HONDA

SHOP MANUAL

HONDA

FES250W

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FES250W

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 possible 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 not vehicle safety will be jeopardized by the service method or tools selected.

TYPE CODE

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

CODE	AREA TYPE
E	U.K.
G	Germany
F	France
IT	Italy
B	Belgium

CODE	AREA TYPE
H	Holland
SP	Spain
PO	Portugal
AR	Austria
SW	Switzerland

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the FES250.

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

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

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

If you are not fimiliar with this scooter, read Technical Feature in section 22.
If you don't know the source of the trouble, go to section 23, Troubleshooting.

HONDA MOTOR CO., LTD.
SERVICE PUBLICATIONS OFFICE

CONTENTS

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COOLANT

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

⚠ WARNING

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

BATTERY HYDROGEN GAS & ELECTROLYTE

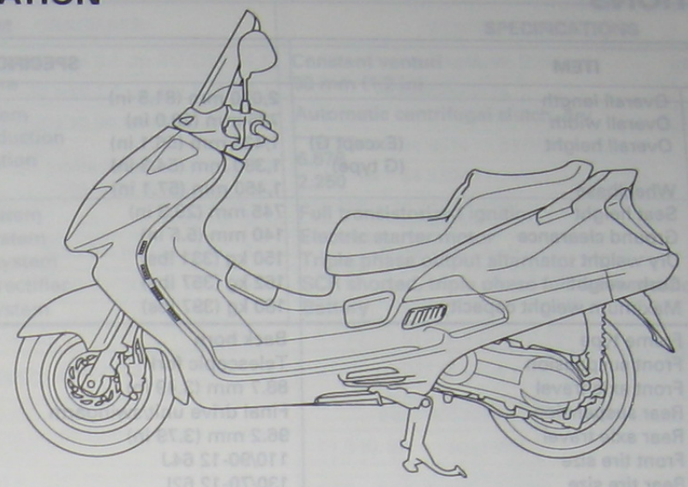
⚠ WARNING

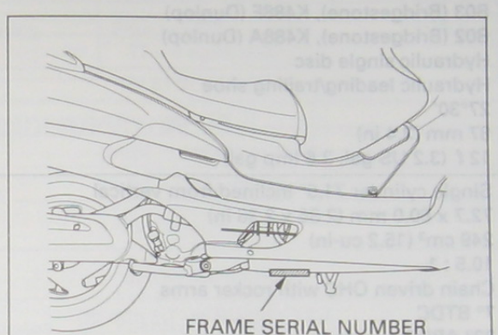
- *The battery gives of explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging or using the battery in an enclosed space.*
- *The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and 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

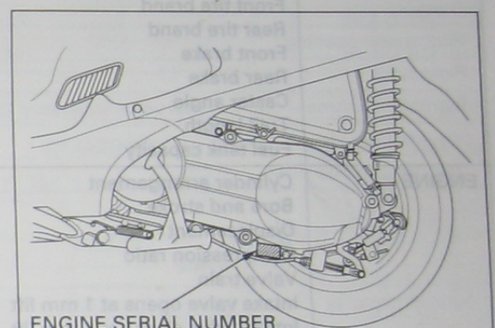
1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that don't meet HONDA's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing 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 shown on pages 1-18 through 1-25, Cable & Harness routing.

MODEL IDENTIFICATION

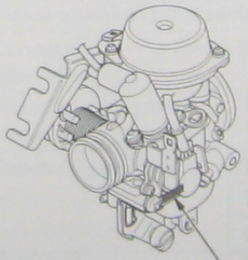




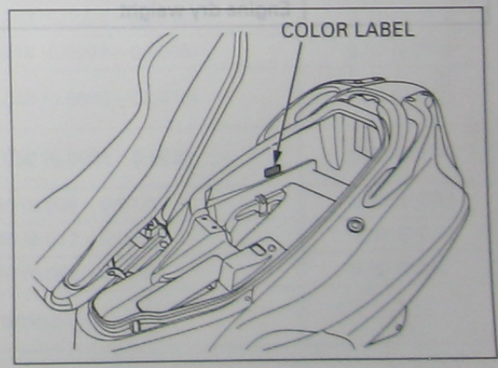
The frame serial number is stamped on the right side of the frame body.



The engine serial number is stamped on the left crankcase near the rear wheel.



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



The color label is attached on luggage box under the seat. When ordering color-coded parts, always specify the designated color code.

SPECIFICATIONS

GENERAL

ITEM			SPECIFICATIONS
DIMENSIONS	Overall length		2,070 mm (81.5 in)
	Overall width		735 mm (29.0 in)
	Overall height	(Except G)	1,425 mm (56.1 in)
		(G type)	1,380 mm (54.3 in)
	Wheelbase		1,450 mm (57.1 in)
	Seat height		745 mm (29.3 in)
	Ground clearance		140 mm (5.5 in)
	Dry weight		150 kg (331 lbs)
	Curb weight		162 kg (357 lbs)
	Maximum weight capacity		180 kg (397 lbs)
FRAME	Frame type		Back born
	Front suspension		Telescopic fork
	Front axle travel		88.7 mm (3.49 in)
	Rear suspension		Final drive unit/swingarm
	Rear axle travel		96.2 mm (3.79 in)
	Front tire size		110/90-12 64J
	Rear tire size		130/70-12 62L
	Front tire brand		B03 (Bridgestone), K488F (Dunlop)
	Rear tire brand		B02 (Bridgestone), K488A (Dunlop)
	Front brake		Hydraulic single disc
	Rear brake		Hydraulic leading/trailing shoe
	Caster angle		27°30′
	Trail length		87 mm (3.4 in)
	Fuel tank capacity		12 ℓ (3.2 US gal, 2.6 Imp gal)
ENGINE	Cylinder arrangement		Single cylinder 71.5° inclined from vertical
	Bore and stroke		72.7 x 60.0 mm (2.86 x 2.36 in)
	Displacement		249 cm³ (15.2 cu-in)
	Compression ratio		10.5 : 1
	Valve train		Chain driven OHC with rocker arms
	Intake valve opens at 1 mm lift		7° BTDC
	Intake valve closes at 1 mm lift		33° ABDC
	Exhaust valve opens at 1 mm lift		37° BBDC
	Exhaust valve closes at 1 mm lift		3° ATDC
	Lubrication system		Forced pressure and wet sump
	Oil pump type		Trochoid
	Cooling system		Liquid cooled
	Air filtration		Viscous paper element
	Engine dry weight		37.2 kg (82 lbs)

GENERAL (cont'd)

ITEM		SPECIFICATIONS
CARBURETOR	Carburetor type	Constant venturi
	Throttle bore	30 mm (1.2 in)
DRIVE TRAIN	Clutch system	Automatic centrifugal clutch, dry
	Primary reduction	———
	Final reduction	6.876
	Gear ratio	2.250
ELECTRICAL	Ignition system	Full transistorized ignition
	Starting system	Electric starter motor
	Charging system	Triple phase output alternator
	Regulator/rectifier	SCR shorted, triple phase full-wave rectification
	Lighting system	Battery

Unit: mm (in)

LUBRICATION SYSTEM

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	at draining	1.1 ℓ (1.2 US qt, 1.0 Imp qt)	———
	at disassembly	1.3 ℓ (1.5 US qt, 1.1 Imp qt)	———
Recommended engine oil		HONDA 4-stroke oil or equivalent motor oil API service classification: SE, SF or SG Viscosity: SAE 10W-40	———
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.20 (0.006 – 0.008)	0.25 (0.010)
	Side clearance	0.04 – 0.09 (0.002 – 0.004)	0.12 (0.005)

FUEL SYSTEM

ITEM		SPECIFICATIONS
Carburetor identification number	Except SW type	VE3BB
	SW type	VE3BD
Main jet		#105
Slow jet		#40
Pilot screw opening		See page 5 – 17
Float level		18.5 mm (0.73 in)
Starting enrichment (SE) thermal valve resistance (20°C/68°F)		10 kΩ max.
Idle speed		1,500 ± 100 min^{-1} (rpm)
Throttle grip free play		2 – 6 mm (1/12 – 1/4 in)

COOLING SYSTEM

ITEM		SPECIFICATIONS
Coolant capacity	radiator and engine	1.2 ℓ (1.3 US qt, 1.1 Imp qt)
	reserve tank	0.2 ℓ (0.21 US qt, 0.18 Imp qt)
Radiator cap relief pressure		74 – 103 kPa (0.75 – 1.05 kgf/cm^2, 11 – 15 psi)
Thermostat	begins to open	69.5 – 72.5°C (157 – 163°F)
	fully open	80°C (176°F)
	valve lift	3.5 mm (0.14 in) minimum

Unit: mm (in)

CYLINDER HEAD/VALVE

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,569 kPa (16.0 kgf/cm^2, 228 psi) –400 min^{-1} (rpm)	———
Cylinder head	Warpage		———	0.05 (0.002)
Camshaft	Cam lobe height	IN	34.2310 – 34.3510 (1.34767 – 1.35240)	34.181 (1.3457)
		EX	34.1124 – 34.2324 (1.34301 – 1.34773)	34.062 (1.3410)
Rocker arm	Rocker arm I.D.	IN/EX	12.000 – 12.018 (0.4724 – 0.4731)	12.10 (0.476)
	Rocker arm shaft O.D.	IN/EX	11.966 – 11.984 (0.4711 – 0.4718)	11.91 (0.469)
Valve and valve guide	Valve stem O.D.	IN	4.975 – 4.990 (0.1959 – 0.1965)	4.90 (0.193)
		EX	4.955 – 4.970 (0.1951 – 0.1957)	4.90 (0.193)
	Valve guide I.D.	IN/EX	5.000 – 5.012 (0.1969 – 0.1973)	5.03 (0.198)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	0.08 (0.003)
		EX	0.030 – 0.057 (0.0012 – 0.0022)	0.10 (0.004)
	Valve guide projection above cylinder head	IN/EX	11.5 (0.45)	———
	Valve seat width	IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.8 (0.07)
Valve spring	Free length	Inner IN/EX	31.06 (1.223)	29.5 (1.16)
		Outer IN/EX	40.42 (1.591)	38.4 (1.51)

CYLINDER/PISTON

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		72.750 – 72.760 (2.8642 – 2.8646)	73.01 (2.874)
	Out of round		———	0.05 (0.002)
	Taper		———	0.05 (0.002)
	Warpage		———	0.05 (0.002)
Piston, piston ring and piston pin	Piston mark direction		"IN" mark toward the intake side	———
	Piston O.D.		72.720 – 72.740 (2.8630 – 2.8638) at 18 (0.7) from the bottom	72.65 (2.860)
	Piston pin hole I.D.		17.002 – 17.008 (0.6694 – 0.6696)	17.04 (0.671)
	Piston pin O.D.		16.996 – 17.000 (0.6691 – 0.6693)	16.96 (0.668)
	Connecting rod small end I.D.		17.016 – 17.034 (0.6699 – 0.6706)	17.06 (0.672)
	Cylinder-to-piston clearance		0.010 – 0.040 (0.0004 – 0.0016)	0.10 (0.004)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.02 (0.001)
	Connecting rod-to-piston pin clearance		0.016 – 0.040 (0.0006 – 0.0016)	0.06 (0.002)
	Piston ring-to-groove clearance	Top/Second	0.015 – 0.050 (0.0006 – 0.0020)	0.09 (0.004)
	Piston ring end gap	Top	0.15 – 0.30 (0.006 – 0.012)	0.50 (0.020)
		Second	0.30 – 0.45 (0.012 – 0.018)	0.65 (0.026)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.04)
	Piston ring mark direction	Top/second	Marking facing up	———

Unit: mm (in)

DRIVE AND DRIVEN PULLEYS/CLUTCH

ITEM		STANDARD	SERVICE LIMIT
Drive belt width		23.3 (0.92)	22.3 (0.88)
Movable drive face	Bushing I.D.	26.989 – 27.052 (1.0626 – 1.0650)	27.91 (1.099)
	Boss O.D.	26.960 – 26.974 (1.0614 – 1.0620)	26.93 (1.0602)
	Weight roller O.D.	22.92 – 23.08 (0.902 – 0.909)	22.5 (0.89)
Clutch	Clutch outer I.D.	135.0 – 135.2 (5.31 – 5.32)	135.5 (5.33)
	Lining thickness	4.0 (0.16)	0.5 (0.02)
Driven pulley	Face spring free length	132.5 (5.22)	127.8 (5.03)
	Driven face boss O.D.	39.965 – 39.985 (1.5734 – 1.5742)	39.94 (1.572)
	Movable driven face I.D.	40.000 – 40.025 (1.5748 – 1.5758)	40.06 (1.577)

FINAL REDUCTION

ITEM		SPECIFICATIONS
Final drive oil capcity	at draining	160 cm³ (5.4 US oz, 5.6 Imp oz)
	at disassembly	200 cm³ (6.8 US oz, 7.0 Imp oz)
Recommended final drive oil		Hypoid gear oil SAE #90 or Honda 4-stroke oil or equivalent motor oil API service classification: SE Viscosity: SAE 10W-30

Unit: mm (in)

ALTERNATOR/STARTER CLUTCH

ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	Boss O.D.	42.195 – 42.208 (1.6612 – 1.6617)	42.15 (1.659)
	Bushing I.D.	22.026 – 22.045 (0.8672 – 0.8679)	22.10 (0.870)
Starter clutch outer I.D.		58.64 – 58.84 (2.309 – 2.317)	58.89 (2.318)

Unit: mm (in)

CRANKSHAFT/CRANKCASE

ITEM	STANDARD	SERVICE LIMIT
Crankshaft runout	———	0.10 (0.004)
Connecting rod big end side clearance	0.05 – 0.40 (0.002 – 0.016)	0.60 (0.024)
Connecting rod big end radial clearance	0 – 0.008 (0 – 0.0003)	0.05 (0.002)

Unit: mm (in)

FRONT WHEEL/SUSPENSION/STEERING

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		———	1.5 (0.06)
Cold tire pressure	Driver only	175 kPa (1.75 kgf/cm², 25 psi)	———
	Driver and passenger	175 kPa (1.75 kgf/cm², 25 psi)	———
Axle runout		———	0.2 (0.01)
Front wheel rim runout	Radial	———	2.0 (0.08)
	Axial	———	2.0 (0.08)
Fork	Spring free length	257.7 (10.15)	252.5 (9.94)
	Tube runout	———	0.2 (0.08)
	Recommended fluid	Fork fluid	———
	Fluid level	67 (2.6)	———
	Fluid capacity	118 cm³ (4.0 US oz, 4.2 Imp oz)	———

Unit: mm (in)

REAR WHEEL/SUSPENSION

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		———	2.0 (0.08)
Cold tire pressure	Driver only	200 kPa (2.00 kgf/cm², 29 psi)	———
	Driver and passenger	250 kPa (2.50 kgf/cm², 36 psi)	———
Rear wheel rim runout	Radial	———	2.0 (0.08)
	Axial	———	2.0 (0.08)

Unit: mm (in)

BRAKE SYSTEM

ITEM			STANDARD	SERVICE LIMIT
Recommended brake fluid			DOT 3 or DOT 4	———
Rear (combined) brake lever free play			20 – 30 (3/4 – 1-1/4)	———
Brake disc	Thickness		3.8 – 4.2 (0.15 – 0.17)	3.5 (0.14)
	Runout		———	0.3 (0.01)
Front master cylinder (R. side)	Cylinder I.D.		11.000 – 11.043 (0.4331 – 0.4348)	11.055 (0.4352)
	Piston O.D.		10.957 – 10.984 (0.4314 – 0.4324)	10.945 (0.4309)
Rear (combined) master cylinder (L. side)	Cylinder I.D.		14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Piston O.D.		13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
Front caliper	Cylinder I.D.	Upper	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
		Center/Lower	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
	Piston O.D.	Upper	25.335 – 25.368 (0.9974 – 0.9987)	25.327 (0.9971)
		Center/Lower	22.585 – 22.618 (0.8892 – 0.8905)	22.577 (0.8889)
Rear thrust cylinder	Cylinder I.D.		19.050 – 19.102 (0.7500 – 0.7520)	19.105 (0.7522)
	Piston O.D.		18.997 – 19.030 (0.7479 – 0.7492)	18.995 (0.7478)
Rear brake drum I.D.			160 (6.3)	161 (6.3)

BATTERY/CHARGING SYSTEM

ITEM			SPECIFICATIONS
Battery	Capacity		12 V-10 AH
	Current leakage		3.5 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.2 A/5 – 10 h
		Quick	5 A/1 h
Alternator	Capacity		290 W/5,000 min^{-1} (rpm)
	Charging coil resistance (20°C/68°F)		0.1 – 0.5 Ω
Regulator/rectifier regulated voltage			14.5 – 15.3 V at 5,000 min^{-1} (rpm)

IGNITION SYSTEM

ITEM		SPECIFICATIONS	
		NGK	DENSO
Spark plug	Standard	DPR7EA-9	X22EPR-U9
	For cold climate (below 5°C/41°F)	DPR6EA-9	X20EPR-U9
	For extended high speed riding	DPR8EA-9	X24EPR-U9
Spark plug gap		0.8 – 0.9 mm (0.031 – 0.035 in)	
Ignition coil primary peak voltage		100 V minimum	
Ignition pulse generator peak voltage		0.7 V minimum	
Ignition timing ("F" mark)		11° BTDC at idle	
Engine coolant temperature (ECT) sensor resistance	at 20°C (68°F)	2 – 3 kΩ	
	at 80°C (176°F)	200 – 400 Ω	
Throttle sensor	Resistance (20°C/68°F)	4 – 6 kΩ	
	Input voltage	4.6 – 5.4 V	

ELECTRIC STARTER

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	8.5 (0.33)

LIGHTS/METERS/SWITCHES

ITEM		SPECIFICATIONS
Fuse	Main fuse	30 A
	Sub-fuse	15 A x 2, 10 A x 3
Bulb	Headlight	12 V-55 W x 2 (high/low beam)
	Position light	12 V-5 W
	Brake/taillight	12 V-21/5 W x 2
	License light	12 V-5 W
	Front turn signal light	12 V-21 W x 2
	Rear turn signal light	12 V-21 W x 2
	Meter light	12 V-1.7 W x 4
	High beam indicator	12 V-1.7 W
	Turn signal indicator	12 V-3.0 W x 2
Fuel pump flow capacity (minimum)		500 cm^3 (16.9 US oz, 17.6 Imp oz)/minute
Thermosensor resistance	at 80°C (176°F)	47 – 57 Ω
	at 120°C (248°F)	14 – 18 Ω
Fan motor switch	Starts to close (ON)	98 – 102°C (208 – 216°F)
	Stops opening (OFF)	91 – 99°C (196 – 210°F)

TORQUE VALUES

STANDARD

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

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

NOTES: 1. Apply sealant to the threads.
2. Apply locking agent to the threads.
3. Apply oil to the threads and seating surface.
4. ALOC bolt. Do not reuse.
5. Mounting rubber bolt.

ENGINE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
LUBRICATION:				
Oil strainer cap	1	30	20 (2.0, 14)	
Oil pump cover screw	1	3	2 (0.2, 1.4)	
FUEL SYSTEM:				
Carburetor throttle cable stay screw	2	5	5 (0.5, 3.6)	NOTE 2
Carburetor insulator band screw	1	5	5 (0.5, 3.6)	Band ends are contact
COOLING SYSTEM:				
Water pump impeller	1	7	12 (1.2, 9)	
CYLINDER HEAD/VALVE:				
Adjusting hole cap	1	14	6 (0.6, 4.3)	
Cylinder head cap nut	4	8	24 (2.4, 17)	NOTE 3
Cam chain adjuster sealing bolt	1	11	22 (2.2, 16)	
Spark plug	1	12	18 (1.8, 13)	
Exhaust pipe stud bolt	2	8	9 (0.9, 6.5)	
CYLINDER/PISTON:				
Cylinder stud bolt	4	8	9 (0.9, 6.5)	(page 9-6)
DRIVE AND DRIVEN PULLEYS/CLUTCH:				
Clutch/driven pulley assembly nut	1	30	78 (8.0, 58)	
Clutch outer nut	1	12	74 (7.5, 54)	
Drive pulley face nut	1	14	93 (9.5, 69)	NOTE 3
Left crankcase cover	4	6	10 (1.0, 7)	NOTE 5
FINAL REDUCTION:				
Oil drain bolt	1	8	13 (1.3, 9)	
Oil level check bolt	1	8	13 (1.3, 9)	
Oil filler bolt	1	8	13 (1.3, 9)	
Transmission cover bolt	7	8	25 (2.5, 18)	
CRANKSHAFT/CRANKCASE:				
Cam chain tensioner slider bolt	1	6	10 (1.0, 7)	
ALTERNATOR/STARTER CLUTCH:				
Starter clutch outer bolt	3	8	29 (3.0, 22)	NOTE 2
Flywheel nut	1	16	116 (11.8, 85)	NOTE 3
Stator mounting bolt	3	6	12 (1.2, 9)	
IGNITION SYSTEM:				
Engine coolant temperature (ECT) sensor	1	12	15 (1.5, 11)	
Timing hole cap	1	14	6 (0.6, 4.3)	
LIGHTS/METERS/SWITCHES:				
Thermosensor	1	PT1/8	10 (1.0, 7)	NOTE 1
Fan motor switch	1	16	18 (1.8, 13)	

FRAME

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
FRAME/BODY PANELS/EXHAUST SYSTEM:				
Exhaust pipe joint nut	2	8	29 (3.0, 22)	
Exhaust pipe band bolt	1	8	22 (2.2, 16)	
Muffler mounting bolt	4	8	34 (3.5, 25)	
ENGINE MOUNTING:				
Engine hanger adjusting bolt	1	22	15 (1.5, 11)	
Engine hanger lock nut	1	22	42 (4.3, 31)	
Engine hanger pivot nut	1	12	78 (8.0, 58)	
Sub-bracket pivot nut	1	10	62 (6.3, 46)	
Sub-bracket stopper nut	1	8	26 (2.7, 20)	
Tension rod nut	1	8	20 (2.0, 14)	
Engine mounting nut	1	12	59 (6.0, 43)	
FRONT WHEEL/SUSPENSION/STEERING:				
Steering stem lock nut	1	26	74 (7.5, 54)	
Steering stem adjustment nut	1	26	4 (0.4, 29)	(page 14-24)
Handle post pinch bolt	1	12	88 (9.0, 65)	NOTE 4
Front brake disc bolt	4	8	42 (4.3, 31)	NOTE 4
Speedometer cable setting screw	1	5	2 (0.2, 1.4)	
Front axle nut	1	12	69 (7.0, 51)	
REAR WHEEL/SUSPENSION:				
Rear axle nut	1	16	118 (12.0, 87)	
Rear suspension mounting bolt	2	10	39 (4.0, 29)	
BRAKE SYSTEM:				
Brake hose oil bolt	7	10	34 (3.5, 25)	
Brake pipe flare nut	4	10	17 (1.7, 12)	
Caliper mounting bolt	2	8	31 (3.2, 23)	NOTE 4
Caliper assembly bolt	3	8	32 (3.3, 24)	NOTE 4
Caliper pad pin	1	10	18 (1.8, 13)	
Pad pin plug	1	10	3 (0.3, 2.2)	
Caliper pin bolt	1	8	23 (2.3, 17)	NOTE 2
Caliper bracket pin bolt	1	8	13 (1.3, 9)	NOTE 2
Thrust cylinder mounting bolt	2	8	26 (2.7, 20)	NOTE 4
Bleed valve	3	8	6 (0.6, 4.3)	
Brake lever pivot bolt	1	6	6 (0.6, 4.3)	
nut	1	6	6 (0.6, 4.3)	
Brake switch screw	3	4	1 (0.1, 0.7)	
Master cylinder reservoir cap screw	4	4	2 (0.2, 1.4)	
Master cylinder holder bolt	4	6	12 (1.2, 9)	
Rear brake arm bolt	1	8	22 (2.2, 16)	NOTE 4
LIGHTS/METERS/SWITCHES:				
Side stand switch bolt	1	6	10 (1.0, 7)	
OTHERS:				
Side stand pivot bolt	1	10	10 (1.0, 7)	
nut	1	10	29 (3.0, 22)	
Center stand pivot bolt	2	10	39 (4.0, 29)	NOTE 4

TOOLS

NOTES: 1. Newly designed tool.
2. Alternative tool.

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Carburetor float level gauge	07401 – 0010000		5
Universal bearing puller	07631 – 0010000		11
Universal holder	07725 – 0030000		6, 10
Flywheel holder	07725 – 0040000		10, 12
Flywheel puller	07733 – KM10000		12
Attachment, 32 x 35 mm	07746 – 0010100		14
Attachment, 42 x 47 mm	07746 – 0010300		11, 15
Attachment, 52 x 55 mm	07746 – 0010400		11
Attachment, 22 x 24 mm	07746 – 0010800	NOTE 1	11
Driver, 40 mm I.D.	07746 – 0030100		6
Attachment, 35 mm I.D.	07746 – 0030400		6, 14
Pilot, 12 mm	07746 – 0040200		14
Pilot, 15 mm	07746 – 0040300		11
Pilot, 17 mm	07746 – 0040400		15
Pilot, 20 mm	07746 – 0040500		11
Pilot, 25 mm	07746 – 0040600		11
Pilot, 22 mm	07746 – 0041000		11
Pilot, 14 mm	07746 – 0041200	NOTE 1	11
Bearing remover shaft	07746 – 0050100		14
Bearing remover head, 12 mm	07746 – 0050300		14
Fork seal driver weight	07747 – 0010100		14
Fork seal driver attachment	07747 – 0010501		14
Driver	07749 – 0010000		6, 11, 14, 15
Valve spring compressor	07757 – 0010000		8
Spring compressor attachment	07959 – KM30101		8
Valve seat cutter, 29 mm (45° IN/EX)	07780 – 0010300		8
Valve seat cutter, 33 mm (32° IN)	07780 – 0012900		8
Valve seat cutter, 28 mm (32° EX)	07780 – 0012100		8
Valve seat cutter, 30 mm (60° IN/EX)	07780 – 0014000		8
Valve seat cutter holder	07781 – 0010400		8
Snap ring pliers	07914 – SA50001		16
Steering stem socket	07916 – 3710101		14
Lock nut wrench	07916 – KM10000		14
Bearing remover set, 20 mm	07936 – 3710001		11
— remover handle	07936 – 3710100		
— bearing remover, 20 mm	07936 – 3710600		
— remover weight	07741 – 0010201		
Bearing remover set, 15 mm	07936 – KC10000		6, 11
— remover shaft	07936 – KC10100		
— bearing remover, 15 mm	07936 – KC10200		
— remover weight	07741 – 0010201		
Valve guide driver, 5 mm	07942 – MA60000		8
Ball race driver attachment	07945 – 3330300		14
Mechanical seal driver attachment	07945 – 4150400		6
Attachment, 28 x 30 mm	07946 – 1870100		6, 14
Oil seal driver	07947 – SB00200		14
Oil seal remover	07948 – 4630100		14
Driver attachment handle	07949 – 3710101		14
Assembly bolt	07965 – 1660200		11
Valve guide reamer	07984 – MA60001		8
Assembly collar	07LMF – KAB0110		11
Socket wrench, 39 x 41 mm	07GMA – KS40100		10
Ball race remover	07GMD – KS40100		14

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Peak voltage adaptor	07HGJ – 0020100	NOTE 2: Imrie diagnostic tester (model 625)	18
Lock nut wrench	07KMA – KAB0100		7
Clutch spring compressor	07LME – GZ40200		10
Bearing remover, 14 mm	07WMC – KFG0100	NOTE 1	11
Bearing remover shaft	07936 – KC10100		11
Bearing remover weight	07741 – 0010201		11

LUBRICATION & SEAL POINTS

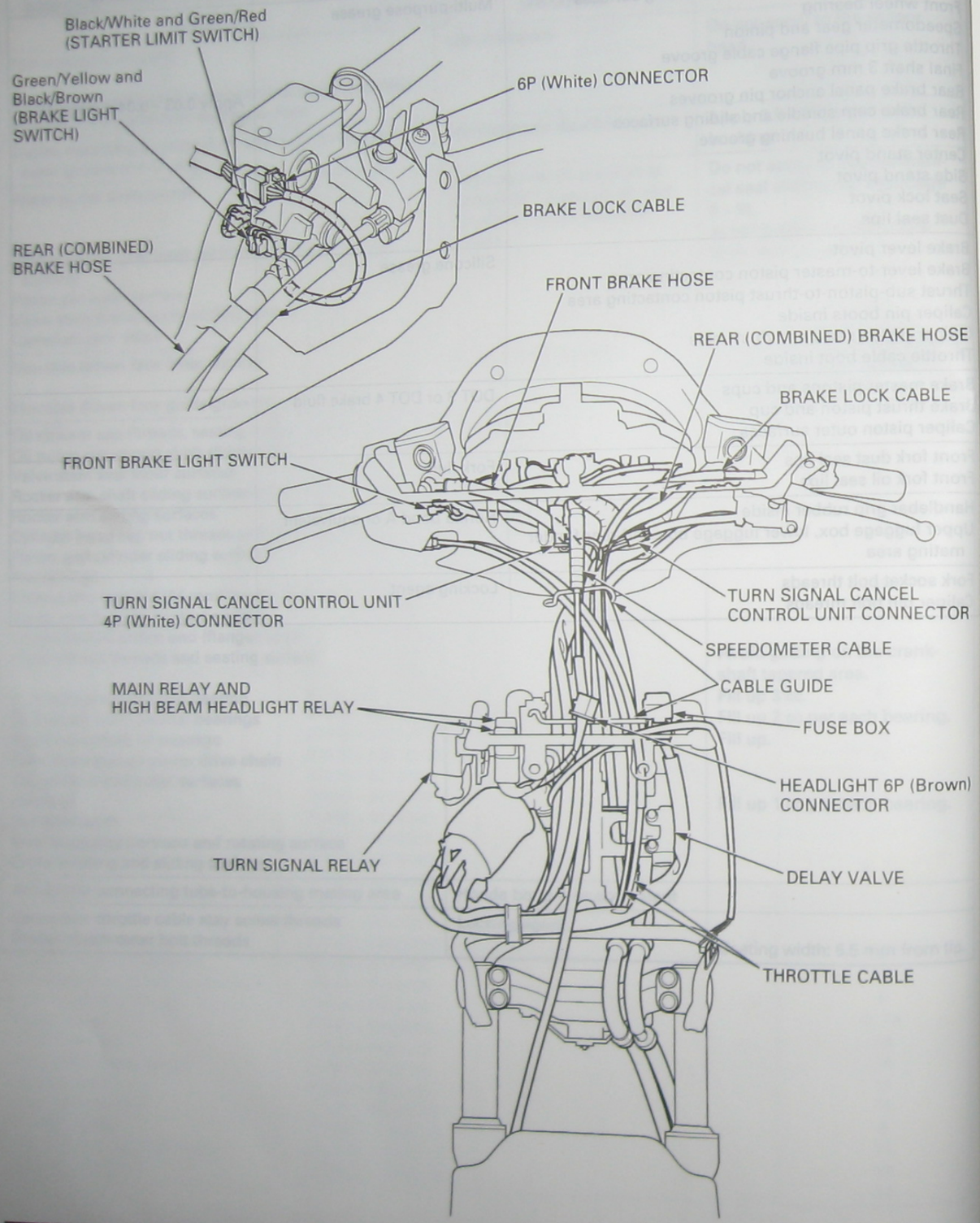
ENGINE

LOCATION	MATERIAL	REMARKS
Thermosensor threads	Liquid sealant	Do not apply to the sensor head.
Ignition pulse generator wire grommet seating surface Alternator wire grommet seating surface	Molybdenum disulfide paste	Apply 0.5 – 0.7 g per each bushing.
Engine mounting bushing (Left and right crankcase) outer groove and O-ring		
Water pump shaft journal Starter driven gear inner surface (crankshaft sliding surface) Piston pin outer surface Valve stem (valve guide sliding surface) Camshaft cam lobes	Molybdenum oil solution (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	Do not apply to the mechanical seal sliding surface (page 6 – 9). Avoid getting on the crankshaft tapered area.
Movable driven face inner surface Movable driven face guide grooves (guide pins)	Multi-purpose grease	Apply 11 – 13 g. Avoid getting on the drive shaft spline. Fill up 4 – 5 g in all.
Oil strainer cap threads, seating surface and O-ring Oil pump rotors and shaft sliding surfaces Valve stem seal inner surfaces Rocker arm shaft sliding surface and O-ring Rocker arm sliding surfaces Cylinder head cap nut threads and seating surfaces Piston and cylinder sliding surfaces Piston rings Drive pulley face nut (14 mm) threads and seating surface Sprag clutch outer contact surface Crankshaft oil orifice end (flanged side) Flywheel nut threads and seating surface Connecting rod big end bearing Crankshaft main journal bearings Right crankshaft oil passage Cam chain and oil pump drive chain Oil seal lips and outer surfaces Bearings Sprocket teeth Gear engaging portions and rotating surface Other rotating and sliding surface	Engine oil	Avoid getting on the crankshaft tapered area. Fill up 3 cc. Fill up 2 cc per each bearing. Fill up. Fill up 1 cc per each bearing.
Air cleaner connecting tube-to-housing mating area	Honda bond A or equivalent	
Carburetor throttle cable stay screw threads Starter clutch outer bolt threads	Locking agent	Coating width: 6.5 mm from tip.

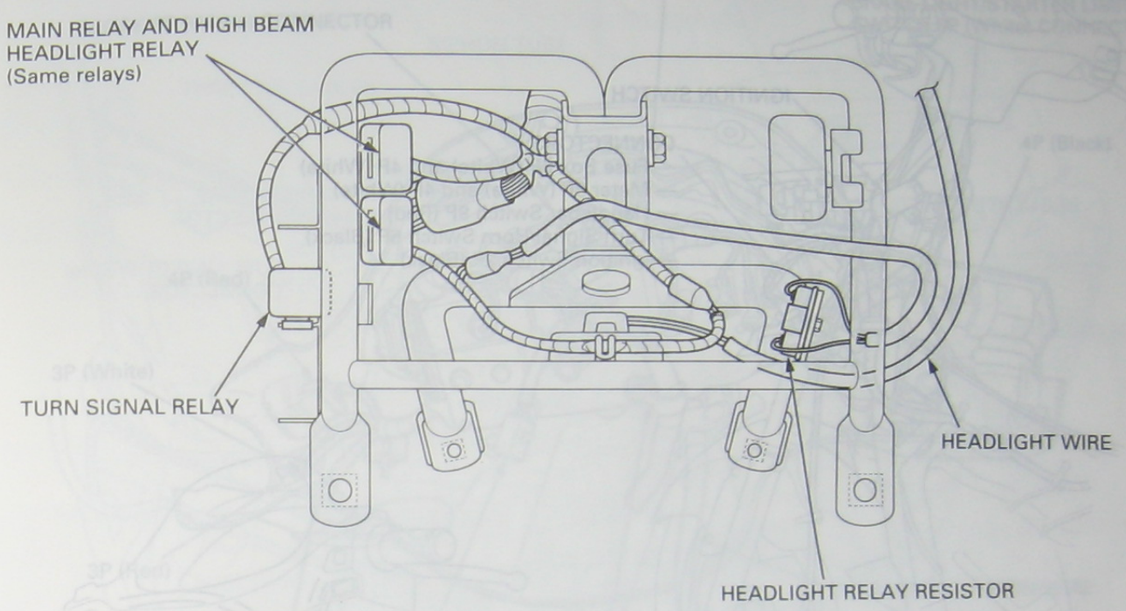
FRAME

LOCATION	MATERIAL	REMARKS
Steering head bearings and race sliding surfaces Front wheel bearing Speedometer gear and pinion Throttle grip pipe flange cable groove Final shaft 3 mm groove Rear brake panel anchor pin grooves Rear brake cam spindle and sliding surfaces Rear brake panel bushing groove Center stand pivot Side stand pivot Seat lock pivot Dust seal lips	Multi-purpose grease	Apply 0.03 – 0.04 g (page 15-5).
Brake lever pivot Brake lever-to-master piston contacting area Thrust sub-piston-to-thrust piston contacting area Caliper pin boots inside Caliper piston seals and dust seals Throttle cable boot inside	Silicone grease	
Brake master pistons and cups Brake thrust piston and cup Caliper piston outer surfaces	DOT 3 or DOT 4 brake fluid	
Front fork dust seal lips Front fork oil seal lips	Fork fluid	
Handlebar grip rubber inside Upper luggage box, lower luggage box and rear fender mating area	Honda bond A or equivalent	
Fork socket bolt threads Caliper pin bolt threads	Locking agent	

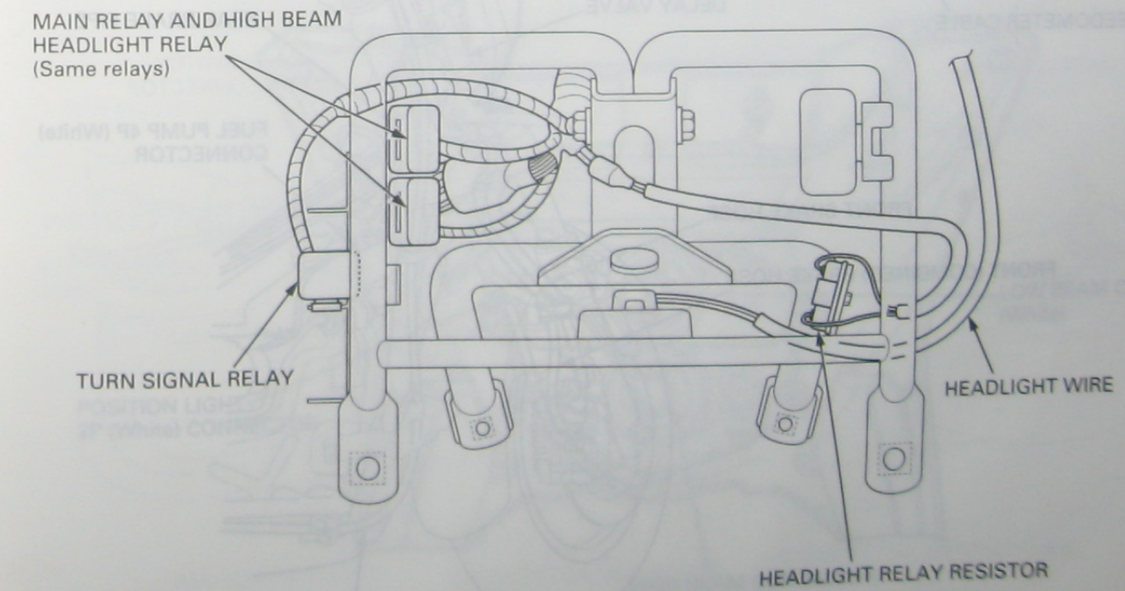
CABLE & HARNESS ROUTING

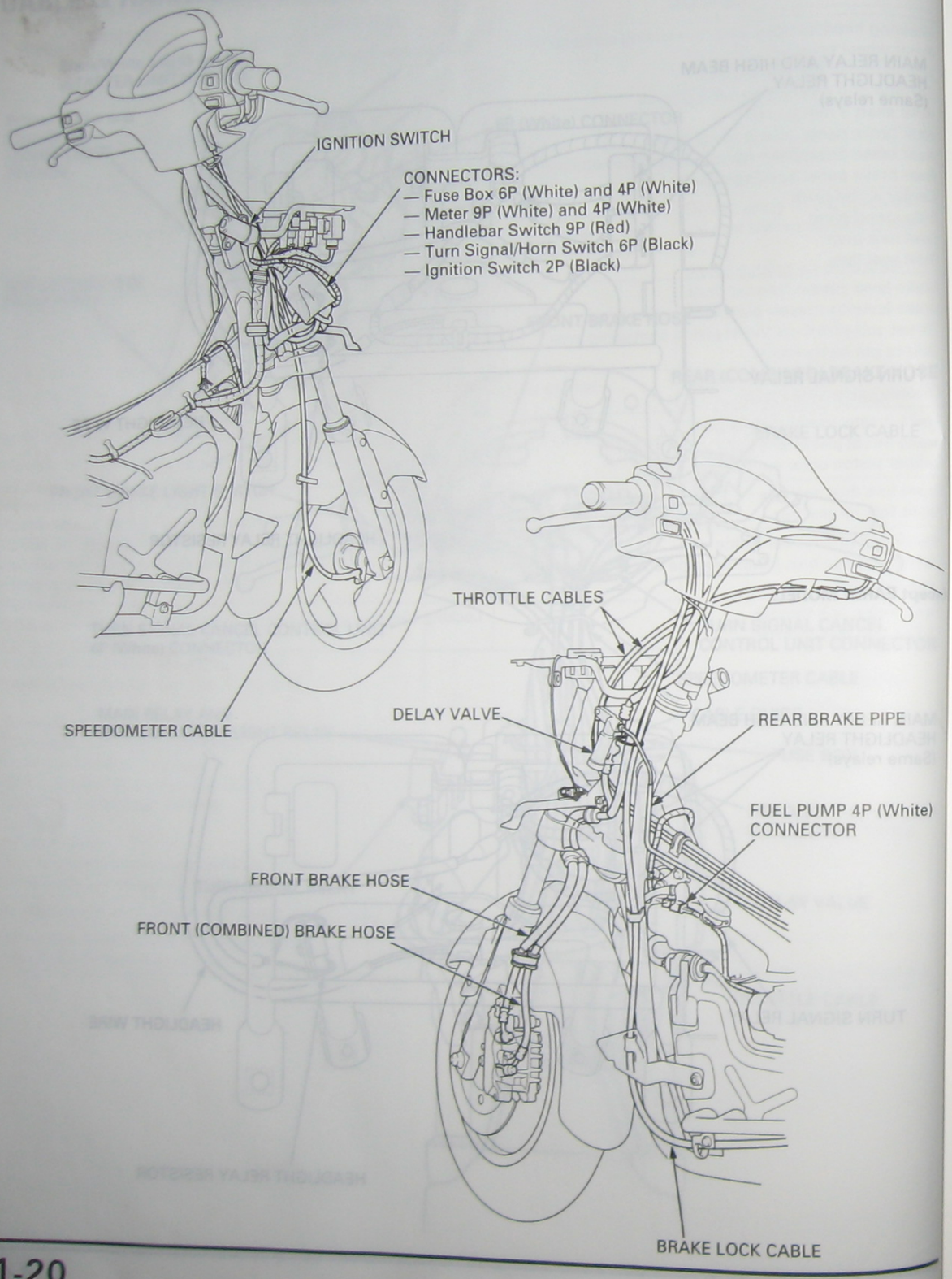


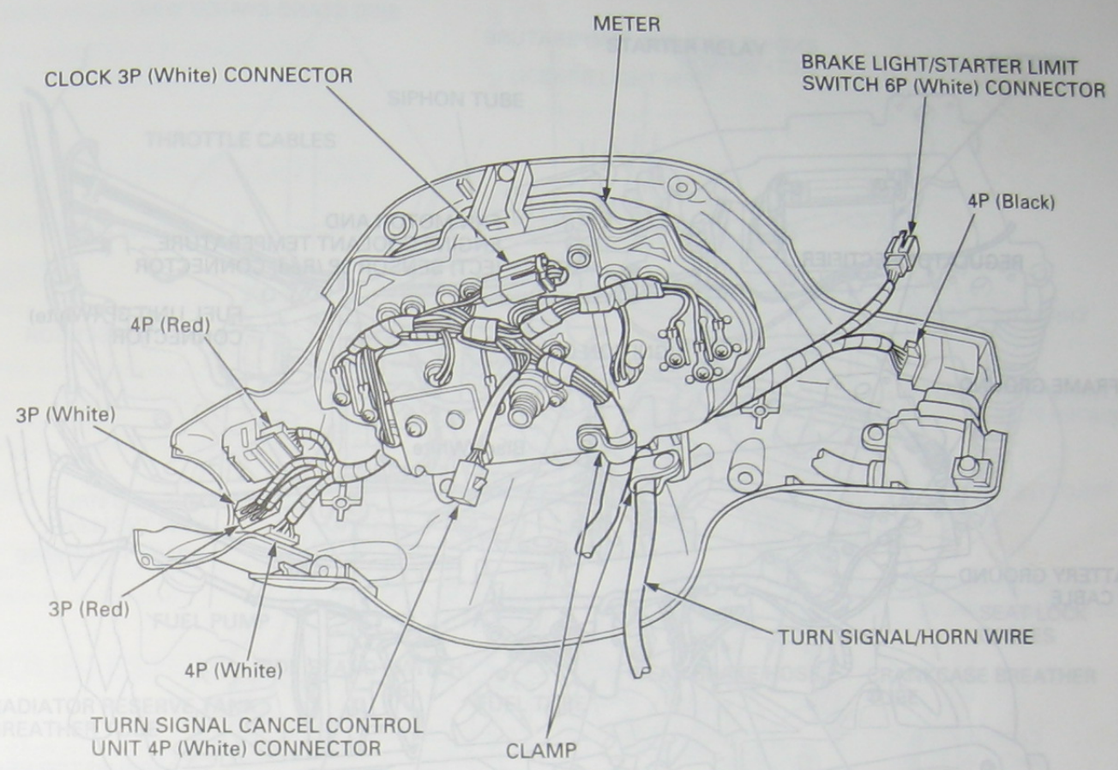
EARLY MODEL:

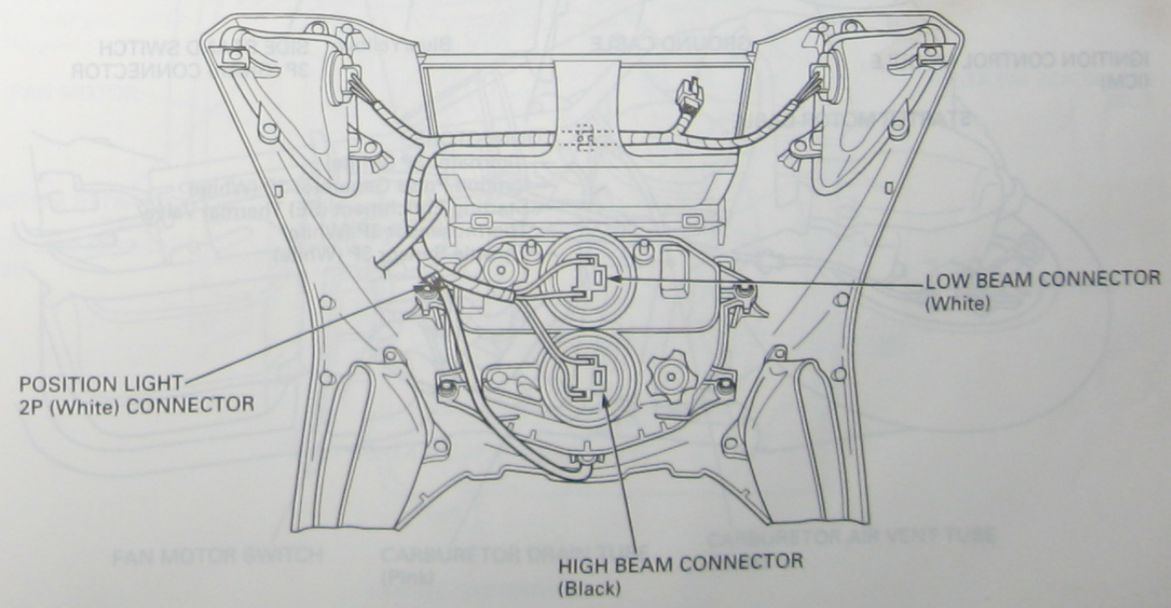


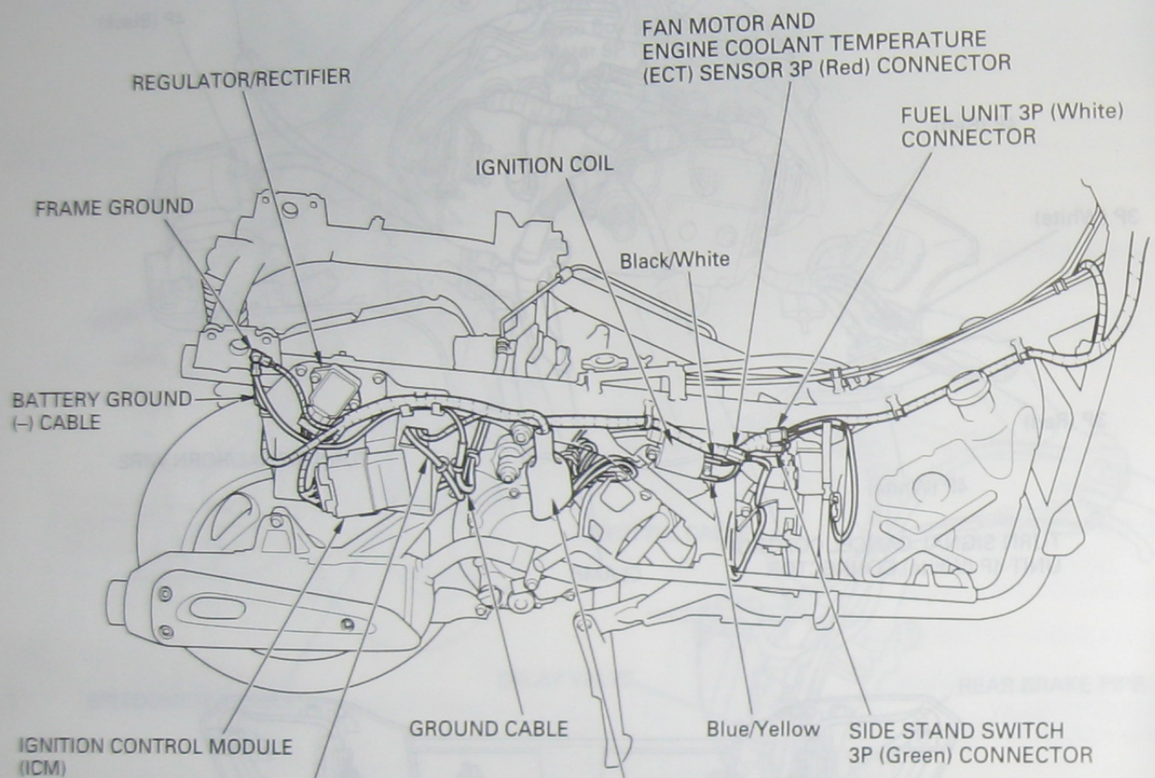
Except EARLY MODEL:



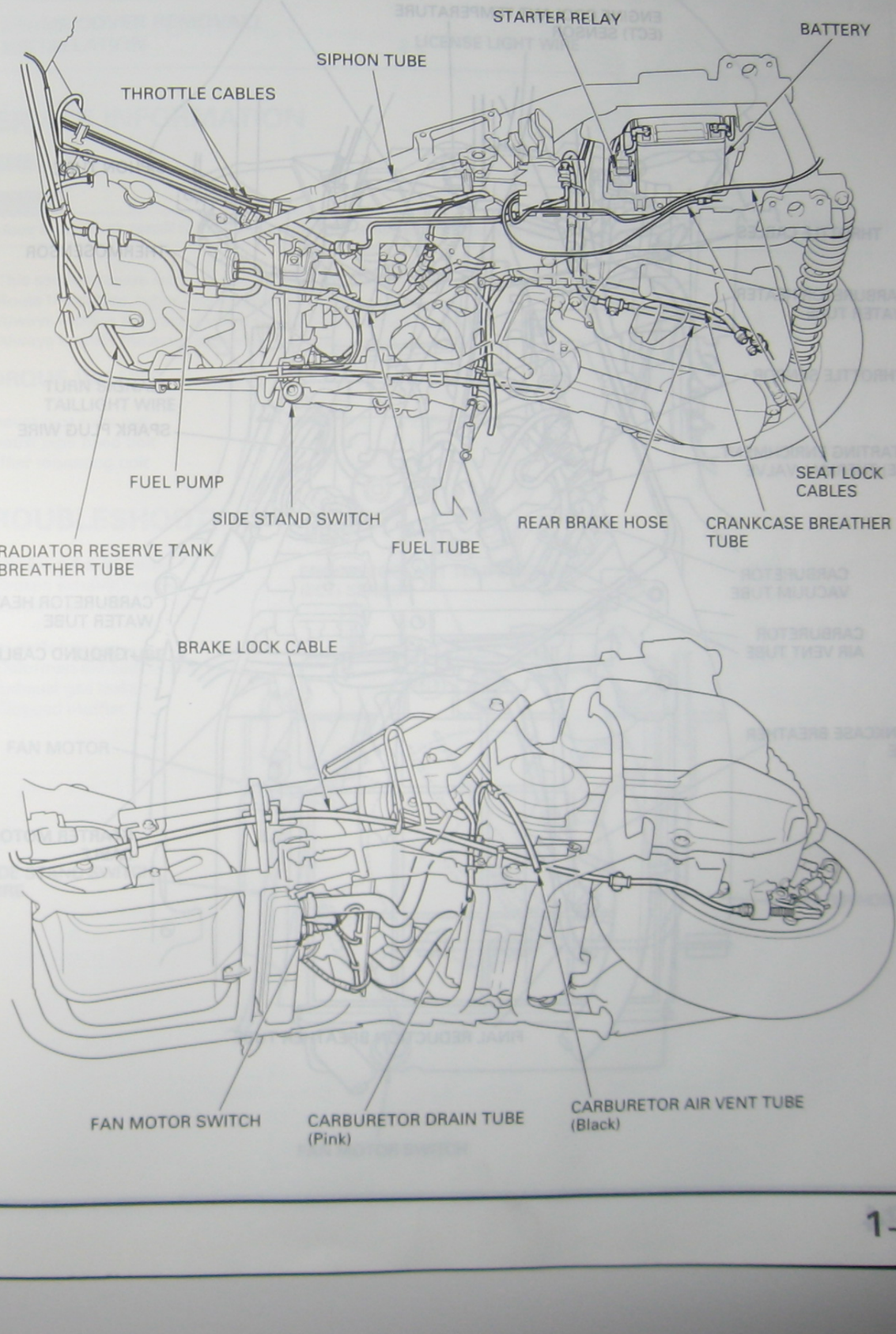

IGNITION SWITCH
CONNECTORS:
— Fuse Box 6P (White) and 4P (White)
— Meter 9P (White) and 4P (White)
— Handlebar Switch 9P (Red)
— Turn Signal/Horn Switch 6P (Black)
— Ignition Switch 2P (Black)
THROTTLE CABLES
SPEEDOMETER CABLE
DELAY VALVE
REAR BRAKE PIPE
FUEL PUMP 4P (White) CONNECTOR
FRONT BRAKE HOSE
FRONT (COMBINED) BRAKE HOSE
BRAKE LOCK CABLE

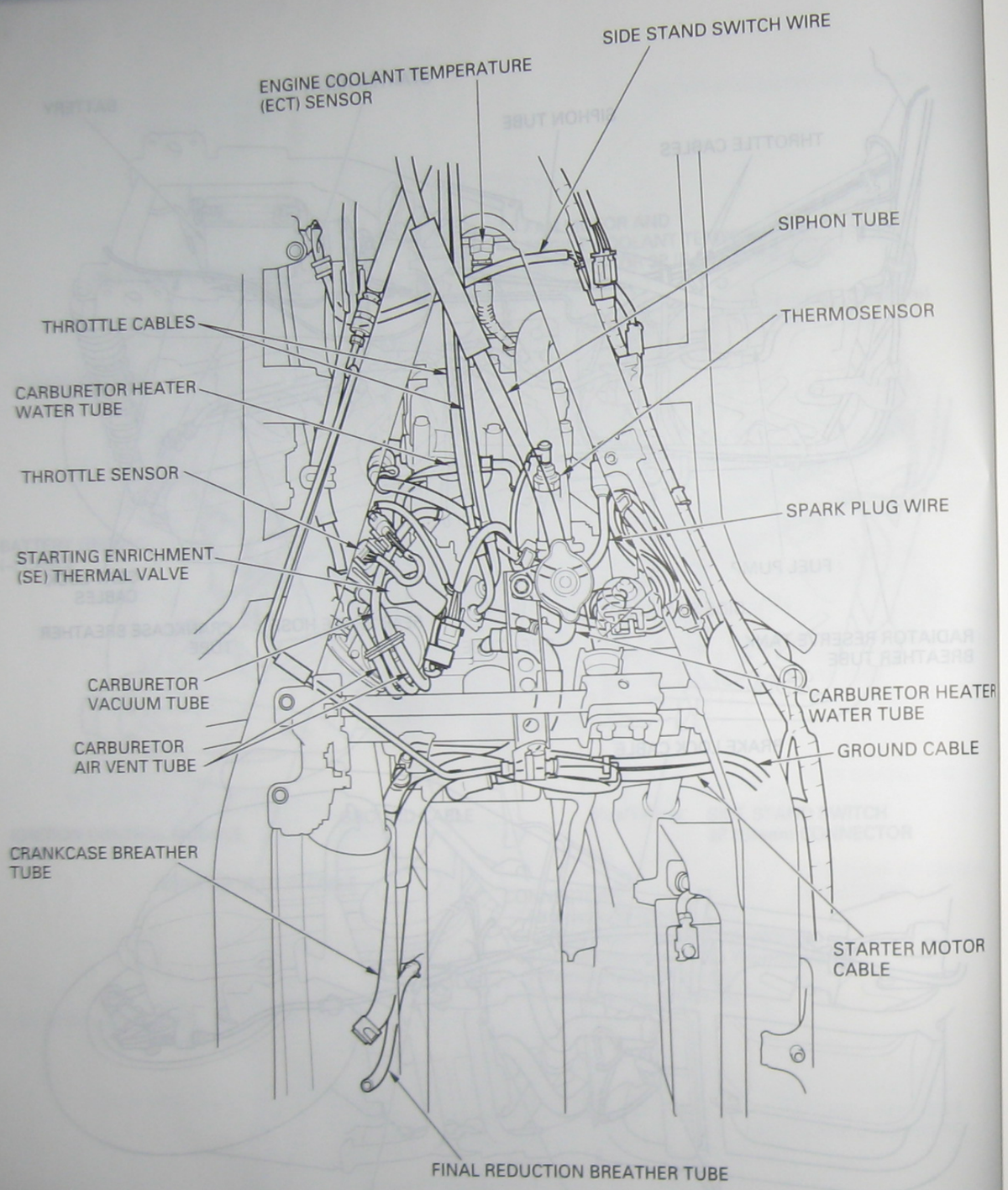

METER
CLOCK 3P (White) CONNECTOR
BRAKE LIGHT/STARTER LIMIT SWITCH 6P (White) CONNECTOR
4P (Black)
4P (Red)
3P (White)
3P (Red)
4P (White)
TURN SIGNAL/HORN WIRE
TURN SIGNAL CANCEL CONTROL UNIT 4P (White) CONNECTOR
CLAMP

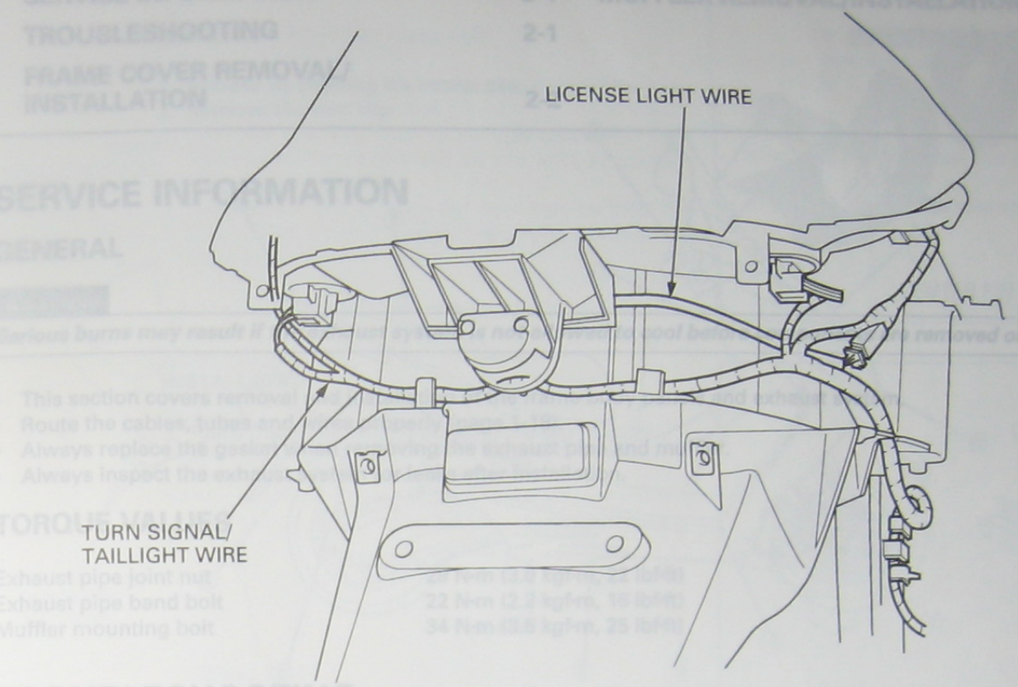

LOW BEAM CONNECTOR (White)
POSITION LIGHT 2P (White) CONNECTOR
HIGH BEAM CONNECTOR (Black)

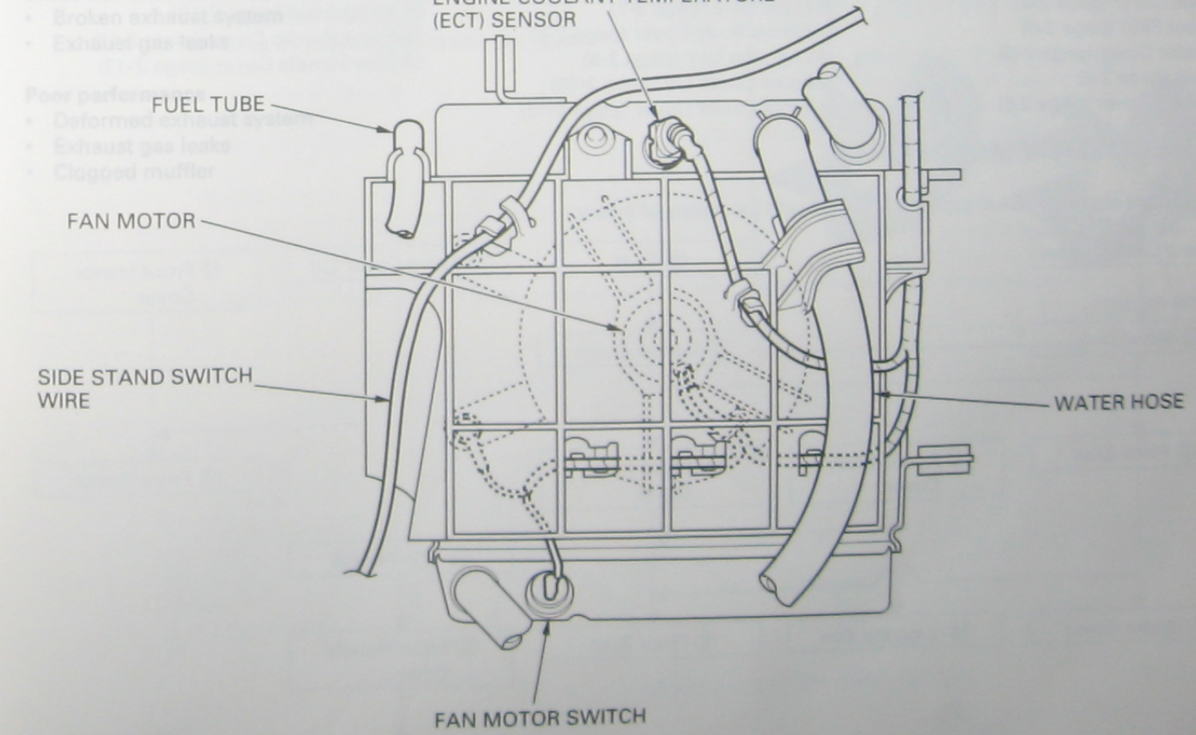


CONNECTORS:
— Alternator 3P (White)
— Ignition Pulse Generator 2P (White)
— Starting Enrichment (SE) Thermal Valve/ Thermosensor 3P (White)
— Throttle Sensor 3P (White)




SIDE STAND SWITCH WIRE
ENGINE COOLANT TEMPERATURE (ECT) SENSOR
SIPHON TUBE
THERMOSENSOR
THROTTLE CABLES
CARBURETOR HEATER WATER TUBE
THROTTLE SENSOR
SPARK PLUG WIRE
STARTING ENRICHMENT (SE) THERMAL VALVE
CARBURETOR VACUUM TUBE
CARBURETOR AIR VENT TUBE
CARBURETOR HEATER WATER TUBE
GROUND CABLE
CRANKCASE BREATHER TUBE
STARTER MOTOR CABLE
FINAL REDUCTION BREATHER TUBE


LICENSE LIGHT WIRE
TURN SIGNAL/ TAILLIGHT WIRE


ENGINE COOLANT TEMPERATURE (ECT) SENSOR
FUEL TUBE
FAN MOTOR
SIDE STAND SWITCH WIRE
WATER HOSE
FAN MOTOR SWITCH

MEMO

2. FRAME/BODY PANELS/EXHAUST SYSTEM

SERVICE INFORMATION

GENERAL

⚠ WARNING

Serious burns may result if the exhaust system is not allowed to cool before components are removed or service.

- This section covers removal and installation of the frame body panels and exhaust system.
- Route the cables, tubes and wires properly (page 1-18).
- Always replace the gasket when removing the exhaust pipe and muffler.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

Exhaust pipe joint nut	29 N·m (3.0 kgf·m, 22 lbf·ft)
Exhaust pipe band bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Muffler mounting bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)

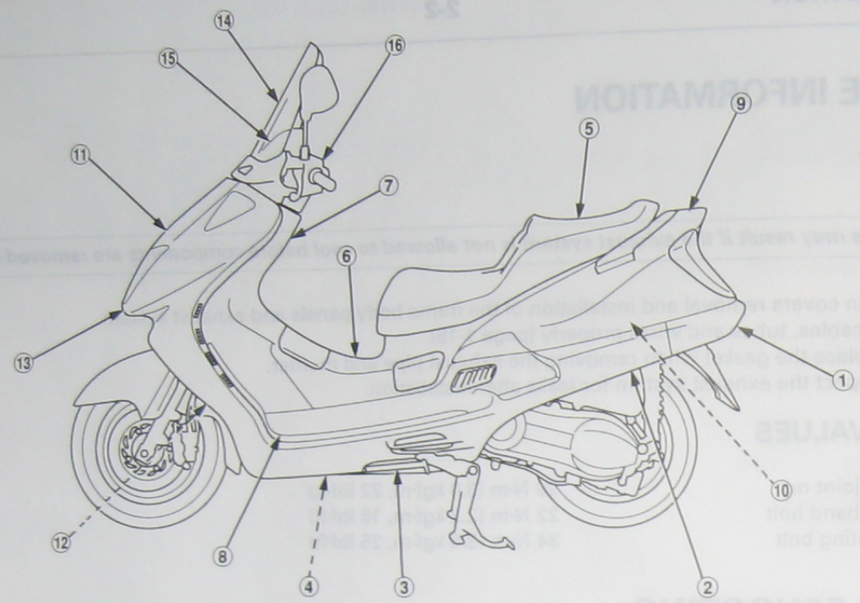
TROUBLESHOOTING

Excessive exhaust noise
- Broken exhaust system
- Exhaust gas leaks

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

FRAME COVER REMOVAL/INSTALLATION

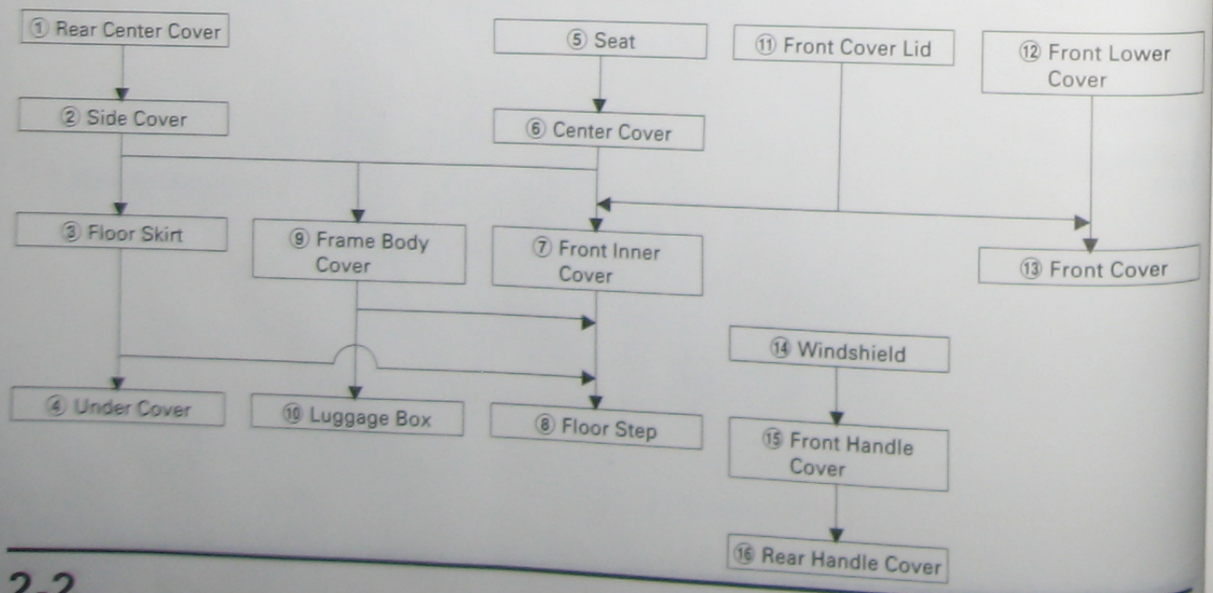
FRAME COVER LOCATIONS



① Rear Center Cover (page 2-4)
② Side Cover (page 2-4)
③ Floor Skirt (page 2-5)
④ Under Cover (page 2-5)
⑤ Seat (page 2-6)
⑥ Center Cover (page 2-6)
⑦ Front Inner Cover (page 2-7)
⑧ Floor Step (page 2-7)
⑨ Frame Body Cover (page 2-8)
⑩ Luggage Box (page 2-9)
⑪ Front Cover Lid (page 2-10)
⑫ Front Lower Cover (page 2-11)
⑬ Front Cover (page 2-11)
⑭ Windshield (page 2-12)
⑮ Front Handle Cover (page 2-12)
⑯ Rear Handle Cover (page 2-13)

FRAME COVER REMOVAL CHART

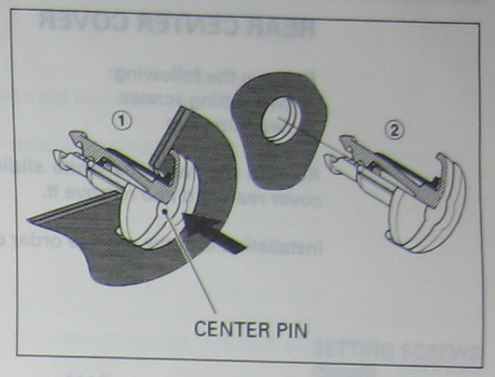
- This chart shows removal order of frame covers by means of arrow.



TRIM CLIP REMOVAL/INSTALLATION

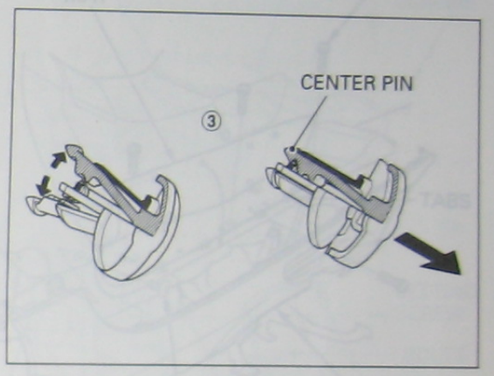
REMOVAL

1. Release by pushing the center pin.
2. Remove the trim clip.

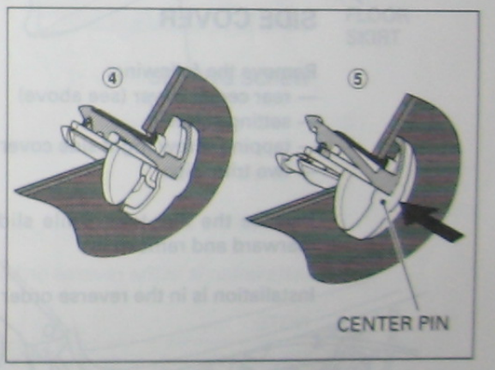


INSTALLATION

3. Raise the center pin by pushing the pin tip back.



4. Install the trim clip.
5. Lock by pushing the center pin flush.

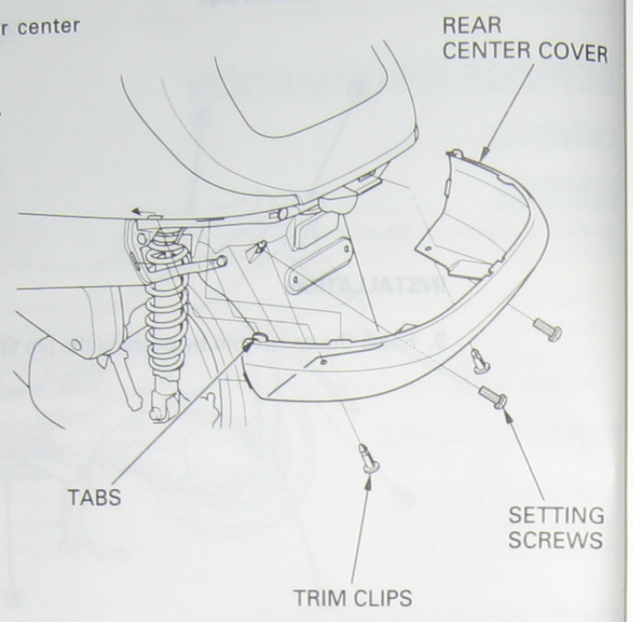


REAR CENTER COVER

Remove the following:
— two setting screws
— two trim clips

Release the two tabs while sliding the rear center cover rearward and remove it.

Installation is in the reverse order of removal.

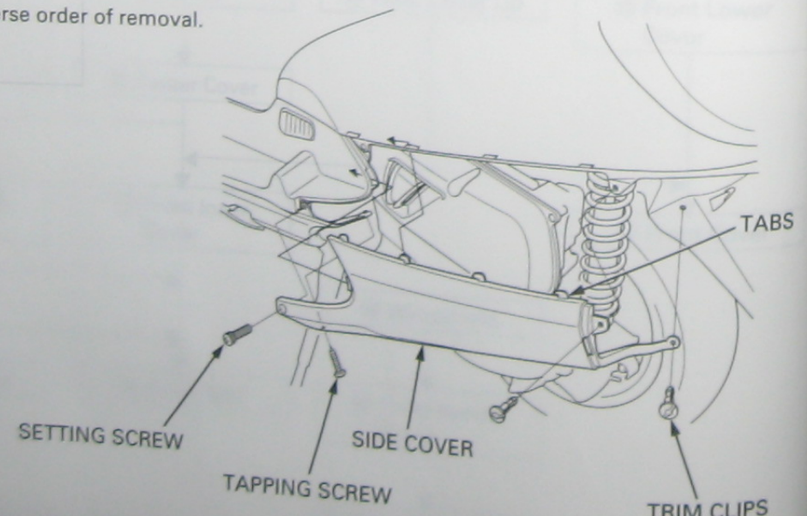


SIDE COVER

Remove the following:
— rear center cover (see above)
— setting screw
— tapping screw (right side cover only)
— two trim clips

Release the five tabs while sliding the side cover rearward and remove it.

Installation is in the reverse order of removal.



FLOOR SKIRT

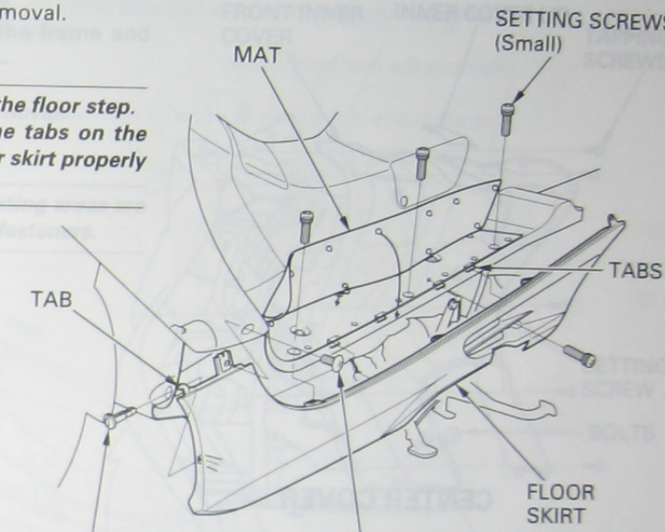
Remove the side cover (page 2-4).

1. Release the bosses on the reverse side of the mat and remove the floor mat.
2. Remove the five setting screws and trim clip. Release the front end tab on the skirt by sliding the skirt rearward.
3. Release the four tabs on the floor step by pushing them inward using a screwdriver and remove the floor skirt.

Installation is in the reverse order of removal.

CAUTION:

- ***Be careful not to break the tabs on the floor step.***
- ***When installing, make sure that the tabs on the floor step are attached onto the floor skirt properly before tightening the screws.***

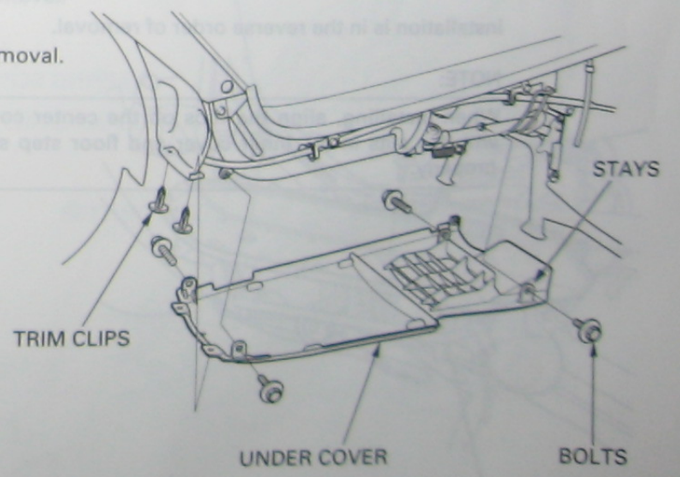


UNDER COVER

Remove the following:
— side covers (see above)
— four bolts
— two trim clips

Release the stays of the under cover by pulling out them outward from the bolt hole studs and remove the under cover.

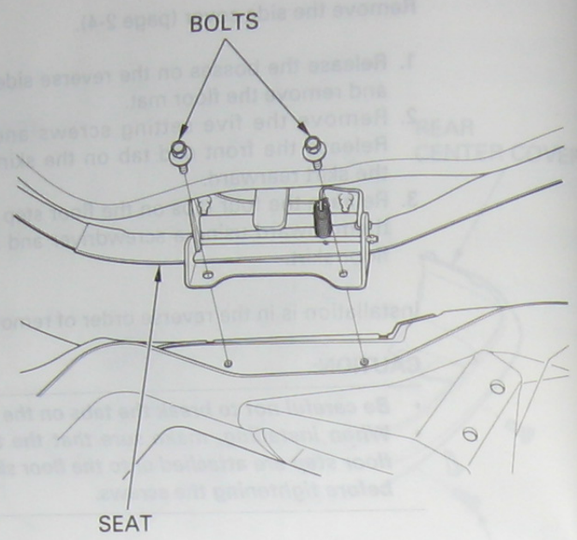
Installation is in the reverse order of removal.



SEAT

Open the seat.
Remove the two bolts and the seat.

Installation is in the reverse order of removal.



CENTER COVER

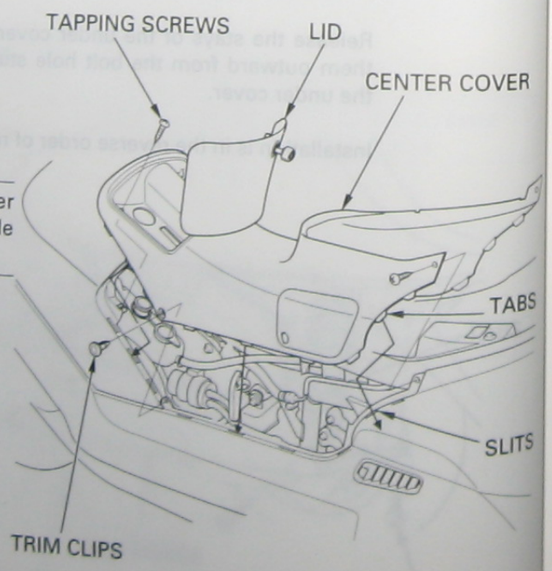
Remove the following:
— seat (see above)
— four tapping screws
(open the fuel/reserve tank lid)
— two trim clips

Remove the center cover.

Installation is in the reverse order of removal.

NOTE:

When installing, align the tabs on the center cover with the slits in the inner cover and floor step side properly.



FRONT INNER COVER

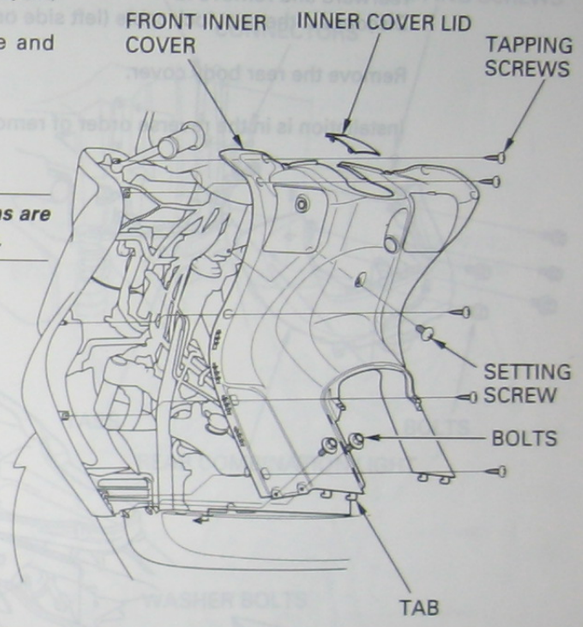
Remove the following:
— center cover (page 2-6)
— front cover lid (page 2-10)
— inner cover lid
— four bolts
— setting screw
— ten tapping screws

1. Release the four tabs from the floor steps by sliding the lower portion of the inner cover.
2. Pull the inner cover back out of the handle post while opening the upper portion of it.
   Slide the front inner cover along the frame and remove it.

Installation is in the reverse order of removal.

CAUTION:

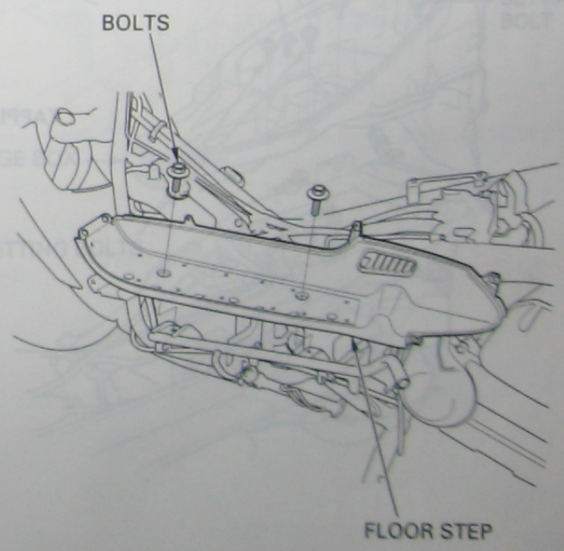
When installing, make sure that the mating areas are aligned properly before tightening the fasteners.



FLOOR STEP

Remove the following:
— floor skirt (page 2-5)
— front inner cover (see above)
— frame body cover (page 2-8)
— two bolts
— floor step

Installation is in the reverse order of removal.



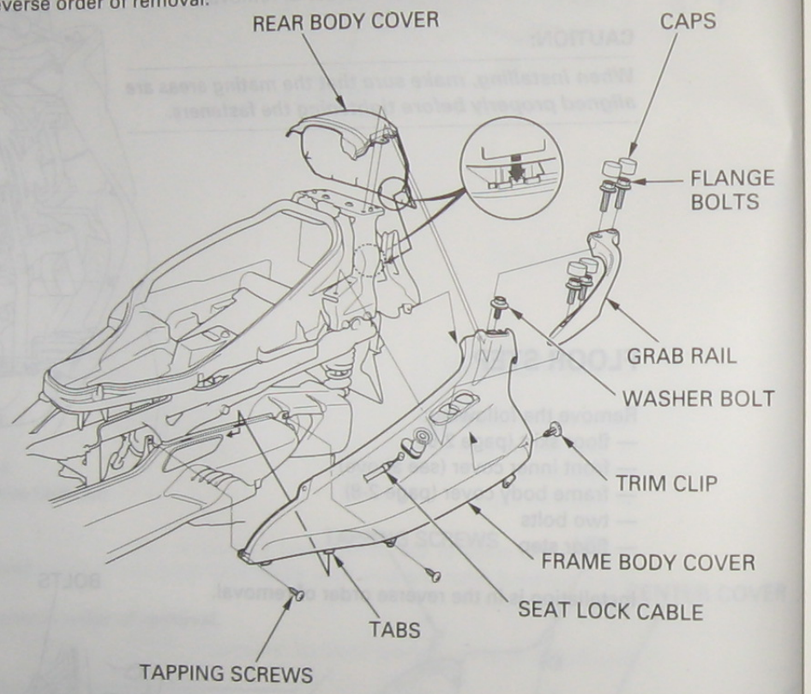
FRAME BODY COVER

Remove the following:
— side covers (page 2-4)
— center cover (page 2-6)
— four bolt caps and bolts
— grab rail
— washer bolt
— two tapping screws
— trim clip

Release the two tabs by sliding the frame body cover rearward and remove it.
Disconnect the seat lock cable (left side only).

Remove the rear body cover.

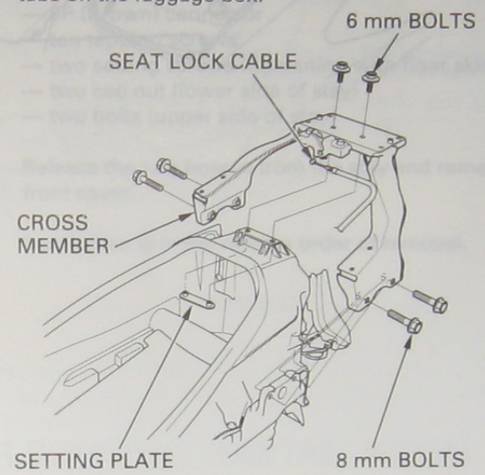
Installation is in the reverse order of removal.

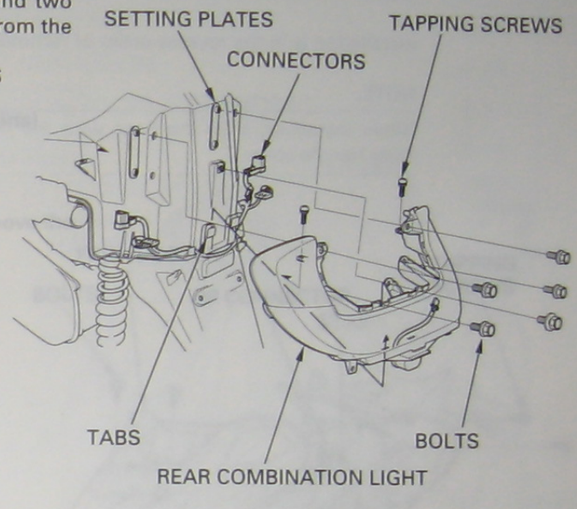


LUGGAGE BOX

Remove the following:
— frame body cover (page 2-8)
— battery cover (page 17-5)
— two 6 mm bolts and setting plate
— four 8 mm bolts
— frame cross member
— five connectors

If the rear combination light removal is necessary, remove the two tapping screws, five bolts and two setting plates and the rear combination light from the tabs on the luggage box.

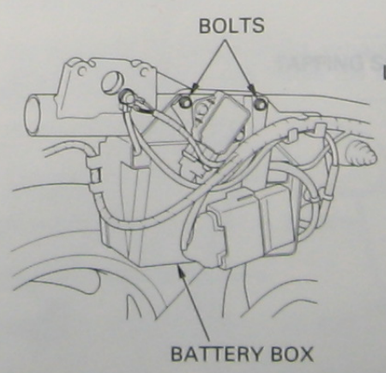


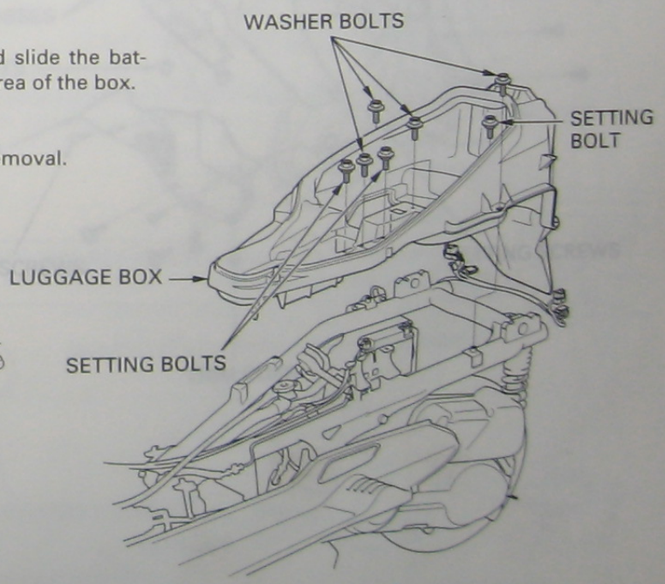


— three setting bolts
— four washer bolts

Loosen the two battery box bolts and slide the battery box outward to release the joint area of the box. Remove the luggage box.

Installation is in the reverse order of removal.

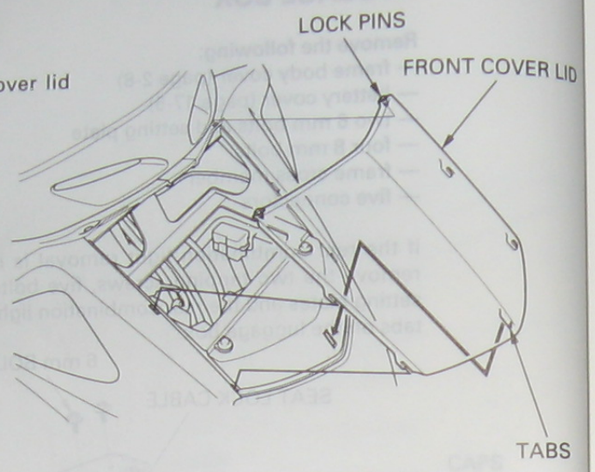




FRONT COVER LID

Release the lock pin by pulling the center pin.
Release the five tabs by sliding the front cover lid upward and remove it.

Installation is in the reverse order of removal.



FRONT LOWER COVER

Remove the following:
— two tapping screws
— four trim clips
— front lower cover

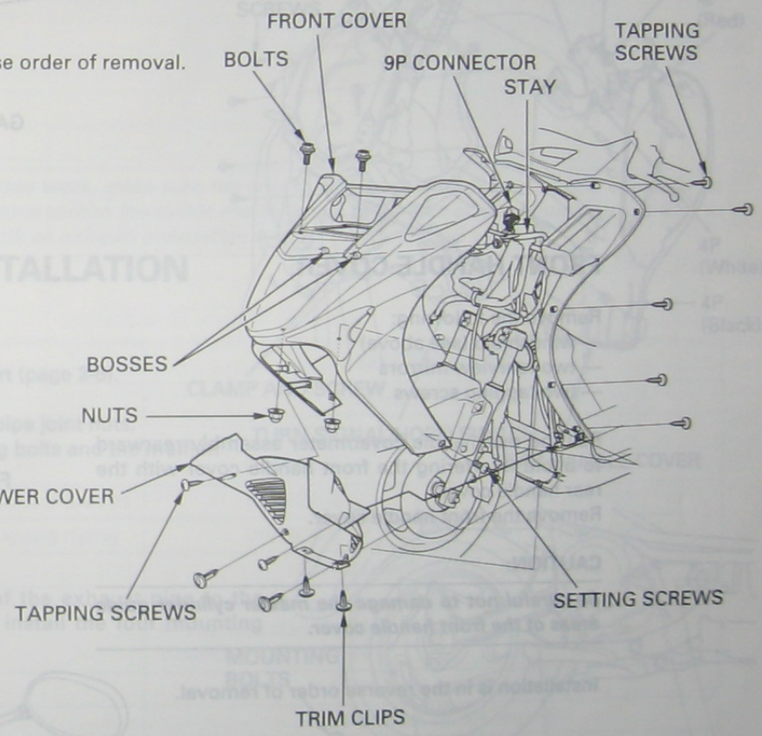
Installation is in the reverse order of removal.

FRONT COVER

Remove the following:
— front cover lid (page 2-10)
— front lower cover (see above)
— 9P (Brown) connector
— ten tapping screws
— two setting screws (tightening with floor skirts)
— two cap nut (lower side of stay)
— two bolts (upper side of stay)

Release the two bosses from the stay and remove the front cover.

Installation is in the reverse order of removal.



WINDSHIELD

Remove the following:
— four tapping screws
— shield garnish
— four socket bolts
— washer bolt
— windshield

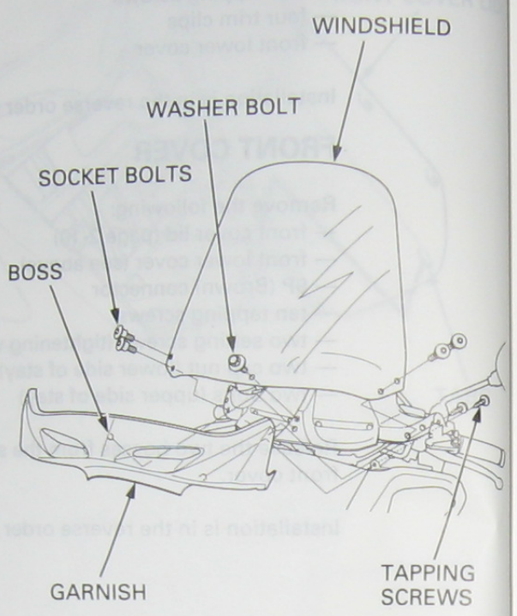
CAUTION:

Be careful not to scratch the shield surface.

Installation is in the reverse order of removal.

NOTE:

When installing, align the boss with the hole in the front handle cover.



FRONT HANDLE COVER

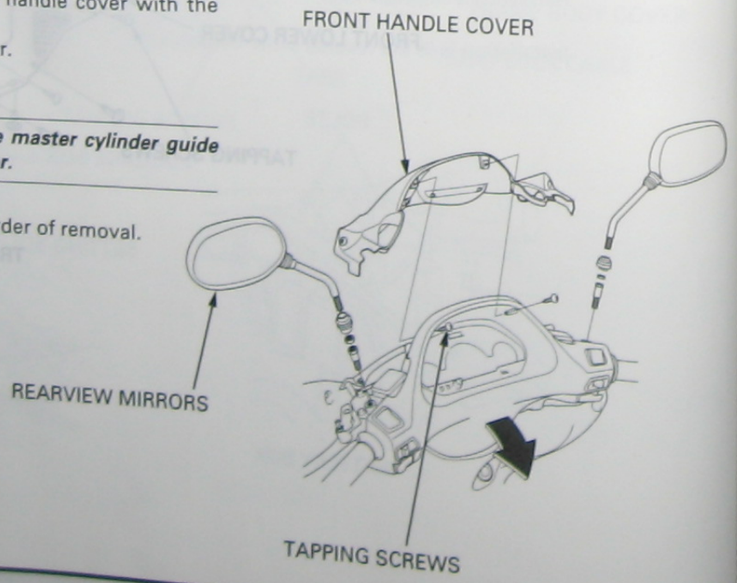
Remove the following:
— windshield (see above)
— two rearview mirrors
— two tapping screws

Pull the rear handle cover/meter assembly rearward to avoid interfering the front handle cover with the rear handle cover.
Remove the front handle cover.

CAUTION:

Be careful not to damage the master cylinder guide areas of the front handle cover.

Installation is in the reverse order of removal.



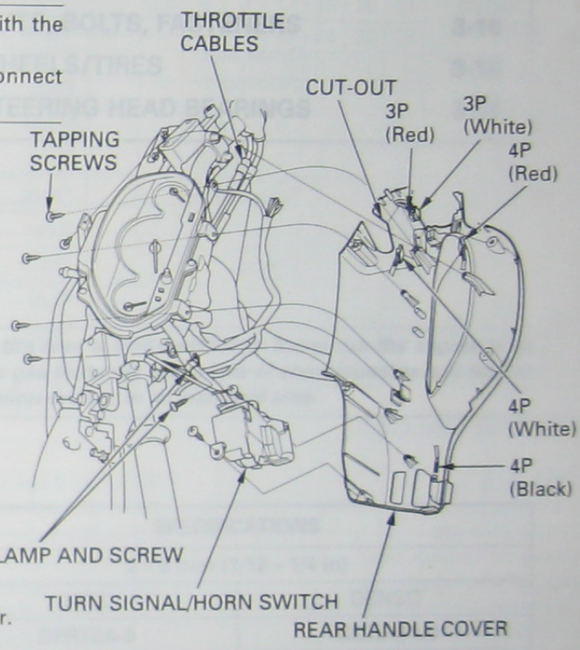
REAR HANDLE COVER

Remove the following:
— front handle cover (page 2-12)
— three tapping screws (installing to meter)
— two tapping screws (installing to handlebar)
— tapping screw, clamp and turn signal/horn switch wire
— two tapping screws and turn signal/horn switch
— five connectors
— rear handle cover

Installation is in the reverse order of removal.

NOTE:

- When installing, align the throttle cables with the cut-out in the rear handle cover.
- Route the wire harnesses properly and connect the connectors securely (page 1-18).



MUFFLER REMOVAL/INSTALLATION

REMOVAL

Remove the right floor skirt (page 2-5).

Remove the two exhaust pipe joint nuts.
Remove the four mounting bolts and the muffler.

INSTALLATION

Install a new gasket.

Set the exhaust flange of the exhaust pipe to the cylinder head studs and install the four mounting bolts.
Install the two joint nuts.

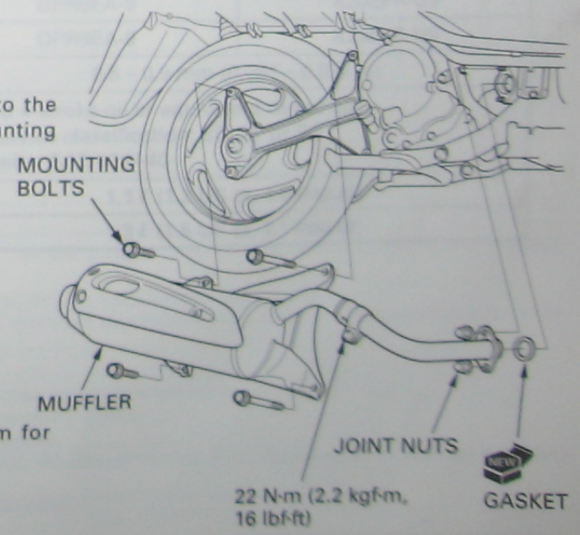
Tighten the joint nuts first.

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)

Tighten the mounting bolts.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

After installation, inspect the exhaust system for leaks.



MEMO

3. MAINTENANCE

SERVICE INFORMATION

GENERAL

⚠ WARNING

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

SPECIFICATIONS

ITEM		SPECIFICATIONS	
Throttle grip free play		2 – 6 mm (1/12 – 1/4 in)	
Spark plug		NGK	DENSO
	Standard	DPR7EA-9	X22EPR-U9
	For cold climate (below 5°C/41°F)	DPR6EA-9	X20EPR-U9
	For extended high speed riding	DPR8EA-9	X24EPR-U9
Spark plug gap		0.8 – 0.9 mm (0.031 – 0.035 in)	
Recommended engine oil		Honda 4-stroke oil or equivalent motor oil API service classification: SE, SF or SG Viscosity: SAE 10W-40	
Engine oil capacity	at draining	1.1 ℓ (1.2 US qt, 1.0 Imp qt)	
	at disassembly	1.3 ℓ (1.5 US qt, 1.1 Imp qt)	

ITEM			SPECIFICATIONS
Engine idle speed			1,500 ± 100 min⁻¹ (rpm)
Final drive oil capacity	at draining		160 cm³ (5.4 US oz, 5.6 Imp oz)
	at disassembly		200 cm³ (6.8 US oz, 7.0 Imp oz)
Recommended final drive oil			Hypoid gear oil SAE #90 or Honda 4-stroke oil or equivalent motor oil API service classification: SE Viscosity: SAE 10W-30
Recommended brake fluid			DOT 3 or DOT 4
Rear (combined) brake lever free play			20 – 30 mm (3/4 – 1-1/4 in)
Cold tire pressure	Driver only	Front	175 kPa (1.75 kgf/cm², 25 psi)
		Rear	200 kPa (2.00 kgf/cm², 29 psi)
	Driver and passenger	Front	175 kPa (1.75 kgf/cm², 25 psi)
		Rear	250 kPa (2.50 kgf/cm², 36 psi)
Tire size		Front	110/90-12 64J
		Rear	130/70-12 62L
Tire brand	Bridgestone	Front	B03
		Rear	B02
	Dunlop	Front	K488F
		Rear	K488A
Minimum tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

TORQUE VALUES

Spark plug	18 N·m (1.8 kgf·m, 10 lbf·ft)
Adjusting hole cap	6 N·m (0.6 kgf·m, 4.3 lbf·ft)
Timing hole cap	6 N·m (0.6 kgf·m, 4.3 lbf·ft)
Engine oil strainer cap	20 N·m (2.0 kgf·m, 14 lbf·ft)
Final drive oil drain bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)
Final drive oil level check bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)
Final drive oil filler bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)
Master cylinde reservoir cap screw	2 N·m (0.2 kgf·m, 1.4 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 Maintenance Schedule specifies all maintenance required to keep your motorcycle in peak operating condition. Maintenance work should be performed in accordance with standards and specifications of Honda by properly trained and equipped technicians. Your authorized Honda dealer meets all of these requirements.

	ITEM / FREQUENCY	WHICHEVER COMES FIRST ⇩ NOTE	ODOMETER READING (NOTE 1)							REFER TO PAGE
			x 1,000 km	1	6	12	18	24	30	36	
			x 1,000 mi	0.6	4	8	12	16	20	24	
			MONTHS		6	12	18	24	30	36	
*	FUEL LINE					I		I		I	3-4
*	THROTTLE OPERATION					I		I		I	3-4
	AIR CLEANER	NOTE 2					R			R	3-5
	CRANKCASE BREATHER	NOTE 3			C	C	C	C	C	C	3-6
	SPARK PLUG				R	R	R	R	R	R	3-6
*	VALVE CLEARANCE			I		I		I		I	3-7
	ENGINE OIL			R	Every 3,000 km (2,000 mi) R						3-8
*	ENGINE OIL STRAINER SCREEN					C		C		C	3-9
*	ENGINE IDLE SPEED			I	I	I	I	I	I	I	3-9
	RADIATOR COOLANT	NOTE 4				I		I		R	3-10
*	COOLING SYSTEM					I		I		I	3-10
*	DRIVE BELT					I	R	I	I	R	10-4
	BELT CASE AIR CLEANER				C	C	C	C	C	C	10-2
*	FINAL DRIVE OIL	NOTE 5									3-11
	BRAKE FLUID	NOTE 4			I	I	R	I	I	R	3-12
	BRAKE SHOE/PAD WEAR				I	I	I	I	I	I	3-12
	BRAKE SYSTEM			I		I		I		I	3-13
*	BRAKE LIGHT SWITCH					I		I		I	20-11
*	STARTER LIMIT SWITCH				I	I	I	I	I	I	20-11
*	BRAKE LOCK OPERATION			I	I	I	I	I	I	I	3-14
*	HEADLIGHT AIM					I		I		I	3-14
**	CLUTCH SHOE WEAR				I	I	I	I	I	I	10-7
	SIDE STAND					I		I		I	3-15
*	SUSPENSION					I		I		I	3-15
*	NUTS, BOLTS, FASTENERS			I		I		I		I	3-16
**	WHEELS/TIRES					I		I		I	3-16
**	STEERING HEAD BEARINGS			I		I		I		I	3-16

* Should be serviced by your Honda dealer, unless the owner has the proper tools and service data and is mechanically qualified.
** In the interest of safety, we recommend these items be serviced only by your Honda dealer.
Honda recommends that your authorized Honda dealer should road test your motorcycle after each periodic maintenance is carried out.

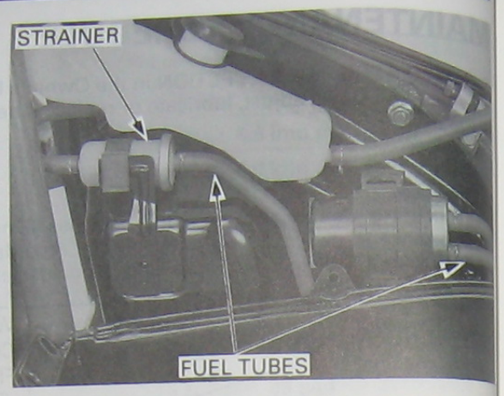
NOTES: 1. At higher odometer readings, repeat at the frequency interval established here.
2. Service more frequently when riding in unusually wet or dusty areas.
3. Service more frequently when riding in rain or at full throttle.
4. Replace every 2 years, or at indicated odometer interval, whichever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

FUEL LINES

Remove the front inner cover (page 2-7).

Check the fuel lines for deterioration, damage or leakage.
Visually inspect the fuel filter for contamination.

Replace the fuel lines or filter if necessary.



THROTTLE OPERATION

Check for any deterioration or damage to the throttle cables.
Check that the throttle grip for smooth operation.
Check that the throttle opens and automatically closes in all steering positions.

If the throttle grip does not return properly, lubricate the throttle cables and overhaul and lubricate the throttle grip housing.
For the lubrication: Disconnect the throttle cables at their upper ends. Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant or a light weight oil.

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

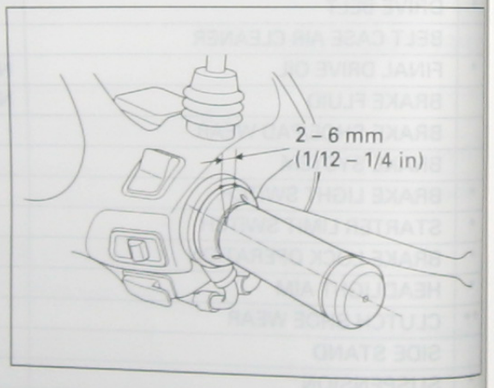
⚠ WARNING

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

With the engine idling, turn the handlebar all the way to the right and left to ensure that the idle speed does not change.
If idle speed increases, check the throttle grip free play and the throttle cable connection.

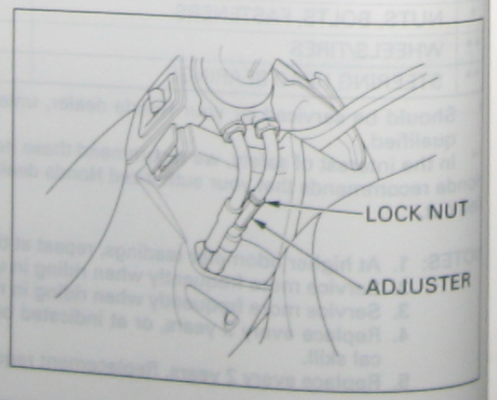
Measure throttle grip free play at the throttle grip flange.

FREE PLAY: 2 – 6 mm (1/12 – 1/4 in)



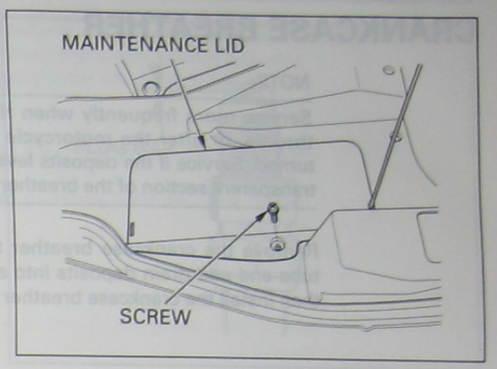
Throttle grip free play can be adjusted at either end of the throttle cable. Minor adjustments are made with the upper adjuster.

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



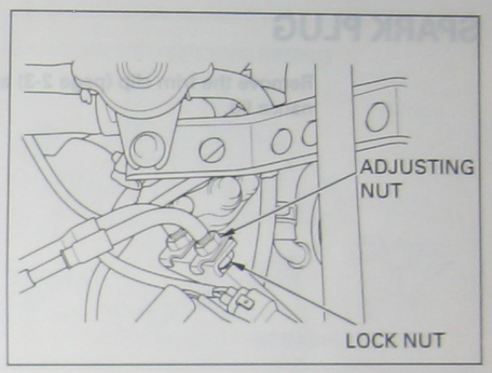
Major adjustment are made with the lower adjuster.

Open the seat.
Remove the screw and the inner maintenance lid.



Loosen the lock nut and turn the adjusting nut to obtain the free play.
Tighten the lock nuts after the adjustment has been made.

Recheck the throttle free play.
Install the inner maintenance lid.



AIR CLEANER

NOTE:

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

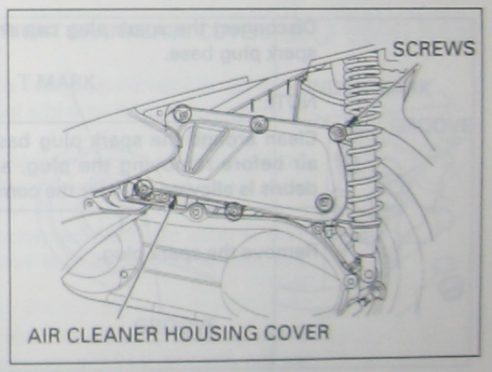
Remove the left side cover (page 2-4).

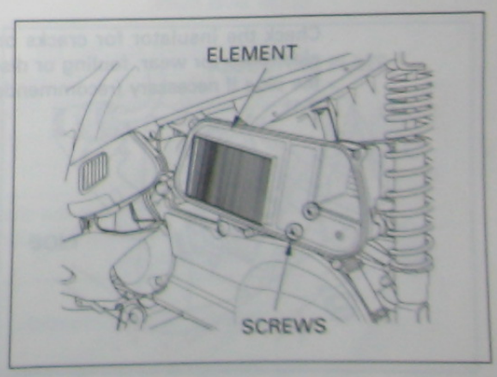
Remove the six screws from the air cleaner housing cover and remove the cover.

Remove the two screws and the air cleaner element.

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

Install new air cleaner element in the reverse order of removal.



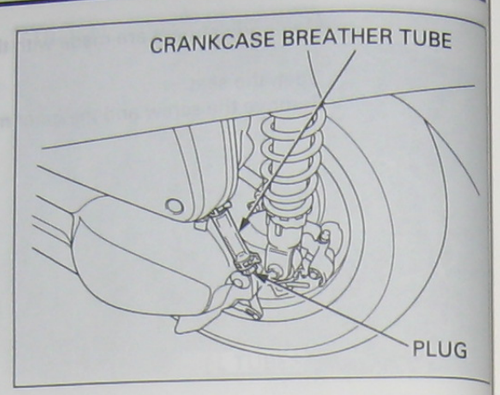


CRANKCASE BREATHER

NOTE:

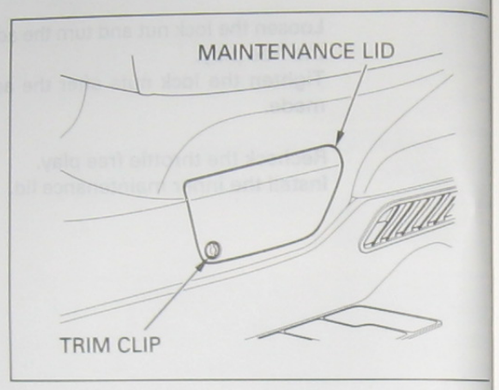
Service more frequently when ridden in rain, at full throttle, or after the motorcycle is washed or overturned. Service if the deposits level can be seen in the transparent section of the breather tube.

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



SPARK PLUG

Remove the trim clip (page 2-3) and the plug maintenance lid.

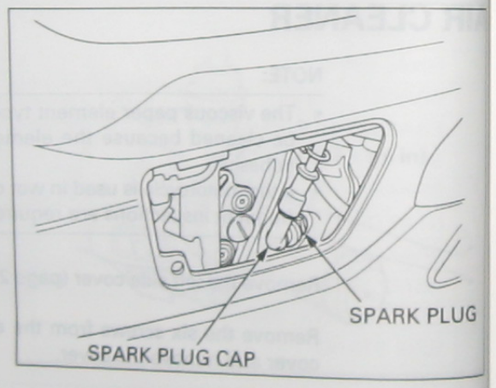


Disconnect the spark plug cap and clean around the spark plug base.

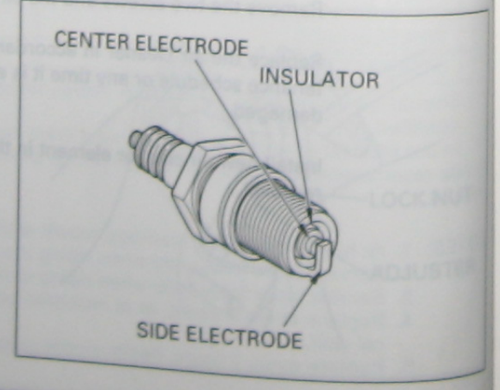
NOTE:

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

Remove the spark plug.



Check the insulator for cracks or damage, and the electrodes for wear, fouling or discoloration. Replace the plug if necessary (recommended spark plug: page 3-1).



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

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

SPARK PLUG GAP: 0.8 – 0.9 mm (0.031 – 0.035 in)

CAUTION:

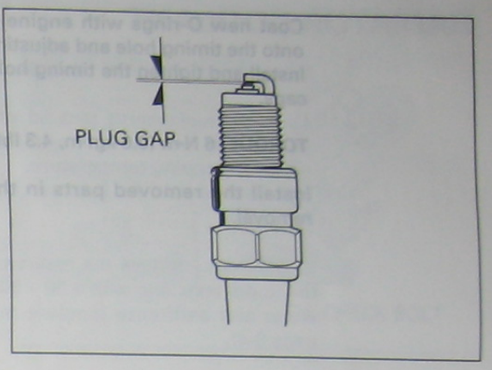
To prevent damage to the cylinder head, hand-tighten the spark plug before using a wrench to tighten to the specified torque.

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

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the spark plug cap.

Install the plug maintenance lid and secure it with the trim clip (page 2-3).



VALVE CLEARANCE

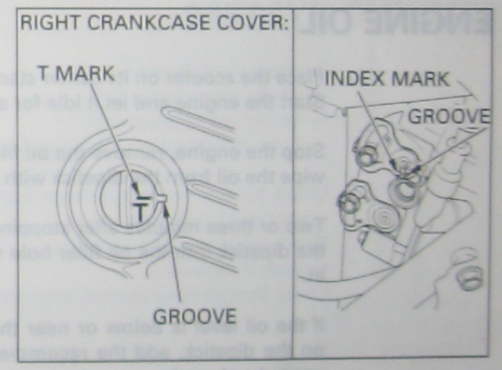
NOTE:

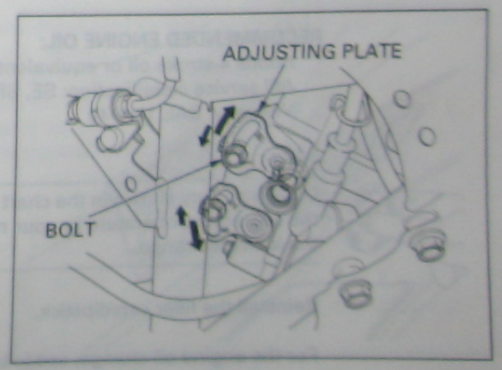
Adjust the valve clearance while the engine is cold (below 35°C/95°F).

Remove the following:
— plug maintenance lid (see previous page)
— belt case air cleaner (page 10-2)
— timing hole cap from right crankcase cover
— adjusting hole cap from cylinder head cover

Rotate the drive pulley (crankshaft) counterclockwise and align the T mark on the flywheel with the index groove in the crankcase cover. Make sure that the camshaft groove aligns with the index mark on the head cover (TDC on the compression stroke).
If the camshaft groove is not aligned, turn the crankshaft one revolution and realign the T mark with the index groove.

Loosen fully the adjusting plate lock bolts.
Move the intake and exhaust adjusting plates outward (away from each other) fully, until resistance is felt. Then move them inwards (towards each other) equivalent of one graduation. Tighten the lock bolts.

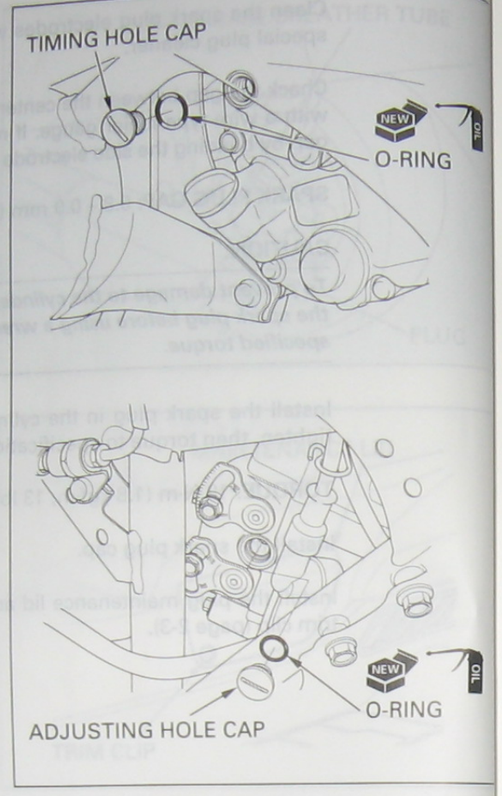




Coat new O-rings with engine oil and install them onto the timing hole and adjusting hole caps.
Install and tighten the timing hole and adjusting hole caps.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Install the removed parts in the reverse order of removal.



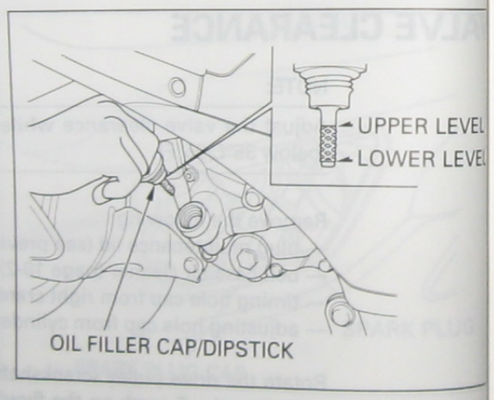
ENGINE OIL

Place the scooter on its center stand.
Start the engine and let it idle for a few minute.

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

Two or three minutes after stopping the engine; insert the dipstick into the oil filler hole without screwing it in.

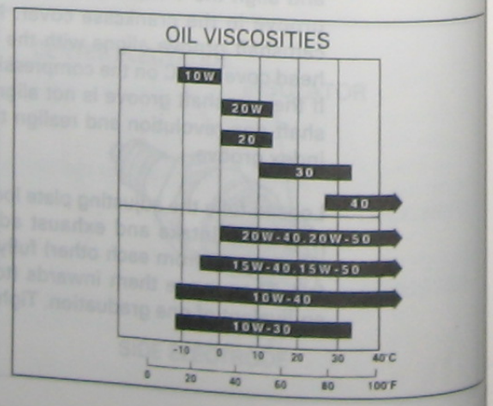
If the oil level is below or near the lower level mark on the dipstick, add the recommended oil up to the upper level mark.



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

NOTE:

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



Reinstall the filler cap/dipstick.

For the engine oil change, see following page.

ENGINE OIL STRAINER SCREEN

NOTE:

Change engine oil with engine warn to assure complete and rapid draining.

⚠ WARNING

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

Warm up the engine.
Remove the oil strainer cap and oil filler cap/dipstick, and drain the oil.

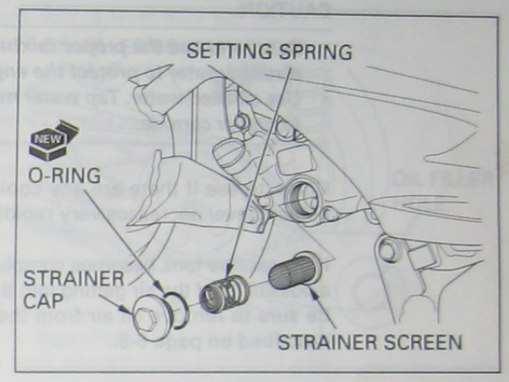
Clean the oil strainer.

After draining the oil completely, install the strainer and setting spring into the engine. Install and tighten the strainer cap with a new O-ring.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

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

OIL CAPACITY:
1.1 ℓ (1.2 US qt, 1.0 Imp qt) at draining
1.3 ℓ (1.5 US qt, 1.1 Imp qt) at disassembly



Reinstall the oil filler cap/dipstick.
Check the engine oil level (see previous page).
Make sure there are no oil leaks.

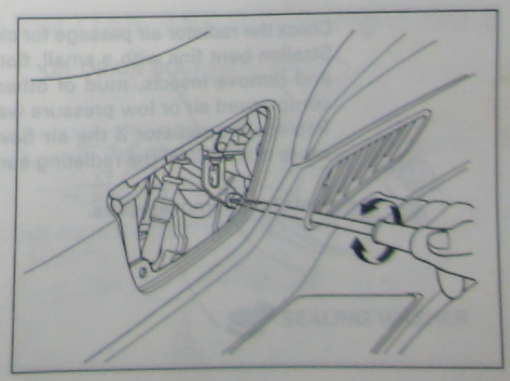
ENGINE IDLE SPEED

NOTE:

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

Warm up engine.
Place the scooter on its center stand.
Remove the plug maintenance lid (page 3-6) and attach a tachometer.
Check the idle speed and adjust by turning the throttle stop screw as required.

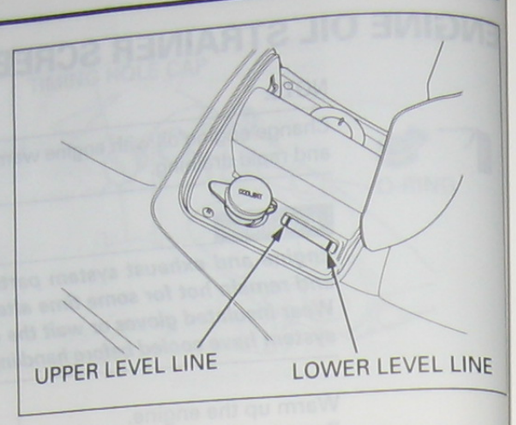
IDLE SPEED: 1,500 ± 100 min^{-1} (rpm)



RADIATOR COOLANT

Place the scooter on its center stand on a level surface.

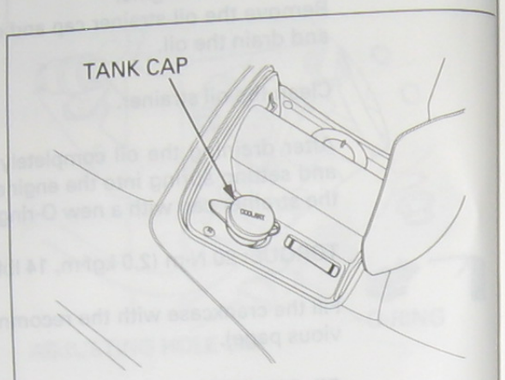
Open the fuel/reserve tank lid and check the coolant level of the reserve tank with the engine running at normal operating temperature.
The level should be between the upper and lower level lines.



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

CAUTION:

- ***Be sure to use the proper mixture of antifreeze and distilled water to protect the engine.***
- ***Use distilled water. Tap water may cause the engine to rust or corrode.***

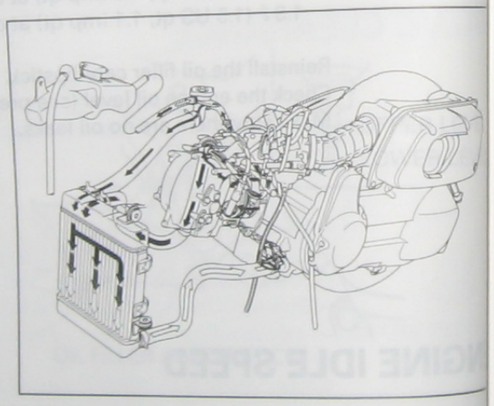


Check to see if there are any coolant leaks when the coolant level decreases very rapidly.

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

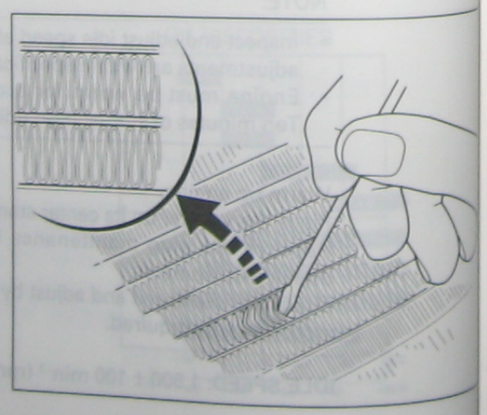
COOLING SYSTEM

Remove the following:
— under cover (page 2-5)
— center cover (page 2-6)
— inner maintenance lid (page 3-5)



Check for any coolant leakage from the water pump, water hoses and hose joints.
Check the water hoses for cracks or deterioration and replace if necessary.
Check that all hose clamps are tight.

Check the radiator air passage for clogging or damage.
Straiten bent fins with a small, flat blade screwdriver and remove insects, mud of other obstructions with compressed air or low pressure water.
Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.



Install the removed parts.

FINAL DRIVE OIL

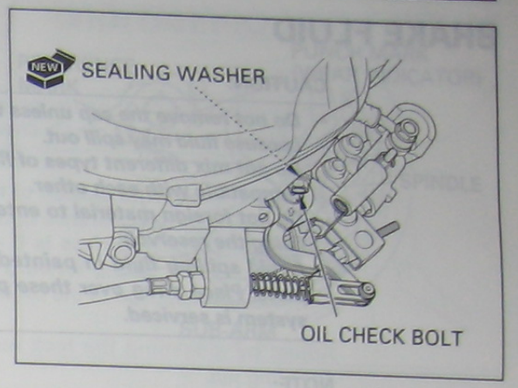
CAUTION:

Avoid getting oil to the inside of the crankcase.

LEVEL CHECK

Place the scooter on its center stand on a level surface.

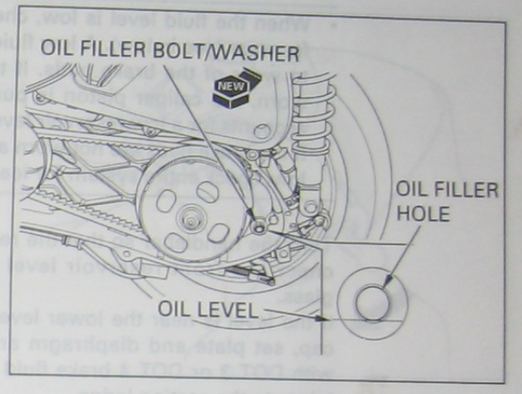
Two or three minutes after stopping the engine; remove the oil check bolt and check whether the oil flows out from the check bolt hole.
If the level is low (that is not flow out), add the recommended oil as described below.



Install the oil check bolt with a new sealing washer and tighten it.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

Remove the left crankcase cover (page 10-2).
Remove the oil filler bolt. Pour the recommended oil through the oil filler hole until it reaches the lower edge of the filler hole.



RECOMMENDED OIL:
Hypoid gear oil SAE #90 or
Honda 4-stroke oil or equivalent motor oil certified to meet API service classification: SE
Viscosity: SAE 10W-30

Install the oil filler bolt with a new sealing washer and tighten it.

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

Install the left crankcase cover (page 10-3).

OIL CHANGE

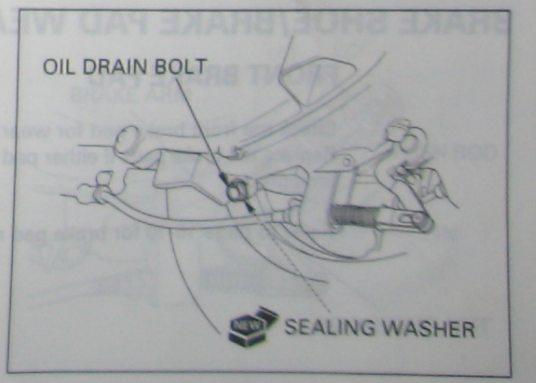
Remove the left crankcase cover (page 10-2).

Place the scooter on its center stand on level surface.
Remove the oil drain bolt and filler bolt, slowly turn the rear wheel and drain the oil.

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

TORQUE: 13 N·m (1.3 kgf·m, 9 lbf·ft)

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



OIL CAPACITY:
160 cm³ (5.4 US oz, 5.6 Imp oz) at draining
200 cm³ (6.8 US oz, 7.0 Imp oz) at disassembly

BRAKE FLUID

CAUTION:

- ***Do not remove the cap unless the reservoir is level because fluid may spill out.***
- ***Do not mix different types of fluid, as they are not compatible with each other.***
- ***Do not foreign material to enter the system when filling the reservoir.***
- ***Avoid spilling fluid in painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.***

NOTE:

- When the fluid level is low, check the brake pads for wear (see below). A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper piston is pushed out, and this accounts for a low reservoir level.
  If the brake pads are not worn and the fluid level is low, check entire system for leaks (page 3-13).

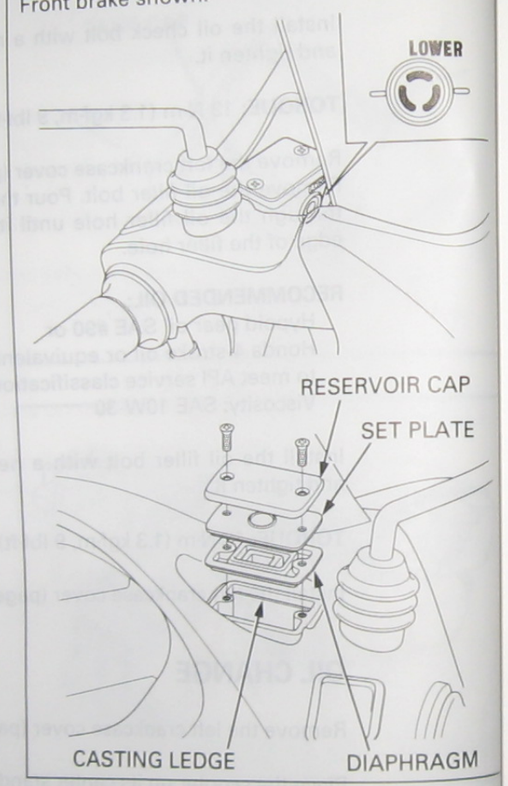
Turn the handlebar so that the reservoir is level and check the front reservoir level through the sight glass.
If the level is near the lower level mark, remove the cap, set plate and diaphragm and fill the reservoir with DOT 3 or DOT 4 brake fluid from a sealed container to the casting ledge.

Install the diaphragm, set plate and reservoir cap and tighten the cap screws.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

Refer to page 16-5 for brake fluid replacement/bleeding procedures.

Front brake shown:

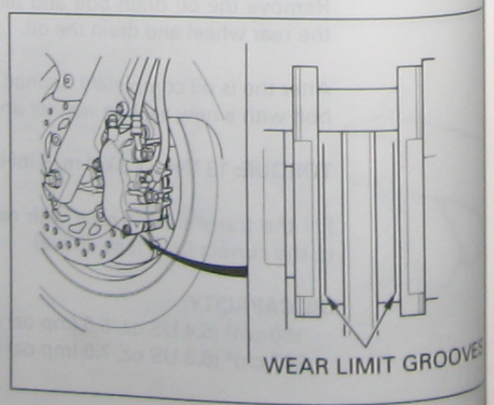


BRAKE SHOE/BRAKE PAD WEAR

FRONT BRAKE PAD

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

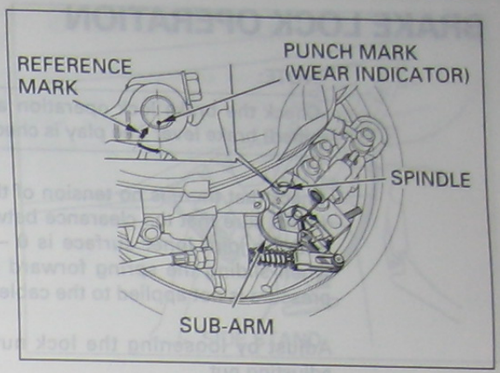
Refer to page 16-10 for brake pad replacement.



REAR BRAKE SHOE

Check the punch mark (wear indicator) position of the brake cam spindle.
Replace the brake shoes if the punch mark aligns with the reference mark "▲" on the brake sub-arm and check the brake drum.

Refer to page 16-25 for brake shoe replacement and brake drum inspection.

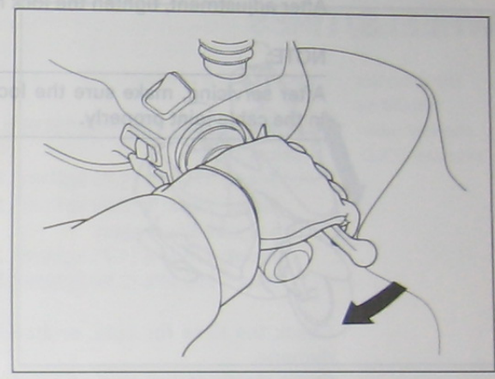


BRAKE SYSTEM

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

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

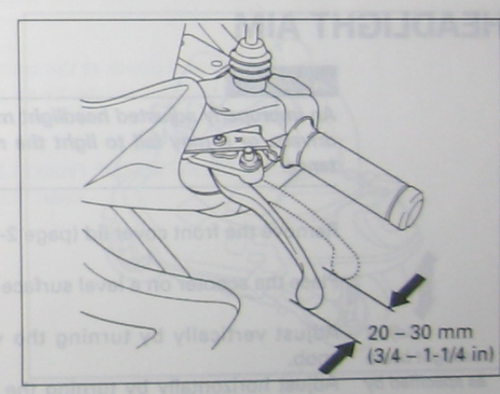
Refer to page 16-5 for brake bleeding procedures.



REAR (COMBINED) BRAKE LEVER FREE PLAY

Check the rear brake lever free play.

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

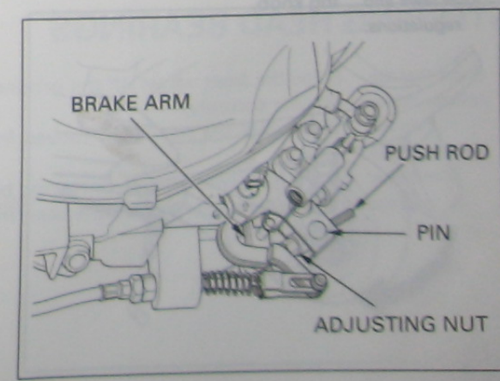


Adjust the free play by turning the adjusting nut using the open end wrench while pushing the push rod forward.
Make sure the cut-out of the adjusting nut is seated on the sub-arm pin.
Check that rear wheel turns smoothly with the center stand applied, that is not dragging.

If the correct free play cannot be obtained, check the brake shoe lining for wear (see above).

NOTE:

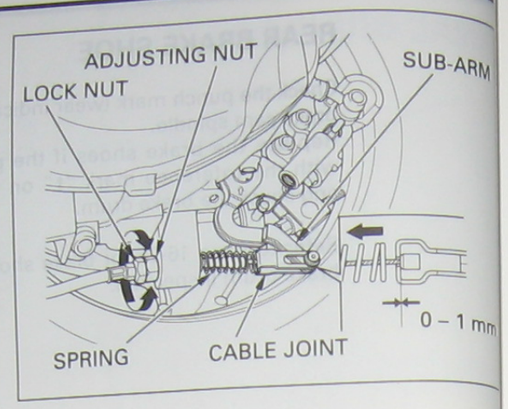
After adjusting the free play, check the brake lock operation (see following page).



BRAKE LOCK OPERATION

NOTE:

Check the brake lock operation after the rear (combined) brake lever free play is checked and adjusted.



Check that there is no tension of the brake lock cable (make sure that the clearance between the cable end and the joint inner surface is 0 – 1 mm as shown) when sliding the spring forward so that the spring pressure is not applied to the cable joint.

Adjust by loosening the lock nut and turning the adjusting nut.
After adjustment, tighten the lock nut securely.

NOTE:

After servicing, make sure the lock cable is installed in the cable joint properly.

HEADLIGHT AIM

⚠ WARNING

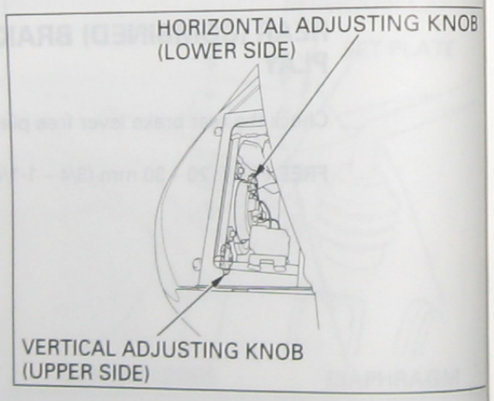
An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.

Remove the front cover lid (page 2-10).

Place the scooter on a level surface.

Adjust headlight beam as specified by local laws and regulations.

Adjust vertically by turning the vertical adjusting knob.
Adjust horizontally by turning the horizontal adjusting knob.

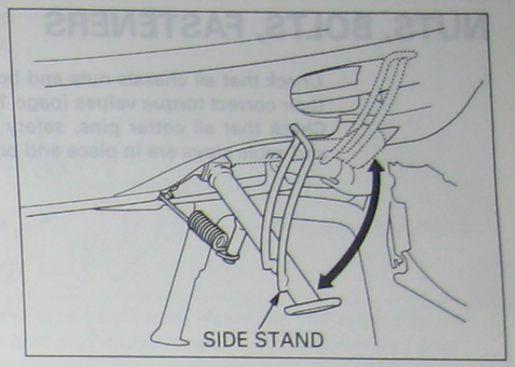


SIDE STAND

Place the scooter on its center stand.

Check the side stand spring for damage or loss of tension.
Check the side stand assembly for freedom of movement and lubricate the side stand pivot if necessary.

Check the side stand ignition cut-off system:
— Start the engine.
— Fully lower the side stand while running the engine.
— The engine should stop as the side stand is lowered.

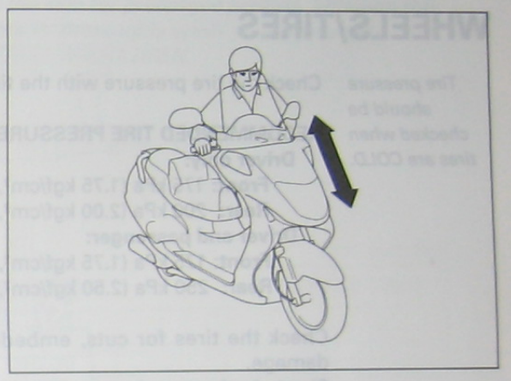


If there is problem with the system, check the side stand switch (page 20-19).

SUSPENSION

⚠ WARNING

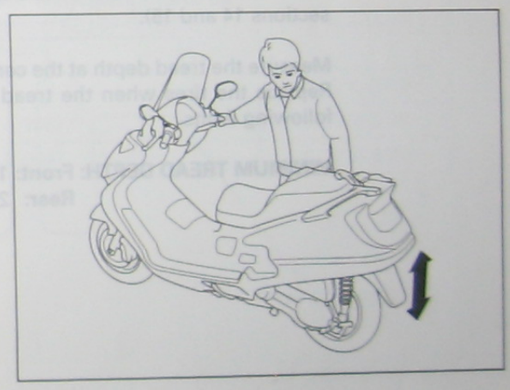
Loose, worn, or damaged suspension parts impair motorcycle stability and control. Repair or replace any damaged components before riding. Riding a scooter with faulty suspension increases your risk of an accident and possible injury.



FRONT

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

Refer to section 14 for front fork service.

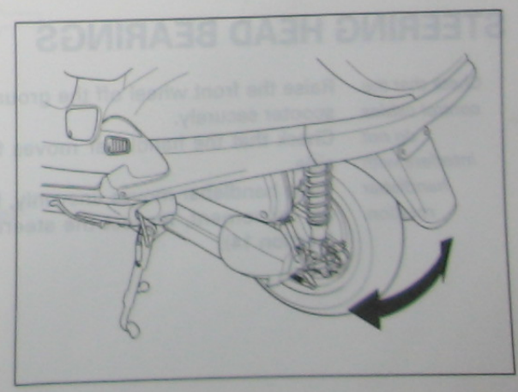


REAR

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

Refer to section 15 for shock absorber service.

Raise the rear wheel off the ground by placing the scooter on its center stand.
Check for worn engine mounting bushings by grabbing the rear wheel and attempting to move the wheel side to side.
Replace the bushings if any looseness is noted (section 7).



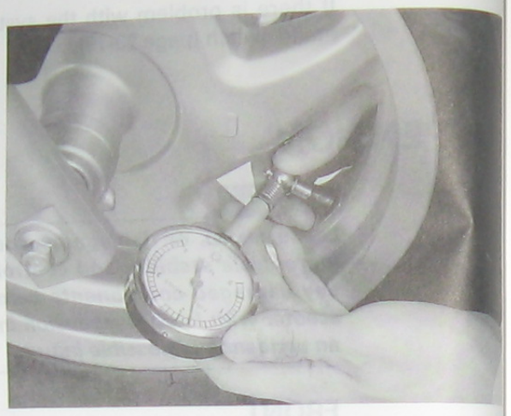
NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-12).
Check that all cotter pins, safety clips, hose clamps and cable stays are in place and properly secured.

WHEELS/TIRES

Tire pressure should be checked when tires are COLD.

Check the tire pressure with the tire pressure gauge.



RECOMMENDED TIRE PRESSURE:
Driver only:
Front: 175 kPa (1.75 kgf/cm², 25 psi)
Rear: 200 kPa (2.00 kgf/cm², 29 psi)
Driver and passenger:
Front: 175 kPa (1.75 kgf/cm², 25 psi)
Rear: 250 kPa (2.50 kgf/cm², 36 psi)

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

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

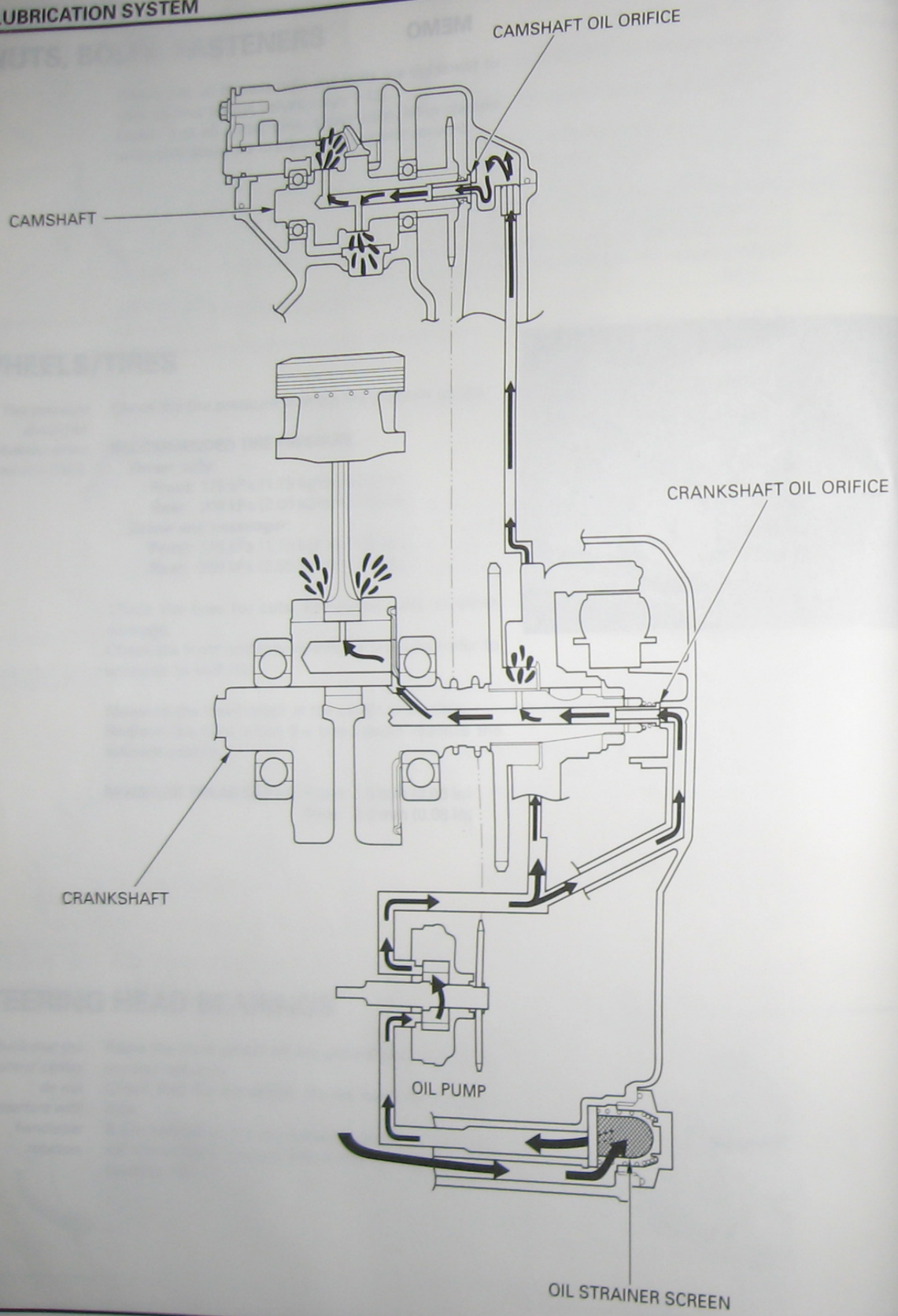
MINIMUM TREAD DEPTH: Front: 1.5 mm (0.06 in)
Rear: 2.0 mm (0.08 in)

STEERING HEAD BEARINGS

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

Raise the front wheel off the ground and support the scooter securely.
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).

MEMO



4. LUBRICATION SYSTEM

SERVICE INFORMATION

GENERAL

⚠ WARNING

- ***If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.***
- ***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.
- When removing and installing the oil pump use care not to allow dust or dirt to enter the engine.
- 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	1.1 ℓ (1.2 US qt, 1.0 Imp qt)	———
	at disassembly	1.3 ℓ (1.5 US qt, 1.1 Imp qt)	———
Recommended engine oil		HONDA 4-stroke oil or equivalent motor oil API service classification SE, SF or SG Viscosity: SAE 10W-40	———
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.20 (0.006 – 0.008)	0.25 (0.010)
	Side clearance	0.04 – 0.09 (0.002 – 0.004)	0.12 (0.005)

TORQUE VALUES

Oil strainer cap	20 N·m (2.0 kgf·m, 14 lbf·ft)
Oil pump cover screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)

TROUBLESHOOTING

Oil level too low – high oil consumption

- Oil consumption
- External oil leak
- Worn piston ring
- Improperly installed piston rings
- Worn cylinder
- Worn stem seals
- Worn valve guide

Oil contamination

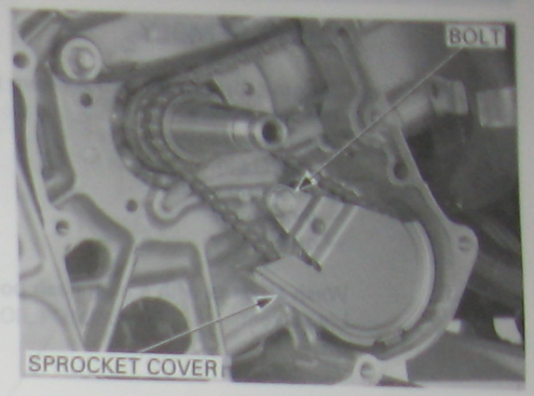
- Oil not changed often enough
- Coolant mixing with oil (white appearance)
  - — Faulty water pump mechanical seal
  - — Faulty cylinder head gasket
- Worn piston ring

OIL PUMP

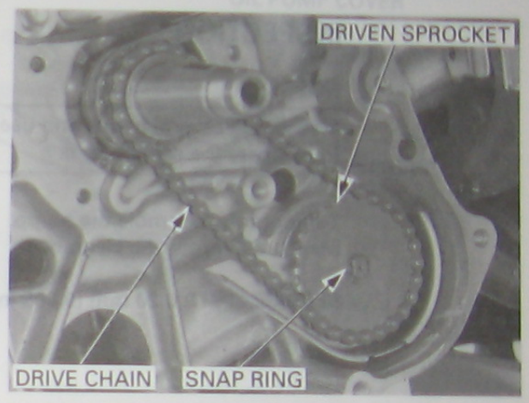
REMOVAL

Remove the starter driven gear (page 12-4).

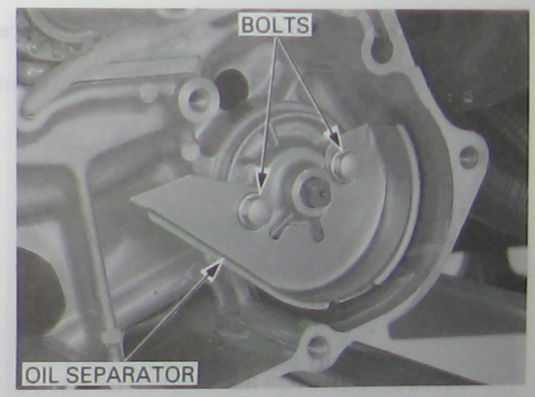
Remove the bolt and the sprocket cover.



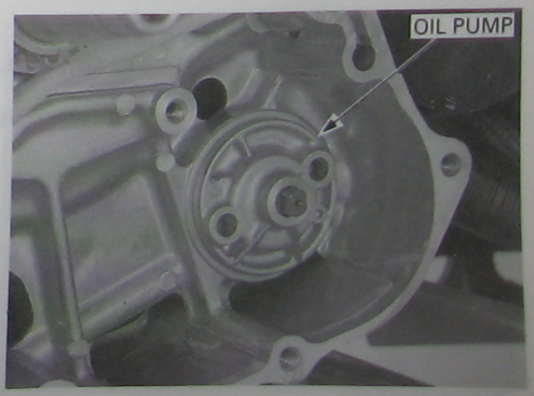
Remove the snap ring.
Remove the oil pump driven sprocket and drive chain.



Remove the two bolts and the oil separator.



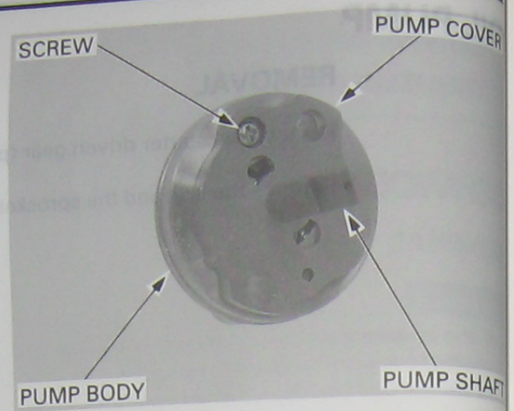
Remove the oil pump from the right crankcase.



DISASSEMBLY

Remove the screw and remove the following from the pump body.
— oil pump cover
— dowel pin
— oil pump shaft
— inner rotor
— outer rotor

Wash all parts with a high flash point or non-flammable solvent.



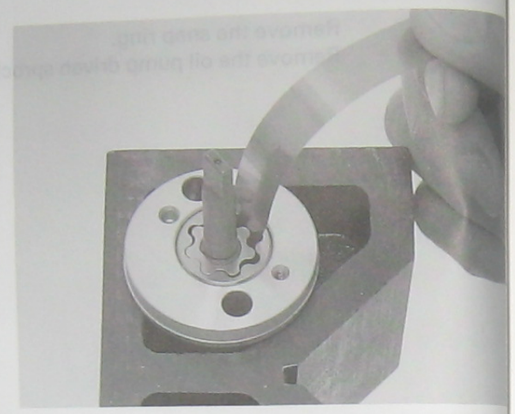
INSPECTION

NOTE:

Measure at several points and use the largest reading to compare the service limit.

Temporarily assemble the pump.
Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



Measure the pump body clearance.

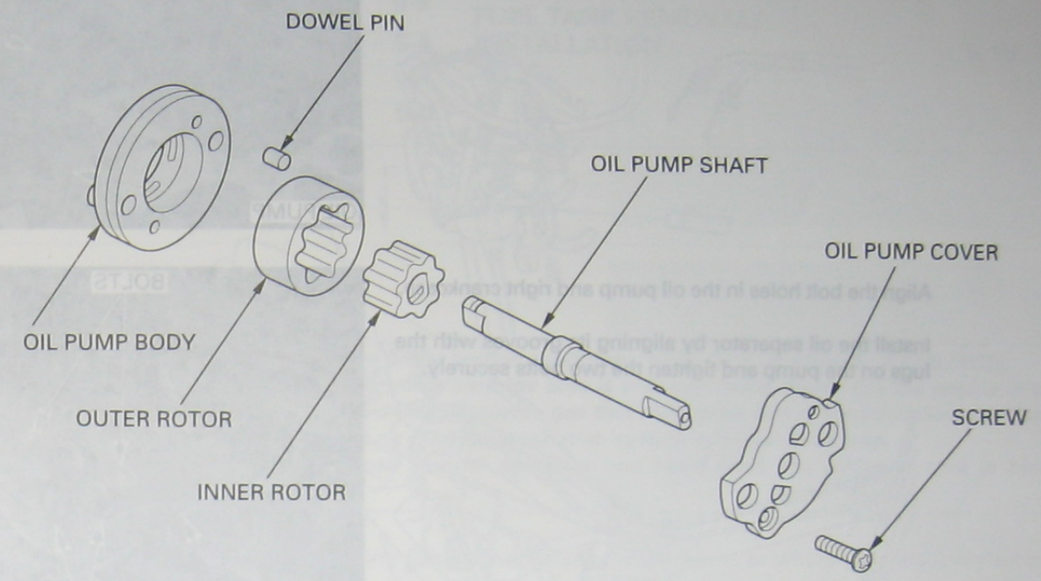
SERVICE LIMIT: 0.25 mm (0.010 in)

Remove the pump shaft.
Measure the pump side clearance.

SERVICE LIMIT: 0.12 mm (0.005 in)

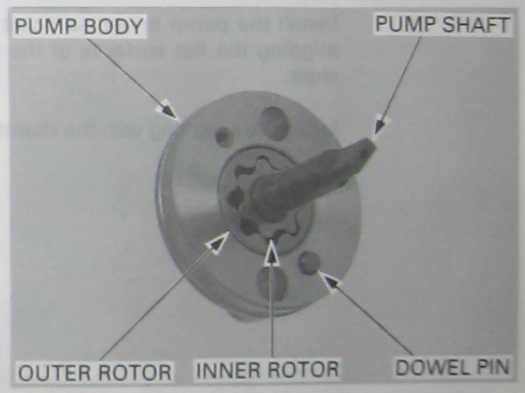
ASSEMBLY

Dip all parts in clean engine oil.



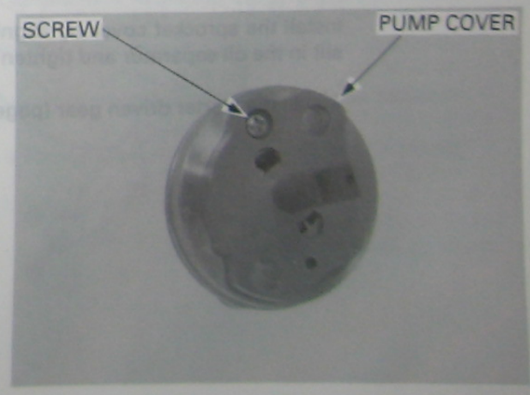
Install the outer rotor into the pump body.
Install the inner rotor over the pump shaft by aligning the flat surfaces.
Install the inner rotor/pump shaft into the pump body.

Install the dowel pin into the pump body.



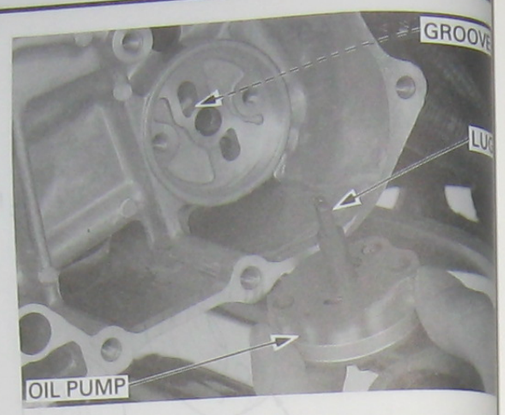
Install the pump cover onto the pump body by aligning the its hole with the dowel pin.
Install and tighten the screw.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)



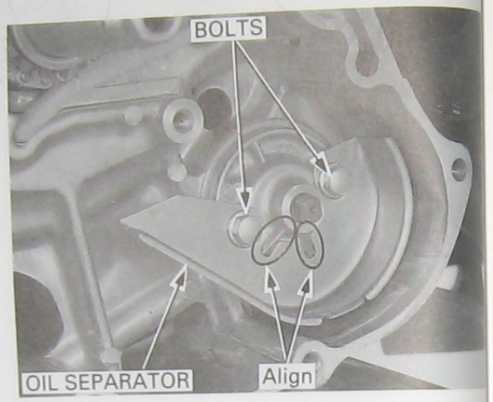
INSTALLATION

Install the oil pump while rotating the pump shaft to seat the lug into the groove in the water pump shaft.



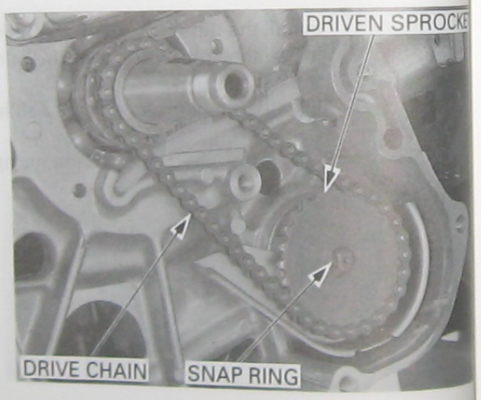
Align the bolt holes in the oil pump and right crankcase.

Install the oil separator by aligning its grooves with the lugs on the pump and tighten the two bolts securely.



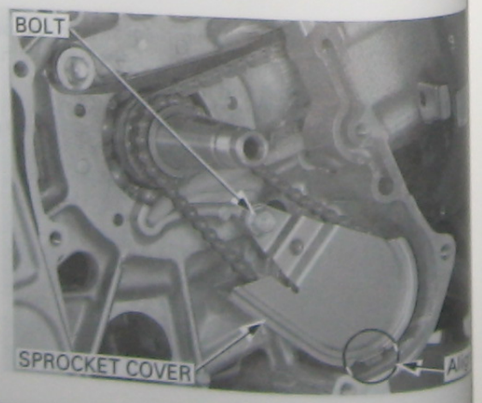
Install the pump driven sprocket and drive chain by aligning the flat surfaces of the sprocket and pump shaft.

Install the snap ring with the chamfered edge facing in.

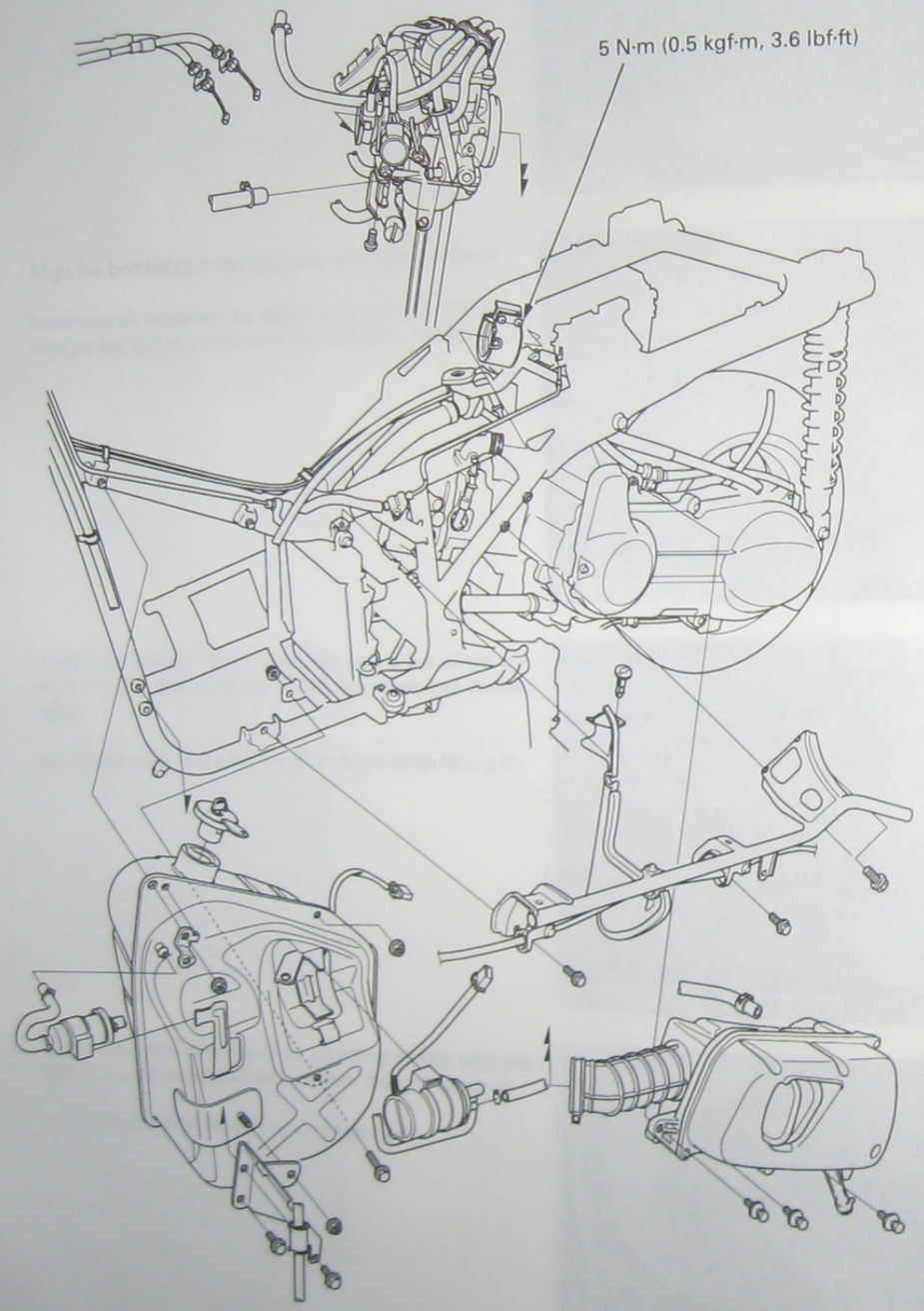


Install the sprocket cover by aligning its tab with the slit in the oil separator and tighten the bolt securely.

Install the starter driven gear (page 12-7).



MEMO



5. FUEL SYSTEM

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.***
- ***Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.***

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

CAUTION:

- ***Be sure to remove the diaphragms before cleaning air and fuel passages with compressed air. The diaphragms might be damaged.***
- ***Do not remove the throttle sensor from the carburetor. Removing the throttle sensor can cause the throttle sensor getting out of position resulting in improper ignition timing. If the throttle sensor replacement is necessary, replace the carburetor as an assembly.***

NOTE:

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

- For fuel pump inspection, refer to section 20.
- For throttle sensor inspection, refer to section 18.
- The starting enrichment (SE) thermal valve system is used battery (DC) for the power source in comparison with conventional alternator (AC)-powered SE thermal valve. The ignition control module (ICM) operates the SE thermal valve by receiving the signals from the ignition pulse generator (i.e. engine speed) and engine coolant temperature (ECT) sensor (page 18-0).
- Before disassembling the carburetor, place an approved fuel container under the carburetor drain tube, loosen the drain screw and drain the carburetor.
- When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- After removing the carburetor, wrap the intake port of the engine with a shop towel or cover it with a piece of tape to prevent any foreign material from dropping into the engine.

SPECIFICATIONS

ITEM		SPECIFICATION
Carburetor identification number	Except SW type	VE3BB
	SW type	VE3BD
Main jet		#105
Slow jet		#40
Pilot screw opening		See page 5-17
Float level		18.5 mm (0.73 in)
Starting enrichment (SE) thermal valve resistance (20°C/68°F)		10 kΩ max.
Idle speed		1,500 ± 100 rpm

TORQUE VALUES

Carburetor throttle cable stay screw	5 N·m (0.5 kgf·m, 3.6 lbf·ft)	
Carburetor insulator band screw	5 N·m (0.5 kgf·m, 3.6 lbf·ft)	Band ends are contact.

TOOLS

Carburetor float level gauge	07401 – 0010000

TROUBLESHOOTING

Engine cranks but won't start
- No fuel in tank
- No fuel to carburetor
  - — Clogged fuel filter
  - — Clogged fuel line
  - — Misadjusted fuel level
  - — Clogged fuel tank breather hole
- Too much fuel getting to the engine
  - — Clogged air cleaner
  - — Flooded carburetor
- Intake air leak
- Contaminated/deteriorated fuel
- Faulty starting enrichment (SE) thermal valve
- Clogged starting enrichment circuit
- Improper throttle operation
- No spark at plug (faulty ignition system-section 18)

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 float level
- Clogged fuel tank breather hole
- Misadjusted pilot screw
- Clogged slow circuit or starting enrichment circuit
- Faulty fuel pump (section 20)
- 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
- Faulty fuel pump (section 20)

Rich mixture
- Faulty float valve
- Clogged air jets
- Float level too high
- Clogged air cleaner
- Flooded carburetor
- Faulty starting enrichment (SE) thermal valve

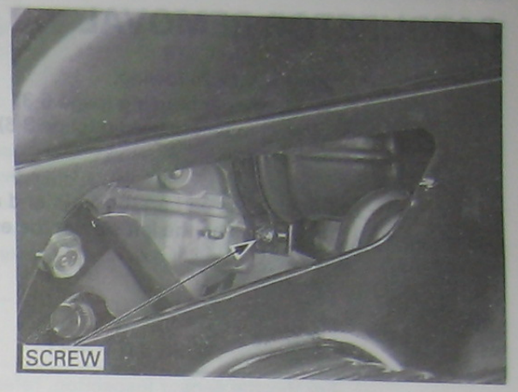
Afterburn when engine braking is used
- Lean mixture in slow circuit
- Faulty air cut-off valve
- Faulty ignition system (section 18)

Backfiring or misfiring during acceleration
- Lean mixture
- Ignition system malfunction (section 18)

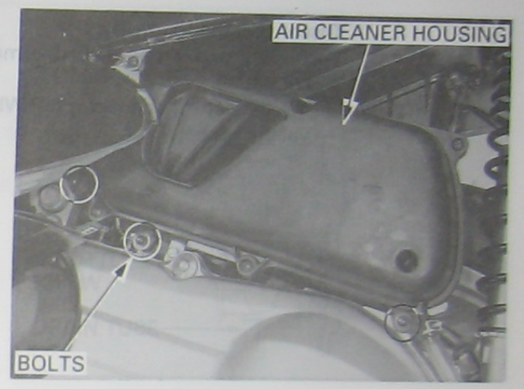
AIR CLEANER HOUSING REMOVAL/ INSTALLATION

Remove the left side cover (page 2-4).
Remove the step grill.

Loosen the connecting tube band screw.

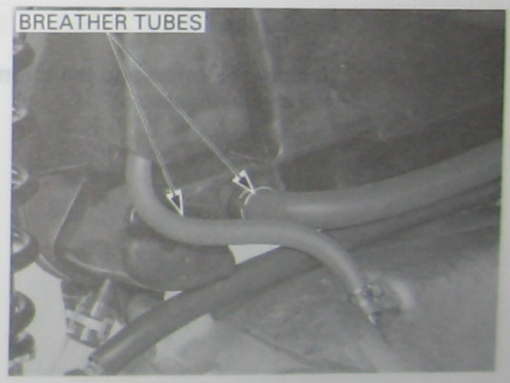


Remove the three mounting bolts.



Be careful not to damage the joint area of the connecting tube and housing.

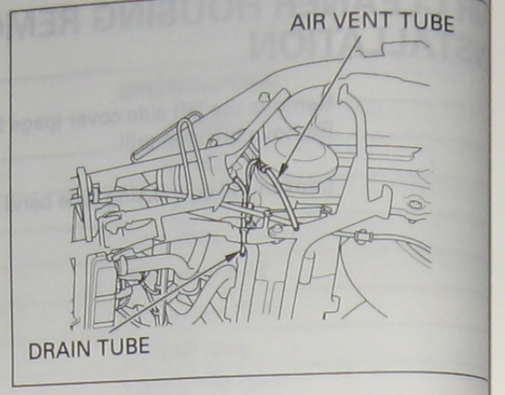
Disconnect the crankcase and final reduction breather tubes while raising the rear portion of the air cleaner housing and remove the air cleaner housing.



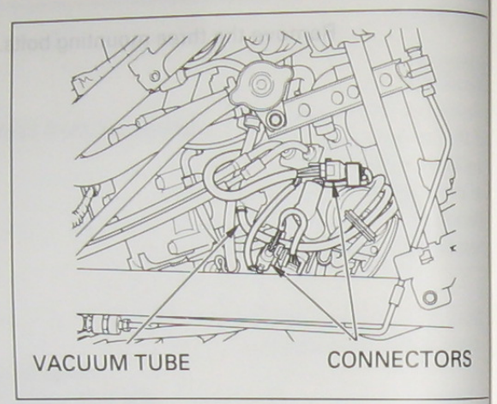
CARBURETOR REMOVAL

Remove the following:
— air cleaner housing (page 5-3)
— plug maintenance lid (page 3-6)
— step grill

Remove the carburetor drain and air vent tubes from the clamps on the left side of the engine.

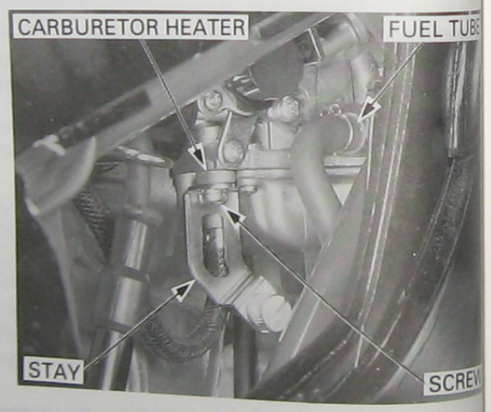


Disconnect the following:
— starting enrichment (SE) thermal valve connector (2P White)
— throttle sensor connector (3P White)
— vacuum tube



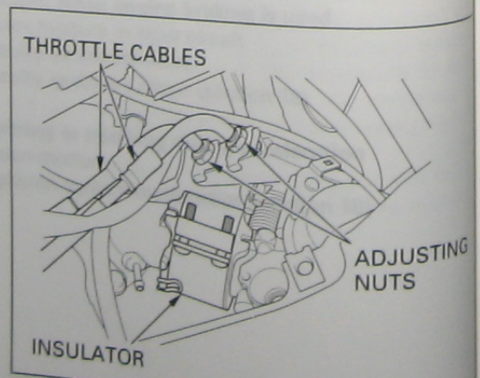
— fuel tube

Remove the screw and the throttle stop screw stay and carburetor heater.



Loosen the throttle cable adjusting nuts.

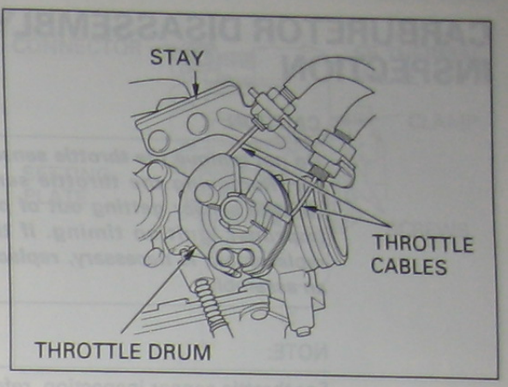
Loosen the insulator band screws.
Remove the carburetor insulator off the intake manifold.



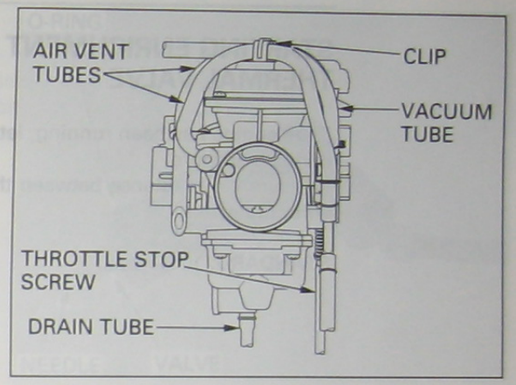
Be careful not to damage the carburetor and insulator.

Remove the carburetor assembly out of the frame cover.

Remove the throttle cables from the stay and disconnect them from the throttle drum.



Remove the following:
— tube clip
— air vent tubes
— vacuum tube
— drain tube
— throttle stop screw if necessary.



CARBURETOR DISASSEMBLY/ INSPECTION

CAUTION:

Do not remove the throttle sensor from the carburetor. Removing the throttle sensor can cause the throttle sensor getting out of position resulting in improper ignition timing. If the throttle sensor replacement is necessary, replace the carburetor as an assembly.

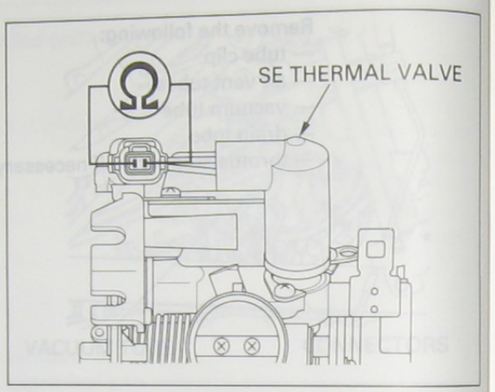
NOTE:

For throttle sensor inspection, refer to section 18.

STARTING ENRICHMENT (SE) THERMAL VALVE

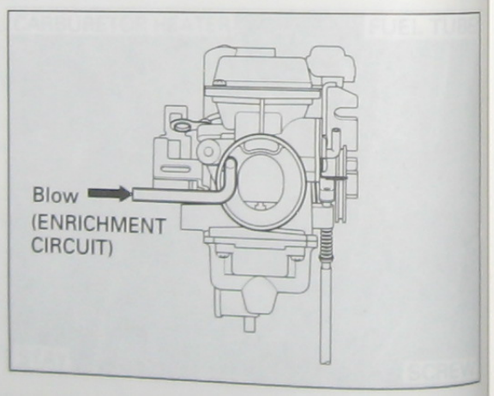
If the engine has been running, let it cool down for 10 minutes or more.
Measure the resistance between the SE thermal valve wire connectors.

STANDARD: 10 kΩ max.



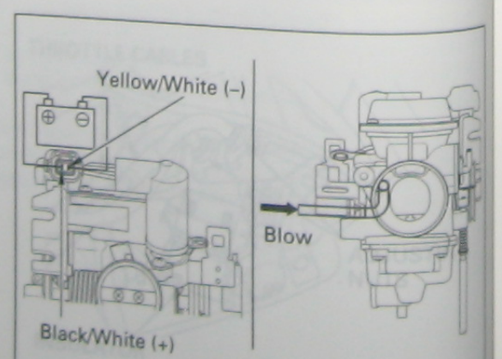
Let the carburetor cool down for 30 minutes or more after the engine stopped.
Insert the vinyl tube into the fuel enrichment circuit and blow into the tube.

Air should flow into the circuit.

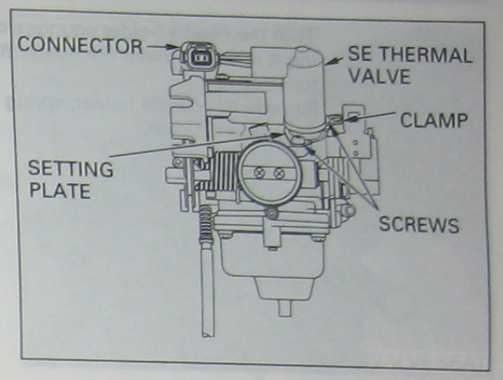


Connect the 12 V battery to the SE thermal valve connector terminals and wait for 5 minutes.
Insert the vinyl tube into the fuel enrichment circuit and blow into the tube.

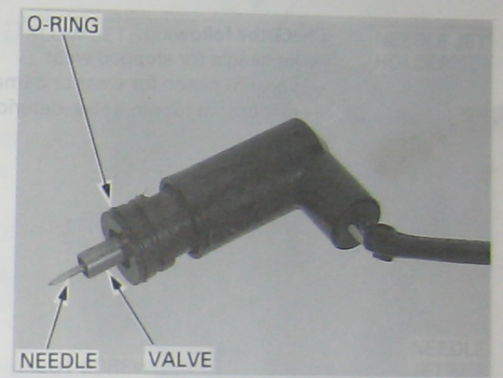
Air should not flow into the circuit.



Remove the SE thermal valve connector from the stay.
Remove the two screws, clamp and setting plate.
Remove the SE thermal valve from the carburetor, being careful not to damage the valve and needle.



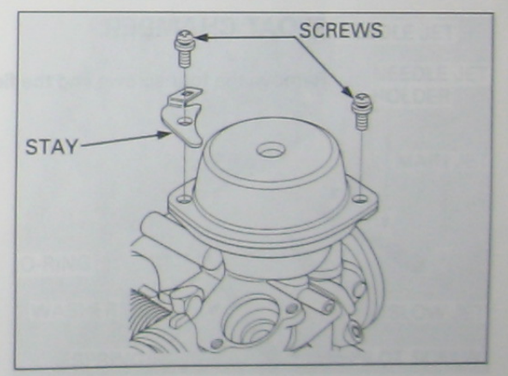
Inspect the valve and needle for stepped wear or damage.



VACUUM CHAMBER

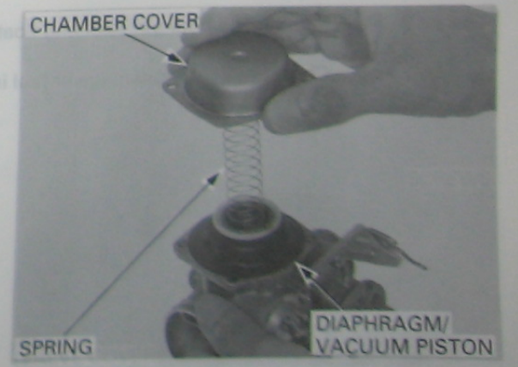
The chamber cover is under spring pressure.

Remove the two screws and stay while holding the chamber cover.

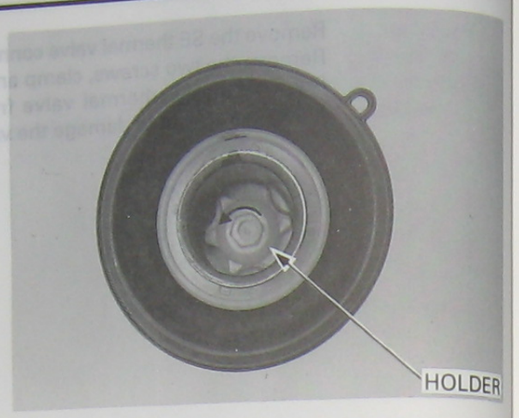


Remove the chamber cover, compression spring and diaphragm/vacuum piston.

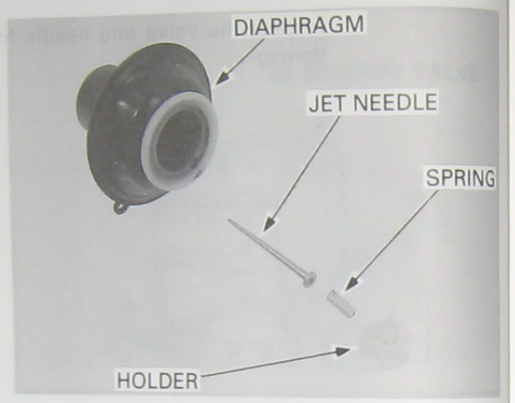
Check the piston for smooth operation up and down in the carburetor body.



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

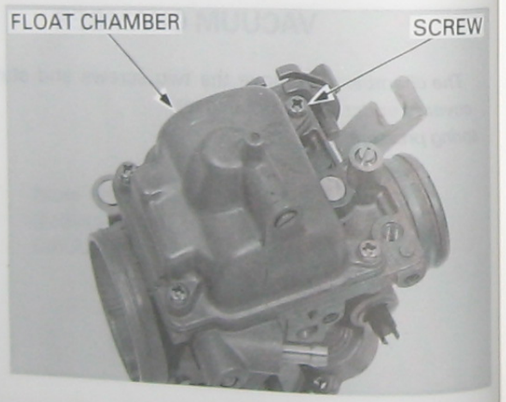


Check the following:
— jet needle for stepped wear
— vacuum piston for wear or damage
— diaphragm for pin holes, deterioration or damage



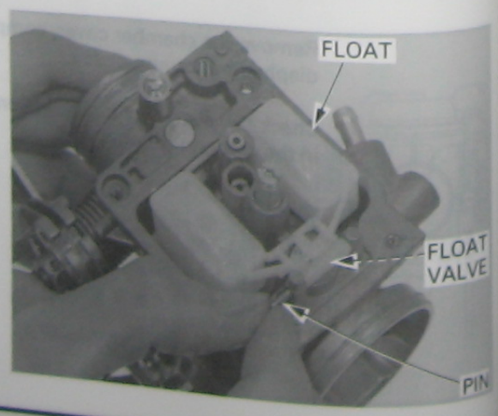
FLOAT CHAMBER

Remove the four screws and the float chamber.

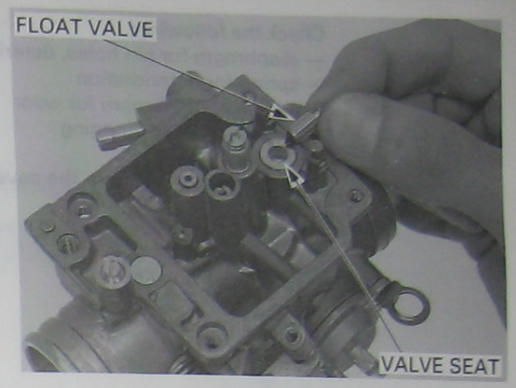


Remove the float pin, float and float valve.

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 holder, needle jet and slow jet.

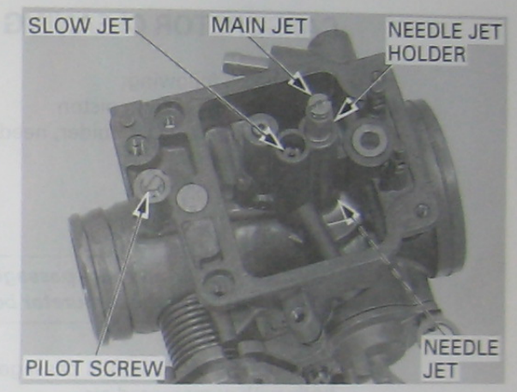
CAUTION:

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:

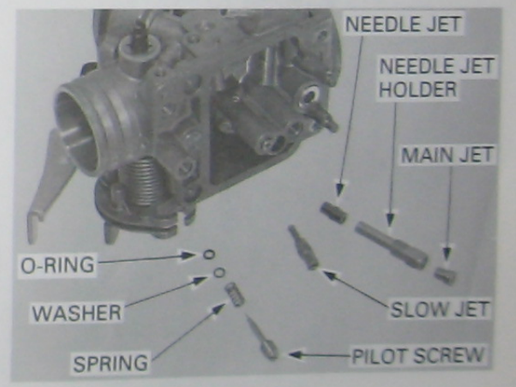
Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.



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

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

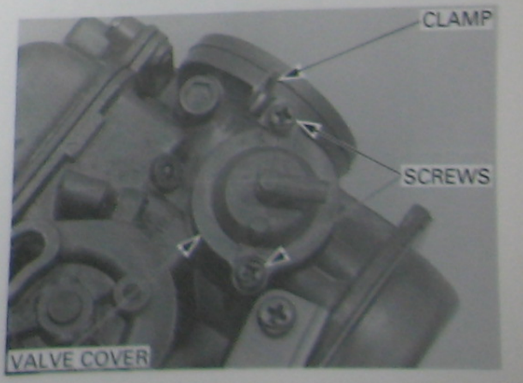
Clean the jets with cleaning solvent and blow open with compressed air.



AIR CUT-OFF VALVE

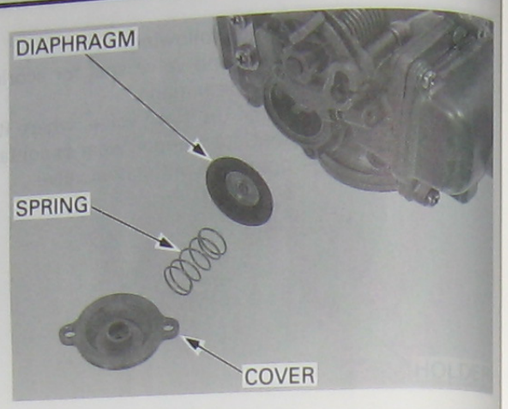
The air cut-off cover is under spring pressure.

Remove the two screws and clamp while holding the valve cover.
Remove the valve cover, spring and diaphragm.



Check the following:
— diaphragm for pin holes, deterioration or damage
— spring for deterioration
— needle of diaphragm for wear
— air passages for clogging

Blow open air passage in the cover with compressed air.



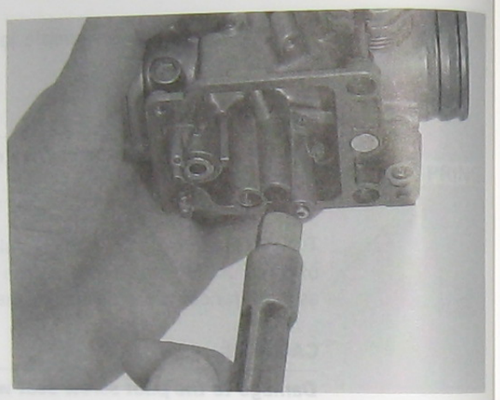
CARBURETOR CLEANING

Remove the following:
— diaphragm/vacuum piston
— main jet, needle jet holder, 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.

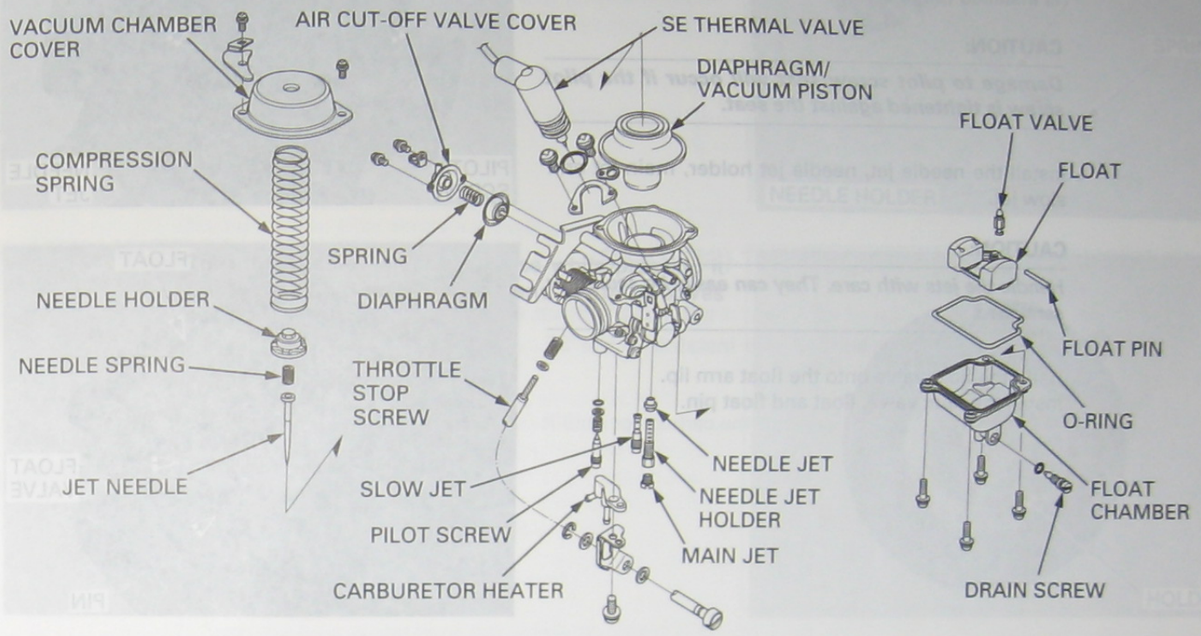
Blow open all air and fuel passages in the carburetor body with compressed air.



CARBURETOR ASSEMBLY

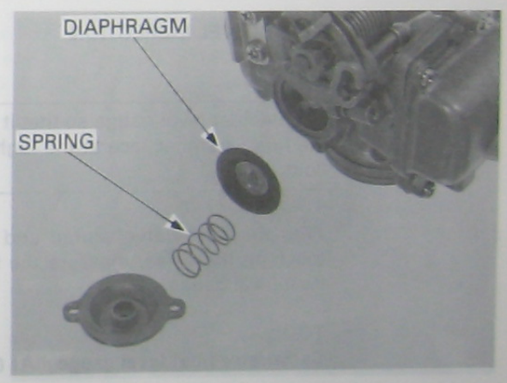
CAUTION:

Do not remove the throttle sensor from the carburetor body.

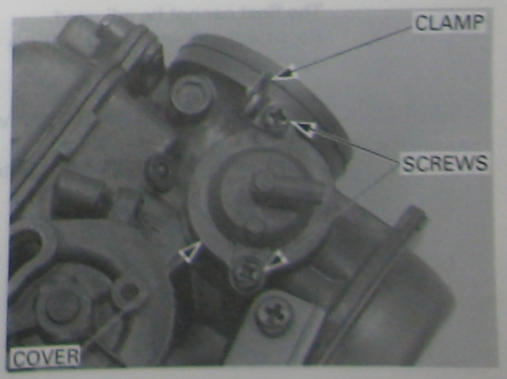


AIR CUT-OFF VALVE

Install the diaphragm and spring. Install and hold the valve cover, being careful not to pinch the diaphragm.



Set the clamp in the position as shown and tighten the two screws.



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 5-17).

CAUTION:

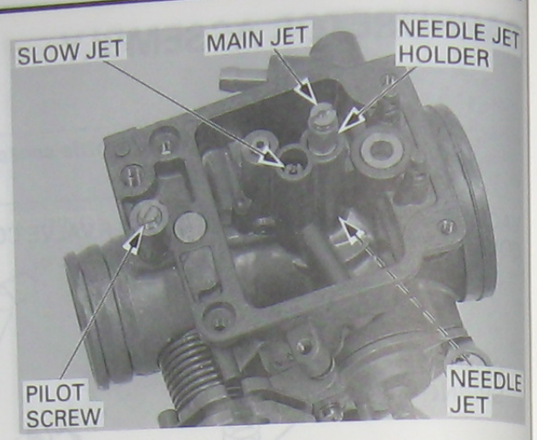
Damage to pilot screw seat will occur if the pilot screw is tightened against the seat.

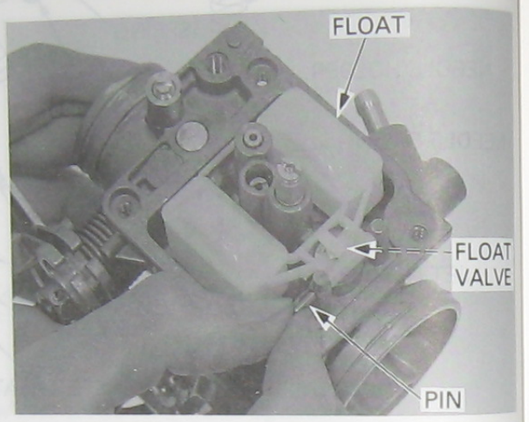
Install the needle jet, needle jet holder, main jet and slow jet.

CAUTION:

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

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.

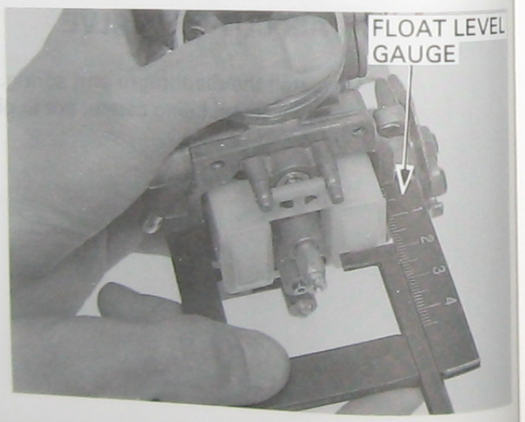
With the float valve seated and the float arm just touching the valve, measure the float level with the float level gauge.

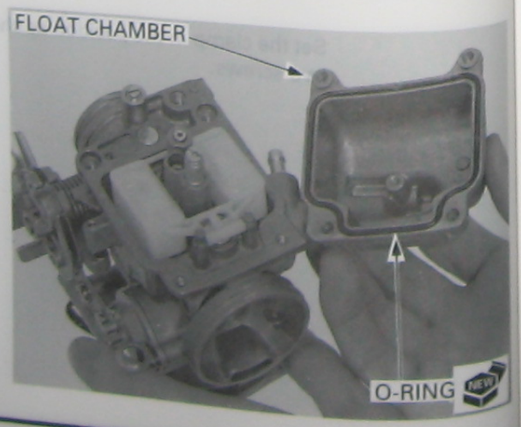
TOOL:

Carburetor float level gauge	07401 – 0010000

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

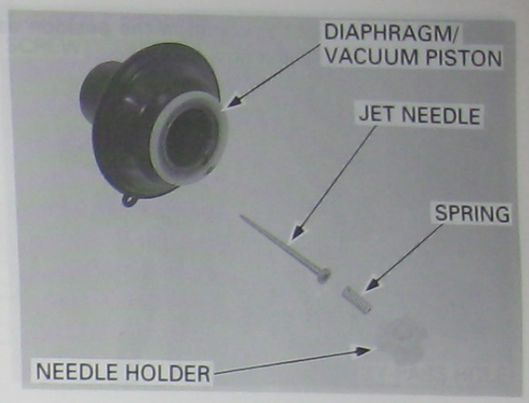
Install a new O-ring into the groove in the float chamber.
Install the float chamber and tighten the four screws.



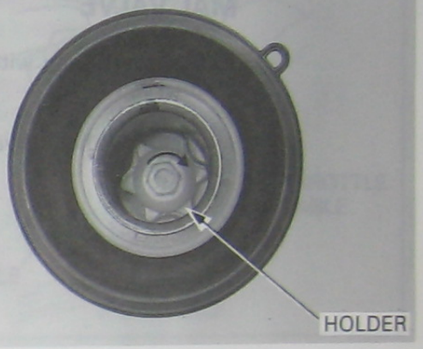


VACUUM CHAMBER

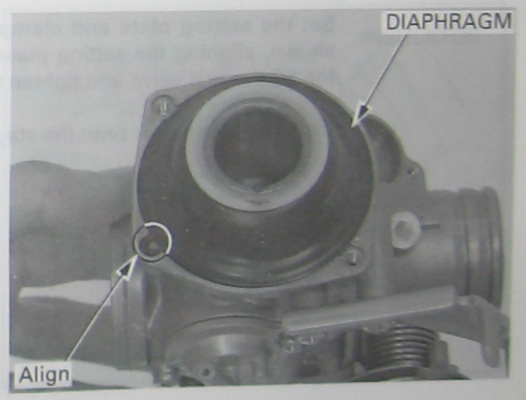
Install the jet needle into the vacuum piston.
Install the spring onto the needle holder and set the needle holder into the piston.



Turn the needle holder clockwise while pressing it until it locks. Holder flanges and piston grooves should be fitted after turning.

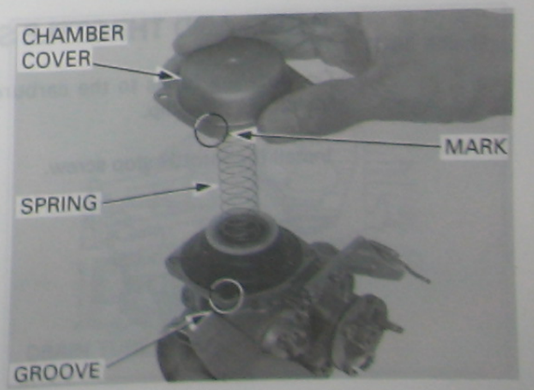


Install the vacuum piston/diaphragm into the carburetor body by aligning the tab with the groove in the carburetor.
Lift the bottom of the piston with your finger to set the diaphragm rib in the groove in the carburetor body.

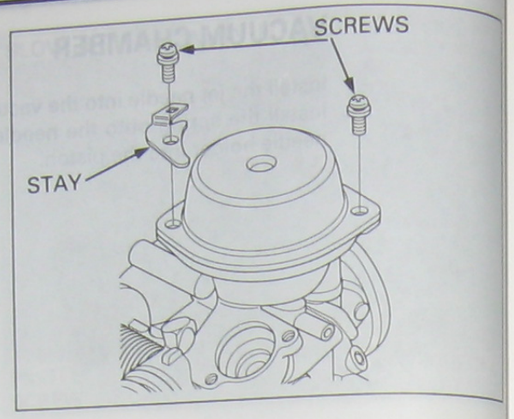


Be careful not to pinch the diaphragm, and to keep the spring straight when compressing the spring.

Install the spring and chamber cover while the piston remains held in place. Align the ○ mark with the groove in the carburetor and hold the cover with your hand.



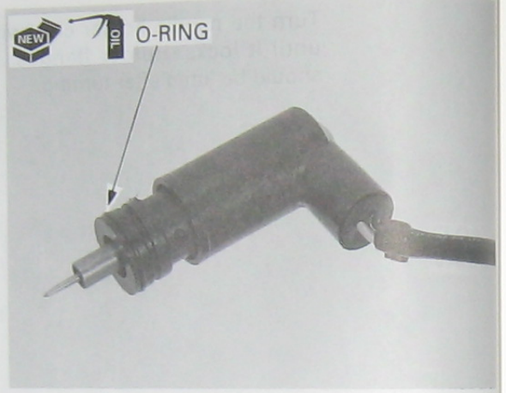
Set the clamp in the position as shown and tighten the chamber screws.



STARTING ENRICHMENT (SE) THERMAL VALVE

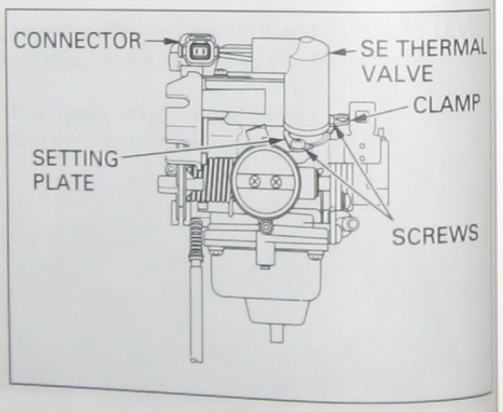
Coat a new O-ring with oil and install it to the SE thermal valve.

Install the SE thermal valve into the carburetor until it fully seated.



Set the setting plate and clamp in the position as shown, aligning the setting plate with the groove in the SE thermal valve and tighten the two screws.

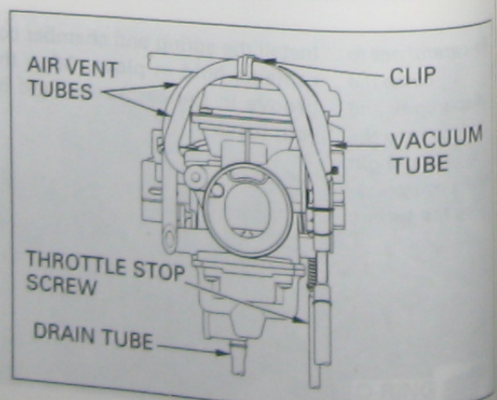
Install the connector onto the stay.



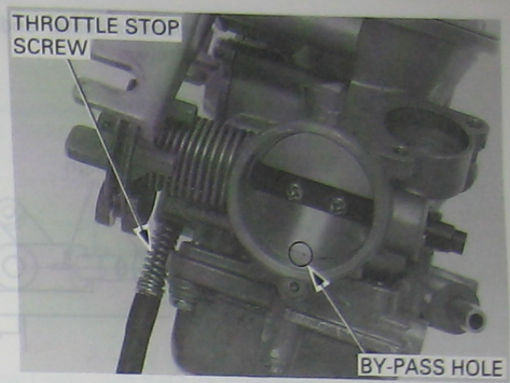
TUBES AND THROTTLE STOP SCREW

Connect the tubes to the carburetor as shown and install the tube clip.

Install the throttle stop screw.

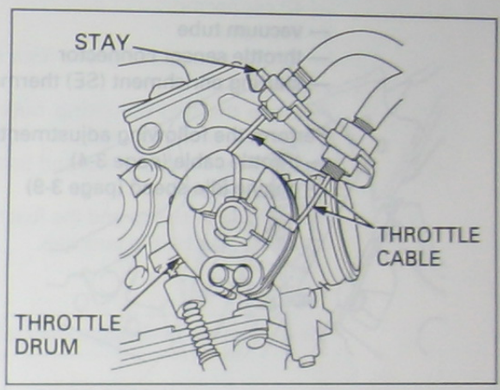


Turn the throttle stop screw to align the throttle valve with the outside (engine side) by-pass hole in the carburetor.



CARBURETOR INSTALLATION

Connect the throttle cables to the throttle drum and install them in the cable stay.

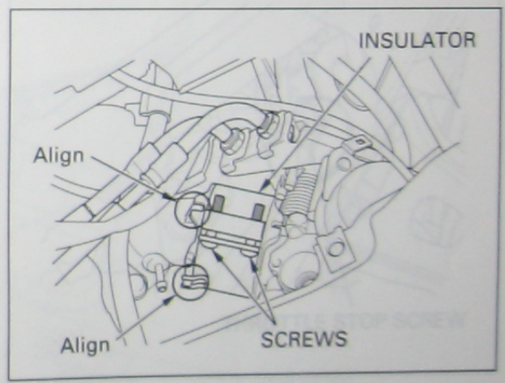


Install the insulator over the carburetor by aligning its groove with the projection on the carburetor. Align the holder on the insulator band with the lower projection on the insulator.

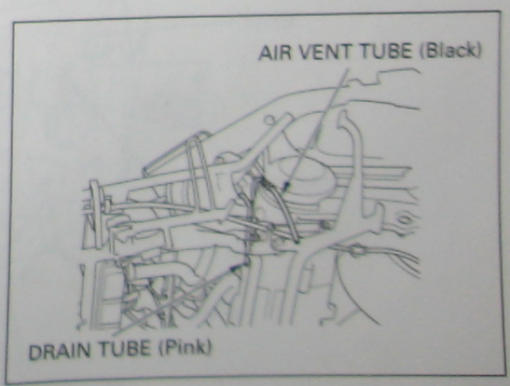
Install the carburetor assembly to the manifold by aligning the insulator groove with the projection on the manifold.

Tighten the insulator band screws until the band ends are contact each other.

TORQUE: 5 N·m (0.5 kgf·m, 3.6 lbf·ft)

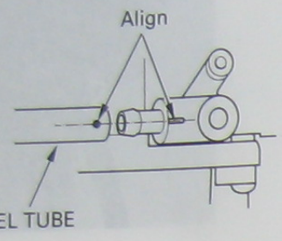


Install the drain and air vent tubes into the clamps.



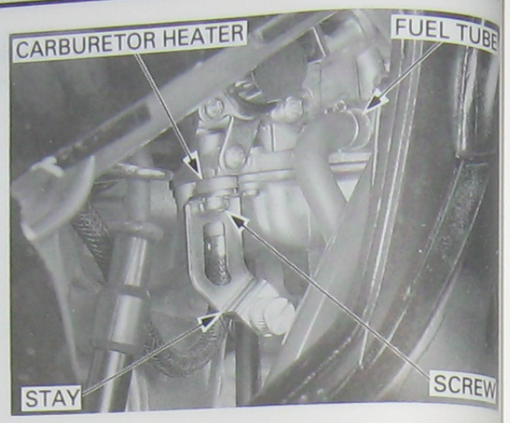
Install the carburetor heater and throttle stop screw stay with the screw.

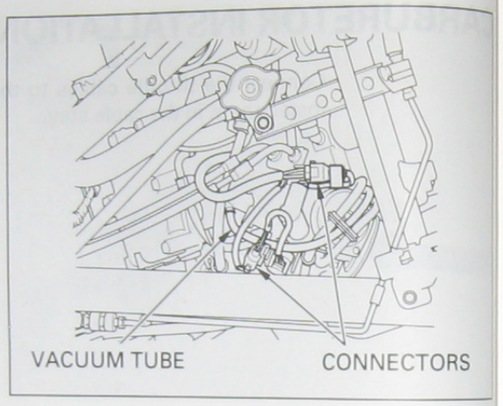
Connect the following:
— fuel tube



— vacuum tube
— throttle sensor connector
— starting enrichment (SE) thermal valve connector

Perform the following adjustment:
— throttle cable (page 3-4)
— engine idle speed (page 3-9)





PILOT SCREW ADJUSTMENT

BEST IDLE 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.

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

CAUTION:

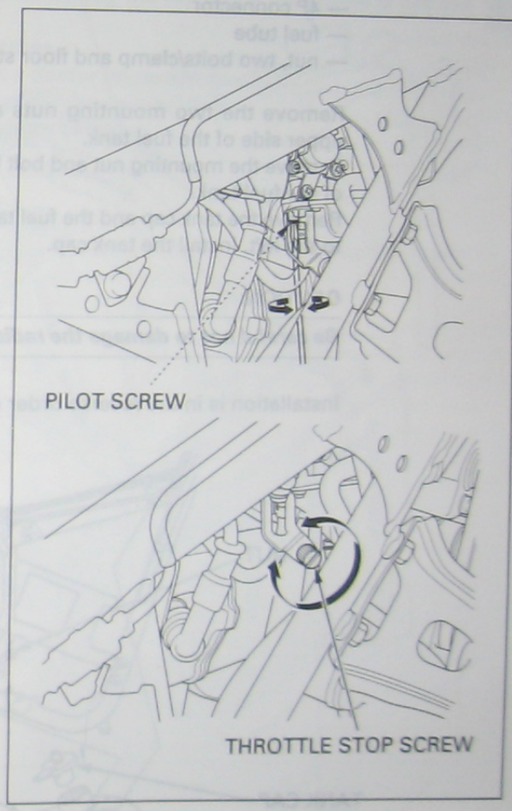
Damage to the pilot screw seat will occur if the pilot screw is tighten against the seat.

PILOT SCREW OPENING: Except SW: 2-1/8 turns out
SW type: 1-7/8 turns out

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

IDLE SPEED: 1,500 ± 100 min^{-1} (rpm)

5. Turn the pilot screw in or out slowly to obtain the highest engine idle speed.
6. Readjust the idle speed to the specified rpm with the throttle stop screw.
7. Make sure that the engine does not miss or run erratically. Repeat step 5 and 6 until engine speed increases smoothly.



FUEL TANK REMOVAL/INSTALLATION

⚠ WARNING

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

Remove the floor steps (page 2-7).
Remove the radiator reserve tank (page 6-13).

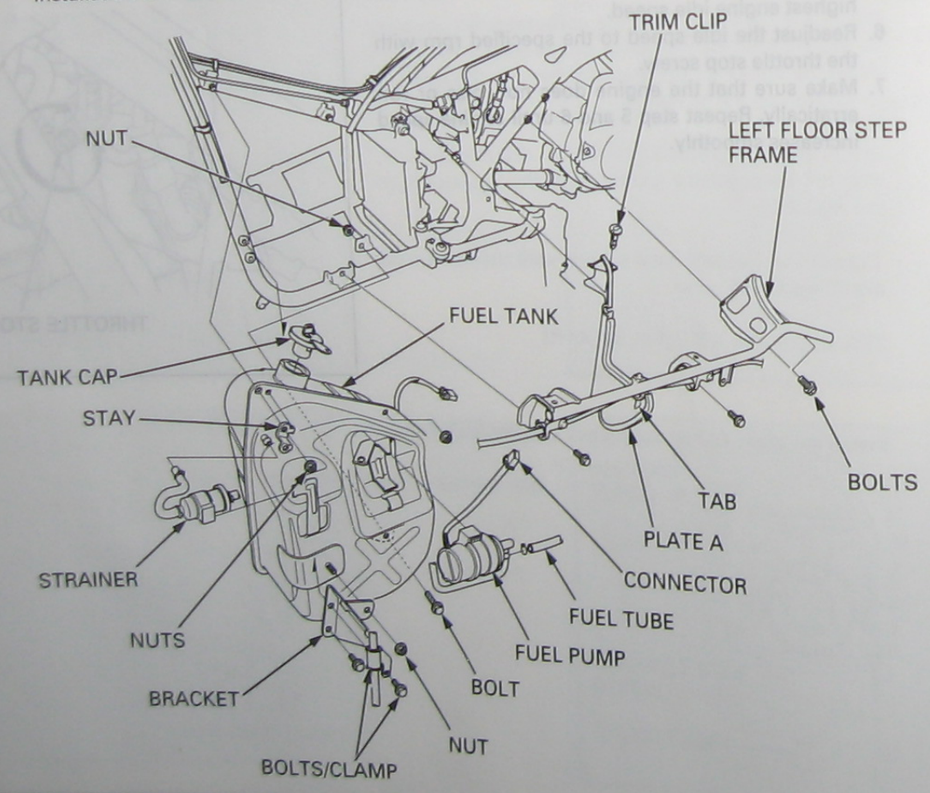
Remove the following:
— trim clip
— tab and air duct plate A
— four bolts and left floor step frame
— 4P connector
— fuel tube
— nut, two bolts/clamp and floor step bracket

Remove the two mounting nuts and stay from the upper side of the fuel tank.
Remove the mounting nut and bolt from the lower side of the fuel tank.
Remove the tank cap and the fuel tank out of the frame to the left. Install the tank cap.

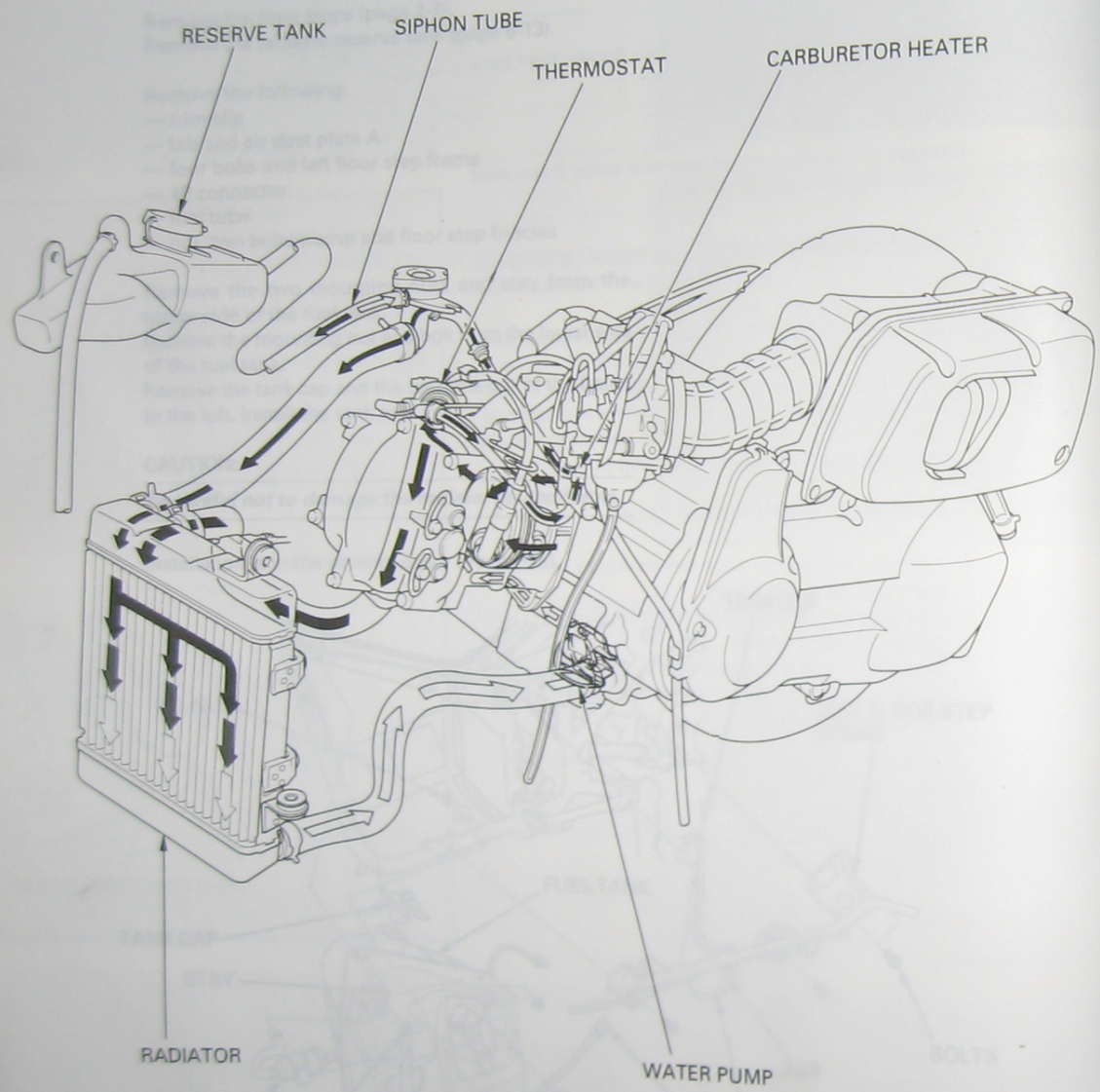
CAUTION:

Be careful not to damage the radiator fin and frame.

Installation is in the reverse order of removal.



MEMO



6. COOLING SYSTEM

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.***

- All cooling system service can be done with the engine installed in the frame.
- Use only distilled water and ethylene glycol in the cooling system. A 50 – 50 mixture is recommended for maximum corrosion protection. Do not use alcohol-based antifreeze or an antifreeze with self sealing properties.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- 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 information.
- Refer to section 18 for engine coolant temperature (ECT) sensor information.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	radiator and engine	1.2 ℓ (1.3 US qt, 1.1 Imp qt)
	reserve tank	0.2 ℓ (0.21 US qt, 0.18 Imp qt)
Radiator cap relief pressure		74 – 103 kPa (0.75 – 1.05 kgf/cm², 11 – 15 psi)
Thermostat	begins to open	69.5 – 72.5°C (157 – 163°F)
	fully open	80°C (176°F)
	valve lift	3.5 mm (0.14 in) minimum

TORQUE VALUE

Water pump impeller	12 N·m (1.2 kgf·m, 9 lbf·ft)

TOOLS

Universal holder	07725 – 0030000
Bearing remover set, 15 mm	07936 – KC10000
— bearing remover, 15 mm	07936 – KC10200
— remover shaft	07936 – KC10100
— remover weight	07741 – 0010201
Driver	07749 – 0010000
Attachment, 28 x 30 mm	07946 – 1870100
Mechanical seal driver attachment	07945 – 4150400
Driver 40 mm I.D.	07746 – 0030100
Attachment, 35 mm I.D.	07746 – 0030400

TROUBLESHOOTING

Engine temperature too high
- Faulty radiator cap
- Faulty temperature gauge or thermosensor
- Air in system
- Passages blocked in radiator, hoses or water jacket
- Thermostat stuck closed
- Faulty cooling fan motor
- Faulty fan motor switch
- Faulty water pump
- Insufficient coolant

Engine temperature too low
- Faulty temperature gauge or thermosensor
- Thermostat stuck open
- Faulty fan motor switch

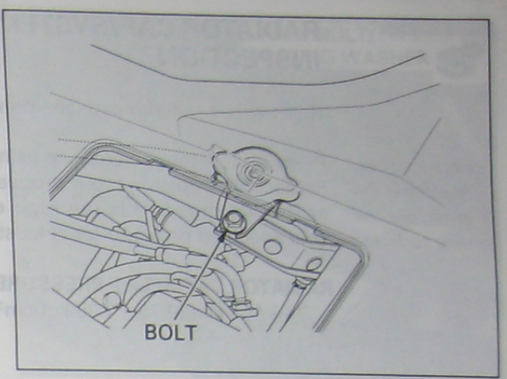
Coolant leaks
- Faulty pump mechanical seal
- Deteriorated O-rings
- Damaged or deteriorated seals or gaskets
- Faulty radiator cap
- Loose hose connection or clamp
- Damaged or deteriorated hoses

SYSTEM TESTING

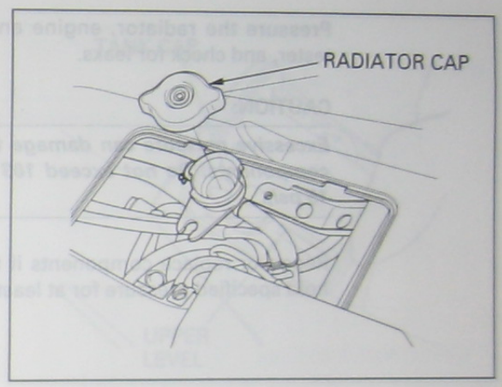
⚠ WARNING

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

Remove the inner maintenance lid (page 3-5).
Remove the bolt and pull out the radiator cap (filler neck) to the lid opening.



Remove the radiator cap.



COOLANT (HYDROMETER TEST)

Test the coolant gravity using a hydrometer.

STANDARD COOLANT CONCENTRATION: 50%

Look for contamination and replace the coolant if necessary.

Coolant specific gravity chart

Coolant temperature °C (°F) / Coolant ratio %	0 (32)	5 (41)	10 (50)	15 (59)	20 (68)	25 (77)	30 (86)	35 (95)	40 (104)	45 (113)	50 (122)
5	1.009	1.009	1.008	1.008	1.007	1.066	1.005	1.003	1.001	0.999	0.997
10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
30	1.053	1.052	1.051	1.049	1.047	1.045	1.043	1.041	1.038	1.035	1.032
35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
45	1.080	1.078	1.076	1.074	1.072	1.069	1.066	1.063	1.060	1.057	1.054
50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Remove the radiator cap (see previous page).

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

Pressure test the radiator cap 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.

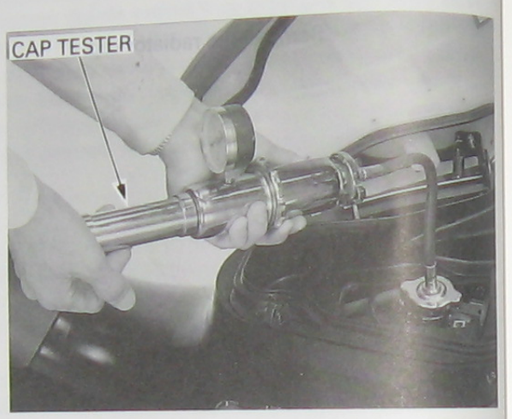
RADIATOR CAP RELIEF PRESSURE:
74 – 103 kPa (0.75 – 1.05 kgf/cm², 11 – 15 psi)

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 103 kPa (1.05 kgf/cm², 15 psi).

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

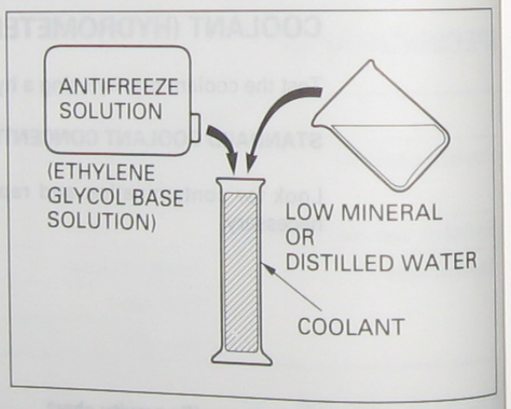


COOLANT REPLACEMENT

PREPARATION

⚠ WARNING

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



NOTE:

- The effectiveness of coolant decrease 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.

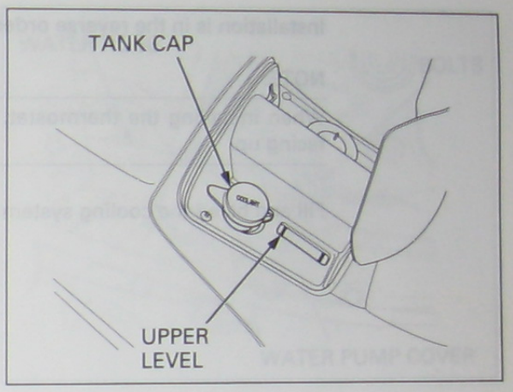
NOTE:

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

Remove the radiator cap (page 6-3).

Remove the drain bolt on the water pump and drain the coolant from the system with the side stand applied.

Open the fuel/reserve tank lid.
Remove the reserve tank cap and drain the coolant from the reserve tank.



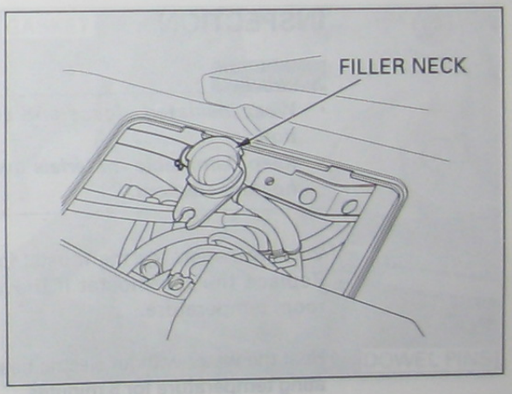
Install the drain bolt with a new sealing washer to the water pump and tighten it.

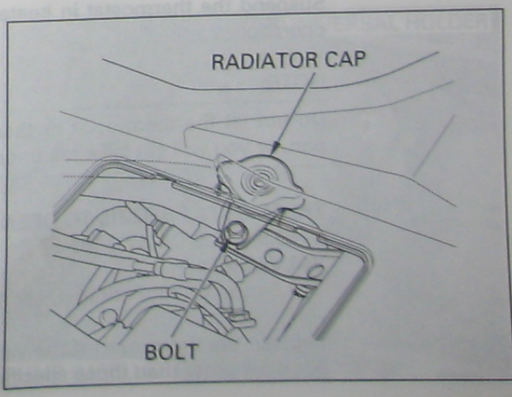
Place the scooter on its center stand on a flat, level surface.
Fill the reserve tank with recommended coolant to the upper level line.

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

Bleed air from the system as follows:
1. 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. Install 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 reserve tank cap.

Install the filler neck onto the frame and tighten the bolt.
Install the maintenance lid.





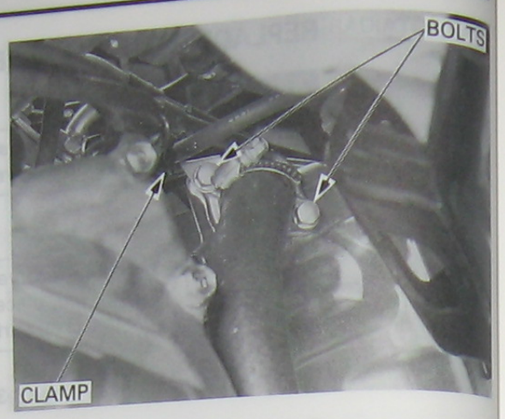
THERMOSTAT

REMOVAL

Drain the coolant (page 6-5).

Remove the following:
— right floor skirt (page 2-5)
— inner maintenance lid (page 3-5)

Remove the two bolts and clamp.
Remove the thermostat housing and the thermostat.

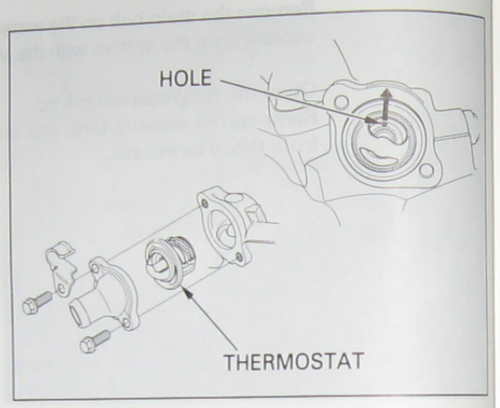


Installation is in the reverse order of removal.

NOTE:

When installing the thermostat, install with its hole facing up.

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



INSPECTION

⚠ WARNING

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

Visually inspect the thermostat for damage.
Replace the thermostat if the valve stays open at room temperature.

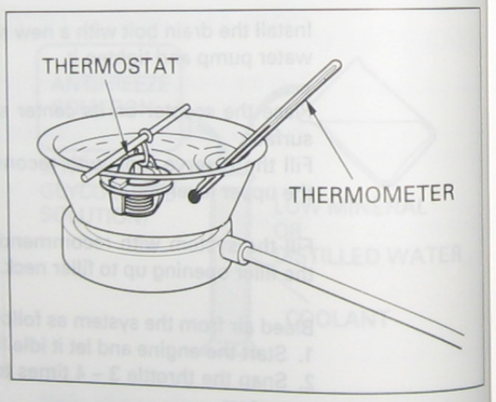
Heat the water with an electric heating element to operating temperature for 5 minutes.
Suspend the thermostat in heated water to check its operation.

NOTE:

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

THERMOSTAT BEGINS TO OPEN:
69.5 – 72.5°C (157 – 163°F)
VALVE LIFT:
3.5 mm (0.14 in) minimum at 80°C (176°F)

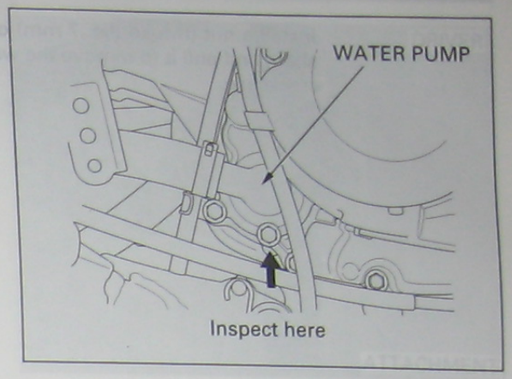
Replace the thermostat if the valve responds at temperature other than those specified.



WATER PUMP

MECHANICAL SEAL INSPECTION

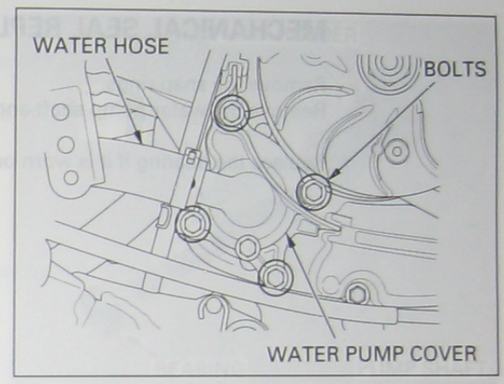
Inspect the telltale hole for signs of coolant leakage.
If there is leakage, the mechanical seal is defective, and it should be replaced (page 6-8).



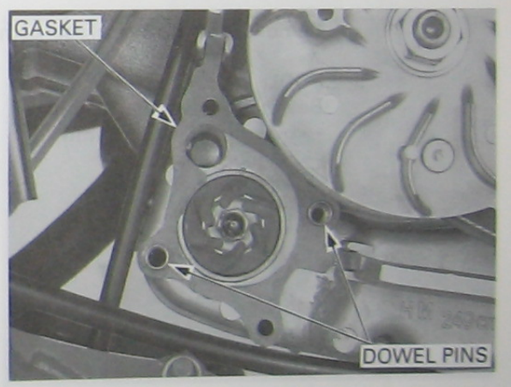
REMOVAL

Drain the coolant from the system (page 6-5).
Remove the left crankcase cover (page 10-2).

Disconnect the water hose.
Remove the four bolts and the water pump cover.



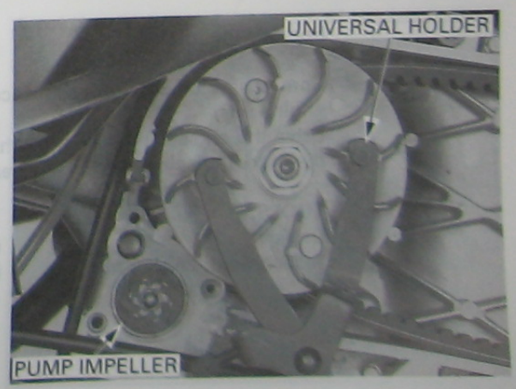
Remove the gasket and dowel pins.



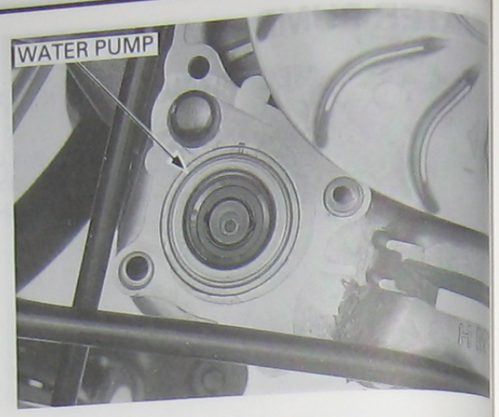
Hold the drive pulley face with the universal holder, and remove the pump impeller.

TOOL:

Universal holder	07725 – 0030000



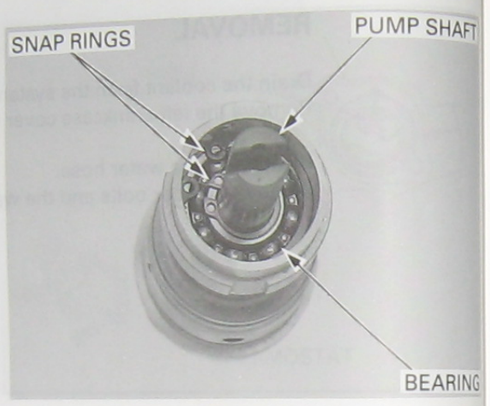
Install a nut (thread dia. 7 mm) onto the water pump shaft, and pull it to remove the water pump out of the crankcase.



MECHANICAL SEAL REPLACEMENT

Remove the snap rings.
Remove the water pump shaft and bearing.

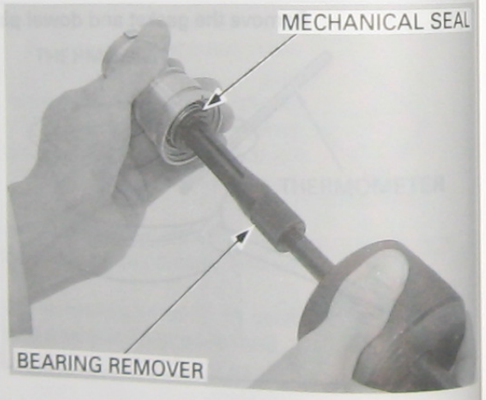
Replace the bearing if it is worn or damaged.



Remove the mechanical seal using the special tool.

TOOL:

Bearing remover set, 15 mm	07936 – KC10000
— bearing remover, 15 mm	07936 – KC10200
— remover shaft	07936 – KC10100
— remover weight	07741 – 0010201



Remove the oil seal.

Coat a new oil seal outer surface and seal lip with engine oil.
Drive the oil seal into the pump holder squarely with the marking facing up until it is seated.

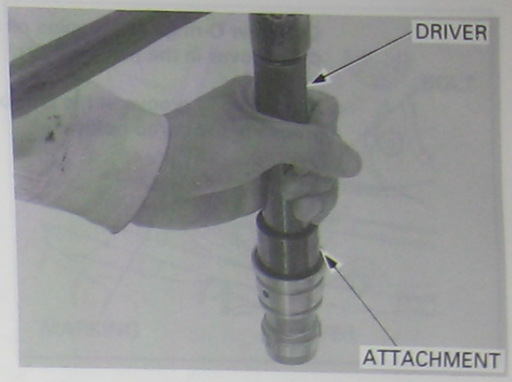
TOOLS:

Driver	
Attachment, 28 x 30 mm	07746 – 0010000 07946 – 1870100

Drive a new mechanical seal into the pump holder.

TOOLS:

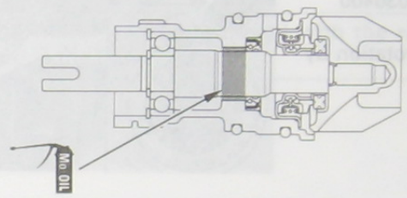
Driver	07749 – 0010000
Mechanical seal driver attachment	07945 – 4150400

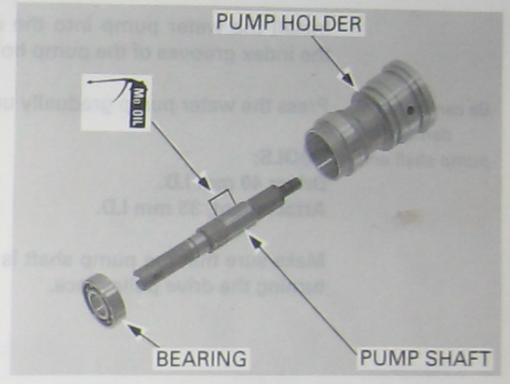


Clean any oil from the pump shaft, and apply molybdenum oil solution to the shaft journal.

CAUTION:

Do not apply to the mechanical seal sliding surface of the pump shaft.



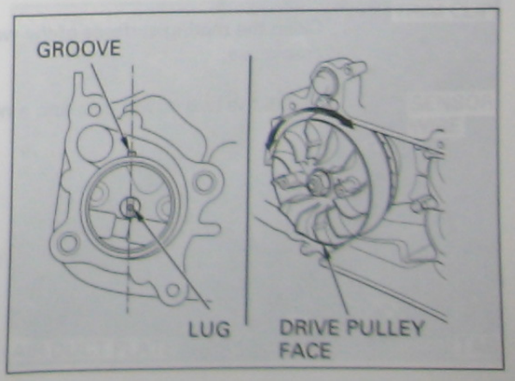


Install the bearing onto the pump shaft and secure it with the snap ring.
Install the pump shaft assembly into the pump holder and secure it with the snap ring.

Make sure that the snap rings are fully seated in the grooves and the pump shaft is smooth rotation after installing.

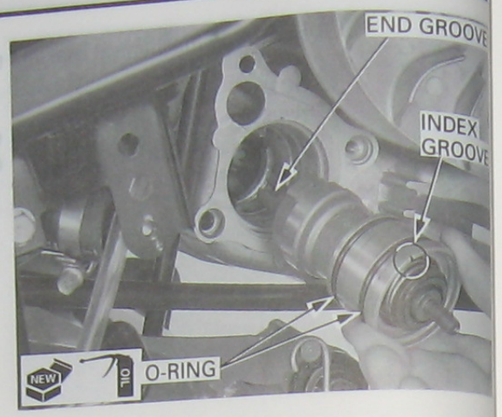
INSTALLATION

Align the lug of the pump shaft with the index groove of the crankcase vertically by turning the drive pulley face.



Coat new O-rings with engine oil and install them into the grooves in the pump holder.

Align the end groove of the pump shaft with the index groove of the pump holder.



Install the water pump into the crankcase, aligning the index grooves of the pump holder and crankcase.

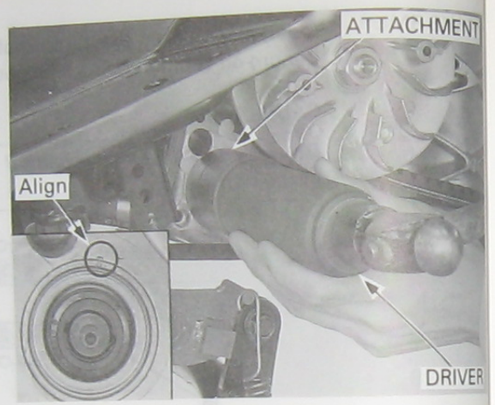
Be careful not to damage the pump shaft end.

Press the water pump gradually until it is seated.

TOOLS:

Driver 40 mm I.D.	07746 – 0030100
Attachment, 35 mm I.D.	07746 – 0030400

Make sure that the pump shaft is smooth rotation by turning the drive pulley face.

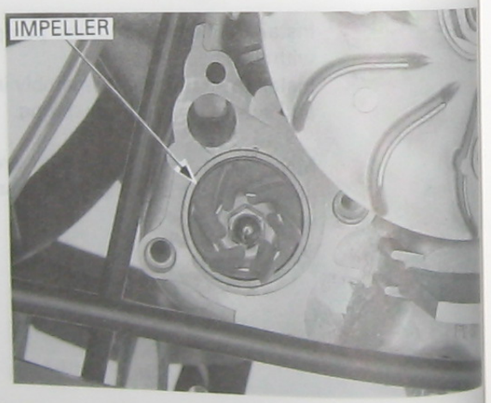


Install the impeller.
Hold the drive pulley with the universal holder and tighten the impeller.

TOOL:

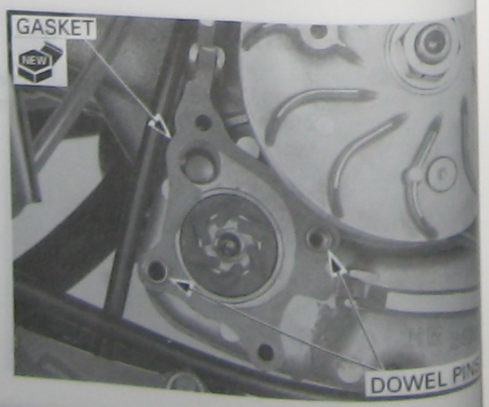
Universal holder	07725 – 0030000

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Clean the mating surfaces of the water pump cover and crankcase.

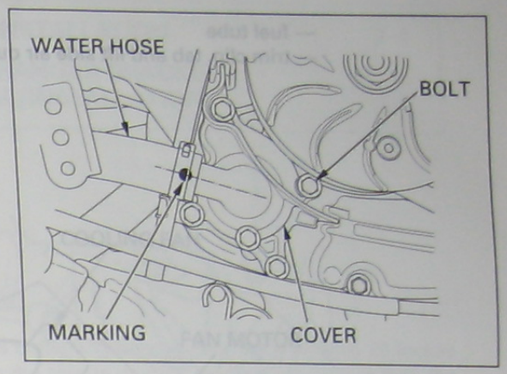
Install the two dowel pins and a new gasket.



Install the pump cover and tighten the four bolts.
Connect the water hose with the marking facing outside and secure it with the hose clamp.

Install the left crankcase cover (page 10-3).

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



RADIATOR/COOLING FAN

CAUTION:

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

NOTE:

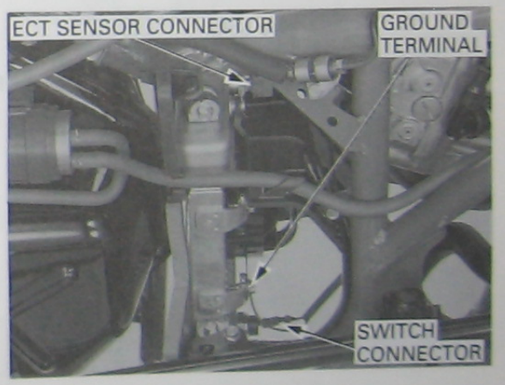
The fan motor can be removed with the radiator installed in the frame.

REMOVAL/INSTALLATION

Drain the coolant from the system (page 6-5).

Remove the following:
— under cover (page 2-5)
— floor steps (page 2-7)

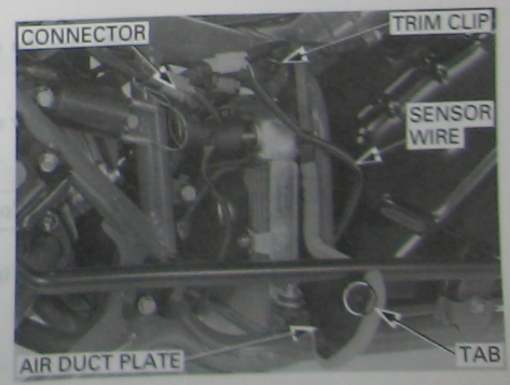
Disconnect the following:
— engine coolant temperature (ECT) sensor connector (2P Green)
— fan motor switch connector
— ground wire (removing fan motor mounting bolt)



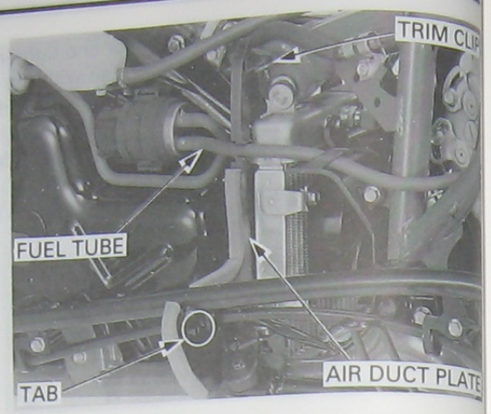
— ECT sensor/fan motor switch connector (3P Red)

If only the fan motor is to be removed from the radiator, it can be removed by removing the two mounting bolts.

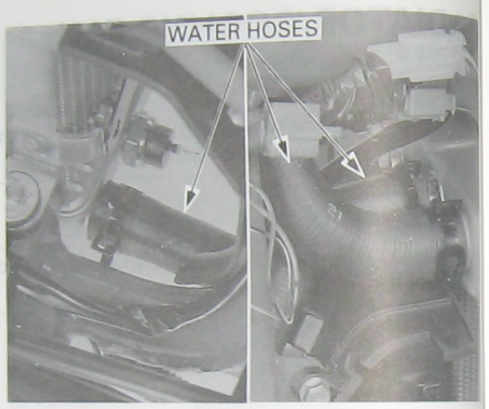
Remove the following:
— fuel level sensor wire
— trim clip, tab and right side air duct plate



— fuel tube
— trim clip, tab and lift side air duct plate

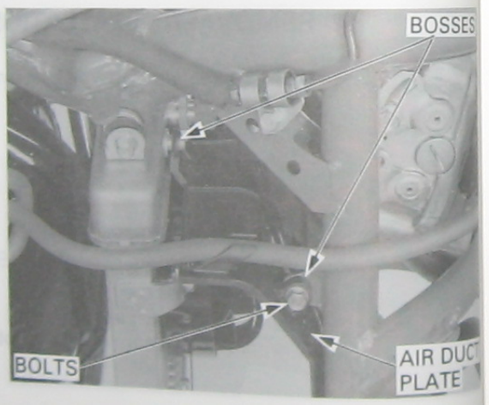


— water hoses



— two bolts

Remove the rear air duct plate from the bosses on the frame and radiator.



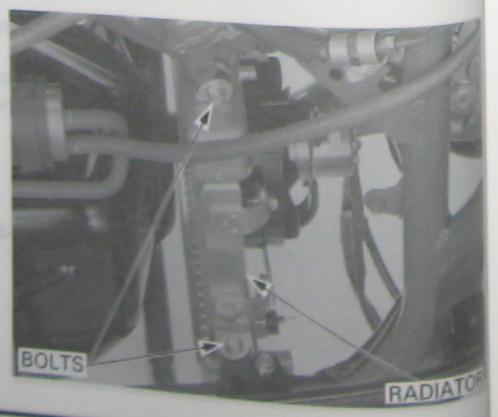
Remove the three bolts and the radiator out of the frame.

Installation is in the reverse order of removal.

NOTE:

Route the wire harness properly (page 1-18).

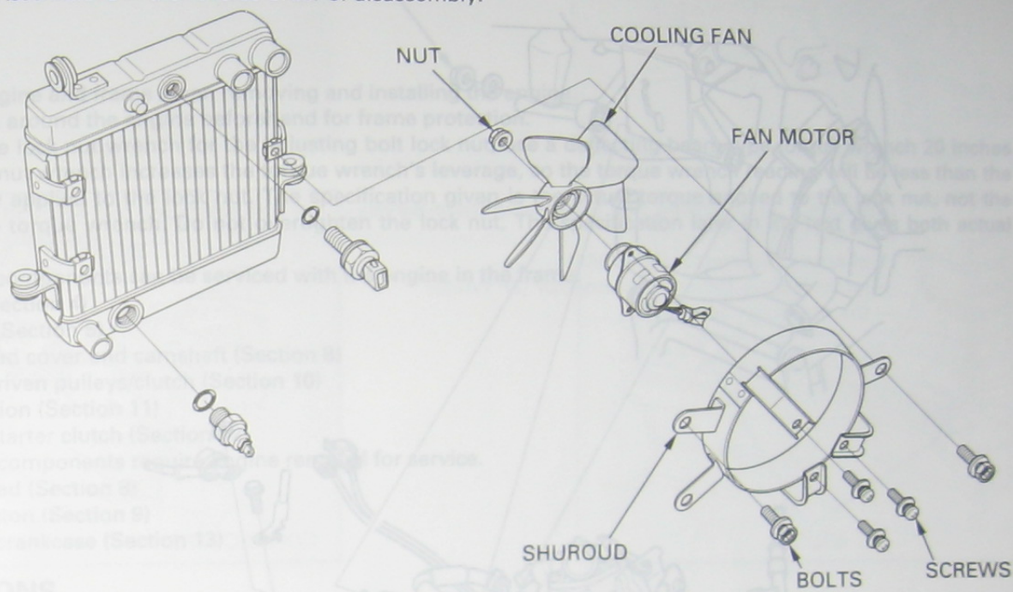
Fill and bleed the cooling system (page 6-5).



DISASSEMBLY/ASSEMBLY

Remove the following:
— two bolts and fan motor assembly
— three screws and fan motor
— nut and cooling fan

Assemble is in the reverse order of disassembly.



RADIATOR RESERVE TANK

REMOVAL

Remove the front inner cover (page 2-7).

Remove the bolt and the reserve tank from the fuel tank.

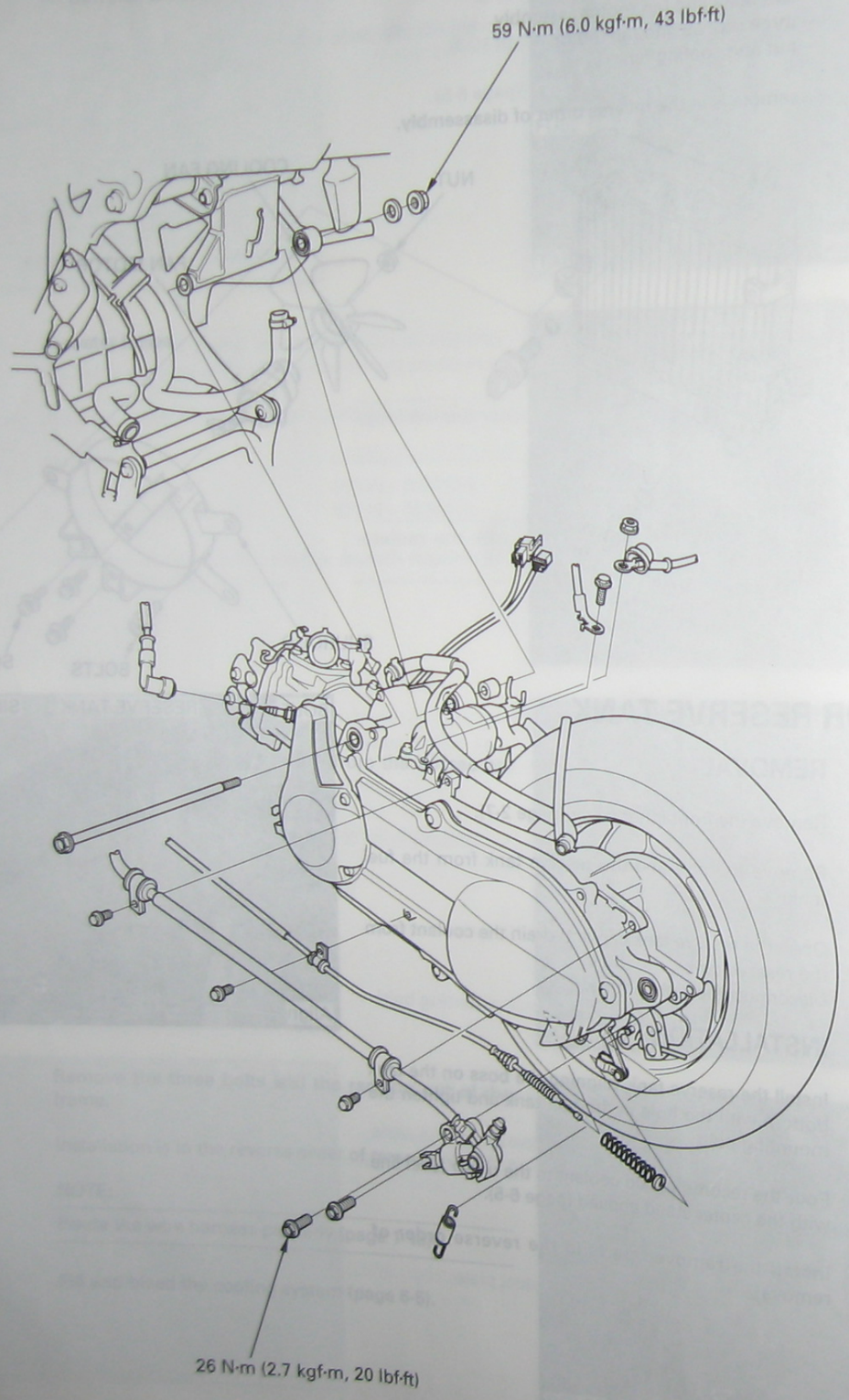
Open the reserve tank cap and drain the coolant from the reserve tank.
Disconnect the siphon tube.

INSTALLATION

Install the reserve tank, aligning the boss on the tank bottom with the hole in the fuel tank and tighten the mounting bolt.

Pour the recommended coolant to the upper level line with the center stand applied (page 6-5).

Install the removed parts in the reverse order of removal.



7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION

GENERAL

- Support the engine and frame when removing and installing the engine.
- Tape the frame around the engine beforehand for frame protection.
- When using the lock nut wrench for the adjusting bolt lock nut, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench. Do not overtighten the lock nut. The specification later in the text gives both actual and indicated.
- The following components can be serviced with the engine in the frame.
  — Oil pump (Section 4)
  — Carburetor (Section 5)
  — Cylinder head cover and camshaft (Section 8)
  — Drive and driven pulleys/clutch (Section 10)
  — Final reduction (Section 11)
  — Alternator/starter clutch (Section 12)
- The following components require engine removal for service.
  — Cylinder head (Section 8)
  — Cylinder/piston (Section 9)
  — Crankshaft/crankcase (Section 13)

SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine dry weight		37.2 kg (82 lbs)
Engine oil capacity	at draining	1.1 ℓ (1.2 US qt, 1.0 Imp qt)
	at disassembly	1.3 ℓ (1.5 US qt, 1.1 Imp qt)
Coolant capacity (radiator and engine)		1.2 ℓ (1.3 US qt, 1.1 Imp qt)

TORQUE VALUES

Engine hanger adjusting bolt	15 N·m (1.5 kgf·m, 11 lbf·ft)	
Engine hanger lock nut	42 N·m (4.3 kgf·m, 31 lbf·ft)	
Engine hanger pivot nut	78 N·m (8.0 kgf·m, 58 lbf·ft)	
Sub-bracket pivot nut	62 N·m (6.3 kgf·m, 46 lbf·ft)	
Sub-bracket stopper nut	26 N·m (2.7 kgf·m, 20 lbf·ft)	
Tension rod nut	20 N·m (2.0 kgf·m, 14 lbf·ft)	
Engine mounting nut	59 N·m (6.0 kgf·m, 43 lbf·ft)	
Thrust cylinder mounting bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	ALOC bolt. Do not reuse.

TOOLS

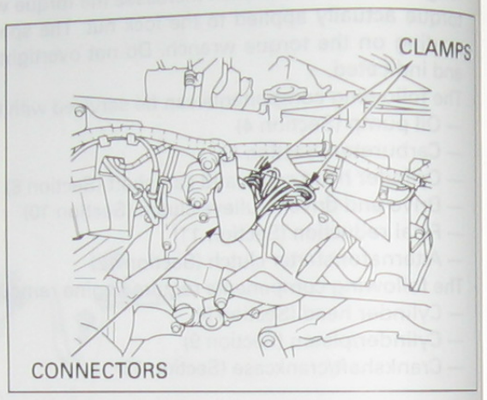
Lock nut wrench	07KMA – KAB0100

ENGINE REMOVAL

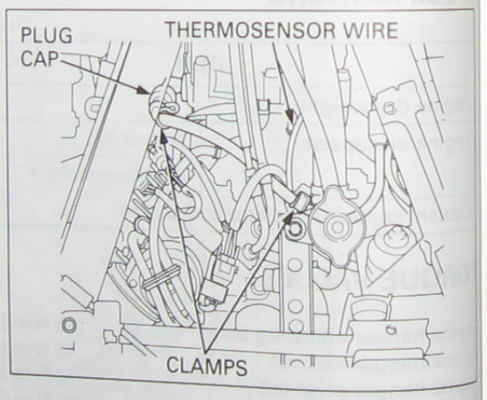
Drain the coolant from the system (page 6-5).

Remove the following:
— floor steps (page 2-7)
— carburetor (page 5-4)

Disconnect the following and release the there wires from the clamps:
— alternator connector (3P White)
— ignition pulse generator connector (2P White)
— thermosensor connector

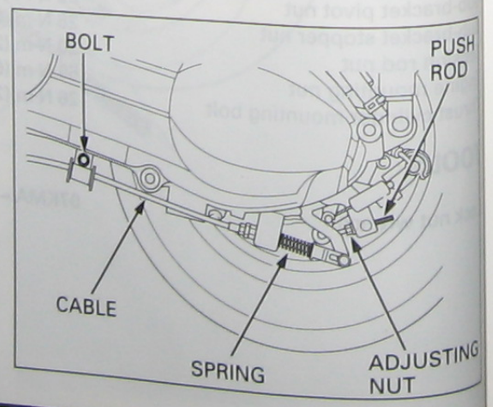


— spark plug cap

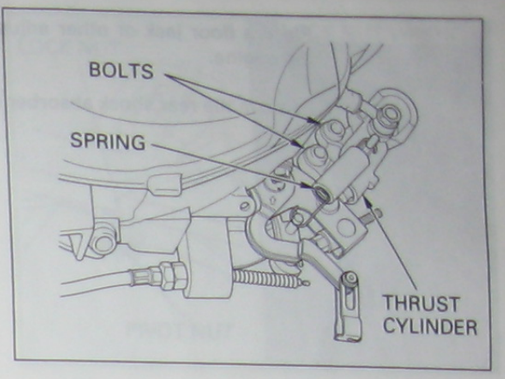


Loosen the rear brake adjusting nut while pushing the push rod.
Disconnect the brake lock cable from the sub-arm and remove the spring.

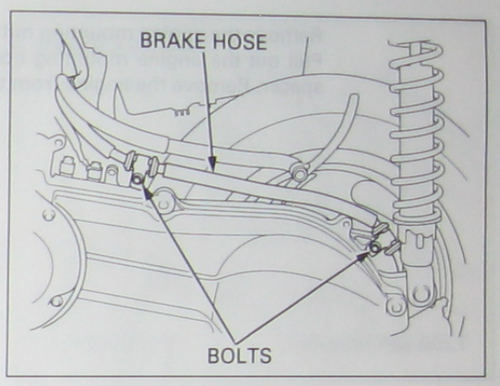
Remove the bolt and the lock cable from the crankcase.



Remove the spring.
Remove the two bolts and the thrust cylinder from the brake panel.

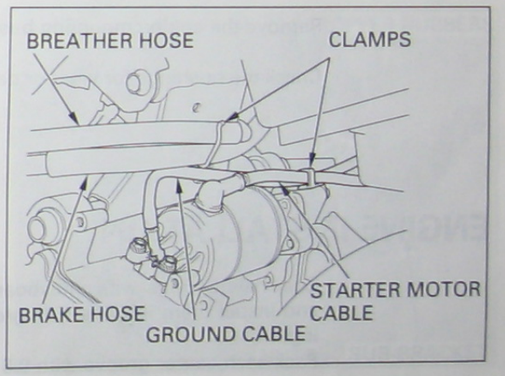


Remove the two bolts and the brake hose from the crankcase.

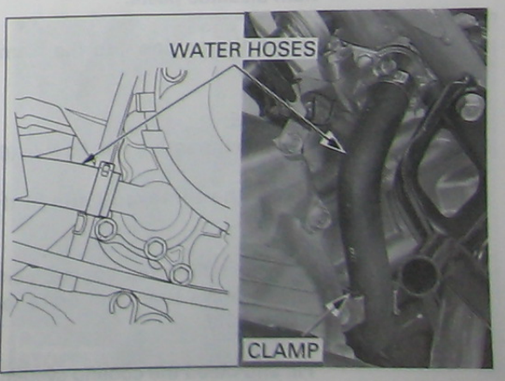


Release the breather and brake hoses from the clamps.

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



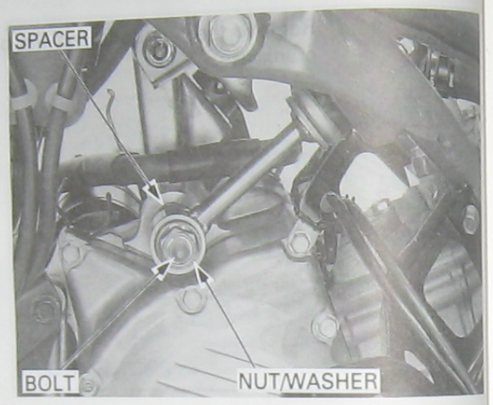
Disconnect the water hoses from the water pump and thermostat. Release the water hose from the clamp.



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

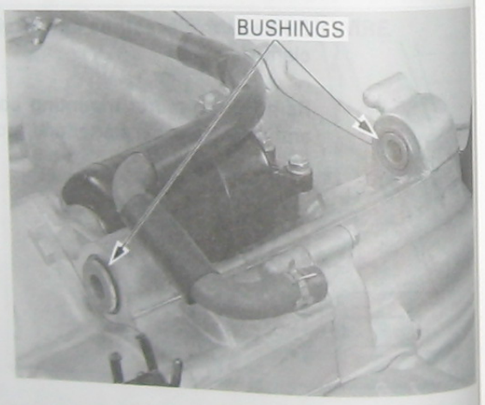
Remove the rear shock absorber (page 15-5).

Remove the engine mounting nut and washer.
Pull out the engine mounting bolt, then remove the spacer. Remove the engine from the frame.



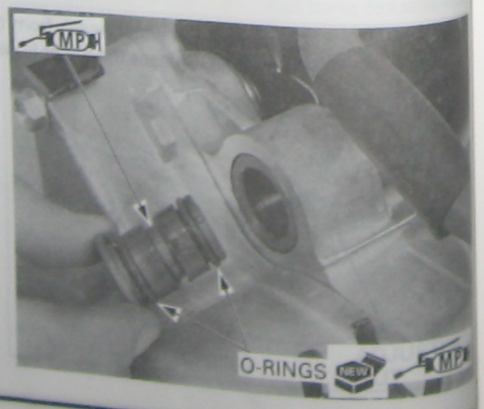
Remove the engine mounting bushings.

Check the bushings for wear or damage.



ENGINE INSTALLATION

Coat new O-rings with molybdenum disulfide paste and install them into the side grooves in each bushing.
Pack each center groove with 0.5 – 0.7 g of molybdenum disulfide paste.



Install the engine into the frame in the reverse of removal.

TORQUE:
Engine mounting nut: 59 N·m (6.0 kgf-m, 43 lbf-ft)

Install the removed parts in the reverse order of removal.

After installing the engine, perform the rear (combined) brake lever and brake lock cable adjustment (page 3-13).

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

ENGINE HANGER BRACKET REMOVAL/ INSTALLATION

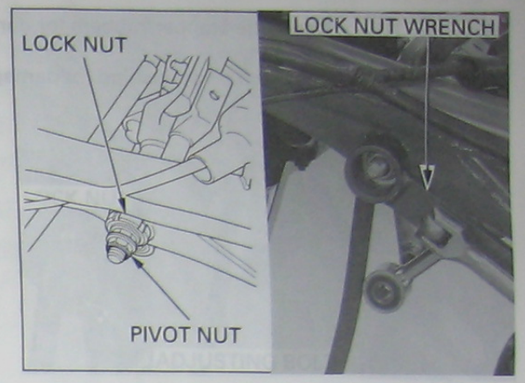
REMOVAL

HANGER BRACKET

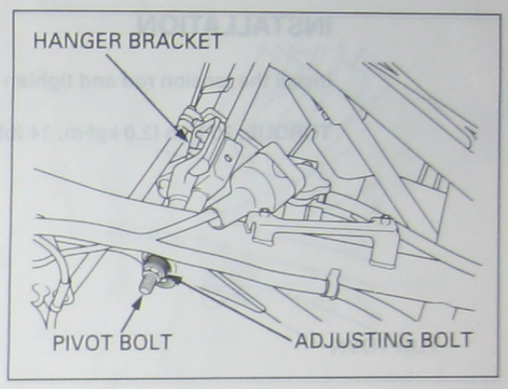
Remove the engine (page 7-2).

Remove the pivot nut.
Loosen the lock nut.

TOOL:
Lock nut wrench 07KMA – KAB0100

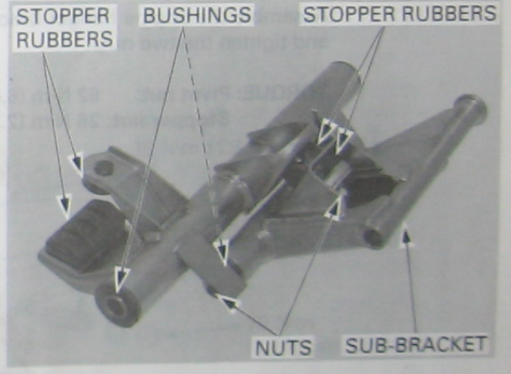


Loosen the adjusting bolt.
Pull out the pivot bolt and remove the hanger bracket from the frame.



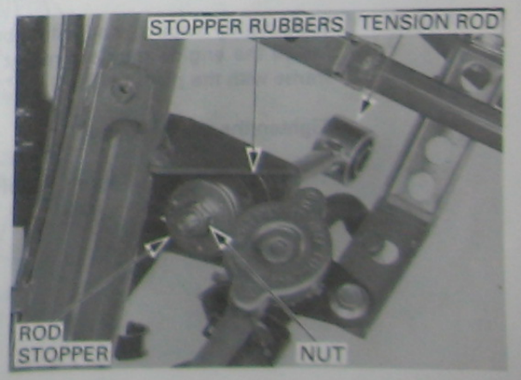
Remove the two nuts and separate the engine hanger bracket and sub-bracket.

Check the stopper rubbers for damage, wear or deterioration.
Check the pivot bushings for damage or wear.

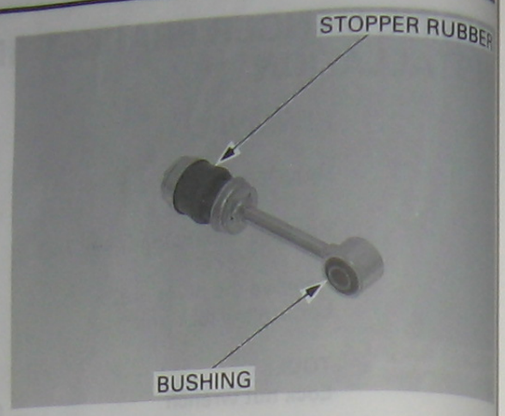


TENSION ROD

Remove the luggage box (page 2-9).
Remove the nut and the tension rod, stopper rubbers and rod stopper.



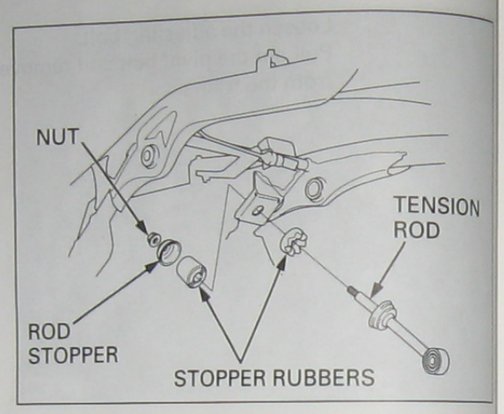
Check the stopper rubbers for damage, wear or deterioration.
Check the pivot bushing for damage or wear.



INSTALLATION

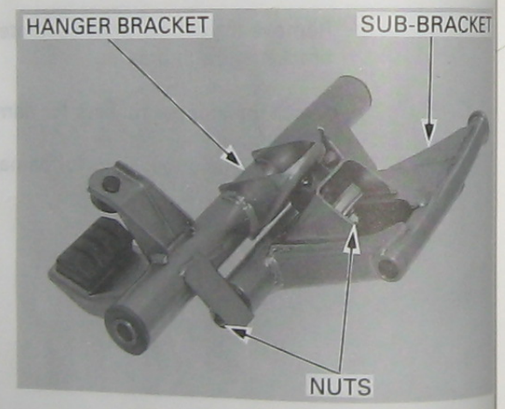
Install the tension rod and tighten the nut.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)



Assemble the engine hanger bracket and sub-bracket and tighten the two nuts.

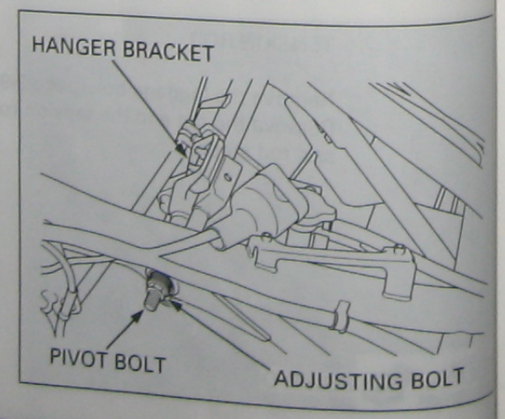
TORQUE: **Pivot nut:** 62 N·m (6.3 kgf·m, 46 lbf·ft)
Stopper nut: 26 N·m (2.7 kgf·m, 20 lbf·ft)



Temporarily install the adjusting bolt into the frame.
Install the engine hanger bracket assembly into the frame with the pivot bolt.

Tighten the adjusting bolt.

TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

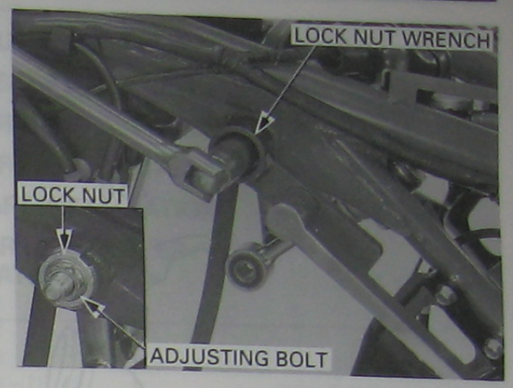


Install the lock nut onto the adjusting bolt.
Hold the adjusting bolt and tighten the lock nut using the lock nut wrench.

TOOL:
Lock nut wrench 07KMA – KAB0100

Refer to torque wrench reading information, on page 7-1 "Service Information".

TORQUE: **Actual:** 42 N·m (4.3 kgf·m, 31 lbf·ft)
Indicated: 38 N·m (3.9 kgf·m, 28 lbf·ft)

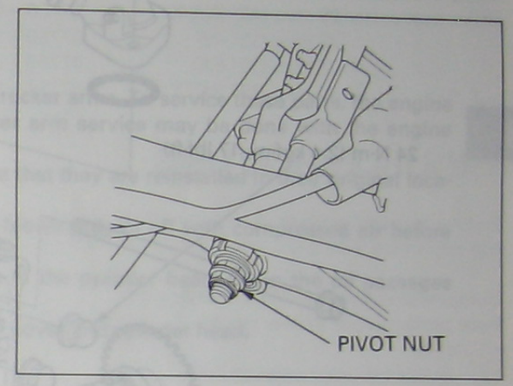


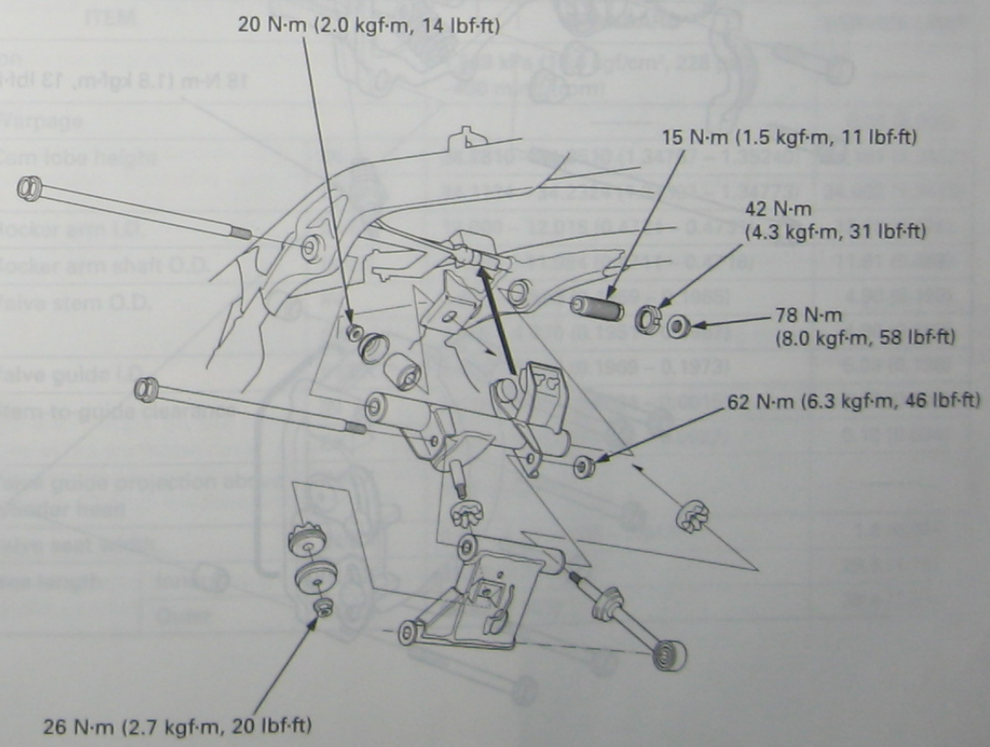
Install the pivot nut and tighten it.

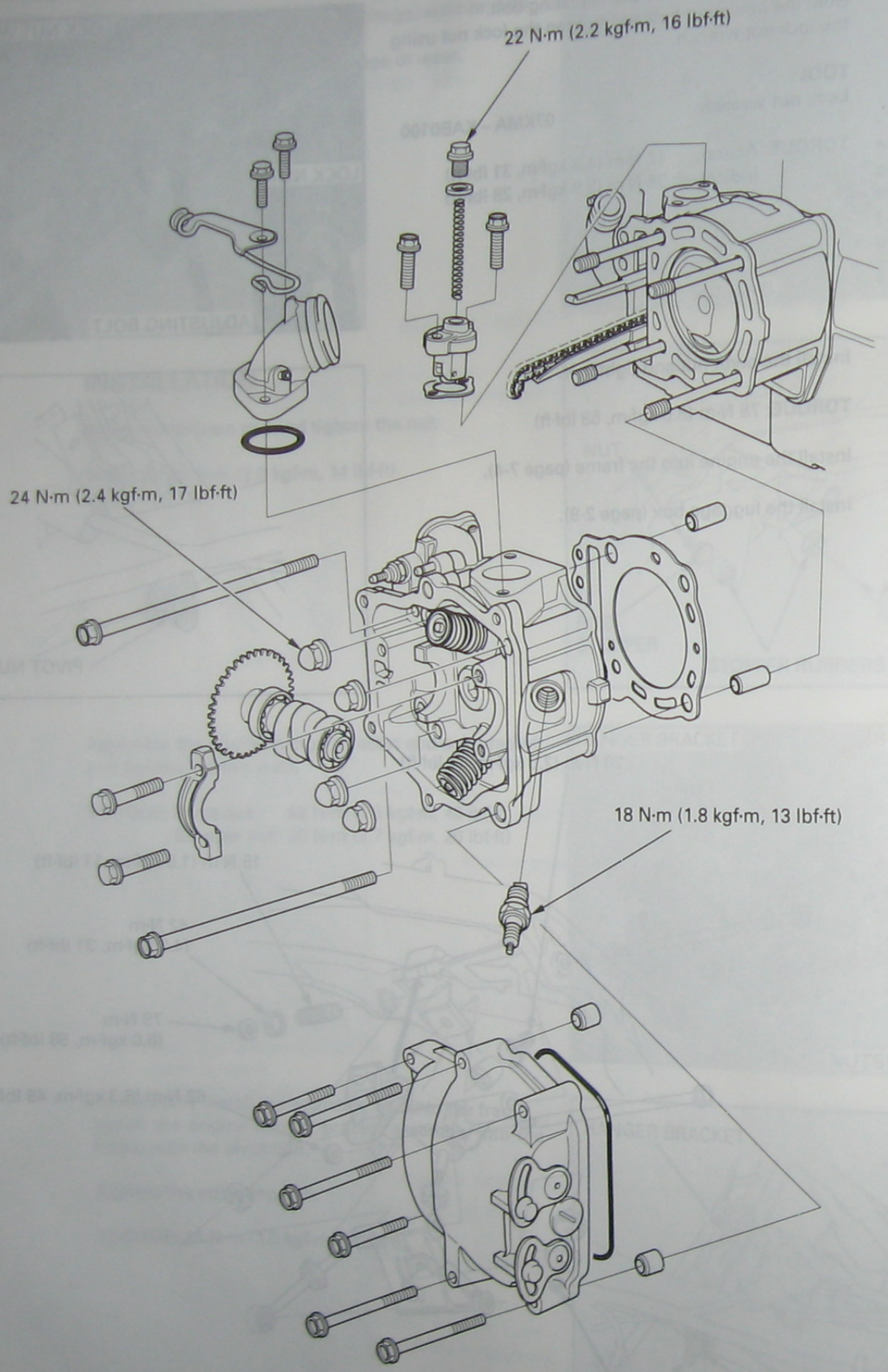
TORQUE: 78 N·m (8.0 kgf·m, 58 lbf·ft)

Install the engine into the frame (page 7-4).

Install the luggage box (page 2-9).







8. CYLINDER HEAD/VALVE

SERVICE INFORMATION

GENERAL

- This section covers service of the cylinder head, valves, camshaft and rocker arms. To service these parts, the engine must be removed from the frame. However, the camshaft and rocker arm service may 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.
- Camshaft and rocker arm lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling cylinder head.
- Be careful not to damage the mating surfaces when removing the head cover and cylinder head.

SPECIFICATIONS

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT
Cylinder compression				1,569 kPa (16.0 kgf/cm², 228 psi) –400 min⁻¹ (rpm)	———
Cylinder head	Warpage			———	0.05 (0.002)
Camshaft	Cam lobe height		IN	34.2310 – 34.3510 (1.34767 – 1.35240)	34.181 (1.3457)
			EX	34.1124 – 34.2324 (1.34301 – 1.34773)	34.062 (1.3410)
Rocker arm	Rocker arm I.D.		IN/EX	12.000 – 12.018 (0.4724 – 0.4731)	12.10 (0.476)
	Rocker arm shaft O.D.		IN/EX	11.966 – 11.984 (0.4711 – 0.4718)	11.91 (0.469)
Valve and valve guide	Valve stem O.D.		IN	4.975 – 4.990 (0.1959 – 0.1965)	4.90 (0.193)
			EX	4.955 – 4.970 (0.1951 – 0.1957)	4.90 (0.193)
	Valve guide I.D.		IN/EX	5.000 – 5.012 (0.1969 – 0.1973)	5.03 (0.198)
	Stem-to-guide clearance		IN	0.010 – 0.037 (0.0004 – 0.0015)	0.08 (0.003)
			EX	0.030 – 0.057 (0.0012 – 0.0022)	0.10 (0.004)
	Valve guide projection above cylinder head		IN/EX	11.5 (0.45)	———
	Valve seat width		IN/EX	0.90 – 1.10 (0.035 – 0.043)	1.8 (0.07)
Valve spring	Free length	Inner	IN/EX	31.06 (1.223)	29.5 (1.16)
		Outer	IN/EX	40.42 (1.591)	38.4 (1.51)

TORQUE VALUES

Timing hole cap	6 N·m (0.6 kgf·m, 4.3 lbf·ft)
Adjusting hole cap	6 N·m (0.6 kgf·m, 4.3 lbf·ft)
Cylinder head cap nut	24 N·m (2.4 kgf·m, 17 lbf·ft)
Cam chain adjuster sealing bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)
Spark plug	18 N·m (1.8 kgf·m, 13 lbf·ft)

TOOLS

Valve spring compressor	07757 – 0010000
Spring compressor attachment	07959 – KM30101
Valve guide driver, 5 mm	07742 – MA60000
Valve guide reamer	07984 – MA60001
Valve seat cutter holder	07781 – 0010400
Valve seat cutter 29 mm (45° IN/EX)	07780 – 0010300
33 mm (32° IN)	07780 – 0012900
28 mm (32° EX)	07780 – 0012100
30 mm (60° IN/EX)	07780 – 0014000

TROUBLESHOOTING

Engine top-end problems usually affect engine performance. These can be diagnosed by a compression test, or by tracing top-end noise with a sounding rod or stethoscope.

Compression too low, Hard starting or Poor performance at low speed
- Valves
  - — Incorrect valve adjustment
  - — Burned or bent valves
  - — Incorrect valve timing
  - — Broken valve springs
  - — Uneven valve seating
- Cylinder head
  - — Leaking or damaged cylinder head gasket
  - — Wraped or cracked cylinder head
  - — Loose spark plug
- Cylinder/piston problem (section 9)

Compression too high
- Excessive carbon built-up on piston or combustion chamber

Excessive smoke
- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (section 9)

Excessive noise
- Incorrect valve clearance
- Sticking valve or broken valve spring
- Excessive worn valve seat
- Worn or damaged camshaft
- Worn or damaged rocker arm and/or shaft
- Worn or damaged cam sprocket teeth
- Loose or worn cam chain
- Worn or damaged cam chain tensioner
- Cylinder/piston problem (section 9)

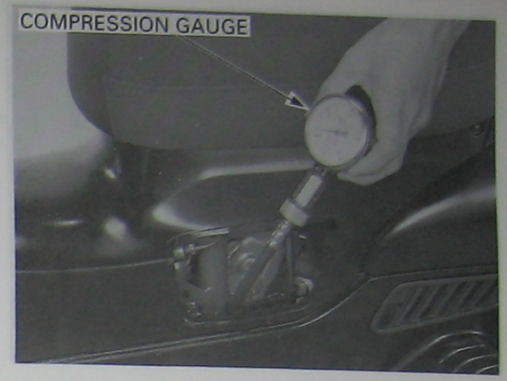
Rough idling
- Low cylinder compression

CYLINDER COMPRESSION

Warm up the engine to normal operating temperature.

Stop the engine, disconnect the spark plug cap and 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 and crank the engine until the gauge reading stops rising. The maximum reading is usually reached within 4 – 7 seconds.



COMPRESSION PRESSURE:
1,569 kPa (16.0 kgf/cm², 228 psi) at 400 min⁻¹ (rpm)

Low compression can be caused by:
- — blown cylinder head gasket
- — improper valve adjustment
- — valve leakage
- — worn piston ring or cylinder (section 9)

High compression can be caused by:
- — carbon deposits in combustion chamber or on piston head

CYLINDER HEAD COVER REMOVAL

Remove the ignition coil (page 18-7).

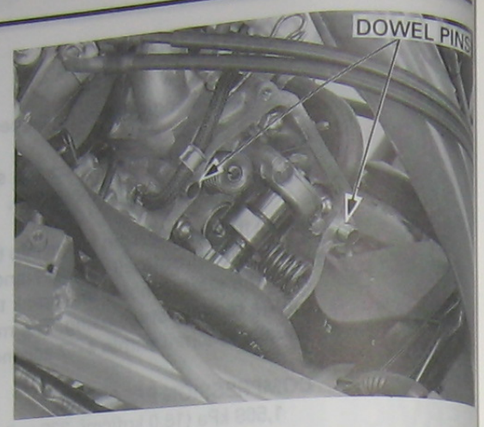
NOTE:

When the cylinder head/valves or cylinder is to be serviced, remove the engine from the frame.

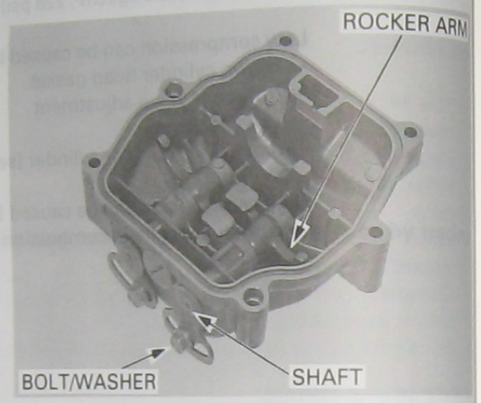
Align the T mark on the flywheel with the index groove in the crankcase cover (page 3-7). The position can be obtained by confirming that there is slack in the rocker arm (TDC on the compression stroke).

Remove the six bolts.
Remove the head cover, being careful not to damage the mating surfaces.

Remove the two dowel pins.



Remove the lock bolts and washers.
Remove the rocker arm shafts and rocker arms.



INSPECTION

Check the rocker arm shafts and rocker arms for wear or damage.
Measure the I.D. of each rocker arm.

SERVICE LIMIT: 12.10 mm (0.476 in)

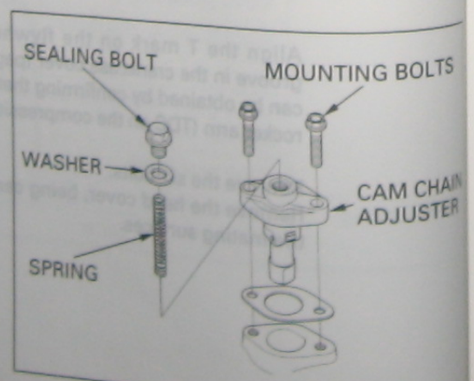
Measure the O.D. of each rocker arm shaft.

SERVICE LIMIT: 11.91 mm (0.469 in)

CAMSHAFT REMOVAL

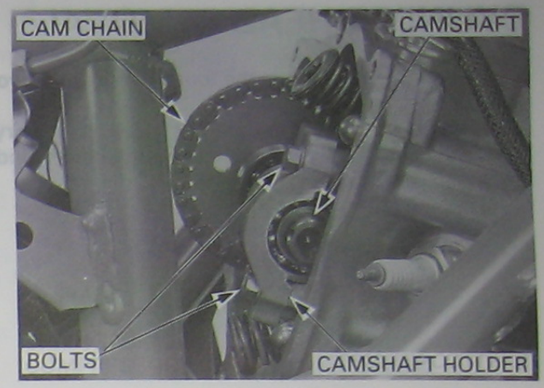
Remove the sealing bolt, sealing washer and spring from the cam chain adjuster.

Loosen the two mounting bolts alternately and remove the bolts and the cam chain adjuster.

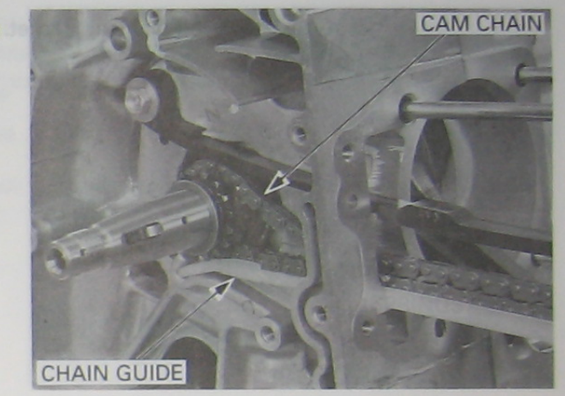


Remove the two bolts and the camshaft holder.

Remove the cam chain off the cam sprocket.
Attach a piece of wire to the cam chain to prevent it from falling into the crankcase and remove the camshaft from the cylinder head.

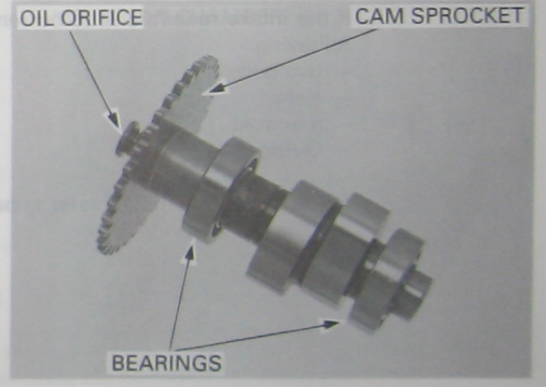


When the cam chain is to be removed, the following component removal is required:
— cylinder head (page 8-6)
— cylinder (page 9-3)
— oil pump drive chain (page 4-3)
— cam chain guide (page 13-2)



INSPECTION

Check the camshaft bearing for wear or damage.
Turn the bearing outer race. The bearings should turn smoothly and quietly. Also check that the inner race fits tightly on the camshaft.
Check the cam sprocket and oil orifice for wear or damage.
Check the cam lobes for excessive wear and the oil holes for clogged.



Measure the height of each cam lobe.

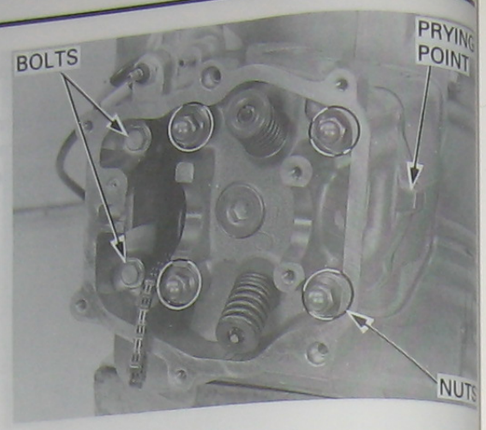
SERVICE LIMIT: IN: 34.181 mm (1.3457 in)
EX: 34.062 mm (1.3410 in)

CYLINDER HEAD REMOVAL

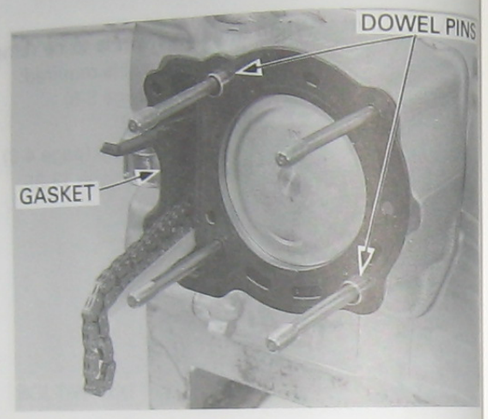
Remove the four cap nuts and two bolts.

Be careful not to damage the mating surfaces.

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

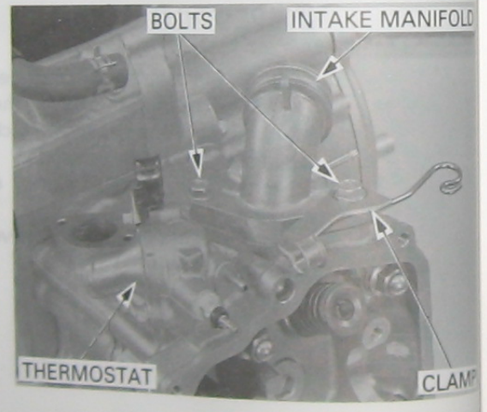


Remove the dowel pins and gasket.



If the intake manifold is to be removed, remove the following:
— two bolts
— clamp
— manifold
— O-ring

For thermostat removal, refer to page 6-6.



CYLINDER HEAD DISASSEMBLY

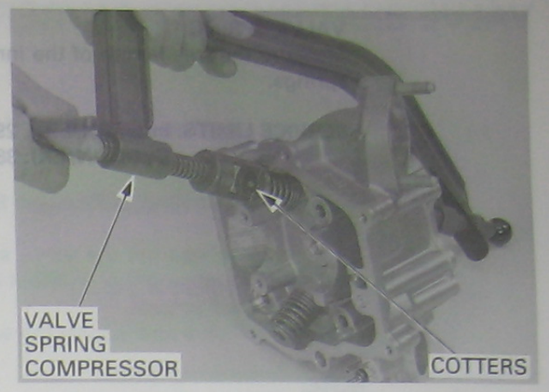
Remove the valve spring cotters using the valve spring compressor.

TOOLS:

Valve spring compressor	07757 – 0010000
Spring compressor attachment	07959 – KM30101

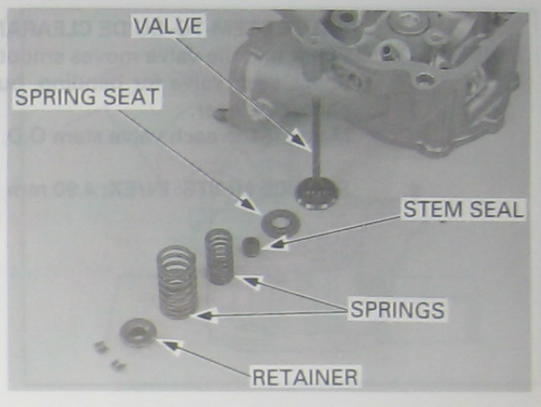
CAUTION:

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



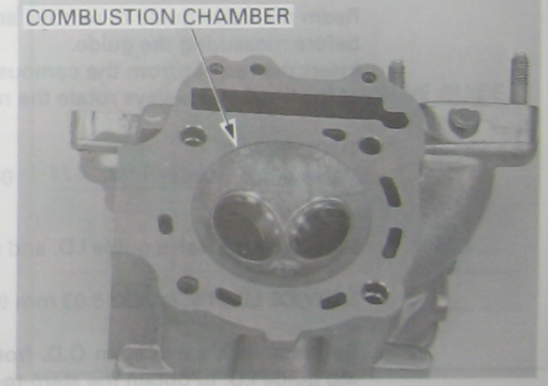
Mark all parts during disassembly so they can be placed back in their original locations.

Remove the valve spring compressor, then remove the following:
— retainers
— valve springs
— spring seats
— valves
— stem seals



Avoid damaging the mating and valve seat surfaces.

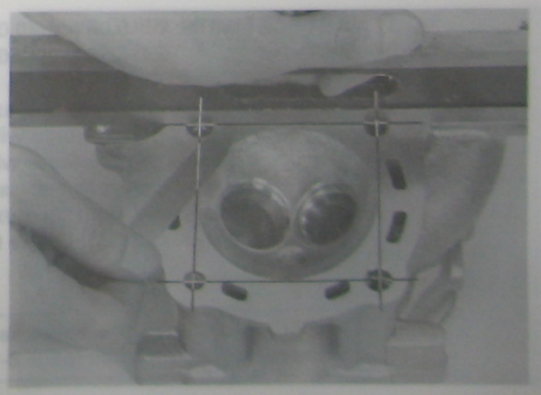
Remove the carbon deposits from the combustion chamber and clean off the head gasket surface.



INSPECTION

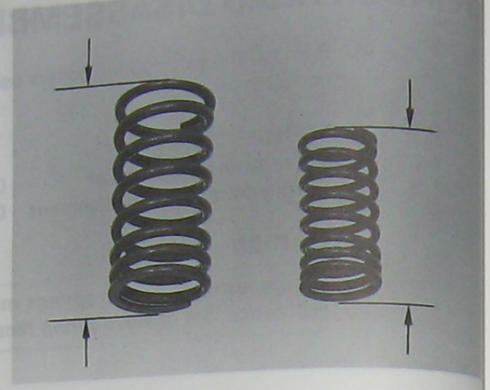
CYLINDER HEAD
Check the spark plug hole and valve areas for cracks.
Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.05 mm (0.002 in)



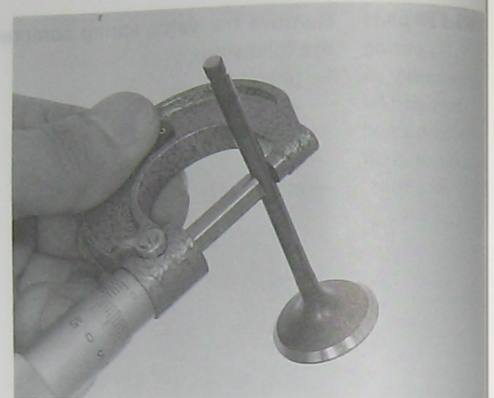
VALVE SPRING
Measure the free length of the inner and outer valve springs.

SERVICE LIMITS: Inner (IN/EX): 29.5 mm (1.16 in)
Outer (IN/EX): 38.4 mm (1.51 in)



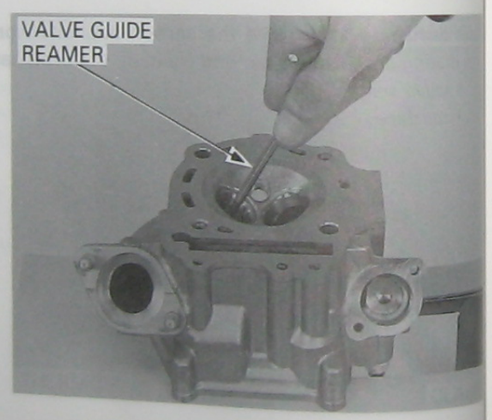
VALVE STEM-TO-GUIDE CLEARANCE
Check that the valve moves smoothly in the guide.
Check each valve for bending, burning, scratches or abnormal wear.
Measure the each valve stem O.D. and record it.

SERVICE LIMITS: IN/EX: 4.90 mm (0.193 in)



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

TOOL:
Valve guide reamer 07984 – MA60001



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

SERVICE LIMITS: IN/EX: 5.03 mm (0.198 in)

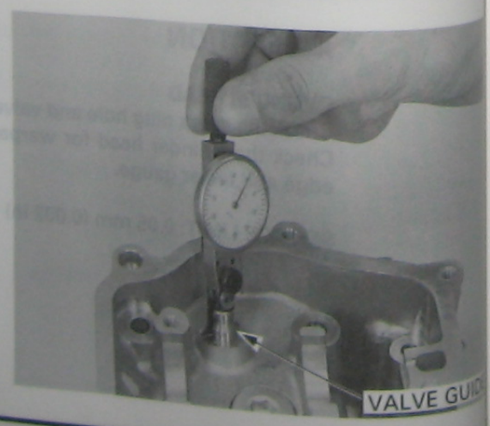
Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

SERVICE LIMITS: IN: 0.08 mm (0.003 in)
EX: 0.10 mm (0.004 in)

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

NOTE:

Inspect and reface the valve seats whenever the valve guides are replaced (page 8-10).



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.

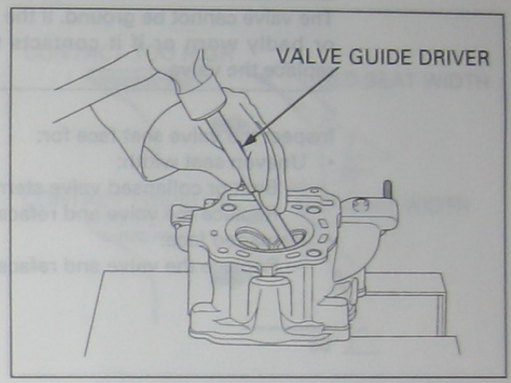
CAUTION:

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.

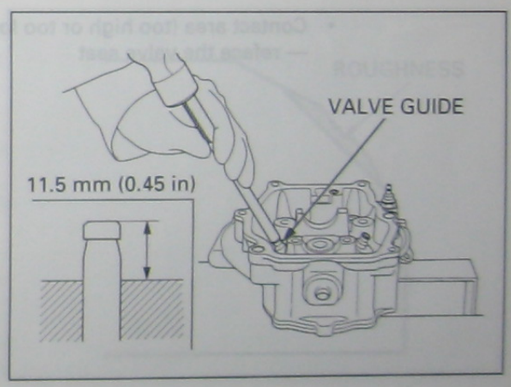
TOOL:
Valve guide driver, 5 mm 07742 – MA60000



Drive new guides in the cylinder head from the camshaft side while the cylinder head is still heated.

TOOL:
Valve guide driver, 5 mm 07742 – MA60000

VALVE GUIDE PROJECTION ABOVE CYLINDER HEAD:
IN/EX: 11.5 mm (0.45 in)



Let the cylinder head cool to room temperature.

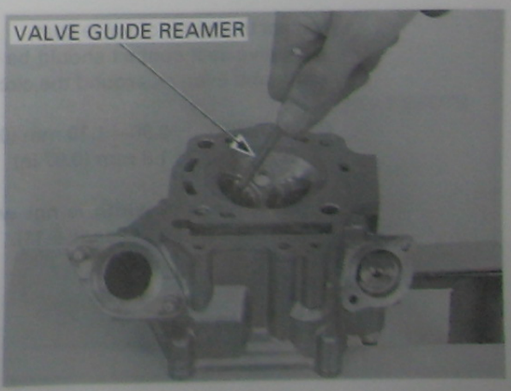
Ream the new valve guides.

TOOL:
Valve guide reamer 07984 – MA60001

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.

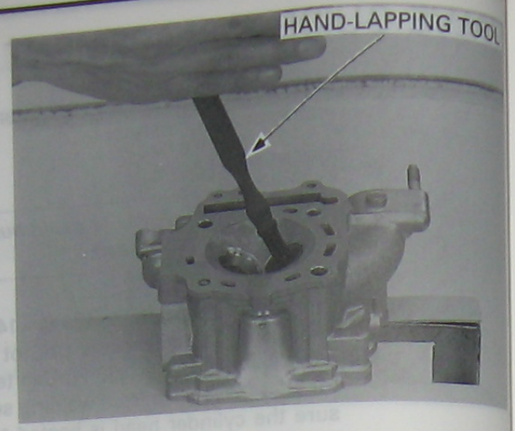


VALVE SEAT INSPECTION/REFACING

INSPECTION

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

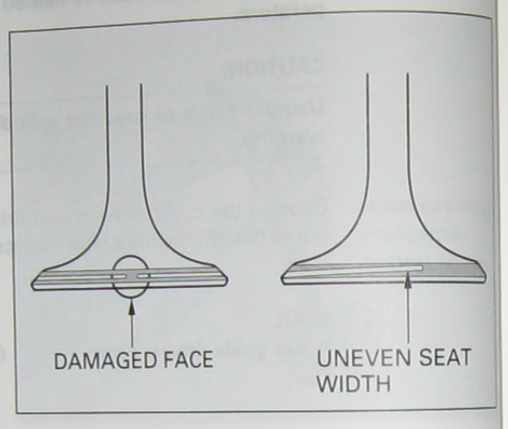
Apply a light coating of Prussian Blue to each valve face.
Tap the valve against the valve seat several times using a hand-lapping tool, without rotating the valve, to make a clear pattern.
Remove the valve and inspect the valve seat face.



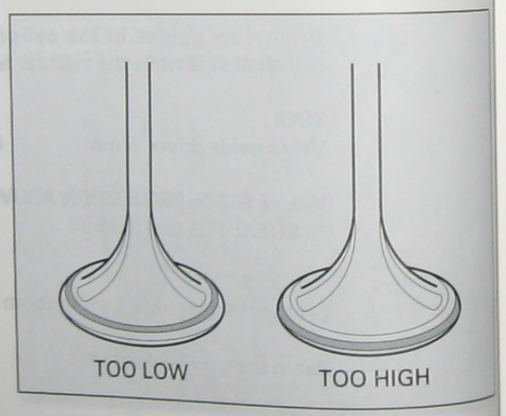
NOTE:

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

Inspect the valve seat face for:
- Uneven seat width:
  — Bent or collapsed valve stem;
  Replace the valve and reface the valve seat
- Damaged face:
  — Replace the valve and reface the valve seat



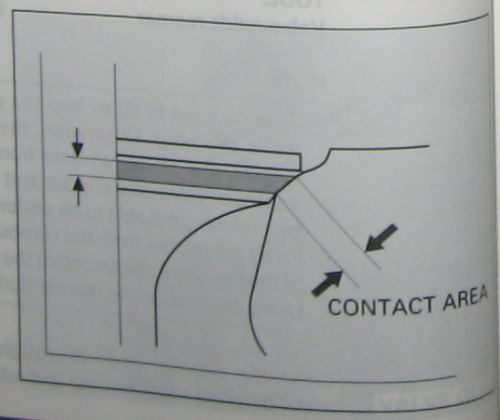
- Contact area (too high or too low area):
  — reface the valve seat



Inspect the width of valve seat.
The valve seat contact should be within the specified width and even all around the circumference.

STANDARD: 0.90 – 1.10 mm (0.035 – 0.043 in)
SERVICE LIMIT: 1.8 mm (0.07 in)

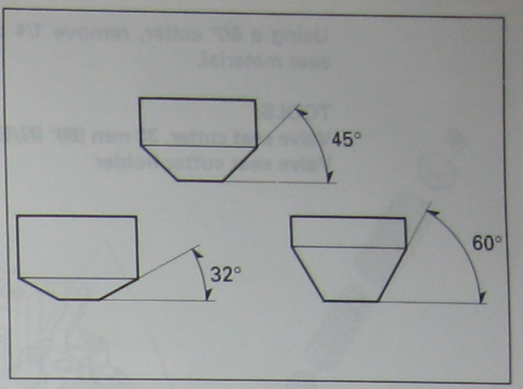
If the valve seat width is not within specification, reface the valve seat (page 8-11).



VALVE SEAT REFACING

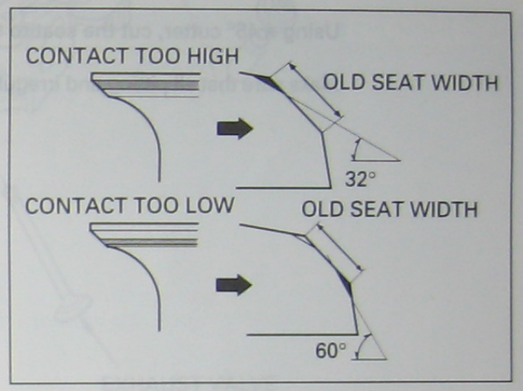
NOTE:

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



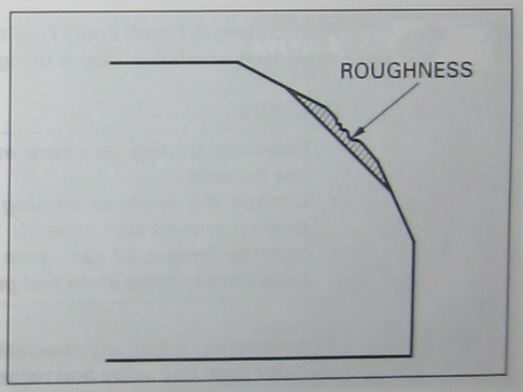
If the contact area is too high on the valve, the seat must be lowered using a 32° flat cutter.

If the contact area is too low on the valve, the seat must be raised using a 60° inner cutter. Refinish the seat to specifications, using a 45° finish cutter.



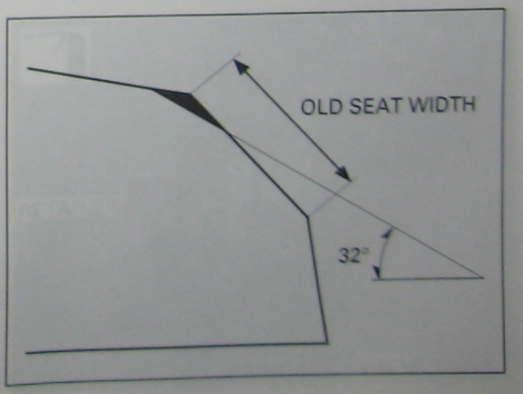
Using a 45° cutter, remove any roughness or irregularities from the seat.

TOOLS:
Valve seat cutter, 29 mm (45° IN/EX) 07780 – 0010300
Valve seat cutter holder 07781 – 0010400



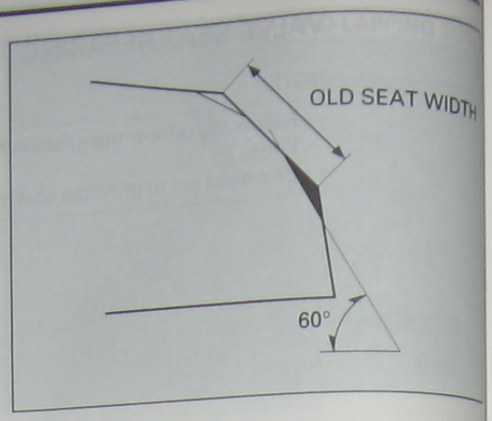
Using a 32° cutter, remove 1/4 of the existing valve seat material.

TOOLS:
Valve seat cutter, 33 mm (32° IN) 07780 – 0012900
Valve seat cutter, 28 mm (32° EX) 07780 – 0012100
Valve seat cutter holder 07781 – 0010400



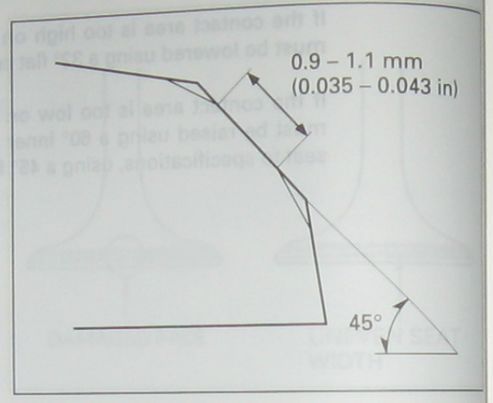
Using a 60° cutter, remove 1/4 of the existing valve seat material.

TOOLS:
Valve seat cutter, 30 mm (60° IN/EX) 07780 – 0014000
Valve seat cutter holder 07781 – 0010400

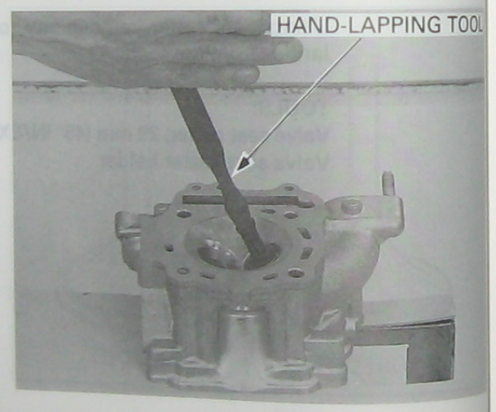


Using a 45° cutter, cut the seat to the proper width.

Make sure that all pitting and irregularities are removed.



After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

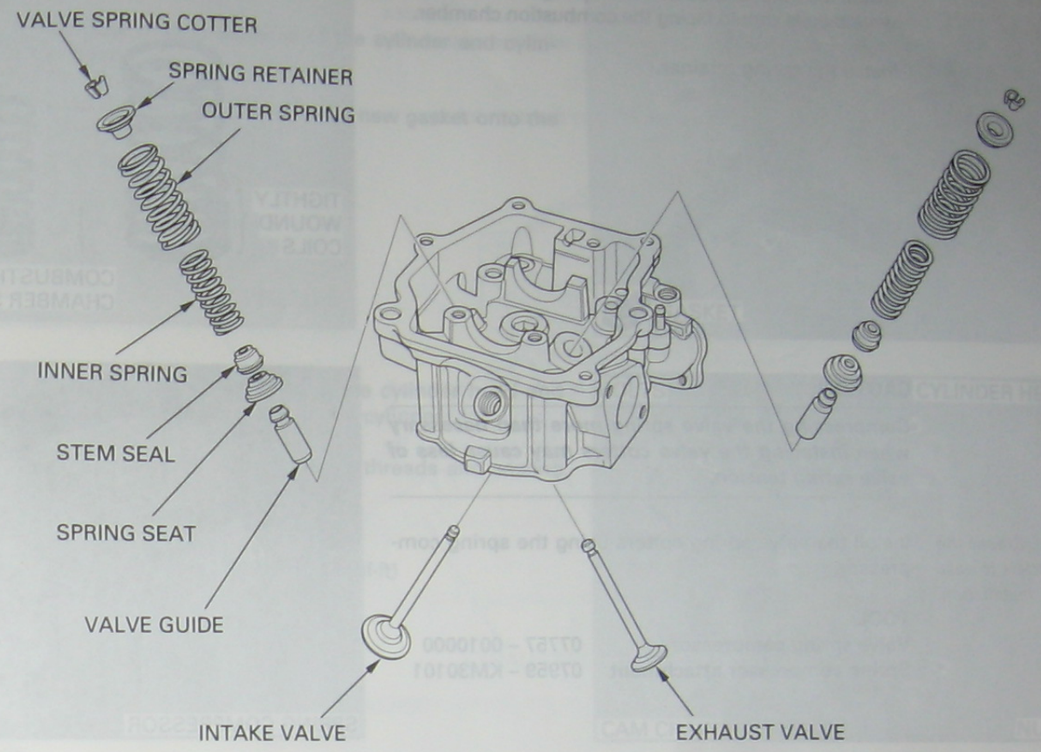


CAUTION:

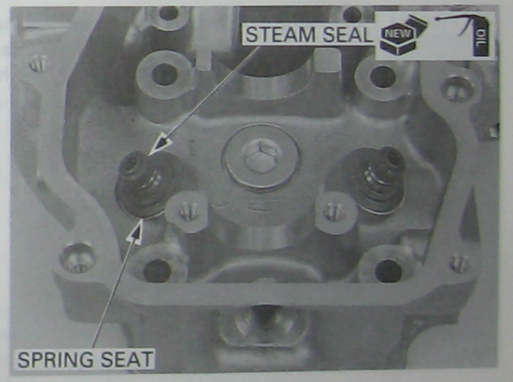
- ***Excessive lapping pressure may deform or damage the seat.***
- ***Change the angle of lapping tool frequently to prevent uneven seat wear.***
- ***Lapping compound can cause damage if it enters between the valve stem and guide.***

After lapping, wash any residual compound off the cylinder head and valve and recheck the seat contact.

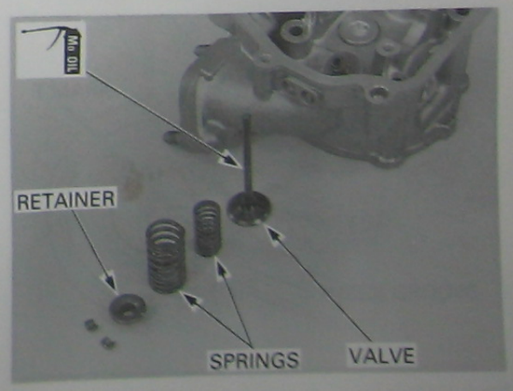
CYLINDER HEAD ASSEMBLY



Apply engine oil to the inner surface of new stem seals.
Install the spring seats and stem seals.

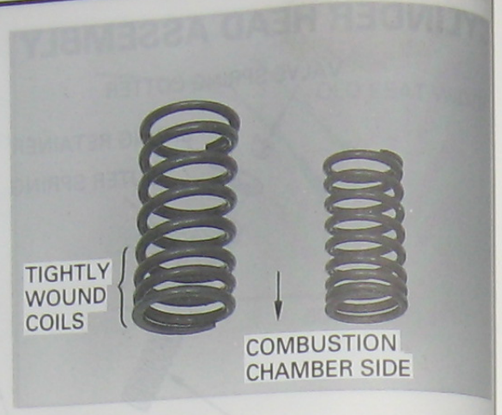


Lubricate each valve stem with molybdenum oil solution.
Insert the valves into the valve guides while turning it slowly to avoid damage to the stem seal.



Install the inner and outer valve springs with the tightly wound coils should facing the combustion chamber.

Install the spring retainer.



CAUTION:

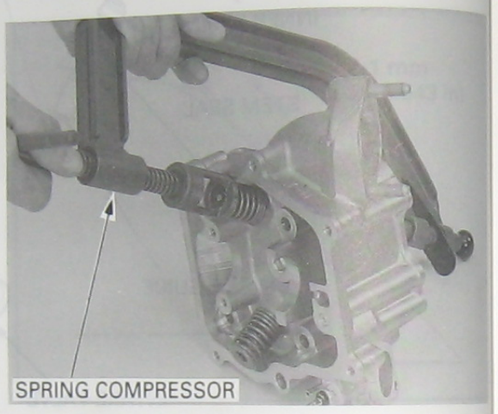
Compressing the valve spring more than necessary when installing the valve cotters may cause loss of valve spring tension.

Grease the cotters to ease installation.

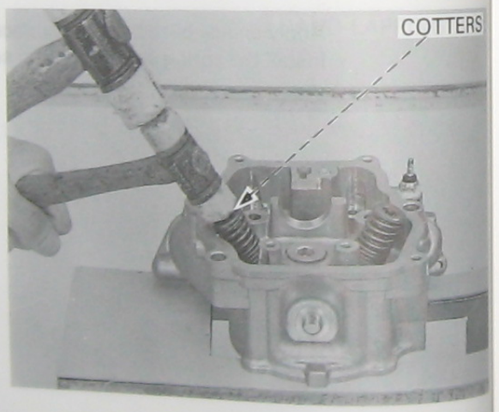
Install the valve spring cotters using the spring compressor.

TOOL:

Valve spring compressor	07757 – 0010000
Spring compressor attachment	07959 – KM30101



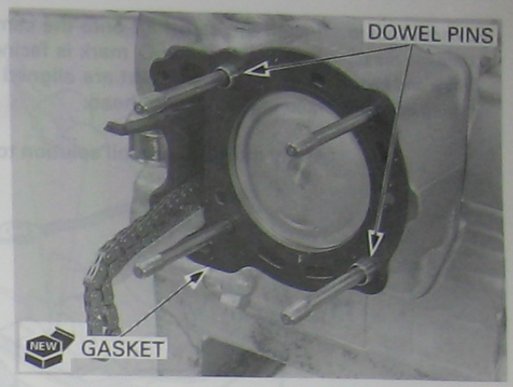
Support the cylinder head so that the valve heads will not contact anything that causes damage.
Tap the valve stems gently with two hammers as shown to seat the cotters firmly.



CYLINDER HEAD INSTALLATION

Clean the mating surfaces of the cylinder and cylinder head.

Install the two dowel pins and a new gasket onto the cylinder.

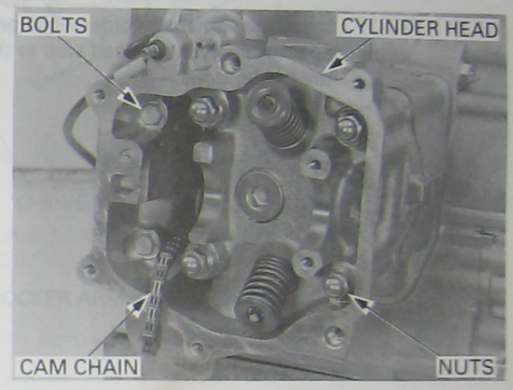


Route the cam chain through the cylinder head and install the cylinder head onto the cylinder.

Apply engine oil to the cap nut threads and sealing surfaces.
Tighten the four cap nuts.

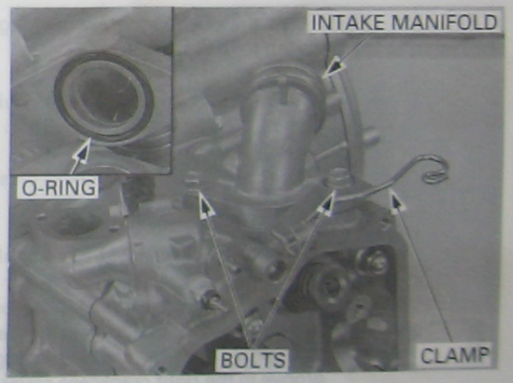
TORQUE: 24 N·m (2.4 kgf·m, 17 lbf·ft)

Tighten the two bolts.



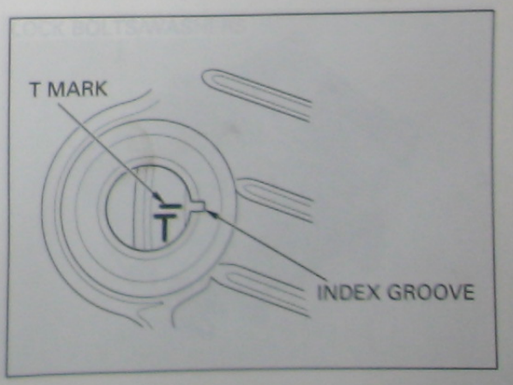
Coat a new O-ring with engine oil and install it into the groove in the intake manifold.
Install the manifold and clamp onto the cylinder head and tighten the two bolts.

For thermostat installation, see page 6-6.
For thermosensor installation, see page 20-15.



CAMSHAFT INSTALLATION

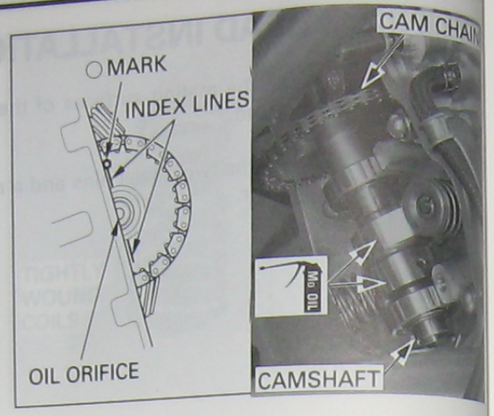
Turn the drive pulley (crankshaft) counterclockwise and align the T mark on the flywheel with the index groove in the right crankcase cover while holding the cam chain.



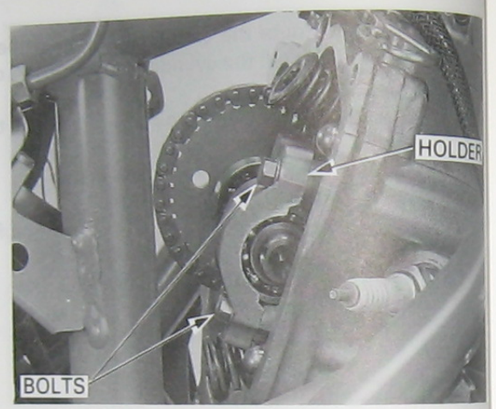
Be careful not to damage the oil orifice and head mating surface.

Install the camshaft onto the cam chain and cylinder head so that the ○ mark is facing up, and the index lines on the sprocket are aligned with the upper surface of the cylinder head.

Apply molybdenum oil solution to the cam lobes.



Install the camshaft holder while pressing the camshaft against the cylinder head wall to the right, then install the holder bolts.
Tighten the two bolts.



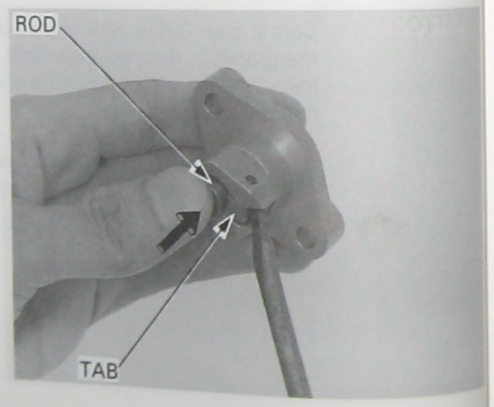
Retract the push rod while pushing the tab and release the tab to lock it.

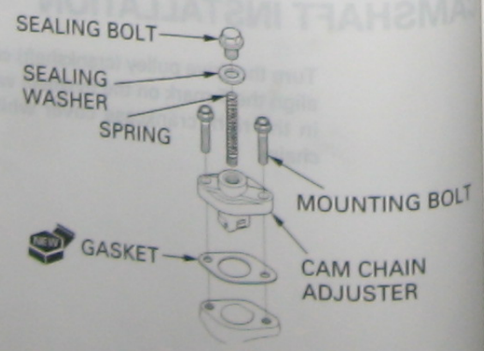
Install a new gasket and cam chain adjuster onto the cylinder head and tighten the two mounting bolts.

Install the spring, new sealing washer and sealing bolt and tighten the sealing bolt.

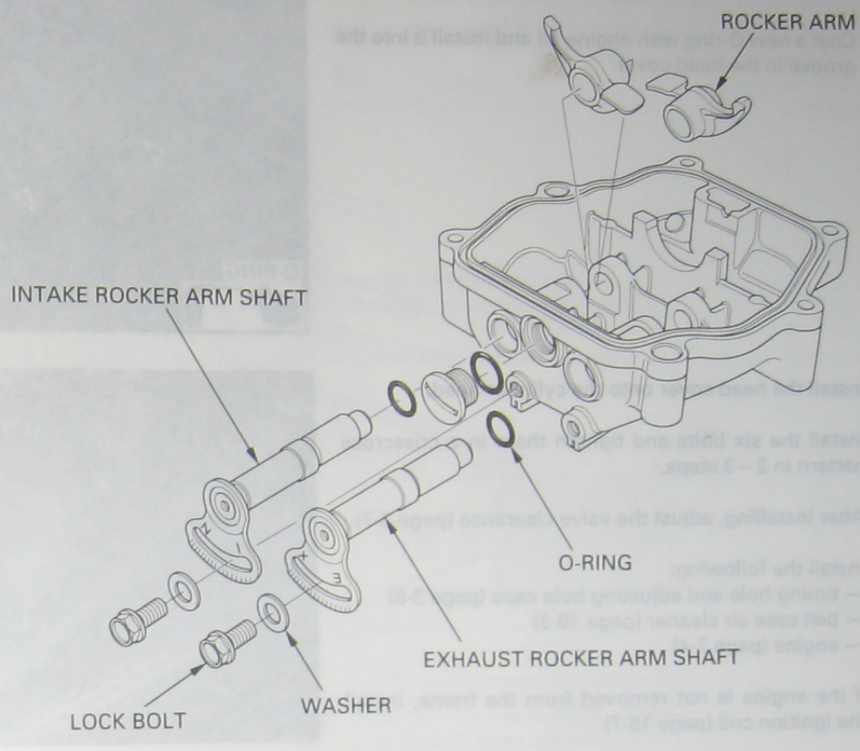
TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)

Make sure that the index lines on the cam sprocket aligns with the upper surface of the cylinder head when the T mark on the flywheel is aligned with the index groove in the right crankcase cover (page 8-15).



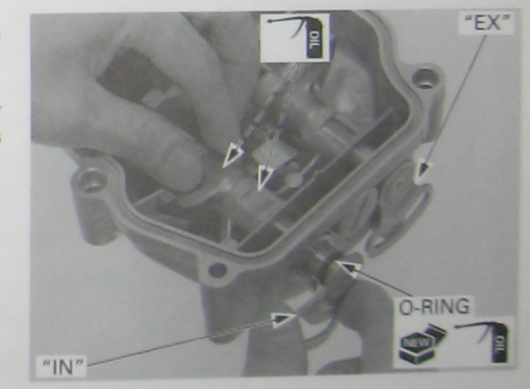


CYLINDER HEAD COVER INSTALLATION



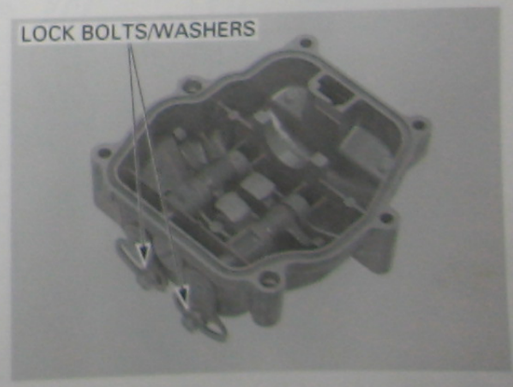
Coat new O-rings with engine oil and install them into the grooves in the rocker arm shafts.

Apply engine oil to the sliding surfaces of the rocker arms and rocker arm shafts. Install the rocker arms and shafts into the head cover.



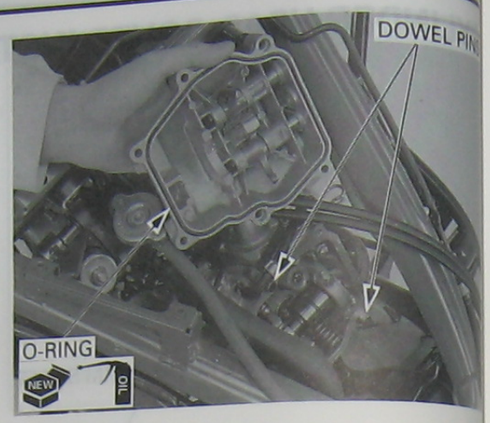
Tighten the lock bolts when adjusting the valve clearance.

Temporarily install the lock bolts and washers.



Install the two dowel pins.

Coat a new O-ring with engine oil and install it into the groove in the head cover.



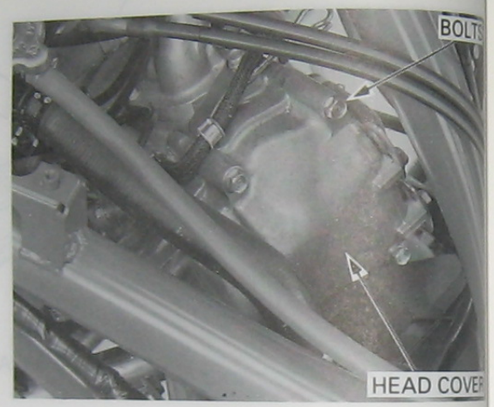
Install the head cover onto the cylinder head.

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

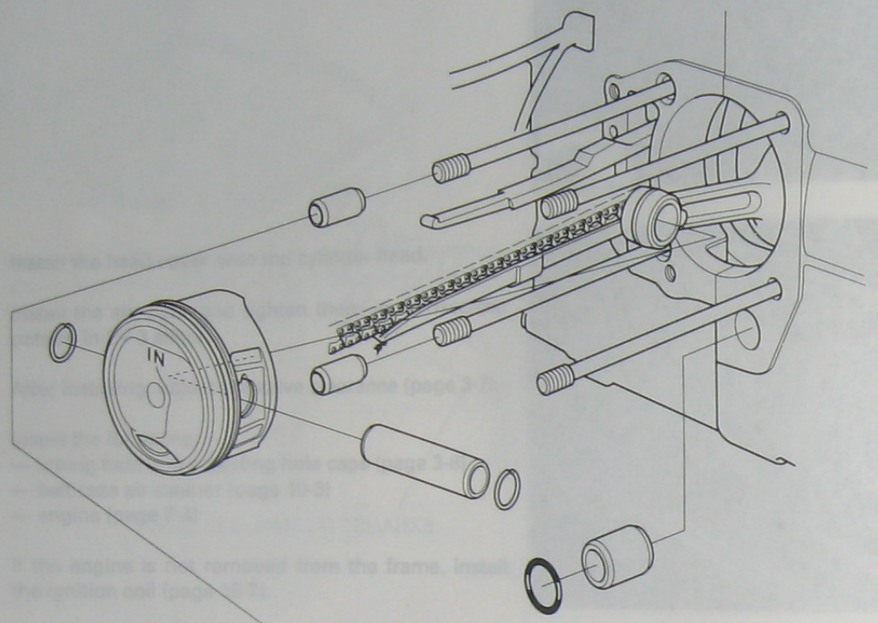
After installing, adjust the valve clearance (page 3-7).

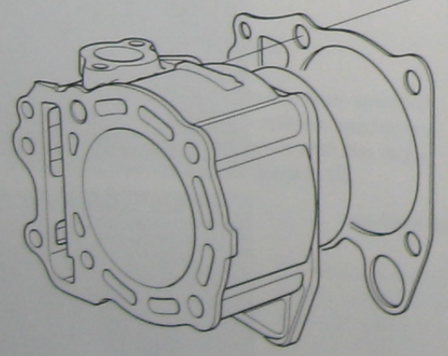
Install the following:
— timing hole and adjusting hole caps (page 3-8)
— belt case air cleaner (page 10-3)
— engine (page 7-4)

If the engine is not removed from the frame, install the ignition coil (page 18-7).



MEMO





9. CYLINDER/PISTON

SERVICE INFORMATION

GENERAL

- The engine must be removed from the frame to service the cylinder and piston.
- Do not damage mating surfaces by using a screwdriver when removing the cylinder.
- Take care not to damage the cylinder wall and piston.
- Camshaft lubricating oil is fed through the oil passage in the cylinder. Clean the oil passage before installing the cylinder.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		72.750 – 72.760 (2.8642 – 2.8646)	73.01 (2.874)
	Out of round		———	0.05 (0.002)
	Taper		———	0.05 (0.002)
	Warpage		———	0.05 (0.002)
Piston, piston ring, and piston pin	Piston mark direction		"IN" mark toward the intake side	———
	Piston O.D.		72.720 – 72.740 (2.8630 – 2.8638) at 18 (0.7) from the bottom	72.65 (2.860)
	Piston pin hole I.D.		17.002 – 17.008 (0.6694 – 0.6696)	17.04 (0.671)
	Piston pin O.D.		16.996 – 17.000 (0.6691 – 0.6693)	16.96 (0.668)
	Connecting rod small end I.D.		17.016 – 17.034 (0.6699 – 0.6706)	17.06 (0.672)
	Cylinder-to-piston clearance		0.010 – 0.040 (0.0004 – 0.0016)	0.10 (0.004)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.02 (0.001)
	Connecting rod-to-piston pin clearance		0.016 – 0.040 (0.0006 – 0.0016)	0.06 (0.02)
	Piston ring-to-groove clearance	Top/Second	0.015 – 0.050 (0.0006 – 0.0020)	0.09 (0.004)
	Piston ring end gap	Top	0.15 – 0.30 (0.006 – 0.012)	0.50 (0.020)
		Second	0.30 – 0.45 (0.012 – 0.018)	0.65 (0.026)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)
	Piston ring mark direction	Top/Second	Marking facing up	———

TORQUE VALUE

Cylinder stud bolt	9 N·m (0.9 kgf·m, 6.5 lbf·ft)

TROUBLESHOOTING

Compression too low, hard starting or poor performance at low speed
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston
- Cylinder head/valve problem (section 8)

Compression too high
- Excessive carbon build-up on piston head or combustion chamber

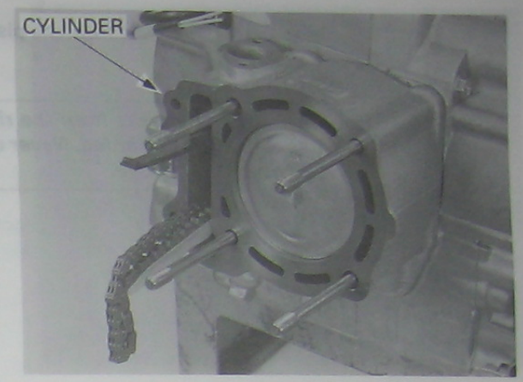
Excessive smoke
- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall
- Cylinder head/valve problem (section 8)

Abnormal noise
- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston or piston rings

CYLINDER/PISTON REMOVAL

Remove the cylinder head (page 8-3).

Remove the cylinder.

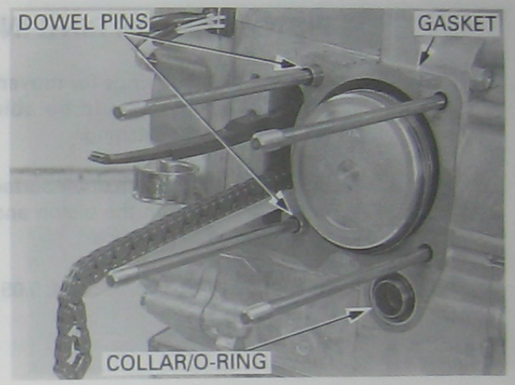


Remove the dowel pins, water joint collar and O-ring.
Remove the gasket.

CAUTION:

Be careful not to damage the gasket surface.

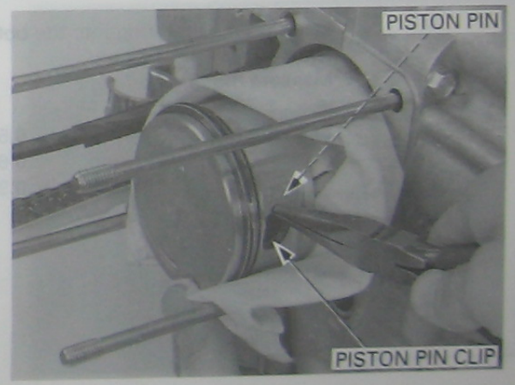
Clean the cylinder.



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

CAUTION:

- ***Be careful not to damage or scratch the piston sliding surface.***
- ***Do not apply side force to the connecting rod.***



Spread each piston ring and remove it by lifting up at a point opposite the gap.

CAUTION:

Do not damage the piston ring by spreading the ends too far.

Clean carbon deposits from the piston.

CAUTION:

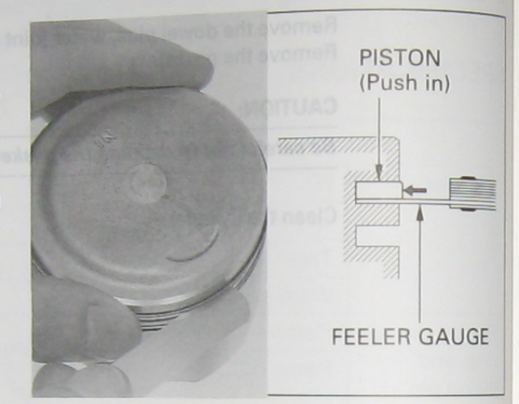
Clean carbon deposits from the ring grooves with a ring that will be discarded. Never use a wire brush; it will scratch the groove.

PISTON/PISTON RING INSPECTION

Inspect the piston rings for movement by rotating the rings. The rings should be able to move in their grooves without catching.

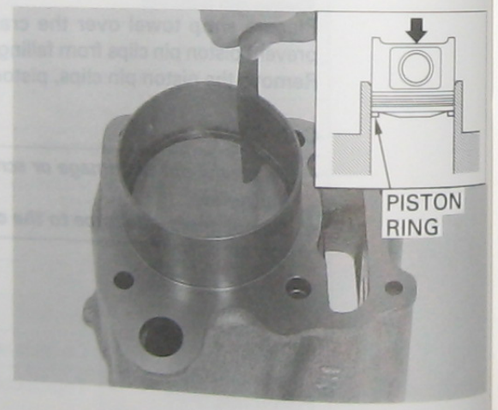
Push the ring until the outer surface of the piston ring is nearly flush with the piston and measure the ring-to-ring groove clearance.

SERVICE LIMIT: Top/Second: 0.09 mm (0.004 in)



Insert each piston ring into the bottom of the cylinder squarely using the piston.
Measure the ring end gap.

SERVICE LIMITS: Top: 0.50 mm (0.020 in)
Second: 0.65 mm (0.026 in)
Oil (side rail): 0.90 mm (0.035 in)



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

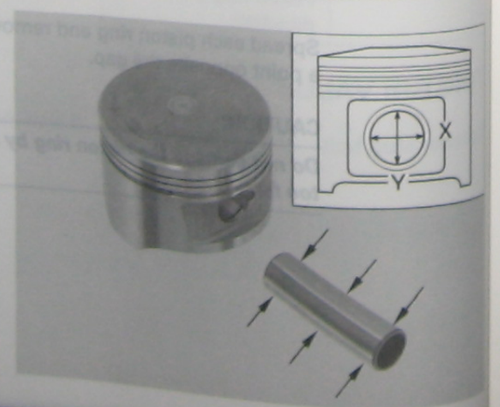
SERVICE LIMIT: 17.04 mm (0.671 in)

Measure the piston pin O.D. at piston and connecting rod sliding areas.

SERVICE LIMIT: 16.96 mm (0.668 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.02 mm (0.001 in)



Measure and record the connecting rod small end I.D..

SERVICE LIMIT: 17.06 mm (0.672 in)

Calculate the connecting rod-to-piston pin clearance.

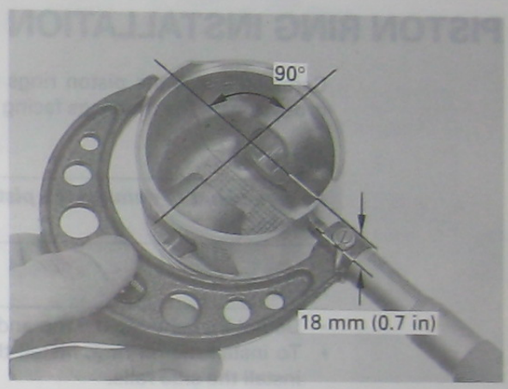
SERVICE LIMIT: 0.06 mm (0.002 in)

Measure the piston O.D. at a point 18 mm (0.7 in) from the bottom and 90° to the piston pin hole.

SERVICE LIMIT: 72.65 mm (2.860 in)

Calculate the cylinder-to-piston clearance (cylinder I.D.: see below).

SERVICE LIMIT: 0.10 mm (0.004 in)



CYLINDER INSPECTION

Check the cylinder wall for wear or damage.
Measure and record the cylinder I.D. at there levels in an X and Y axis. Take the maximum reading to determine the cylinder wear.

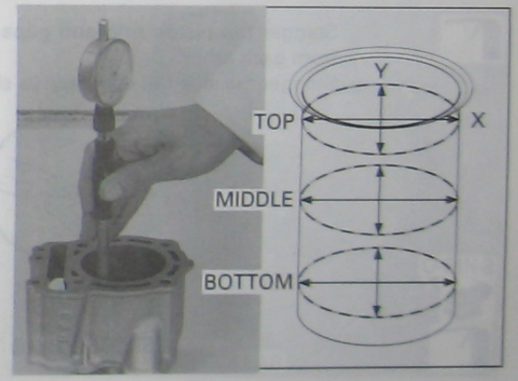
SERVICE LIMIT: 72.76 mm (2.865 in)

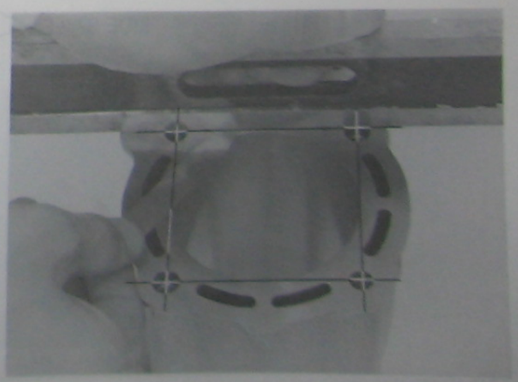
Calculate the cylinder taper and out-of-round at three levels in an X and Y axis. Take the maximum reading to determine the taper and out-of-round.

SERVICE LIMITS: Taper: 0.05 mm (0.002 in)
Out-of-round: 0.05 mm (0.002 in)

Check the cylinder for warpage with a straight edge and feeler gauge in the directions shown.

SERVICE LIMIT: 0.05 mm (0.002 in)





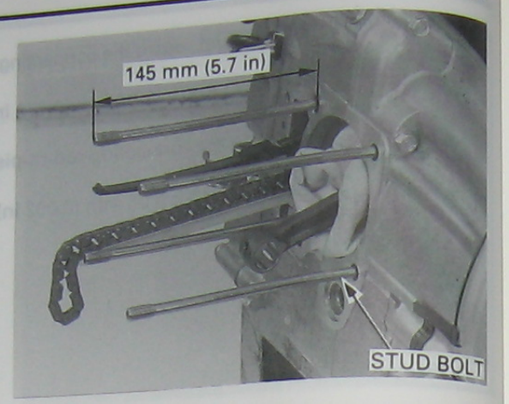
CYLINDER STUD BOLT REPLACEMENT

Remove the stud bolts from the crankcase.

Install new stud bolts into the crankcase.

TORQUE: 9 N·m (0.9 kgf·m, 6.5 lbf·ft)

After installing the stud bolts, check that the length from the bolt head to the crankcase surface is within specification.



PISTON RING INSTALLATION

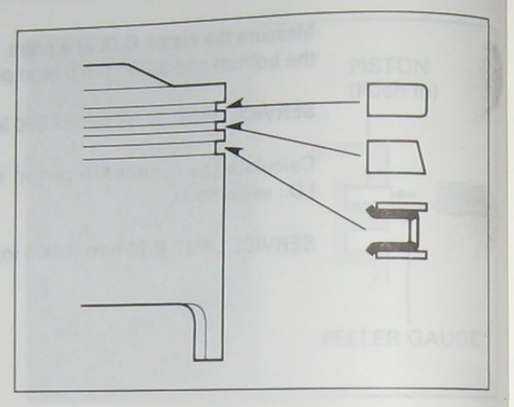
Carefully install the piston rings into the piston ring grooves with the markings facing up.

CAUTION:

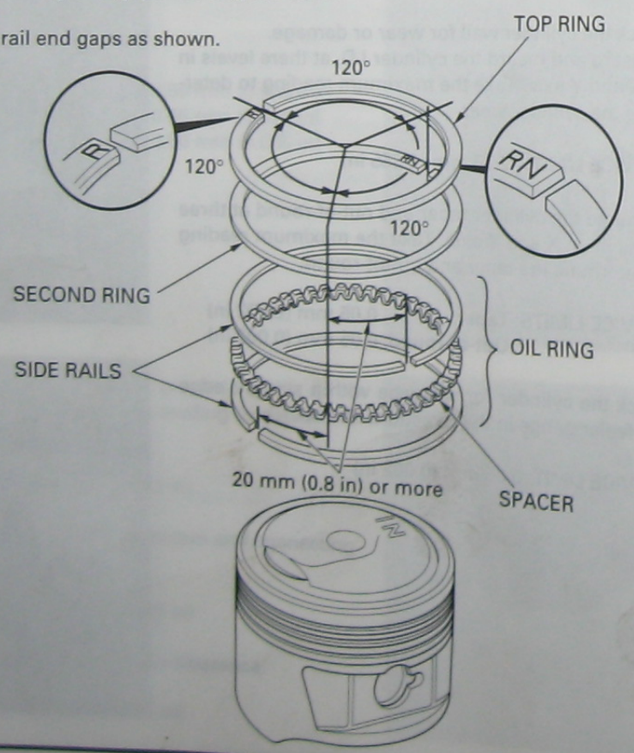
Be careful not to damage the piston and rings during installation.

NOTE:

- Do not interchange the top and second rings.
- To install the oil ring, install the spacer first, then install the side rails.



Stagger the piston ring end gaps 120 degrees apart from each other.
Stagger the side rail end gaps as shown.



CYLINDER/PISTON INSTALLATION

Place a shop towel over the crankcase opening to prevent piston pin clips from falling into the crankcase.
Apply molybdenum oil solution to the piston pin outer surface.
Set the piston over the connecting rod with the "IN" mark facing toward the intake side and install the piston pin into the piston and connecting rod.

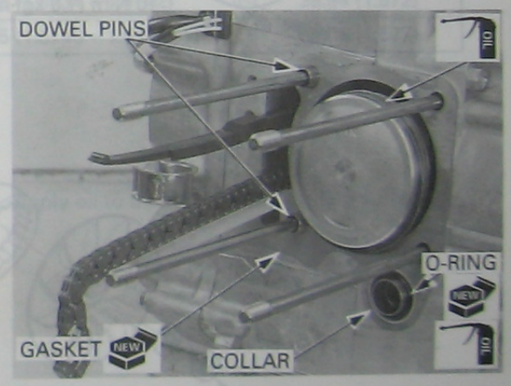
Install new piston pin clips into the grooves in the piston pin hole.

NOTE:

- Make sure that the piston pin clips are seated securely.
- Do not align the piston pin clip end gap with the piston cutout.

Clean the gasket surface of the crankcase thoroughly, being careful not to damage it and not to allow gasket material into the crankcase.

Install the dowel pins and a new gasket.
Coat a new O-ring with oil, and install the joint collar and O-ring.



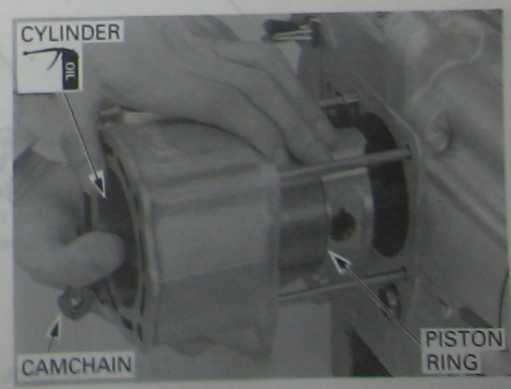
Apply engine oil to the cylinder wall, piston and piston ring outer surfaces.

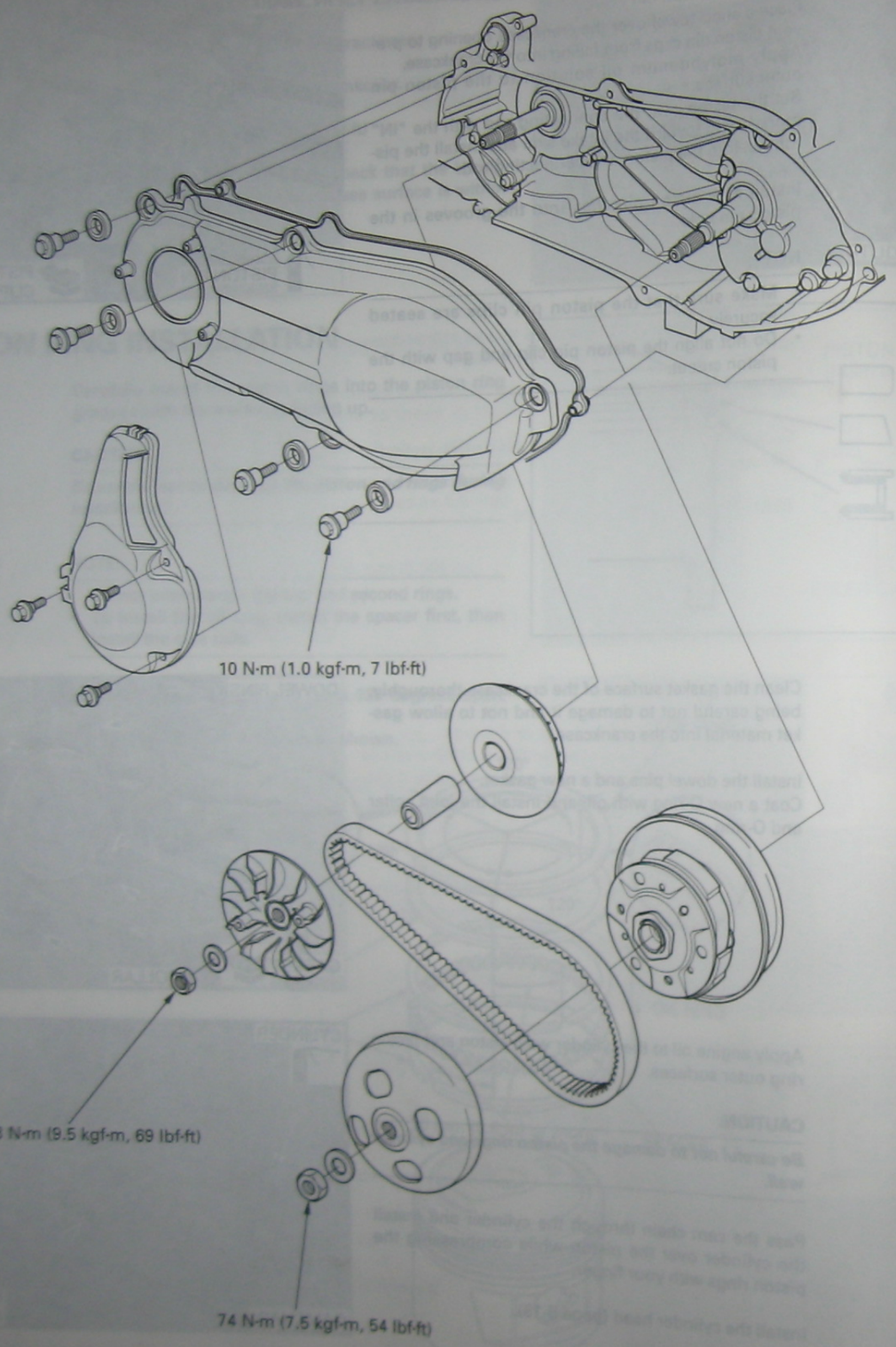
CAUTION:

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

Pass the cam chain through the cylinder and install the cylinder over the piston while compressing the piston rings with your finger.

Install the cylinder head (page 8-15).





10. DRIVE AND DRIVEN PULLEYS/CLUTCH

SERVICE INFORMATION

GENERAL

CAUTION:

- ***Avoid getting grease and oil on the V-belt and pulley drive faces in order to prevent belt slippage.***
- ***Do not apply grease to the movable drive face and weight rollers.***

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Drive belt width		23.3 (0.92)	22.3 (0.88)
Movable drive face	Bushing I.D.	26.989 – 27.052 (1.0626 – 1.0650)	27.91 (1.099)
	Boss O.D.	26.960 – 26.974 (1.0614 – 1.0620)	26.93 (1.060)
	Weight roller O.D.	22.92 – 23.08 (0.902 – 0.909)	22.5 (0.89)
Clutch	Clutch outer I.D.	135.0 – 135.2 (5.31 – 5.32)	135.5 (5.33)
	Lining thickness	4.0 (0.16)	0.5 (0.02)
Driven pulley	Face spring free length	132.5 (5.22)	127.8 (5.03)
	Driven face boss O.D.	39.965 – 39.985 (1.5734 – 1.5742)	39.94 (1.572)
	Movable driven face I.D.	40.000 – 40.025 (1.5748 – 1.5758)	40.06 (1.577)

TORQUE VALUES

Clutch/driven pulley assembly nut	78 N·m (8.0 kgf·m, 58 lbf·ft)	
Clutch outer nut	74 N·m (7.5 kgf·m, 54 lbf·ft)	
Drive pulley face nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	Apply oil to the threads and seating surface.
Left crankcase cover bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	

TOOLS

Universal holder	07725 – 0030000
Flywheel holder	07725 – 0040000
Clutch spring compressor	07LME – GZ40200
Socket wrench, 39 x 41 mm	07GMA – KS40100

TROUBLESHOOTING

Engine starts but scooter won't move

- Worn drive belt
- Damaged ramp plate
- Worn or damaged clutch shoe
- Broken driven face spring

Engine stalls or scooter creeps

- Broken clutch shoe spring

Poor performance at high speed or lack of power

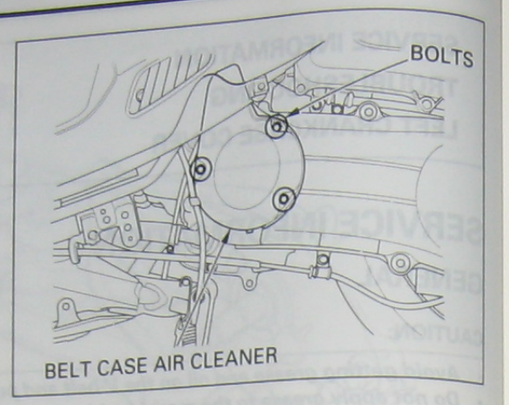
- Worn drive belt
- Weak driven face spring
- Worn weight rollers
- Contaminated pulley faces

LEFT CRANKCASE COVER

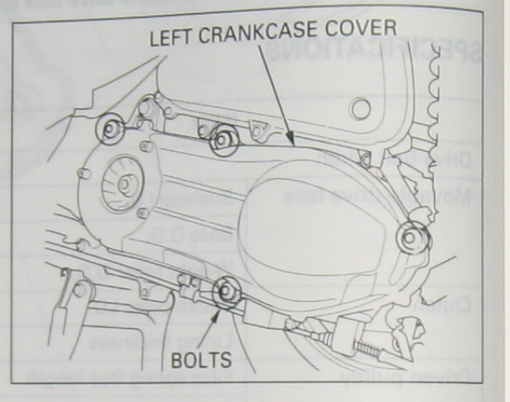
REMOVAL

Remove the left floor skirt (page 2-5).

Remove the carburetor air vent tube from the clamp of the belt case air cleaner.
Remove the three bolts and the belt case air cleaner.



Remove the four bolts and the left crankcase cover.



BELT CASE AIR CLEANER INSPECTION

Release the two tabs and remove the air cleaner cover from the base.

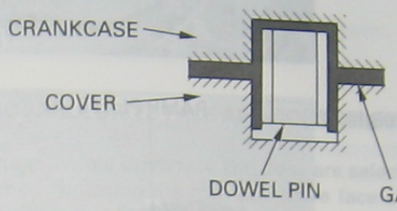
Check the air cleaner element.
Remove the element from the base and wash it in cleaning solvent if necessary.
Dry the element thoroughly, then install it onto the base.

Install the air cleaner cover on the base and secure it with the two tabs.

INSTALLATION

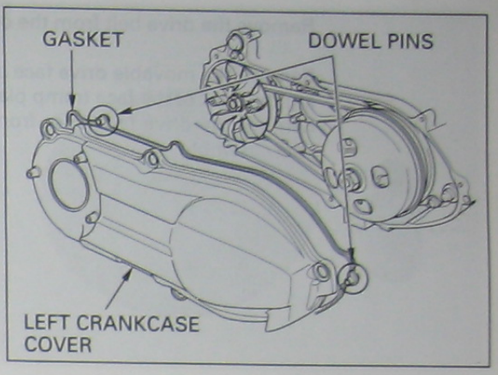
Check the left crankcase cover gasket and replace it if it is deteriorated or damaged.
Remove the gasket from the left crankcase cover.
Clean the gasket groove in the left crankcase cover.
Install the dowel pins and a new gasket onto the left crankcase cover.

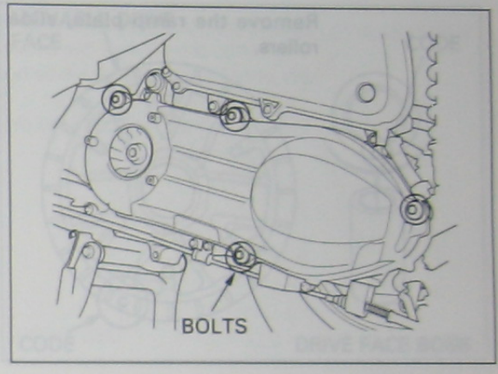
Install the left crankcase cover onto the crankcase by aligning the dowel pins with the holes.



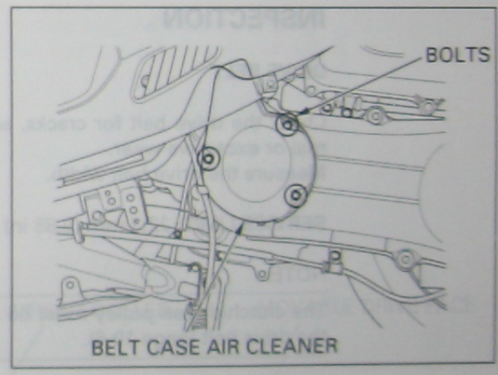
Install the four bolts and tighten them.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)





Install the belt case air cleaner and tighten the three bolts securely.
Install the carburetor air vent tube into the clamp of the belt case air cleaner.



DRIVE PULLEY

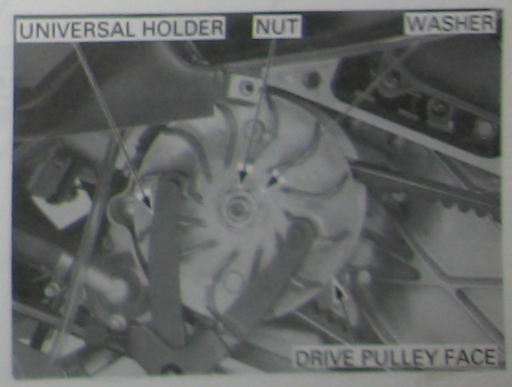
REMOVAL

Remove the left crankcase cover (page 10-2).

Hold the drive pulley face with the special tool and loosen the drive pulley face nut.

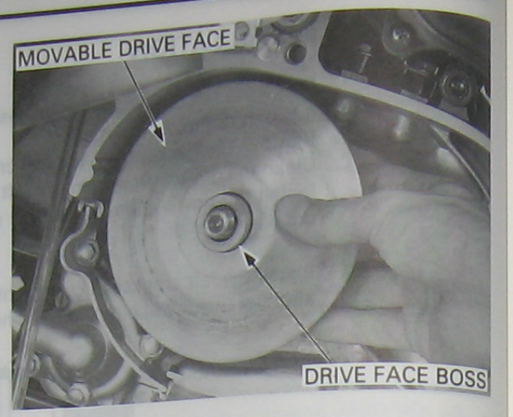
TOOL:
Universal holder 07725 – 0030000

Remove the nut, washer and drive pulley face.

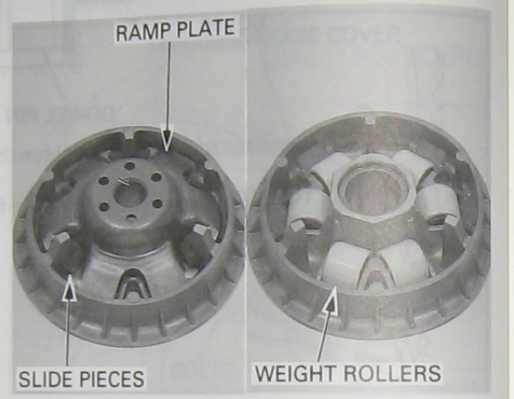


Remove the drive belt from the crankshaft.

Remove the movable drive face assembly while holding the back of the face (ramp plate).
Remove the drive face boss from the movable drive face assembly.



Remove the ramp plate, slide pieces and weight rollers.



INSPECTION

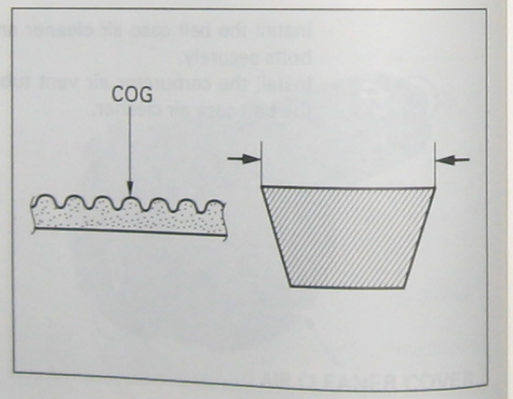
DRIVE BELT

Check the drive belt for cracks, separation or abnormal or excessive wear.
Measure the drive belt width.

SERVICE LIMIT: 22.3 mm (0.88 in)

NOTE:

The clutch/driven pulley must be removed to replace the drive belt (page 10-6).



WEIGHT ROLLER

Check each roller for wear or damage.
Measure the weight roller O.D.

SERVICE LIMIT: 22.5 mm (0.89 in)

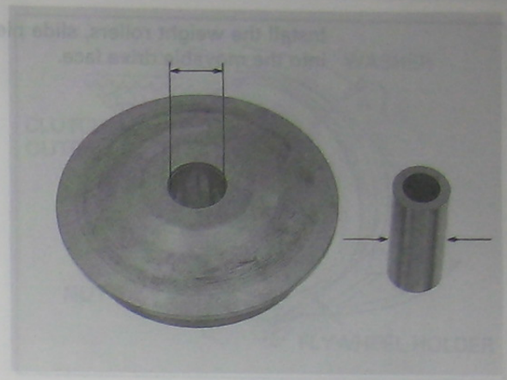
MOVABLE DRIVE FACE

Check the drive face boss for wear or damage.
Measure the boss O.D.

SERVICE LIMIT: 26.93 mm(1.060 in)

Measure the face bushing I.D.

SERVICE LIMIT: 27.91 mm (1.099 in)

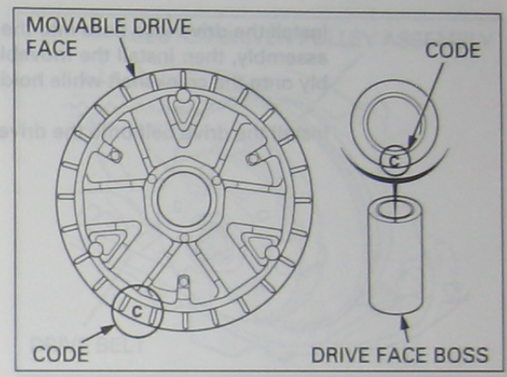


MOVABLE DRIVE FACE AND BOSS SELECTION

The movable drive face and boss are select fitted.
When replacing the movable drive face and/or drive face boss, select proper drive face or boss following the chart below.

Face I.D. code / Boss O.D. code	A	B	C
A	○	—	—
No marking	—	○	—
C	—	—	○

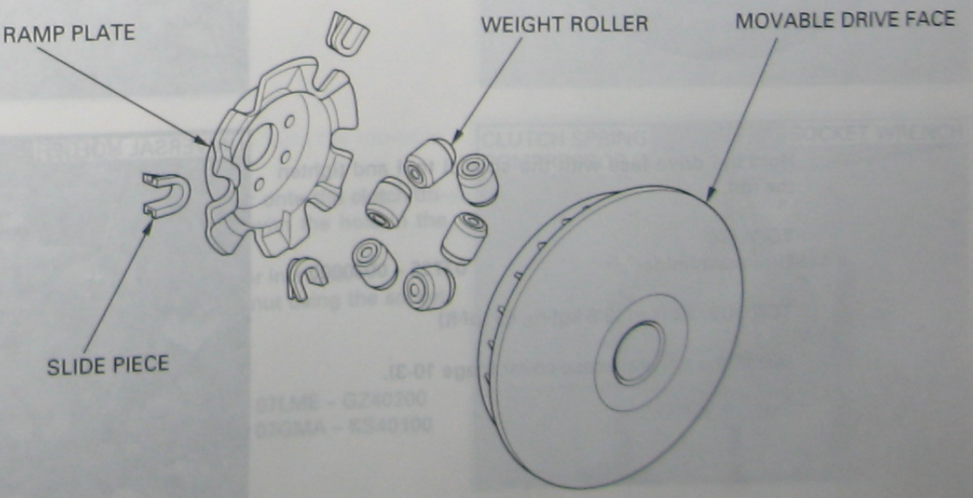
The "○" mark in the table indicates that matching is possible in the crossed codes.



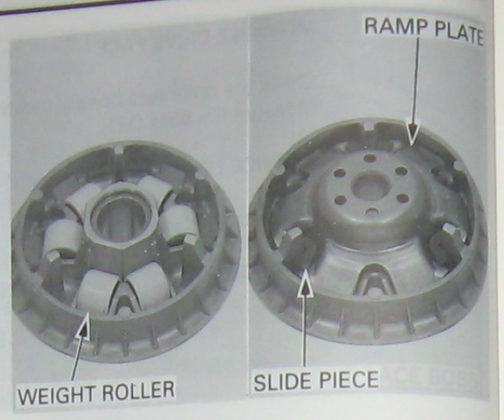
INSTALLATION

CAUTION:

- ***Clean any oil and grease from the pulley faces. Replace the contaminated drive belt.***
- ***Do not apply grease to the movable drive face and weight rollers.***

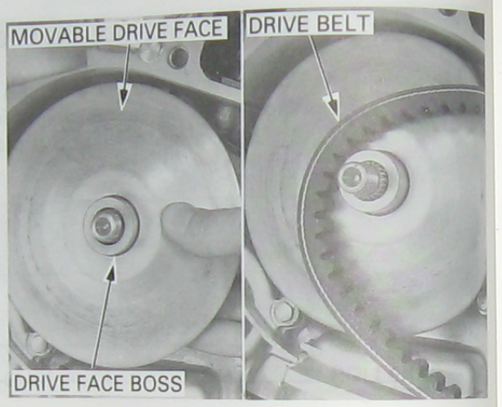


Install the weight rollers, slide pieces and ramp plate into the movable drive face.

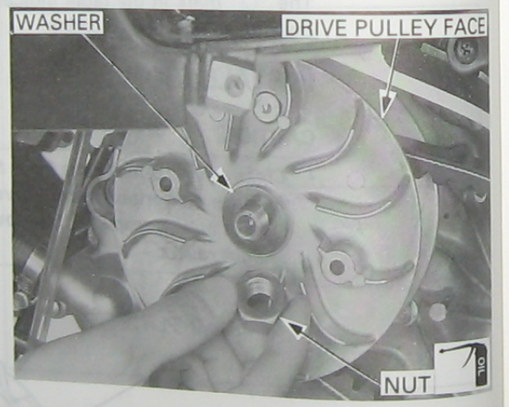


Install the drive face boss into the movable drive face assembly, then install the movable drive face assembly onto the crankshaft while holding the ramp plate.

Install the drive belt onto the drive face boss.



Install the drive face and washer.
Apply oil to the drive face nut threads and seating surface and install the nut.

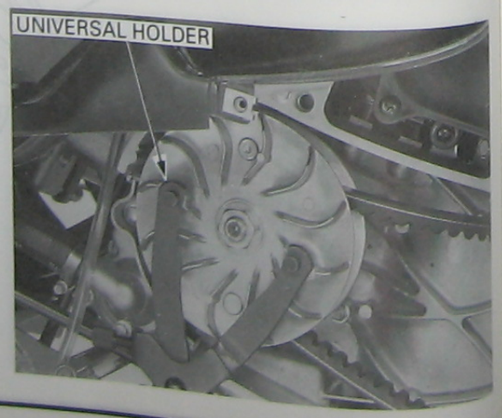


Hold the drive face with the special tool and tighten the nut.

TOOL:
Universal holder 07725 – 0030000

TORQUE: 93 N·m (9.5 kgf·m, 69 lbf·ft)

Install the left crankcase cover (page 10-3).



CLUTCH/DRIVEN PULLEY

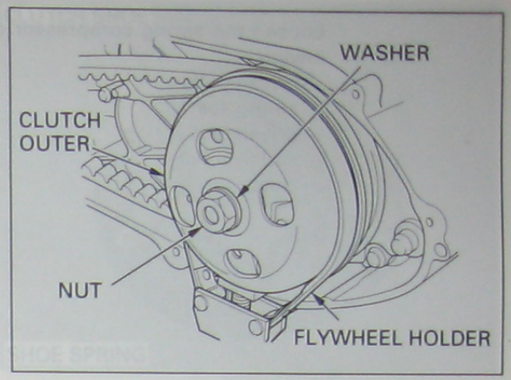
REMOVAL

Remove the drive pulley face (page 10-3).

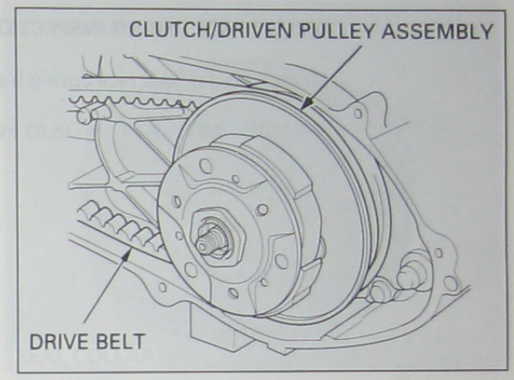
Hold the clutch outer with the special tool and loosen the clutch outer nut.

TOOL:
Flywheel holder 07725 – 0040000

Remove the nut, washer and clutch outer.



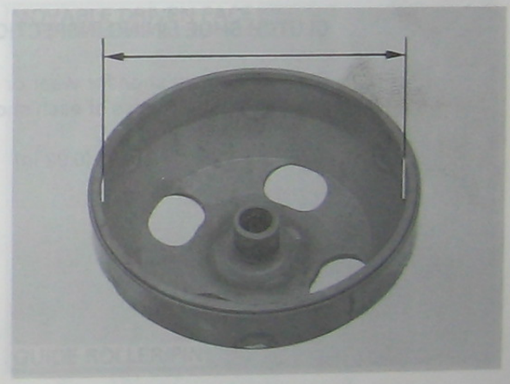
Remove the clutch/driven pulley assembly.
Remove the drive belt from the driven pulley.



CLUTCH OUTER INSPECTION

Check the clutch outer for wear or damage.
Measure the clutch outer I.D.

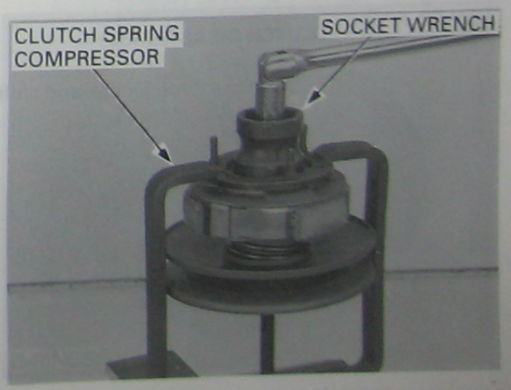
SERVICE LIMIT: 135.5 mm (5.33 in)



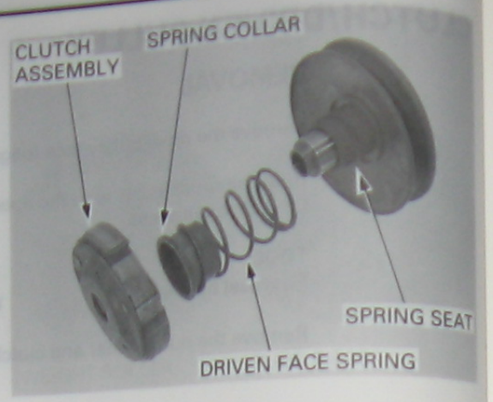
DISASSEMBLY

Set the clutch spring compressor onto the clutch/driven pulley, aligning the bosses with the hole in the clutch.
Hold the clutch spring compressor in a vice.
Remove the clutch/driven pulley nut using the socket wrench.

TOOLS:
Clutch spring compressor 07LME – GZ40200
Socket wrench, 39 x 41 mm 07GMA – KS40100



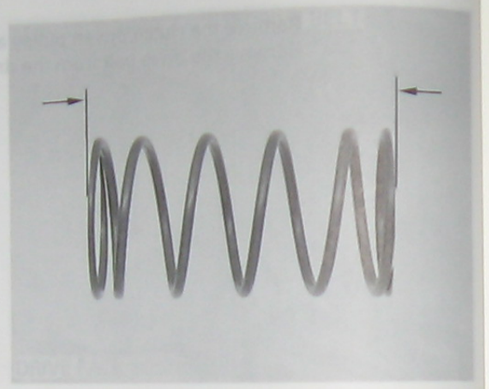
Loosen the spring compressor and remove the following:
— driven pulley
— spring seat
— driven face spring
— spring collar
— clutch



DRIVEN FACE SPRING INSPECTION

Measure the driven face spring free length.

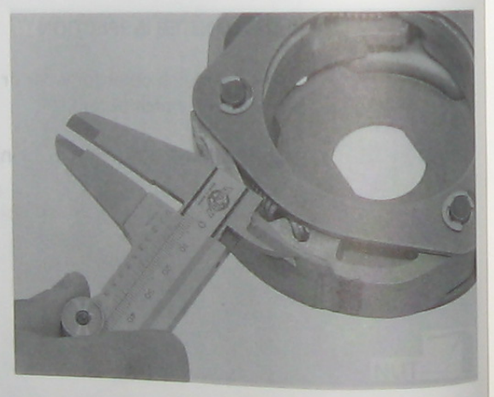
SERVICE LIMIT: 127.8 mm (5.03 in)



CLUTCH SHOE LINING INSPECTION

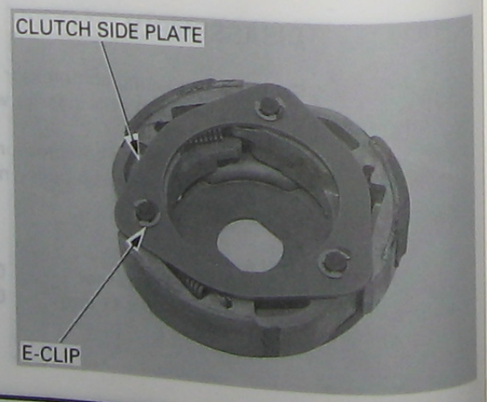
Check the clutch shoe for wear or damage.
Measure the thickness of each shoe.

SERVICE LIMIT: 0.5 mm (0.02 in)

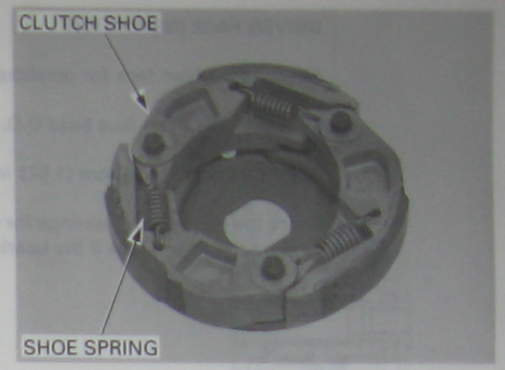


CLUTCH DISASSEMBLY

Remove the three E-clips and clutch side plate.



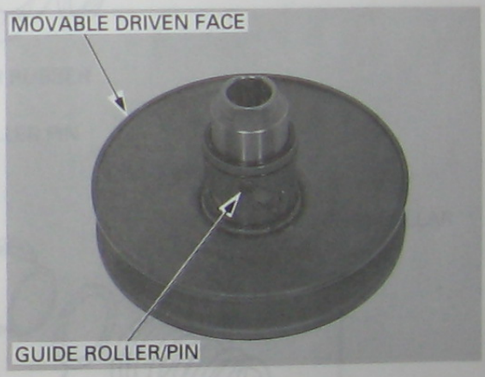
Remove the clutch shoes, shoe springs and damper rubbers from the drive plate.



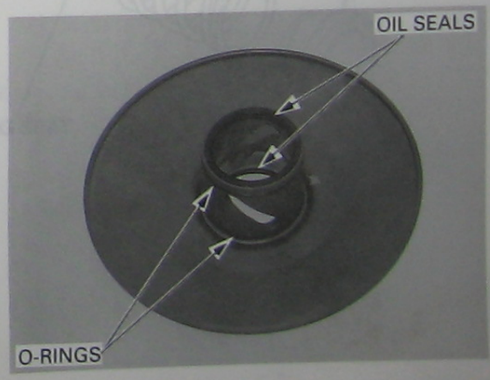
DRIVEN PULLEY DISASSEMBLY

Remove the seal collar.

Remove the four guide roller pins, guide rollers and the movable driven face.



Remove the O-rings and oil seals from the movable driven face.

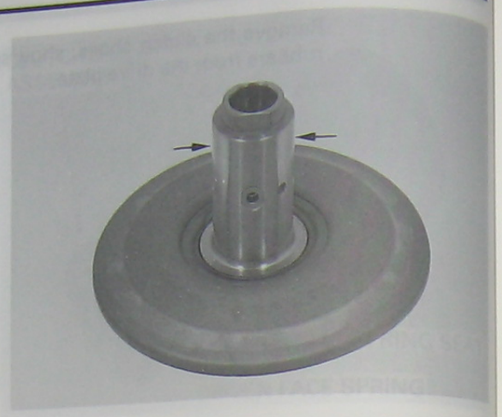


DRIVEN FACE INSPECTION

Check the driven face for scratches, scoring or damage.
Measure the driven face boss O.D.

SERVICE LIMIT: 39.94 mm (1.572 in)

Check the driven face bearings for wear or damage.
Replace the driven face if the bearings are faulty.



MOVABLE DRIVEN FACE INSPECTION

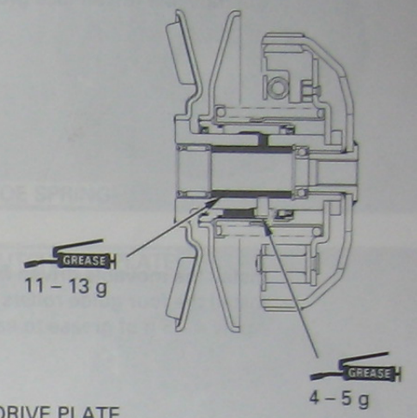
Check the movable driven face for scratches, scoring or damage.
Check the guide grooves for stepped wear or damage.
Measure the face I.D.

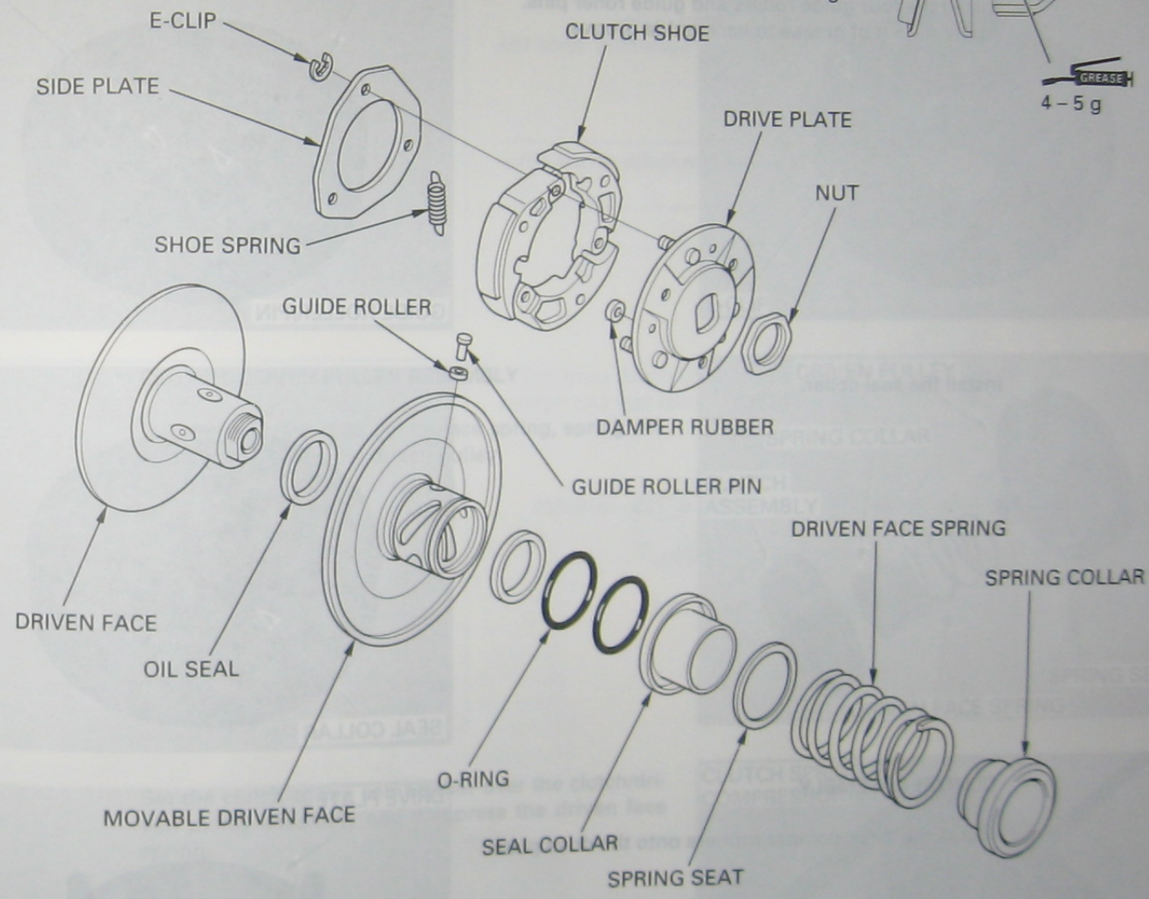
SERVICE LIMIT: 40.06 mm (1.577 in)

ASSEMBLY

CAUTION:

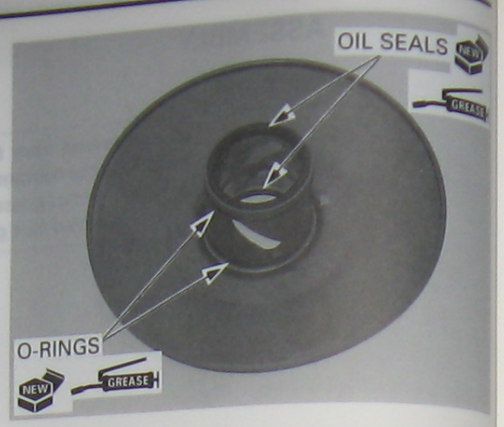
- ***Clean any oil and grease from the pulley faces and clutch outer. Replace the contaminated clutch shoes.***
- ***Apply specified amount of grease to the driven face inside and movable driven face guide grooves.***



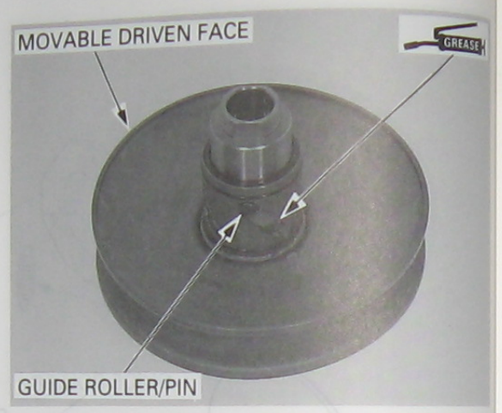


DRIVEN PULLEY ASSEMBLY

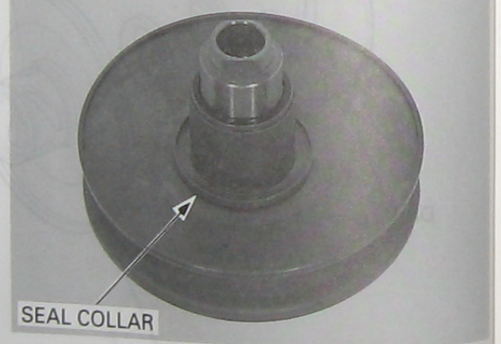
Apply grease to new oil seal lips and install them into the movable driven face.
Coat new O-rings with grease and install them into the movable driven face grooves.



Install the movable driven face onto the driven face.
Install the four guide rollers and guide roller pins.
Apply 4 – 5 g of grease to each guide groove.

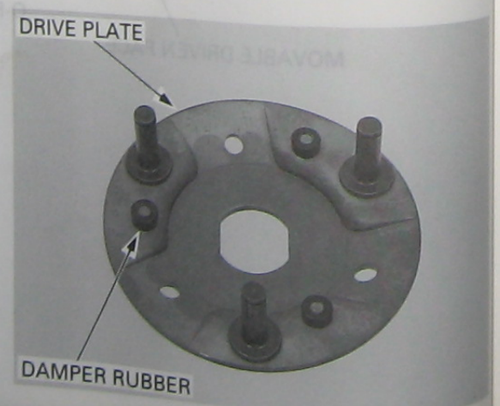


Install the seal collar.

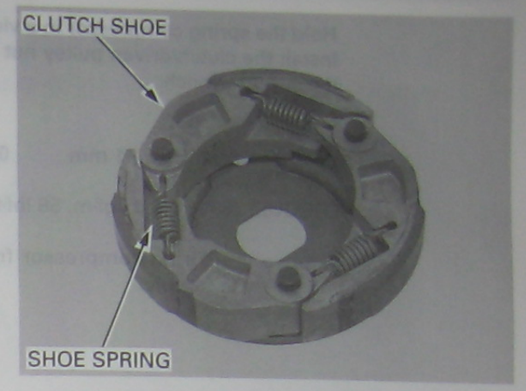


CLUTCH ASSEMBLY

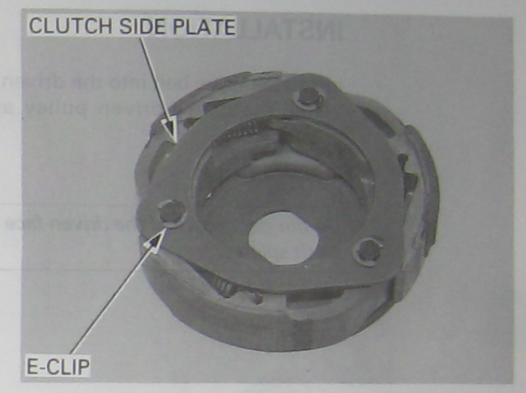
Install the three damper rubbers onto the drive plate.



Install the clutch shoes and shoe springs onto the drive plate.

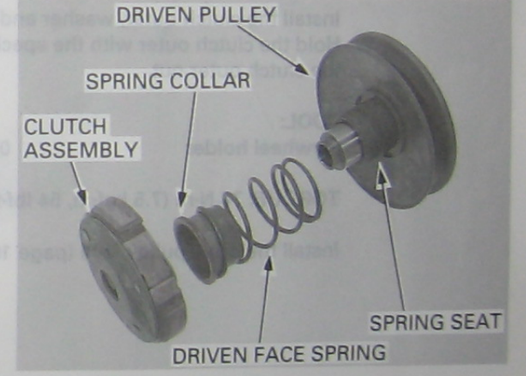


Install the clutch side plate and secure it with the three E-clips.



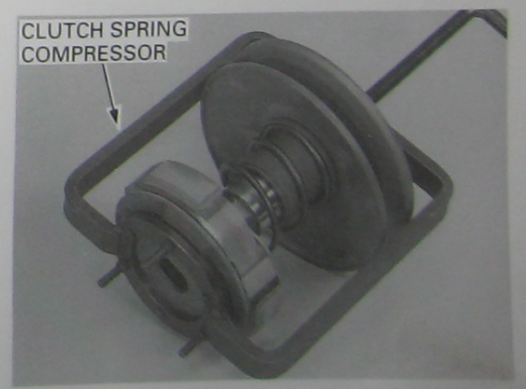
CLUTCH/DRIVEN PULLEY ASSEMBLY

Install the spring seat, driven face spring, spring collar and clutch over the driven pulley.



Set the clutch spring compressor over the clutch/driven pulley assembly and compress the driven face spring.

TOOL:
Clutch spring compressor 07LME – GZ40200

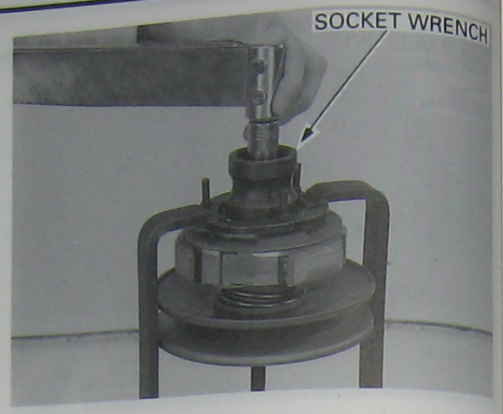


Hold the spring compressor in a vice.
Install the clutch/driven pulley nut and tighten it with the socket wrench.

TOOL:
Socket wrench, 39 x 41 mm 07GMA – KS40100

TORQUE: 78 N·m (8.0 kgf·m, 58 lbf·ft)

Remove the spring compressor from the clutch/driven pulley assembly.

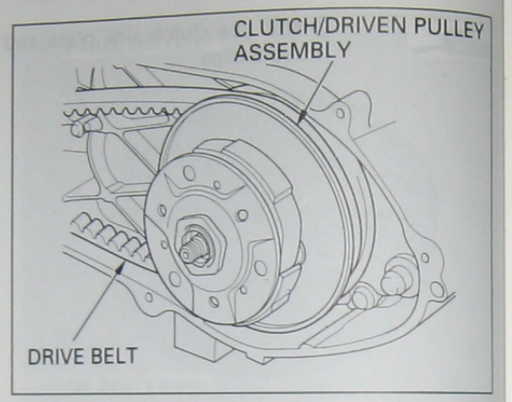


INSTALLATION

Install the drive belt into the driven pulley.
Install the clutch/driven pulley assembly onto the driveshaft.

CAUTION:

Do not get grease of the driven face inside on the driveshaft splines.

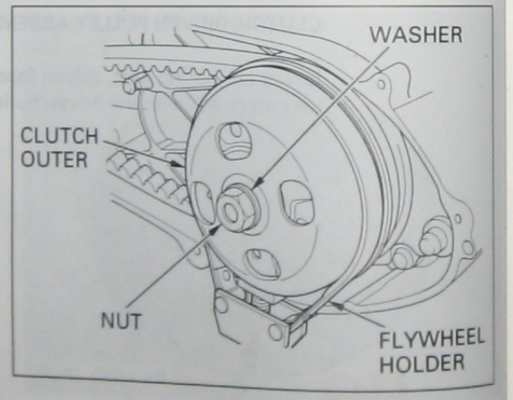


Install the clutch outer, washer and clutch outer nut.
Hold the clutch outer with the special tool and tighten the clutch outer nut.

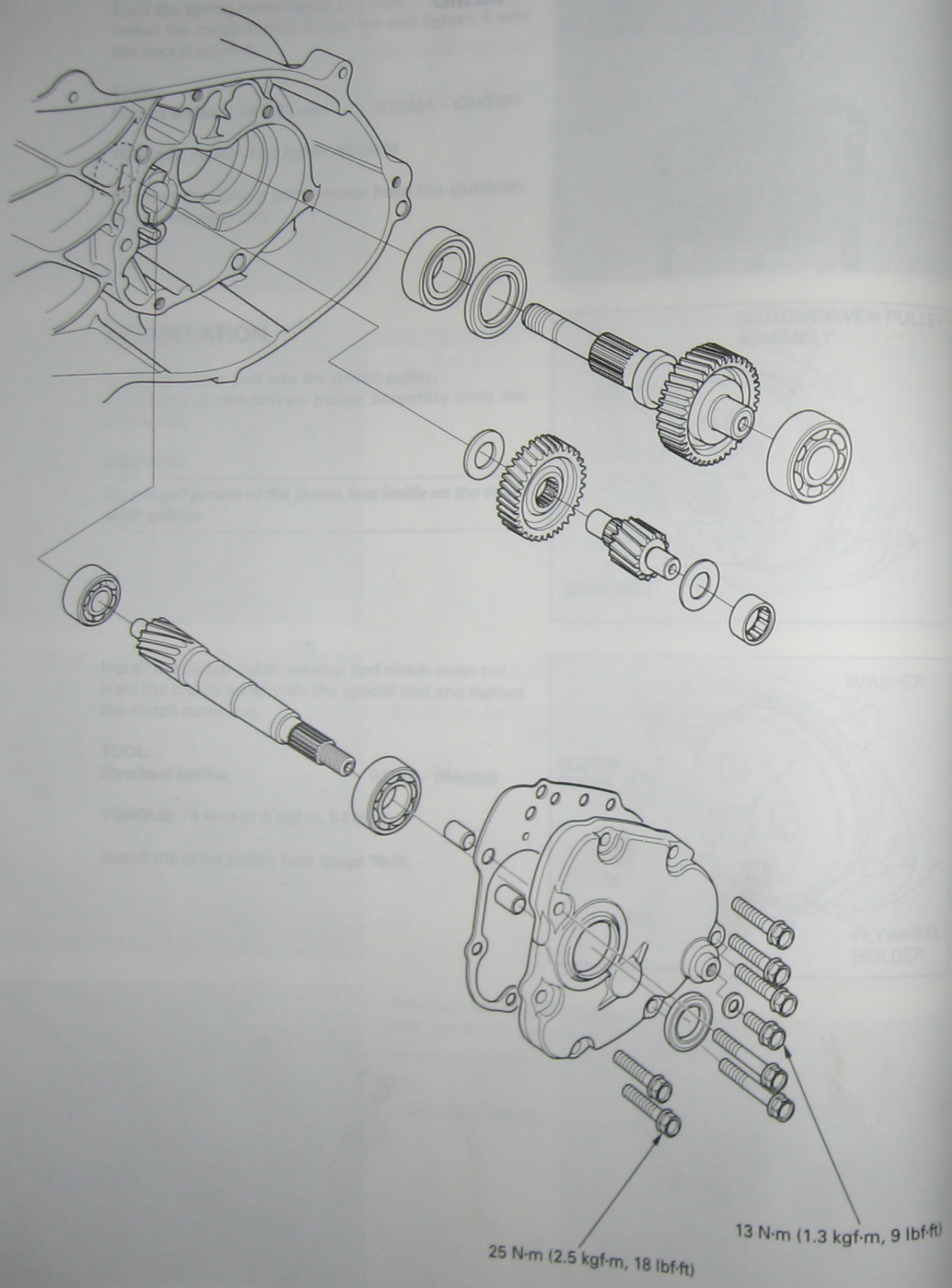
TOOL:
Flywheel holder 07725 – 0040000

TORQUE: 74 N·m (7.5 kgf·m, 54 lbf·ft)

Install the drive pulley face (page 10-5).



MEMO



11. FINAL REDUCTION

SERVICE INFORMATION

GENERAL

- The final reduction servicing can be performed with the engine installed in the frame.
- When installing the driveshaft, be sure to use the special tool; position the special tool against the bearing inner race and pull the driveshaft into the bearing.
- Refer to page 3-11 for final drive oil inspection and change.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Final drive oil capacity	at draining	160 cm³ (5.4 US oz, 5.6 Imp oz)
	at disassembly	200 cm³ (6.8 US oz, 7.0 Imp oz)
Recommended final drive oil		Hypoid gear oil SAE #90 or Honda 4-stroke oil or equivalent motor oil API service classification: SE Viscosity: SAE 10W-30

TORQUE VALUES

Oil drain bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)
Oil level check bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)
Oil filler bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)
Transmission cover bolt	25 N·m (2.5 kgf·m, 18 lbf·ft)

TOOLS

Universal bearing puller	07631 – 0010000
Bearing remover set, 15 mm	07936 – KC10000
— bearing remover, 15 mm	07936 – KC10200
— remover shaft	07936 – KC10100
— remover weight	07741 – 0010201
Bearing remover set, 20 mm	07936 – 3710001
— bearing remover, 20 mm	07936 – 3710600
— remover handle	07936 – 3710100
— remover weight	07741 – 0010201
Bearing remover, 14 mm	07WMC – KFG0100
Remover shaft	07936 – KC10100
Remover weight	07741 – 0010201
Driver	07749 – 0010000
Attachment, 42 x 47 mm	07746 – 0010300
Attachment, 52 x 55 mm	07746 – 0010400
Attachment, 22 x 24 mm	07746 – 0010800
Pilot, 15 mm	07746 – 0040300
Pilot, 20 mm	07746 – 0040500
Pilot, 25 mm	07746 – 0040600
Pilot, 22 mm	07746 – 0041000
Pilot, 14 mm	07746 – 0041200
Crank assembly bolt	07965 – 1660200
Crank assembly collar	07LMF – KAB0110

TROUBLESHOOTING

Engine starts but scooter won't move
- *Damaged transmission*
- *Seized transmission*
- *Faulty drive and driven pulley/clutch (section 9B)*

Abnormal noise
- *Worn, seized or chipped gears*
- *Worn or damaged transmission bearing*

Oil leaks
- *Oil level too high*
- *Worn or damaged oil seal*
- *Cracked crankcase*

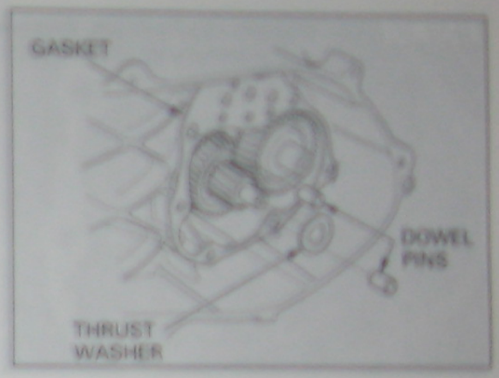
FINAL REDUCTION DISASSEMBLY

TRANSMISSION DISASSEMBLY

Remove the rear wheel (page 15-3).
Remove the clutch/driven pulley assembly (page 10-6).
Drain the final drive oil (page 3-11).

Remove the seven bolts and the transmission cover.

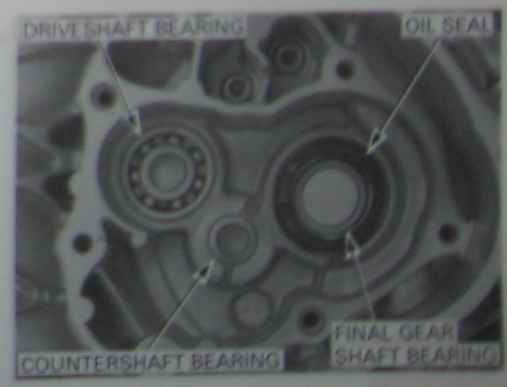
Remove the thrust washer, dowel pins and gasket.



Remove the final gear shaft, countershaft and thrust washer.

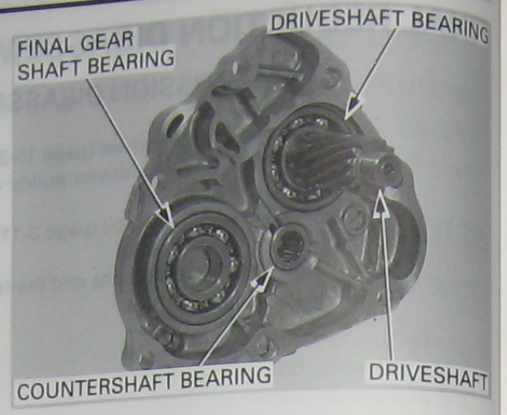
INSPECTION

Check the oil seal and bearings in the left crankcase for wear or damage.

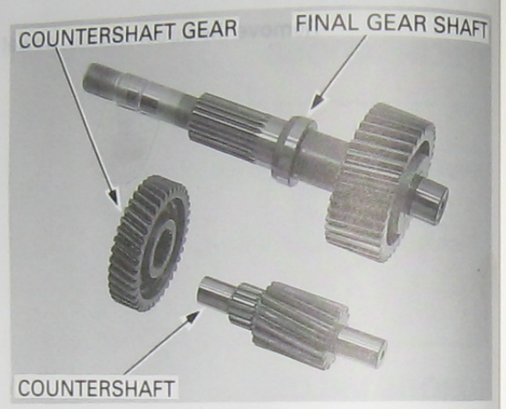


Check the bearings in the transmission cover for wear or damage.

Check the driveshaft for wear or damage.



Check the countershaft, countershaft gear and final gear shaft for wear or damage.

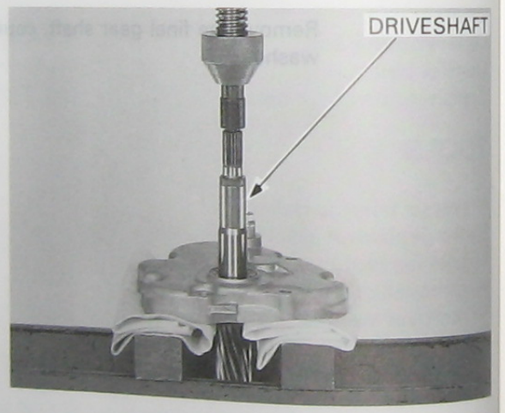


DRIVESHAFT REMOVAL

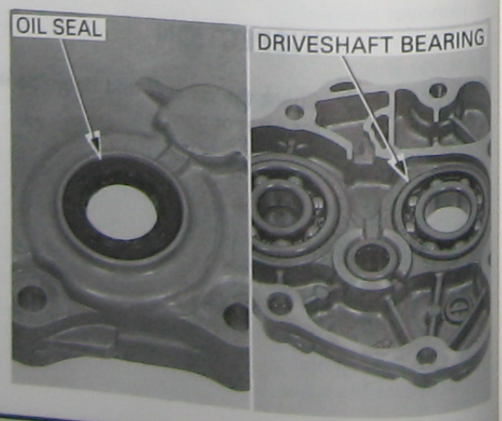
Press the driveshaft out of the transmission cover.

CAUTION:

Be careful not to damage the transmission cover mating surface.



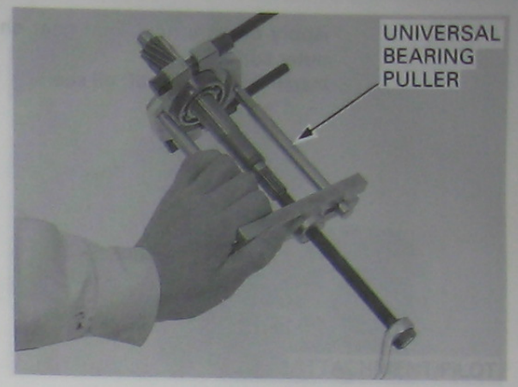
Remove the driveshaft oil seal and bearing from the transmission cover.



If the bearing is left on the driveshaft, remove it with the special tool.

TOOL:

Universal bearing puller	07631 – 0010000



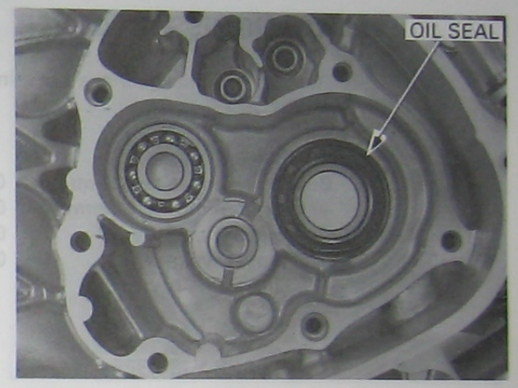
BEARING REPLACEMENT

CAUTION:

Be careful not to damage the left crankcase and transmission cover mating surfaces.

LEFT CRANKCASE

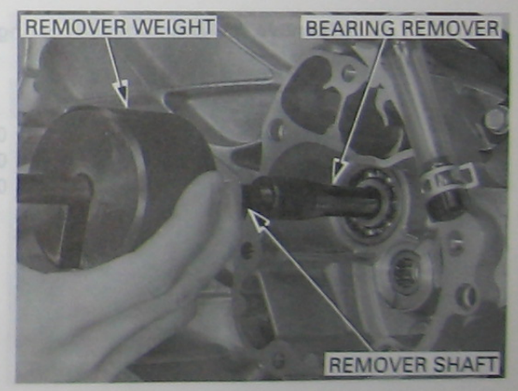
Remove the final gear shaft oil seal and bearing.



Remove the driveshaft bearing using the special tools.

TOOLS:

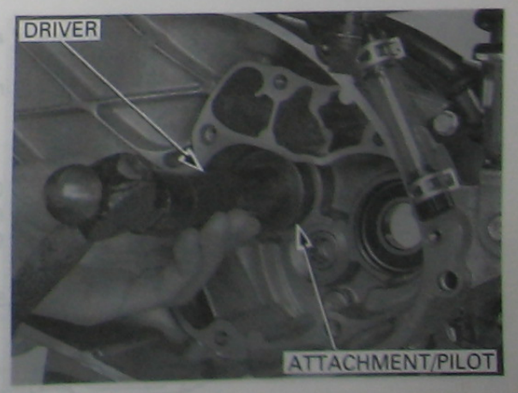
Bearing remover set, 15 mm	07936 – KC10000
— bearing remover, 15 mm	07936 – KC10200
— remover shaft	07936 – KC10100
— remover weight	07741 – 0010201



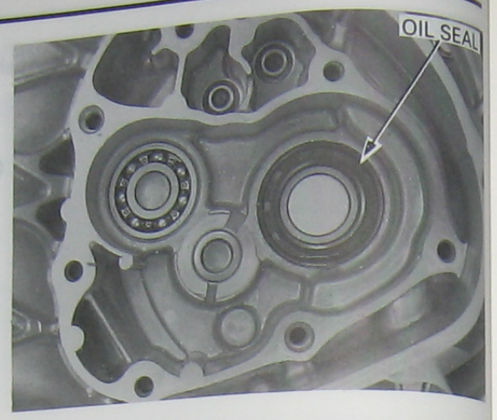
Apply engine oil to new driveshaft bearing cavities. Drive new bearings into the left crankcase.

TOOLS:

Driveshaft bearing:	
Driver	07749 – 0010000
Attachment, 42 x 47 mm	07746 – 0010300
Pilot, 15 mm	07746 – 0040300
Final gear shaft bearing:	
Driver	07749 – 0010000
Attachment, 52 x 55 mm	07746 – 0010400
Pilot, 25 mm	07746 – 0040600



Apply oil to a new final gear shaft oil seal lip and outer surface.
Install final gear shaft oil seal.

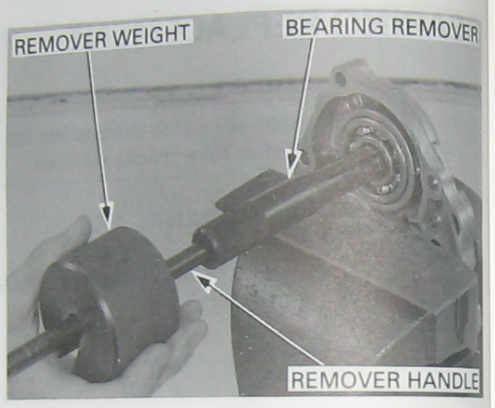


TRANSMISSION COVER

Remove the final gear shaft bearing using the special tools.

TOOLS:

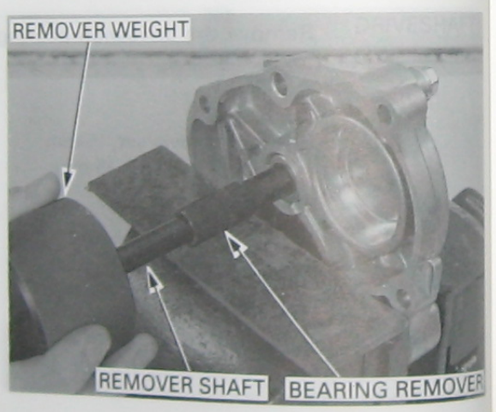
Bearing remover set, 20 mm	07936 – 3710001
— bearing remover, 20 mm	07936 – 3710600
— remover handle	07936 – 3710100
— remover weight	07741 – 0010201



Remove the countershaft bearing using the special tools.

TOOLS:

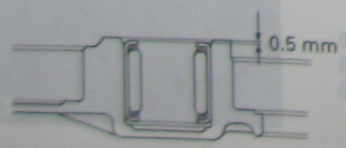
Bearing remover, 14 mm	07WMC – KFG0100
Remover shaft	07936 – KC10100
Remover weight	07741 – 0010201

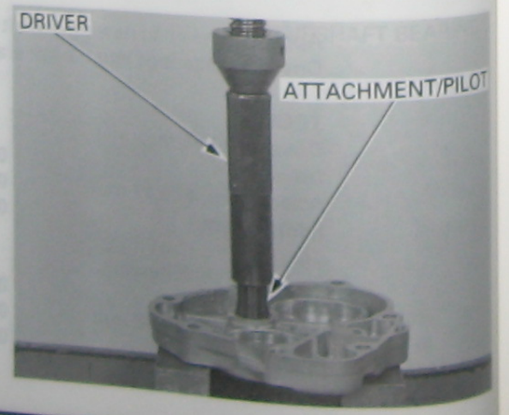


Apply oil to the needle rollers of a new countershaft bearing.
Press the countershaft bearing in the transmission cover using the special tools.

TOOLS:

Driver	07749 – 0010000
Attachment, 22 x 24 mm	07746 – 0010800
Pilot, 14 mm	07746 – 0041200

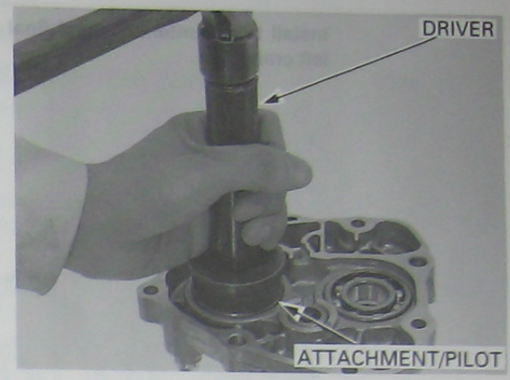




Apply oil to new bearing cavities.
Drive new bearings into the left crankcase.

TOOLS:

Driveshaft bearing:	
Driver	07749 – 0010000
Attachment, 42 x 47 mm	07746 – 0010300
Pilot, 22 mm	07746 – 0041000
Final gear shaft bearing:	
Driver	07749 – 0010000
Attachment, 52 x 55 mm	07746 – 0010400
Pilot, 20 mm	07746 – 0040500



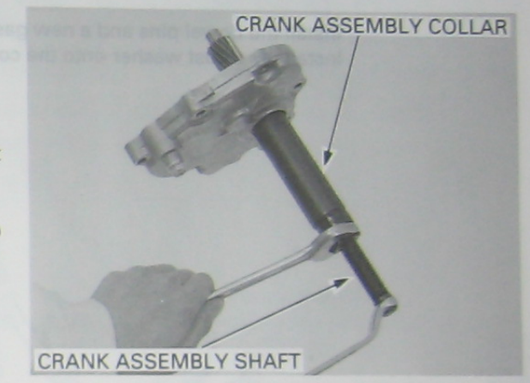
FINAL REDUCTION ASSEMBLY

DRIVESHAFT INSTALLATION

Install the driveshaft into the transmission cover.
Position the assembly collar against the driveshaft bearing inner race.
Thread the assembly shaft onto the driveshaft.
Hold the assembly shaft and draw the driveshaft into the bearing inner race by turning the nut.

TOOLS:

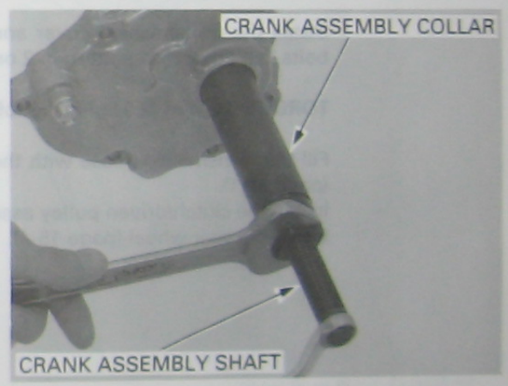
Crank assembly collar	07LMF – KAB0110
Crank assembly shaft	07965 – 1660200



Apply oil to a new driveshaft oil seal lip and outer surface.
Install the driveshaft oil seal until it is flush with the transmission cover surface, using the special tools.

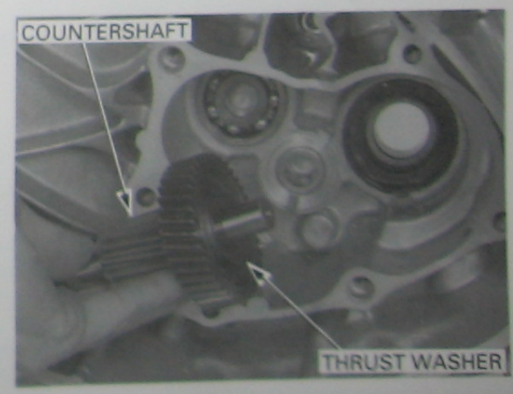
TOOLS:

Crank assembly collar	07LMF – KAB0110
Crank assembly shaft	07965 – 1660200

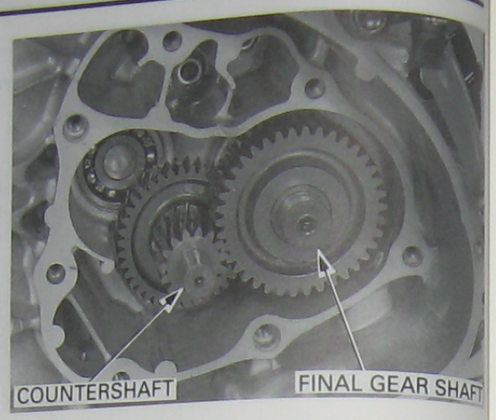


TRANSMISSION ASSEMBLY

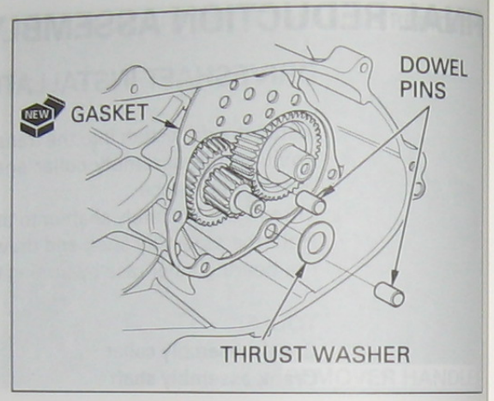
Install the thrust washer on the left crankcase side of the countershaft.



Install the countershaft and final gear shaft into the left crankcase.



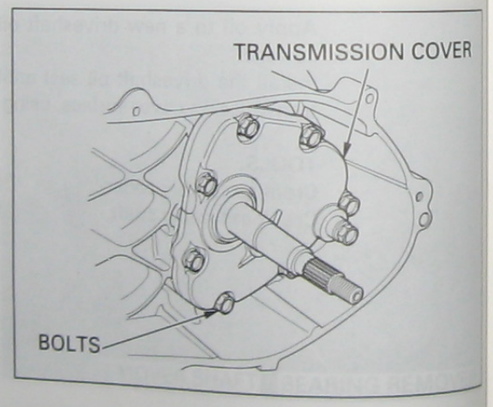
Install the dowel pins and a new gasket.
Install the thrust washer onto the countershaft.



Install the transmission cover and tighten the seven bolts in a crisscross pattern in 2 or 3 steps.

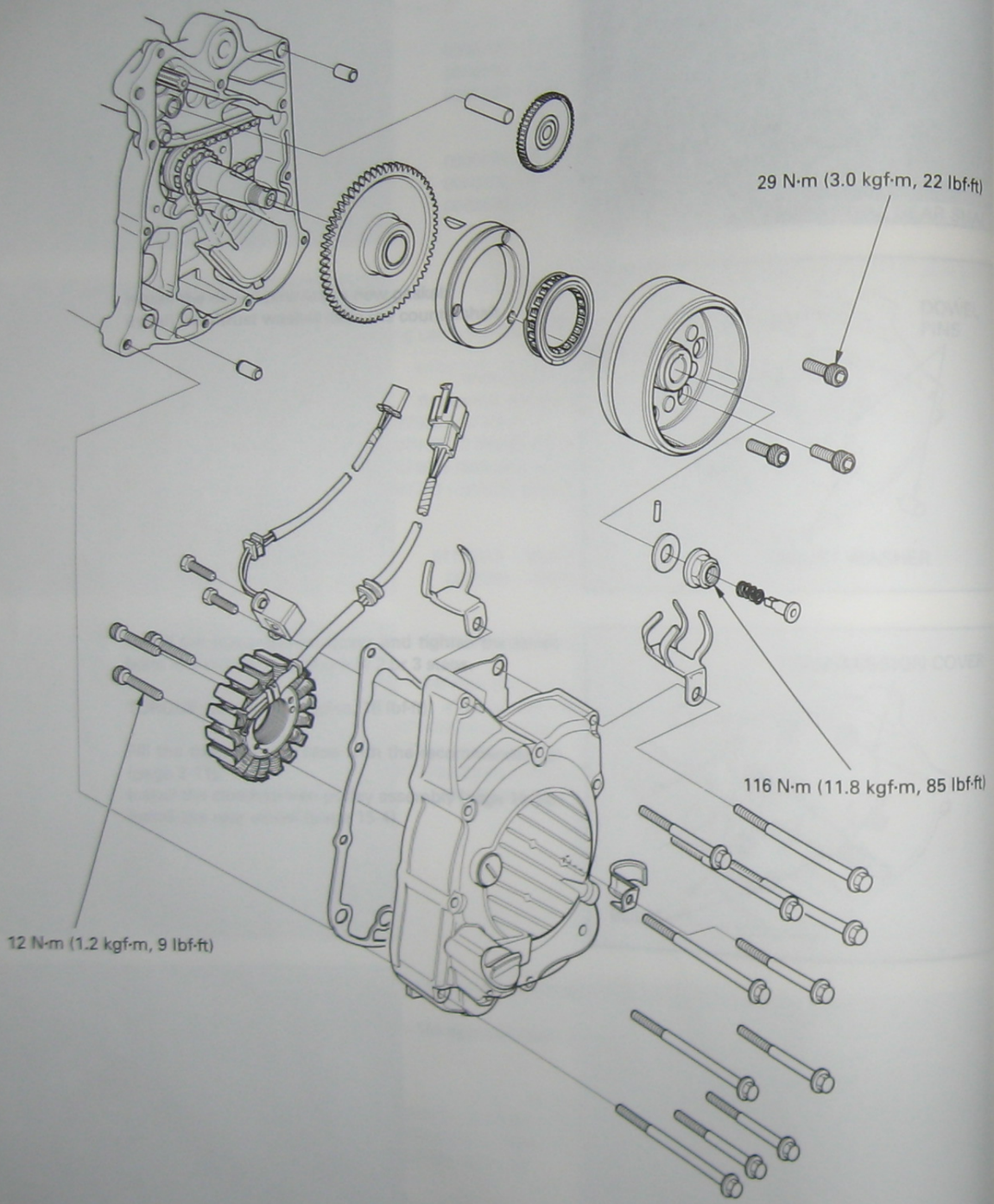
TORQUE: 25 N·m (2.5 kgf·m, 18 lbf·ft)

Fill the transmission case with the recommended oil (page 3-11).
Install the clutch/driven pulley assembly (page 10-14).
Install the rear wheel (page 15-4).



12. ALTERNATOR/STARTER CLUTCH

MEMO



12. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION

GENERAL

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

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Starter driven gear	Boss O.D.	42.195 – 42.208 (1.6612 – 1.6617)	42.15 (1.659)
	Bushing I.D.	22.026 – 22.045 (0.8672 – 0.8676)	22.10 (0.870)
Starter clutch outer I.D.		58.64 – 58.84 (2.309 – 2.317)	58.89 (2.318)

TORQUE VALUES

Starter clutch outer bolt	29 N·m (3.0 kgf·m, 22 lbf·ft)	Apply locking agent to the threads.
Flywheel nut	116 N·m (11.8 kgf·m, 85 lbf·ft)	Apply oil to the threads and seating surface.
Stator mounting bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

TOOLS

Flywheel holder	07725 – 0040000
Flywheel puller	07933 – KM10000

TROUBLESHOOTING

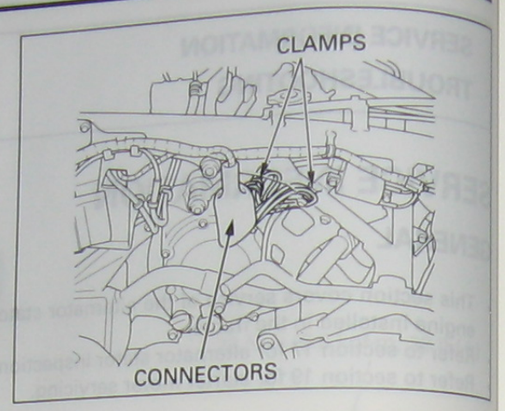
Starter motor turns, but engine does not turn
- Faulty starter clutch
- Damaged starter reduction gear

ALTERNATOR STATOR

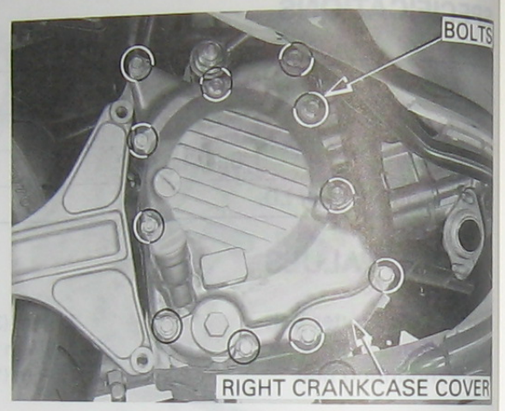
RIGHT CRANKCASE COVER REMOVAL

Drain the engine oil (page 3-9).
Remove the muffler (page 2-13).

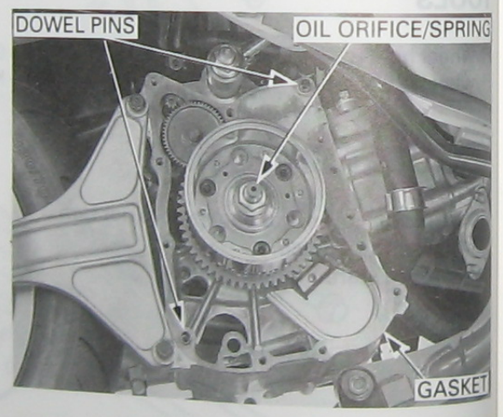
Disconnect the alternator 3P (Withe) and ignition pulse generator 2P (White) connectors, and free the wires from the two clamps.



Remove the eleven bolts, three clamps and the right crankcase cover.



Remove the oil orifice and spring.
Remove the dowel pins and gasket.



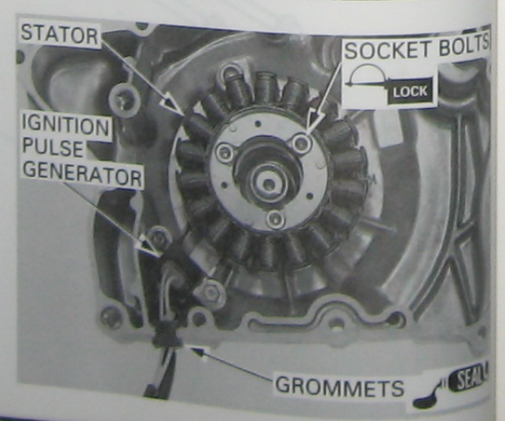
STATOR/IGNITION PULSE GENERATOR REPLACEMENT

Remove the two flange bolts, grommet and the ignition pulse generator from the right crankcase cover.
Remove the three socket bolts, grommet and the stator from the right crankcase cover.

Install a new stator and tighten the socket bolts.

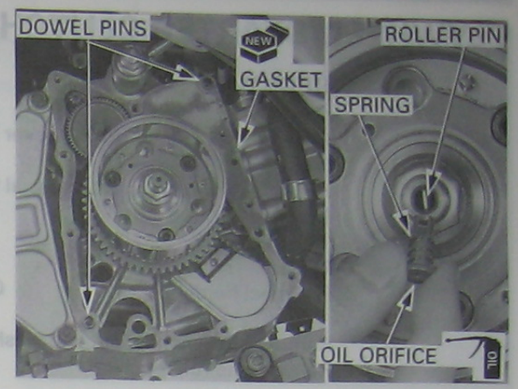
TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Apply sealant to the grommet seating surface and install it into the cover groove properly.
Install a new ignition pulse generator and tighten the two bolts securely.
Apply sealant to the grommet seating surface and install it into the cover groove properly.

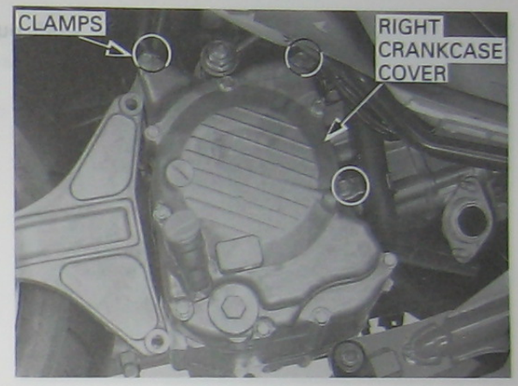


RIGHT CRANKCASE COVER INSTALLATION

Install the dowel pins and a new gasket.
Install the oil orifice and spring, aligning the groove in the orifice with the roller pin in the crankshaft.
Apply oil to the oil orifice end.

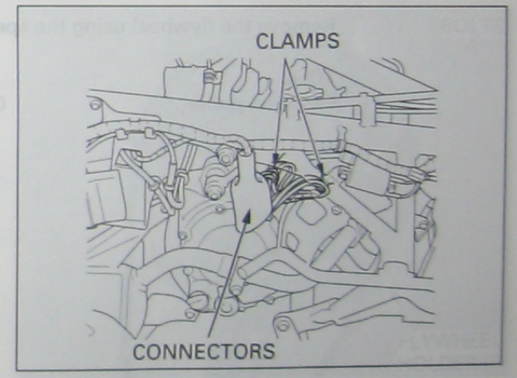


Install the right crankcase cover, three clamps and eleven bolts as shown.
Tighten the bolts in a crisscross pattern in 2 or 3 steps.



Route and clamp the alternator and ignition pulse generator wires properly.
Connect the alternator 3P (Withe) and ignition pulse generator 2P (White) connectors.

Install the muffler (page 2-13).
Fill the crankcase with the recommended engine oil (page 3-9).



FLYWHEEL/STARTER CLUTCH

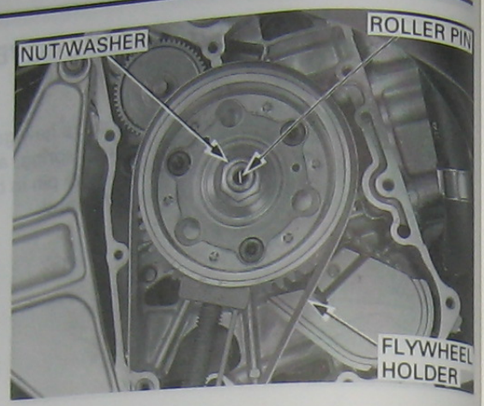
REMOVAL

Remove the right crankcase cover (page 12-2).

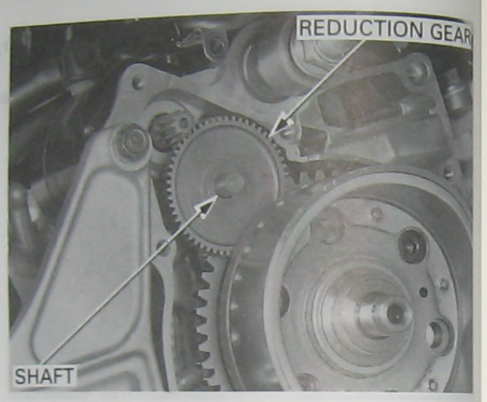
Hold the flywheel with the special tool and loosen the flywheel nut.

TOOL:
Flywheel holder 07725 – 0040000

Remove the flywheel nut and washer.
Remove the roller pin.

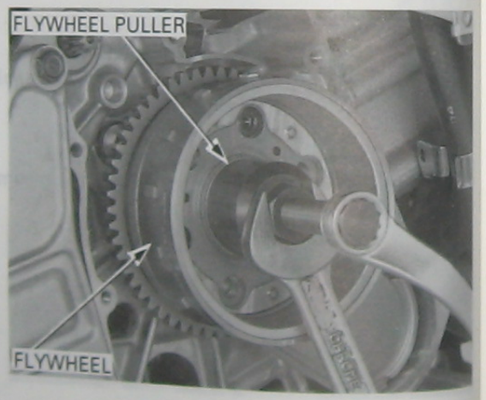


Pull the reduction gear shaft out and remove the reduction gear.

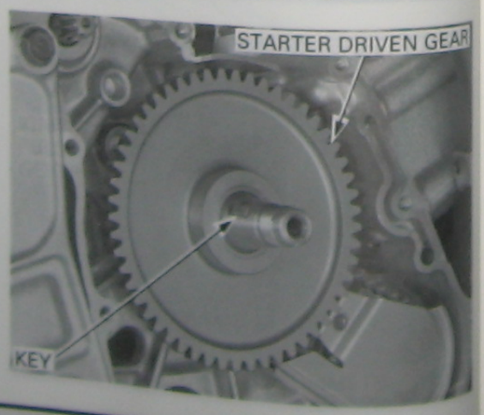


Remove the flywheel using the special tool.

TOOL:
Flywheel puller 07733 – KM10000



Remove the woodruff key and starter driven gear from the crankshaft.



DISASSEMBLY/INSPECTION

Check the starter driven gear and reduction gear teeth for wear or damage.

Measure the starter driven gear boss O.D.

SERVICE LIMIT: 42.15 mm(1.659 in)

Measure the starter driven gear bushing I.D.

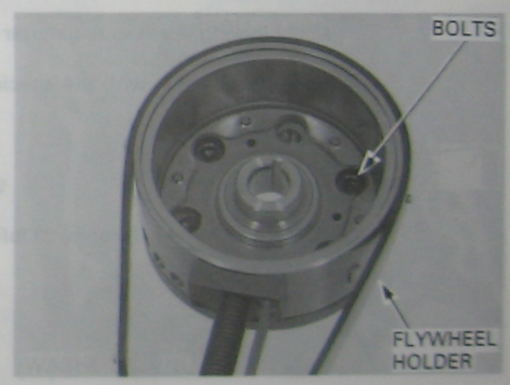
SERVICE LIMIT: 22.10 mm (0.870 in)

Install the starter driven gear into the starter clutch on the flywheel while turning it clockwise.
Check that the starter driven gear turns clockwise smoothly and does not turn counterclockwise.

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

TOOL:
Flywheel holder 07725 – 0040000

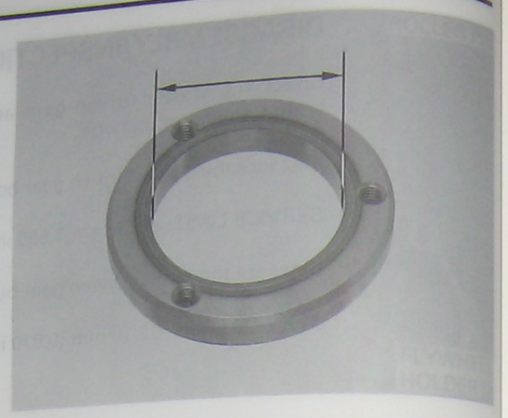
Remove the starter clutch assembly from the flywheel.
Remove the sprag clutch from the starter clutch outer.



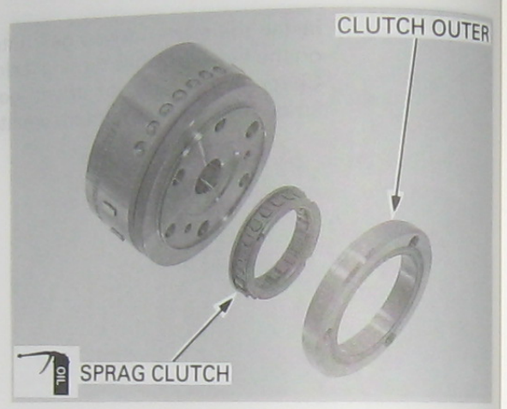
Check the starter clutch outer and sprag clutch for abnormal wear or damage.

Measure the starter clutch outer I.D.

SERVICE LIMIT: 58.89 mm (2.318 in)



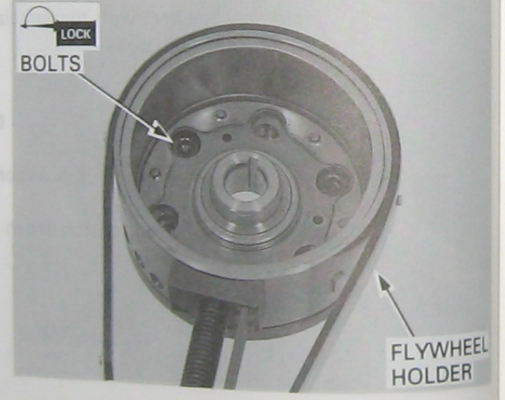
Apply oil to the sprag clutch outer surface.
Install the sprag clutch into the starter clutch outer as shown.
Install the starter clutch assembly onto the flywheel.



Apply locking agent to the starter clutch bolt threads and install them.
Hold the flywheel with the special tool and tighten the bolts.

TOOL:
Flywheel holder 07725 – 0040000

TORQUE: 29 N·m (3.0 kgf·m, 22 lbf·ft)

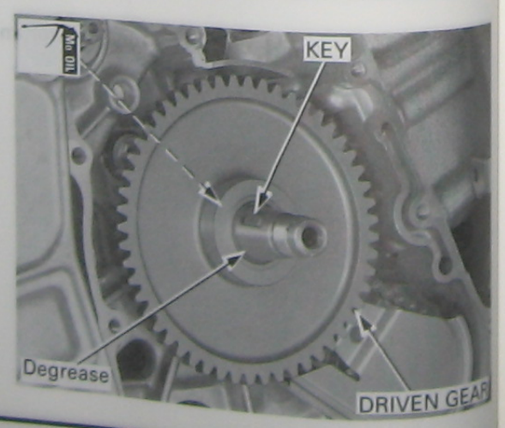


INSTALLATION

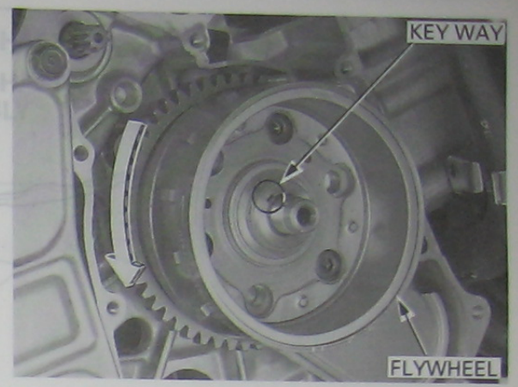
Apply molybdenum oil solution to the starter driven gear bushing (I.D.) and install the gear onto the crankshaft.

Clean any oil from the tapered portion of the crankshaft.

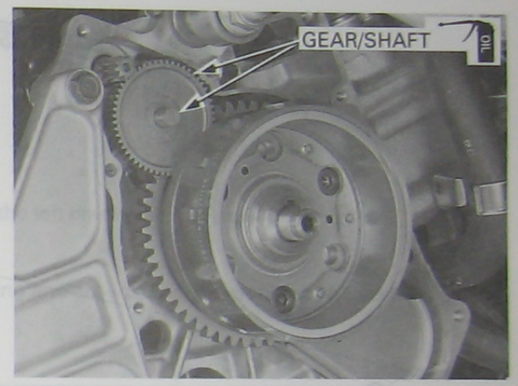
Install the woodruff key in the crankshaft key groove.



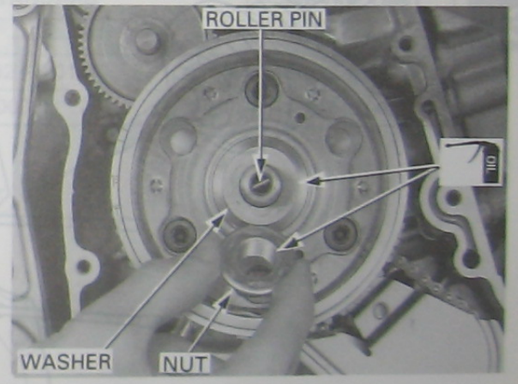
Clean any oil from the tapered portion of the flywheel.
Install the flywheel onto the crankshaft, aligning the key way with the woodruff key while turning the starter driven gear counterclockwise.



Apply oil to the starter reduction gear and shaft.
Set the reduction gear properly and insert the shaft.



Install the roller pin into the crankshaft.
Apply oil to the washer and the flywheel nut threads and seating surface.
Install the washer and nut.

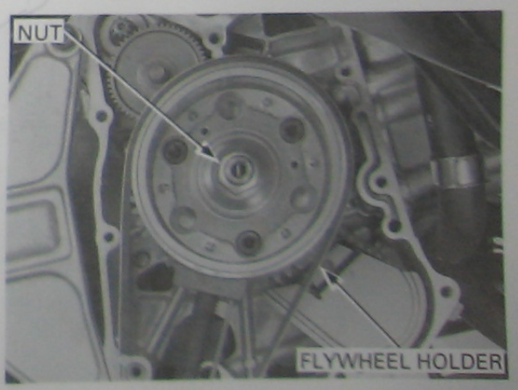


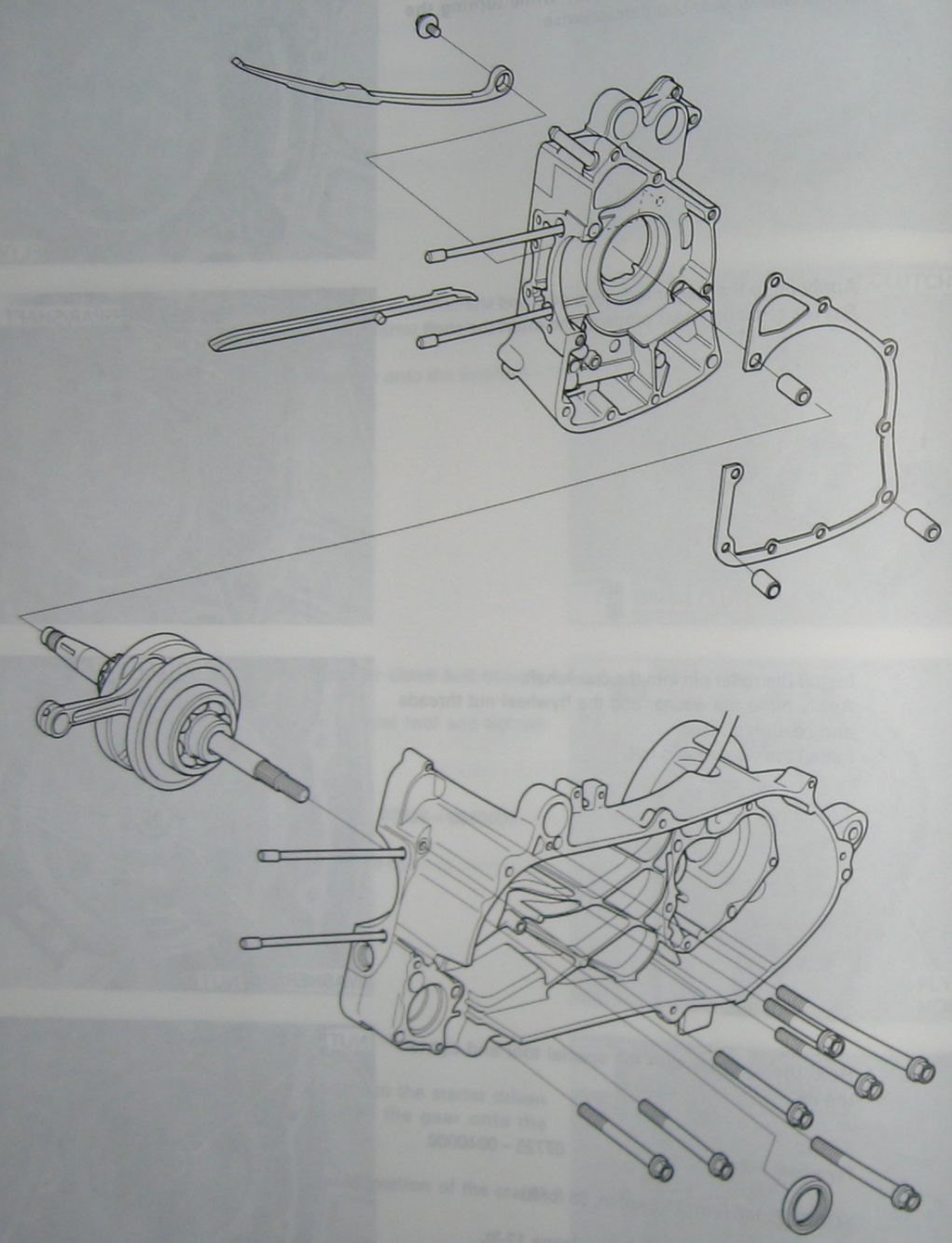
Hold the flywheel with the special tool and tighten the nut.

TOOL:
Flywheel holder 07725 – 0040000

TORQUE: 116 N·m (11.8 kgf·m, 85 lbf·ft)

Install the right crankcase cover (page 12-3).





13. CRANKSHAFT/CRANKCASE

SERVICE INFORMATION

GENERAL

- This section covers the crankcase separation to service the crankshaft.
- The following parts must be removed before separating crankcase:
  — engine (section 7)
  — oil pump (section 4)
  — water pump (section 6)
  — cylinder head (section 8)
  — cylinder, piston (section 9)
  — drive pulley, clutch/driven pulley (section 10)
  — flywheel, starter clutch (section 12)
  — starter motor (section 19)
- In addition to the parts listed above, remove the following parts when the left crankcase half must be replaced:
  — final reduction (section 11)
  — rear brake (section 16)
- Be careful not to damage the crankcase mating surfaces when separating and assembling the crankcase halves.

SPECIFICATIONS

Unit: mm

ITEM	STANDARD	SERVICE LIMIT
Crankshaft runout	——	0.10 (0.004)
Connecting rod big end side clearance	0.05 – 0.40 (0.002 – 0.016)	0.60 (0.024)
Connecting rod big end radial clearance	0 – 0.008 (0 – 0.0003)	0.05 (0.002)

TORQUE VALUES

Cam chain tensioner slider bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)

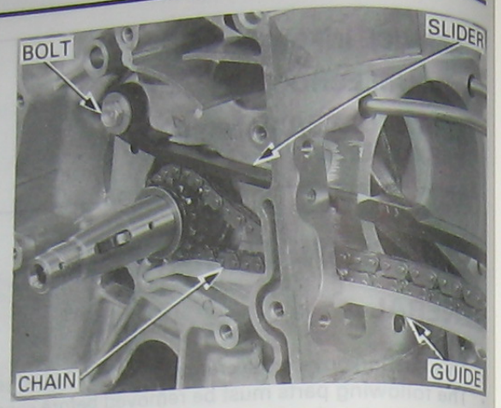
TROUBLESHOOTING

Abnormal engine noise
- Worn connecting rod small end
- Worn or damaged connecting rod big end bearing
- Worn or damaged crankshaft bearings

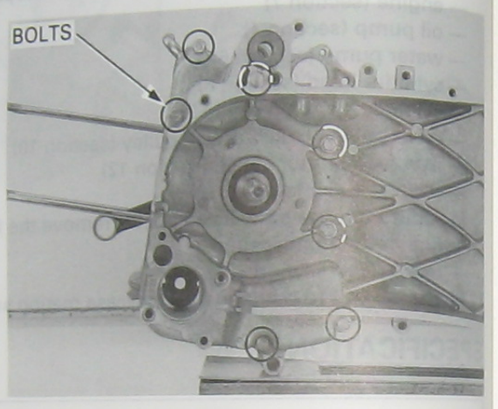
CRANKCASE/CRANKSHAFT DISASSEMBLY

Remove the parts required for crankcase separation (page 13-1).

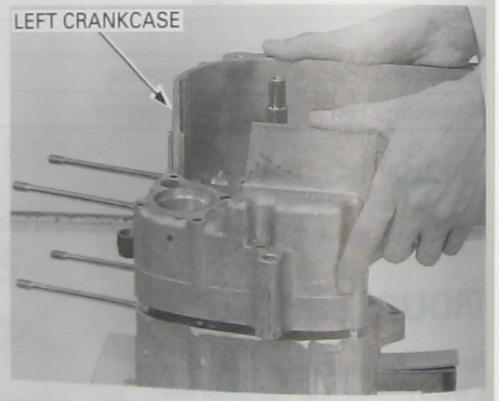
Remove the cam chain guide, bolt and tensioner slider from the crankcase.
Remove the cam chain from the drive sprocket.



Remove the seven bolts.



Place the crankcase assembly with the right side down and separate the left crankcase from the right crankcase.

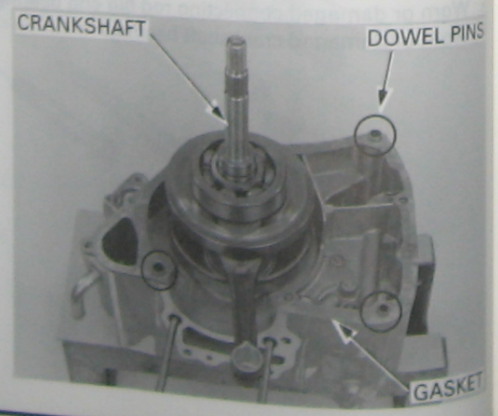


Remove the three dowel pins and gasket.

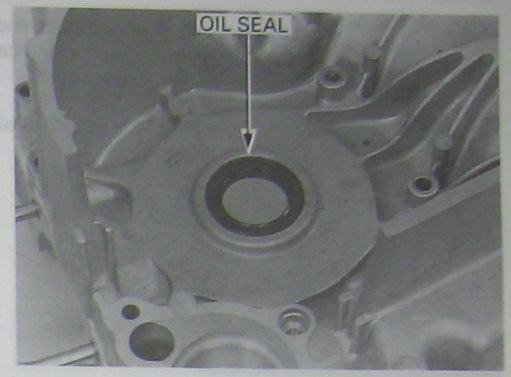
CAUTION:

Be careful not to damage the crankcase mating surface.

Remove the crankshaft.



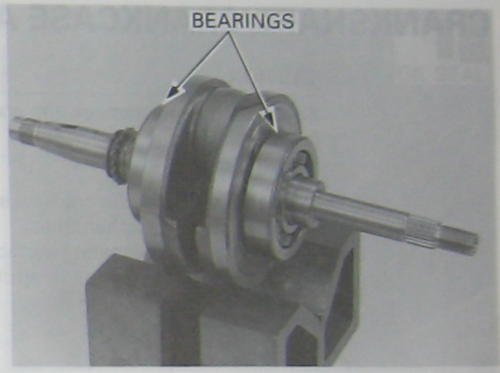
Remove the oil seal from the left crankcase.



CRANKSHAFT INSPECTION

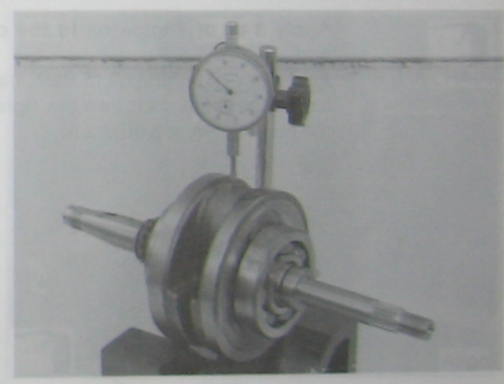
Turn the outer race of the crankshaft bearing with your finger. The bearing should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the crankshaft.

Replace the crankshaft assembly if the bearings do not turn smoothly, quietly, or if they fit loosely on the crankshaft.



Measure the connecting rod big end radial clearance.

SERVICE LIMIT: 0.05 mm (0.002 in)

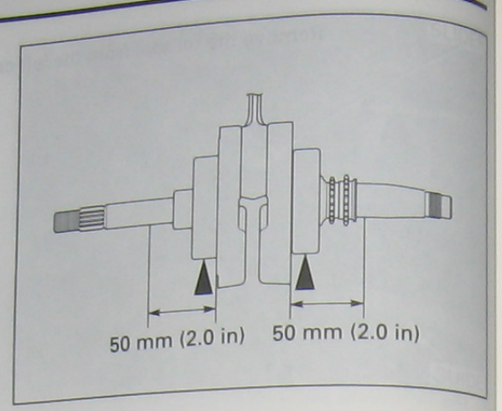


Measure the connecting rod big end side clearance with a feeler gauge.

SERVICE LIMIT: 0.60 mm (0.024 in)

Set the crankshaft on V-blocks and read the runout at points as shown, using dial indicators. Actual runout is 1/2 of total indicator reading.

SERVICE LIMIT: 0.10 mm (0.004 in)

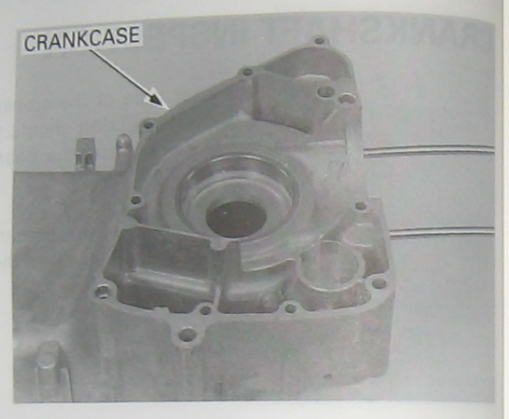


CRANKSHAFT/CRANKCASE ASSEMBLY

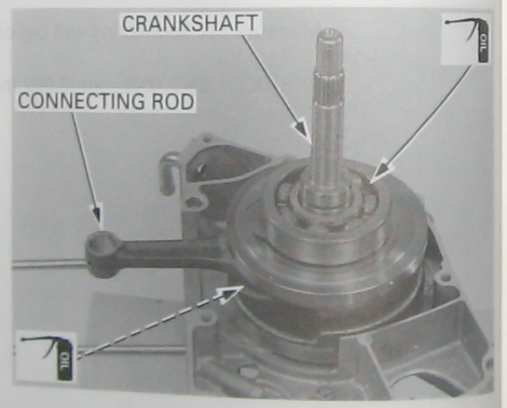
CAUTION:

Be careful not to damage the crankcase mating surfaces.

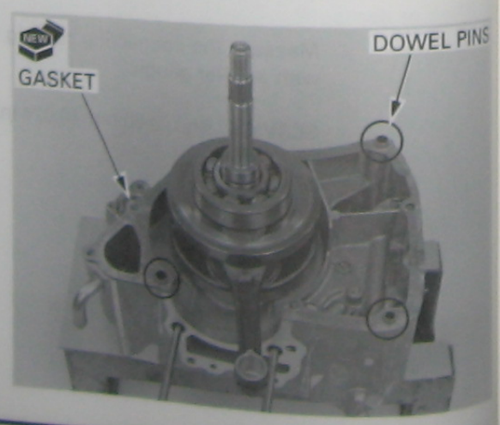
Clean the insides of the crankcases.
Check for cracks or other faults.
Clean the crankcase mating surfaces.
Dress any roughness or irregularities with an oil stone.



Apply 3 cc of engine oil to the connecting rod big end.
Apply 2 cc of engine oil to each crankshaft bearing.
Install the crankshaft into the right crankcase, noting the connecting rod position.

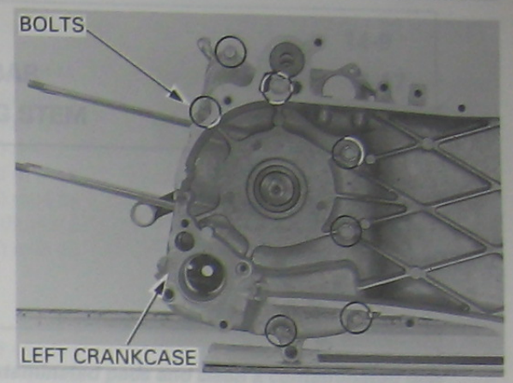


Install the dowel pins and a new gasket.

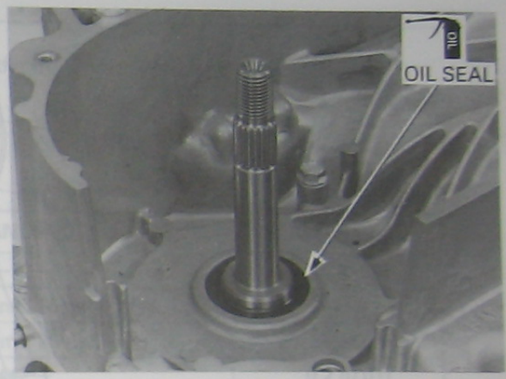


Install the left crankcase over the right crankcase.
Install the seven bolts and tighten them in a criss-cross pattern in 2 or 3 steps.

Make sure that the crankshaft turns smoothly.



Apply oil to a new crankshaft oil seal lip and outer surface.
Install the crankshaft oil seal until it is flush with the crankcase surface.

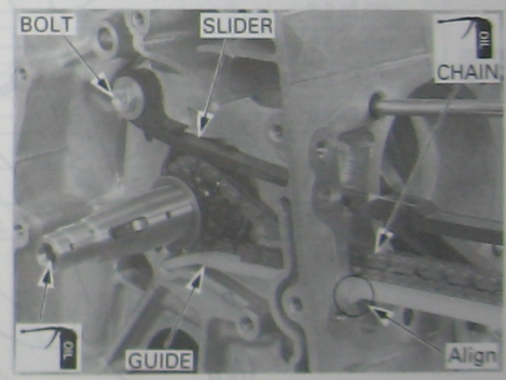


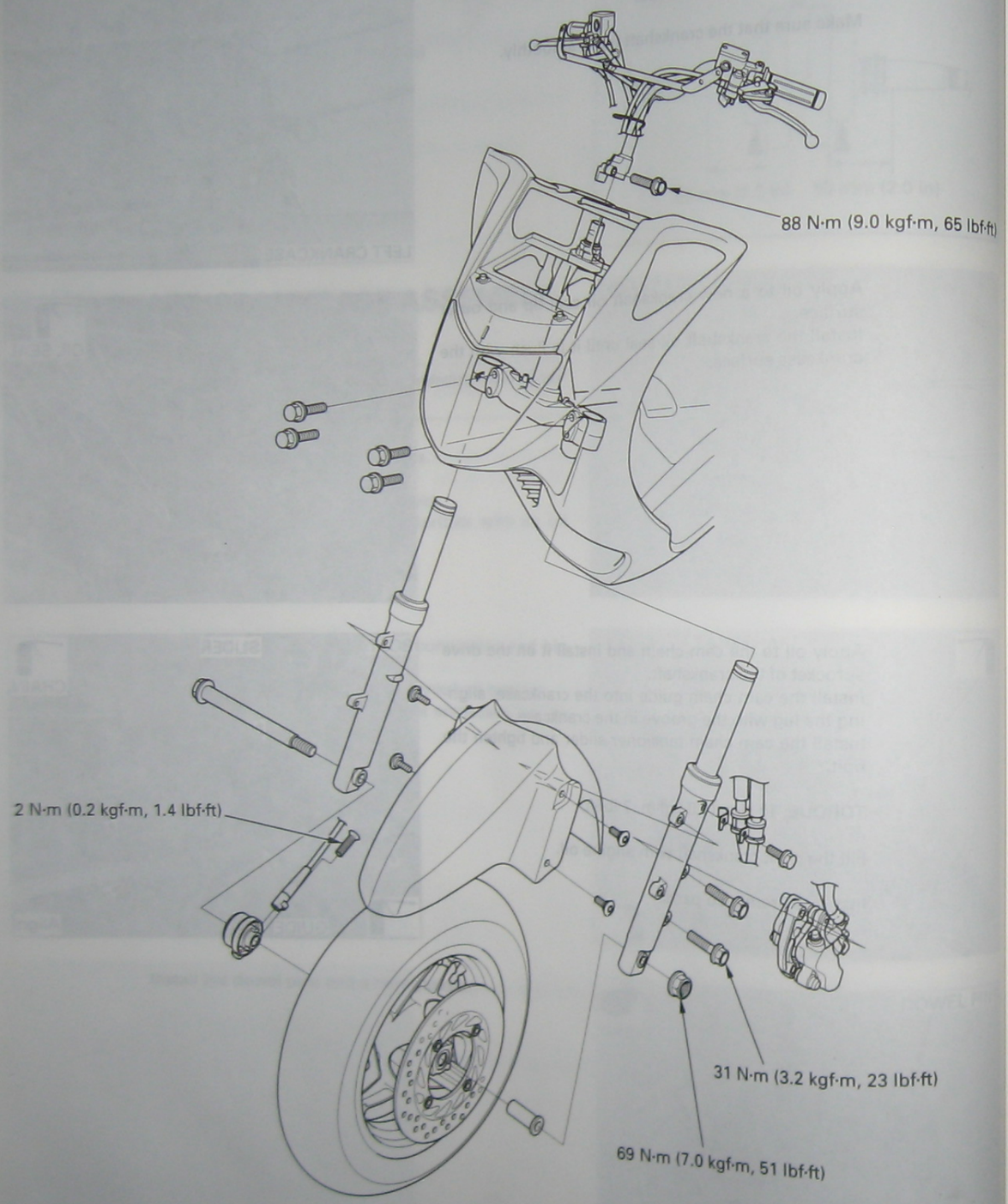
Apply oil to the cam chain and install it on the drive sprocket of the crankshaft.
Install the cam chain guide into the crankcase, aligning the lug with the groove in the crankcase.
Install the cam chain tensioner slider and tighten the bolt.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Fill the right crankshaft with engine oil.

Install the removed parts.





14. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION

GENERAL

⚠ WARNING

- ***Riding on damaged rims impairs safe operation of the vehicle.***
- ***A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.***

- A hoist or equivalent is required to support the scooter when servicing the front wheel, fork and steering stem.
- Refer to section 16 for brake system service.
- Refer to section 20 for light, meter and switch service.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—	1.5 (0.06)
Cold tire pressure	Driver only	175 kPa (1.75 kgf/cm², 25 psi)	—
	Driver and passenger	175 kPa (1.75 kgf/cm², 25 psi)	—
Axle runout		—	0.2 (0.01)
Front wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Fork	Spring free length	257.7 (10.15)	252.5 (9.94)
	Tube runout	—	0.2 (0.08)
	Recommended fluid	Fork fluid	—
	Fluid level	67 (2.6)	—
	Fluid capacity	118 cm³ (4.0 US oz, 4.2 Imp oz)	—

TORQUE VALUES

Steering stem lock nut	74 N·m (7.5 kgf·m, 54 lbf·ft)	(page 14-24)
Steering stem adjustment nut	4 N·m (0.4 kgf·m, 2.9 lbf·ft)	ALOC bolt. Do not reuse.
Handle post pinch bolt	88 N·m (9.0 kgf·m, 65 lbf·ft)	
Master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front caliper mounting bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	ALOC bolt. Do not reuse.
Front brake disc bolt	42 N·m (4.3 kgf·m, 31 lbf·ft)	ALOC bolt. Do not reuse.
Speedometer cable setting screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Front axle nut	69 N·m (7.0 kgf·m, 51 lbf·ft)	

TOOLS

Bearing remover shaft	07746 – 0050100
Bearing remover head, 12 mm	07746 – 0050300
Driver	07749 – 0010000
Attachment, 28 x 30 mm	07746 – 1870100
Attachment, 32 x 35 mm	07746 – 0010100
Pilot, 12 mm	07746 – 0040200
Fork seal driver weight	07747 – 0010100
Fork seal driver attachment	07947 – 0010501
Lock nut wrench	07916 – KM10000
Steering stem socket	07916 – 3710101
Ball race remover	07GMD – KS40100
Ball race driver attachment	07945 – 3330300
Driver attachment handle	07949 – 3710101
Oil seal remover	07948 – 4630100
Oil seal driver	07947 – SB00200
Attachment, 35 mm I.D.	07746 – 0030400

TROUBLESHOOTING

Hard steering
- Steering bearing adjustment nut too tight
- Worn or damaged steering bearings
- Worn or damaged steering bearing races
- Bent steering stem
- Insufficient tire pressure
- Faulty front tire

Steers to one side or does not track straight
- Damaged or loose steering bearings
- Bent fork
- Bent front axle: wheel installed incorrectly
- Bent frame
- Faulty front tire
- Worn or damaged front wheel bearings
- Worn or damaged engine mounting bushings (section 7)

Front wheel wobbling
- Bent rim
- Worn or damaged front wheel bearings
- Faulty front tire
- Loose front axle fasteners

Wheel turns hard
- Faulty front wheel bearings
- Bent front axle
- Brake drag (section 16)

Soft suspension
- Weak fork springs
- Insufficient fluid in fork
- Deteriorated fork fluid
- Incorrect fork fluid weight
- Low tire pressure

Hard suspension
- Bent fork tubes
- Too much fluid in fork
- Incorrect fork fluid weight
- Clogged fork fluid passage
- High tire pressure

Front suspension noise
- Worn slider or fork tube bushing
- Insufficient fluid in fork
- Loose fork fasteners

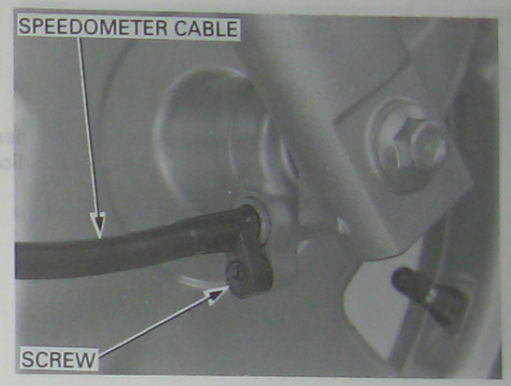
FRONT WHEEL

⚠ WARNING

Do not get grease on the brake disc or stopping power will be reduced.

REMOVAL

Remove the screw and disconnect the speedometer cable.

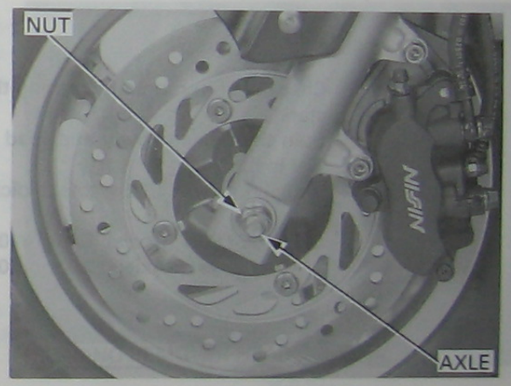


Remove the axle nut.

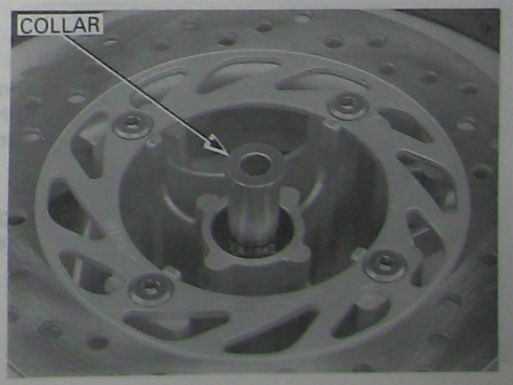
Support the scooter securely using a hoist or equivalent and raise the front wheel off the ground.

Do not operate the front and rear brake lever after removing the front wheel.

Pull the axle out and remove the front wheel.



Remove the side collar from the left side of the wheel.



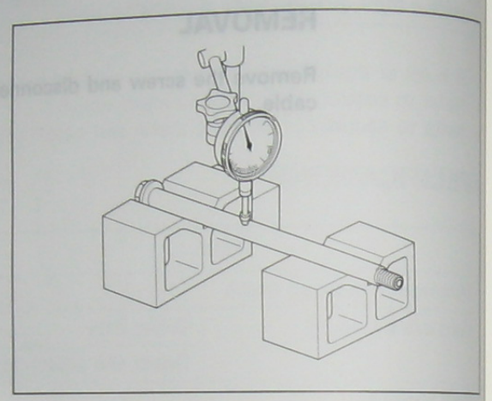
Remove the speedometer gear box from the right side of the wheel.

INSPECTION

AXLE

Place the axle in V-blocks and measure the runout.
Actual runout is 1/2 the total indicator reading.

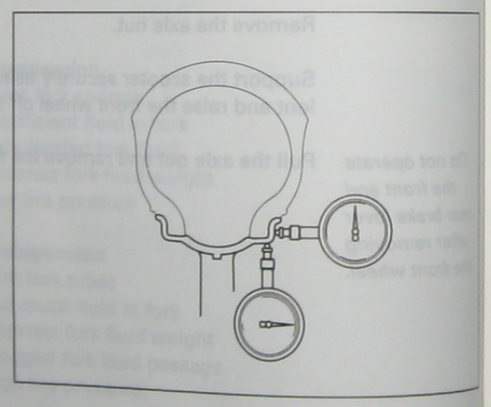
SERVICE LIMIT: 0.2 mm (0.01 in)



WHEEL

Check the rim runout by placing the wheel in a truing stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

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

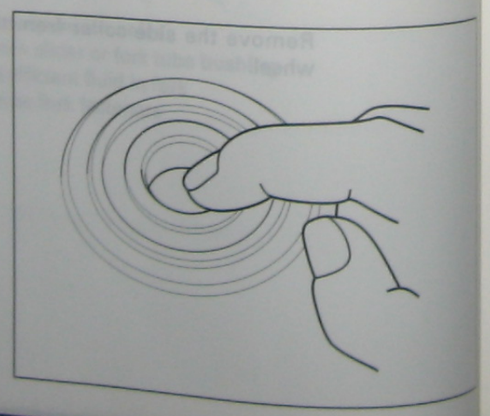


WHEEL BEARING

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

Replace the wheel bearings in pairs.

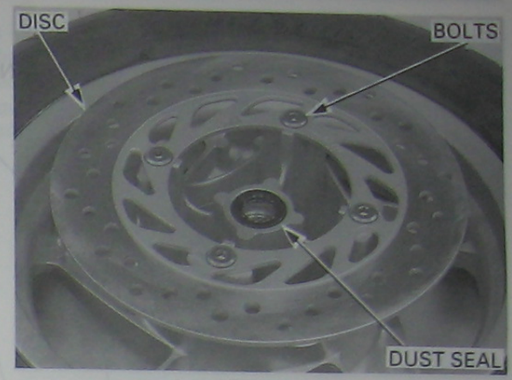
Remove and discard the bearings if the race do not turn smoothly, quietly, or if they fit loosely in the hub.



DISASSEMBLY

Remove the four socket bolts and the brake disc.

Remove the dust seal.



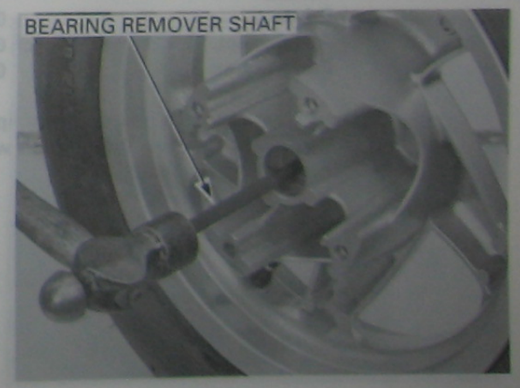
Remove the dust seal/retainer.

Replace the wheel bearings in pairs. Do not reuse old bearings.

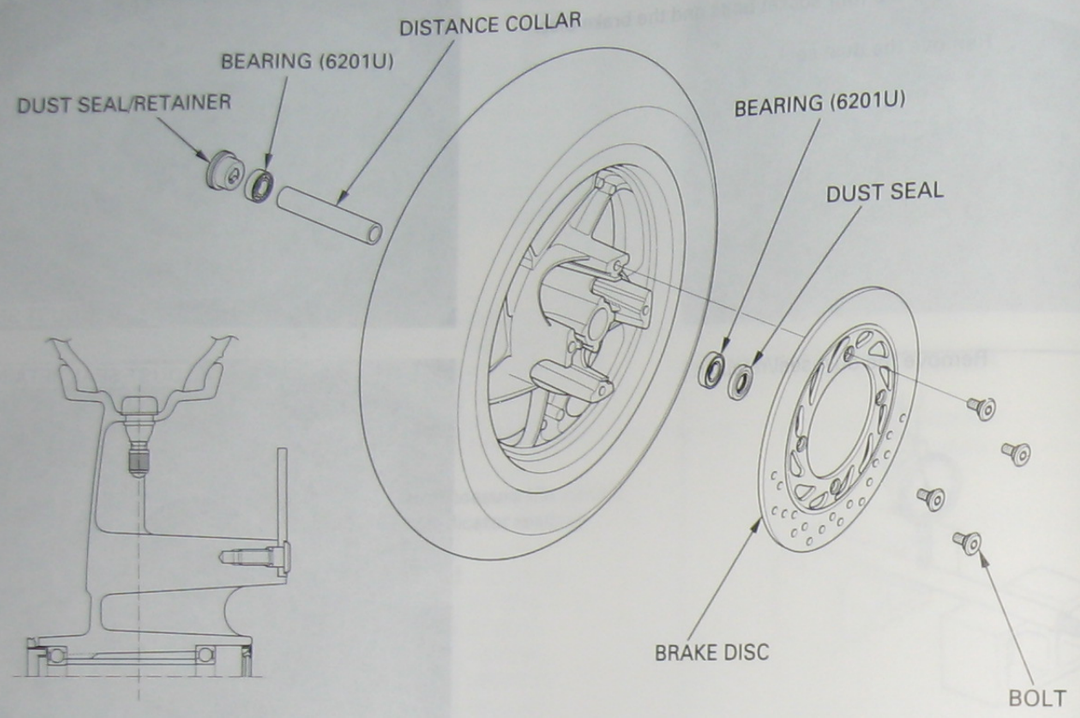
Install the bearing remover head into the bearing. From opposite side install the bearing remover shaft and drive the bearing out of the wheel hub.
Remove the distance collar and drive out the other bearing.

TOOLS:

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



ASSEMBLY



Pack new bearing cavities with grease.
Drive in the new left bearing (disc side) squarely with the sealed side facing up until it is fully seated.

TOOLS:

Driver	07749 – 0010000
Attachment, 28 x 30 mm	07746 – 1870100
Pilot, 12 mm	07746 – 0040200

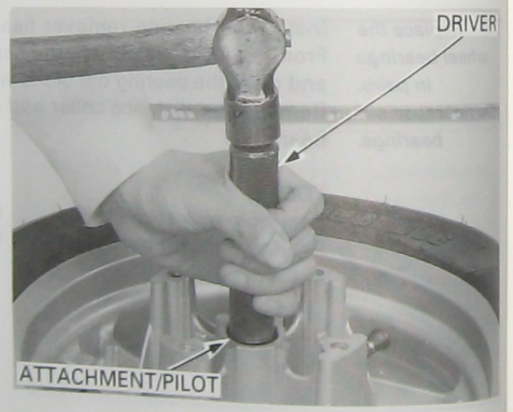
Install the distance collar.

Drive in the new right bearing squarely with the sealed side facing up until it is seated.

TOOLS:

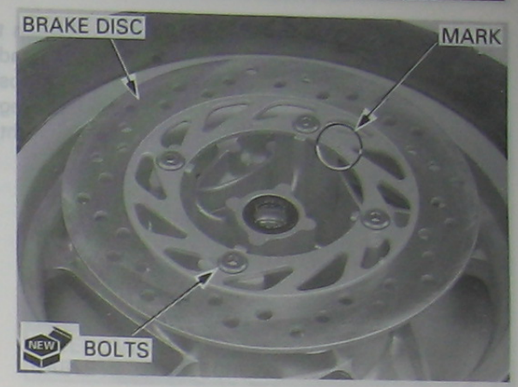
Driver	07749 – 0010000
Attachment, 32 x 35 mm	07746 – 0010100
Pilot, 12 mm	07746 – 0040200

Apply grease to a new dust seal lips.
Install the dust seal into the left wheel hub until it is flush with the wheel hub.



Install the brake disc onto the wheel hub with the marked side facing out.
Install new disc bolts and tighten them.

TORQUE: 42 N·m (4.3 kgf·m, 31 lbf·ft)



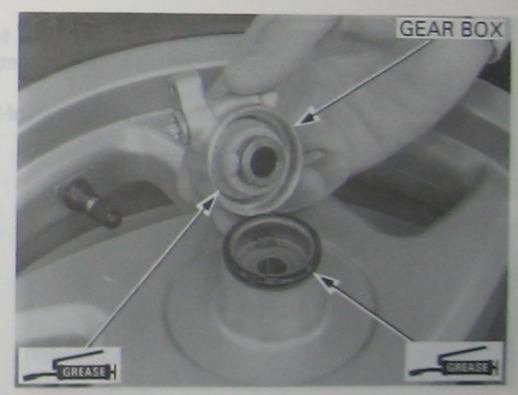
Be careful not to damage the seal lip.

Install a new dust seal/retainer into the right wheel hub until it is seated.

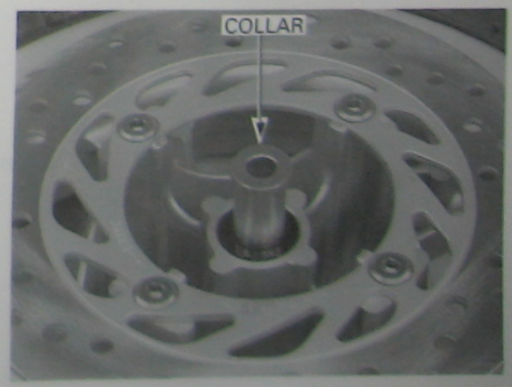
INSTALLATION

Apply grease to the inside of the speedometer gear box, and install the plain washers and speedometer gear.

Apply grease to the dust seal lip, and install the speedometer gear box over the right wheel hub.

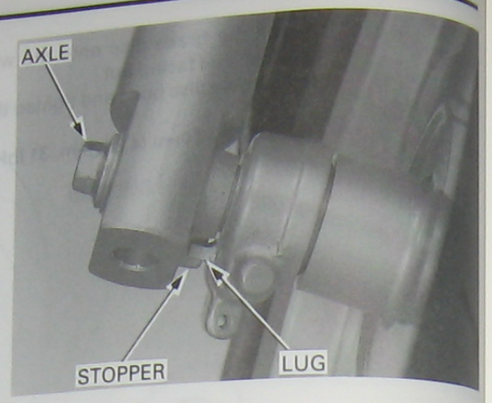


Install the side collar into the left wheel hub.



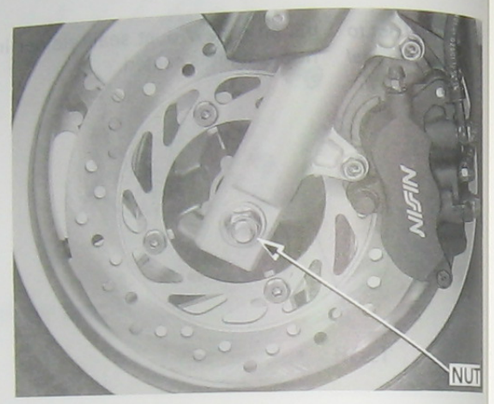
Be careful not to damage the brake pads.

Install the front wheel between the fork legs while inserting the disc between the pads so that the lug on the speedometer gear box is positioned against the front of the stopper on the fork leg.
Install the front axle from the right side.



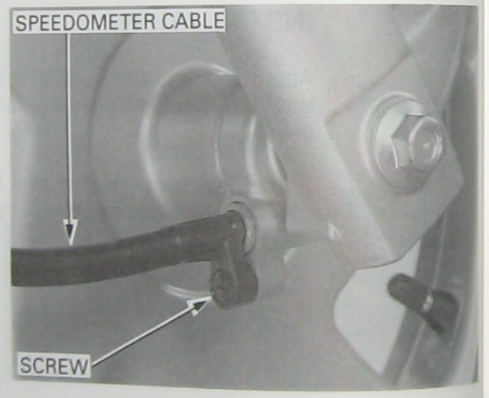
Install the axle nut and tighten it.

TORQUE: 69 N·m (7.0 kgf·m, 51 lbf·ft)



Connect the speedometer cable to the speedometer gear box and secure it with the setting screw.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

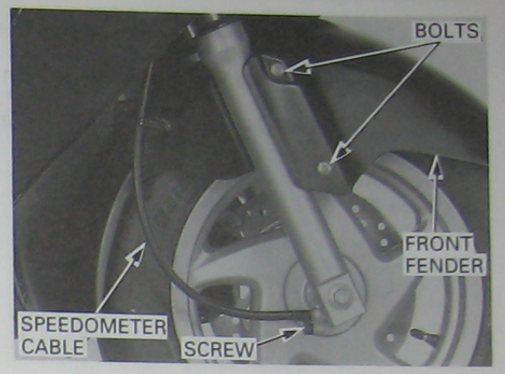


FORK

REMOVAL

Remove the screw and disconnect the speedometer cable from the speedometer gear box.

Remove the four bolts and the front fender.

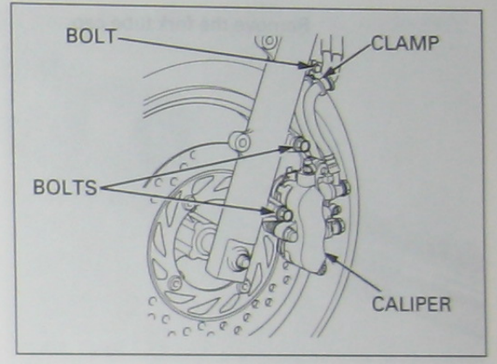


Remove the brake hose clamp by removing the bolt.
Remove the caliper mounting bolts and the brake caliper from the fork leg.

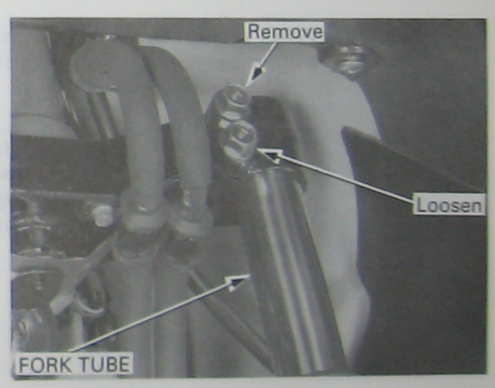
CAUTION:

Support the brake caliper so that it does not hang from the brake hose. Do not twist the brake hose.

Remove the front wheel (page 14-3).



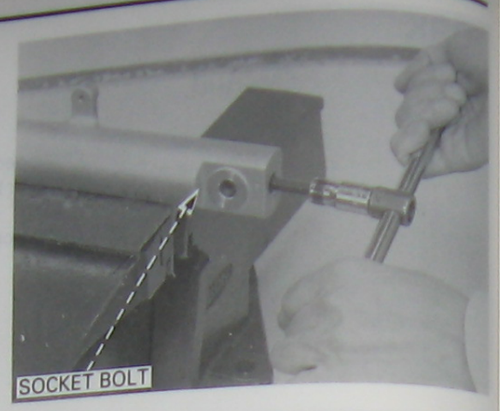
Remove the upper fork pinch bolt.
Loosen the lower fork pinch bolt and remove the fork tube from the steering stem.



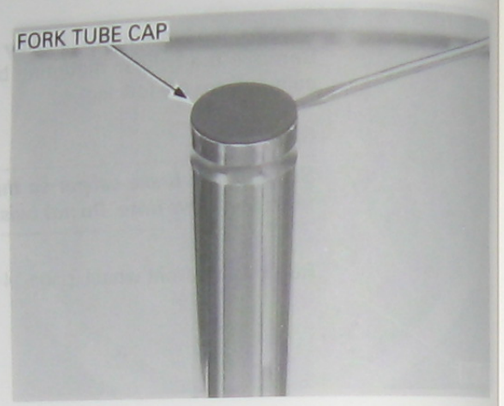
DISASSEMBLY

Remove the socket bolt after draining the fork fluid.

Hold the fork slider in a vise with a soft jaws or shop towel.
Loosen the fork socket bolt slightly, but do not remove yet.



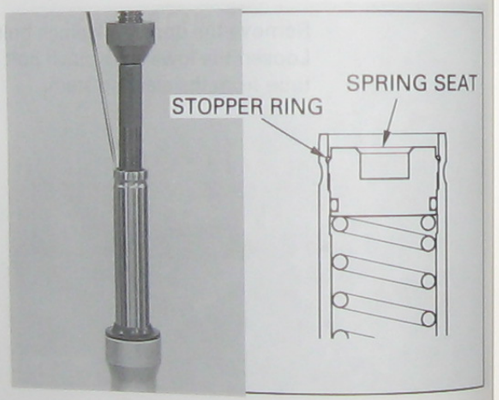
Remove the fork tube cap.



Press the spring seat into the fork tube using hydraulic press and remove the stopper ring.

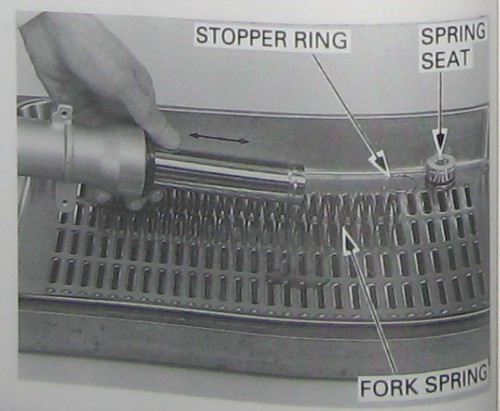
CAUTION:

- ***To prevent loss of tension, do not compress the fork spring more than necessary.***
- ***The spring seat is under spring pressure. Use care when removing the fork assembly from the hydraulic press.***



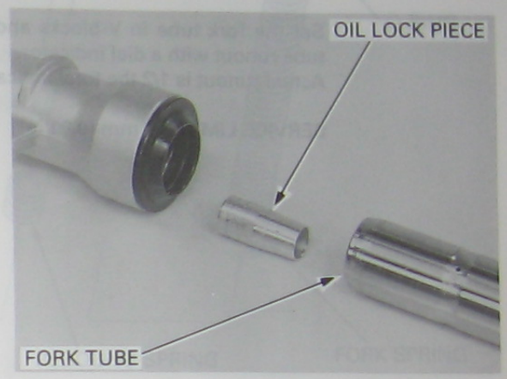
Remove the following:
— stopper ring
— spring seat
— fork spring

Pour out the fork fluid by pumping the fork tube several times.

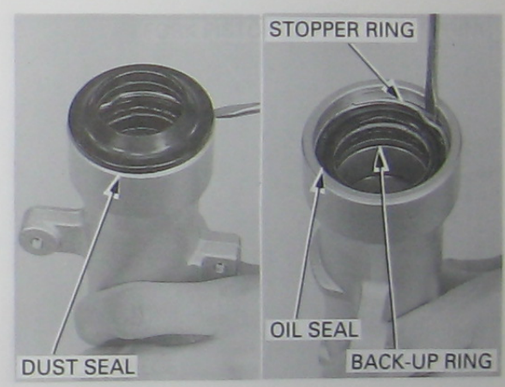


Remove the following:
— socket bolt and sealing washer
— fork piston
— rebound spring

— fork tube
— oil lock piece



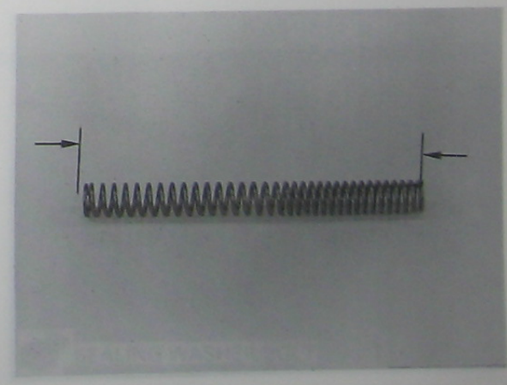
— dust seal
— stopper ring
— oil seal
— back-up ring



INSPECTION

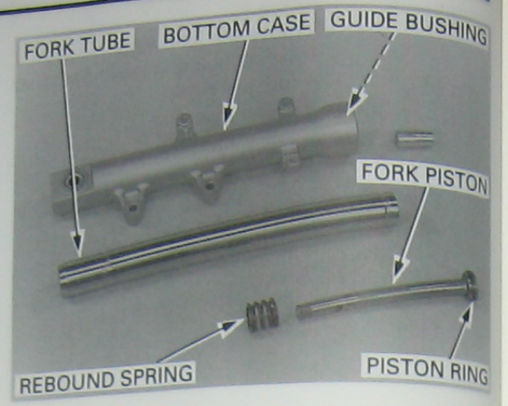
Measure the fork spring free length.

SERVICE LIMIT: 252.5 mm (9.94 in)



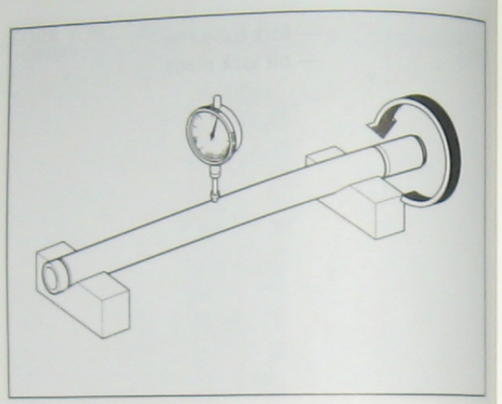
Check the fork tube, fork slider, fork piston and piston ring for score marks, and excessive or abnormal wear.
Check the rebound spring for fatigue or damage.

Visually inspect the guide bushing in the fork slider. Replace the bushing if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more 3/4 of the entire surface.



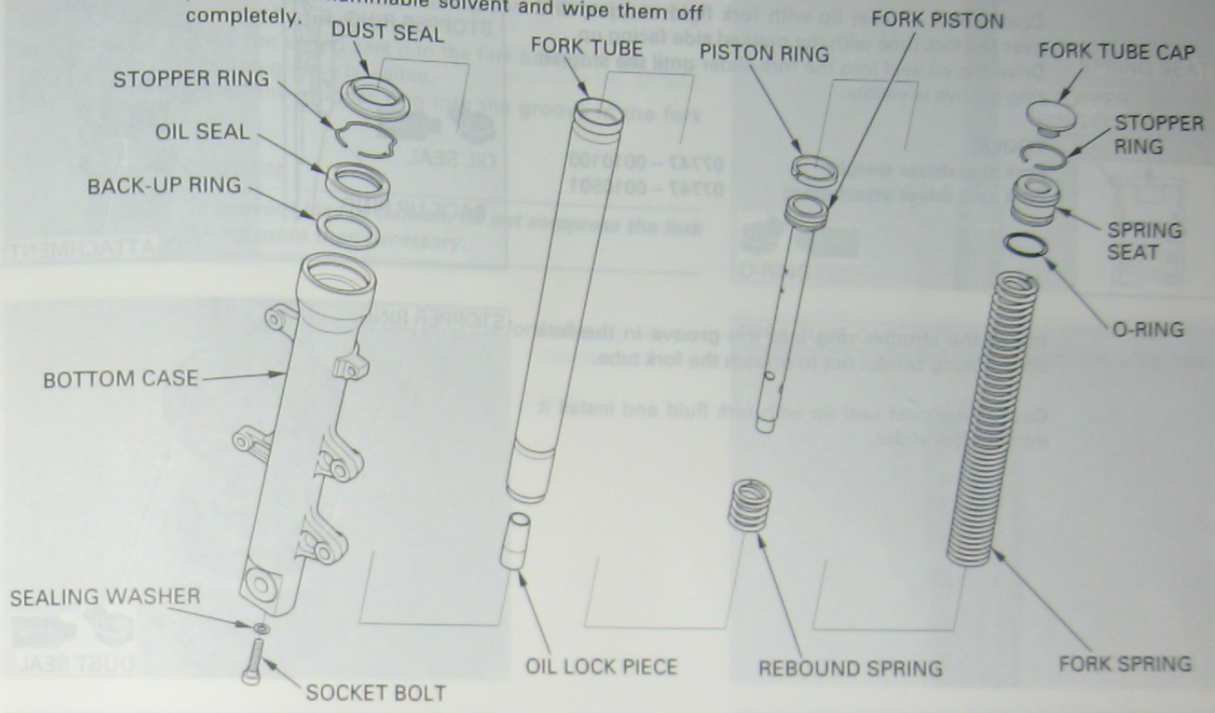
Set the fork tube in V-blocks and measure the fork tube runout with a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.2 mm (0.01 in)

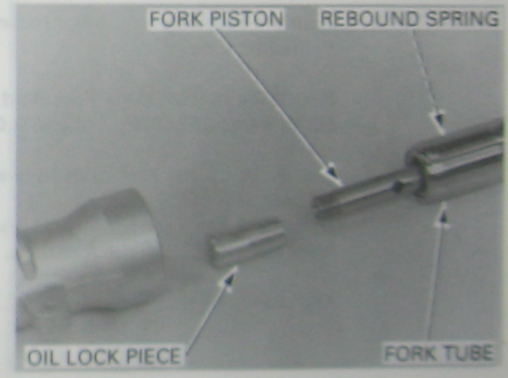


ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



Install the following:
— rebound spring
— fork piston
— oil lock piece
— fork tube



Hold the fork slider in a vise with a soft jaws or shop towel.

Apply locking agent to the socket bolt threads.
Install the socket bolt with a new sealing washer into the fork piston and tighten it.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)

NOTE:

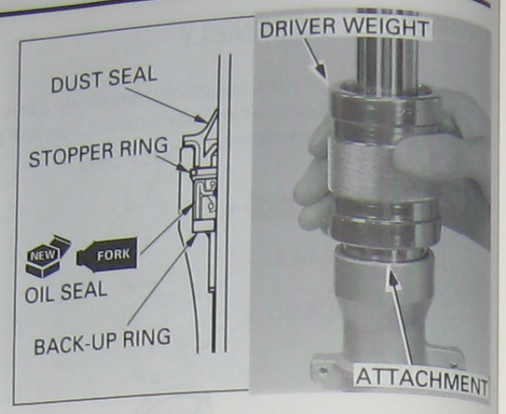
If the fork piston turns together with the socket bolt, temporarily install the fork spring and spring seat (page 14-15).

Install the back-up ring over the fork tube and rest it on the slider.

Coat a new oil seal lip with fork fluid and install it over the fork tube with the marked side facing up.
Drive the oil seal into the fork slider until the stopper ring groove is visible.

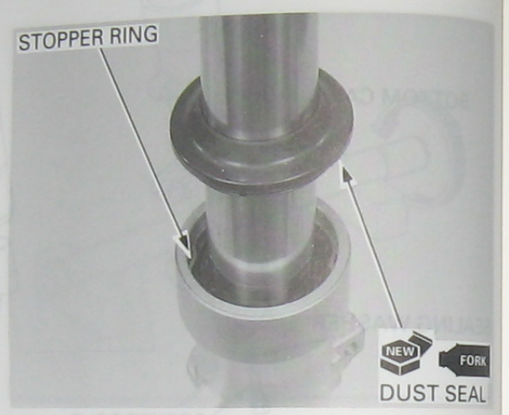
TOOLS:

Fork seal driver weight	07747 – 0010100
Fork seal driver attachment	07747 – 0010501



Install the stopper ring into the groove in the fork slider, being careful not to scratch the fork tube.

Coat a new dust seal lip with fork fluid and install it into the fork slider.

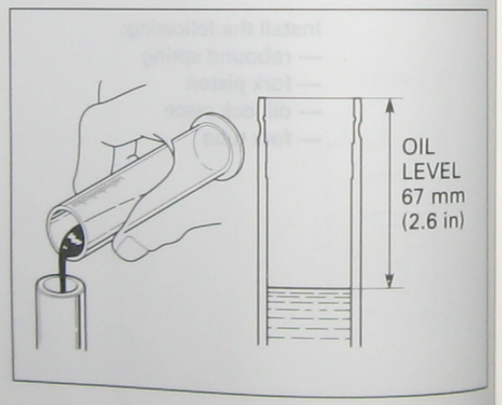


Pour the specified amount of recommended fork fluid in the fork tube.

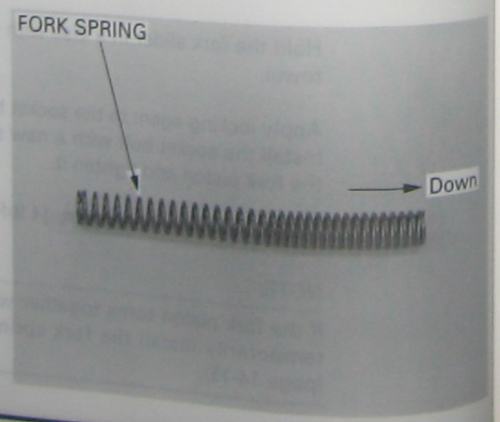
RECOMMENDED FLUID: Fork fluid
FORK FLUID CAPACITY: 118 cm³ (4.0 US oz, 4.2 Imp oz)

Slowly pump the fork tube several times to remove trapped air.
Compress the fork tube fully and measure the oil level from the top of the fork tube.

OIL LEVEL: 67 mm (2.6 in)



Pull the fork tube up fully.
Install the fork spring with the tightly wound end facing down.



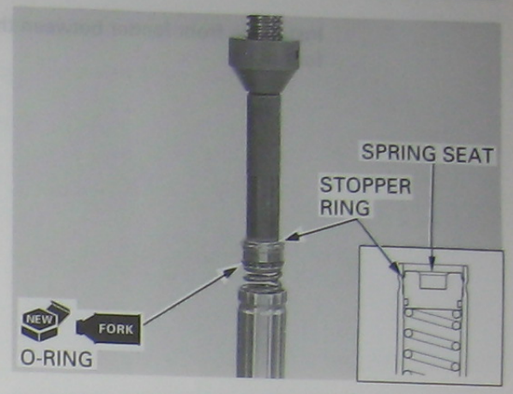
Coat a new O-ring with fork fluid and install it into the groove in the spring seat.

Be careful not to fall down the fork assembly.

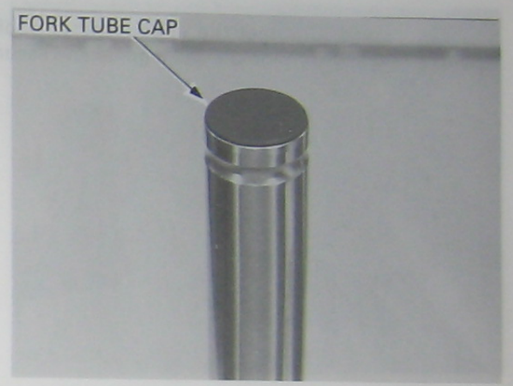
Set the fork assembly, spring seat and stopper ring onto the hydraulic press.
Press the spring seat into the fork tube until the stopper ring groove is visible.
Install the stopper ring into the groove in the fork tube.

CAUTION:

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



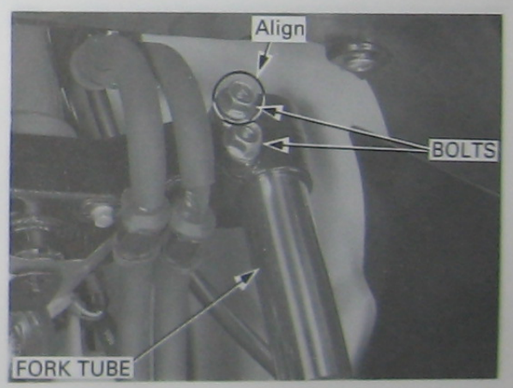
Install the fork tube cap onto the fork tube.



INSTALLATION

Install the fork into the steering stem and align the groove of the fork tube with the upper bolt hole in the stem, then install the upper pinch bolt.
Tighten the two pinch bolts.

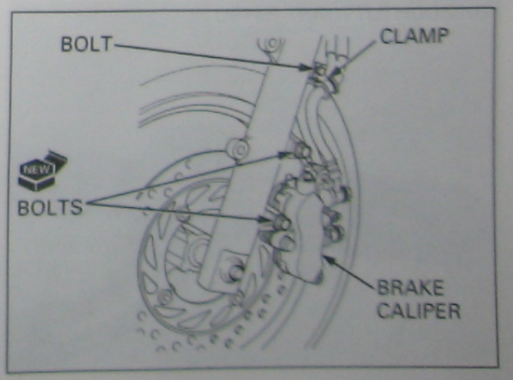
Install the front wheel (page 14-7).



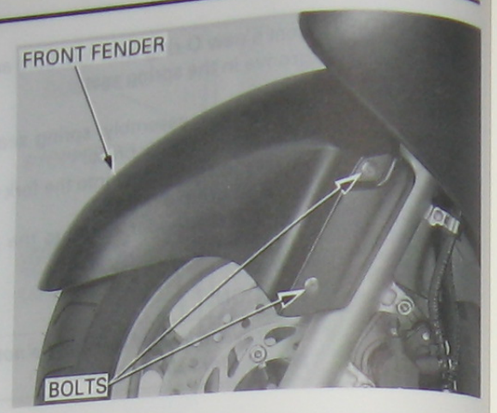
Install the brake caliper onto the fork leg with new mounting bolts, being careful not to damage the brake pads.

TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

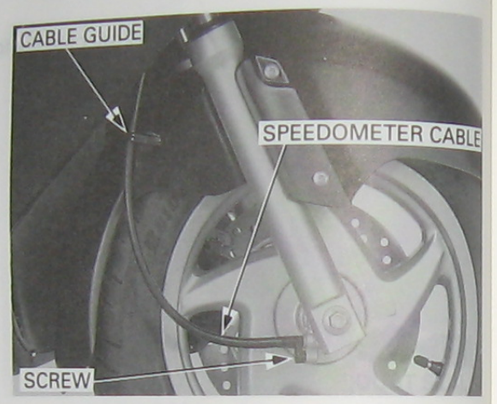
Install the brake hose clamp onto the fork leg with the bolt.



Install the front fender between the fork legs with the four bolts.



Connect the speedometer cable to the gear box through the cable guide and secure it with the screw.

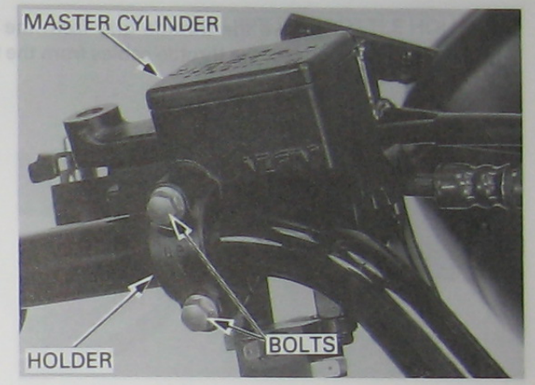


HANDLEBAR

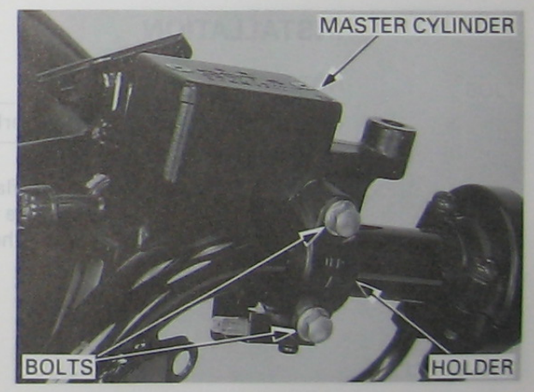
REMOVAL

Remove the front cover lid (page 2-10).
Remove the rear handle cover (page 2-13).
Remove the meter without disconnecting the 4P and 9P connectors (page 20-8).

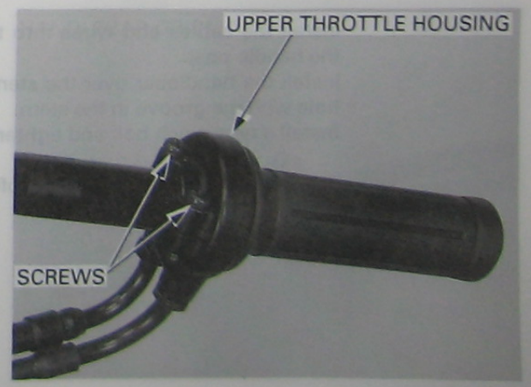
Remove the following:
— holder bolts
— master cylinder holder
— rear (combined) brake master cylinder
— left handlebar grip



— holder bolts
— master cylinder holder
— front brake master cylinder

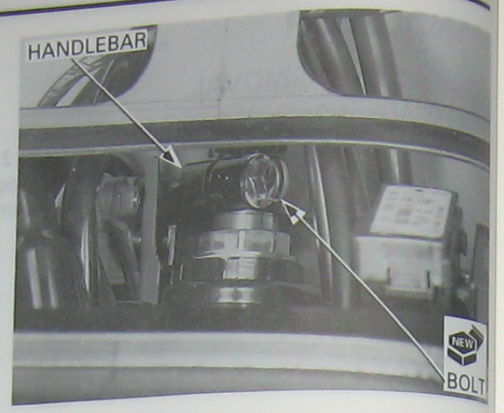


— housing attaching screws
— upper throttle housing

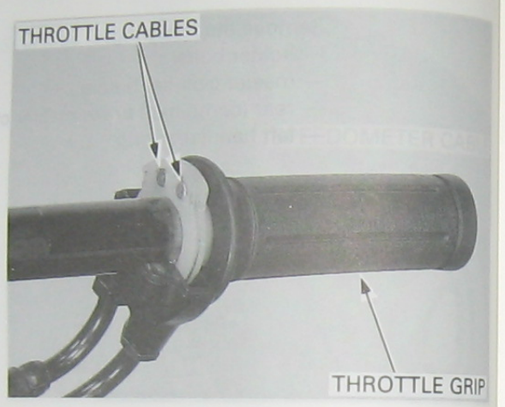


— handle post pinch bolt

Release the cables and wires from the guide on the handle post.
Remove the handlebar from the steering stem.



Remove the throttle grip from the handlebar and disconnect the throttle cables from the throttle grip flange.

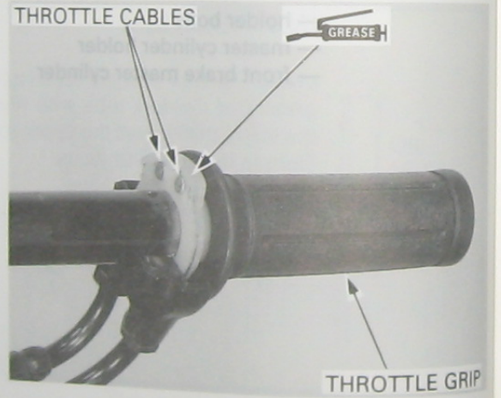


INSTALLATION

NOTE:

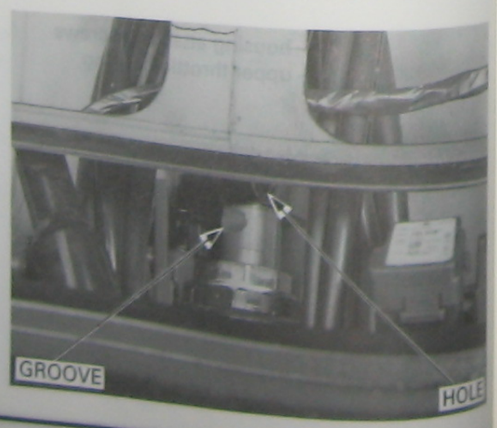
Route the cables and wires properly (page 1-18).

Apply grease to the throttle grip flange groove.
Connect the throttle cables to the throttle grip flange and install the throttle grip onto the handlebar.

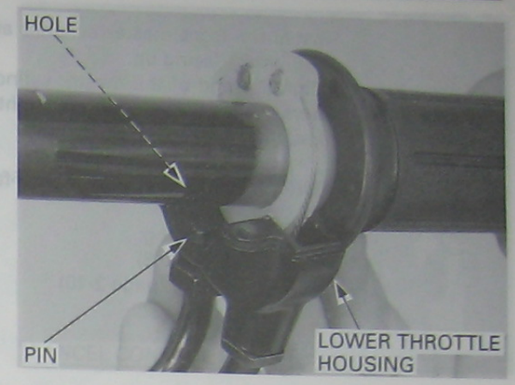


Install the cables and wires into the cable guide on the handle post.
Install the handlebar over the stem, aligning the bolt hole with the groove in the stem.
Install a new pinch bolt and tighten it.

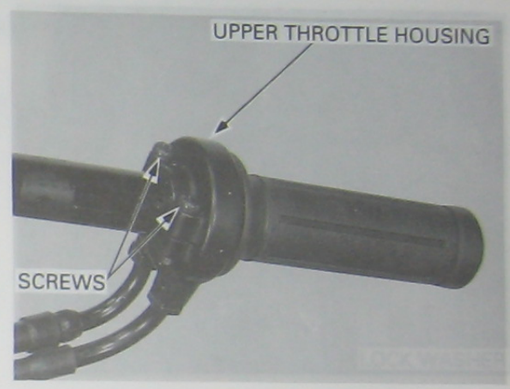
TORQUE: 88 N·m (9.0 kgf·m, 65 lbf·ft)



Install the lower throttle housing, aligning the locating pin with the hole in the handlebar.

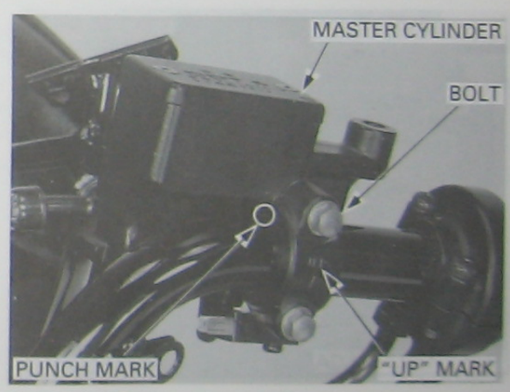


Install the upper throttle housing.
Install the attaching screws and tighten the forward screw first, then tighten the rear screw.



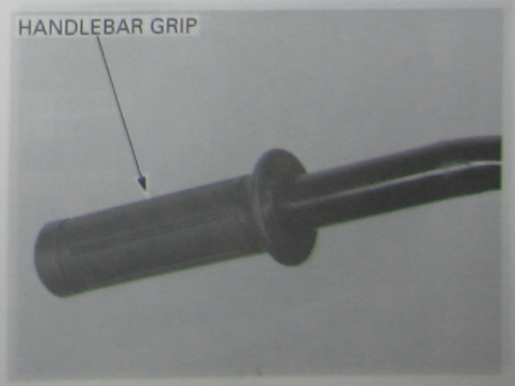
Install the front master cylinder and holder with the "UP" mark facing up.
Align the end of the master cylinder with the punch mark on the handlebar and tighten the upper bolt first, then tighten the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Allow the adhesive to dry for an hour before using.

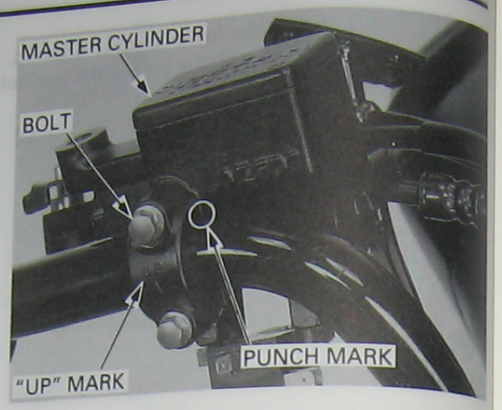
Apply Honda Bond A or equivalent to the inside surface of the handlebar grip and to the clean surface of the handlebar. Wait 3 – 5 minutes and install the grip. Rotate the grip for even application of the adhesive.



Install the front 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.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Install the following:
— meter (page 20-8)
— front cover lid (page 2-10)



STEERING STEM

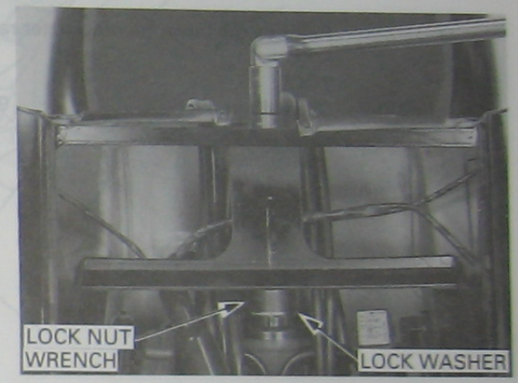
REMOVAL

Remove the following:
— handlebar (page 14-17)
— fork legs (page 14-9)
— turn signal cancel control unit (page 20-10)

Loosen the steering stem lock nut.

TOOL:
Lock nut wrench 07916 – KM10000

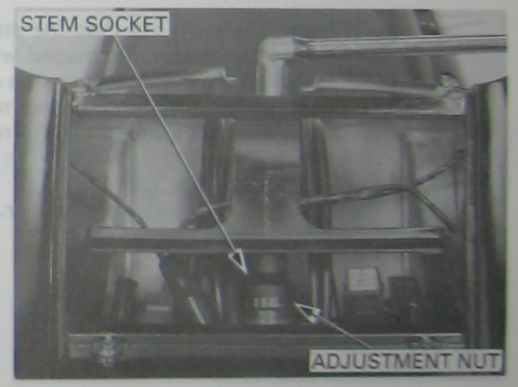
Remove the lock nut and lock washer.



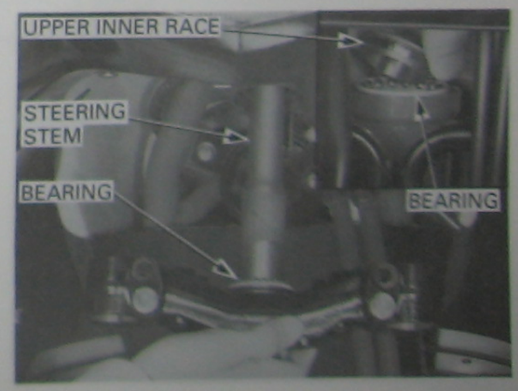
Loosen the steering stem adjustment nut.

TOOL:
Steering stem socket 07916 – 3710101

Remove the following:
— adjustment nut (while holding stem)



— steering stem
— upper inner race
— upper and lower steering bearings



Remove the upper bearing outer race.

TOOL:
Ball race remover 07GMD – KS40100

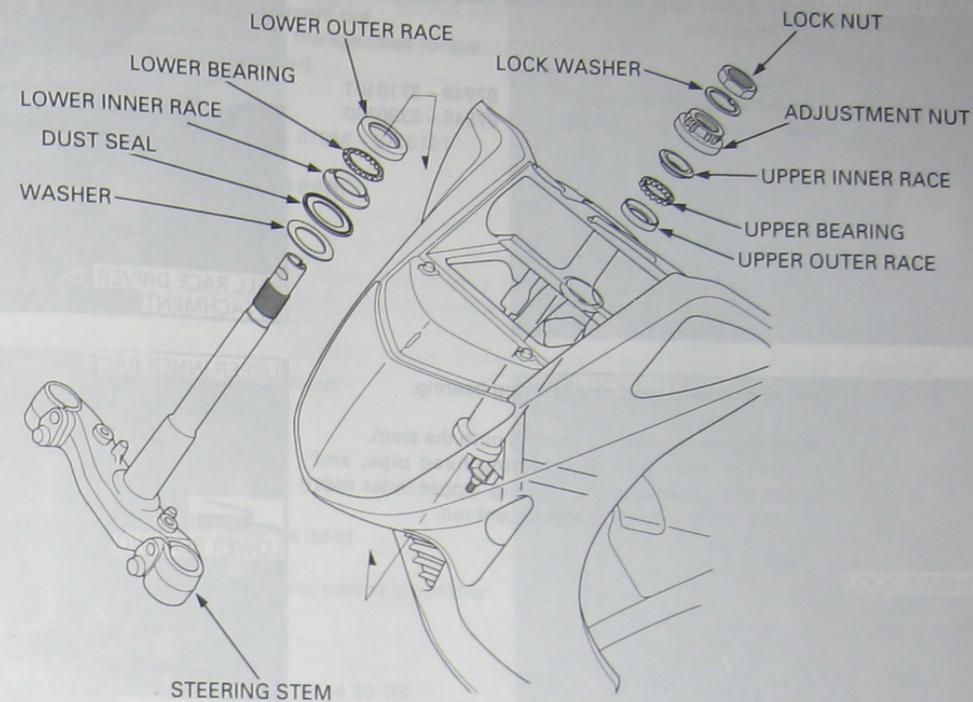
Remove the lower bearing outer race.

TOOL:
Oil seal remover 07948 – 4630100

Install the stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.
Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.

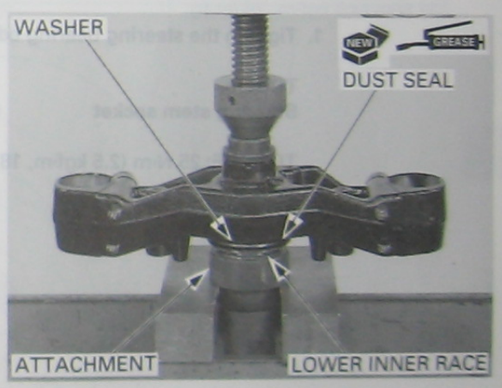
Remove the dust seal and washer.

INSTALLATION



Install the washer onto the steering stem.
Apply grease to a new dust seal lip and install it onto the stem.
Press a new lower bearing inner race using a hydraulic press.

TOOL:
Attachment, 35 mm I.D. 07746 – 0030400



Drive a new lower bearing outer race into the steering head pipe.

TOOL:
Oil seal driver 07947 – SB00200

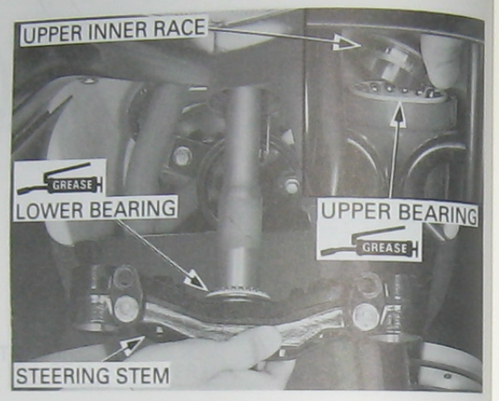
Drive a new upper bearing outer race into the steering head pipe.

TOOLS:

Driver attachment handle	07949 – 3710101
Ball race driver attachment	07945 – 3330300

Apply grease to each new steering bearing.

Install the lower steering bearing onto the stem. Insert the stem into the steering head pipe, and install the upper steering bearing, upper inner race and the steering bearing adjustment nut.

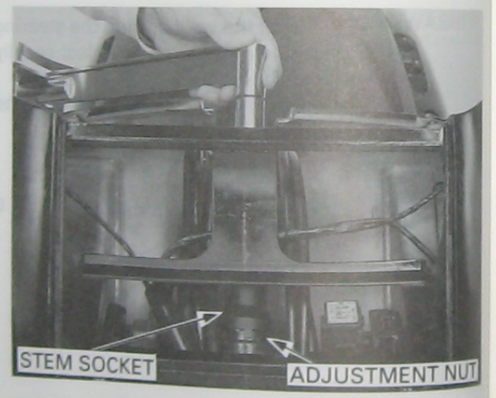


1. Tighten the steering bearing adjustment nut.

   TOOL:

Steering stem socket	07916 – 3710101

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



2. Turn the steering stem lock-to-lock several times to seat the bearings.

3. Install the front fork and wheel (page 14-15).
4. Temporarily loosen the adjustment nut.
5. Tighten the adjustment nut to the specified torque with the front wheel is grounded.

   TOOL:

Steering stem socket	07916 – 3710101

   TORQUE: 4 N·m (0.4 kgf·m, 2.9 lbf·ft)

6. Install the lock washer and lock nut. Tighten the lock nut.

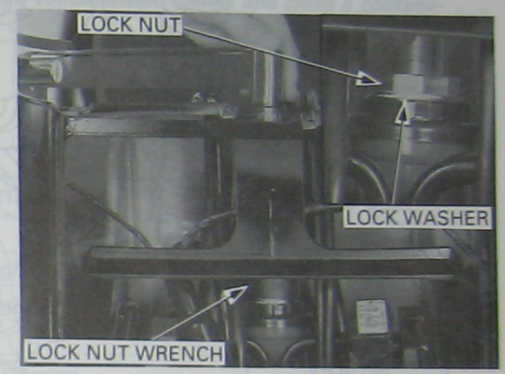
   TOOL:

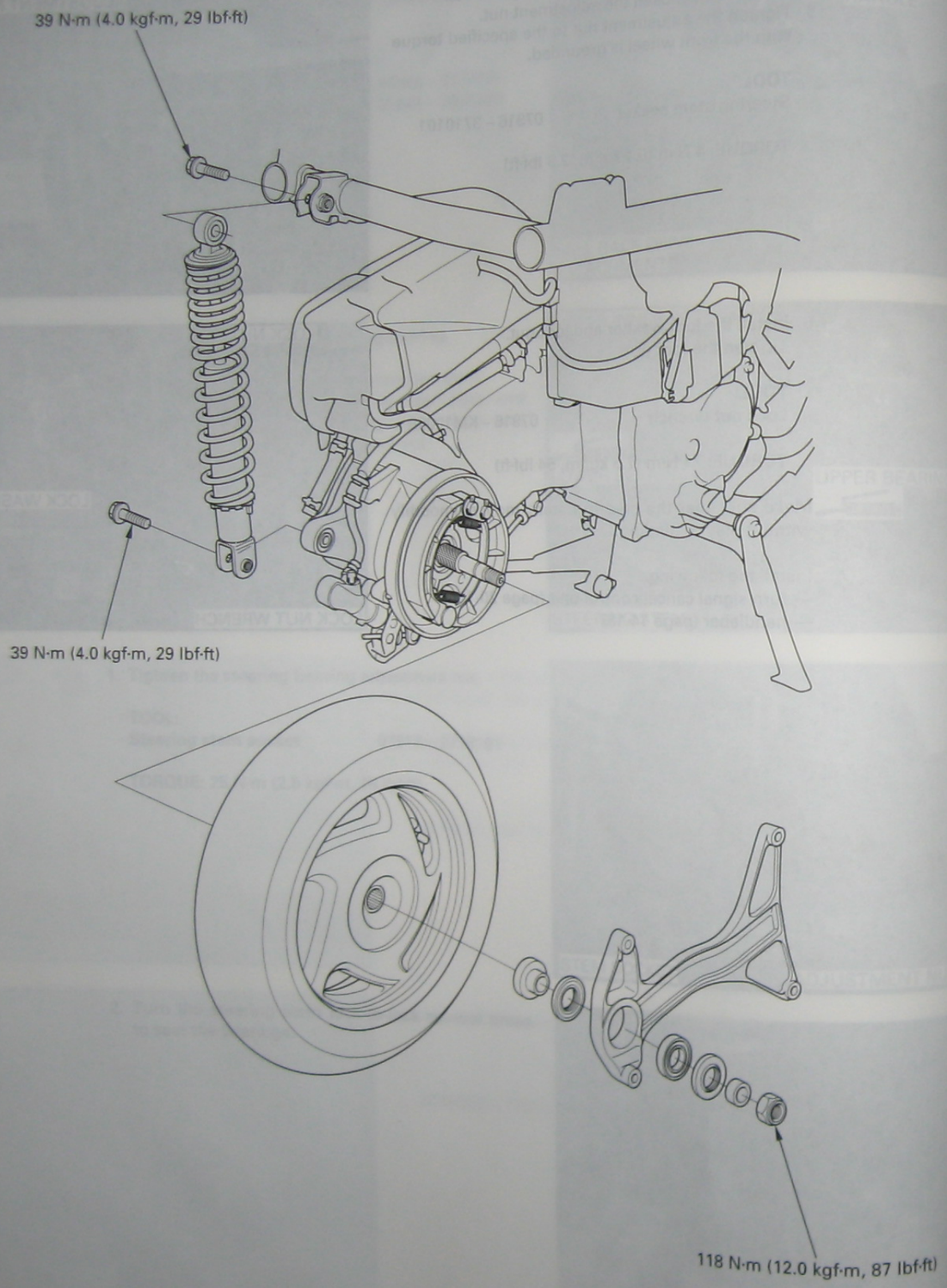
Lock nut wrench	07916 – KM10000

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

Make sure that the steering stem moves smoothly without play or binding.

Install the following:
— turn signal cancel control unit (page 20-10)
— handlebar (page 14-18)





15. REAR WHEEL/SUSPENSION

SERVICE INFORMATION

GENERAL

⚠WARNING

- ***Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies. Use a vacuum cleaner or alternate method to minimize the hazard caused by air borne asbestos fibers.***
- ***A contaminated brake drum or lining reduces stopping power. Discard contaminated linings and clean a contaminated drum with a high quality brake degreasing agent.***

- Refer to section 16 for brake system service.

SPECIFICATIONS

Unit: mm

ITEM		STANDARD	SERVICE LIMIT
Minimum tire thread depth		—	2.0 (0.08)
Cold tire pressure	Driver only	200 kPa (2.00 kgf/cm², 29 psi)	—
	Driver and passenger	250 kPa (2.50 kgf/cm², 36 psi)	—
Rear wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)

TORQUE VALUES

Rear axle nut	118 N·m (12.0 kgf·m, 87 lbf·ft)
Rear shock absorber mounting bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)

TOOLS

Driver	07749 – 0010000
Attachment, 42 x 47 mm	07746 – 0010300
Pilot, 17 mm	07746 – 0040400

TROUBLESHOOTING

Rear wheel wobbling
- Bent rim
- Faulty tire
- Axle nut and/or engine mounting bolt not tightened properly
- Faulty rear wheel bearing
- Insufficient tire pressure
- Unbalanced tire and wheel

Hard suspension
- Bent rear shock absorber damper rod
- Worn or damaged engine mounting bushings
- High tire pressure

Soft suspension
- Weak rear shock absorber spring
- Faulty rear shock absorber damper

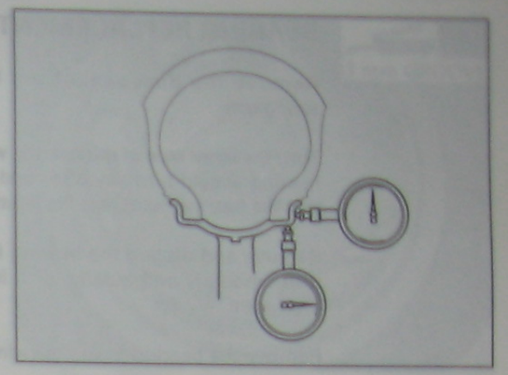
Rear suspension noise
- Loose rear suspension fasteners
- Faulty rear shock absorber
- Worn rear suspension mounting bushings

REAR WHEEL

INSPECTION

Check the wheel rim runout using dial indicator.
Actual runout is 1/2 the total indicator reading.

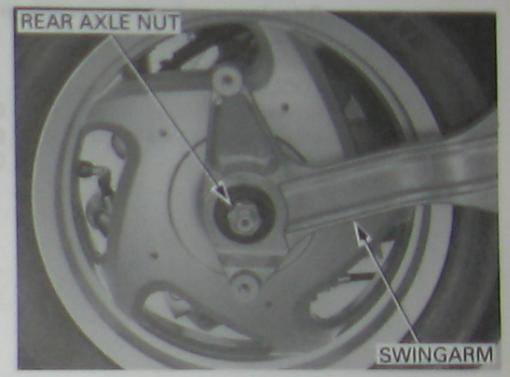
SERVICE LIMITS: Radial: 2.0 mm (0.08 in)
Axial: 2.0 mm (0.08 in)



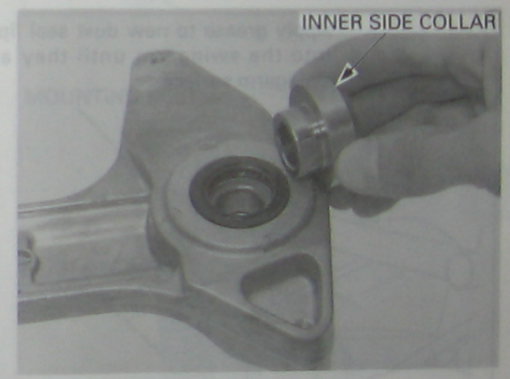
REMOVAL

Remove the muffler (page 2-13).

Loosen the rear axle nut.
Support the frame securely, and remove the axle nut, swingarm and rear wheel.



Remove the inner side collar from the swingarm.



Remove the outer side collar from the swingarm.

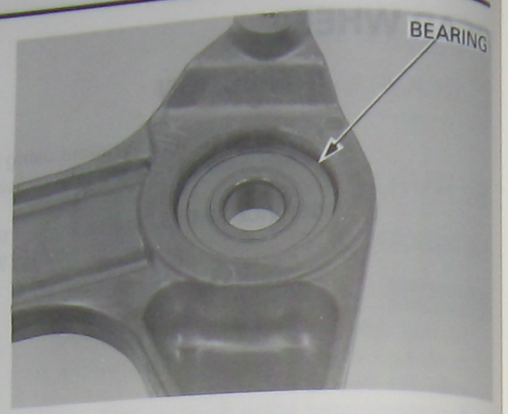
BEARING REPLACEMENT

Remove the dust seals from both sides of the swingarm.

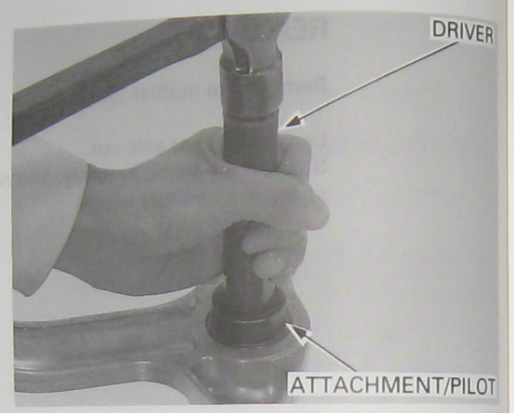
Turn the inner race of the bearing with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the swingarm.

Remove and discard the bearing if the race does not turn smoothly and quietly, or if it fits loosely in the swingarm.

Remove the bearing from the swingarm.



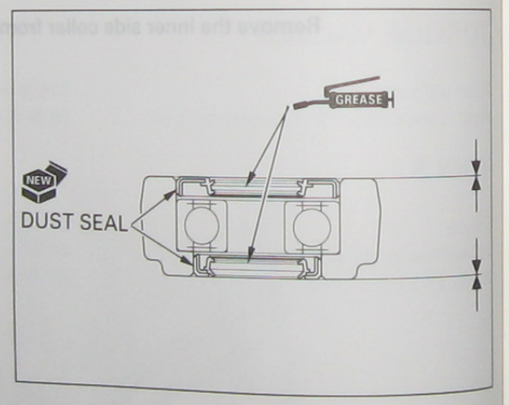
Drive in a new bearing squarely until it is fully seated, using the special tools.



TOOLS:

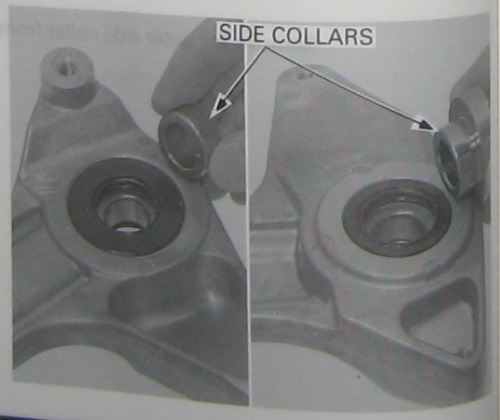
Driver	07749 – 0010000
Attachment, 42 x 47 mm	07746 – 0010300
Pilot, 17 mm	07746 – 0040400

Apply grease to new dust seal lips and install them into the swingarm until they are flush with the swingarm surfaces.

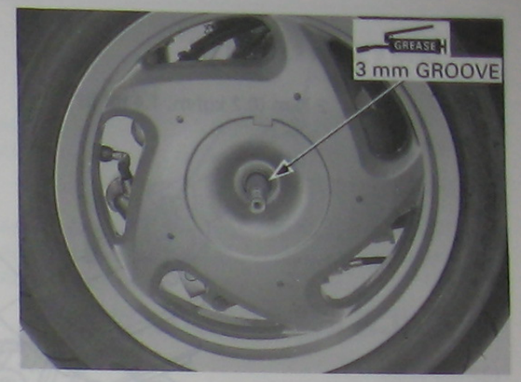


INSTALLATION

Install the inner and outer side collars.



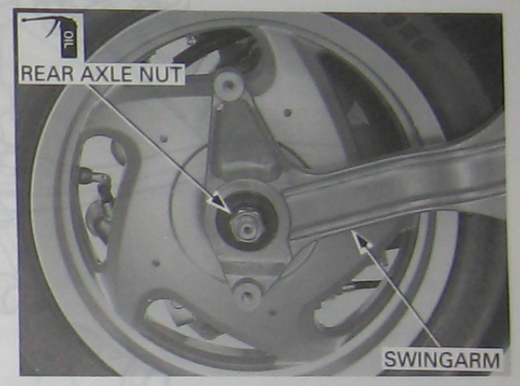
Install the rear wheel onto the final gear shaft, aligning the splines.
Apply grease to the 3 mm groove in the final gear shaft.



Install the swingarm onto the final gear shaft.
Install and tighten the rear axle nut.

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

Install the muffler (page 2-13).



REAR SHOCK ABSORBER

REMOVAL/INSTALLATION

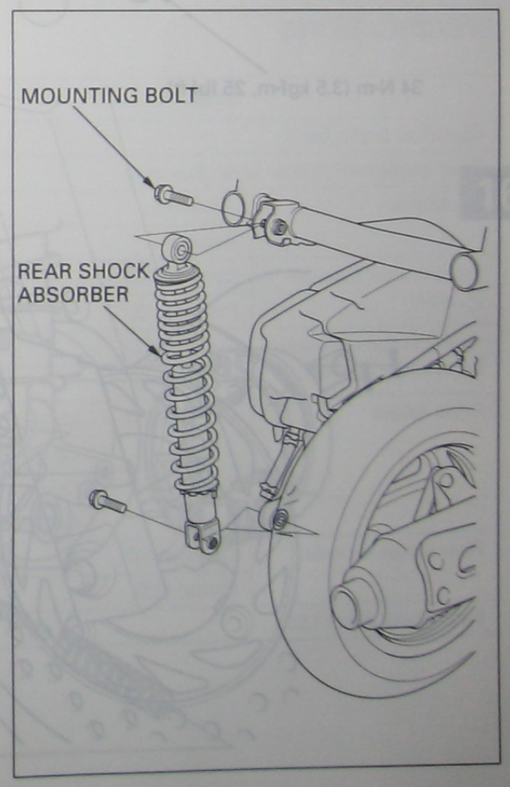
Support the engine unit securely.
Remove the left side cover (page 2-4).

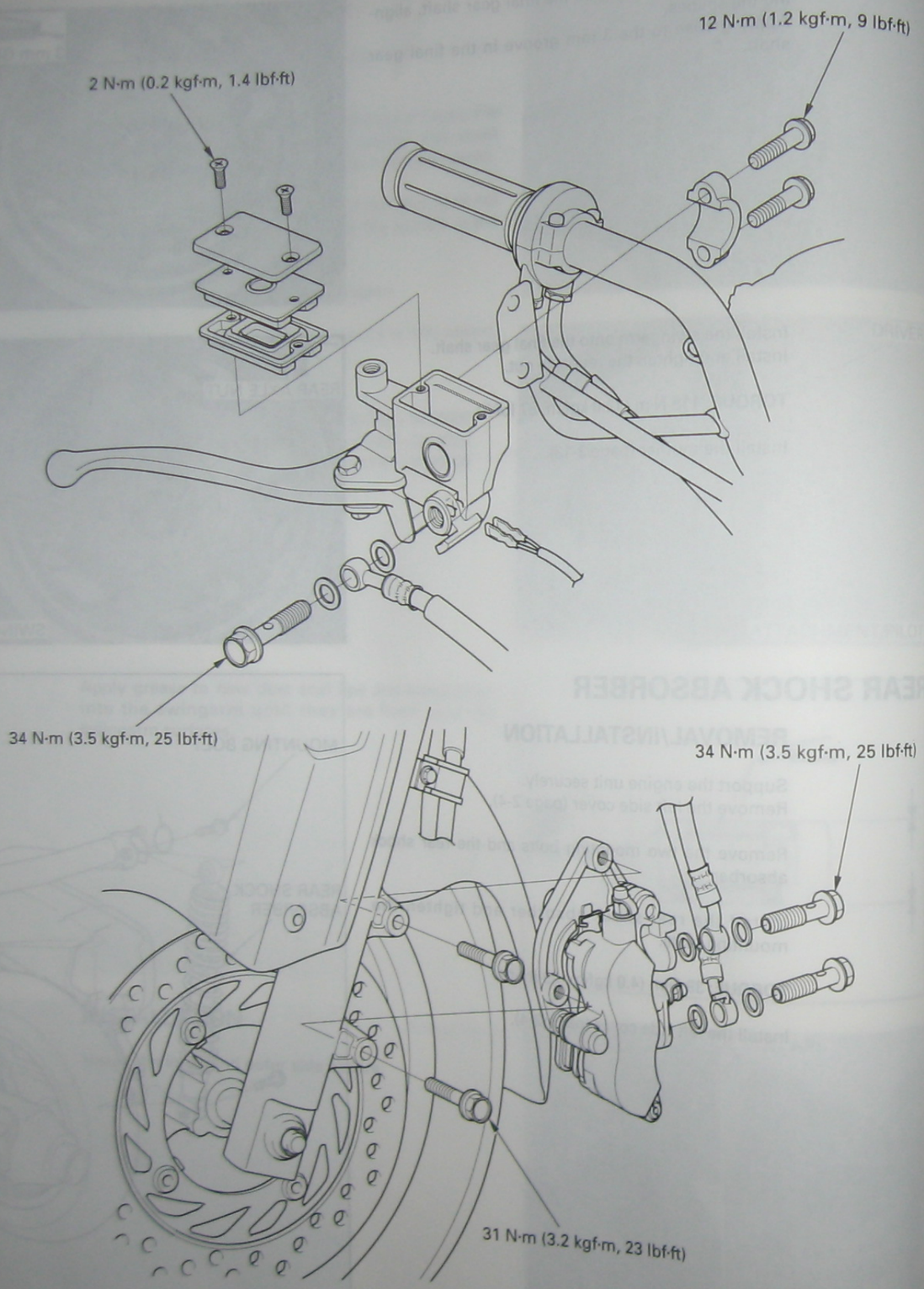
Remove the two mounting bolts and the rear shock absorber.

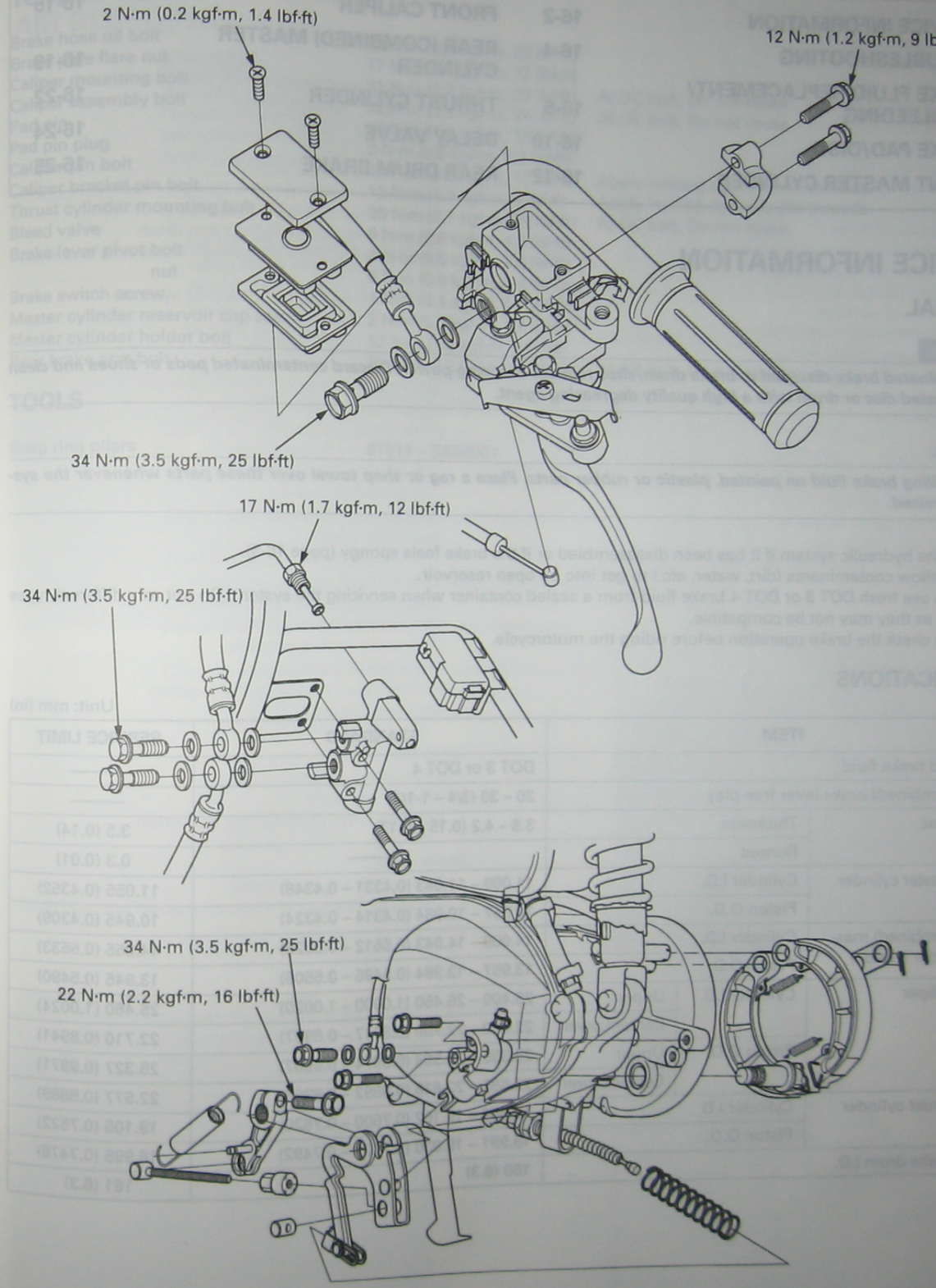
Install the rear shock absorber and tighten the mounting bolts.

TORQUE: 39 N·m (4.0 kgf·m, 29 lbf·ft)

Install the left side cover (page 2-4).




12 N·m (1.2 kgf·m, 9 lbf·ft)
2 N·m (0.2 kgf·m, 1.4 lbf·ft)
34 N·m (3.5 kgf·m, 25 lbf·ft)
34 N·m (3.5 kgf·m, 25 lbf·ft)
31 N·m (3.2 kgf·m, 23 lbf·ft)


2 N·m (0.2 kgf·m, 1.4 lbf·ft)
12 N·m (1.2 kgf·m, 9 lbf·ft)
34 N·m (3.5 kgf·m, 25 lbf·ft)
17 N·m (1.7 kgf·m, 12 lbf·ft)
34 N·m (3.5 kgf·m, 25 lbf·ft)
34 N·m (3.5 kgf·m, 25 lbf·ft)
22 N·m (2.2 kgf·m, 16 lbf·ft)

SERVICE INFORMATION

GENERAL

⚠ WARNING

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

CAUTION:

Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag or shop towel over these parts whenever the system is serviced.

- Bleed the hydraulic system if it has been disassembled or if the brake feels spongy (page 16-5).
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Always use fresh DOT 3 or DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Always check the brake operation before riding the motorcycle.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Specified brake fluid			DOT 3 or DOT 4	———
Rear (combined) brake lever free play			20 – 30 (3/4 – 1-1/4)	———
Brake disc	Thickness		3.8 – 4.2 (0.15 – 0.17)	3.5 (0.14)
	Runout		———	0.3 (0.01)
Front master cylinder (R. side)	Cylinder I.D.		11.000 – 11.043 (0.4331 – 0.4348)	11.055 (0.4352)
	Piston O.D.		10.957 – 10.984 (0.4314 – 0.4324)	10.945 (0.4309)
Rear (combined) master cylinder (L. side)	Cylinder I.D.		14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Piston O.D.		13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
Front caliper	Cylinder I.D.	Upper	25.400 – 25.450 (1.0000 – 1.0020)	25.460 (1.0024)
		Center/Lower	22.650 – 22.700 (0.8917 – 0.8937)	22.710 (0.8941)
	Piston O.D.	Upper	25.335 – 25.368 (0.9974 – 0.9987)	25.327 (0.9971)
		Center/Lower	22.585 – 22.618 (0.8892 – 0.8905)	22.577 (0.8889)
Rear thrust cylinder	Cylinder I.D.		19.050 – 19.102 (0.7500 – 0.7520)	19.105 (0.7522)
	Piston O.D.		18.997 – 19.030 (0.7479 – 0.7492)	18.995 (0.7478)
Rear brake drum I.D.			160 (6.3)	161 (6.3)

TORQUE VALUES

Brake hose oil bolt	34 N·m (3.5 kgf·m, 25 lbf·ft)	
Brake pipe flare nut	17 N·m (1.7 kgf·m, 12 lbf·ft)	
Caliper mounting bolt	31 N·m (3.2 kgf·m, 23 lbf·ft)	ALOC bolt. Do not reuse.
Caliper assembly bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	ALOC bolt. Do not reuse.
Pad pin	18 N·m (1.8 kgf·m, 13 lbf·ft)	
Pad pin plug	3 N·m (0.3 kgf·m, 2.2 lbf·ft)	
Caliper pin bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	Apply locking agent to the threads.
Caliper bracket pin bolt	13 N·m (1.3 kgf·m, 9 lbf·ft)	Apply locking agent to the threads.
Thrust cylinder mounting bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)	ALOC bolt. Do not reuse.
Bleed valve	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Brake lever pivot bolt	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
nut	6 N·m (0.6 kgf·m, 4.3 lbf·ft)	
Brake switch screw	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	
Master cylinder reservoir cap screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Rear brake arm bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	ALOC bolt. Do not reuse.

TOOLS

Snap ring pliers	07914 – SA50001

TROUBLESHOOTING

<FRONT BRAKE>

Brake lever soft or spongy
- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master cylinder piston cup
- Worn brake pad/disc
- Contaminated caliper
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever

Brake lever hard
- Clogged/restricted fluid passage
- Sticking/worn caliper piston
- Caliper not sliding properly
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever

Brake drag
- Contaminated brake pad/disc
- Misaligned wheel
- Badly worn brake pad/disc
- Warped/deformed brake disc
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Sticking caliper piston

<REAR BRAKE>

Poor brake performance (drum brake)
- Improperly adjusted brake
- Worn brake linings
- Worn brake drum
- Worn brake cam or shoes
- Improperly installed brake linings
- Brake linkage needs lubrication
- Contaminated brake linings and drum
- Improper engagement between brake arm and shaft

Poor brake performance (hydraulic system)
- Air in hydraulic system
- Leaking hydraulic system
- Worn master cylinder piston cup
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Worn thrust piston cup
- Sticking/worn thrust piston
- Contaminated thrust cylinder
- Low brake fluid level
- Clogged fluid passage
- Bent brake lever

Brake lever hard
- Clogged/restricted fluid passage
- Sticking/worn thrust piston
- Caliper not sliding properly
- Worn thrust piston cup
- Sticking/worn master cylinder piston
- Bent brake lever

Brake squeaks
- Worn brake linings
- Worn brake drum
- Contaminated brake linings and drum

Brake drag
- Improperly adjusted brake
- Improper engagement between brake arm and shaft

BRAKE FLUID REPLACEMENT/ AIR BLEEDING

⚠ WARNING

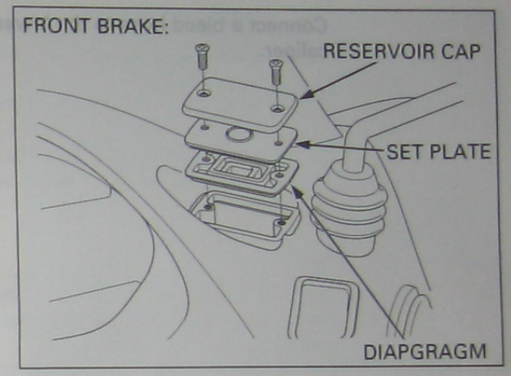
A brake fluid contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

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.***
- ***Use DOT 3 or DOT 4 brake fluid from a sealed container.***
- ***Do not mix different types of fluid. They are not compatible.***

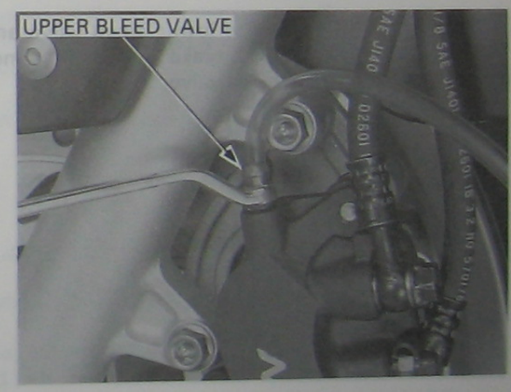
BRAKE FLUID DRAINING

FRONT BRAKE

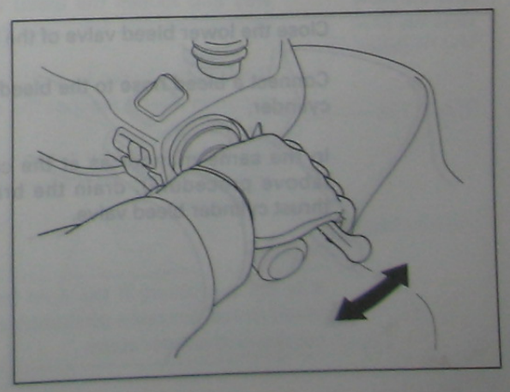
Place the scooter on its center stand.
Turn the handlebar so that the reservoir is level before removing the reservoir cap.
Remove the reservoir cap, set plate and diaphragm.



Connect a bleed hose to the upper bleed valve of the caliper.

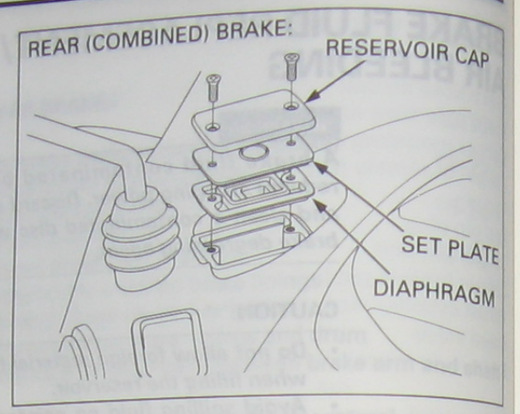


Loosen the upper bleed valve and pump the front brake lever until no more fluid flows out of the bleed valve.

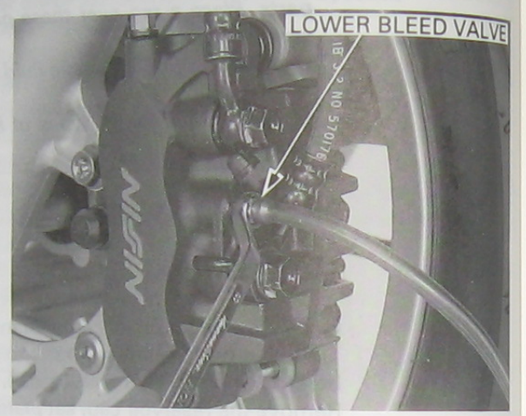


REAR (COMBINED) BRAKE

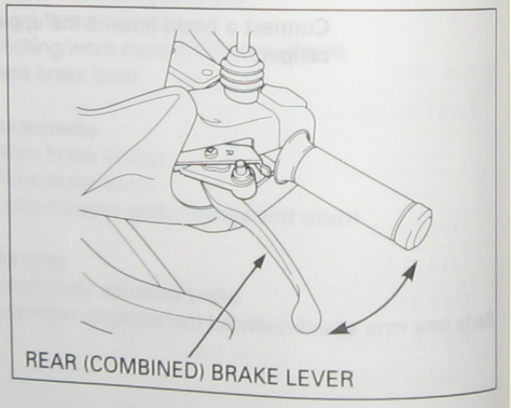
Place the scooter on its center stand.
Turn the handlebar so that the reservoir is level before removing the reservoir cap.
Remove the reservoir cap, set plate and diaphragm.



Connect a bleed hose to the lower bleed valve of the caliper.



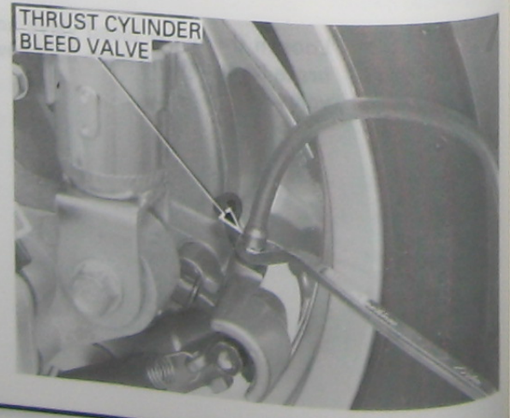
Loosen the lower bleed valve and pump the rear (combined) brake lever until no more fluid flows out of the bleed valve.



Close the lower bleed valve of the caliper.

Connect a bleed hose to the bleed valve of the thrust cylinder.

In the same manner as at the caliper bleed valve (above procedure), drain the brake fluid from the thrust cylinder bleed valve.



BRAKE FLUID FILLING/BLEEDING

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.

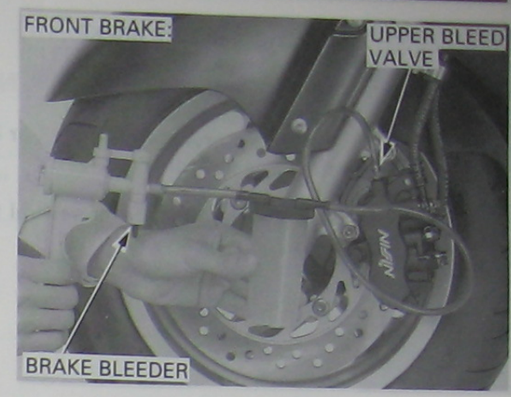
FRONT BRAKE

Close the bleed valve.
Connect a commercially available brake bleeder to the upper bleed valve of the caliper.
Fill the reservoir with DOT 3 or DOT 4 brake fluid from a sealed container.
Pump the brake bleeder and loosen the bleed valve, adding fluid when the fluid level in the reservoir is low.

If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Repeat the above procedure until air bubbles do not appear in the transparent hose.

Close the bleed valve and operate the front brake lever.
If it still spongy, bleed the system again.



If a brake bleeder is not available, use the following procedure:
Connect a bleed hose to the upper bleed valve of the caliper.
Pump up the system pressure with the brake lever until lever resistance is felt.

Do not release the brake lever until the bleed valve has been closed.

1. Squeeze the brake lever, open the bleed valve 1/4 turn and then close it.
2. Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

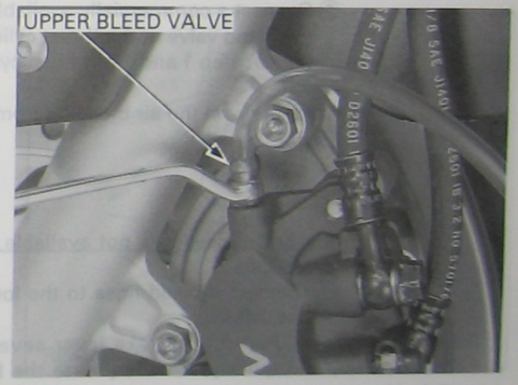
Repeat the steps 1 and 2 until air bubbles do not appear in the bleed hose.

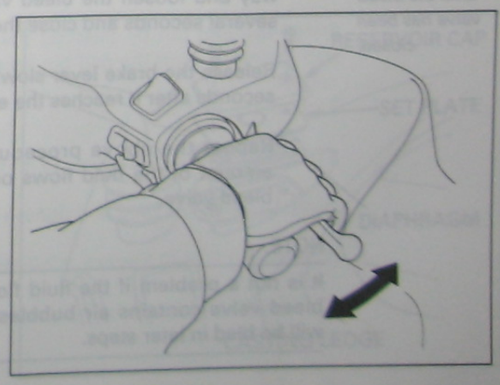
Tighten the bleed valve.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Fill the reservoir to the casting ledge with the brake fluid.
Install the diaphragm, set plate and reservoir cap and tighten the two screws (page 3-12).

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)

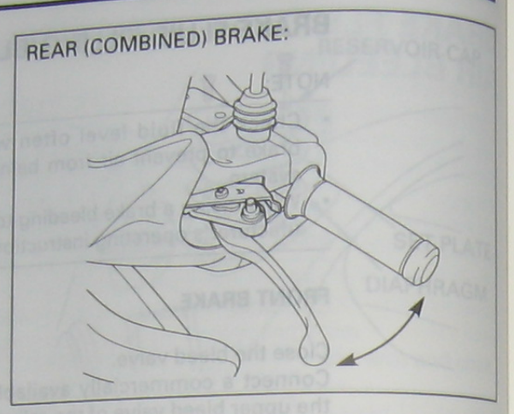




REAR (COMBINED) BRAKE

FLUID FEEDING:
Close the bleed valve.
Fill the reservoir with DOT 3 or DOT 4 brake fluid from a sealed container.

Operate the brake lever several times to bleed air from the master cylinder.

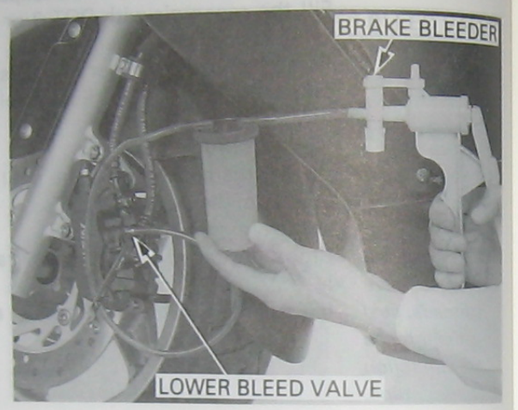


① Connect a commercially available brake bleeder to the lower bleed valve of the caliper.
1. Pump the brake bleeder and loosen the bleed valve, adding fluid when the fluid level in the reservoir is low.
2. Repeat the above procedure until sufficient amount of the fluid flows out from the caliper bleed valve.

If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

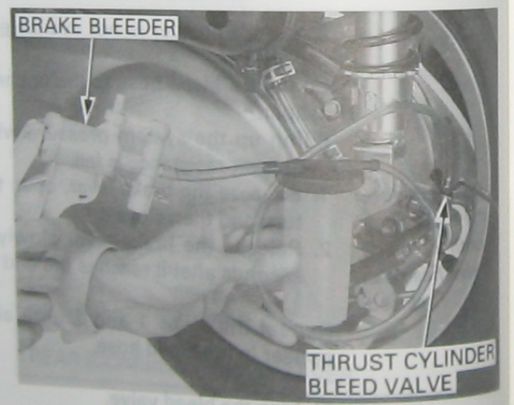
NOTE:

It is not a problem if the fluid flowing out from the bleed valve contains air bubbles because the lines will be bled in later steps.



② Connect a commercially available brake bleeder to the bleed valve of the thrust cylinder.
Repeat step 1 and 2 for thrust cylinder bleed valve.

Next, perform the air bleeding from the system (page 16-9).



If a brake bleeder is not available, use the following procedure.
① Connect a bleed hose to the lower bleed valve of the caliper.
1. Pump the brake lever several (5 – 10) times quickly, them squeeze the brake lever all the way and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.

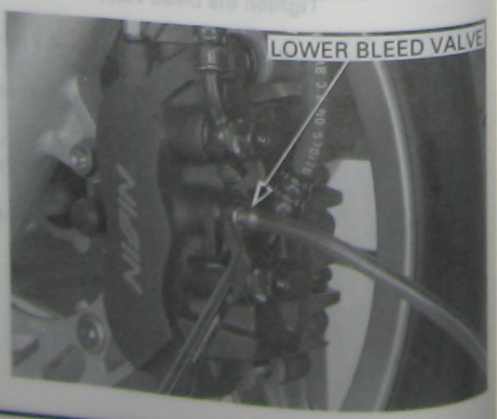
Do not release the brake lever until the bleed valve has been closed.

Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

2. Repeat the above procedure until sufficient amount of the fluid flows out from the caliper bleed valve.

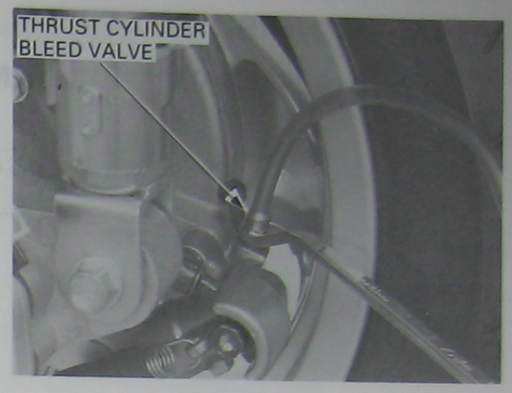
NOTE:

It is not a problem if the fluid flowing out from the bleed valve contains air bubbles because the lines will be bled in later steps.



② Connect the bleed hose to the bleed valve of the thrust cylinder.
Repeat step 1 and 2 for thrust cylinder bleed valve.

Next, perform the air bleeding from the system (see below).



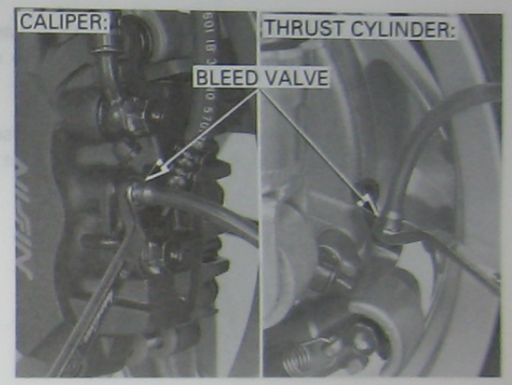
AIR BLEEDING

① Connect the bleed hose to the bleed valve of the thrust cylinder.
1. Pump the brake lever several (5 – 10) times quickly, then squeeze the brake lever all the way and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.

Do not release the brake lever until the bleed valve has been closed.

Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

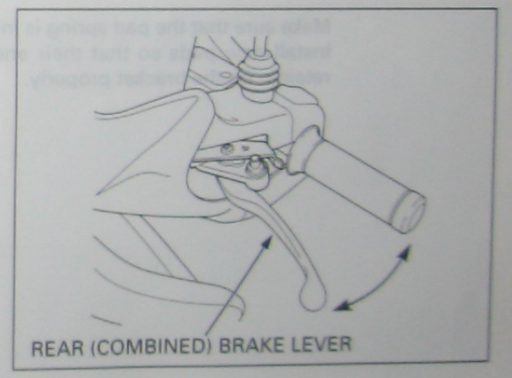
2. Repeat the above procedure until air bubbles do not appear in the transparent hose.



② Connect the bleed hose to the lower bleed valve of the caliper.
Repeat step 1 and 2 for the caliper bleed valve.

NOTE:

Note that you may feel strong resistance on the rear (combined) brake lever during pumping to bleed air from the caliper. This symptom is caused by the delay valve function. Be sure to squeeze the brake lever fully to this side.



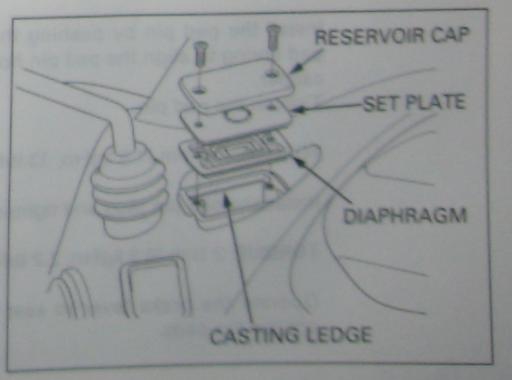
After the air bubbles cease to appear in the fluid, repeat air bleeding procedure about 2 – 3 times at each bleed valve.
Make sure the bleed valves are closed and operate the brake lever. If it still feels spongy, bleed the system again.

After the bleeding air completely, tighten the bleed valves to the specified torque.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Fill the reservoir to the casting ledge with the brake fluid.
Install the diaphragm, set plate and reservoir cap and tighten the two screws.

TORQUE: 2 N·m (0.2 kgf·m, 1.4 lbf·ft)



Check the brake lever free play (page 3-13).

BRAKE PAD/DISC

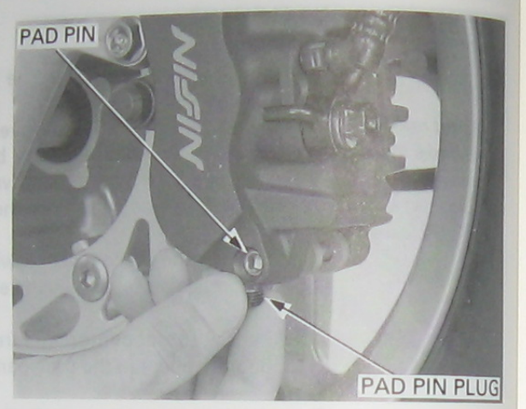
BRAKE PAD REPLACEMENT

NOTE:

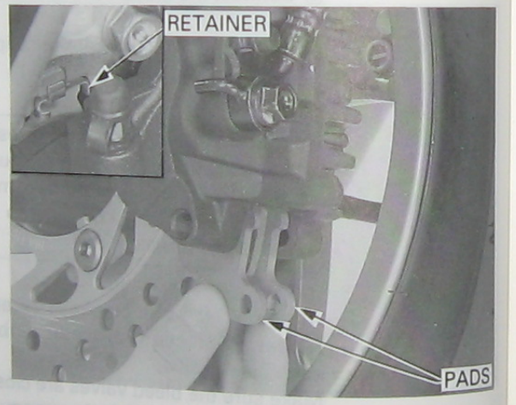
Always replace the brake pads in pairs to assure even disc pressure.

Push the caliper pistons all the way in by pushing the caliper body inward to provide clearance for new pads.

Remove the pad pin plug and loosen the pad pin.
Remove the pad pin and the brake pads.



Make sure that the pad spring is installed in position.
Install new pads so that their ends rest on the pad retainer on the bracket properly.



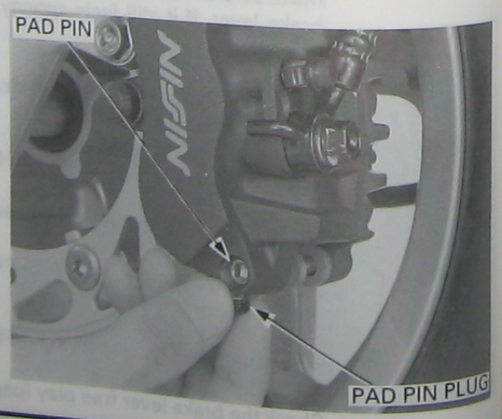
Install the pad pin by pushing the pads against the pad spring to align the pad pin holes in the pads and caliper.
Tighten the pad pin.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

Install the pad pin plug and tighten it.

TORQUE: 3 N·m (0.3 kgf·m, 2.2 lbf·ft)

Operate the brake lever to seat the caliper pistons against the pads.

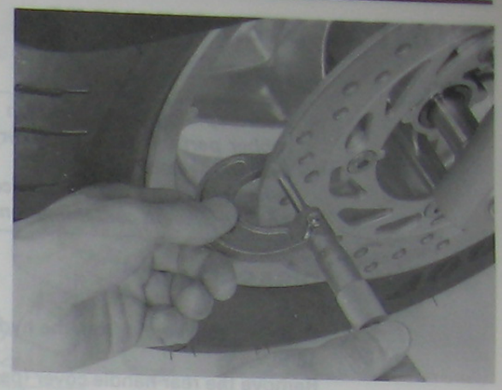


BRAKE DISC INSPECTION

Visually inspect the disc for damage or cracks.
Measure the brake disc thickness at the several points.

SERVICE LIMIT: 3.5 mm (0.14 in)

Replace the brake disc if the smallest measurement is less than service limit.

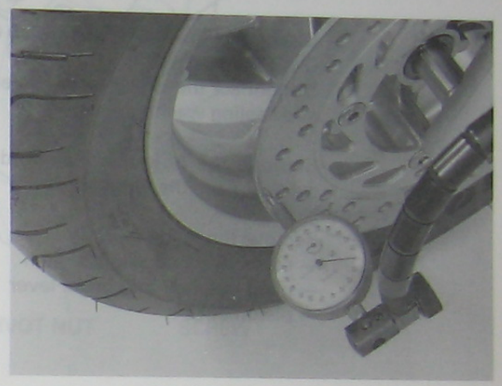


First make sure the wheel bearings are normal, or you will not get accurate results.

Check the brake disc for warpage.

SERVICE LIMIT: 0.3 mm (0.01 in)

Replace the brake disc if the warpage exceeds the service limit.



FRONT MASTER CYLINDER

CAUTION:

- ***Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.***
- ***When removing the oil bolt, cover the end of the hose to prevent contaminations.***

DISASSEMBLY

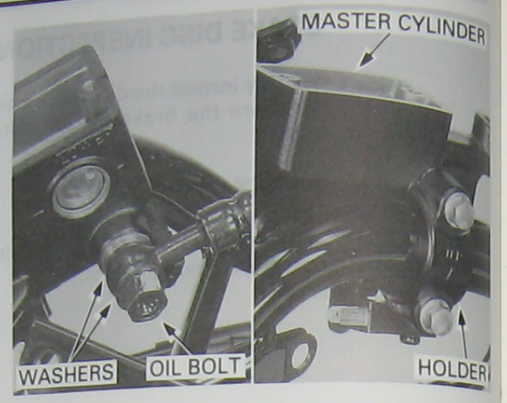
Drain the brake fluid from the hydraulic system (page 16-5).
Remove the rear handle cover (page 2-13).

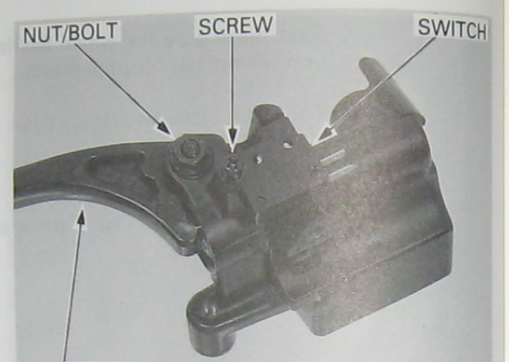
Disconnect the brake light switch connectors.

Disconnect the brake hose by removing the oil bolt and sealing washers.

Remove the holder bolts, holder and the master cylinder from the handlebar.

Remove the following:
— screw and brake light switch
— pivot nut, bolt and brake lever
— piston boot



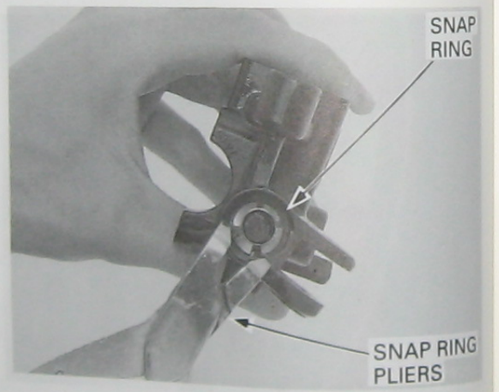


— snap ring

TOOL:
Snap ring pliers 07914 – SA50001

— washer
— master piston
— spring

Clean the master cylinder, reservoir and master piston in clean brake fluid.



INSPECTION

Check the piston cups for wear, deterioration or damage.
Check the master cylinder and piston for scoring or damage.

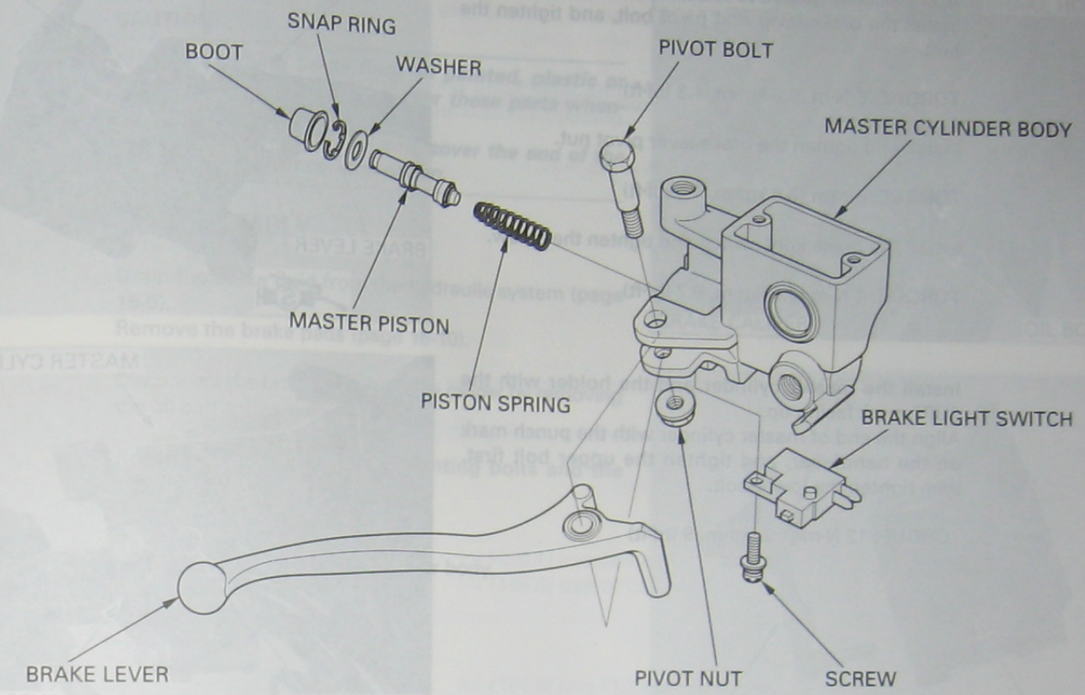
Measure the master cylinder I.D.

SERVICE LIMIT: 11.055 mm (0.4352 in)

Measure the master piston O.D.

SERVICE LIMIT: 10.945 mm (0.4309 in)

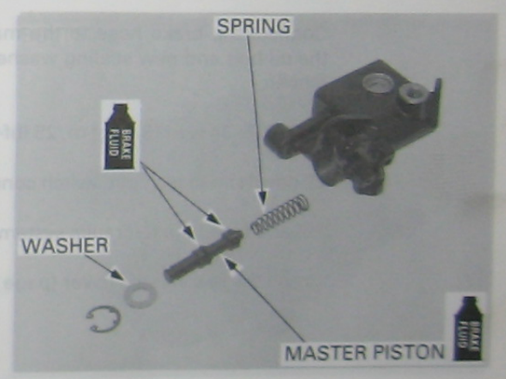
ASSEMBLY



Coat the master piston and piston cups with clean brake fluid.
Install the spring onto the piston end.
Install the piston/spring and washer into the master cylinder.

CAUTION:

Do not allow the piston cup lips to turn inside out.



Install the snap ring into the groove in the master cylinder with the chamfered edges facing in.

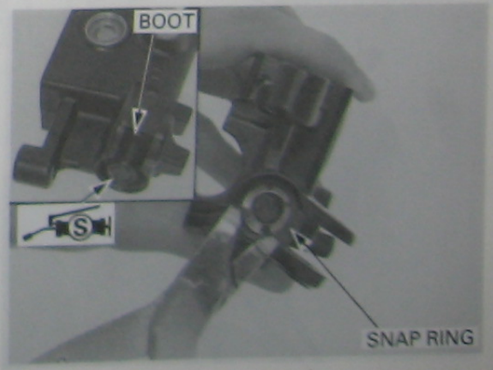
TOOL:
Snap ring pliers 07914 – SA50001

CAUTION:

Be certain the snap ring is firmly seated in the groove.

Install the piston boot into the master cylinder and the groove in the master piston.

Apply silicone grease to the brake lever contacting surface of the master piston.



Apply silicone grease to the brake lever pivot.
Install the brake lever and pivot bolt, and tighten the bolt.

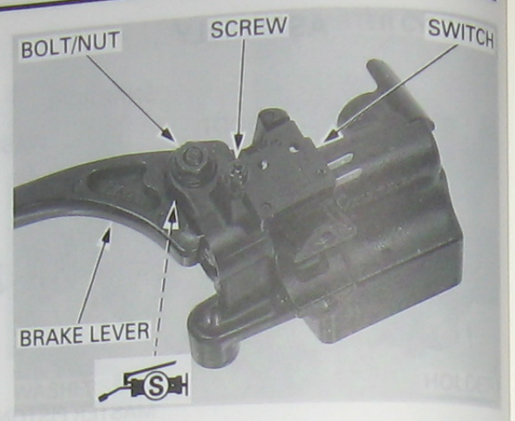
TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Install and tighten the brake lever pivot nut.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

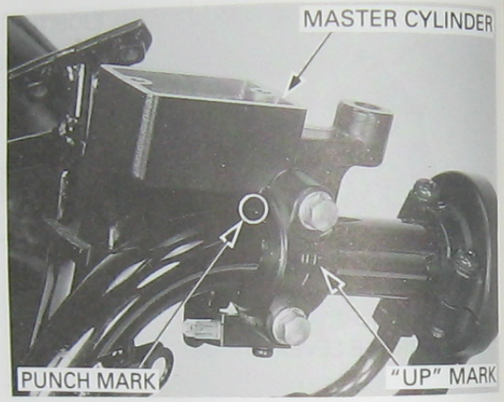
Install the brake light switch and tighten the screw.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



Install the master cylinder and the holder with the "UP" mark facing up.
Align the end of master cylinder with the punch mark on the handlebar, and tighten the upper bolt first, then tighten the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)



Connect the brake hose to the master cylinder with the oil bolt and new sealing washers, and tighten the oil bolt.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Connect the brake light switch connectors.

Fill and bleed the hydraulic system (page 16-7).

Install the rear handle cover (page 2-13).

FRONT CALIPER

CAUTION:

- ***Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.***
- ***When removing the oil bolt, cover the end of the hose to prevent contamination.***

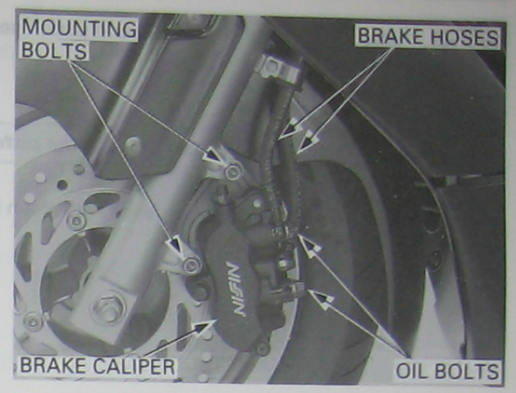
DISASSEMBLY

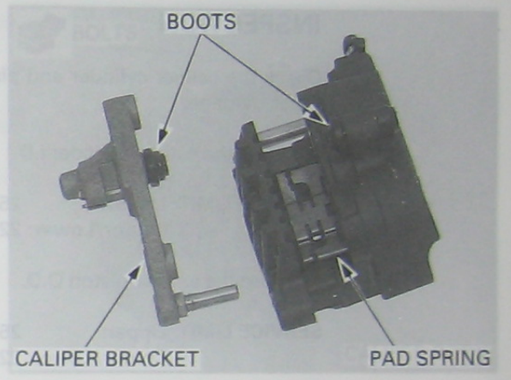
Drain the brake fluid from the hydraulic system (page 16-5).
Remove the brake pads (page 16-10).

Disconnect the brake hose from the caliper by removing the oil bolt and sealing washers.

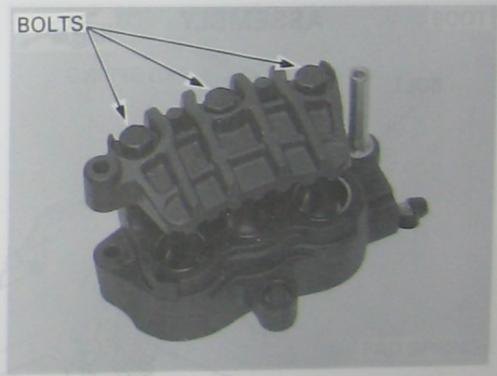
Remove the front caliper mounting bolts and the caliper

Remove the following:
— caliper bracket from the caliper body
— caliper pin boot
— bracket pin boot
— pad spring





Remove the three bolts and separate the caliper bodies.



Place a shop towel over the pistons.
Position the caliper body with the pistons down and apply small squirts of air pressure to the fluid inlets to remove the pistons.

⚠ WARNING

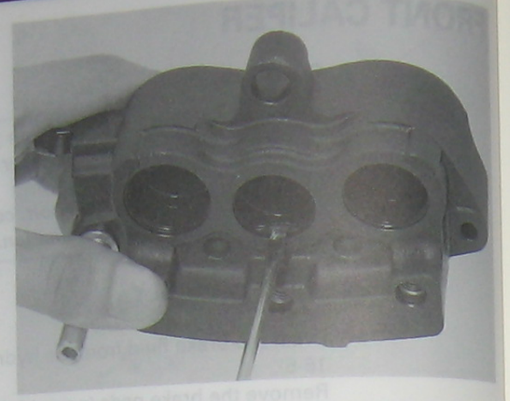
Do not use high pressure air or bring the nozzle too close to the inlet.

Push the dust seals and piston seals in and lift them out.

CAUTION:

Be careful not to damage the piston sliding surface.

Clean the seal grooves with clean brake fluid.



INSPECTION

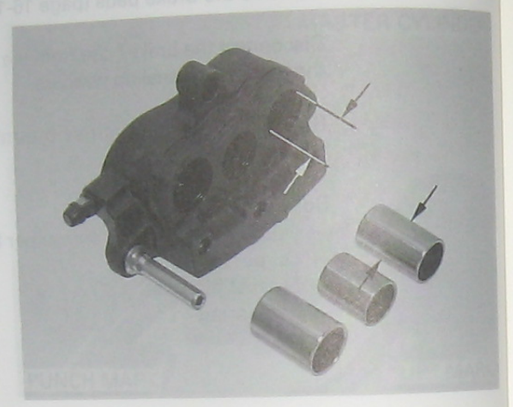
Check the caliper cylinder and pistons for scoring or other damage.

Measure the caliper cylinder I.D.

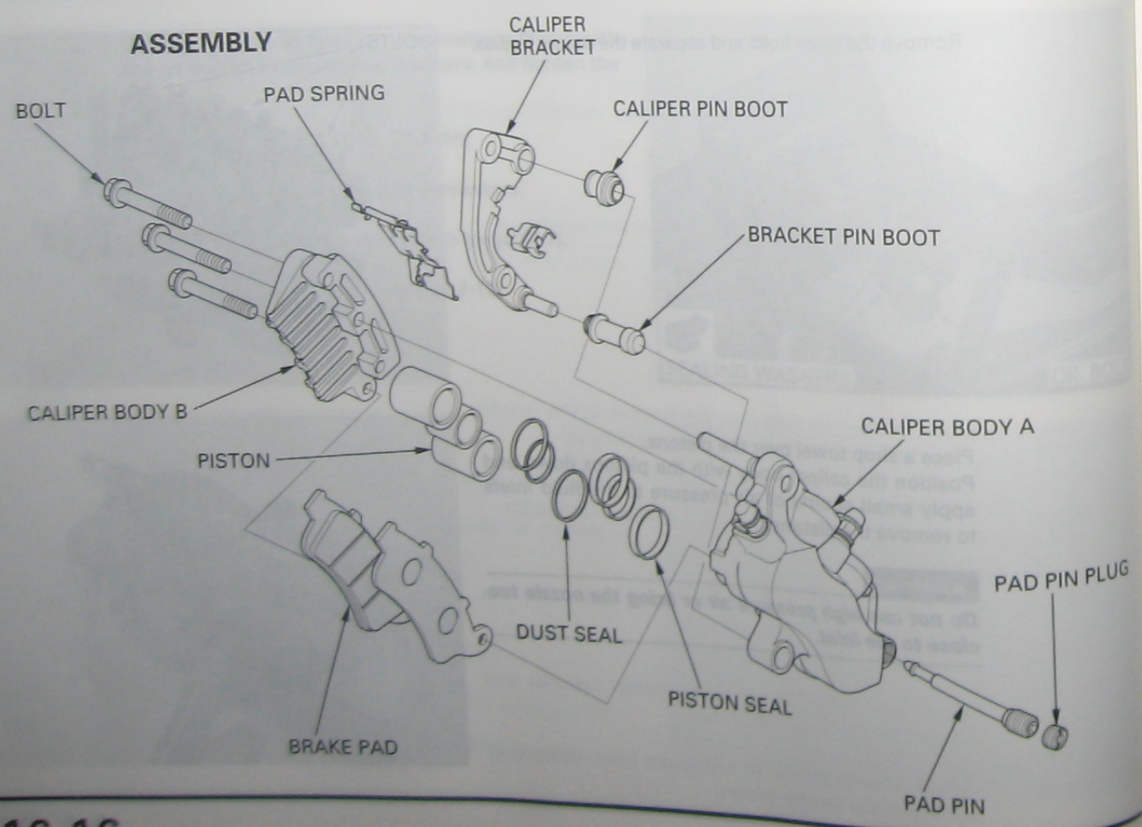
SERVICE LIMIT: Upper: 25.460 mm (1.0024 in)
Center/Lower: 22.710 mm (0.8941 in)

Measure the caliper piston O.D.

SERVICE LIMIT: Upper: 25.327 mm (0.9971 in)
Center/Lower: 22.577 mm (0.8889 in)



ASSEMBLY

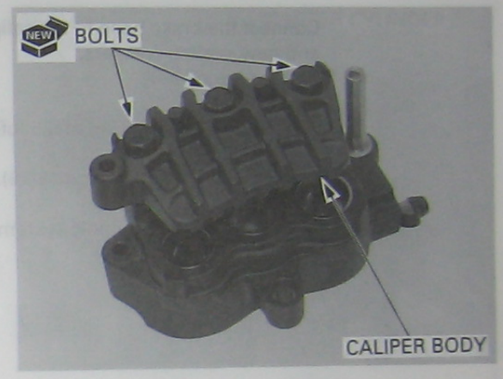


Coat new dust seals and piston seals with silicone grease and install them into the seal grooves in the caliper.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with the opening toward the pads.

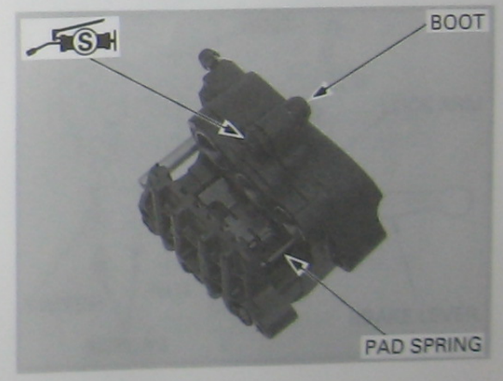
Assemble the caliper bodies with new three bolts.

TORQUE: 32 N·m (3.3 kgf·m, 24 lbf·ft)



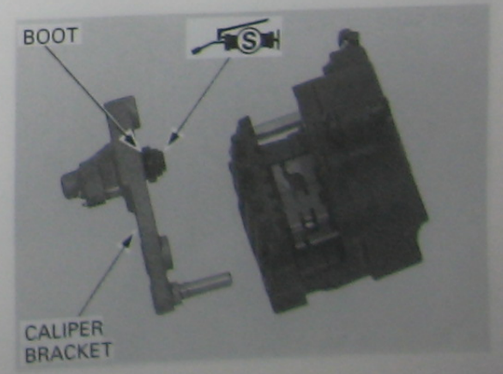
Install the pad spring in the caliper body as shown.

If the caliper and bracket pin boots are hard or deteriorated, replace them with new ones.
Install the bracket pin boot into the caliper body.



Install the caliper pin boot into the bracket.

Apply silicone grease to the inside of each pin boot and install the caliper bracket over the caliper body.



Install the caliper assembly over the brake disc and onto the fork leg with new mounting bolts.
Tighten the mounting bolts.

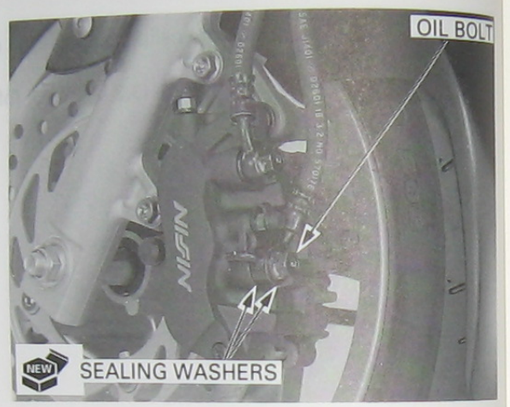
TORQUE: 31 N·m (3.2 kgf·m, 23 lbf·ft)

Connect the brake hose to the caliper with the oil bolt and new sealing washers.
Tighten the oil bolt.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the brake pads (page 16-10).

Fill and bleed the hydraulic system (page 16-7).



REAR (COMBINED) MASTER CYLINDER

CAUTION:

- ***Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.***
- ***When removing the oil bolt, cover the end of the hose to prevent contaminations.***

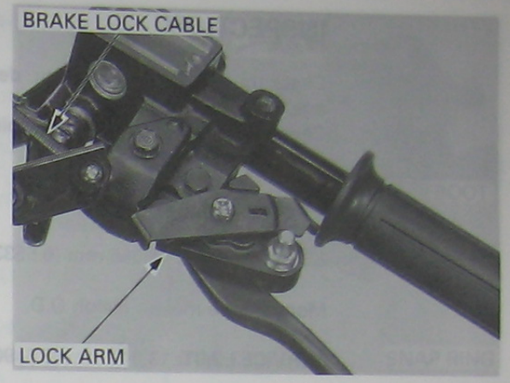
DISASSEMBLY

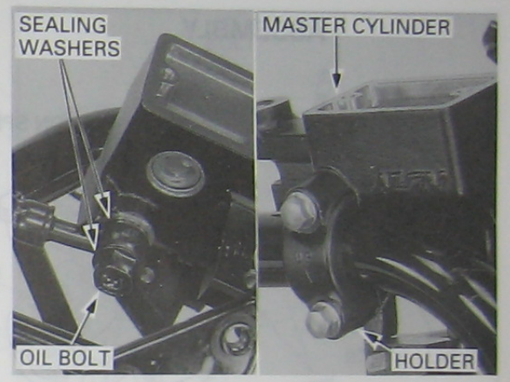
Drain the brake fluid from the hydraulic system (page 16-5).
Remove the rear handle cover (page 2-13).
Disconnect the brake lock cable from the brake sub-arm (page 16-26).

Disconnect the brake lock cable from the lock arm.
Disconnect the brake light/starter limit switch connectors.

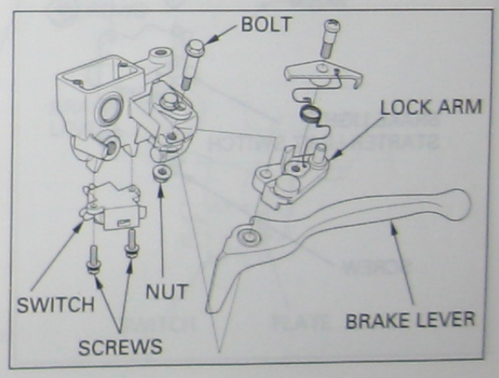
Disconnect the brake hose by removing the oil bolt and sealing washers.

Remove the holder bolts, holder and the master cylinder from the handlebar.





Remove the following:
— screws and brake light/limit switch
— pivot nut and bolt
— brake lever and lock arm
— piston boot

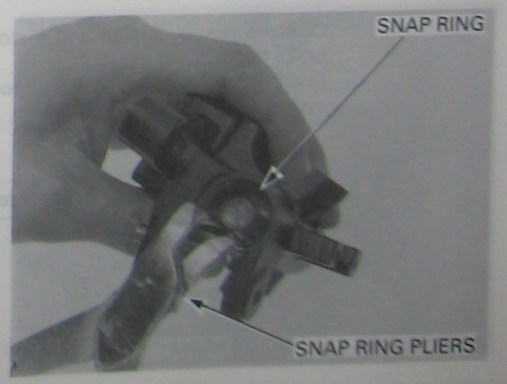


— snap ring

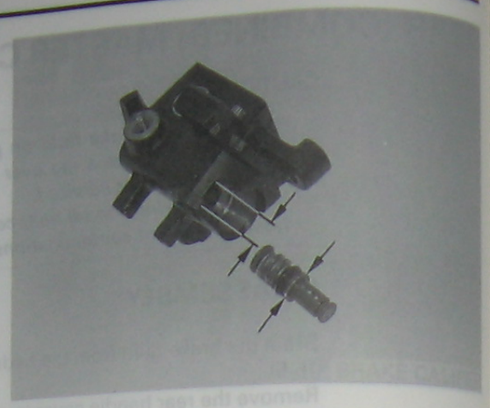
TOOL:
Snap ring pliers 07914 – SA50001

— master piston
— piston cup
— spring

Clean the master cylinder, reservoir and master piston in clean brake fluid.



INSPECTION



Check the piston cups for wear, deterioration or damage.
Check the master cylinder and piston for scoring or damage.

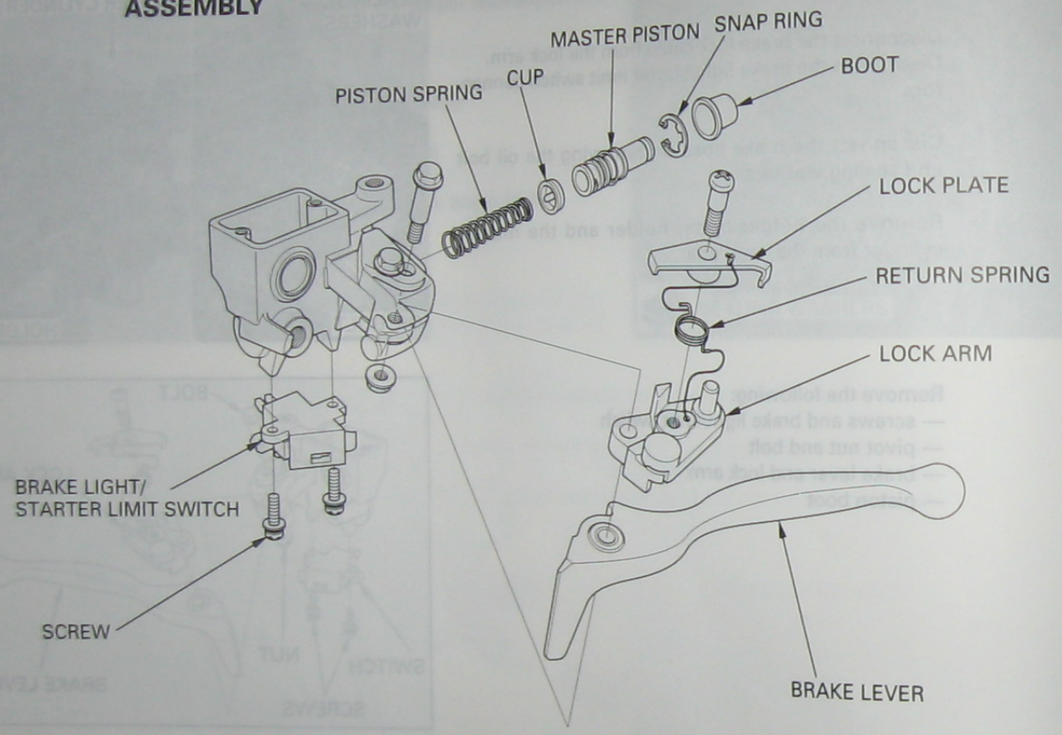
Measure the master cylinder I.D.

SERVICE LIMIT: 14.055 mm (0.5533 in)

Measure the master piston O.D.

SERVICE LIMIT: 13.945 mm (0.5490 in)

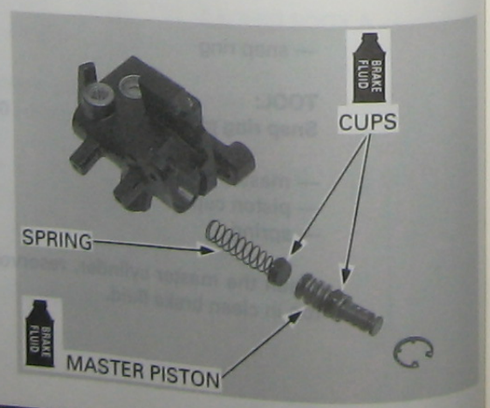
ASSEMBLY



Coat the master piston and piston cups with clean brake fluid.
Install the spring, cup and piston into the master cylinder.

CAUTION:

Do not allow the piston cup lips to turn inside out.

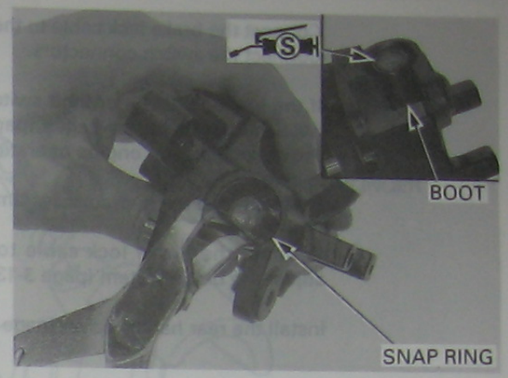


Install the snap ring into the groove in the master cylinder with the chamfered edges facing in.

TOOL:
Snap ring pliers 07914 – SA50001

CAUTION:

Be certain the snap ring is firmly seated in the groove.



Install the piston boot into the master cylinder and the groove in the master piston.

Apply silicone grease to the brake lever contacting surface of the master piston.

Apply silicone grease to the brake lever and lock arm pivots.
Install the brake lever and lock arm with the pivot bolt, and tighten the bolt.

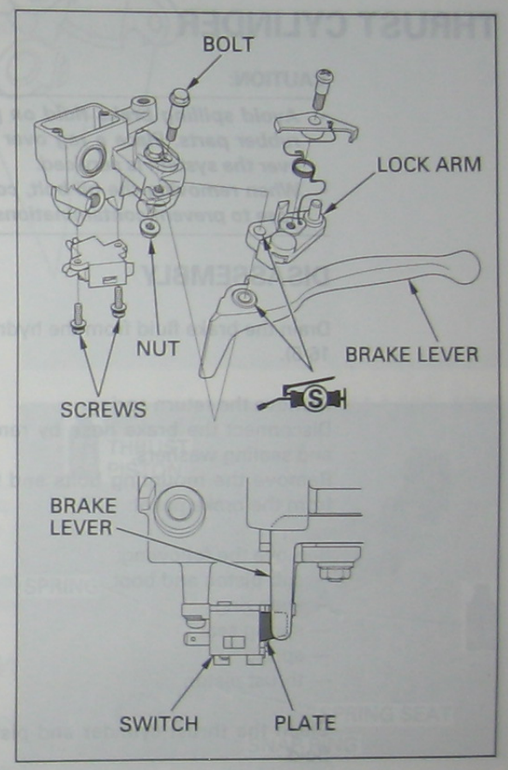
TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Install and tighten the pivot nut.

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Install the brake light/starter limit switch onto the master cylinder so that its plate position is against the back of the lever as shown. Tighten the two screws.

TORQUE: 1 N·m (0.1 kgf·m, 0.7 lbf·ft)



Install the master cylinder and the holder with the "UP" mark facing up.
Align the end of master cylinder with the punch mark on the handlebar, and tighten the upper bolt first, then tighten the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

Connect the brake hose to the master cylinder with the oil bolt and new sealing washers, and tighten the oil bolt.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

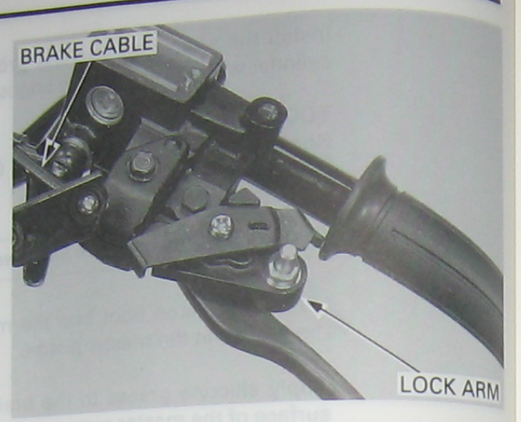
Connect the brake lock cable to the lock arm.
Connect the switch connectors.

If the brake light/starter limit switch is replaced, connect the handlebar switches (page 2-13) and check the brake light and engine operation.

Fill and bleed the hydraulic system (page 16-7).

Connect the brake lock cable to the sub-arm and adjust the brake system (page 3-13).

Install the rear handle cover (page 2-13).



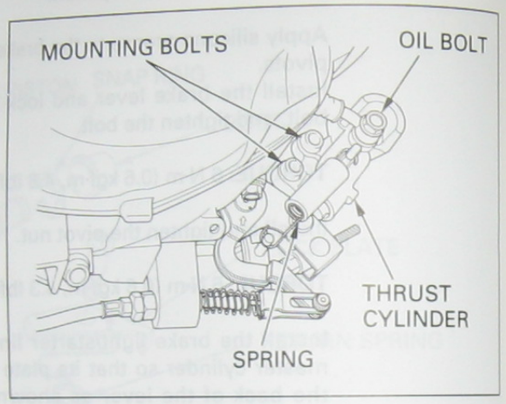
THRUST CYLINDER

CAUTION:

- ***Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.***
- ***When removing the oil bolt, cover the end of the hose to prevent contaminations.***

DISASSEMBLY

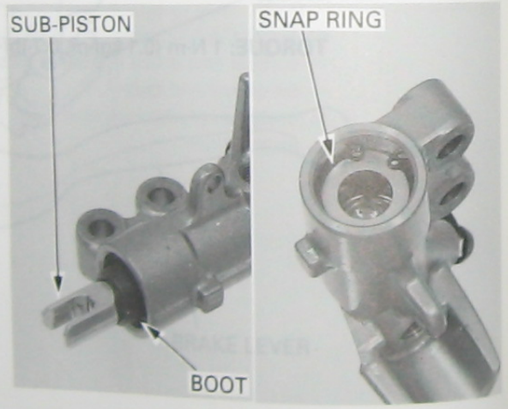
Drain the brake fluid from the hydraulic system (page 16-5).



Remove the return spring.
Disconnect the brake hose by removing the oil bolt and sealing washers.
Remove the mounting bolts and the thrust cylinder from the brake panel.

Remove the following:
— sub-piston and boot
— snap ring
— spring seat
— spring
— thrust piston

Clean the thrust cylinder and piston in clean brake fluid.



INSPECTION

Check the piston cups for wear, deterioration or damage.
Check the thrust cylinder and piston for scoring or damage.

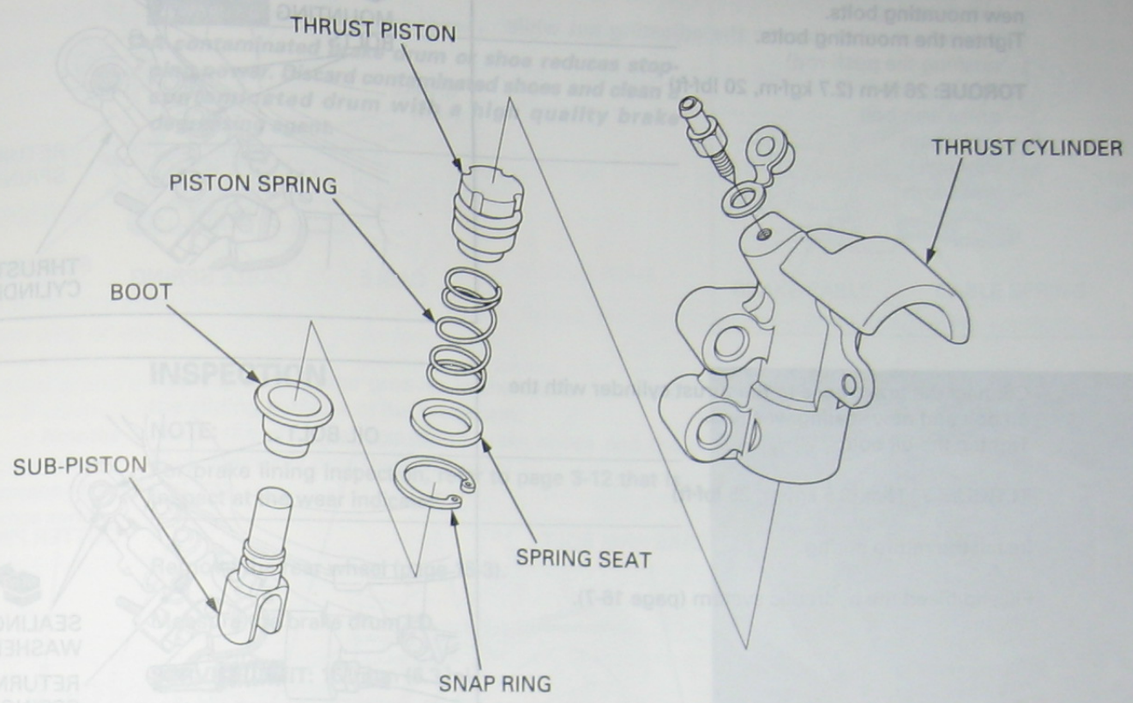
Measure the thrust cylinder I.D.

SERVICE LIMIT: 19.105 mm (0.7522 in)

Measure the thrust piston O.D.

SERVICE LIMIT: 18.995 mm (0.7478 in)

ASSEMBLY



Note the installation direction of the piston.

Coat the thrust piston and piston cup with clean brake fluid.
Install the piston, spring and spring seat into the thrust cylinder.

CAUTION:

Do not allow the piston cup lip to turn inside out.

Install the snap ring into the groove in the thrust cylinder with the chamfered edges facing in.

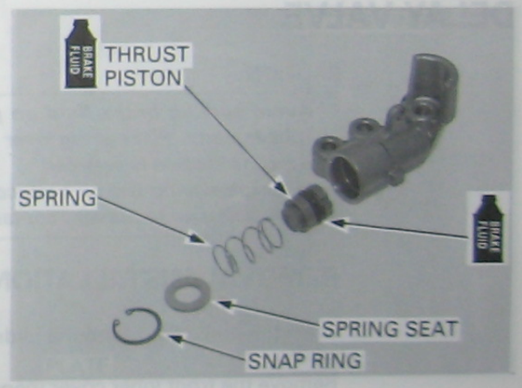
CAUTION:

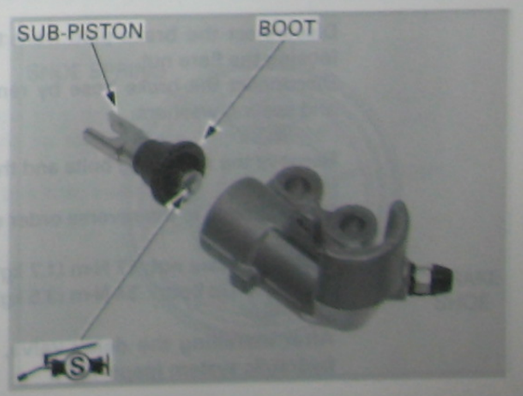
Be certain the snap ring is firmly seated in the groove.

Install the boots into the groove in the sub-piston.

Apply silicone grease to the thrust piston contacting surface of the sub-piston.

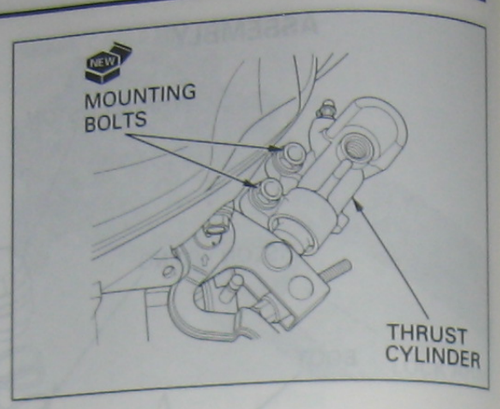
Install the sub-piston/boot into the thrust cylinder.





Install the thrust cylinder onto the brake panel with new mounting bolts.
Tighten the mounting bolts.

TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)

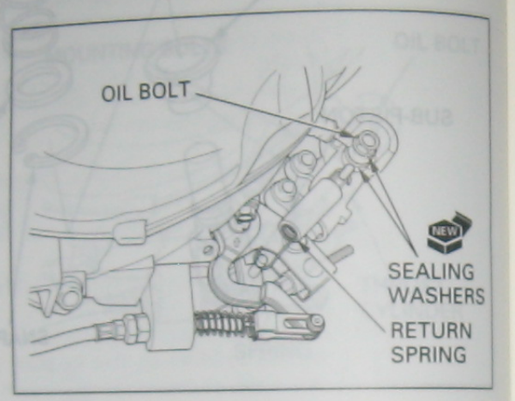


Connect the brake hose to the thrust cylinder with the oil bolt and new sealing washers.
Tighten the oil bolt.

TORQUE: 34 N·m (3.5 kgf·m, 25 lbf·ft)

Install the return spring.

Fill and bleed the hydraulic system (page 16-7).



DELAY VALVE

CAUTION:

- ***Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.***
- ***When removing the oil bolt, cover the end of the hose and pipe to prevent contaminations.***

REMOVAL/INSTALLATION

Drain the brake fluid from the hydraulic system (page 16-5).
Remove the front inner cover (page 2-7).

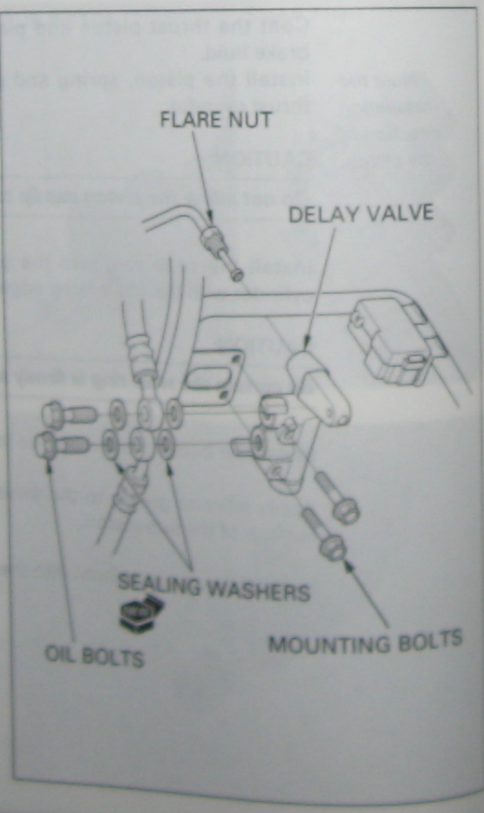
Disconnect the brake pipe from the delay valve by loosing the flare nut.
Disconnect the brake hose by removing the oil bolt and sealing washers.

Remove the mounting bolts and the delay valve.

Installation is in the reverse order of removal.

TORQUE: Flare nut: 17 N·m (1.7 kgf·m, 12 lbf·ft)
Oil bolt: 34 N·m (3.5 kgf·m, 25 lbf·ft)

After installing the delay valve, fill and bleed the hydraulic system (page 16-7).



REAR DRUM BRAKE

⚠ WARNING

A contaminated brake drum or shoe reduces stopping power. Discard contaminated shoes and clean a contaminated drum with a high quality brake degreasing agent.

INSPECTION

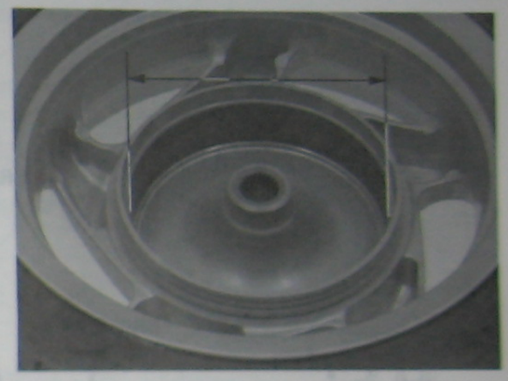
NOTE:

For brake lining inspection, refer to page 3-12 that is inspect at the wear indicator.

Remove the rear wheel (page 15-3).

Measure the brake drum I.D.

SERVICE LIMIT: 161 mm (6.3 in)

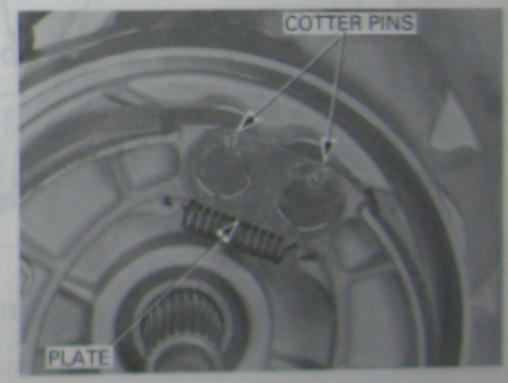


DISASSEMBLY

NOTE:

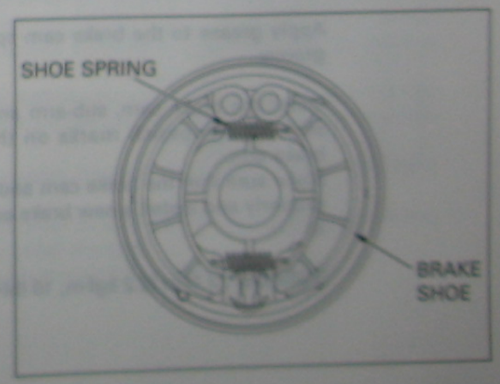
Always replace the brake shoes in pairs.

Remove the following:
— cotter pins
— setting plate

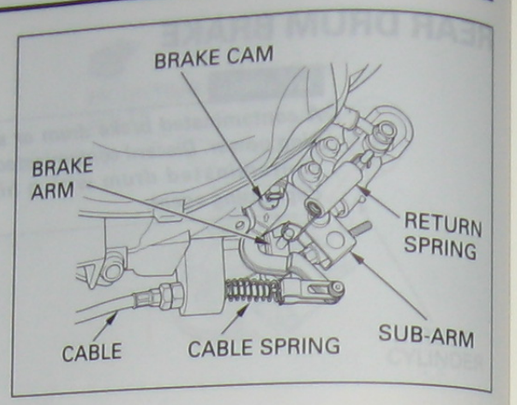


Do not operate the brake lever after removing the brake shoes.

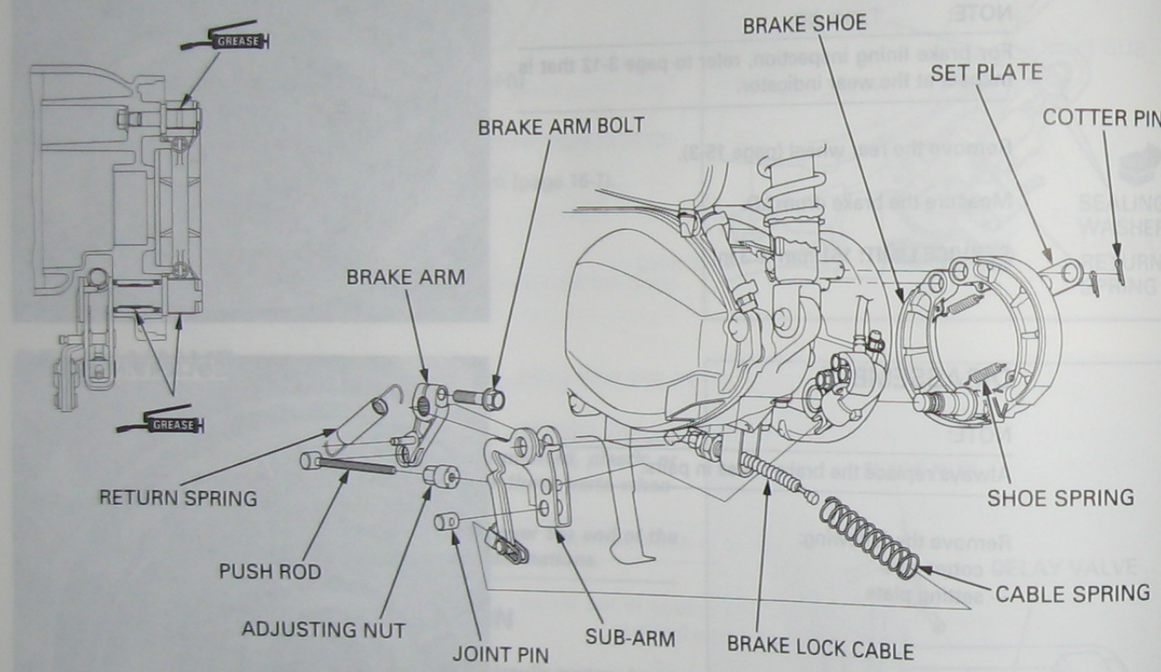
— brake shoes
— shoe springs



Remove the following:
— return spring
— brake lock cable (loosen the adjusting nut while pushing the push rod)
— cable spring
— brake arm bolt
— brake cam
— sub-arm
— brake arm



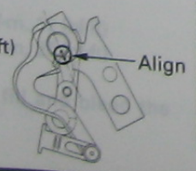
ASSEMBLY

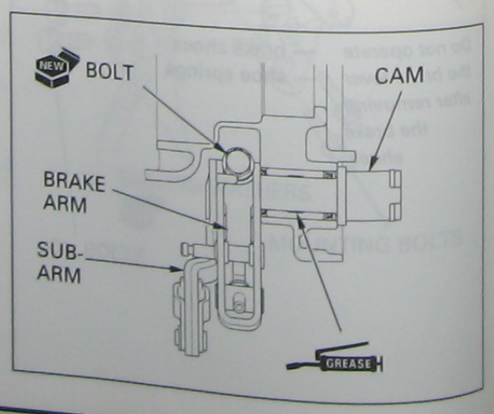


Apply grease to the brake cam spindle and bushing groove.

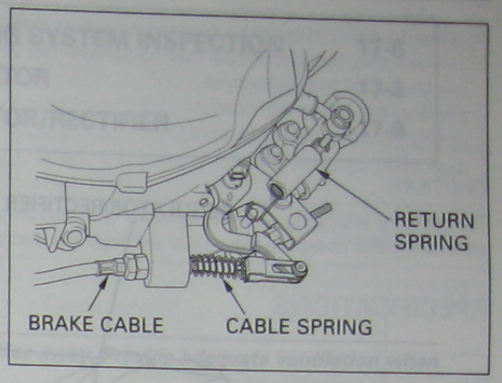
Install the brake cam, sub-arm and brake arm while aligning the punch marks on the brake cam and brake arm.
Make sure that the brake cam and arms are installed properly and install a new brake arm bolt and tighten it.

TORQUE: 22 N·m (2.2 kgf·m, 16 lbf·ft)



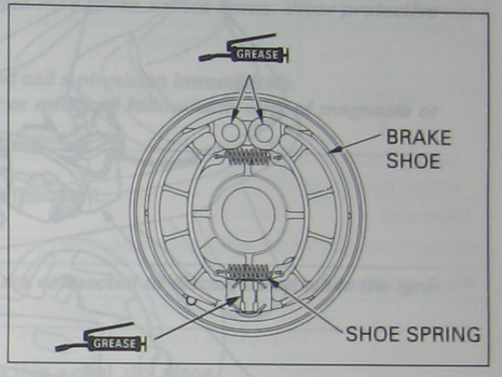


Connect the brake lock cable with the cable spring to the sub-arm.
Install the return spring as shown.



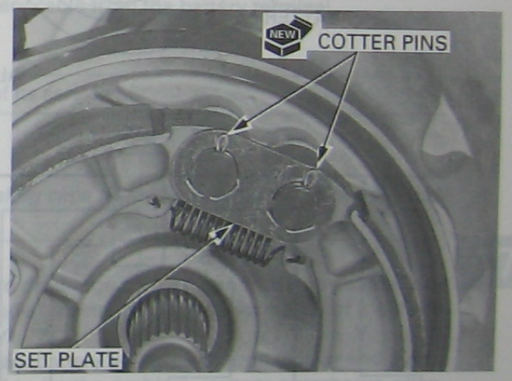
Apply grease to the grooves in the anchor pins and the sliding surfaces of the brake cam.
Install the shoe springs to the brake shoes and the shoe assembly onto the brake panel.

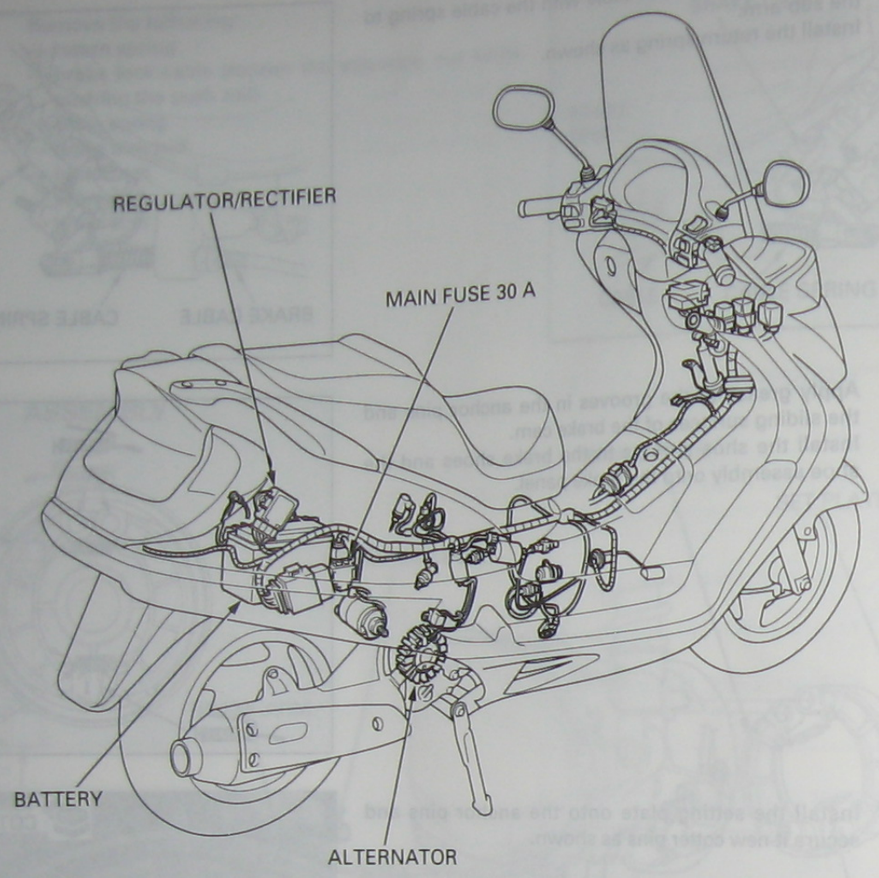
Note the installation direction of the shoe springs.

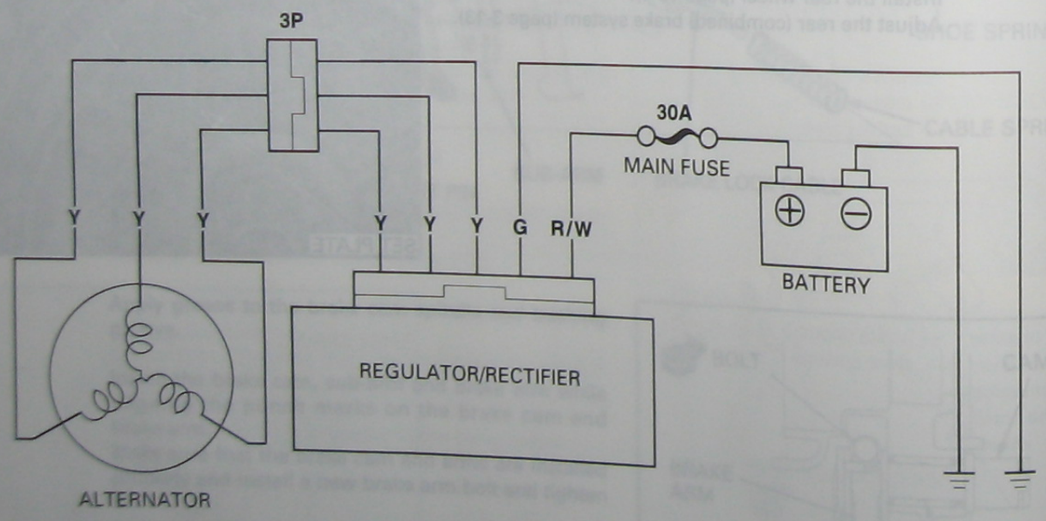


Install the setting plate onto the anchor pins and secure it new cotter pins as shown.

Install the rear wheel (page 15-4).
Adjust the rear (combined) brake system (page 3-13).







Y . . . YELLOW
G . . . GREEN
R . . . RED
W . . . WHITE

17. BATTERY/CHARGING SYSTEM

SERVICE INFORMATION

GENERAL

⚠ WARNING

- ***The battery gives off explosive gases; keep sparks, flames, and cigarettes away. Provide adequate ventilation when charging or using the battery in an enclosed space.***
- ***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 15 minutes and call a physician immediately.***
- ***Electrolyte is poisonous. If swallowed, drink large quantities of water or milk and follow with milk of magnesia or vegetable oil and call a physician. KEEP OUT OF REACH OF CHILDREN.***

- Always turn off the ignition switch before disconnecting any electrical component.

CAUTION:

Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.

- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry place.
- For battery remaining in a stored scooter, disconnect the negative battery cable from the battery terminal.

NOTE:

The maintenance free battery must be replaced when it reaches the end of its service life.

CAUTION:

The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.

- The battery can be damaged if overcharged or undercharged, or if left to discharge for long periods. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of a battery deteriorates after 2 – 3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected to be the problem. Battery overcharge often results from problems in the battery its self, which may appear to be an overcharge symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the scooter.
- The battery will self-discharge when the scooter is not in use. For this reason, charge the battery every two weeks to prevent sulfation from forming.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initial-charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 17-3).
- For alternator service, refer to section 12.

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
  — Use only the electrolyte that come with the battery.
  — Use all of the electrolyte.
  — Seal the battery properly.
  — Never open the seals again.

CAUTION:

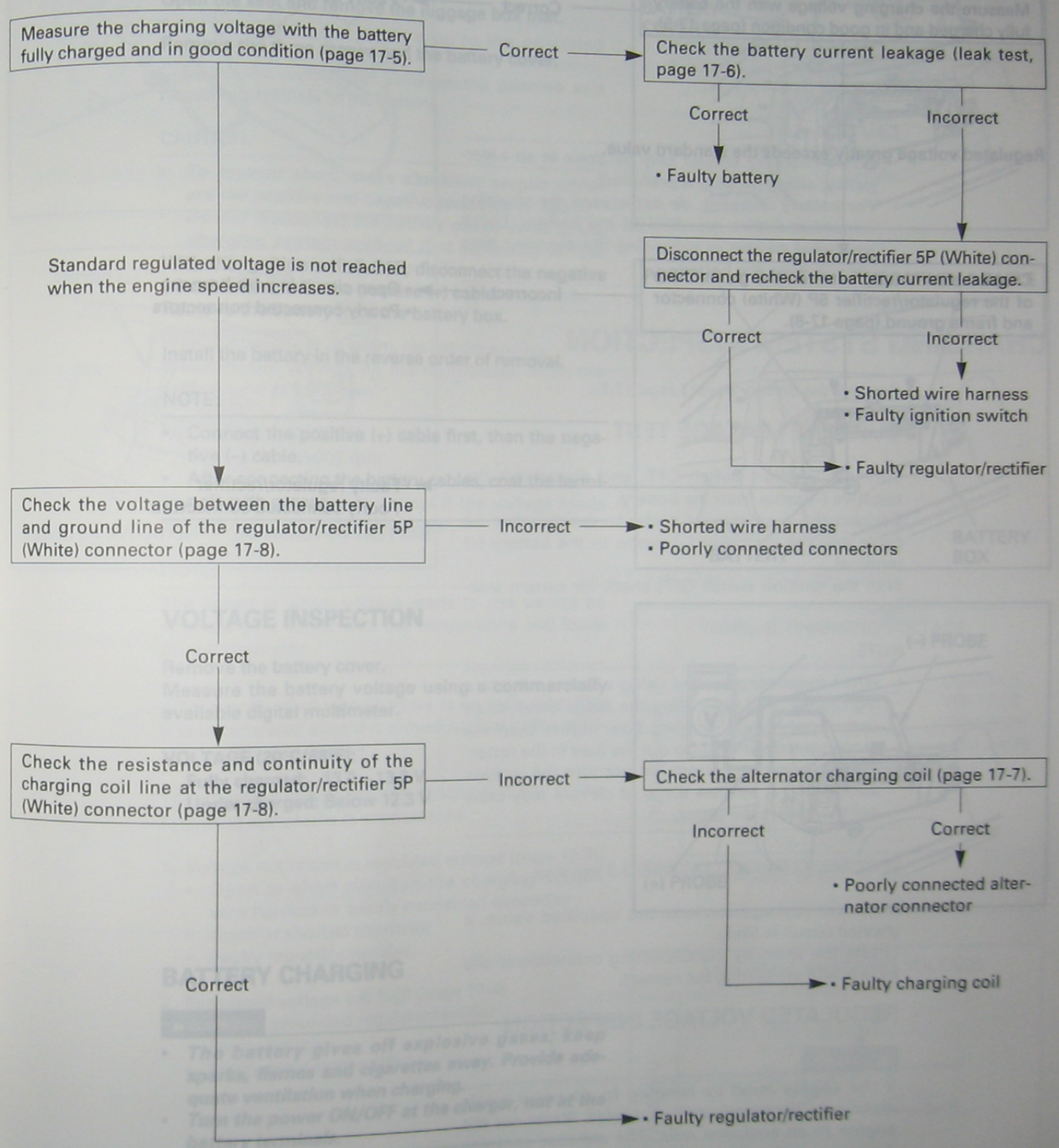
For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.

SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12 V-10 AH
	Current leakage		3.5 mA max.
	Voltage (20°C/68°F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.2 A/5 – 10 h
		Quick	5 A/1 h
Alternator	Capacity		290 W/5,000 min^{-1} (rpm)
	Charging coil resistance (20°C/68°F)		0.1 – 0.5 Ω
Regulator/rectifier regulated voltage			14.5 – 15.3 V at 5,000 min^{-1} (rpm)

TROUBLESHOOTING

Battery undercharging (voltage not raised to regulated voltage)



Battery overcharging (regulated voltage too high).

Measure the charging voltage with the battery fully charged and in good condition (page 17-5).
- Correct → • Faulty battery

Regulated voltage greatly exceeds the standard value.

Check the continuity between the ground line of the regulator/rectifier 5P (White) connector and frame ground (page 17-8).
- Incorrect → • Open circuit in wire harness
  • Poorly connected connectors

Correct

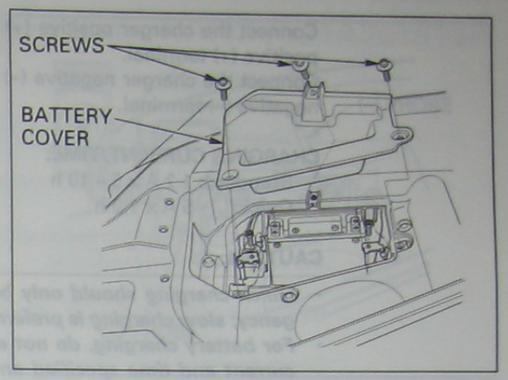
- → • Faulty regulator/rectifier
  • Poorly connected connectors

BATTERY

REMOVAL/INSTALLATION

Open the seat and remove the luggage box mat.

Remove the three screws and the battery cover.

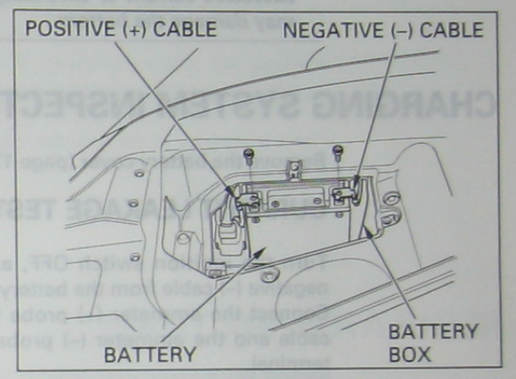


With the ignition switch OFF, disconnect the negative (–) cable first, then the positive (+) cable.
Remove the battery from the battery box.

Install the battery in the reverse order of removal.

NOTE:

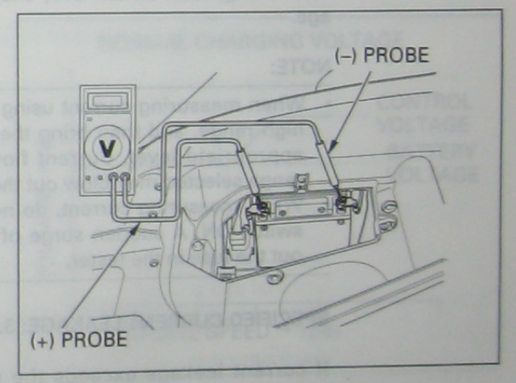
- Connect the positive (+) cable first, then the negative (–) cable.
- After connecting the battery cables, coat the terminals with grease.



VOLTAGE INSPECTION

Remove the battery cover.
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 the power ON/OFF at the charger, not at the battery terminals.***

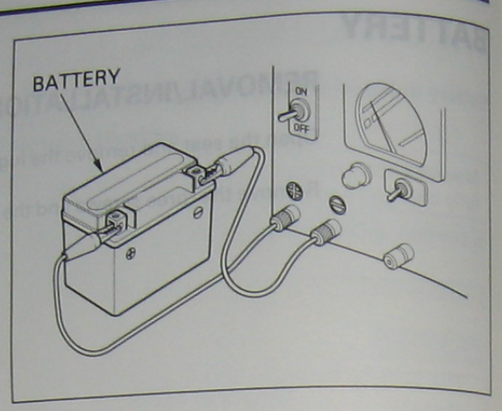
Remove the battery.

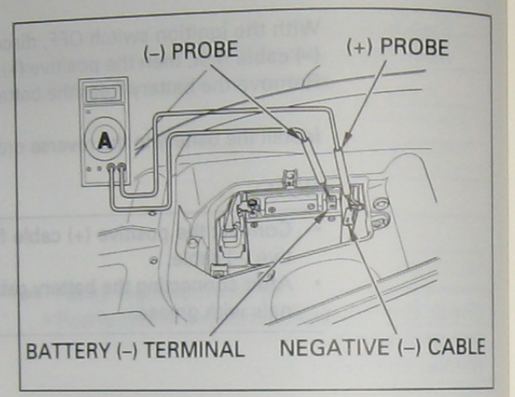
Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (–) cable to the battery negative (–) terminal.

CHARGING CURRENT/TIME:
Standard: 1.2 A x 5 – 10 h
Quick: 5 A x 1.0 h

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

Remove the battery cover (page 17-5).

CURRENT LEAKAGE TEST

Turn the ignition switch OFF, and disconnect the negative (–) cable from the battery.
Connect the ammeter (+) probe to the negative (–) cable and the ammeter (–) probe to the battery (–) terminal.
With the ignition switch OFF, check for current leakage.

NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition switch ON. A sudden surge of current may blow out the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 3.5 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.

REGULATED VOLTAGE INSPECTION

⚠ WARNING

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

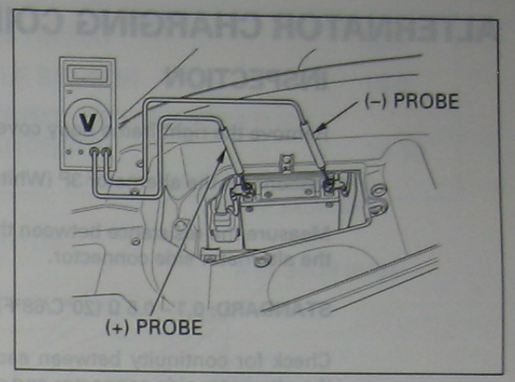
NOTE:

Be sure that the battery is in good condition before performing this test.

Start the engine and warm it up to the operating temperature; stop the engine.
Connect the multimeter between the positive and negative terminals of the battery.

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 Hi beam, restart the engine.
Measure the voltage on the multitester when the engine runs at 5,000 rpm.

REGULATED VOLTAGE:
14.5 – 15.3 V/5,000 rpm

The charging system is normal if the voltage reads the regulated voltage on the tester.

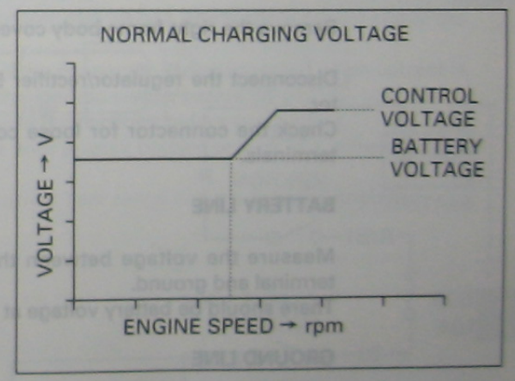
NOTE:

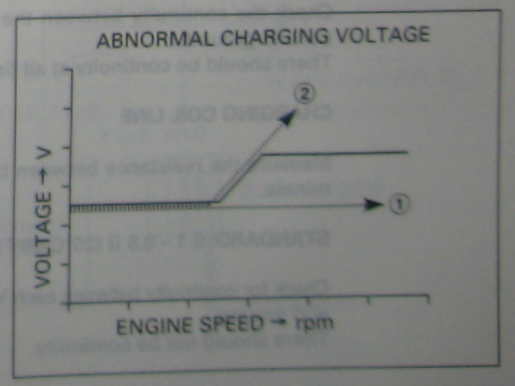
The speed at which voltage starts to rise cannot be checked as it varies with the temperature and loads on the alternator.

A frequently discharged battery is an indication that it is deteriorated even if it proves normal in the regulated voltage inspection.

The charging circuit may be abnormal if any of the following symptoms is encountered:

1. Voltage not raised to regulated voltage (page 17-3).
   - Open or short circuit in the charging system wire harness or poorly connected connector
   - Open or shorted alternator
   - Faulty regulator/rectifier
2. Regulated voltage too high (page 17-4)
   - Poorly grounded regulator/rectifier
   - Faulty battery
   - Faulty regulator/rectifier





ALTERNATOR CHARGING COIL

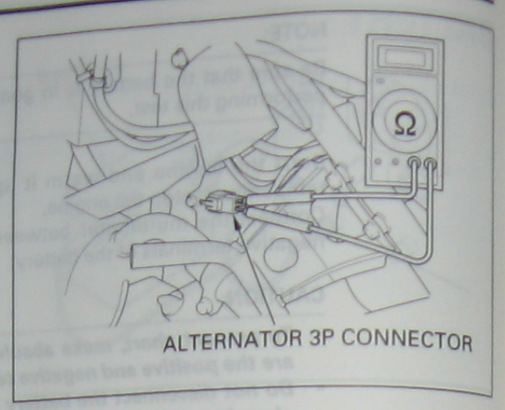
INSPECTION

Remove the right frame body cover (page 2-8).

Disconnect the alternator 3P (White) connector.

Measure the resistance between the wire terminals of the alternator side connector.

STANDARD: 0.1 – 0.5 Ω (20°C/68°F)



Check for continuity between each wire terminal of the alternator side connector and ground.
There should not be continuity.

Replace the alternator stator if resistance is out of specification, or if any wire has continuity to ground.

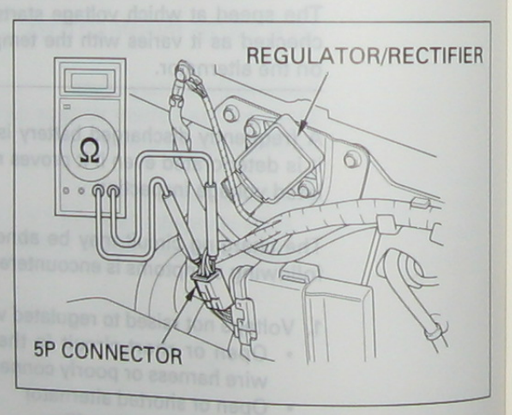
Refer to section 12 for alternator stator replacement.

REGULATOR/RECTIFIER

WIRE HARNESS INSPECTION

Remove the right frame body cover (page 2-8).

Disconnect the regulator/rectifier 5P (White) connector.
Check the connector for loose contact or corroded terminals.



BATTERY LINE

Measure the voltage between the Red/White wire terminal and ground.
There should be battery voltage at all time.

GROUND LINE

Check the continuity between the Green wire terminal and ground.
There should be continuity at all time.

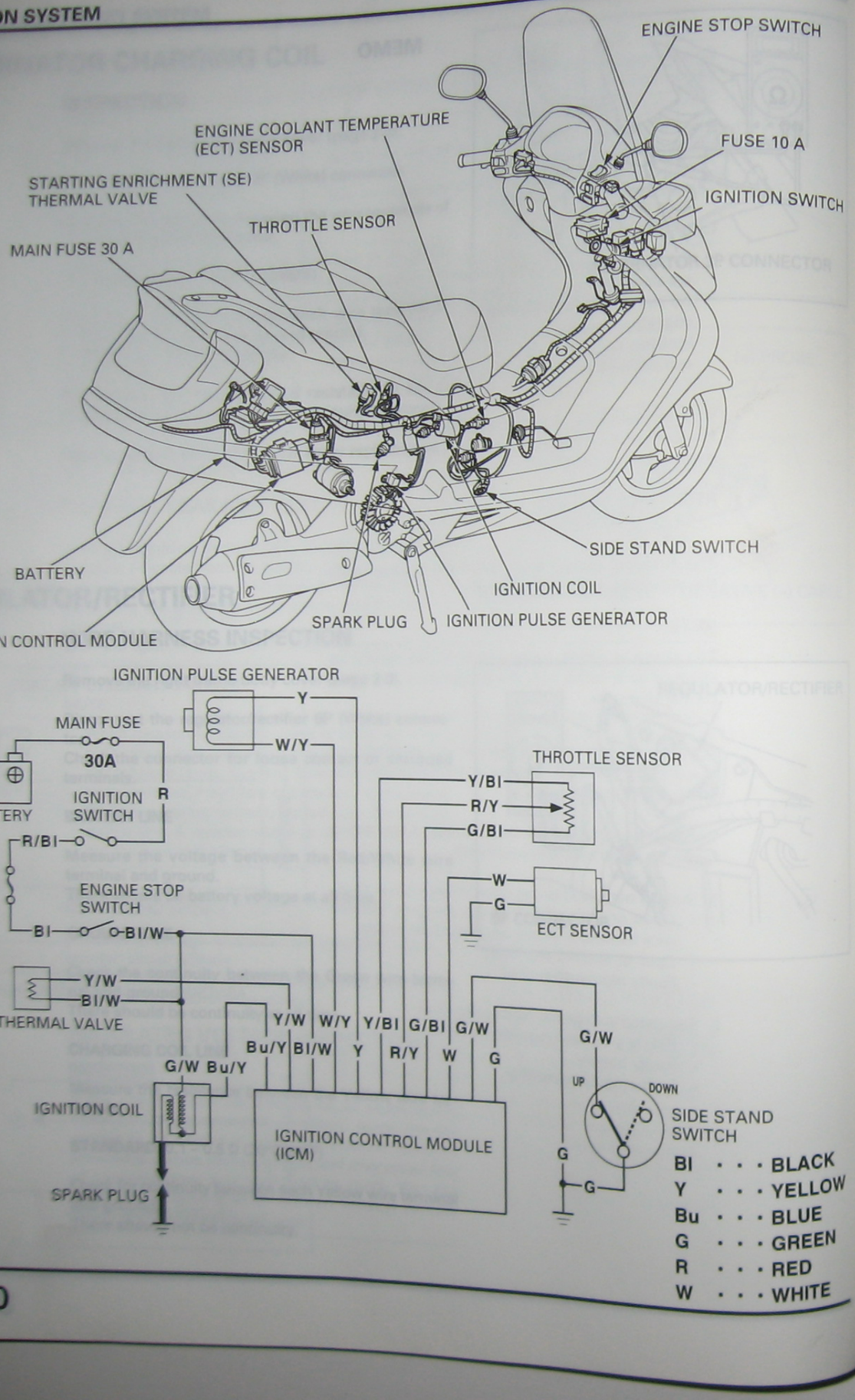
CHARGING COIL LINE

Measure the resistance between the Yellow wire terminals.

STANDARD: 0.1 – 0.5 Ω (20°C/68°F)

Check for continuity between each Yellow wire terminal and ground.
There should not be continuity.

MEMO



18. IGNITION SYSTEM

SERVICE INFORMATION

GENERAL

⚠WARNING

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

CAUTION:

- ***Do not remove the throttle sensor from the carburetor. Removing the throttle sensor can cause the throttle sensor getting out of position resulting in improper ignition timing. If the throttle sensor replacement is necessary, replace the carburetor as an assembly.***
- ***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 transistorized ignition system uses an electrically controlled ignition timing system. No adjustments can be made to the ignition timing.
- The ignition control module (ICM) varies ignition timing according to the engine speed. The throttle sensor signal the ICM compensate the ignition timing according to the throttle opening.
- 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 ICM. 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 as the spark plug.
- Use spark plug of the correct heat range. Using spark plug with an incorrect heat range can damage the engine.
- See section 20 for following components:
  — Side stand switch
  — Ignition switch
  — Engine stop switch.
- For ignition pulse generator removal/installation, see section 12.

SPECIFICATIONS

ITEM		SPECIFICATIONS	
Spark plug		NGK	DENSO
	Standard	DPR7EA-9	X22EPR-U9
	For cold climate (below 5°C/41°F)	DPR6EA-9	X20EPR-U9
	For extended high speed riding	DPR8EA-9	X24EPR-U9
Spark plug gap		0.8 – 0.9 mm (0.031 – 0.035 in)	
Ignition coil primary peak voltage		100 V minimum	
Ignition pulse generator peak voltage		0.7 V minimum	
Ignition timing ("F" mark)		11° BTDC at idle	
Engine coolant temperature (ECT) sensor resistance	at 20°C (68°F)	2 – 3 kΩ	
	at 80°C (176°F)	200 – 400 Ω	
Throttle sensor	Resistance (20°C/68°F)	4 – 6 kΩ	
	Input voltage	4.6 – 5.4 V	

TORQUE VALUES

Timing hole cap	6 N·m (0.6 kgf·m, 4.3 lbf·ft)
Engine coolant temperature (ECT) sensor	15 N·m (1.5 kgf·m, 11 lbf·ft)

TOOLS

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 connections.
  — Water got into the spark plug cap (Leaking the ignition coil secondary voltage).
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch ON and engine stop switch at RUN. (The engine is not cranked by the starter motor.)

No spark at all spark plugs

Unusual condition		Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with ignition and engine stop switches ON. (Other electrical components are normal.)	1. Faulty engine stop switch. 2. An open circuit in Bl/W wire between the ignition coil and engine stop switch. 3. Loose primary terminal or an open circuit in primary coil. 4. Faulty ignition control module (ICM): in case when the initial voltage is normal while disconnecting ICM connector.
	Initial voltage is normal, but it drops down to 2 – 4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Undercharged battery. 3. No voltage at the power source wire between Bl (+) and ground (–) of the ignition control module (ICM) connector or loosen ICM connection. 4. An open circuit or loose connection in G wire of the ICM. 5. Open circuits or loose connections in Bu/Y wire between the ignition coil and ICM. 6. Short circuit in ignition primary coil. 7. Faulty side stand switch. 8. An open circuit or loose connection in No. 7 related circuit wires (G/W and G wire). 9. Faulty ICM (in case when above No. 1 – 8 are normal).
	Initial voltage is normal, but no peak voltage while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Faulty peak voltage adaptor. 3. Faulty ICM (in case when above No. 1, 2 are normal).
	Initial voltage is normal, but peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow (battery is undercharged). 3. The sample 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 ICM (in case that above No. 1 – 3 are normal).
	Initial and peak voltage are normal, but does not spark.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coils.
Ignition pulse generator	Peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too slow (battery is undercharged). 3. The sample timing of the tester and measured ignition 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. 2. Faulty ignition pulse generator.

IGNITION SYSTEM INSPECTION

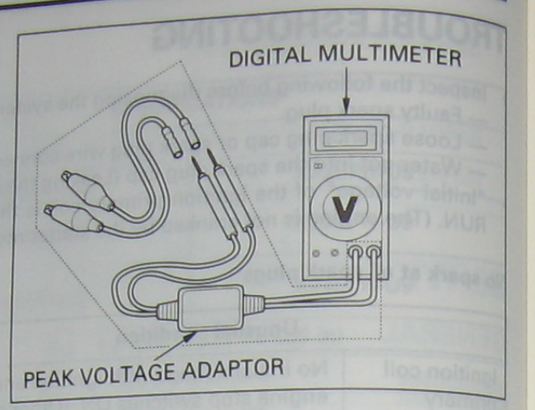
NOTE:

- If not spark jumps at the plug, check that all connections for loose or poor contact before measuring each peak voltage.
- Use recommended digital multimeter or commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If using Imrie diagnostic tester (model 625), follow the manufacturer's instructions.

Connect the peak voltage adaptor to the digital multimeter.

TOOL:

Imrie diagnostic tester (model 625) or	
Peak voltage adaptor	07HGJ – 0020100 with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)



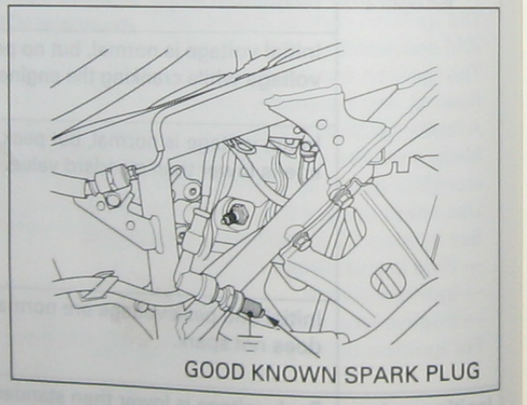
IGNITION PRIMARY VOLTAGE INSPECTION

NOTE:

- Check all system connections before this inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression at the cylinder and check that the spark plug is installed correctly in the cylinder head.

Remove the right frame body cover (page 2-8).

Disconnect the spark plug cap from the spark plug on the cylinder head.
Connect a good known spark plug to the spark plug cap and ground the spark plug to the cylinder as done in a spark test.



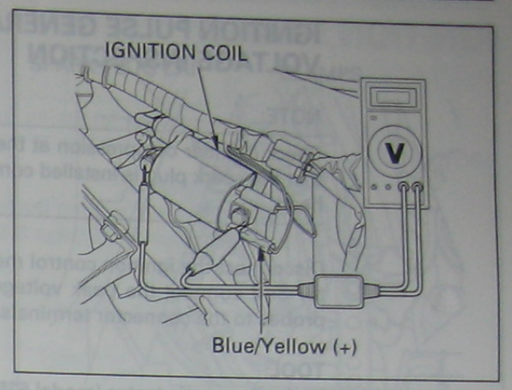
Connect the peak voltage adaptor or tester probes to the ignition coil.

NOTE:

Do not disconnect the ignition coil primary wire.

TOOL:

Imrie diagnostic tester (model 625) or	
Peak voltage adaptor	07HGJ – 0020100 with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)



CONNECTION:
Blue/Yellow terminal (+) — Body ground (–)

Turn the ignition switch ON and engine stop switch to RUN position.
Check for the initial battery voltage.
If battery voltage is not present, follow the checks described in the troubleshooting on page 18-3.

Retract the side stand.
Crank the engine with the starter motor and read ignition coil primary voltage.

PEAK VOLTAGE: 100 V minimum

⚠ WARNING

Avoid touching the spark plugs and tester probes to prevent electric shock.

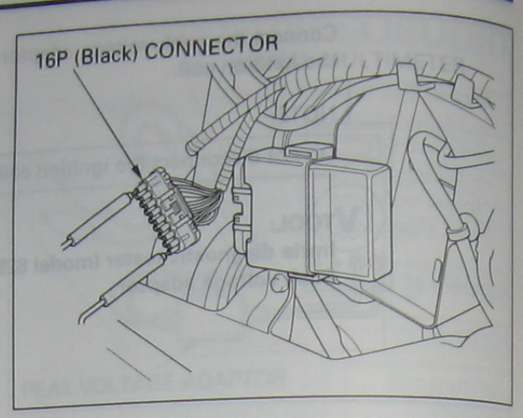
If the peak voltage is lower than standard value, follow the checks described in the troubleshooting on page 18-3.

IGNITION PULSE GENERATOR PEAK VOLTAGE INSPECTION

NOTE:

Check cylinder compression at the cylinder and check that the spark plug is installed correctly in the cylinder head.

Disconnect the ignition control module (ICM) connector and connect the peak voltage adaptor or tester probes to the connector terminals.



TOOL:

Imrie diagnostic tester (model 625) or Peak voltage adaptor	07HGJ – 0020100 with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

CONNECTION:
White/Yellow (+) — Yellow (–) terminal

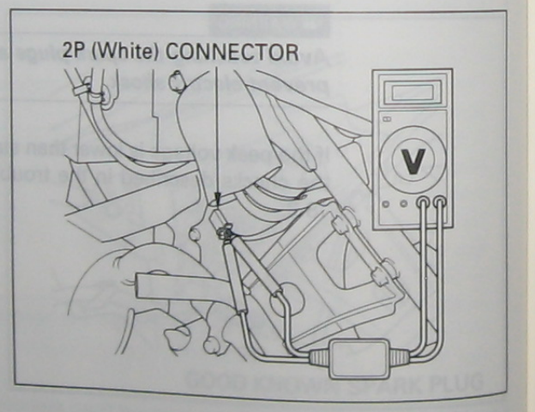
Retract the side stand.
Turn the ignition switch ON and engine stop switch to RUN position.
Crank the engine with the starter motor and read the peak voltage.

PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured at the ICM connector is abnormal, measure the peak voltage at the ignition pulse generator 2P (White) connector.

Disconnect the ignition pulse generator 2P connector and connect the peak voltage adaptor or tester probes to the connector terminals of the ignition pulse generator side.
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 voltage measured are lower than standard value, follow the checks described in the troubleshooting on page 18-3.



IGNITION COIL

REMOVAL/INSTALLATION

Remove the following:
— right frame body cover (page 2-8)
— inner maintenance lid (page 3-5)

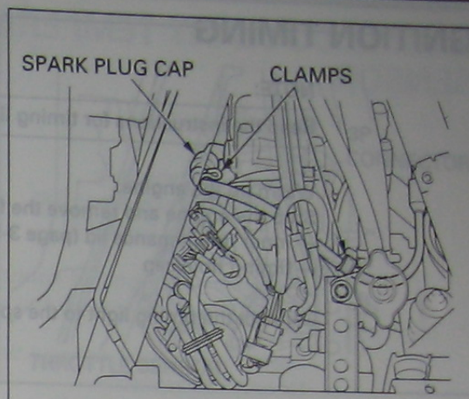
Disconnect the spark plug cap from the spark plug and remove its wire from the clamps.
Disconnect the ignition coil wires.

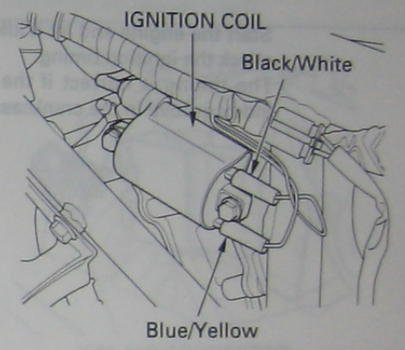
Remove the two bolts and the ignition coil.

Install the removed parts in the reverse order of removal.

NOTE:

Route the spark plug wire properly.





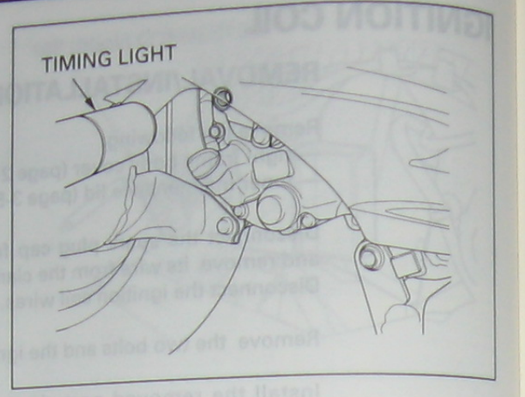
IGNITION TIMING

NOTE:

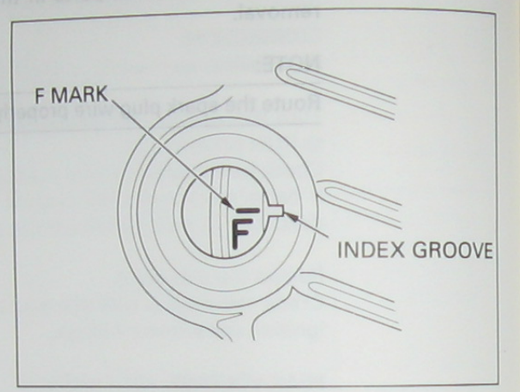
Read the instructions for timing light operation.

Warm up the engine.
Stop the engine and remove the following:
— inner maintenance lid (page 3-5)
— timing hole cap

Connect the timing light to the spark plug wire.



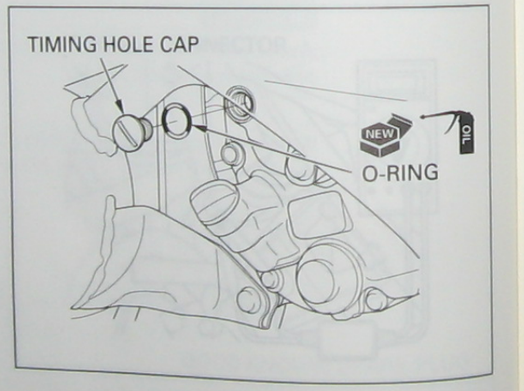
Start the engine and let it idle [1,500 min^{-1} (rpm)] and check the ignition timing.
The timing is correct if the F mark aligns with the index groove in the crankcase cover.



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

TORQUE: 6 N·m (0.6 kgf·m, 4.3 lbf·ft)

Install the inner maintenance lid.



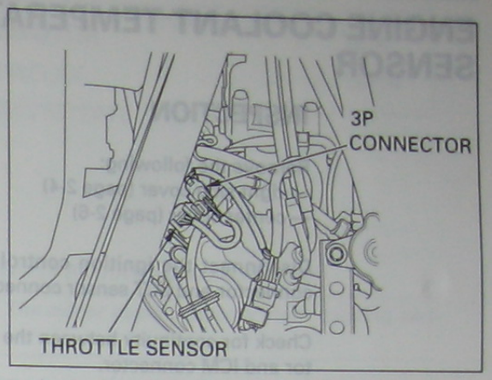
THROTTLE SENSOR

CAUTION:

Do not remove the throttle sensor from the carburetor. Removing the throttle sensor can cause the throttle sensor getting out of position resulting in improper ignition timing. If the throttle sensor replacement is necessary, replace the carburetor as an assembly.

OPERATION INSPECTION

Remove the inner maintenance lid (page 3-5).
Start the engine.
Disconnect the throttle sensor 3P connector when the engine speed is 4,500 ± 200 min^{-1} (rpm) (throttle angle is about 10°). The engine speed should increase.

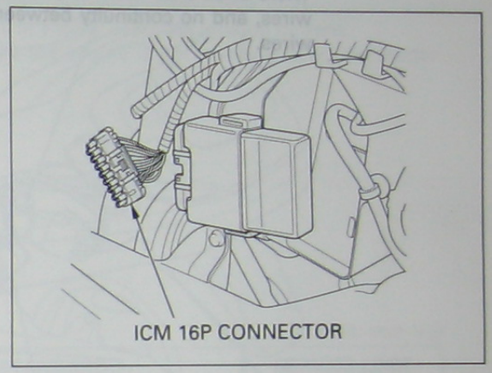


SYSTEM INSPECTION

Remove the right side cover (page 2-4).
Disconnect the ignition control module (ICM) 16P connector.

Measure the resistance between the Yellow/Black and Green/Black wire terminals of the wire harness side connector.

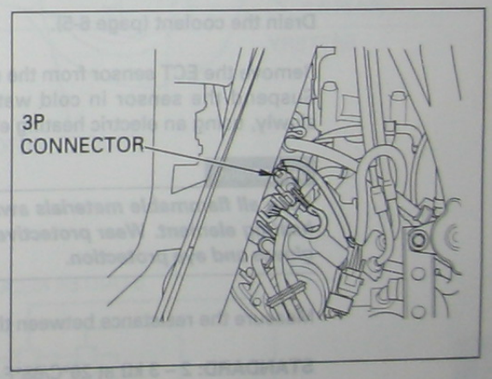
STANDARD: 4 – 6 kΩ (20°C/68°F)



Check that resistance between the Red/Yellow and Green/Black wire terminals of the 16P connector varies with the throttle position while operating the throttle grip.

Fully open — Fully closed position: Resistance decreases

Fully closed — Fully open position: Resistance increases



If the correct measurements cannot be obtained, disconnect the throttle sensor 3P connector and perform the same inspection at the sensor side 3P connector.
- If the measurement at the ICM is abnormal and the one at the throttle sensor is normal, check for open or short circuit, or loose or poor connections in the wire harness.
- If both measurements are abnormal, replace the throttle sensor that is carburetor as an assembly.

Connect the ICM connector.
Turn the engine stop switch to RUN position and the ignition switch ON.
Measure the input voltage between the Yellow/Black (+) and Green/Black (–) wire terminals of the ICM side throttle sensor 3P connector.

STANDARD: 4.6 – 5.4 V

If the input voltage is abnormal, or if there is no input voltage, check for open or short circuit in the wire harness, or loose or poor ICM connector contact.

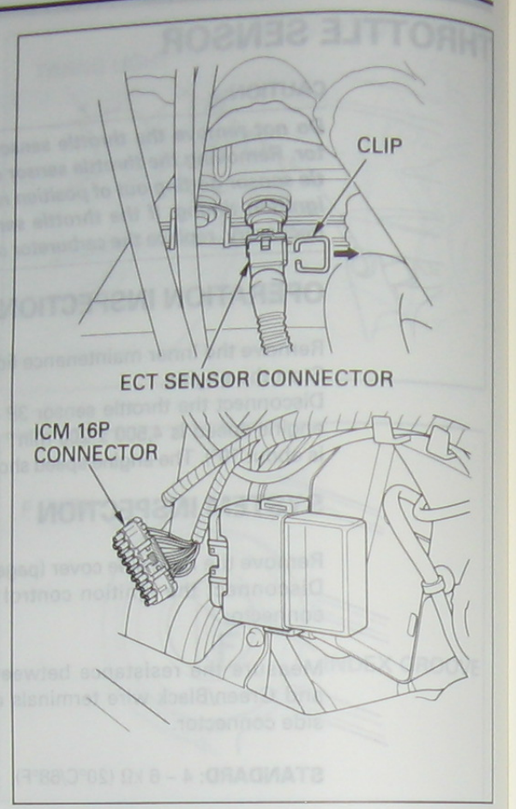
ENGINE COOLANT TEMPERATURE (ECT) SENSOR

INSPECTION

Remove the following:
— right side cover (page 2-4)
— center cover (page 2-6)

Disconnect the ignition control module (ICM) 16P connector and ECT sensor connector.

Check for continuity between the ECT sensor connector and ICM connector.
There should be continuity between the same color wires, and no continuity between the different color wires.

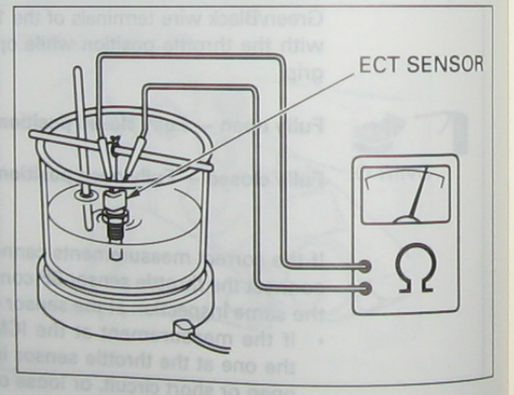


Drain the coolant (page 6-5).

Remove the ECT sensor from the radiator.
Suspend the sensor in cold water. Heat the water slowly, using an electric heating element.

⚠ WARNING

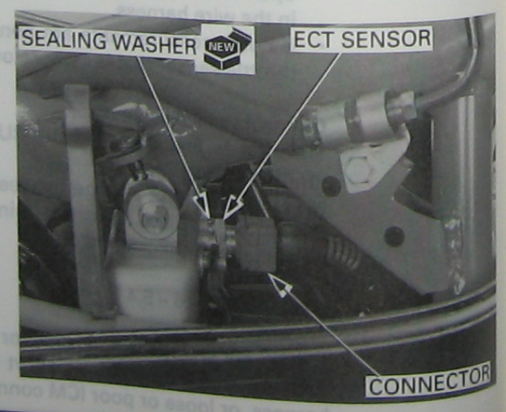
Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.



Measure the resistance between the sensor terminals.

STANDARD: 2 – 3 kΩ at 20°C/68°F
200 – 400 Ω at 80°C/178°F

If the resistance is out of above ranges, replace the ECT sensor.



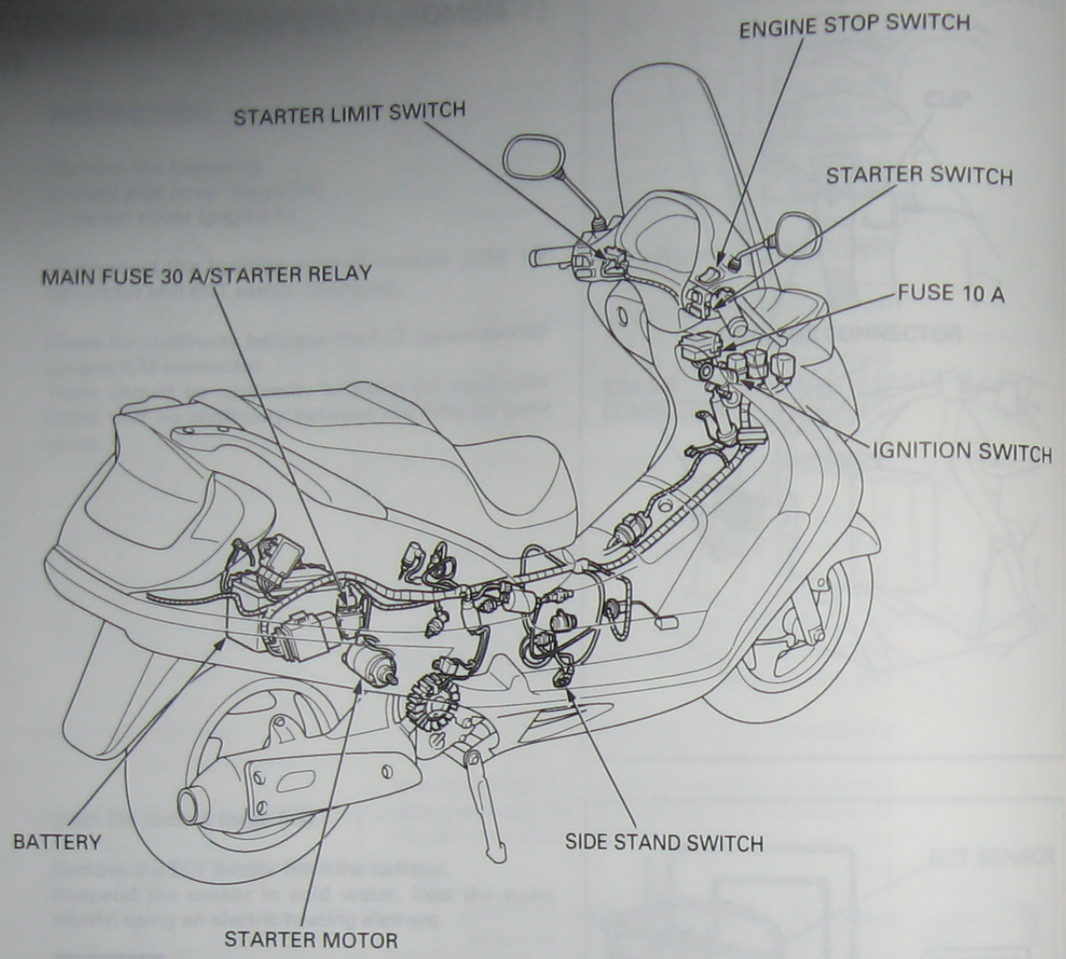
Install the ECT sensor with a new sealing washer and tighten it.

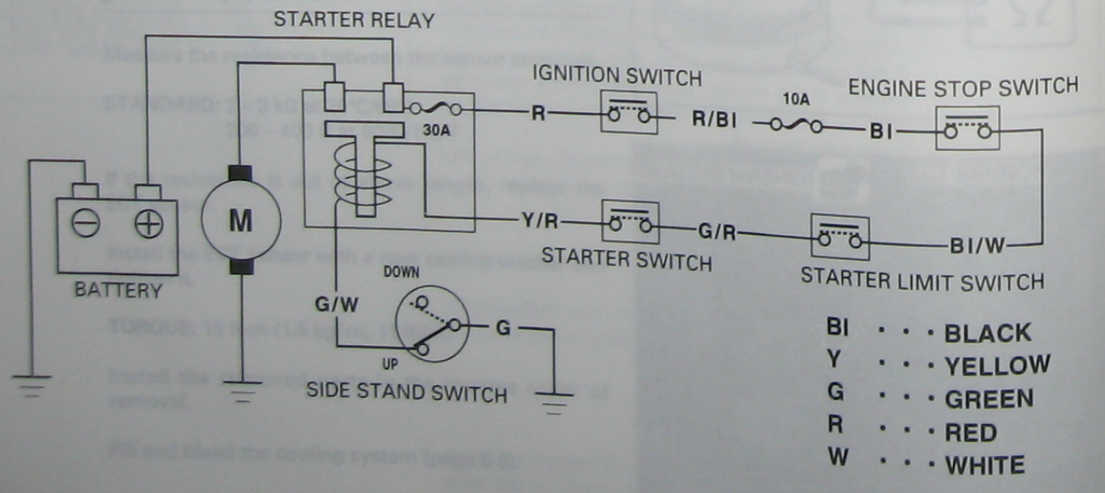
TORQUE: 15 N·m (1.5 kgf·m, 11 lbf·ft)

Install the removed parts in the reverse order of removal.

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

MEMO





19. ELECTRIC STARTER

SERVICE INFORMATION

GENERAL

⚠WARNING

Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.

- 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.
- See section 12 for starter clutch servicing.
- See section 20 for following components:
  - — Side stand switch
  - — Ignition switch
  - — Starter switch
  - — Engine stop switch
  - — Starter limit switch

SPECIFICATIONS

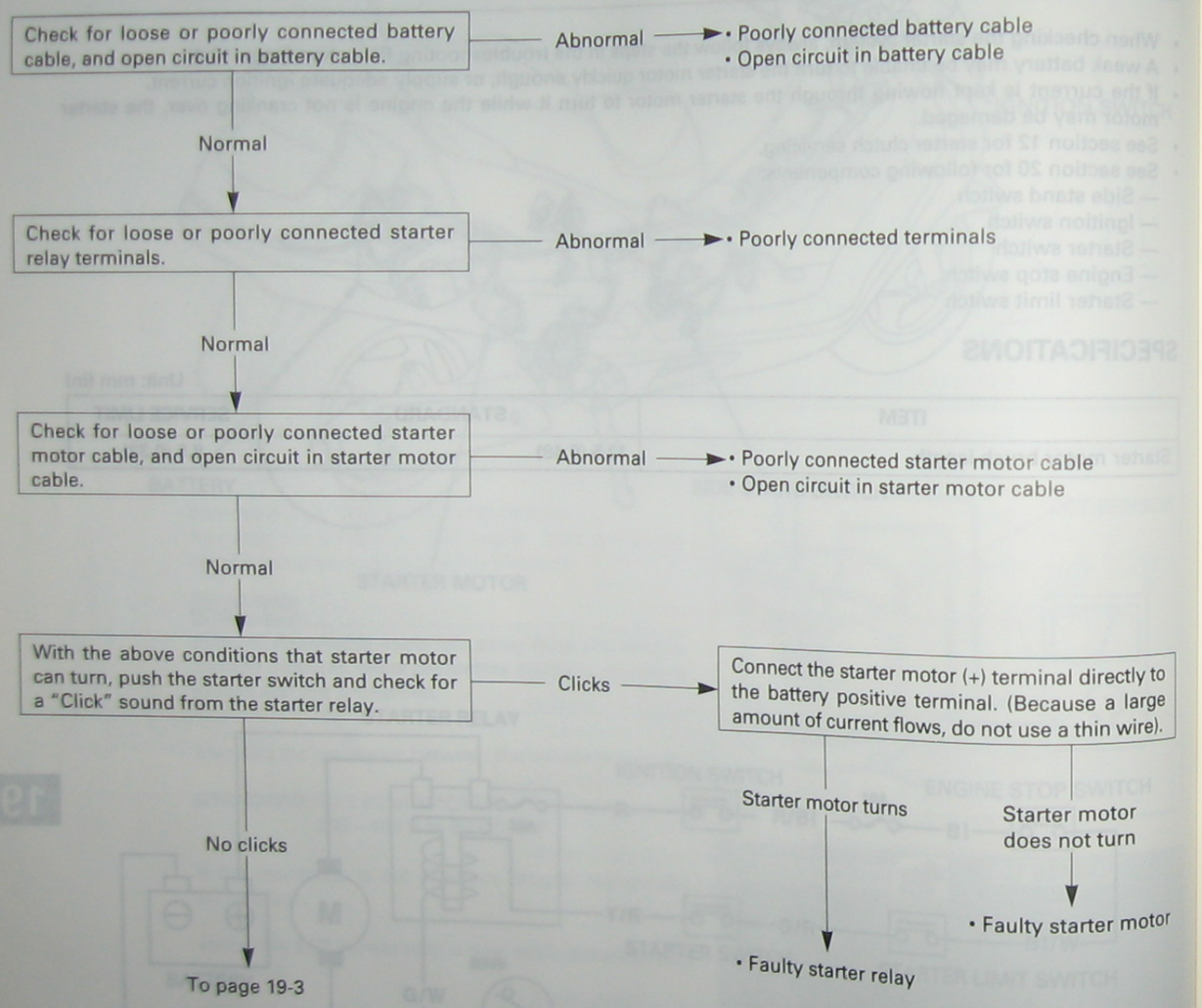
Unit: mm (in)

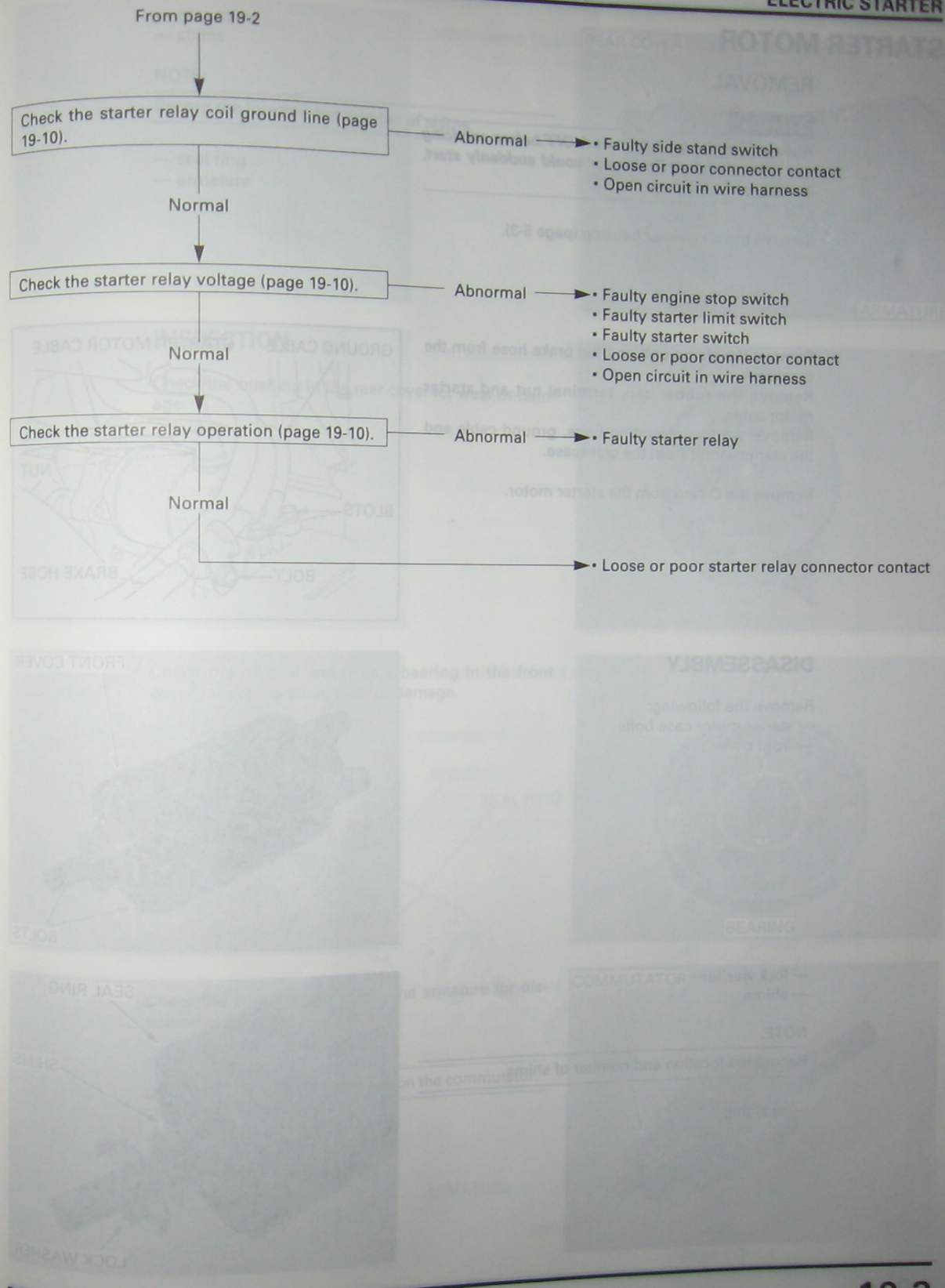
ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.5 (0.49)	8.5 (0.33)

TROUBLESHOOTING

- Check for a blown main fuse (30 A) or sub-fuse (10 A)
- Check that the battery is fully charged and in good condition.
- The starter motor can turn with the following conditions:
  — ignition switch ON
  — engine stop switch in RUN
  — rear (combined) brake lever fully squeezed
  — side stand retracted
  — starter switch pushed

Starter motor will not turn





STARTER MOTOR

REMOVAL

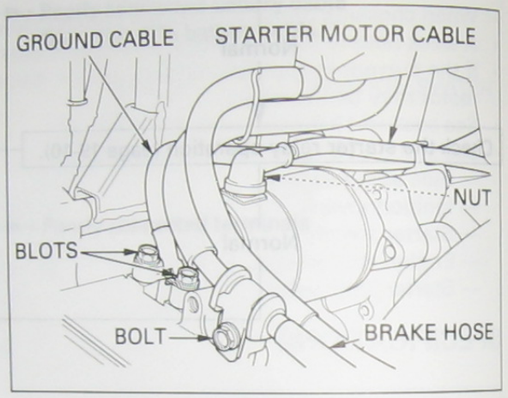
⚠ WARNING

Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.

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

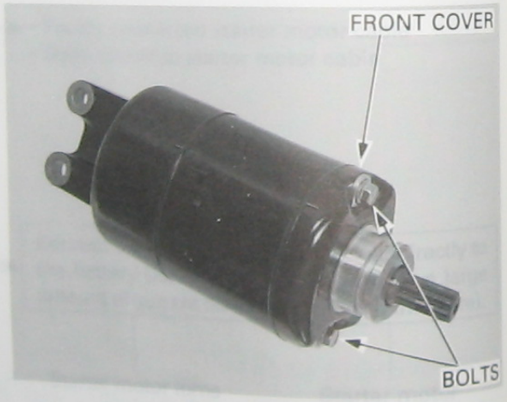
Remove the clamp bolt and the brake hose from the crankcase.
Remove the rubber cap, terminal nut and starter motor cable.
Remove the two mounting bolts, ground cable and the starter motor from the crankcase.

Remove the O-ring from the starter motor.



DISASSEMBLY

Remove the following:
— starter motor case bolts
— front cover



— lock washer
— shims

NOTE:

Record the location and number of shims.

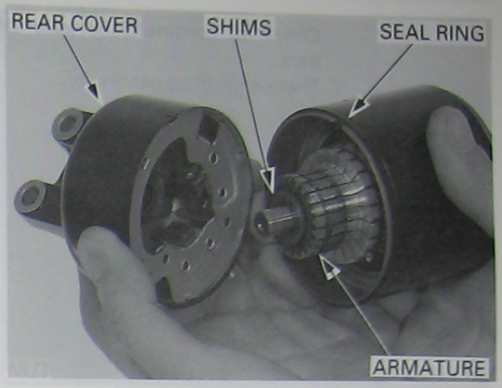
— seal ring

— rear cover
— shims

NOTE:

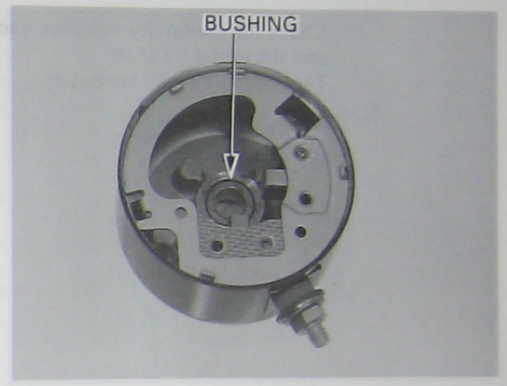
Record the location and number of shims.

— seal ring
— armature



INSPECTION

Check the bushing in the rear cover for wear or damage.



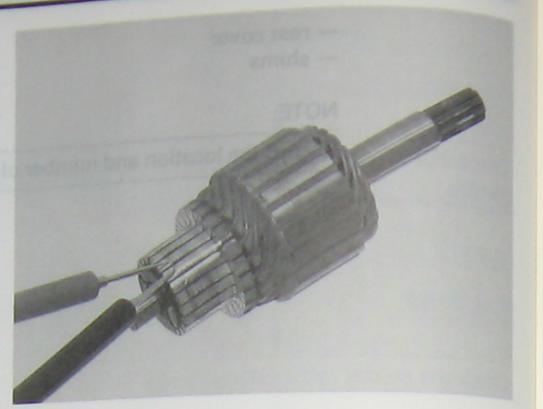
Check the oil seal and needle bearing in the front cover for deterioration, wear or damage.

Check the commutator bars of the armature for discoloration.

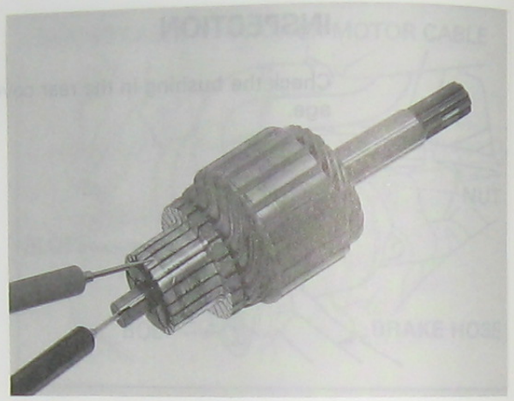
NOTE:

Do not use emery or sand paper on the commutator.

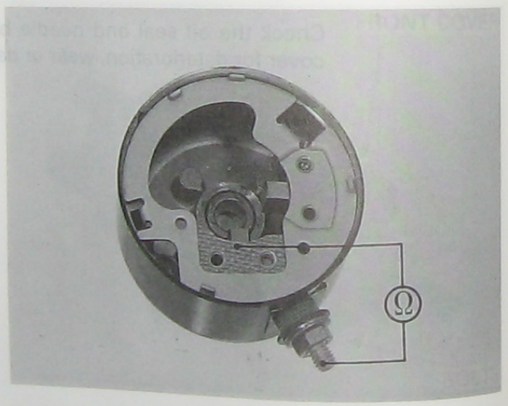
Check for continuity between pairs of commutator bars.
There should be continuity.



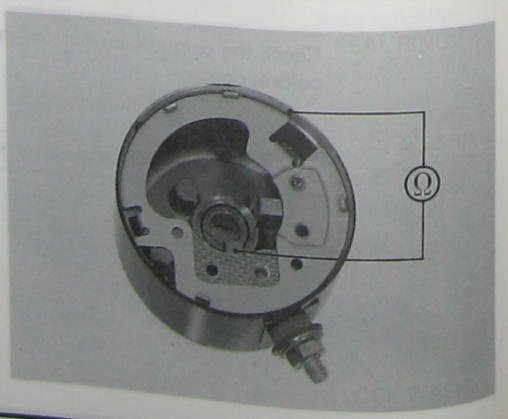
Check for continuity between each commutator bar and the armature shaft.
There should be no continuity.



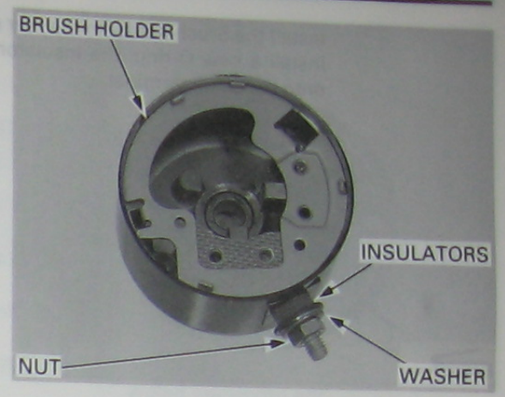
Check for continuity between the insulated (+) brush and cable terminal.
There should be continuity.



Check for continuity between the insulated (+) brush and rear cover.
There should be no continuity.



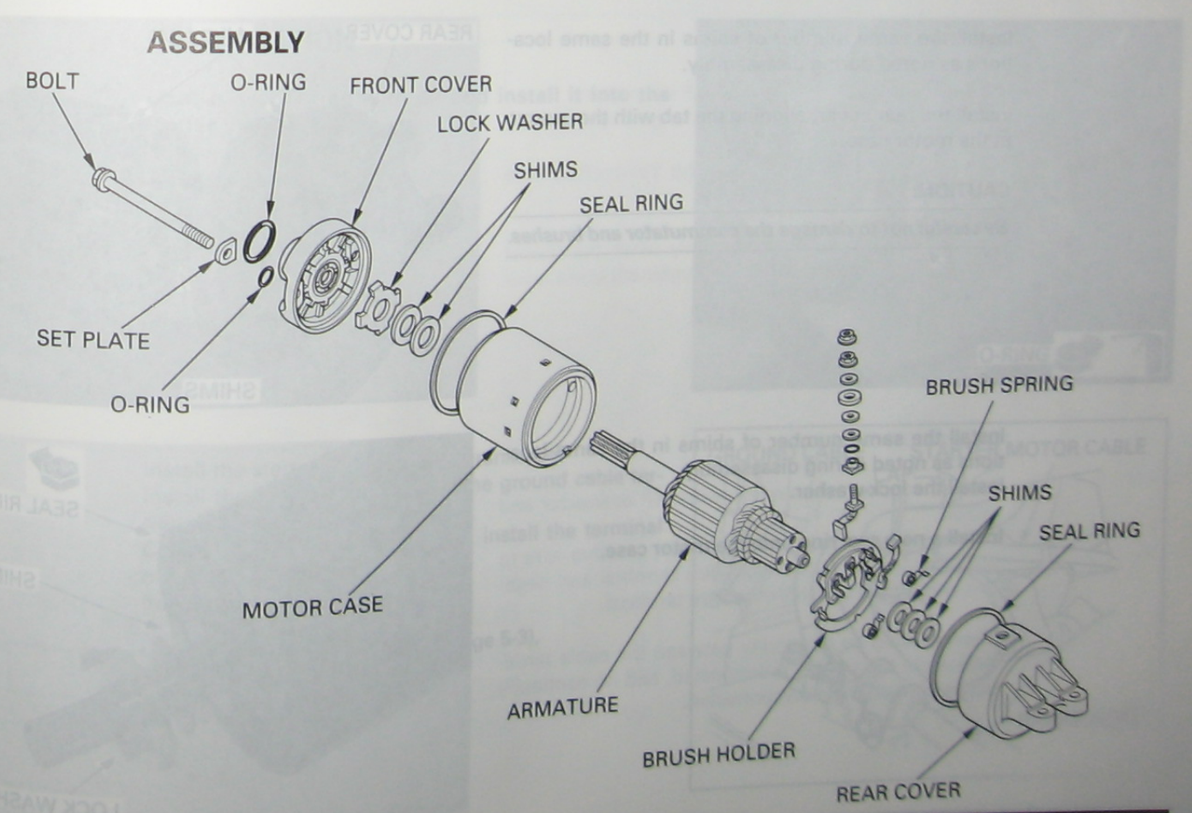
Remove the following:
— nut
— washer
— insulators
— brush holder



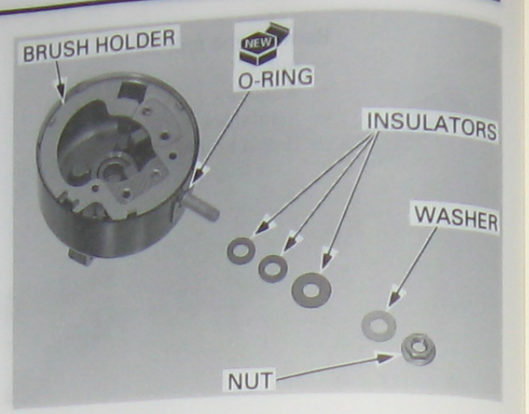
Measure the brush length.

SERVICE LIMIT: 8.5 mm (0.33 in)

ASSEMBLY



Install the brush holder in the rear cover.
Install a new O-ring, the insulators, washer and nut onto the cable terminal.

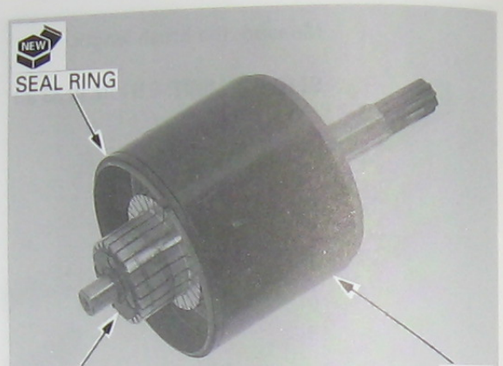


Install the armature into the motor case.
When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

CAUTION:

The coil may be damaged if the magnet pulls the armature against the case.

Install a new seal ring onto the motor case.

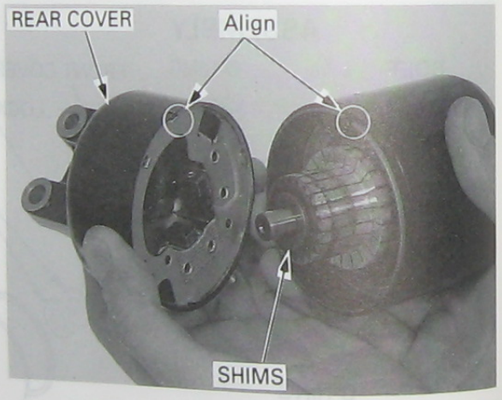


Install the same number of shims in the same locations as noted during disassembly.

Install the rear cover, aligning the tab with the groove in the motor case.

CAUTION:

Be careful not to damage the commutator and brushes.

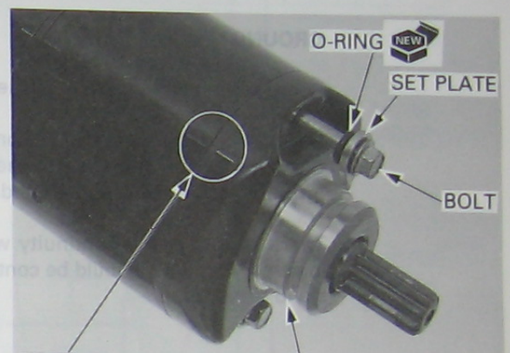


Install the same number of shims in the same locations as noted during disassembly.
Install the lock washer.

Install a new seal ring onto the motor case.

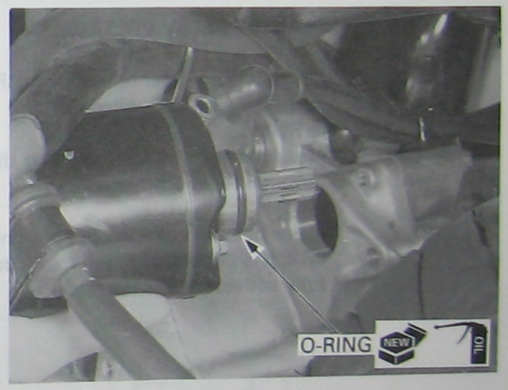
Apply grease to the oil seal lip and needle bearing in the front cover.

Install the front cover onto the motor case and align the marks on the cover and case.
Install the set plates and new O-rings onto the motor case bolts.
Install the bolts and tighten them securely.



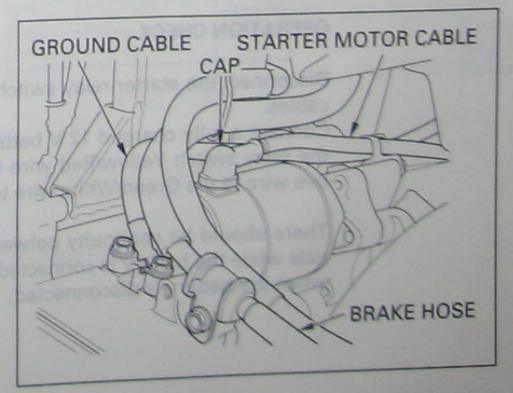
INSTALLATION

Coat a new O-ring with oil and install it into the starter motor groove.



Install the starter motor into the crankcase.
Install the mounting bolts with the ground cable terminal, and tighten them securely.
Connect the starter motor cable, install the terminal nut and tighten it securely.
Install the rubber cap properly.

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



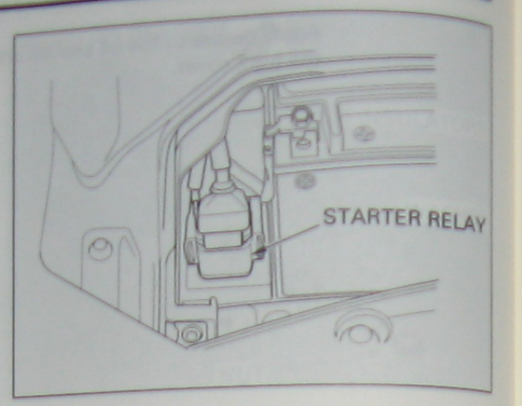
STARTER RELAY

INSPECTION

Remove the battery cover (page 17-5).

Retract the side stand.
Turn the ignition switch ON and engine stop switch to RUN.
Squeeze the rear (combined) brake lever fully and push the starter switch.
The coil is normal if the starter relay clicks.

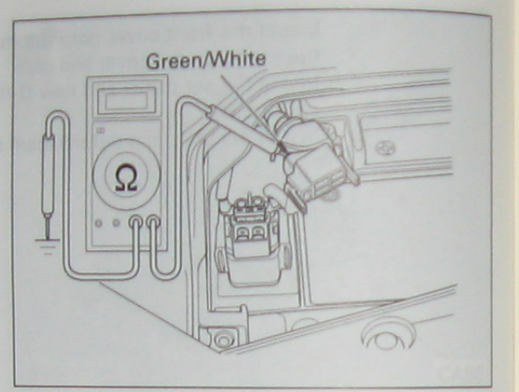
If you don't hear the "CLICK", inspect the relay using the procedure below.



GROUND LINE

Remove the starter relay from the stay of the battery box.
Disconnect the starter relay 4P connector.
Check for continuity between the Green/White wire (ground line) terminal and ground.

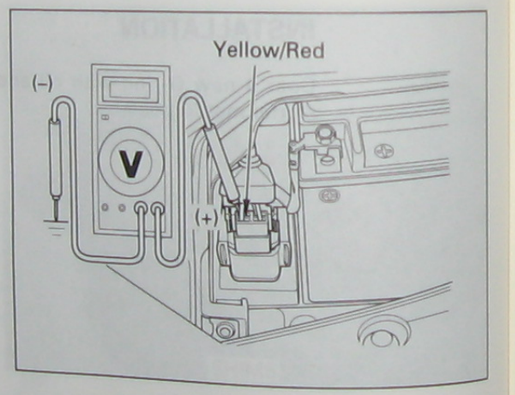
There should be no continuity with the side stand lowered, and there should be continuity with the side stand retracted.



STARTER RELAY VOLTAGE

Connect the starter relay switch 4P connector.
Turn the ignition switch ON and engine stop switch to RUN.
Measure the voltage between the Yellow/Red wire terminal (+) and ground (–).

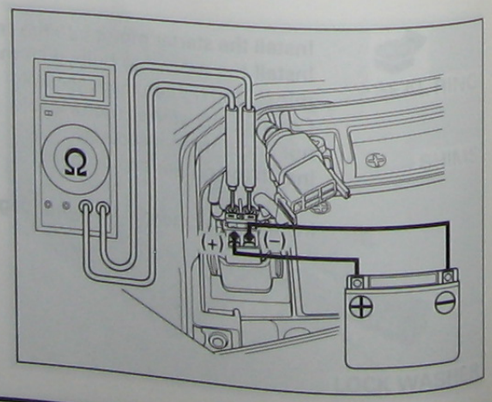
If the battery voltage appears only when the starter switch is pushed with the rear (combined) brake lever fully squeezed, it is normal.



OPERATION CHECK

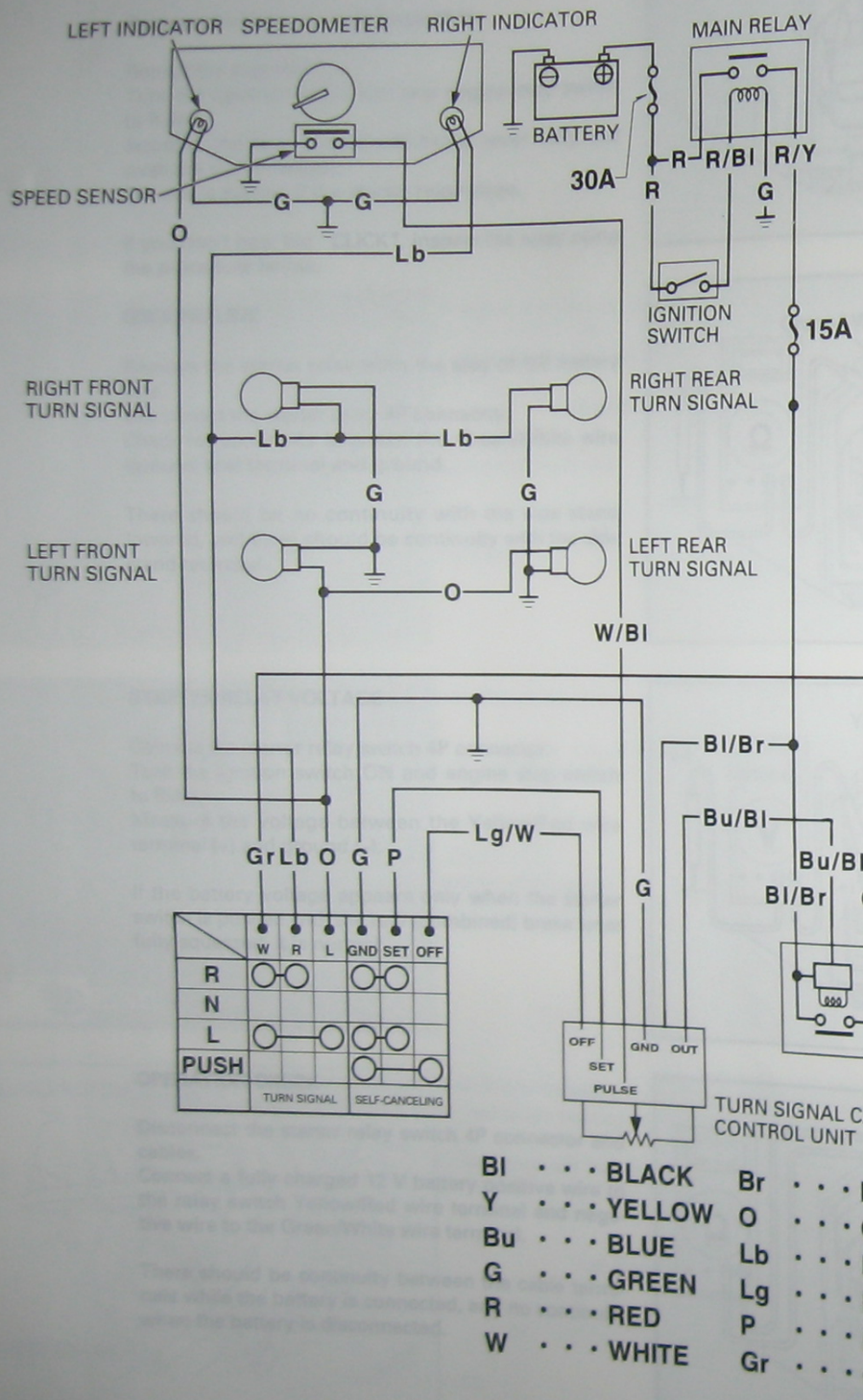
Disconnect the starter relay switch 4P connector and cables.
Connect a fully charged 12 V battery positive wire to the relay switch Yellow/Red wire terminal and negative wire to the Green/White wire terminal.

There should be continuity between the cable terminals while the battery is connected, and no continuity when the battery is disconnected.



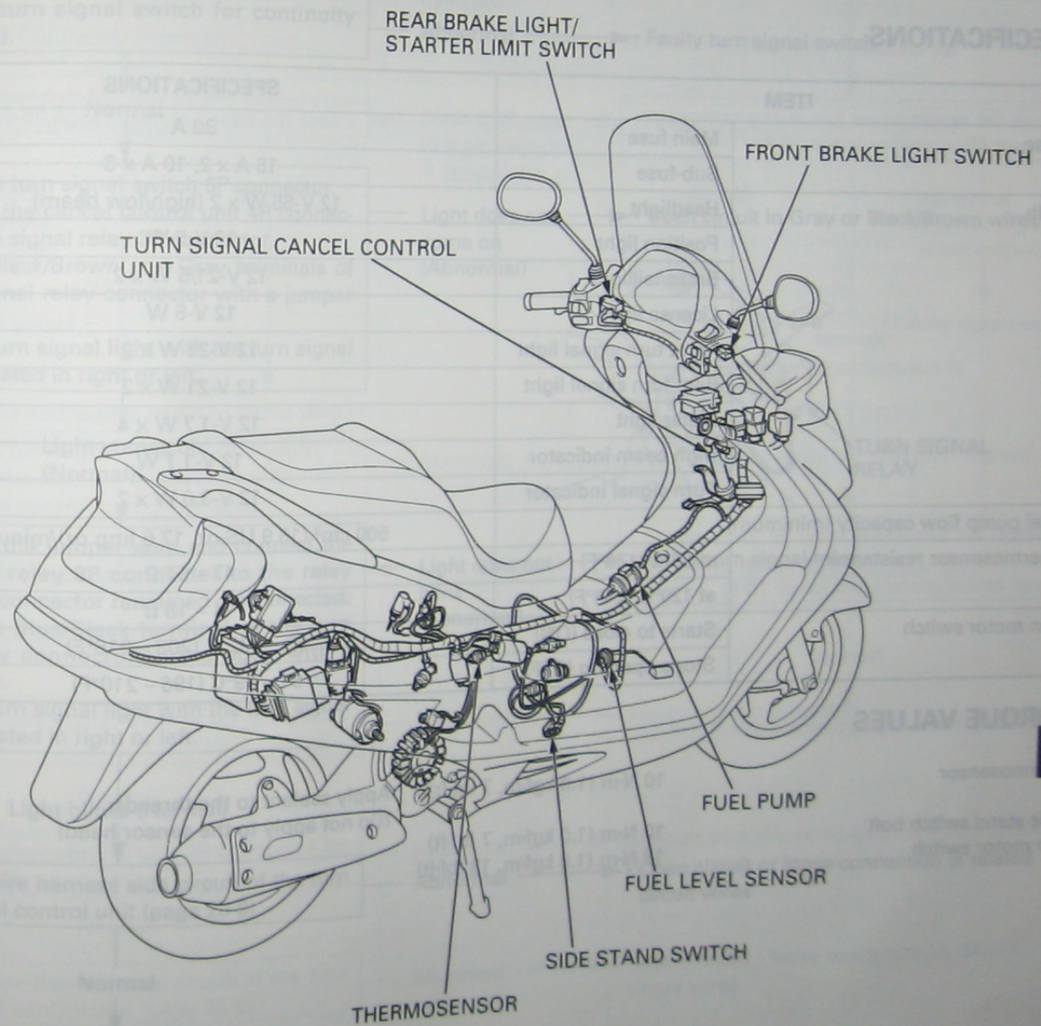
MEMO

SELF CANCELING TURN SIGNAL SYSTEM CIRCUIT DIAGRAM



Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

20. LIGHTS/METERS/SWITCHES



20

SERVICE INFORMATION

GENERAL

⚠ WARNING

- ***A halogen headlight bulb becomes very hot while the headlight is ON, and remain hot for a while after it is turned OFF. Be sure to let it cool down before servicing.***
- ***Use an electric heating element to heat the water/coolant mixture for the fan motor switch inspection. Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.***

- Note the following when replacing the halogen headlight bulb.
  — Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
  — If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
  — Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- Route the wires and cables properly after servicing each component (page 1-18).

SPECIFICATIONS

ITEM		SPECIFICATIONS
Fuse	Main fuse	30 A
	Sub-fuse	15 A x 2, 10 A x 3
Bulb	Headlight	12 V-55 W x 2 (high/low beam)
	Position light	12 V-5 W
	Brake/taillight	12 V-21/5 W x 2
	License light	12 V-5 W
	Front turn signal light	12 V-21 W x 2
	Rear turn signal light	12 V-21 W x 2
	Meter light	12 V-1.7 W x 4
	High beam indicator	12 V-1.7 W
	Turn signal indicator	12 V-3.0 W x 2
Fuel pump flow capacity (minimum)		500 cm³ (16.9 US oz, 17.6 Imp oz)/minute
Thermosensor resistance	at 80°C (176°F)	47 – 57 Ω
	at 120°C (248°F)	14 – 18 Ω
Fan motor switch	Starts to close (ON)	98 – 102°C (208 – 216°F)
	Stops opening (OFF)	91 – 99°C (196 – 210°F)

TORQUE VALUES

Thermosensor	10 N·m (1.0 kgf·m, 7 lbf·ft)	Apply sealant to the threads. (Do not apply to the sensor head)
Side stand switch bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Fan motor switch	18 N·m (1.8 kgf·m, 13 lbf·ft)	

SELF-CANCELING TURN SIGNAL SYSTEM

Turn signal does not operate

Remove the front handle cover (page 2-12).
Remove the front cover (page 2-11).
Check the following for loose or poorly connection.
— cancel control unit 4P (White) connector and single lead connectors
— turn signal switch 6P (Black) connector
— turn signal relay 3P (Black) connector

Abnormal → • Connect securely or repair poorly connection

Normal ↓

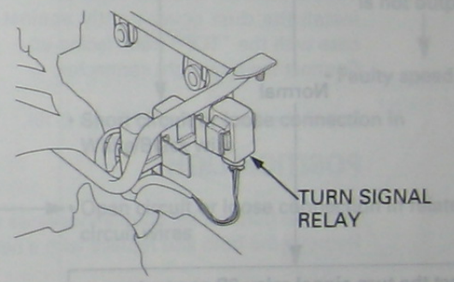
Check the turn signal switch for continuity (page 20-12).

Abnormal → • Faulty turn signal switch

Normal ↓

Connect the turn signal switch 6P connector.
Disconnect the cancel control unit 4P connector and turn signal relay 3P connector.
Short the Black/Brown and Gray terminals of the turn signal relay connector with a jumper wire.
Check the turn signal light with the turn signal switch operated in right or left.

Light does not come on (Abnormal) → • Open circuit in Gray or Black/Brown wires



Light comes on (Normal) ↓

Disconnect the jumper wire and connect the turn signal relay 3P connector to the relay with the 4P connector remained disconnected.
Ground the Blue/Black terminal of the turn signal relay connector to the body with a jumper wire.
Check the turn signal light with the turn signal switch operated in right or left.

Light does not blink (Abnormal) → • Faulty turn signal relay

Light blinks (Normal) ↓

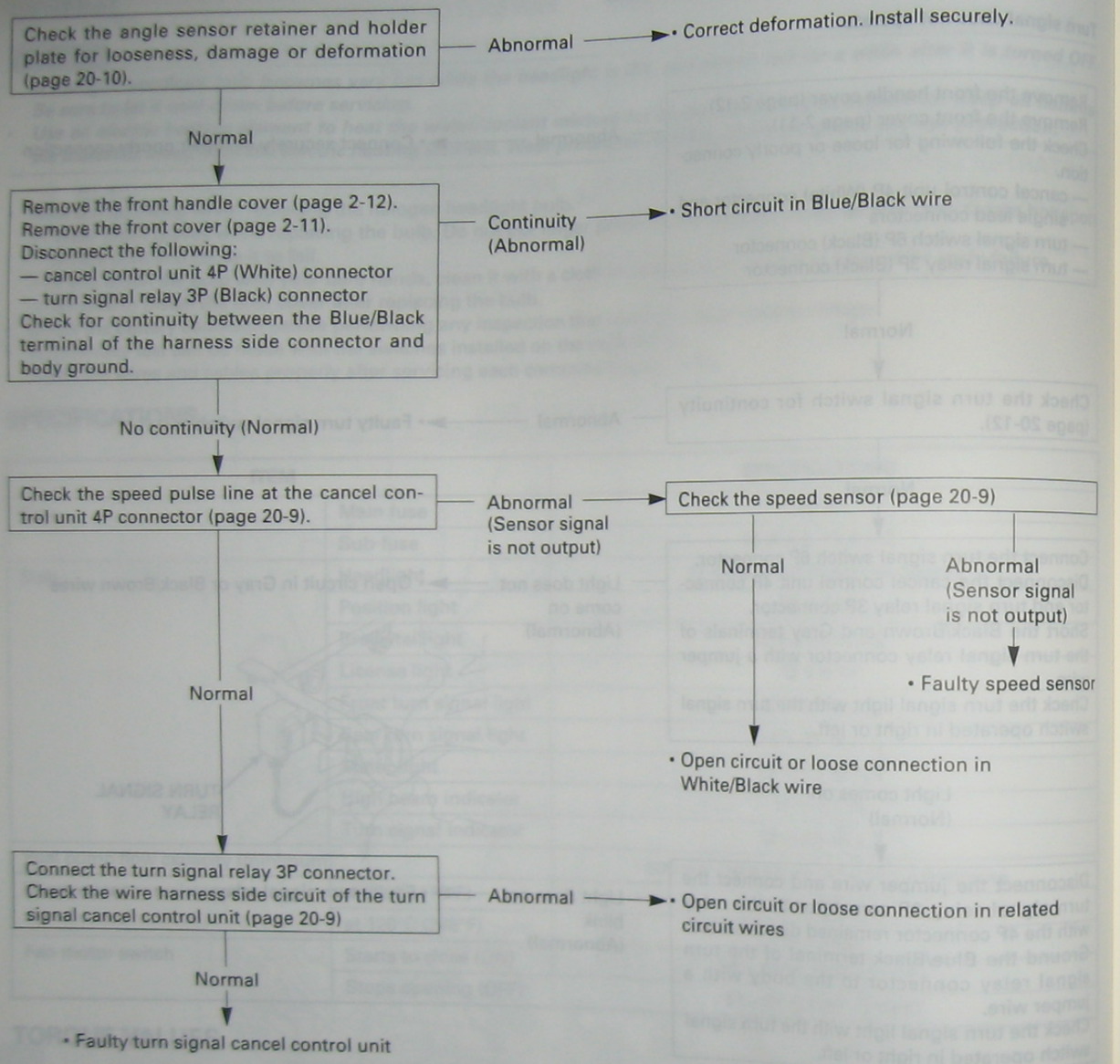
Check the wire harness side circuit of the turn signal cancel control unit (page 20-9)

Abnormal → • Open circuit or loose connection in related circuit wires

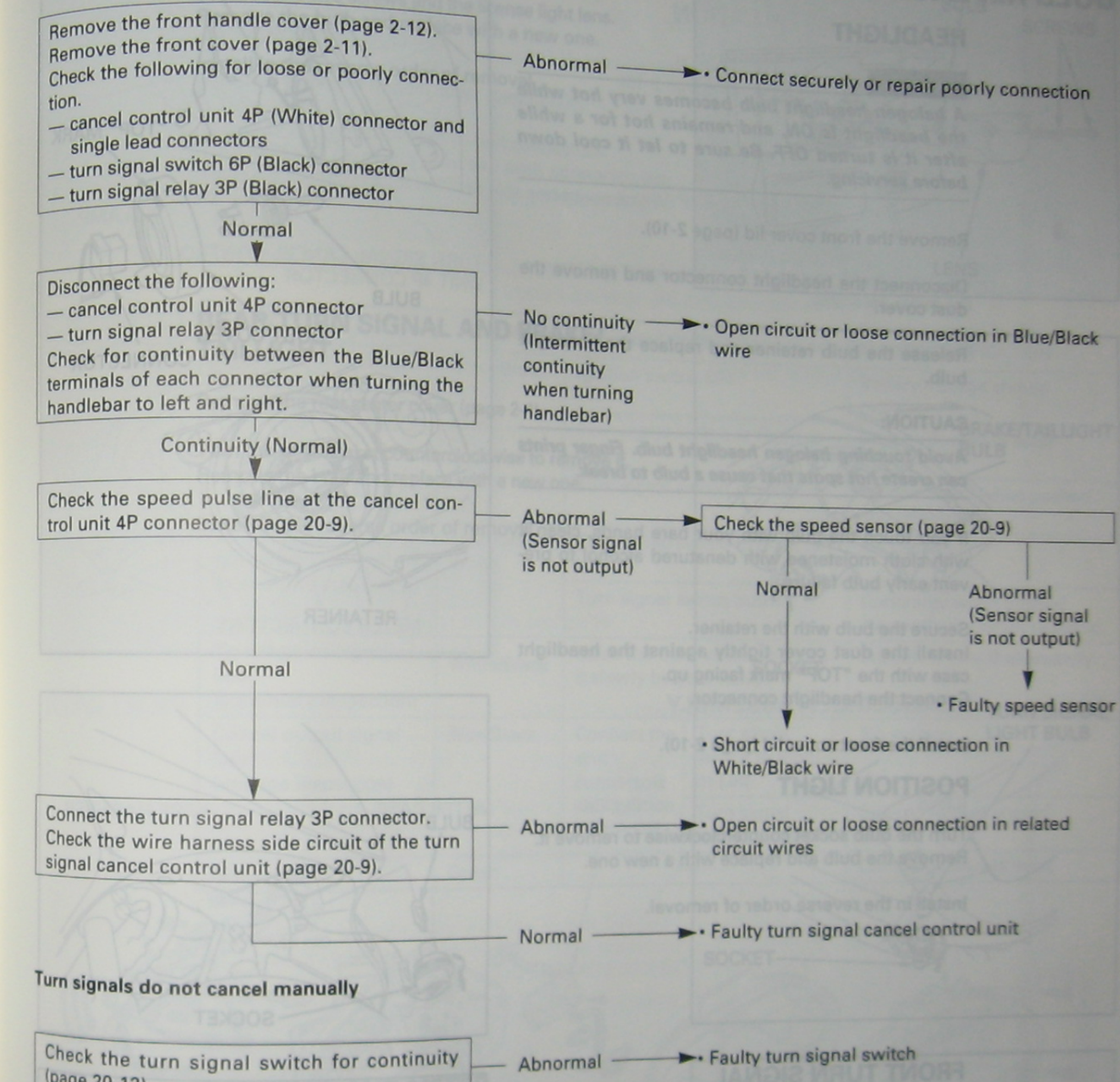
Normal ↓

• Faulty turn signal cancel control unit

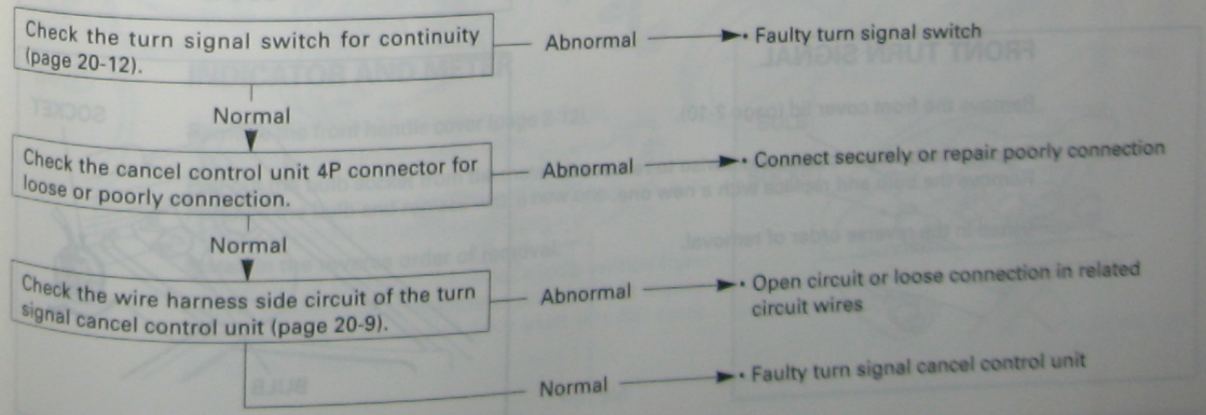
Turn signals do not cancel automatically



On parking, when the handlebar is turned slowly from left to right, turn signal is canceled



Turn signals do not cancel manually



BULB REPLACEMENT

HEADLIGHT

⚠ WARNING

A halogen headlight bulb becomes very hot while the headlight is ON, and remains hot for a while after it is turned OFF. Be sure to let it cool down before servicing.

Remove the front cover lid (page 2-10).

Disconnect the headlight connector and remove the dust cover.

Release the bulb retainer and replace the headlight bulb.

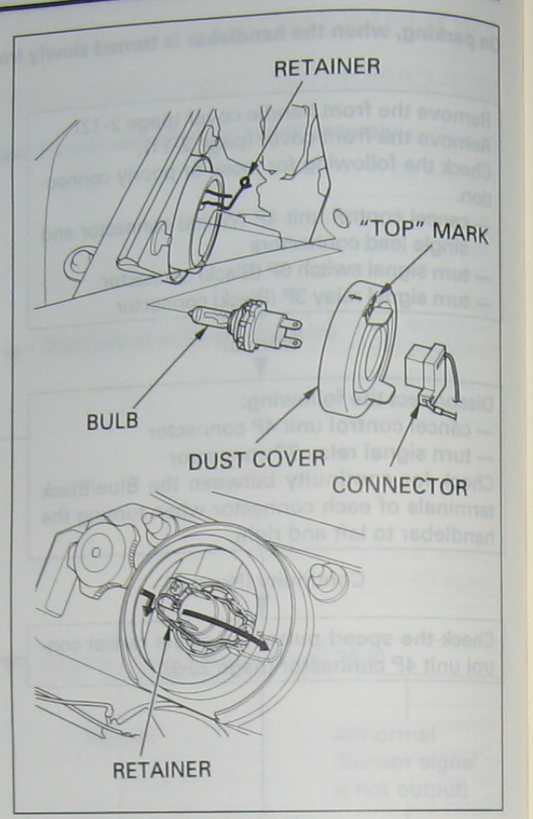
CAUTION:

Avoid touching halogen headlight bulb. Finger prints can create hot spots that cause a bulb to break.

If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.

Secure the bulb with the retainer.
Install the dust cover tightly against the headlight case with the "TOP" mark facing up.
Connect the headlight connector.

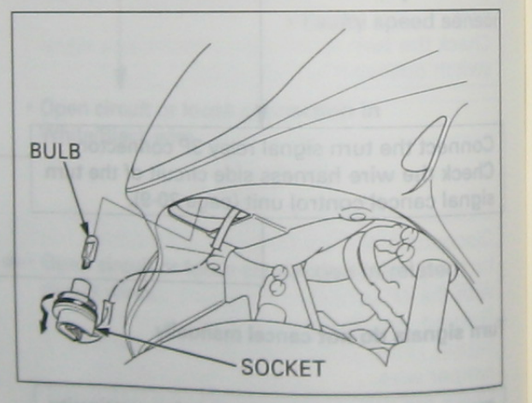
Install the front cover lid (page 2-10).



POSITION LIGHT

Turn the bulb socket counterclockwise to remove it.
Remove the bulb and replace with a new one.

Install in the reverse order of removal.

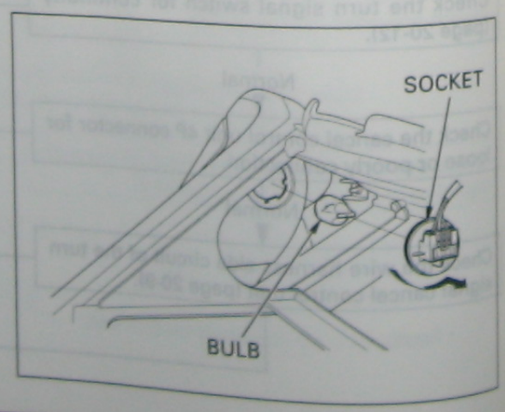


FRONT TURN SIGNAL

Remove the front cover lid (page 2-10).

Turn the bulb socket counterclockwise to remove it.
Remove the bulb and replace with a new one.

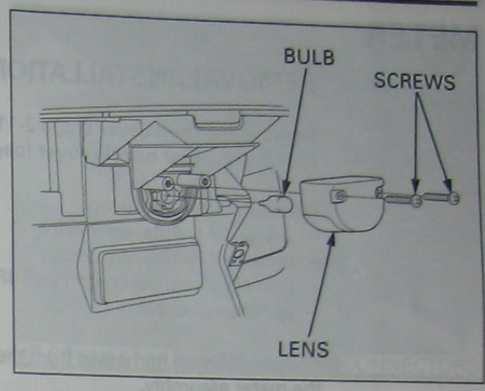
Install in the reverse order of removal.



LICENSE LIGHT

Remove the two screws and the license light lens.
Remove the bulb and replace with a new one.

Install in the reverse order of removal.

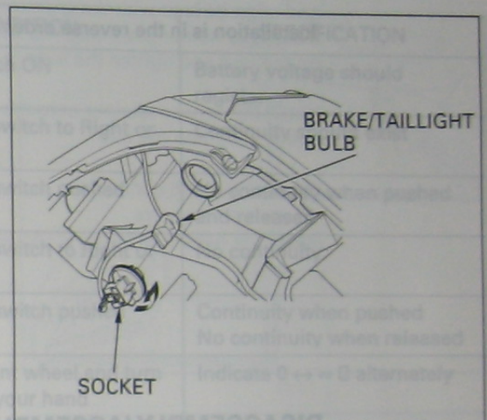


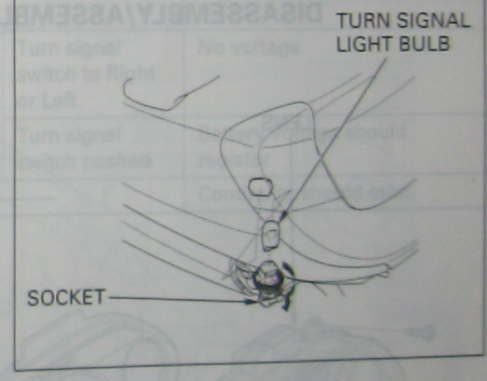
REAR TURN SIGNAL AND BRAKE/ TAILLIGHT

Remove the rear center cover (page 2-4).

Turn the bulb socket counterclockwise to remove it.
Remove the bulb and replace with a new one.

Install in the reverse order of removal.



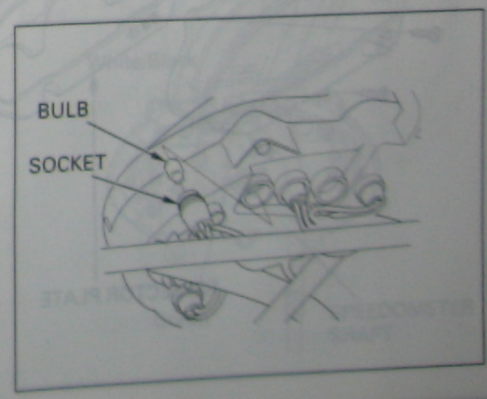


INDICATOR AND METER

Remove the front handle cover (page 2-12).

Pull out the bulb socket from the meter case.
Remove the bulb and replace with a new one.

Install in the reverse order of removal.



METER

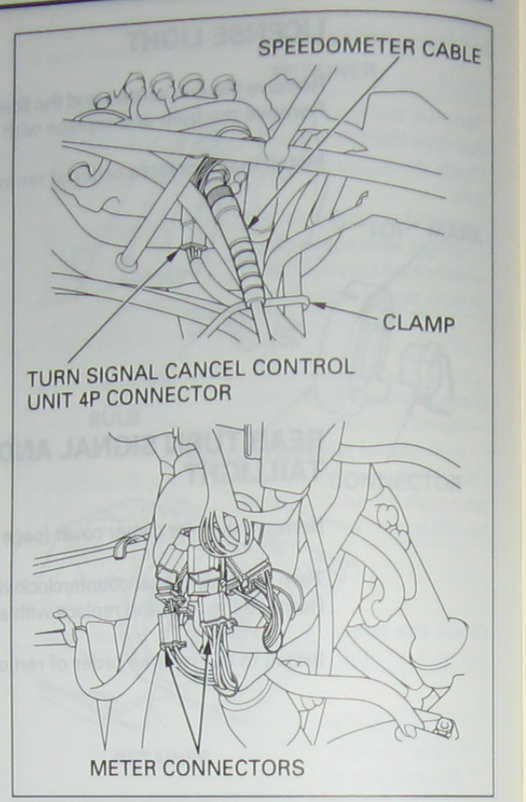
REMOVAL/INSTALLATION

Remove the front cover (page 2-11).
Remove the rear handle cover (page 2-13).

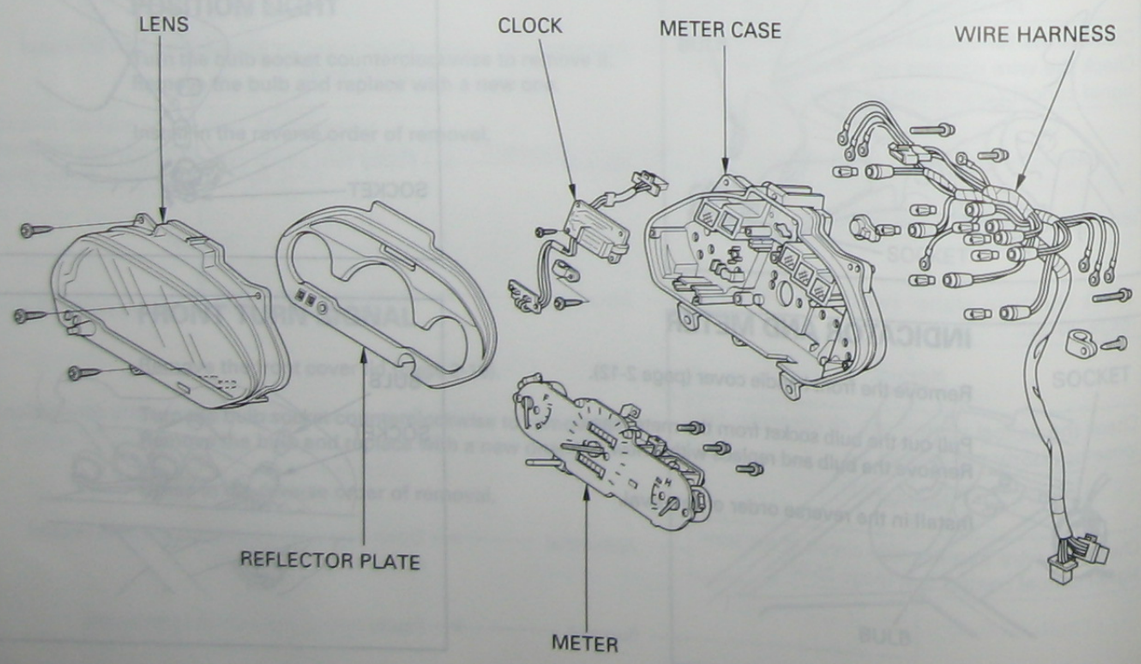
Disconnect the following:
— meter 4P (White) connector
— meter 9P (White) connector
— turn signal cancel control unit 4P (White) connector
— speedometer cable

Release the wire harnesses from the clamp and remove the meter assembly.

Installation is in the reverse order of removal.



DISASSEMBLY/ASSEMBLY



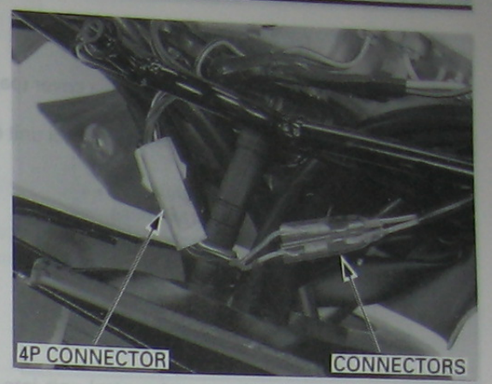
TURN SIGNAL CANCEL CONTROL UNIT

INSPECTION

SYSTEM INSPECTION

Remove the front handle cover (page 2-12).

Disconnect the cancel control unit connectors.
Measure the following between each connector terminal of the main wire harness side and ground.



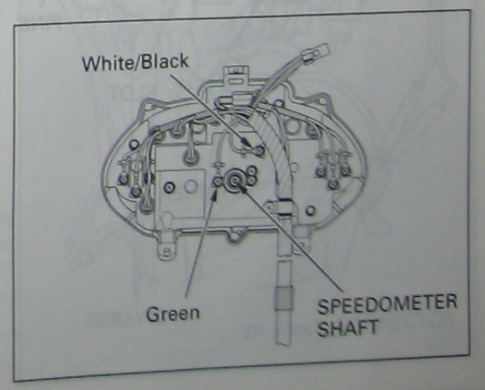
ITEM	TERMINAL	CONDITION		SPECIFICATION
Battery voltage input line (voltage inspection)	Black/Brown	Ignition switch ON		Battery voltage should register
Turn signal ON signal line (continuity inspection)	Pink	Turn signal switch to Right or Left		Continuity should exist
		Turn signal switch pushed		No continuity when pushed and released
Turn signal OFF (forced) signal line (continuity inspection)	Light Green/ White	Turn signal switch to Right or Left		No continuity
		Turn signal switch pushed		Continuity when pushed No continuity when released
Speed pulse signal line (continuity inspection)	White/Black	Raise the front wheel and turn it slowly by your hand		Indicate 0 ↔ ∞ Ω alternately
Cancel output signal line (voltage inspection)	Blue/Black	Connect the unit connectors and ignition switch ON	Turn signal switch to Right or Left	No voltage
			Turn signal switch pushed	Battery voltage should register
Ground line	Green	——		Continuity should exist

SPEED SENSOR INSPECTION

Remove the front handle cover (page 2-12).
Disconnect the speedometer cable.

Check for continuity between the White/Black and Green terminals at the meter bottom.

The sensor is normal if the tester needle swings from 0 to ∞ Ω when the speedometer drive shaft is slowly turns (swings 4 times per drive shaft one full turn) using a screwdriver.



REMOVAL

Remove the front handle cover (page 2-13).

Disconnect the cancel control unit connectors.

Remove the following:
— bolt and brake hose
— nut and angle sensor retainer
— two bolts and holder plate
— cancel control unit

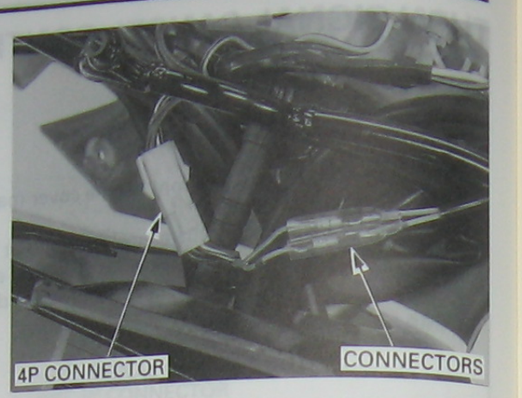
INSTALLATION

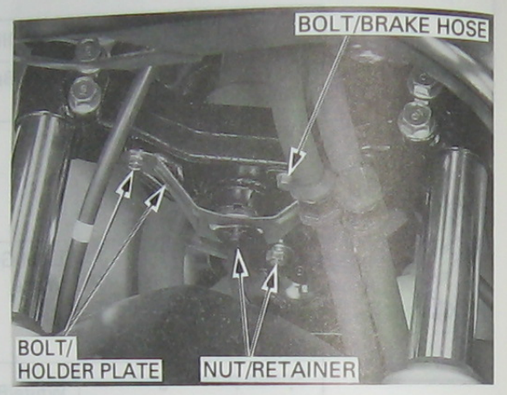
Insert the cancel control unit into the steering stem and align its lugs with the grooves.
Install the holder plate aligning the slot with the pins on the unit and tighten the nuts.

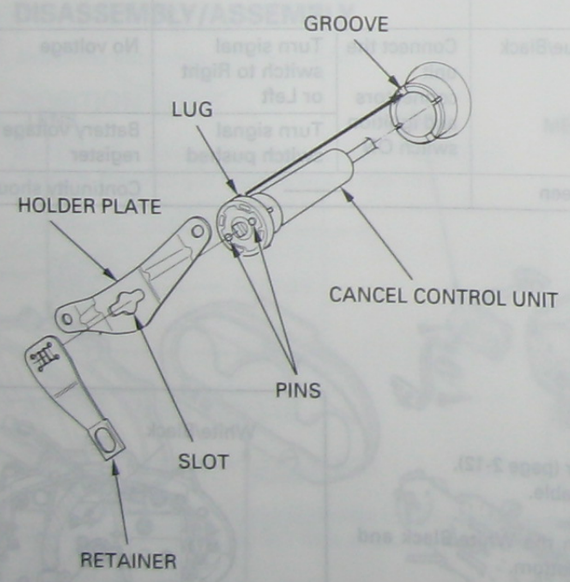
Install the sensor retainer onto the unit shaft and stud bolt and tighten the nut.

Connect the unit connectors.

Install the handle front cover (page 2-12).







STARTER LIMIT SWITCH

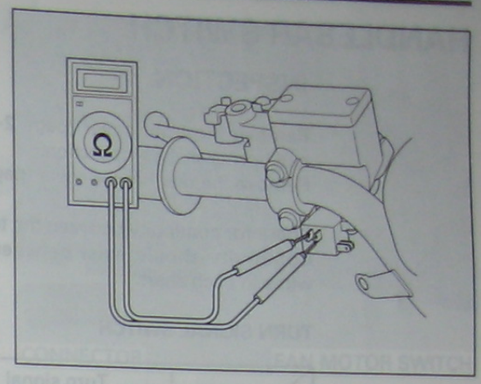
INSPECTION

Remove the rear handle cover (page 2-13).

Disconnect the limit switch wires and check for continuity.

There should be continuity with the rear (combined) brake lever fully squeezed and no continuity with it released.

For switch removal/installation, see section 16.



BRAKE LIGHT SWITCH

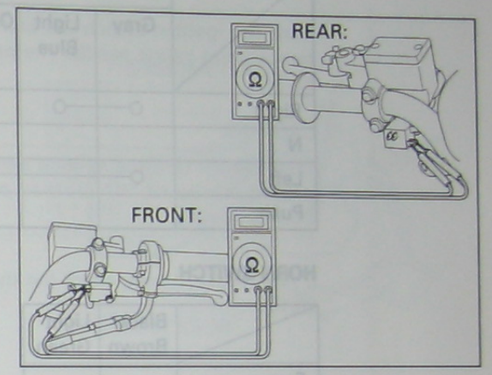
INSPECTION

Remove the front handle cover (page 2-12).

Disconnect the brake light switch wires and check for continuity.

There should be continuity with the brake applied and no continuity with it released.

For switch removal/installation, see section 16.



IGNITION SWITCH

INSPECTION

Remove the front cover (page 2-7).
Disconnect the ignition switch 2P (Black) connector and check for continuity at the switch side connector terminals.

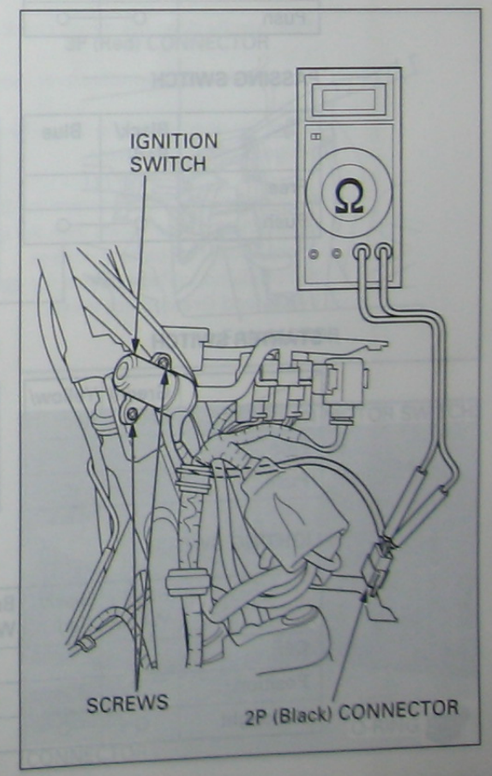
There should be continuity with the switch ON and no continuity with the switch OFF and LOCK position.

REMOVAL/INSTALLATION

Disconnect the ignition switch 2P (Black) connector.
Remove the two screws and the ignition switch.

Install the ignition switch with new screws.
Route the switch wire properly (page 1-18) and connect the switch 2P connector.

Install the front cover (page 2-7).

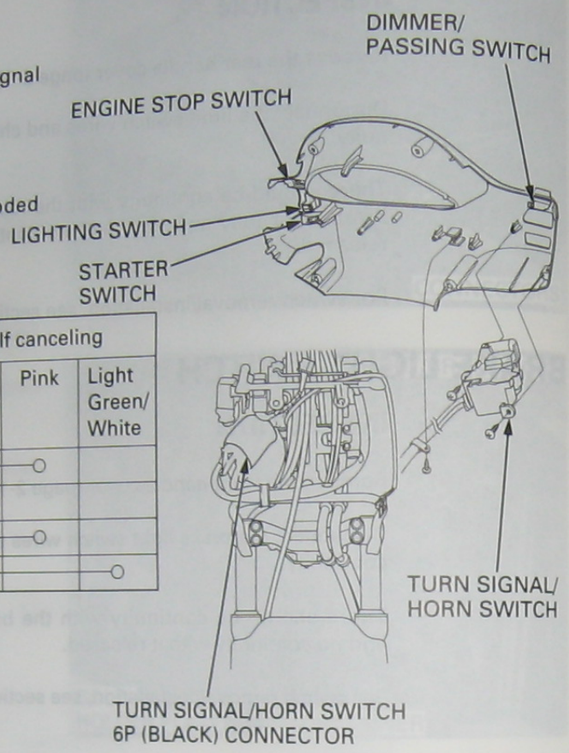


HANDLEBAR SWITCH

INSPECTION

Remove the front cover (page 2-11) for turn signal and horn switches inspection.
Remove the rear handle cover (page 2-13).

Check for continuity between the terminals.
Continuity should exist between the color coded wires in each chart.



TURN SIGNAL SWITCH

	Turn signal			Self canceling		
	Gray	Light Blue	Orange	Green	Pink	Light Green/ White
Right	○—○			○—○		
N						
Left	○—————○			○—○		
Push				○————		————○

HORN SWITCH

	Black/ Brown	Light Green
Free		
Push	○——	——○

PASSING SWITCH

	Black/ Red	Blue
Free		
Push	○——	——○

DIMMER SWITCH

	Blue	Blue/ White	White
Low		○——	——○
(N)	○——	○——	——○
Hi	○——		

STARTER SWITCH

	Green/ Red	Yellow/ Red
Free		
Push	○——	——○

ENGINE STOP SWITCH

	Black	Black/ White
OFF		
Run	○——	——○

LIGHTING SWITCH

	Blue/ White	Black/ Red	Brown/ White	Black/ Brown
OFF				
Position			○——	——○
Headlight	○——	——○	○——	——○

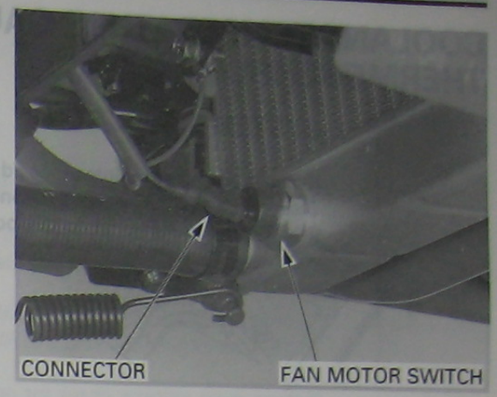
FAN MOTOR SWITCH

INSPECTION

Remove the under cover (page 2-5).

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.



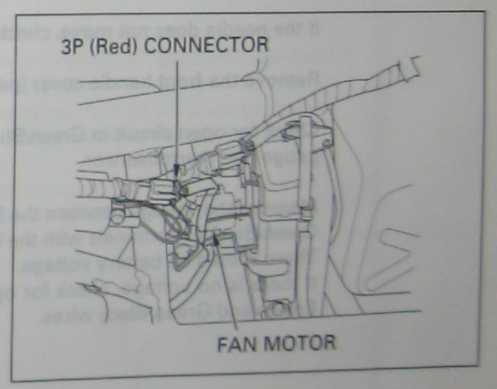
Fan motor does not start
Before testing, check for a blown fan motor fuse.
Warm up the engine to operating temperature.

Disconnect the connector from the fan motor switch and ground the connector 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 center cover (page 2-6) and check for voltage between the Blue (+) and Green (–) terminals at the fan motor switch 3P (Red) 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

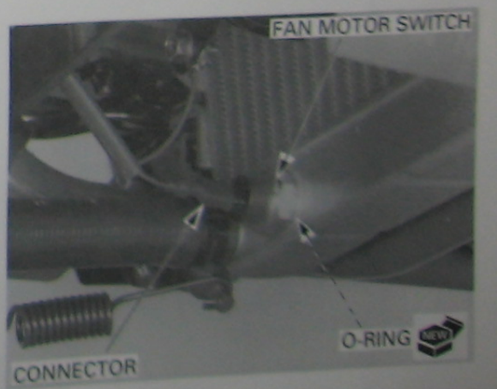
Drain the coolant (page 6-5).
Remove the under cover (page 2-5).

Disconnect the switch connector and remove the fan motor switch.

Install a new O-ring onto the switch.
Install and tighten the switch.

TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)

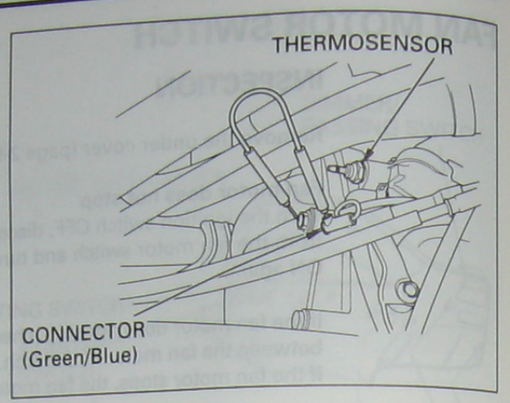
Connect the switch connector.
Fill and bleed the cooling system (page 6-5).
Install the removed parts in the reverse order of removal.



COOLANT TEMPERATURE GAUGE/ THERMOSENSOR

SYSTEM INSPECTION

Remove the inner maintenance lid (page 3-5).
Disconnect the thermosensor connector and ground the connector terminal to the body with a jumper wire.

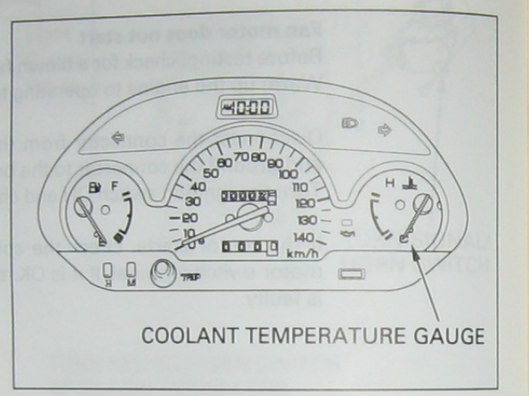


Turn the ignition switch ON and check the coolant temperature gauge needle. The needle should move to "H".

CAUTION:

Immediately turn the ignition switch OFF when the needle moves to "H" (hot) to prevent the gauge from damaging.

If the needle moves, check the thermosensor (page 20-15).

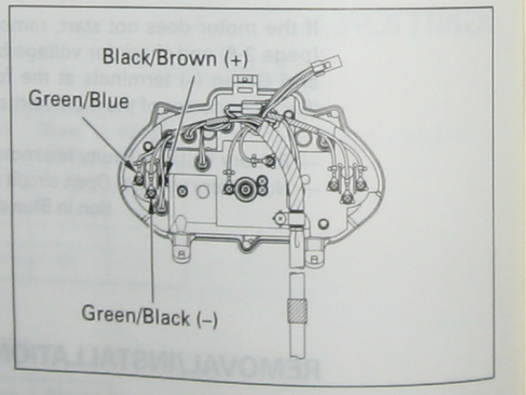


If the needle does not move, check the following:

Remove the front handle cover (page 2-12).

Check for open circuit in Green/Blue line between the gauge and thermosensor.

Measure the voltage between the Black/Brown (+) and Green/Black (–) terminals with the ignition switch ON.
There should be battery voltage.
If there is no voltage, check for open circuit in Black/Brown and Green/Black wires.



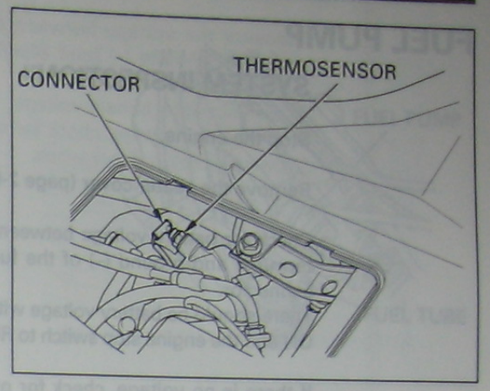
THERMOSENSOR INSPECTION

⚠ WARNING

Keep flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.

Drain the coolant (page 6-5).

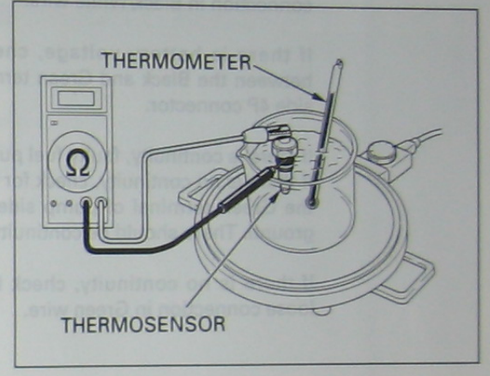
Disconnect the thermosensor connector and remove the thermosensor.



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 pan to 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	80°C (176°F)	120°C (248°F)
Resistance	47 – 57 Ω	14 – 18 Ω

Replace the sensor if it is out of specifications by more than 10% at any temperature listed.

Apply sealant to the thermosensor threads. Do not apply sealant to the sensor head.
Install the thermosensor.

TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Connect the thermosensor connector.

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

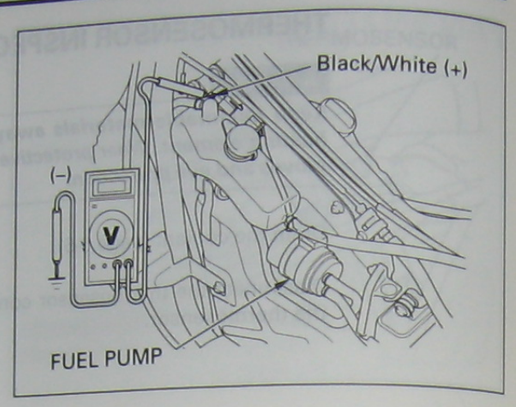
FUEL PUMP

SYSTEM INSPECTION

Stop the engine.

Remove the center cover (page 2-6).

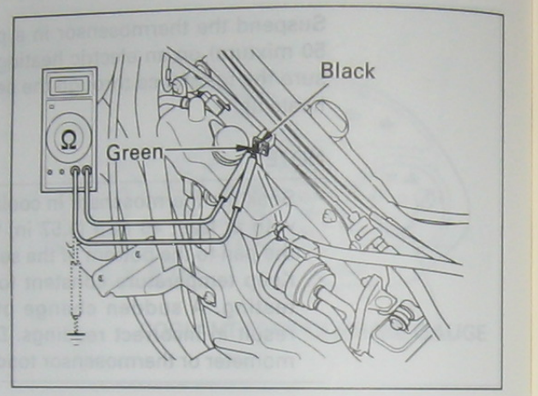
Check for battery voltage between the Black/White (+) terminal and ground (–) of the fuel pump 4P (White) connector.
There should be battery voltage with the ignition switch ON and the engine stop switch to RUN position.



If there is no voltage, check for open circuit or loose connection in Black/White wire.

If there is battery voltage, check for continuity between the Black and Green terminals of the pump side 4P connector.

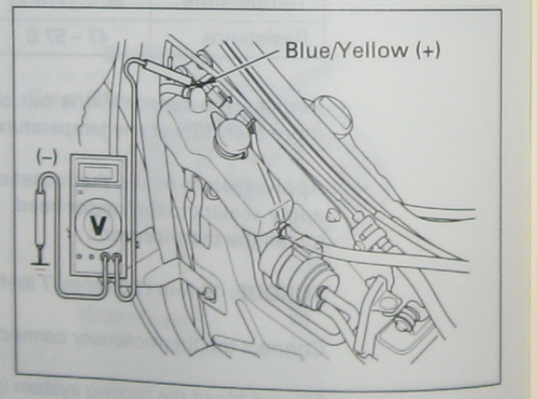
If there is continuity, faulty fuel pump.
If there is no continuity, check for continuity between the Green terminal of pump side 4P connector and ground. There should be continuity.



If there is no continuity, check for open circuit or loose connection in Green wire.

If there is continuity, check for battery voltage between the Blue/Yellow (+) terminal of the main harness side 4P connector and ground (–).
There should be battery voltage with the ignition switch ON and the engine stop switch to RUN position.

If there is no battery voltage, check for open circuit or loose connection in Blue/Yellow wire.



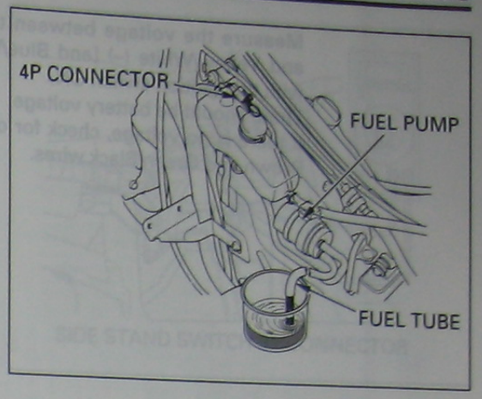
DISCHARGE VOLUME INSPECTION

⚠ WARNING

Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the work area or where gasoline is stored.

Short the Black and Black/White terminals of the fuel pump 4P connector with the suitable jumper wire.

Remove the step grill and disconnect the fuel tube from the carburetor.
Hold a graduated beaker under the fuel tube.



Turn the engine stop switch to RUN position.
Turn the ignition switch ON and let the fuel flow into the beaker for 5 seconds, then turn the ignition switch OFF.

Multiply the amount in the beaker by 12 to determine the fuel pump flow capacity per minute.

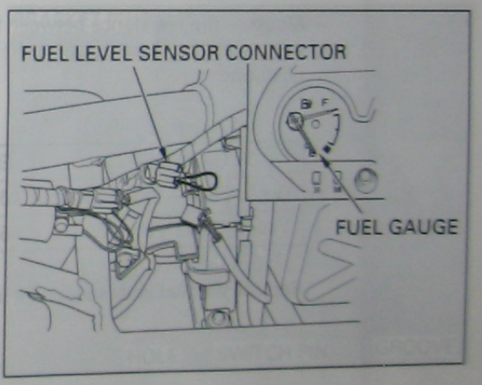
FUEL PUMP FLOW CAPACITY:
500 cm³ (16.9 US oz, 17.6 Imp oz) minimum/minute

FUEL GAUGE/FUEL LEVEL SENSOR

SYSTEM INSPECTION

Remove the center cover (page 2-6).

Short the Yellow/White and Green/Black terminals of the fuel level sensor 3P (White) connector with the suitable jumper wire.
Turn the ignition switch ON and check the fuel gauge needle. The needle should move to "F".

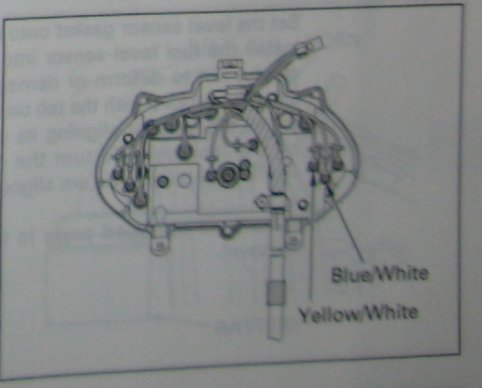


If the needle moves, check the fuel level sensor (page 20-18).

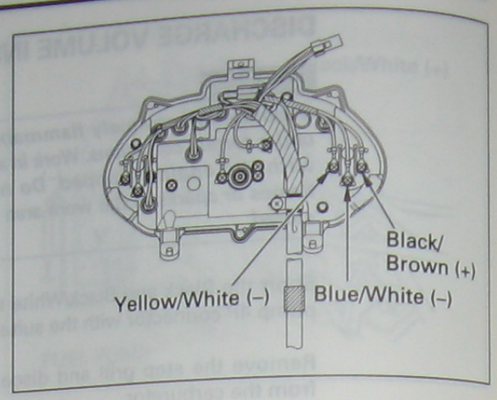
If the needle does not move, check the following:

Remove the front handle cover (page 2-12).

Check for open circuit in Yellow/White and Blue/White line between the gauge and level sensor.



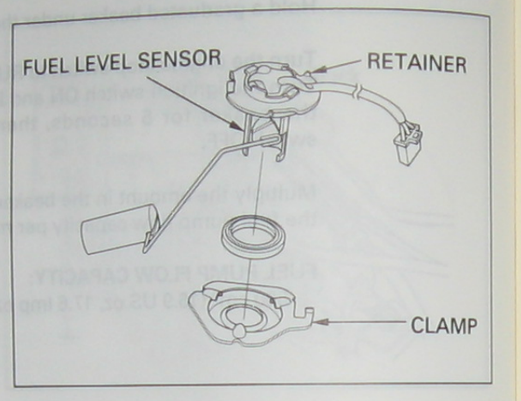
Measure the voltage between the Black/Brown (+) and Yellow/White (–) [and Blue/White (–)] terminals with the ignition switch ON.
There should be battery voltage.
If there is no voltage, check for open circuit in Black/Brown and Green/Black wires.



FUEL LEVEL SENSOR INSPECTION

Remove the fuel tank (page 5-18).

Remove the wire harness from the clamp.
Turn the sensor retainer counterclockwise to remove it.
Remove the fuel level sensor, being careful not to deform or damage the float arm.

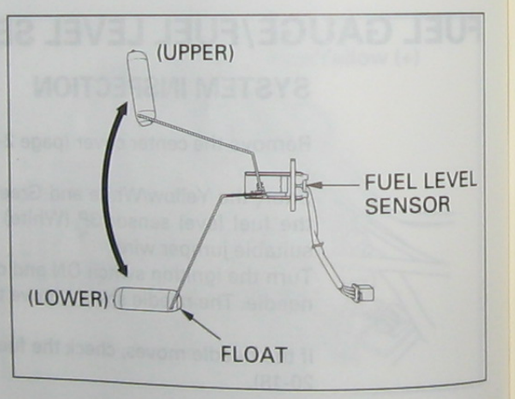


Measure the resistance between the connector terminals with the float upper (full) and lower (empty) positions.

Unit: Ω (20°C/68°F)

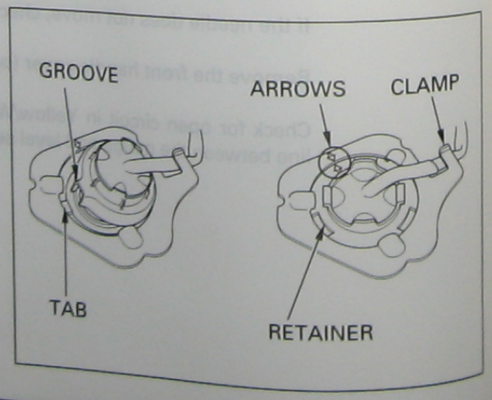
FLOAT POSITION	EMPTY	FULL
Green/Black – Yellow/White	400 – 700	30 – 45
Yellow/White – Blue/White	450 – 750	450 – 750

Replace the fuel level sensor if it is out of specification.



Set the level sensor gasket onto the fuel tank.
Install the fuel level sensor into the fuel tank, being careful not to deform or damage the float arm and align the groove with the tab on the fuel tank.
Install the retainer aligning its cutouts with the tabs on the fuel tank and turn the retainer clockwise to lock it until the arrows are aligned.

Install the removed parts in the reverse order of removal.



SIDE STAND SWITCH

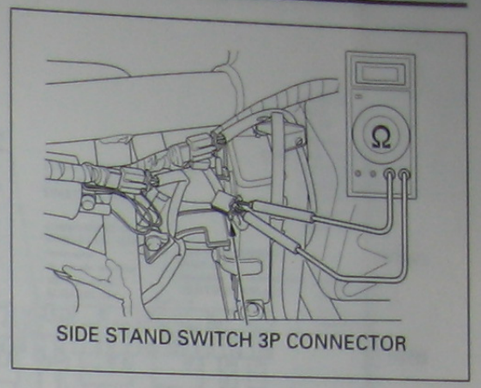
INSPECTION

Remove the center cover (page 2-6).

Disconnect the side stand switch 3P (Green) connector.

Check for continuity between the ○—○ position on the continuity chart below.

	Yellow/ Black	Green	Green/ White
Side stand applied			
Side stand retracted		○	—○



SIDE STAND SWITCH 3P CONNECTOR

REMOVAL/INSTALLATION

Disconnect the 3P (Green) connector.
Remove the left floor skirt (page 2-5).

Release the side stand wire from the frame.
Remove the bolt and the side stand switch from the side stand pivot.

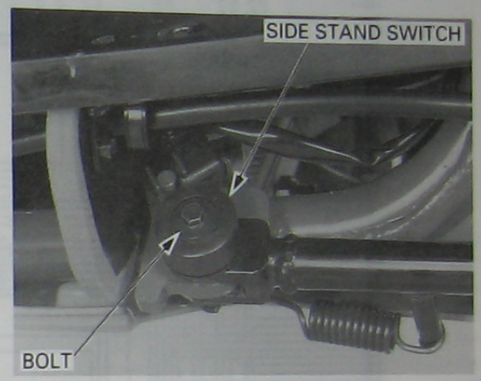
Install the side stand switch aligning the switch pin with the side stand hole and the switch groove with the bracket pin.
Secure the side stand switch with the bolt.

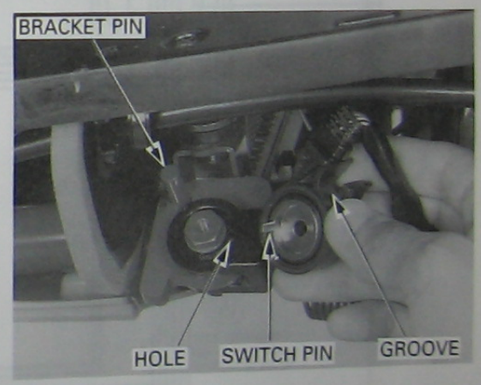
TORQUE: 10 N·m (1.0 kgf·m, 7 lbf·ft)

Install the removed parts in the reverse order of removal.

NOTE:

Route the side stand switch wire properly (page 1-18).

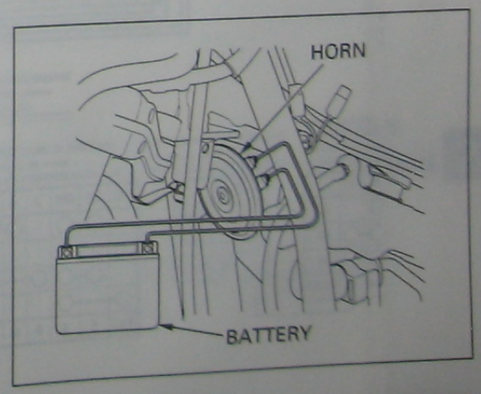




HORN

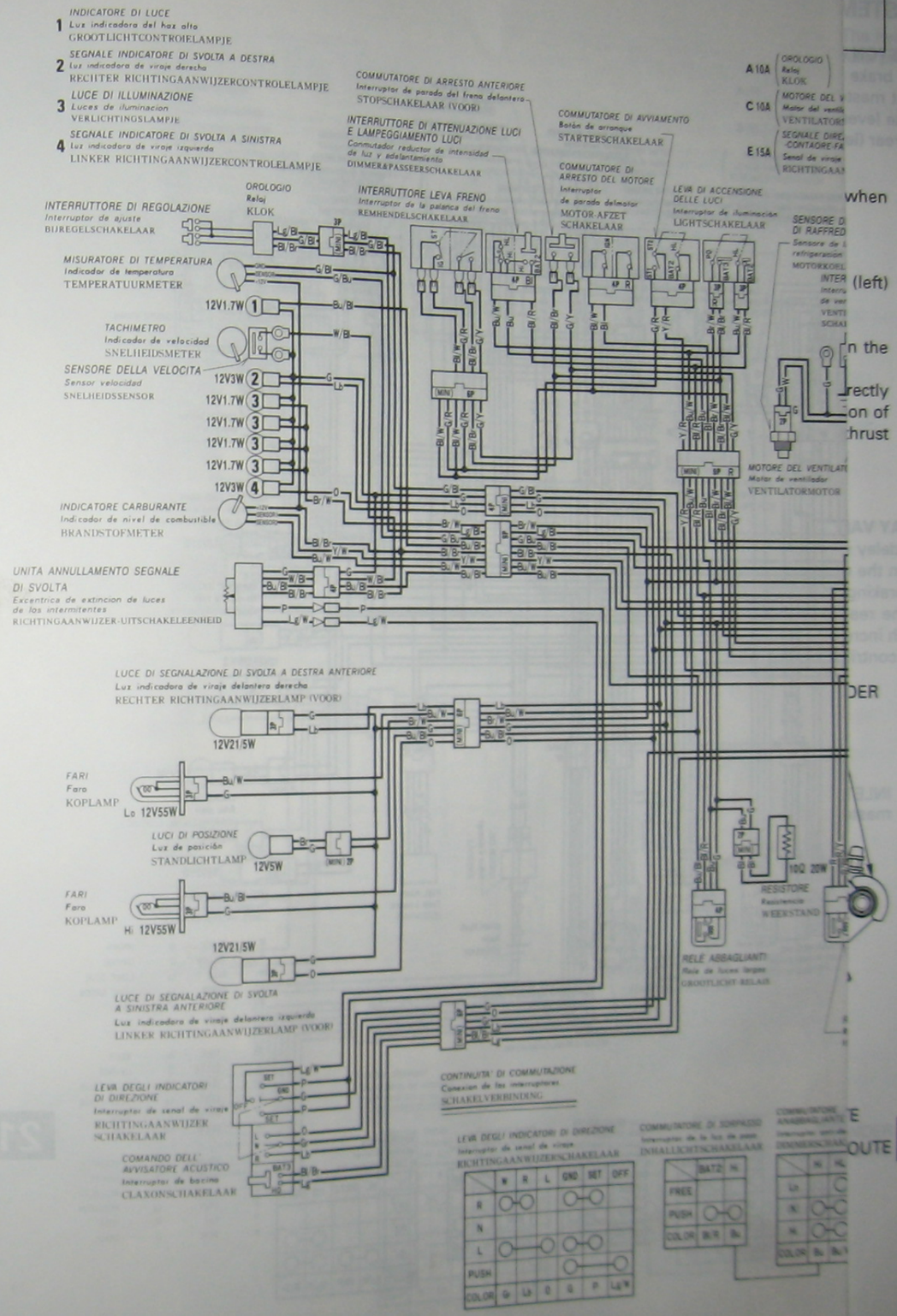
Disconnect the wire connectors from the horn.

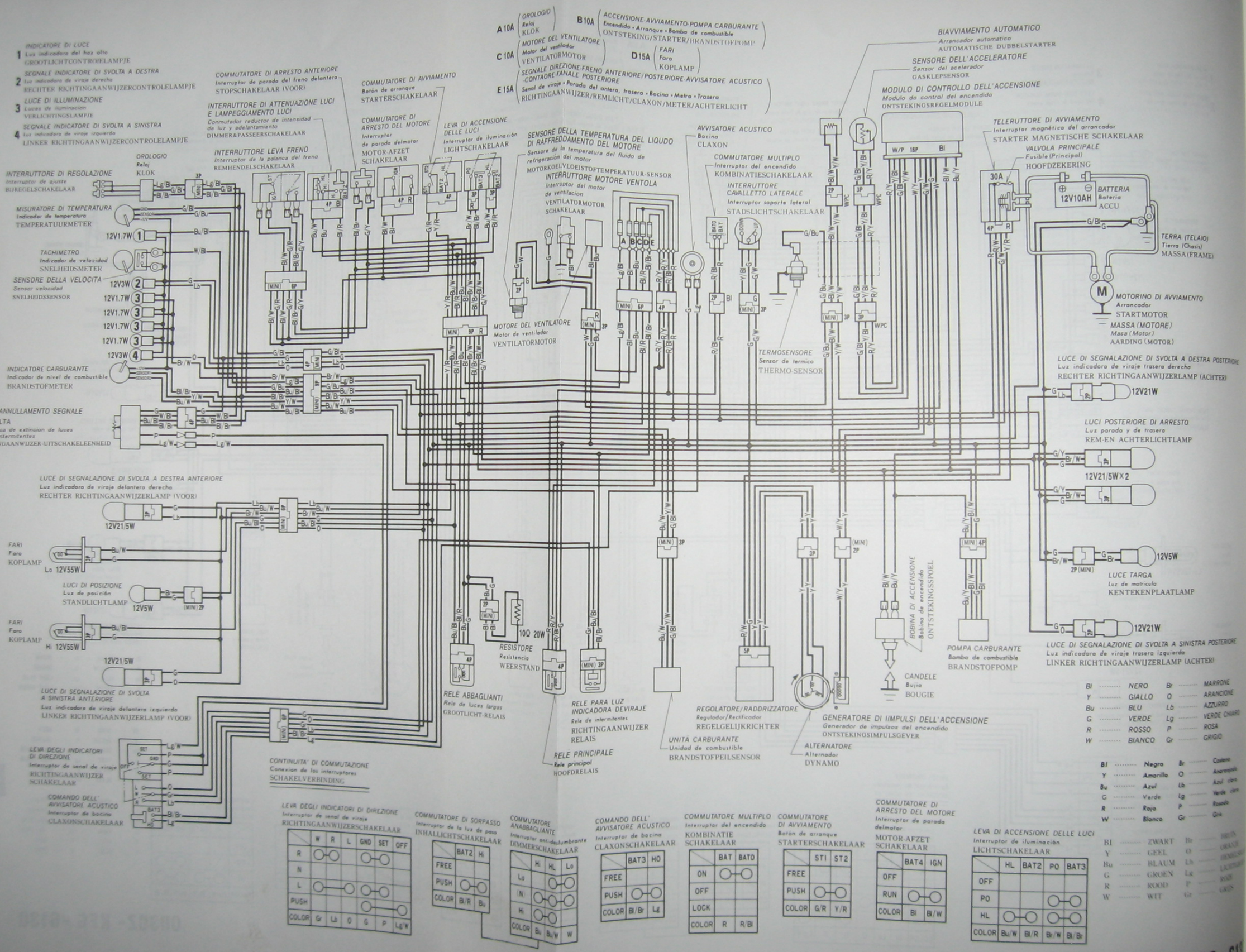
Connect a 12 V battery to the horn terminals.
The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



MEMO

WIRING DIAGRAM





	W	R	L	GND	SET	OFF
R	○				○	
N						
L	○				○	
PUSH					○	○
COLOR	Gr	Lb	O	G	P	Lg/W

	BAT2	Hi
FREE		
PUSH	○	
COLOR	Bl/R	Bu

	Hi	HL	Lo
Lo			○
IN	○		○
Hi	○		
COLOR	Bu	Bu/W	W

	BAT3	HO
FREE		
PUSH	○	
COLOR	Bl/Br	Lg

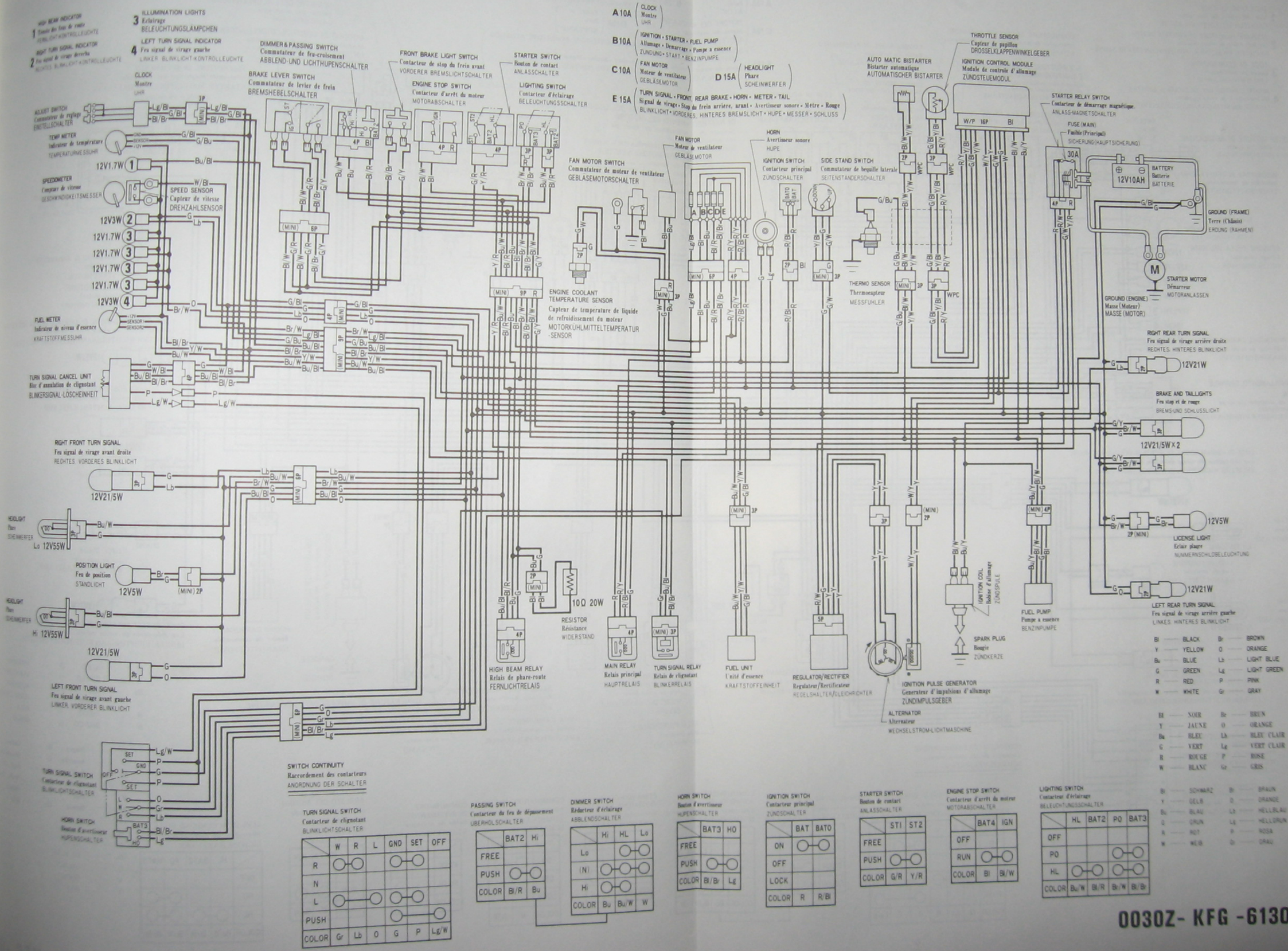
	BAT	BAT0
ON	○	
OFF		
LOCK		
COLOR	R	R/Bl

	STI	ST2
FREE		
PUSH	○	
COLOR	G/R	Y/R

	BAT4	IGN
OFF		
RUN	○	
COLOR	Bl	Bl/W

	HL	BAT2	PO	BAT3
OFF				
PO			○	
HL	○		○	
COLOR	Bu/W	Bl/R	Br/W	Bl/Br

21. WIRING DIAGRAM



	W	R	L	GND	SET	OFF
R	○			○	○	
N						
L	○			○	○	
PUSH					○	○
COLOR	Gr	Lb	O	G	P	Lg/W

	BAT2	Hi
FREE		
PUSH	○	
COLOR	Bl/R	Bu

	Hi	HL	Lo
Lo		○	
(N)	○	○	
Hi	○		
COLOR	Bu	Bu/W	W

	BAT3	HO
FREE		
PUSH	○	
COLOR	Bl/Br	Lg

	BAT	BATO
ON	○	
OFF		
LOCK		
COLOR	R	R/Bl

	STI	ST2
FREE		
PUSH	○	
COLOR	G/R	Y/R

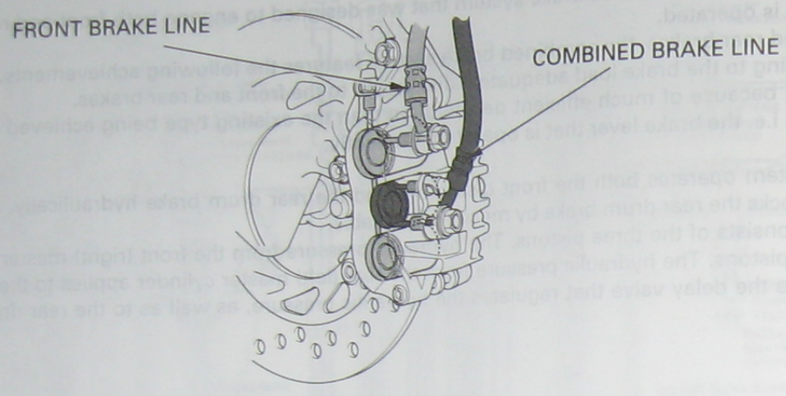
	BAT4	IGN
OFF		
RUN	○	
COLOR	Bl	Bl/W

	HL	BAT2	PO	BAT3
OFF				
PO			○	○
HL	○		○	○
COLOR	Bu/W	Bl/R	Br/W	Bl/Br

SYSTEM CONSTRUCTION

3-PISTON CALIPER

The brake caliper of the combined brake system features the two independent hydraulic pressure circuits, i.e. one from the front master cylinder and the other from the rear master cylinder, by adopting the three pistons. Operating the front (right) brake lever directly operates the two outer pistons, while the center piston operates (via the delay valve) when you operate the rear (left) brake lever.



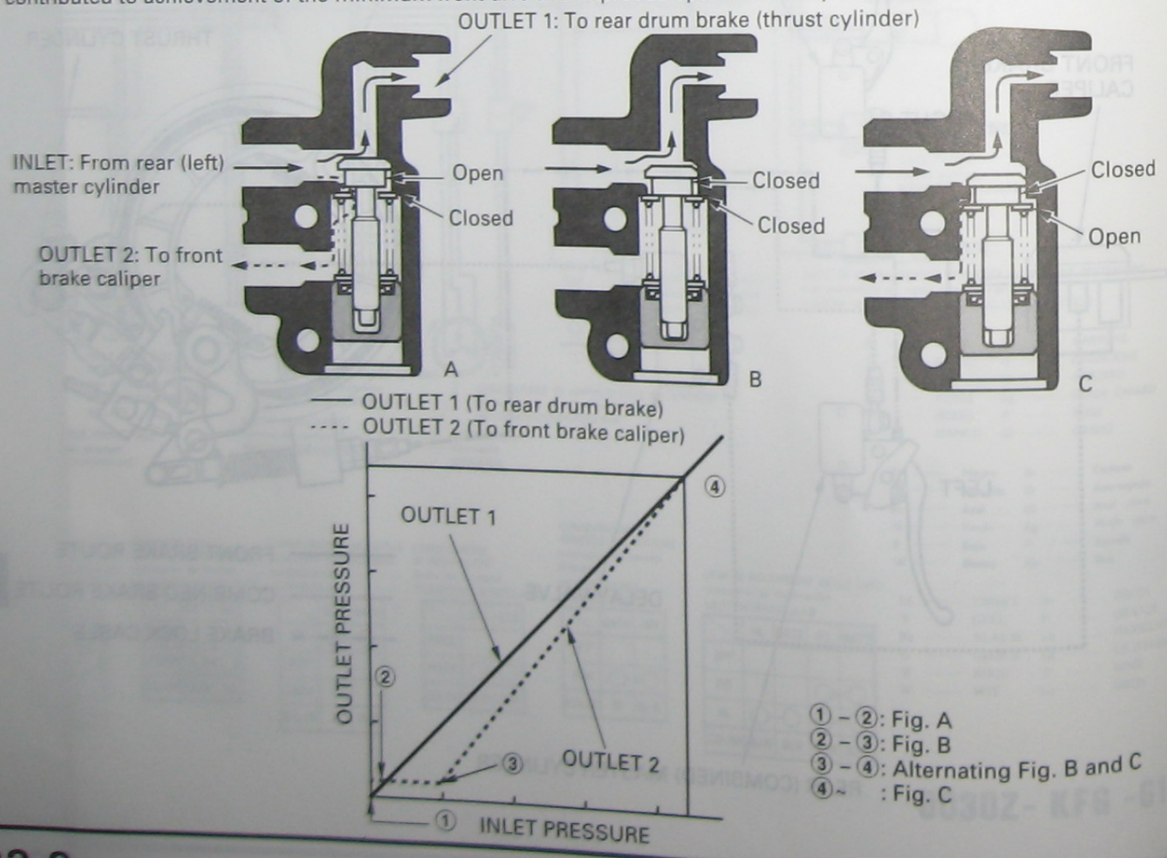
DELAY VALVE

The delay valve locates between the rear master cylinder and the center piston of the front brake caliper.

When the rear (left) brake lever is operated, the delay valve engages the rear drum brake at first, effectively reducing the initial braking force of the front wheel (Figure A and B).

As the rear (left) brake lever pressure gradually increases, the delay valve introduces pressure to the front brake caliper, which increases to match the pressure to the rear drum brake at a predetermined level (Figure C).

This contributed to achievement of the minimum front dive and improved operationability of the rear (left) brake lever.

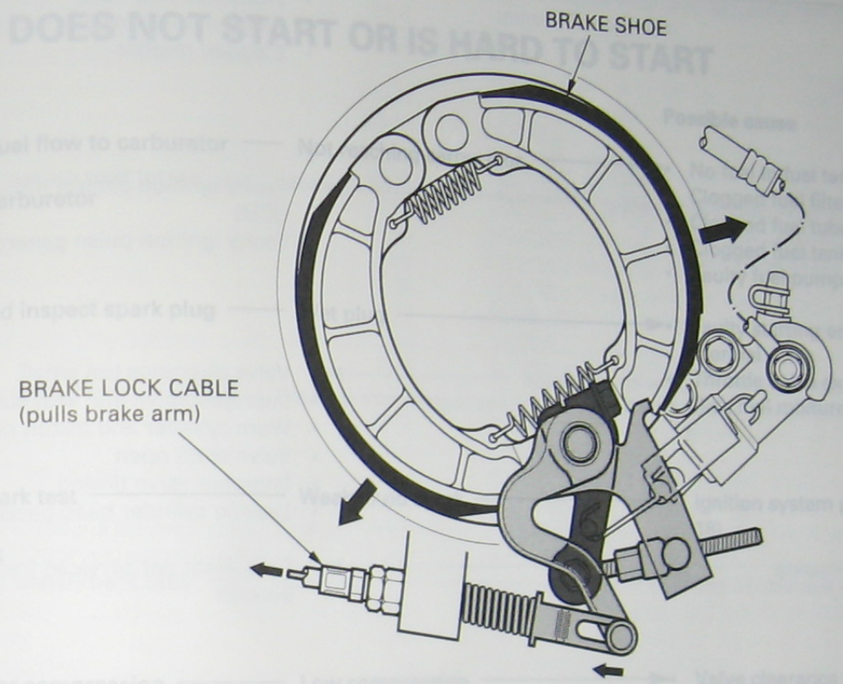


① – ②: Fig. A
② – ③: Fig. B
③ – ④: Alternating Fig. B and C
④~ : Fig. C

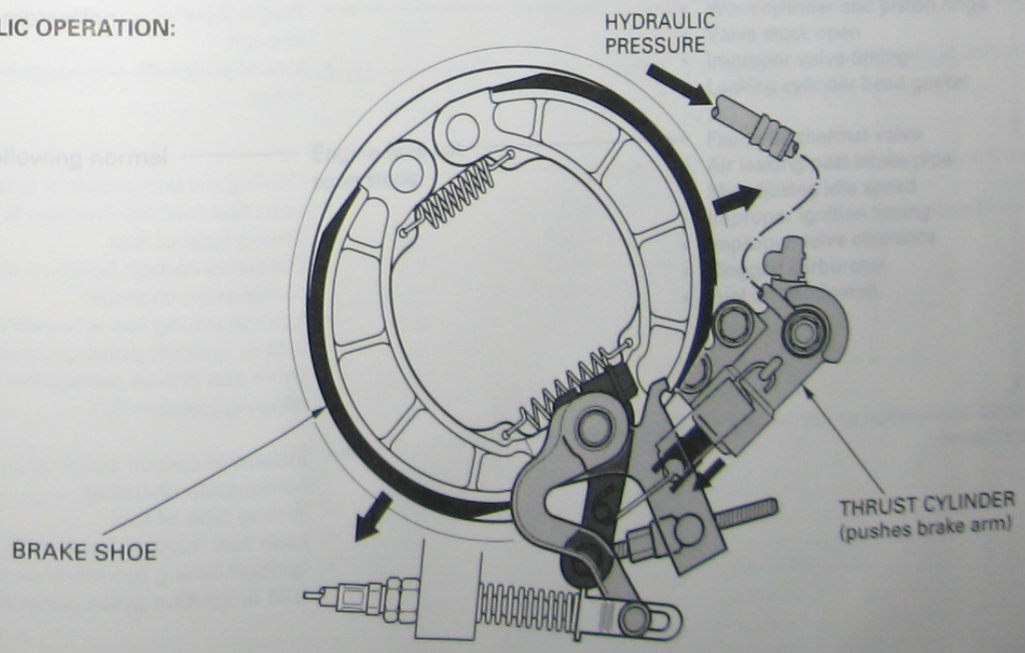
BRAKE LOCK MECHANISM

The combined brake system operates the rear drum brake with the designated brake cable and locks the brake. The hydraulic system does not function this time. Because the lost motion structure is adopted in this brake system, the hydraulic pressure does not apply to the brake cable side at the normal braking (i.e. hydraulic operation).

AT BRAKE LOCK:



AT HYDRAULIC OPERATION:



MEMO

23. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START

		Possible cause
1. Check the fuel flow to carburetor	Not reaching carburetor	• No fuel in fuel tank • Clogged fuel filter • Clogged fuel tube • Clogged fuel tank cap breather hole • Faulty fuel pump
Reaching carburetor		
2. Remove and inspect spark plug	Wet plug	• Faulty starting enrichment (SE) thermal valve • Throttle valve excessively open • Rich fuel mixture (section 5)
Dry plug		
3. Perform spark test	Weak or no spark	• Ignition system problem (section 18)
Good spark		
4. Test cylinder compression	Low compression	• Valve clearance too small • Improper valve and seat contact • Worn cylinder and piston rings • Valve stuck open • Improper valve timing • Leaking cylinder head gasket
Normal compression		
5. Start by following normal procedure	Engine fires but soon stops	• Faulty SE thermal valve • Air leaking past intake pipe • Misadjusted idle speed • Improper ignition timing • Improper valve clearance • Clogged carburetor • Fuel contaminated

ENGINE LACKS POWER

		Possible cause
1. Raise rear wheel off ground and accelerate lightly	Engine speed does not increase sufficiently	• Clogged air cleaner • Restricted fuel flow • Clogged fuel tank cap breather hole • Clogged muffler
Engine speed increase		
2. Check ignition timing	Incorrect	• Faulty ignition control module (ICM) • Faulty ignition pulse generator
Correct		
3. Test cylinder compression	Low compression	• Valve clearance too small • Improper valve and seat contact • Worn cylinder and piston rings • Valve stuck open • Improper valve timing • Leaking cylinder head gasket
Normal compression		
4. Check carburetor for clogging	Clogged	• Carburetor not serviced frequently enough
Normal		
5. Remove and inspect spark plug	Fouled or discolored	• Plug not serviced frequently enough • Use of plug with improper heat range
Not fouled or discolored		
6. Check if engine overheats	Overheating	• Cooling system problem (section 6) • Lean fuel mixture (section 5) • Wrong type of fuel • Excessive carbon build-up in combustion chamber • Ignition timing too advance (Faulty ICM or ignition pulse generator) • Drive and driven pulleys/clutch slipping (section 10)
Not overheating		
7. Try rapid acceleration or run at high speed	Engine knocks	• Excessive carbon build-up in combustion chamber • Wrong type of fuel • Lean fuel mixture (section 5) • Ignition timing too advance (Faulty ICM or ignition pulse generator)

POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		Possible cause
1. Check carburetor air screw adjustment	Incorrect	• See section 5
Correct		
2. Check if air is leaking past intake pipe	Leaking	• Loose carburetor and/or intake pipe • Damaged carburetor insulator • Deteriorated intake pipe O-ring
Not leaking		
3. Perform spark test	Weak or intermittent spark	• Ignition system problem (section 18)
Good spark		
4. Check starting enrichment (SE) thermal valve	Abnormal	• Faulty SE thermal valve
Normal		
5. Check ignition timing	Incorrect	• Faulty ignition pluse generator • Faulty ignition control module (ICM)

POOR PERFORMANCE AT HIGH SPEED

		Possible cause
1. Check fuel flow from fuel pump	Fuel flow restricted	• Clogged fuel tank cap breather hole • Clogged fuel filter • Clogged fuel tube • Faulty fuel pump
Fuel flows enough		
2. Check carburetor for clogging	Clogged	• Carburetor not serviced frequently enough
Normal		
3. Check valve timing	Incorrect	• Cam sprocket not installed properly
Correct		
4. Check ignition timing	Incorrect	• Faulty ignition pluse generator • Faulty ignition control module (ICM)
Correct		
5. Check starting enrichment (SE) thermal valve	Abnormal	• Faulty SE thermal valve
Normal		
6. Check valve spring	Weak	• Faulty valve spring

24. INDEX