in)
Bushing-to-Shaft: C1/C2:	0.10 mm (0.004 in)

Shift Drum/Drum Journal

Inspect the shift drum end for scoring, scratches, or evidence of sufficient lubrication.
Check the shift drum grooves for abnormal wear or damage.

Measure the shift drum O.D. at right end.

SERVICE LIMIT: 25.08 mm (0.987 in)



Check the shift drum journal in the right crankcase for excessive wear or damage.
Measure the shift drum journal I.D.

SERVICE LIMIT: ?? mm (?? in)



Shift Fork

Check the shift forks for deformation or abnormal wear.
Measure each shift fork claw thickness.

SERVICE LIMIT: 4.90 mm (0.193 in)

Measure I.D. of each fork.

SERVICE LIMIT: 10.03 mm (0.395 in)



Shift Fork Shaft

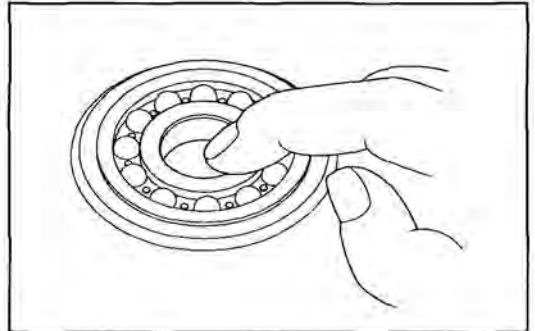
Check for damage and straightness.
Measure the shift fork shaft O.D.

SERVICE LIMIT: 9.93 mm (0.391 in)



Transmission Bearing

Turn the inner race of each bearing with your finger.
The bearings should turn smoothly and quietly.
Also check that bearing outer races fit tightly in the crank-cases.

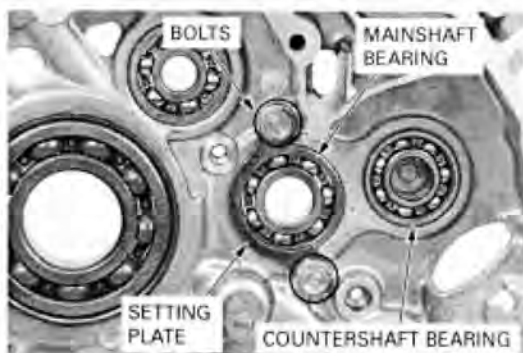


TRANSMISSION

TRANSMISSION BEARING REPLACEMENT

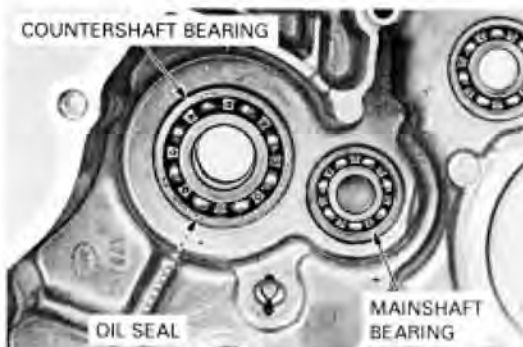
Remove the bolts and mainshaft bearing setting plate from the right crankcase.

Remove the mainshaft bearing from the inside of the right crankcase.



Remove the oil seal from the left crankcase.

Remove the countershaft bearing from the inside of the left crankcase.



Remove the bearings with following tools.

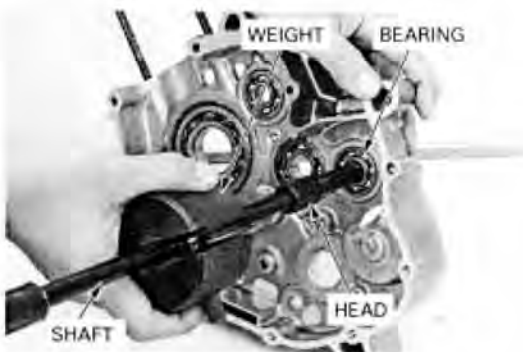
TOOLS:

Right crankcase countershaft bearing:

Bearing remover head, 15 mm	07936 - KC10200
Remover shaft	07936 - KC10100
Remover weight	07741 - 0010201

Left crankcase mainshaft bearing:

Bearing remover head, 12 mm	07936 - 1660110
Remover shaft	07936 - 1660120
Remover weight	07741 - 0010201



Drive new bearings into the left crankcase with following tools:

TOOLS:

RIGHT CRANKCASE

Mainshaft bearing:

Driver	07749 - 0010000
Attachment, 37 x 40 mm	07746 - 0010200
Pilot, 17 mm	07746 - 0040400

Countershaft bearing:

Driver	07749 - 0010000
Attachment, 32 x 35 mm	07746 - 0010100
Pilot, 15 mm	07746 - 0040300

LEFT CRANKCASE

Mainshaft bearing:

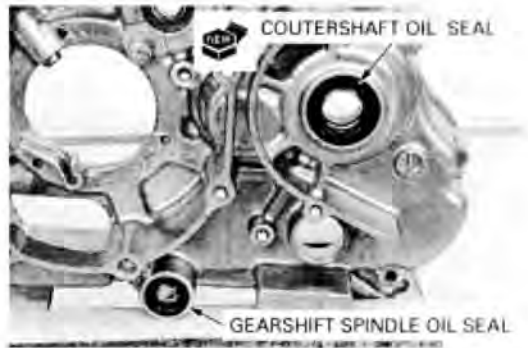
Driver	07749 - 0010000
Attachment, 32 x 35 mm	07746 - 0010100
Pilot, 12 mm	07746 - 0040200

Countershaft bearing:

Driver	07749 - 0010000
Attachment, 42 x 47 mm	07746 - 0010300
Pilot, 20 mm	07746 - 0040500

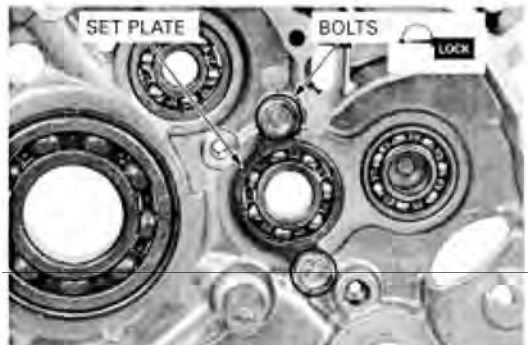


After installing the bearings, install a new countershaft oil seal. Check the gearshift spindle oil seal for damage and replace if necessary.



Apply locking agent to the threads of the setting plate bolts, and install the mainshaft bearing setting plate by tightening the bolts.

Lubricate the all bearings with engine oil.



TRANSMISSION ASSEMBLY

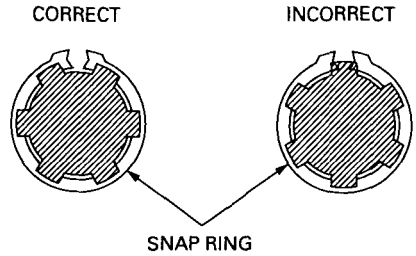
Clean all parts in solvent.

Apply molybdenum oil solution to the gear and bushing sliding surface and shift fork grooves to ensure initial lubrication.

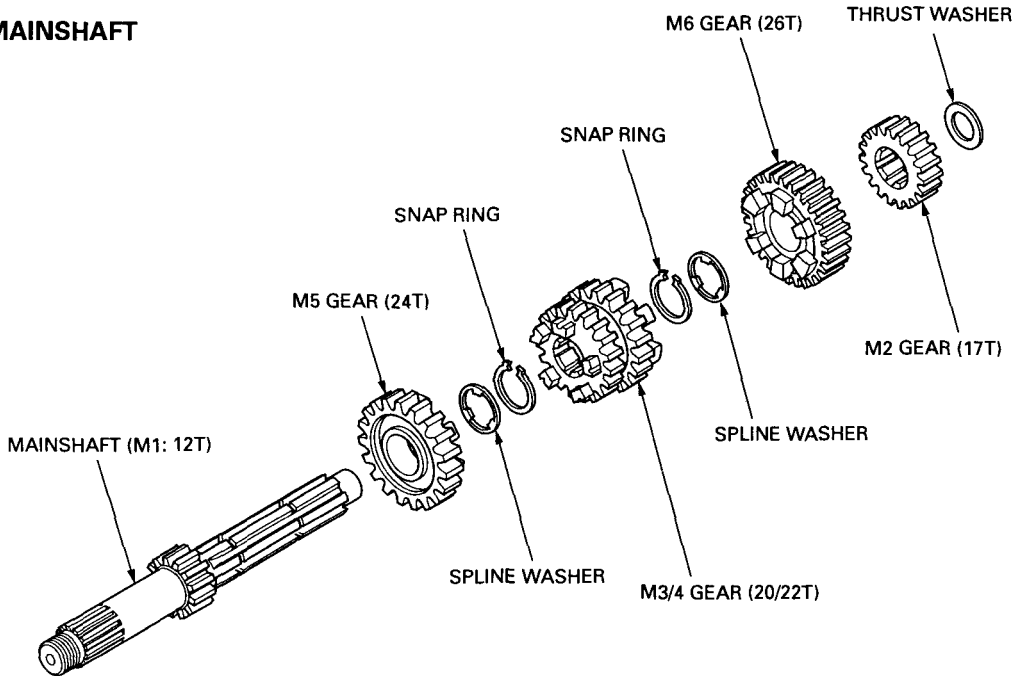
Assemble all parts into their original positions.

NOTE:

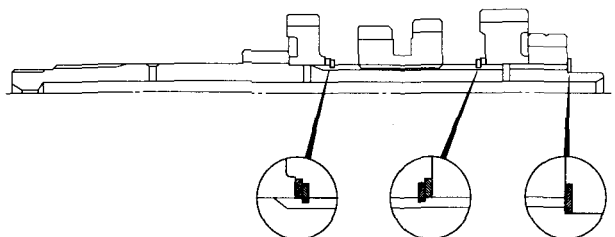
- Check the gears for freedom of movement or rotation on the shaft.
- Install the washers and snap rings with the chamfered edges facing the thrust load side. Do not reuse worn snap ring which could easily spin in the groove.
- Check that the snap rings are seated in the grooves and align their end gaps with the grooves of the spline.




MAINSHAFT

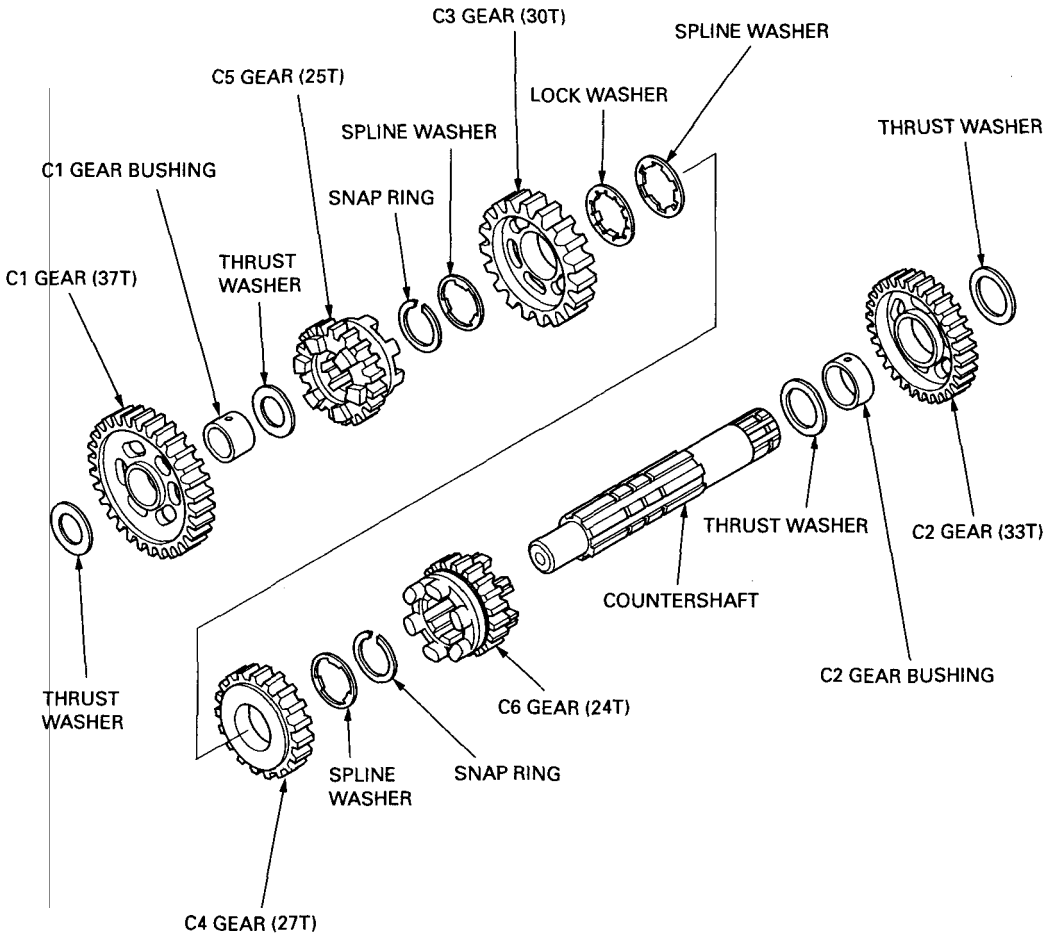


WASHER AND SNAP RING DIRECTION:

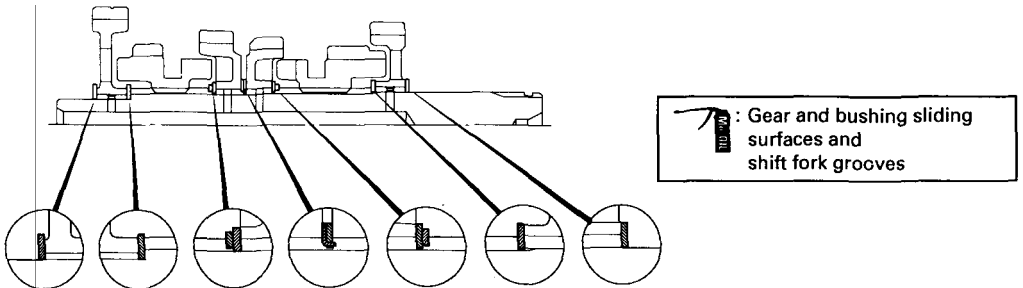


 : Gear and bushing sliding surfaces and shift fork grooves

COUNTERSHAFT



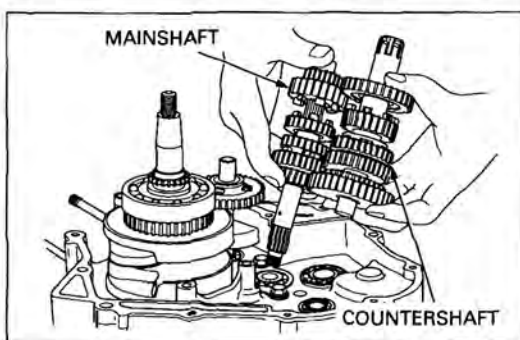
WASHER AND SNAP RING DIRECTION:



TRANSMISSION

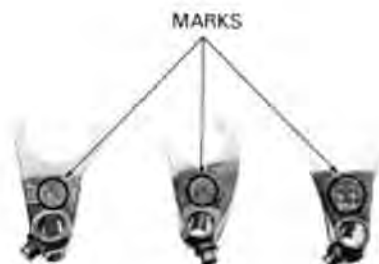
If the crankshaft removed, install the crankshaft and balancer first (page 13-5).

Apply engine oil to the countershaft oil seal lips. Install the mainshaft and countershaft as an assembly into the right crankcase. Be sure to install the three end washers (mainshaft; left side only/countershaft; both ends).

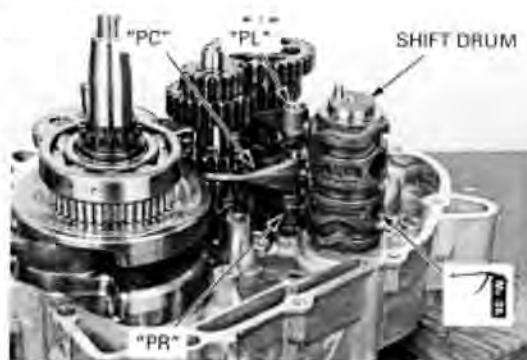


Each shift fork has an identification marks; "PR" (right), "PC" (center), "PL" (left).

Install the shift forks into the shifter gear grooves with the marks facing down (right crankcase side).



Apply molybdenum oil solution to the guide grooves in the shift drum and install it by aligning the shift fork guide pins with the guide grooves.



Apply molybdenum oil solution to the shift fork shaft insert it through the shift forks into the left crankcase.



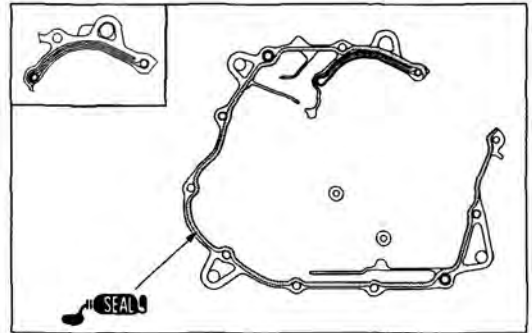
CRANKCASE ASSEMBLY

Clean the left and right crankcase mating surfaces thoroughly, being careful not to damage them and check for damage.

Install the dowel pins onto the right crankcase.



Apply a light but thorough coating of sealant to left crankcase mating surface except the oil passage area.



Make sure all the parts are installed in the left and right crankcases.

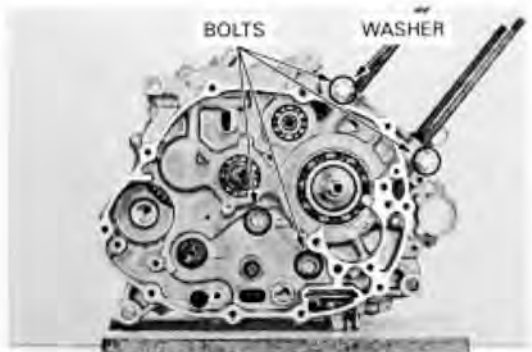
CAUTION:

Do not force the crankcase halves together, if there is excessive force required, something is wrong. Remove the right crankcase and check for misaligned parts.

Install the left crankcase over the right crankcase.



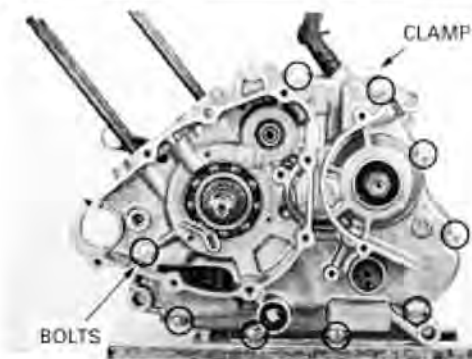
Install the right crankcase bolts and washer, and tighten the bolts in a crisscross pattern in 2 or 3 steps.



TRANSMISSION

Make sure that the crankcase mating surfaces are touched evenly.

Install the left crankcase bolts and clamp, then tighten the bolts in a crisscross pattern in 2 or 3 steps.



Install the cam chain to the cam chain drive sprocket through the crankcase.

Install the cam chain tensioner, plate and bolt. Tighten the bolt securely.

Install the remaining parts.

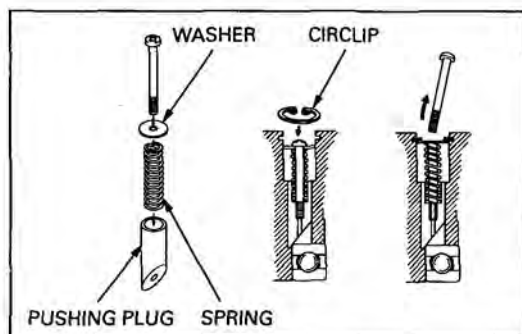
Install the engine in the frame (section 7).

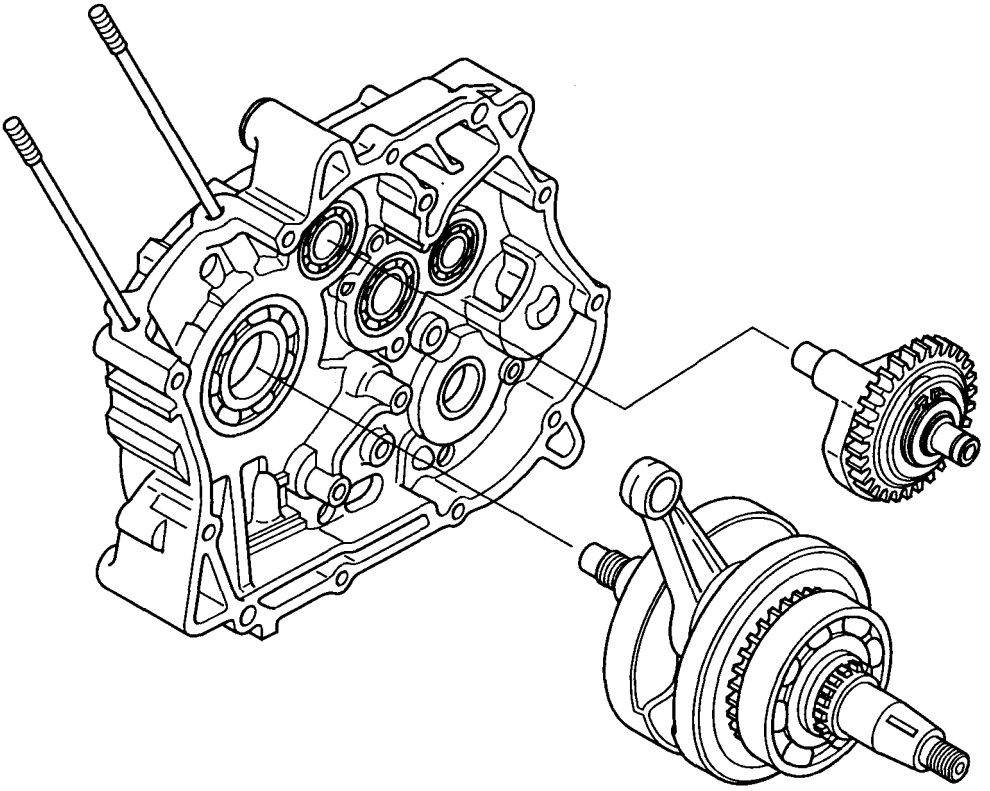


Install the spring, washer and 3 mm screw to the bearing push plug, then install them into the left crankcase.

Install the circlip and remove the screw.

Assemble the crankcase halves (page 12-12).





13. CRANKSHAFT/BALANCER

SERVICE INFORMATION	13-1	CRANKSHAFT REMOVAL	13-2
TROUBLESHOOTING	13-1	CRANKSHAFT INSTALLATION	13-5

SERVICE INFORMATION

GENERAL

- This section covers service of the crankshaft and balancer.
- The crankcase halves must be separated to service the crankshaft and balancer. For crankcase separation and assembly, refer to section 12.
- Be careful not to damage the crankcase mating surfaces when servicing.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Connecting rod	Big end side clearance	—	0.6 (0.02)
	Big end radial clearance	—	0.05 (0.002)
Crankshaft runout		—	0.03 (0.001)

TOOLS

Driver	07749 - 0010000
Attachment, 32 x 35 mm	07746 - 0010100
Attachment, 37 x 40 mm	07746 - 0010200
Attachment, 72 x 75 mm	07746 - 0010600
Pilot, 12 mm	07746 - 0040200
Pilot, 35 mm	07746 - 0040800
Crankcase assembly tool	
— assembly collar	07965 - VM00100
— assembly shaft	07965 - VM00200
Universal bearing puller	07631 - 0010000

13

TROUBLESHOOTING

Excessive noise

- Worn crankshaft main journal bearings
- Worn or damaged connecting rod bearings
- Worn connecting rod small end
- Worn balancer bearings
- Improper balancer installation

Abnormal vibration

- Improper balancer timing

CRANKSHAFT REMOVAL

Separate the crankcase and remove the transmission (section 12).

Remove the crankshaft and balancer from the right crankcase.

CAUTION:

Be careful not to damage the crankcase mating surface and crankshaft assembly.

Remove the left crankshaft bearing using the bearing puller with a suitable protector.

CAUTION:

*-Be careful not to damage the balancer drive gear.
-If the balancer drive gear is scratched, file off the scratched part.*

TOOL:

Universal bearing puller 07631 - 0010000

NOTE:

Always replace the left bearing with a new one if it comes out with the crankshaft.

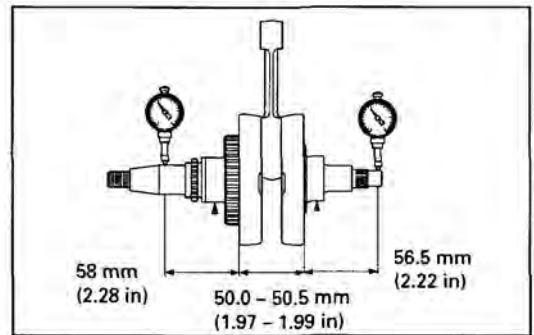


INSPECTION

Crankshaft Runout

Place the crankshaft on a stand or V-blocks.
Set the dial indicator on the shafts.
Rotate the crankshaft two revolutions and read the runout.

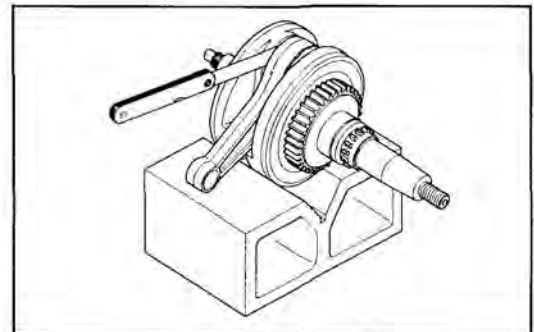
SERVICE LIMIT: 0.03 mm (0.001 in)



Big End Side Clearance

Measure the side clearance of the connecting rod big end.

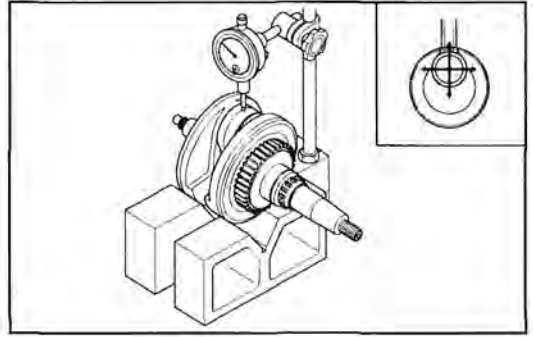
SERVICE LIMIT: 0.6 mm (0.02 in)



Big End Radial Clearance

Measure the radial clearance of the connecting rod big end.

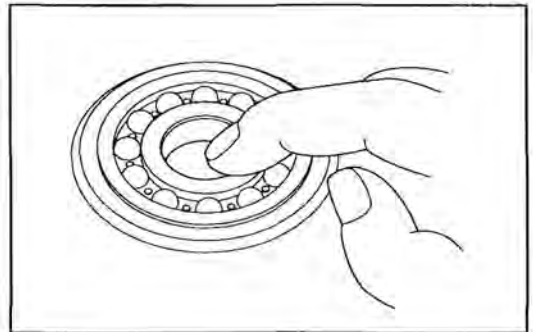
SERVICE LIMIT: 0.05 mm (0.002 in)

**Balancer Gear**

Check the balancer gear for wear or damage.

**Crankshaft/Balancer Bearing**

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that bearing outer races fit tightly in the crankcase.

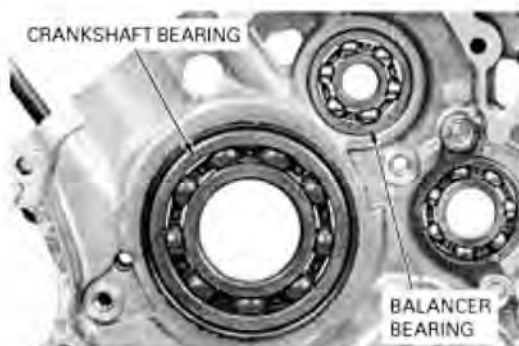


CRANKSHAFT/BALANCER

CRANKSHAFT/BALANCER BEARING REPLACEMENT

REMOVAL

Drive the right crankshaft bearing and balancer bearings out of the right and left crankcases.



INSTALLATION

Crankshaft bearings

Clean the crankcase mating surface thoroughly, be careful not to damage the mating surface.

Apply engine oil to the new crankshaft bearings and place it on the crankcase.

CAUTION:

- **Check the each bearing stamp mark before install the crankshaft bearing.**
Right side: TM-SC07A87CS26
Left side: TM-SC07A87CS42



Drive the crankshaft bearing to the right crankcase using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 72 x 75 mm	07746-0010600
Pilot, 35 mm	07746-0040800

Install the crankshaft bearing to the left crankcase. Assemble the special tools onto the crankshaft as shown. Install the bearing to the left crankshaft by drawing it.

TOOLS:

Crankcase assembly tool	
– assembly collar	07965 – VM00100
– assembly shaft	07965 – VM00200

Remove the crankshaft and bearing assembly from the left crankcase.



Balancer bearings

Drive new balancer bearings into the right and left crankcase with following tools:

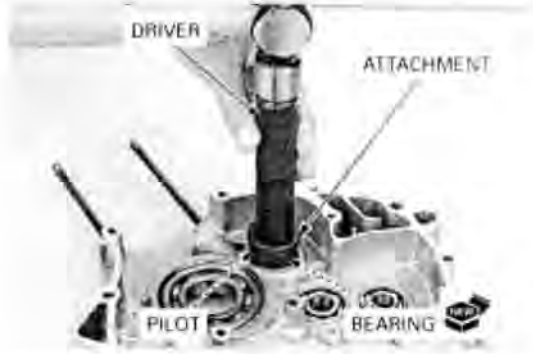
TOOLS:

Right crankcase side:

- Driver 07749 - 0010000
- Attachment, 37 x 40 mm 07746 - 0010200
- Pilot, 12 mm 07746 - 0040200

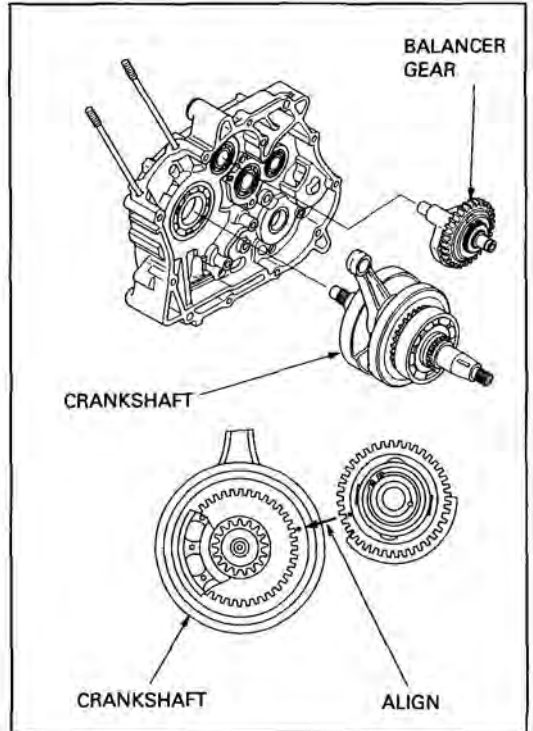
Left crankcase side:

- Driver 07749 - 0010000
- Attachment, 32 x 35 mm 07746 - 0010100
- Pilot, 12 mm 07746 - 0040200

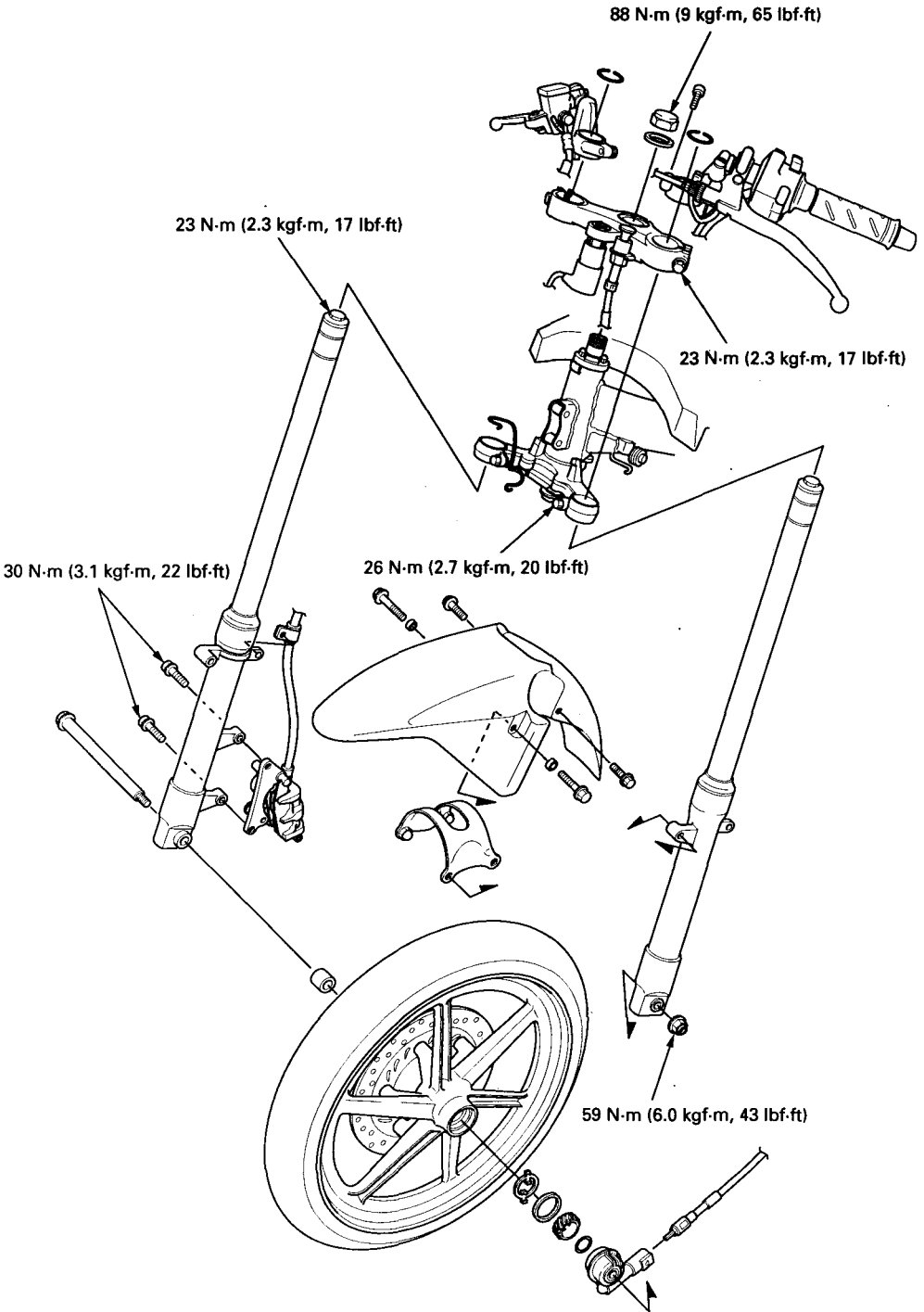


CRANKSHAFT INSTALLATION

Engage the balancer and crankshaft aligning the index lines on the balancer driven and drive gears as shown and set the crankshaft and balancer together into the right crankcase.



FRONT WHEEL/SUSPENSION/STEERING



14. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	14-1	FRONT WHEEL	14-8
TROUBLESHOOTING	14-2	FORK	14-12
HANDLEBAR	14-3	STEERING STEM	14-19

SERVICE INFORMATION

GENERAL

⚠ WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

- This section covers maintenance of the front wheel, fork and steering stem. Refer to section 16 for front (hydraulic) brake service.
- Support the motorcycle securely using a hoist or work stand.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	To the indicator
Cold tire pressure	Driver only	200 kPa (2.00 kgf/cm ² , 29 psi)	—
	Driver and passenger	200 kPa (2.00 kgf/cm ² , 29 psi)	—
Axle runout		—	0.20 (0.008)
Wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Wheel balancer weight		—	60 g (2.1 oz) max.
Fork	Spring free length	412.4 (16.24)	404.1 (15.91)
	Spring direction	With the tightly wound end facing down	—
	Pipe runout	—	0.20 (0.008)
	Recommended fork fluid	Honda Ultra Cushon oil No.10	—
	Fluid level	131 (5.2)	—
	Fluid capacity	206 ± 2.5 cm ³ (7.0 ± 0.08 US oz, 7.3 ± 0.09 Imp oz)	—

14

TORQUE VALUES

Front axle nut	59 N·m (6.0 kgf·m, 43 lbf·ft)	U-nut
Front brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt
Fork bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Fork socket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply a locking agent to the threads
Steering stem nut	88 N·m (9 kgf·m, 65 lbf·ft)	
Top thread	See page 14-22	
Top bridge pinch bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Bottom bridge pinch bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Handlebar pinch bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	
Grip end screw	8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)	

FRONT WHEEL/SUSPENSION/STEERING

TOOLS

Bearing remover head, 12 mm	07746 – 0050300
Bearing remover shaft	07746 – 0050100
Driver	07749 – 0010000
Attachment, 37 x 40 mm	07746 – 0010200
Attachment, 42 x 47 mm	07746 – 0010300
Pilot, 12 mm	07746 – 0040200
Steering stem socket	07916 – 3710101
Ball race remover	07GMD – KS40100
Steering stem driver	07946 – 4300101
Fork seal driver	07747 – 0010100
Fork seal driver attachment	07747 – 0010300
Oil seal remover	07748 – 0010001

TROUBLESHOOTING

Hard steering

- Steering top thread too tight
- Damaged steering head bearing
- Insufficient tire pressure
- Faulty tire

Steers to one side or does not track straight

- Bent fork
- Bent front axle
- Wheel installed incorrectly
- Faulty steering head bearing
- Bent frame
- Faulty wheel bearing
- Worn swingarm pivot components

Front wheel wobbling

- Bent rim
- Worn wheel bearings
- Bent or loose spoke
- Faulty tire

Wheel turns hard

- Faulty wheel bearing
- Faulty speedometer gear

Soft suspension

- Weak fork spring
- Insufficient fork oil

Hard suspension

- Bent fork pipe
- Clogged fluid passage

Front suspension noisy

- Insufficient fluid in fork
- *Loose front suspension fasteners*
- Lack of grease in speedometer gear

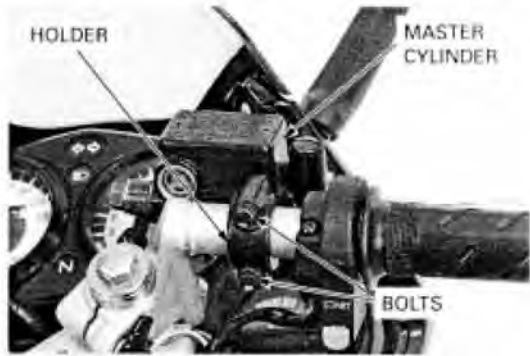
HANDLEBAR

REMOVAL

Disconnect the front brake light switch connectors from the switch.
Remove the bolts, master cylinder holder and master cylinder.

NOTE:

Keep the brake reservoir upright to prevent air from entering the hydraulic system.



Remove the throttle housing screws.



Remove the throttle upper housing.
Remove the throttle cable from the throttle pipe.



Remove the grip end.
Remove the throttle grip from the handle bar.

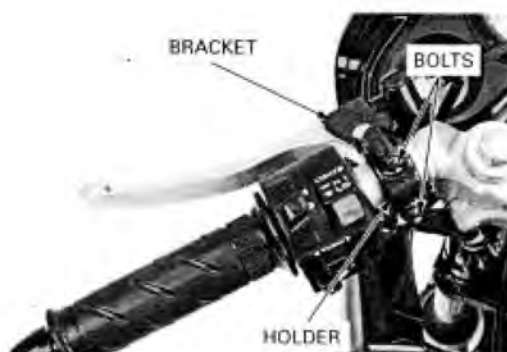


FRONT WHEEL/SUSPENSION/STEERING

Remove the clutch switch connectors.



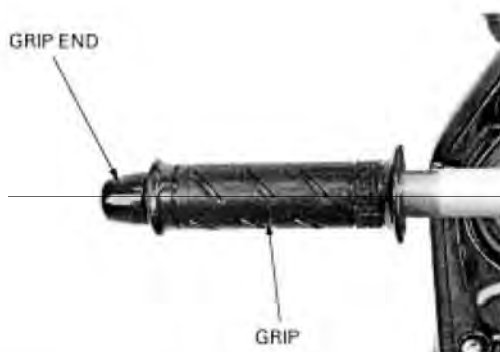
Remove the clutch lever holder bolts.
Remove the clutch lever holder and clutch lever bracket assembly.



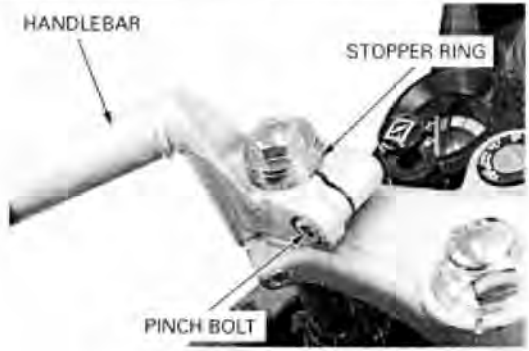
Remove the screws and left handlebar switch housing.



Remove the grip end and left handlebar grip.



Remove the stopper ring.
Loosen the handlebar pinch bolt and remove the handlebar from the fork.



INSTALLATION

Install the handlebar onto the fork and align the boss on the handle bar with the cut-out on the top bridge.

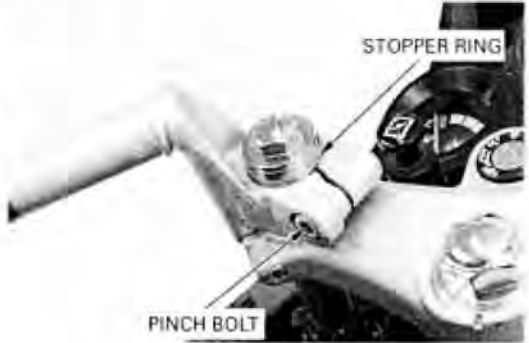


Tighten the handlebar pinch bolt to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)

Install the stopper ring into the groove on the fork pipe.

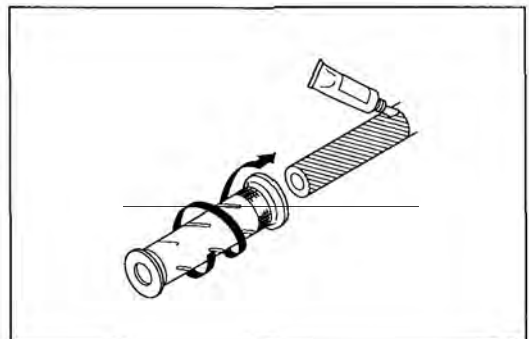
Install the right handlebar in the same manner as for the left handlebar.



If the left handlebar grips were removed, apply Honda Bond A or its equivalent to the inside surface of the grip and to the clean surface of the left handlebar. Wait 3 – 5 minutes and install the grip. Rotate the grip for even application of the adhesive.

NOTE:

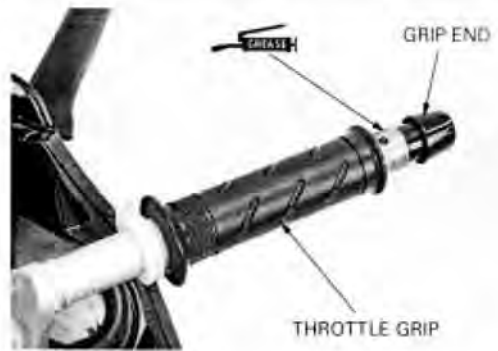
Allow the adhesive to dry for an hour before using.



FRONT WHEEL/SUSPENSION/STEERING

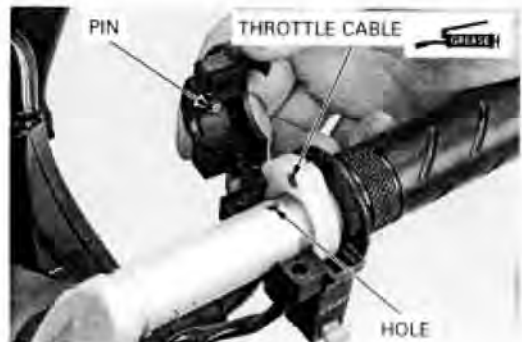
Apply grease to the throttle pipe sliding surface and throttle cable contact point.
Install the throttle grip to the handlebar.
Install the grip end.
Tighten the grip end screw to the specified torque.

TORQUE: 8.8 N-m (0.9 kgf-m, 6.5 lbf-ft)



Apply grease to the throttle cable end.

Connect the throttle cable to the throttle pipe.
Install the throttle housing and align its locating pin of the throttle housing cover with the hole on the handlebar.

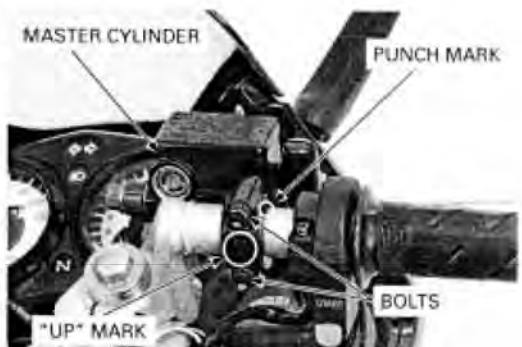


Install the screws and tighten the forward screw first, then the rear screw.



Place the front master cylinder on the handlebar and install the master cylinder holder with its "UP" mark facing up.

Align the end of the holder with the punch mark on the handlebar.
Tighten the upper bolt first, then tighten the lower bolt.

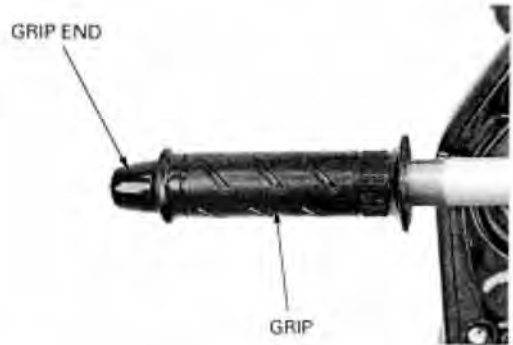


Connect the front brake switch connectors.



Install the left handlebar grip onto the handlebar (refer to page 14-5).
Install the grip end.
Tighten the grip end screw to the specified torque.

TORQUE: 8.8 N·m (0.9 kgf·m, 6.5 lbf·ft)



Install the left handlebar switch housing aligning its locating pin with the hole on the handlebar.



Install the screws and tighten the forward screw first, then the rear screw.



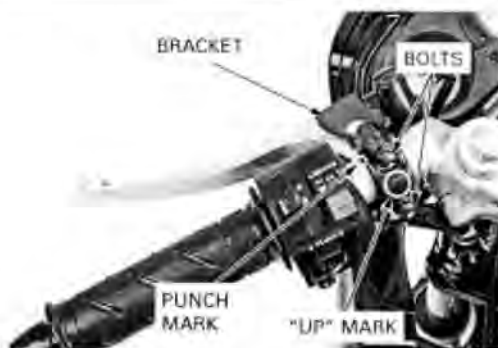
FRONT WHEEL/SUSPENSION/STEERING

Place the clutch lever bracket on the handlebar and install the clutch lever holder with its "UP" mark facing up.

Align the end of the holder with the punch mark on the handlebar.

Tighten the upper bolt first, then the lower bolt.

Connect the clutch switch connectors.



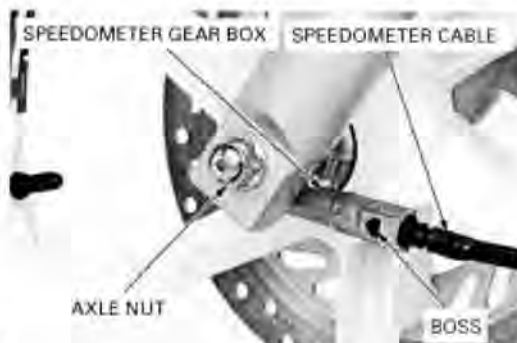
FRONT WHEEL

REMOVAL

Raise the front wheel off the ground by suitable support. Press the boss of speedometer cable in the speedometer gear box.

Disconnect the speedometer cable from the speedometer gear box.

Remove the axle nut, axle and front wheel.



NOTE:

Do not operate the front brake lever after the front wheel is removed. The caliper piston will move out and make assembly difficult.

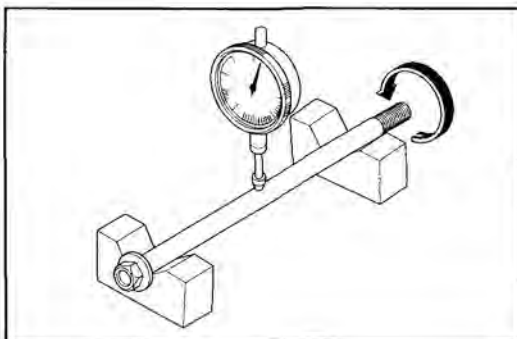
INSPECTION

Axle

Place the axle in V-blocks and measure the runout with a dial indicator.

SERVICE LIMIT: 0.2 mm (0.008 in)

The actual runout is 1/2 of the total indicator reading.



Wheel Bearing

Remove the dust seal. (page 14-9).

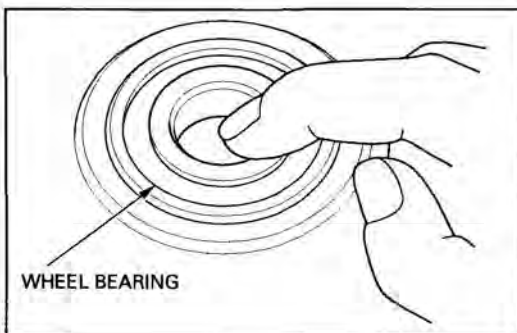
Turn the inner race of each bearing with your finger, the bearing should turn smoothly and quietly.

Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

NOTE:

Replace wheel bearings in pairs.

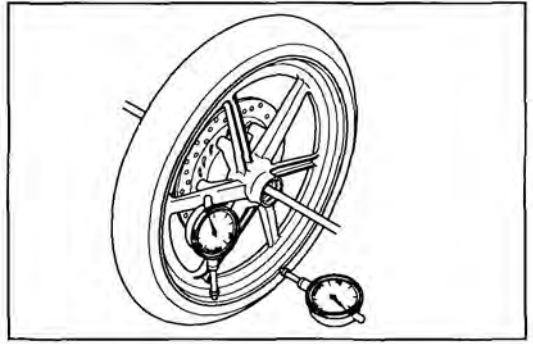


For bearing replacement, see page 14-9.

Wheel rim

Check the wheel rim runout by placing the wheel in a turning stand. Spin the wheel by hand and read the runout using a dial indicator.

SERVICE LIMIT: Actual: 2.0 mm (0.08 in)
Radial: 2.0 mm (0.08 in)



DISASSEMBLY

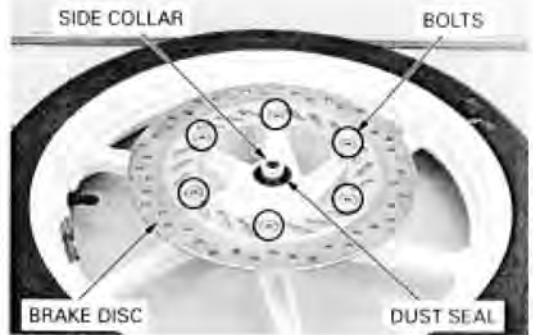
Remove the speedometer gearbox, dust seal and speedometer retainer.



Remove the side collar and dust seal from the right hub. Remove the brake disc bolts and brake disc.

NOTE:

Check for disc warpage; see page 16-8.



WHEEL BEARING REPLACEMENT

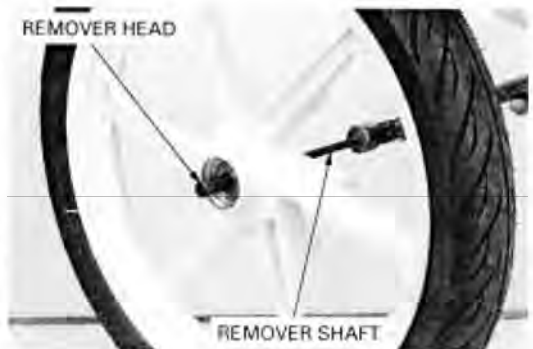
Remove the wheel bearings and distance collar from the wheel hub.

TOOLS:

Bearing remover head, 12 mm 07746 - 0050300
Bearing remover shaft 07746 - 0050100

NOTE:

Never reinstall old bearings. Once the bearings have been removed, they must be replaced with a new one.



FRONT WHEEL/SUSPENSION/STEERING

Drive the new right bearing in using the following tools.

NOTE:

Install the bearings with its marking side facing out.

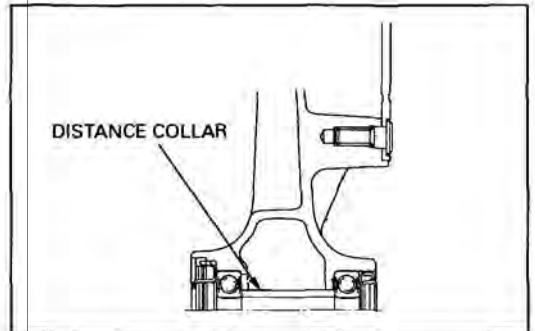
TOOLS:

Driver	07749 - 0010000
Attachment, 37 x 40 mm	07746 - 0010200
Pilot, 12 mm	07746 - 0040200

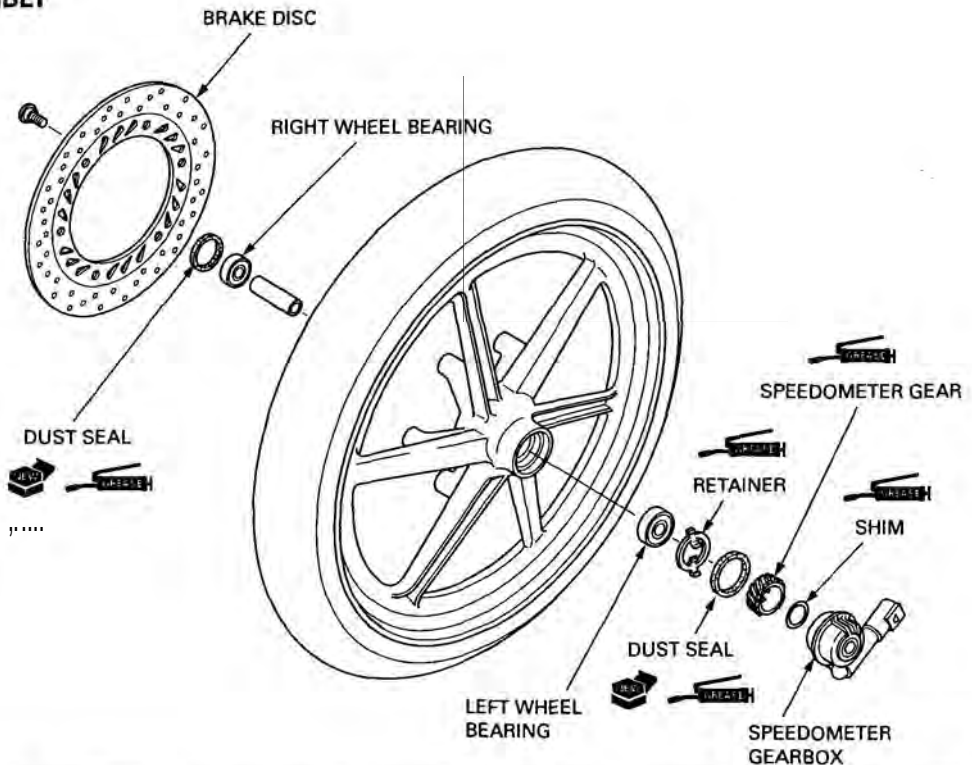


Install the distance collar.

Drive the new left bearing in using the same tools.



ASSEMBLY



If removed the front tire, inspect the wheel balance (page 15-3).

Apply grease to the speedometer gear retainer, and install it into the left side hub aligning its tabs with the slots in the hub.



Apply grease to a new left dust seal lips, then install it into the wheel hub.



Install a new right dust seal and brake disc with the stamped mark "MIN.TH, 3.5 mm" facing out side.

Apply grease to the dust seal lips.

Tighten the brake disc mounting bolts to the specified torque.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



Install the right side collar.



FRONT WHEEL/SUSPENSION/STEERING

Install the speedometer gear box in the wheel hub aligning the tangs of the retainer with the slots in the speedometer gear box.



INSTALLATION

Position the front wheel between the fork legs and align the stopper of the left fork leg and groove of the speedometer gear box.

Install the front axle from the right side.

CAUTION:

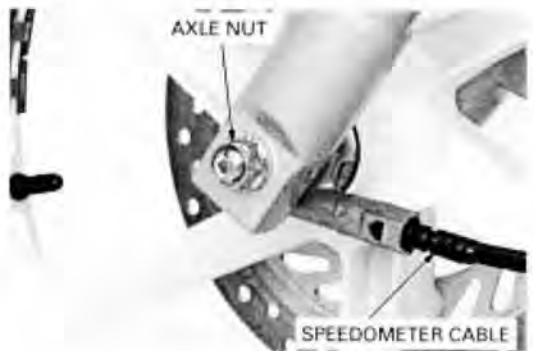
When installing the front wheel, fit the brake disc carefully between the brake pads to avoid damaging the pads.



Install and tighten the axle nut to the specified torque.

TORQUE: 59 N·m (6.0 kgf·m, 43 lbf·ft)

Install and connect the speedometer cable to the speedometer gear box securely.



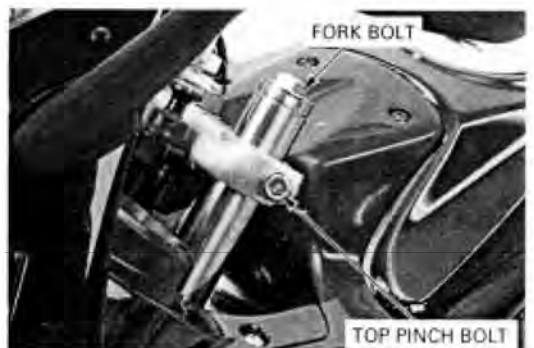
FORK

REMOVAL

Remove the following:

- front wheel (page 14-8)
- front fender (page 2-4)
- handlebars (page 14-3)
- brake caliper (page 16-6)

Loosen the fork bolts, but do not remove it.
Loosen the fork top pinch bolts.



Loosen the fork bottom pinch bolts and remove the fork pipe.



DISASSEMBLY

Carefully remove the fork bolt.

⚠ WARNING

The fork bolt is under spring pressure. Use care when removing it and wear eye and face protection.



Remove the spring collar, spring seat.

SPRING COLLAR



Remove the fork spring.

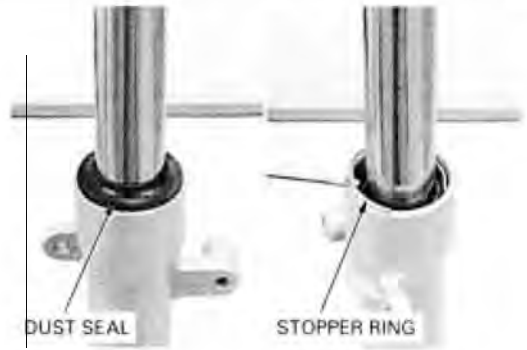
Pour out the fork fluid by pumping the fork pipe several times.

SPRING



FRONT WHEEL/SUSPENSION/STEERING

Remove the dust seal and stopper ring.



Hold the fork slider in a vise with piece of woods or shop towel.
Remove the fork socket bolt and sealing washer.

NOTE:

If the socket bolt turn together with the fork piston, temporarily install the fork spring and fork bolt.



Remove the fork piston and rebound spring.



Remove the fork pipe and oil lock piece.



Remove the oil seal from the fork slider.

TOOL:

Oil seal remover

07748 - 0010001



INSPECTION

Fork Spring

Measure the fork spring free length.

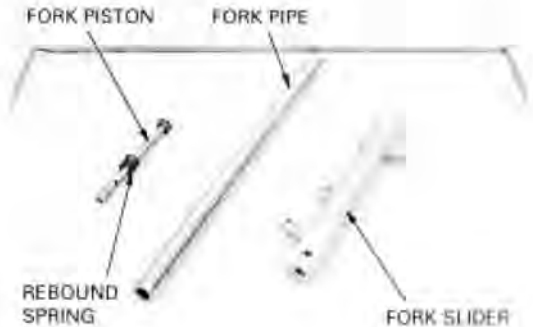
SERVICE LIMIT: 404.1 mm (15.91 in)



Fork Pipe/Slider/Piston

Check the fork pipe, slider and piston for score marks, scratches, or excessive or abnormal wear.
Check the rebound spring for damage.
Check the piston ring for wear or damage.

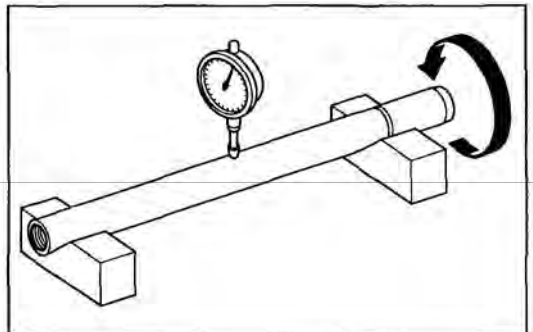
Replace any components that are worn or damaged.



Set the fork pipe in V-blocks and read the runout with a dial indicator.

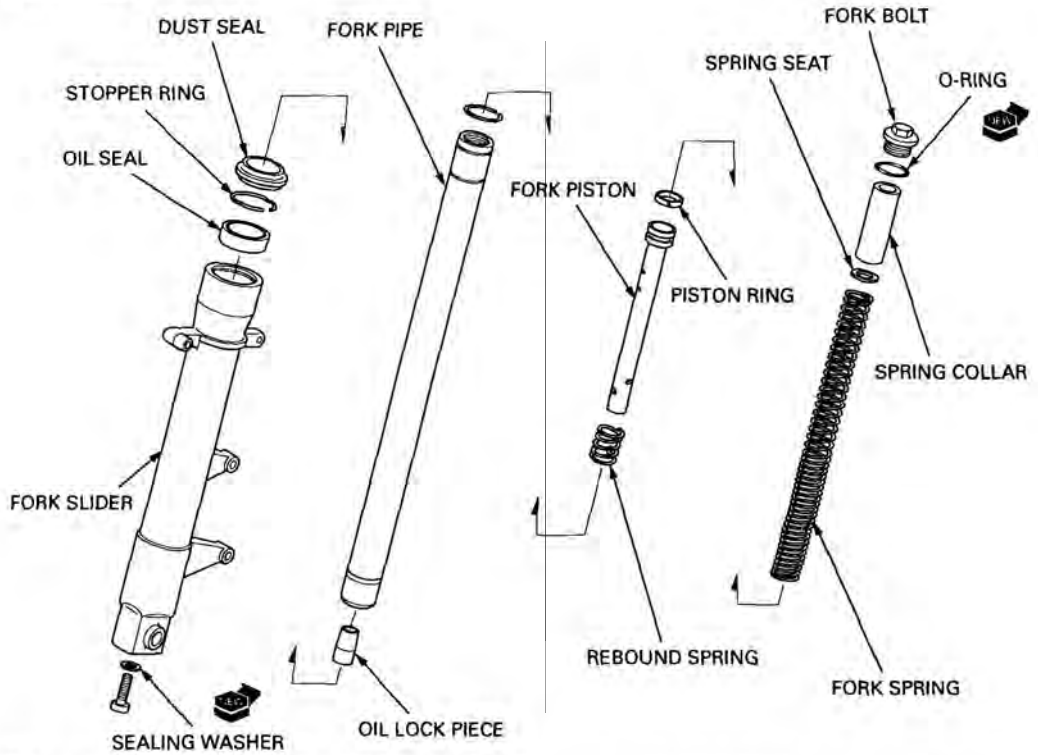
SERVICE LIMIT: 0.20 mm (0.008 in)

The actual runout is 1/2 of the total indicator reading.



FRONT WHEEL/SUSPENSION/STEERING

ASSEMBLY



Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.

Install the oil lock piece and fork tube into the fork slider.



Install the fork piston and rebound spring into the fork pipe.



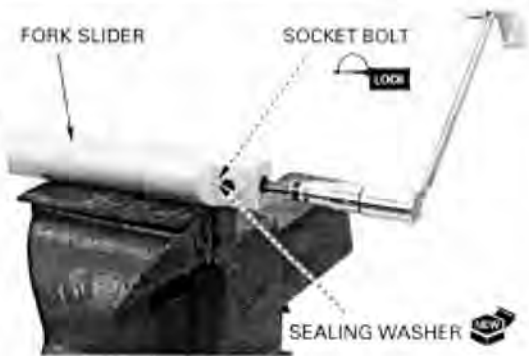
Clean and apply a locking agent to the fork socket bolt threads.
Install a new sealing washer and socket bolt.

Hold the fork slider in a vise with piece of woods or shop towel.
Tighten the fork socket bolt to the specified torque.

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

NOTE:

If the socket bolt turn together with the fork piston, temporarily install the fork spring and fork bolt.



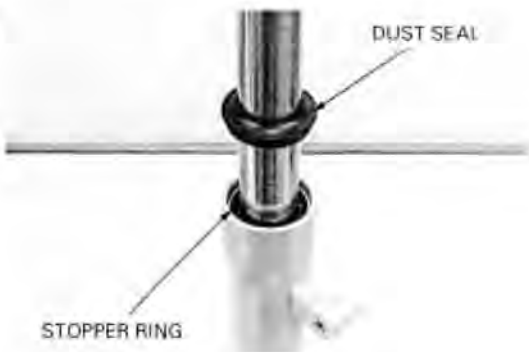
Apply fork fluid to the lip of the oil seal.
Drive the oil seal using the oil seal driver.

TOOLS:

Fork seal driver 07747 - 0010100
Fork seal driver attachment 07747 - 0010300



Install the oil seal stopper ring into the groove of the fork slider.
Install the dust seal.



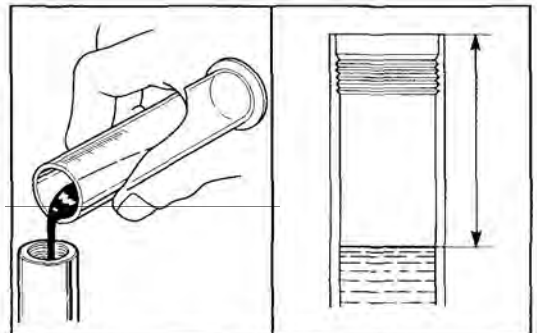
Compress the fork pipe all the way and pour in the specified amount of fork fluid.

OIL CAPACITY:

206 ± 2.5 cm³ (7.0 ± 0.08 US oz, 7.3 ± 0.09 Imp oz)

Pump the fork pipe slowly several times to stabilize the fork oil level.
Compress the fork all the way and measure the oil level from the top of the pipe.

OIL LEVEL: 131 mm (5.2 in)



FRONT WHEEL/SUSPENSION/STEERING

Wipe oil off the spring thoroughly using a clean cloth.
Install the fork spring with the tightly wound end facing down.

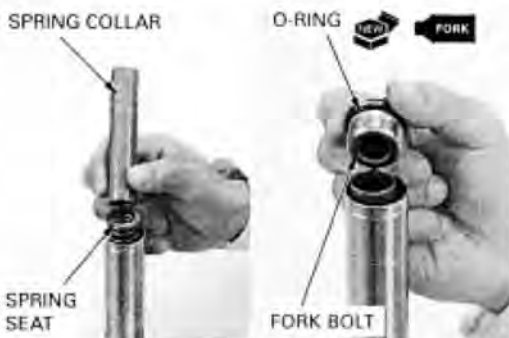


Install the spring seat and spring collar.

Apply fork fluid to a new O-ring.
Install a new O-ring onto the fork bolt and install it loosely.

NOTE:

Install the fork bolt but do not tighten yet.



INSTALLATION

Install the fork leg and temporarily tighten the fork bottom pinch bolt.



Install the following:
— handlebars (page 14-5)

Loosen the handlebar pinch bolt.
Loosen the fork bottom pinch bolt and align the stopper ring groove with upper surface of the handlebar.



Tighten the fork bottom pinch bolts to the specified torque.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

Tighten the fork top pinch bolt to the specified torque.

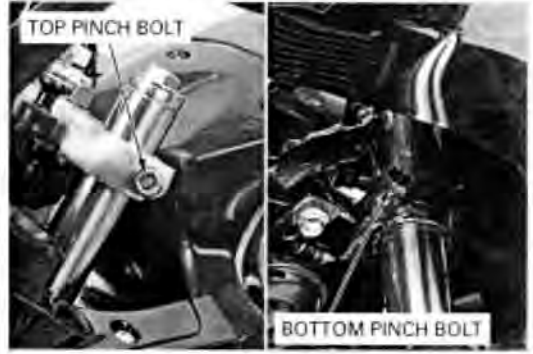
TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Tighten the fork bolt to the specified torque.

TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Tighten the handlebar pinch bolt.

TORQUE: 27 N·m (2.8 kgf·m, 20 lbf·ft)



Install the following:

- front fender (page 2-3)
- front wheel (page 14-12)
- brake carrier (page 16-19)

STEERING STEM

REMOVAL

Remove the following:

- handlebars (page 14-3)
- upper cowl (page 2-4)
- front wheel (page 14-8)
- front fender (page 2-3)

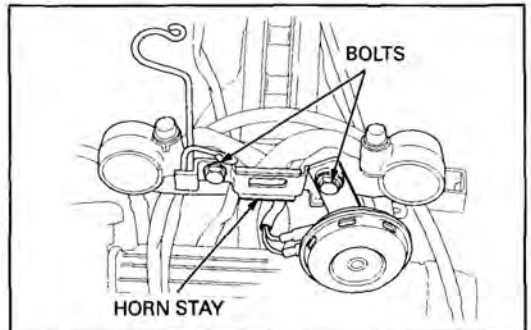
Remove the steering stem nut and washer.

Remove the fork (page 14-12).

Remove the top bridge.



Remove the horn stay mounting bolts and horn stay.



FRONT WHEEL/SUSPENSION/STEERING

Remove the top thread using the special tool.

TOOL:
Steering stem socket 07916 - 3710101



Remove the following:

- top cone race
- upper bearing
- steering stem
- lower bearing

CAUTION:

Be careful not to lose any of the bearing.



BEARING RACE REPLACEMENT

NOTE:

Replace the bearing and races as a set.

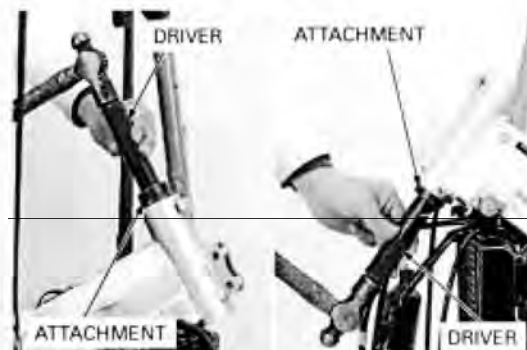
Remove the ball races using the special tool.

TOOL:
Ball race remover 07GMD - KS40100



Install the new ball races using the special tools.

TOOLS:
Driver 07749 - 0010000
Attachment, 42 x 47 mm 07746 - 0010300



BOTTOM CONE RACE REPLACEMENT

Avoid damaging the steering stem thread, temporarily install the stem nut.
Remove the bottom cone race, dust seal and dust seal washer.

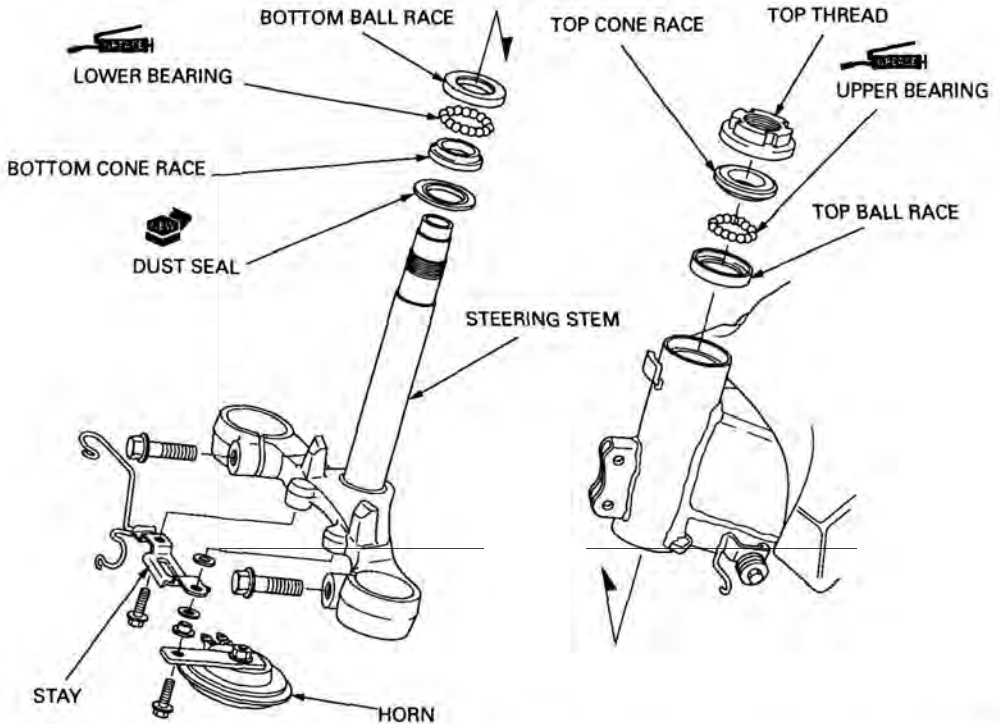


Install the new dust seal and bottom cone race.
Drive a new bottom cone race onto the steering stem using the special tool.

TOOL:
Steering stem driver 07946 - 4300101



INSTALLATION



FRONT WHEEL/SUSPENSION/STEERING

Apply grease to all bearing area.
Install the lower bearing.
Install the steering stem, upper bearing and top cone race.

CAUTION:

Be careful not to lose any of the bearing.



Install the top thread.
Tighten the top thread to the initial torque using the special tool while holding steering stem securely.

TOOL:

Steering stem socket 07916 - 3710101

TORQUE: 27 N-m (2.8 kgf-m, 20 lbf-ft)



Move the steering stem right and left, lock-to-lock, five times for races and bearings to get to fit enough.
Loosen the top thread completely.



Retighten the top thread to the specified torque using the special tool.

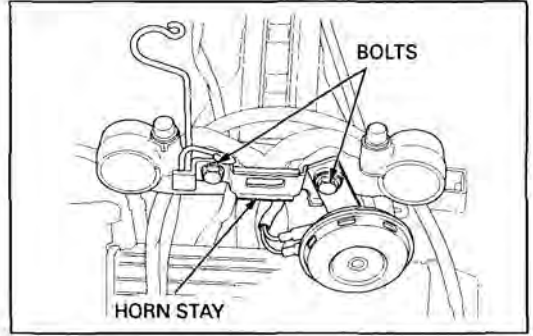
TOOL:

Steering stem socket 07916 - 3710101

TORQUE: 1.0 N-m (0.1 kgf-m, 0.7 lbf-ft)



Install the horn stay.



Install the following:

- top bridge
- front fork (page 14-18)
- washer
- stem nut

Tighten the stem nut to the specified torque.

TORQUE: 88 N·m (9 kgf·m, 65 lbf·ft)

Install the following:

- front fender (page 2-3)
- front wheel (page 14-12)
- handlebar (page 14-5)
- upper cowl (page 2-5)



STEERING BEARING PRELOAD

Raise the front wheel off the ground.

Position the steering stem to the straight ahead position. Hook a spring scale to the fork pipe between the fork top and bottom bridges.

Make sure that there is no cable or wire harness interference.

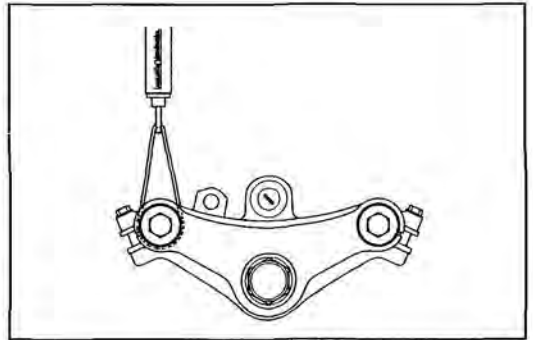
Pull the spring scale keeping the scale at a right angle to the steering stem.

Read the scale at the point where the steering stem just starts to move.

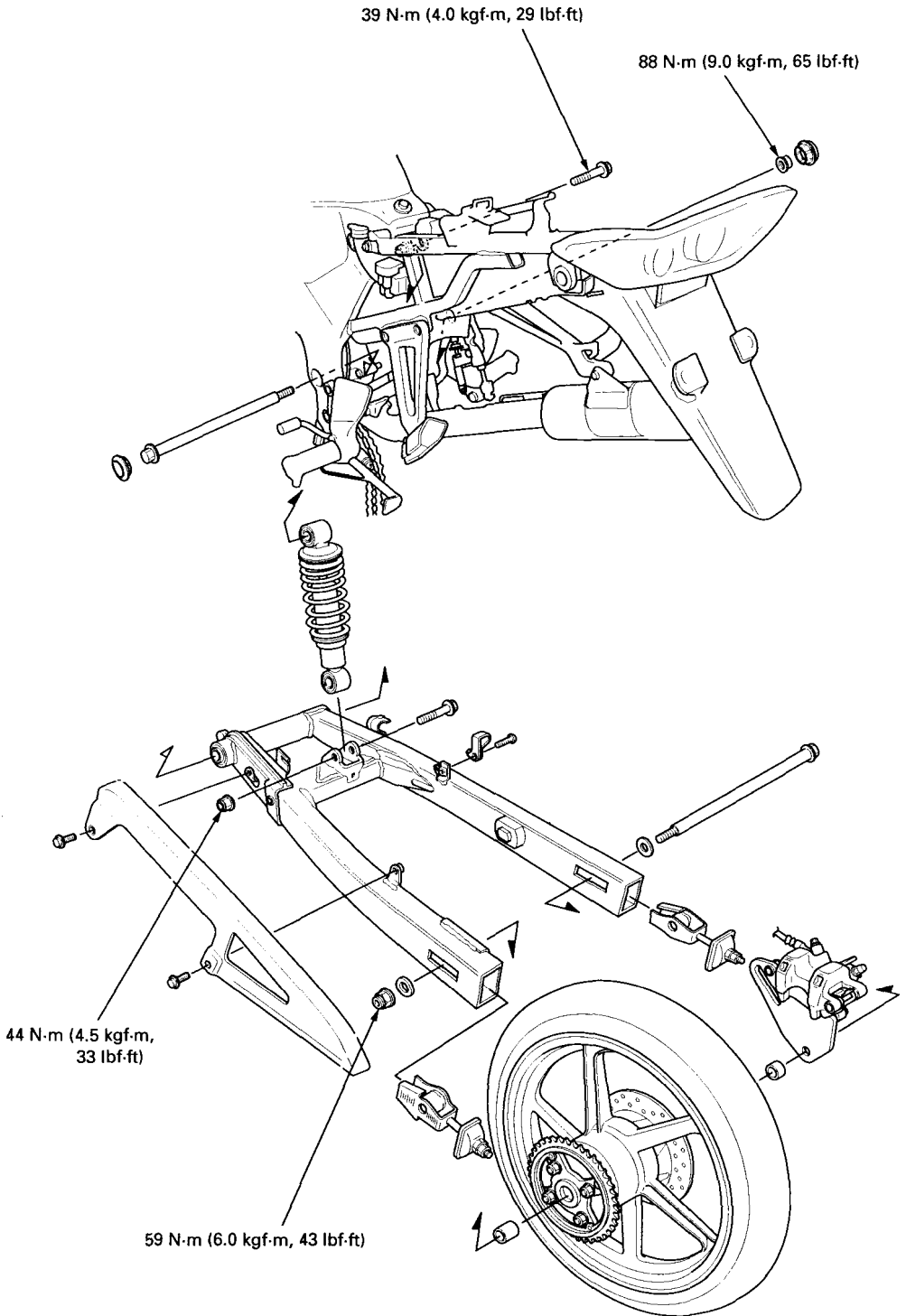
STEERING BEARING PRELOAD:
0.10 – 0.15 kgf (0.220 – 0.330 lbf)

If the readings do not fall within the limits, readjust the steering top thread.

Install the removed parts in the reverse order of removal.



REAR WHEEL/SUSPENSION



15. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	15-1	SHOCK ABSORBER	15-9
TROUBLESHOOTING	15-2	SWINGARM	15-10
REAR WHEEL	15-3		

SERVICE INFORMATION

GENERAL

⚠ WARNING

- A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean contaminated disc with a high quality brake degreasing agent.
- Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Carefully check balance before reinstalling the wheel.

CAUTION:

To avoid damaging the rim when using the tire lever, always use rim protectors.

- When servicing the rear wheel, swingarm or shock absorber, support the motorcycle securely using a hoist or equivalent.
- Use only genuine Honda replacement bolts and nuts for all suspension pivot and mounting points.

SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Minimum tire tread depth	—	To the indicator
Cold tire pressure	Driver only	200 kPa (2.00 kgf/cm ² , 29 psi)
	Driver and passenger	225 kPa (2.25 kgf/cm ² , 33 psi)
Axle runout	—	0.20 (0.008)
Wheel rim runout	Radial	2.0 (0.08)
	Axial	2.0 (0.08)
Wheel balancer weight	—	60 g (2.1 oz) max.
Drive chain	Size/link	DID428VI3-124LE
	Slack	25 – 35 (1.0 – 1.4)

TORQUE VALUES

Rear axle nut	59 N·m (6.0 kgf·m, 43 lbf·ft)	U-nut
Driven sprocket nut	64 N·m (6.5 kgf·m, 47 lbf·ft)	U-nut
Rear brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt
Shock absorber upper mounting bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)	
Shock absorber lower mounting nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	U-nut
Swingarm pivot nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Chain slider screw	5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)	

REAR WHEEL/SUSPENSION

TOOLS

Bearing remover head, 12 mm	07746 – 0050300
Bearing remover shaft	07746 – 0050100
Driver	07749 – 0010000
Attachment, 37 x 40 mm	07746 – 0010200
Pilot, 12 mm	07746 – 0040200

TROUBLESHOOTING

Wobble or vibration in motorcycle

- Bent rim
- Bent spokes
- Damaged tire
- Axle not tightened properly
- Chain adjusters not adjusted equally

Soft suspension

- Weak spring
- Oil leakage from damper unit
- Tire pressure too low

Hard suspension

- Bent damper rod
- Bent frame or swing arm
- Tire pressure too high

Suspension noise

- Faulty damper
- Loose fasteners

Steers to one side or does not track straight

- Bent rear axle
- Axle alignment/chain adjustment not equal both sides

REAR WHEEL

REMOVAL

Support the motorcycle securely using a hoist or equivalent.

Loosen the drive chain adjusting nuts and lock nuts.

Loosen the rear axle nut.
Push the rear wheel forward.
Derail the drive chain.

Remove the axle nut.
Remove the rear axle from the right side.
Remove the rear wheel and side collars.

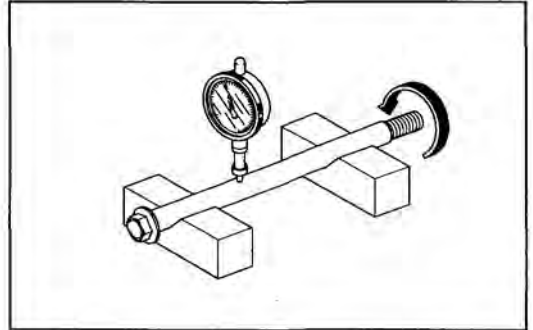


INSPECTION

Axle

Place the axle in V-blocks and measure the runout.
Actual runout is 1/2 the total indicator reading.

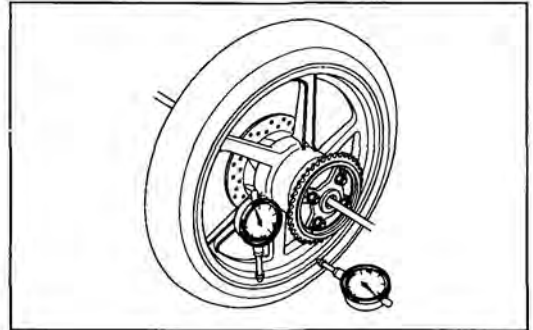
SERVICE LIMIT: 0.20 mm (0.008 in)



Wheel rim runout

Check the rim runout by placing the wheel in a turning stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS: Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)



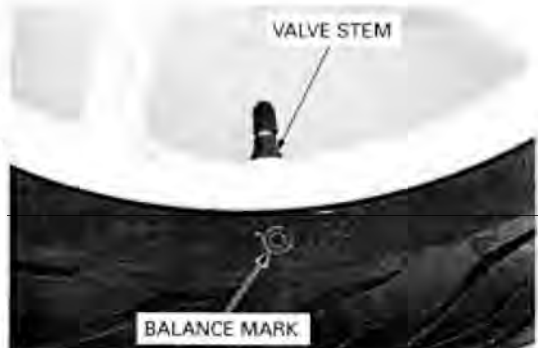
Wheel balance

CAUTION:

*Wheel balance directly affects the stability, handling and over all safety of the motorcycle.
Always check balance when the tire has been removed from the rim.*

NOTE:

For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem.
Remount the tire if necessary.



REAR WHEEL/SUSPENSION

NOTE:

Note the rotating direction marks on the tire.



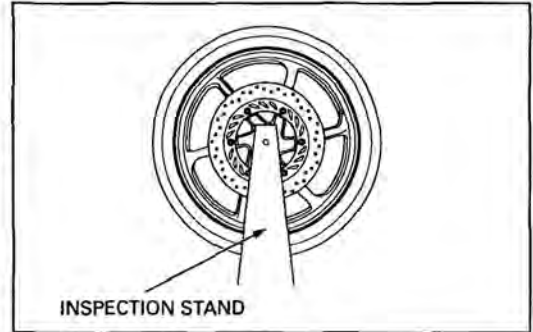
Remove the dust seals from the wheel.

Mount the wheel, tire, driven flange and brake disc assembly in an inspection stand.

Spin the wheel, allow it to stop, and mark the lowest (heaviest) point of the wheel with a chalk.

Do this two or three times to verify the heaviest area.

If the wheel is balanced, it will not stop consistently in the same position.



To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Adjust enough weight so the wheel will no longer stop in the same position when it is spun.

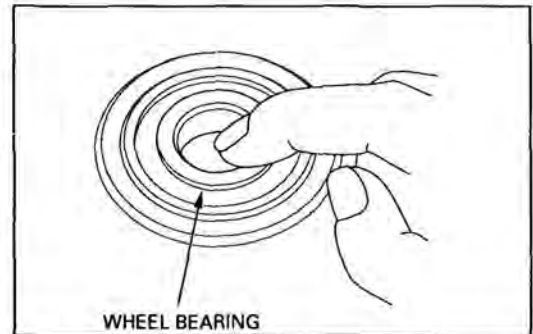
Do not add more than 60 grams to the wheel.

Wheel bearing

Turn the inner race of each bearing with your finger.

Bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the hub and flange.



NOTE:

Replace the wheel and flange bearings in pairs.

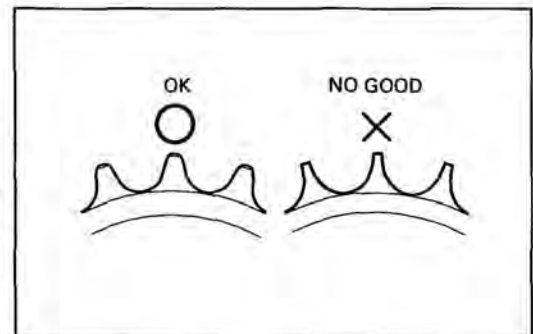
Driven sprocket

Check the condition of the final driven sprocket teeth.

Replace the sprocket if worn or damaged.

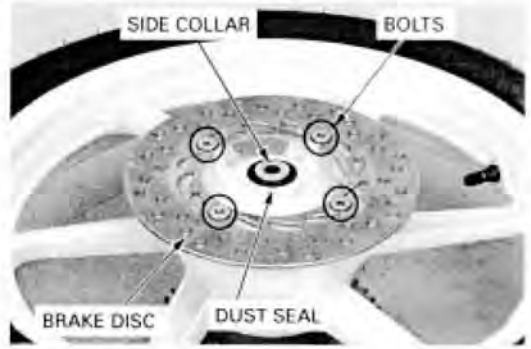
NOTE:

- If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the replacement chain or sprocket will wear rapidly.



DISASSEMBLY

Remove the brake disc bolts and brake disc.
Remove the side collar and dust seal.



Remove the side collar and dust seal.
Remove the driven flange from the left wheel hub.

NOTE:

If you will be disassemble the driven flange, remove the driven sprocket nuts before removing the driven flange from the wheel hub.



Remove the damper rubbers and O-ring.



REAR WHEEL/SUSPENSION

Driven flange bearing removal

Remove the driven flange bearing and collar.

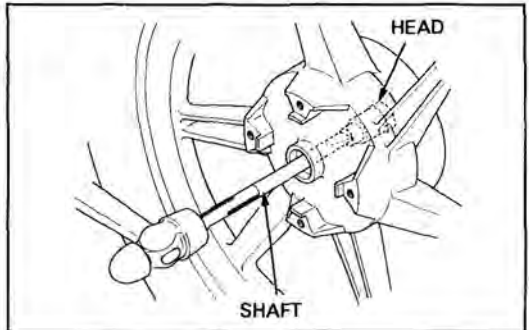


Wheel bearing removal

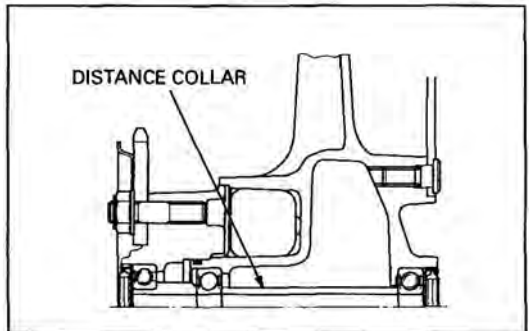
Install the bearing remover head into the bearing. From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub.

TOOLS:

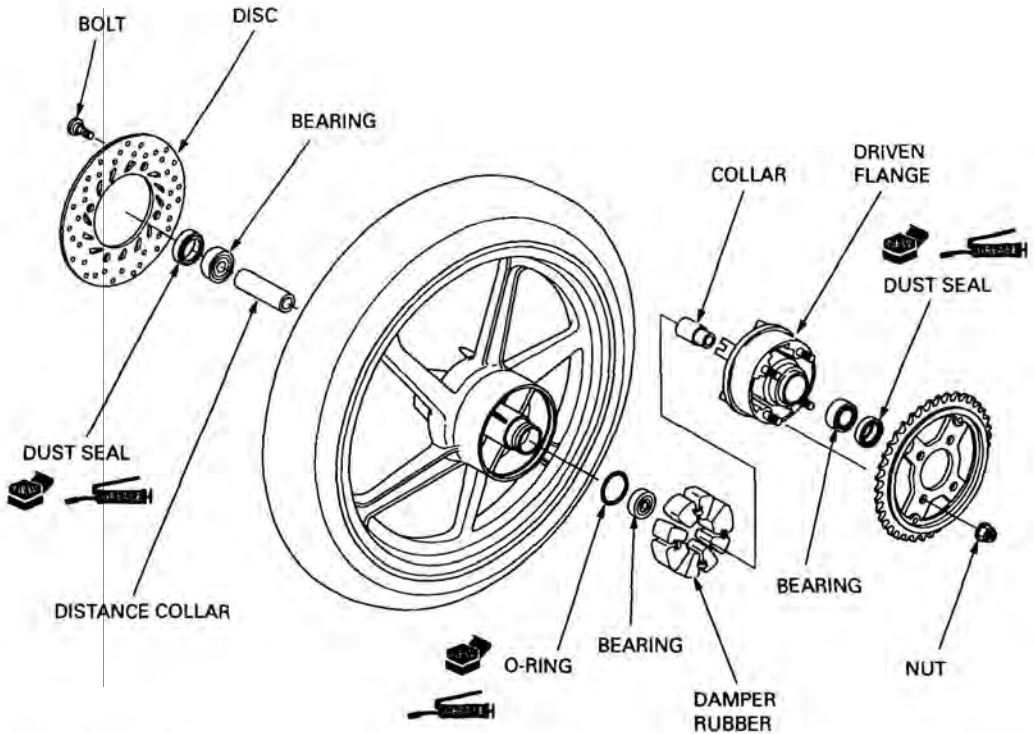
Bearing remover head, 12 mm 07746 - 0050300
Bearing remover shaft 07746 - 0050100



Remove the distance collar and drive out the other bearing.



ASSEMBLY



Wheel bearing installation

CAUTION:

Never install an old bearing has been removed, the bearing must be replaced with a new one.

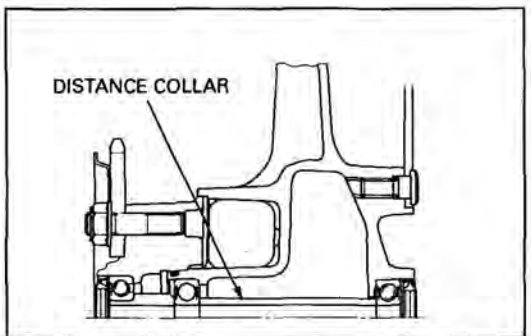
Drive a new right bearing squarely with its marking side facing out.

TOOLS:

- | | |
|------------------------|-----------------|
| Driver | 07749 - 0010000 |
| Attachment, 37 x 40 mm | 07746 - 0010200 |
| Pilot, 12 mm | 07746 - 0040200 |



Install the distance collar, then drive in the left side bearing with its marking side facing out.



REAR WHEEL/SUSPENSION

Driven flange installation

Pack all bearing cavities with grease install the driven flange collar into a new driven flange bearing.

Drive a new driven flange bearing into the driven flange using the special tools.

TOOLS:

Driver 07749 - 0010000

Attachment, 37 x 40 mm 07746 - 0010200

Pilot, 12 mm 07746 - 0040200



Wheel assembly

Install the rear brake disc with the stamped mark "MIN. TH, 3.5 mm" facing outside and install the brake disc bolts.

Tighten the brake disc bolts to the specified torque.

TORQUE: 42 N-m (4.3 kgf-m, 31 lbf-ft)

Install a new dust seal and apply grease to the dust seal lip. Install the right side collar.

▲ WARNING

Do not get grease on the brake disc or stopping power will be reduced.



Apply grease to the new O-ring.

Install the wheel damper rubbers and O-ring into the wheel hub.



Install the driven flange assembly into the left wheel hub.

If the driven sprocket was removed, install the driven sprocket and tighten the nuts to the specified torque.

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

Apply grease to the new dust seal lips, then install it into the driven flange.

Install the side collar.



INSTALLATION

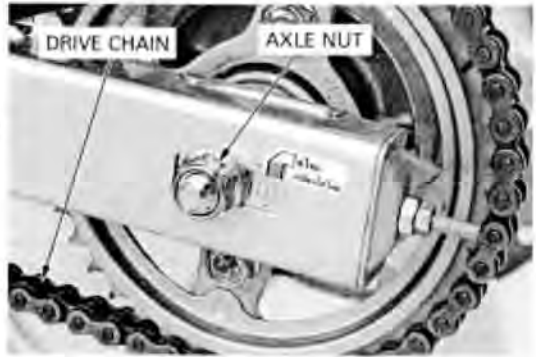
Install the drive chain adjusters into the swingarm.
Place the rear wheel into the frame.

Insert the rear axle through the right drive chain adjuster, right side collar, rear wheel, left side collar and left chain adjuster.

Install the drive chain onto the driven sprocket.

Install the rear axle nut.

Adjust the drive chain slack (page 3-15).



SHOCK ABSORBER

REMOVAL

Remove the rear cowl assembly (page 2-2).

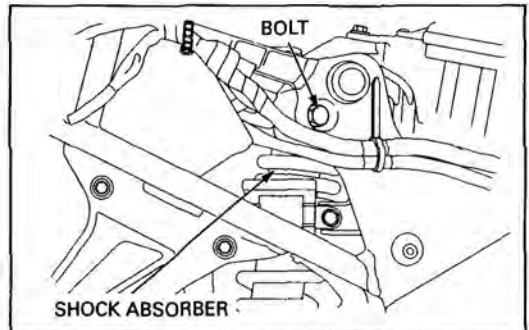
Support the motorcycle securely using a hoist or equivalent.

Remove the shock absorber lower mounting bolt and nut.



Remove the shock absorber upper mounting bolt.

Remove the shock absorber.



INSPECTION

Visually inspect the shock absorber for damage.

Check the following:

- Damper unit for deformation or oil leaks
- Upper and lower bushings for wear or damage

CAUTION:

- *Do not disassemble the shock absorber.*
- *Replace the shock absorber if any component is damaged.*

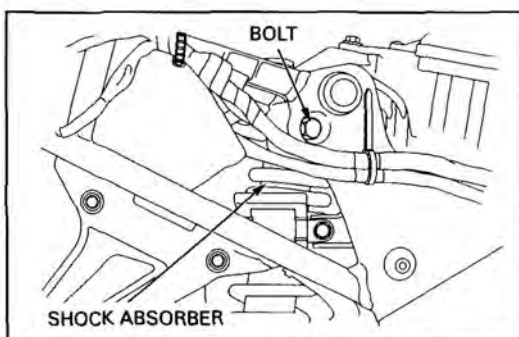


REAR WHEEL/SUSPENSION

INSTALLATION

Install the shock absorber to the frame.
Install and tighten the shock absorber upper mounting bolt to the specified torque.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)



Install the shock absorber lower mounting bolt and nut and tighten the nut to the specified torque.

TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)

Check the operation of the shock absorber (page 3-20).
Install the rear cowl (page 2-2).



SWINGARM

REMOVAL

Remove the rear wheel (page 15-3).

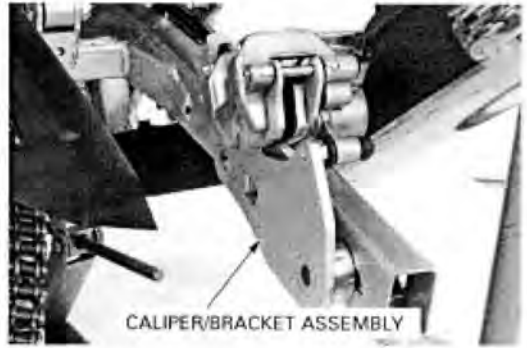
Remove the swingarm pivot caps.



Remove the screw and brake hose guide.

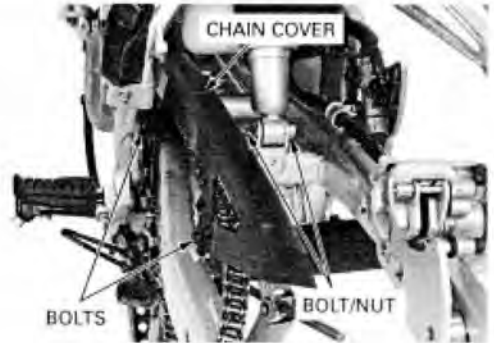


Remove the rear brake caliper/bracket assembly from the swingarm.

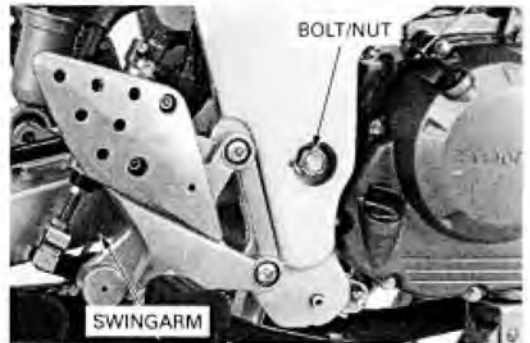


Remove the bolts, and drive chain cover.

Remove the shock absorber lower mounting bolt and nut.

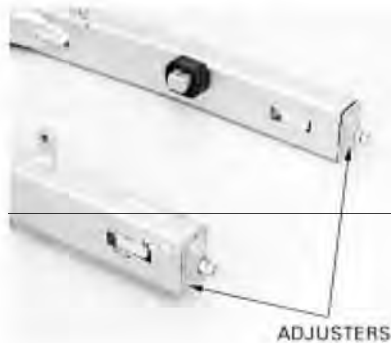


Remove the swingarm pivot nut.
Remove the swingarm pivot bolt from the left side and remove the swingarm.



DISASSEMBLY

Remove the drive chain adjusters.



REAR WHEEL/SUSPENSION

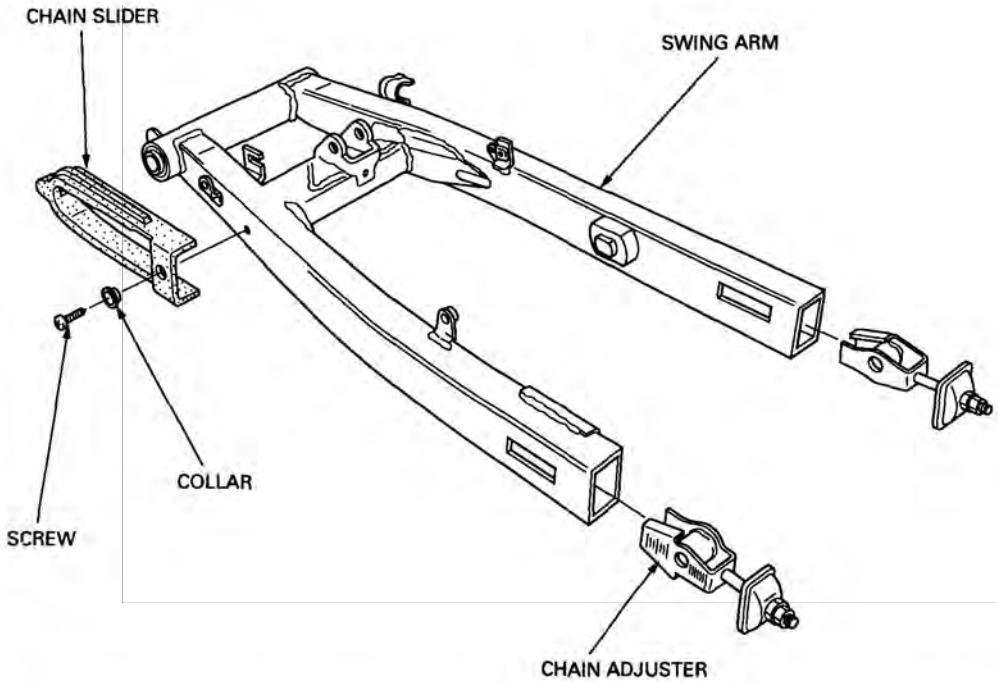
Check the chain slider for wear or damage.
Remove the screw, collar and chain slider.



Check the rubber bushings for wear, damage or fatigue.



ASSEMBLY



Install the chain slider.
Install the collar and tighten the screw to the specified torque.

TORQUE: 5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)



Place the drive chain adjusters into the swingarm.



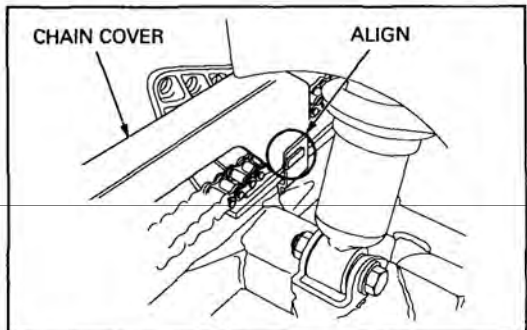
INSTALLATION

Install the swingarm onto the frame.
Install the swingarm pivot bolt to the frame from the left side.

Temporarily tighten the swingarm pivot nut.



Install the chain cover to the swingarm by aligning the chain cover boss with the groove on the swingarm.

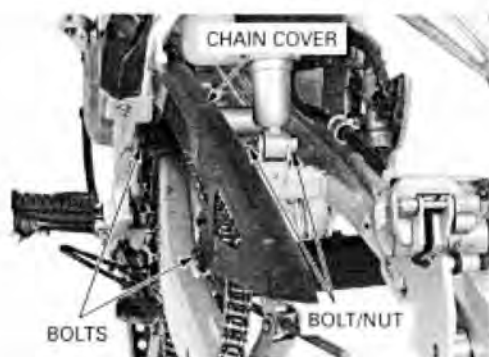


REAR WHEEL/SUSPENSION

Install and tighten the bolts securely.

Tighten the shock absorber lower mounting bolt and nut to the specified torque.

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



Install the brake hose guide and tighten the screw securely.



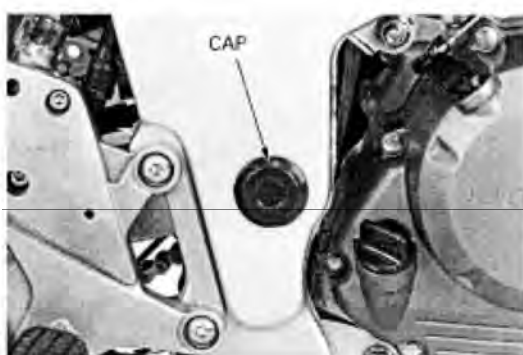
Install the rear brake caliper/bracket assembly on the swingarm aligning the slot on the bracket with boss on the swingarm.

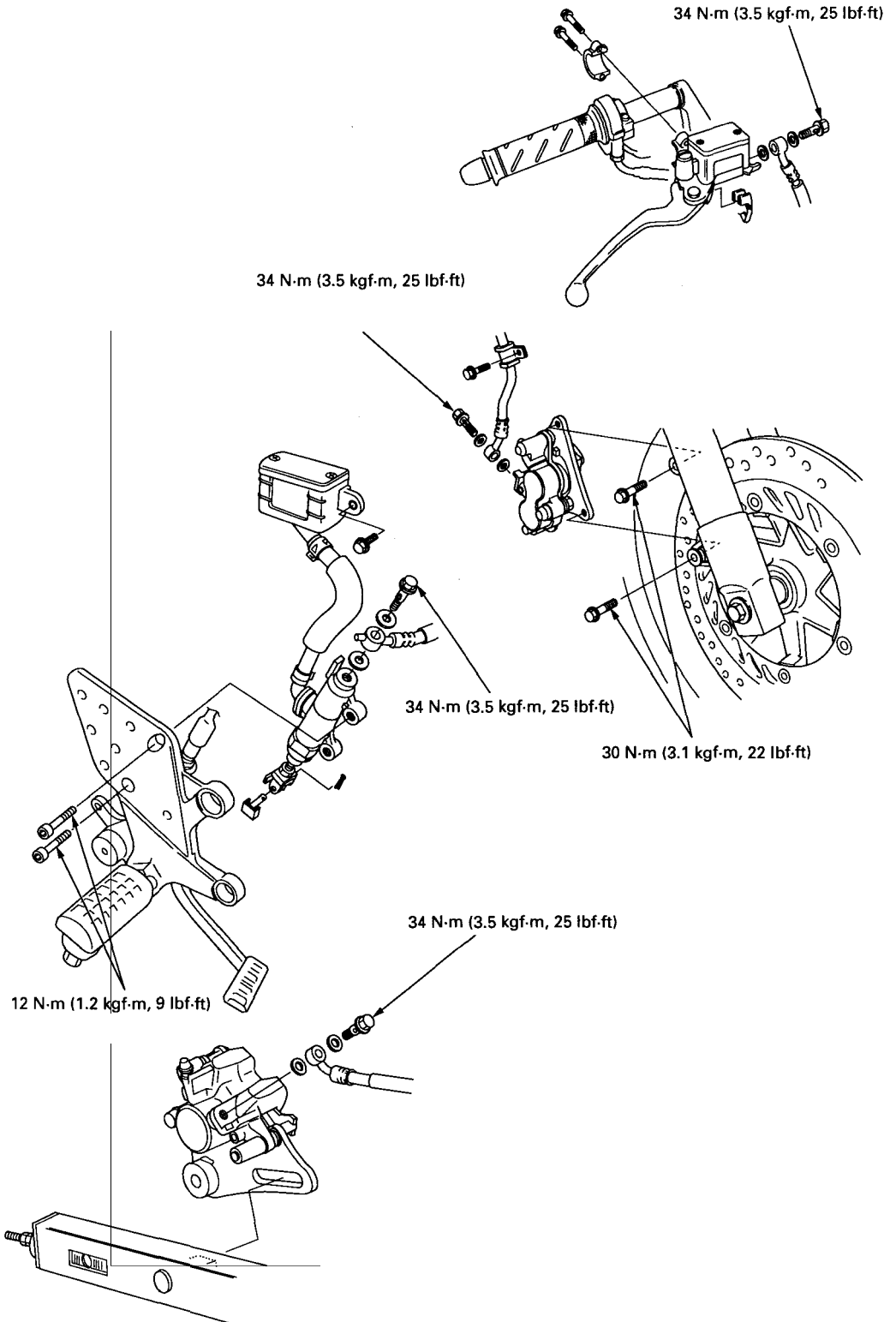


Install the rear wheel (page 15-9), then place the motorcycle on level ground.
Tighten the swingarm pivot nut to the specified torque.

TORQUE: 88 N-m (9.0 kgf-m, 65 lbf-ft)

Install the pivot caps.





16. BRAKE SYSTEM

SERVICE INFORMATION	16-1	REAR MASTER CYLINDER	16-12
TROUBLESHOOTING	16-2	FRONT BRAKE CALIPER	16-16
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	16-3	REAR BRAKE CALIPER	16-19
BRAKE PAD/DISC	16-5	BRAKE PEDAL	16-22
FRONT MASTER CYLINDER	16-8		

SERVICE INFORMATION

GENERAL

Keep grease off of brake pads and disc.

▲ WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bleed.
- Always use fresh DOT 3 or 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid they may not be compatible.

CAUTION:

Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts.

Be careful whenever you remove the reservoir cap; make sure the front reservoir is horizontal first.

- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Front	Specified brake fluid	DOT 3 or DOT 4	—
	Brake pad wear indicator	—	To groove
	Brake disc thickness	3.8 – 4.2 (0.15 – 0.17)	3.0 (0.12)
	Brake disc runout	—	0.1 (0.004)
	Master cylinder I.D.	12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
	Master piston O.D.	12.657 – 12.684 (0.4983 – 0.4994)	12.640 (0.4976)
	Caliper cylinder I.D.	25.400 – 25.405 (1.0000 – 1.0002)	25.450 (1.0020)
	Caliper piston O.D.	25.318 – 25.368 (0.9968 – 0.9987)	25.300 (0.9960)
Rear	Specified brake fluid	DOT 3 or DOT 4	—
	Brake pad wear indicator	—	To groove
	Brake disc thickness	3.8 – 4.2 (0.15 – 0.17)	3.0 (0.12)
	Brake disc runout	—	0.1 (0.004)
	Master cylinder I.D.	12.700 – 12.743 (0.5000 – 0.5017)	12.755 (0.5022)
	Master piston O.D.	12.657 – 12.684 (0.4983 – 0.4994)	12.645 (0.4978)
	Caliper cylinder I.D.	32.030 – 32.080 (1.2610 – 1.2630)	32.090 (1.2634)
	Caliper piston O.D.	31.948 – 31.998 (1.2578 – 1.2598)	31.94 (1.257)

BRAKE SYSTEM

TORQUE VALUES

Brake hose bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Front master cylinder cover screw	1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)	
Front brake light switch screw	1.2 N·m (0.12 kgf·m, 0.9 lbf·ft)	
Brake lever pivot nut	5.9 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt
Brake caliper pad pin	17 N·m (1.7 kgf·m, 12 lbf·ft)	
Rear brake reservoir cover screw	1.5 N·m (0.15 kgf·m, 1.1 lbf·ft)	
Rear master cylinder mounting bolts	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Rear master cylinder push rod nut	17 N·m (1.7 kgf·m, 12 lbf·ft)	
Bleed valve	5.4 N·m (0.6 kgf·m, 4 lbf·ft)	
Main step holder mounting bolt	27 N·m (2.8 kgf·m, 20 lbf·ft)	

TOOL

Snap ring pliers	07914 – SA50001
------------------	-----------------

TROUBLESHOOTING

Brake lever/pedal soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pads/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pads/disc
- Contaminated caliper
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever/pedal

Brake lever/pedal hard

- Clogged/restricted brake system
- Sticking/worn caliper piston
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

Brake drags

- Contaminated brake pads/disc
- Misaligned wheel
- Clogged/restricted brake hose joint
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted brake hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port

BRAKE FLUID REPLACEMENT/AIR BLEEDING

▲ WARNING

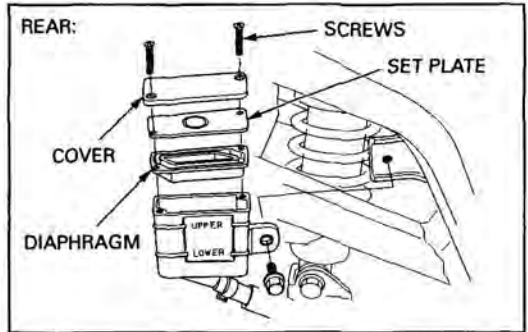
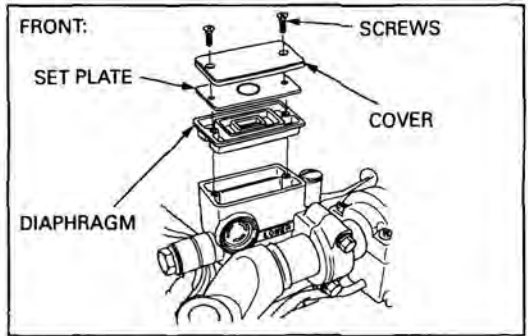
A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

CAUTION:

- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

NOTE:

- The pedal brake line air bleeding procedure is performed in the same manner as in the lever brake line air bleeding procedure.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- When using a commercially available brake bleeder, follow the manufacturer's operating instructions.



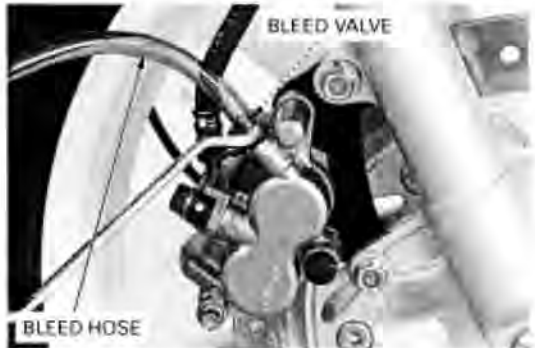
BRAKE FLUID DRAINING

Make sure that the master cylinder is parallel to the ground, before removing the reservoir cover.

Remove the screws, reservoir cover, set plate and diaphragm.

Connect a bleed hose to the bleed valve.

Loosen the bleed valve and pump the brake lever (pedal). Stop operating the brake when no more fluid flows out of the bleed valve.

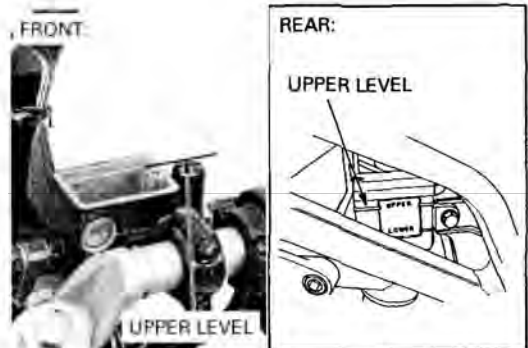


BRAKE FLUID FILLING/BLEEDING

CAUTION:

Do not mix different types of fluid since they are not compatible.

Fill the reservoir with DOT 3 or DOT 4 brake fluid to the upper level.



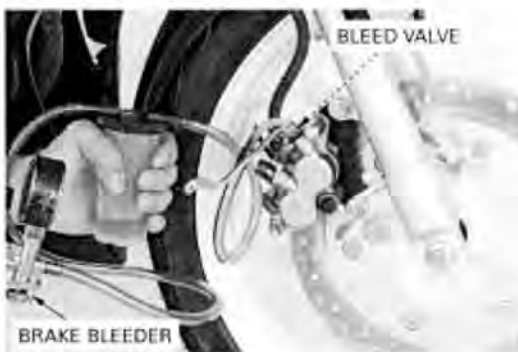
BRAKE SYSTEM

Connect a commercially available brake bleeder to the bleed valve.

Pump the brake bleeder and loosen the bleed valve. Add brake fluid when the fluid level in the reservoir is low.

NOTE:

- Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



Repeat the above procedures until air bubbles do not appear in the bleed tube.

NOTE:

If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Close the bleed valve and operate the brake lever (pedal). If it still feels spongy, bleed the system again.

If a brake bleeder is not available, use the following procedure:

Pump up the system pressure with the brake lever (pedal) until lever (pedal) resistance is felt.

1. Pump the brake lever or pedal several times, then squeeze the brake lever or push the brake pedal all the way and loosen the bleed valve 1/2 turn. Wait several seconds and close the bleed valve.

NOTE:

Do not release the brake lever or pedal until the bleed valve has been closed.

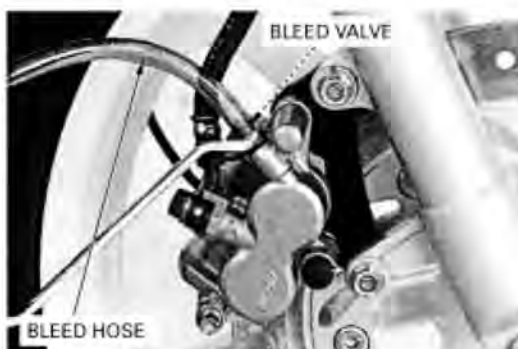


2. Release the brake lever or pedal slowly until the bleed valve has been closed.
3. Repeat steps 1 - 2 until there are no air bubbles in the bleed hose.

After bleeding air completely, tighten the bleed valve to the specified torque.

TORQUE: 5.4 N·m (0.6 kgf·m, 4 lbf·ft)

Fill the reservoir with DOT3 or DOT 4 brake fluid to the upper level.



FRONT:



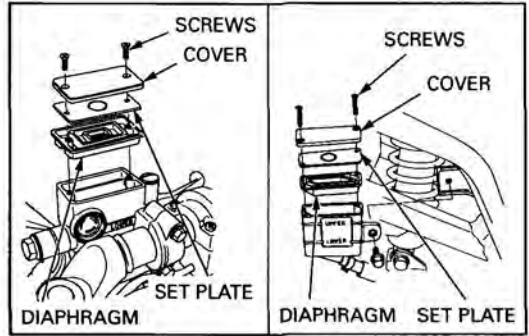
REAR:

UPPER LEVEL



Install the diaphragm set plate and reservoir cover.
Tighten the reservoir cover screws to the specified torque.

TORQUE: 1.5 N-m (0.15 kgf-m, 1.1 lbf-ft)



BRAKE PAD/DISC

FRONT BRAKE PAD REPLACEMENT

▲ WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

NOTE:

- Always replace the brake pads in pairs to assure even disc pressure.
- Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

Push the caliper pistons all the way in to allow installation of new brake pads.



Remove the pad pin and brake pads.



BRAKE SYSTEM

Install the new brake pads to the brake caliper.



Install the new O-ring into the pad pin groove.
Apply grease to the pad pin sliding surface.
Push the brake pads against the pad spring, then install the pad pin.

Tighten the pad pin to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)



REAR BRAKE PAD REPLACEMENT

▲ WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

NOTE:

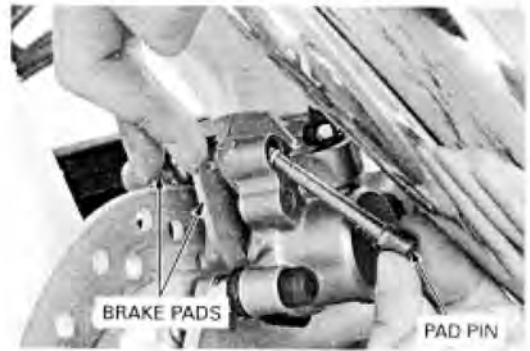
- Check the brake fluid level in the reservoir as this operation causes the level to rise.
- Always replace the brake pads in pairs to assure even disc pressure.

Push the caliper pistons all the way in to allow installation of new brake pads.

Remove the rubber plug.

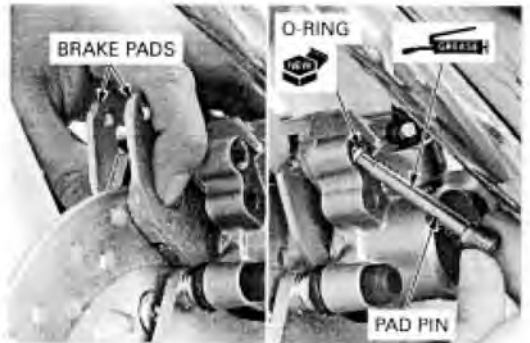


Remove the pad pin and brake pads.



Install the new O-ring into the pad pin groove.
Apply grease to the pad pin sliding surface.
Push the brake pads against the pad spring, then install the pad pin.
Tighten the pad pin to the specified torque.

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)



Install the rubber plug.



BRAKE DISC INSPECTION

Visually inspect the brake disc for damage or cracks.

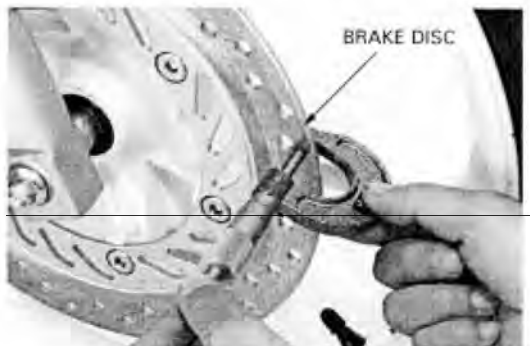
Measure the brake disc thickness with a micrometer.

SERVICE LIMITS:

FRONT: 3.0 mm (0.12 in)

REAR: 3.0 mm (0.12 in)

Replace the brake disc if the smallest measurement is less than the service limit.



BRAKE SYSTEM

Measure the brake disc warpage with a dial indicator.

SERVICE LIMIT: 0.1 mm (0.004 in)

Check the wheel bearings for excessive play, if the warpage exceeds the service limit.

Replace the brake disc if the wheel bearings are normal.



FRONT MASTER CYLINDER

REMOVAL

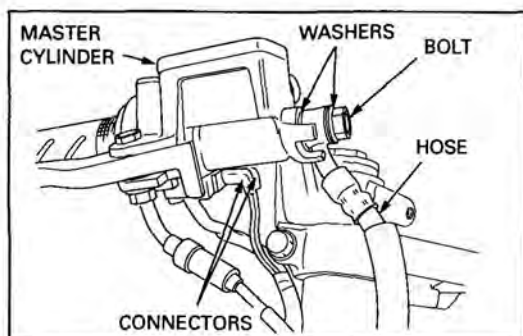
CAUTION:

Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

Drain the brake fluid from the front brake hydraulic system (page 16-3).

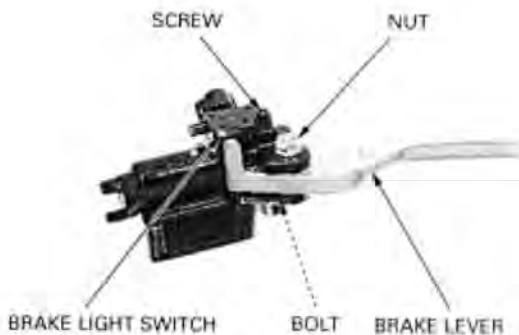
Remove the front brake light switch connectors.
Remove the bolt, sealing washers and disconnect the brake hose.

Remove the master cylinder holder bolts, holder and master cylinder.



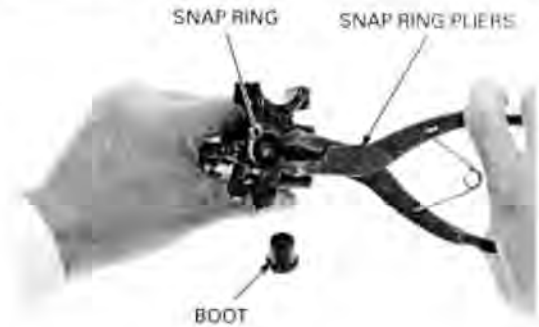
DISASSEMBLY

Remove the pivot nut, bolt and brake lever.
Remove the screw and front brake light switch.



Remove the boot.
Remove the snap ring using the special tool.

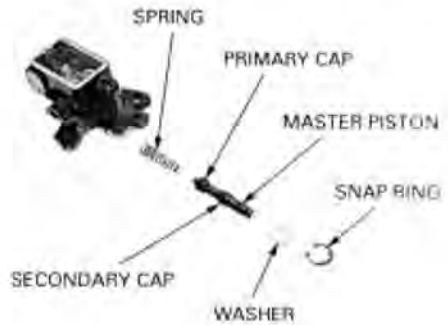
TOOL:
Snap ring pliers **07914 - SA50001**



Remove the washer, master piston and spring from the master cylinder.

Clean the inside of the master cylinder and reservoir with brake fluid.

NOTE:
Clean the disassembled parts with clean brake fluid and make sure air can ventilate the master cylinder port by compressed air.



INSPECTION

Check the boot, primary and secondary cups for wear, deterioration or damage.
Check the master cylinder and piston for scoring or other damage.
Replace if necessary.

Measure the master cylinder I.D.
SERVICE LIMIT: 12.755 mm (0.5022 in)



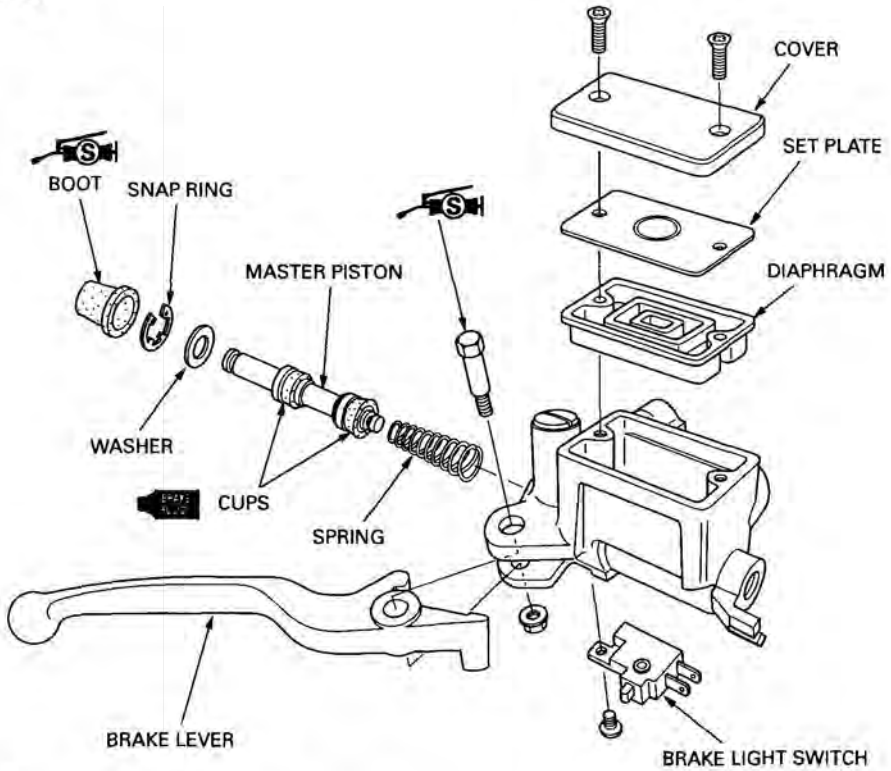
Measure the master piston O.D.
SERVICE LIMIT: 12.640 mm (0.4976 in)

NOTE:
The master piston, piston cups, spring and snap ring, must be replaced as a set.



BRAKE SYSTEM

ASSEMBLY



CAUTION:

When installing the cups, do not allow the lips to turn inside out.

Dip the piston cups in clean brake fluid before assembly. Install the spring onto the master piston. Install the spring/master piston and washer into the master cylinder.



Install the snap ring using the special tool.

TOOL:

Snap ring pliers

07914 - SA50001

CAUTION:

Be certain the snap ring is firmly seated in the groove.

Apply silicone grease to the inside of the boot. Install the boot to the master cylinder.



Install the front brake light switch onto the master cylinder with aligning the boss of the switch with hole of the master cylinder.

BRAKE LIGHT SWITCH



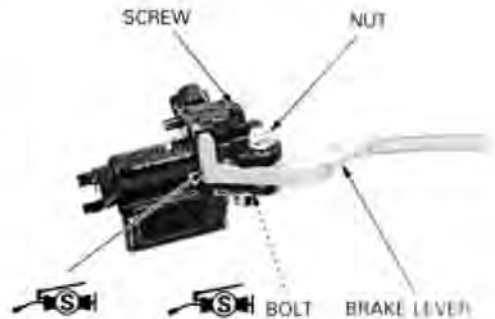
Install and tighten the front brake light switch screw to the specified torque.

TORQUE: 1.2 N-m (0.12 kgf-m, 0.9 lbf-ft)

Apply silicone grease to the brake lever contacting area of the master piston and pivot bolt sliding surface.
Install the brake lever.
Install and tighten the pivot bolt and nut to the specified torque.

TORQUE:

Pivot nut: 5.9 N-m (0.6 kgf-m, 4.3 lbf-ft)



Install the master cylinder and holder with the "UP" mark facing up.

Align the end of the master cylinder with the punch mark on the handlebar, and tighten the upper bolt first, then tighten the lower bolt.

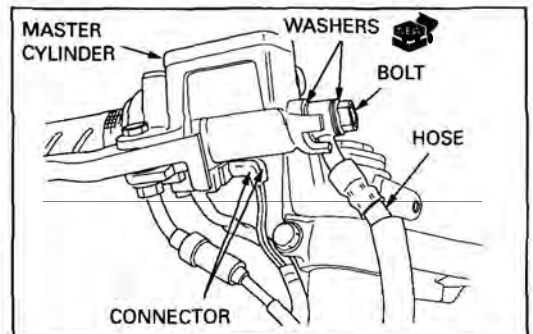


Connect the brake hose to the master cylinder with the bolt and new sealing washers as shown.
Adjust the brake hose angle and tighten the bolt to the specified torque.

TORQUE: 34 N-m (3.5 kgf-m, 25 lbf-ft)

Connect the front brake light switch connectors.

Fill and bleed the front brake hydraulic system (page 6-3).



REAR MASTER CYLINDER

REMOVAL

CAUTION:

- *Avoid spilling fluid on painted, plastic or rubber parts.*
- *Place a shop towel over these parts whenever the system is serviced.*

NOTE:

- When removing the brake hose bolt, cover the end of the hose to prevent contamination.
- Secure the hose to prevent fluid from leaking out.

Drain the brake fluid from the rear brake hydraulic system (page 16-3).

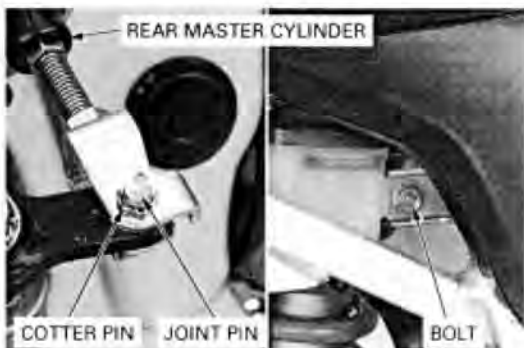
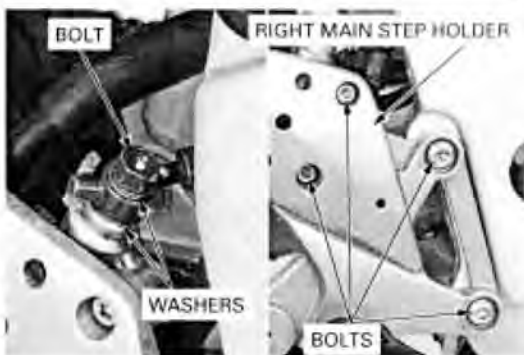
Remove the brake hose bolt, sealing washers and brake hose.

Remove the rear master cylinder mounting bolts.

Remove the mounting bolts and right main step holder with the rear brake light switch installed.

Remove the cotter pin, joint pin and rear master cylinder.

Remove the bolt and reservoir.



DISASSEMBLY

Remove the screw, O-ring and joint pipe.



Remove the boot.



Remove the snap ring using the special tool.

TOOL:

Snap ring pliers

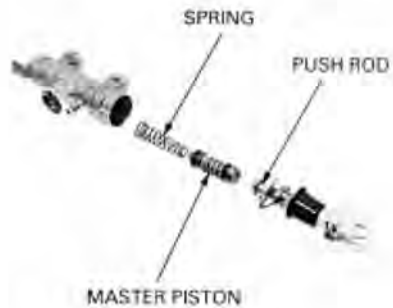
07914 – SA50001



Remove the following:

- push rod assembly
- master piston assembly
- spring

Check the spring and replace if necessary.



INSPECTION

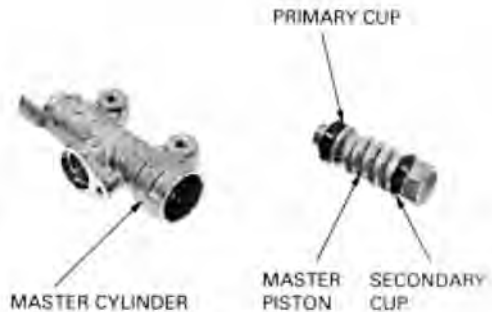
Check the boot, primary cup and secondary cup for fatigue or damage.

Check the master cylinder and piston for scoring, scratches or other damage.

Replace if necessary.

NOTE:

Replace the piston assembly and spring as a set if damaged.



Measure the master cylinder bore I.D.

SERVICE LIMIT: 12.755 mm (0.5022 in)

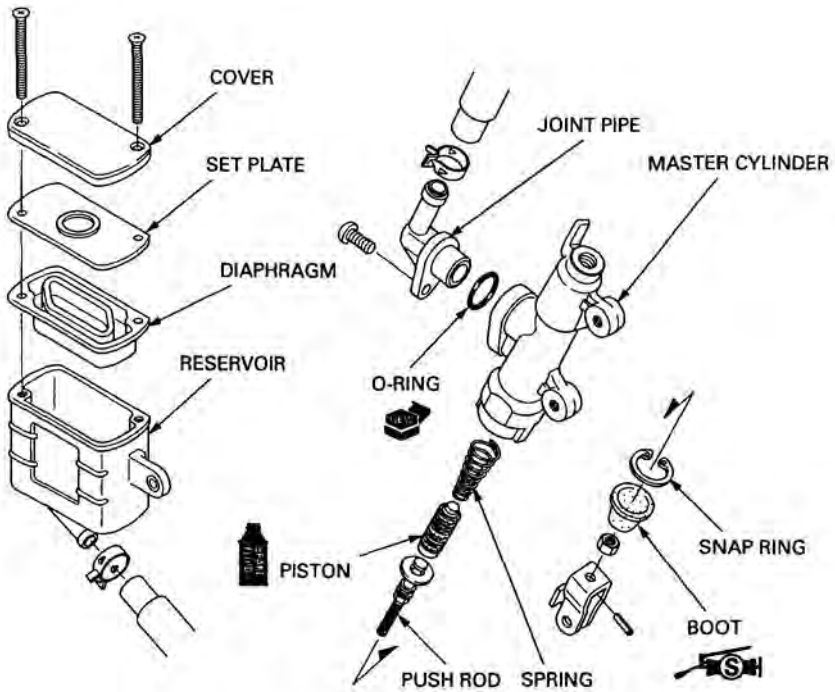
Measure the master piston O.D.

SERVICE LIMIT: 12.645 mm (0.4978 in)



BRAKE SYSTEM

ASSEMBLY

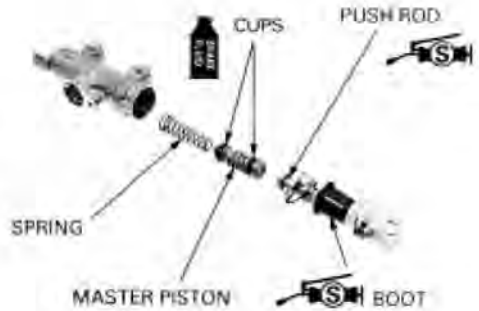


NOTE:

- Make sure that each part is free from dust or dirt before reassembly.

Coat the piston cups with the recommended brake fluid.
Apply silicone grease to the push rod contacting area of the master cylinder.

Install the spring onto the master piston.
Install the spring, master piston and push rod into the master cylinder.



Install the snap ring using the special tool.

TOOL:

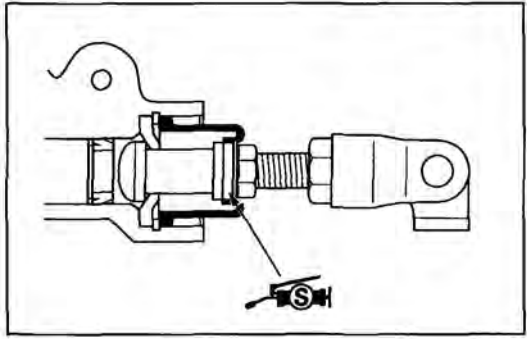
Snap ring pliers

07914 - SA50001

Install the boot.

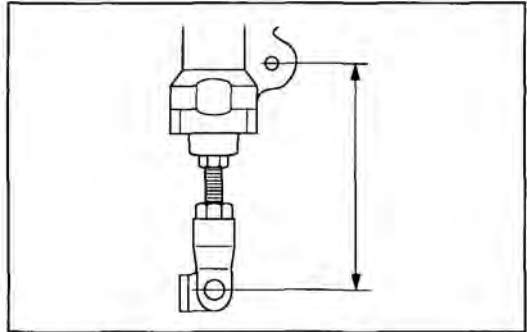


Apply silicone grease to the boot groove in the push rod and install the piston boot into the master cylinder.



If the push rod joint is reinstalled, adjust the push rod length so that the distance from the center of the master cylinder lower mounting hole to the center of the joint pin hole is 84 – 86 mm (3.3 – 3.4 in). After adjustment tighten the lock nut.

TORQUE: 17 N·m (1.7 kgf·m, 12 lbf·ft)



Apply brake fluid to the new O-ring. Install the new O-ring and joint pipe. Tighten the screw securely.



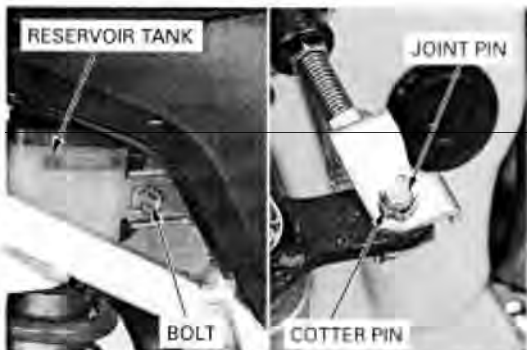
INSTALLATION

CAUTION:

- After installing the brake hose to the master cylinder, make sure it does not interfere with the movement of the shock absorber.

Install the reservoir and tighten the bolt.

Install the joint pin.
Secure the joint pin with a new cotter pin.



BRAKE SYSTEM

Temporarily install the rear master cylinder and mounting bolts.

Install the right main step holder and tighten the mounting bolts to the specified torque.

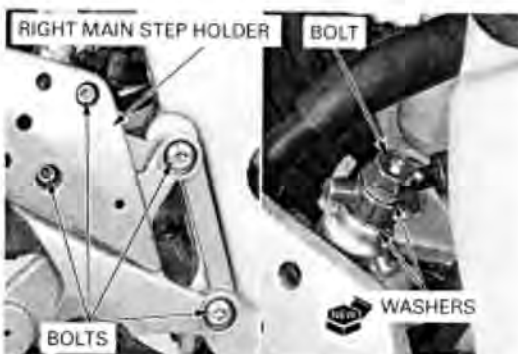
TORQUE: 27 N-m (2.8 kgf-m, 20 lbf-ft)

Tighten the rear master cylinder mounting bolts.

Install the new sealing washers and brake hose and tighten the bolt to the specified torque.

TORQUE: 34 N-m (3.5 kgf-m, 25 lbf-ft)

Fill and bleed the rear brake hydraulic system (page 16-3).



FRONT BRAKE CALIPER

REMOVAL

CAUTION:

Avoid spilling fluid on painted, plastic or rubber parts. Place a shop towel over these parts whenever the system is serviced.

Drain the brake fluid from the front brake hydraulic system (page 16-3).

Place a clean container under the caliper and remove the oil bolt, sealing washers and eyelet joint from the caliper. Remove the brake caliper mounting bolts and caliper assembly.

Remove the brake pads (page 16-5).

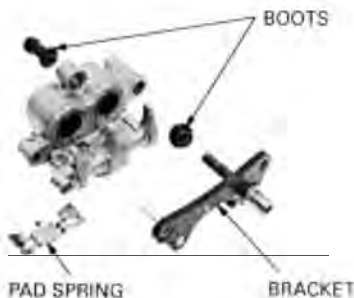
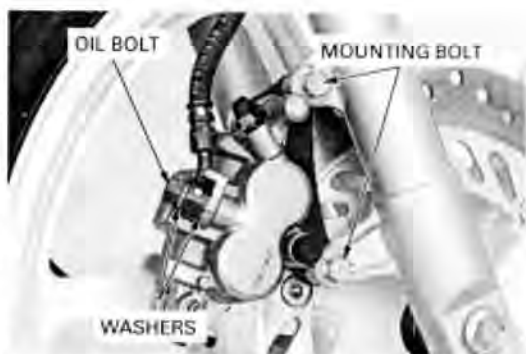
DISASSEMBLY

Remove the following:

- caliper bracket
- pad spring
- bracket pin boots

Remove the caliper pistons.

If necessary, lightly apply compressed air to the fluid inlet to get the piston out.



Place a shop rag under the caliper to cushion the piston when it is expelled.
Use the air in short spurts.

⚠ WARNING

Do not bring the air nozzle too close to the inlet or the pistons may be forced out with excessive force that could cause injury.



Push the dust and piston seals in and lift them out.

Clean the seal groove with clean brake fluid.

CAUTION:

Be careful not to damage the piston sliding surface.



INSPECTION

Check the caliper pistons for scoring or other damage.

Measure the caliper piston O.D.

SERVICE LIMIT: 25.300 mm (0.9960 in)

Check the caliper cylinder bores for scoring or other damage.

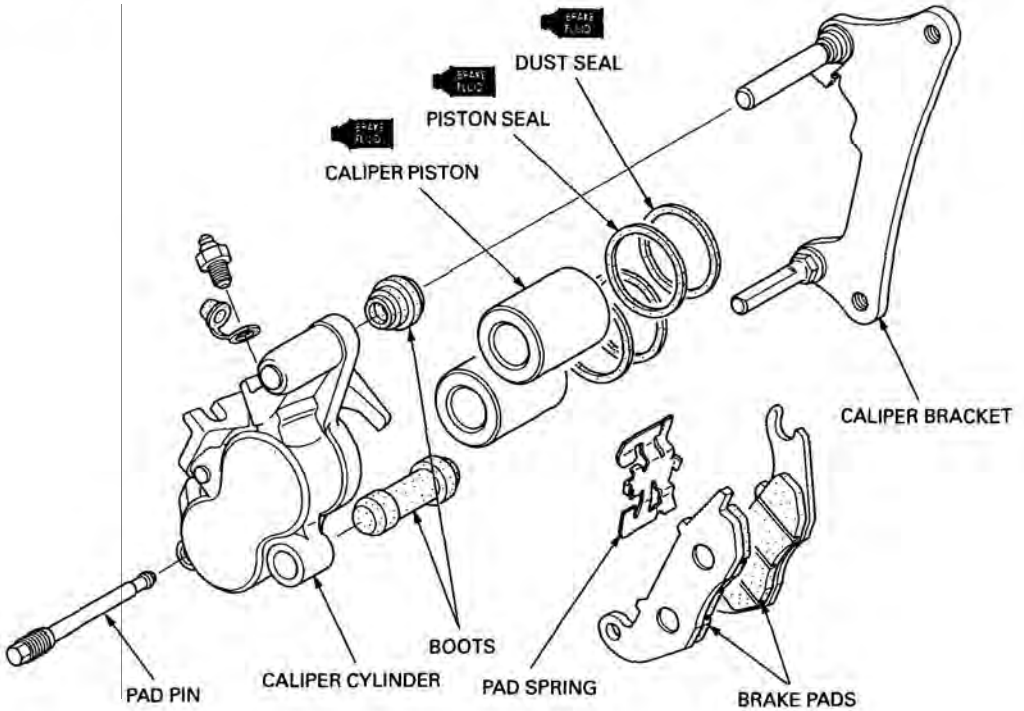
Measure the caliper cylinder I.D.

SERVICE LIMIT: 25.400 mm (25.405 in)



BRAKE SYSTEM

ASSEMBLY



Coat the new piston seals and dust seals with clean brake fluid and install them in the seal grooves of the caliper.

Lubricate the caliper cylinders and pistons with clean brake fluid and install the pistons into the caliper cylinders with the opening towards the pads.

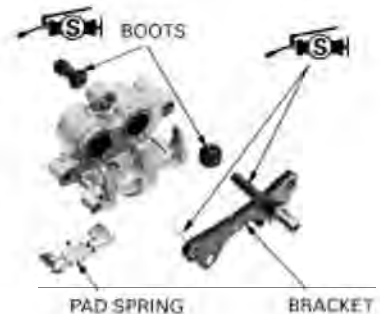


If the caliper and bracket pin boots are hard or deteriorated, replace them with new ones.

Apply silicone grease to the bracket pin boots and bracket pins and install them making sure that they are seated in the bracket pin grooves properly.

Install the pad spring on the caliper.

Assemble the caliper bracket and caliper body.



INSTALLATION

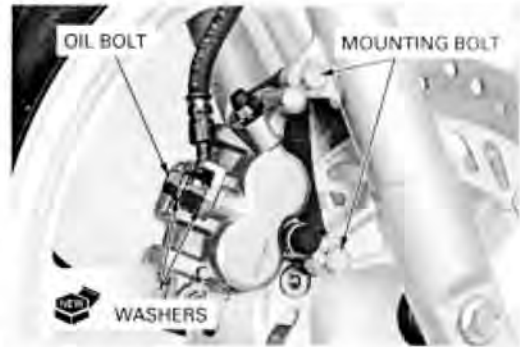
Install the brake pads (page 16-6).
Install the brake caliper and mounting bolts.
Tighten the bolts to the specified torque.

TORQUE: 30 N·m (3.1 kgf·m, 22 lbf·ft)

Connect the brake hose eyelet joint with two new sealing washers, then tighten the oil bolt to the specified torque.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the front brake hydraulic system (page 16-3).



REAR BRAKE CALIPER

REMOVAL

Drain the brake fluid from the rear brake hydraulic system (page 16-3).
Remove the brake pads (page 16-5).

Remove the bolt, sealing washers and brake hose eyelet joint.

Remove the rear wheel (page 15-3).
Remove the brake caliper.



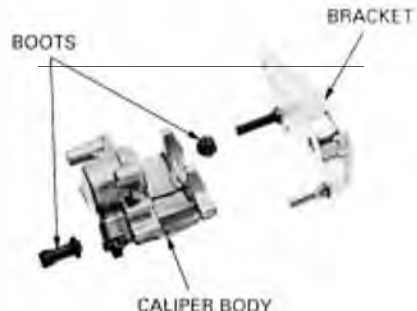
DISASSEMBLY

Remove the brake pad spring from the caliper body.

PAD SPRING



Remove the caliper bracket from the caliper body.
Remove the bracket pin boots.



BRAKE SYSTEM

If necessary, lightly apply compressed air to the fluid inlet to get the piston out.

Place the shop rag under the caliper to cushion the piston when it is expelled.
Use the air in short spurts.

▲ WARNING

Do not bring the air nozzle too close to the inlet or the pistons may be forced out with excessive force that could cause injury.



Push the dust seal and piston seal in and lift them out.

CAUTION:

Be careful not to damage the piston sliding surface.

Clean the seal grooves, caliper piston and caliper piston sliding surface with clean brake fluid.



INSPECTION

Check the caliper cylinder and pistons for scoring, scratches or damage.

Measure the caliper cylinder I.D.

SERVICE LIMIT: 32.090 mm (1.2634 in)

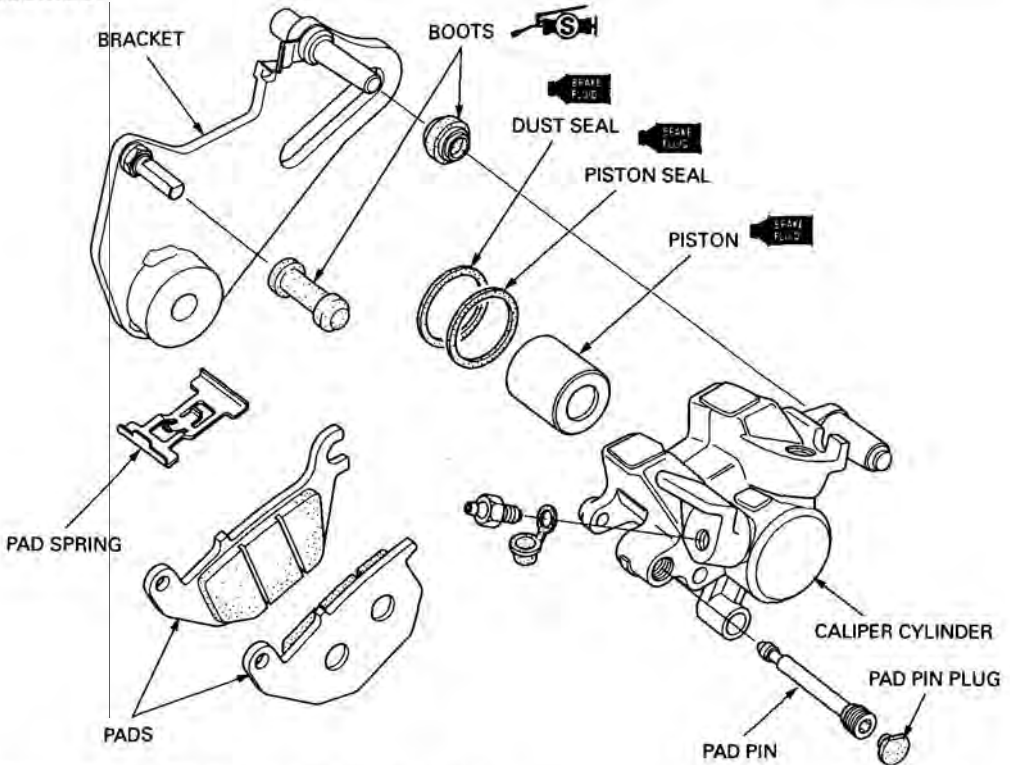


Measure the caliper piston O.D.

SERVICE LIMITS: 31.94 mm (1.257 in)



ASSEMBLY



Coat the new piston seal and dust seal with clean brake fluid and install them in the seal grooves of the caliper.

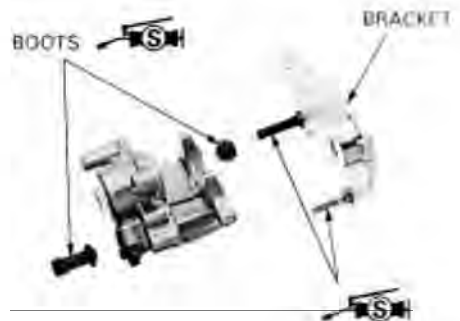
Apply brake fluid to the caliper piston and install it into the caliper cylinder with the opening towards the pads.



If the caliper and bracket pin boots are hard or deteriorated, replace them with new ones.

Apply silicone grease to the bracket pin boots and bracket pins and install them. Make sure the boots are securely seated into the pin grooves.

Assemble the caliper bracket and caliper body.



BRAKE SYSTEM

Check the pad spring for damage and replace it if necessary.

Install the pad spring onto the caliper body.

PAD SPRING



INSTALLATION

Install the rear brake caliper/bracket assembly onto the swingarm by aligning the bracket slot with the boss on the swingarm.

Install the rear wheel (page 15-9).
Install the brake pads (page 16-5).

Temporarily install the brake hose eyelet joint to the caliper body with new sealing washers and bolts. Push the brake hose eyelet joint to the stopper on the caliper, then tighten the bolt to the specified torque.

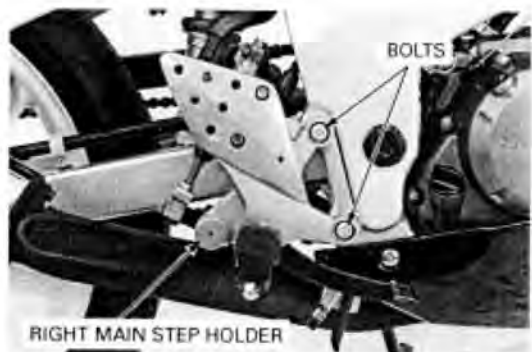
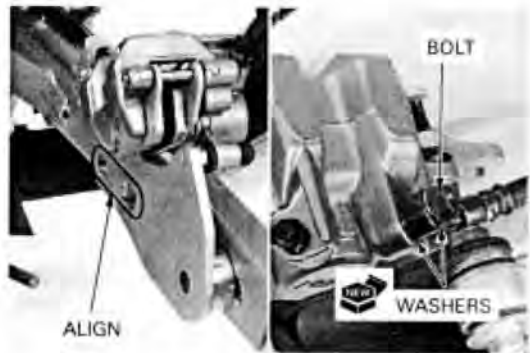
TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Fill and bleed the rear brake hydraulic system (page 16-3).

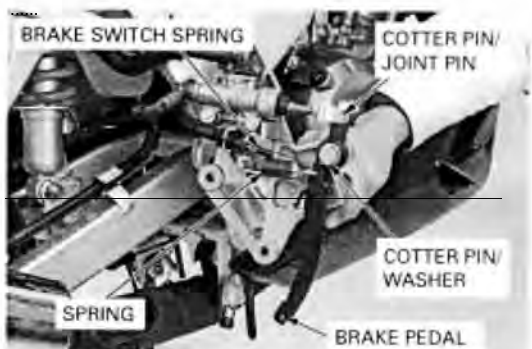
BRAKE PEDAL

REMOVAL

Remove the mounting bolts and right main step holder.

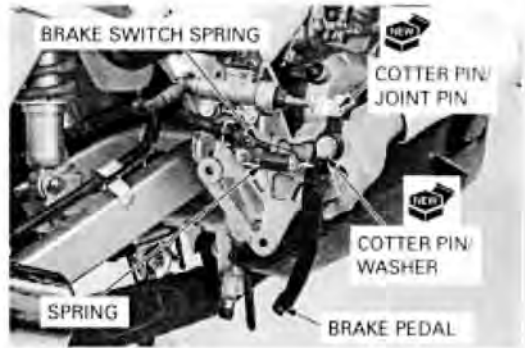


Remove the brake light switch return spring.
Remove the cotter pin and joint pin.
Remove the cotter pin, washer, return spring and brake pedal.



INSTALLATION

Apply grease to the pedal pivot sliding surface and install the brake pedal into the right main step holder. Secure the brake pedal with the washer and a new cotter pin. Install the joint pin and new cotter pin. Install the brake light switch spring to the return spring as shown.



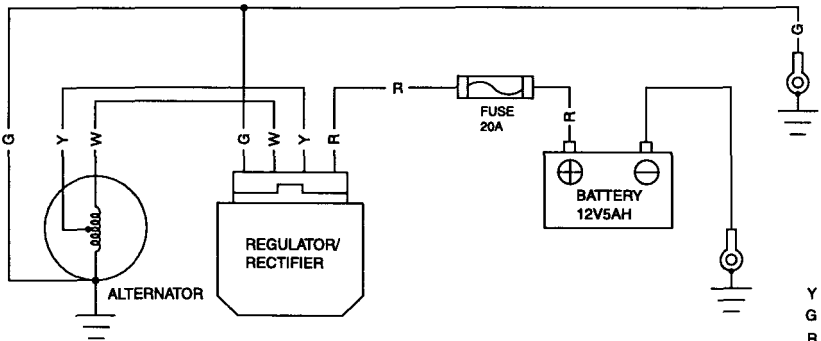
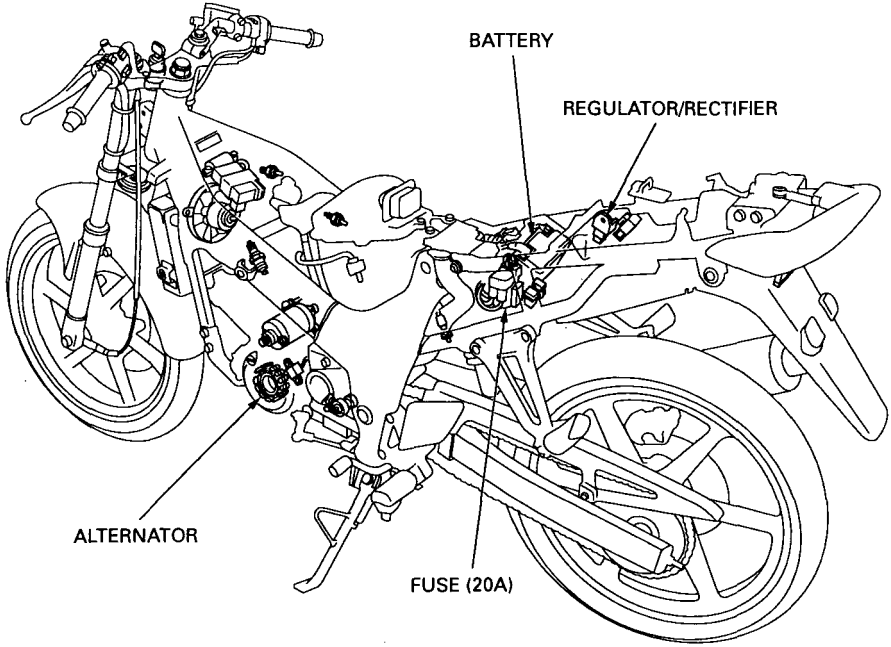
Install the right main step holder and mounting bolts. Tighten the bolts to the specified torque.

TORQUE: 27 N-m (2.8 kgf-m, 20 lbf-ft)



CHARGING SYSTEM

SYSTEM DIAGRAM



17. CHARGING SYSTEM

SYSTEM DIAGRAM	17-0	CHARGING SYSTEM INSPECTION	17-5
SERVICE INFORMATION	17-1	ALTERNATOR INSPECTION	17-7
TROUBLESHOOTING	17-3	REGULATOR/RECTIFIER	17-8
BATTERY	17-4		

SERVICE INFORMATION

GENERAL

⚠ WARNING

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

- Always turn off the ignition switch before disconnecting any electrical components.

CAUTION:

Some electrical components may be damaged if terminals or connectors are connected or disconnect while the ignition switch is ON and a current is present.

- For extended storage, remove the battery, give it a full charge and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- For battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.
- The battery can be damaged if overcharged or undercharged, or if left to discharge for long periods. These same conditions contribute to shortening the life-span of the battery. Even under normal use, the performance of the battery deteriorates after 2-3 years.
- Battery voltage may recover after battery charging, but under a heavy load, battery voltage will drop quickly and eventually the battery will be completely discharged. For this reason, the charging system is often suspected to be the problem. Battery overcharge often results in problems in the battery itself, which may appear to be an overcharge symptom. If one of the battery cells is shorted and the battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level drops quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under a heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not use. For this reason, charge the battery every two weeks to prevent sulfation from forming.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 17-3).
- Alternator servicing can be done with the engine in the frame.

CHARGING SYSTEM

- This model comes with a maintenance free (i.e. sealed and electrolyte filled) type battery.

BATTERY TESTING

Refer to the instructions in the Operation Manual for the recommended battery tester for details about the battery testing.

The recommended battery tester puts a "load" on the battery so that the actual battery condition of the load can be measured.

Recommended battery tester **BM210 or BATTERY MATE or equivalent**

CAUTION:

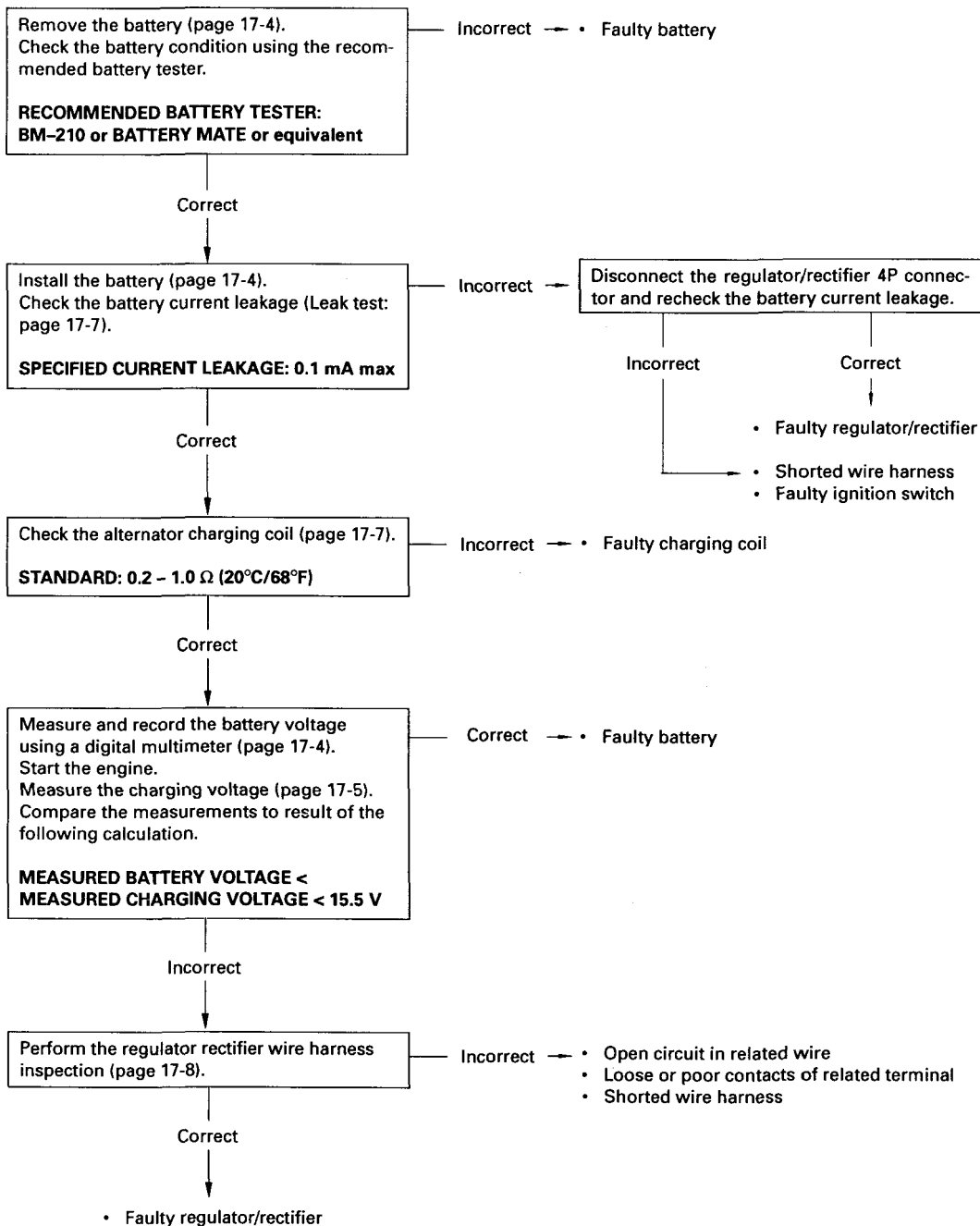
For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.

SPECIFICATIONS

ITEM		SPECIFICATIONS	
Battery	Capacity	12 V – 5 Ah	
	Current leakage	0.1 mA max	
	Specific gravity	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	0.5 A x 5 – 10 h
Quick		2.5 A x 1 h	
Alternator	Capacity	155 W/ 5,000 min ⁻¹ (rpm)	
	Charging coil resistance (20°C/68°F)	0.2 – 1.0 Ω	
	Lighting coil resistance (20°C/68°F)	0.1 – 0.8 Ω	

TROUBLESHOOTING

Battery is damaged or weak



CHARGING SYSTEM

BATTERY

REMOVAL

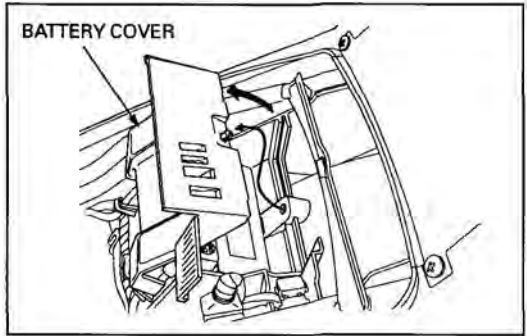
NOTE:

Always turn the ignition switch OFF before removing or installing the battery.
Disconnect the battery negative cable first, then positive cable from the battery.

Remove the driver seat (page 2-2).
Remove the trim clip and open the battery cover.

Remove the bolt and disconnect the battery negative (-) cable.
Remove the positive terminal cover.
Remove the bolt and disconnect the battery positive (+) cable.

Remove the battery out of the battery case.

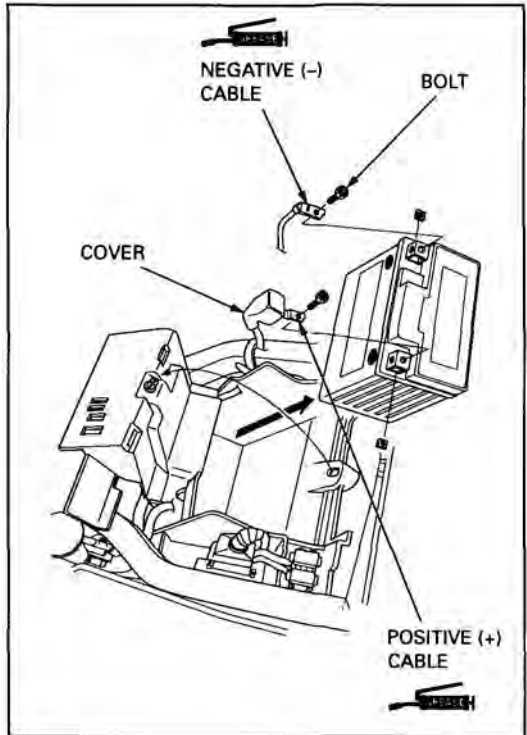


INSTALLATION

Install the battery into the case.
Coat the battery terminal with clean grease.
Place the battery into the case and connect the battery positive (+) cable to the battery, then connect the negative (-) cable.
Install the positive terminal cover.

NOTE:

Pull the cover over the positive terminal.



INSPECTION

Measure the battery voltage using a commercially available digital multimeter.

VOLTAGE: (20°C/68°F):

Fully charged: 13.0 – 13.2 V

Under charged: Below 12.3 V



BATTERY CHARGING

⚠ WARNING

- *The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.*
- *Turn power ON/OFF at the charger, not at the battery terminals.*

Remove the battery (page 17-4).

Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (-) cable to the battery negative (-) terminal.

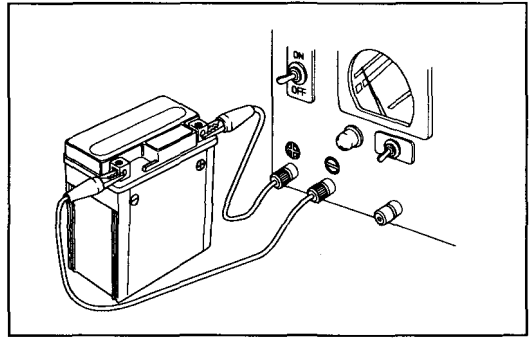
CHARGING CURRENT/TIME

Standard:

Quick:

CAUTION:

- *Quick-charging should only be done in an emergency; slow charging is preferred.*
- *For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.*



CHARGING SYSTEM INSPECTION

CHARGING VOLTAGE INSPECTION

⚠ WARNING

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

NOTE:

Be sure the battery is in good condition before performing this test.

CHARGING SYSTEM

CHARGING OUTPUT:

Warm up the engine to normal operating temperature. Stop the engine, and connect the multimeter as shown.

CAUTION:

- *To prevent short, make absolutely certain which are the positive and negative terminals or cable.*
- *Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.*

With the headlight on Hi beam, restart the engine. Measure the voltage on the multimeter when the engine runs at $5,000 \text{ min}^{-1}$ (rpm).

Standard:

Measured battery voltage (page 17-4) < Measured charging voltage (See above) < 15.5 V at $5,000 \text{ rpm}^{-1}$

The battery is normal if voltage reads the regulated voltage on the multimeter.

NOTE:

The speed at which voltage starts to rise cannot be checked as it varies with the temperature and loads of the generator.



LIGHTING OUTPUT:

NOTE:

Measure the voltage with the headlight wire connectors connected.

Connect the voltmeter positive (+) probe to the headlight 6P connector Blue terminal, and negative (-) probe to the Green wire terminal.

Start the engine and light switch is "H" position and the dimmer switch is "Hi" position, and read the voltage.

REGULATED VOLTAGE: 12.1 – 13.1 V at $5,000 \text{ min}^{-1}$ (rpm)

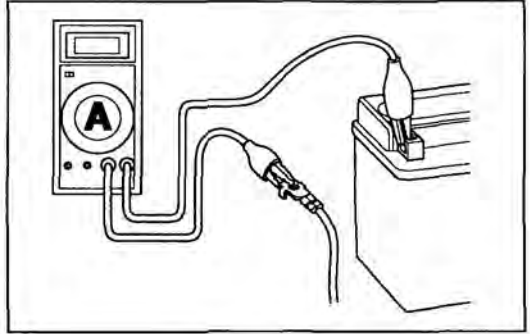


CURRENT LEAKAGE INSPECTION

Turn the ignition switch off and disconnect the battery negative (-) cable from the battery.
 Connect the ammeter positive (+) probe to the ground cable and the ammeter negative (-) probe to the battery negative (-) terminal.
 With the ignition switch off, check for current leakage.

NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow out the fuse in the tester.



SPECIFIED CURRENT LEAKAGE: 0.1 mA max

If current leakage exceeds the specified value, a shorted circuit is likely.
 Locate the short by disconnecting connections one by one and measuring the current.

ALTERNATOR INSPECTION

NOTE:

It is not necessary to remove the stator coil to make this test.

Release the alternator 4P connector from the clamp of the frame.

Disconnect the alternator 4P connector.

Check the resistance between following terminals.



STANDARD:

Charging coil (White - Ground)

White - Ground	0.2 - 1.0 Ω (at 20°C/68°F)
----------------	----------------------------

Lighting coil (Yellow - Ground)

Yellow - Ground	0.1 - 0.8 Ω (at 20°C/68°F)
-----------------	----------------------------

Replace the alternator stator if readings are far beyond the standard.
 Refer to page 9-2 for stator removal.



CHARGING SYSTEM

REGULATOR/RECTIFIER

SYSTEM INSPECTION

Remove the rear cowl (page 2-2).

Disconnect the regulator/rectifier 4P connector, and check it for loose contact or corroded terminals.

If the regulated voltage reading (see page 17-4) is out of the specification, measure the voltage between connector terminals (wire harness side) as follows:

Item	Terminal	Specification
Battery charging line	Red (+) and ground (-)	Battery voltage should register
Charging coil line	White and ground	Standard resistance; 1 k - 20 k Ω (20°C/68°F)
Lighting coil line	Yellow and Green	Standard resistance; 10 k - 200 k Ω (20°C/68°F)
Ground line	Green and ground	Continuity should exist

If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connectors, replace the regulator/rectifier unit.

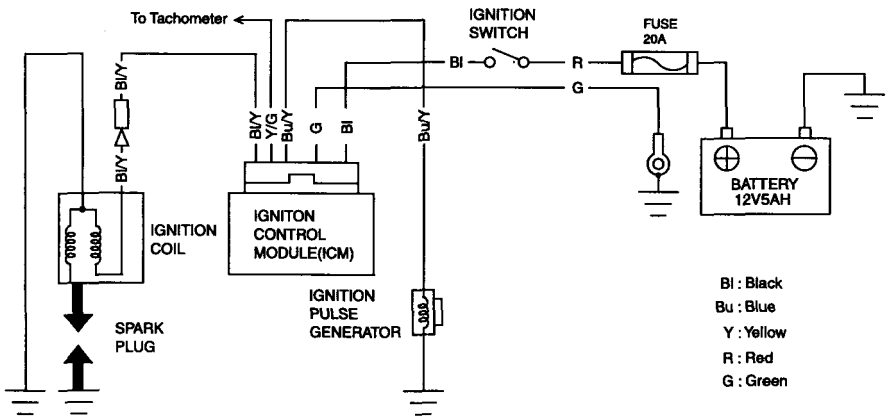
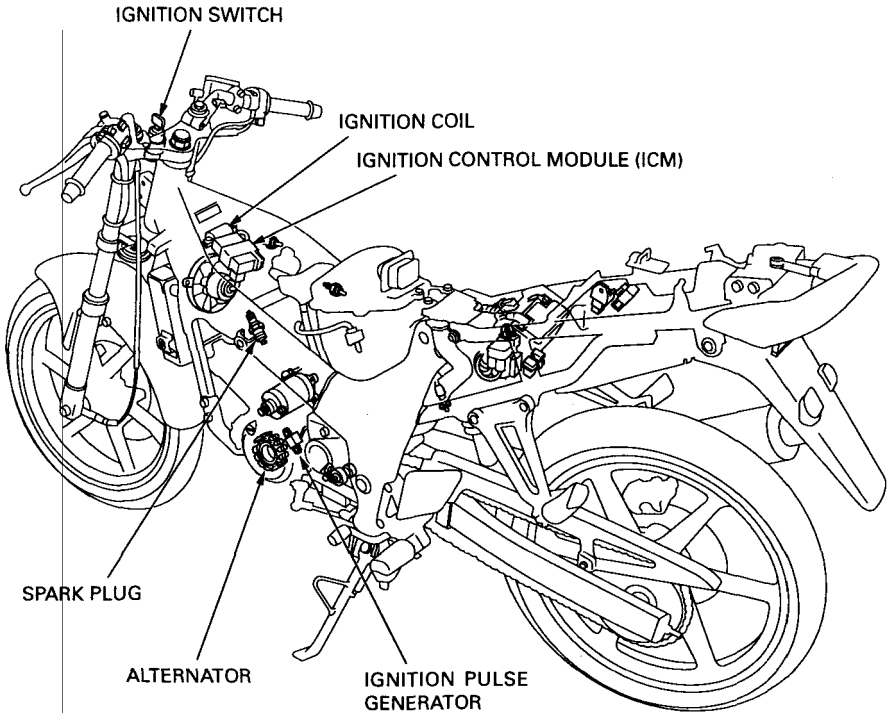
REMOVAL/INSTALLATION

Remove the regulator/rectifier unit mounting bolt. Disconnect the connector and remove the regulator/rectifier unit.

Install the regulator/rectifier unit in the reverse order of removal.



SYSTEM DIAGRAM



18. IGNITION SYSTEM

SYSTEM DIAGRAM	18-0	IGNITION COIL	18-5
SERVICE INFORMATION	18-1	IGNITION CONTROL MODULE (ICM)	18-5
TROUBLESHOOTING	18-2	IGNITION TIMING	18-6
IGNITION SYSTEM INSPECTION	18-3		

SERVICE INFORMATION

GENERAL

▲ WARNING

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

CAUTION:

Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.

- When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 18-3.
- The ignition timing does not normally need to be adjusted since the Ignition Control Module (ICM) is factory preset.
- The Ignition Control Module (ICM) may be damaged if dropped. Also if the connector is disconnected when current is flowing, the excessive voltage may damage the module. Always turn off the ignition switch before servicing.
- A faulty ignition system is often related to poor connections. Check those connections before proceeding. Make sure the battery is adequately charged. Using the starter motor with a weak battery results in a slower engine cranking speed as well as no spark at the spark plug.
- Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.

SPECIFICATIONS

ITEM		SPECIFICATIONS	
Spark plug		NGK	DENSO
	Standard	CR8E	U24ESR - N
	Optional	CR9E	U27ESR - N
Spark plug gap		0.7 - 0.8 mm (0.028 - 0.032 in)	
Ignition coil peak voltage		100 V minimum	
Ignition pulse generator peak voltage		0.7 V minimum	
Ignition timing		12° BTDC at 1,400 ± 100 min ⁻¹ (rpm)	

TORQUE VALUE

Timing hole cap 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

TOOLS

Imrie diagnostic tester (model 625) or
Peak voltage adaptor

07HGJ - 0020100 with
Commercially available digital multimeter (impedance 10 MΩ/DCV
minimum)

TROUBLESHOOTING

- Inspect the following before diagnosing the system.
 - Faulty spark plug
 - Loose spark plug cap or spark plug wire connection
 - Water got into the spark plug cap (leaking the ignition coil secondary voltage)
- If there is no spark at cylinder, temporarily exchange the ignition coil with the other good one and perform the spark test. If there is spark, the exchanged ignition coil is faulty.

No spark at plug

	Unusual condition	Probable cause (Check in numerical order)
Ignition coil primary voltage	Low peak voltage	1. The multimeter impedance is too low. 2. Cranking speed is too low. • Battery under charged. 3. The sampling time of the tester and measured pulse were not synchronized (System is normal if measured voltage is over the standard voltage at least ones). 4. Poorly connected connector or an open circuit in ignition system. 5. Faulty ignition coil (Measure the peak voltage). 6. Faulty ICM (in case when above No. 1 – 5 are normal).
	No peak voltage	1. Incorrect peak voltage adaptor connections. 2. Faulty ignition switch. 3. Loose or poor connected ICM connector. 4. An open circuit or loose connection in Green wire. 5. Open circuit or poor connection in ground wire of the ICM. 6. Faulty peak voltage adaptor, or Imrie tester. 7. Faulty ignition pulse generator (measure the peak voltage). 8. Faulty ICM (in case when above No. 1 – 7 are normal).
	Peak voltage is normal, but no spark jumps at plug.	1. Faulty spark plug or leaking ignition coil secondary current. 2. Faulty ignition coil.
Ignition pulse generator	Low peak voltage	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too low 3. The sampling timing of the tester and measured pulse were not synchronized (system is normal if measured voltage is over the standard voltage at least once). 4. Faulty ignition pulse generator (in case when above No. 1 – 3 are normal).
	No peak voltage	1. Faulty peak voltage adaptor or Imrie tester. 2. Faulty ignition pulse generator.

IGNITION SYSTEM INSPECTION

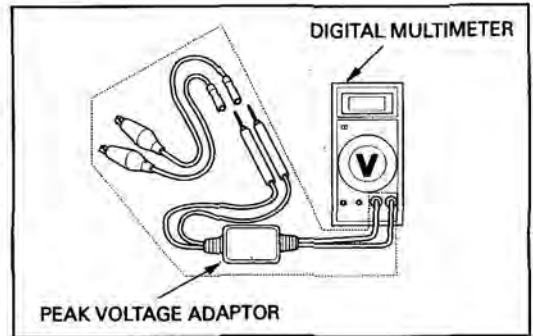
NOTE:

- If there is no spark at plug, check all connections for loose or poor contact before measuring peak voltage.
- Use commercially available digital multimeter with an impedance of 10 M Ω /DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If using Imrie diagnostic tester (model 625), follow the manufacturer's instructions.

Connect the peak voltage adaptor to the digital multimeter, or use the Imrie diagnostic tester.

TOOLS:

Imrie diagnostic tester (model 625) or
 Peak voltage adaptor 07HGJ - 0020100 with
 Commercially available digital multimeter (impedance
 10 MW/DCV minimum)



IGNITION COIL PRIMARY PEAK VOLTAGE

NOTE:

- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plug is installed correctly.

Disconnect the spark plug cap from the spark plug (page 3-6).

Remove the fuel tank (page 5-3).

Connect a good known spark plug to spark plug cap and ground the spark plug to the cylinder as done in a spark test.



IGNITION SYSTEM

With the ignition coil primary wire connected, connect the peak voltage adaptor or Imrie diagnostic tester probe to the ignition coil primary wire terminal and ground.

CONNECTION:

Black/Yellow terminal (+) – Body ground (-)

Turn the ignition switch "ON".

Crank the engine with the starter motor and read ignition coil primary peak voltage.

PEAK VOLTAGE: 100 V minimum

⚠ WARNING

Avoid touching the spark plug and tester probes to prevent electric shock.

If the peak voltage is abnormal, check an open circuit or poorly connected connectors in Black/Yellow wire. If no defects are found in the harness, refer to the troubleshooting chart on page 18-2.

Install the removed parts in the reverse order of removal.



IGNITION PULSE GENERATOR PEAK VOLTAGE

NOTE:

Check cylinder compression and check that the spark plug is installed correctly.

Remove the fuel tank (page 5-3).

Disconnect the 6P connector from the ICM. Connect the peak voltage adaptor or Imrie diagnostic tester probes to the connector terminals of the wire harness side.

TOOLS:

Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ – 0020100 with
Commercially available digital multimeter (impedance
10 M Ω /DCV minimum)

CONNECTION:

Blue/Yellow terminal (+) – Green (-)

Crank the engine with starter motor and read the peak voltage.

PEAK VOLTAGE: 0.7 V minimum

⚠ WARNING

Avoid touching the spark plug and tester probes to prevent electric shock.



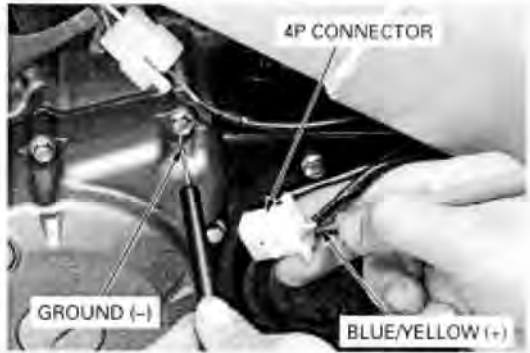
If the peak voltage measured at ICM connector is abnormal, measure the peak voltage at the ignition pulse generator 4P connector.

Disconnect the ignition pulse generator 4P connector and connect the tester probes to the terminal (Blue/Yellow and Ground).

In the same manner as at the ICM connector, measure the peak voltage and compare it to the voltage measured at the ICM connector.

- If the peak voltage measured at the ICM is abnormal and the one measured at the ignition pulse generator is normal, the wire harness has an open circuit or loose connection.
- If both peak voltages measure are abnormal, check each item in the troubleshooting chart. If all items are normal, the ignition pulse generator is faulty. See section 9 for ignition pulse generator replacement.

Install the removed parts in the reverse order of removal.



IGNITION COIL

REMOVAL/INSTALLATION

Remove the fuel tank (page 5-3).
Disconnect the spark plug cap from the spark plug (page 3-6).

Disconnect the primary wire connector.
Remove the two bolts and ignition coil.

Installation is in the reverse order of removal.



IGNITION CONTROL MODULE (ICM)

REPLACEMENT

Remove the fuel tank (page 5-3).

Disconnect the ICM 6P connector.
Remove the ICM from the rubber bracket.

Install the ICM in the reverse order of removal.



IGNITION SYSTEM

SYSTEM INSPECTION

Disconnect the ICM 6P connector, and check it for loose contact or corroded terminals.

Turn the ignition switch ON.

Measure the voltage between connector terminals (wire harness side) as follows:

Item	Terminal	Specification
Battery line	Black and Green	Battery voltage should exist
Ground line	Green and ground	Continuity should exist



Install the removed parts in the reverse order of removal.

IGNITION TIMING

▲ WARNING

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

NOTE:

Read the instruction for timing light operating.

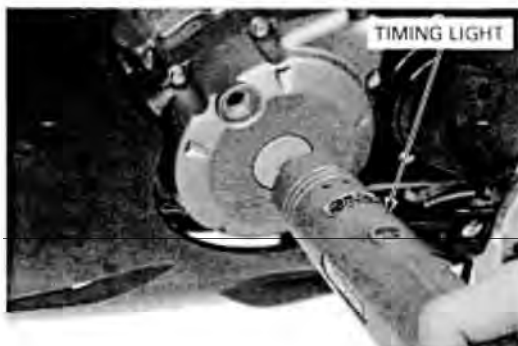
Warm up the engine.

Stop the engine and remove the timing hole cap.

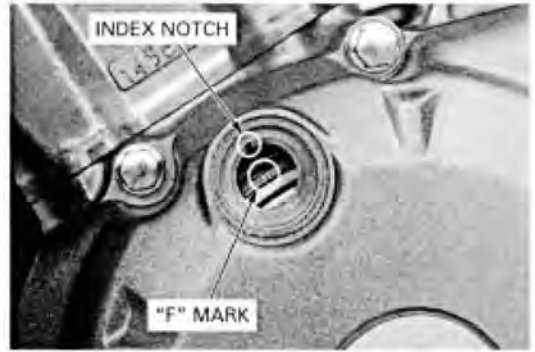
Connect the timing light to the spark plug wire.

Start the engine and let it idle.

IDLE SPEED: $1,400 \pm 100 \text{ min}^{-1}$ (rpm)

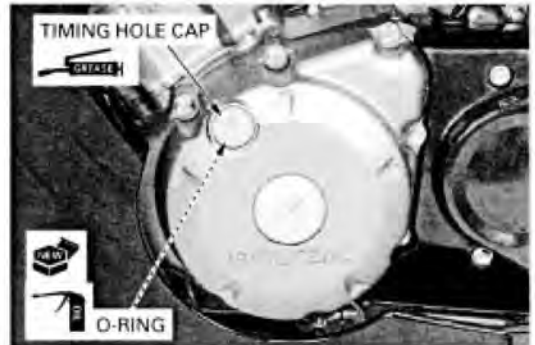


The ignition timing is correct if the "F" mark aligns with the index notch on the left crankcase cover.

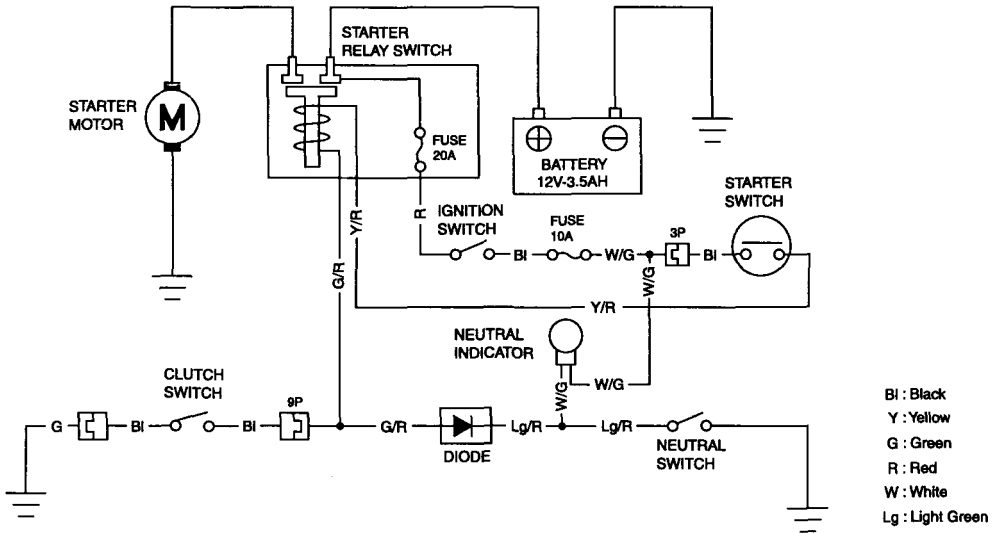
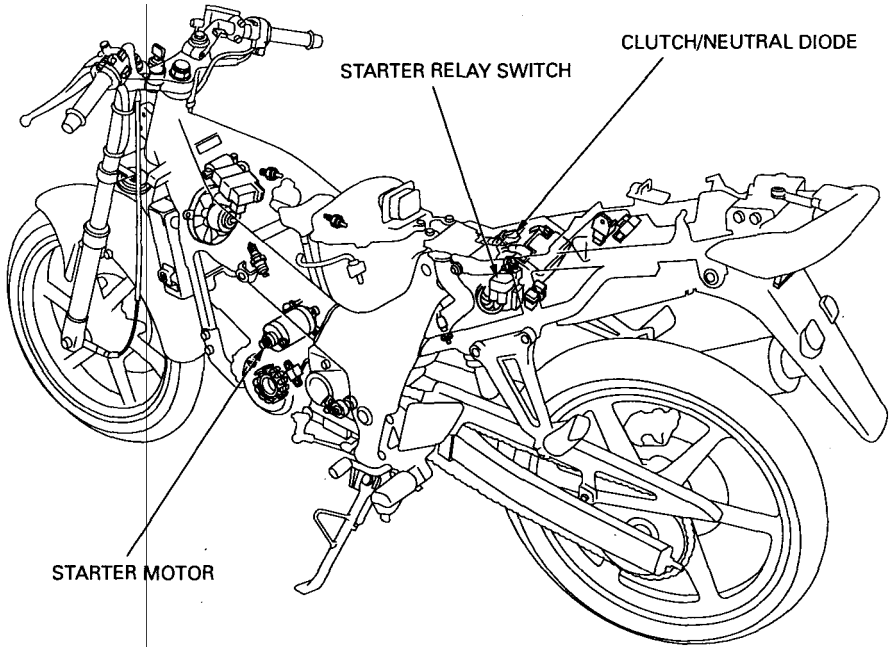


Apply oil to the O-ring and install and tighten the timing hole cap to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)



SYSTEM DIAGRAM



19. ELECTRIC STARTER

SYSTEM DIAGRAM	19-0	STARTER MOTOR	19-4
SERVICE INFORMATION	19-1	STARTER RELAY SWITCH	19-10
TROUBLESHOOTING	19-2	CLUTCH/NEUTRAL DIODE	19-11

SERVICE INFORMATION

GENERAL

▲ WARNING

Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.

- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 19-2).
- A weak battery may be unable to turn the starter motor quickly enough, or supply adequate ignition current.
- If the current is kept flowing through the starter motor to turn it while the engine is not cranking over, the starter motor may be damaged.
- Refer to page 9-4 for starter clutch servicing.
- Refer to section 20 for following components:
 - Ignition switch
 - Starter switch
 - Neutral switch
 - Clutch switch

SPECIFICATION

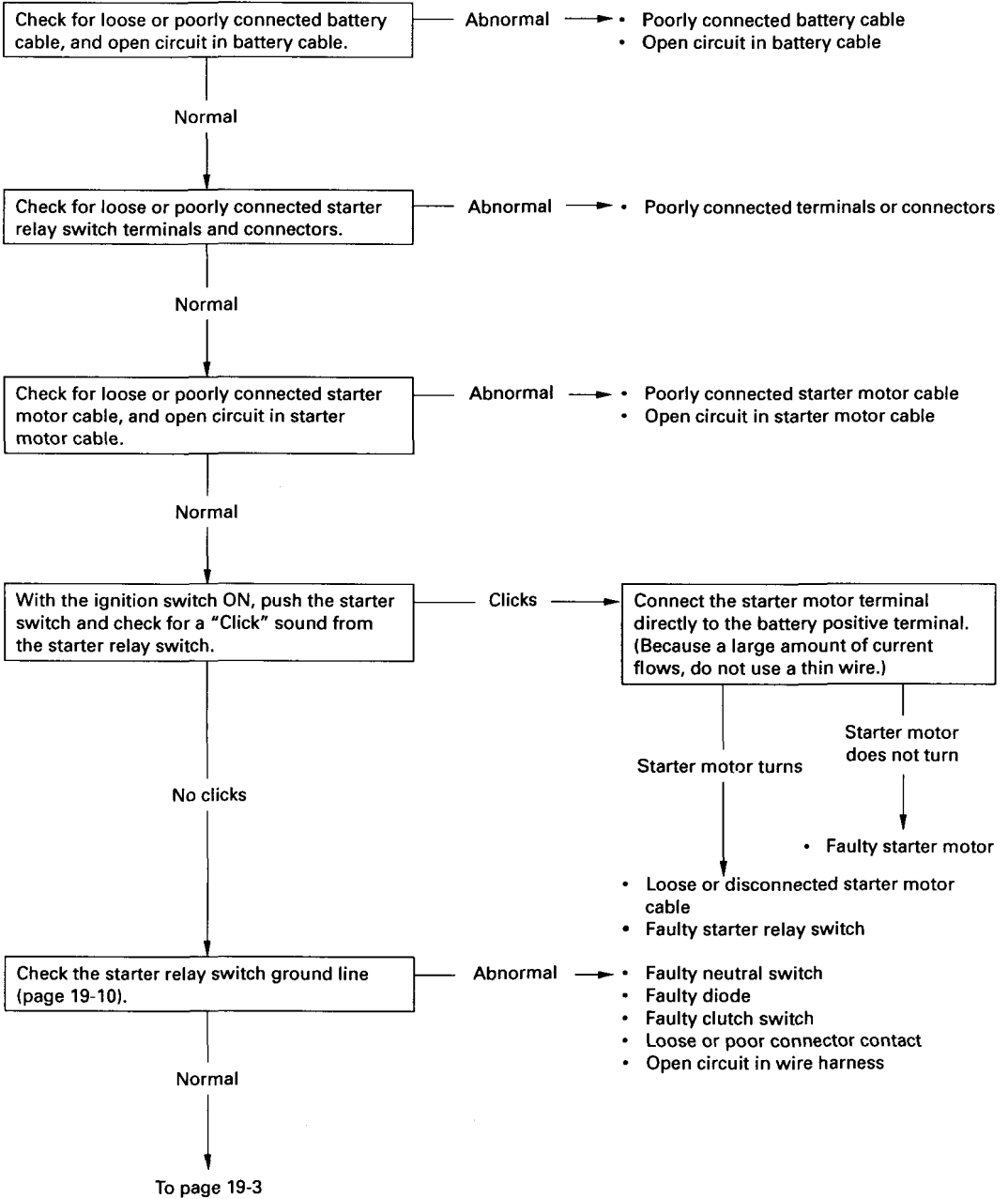
Unit: mm (in)

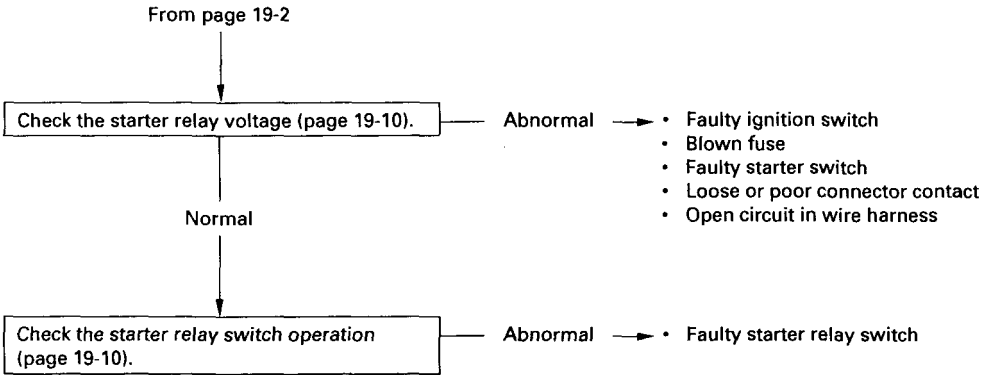
ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	10.00 – 10.05 (0.393 – 0.396)	3.5 (0.14)

TROUBLESHOOTING

Starter motor will not turn

- Check for a blown main fuse (20A) or sub-fuse (10A).
- Check that the battery is fully charged and in good condition (section 17).





Starter motor turns slowly

- Weak battery
- Poorly connected battery cable
- Poorly connected starter motor cable
- Faulty starter motor

Starter motor turns, but engine does not turn

- Faulty starter clutch (section 9)

Starter relay switch "Clicks", but engine does not turn over

- Crankshaft does not turn due to engine problem
- Faulty starter reduction gear (section 9)

STARTER MOTOR

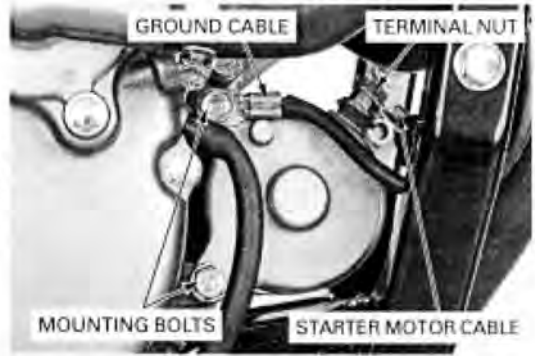
REMOVAL

▲ WARNING

Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.

Remove the under cowl (page 2-3).

Remove the rubber cap.
Remove the terminal nut and starter motor cable.
Remove the two mounting bolts and ground cable.
Remove the starter motor from the left crankcase.

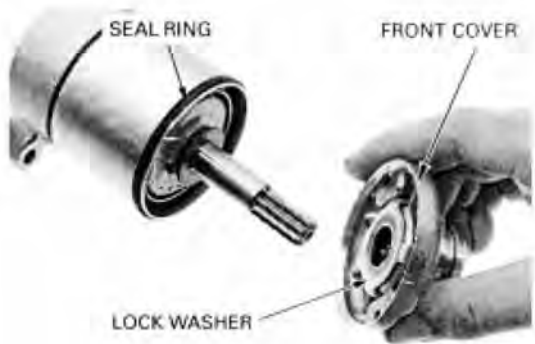


DISASSEMBLY/INSPECTION

Remove the o-ring.
Remove the starter motor case bolts, and O-rings.



Remove the front cover, lock washer and seal ring.



Remove the shims.



Remove the rear cover, shims and seal ring.

Remove the armature from the motor case.

NOTE:

Record the location and number of shims.



Check the needle bearing and dust seal in the front cover for wear or damage.



Check the commutator bars of the armature for discoloration.

NOTE:

Do not use emery or sand paper on the commutator.



Check for continuity between pairs of commutator bars. There should be continuity.



ELECTRIC STARTER

Check for continuity between each commutator bar and the armature shaft.
There should be no continuity.



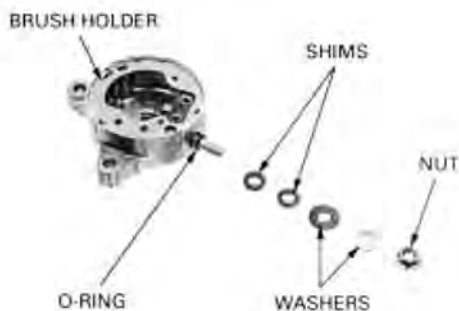
Check for continuity between the insulated brush and cable terminal.
There should be continuity.

Check for continuity between the cable terminal and rear cover.
There should be no continuity.



Remove the following:

- nut
- washers
- shims
- O-ring
- brush holder assembly



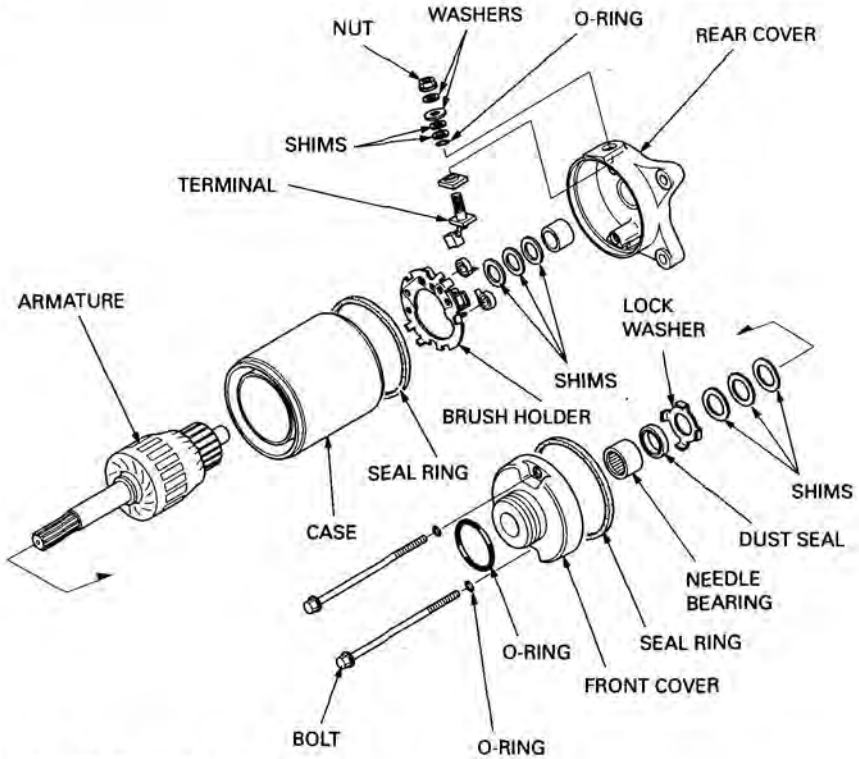
Remove the brushes from the brush holder.

Measure the brush length.

SERVICE LIMIT: 3.5 mm (0.14 in)



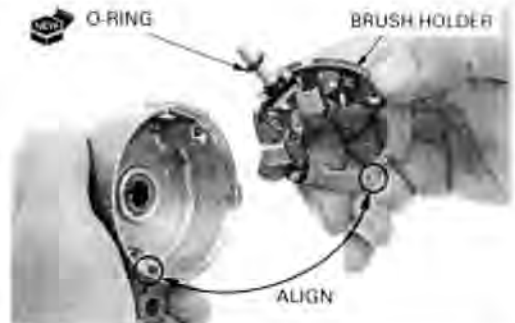
ASSEMBLY



Install the brushes into the brush holder.



Install the brush holder assembly into the rear cover by aligning the tab of the holder with the groove of the rear cover.
Install the new O-ring.



ELECTRIC STARTER

Install the shims, washers and nut.



Install the armature into the motor case while holding the armature tightly to keep the magnet of the case from pulling the armature against it.

CAUTION:

The coil may be damaged if the magnet pulls the armature against the case.

Install the same number of washers and shims in the same locations as noted during disassembly.

NOTE:

The number of shims are different individually.

Install a new seal ring.

Install the rear cover by aligning the brush holder tab with the motor case groove.

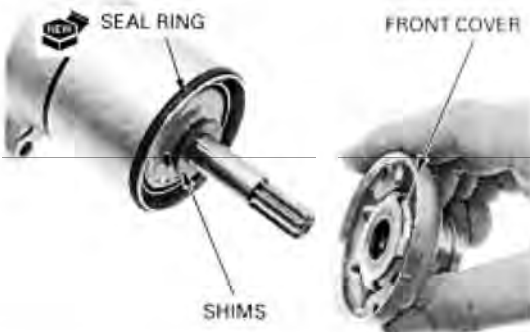


Install the lock washer to the front cover.

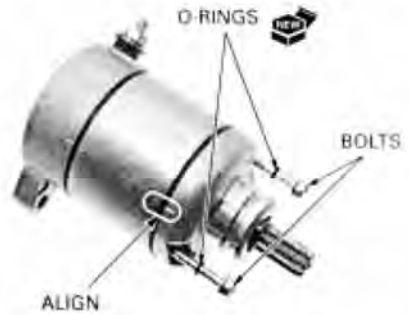


Install the shims and a new seal ring.

Install the front cover.



Align the index lines on the front cover and motor case.
Install the new O-rings onto the motor case bolts.
Install and tighten the motor case bolts.

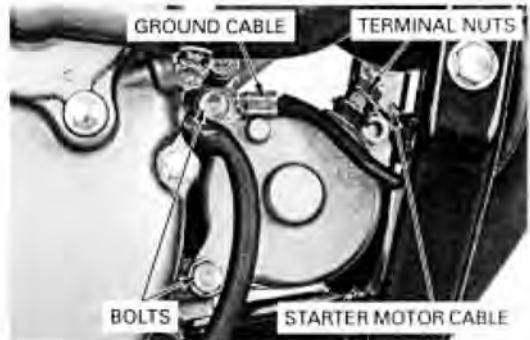


INSTALLATION

Coat a new O-ring with oil and install it into the starter motor groove.



Install the starter motor into the crankcase.
Install the ground cable and mounting bolt, then tighten the bolts securely.
Install the starter motor cable and terminal nut onto the motor terminal and tighten the nut securely.
Install the rubber cap over the motor terminal securely.
Install the under cowl (page 2-3)



STARTER RELAY SWITCH

INSPECTION

NOTE:

Before checking the starter relay switch, check for battery condition.

Remove the driver seat (page 2-2).

Shift the transmission into neutral.
Turn the ignition switch ON and depress the starter switch button.

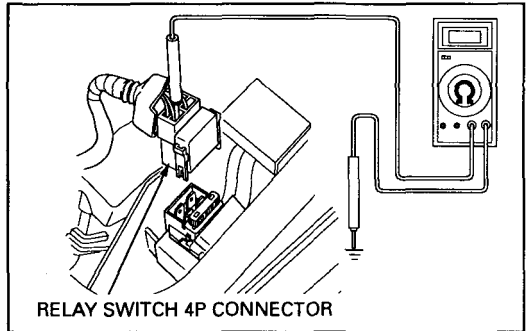
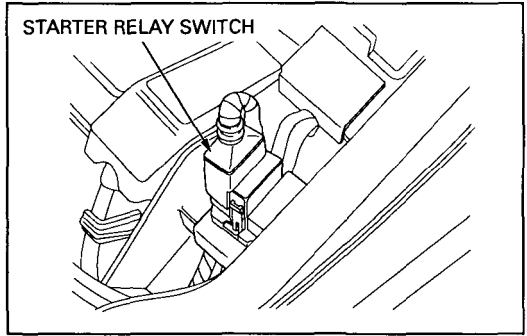
The coil is normal if the starter relay switch clicks.

If you don't hear the switch "CLICK", inspect the relay switch using the procedure below.

GROUND LINE

Disconnect the starter relay switch 4P connector.
Check for continuity between the Green/Red wire (ground line) and ground.

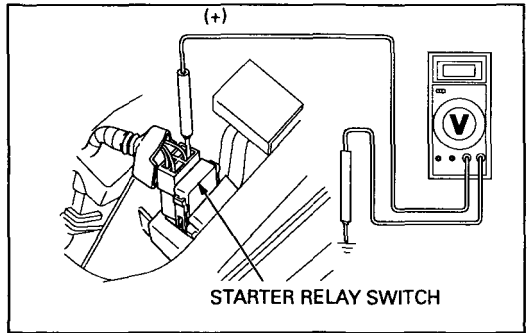
If there is continuity when the transmission is in neutral or when the clutch is disengaged, the ground circuit is normal (In neutral, there is a slight resistance due to the diode).



STARTER RELAY VOLTAGE

Connect the starter relay switch 4P connector.
Shift the transmission into neutral.
Measure the voltage between the Yellow/Red (+) wire and ground at the starter relay switch 4P connector.

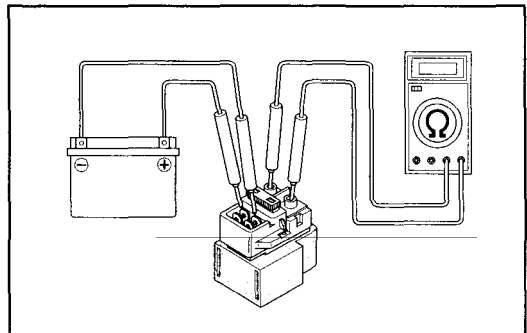
If the battery voltage appears only when the starter switch is pressed with the ignition switch ON, it is normal.



OPERATION CHECK

Disconnect the starter relay switch 4P connector and cables.
Connect a fully charged 12 V battery positive wire to the relay switch Yellow/Red wire terminal and negative wire to the Green/Red wire terminal.

There should be continuity between the large terminals while the battery is connected, and no continuity when the battery is disconnected.

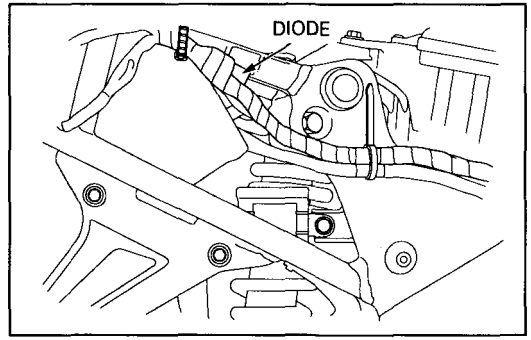


CLUTCH/NEUTRAL DIODE

INSPECTION

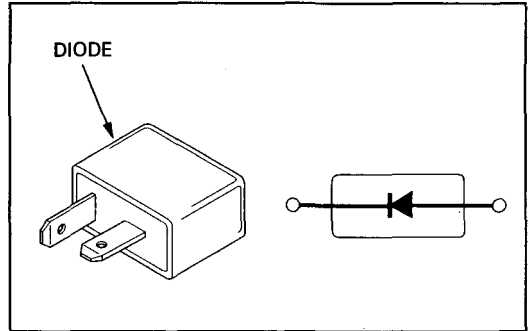
Remove the rear cowl
(page 2-3).

Remove the diode.

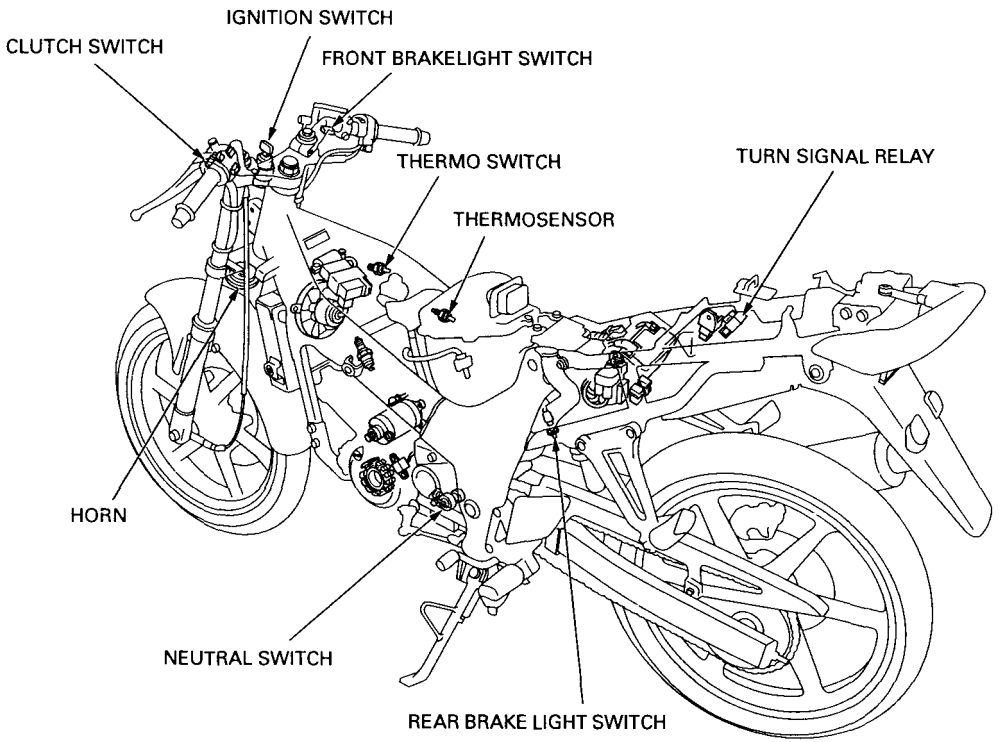


Check for continuity between the diode terminals.
When there is continuity, a small resistance value will register.

If there is continuity in one direction, the diode is normal.



SYSTEM LOCATION



20. LIGHTS/METERS/SWITCHES

SYSTEM DIAGRAM	20-0	FUEL METER/FUEL UNIT	20-11
SERVICE INFORMATION	20-1	HORN	20-13
TROUBLESHOOTING	20-2	TURN SIGNAL RELAY	20-13
BULB REPLACEMENT	20-3	COOLING FAN MOTOR SWITCH	20-14
COMBINATION METER	20-5	COOLANT TEMPERATURE GAUGE/ THERMOSENSOR	20-15
IGNITION SWITCH	20-7	CLUTCH SWITCH	20-16
HANDLEBAR SWITCHES	20-8	TACHOMETER	20-17
BRAKE LIGHT SWITCH	20-8		
NEUTRAL INDICATOR/SWITCH	20-9		

SERVICE INFORMATION

GENERAL

▲ WARNING

- *Use an electric heating element to heat the water/coolant mixture for the thermosensor inspection. Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.*

Check the battery condition before performing any inspection that requires proper battery voltage.

A continuity test can be made with the switches installed on the motorcycle.

The following color codes used are indicated throughout this section.

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

SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlight (Hi/low beam)	12 V - 18/18 W x 2
	Brake/tail light	12 V - 10/5 W x 2
	License light	12 V - 5 W
	Front turn signal light	12 V - 10 W x 2
	Rear turn signal light	12 V - 10 W x 2
	Instrument light	12 V - 1.7 W x 4
	Turn signal indicator	12 V - 1.7 W
	High-beam indicator	12 V - 1.7 W
	Neutral indicator	12 V - 1.7 W
Fuse	Main	20 A
	Sub	10 A x 2
Thermosensor resistance	50°C (122°F)	133.9 - 178.9 Ω
	120°C (248°F)	14.9 - 17.3 Ω

20

TROUBLESHOOTING

Headlight do not come on or bulb is frequently burned when the engine is started

- Faulty lighting and/or dimmer switch
- Faulty bulb
- Faulty alternator lighting coil (section 17)
- Faulty regulator/rectifier (section 17)
- Loose or poorly connected connector

Headlight beam does not shift when Hi-Lo switch is operated

- Burned bulb
- Faulty dimmer switch
- Loose or poorly connected connector

BULB REPLACEMENT

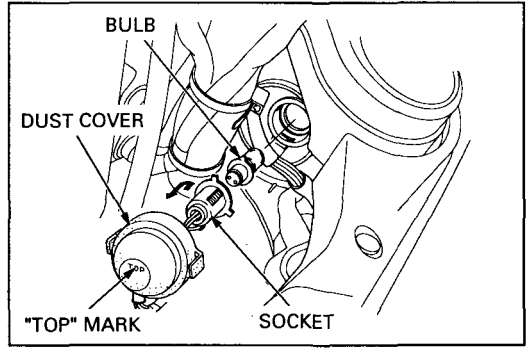
HEADLIGHT

Remove the dust cover.
 While pushing in, turn the bulb socket counterclockwise to remove it.
 Remove the headlight bulb and replace it with a new one.

Install the headlight bulb in the reverse order of removal.

NOTE:

Install the dust cover tightly against the headlight housing with the "TOP" mark facing up.

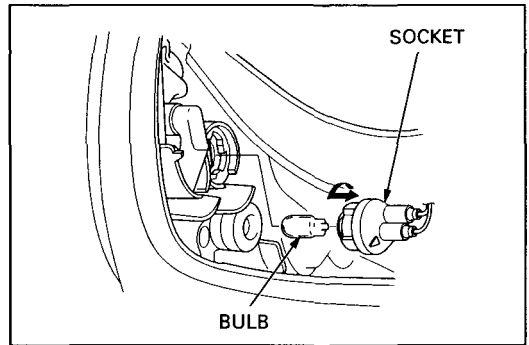


FRONT TURN SIGNAL LIGHT

Remove the screws and upper cowl lid (page 2-5).

Turn the bulb socket counterclockwise and remove it.
 Remove the bulb and replace it with a new one.

Installation is in the reverse order of removal.

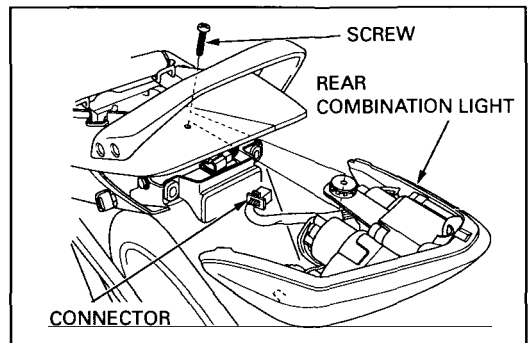


REAR TURN SIGNAL AND TAIL/BRAKE LIGHT AND LICENSE LIGHT

Remove the passenger seat (page 2-2).

Disconnect the rear combination light 6P connector.

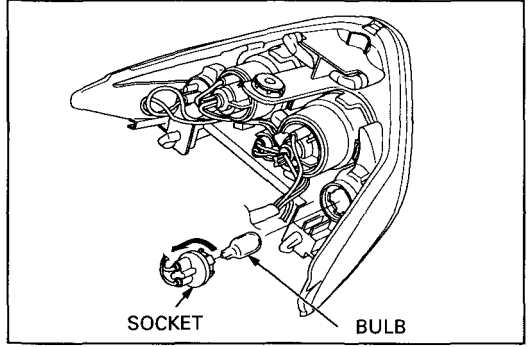
Remove the screw and rear combination meter.



LIGHTS/METERS/SWITCHES

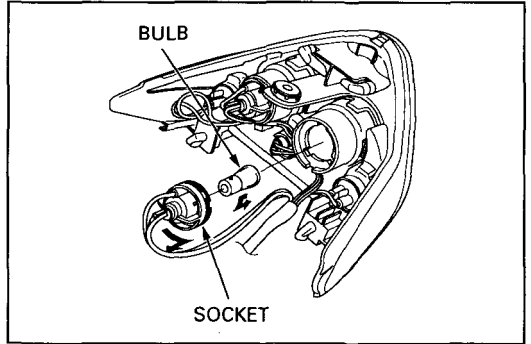
REAR TURN SIGNAL LIGHT

Turn the bulb socket counterclockwise and remove it. Remove the turn signal bulb and replace it with a new one.



TAIL/BRAKE LIGHT

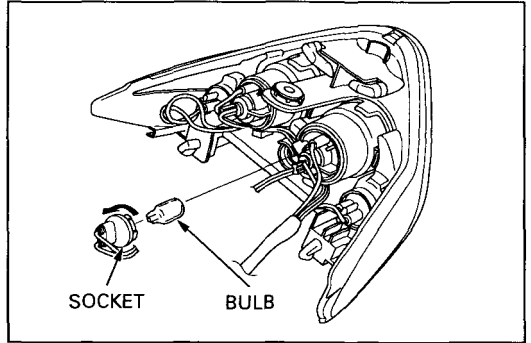
Turn the bulb socket counterclockwise and remove it. While pushing in, turn the bulb counterclockwise to remove it. Remove the tail/brake light bulb and replace it with a new one.



LICENSE LIGHT

Turn the bulb socket counterclockwise and remove it. Remove the bulb and replace it with a new one.

Installation is in the reverse order of removal.



COMBINATION METER

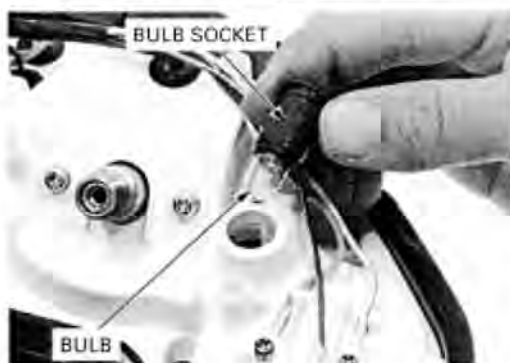
REMOVAL

Disassemble the upper cowl (page 2-5).

BULB REPLACEMENT

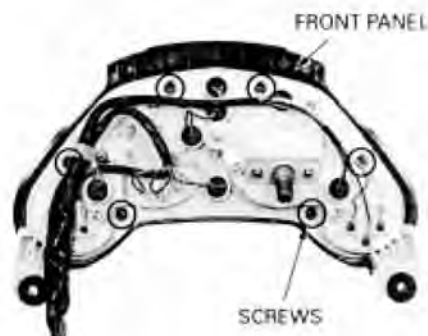
Pull the indicator and instrument bulb socket out of the combination meter.

Remove the bulb from the socket and replace it with a new one.



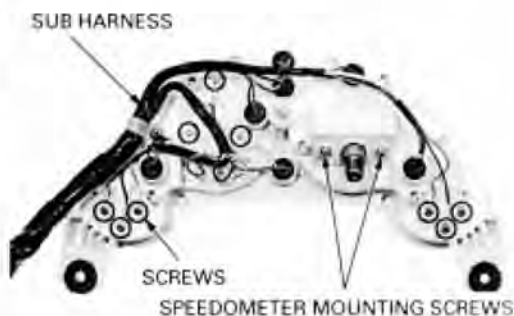
DISASSEMBLY

Remove the six screws and speedometer front panel.

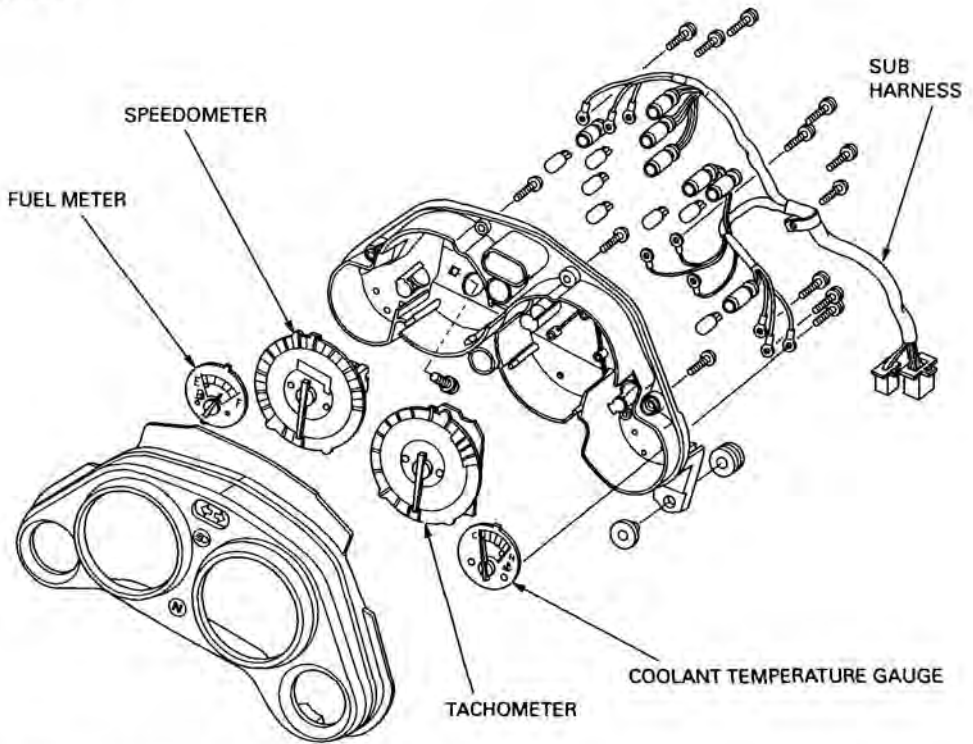


Remove the indicator and instrument light bulbs.
Remove the screws and combination meter sub harness from the rear panel.

Remove the speedometer, tachometer, fuel meter and coolant temperature gauge.



ASSEMBLY



Assemble the speedometer in the reverse order of disassembly.

NOTE:

- Route the sub harness as shown.

INSTALLATION

Assemble the upper cowl (page 2-4).

NOTE:

Route the combination meter wire and cable properly (page 1-17).



IGNITION SWITCH

INSPECTION

Remove the fuel tank (page 5-3).

Disconnect the ignition switch 2P connector.

Check for continuity between the wire terminals of the ignition switch connector in each switch position. Continuity should exist between the color coded wires as follows:

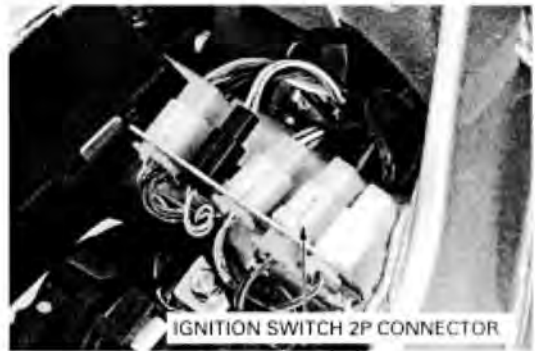


IGNITION SWITCH

	BAT	HO1
ON	○ — ○	○ — ○
OFF		
LOCK		
COLOR	R	B

REMOVAL/INSTALLATION

Disconnect the ignition switch 2P connector.



Remove the two bolts and ignition switch.

Install the ignition switch in the reverse order of removal.



HANDLEBAR SWITCHES

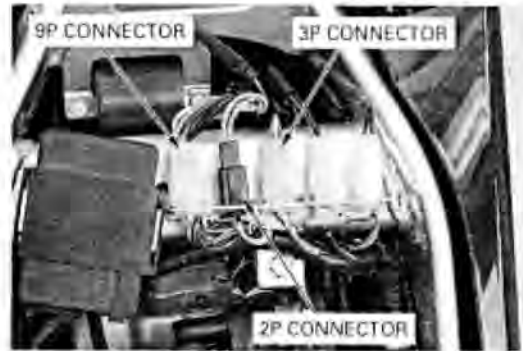
Remove the fuel tank (page 5-3).

Disconnect the right handlebar switch 3P connector.

Disconnect the left handlebar switch 9P and 2P (Black) connector.

Check for continuity between the wire terminals of the handlebar switch connector.

Continuity should exist between the color coded wire terminals as follows:



LIGHTING SWITCH

	C1 (HL)	TL
OFF		
(N)		
H	○—○	○
COLOR	Y	Br

DIMMER SWITCH

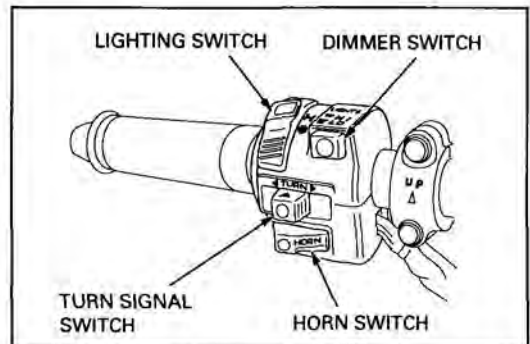
	(HL)	Lo	Hi
Lo	○—○		
(N)	○—○	○	○
Hi	○—○		○
COLOR		W	Bu

TURN SIGNAL SWITCH

	R	WR	L
R	○—○		
N			
L		○—○	
COLOR	Lb	Gr	O

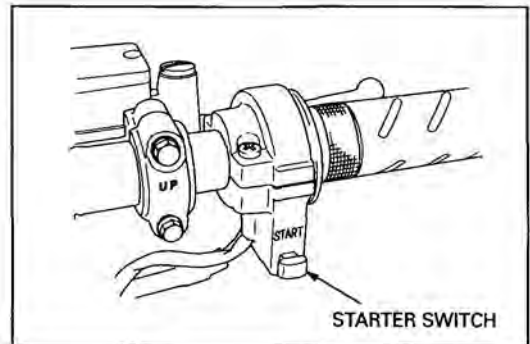
HORN SWITCH

	Ho	BAT
FREE		
PUSH	○—○	
COLOR	BI	W/G



STARTER SWITCH

	ST	BAT
FREE		
PUSH	○—○	
COLOR	Y/R	BI

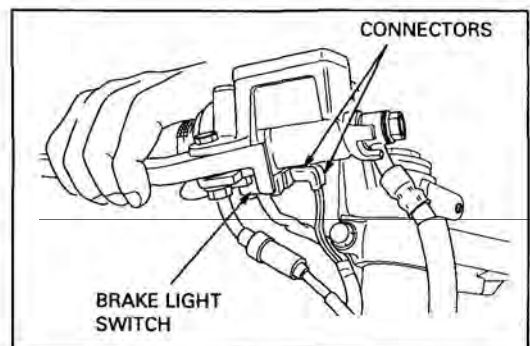


BRAKE LIGHT SWITCH

FRONT

Disconnect the front brake light switch connector and check for continuity between the terminals.

There should be continuity with the brake lever applied, and there should be no continuity with the brake lever is released.



REAR

Remove the following:

- driver seat (page 2-2)
- fuel tank (page 5-3)
- rear cowl (page 2-3)

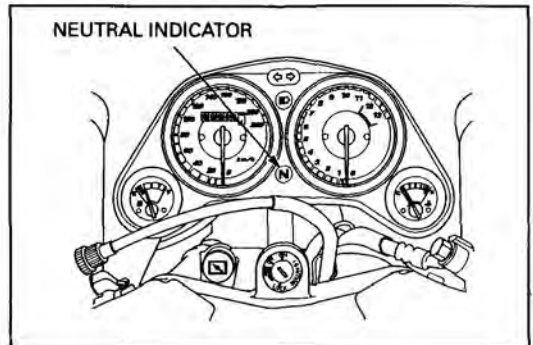
Disconnect the rear brake light switch connector and check for continuity between the terminals.

There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal is released.

**NEUTRAL INDICATOR/SWITCH****INSPECTION**

Make sure that the neutral indicator come on with the ignition switch ON and neutral position.

If the indicator does not come on, inspect as follows:



Release the neutral switch connector from the clamp of the frame.

Disconnect the neutral switch connector.



Shift the transmission into neutral and check for continuity between the Light green/Red wire terminal and ground. There should be continuity with the transmission in neutral, and no continuity with the transmission in gear except neutral.

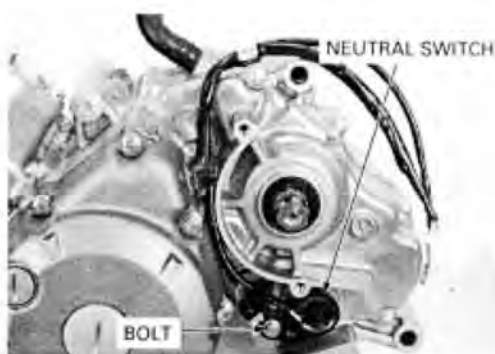


REMOVAL

Disconnect the neutral switch connector (page 20-9).

Remove the drive sprocket cover.

Remove the bolt and neutral switch.



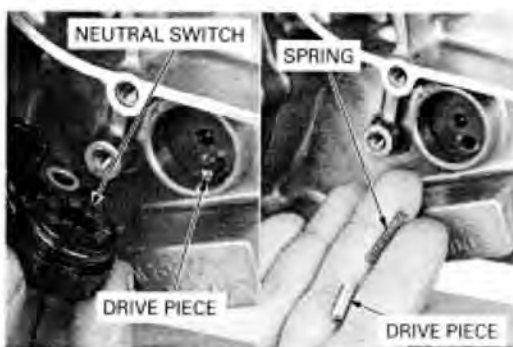
Remove the drive piece and spring.

Check the gear position switch for wear or damage.
Replace it if necessary.

Check the drive piece for wear or damage.
Replace it if necessary.

CAUTION:

- *Do not bent or tap the drive piece when install the drive piece.*
- *Bent the drive piece by force or crush the contact point will cause poor electricity connection.*

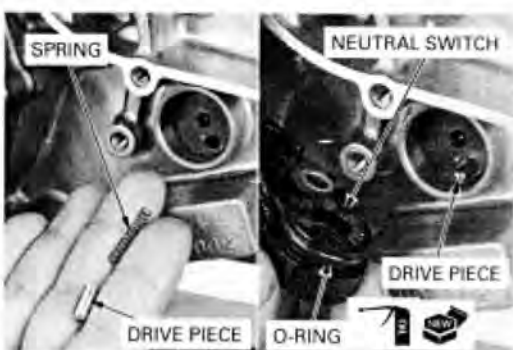


INSTALLATION

Install the spring and drive piece.

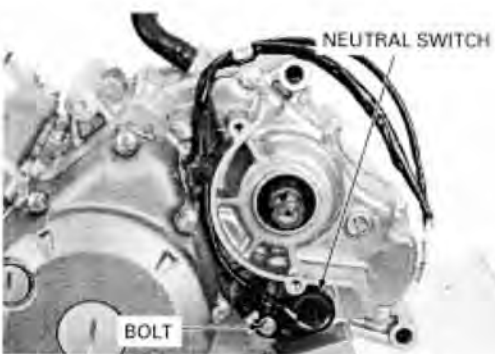
Apply engine oil to the new O-ring and install it into the groove of the neutral switch.

Install the neutral switch to the crankcase.



Tighten the bolt securely.

Install the removed parts in the reverse order of removal.



FUEL METER/FUEL UNIT

FUEL METER INSPECTION

Remove the fuel tank (page 5-3).

Disconnect the fuel unit 3P connector.

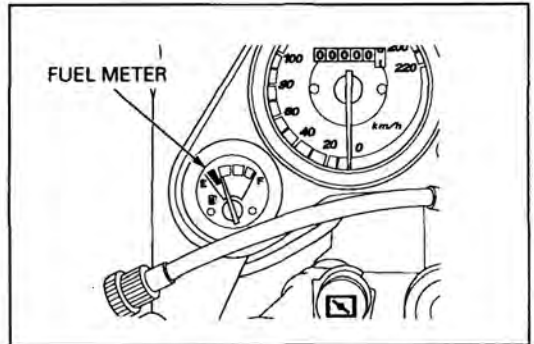


Connect the jumper wire between the Yellow/White and Green wire terminals of the wire harness side. Turn the ignition switch "ON" and make sure that the fuel meter needle swings to "FULL".

Connect the jumper wire between the Blue/White and Green wire terminals of the wire harness side. Fuel meter is in good condition if the needle returns to "EMPTY".

CAUTION:

Do not leave the terminals connected with the jumper wire for a long time, as it causes damage to the fuel meter.



FUEL UNIT INSPECTION

Disconnect the fuel unit 3P connector.



Remove the four nuts and fuel unit.

CAUTION:

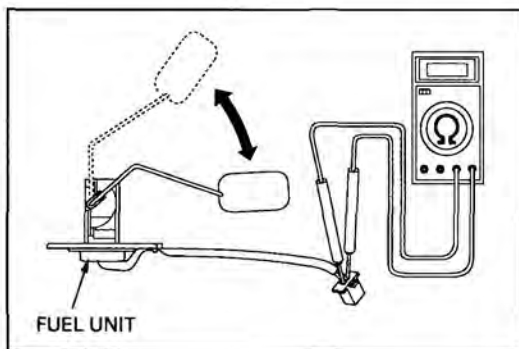
- Be careful not to damage the unit cable.
- Be careful not to bent the float arm of the unit.



LIGHTS/METERS/SWITCHES

Measure the resistance between the terminals as follows:

	FULL	EMPTY
Green - Blue/White	566 Ω	33 Ω
Green - Yellow/White	33 Ω	566 Ω
Blue/White - Yellow/White	600 Ω	600 Ω

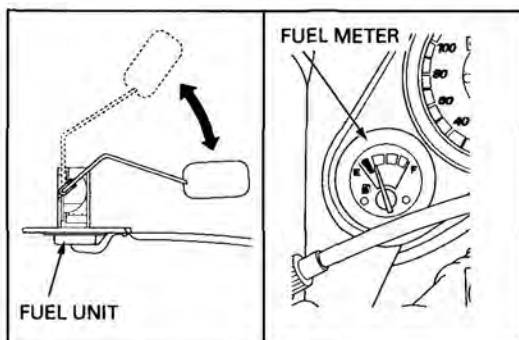


Reconnect the fuel unit 3P connector and turn the ignition switch ON.

Move the fuel unit float up and down and make sure that the fuel gauge needle moves smoothly.

FLOAT UP: Needle in "FULL"

FLOAT DOWN: Needle in "EMPTY"



FUEL UNIT INSTALLATION

Install the new O-ring.
Install the fuel unit.



Install and tighten the four nuts.



Route the fuel unit wire and connect the 3P connector.

Install the fuel tank (page 5-3).

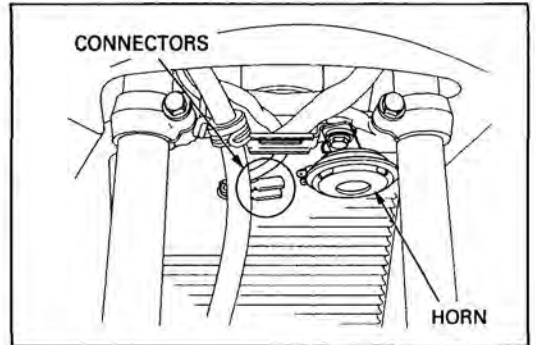


HORN

Disconnect the wire connectors from the horn.

Connect the battery voltage to the horn terminals.

The horn is normal if it sounds when the battery connected across the horn terminals.



TURN SIGNAL RELAY

INSPECTION

Check the following:

- battery condition
- burned out bulb or non-specified wattage
- burned fuse
- ignition switch and turn signal switch function
- loose connectors

If above items all normal, check the following:

Remove the rear cowl (page 2-3).

Disconnect the connector from the relay.



1. Short the White/Green and Gray terminals of the turn signal relay connector with a jumper wire. Check the turn signal light by turning the switch "R" or "L".

↓
Lights comes on
↓

↓
Lights does not come on
↓
• Broken wire harness.

- Faulty turn signal relay.
- Poor connection of the connector.

COOLING FAN MOTOR SWITCH

INSPECTION

Remove the right middle cowl (page 2-4).

Fan motor does not stop

Turn the ignition switch OFF, disconnect the connector from the fan motor switch and turn the ignition switch ON again.

If the fan motor does not stop, check for a shorted wire between the fan motor and switch.

If the fan motor stops, the fan motor switch is faulty.

Fan motor does not start

Before testing, check for a blown fan motor fuse (10A). Warm up the engine to operating temperature.

Disconnect the connector from the fan motor switch and ground the connector terminal to the body ground. Turn the ignition switch ON and check the fan motor.

If the motor starts, check the connection at the fan motor switch terminal. If it is OK, the fan motor switch is faulty.

If the motor does not start, remove the fuel tank (page 5-4) and check for voltage between the Blue (+) and Green(-) terminals at the fan motor switch 2P connector of the main harness side.

- Battery voltage: Faulty fan motor
- No battery voltage: Open circuit or poor connection in Blue or Green wire

REMOVAL/INSTALLATION

Drain the coolant (page 6-5). Disconnect the fan motor switch connector and remove the fan motor switch.

Install a new O-ring onto the switch. Install and tighten the switch.

Connect the switch connector. Fill and bleed the cooling system (page 6-5).

Install the removed parts in the reverse order of removal.



COOLANT TEMPERATURE GAUGE/ THERMOSENSOR

SYSTEM INSPECTION

Remove the fuel tank (page 5-3).

Disconnect the *thermosensor connector* and ground the connector terminal to the body ground.

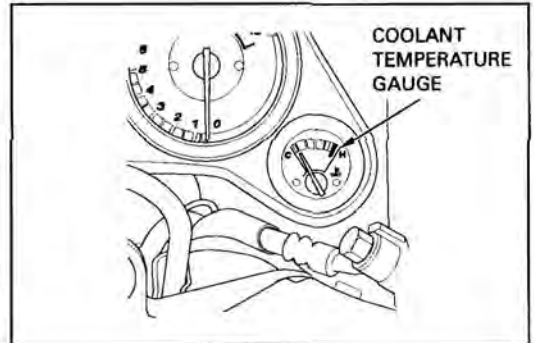


Turn the ignition switch ON and check the coolant temperature gauge needle. The needle should move to "H".

CAUTION:

Immediately turn the ignition switch OFF when the needle move to "H" (hot) to prevent the gauge from damaging.

- If the needle moves, check the thermosensor.
- If the needle does not move, check for open circuit in Green/Blue wire. If the Green/Blue wire is OK, replace the coolant temperature gauge.



THERMOSENSOR INSPECTION

⚠ WARNING

Keep flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.

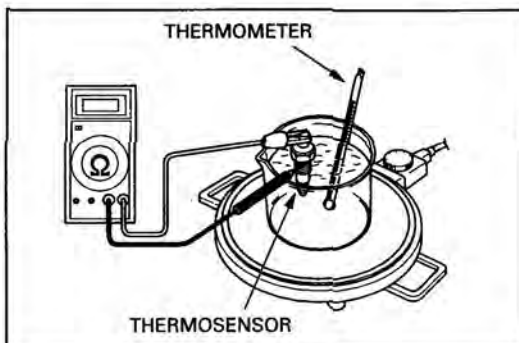
Drain the coolant (page 6-5).

Disconnect the thermosensor connector and remove the thermosensor.

Suspend the thermosensor in a pan of coolant (50 - 50 mixture) on an electric heating element and measure the resistance through the sensor as the coolant heats up:

NOTE:

- Soak the thermosensor in coolant up to its threads with at least 40 mm (1.57 in) from the bottom of the sensor.
- Keep temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or thermosensor touch the pan.



Temperature	50 °C (122 °F)	120 °C (248 °F)
Resistance	133.9 – 178.9 Ω	14.9 – 17.3 Ω

Replace the sensor if it is out of specifications by more than 10 % at any temperature listed.
Install the thermosensor.

Apply sealant to the thermosensor threads. Do not apply sealant to the sensor head.

Connect the thermosensor connector.

Fill and bleed the cooling system (page 6-5).

CLUTCH SWITCH

Disconnect the clutch switch connectors and check for continuity.

There should be continuity with the clutch lever applied and no continuity with it released.



TACHOMETER

Disassemble the upper cowl (page 2-5).

Connect the combination meter 9P and tachometer 2P connector.

Check the continuity between the Green wire terminal and body ground.

There should be continuity.

If there is no continuity, check for open circuit in the Green wire.

Turn the ignition switch ON and measure the voltage between the White/Green (+) and Green (-) wire terminals. There should be battery voltage.

If there is no voltage, check for open circuit in White/Green wire.

Start the engine and measure the voltage between the Yellow/Green (+) and Green (-) wire terminals.

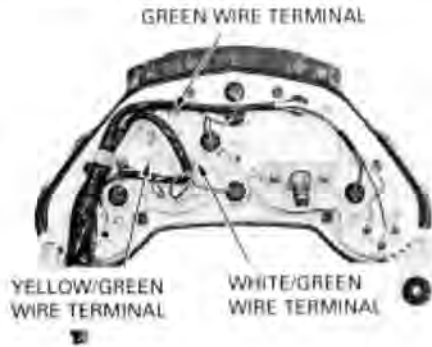
There should be at least 6V pulse voltage.

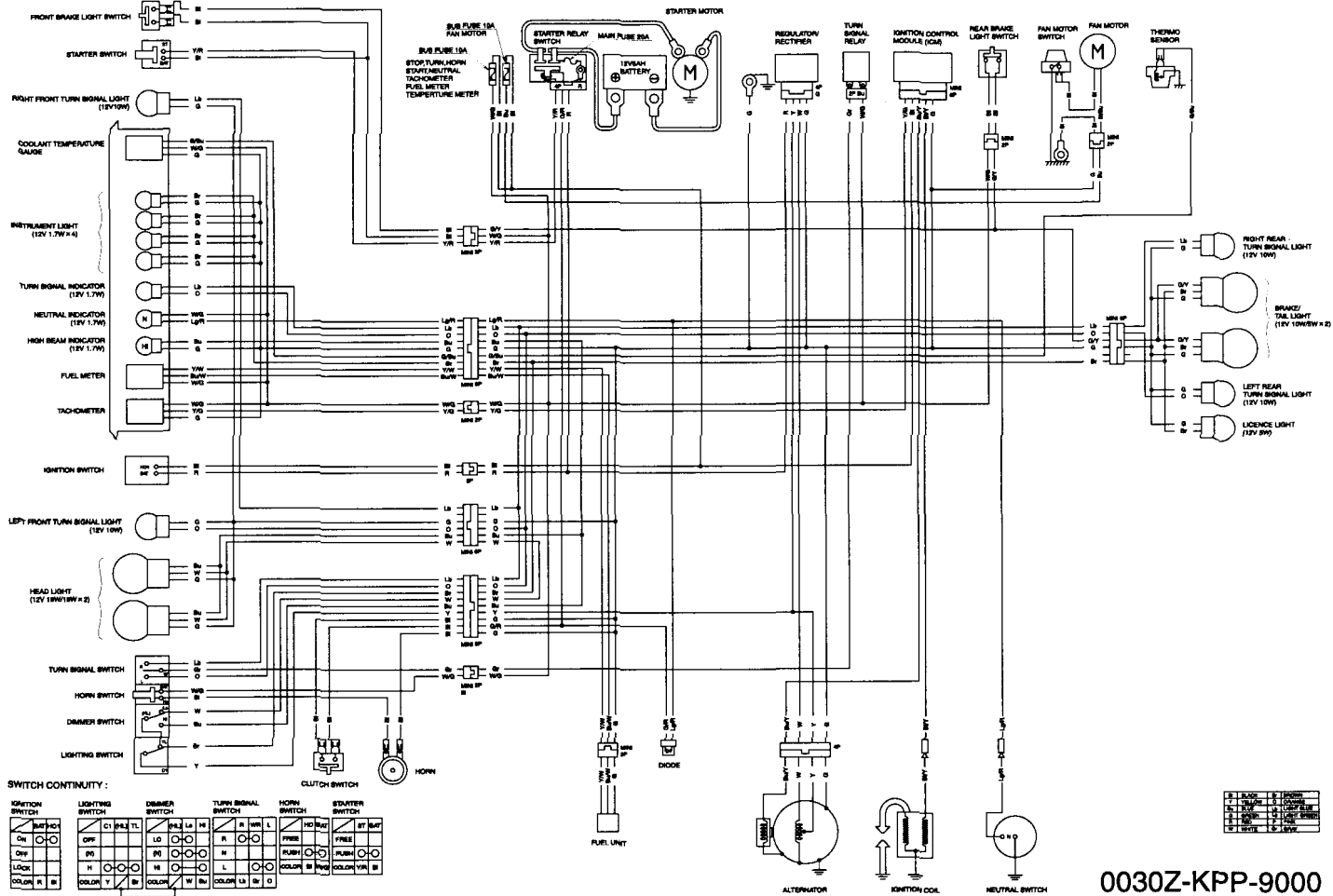
If there is no voltage, check the following:

- open circuit in Yellow/Green wire
- ignition control module (ICM) (page 18-6)

If there is continuity and ICM is normal, replace the tachometer.

For tachometer replacement, see 20-5; combination meter disassembly and assembly.





0030Z-KPP-9000

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

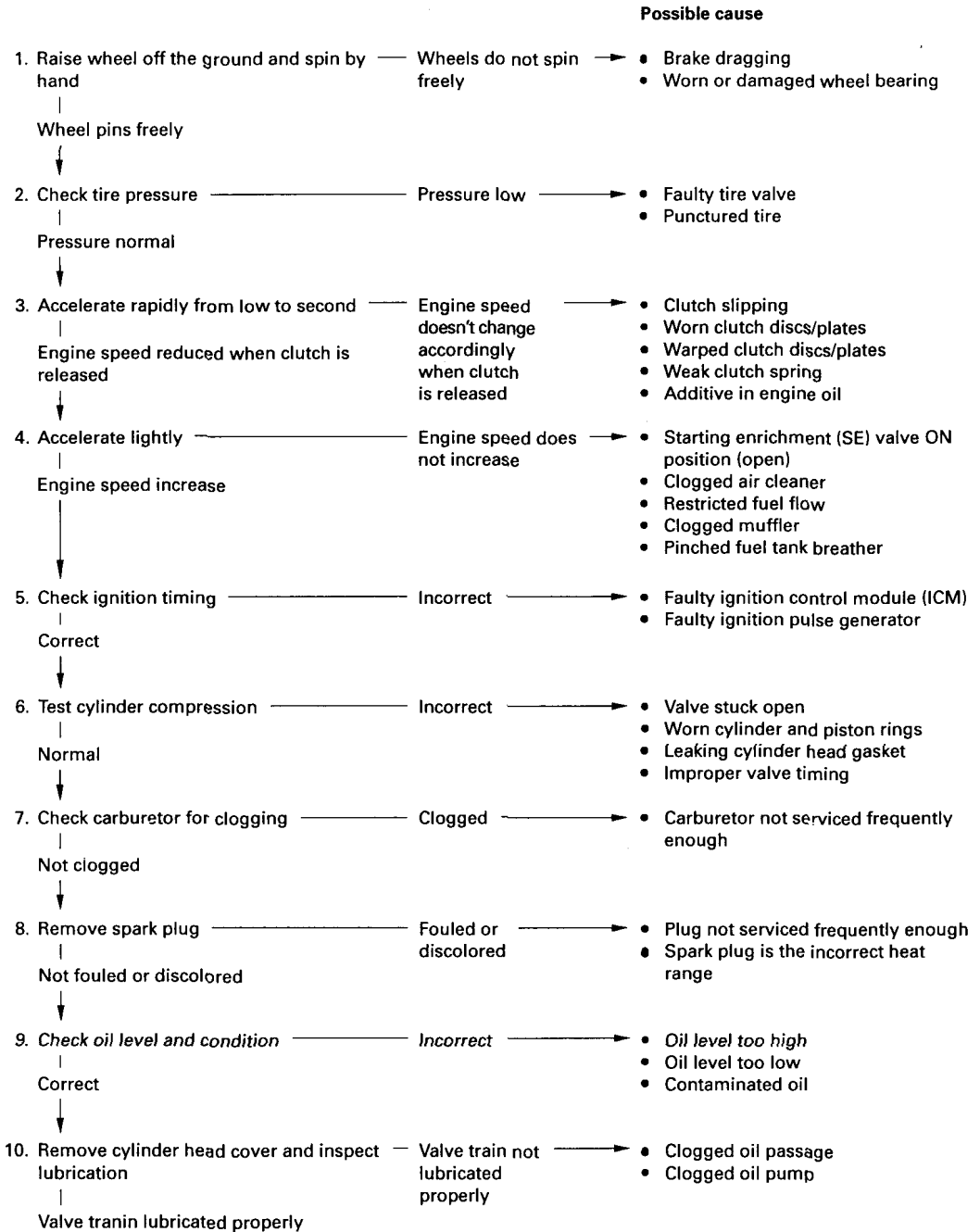
22. TROUBLESHOOTING

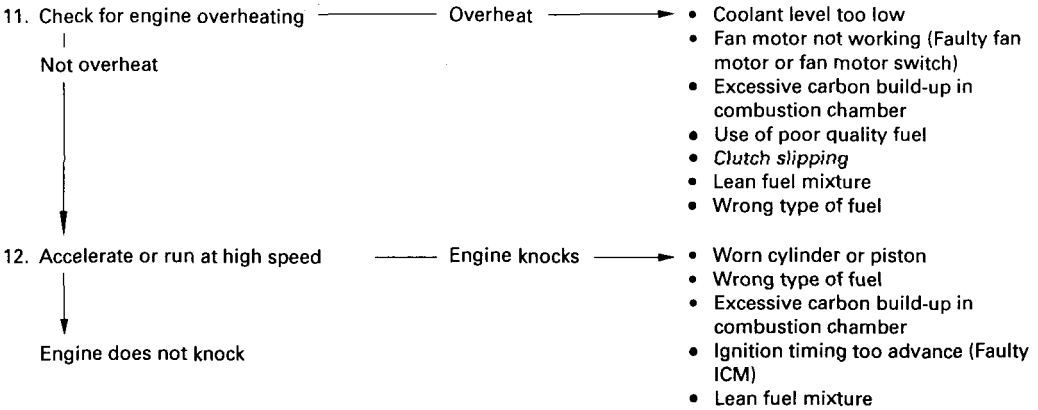
ENGINE DOES NOT START OR IS HARD TO START	22-1	POOR PERFORMANCE AT HIGH SPEED	22-4
ENGINE LACKS POWER	22-2	POOR HANDLING	22-4
POOR PERFORMANCE AT LOW AND IDLE SPEED	22-3		

ENGINE DOES NOT START OR IS HARD TO START



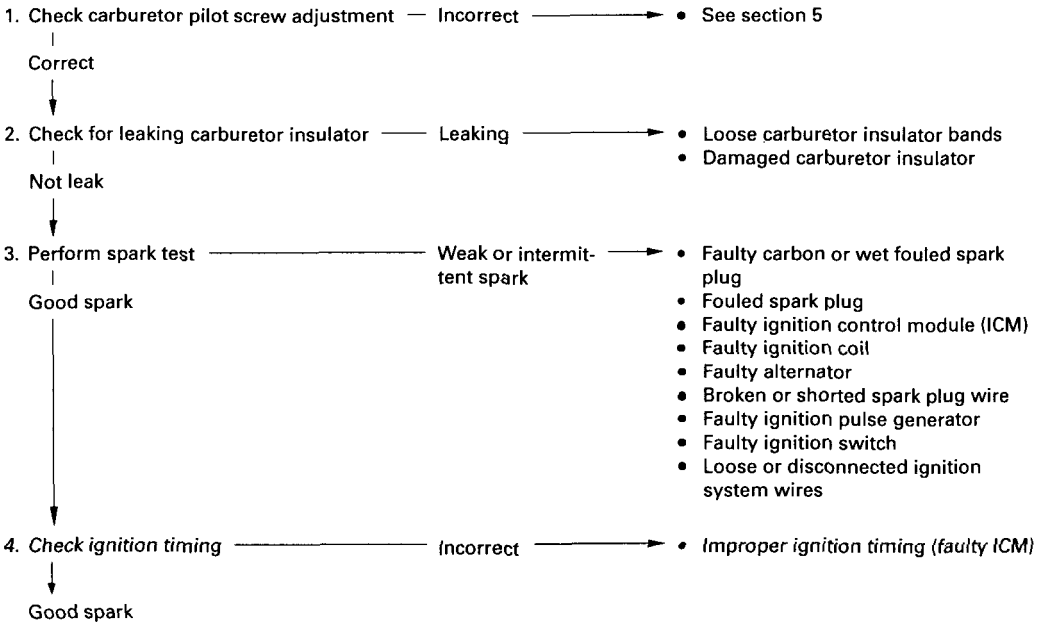
ENGINE LACKS POWER





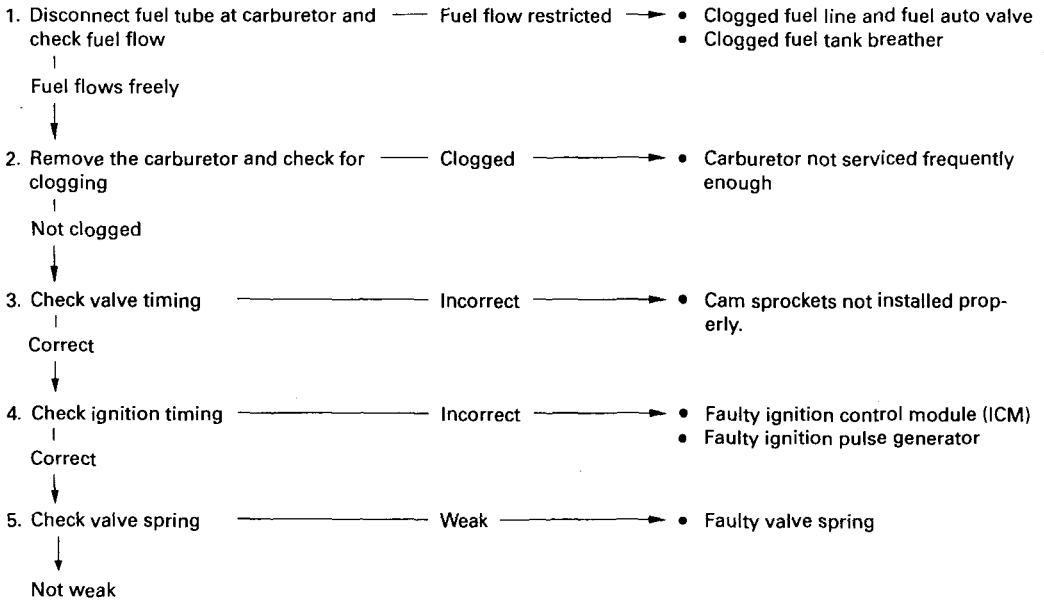
POOR PERFORMANCE AT LOW AND IDLE SPEED

Possible cause



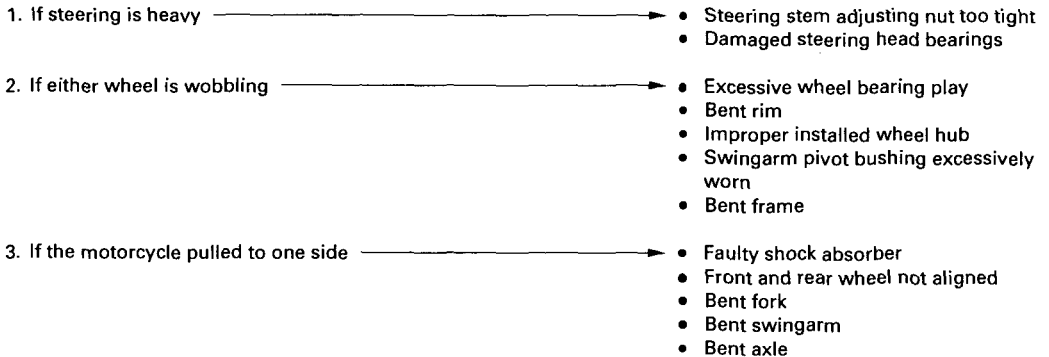
POOR PERFORMANCE AT HIGH SPEED

Possible cause



POOR HANDLING

Possible cause



AIR CLEANER	3-5	HANDLEBAR	14-3
AIR CLEANER HOUSING	5-4	HANDLEBAR SWITCHES	20-8
ALTERNATOR/STATOR	9-2	HEADLIGHT AIM	3-19
ALTERNATOR INSPECTION	17-7	HORN	20-13
BATTERY	17-4	IGNITION COIL	18-5
BODY PANEL LOCATIONS	2-0	IGNITION CONTROL MODULE (ICM)	18-5
BRAKE FLUID	3-17	IGNITION SWITCH	20-7
BRAKE FLUID REPLACEMENT/AIR BLEEDING	16-3	IGNITION SYSTEM INSPECTION	18-3
BRAKE LIGHT SWITCH	3-18	IGNITION TIMING	18-6
BRAKE LIGHT SWITCH (SYSTEM INSPECTION)	20-8	LEFT CRANKCASE COVER INSTALLATION	9-8
BRAKE PAD WEAR	3-18	LEFT CRANKCASE COVER REMOVAL	9-2
BRAKE PEDAL	16-22	LUBRICATION & SEAL POINTS	1-15
BRAKE PAD/DISC	16-5	LUBRICATION SYSTEM DIAGRAM	4-0
BRAKE SYSTEM	3-18	MAINTENANCE SCHEDULE	3-3
BULB REPLACEMENT	20-3	MIDDLE COWL	2-4
CABLE & HARNESS ROUTING	1-17	MODEL IDENTIFICATION	1-3
CARBURETOR ASSEMBLY	5-9	NUTS, BOLTS, FASTENERS	3-21
CARBURETOR CHOKE	3-5	OIL PUMP	4-2
CARBURETOR DISASSEMBLY	5-6	PASSENGER GEAR SEAT	2-2
CARBURETOR INSTALLATION	5-13	PILOT SCREW ADJUSTMENT	5-14
CARBURETOR REMOVAL	5-4	PISTON INSTALLATION	11-7
CHARGING SYSTEM INSPECTION	17-5	PISTON REMOVAL	11-4
CLUTCH	8-4	POOR HANDLING	22-4
CLUTCH/NEUTRAL DIODE	19-11	POOR PERFORMANCE AT HIGH SPEED	22-4
CLUTCH SWITCH	20-16	POOR PERFORMANCE AT LOW	
CLUTCH SYSTEM	3-19	AND IDLE SPEED	22-3
COMBINATION METER	20-5	PRIMARY DRIVE GEAR	8-12
COOLANT REPLACEMENT	6-4	RADIATOR COOLANT	3-13
COOLANT TEMPERATURE		RADIATOR/COOLING FAN	6-8
GAUGE/THERMOSENSOR	20-15	RADIATOR RESERVE TANK	6-12
COOLING FAN MOTOR SWITCH	20-14	REAR BRAKE CALIPER	16-19
COOLING SYSTEM	3-14	REAR COWL	2-2
CRANKCASE ASSEMBLY	12-13	REAR FENDER	2-3
CRANKCASE BREATHER	3-6	REAR MASTER CYLINDER	16-12
CRANKSHAFT INSTALLATION	13-5	REAR WHEEL	15-3
CRANKSHAFT REMOVAL	13-2	REGULATOR/RECTIFIER	17-8
CYLINDER INSTALLATION	11-8	RIGHT CRANKCASE COVER INSTALLATION	8-13
CYLINDER REMOVAL	11-3	RIGHT CRANKCASE COVER REMOVAL	8-3
CYLINDER COMPRESSION	10-3	SECONDARY AIR SUPPLY SYSTEM	
CYLINDER HEAD ASSEMBLY	10-17	(MAINTENANCE)	3-14
CYLINDER HEAD DISASSEMBLY	10-8	SECONDARY AIR SUPPLY SYSTEM	
CYLINDER HEAD INSTALLATION	10-19	(SYSTEM INSPECTION)	5-15
CYLINDER HEAD REMOVAL	10-4	SERVICE INFORMATION	
DRIVE CHAIN	3-15	(ALTERNATOR/STARTER CLUTCH)	9-1
DRIVER SEAT	2-2	(COOLING SYSTEM)	6-1
ENGINE IDLE SPEED	3-12	(CHARGING SYSTEM)	17-1
ENGINE LACKS POWER	22-2	(BRAKE SYSTEM)	16-1
ENGINE OIL	3-10	(CLUTCH/GEARSHIFT LINKAGE)	8-1
ENGINE OIL STRAINER SCREEN	3-12	(CRANKSHAFT/BALANCER)	13-1
ENGINE INSTALLATION	7-4	(CYLINDER HEAD/VALVES)	10-1
ENGINE REMOVAL	7-2	(CYLINDER/PISTON)	11-1
EXHAUST SYSTEM	2-5	(ENGINE REMOVAL/INSTALLATION)	7-1
FLYWHEEL INSTALLATION	9-7	(ELECTRIC STARTER)	19-1
FLYWHEEL REMOVAL	9-3	(FRAME/BODY PANELS/EXHAUST SYSTEM)	2-1
FORK	14-12	(FRONT WHEEL/SUSPENSION/STEERING)	14-1
FRONT BRAKE CALIPER	16-16	(FUEL SYSTEM)	5-1
FRONT FENDER	2-4	(IGNITION SYSTEM)	18-1
FRONT MASTER CYLINDER	16-8	(LIGHTS/METERS/SWITCHES)	20-1
FRONT WHEEL	14-8	(LUBRICATION SYSTEM)	4-1
FUEL LINE	3-4	(MAINTENANCE)	3-1
FUEL METER/FUEL UNIT	20-11	(REAR WHEEL/SUSPENSION)	15-1
FUEL TANK	5-3	(TRANSMISSION)	12-1
GEARSHIFT LINKAGE	8-10	SERVICE RULES	1-2
GENERAL SAFETY	1-1	SHOCK ABSORBER	15-9
GRAB RAIL	2-2	SIDE STAND	3-20

INDEX

SPARK PLUG	3-6
SPECIFICATIONS	1-4
STARTER CLUTCH	9-4
STARTER MOTOR	19-4
STARTER RELAY SWITCH	19-10
STEERING HEAD BEARINGS	3-22
STEERING STEM	14-19
SUB-AIR CLEANER	5-4
SUSPENSION	3-20
SWINGARM	15-10
SYSTEM DIAGRAM	
(CHARGING SYSTEM)	17-0
(IGNITION SYSTEM)	18-0
(ELECTRIC STARTER)	19-0
SYSTEM LOCATION	20-0
SYSTEM TESTING	6-3
THERMOSTAT	6-6
THROTTLE OPERATION	3-4
TOOLS	1-14
TORQUE VALUES	1-12
TRANSMISSION ASSEMBLY	12-10
TRANSMISSION DISASSEMBLY	12-3
TROUBLESHOOTING	
(ALTERNATOR/STARTER CLUTCH)	9-1
(COOLING SYSTEM)	6-2
(CHARGING SYSTEM)	17-3
(BRAKE SYSTEM)	16-2
(CLUTCH/GEARSHIFT LINKAGE)	8-2
(CRANKSHAFT/BALANCER)	13-1
(CYLINDER HEAD/VALVES)	10-2
(CYLINDER/PISTON)	11-2
(ELECTRIC STARTER)	19-2
(FRAME/BODY PANELS/EXHAUST SYSTEM)	2-1
(FRONT WHEEL/SUSPENSION/STEERING)	14-2
(FUEL SYSTEM)	5-2
(IGNITION SYSTEM)	18-2
(LIGHTS/METERS/SWITCHES)	20-2
(LUBRICATION SYSTEM)	4-1
(REAR WHEEL/SUSPENSION)	15-2
(TRANSMISSION)	12-2
TURN SIGNAL RELAY	20-13
UNDER COWL	2-3
UPPER COWL	2-5
VALVE CLEARANCE	3-8
VALVE GUIDE REPLACEMENT	10-13
VALVE SEAT INSPECTION	10-14
VALVE SEAT REFACING	10-15
WATER PUMP	6-12
WHEELS/TIRES	3-21

To print chapters, click on the printer icon and fill in the page range.

1.	General Information	4 - 28
2.	Frame/Body panels/Exhaust system	29 - 36
3.	Maintenance	37 - 58
4.	Lubrication system	59 - 65
5.	Fuel system	66 - 82
6.	Cooling System	83 - 98
7.	Engine removal/Installation	99 - 106
8.	Clutch/Gearshift linkage	107 - 121
9.	Alternator/Starter Clutch	122 - 130
10.	Cylinder head/Valves	131 - 154
11.	Cylinder/Piston	155 - 164
12.	Transmission	165 - 179
13.	Crankshaft/Balancer	180 - 185
14.	Front wheel/Suspension/Steering	186 - 209
15.	Rear wheel/Suspension	210 - 224
16.	Brake system	225 - 248
17.	Charging system	249 - 257
18.	Ignition system	258 - 265
19.	Electric starter	266 - 277
20.	Lights/Meter/Switches	278 - 295
21.	Wiring diagram	296
22.	Troubleshooting	297 - 300
23.	Index	301 - 302