

HOW TO USE THIS MANUAL

This service manual describes the service procedures for the VTR1000F.

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

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

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

The subsequent pages give detailed procedure.

If you don't know the source of the trouble, go to section 21 Troubleshooting.

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HONDA MOTOR CO., LTD.
SERVICE PUBLICATION OFFICE

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SYMBOLS

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

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

IMPORTANT SAFETY NOTICE

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

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

NOTE: Gives helpful information.

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

TYPE CODE

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

CODE	AREA TYPE
E	U.K.
G	Germany, Sweden, Finland
IIG	Germany (Type II)
F	France
ED	European direct sales (Belgium, Holland, Portugal)

CODE	AREA TYPE
SW	Switzerland
AR	Austria
IT	Italy, Spain
ND	North Europe (Denmark, Norway)
U	Australia

1. GENERAL INFORMATION

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GENERAL SAFETY

CARBON MONOXIDE

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

▲WARNING

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

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

GASOLINE

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

▲WARNING

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

HOT COMPONENTS

▲WARNING

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

USED ENGINE OIL

▲WARNING

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

BRAKE DUST

Never use an air hose or dry brush to clean brake assemblies. Use a vacuum cleaner or alternate method to minimize the hazard caused by air borne asbestos fibers.

▲WARNING

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

BRAKE FLUID

CAUTION:

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

GENERAL INFORMATION

COOLANT

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

▲WARNING

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

BATTERY HYDROGEN GAS & ELECTROLYTE

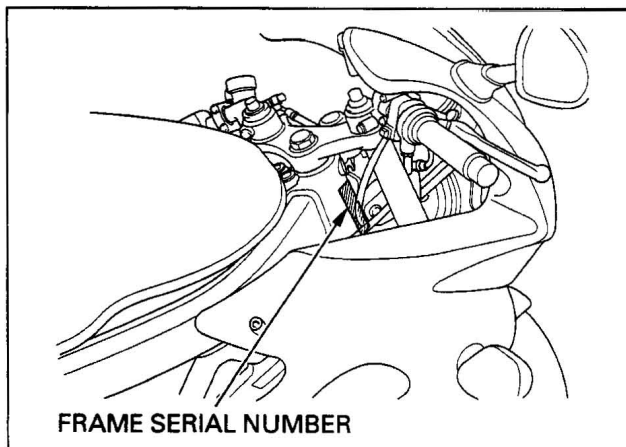
▲WARNING

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

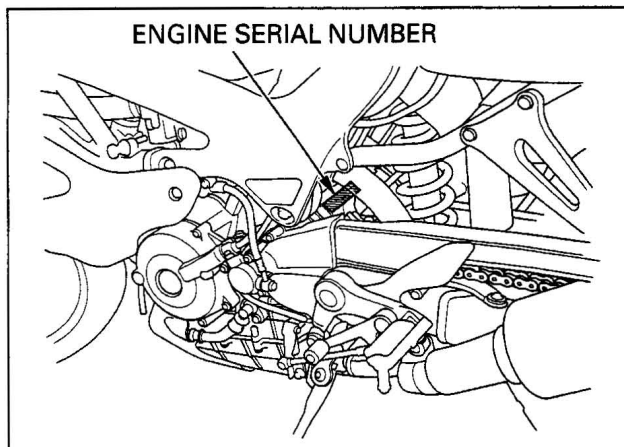
SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that don't meet HONDA's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown on pages 1-18 through 1-24, Cable & Harness routing.

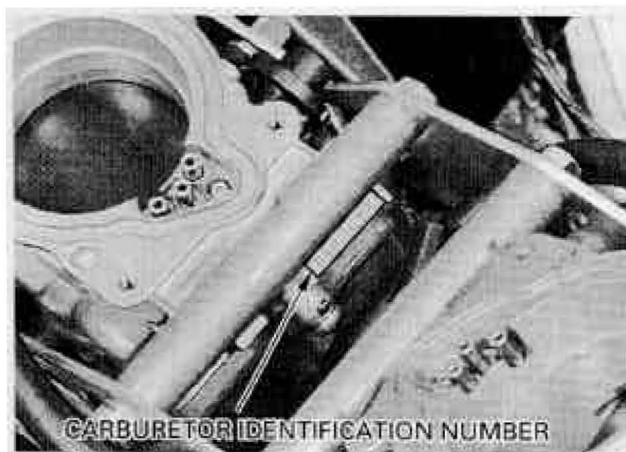
MODEL IDENTIFICATION



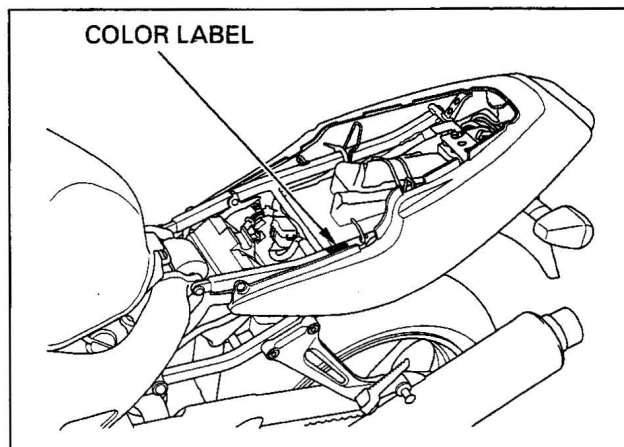
The frame serial number is stamped on the right side of the steering head.



The engine serial number is stamped on the rear of the upper crankcase.



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



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

GENERAL INFORMATION

SPECIFICATIONS

GENERAL			
	ITEM		SPECIFICATIONS
DIMENSIONS	Overall length	G, IIG, SW, AR, ND E, F, ED, U, IT	2,155 mm (84.8 in) 2,050 mm (80.7 in)
	Overall width		710 mm (28.0 in)
	Overall height		1,155 mm (45.5 in)
	Wheelbase		1,430 mm (56.3 in)
	Seat height		810 mm (31.9 in)
	Footpeg height		377 mm (14.8 in)
	Ground clearance		135 mm (5.3 in)
	Dry weight	Except SW, AR, IIG SW, AR, IIG	192 kg (423 lbs) 193 kg (425 lbs)
	Curb weight	Except SW, AR, IIG SW, AR, IIG	214 kg (472 lbs) 215 kg (474 lbs)
	Maximum weight capacity		188 kg (415 lbs)
FRAME	Frame type		Diamond
	Front suspension		Telescopic fork
	Front axle travel		109 mm (4.3 in)
	Front fork stroke		120 mm (4.7 in)
	Rear suspension		Swingarm
	Rear axle travel		124 mm (4.9 in)
	Front tire size		120/70ZR17 (58W)
	Rear tire size		180/55ZR17 (73W)
	Front tire brand		D204FK (DUNLOP), MACADAM 90X G (MICHELIN)
	Rear tire brand		D204K (DUNLOP), MACADAM 90X G (MICHELIN)
	Front brake		Hydraulic double disc
	Rear brake		Hydraulic single disc
Caster angle		24°53'	
Trail length		97 mm (3.8 in)	
Fuel tank capacity		16.0 ℓ (4.23 US gal, 3.52 Imp gal)	
ENGINE	Cylinder arrangement		2 cylinders 90° V transverse
	Bore and stroke		98.0 × 66.0 mm (3.90 × 2.60 in)
	Displacement		995.7 cm ³ (60.74 cu-in)
	Compression ratio		9.4 : 1
	Valve train		Chain driven, DOHC
	Intake valve	opens closes	20° BTDC (At 1 mm lift) 45° ABDC (At 1 mm lift)
	Exhaust valve	opens closes	50° BBDC (At 1 mm lift) 15° ATDC (At 1 mm lift)
	Lubrication system		Forced pressure and wet sump
	Oil pump type		Trochoid
	Cooling system		Liquid cooled
	Air filtration		Viscous paper element
	Engine dry weight		74.2 kg (163.6 lbs)
	Firing order		Front – 270° – Rear – 450° – Front

GENERAL (Cont'd)		
ITEM		SPECIFICATIONS
CARBURETOR	Carburetor type Throttle bore	CV semi-downdraft 48 mm (1.9 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Final reduction Gear ratio 1st 2nd 3rd 4th 5th 6th Gearshift pattern	Multi-plate, wet Hydraulic operating Constant mesh, 6-speeds 1.681 (74/44) 2.562 (41/16) 2.733 (41/15) 1.812 (29/16) 1.428 (30/21) 1.206 (35/29) 1.080 (27/25) 0.961 (25/26) Left foot operated return system, 1-N-2-3-4-5-6
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	DC-CDI Electric starter motor Triple phase output alternator SCR shorted, triple phase full wave rectification Battery

GENERAL INFORMATION

Unit: mm (in)

LUBRICATION SYSTEM		STANDARD	SERVICE LIMIT
ITEM			
Engine oil capacity	After draining	3.7 ℓ (3.9 US qt , 3.3 Imp qt)	————
	After draining/filter change	3.9 ℓ (4.1 US qt , 3.4 Imp qt)	————
	After disassembly	4.5 ℓ (4.8 US qt , 4.0 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 pressure (at oil pressure switch)		588 kPa (6.0 kgf/cm ² , 85 psi) at 5,000 min ⁻¹ (rpm) /176 °F (80 °C)	————
Oil pump	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
	Side clearance	0.02 – 0.09 (0.001 – 0.004)	0.12 (0.005)

FUEL SYSTEM		SPECIFICATIONS
ITEM		
Carburetor identification number	Except G, SW, AR, IIG type	VPT0B
	G type	VPT0A
	SW type	VPT2B
	AR, IIG type	VPT2C
Main jet		Front: # 175, Rear: # 178
Slow jet		# 45
Jet needle number	Except SW, AR, G type	Front: A1UD, Rear: A1UC
	SW, AR, G type	Front: A1UF, Rear: A1UE
Pilot screw opening		See page 5-18
Float level		16.6 ± 0.5 mm (0.65 ± 0.02 in)
Idle speed	Except SW, AR, IIG type	1,100 ± 100 min ⁻¹ (rpm)
	AR, IIG type	1,200 ± 100 min ⁻¹ (rpm)
	SW type	1,200 ± 50 min ⁻¹ (rpm)

COOLING SYSTEM		SPECIFICATIONS
ITEM		
Coolant capacity	Radiator and engine	2.86 ℓ (0.756 US gal , 0.629 Imp gal)
	Reserve tank	0.71 ℓ (0.188 US gal , 0.156 Imp gal)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm ² , 16 – 20 psi)
Thermostat	Begin to open	163 – 171 °F (73 – 77 °C)
	Fully open	194 °F (90 °C)
	Valve lift	8 mm (0.3 in) minimum

Unit: mm (in)

CYLINDER HEAD/VALVE		ITEM		STANDARD	SERVICE LIMIT
Cylinder compression at 350 min ⁻¹ (rpm)				1,128 kPa (11.5 kgf/cm ² , 164 psi)	—————
Valve clearance		IN		0.16 (0.006)	—————
		EX		0.31 (0.012)	—————
Camshaft	Cam lobe height	IN		40.080 – 40.240 (1.5779 – 1.5842)	39.780 (1.5661)
		EX		40.230 – 40.390 (1.5839 – 1.5902)	39.930 (1.5720)
	Runout			—————	0.05 (0.002)
	Oil clearance			0.020 – 0.062 (0.0008 – 0.0024)	0.088 (0.0035)
Valve lifter	Valve lifter O.D.			33.978 – 33.993 (1.3377 – 1.3383)	33.97 (1.337)
	Valve lifter bore I.D.			34.010 – 34.026 (1.3390 – 1.3396)	34.04 (1.340)
Valve, valve guide	Valve stem O.D.	IN		5.975 – 5.990 (0.2352 – 0.2358)	5.965 (0.2348)
		EX		5.965 – 5.980 (0.2348 – 0.2354)	5.955 (0.2344)
	Valve guide I.D.	IN/EX		6.000 – 6.012 (0.2362 – 0.2367)	6.040 (0.2378)
	Stem-to-guide clearance	IN		0.010 – 0.037 (0.0004 – 0.0015)	0.075 (0.0030)
		EX		0.020 – 0.047 (0.0008 – 0.0019)	0.085 (0.0033)
	Valve guide projection above cylinder head			14.0 – 14.2 (0.55 – 0.56)	—————
Valve seat width	IN		1.1 – 1.3 (0.04 – 0.05)	1.7 (0.07)	
	EX		1.3 – 1.5 (0.05 – 0.06)	1.9 (0.07)	
Valve spring	Free length	Inner		37.0 (1.46)	36.0 (1.42)
		Outer		41.9 (1.65)	40.9 (1.61)
Cylinder head warpage				—————	0.10 (0.004)

Unit: mm (in)

CLUTCH/GEARSHIFT LINKAGE		ITEM		STANDARD	SERVICE LIMIT
Specified clutch fluid				DOT 4 brake fluid	—————
Clutch master cylinder	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)
Clutch	Spring free length			49.6 (1.95)	46.6 (1.83)
	Disc thickness			3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	Plate warpage			—————	0.30 (0.012)
Clutch outer guide	I.D.			28.000 – 28.021 (1.1024 – 1.1032)	28.031 (1.1036)
	O.D.			34.975 – 34.991 (1.3770 – 1.3776)	34.965 (1.3766)
Mainshaft O.D. at clutch outer guide				27.980 – 27.993 (1.1016 – 1.1021)	27.970 (1.1012)

Unit: mm (in)

ALTERNATOR/STARTER CLUTCH		ITEM		STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.				57.749 – 57.768 (2.2736 – 2.2743)	57.639 (2.2692)

GENERAL INFORMATION

Unit: mm (in)

CRANKCASE/TRANSMISSION ITEM		STANDARD	SERVICE LIMIT
Shift fork	I.D.	12.000–12.021 (0.4724–0.4733)	12.03 (0.474)
	Claw thickness	5.93–6.00 (0.233–0.236)	5.9 (0.23)
Shift fork shaft	O.D.	11.957–11.968 (0.4707–0.4712)	11.95 (0.470)
Transmission	Gear I.D.	M5, M6	31.000–31.016 (1.2205–1.2211)
		C2, C3, C4	33.000–33.025 (1.2992–1.3002)
	Gear bushing O.D.	M5, M6	30.955–30.980 (1.2187–1.2197)
		C2, C3, C4	32.955–32.980 (1.2974–1.2984)
	Gear-to-bushing clearance	M5, M6	0.020–0.061 (0.0008–0.0024)
		C2, C3, C4	0.020–0.070 (0.0008–0.0028)
	Gear bushing I.D.	M5	27.985–28.006 (1.1018–1.1026)
		C2	29.985–30.006 (1.1805–1.1813)
	Mainshaft O.D.	at M5	27.967–27.980 (1.1011–1.1016)
	Countershaft O.D.	at C2	29.950–29.975 (1.1791–1.1801)
Bushing-to-shaft clearance	M5	0.005–0.039 (0.0002–0.0015)	
	C2	0.010–0.056 (0.0004–0.0022)	

Unit: mm (in)

CRANKSHAFT/PISTON/CYLINDER ITEM		STANDARD	SERVICE LIMIT	
Crankshaft	Connecting rod side clearance	0.10–0.30 (0.004–0.012)	0.40 (0.016)	
	Crankpin bearing oil clearance	0.032–0.050 (0.0013–0.0020)	0.060 (0.0024)	
	Main journal bearing oil clearance	0.020–0.038 (0.0008–0.0015)	0.048 (0.0019)	
	Runout	—	0.10 (0.004)	
Piston, piston pin, piston ring	Piston O.D. at 20 (0.8) from bottom	97.965–97.985 (3.8569–3.8577)	97.900 (3.8543)	
	Piston pin hole I.D.	24.002–24.008 (0.9450–0.9452)	24.03 (0.946)	
	Piston pin O.D.	23.994–24.000 (0.9446–0.9449)	23.984 (0.9443)	
	Piston-to-piston pin clearance	0.002–0.014 (0.0001–0.0006)	0.046 (0.0018)	
	Piston ring end gap	Top	0.25–0.40 (0.010–0.016)	0.55 (0.022)
		Second	0.40–0.55 (0.016–0.022)	0.70 (0.028)
		Oil (side rail)	0.20–0.70 (0.008–0.028)	0.90 (0.035)
Piston ring-to-ring groove clearance	Top	0.065–0.100 (0.0026–0.0039)	0.115 (0.0045)	
	Second	0.035–0.070 (0.0014–0.0028)	0.085 (0.0033)	
Cylinder	I.D.	98.005–98.025 (3.8585–3.8592)	98.100 (3.8622)	
	Out of round	—	0.10 (0.004)	
	Taper	—	0.10 (0.004)	
	Warpage	—	0.05 (0.002)	
Cylinder-to-piston clearance		0.020–0.060 (0.0008–0.0024)	0.200 (0.0079)	
Connecting rod small end I.D.		24.020–24.041 (0.9457–0.9465)	24.051 (0.9469)	
Connecting rod-to-piston pin clearance		0.020–0.047 (0.0008–0.0019)	0.067 (0.0026)	

Unit: mm (in)

FRONT WHEEL/SUSPENSION/STEERING			
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—————	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm ² , 36 psi)	—————
	Driver and passenger	250 kPa (2.50 kgf/cm ² , 36 psi)	—————
Axle runout		—————	0.20 (0.008)
Wheel rim runout	Radial	—————	2.0 (0.08)
	Axial	—————	2.0 (0.08)
Wheel balance weight		—————	60 g (2.1 oz) max.
Fork	Spring free length	309.9 (12.20)	303.7 (11.96)
	Tube runout	—————	0.20 (0.008)
	Recommended fluid	Fork fluid	—————
	Fluid level	130 (5.1)	—————
	Fluid capacity	448 ± 2.5 cm ³ (15.2 ± 0.08 US oz, 15.8 ± 0.09 Imp oz)	—————
Steering head bearing preload		1.0 – 1.6 kgf (2.2 – 3.3 lbf)	—————

Unit: mm (in)

REAR WHEEL/SUSPENSION			
ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—————	2.0 (0.08)
Cold tire pressure	Driver only	290 kPa (2.90 kgf/cm ² , 42 psi)	—————
	Driver and passenger	290 kPa (2.90 kgf/cm ² , 42 psi)	—————
Axle runout		—————	0.20 (0.008)
Wheel rim runout	Radial	—————	2.0 (0.08)
	Axial	—————	2.0 (0.08)
Wheel balance weight		—————	60 g (2.1 oz) max.

Unit: mm (in)

HYDRAULIC BRAKE				
ITEM			STANDARD	SERVICE LIMIT
Front	Specified brake fluid		DOT 4	—————
	Brake disc thickness		4.4 – 4.6 (0.17 – 0.18)	3.5 (0.14)
	Brake disc runout		—————	0.30 (0.012)
	Master cylinder I. D.		14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Master piston O. D.		13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
	Caliper cylinder I. D.	A	30.23 – 30.28 (1.190 – 1.192)	30.29 (1.193)
		B	27.000 – 27.050 (1.0630 – 1.0650)	27.060 (1.0654)
	Caliper piston O. D.	A	30.148 – 30.198 (1.1869 – 1.1889)	30.14 (1.187)
		B	26.918 – 26.968 (1.0598 – 1.0617)	26.91 (1.059)
Rear	Specified brake fluid		DOT 4	—————
	Brake disc thickness		4.8 – 5.2 (0.19 – 0.20)	4.0 (0.16)
	Brake disc runout		—————	0.30 (0.012)
	Master cylinder I. D.		14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	Master piston O. D.		13.957 – 13.984 (0.5495 – 0.5506)	13.945 (0.5490)
	Caliper cylinder I. D.		38.18 – 38.23 (1.503 – 1.505)	38.24 (1.506)
	Caliper piston O. D.		38.098 – 38.148 (1.4999 – 1.5019)	38.09 (1.500)

GENERAL INFORMATION

BATTERY/CHARGING SYSTEM			SPECIFICATIONS	
ITEM				
Battery	Capacity		12 V – 10 AH	
	Current leakage		0.1 mA max.	
	Voltage (68 °F/20 °C)	Fully charged		13.0 – 13.2 V
		Needs charging		Below 12.3 V
	Charging current	Normal		1.2 A × 5 – 10 h
Quick			5.0 A × 1.0 h	
Alternator	Capacity		0.280 kW/5,000 min ⁻¹ (rpm)	
	Charging coil resistance (68 °F/20 °C)		0.2 – 0.5 Ω	
Regulator/rectifier regulated voltage			13.5 – 15.5 V/5,000 min ⁻¹ (rpm)	

IGNITION SYSTEM			SPECIFICATIONS
ITEM			
Spark plug			DPR9EVX-9 (NGK)
Spark plug gap			0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil primary peak voltage			100 V minimum
Ignition pulse generator peak voltage			0.7 V minimum
Ignition timing ("F" mark)			15° BTDC at idle
Engine coolant temperature (ECT) sensor resistance	At 68 °F (20 °C)		2 – 3 kΩ
	At 176 °F (80 °C)		200 – 400 Ω
Throttle sensor	Resistance (68 °F/20 °C)		4 – 6 kΩ
	Input voltage		4.7 – 5.3 V

ELECTRIC STARTER		Unit: mm (in)	
ITEM	STANDARD	SERVICE LIMIT	
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	6.5 (0.26)	

LIGHTS/METERS/SWITCHES			SPECIFICATIONS
ITEM			
Bulbs	Headlight (High/low beam)		12 V – 60/55 W
	Position light (Except U type)		12 V – 5 W
	Brake/taillight		12 V – 21/5 W × 2
	Turn signal light		12 V – 21 W × 4
	Instrument light		12 V – 1.7 W × 3
	Turn signal indicator		12 V – 1.7 W × 2
	High beam indicator		12 V – 1.7 W
	Neutral indicator		12 V – 1.7 W
	Oil pressure indicator		12 V – 1.7 W
	Side stand indicator		12 V – 1.7 W
Fuse	Main fuse		30 A
	Sub-fuse		10 A, 20 A
Thermosensor resistance	At 176 °F (80 °C)		47 – 57 Ω
	At 248 °F (120 °C)		14 – 18 Ω
Fan motor switch	Starts to close (ON)		208 – 216 °F (98 – 102 °C)
	Stops to open (OFF)		199 – 207 °F (93 – 97 °C)

TORQUE VALUES

STANDARD

FASTENER TYPE	TORQUE N-m (kgf-m, lbf-ft)	FASTENER TYPE	TORQUE N-m (kgf-m, lbf-ft)
5 mm bolt and nut	5 (0.5, 3.6)	5 mm screw	4 (0.4 , 2.9)
6 mm bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9 , 6.5)
8 mm bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head, small flange)	10 (1.0 , 7)
10 mm bolt and nut	34 (3.5, 25)	6 mm flange bolt (8 mm head, large flange)	12 (1.2 , 9)
12 mm bolt and nut	54 (5.5, 40)	6 mm flange bolt (10 mm head) and nut	12 (1.2 , 9)
		8 mm flange bolt and nut Engine	23 (2.3 , 17)
		Frame	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. Replace with a new one.
 4. Stake.
 5. Apply oil to the threads and seating surface.
 6. Apply engine oil to the O-ring.
 7. U-nut.
 8. ALOC bolt/screw: replace with a new one.
 9. Apply grease to the threads.

ENGINE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
MAINTENANCE:				
Spark plug	2	12	14 (1.4 , 10)	
Crankshaft hole cap	1	30	15 (1.5 , 11)	NOTE 9
Timing hole cap	1	14	10 (1.0 , 7)	NOTE 9
Engine oil filter cartridge	1	20	10 (1.0 , 7)	NOTE 5, 6
Engine oil drain bolt	1	12	29 (3.0 , 22)	
LUBRICATION SYSTEM:				
Oil pressure switch	1	PT 1/8	12 (1.2 , 9)	NOTE 1
Oil pressure switch terminal screw	1	4	2 (0.2 , 1.4)	
Oil pump bolt	2	6	12 (1.2 , 9)	
Oil filter boss	1	20	18 (1.8 , 13)	NOTE 2
FUEL SYSTEM:				
Carburetor insulator band bolt	4	5	1 (0.1 , 0.7)	
Vacuum joint	1	5	2 (0.25 , 1.8)	
Reed valve cover bolt	4	5	5 (0.52 , 3.8)	NOTE 2
ENGINE MOUNTING:				
Drive sprocket bolt	1	10	54 (5.5 , 40)	
CYLINDER HEAD/VALVE:				
Cylinder head cover bolt	8	6	10 (1.0 , 7)	
Breather plate bolt	4	6	12 (1.2 , 9)	NOTE 2
Cam sprocket bolt	4	7	20 (2.0 , 14)	NOTE 2
Camshaft holder bolt	16	7	21 (2.1 , 15)	NOTE 5
Cylinder head bolt	12	10	53 (5.4 , 39)	NOTE 5
Cylinder head sealing bolt	2	12	32 (3.3 , 24)	NOTE 2
Intake manifold vacuum port socket bolt	1	5	3 (0.34 , 2.5)	

GENERAL INFORMATION

ENGINE (Cont'd)				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
CLUTCH/GEARSHIFT LINKAGE:				
Clutch slave cylinder bleed valve	1	8	9 (0.9, 6.5)	
Clutch bolt	5	6	12 (1.2, 9)	
Clutch center lock nut	1	25	127 (13.0, 94)	NOTE 4, 5
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	NOTE 2
Gearshift cam bolt	1	8	23 (2.3, 17)	NOTE 2
Gearshift spindle return spring pin	1	8	23 (2.3, 17)	
Primary drive gear bolt	1	12	88 (9.0, 65)	NOTE 5
ALTERNATOR/STARTER CLUTCH:				
Flywheel bolt	1	12	157 (16.0, 116)	NOTE 5
Starter clutch bolt	6	8	23 (2.3, 17)	NOTE 2
Alternator stator bolt	3	6	12 (1.2, 9)	
CRANKCASE/TRANSMISSION:				
Cam chain tensioner bolt	2	8	23 (2.3, 17)	NOTE 2
Cam chain guide bolt	2	8	23 (2.3, 17)	NOTE 2
Crankcase flange bolt	1	10	39 (4.0, 29)	
Crankcase special bolt	8	10	42 (4.3, 31)	NOTE 5
Crankcase sealing bolt	1	15	29 (3.0, 22)	NOTE 2
Crankcase sealing bolt	1	18	29 (3.0, 22)	NOTE 2
Crankcase sealing bolt	1	22	29 (3.0, 22)	
Crankcase sealing bolt	1	24	49 (5.0, 36)	NOTE 2
CRANKSHAFT/PISTON/CYLINDER:				
Connecting rod bolt (standard)	4	9	29 (3.0, 22) + 120°	NOTE 3, 5
(checking the oil clearance)	4	9	20 (2.0, 14) + 120°	NOTE 3, 5
IGNITION SYSTEM:				
Ignition pulse generator bolt	2	6	12 (1.2, 9)	
Engine coolant temperature (ECT) sensor	1	12	23 (2.3, 17)	
ELECTRIC STARTER:				
Starter motor terminal nut	1	6	10 (1.0, 7)	
LIGHTS/METERS/SWITCHES:				
Thermosensor	1	PT 1/8	12 (1.2, 9)	NOTE 1
Neutral switch	1	10	12 (1.2, 9)	

FRAME				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
FRAME/BODY PANELS/EXHAUST SYSTEM:				
Exhaust pipe joint nut	4	7	12 (1.2, 9)	
Muffler band bolt	2	8	26 (2.7, 20)	
ENGINE MOUNTING:				
Front engine hanger nut	1	12	64 (6.5, 47)	Page 7-7
Front engine hanger adjusting bolt	1	20	3 (0.3, 2.2)	
Front engine hanger lock nut	1	20	54 (5.5, 40)	
Center engine hanger bolt	2	10	39 (4.0, 29)	
Left center engine hanger adjusting bolt	1	20	3 (0.3, 2.2)	
Left center engine hanger lock nut	1	20	54 (5.5, 40)	
Rear engine hanger nut	1	12	64 (6.5, 47)	
Rear engine hanger adjusting bolt	1	22	3 (0.3, 2.2)	
Rear engine hanger lock nut	1	22	54 (5.5, 40)	
Shock link bracket nut	2	10	44 (4.5, 33)	
CLUTCH/GEARSHIFT LINKAGE:				
Clutch reservoir mounting screw	1	4	1 (0.15, 1.1)	NOTE 2
Clutch reservoir cap stopper plate screw	1	4	1 (0.12, 0.9)	
Clutch lever pivot nut	1	6	6 (0.6, 4.3)	
Clutch hose oil bolt	2	10	34 (3.5, 25)	

FRAME	ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
FRONT WHEEL/SUSPENSION/STEERING:					
	Handlebar weight mounting screw	2	6	10 (1.0 , 7)	NOTE 8
	Front master cylinder holder bolt	2	6	12 (1.2 , 9)	
	Front axle bolt	1	14	59 (6.0 , 43)	
	Front axle holder bolt	4	8	22 (2.2 , 16)	
	Front brake disc bolt	12	6	20 (2.0 , 14)	NOTE 8
	Fork cap	2	37	23 (2.3 , 17)	
	Fork socket bolt	2	8	20 (2.0 , 14)	NOTE 2
	Fork top bridge pinch bolt	2	8	23 (2.3 , 17)	
	Fork bottom bridge pinch bolt	2	10	49 (5.0 , 36)	
	Front brake hose clamp bolt (fork side)	2	6	10 (1.0 , 7)	
	Steering stem nut	1	24	103 (10.5 , 76)	Page 13-27
	Steering bearing adjustment nut	1	26	25 (2.5 , 18)	
	Steering bearing adjustment nut lock nut	1	26		
	Front brake hose clamp bolt (stem side)	1	6	10 (1.0 , 7)	
	Front brake hose 3-way joint bolt	1	6	10 (1.0 , 7)	
REAR WHEEL/SUSPENSION:					
	Rear axle nut	1	18	93 (9.5 , 69)	
	Rear brake disc bolt	4	8	42 (4.3 , 31)	NOTE 8
	Final driven sprocket nut	5	12	108 (11.0 , 80)	NOTE 7
	Shock absorber upper mounting bolt	1	10	44 (4.5 , 33)	NOTE 8
	Shock absorber lower mounting nut	1	10	44 (4.5 , 33)	NOTE 7
	Shock arm-to-swingarm nut	1	10	44 (4.5 , 33)	NOTE 7
	Shock arm-to-shock link nut	1	10	44 (4.5 , 33)	NOTE 7
	Shock link-to-bracket nut	1	10	44 (4.5 , 33)	NOTE 7
	Swingarm pivot nut	1	18	93 (9.5 , 69)	NOTE 7
	Drive chain slider bolt	2	6	9 (0.9 , 6.5)	NOTE 8
	Rear brake hose clamp screw	2	5	4 (0.43 , 3.1)	NOTE 8
HYDRAULIC BRAKE:					
	Brake caliper bleed valve	3	8	6 (0.6 , 4.3)	
	Pad pin plug	3	10	2 (0.25 , 1.8)	
	Pad pin	3	10	18 (1.8 , 13)	
	Brake hose oil bolt	5	10	34 (3.5 , 25)	
	Front brake lever pivot nut	1	6	6 (0.6 , 4.3)	
	Front brake fluid reservoir mounting nut	1	6	6 (0.6 , 4.3)	NOTE 7
	Rear brake fluid reservoir mounting bolt	1	6	9 (0.9 , 6.5)	
	Rear master cylinder mounting bolt	2	6	10 (1.0 , 7)	
	Rear master cylinder joint nut	1	8	18 (1.8 , 13)	
	Front brake caliper mounting bolt	4	8	30 (3.1 , 22)	NOTE 8
	Front brake caliper assembly bolt	8	8	32 (3.3 , 24)	NOTE 2
	Rear brake caliper bolt	1	8	23 (2.3 , 17)	
	Rear brake caliper pin bolt	1	12	27 (2.8 , 20)	NOTE 2
IGNITION SYSTEM:					
	Ignition coil mounting bolt	4	6	10 (1.0 , 7)	
LIGHTS/METERS/SWITCHES:					
	Side stand switch bolt	1	6	10 (1.0 , 7)	
	Ignition switch mounting bolt	2	8	25 (2.5 , 18)	
	Fan motor switch	1	16	18 (1.8 , 13)	
OTHERS:					
	Side stand pivot bolt	1	10	10 (1.0 , 7)	
	Side stand pivot lock nut	1	10	29 (3.0 , 22)	
	Side stand bracket bolt	1	10	44 (4.5 , 33)	NOTE 8
	Passenger footpeg bracket bolt	4	8	26 (2.7 , 20)	
	Bank sensor bolt	2	8	10 (1.0 , 7)	
	Seat rail upper mounting bolt	2	10	39 (4.0 , 29)	
	Seat rail lower mounting bolt	2	10	44 (4.5 , 33)	
	Gearshift pedal pivot bolt	1	8	26 (2.7 , 20)	

GENERAL INFORMATION

TOOLS

DESCRIPTION	TOOL NUMBER	REF. SECTION
Oil filter wrench	07HAA-PJ70100	3
Drive chain tool set	07HMH-MR10103	3
Oil pressure gauge	07506-3000000	4
Oil pressure gauge attachment	07510-4220100	4
Float level gauge	07401-0010000	5
Pilot screw wrench (Except SW type)	07908-4220201	5
Pilot screw wrench (SW type)	07KMA-MN90100	5
Bearing remover set	07936-GE00000	6
– Bearing remover shaft	07936-GE00100	6
– Bearing remover, 10 mm	07936-GE00200	6
– Sliding weight	07741-0010201	6, 14
Driver	07749-0010000	6, 9, 13, 14
Attachment, 28 × 30 mm	07946-1870100	6
Pilot, 10 mm	07746-0040100	6
Mechanical seal driver attachment	07945-4150400	6
Lock nut wrench	07HMA-MR70200	7
Lock nut wrench	07VMA-MBB0100	7
Valve spring compressor	07757-0010000	8
Valve guide remover, 5.5 mm	07742-0010000	8
Valve guide driver	07743-0020000	8
Valve guide reamer	07VMH-MBB0200	8
Valve seat cutter, 40 mm (IN/EX 45°)	07780-0010500	8
Flat cutter, 38.5 mm (IN 32°)	07780-0012400	8
Flat cutter, 35 mm (EX 32°)	07780-0012300	8
Interior cutter, 37.5 mm (IN/EX 60°)	07780-0014100	8
Cutter holder, 6 mm	07VMH-MBB0100	8
Snap ring pliers	07914-3230001	9, 15
Clutch center holder	07742-0050002	9
Attachment, 32 × 35 mm	07746-0010100	9, 14
Pilot, 17 mm	07746-0040400	9, 14
Attachment, 37 × 40 mm	07746-0010200	9, 14
Attachment, 42 × 47 mm	07746-0010300	9, 13, 14
Gear holder	07724-0010100	9
Flywheel holder	07725-0040000	10
Rotor puller	07733-0020001	10
Inner driver C	07746-0030100	11
Attachment, 35 mm I.D.	07746-0030400	11
Bearing remover shaft	07746-0050100	13, 14
Bearing remover head, 20 mm	07746-0050600	13, 14
Pilot, 20 mm	07746-0040500	13, 14
Fork seal driver weight	07947-KA50100	13
Fork seal driver	07947-KF00100	13
Steering stem socket	07916-3710101	13
Ball race remover set	07946-KM90001	13
– Driver attachment A	07946-KM90100	13
– Driver attachment B	07946-KM90200	13
– Driver shaft assembly	07946-KM90300	13
– Bearing remover A	07946-KM90401	13
– Bearing remover B	07946-KM90500	13
– Assembly base	07946-KM90600	13
Steering stem driver	07946-MB00000	13

DESCRIPTION	TOOL NUMBER	REF. SECTION
Attachment, 52 × 55	07746-0010400	14
Pilot, 22 mm	07746-0041000	14
Pin driver	07GMD-KT80100	14
Attachment, 24 × 26 mm	07746-0010700	14
Driver shaft	07946-MJ00100	14
Needle bearing remover	07HMC-MR70100	14
Pilot, 28 mm	07746-0041100	14
Bearing remover, 17 mm	07936-3710300	14
Bearing remover handle	07936-3710100	14
Peak voltage adaptor	07HGJ-0020100	17
Inspection adaptor	07VMJ-0020100	17

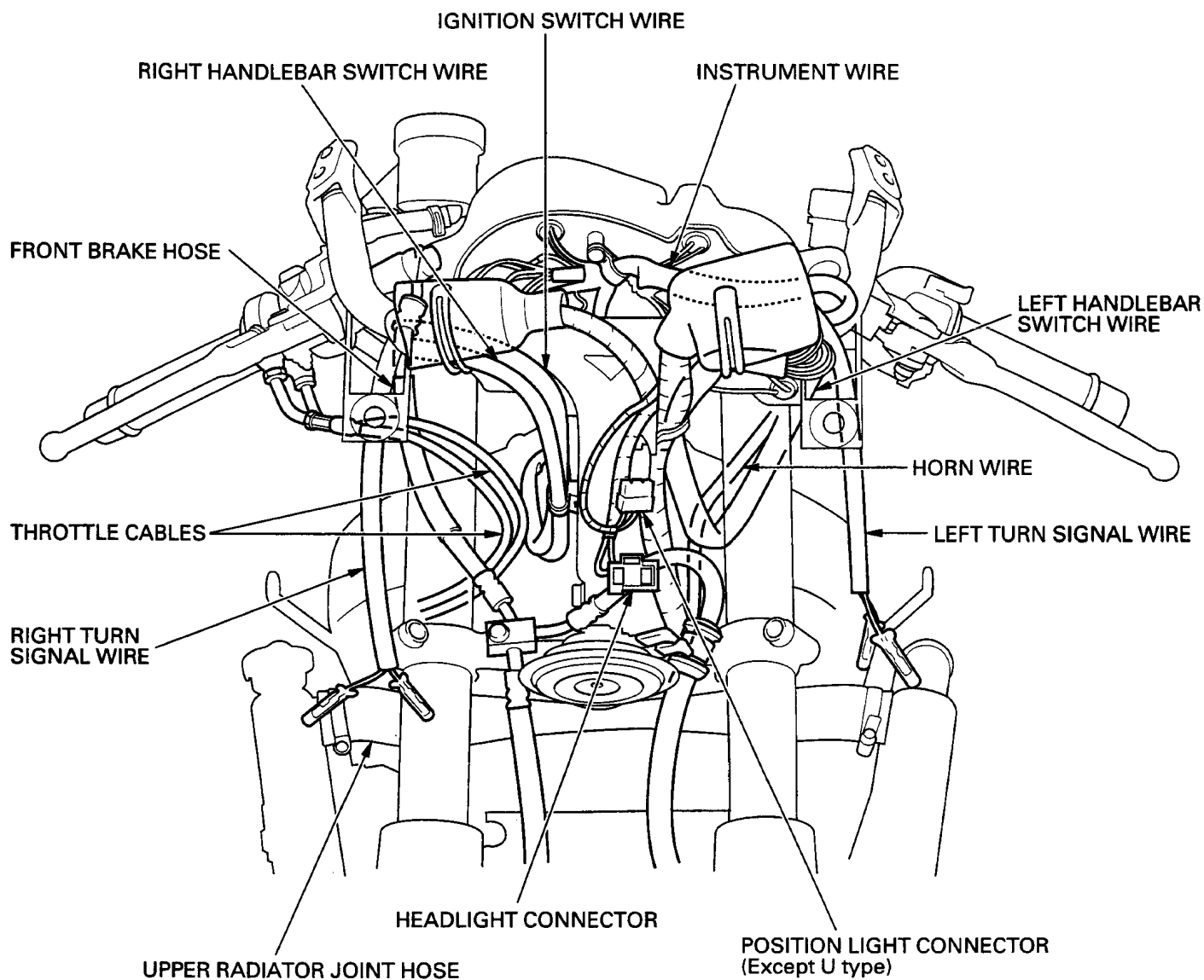
GENERAL INFORMATION

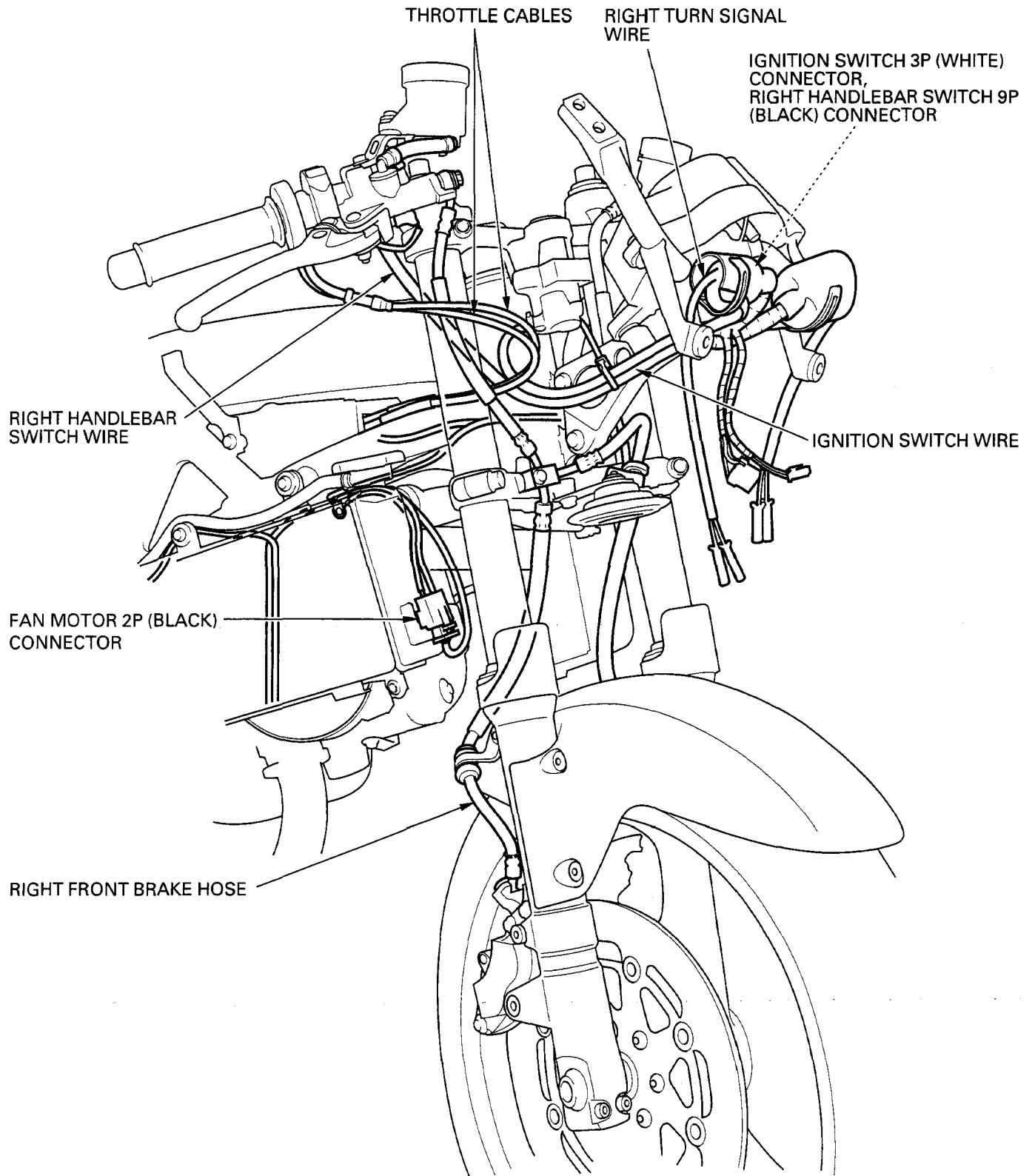
LUBRICATION & SEAL POINTS

ENGINE	LOCATION	MATERIAL	REMARKS
	Crankcase mating surfaces Crankcase mating surfaces (right side) Crankcase mating surfaces (left side) Oil pan mating surface Cylinder head semi-circular area Cylinder head cover gasket mating surface (cover side) Oil pressure switch threads Thermosensor threads Alternator stator wire grommet seating surface	Sealant	See page 11-10 See page 6-14 See page 10-3 Do not apply to the sensor head.
	Crankshaft main journal bearing sliding surface Crankpin bearing sliding surface Connecting rod small end inner surface Valve stem sliding surface Valve lifter outer surface Camshaft journals and cam lobes Clutch outer sliding surface M3/4, C5, C6 gear shift fork grooves Each gear teeth and sliding surface Other rotating and sliding area	Molybdenum oil solution (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
	Primary drive gear and sub gear sliding surface	Molybdenum disulfide grease	
	Engine oil filter cartridge threads and seating surface Camshaft holder bolt threads and seating surface Cylinder head bolt threads and seating surface Clutch disc lining surface Clutch center lock nut threads and seating surface Primary drive gear bolt threads and seating surface Flywheel bolt threads and seating surface Piston outer surface and piston pin hole Piston ring whole surface Connecting rod bolt threads and seating surface 10 mm crankcase special bolt threads and seating surface Each bearing rotating area Each O-ring whole surface	Engine oil	
	Timing hole cap threads Crankshaft hole cap threads Each oil seal lips	Multi-purpose grease	
	Oil pump driven sprocket bolt threads Oil filter boss threads Reed valve cover bolt threads Breather plate bolt threads Cam sprocket bolt threads Cylinder head 12 mm sealing bolt threads Gearshift cam bolt threads Starter clutch bolt threads Cam chain tensioner bolt threads Cam chain guide bolt threads Crankcase 15 mm sealing bolt threads Crankcase 18 mm sealing bolt threads Crankcase 24 mm sealing bolt threads Mainshaft bearing set plate bolt threads Shift drum bearing set plate bolt threads	Locking agent	

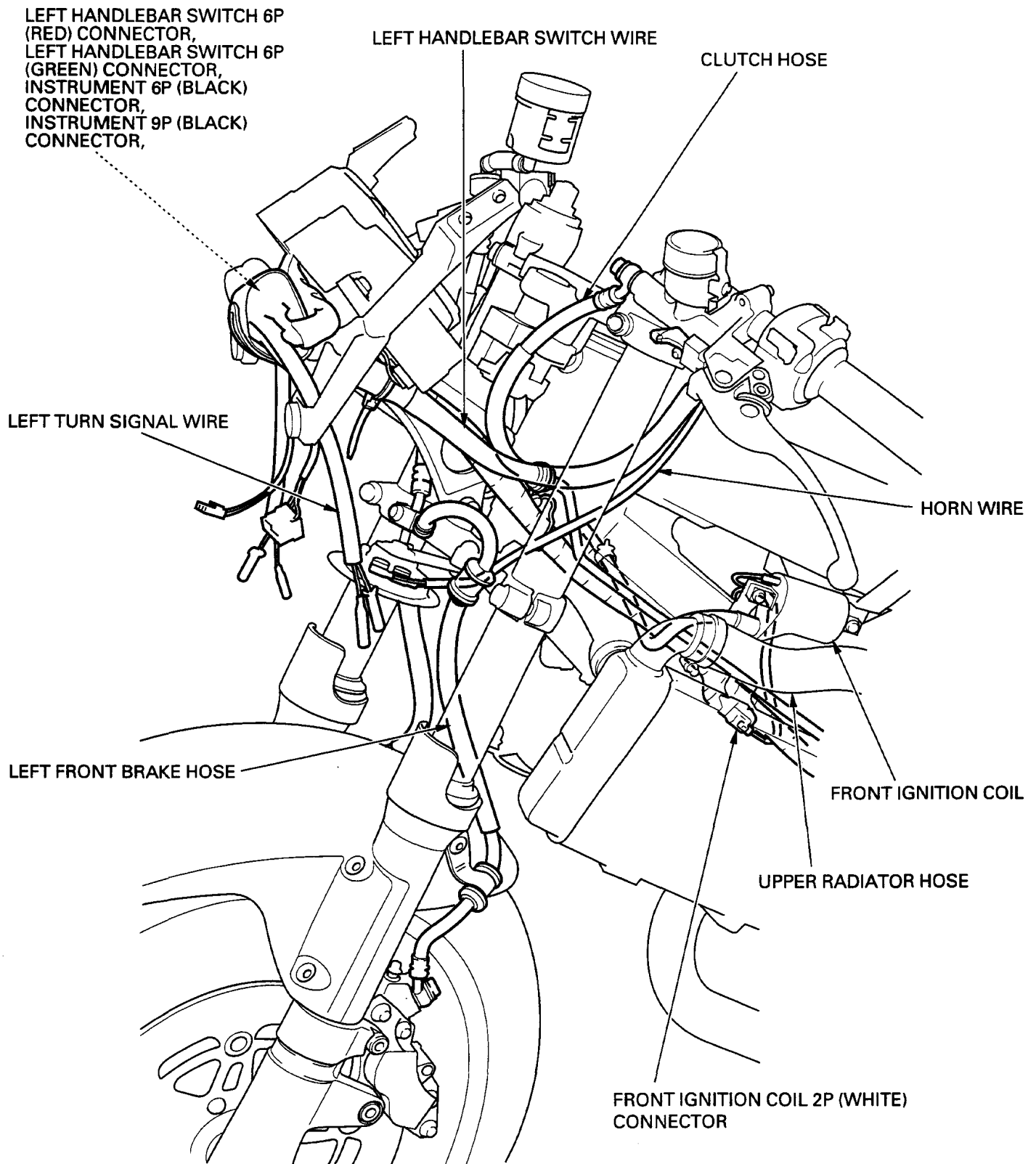
FRAME		
LOCATION	MATERIAL	REMARKS
Front wheel dust seal lips Rear wheel dust seal lips Rear wheel side collar inner surfaces Driver footpeg sliding area Passenger footpeg sliding area Throttle grip pipe flange Seat catch hook sliding area Gearshift pedal link tie-rod ball joints Gearshift pedal pivot Rear brake pedal pivot	Multi-purpose grease	
Side stand pivot Steering head bearings Steering head bearing dust seal lips Shock absorber dust seal lips Shock absorber needle bearing Shock arm and link dust seal lips Shock arm and link needle bearings Swingarm pivot bearings Swingarm pivot dust seal lips	Molybdenum disulfide grease	
Shock absorber spring adjuster cam surface	Molybdenum disulfide past	
Throttle cable outer inside Choke cable outer inside	Cable lubricant	
Left handlebar grip rubber inside	Honda bond A or equivalent	
Steering bearing adjustment nut threads	Engine oil	
Front brake lever-to-master piston contacting area Front brake lever pivot Rear brake caliper pin bolt sliding surfaces Rear brake master piston-to-push rod contacting area Clutch lever pivot Clutch lever joint piece-to-push rod contacting area Clutch master piston-to-push rod contacting area	Silicone grease	
Brake master piston and cups Brake caliper piston and piston seals Clutch master piston and cups	DOT 4 brake fluid	
Fork dust seal and oil seal lips	Fork fluid	
Clutch fluid reservoir mounting screw threads Fork socket bolt threads Front brake caliper assembly bolt threads Rear brake caliper pin bolt threads	Locking agent	

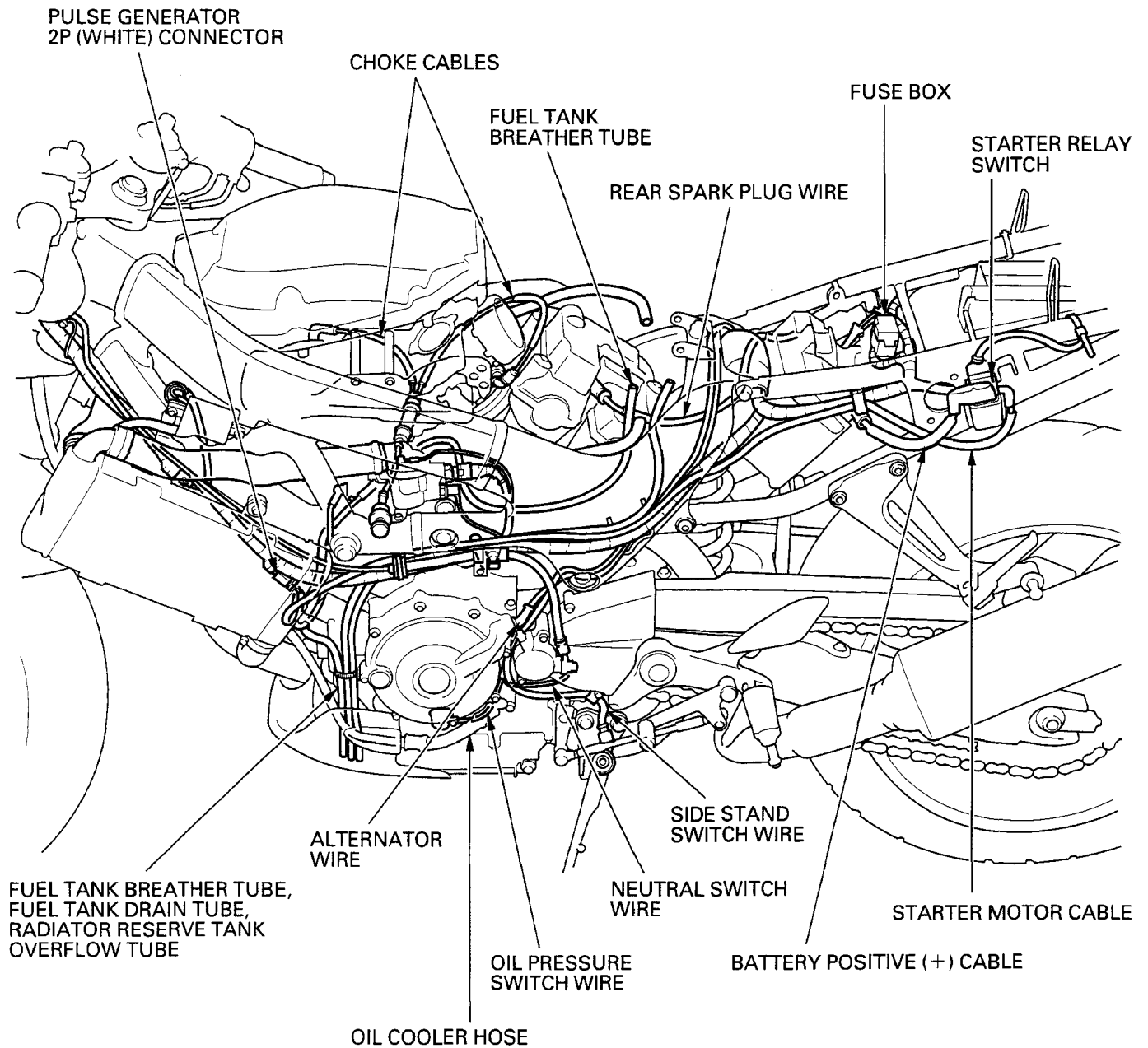
CABLE & HARNESS ROUTING



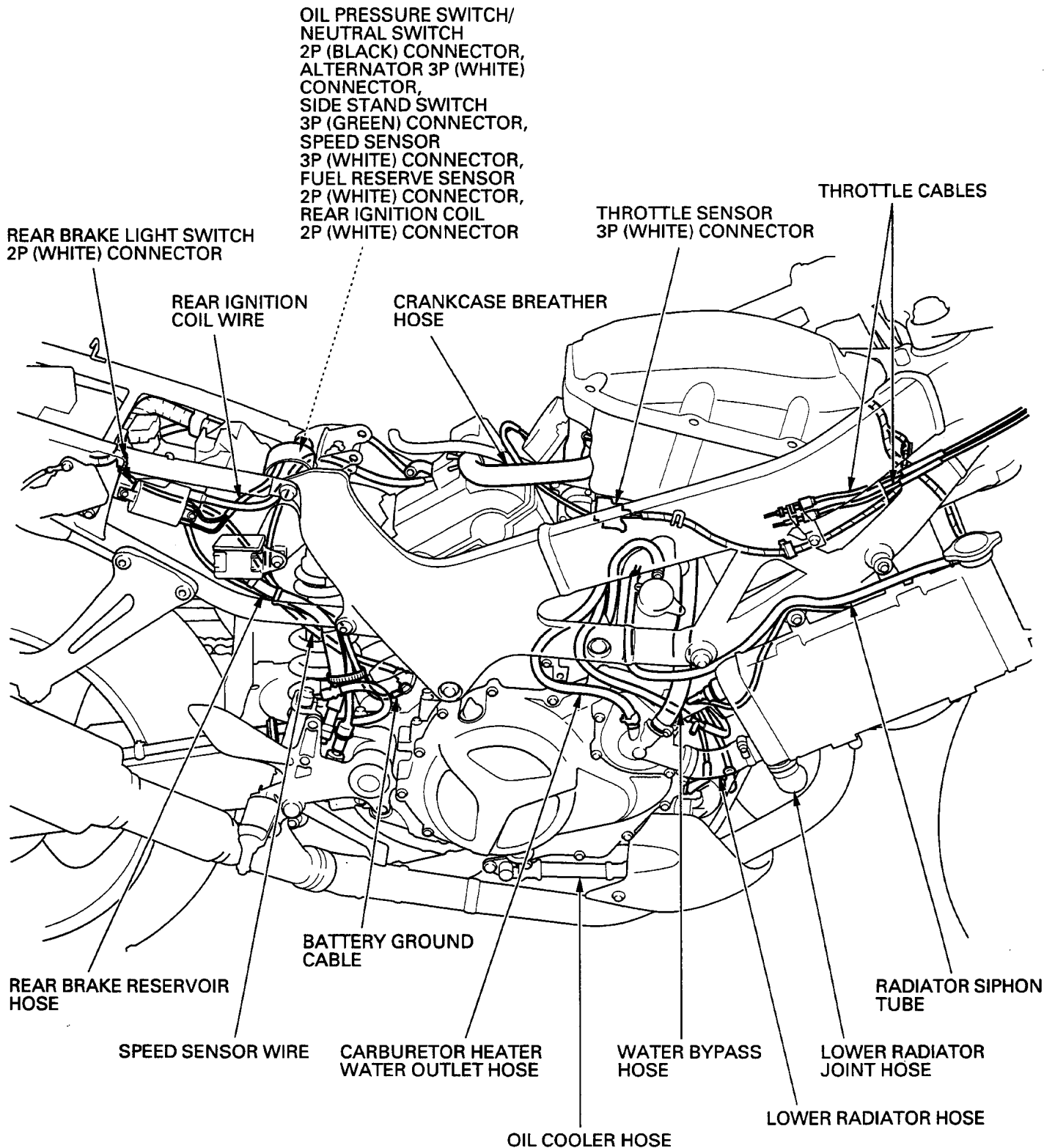


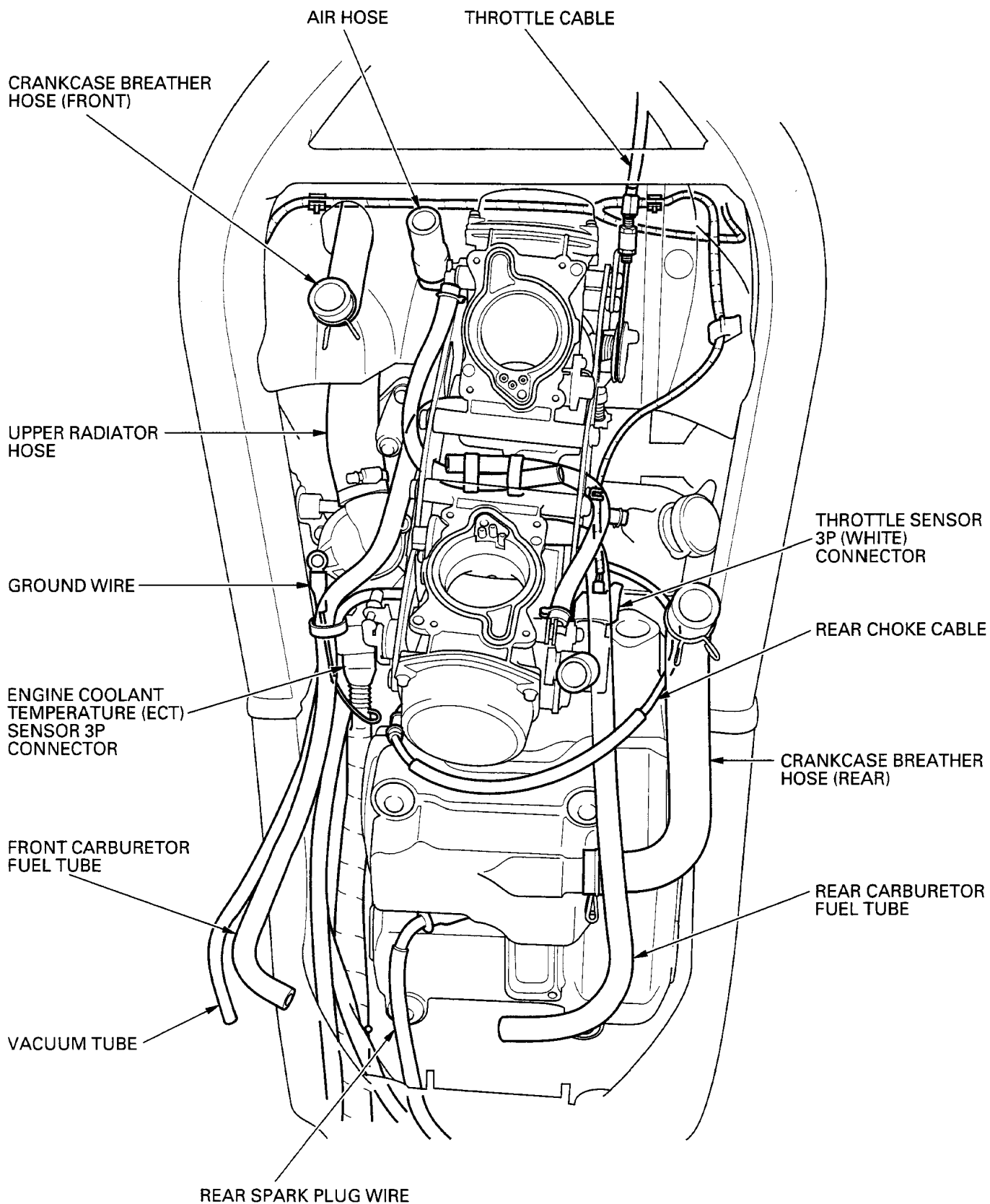
GENERAL INFORMATION



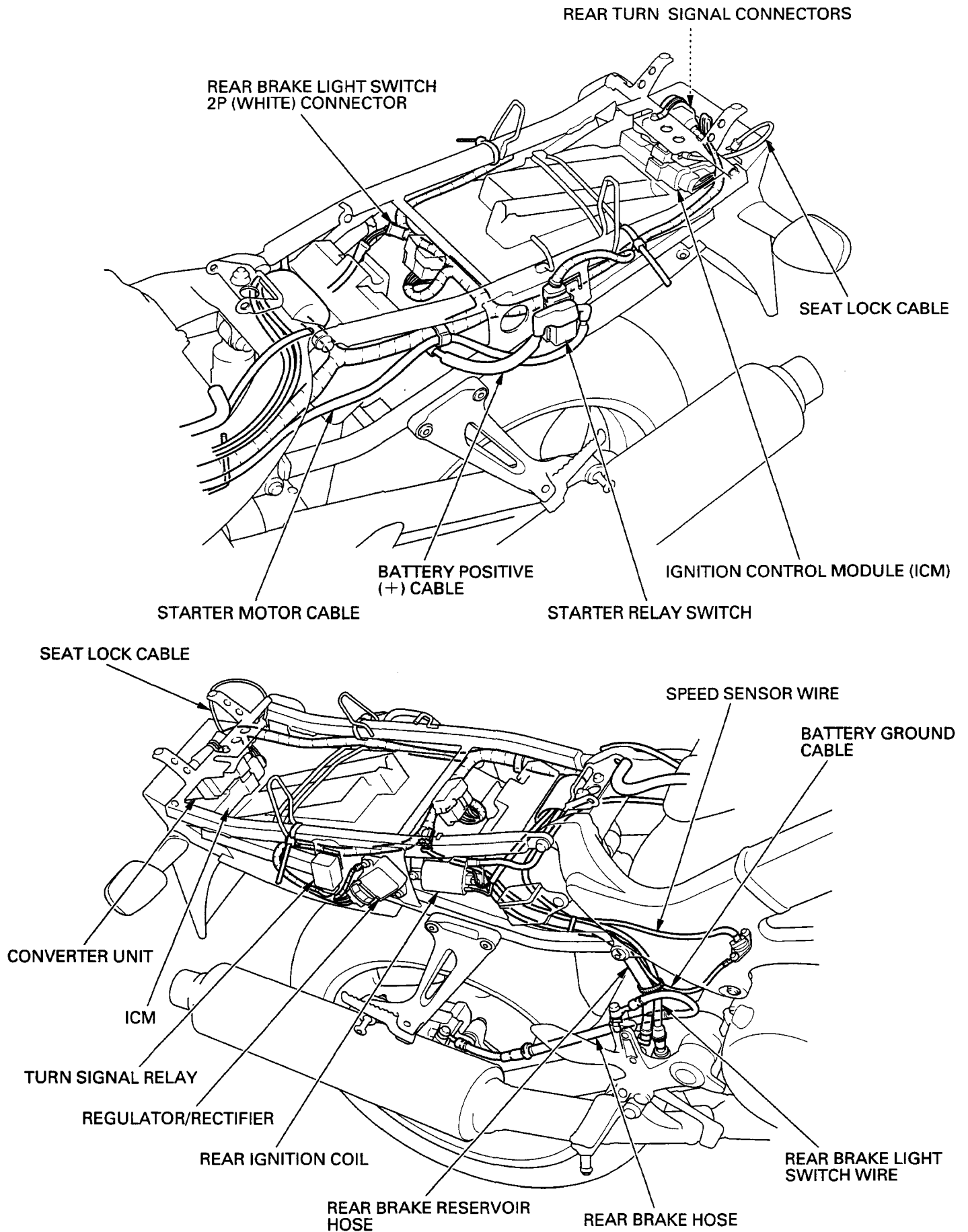


GENERAL INFORMATION





GENERAL INFORMATION



EMISSION CONTROL SYSTEMS

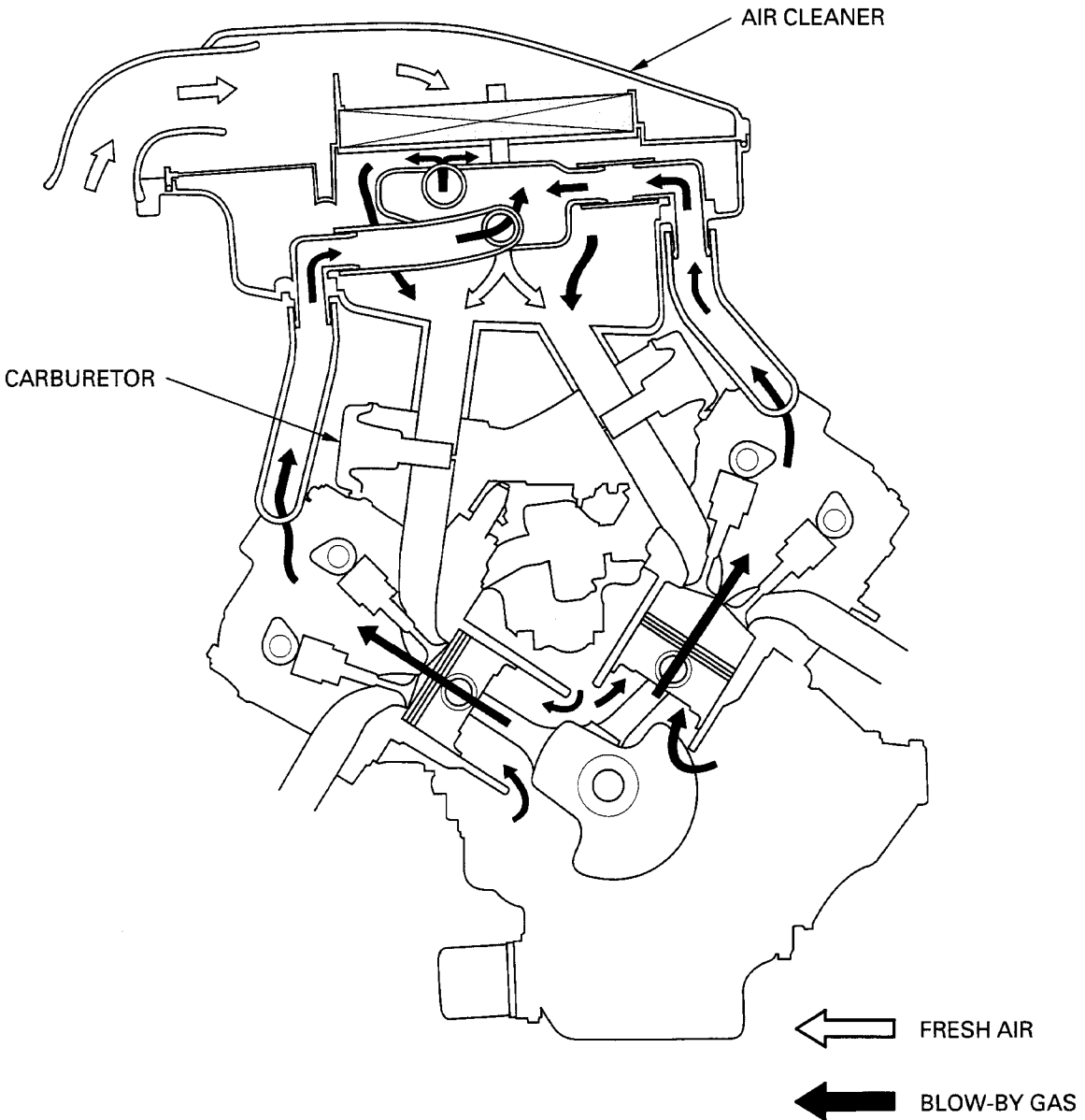
SOURCE OF EMISSIONS

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

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

CRANKCASE EMISSION CONTROL SYSTEM

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



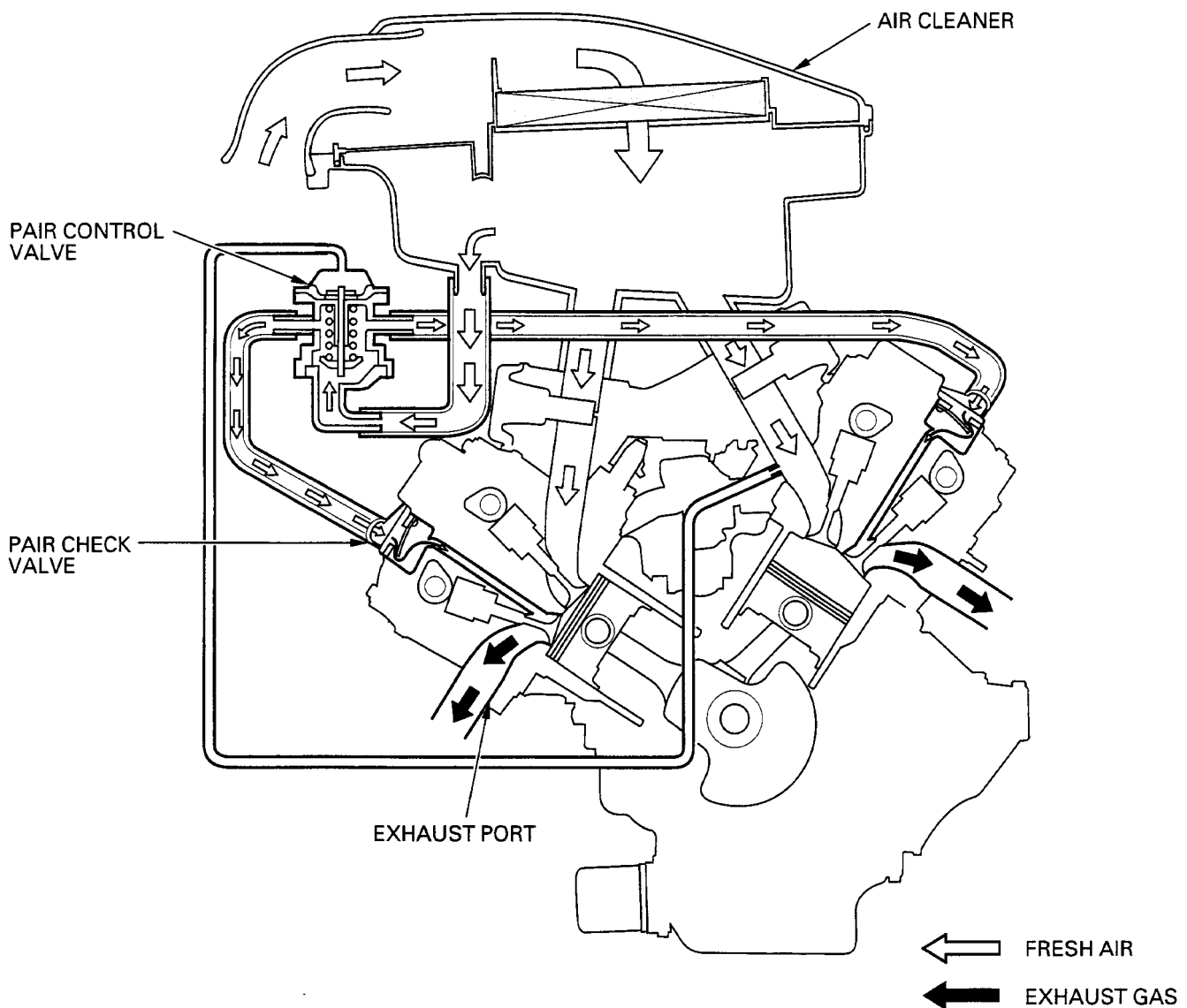
GENERAL INFORMATION

EXHAUST EMISSION CONTROL SYSTEM (PULSE SECONDARY AIR INJECTION SYSTEM) (SW, AR, IIG type only)

The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust port whenever there is a negative pressure pulse in the exhaust system. This charge of fresh air promotes burning of the unburned exhaust gases and changes a considerable amount of hydrocarbons and carbon monoxide into relatively harmless carbon dioxide and water vapor.

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

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



NOISE EMISSION CONTROL SYSTEM (U type only)

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

2. FRAME/BODY PANELS/EXHAUST SYSTEM

SERVICE INFORMATION	2-1	FRONT FAIRING	2-3
TROUBLESHOOTING	2-1	ENGINE UNDER COVER	2-4
SEAT	2-2	FUEL TANK	2-4
SEAT COWL	2-2	EXHAUST SYSTEM	2-5

SERVICE INFORMATION

GENERAL

▲WARNING

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

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

TORQUE VALUES

Exhaust pipe joint nut	12 N·m (1.2 kgf·m , 9 lbf·ft)
Muffler band bolt	26 N·m (2.7 kgf·m , 20 lbf·ft)

TROUBLESHOOTING

Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leaks

Poor performance

- Deformed exhaust system
- Exhaust gas leaks
- Clogged muffler

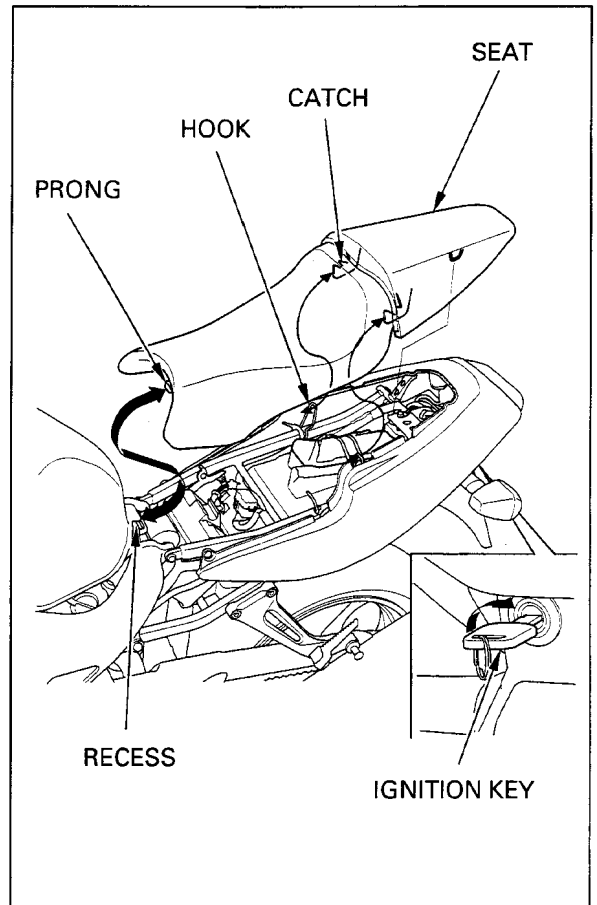
SEAT

REMOVAL

Unlock the seat with the ignition key.
Pull the seat back and remove it.

INSTALLATION

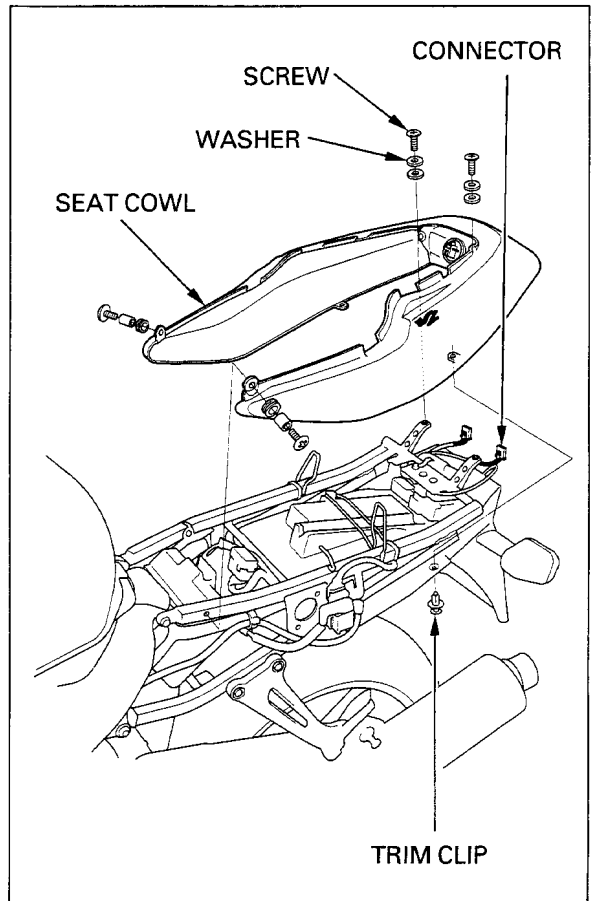
Install the seat, inserting the prong into the recess under the frame and the catches into the hooks of the frame.
Push the seat forward, then down to lock it.



SEAT COWL

Remove the seat.
Disconnect the taillight connectors.
Remove the two trim clips.
Remove the four screws, washers and the seat cowl.

Install the seat cowl in the reverse order of removal.



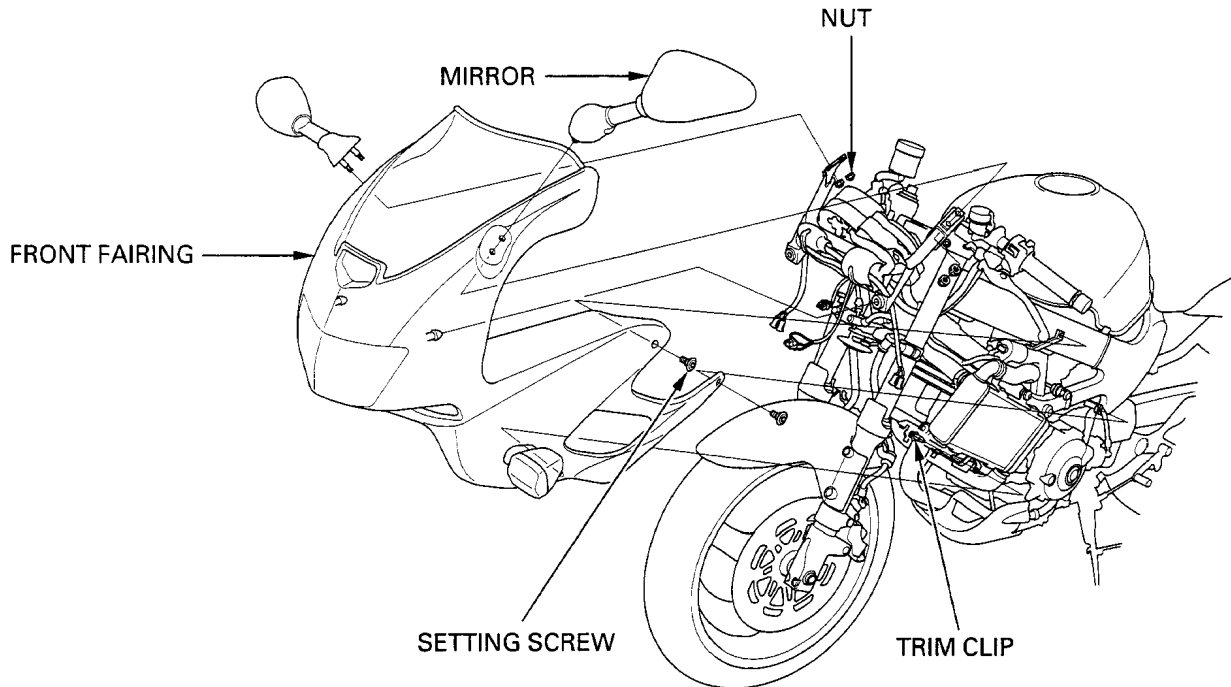
FRONT FAIRING

REMOVAL

Disconnect the front turn signal connectors.
 Remove the two trim clips.
 Remove the nuts and rear view mirrors.
 Remove the four setting bolts.
 Slide the front fairing forward, and disconnect the headlight connector and the position light connector (except U type).
 Remove the front fairing.

INSTALLATION

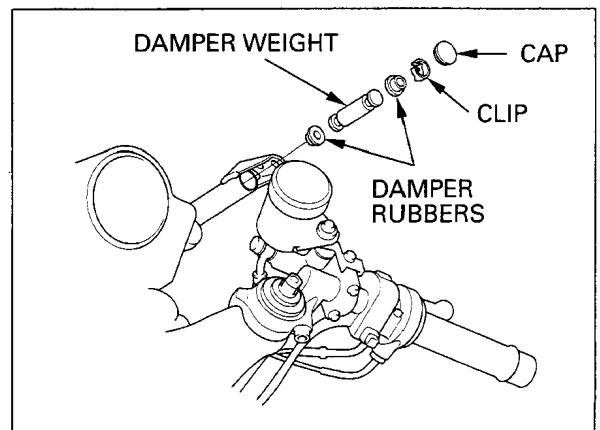
Install the front fairing, and connect the headlight and position light connectors.
 Insert the bosses of the front fairing into the grommets in the stay.
 Install the removed parts in the reverse order of removal.



DYNAMIC DAMPER REPLACEMENT

Remove the cap from the fairing stay end.
 Push the clip tabs in and remove the damper weight and rubbers from the fairing stay.

Install a new dynamic damper and the cap into the fairing stay.



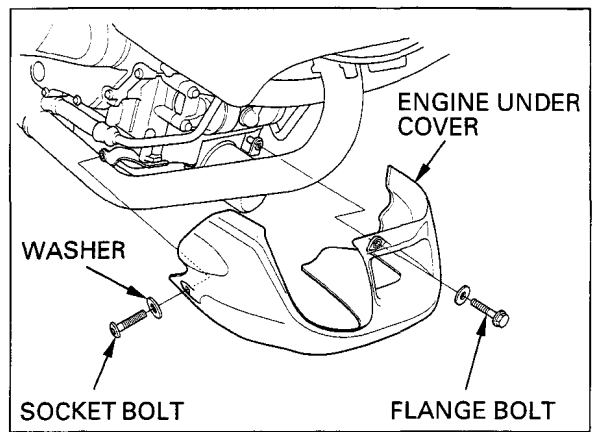
ENGINE UNDER COVER

Remove the two bolts, washers and the engine under cover.

Install the engine under cover and tighten the bolts.

NOTE:

Use the socket bolt for the right side mounting.



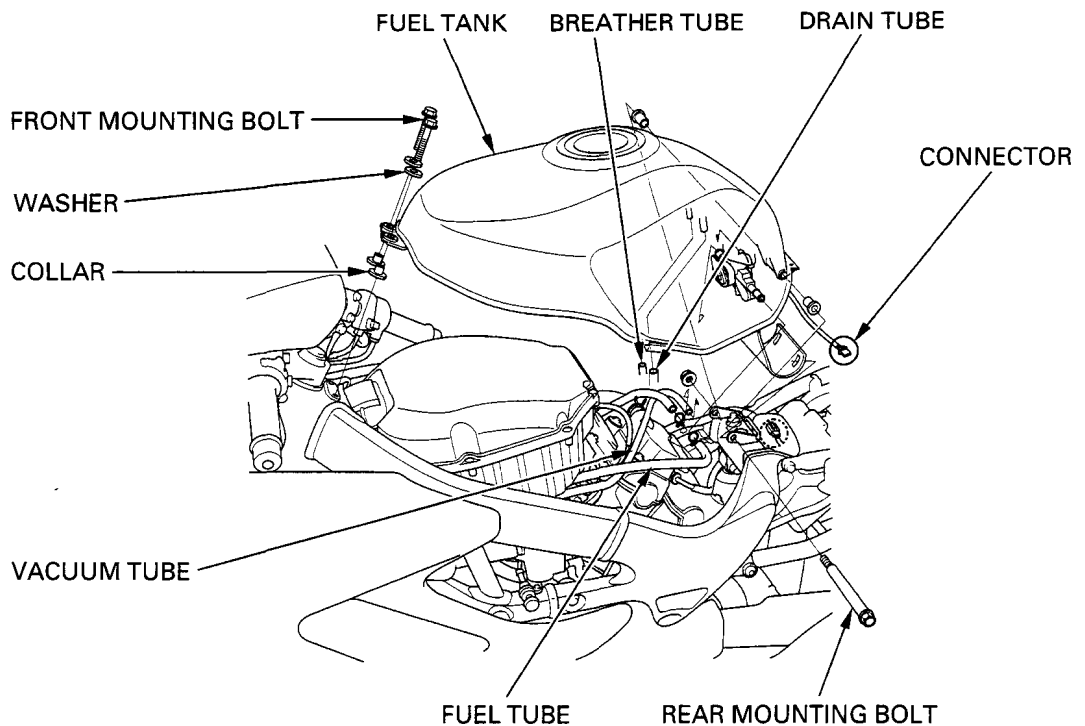
FUEL TANK

▲WARNING

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

Remove the seat (page 2-3).
Disconnect the fuel reserve sensor 2P connector.
Remove the front mounting bolts and washers, and raise the front of the fuel tank.
Disconnect the fuel tubes and vacuum tube from the fuel valve.
Disconnect the fuel tank breather tube and drain tube from the fuel tank.
Remove the rear mounting nut, bolt and the fuel tank.

Install the fuel tank in the reverse order of removal.



EXHAUST SYSTEM

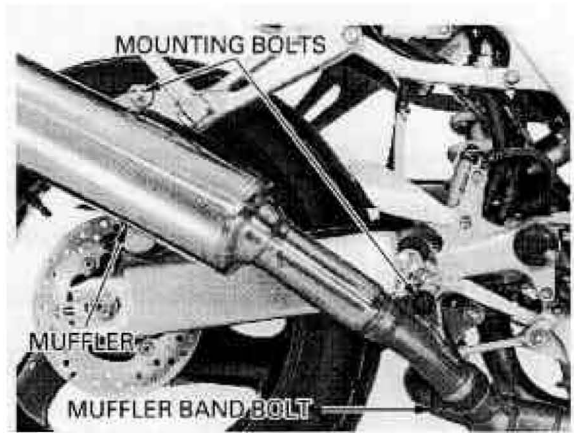
REMOVAL

▲WARNING

Do not service the exhaust system while it is hot.

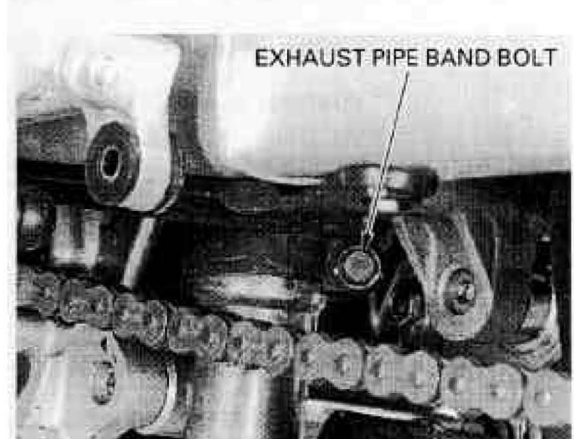
MUFFLER

Loosen the muffler band bolt.
Remove the upper and lower muffler mounting bolts, washers and the muffler.
Remove the muffler gasket.

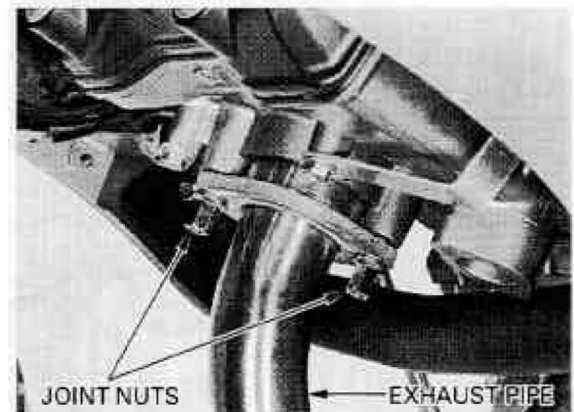


EXHAUST PIPE

Remove the left and right mufflers.
Remove the engine under cover (page 2-4).
Loosen the rear exhaust pipe band bolt.



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



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



INSTALLATION

EXHAUST PIPE

Install a new joint gasket and the rear exhaust pipe.
Tighten the joint nuts.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install a new gasket into the exhaust pipe.
Install new joint gasket and the exhaust pipe onto
the front cylinder head and rear exhaust pipe.
Tighten the joint nuts.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Tighten the rear exhaust pipe band bolt.

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

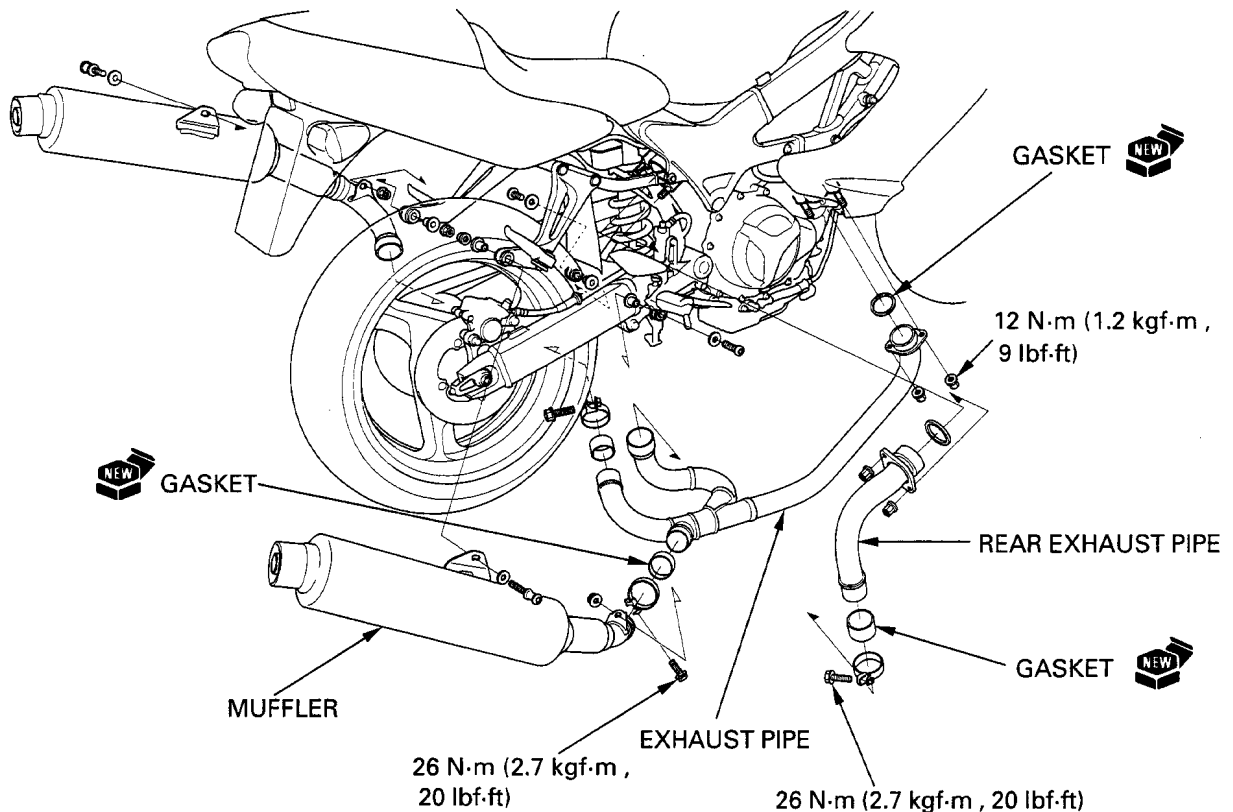
Install the engine under cover (page 2-4).

MUFFLER

Install the muffler onto the exhaust pipe, driver and
passenger footpeg brackets, and temporarily
tighten all bolts.
Tighten the muffler band bolt.

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

Tighten the muffler mounting bolts.



3. MAINTENANCE

SERVICE INFORMATION	3-1	DRIVE CHAIN	3-14
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COOLING SYSTEM	3-13	STEERING HEAD BEARINGS	3-25
SECONDARY AIR SUPPLY SYSTEM	3-14		

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		DPR9EVX-9 (NGK)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Valve clearance	Intake	0.16 mm (0.006 in)
	Exhaust	0.31 mm (0.012 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	After draining	3.7 ℓ (3.9 US qt , 3.3 Imp qt)
	After draining/filter change	3.9 ℓ (4.1 US qt , 3.4 Imp qt)
	After disassembly	4.5 ℓ (4.8 US qt , 4.0 Imp qt)
Carburetor vacuum difference		20 mm Hg (0.8 in Hg)

MAINTENANCE

ITEM		SPECIFICATIONS	
Engine idle speed	Except SW, AR, IIG type		1,100 ± 100 min ⁻¹ (rpm)
	AR, IIG type		1,200 ± 100 min ⁻¹ (rpm)
	SW type		1,200 ± 50 min ⁻¹ (rpm)
Drive chain slack			30–40 mm (1.2–1.6 in)
Recommended brake fluid			DOT 4
Recommended clutch fluid			DOT 4 brake fluid
Cold tire pressure	Driver only	Front	250 kPa (2.50 kgf/cm ² , 36 psi)
		Rear	290 kPa (2.90 kgf/cm ² , 42 psi)
	Driver and passenger	Front	250 kPa (2.50 kgf/cm ² , 36 psi)
		Rear	290 kPa (2.90 kgf/cm ² , 42 psi)
Tire size		Front	120/70ZR17 (58W)
		Rear	180/55ZR17 (73W)
Tire brand	DUNLOP	Front	D204FK
		Rear	D204K
	MICHELIN	Front	MACADAM 90X G
		Rear	MACADAM 90X G
Minimum tread depth		Front	1.5 mm (0.06 in)
		Rear	2.0 mm (0.08 in)

TORQUE VALUES

Spark plug	14 N·m (1.4 kgf·m , 10 lbf·ft)	
Crankshaft hole cap	15 N·m (1.5 kgf·m , 11 lbf·ft)	Apply grease to the threads.
Timing hole cap	10 N·m (1.0 kgf·m , 7 lbf·ft)	Apply grease to the threads.
Oil filter cartridge	10 N·m (1.0 kgf·m , 7 lbf·ft)	Apply oil to the threads and O-ring.
Engine oil drain bolt	29 N·m (3.0 kgf·m , 22 lbf·ft)	
Vacuum port socket bolt	3 N·m (0.34 kgf·m , 2.5 lbf·ft)	
Rear axle nut	93 N·m (9.5 kgf·m , 69 lbf·ft)	
Rear reservoir mounting bolt	9 N·m (0.9 kgf·m , 6.5 lbf·ft)	
Clutch reservoir stopper plate screw	1 N·m (0.12 kgf·m , 0.9 lbf·ft)	

TOOL

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

MAINTENANCE SCHEDULE

Perform the PRE-RIDE INSPECTION in the Owner's Manual at each scheduled maintenance period.

I: Inspect and clean, adjust, lubricate or replace if necessary.

C: Clean

R: Replace

A: Adjust

L: Lubricate

The following 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
			× 1,000 km	1	6	12	18	24	30	36	
			× 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	
* CARBURETOR CHOKE					I		I		I	3-5	
* AIR CLEANER		NOTE 2				R			R	3-5	
SPARK PLUG					I		R		I	3-6	
* VALVE CLEARANCE							I			3-7	
ENGINE OIL			R		R		R		R	3-10	
ENGINE OIL FILTER			R		R		R		R	3-11	
* CARBURETOR SYNCHRONIZATION			I		I		I		I	3-12	
* ENGINE IDLE SPEED			I	I	I	I	I	I	I	3-13	
RADIATOR COOLANT		NOTE 3			I		I		R	3-13	
* COOLING SYSTEM					I		I		I	3-13	
* SECONDARY AIR SUPPLY SYSTEM		NOTE 4			I		I		I	3-14	
DRIVE CHAIN			Every 1,000 km (600 mi) I, L							I, L	3-14
DRIVE CHAIN SLIDER					I		I		I	3-18	
BRAKE FLUID		NOTE 3		I	I	R	I	I	R	3-18	
BRAKE PAD WEAR				I	I	I	I	I	I	3-19	
BRAKE SYSTEM			I		I		I		I	3-20	
* BRAKE LIGHT SWITCH					I		I		I	3-20	
* HEADLIGHT AIM					I		I		I	3-21	
CLUTCH SYSTEM					I		I		I	3-21	
CLUTCH FLUID		NOTE 3		I	I	R	I	I	R	3-22	
SIDE STAND					I		I		I	3-22	
* SUSPENSION					I		I		I	3-23	
* NUTS, BOLTS, FASTENERS			I		I		I		I	3-24	
** WHEELS/TIRES					I		I		I	3-25	
** STEERING HEAD BEARINGS			I		I		I		I	3-25	

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

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

Honda recommends that your authorized Honda dealer should road test your motorcycle after each periodic maintenance is carried out.

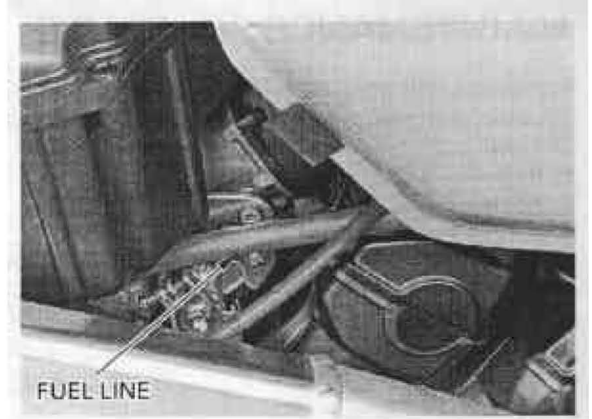
- NOTES:
- At higher odometer readings, repeat at the frequency interval established here.
 - Service more frequently when riding in unusually wet or dusty areas.
 - Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.
 - SW, AR and IIG type only.

FUEL LINE

Remove the fuel tank front mounting bolts and raise the front of the fuel tank (page 2-4).

Check the fuel lines for deterioration, damage or leakage.

Replace the fuel lines 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 cable 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.

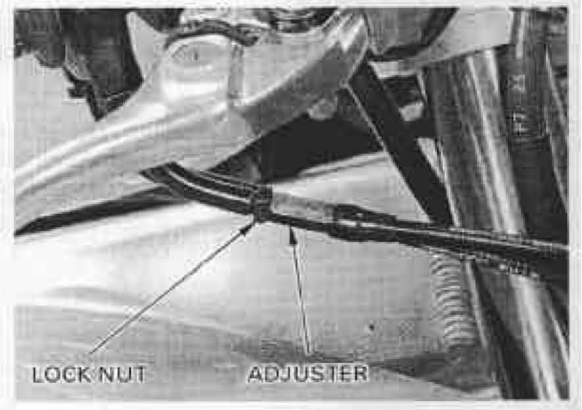
Measure the throttle grip free play at the throttle grip flange.

THROTTLE GRIP 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.

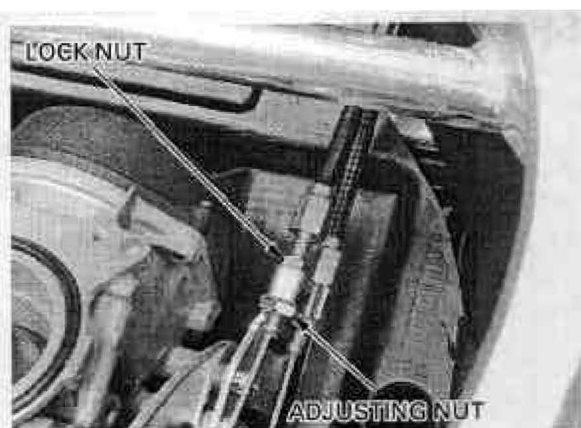
Loosen the lock nut, turn the adjuster as required and tighten the lock nut.



Major adjustments are made with the lower adjuster.

Remove the air cleaner housing (page 5-4). Loosen the lock nut, turn the adjusting nut as required and tighten the lock nut.

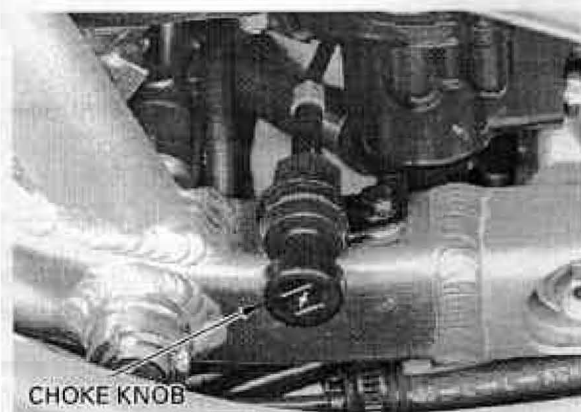
Recheck the throttle operation and install the air cleaner housing (page 5-4).



CARBURETOR CHOKE

This model's choke system uses a fuel enriching circuit controlled by a starting enrichment (SE) valve. The SE valve opens the enriching circuit via a cable when the choke knob on the left side of the frame is pulled out.

Check for smooth choke knob operation. If operation is not smooth, check the cable condition (page 5-17).



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 fuel tank (page 2-4).

Remove the eight air cleaner cover screws. Remove the air cleaner cover together with the element.

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

Install the air cleaner element and cover, and tighten the screws.

Install the fuel tank (page 2-4).



SPARK PLUG

Rear cylinder Remove the seat (page 2-2).

Remove the fuel tank rear mounting nut and bolt.

Rear cylinder Raise the rear of the fuel tank and support it with the maintenance bar.

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

NOTE:

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

Remove the spark plugs.

Check the insulator for cracks or damage, and the electrodes for wear, fouling or discoloration. Replace the plug if necessary. If the electrode is contaminated with carbon deposits, clean the electrode using the spark plug cleaner.

CAUTION:

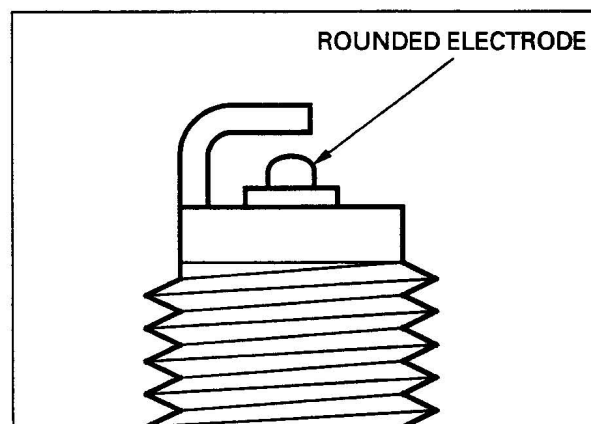
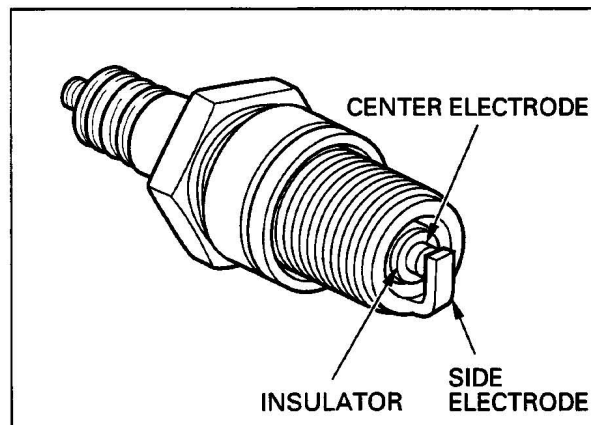
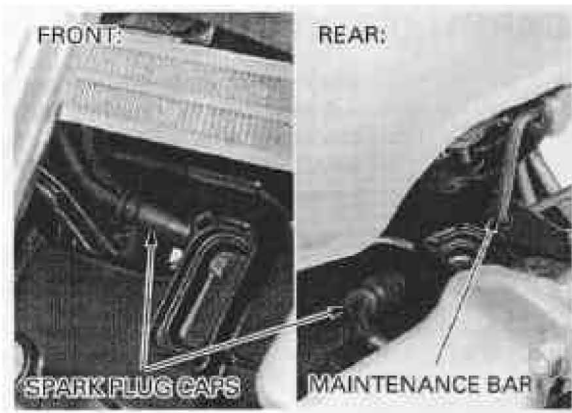
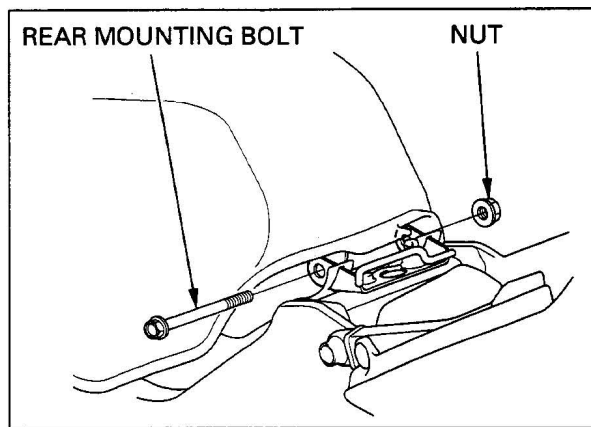
- *This motorcycle's spark plug is equipped with platinum type electrodes. Do not use wire brush to clean the electrodes.*
- *The plug cleaner should be used with the air pressure of less than 6 kgf/cm² (85 psi) and for less than 20 seconds.*

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

NOTE:

Always use specified spark plugs on this motorcycle.

SPECIFIED SPARK PLUG: DPR9EVX-9 (NGK)



Measure the spark plug gap between the center and side electrodes with a wire-type feeler gauge.

CAUTION:

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

Make sure that the 1.0 mm (0.04 in) wire type feeler gauge cannot be inserted into the gap. If the gauge can be inserted into the gap, replace the plug with a new one.

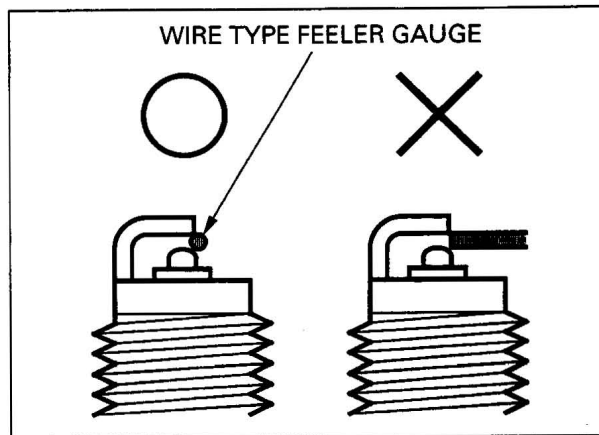
CAUTION:

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

With the plug washer attached, screw the spark plug in by hand to prevent cross-threading. Tighten the spark plug.

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

Install the removed part in the reverse order of removal.



VALVE CLEARANCE

INSPECTION

NOTE:

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

Remove the front and rear cylinder head covers (page 8-3).

Remove the timing hole cap and crankshaft hole cap.

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



MAINTENANCE

The timing marks ("F-I" for intake and "F-E" for exhaust) on the front cylinder cam sprockets must be flush with the cylinder head surface and facing outward as shown.

If the timing marks are facing inward, rotate the crankshaft counterclockwise 360° (1 full turn) and align the "F T" mark with the index mark.



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

VALVE CLEARANCES: IN: 0.16 mm (0.006 in)
EX: 0.31 mm (0.012 in)



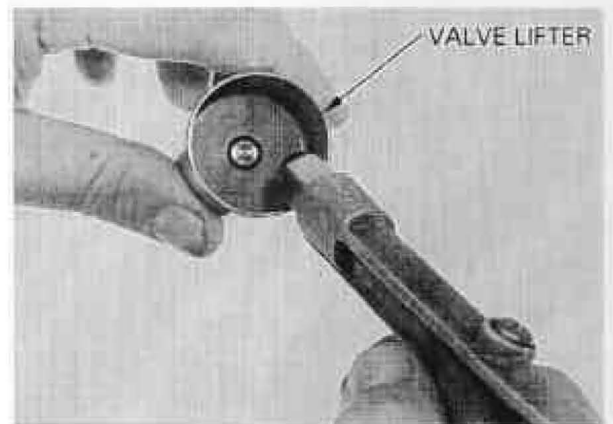
Rotate the crankshaft counterclockwise 270° and align the "R T" mark with index mark. Check the rear cylinder valve clearances.



ADJUSTMENT

Remove the valve lifters and shims (page 8-4).

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



Measure the shim thickness and record it.

NOTE:

Fifty-one different thickness shims are available from the thinnest (1.200 mm thickness) shim to the thickest (2.450 mm thickness) in intervals of 0.025 mm.

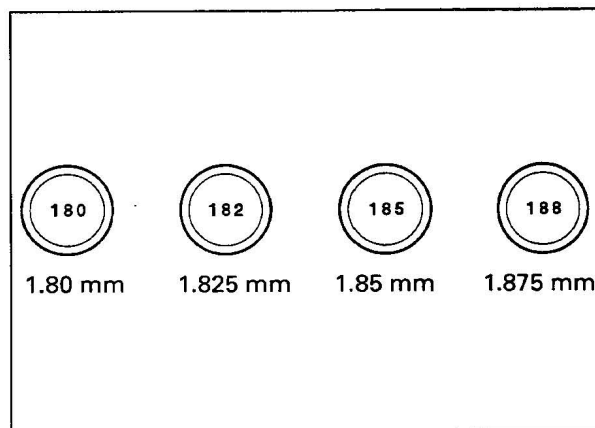
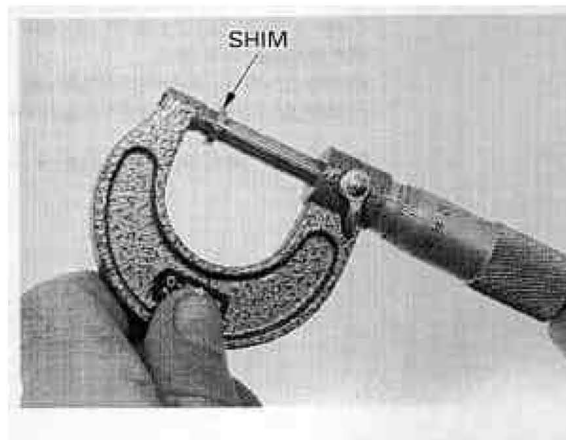
Calculate the new shim thickness using the equation below.

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

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

NOTE:

- Make sure of the correct shim thickness by measuring the shim with the micrometer.
- Reface the valve seat if carbon deposits result in a calculated dimension of over 2.450 mm.

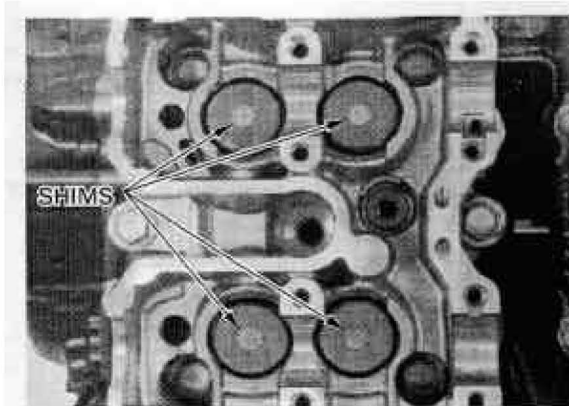


Install the newly selected shims on the valve retainers.

Install the valve lifters and camshafts (page 8-19).

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

Install the cylinder head covers (page 8-23).



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

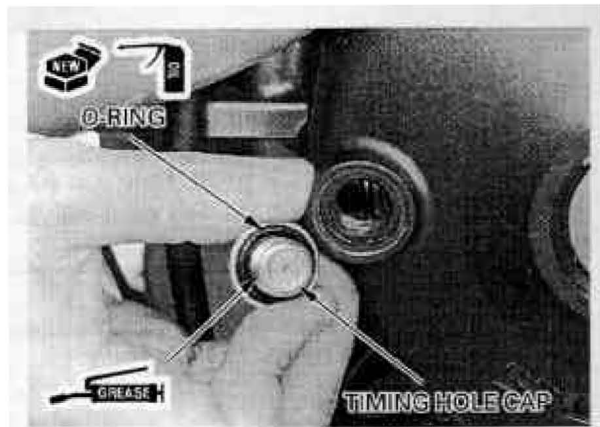
TORQUE: 15 N·m (1.5 kgf·m , 11 lbf·ft)



MAINTENANCE

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

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

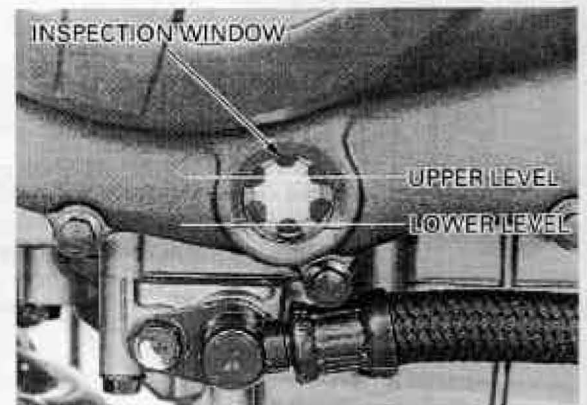


ENGINE OIL

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

Stop the engine, support the motorcycle upright on a level surface.

Wait for a few minutes and check that the oil level is between the upper and lower level marks in the inspection window.



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

RECOMMENDED ENGINE OIL:

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

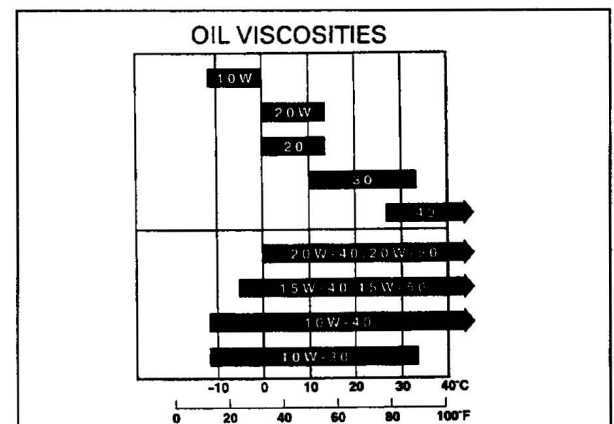


NOTE:

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

Reinstall the filler cap.

For engine oil change, see next page.



ENGINE OIL FILTER

NOTE:

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

▲ WARNING

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

Warm up the engine.
Stop the engine and remove the engine under cover (page 2-4).

Remove oil filler cap and drain bolt, and drain the oil.
Remove the oil filter cartridge and let the remaining oil drain out. Discard the filter cartridge.

TOOL:
Oil filter wrench 07HAA-PJ70100

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

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

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

After draining the oil completely check that the sealing washer on the drain bolt is in good condition and replace it if necessary.
Install and tighten the drain bolt.

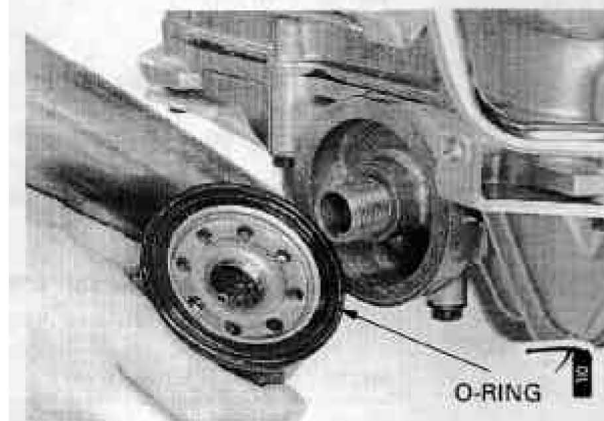
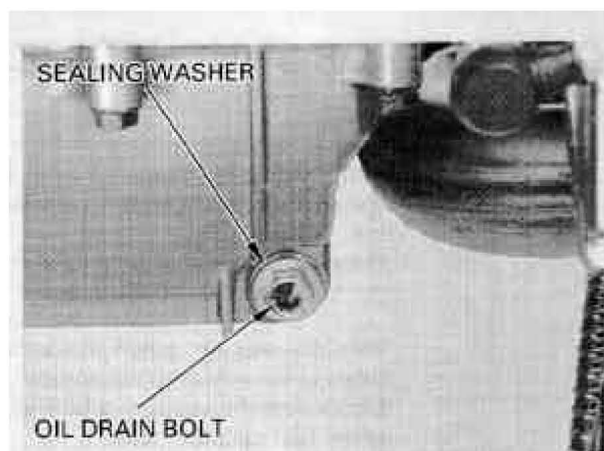
TORQUE: 29 N·m (3.0 kgf·m , 22 lbf·ft)

Fill the crankcase with the recommended oil (page 3-10).

OIL CAPACITY: 3.9 ℓ (4.1 US qt , 3.4 Imp qt)
 after draining/filter change
 4.5 ℓ (4.8 US qt , 4.0 Imp qt)
 at disassembly

Reinstall the oil filler cap.
Check the engine oil level (page 3-9).
Make sure there are no oil leaks.

Install the engine under cover (page 2-4).



CARBURETOR SYNCHRONIZATION

NOTE:

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

Place the motorcycle on a level surface.

Start the engine, pinch the vacuum tube using a tube clamp, and stop the engine.
Disconnect the vacuum tube from the vacuum joint of the rear cylinder head.

Remove the socket bolt and washer from the front cylinder head vacuum port.
Install the vacuum gauge attachment into the vacuum port.

Connect the vacuum gauge tubes to the attachment and vacuum joint.

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

IDLE SPEED:

Except SW, AR, IIG type: $1,100 \pm 100 \text{ min}^{-1}$ (rpm)

AR, IIG, type: $1,200 \pm 100 \text{ min}^{-1}$ (rpm)

SW type: $1,200 \pm 50 \text{ min}^{-1}$ (rpm)

Check the difference between the front and rear carburetors.

CARBURETOR VACUUM DIFFERENCE:

20 mm Hg (0.8 in Hg)

NOTE:

The base carburetor is the front carburetor.

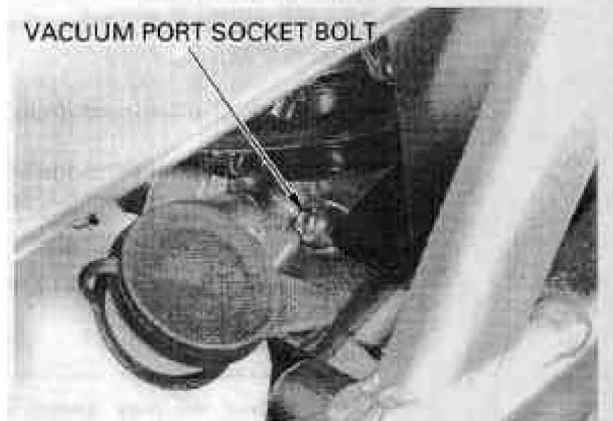
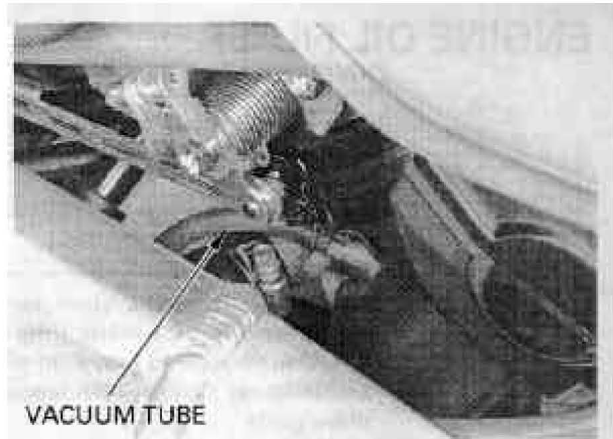
Synchronize to specification by turning the synchronization adjusting screw.

Rev the engine up several times.
Recheck the idle speed and synchronization.

Remove the vacuum gauge and attachment.
Install and tighten the vacuum port socket bolt.

TORQUE: 3 N·m (0.34 kgf·m , 2.5 lbf·ft)

Remove the tube clamp from the vacuum tube and connect the vacuum tube to the vacuum joint.



ENGINE IDLE SPEED

NOTE:

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

Warm up the engine, shift the transmission into neutral and place the motorcycle on its side stand on a level surface.

Check the idle speed and adjust by turning the throttle stop screw as required.

IDLE SPEED:

Except SW, AR, IIG type: $1,100 \pm 100 \text{ min}^{-1}$ (rpm)

AR, IIG type: $1,200 \pm 100 \text{ min}^{-1}$ (rpm)

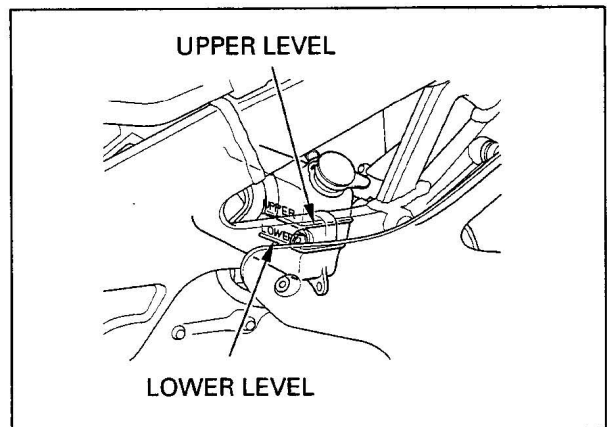
SW type: $1,200 \pm 50 \text{ min}^{-1}$ (rpm)



RADIATOR COOLANT

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

If the level is low, remove the reserve tank cap and fill the tank to the "UPPER" level line with a 50/50 mixture of distilled water and antifreeze.



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 reserve tank becomes completely empty, there is a possibility of air getting into the cooling system. Be sure to remove all air from the cooling system (page 6-6).



COOLING SYSTEM

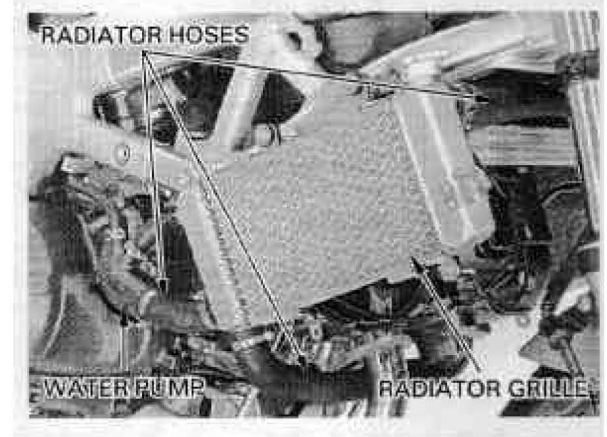
Remove the front fairing (page 2-3).

Check for any coolant leakage from the water pump, radiator hoses and hose joints.

Check the radiator hoses for cracks or deterioration and replace if necessary.

Check that all hose clamps are tight.

Remove the radiator grille.

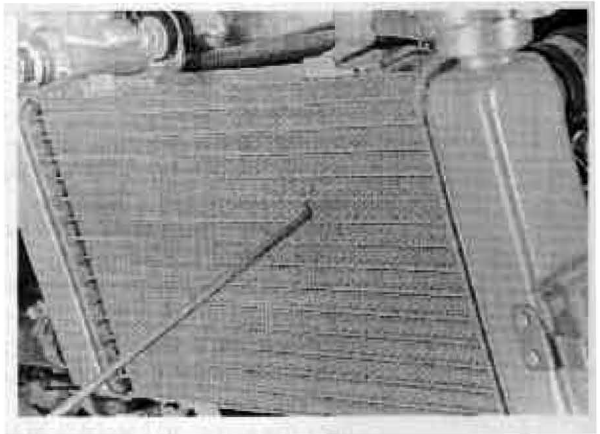


MAINTENANCE

Check the radiator air passage for clogging or damage.

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

Install the radiator grille and front fairing (page 2-3).



SECONDARY AIR SUPPLY SYSTEM

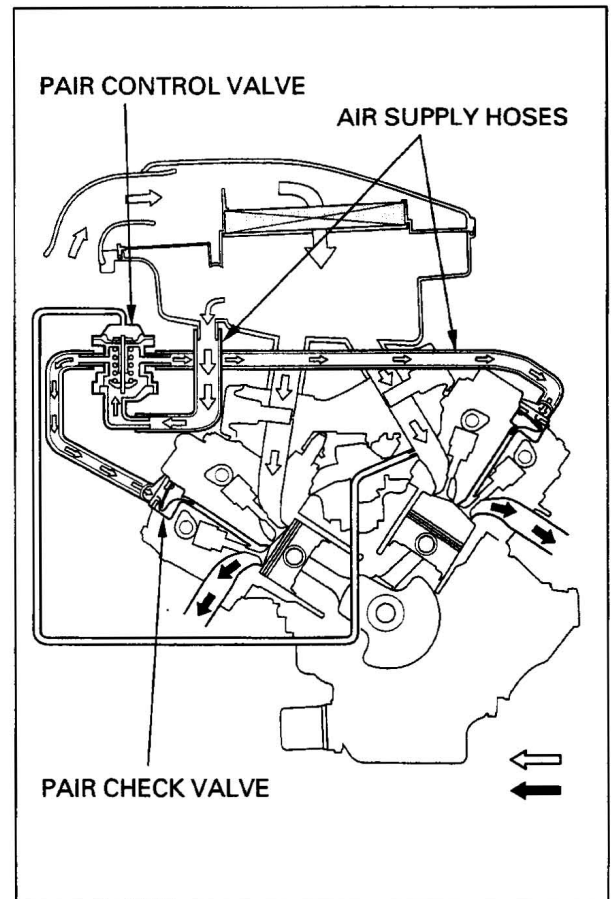
Check the air supply hoses between the pulse secondary air injection (PAIR) control valve and PAIR check valves for damage or loose connections. Check the air supply hoses for cracks or deterioration.

NOTE:

If the hoses show any signs of heat damage, inspect the PAIR check valves (page 5-20).

Check the vacuum tubes between the rear cylinder head vacuum joint and PAIR control valve for deterioration, damage or loose connections. Also check that the tubes are not kinked or pinched.

For PAIR control valve inspection, see page 5-19.



DRIVE CHAIN

CHAIN SLACK INSPECTION

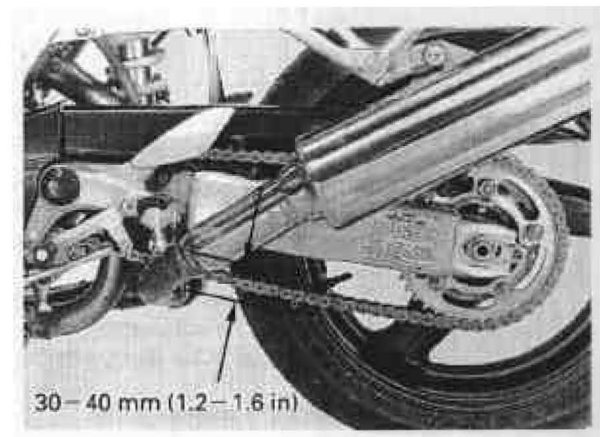
▲WARNING

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

Turn the ignition switch OFF, place the motorcycle on its side stand and shift the transmission into neutral.

Check the slack in the drive chain lower run mid-way between the sprockets.

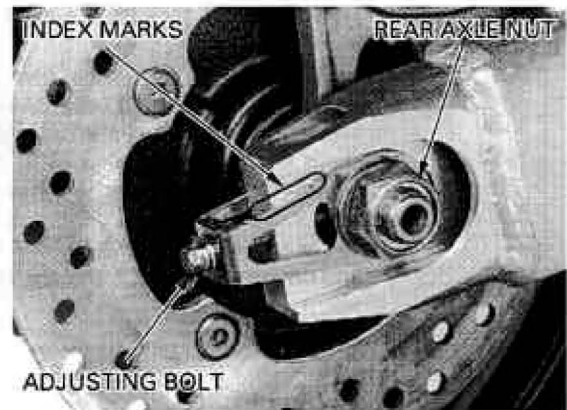
CHAIN SLACK: 30–40 mm (1.2–1.6 in)



ADJUSTMENT

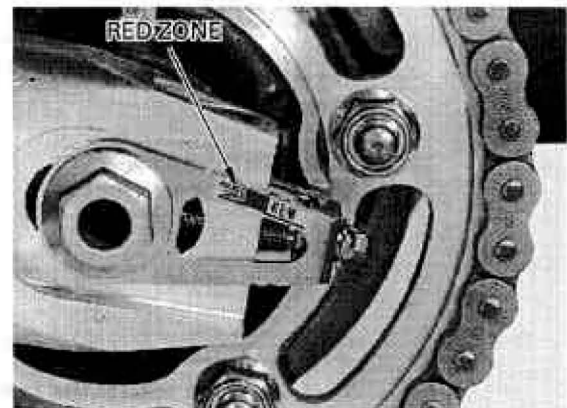
Loosen the rear axle nut.
Turn both adjusting bolts an equal number of turn until the correct drive chain slack is obtained. Make sure the index marks on both adjusters are aligned with the rear end of the swingarm. Tighten the rear axle nut.

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



Recheck the drive chain slack and free wheel rotation.

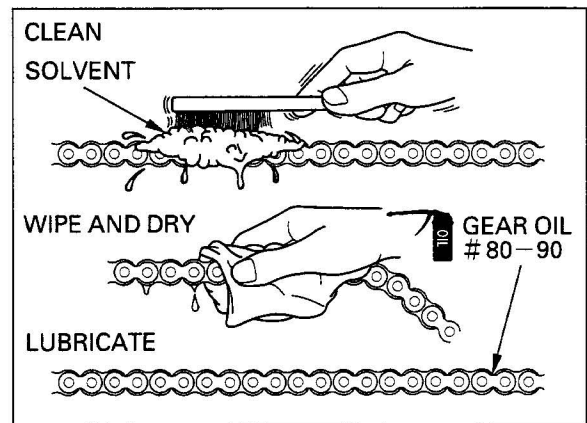
Check the drive chain wear indicator label attached on the left drive chain adjuster. If the red zone of the indicator label reaches the end of the swingarm, replace the drive chain with a new one (page 3-16).



CLEANING AND INSPECTION

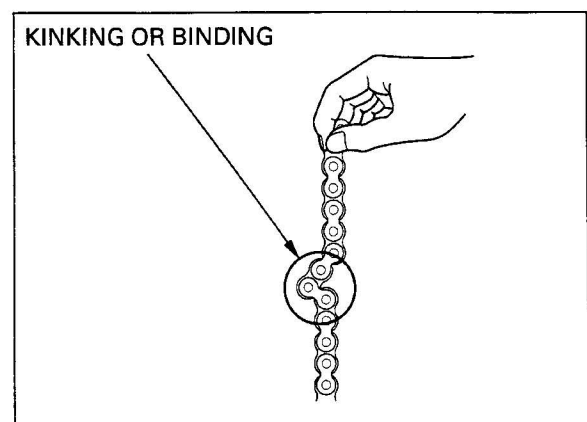
Clean the chain with a soft brush using a non-flammable or high flash point solvent and wipe it dry. Be sure the chain has dried completely before lubricating.

Inspect the drive chain for possible damage or wear. Replace any chain that has damaged rollers, loose fitting links, or otherwise appears unserviceable. Installing a new chain on badly worn sprockets will cause the new chain to wear quickly. Inspect and replace the sprockets as necessary.



LUBRICATION

Lubricate the drive chain with # 80–90 gear oil or equivalent chain lubricant designed for specifically for use on O-ring chains. Some commercially available chain lubricants may contain solvents which could damage the O-rings. Wipe off the excess chain lube.

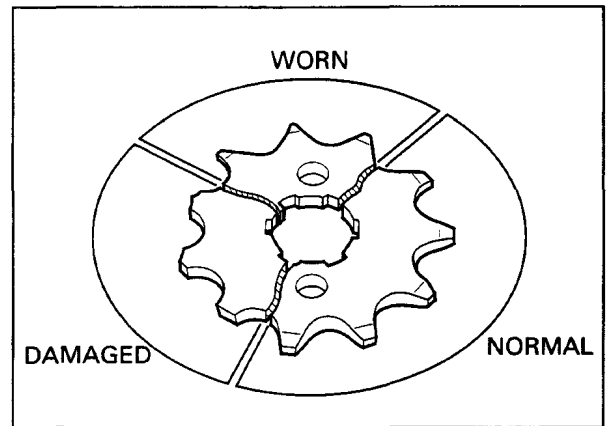


SPROCKET INSPECTION

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

Never use a worn chain on new sprockets. Both chain and sprockets must be in good condition, or the new replacement parts will wear rapidly.

Check the attachment bolt and nuts on the drive and driven sprockets. If any are loose, torque them.



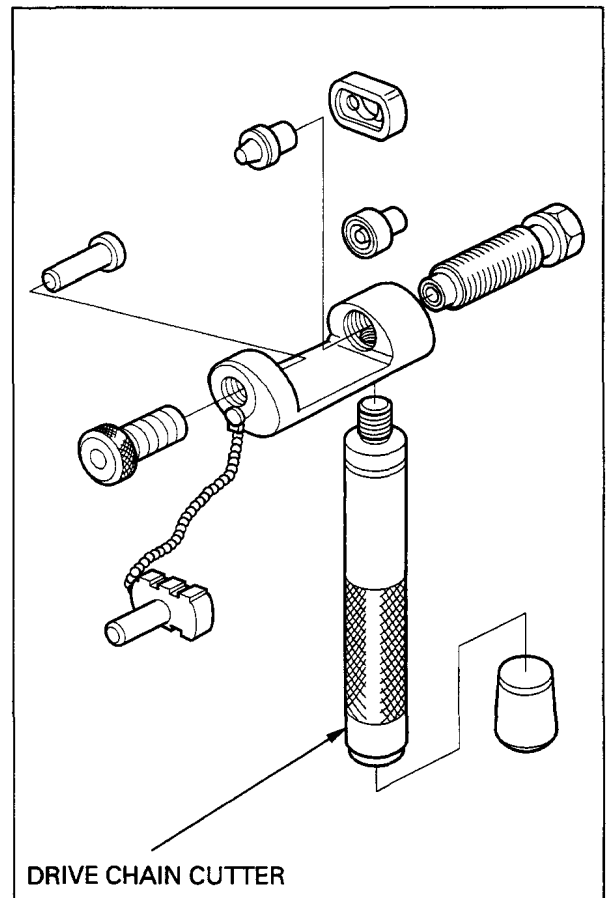
REPLACEMENT

This motorcycle uses a drive chain with a staked master link.

Loosen the drive chain.
Assemble the special tool.

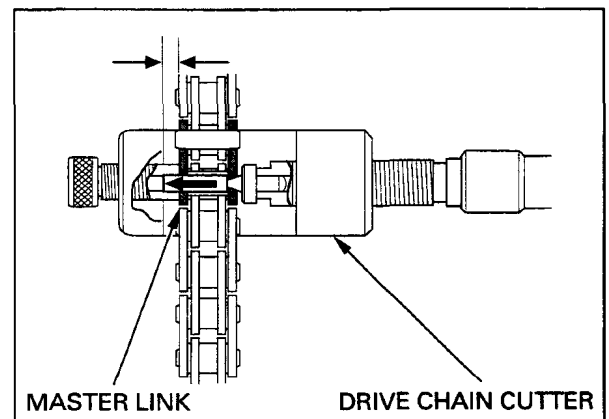
TOOL:
Drive chain tool set 07HMH-MR10103

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



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

Remove the drive chain.



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

NOTE:

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

SPECIFIED LINKS: 102 links
REPLACEMENT CHAIN: DID 50ZVM
 RK50LFOZ2

Remove the drive sprocket cover (page 7-4).
 Install the new drive chain on the sprockets over the drive and driven sprockets.

Assemble the new master link, O-rings and master link plate with the drive chain tool set.

NOTE:

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

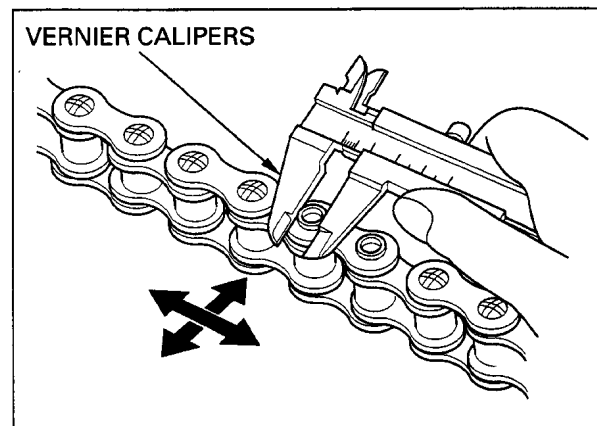
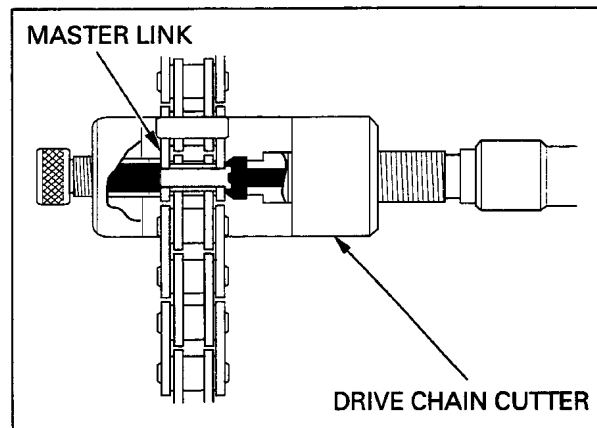
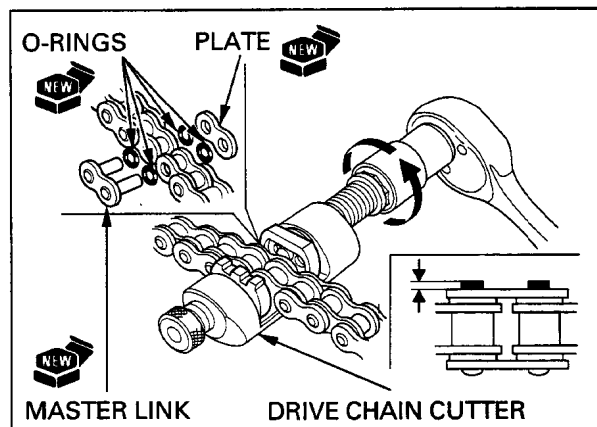
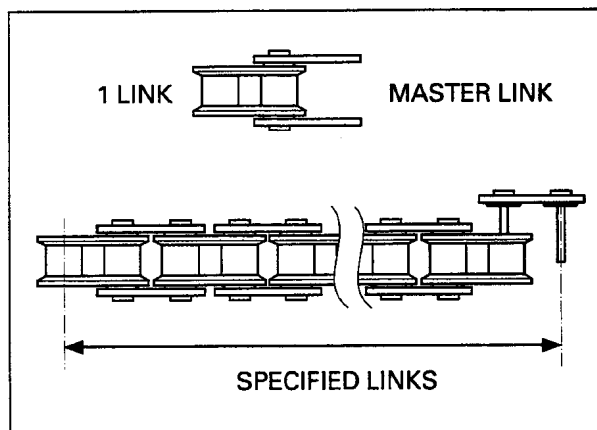
Measure the master link pin length projected from the plate.

SPECIFIED LENGTH:
DID: 1.30 – 1.50 mm (0.051 – 0.059 in)
RK: 1.20 – 1.40 mm (0.047 – 0.055 in)

Stake the master link pins with the drive chain tool set.

Make sure that the master link pins are staked properly by measuring the diameter of the staked area.

DIAMETER OF THE STAKED AREA:
DID: 5.50 – 5.80 mm (0.217 – 0.228 in)
RK: 5.45 – 5.85 mm (0.215 – 0.230 in)



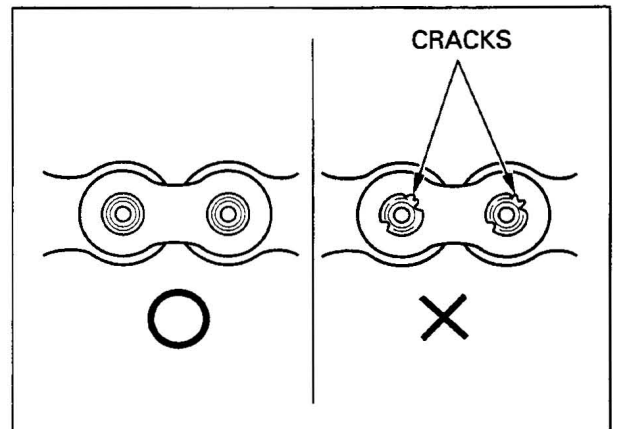
MAINTENANCE

After staking, check the staked area of the master link for cracks.
If there is any cracking, replace the master link, O-rings and plate.

CAUTION:

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

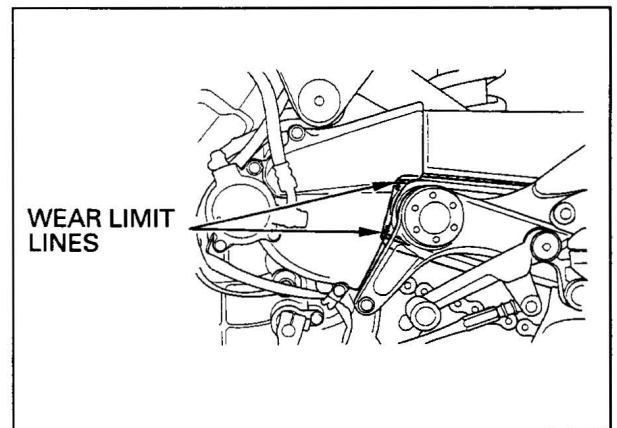
Install the drive sprocket cover (page7-11).



DRIVE CHAIN SLIDER

Check the drive chain slider for wear.
Replace the chain slider if it is worn to the wear limit line.

Refer to section 14 for drive chain slider replacement.



BRAKE FLUID

CAUTION:

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

NOTE:

When the fluid level is low, check the brake pads for wear (page 3-19). A low fluid level may be due to wear of the brake pads. If the brake pads are worn, the caliper pistons are pushed out, and this accounts for a low reservoir level.
If the brake pads are not worn and the fluid level is low, check entire system for leaks (page 3-20).

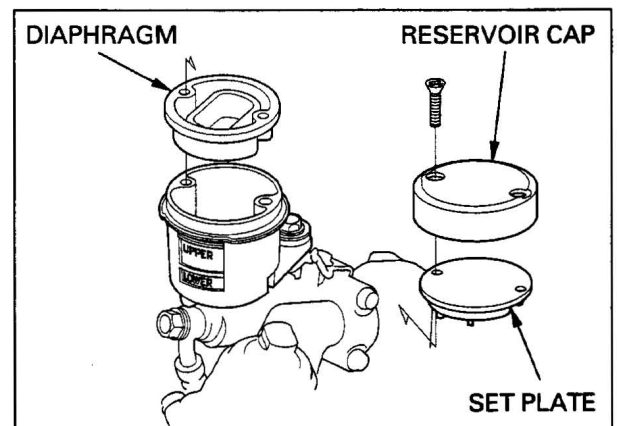


FRONT BRAKE

Turn the handlebar to the left side so that the reservoir is level and check the fluid level in the front brake reservoir.

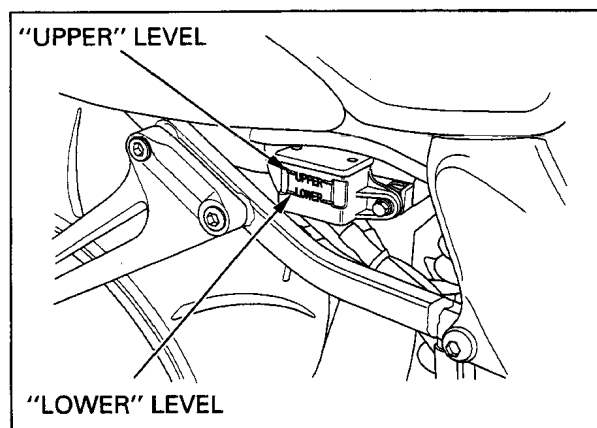
If the level is near the "LOWER" level line, remove the reservoir cap, set plate and diaphragm, and fill the reservoir with DOT 4 brake fluid from a sealed container to the "UPPER" level line.

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



REAR BRAKE

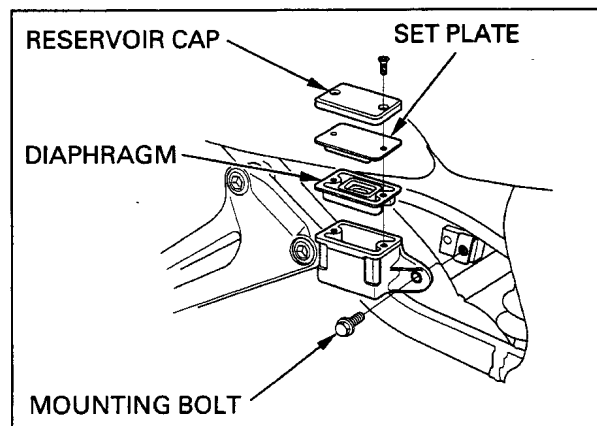
Place the motorcycle on a level surface, and support it upright.
Check the fluid level in the rear brake reservoir.



If the level is near the "LOWER" level line, remove the reservoir mounting bolt, reservoir cap, set plate and diaphragm, and fill the reservoir with DOT 4 brake fluid from a sealed container to the upper level line.

Install the diaphragm, set plate and reservoir cap and tighten the cap screws.
Install the reservoir onto the stay and tighten the mounting bolt.

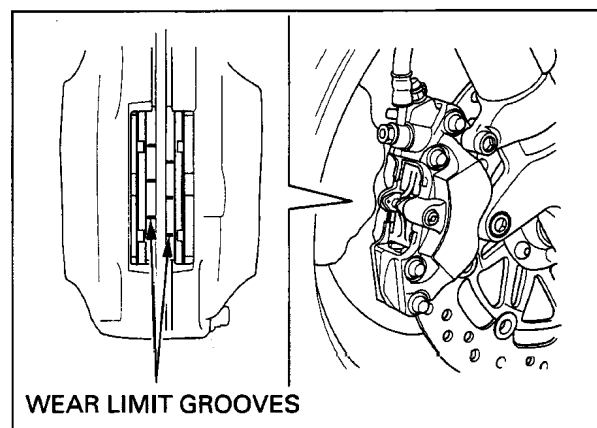
TORQUE: 9 N·m (0.9 kgf·m , 6.5 lbf·ft)



BRAKE PAD WEAR

FRONT BRAKE PAD

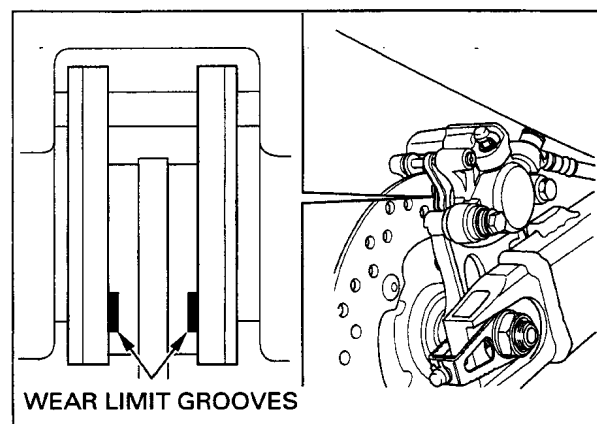
Check the brake pad for wear.
Replace the brake pads if the wear limit groove of either pad is worn out.



REAR BRAKE PAD

Check the brake pad for wear by looking from the rear side of the caliper.
Replace the brake pads if either pad is worn to the bottom of the wear limit groove.

Refer to page 15-5 for brake pad replacement.

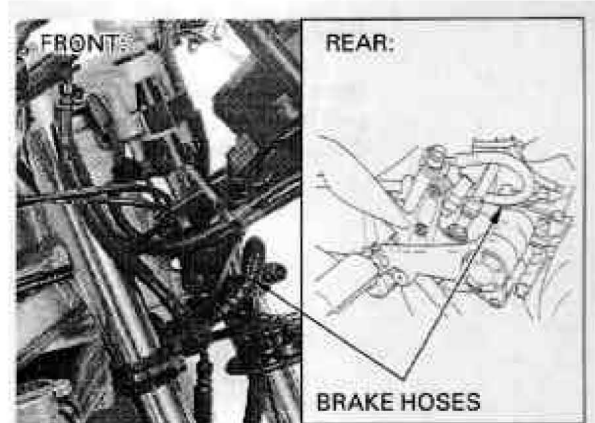


BRAKE SYSTEM

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

Refer to page 15-3 for air bleeding procedures.

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



BRAKE LEVER ADJUSTMENT

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

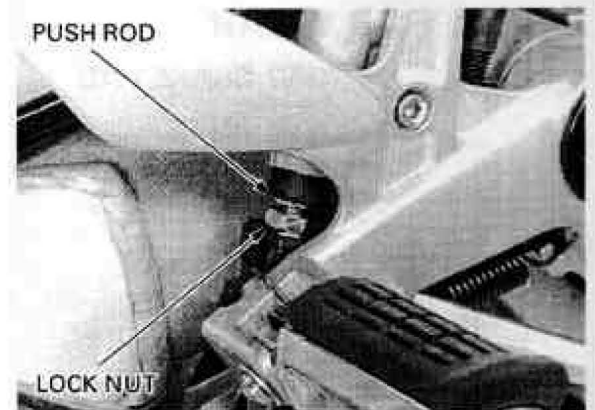
CAUTION:

Align the arrow on the brake lever with the index mark on the adjuster.



BRAKE PEDAL HEIGHT ADJUSTMENT

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

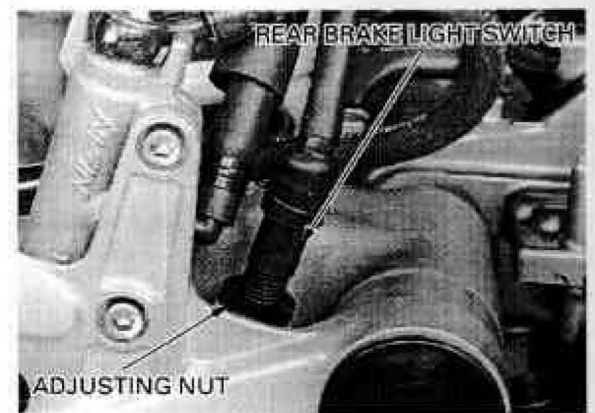


BRAKE LIGHT SWITCH

NOTE:

The brake light switch on the front brake master cylinder cannot be adjusted. If the front brake light switch actuation and brake engagement are off, either replace the switch unit or the malfunctioning parts of the system.

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



HEADLIGHT AIM

▲WARNING

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

NOTE:

Adjust headlight beam as specified by local laws and regulations.

Adjust vertically by turning the vertical adjusting screw.

Adjust horizontally by turning the horizontal adjusting screw.



CLUTCH SYSTEM

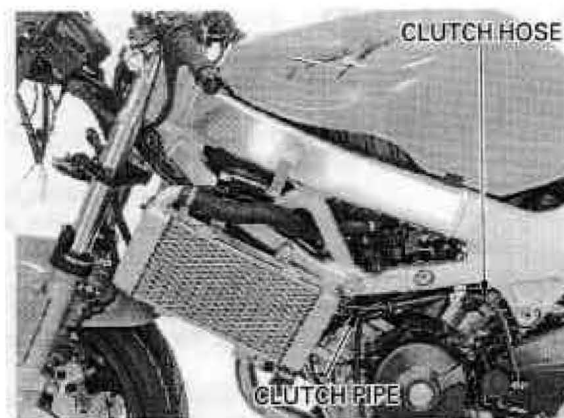
Operate the clutch lever and check that no air has entered the system.

If the clutch is not disengaged properly, or the lever feels soft or spongy, bleed the air from the system.

Refer to page 9-4 for air bleeding procedures.

Inspect the clutch hoses, pipe and fittings for damage, deterioration, cracks or signs of leakage. Tighten any loose fittings.

Replace hoses, pipe and fittings as required.

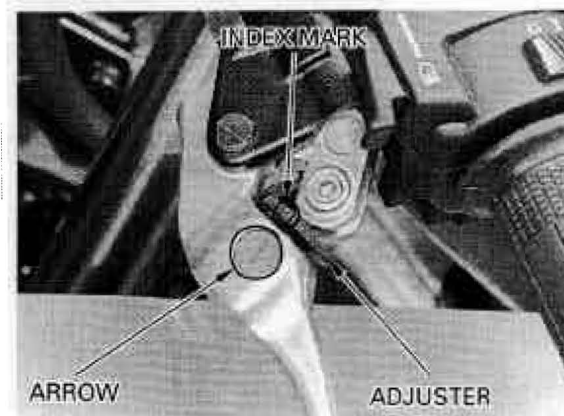


CLUTCH LEVER ADJUSTMENT

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

CAUTION:

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



CLUTCH FLUID

CAUTION:

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

NOTE:

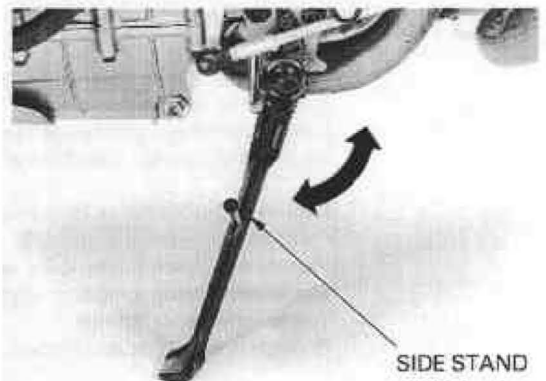
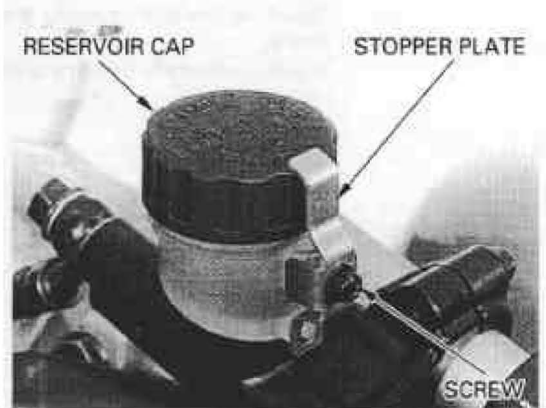
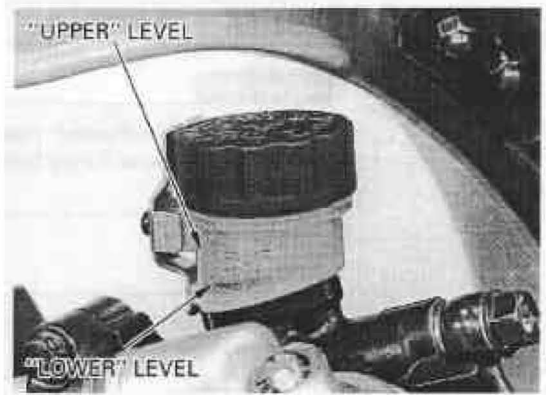
When the fluid level is low, check entire system for leaks (page 3-21).

Turn the handlebar to the right side so that the reservoir is level and check the fluid level in the clutch reservoir.

If the level is near the "LOWER" level line, remove the screw, stopper plate, reservoir cap, set plate and diaphragm, and fill the reservoir with DOT 4 brake fluid from a sealed container to the "UPPER" level line.

Install the diaphragm, set plate, reservoir cap and stopper plate, and tighten the stopper plate screw.

TORQUE: 1 N·m (0.12 kgf·m , 0.9 lbf·ft)



SIDE STAND

Support the motorcycle on a level surface.

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

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

Check the side stand ignition cut-off system:

- Sit astride the motorcycle and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, while squeezing the clutch lever.
- Fully lower the side stand.
- The engine should stop as the side stand is lowered.

If there is a problem with the system, check the side stand switch (page 19-17).

SUSPENSION

▲WARNING

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

FRONT SUSPENSION INSPECTION

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

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

Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Refer to section 13 for fork service.

FRONT SUSPENSION ADJUSTMENT

SPRING PRELOAD

Turn the preload adjuster counterclockwise to reduce the spring preload, and turn it clockwise to increase the preload.

To set the standard position, align the 4th groove on the adjuster with the top surface of the fork cap.

REBOUND DAMPING

Turn the rebound damping adjuster counterclockwise to reduce the rebound damping force, and turn it clockwise to increase the rebound damping force.

To set the standard position, turn the adjuster clockwise until it stops, then turn it counterclockwise approx. 1 turn. Align the punch mark on the adjuster with the reference mark.

REAR SUSPENSION INSPECTION

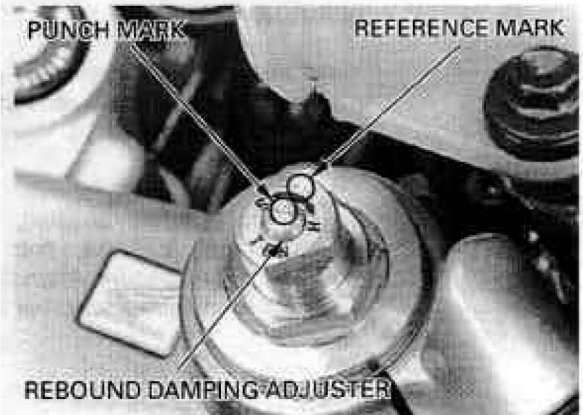
Check the action of the shock absorber by compressing it several times.

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

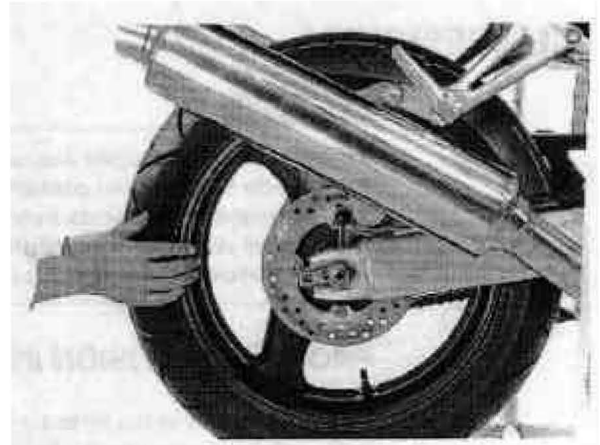
Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Refer to section 14 for shock absorber service.



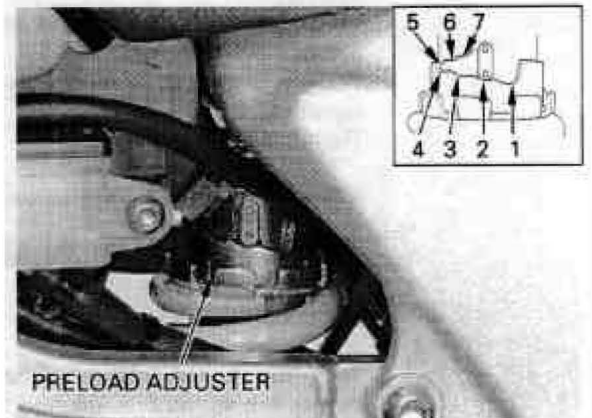
Raise the rear wheel off the ground and support the motorcycle securely.
Check for worn swingarm bearings by grabbing the rear wheel and attempting to move the wheel side to side.
Replace the bearings if any looseness is noted (section 14).



REAR SUSPENSION ADJUSTMENT

SPRING PRELOAD

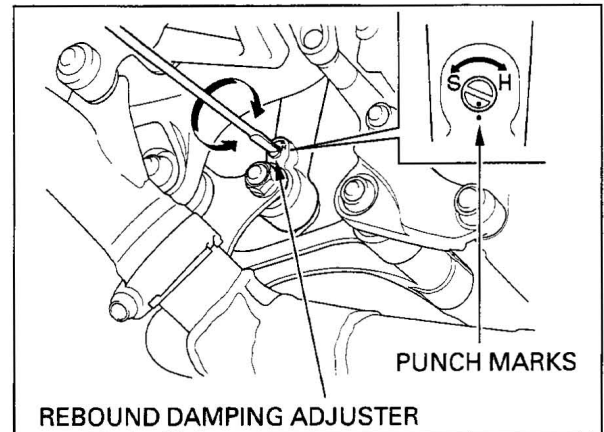
The spring preload adjuster has 7 positions.
To change the spring preload, turn the adjuster with the pin spanner.
Position 2 is the standard position.
Position 1 is for soft spring preload.
Positions 3 to 7 are for hard spring preload.



REBOUND DAMPING

Turn the rebound damping adjuster counter-clockwise to reduce the rebound damping force, and turn it clockwise to increase the rebound damping force.

To set the standard position, turn the adjuster clockwise until it stops, then turn it counter-clockwise approx. 1 turn. Align the punch marks on the adjuster and shock absorber lower joint.



NUTS, BOLTS, FASTENERS

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

WHEELS/TIRES

NOTE:

Tire pressure should be checked when the tires are COLD.

Check the tire pressure with the tire pressure gauge.

RECOMMENDED TIRE PRESSURE:

Driver only:

Front: 250 kPa (2.50 kgf/cm², 36 psi)

Rear: 290 kPa (2.90 kgf/cm², 42 psi)

Driver and passenger:

Front: 250 kPa (2.50 kgf/cm², 36 psi)

Rear: 290 kPa (2.90 kgf/cm², 42 psi)

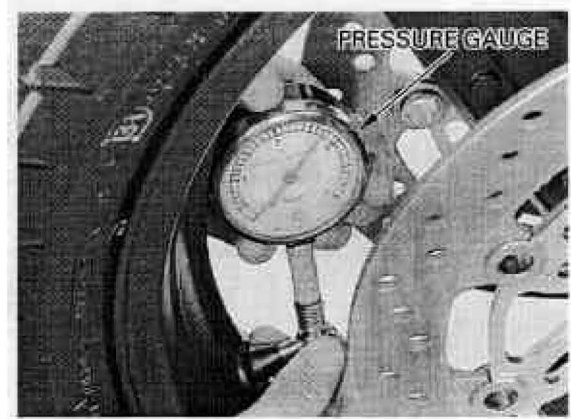
Check the tires for cuts, embedded nails, or other damage.

Check the front and rear wheels for trueness (refer to section 13 and 14).

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

MINIMUM TREAD DEPTH: Front: 1.5 mm (0.06 in)

Rear: 2.0 mm (0.08 in)



STEERING HEAD BEARINGS

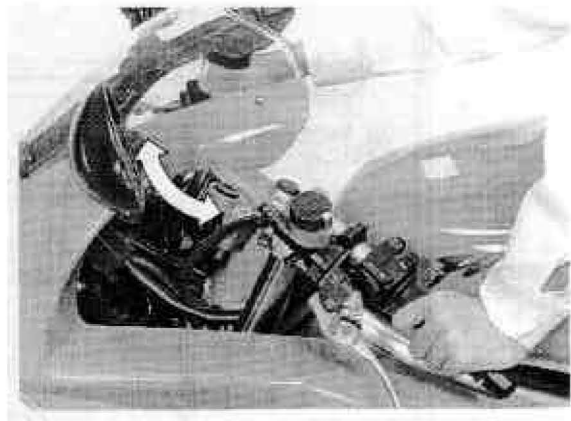
NOTE:

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

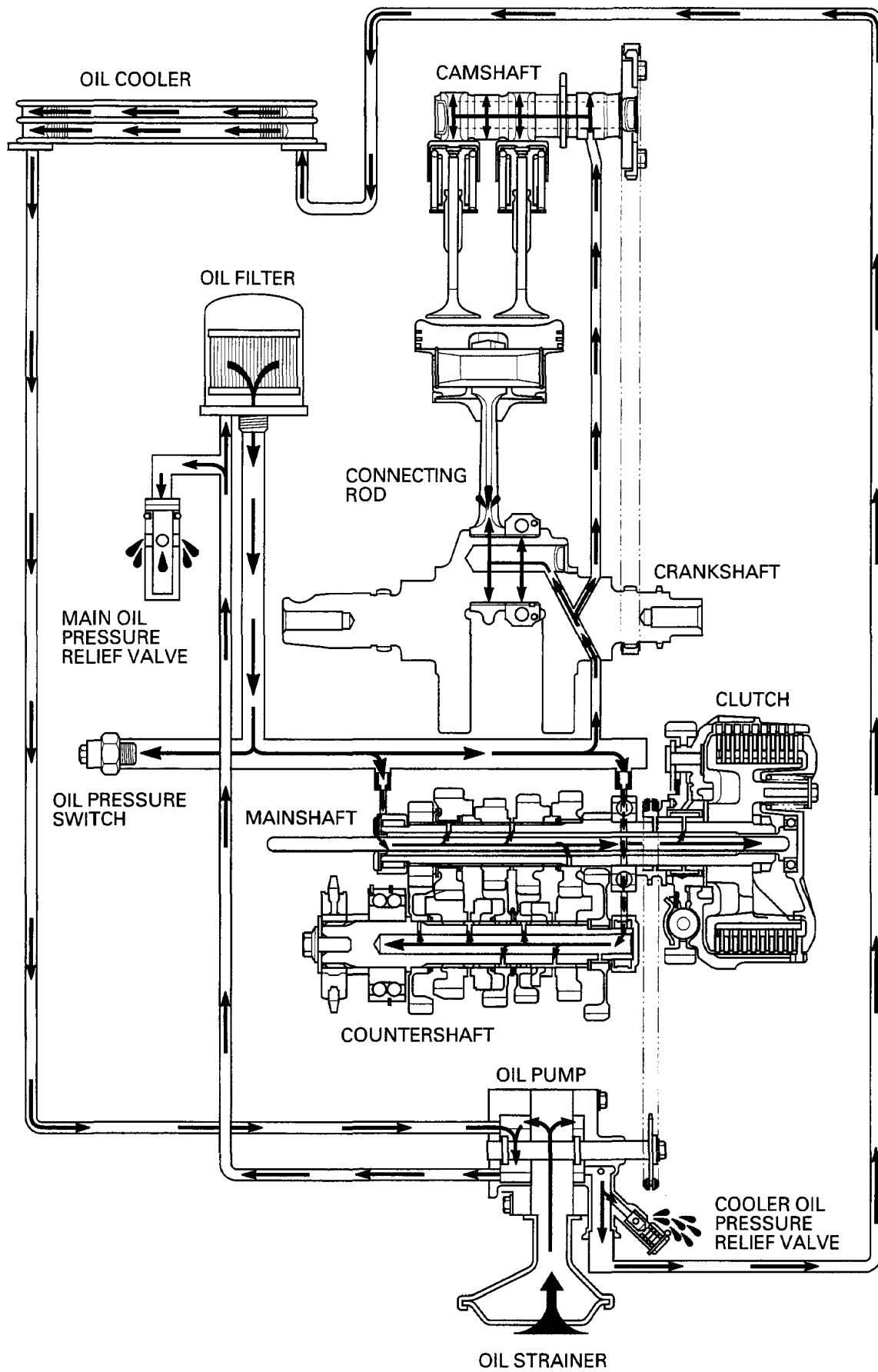
Raise the front wheel off the ground and support the motorcycle securely.

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 13).



LUBRICATION SYSTEM



4. LUBRICATION SYSTEM

SERVICE INFORMATION

4-2

OIL STRAINER/PRESSURE RELIEF VALVE

4-5

TROUBLESHOOTING

4-3

OIL PUMP

4-7

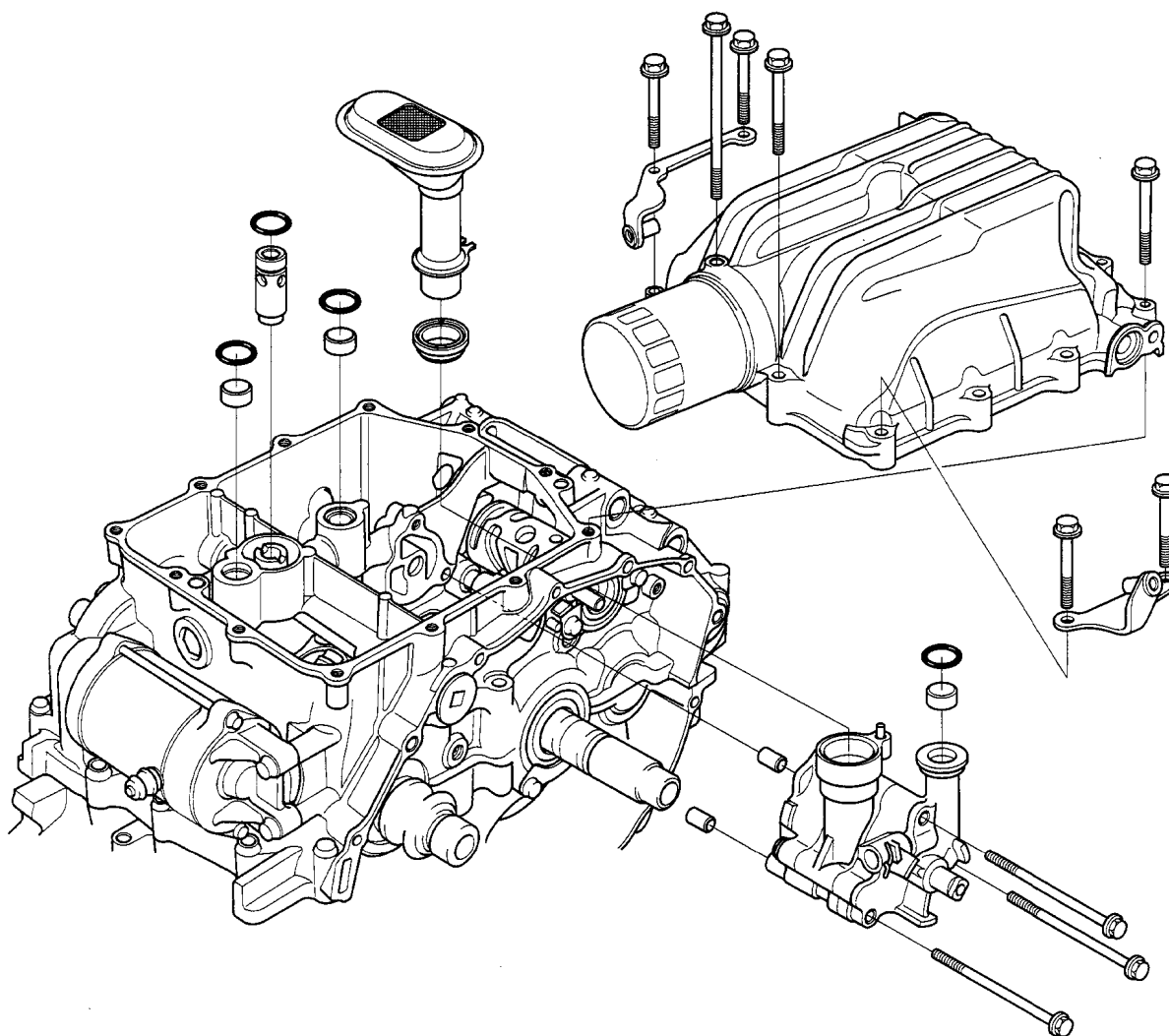
OIL PRESSURE CHECK

4-4

OIL COOLER

4-11

4



SERVICE INFORMATION

GENERAL

▲WARNING

- If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and may lead to death. 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.
- For engine oil level check, see page 3-10.
- For engine oil and filter change, see page 3-11.
- For oil pressure indicator inspection, see page 19-13

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	After draining	3.7 ℓ (3.9 US qt, 3.3 Imp qt)	————
	After draining/filter change	3.9 ℓ (4.1 US qt, 3.4 Imp qt)	————
	After disassembly	4.5 ℓ (4.8 US qt, 4.0 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 pressure (at oil pressure switch)		588 kPa (6.0 kgf/cm ² , 85 psi) at 5,000 min ⁻¹ (rpm) /80 °C (176 °F)	————
Oil pump	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15–0.21 (0.006–0.008)	0.35 (0.014)
	Side clearance	0.02–0.09 (0.001–0.004)	0.12 (0.005)

TORQUE VALUES

Oil pressure switch	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply sealant to the threads
Oil pressure switch terminal screw	2 N·m (0.2 kgf·m, 1.4 lbf·ft)	
Oil pump bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	

TOOLS

Oil pressure gauge	07506-3000000
Oil pressure gauge attachment	07510-4220100

TROUBLESHOOTING

Oil level too low

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

Low oil pressure

- Oil level low
- Clogged oil strainer
- Faulty oil pump
- Internal oil leak
- Incorrect oil being used

No oil pressure

- Oil level too low
- Oil pressure relief valve stuck open
- Broken oil pump drive chain
- Broken oil pump drive or driven sprocket
- Damaged oil pump
- Internal oil leak

High oil pressure

- Oil pressure relief valve stuck closed
- Clogged oil gallery or metering orifice
- Incorrect oil being used

Oil contamination

- Oil or filter not changed often enough
- Worn piston rings

Oil emulsification

- Blown cylinder head gasket
- Leaky coolant passage
- Entry of water

OIL PRESSURE CHECK

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

Stop the engine, remove the rubber cap and disconnect the oil pressure switch wire by removing the terminal screw.

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

TOOLS:

Oil pressure gauge 07506-3000000

Oil pressure gauge attachment 07510-4220100

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

Start the engine and check the oil pressure.

OIL PRESSURE: 588 kPa (6.0 kgf/cm², 85 psi)
at 5,000 min⁻¹ (rpm) /80 °C (176 °F)

Stop the engine.

Apply sealant to the oil pressure switch threads as shown.

Remove the oil pressure gauge and attachment and install the oil pressure switch.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

CAUTION:

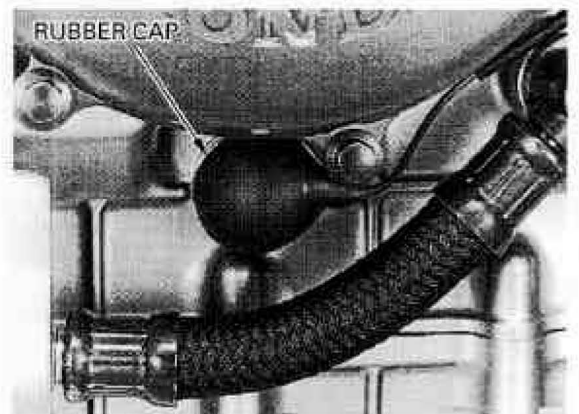
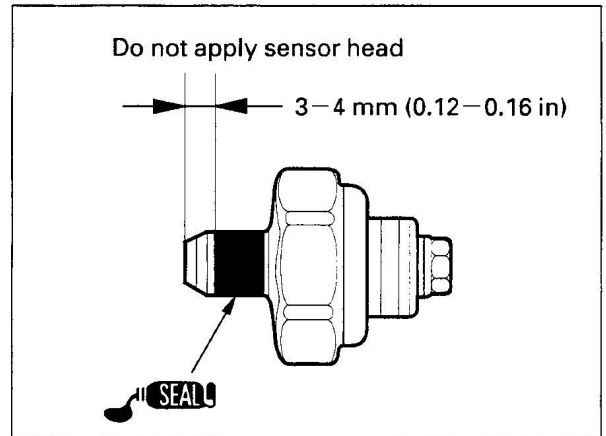
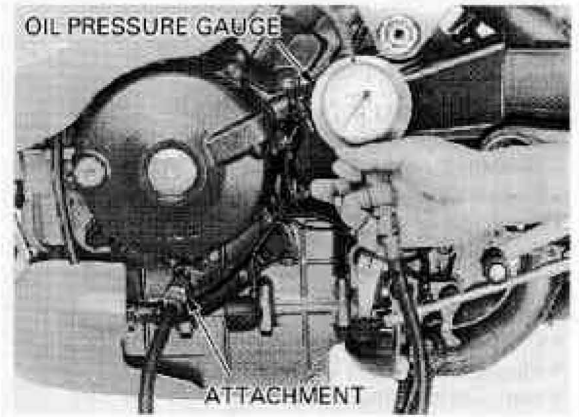
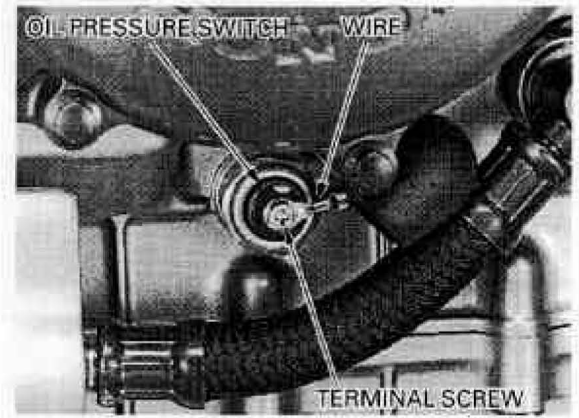
To prevent crankcase damage, do not overtighten the switch.

Connect the oil pressure switch cord and install the rubber cap.

Start the engine.

Check that the oil pressure indicator goes out after one or two seconds.

If the oil pressure indicator stays on, stop the engine and check the indicator system (page 19-13).

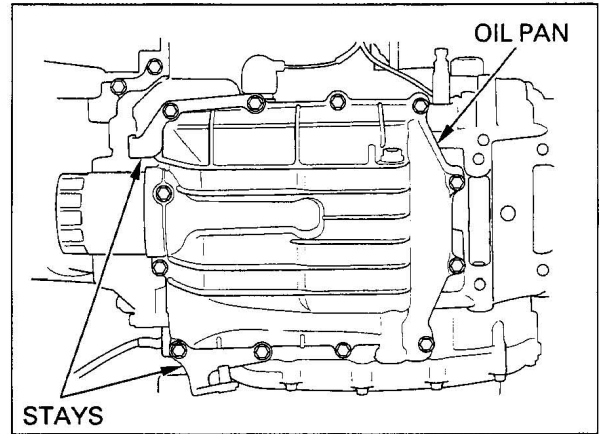


OIL STRAINER/PRESSURE RELIEF VALVE

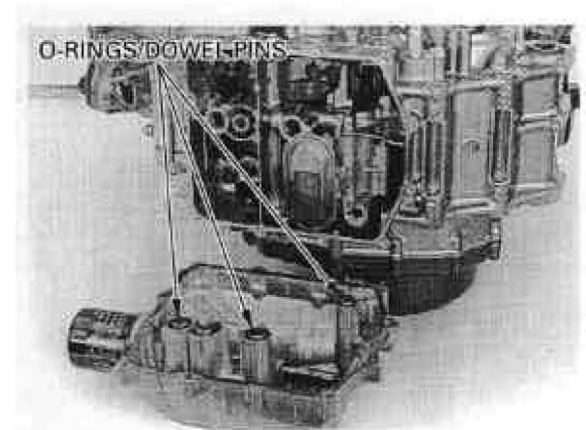
OIL PAN REMOVAL

Drain the engine oil (page 3-10).
Remove the exhaust pipe (page 2-5).

Remove the twelve oil pan mounting bolts, under cover stays and the oil pan.



Remove the dowel pins and O-rings.

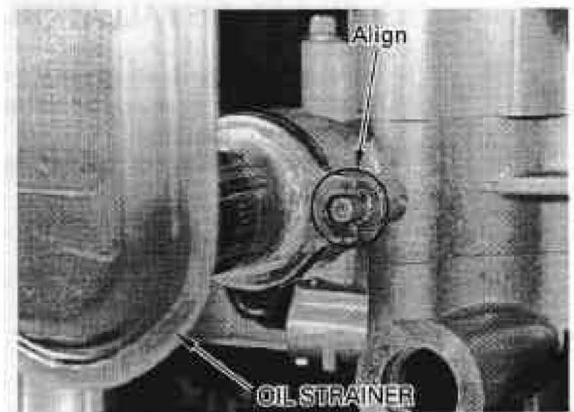


OIL STRAINER

Remove the oil strainer and seal rubber from the oil pump.

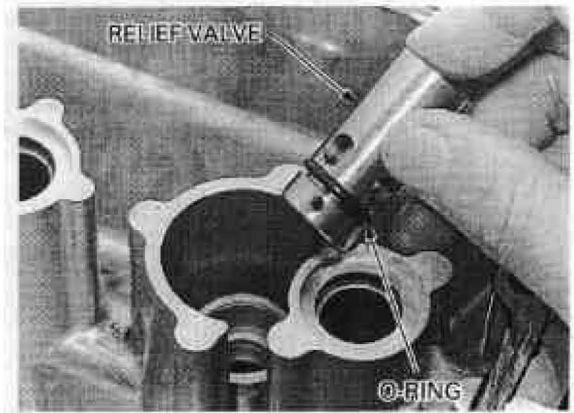
Clean the oil strainer screen thoroughly.

Coat a new seal rubber with oil and install it onto the strainer.
Install the strainer, aligning its groove with the pin on the oil pump.



OIL PRESSURE RELIEF VALVE

Remove the oil pressure relief valve from the oil pan.
Remove the O-ring from the relief valve body.

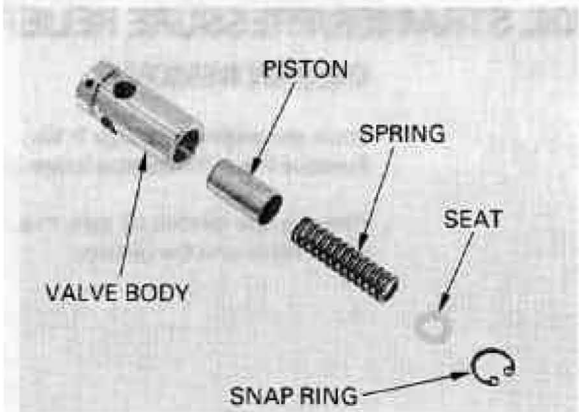


LUBRICATION SYSTEM

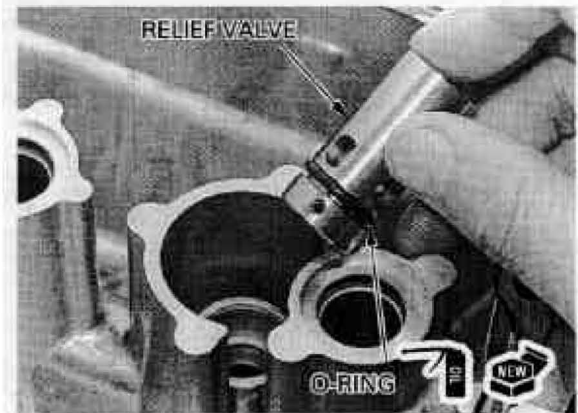
Remove the snap ring, spring seat, spring and piston from the valve body.

Check the piston for wear, sticking or other damage.
Check the spring for fatigue or damage.

Install the piston, spring and spring seat and secure them with the snap ring.

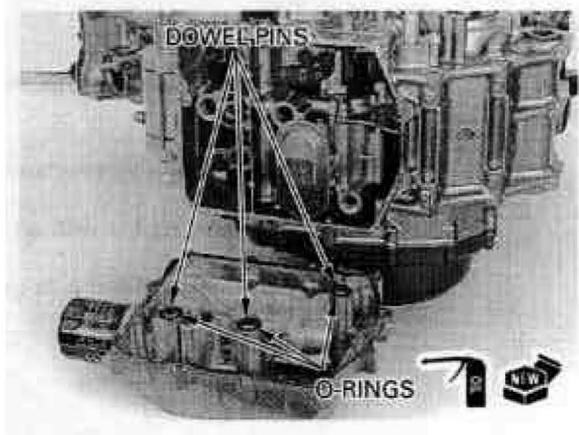


Coat a new O-ring with oil and install it into the relief valve body groove.
Install the relief valve into the oil pan.



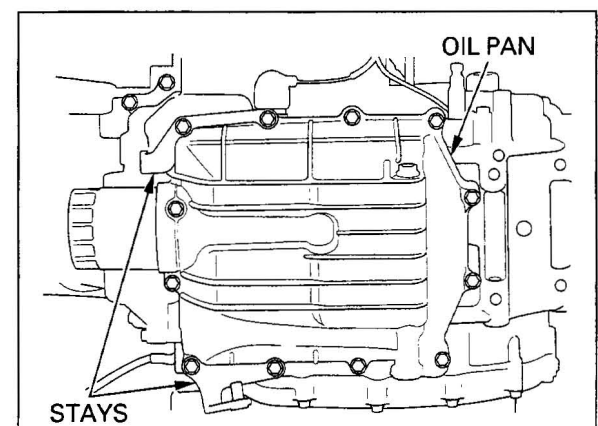
OIL PAN INSTALLATION

Clean the oil pan mating surfaces thoroughly.
Apply sealant to the oil pan mating surface.
Install the dowel pins.
Coat new O-rings with oil and install them onto the dowel pins.



Install the oil pan and cover stays, and tighten the twelve bolts in a crisscross pattern in 2 or 3 steps.

Install the exhaust pipe (page 2-6).
Fill the crankcase with recommended engine oil (page 3-10).



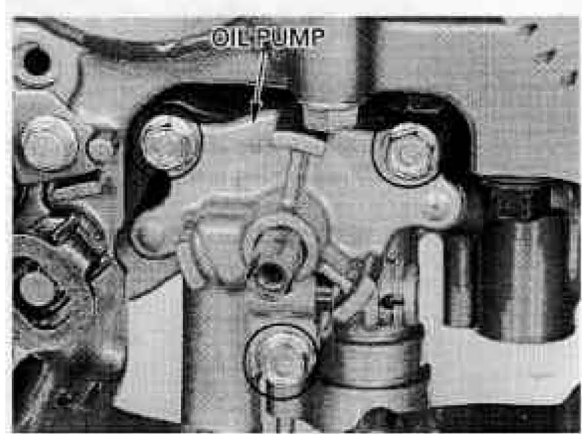
OIL PUMP

REMOVAL

Remove the oil pan and oil strainer (page 4-5).
Remove the clutch and oil pump driven sprocket (page 9-12).

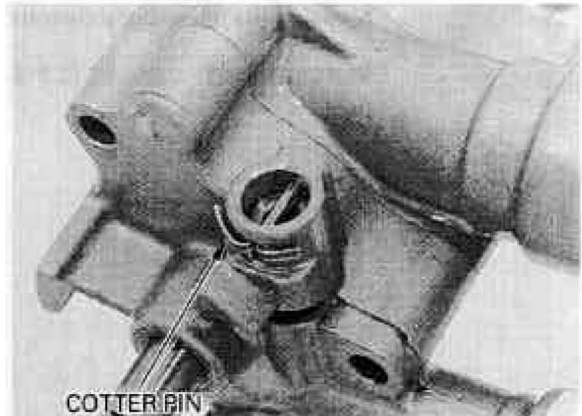
Remove the oil pump mounting bolts and the oil pump.

Remove the dowel pins.



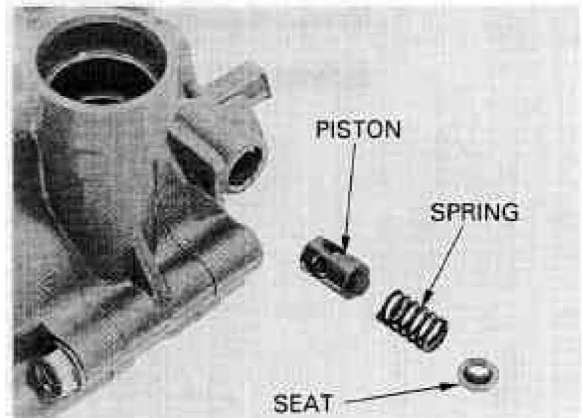
COOLER PUMP RELIEF VALVE

Remove the cotter pin, spring seat, spring and piston.



Check the piston for wear, sticking or other damage.
Check the spring for fatigue or damage.

Install the piston, spring and spring seat and secure them with a new cotter pin.

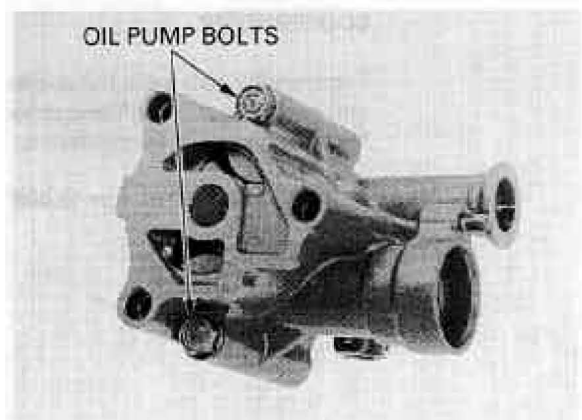


DISASSEMBLY

Remove the following:

- oil pump bolts
- cooler pump body
- dowel pins
- cooler pump outer and inner rotors
- drive pin
- main pump body
- pump shaft
- thrust washer
- drive pin
- main pump inner and outer rotors

Clean the all disassembled parts thoroughly.

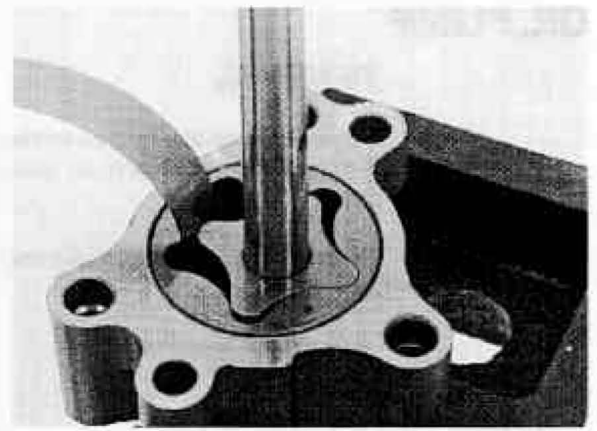


INSPECTION

MAIN PUMP

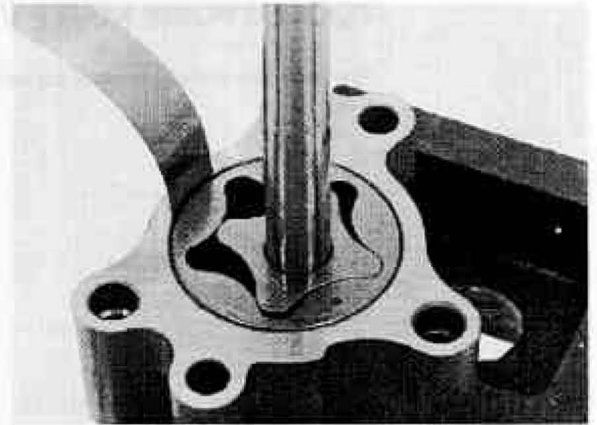
Temporarily assemble the main pump (page 4-9).
Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



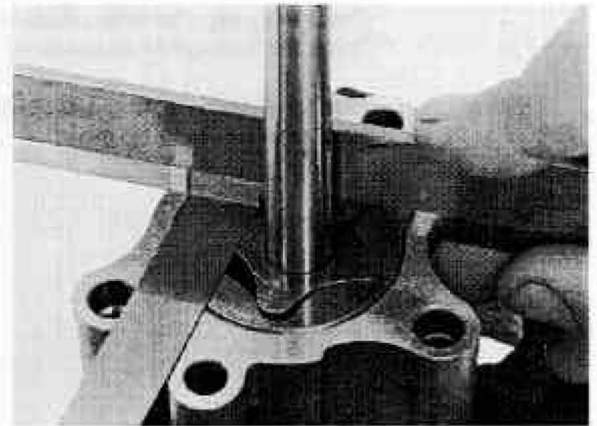
Measure the pump body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)



Measure the pump side clearance.

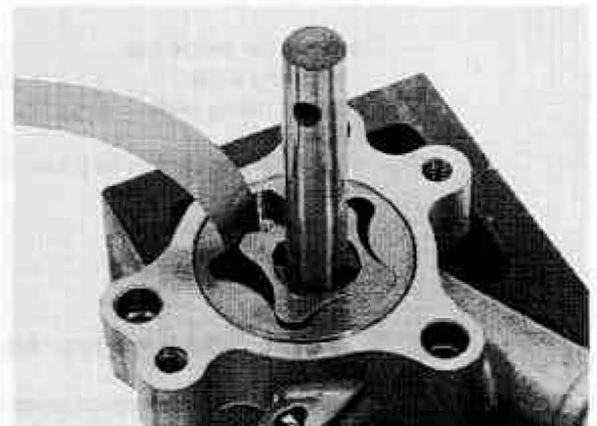
SERVICE LIMIT: 0.12 mm (0.005 in)



COOLER PUMP

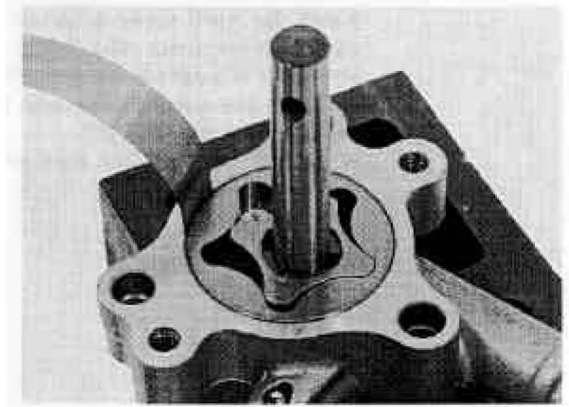
Temporarily assemble the cooler pump outer rotor,
inner rotor, pump shaft and drive pin.
Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



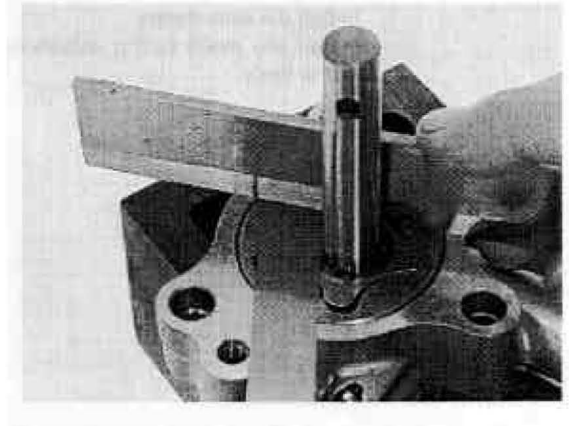
Measure the pump body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)



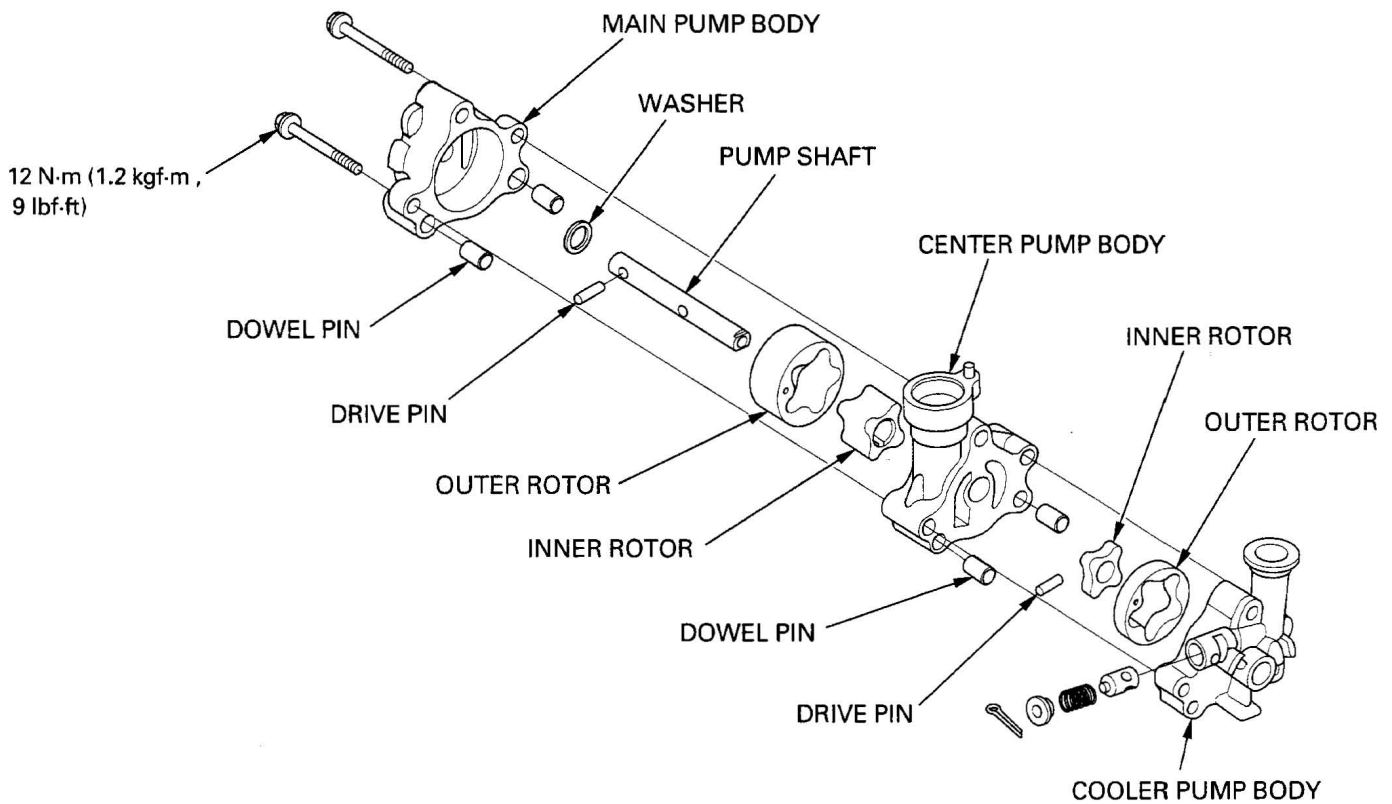
Measure the pump side clearance.

SERVICE LIMIT: 0.12 mm (0.005 in)



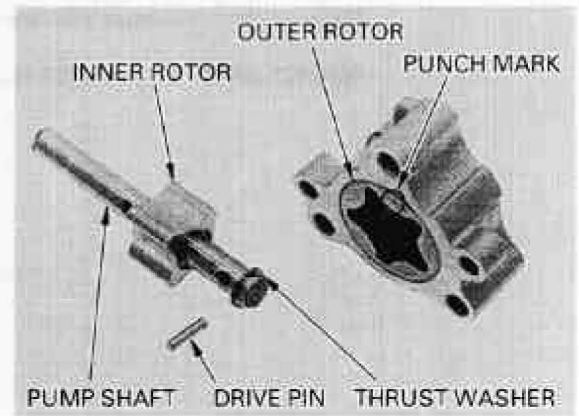
ASSEMBLY

Dip all parts in clean engine oil.

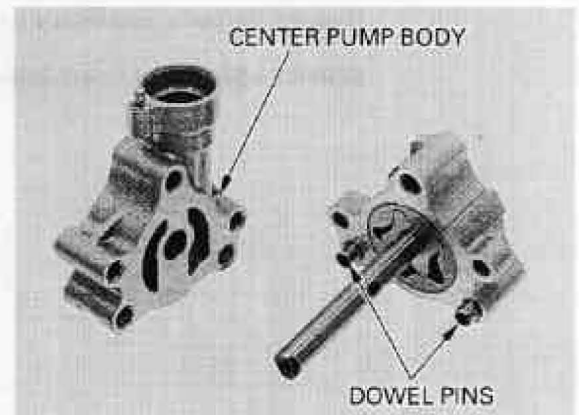


LUBRICATION SYSTEM

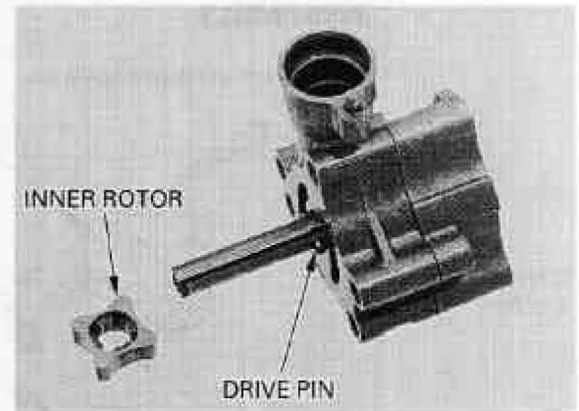
Install the main pump outer rotor into the pump body with the punch mark facing out.
Install the drive pin into the pump shaft, and install the main pump inner rotor onto the shaft, aligning the slots with the drive pin.
Install the thrust washer, shaft and inner rotor into the main pump body.



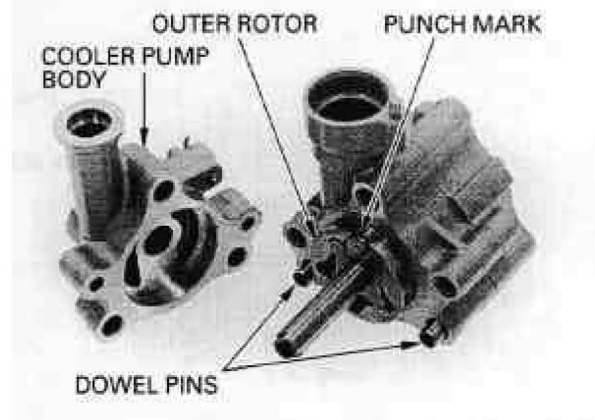
Install the dowel pins.
Install the main pump assembly onto the center pump body.



Install the drive pin into the pump shaft and install the cooler pump inner rotor onto the shaft, aligning the slots with the drive pin.

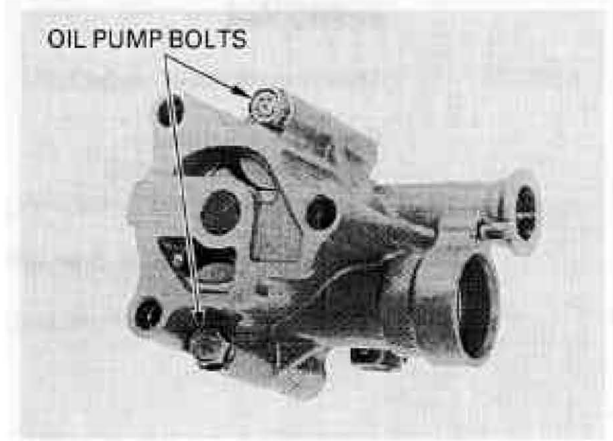


Install the cooler pump outer rotor with the punch mark toward the cooler pump body.
Install the dowel pins.
Install the cooler pump body onto the center pump body.



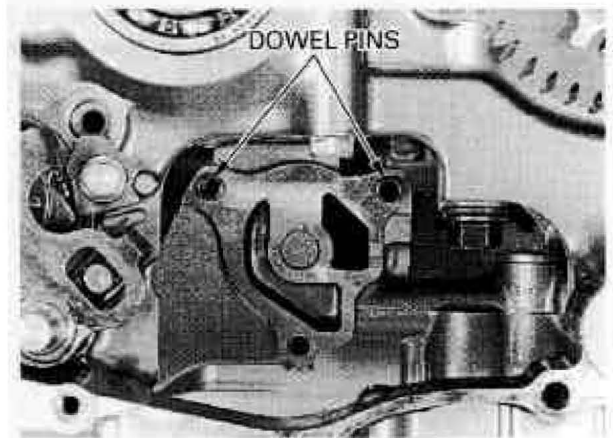
Install the oil pump bolts and tighten them.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



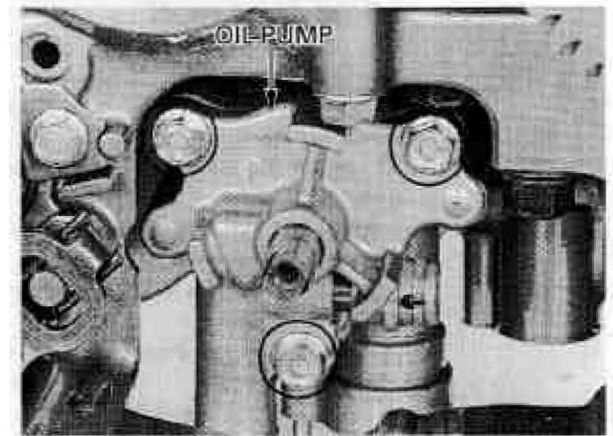
INSTALLATION

Install the dowel pins.



Install the oil pump and tighten the mounting bolts securely.

Install the clutch (page 9-17).
Install the oil pan (page 4-6).



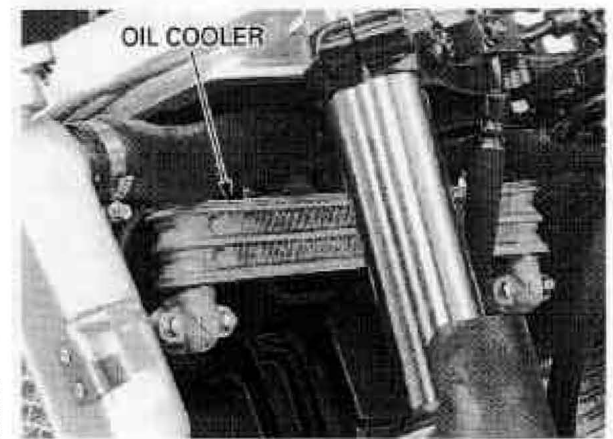
OIL COOLER

INSPECTION

Remove the front fairing (page 2-3).

Check the oil cooler pipe joints and seams for leaks. Check the oil cooler air passage for clogging or damage.

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



REMOVAL

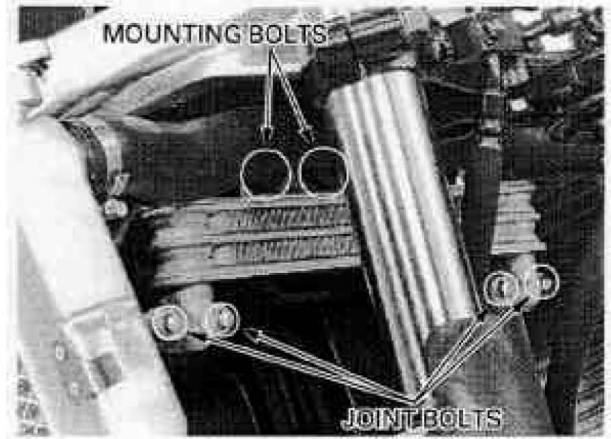
Drain the engine oil (page 3-10).

Remove the following:

- front fairing (page 2-3)
- engine under cover (page 2-4)

Remove the oil cooler pipe joint bolts and joints from the oil cooler.

Remove the mounting bolts and the oil cooler from the bracket.



Remove the oil hose joint bolts and joints from the engine, then remove the oil hoses/pipes.



INSTALLATION

Install the oil hoses/pipes.

Coat new O-rings with oil and install them onto the oil hose joints.

Connect the oil hose joints to the engine and tighten the bolts.

Install the oil cooler onto the bracket and tighten the mounting bolts.

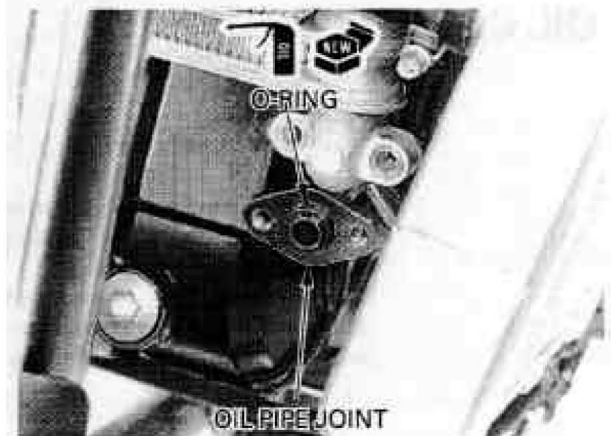
Coat new O-rings with oil and install them onto the oil pipe joints.

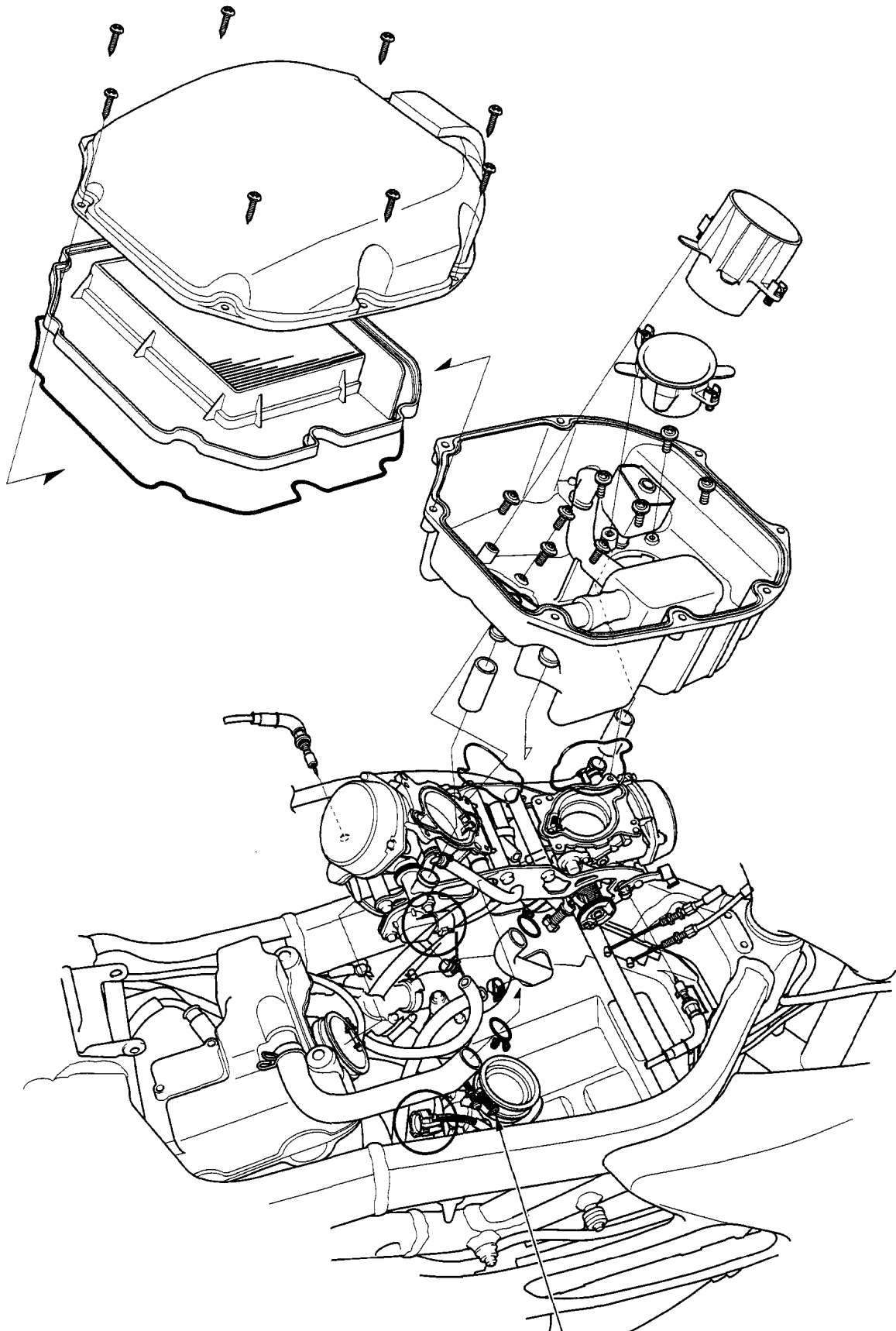
Connect the oil pipe joints to the oil cooler and tighten the bolts.



Install the removed parts in the reverse order of removal.

Fill the crankcase with recommended engine oil (page 3-10)





1 N·m (0.1 kgf·m , 0.7 lbf·ft)

5. FUEL SYSTEM

SERVICE INFORMATION	5-1	CARBURETOR ASSEMBLY	5-10
TROUBLESHOOTING	5-3	CARBURETOR COMBINATION	5-13
AIR CLEANER HOUSING	5-4	CARBURETOR INSTALLATION	5-16
CARBURETOR REMOVAL	5-5	CHOKE SYSTEM	5-17
CARBURETOR SEPARATION	5-6	PILOT SCREW ADJUSTMENT	5-18
CARBURETOR DISASSEMBLY/ INSPECTION	5-7	SECONDARY AIR SUPPLY SYSTEM (SW, AR, IIG type only)	5-19

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 may 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 cable will impair smooth operation and could cause the cable to stick or bind, resulting in loss of vehicle control.*

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

CAUTION:

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

- For fuel tank removal and installation, see page 2-4.
- Before disassembling the carburetors, place an approved fuel container under the float chambers, loosen the drain screws and drain the carburetors.
- After removing the carburetors, cover the intake ports of the cylinder heads with shop towels to prevent any foreign material from dropping into the engine.
- When disassembling the fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- The vacuum chamber and float chamber can be serviced with the carburetors combined.
- For carburetor synchronization, see page 3-12.

NOTE:

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

FUEL SYSTEM

SPECIFICATIONS

ITEM		SPECIFICATIONS
Carburetor identification number	Except G, SW, AR, IIG type	VPT0B
	G type	VPT0A
	SW type	VPT2B
	AR, IIG type	VPT2C
Main jet		Front: #175, Rear: #178
Slow jet		#45
Jet needle number	Except SW, AR, G type	Front: A1UD, Rear: A1UC
	SW, AR, G type	Front: A1UF, Rear: A1UE
Pilot screw opening		See page 5-18
Float level		16.6 ± 0.5 mm (0.65 ± 0.02 in)
Idle speed	Except SW, AR, IIG type	$1,100 \pm 100$ min ⁻¹ (rpm)
	AR, IIG type	$1,200 \pm 100$ min ⁻¹ (rpm)
	SW type	$1,200 \pm 50$ min ⁻¹ (rpm)

TORQUE VALUES

Carburetor insulator band bolt 1 N·m (0.1 kgf·m , 0.7 lbf·ft)
Reed valve cover bolt 5 N·m (0.52 kgf·m , 3.8 lbf·ft) Apply locking agent to the threads.

TOOL

Float level gauge 07401-0010000
Pilot screw wrench 07908-4220201 (Except SW type)
 07KMA-MN90100 (SW type)

TROUBLESHOOTING

Engine cranks but won't start

- No fuel in tank
- No fuel to carburetor
 - Clogged fuel strainer
 - Clogged fuel line
 - Clogged fuel valve vacuum tube
 - Disconnected fuel valve vacuum tube
 - Clogged fuel tank breather tube
- Too much fuel getting to the engine
 - Clogged air cleaner
 - Flooded carburetor
- Intake air leak
- Contaminated/deteriorated fuel
- Improper choke operation
- Improper throttle operation
- No spark at plug (faulty ignition system-section 17)

Lean mixture

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

Rich mixture

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

Engine stalls, hard to start, rough idling

- Restricted fuel line
- Fuel mixture too lean/rich
- Contaminated/deteriorated fuel
- Intake air leak
- Misadjusted idle speed
- Misadjusted pilot screw
- Restricted fuel tank breather tube
- Clogged air cleaner
- Clogged slow circuit
- Starting enrichment valve open
- Faulty ignition system (section 17)

Afterburn when engine braking is used

- Lean mixture in slow circuit
- Faulty air cut-off valve
- Faulty pulse secondary air injection (PAIR) system (SW, AR, GII type only)
 - Faulty PAIR control valve
 - Faulty PAIR check valve
 - Clogged hose of the PAIR system
- Faulty ignition system (section 17)

Backfiring or misfiring during acceleration

- Lean mixture
- Faulty ignition system (section 17)

Poor performance (driveability) and poor fuel economy

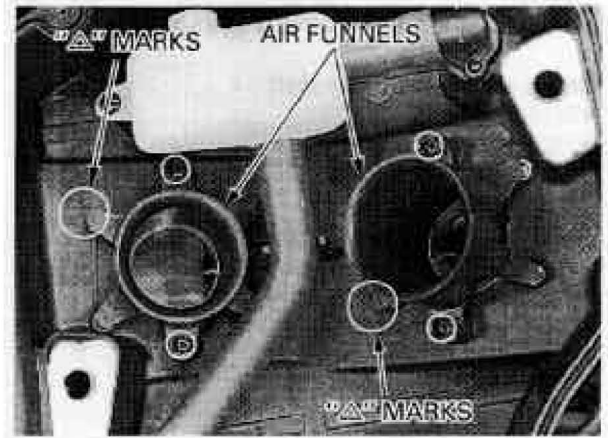
- Clogged fuel system
- Faulty ignition system (section 17)

AIR CLEANER HOUSING

REMOVAL/INSTALLATION

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

Remove the screws and air funnels.



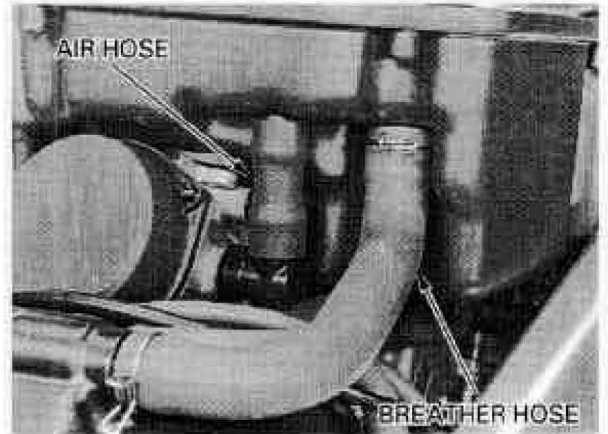
Remove the eight air cleaner housing mounting screws.

CAUTION:

Do not overtighten the screws when installing, as the threaded holes in the carburetors will be stripped.



Disconnect the front and rear crankcase breather hoses and air hoses from the air cleaner housing. Remove the air cleaner housing.

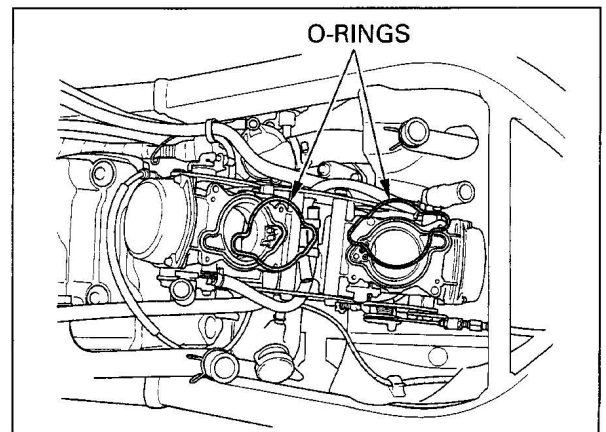


Remove the O-rings.

Install new O-rings into the carburetor grooves. Install the removed parts in the reverse order of removal.

NOTE:

- Note that the rear air funnel is longer than the front air funnel.
- Install the air funnels with the "△" marks on the air funnel and air cleaner housing aligned.



CARBURETOR REMOVAL

Drain the coolant (page 6-5).
Remove the air cleaner housing (page 5-4).

NOTE:

When the carburetors will not be serviced, remove the carburetor assembly with the air cleaner housing attached to prevent the threaded holes in the carburetor from damaging.

Disconnect the throttle sensor 3P (white) connector. ED, G type: Remove the throttle sensor wire from the clamp.

Loosen the carburetor insulator band bolts.

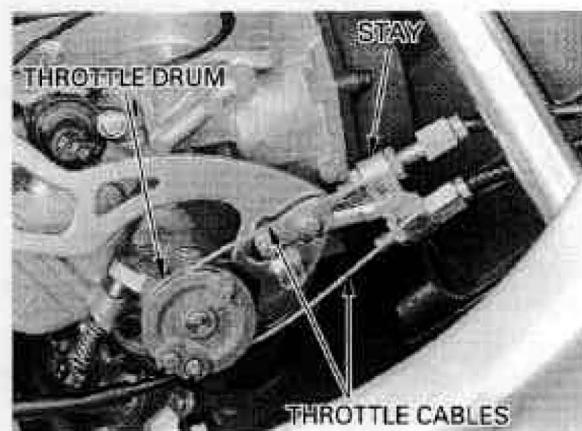
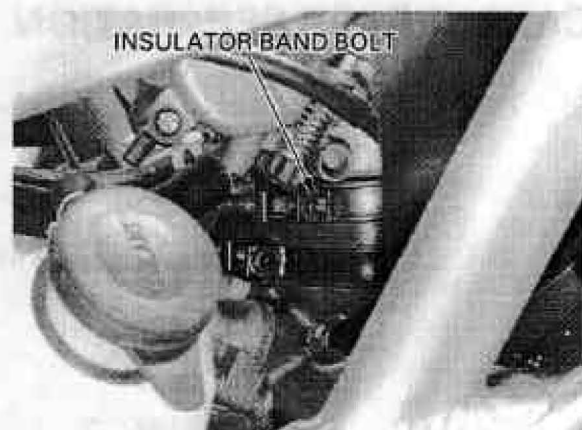
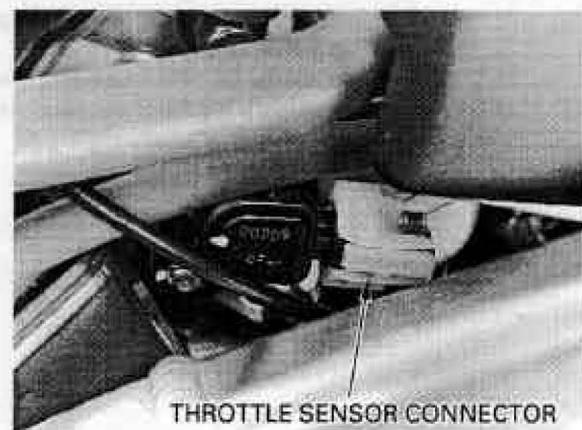
NOTE:

Insert the screwdriver through the hole in the heat guard to loosen the front carburetor insulator band bolt.

Remove the carburetor assembly from the insulators.

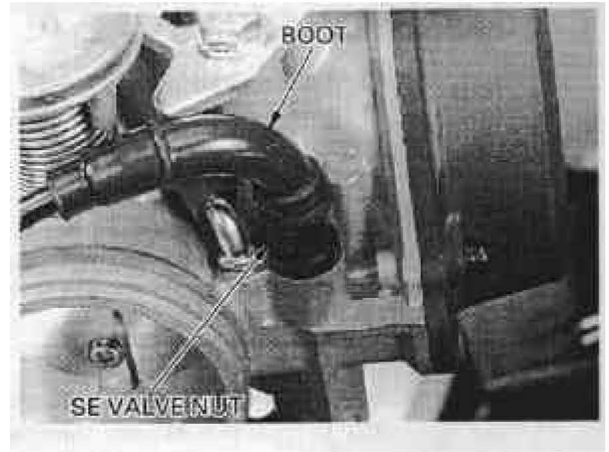
Remove the throttle cables from the cable stay and disconnect them from the throttle drum.

Disconnect the water inlet and outlet hoses from the carburetor heaters.



FUEL SYSTEM

Slide off the boots from the starting enrichment (SE) valve nuts.
Loosen the SE valve nuts and disconnect the choke cables from the front and rear carburetors.

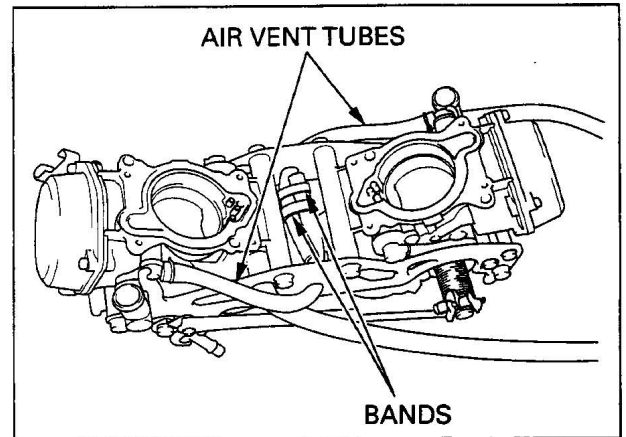


CARBURETOR SEPARATION

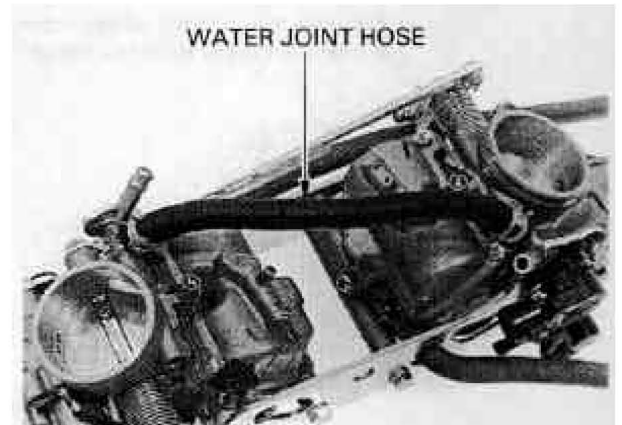
NOTE:

The vacuum chamber can be serviced without separating the carburetors.

Remove the air vent tubes and tube bands.



Remove the water joint hose.



Remove the cotter pins, washers and throttle link.

CAUTION:

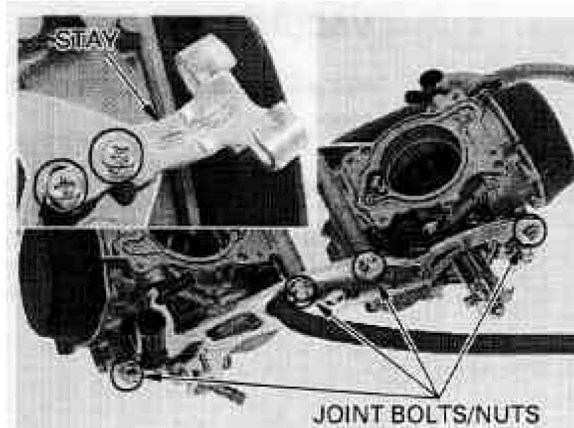
Be careful not to bend or damage the throttle arm and link.



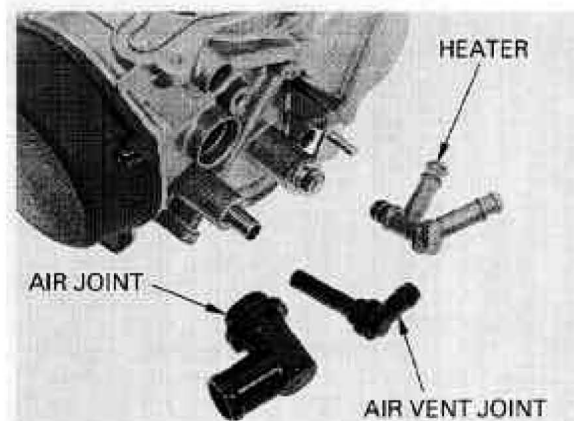
Remove the cable stay from the front carburetor.
 Remove the four nut and joint bolts, and separate the carburetors.
 Remove the set plates, dowel pins and fuel tubes.

CAUTION:

Do not remove the throttle sensor from the set plate unless it requires replacement. It can cause the throttle sensor getting out of position resulting in improper ignition timing.



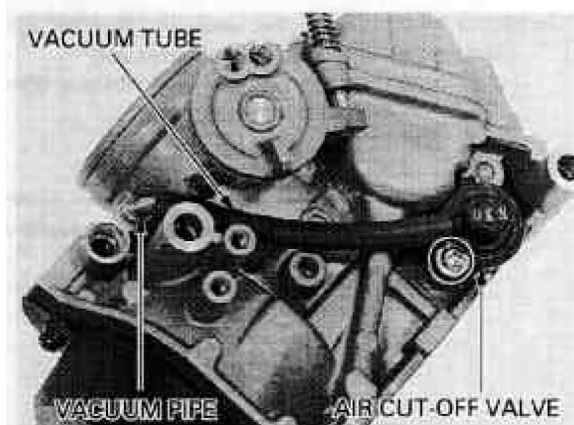
Remove the air joint, air vent joint and carburetor heater from each carburetor.



CARBURETOR DISASSEMBLY/INSPECTION

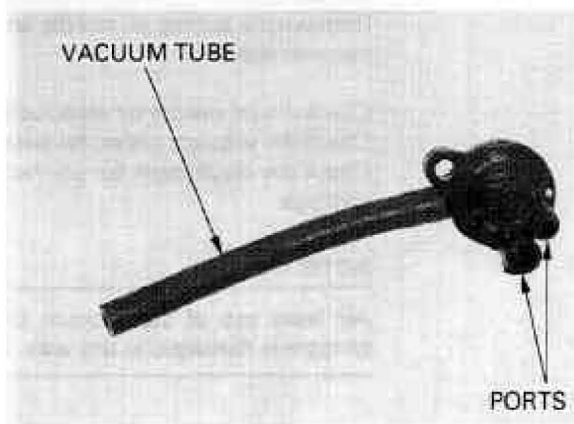
AIR CUT-OFF VALVE

Disconnect the vacuum tube from the vacuum pipe.
 Remove the attaching screw, washer and the air cut-off valve.
 Remove the O-rings and joint pipe.



Apply vacuum to the vacuum tube of the valve.

The vacuum should be maintained.
 Air should not flow through the valve ports when the vacuum is applied, and should flow when the vacuum is not applied.



VACUUM CHAMBER

Remove the three screws and the vacuum chamber cover.

NOTE:

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

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

Be careful not to damage the diaphragm.

Screw the vacuum chamber cover (4 mm) screw into the jet needle holder. Pull the screw and remove the jet needle holder from the vacuum piston.

CAUTION:

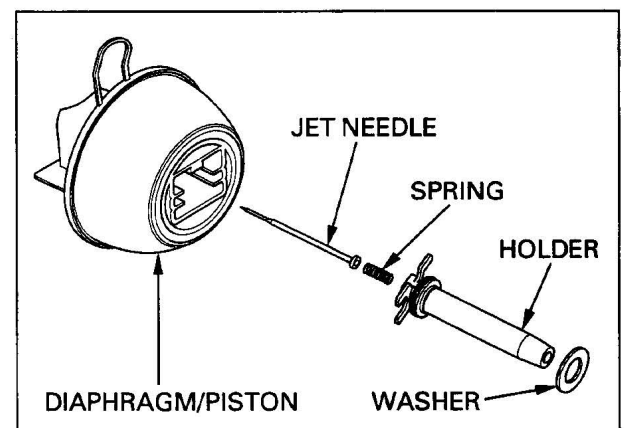
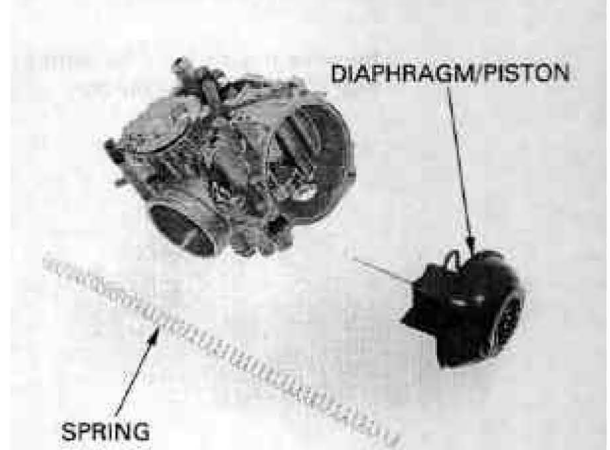
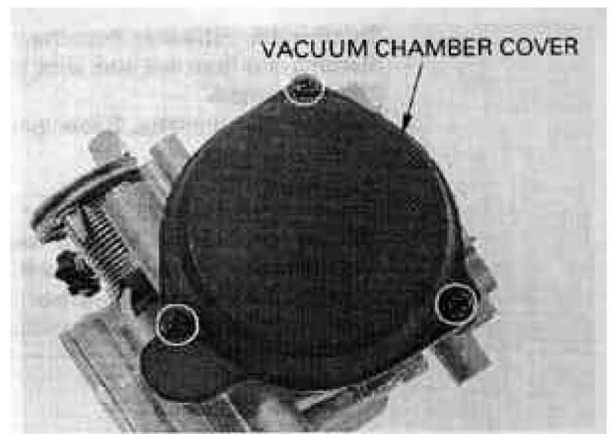
Do not remove the jet needle holder by pushing the jet needle.

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

Check the jet needle for stepped wear. Check the vacuum piston for wear or damage. Check the diaphragm for pin hole, deterioration or damage.

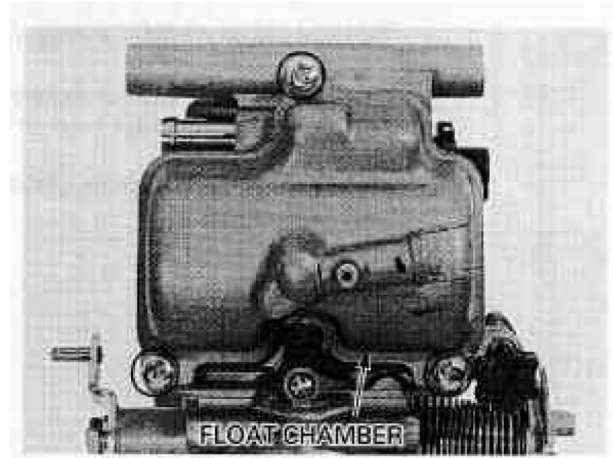
NOTE:

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



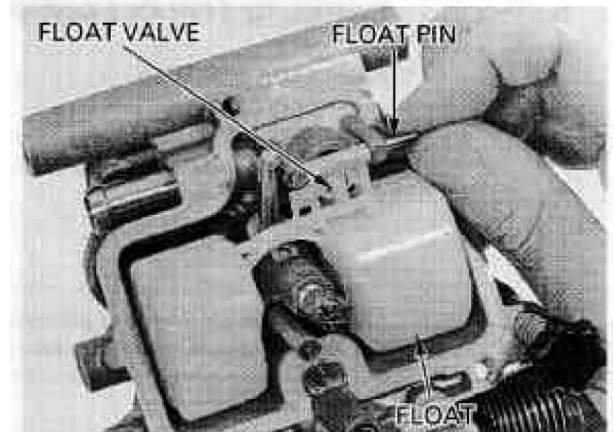
FLOAT CHAMBER

Remove the three screws and the float chamber.

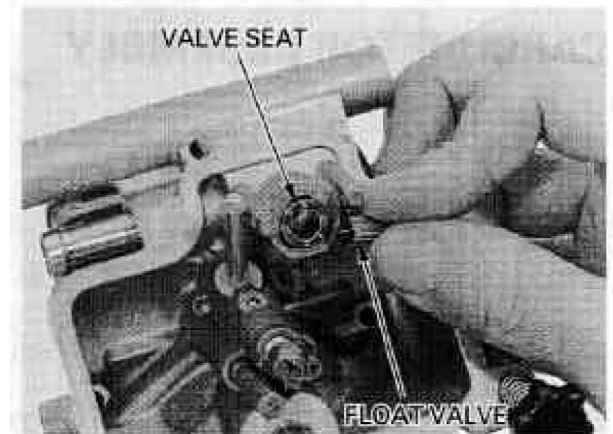


Remove the float pin, float and float valve.

Check the float for damage or fuel in the float.



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



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

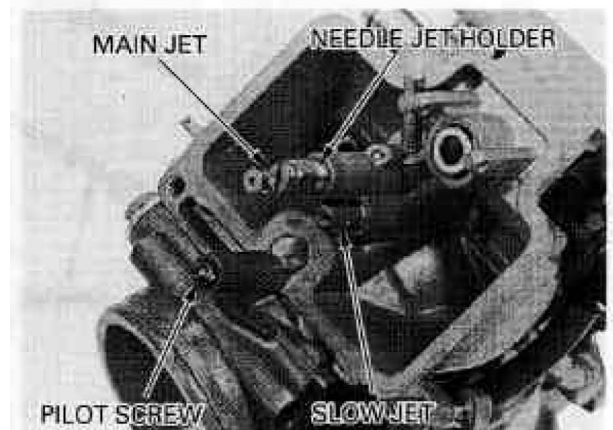
CAUTION:

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.

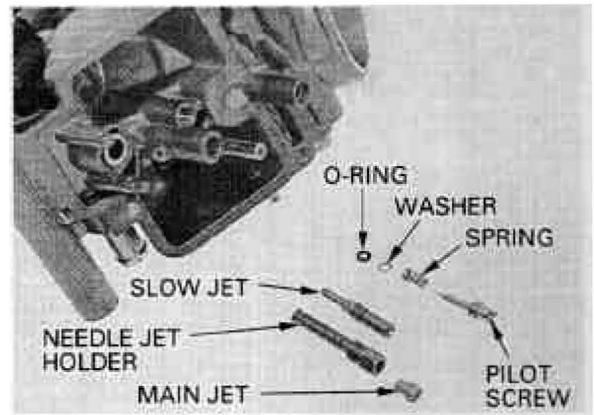


FUEL SYSTEM

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.



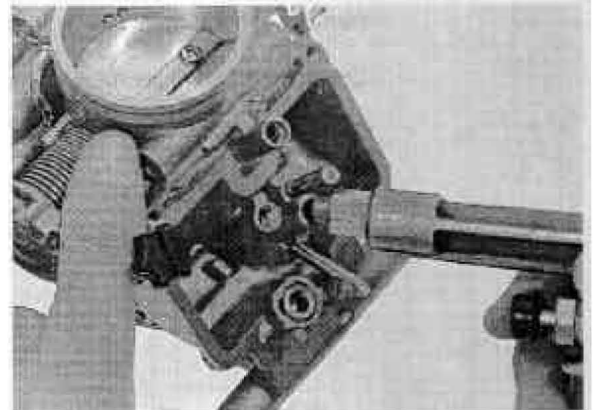
CARBURETOR CLEANING

Remove the following:

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

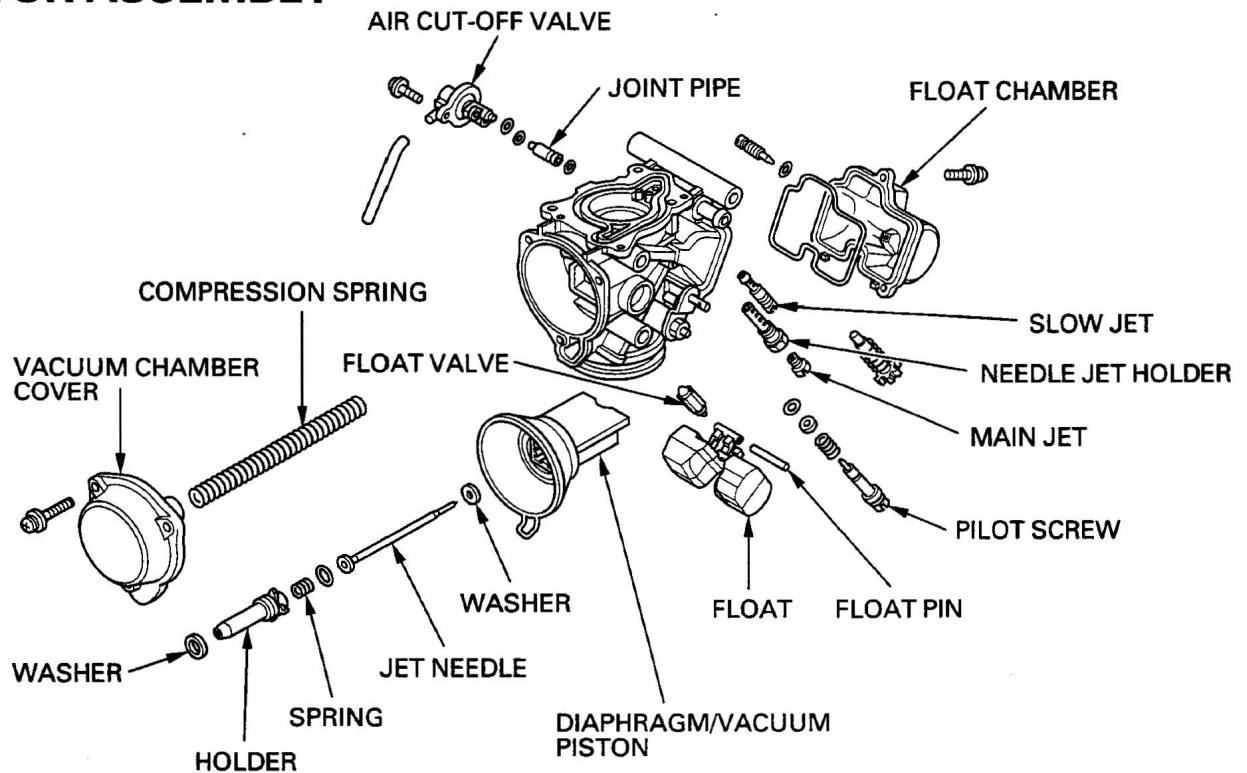
CAUTION:

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



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

CARBURETOR ASSEMBLY



FLOAT CHAMBER

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

CAUTION:

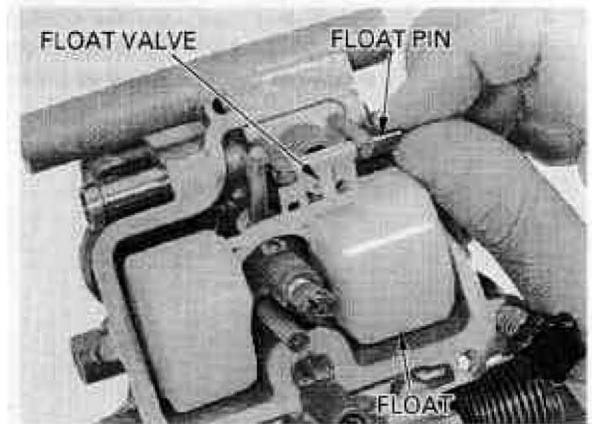
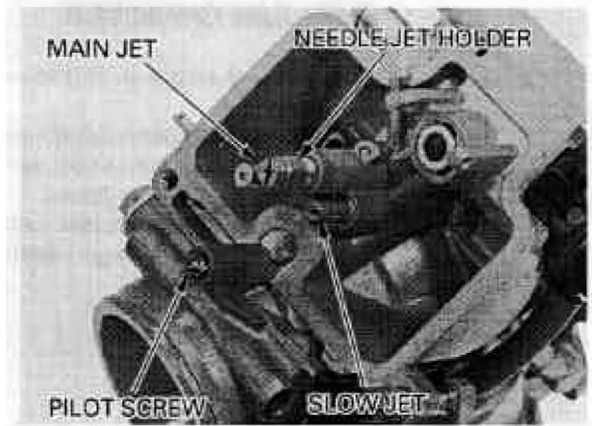
Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.

Install the 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

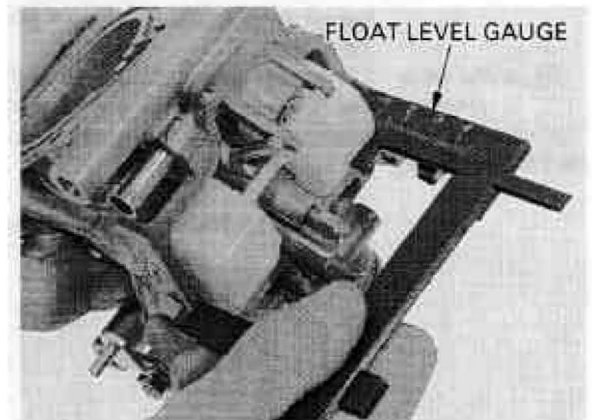
With the float valve seated and the float arm just touching the valve, measure the float level with the float level gauge.

TOOL:

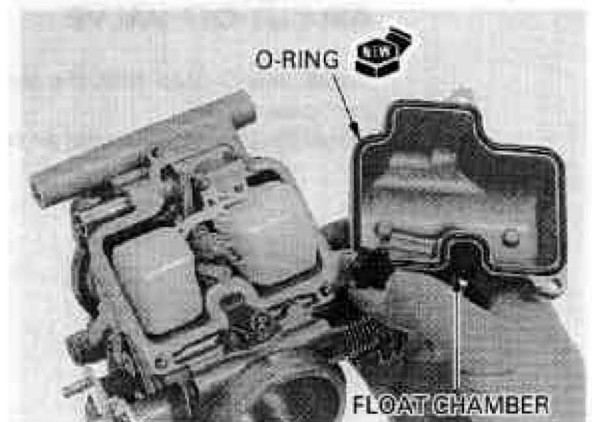
Float level gauge 07401-0010000

FLOAT LEVEL: 16.6 ± 0.5 mm (0.65 ± 0.02 in)

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



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



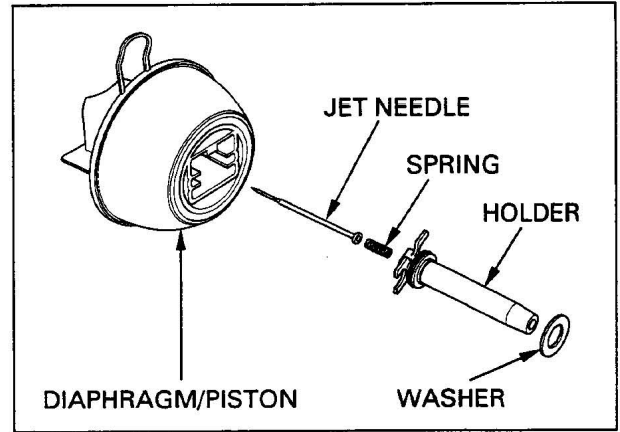
VACUUM CHAMBER

Coat a new O-ring with oil and install it onto the jet needle holder.

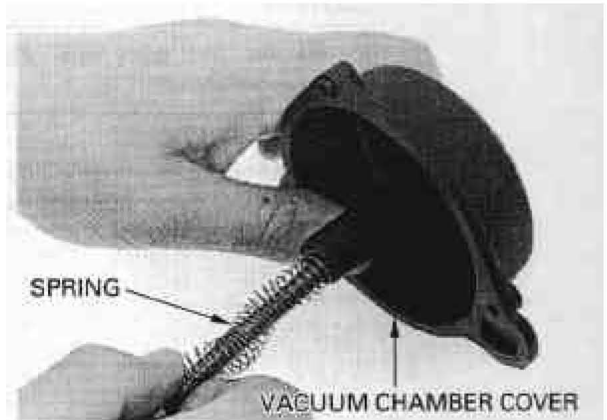
Install the washer onto the jet needle holder.

Install the washer, jet needle, spring and jet needle holder into the vacuum piston.

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



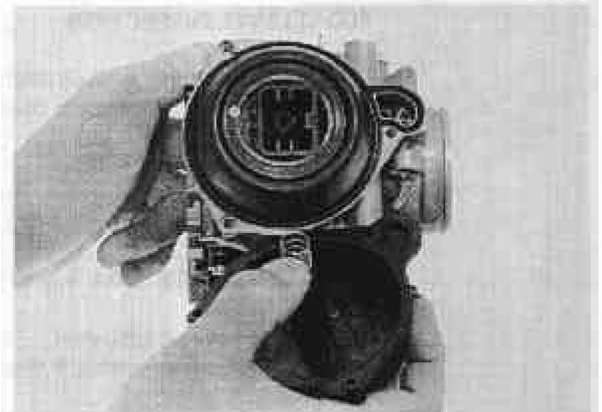
Install and compress the compression spring into the spring hole in the vacuum chamber cover using a screwdriver as a guide as shown.



Install the diaphragm/vacuum piston into the carburetor body.

Be careful not to pinch the diaphragm under the chamber cover. Lift the bottom of the piston with your finger to set the diaphragm rib in the groove in the carburetor body, and install the spring and vacuum chamber cover.

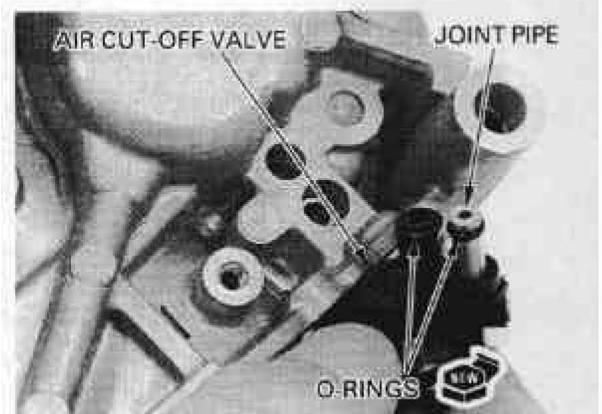
Install and tighten the three screws.



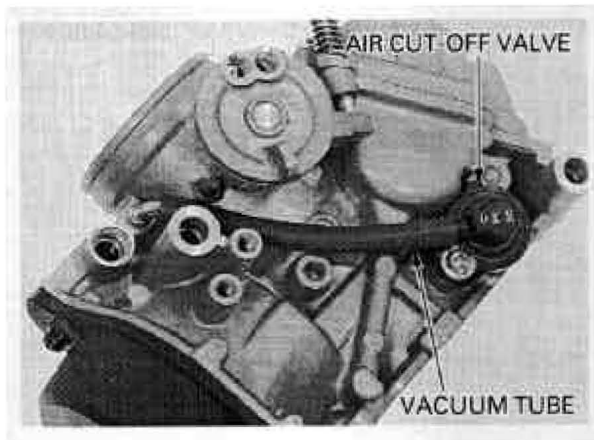
AIR CUT-OFF VALVE

Install new O-rings onto the air cut-off valve and joint pipe.

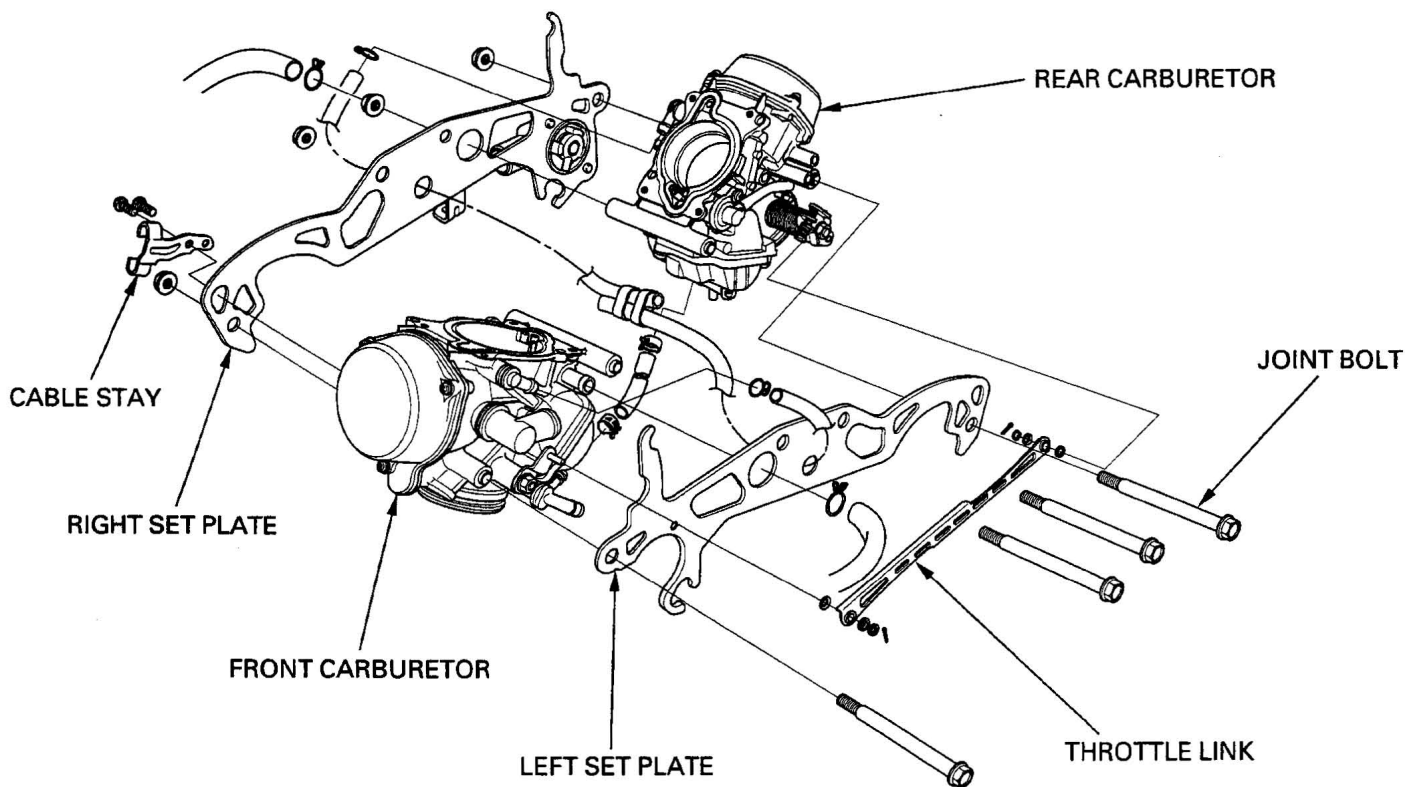
Install the joint pipe into the air cut-off valve.



Install the air cut-off valve and secure it with the washer and screw.
 Connect the vacuum tube to the vacuum pipe of the carburetor body.



CARBURETOR COMBINATION

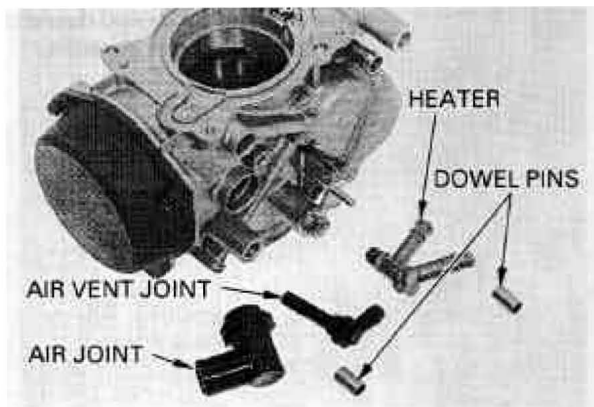


NOTE:

Always replace the O-rings with new ones.

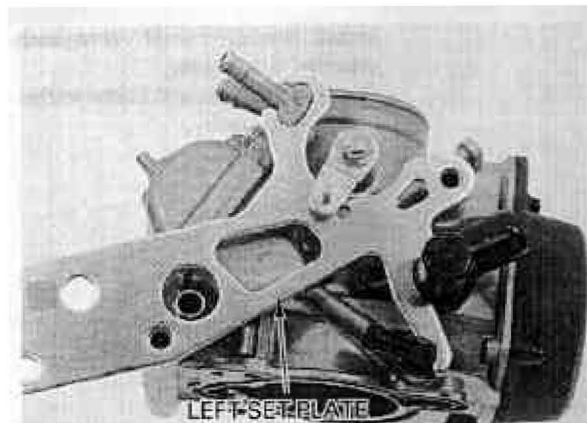
Install the following onto each carburetor:

- carburetor heater with new O-rings
- air vent joint with a new O-ring
- air joint with a new O-ring
- dowel pins



FUEL SYSTEM

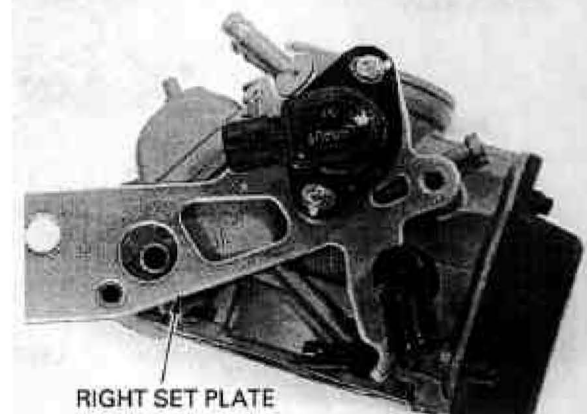
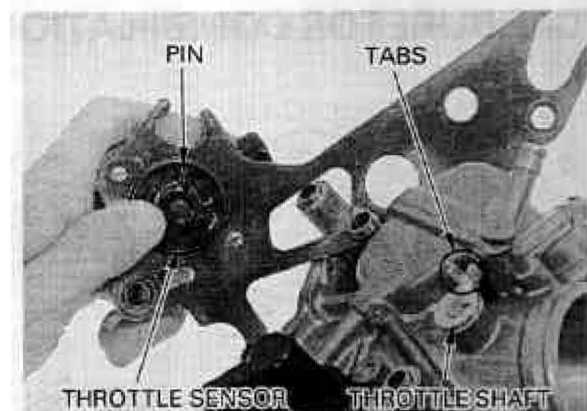
Install the left set plate onto the front carburetor as shown.



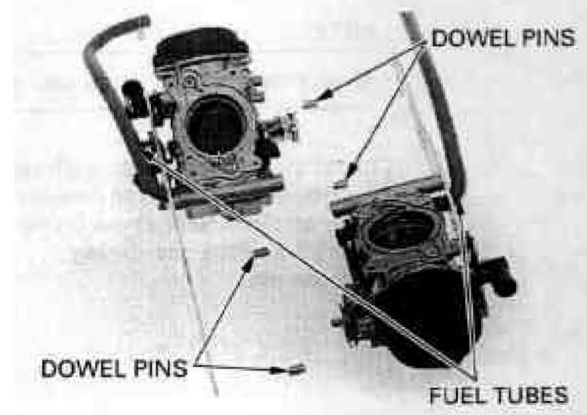
Install the right set plate onto the rear carburetor so that the pin of the throttle sensor is positioned between the tabs of the throttle shaft.

CAUTION:

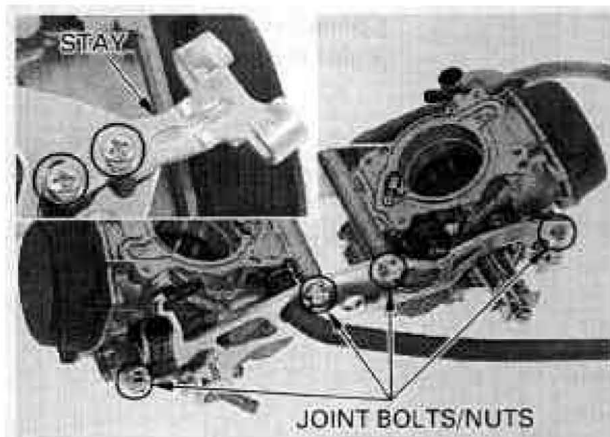
Do not remove the throttle sensor from the set plate unless it requires replacement. It can cause the throttle sensor getting out of position resulting in improper ignition timing.



Install the fuel tubes and dowel pins, and assemble the front and rear carburetors.



Install the four joint bolts and tighten the nuts.
Install the cable stay onto the front carburetor and tighten the screws.



Install the plastic cone washer with the concave side facing to the throttle link.

Install the following onto the throttle arm pin:

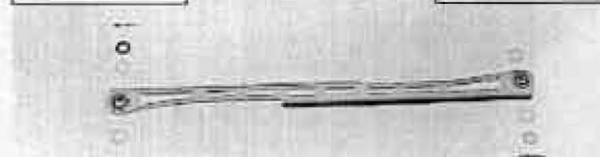
Front carburetor:

- plastic cone washer
- throttle link
- plastic plain washer
- metallic washer
- new cotter pin

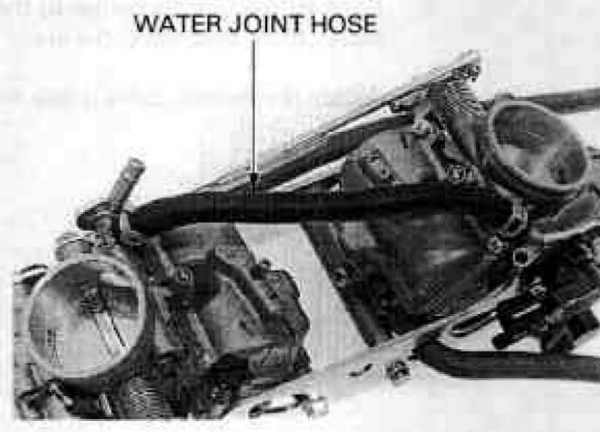
Rear carburetor:

- plastic plain washer
- throttle link
- plastic cone washer
- metallic washer
- new cotter pin

Move the throttle drum and check that throttle valves move smoothly and return automatically without binding.

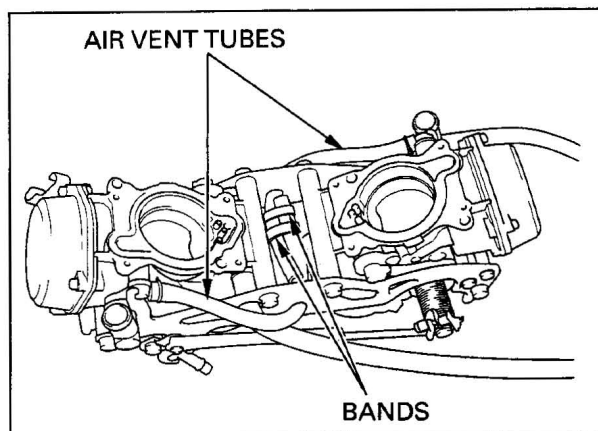


Connect the water joint hose to the front and rear carburetor heaters.



FUEL SYSTEM

Connect the air vent tubes to the air vent joints and install the tube bands as shown.



CARBURETOR INSTALLATION

Install the SE valve into each carburetor and tighten the SE valve nut.

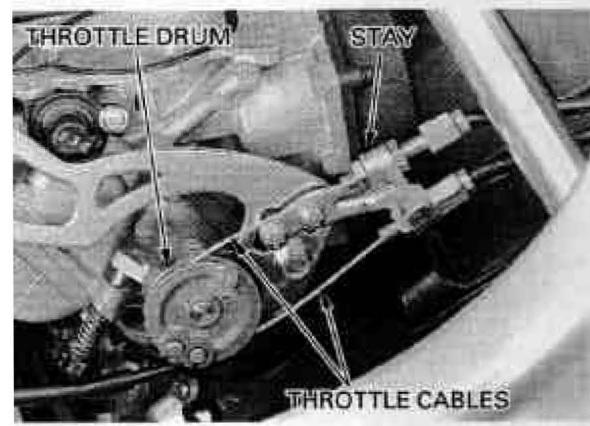


Connect the water inlet hose to the rear carburetor heater and the outlet hose to the front carburetor heater.



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

Adjust the throttle cable (page 3-4).



Install the carburetor assembly into the carburetor insulators and tighten the insulator band bolts.

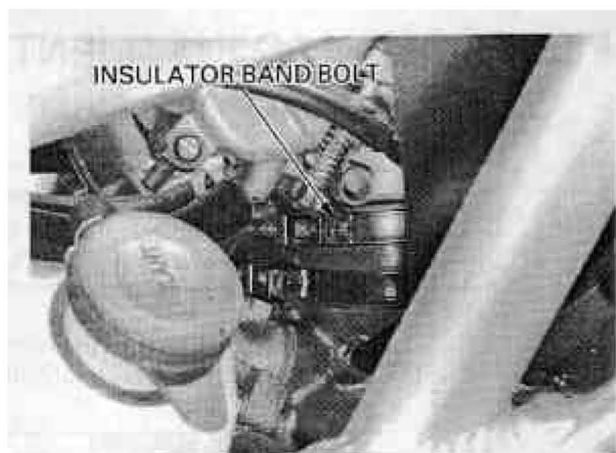
NOTE:

Insert the screwdriver through the hole in the heat guard to tighten the front carburetor insulator band bolt.

TORQUE: 1 N·m (0.1 kgf·m , 0.7 lbf·ft)

Connect the throttle sensor 3P (white) connector.

Install the air cleaner housing (page 5-4).
Fill and bleed the cooling system (page 6-5).



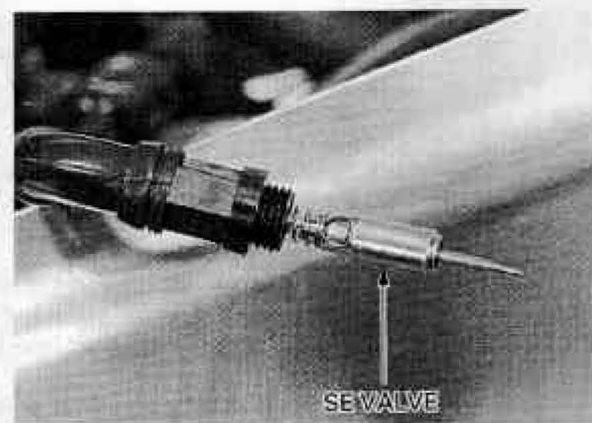
CHOKE SYSTEM

Remove the carburetors (page 5-5).

Check the starting enrichment (SE) valve for scoring, scratches or wear.

Check the seat at the tip of the SE valve for stepped wear.

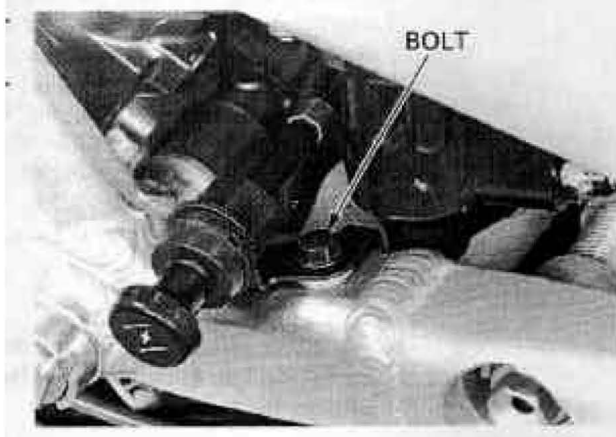
Replace the SE valve set if necessary.



Check the choke cables for frayed, kinked or other damage.

Remove the bolt and replace the choke cable assembly if necessary.

Install the carburetors (page 5-16).



SECONDARY AIR SUPPLY SYSTEM (SW, AR, IIG type only)

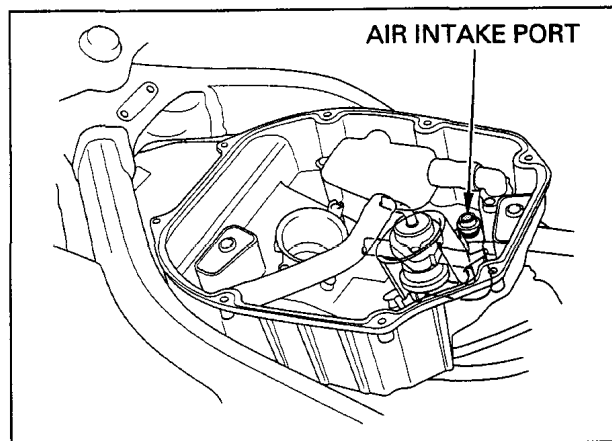
SYSTEM INSPECTION

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

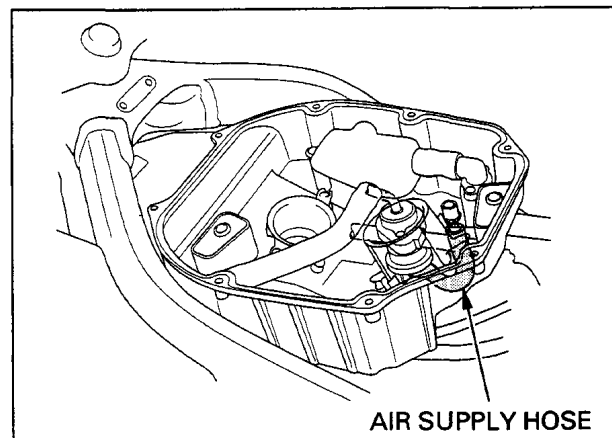
Remove the air cleaner element (page 3-6).

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

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



Disconnect the air supply (air cleaner housing-to-PAIR control valve) hose from the air cleaner housing.



Disconnect the PAIR control valve vacuum tube from the 3-way vacuum joint and plug the vacuum joint.

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

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

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

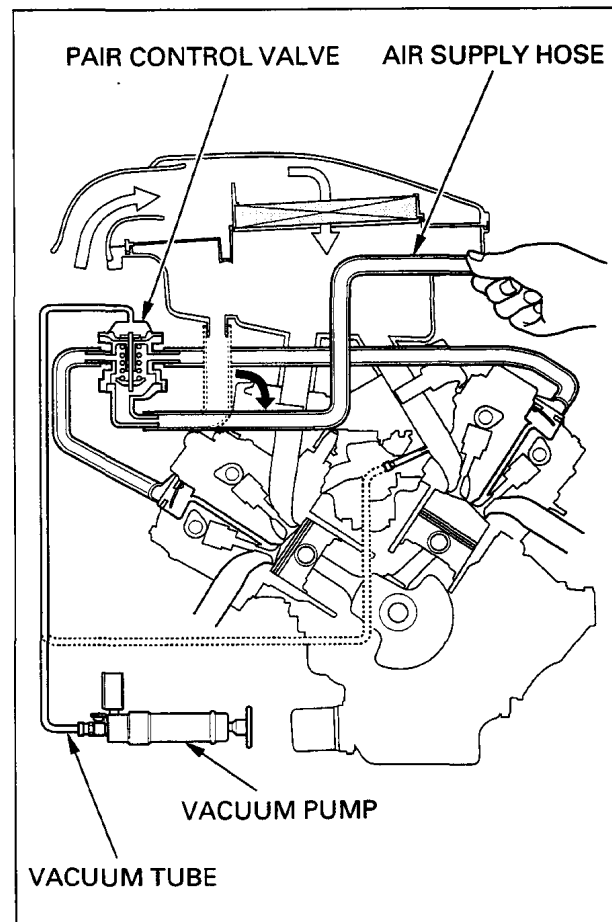
With the engine running, gradually apply vacuum to the PAIR control valve vacuum tube.

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

SPECIFIED VACUUM: 400 mm Hg (15.7 in Hg)

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

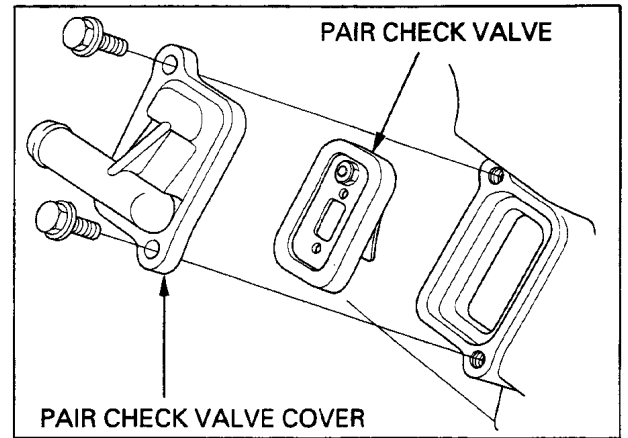
If afterburn occurs on deceleration, even when the secondary air supply system is normal, check the air cut-off valve.



PAIR CHECK VALVE INSPECTION

For the rear cylinder PAIR check valve removal, remove the fuel tank (page 2-4).

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



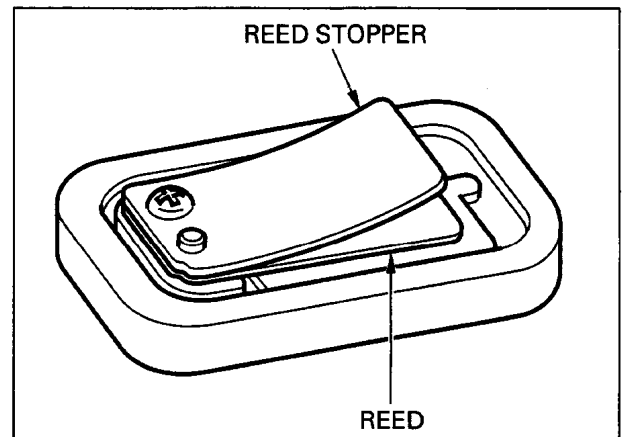
Check the reed for damage or fatigue. Replace if necessary.

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

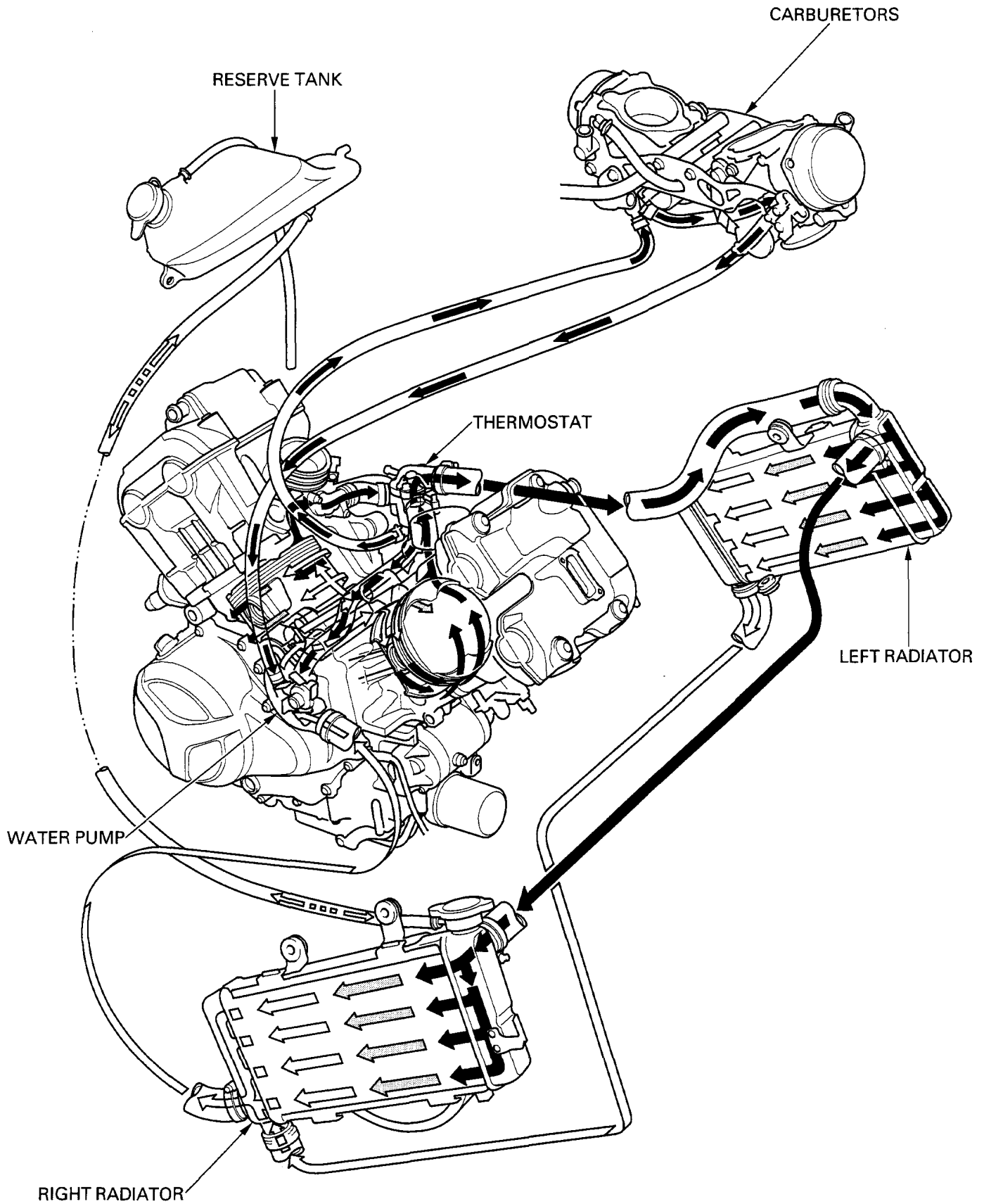
Install the PAIR check valve and cover onto the cylinder head cover.

Apply locking agent to the cover bolt threads. Install and tighten the bolts.

TORQUE: 5 N·m (0.52 kgf·m , 3.8 lbf·ft)



COOLING SYSTEM



6. COOLING SYSTEM

SERVICE INFORMATION	6-1	RADIATOR/COOLING FAN	6-6
TROUBLESHOOTING	6-2	RADIATOR RESERVE TANK	6-9
SYSTEM TESTING	6-3	THERMOSTAT	6-10
COOLANT REPLACEMENT	6-4	WATER PUMP	6-11

SERVICE INFORMATION

GENERAL

▲WARNING

6

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

- Use only distilled water and ethylene glycol 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.
- All cooling system service can be done with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to section 19 for coolant temperature indicator and fan motor switch.

SPECIFICATIONS

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.86 ℓ (0.756 US gal , 0.629 Imp gal)
	Reserve tank	0.71 ℓ (0.188 US gal , 0.156 Imp gal)
Radiator cap relief pressure		108–137 kPa (1.1–1.4 kgf/cm ² , 16–20 psi)
Thermostat	Begin to open	163–171 °F (73–77 °C)
	Fully open	194 °F (90 °C)
	Valve lift	8 mm (0.3 in) minimum

TOOLS

Bearing remover set, 10 mm	07936-GE00000
– Bearing remover shaft	07936-GE00100
– Bearing remover, 10 mm	07936-GE00200
– Sliding weight	07741-0010201
Driver	07749-0010000
Attachment, 28 × 30 mm	07946-1870100
Pilot, 10 mm	07746-0040100
Mechanical seal driver attachment	07945-4150400

TROUBLESHOOTING

Engine temperature too high

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

Engine temperature too low

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

Coolant leaks

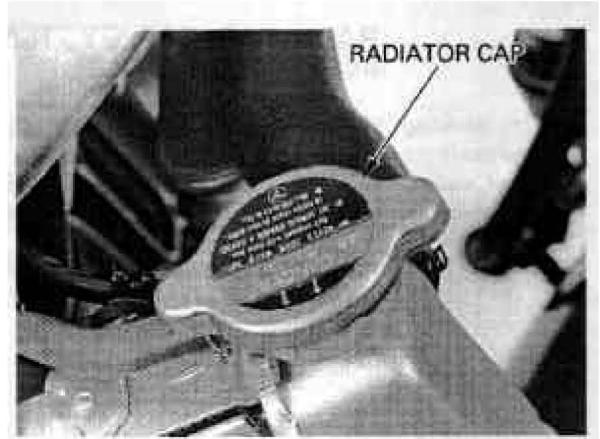
- Faulty water pump mechanical seal
- Deteriorated O-rings
- Faulty radiator cap
- Damaged or deteriorated cylinder head gasket
- Loose hose connection or clamp
- Damaged or deteriorated hoses

SYSTEM TESTING

▲WARNING

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

Remove the front fairing (page 2-3).
Remove the radiator cap.

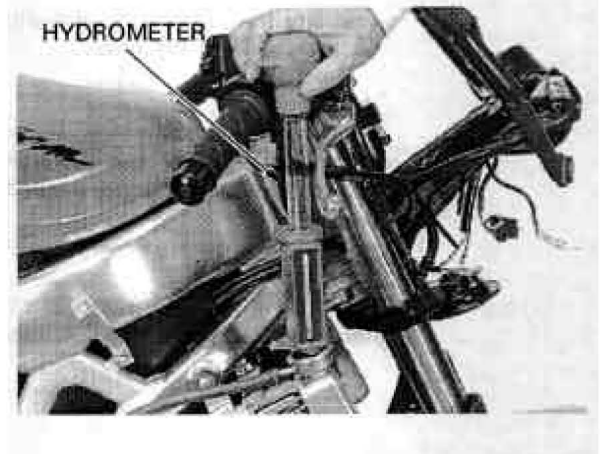


COOLANT (HYDROMETER TEST)

Test the coolant gravity using a hydrometer.

STANDARD COOLANT CONCENTRATION: 50%

Look for contamination and replace the coolant if necessary.



Coolant temperature °F (°C)	32 (0)	41 (5)	50 (10)	59 (15)	68 (20)	77 (25)	86 (30)	95 (35)	104 (40)	113 (45)	122 (50)
Coolant ratio %											
5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
20	1.036	1.035	1.034	1.033	1.031	1.029	1.027	1.025	1.023	1.021	1.019
25	1.045	1.044	1.043	1.042	1.040	1.038	1.036	1.034	1.031	1.028	1.025
30	1.053	1.052	1.051	1.049	1.047	1.045	1.043	1.041	1.038	1.035	1.032
35	1.063	1.062	1.060	1.058	1.056	1.054	1.052	1.049	1.046	1.043	1.040
40	1.072	1.070	1.068	1.066	1.064	1.062	1.059	1.056	1.053	1.050	1.047
45	1.080	1.078	1.076	1.074	1.072	1.069	1.066	1.063	1.060	1.057	1.054
50	1.086	1.084	1.082	1.080	1.077	1.074	1.071	1.068	1.065	1.062	1.059
55	1.095	1.093	1.091	1.088	1.085	1.082	1.079	1.076	1.073	1.070	1.067
60	1.100	1.098	1.095	1.092	1.089	1.086	1.083	1.080	1.077	1.074	1.071

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Before installing the cap in the tester, wet the sealing surfaces. Pressure test the radiator cap using the tester. Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low. It must hold specified pressure for at least 6 seconds.

RADIATOR CAP RELIEF PRESSURE:

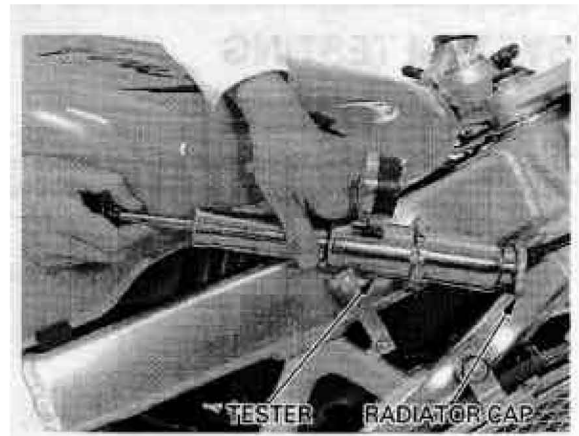
108–137 kPa (1.1–1.4 kgf/cm², 16–20 psi)

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

CAUTION:

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

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



COOLANT REPLACEMENT

PREPARATION

▲WARNING

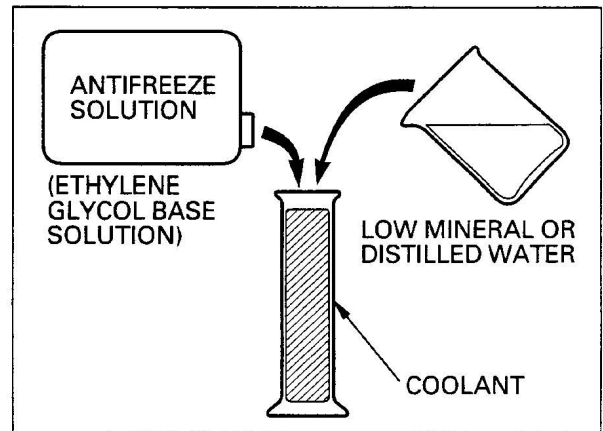
- **Radiator coolant is toxic. Keep it away from eyes, mouth, skin and clothes.**
 - If any coolant gets in your eyes, rinse them with water and consult a doctor immediately.
 - If any coolant is swallowed, induce vomiting, gargle and consult a physician immediately.
 - If any coolant gets on your skin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

NOTE:

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

RECOMMENDED MIXTURE:

50–50 (Distilled water and antifreeze)



REPLACEMENT/AIR BLEEDING

▲WARNING

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

NOTE:

When filling the system, place the motorcycle on its side stand on a flat, level surface.

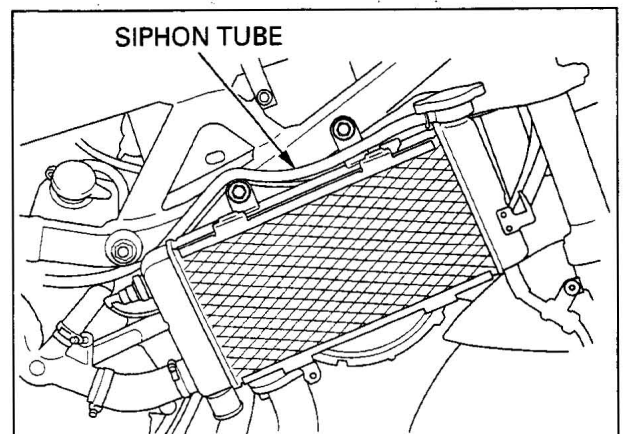
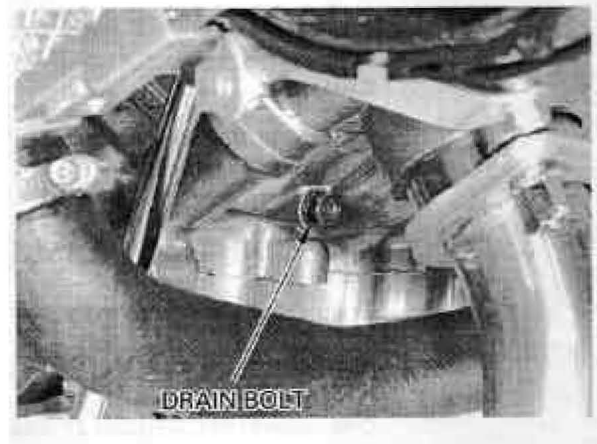
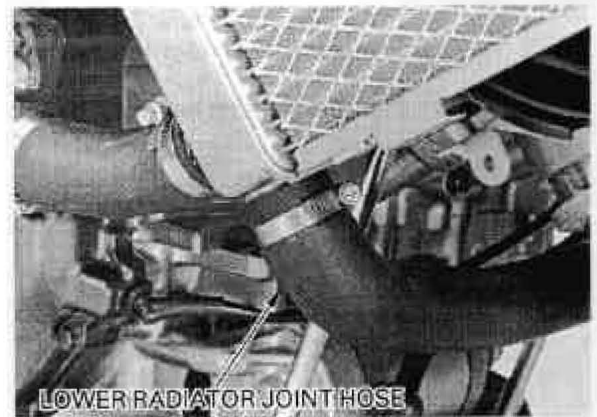
Remove the front fairing (page 2-3).
Remove the radiator cap.

Disconnect the lower radiator joint hose at the right radiator by loosening the hose band screw and drain the coolant from the system.

Remove the drain bolt and drain the coolant from the front cylinder.

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

Connect the radiator lower joint hose and siphon tube, and install the drain bolt with a new sealing washer.



COOLING SYSTEM

Fill the system with recommended coolant up to the filler neck with the motorcycle on its side stand.

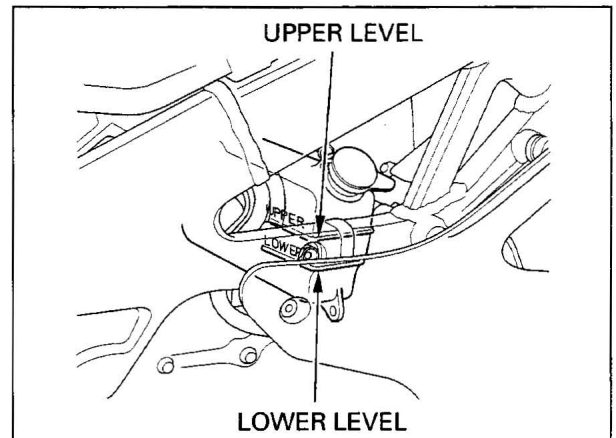
Bleed air from the system as follows:

1. Shift the transmission into neutral.
Start the engine and let it idle for 2–3 minutes.
2. Snap the throttle 3–4 times to bleed air from the system.
3. Stop the engine and add coolant up to the filler neck.
4. Install the radiator cap.



Fill the reserve tank to the upper level line with the motorcycle upright on a flat, level surface.

Install the front fairing (page 2-3).



RADIATOR/COOLING FAN

CAUTION:

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

RADIATOR REMOVAL/INSTALLATION

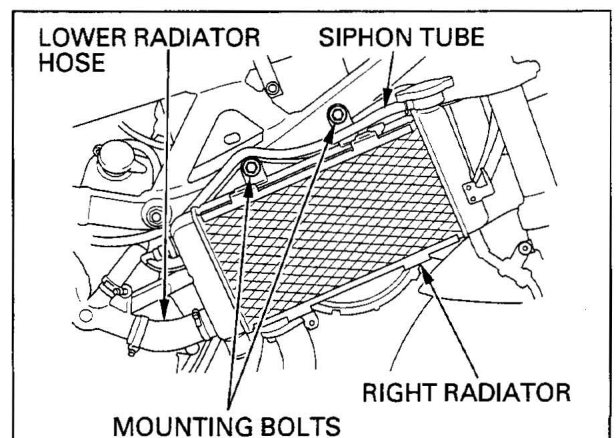
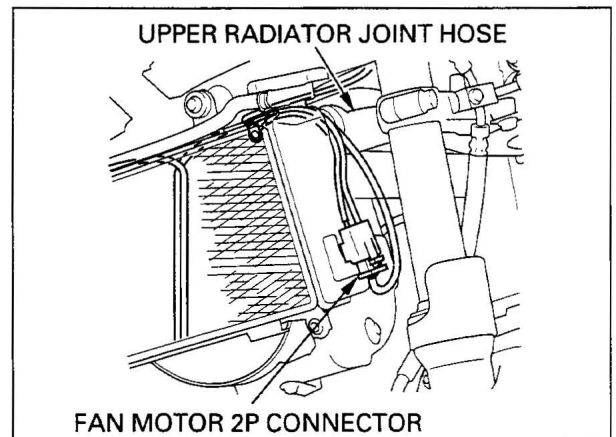
Drain the coolant from the system (page 6-5).

RIGHT RADIATOR

Disconnect the fan motor 2P (black) connector.
Disconnect the radiator siphon tube and upper radiator joint hose.
Remove the two mounting bolts and the radiator from the mounting stay.
Disconnect the lower radiator hose from the radiator.

Install the right radiator in the reverse order of removal.

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

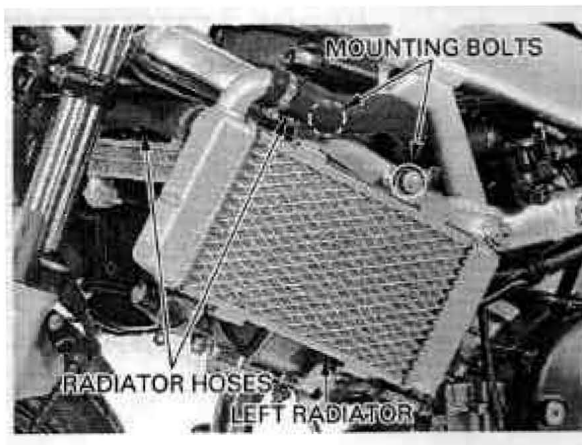


LEFT RADIATOR

Disconnect the upper radiator hose, upper and lower radiator joint hoses.
Remove the two mounting bolts and the radiator from the mounting stay.

Install the left radiator in the reverse order of removal.

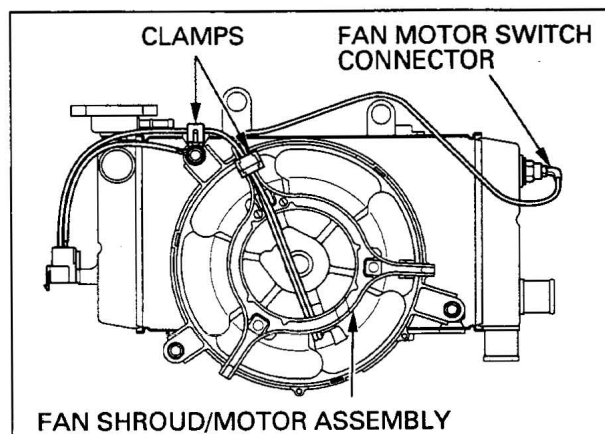
Fill and bleed the cooling system (page 6-5).

**COOLING FAN DISASSEMBLY**

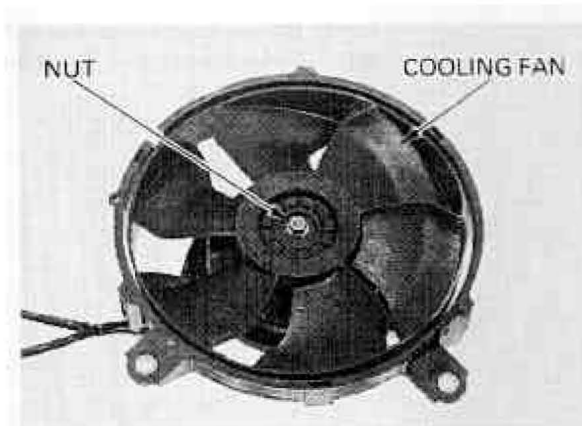
Remove the right radiator (page 6-6).

Disconnect the fan motor switch connector.
Free the fan motor wires from the clamps.

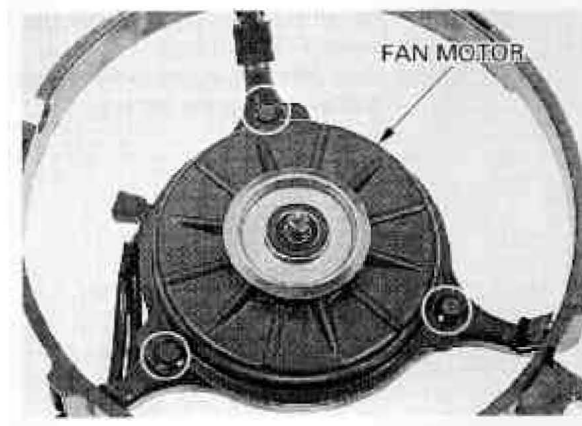
Remove the three bolts, clamp and fan shroud/motor assembly from the radiator.



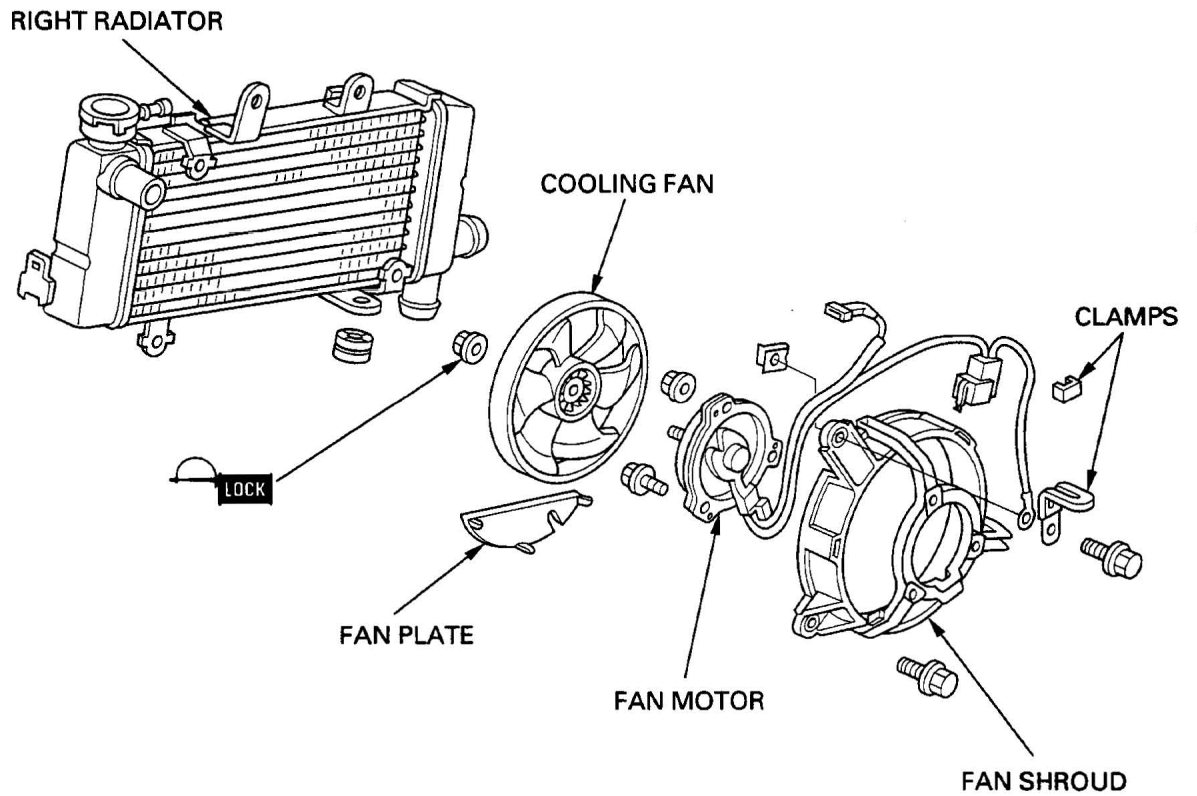
Remove the nut and cooling fan from the motor.



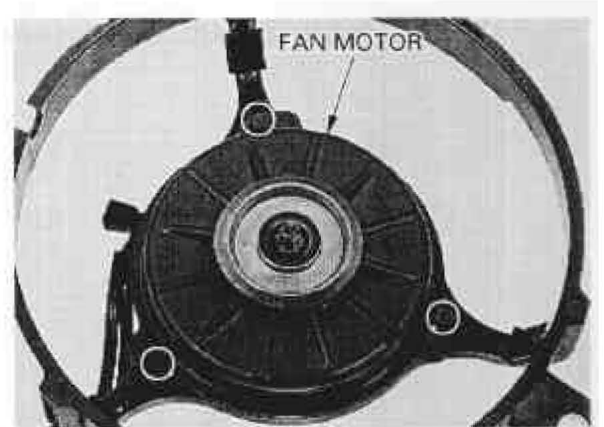
Remove the three bolts and the fan motor from the shroud.



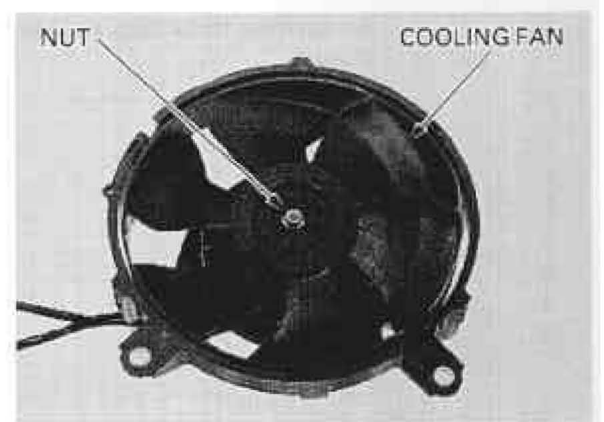
COOLING FAN ASSEMBLY



Install the fan motor onto the shroud with the drain tube facing toward the fan plate, and tighten the three bolts.



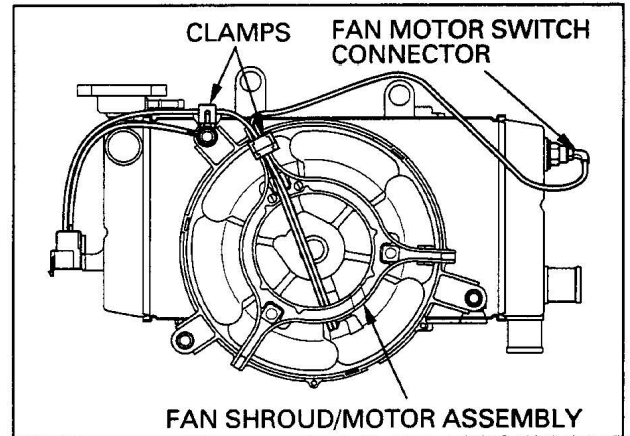
Install the cooling fan onto the motor shaft, aligning the flat surfaces. Apply locking agent to the motor shaft threads. Install and tighten the nut.



Install the fan shroud/motor assembly with the clamps and ground terminal onto the right radiator as shown and tighten the bolts.

Route and clamp the fan motor wires properly as shown.

Install the right radiator (page 6-6).



RADIATOR RESERVE TANK

REMOVAL/INSTALLATION

Remove the front fairing (page 2-3).

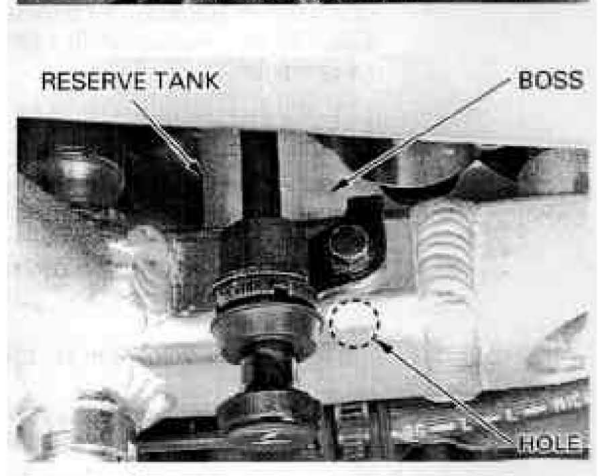
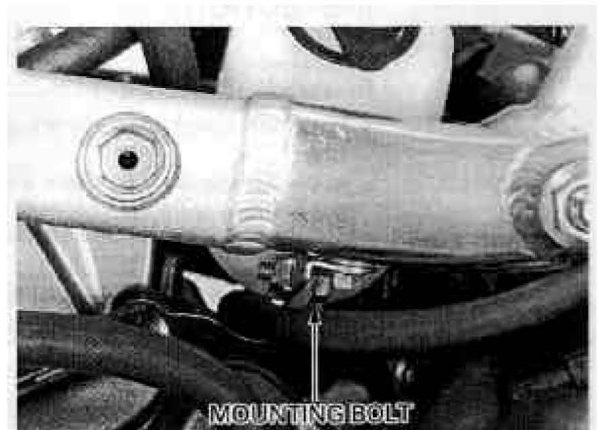
Disconnect the radiator siphon tube from the radiator filler neck and drain the coolant from the reserve tank.

Remove the mounting bolt and the reserve tank from the frame.

Install the reserve tank in the frame and insert its boss into the hole in the frame.

Install the removed parts in the reverse order of removal.

Fill the reserve tank with recommended coolant to the upper level line.



THERMOSTAT

REMOVAL

Remove the fuel tank (page 2-4).
Drain the coolant from the system (page 6-5).

Loosen the hose band screw and disconnect the upper radiator hose from the thermostat housing cover.

Remove the two bolts, ground terminal and thermostat housing cover.

Remove the thermostat from the housing.



INSPECTION

⚠ WARNING

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

Visually inspect the thermostat for damage.
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 thermometer or thermostat touch the pan, or you will get false readings.

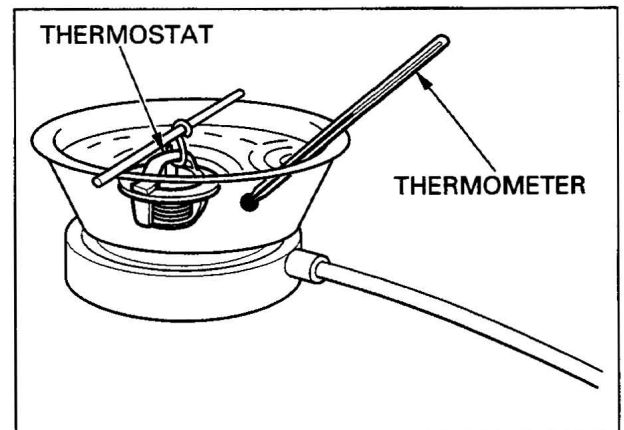
THERMOSTAT BEGINS TO OPEN:

163–171 °F (73–77 °C)

VALVE LIFT:

8 mm (0.3 in) minimum at 194 °F (90 °C)

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



INSTALLATION

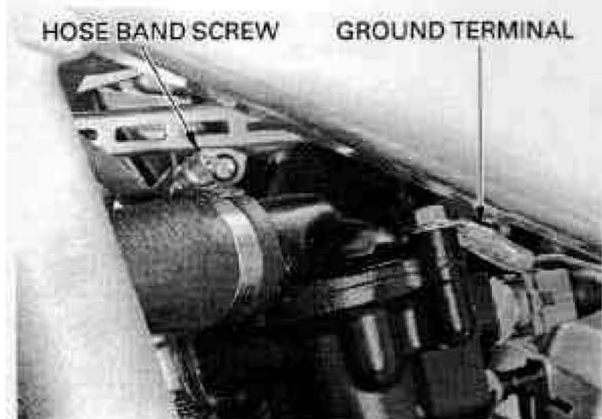
Install the thermostat into the housing with its hole facing rearwards.



Install a new O-ring into the groove in the housing cover and install the cover onto the housing.



Install the cover bolts with the ground terminal and tighten them.
Connect the upper radiator hose to the thermostat housing cover.

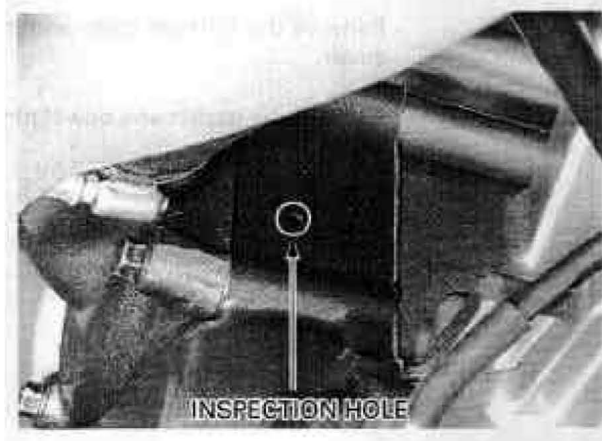


Fill and bleed the cooling system (page 6-5).
Install the fuel tank (page 2-4).

WATER PUMP

MECHANICAL SEAL INSPECTION

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

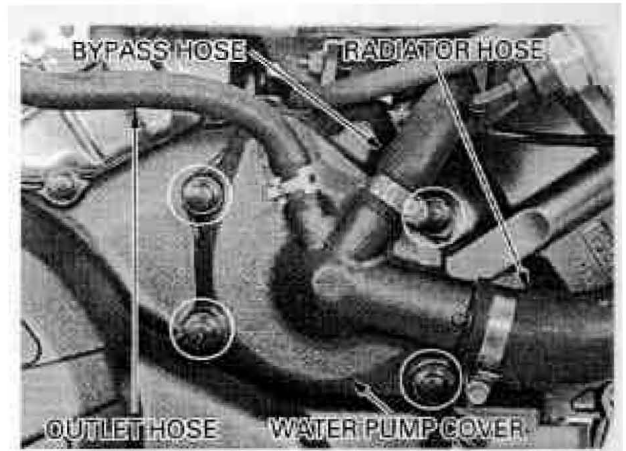


COOLING SYSTEM

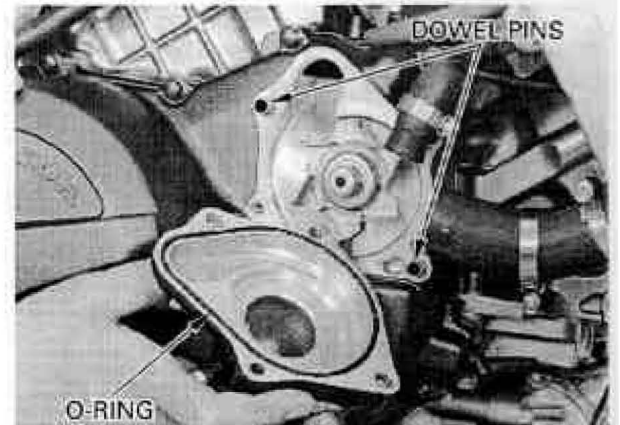
RIGHT CRANKCASE COVER REMOVAL

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

Disconnect the carburetor heater water outlet hose and bypass hose from the water pump cover. Remove the four bolts and the water pump cover. Loosen the hose band screw and disconnect the lower radiator hose from the water pump cover.



Remove the O-ring and dowel pins.

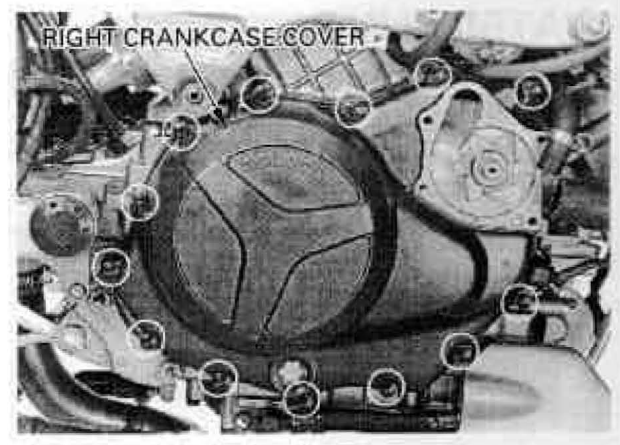


Disconnect the ignition pulse generator 2P (white) connector.



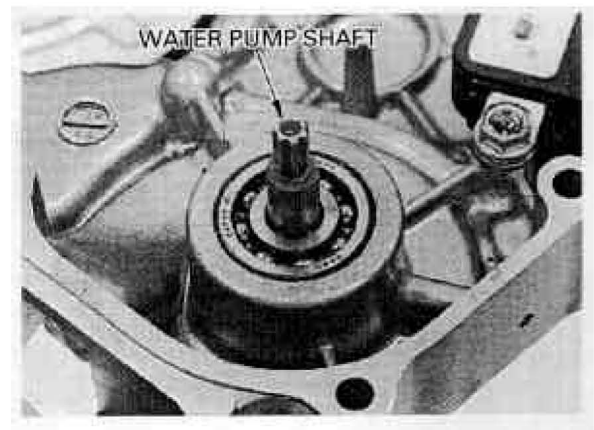
Remove the thirteen bolts and the right crankcase cover.

Remove the gasket and dowel pins.



MECHANICAL SEAL REPLACEMENT

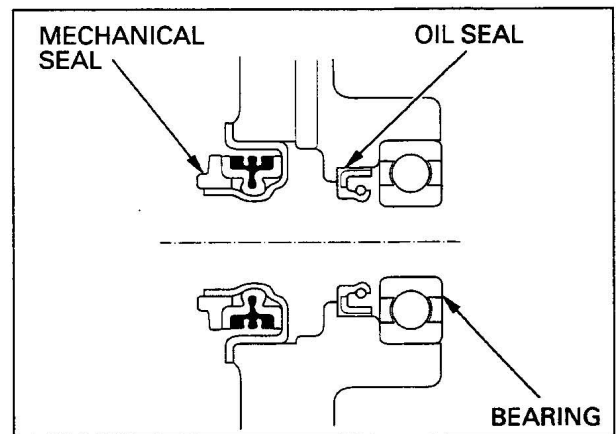
Remove the water pump shaft from the right crankcase cover.



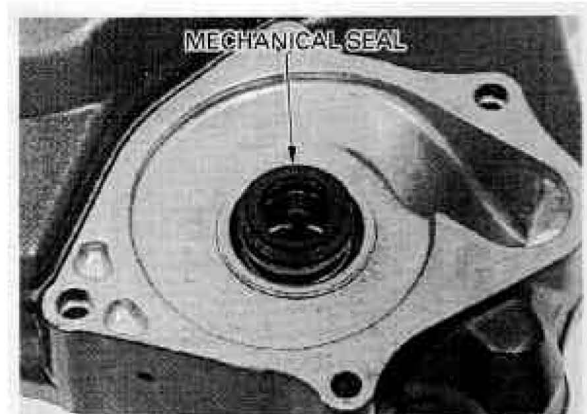
Remove the bearing using the special tools.

TOOLS:

- | | |
|-----------------------------------|---------------|
| Bearing remover set, 10 mm | 07936-GE00000 |
| – Bearing remover shaft | 07936-GE00100 |
| – Bearing remover, 10 mm | 07936-GE00200 |
| – Sliding weight | 07741-0010201 |



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

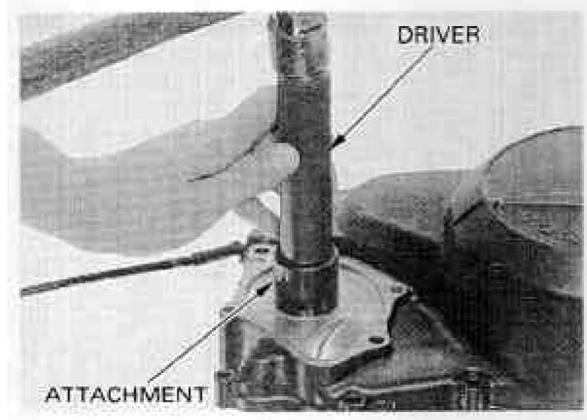


Drive a new mechanical seal using the special tool.

TOOLS:

- | | |
|--|---------------|
| Driver | 07749-0010000 |
| Mechanical seal driver attachment | 07945-4150400 |

Apply grease to a new oil seal lip and install the oil seal into the right crankcase cover.

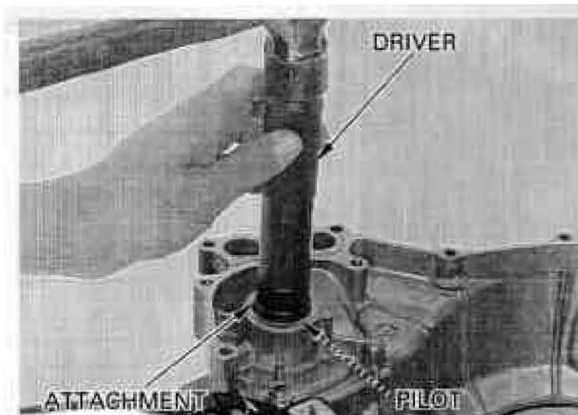


COOLING SYSTEM

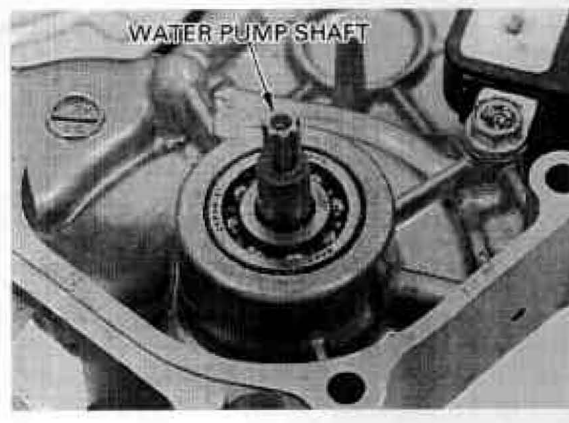
Drive a new bearing with the markings facing out, using the special tools.

TOOLS:

- Driver** 07749-0010000
- Attachment, 28 × 30 mm** 07946-1870100
- Pilot, 10 mm** 07746-0040100

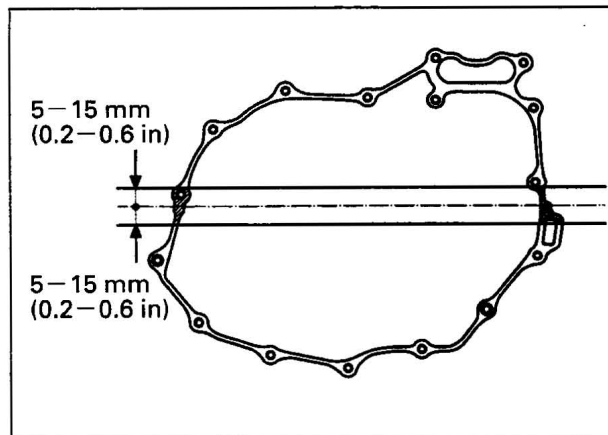


Support the bearing inner race properly and install the water pump shaft until it is seated.

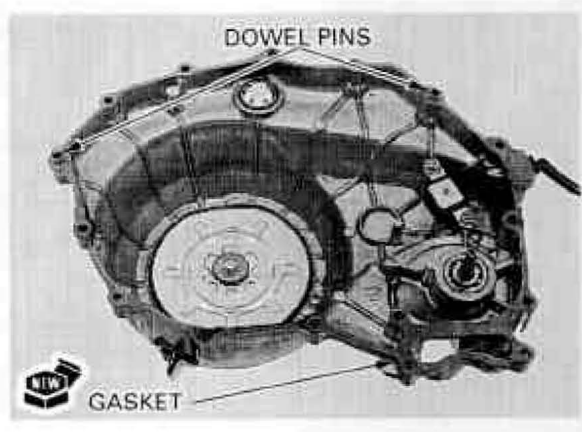


RIGHT CRANKCASE COVER INSTALLATION

Apply sealant to the crankcase mating surfaces as shown.



Install the dowel pins and a new gasket.



Install the right crankcase cover and tighten the thirteen bolts.

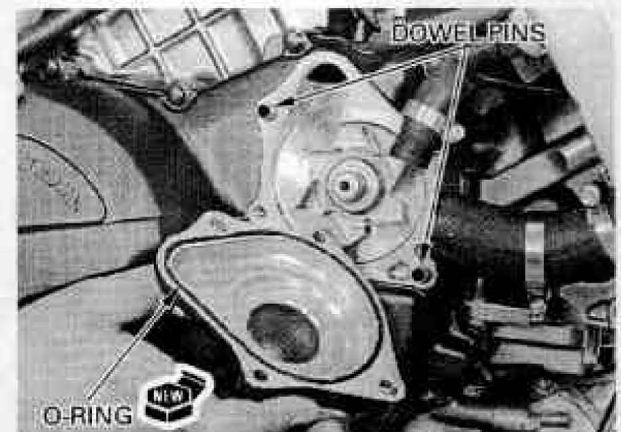


Route the ignition pulse generator wire properly (page 1-18).

Connect the ignition pulse generator connector.



Install the dowel pins and a new O-ring into the water pump cover groove.

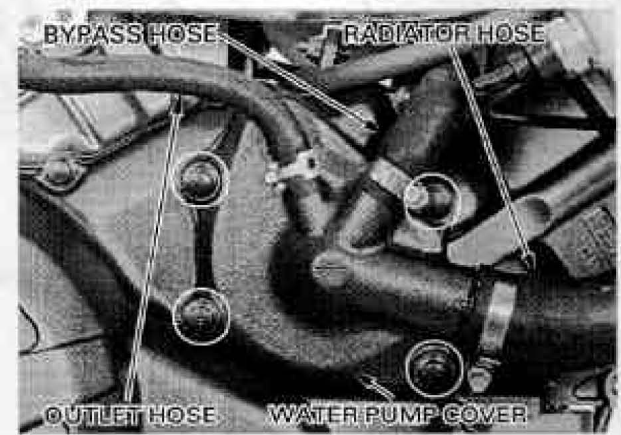


Connect the lower radiator hose to the water pump cover.

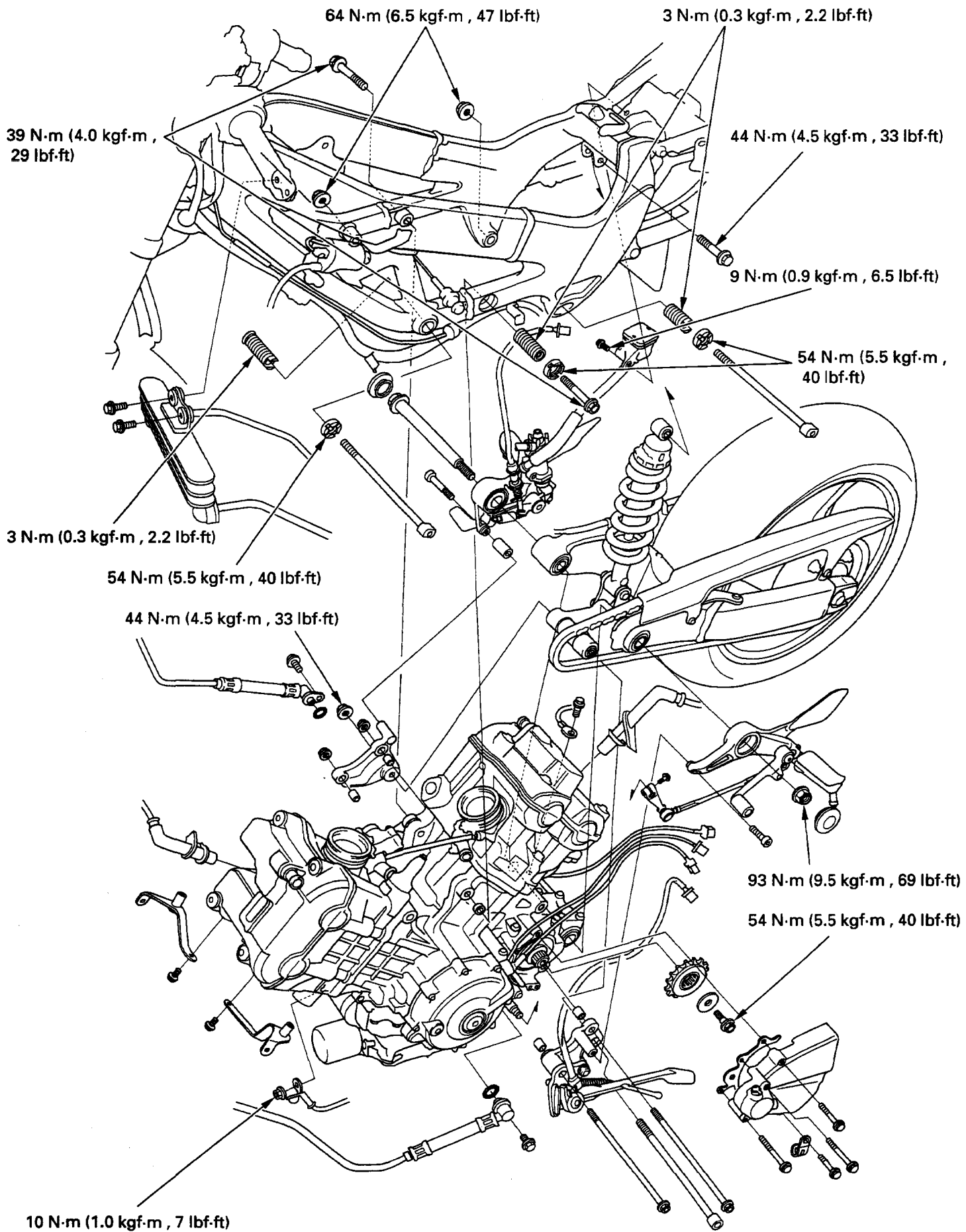
Install the water pump cover onto the right crankcase cover and tighten the four bolts.

Connect the carburetor heater water outlet hose and bypass hose to the water pump cover.

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



ENGINE REMOVAL/INSTALLATION



7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION

7-1

ENGINE INSTALLATION

7-7

ENGINE REMOVAL

7-3

SERVICE INFORMATION

GENERAL

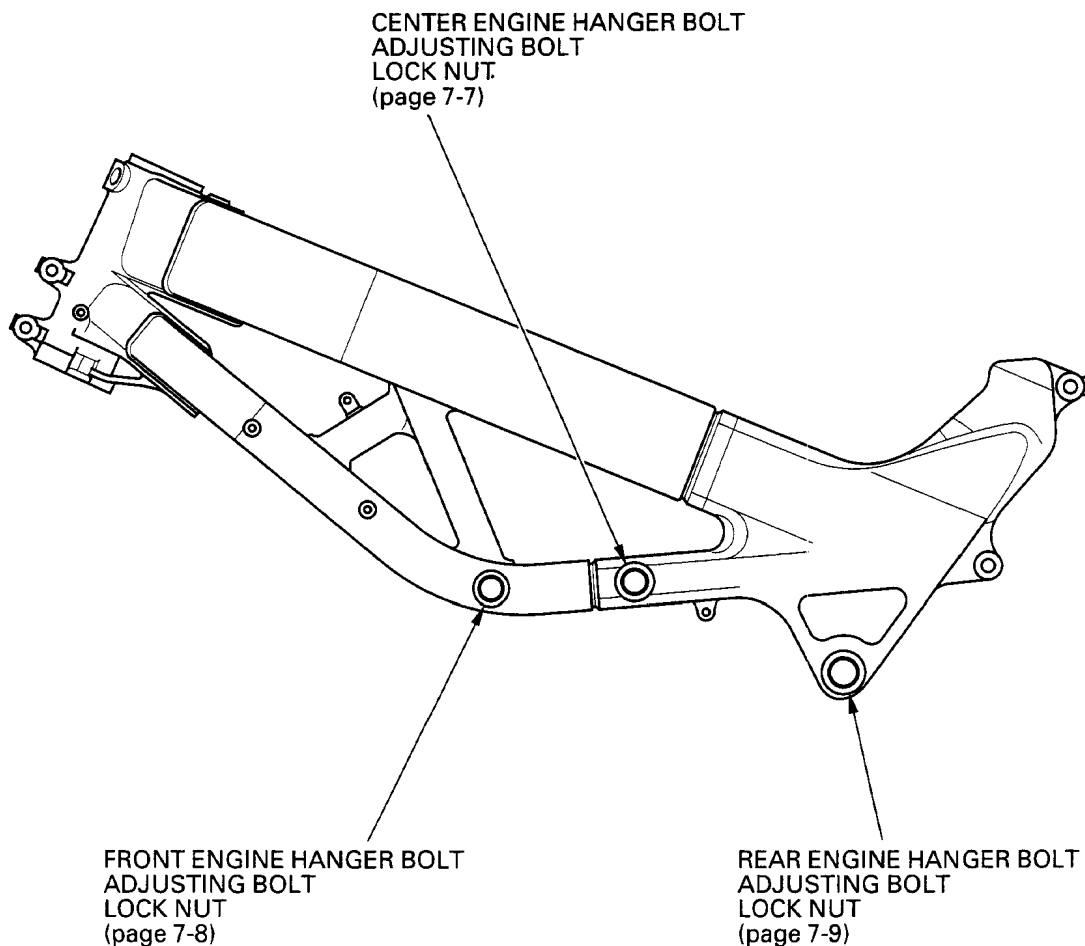
- A hoist or equivalent is required to support the motorcycle when removing and installing the engine.
- A floor jack or other adjustable support is required to support and maneuver the engine.

CAUTION:

Do not use the oil filter as a jacking point.

7

- 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 require engine removal for service:
 - transmission (section 11)
 - crankshaft/piston/cylinder (section 12)
- When installing the engine, be sure to tighten the engine mounting fasteners to the specified torque in the specified sequence. If you mistake the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the correct sequence.



ENGINE REMOVAL/INSTALLATION

SPECIFICATIONS

ITEM	SPECIFICATIONS
Engine dry weight	74.2 kg (163.6 lbs)
Engine oil capacity after disassembly	4.5 ℓ (4.8 US qt, 4.0 Imp qt)
Coolant capacity (radiator and engine)	2.86 ℓ (0.756 US gal, 0.629 Imp gal)

TORQUE VALUES

Center engine hanger bolt	39 N·m (4.0 kgf·m, 29 lbf·ft)
Left center engine hanger adjusting bolt	3 N·m (0.3 kgf·m, 2.2 lbf·ft)
Left center engine hanger lock nut	54 N·m (5.5 kgf·m, 40 lbf·ft)
Rear engine hanger adjusting bolt	3 N·m (0.3 kgf·m, 2.2 lbf·ft)
Rear engine hanger lock nut	54 N·m (5.5 kgf·m, 40 lbf·ft)
Front engine hanger adjusting bolt	3 N·m (0.3 kgf·m, 2.2 lbf·ft)
Front engine hanger lock nut	54 N·m (5.5 kgf·m, 40 lbf·ft)
Rear engine hanger nut	64 N·m (6.5 kgf·m, 47 lbf·ft)
Front engine hanger nut	64 N·m (6.5 kgf·m, 47 lbf·ft)
Shock link bracket nut	44 N·m (4.5 kgf·m, 33 lbf·ft)
Swingarm pivot nut	93 N·m (9.5 kgf·m, 69 lbf·ft)
Shock absorber lower mounting nut	44 N·m (4.5 kgf·m, 33 lbf·ft)
Shock link-to-bracket nut	44 N·m (4.5 kgf·m, 33 lbf·ft)
Rear brake reservoir mounting bolt	9 N·m (0.9 kgf·m, 6.5 lbf·ft)
Drive sprocket bolt	54 N·m (5.5 kgf·m, 40 lbf·ft)
Starter motor cable terminal nut	10 N·m (1.0 kgf·m, 7 lbf·ft)

TOOLS

Lock nut wrench	07VMA-MBB0100
Lock nut wrench	07HMA-MR70200

ENGINE REMOVAL

Drain the engine oil (page 3-11).

Remove the following:

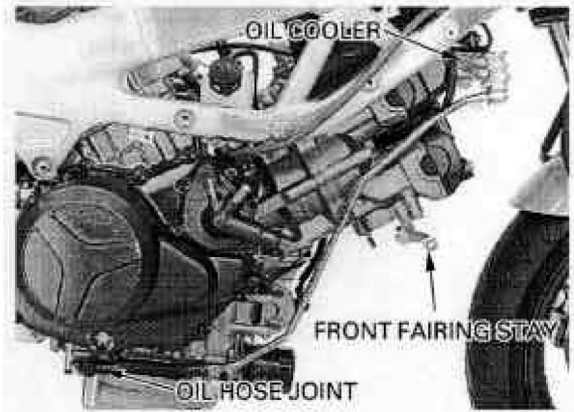
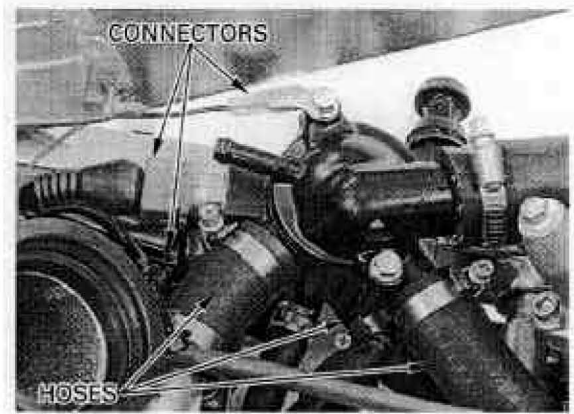
- exhaust system (page 2-5).
- left and right radiators (page 6-6).
- carburetor assembly (page 5-5).

Remove the thermostat housing assembly by disconnecting the following:

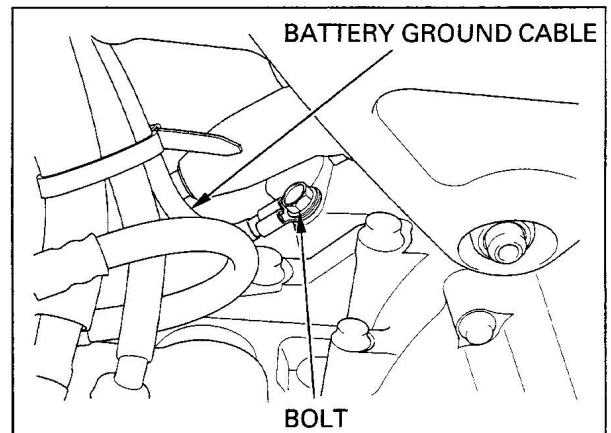
- ground wire connector
- engine coolant temperature sensor connector
- thermosensor connector
- bypass hose from the water pump
- water hoses from the cylinder heads

Remove the front fairing stays from the front cylinder head.

Remove the oil hose joints, mounting bolts and the oil cooler assembly.



Remove the bolt and the battery ground cable from the engine.



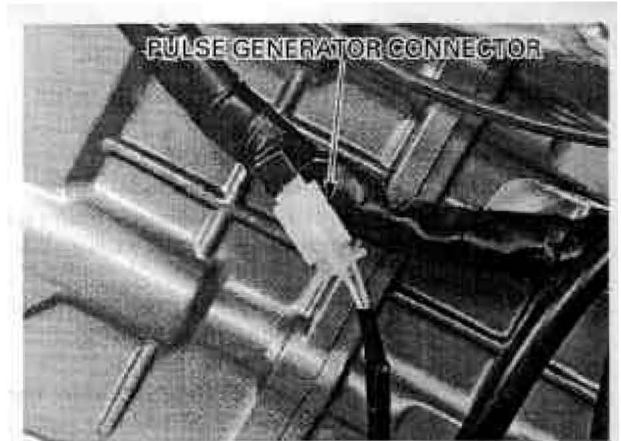
Disconnect the following:

- alternator 3P (white) connector
- oil pressure switch/neutral switch wire 2P (black) connector
- speed sensor 3P (white) connector
- side stand switch 3P (green) connector



ENGINE REMOVAL/INSTALLATION

- pulse generator 2P (white) connector



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

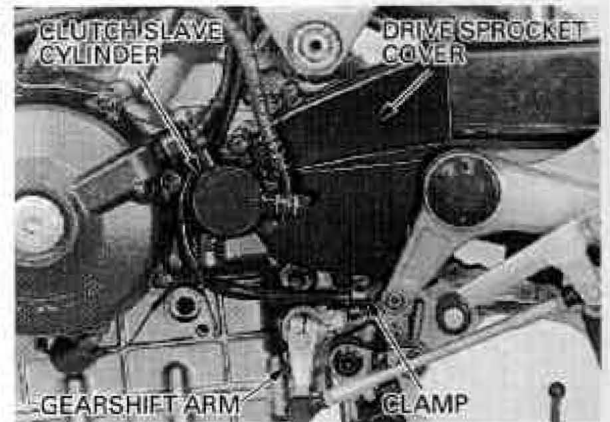


Remove the following:

- bolt and gearshift arm
- three bolts, clutch slave cylinder, dowel pins and gasket

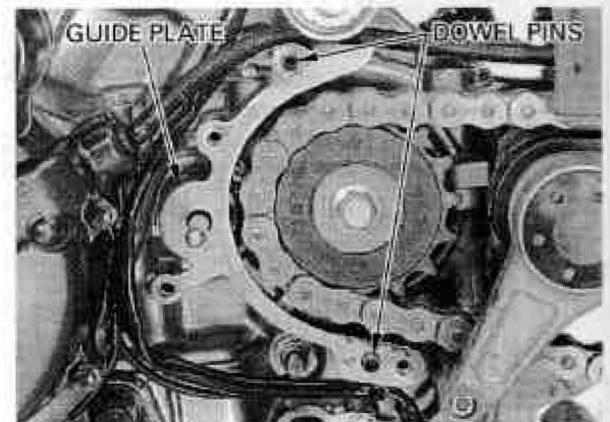
NOTE:

- Do not disconnect the clutch hose.
- To keep slave cylinder piston from being forced out of the cylinder, squeeze the clutch lever and tie it to the handlebar.

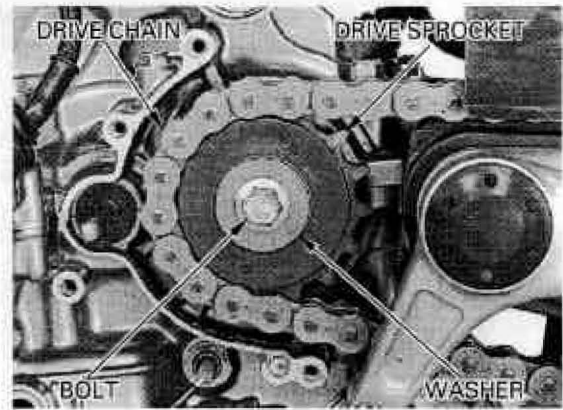


- two bolts, wire clamp and drive sprocket cover

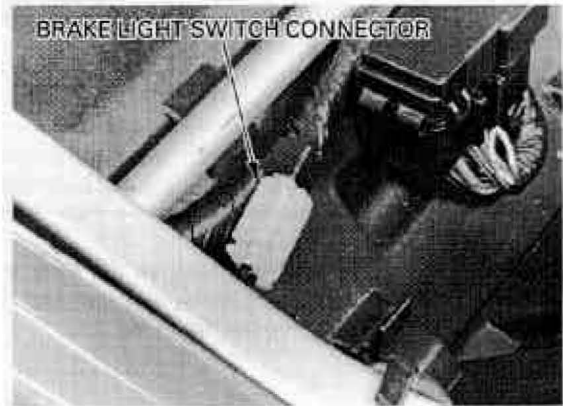
Remove the gasket, guide plate and dowel pins.



Loosen the rear axle nut and drive chain adjusters. Remove the drive sprocket bolt, washer and the drive sprocket with the drive chain from the countershaft.



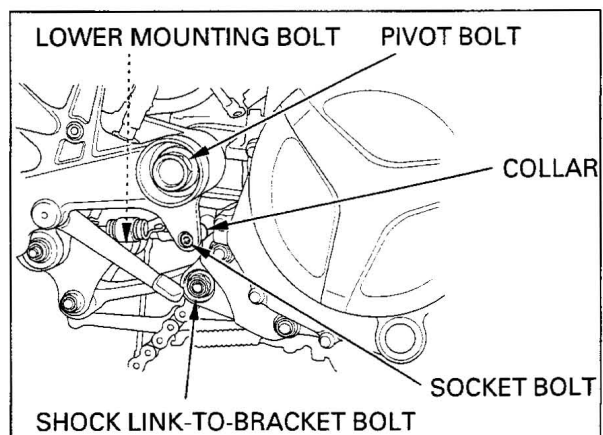
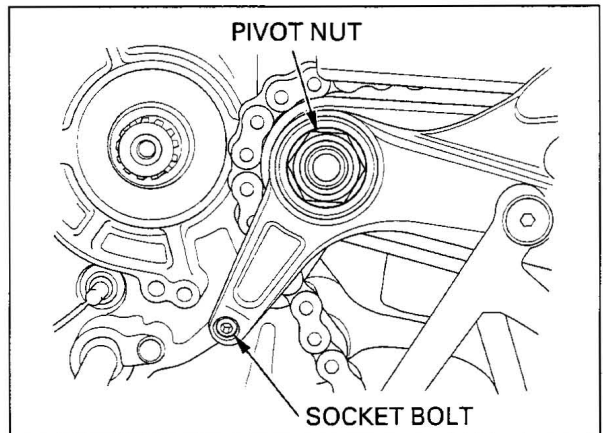
Disconnect the rear brake light switch connector. Remove the rear brake reservoir mounting bolt and the reservoir.



Support the motorcycle securely with a hoist or equivalent.

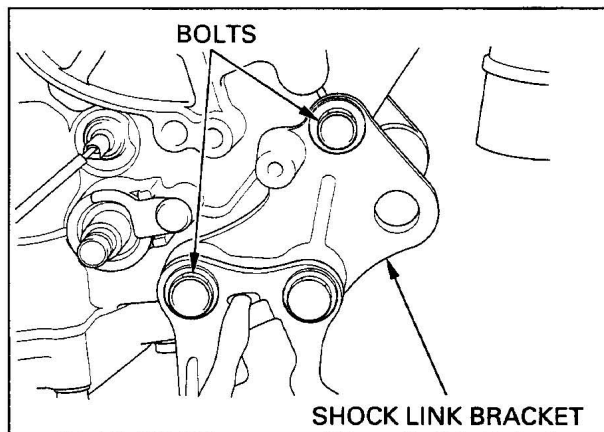
Remove the following:

- swingarm pivot caps
- shock link-to-bracket nut and bolt
- shock absorber lower mounting nut and bolt
- swingarm pivot nut, socket bolt, left driver footpeg bracket
- socket bolt, collar, swingarm pivot bolt, right driver footpeg bracket
- rear wheel, swingarm and rear brake system as an assembly



ENGINE REMOVAL/INSTALLATION

Remove the shock link bracket mounting nuts, bolts, brackets with the side stand and four dowel pins.



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

NOTE:

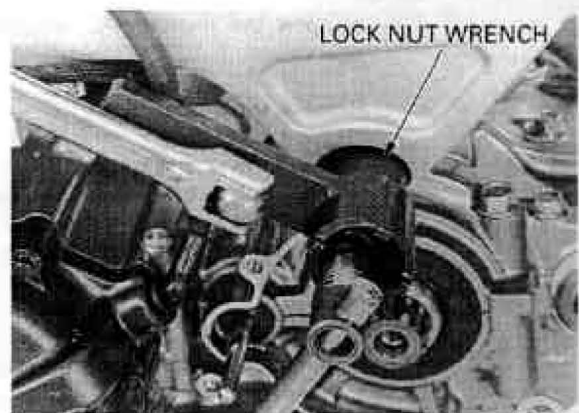
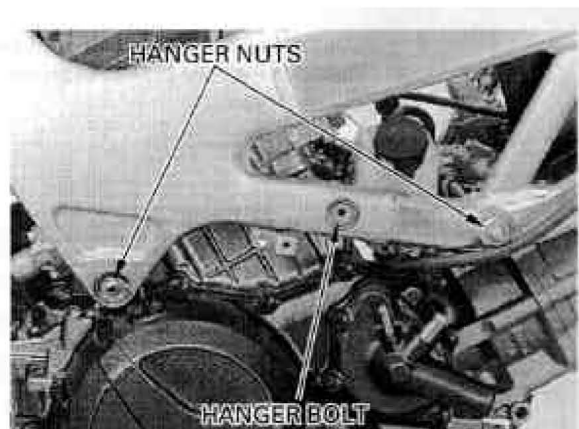
The jack height must be continually adjusted to relieve stress for ease of bolt removal.

Loosen and remove the front engine hanger nut, center engine hanger bolt and rear engine hanger nut from the right side.

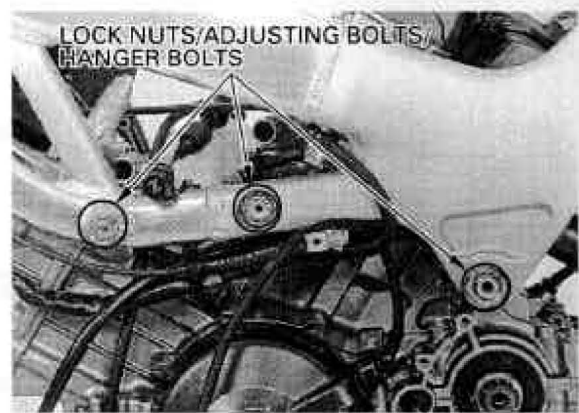
Hold each hanger bolt and loosen each lock nut using the special tool.

TOOLS:

Front and center:	
Lock nut wrench	07VMA-MBB0100
Rear:	
Lock nut wrench	07HMA-MR70200



Remove the lock nuts, adjusting bolts, engine hanger bolts and the engine from the frame.



ENGINE INSTALLATION

NOTE:

- When tightening the lock nut with the lock nut wrench, refer to torque wrench reading information on page 7-1 "SERVICE INFORMATION".
- The jack height must be continually adjusted to relieve stress from the mounting fasteners.

CAUTION:

Be sure to tighten all engine mounting fasteners to the specified torque in the specified sequence described below. If you mistake the tightening torque or sequence, loosen all mounting fasteners, then tighten them again to the specified torque in the specified sequence.

Install the engine in the frame.
Install the engine hanger bolts, adjusting bolts and lock nuts from the left side.

Install the center engine hanger bolt, front and rear engine hanger nut from the right side.

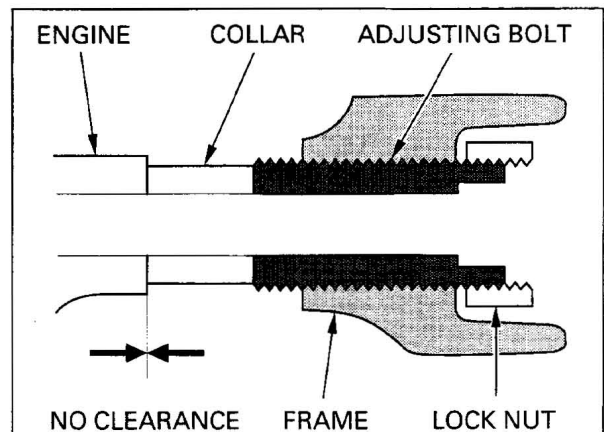
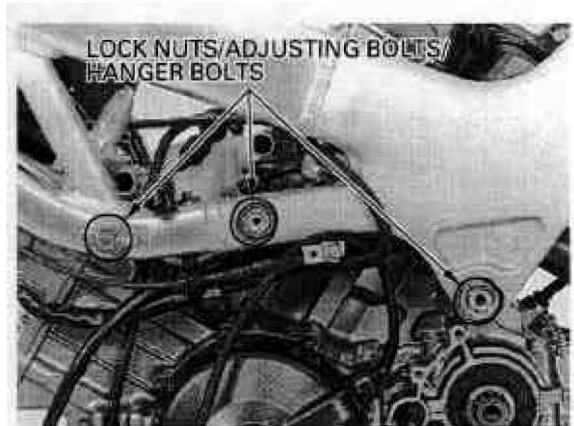
1. Tighten the right center engine hanger bolt to the specified torque.

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

2. Install the distance collar between the left center adjusting bolt and engine.

Tighten the left center adjusting bolt to the specified torque and check that there is no clearance between the distance collar and engine.

TORQUE: 3 N·m (0.3 kgf·m , 2.2 lbf·ft)

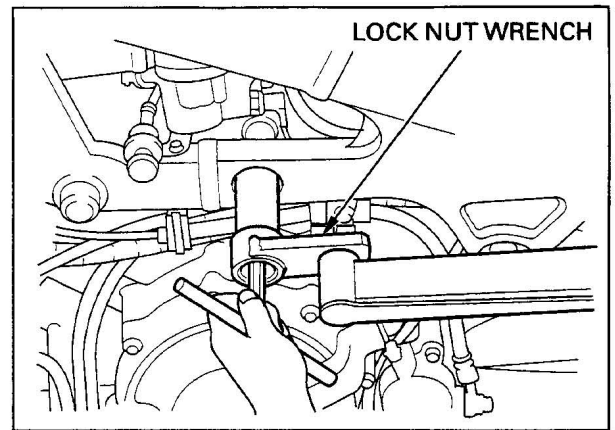


ENGINE REMOVAL/INSTALLATION

3. Hold the left center adjusting bolt and tighten the lock nut to the specified torque using the special tool.

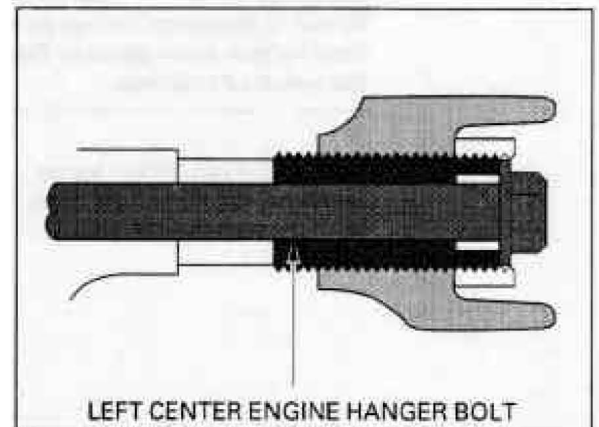
TOOL:
Lock nut wrench 07VMA-MBB0100

TORQUE: Actual: 54 N·m (5.5 kgf·m , 40 lbf·ft)
Indicated: 49 N·m (5.0 kgf·m , 36 lbf·ft)



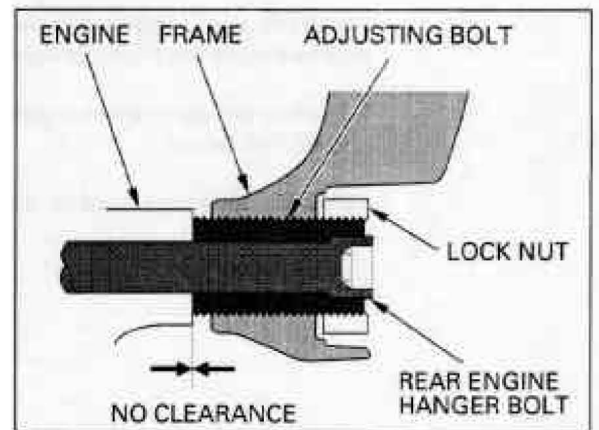
4. Install and tighten the left center engine hanger bolt to the specified torque.

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



5. Tighten the rear adjusting bolt with the rear engine hanger bolt to the specified torque and check that there is no clearance between the adjusting bolt and engine.

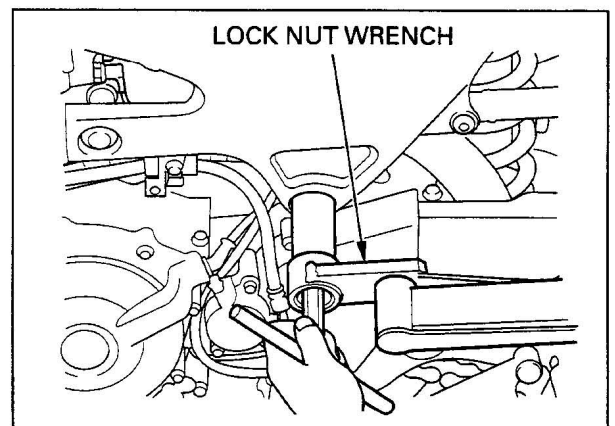
TORQUE: 3 N·m (0.3 kgf·m , 2.2 lbf·ft)



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

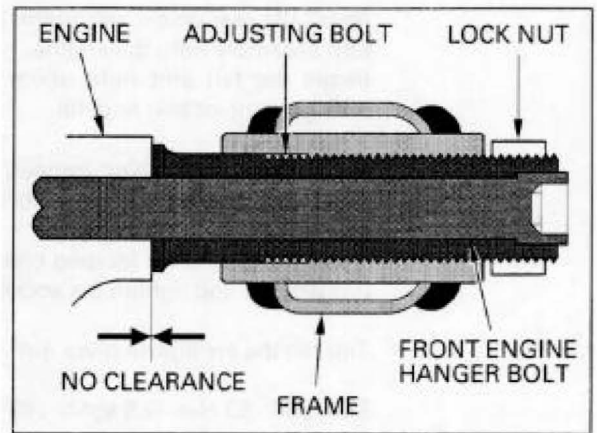
TOOL:
Lock nut wrench 07HMA-MR70200

TORQUE: Actual: 54 N·m (5.5 kgf·m , 40 lbf·ft)
Indicated: 49 N·m (5.0 kgf·m , 36 lbf·ft)



7. Tighten the front adjusting bolt with the front engine hanger bolt to the specified torque and check that there is no clearance between the adjusting bolt and engine.

TORQUE: 3 N·m (0.3 kgf·m , 2.2 lbf·ft)

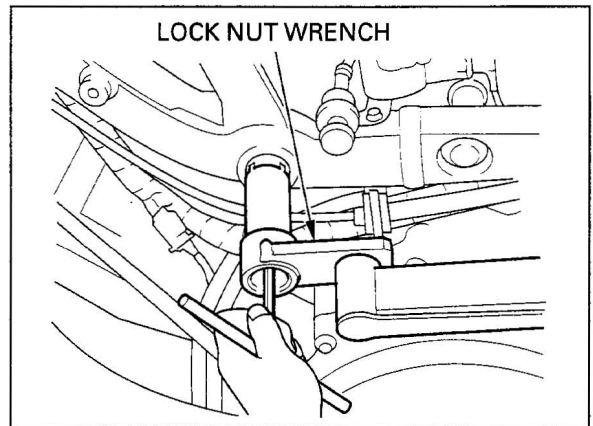


8. Hold the front adjusting bolt with the front engine hanger bolt and tighten the lock nut to the specified torque using the special tool.

TOOL:

Lock nut wrench 07VMA-MBB0100

TORQUE: Actual: 54 N·m (5.5 kgf·m , 40 lbf·ft)
Indicated: 49 N·m (5.0 kgf·m , 36 lbf·ft)



9. Tighten the rear engine hanger nut to the specified torque.

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

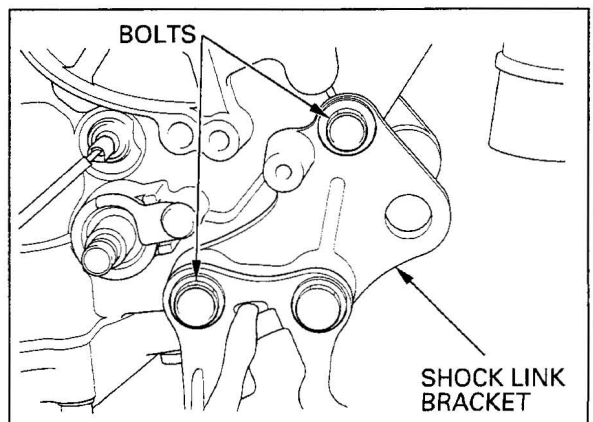
10. Tighten the front engine hanger nut to the specified torque.

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



- Install the four dowel pins, shock link brackets and tighten the mounting nuts.

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



ENGINE REMOVAL/INSTALLATION

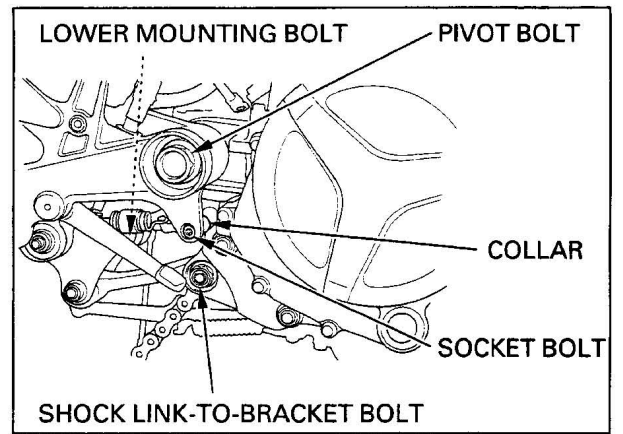
Install the rear wheel, swingarm and rear brake system assembly onto the engine.
Install the left and right driver footpeg brackets, swingarm pivot bolt and nut.

Install the right driver footpeg bracket onto the shock link bracket with the collar and tighten the socket bolt.

Install the left driver footpeg bracket onto the shock link bracket and tighten the socket bolt.

Tighten the swingarm pivot nut.

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



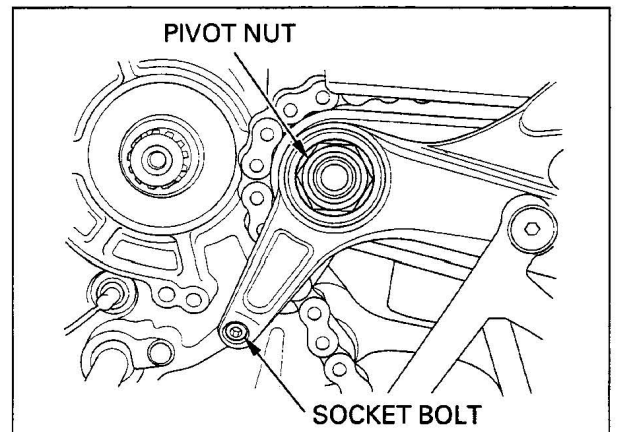
Install the swingarm pivot caps.

Install the shock absorber lower mounting bolt and tighten the nut.

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

Install the shock link-to-bracket bolt and tighten the nut.

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



Route the rear brake reservoir hose and brake light switch wire properly (page 1-18).

Install the rear brake reservoir and tighten the mounting bolt.

TORQUE: 9 N·m (0.9 kgf·m , 6.5 lbf·ft)

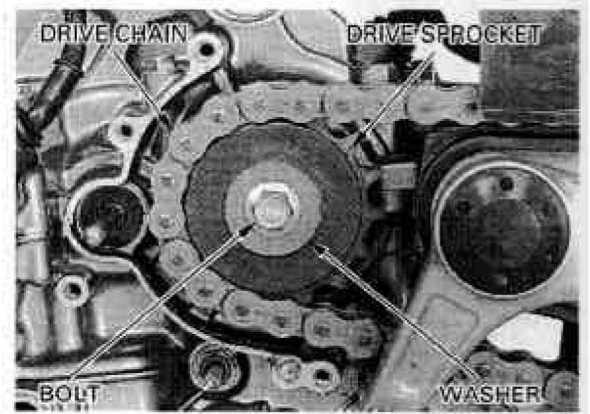
Connect the rear brake light switch connector.



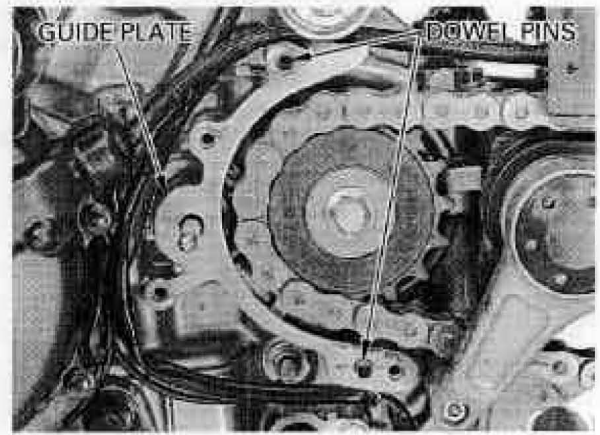
Install the drive sprocket with the drive chain onto the countershaft.

Install the washer and bolt, and tighten the bolt.

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



Install the dowel pins and guide plate.

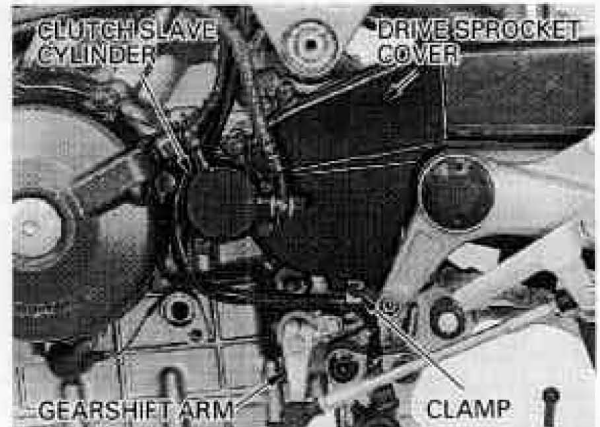


Install a new gasket, drive sprocket cover and clamp, and tighten the two bolts.

Install the dowel pins and a new gasket (page 9-11).
Install the clutch slave cylinder and tighten the bolts.

Release the clutch lever from the handlebar.

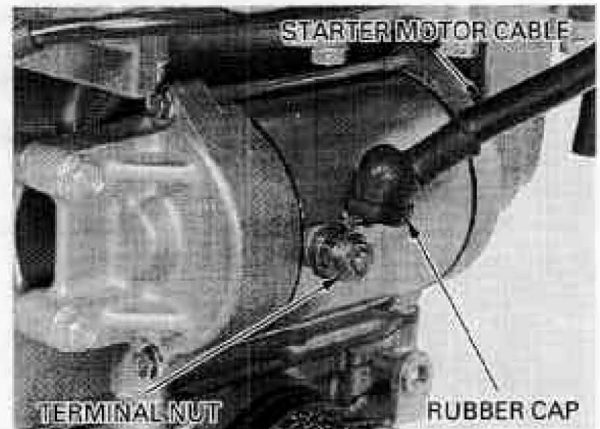
Install the gearshift arm (page 9-22).



Connect the starter motor cable.
Install and tighten the terminal nut.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the rubber cap securely.



Route the wires properly (page 1-18).

Connect the following:

— pulse generator 2P (white) connector

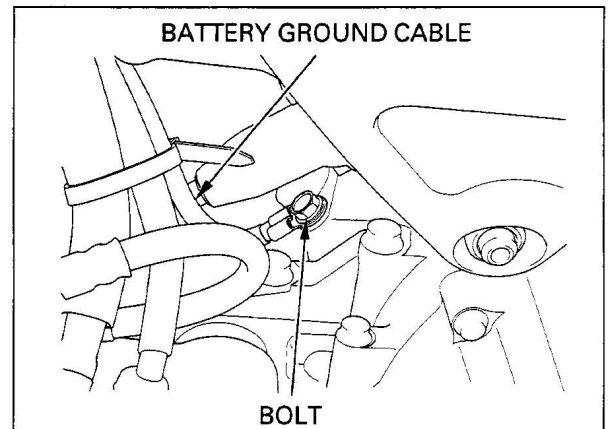


ENGINE REMOVAL/INSTALLATION

- alternator 3P (white) connector
- oil pressure switch/neutral switch wire 2P (black) connector
- speed sensor 3P (white) connector
- side stand switch 3P (green) connector



Install the battery ground cable and tighten the bolt.

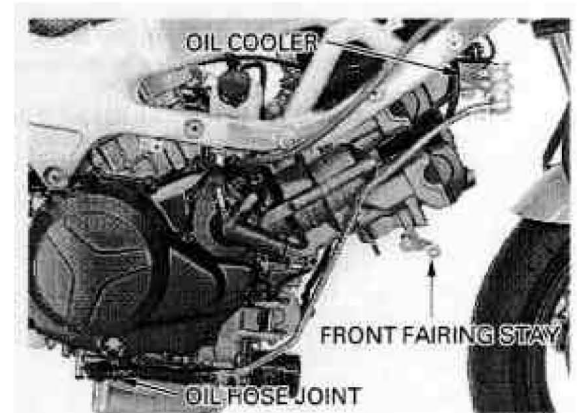


Install the oil cooler assembly onto the stay and tighten the mounting bolts.

Coat new O-rings with oil and install them onto the oil hose joints.

Connect the oil hose joints to the engine and tighten the bolts.

Install the front fairing stays onto the front cylinder head and tighten the bolts.



Install the thermostat housing assembly and connect the following:

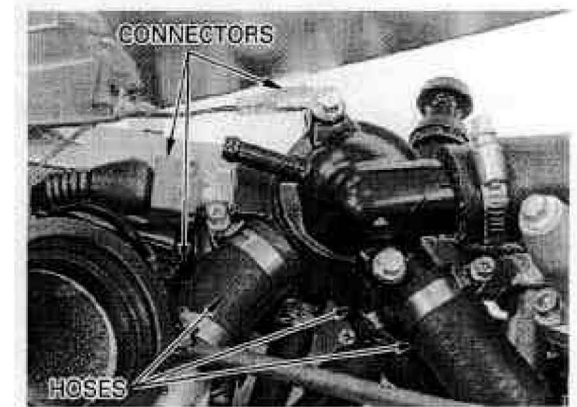
- water hoses to the cylinder heads
- bypass hose to the water pump
- thermosensor connector
- engine coolant temperature sensor connector
- ground wire connector

Install the following:

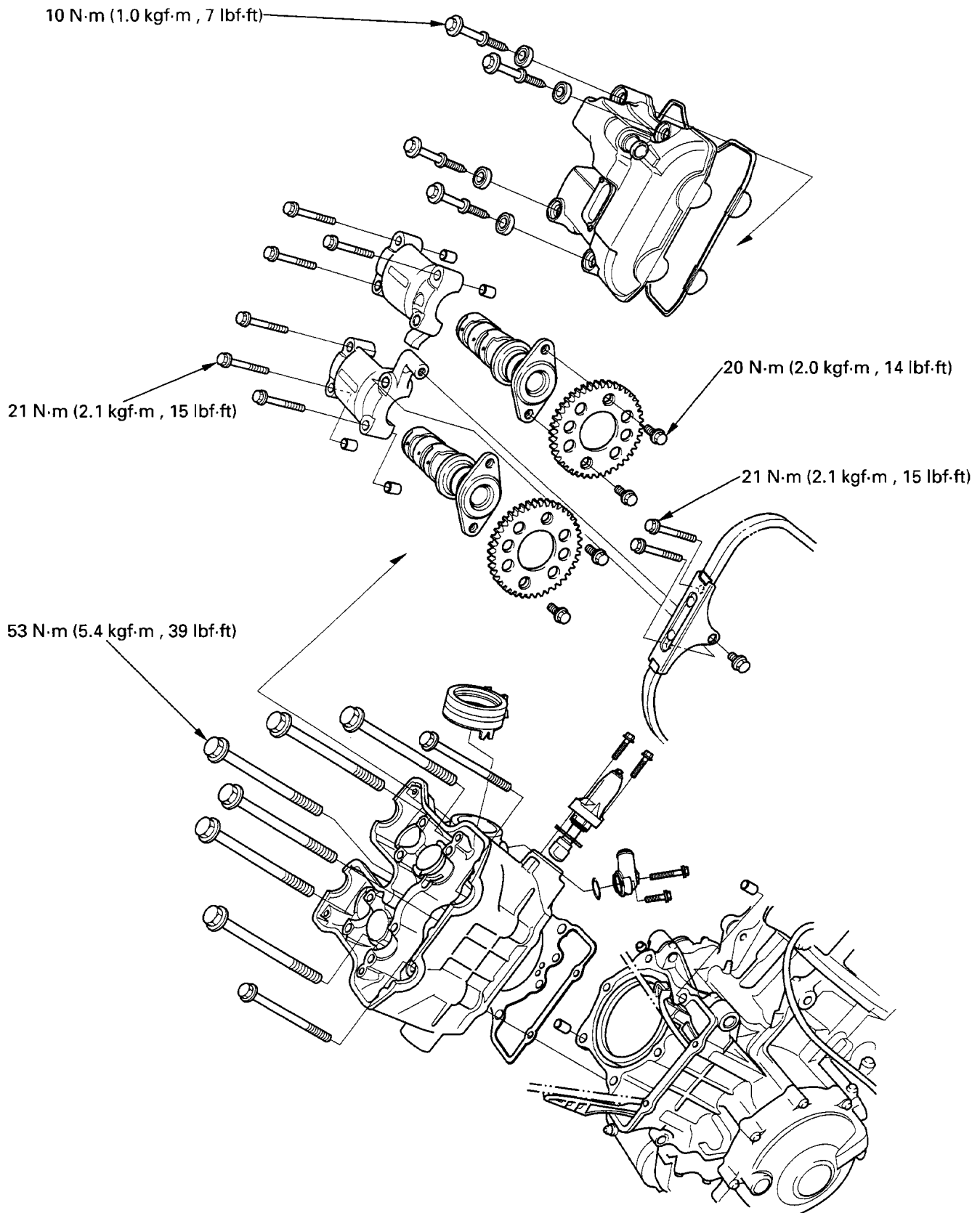
- carburetor assembly (page 5-16)
- left and right radiators (page 6-6)
- exhaust system (page 2-6)

Adjust the drive chain (page 3-14).

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



CYLINDER HEAD/VALVE



8. CYLINDER HEAD/VALVE

SERVICE INFORMATION	8-1	VALVE GUIDE REPLACEMENT	8-12
TROUBLESHOOTING	8-2	VALVE SEAT INSPECTION/REFACING	8-13
CYLINDER COMPRESSION	8-3	CYLINDER HEAD ASSEMBLY	8-16
CYLINDER HEAD COVER REMOVAL	8-3	CYLINDER HEAD INSTALLATION	8-17
CAMSHAFT REMOVAL	8-4	CAMSHAFT INSTALLATION	8-19
CYLINDER HEAD REMOVAL	8-7	CYLINDER HEAD COVER INSTALLATION	8-23
CYLINDER HEAD DISASSEMBLY	8-8		

SERVICE INFORMATION

GENERAL

- This section covers service of the camshafts, cylinder head and valves.
- The camshafts, cylinder head and valves can be serviced 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 lubricating oil is fed through oil passages in the cylinder head. Clean the oil passages before assembling cylinder head.
- Be careful not to damage the mating surfaces when removing the cylinder head cover and cylinder head.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Cylinder compression at 350 min ⁻¹ (rpm)		1,128 kPa (11.5 kgf/cm ² , 164 psi)	————	
Valve clearance		IN	0.16 (0.006)	
		EX	0.31 (0.012)	
Camshaft	Cam lobe height	IN	40.080 – 40.240 (1.5779 – 1.5842)	
		EX	40.230 – 40.390 (1.5839 – 1.5902)	
	Runout		————	
	Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.088 (0.0035)
Valve lifter	Valve lifter O.D.		33.978 – 33.993 (1.3377 – 1.3383)	
	Valve lifter bore I.D.		34.010 – 34.026 (1.3390 – 1.3396)	
Valve, valve guide	Valve stem O.D.	IN	5.975 – 5.990 (0.2352 – 0.2358)	
		EX	5.965 – 5.980 (0.2348 – 0.2354)	
	Valve guide I.D.		6.000 – 6.012 (0.2362 – 0.2367)	
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)	
		EX	0.020 – 0.047 (0.0008 – 0.0019)	
	Valve guide projection above cylinder head		14.0 – 14.2 (0.55 – 0.56)	————
	Valve seat width	IN	1.1 – 1.3 (0.04 – 0.05)	
EX		1.3 – 1.5 (0.05 – 0.06)		
Valve spring	Free length	Inner	37.0 (1.46)	
		Outer	41.9 (1.65)	
Cylinder head warpage		————	0.10 (0.004)	

CYLINDER HEAD/VALVE

TORQUE VALUES

Cylinder head cover bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Cam sprocket bolt	20 N·m (2.0 kgf·m , 14 lbf·ft)	Apply locking agent to the threads
Camshaft holder bolt	21 N·m (2.1 kgf·m , 15 lbf·ft)	Apply oil to the threads and seating surface
Cylinder head bolt (10 mm)	53 N·m (5.4 kgf·m , 39 lbf·ft)	Apply oil to the threads and seating surface
Cam chain tensioner bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply locking agent to the threads
Cam chain guide bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply locking agent to the threads
Carburetor insulator band screw	1 N·m (0.1 kgf·m , 0.7 lbf·ft)	
Spark plug	14 N·m (1.4 kgf·m , 10 lbf·ft)	

TOOLS

Valve spring compressor	07757-0010000
Valve guide remover	07742-0010000
Valve guide driver	07743-0020000
Valve guide reamer	07VMH-MBB0200
Valve seat cutter, 40 mm (IN/EX 45°)	07780-0010500
Flat cutter, 38.5 mm (IN 32°)	07780-0012400
Flat cutter, 35 mm (EX 32°)	07780-0012300
Interior cutter, 37.5 mm (IN/EX 60°)	07780-0014100
Cutter holder, 6 mm	07VMH-MBB0100

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 spring
 - Uneven valve seating
- Cylinder head
 - Leaking or damaged cylinder head gasket
 - Warped or cracked cylinder head
 - Loose spark plug
- Cylinder/piston (section 12)

Compression too high

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

Excessive smoke

- Worn valve stem or valve guide
- Damaged stem seal
- Cylinder/piston problem (section 12)

Excessive noise

- Incorrect valve clearance
- Sticking valve or broken valve spring
- Worn or damaged camshaft
- Worn or damaged valve lifter
- Worn cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth
- Cylinder/piston problem (section 12)

Rough idle

- Low cylinder compression

CYLINDER COMPRESSION

Warm up the engine to normal operating temperature.

Stop the engine and remove the spark plug caps and spark plugs.

Install the compression gauge into the spark plug hole.

Shift the transmission in neutral.

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

COMPRESSION PRESSURE:

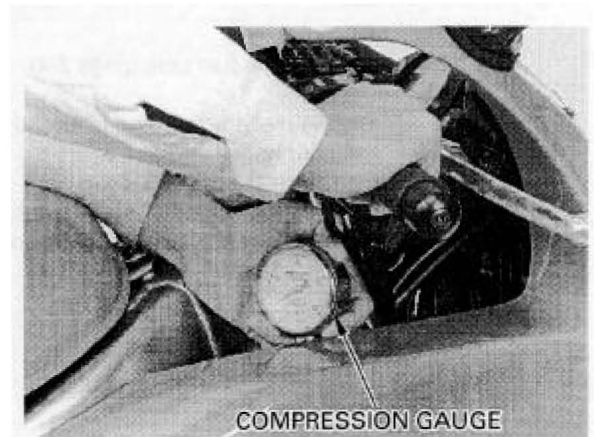
1,128 kPa (11.5 kgf/cm², 164 psi)
at 350 min⁻¹ (rpm)

Low compression can be caused by:

- blown cylinder head gasket
- improper valve adjustment
- valve leakage
- worn piston ring or cylinder

High compression can be caused by:

- carbon deposits in combustion chamber or on piston head



CYLINDER HEAD COVER REMOVAL

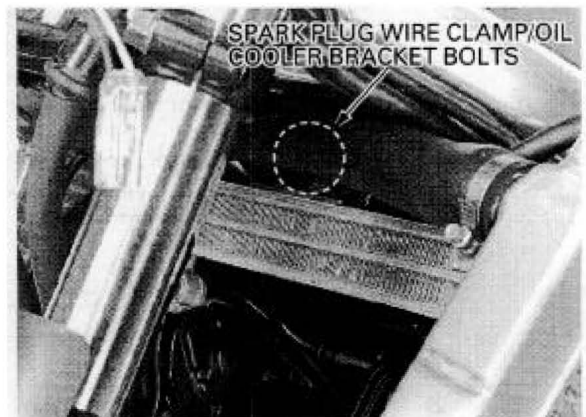
FRONT:

Remove the front fairing (page 2-3).

Remove the spark plug wire from the clamp.

Remove the two bolts and the oil cooler with the bracket from the frame.

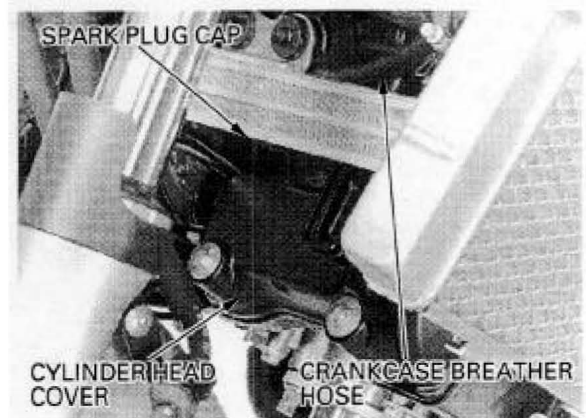
Move the oil cooler forward.



Disconnect the crankcase breather hose from the cylinder head cover.

Remove the spark plug cap.

Remove the four cylinder head cover bolts, special washers and the cylinder head cover.



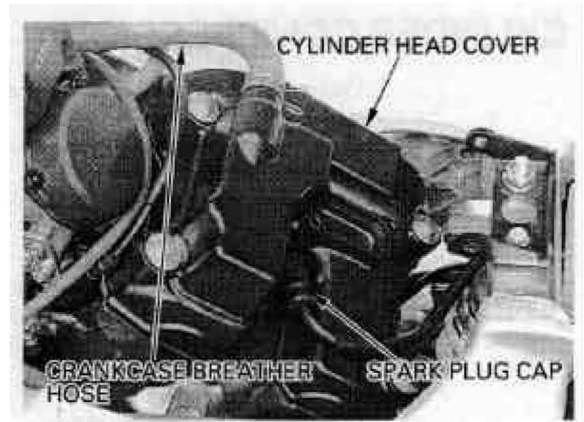
REAR:

Remove the fuel tank (page 2-4).

Disconnect the crankcase breather hose from the cylinder head cover.

Remove the spark plug cap.

Remove the four cylinder head cover bolts, special washers and the cylinder head cover.



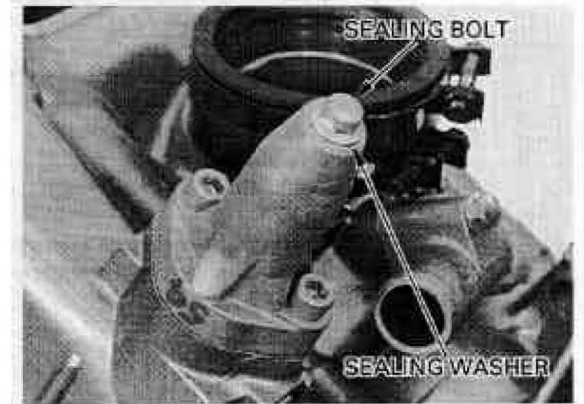
CAMSHAFT REMOVAL

For the front cylinder, remove the following:

- air cleaner housing (page 5-4)
- left radiator (page 6-6)

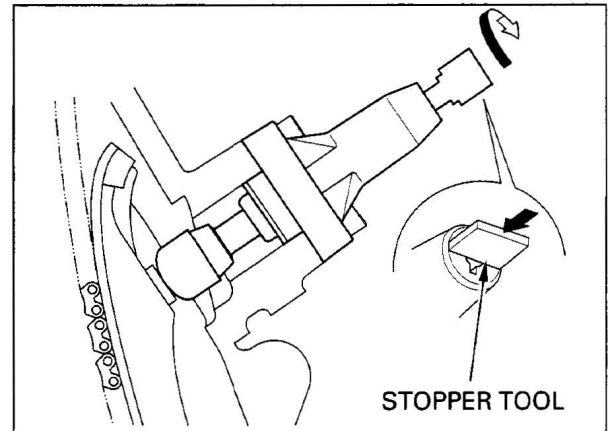
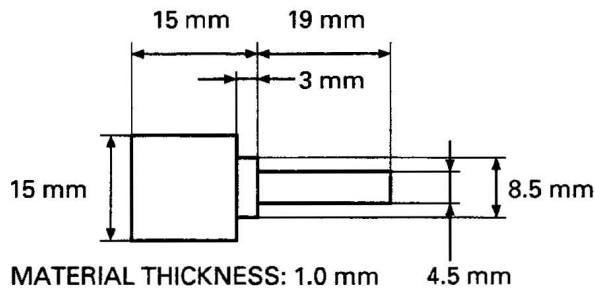
Remove the cylinder head cover (page 8-3).

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

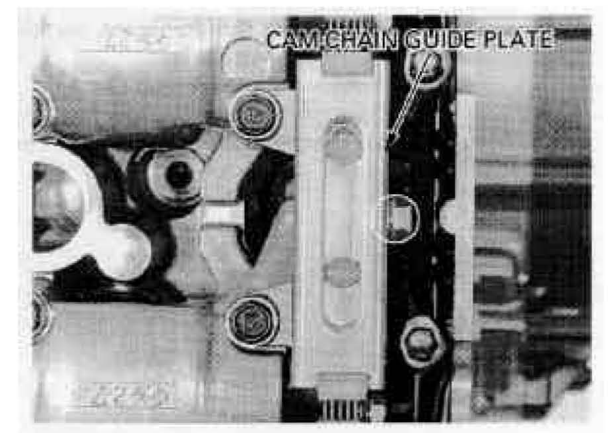


Turn the cam chain tensioner lifter shaft clockwise fully and secure it with a stopper tool.

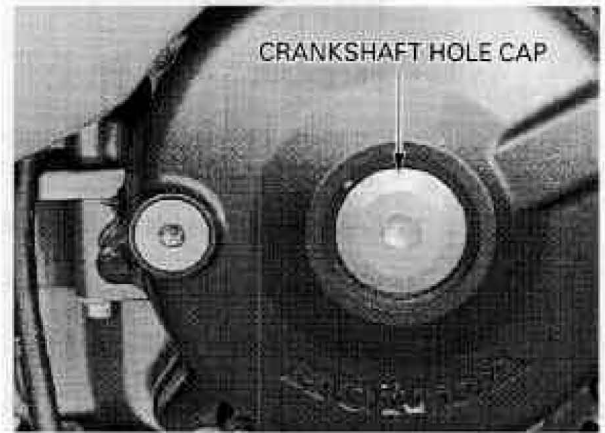
This tool can easily be made from a thin (1 mm of thickness) piece of steel as shown below.



Remove the three bolts and the cam chain guide plate from the camshaft holders.

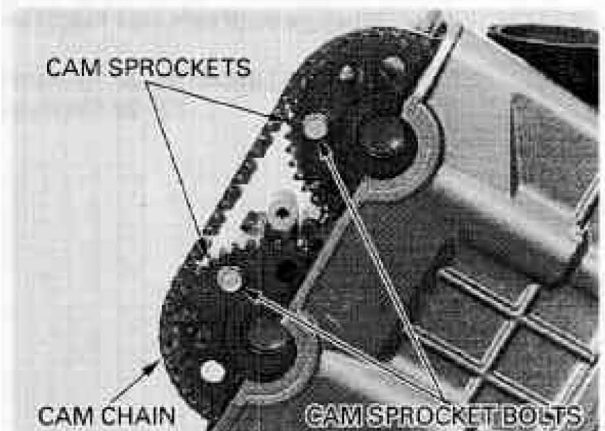


Remove the crankshaft hole cap.



Be careful not to drop the cam sprocket bolts into the crankcase. Remove the cam sprocket bolts from the intake and exhaust camshafts. Turn the crankshaft counterclockwise one turn, and remove the other cam sprocket bolts.

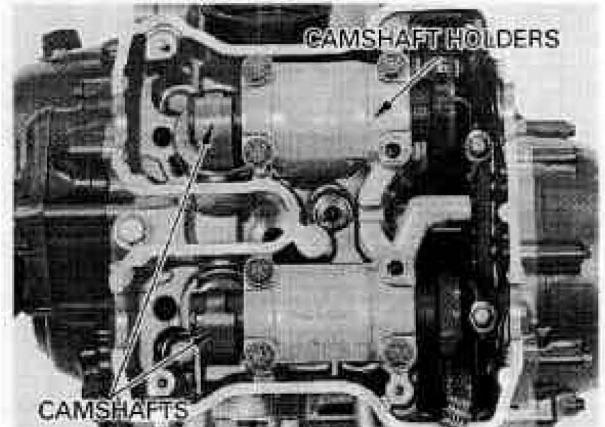
Remove the cam sprockets from the camshafts, and suspend the cam chain with a piece of wire to prevent it from falling into the crankcase.



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

NOTE:

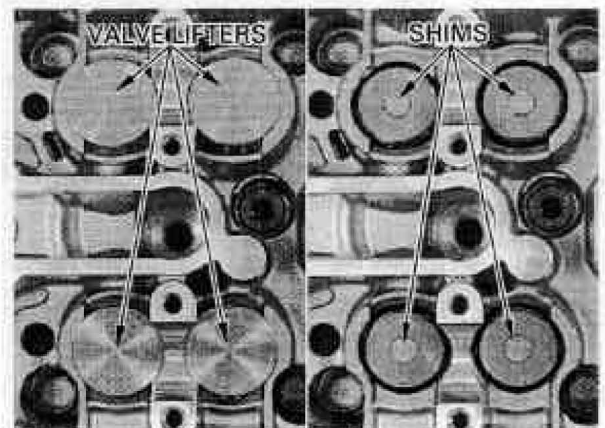
Do not forcibly remove the dowel pins from the camshaft holders.



Remove the valve lifters and shims.

NOTE:

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



INSPECTION

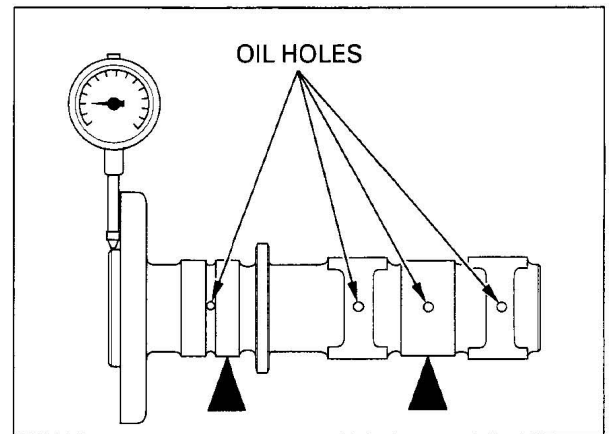
CAMSHAFT

Check the cam and journal surfaces of the camshaft for scoring, scratches or evidence of insufficient lubrication.

Check the oil holes in the camshaft for clogging.

Measure the camshaft runout using a dial indicator.

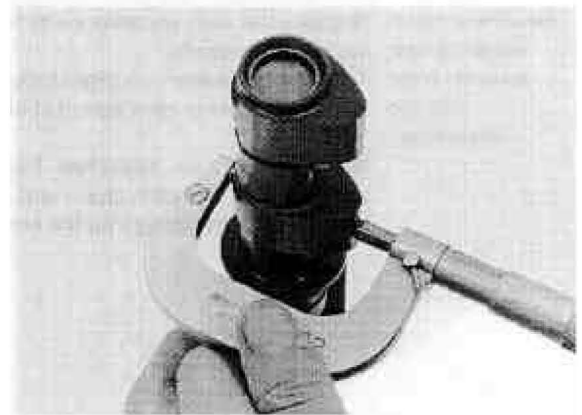
SERVICE LIMIT: 0.05 mm (0.002 in)



Measure each cam lobe height using a micrometer.

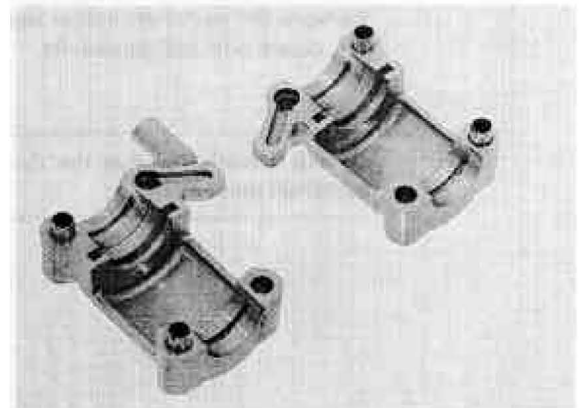
SERVICE LIMITS: IN: 39.780 mm (1.5661 in)

EX: 39.930 mm (1.5720 in)



CAMSHAFT JOURNAL

Check the camshaft journal surfaces of the camshaft holders and cylinder head for scoring, scratches or evidence of insufficient lubrication.

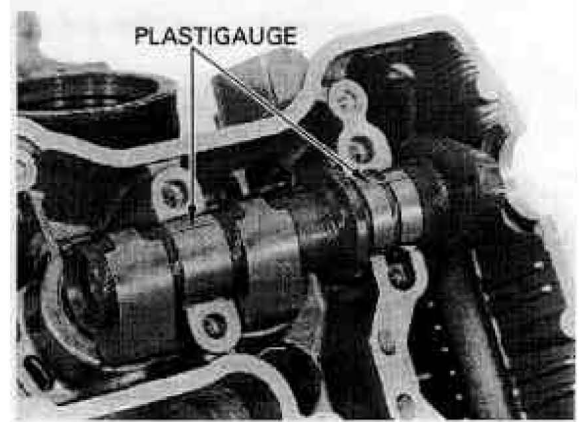


Do not rotate the camshaft during inspection.

CAMSHAFT OIL CLEARANCE

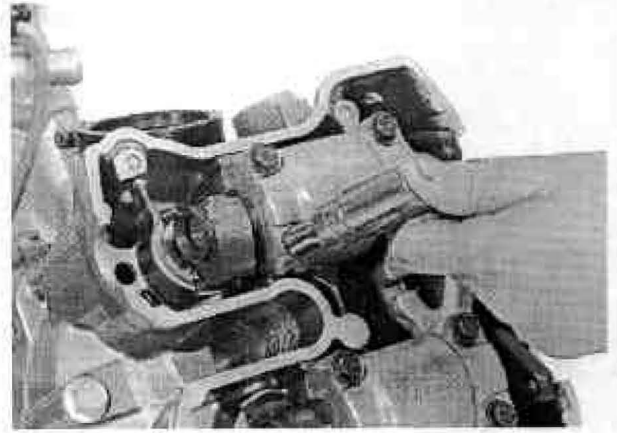
Wipe any oil from the journals of the cylinder head, camshaft and camshaft holder.

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



Apply oil to the threads and seating surfaces of the camshaft holder bolts.
Install the camshaft holder and tighten the bolts in a crisscross pattern in 2 or 3 steps.

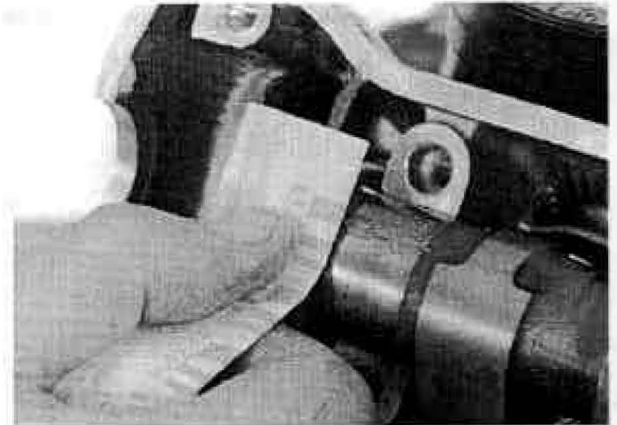
TORQUE: 21 N·m (2.1 kgf·m , 15 lbf·ft)



Remove the camshaft holder and measure the compressed plastigauge at its widest point on the camshaft to determine the oil clearance.

SERVICE LIMIT: 0.088 mm (0.0035 in)

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



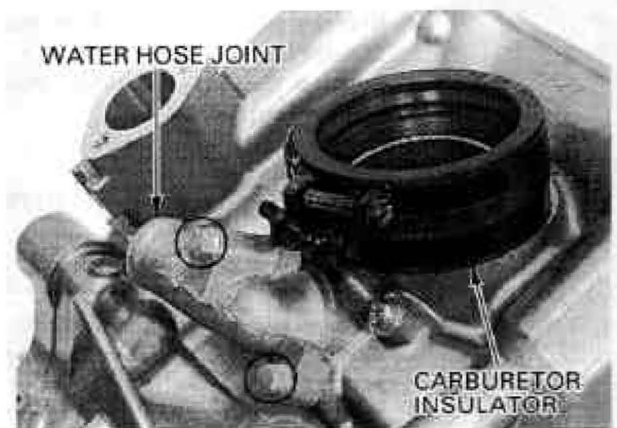
CYLINDER HEAD REMOVAL

Remove the following:

- carburetor assembly (page 5-5)
- camshafts (page 8-4)
- two bolts and cam chain tensioner lifter

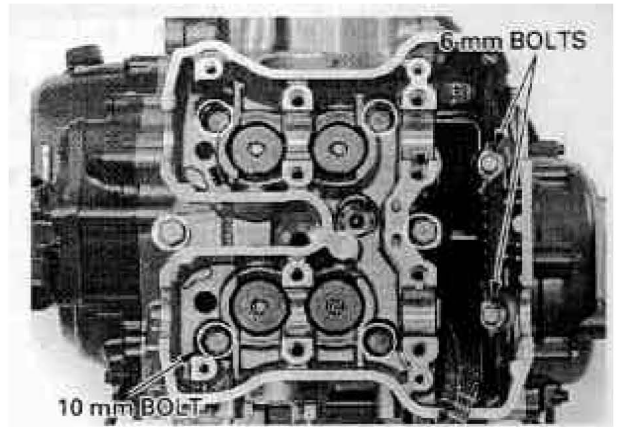


- carburetor insulator
- two bolts and water hose joint

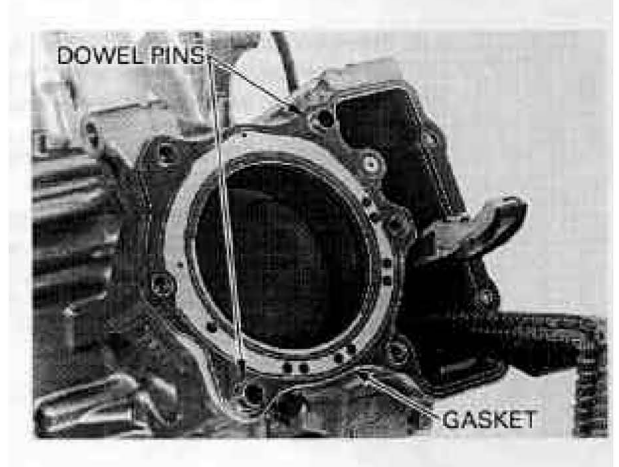


CYLINDER HEAD/VALVE

Remove the two 6 mm cylinder head bolts.
Loosen the six 10 mm cylinder head bolts in a crisscross pattern in 2 or 3 steps, and remove them.
Remove the cylinder head.



Remove the gasket and dowel pins.

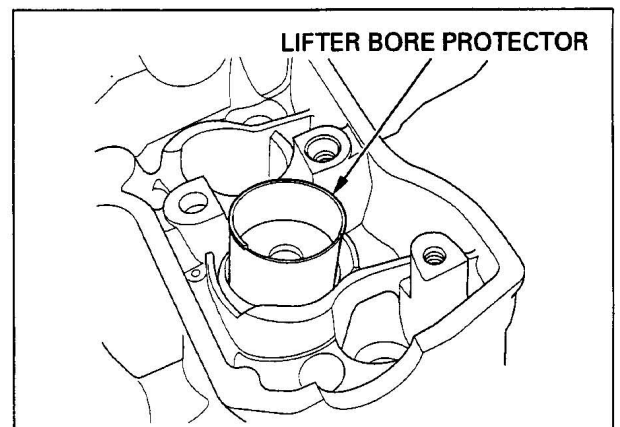


CYLINDER HEAD DISASSEMBLY

Remove the spark plug from the cylinder head.

Make a lifter bore protector from a plastic 35 mm film container by cutting the bottom of the container.

Install the protector into the valve lifter bore.



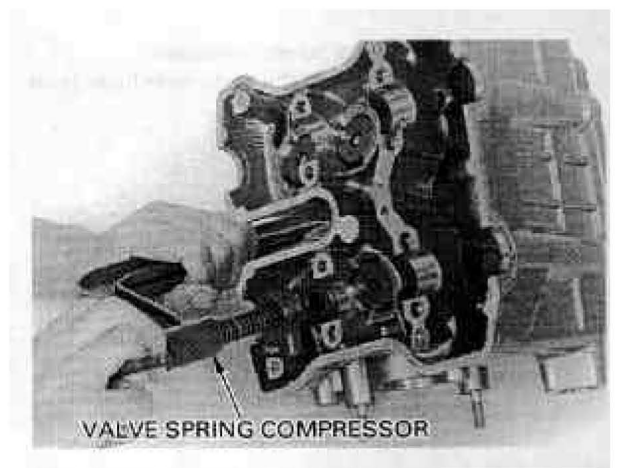
Remove the attachment from the valve spring compressor.
Remove the valve spring cotters using the valve spring compressor.

TOOL:

Valve spring compressor 07757-0010000

CAUTION:

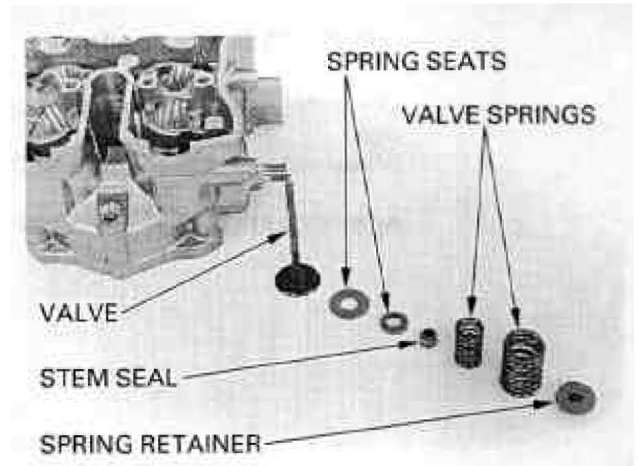
To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.



- Remove the following:
- spring retainer
 - inner and outer valve springs
 - valve
 - stem seal
 - inner and outer valve spring seats

NOTE:

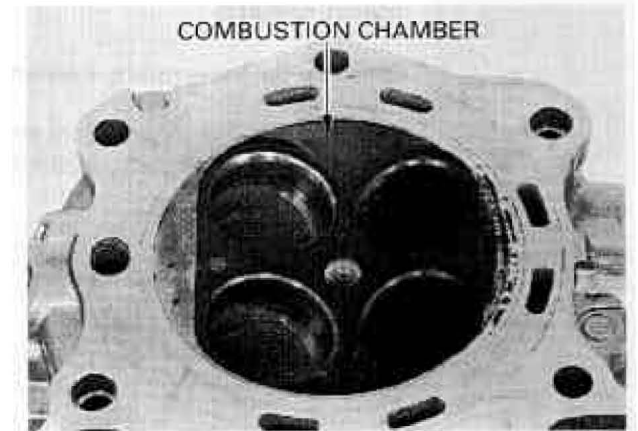
Mark all parts during disassembly so they can be placed back in their original locations.



INSPECTION

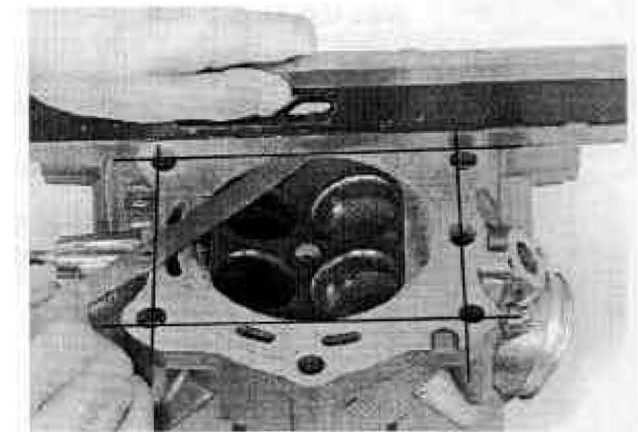
CYLINDER HEAD

Remove the carbon deposits from the combustion chamber, being careful not to damage the gasket surface. Check the spark plug hole and valve areas for cracks.



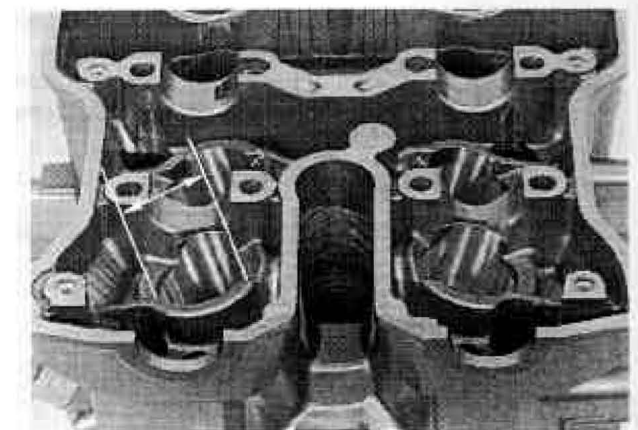
Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.10 mm (0.004 in)



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

SERVICE LIMIT: 34.04 mm (1.340 in)



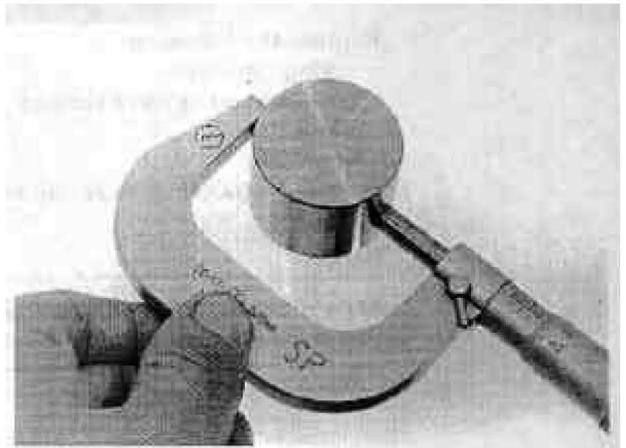
CYLINDER HEAD/VALVE

VALVE LIFTER

Check the valve lifter for scoring, scratches or damage.

Measure the each valve lifter O.D.

SERVICE LIMIT: 33.97 mm (1.337 in)

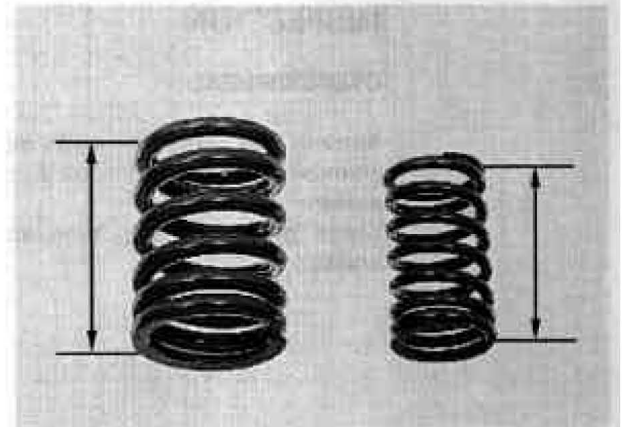


VALVE SPRING

Measure the valve spring free length.

SERVICE LIMITS: Inner: 36.0 mm (1.42 in)

Outer: 40.9 mm (1.61 in)



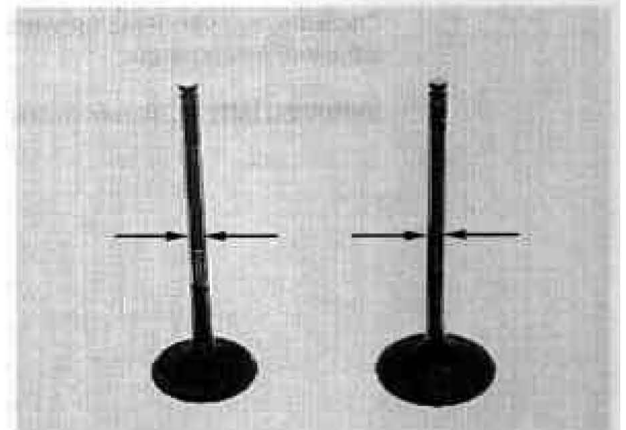
VALVE/VALVE GUIDE

Check that the valve moves smoothly in the guide.
Check the valve for bending, burning or abnormal wear.

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

SERVICE LIMITS: IN: 5.965 mm (0.2348 in)

EX: 5.955 mm (0.2344 in)



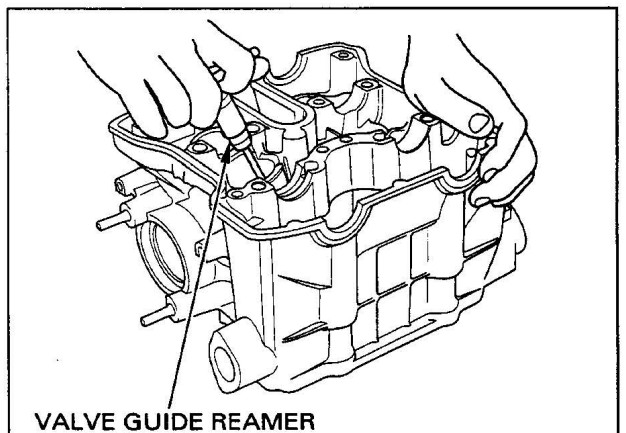
Ream the valve guide to remove any carbon build-up before measuring the guide.

Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

TOOL:

Valve guide reamer

07VMH-MBB0200



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

SERVICE LIMIT: 6.040 mm (0.2378 in)

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

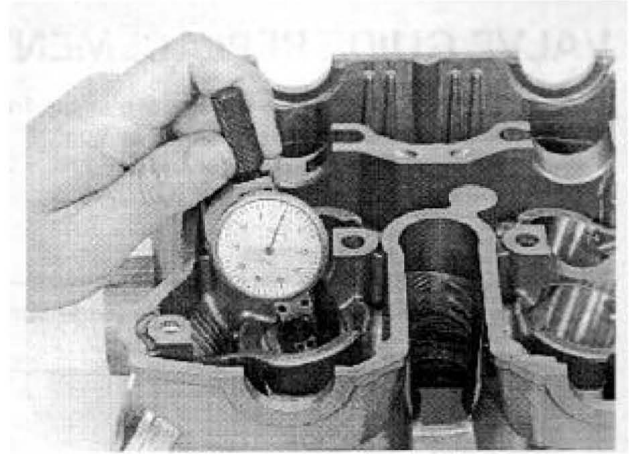
SERVICE LIMITS: IN: 0.075 mm (0.0030 in)
EX: 0.085 mm (0.0033 in)

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 a new guide, also replace the valve.

NOTE:

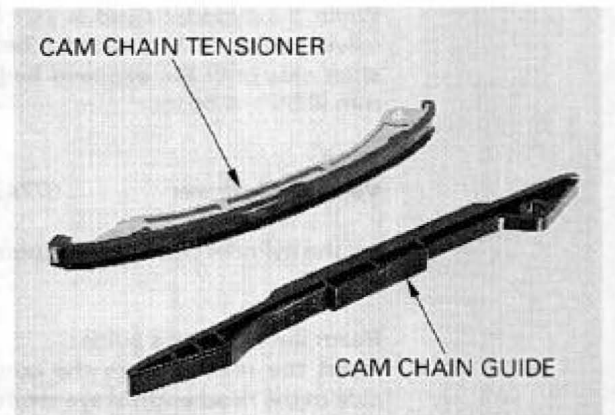
Inspect and reface the valve seats whenever the valve guides are replaced (page 8-12).



CAM CHAIN TENSIONER/GUIDE

Check the cam chain tensioner and guide for excessive wear or damage and replace them if necessary.

To remove the cam chain tensioner and guide:
 Front cylinder: Remove the flywheel (page 10-4).
 Rear cylinder: Remove the primary drive gear (page 9-22).

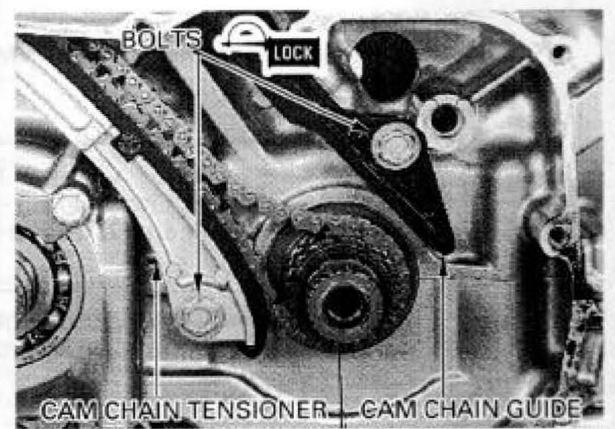


Remove the bolts, cam chain tensioner and guide.

Apply locking agent to the bolt threads. Install the cam chain tensioner and guide, and tighten the bolts.

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

Install the primary drive gear (page 9-23).
 Install the flywheel (page 10-7).



VALVE GUIDE REPLACEMENT

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

Heat the cylinder head to 275 – 290 ° F (130 – 140 ° C) with a hot plate or oven.

▲ WARNING

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

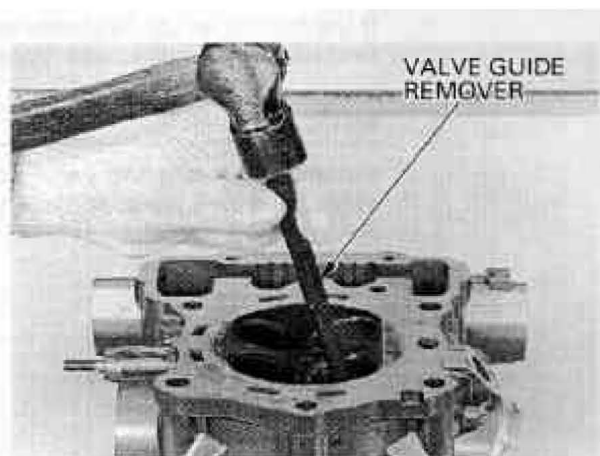
CAUTION:

Using a torch to heat the cylinder head may cause warpage.

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

TOOL:

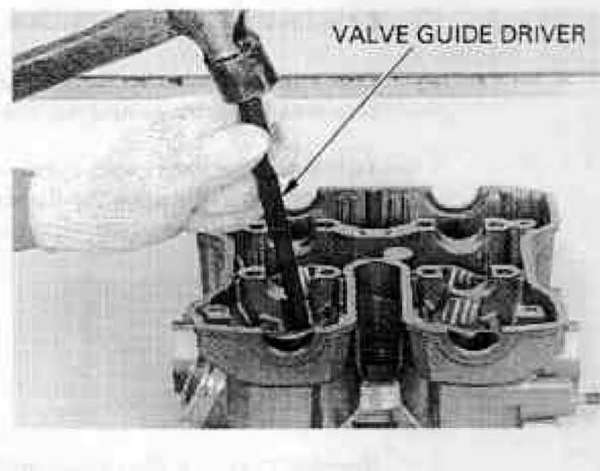
Valve guide remover 07742-0010000



While the cylinder head is still heated, drive new valve guides in the cylinder head from the camshaft side until the exposed height is 14.0 – 14.2 mm (0.55 – 0.56 in).

TOOL:

Valve guide driver 07743-0020000



Let the cylinder head cool to room temperature.

Ream the new valve guides. Insert the reamer from the combustion chamber side of the head and always rotate the reamer clockwise.

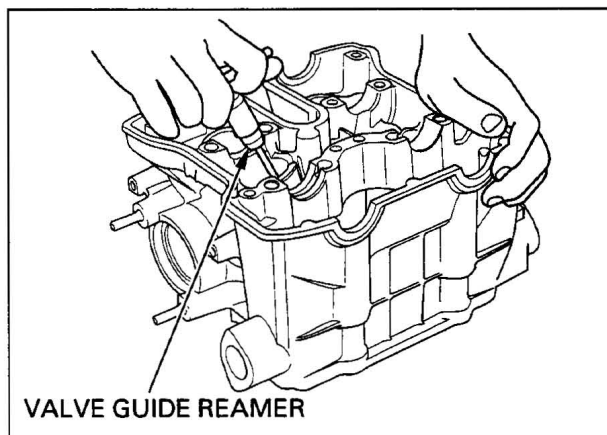
TOOL:

Valve guide reamer 07VMH-MBB0200

NOTE:

- Take care not to tilt or lean the reamer in the guide while reaming.
- 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 (page 8-14).



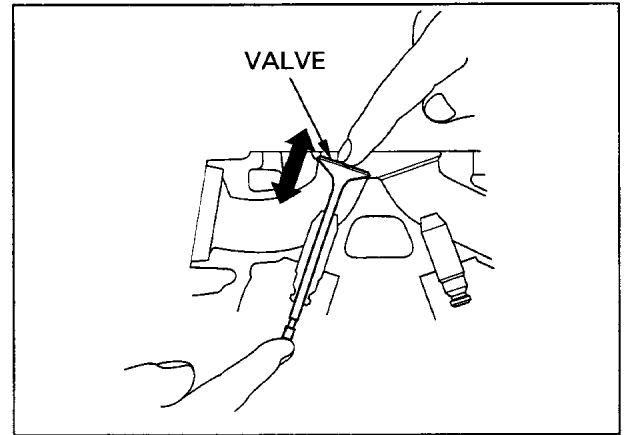
VALVE SEAT INSPECTION/REFACING

INSPECTION

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

Apply a light coating of Prussian Blue to each valve seat.

Tap the valve against the valve seat several times without rotating the valve, to check for proper valve seat contact.

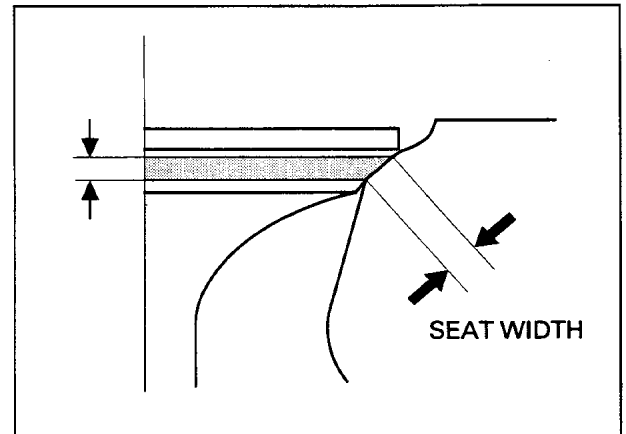


Remove the valve and inspect the valve seat face. The valve seat contact should be within the specified width and even all around the circumference.

STANDARD: IN: 1.1–1.3 mm (0.04–0.05 in)
EX: 1.3–1.5 mm (0.05–0.06 in)

SERVICE LIMIT: IN: 1.7 mm (0.07 in)
EX: 1.9 mm (0.07 in)

If the valve seat width is not within specification, reface the valve seat (page 9-14).

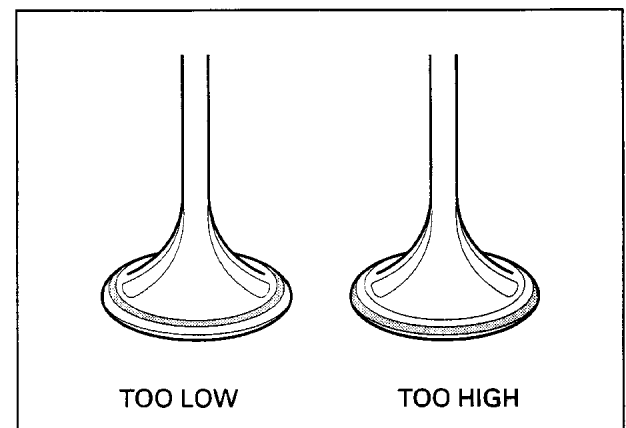
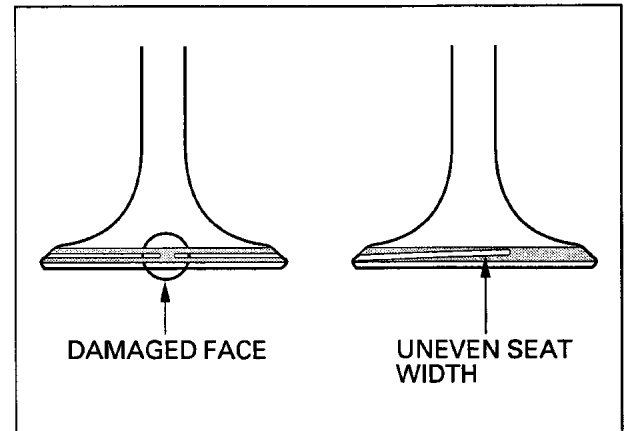


Inspect the valve seat face for:

- Uneven seat width:
 - 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)
 - Reface the valve seat.

NOTE:

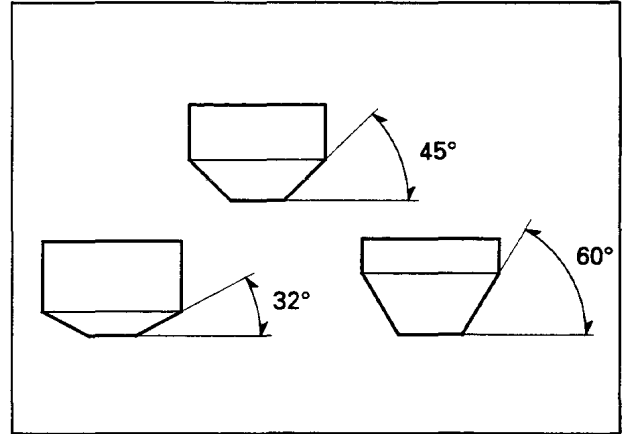
The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.



REFACING

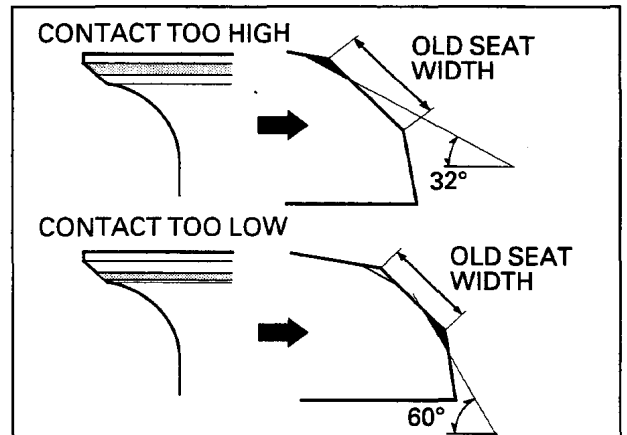
NOTE:

- Follow the refacing 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.

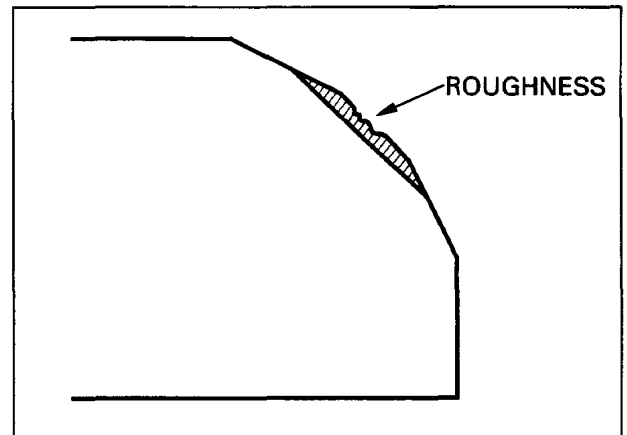
If the contact area is too low on the valve, the seat must be raised using a 60° interior cutter.



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

TOOLS:

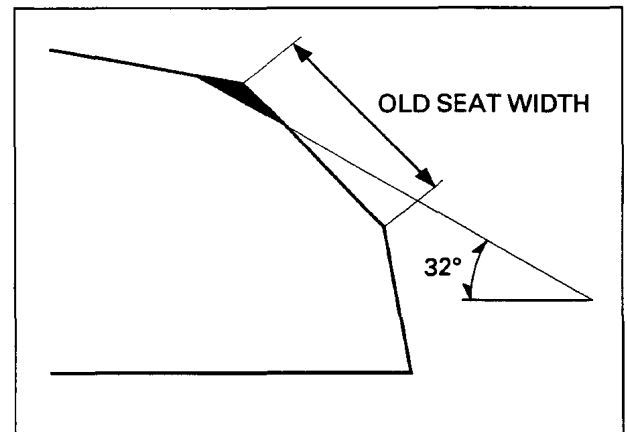
Seat cutter, 40 mm 07780-0010500
Cutter holder, 6 mm 07VMH-MBB0100



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

TOOLS:

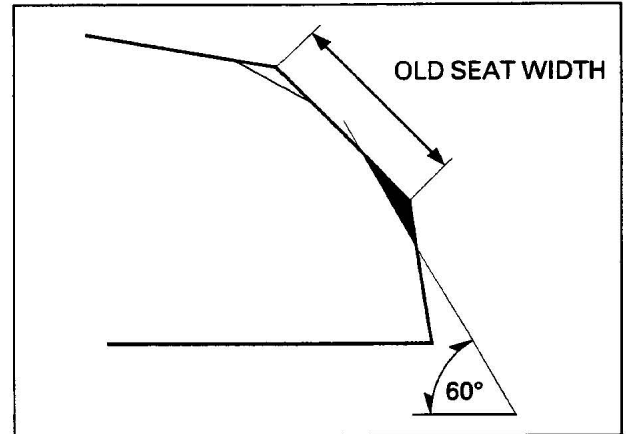
Flat cutter, 38.5 mm (IN) 07780-0012400
Flat cutter, 35 mm (EX) 07780-0012300
Cutter holder, 6 mm 07VMH-MBB0100



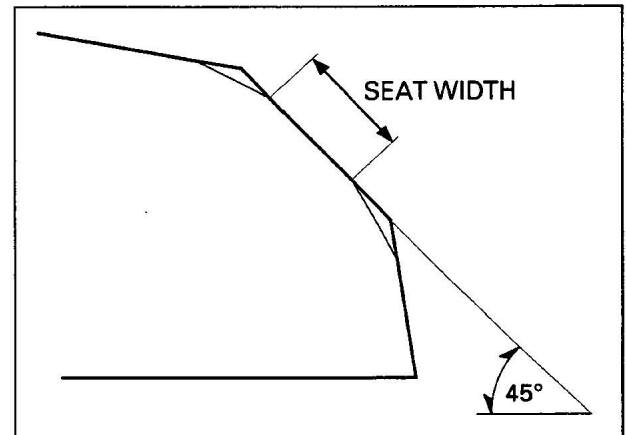
Using a 60 ° interior cutter, remove 1/4 of the existing valve seat material.

TOOLS:

Interior cutter, 37.5 mm 07780-0014100
Cutter holder, 6 mm 07VMH-MBB0100



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

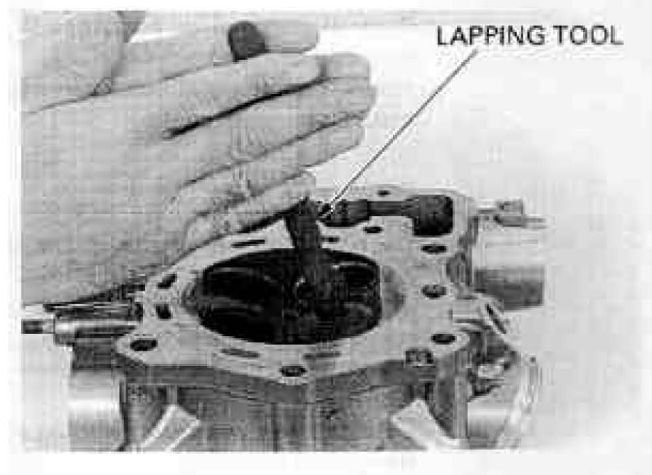


After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

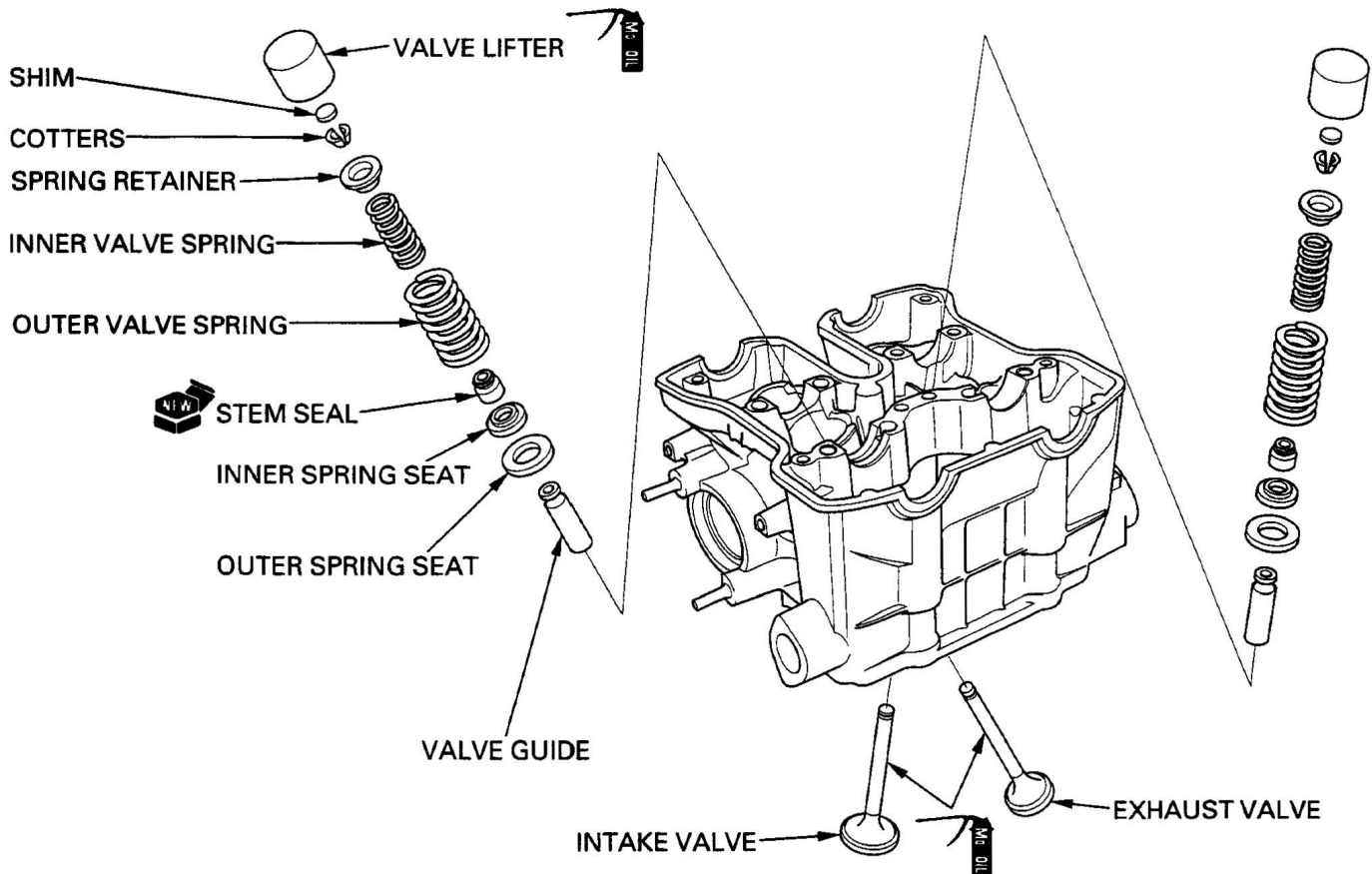
CAUTION:

- *Excessive lapping pressure may deform or damage the seat.*
- *Change the angle of lapping tool frequently to prevent uneven seat wear.*
- *Do not allow lapping compound to enter the guides.*

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



CYLINDER HEAD ASSEMBLY



Blow through all oil passages in the cylinder head with compressed air.
Install the inner and outer valve spring seats.
Install new stem seals.

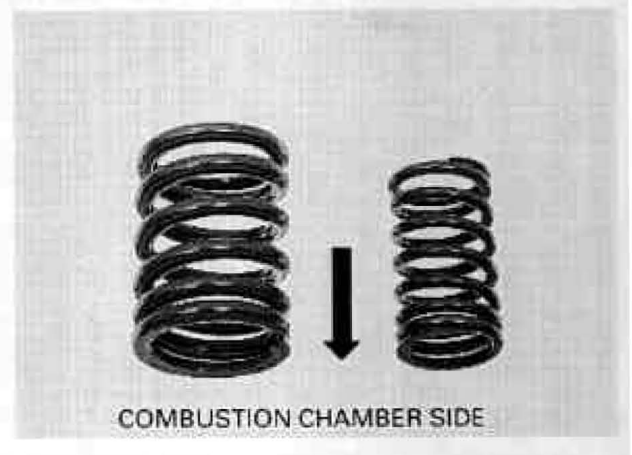
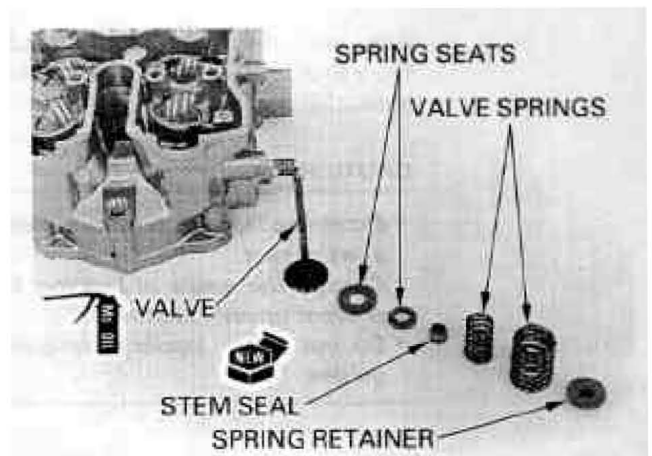
NOTE:

Do not interchange the intake and exhaust stem seals.
The intake stem seal has silver spring and the exhaust stem seal has black spring.

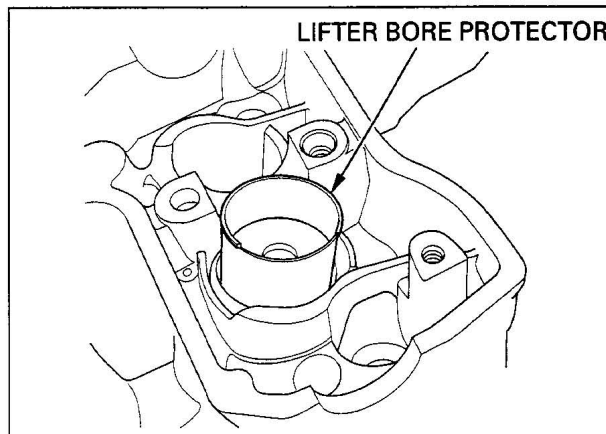
Lubricate the valve stem sliding surface with molybdenum oil solution.
Insert the valve into the guide while turning it slowly to avoid damage to the stem seal.

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

Install the spring retainer.



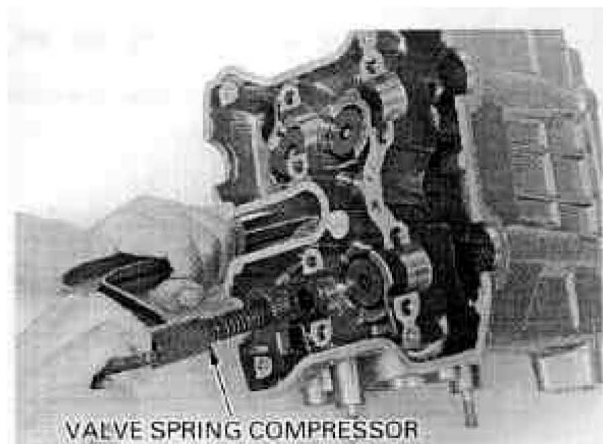
Install the lifter bore protector made from the film container into the valve lifter bore.



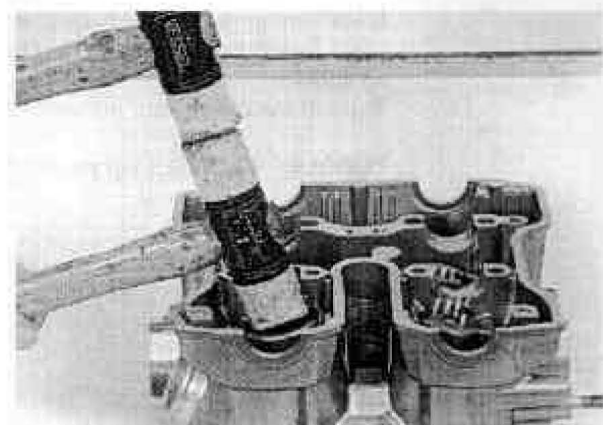
Grease the cotters to ease installation. Remove the attachment from the valve spring compressor. Install the valve spring cotters using the valve spring compressor.

TOOL:
Valve spring compressor 07757-0010000

CAUTION:
To prevent loss of tension, do not compress the valve springs more than necessary to install the cotters.



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

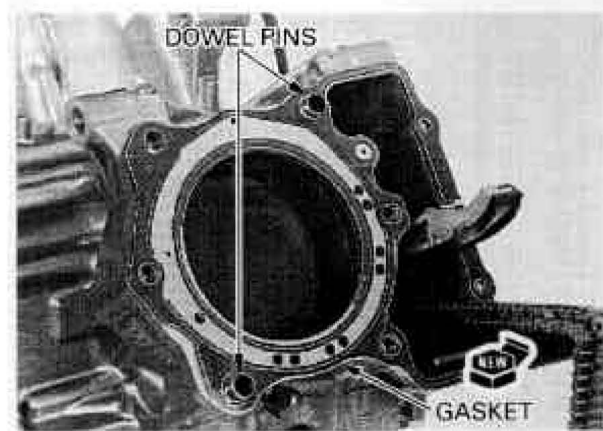


Install and tighten the spark plug.

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

CYLINDER HEAD INSTALLATION

Install the dowel pins and a new gasket.



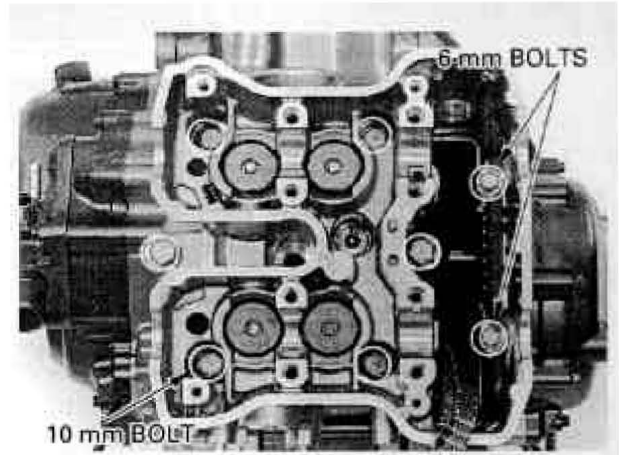
CYLINDER HEAD/VALVE

Install the cylinder head onto the cylinder.

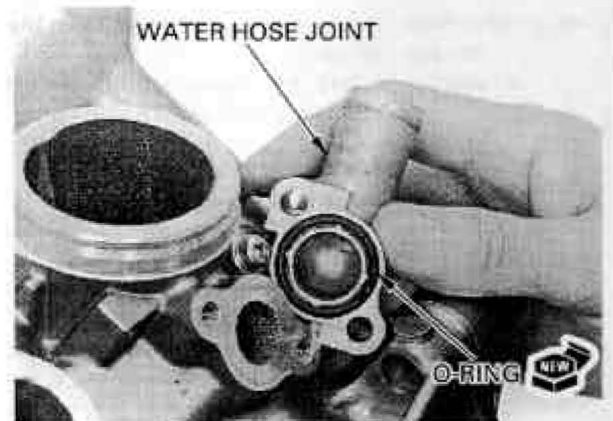
Apply oil to the threads and seating surfaces of the 10 mm cylinder head bolts and install them. Tighten the 10 mm bolts in a crisscross pattern in 2 or 3 steps.

TORQUE: 53 N·m (5.4 kgf·m , 39 lbf·ft)

Install and tighten the two 6 mm bolts.



Install a new O-ring into the water hose joint groove. Install the water hose joint and tighten the two bolts.

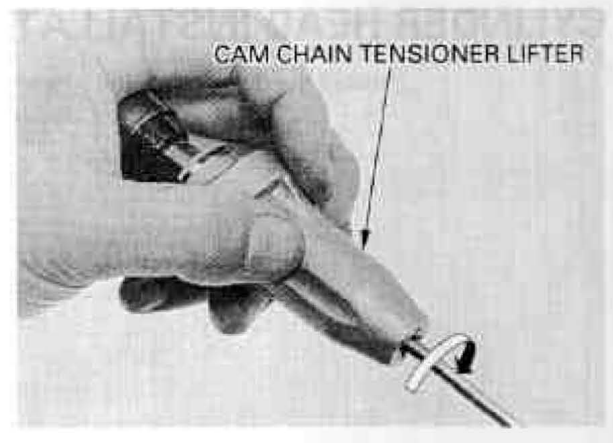


Install the carburetor insulator with the "CARB UP" mark facing out and up so that the tab is positioned as shown. Tighten the carburetor insulator band screw.

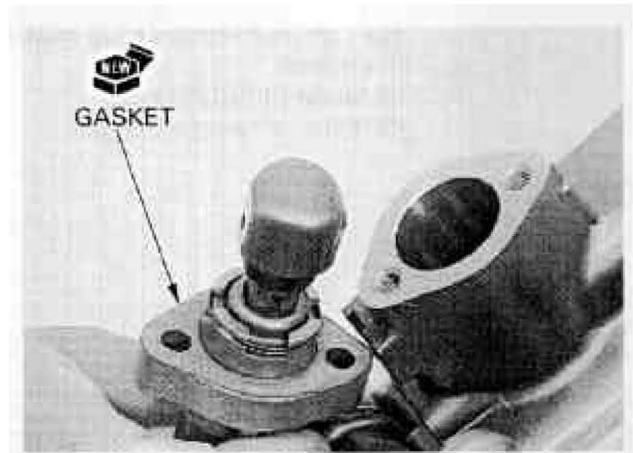
TORQUE: 1 N·m (0.1 kgf·m , 0.7 lbf·ft)



Turn the cam chain tensioner lifter shaft clockwise fully to retract the tensioner lifter and secure it with a stopper tool.

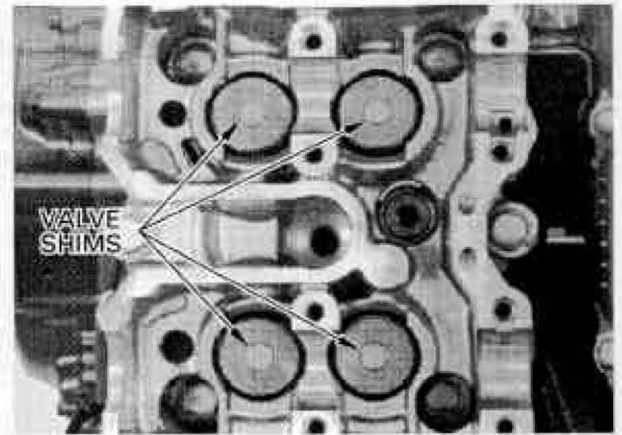


Install a new gasket onto the tensioner lifter.
Install the tensioner lifter onto the cylinder head and tighten the two bolts.

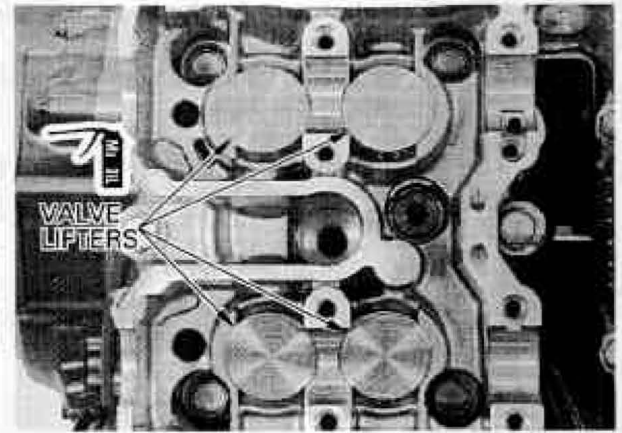


CAMSHAFT INSTALLATION

Install the valve shims in their original locations.



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

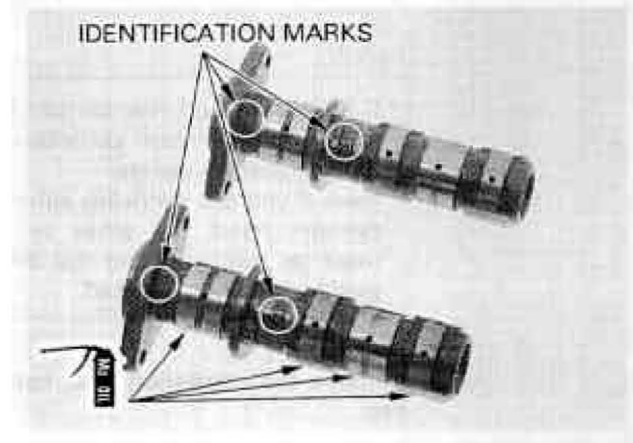


Apply molybdenum oil solution to the camshaft journals and cam lobes.

The camshafts have the following identification marks:

- FR IN: Front cylinder intake camshaft
- FR EX: Front cylinder exhaust camshaft
- RR IN: Rear cylinder intake camshaft
- RR EX: Rear cylinder exhaust camshaft

Install the camshafts in their proper locations.

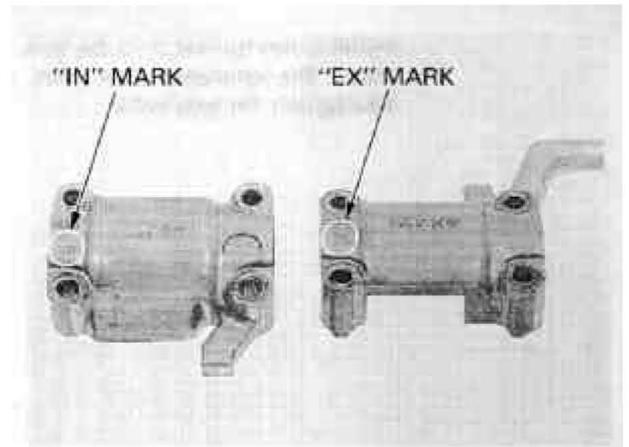


CYLINDER HEAD/VALVE

The camshaft holders have the following identification marks:

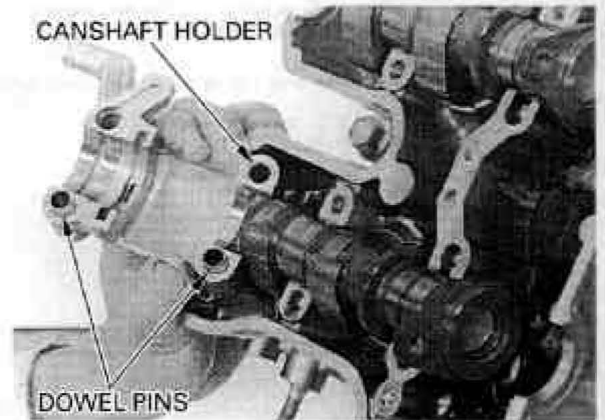
IN: Intake camshaft holder

EX: Exhaust camshaft holder



Install the dowel pins.

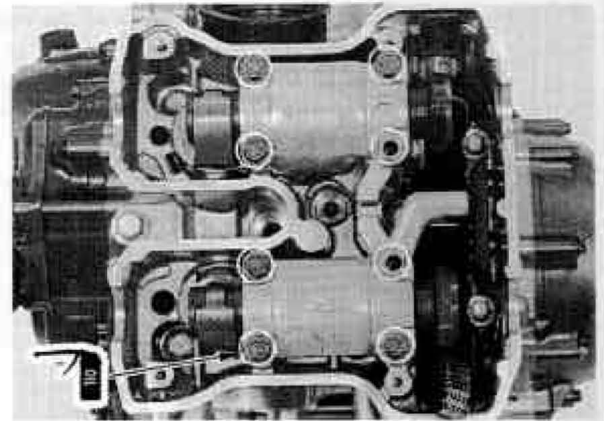
Install the camshaft holders in their proper locations.



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

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

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



CAM SPROCKET INSTALLATION

NOTE:

- If both front and rear camshafts were serviced, install the front cam sprockets first, then install the rear cam sprockets.
- Even if you are servicing either the front or rear cylinder head, the other cylinder head cover must be removed and the other cam sprocket position must be checked.

Remove the crankshaft hole cap and timing hole cap.

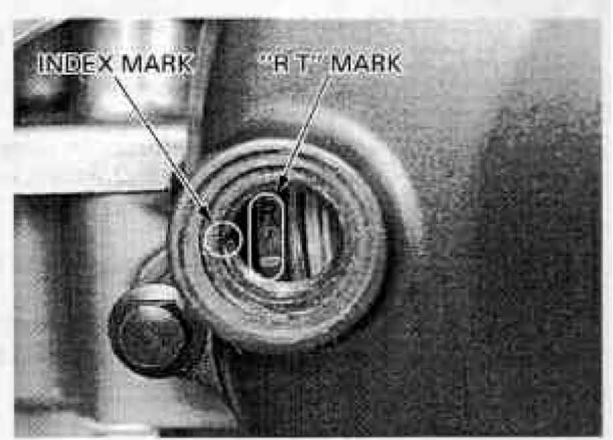


FRONT CAM SPROCKETS:

If the rear cylinder has not been serviced, remove the rear cylinder head cover and check the rear cam sprocket position as follows:

Be careful not to jam the cam chain at the crankshaft when turning the crankshaft.

Turn the crankshaft counterclockwise and align "RT" mark on the flywheel with the index mark on the left crankcase cover.



Check the timing marks ("R-I" for intake and "R-E" for exhaust) on the rear cylinder cam sprockets.



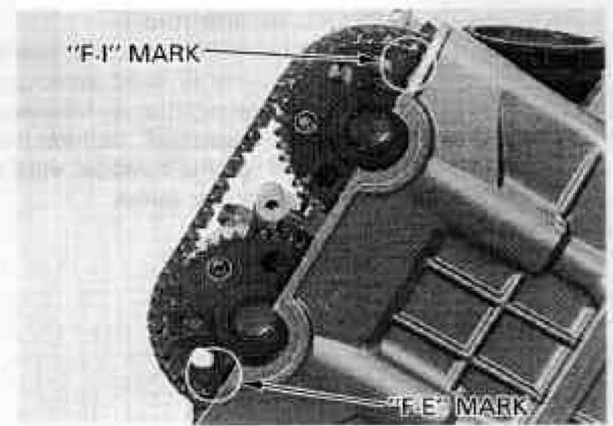
If the timing marks are facing outward, turn the crankshaft counterclockwise 1-1/4 turn (450 °) and align the "FT" mark with the index mark.

If the timing marks are facing inward, turn the crankshaft counterclockwise 1/4 turn (90 °) and align the "FT" mark with the index mark.



Install the cam sprockets onto the cam chain and cam sprocket flanges so that the timing marks ("F-I" for intake and "F-E" for exhaust) on the sprockets are flush with the cylinder head surface and facing outward as shown.

Make sure that both intake and exhaust cam lobes are facing up, align the bolt holes in the cam sprockets and camshafts.



CYLINDER HEAD/VALVE

Apply locking agent to the cam sprocket bolt threads.

Install the cam sprocket bolts.

Turn the crankshaft counterclockwise one turn and install the remaining cam sprocket bolts.
Tighten the cam sprocket bolts.

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

Turn the crankshaft counterclockwise one turn and tighten the other sprocket bolts to the same torque.



Remove the two camshaft holder bolts to attach the cam chain guide plate.

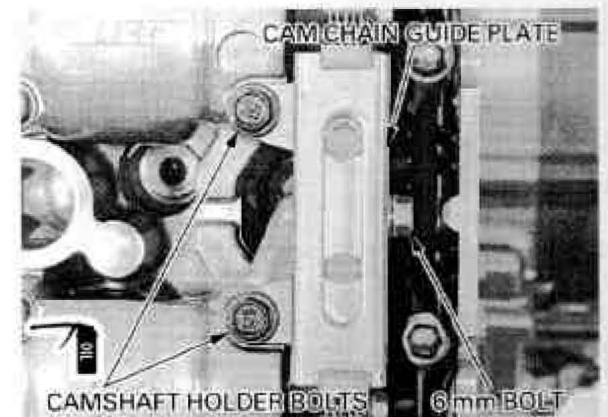
Apply oil to the threads and seating surfaces of the camshaft holder bolts.

Install the cam chain guide plate.

Tighten the camshaft holder bolts.

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

Tighten the 6 mm bolt.



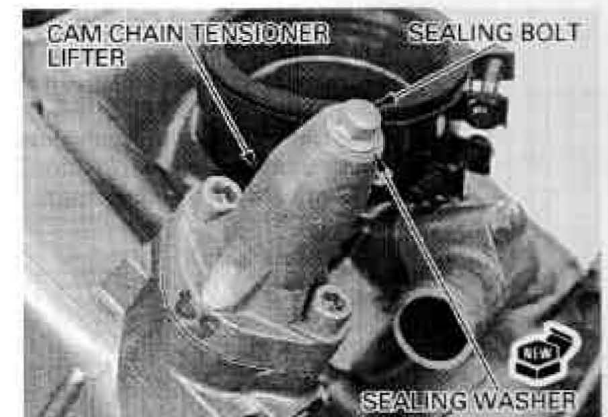
Remove the stopper tool from the cam chain tensioner lifter and install the sealing bolt with a new sealing washer.

If the rear cylinder head has been serviced, install the rear cylinder cam sprockets (see below).

Install the crankshaft hole cap and timing hole cap (page 3-9).

Install the following:

- cylinder head cover (page 8-23)
- left radiator (page 6-6)
- air cleaner housing (page 5-4)

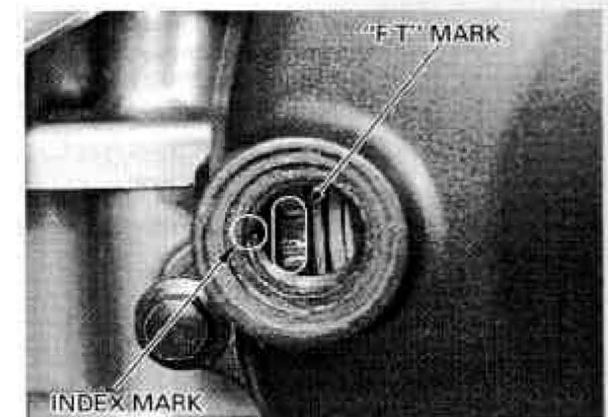


REAR CAM SPROCKET:

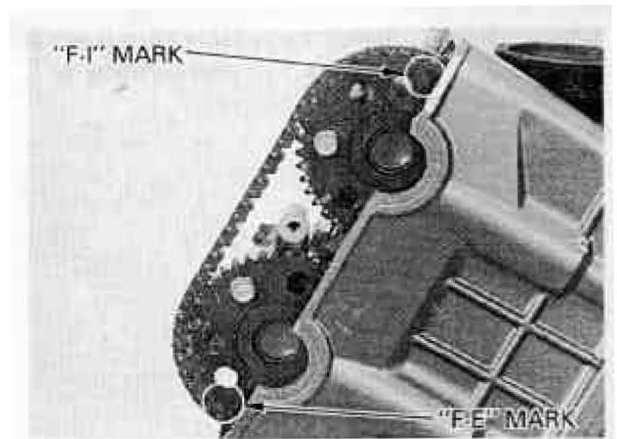
If the front cylinder head has not been serviced, remove the front cylinder head cover and check the front cam sprocket position as follows:

Turn the crankshaft counterclockwise and align "FT" mark on the flywheel with the index mark on the left crankcase cover.

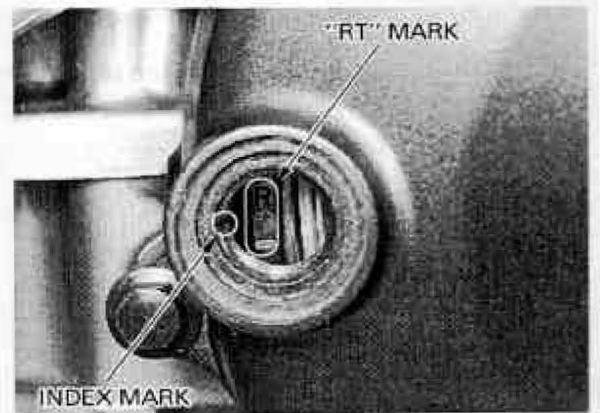
Be careful not to jam the cam chain at the crankshaft when turning the crankshaft.



Check the timing marks ("F-I" for intake and "F-E" for exhaust) on the front cylinder cam sprockets.



If the timing marks are facing outward, turn the crankshaft counterclockwise 3/4 turn (270°) and align the "RT" mark with the index mark.



If the timing marks are facing inward, turn the crankshaft counterclockwise 1-3/4 turn (630°) and align the "RT" mark with the index mark.

Install the cam sprockets onto the cam chain and cam sprocket flanges so that the timing marks ("R-I" for intake and "R-E" for exhaust) on the sprockets are flush with the cylinder head surface and facing outward as shown.



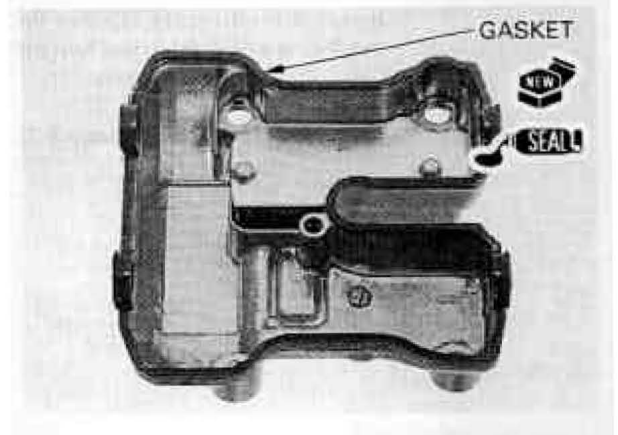
Install the cam sprocket bolts and cam chain guide plate in the same procedures as for the front cylinder.

CYLINDER HEAD COVER INSTALLATION

Apply sealant to the cylinder head cover side of a new gasket.

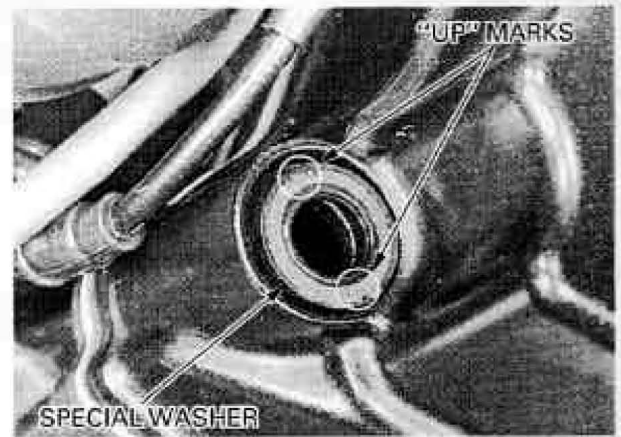
Install the gasket into the groove in the head cover.

Apply sealant to the cylinder head semi-circular areas.



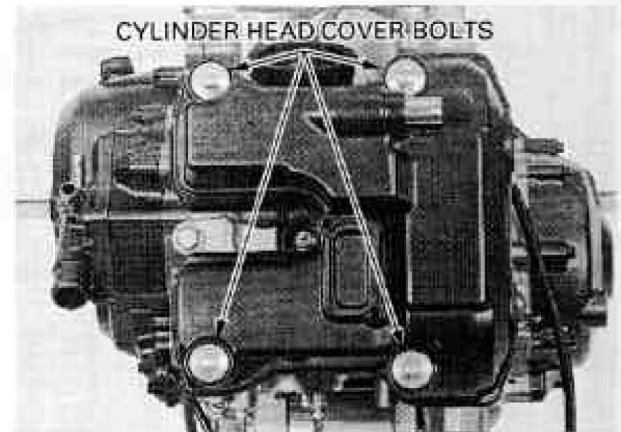
CYLINDER HEAD/VALVE

Install the cylinder head cover and special washers with the "UP" marks facing up.



Install and tighten the cylinder head cover bolts.

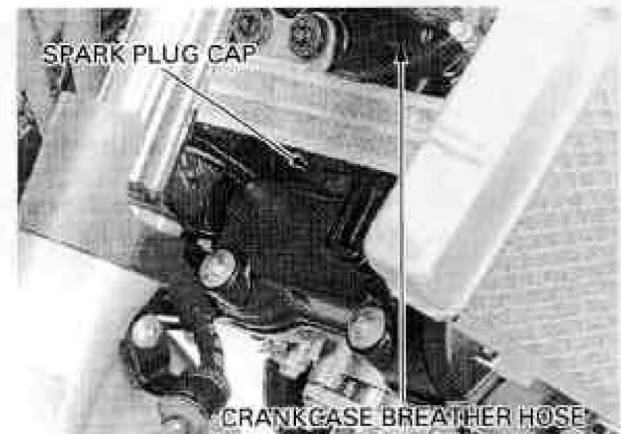
TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)



FRONT:

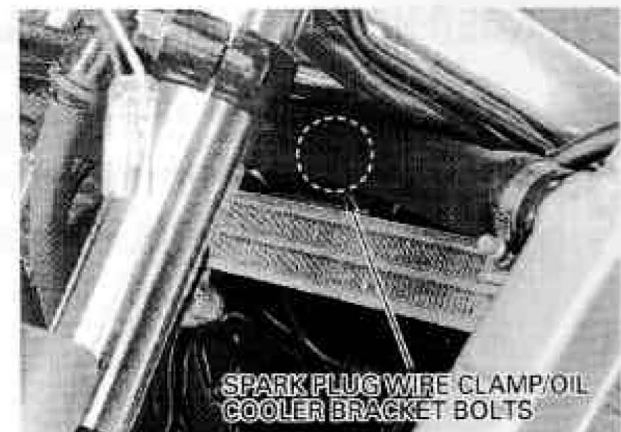
Install the spark plug cap onto the plug.
Connect the breather hose to the cylinder head cover.

Connect the air supply hose to the pulse secondary air injection (PAIR) check valve (SW, AR, IIG type only).



Install the oil cooler bracket with the cooler onto the frame and tighten the two bolts.
Clamp the spark plug wire.

Install the front fairing (page 2-2).



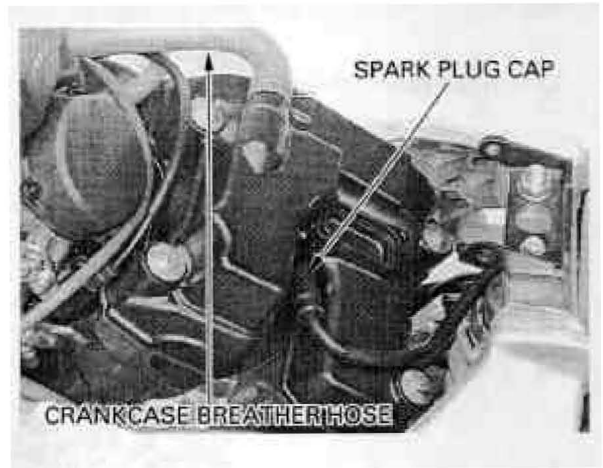
REAR:

Install the spark plug cap onto the plug.

Connect the breather hose to the cylinder head cover.

Connect the air supply hose to the PAIR check valve (SW, AR, IIG type only).

Install the fuel tank (page 2-4).



CLUTCH/GEARSHIFT LINKAGE

23 N·m (2.3 kgf·m , 17 lbf·ft)

127 N·m (13.0 kgf·m , 94 lbf·ft)

12 N·m (1.2 kgf·m , 9 lbf·ft)

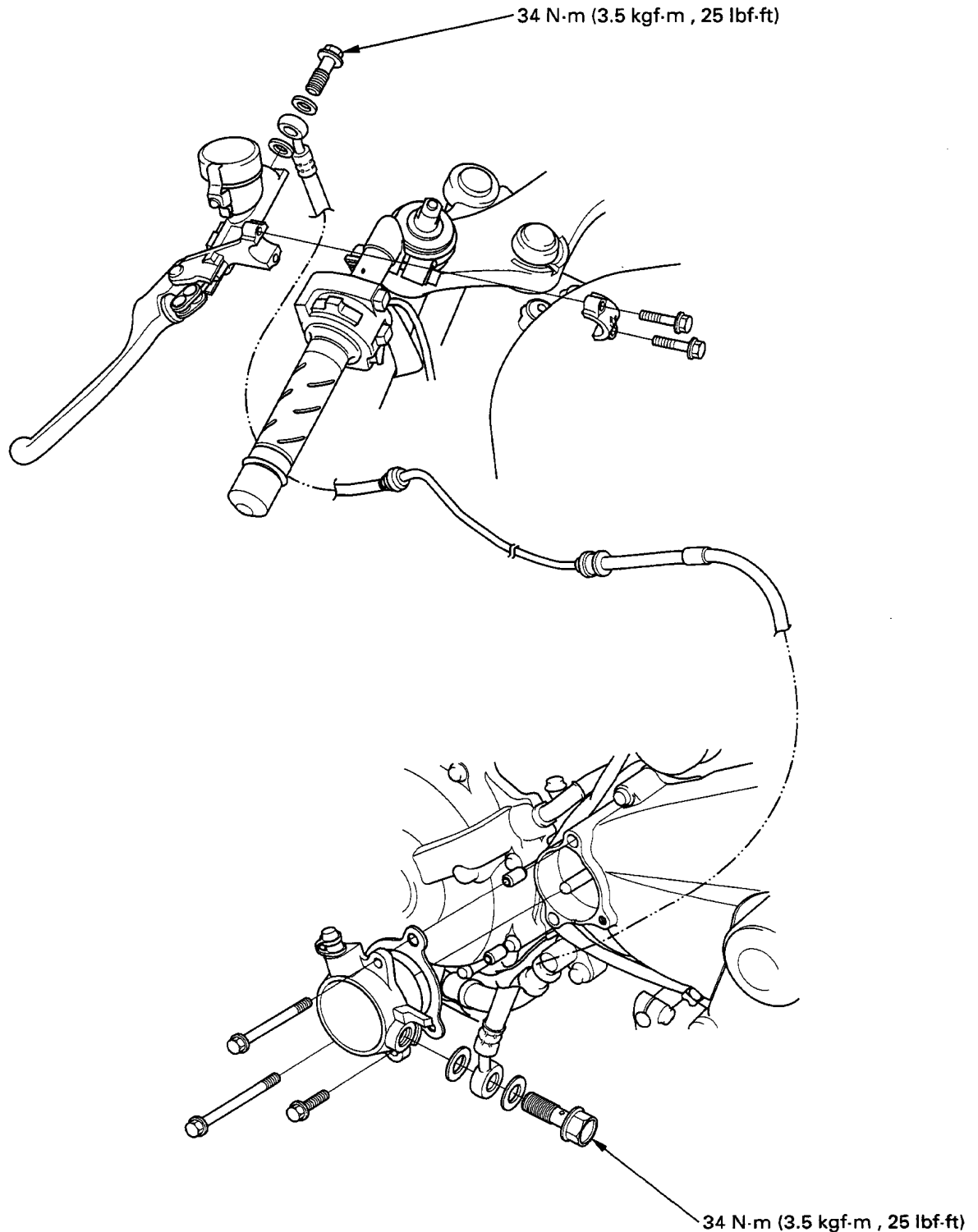
15 N·m (1.5 kgf·m , 11 lbf·ft)

88 N·m (9.0 kgf·m , 65 lbf·ft)

'98 only **NEW**

9. CLUTCH/GEARSHIFT LINKAGE

SERVICE INFORMATION	9-2	CLUTCH SLAVE CYLINDER	9-10
TROUBLESHOOTING	9-3	CLUTCH	9-12
CLUTCH FLUID REPLACEMENT/ AIR BLEEDING	9-4	GEARSHIFT LINKAGE	9-20
CLUTCH MASTER CYLINDER	9-5	PRIMARY DRIVE GEAR	9-22



SERVICE INFORMATION

GENERAL

- The clutch system can be serviced with the engine in the frame.
- DOT 4 brake fluid is used for the hydraulic clutch and is referred to as clutch fluid in this section. Do not use other types of fluid as they are not compatible.
- Spilled clutch (brake) fluid will severely damage the plastic parts and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Engine oil viscosity and level and the use of oil additives have an effect on clutch disengagement. Oil additives of any kind are specifically not recommended. When the clutch does not disengage or the motorcycle creeps with the clutch disengaged, inspect the engine oil viscosity and level before servicing the clutch system.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Specified clutch fluid		DOT 4 brake fluid	—
Clutch master cylinder	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)
Clutch	Spring free length	49.6 (1.95)	46.6 (1.83)
	Disc thickness	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	Plate warpage	—	0.30 (0.012)
Clutch outer guide	I.D.	28.000 – 28.021 (1.1024 – 1.1032)	28.031 (1.1036)
	O.D.	34.975 – 34.991 (1.3770 – 1.3776)	34.965 (1.3766)
Mainshaft O.D. at clutch outer guide		27.980 – 27.993 (1.1016 – 1.1021)	27.970 (1.1012)

TORQUE VALUES

Clutch slave cylinder bleed valve	9 N·m (0.9 kgf·m , 6.5 lbf·ft)	
Clutch fluid reservoir cap stopper plate screw	1 N·m (0.12 kgf·m , 0.9 lbf·ft)	
Clutch fluid reservoir mounting screw	1 N·m (0.15 kgf·m , 1.1 lbf·ft)	Apply locking agent to the threads
Clutch lever pivot nut	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Clutch hose oil bolt	34 N·m (3.5 kgf·m , 25 lbf·ft)	
Clutch bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Clutch center lock nut	127 N·m (13.0 kgf·m , 94 lbf·ft)	Apply oil to the threads and seating surface and stake
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m , 11 lbf·ft)	Apply locking agent to the threads
Gearshift cam bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply locking agent to the threads
Primary drive gear bolt	88 N·m (9.0 kgf·m , 65 lbf·ft)	Apply oil to the threads and seating surface

TOOLS

Snap ring pliers	07914-3230001
Clutch center holder	07724-0050002
Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 17 mm	07746-0040400
Attachment, 37 × 40 mm	07746-0010200
Attachment, 42 × 47 mm	07746-0010300
Gear holder	07724-0010100

TROUBLESHOOTING

Clutch lever too hard

- Sticking piston (s)
- Clogged hydraulic system

Clutch slips

- Sticking piston (s)
- Clogged hydraulic system
- Discs worn
- Weak clutch spring

Clutch will not disengage or motorcycle creeps with clutch disengaged

- Air in hydraulic system
- Low clutch fluid level
- Sticking piston (s)
- Leaking hydraulic system
- Warped plates
- Oil level too high, improper oil viscosity or oil additive used.

CLUTCH FLUID REPLACEMENT/AIR BLEEDING

CAUTION:

- *Do not allow foreign material to enter the system when filling the reservoir.*
- *Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

CLUTCH FLUID DRAINING

Turn the handlebar to the right until the reservoir is level, and remove the stopper plate, reservoir cap, set plate and diaphragm.

Connect a bleed hose to the clutch slave cylinder bleed valve.

Loosen the bleed valve and pump the clutch lever until no more fluid flows out of the bleed valve.

CLUTCH FLUID FILLING/BLEEDING

Fill the reservoir with DOT 4 brake fluid from a sealed container.

CAUTION:

- *Use only DOT 4 brake fluid from a sealed container.*
- *Do not mix different types of fluid. They are not compatible.*

Connect a commercially available brake bleeder to the bleed valve.

Loosen the bleed valve and pump the brake bleeder.

Add brake fluid when the fluid level in the reservoir is low.

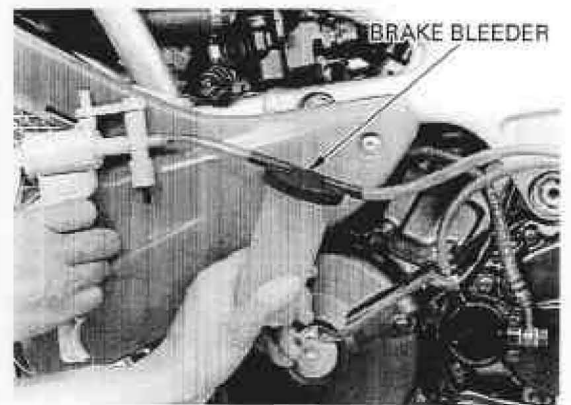
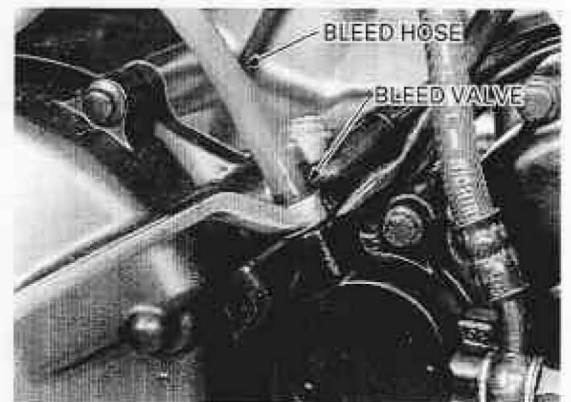
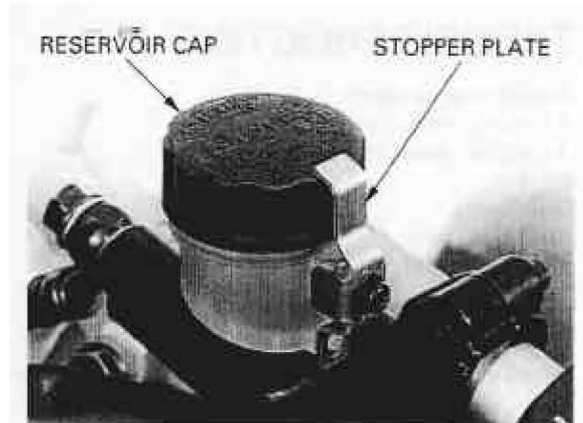
NOTE:

- Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.

Repeat the above procedures until new fluid appear coming out of the bleed valve and air bubbles do not appear in the plastic hose.

NOTE:

If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.



If a brake bleeder is not available, use the following procedure:

Pump up the system pressure with the clutch lever until the lever resistance is felt.

Connect a bleed hose to the bleed valve and bleed the system as follows:

1. Squeeze the clutch lever, open the bleed valve 1/2 turn and then close it.

NOTE:

Do not release the clutch lever until the bleed valve has been closed.

2. Release the clutch 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.

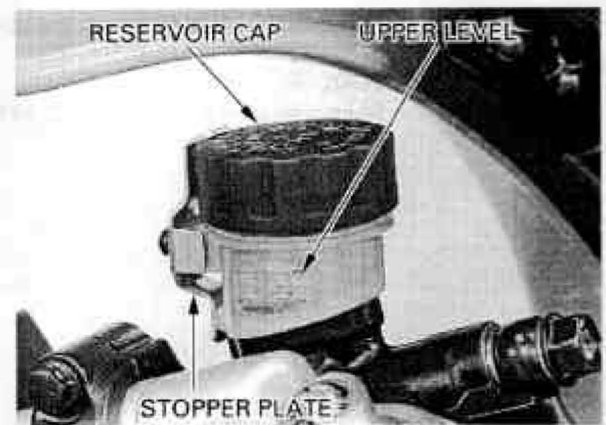
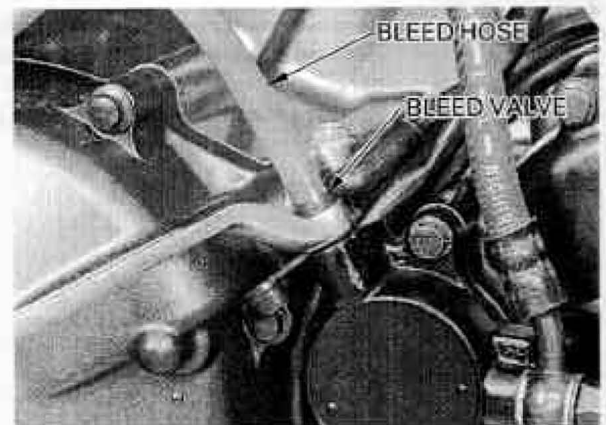
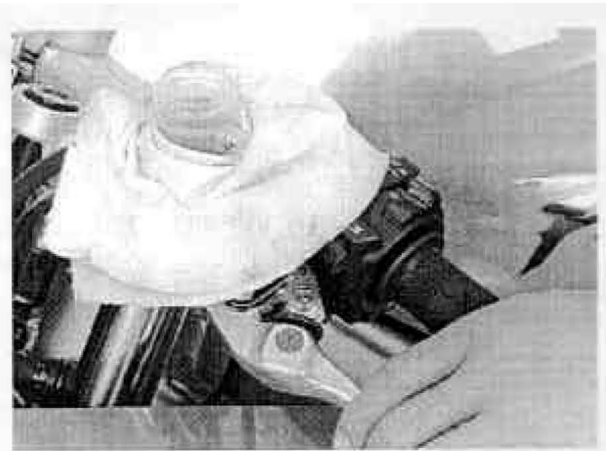
Tighten the bleed valve

TORQUE: 9 N·m (0.9 kgf·m , 6.5 lbf·ft)

Fill the reservoir to the upper level mark with DOT 4 brake fluid from a sealed container.

Install the diaphragm, set plate, reservoir cap and stopper plate, and tighten the stopper plate screw.

TORQUE: 1 N·m (0.12 kgf·m , 0.9 lbf·ft)



CLUTCH MASTER CYLINDER

CAUTION:

- *Avoid spilling clutch 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

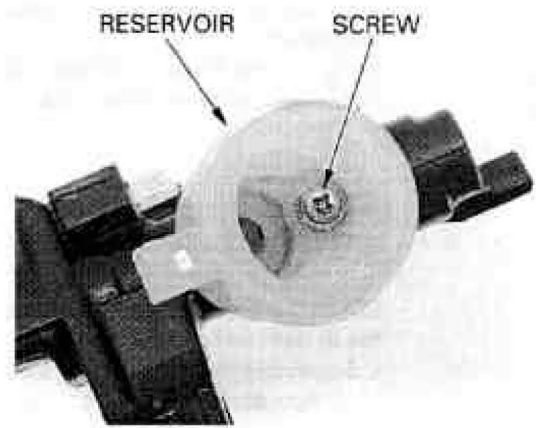
Drain the clutch fluid from the hydraulic system (page 9-4).

Disconnect the clutch switch connectors. Disconnect the clutch hose from the master cylinder by removing the oil bolt and sealing washers.

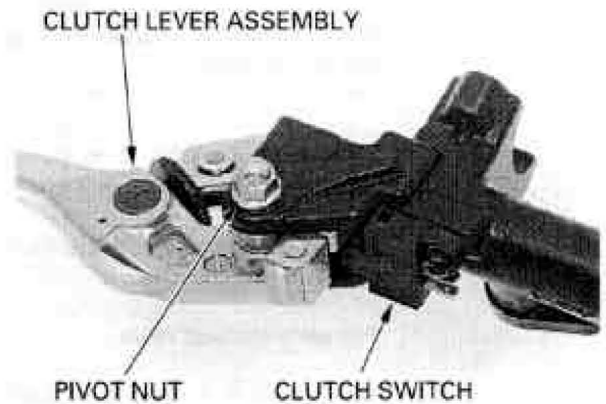
Remove the master cylinder holder bolts, holder and the master cylinder.

CLUTCH/GEARSHIFT LINKAGE

Remove the screw, fluid reservoir and O-rings from the master cylinder.



Remove the screw and clutch switch.
Remove the pivot nut, bolt and clutch lever assembly.
Remove the push rod and piston boot.

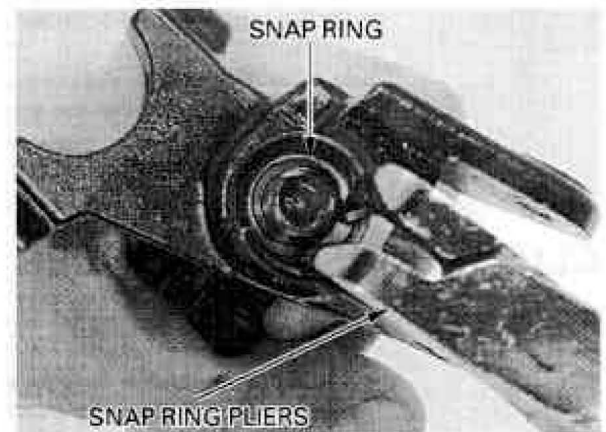


Remove the snap ring with the special tool.

TOOL:

Snap ring pliers

07914-3230001



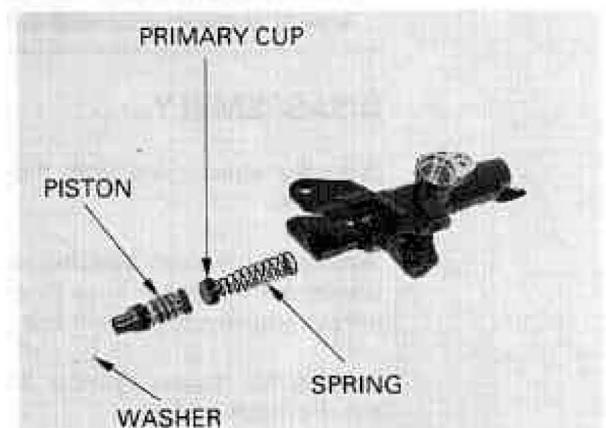
Remove the washer, master piston, primary cup and spring.

Clean the master cylinder, reservoir and master piston in clean clutch fluid.

INSPECTION

Check the piston cups for wear, deterioration or damage.

Check the spring for damage.



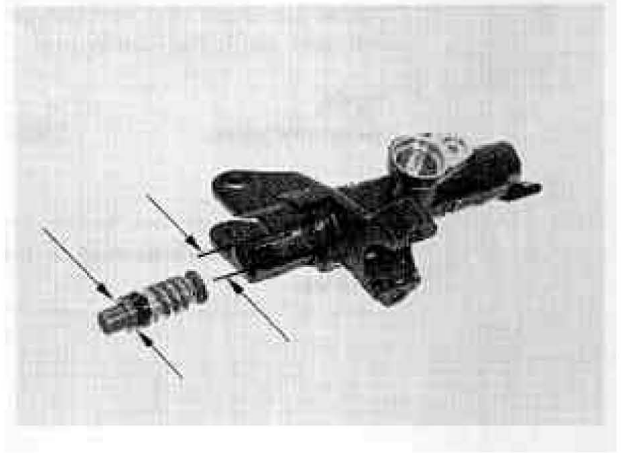
Check the master cylinder and piston for scoring or damage.

Measure the master cylinder I.D.

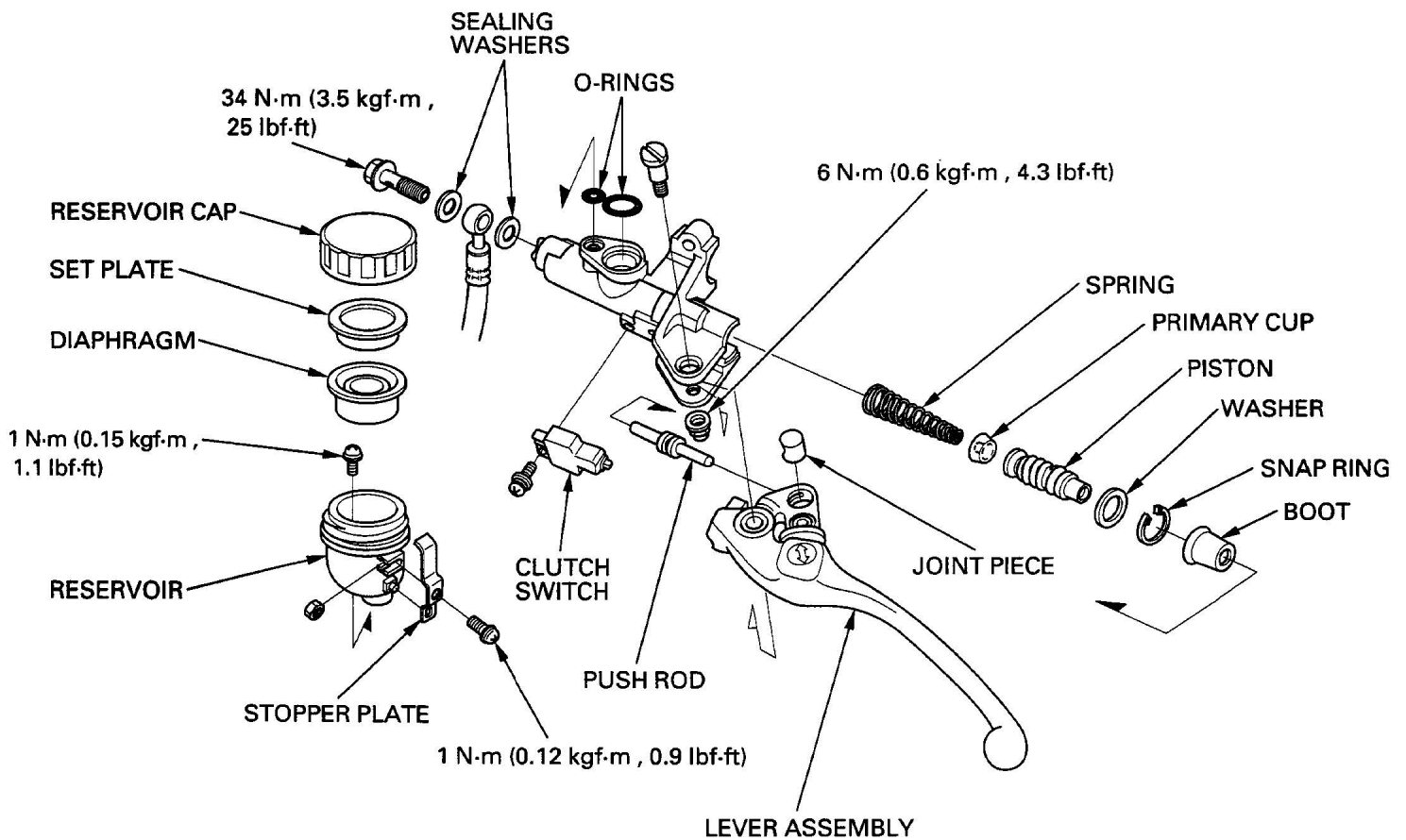
SERVICE LIMIT: 14.055 mm (0.5533 in)

Measure the master piston O.D.

SERVICE LIMIT: 13.945 mm (0.5490 in)



ASSEMBLY



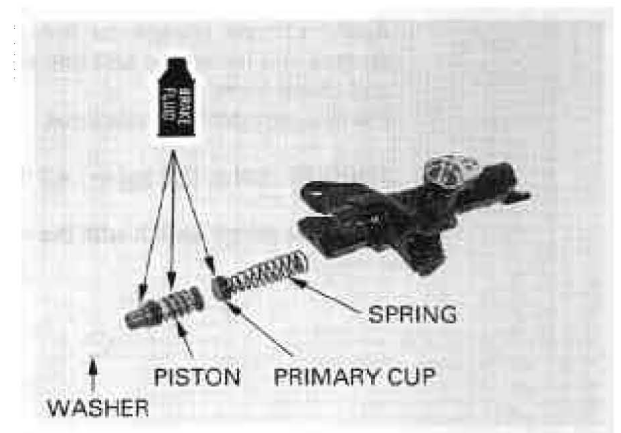
Coat the master piston and piston cups with clean clutch fluid.

Install the spring onto the primary cup.

Install the spring, primary cup, master piston and washer into the master cylinder.

CAUTION:

Do not allow the piston cup lips to turn inside out.



CLUTCH/GEARSHIFT LINKAGE

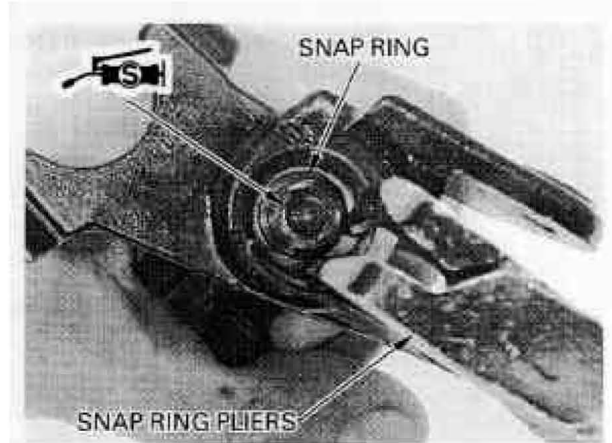
Install the snap ring into the groove in the master cylinder, using the special tool.

TOOL:

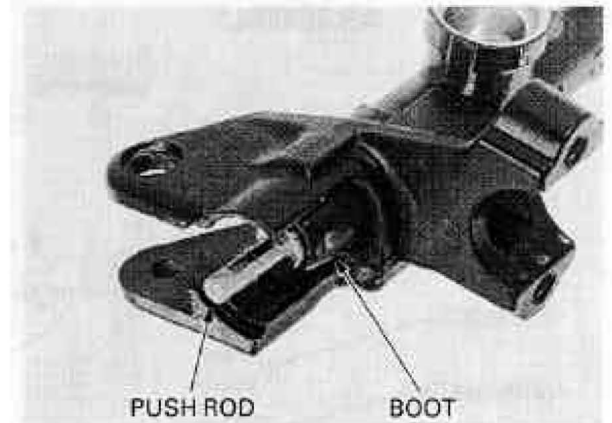
Snap ring pliers 07914-323001

CAUTION:

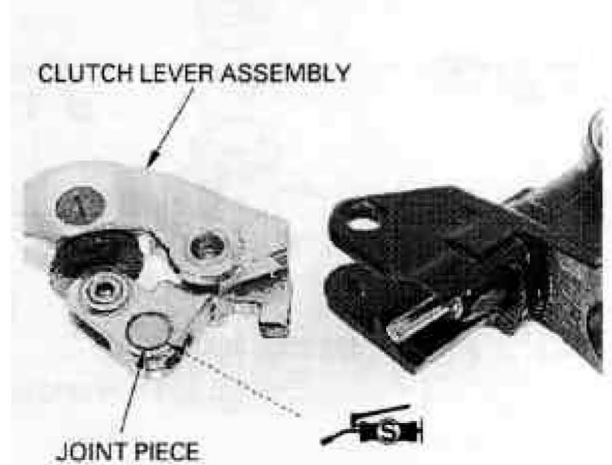
Be certain the snap ring is firmly seated in the groove.



Apply silicone grease to the push rod contacting area of the master piston.
Install the boot onto the push rod.
Install the boot and push rod into the master cylinder.



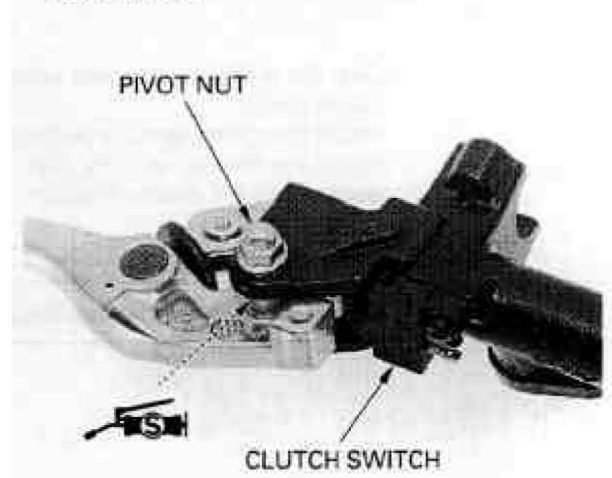
Apply silicone grease to the push rod hole in the clutch lever joint piece.
Insert the push rod into the hole in the joint piece and install the clutch lever assembly onto the master cylinder.



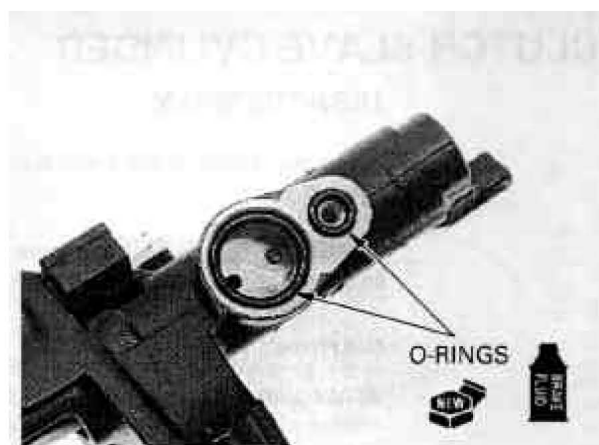
Apply silicone grease to the pivot bolt sliding surface and install the bolt into the master cylinder and clutch lever.
Install and tighten the pivot nut.

TORQUE: 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

Install the clutch switch with the screw.

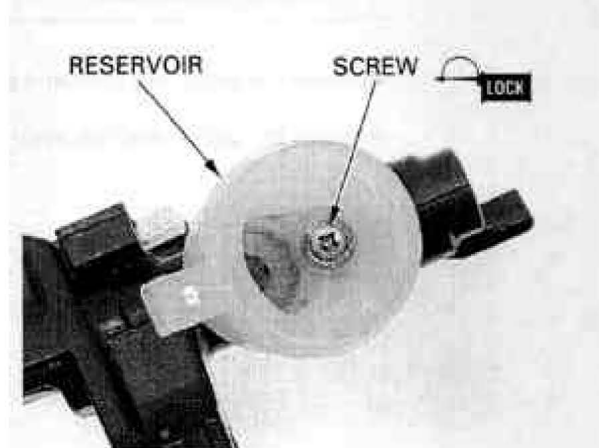


Coat new O-rings with clutch fluid and install them onto the master cylinder.



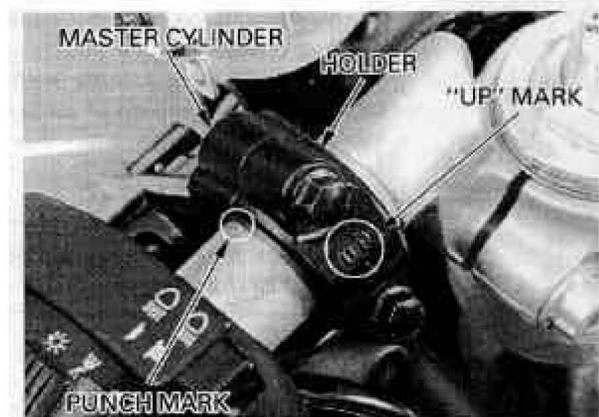
Apply locking agent to the reservoir mounting screw threads. Install the reservoir and tighten the mounting screw.

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



Install the master cylinder and holder with the "UP" mark facing up.

Align the end of the master cylinder with the punch mark on the handlebar, and tighten the upper bolt first, then tighten the lower bolt.



Connect the clutch 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 clutch switch connectors.

Fill and bleed the clutch hydraulic system (page 9-4).



CLUTCH SLAVE CYLINDER

DISASSEMBLY

Drain the clutch fluid from the hydraulic system (page 9-4).

Disconnect the clutch hose from the slave cylinder by removing the oil bolt and sealing washers.

CAUTION:

Avoid spilling clutch fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.

Remove the mounting bolts and slave cylinder.

Remove the gasket and dowel pins.

Remove the piston from the slave cylinder. If piston removal is hard, place a shop towel over the piston, position the cylinder body with the piston down and apply small squirts of air pressure to the fluid inlet.

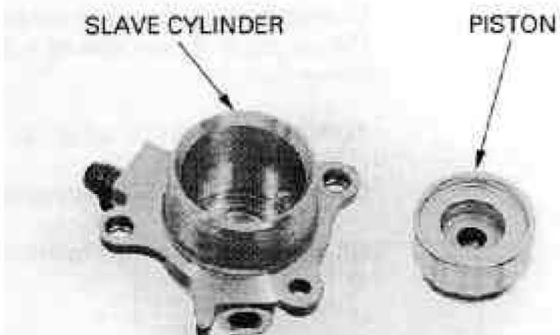
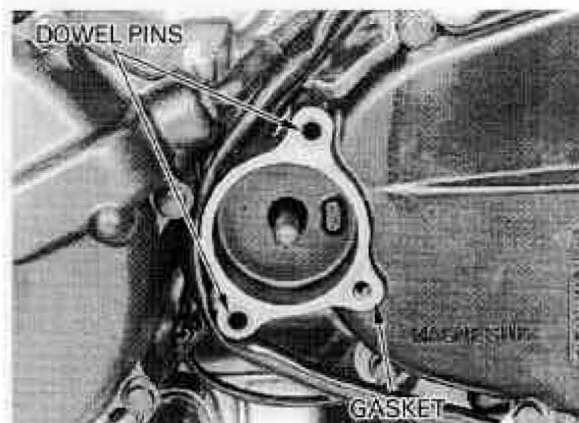
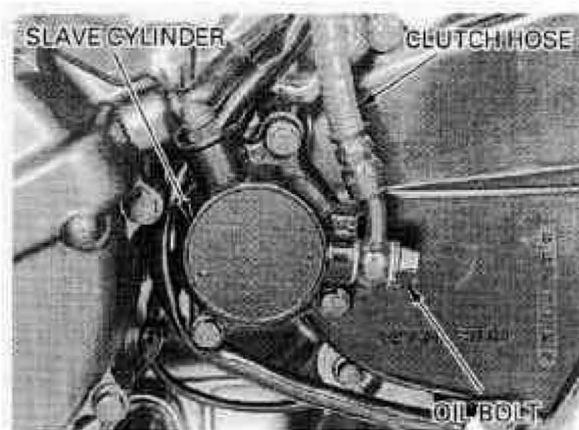
▲WARNING

Do not use high pressure air or bring the nozzle too close to the inlet.

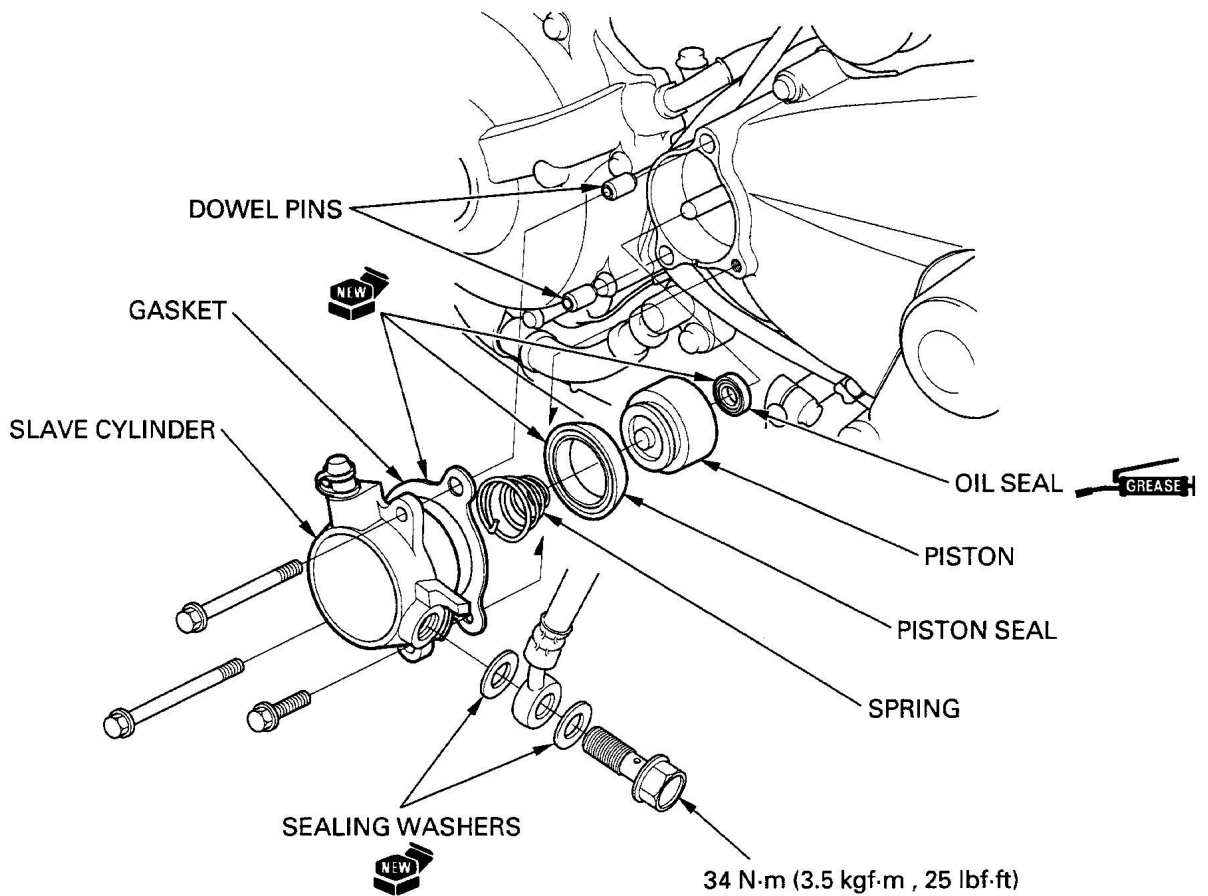
Remove the spring, piston seal and oil seal from the piston.

INSPECTION

Check the piston spring for weakness or damage. Check the slave cylinder and piston for scoring or damage.

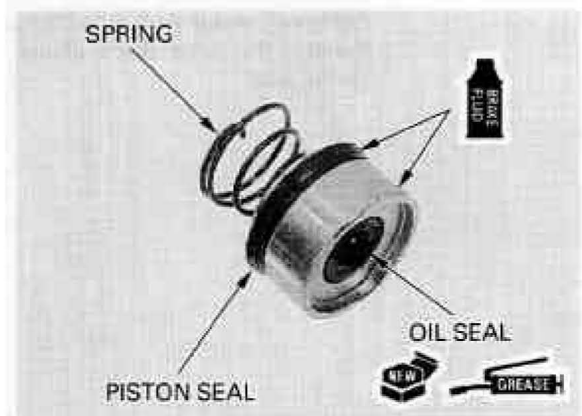


ASSEMBLY

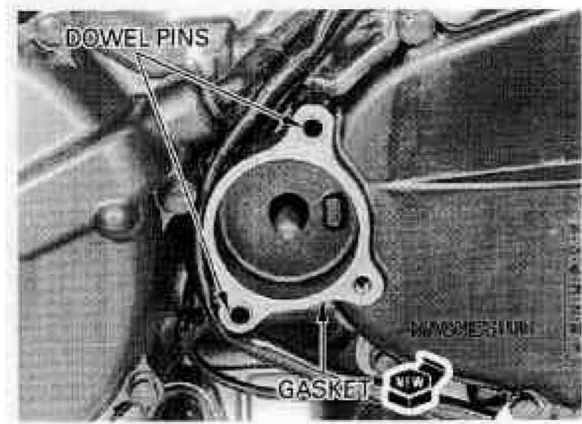


Apply small amount of silicone grease to the lifter rod contacting area of the piston.
 Apply grease to new oil seal lips and install the oil seal into the piston.
 Install a new piston seal into the piston groove.
 Install the piston spring onto the piston.

Coat the piston and piston seal with clutch fluid and install piston and spring into the slave cylinder.



Install the dowel pins and a new gasket.



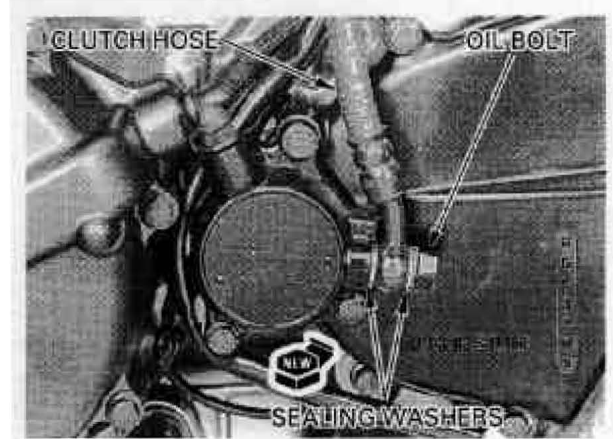
CLUTCH/GEARSHIFT LINKAGE

Install the slave cylinder and tighten the mounting bolts securely.

Connect the clutch hose to the slave cylinder with the oil bolt and new sealing washers. Tighten the oil bolt.

TORQUE: 34 N·m (3.5 kgf·m , 25 lbf·ft)

Fill and bleed the clutch hydraulic system (page 9-4).



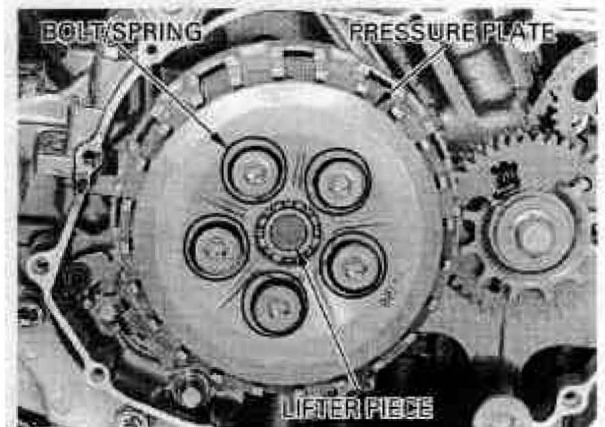
CLUTCH

DISASSEMBLY

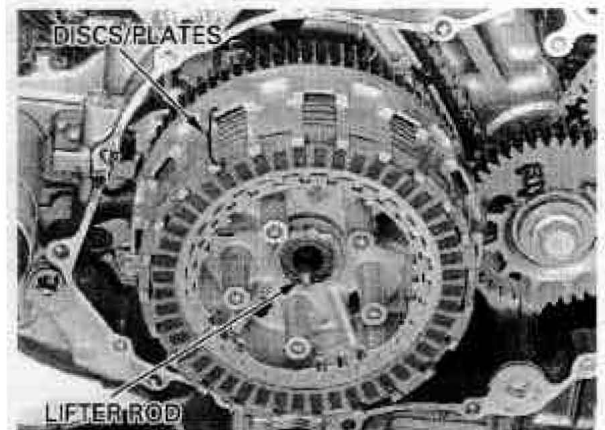
Remove the right crankcase cover (page 6-12).

Remove the clutch bolts, springs and pressure plate.

Remove the clutch lifter piece.

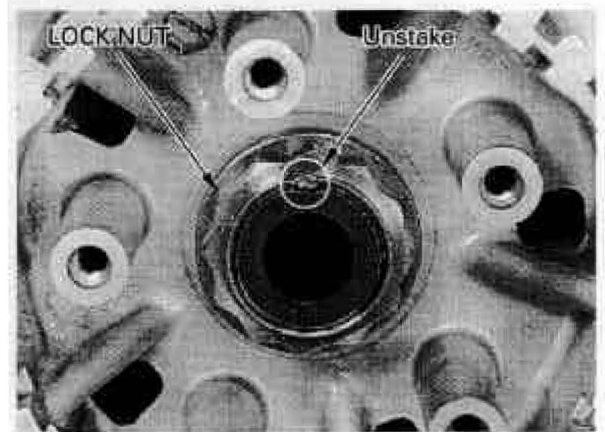


Remove the clutch lifter rod from the mainshaft. Remove the clutch discs, plates, judder spring and spring seat.



Be careful not to damage the mainshaft threads.

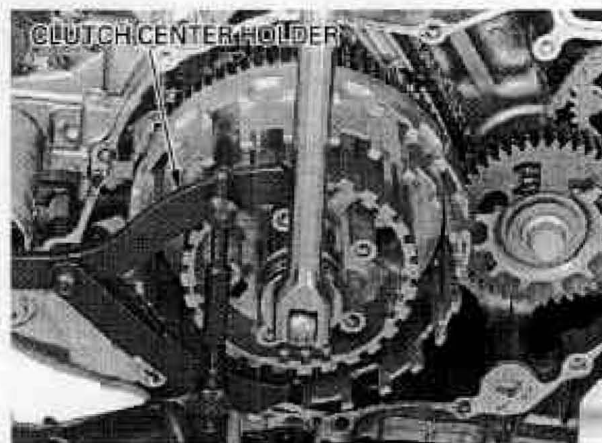
Unstake the clutch center lock nut.



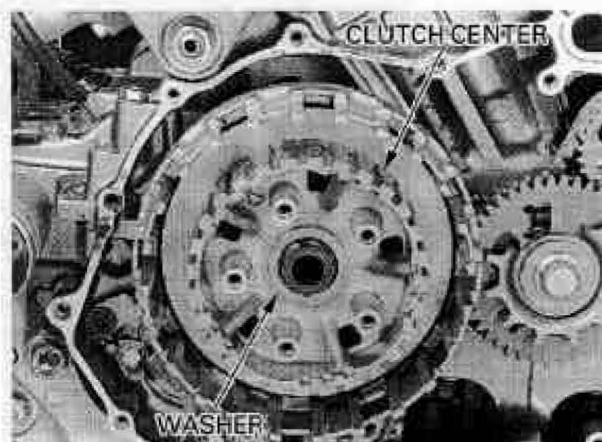
Hold the clutch center with the special tool and remove the clutch center lock nut.

TOOL:

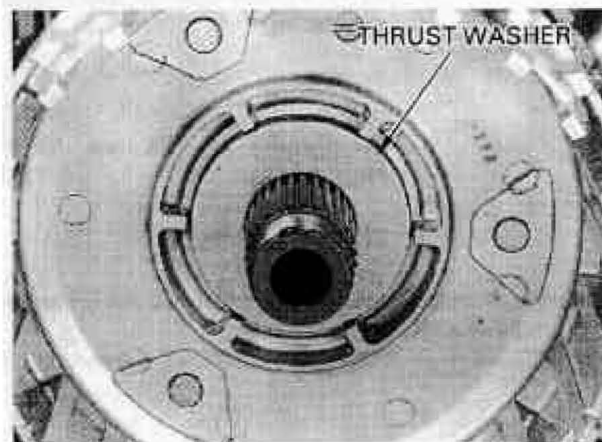
Clutch center holder 07724-0050002



Remove the special washer and clutch center.

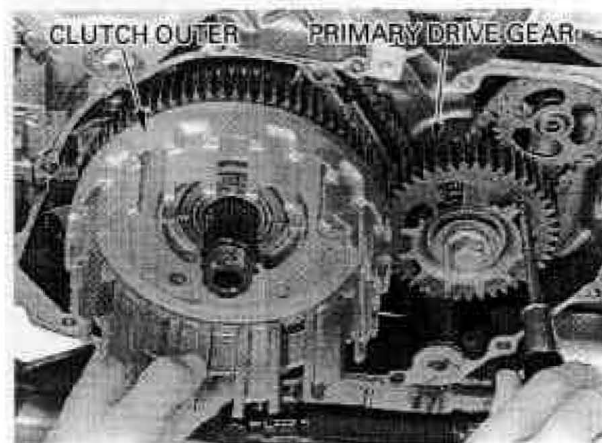


Remove the thrust washer.



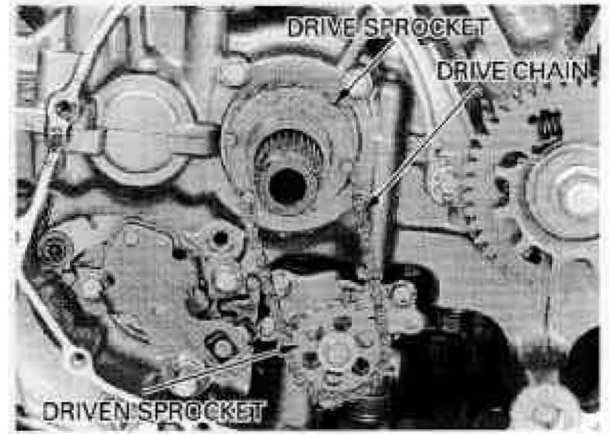
When the oil pump driven sprocket will be removed, loosen the driven sprocket bolt with the clutch outer still installed.

Align the gear teeth of the scissors gears (primary drive gear and sub-gear) by inserting a screwdriver into the gear holes, and remove the clutch outer.



CLUTCH/GEARSHIFT LINKAGE

Remove the oil pump driven sprocket bolt and washer.
Remove the oil pump driven sprocket, drive chain and drive sprocket as a set.
Remove the clutch outer guide.



INSPECTION

LIFTER BEARING

Turn the inner race of the lifter bearing with your finger.
The bearing should turn smoothly and quietly.
Also check that the outer race of the bearing fits tightly in the pressure plate.
Replace the bearing if the inner race does not turn smoothly, quietly, or if the outer race fit loosely in the pressure plate.

Drive the bearing out of the pressure plate.

Drive a new bearing into the plate with its mark side facing out.

TOOLS:

Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 17 mm	07746-0040400

CLUTCH SPRING

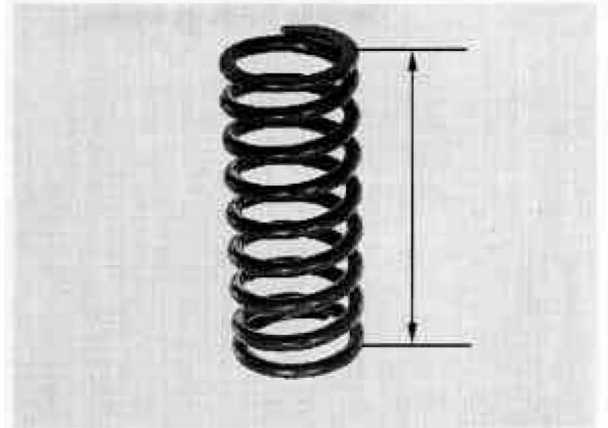
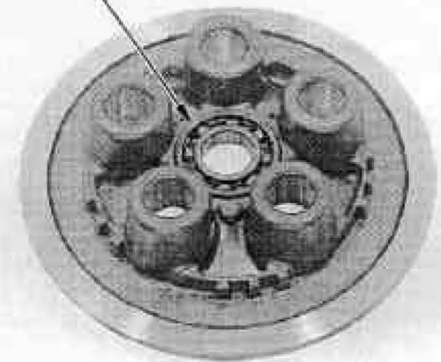
Replace the clutch springs as a set Measure the clutch spring free length.

SERVICE LIMIT: 46.6 mm (1.83 in)

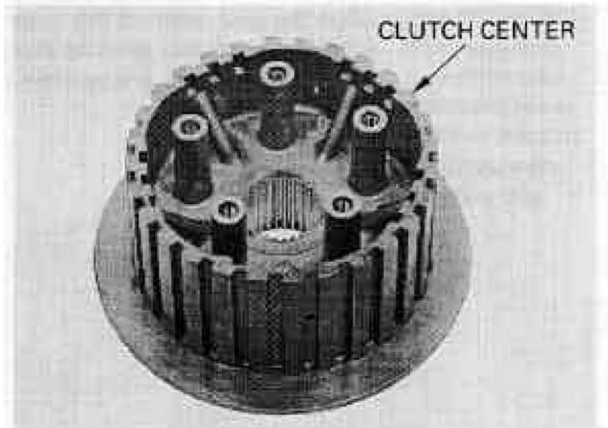
CLUTCH CENTER

Check the clutch center and pressure plate for nicks, indentations or abnormal wear made by the plates.

LIFTER BEARING

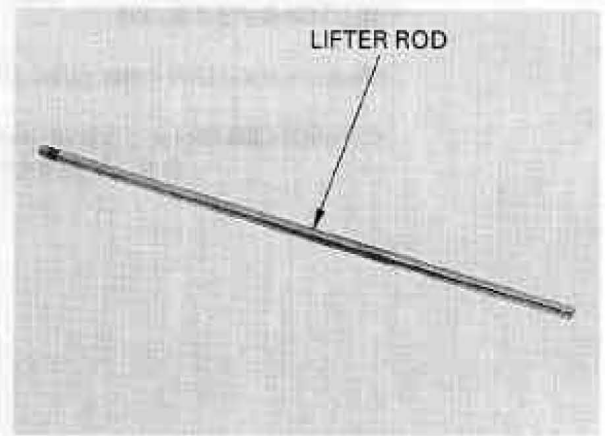


CLUTCH CENTER



CLUTCH LIFTER ROD

Check the clutch lifter rod for bending or damage.

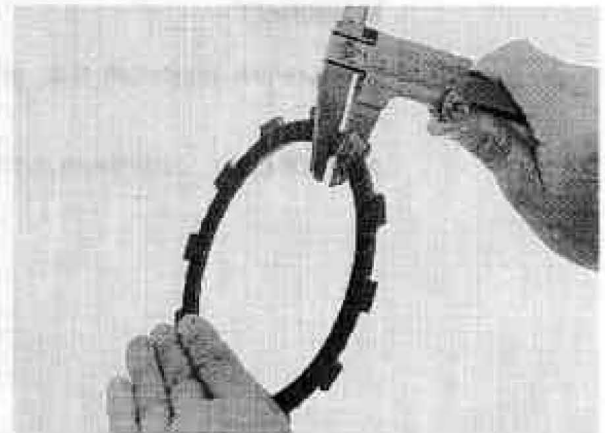


CLUTCH DISC

Replace the clutch discs and plates as a set.

Check the clutch discs for signs of scoring or discoloration. Measure the clutch disc thickness.

SERVICE LIMIT: 3.5 mm (0.14 in)

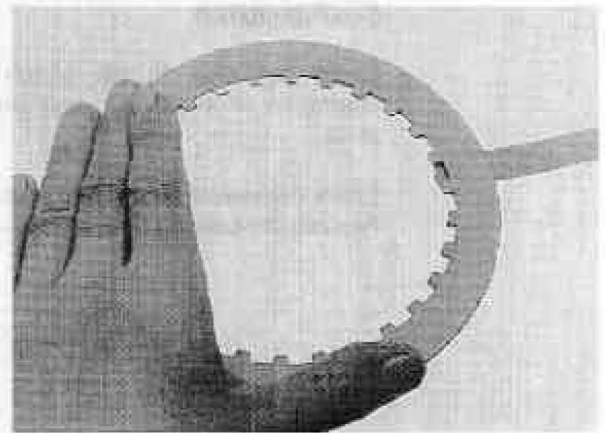


CLUTCH PLATE

Replace the clutch discs and plates as a set.

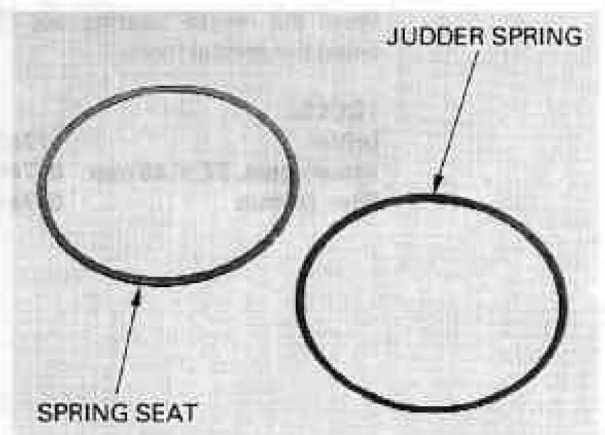
Check the plates for discoloration. Check the plate warpage on a surface plate using a feeler gauge.

SERVICE LIMIT: 0.30 mm (0.012 in)



JUDDER SPRING, SPRING SEAT

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

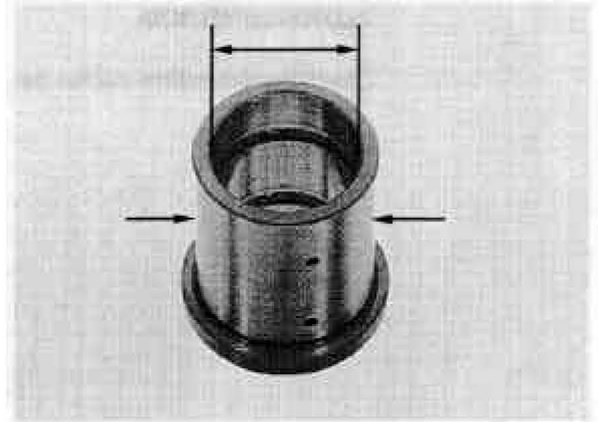


CLUTCH/GEARSHIFT LINKAGE

CLUTCH OUTER GUIDE

Measure the clutch outer guide I.D. and O.D.

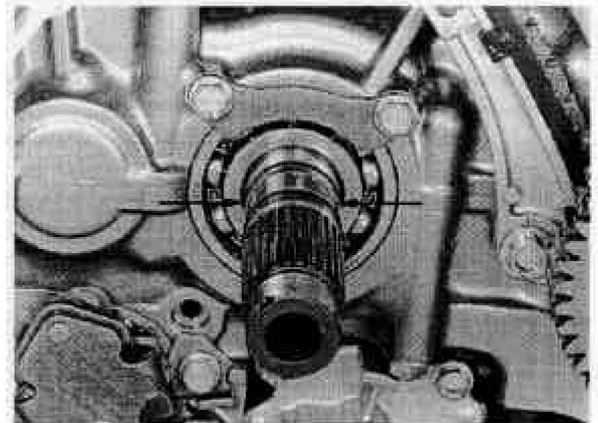
SERVICE LIMITS: I.D. : 28.031 mm (1.1036 in)
O.D. : 34.965 mm (1.3766 in)



MAINSHAFT

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

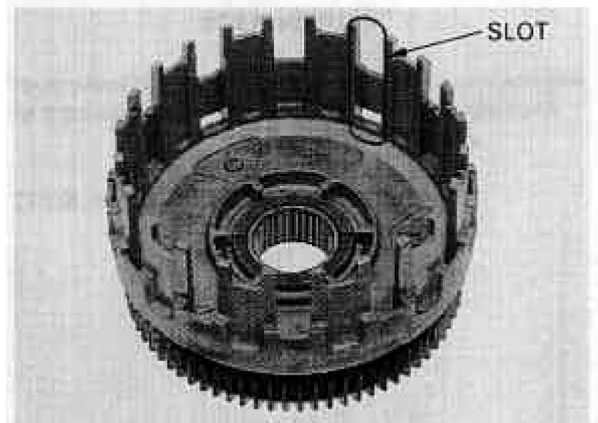
SERVICE LIMIT: 27.970 mm (1.1012 in)



CLUTCH OUTER

Check the slots in the clutch outer for nicks, indentation or abnormal wear made by the clutch discs.

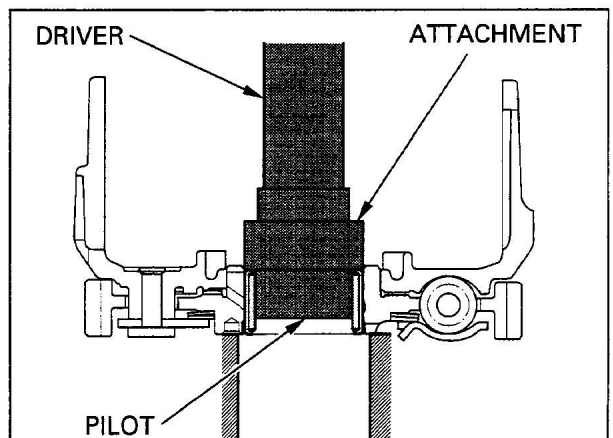
Check the needle bearing for wear or damage.
Replace the bearing if necessary.



Press the needle bearing out of the clutch outer using the special tools.

TOOLS:

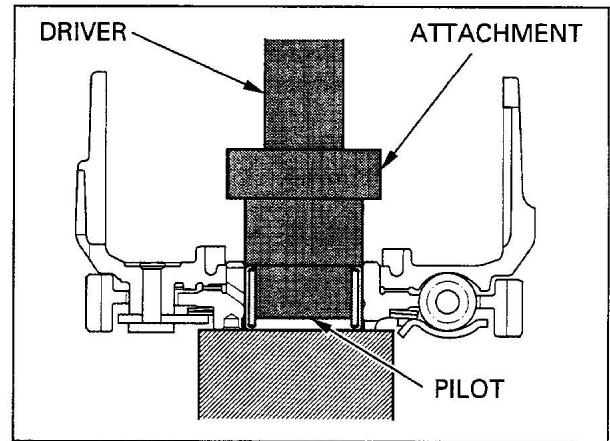
Driver	07749-0010000
Attachment, 37 × 40 mm	07746-0010200
Pilot, 35 mm	07746-0040800



Press in the bearing with the marking side facing up. Press the needle bearing in the clutch outer until it is flush with the inner edge of the clutch outer, using the special tools.

TOOLS:

- Driver** 07749-0010000
- Attachment, 42 × 47 mm** 07746-0010300
- Pilot, 35 mm** 07746-0040800



ASSEMBLY

Coat the clutch outer guide with molybdenum oil solution and install it onto the mainshaft with the flange side facing the crankcase.

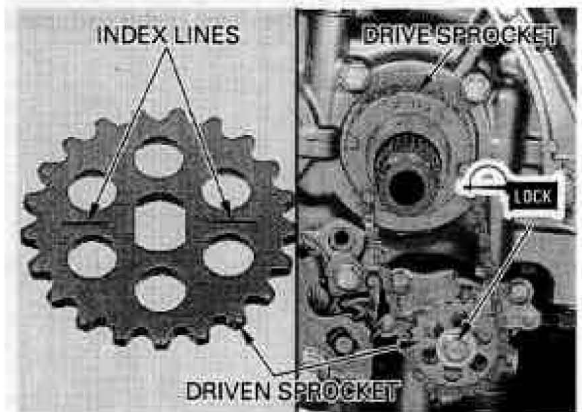


Install the oil pump drive sprocket, drive chain and driven sprocket as a set with the index lines on the driven sprocket facing in.

Apply locking agent to the oil pump driven sprocket bolt threads and install the washer and bolt.

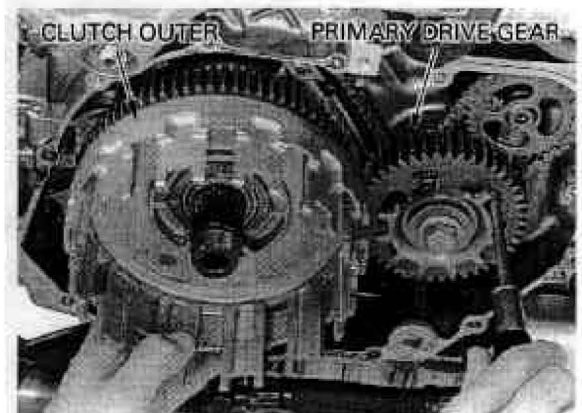
NOTE:

Tighten the driven sprocket bolt to the specified torque after installing the clutch outer.



Apply molybdenum oil solution to the clutch outer needle bearing.

Align the gear teeth of the scissors gears (primary drive gear and sub-gear) by inserting a screwdriver into the gear holes, and install the clutch outer.

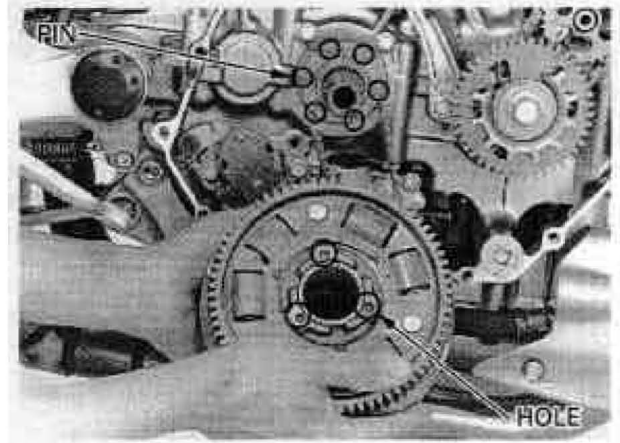


CLUTCH/GEARSHIFT LINKAGE

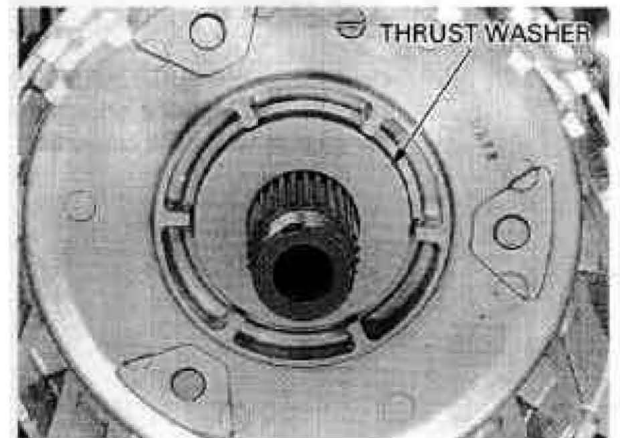
Align the holes in the clutch outer with the pins on the oil pump drive sprocket by turning the oil pump driven sprocket while pushing in the clutch outer.

Tighten the oil pump driven sprocket bolt if it was removed.

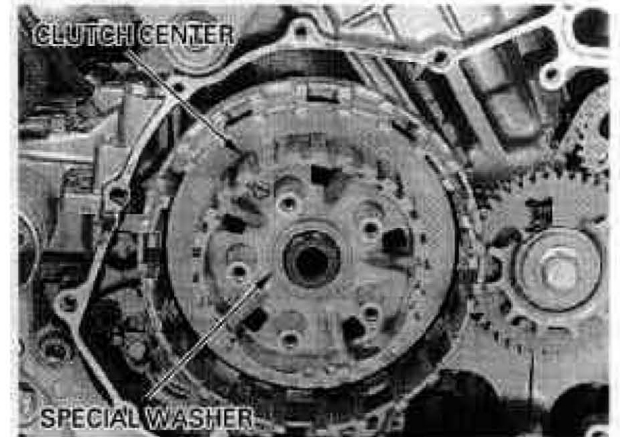
TORQUE: 15 N·m (1.5 kgf·m , 11 lbf·ft)



Install the thrust washer.



Install the clutch center and special washer.

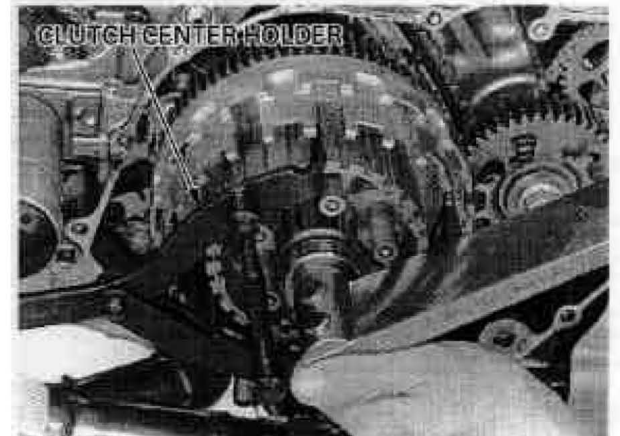


Apply oil to the threads and seating surface of a new clutch center lock nut and install it onto the mainshaft.

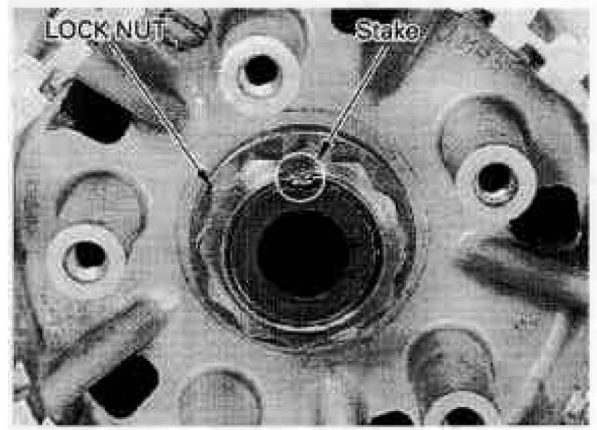
Hold the clutch center with the special tool and tighten the lock nut.

TOOL:
Clutch center holder 07724-0050002

TORQUE: 127 N·m (13.0 kgf·m , 94 lbf·ft)

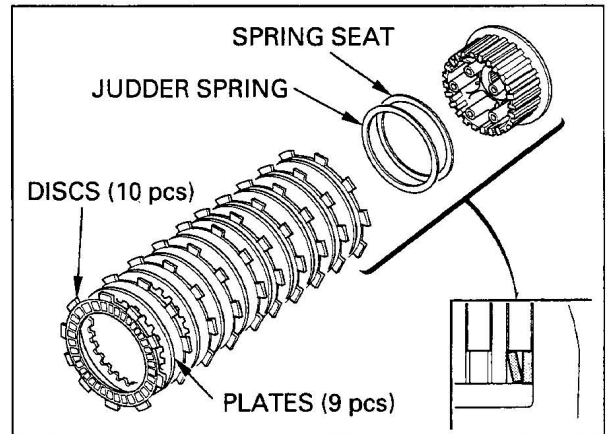


Be careful not to damage the mainshaft threads. Stake the clutch center lock nut into the mainshaft groove.



Install the spring seat and judder spring, with the concaved side facing out, onto the clutch center.

Coat the clutch discs with clean engine oil. Install the ten clutch discs and nine plates alternately, starting with the disc.

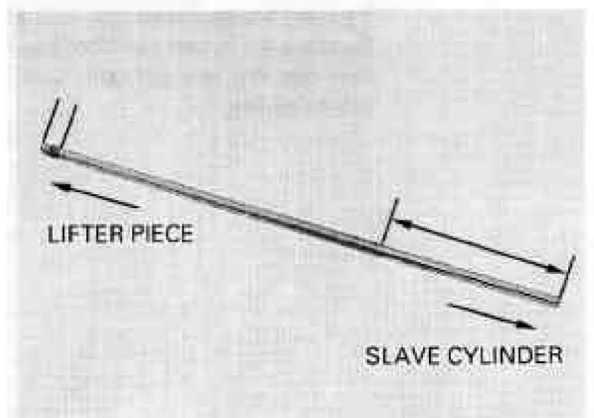


NOTE:

Install the outside clutch disc tabs into the shallow slots of the clutch outer.



Note the clutch lifter rod installation direction and install it into the mainshaft.



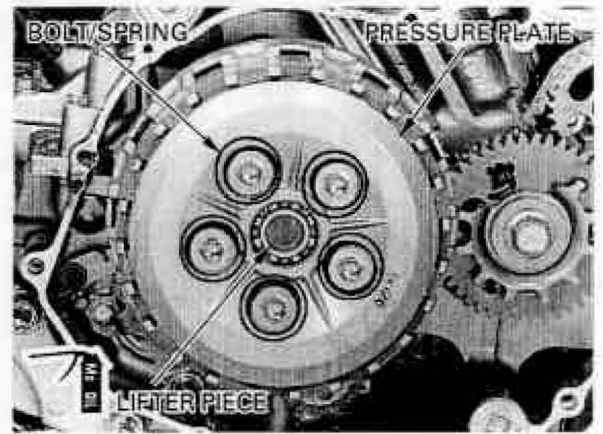
CLUTCH/GEARSHIFT LINKAGE

Coat the clutch lifter piece with molybdenum oil solution.

Install the clutch lifter piece and pressure plate.
Install the clutch springs and clutch bolts, and tighten the bolts.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the right crankcase cover (page 6-14).

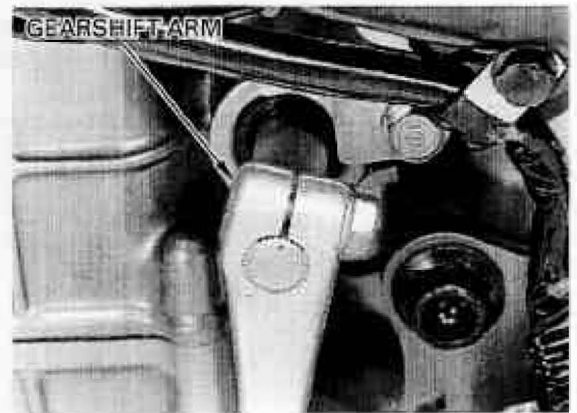


GEARSHIFT LINKAGE

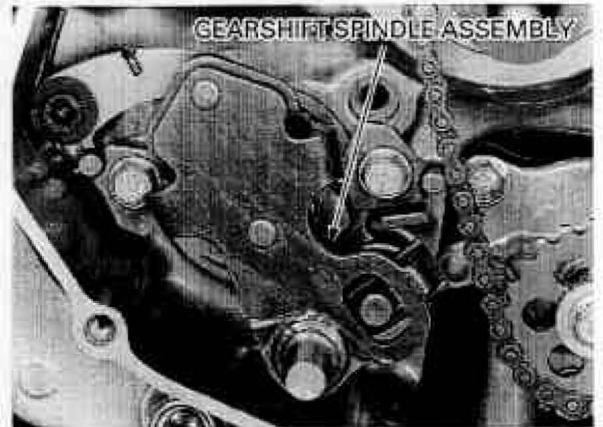
REMOVAL

Disassemble the clutch to the clutch outer (page 9-12).

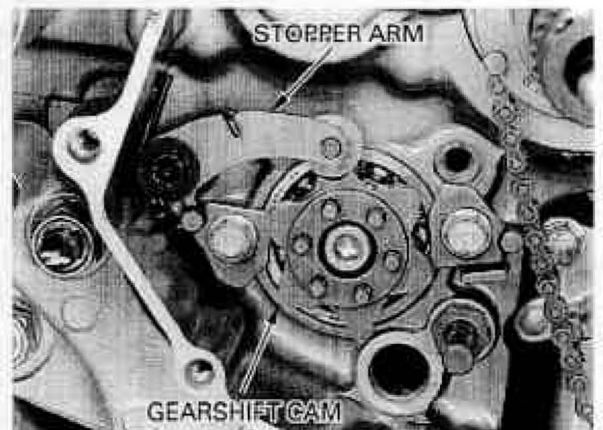
Remove the gearshift arm.



Remove the gearshift spindle assembly and thrust washer.

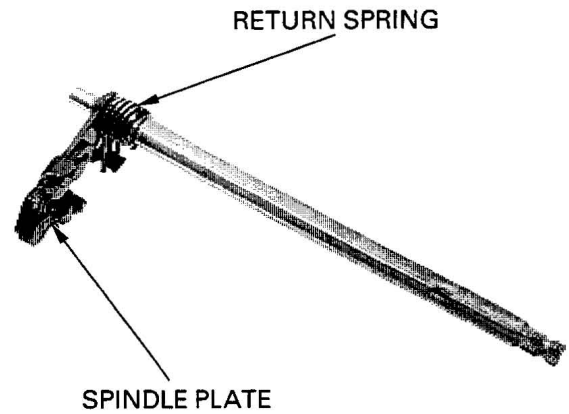


Remove the gearshift cam bolt and gearshift cam.
Remove the dowel pin from the shift drum.
Remove the stopper arm bolt, arm, washer and return spring.



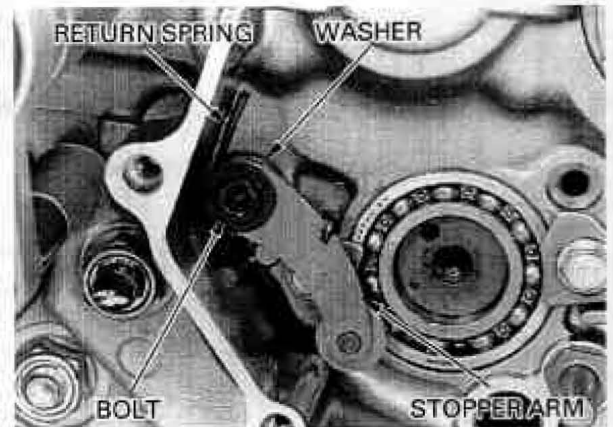
INSPECTION

Check the gearshift spindle for bending.
Check the spindle plate for wear or damage.
Check the spindle return spring for fatigue or damage.

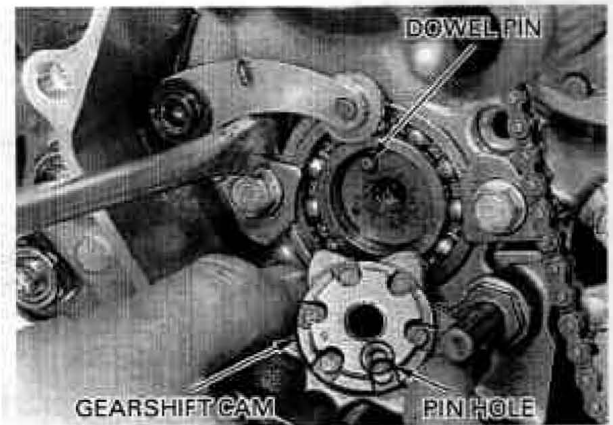


INSTALLATION

Install the washer, return spring, stopper arm and bolt, and tighten the bolt.

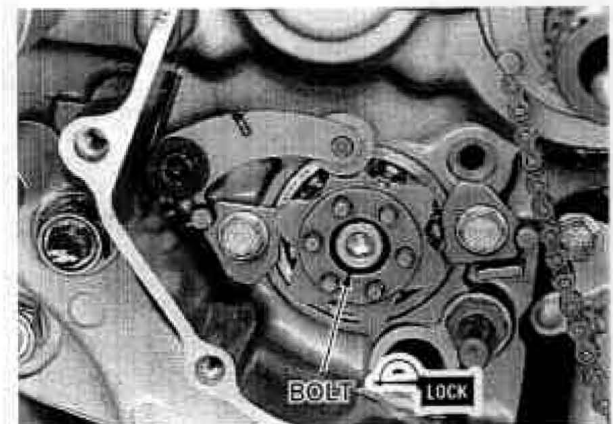


Install the dowel pin into the shift drum.
Lift the stopper arm with a screwdriver and install the gearshift cam by aligning the pin hole in the cam with the dowel pin.



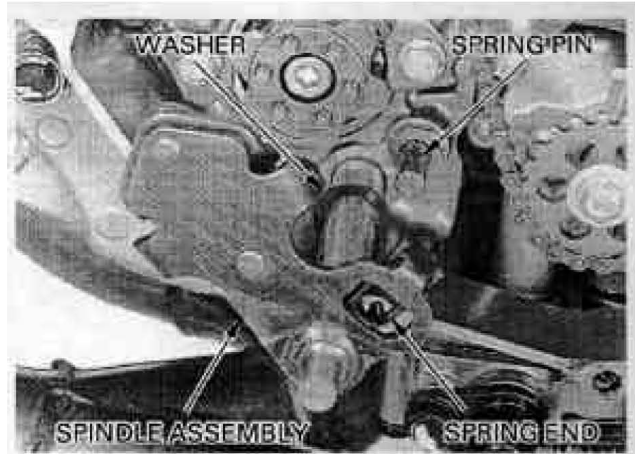
Apply locking agent to the gearshift cam bolt threads.
Install and tighten the bolt.

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



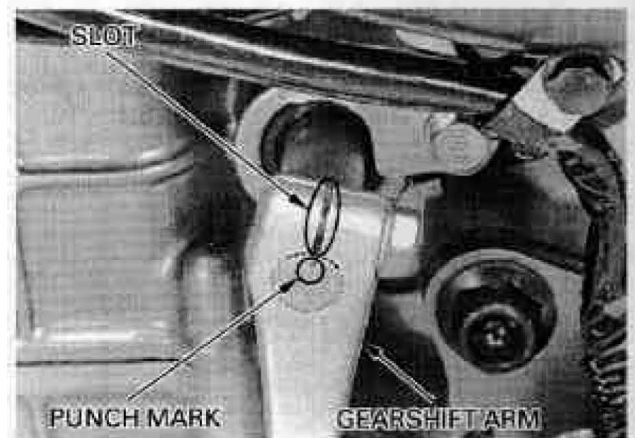
CLUTCH/GEARSHIFT LINKAGE

Install the thrust washer onto the gearshift spindle, and insert the spindle into the crankcase, aligning the return spring ends with the spring pin.



Install the gearshift arm onto the spindle, aligning the slit of the arm with the punch mark on the spindle. Tighten the gearshift arm bolt securely.

Assemble the clutch (page 9-17).



PRIMARY DRIVE GEAR

REMOVAL

Disassemble the clutch to the clutch center thrust washer (page 9-12).

Install the special tool between the primary drive and driven gears as shown, loosen the primary drive gear bolt, and remove the bolt and special washer.

TOOL:

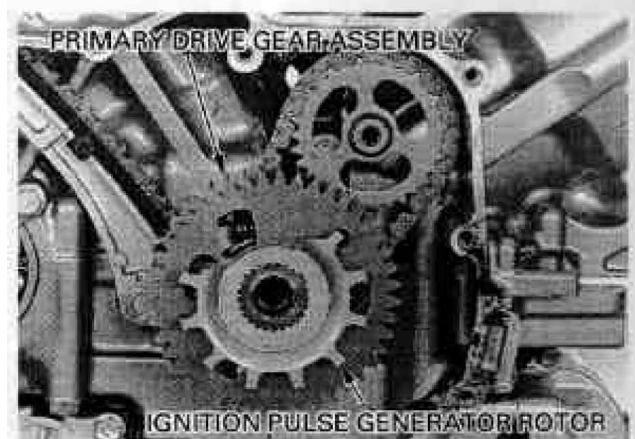
Gear holder

07724-0010100



Remove the clutch outer (page 9-13).

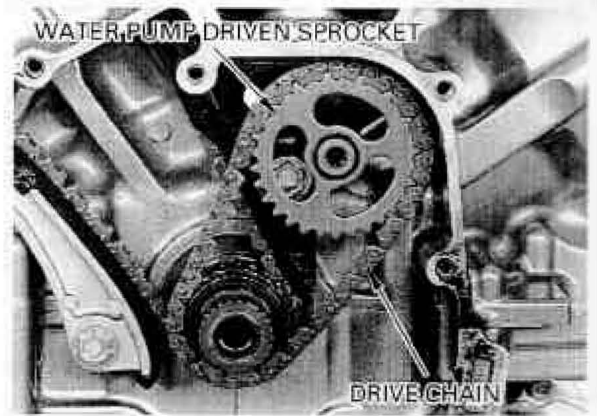
Remove the ignition pulse generator rotor and primary drive gear assembly.



Remove the water pump driven sprocket and drive chain.

INSTALLATION

Apply molybdenum oil solution to the water pump driven sprocket shaft.
 Install the water pump drive chain over the drive and driven sprockets.
 Install the driven sprocket shaft into the crankcase.

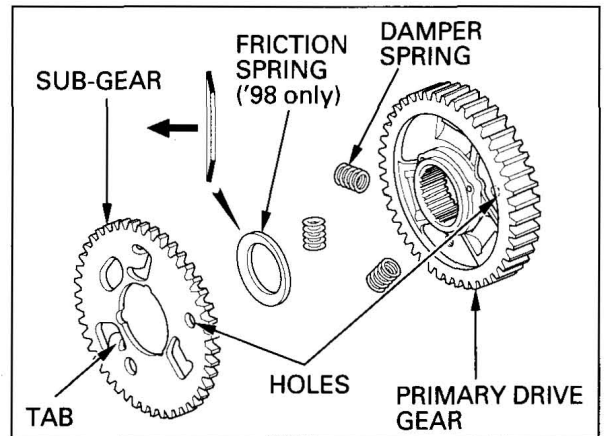


Install the damper springs into the primary drive gear grooves.

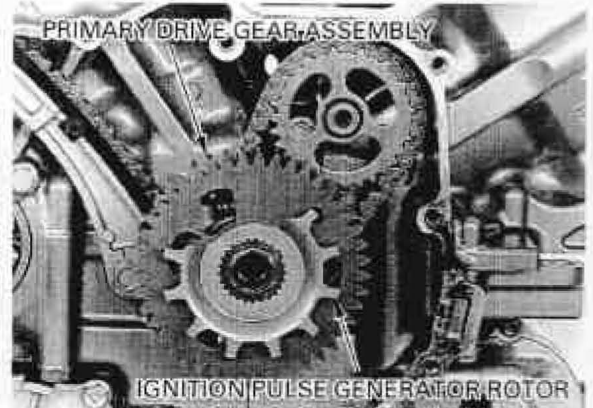
NEW '98 only

Install the friction spring onto the primary drive gear with the concaved side toward the sub-gear.

Apply molybdenum disulfide grease to the primary drive gear and sub-gear sliding surfaces.
 Install the sub-gear onto the primary drive gear boss so that the sub-gear tabs are positioned against the damper spring and holes are aligned.



Install the primary drive gear assembly and ignition pulse generator rotor by aligning the wide grooves with the wide tooth.



Apply oil to the threads and seating surface of the primary drive gear bolt.
 Install the special washer and primary drive gear bolt.

Install the clutch outer (page 9-17).

Install the special tool between the primary drive and driven gears as shown and tighten the primary drive gear bolt.

TOOL:

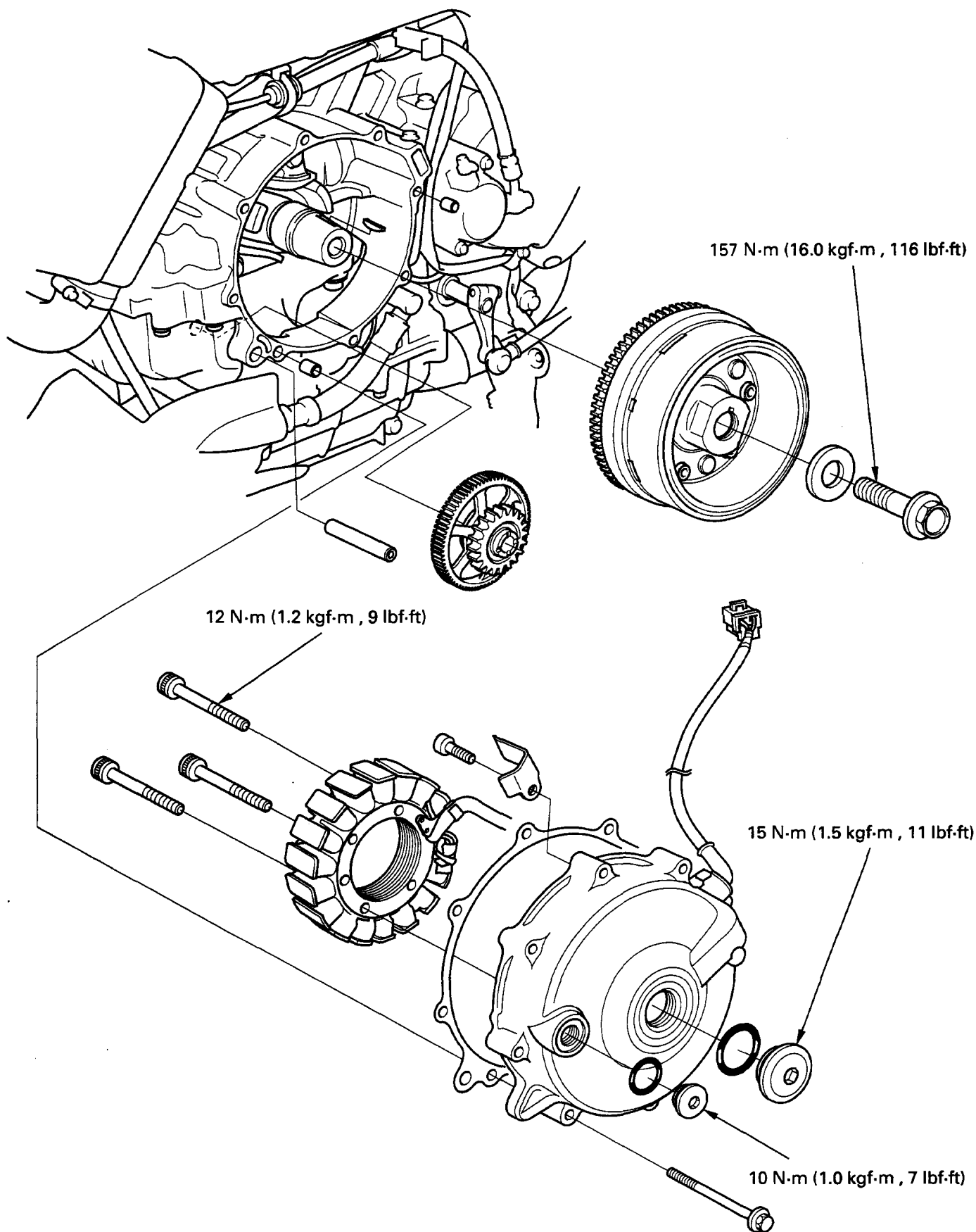
Gear holder 07724-0010100

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

Assemble the clutch (page 9-17).



ALTERNATOR/STARTER CLUTCH



10. ALTERNATOR/STARTER CLUCH

SERVICE INFORMATION	10-1	FLYWHEEL REMOVAL	10-3
TROUBLESHOOTING	10-1	STARTER CLUTCH	10-4
ALTERNATOR STATOR	10-2	FLYWHEEL INSTALLATION	10-7

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.
- The front cylinder cam sprockets must be removed to remove the starter reduction gear.
- Refer to section 16 for alternator stator inspection.
- Refer to section 18 for starter motor servicing.

SPECIFICATION

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.	57.749 – 57.768 (2.2736 – 2.2743)	57.639 (2.2692)

10

TORQUE VALUES

Flywheel bolt	157 N·m (16.0 kgf·m , 116 lbf·ft)	Apply oil to the threads and seating surface.
Starter clutch bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply locking agent to the threads.
Alternator stator bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	

TOOLS

Flywheel holder	07725-0040000
Rotor puller	07733-0020001

TROUBLESHOOTING

Engine does not turn

- Faulty starter clutch
- Damaged starter reduction gear

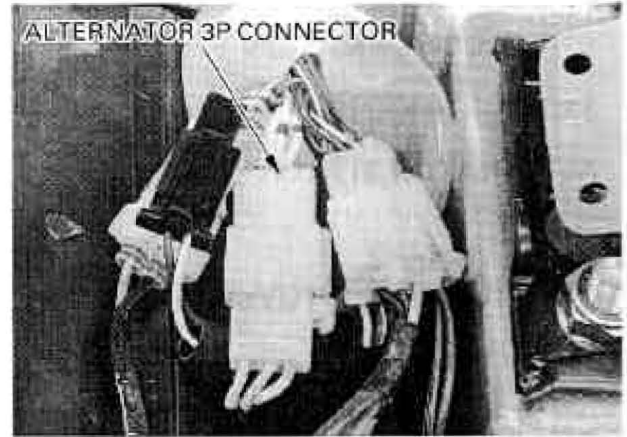
ALTERNATOR STATOR

LEFT CRANKCASE COVER REMOVAL

Remove the following:

- seat (page 2-2)
- front fairing (page 2-3)

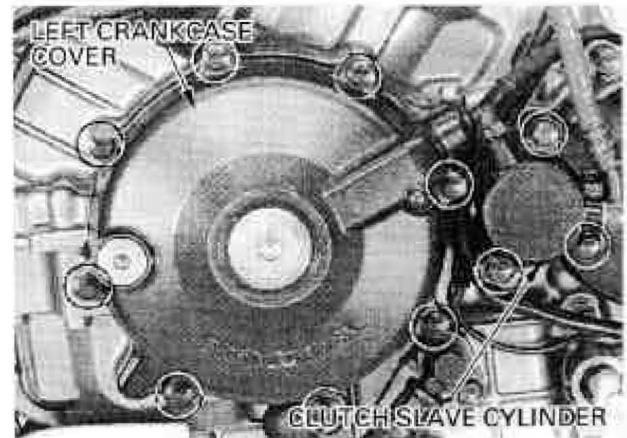
Disconnect the alternator 3P (white) connector.



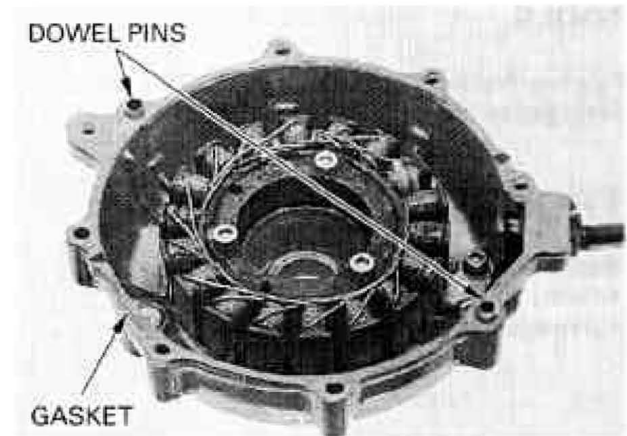
Remove the three bolts and clutch slave cylinder from the drive sprocket cover.

Remove the eight bolts and left crankcase cover.

Temporarily install the clutch slave cylinder.



Remove the dowel pins and gasket.

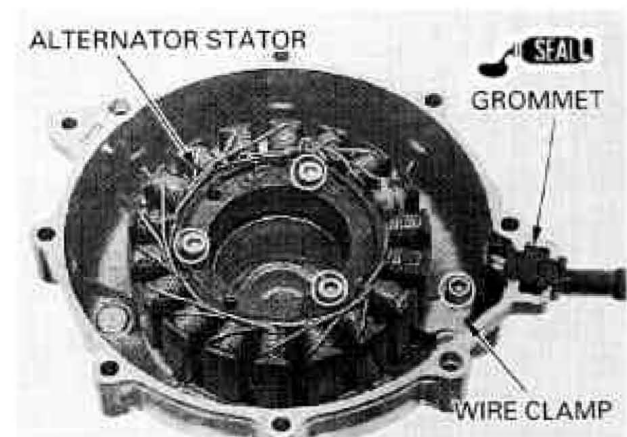


STATOR REPLACEMENT

Remove the four bolts, wire clamp, grommet and stator from the left crankcase cover.

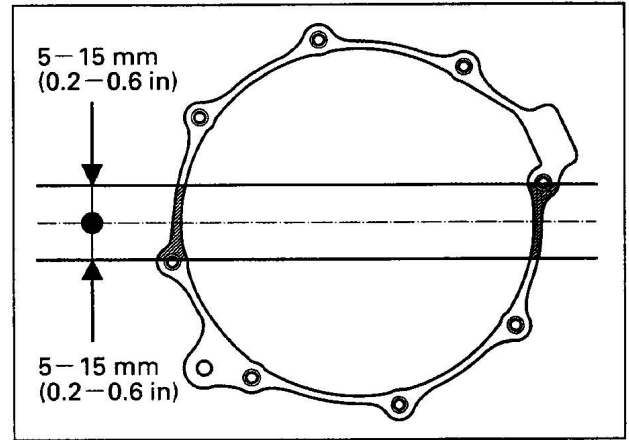
Install a new stator onto the left crankcase cover.
Apply sealant to the grommet seating surface and install it into the cover groove properly.
Install the wire clamp.
Tighten the four bolts.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

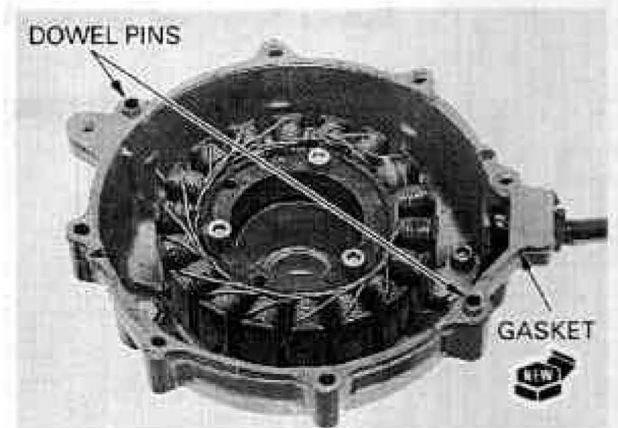


**LEFT CRANKCASE COVER
INSTALLATION**

Apply sealant to the crankcase mating surfaces as shown.



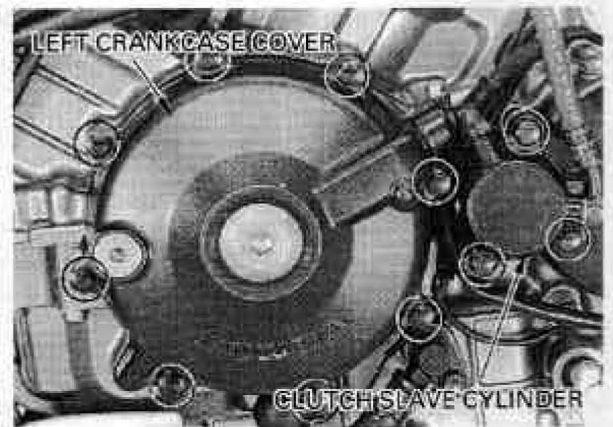
Install the dowel pins and a new gasket.



Remove the three bolts and clutch slave cylinder.

Install the left crankcase cover and tighten the eight bolts securely.

Reinstall the clutch slave cylinder and tighten the three bolts securely.

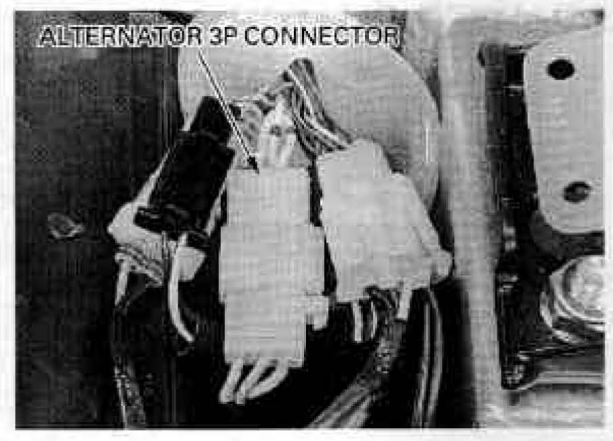


Route the alternator wire properly (page 1-21).

Connect the alternator 3P (white) connector.

- Install the following:
- front fairing (page 2-3)
 - seat (page 2-2)

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



FLYWHEEL REMOVAL

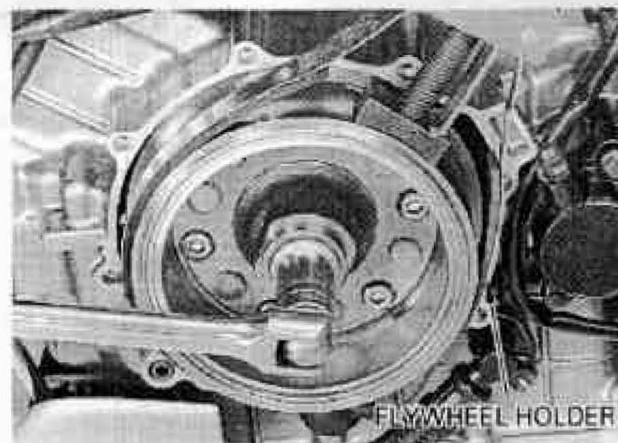
Remove the left crankcase cover (page 10-2).

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

TOOL:

Flywheel holder 07725-0040000

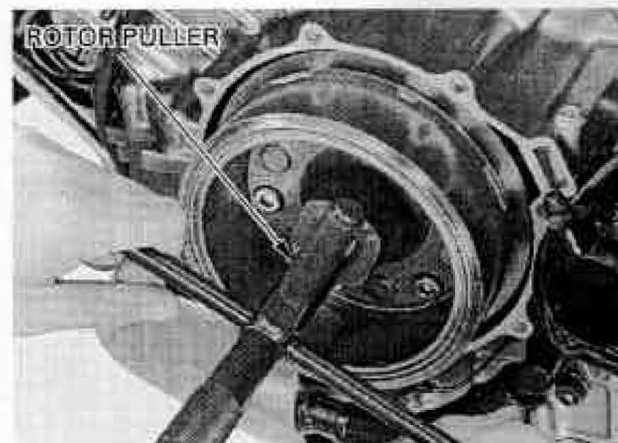
Remove the flywheel bolt and special washer.



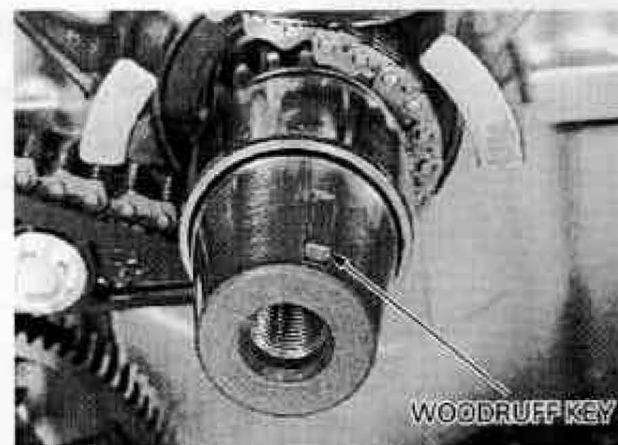
Remove the flywheel using the special tool.

TOOL:

Rotor puller 07733-0020001



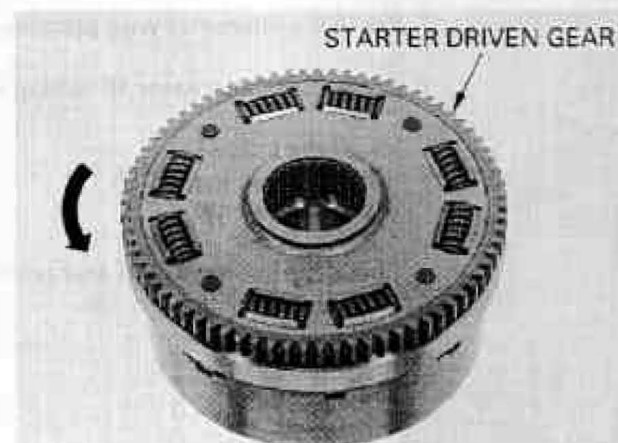
Remove the woodruff key from the crankshaft.



STARTER CLUTCH REMOVAL

Remove the flywheel.

Remove the starter driven gear while turning it counterclockwise.



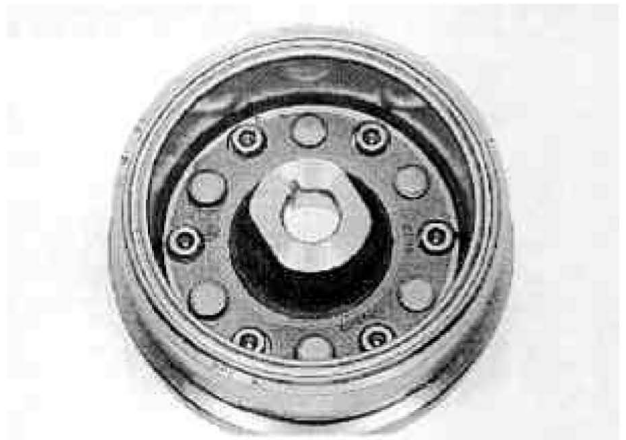
Hold the flywheel with the special tool and remove the starter clutch bolts.

TOOL:

Flywheel holder 07725-0040000

Remove the starter clutch assembly from the flywheel.

Remove the sprag clutch from the starter clutch outer.

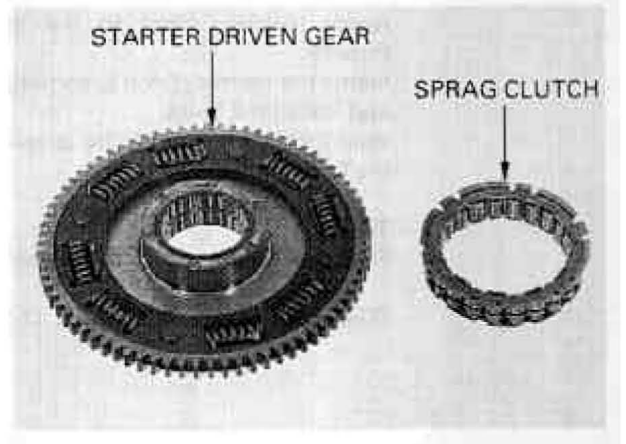


INSPECTION

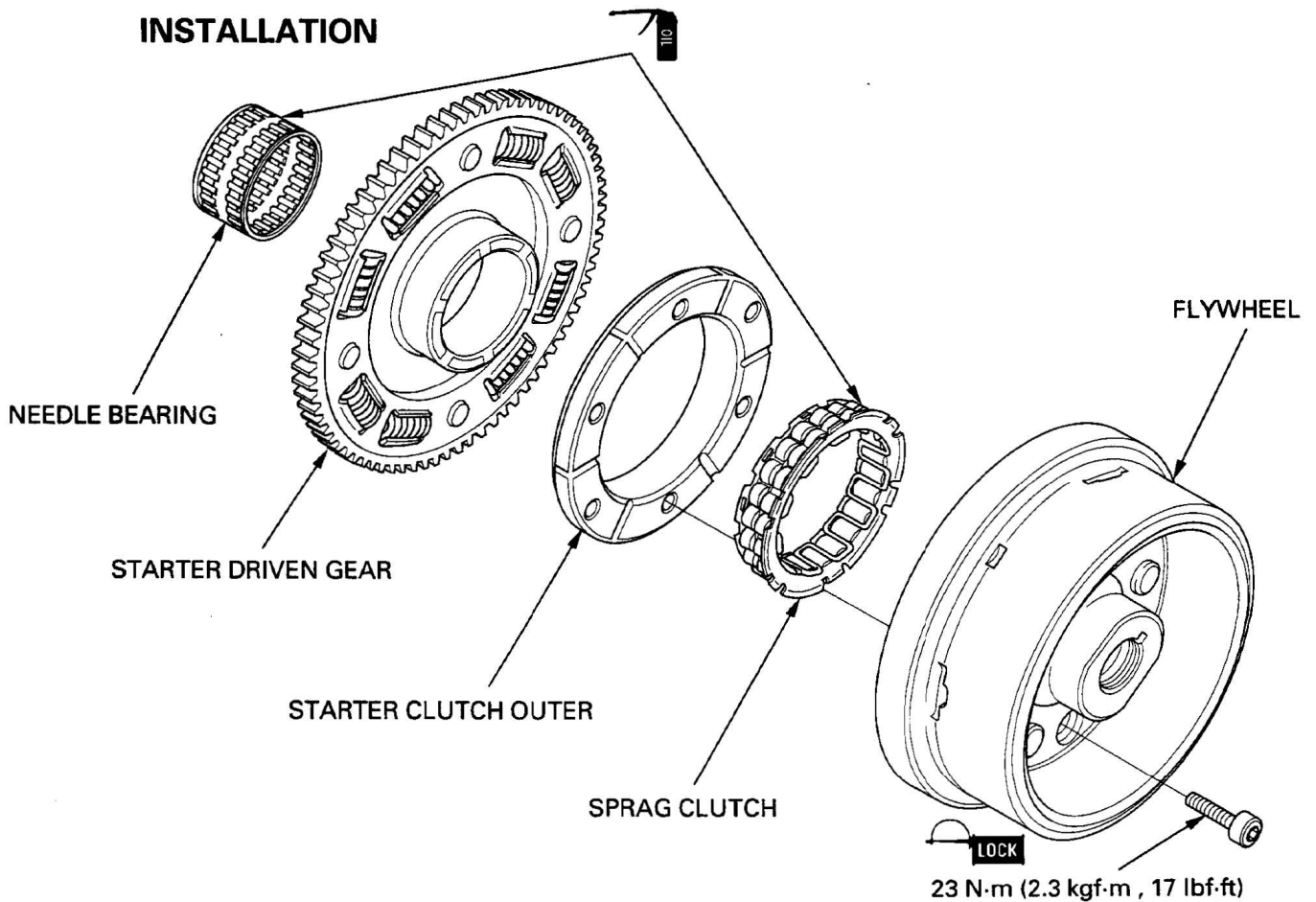
Check the starter driven gear and sprag clutch for abnormal wear or damage.

Measure the starter driven gear O.D.

SERVICE LIMIT: 57.639 mm (2.2692 in)

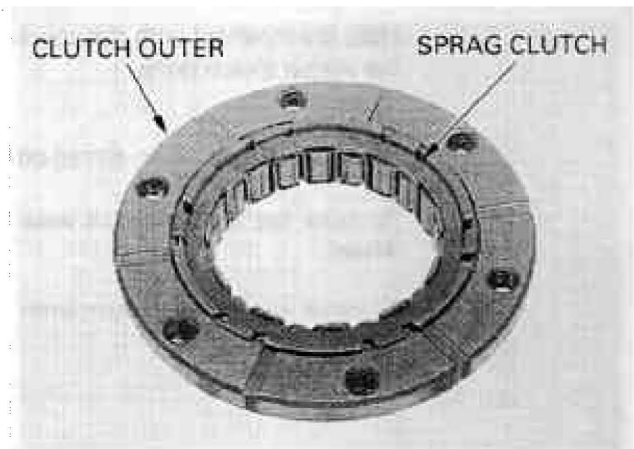


INSTALLATION



ALTERNATOR/STARTER CLUTCH

Install the sprag clutch into the starter clutch outer as shown.



Apply locking agent to the starter clutch bolt threads.

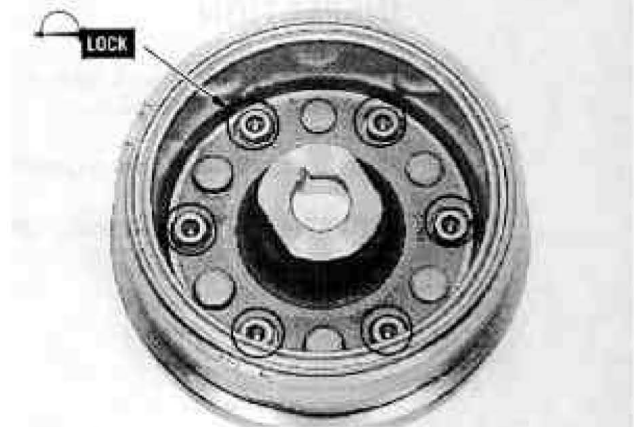
Install the starter clutch assembly onto the flywheel and install the bolts.

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

TOOL:

Flywheel holder 07725-0040000

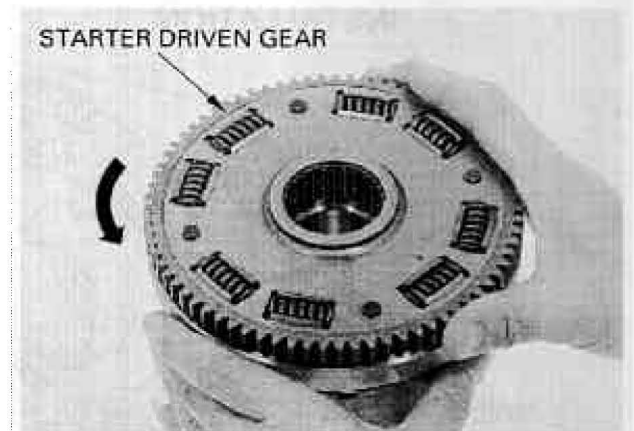
TORQUE: 23 N·m (2.3 kgf·m , 17 lbf·ft)



Install the starter driven gear while turning it counterclockwise.

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

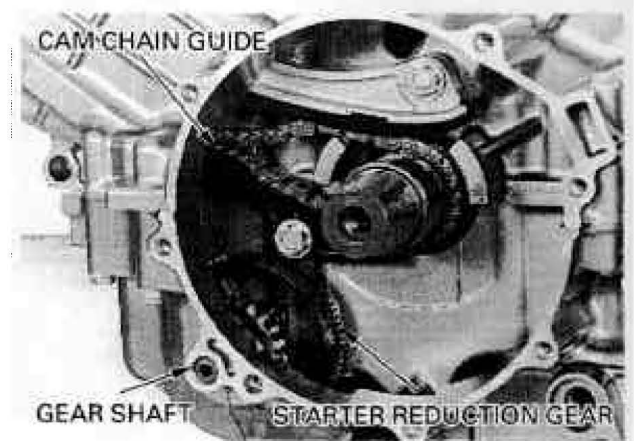
Install the flywheel (page 10-7).



STARTER REDUCTION GEAR

Remove the front cylinder cam sprockets (page 8-4).
Remove the flywheel (page 10-4).

Remove the bolt and cam chain guide.
Pull the starter reduction gear shaft and remove the reduction gear.



Check the starter reduction gear for wear or damage.

Coat the reduction gear shaft with molybdenum oil solution.

Install the starter reduction gear and insert the shaft with the holed end facing out.

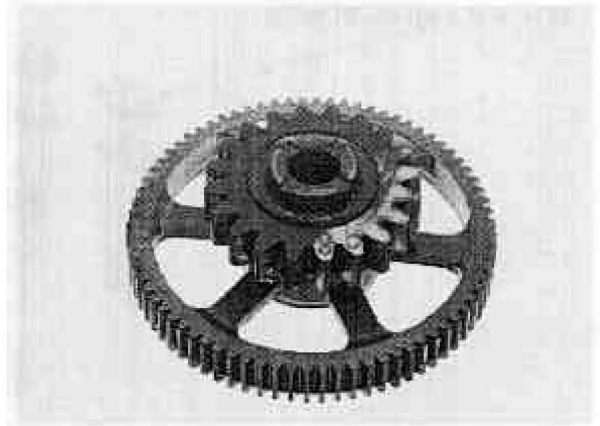
Apply locking agent to the cam chain guide bolt threads.

Install the cam chain guide and tighten the bolt.

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

Install the flywheel (see below).

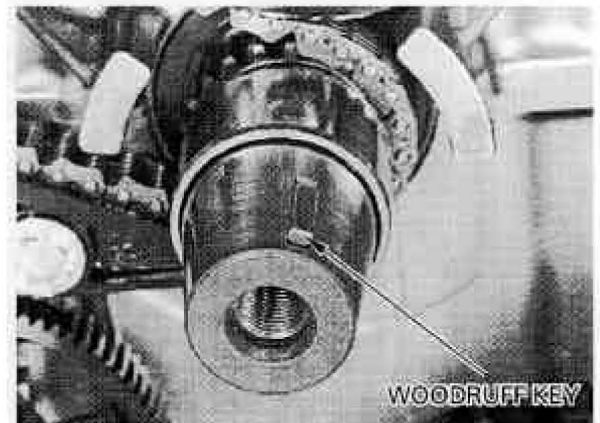
Install the front cylinder cam sprockets (page 8-20).



FLYWHEEL INSTALLATION

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

Install the woodruff key in the crankshaft key groove.

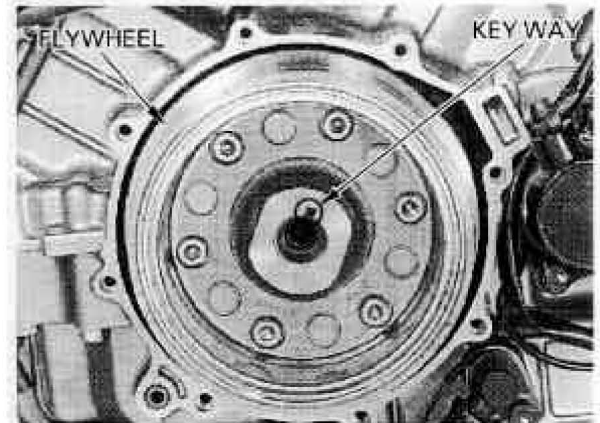


Apply oil to the needle bearing in the starter driven gear.

Install the flywheel on the crankshaft, aligning the key way with the woodruff key, and mesh the starter driven and reduction gears.

If necessary, remove the starter motor and check that the starter driven and reduction gears are meshed by turning the reduction gear.

The reduction gear should turn clockwise and not turn counterclockwise as viewed from starter motor side.

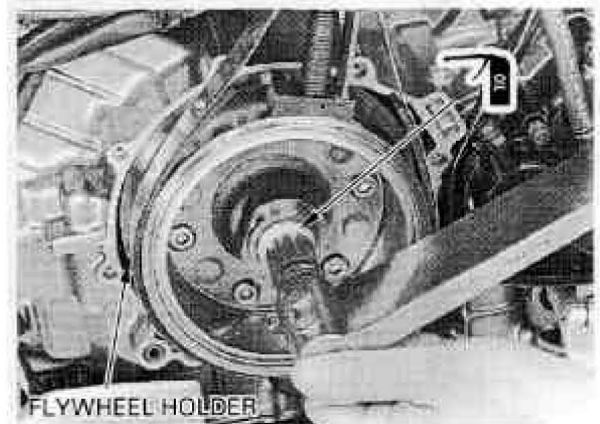


Apply oil to the flywheel bolt threads and seating surface and install the special washer and bolt. Hold the flywheel with the special tool and tighten the bolt.

TOOL:
Flywheel holder 07725-0040000

TORQUE: 157 N·m (16.0 kgf·m , 116 lbf·ft)

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



CRANKCASE/TRANSMISSION

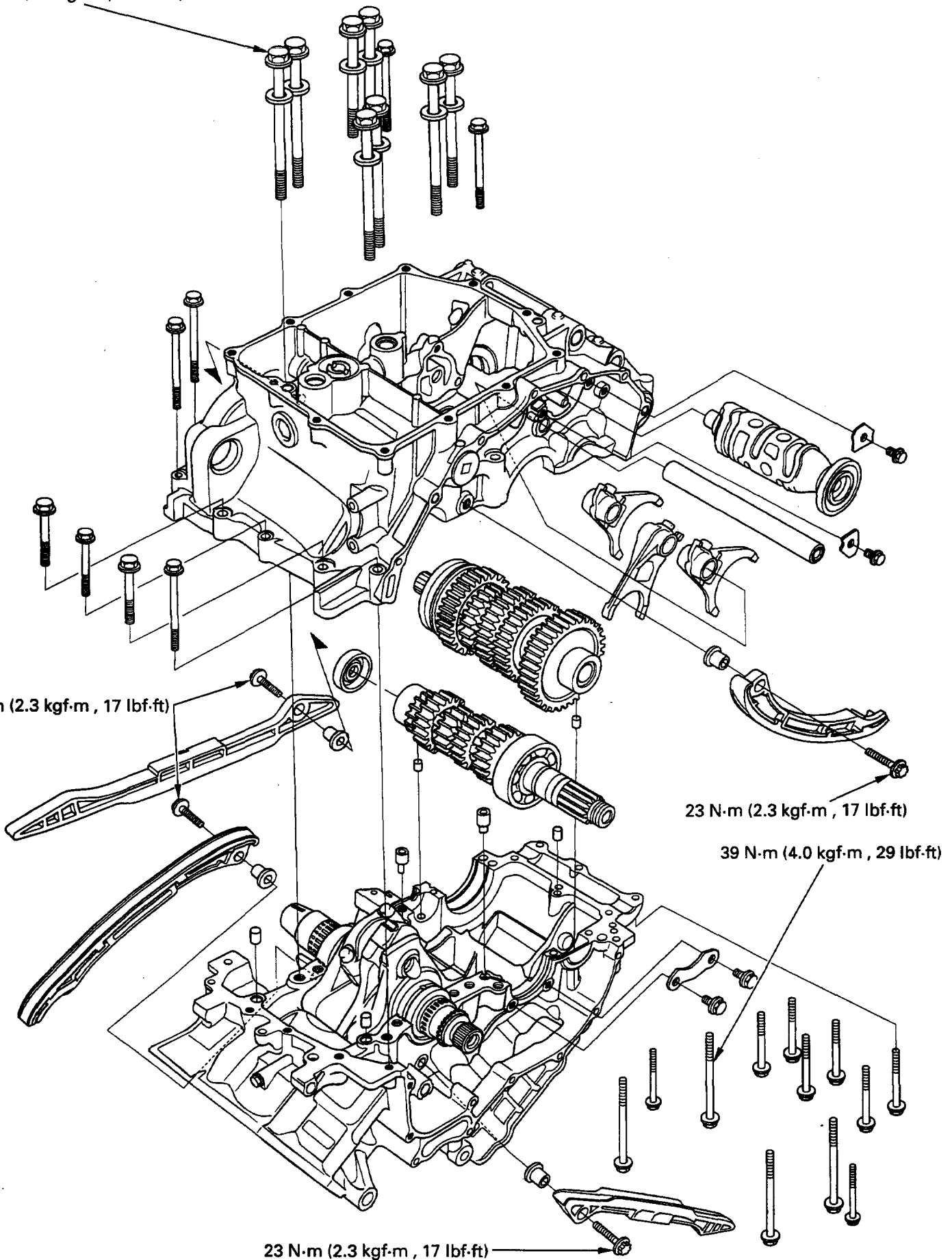
42 N·m (4.3 kgf·m , 31 lbf·ft)

23 N·m (2.3 kgf·m , 17 lbf·ft)

23 N·m (2.3 kgf·m , 17 lbf·ft)

39 N·m (4.0 kgf·m , 29 lbf·ft)

23 N·m (2.3 kgf·m , 17 lbf·ft)



11. CRANKCASE/TRANSMISSION

SERVICE INFORMATION	11-1	SHIFT FORK/SHIFT DRUM	11-4
TROUBLESHOOTING	11-2	TRANSMISSION	11-6
CRANKCASE SEPARATION	11-3	CRANKCASE ASSEMBLY	11-10

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the following:
 - transmission
 - crankshaft (section 12)
 - piston/connecting rod (section 12)
- Be careful not to damage the crankcase mating surfaces when servicing.
- Prior to assembling the crankcase halves, apply sealant to their mating surfaces. Wipe off excess sealant thoroughly.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Shift fork	I. D.	12.000–12.021 (0.4724–0.4733)	12.03 (0.474)
	Claw thickness	5.93–6.00 (0.233–0.236)	5.9 (0.23)
Shift fork shaft	O. D.	11.957–11.968 (0.4707–0.4712)	11.95 (0.470)
Transmission	Gear I. D.	M5, M6	31.000–31.016 (1.2205–1.2211)
		C2, C3, C4	33.000–33.025 (1.2992–1.3002)
	Gear bushing O. D.	M5, M6	30.955–30.980 (1.2187–1.2197)
		C2, C3, C4	32.955–32.980 (1.2974–1.2984)
	Gear-to-bushing clearance	M5, M6	0.020–0.061 (0.0008–0.0024)
		C2, C3, C4	0.020–0.070 (0.0008–0.0028)
	Gear bushing I. D.	M5	27.985–28.006 (1.1018–1.1026)
		C2	29.985–30.006 (1.1805–1.1813)
	Mainshaft O. D.	at M5	27.967–27.980 (1.1011–1.1016)
	Countershaft O. D.	at C2	29.950–29.975 (1.1791–1.1801)
Bushing-to-shaft clearance	M5	0.005–0.039 (0.0002–0.0015)	
	C2	0.010–0.056 (0.0004–0.0022)	

11

TORQUE VALUES

Cam chain tensioner bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply locking agent to the threads.
Cam chain guide bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply locking agent to the threads.
Crankcase 10 mm flange bolt	39 N·m (4.0 kgf·m , 29 lbf·ft)	
Crankcase 10 mm special bolt	42 N·m (4.3 kgf·m , 31 lbf·ft)	Apply oil to the threads and seating surface.

TOOLS

Inner driver C	07746-0030100
Attachment, 35 mm I. D.	07746-0030400

TROUBLESHOOTING

Hard to shift

- Improper clutch operation (section 9)
- Incorrect engine oil weight
- Bent shift forks
- Bent shift fork shaft
- Bent shift fork claw
- Damaged shift drum cam grooves
- Bent gearshift spindle

Transmission jumps out of gear

- Worn gear dogs
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Worn or bent shift forks
- Broken drum stopper arm spring
- Broken gearshift spindle return spring

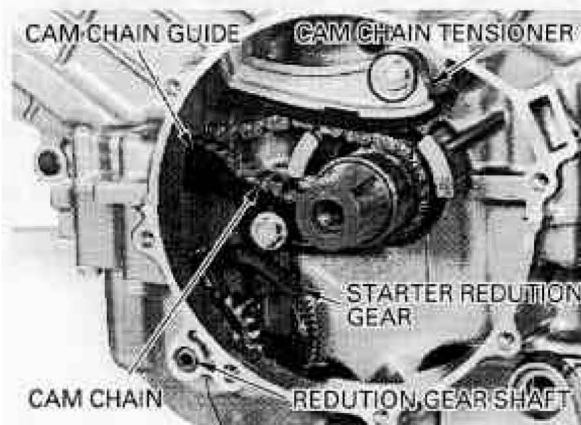
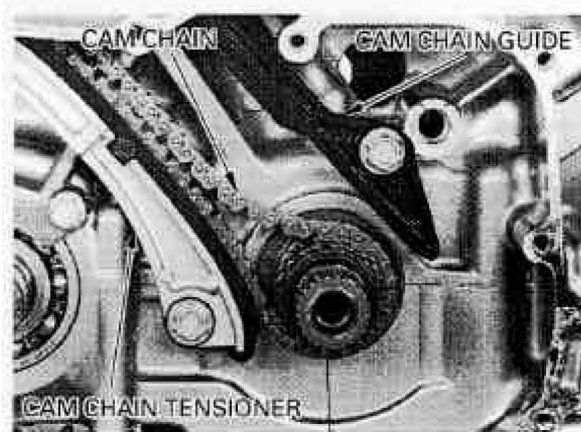
Excessive engine noise

- Worn or damaged transmission gears
- Worn or damaged transmission bearings

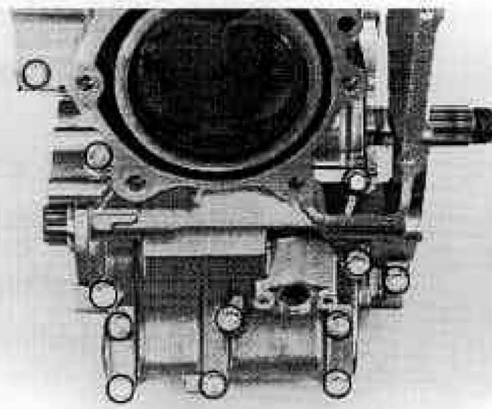
CRANKCASE SEPARATION

Remove the following:

- engine (section 7)
- cylinder head (section 8)
- clutch, gearshift linkage, primary drive gear (section 9)
- flywheel (section 10)
- starter motor (section 18)
- oil pump (section 4)
- cam chain tensioners
- cam chain guides
- starter reduction gear and shaft
- cam chains

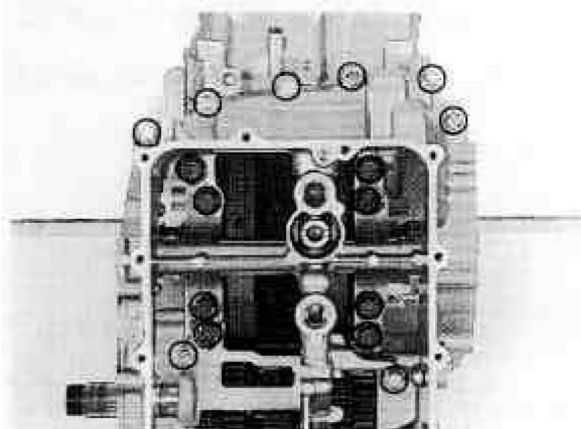


Loosen the two 6 mm bolts, nine 8 mm bolts and 10 mm bolt in a crisscross pattern in 2 or 3 steps and remove them from the upper crankcase.



Place the engine with the upper side down. Loosen the two 6 mm bolts, six 8 mm bolts and eight 10 mm bolt in a crisscross pattern in 2 or 3 steps and remove them from the lower crankcase.

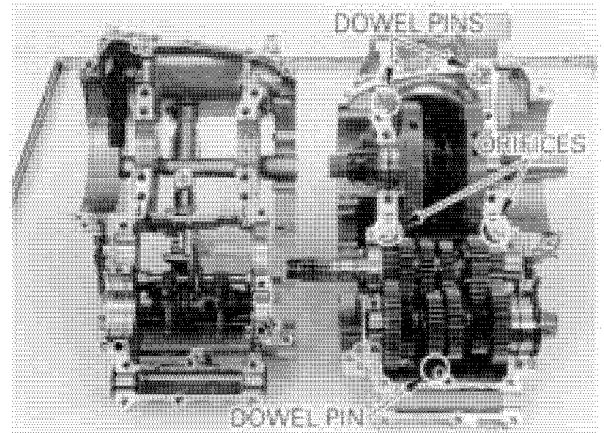
Separate the lower crankcase from the upper crankcase.



NEW

Remove the dowel pins and oil orifices.

Clean any sealant from the crankcase mating surfaces.



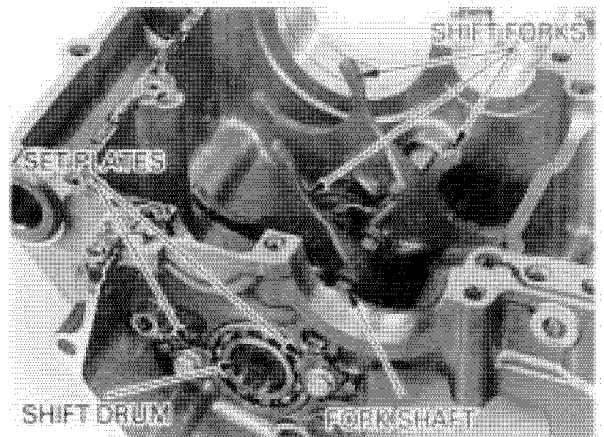
SHIFT FORK/SHIFT DRUM

REMOVAL

Separate the crankcase halves (page 11-3).

Remove the shift fork shaft set plate, shift fork shaft and shift forks.

Remove the shift drum bearing set plate and shift drum.



INSPECTION

Check the shift fork guide pins for abnormal wear or damage.

Measure the shift fork I. D.

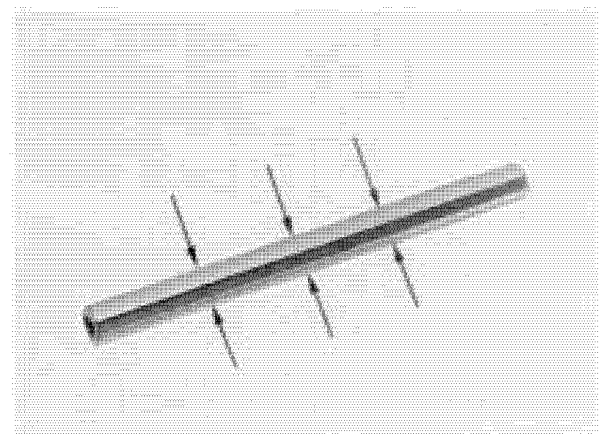
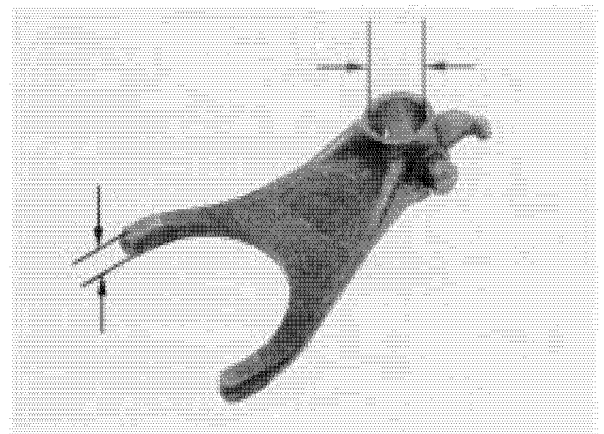
SERVICE LIMIT: 12.03 mm (0.474 in)

Measure the shift fork claw thickness.

SERVICE LIMIT: 5.9 mm (0.23 in)

Measure the shift fork shaft O.D.

SERVICE LIMIT: 11.95 mm (0.470 in)



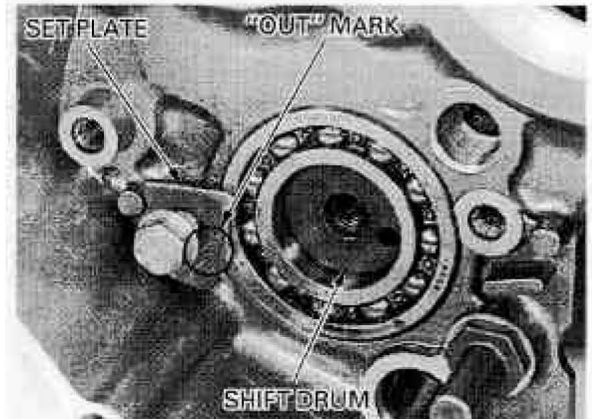
Check the shift drum guide groove for abnormal wear or damage.

Check the shift drum bearings for smooth rotation.



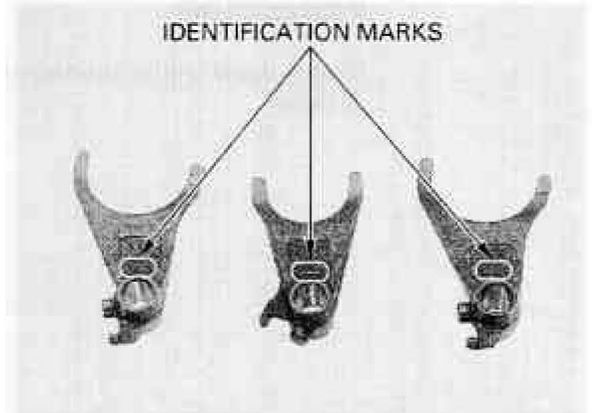
INSTALLATION

Apply locking agent to the set plate bolt threads.
Install the shift drum and bearing set plate with the "OUT" mark facing out, and its cutout aligned with the pin on the crankcase.
Install and tighten the set plate bolt.



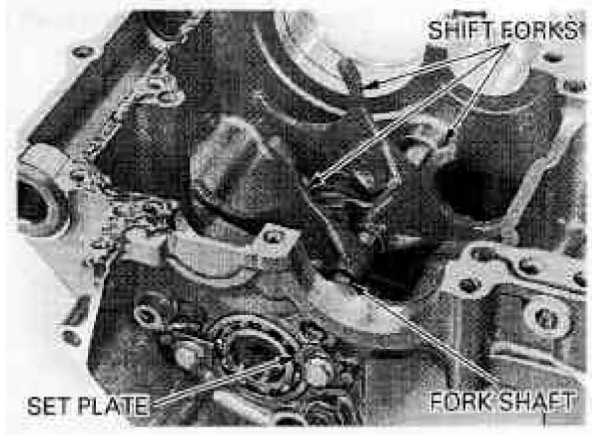
The shift forks have the following identification marks:

RL: right and left shift forks
C: center shift fork



Install the shift forks into the shift drum guide groove with the identification marks facing toward the right side of the engine and insert the fork shaft.
Install the set plate in the same manner as that of the shift drum.

Assemble the crankcase halves (page 11-10).

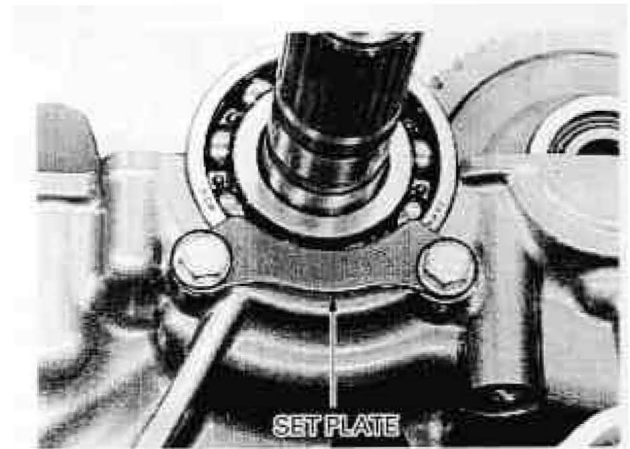


TRANSMISSION

DISASSEMBLY

Separate the crankcase halves (page 11-3).

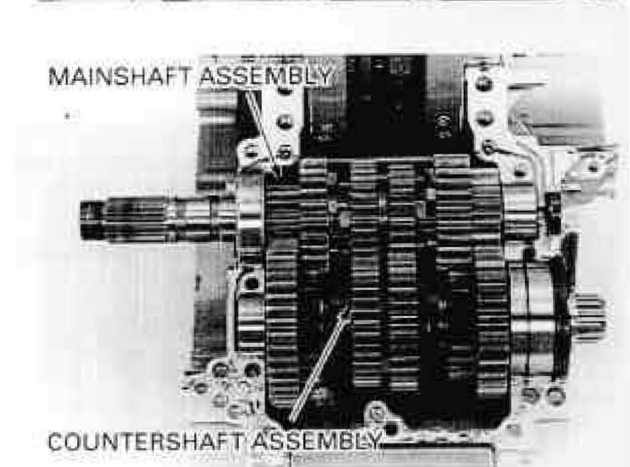
Remove the mainshaft bearing set plate.



Remove the mainshaft and countershaft assemblies.

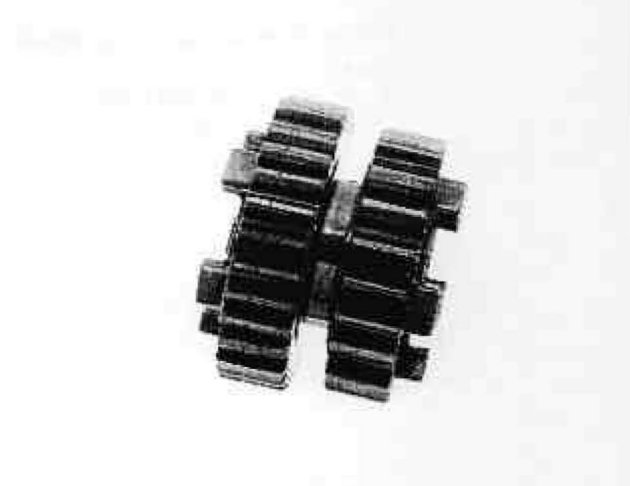
Disassemble the mainshaft and countershaft.

Clean all disassembled parts in solvent thoroughly.



INSPECTION

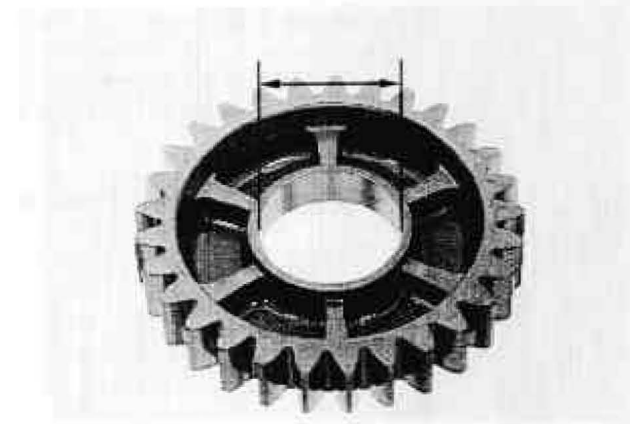
Check the gear shifter groove for abnormal wear or damage.



Check the gear dogs and teeth for abnormal wear or damage.

Measure the gear I.D.

SERVICE LIMITS: M5, M6: 31.04 mm (1.222 in)
C2, C3, C4: 33.05 mm (1.301 in)



Measure the gear bushing O. D.

SERVICE LIMITS: M5, M6: 30.93 mm (1.218 in)
C2, C3, C4: 32.93 mm (1.296 in)

Calculate the gear-to-bushing clearance.

SERVICE LIMITS: M5, M6: 0.10 mm (0.004 in)
C2, C3, C4: 0.11 mm (0.004 in)

Measure the gear bushing I. D.

SERVICE LIMITS: M5: 28.02 mm (1.103 in)
C2: 30.02 mm (1.182 in)

Check the mainshaft and countershaft for abnormal wear or damage.

Measure the mainshaft O. D. at the M5 gear.

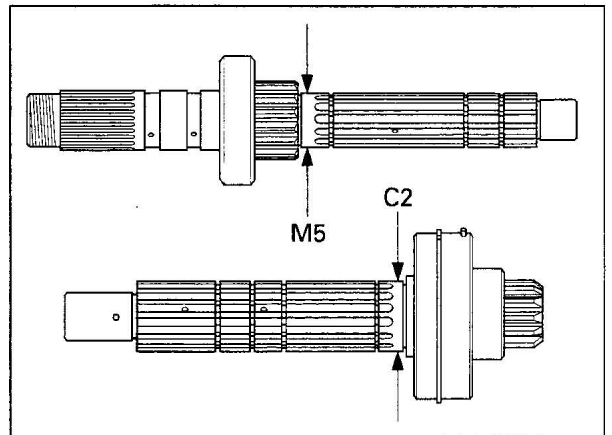
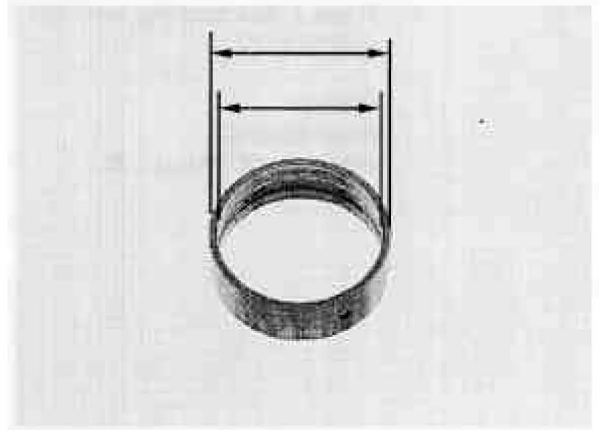
SERVICE LIMIT: 27.94 mm (1.100 in)

Measure the countershaft O. D. at the C2 gear.

SERVICE LIMIT: 29.92 mm (1.178 in)

Calculate the gear bushing-to-shaft clearance.

SERVICE LIMIT: 0.06 mm (0.002 in)

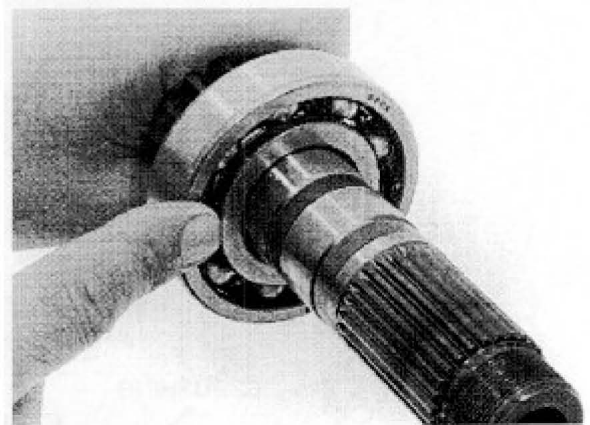


Turn the bearing outer race with your finger. The bearing should turn smoothly and quietly. Also check that the bearing inner race fits tightly on the shaft.

Replace the bearing if the outer race does not turn smoothly, quietly, or if the inner race fit loosely on the shaft.

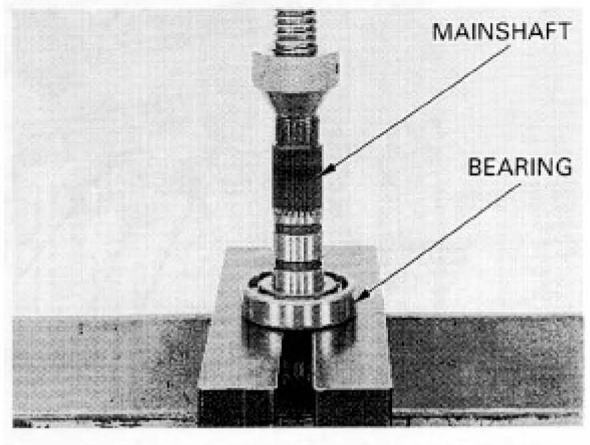
NOTE:

The countershaft bearing cannot be replaced. If the countershaft bearing is faulty, replace the countershaft.



MAINSHAFT BEARING REPLACEMENT

Press the mainshaft out of the bearing.



CRANKCASE/TRANSMISSION

Press a new bearing onto the mainshaft with the special tools.

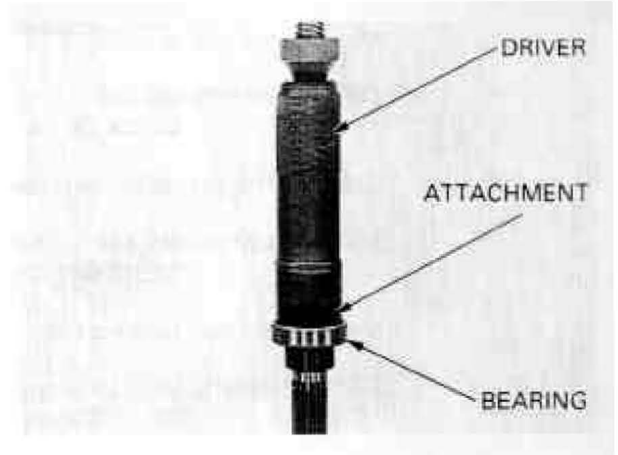
TOOLS:

Inner driver C

07746-0030100

Attachment, 35 mm I. D.

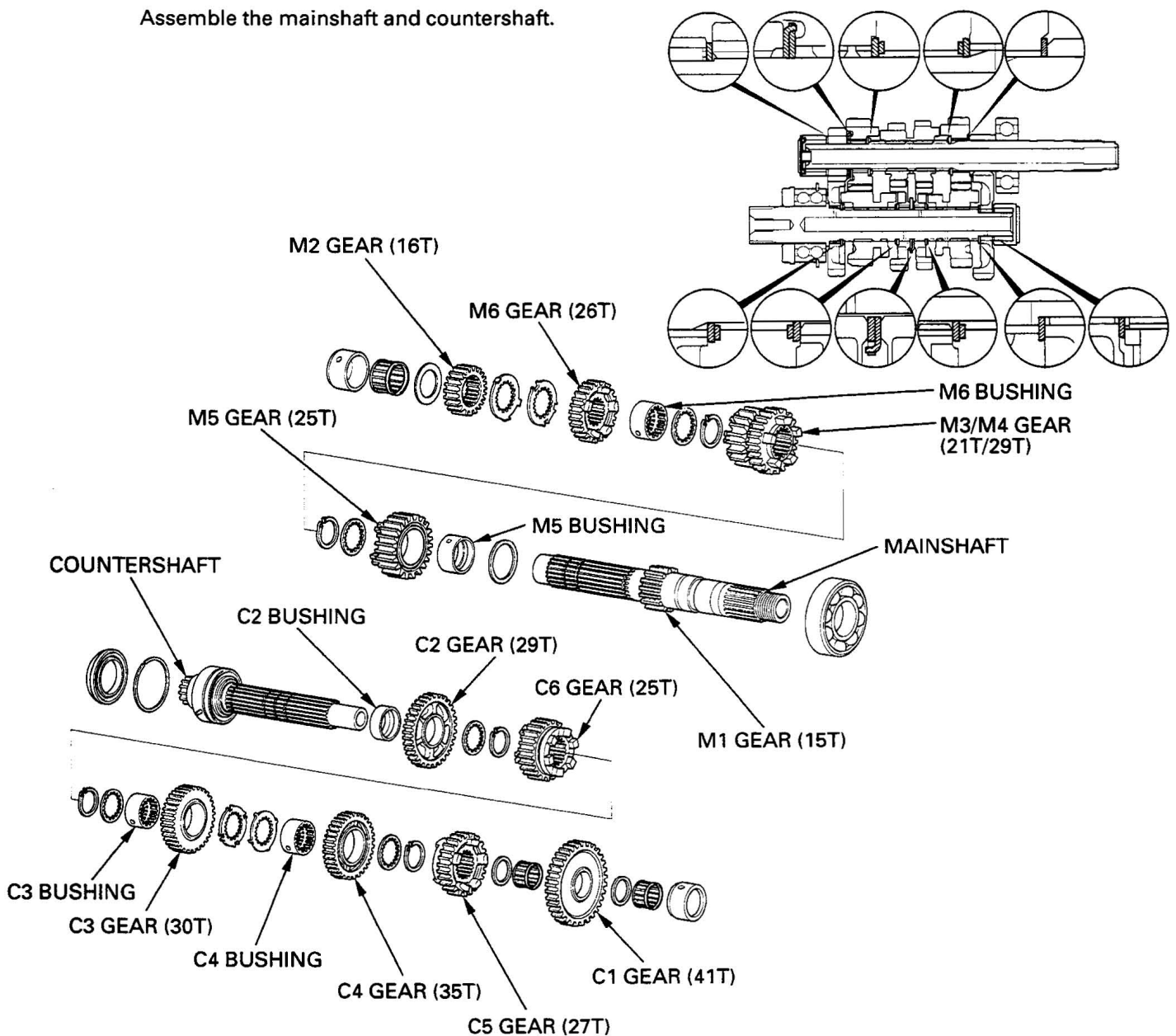
07746-0030400



ASSEMBLY

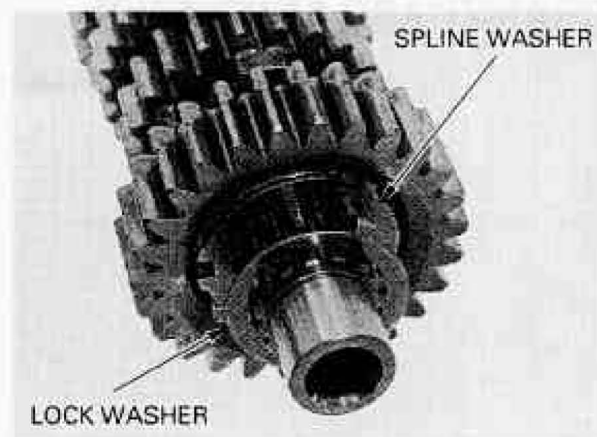
Apply molybdenum oil solution to the gear teeth, sliding surface, shifter grooves and bushings.

Assemble the mainshaft and countershaft.

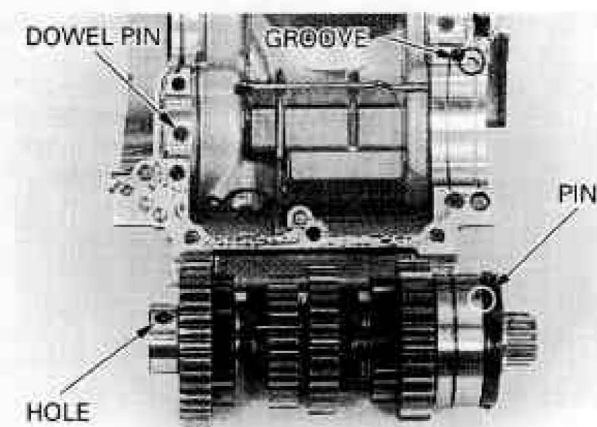


NOTE:

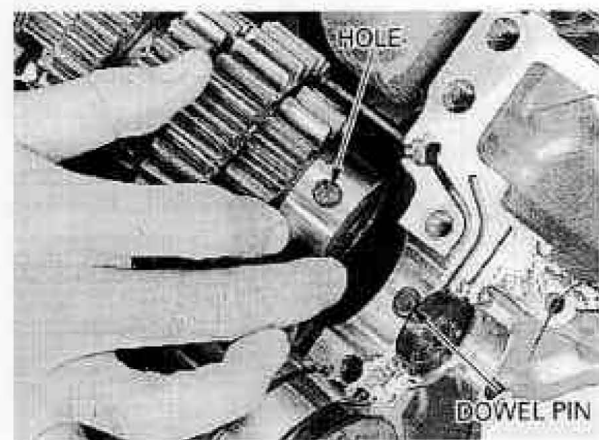
- Align the lock washer tabs with the spline washer grooves.
- Always install the thrust washer and snap ring with the chamfered (rolled) edge facing away from the thrust load.
- Install the snap ring so that its end gap aligns with the groove in the splines.
- Make sure that the snap ring is fully seated in the shaft groove after installing it.



Install the countershaft assembly, aligning the hole in the needle bearing outer race with the dowel pin, and the set ring with the ring groove. Rest the pin on the ball bearing into the pin groove.

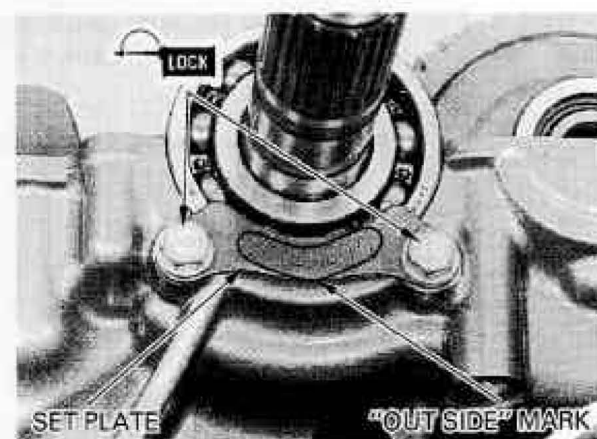


Install the mainshaft assembly, aligning the hole in the needle bearing outer race with the dowel pin.



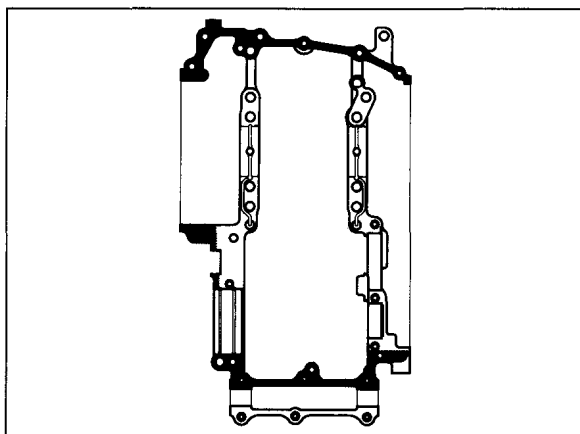
Apply locking agent to the set plate bolt threads. Install the mainshaft bearing set plate with the "OUT SIDE" mark facing out and tighten the bolts.

Assemble the crankcase halves (page 11-10).



CRANKCASE ASSEMBLY

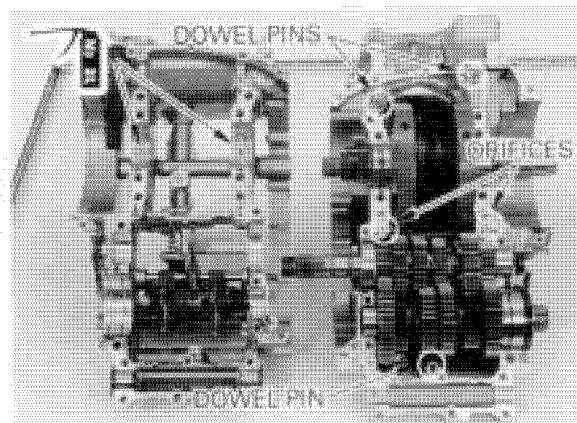
Apply sealant to the crankcase mating surfaces as shown.



NEW

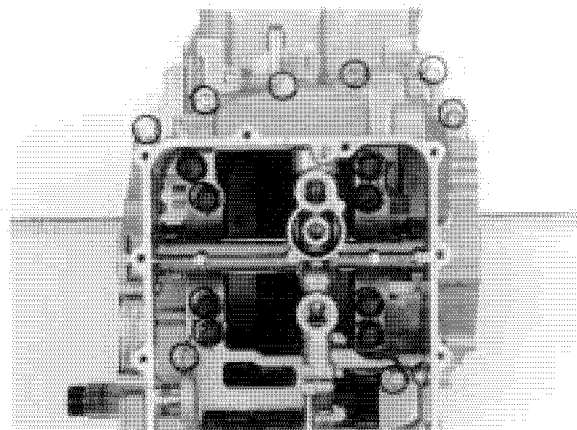
Install the dowel pins and oil orifices.

Apply molybdenum oil solution to the main journal bearing surfaces on the lower crankcase. Install the lower crankcase onto the upper crankcase, aligning the shift forks with the gear shifter grooves.



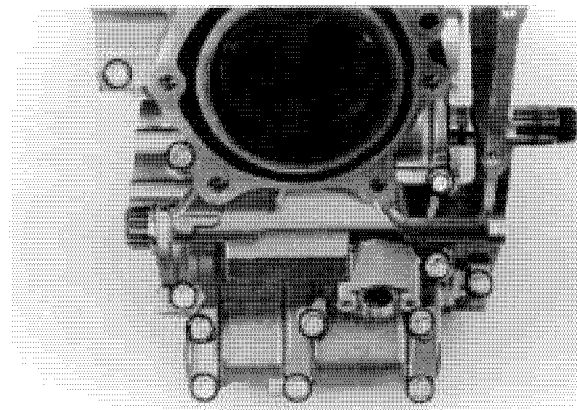
Apply oil to the 10 mm special bolt threads and seating surfaces. Install the eight 10 mm bolt, six 8 mm bolts and two 6 mm bolts, and tighten them in a crisscross pattern in 2 or 3 steps.

TORQUE: 10 mm bolt : 42 N·m (4.3 kgf·m , 31 lbf·ft)



Install the 10 mm bolt, nine 8 mm bolts and two 6 mm bolts, and tighten them in a crisscross pattern in 2 or 3 steps.

TORQUE: 10 mm bolt : 39 N·m (4.0 kgf·m , 29 lbf·ft)



Coat the reduction gear shaft with molybdenum oil solution.

Install the starter reduction gear and insert the shaft with the holed end facing out.

Install the cam chains.

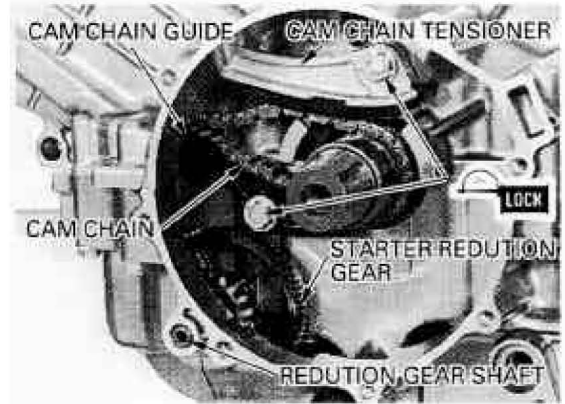
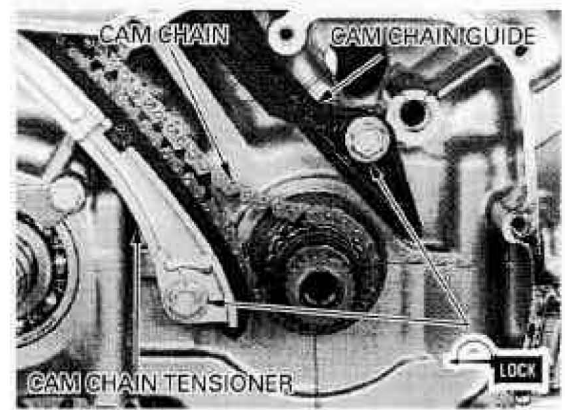
Apply locking agent to the threads of the cam chain tensioner and guide bolts.

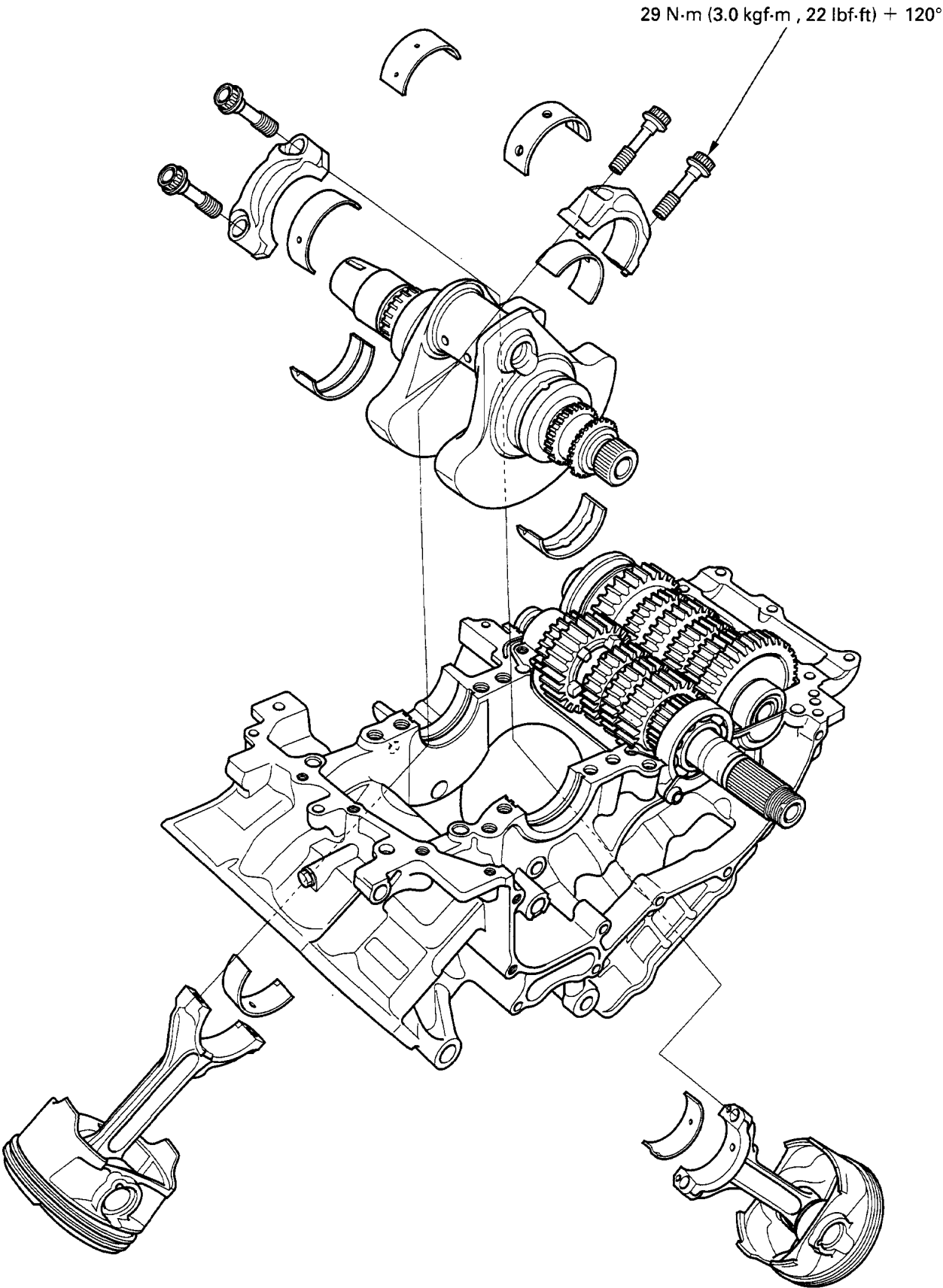
Install the cam chain tensioners and guides, and tighten the bolts.

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

Install the following:

- oil pump (section 4)
- starter motor (section 18)
- flywheel (section 10)
- clutch, gearshift linkage, primary drive gear (section 9)
- cylinder head (section 8)
- engine (section 7)





12. CRANKSHAFT/PISTON/CYLINDER

SERVICE INFORMATION	12-1	MAIN JOURNAL BEARING	12-4
TROUBLESHOOTING	12-2	CRANKPIN BEARING	12-6
CRANKSHAFT	12-3	PISTON/CYLINDER	12-8

SERVICE INFORMATION

GENERAL

- The crankcase must be separated to service the crankshaft and piston connecting rod. Refer to section 11 for crankcase separation and assembly.
- Mark and store the connecting rods, bearing caps and bearing inserts to be sure of their correct locations for reassembly.
- The crankpin and main journal bearing inserts are select fit and are identified by color codes. Select replacement bearings from the code tables. After selecting new bearings, recheck the oil clearance with a plastigauge. Incorrect oil clearance can cause major engine damage.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Crankshaft	Connecting rod side clearance	0.10–0.30 (0.004–0.012)	0.40 (0.016)	
	Crankpin bearing oil clearance	0.032–0.050 (0.0013–0.0020)	0.060 (0.0024)	
	Main journal bearing oil clearance	0.020–0.038 (0.0008–0.0015)	0.048 (0.0019)	
	Runout	—————	0.10 (0.004)	
Piston, piston pin, piston ring	Piston O. D. at 10 (0.4) from bottom	97.965–97.985 (3.8569–3.8577)	97.900 (3.8543)	
	Piston pin hole I. D.	24.002–24.008 (0.9450–0.9452)	24.03 (0.946)	
	Piston pin O. D.	23.994–24.000 (0.9446–0.9449)	23.984 (0.9443)	
	Piston-to-piston pin clearance	0.002–0.014 (0.0001–0.0006)	0.046 (0.0018)	
	Piston ring end gap	Top	0.25–0.40 (0.010–0.016)	0.55 (0.022)
		Second	0.40–0.55 (0.016–0.022)	0.70 (0.028)
		Oil (side rail)	0.20–0.70 (0.008–0.028)	0.90 (0.035)
Piston ring-to-ring groove clearance	Top	0.065–0.100 (0.0026–0.0039)	0.115 (0.0045)	
	Second	0.035–0.070 (0.0014–0.0028)	0.085 (0.0033)	
Cylinder	I. D.	98.005–98.025 (3.8585–3.8592)	98.100 (3.8622)	
	Out of round	—————	0.10 (0.004)	
	Taper	—————	0.10 (0.004)	
	Warpage	—————	0.05 (0.002)	
Cylinder-to-piston clearance		0.020–0.060 (0.0008–0.0024)	0.200 (0.0079)	
Connecting rod small end I. D.		24.020–24.041 (0.9457–0.9465)	24.051 (0.9469)	
Connecting rod-to-piston clearance		0.020–0.047 (0.0008–0.0019)	0.067 (0.0026)	

12

TORQUE VALUES

Connecting rod bolt (standard)	29 N·m (3.0 kgf·m , 22 lbf·ft) + 120°	Apply oil to the threads and seating surface
Connecting rod bolt (checking the oil clearance)	20 N·m (2.0 kgf·m , 14 lbf·ft) + 120°	Apply oil to the threads and seating surface
Crankcase 10 mm special bolt	42 N·m (4.3 kgf·m , 31 lbf·ft)	Apply oil to the threads and seating surface

TROUBLESHOOTING

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

- Leaking cylinder head gasket
- Worn, stuck or broken piston ring
- Worn or damaged cylinder and piston

Compression too high, overheating or knocking

- Excessive carbon built-up on piston head or combustion chamber

Excessive smoke

- Worn cylinder, piston or piston rings
- Improper installation of piston rings
- Scored or scratched piston or cylinder wall

Abnormal noise

- Worn piston pin or piston pin hole
- Worn connecting rod small end
- Worn cylinder, piston or piston rings
- Worn main journal bearings
- Worn crankpin bearings

CRANKSHAFT

Separate the crankcase halves (page 11-3).

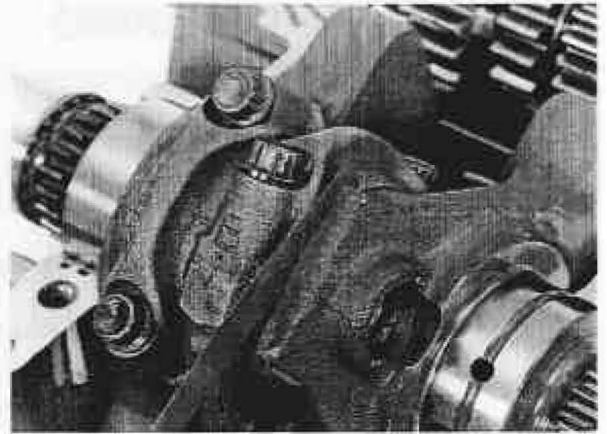
SIDE CLEARANCE INSPECTION

Measure the connecting rod side clearance.

SERVICE LIMIT: 0.40 mm (0.016 in)

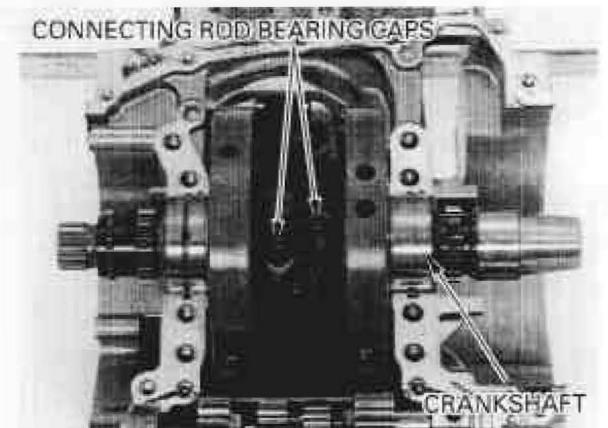
If the clearance exceeds the service limit, replace the connecting rod.

Recheck and if still out of limit, replace the crankshaft.



REMOVAL

Remove the connecting rod bolts and bearing caps. Remove the crankshaft.



INSPECTION

Place the crankshaft on V-blocks.

Rotate the crankshaft two revolutions and read the runout with a dial indicator.

Divide the total indicator reading in half to get the actual runout.

SERVICE LIMIT: 0.10 mm (0.004 in)

INSTALLATION

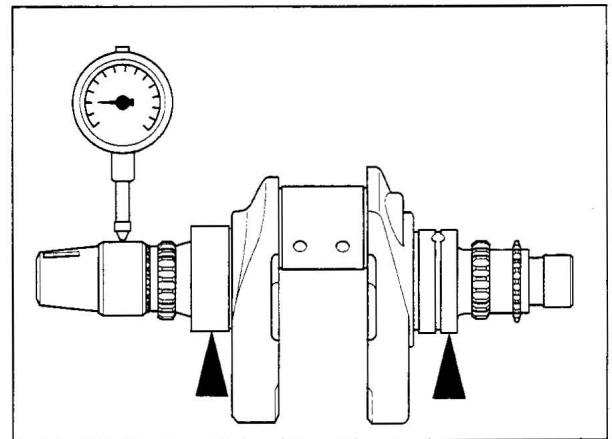
Apply molybdenum oil solution to the main journal bearing sliding surfaces on the upper crankcase, and crankpin bearing sliding surfaces on the connecting rods and bearing caps.

Install the crankshaft onto the upper crankcase.

Set the connecting rods onto the crankpin.

Install the bearing caps, aligning the dowel pins with the holes in the connecting rods.

Apply oil to new connecting bolt threads and seating surfaces and install the bolts.



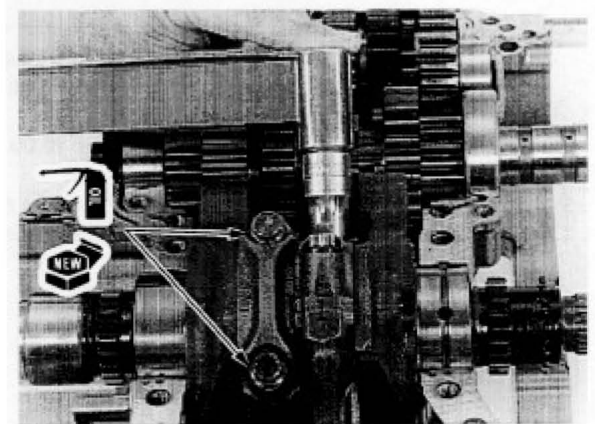
CAUTION:

The connecting rod bolts cannot be reused. Once the connecting rod bolts have been loosened replace them with new ones.

Tighten the bolts in 2 or 3 steps alternately.

TORQUE: 29 N·m (3.0 kgf·m , 22 lbf·ft) + 120°

Assemble the crankcase halves (page 11-10).



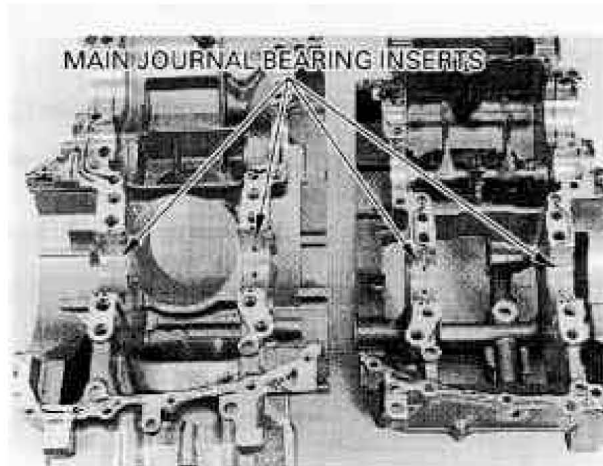
MAIN JOURNAL BEARING

Remove the crankshaft (page 12-3).

BEARING INSPECTION

Check the bearing inserts for unusual wear or peeling.

Check the bearing tabs for damage.



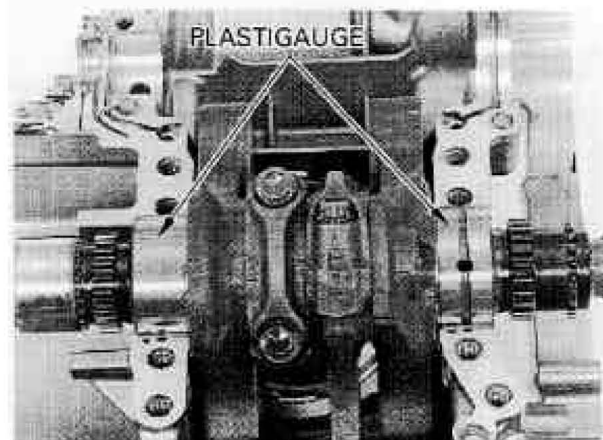
OIL CLEARANCE INSPECTION

Do not rotate the crankshaft during inspection.

Clean off any oil from the bearing inserts and main journals.

Install the crankshaft onto the upper crankcase.

Put a strip of plastigauge lengthwise on each main journal avoiding the oil hole.



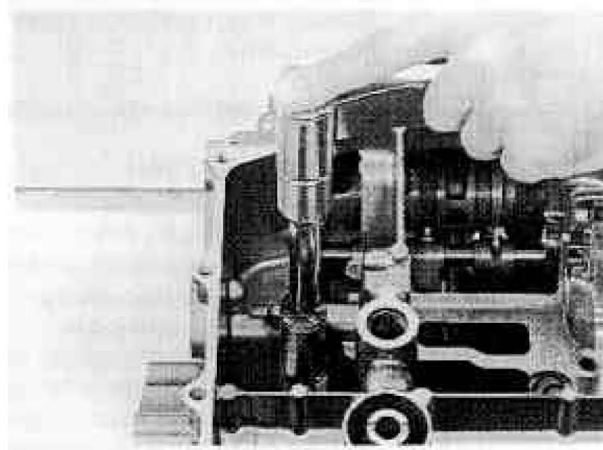
Install the dowel pins.

Carefully install the lower crankcase on the upper crankcase.

Apply oil to the 10 mm special bolt threads and seating surfaces and install them.

Tighten the bolts in a crisscross pattern in 2 or 3 steps.

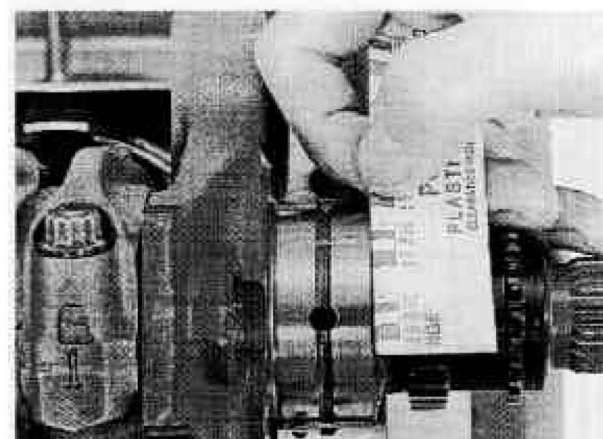
TORQUE: 42 N·m (4.3 kgf·m , 31 lbf·ft)



Remove the lower crankcase and measure the compressed plastigauge at its widest point on each main journal to determine the oil clearance.

SERVICE LIMIT: 0.048 mm (0.0019 in)

If the oil clearance exceeds the service limit, select the correct replacement bearings.



BEARING SELECTION

Record the main journal O. D. code numbers.

NOTE:

Number 1, 2 or 3 on the crank weight is the code for the main journal O. D.

Record the crankcase bearing support I. D. code letters.

NOTE:

Letters A, B or C on the left side of the upper crankcase are the codes for the bearing support I. D.

Cross reference the main journal and bearing support codes to determine the replacement bearing color code.

Bearing support I. D. code Main journal O. D. code	A	B	C
1	Yellow	Green	Brown
2	Green	Brown	Black
3	Brown	Black	Blue

MAIN JOURNAL BEARING INSERT THICKNESS:

- Yellow:** 1.488 – 1.491 mm (0.0586 – 0.0587 in)
- Green:** 1.491 – 1.494 mm (0.0587 – 0.0588 in)
- Brown:** 1.494 – 1.497 mm (0.0588 – 0.0589 in)
- Black:** 1.497 – 1.500 mm (0.0589 – 0.0591 in)
- Blue:** 1.500 – 1.503 mm (0.0591 – 0.0592 in)

CAUTION:

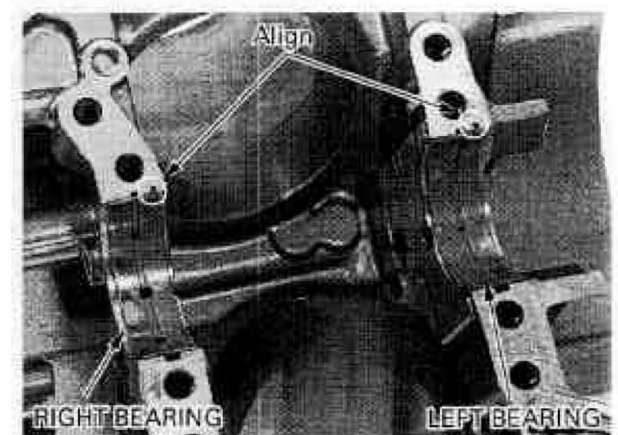
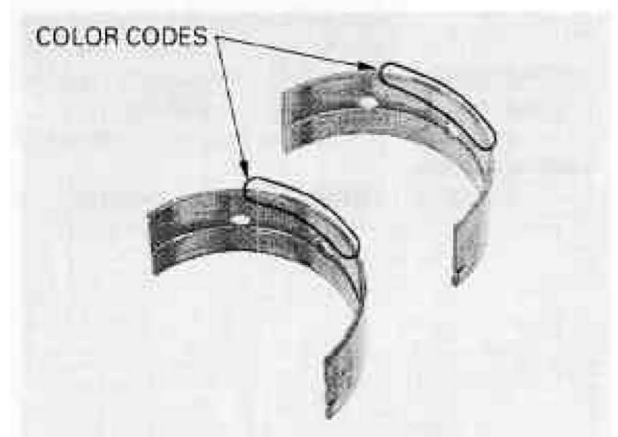
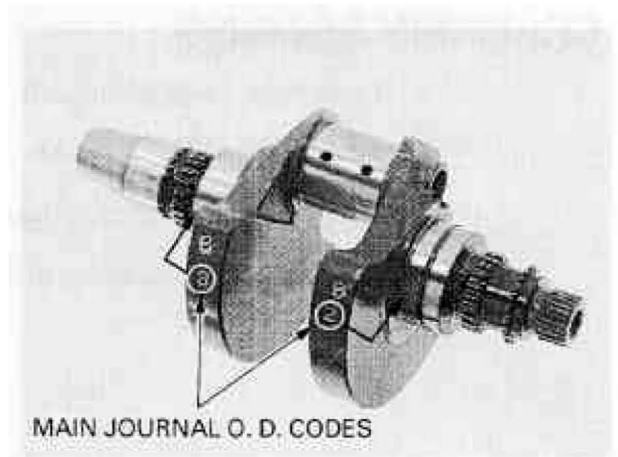
After selecting new bearings, recheck the oil clearance with plastigauge. Incorrect oil clearance can cause major engine damage.

BEARING INSTALLATION

Clean the bearing outer surfaces and crankcase bearing supports. Install the main journal bearing inserts onto the crankcase bearing supports, aligning each tab with each groove.

CAUTION:

Do not interchange the left and right bearing inserts. The oil holes in the right bearing insert are larger than the ones in the left bearing insert.



CRANKPIN BEARING

Remove the crankshaft (page 12-3).

BEARING INSPECTION

Check the bearing inserts for unusual wear or peeling.

Check the bearing tabs for damage.

OIL CLEARANCE INSPECTION

Do not rotate the crankshaft during inspection.

Clean off any oil from the bearing inserts and crankpin.

Install the crankshaft onto the upper crankcase.

Set the connecting rods onto the crankpin.

Put a strip of plastigauge lengthwise on the crankpin avoiding the oil hole.

Use the removed connecting rod bolts when checking the oil clearance.

Carefully install the bearing caps, aligning the dowel pins with the holes in the connecting rods.

Apply oil to the connecting bolt threads and seating surfaces and install the bolts.

Tighten the bolts in 2 or 3 steps alternately.

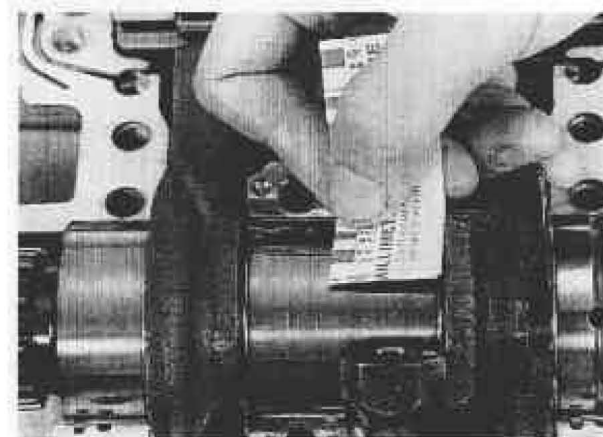
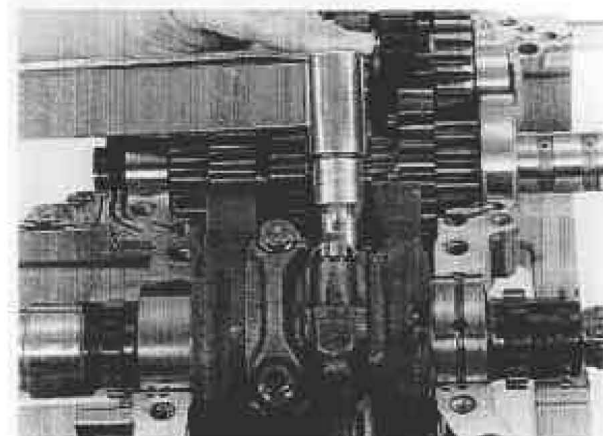
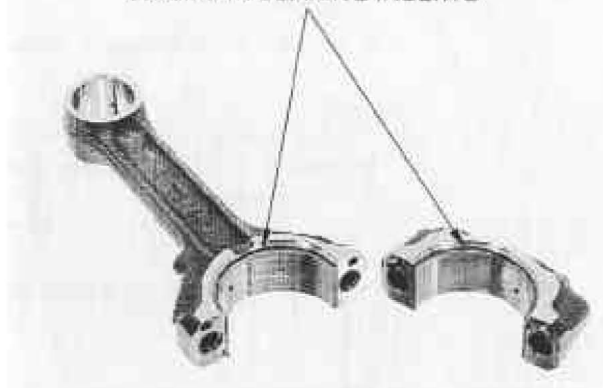
TORQUE: 20 N·m (2.0 kgf·m , 14 lbf·ft) + 120°

Remove the bearing caps and measure the compressed plastigauge at its widest point on the crankpin to determine the oil clearance.

SERVICE LIMIT: 0.060 mm (0.0024 in)

If the oil clearance exceeds the service limit, select the correct replacement bearings.

CRANKPIN BEARING INSERTS



BEARING SELECTION

Record the connecting rod I. D. code numbers.

NOTE:

Number 1, 2 or 3 on the connecting rod is the code for the connecting rod I. D.

Record the crankpin O. D. code letters.

NOTE:

Letter A, B or C on the crank weight is the code for the crankpin O. D.

Cross reference the connecting rod and crankpin codes to determine the replacement bearing color code.

Connecting rod I. D. code	1	2	3
Crankpin O. D. code			
A	Yellow	Green	Brown
B	Green	Brown	Black
C	Brown	Black	Blue

CRANKPIN BEARING INSERT THICKNESS:

- Yellow:** 1.485 – 1.488 mm (0.0585 – 0.0586 in)
- Green:** 1.488 – 1.491 mm (0.0586 – 0.0587 in)
- Brown:** 1.491 – 1.494 mm (0.0587 – 0.0588 in)
- Black:** 1.494 – 1.497 mm (0.0588 – 0.0589 in)
- Blue:** 1.497 – 1.500 mm (0.0589 – 0.0591 in)

NOTE:

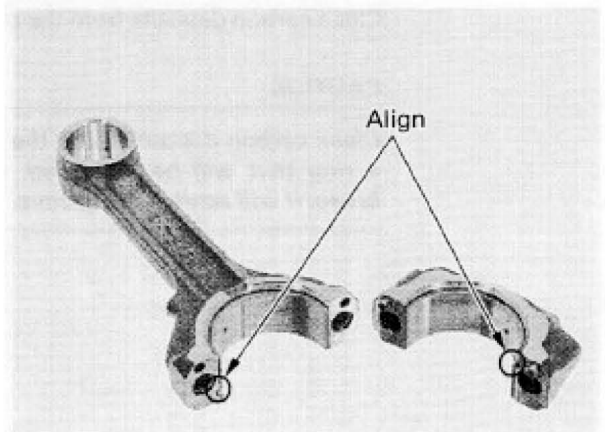
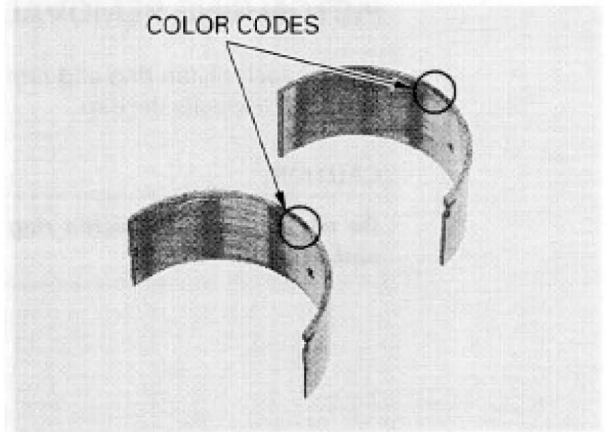
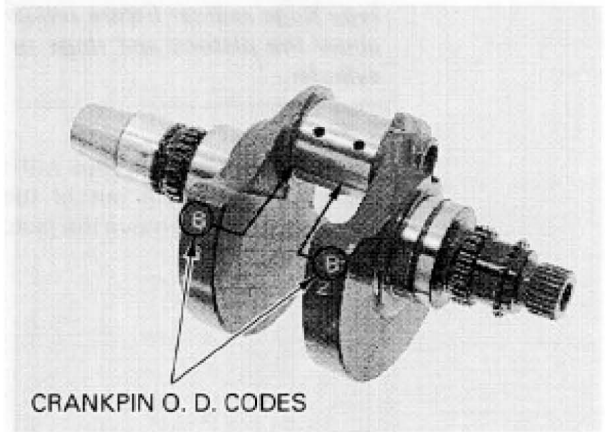
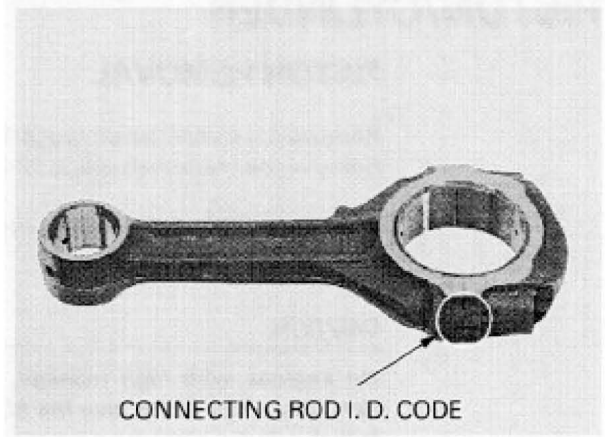
There are one painted mark on the bearing insert for the front connecting rod, and two painted marks for the rear connecting rod. Use correct bearing inserts.

CAUTION:

After selecting new bearings, recheck the oil clearance with plastigauge. Incorrect oil clearance can cause major engine damage.

BEARING INSTALLATION

Clean the bearing outer surfaces, bearing cap and connecting rod.
Install the crankpin bearing inserts onto the bearing cap and connecting rod, aligning each tab with each groove.



PISTON/CYLINDER

PISTON REMOVAL

Remove the transmission (page 11-6).
Remove the crankshaft (page 12-3).

Push each piston/connecting rod out through the top of the cylinder bore.

CAUTION:

On engines with high mileage, inspect the cylinders for a ridge just above the highest point of ring travel.

Any ridge must be removed with an automotive type ridge reamer before removing the pistons to allow the pistons and rings to pass through the cylinder.

Remove the piston pin clips with the pliers.
Push the piston pin out of the piston and connecting rod, and remove the piston.

PISTON RING REMOVAL

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

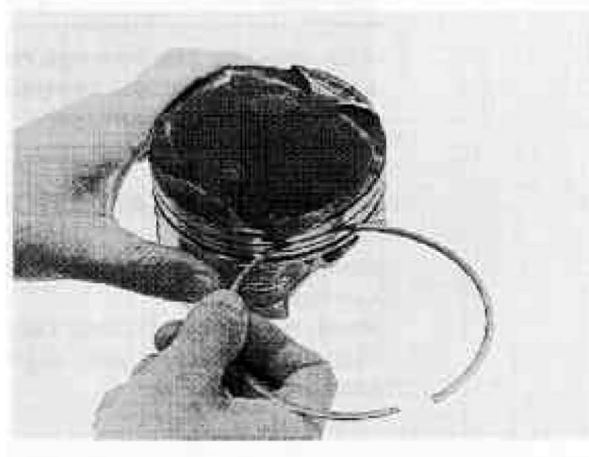
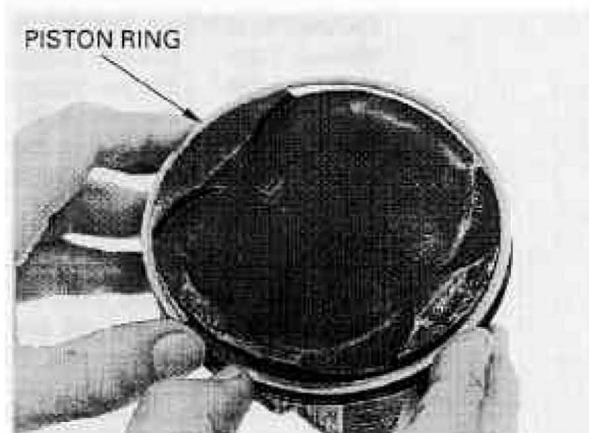
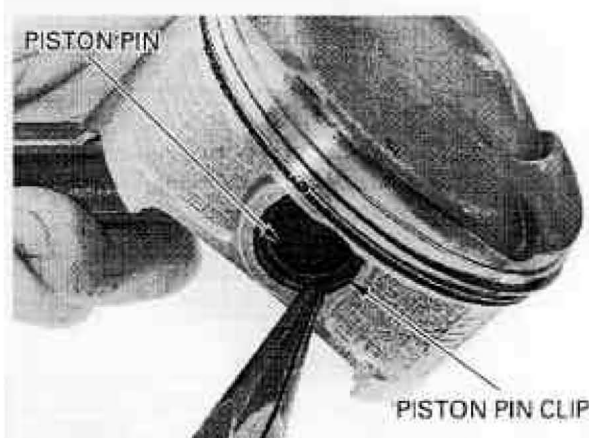
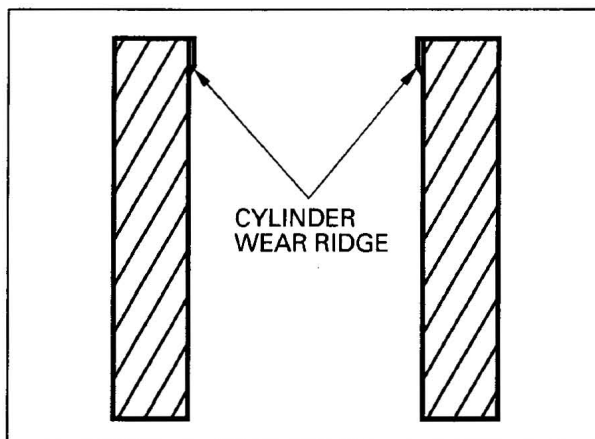
CAUTION:

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 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 LIMITS: Top: 0.115 mm (0.0045 in)
Second: 0.085 mm (0.0033 in)



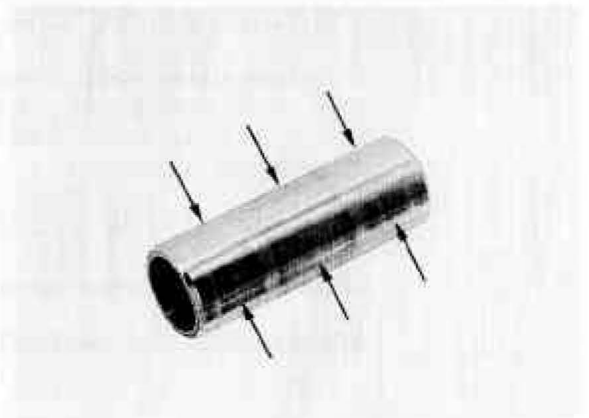
Insert each piston ring into the bottom of the cylinder squarely using the piston. Measure the ring end gap.

SERVICE LIMITS: Top: 0.55 mm (0.022 in)
Second: 0.70 mm (0.028 in)
Oil (side rail) : 0.90 mm (0.035 in)



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

SERVICE LIMIT: 23.984 mm (0.9443 in)



Measure the piston pin hole I. D.

SERVICE LIMIT: 24.03 mm (0.946 in)

Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.046 mm (0.0018 in)



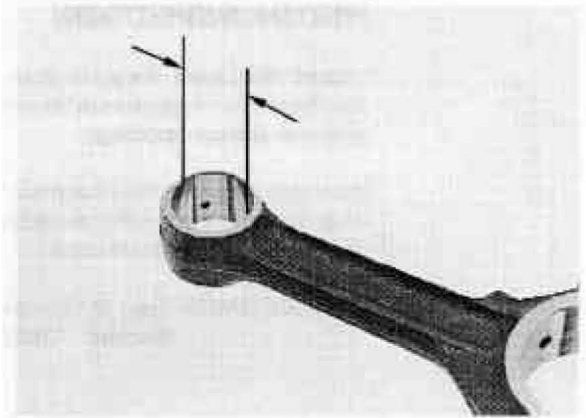
CRANKSHAFT/PISTON/CYLINDER

Measure the connecting rod small end I. D.

SERVICE LIMIT: 24.051 mm (0.9469 in)

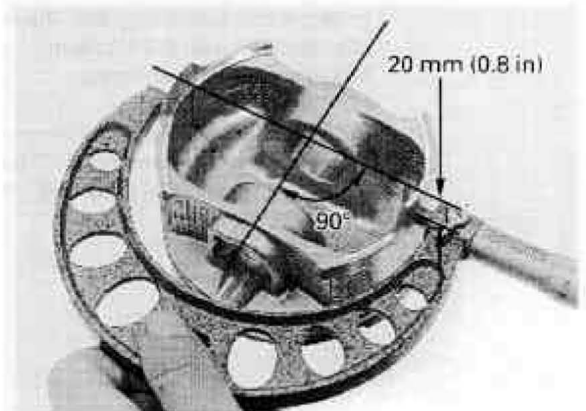
Calculate the connecting rod-to-piston pin clearance.

SERVICE LIMIT: 0.067 mm (0.0026 in)



Measure the piston O. D. at a point 20 mm (0.8 in) from the bottom and 90° to the piston pin hole.

SERVICE LIMIT: 97.900 mm (3.8543 in)



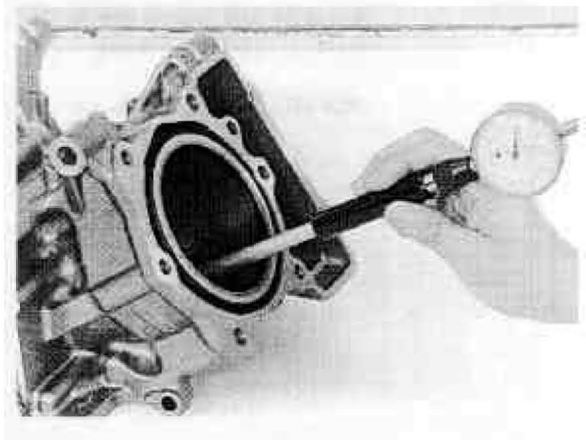
CYLINDER INSPECTION

Inspect the cylinder wall for scratch or wear. Measure the cylinder I. D. at three levels in an X and Y axis. Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 98.100 mm (3.8622 in)

Calculate the cylinder-to-piston clearance.

SERVICE LIMIT: 0.200 mm (0.0079 in)



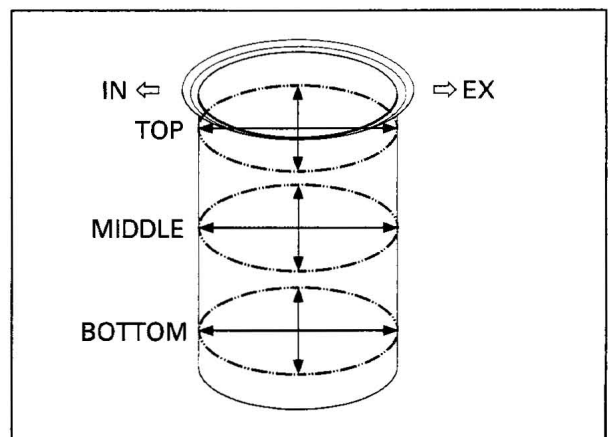
Calculate the cylinder taper and out-of-round at three levels in an X and Y axis. Take the maximum reading to determine the taper and out-of-round.

SERVICE LIMITS: Taper:

0.10 mm (0.004 in)

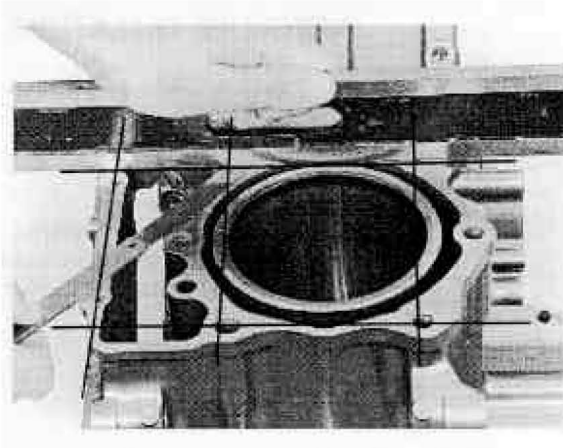
Out-of-round:

0.10 mm (0.004 in)



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

SERVICE LIMIT: 0.05 mm (0.002 in)



PISTON RING INSTALLATION

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

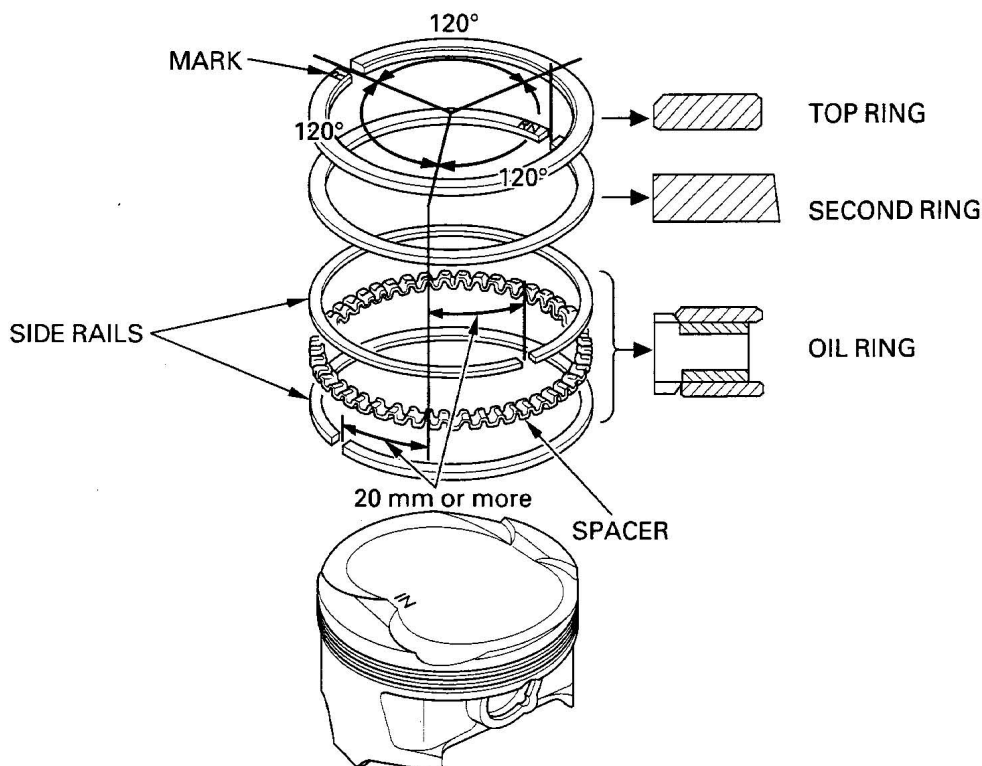
CAUTION:

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

NOTE:

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.

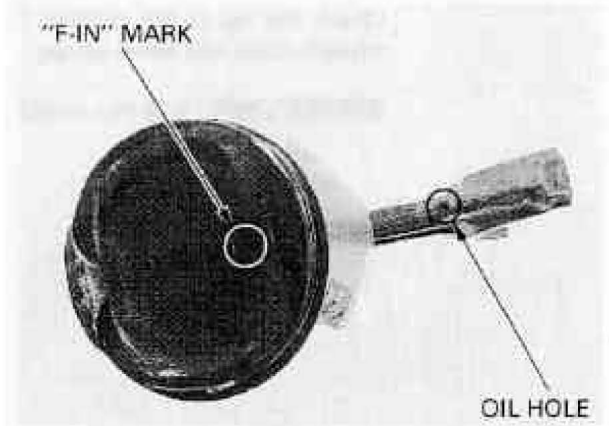


PISTON INSTALLATION

Apply molybdenum oil solution to the connecting rod small end inner surfaces.
Apply oil to the piston pin hole.

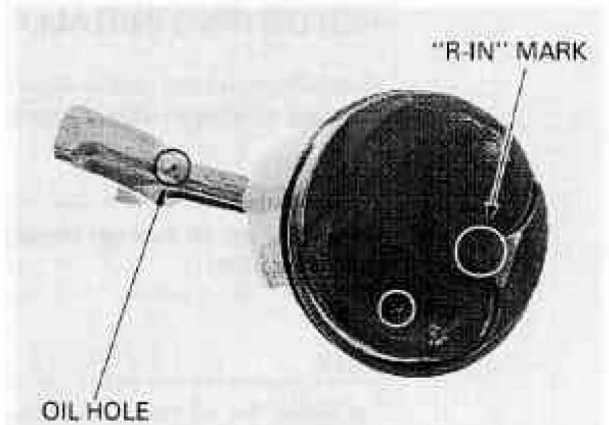
Front cylinder piston:

Note that the connecting rod has "MBBF" mark.
Install the piston on the connecting rod so that the "F-IN" mark is facing the same direction as the oil hole in the rod.



Rear cylinder piston:

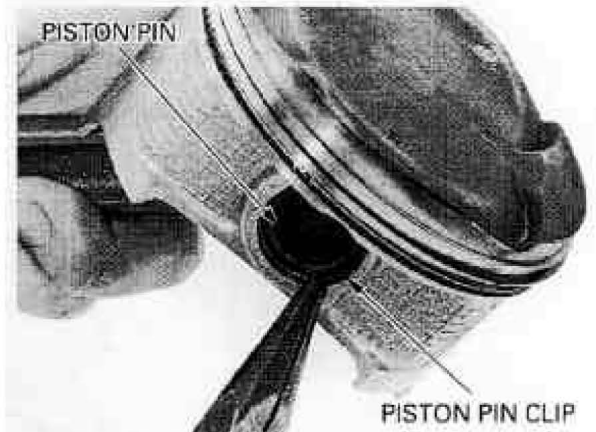
Note that the connecting rod has "MBBR" mark.
Install the piston on the connecting rod so that the "R-IN" mark is opposite the oil hole in the rod.



Install the piston pin into the piston and connecting rod.
Install new piston pin clips into the groove of the piston pin hole.

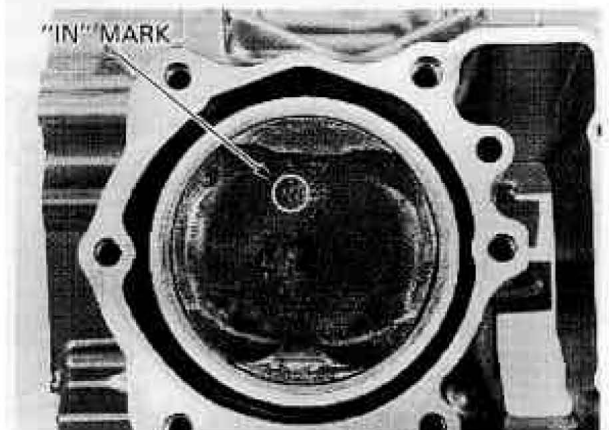
NOTE:

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

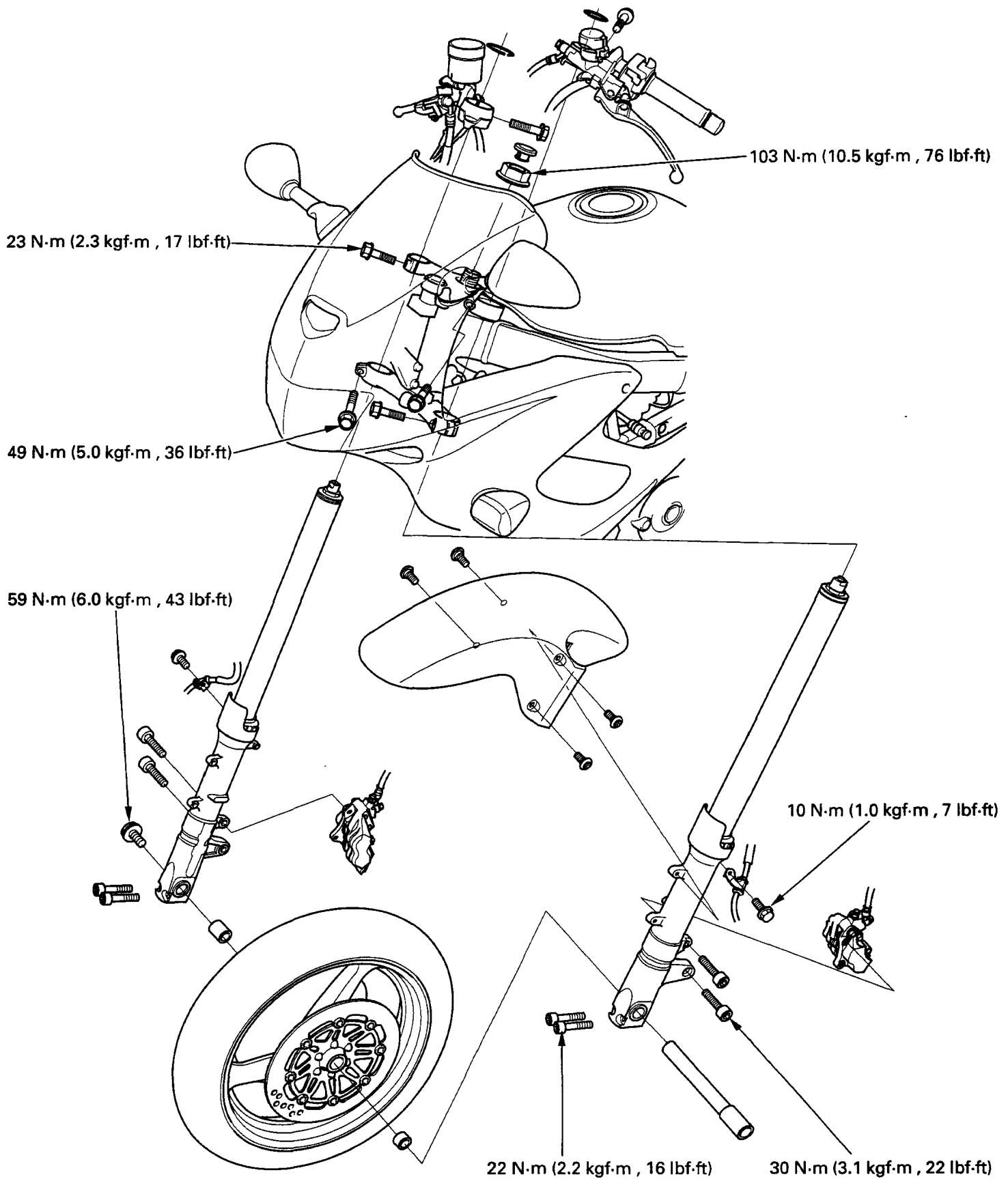


Coat the piston and piston rings with engine oil.
Install the piston/connecting rod in the cylinder with the "IN" mark toward the intake side, using a commercially available piston ring compressor tool.

Install the crankshaft (page 12-3).



FRONT WHEEL/SUSPENSION/STEERING



13. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	13-1	FRONT WHEEL	13-6
TROUBLESHOOTING	13-2	FORK	13-12
HANDLEBAR	13-3	STEERING STEM	13-21

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 motorcycle when servicing the front wheel, fork and steering stem.
- Refer to section 15 for brake system service.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—————	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm ² , 36 psi)	—————
	Driver and passenger	250 kPa (2.50 kgf/cm ² , 36 psi)	—————
Axle runout		—————	0.20 (0.008)
Wheel rim runout	Radial	—————	2.0 (0.08)
	Axial	—————	2.0 (0.08)
Wheel balance weight		—————	60 g (2.1 oz) max.
Fork	Spring free length	309.9 (12.20)	303.7 (11.96)
	Tube runout	—————	0.20 (0.008)
	Recommended fluid	Fork fluid	—————
	Fluid level	130 (5.1)	—————
	Fluid capacity	448 ± 2.5 cm ³ (15.2 ± 0.08 US oz, 15.8 ± 0.09 Imp oz)	—————
Steering head bearing preload		1.0–1.6 kgf (2.2–3.5 lbf)	—————

13

TORQUE VALUES

Handlebar weight mounting screw	10 N·m (1.0 kgf·m, 7 lbf·ft)	ALOC screw
Front master cylinder holder bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Front axle bolt	59 N·m (6.0 kgf·m, 43 lbf·ft)	
Front axle holder bolt	22 N·m (2.2 kgf·m, 16 lbf·ft)	
Front brake disc bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	ALOC bolt
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)	ALOC bolt
Fork cap	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Fork socket bolt	20 N·m (2.0 kgf·m, 14 lbf·ft)	Apply locking agent to the threads
Fork top bridge pinch bolt	23 N·m (2.3 kgf·m, 17 lbf·ft)	
Fork bottom bridge pinch bolt	49 N·m (5.0 kgf·m, 36 lbf·ft)	
Front brake hose clamp bolt (fork side)	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Steering stem nut	103 N·m (10.5 kgf·m, 76 lbf·ft)	
Steering bearing adjustment nut	25 N·m (2.5 kgf·m, 18 lbf·ft)	
Front brake hose clamp bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Front brake hose 3-way joint bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	

FRONT WHEEL/SUSPENSION/STEERING

TOOLS

Bearing remover shaft	07746-0050100
Bearing remover head, 20 mm	07746-0050600
Driver	07749-0010000
Attachment, 42×47 mm	07746-0010300
Pilot, 20 mm	07746-0040500
Fork seal driver weight	07947-KA50100
Fork seal driver	07947-KF00100
Steering stem socket	07916-3710101
Ball race remover set	07946-KM90001
– Driver attachment A	07946-KM90100
– Driver attachment B	07946-KM90200
– Driver shaft assembly	07946-KM90300
– Bearing remover A	07946-KM90401
– Bearing remover B	07946-KM90500
– Assembly base	07946-KM90600
Steering stem driver	07946-MB00000

TROUBLESHOOTING

Hard steering

- Steering bearing adjustment nut too tight
- Worn or damaged steering head bearings
- Bent steering stem
- Insufficient tire pressure

Steers one side or does not track straight

- Damaged or loose steering head bearings
- Bent forks
- Bent axle
- Wheel installed incorrectly
- Bent frame
- Worn or damaged wheel bearings
- Worn or damaged swingarm pivot bearings

Front wheel wobbling

- Bent rim
- Worn or damaged front wheel bearings
- Faulty front tire
- Unbalanced front tire and wheel

Front wheel turns hard

- Faulty front wheel bearings
- Bent front axle
- Front brake drag

Soft suspension

- Insufficient fluid in fork
- Incorrect fork fluid weight
- Weak fork springs
- Insufficient tire pressure

Hard suspension

- Bent fork tubes
- Too much fluid in fork
- Incorrect fork fluid weight
- Clogged fork fluid passage

Front suspension noise

- Insufficient fluid in fork
- Loose fork fasteners

HANDLEBAR

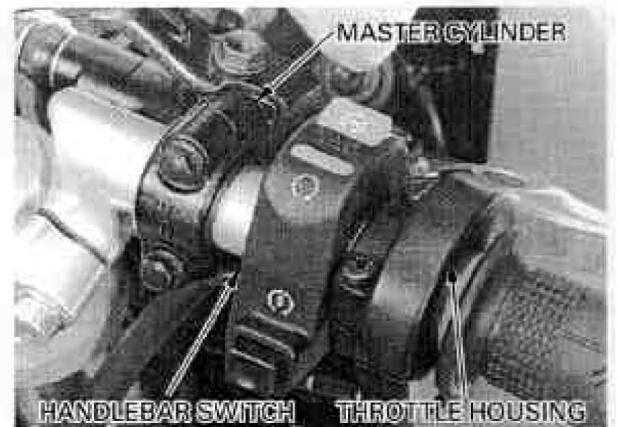
RIGHT HANDLEBAR

REMOVAL

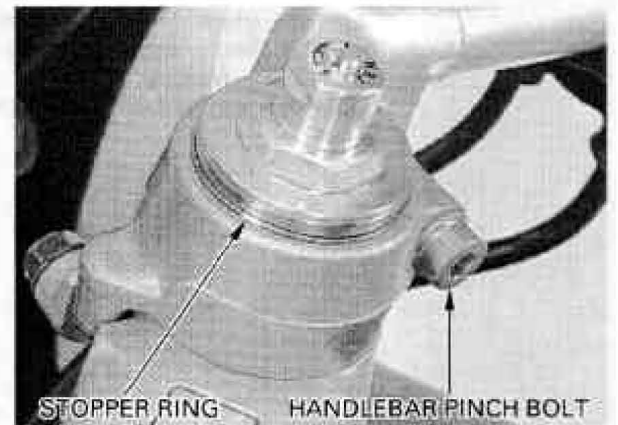
Hold the handlebar weight and remove the mounting screw and the weight.



Disconnect the front brake light switch connectors. Remove the two bolts, holder and the front brake master cylinder assembly. Remove the two screws and upper throttle housing. Remove the two screws and right handlebar switch.



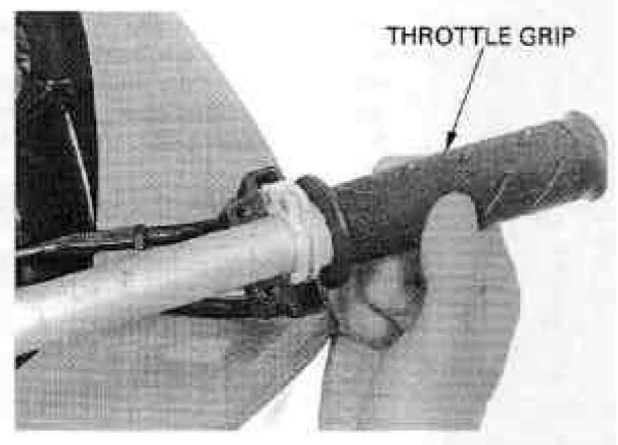
Loosen the handlebar pinch bolt, and remove the stopper ring and handlebar from the fork.



Remove the throttle grip pipe from the handlebar.

INSTALLATION

Apply grease to the throttle grip pipe flange and install the throttle grip pipe onto the handlebar.

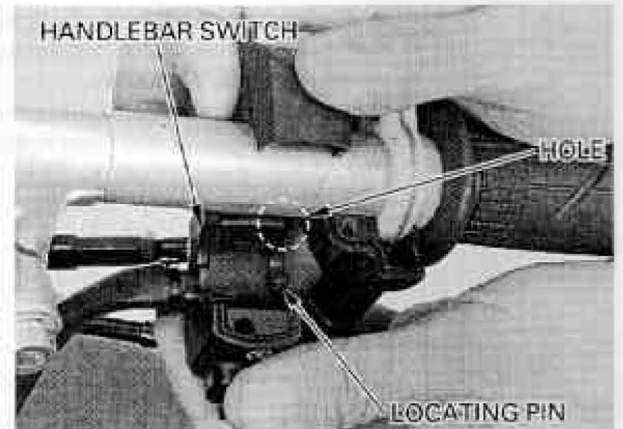


FRONT WHEEL/SUSPENSION/STEERING

Install the handlebar onto the fork, aligning its boss with the groove in the fork top bridge. Install the stopper ring and tighten the handlebar pinch bolt.



Install the right handlebar switch, aligning its locating pin with the hole in the handlebar. Tighten the forward screw first, then the rear screw.



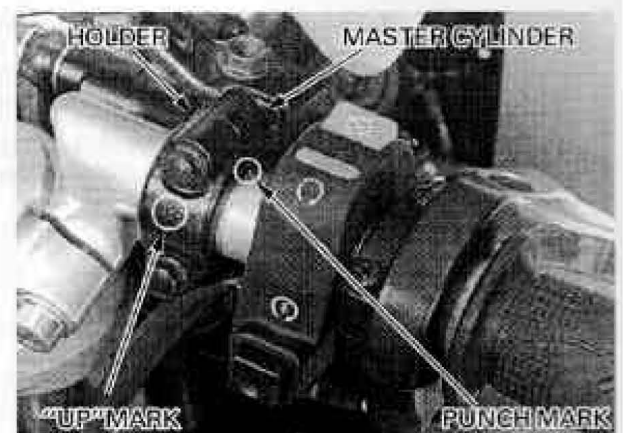
Install the upper throttle housing over the throttle grip pipe flange, aligning its locating pin with the hole in the handlebar. Tighten the forward screw first, then the rear screw.



Install the front brake 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 lower bolt.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

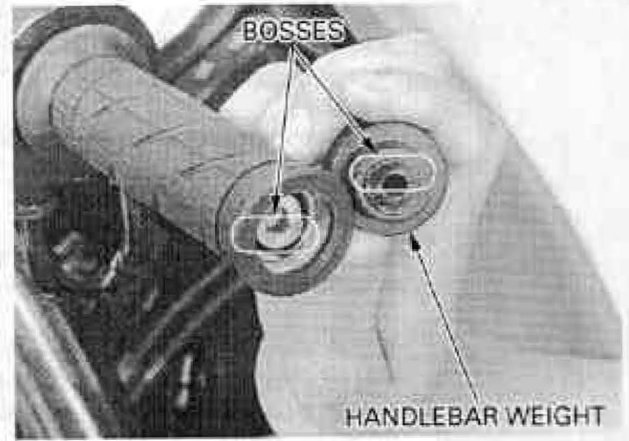
Connect the front brake light switch connectors.



Install the handlebar weight onto the inner weight, aligning the bosses and grooves each other. Install a new weight mounting screw and tighten it while holding the weight.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

Check the throttle grip operation and free play (page 3-4).



LEFT HANDLEBAR

REMOVAL

Disconnect the clutch switch connectors. Remove the two bolts, holder and the clutch master cylinder assembly. Remove the two screws and left handlebar switch.



Hold the handlebar weight and remove the mounting screw and the weight. Remove the left handlebar grip.



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

INSTALLATION

Install the handlebar onto the fork, aligning its boss with the groove in the fork top bridge. Install the stopper ring and tighten the handlebar pinch bolt.



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.

NOTE:

Allow the adhesive to dry for an hour before using.

Install the handlebar weight onto the inner weight, aligning the bosses and grooves each other. Install a new weight mounting screw and tighten it while holding the weight.

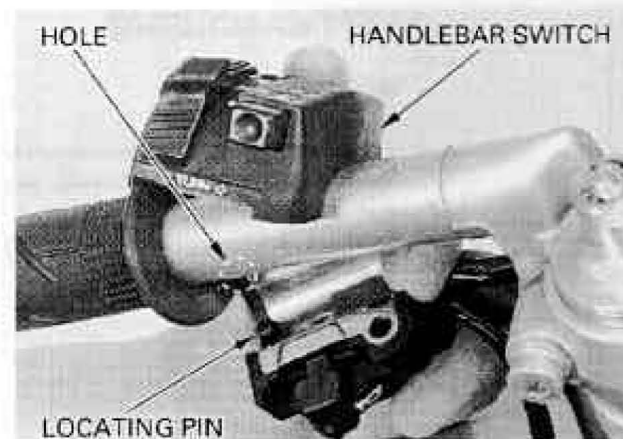
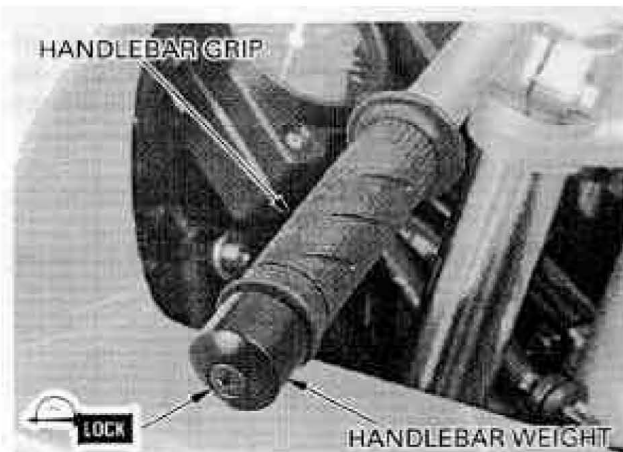
TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the left handlebar switch, aligning its locating pin with the hole in the handlebar. Tighten the forward screw first, then the rear screw.

Install the clutch master cylinder 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 lower bolt.

Connect the clutch switch connectors.



FRONT WHEEL

REMOVAL

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

Remove the mounting bolts and front brake calipers.

CAUTION:

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

NOTE:

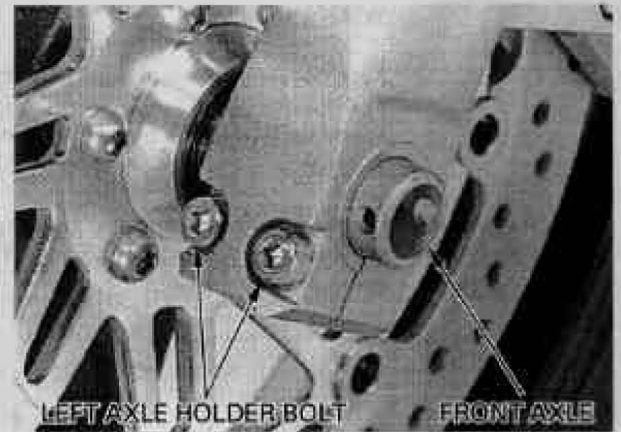
Do not operate the brake lever after removing the brake calipers.



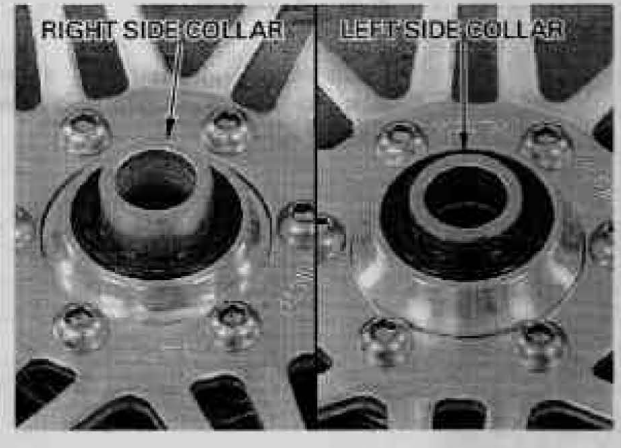
Loosen the right front axle holder bolts.
Remove the front axle bolt.



Loosen the left front axle holder bolts.
Remove the front axle and the front wheel.



Remove the side collars.

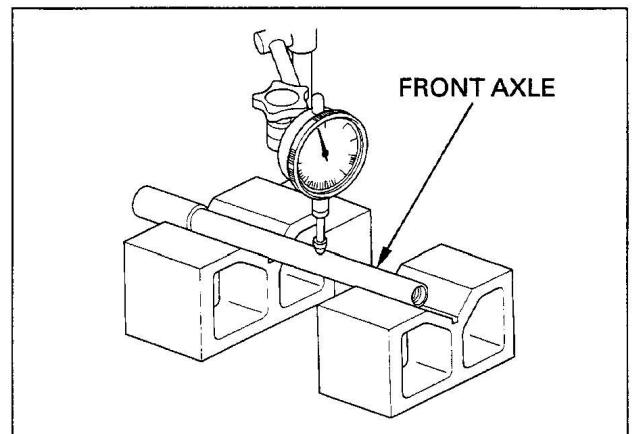


INSPECTION

AXLE

Set the front axle in V-blocks.
Turn the front axle and measure the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)



WHEEL RIM

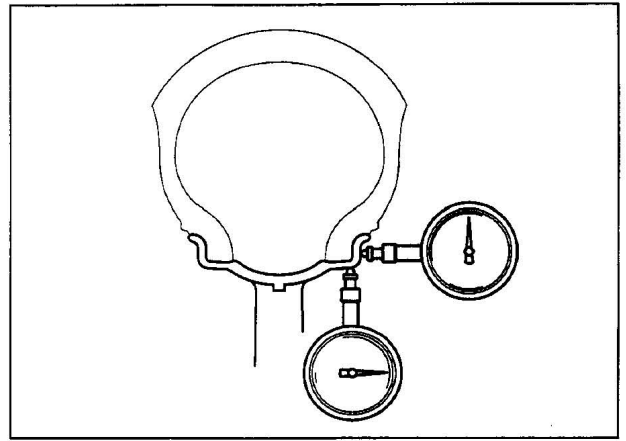
Check the rim runout by placing the wheel in a truing stand.

Spin the wheel slowly and read the runout using a dial indicator.

Actual runout is 1/2 the total indicator reading.

SERVICE LIMITS: Radial: 2.0 mm (0.08 in)

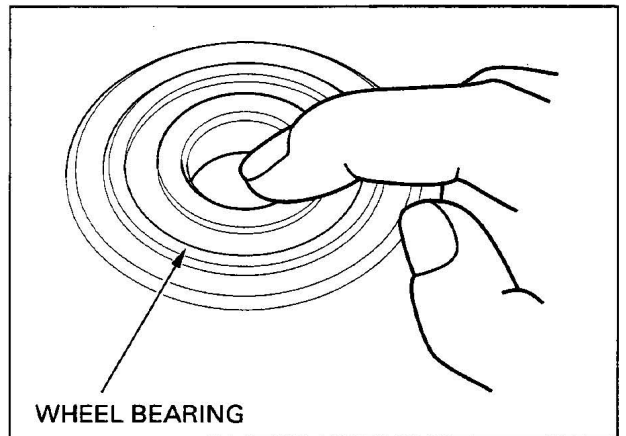
Axial: 2.0 mm (0.08 in)



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



DISASSEMBLY

Remove the dust seals from the wheel hub. Remove the disc bolts and brake discs from the wheel hub.

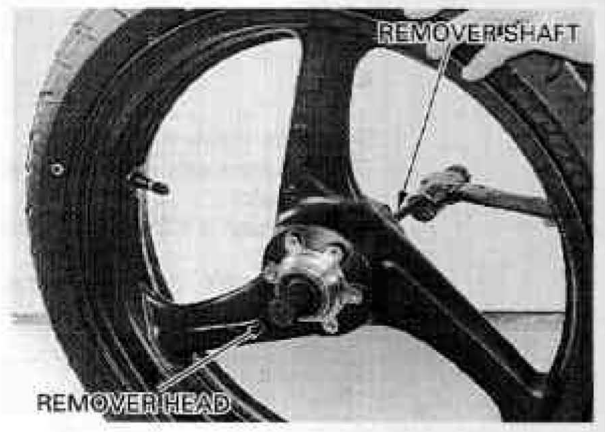


Replace the wheel bearings in pairs. Do not reuse old bearings. Install the bearing remover head into the bearing. From opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

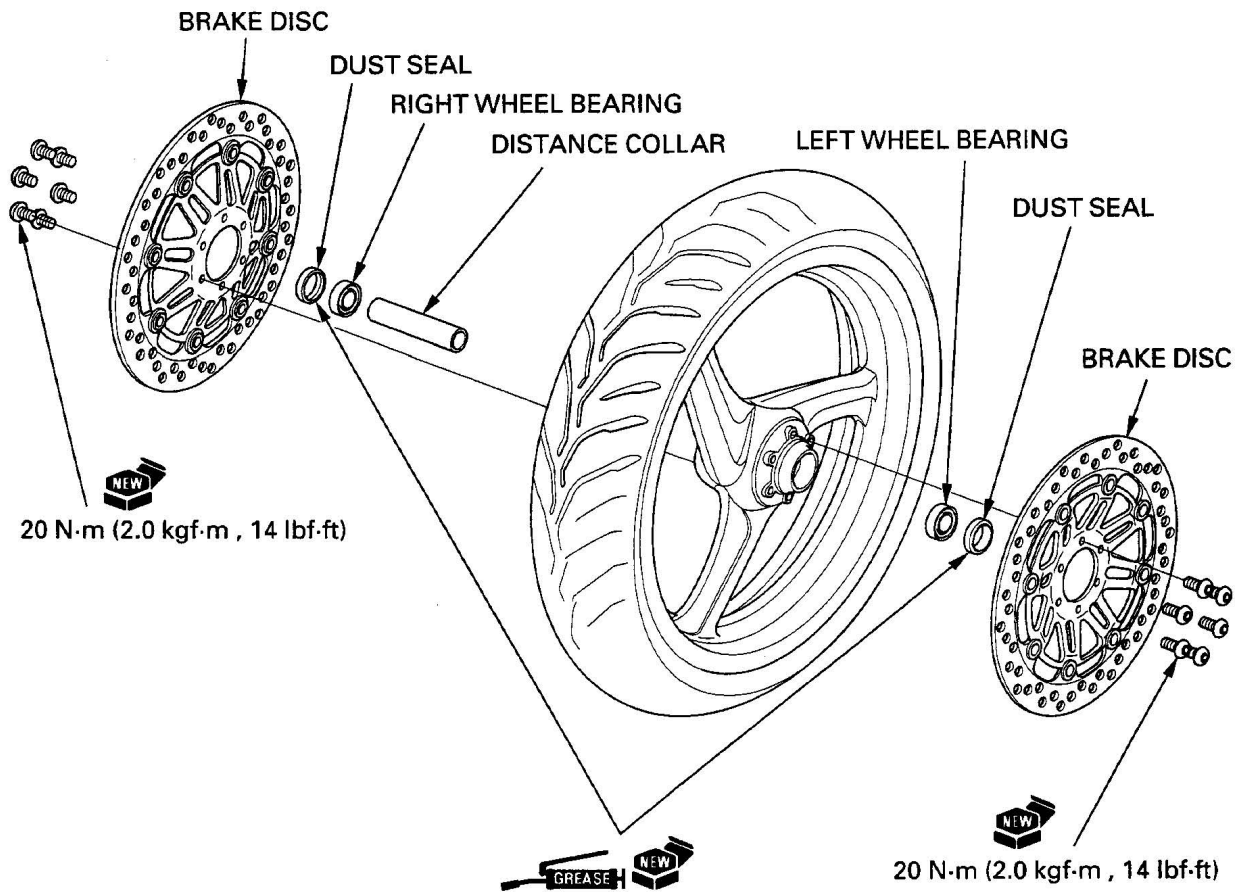
TOOLS:

Bearing remover shaft 07746-0050100

Bearing remover head, 20 mm 07746-0050600



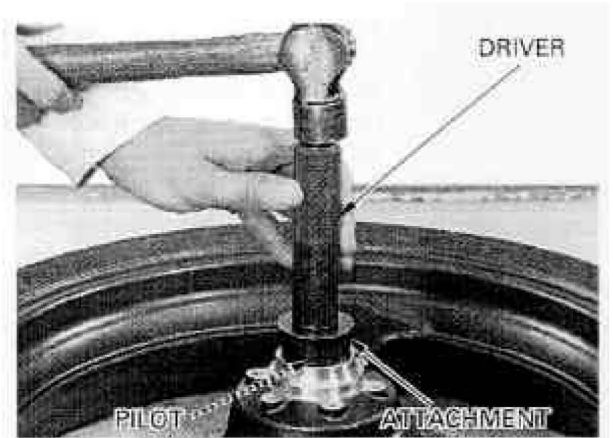
ASSEMBLY



Drive in a new left bearing squarely with the marking side facing up until it is fully seated.
 Install the distance collar.
 Drive in a new right bearing squarely with the marking side facing up until it is fully seated.

TOOLS:

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



Install the brake discs with the arrow mark facing in the normal rotating direction.
 Install new disc bolts and tighten them in a criss-cross pattern in 2 or 3 steps.

TORQUE: 20 N·m (2.0 kgf·m, 14 lbf·ft)



WHEEL BALANCE

▲WARNING

Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Carefully check balance before reinstalling the wheel.

NOTE:

- Mount the tire with the arrow mark facing in the normal rotating direction.
- The wheel balance must be checked when the tire is remounted.
- For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.

Mount the wheel, tire and brake disc assembly on an inspection stand.

Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.

Do this two or three times to verify the heaviest area.

If wheel is balanced, it will not stop consistently in the same position.

To balance the wheel, install balance weights on the lightest side of rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 60 g (2.1 oz) to the wheel.

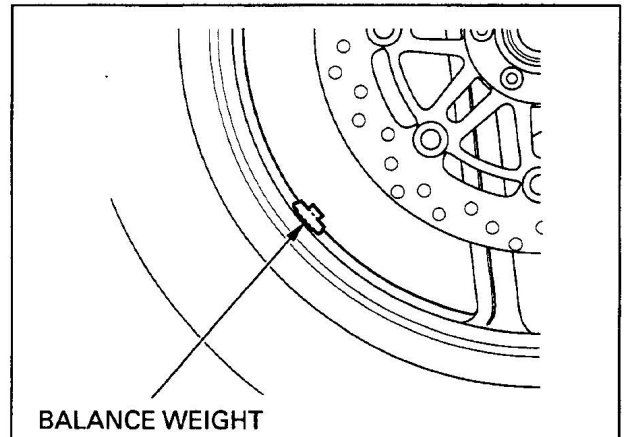
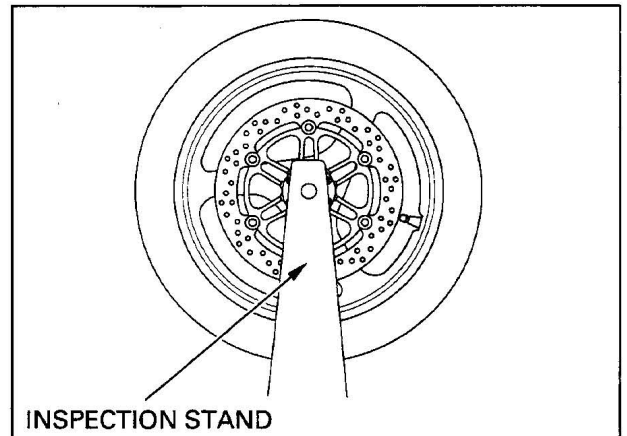
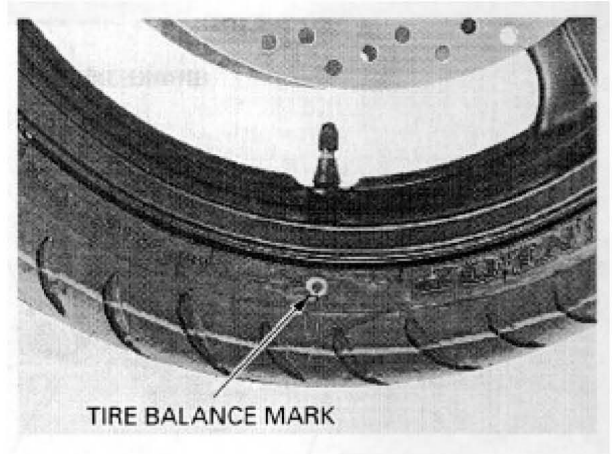
Apply grease to new dust seal lips.
Install the dust seals into the wheel hub.

INSTALLATION

Install the side collars.

NOTE:

The right side collar is longer than the left side collar.



Install the front wheel between the fork legs.

Apply thin coat of grease to the front axle.
Install the front axle.

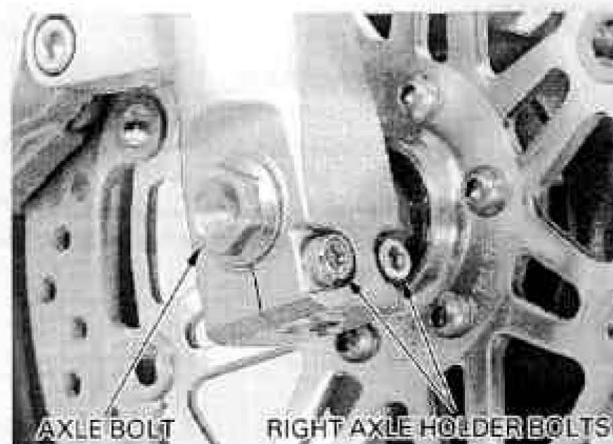


Install the axle bolt and tighten it while holding the axle.

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

Tighten the right axle holder bolts.

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



Install the brake calipers with new mounting bolts and tighten the mounting bolts.

TORQUE: 30 N·m (3.1 kgf·m , 22 lbf·ft)



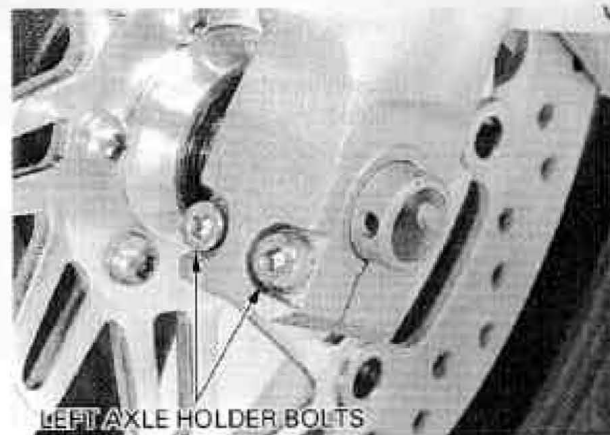
With the front brake applied, pump the forks up and down several times to seat the axle and check brake operation.



FRONT WHEEL/SUSPENSION/STEERING

Tighten the left axle holder bolts.

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

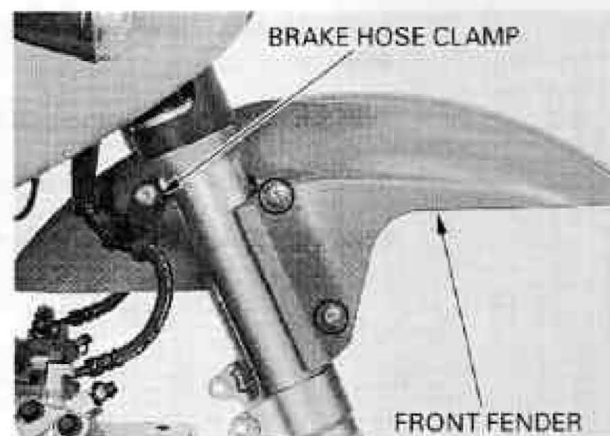


FORK

REMOVAL

Remove the front wheel (page 13-6).

Remove the four bolts and the front fender.
Remove the front brake hose clamp from the fork leg.

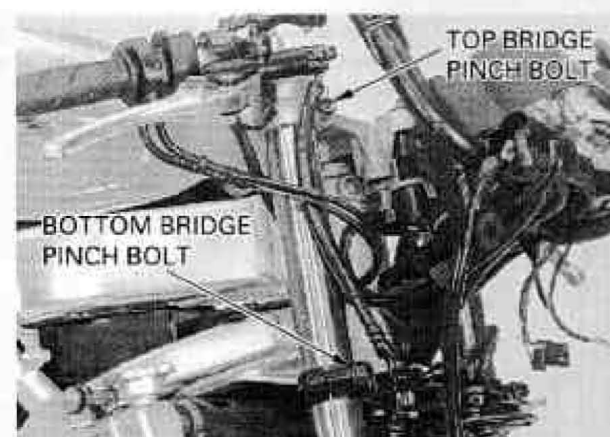


Loosen the handlebar pinch bolt and remove the stopper ring from the fork.

When the fork is ready to be disassembled, loosen the fork cap, but do not remove it.

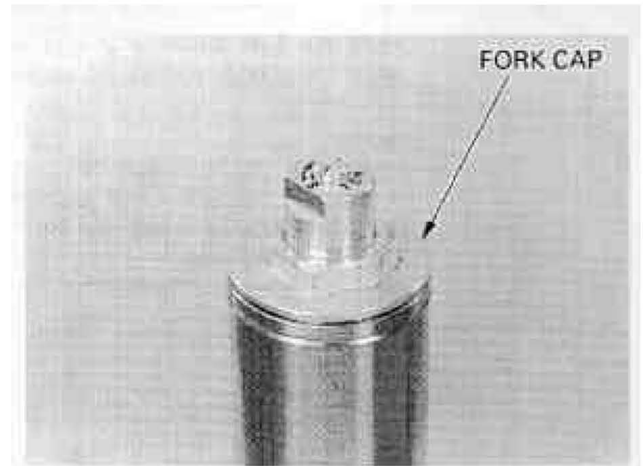


Loosen the fork top and bottom pinch bolts, and remove the fork tube from the fork bridges.



DISASSEMBLY

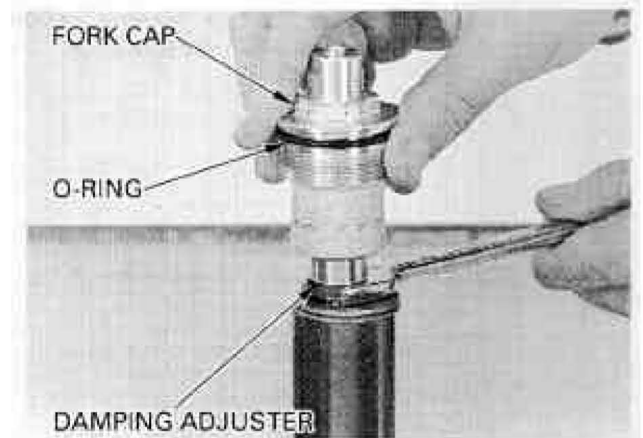
Remove the fork cap from the fork tube.



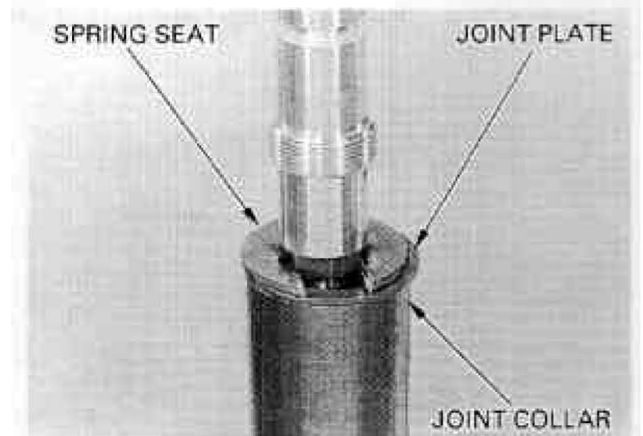
Hold the rebound damping adjuster and remove the fork cap from the damping adjuster. Remove the O-rings from the fork cap and rebound damping adjuster.

CAUTION:

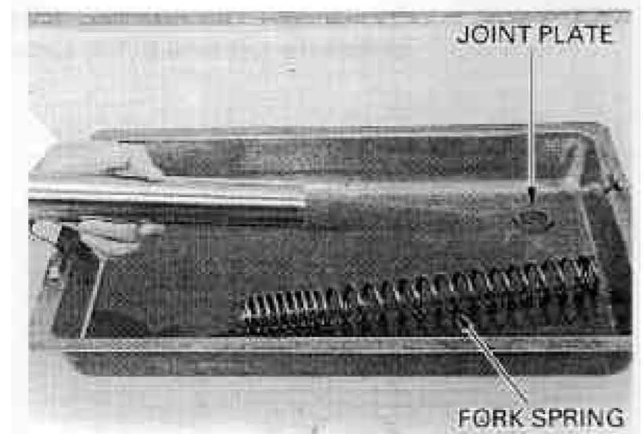
Do not remove the rebound damping adjuster from the damper rod, or fork damping force will be changed.



Remove the spring seat, joint plate and joint collar.



Remove the joint plate and fork spring. Pour out the fork fluid by pumping the fork tube several times.



FRONT WHEEL/SUSPENSION/STEERING

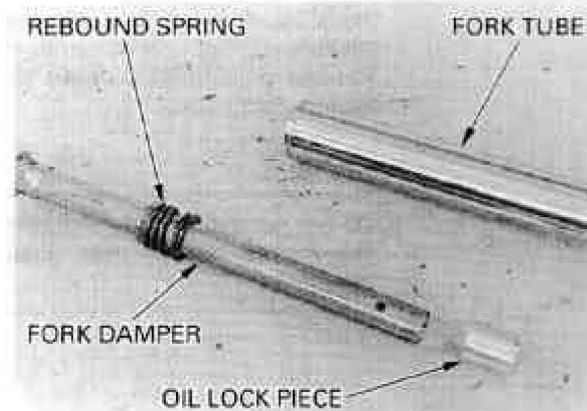
Hold the fork slider in a vise with a soft jaws or shop towel and remove the socket bolt.

NOTE:

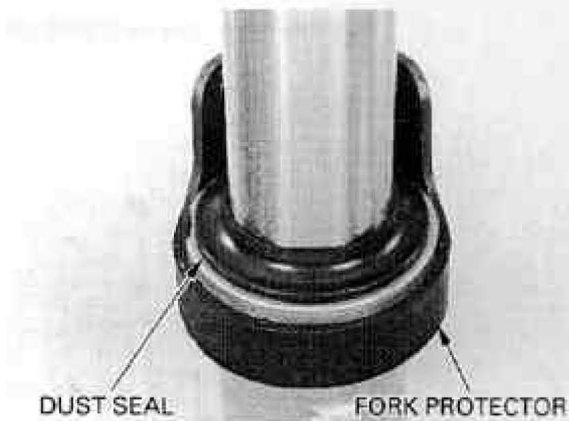
If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring collar and spring seat.



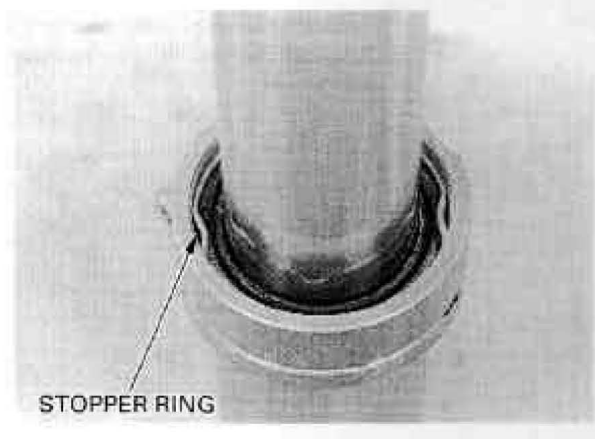
Remove the fork damper, rebound spring and oil lock piece from the fork tube.



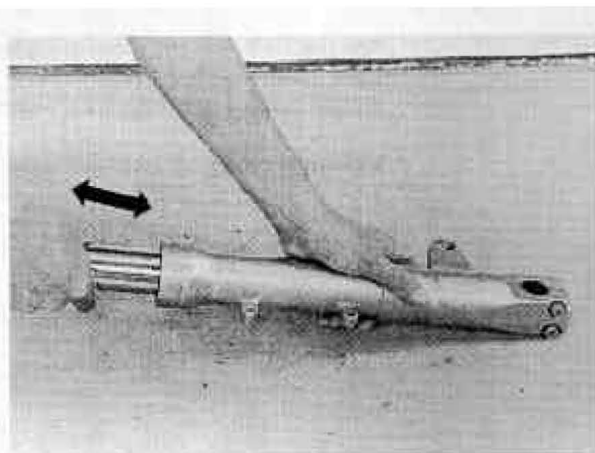
Remove the dust seal and fork protector.



Remove the stopper ring being careful not to scratch the fork tube sliding surface.



Using quick successive motions, pull the fork tube out of the fork slider.

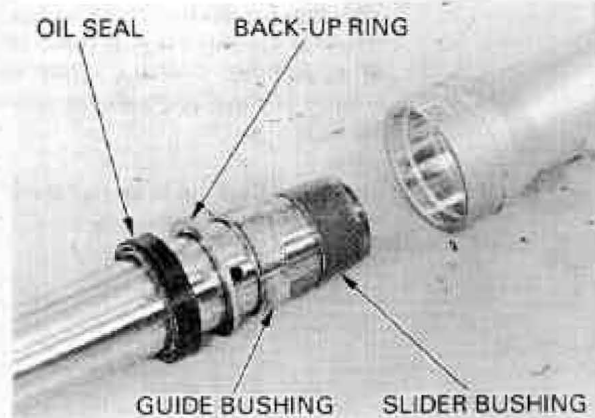


Remove the oil seal, back-up ring and guide bushing from the fork tube.

NOTE:

Do not remove slider bushing unless it is necessary to replace it with a new one.

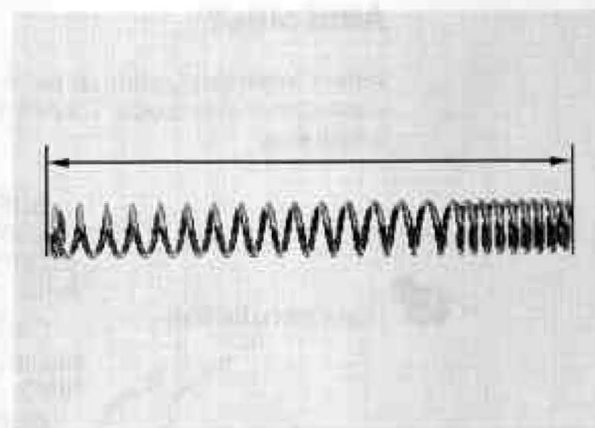
Carefully remove the slider bushing by prying the slot with a screwdriver until the bushing can be pulled off by hand.



INSPECTION

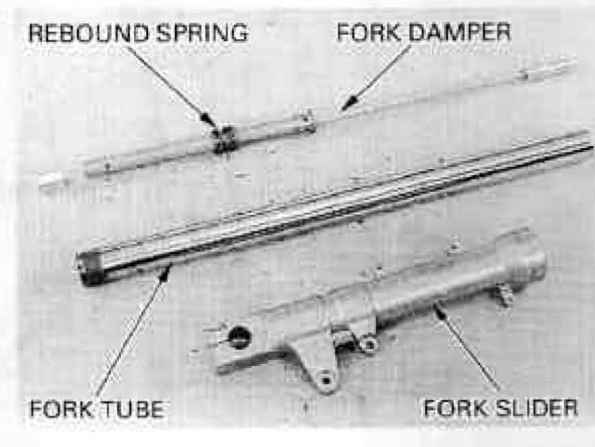
Measure the fork spring free length.

SERVICE LIMIT: 303.7 mm (11.96 in)



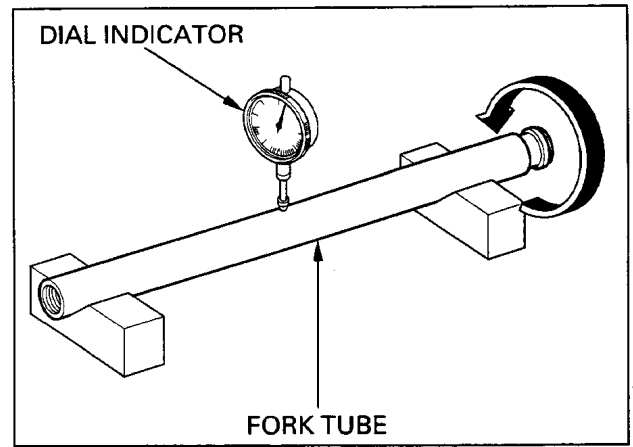
Check the fork tube, slider and damper piston for score marks, and excessive or abnormal wear. Check the rebound spring for fatigue or damage.

Replace the component if necessary.



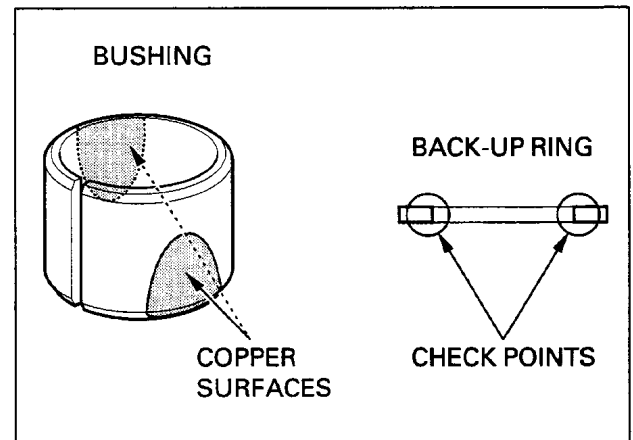
Set the fork tube in V-blocks and measure the fork tube runout with a dial indicator.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)



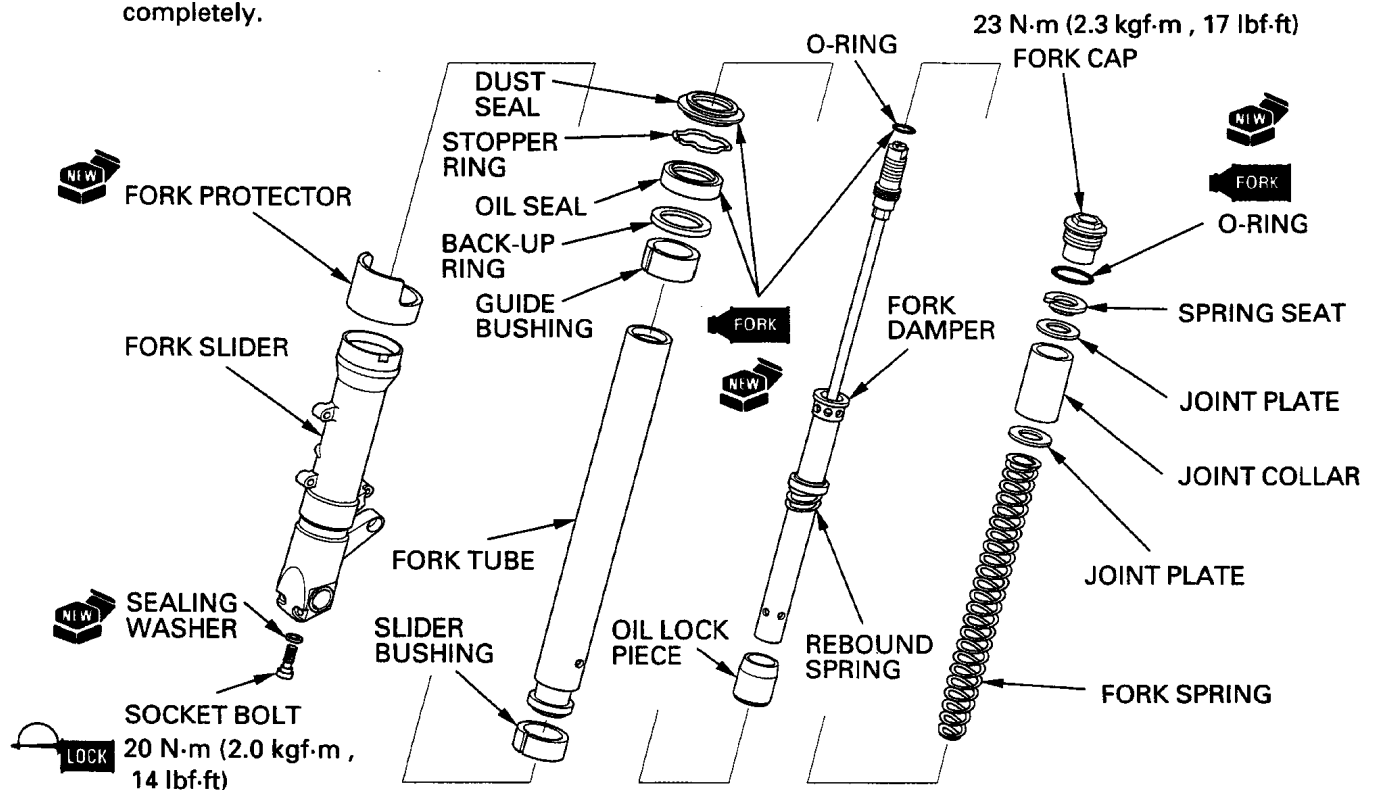
Visually inspect the slider and guide bushings.
Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.



ASSEMBLY

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



Install a new slider bushing if it has been removed.

CAUTION:

- *Be careful not to damage the coating of the bushing.*
- *Do not open the bushing more than necessary.*

NOTE:

Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

Install the guide bushing and back-up ring.
Apply fork fluid to a new oil seal lip.
Install the oil seal with the marking side facing up.
Install the fork tube into the fork slider.

Install the rebound spring and oil lock piece onto the damper piston.
Install the fork damper into the 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 and tighten it.

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

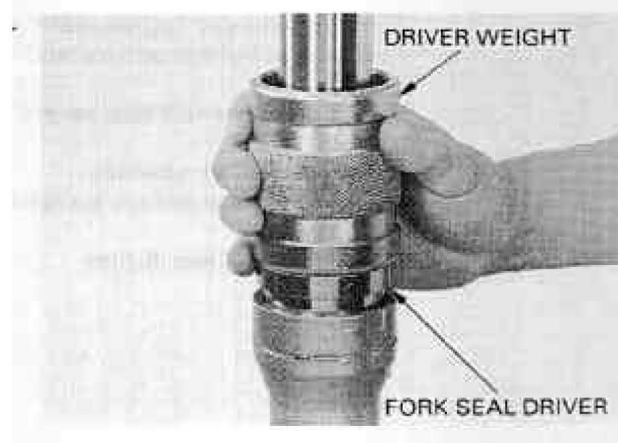
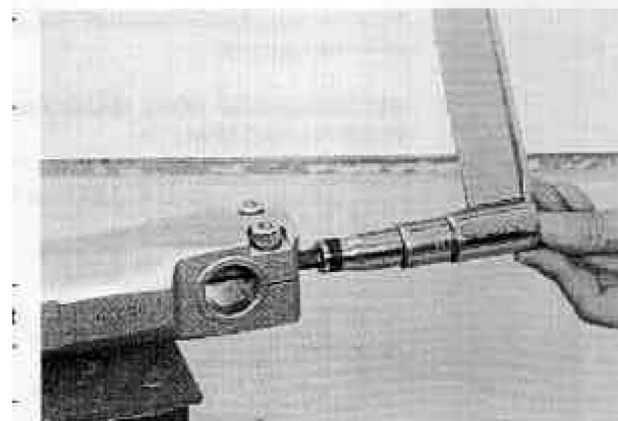
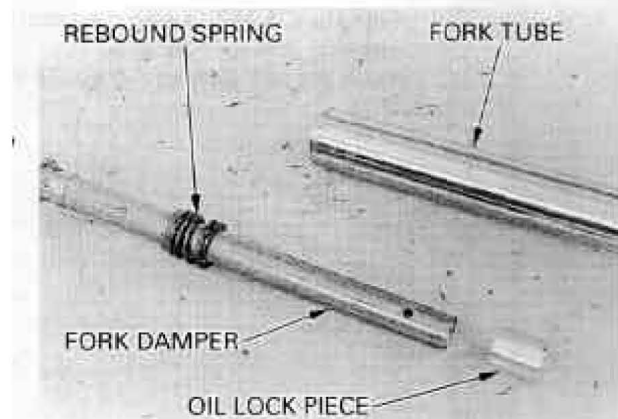
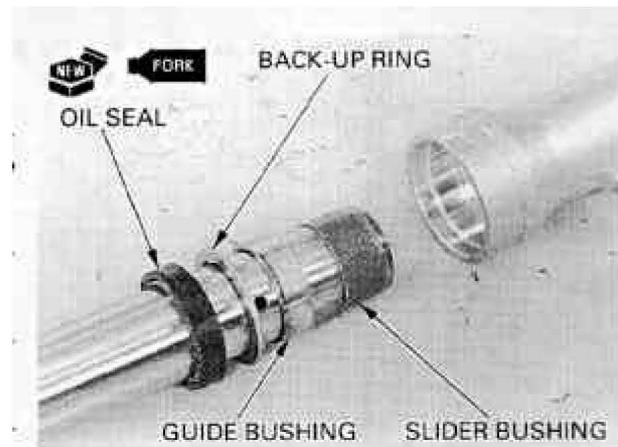
NOTE:

If the fork damper turns together with the socket bolt, temporarily install the fork spring, spring collar and spring seat.

Drive the oil seal into the fork slider until the stopper ring groove is visible, using the special tool.

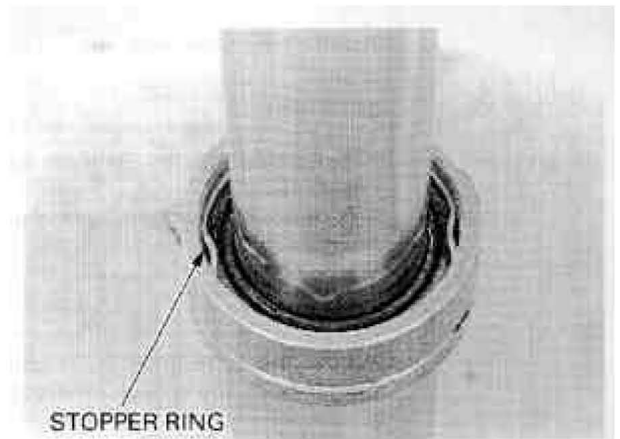
TOOLS:

Fork seal driver weight 07947-KA50100
Fork seal driver 07947-KF00100

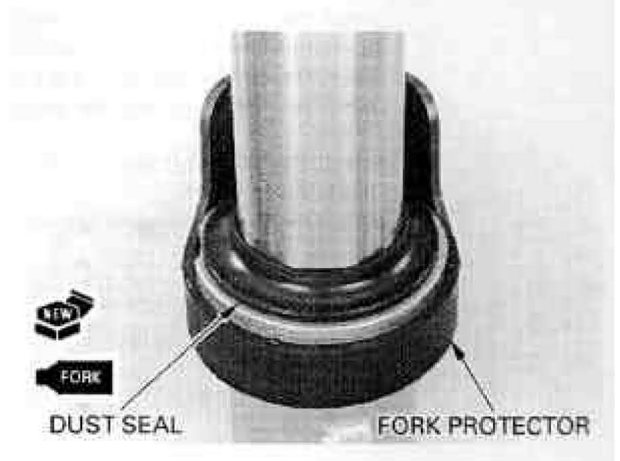


FRONT WHEEL/SUSPENSION/STEERING

Install the stopper ring into the groove in the fork slider.



Apply fork fluid to a new dust seal lip and install the dust seal into the fork slider.
Install the fork protector onto the fork slider.

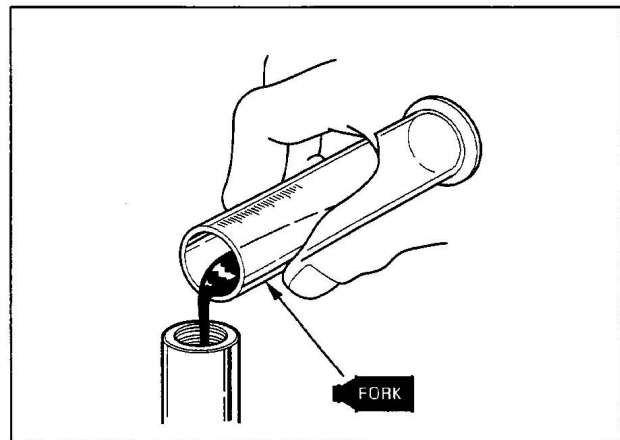


Pour the specified amount of recommended fork fluid in the fork tube.

RECOMMENDED FORK FLUID: Fork fluid

FORK FLUID CAPACITY:

$448 \pm 2.5 \text{ cm}^3$ (15.2 \pm 0.08 US oz,
15.8 \pm 0.09 Imp oz)



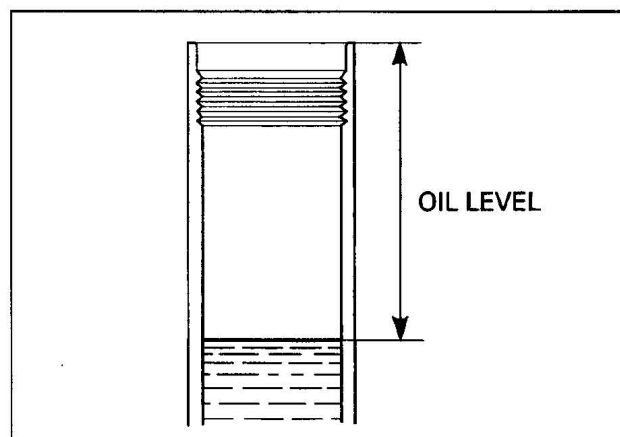
Pump the damper rod several times until the fork fluid flow out of the oil hole in the rebound damping adjuster.

Slowly pump the fork tube several times to remove trapped air.

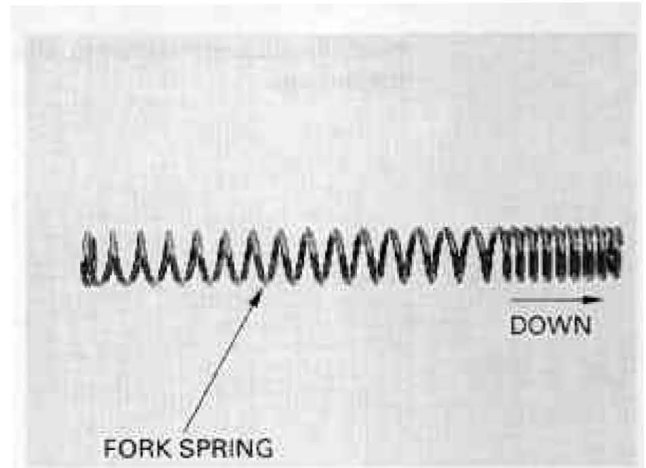
Compress the fork tube fully.

Measure the oil level from the top of the fork tube.

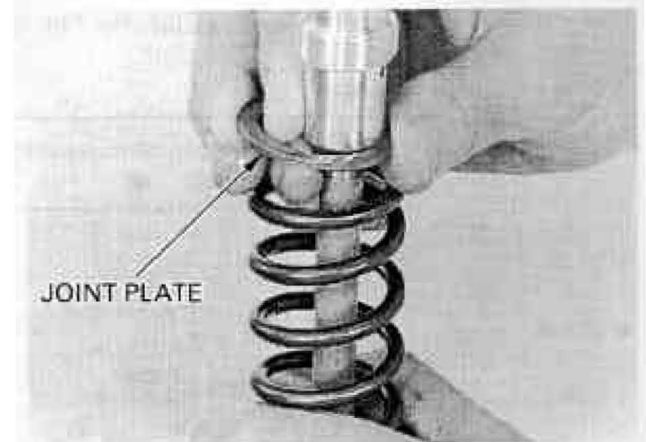
OIL LEVEL: 130 mm (5.1 in)



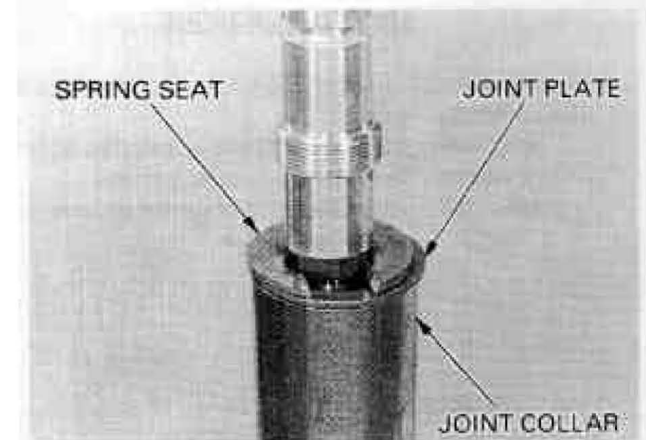
Pull up the damper rod fully.
Install the fork spring with the tightly wound end facing down.



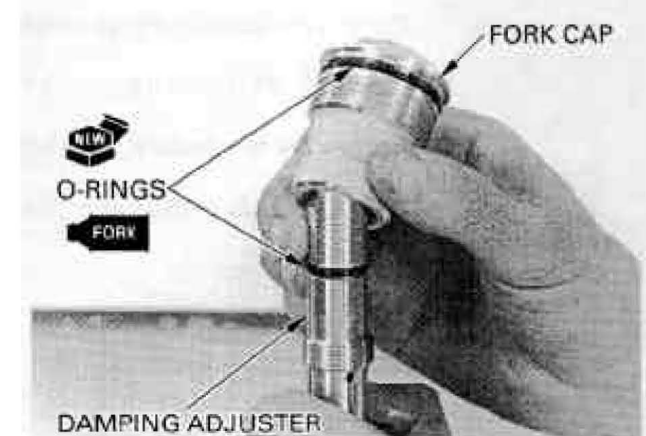
Install the joint plate.



Install the spring collar, joint plate and spring seat.

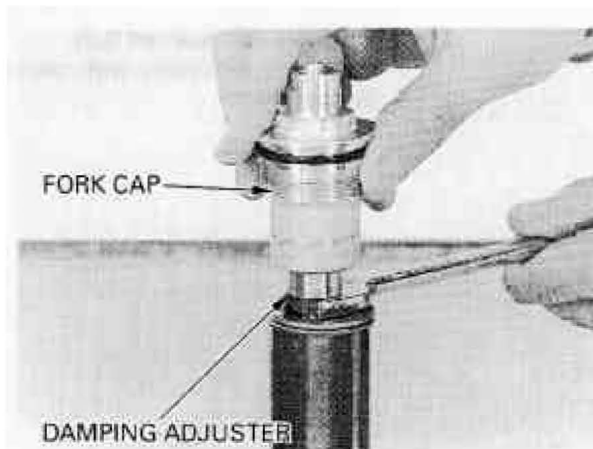


Coat new O-rings with fork fluid and install them into the grooves in the rebound damping adjuster and fork cap.
Install the fork cap onto the rebound damping adjuster.



FRONT WHEEL/SUSPENSION/STEERING

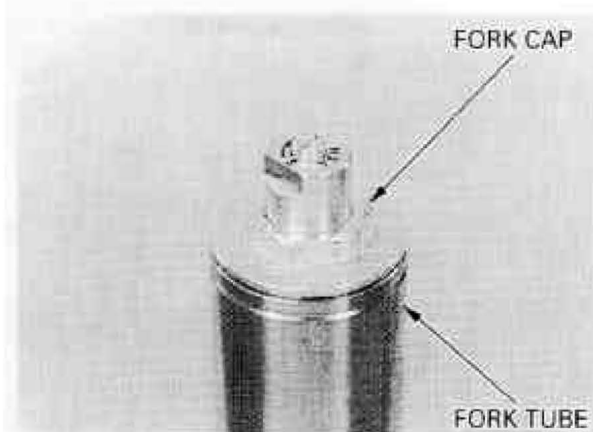
Hold the rebound damping adjuster and screw in the fork cap.



Install the fork cap into the fork tube.

NOTE:

Tighten the fork cap after installing the fork tube into the fork bridges.



INSTALLATION

Route the cables, wire harnesses and hoses properly (page 1-18).

Install the fork tube into the fork bridges and handlebar.

Make sure that the handlebar boss is positioned in the fork top bridge groove.

Align the stopper ring groove with the top surface of the handlebar.

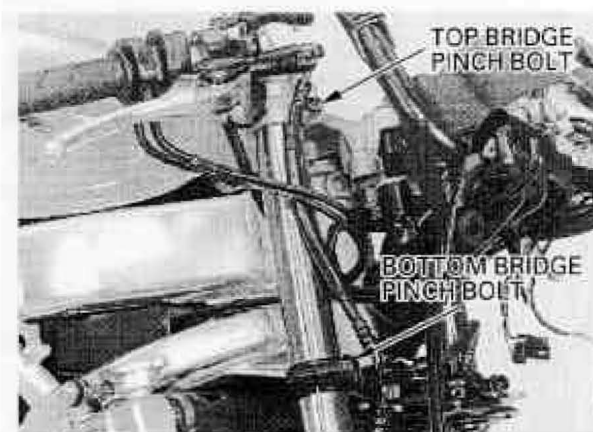


Tighten the fork top bridge pinch bolt.

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

Tighten the fork bottom bridge pinch bolt.

TORQUE: 49 N·m (5.0 kgf·m , 36 lbf·ft)



Tighten the fork cap.

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

Install the stopper ring and tighten the handlebar pinch bolt.

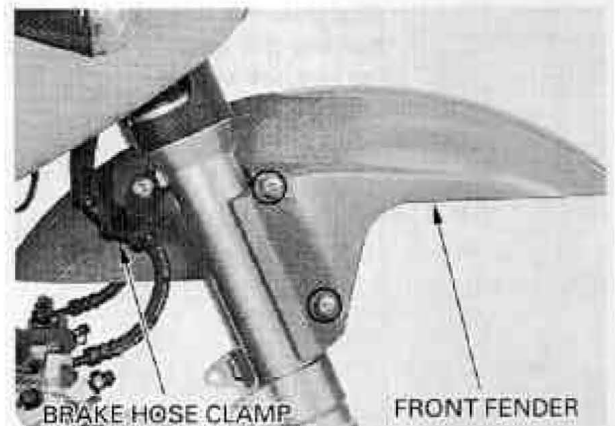


Install the front brake hose clamp onto the fork leg and tighten the bolt.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the front fender and tighten the four bolts.

Install the front wheel (page 13-10).



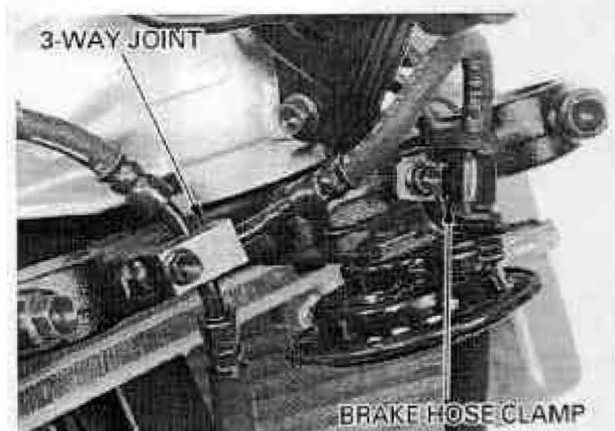
STEERING STEM

REMOVAL

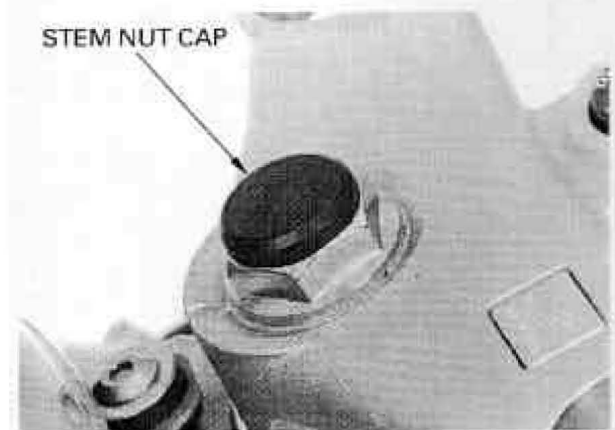
Remove the front fairing (page 2-3).

Remove the left and right forks (page 13-12).

Remove the front brake hose clamp and 3-way joint from the steering stem.

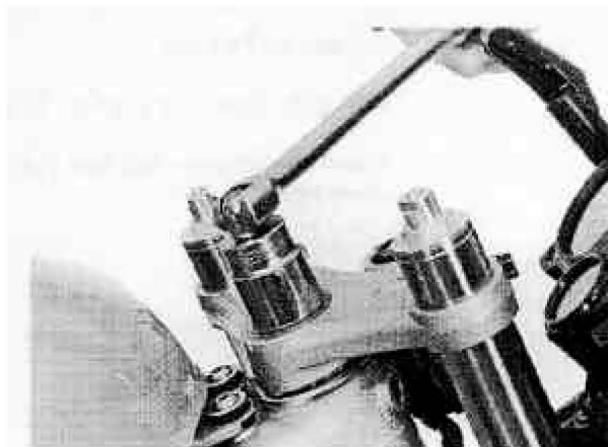


Remove the steering stem nut cap.

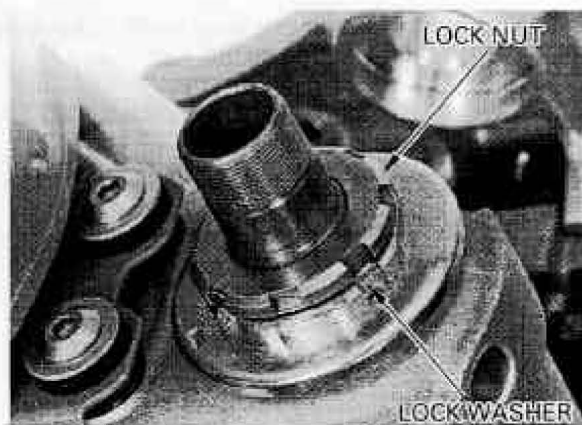


FRONT WHEEL/SUSPENSION/STEERING

Temporarily install the forks into the fork bridges.
Loosen the steering stem nut.
Remove the forks, stem nut and fork top bridge.



Straighten the lock washer tabs.
Remove the steering bearing adjustment nut lock nut and lock washer.

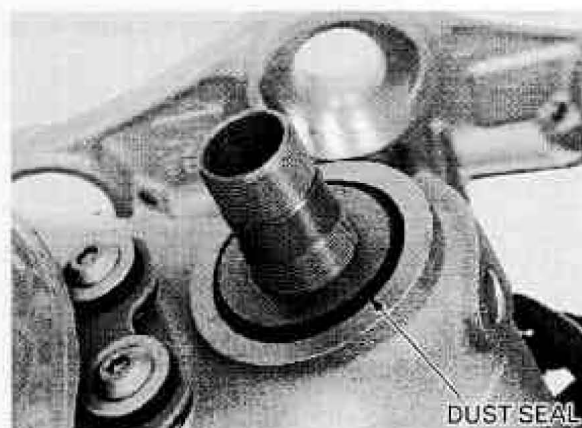


Remove the steering bearing adjustment nut using the special tool.

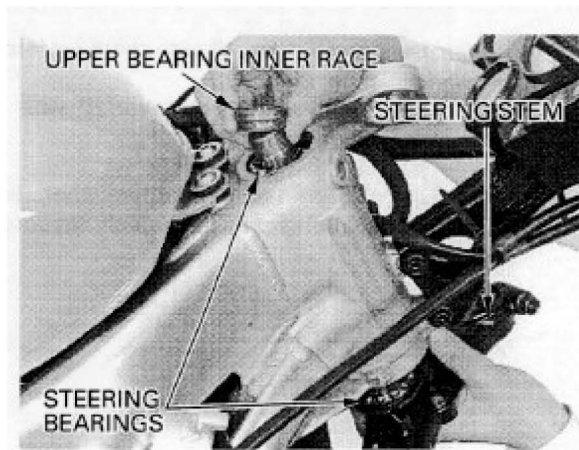
TOOL:
Steering stem socket 07916-3710101



Remove the dust seal.



Remove the upper bearing inner race, steering stem, upper and lower steering bearings.



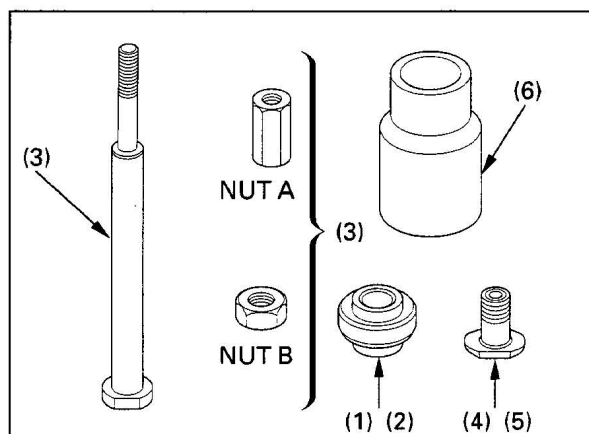
STEERING BEARING REPLACEMENT

Always replace the bearings and races as a set.

Replace the steering bearing outer races using the ball race remover set.

TOOLS:

Ball race remover set	07946-KM90001
– Driver attachment A (1)	07946-KM90100
– Driver attachment B (2)	07946-KM90200
– Driver shaft assembly (3)	07946-KM90300
– Bearing remover A (4)	07946-KM90401
– Bearing remover B (5)	07946-KM90500
– Assembly base (6)	07946-KM90600



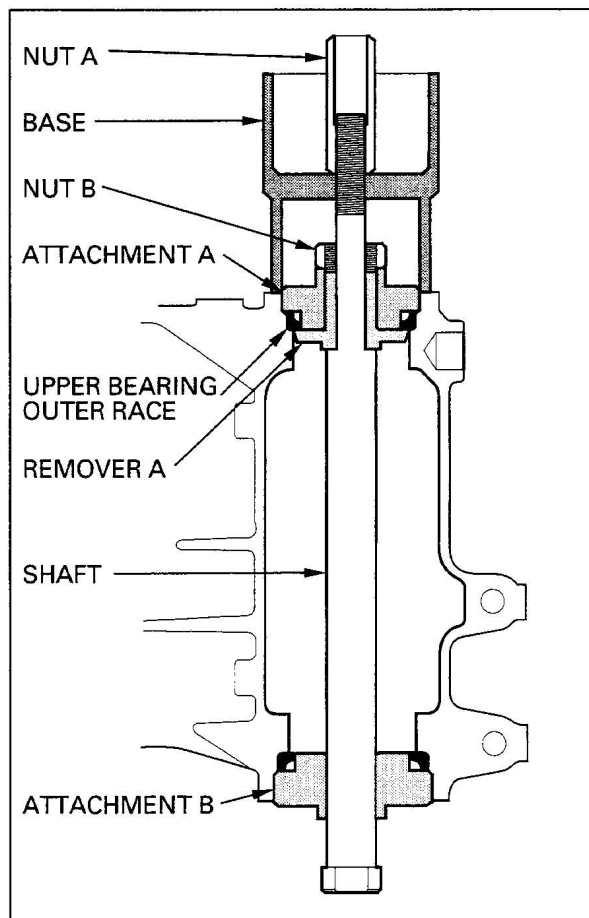
Note the installation direction of the assembly base.

Install the ball race remover into the steering head pipe as shown.

Align bearing remover A with the groove in the steering head.

Lightly tighten nut B.

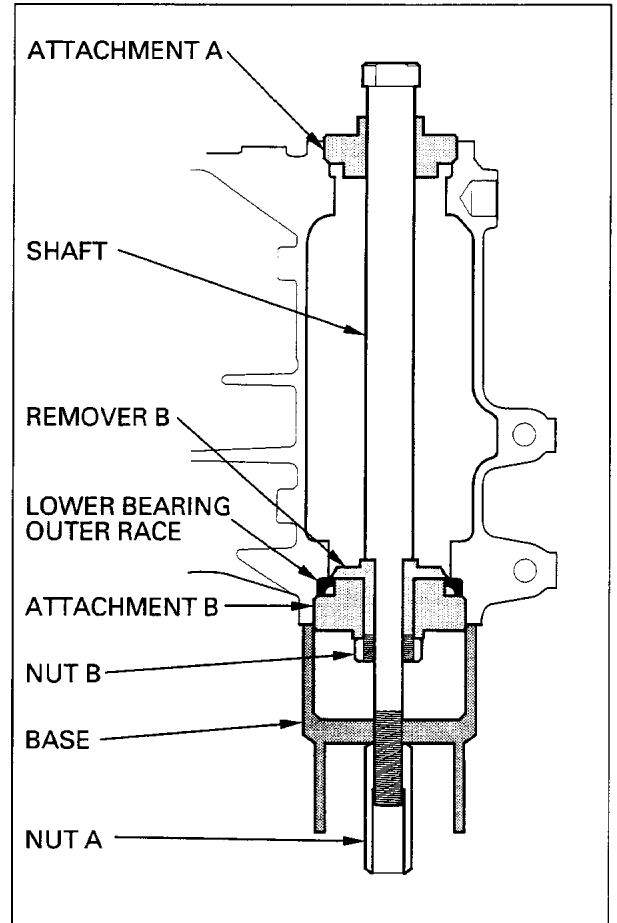
While holding the driver shaft, turn nut A gradually to remove the upper bearing outer race.



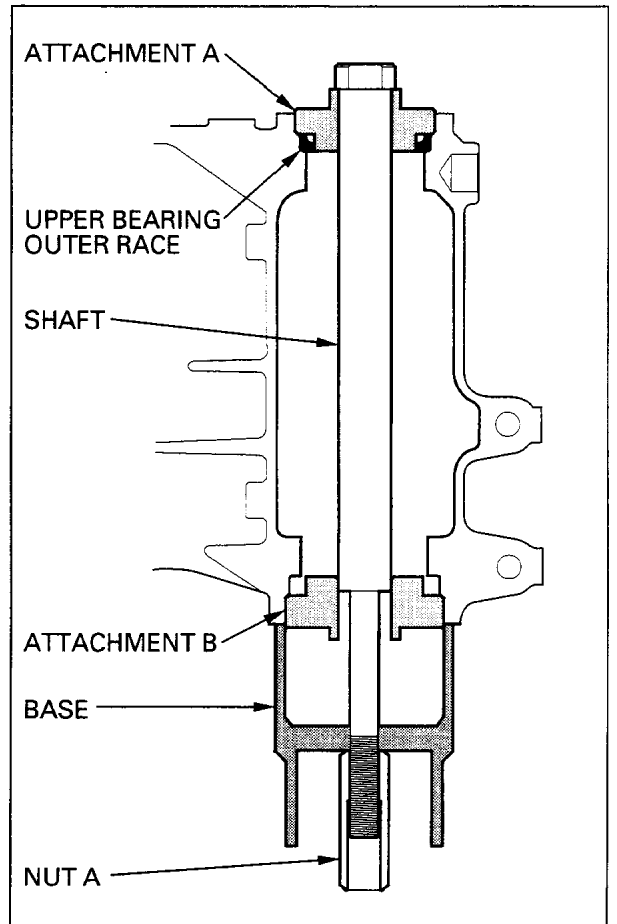
FRONT WHEEL/SUSPENSION/STEERING

Note the installation direction of the assembly base.

Install the ball race remover into the steering head pipe as shown.
Align bearing remover B with the groove in the steering head.
Lightly tighten nut B.
While holding the driver shaft, turn nut A gradually to remove the lower bearing outer race.

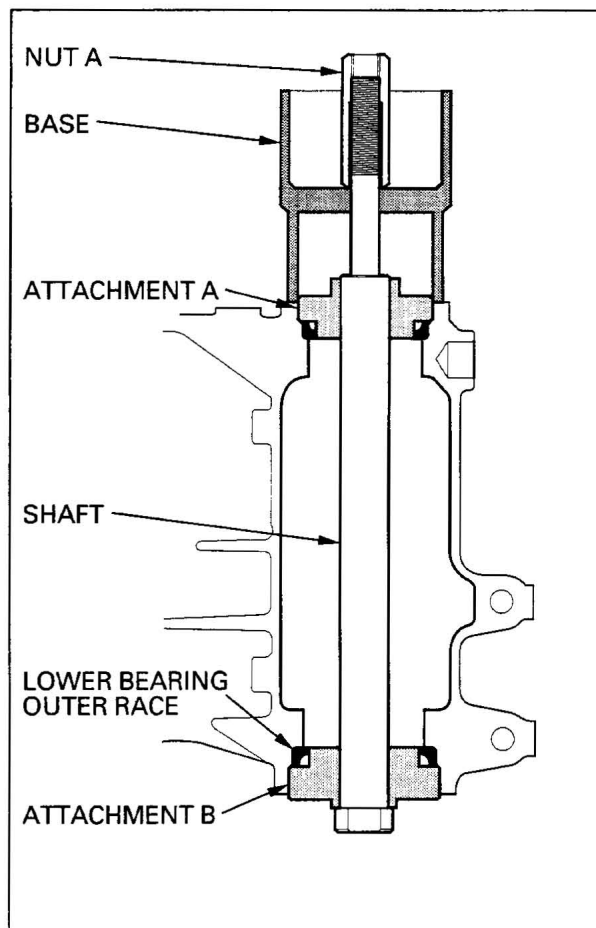


Install a new upper bearing outer race and the ball race remover as shown.
While holding the driver shaft, turn nut A gradually until the groove in driver attachment A aligns with the upper end of the steering head. This will allow you to install the upper bearing outer race.



Install a new lower bearing outer race and the ball race remover as shown.

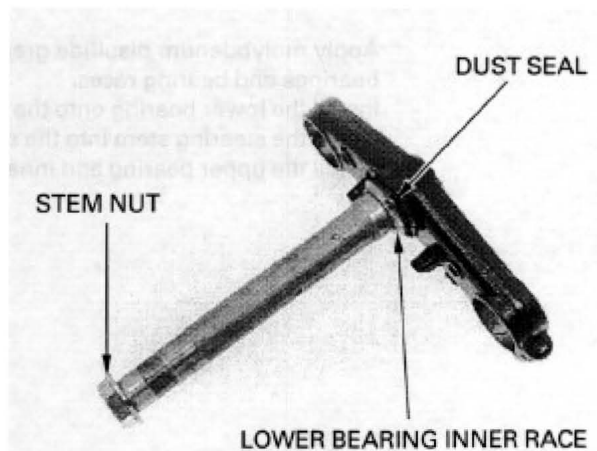
While holding the driver shaft, turn nut A gradually until the groove in driver attachment B aligns with the lower end of the steering head. This will allow you to install the upper bearing outer race.



Install the stem nut onto the stem to prevent the threads from being damage when removing the lower bearing inner race from the stem.

Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.

Remove the dust seal.



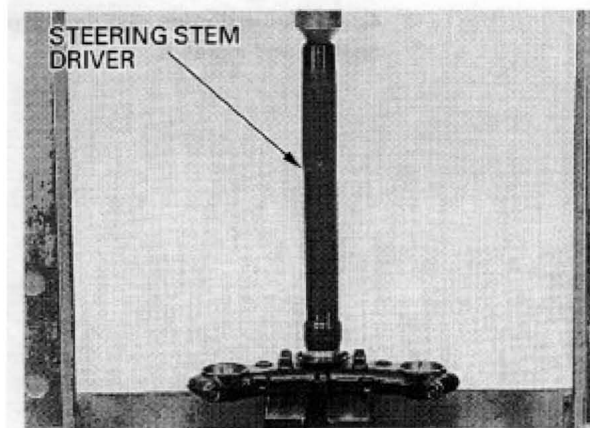
Apply molybdenum disulfide grease to a new dust seal lip and install it to the steering stem.

Press a new lower bearing inner race onto the steering stem using the special tool.

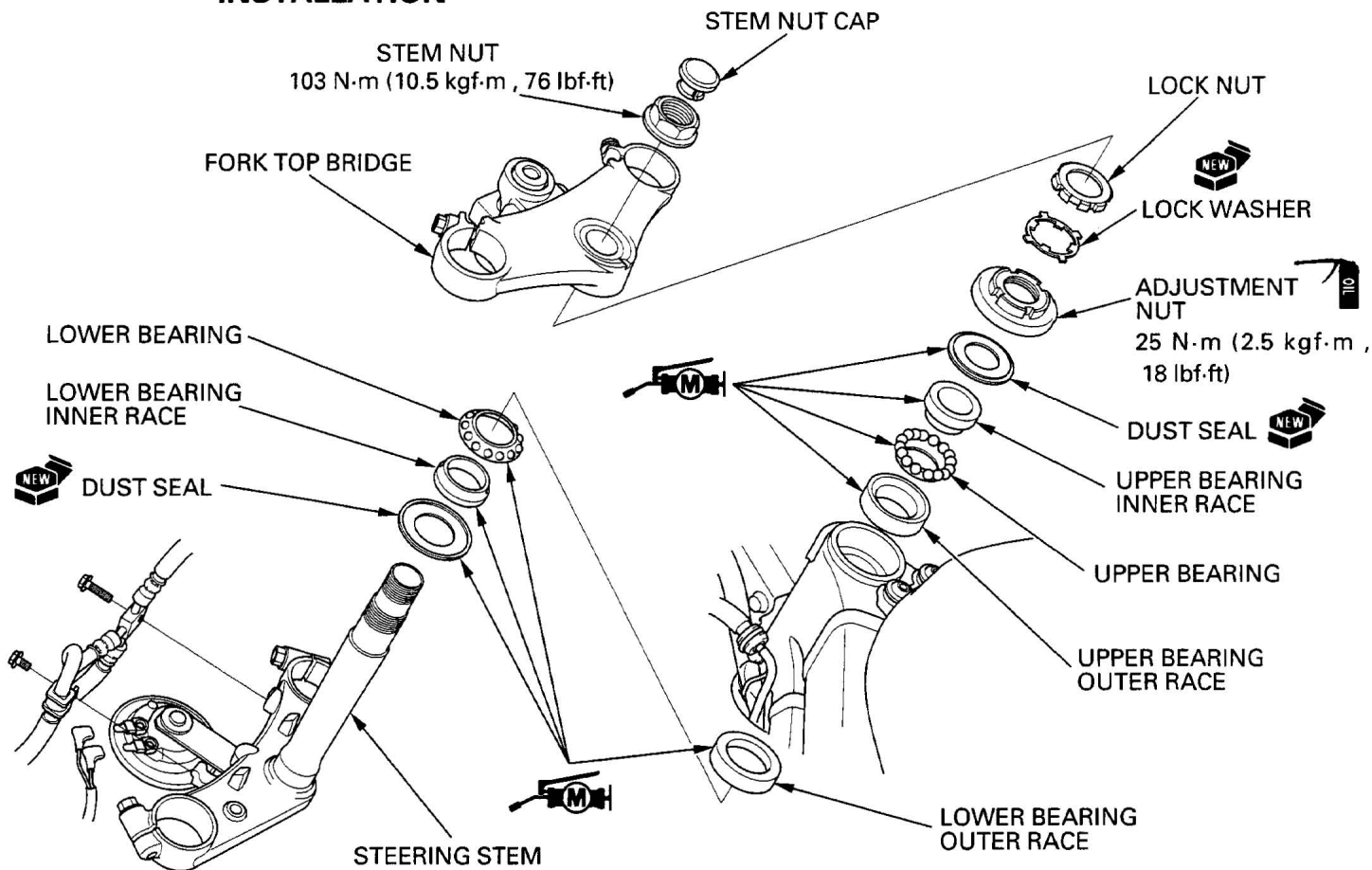
TOOL:

Steering stem driver

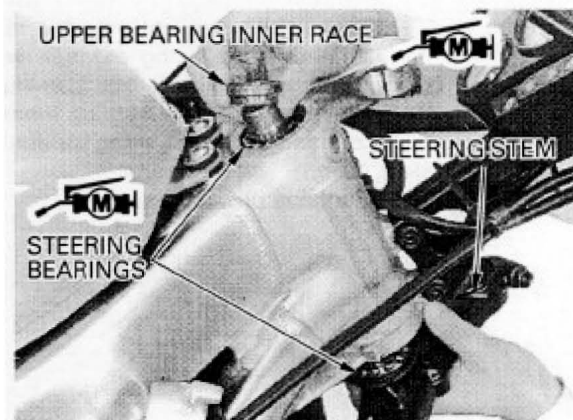
07946-MB00000



INSTALLATION



Apply molybdenum disulfide grease to the steering bearings and bearing races.
Install the lower bearing onto the steering stem.
Install the steering stem into the steering head pipe.
Install the upper bearing and inner race.



Apply molybdenum disulfide grease to a new dust seal lip and install it.



Apply oil to the bearing adjustment nut threads.
Install and tighten the steering stem adjustment nut.

TOOL:

Steering stem socket 07916-3710101

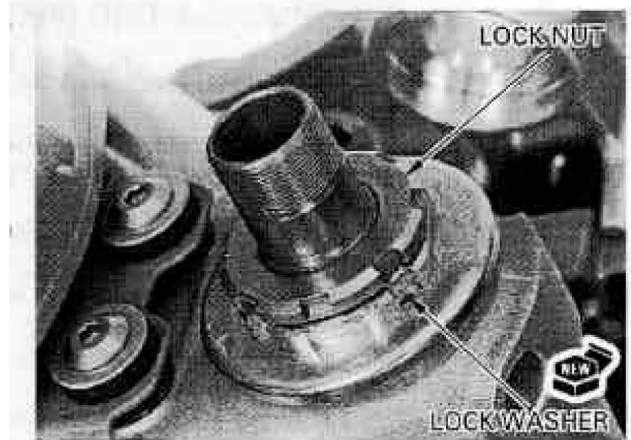
TORQUE: 25 N·m (2.5 kgf·m , 18 lbf·ft)

Turn the steering stem right and left, lock-to-lock at least five times to seat the bearings.
Retighten the steering stem adjustment nut to the same torque.



Install a new lock washer and bend the two opposite tabs down into the grooves in the adjustment nut.

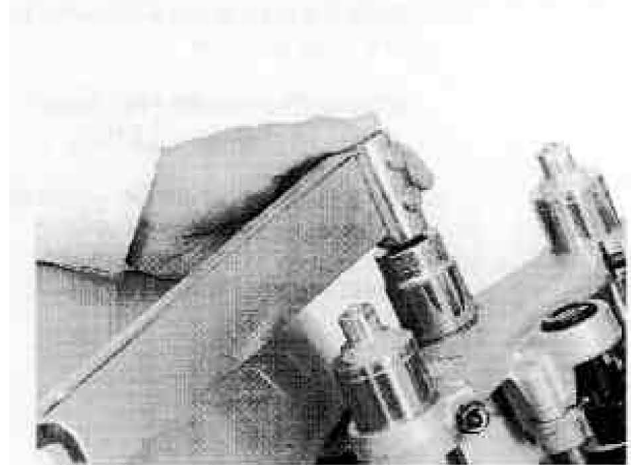
Install and finger tighten the lock nut all the way.
Hold the steering adjustment nut and further tighten the lock nut, within 90 degrees, to align its grooves with the tabs of the lock washer.
Bend up the lock washer tabs into the grooves of the lock nut.



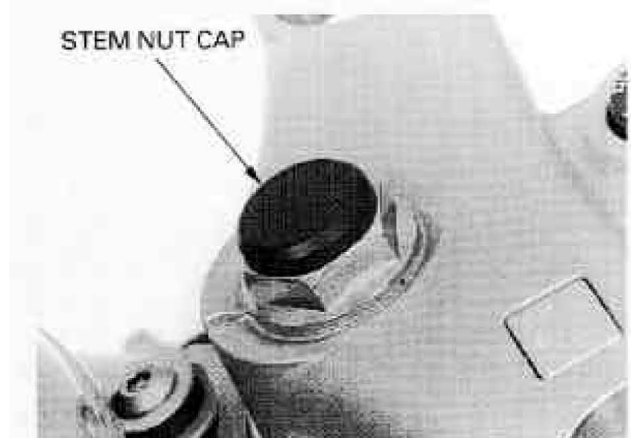
Install the fork top bridge and steering stem nut.
Temporarily install the forks into the fork bridges.
Tighten the steering stem nut.

TORQUE: 103 N·m (10.5 kgf·m , 76 lbf·ft)

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



Install the steering stem nut cap.

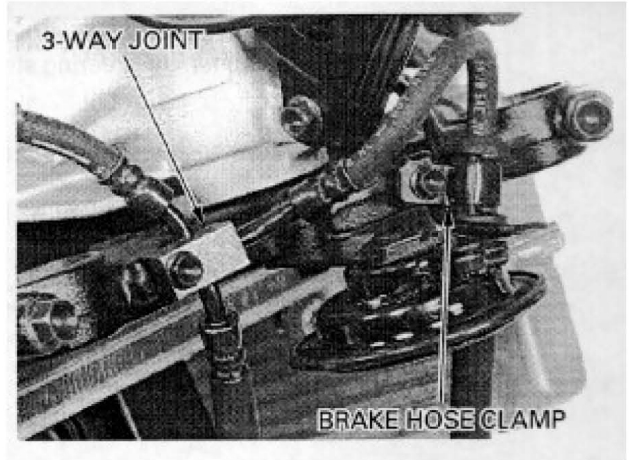


FRONT WHEEL/SUSPENSION/STEERING

Install the front brake hose 3-way joint and clamp, and tighten the bolts.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the forks (page 13-20).
Install the front fairing (page 2-3).



STEERING BEARING PRELOAD

Remove the front fairing (page 2-3).

Support the motorcycle securely using safety stands or a hoist and raise the front wheel off the ground.

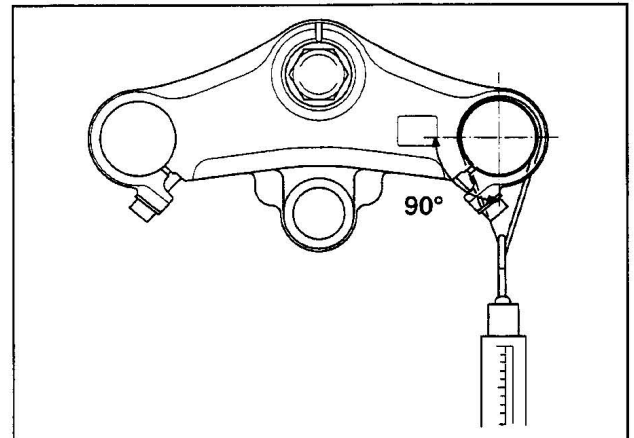
Position the steering stem to the straight ahead position.

Hook a spring scale to the fork tube between the fork top and bottom bridges.

Make sure that there is no cable, wire harness or hose interference.

Pull the spring scale keeping it right angle to the steering stem.

Read the scale at the point where the steering stem just starts to move.



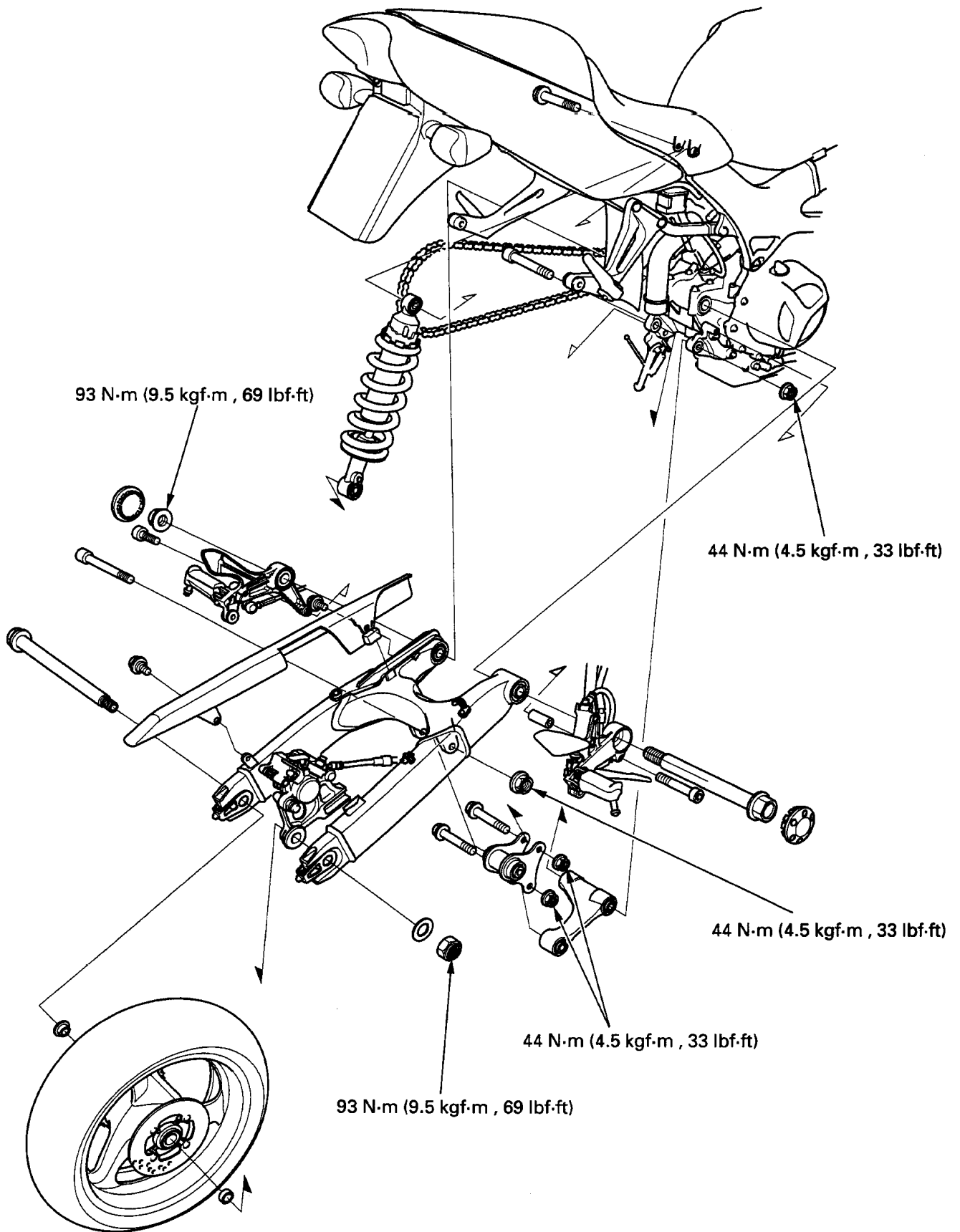
STEERING BEARING PRELOAD:

1.0—1.6 kgf (2.2—3.5 lbf)

If the readings do not fall within the limits, readjust the steering bearing adjustment.

Install the front fairing (page 2-3).

REAR WHEEL/SUSPENSION



14. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	14-1	SHOCK ABSORBER	14-8
TROUBLESHOOTING	14-2	SUSPENSION LINKAGE	14-11
REAR WHEEL	14-3	SWINGARM	14-15

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.
- The shock absorber contains nitrogen gas under high pressure. Do not allow fire or heat near the shock absorber.
- Before disposal of the shock absorber, release the nitrogen.
- The damper unit is filled with nitrogen gas under high pressure, do not try to disassemble.

- A hoist or equivalent is required to support the motorcycle when servicing the rear wheel and suspension.
- Use genuine Honda replacement bolts and nuts for all suspension pivots and mounting points.
- Refer to section 15 for brake system service.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—————	2.0 (0.08)
Cold tire pressure	Driver only	290 kPa (2.90 kgf/cm ² , 42 psi)	—————
	Driver and passenger	290 kPa (2.90 kgf/cm ² , 42 psi)	—————
Axle runout		—————	0.20 (0.008)
Wheel rim runout	Radial	—————	2.0 (0.08)
	Axial	—————	2.0 (0.08)
Wheel balance weight		—————	60 g (2.1 oz) max.

14

TORQUE VALUES

Rear axle nut	93 N·m (9.5 kgf·m , 69 lbf·ft)	
Rear brake disc bolt	42 N·m (4.3 kgf·m , 31 lbf·ft)	ALOC bolt
Final driven sprocket bolt	108 N·m (11.0 kgf·m , 80 lbf·ft)	U-nut
Shock absorber upper mounting bolt	44 N·m (4.5 kgf·m , 33 lbf·ft)	ALOC bolt
Shock absorber lower mounting nut	44 N·m (4.5 kgf·m , 33 lbf·ft)	U-nut
Shock arm-to-swingarm nut	44 N·m (4.5 kgf·m , 33 lbf·ft)	U-nut
Shock arm-to-shock link nut	44 N·m (4.5 kgf·m , 33 lbf·ft)	U-nut
Shock link-to-bracket nut	44 N·m (4.5 kgf·m , 33 lbf·ft)	U-nut
Swingarm pivot nut	93 N·m (9.5 kgf·m , 69 lbf·ft)	U-nut
Drive chain slider bolt	9 N·m (0.9 kgf·m , 6.5 lbf·ft)	ALOC bolt
Rear brake hose clamp screw	4 N·m (0.43 kgf·m , 3.1 lbf·ft)	ALOC screw

REAR WHEEL/SUSPENSION

TOOLS

Bearing remover shaft	07746-0050100
Bearing remover head, 20 mm	07746-0050600
Driver	07749-0010000
Attachment, 42 × 47 mm	07746-0010300
Pilot, 20 mm	07746-0040500
Attachment, 52 × 55 mm	07746-0010400
Pilot, 22 mm	07746-0041000
Pin driver	07GMD-KT80100
Attachment, 24 × 26 mm	07746-0010700
Pilot, 17 mm	07746-0040400
Driver shaft	07946-MJ00100
Needle bearing remover	07HMC-MR70100
Attachment, 32 × 35 mm	07746-0010100
Attachment, 37 × 40 mm	07746-0010200
Pilot, 28 mm	07746-0041100
Bearing remover, 17 mm	07936-3710300
Bearing remover handle	07936-3710100
Sliding weight	07741-0010201

TROUBLESHOOTING

Soft suspension

- Weak shock absorber spring
- Incorrect suspension adjustment
- Oil leakage from damper unit
- Insufficient tire pressure

Hard suspension

- Incorrect suspension adjustment
- Damaged rear suspension pivot bearings
- Bent damper rod
- Tire pressure too high

Rear wheel wobbling

- Bent rim
- Worn or damaged rear wheel bearings
- Faulty rear tire
- Unbalanced rear tire and wheel
- Insufficient rear tire pressure
- Faulty swingarm pivot bearings

Rear wheel turns hard

- Faulty rear wheel bearings
- Bent rear axle
- Rear brake drag
- Drive chain too tight

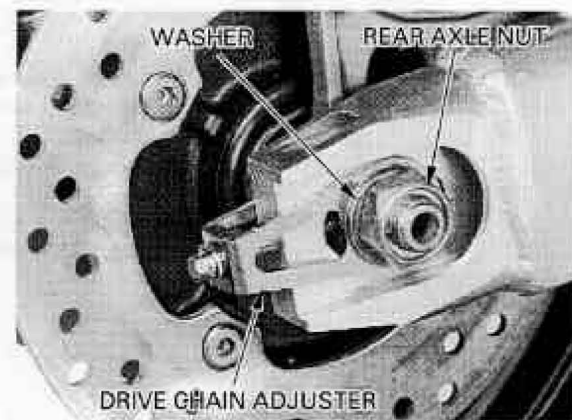
Rear suspension noise

- Faulty rear shock absorber
- Loose rear suspension fasteners
- Worn rear suspension pivot bearings

REAR WHEEL

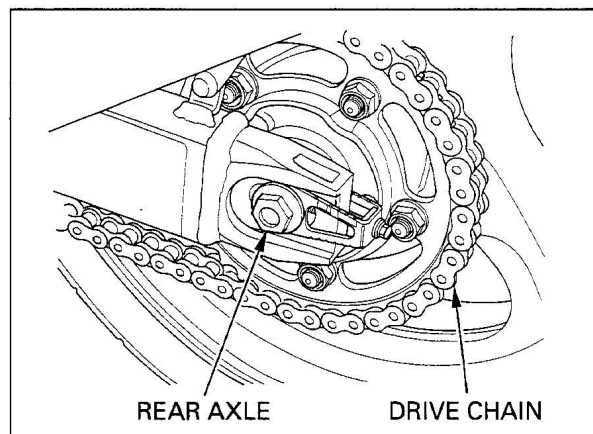
REMOVAL

Loosen the drive chain adjusters and rear axle nut. Raise the rear wheel off the ground and support the motorcycle securely with a hoist or equivalent. Remove the rear axle nut and washer.

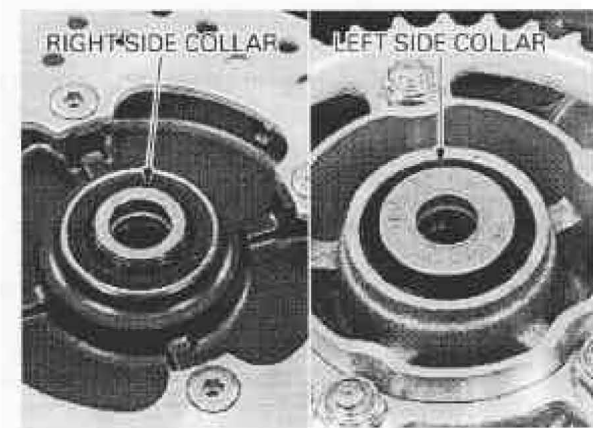


Push the rear wheel forward and derail the drive chain from the final driven sprocket.

Remove the rear axle and the rear wheel.



Remove the side collars.

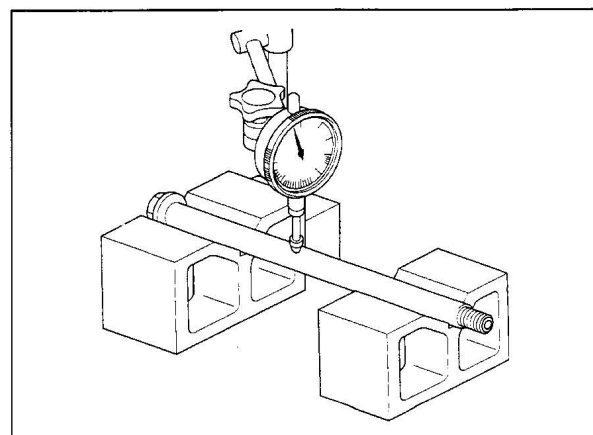


INSPECTION

AXLE

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

SERVICE LIMIT: 0.20 mm (0.008 in)



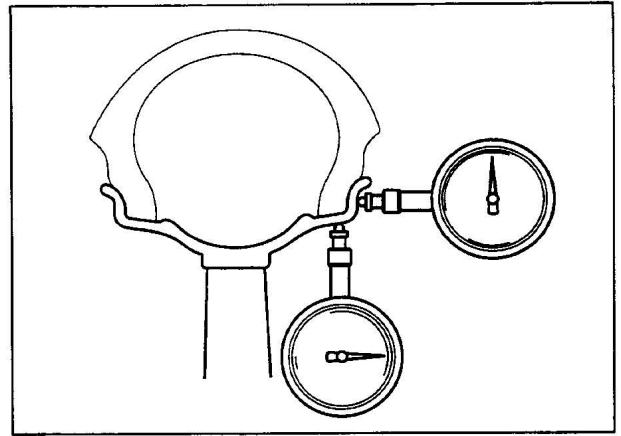
REAR WHEEL/SUSPENSION

WHEEL

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 LIMITS: RADIAL: 2.0 mm (0.08 in)
AXIAL: 2.0 mm (0.08 in)

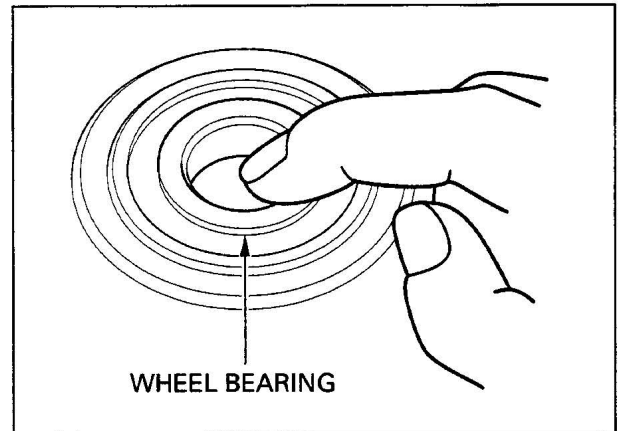


WHEEL BEARING

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

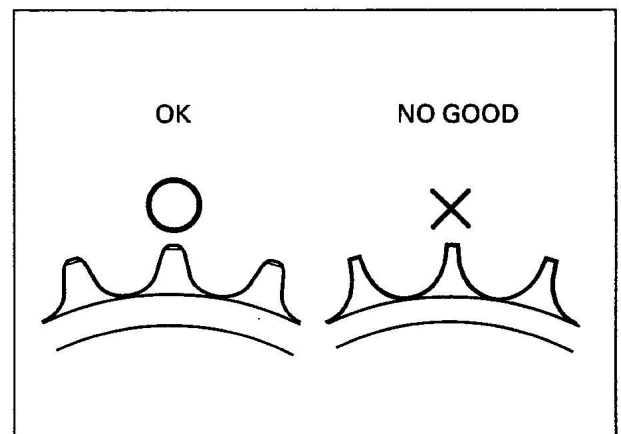


DRIVEN SPROCKET

Check the condition of the driven sprocket teeth. Replace the sprocket if worn or damaged.

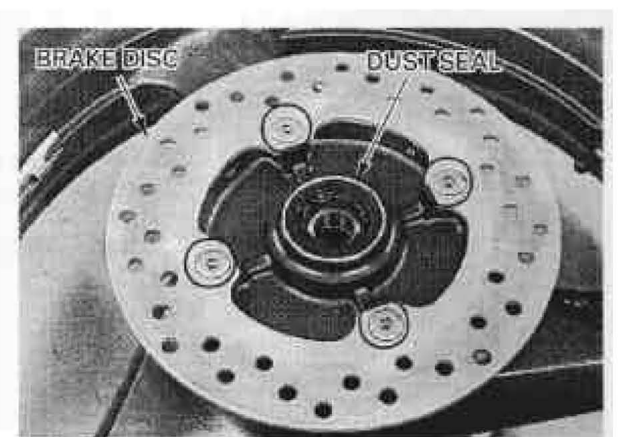
NOTE:

- If the driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition, or the replacement chain or sprocket will wear rapidly.



DISASSEMBLY

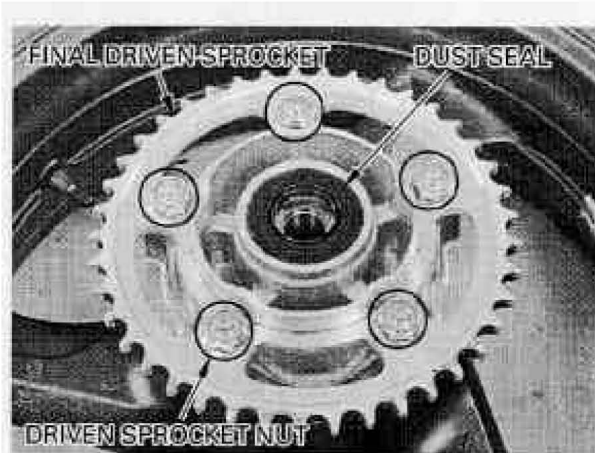
Remove the right dust seal.
Remove the bolts and brake disc.



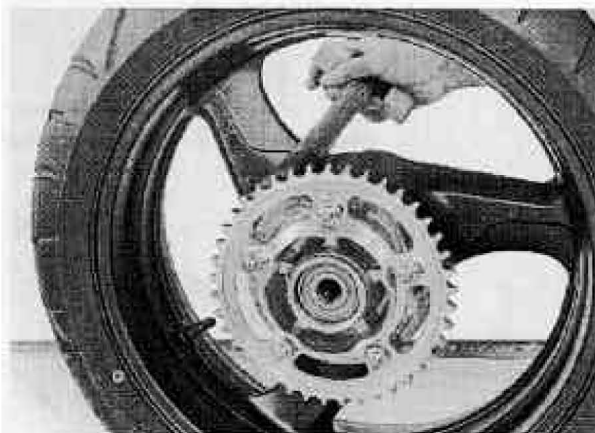
Remove the left dust seal.

NOTE:

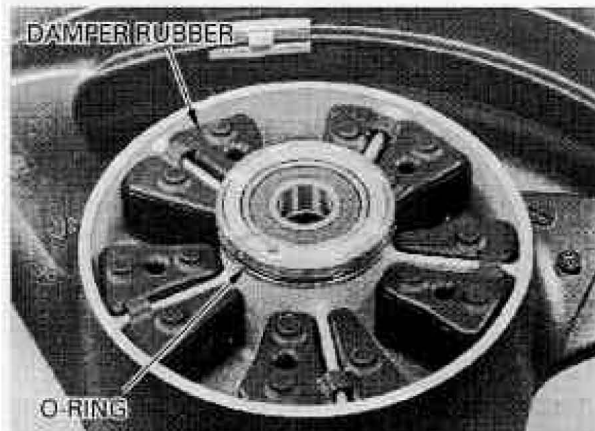
If you will replace the final driven sprocket, loosen the driven sprocket nuts.



Remove the final driven flange assembly from the left wheel hub.



Remove the damper rubbers and O-ring.

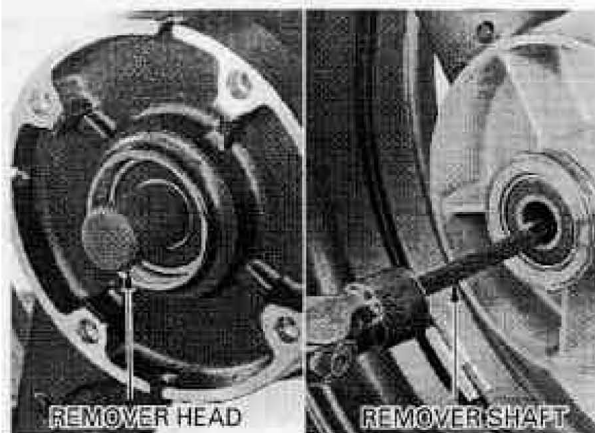


Replace the wheel bearings in pairs. Do not reuse old bearings.

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:

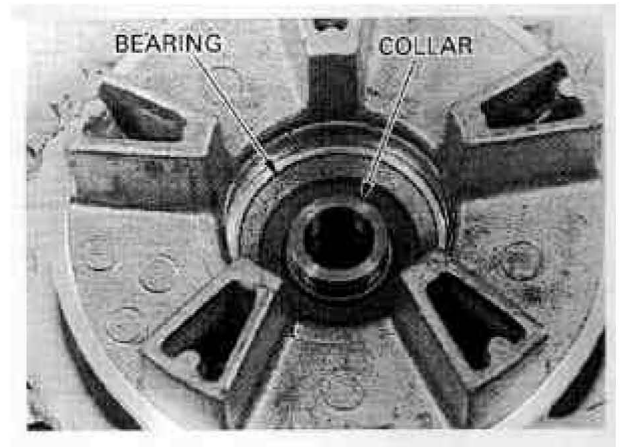
- Bearing remover shaft** 07746-0050100
- Bearing remover head, 20 mm** 07746-0050600



REAR WHEEL/SUSPENSION

Remove the driven flange collar.

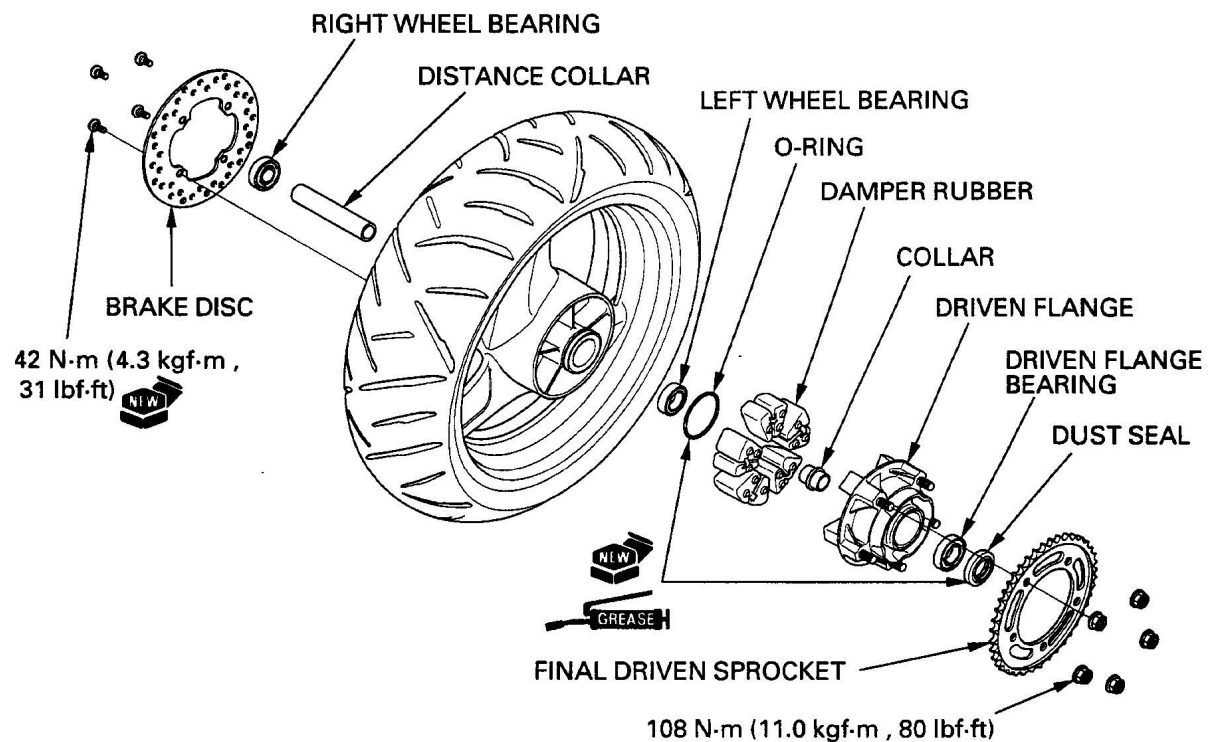
Remove the driven flange bearing.



ASSEMBLY

NOTE:

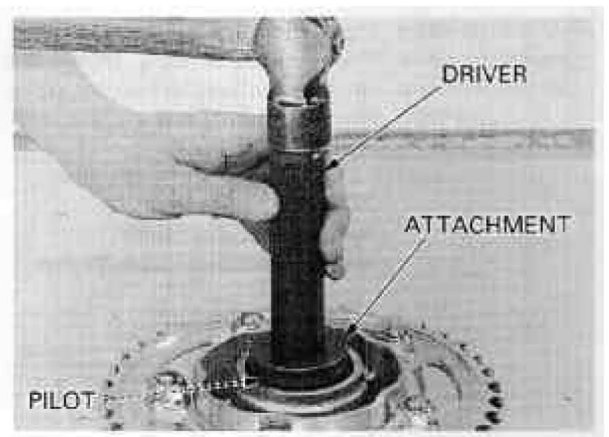
Refer to page 13-10 for wheel balance.



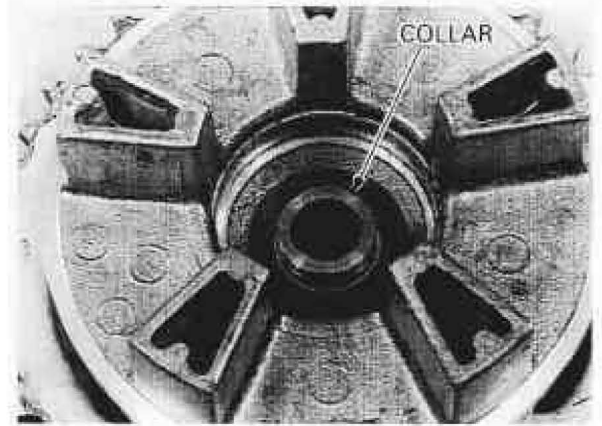
Drive in a new driven flange bearing squarely with the marking side facing up until it is fully seated, using the special tools.

TOOLS:

Driver	07749-001000
Attachment, 52 × 55 mm	07746-0010400
Pilot, 22 mm	07746-0041000



Install the driven flange collar.



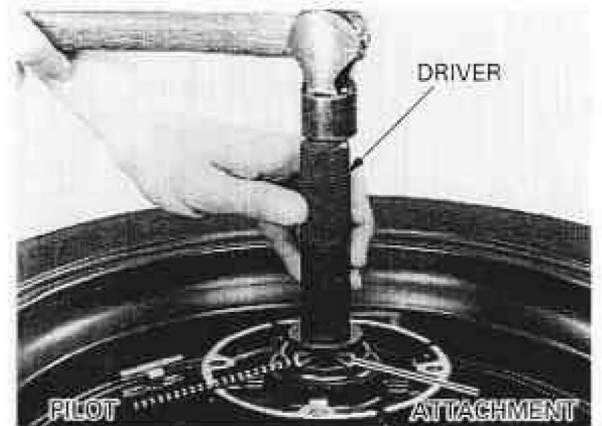
Drive in a new right bearing squarely with the marking side facing up until it is fully seated, using the special tools.

Install the distance collar.

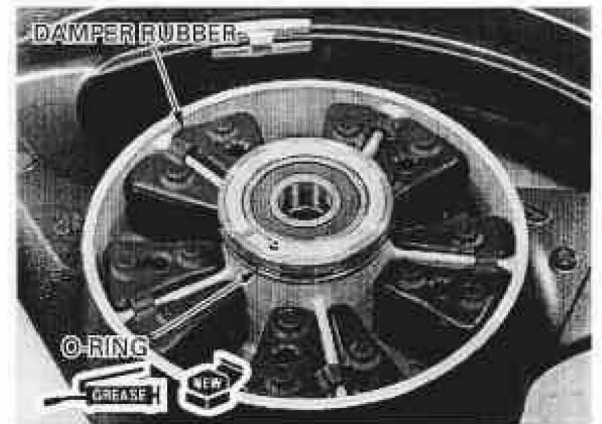
Drive in a new left bearing squarely with the marking side facing up until it is fully seated.

TOOLS:

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



Install the damper rubbers into the left wheel hub. Coat a new O-ring with grease and install it into the left wheel hub groove.



Install the driven flange assembly into the left wheel hub.

When the driven sprocket is replaced, install a new sprocket and tighten the nuts.

TORQUE: 108 N·m (11.0 kgf·m , 80 lbf·ft)

Apply grease to a new dust seal lip and install it into the driven flange.

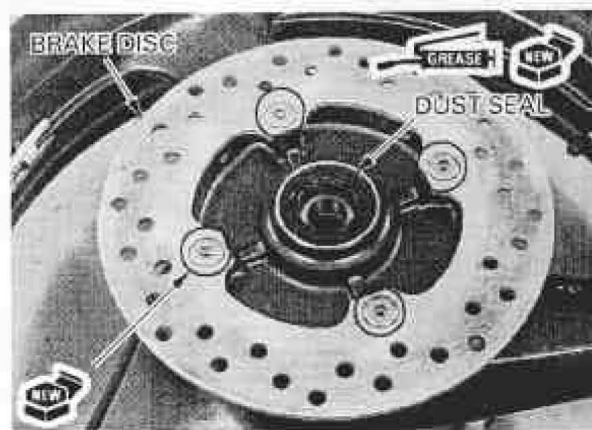


REAR WHEEL/SUSPENSION

Install the brake disc onto the right wheel hub.
Install new disc bolts and tighten them in a criss-cross pattern in 2 or 3 steps.

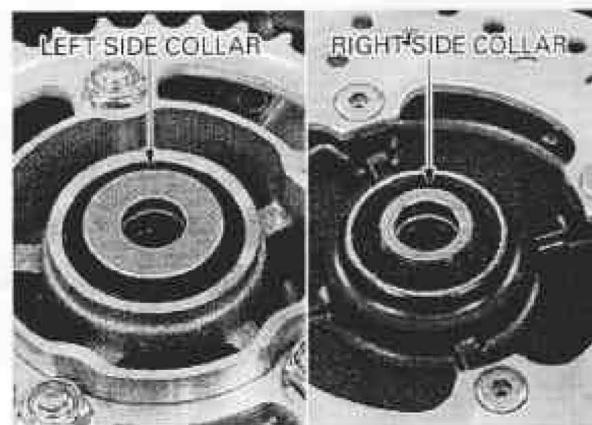
TORQUE: 42 N·m (4.3 kgf·m , 31 lbf·ft)

Apply grease to a new dust seal lip and install it into the right wheel hub.



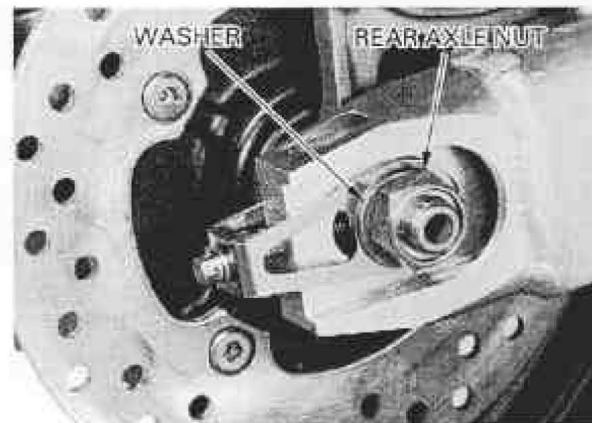
INSTALLATION

Install the side collars.



Make sure that the rear brake caliper is in position.
Place the rear wheel in the swingarm and install the drive chain over the driven sprocket.
Insert the rear axle through the swingarm, wheel and caliper bracket.
Install the washer and axle nut.

Adjust the drive chain slack (page 3-14).



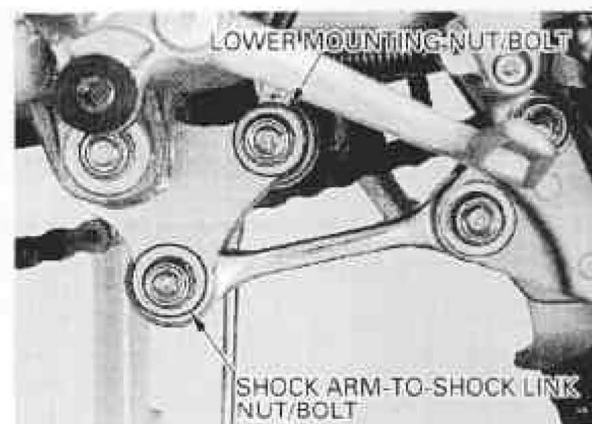
SHOCK ABSORBER

REMOVAL

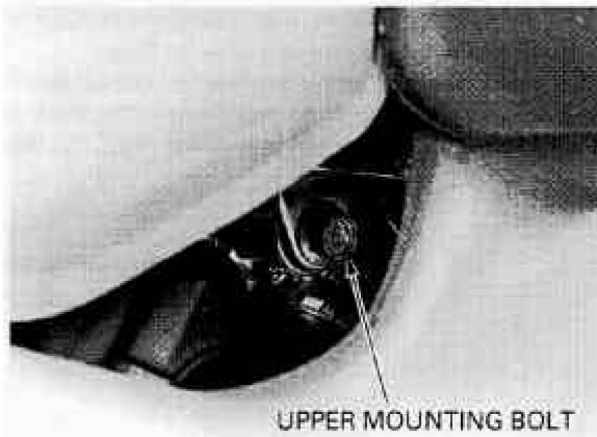
Support the motorcycle securely with a hoist or equivalent.

Remove the exhaust pipe (page 2-5).

Remove the shock arm-to-shock link nut and bolt.
Remove the shock absorber lower mounting nut and bolt.

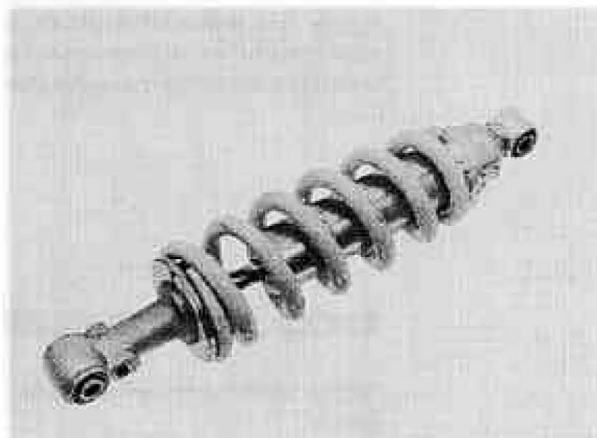


Remove the shock absorber upper mounting bolt and the shock absorber.



INSPECTION

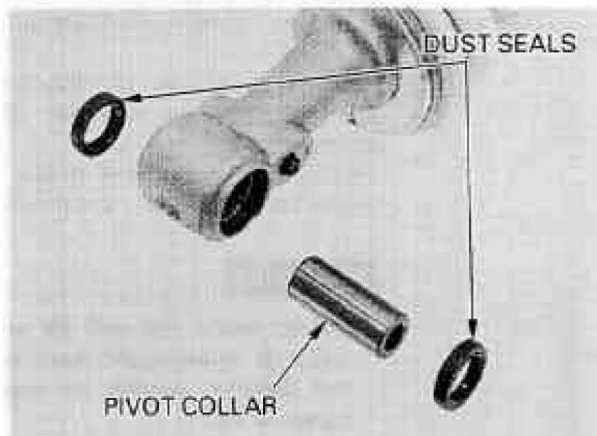
Check the damper unit for leakage or other damage. Check the upper joint bushing for wear or damage. Replace the shock absorber assembly if necessary.



Remove the lower joint pivot collar. Check the dust seals and needle bearing for wear or damage; replace them if necessary.

NEEDLE BEARING REPLACEMENT

Remove the dust seals.

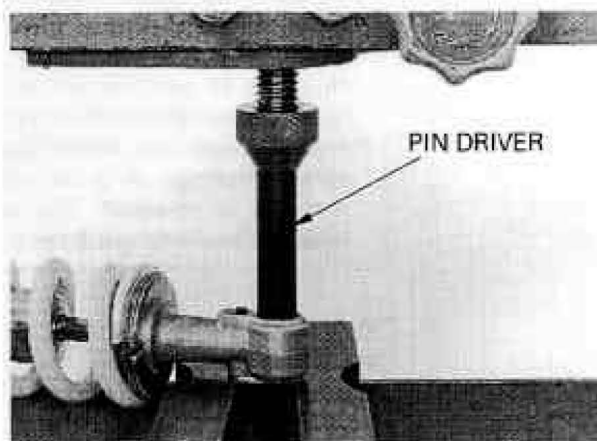


Set the lower joint in a hydraulic press with the rebound damping adjuster facing up when pressing in and out the bearing.

Press the needle bearing out of the lower joint using the special tool.

TOOL
Pin driver

07GMD-KT80100



REAR WHEEL/SUSPENSION

Press in the bearing with the marking side facing up.

Apply molybdenum disulfide grease to the needle rollers of a new bearing. Carefully press the needle bearing in the lower joint until the depth from the lower joint outer surface is 5.0–5.5 mm (0.20–0.22 in), using the special tool.

TOOLS:

Driver	07749-0010000
Attachment, 24 × 26 mm	07746-0010700
Pilot, 17 mm	07746-0040400

Apply molybdenum disulfide grease to new dust seal lips and install them into the lower joint. Install the lower joint pivot collar.

SHOCK ABSORBER DISPOSAL

Center punch the damper case to mark the drilling point.

DRILLING POINT:

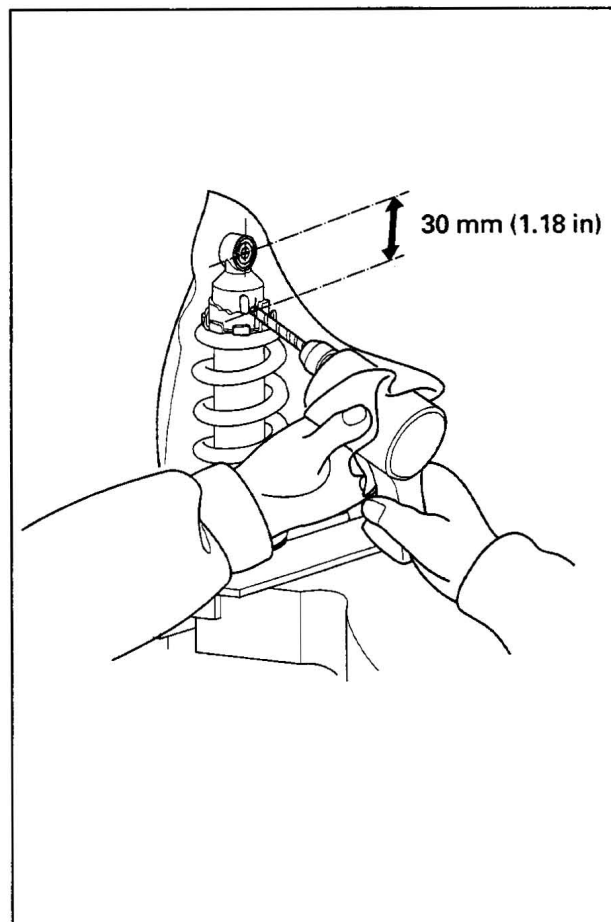
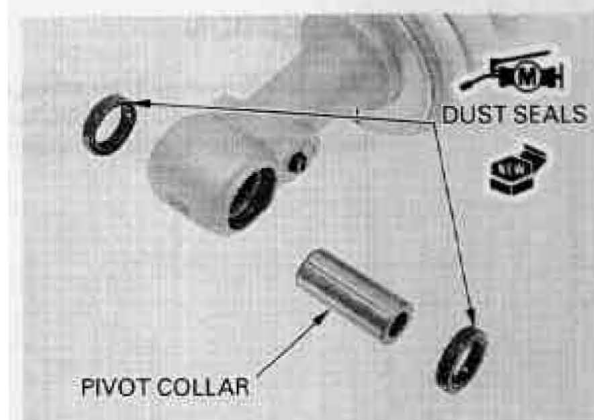
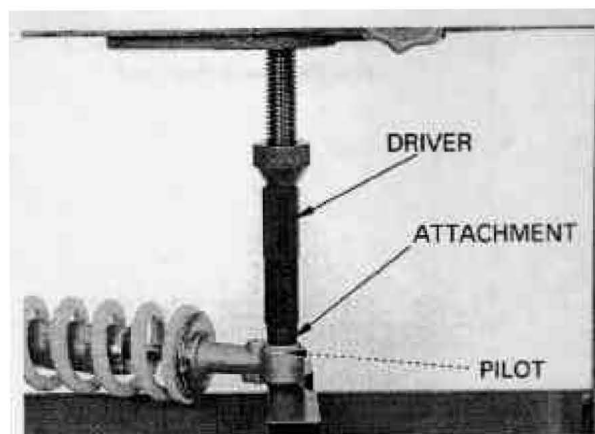
30.0 mm (1.18 in) from top surface

Wrap the shock absorber inside a plastic bag. Support the shock absorber upright in a vise as shown. Through the open end of the bag, insert a drill motor with a sharp 2–3 mm (5/64–1/8 in) drill bit.

▲WARNING

- **Do not use a dull drill bit which could cause a build-up of excessive heat and pressure inside the damper, leading to explosion and severe personal injury.**
- **The shock absorber contains nitrogen gas and oil under high pressure. Do not drill any further down the damper case than the measurement given above, or you may drill into the oil chamber; oil escaping under high pressure may cause serious personal injury.**
- **Always wear eye protection to avoid getting metal shavings in your eyes when the gas pressure is released. The plastic bag is only intended to shield you from the escaping gas.**

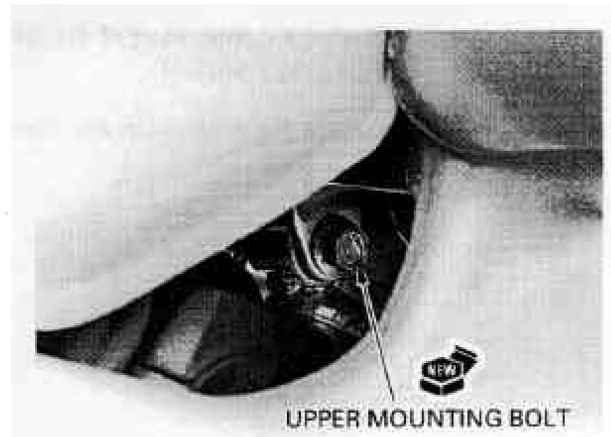
Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from the getting caught in the bit when you start.



INSTALLATION

Install the shock absorber in the frame with the rebound damping adjuster facing to the right.
Install and tighten a new upper mounting bolt.

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



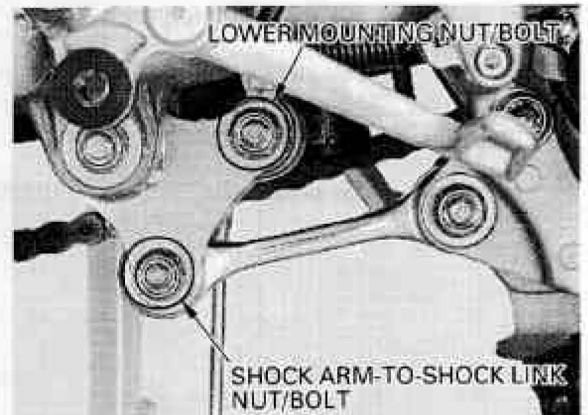
Install the lower mounting bolt and tighten the nut.

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

Install the shock arm-to-shock link bolt and tighten the nut.

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

Install the exhaust pipe and mufflers (page 2-6).



SUSPENSION LINKAGE

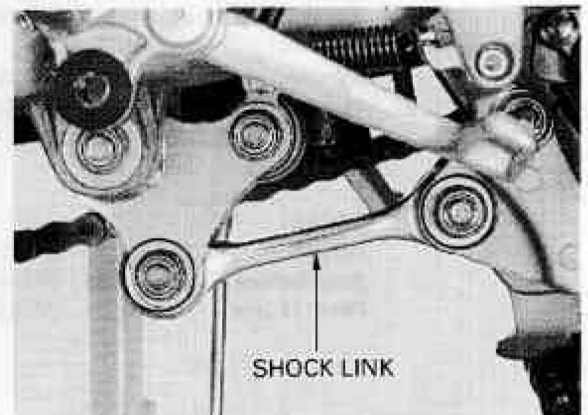
REMOVAL

Support the motorcycle securely with a hoist or equivalent.

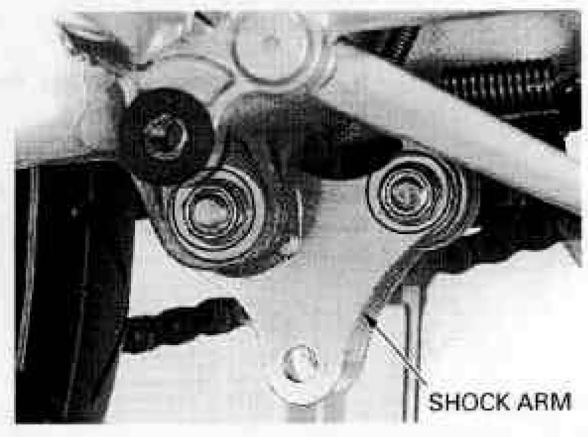
Remove the exhaust pipe (page 2-5).

Remove the following:

- shock arm-to-shock link nut and bolt
- shock link-to-bracket nut and bolt
- shock link

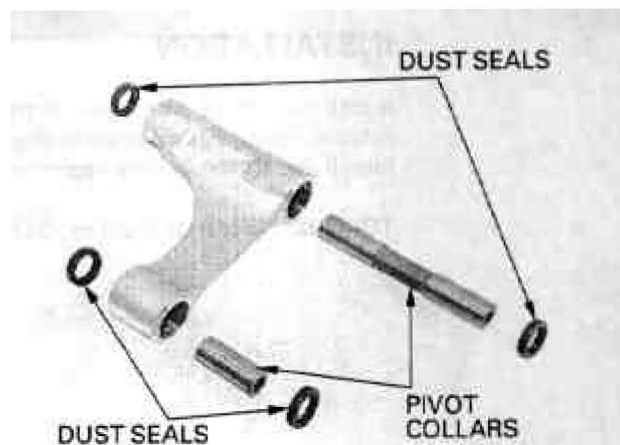


- shock arm-to-swingarm nut and bolt
- shock absorber lower mounting nut and bolt
- shock arm



SHOCK LINK PIVOT BEARING REPLACEMENT

Remove the pivot collars and dust seals.



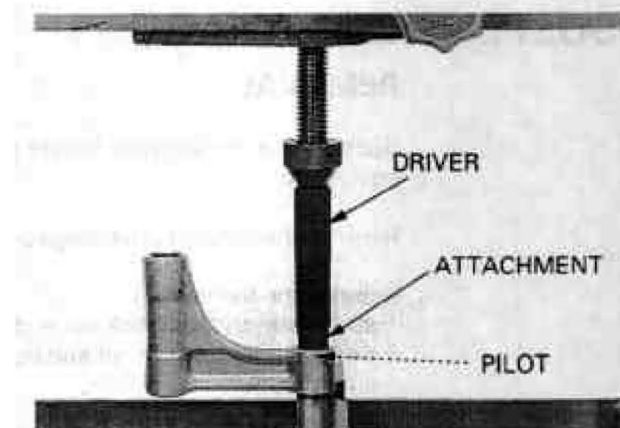
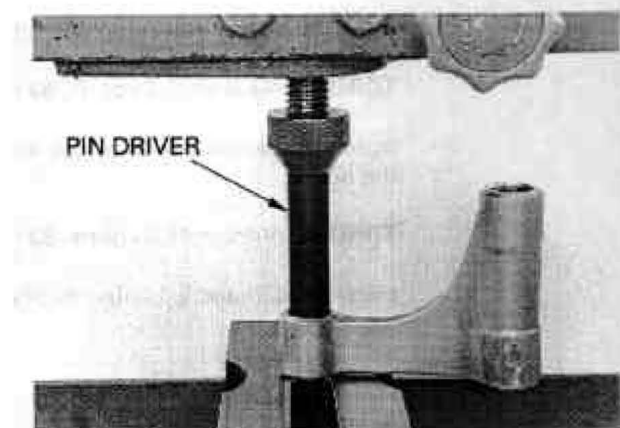
SHOCK ARM SIDE

Press the needle bearing out of the shock link pivot using the special tool.

TOOL:

Pin driver

07GMD-KT80100



Press in the bearing with the marking side facing up.

Apply molybdenum disulfide grease to the needle rollers of a new bearing.

Carefully press the needle bearing in the shock link pivot until the depth from the shock link outer surface is 5.2–5.7 mm (0.20–0.22 in), using the special tool.

TOOLS:

Driver

07749-0010000

Attachment, 24 × 26 mm

07746-0010700

Pilot, 17 mm

07746-0040400

SHOCK LINK BRACKET SIDE

Remove the needle bearings from the shock link pivot using the special tools.

TOOLS:

Bearing remover, 17 mm

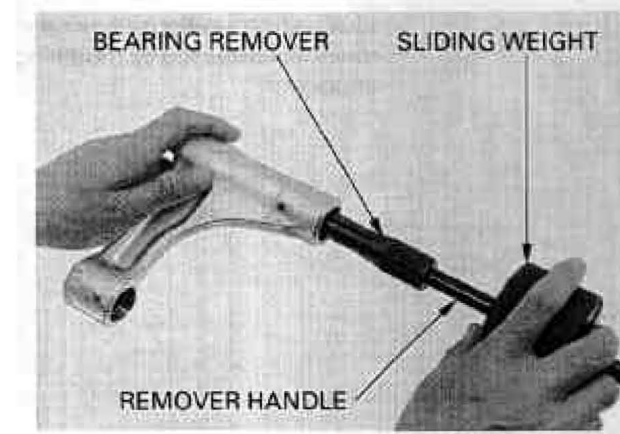
07936-3710300

Bearing remover handle

07936-3710100

Sliding weight

07741-0010201

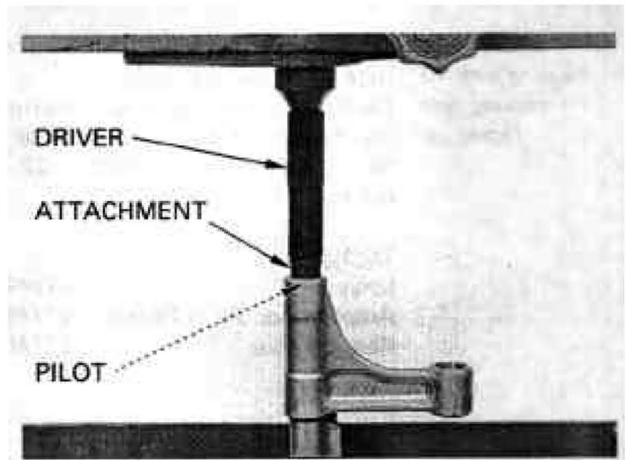


Press in the bearing with the marking side facing up.

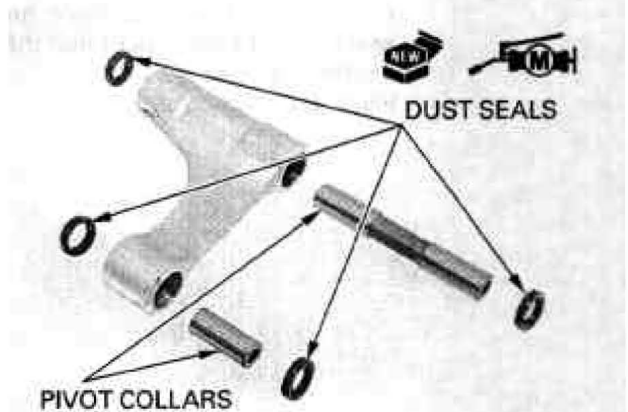
Apply molybdenum disulfide grease to the needle rollers of new bearings. Carefully press the needle bearing in the shock link pivot until the depth from the shock link outer surface is 5.2–5.7 mm (0.20–0.22 in), using the special tool.

TOOLS:

- Driver** 07749-0010000
- Attachment, 24 × 26 mm** 07746-0010700
- Pilot, 17 mm** 07746-0040400

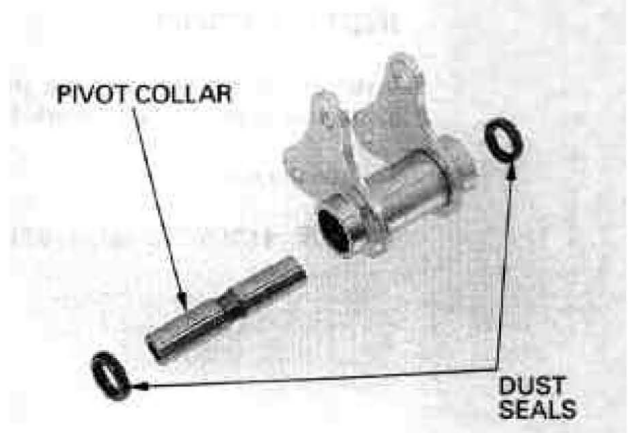


Apply molybdenum disulfide grease to new dust seal lips and install them into the shock link pivots until they are seated. Install the pivot collars.



SHOCK ARM PIVOT BEARING REPLACEMENT

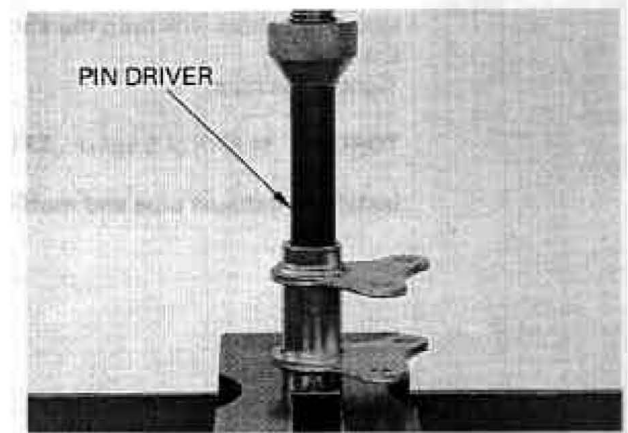
Remove the pivot collar and dust seals.



Press the needle bearings out of the shock arm pivot using the special tool.

TOOL:

- Pin driver** 07GMD-KT80100



REAR WHEEL/SUSPENSION

Press in the bearing with the marking side facing up.

Apply molybdenum disulfide grease to the needle rollers of new bearings. Carefully press the needle bearing in the shock link pivot until the depth from the shock link outer surface is 5.2–5.7 mm (0.20–0.22 in), using the special tool.

TOOLS:

Driver	07749-0010000
Attachment, 24 × 26 mm	07746-0010700
Pilot, 17 mm	07746-0040400

Apply molybdenum disulfide grease to new dust seal lips and install them into the shock link pivots until they are seated. Install the pivot collar.

INSTALLATION

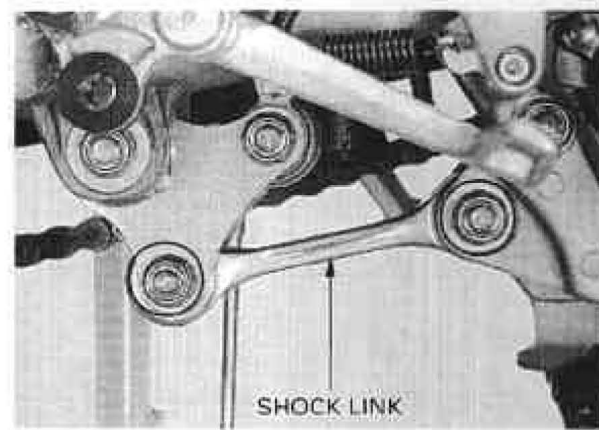
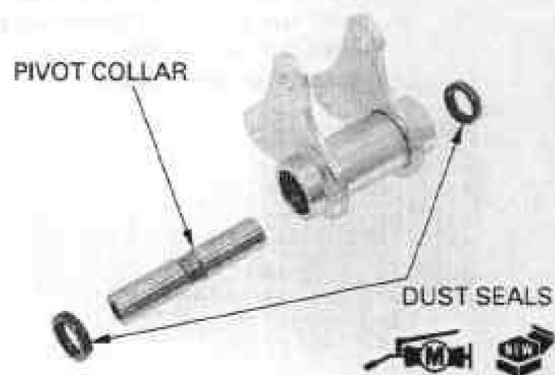
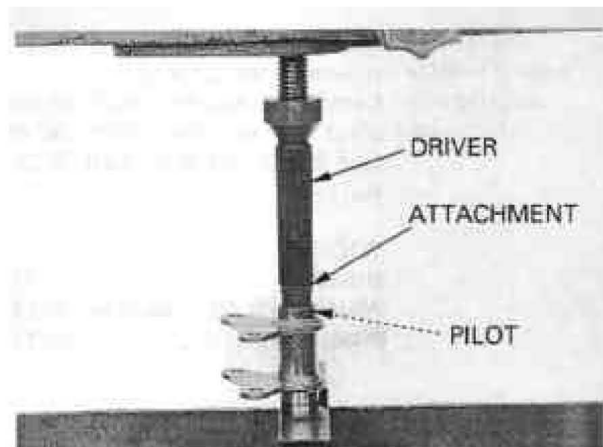
Install the shock arm onto the shock absorber and swingarm with the "FR" mark (arrow) facing forward. Tighten the nuts.

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

Install the shock link onto the shock arm and shock link bracket. Tighten the nuts.

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

Install the exhaust pipe and mufflers (page 2-6).



SWINGARM

REMOVAL

Remove the left and right mufflers (page 2-5).
Remove the rear wheel (page 14-3).

Remove the two bolts and drive chain cover.



Remove the rear brake hose from the clamps and remove the rear brake caliper/bracket assembly from the swingarm.



Remove the shock arm-to-swingarm nut and bolt.

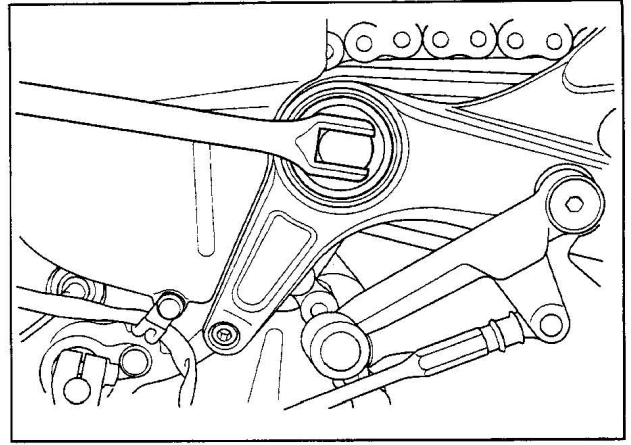


Remove the left and right swingarm pivot caps.

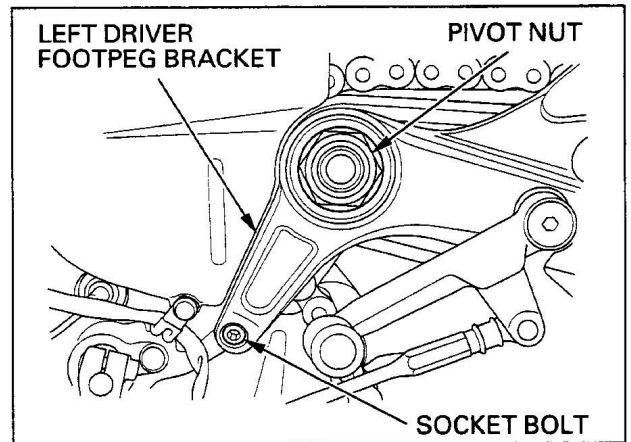


REAR WHEEL/SUSPENSION

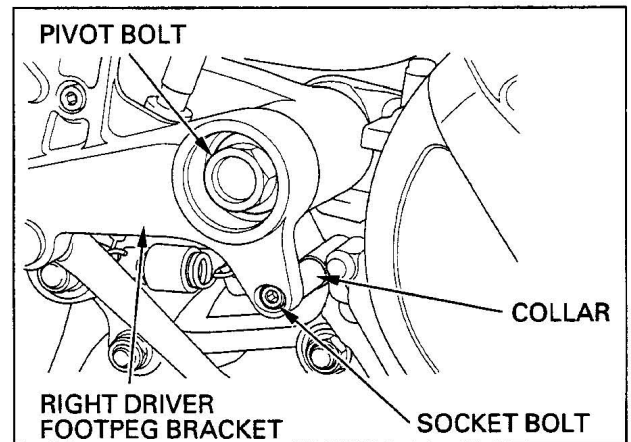
Loosen the swingarm pivot nut.



Remove the socket bolt, swingarm pivot nut and left driver footpeg bracket.

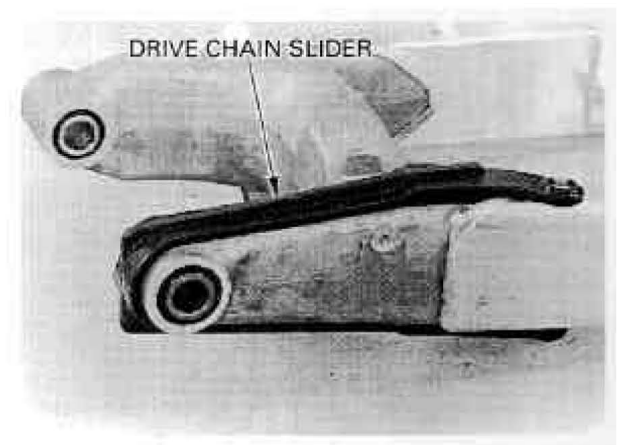


Remove the socket bolt and collar.
Remove the swingarm pivot bolt and right driver footpeg bracket.
Remove the swingarm from the frame.

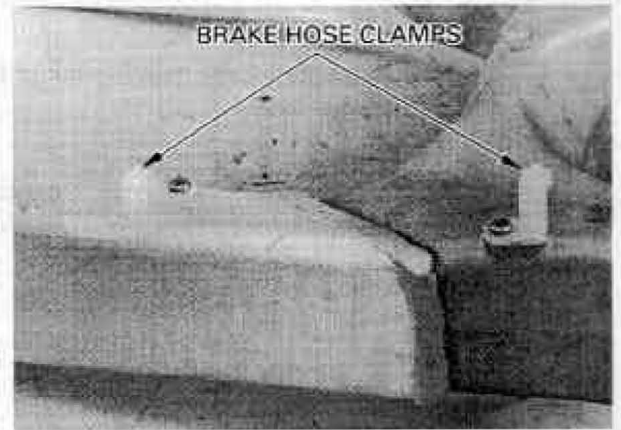


DISASSEMBLY

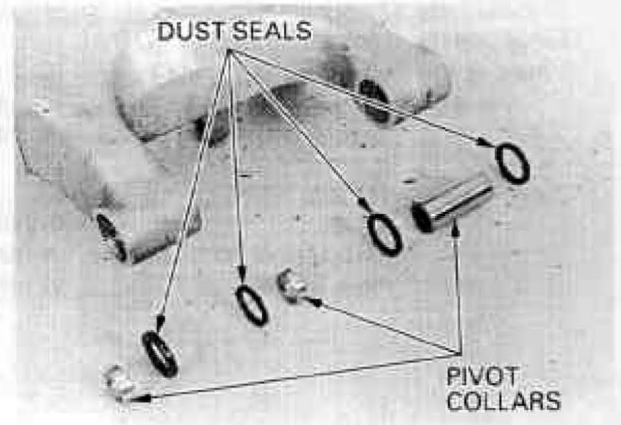
Remove the two bolts and drive chain slider if necessary.



Remove the screws and brake hose clamps if necessary.



Remove the pivot collars and dust seals.



PIVOT BEARING REPLACEMENT

RIGHT PIVOT BEARING

Remove the snap ring.
Drive ball bearings and distance collar out of the pivot.

Pack new bearing cavities with molybdenum disulfide grease.

Press the inner bearing into the pivot with the marking side facing up until it is fully seated, using the special tools.

TOOLS:

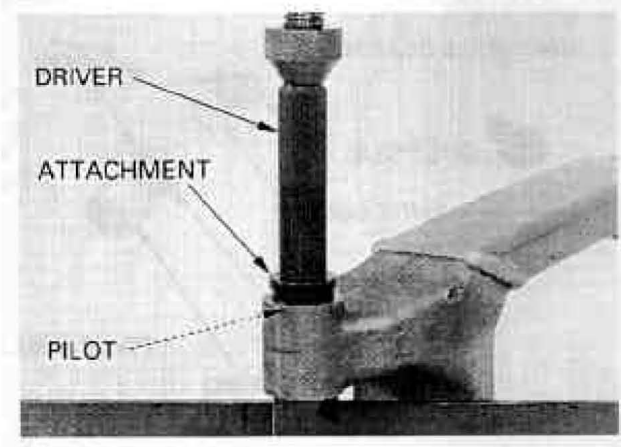
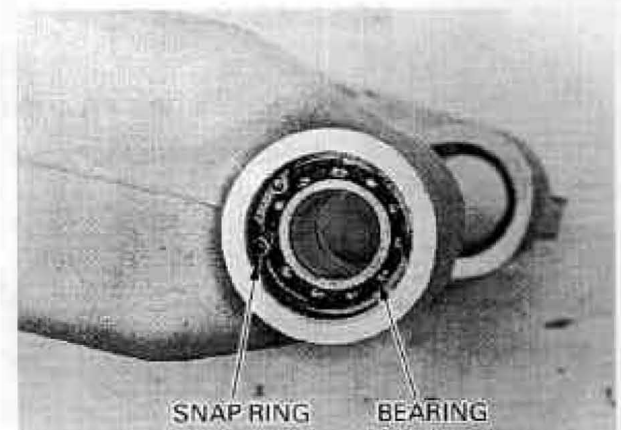
Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 20 mm	07746-0040500

Install the distance collar.
Press the outer bearing into the pivot with the marking side facing up until it is seated, using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 37 × 40 mm	07746-0010200
Pilot, 20 mm	07746-0040500

Install the snap ring.



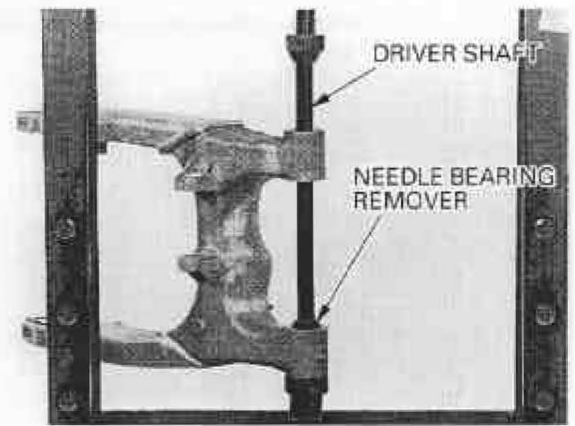
REAR WHEEL/SUSPENSION

LEFT PIVOT BEARING

Press the needle bearing out of the pivot using the special tools.

TOOLS:

Driver shaft 07946-MJ00100
Needle bearing remover 07HMC-MR70100

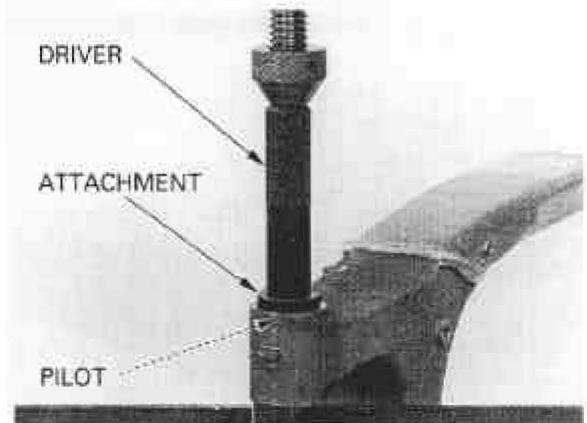


Press in the bearing with the marking side facing up.

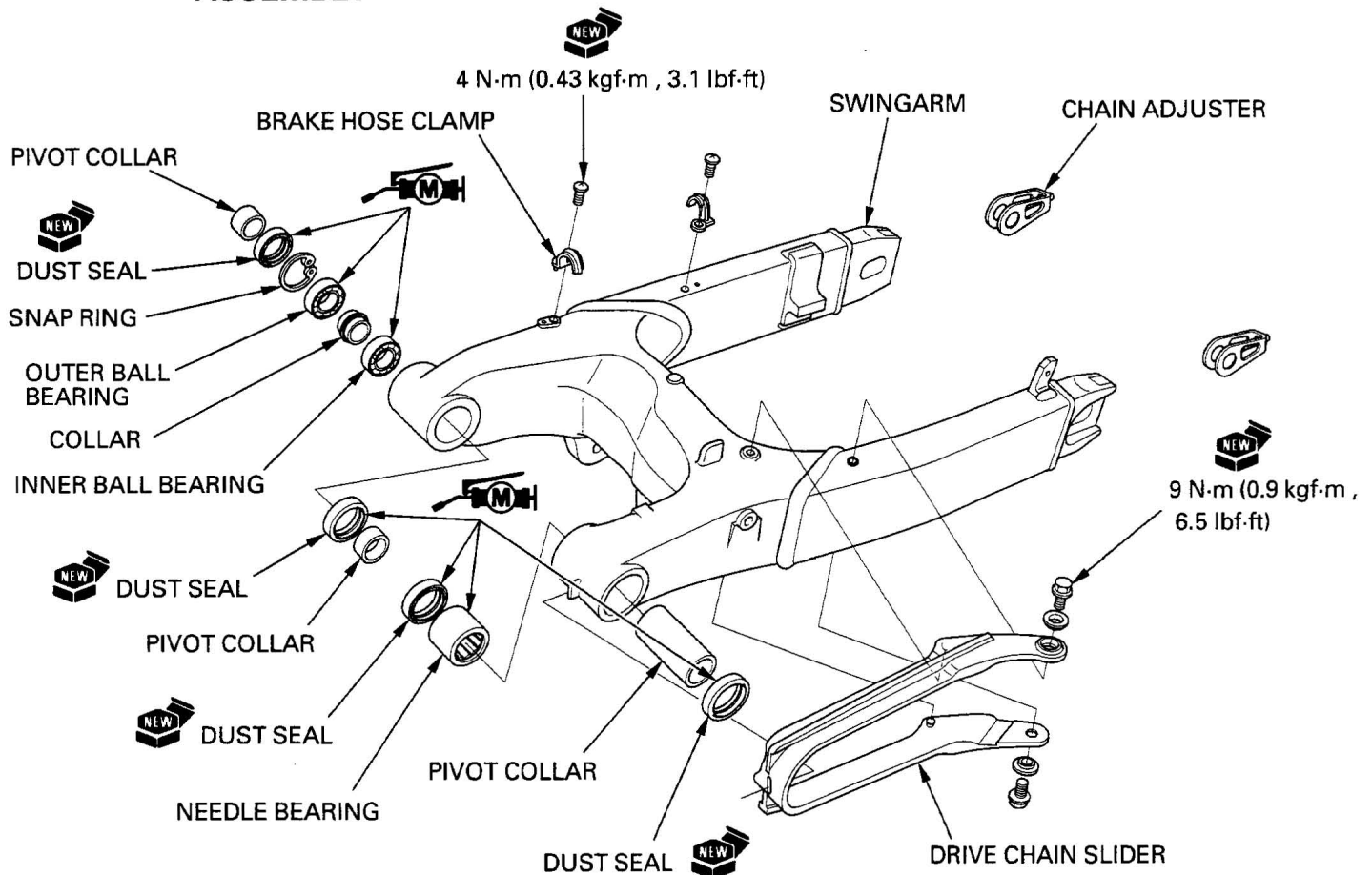
Apply molybdenum disulfide grease to the needle rollers of a new bearing. Carefully press the needle bearing into pivot until the depth from the swingarm outer surface is 14–15 mm (0.55–0.59 in), using the special tool.

TOOLS:

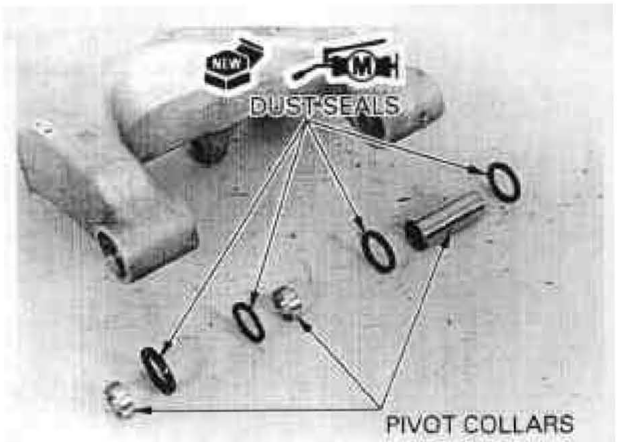
Driver 07749-0010000
Attachment, 37 × 40 mm 07746-0010200
Pilot, 28 mm 07746-0041100



ASSEMBLY

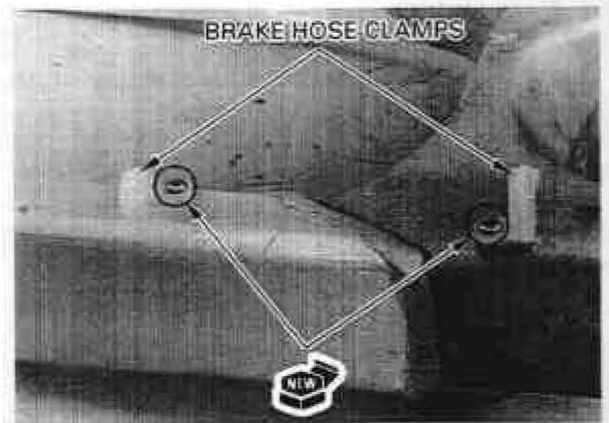


Apply molybdenum disulfide grease to new dust seal lips and install them into the swingarm pivots. Install the pivot collars.



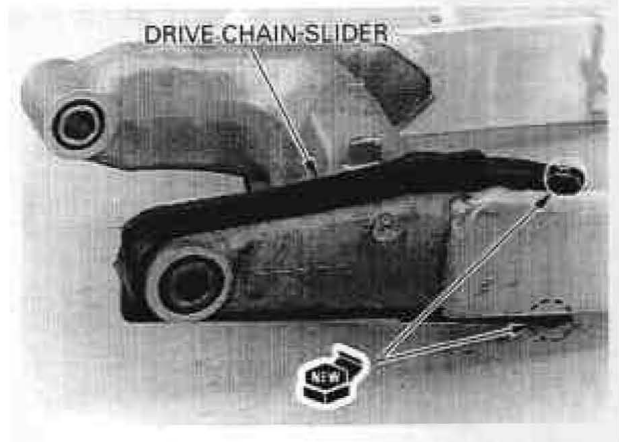
Install the brake hose clamps if removed, aligning the boss with the hole in the swingarm. Install and tighten new screws.

TORQUE: 4 N·m (0.43 kgf·m , 3.1 lbf·ft)



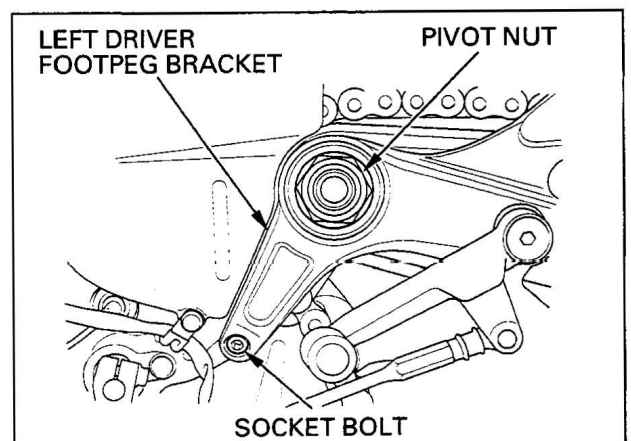
Install the drive chain slider if removed, aligning the hole with the boss of the swingarm. Install and tighten new bolts.

TORQUE: 9 N·m (0.9 kgf·m , 6.5 lbf·ft)



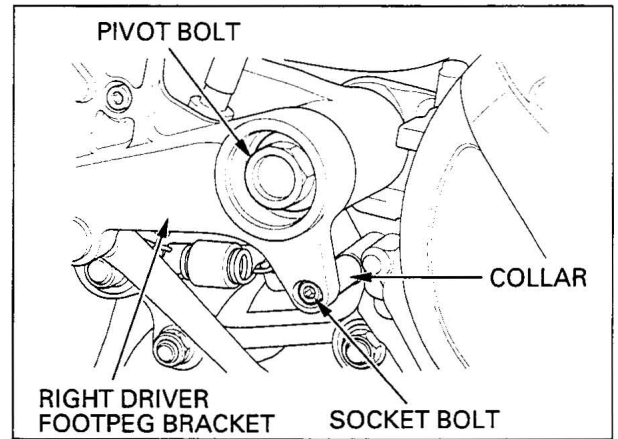
INSTALLATION

Install the swingarm onto the engine and insert the pivot bolt through the right driver footpeg bracket, swingarm, engine and left driver footpeg bracket. Install the swingarm pivot nut. Install the left driver footpeg bracket onto the shock link bracket and tighten the socket bolt.



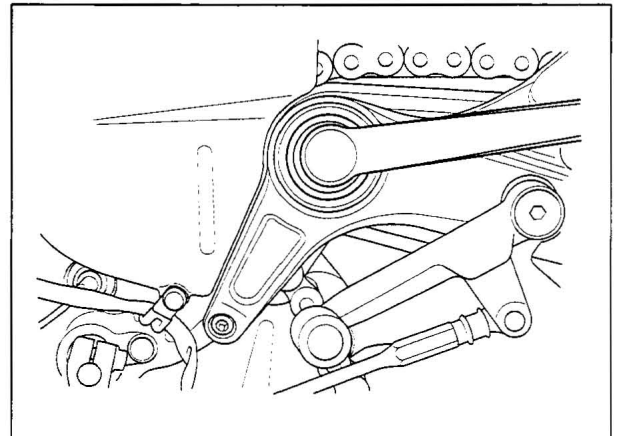
REAR WHEEL/SUSPENSION

Install the collar between the right driver footpeg bracket and shock link bracket, and tighten the socket bolt.



Tighten the swingarm pivot nut.

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

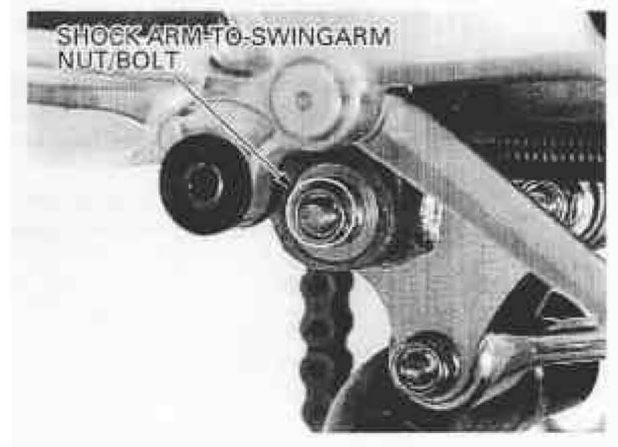


Install the left and right swingarm pivot caps.

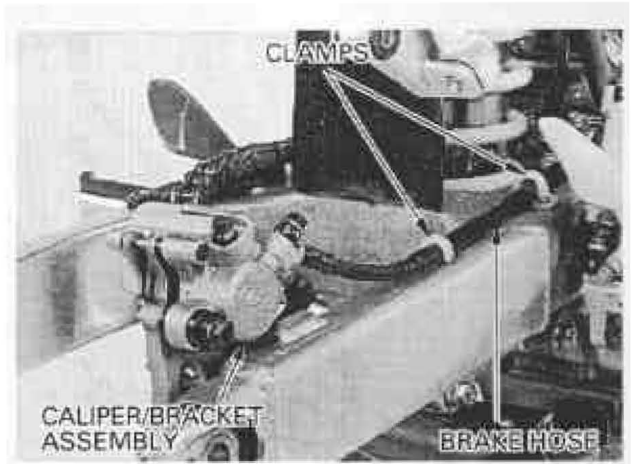


Install the shock arm-to-swingarm bolt and tighten the nut.

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



Install the rear brake caliper/bracket assembly onto the boss of the swingarm.
Install the rear brake hose in the clamps.

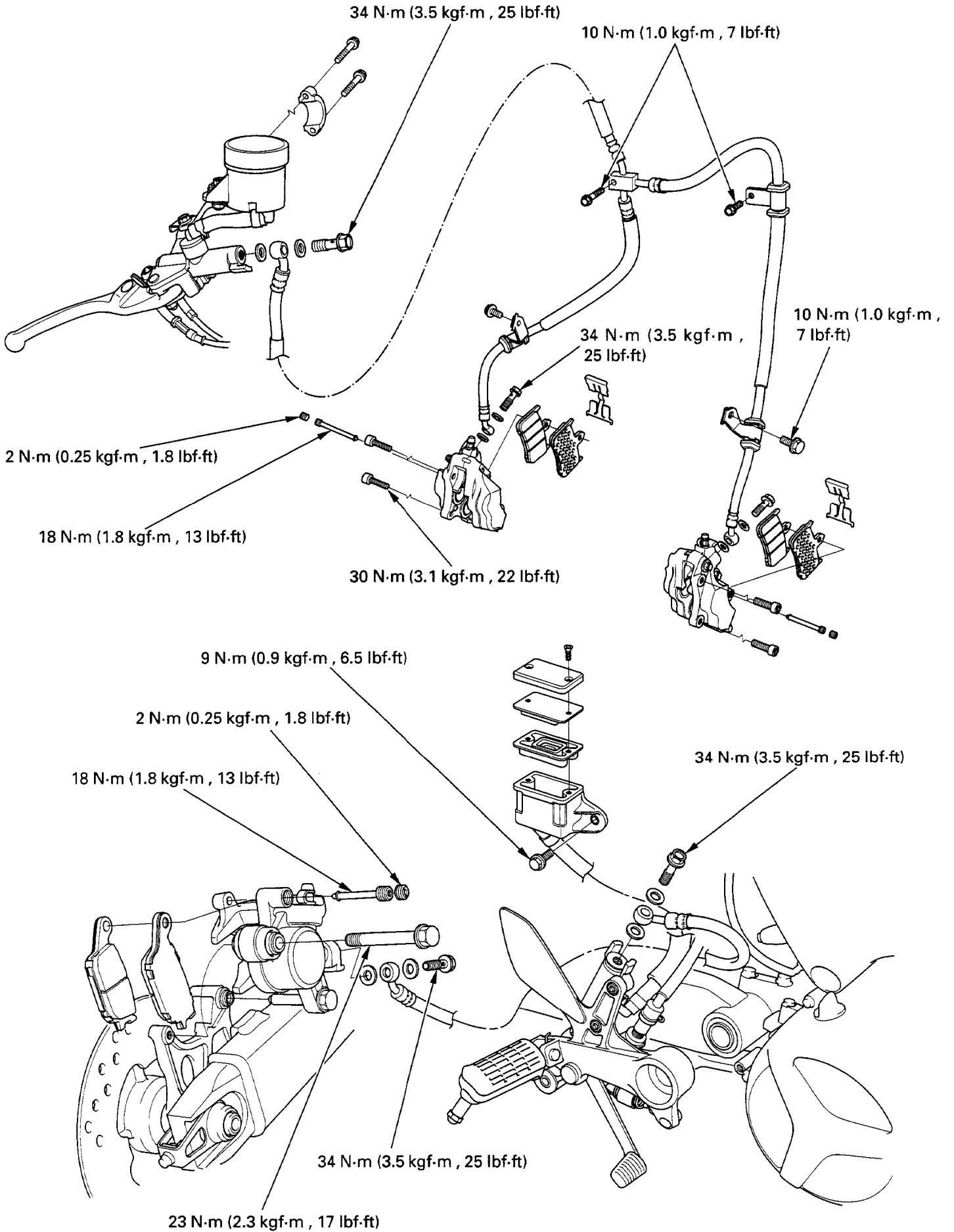


Install the drive chain cover aligning the slot with the boss of the swingarm, and tighten the two bolts.

Install the rear wheel (page 14-8).
Install the left and right mufflers (page 2-6).



HYDRAULIC BRAKE



15. HYDRAULIC BRAKE

SERVICE INFORMATION	15-1	FRONT MASTER CYLINDER	15-7
TROUBLESHOOTING	15-2	REAR MASTER CYLINDER/ BRAKE PEDAL	15-12
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15-3	FRONT BRAKE CALIPER	15-16
BRAKE PAD/DISC	15-5	REAR BRAKE CALIPER	15-19

SERVICE INFORMATION

GENERAL

▲WARNING

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

- Spilled brake fluid will severely damage the plastic parts and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the reservoir is horizontal first.
- Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid as they may not be compatible.
- Always check brake operation before riding the motorcycle.
- A hoist or equivalent is required to support the motorcycle when servicing the rear master cylinder.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT	
Front	Specified brake fluid	DOT 4	—	
	Brake disc thickness	4.4–4.6 (0.17–0.18)	3.5 (0.14)	
	Brake disc runout	—	0.30 (0.012)	
	Master cylinder I. D.	14.000–14.043 (0.5512–0.5529)	14.055 (0.5533)	
	Master piston O. D.	13.957–13.984 (0.5495–0.5506)	13.945 (0.5490)	
	Caliper cylinder I. D.	A	30.23–30.28 (1.190–1.192)	30.29 (1.193)
		B	27.000–27.050 (1.0630–1.0650)	27.060 (1.0654)
	Caliper piston O. D.	A	30.148–30.198 (1.1869–1.1889)	30.14 (1.187)
B		26.918–26.968 (1.0598–1.0617)	26.91 (1.059)	
Rear	Specified brake fluid	DOT 4	—	
	Brake disc thickness	4.8–5.2 (0.19–0.20)	4.0 (0.16)	
	Brake disc runout	—	0.30 (0.012)	
	Master cylinder I. D.	14.000–14.043 (0.5512–0.5529)	14.055 (0.5533)	
	Master piston O. D.	13.957–13.984 (0.5495–0.5506)	13.945 (0.5490)	
	Caliper cylinder I. D.	38.18–38.23 (1.503–1.505)	38.24 (1.506)	
	Caliper piston O. D.	38.098–38.148 (1.4999–1.5019)	38.09 (1.500)	

TORQUE VALUES

Brake caliper bleed valve	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Pad pin plug	2 N·m (0.25 kgf·m , 1.8 lbf·ft)	
Pad pin	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Brake hose oil bolt	34 N·m (3.5 kgf·m , 25 lbf·ft)	
Front brake lever pivot nut	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Front brake fluid reservoir mounting nut	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	U-nut
Front master cylinder holder bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Rear brake fluid reservoir mounting bolt	9 N·m (0.9 kgf·m , 6.5 lbf·ft)	
Rear master cylinder mounting bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Rear master cylinder joint nut	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Swingarm pivot nut	93 N·m (9.5 kgf·m , 69 lbf·ft)	U-nut
Front brake caliper mounting bolt	30 N·m (3.1 kgf·m , 22 lbf·ft)	ALOC bolt
Front brake caliper assembly bolt	32 N·m (3.3 kgf·m , 24 lbf·ft)	Apply locking agent to the threads
Rear brake caliper bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Rear brake caliper pin bolt	27 N·m (2.8 kgf·m , 20 lbf·ft)	Apply locking agent to the threads

TOOL

Snap ring pliers 07914-3230001

TROUBLESHOOTING

Brake lever/pedal soft or spongy

- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seals
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Contaminated master cylinder
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master piston
- Bent brake lever/pedal

Brake lever/pedal hard

- Clogged/restricted hydraulic system
- Sticking/worn caliper piston
- Sticking/worn master piston
- Caliper not sliding properly
- Bent brake lever/pedal

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

BRAKE FLUID REPLACEMENT/AIR BLEEDING

▲ WARNING

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

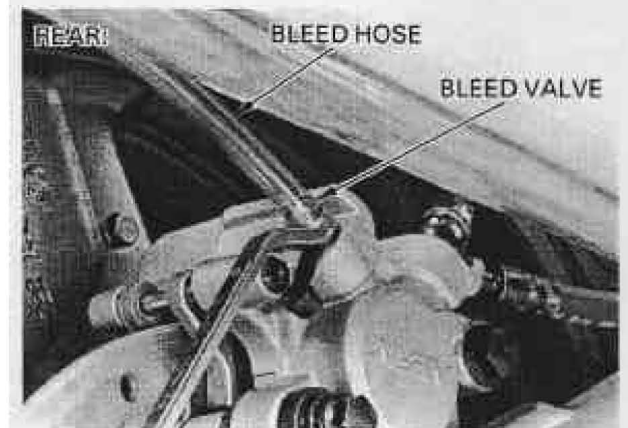
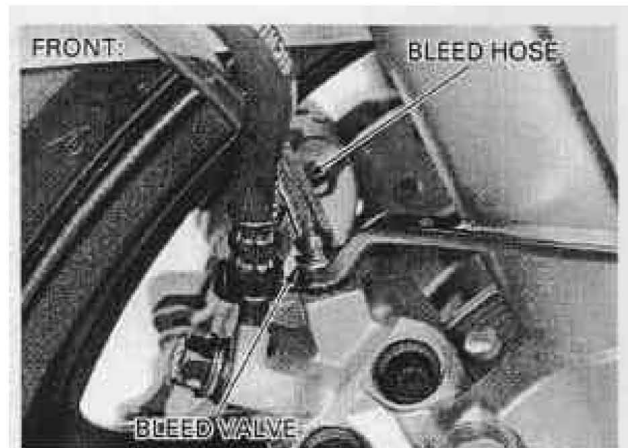
CAUTION:

- *Do not allow foreign material to enter the system when filling the reservoir.*
- *Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*
- *Use only DOT 4 brake fluid from a sealed container.*
- *Do not mix different types of fluid. They are not compatible.*

BRAKE FLUID DRAINING

Remove the reservoir cap, set plate and diaphragm (page 3-18 for front, page 3-19 for rear).

Connect a bleed hose to the bleed valve. Loosen the bleed valve and pump the brake lever or pedal until no more fluid flows out of the bleed valve.



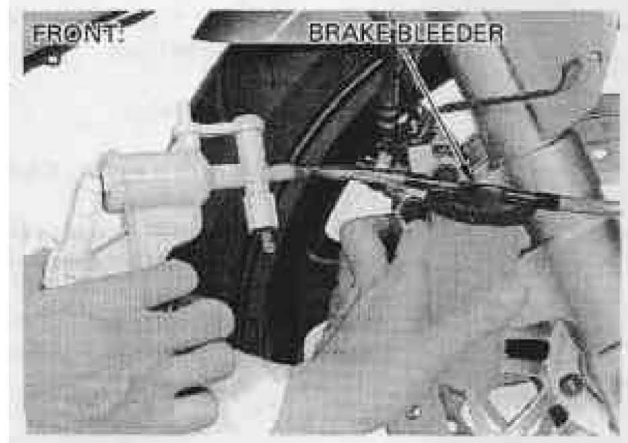
BRAKE FLUID FILLING/BLEEDING

Close the bleed valve. Fill the reservoir with DOT 4 brake fluid from a sealed container.

Connect a commercially available brake bleeder to the bleed valve. Pump the brake bleeder and loosen the bleed valve. Add brake fluid when the fluid level in the reservoir is low.

NOTE:

- Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



HYDRAULIC BRAKE

Repeat the above procedures until air bubbles do not appear in the plastic hose.

NOTE:

If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Close the bleed valve and operate the brake lever or pedal. If it still feels spongy, bleed the system again.

If a brake bleeder is not available, use the following procedure:

Pump up the system pressure with the brake lever or pedal until lever or pedal resistance is felt.

Connect a bleed hose to the bleed valve and bleed the system as follows:

1. Squeeze the brake lever or depress the brake pedal, open the bleed valve 1/2 turn and then close it.

NOTE:

Do not release the brake lever until the bleed valve has been closed.

2. Release the brake lever or pedal slowly and wait several seconds after it reaches the end of its travel.

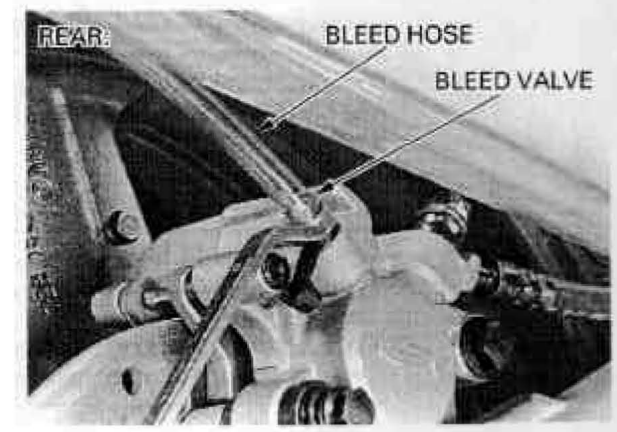
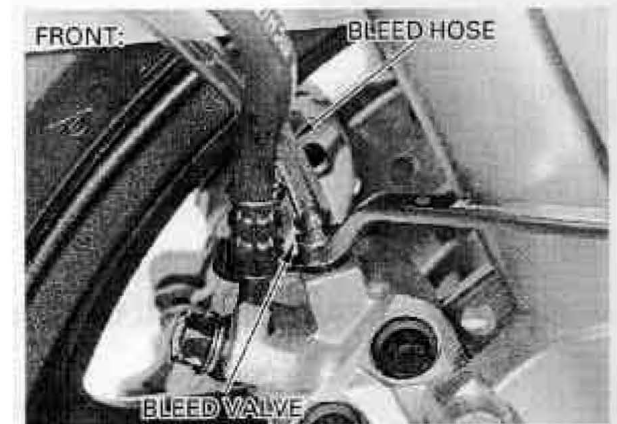
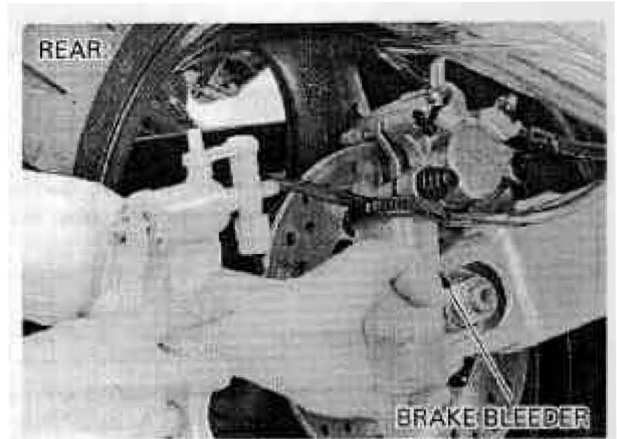
Repeat the steps 1 and 2 until air bubbles do not appear in the bleed hose.

Tighten the bleed valve.

TORQUE: 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

Fill the reservoir to the upper level line with DOT 4 brake fluid from a sealed container.

Install the diaphragm, set plate and reservoir cap (page 3-18 for front, page 3-19 for rear).



BRAKE PAD/DISC

FRONT BRAKE PAD REPLACEMENT

Always replace the brake pads in pairs to ensure even disc pressure.

Remove the pad pin plug and loosen the pad pin. Remove the mounting bolts and front brake caliper.

Push the caliper pistons all the way in to allow installation of new brake pads.

NOTE:

Check the brake fluid level in the brake reservoir as this operation causes the level to rise.

Remove the pad pin while pushing in the pad spring, then remove the pad spring and brake pads.

Install new brake pads and the pad spring with its tabs with the grooves in the caliper body grooves. Install the pad pin while pushing in the pad spring.

Install the front brake caliper so the disc is positioned between the pads, being careful not to damage the pads.

Install and tighten new mounting bolts.

TORQUE: 30 N·m (3.1 kgf·m , 22 lbf·ft)

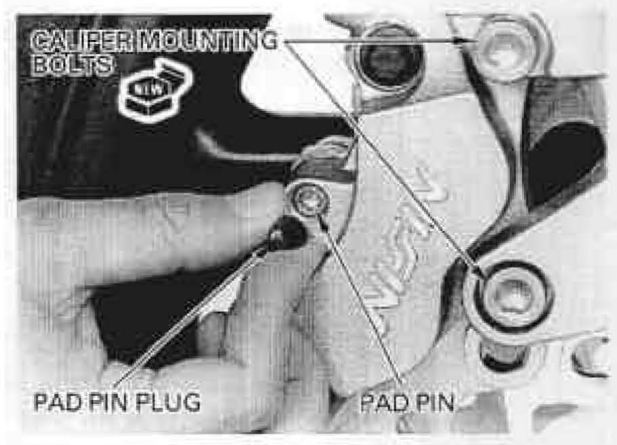
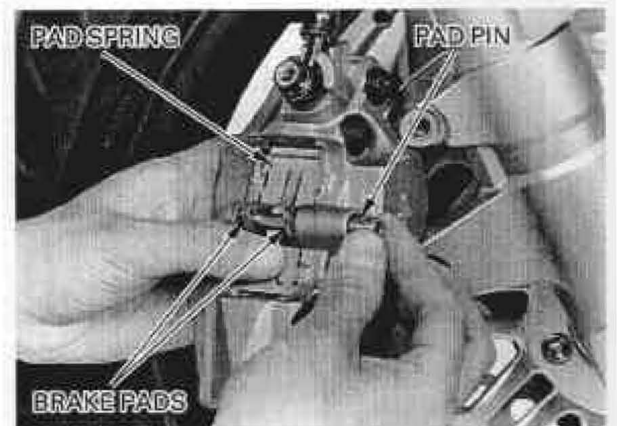
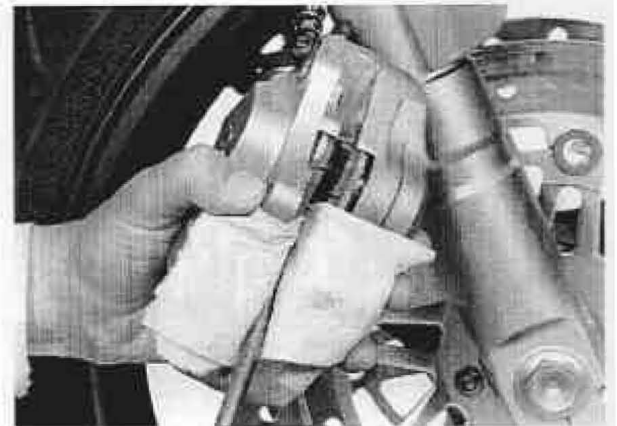
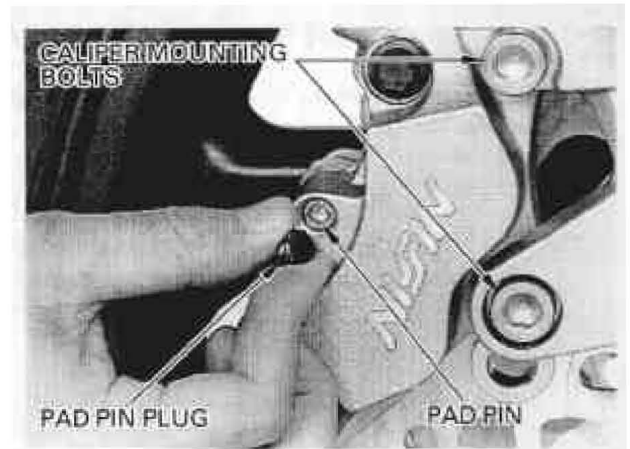
Tighten the pad pin.

TORQUE: 18 N·m (1.8 kgf·m , 13 lbf·ft)

Install and tighten the pad pin plug.

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

Operate the brake lever to seat the caliper pistons against the pads.



REAR BRAKE PAD REPLACEMENT

Always replace the brake pads in pairs to ensure even disc pressure.

Push the caliper piston all the way in to allow installation of new brake pads.

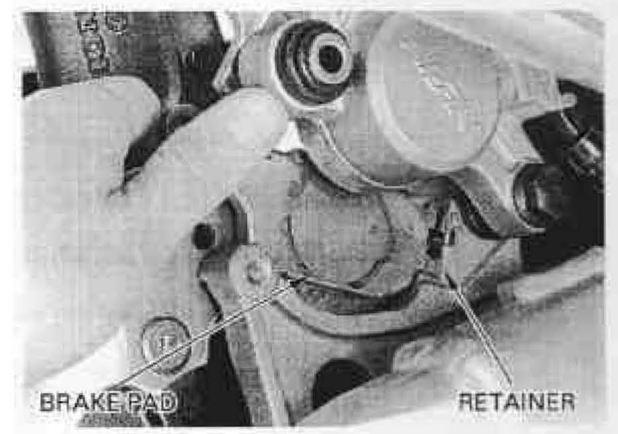
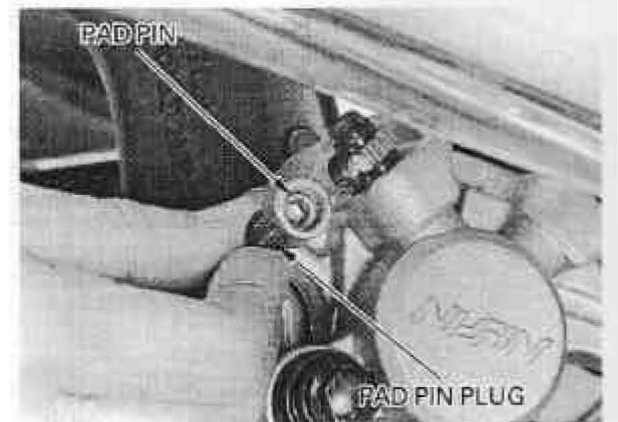
NOTE:

Check the brake fluid level in the brake reservoir as this operation causes the level to rise.

Remove the pad pin plug and loosen the pad pin.

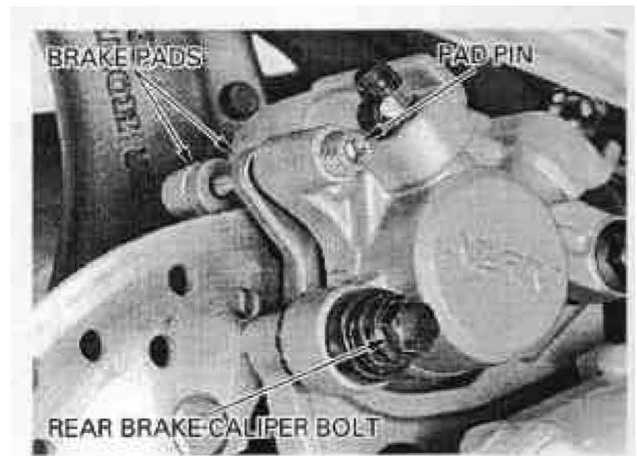
Remove the rear brake caliper bolt. Pivot the caliper up, and remove the pad pin and brake pads.

Install new brake pads so that their ends positioned onto the retainer on the caliper bracket as shown.



Lower the caliper and install the pad pin.
Install and tighten the rear brake caliper bolt.

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



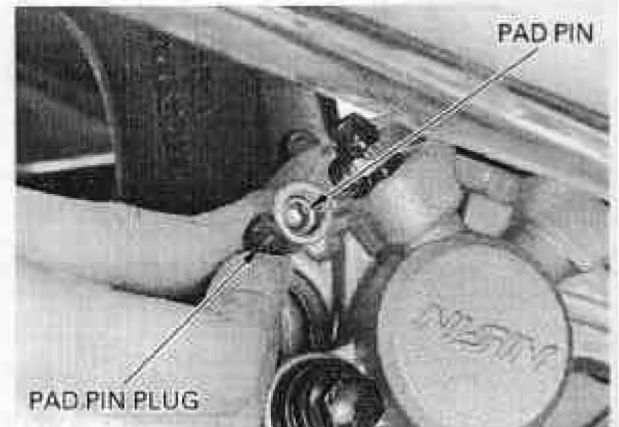
Tighten the pad pin.

TORQUE: 18 N·m (1.8 kgf·m , 13 lbf·ft)

Install and tighten the pad pin plug.

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

Operate the brake pedal to seat the caliper piston against the pads.

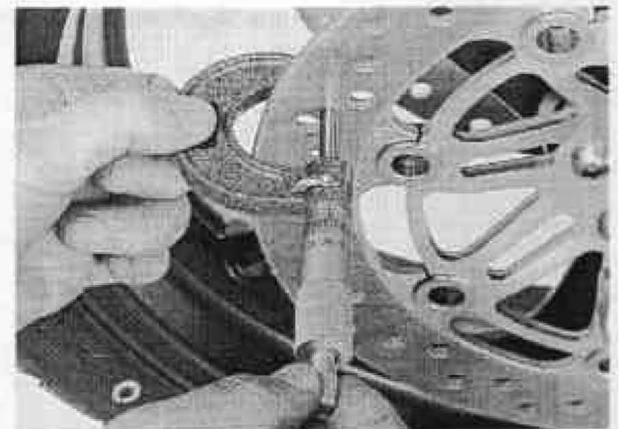


BRAKE DISC INSPECTION

Visually inspect the disc for damage or cracks.

Measure the brake disc thickness at several points.

SERVICE LIMITS: Front: 3.5 mm (0.14 in)
Rear: 4.0 mm (0.16 in)



FRONT MASTER CYLINDER

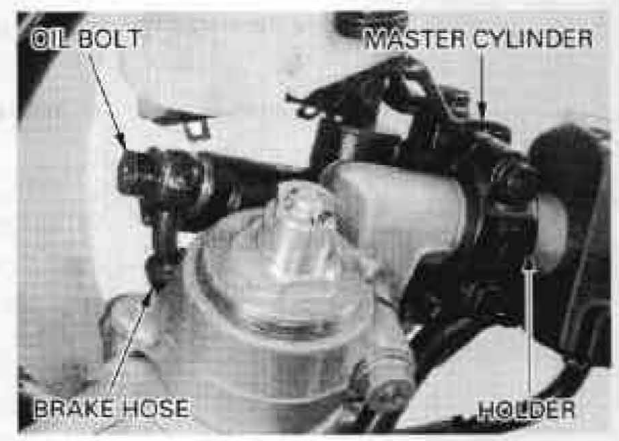
CAUTION:

- *Avoid spilling 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

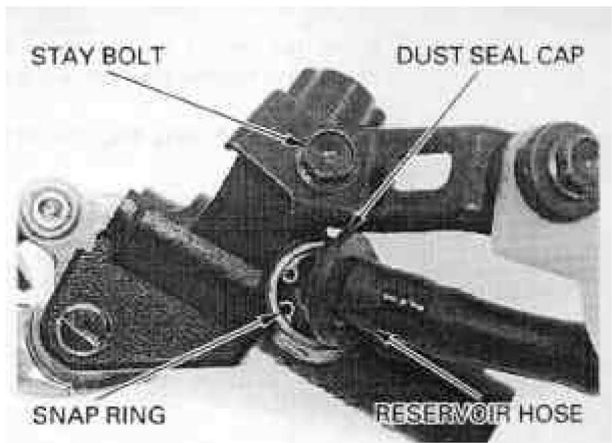
Drain the brake fluid from the front brake hydraulic system (page 15-3).

Disconnect the front brake light switch connectors. Disconnect the brake hose from the master cylinder by removing the oil bolt and sealing washers. Remove the master cylinder holder bolts, holder and the master cylinder.

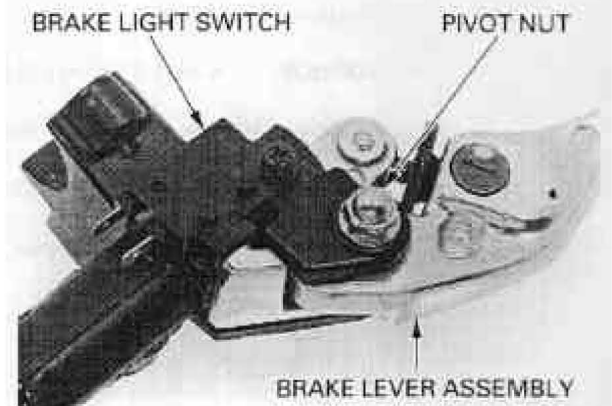


HYDRAULIC BRAKE

Remove the dust seal cap, snap ring and reservoir hose from the master cylinder.
Remove the O-ring.
Remove the stay bolt and fluid reservoir with the stay and hose.



Remove the pivot nut, bolt and brake lever assembly.
Remove screw and brake light switch.



Remove the boot from the master cylinder and master piston.

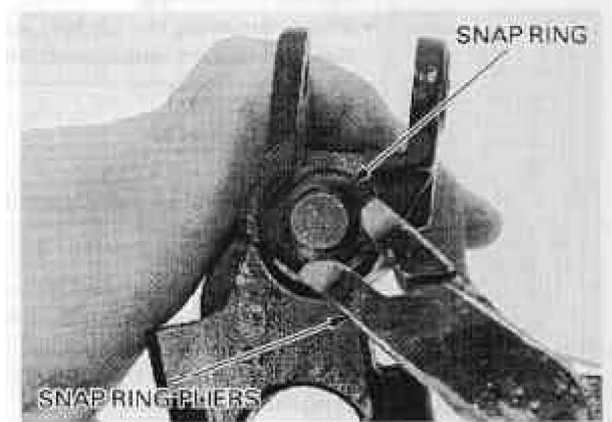


Remove the snap ring using the special tool.

TOOL:

Snap ring pliers

07914-3230001



Remove the master piston and spring from the master cylinder.

Clean the master cylinder, reservoir and master piston in clean brake fluid.

INSPECTION

Check the piston cups for wear, deterioration or damage.

Check the spring for damage.

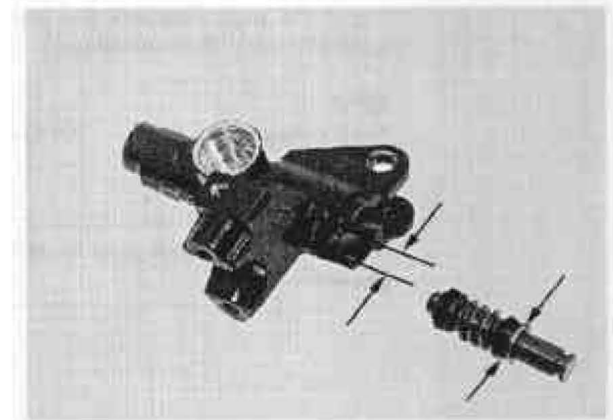
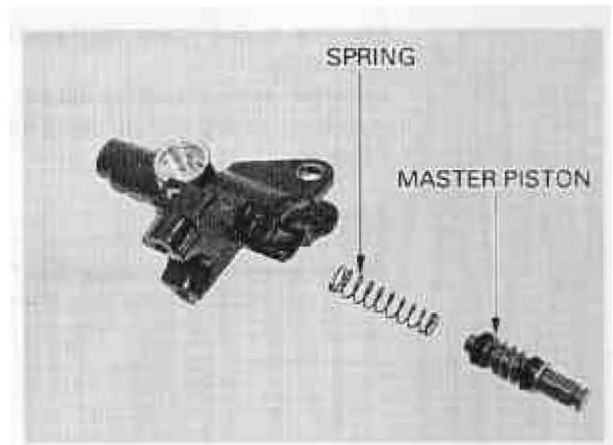
Check the master cylinder and piston for scoring, scratches or damage.

Measure the master cylinder I. D.

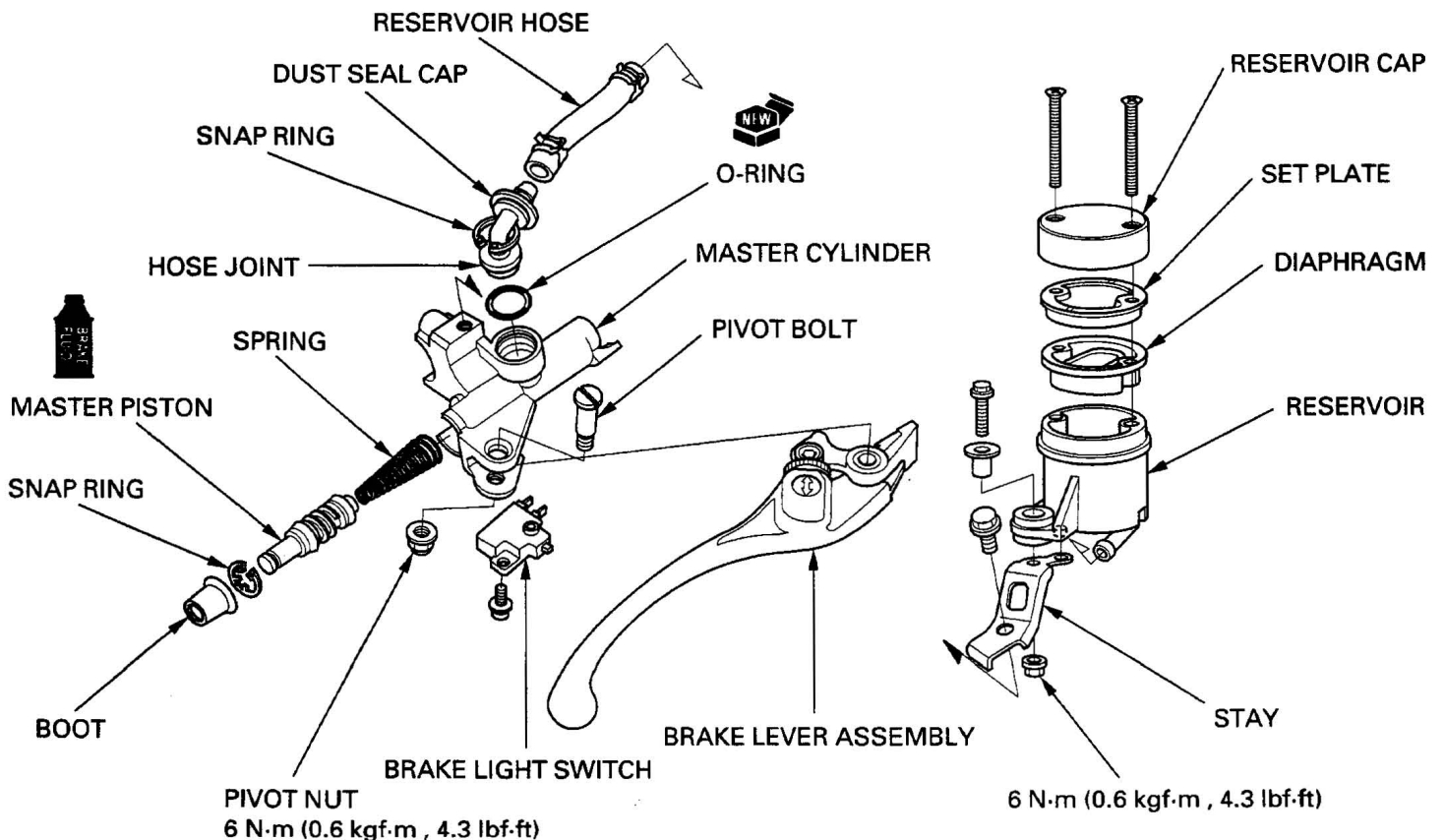
SERVICE LIMIT: 14.055 mm (0.5533 in)

Measure the master piston O. D.

SERVICE LIMIT: 13.945 mm (0.5490 in)



ASSEMBLY



HYDRAULIC BRAKE

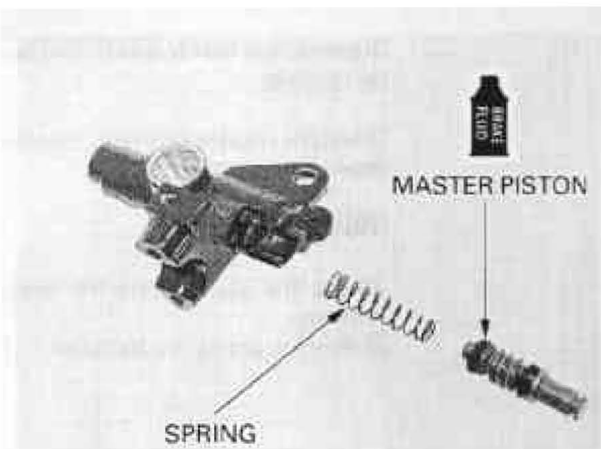
Coat the master piston and piston cups with clean brake fluid.

Install the spring onto the master piston.

Install the spring and master piston into the master cylinder.

CAUTION:

Do not allow the piston cup lips to turn inside out.



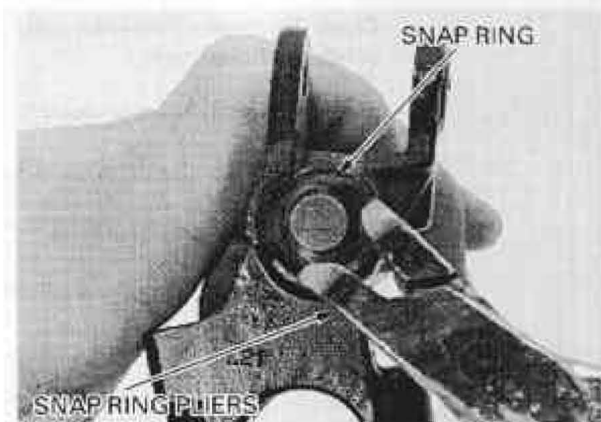
Install the snap ring into the groove in the master cylinder, using the special tool.

TOOL:

Snap ring pliers 07914-3230001

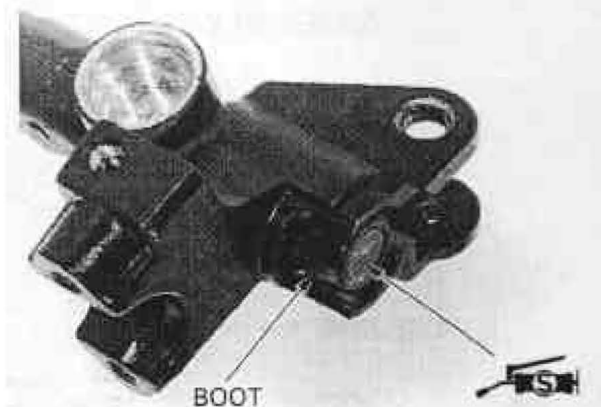
CAUTION:

Be certain the snap ring is firmly seated in the groove.



Install the boot onto the piston and into the master cylinder.

Apply silicone grease to the brake lever contacting area of the master piston.



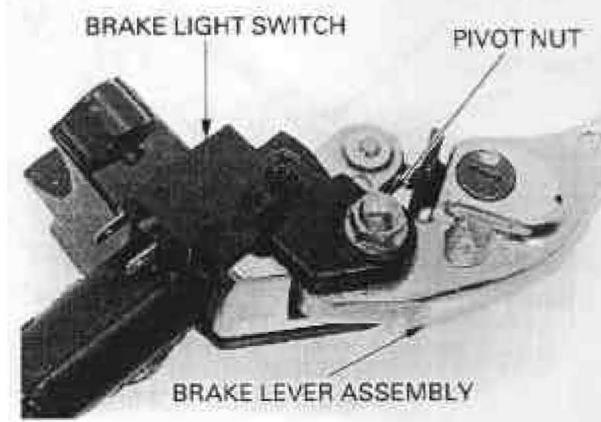
Apply silicone grease to the pivot bolt sliding surface.

Install the brake lever assembly and pivot bolt.

Install and tighten the pivot nut.

TOOL: 6 N·m (0.6 kgf·m , 4.3 lbf·ft)

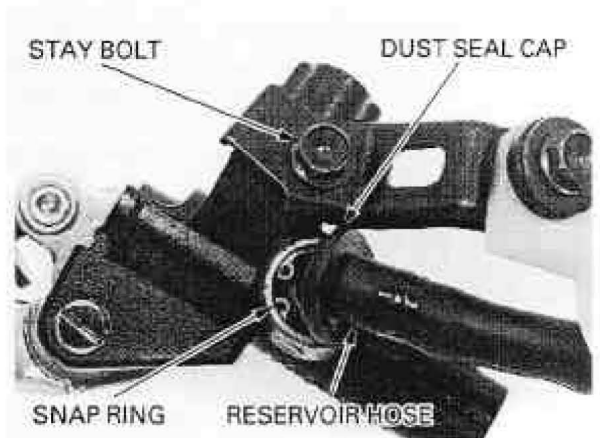
Install the front brake light switch with the screw.



Coat a new O-ring with brake fluid and install it into the master cylinder.



Install the fluid reservoir with the stay and hose, and tighten the stay bolt.
Install the reservoir hose joint, secure it with the snap ring and install the dust seal cap.



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

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 front brake light switch connectors.

Fill and bleed the front brake hydraulic system (page 14-3).



REAR MASTER CYLINDER/BRAKE PEDAL

CAUTION:

- *Avoid spilling 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 rear brake hydraulic system (page 15-3).

Disconnect the brake hose from the master cylinder by removing the oil bolt and sealing washers. Loosen the master cylinder mounting bolts.

Support the motorcycle securely with a hoist or equivalent.

Remove the swingarm pivot caps.

Remove the lower muffler mounting bolt and washer.

Remove the swingarm pivot nut.

Remove the socket bolt, collar, swingarm pivot bolt and right driver footpeg bracket.

Remove the master cylinder mounting bolts.

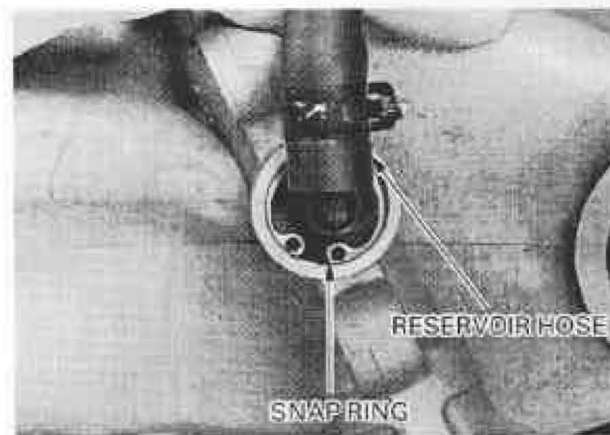
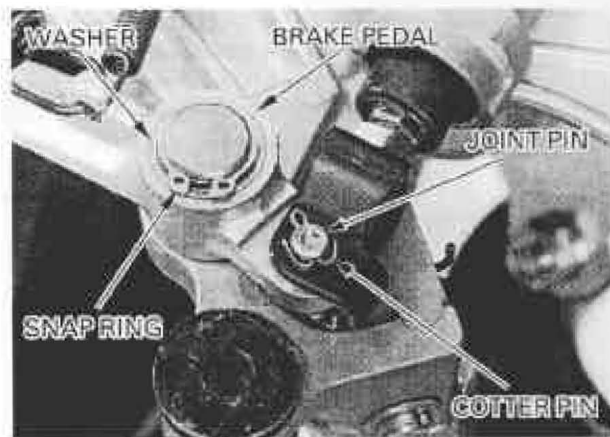
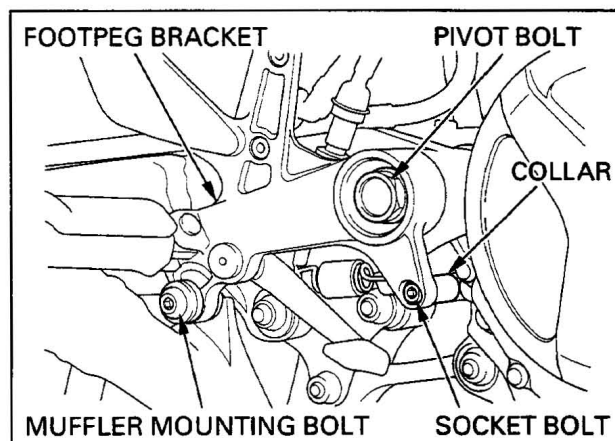
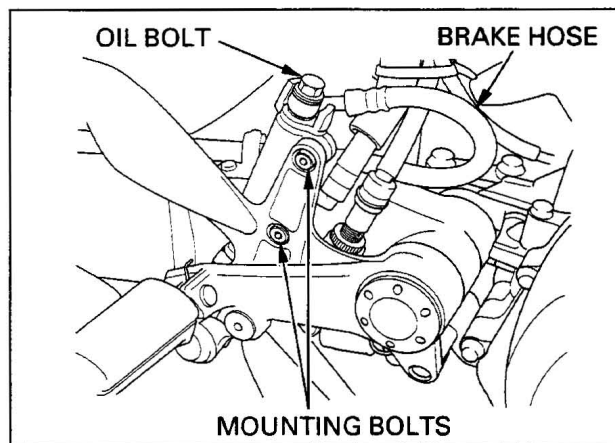
Remove the snap ring, washer and brake pedal from the pedal pivot shaft.

Remove the cotter pin from the joint pin.

Remove the joint pin and master cylinder from the brake pedal.

Remove the snap ring and reservoir hose joint from the master cylinder.

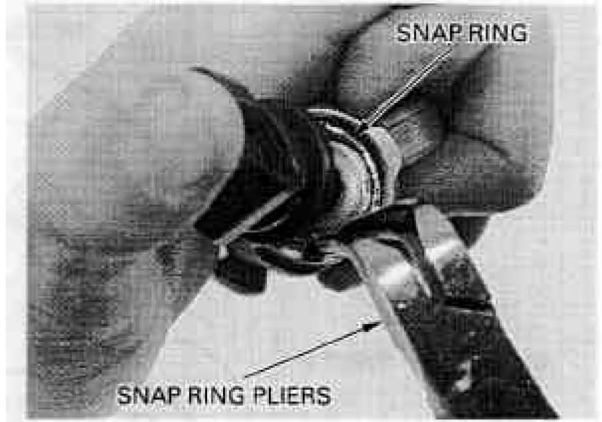
Remove the O-ring.



Remove the dust seal from the master cylinder.
Remove the snap ring using the special tool.

TOOL:

Snap ring pliers 07914-3230001

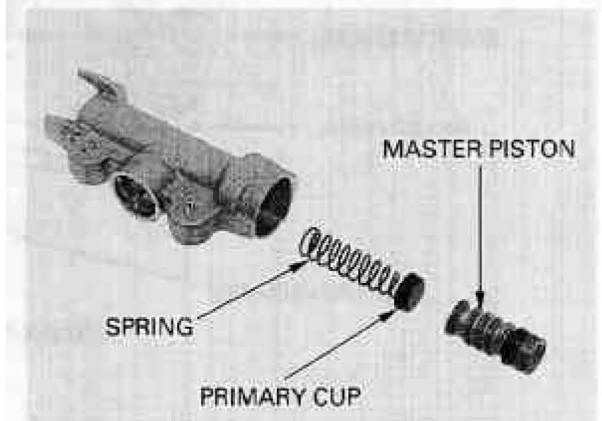


Remove the master piston, primary cup and spring.

Clean the master cylinder, reservoir and master piston in clean brake fluid.

INSPECTION

Check the piston cups for wear, deterioration or damage.
Check the spring for damage.



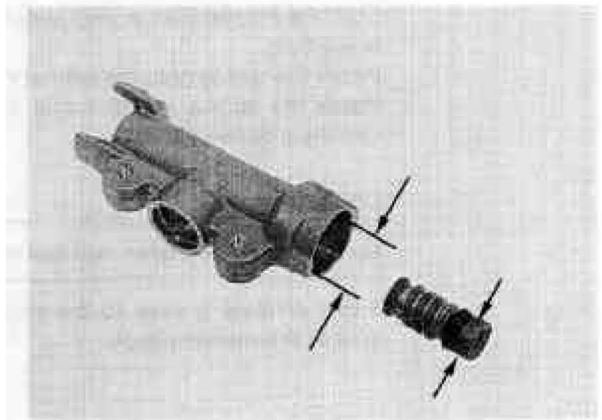
Check the master cylinder and piston for scoring or damage.

Measure the master cylinder I. D.

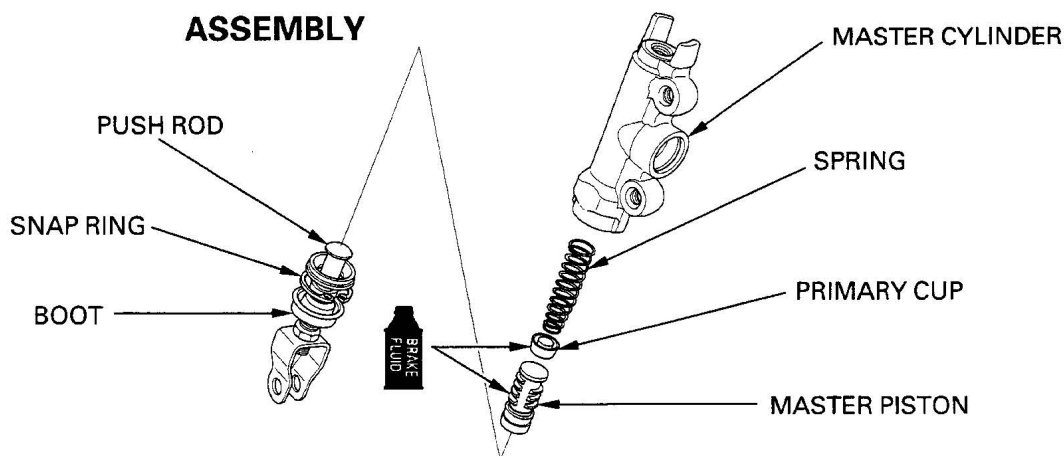
SERVICE LIMIT: 14.055 mm (0.5533 in)

Measure the master piston O. D.

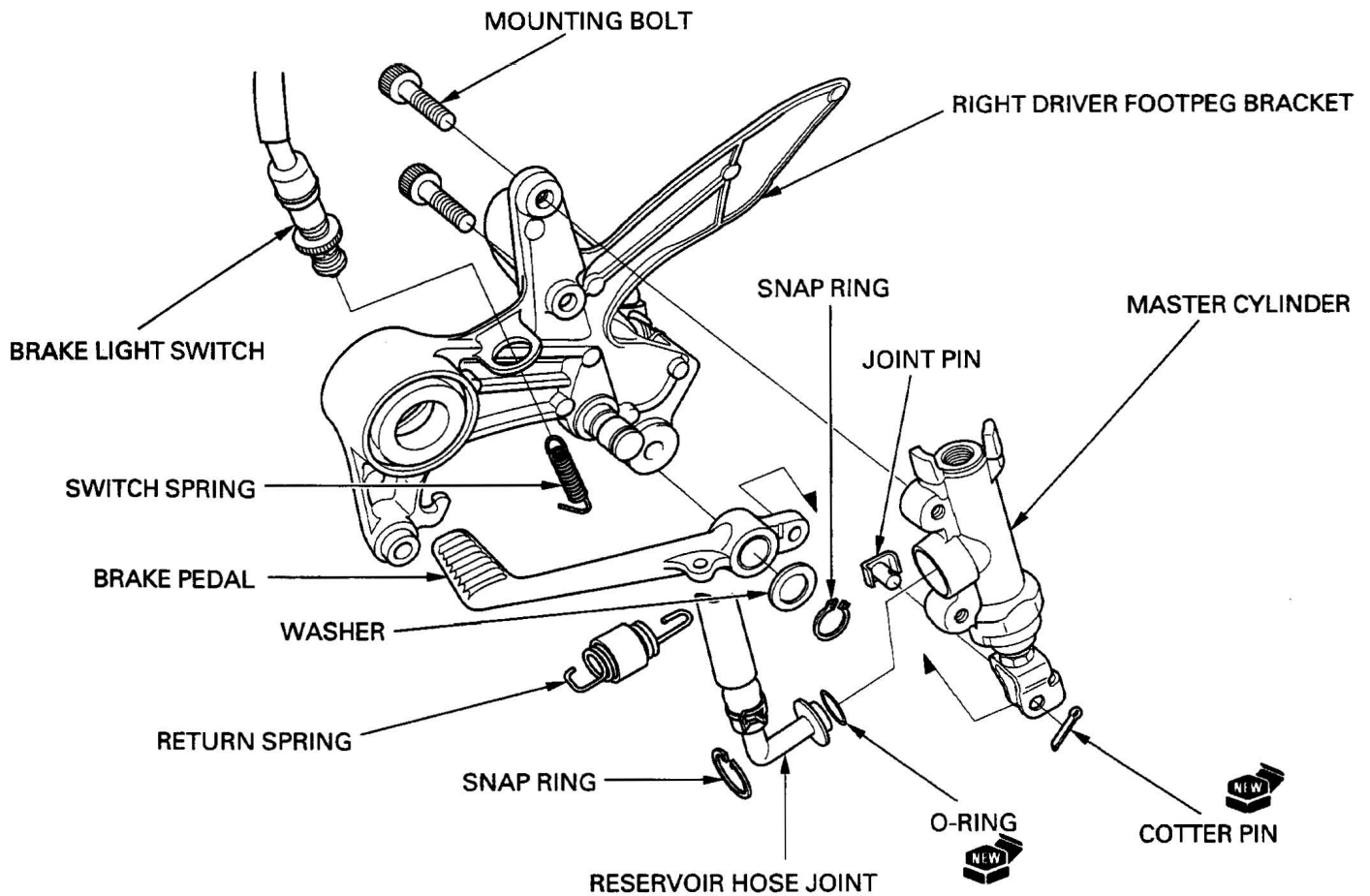
SERVICE LIMIT: 13.945 mm (0.5490 in)



ASSEMBLY



HYDRAULIC BRAKE

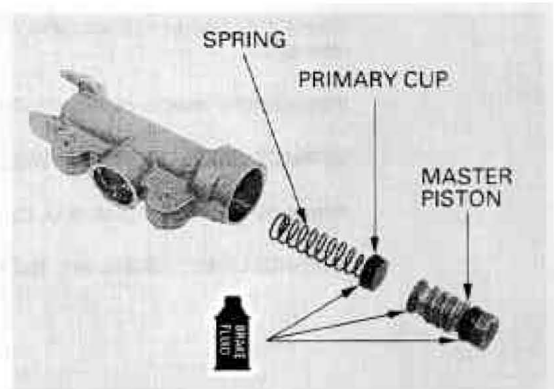


Coat the master piston and piston cups with clean brake fluid.
 Install the spring onto the primary cup.
 Install the spring, primary cup and master piston into the master cylinder.

CAUTION:

Do not allow the piston cup lips to turn inside out.

Apply silicone grease to the push rod contacting area of the master piston.



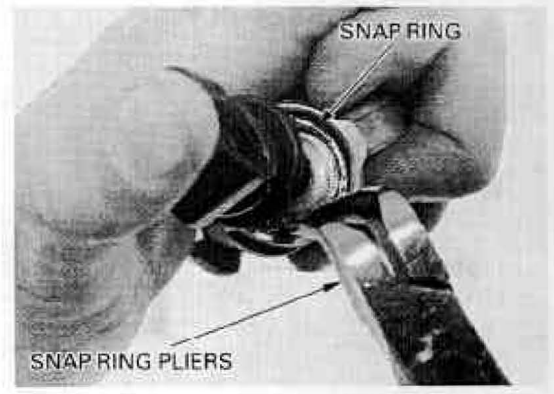
Install the push rod into the master cylinder.
 Install the snap ring into the groove in the master cylinder, using the special tool.

TOOL:

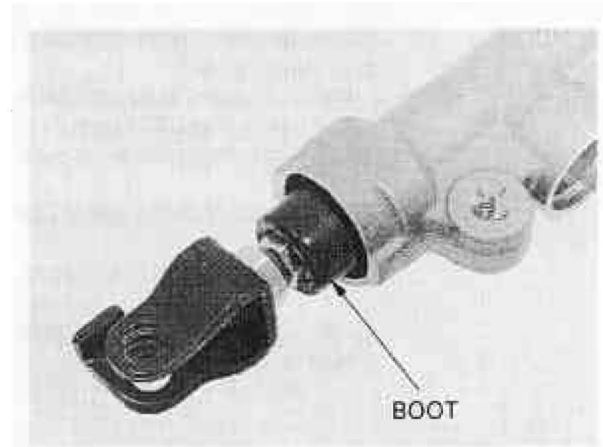
Snap ring pliers 07914-3230001

CAUTION:

Be certain the snap ring is firmly seated in the groove.



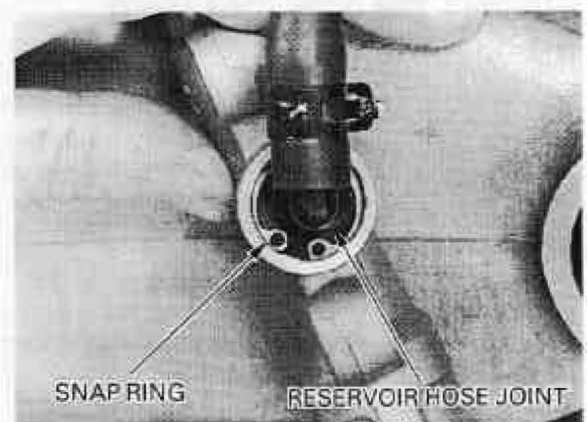
Install the boot into the master cylinder.



Coat a new O-ring with brake fluid and install it into the master cylinder.



Install the reservoir hose joint and secure it with the snap ring.



Connect the master cylinder push rod joint to the brake pedal with the joint pin and a new cotter pin.
Apply grease to the brake pedal pivot.
Connect the rear brake light switch spring to the brake pedal.
Install the brake pedal onto the pivot shaft.
Install the washer and snap ring onto the pivot shaft.
Connect the pedal return spring.
Install the master cylinder mounting bolts.



Install the right driver footpeg bracket, swingarm pivot bolt and nut.

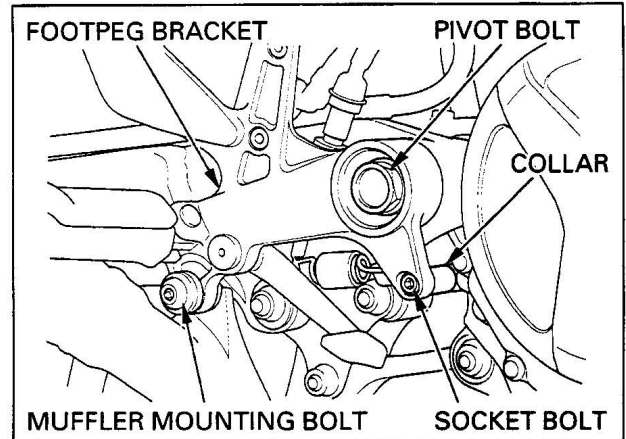
Install the collar between the footpeg bracket and shock link bracket, and tighten the socket bolt.

Tighten the swingarm pivot nut.

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

Install the swingarm pivot caps.

Install the lower muffler mounting bolt with the washer and tighten it.



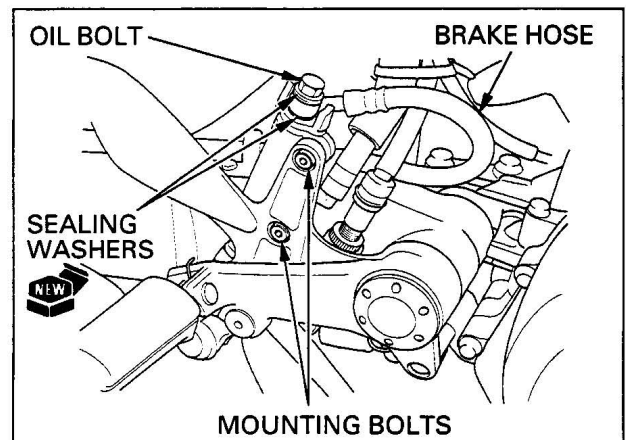
Tighten the master cylinder mounting bolts.

TORQUE: 10 N·m (1.0 kgf·m , 7 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)

Fill and bleed the rear brake hydraulic system (page 15-3).



FRONT BRAKE CALIPER

CAUTION:

Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

DISASSEMBLY

Drain the brake fluid from the front brake hydraulic system (page 15-3).

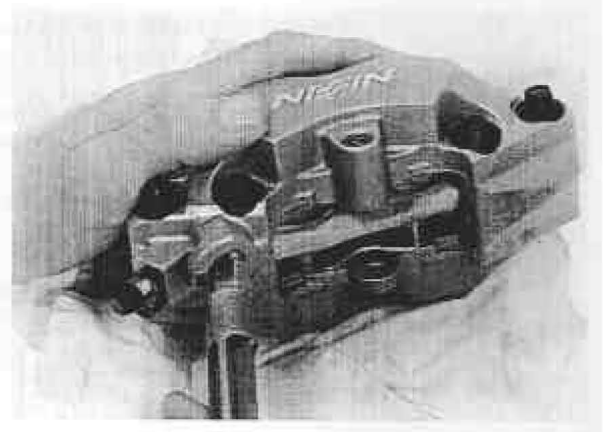
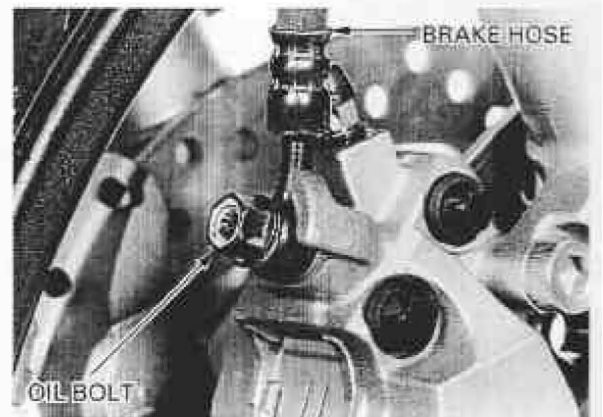
Disconnect the brake hose from the front brake caliper by removing the oil bolt and sealing washers. Remove the front brake pads (page 15-5).

Install a corrugated cardboard or soft wood sheet between the pistons.

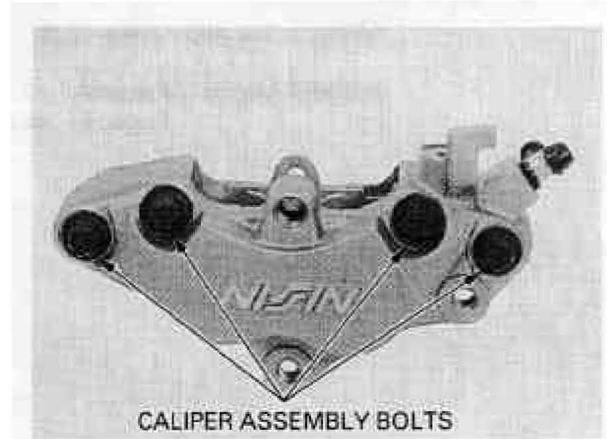
Apply small squirts of air pressure to the fluid inlet to remove the pistons.

▲ WARNING

Do not use high pressure air or bring the nozzle too close to the inlet.

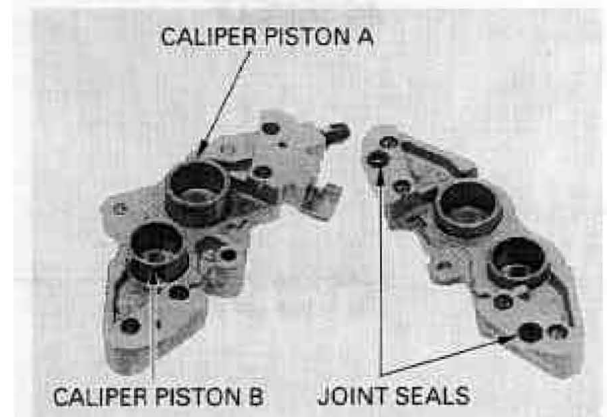


Remove the four caliper assembly bolts and separate the caliper body halves.



Remove the following:

- joint seals
- caliper piston A
- caliper piston B

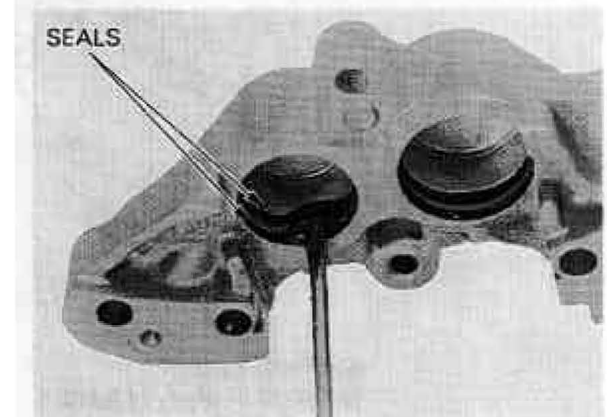


Push the dust seals and piston seals in and lift them out.

CAUTION:

Be careful not to damage the piston sliding surface.

Clean the seal grooves, caliper cylinders and piston with clean brake fluid.

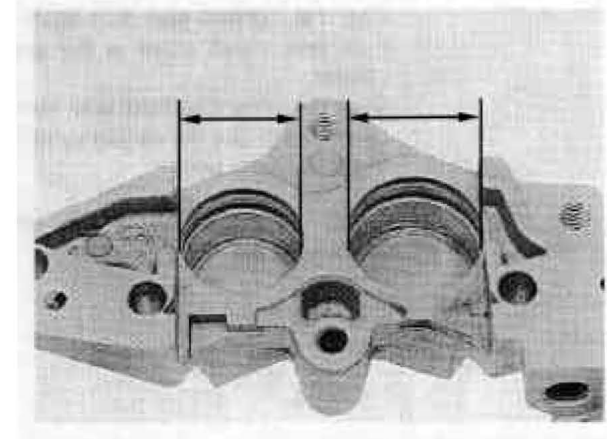


INSPECTION

Check the caliper cylinders and pistons for scoring, scratches or damage.

Measure the caliper cylinder I. D.

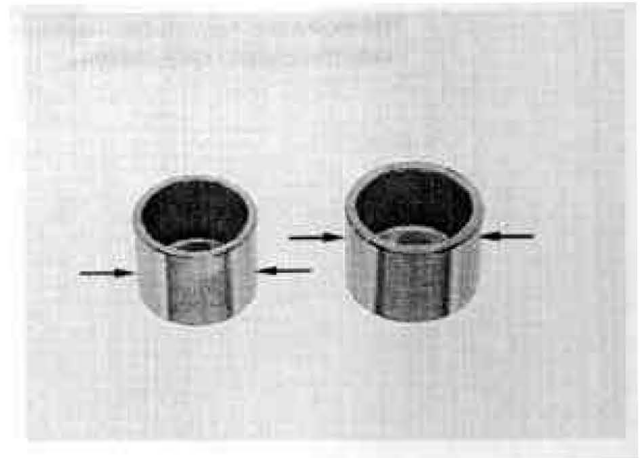
- SERVICE LIMITS:**
- Cylinder A:**
30.29 mm (1.193 in)
 - Cylinder B:**
27.060 mm (1.0654 in)



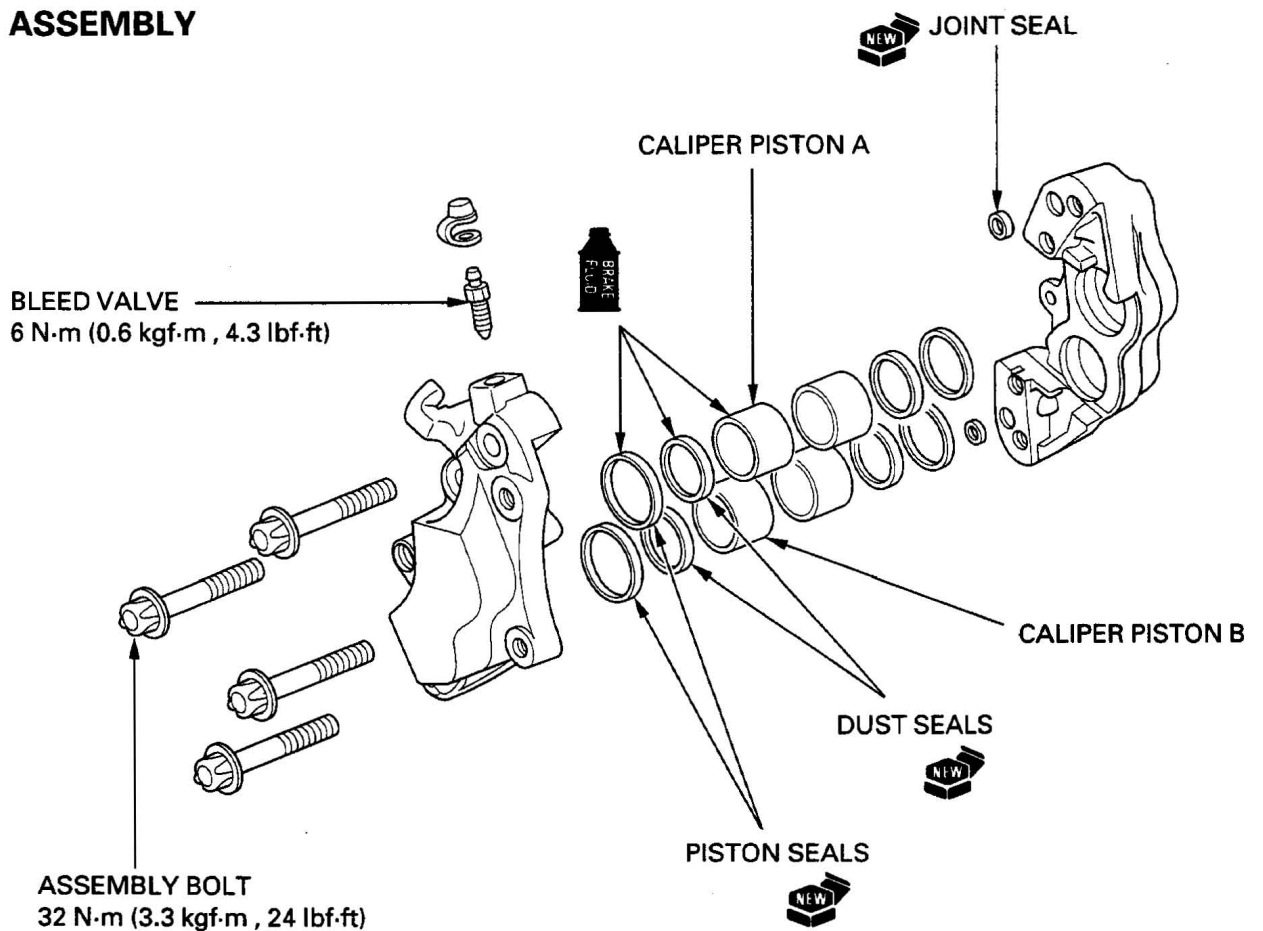
HYDRAULIC BRAKE

Measure the caliper piston O. D.

SERVICE LIMITS: Piston A: 30.14 mm (1.187 in)
Piston B: 26.91 mm (1.059 in)



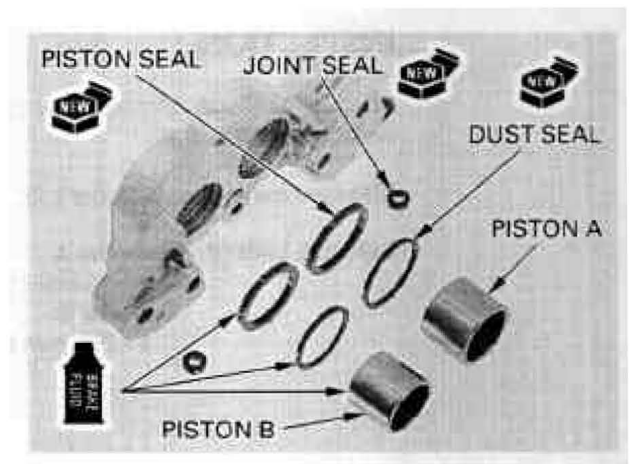
ASSEMBLY



Coat new piston and dust seals with clean brake fluid and install them in the seal grooves in the caliper.

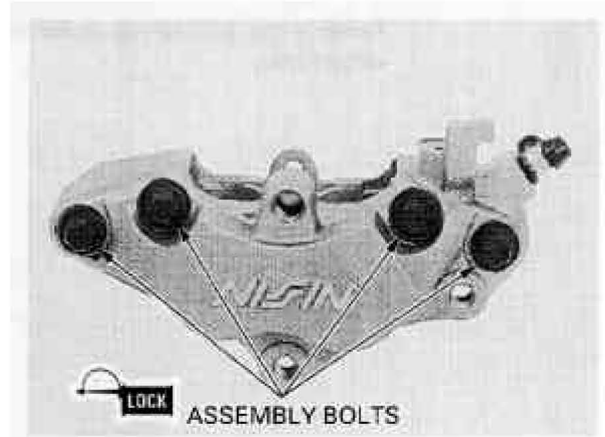
Coat the caliper pistons with clean brake fluid and install them into the caliper cylinders with the opening toward the pads.

Install new joint seals into the fluid passage grooves in the caliper body.



Assemble the caliper body halves.
 Apply locking agent to the caliper assembly bolt threads.
 Install and tighten the assembly bolts.

TORQUE: 32 N·m (3.3 kgf·m , 24 lbf·ft)

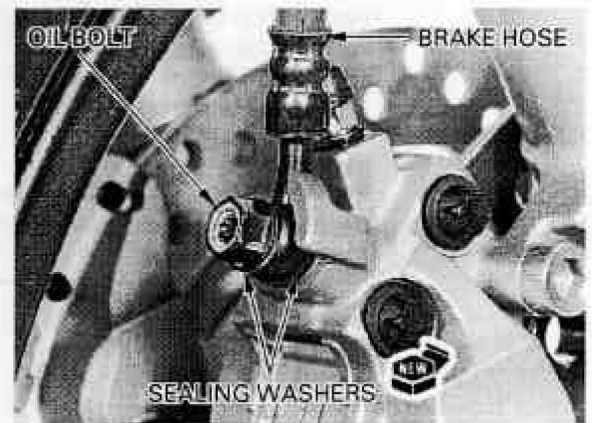


Install the brake pads (page 15-5).

Connect the brake hose to the brake caliper with the oil bolt and new sealing washers, and tighten the oil bolt.

TORQUE: 34 N·m (3.5 kgf·m , 25 lbf·ft)

Fill and bleed the front brake hydraulic system (page 14-3).



REAR BRAKE CALIPER

CAUTION:

Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.

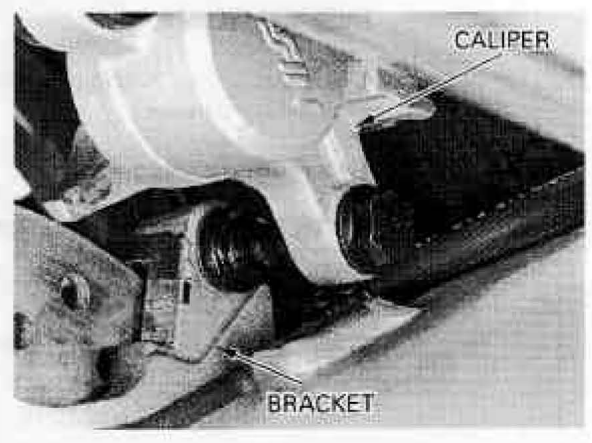
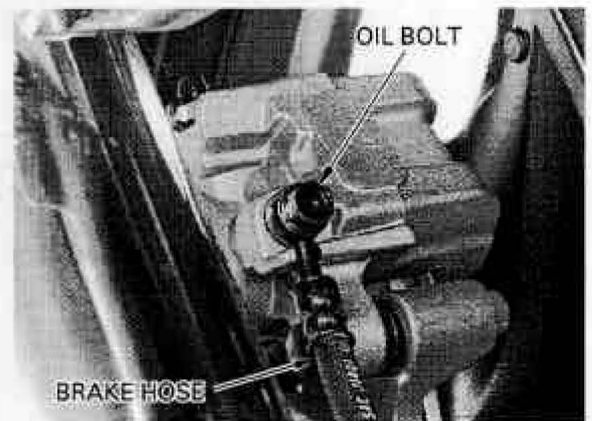
DISASSEMBLY

Drain the brake fluid from the rear brake hydraulic system (page 15-3).

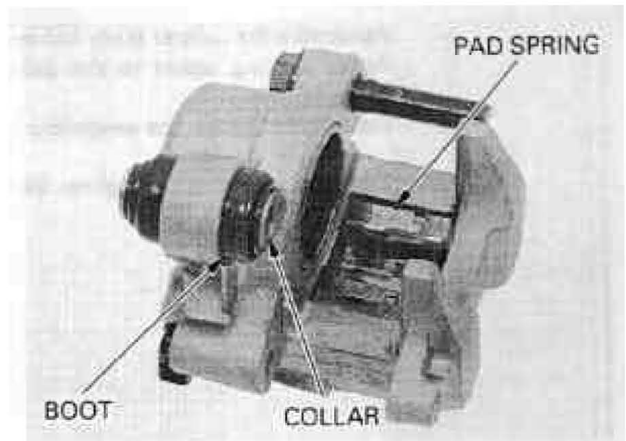
Disconnect the brake hose from the rear brake caliper by removing the oil bolt and sealing washers.

Remove the rear brake pads (page 15-6).

Remove the rear brake caliper from the bracket.



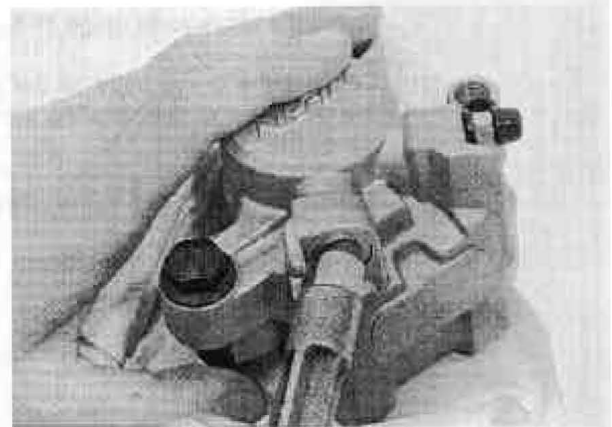
Remove the pad spring, collar and boot from the caliper body.



Place a shop towel over the piston. Position the caliper body with the piston down and apply small squirts of air pressure to the fluid inlet to remove the piston.

▲ WARNING

Do not use high pressure air or bring the nozzle too close to the inlet.

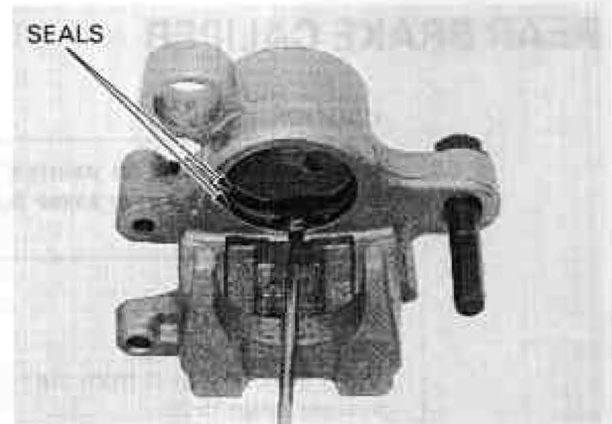


Push the dust seal and piston seal in and lift them out.

CAUTION:

Be careful not to damage the piston sliding surface.

Clean the seal grooves, caliper cylinder and piston with clean brake fluid.



INSPECTION

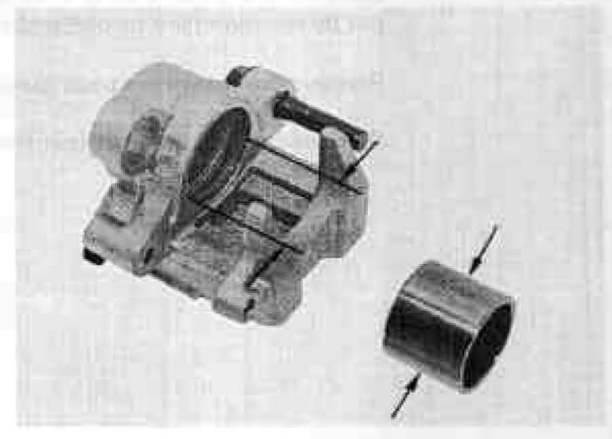
Check the caliper cylinder and piston for scoring, scratches or damage.

Measure the caliper cylinder I. D.

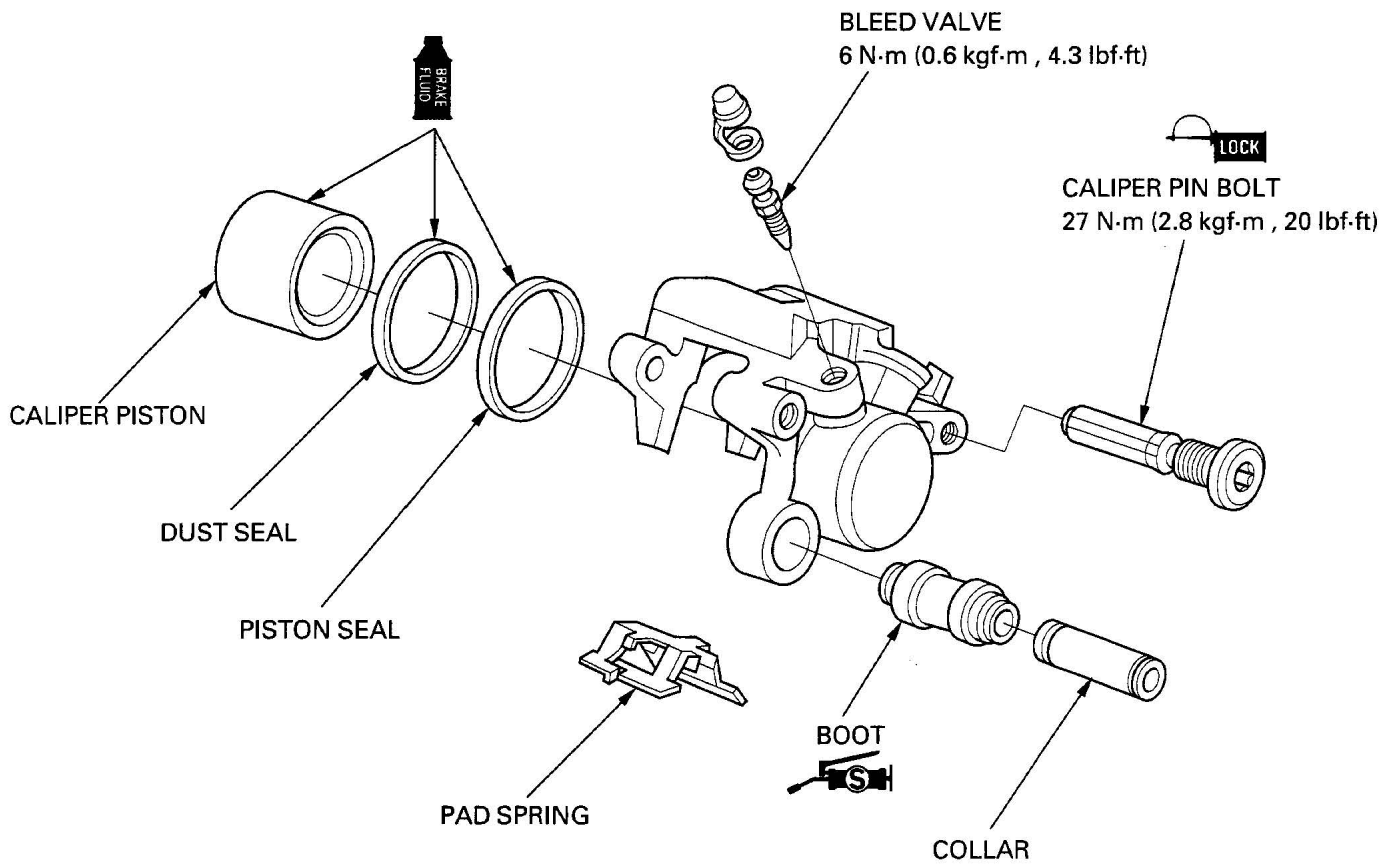
SERVICE LIMIT: 38.24 mm (1.506 in)

Measure the caliper piston O. D.

SERVICE LIMIT: 38.09 mm (1.500 in)



ASSEMBLY



Coat new piston and dust seals with clean brake fluid and install them in the seal grooves in the caliper.

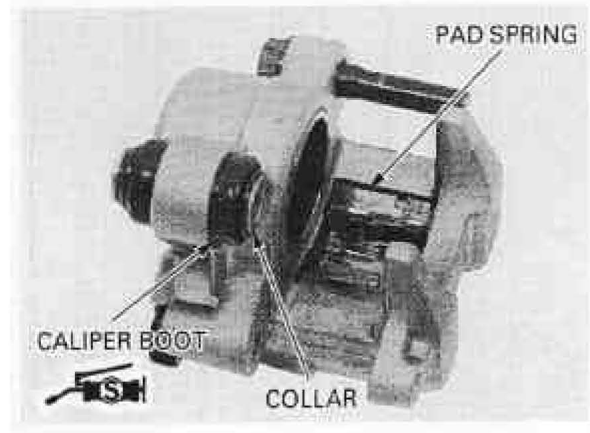
Coat the caliper piston with clean brake fluid and install it into the caliper cylinder with the opening toward the pads.



Install the pad spring onto the caliper body as shown.

Check the caliper boot and replace it if it is hard, deteriorated or damaged.

Apply silicone grease to the inside of the boot. Install the boot and collar into the caliper.

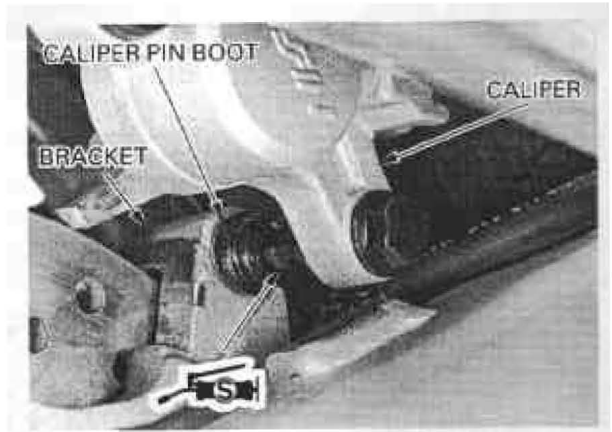


HYDRAULIC BRAKE

Check the caliper pin boot and replace it if it is hard, deteriorated or damaged.

Apply silicone grease to the caliper pin and install the caliper onto the bracket.

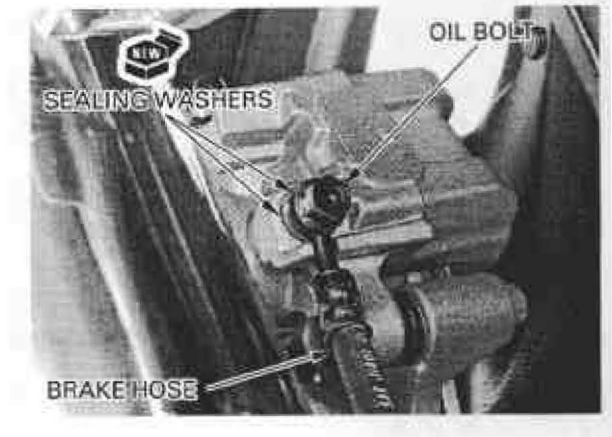
Install the rear brake pads (page 15-6).



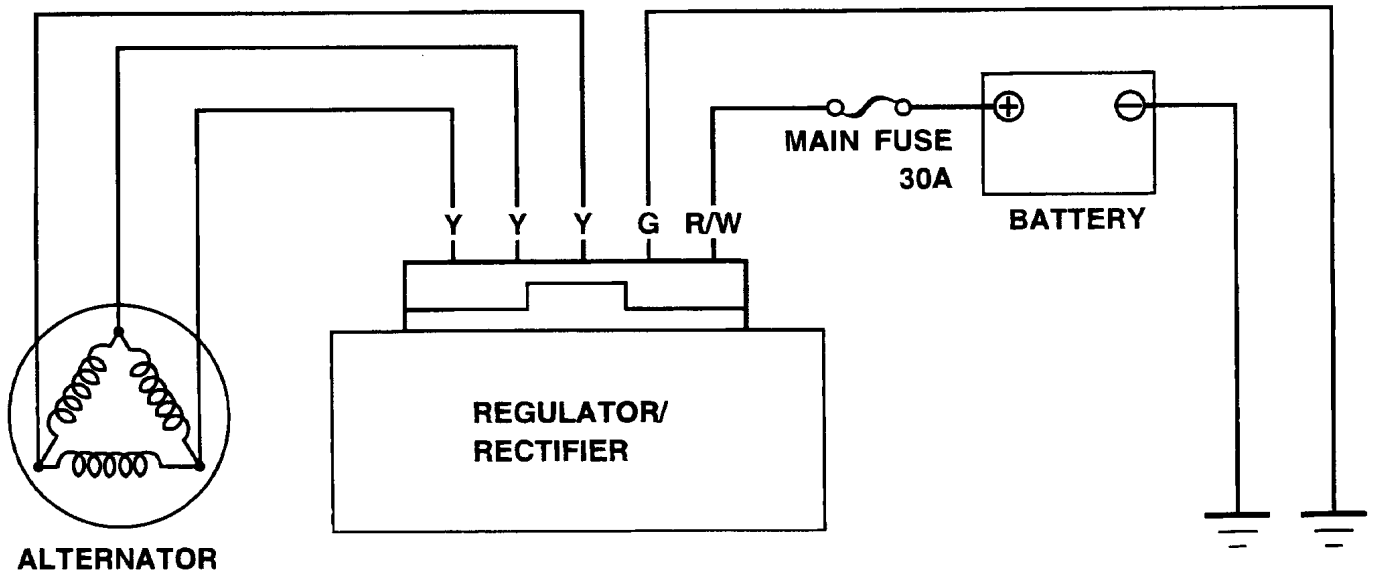
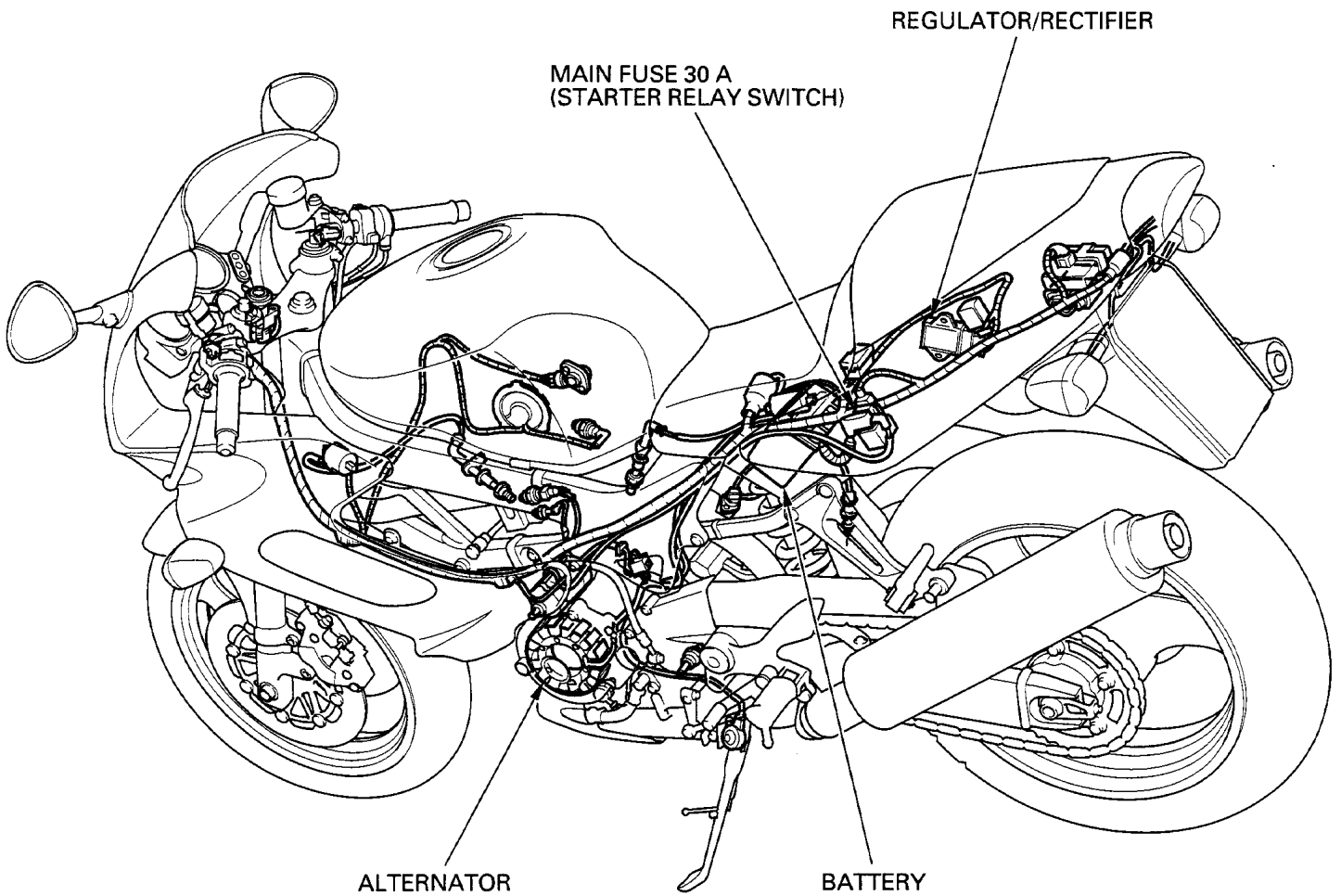
Connect the brake hose to the brake caliper with the oil bolt and new sealing washers, and tighten the oil bolt.

TORQUE: 34 N·m (3.5 kgf·m , 25 lbf·ft)

Fill and bleed the rear brake hydraulic system (page 15-3).



BATTERY/CHARGING SYSTEM



Y: Yellow
G: Green
R: Red
W: White

16. BATTERY/CHARGING SYSTEM

SERVICE INFORMATION	16-1	CHARGING SYSTEM INSPECTION	16-6
TROUBLESHOOTING	16-3	ALTERNATOR CHARGING COIL	16-8
BATTERY	16-5	REGULATOR/RECTIFIER	16-8

SERVICE INFORMATION

GENERAL

▲WARNING

- *The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.*
 - *The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.*
 - *If electrolyte gets on your skin, flush with water.*
 - *If electrolyte gets in your eyes, flush with water for at least 15 minutes and call a physician 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 a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery.

NOTE:

The maintenance free battery must be replaced when it reaches the end of its service life.

16

CAUTION:

The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.

- The battery can be damaged if overcharged or undercharged, or if left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2–3 years.
- Battery voltage may recover after battery charging, but under heavy load, the battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom. If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery. Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.
- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 16-3).
- For alternator service, refer to section 10.

BATTERY/CHARGING SYSTEM

- This model comes with a maintenance free (MF) battery. Remember the following about MF batteries.
 - Use only the electrolyte that comes with the battery.
 - Use all of the electrolyte.
 - Seal the battery properly.
 - Never open the seals again.

CAUTION:

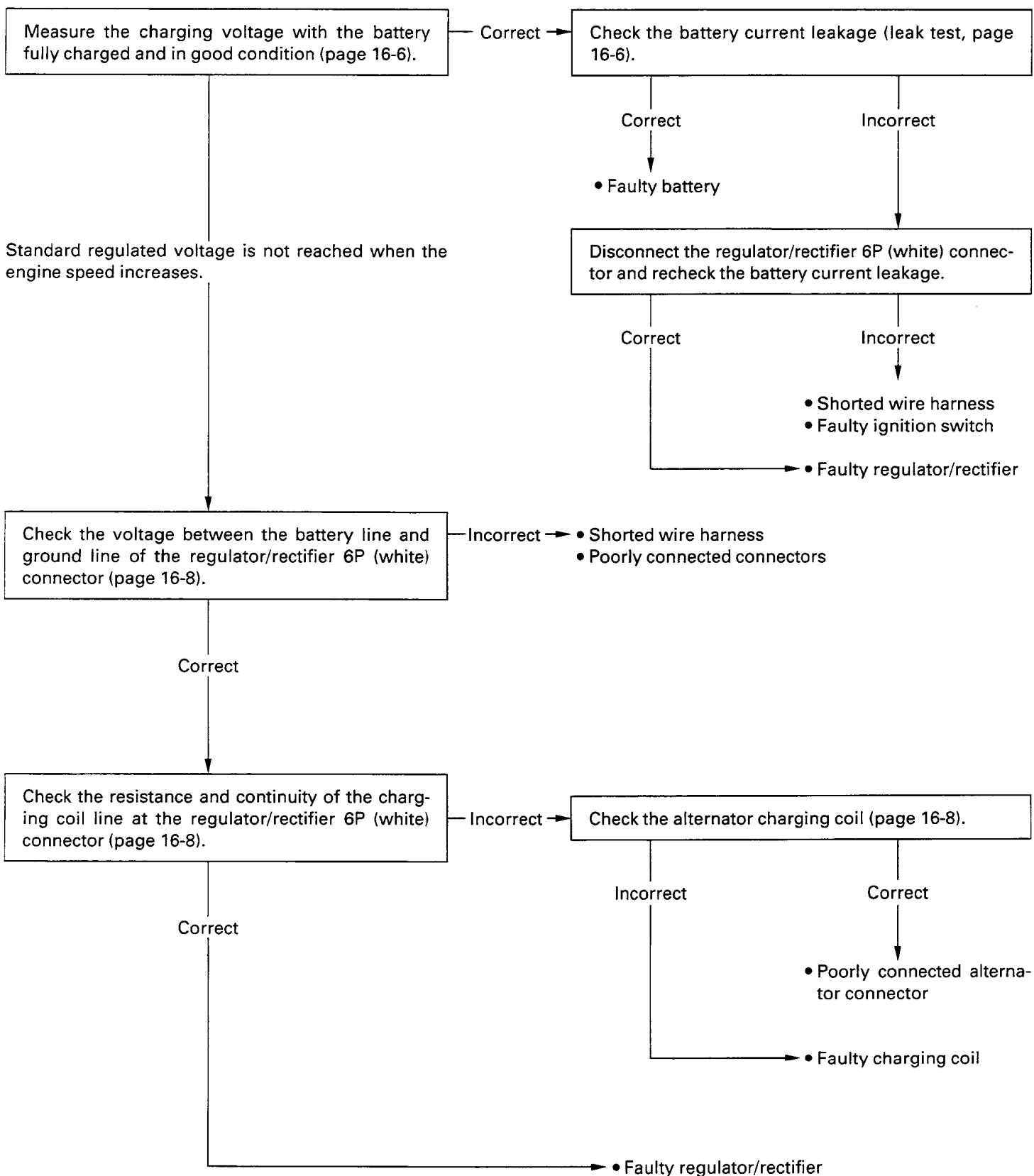
For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.

SPECIFICATIONS

ITEM		SPECIFICATIONS	
Battery	Capacity	12 V – 10 AH	
	Current leakage	0.1 mA max.	
	Voltage (68 °F/20 °C)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.2 A × 5 – 10 h
Quick		5.0 A × 1.0 h	
Alternator	Capacity	0.280 kW	
	Charging coil resistance (68 °F/20 °C)	0.2 – 0.5 Ω	
Regulator/rectifier regulated voltage		13.5 – 15.5 V/5,000 min ⁻¹ (rpm)	

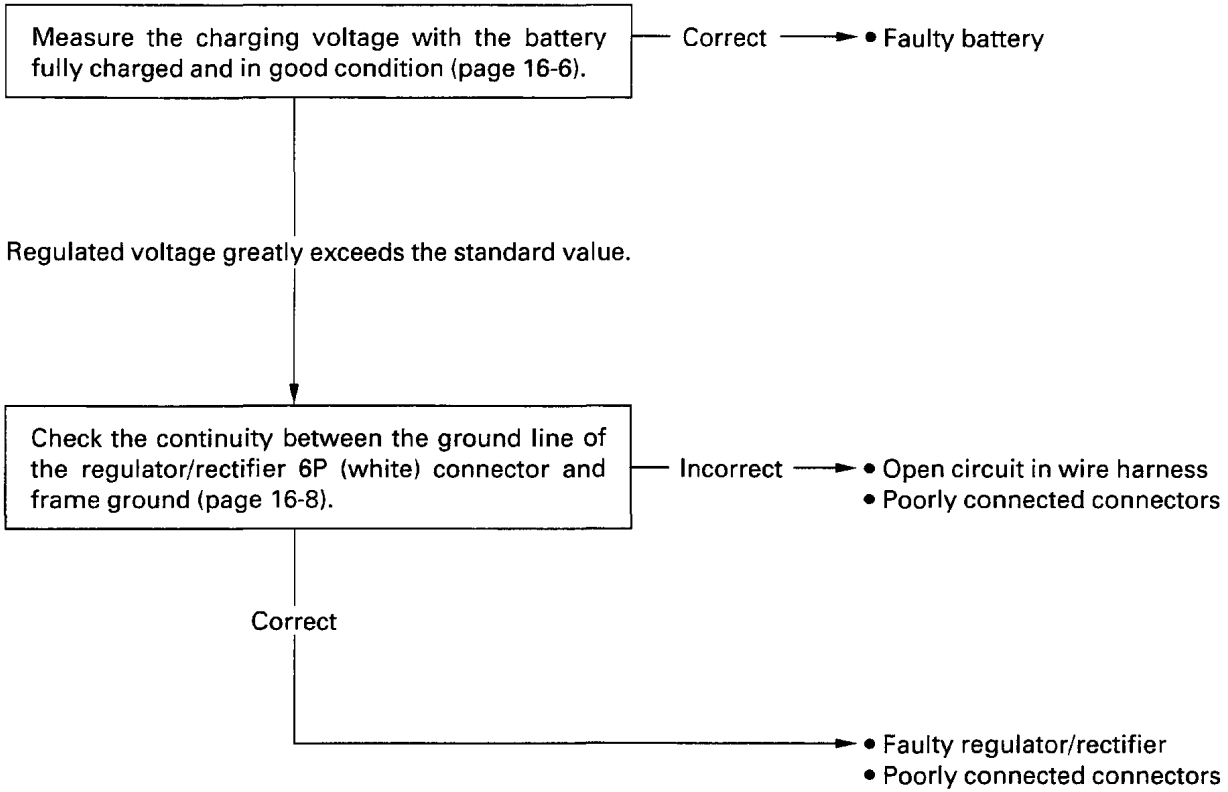
TROUBLESHOOTING

Battery undercharging (voltage not raised to regulated voltage)



BATTERY/CHARGING SYSTEM

Battery overcharging (regulated voltage too high).



BATTERY

REMOVAL/INSTALLATION

Remove the seat (page 2-2).

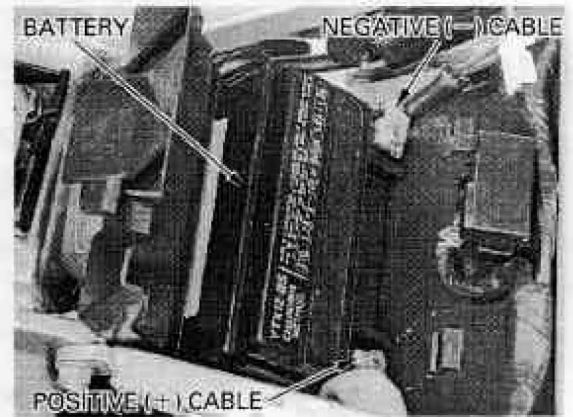
Open the battery case cover.

With the ignition switch OFF, disconnect the negative (-) cable first, then the positive (+) cable.
Remove the battery from the battery case.

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.



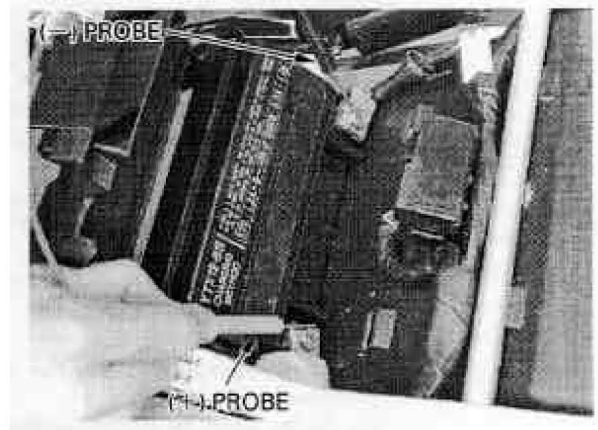
VOLTAGE INSPECTION

Open the battery case cover.
Measure the battery voltage using a commercially available digital multimeter.

VOLTAGE (68 °F/20 °C):

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.

BATTERY/CHARGING SYSTEM

Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (-) cable to the battery negative (-) terminal.

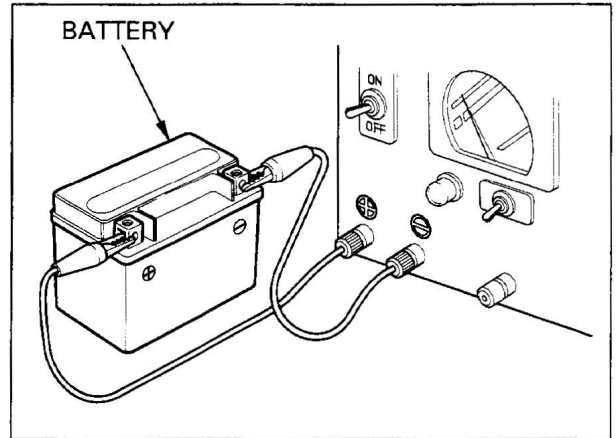
CHARGING CURRENT/TIME:

Standard: 1.2 A × 5–10 h

Quick: 5.0 A × 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

Open the battery case cover (page 16-5).

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: 0.1 mA max.

If current leakage exceeds the specified value, a shorted circuit is likely.

Locate the short by disconnecting connections one by one and measuring the current.

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.



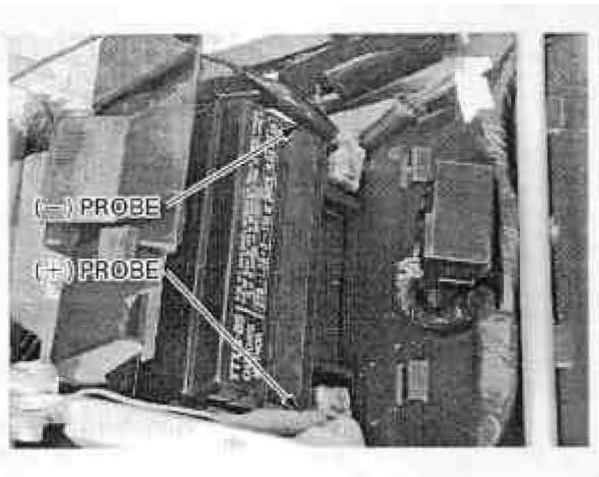
NOTE:

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 multimeter when the engine runs at 5,000 min⁻¹ (rpm)

REGULATED VOLTAGE:

13.5 – 15.5 V/5,000 min⁻¹ (rpm)

The charging system is normal if the voltage reads the regulated voltage on the tester.

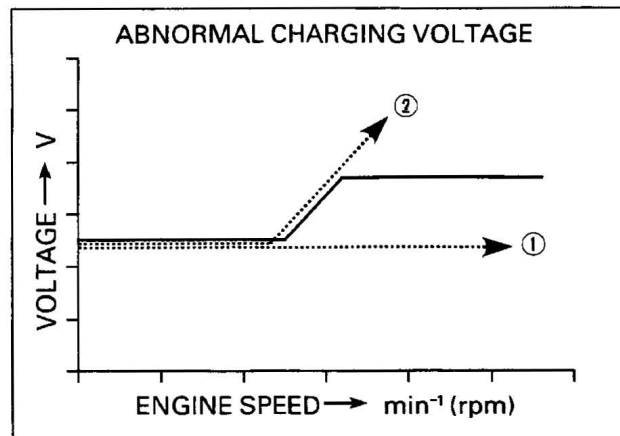
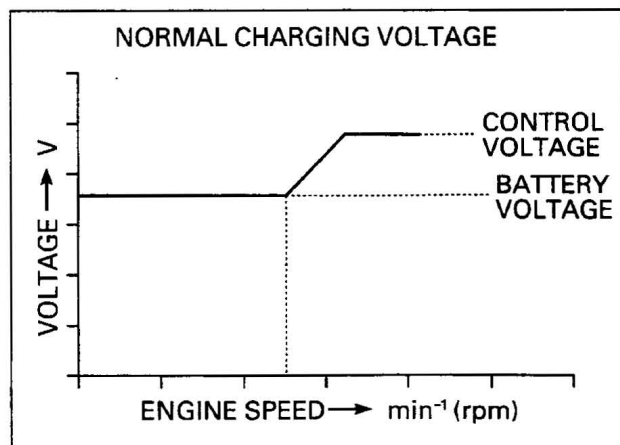
NOTE:

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 16-3)
 - 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 16-4)
 - Poorly grounded regulator/rectifier
 - Faulty battery
 - Faulty regulator/rectifier



ALTERNATOR CHARGING COIL

INSPECTION

Remove the seat (page 2-2).

Disconnect the alternator 3P (white) connector.

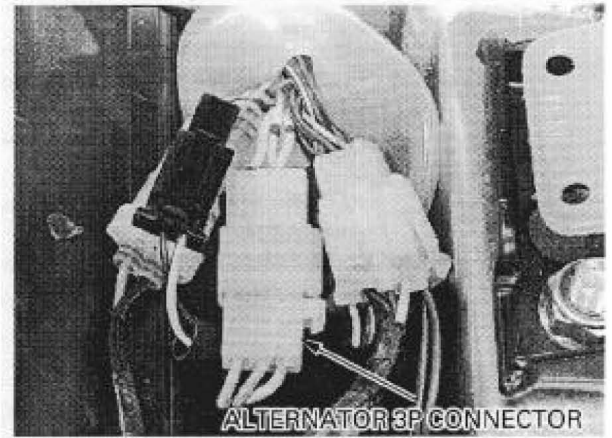
Measure the resistance between the wire terminals of the alternator side connector.

STANDARD: 0.2 – 0.5 Ω (68 °F/20 °C)

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 10 for alternator stator replacement.



REGULATOR/RECTIFIER

WIRE HARNESS INSPECTION

Remove the seat cowl (page 2-2).

Disconnect the regulator/rectifier 6P (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.

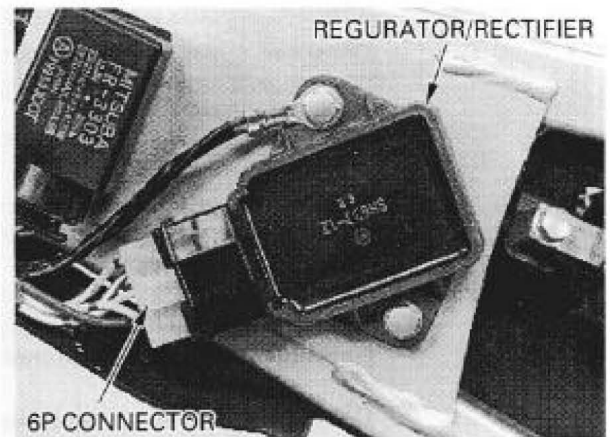
CHARGING COIL LINE

Measure the resistance between the yellow wire terminals.

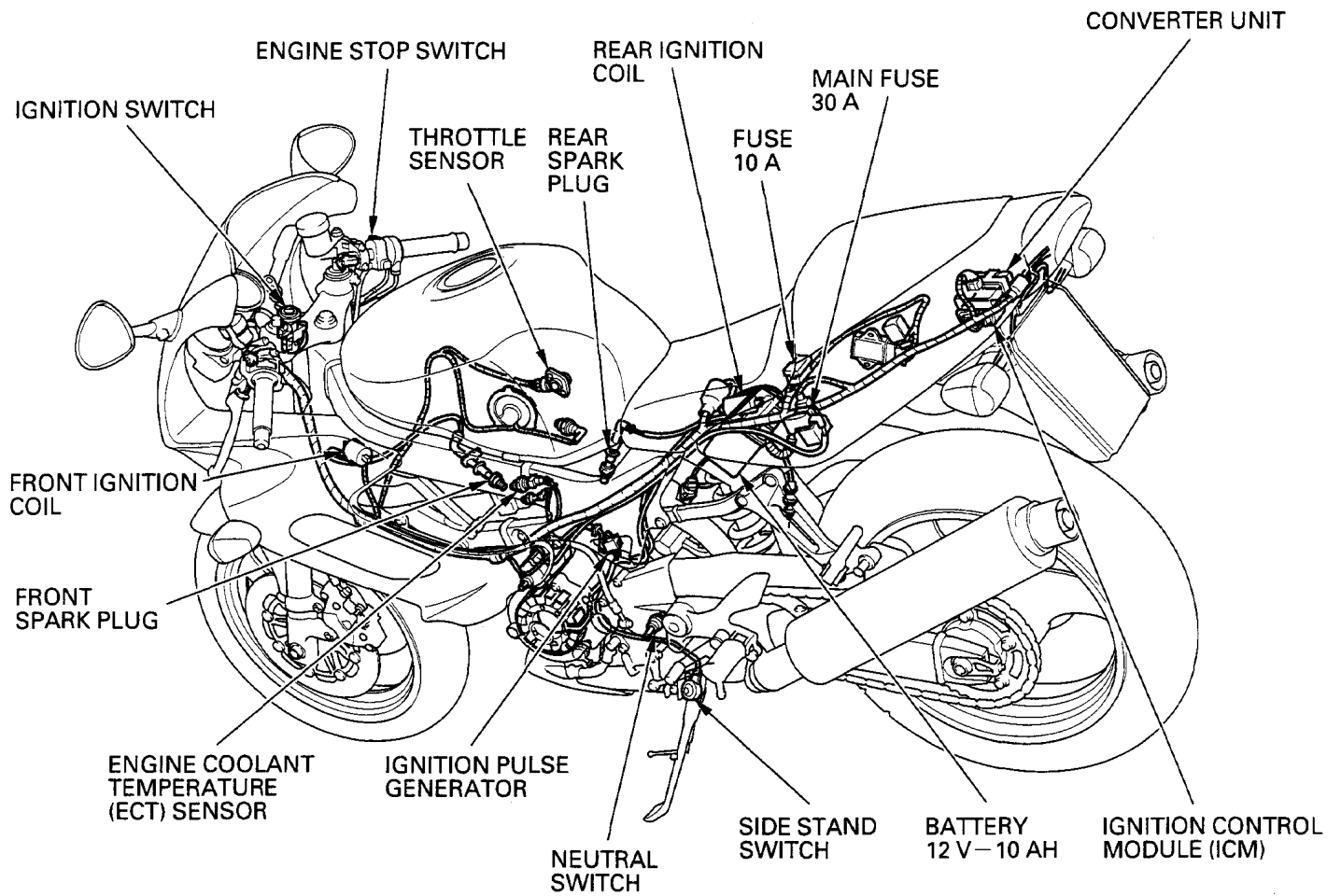
STANDARD: 0.2 – 0.5 Ω (68 °F/20 °C)

Check for continuity between each yellow wire terminal and ground.

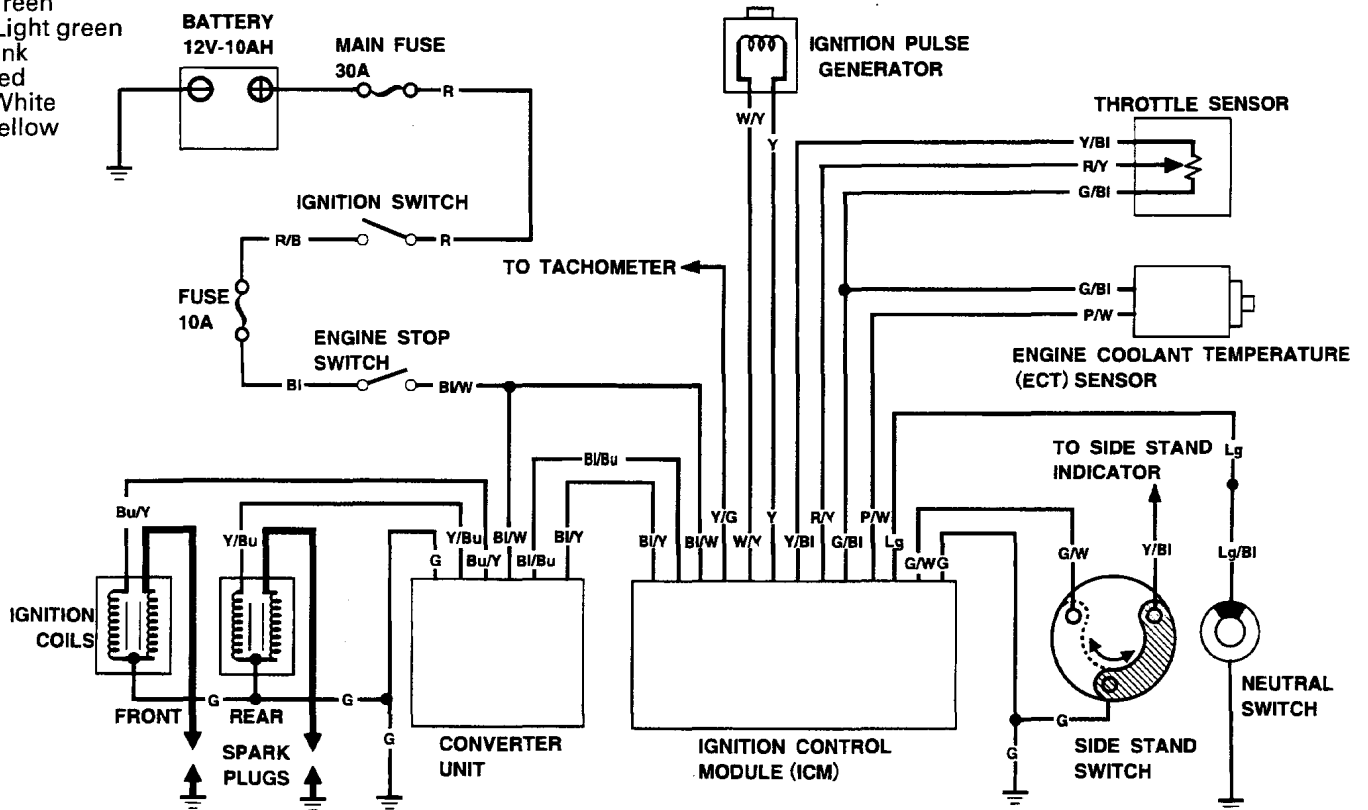
There should not be continuity.



IGNITION SYSTEM



BI: Black
 Bu: Blue
 G: Green
 Lg: Light green
 P: Pink
 R: Red
 W: White
 Y: Yellow



17. IGNITION SYSTEM

SERVICE INFORMATION	17-1	IGNITION TIMING	17-7
TROUBLESHOOTING	17-3	THROTTLE SENSOR	17-8
IGNITION SYSTEM INSPECTION	17-4	ENGINE COOLANT TEMPERATURE (ECT) SENSOR	17-10
IGNITION COIL	17-6		
IGNITION PULSE GENERATOR	17-7		

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.

CAUTION:

Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.

- When servicing the ignition system, always follow the steps in the troubleshooting sequence on page 17-3.
- The 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 engine coolant temperature (ECT) sensor and throttle sensor signal the ICM to compensate the ignition timing according to the coolant temperature and throttle opening.
- The 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 at the spark plugs.
- This motorcycle's spark plug is equipped with platinum type electrodes. Do not use spark plugs other than specified.
- For spark plug inspection, see section 3.
- See section 19 for following components:
 - Ignition switch
 - Engine stop switch
 - Neutral switch
 - Side stand switch
 - Clutch switch

IGNITION SYSTEM

SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug		DPR9EVX-9 (NGK)
Spark plug gap		0.80–0.90 mm (0.031–0.035 in)
Ignition coil primary peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		15° BTDC at idle
Engine coolant temperature (ECT) sensor resistance	At 68 °F (20 °C)	2–3 k Ω
	At 176 °F (80 °C)	200–400 Ω
Throttle sensor	Resistance (68 °F/20 °C)	4–6 k Ω
	Input voltage	4.7–5.3 V

TORQUE VALUES

Ignition coil mounting bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)
Ignition pulse generator bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)
Engine coolant temperature (ECT) sensor	23 N·m (2.3 kgf·m , 17 lbf·ft)

TOOL

Peak voltage adaptor	07HGJ-0020100 with commercially available digital multimeter (impedance 10 M Ω /DCV minimum)
Inspection adaptor	07VMJ-0020100

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)
- If there is no spark at any cylinder, temporarily exchange the ignition coil with the other good one and perform the spark test. If there is spark, the exchanged ignition coil is faulty.

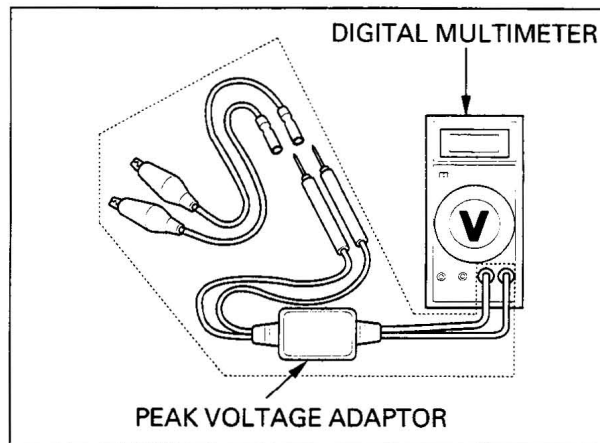
NO SPARK AT SPARK PLUGS

UNUSUAL CONDITION		PROBABLE CAUSE (Check in numerical order)
Ignition coil primary voltage	Low peak voltage	1. Incorrect peak voltage adaptor connections. 2. The multimeter impedance is too low; below 10 M Ω /DCV. (System is normal if measured voltage is over the specifications with reverse connections.) 3. Cranking speed is too low. (Battery is undercharged) 4. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 5. Poorly connected connectors or an open circuit in ignition system. 6. Faulty side stand switch or neutral switch. 7. An open circuit or loose connection in No. 6 related circuit wires. <ul style="list-style-type: none"> • Side stand switch line: green/white wire • Neutral switch line: light green and light green/black wires 8. Faulty ignition control module (ICM) and/or converter unit (in case when above No. 1 thru. 7 are normal).
	No peak voltage	1. Incorrect peak voltage adaptor connections. (System is normal if measured voltage is over the specifications with reverse connections.) 2. Battery is undercharged. (Voltage drops largely when the engine is started.) 3. Faulty ignition switch or engine stop switch. 4. Loose or poorly connected ICM or converter unit connectors. 5. No voltage at the black/white wire of the ICM or converter unit. 6. Open circuit or poor connection in green (ground) wire of the ICM or converter unit. 7. Faulty side stand switch or neutral switch. 8. An open circuit or loose connection in No. 7 related circuit wires. <ul style="list-style-type: none"> • Side stand switch line: green/white wire • Neutral switch line: light green and light green/black wires 9. Faulty peak voltage adaptor. 10. Faulty ignition pulse generator. (Measure peak voltage.) 11. Faulty ICM and/or converter unit (in case when above No. 1 thru. 10 are normal).
	Peak voltage is normal, but does not spark	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coils.
Ignition pulse generator	Low peak voltage	1. The multimeter impedance is too low; below 10 M Ω /DCV. 2. Cranking speed is too slow. (Battery is undercharged.) 3. The sampling timing of the tester and measured pulse were not synchronized. (System is normal if measured voltage is over the standard voltage at least once.) 4. Faulty ignition pulse generator (in case when above No. 1 thru. 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 plugs, 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 $10\text{ M}\Omega$ /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.

TOOLS:

**Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance $10\text{ M}\Omega$ /DCV minimum)**

IGNITION PRIMARY PEAK VOLTAGE

NOTE:

- Check all system connections before this inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression at each cylinder and check that the spark plugs are installed correctly in the cylinder heads.

Disconnect the spark plug caps from the spark plugs.

Connect good known spark plugs to the spark plug caps and ground the spark plugs to the cylinder heads as done in a spark test.

Front: Remove the front fairing (page 2-3).

Rear: Remove the seat (page 2-2).

Disconnect the ignition coil 2P (white) connector.



Connect the inspection adaptor.

TOOL:

Inspection adaptor 07VMJ-0020100

Connect the peak voltage adaptor to the inspection adaptor.

CONNECTIONS:

Red clip (-) – Green clip (+)

Turn the ignition switch ON and engine stop switch to RUN.

Shift the transmission into neutral.
Crank the engine with the starter motor and measure the ignition coil primary peak voltage.

PEAK VOLTAGE: 100 V minimum

▲WARNING

Avoid touching the spark plugs and tester probes to prevent electric shock.

NOTE:

Although measured values are different for each ignition coil, they are normal as long as voltage is higher than the specified value.

If the peak voltage is lower than standard value, follow the checks described in the troubleshooting chart (page 17-3).

Install the removed parts in the reverse order of removal.

IGNITION PULSE GENERATOR PEAK VOLTAGE

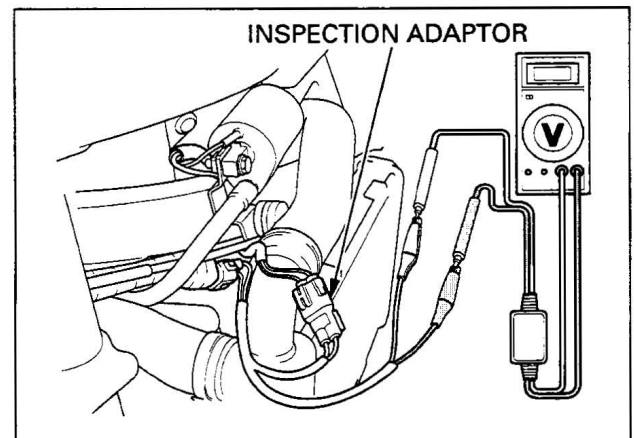
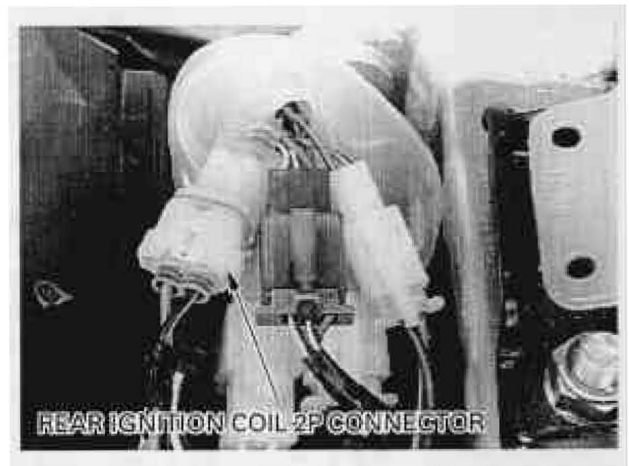
NOTE:

Check cylinder compression at each cylinder and check that the spark plugs are installed correctly in the cylinders.

Remove the seat (page 2-2).

Remove the converter unit from the stay.

Remove the ignition control module (ICM) from the stay and disconnect the ICM connector.



IGNITION SYSTEM

Connect the peak voltage adaptor probes to the connector terminals of the wire harness side.

CONNECTION:

White/Yellow terminal – Yellow terminal

Turn the ignition switch ON and engine stop switch to RUN.

Shift the transmission into neutral.

Crank the engine with the starter motor and measure the ignition pulse generator peak voltage.

PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured at ICM connector is abnormal, measure the peak voltage at the pulse generator connector.

Remove the front fairing (page 2-3).

Disconnect the ignition pulse generator 2P (white) connector and connect the peak voltage adaptor 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 or short circuit, or loose connection.
- If both peak voltage are lower than standard value, follow the checks described in the troubleshooting chart (page 17-3).

Install the removed parts in the reverse order of removal.

IGNITION COIL

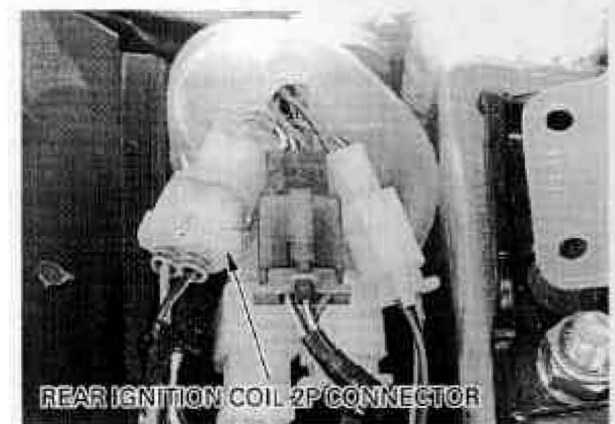
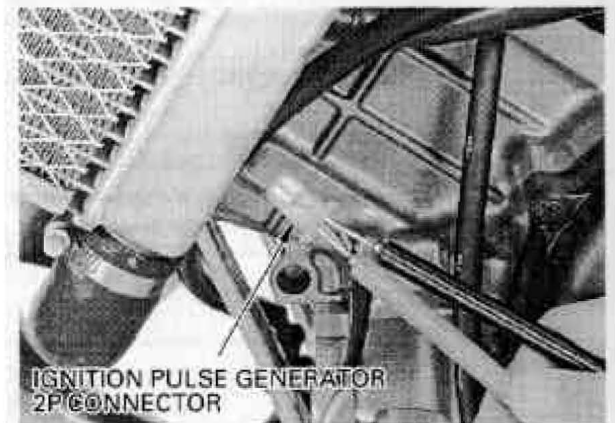
REPLACEMENT

Front: Remove the front fairing (page 2-3).

Rear: Remove the seat cowl (page 2-2).

Disconnect the spark plug cap from the plug.

Disconnect the ignition coil connector.



Remove the two mounting bolts and the ignition coil.

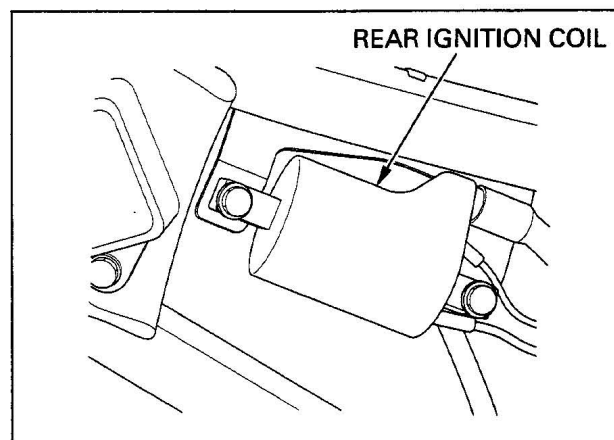
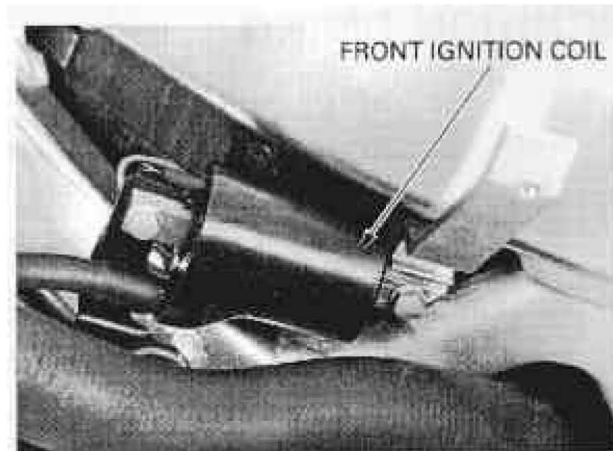
Install the ignition coil and tighten the mounting bolts.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the removed parts in the reverse order of removal.

NOTE:

Route the ignition coil wire and spark plug wire properly (page 1-18).



IGNITION PULSE GENERATOR

REPLACEMENT

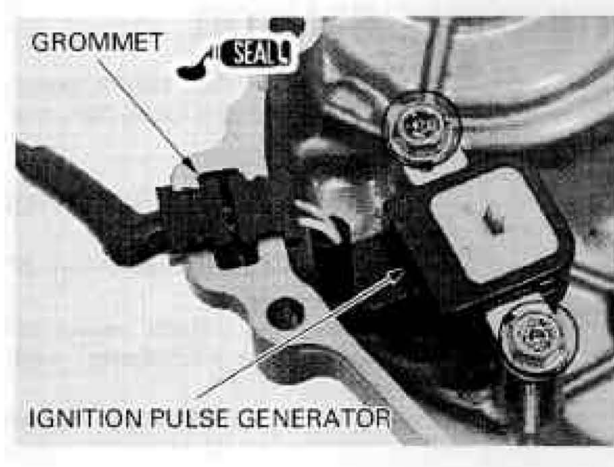
Remove the right crankcase cover (page 6-12).

Remove the two bolts and ignition pulse generator.

Apply sealant to the grommet seating surfaces. Install a new ignition pulse generator and the grommet into the cover groove properly. Tighten the bolts.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the right crankcase cover (page 6-14).



IGNITION TIMING

NOTE:

Read the instructions for timing light operation.

Start the engine and warm it up to operating temperature.

Stop the engine and remove the timing hole cap.

Connect the timing light to the spark plug wire.

Start the engine, let it idle and check the ignition timing.

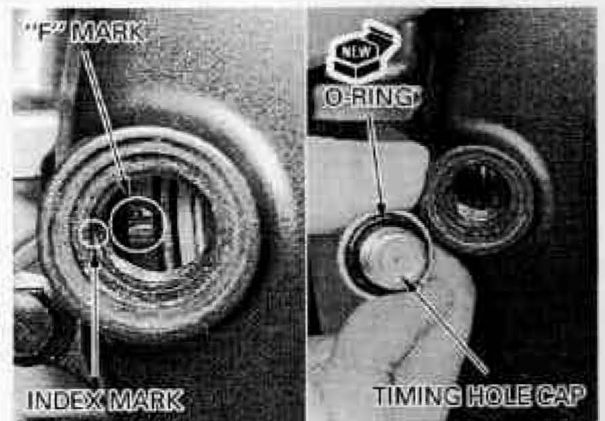
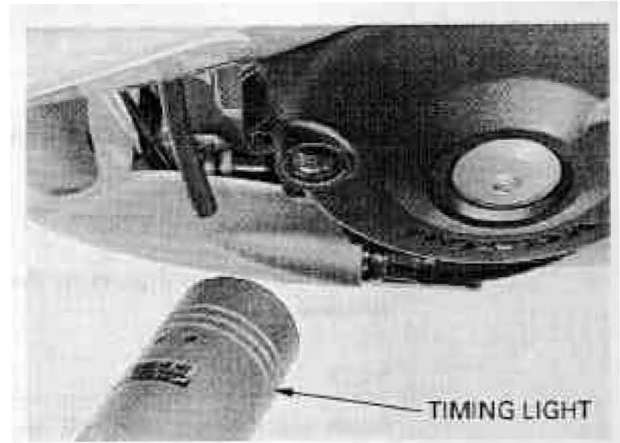
The ignition timing is correct if the "F" mark on the flywheel aligns with the index mark on the left crankcase cover at idle.

Coat a new O-ring with grease and install it onto the timing hole cap.

Apply grease the timing hole cap threads.

Install and tighten the timing hole cap.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)



THROTTLE SENSOR

Remove the fuel tank without disconnecting the fuel and vacuum tubes from the fuel valve (page 2-4).

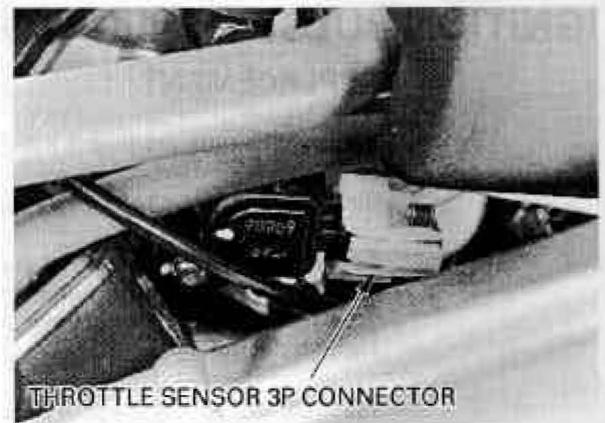
OPERATION INSPECTION

Disconnect the throttle sensor 3P connector.

Start the engine.

Connect the throttle sensor connector when the engine speed is 3,500 min⁻¹ (rpm) or above (throttle angle is 4–12°).

The engine speed should increase.



SYSTEM INSPECTION

Disconnect the ignition control module (ICM) connector (17-5).

Measure the resistance between the yellow/black and green/black wire terminals of the wire harness side connector.

STANDARD: 4–6 kΩ (68 °F/20 °C)



Check that the resistance between the red/yellow and green/black wire terminals 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 inspections at the sensor terminals.

- 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.

Connect the ICM connector.

Turn the engine stop switch to RUN and the ignition switch ON.

Measure the input voltage between the yellow/black (+) and green/black (-) wire terminals of the wire harness side throttle sensor connector.

STANDARD: 4.7 – 5.3 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.

REPLACEMENT

Remove the carburetors from the insulators (page 5-5).

Disconnect the throttle sensor connector.

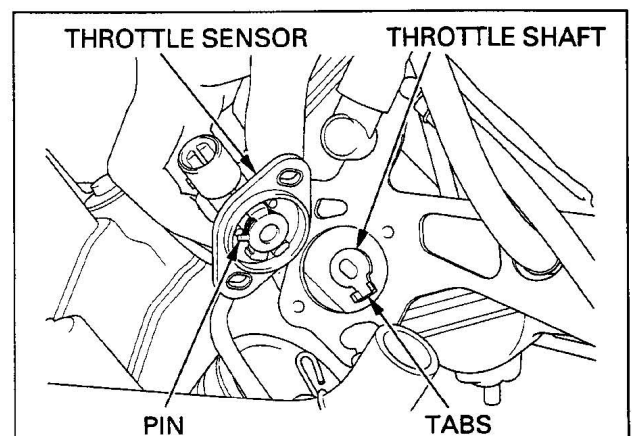
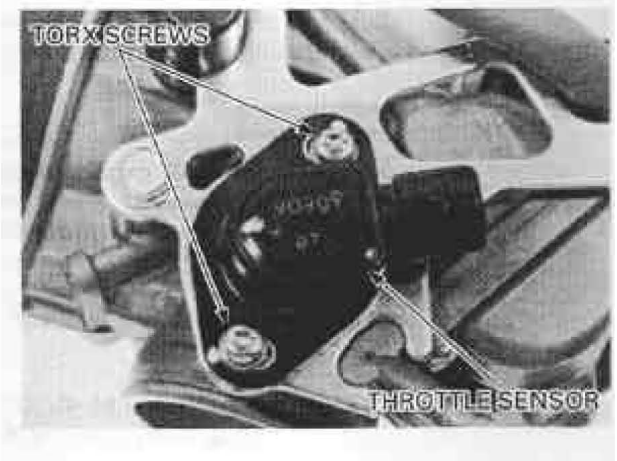
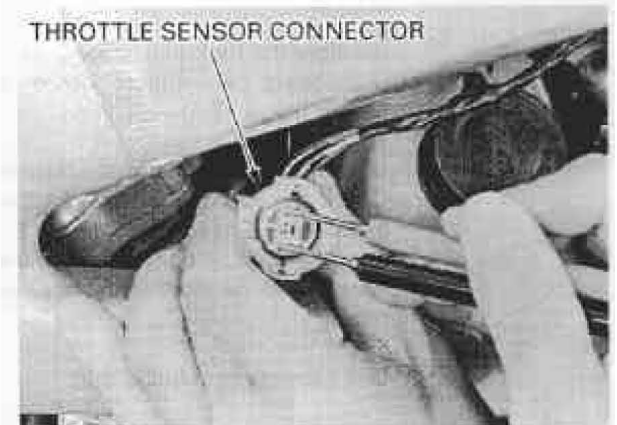
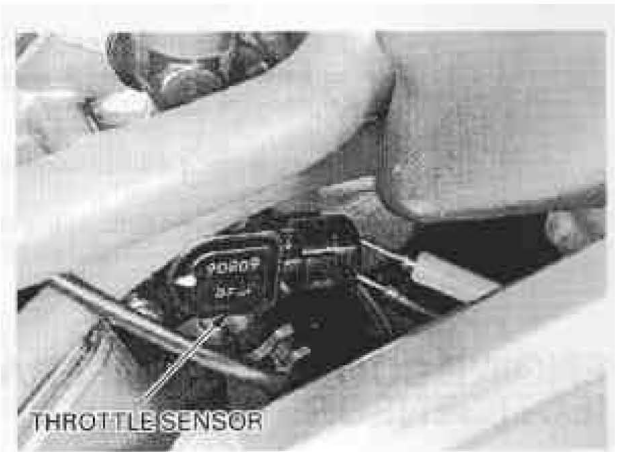
Remove the two torx screws and the throttle sensor.

Install the throttle sensor so that the pin of the throttle sensor is positioned between the tabs of the throttle shaft.

Apply locking agent to the torx screw threads and loosely install the screws.

CAUTION:

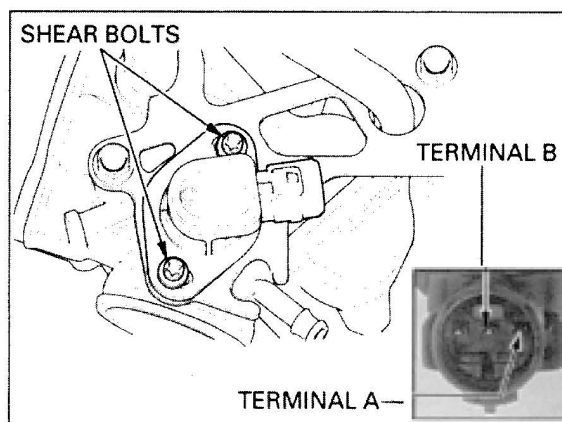
Install the throttle sensor properly. Improper installation can cause damage to the throttle sensor.



Adjust the throttle sensor position so that the resistance between terminals A and B is 490–510 Ω , and tighten the shear bolts until the bolt heads break off.

Connect the throttle sensor connector.

Install the removed parts in the reverse order of removal.



ENGINE COOLANT TEMPERATURE (ECT) SENSOR

INSPECTION

Remove the fuel tank (page 2-4).
Disconnect the ignition control module (ICM) connector (page 17-5).

Disconnect the ECT sensor connector.
Check for continuity between the ETC sensor connector and ICM connector.
There should be continuity between the same color wires, and no continuity between different color wires.

Drain the coolant (page 6-5).

Remove the ECT sensor from the thermostat housing.

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 k Ω at 20 °C (68 °F)
200 – 400 Ω at 80 °C (178 °F)

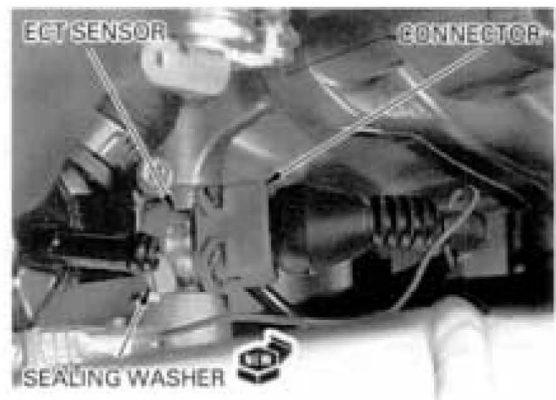
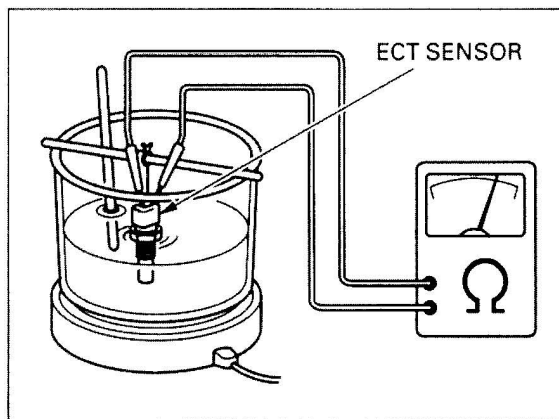
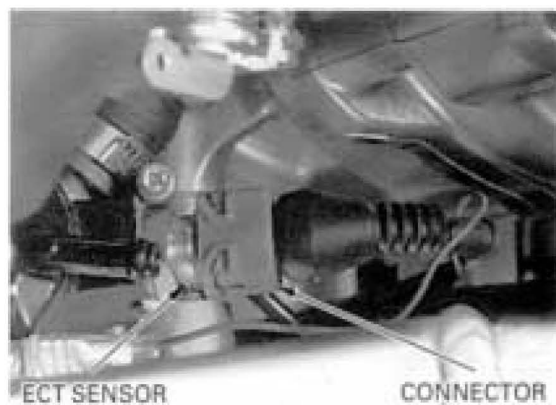
If the resistance is out of above ranges, replace the ECT sensor.

Install the ECT sensor with a new sealing washer and tighten it.

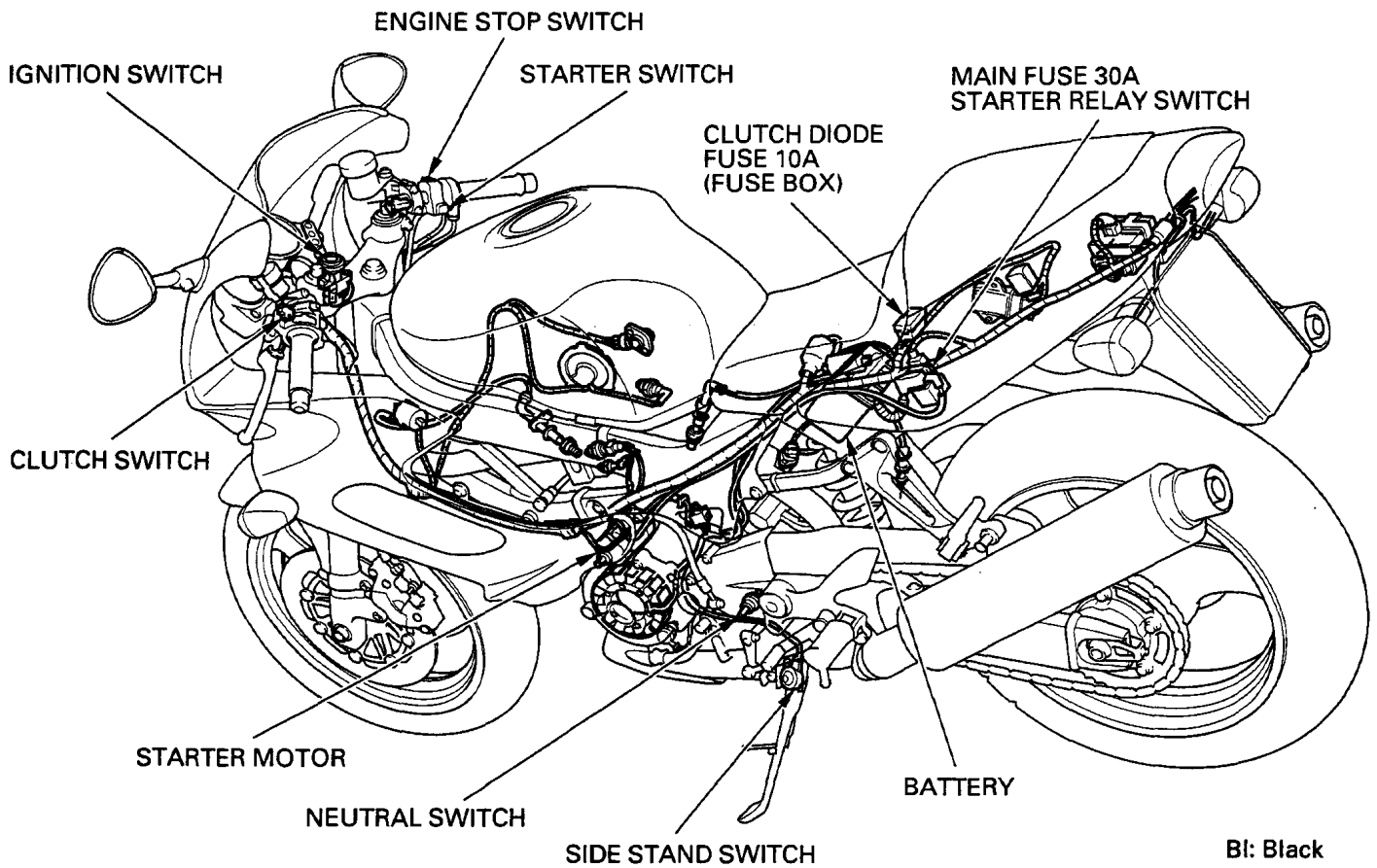
TORQUE: 23 N·m (2.3 kgf·m, 17 lbf·ft)

Install the removed parts in the reverse order of removal.

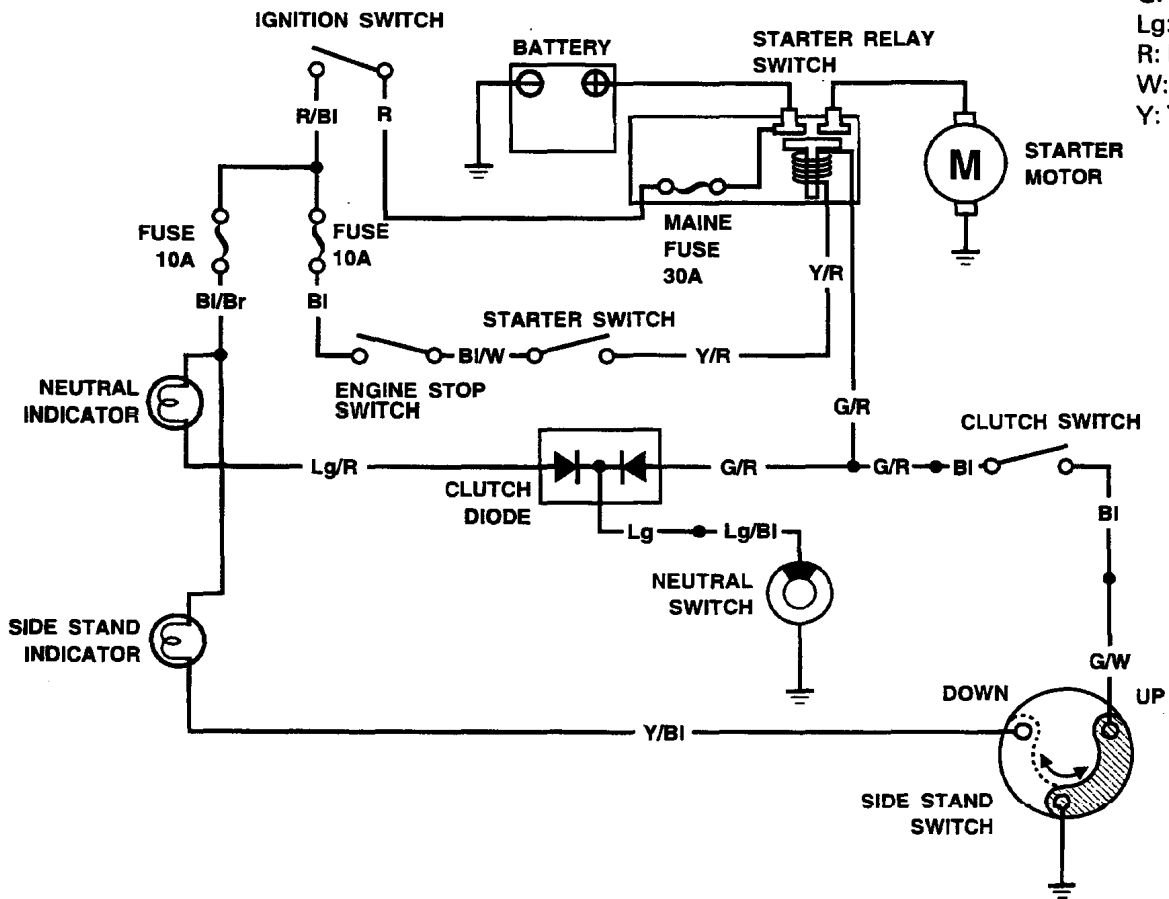
Fill and bleed the cooling system (page 6-5).



ELECTRIC STARTER



Bl: Black
 Br: Brown
 G: Green
 Lg: Light green
 R: Red
 W: White
 Y: Yellow



18. ELECTRIC STARTER

SERVICE INFORMATION	18-1	STARTER RELAY SWITCH	18-10
TROUBLESHOOTING	18-2	CLUTCH DIODE	18-11
STARTER MOTOR	18-4		

SERVICE INFORMATION

GENERAL

▲WARNING

Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.

- The starter motor can be serviced with the engine in the frame.
- When checking the starter system, always follow the steps in the troubleshooting flow chart (page 18-2).
- 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 10 for starter clutch servicing.
- See section 19 for following components:
 - Ignition switch
 - Engine stop switch
 - Starter switch
 - Neutral switch
 - Side stand switch
 - Clutch switch

SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	6.5 (0.26)

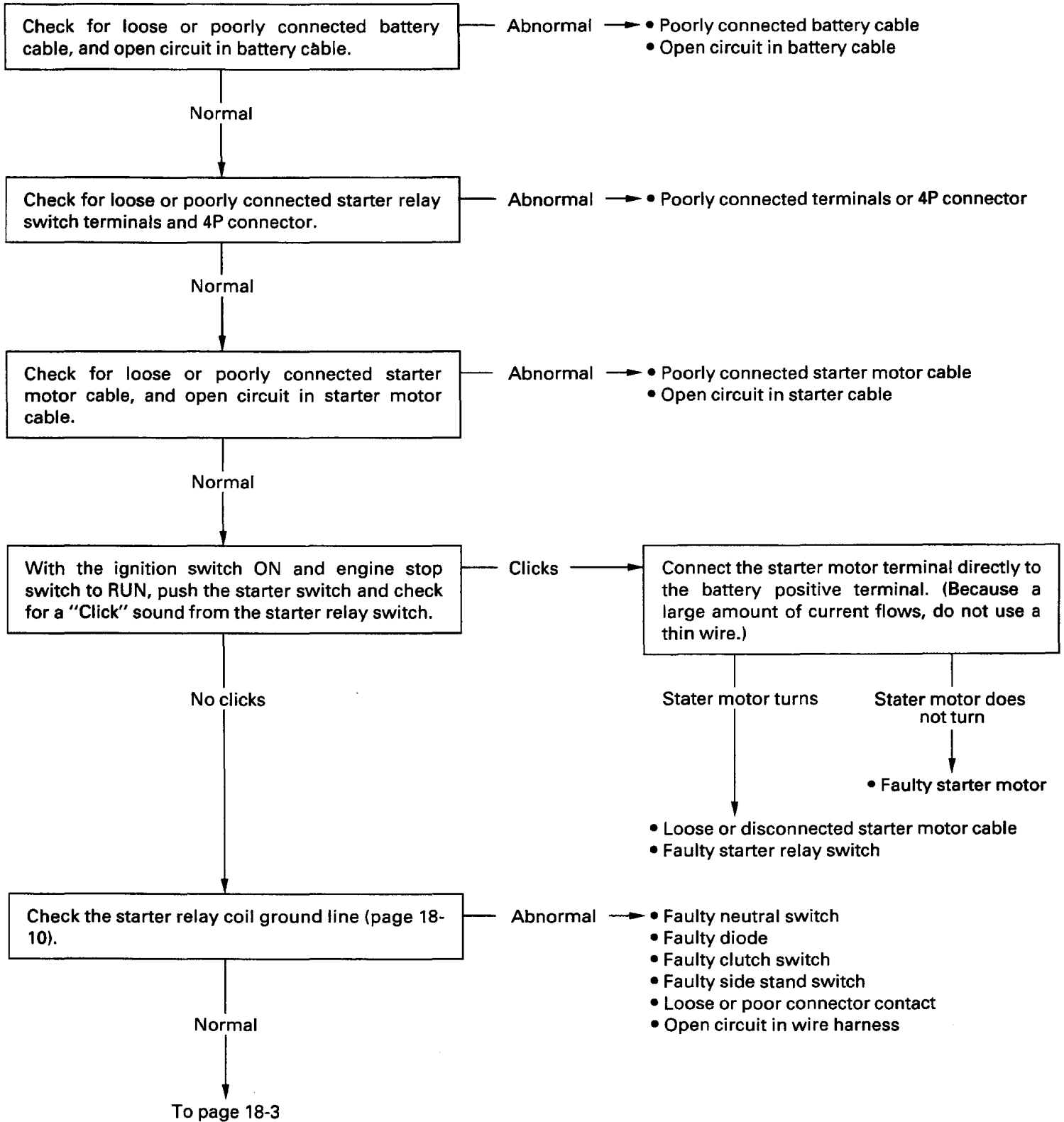
TORQUE VALUE

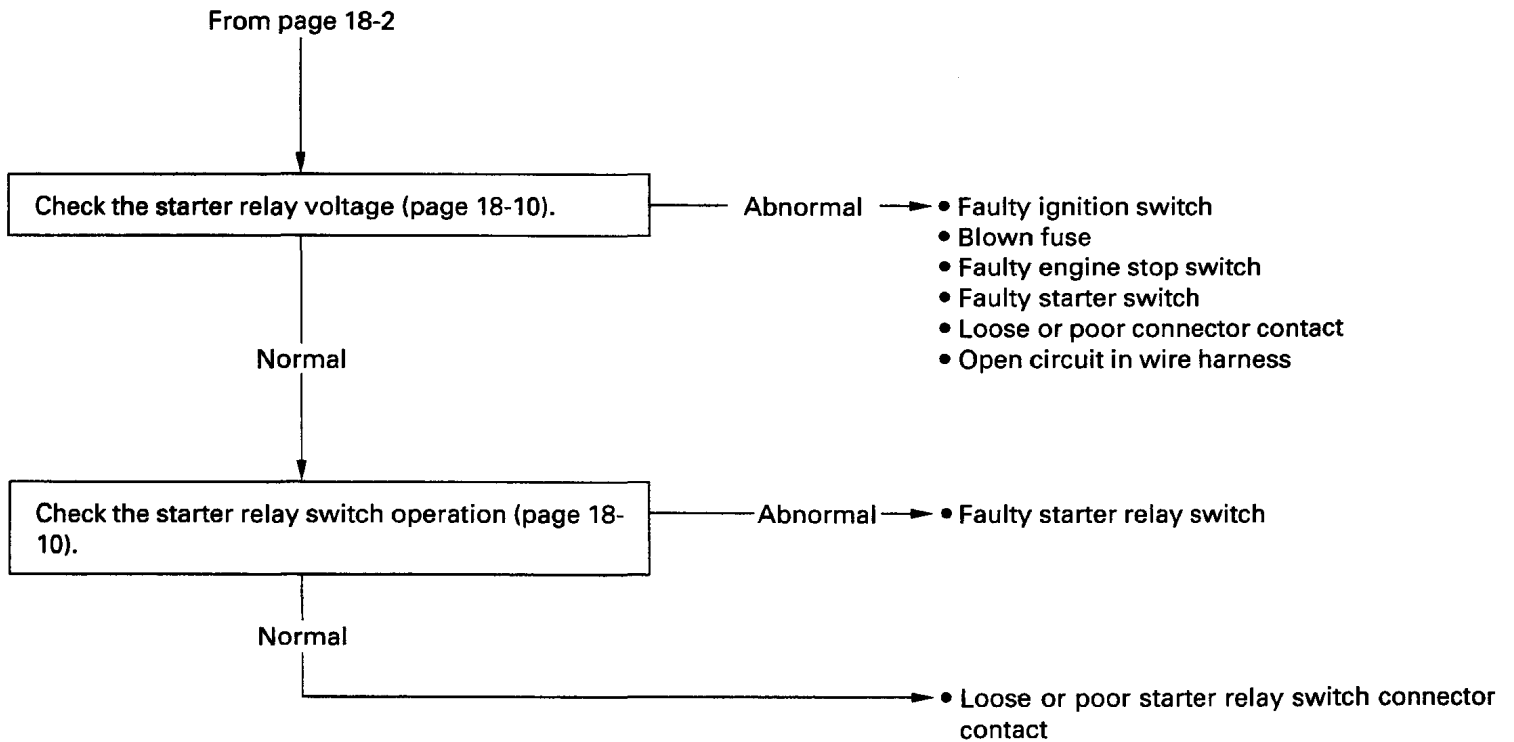
Starter motor terminal nut 10 N·m (1.0 kgf·m , 7 lbf·ft)

TROUBLESHOOTING

Starter motor will not turn

- Check for a blown main fuse (30 A) or sub-fuse (10 A)
- Check that the battery is fully charged and in good condition.





Starter motor turns slowly

- Weak battery
- Poorly connected battery cable
- Poorly connected starter motor cable
- Faulty starter motor

Starter motor turns, but engine does not turn

- Faulty starter clutch (section 10)

Starter relay switch "clicks", but engine does not turn over

- Crankshaft does not turn due to engine problem
- Faulty starter clutch (section 10)
- Faulty starter reduction gear (section 10)

STARTER MOTOR

REMOVAL

▲WARNING

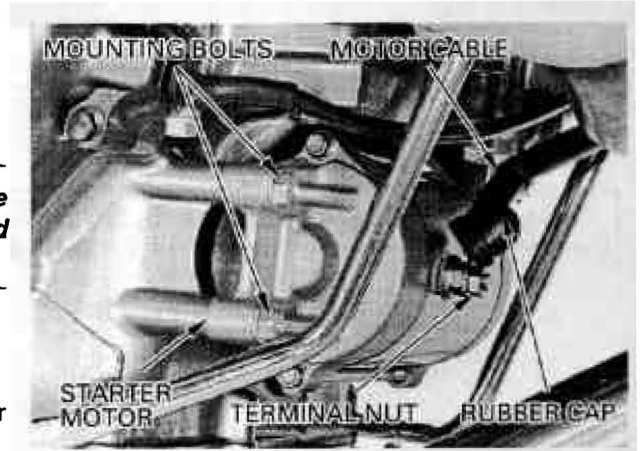
Always turn the ignition switch OFF before servicing the starter motor. The motor could suddenly start, causing serious injury.

Remove the engine under cover (page 2-4).

Remove the rubber cap, terminal nut and starter motor cable.

Remove the two mounting bolts and the starter motor from the crankcase.

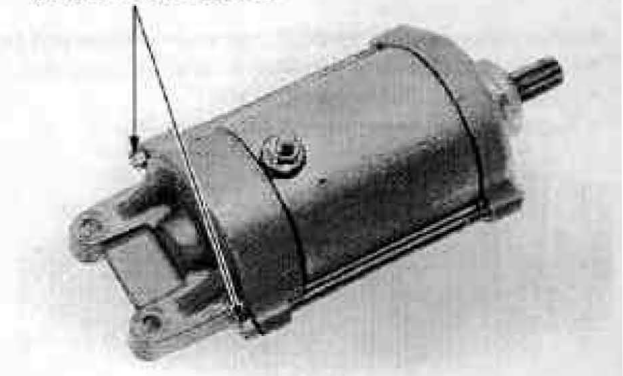
Remove the O-ring from the starter motor.



DISASSEMBLY

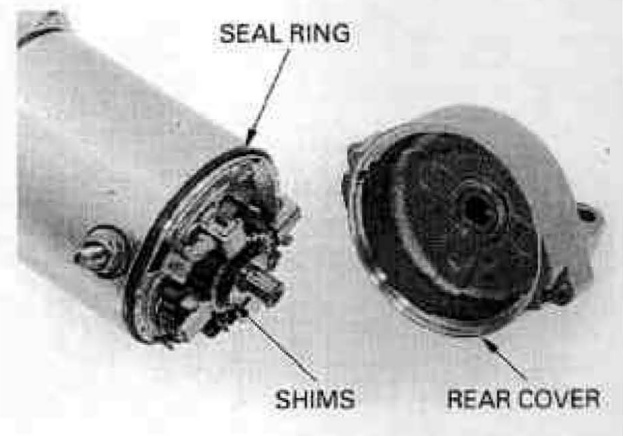
Remove the starter motor case bolts.

MOTOR CASE BOLTS



Record the location and number of shims.

Remove the rear cover, seal ring and shims.



Remove the following:

- front cover
- seal ring
- lock washer
- insulated washer
- shims
- armature

INSPECTION

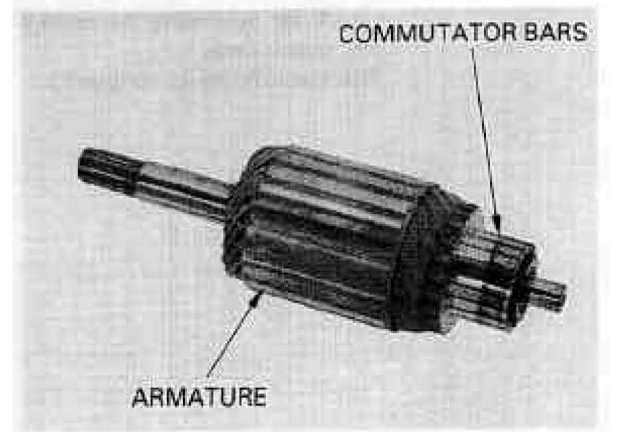
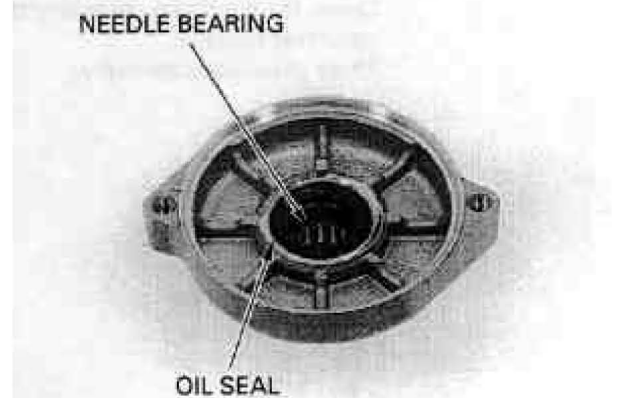
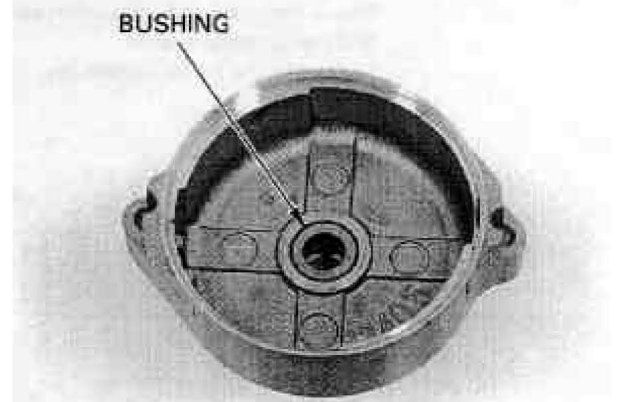
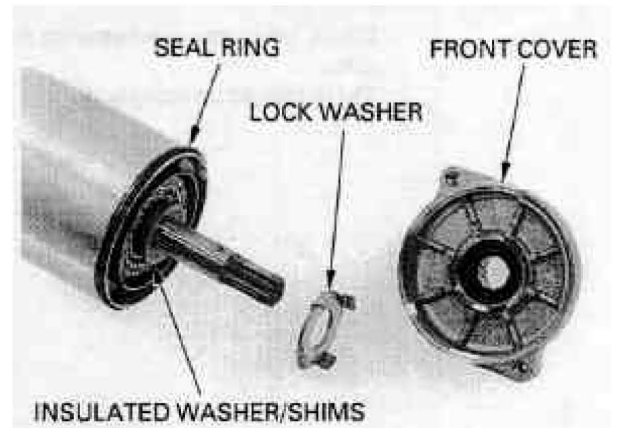
Check the bushing in the rear cover for wear or damage.

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:

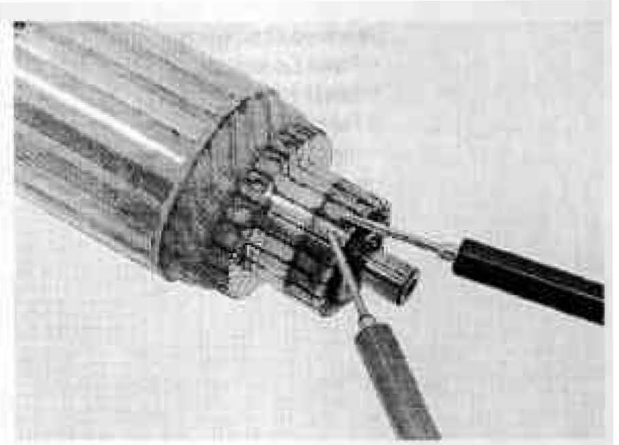
Do not use emery or sand paper on the commutator.



ELECTRIC STARTER

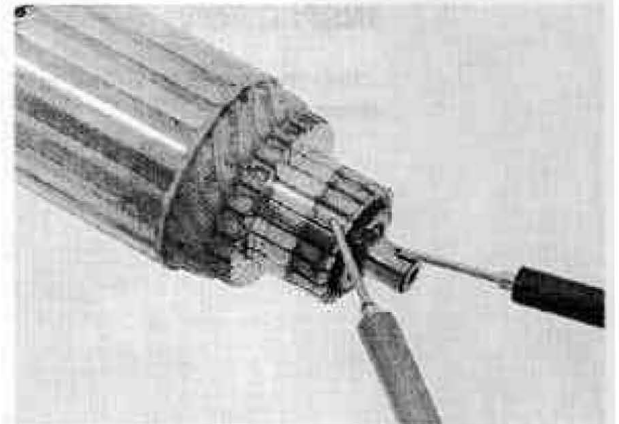
Check for continuity between pairs of commutator bars.

There should be continuity.



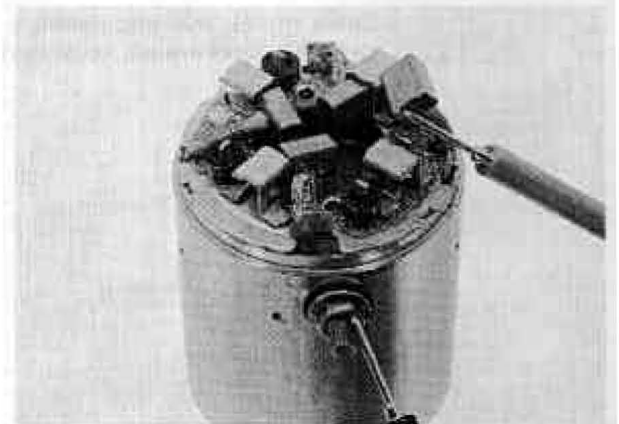
Check for continuity between each commutator bar and the armature shaft.

There should be no continuity.



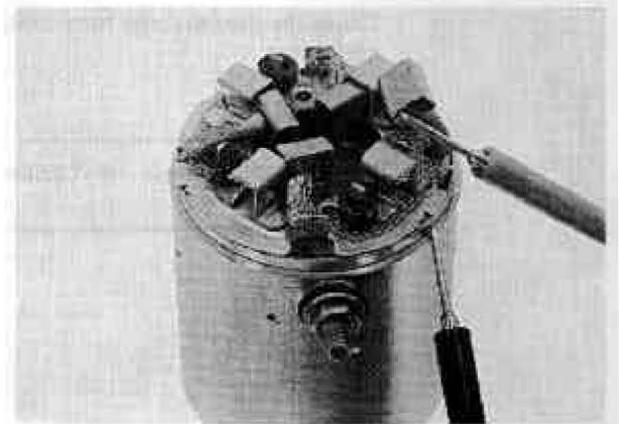
Check for continuity between the insulated brush and cable terminal.

There should be continuity.



Check for continuity between the insulated brush and motor case.

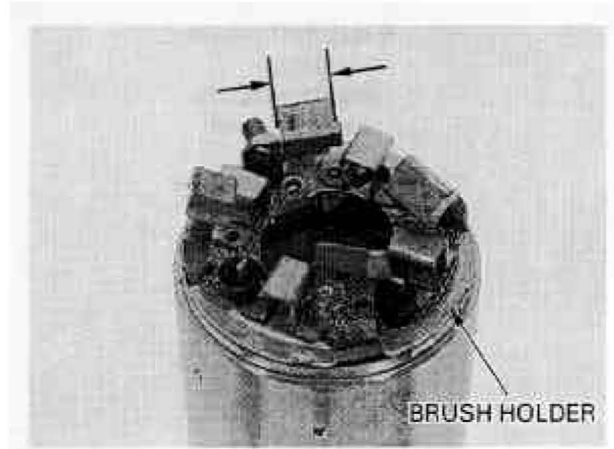
There should be no continuity.



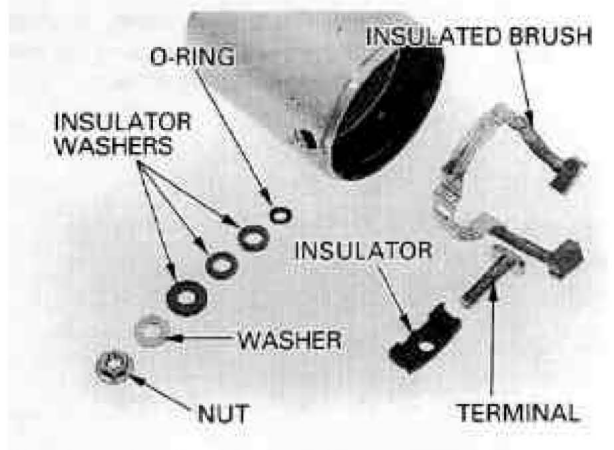
Measure the brush length.

SERVICE LIMIT: 6.5 mm (0.26 in)

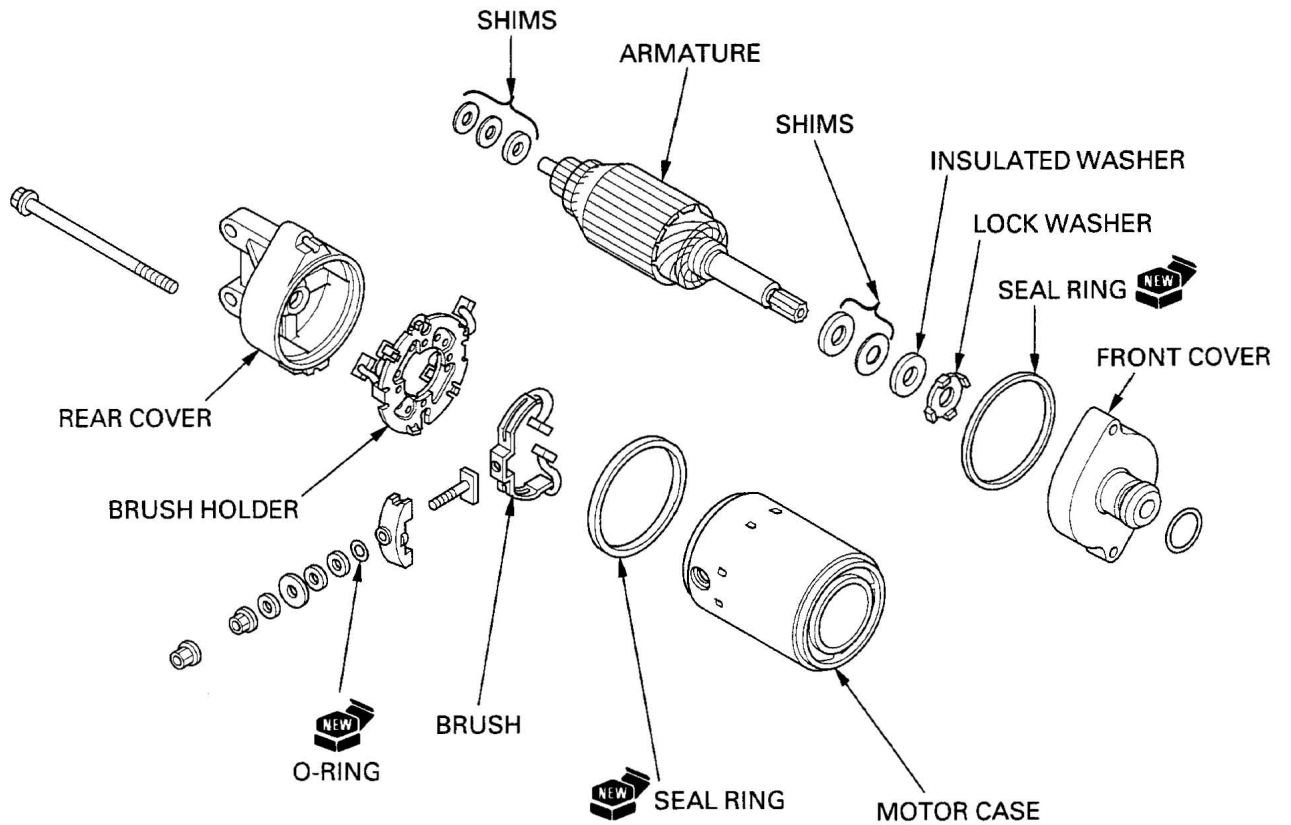
Remove the following if necessary:
 – brush holder



- nut
- washer
- insulator washers
- O-ring
- cable terminal
- insulated brush
- insulator



ASSEMBLY

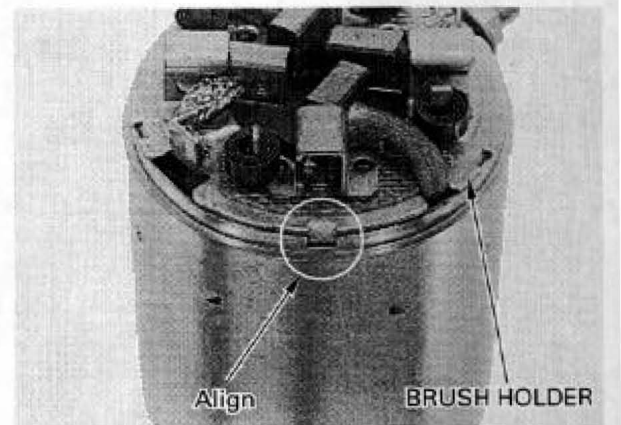
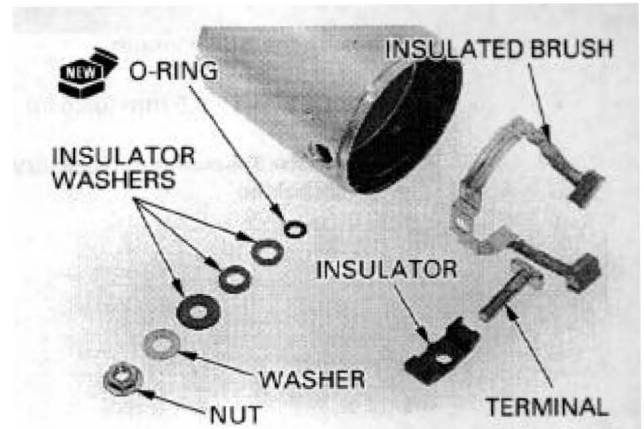


ELECTRIC STARTER

Install the following:

- insulator
- insulated brush
- cable terminal
- new O-ring
- insulator washers
- washer
- nut

Install the brush holder, aligning the holder tab with the case groove, and the holder grooves with the insulated brush wires.



Push and hold the brushes inside the brush holder, and install the armature through the motor case and brush holder.

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.

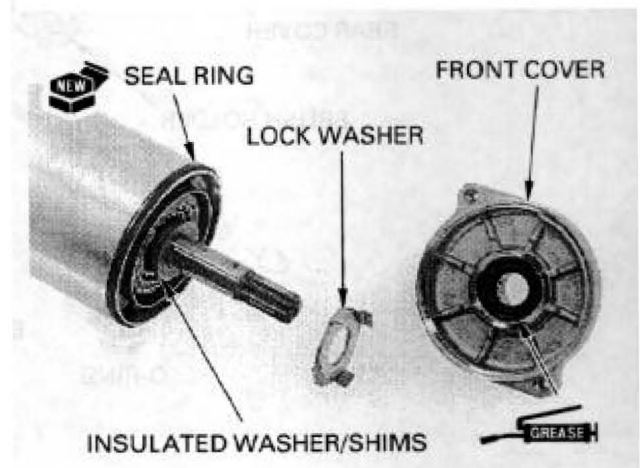
Install the shims and insulated washer onto the armature shaft.

Install a new seal ring onto the motor case.

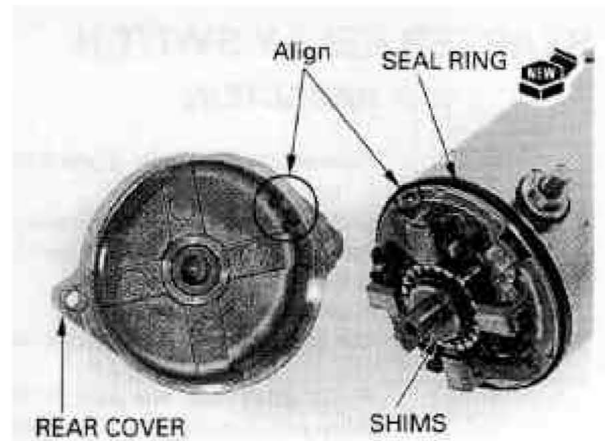
Apply grease to the oil seal lip and needle bearing in the front cover.

Install the lock washer onto the front cover.

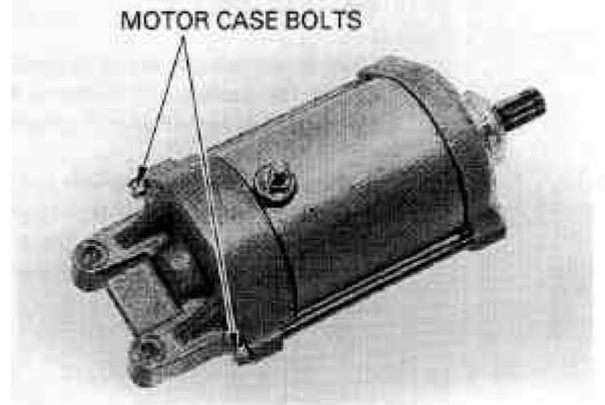
Install the front cover.



Install the same number of shims in the same locations as noted during disassembly.
Install a new seal ring onto the motor case.
Apply thin coat of grease to the armature shaft end.
Install the rear cover aligning its groove with the brush holder tab.



Install and tighten the motor case bolts.



INSTALLATION

Coat a new O-ring with oil and install it into the starter motor groove.

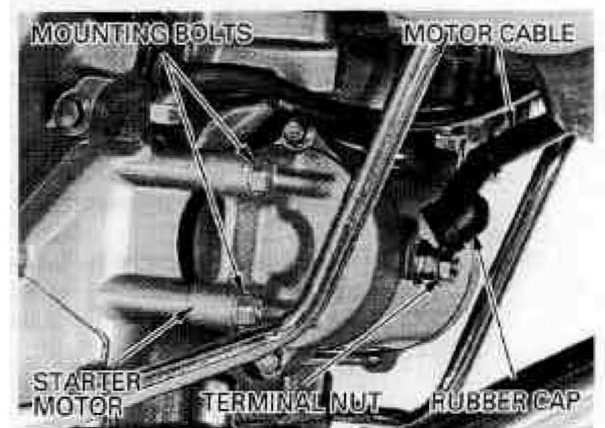


Install the starter motor into the crankcase and tighten the mounting bolts.
Connect the starter motor cable.
Install and tighten the terminal nut.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the rubber cap securely.

Install the engine under cover (page 2-4).



STARTER RELAY SWITCH

INSPECTION

Remove the seat cowl (page 2-2).

Shift the transmission into neutral.
Turn the ignition switch ON and engine stop switch to RUN.
Push the starter switch.
The coil is normal if the starter relay switch clicks.

If you don't hear the switch "CLICK", inspect the relay switch using the procedure below.

GROUND LINE

Disconnect the starter relay switch 4P connector.
Check for continuity between the green/red wire (ground line) terminal and ground.

If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand is retracted, the ground circuit is normal. (In neutral, there is a slight resistance due to the diode.)

STARTER RELAY VOLTAGE

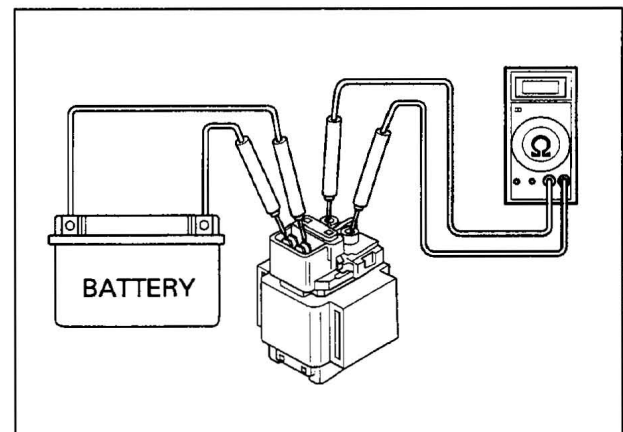
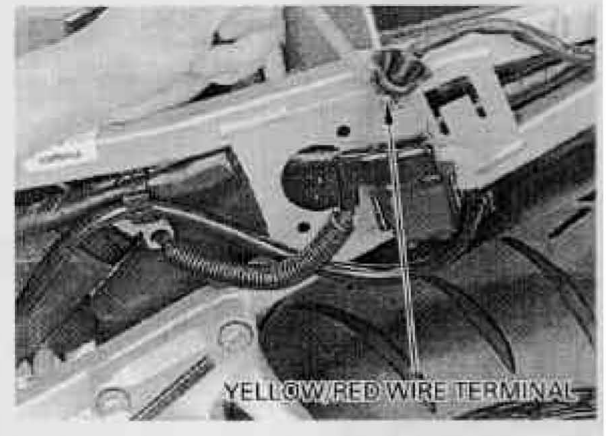
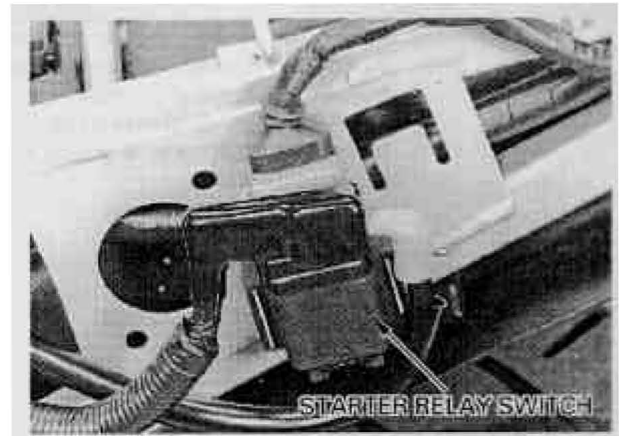
Connect the starter relay switch 4P connector.
Shift the transmission into neutral.
Measure the voltage between the yellow/red wire terminal (+) and ground (-).

If the battery voltage appears only when the starter switch is pushed with the ignition switch ON and engine stop switch to RUN, it is normal.

OPERATION CHECK

Disconnect the starter relay switch 4P connector and cables.
Connect a fully charged 12 V battery positive wire to the relay switch yellow/red wire terminal and negative wire to the green/red wire terminal.

There should be continuity between the large terminals while the battery is connected, and no continuity when the battery is disconnected.

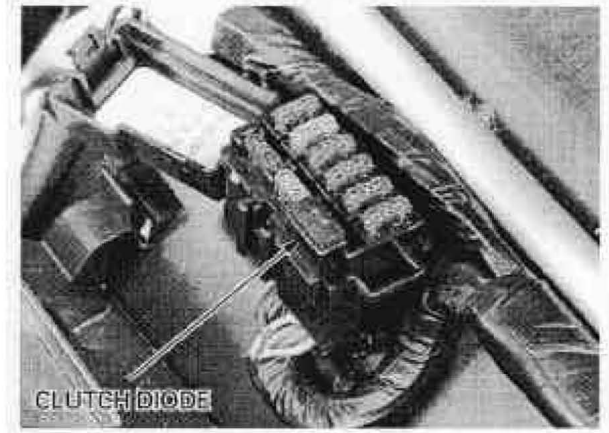


CLUTCH DIODE

INSPECTION

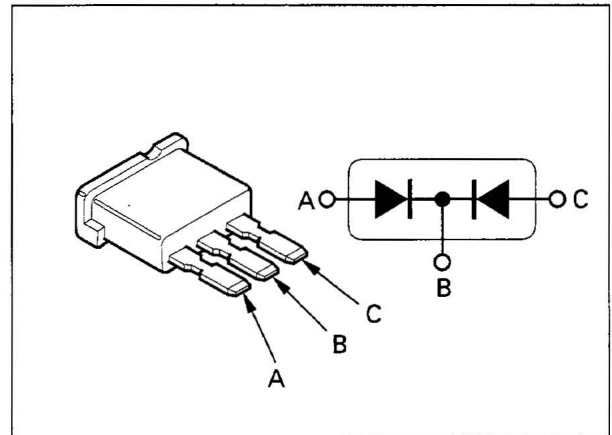
Remove the seat (page 2-2).

Remove the fuse box cover and clutch diode.



Check for continuity between the diode terminals. When there is continuity, a small resistance value will register.

If there is continuity in one direction, the diode is normal.



19. LIGHTS/METERS/SWITCHES

SERVICE INFORMATION	19-1	OIL PRESSURE INDICATOR	19-13
HEADLIGHT	19-3	IGNITION SWITCH	19-13
POSITION LIGHT (Except U type)	19-4	HANDLEBAR SWITCHES	19-14
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BRAKE/TAILLIGHT	19-5	CLUTCH SWITCH	19-16
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TACHOMETER	19-9	LOW FUEL INDICATOR/ FUEL RESERVE SENSOR	19-17
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COOLING FAN MOTOR SWITCH	19-12	TURN SIGNAL RELAY	19-18

SERVICE INFORMATION

GENERAL

▲WARNING

- *A halogen headlight bulb becomes very hot while the headlight is ON, and remains hot for a while after it is turned OFF. Be sure to let it cool down before servicing.*
- *Use an electric heating element to heat the water/coolant mixture for the fan motor switch inspection. Keep all flammable materials away from the electric heating element. Wear protective clothing, insulated gloves and eye protection.*

- Note the following when replacing the halogen headlight bulb.
 - Wear clean gloves while replacing the bulb. Do not put finger prints on the headlight bulb, as they may create hot spots on the bulb and cause it to fail.
 - If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.
 - Be sure to install the dust cover after replacing the bulb.
- Check the battery condition before performing any inspection that requires proper battery voltage.
- A continuity test can be made with the switches installed on the motorcycle.
- The following color codes used are indicated throughout this section.

Bu: Blue	G: Green	Lg: Light Green	R: Red
Bl: Black	Gr: Gray	O: Orange	W: White
Br: Brown	Lb: Light Blue	P: Pink	Y: Yellow

LIGHTS/METERS/SWITCHES

SPECIFICATIONS

ITEM		SPECIFICATIONS
Bulbs	Headlight (High/low beam)	12 V – 60/55 W
	Position light	12 V – 5 W
	Brake/taillight	12 V – 21/5 W × 2
	Turn signal light	12 V – 21 W × 4
	Instrument light	12 V – 1.7 W × 3
	Turn signal indicator	12 V – 1.7 W × 2
	High beam indicator	12 V – 1.7 W
	Neutral indicator	12 V – 1.7 W
	Oil pressure indicator	12 V – 1.7 W
	Side stand indicator	12 V – 1.7 W
Fuse	Main fuse	30 A
	Sub-fuse	10 A, 20 A
Thermosensor resistance	At 176 °F (80 °C)	47 – 57 Ω
	At 248 °F (120 °C)	14 – 18 Ω
Fan motor switch	Starts to close (ON)	208 – 216 °F (98 – 102 °C)
	Stops to open (OFF)	199 – 207 °F (93 – 97 °C)

TORQUE VALUES

Thermosensor	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply sealant to the threads
Fan motor switch	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Ignition switch mounting bolt	25 N·m (2.5 kgf·m , 18 lbf·ft)	
Neutral switch	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Side stand switch bolt	10 N·m (1.0 kgf·m , 7 lbf·ft)	

HEADLIGHT

BULB REPLACEMENT

▲WARNING

A halogen headlight bulb becomes very hot while the headlight is ON, and remains hot for a while after it is turned OFF. Be sure to let it cool down before servicing.

Disconnect the headlight connector.
Remove the dust cover.

Unhook 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 a cloth moistened with alcohol to prevent its early failure.

Hook the bulb retainer properly.

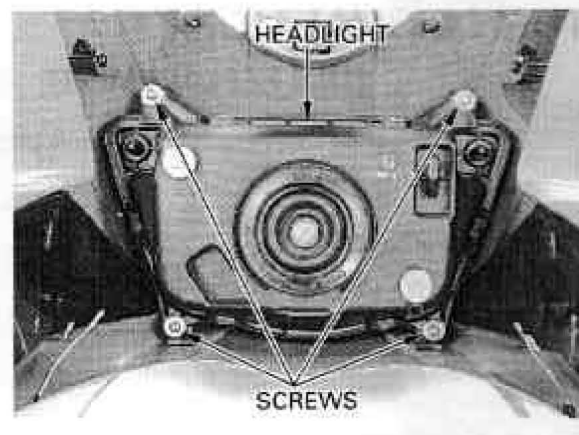
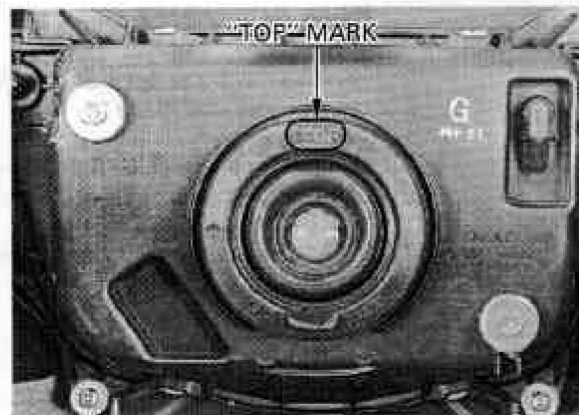
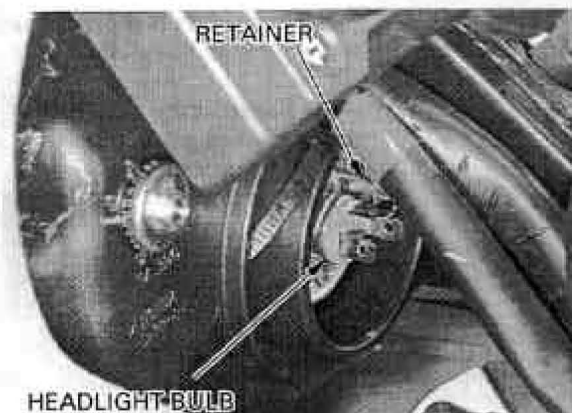
Install the dust cover properly onto the headlight with the "TOP" mark facing up.
Connect the headlight connector.

REMOVAL/INSTALLATION

Remove the front fairing (page 2-3).

Remove the four screws and the headlight unit.

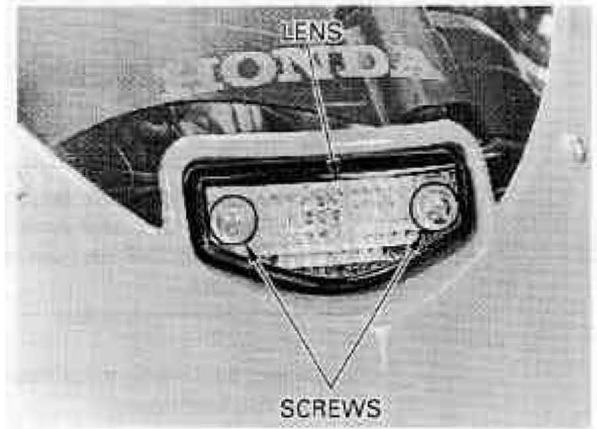
Install the headlight unit in the reverse order of removal.



POSITION LIGHT (Except U type)

BULB REPLACEMENT

Remove the two screws and position light lens.



Pull the position light bulb out of the socket and replace it with a new one.

Make sure that the seal rubber is installed in position and is in good condition, and replace it with new one if necessary.

Install the position light lens and tighten the two screws.

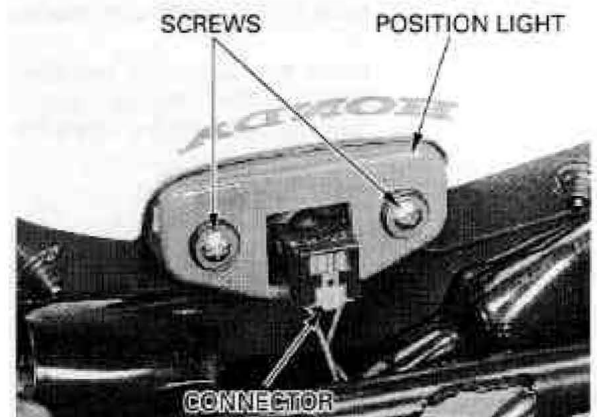


REPLACEMENT

Remove the three bolts and the instrument assembly from the stay (page 19-6).

Disconnect the position light connector.
Remove the two screws and the position light.

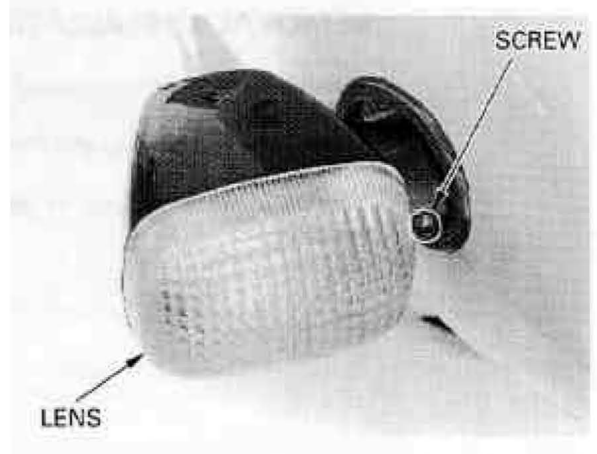
Install the position light in the reverse order of removal.



TURN SIGNAL LIGHT

BULB REPLACEMENT

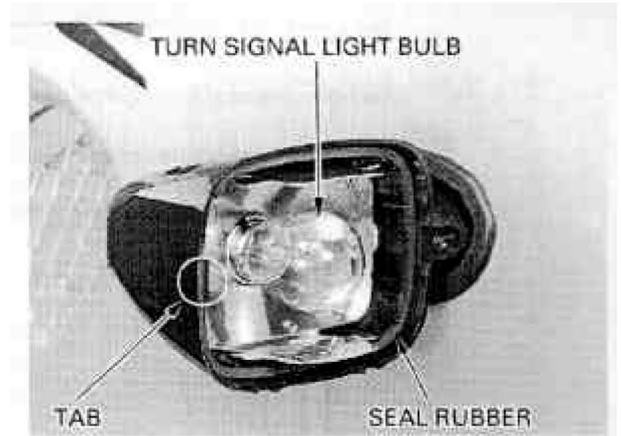
Remove the screw and turn signal light lens.



While pushing the bulb in, turn it counterclockwise to remove it, and replace it with a new one.

Make sure that the seal rubber is installed in position and is in good condition, and replace it with new one if necessary.

Install the lens, aligning the hook with the tab of the turn signal light, and tighten the screw.

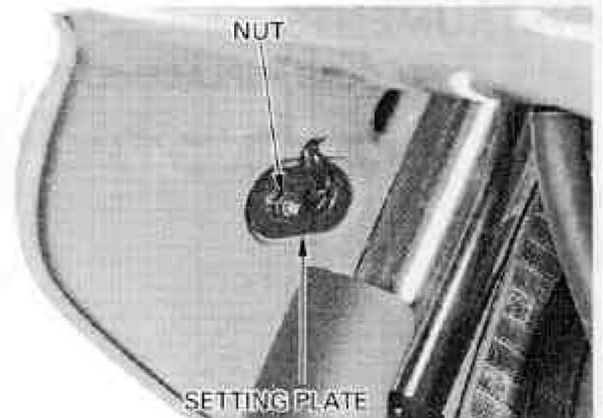


REMOVAL/INSTALLATION

Rear turn signal light: Remove the seat (page 2-2).

Disconnect the turn signal light connectors. Remove the nut, setting plate and the turn signal light.

Install the turn signal light in the reverse order of removal.

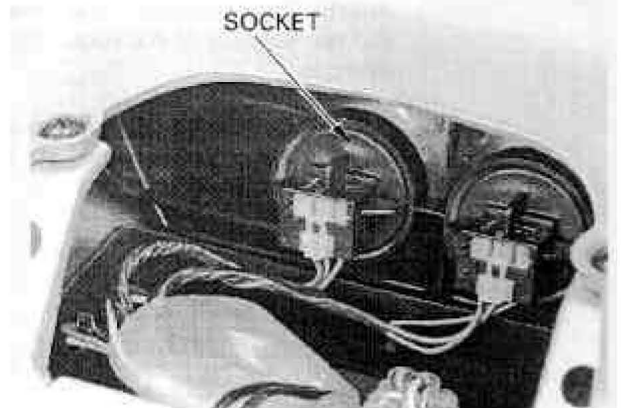


BRAKE/TAILLIGHT

BULB REPLACEMENT

Remove the seat (page 2-2).

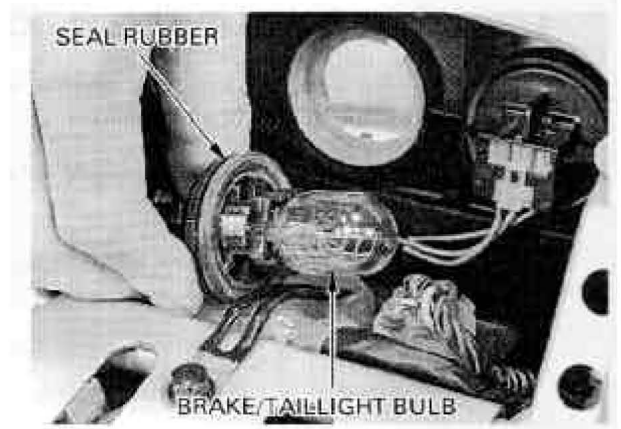
Turn the socket counterclockwise and remove it from the brake/taillight.



Pull the brake/taillight bulb out of the socket and replace it with a new one.

Make sure that the seal rubber is installed in position and is in good condition, and replace it with new one if necessary.

Install the socket by turning it clockwise. Install the seat (page 2-2).

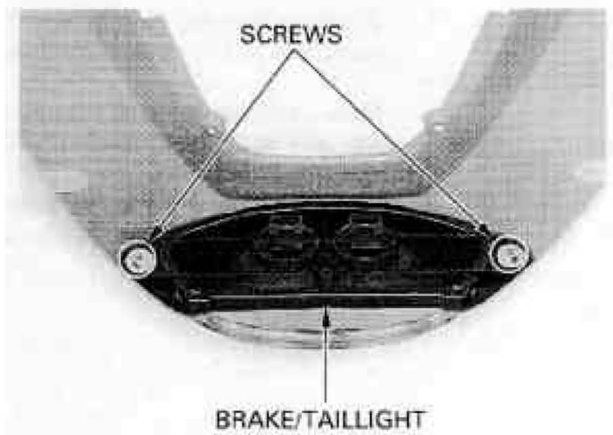


REMOVAL/INSTALLATION

Remove the seat cowl (page 2-2).

Remove the two screws and the brake/taillight.

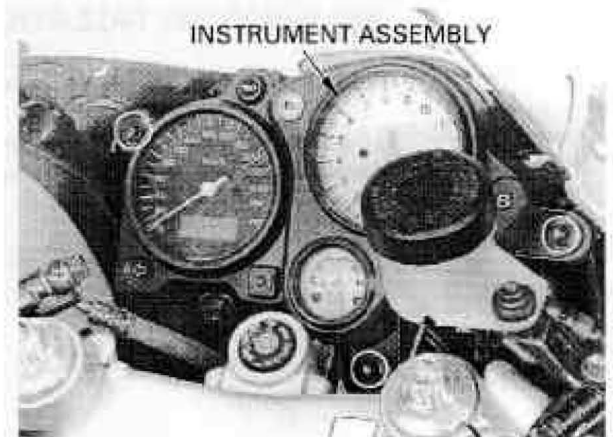
Install the brake/taillight in the reverse order of removal.



INSTRUMENTS

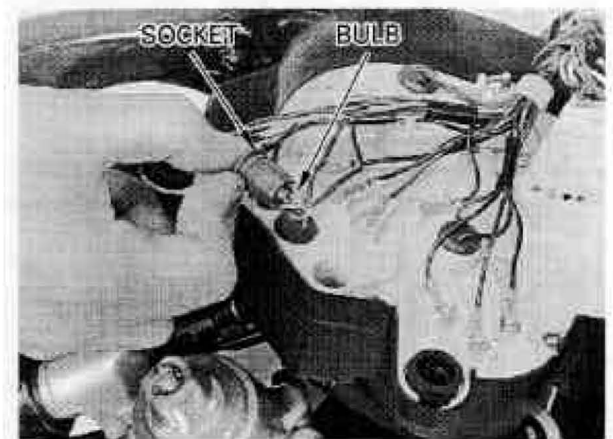
BULB REPLACEMENT

Remove the three bolts and the instrument assembly from the stay.



Pull the socket out of the instrument case. Pull the bulb out of the socket and replace it with a new one.

Install the socket into the instrument case. Install the instrument assembly onto the stay and tighten the three bolts.



REMOVAL/INSTALLATION

Remove the three bolts and the instrument assembly from the stay (see above).

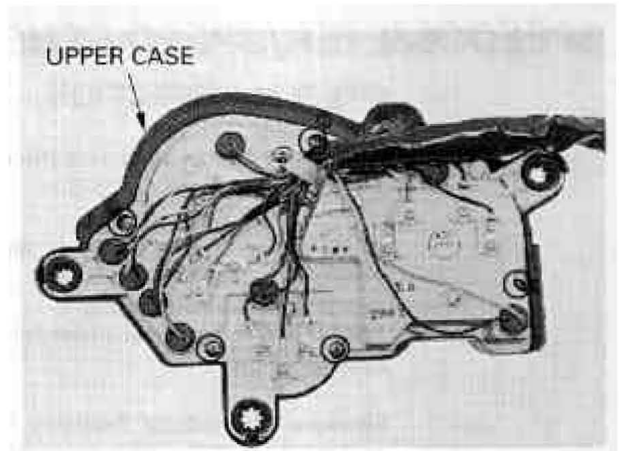
Disconnect the instrument 6P (black) and 9P (black) connectors.

Install the instrument assembly in the reverse order of removal.

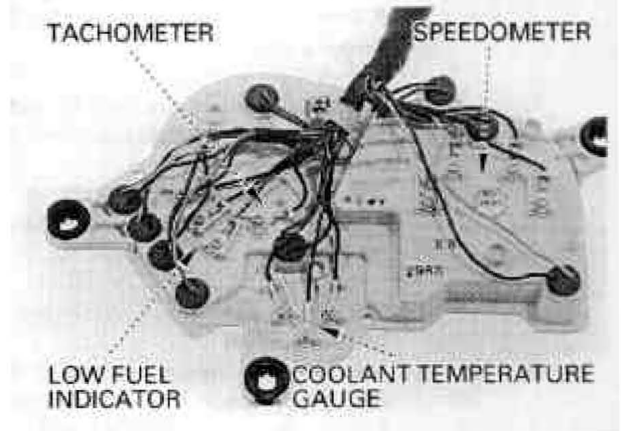


DISASSEMBLY

Remove the five screws and upper case.



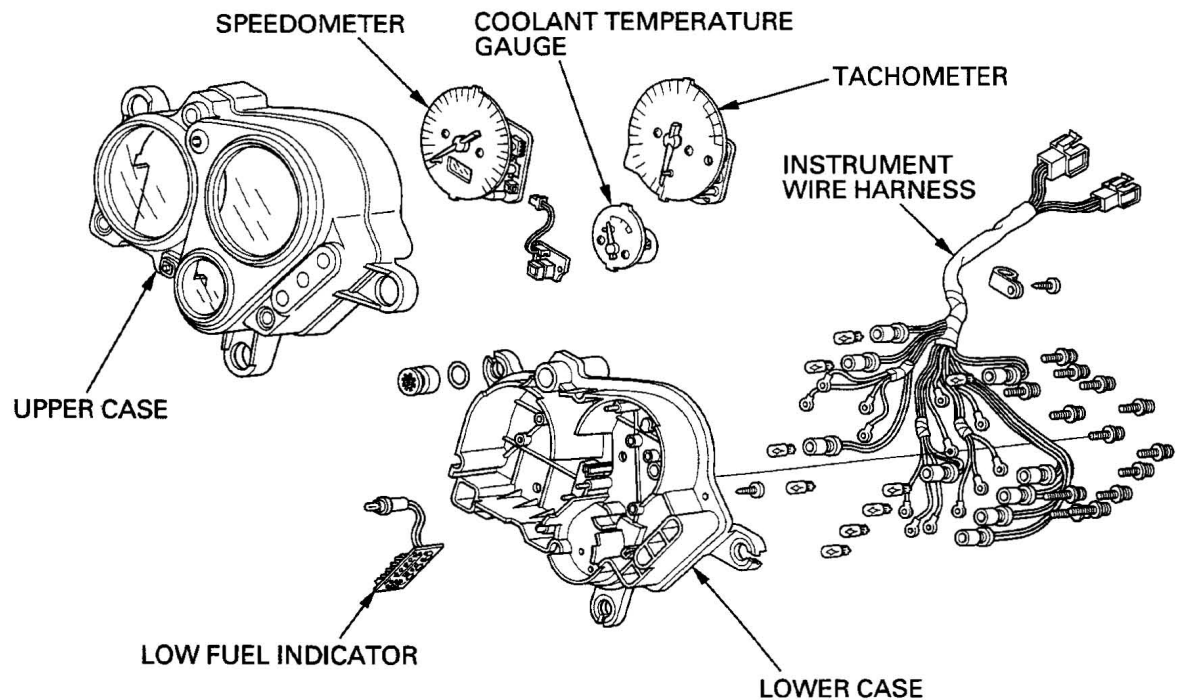
Remove the screws, speedometer, tachometer and coolant temperature gauge. Remove the bulb sockets and instrument wire harness.



ASSEMBLY

NOTE:

Connect the wire terminal and install the bulb sockets according to the color codes on the lower case.



SPEEDOMETER/SPEED SENSOR**SYSTEM INSPECTION**

Remove the three bolts and the instrument assembly from the stay (page 19-6).

Check the continuity between the green/black wire terminal and body ground.

There should be continuity.

If there is no continuity, check for open circuit in the green/black wire.

Measure the voltage between the red/green (+) and green/black (-) wire terminals.

There should be battery voltage at all time.

If there is no voltage, check for open circuit in red/green wire.

Turn the ignition switch ON and measure the voltage between the black/brown (+) and green/black (-) wire terminals.

There should be battery voltage.

If there is no voltage, check for open circuit in black/brown wire.

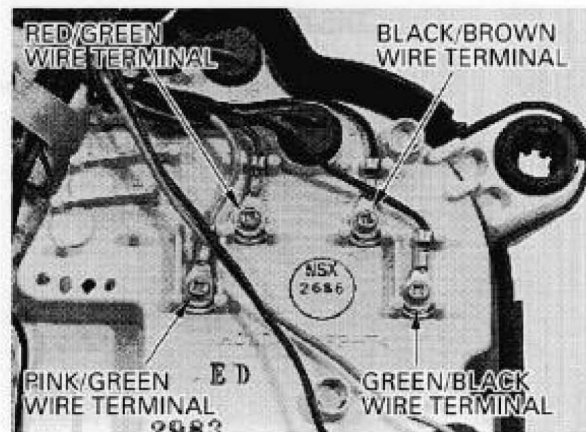
Shift the transmission in neutral and turn the ignition switch ON.

Measure the voltage between the pink/green (+) and green/black (-) wire terminals while slowly turning the rear wheel by hand.

There should be 0 to 5 V pulse voltage.

If pulse voltage does not appear, check for open or short circuit in pink/green wire.

If the pink/green wire is OK, check the speed sensor.

**SPEED SENSOR INSPECTION**

Remove the seat (page 2-2).

Turn the ignition switch ON and measure the voltage between the black/brown (+) and green/black (-) wire terminals at the speed sensor 3P (white) connector.

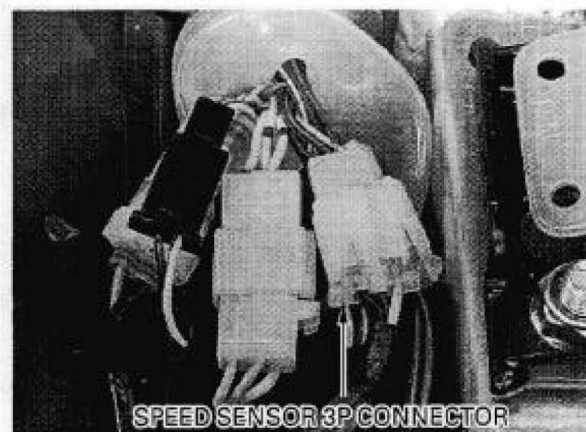
There should be battery voltage.

If there is no voltage, check for open circuit in black/brown and green/black wires.

Shift the transmission in neutral and turn the ignition switch ON.

Measure the voltage between the pink/green (+) and green/black (-) wire terminals while slowly turning the rear wheel by hand.

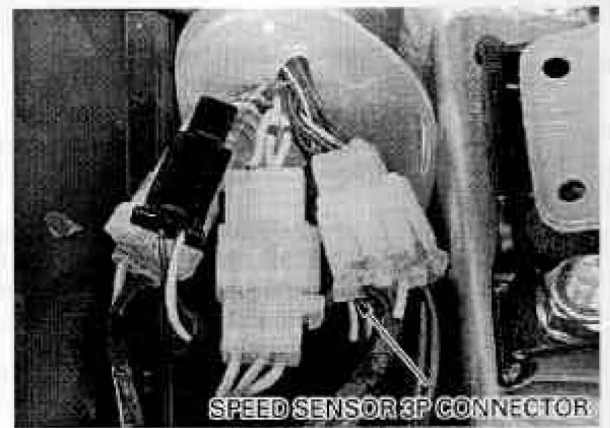
There should be 0 to 5 V pulse voltage.



SPEED SENSOR REMOVAL/INSTALLATION

Remove the seat (page 2-2).

Disconnect the speed sensor 3P (white) connector.



Remove the two bolt, battery ground cable and speed sensor.

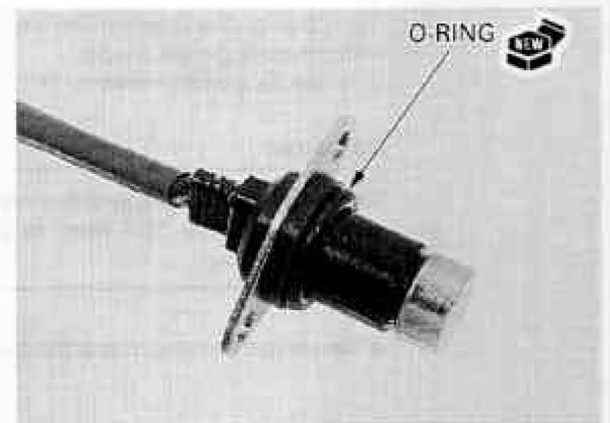


Coat a new O-ring with oil and install it onto the speed sensor.

Install the speed sensor in the reverse order of removal.

NOTE:

Route the speed sensor wire properly (page 1-18).



TACHOMETER

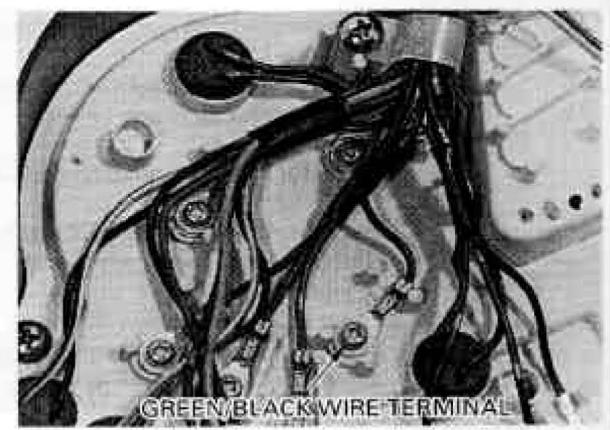
SYSTEM INSPECTION

Remove the three bolts and the instrument assembly from the stay (page 19-6).

Check the continuity between the green/black wire terminal and body ground.

There should be continuity.

If there is no continuity, check for open circuit in the green/black wire.



Turn the ignition switch ON and measure the voltage between the black/brown (+) and green/black (-) wire terminals.

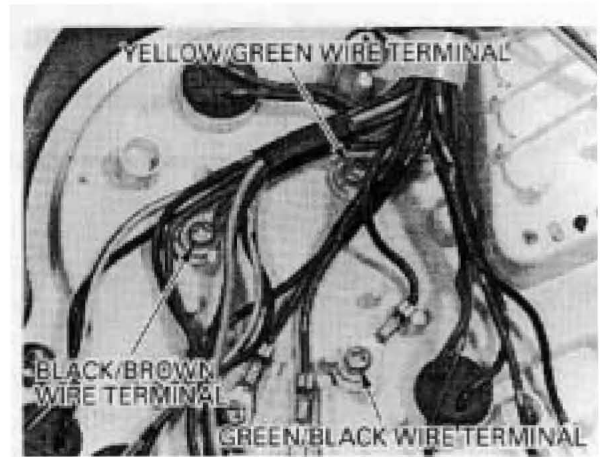
There should be battery voltage.

If there is no voltage, check for open circuit in black/brown wire.

Turn the ignition switch ON and the engine stop switch to "RUN", and measure the voltage between the yellow/green (+) and green/black (-) wire terminals.

There should be battery voltage.

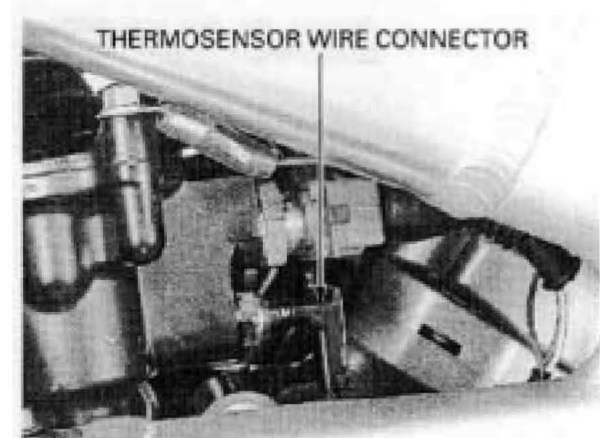
If there is no voltage, check for open circuit in yellow/green wire.



COOLANT TEMPERATURE GAUGE/ THERMOSENSOR

SYSTEM INSPECTION

Disconnect the thermosensor wire connector and ground it with a jumper wire.

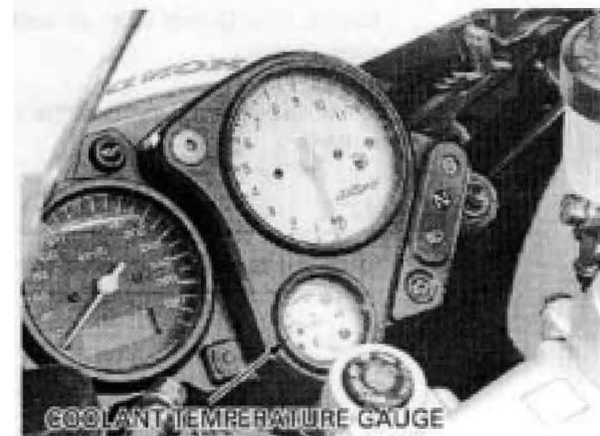


Turn the ignition switch ON and check the coolant temperature gauge needle.

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.

If the needle does not move, check the following:

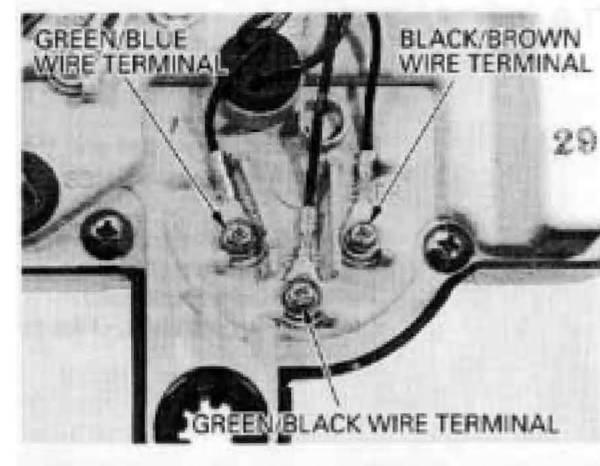
Remove the three bolts and the instrument assembly from the stay (page 19-6).

Check for open circuit in green/blue wire.

Turn the ignition switch ON and measure the voltage between the black/brown (+) and green/black (-) wire terminals.

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 all 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 the 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	176 °F (80 °C)	248 °F (120 °C)
Resistance	47–57 Ω	14–18 Ω

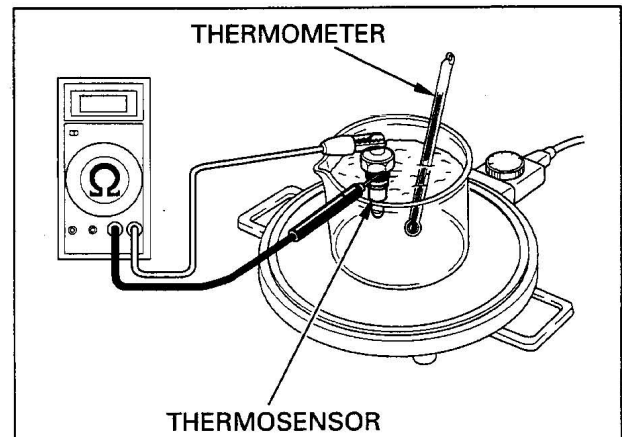
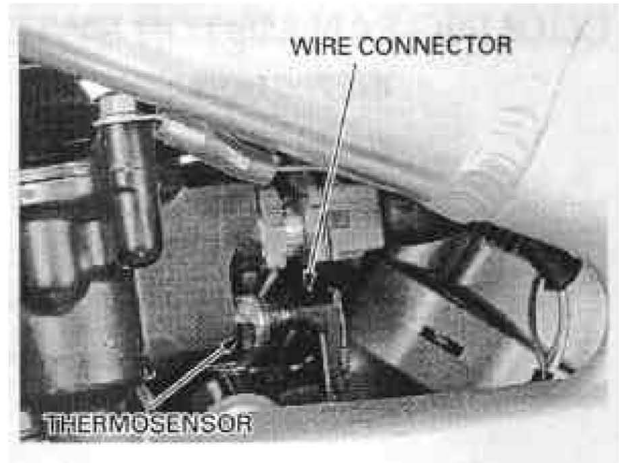
Replace the thermosensor if it is out of specifications by more than 10 % at any temperature listed.

Apply sealant to the thermosensor threads. Do not apply sealant to the sensor head.
Install and tighten the thermosensor.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Connect the thermosensor connector.

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



COOLING FAN MOTOR SWITCH

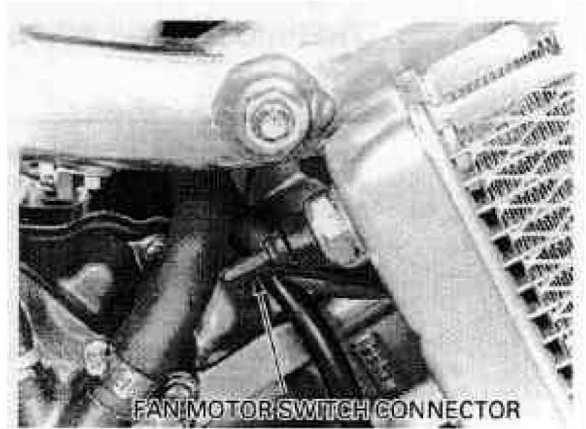
INSPECTION

Fan motor does not stop

Turn the ignition switch OFF, disconnect the connector from the fan motor switch and turn the ignition switch ON again.

If the fan motor does not stop, check for short circuit between the fan motor and switch.

If the fan motor stops, replace the fan motor switch.



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 with a jumper wire.

Turn the ignition switch ON and check the fan motor.

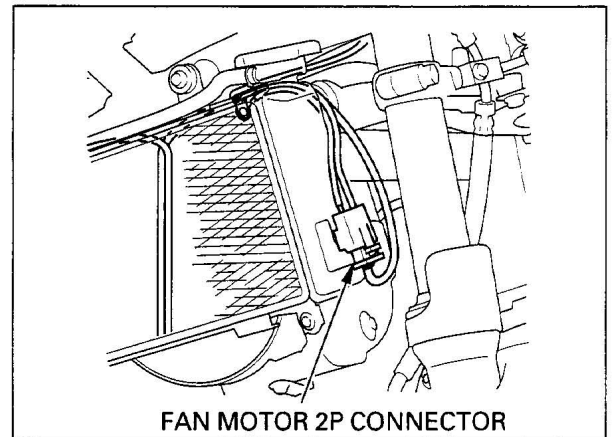
If the motor starts, check the connection at the fan motor switch terminal. If it is OK, replace the fan motor switch.

If the fan motor does not start, measure the voltage between the black/blue (+) and green (-) wire terminal at the fan motor 2P (black) connector.

There should be battery voltage.

If there is battery voltage, replace the fan motor.

If there is no voltage, check for open circuit in black/blue and green wires.



REMOVAL/INSTALLATION

Drain the coolant (page 6-5).

Disconnect the fan motor switch connector and remove the switch.

Install a new O-ring onto the fan motor switch. Install and tighten the fan motor switch.

TORQUE: 18 N·m (1.8 kgf·m , 13 lbf·ft)

Connect the fan motor switch connector.

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



OIL PRESSURE INDICATOR

INSPECTION

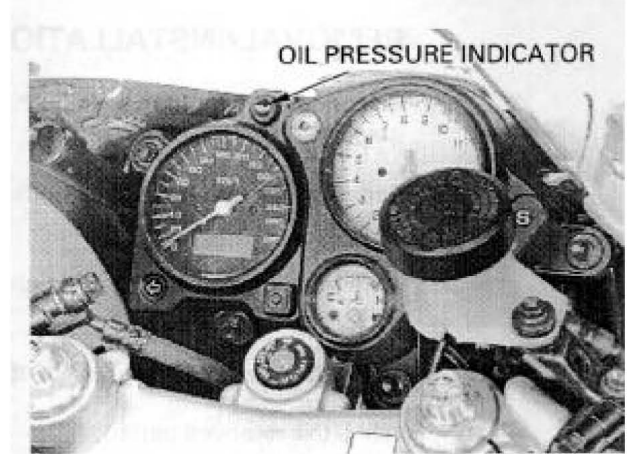
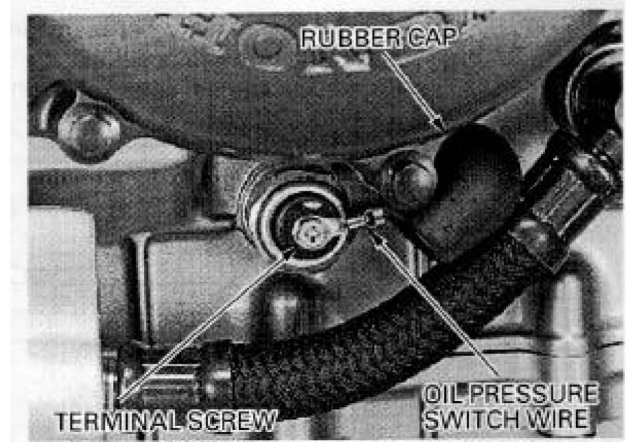
Indicator does not come on with the ignition switch turned ON

Remove the rubber cap, and disconnect the oil pressure switch wire by removing the terminal screw. Ground the wire terminal to the engine with a jumper wire.

Turn the ignition switch ON and check the oil pressure indicator.

If the indicator comes on, replace the oil pressure switch (page 4-4).

If the indicator does not come on, check for open circuit in blue/red wire.



Indicator stays on while the engine is running

Remove the rubber cap, and disconnect the oil pressure switch wire by removing the terminal screw. Check for continuity between the wire terminal and ground.

If there is continuity, check for short circuit in blue/red wire.

If there is no continuity, check the oil pressure (page 4-4).

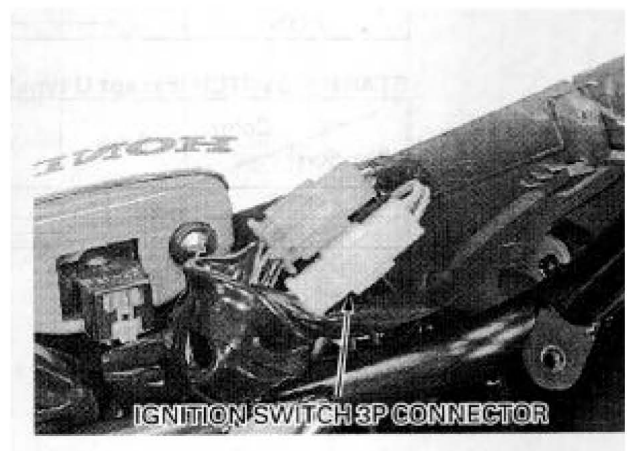
If the oil pressure is normal, replace the oil pressure switch (page 4-4).

IGNITION SWITCH

INSPECTION

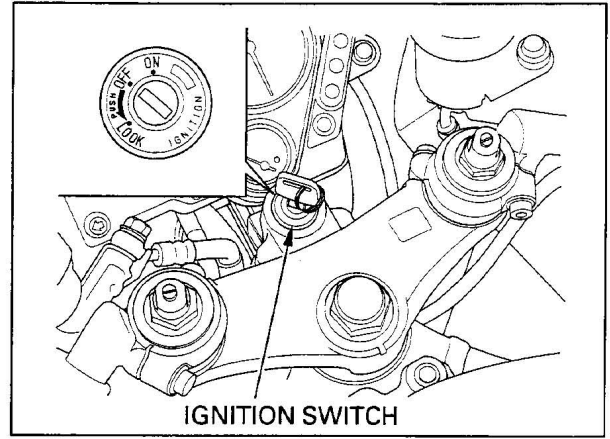
Remove the three bolts and the instrument assembly from the stay (page 19-6).

Disconnect the ignition switch 3P (white) connector.



Check for continuity between the connector terminals in each switch position. Continuity should exist between the color coded wires as follows:

Position \ Color	R	R/BI	Bu/O
ON	○	○	○
OFF			
LOCK			



IGNITION SWITCH

REMOVAL/INSTALLATION

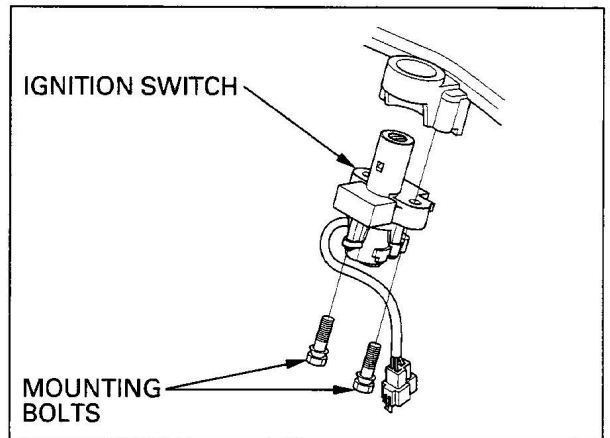
Disconnect the ignition switch 3P (white) connector (page 19-13).

Remove the two mounting bolts and the ignition switch.

Install the ignition switch and tighten the mounting bolts.

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

Install the removed parts.



HANDLEBAR SWITCHES

Remove the three bolts and the instrument assembly from the stay (page 19-6).

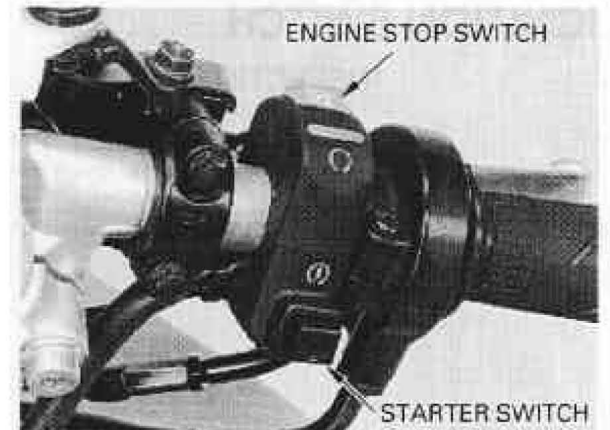
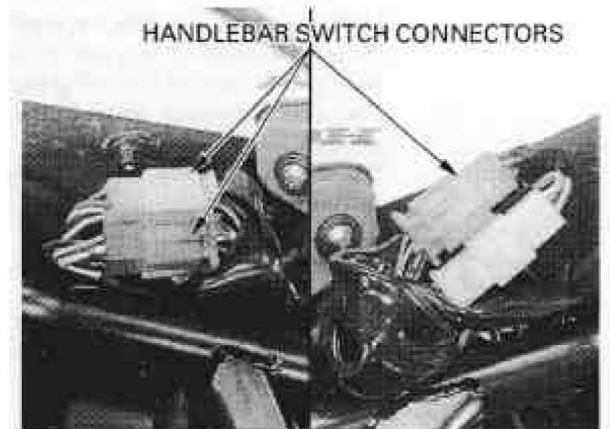
Disconnect the handlebar switch 6P connectors. Check for continuity between the connector terminals in each switch position. Continuity should exist between the color coded wires as follows:

ENGINE STOP SWITCH

Position \ Color	BI	BI/W
OFF		
RUN	○	○

STARTER SWITCH (Except U type)

Position \ Color	BI/W	Y/R
FREE		
PUSH	○	○



STARTER SWITCH (U type)

Color	Y/R	Bl/R	Bu/W
Position			
FREE		○	○
PUSH	○	○	

TURN SIGNAL SWITCH

Color	O	Gr	Lb
Position			
L	○	○	
(N)			
R		○	○

HORN SWITCH

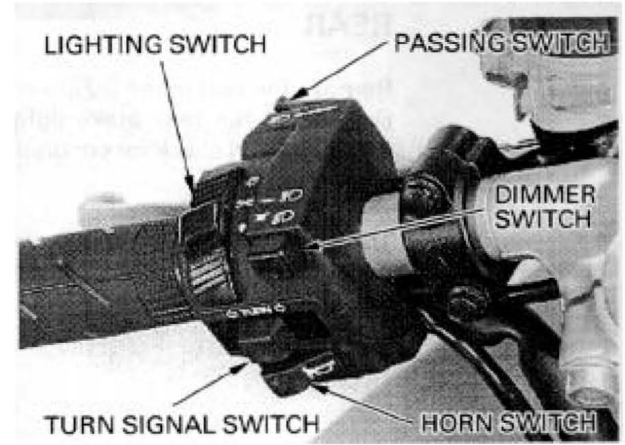
Color	W/G	Lg
Position		
FREE		
PUSH	○	○

LIGHTING SWITCH (Except U type)

Color	Bl/Br	Br	Bl/R	○
Position				
O				
P	○	○		
H	○	○	○	○

DIMMER SWITCH (U type)

Color	Bu	Bu/W	W
Position			
H	○	○	
(N)	○	○	○
L		○	○



PASSING SWITCH (Except U type)

Color	Bl/R	Bu
Position		
FREE		
PUSH	○	○

DIMMER SWITCH (Except U type)

Color	Bu	○	W
Position			
H	○	○	
(N)	○	○	○
L		○	○

BRAKE SWITCH

FRONT

Disconnect the front brake light switch wire connectors and check for continuity between the switch terminals.

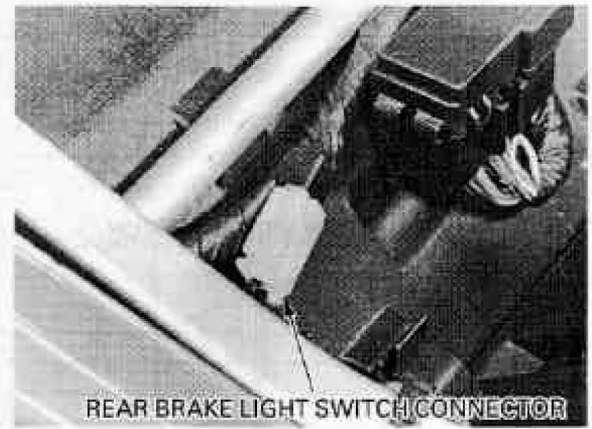
There should be continuity with the front brake lever squeezed and no continuity with the lever released.



REAR

Remove the seat (page 2-2).
Disconnect the rear brake light switch 2P (white) connector and check for continuity between the connector terminals.

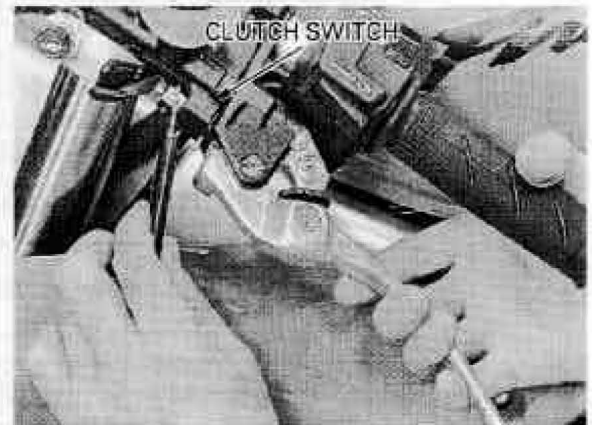
There should be continuity with the rear brake pedal depressed and no continuity with the pedal released.



CLUTCH SWITCH

Disconnect the clutch switch wire connector and check for continuity between the switch terminals.

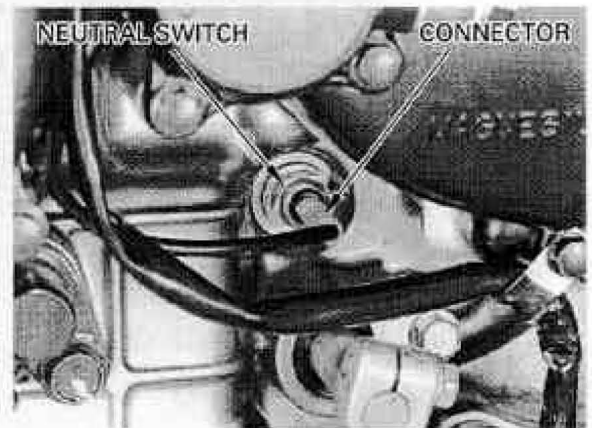
There should be continuity with the clutch lever squeezed and no continuity with the lever released.



NEUTRAL SWITCH

INSPECTION

Disconnect the neutral switch wire connector.
Check for continuity between the switch terminal and engine ground.
There should be continuity with the transmission in neutral, and no continuity with the transmission in gear except neutral.



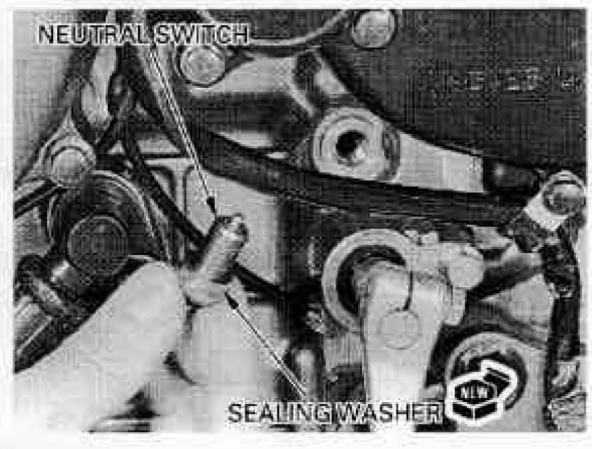
REMOVAL/INSTALLATION

Disconnect the neutral switch wire connector.
Remove the neutral switch from the crankcase.

Install the neutral switch with a new sealing washer and tighten it.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Connect the neutral switch wire connector.



SIDE STAND SWITCH

INSPECTION

Remove the seat (page 2-2).

Disconnect the side stand switch 3P (green) connector.

Check for continuity between the connector terminals in each side stand position.

Continuity should exist between the color coded wires as follows:

Position \ Color	G/W	Y/BI	G
Lowered		○	○
Retracted	○	○	

REMOVAL/INSTALLATION

Remove the seat (page 2-2).

Disconnect the side stand switch 3P (green) connector.

Remove the side stand switch bolt and switch.

Install the side stand switch by aligning the switch pin with the side stand hole and the switch groove with the bracket pin.

Install the side stand switch bolt and tighten it.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

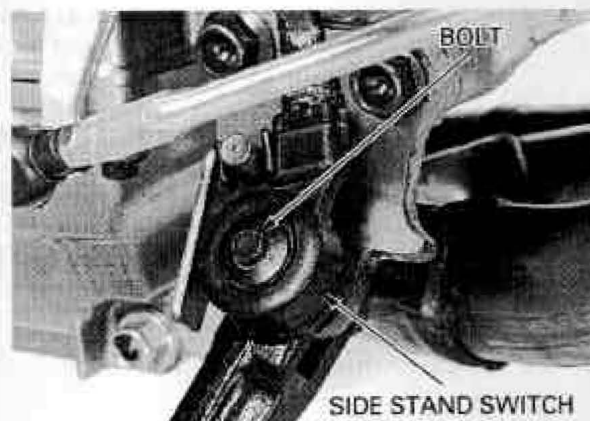
Install the removed parts.

NOTE:

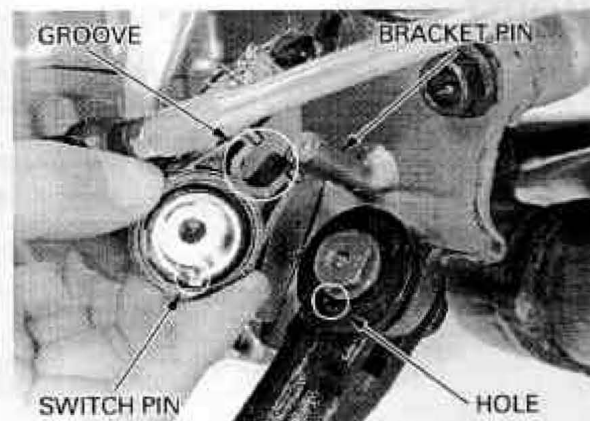
Route the speed sensor wire properly (page 1-18).



SIDE STAND SWITCH 3P CONNECTOR



SIDE STAND SWITCH



LOW FUEL INDICATOR/FUEL RESERVE SENSOR SYSTEM INSPECTION

Remove the seat (page 2-2).

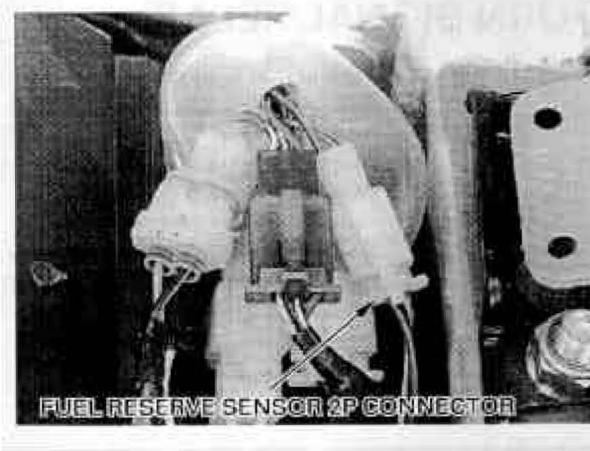
Low fuel indicator does not go off

Disconnect the fuel reserve sensor 2P (white) connector.

Turn the ignition switch ON and check the low fuel indicator.

If the indicator does not come on, replace the fuel reserve sensor.

If the indicator comes on, check for short circuit in brown/black wire.



FUEL RESERVE SENSOR 2P CONNECTOR

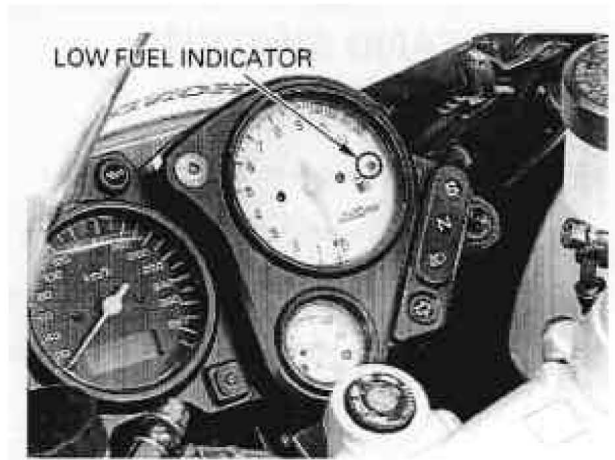
Low fuel indicator does not come on

Disconnect the fuel reserve sensor 2P (white) connector and short the connector terminals with a jumper wire.

Turn the ignition switch ON and check the low fuel indicator.

If the indicator comes on, replace the fuel reserve sensor.

If the indicator does not come on, check for open circuit in brown/black and green/black wires.



If the wires are OK, check as follows:

Remove the three bolts and the instrument assembly from the stay (page 19-6).

Turn the ignition switch ON and measure the voltage between the black/brown (+) and green (-) wire terminals at the low fuel indicator.

There should be battery voltage.

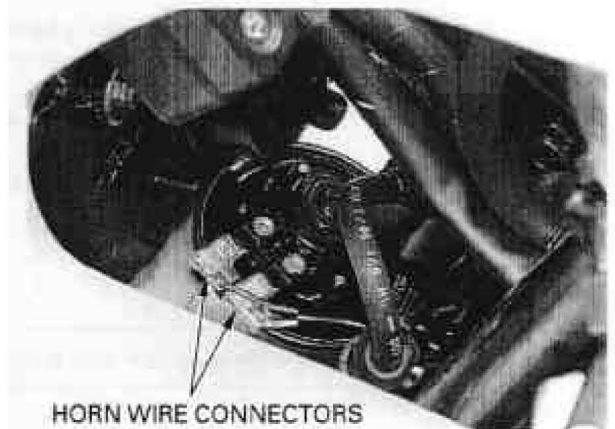
If there is no voltage, check for open circuit in black/brown and green wires.



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.



TURN SIGNAL RELAY

Turn signal light does not blink

Remove the seat cowl (page 2-2).

Remove the turn signal relay from the stay and disconnect the relay connector.

Short the white/green and gray wire terminals of the relay connector with a jumper wire.

Check the turn signal light with the ignition switch ON.



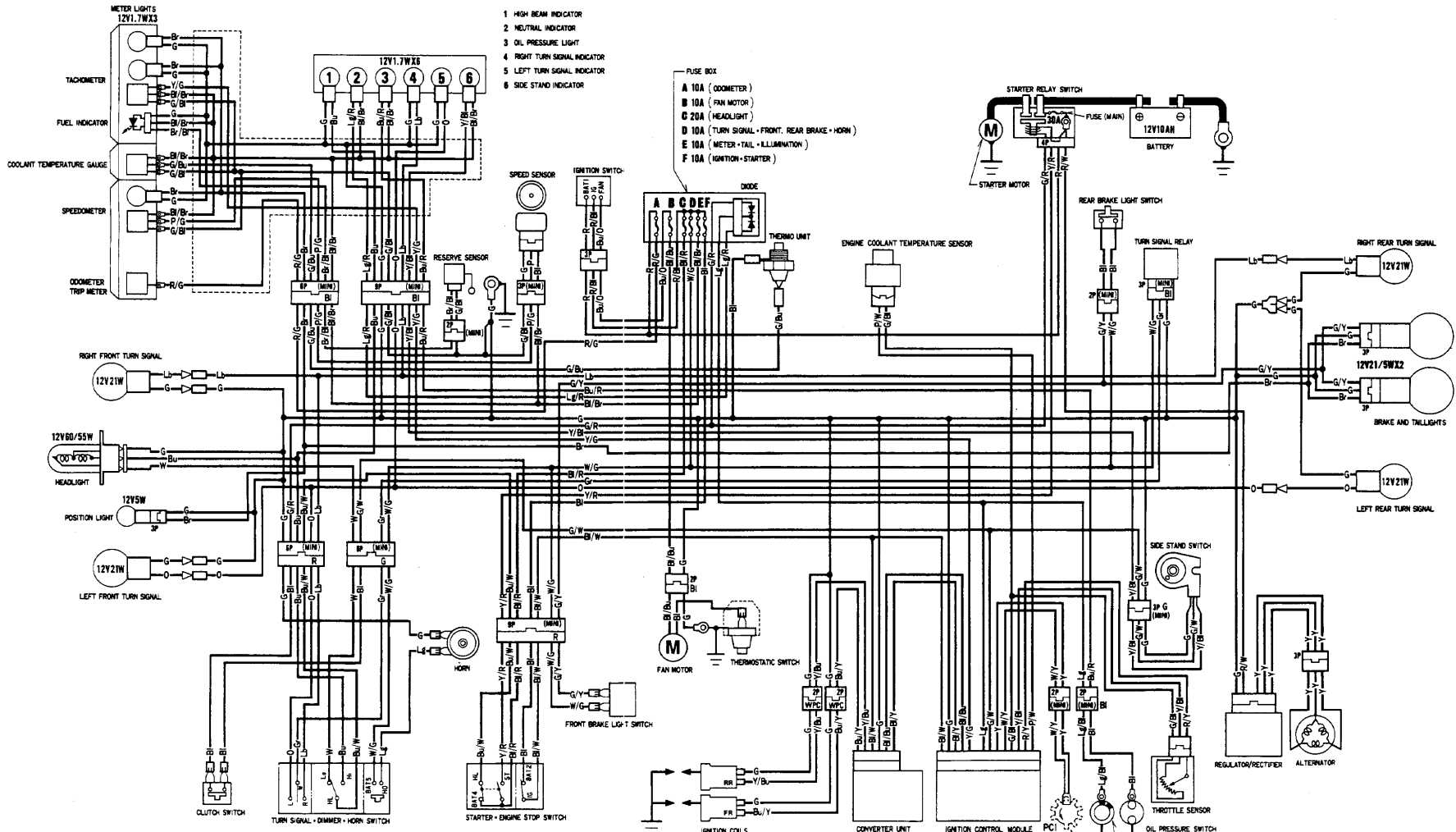
If the light does not come on, check for open circuit in white/green and gray wires.

If the light comes on, check for continuity between the green wire terminal and body ground.

If there is no continuity, check for open circuit in green wire.

If there is continuity, check the connector terminals for loose or poor contact.

If the connector terminals are OK, replace the turn signal relay.



SWITCH CONTINUITY

IGNITION SWITCH	
	BAT1 IG FAN
ON	○
OFF	○
LOCK	○

TURN SIGNAL SWITCH	
	W R L
R	○
N	○
L	○

HORN SWITCH	
	HO BATS
FREE	○
PUSH	○

DIMMER SWITCH	
	HL 10 HI
Lo	○
NI	○
HI	○

ENGINE STOP SWITCH	
	IG BAT2
OFF	○
RUN	○

STARTER SWITCH	
	ST BAT4 HL
FREE	○
PUSH	○

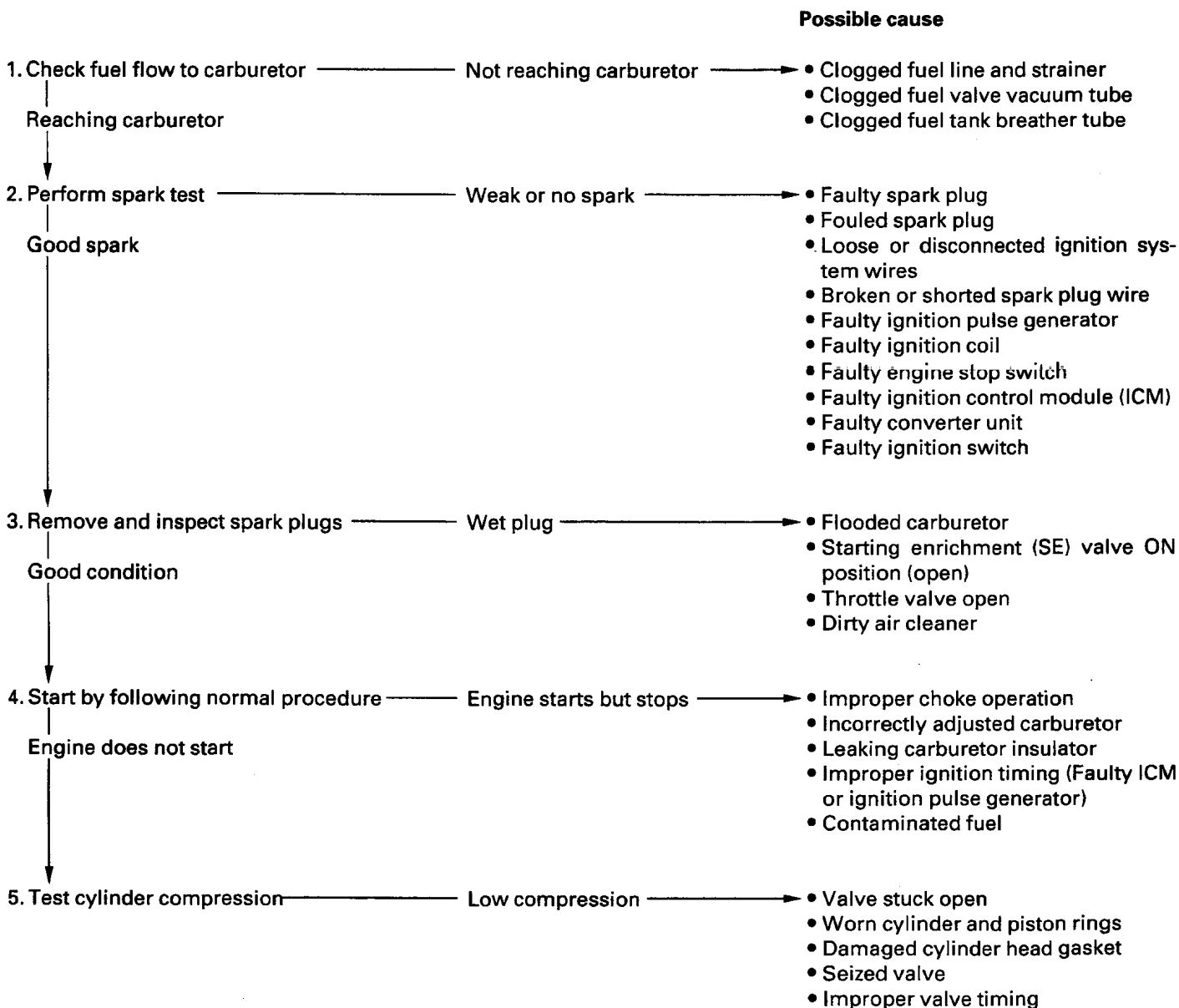
B	BLACK	B	BROWN
Y	YELLOW	O	ORANGE
Bl	BLUE	L	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	G	GRAY

0030Z-MBB-6500

21. TROUBLESHOOTING

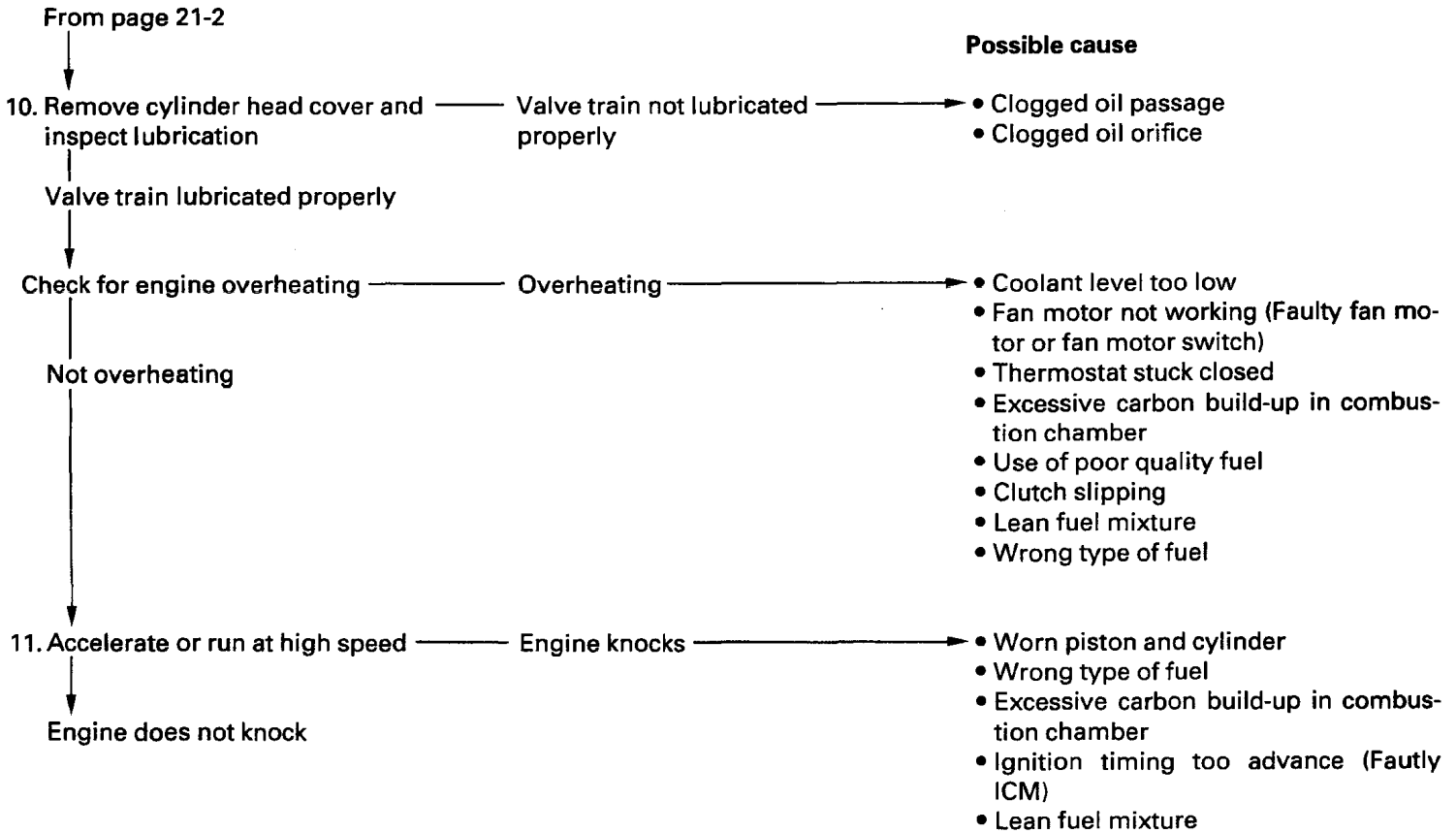
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ENGINE DOES NOT START OR IS HARD TO START

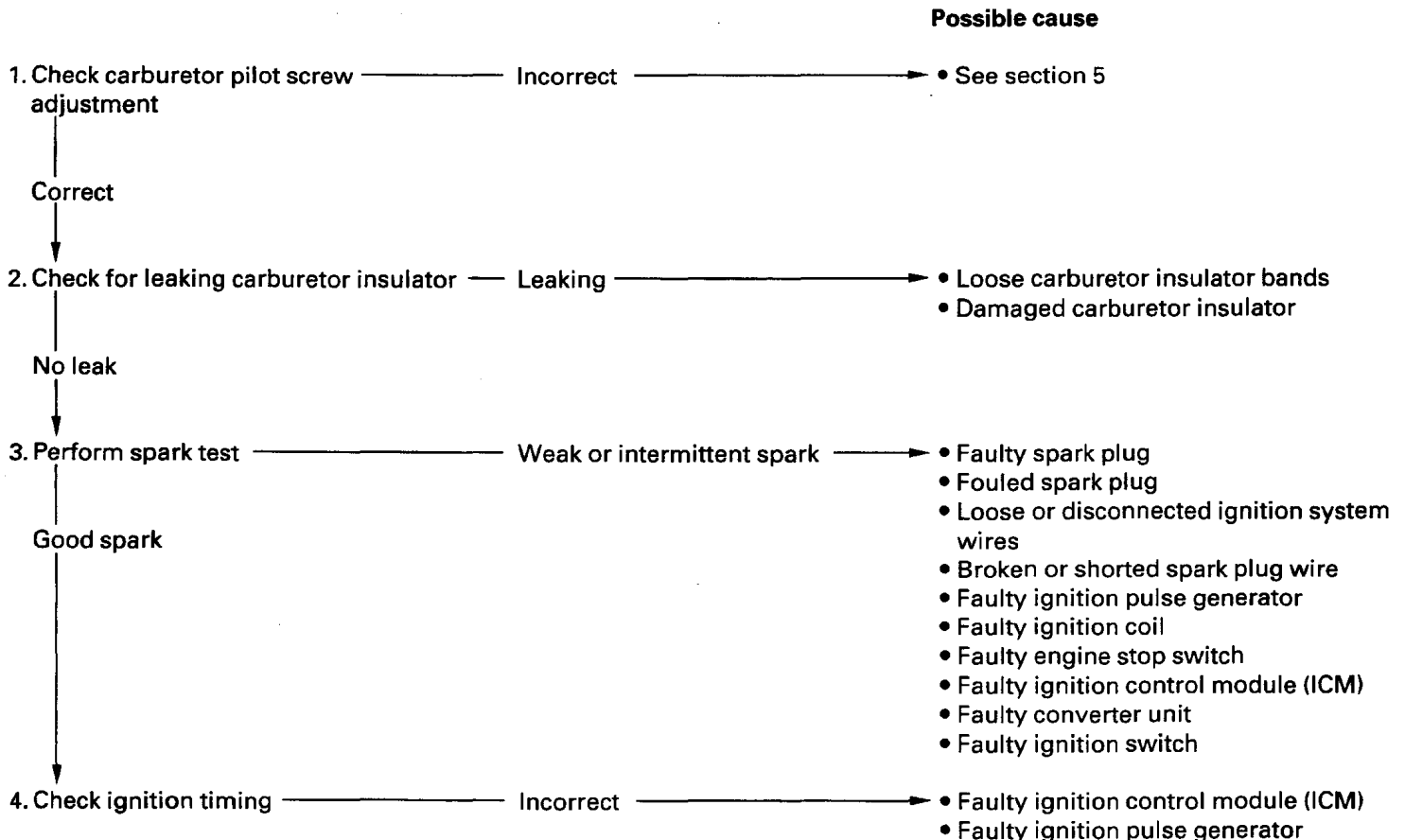


ENGINE LACKS POWER

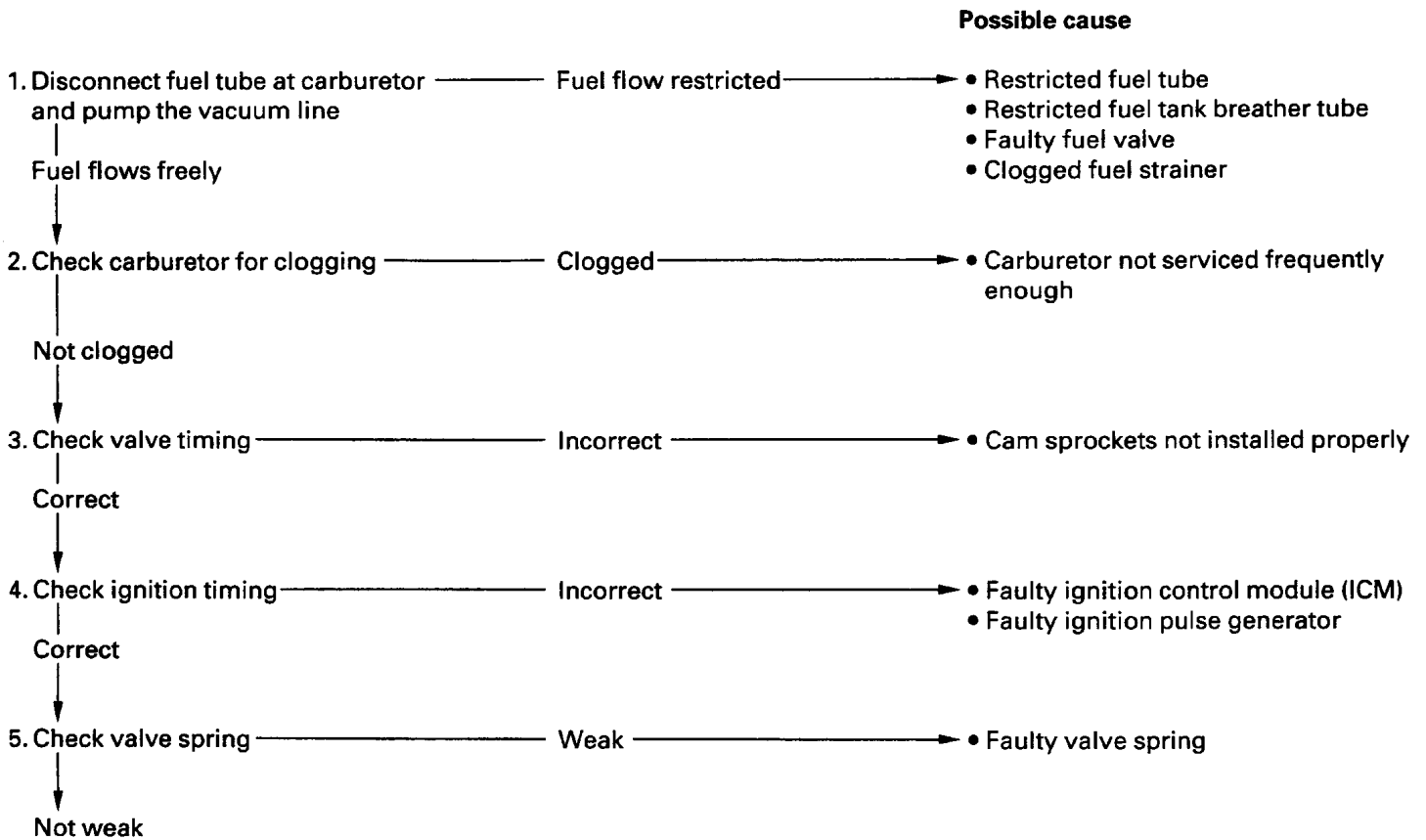




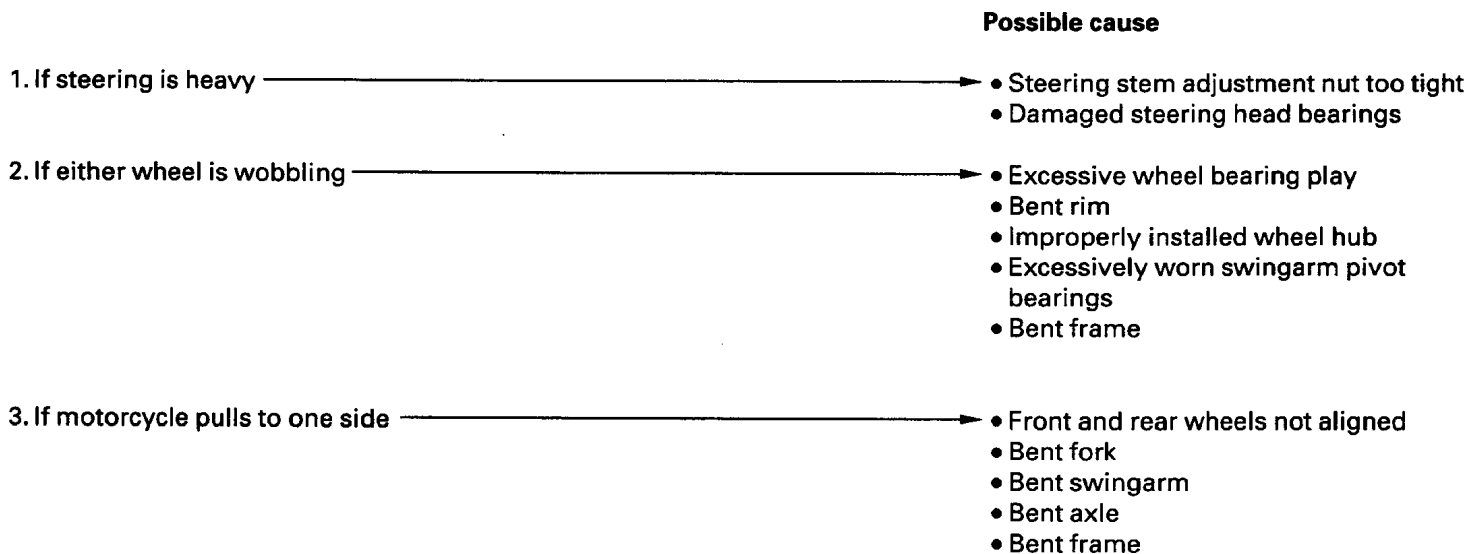
POOR PERFORMANCE AT LOW AND IDLE SPEED



POOR PERFORMANCE AT HIGH SPEED



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23. VTR1000F (W) ADDENDUM

INTRODUCTION

This addendum contains information for the VTR1000F (W). Refer to the VTR1000F Shop Manual (No. 62MBB00) for service procedures and data not included in this addendum.

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IMPORTANT SAFETY NOTICE

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

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

NOTE: Gives helpful information.

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

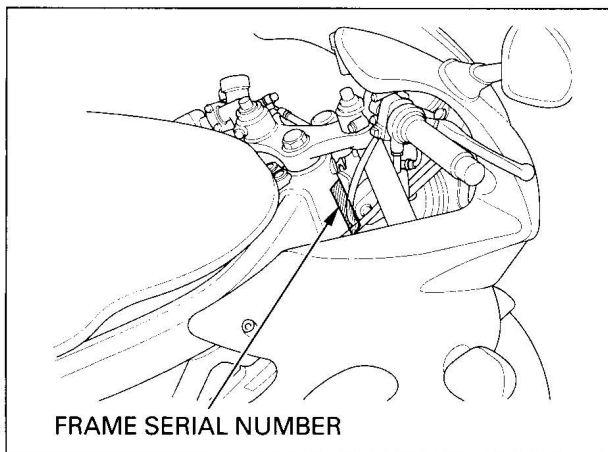
TYPE CODE

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

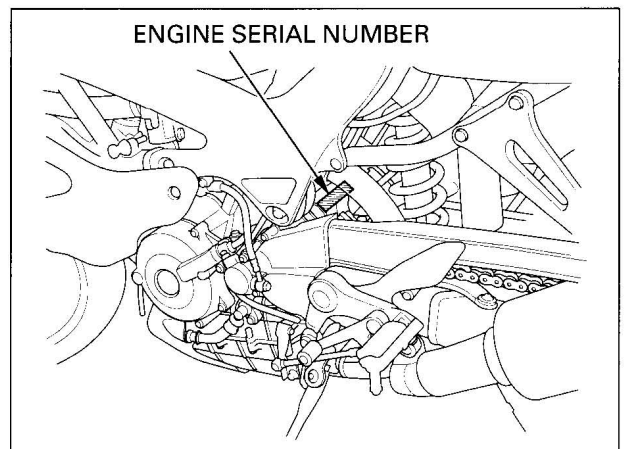
CODE	AREA TYPE
E	U.K.
G	Germany, Sweden
IIG	Germany (Type II)
F	France
ED	European direct sales (Belgium, Holland, Portugal)
FI	Finland

CODE	AREA TYPE
SW	Switzerland
AR	Austria
IT	Italy, Spain
ND	North Europe (Denmark, Norway)
U	Australia

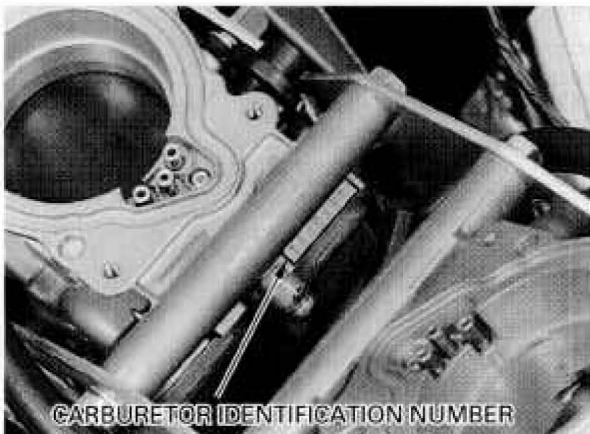
MODEL IDENTIFICATION



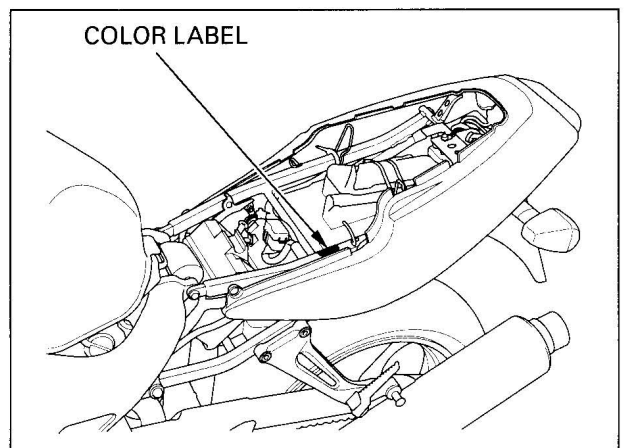
The frame serial number is stamped on the right side of the steering head.



The engine serial number is stamped on the rear of the upper crankcase.



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



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

SPECIFICATIONS

GENERAL			
	ITEM	SPECIFICATIONS	
DIMENSIONS	Overall length	G, IIG, SW, AR, ND, FI E, F, ED, U, IT	2,155 mm (84.8 in) 2,050 mm (80.7 in)
	Overall width		710 mm (28.0 in)
	Overall height		1,155 mm (45.5 in)
	Wheelbase		1,430 mm (56.3 in)
	Seat height		810 mm (31.9 in)
	Footpeg height		377 mm (14.8 in)
	Ground clearance		135 mm (5.3 in)
	Dry weight	Except SW, AR, IIG SW, AR, IIG	192 kg (423 lbs) 193 kg (425 lbs)
	Curb weight	Except SW, AR, IIG SW, AR, IIG	214 kg (472 lbs) 215 kg (474 lbs)
	Maximum weight capacity		188 kg (415 lbs)
FRAME	Frame type		Diamond
	Front suspension		Telescopic fork
	Front axle travel		109 mm (4.3 in)
	Front fork stroke		120 mm (4.7 in)
	Rear suspension		Swingarm
	Rear axle travel		124 mm (4.9 in)
	Front tire size		120/70ZR17 (58W)
	Rear tire size		180/55ZR17 (73W)
	Front tire brand		D204FK (DUNLOP), MACADAM 90X G (MICHELIN)
	Rear tire brand		D204K (DUNLOP), MACADAM 90X G (MICHELIN)
	Front brake		Hydraulic double disc
	Rear brake		Hydraulic single disc
	Caster angle		24°53'
Trail length		97 mm (3.8 in)	
Fuel tank capacity		16.0 ℓ (4.23 US gal, 3.52 Imp gal)	
ENGINE	Cylinder arrangement		2 cylinders 90° V transverse
	Bore and stroke		98.0 × 66.0 mm (3.90 × 2.60 in)
	Displacement		995.7 cm ³ (60.74 cu-in)
	Compression ratio		9.4 : 1
	Valve train		Chain driven, DOHC
	Intake valve	opens closes	20° BTDC (At 1 mm lift) 45° ABDC (At 1 mm lift)
	Exhaust valve	opens closes	50° BBDC (At 1 mm lift) 15° ATDC (At 1 mm lift)
	Lubrication system		Forced pressure and wet sump
	Oil pump type		Trochoid
	Cooling system		Liquid cooled
	Air filtration		Viscous paper element
	Engine dry weight		74.3 kg (163.8 lbs)
	Firing order		Front – 270° – Rear – 450° – Front

GENERAL (Cont'd)		
	ITEM	SPECIFICATIONS
CARBURETOR	Carburetor type Throttle bore	CV semi-downdraft 48 mm (1.9 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Final reduction Gear ratio 1st 2nd 3rd 4th 5th 6th Gearshift pattern	Multi-plate, wet Hydraulic operating Constant mesh, 6-speeds 1.681 (74/44) 2.562 (41/16) 2.733 (41/15) 1.812 (29/16) 1.428 (30/21) 1.206 (35/29) 1.080 (27/25) 0.961 (25/26) Left foot operated return system, 1-N-2-3-4-5-6
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	DC-CDI Electric starter motor Triple phase output alternator SCR shorted, triple phase full wave rectification Battery

Unit: mm (in)

LUBRICATION SYSTEM		STANDARD	SERVICE LIMIT
ITEM			
Engine oil capacity	After draining	3.7 ℓ (3.9 US qt , 3.3 Imp qt)	_____
	After draining/filter change	3.9 ℓ (4.1 US qt , 3.4 Imp qt)	_____
	After disassembly	4.5 ℓ (4.8 US qt , 4.0 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 pressure (at oil pressure switch)		588 kPa (6.0 kgf/cm ² , 85 psi) at 5,000 min ⁻¹ (rpm) /176 °F (80 °C)	_____
Oil pump	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
	Side clearance	0.02 – 0.09 (0.001 – 0.004)	0.12 (0.005)

FUEL SYSTEM		SPECIFICATIONS
ITEM		
Carburetor identification number	Except G, SW, AR, IIG, FI	VPT0G
	G, FI	VPT0A
	SW	VPT2B
	AR, IIG	VPT2C
Main jet		Front: # 175, Rear: # 178
Slow jet	Except G, SW, AR, IIG, FI	# 48
	G, SW, AR, IIG, FI	# 45
Jet needle number	Except G, SW, AR, IIG, FI	Front: A1UD, Rear: A1UC
	G, SW, AR, IIG, FI	Front: A1UF, Rear: A1UE
Pilot screw opening		See page 5-18
Float level		16.6 ± 0.5 mm (0.65 ± 0.02 in)
Idle speed	Except SW	1,200 ± 100 min ⁻¹ (rpm)
	SW	1,200 ± 50 min ⁻¹ (rpm)

COOLING SYSTEM		SPECIFICATIONS
ITEM		
Coolant capacity	Radiator and engine	2.86 ℓ (0.756 US gal , 0.629 Imp gal)
	Reserve tank	0.71 ℓ (0.188 US gal , 0.156 Imp gal)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm ² , 16 – 20 psi)
Thermostat	Begin to open	73 – 77 °C (163 – 171 °F)
	Fully open	90 °C (194 °F)
	Valve lift	8 mm (0.3 in) minimum

Unit: mm (in)

CYLINDER HEAD/VALVE				STANDARD	SERVICE LIMIT
ITEM					
Cylinder compression at 350 min ⁻¹ (rpm)				1,128 kPa (11.5 kgf/cm ² , 164 psi)	————
Valve clearance		IN		0.16 (0.006)	————
		EX		0.31 (0.012)	————
Camshaft	Cam lobe height	IN		40.080 – 40.240 (1.5779 – 1.5842)	39.780 (1.5661)
		EX		40.230 – 40.390 (1.5839 – 1.5902)	39.930 (1.5720)
	Runout			————	0.05 (0.002)
Oil clearance				0.020 – 0.062 (0.0008 – 0.0024)	0.088 (0.0035)
Valve lifter	Valve lifter O.D.			33.978 – 33.993 (1.3377 – 1.3383)	33.97 (1.337)
	Valve lifter bore I.D.			34.010 – 34.026 (1.3390 – 1.3396)	34.04 (1.340)
Valve, valve guide	Valve stem O.D.	IN		5.975 – 5.990 (0.2352 – 0.2358)	5.965 (0.2348)
		EX		5.965 – 5.980 (0.2348 – 0.2354)	5.955 (0.2344)
	Valve guide I.D.	IN/EX		6.000 – 6.012 (0.2362 – 0.2367)	6.040 (0.2378)
	Stem-to-guide clearance	IN		0.010 – 0.037 (0.0004 – 0.0015)	0.075 (0.0030)
		EX		0.020 – 0.047 (0.0008 – 0.0019)	0.085 (0.0033)
	Valve guide projection above cylinder head			14.0 – 14.2 (0.55 – 0.56)	————
	Valve seat width	IN		1.1 – 1.3 (0.04 – 0.05)	1.7 (0.07)
EX			1.3 – 1.5 (0.05 – 0.06)	1.9 (0.07)	
Valve spring	Free length	Inner		37.0 (1.46)	36.0 (1.42)
		Outer		41.9 (1.65)	40.9 (1.61)
Cylinder head warpage				————	0.10 (0.004)

Unit: mm (in)

CLUTCH/GEARSHIFT LINKAGE				STANDARD	SERVICE LIMIT
ITEM					
Specified clutch fluid				DOT 4 brake fluid	————
Clutch master cylinder	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)
Clutch	Spring free length			49.6 (1.95)	46.6 (1.83)
	Disc thickness			3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	Plate warpage			————	0.30 (0.012)
Clutch outer guide	I.D.			28.000 – 28.021 (1.1024 – 1.1032)	28.031 (1.1036)
	O.D.			34.975 – 34.991 (1.3770 – 1.3776)	34.965 (1.3766)
Mainshaft O.D. at clutch outer guide				27.980 – 27.993 (1.1016 – 1.1021)	27.970 (1.1012)

Unit: mm (in)

ALTERNATOR/STARTER CLUTCH				STANDARD	SERVICE LIMIT
ITEM					
Starter driven gear boss O.D.				57.749 – 57.768 (2.2736 – 2.2743)	57.639 (2.2692)

Unit: mm (in)

CRANKCASE/TRANSMISSION				
ITEM			STANDARD	SERVICE LIMIT
Shift fork	I.D.		12.000 – 12.021 (0.4724 – 0.4733)	12.03 (0.474)
	Claw thickness		5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
Shift fork shaft	O.D.		11.957 – 11.968 (0.4707 – 0.4712)	11.95 (0.470)
Transmission	Gear I.D.	M5, M6	31.000 – 31.016 (1.2205 – 1.2211)	31.04 (1.222)
		C2, C3, C4	33.000 – 33.025 (1.2992 – 1.3002)	33.05 (1.301)
	Gear bushing O.D.	M5, M6	30.955 – 30.980 (1.2187 – 1.2197)	30.93 (1.218)
		C2, C3, C4	32.955 – 32.980 (1.2974 – 1.2984)	32.93 (1.296)
	Gear-to-bushing clearance	M5, M6	0.020 – 0.061 (0.0008 – 0.0024)	0.10 (0.004)
		C2, C3, C4	0.020 – 0.070 (0.0008 – 0.0028)	0.11 (0.004)
	Gear bushing I.D.	M5	27.985 – 28.006 (1.1018 – 1.1026)	28.02 (1.103)
		C2	29.985 – 30.006 (1.1805 – 1.1813)	30.02 (1.182)
	Mainshaft O.D.	at M5	27.967 – 27.980 (1.1011 – 1.1016)	27.94 (1.100)
	Countershaft O.D.	at C2	29.950 – 29.975 (1.1791 – 1.1801)	29.92 (1.178)
Bushing-to-shaft clearance	M5	0.005 – 0.039 (0.0002 – 0.0015)	0.06 (0.002)	
	C2	0.010 – 0.056 (0.0004 – 0.0022)	0.06 (0.002)	

Unit: mm (in)

CRANKSHAFT/PISTON/CYLINDER				
ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod side clearance		0.10 – 0.30 (0.004 – 0.012)	0.40 (0.016)
	Crankpin bearing oil clearance		0.032 – 0.050 (0.0013 – 0.0020)	0.060 (0.0024)
	Main journal bearing oil clearance		0.020 – 0.038 (0.0008 – 0.0015)	0.048 (0.0019)
	Runout		—	0.10 (0.004)
Piston, piston pin, piston ring	Piston O.D. at 20 (0.8) from bottom		97.965 – 97.985 (3.8569 – 3.8577)	97.900 (3.8543)
	Piston pin hole I.D.		24.002 – 24.008 (0.9450 – 0.9452)	24.03 (0.946)
	Piston pin O.D.		23.994 – 24.000 (0.9446 – 0.9449)	23.984 (0.9443)
	Piston-to-piston pin clearance		0.002 – 0.014 (0.0001 – 0.0006)	0.046 (0.0018)
	Piston ring end gap	Top	0.25 – 0.40 (0.010 – 0.016)	0.55 (0.022)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.70 (0.028)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)
Piston ring-to-ring groove clearance	Top	0.065 – 0.100 (0.0026 – 0.0039)	0.115 (0.0045)	
	Second	0.035 – 0.070 (0.0014 – 0.0028)	0.085 (0.0033)	
Cylinder	I.D.		98.005 – 98.025 (3.8585 – 3.8592)	98.100 (3.8622)
	Out of round		—	0.10 (0.004)
	Taper		—	0.10 (0.004)
	Warpage		—	0.05 (0.002)
Cylinder-to-piston clearance			0.020 – 0.060 (0.0008 – 0.0024)	0.200 (0.0079)
Connecting rod small end I.D.			24.020 – 24.041 (0.9457 – 0.9465)	24.051 (0.9469)
Connecting rod-to-piston pin clearance			0.020 – 0.047 (0.0008 – 0.0019)	0.067 (0.0026)

Unit: mm (in)

FRONT WHEEL/SUSPENSION/STEERING ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		_____	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm ² , 36 psi)	_____
	Driver and passenger	250 kPa (2.50 kgf/cm ² , 36 psi)	_____
Axle runout		_____	0.20 (0.008)
Wheel rim runout	Radial	_____	2.0 (0.08)
	Axial	_____	2.0 (0.08)
Wheel balance weight		_____	60 g (2.1 oz) max.
Fork	Spring free length	309.9 (12.20)	303.7 (11.96)
	Tube runout	_____	0.20 (0.008)
	Recommended fluid	Fork fluid	_____
	Fluid level	130 (5.1)	_____
Fluid capacity		448 ± 2.5 cm ³ (15.2 ± 0.08 US oz, 15.8 ± 0.09 Imp oz)	_____
Steering head bearing preload		1.0–1.6 kgf (2.2–3.3 lbf)	_____

Unit: mm (in)

REAR WHEEL/SUSPENSION ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		_____	2.0 (0.08)
Cold tire pressure	Driver only	290 kPa (2.90 kgf/cm ² , 42 psi)	_____
	Driver and passenger	290 kPa (2.90 kgf/cm ² , 42 psi)	_____
Axle runout		_____	0.20 (0.008)
Wheel rim runout	Radial	_____	2.0 (0.08)
	Axial	_____	2.0 (0.08)
Wheel balance weight		_____	60 g (2.1 oz) max.

Unit: mm (in)

HYDRAULIC BRAKE ITEM		STANDARD	SERVICE LIMIT	
Front	Specified brake fluid	DOT 4	_____	
	Brake disc thickness	4.4–4.6 (0.17–0.18)	3.5 (0.14)	
	Brake disc runout	_____	0.30 (0.012)	
	Master cylinder I. D.	14.000–14.043 (0.5512–0.5529)	14.055 (0.5533)	
	Master piston O. D.	13.957–13.984 (0.5495–0.5506)	13.945 (0.5490)	
	Caliper cylinder I. D.	A	30.23–30.28 (1.190–1.192)	30.29 (1.193)
		B	27.000–27.050 (1.0630–1.0650)	27.060 (1.0654)
	Caliper piston O. D.	A	30.148–30.198 (1.1869–1.1889)	30.14 (1.187)
B		26.918–26.968 (1.0598–1.0617)	26.91 (1.059)	
Rear	Specified brake fluid	DOT 4	_____	
	Brake disc thickness	4.8–5.2 (0.19–0.20)	4.0 (0.16)	
	Brake disc runout	_____	0.30 (0.012)	
	Master cylinder I. D.	14.000–14.043 (0.5512–0.5529)	14.055 (0.5533)	
	Master piston O. D.	13.957–13.984 (0.5495–0.5506)	13.945 (0.5490)	
	Caliper cylinder I. D.	38.18–38.23 (1.503–1.505)	38.24 (1.506)	
	Caliper piston O. D.	38.098–38.148 (1.4999–1.5019)	38.09 (1.500)	

BATTERY/CHARGING SYSTEM			
ITEM		SPECIFICATIONS	
Battery	Capacity		12 V – 10 AH
	Current leakage		0.1 mA max.
	Voltage (68 °F/20 °C)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.2 A × 5 – 10 h
Quick		5.0 A × 1.0 h	
Alternator	Capacity		0.280 kW/5,000 min ⁻¹ (rpm)
	Charging coil resistance (68 °F/20 °C)		0.2 – 0.5 Ω
Regulator/rectifier regulated voltage			13.5 – 15.5 V/5,000 min ⁻¹ (rpm)

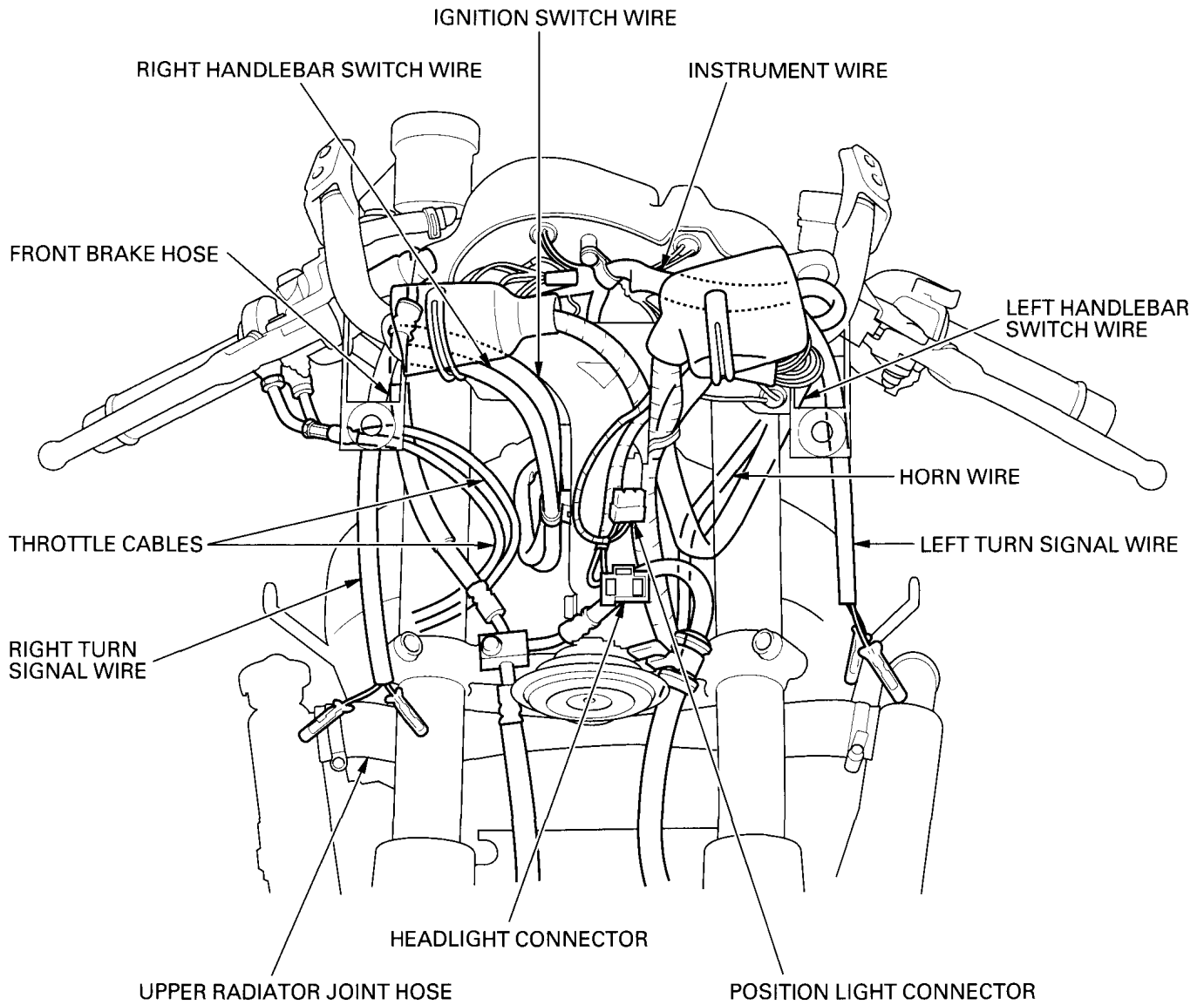
IGNITION SYSTEM			
ITEM		SPECIFICATIONS	
Spark plug		DPR9EVX-9 (NGK)	
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)	
Ignition coil primary peak voltage		100 V minimum	
Ignition pulse generator peak voltage		0.7 V minimum	
Ignition timing ("F" mark)		15° BTDC at idle	
Engine coolant temperature (ECT) sensor resistance	At 68 °F (20 °C)	2 – 3 kΩ	
	At 176 °F (80 °C)	200 – 400 Ω	
Throttle sensor	Resistance (68 °F/20 °C)	4 – 6 kΩ	
	Input voltage	4.7 – 5.3 V	

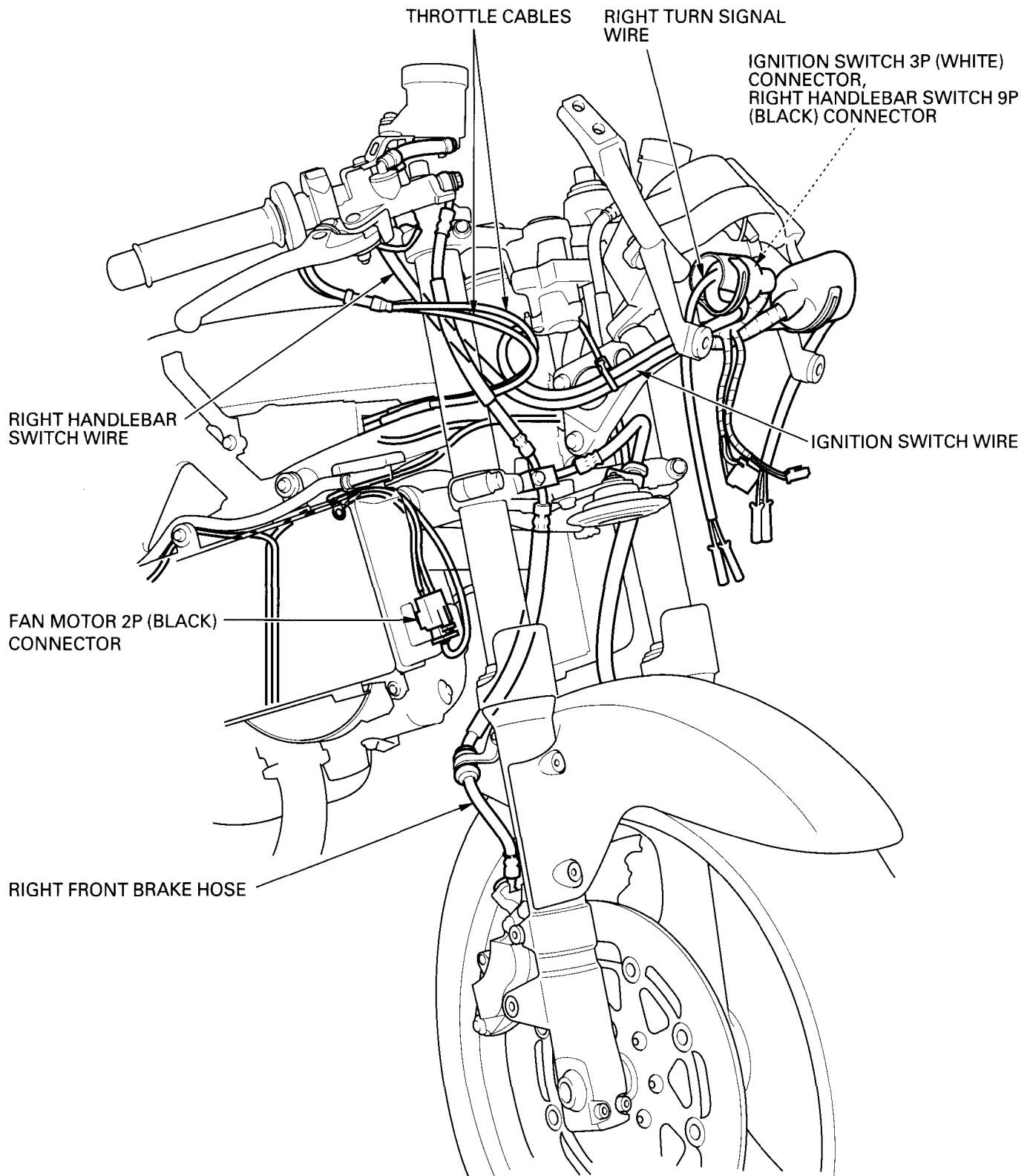
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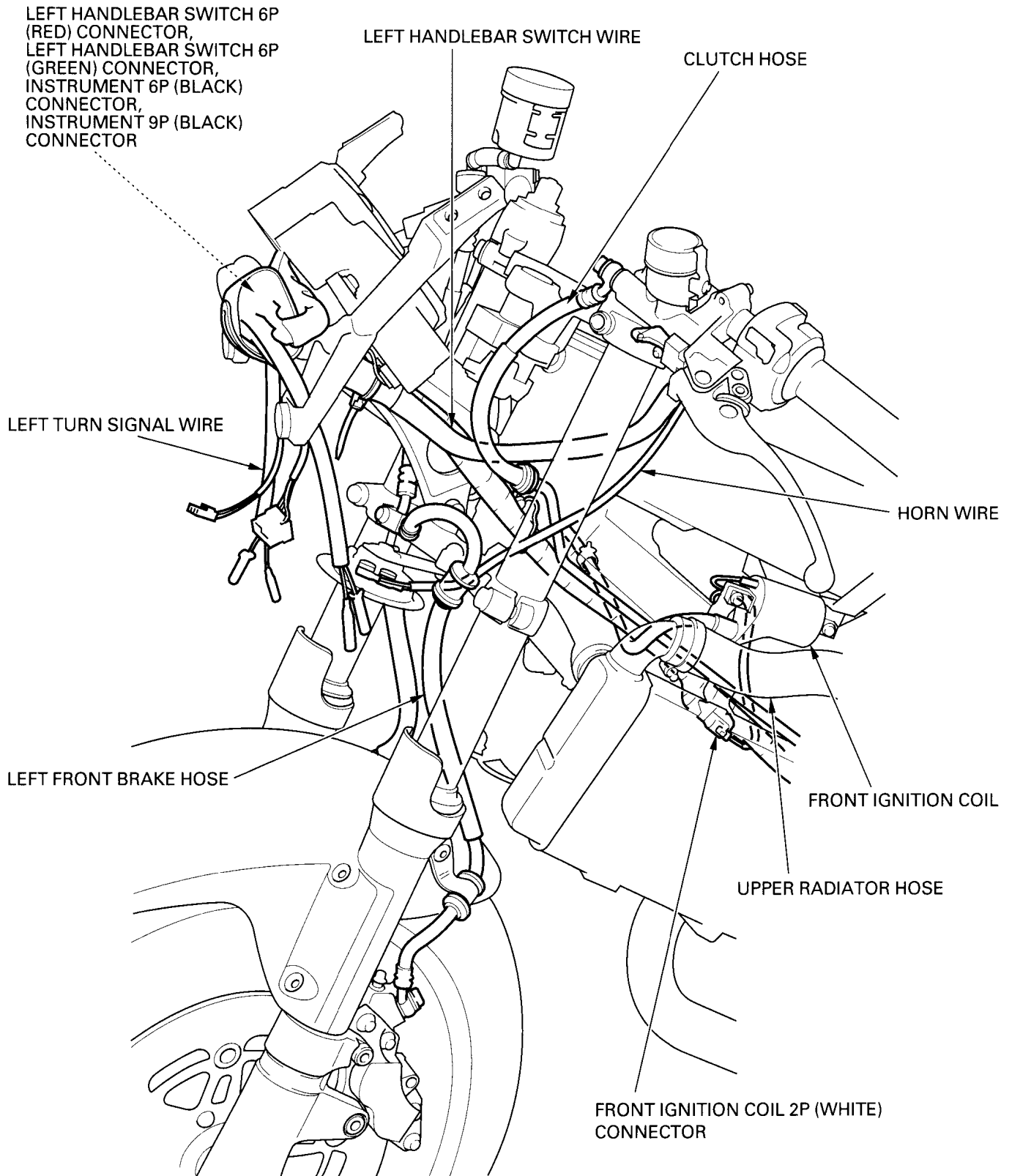
ELECTRIC STARTER		
ITEM	STANDARD	SERVICE LIMIT
Starter motor brush length	12.0 – 13.0 (0.47 – 0.51)	6.5 (0.26)

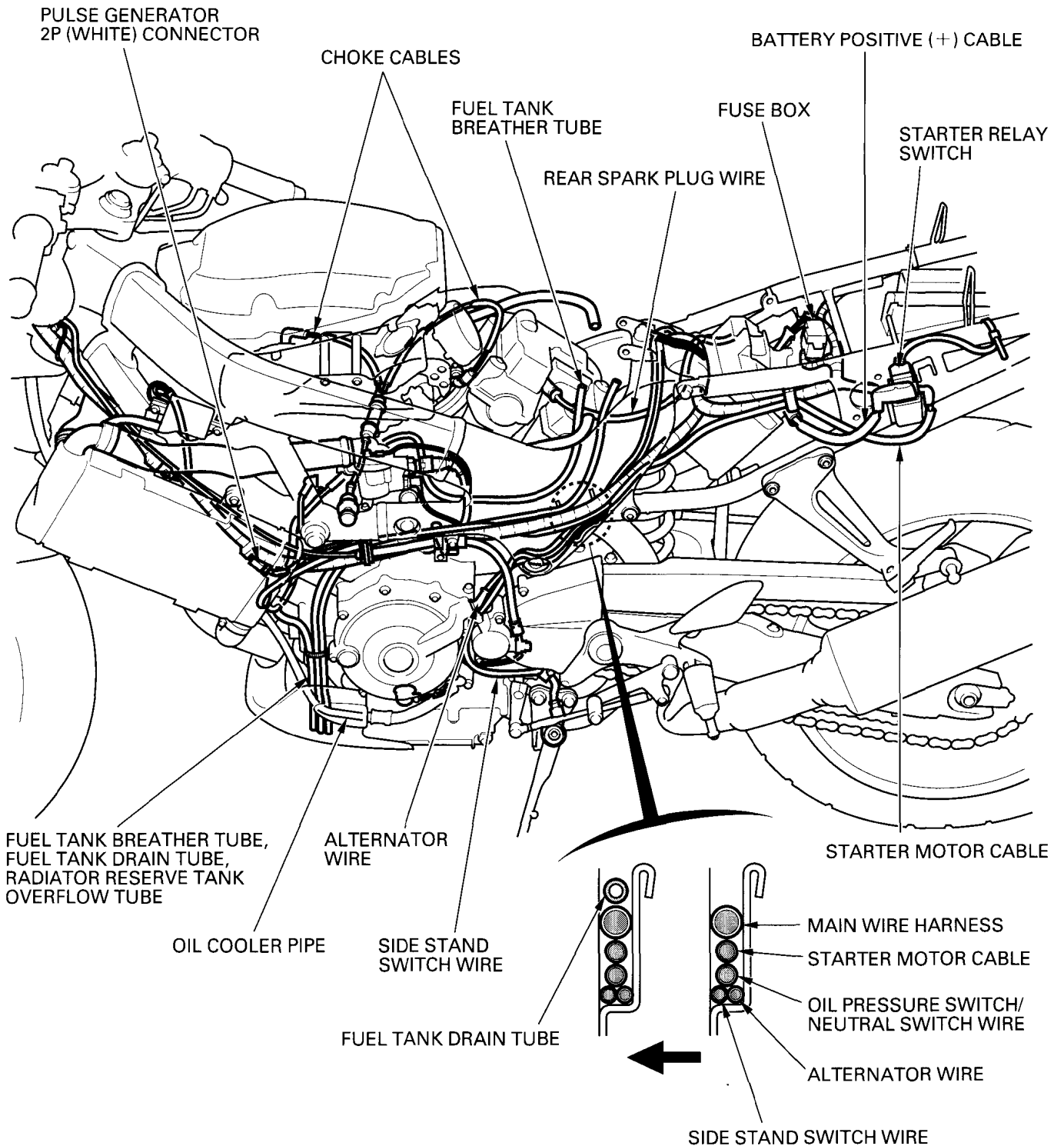
LIGHTS/METERS/SWITCHES			
ITEM		SPECIFICATIONS	
Bulbs	Headlight (High/low beam)		12 V – 60/55 W
	Position light (Except U type)		12 V – 5 W
	Brake/taillight		12 V – 21/5 W × 2
	Turn signal light		12 V – 21 W × 4
	Instrument light		12 V – 1.7 W × 3
	Turn signal indicator		12 V – 1.7 W × 2
	High beam indicator		12 V – 1.7 W
	Neutral indicator		12 V – 1.7 W
	Oil pressure indicator		12 V – 1.7 W
	Side stand indicator		12 V – 1.7 W
Fuse	Main fuse		30 A
	Sub-fuse		10 A, 20 A
Thermosensor resistance	At 176 °F (80 °C)	47 – 57 Ω	
	At 248 °F (120 °C)	14 – 18 Ω	
Fan motor switch	Starts to close (ON)		208 – 216 °F (98 – 102 °C)
	Stops to open (OFF)		199 – 207 °F (93 – 97 °C)

CABLE & HARNESS ROUTING



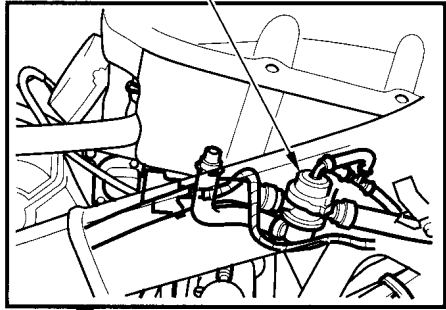






PULSE SECONDARY AIR INJECTION (PAIR)
CONTROL VALVE

SW, AR, IIG:



OIL PRESSURE SWITCH/
NEUTRAL SWITCH
2P (BLACK) CONNECTOR,
ALTERNATOR 3P (WHITE)
CONNECTOR,
SIDE STAND SWITCH
3P (GREEN) CONNECTOR,
SPEED SENSOR
3P (WHITE) CONNECTOR,
FUEL RESERVE SENSOR
2P (WHITE) CONNECTOR,
REAR IGNITION COIL
2P (WHITE) CONNECTOR

REAR BRAKE LIGHT SWITCH
2P (WHITE) CONNECTOR

REAR IGNITION
COIL WIRE

THROTTLE SENSOR
3P (WHITE) CONNECTOR

THROTTLE CABLES

CRANKCASE BREATHER
HOSE

REAR BRAKE RESERVOIR
HOSE

BATTERY GROUND
CABLE

RADIATOR SIPHON
TUBE

SPEED SENSOR WIRE

CARBURETOR HEATER
WATER OUTLET HOSE

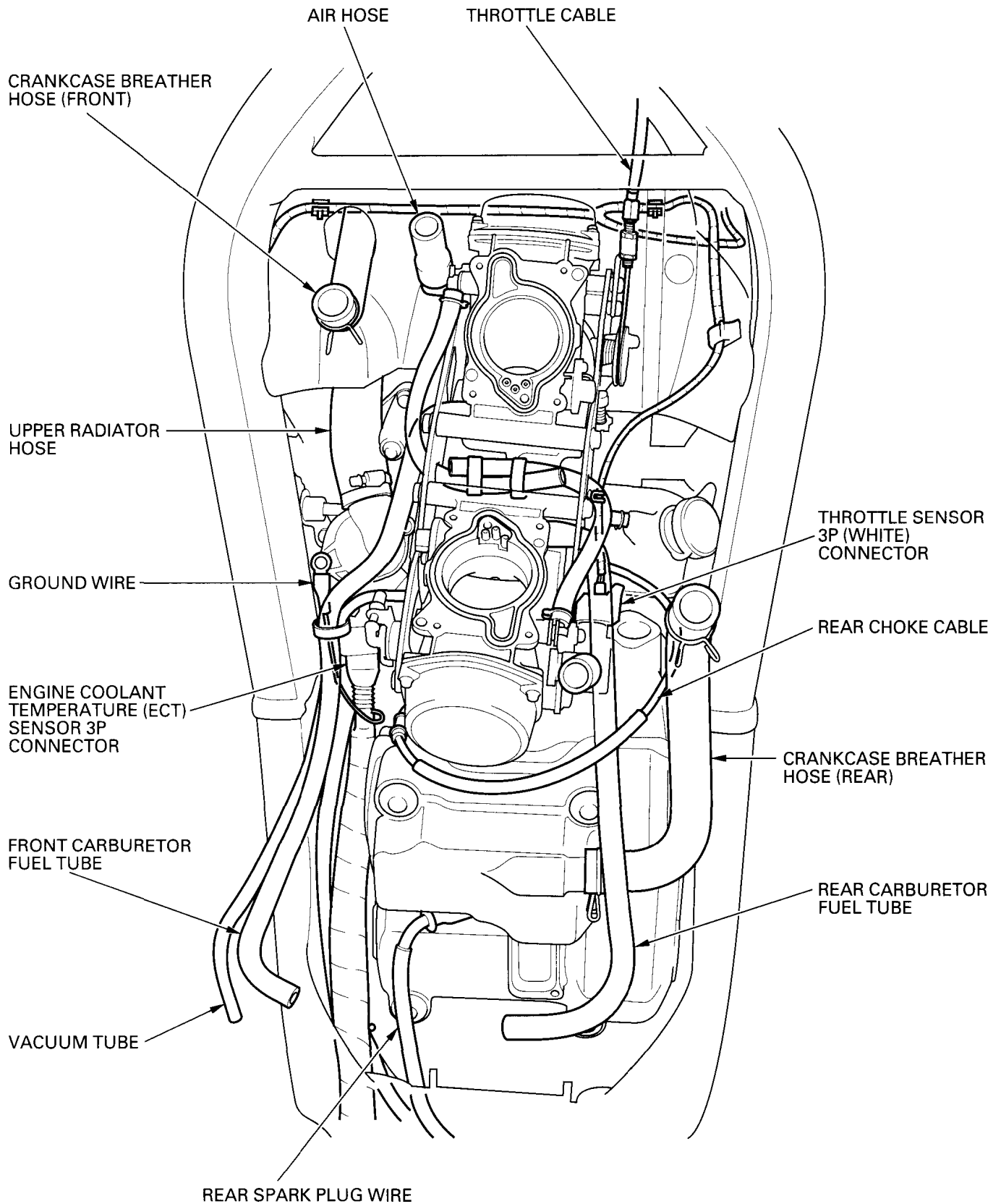
WATER BYPASS
HOSE

LOWER RADIATOR
JOINT HOSE

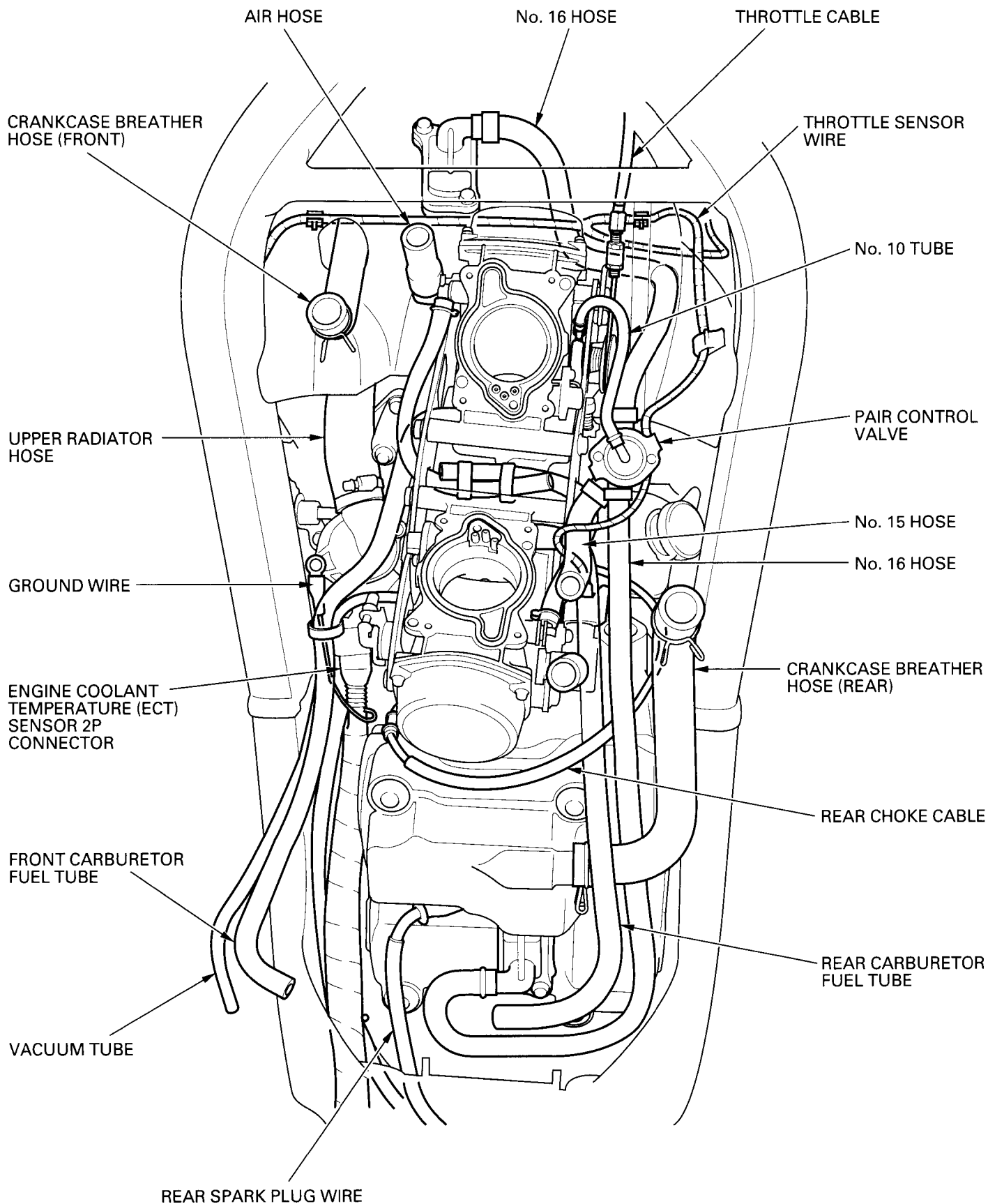
OIL COOLER HOSE

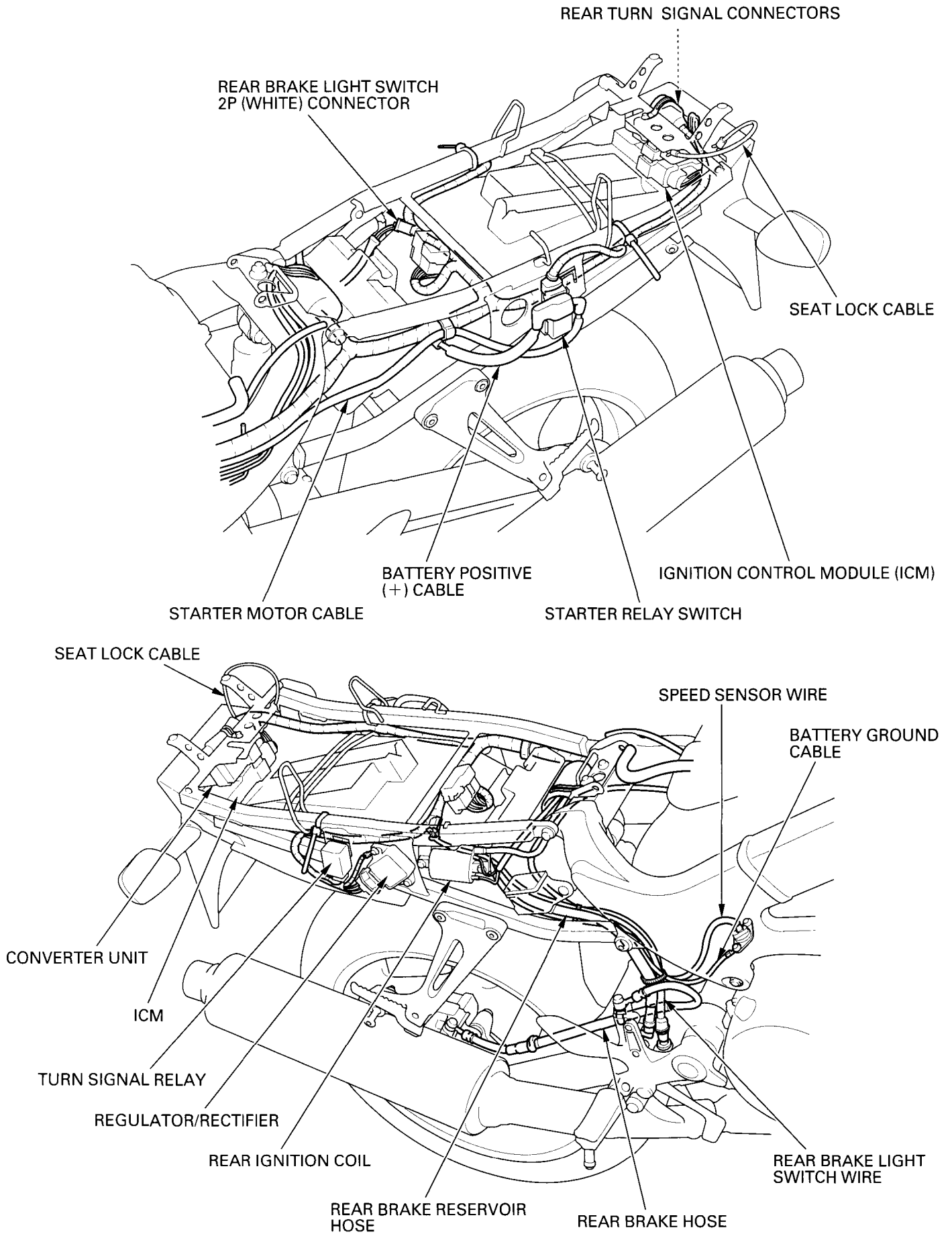
LOWER RADIATOR HOSE

EXCEPT SW, AR, IIG:



SW, AR, IIG:





PILOT SCREW ADJUSTMENT

IDLE DROP PROCEDURE

NOTE:

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

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

CAUTION:

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

TOOL:

Pilot screw wrench	07908-4220201 (except SW) 07KMA-MN90100 (SW)
---------------------------	---

INITIAL OPENING:

Except SW, AR, IIG type: 1-5/8 turns out

SW, AR, IIG type: 2-3/4 turns out

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

IDLE SPEED:

Except SW type: 1,200 ± 100 min⁻¹ (rpm)

SW type: 1,200 ± 50 min⁻¹ (rpm)

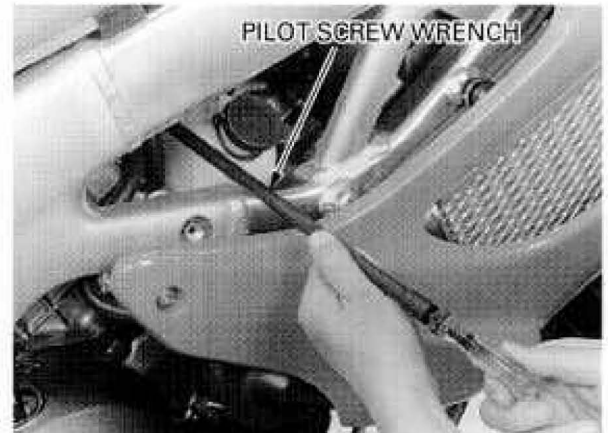
5. Turn the front carburetor pilot screw in or out slowly to obtain the highest engine speed.
6. Perform step 5 for rear carburetor pilot screw.
7. Lightly open the throttle 2 or 3 times, then adjust the idle speed with the throttle stop screw.
8. Turn the front carburetor pilot screw in until the engine speed drops by 50 min⁻¹ (rpm) .
9. Turn the front carburetor pilot screw out to the final opening from the position obtained in step 8.

FINAL OPENING:

Front: 1 turn out

Rear: 1-1/4 turns out

10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for the rear carburetor pilot screw.



24. VTR1000F (1) ADDENDUM

INTRODUCTION

This addendum contains information for the VTR1000F (1). Refer to the VTR1000F Shop Manual (No. 62MBB00 and 62MBB00Z) for service procedures and data not included in this addendum.

ALL INFORMATION, ILLUSTRATIONS, DIRECTIONS AND SPECIFICATIONS INCLUDED IN THIS PUBLICATION ARE BASED ON THE LATEST PRODUCT INFORMATION AVAILABLE AT THE TIME OF APPROVAL FOR PRINTING. HONDA MOTOR CO., LTD. RESERVES THE RIGHT TO MAKE CHANGES AT ANY TIME WITHOUT NOTICE AND WITHOUT INCURRING ANY OBLIGATION WHATEVER. NO PART OF THIS PUBLICATION MAY BE REPRODUCED WITHOUT WRITTEN PERMISSION. THIS MANUAL IS WRITTEN FOR PERSONS WHO HAVE ACQUIRED BASIC KNOWLEDGE OF MAINTENANCE ON HONDA MOTORCYCLES, MOTOR SCOOTERS OR ATVS.

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SERVICE PUBLICATION OFFICE**

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IMPORTANT SAFETY NOTICE

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

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

NOTE: Gives helpful information.

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

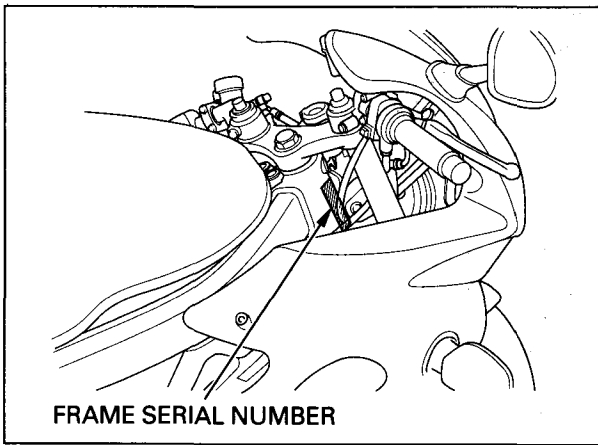
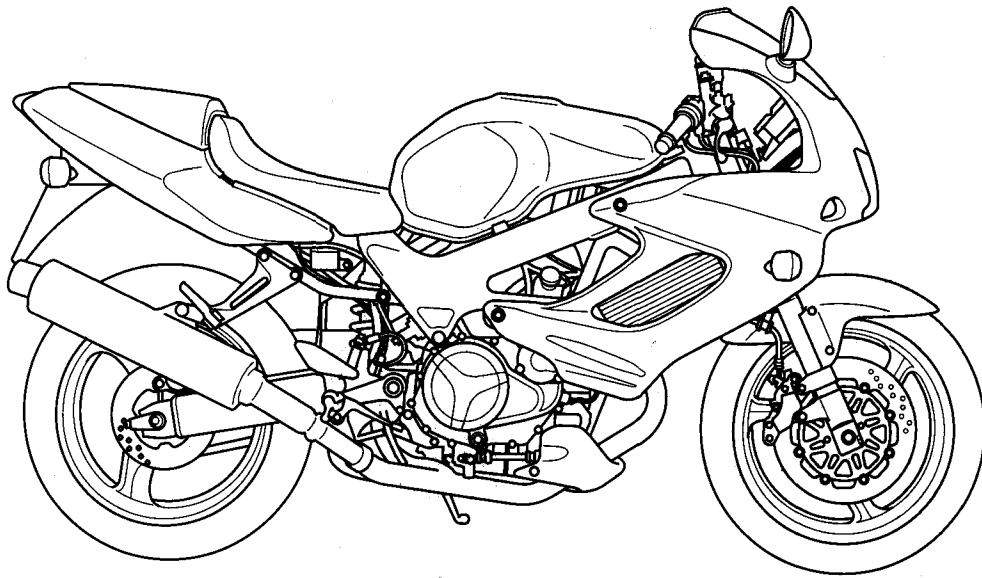
TYPE CODE

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

CODE	AREA TYPE
E	U.K.
IIG	Germany (Type II)
F	France
ED	European direct sales (Belgium, Holland, Portugal)

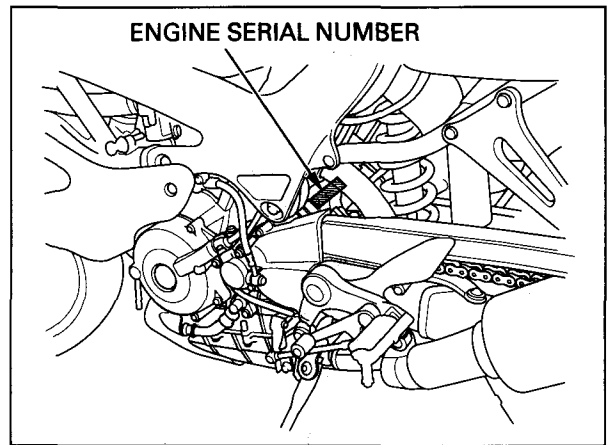
CODE	AREA TYPE
U	Australia

MODEL IDENTIFICATION



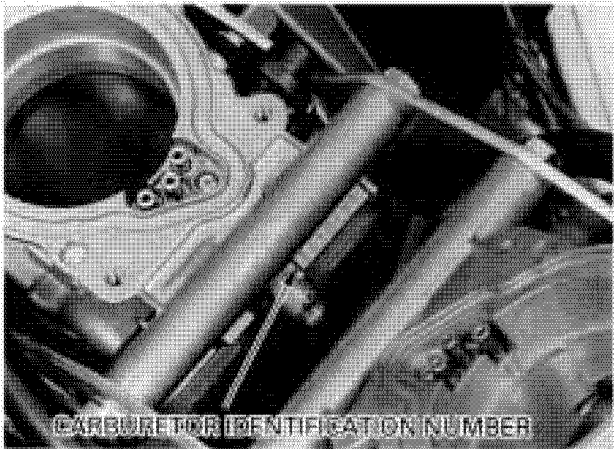
FRAME SERIAL NUMBER

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



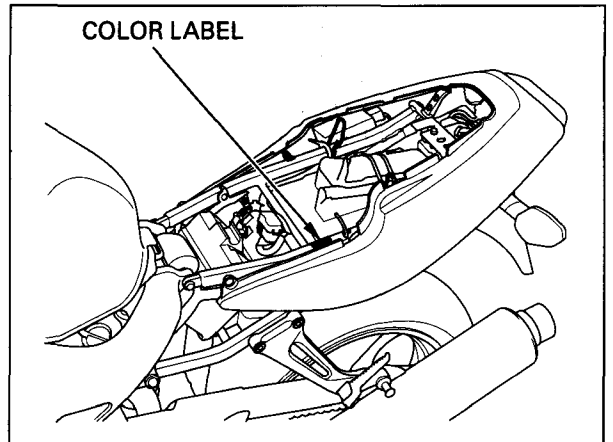
ENGINE SERIAL NUMBER

The engine serial number is stamped on the rear of the upper crankcase.



CARBURETOR IDENTIFICATION NUMBER

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



COLOR LABEL

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

SPECIFICATIONS

GENERAL		
	ITEM	SPECIFICATIONS
DIMENSIONS	Overall length	IIG E, F, ED, U 2,155 mm (84.8 in) 2,050 mm (80.7 in)
	Overall width	720 mm (28.3 in)
	Overall height	1,155 mm (45.5 in)
	Wheelbase	1,430 mm (56.3 in)
	Seat height	810 mm (31.9 in)
	Footpeg height	377 mm (14.8 in)
	Ground clearance	135 mm (5.3 in)
	Dry weight	Except IIG IIG 193 kg (425 lbs) 194 kg (428 lbs)
	Curb weight	Except IIG IIG 218 kg (481 lbs) 219 kg (483 lbs)
	Maximum weight capacity	188 kg (415 lbs)
	FRAME	Frame type
Front suspension		Telescopic fork
Front axle travel		109 mm (4.3 in)
Front fork stroke		120 mm (4.7 in)
Rear suspension		Swingarm
Rear axle travel		124 mm (4.9 in)
Front tire size		120/70ZR17 (58W)
Rear tire size		180/55ZR17 (73W)
Front tire brand		D204FK (DUNLOP), MACADAM 90X G (MICHELIN)
Rear tire brand		D204K (DUNLOP), MACADAM 90X G (MICHELIN)
Front brake		Hydraulic double disc
Rear brake		Hydraulic single disc
Caster angle		24°50'
Trail length	97 mm (3.8 in)	
Fuel tank capacity	19.0 l (5.02 US gal, 4.18 Imp gal)	
ENGINE	Cylinder arrangement	2 cylinders 90° V transverse
	Bore and stroke	98.0 × 66.0 mm (3.90 × 2.60 in)
	Displacement	996 cm ³ (60.8 cu-in)
	Compression ratio	9.4 : 1
	Valve train	Chain driven, DOHC
	Intake valve	opens closes 20° BTDC (At 1 mm lift) 45° ABDC (At 1 mm lift)
	Exhaust valve	opens closes 50° BBDC (At 1 mm lift) 15° ATDC (At 1 mm lift)
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
	Air filtration	Viscous paper element
Engine dry weight	74.3 kg (163.8 lbs)	
Firing order	Front - 270° - Rear - 450° - Front	

GENERAL (Cont'd)		
	ITEM	SPECIFICATIONS
CARBURETOR	Carburetor type Throttle bore	CV semi-downdraft 48 mm (1.9 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Final reduction Gear ratio 1st 2nd 3rd 4th 5th 6th Gearshift pattern	Multi-plate, wet Hydraulic operating Constant mesh, 6-speeds 1.681 (74/44) 2.562 (41/16) 2.733 (41/15) 1.812 (29/16) 1.428 (30/21) 1.206 (35/29) 1.080 (27/25) 0.961 (25/26) Left foot operated return system, 1-N-2-3-4-5-6
ELECTRICAL	Ignition system Starting system Charging system Regulator/rectifier Lighting system	DC-CDI Electric starter motor Triple phase output alternator SCR shorted, triple phase full wave rectification Battery

VTR1000F (1) ADDENDUM

Unit: mm (in)

LUBRICATION SYSTEM		STANDARD	SERVICE LIMIT
ITEM			
Engine oil capacity	After draining	3.7 ℓ (3.9 US qt, 3.3 Imp qt)	————
	After draining/filter change	3.9 ℓ (4.1 US qt, 3.4 Imp qt)	————
	After disassembly	4.5 ℓ (4.8 US qt, 4.0 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 pressure (at oil pressure switch)		588 kPa (6.0 kgf/cm ² , 85 psi) at 5,000 min ⁻¹ (rpm) / 176 °F (80 °C)	————
Oil pump	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15 – 0.21 (0.006 – 0.008)	0.35 (0.014)
	Side clearance	0.02 – 0.09 (0.001 – 0.004)	0.12 (0.005)

FUEL SYSTEM	ITEM	SPECIFICATIONS
	Carburetor identification number	Except IIG: VPT3A, IIG: VPT3E
	Main jet	Front: # 175, Rear: # 178
	Slow jet	# 45
	Jet needle number	Front: A1UF, Rear: A1UE
	Pilot screw opening	See page 24-25
	Float level	16.6 ± 0.5 mm (0.65 ± 0.02 in)
	Idle speed	1,200 ± 100 min ⁻¹ (rpm)

COOLING SYSTEM		SPECIFICATIONS
ITEM		
Coolant capacity	Radiator and engine	2.9 ℓ (3.1 US qt, 2.6 Imp qt)
	Reserve tank	0.71 ℓ (0.188 US gal, 0.156 Imp gal)
Radiator cap relief pressure		108 – 137 kPa (1.1 – 1.4 kgf/cm ² , 16 – 20 psi)
Thermostat	Begin to open	73 – 77 °C (163 – 171 °F)
	Fully open	90 °C (194 °F)
	Valve lift	8 mm (0.3 in) minimum
Recommended antifreeze		Pro Honda HP coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors

Unit: mm (in)

CYLINDER HEAD/VALVE ITEM		STANDARD	SERVICE LIMIT
Cylinder compression at 350 min ⁻¹ (rpm)		1,128 kPa (11.5 kgf/cm ² , 164 psi)	————
Valve clearance		IN	0.16 (0.006)
		EX	0.31 (0.012)
Camshaft	Cam lobe height	IN	40.080 – 40.240 (1.5779 – 1.5842)
		EX	40.230 – 40.390 (1.5839 – 1.5902)
	Runout	————	0.05 (0.002)
Oil clearance		0.020 – 0.062 (0.0008 – 0.0024)	0.088 (0.0035)
Valve lifter	Valve lifter O.D.	33.978 – 33.993 (1.3377 – 1.3383)	33.97 (1.337)
	Valve lifter bore I.D.	34.010 – 34.026 (1.3390 – 1.3396)	34.04 (1.340)
Valve, valve guide	Valve stem O.D.	IN	5.975 – 5.990 (0.2352 – 0.2358)
		EX	5.965 – 5.980 (0.2348 – 0.2354)
	Valve guide I.D.	IN/EX	6.000 – 6.012 (0.2362 – 0.2367)
	Stem-to-guide clearance	IN	0.010 – 0.037 (0.0004 – 0.0015)
		EX	0.020 – 0.047 (0.0008 – 0.0019)
	Valve guide projection above cylinder head	14.0 – 14.2 (0.55 – 0.56)	————
	Valve seat width	IN	1.1 – 1.3 (0.04 – 0.05)
EX		1.3 – 1.5 (0.05 – 0.06)	
Valve spring	Free length	Inner	37.0 (1.46)
		Outer	41.9 (1.65)
Cylinder head warpage		————	0.10 (0.004)

Unit: mm (in)

CLUTCH/GEARSHIFT LINKAGE ITEM		STANDARD	SERVICE LIMIT
Specified clutch fluid		DOT 4 brake fluid	————
Clutch master cylinder	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)
Clutch	Spring free length	49.6 (1.95)	46.6 (1.83)
	Disc thickness	3.72 – 3.88 (0.146 – 0.153)	3.5 (0.14)
	Plate warpage	————	0.30 (0.012)
Clutch outer guide	I.D.	28.000 – 28.021 (1.1024 – 1.1032)	28.031 (1.1036)
	O.D.	34.975 – 34.991 (1.3770 – 1.3776)	34.965 (1.3766)
Mainshaft O.D. at clutch outer guide		27.980 – 27.993 (1.1016 – 1.1021)	27.970 (1.1012)

Unit: mm (in)

ALTERNATOR/STARTER CLUTCH ITEM		STANDARD	SERVICE LIMIT
Starter driven gear boss O.D.		57.749 – 57.768 (2.2736 – 2.2743)	57.639 (2.2692)

VTR1000F (1) ADDENDUM

Unit: mm (in)

CRANKCASE/TRANSMISSION		STANDARD	SERVICE LIMIT
ITEM			
Shift fork	I.D.	12.000 – 12.021 (0.4724 – 0.4733)	12.03 (0.474)
	Claw thickness	5.93 – 6.00 (0.233 – 0.236)	5.9 (0.23)
Shift fork shaft	O.D.	11.957 – 11.968 (0.4707 – 0.4712)	11.95 (0.470)
Transmission	Gear I.D.	M5, M6	31.000 – 31.016 (1.2205 – 1.2211)
		C2, C3, C4	33.000 – 33.025 (1.2992 – 1.3002)
	Gear bushing O.D.	M5, M6	30.955 – 30.980 (1.2187 – 1.2197)
		C2, C3, C4	32.955 – 32.980 (1.2974 – 1.2984)
	Gear-to-bushing clearance	M5, M6	0.020 – 0.061 (0.0008 – 0.0024)
		C2, C3, C4	0.020 – 0.070 (0.0008 – 0.0028)
	Gear bushing I.D.	M5	27.985 – 28.006 (1.1018 – 1.1026)
		C2	29.985 – 30.006 (1.1805 – 1.1813)
	Mainshaft O.D.	at M5	27.967 – 27.980 (1.1011 – 1.1016)
	Countershaft O.D.	at C2	29.950 – 29.975 (1.1791 – 1.1801)
Bushing-to-shaft clearance	M5	0.005 – 0.039 (0.0002 – 0.0015)	
	C2	0.010 – 0.056 (0.0004 – 0.0022)	

Unit: mm (in)

CRANKSHAFT/PISTON/CYLINDER		STANDARD	SERVICE LIMIT	
ITEM				
Crankshaft	Connecting rod side clearance	0.10 – 0.30 (0.004 – 0.012)	0.40 (0.016)	
	Crankpin bearing oil clearance	0.032 – 0.050 (0.0013 – 0.0020)	0.060 (0.0024)	
	Main journal bearing oil clearance	0.020 – 0.038 (0.0008 – 0.0015)	0.048 (0.0019)	
	Runout	—	0.10 (0.004)	
Piston, piston pin, piston ring	Piston O.D. at 20 (0.8) from bottom	97.965 – 97.985 (3.8569 – 3.8577)	97.900 (3.8543)	
	Piston pin hole I.D.	24.002 – 24.008 (0.9450 – 0.9452)	24.03 (0.946)	
	Piston pin O.D.	23.994 – 24.000 (0.9446 – 0.9449)	23.984 (0.9443)	
	Piston-to-piston pin clearance	0.002 – 0.014 (0.0001 – 0.0006)	0.046 (0.0018)	
	Piston ring end gap	Top	0.25 – 0.40 (0.010 – 0.016)	0.55 (0.022)
		Second	0.40 – 0.55 (0.016 – 0.022)	0.70 (0.028)
		Oil (side rail)	0.20 – 0.70 (0.008 – 0.028)	0.90 (0.035)
Piston ring-to-ring groove clearance	Top	0.065 – 0.100 (0.0026 – 0.0039)	0.115 (0.0045)	
	Second	0.035 – 0.070 (0.0014 – 0.0028)	0.085 (0.0033)	
Cylinder	I.D.	98.005 – 98.025 (3.8585 – 3.8592)	98.100 (3.8622)	
	Out of round	—	0.10 (0.004)	
	Taper	—	0.10 (0.004)	
	Warpage	—	0.05 (0.002)	
Cylinder-to-piston clearance		0.020 – 0.060 (0.0008 – 0.0024)	0.200 (0.0079)	
Connecting rod small end I.D.		24.020 – 24.041 (0.9457 – 0.9465)	24.051 (0.9469)	
Connecting rod-to-piston pin clearance		0.020 – 0.047 (0.0008 – 0.0019)	0.067 (0.0026)	

Unit: mm (in)

FRONT WHEEL/SUSPENSION/STEERING ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—————	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm ² , 36 psi)	—————
	Driver and passenger	250 kPa (2.50 kgf/cm ² , 36 psi)	—————
Axle runout		—————	0.20 (0.008)
Wheel rim runout	Radial	—————	2.0 (0.08)
	Axial	—————	2.0 (0.08)
Wheel balance weight		—————	60 g (2.1 oz) max.
Fork	Spring free length	309.9 (12.20)	303.7 (11.96)
	Tube runout	—————	0.20 (0.008)
	Recommended fluid	Fork fluid	—————
	Fluid level	130 (5.1)	—————
Fluid capacity		448 ± 2.5 cm ³ (15.2 ± 0.08 US oz, 15.8 ± 0.09 Imp oz)	—————
Steering head bearing preload		1.0–1.6 kgf (2.2–3.3 lbf)	—————

Unit: mm (in)

REAR WHEEL/SUSPENSION ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		—————	2.0 (0.08)
Cold tire pressure	Driver only	290 kPa (2.90 kgf/cm ² , 42 psi)	—————
	Driver and passenger	290 kPa (2.90 kgf/cm ² , 42 psi)	—————
Axle runout		—————	0.20 (0.008)
Wheel rim runout	Radial	—————	2.0 (0.08)
	Axial	—————	2.0 (0.08)
Wheel balance weight		—————	60 g (2.1 oz) max.

Unit: mm (in)

HYDRAULIC BRAKE ITEM		STANDARD	SERVICE LIMIT	
Front	Specified brake fluid	DOT 4	—————	
	Brake disc thickness	4.4–4.6 (0.17–0.18)	3.5 (0.14)	
	Brake disc runout	—————	0.30 (0.012)	
	Master cylinder I. D.	14.000–14.043 (0.5512–0.5529)	14.055 (0.5533)	
	Master piston O. D.	13.957–13.984 (0.5495–0.5506)	13.945 (0.5490)	
	Caliper cylinder I. D.	A	30.23–30.28 (1.190–1.192)	30.29 (1.193)
		B	27.000–27.050 (1.0630–1.0650)	27.060 (1.0654)
	Caliper piston O. D.	A	30.148–30.198 (1.1869–1.1889)	30.14 (1.187)
B		26.918–26.968 (1.0598–1.0617)	26.91 (1.059)	
Rear	Specified brake fluid	DOT 4	—————	
	Brake disc thickness	4.8–5.2 (0.19–0.20)	4.0 (0.16)	
	Brake disc runout	—————	0.30 (0.012)	
	Master cylinder I. D.	14.000–14.043 (0.5512–0.5529)	14.055 (0.5533)	
	Master piston O. D.	13.957–13.984 (0.5495–0.5506)	13.945 (0.5490)	
	Caliper cylinder I. D.	38.18–38.23 (1.503–1.505)	38.24 (1.506)	
	Caliper piston O. D.	38.098–38.148 (1.4999–1.5019)	38.09 (1.500)	

VTR1000F (1) ADDENDUM

BATTERY/CHARGING SYSTEM		SPECIFICATIONS	
ITEM			
Battery	Capacity	12 V – 10 Ah	
	Current leakage	0.1 mA max.	
	Voltage (68 °F/20 °C)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.2 A × 5 – 10 h
Quick		5.0 A × 1.0 h	
Alternator	Capacity	0.280 kW/5,000 min ⁻¹ (rpm)	
	Charging coil resistance (68 °F/20 °C)	0.2 – 0.5 Ω	
Regulator/rectifier regulated voltage		13.5 – 15.5 V/5,000 min ⁻¹ (rpm)	

IGNITION SYSTEM		SPECIFICATIONS
ITEM		
Spark plug		DPR9EVX-9 (NGK)
Spark plug gap		0.80 – 0.90 mm (0.031 – 0.035 in)
Ignition coil primary peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		15° BTDC at idle
Engine coolant temperature (ECT) sensor resistance	At 68 °F (20 °C)	2 – 3 kΩ
	At 176 °F (80 °C)	200 – 400 Ω
Throttle sensor	Resistance (68 °F/20 °C)	4 – 6 kΩ
	Input voltage	4.7 – 5.3 V

ELECTRIC STARTER		Unit: mm (in)	
ITEM		STANDARD	SERVICE LIMIT
Starter motor brush length		12.0 – 13.0 (0.47 – 0.51)	6.5 (0.26)

LIGHTS/METERS/SWITCHES		SPECIFICATIONS
ITEM		
Bulbs	Headlight (High/low beam)	12 V – 60/55 W
	Position light (Except U type)	12 V – 5 W
	Brake/taillight	12 V – 21/5 W × 2
	Turn signal light	12 V – 21 W × 4
	Instrument light	14 V – 1.4 W × 3
	Turn signal indicator	14 V – 1.4 W × 2
	High beam indicator	14 V – 1.4 W
	Neutral indicator	14 V – 1.4 W
	Oil pressure indicator	14 V – 1.4 W
Fuse	Main fuse	30 A
	Sub-fuse	10 A, 20 A
Thermosensor resistance	At 176 °F (80 °C)	47 – 57 Ω
	At 248 °F (120 °C)	14 – 18 Ω
Fan motor switch	Starts to close (ON)	208 – 216 °F (98 – 102 °C)
	Stops to open (OFF)	199 – 207 °F (93 – 97 °C)

TORQUE VALUES

STANDARD

FASTENER TYPE	TORQUE N-m (kgf-m, lbf-ft)	FASTENER TYPE	TORQUE N-m (kgf-m, lbf-ft)
5 mm bolt and nut	5 (0.5, 3.6)	5 mm screw	4 (0.4, 2.9)
6 mm bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 6.5)
8 mm bolt and nut	22 (2.2, 16)	6 mm flange bolt (8 mm head, small flange)	10 (1.0, 7)
10 mm bolt and nut	34 (3.5, 25)	6 mm flange bolt (8 mm head, large flange)	12 (1.2, 9)
12 mm bolt and nut	54 (5.5, 40)	6 mm flange bolt (10 mm head) and nut	12 (1.2, 9)
		8 mm flange bolt and nut Engine Frame	23 (2.3, 17)
		10 mm flange bolt and nut	26 (2.7, 20)
			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. Replace with a new one.
 4. Stake.
 5. Apply oil to the threads and seating surface.
 6. Apply engine oil to the O-ring.
 7. U-nut.
 8. ALOC bolt/screw: replace with a new one.
 9. Apply grease to the threads.

ENGINE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
MAINTENANCE:				
Spark plug	2	12	14 (1.4, 10)	
Crankshaft hole cap	1	30	15 (1.5, 11)	NOTE 9
Timing hole cap	1	14	9.8 (1.0, 7)	NOTE 9
Engine oil filter cartridge	1	20	9.8 (1.0, 7)	NOTE 5, 6
Engine oil drain bolt	1	12	29 (3.0, 22)	
LUBRICATION SYSTEM:				
Oil pressure switch	1	PT 1/8	12 (1.2, 9)	NOTE 1
Oil pressure switch terminal screw	1	4	2.0 (0.2, 1.4)	
Oil pump bolt	2	6	13 (1.3, 9)	
Oil filter boss	1	20	18 (1.8, 13)	NOTE 2
FUEL SYSTEM:				
Carburetor insulator band bolt	4	5	1.0 (0.1, 0.7)	
Vacuum joint	1	5	2.5 (0.25, 1.8)	
Reed valve cover bolt	4	5	5.1 (0.52, 3.8)	NOTE 2
ENGINE MOUNTING:				
Drive sprocket bolt	1	10	54 (5.5, 40)	
CYLINDER HEAD/VALVE:				
Cylinder head cover bolt	8	6	9.8 (1.0, 7)	
Breather plate bolt	4	6	12 (1.2, 9)	NOTE 2
Cam sprocket bolt	4	7	20 (2.0, 14)	NOTE 2
Camshaft holder bolt	16	7	21 (2.1, 15)	NOTE 5
Cylinder head bolt	12	10	53 (5.4, 39)	NOTE 5
Cylinder head sealing bolt	2	12	32 (3.3, 24)	NOTE 2
Intake manifold vacuum port socket bolt	1	5	3.3 (0.34, 2.5)	

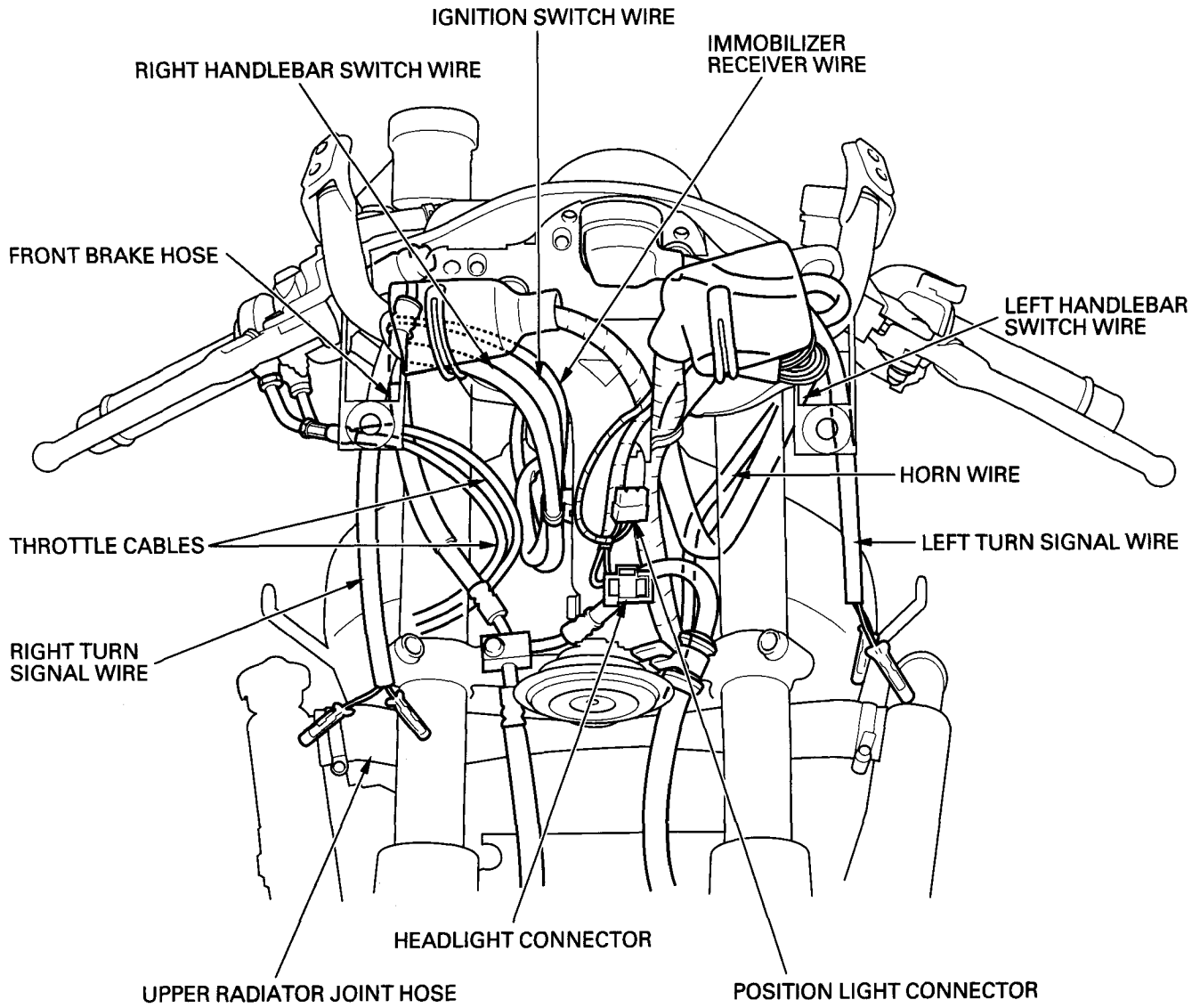
VTR1000F (1) ADDENDUM

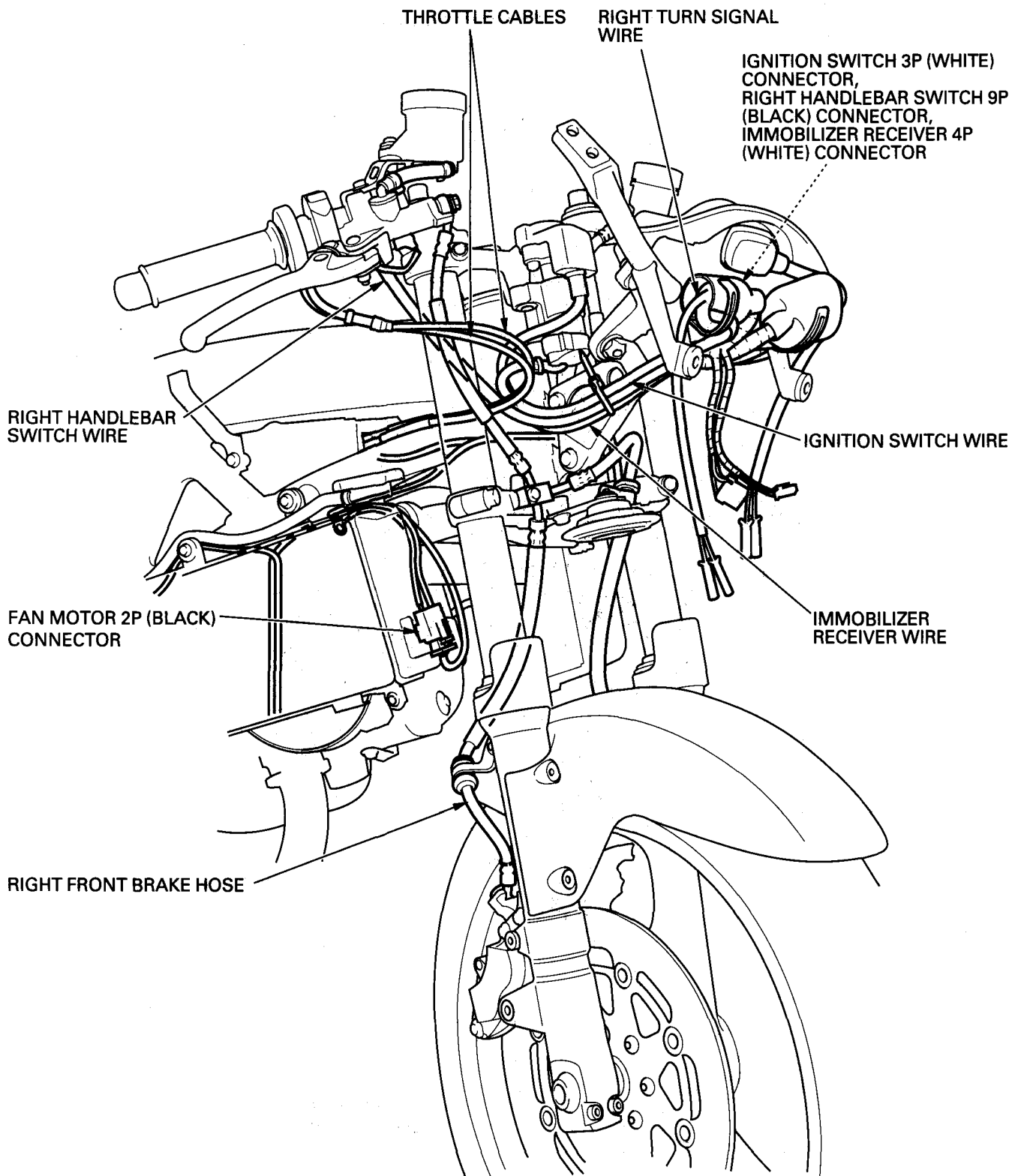
ENGINE (Cont'd)				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
CLUTCH/GEARSHIFT LINKAGE:				
Clutch slave cylinder bleed valve	1	8	8.8 (0.9, 6.5)	
Clutch bolt	5	6	12 (1.2, 9)	
Clutch center lock nut	1	25	127 (13.0, 94)	NOTE 4, 5
Oil pump driven sprocket bolt	1	6	15 (1.5, 11)	NOTE 2
Gearshift cam bolt	1	8	23 (2.3, 17)	NOTE 2
Gearshift spindle return spring pin	1	8	23 (2.3, 17)	
Primary drive gear bolt	1	12	88 (9.0, 65)	NOTE 5
ALTERNATOR/STARTER CLUTCH:				
Flywheel bolt	1	12	157 (16.0, 116)	NOTE 5
Starter clutch bolt	6	8	23 (2.3, 17)	NOTE 2
Alternator stator bolt	3	6	12 (1.2, 9)	
CRANKCASE/TRANSMISSION:				
Cam chain tensioner bolt	2	8	23 (2.3, 17)	NOTE 2
Cam chain guide bolt	2	8	23 (2.3, 17)	NOTE 2
Crankcase flange bolt	1	10	39 (4.0, 29)	
Crankcase special bolt	8	10	42 (4.3, 31)	NOTE 5
Crankcase sealing bolt	1	15	29 (3.0, 22)	NOTE 2
Crankcase sealing bolt	1	18	29 (3.0, 22)	NOTE 2
Crankcase sealing bolt	1	22	29 (3.0, 22)	
Crankcase sealing bolt	1	24	49 (5.0, 36)	NOTE 2
CRANKSHAFT/PISTON/CYLINDER:				
Connecting rod bolt (standard)	4	9	29 (3.0, 22) + 120°	NOTE 3, 5
(checking the oil clearance)	4	9	20 (2.0, 14) + 120°	NOTE 3, 5
IGNITION SYSTEM:				
Ignition pulse generator bolt	2	6	12 (1.2, 9)	
Engine coolant temperature (ECT) sensor	1	12	23 (2.3, 17)	
ELECTRIC STARTER:				
Starter motor terminal nut	1	6	9.8 (1.0, 7)	
LIGHTS/METERS/SWITCHES:				
Thermosensor	1	PT 1/8	9.8 (1.0, 7)	NOTE 1
Neutral switch	1	10	12 (1.2, 9)	

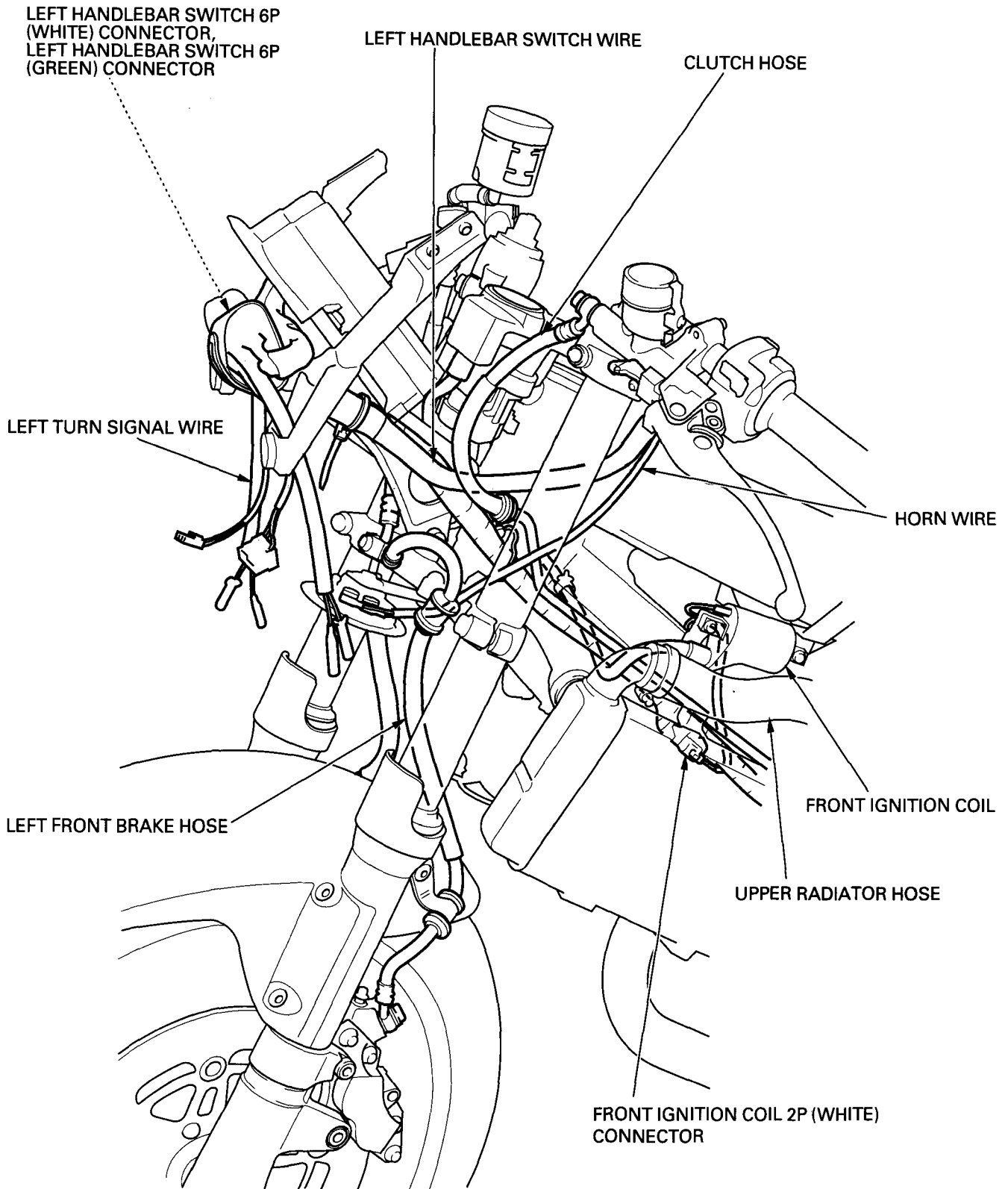
FRAME				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
FRAME/BODY PANELS/EXHAUST SYSTEM:				
Front fairing setting bolt	4	6	6.9 (0.7, 5.1)	
Exhaust pipe joint nut	4	7	12 (1.2, 9)	
Muffler band bolt	2	8	26 (2.7, 20)	
ENGINE MOUNTING:				
Front engine hanger nut	1	12	64 (6.5, 47)	Page 7-7
Front engine hanger adjusting bolt	1	20	2.9 (0.3, 2.2)	
Front engine hanger lock nut	1	20	54 (5.5, 40)	
Center engine hanger bolt	2	10	39 (4.0, 29)	
Left center engine hanger adjusting bolt	1	20	2.9 (0.3, 2.2)	
Left center engine hanger lock nut	1	20	54 (5.5, 40)	
Rear engine hanger nut	1	12	64 (6.5, 47)	
Rear engine hanger adjusting bolt	1	22	2.9 (0.3, 2.2)	
Rear engine hanger lock nut	1	22	54 (5.5, 40)	
Shock link bracket nut	2	10	44 (4.5, 33)	
CLUTCH/GEARSHIFT LINKAGE:				
Clutch reservoir mounting screw	1	4	1.5 (0.15, 1.1)	NOTE 2
Clutch reservoir cap stopper plate screw	1	4	1.2 (0.12, 0.9)	
Clutch lever pivot nut	1	6	5.9 (0.6, 4.3)	
Clutch hose oil bolt	2	10	34 (3.5, 25)	

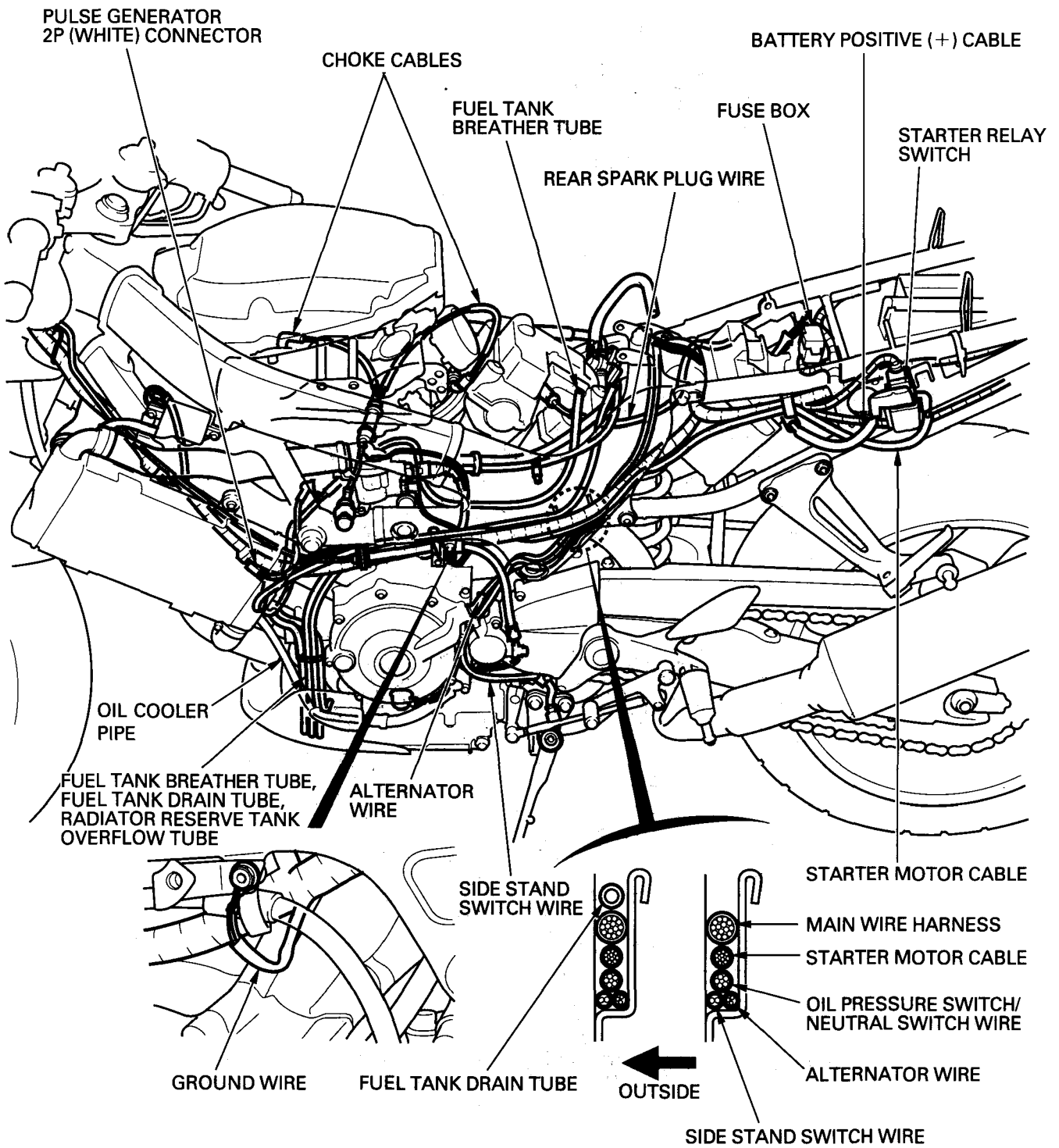
FRAME	ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
	FRONT WHEEL/SUSPENSION/STEERING:				
	Handlebar weight mounting screw	2	6	9.8 (1.0, 7)	NOTE 8
	Front master cylinder holder bolt	2	6	12 (1.2, 9)	
	Front axle bolt	1	14	59 (6.0, 43)	
	Front axle holder bolt	4	8	22 (2.2, 16)	
	Front brake disc bolt	12	6	20 (2.0, 14)	NOTE 8
	Fork cap	2	37	23 (2.3, 17)	
	Fork socket bolt	2	8	20 (2.0, 14)	NOTE 2
	Fork top bridge pinch bolt	2	8	23 (2.3, 17)	
	Fork bottom bridge pinch bolt	2	10	49 (5.0, 36)	
	Front brake hose clamp bolt (fork side)	2	6	9.8 (1.0, 7)	
	Steering stem nut	1	24	103 (10.5, 76)	Page 13-27
	Steering bearing adjustment nut	1	26	25 (2.5, 18)	
	Steering bearing adjustment nut lock nut	1	26		
	Front brake hose clamp bolt (stem side)	1	6	10 (1.0, 7)	
	Front brake hose 3-way joint bolt	1	6	9.8 (1.0, 7)	
	REAR WHEEL/SUSPENSION:				
	Rear axle nut	1	18	93 (9.5, 69)	
	Rear brake disc bolt	4	8	42 (4.3, 31)	NOTE 8
	Final driven sprocket nut	5	12	108 (11.0, 80)	
	Shock absorber upper mounting bolt	1	10	44 (4.5, 33)	NOTE 8
	Shock absorber lower mounting nut	1	10	44 (4.5, 33)	NOTE 7
	Shock arm-to-swingarm nut	1	10	44 (4.5, 33)	NOTE 7
	Shock arm-to-shock link nut	1	10	44 (4.5, 33)	NOTE 7
	Shock link-to-bracket nut	1	10	44 (4.5, 33)	NOTE 7
	Swingarm pivot nut	1	18	93 (9.5, 69)	NOTE 7
	Drive chain slider bolt	2	6	8.8 (0.9, 6.5)	NOTE 8
	Rear brake hose clamp screw	2	5	4.2 (0.43, 3.1)	NOTE 8
	HYDRAULIC BRAKE:				
	Brake caliper bleed valve	3	8	5.9 (0.6, 4.3)	
	Pad pin plug	3	10	2.5 (0.25, 1.8)	
	Pad pin	3	10	18 (1.8, 13)	
	Brake hose oil bolt	5	10	34 (3.5, 25)	
	Front brake lever pivot nut	1	6	5.9 (0.6, 4.3)	
	Front brake fluid reservoir mounting nut	1	6	5.9 (0.6, 4.3)	NOTE 7
	Rear brake fluid reservoir mounting bolt	1	6	8.8 (0.9, 6.5)	
	Rear master cylinder mounting bolt	2	6	9.8 (1.0, 7)	
	Rear master cylinder joint nut	1	8	18 (1.8, 13)	
	Front brake caliper mounting bolt	4	8	30 (3.1, 22)	NOTE 8
	Front brake caliper assembly bolt	8	8	32 (3.3, 24)	NOTE 2
	Rear brake caliper bolt	1	8	23 (2.3, 17)	
	Rear brake caliper pin bolt	1	12	27 (2.8, 20)	NOTE 2
	LIGHTS/METERS/SWITCHES:				
	Side stand switch bolt	1	6	9.8 (1.0, 7)	
	Ignition switch mounting bolt	2	8	25 (2.5, 18)	
	Fan motor switch	1	16	18 (1.8, 13)	
	OTHERS:				
	Side stand pivot bolt	1	10	9.8 (1.0, 7)	
	Side stand pivot lock nut	1	10	29 (3.0, 22)	
	Side stand bracket bolt	1	10	44 (4.5, 33)	NOTE 8
	Passenger footpeg bracket bolt	4	8	26 (2.7, 20)	
	Bank sensor bolt	2	8	22 (2.2, 16)	
	Seat rail upper mounting bolt	2	10	39 (4.0, 29)	
	Seat rail lower mounting bolt	2	10	44 (4.5, 33)	
	Gearshift pedal pivot bolt	1	8	26 (2.7, 20)	
	Fuel valve	1	22	34 (3.5, 25)	

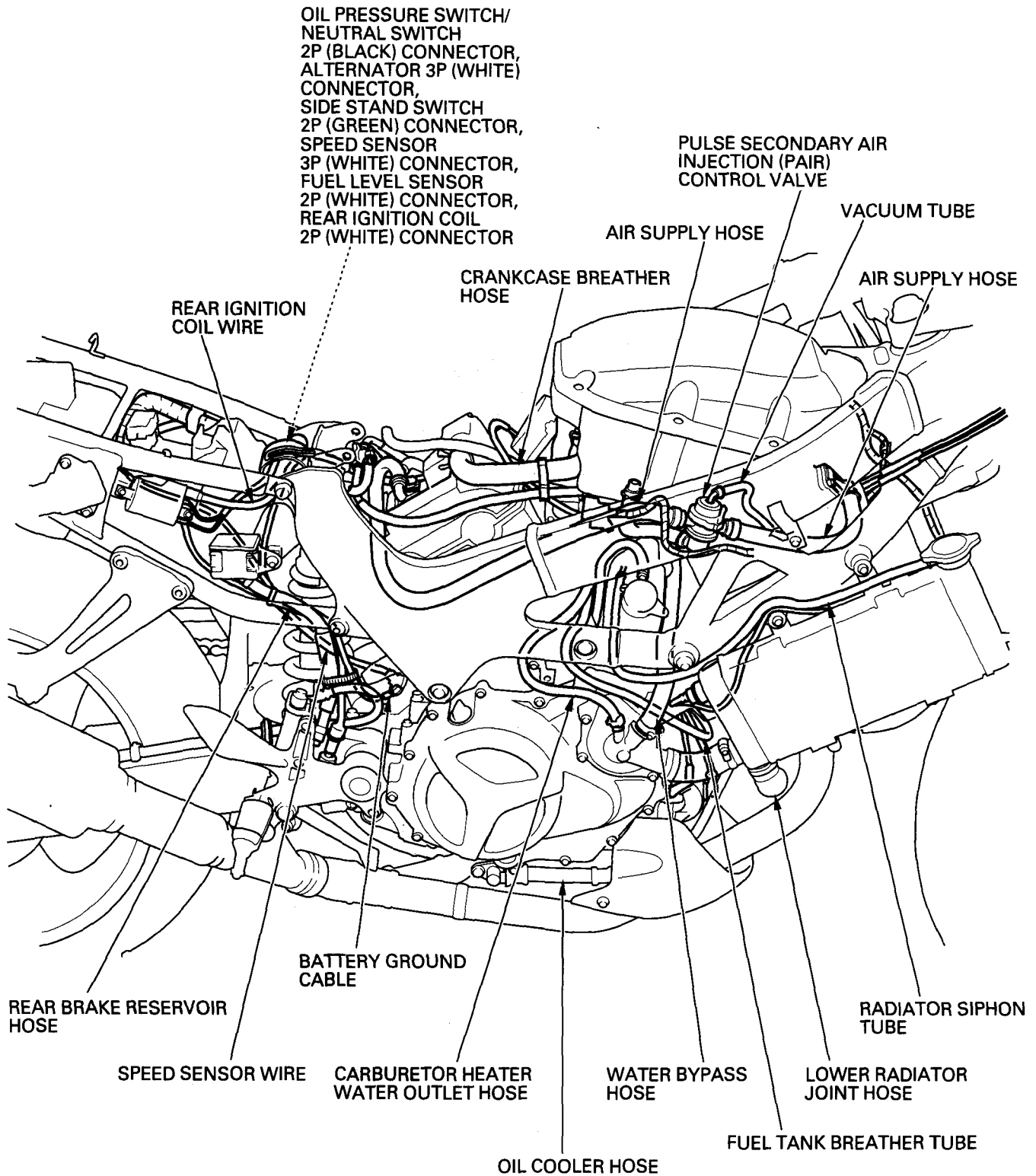
CABLE & HARNESS ROUTING

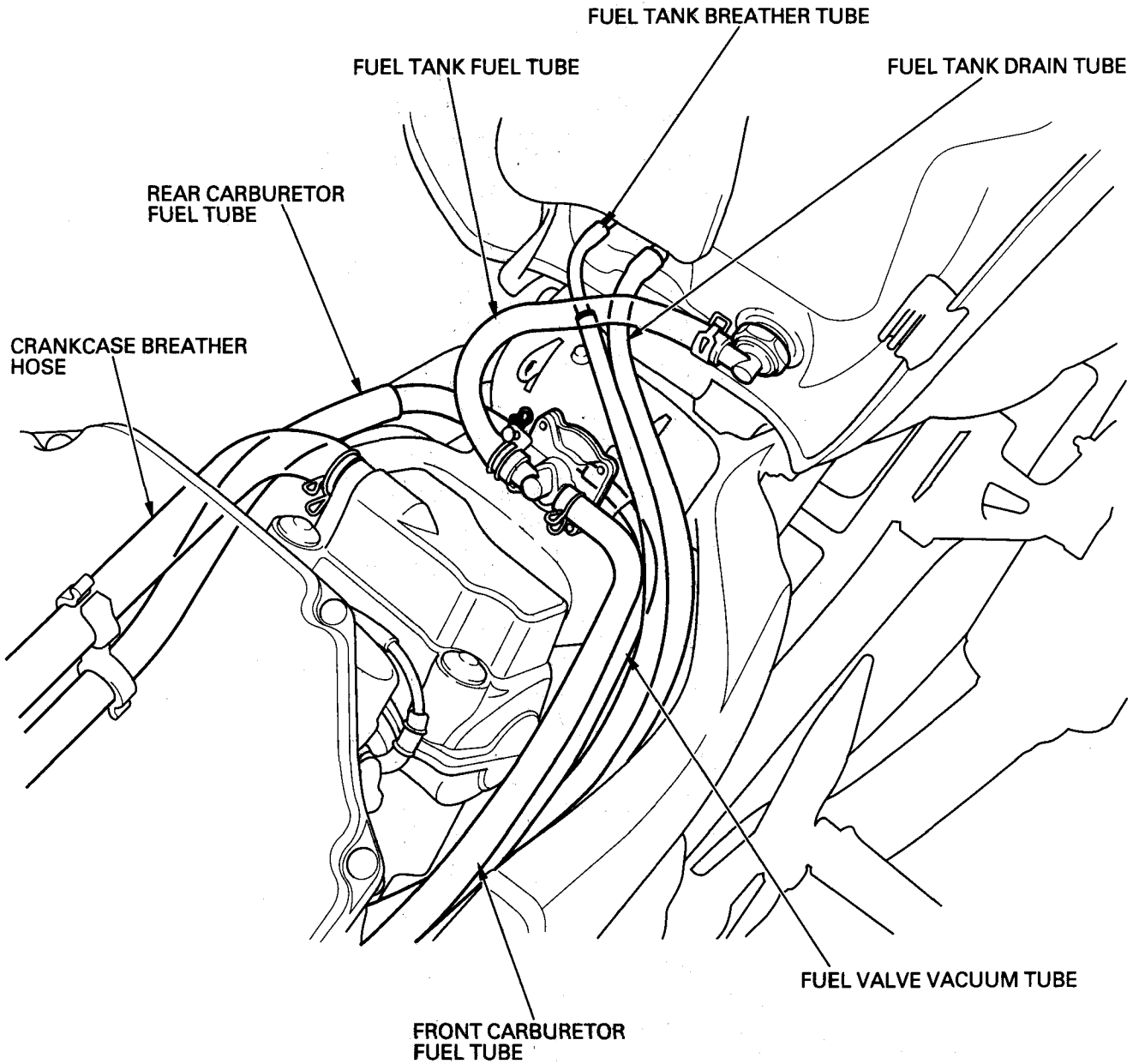


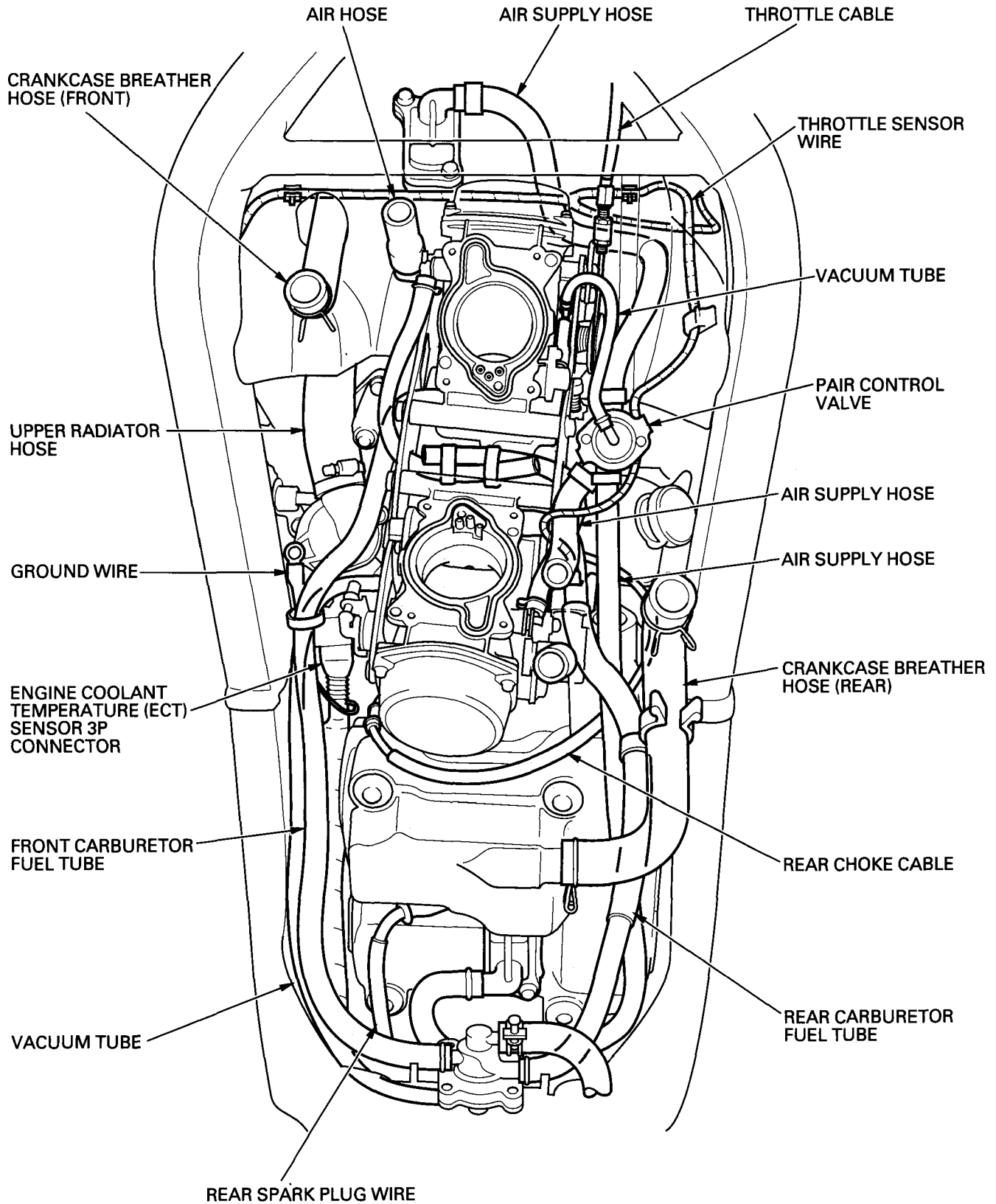


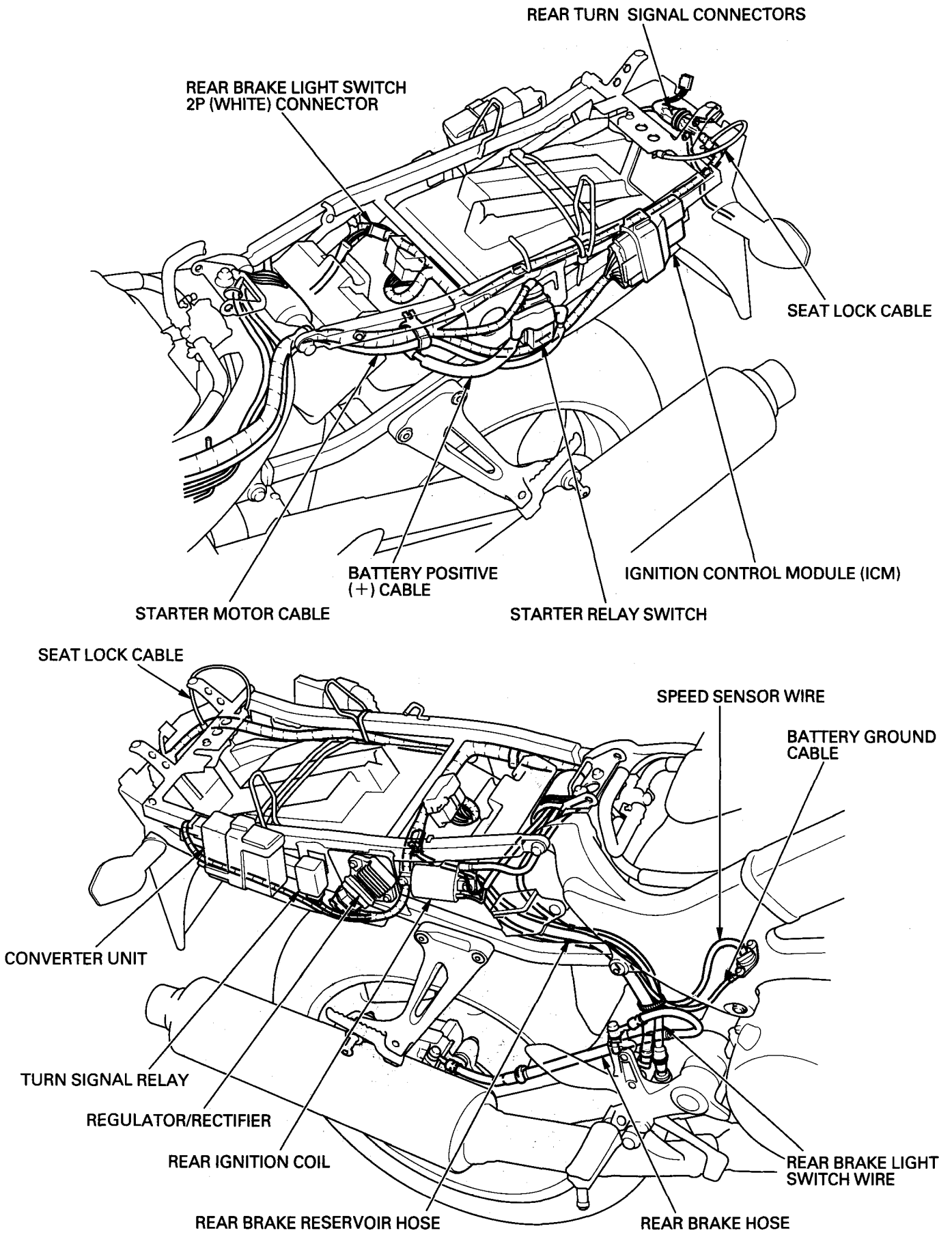












FUEL TANK

REMOVAL/INSTALLATION

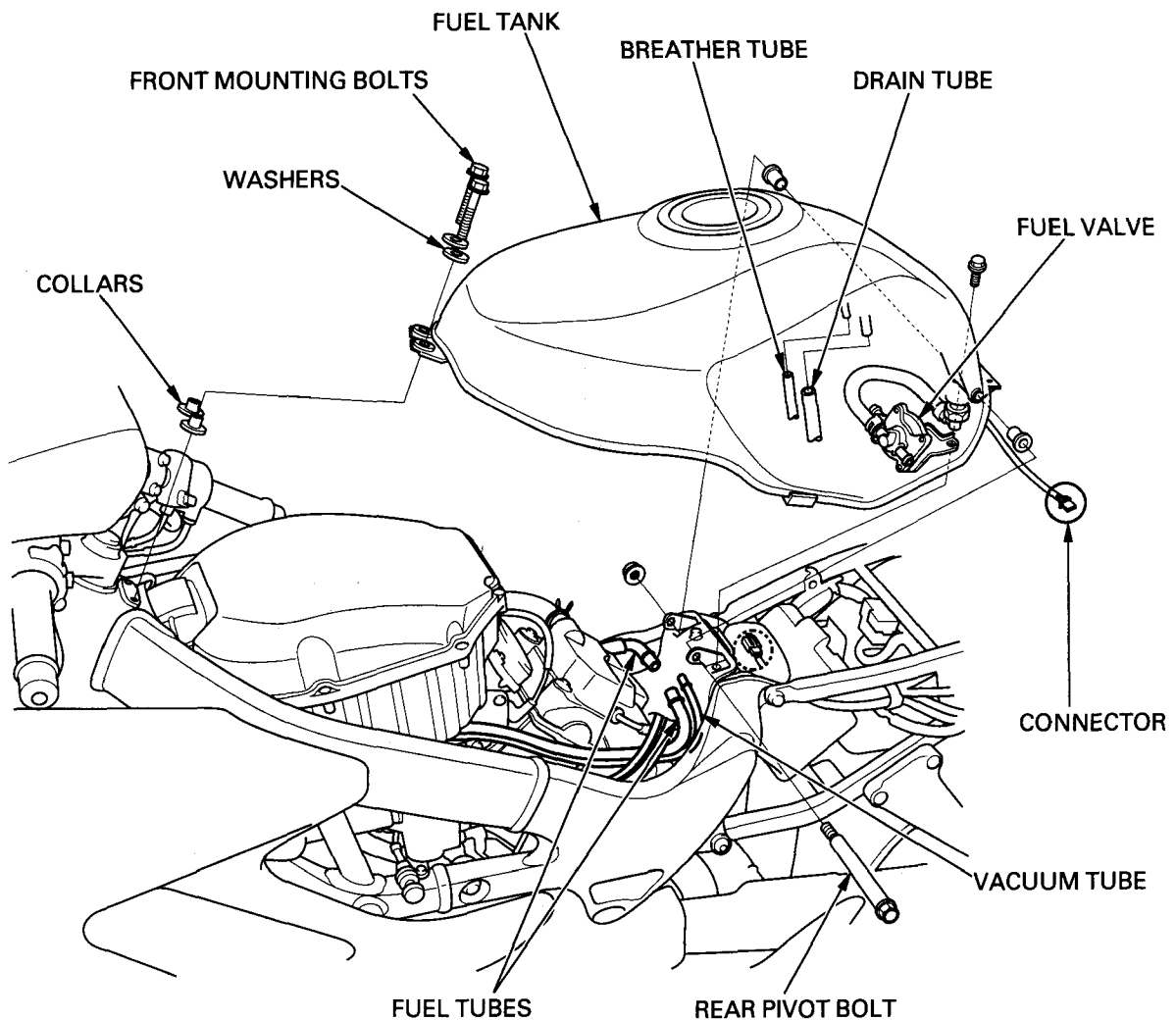
▲WARNING

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

Remove the seat (page 2-2).

Disconnect the fuel level sensor 2P connector.
Remove the fuel tank front mounting bolts and washers, and raise the front of the fuel tank.
Disconnect the fuel tubes and vacuum tube from the fuel valve.
Disconnect the fuel tank breather tube and drain tube from the fuel tank.
Remove the fuel tank pivot nut and bolt.
Remove the fuel valve mounting bolt and remove the fuel tank.

Install the fuel tank in the reverse order of removal.



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
			× 1,000 km	1	6	12	18	24	30	36	
			× 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	
* CARBURETOR CHOKE					I		I		I	3-5	
* AIR CLEANER		NOTE 2					R		R	3-5	
SPARK PLUG					I		R		I	3-6	
* VALVE CLEARANCE							I			3-7	
ENGINE OIL			R		R		R		R	3-10	
ENGINE OIL FILTER			R		R		R		R	3-11	
* CARBURETOR SYNCHRONIZATION			I		I		I		I	3-12	
* ENGINE IDLE SPEED			I	I	I	I	I	I	I	3-13	
RADIATOR COOLANT		NOTE 3			I		I		R	3-13	
* COOLING SYSTEM					I		I		I	3-13	
* SECONDARY AIR SUPPLY SYSTEM					I		I		I	3-14	
DRIVE CHAIN			Every 1,000 km (600 mi) I, L								3-14
DRIVE CHAIN SLIDER					I		I		I	3-18	
BRAKE FLUID		NOTE 3		I	I	R	I	I	R	3-18	
BRAKE PAD WEAR				I	I	I	I	I	I	3-19	
BRAKE SYSTEM			I		I		I		I	3-20	
* BRAKE LIGHT SWITCH					I		I		I	3-20	
* HEADLIGHT AIM					I		I		I	3-21	
CLUTCH SYSTEM					I		I		I	3-21	
CLUTCH FLUID		NOTE 3		I	I	R	I	I	R	3-22	
SIDE STAND					I		I		I	3-22	
* SUSPENSION					I		I		I	3-23	
* NUTS, BOLTS, FASTENERS			I		I		I		I	3-24	
** WHEELS/TIRES					I		I		I	3-25	
** STEERING HEAD BEARINGS			I		I		I		I	3-25	

- * Should be serviced by your authorized Honda dealer, unless the owner has proper tools and service data and is mechanically qualified.
 - * * In the interest of safety, we recommend these items be serviced only by your authorized 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. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.

AIR CLEANER HOUSING

REMOVAL/INSTALLATION

NOTE:

Do not remove the air cleaner housing from the carburetors unless the carburetor overhaul is required.

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

Remove the screws and air funnels.

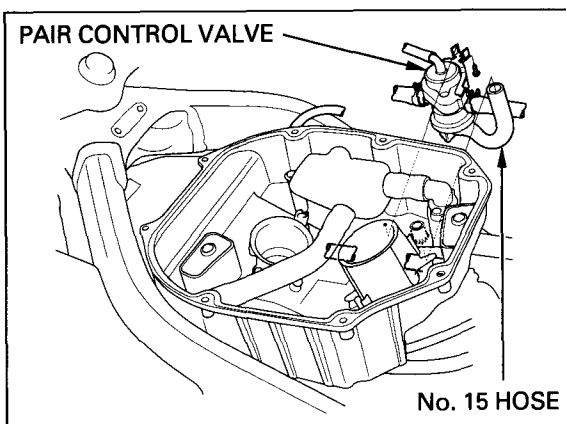
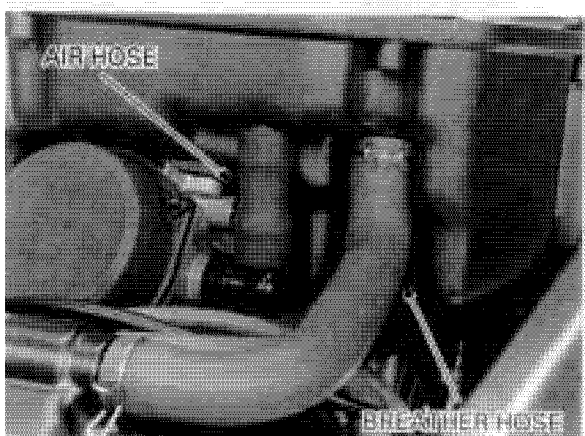
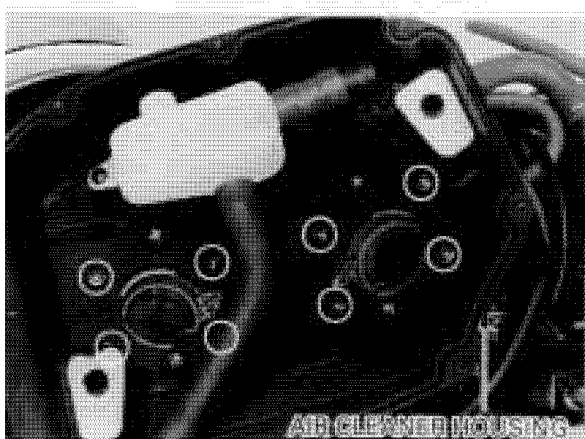
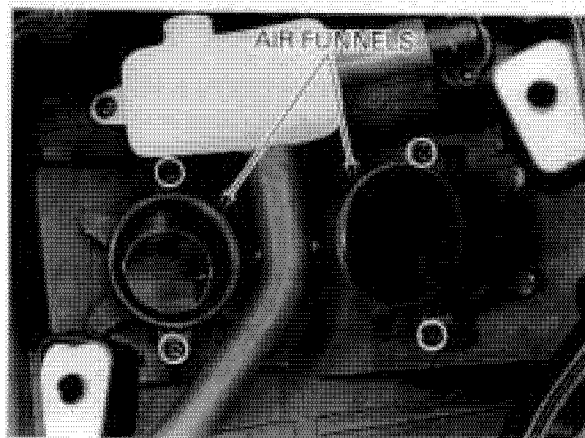
Remove the eight air cleaner housing mounting screws.

CAUTION:

Do not overtighten the screws when installing, as the threaded holes in the carburetors will be stripped.

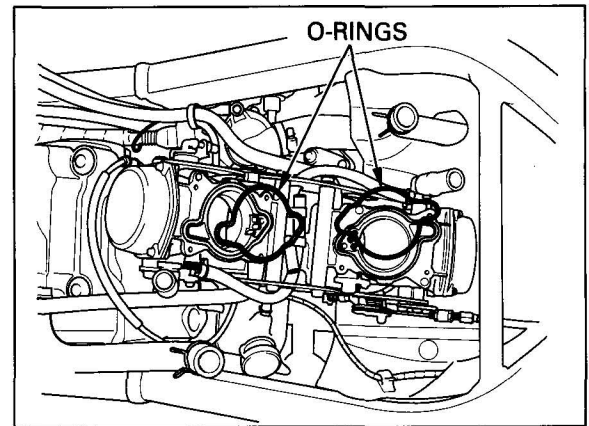
Disconnect the front and rear crankcase breather hoses and air hoses from the air cleaner housing. Remove the air cleaner housing.

Remove the screw and the pulse secondary air injection (PAIR) control valve with the stay, and disconnect the air supply (No. 15) hose from the air cleaner housing.



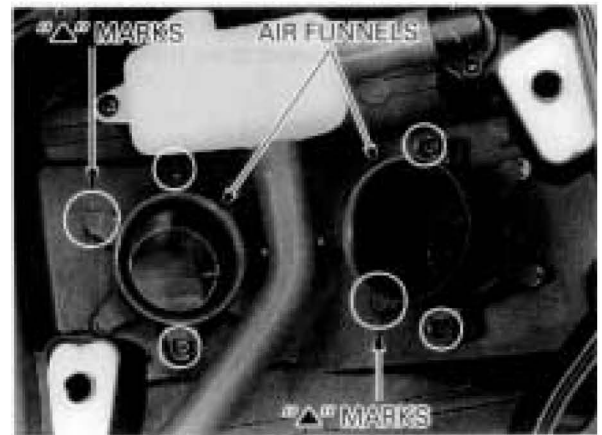
Remove the O-rings.

Install new O-rings into the carburetor grooves. Install the removed parts in the reverse order of removal.



NOTE:

- Note that the rear air funnel is longer than the front air funnel.
- Install the air funnels by aligning the "▲" marks on the air funnel and air cleaner housing.



CARBURETOR

REMOVAL/INSTALLATION

Drain the coolant (page 6-5).
Remove the air cleaner housing (page 24-21).

NOTE:

When the carburetors will not be serviced, remove the carburetor assembly with the air cleaner housing attached to prevent the threaded holes in the carburetor from damaging.

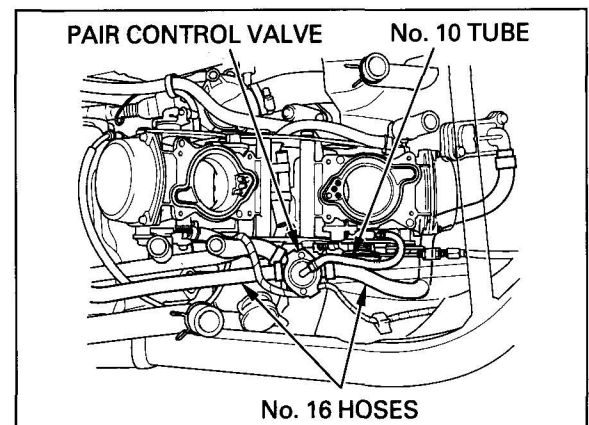
Remove the pulse secondary air injection (PAIR) control valve by disconnecting the No. 10 vacuum tube and No. 16 air supply hoses.

Loosen the carburetor insulator band bolts from the right side.

NOTE:

Insert the screwdriver through the hole in the heat guard to loosen the front carburetor insulator band bolt.

Remove the carburetor assembly from the insulators.



VTR1000F (1) ADDENDUM

Disconnect the throttle sensor 3P (white) connector. Remove the throttle sensor wire from the clamp on the carburetor set plate.



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



Disconnect the water inlet and outlet hoses from the carburetor heaters.



Slide off the boots from the starting enrichment (SE) valve nuts. Loosen the SE valve nuts and disconnect the choke cables from the front and rear carburetors.

Install the carburetor in the reverse order of removal.



PILOT SCREW ADJUSTMENT

IDLE DROP PROCEDURE

NOTE:

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

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

CAUTION:

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

TOOL:

Pilot screw wrench 07908-4220201

INITIAL OPENING: 2 turns out

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

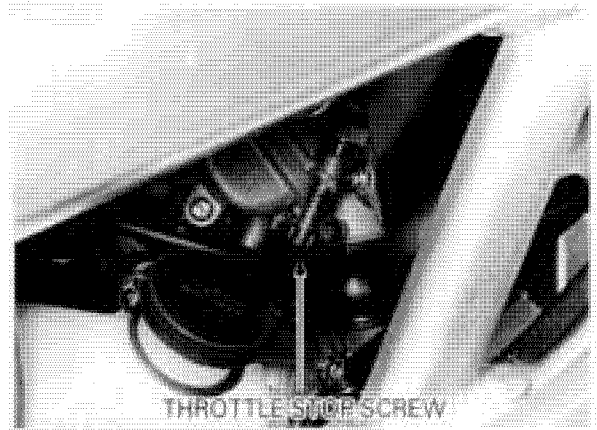
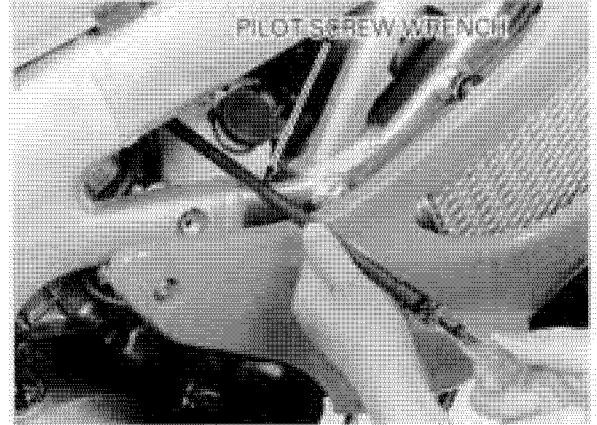
IDLE SPEED: 1,200 ± 100 min⁻¹ (rpm)

5. Turn the front carburetor pilot screw in or out slowly to obtain the highest engine speed.
6. Perform step 5 for rear carburetor pilot screw.
7. Lightly open the throttle 2 or 3 times, then adjust the idle speed with the throttle stop screw.
8. Turn the front carburetor pilot screw in until the engine speed drops by 50 min⁻¹ (rpm) .
9. Turn the front carburetor pilot screw out to the final opening from the position obtained in step 8.

FINAL OPENING:

Front: 1 turn out
Rear: 1-1/4 turns out

10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for the rear carburetor pilot screw.



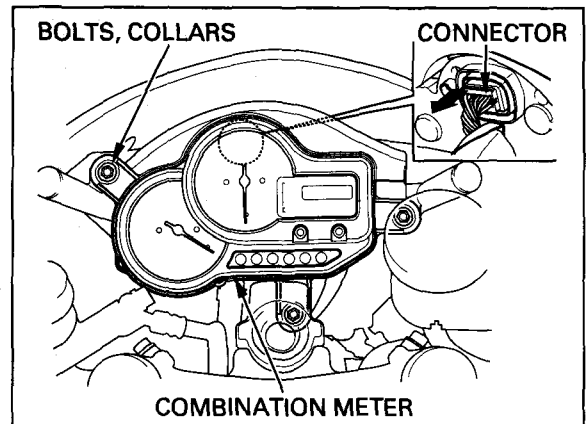
COMBINATION METER

REMOVAL/INSTALLATION

Remove the three bolts, collars and combination meter assembly from the stay.

Disconnect the combination meter 16P connector and remove the combination meter assembly.

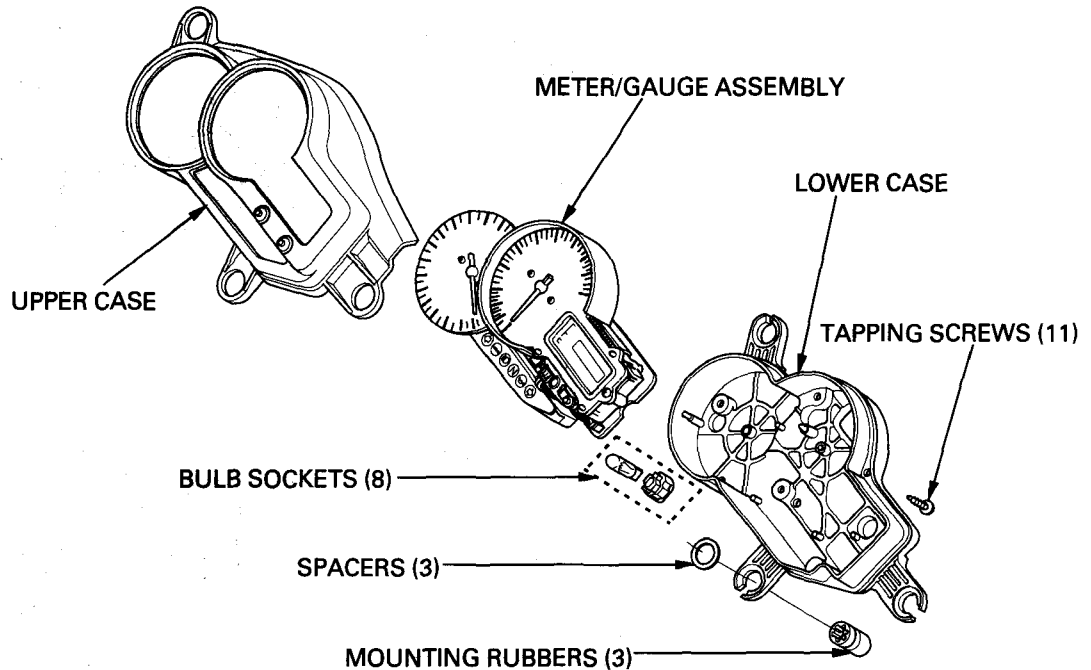
Install the combination meter assembly in the reverse order of removal.



DISASSEMBLY/ASSEMBLY

Remove the eleven screws and disassemble the combination meter assembly.

Assembly is in the reverse order of disassembly.



POWER/GROUND LINE INSPECTION

Remove the combination meter assembly.
Check the following at the combination meter connector terminals:

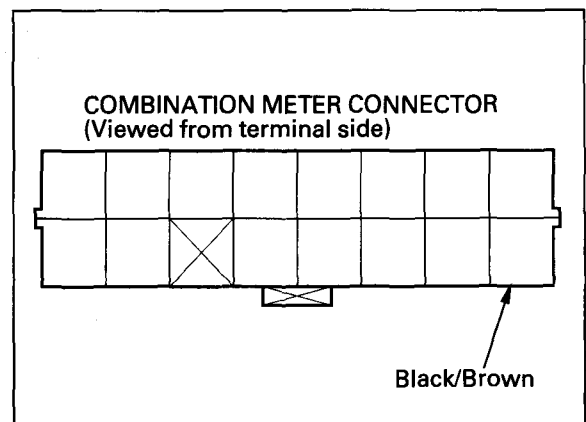
POWER SOURCE LINE

Measure the voltage between the Black/Brown wire terminal (+) and ground (-).

There should be battery voltage with the ignition switch ON.

If there is no voltage, check the following:

- open circuit in the Black/Brown wire
- blown sub-fuse (10 A) (Meter/tail/illumination)



SENSOR GROUND LINE

Check for continuity between the Green/Black wire terminal and ground.
There should be continuity at all times.
If there is no continuity, check for open circuit in the Green/Black wire.

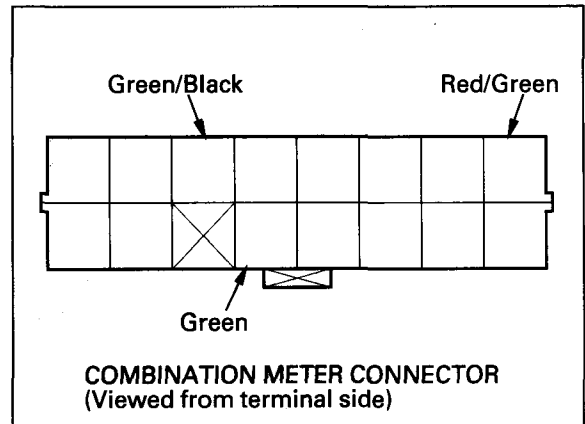
GROUND LINE

Check for continuity between the Green wire terminal and ground.
There should be continuity at all times.
If there is no continuity, check for open circuit in the Green wire.

BACK-UP VOLTAGE LINE

Measure the voltage between the Red/Green wire terminal (+) and ground (-).
There should be battery voltage at all times.
If there is no voltage, check the following:

- open circuit in the Red/Green wire
- blown sub-fuse (10 A) (Odometer)
- open circuit in the Red wire

**SPEEDOMETER****INSPECTION****Speedometer does not operate**

1. Check that the tachometer, coolant temperature gauge and fuel gauge function properly.

- If they do not function, check the power source line and sensor ground line.
- If they function properly, go to step 2.

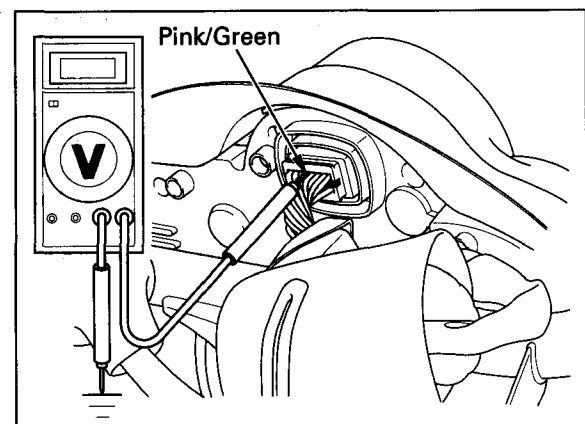
2. Remove the combination meter assembly from the stay (page 24-26), but do not disconnect the connector.

Shift the transmission into neutral and turn the ignition switch ON.

Measure the voltage between the Pink/Green (+) wire terminal of the combination meter connector and ground (-) with the connector connected.

There should be 0 V to 5 V pulse voltage while slowly turning the rear wheel by hand.

- If the pulse voltage appears, replace the meter/gauge assembly (page 24-26).
- If the pulse voltage does not appear, check for open or short circuit in the Pink/Green wire. If the wire is OK, check the speed sensor (page 19-9).



TACHOMETER

INSPECTION

Tachometer does not operate

1. Check that the speedometer, coolant temperature gauge and fuel gauge function properly.

- If they do not function, check the power source line and sensor ground line (page 24-27).
- If they function properly, go to step 2.

2. Remove the combination meter assembly (page 24-26).

Connect the peak voltage adaptor or Imrie diagnostic tester probes to the Yellow/Green (+) wire terminal of the combination meter connector and ground (-).

TOOLS:

**Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with commercially available digital multimeter
(impedance 10 M Ω /DCV minimum)**

Start the engine and measure the tachometer signal peak voltage.

PEAK VOLTAGE: 10.5 V minimum

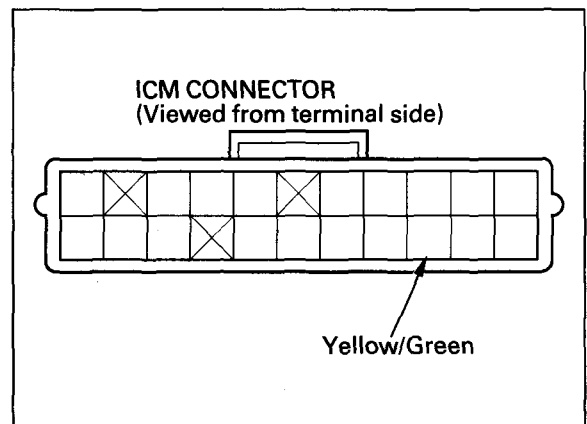
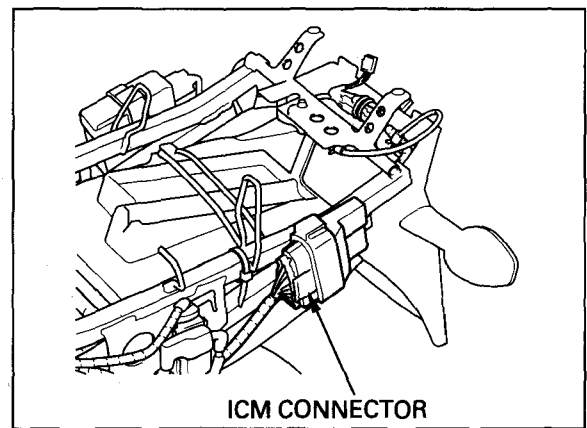
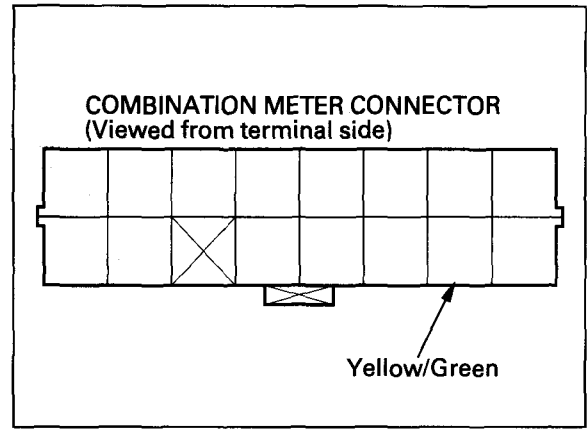
- If the measured value is more than 10.5 V, replace the meter/gauge assembly (page 24-27).
- If the measured value is less than 10.5 V, replace the ignition control module (ICM).
- If there is no voltage, go to step 3.

3. Remove the seat cowl (page 2-2).
Disconnect the ICM connector.

4. Check the Yellow/Green wire for open or short circuit as follows:

- Check for continuity between the combination meter and ICM connectors.
There should be continuity.
- Check for continuity to ground.
There should be no continuity.

- If the Yellow/Green wire is OK, replace the ICM.



COOLANT TEMPERATURE GAUGE

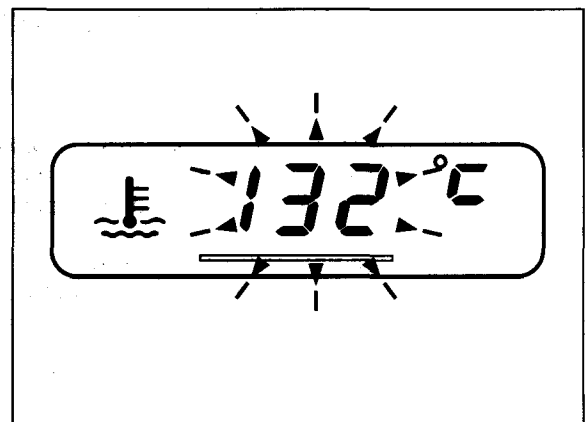
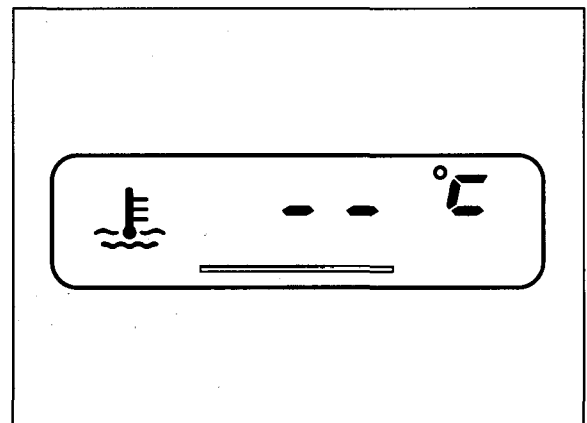
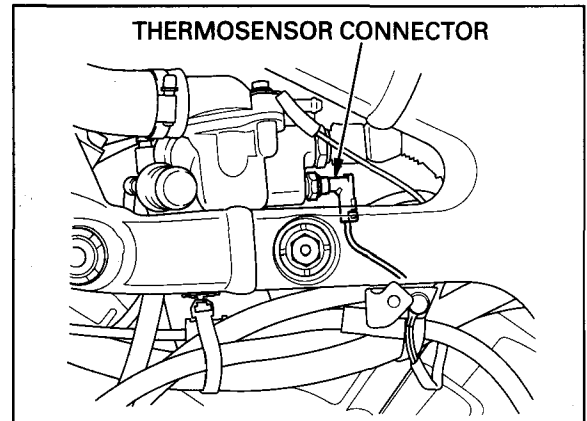
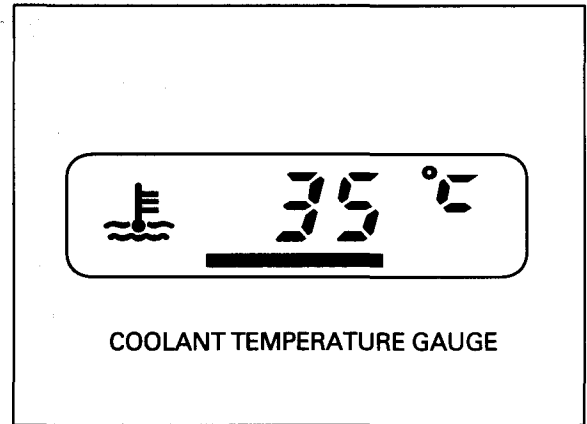
NOTE:

The coolant temperature gauge displays "35°C" to "132°C". It displays "-- °C" when the coolant temperature is below 34°C and the displayed figures blink when the coolant temperature is above 122°C.

INSPECTION

Gauge does not operate properly

1. Check that the tachometer, speedometer and fuel gauge function properly.
 - If they do not function, check the power source line and sensor ground line (page 24-27).
 - If they function properly, go to step 2.
2. Turn the ignition switch OFF and disconnect the thermosensor connector.
Turn the ignition switch ON and check the coolant temperature gauge.
 - If the gauge displays "-- °C", go to step 3.
 - If the gauge displays "132°C" and the figures blink, check for short circuit in the Green/Blue wire between the thermosensor and combination meter.
 - If the gauge displays any figures other than "-- °C", replace the meter/gauge assembly.
3. Turn the ignition switch OFF and ground the connector terminal with a jumper wire.
Turn the ignition switch ON and check the coolant temperature gauge.
 - If the gauge displays "132°C" and the figures blink, check the thermosensor (page 19-11).
 - If the gauge displays "-- °C", check for open circuit in Green/Blue wire between the thermosensor and combination meter.
 - If the gauge displays any figures other than "132°C", replace the meter/gauge assembly.



FUEL GAUGE/FUEL LEVEL SENSOR

Remove the seat (page 2-2).

SYSTEM INSPECTION

Gauge does not operate properly

1. Check that the tachometer, speedometer and coolant temperature gauge function properly.

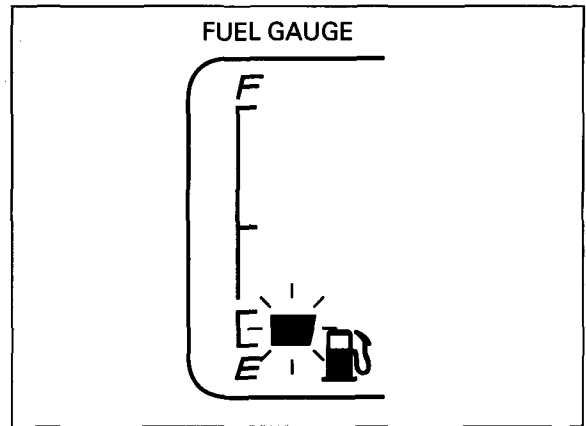
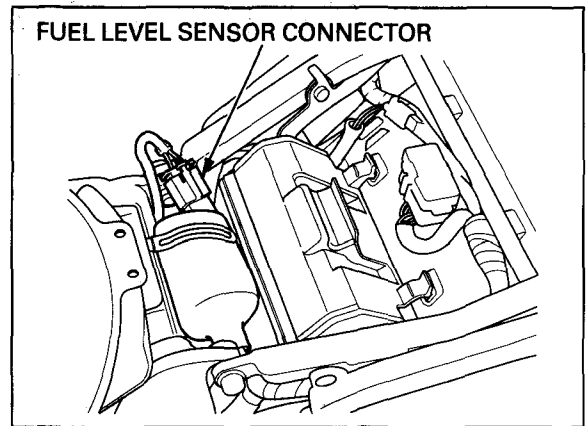
- If they do not function, check the power source line and sensor ground line (page 24-27).
- If they function properly, go to step 2.

2. Turn the ignition switch OFF and disconnect the fuel level sensor connector.

Turn the ignition switch ON and check the fuel gauge.

The segment E should be blinking.

- If the segment E is blinking, go to step 3.
- If all segments up to segment F appear, check for short circuit in the Gray/Black wire.
- If some segments appear, replace the meter/gauge assembly (page 24-26).

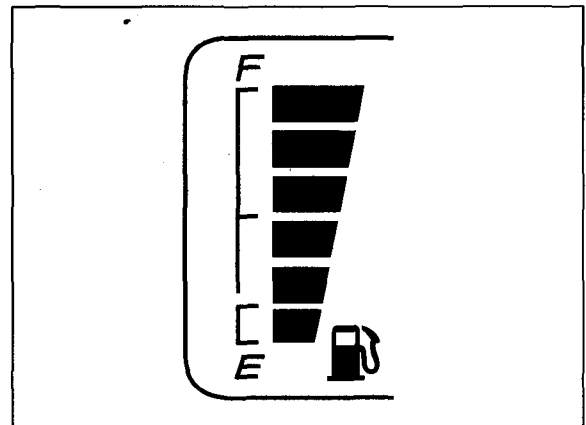


3. Turn the ignition switch OFF and short the wire harness side sensor connector terminals with a jumper wire.

Turn the ignition switch ON and check the fuel gauge display.

All segments up to segment F should appear.

- If all segments up to segment F appear, check the fuel level sensor.
- If the segment E is blinking, check for open circuit in the Gray/Black and Green/Black wires.
- If some segments appear, replace the meter/gauge assembly (page 24-26).



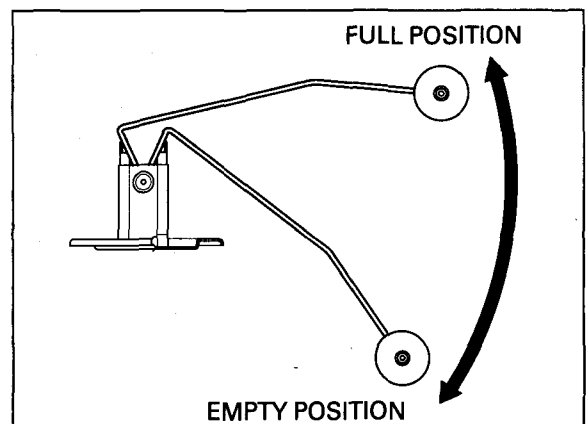
FUEL LEVEL SENSOR INSPECTION

Remove the fuel level sensor from the fuel tank.

Measure the resistance between the fuel level sensor connector terminals with the float at top (FULL) and bottom (EMPTY) positions.

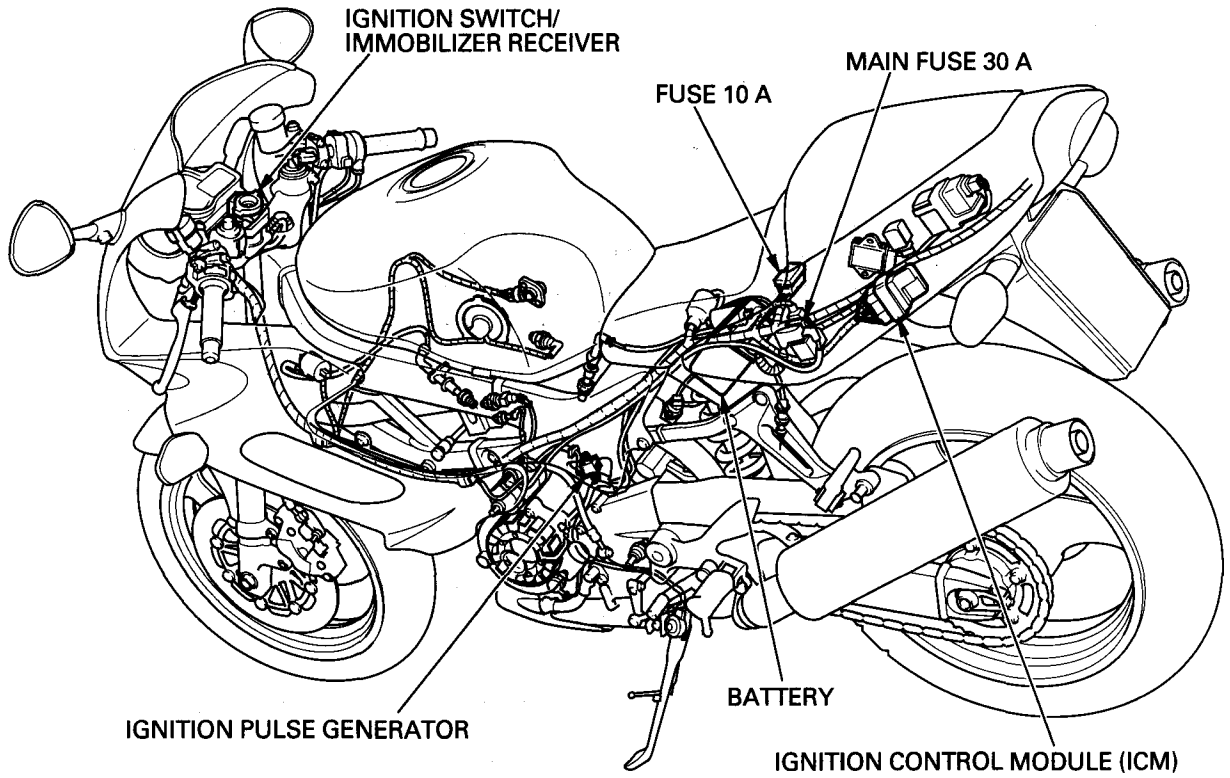
RESISTANCE (20°C/68°F):

- 4 – 10 Ω with the float at FULL position
- 81 – 91 Ω with the float at EMPTY position

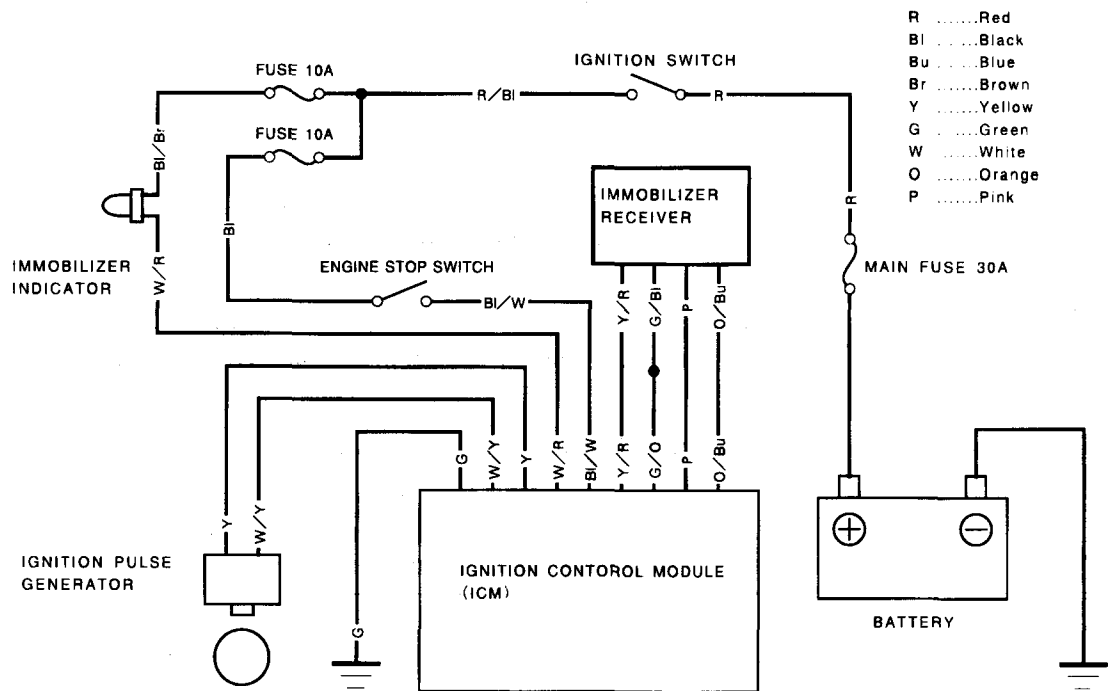


IMMOBILIZER SYSTEM

SYSTEM LOCATION



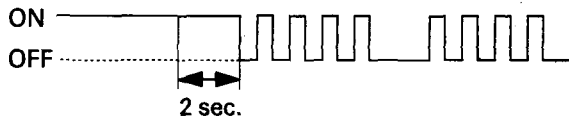
SYSTEM DIAGRAM



KEY REGISTRATION PROCEDURES

When the key has been lost, or additional spare key is required:

1. Obtain a new transponder key.
2. Grind the key in accordance with the shape of the original key.
3. Apply 12 V battery voltage to the ignition pulse generator lines of the ignition control module (ICM) using the special tool (page 24-35).
4. Turn the ignition switch ON with the original key. The immobilizer indicator comes on and it remains on.
 - The code of the original key is recognized by the ICM.
 - If there is any problem in the immobilizer system, the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 24-35).
5. Disconnect the red clip of the inspection adaptor from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds, then it blinks four times repeatedly.

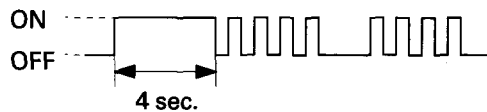


- The immobilizer system enters the registration mode. Registrations of all key except the original key inserted in the ignition switch are cancelled. (Registration of the lost key or spare key is cancelled.)

NOTE:

The spare key must be registered again.

6. Turn the ignition switch OFF and remove the key.
7. Turn the ignition switch ON with a new key or the spare key. (Never use the key registered in previous step.) The indicator comes on for four seconds then it blinks four times repeatedly.



- The new key or spare key is registered in the ICM.
- If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 24-36).

CAUTION:

Keep the other transponder key away from the immobilizer receiver more than 50 mm (2.0 in).

8. Repeat the steps 6 and 7 when you continuously register the other new key.

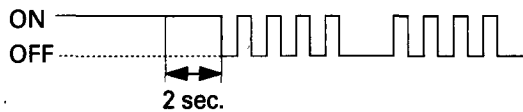
NOTE:

The ICM can store up to four key codes. (The four keys can be registered.)

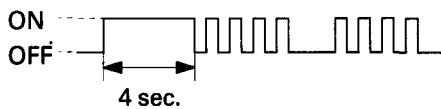
9. Turn the ignition switch OFF, remove the inspection adaptor and connect the ignition pulse generator connector.
10. Turn the ignition switch ON with the registered key.
 - The immobilizer system returns to the normal mode.
11. Check that the engine can be started using all registered key.

When the ignition switch is faulty:

1. Obtain a new ignition switch and two new transponder keys.
2. Remove the ignition switch (page 19-14).
3. Apply 12 V battery voltage to the ignition pulse generator lines of the ignition control module (ICM) using the special tool (page 24-35).
4. Set the original (registered) key near the immobilizer receiver so that the transponder in the key can communicate with the receiver.
5. Connect a new ignition switch to the wire harness and turn it ON with a new transponder key. (keep the ignition switch away from the receiver.) The immobilizer indicator comes on and it remains on.
 - The code of the original key is recognized by the ICM.
 - If there is any problem in the immobilizer system, the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 24-35).
6. Disconnect the red clip of the inspection adaptor from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds then it blinks four times repeatedly.



- The immobilizer system enters the registration mode. Registrations of all key except the original key set near the receiver are cancelled.
7. Turn the ignition switch OFF and remove the key.
 8. Install the ignition switch onto the top bridge (page 19-14).
 9. Turn the ignition switch ON with a first new key. The indicator comes on for four seconds then it blinks four times repeatedly.



- The first key is registered in the ICM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 24-36).
10. Turn the ignition switch OFF and disconnect the red clip of the inspection adaptor from the battery positive (+) terminal.
 11. Turn the ignition switch ON (with the first key registered in step 9). The immobilizer indicator comes on for two seconds then it goes off.
 - The immobilizer system returns to the normal mode.
 12. Turn the ignition switch OFF and connect the red clip of the inspection adaptor to the battery positive (+) terminal.
 13. Turn the ignition switch ON (with the first key registered in step 9). The immobilizer indicator comes on and it remains on.
 - The code of the first key is recognized by the ICM.
 - If there is any problem in the immobilizer system, the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 24-35).
 14. Disconnect the red clip of the inspection adaptor from the battery positive (+) terminal for two seconds or more, then connect it again. The indicator remains on for approx. two seconds then it blinks four times repeatedly.
 - The immobilizer system enters the registration mode. Registration of the original key used in step 4 is cancelled.

VTR1000F (1) ADDENDUM

15. Turn the ignition switch OFF and remove the key.
16. Turn the ignition switch ON with a second new key. (Never use the key registered in previous step.) The indicator comes on for four seconds then it blinks four times repeatedly.
 - The second key is registered in the ICM.
 - If there is any problem in the registration, the system will enter the diagnostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 24-36).

CAUTION:

Keep the other transponder key away from the immobilizer receiver more than 50 mm (2.0 in).

17. Repeat the steps 15 and 16 when you continuously register the other new key.

NOTE:

The ICM can store up to four key codes. (The four keys can be registered.)

18. Turn the ignition switch OFF, remove the inspection adaptor and connect the ignition pulse generator connector.
19. Turn the ignition switch ON with the registered key.
 - The immobilizer system returns to the normal mode.
20. Check that the engine can be started using all registered key.

When all keys have been lost, or the ignition control module (ICM) is faulty:

1. Obtain a new ICM and two new transponder keys.
2. Grind the keys in accordance with the shape of the original key (or use the key number plate when all key have been lost).
3. Replace the ICM with new one.
4. Turn the ignition switch ON with a first new key. The immobilizer indicator comes on for two seconds, then it blinks four times repeatedly.
 - The first key is registered in the ICM.
 - If there is any problem in the registration, the system will enter the daignostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 24-36).
5. Turn the ignition switch OFF and remove the first key.
6. Turn the ignition switch ON with a second new key. The immobilizer indicator comes on for two seconds, then it blinks four times repeatedly.
 - The second key is registered in the ICM.
 - If there is any problem in the registration, the system will enter the daignostic mode and the indicator will remain on for approx. ten seconds, then it will indicate the diagnostic code (page 24-36).
7. Turn the ignition switch OFF and remove the second key.

NOTE:

- The system (ICM) will not enter the normal mode unless the two keys are registered in ICM.
 - The third new key cannot be continuously registered. When it is necessary to register the third key, follow the procedures "When the key has been lost, or additional key is required" (page 24-32).
-

8. Check that the engine can be started using all registered keys.

DIAGNOSTIC CODE INDICATION

Remove the front fairing (page 2-3).

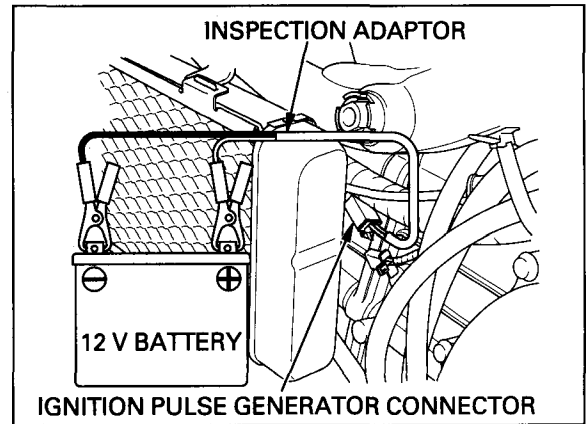
Disconnect the ignition pulse generator 2P (white) connector.

Connect the inspection adaptor to the wire harness side connector.

Connect the red clip of the adaptor to the 12 V battery positive (+) terminal and green clip to the negative (-) terminal.

TOOL:

Inspection adaptor 07XMZ-MBW0100



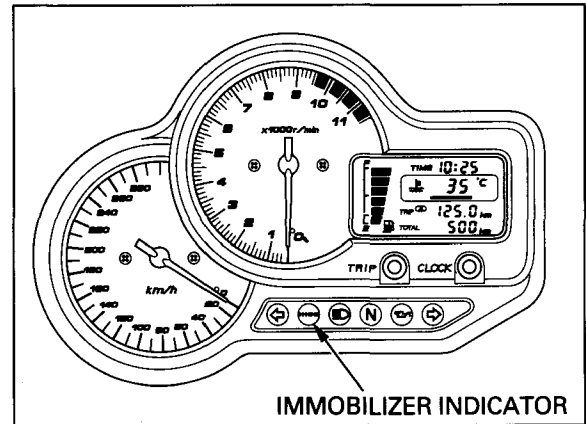
Turn the ignition switch ON with the properly registered key.

The immobilizer indicator will come on for approx. ten seconds then it will start blinking to indicate the diagnostic code if the system is abnormal.

The blinking frequency is repeated.

NOTE:

The immobilizer indicator remains on when the system is normal. (The system is in the normal mode and the diagnostic code does not appear.)

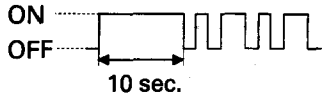




DIAGNOSTIC CODE

When the system (ICM) enters the diagnostic mode from the normal mode:

BLINKING PATTERN	SYMPTOM	PROBLEM	PROCEDURE
<p>ON OFF 10 sec.</p>	Ignition control module (ICM) data is abnormal.	Faulty ICM	Replace the ICM
	Code signals cannot send or receive.	Faulty receiver or wire harness	Follow the troubleshooting (page 24-39).
	Identification code is disagree	Jamming by the other transponder	Keep the other vehicle's transponder key away from the immobilizer receiver more than 50 mm (2.0 in).
	Secret code is disagree		

When the system (ICM) enters the diagnostic mode from the registration mode:

BLINKING PATTERN	SYMPTOM	PROBLEM	PROCEDURE
 <p>ON OFF 10 sec.</p>	Registration is overlapped.	The key is already registered properly.	Use a new key or cancelled key.
	Code signals cannot send or receive.	Communication fails.	Follow the troubleshooting (page 24-39).
	Registration is impossible	The key is already registered on the other system.	Use a new key.

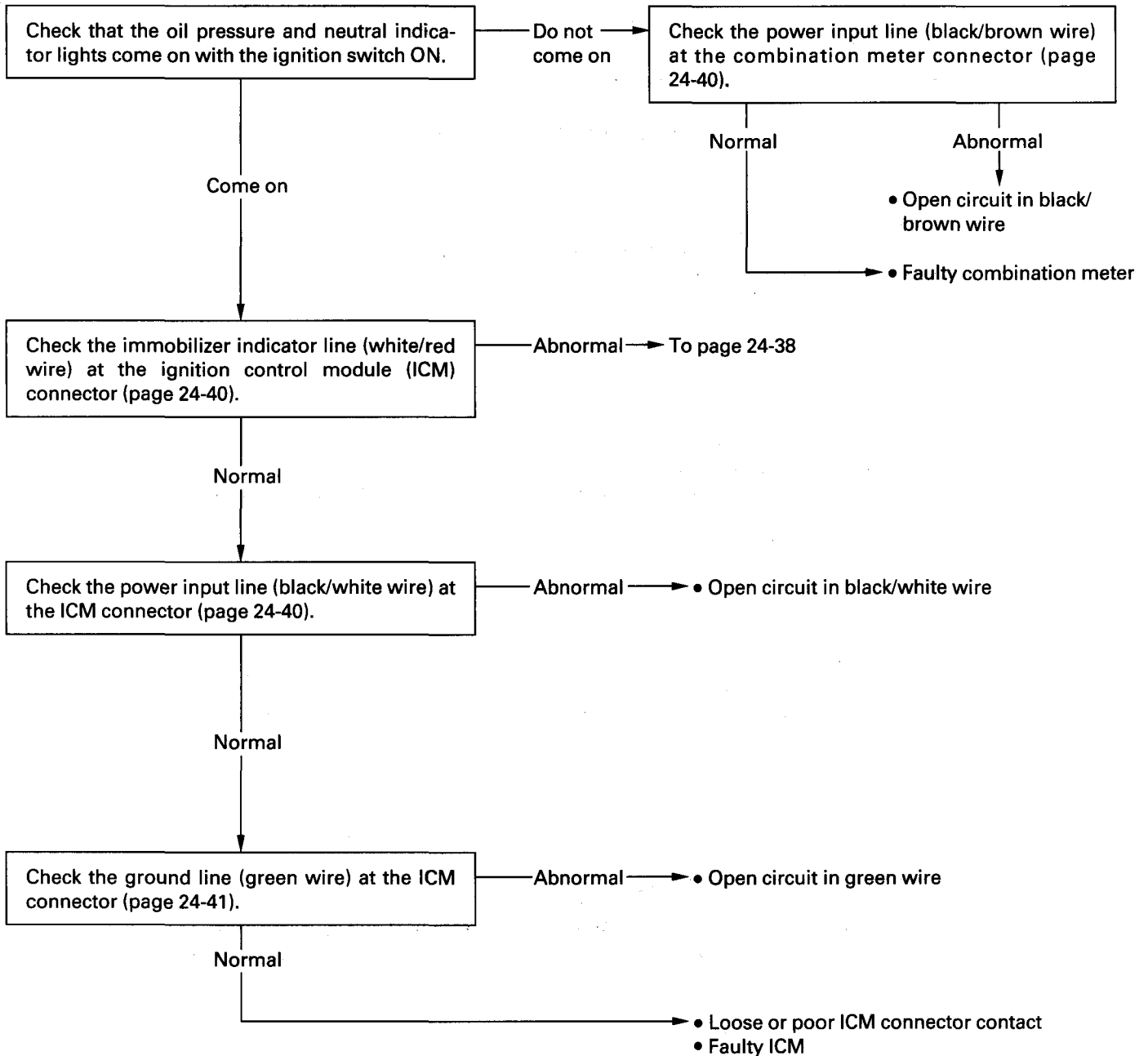
TROUBLESHOOTING

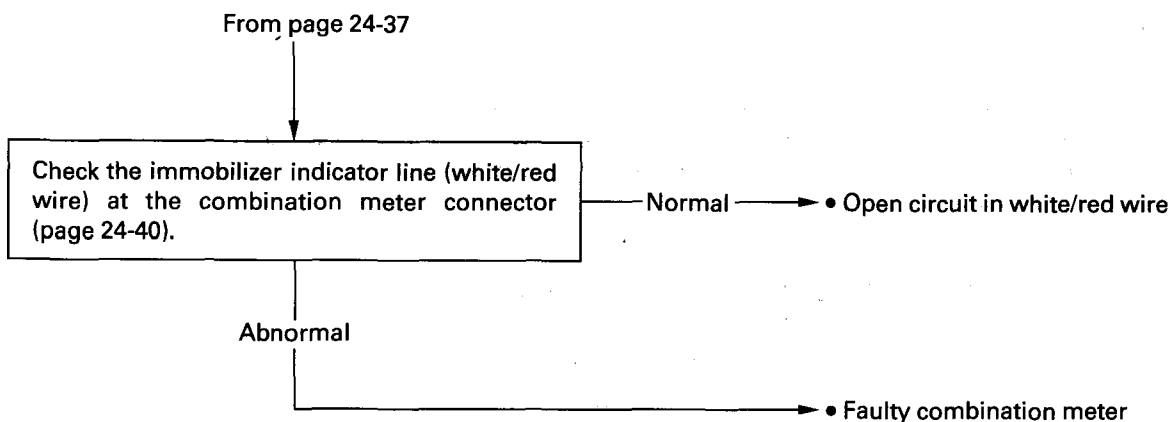
NOTE:

The immobilizer indicator comes on for approx. two seconds then it goes off, when the ignition switch is turned ON with the properly registered key and the immobilizer system functions normally. If there is any problem or the properly registered key is not used, the indicator will remains on.

Immobilizer indicator does not come on when the ignition switch is turned ON

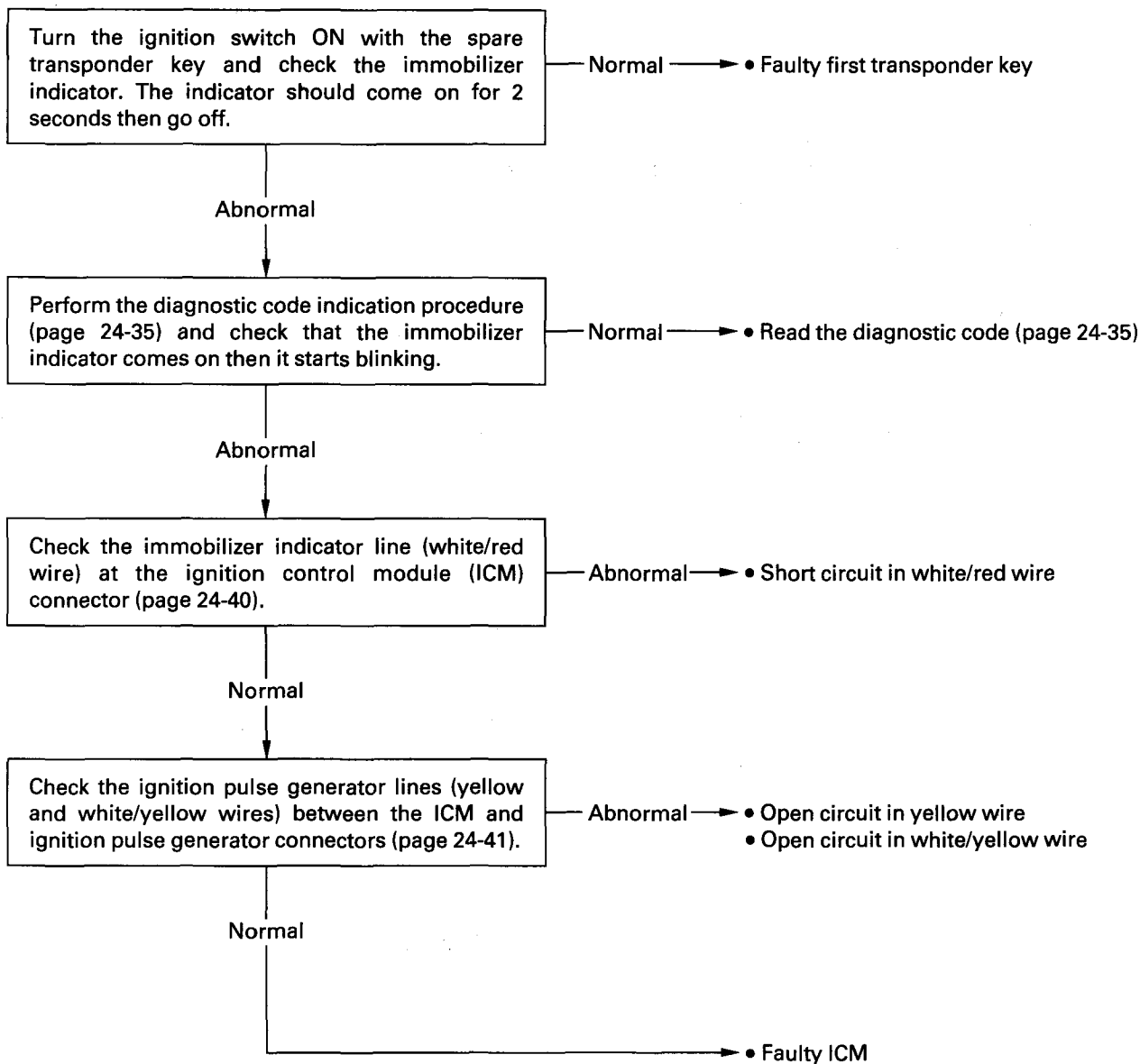
- Check for a blown fuses (10 A).



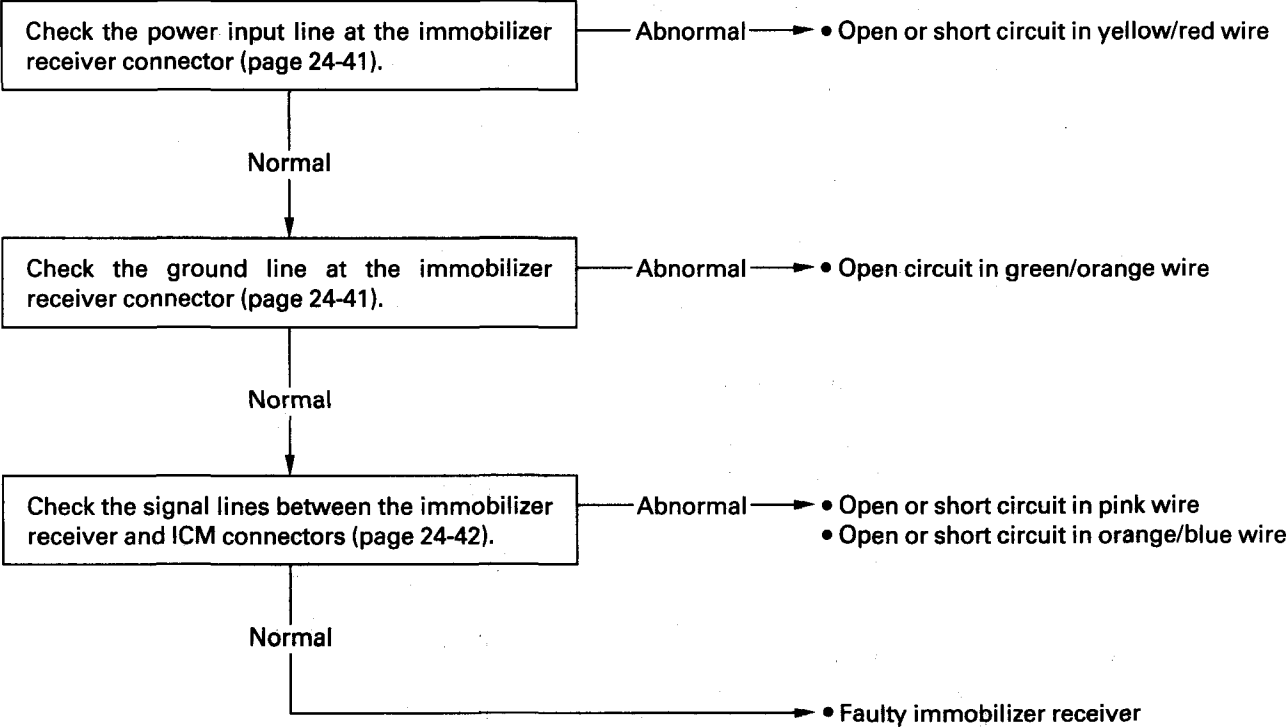


Immobilizer indicator remains on with the ignition switch ON

- Check that there is any metal obstruction or the other vehicle's transponder key near the immobilizer receiver and key. If so, remove it and recheck.



Diagnostic code  is indicated (Code signals cannot send or receive)



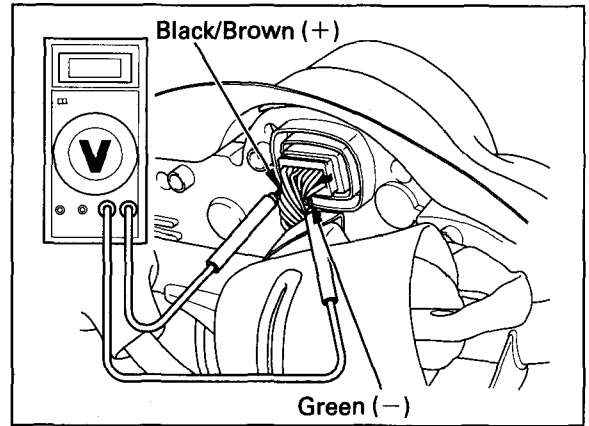
IMMOBILIZER INDICATOR

Remove the combination meter from the stay (page 24-26).

Perform the following inspections with the combination meter connector connected.

POWER INPUT LINE INSPECTION

Measure the voltage between the black/brown (+) and green (-) wire terminals.
Turn the ignition switch ON.
There should be battery voltage.

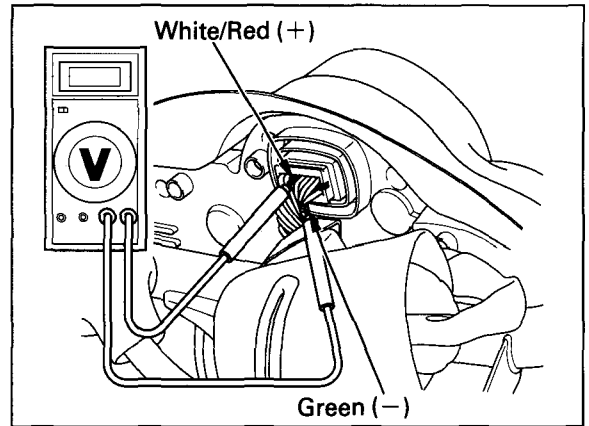


IMMOBILIZER INDICATOR LINE INSPECTION

Measure the voltage between the white/red (+) and green (-) wire terminals.
Turn the ignition switch ON.
There should be battery voltage.

NOTE:

There should be no voltage for approx. two seconds after the ignition switch is turned ON, then the battery voltage should appear, if the system is normal.



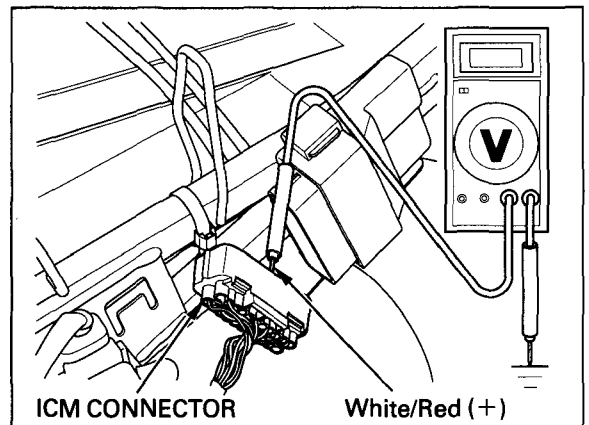
IGNITION CONTROL MODULE (ICM)

Remove the seat cowl (page 2-2).

Disconnect the ICM connector.
Perform the following inspections at the wire harness side connector of the ICM.

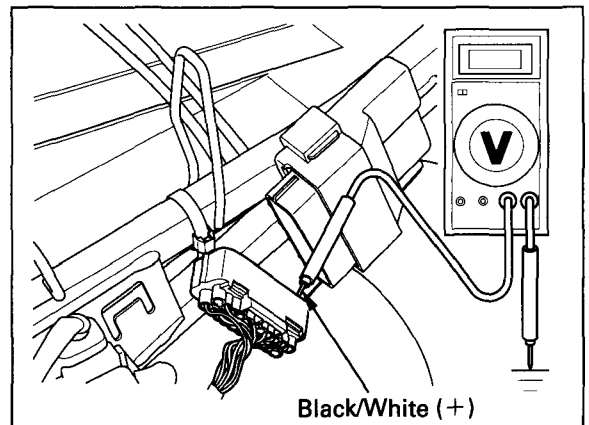
IMMOBILIZER INDICATOR LINE INSPECTION

Measure the voltage between the white/red wire terminal (+) and ground (-).
Turn the ignition switch ON.
There should be battery voltage.



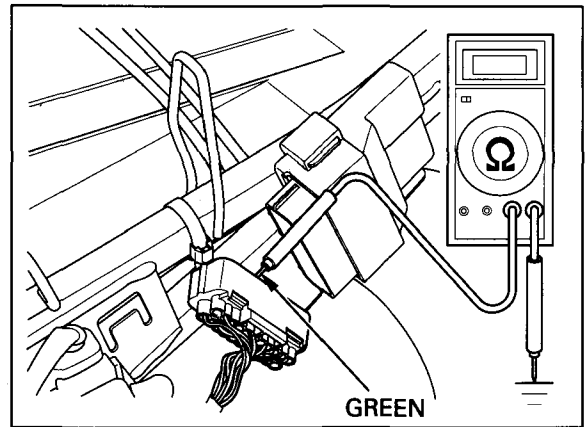
POWER INPUT LINE INSPECTION

Measure the voltage between the black/white wire terminal (+) and ground (-).
Turn the ignition switch ON.
There should be battery voltage.



GROUND LINE INSPECTION

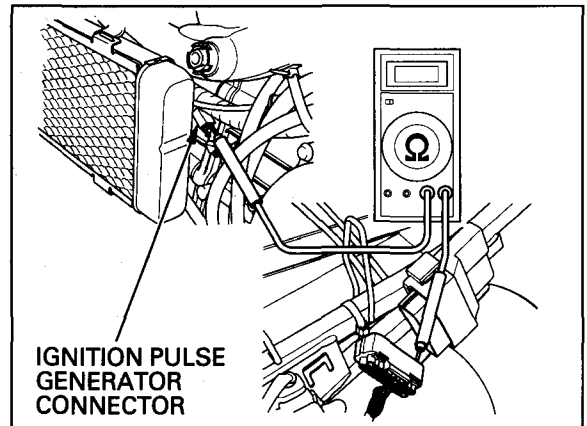
Check for continuity between the green wire terminal and ground.
There should be continuity at all times.



IGNITION PULSE GENERATOR LINE INSPECTION

Disconnect the ignition pulse generator 2P (white) connector (page 24-35).

Check the yellow and white/yellow wires for continuity between the ICM and ignition pulse generator connectors.
There should be continuity between the same color wire terminals.



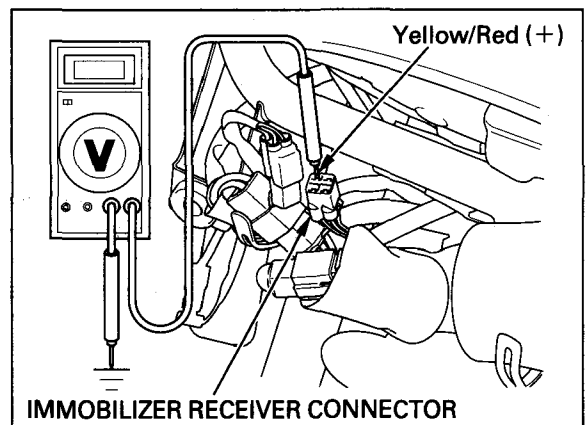
IMMOBILIZER RECEIVER

Remove the front fairing (page 2-3).

Disconnect the immobilizer receiver 4P connector.

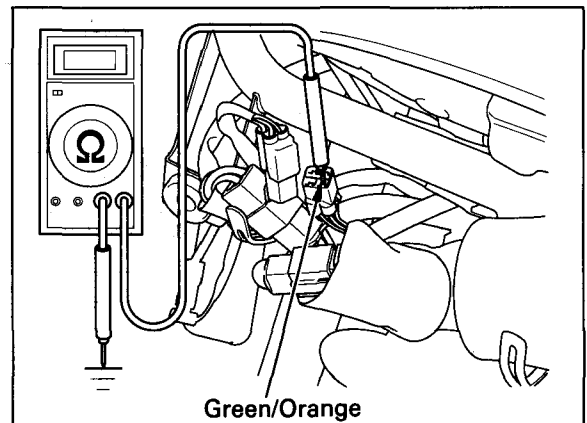
POWER INPUT LINE INSPECTION

Measure the voltage between the yellow/red wire terminal (+) of the wire harness side connector and ground (-).
Turn the ignition switch ON.
There should be approx. 5 V.



GROUND LINE INSPECTION

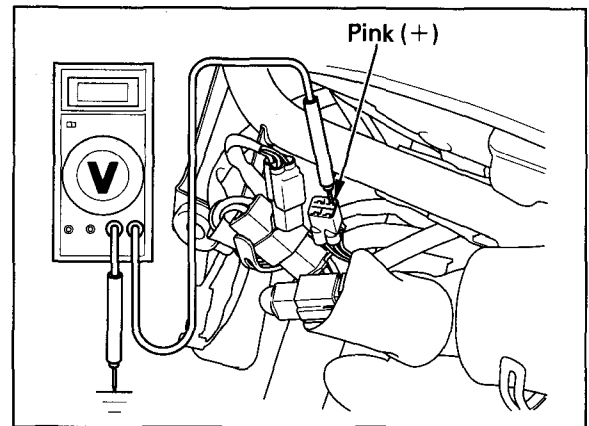
Check for continuity between the green/orange wire terminal of the wire harness side connector and ground.
There should be continuity at all times.



VTR1000F (1) ADDENDUM

SIGNAL LINE INSPECTION

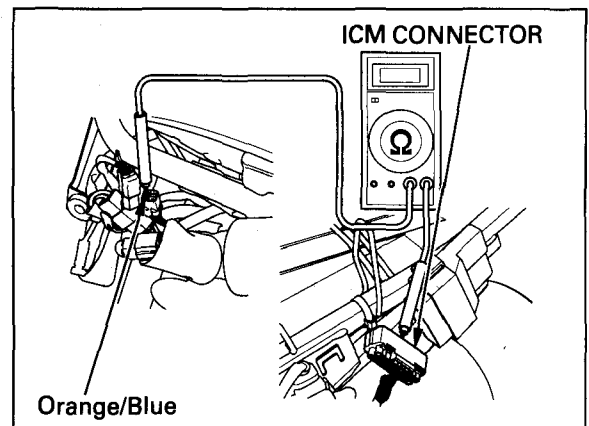
Measure the voltage between the pink wire terminal (+) of the wire harness side connector and ground (-).
Turn the ignition switch ON.
There should be approx. 5 V.



Remove the seat cowl (page 2-2).

Disconnect the ignition control module (ICM) connector.
Check the orange/blue wire for continuity between the immobilizer receiver and ICM connectors.
There should be continuity.

Check for continuity between the orange/blue wire terminal and ground.
There should be no continuity.

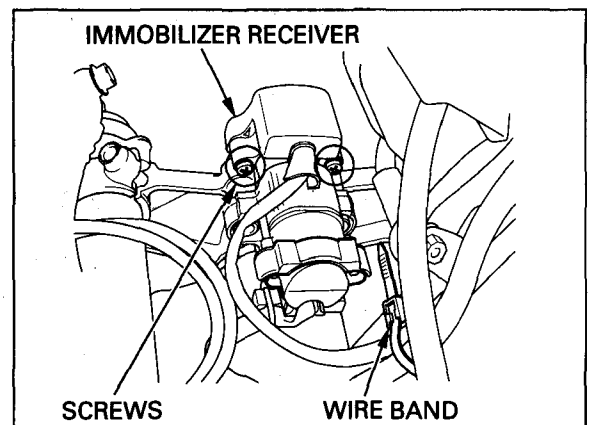


REPLACEMENT

Remove the wire band.
Remove the two screws and the immobilizer receiver.

Install a new receiver and tighten the two screws.
Route the receiver wire properly (page 24-12).

Install the removed part in the reverse order of removal.

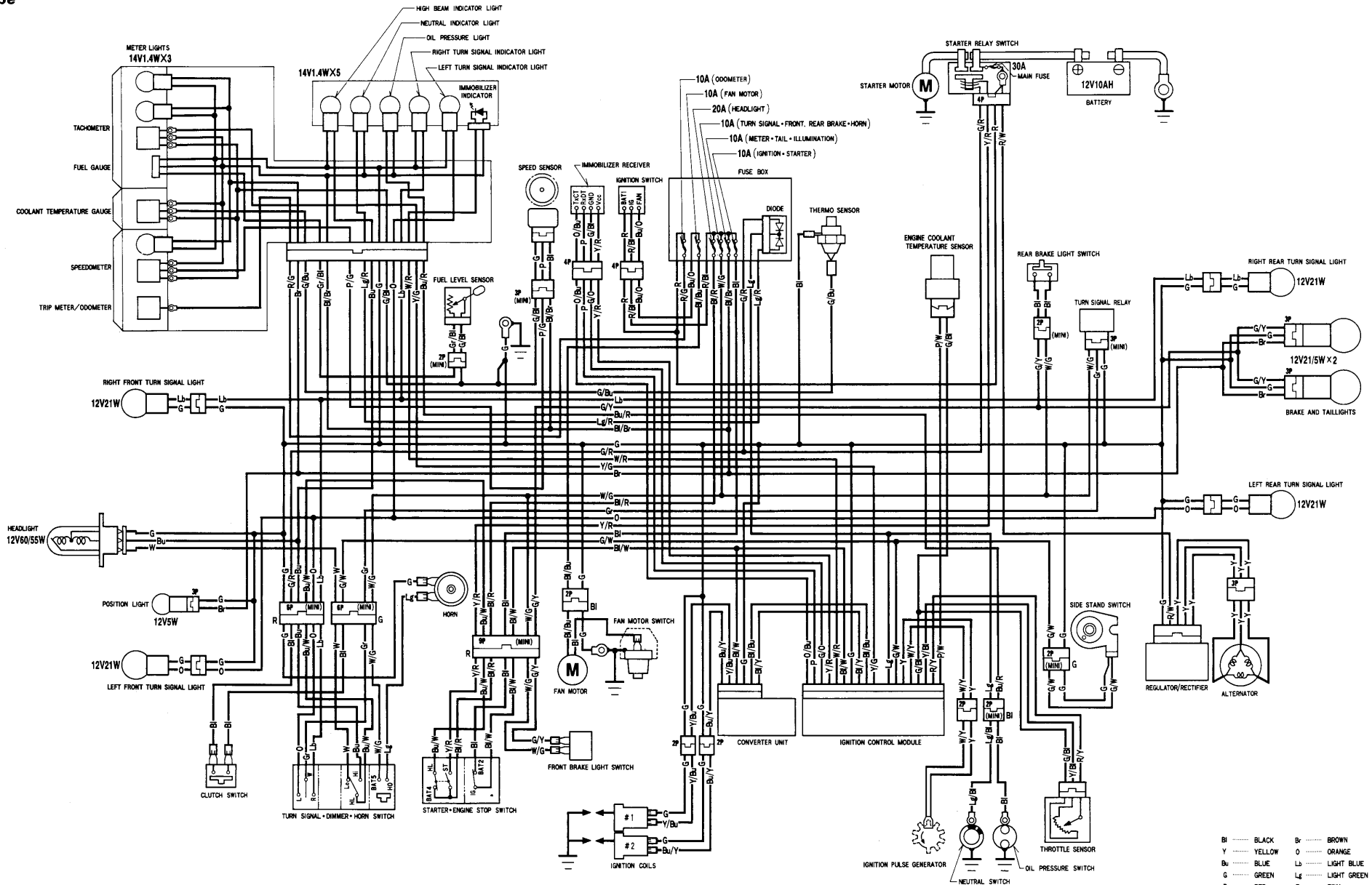


REQUIRED PARTS FOR PROBLEM

Problem	Replacement parts				
	Transponder key	Immobilizer receiver	ICM	Ignition switch	*Accessory lock and key
One key has been lost, or additional spare key is required	○				
All keys have been lost, or ignition control module (ICM) is faulty	○		○		
Immobilizer receiver is faulty		○			
Ignition switch is faulty	○			○	
*Accessory lock is faulty					○

*Accessory lock means the seat lock, fuel fill cap or helmet holder.

U Type



- Bl BLACK
- Bu BLUE
- Gr GRAY
- Hi LIGHT GREEN
- Ho LIGHT BLUE
- Lb LIGHT BLUE
- Lg LIGHT GREEN
- Lo LIGHT BLUE
- Lu LIGHT BLUE
- Ly LIGHT GREEN
- Or ORANGE
- P PINK
- R RED
- W WHITE
- Y YELLOW

SWITCH CONTINUITY

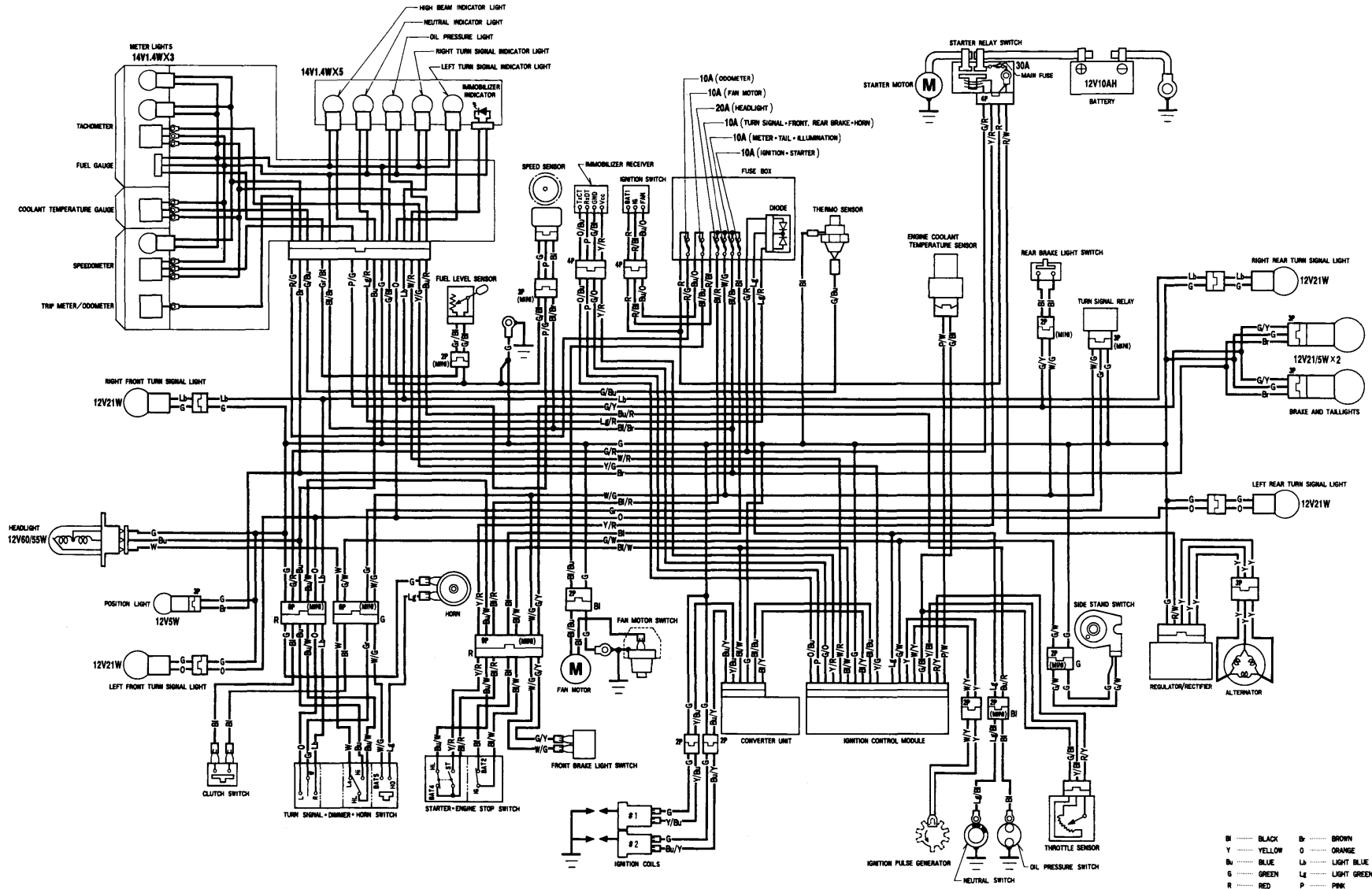
IGNITION SWITCH			TURN SIGNAL SWITCH			HORN SWITCH		DIMMER SWITCH			ENGINE STOP SWITCH		STARTER SWITCH				
	BAT1	IG	FAN		W	R	L	HO	BATS	HL	Lo	Hi	IG	BAT2	ST	BAT4	HL
ON	○	○	○	R	○	○	○	FREE	○	Lo	○	○	OFF	○	FREE	○	○
OFF	○	○	○	N	○	○	○	PUSH	○	(N)	○	○	○	○	○	○	○
LOCK	○	○	○	L	○	○	○			Hi	○	○	○	○	○	○	○

0030Z-MBB-U200

Additional Information For VTR1000F-3 Page 2/5

FUEL SYSTEM	
ITEM	SPECIFICATIONS
Carburetor identification number	VPT3E

U TYPE



IGNITION SWITCH		TURN SIGNAL SWITCH		HORN SWITCH		DIMMER SWITCH		ENGINE STOP SWITCH		STARTER SWITCH	
ON	BAT1	IG	FAN	FREE	HO	BATS	Lo	Lo	Lo	Lo	Lo
OFF				PUSH			(N)		OFF	IG	BAT2
LOCK							Hi		RUN		
										FREE	ST
											BAT4
										PUSH	HL

- B BLACK
- Y YELLOW
- Bu BLUE
- G GREEN
- R RED
- W WHITE
- Br BROWN
- O ORANGE
- L LIGHT BLUE
- Lg LIGHT GREEN
- P PINK
- G GRAY

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