HOW TO USE THIS MANUAL

This service manual describes the service procedures for the XL1000V.

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. Sections 4 through 19 describe parts of the motorcycle, grouped according to location.

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

Most sections 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.

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.

HONDA MOTOR CO., LTD.
SERVICE PUBLICATION OFFICE

CONTENTS

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

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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.
F	France
ED	Europian direct sales (Germany, Sweden, Finland, Austria, Denmark, Norway, Switzerland, Belgium, Holland, Portugal)

CODE	AREA TYPE
U	Australia

SYMBOLS

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

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

1. GENERAL INFORMATION

GENERAL SAFETY	1-1	TOOLS	1-16
SERVICE RULES	1-2	LUBRICATION & SEAL POINTS	1-18
MODEL IDENTIFICATION	1-3	CABLE & HARNESS ROUTING	1-21
SPECIFICATIONS	1-4	EMISSION CONTROL SYSTEMS	1-28
TORQUE VALUES	1-12		

GENERAL SAFETY

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

⚠WARNING

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

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

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

⚠WARNING

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

HOT COMPONENTS

⚠WARNING

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

USED ENGINE OIL

⚠WARNING

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

BRAKE 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.

COOLANT

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

⚠WARNING

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

CAUTION:

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

If it contacts your skin, wash the affected areas immediately with soap and water. If it contacts your eyes, flush them thoroughly with fresh water and get immediate medical attention. If it is swallowed, the victim must be forced to vomit, then rinse mouth and throat with fresh water before obtaining medical attention. Because of these dangers, always keep from the reach of children. Recycle used coolant in an ecologically correct manner.

BATTERY HYDROGEN GAS & ELECTROLYTE

⚠WARNING

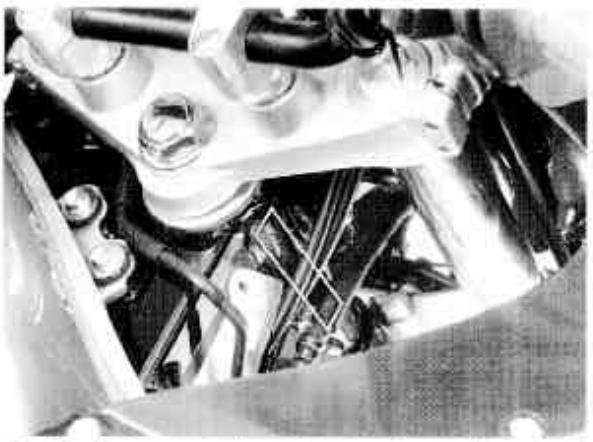
- ***The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.***
- ***The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.***
  - ***If electrolyte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

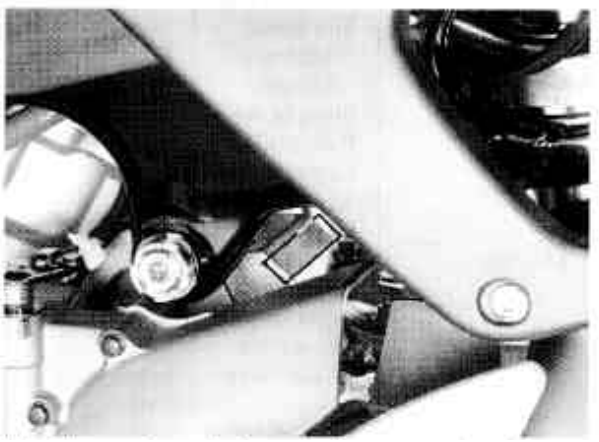
1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that don't meet HONDA's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing 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 1-21 through 1-27, Cable & Harness routing.

MODEL IDENTIFICATION





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



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



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



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

SPECIFICATIONS

GENERAL

ITEM		SPECIFICATIONS
DIMENSIONS	Overall length	2,295 mm (90.4 in)
	Overall width	880 mm (34.6 in)
	Overall height	1,460 mm (57.5 in)
	Wheelbase	1,560 mm (61.4 in)
	Seat height	845 mm (33.3 in)
	Footpeg height	334 mm (13.1 in)
	Ground clearance	195 mm (7.7 in)
	Dry weight	220 kg (485 lbs)
	Curb weight	250 kg (551 lbs)
	Maximum weight capacity	201 kg (443 lbs)
FRAME	Frame type	Diamond
	Front suspension	Telescopic fork
	Front wheel travel	175 mm (6.9 in)
	Front axle travel	155.2 mm (6.11 in)
	Rear suspension	Swingarm
	Rear axle travel	155 mm (6.1 in)
	Rear damper	Nitrogen gas filled damper
	Front tire size	110/80 R19 59H
	Rear tire size	150/70 R17 69H
	Tire brand	
	Michelin	Front: T66X /Rear: T66X
	Metzeler	Front: ENDURO4A /Rear: ENDURO4A
	Front brake	Hydraulic double disc brake with 3 pots caliper
	Rear brake	Hydraulic single disc brake with 3 pots caliper
	Caster angle	27°30′
	Trail length	110 mm (4.3 in)
	Fuel tank capacity	25 ℓ (6.6 US gal , 5.5 Imp gal)
ENGINE	Bore and stroke	98.0 × 66.0 mm (3.90 × 2.60 in)
	Displacement	996 cm^3 (60.8 cu-in)
	Compression ratio	9.0 : 1
	Valve train	Chain drive and DOHC
	Intake valve opens	15° BTDC (At 1 mm lift)
	closes	30° ABDC (At 1 mm lift)
	Exhaust valve opens	40° BBDC (At 1 mm lift)
	closes	5° ATDC (At 1 mm lift)
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
	Air filtration	Paper filter
	Engine dry weight	74.8 kg (164.9 lbs)
	Cylinder arrangement	Front - 270° - Rear - 450° - Front

GENERAL (Cont'd)

ITEM			SPECIFICATIONS
CARBURETOR	Carburetor type		CV (Constant Velocity) type, with flat valve
	Throttle bore		42 mm (1.7 in)
DRIVE TRAIN	Clutch system		Multi-plate, wet
	Clutch operation system		Cable operated type
	Transmission		Constant mesh, 5-speed
	Primary reduction		1.682 (74/44)
	Final reduction		2.938 (47/16)
	Gear ratio	1st	2.571 (36/14)
		2nd	1.706 (29/17)
		3rd	1.318 (29/22)
		4th	1.111 (30/27)
		5th	0.962 (25/26)
	Gearshift pattern		Left foot operated return system, 1 – N – 2 – 3 – 4 – 5
ELECTRICAL	Ignition system		Full transistor digital ignition
	Starting system		Electric starter motor
	Charging system		Triple phase output alternator
	Regulator/rectifier		SCR shorted/triple phase, full wave rectification
	Lighting system		Battery

LUBRICATION SYSTEM

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	3.4 ℓ (3.6 US qt , 3.0 Imp qt)	———
	At disassembly	4.1 ℓ (4.3 US qt , 3.6 Imp qt)	———
	At oil filter change	3.6 ℓ (3.8 US qt , 3.2 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/cm², 85 psi) at 5,000 rpm/(80 °C/176 °F)	———
Oil pump rotor	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	VPJ0A
Main jet	Front: #168 Rear: #170
Slow jet	#42
Jet needle number	Front: B51C Rear: B51B
Pilot screw initial opening	See page 5-20
Float level	13.7 ± 0.5 mm (0.54 ± 0.02 in)
Idle speed	1,200 ± 50 min^{-1} (rpm)
Throttle grip free play	2−6 mm (1/16−1/4 in)

COOLING SYSTEM

ITEM		SPECIFICATIONS
Coolant capacity	Radiator and engine	2.8 ℓ (3.0 US qt , 2.5 Imp qt)
	Reserve tank	0.5 ℓ (0.5 US qt , 0.4 Imp qt)
Radiator cap relief pressure		108−137 kPa (1.1−1.4 kgf/cm², 16−20 psi)
Thermostat	Begin to open	75−82 °C (167−180 °F)
	Fully open	82 °C (180 °F)
	Valve lift	8 mm (0.3 in) minimum
Standard coolant concentration		50% mixture with soft water

CYLINDER HEAD/VALVES

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,177 kPa (12.0 kgf/cm², 171 psi) at 300 rpm	———
Cylinder head warpage			———	0.10 (0.004)
Valve, valve guide	Valve clearance	IN	0.16 (0.006)	———
		EX	0.31 (0.012)	———
	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	6.000–6.012 (0.2362–0.2367)	6.040 (0.2378)
		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	IN	14.0–14.2 (0.55–0.56)	———
		EX	14.0–14.2 (0.55–0.56)	———
	Valve seat width	IN/EX	1.1–1.3 (0.04–0.05)	1.7 (0.07)
Valve spring free length			43.9 (1.73)	42.9 (1.69)
Valve lifter	Valve lifter O.D.	IN/EX	33.978–33.993 (1.3377–1.3383)	33.97 (1.337)
	Valve lifter bore I.D.	IN/EX	34.010–34.026 (1.3390–1.3396)	34.04 (1.340)
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)	0.10 (0.004)

CLUTCH/GEARSHIFT LINKAGE

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10–20 (3/8–13/16)	———
Clutch spring free length		49.6 (1.95)	46.6 (1.83)
Clutch disc thickness		3.72–3.88 (0.146–0.153)	3.5 (0.14)
Clutch plate warpage		———	0.30 (0.012)
Clutch outer guide	I.D.	28.000–28.021 (1.1024–1.1032)	28.031 (1.1036)
	O.D.	34.975–34.991 (1.3770–1.3776)	34.965 (1.3766)
Mainshaft O.D. at clutch outer guide		27.980–27.993 (1.1016–1.1021)	27.970 (1.1012)

ALTERNATOR/STARTER CLUTCH

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)

CRANKCASE/TRANSMISSION

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.	M4, 5	31.000–31.016 (1.2205–1.2211)	31.04 (1.222)
		C1	26.000–26.021 (1.0236–1.0244)	26.04 (1.025)
		C2, 3	33.000–33.025 (1.2992–1.3002)	33.05 (1.301)
	Bushing O.D.	M4, 5	30.955–30.980 (1.2187–1.2197)	30.93 (1.218)
		C2, 3	32.955–32.980 (1.2974–1.2984)	32.93 (1.296)
	Bushing I.D.	M4	27.985–28.006 (1.1018–1.1026)	28.02 (1.103)
		C2	29.985–30.006 (1.1805–1.1813)	30.02 (1.182)
	Gear-to-bushing clearance	M4, 5	0.020–0.061 (0.0008–0.0024)	0.10 (0.004)
		C2, 3	0.020–0.070 (0.0008–0.0028)	0.11 (0.004)
	Mainshaft O.D.	M4	27.967–27.980 (1.1011–1.1016)	27.94 (1.100)
	Countershaft O.D.	C2	29.967–29.980 (1.1798–1.1803)	29.92 (1.178)
	Bushing-to-shaft clearance	M4	0.005–0.039 (0.0002–0.0015)	0.06 (0.002)
		C2	0.010–0.055 (0.0004–0.0022)	0.06 (0.002)

CRANKSHAFT/PISTON/CYLINDER

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)
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)
Piston, piston rings	Piston mark direction		"IN" mark facing toward the intake side	———
	Piston O.D.		97.983–97.985 (3.8576–3.8577)	97.900 (3.8543)
	Piston O.D. measurement point		20 mm (0.8 in) from bottom of skirt	———
	Piston pin bore 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)	0.55 (0.022)
	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)
	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)	0.425–0.475 (0.0167–0.0187)	0.70 (0.028)
Cylinder-to-piston clearance			0.010–0.055 (0.0004–0.0022)	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)

FRONT WHEEL/SUSPENSION/STEERING

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/cm², 36 psi)	———
	Driver and passenger	250 kPa (2.50 kgf/cm², 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	428.8 (16.88)	420.2 (16.54)
	Spring direction	With the tapered end facing down	———
	Tube runout	———	0.20 (0.008)
	Recommended fork fluid	Fork fluid	———
	Fluid level	114 (4.5)	———
	Fluid capacity	529 ± 2.5 cm³ (17.9 ± 0.08 US oz, 18.7 ± 0.09 Imp oz)	———
Steering head bearing pre-load		1.0–1.5 kgf (2.2–3.3 lbf)	———

REAR WHEEL/SUSPENSION

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Minimum tire tread depth			———	2.0 (0.08)
Cold tire pressure	Driver only		250 kPa (2.50 kgf/cm², 36 psi)	———
	Driver and passenger		280 kPa (2.80 kgf/cm², 41 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.
Drive chain	Size/link	DID	DID525 HV/112 LE	———
		RK	RK525 ROZ1/112 LE	———
	Slack		35–45 (1 3/8–1 3/4)	———

HYDRAULIC BRAKE

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.			12.700–12.743 (0.5000–0.5017)	12.755 (0.5022)
	Master piston O.D.			12.657–12.684 (0.4983–0.4994)	12.645 (0.4978)
	Secondary master cylinder I.D.			12.700–12.743 (0.5000–0.5017)	12.755 (0.5022)
	Secondary master piston O.D.			12.657–12.684 (0.4983–0.4994)	12.645 (0.4978)
	Caliper cylinder I.D.	Right	Upper	27.000–27.050 (1.0630–1.0650)	27.060 (1.0654)
			Middle	22.650–22.700 (0.8917–0.8937)	22.710 (0.8941)
			Lower	27.000–27.050 (1.0630–1.0650)	27.060 (1.0654)
		Left	Upper	25.400–25.450 (1.0000–1.0020)	25.460 (1.0024)
			Middle	22.650–22.700 (0.8917–0.8937)	22.710 (0.8941)
			Lower	25.400–25.450 (1.0000–1.0020)	25.460 (1.0024)
	Caliper piston O.D.	Right	Upper	26.935–26.968 (1.0604–1.0617)	26.910 (1.0594)
			Middle	22.585–22.618 (0.8892–0.8905)	22.560 (0.8882)
			Lower	26.935–26.968 (1.0604–1.0617)	26.910 (1.0594)
		Left	Upper	25.335–25.368 (0.9974–0.9987)	25.310 (0.9965)
			Middle	22.585–22.618 (0.8892–0.8905)	22.560 (0.8882)
			Lower	25.335–25.368 (0.9974–0.9987)	25.310 (0.9965)
Rear	Specified brake fluid			DOT 4	———
	Brake pedal height			82.5–84.5 (3.25–3.33)	———
	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.			17.460–17.503 (0.6874–0.6891)	17.515 (0.6896)
	Master piston O.D.			17.417–17.444 (0.6857–0.6868)	17.405 (0.6852)
	Caliper cylinder I.D.		Front	22.650–22.700 (0.8917–0.8937)	22.710 (0.8941)
			Center	27.000–27.050 (1.0630–1.0650)	27.060 (1.0654)
			Rear	22.650–22.700 (0.8917–0.8937)	22.710 (0.8941)
	Caliper piston O.D.		Front	22.585–22.618 (0.8892–0.8905)	22.560 (0.8882)
			Center	26.935–26.968 (1.0604–1.0617)	26.910 (1.0594)
			Rear	22.585–22.618 (0.8892–0.8905)	22.560 (0.8882)

BATTERY/CHARGING SYSTEM

ITEM			SPECIFICATIONS
Battery	Capacity		12V–12AH
	Current leakage		0.1 mA max.
	Voltage (20 °C/68 °F)	Fully charged	13.0–13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.2 A/5–10h
		Quick	5.0 A/0.5 h
Alternator	Capacity		0.315 kW/5,000 min^{-1} (rpm)
	Charging coil resistance (20 °C/68 °F)		0.3 – 0.5 Ω

IGNITION SYSTEM

ITEM		SPECIFICATIONS
Spark plug		DPR8EVX−9 (NGK)
Spark plug gap		0.80−0.90 mm (0.031−0.035 in)
Ignition coil peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		15° BTDC at idle
Engine coolant temperature (ECT) sensor resistance	At 20 °C (68 °F)	2−3 kΩ
	At 80 °C (176 °F)	200−400 Ω
Throttle sensor	resistance (20 °C/68 °F)	4−6 kΩ
	Input voltage	4.7−5.3 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

ITEM			SPECIFICATIONS
Bulbs	Headlight	High/Low	12V−60/55W ×2
	Position light		12V−5W
	Brake/tail light		12V−21/5W ×2
	Front turn signal light		12V−21W
	Rear turn signal light		12V−21W
	License light		12V−5W
	Instrument light		12V−1.7W, 12V−3.4W ×2
	Turn signal indicator		12V−3.4W ×2
	High beam indicator		12V−1.7W
	Neutral indicator		12V−3.4W
	Oil pressure indicator		12V−3.4W
	Fuel indicator		12V−3.4W
Fuse	Main fuse		30 A
	Sub fuse		20 A × 1, 10 A × 5
Fan motor switch	Start to close (ON)		98−102 °C (208−216 °F)
	Stop to open		93−97 °C (199−207 °F)
Coolant temperature sensor resistance		at 80 °C/176 °F	47−57 Ω
		at 120 °C/248 °F	14−18 Ω
Fuel pump flow capacity			Minimum 700 cm³ (23.7 US oz , 24.6 Imp oz)/minute at 13 V

TORQUE VALUES

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

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

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

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 4
Timing hole cap	1	14	10 (1.0 , 7)	NOTE 4
Oil filter cartridge	1	20	10 (1.0 , 7)	NOTE 6, 7
Oil drain bolt	1	12	30 (3.1 , 22)	
LUBRICATION SYSTEM:				
Oil pressure switch	1	PT 1/8	12 (1.2 , 9)	NOTE 1
Oil pressure switch wire terminal screw	1	4	2 (0.2 , 1.4)	
Oil pump mounting bolt	3	6	12 (1.2 , 9)	
Oil pump bolt	2	6	13 (1.3 , 9)	
Oil filter boss	1	20	18 (1.8 , 13)	NOTE 2
Oil pump driven sprocket bolt	1	6	15 (1.5 , 11)	NOTE 2
FUEL SYSTEM:				
Carburetor insulator band bolt	4	5	1 (0.1 , 0.7)	
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/VALVES:				
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 6
Cylinder head bolt	12	10	53 (5.4 , 39)	NOTE 6
Cylinder head sealing bolt	2	12	32 (3.3 , 24)	NOTE 2
Intake manifold vacuum port socket bolt	2	5	3 (0.34 , 2.5)	

ENGINE (Cont'd)

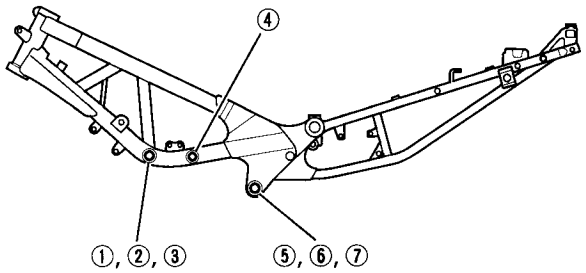
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
CLUTCH/GEARSHIFT LINKAGE:				
Clutch spring bolt	5	6	12 (1.2 , 9)	
Clutch center lock nut	1	25	127 (13.0 , 94)	NOTE 5, 6
Gearshift cam bolt	1	8	23 (2.3 , 17)	NOTE 2
Gearshift spindle return spring pin	1	8	23 (2.3 , 17)	
Primary drive gear bolt	1	12	88 (9.0 , 65)	NOTE 6
ALTERNATOR/STARTER CLUTCH:				
Flywheel bolt	1	12	157 (16.0 , 116)	NOTE 6
Starter one-way clutch socket bolt	6	8	23 (2.3 , 17)	NOTE 2
Stator socket 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 6
Crankcase sealing bolt (15 mm)	1	15	29 (3.0 , 22)	NOTE 2
(18 mm)	1	18	29 (3.0 , 22)	NOTE 2
(22 mm)	1	22	29 (3.0 , 22)	
(24 mm)	1	24	49 (5.0 , 36)	NOTE 2
CRANKSHAFT/PISTON/CYLINDER:				
Connecting rod bolt	4	9	29 (3.0 , 22) ± 120°	NOTE 6, 9
IGNITION SYSTEM:				
Ignition pulse generator mounting bolt	2	6	12 (1.2 , 9)	NOTE 2
ELECTRIC STARTER:				
Starter motor terminal nut	1	6	10 (1.0 , 7)	
LIGHT/METERS/SWITCHES:				
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)	
Fuel cock nut	1	22	34 (3.5 , 25)	
Upper cowl stay mounting bolt (upper)	2	8	34 (3.5 , 25)	
(lower)	2	10	44 (4.5 , 33)	
Upper cowl stay mounting nut (head pipe)	1	10	44 (4.5 , 33)	
COOLING SYSTEM:				
Thermo sensor	1	PT1/8	9 (0.9 , 6.5)	NOTE 1
Engine coolant temperature (ECT) sensor	1	12	23 (2.3 , 17)	
Fan motor switch	1	16	17 (1.7 , 12)	

FRAME (Cont'd)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
ENGINE MOUNTING:				
Front engine hanger nut ①	1	12	64 (6.5 , 47)	Page 7-6
Front engine hanger adjusting bolt ②	1	20	3 (0.3 , 2.2)	
Front engine hanger lock nut ③	1	20	54 (5.5 , 40)	
Center engine hanger bolt ④	2	10	39 (4.0 , 29)	
Rear engine hanger nut ⑤	1	12	64 (6.5 , 47)	
Rear engine hanger adjusting bolt ⑥	1	20	3 (0.3 , 2.2)	
Rear engine hanger lock nut ⑦	1	20	54 (5.5 , 40)	
FRONT WHEEL/SUSPENSION/STEERING:				
Handlebar weight mounting screw	2	6	10 (1.0 , 7)	NOTE 9
Throttle housing screw	2	5	4 (0.42 , 3.0)	
Bystarter lever pivot bolt	1	6	9 (0.9 , 6.5)	
Handlebar upper holder bolt	4	8	27 (2.8 , 20)	
Handlebar lower holder nut	2	8	27 (2.8 , 20)	
Steering stem nut	1	24	103 (10.5 , 76)	Page 13-33
Steering stem bearing adjusting nut	1	26	25 (2.5 , 18)	
Steering stem bearing lock nut	1	26	—	
Fork top bridge pinch bolt	4	8	22 (2.2 , 16)	
Fork bottom bridge pinch bolt	4	8	27 (2.8 , 20)	
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 9
Fork socket bolt	2	8	20 (2.0 , 14)	NOTE 2
Fork cap	2	39	22 (2.2 , 16)	
REAR WHEEL/SUSPENSION:				
Rear axle nut	1	18	93 (9.5 , 69)	NOTE 8
Final driven sprocket nut	5	12	108 (11.0 , 80)	
Rear brake disc bolt	4	8	42 (4.3 , 31)	NOTE 9
Shock link bracket bolt	1	12	54 (5.5 , 40)	
	1	14	59 (6.0 , 43)	
Swingarm pivot nut	1	18	93 (9.5 , 69)	NOTE 8
Drive chain slider screw	2	5	4 (0.42 , 3.0)	NOTE 2
Shock absorber upper mounting nut	1	10	59 (6.0 , 43)	NOTE 8
Shock absorber lower mounting nut	1	10	44 (4.5 , 33)	NOTE 8
Shock link-to-bracket nut	1	10	59 (6.0 , 43)	NOTE 8
Shock link-to-shock link plate nut	1	10	44 (4.5 , 33)	NOTE 8
Swingarm-to-shock link plate nut	1	12	88 (9.0 , 65)	NOTE 8



FRAME (Cont'd)

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
HYDRAULIC BRAKE:				
Front brake master cylinder holder bolt	2	6	12 (1.2 , 9)	
Front brake master cylinder cap screw	2	4	1 (0.15 , 1.1)	
Brake lever pivot bolt	1	6	1 (0.1 , 0.7)	
Brake lever pivot nut	1	6	6 (0.6 , 4.3)	
Brake lever adjuster	1	5	4 (0.4 , 2.9)	
Front brake light switch screw	1	4	1 (0.12 , 0.9)	
Right front caliper mounting bolt	2	8	31 (3.2 , 23)	NOTE 9
Left front caliper pivot bolt	1	8	31 (3.2 , 23)	NOTE 9
Left front caliper bolt (secondary master joint)	1	8	31 (3.2 , 23)	NOTE 9
Caliper body B bolt	9	8	32 (3.3 , 24)	NOTE 9
Front brake caliper slide pin (main)	3	12	23 (2.3 , 17)	
Front brake caliper slide pin (sub)	3	8	13 (1.3 , 9)	
Pad pin	3	10	18 (1.8 , 13)	
Brake caliper bleed valve	6	8	6 (0.6 , 4.3)	
Secondary master cylinder push rod nut	1	8	18 (1.8 , 13)	
Secondary master cylinder connector	2	6	10 (1.0 , 7)	
Rear master cylinder mounting bolt	2	6	12 (1.2 , 9)	
Rear master cylinder reservoir mounting bolt	1	6	12 (1.2 , 9)	
Rear master cylinder push rod nut	1	8	18 (1.8 , 13)	
Rear master cylinder hose joint screw	1	4	1 (0.15 , 1.1)	NOTE 2
Brake hose oil bolt	12	10	35 (3.6 , 26)	
Brake pipe joint	8	10	17 (1.7 , 12)	NOTE 6
Brake pipe 2/3 way joint	2	6	12 (1.2 , 9)	
Brake hose guide bolt	2	6	12 (1.2 , 9)	
Delay valve mounting bolt	2	6	12 (1.2 , 9)	
PCV (Proportional Control Valve) mounting bolt	2	6	12 (1.2 , 9)	
IGNITION SYSTEM:				
Rear ignition coil mounting bolt	2	6	12 (1.2 , 9)	
LIGHTS/METERS/SWITCHES:				
Side stand pivot bolt	1	10	10 (1.0 , 7)	
Side stand pivot lock nut	1	10	29 (3.0 , 22)	
Side stand switch bolt	1	6	10 (1.0 , 7)	
Fuel level sensor	1	18	23 (2.3 , 17)	
OTHERS:				
Rear turn signal nut	2	10	5 (0.5 , 3.6)	
Footpeg bracket bolt	2	8	35 (3.6 , 26)	
Bank sensor bolt	2	8	10 (1.0 , 7)	
Gearshift pedal link joint nut	2	8	27 (2.8 , 20)	

TOOLS

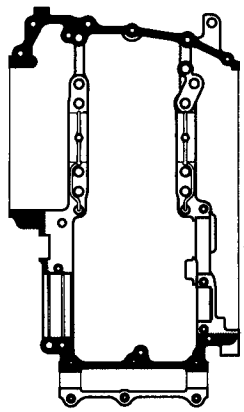
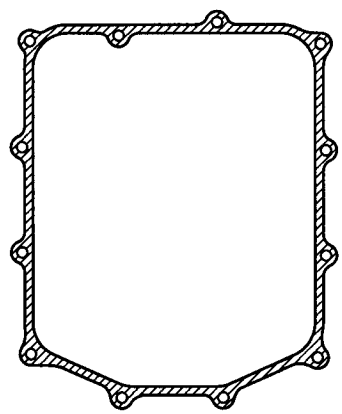
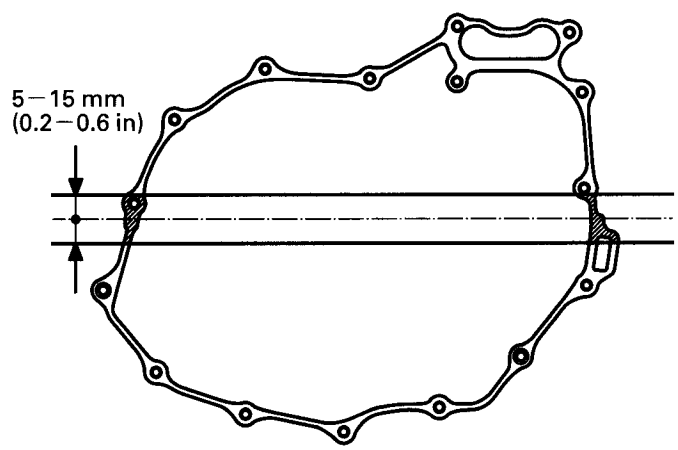
NOTES: 1. Equivalent commercially available.
2. Alternative tool.
3. Newly provided tool.
4. Newly designed tool.

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Carburetor float level gauge	07401-0010000		5
Oil pressure gauge	07506-3000000		4
Oil pressure gauge attachment	07406-0030000		4
Gear holder	07724-0010100		9
Clutch center holder	07724-0050002		9
Flywheel holder	07725-0040000	NOTE 1	10
Rotor puller	07733-0020001		10
Valve guide remover	07742-0010100		8
Remover weight	07741-0010201		6
Adjustable valve guide driver	07743-0020000		8
Attachment, 32 × 35 mm	07746-0010100		9, 14
Attachment, 37 × 40 mm	07746-0010200		9, 14
Attachment, 42 × 47 mm	07746-0010300		9, 13, 14
Attachment, 52 × 55 mm	07746-0010400		13, 14
Attachment, 62 × 68 mm	07746-0010500		14
Attachment, 24 × 26 mm	07746-0010700		14
Attachment, 22 × 24 mm	07746-0010800		14
Driver B	07746-0030100		11
Inner driver, 35 mm	07746-0030400		11
Pilot, 10 mm	07746-0040100		6
Pilot, 17 mm	07746-0040400		9, 14
Pilot, 20 mm	07746-0040500		13, 14
Pilot, 25 mm	07746-0040600		14
Pilot, 35 mm	07746-0040800		9
Pilot, 28 mm	07746-0041100		14
Bearing remover shaft	07746-0050100		13, 14
Bearing remover head, 20 mm	07746-0050600		13, 14
Driver	07749-0010000		6, 9, 13, 14
Valve spring compressor	07757-0010000		8
Valve seat cutter		NOTE 1	8
Seat cutter, 35 mm (45° EX)	07780-0010400		
Seat cutter, 40 mm (45° IN)	07780-0010500		
Flat cutter, 35 mm (32° EX)	07780-0012300		
Flat cutter, 38 mm (32° IN)	07780-0012400		
Interior cutter, 37.5 mm (60° EX)	07780-0014100		
Interior cutter, 42 mm (60° IN)	07780-0014400		
Pilot screw wrench	07908-4730002		5
Snap ring pliers	07914-SA50001		15
Steering stem socket	07916-3710101		13
Remover shaft	07936-GE00100		6
Remover head, 10 mm	07936-GE00200		6
Attachment, 28 × 30 mm	07946-1870100		6
Bearing race remover	07946-3710500		13
Needlebearing remover	07946-KA50000		13
Mechanical seal driver attachment	07946-4150400		6
Steering stem driver	07946-MB00000		13
Oil seal driver	07947-KA40200		13
Slider weight	07947-KA50100		13
Driver handle attachment	07949-3710001		14
Ball race remover	07953-MJ10000		13
Driver attachment	07953-MJ10100		
Driver handle	07953-MJ10200		

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SEC.
Oil filter wrench	07HAA-PJ70100		3
Peak voltage adaptor	07HGJ-0020100	NOTE 3: Imrie diagnostic tester (model 625)	17, 19
Drive chain tool set	07HMH-MR10103		3
Needle bearing remover	07LMC-KV30100		14
Lock nut wrench	07VMA-MBB0100		7
Cutter holder, 6 mm	07VMH-MBB0100		8
Valve guide reamer, 6.012 mm	07VMH-MBB0200		8
Analog tester (KOWA)	TH-5H		16, 17, 18, 19
Analog tester (SANWA)	SP-15D		16, 17, 18, 19

LUBRICATION & SEAL POINTS

ENGINE

LOCATION	MATERIAL	REMARKS
Crankcase mating surface 	Liquid sealant (Three Bond 1207B or equivalent)	
Oil pan mating surface 		
Right crankcase cover, alternator cover mating surface 		
Cylinder head semi-circular area Cylinder head cover gasket mating surface (cover side) Oil pressure switch threads Alternator stator wire grommet seating surface		

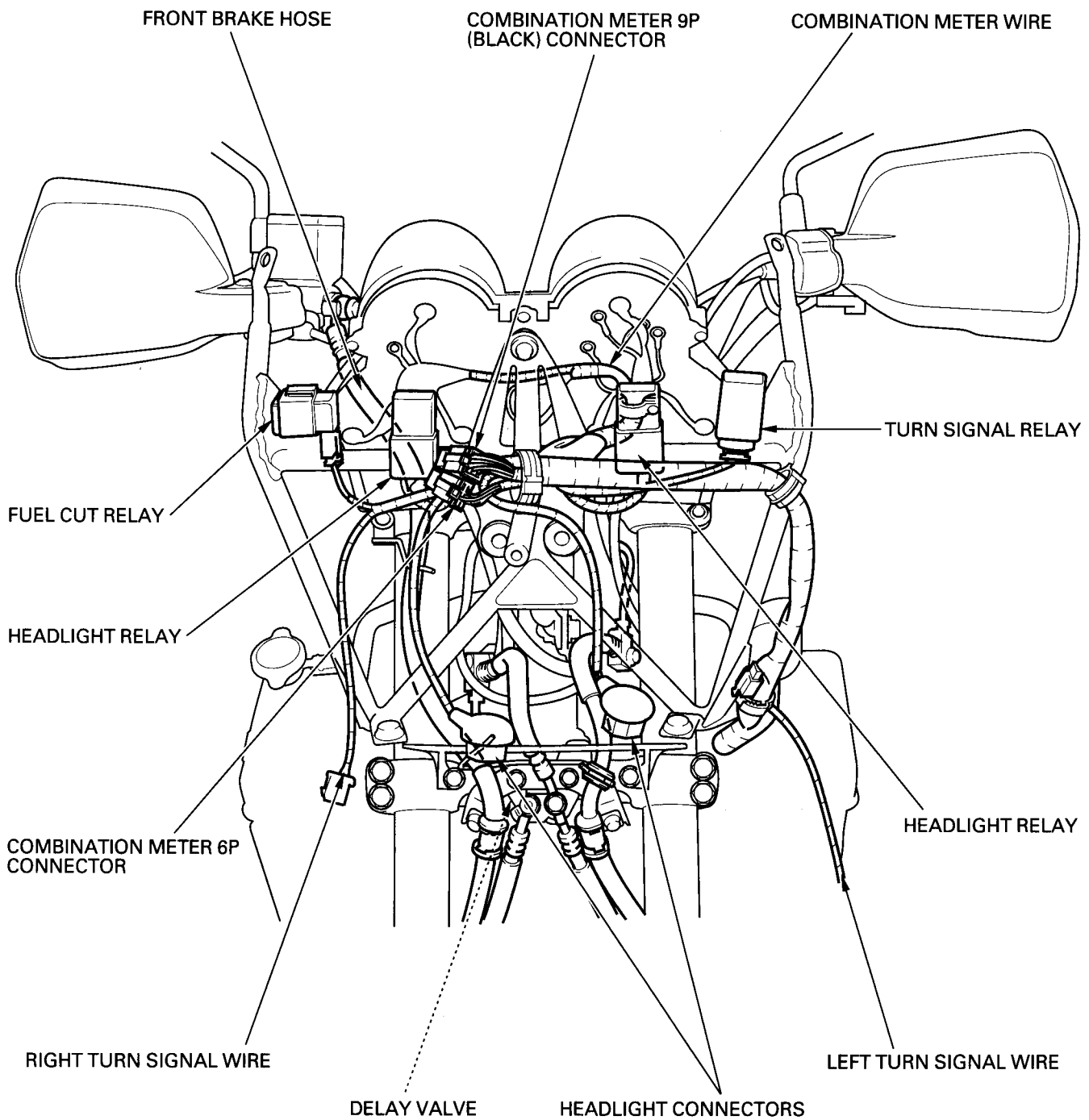
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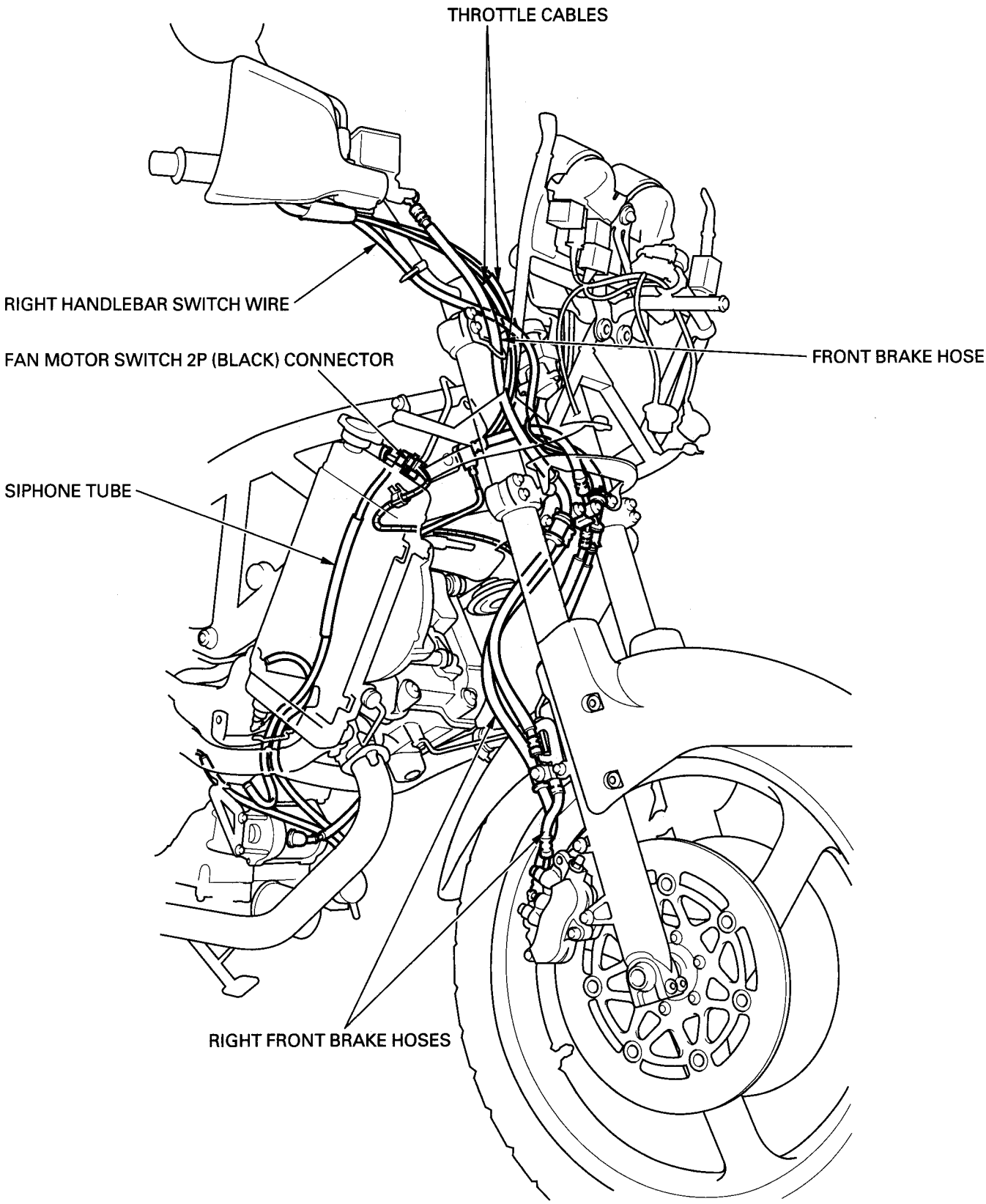
LOCATION	MATERIAL	REMARKS
Crankshaft main journal bearing sliding surface Crankpin bearing sliding surface Connecting rod small end inner surface Valve stem sliding surface Valve lifter outer surface Camshaft journals and lobes Clutch outer sliding surface M3, C2, C4 gear shift fork grooves Each gear teeth and sliding surface Other rotating and sliding area	Molybdenum disulfide oil (a mixture of 1/2 engine oil and 1/2 molybdenum disulfide grease)	
Primary drive gear and sub gear sliding surface	Molybdenum disulfide grease	
Oil filter cartrige 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 Flywheel bolt threads and seating surface Piston outer surface and piston pin hole Piston ring whole surface Connecting rod bolt threads and seating surface Primary drive gear bolt threads 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 18 mm sealing bolt threads Crankcase 22 mm sealing bolt threads Crankcase 24 mm sealing bolt threads Mainshaft bearing set plate bolt threads Shift drum bearing set plate bolt threads Pulse generator bolt threads	Locking agent	

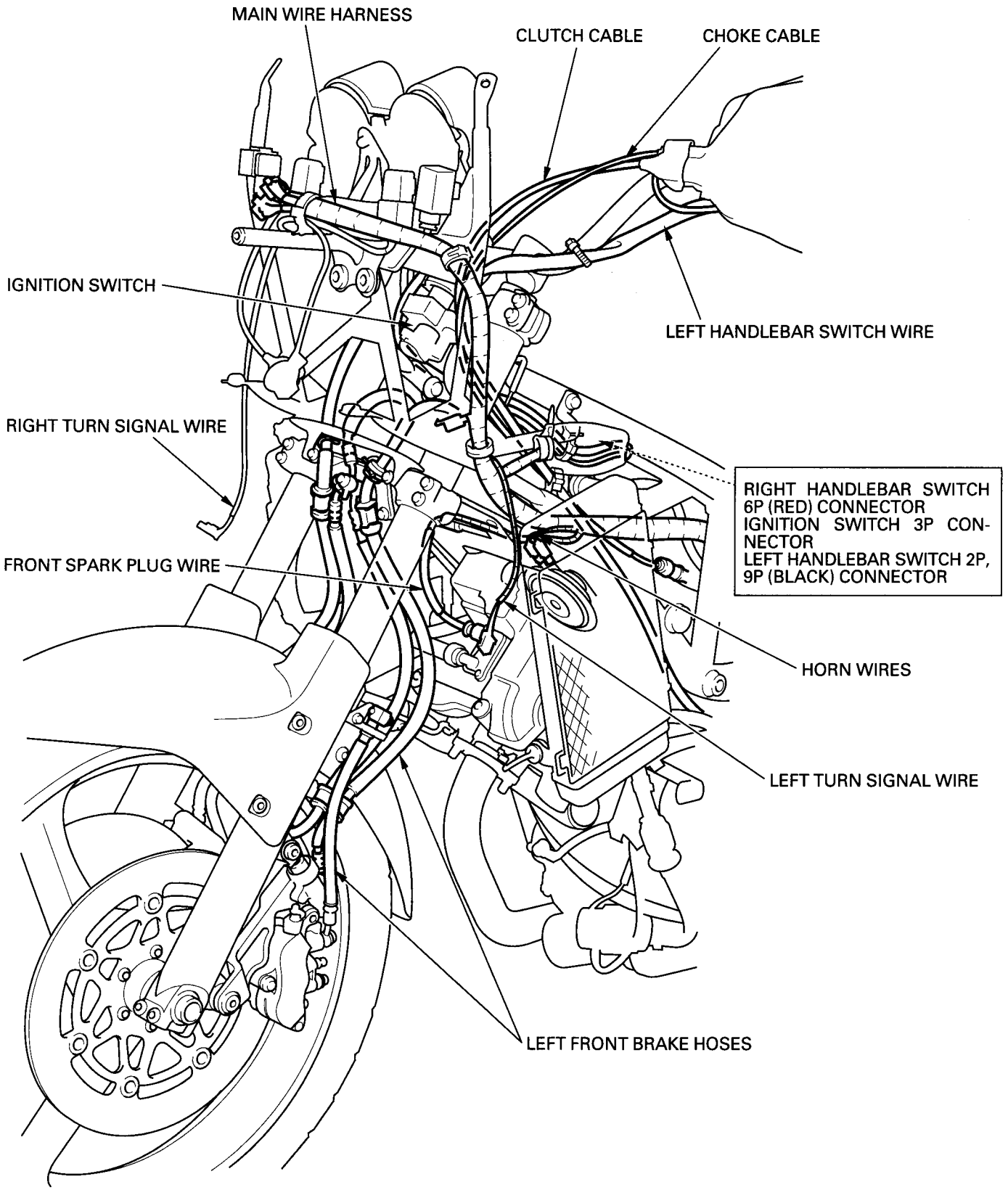
FRAME

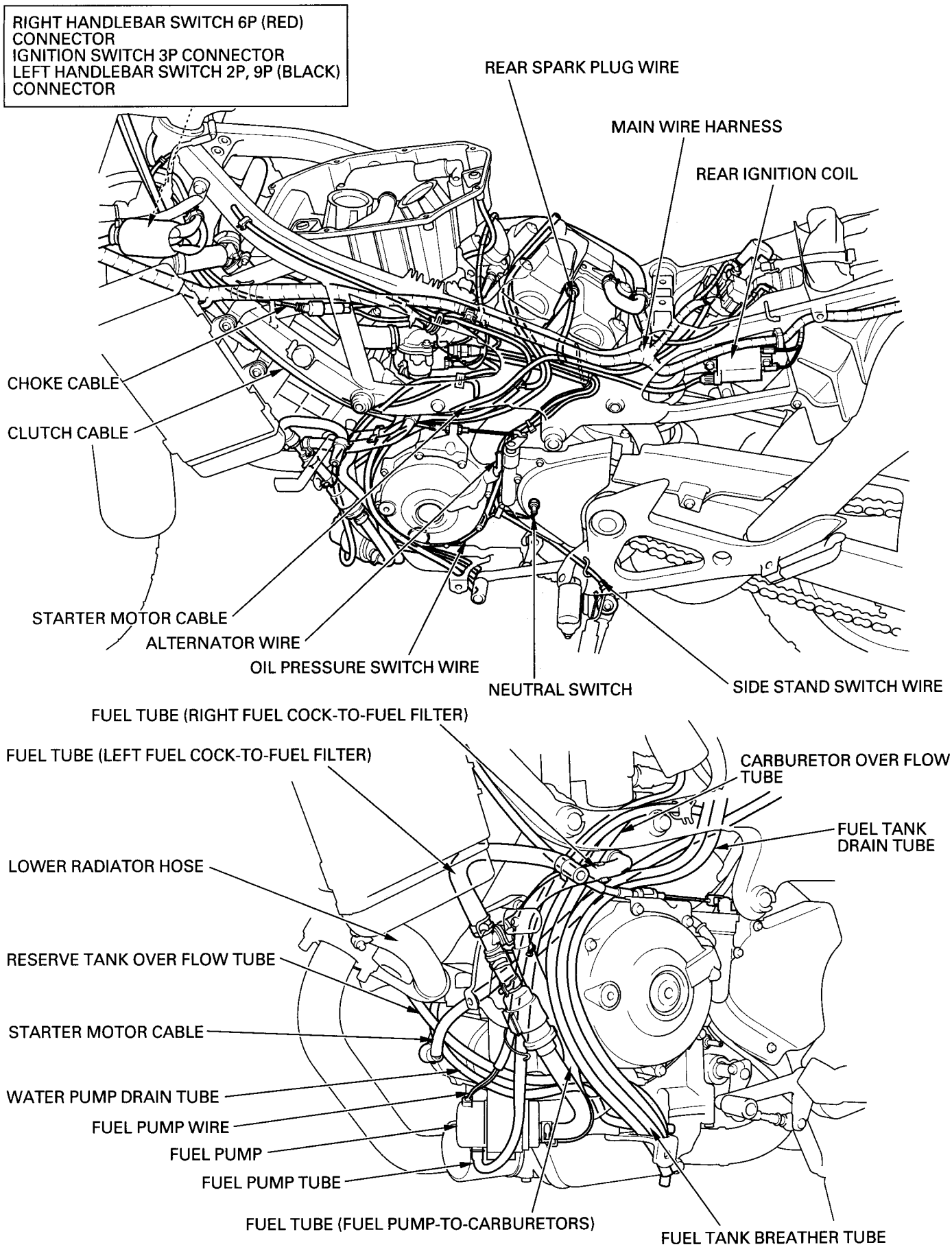
LOCATION	MATERIAL	REMARKS
Front wheel dust seal lips Rear wheel dust seal lips Driver footpeg sliding area Passenger footpeg sliding area Throttle grip pipe inner flange Seat catch hook Gearshift pedal link tie-rod ball joints Gearshift pedal pivot Side stand pivot Rear brake pedal pivot Steering head bearings Steering head bearing dust seal lips Clutch lever pivot Left front brake caliper pivot bearing sliding surface Left front brake caliper pivot oil seal sliding surface Left fork needle bearing sliding surface Left fork dust seal sliding surface Shock absorber dust seal lips Shock absorber needle bearing Shock link dust seal lips Shock link needle bearings Swingarm link plate needle bearings Swingarm pivot bearings Swingarm link plate dust seal lips Swingarm pivot dust seal lips Driven flange collar outer surface	Multi-purpose grease	
Throttle cable Choke cable Clutch cable	Cable lubricant	
Steering bearing adjustment nut threads Brake pipe joint threads	Engine oil	
Front brake lever-to-push rod contacting area Front brake lever pivot Brake caliper pin bolt sliding surfaces Brake master piston-to-push rod contacting area Secondary master cylinder boot inside and push rod tips Brake caliper dust seals	Silicone grease	
Brake master piston and cups Brake caliper piston and seals	DOT 4 brake fluid	
Fork oil seal lips Fork cap O-ring	Fork fluid	
Brake caliper slide pin bolt threads Fork socket bolt threads	Locking agent	
Handle grip rubber inside	Honda Bond A or equivalent	

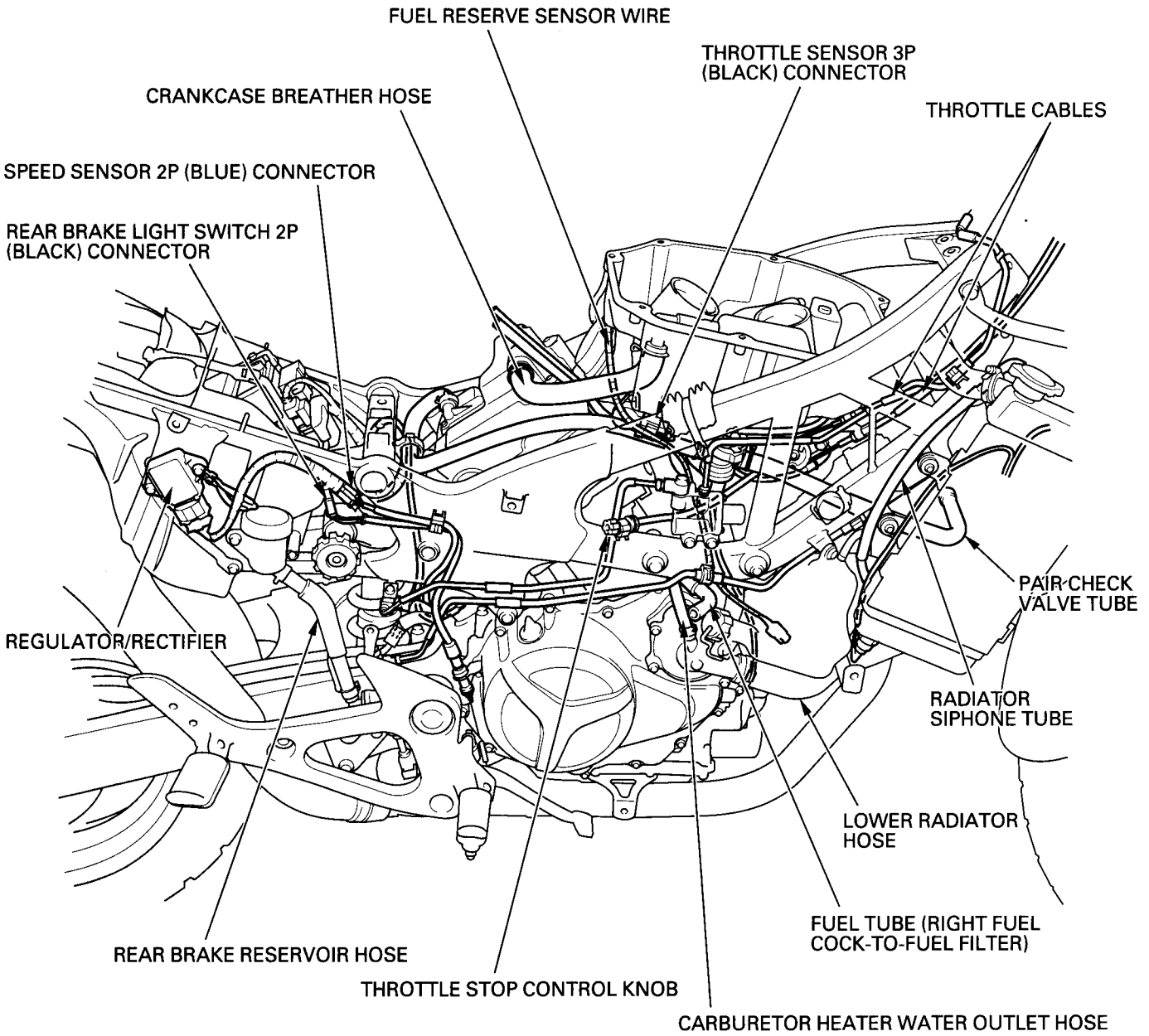
CABLE & HARNESS ROUTING

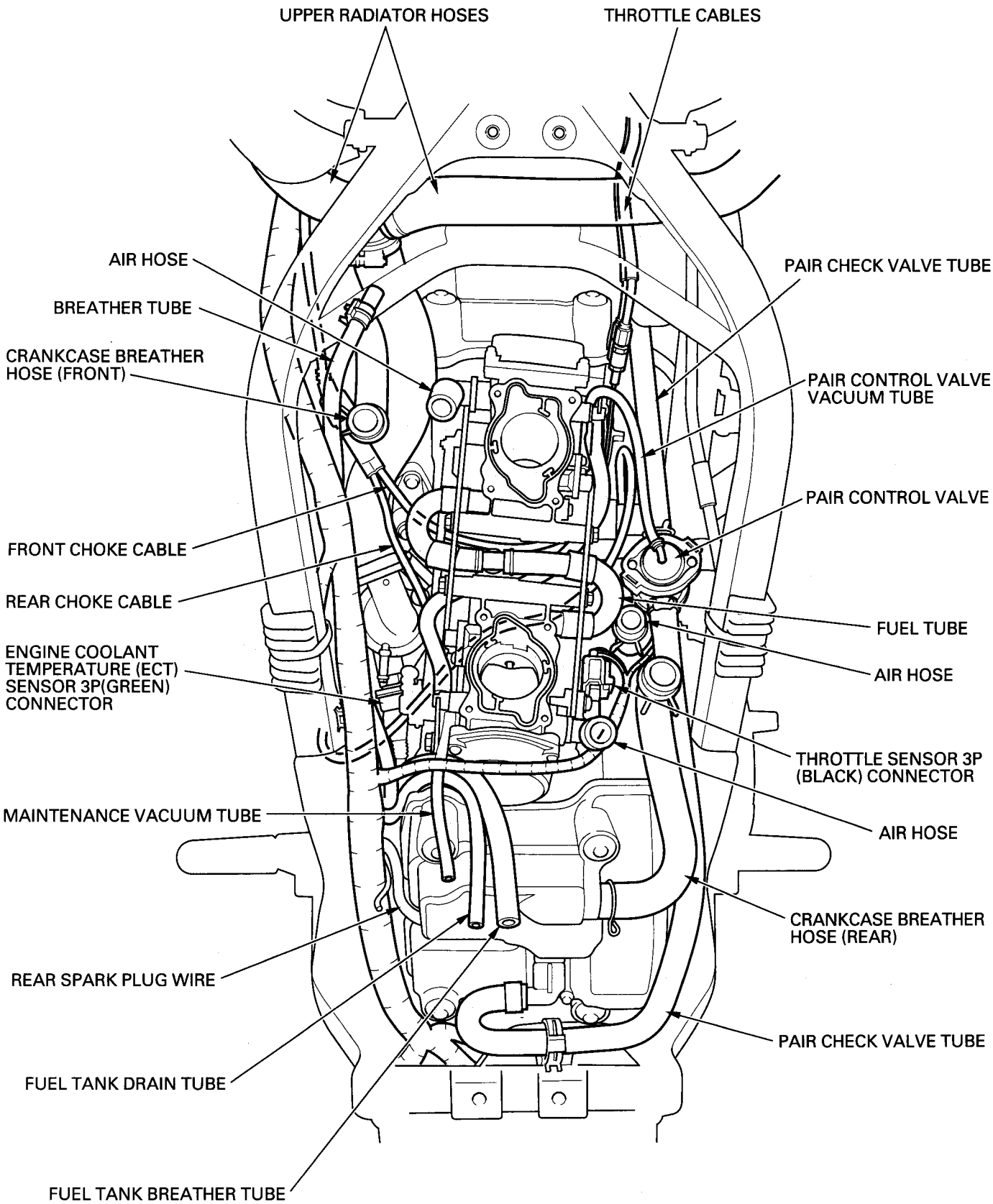


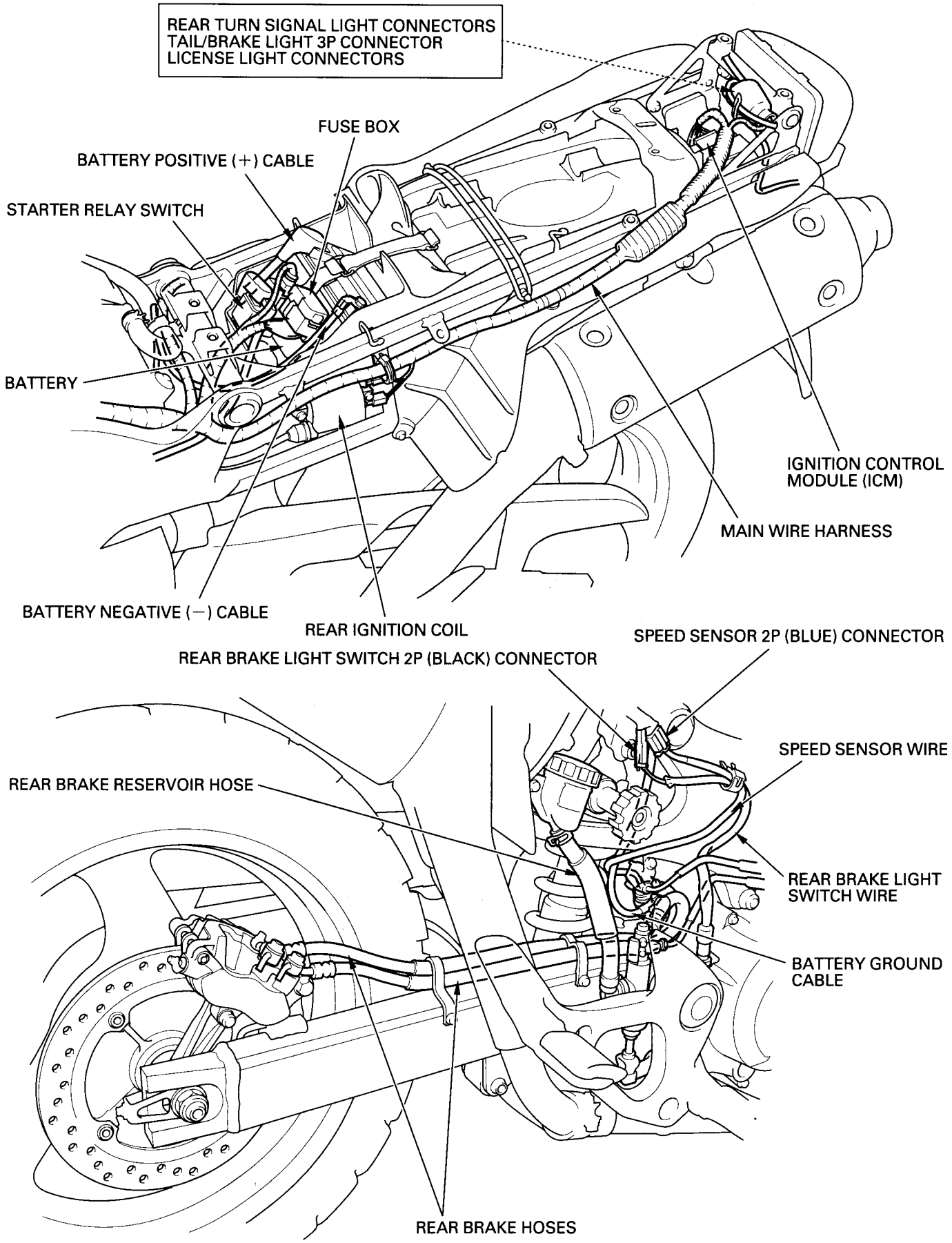

THROTTLE CABLES
RIGHT HANDLEBAR SWITCH WIRE
FAN MOTOR SWITCH 2P (BLACK) CONNECTOR
FRONT BRAKE HOSE
SIPHONE TUBE
RIGHT FRONT BRAKE HOSES


MAIN WIRE HARNESS
CLUTCH CABLE
CHOKE CABLE
IGNITION SWITCH
LEFT HANDLEBAR SWITCH WIRE
RIGHT TURN SIGNAL WIRE
RIGHT HANDLEBAR SWITCH 6P (RED) CONNECTOR
IGNITION SWITCH 3P CONNECTOR
LEFT HANDLEBAR SWITCH 2P, 9P (BLACK) CONNECTOR
FRONT SPARK PLUG WIRE
HORN WIRES
LEFT TURN SIGNAL WIRE
LEFT FRONT BRAKE HOSES


RIGHT HANDLEBAR SWITCH 6P (RED) CONNECTOR
IGNITION SWITCH 3P CONNECTOR
LEFT HANDLEBAR SWITCH 2P, 9P (BLACK) CONNECTOR
REAR SPARK PLUG WIRE
MAIN WIRE HARNESS
REAR IGNITION COIL
CHOKE CABLE
CLUTCH CABLE
STARTER MOTOR CABLE
ALTERNATOR WIRE
OIL PRESSURE SWITCH WIRE
NEUTRAL SWITCH
SIDE STAND SWITCH WIRE
FUEL TUBE (RIGHT FUEL COCK-TO-FUEL FILTER)
FUEL TUBE (LEFT FUEL COCK-TO-FUEL FILTER)
CARBURETOR OVER FLOW TUBE
FUEL TANK DRAIN TUBE
LOWER RADIATOR HOSE
RESERVE TANK OVER FLOW TUBE
STARTER MOTOR CABLE
WATER PUMP DRAIN TUBE
FUEL PUMP WIRE
FUEL PUMP
FUEL PUMP TUBE
FUEL TUBE (FUEL PUMP-TO-CARBURETORS)
FUEL TANK BREATHER TUBE


FUEL RESERVE SENSOR WIRE
THROTTLE SENSOR 3P (BLACK) CONNECTOR
CRANKCASE BREATHER HOSE
THROTTLE CABLES
SPEED SENSOR 2P (BLUE) CONNECTOR
REAR BRAKE LIGHT SWITCH 2P (BLACK) CONNECTOR
PAIR CHECK VALVE TUBE
REGULATOR/RECTIFIER
RADIATOR SIPHONE TUBE
LOWER RADIATOR HOSE
FUEL TUBE (RIGHT FUEL COCK-TO-FUEL FILTER)
REAR BRAKE RESERVOIR HOSE
THROTTLE STOP CONTROL KNOB
CARBURETOR HEATER WATER OUTLET HOSE


UPPER RADIATOR HOSES
THROTTLE CABLES
AIR HOSE
BREATHER TUBE
CRANKCASE BREATHER HOSE (FRONT)
PAIR CHECK VALVE TUBE
PAIR CONTROL VALVE VACUUM TUBE
PAIR CONTROL VALVE
FRONT CHOKE CABLE
REAR CHOKE CABLE
FUEL TUBE
AIR HOSE
ENGINE COOLANT TEMPERATURE (ECT) SENSOR 3P(GREEN) CONNECTOR
THROTTLE SENSOR 3P (BLACK) CONNECTOR
MAINTENANCE VACUUM TUBE
AIR HOSE
CRANKCASE BREATHER HOSE (REAR)
REAR SPARK PLUG WIRE
PAIR CHECK VALVE TUBE
FUEL TANK DRAIN TUBE
FUEL TANK BREATHER TUBE


REAR TURN SIGNAL LIGHT CONNECTORS
TAIL/BRAKE LIGHT 3P CONNECTOR
LICENSE LIGHT CONNECTORS
FUSE BOX
BATTERY POSITIVE (+) CABLE
STARTER RELAY SWITCH
BATTERY
IGNITION CONTROL MODULE (ICM)
MAIN WIRE HARNESS
BATTERY NEGATIVE (−) CABLE
REAR IGNITION COIL
SPEED SENSOR 2P (BLUE) CONNECTOR
REAR BRAKE LIGHT SWITCH 2P (BLACK) CONNECTOR
SPEED SENSOR WIRE
REAR BRAKE RESERVOIR HOSE
REAR BRAKE LIGHT SWITCH WIRE
BATTERY GROUND CABLE
REAR BRAKE HOSES

EMISSION CONTROL SYSTEMS

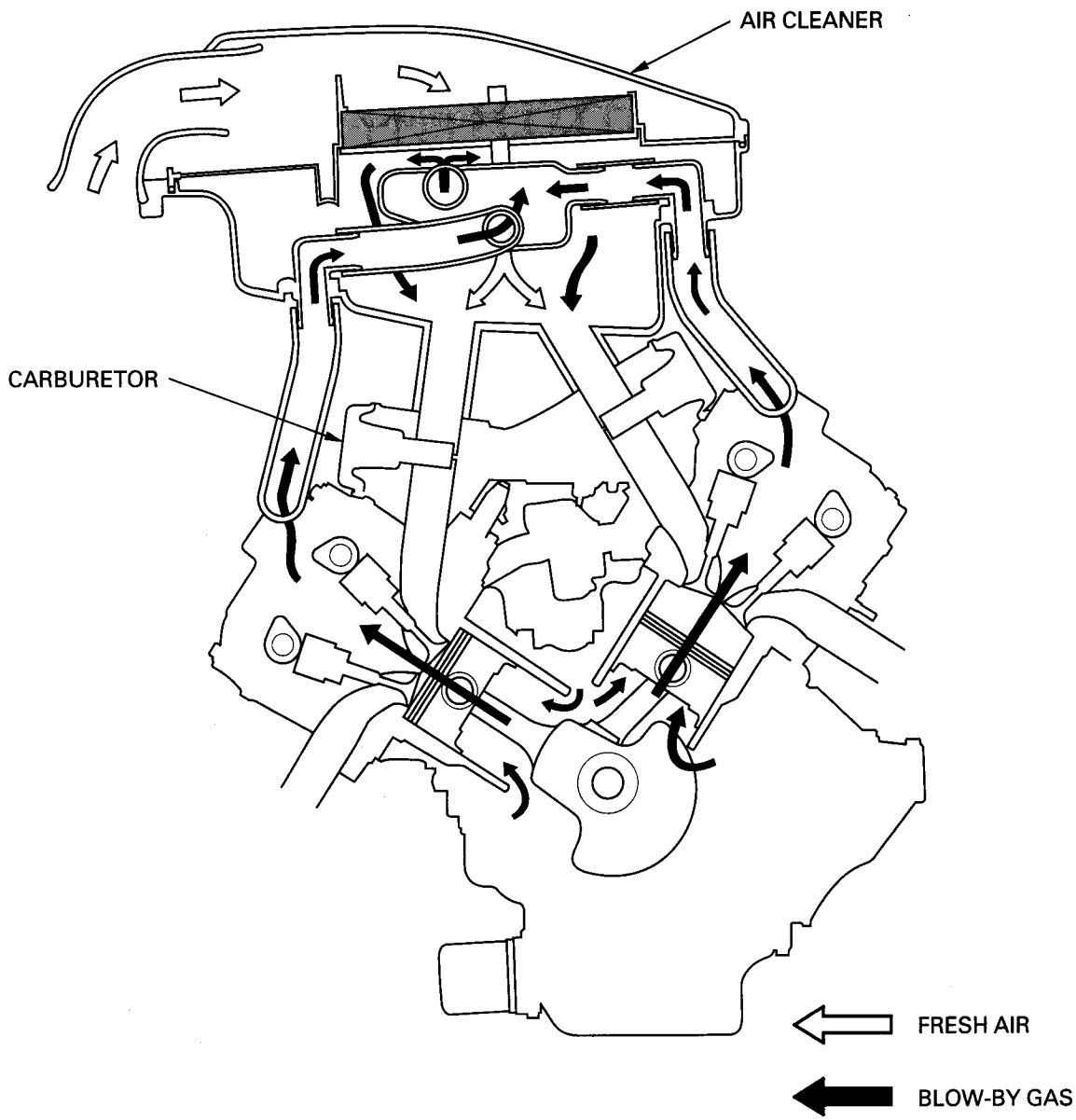
SOURCE OF EMISSIONS

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

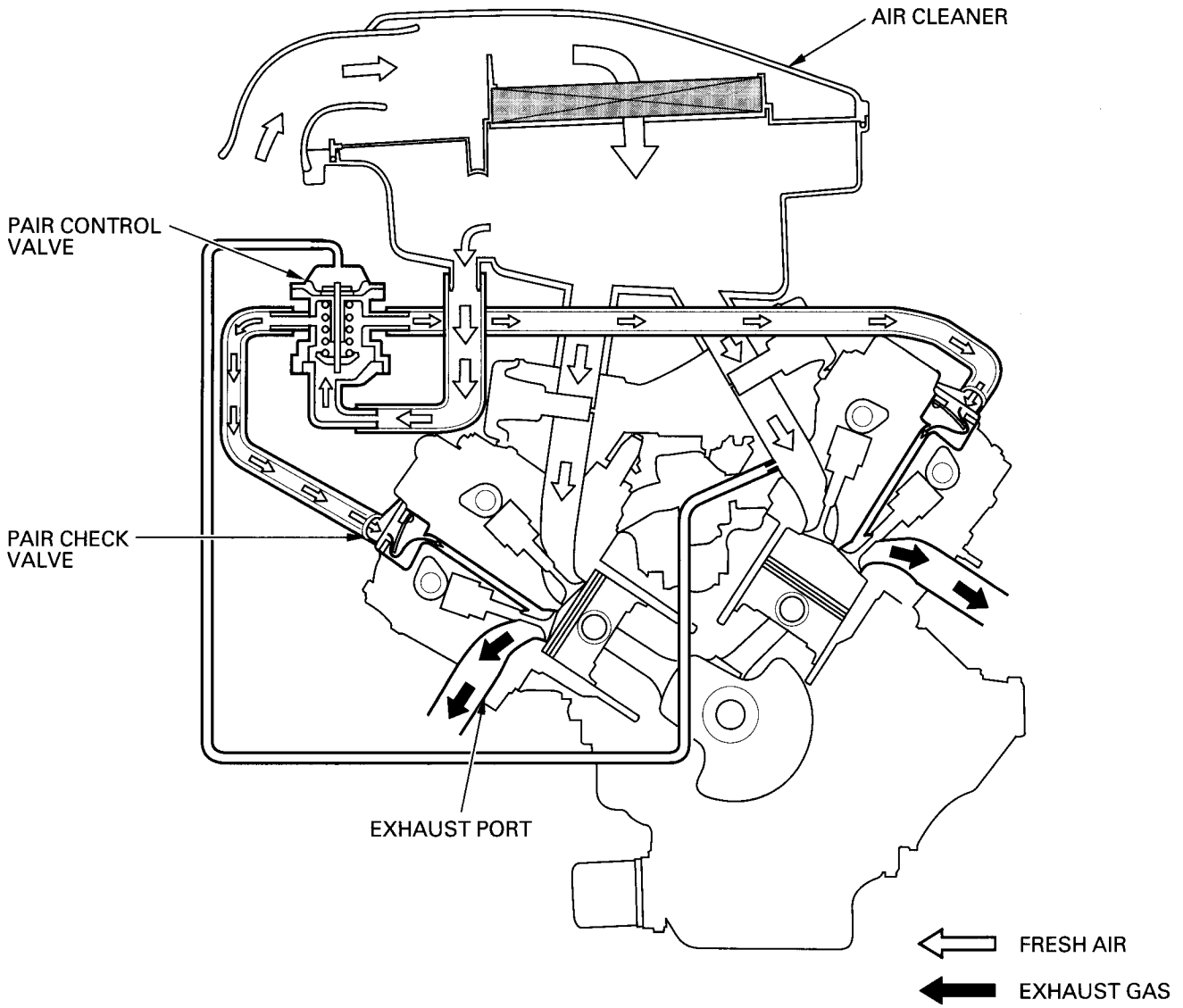
The engine is equipped with a closed crankcase system to prevent discharging crankcase emissions into the atmosphere. Blow-by gas is returned to the combustion chamber through the air cleaner and carburetor.



EXHAUST EMISSION CONTROL SYSTEM (PULSE SECONDARY AIR INJECTION SYSTEM)

The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. Fresh air is drawn into the exhaust 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.

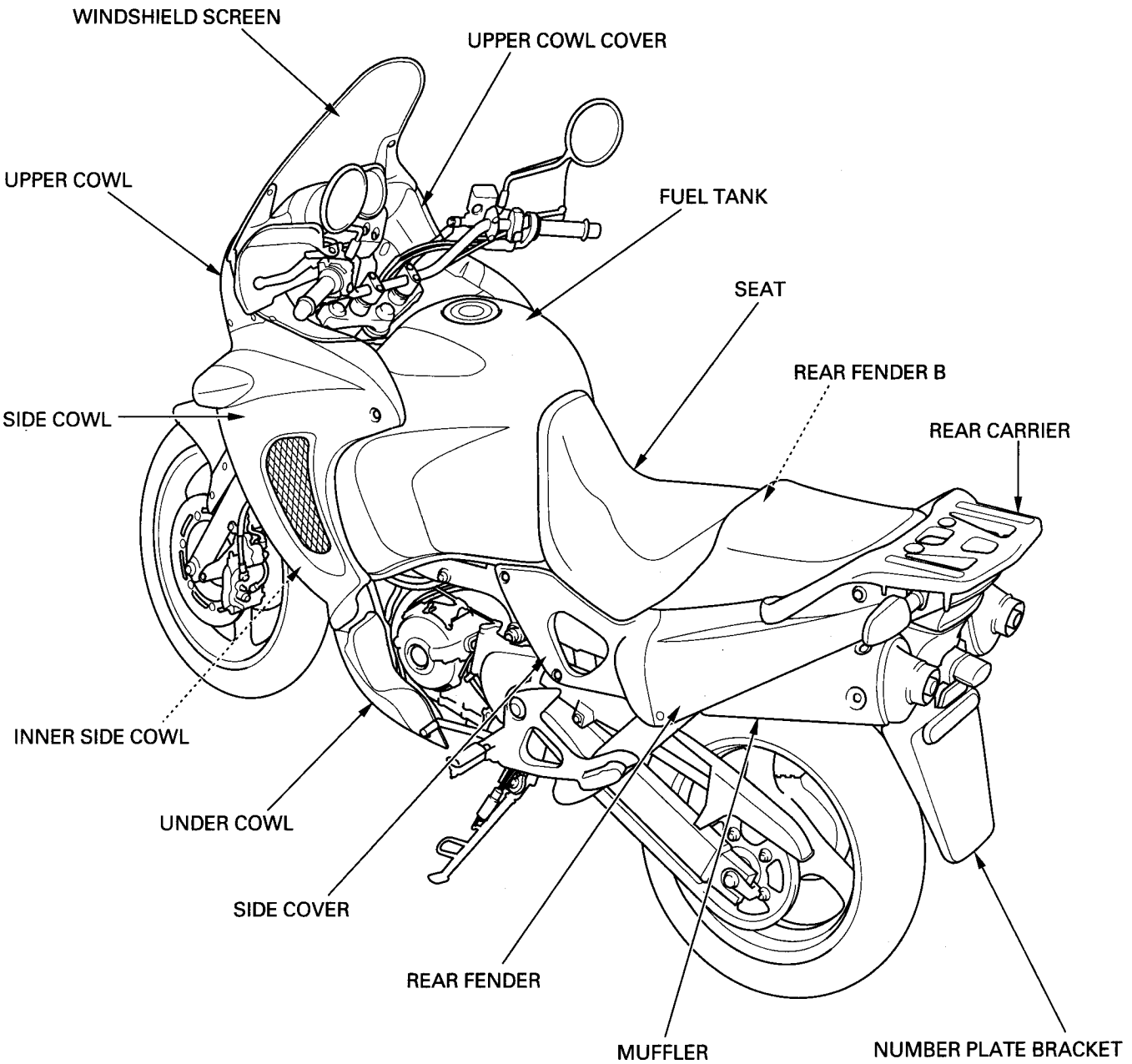
No adjustment to the pulse secondary air injection system should be made, although periodic inspection of the components is recommended.



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.

BODY PANEL LOCATIONS



2. FRAME/BODY PANELS/EXHAUST SYSTEM

BODY PANEL LOCATIONS	2-0	NUMBER PLATE BRACKET	2-4
SERVICE INFORMATION	2-1	REAR FENDER B	2-4
TROUBLESHOOTING	2-1	SIDE COWL	2-5
SEAT	2-2	UPPER COWL	2-6
SIDE COVER	2-2	UNDER COWL	2-7
REAR CARRIER	2-3	MUFFLER/EXHAUST PIPE	2-8
REAR FENDER	2-3	FUEL TANK	2-10

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.
- When installing the exhaust system, loosely install all of the exhaust fasteners. Always tighten the exhaust clamps first, then tighten the mounting fasteners. If you tighten the mounting fasteners first, the exhaust pipe may not seat properly.
- Always inspect the exhaust system for leaks after installation.

TORQUE VALUES

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)
Fuel cock nut	34 N·m (3.5 kgf·m , 25 lbf·ft)
Rear turn signal nut	5 N·m (0.5 kgf·m , 3.6 lbf·ft)
Upper cowl stay mounting bolt (upper)	34 N·m (3.5 kgf·m , 25 lbf·ft)
(lower)	44 N·m (4.5 kgf·m , 33 lbf·ft)
Upper cowl stay mounting nut (head pipe)	44 N·m (4.5 kgf·m , 33 lbf·ft)

TROUBLESHOOTING

Excessive exhaust noise
- Broken exhaust system
- Exhaust gas leaks

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

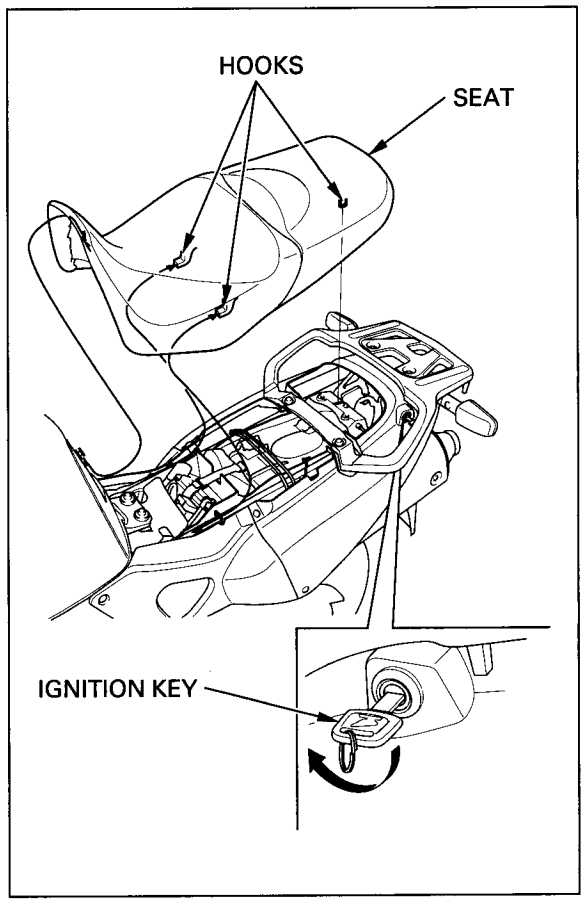
SEAT

REMOVAL

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

INSTALLATION

Install the seat, inserting the groove to the prong on the fuel tank and the catches into the hooks of the frame.
Push the seat forward, then down to lock it.



SIDE COVER

NOTE:

At side cover removal/installation, be careful not to damage the tabs on the rear fender.

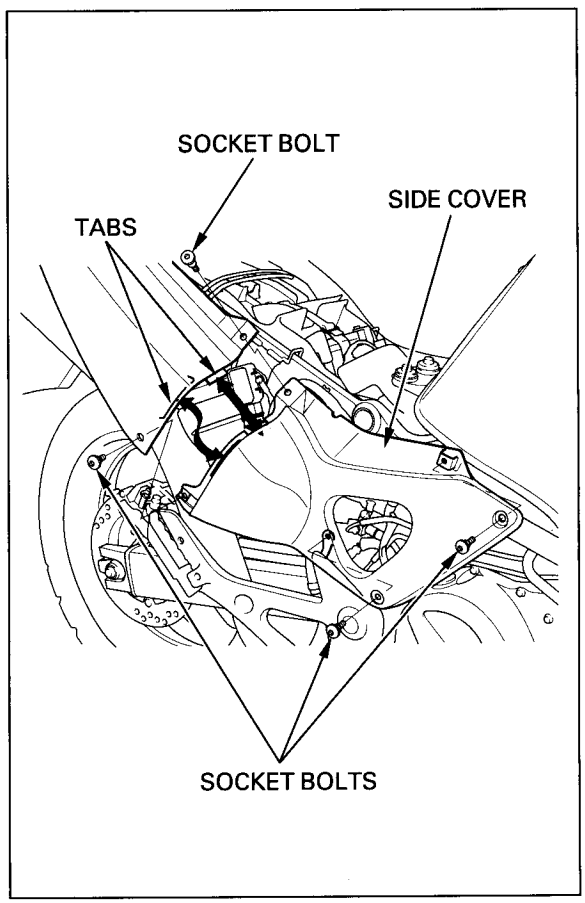
Remove the seat (see above).

Remove the socket bolts and side cover.

Install the side cover in the reverse order of removal.

NOTE:

Align the grooves on the side cover with the tabs on the rear fender.

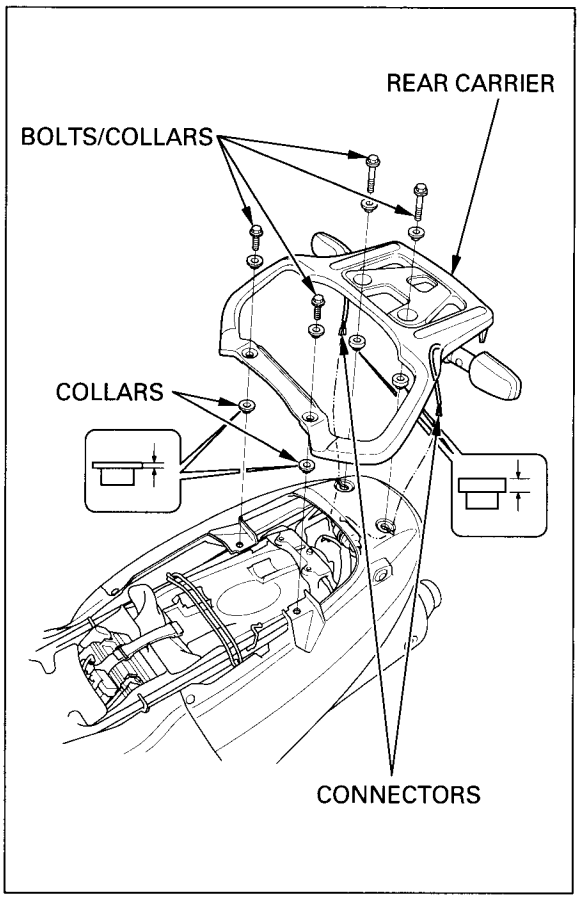


REAR CARRIER

Remove the seat (page 2-2).

Disconnect the rear turn signal connectors.
Remove the bolts and collars.
Remove the rear carrier and collars.

Installation is in the reverse order of removal.

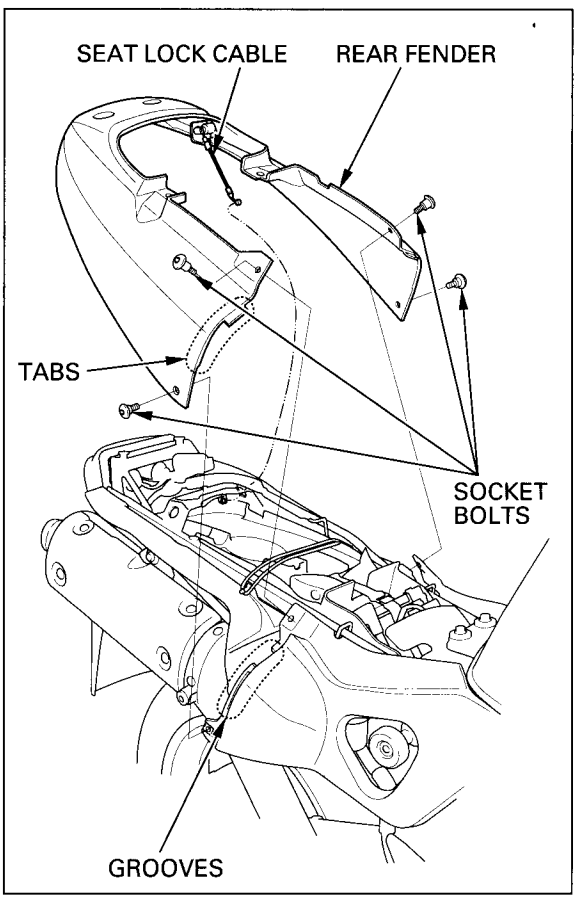


REAR FENDER

Remove the seat (page 2-2).
Remove the rear carrier (see above).

Disconnect the seat lock cable from the seat lock.
Remove the socket bolts.
Unhook the tabs on the rear fender from the grooves on the side cover.
Remove the rear fender.

Installation is in the reverse order of removal.

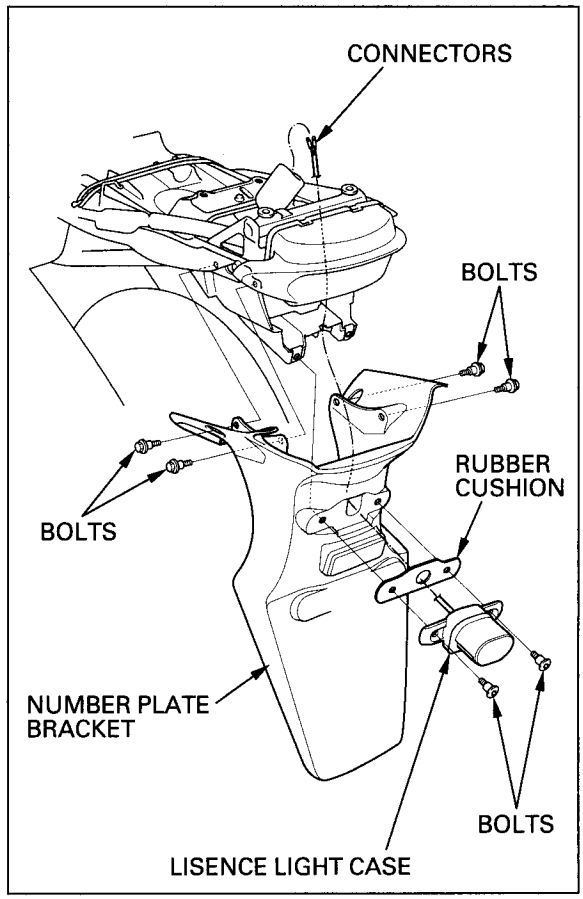


NUMBER PLATE BRACKET

Remove the rear fender (page 2-3).
Remove the muffler (page 2-8).

Disconnect the lisence light connectors.
Remove the bolts and lisence light case.
Remove the rubber cushion.
Remove the bolts and number plate bracket.

Installation is in the reverse order of removal.

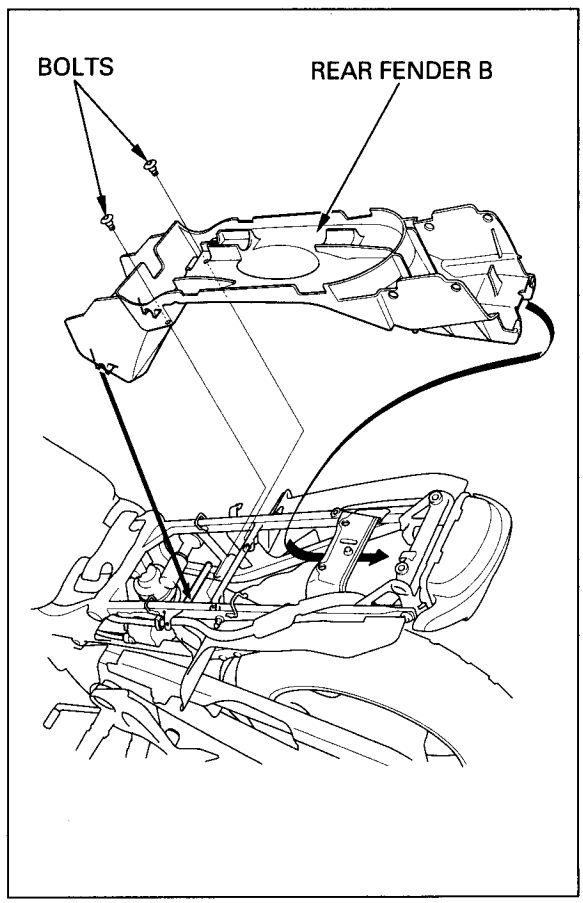


REAR FENDER B

Remove the number plate bracket (see above).
Remove the side cover (page 2-2).
Remove the battery (page 16-5).
Remove the ICM (page 17-5).

Remove the bolts and rear fender B.

Installation is in the reverse order of removal.

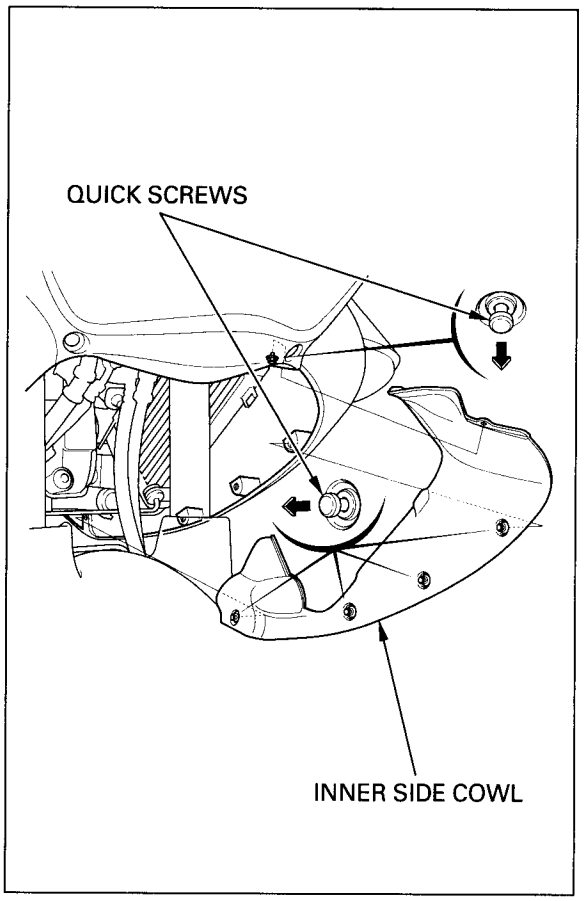


SIDE COWL

INNER SIDE COWL

Release the quick screws and remove the inner side cowl.

Installation is in the reverse order of removal.

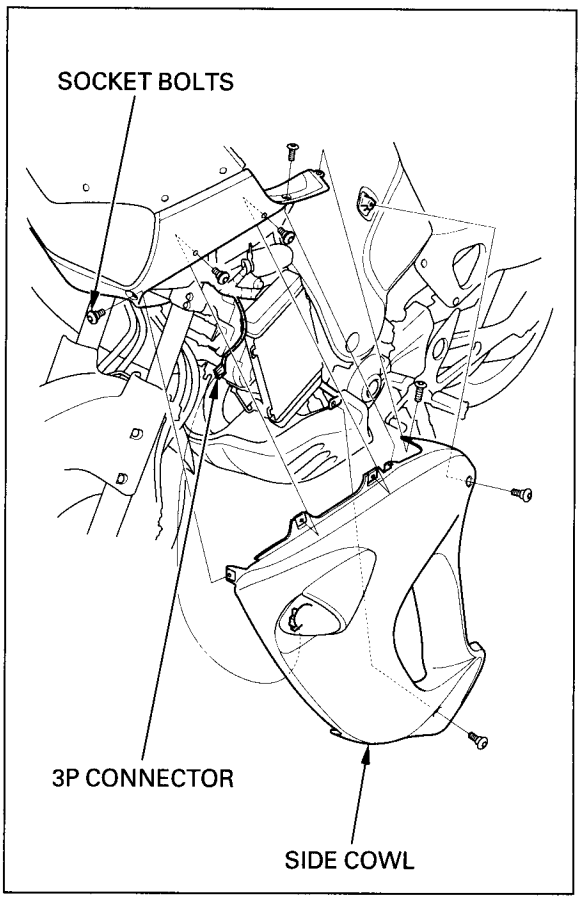


SIDE COWL

Remove the inner side cowl (see above).

Disconnect the front turn signal 3P connector.
Remove the socket bolts and side cowl.

Installation is in the reverse order of removal.



UPPER COWL

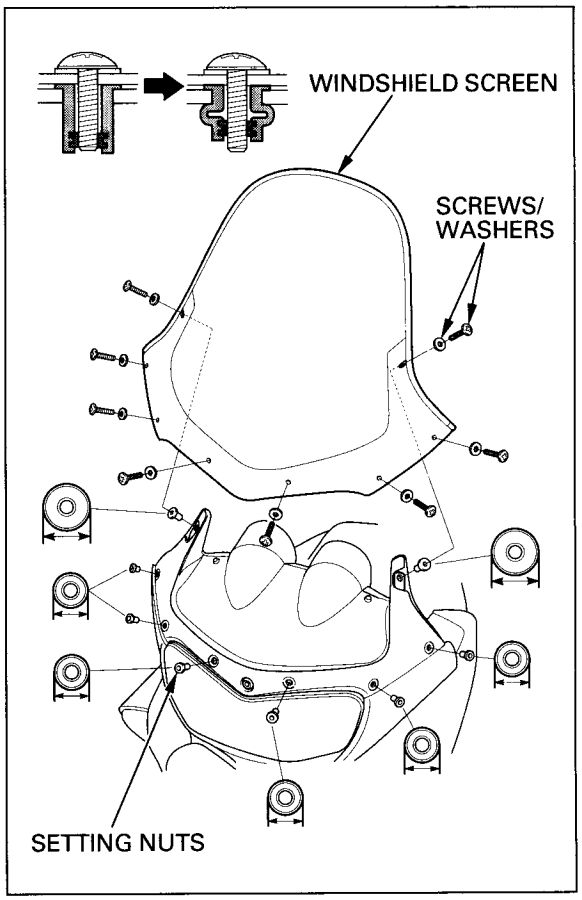
WINDSHIELD SCREEN

CAUTION:

Do not scratch and damage the windshield screen.

Remove the screws, washers and windshield screen.
Remove the setting nuts.

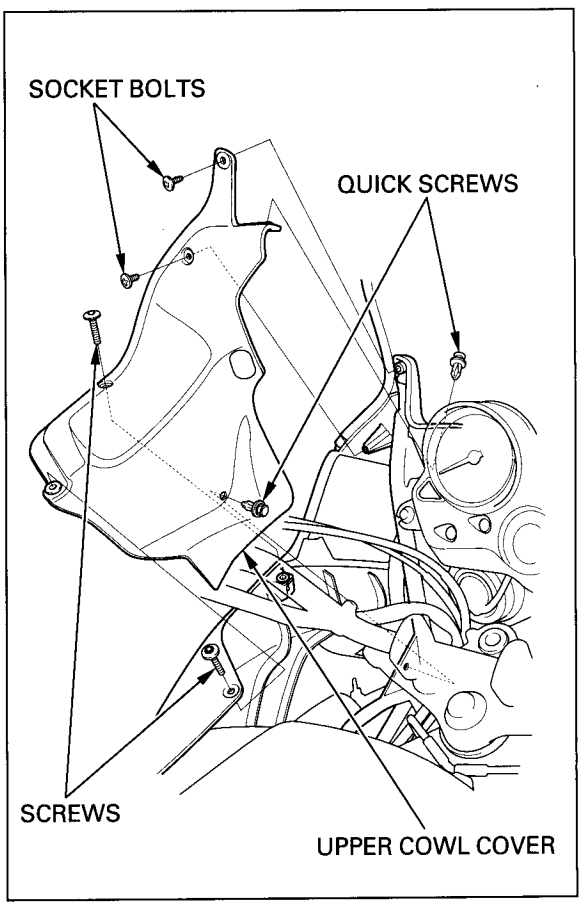
Installation is in the reverse order of removal.



UPPER COWL COVER

Remove the screws and socket bolts.
Release the quick screws and remove the upper cowl cover.

Installation is in the reverse order of removal.

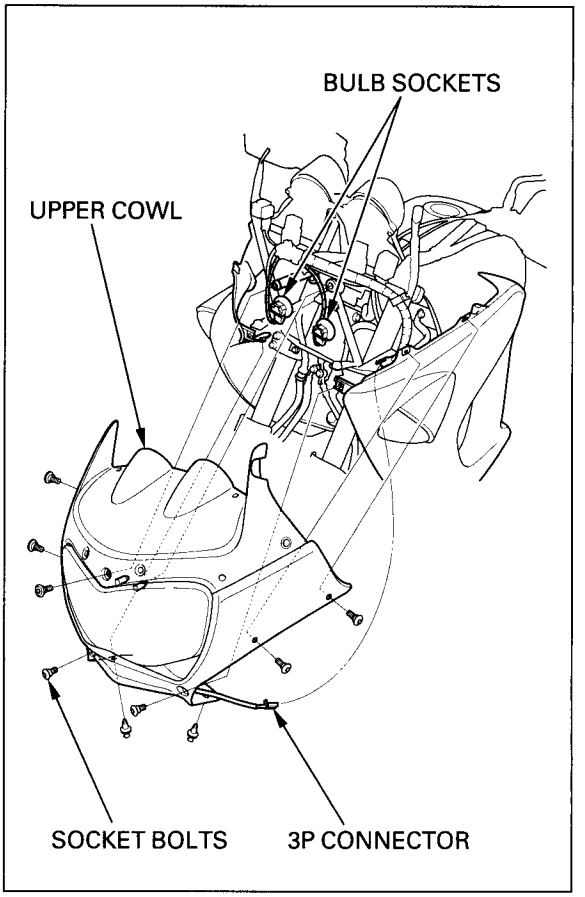


UPPER COWL

Remove the windshield screen (page 2-6).
Remove the upper cowl cover (page 2-6).

Remove the socket bolts.
Disconnect the position light 3P connector and headlight bulb sockets.
Remove the upper cowl.

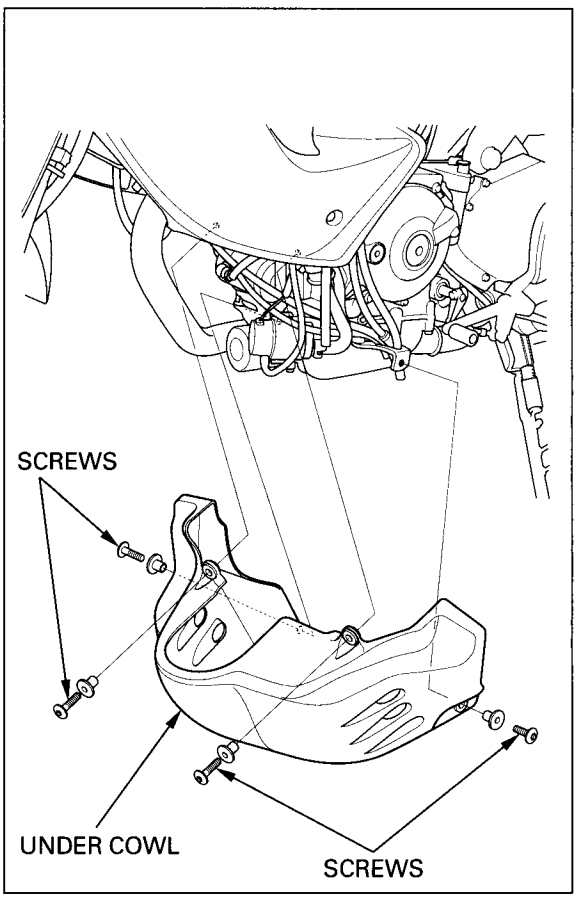
Installation is in the reverse order of removal.



UNDER COWL

Remove the screws and under cowl.

Installation is in the reverse order of removal.



MUFFLER/EXHAUST PIPE

REMOVAL

⚠WARNING

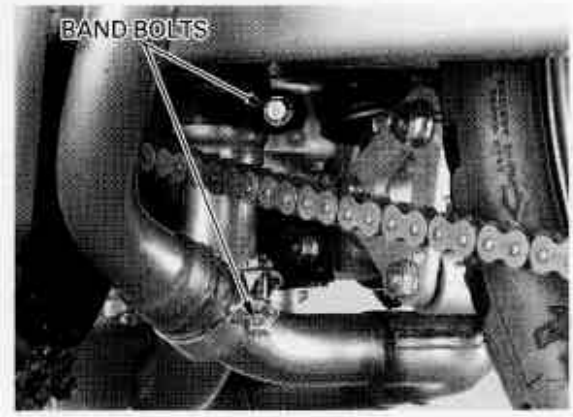
Do not service the exhaust system while it is hot.

Remove the rear fender (page 2-3).
Remove the under cowl (page 2-7).

Loosen the right muffler band bolt.



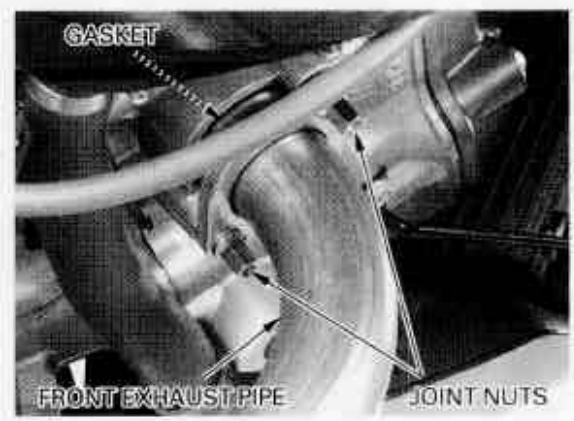
Loosen the left muffler band bolt and rear exhaust pipe band bolt.



Remove the muffler mounting bolts, washers and nuts.
Remove the muffler.



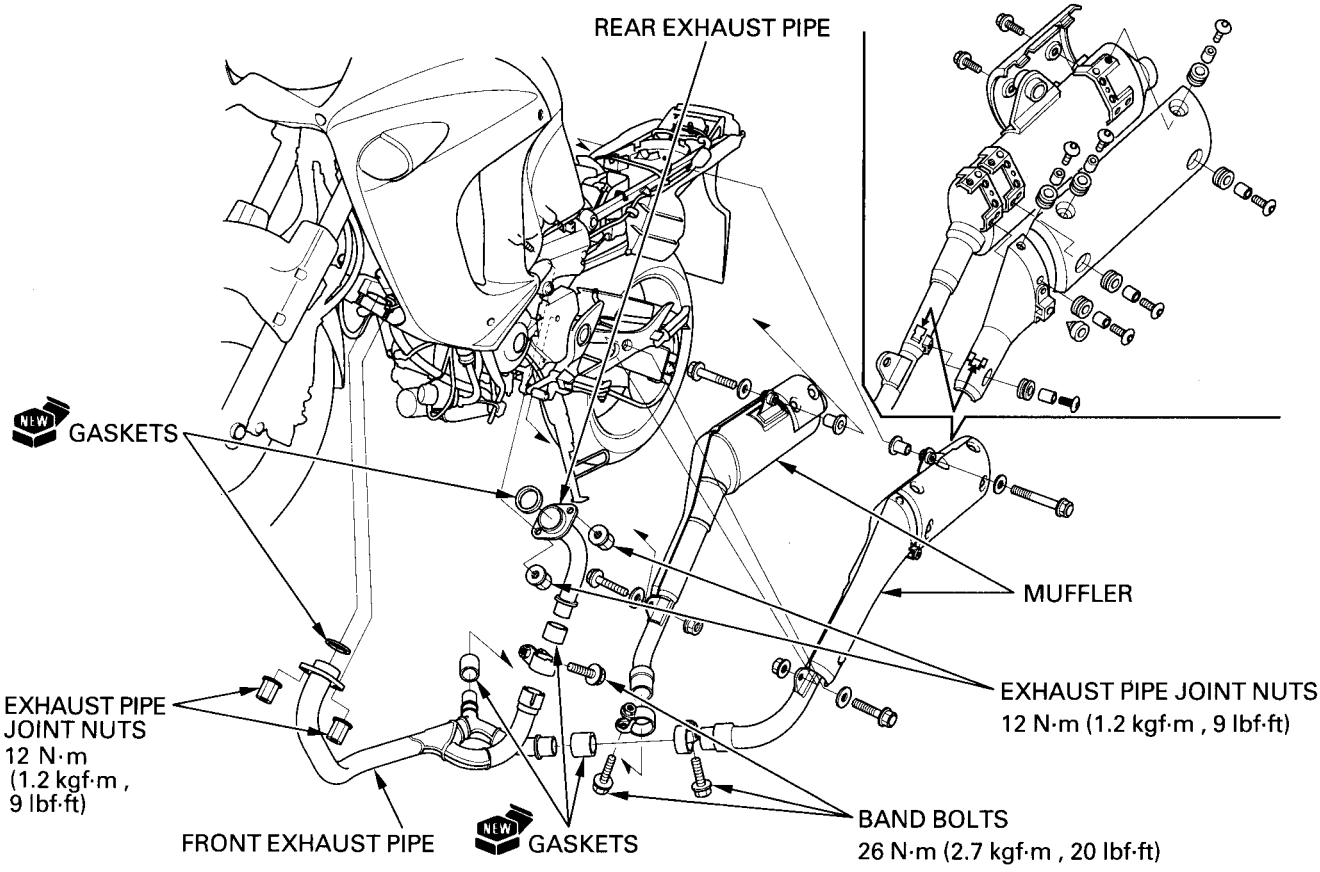
Remove the front exhaust pipe joint nuts, gasket and front exhaust pipe.



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



INSTALLATION



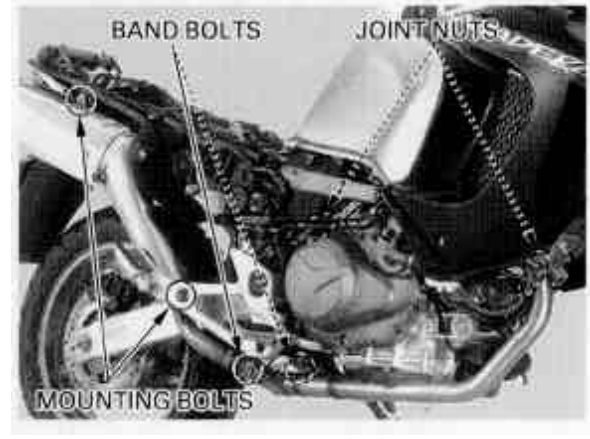
Replace the gaskets with new ones.

Installation is in the reverse order of removal.

Tighten the bolts and nuts to their specified torque.

TORQUE:

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)



FUEL TANK

⚠WARNING

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

NOTE:

- Drain the fuel from the fuel tank for ease of the fuel tank removal.
- Before disconnecting the fuel tube, turn the fuel valve OFF.

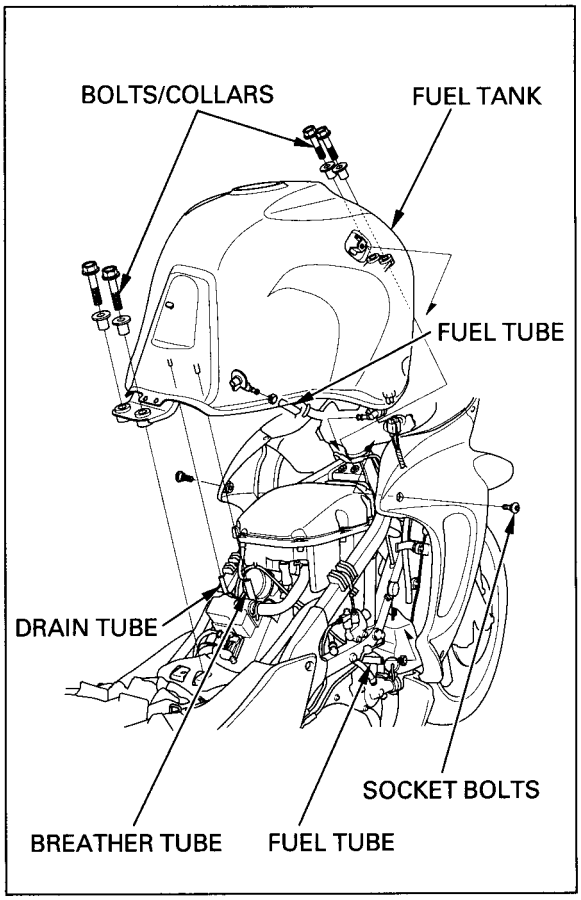
Remove the seat (page 2-2).

Disconnect the fuel tubes from the fuel valves.
Remove the socket bolts.
Remove the front and rear fuel tank mounting bolts/collars.
Disconnect the fuel reserve sensor connectors.
Disconnect the drain and breather tubes from the fuel tank.
Remove the fuel tank.

Installation is in the reverse order of removal.

NOTE:

After installation, check for the fuel valves ON position.



3. MAINTENANCE

SERVICE INFORMATION	3-1	SECONDARY AIR SUPPLY SYSTEM	3-16
MAINTENANCE SCHEDULE	3-3	DRIVE CHAIN	3-16
FUEL LINE	3-4	DRIVE CHAIN SLIDER	3-20
THROTTLE OPERATION	3-4	BRAKE FLUID	3-20
CARBURETOR CHOKE	3-5	BRAKE PAD WEAR	3-21
AIR CLEANER	3-5	BRAKE SYSTEM	3-21
SPARK PLUG	3-6	BRAKE LIGHT SWITCH	3-22
VALVE CLEARANCE	3-8	HEADLIGHT AIM	3-23
ENGINE OIL	3-10	CLUTCH SYSTEM	3-23
ENGINE OIL FILTER	3-11	SIDE STAND	3-24
CARBURETOR SYNCHRONIZATION	3-12	SUSPENSION	3-25
ENGINE IDLE SPEED	3-14	NUTS, BOLTS, FASTENERS	3-25
RADIATOR COOLANT	3-14	WHEELS/TIRES	3-26
COOLING SYSTEM	3-15	STEERING HEAD BEARING	3-26

SERVICE INFORMATION

GENERAL

⚠WARNING

- ***Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Smoking or allowing flames or sparks in the work area or where the gasoline is stored can cause a fire or explosion.***
- ***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.***

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

SPECIFICATIONS

ITEM		SPECIFICATIONS
Throttle grip free play		2–6 mm (1/16–1/4 in)
Spark plug		DPR8EVX–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	At draining	3.4 ℓ (3.6 US qt , 3.0 Imp qt)
	At filter change	3.6 ℓ (3.8 US qt , 3.2 Imp qt)
	At disassembly	4.1 ℓ (4.3 US qt , 3.6 Imp qt)
Carburetor vacuum difference		20 mm Hg (0.8 in Hg)

ITEM			SPECIFICATIONS
Engine idle speed			1,200 ± 50 min^{-1} (rpm)
Drive chain slack			35 – 45 mm (1 3/8 – 1 3/4 in)
Recommended brake fluid			DOT 4
Cold tire pressure	Driver only	Front	250 kPa (2.50 kgf/cm^2, 36 psi)
		Rear	250 kPa (2.50 kgf/cm^2, 36 psi)
	Driver and passenger	Front	250 kPa (2.50 kgf/cm^2, 36 psi)
		Rear	280 kPa (2.80 kgf/cm^2, 41 psi)
Tire size		Front	110/80 R19 59H
		Rear	150/70 R17 69H
Tire brand	METZELER	Front	ENDURO4A
		Rear	ENDURO4A
	MICHELIN	Front	T66X
		Rear	T66X
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	30 N·m (3.1 kgf·m, 22 lbf·ft)	
Intake manifold 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)	U-nut
Front brake master cylinder cap screw	1 N·m (0.15 kgf·m, 1.1 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.

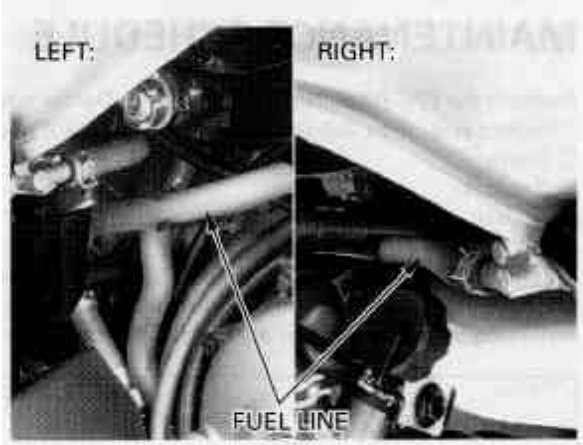
	ITEM / FREQUENCY	WHICHEVER COMES ⇨ FIRST ⇩ NOTE	ODOMETER READING (NOTE 1)								REFER TO PAGE
			× 1,000 km	1	6	12	18	24	30	36	
			× 1,000 mi	0.6	4	8	12	16	20	24	
			MONTHS		6	12	18	24	30	36	
*	FUEL LINE					I		I		I	3-4
*	THROTTLE OPERATION					I		I		I	3-4
*	CARBURETOR CHOKE					I		I		I	3-5
*	AIR CLEANER	NOTE 2					R			R	3-5
	SPARK PLUG					I		R		I	3-6
*	VALVE CLEARANCE							I			3-8
	ENGINE OIL			R		R		R		R	3-10
	ENGINE OIL FILTER			R		R		R		R	3-11
*	CARBURETOR SYNCHRONIZATION			I		I		I		I	3-12
*	ENGINE IDLE SPEED			I	I	I	I	I	I	I	3-14
	RADIATOR COOLANT	NOTE 3				I		I		R	3-14
*	COOLING SYSTEM					I		I		I	3-15
*	SECONDARY AIR SUPPLY SYSTEM					I		I		I	3-16
	DRIVE CHAIN			Every 1,000 km (600 mi) I, L							3-16
	DRIVE CHAIN SLIDER					I		I		I	3-20
	BRAKE FLUID	NOTE 3			I	I	R	I	I	R	3-20
	BRAKE PAD WEAR				I	I	I	I	I	I	3-21
	BRAKE SYSTEM			I		I		I		I	3-21
*	BRAKE LIGHT SWITCH					I		I		I	3-22
*	HEADLIGHT AIM					I		I		I	3-23
	CLUTCH SYSTEM			I	I	I	I	I	I	I	3-23
	SIDE STAND					I		I		I	3-24
*	SUSPENSION					I		I		I	3-25
*	NUTS, BOLTS, FASTENERS			I		I		I		I	3-25
**	WHEELS/TIRES					I		I		I	3-26
**	STEERING HEAD BEARINGS			I		I		I		I	3-26

* 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 reading, repeat at the frequency interval established here.
2. Service more frequently If the motorcycle is ridden in unusually wet or dusty areas.
3. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.

FUEL LINE

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.



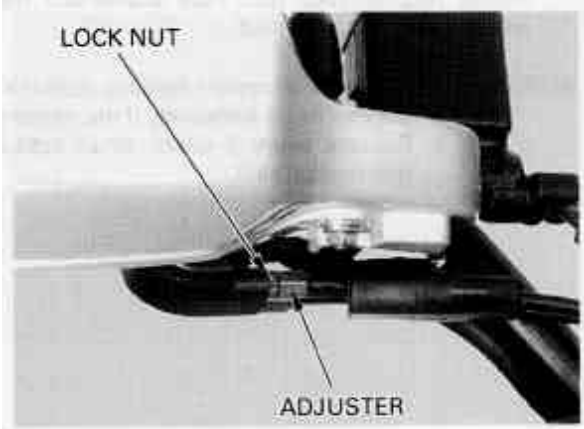
With the engine idling, turn the handlebar all the way to the right and left to ensure that the idle speed does not change. If idle speed increases, check the throttle grip free play and throttle cable connection.

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

THROTTLE GRIP FREE PLAY:
2–6 mm (1/16–1/4 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.

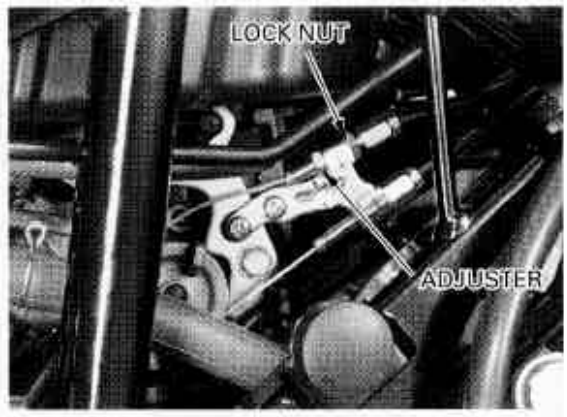


Major adjustments are made with the lower adjuster.

Remove the fuel tank (page 2-10).

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

Recheck the throttle operation and install the fuel tank (page 2-10).



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 bystarter valve lever is ON position.

Check for smooth bystarter valve lever operation. If operation is not smooth, check the cable condition.



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.

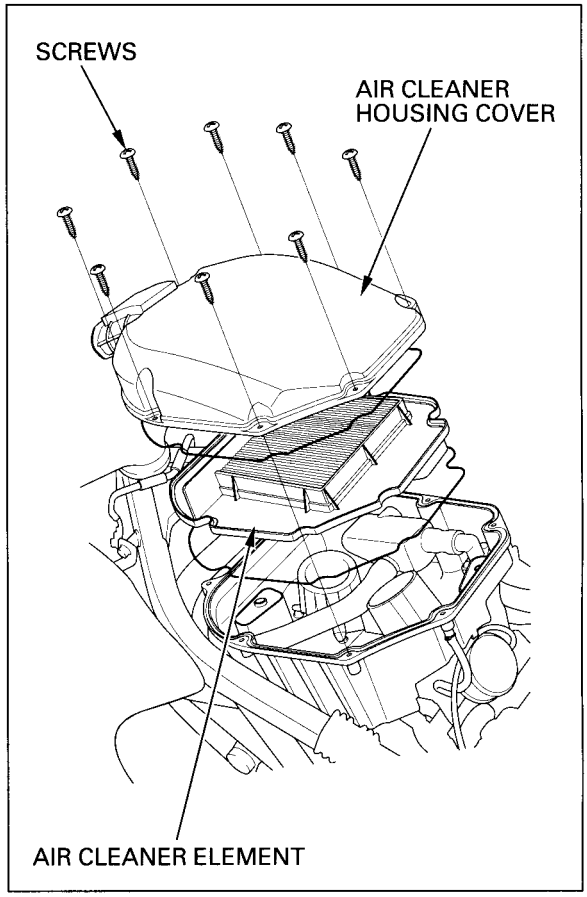
Remove the fuel tank (page 2-10).

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

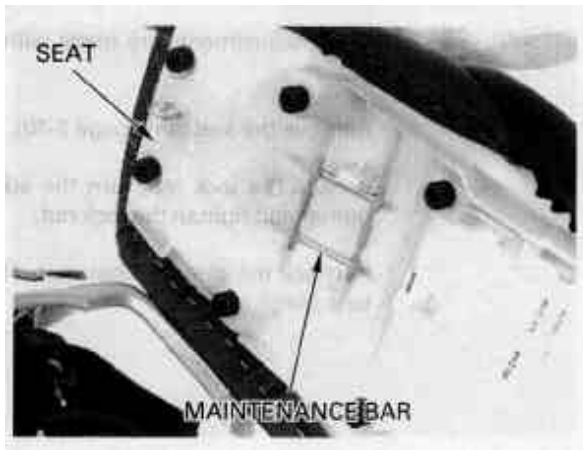
Replace the element in accordance with the maintenance schedule or any time it is excessive dirty or damaged.

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

Install the fuel tank (page 2-10).



SPARK PLUG



Rear cylinder:

NOTE:

Make sure the fuel tank cap is closed, before fuel tank lift up.

Turn the right and left fuel valves to "OFF" position.

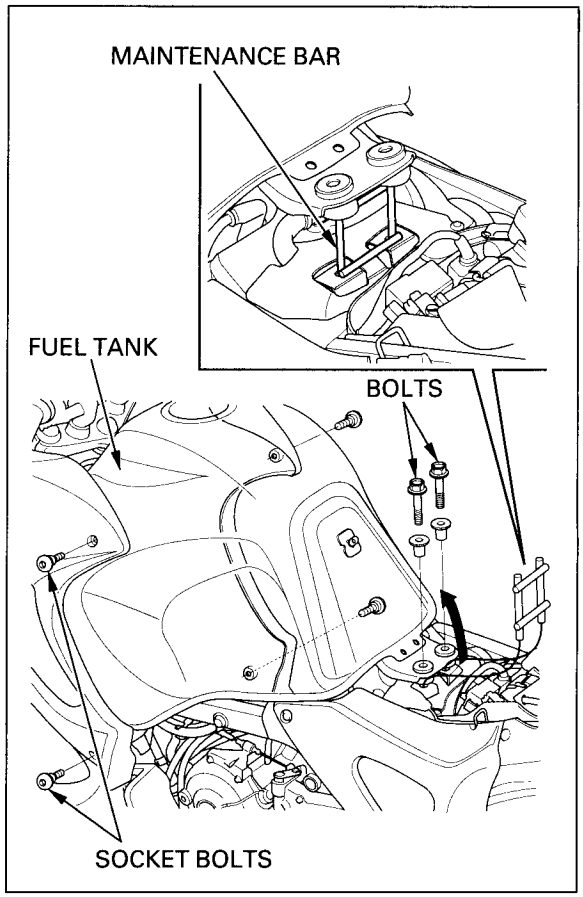
Remove the seat (page 2-2).

Remove the rear fuel tank mounting bolts.
Remove the side cowl socket bolts.

Turn the steering handle to right then hold the steering handle to the straight ahead position.

Remove the maintenance bar from the seat.

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

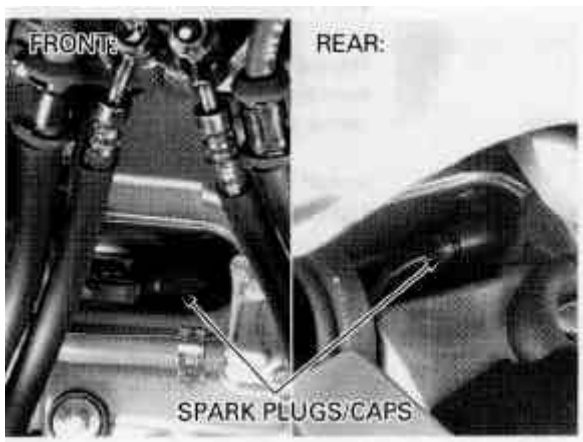


Both cylinders: Disconnect the spark plug caps and clean around the spark plug bases.

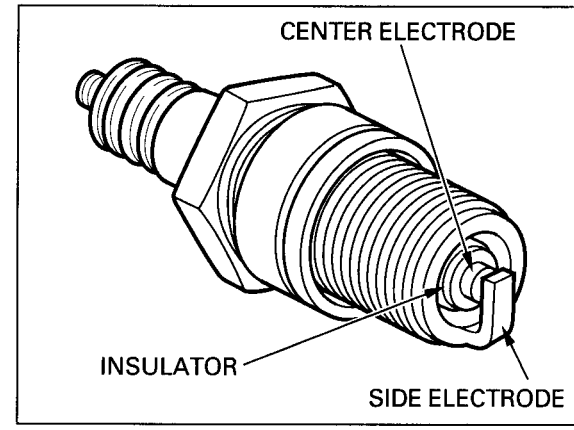
NOTE:

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.



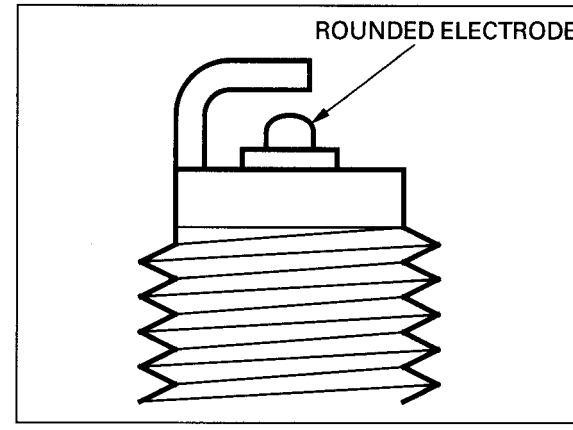
Check the insulator for cracks or damage, and the electrodes for wear, fouling or discoloration. Replace the plug if necessary.
If the electrode is contaminated with carbon deposits, clean the electrode using the spark plug cleaner.



CAUTION:

- ***This motorcycles 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.

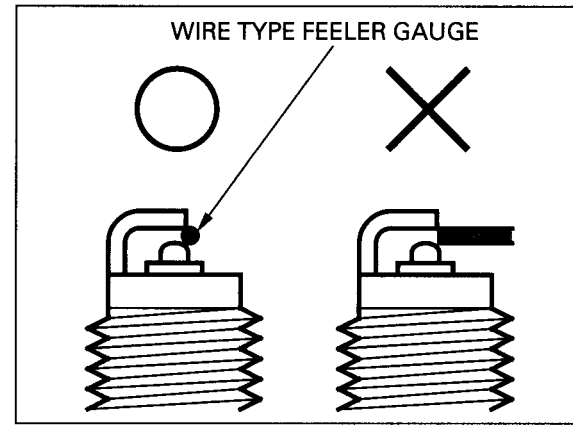


NOTE:

Always use specified spark plugs on this motorcycle.

SPECIFIED SPARK PLUG: DPR8EVX−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 parts in the reverse order of removal.

VALVE CLEARANCE

INSPECTION

NOTE:

Inspect and adjust the valve clearance while the engine is cold.

Remove the front and rear cylinder head covers (page 8-4).

Remove the timing hole cap and crankshaft hole cap.



Rotate the crankshaft counterclockwise and align the "FT" mark on the left crankcase cover.



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 "FT" 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)



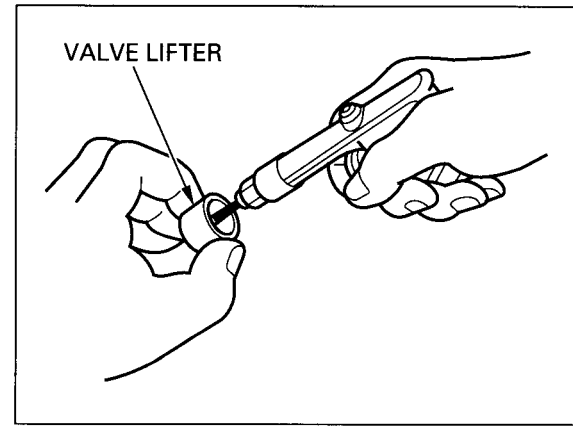
Rotate the crankshaft counterclockwise 270° and align the "RT" mark with index mark.
Check the rear cylinder valve clearances.



ADJUSTMENT

Remove the valve lifters and shims (page 8-7).

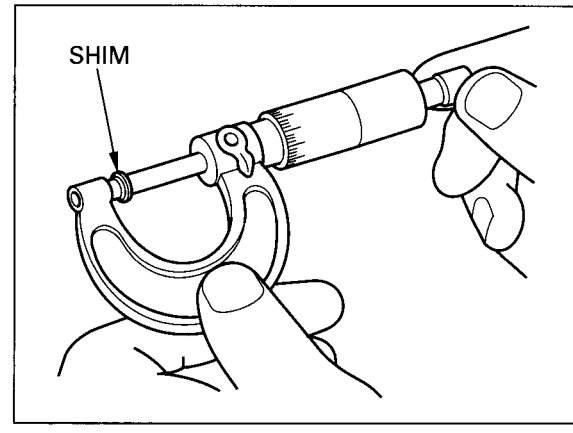
Clean the valve shim contact area in the valve lifter with compressed air.



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.



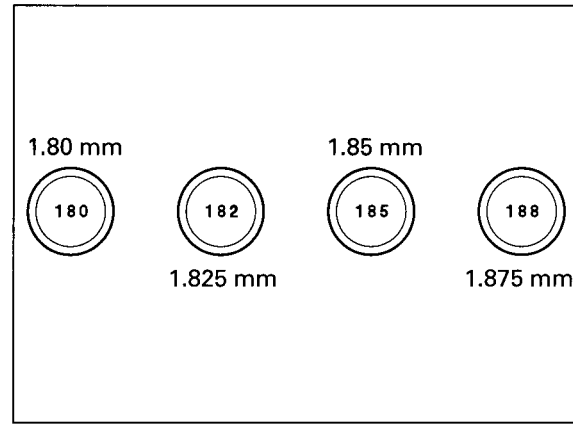
Calculate the new shim thickness using the equation below.

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 8-21).

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

Install the cylinder head cover (page 8-26).



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

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



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

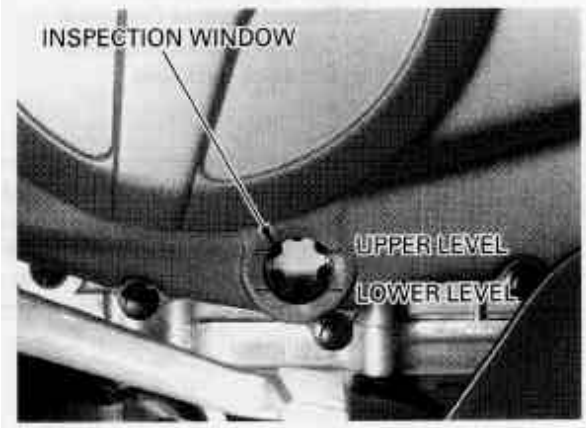
TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)



ENGINE OIL

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

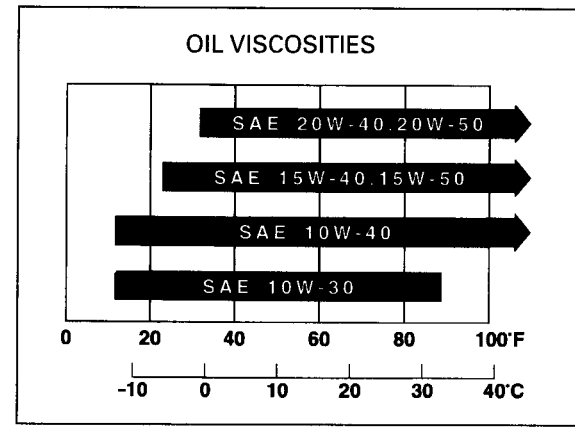
Stop the engine, support the motorcycle upright on a level surface.
Wait for a few minutes and check that the oil level is between the upper and lower level marks in the inspection window.



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 below.



ENGINE OIL FILTER

NOTE:

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

⚠WARNING

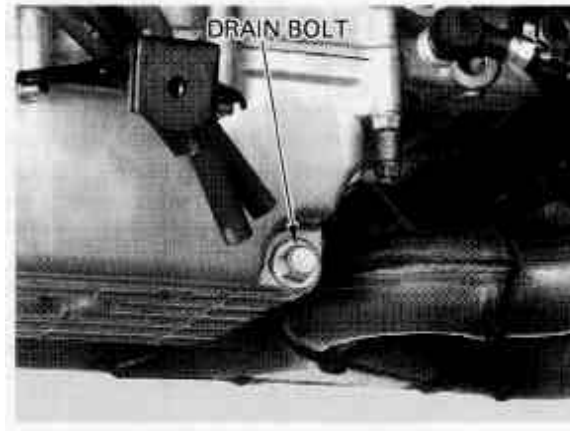
Engine and exhaust system parts become very hot and remain hot for some time after the engine is run. Wear insulated gloves or wait until the engine and exhaust system have cooled before handling these parts.

Warm up the engine.

Stop the engine and remove the under cowl (page 2-7).

Remove the oil filler cap and drain bolt, and drain the oil.



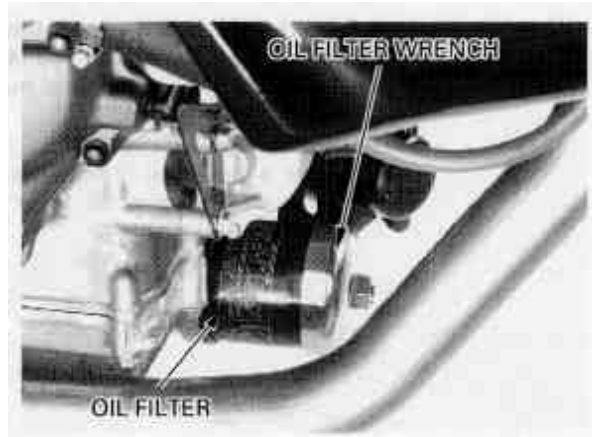


Remove the oil filter cartridge and let the remaining oil drain out. Discard the filter cartridge.

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 the it if necessary.
Install and tighten the drain bolt.

TORQUE: 30 N·m (3.1 kgf·m , 22 lbf·ft)



Fill the crankcase with the recommended oil.

OIL CAPACITY: 3.6 ℓ (3.8 US qt , 3.2 Imp qt) at filter change
4.1 ℓ (4.3 US qt , 3.6 Imp qt) at disassembly



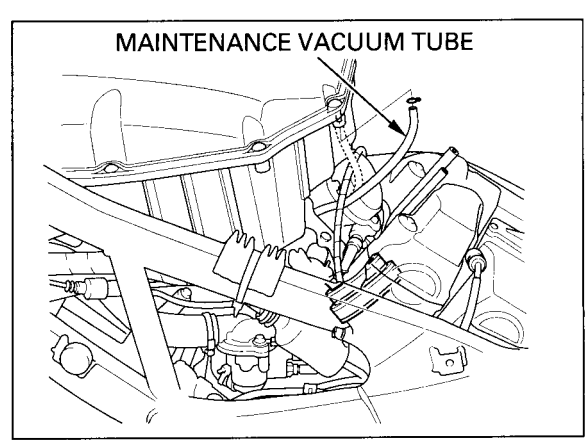
Reinstall the oil filler cap.
Check the engine oil level (page 3-10).
Make sure there are no oil leaks.

Install the under cowl (page 2-7).

CARBURETOR SYNCHRONIZATION

NOTE:

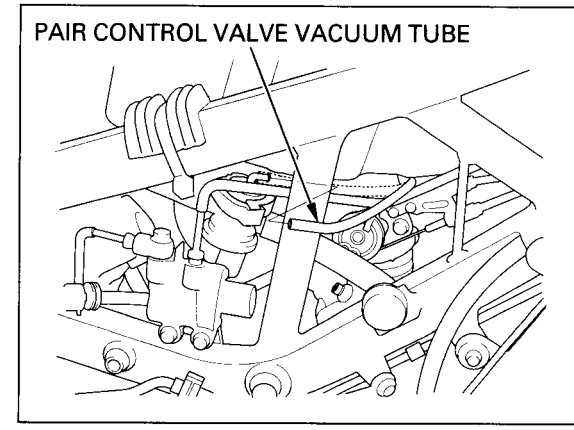
Perform this maintenance with the engine at normal operating temperature and transmission in neutral. Please the motorcycle on a level surface.



Start the engine, pinch the vacuum tube using a tube clamp, and stop the engine.
Disconnect the maintenance vacuum tube from the air cleaner housing.

Disconnect the PAIR control valve vacuum tube from the PAIR control valve.
Install the vacuum gauge attachment into the vacuum port.

Connect the vacuum gauge to the maintenance vacuum tube and PAIR control valve vacuum tube.



Start the engine and adjust the idle speed with the throttle stop control knob.

IDLE SPPED: 1,200 ± 50 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 front carburetor.

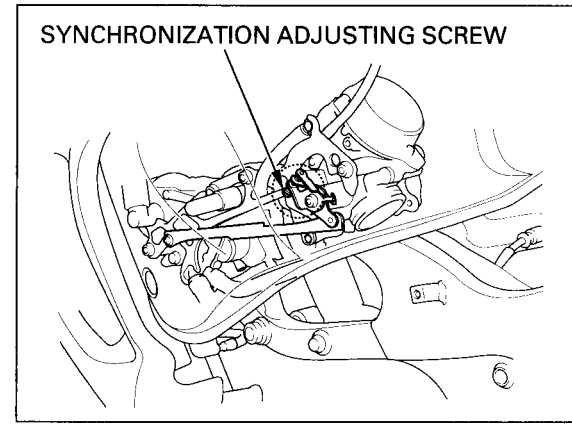


Synchronize to specification by turning the synchronization adjusting screw.

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

Remove the vacuum gauge.

Connect the vacuum tubes to the air cleaner housing and PAIR control valve.



ENGINE IDLE SPEED



⚠WARNING

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

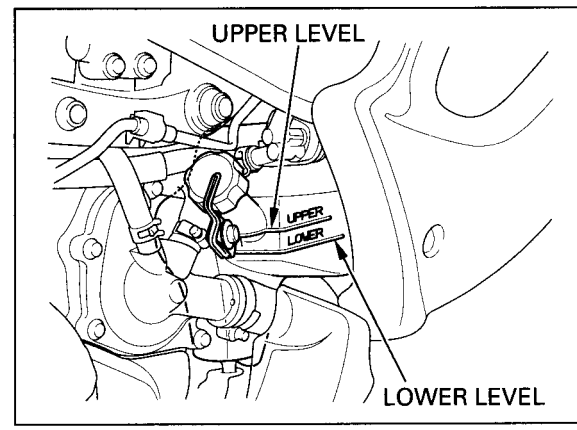
NOTE:

- 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 control knob as required.

IDLE SPEED: 1,200 ± 50 min^{-1} (rpm)

RADIATOR COOLANT



⚠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.***

Check the coolant level of the reserve tank with the engine running at normal operating temperature.
The level should be been 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 (coolant mixture preparation: page 6-4).



CAUTION:

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

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

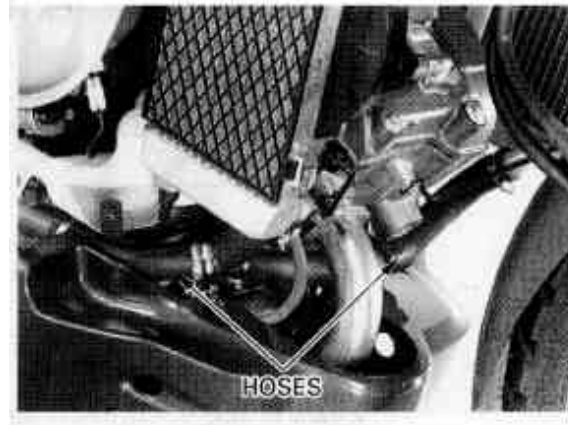
If reserve tank becomes completely empty, there is a possibility of air getting into the cooling system. Be sure to remove all air from the cooling system (page 6-5).

COOLING SYSTEM

⚠WARNING

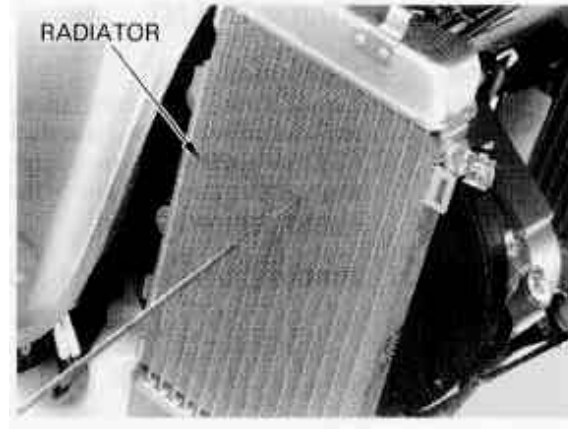
To prevent injury, keep your hands and clothing away from the cooling fan. It may start automatically, without warning.

Remove the side cowl (page 2-5).



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.



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 side cowl (page 2-5).

SECONDARY AIR SUPPLY SYSTEM

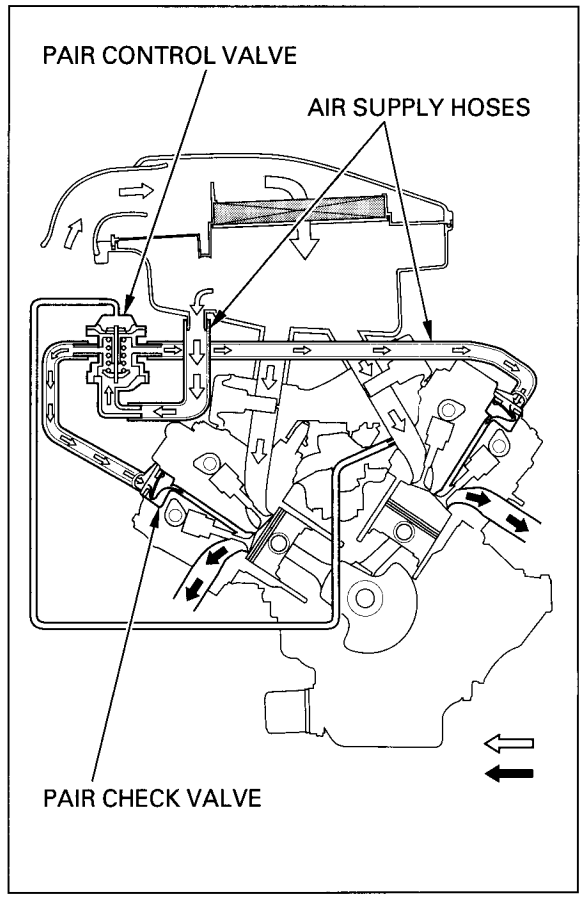
Check the air supply hoses between the pulse secondary air injection (PAIR) control valve and PAIR check valves for damage or loose connections. Check the air supply hoses for cracks or deterioration.

NOTE:

If the hoses show any signs of heat damage, inspect the PAIR check valves (page 5-22).

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

For PAIR control valve inspection, see page 5-23.



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 midway between the sprockets.

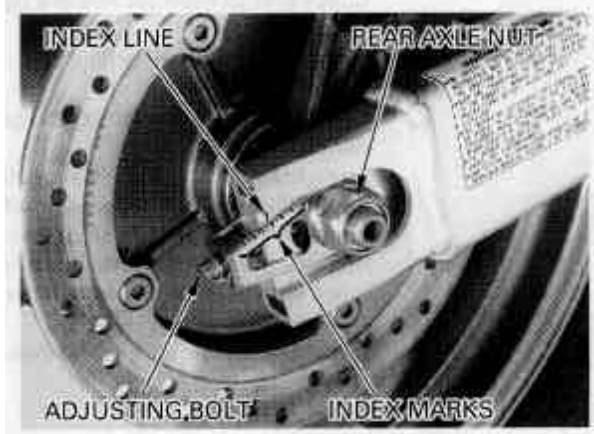
CHAIN SLACK: 35 – 45 mm (1 3/8 – 1 3/4 in)



ADJUSTMENT

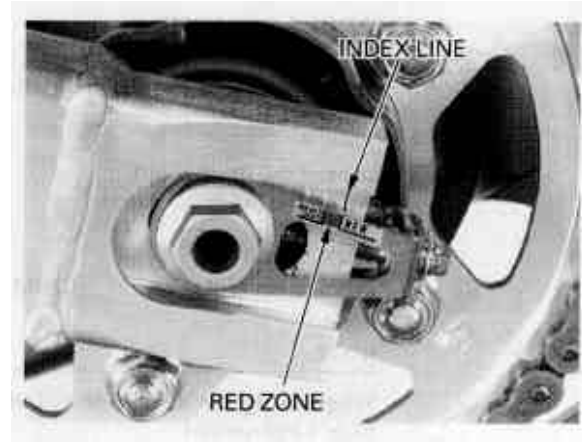
Loosen the axle nut.
Turn both adjusting bolts an equal number of turn until the correct drive chain slack is obtained.
Make sure the index marks on both adjusters are aligned with the index line of the swingarm.
Tighten the rear axle nut.

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



Recheck the drive chain slack and free wheel rotation.

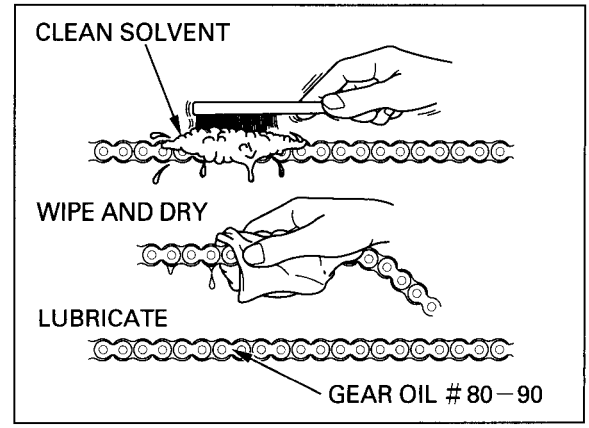
Check the drive chain wear indicator label attached on the left drive chain adjuster.
If the red zone of the indicator label reaches the index line on the swingarm, replace the drive chain with a new one (page 3-18).



CLEANING AND INSPECTION

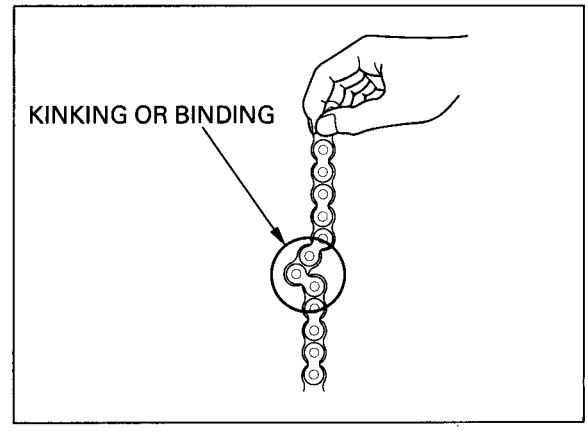
Clean the chain with a soft brush using a non-flammable or high flash point solvent and wipe it dry.
Be sure the chain has dried completely before lubricating.

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

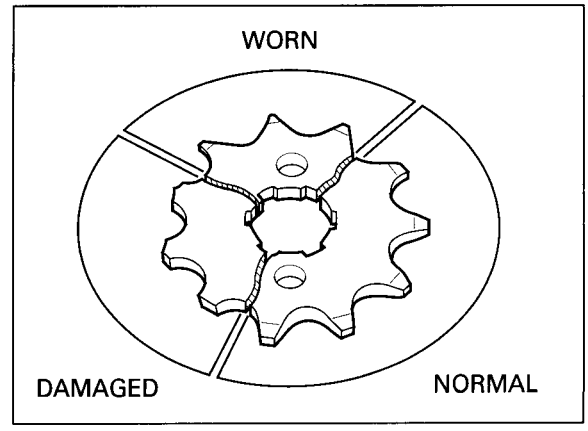
Lubricate the drive chain with #80–90 gear oil or equivalent chain lubricant designed for specifically for use on O-ring chains.
Some commercially available chain lubricants may contain solvents which could damage the O-rings.
Wipe off the excess chain lube.



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

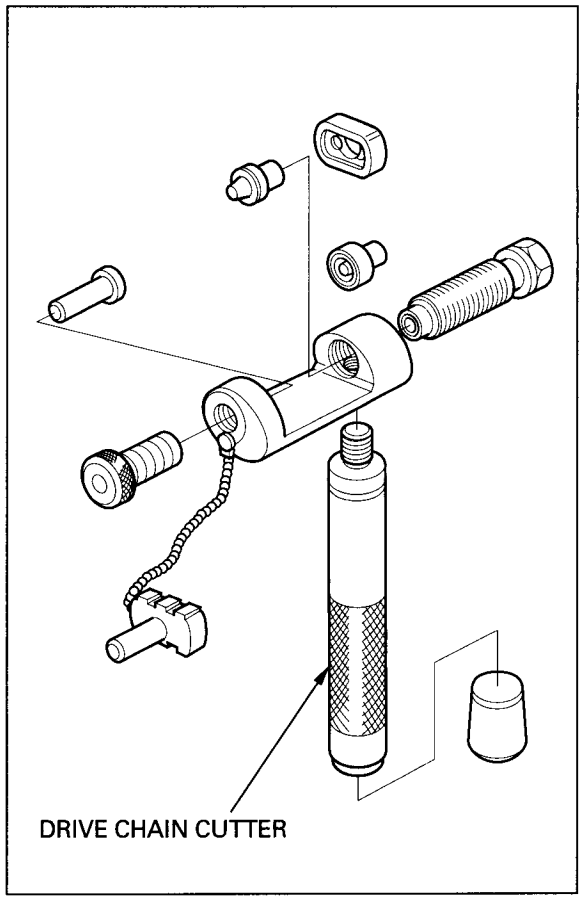
This motorcycle uses a drive chain with a staked master link.

Loosen the drive chain.
Assemble the special tool.

TOOL:
Drive chain tool set 07HMH-MR10103

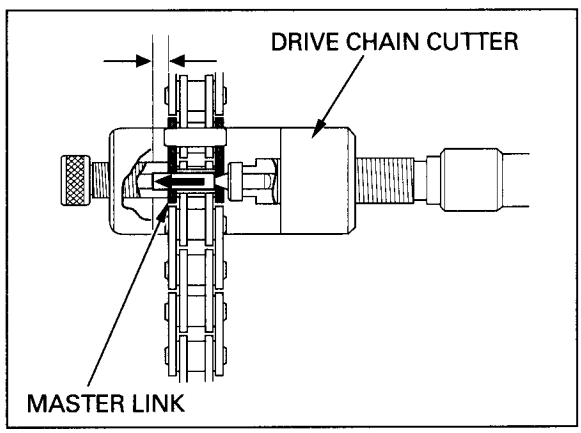
NOTE:

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.

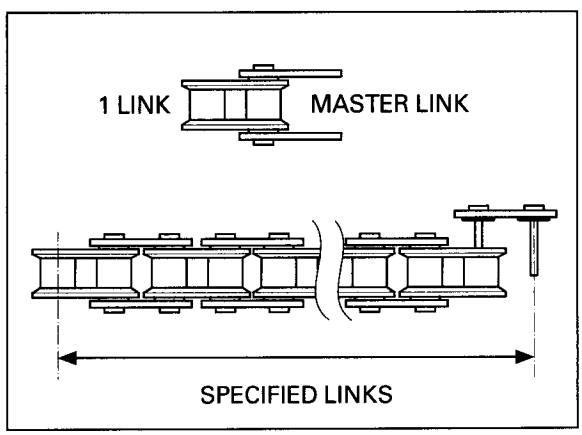


Remove the excessive drive chain links from the new drive chain with the drive chain tool set.

NOTE:

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

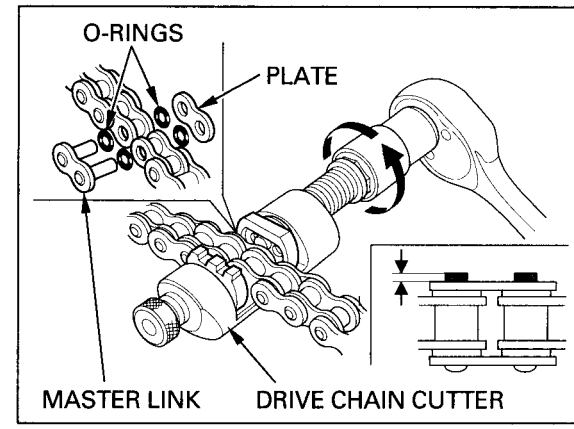
SPECIFIED LINKS: 112 links
REPLACEMENT CHAIN: DID525 HV
RK525 ROZ1



Remove the drive sprocket cover (page 7-3).

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.



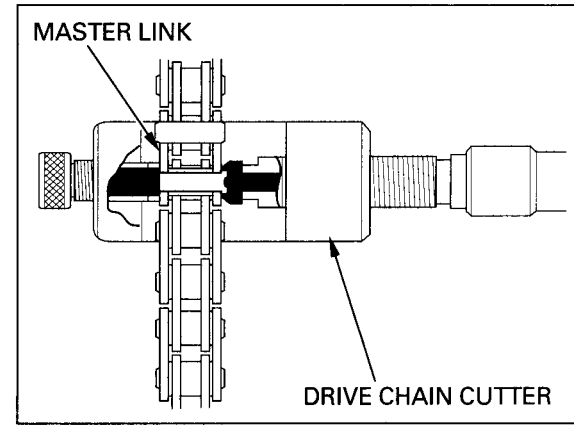
NOTE:

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.

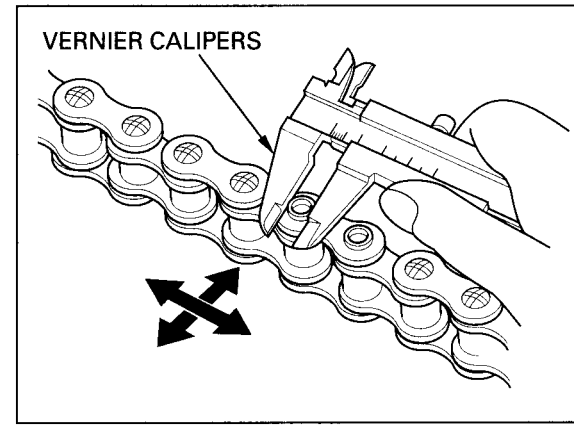
SPECIFIED LENGTH:
DID:1.30—1.50 mm (0.051—0.059 in)
RK: 1.20—1.40 mm (0.047—0.055 in)

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.

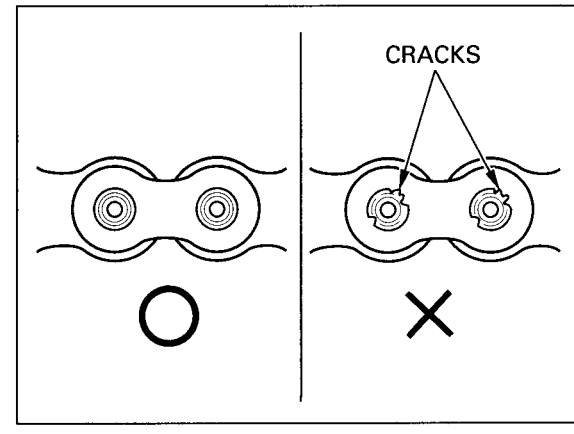
DIAMETER OF THE STAKED AREA:
DID:5.50—5.80 mm (0.217—0.228 in)
RK: 5.45—5.85 mm (0.215—0.230 in)



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.

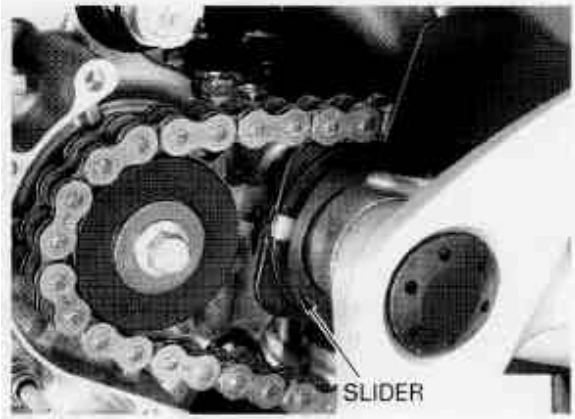


Install the drive sprocket cover (page 7-12).

DRIVE CHAIN SLIDER

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

Refer to section 14 for drive chain slider replacement.



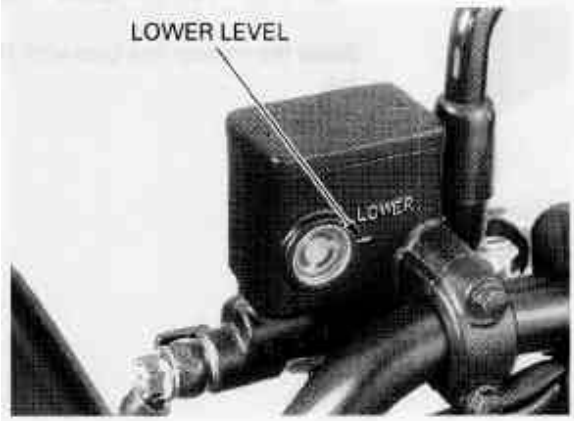
BRAKE FLUID

CAUTION:

- ***Do not mix different types of fluid, as they are not compatible with 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 rug over these parts whenever the system is serviced.***

NOTE:

When the full level is low, check the brake pads for wear (page 3-21). 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 3-21).

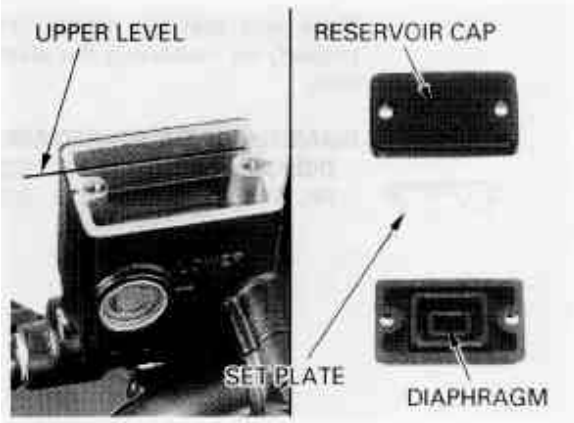


FRONT BRAKE

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 to the specified torque.

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



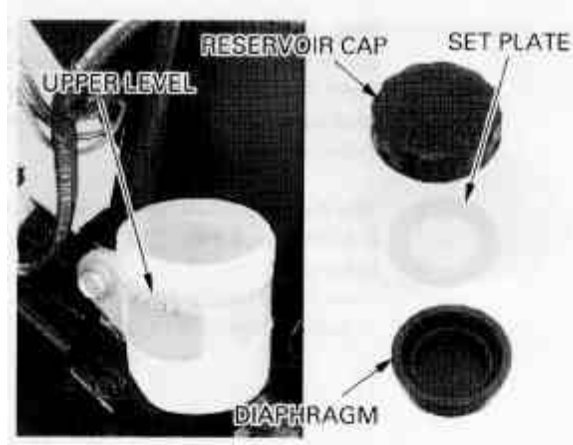
REAR BRAKE

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



If the level is near the "LOWER" level line, remove the 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.



BRAKE PAD WEAR

FRONT BRAKE PAD

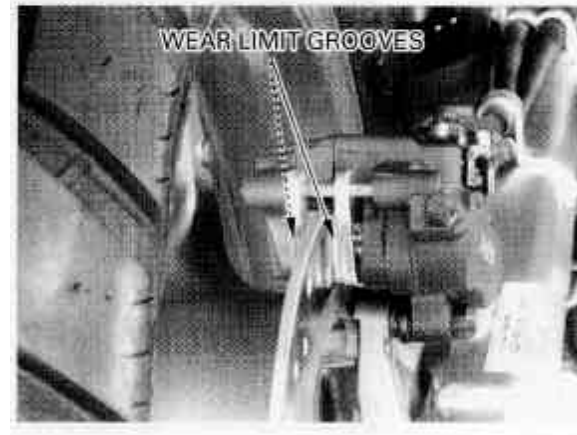
Check the brake pad for wear.
Replace the brake pads if the wear limit groove of either pad is worn out.



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 15-10, 11 for brake pad replacement.

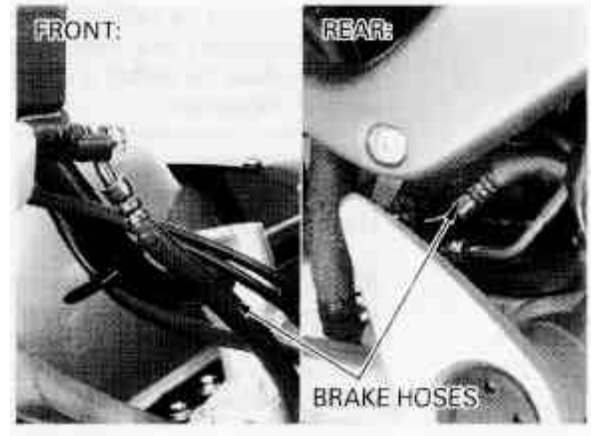


BRAKE SYSTEM

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 15-6 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.



This model is equipped with a Dual Combined Brake System. Check the system as follows:
Push the left front brake caliper upward by hand.
Measure the stroke of the secondary master cylinder.

The stroke should be less than 4 mm (0.2 in).
If stroke is 4 mm (0.2 in) or more, check for followings:
– Air in hydraulic system
– leaking hydraulic system

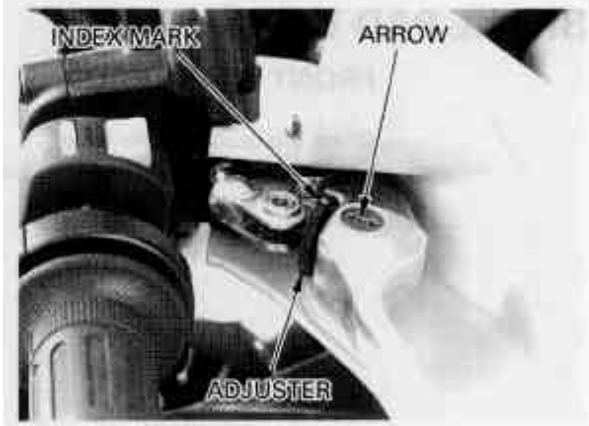


BRAKE LEVER ADJUSTMENT

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

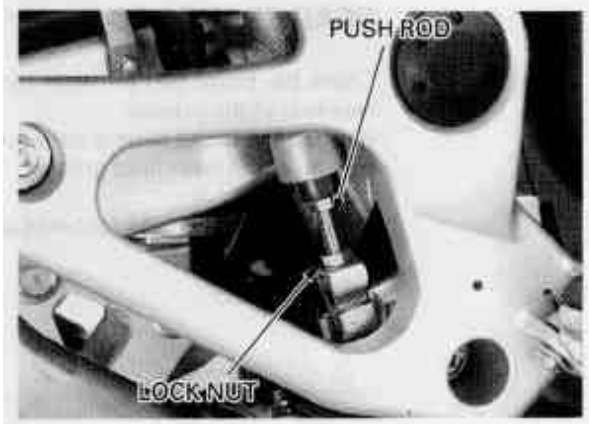
CAUTION:

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

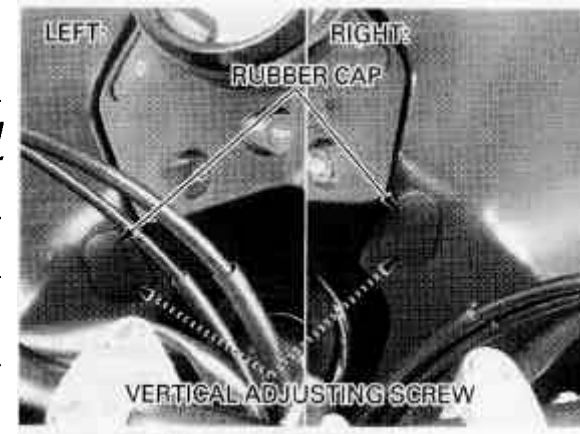
An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.

NOTE:

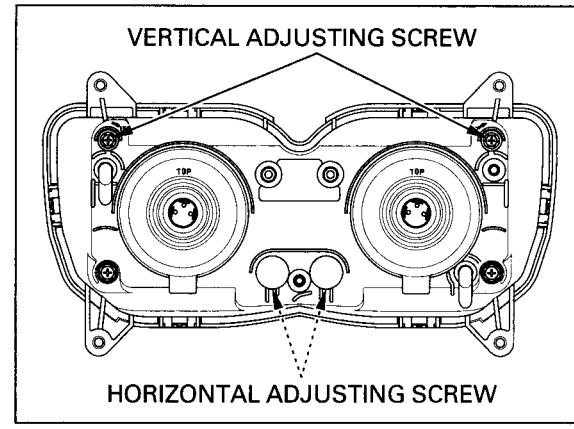
Adjust the headlight beam as specified by local laws and regulations.

Adjust vertically by turning the vertical adjusting screw.

Adjust horizontally by turning the horizontal adjusting screw.





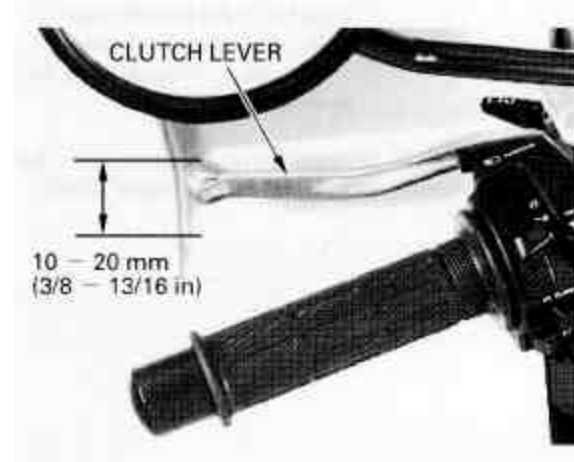


CLUTCH SYSTEM

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

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

Adjust the next page:



Minor adjustment are made at the adjuster near the lever.
Loosen the lock nut and turn the adjuster.
Tighten the lock nut securely.

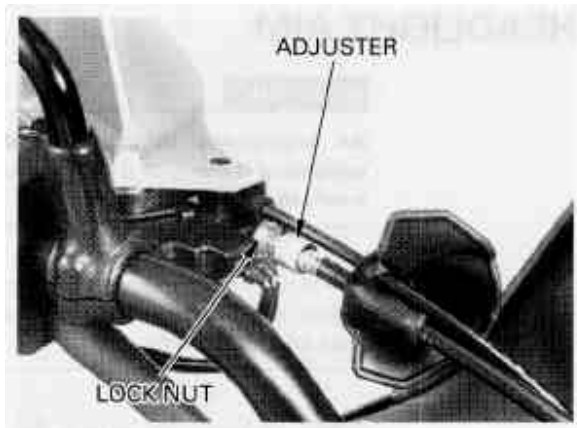
CAUTION:

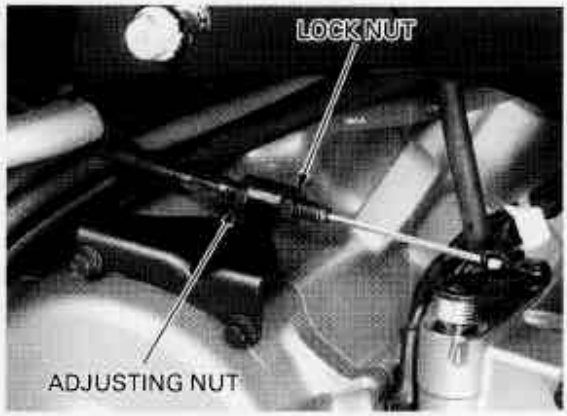
The adjuster may be damaged if it is positioned too far out, leaving minimal threads engagement.

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

Major adjustment is performed at the clutch arm.
Loosen the lock nut and turn the adjusting nut to adjust free play. Hold the adjusting nut securely while tightening the lock nut.

If proper free play cannot be obtained, or the clutch slips during the test ride, disassemble and inspect the clutch (see section 9).





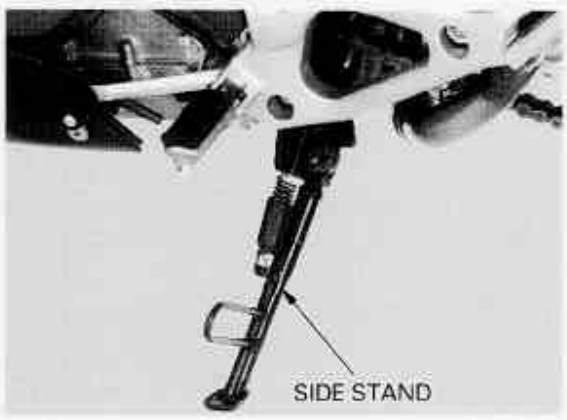
SIDE STAND

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



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

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

Refer to section 13 for fork service.

REAR SUSPENSION

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.

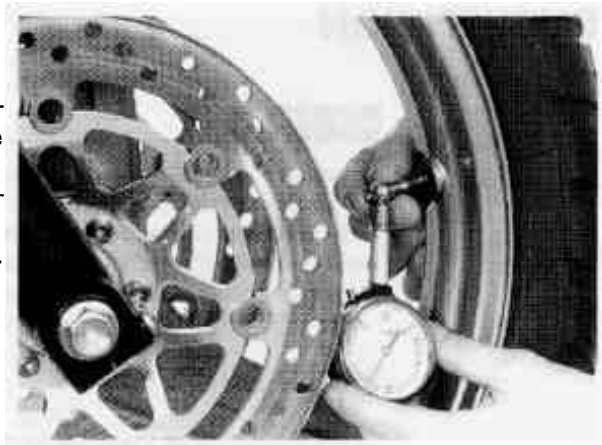
Refer to section 14 for shock absorber service.

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).

NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-12).
Check that the all cotter pins, safety clips, hose clips 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:
Font: 250 kPa (2.50 kgf/cm², 36 psi)
Rear: 250 kPa (2.50 kgf/cm², 36 psi)
Driver and passenger:
Font: 250 kPa (2.50 kgf/cm², 36 psi)
Rear: 280 kPa (2.80 kgf/cm², 41 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 TIRE DEPTH:
Front: 1.5 mm (0.06 in)
Rear: 2.0 mm (0.08 in)

STEERING HEAD BEARING

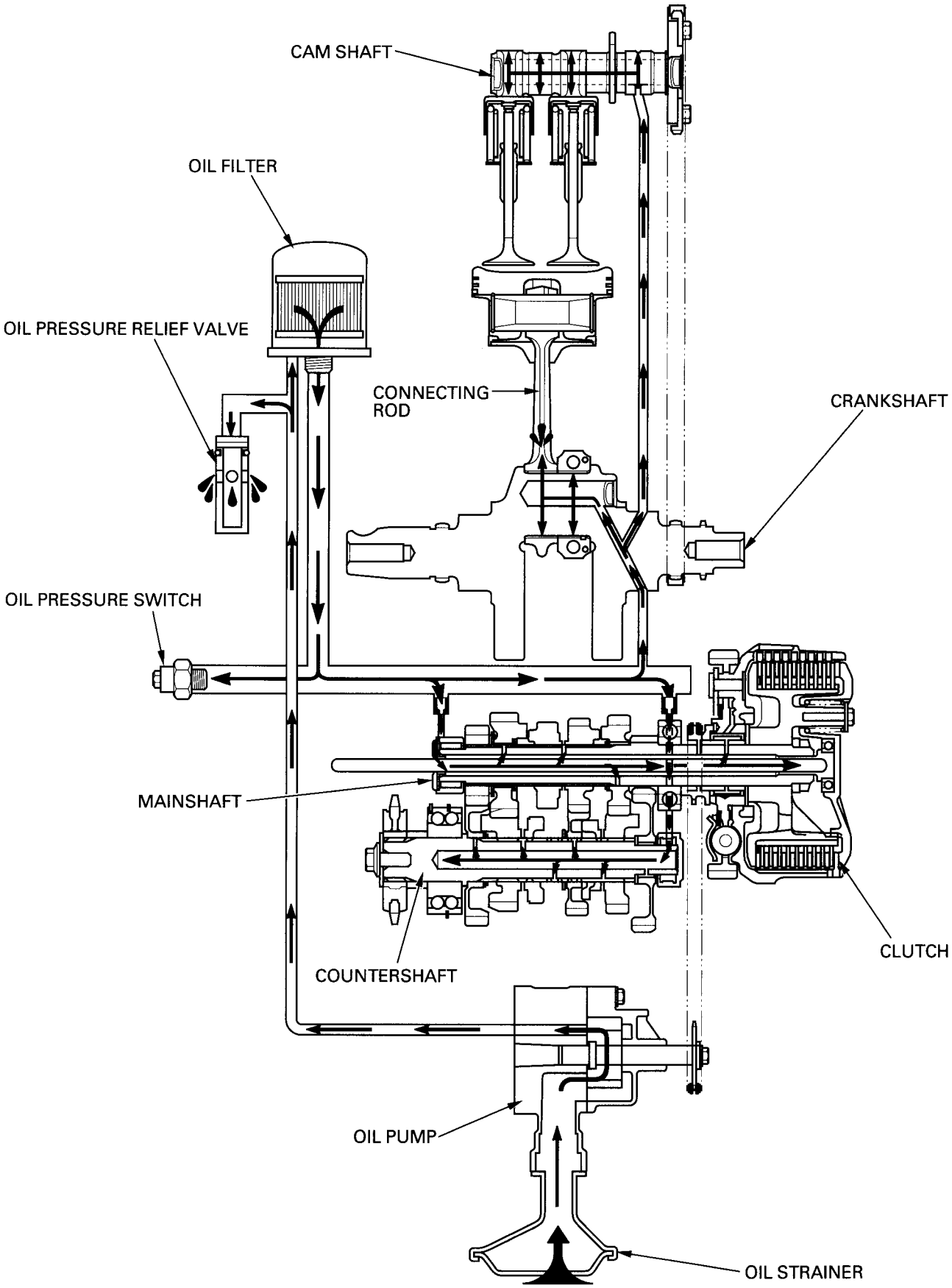


NOTE:

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

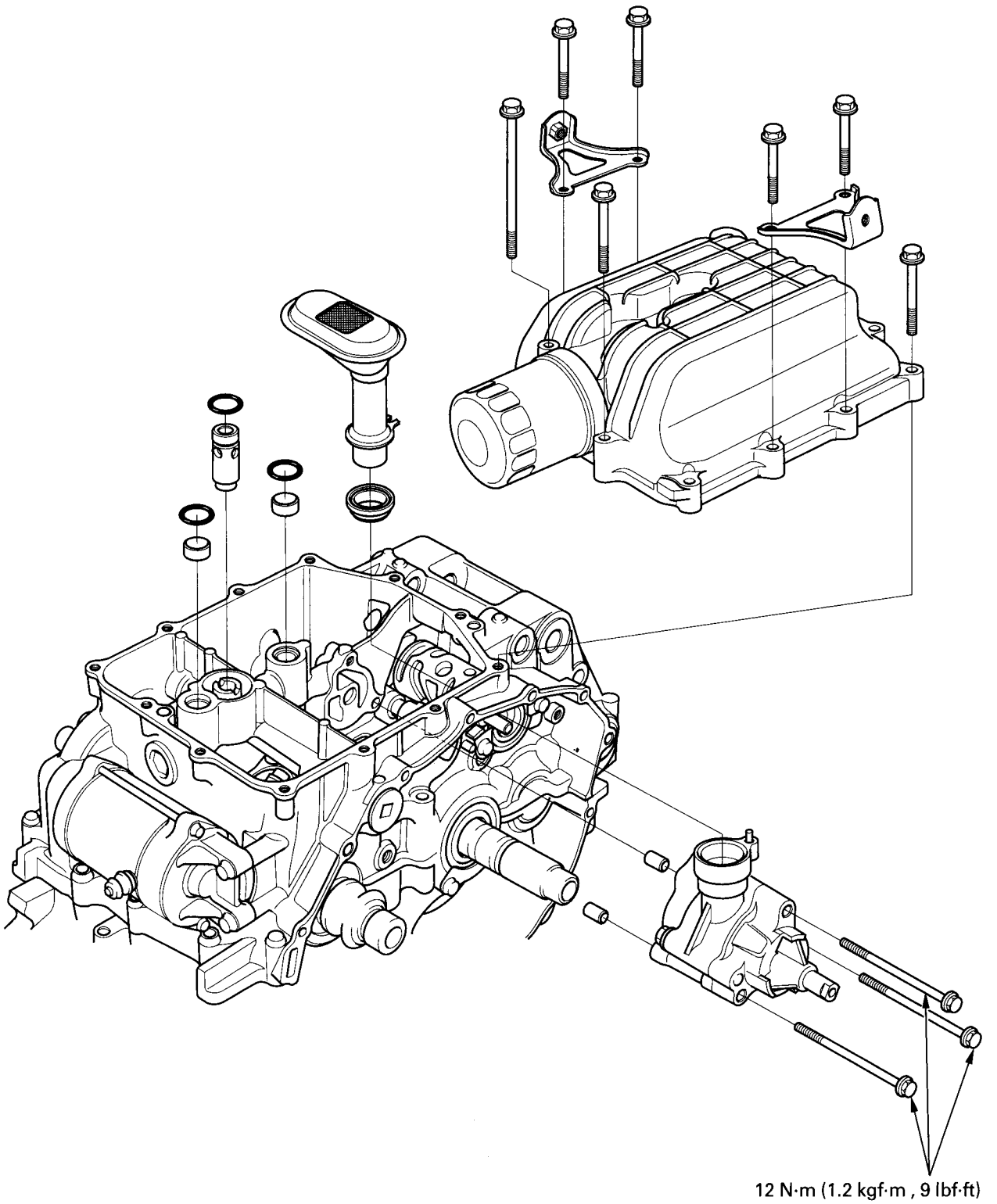
Raise the front wheel off the ground and support the motorcycle securely.
Check that the handlebar moves freely from side to side.
If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (section 13).

LUBRICATION SYSTEM DIAGRAM



4. LUBRICATION SYSTEM

LUBRICATION SYSTEM DIAGRAM	4-0	OIL STRAINER/PRESSURE RELIEF VALVE	4-5
SERVICE INFORMATION	4-2	OIL PUMP	4-7
TROUBLESHOOTING	4-3		
OIL PRESSURE INSPECTION	4-4		



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 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.***

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

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	3.4 ℓ (3.6 US qt , 3.0 Imp qt)	———
	At disassembly	4.1 ℓ (4.3 US qt , 3.6 Imp qt)	———
	At oil filter change	3.6 ℓ (3.8 US qt , 3.2 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/cm², 85 psi) at 5,000 rpm/(80 °C/176 °F)	———
Oil pump rotor	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 wire terminal screw	2 N·m (0.2 kgf·m , 1.4 lbf·ft)	
Oil pump bolt	13 N·m (1.3 kgf·m , 9 lbf·ft)	
Oil pump mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Oil drain bolt	30 N·m (3.1 kgf·m , 22 lbf·ft)	
Oil filter boss	18 N·m (1.8 kgf·m , 13 lbf·ft)	Apply a locking agent to the threads
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m , 11 lbf·ft)	Apply a locking agent to the threads
Oil filter cartridge	10 N·m (1.0 kgf·m , 7 lbf·ft)	Apply clean engine oil to the O-ring

TOOLS

Oil pressure gauge	07506-3000000
Oil pressure gauge attachment	07406-0030000
Oil filter wrench	07HAA-PJ70100

TROUBLESHOOTING

Engine oil level too low
- Oil consumption
- External oil leak
- Worn piston ring or incorrect piston ring installation
- Worn cylinder
- Worn valve guide or seal

Low or no oil pressure
- Clogged oil orifice
- Incorrect oil being used

No oil pressure
- Oil level too low
- Oil pump drive sprocket broken
- Oil pump damaged (pump shaft)
- Internal oil leak

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

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

OIL PRESSURE INSPECTION

NOTE:

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

Check the oil level (page 3-10).

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



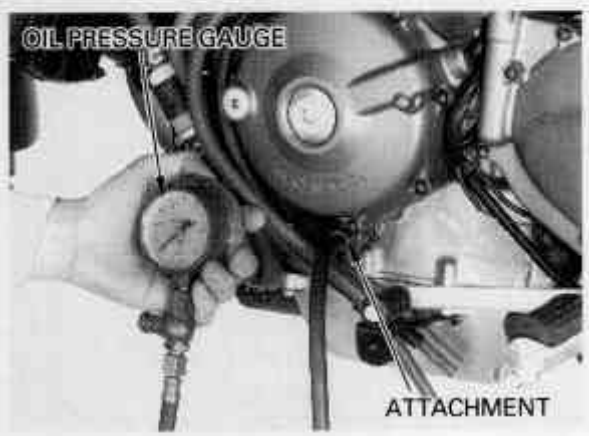
Remove the bolt and washer.
Remove the oil pressure switch.



Connect an oil pressure gauge and attachment to the switch hole.

TOOLS:

Oil pressure gauge	07506-3000000
Oil pressure gauge attachment	07406-0030000



Start the engine and increase the rpm to 5,000 rpm and read the oil pressure.

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

Stop the engine and remove the tools.

Apply sealant to the threads of the oil pressure switch.

Install and tighten it to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m, 9 lbf·ft)

CAUTION:

To prevent crankcase damage, do not overtighten the switch.



Install the bolt and washer.

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

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

Install the rubber cap.

Start the engine and check the oil pressure indicator light gones out after a few seconds.
If the oil pressure indicator light remains on a few seconds, stop the engine and check the indicator system (page 19-15).

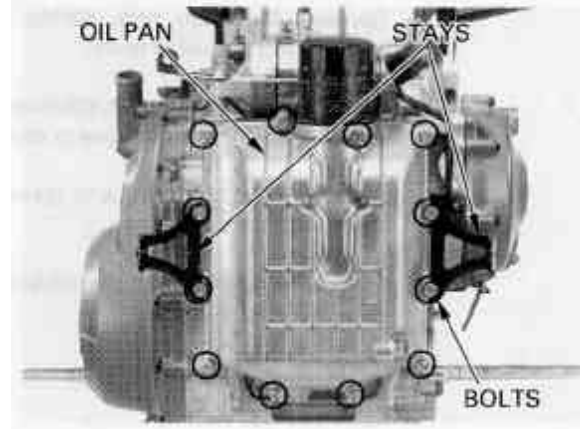


OIL STRAINER/ PRESSURE RELIEF VALVE

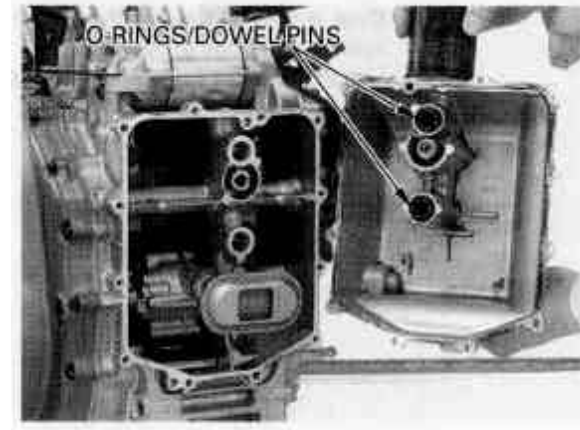
OIL PAN REMOVAL

Remove the under cowl (page 2-7).
Remove the exhaust pipe (page 2-8).
Drain the engine oil (page 3-11).

Remove the oil pan flange bolts and under cowl stays.
Remove the oil pan.



Remove the dowel pins and O-rings.



OIL STRAINER

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

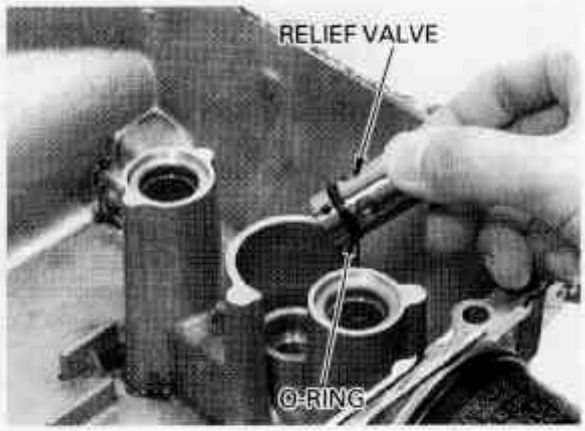
Clean the oil strainer screen.

Coat the new seal rubber with a 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.

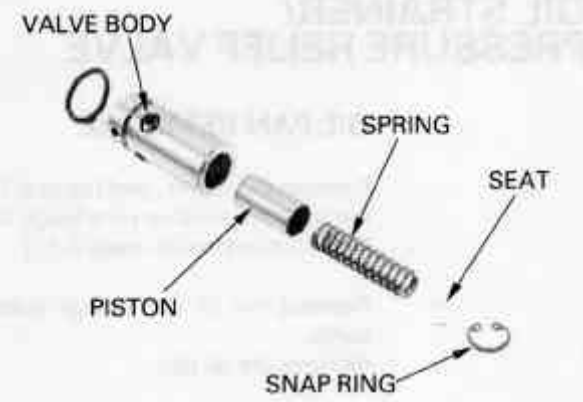


Remove the snap ring, spring seat, spring and piston from the valve body.

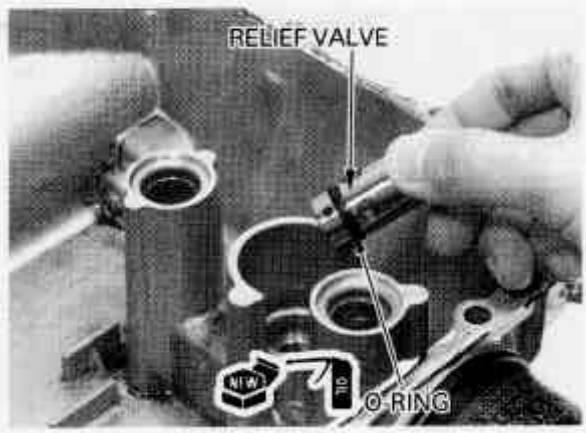
Check the piston for wear, sticking or other damage.
Check the spring for fatigue or damage.

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

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



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

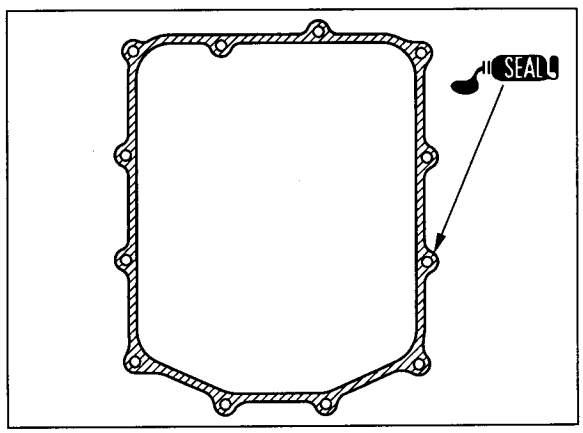


OIL PAN INSTALLATION

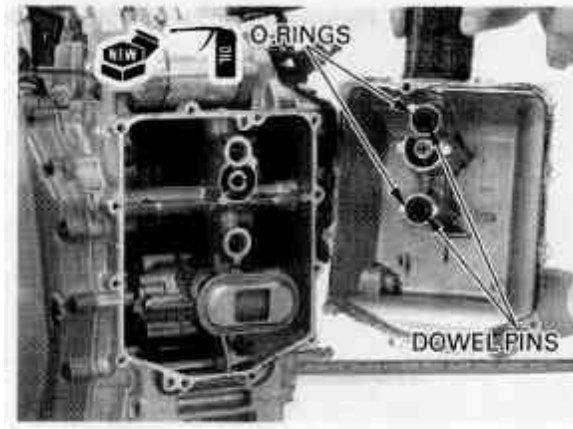
Clean the oil pan mating surface thoroughly.
Apply sealant to the oil pan mating surface.

CAUTION:

Do not apply sealant more than necessary.



Install the dowel pins to the oil pan.
Coat new O-rings with oil and install them onto the dowel pins.
Install the oil pan.

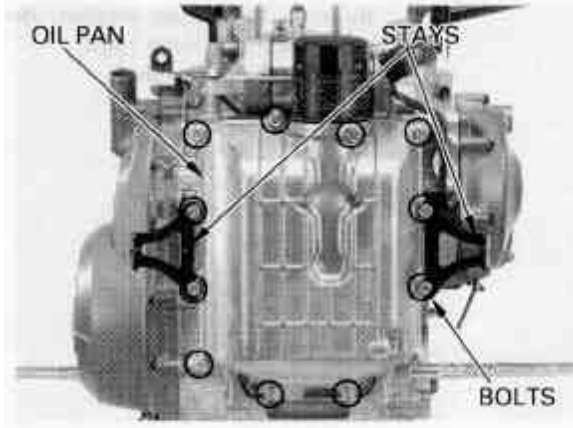


Install the under cowl stays.
Install and tighten the flange bolts in a crisscross pattern in 2–3 steps.

Install the exhaust pipe (page 2-9).
Install the under cowl (page 2-7).
Fill the crankcase with recommended oil (page 3-11).

NOTE:

After installation, check that there are no oil leaks.



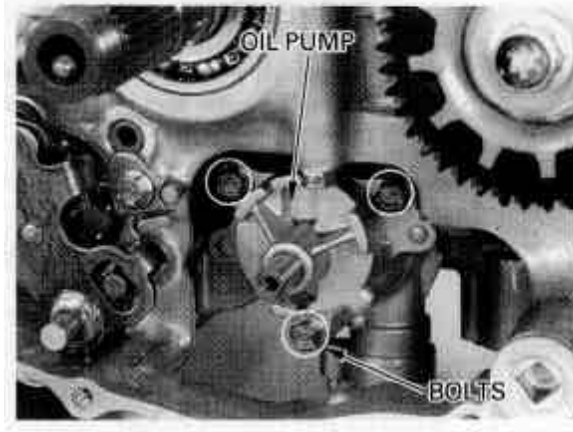
OIL PUMP

REMOVAL

Remove the following:
– Clutch and oil pump driven sprocket (page 9-3)
– Oil pan and strainer (page 4-5)

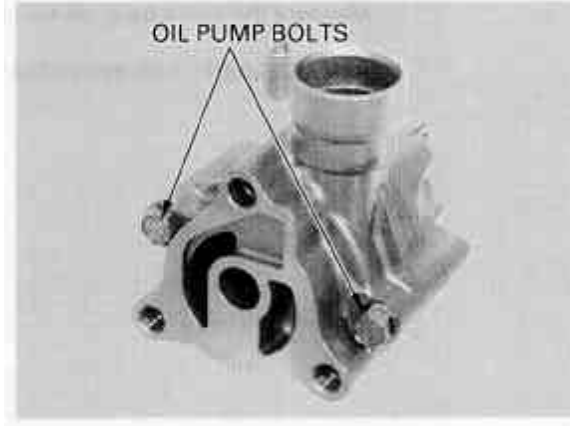
Remove the three mounting bolts and oil pump assembly.

Remove the dowel pins.

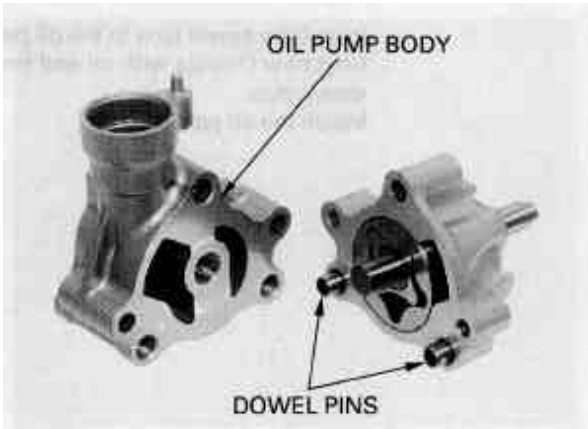


DISASSEMBLY

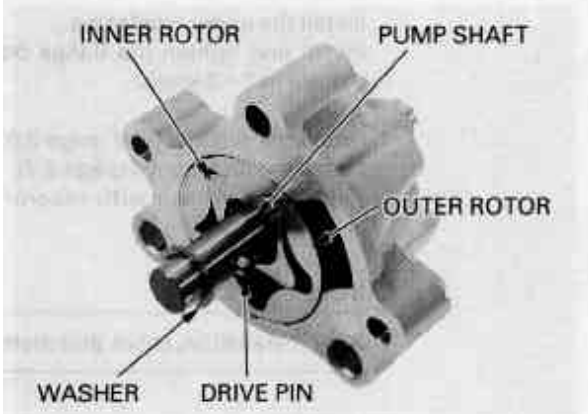
Remove the oil pump bolts.



Remove the oil pump body and dowel pins.



Remove the thrust washer, drive pin, oil pump outer rotor and inner rotor.
Remove the pump shaft.

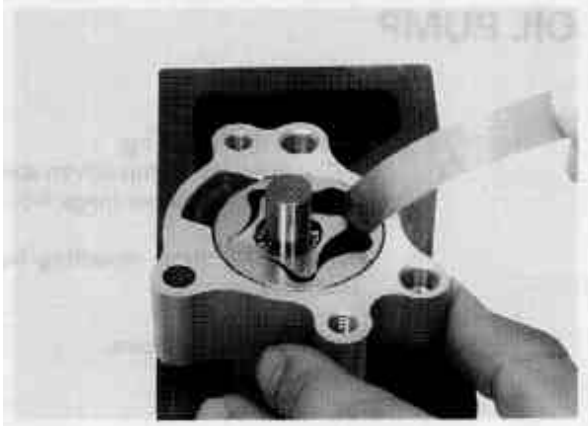


INSPECTION

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

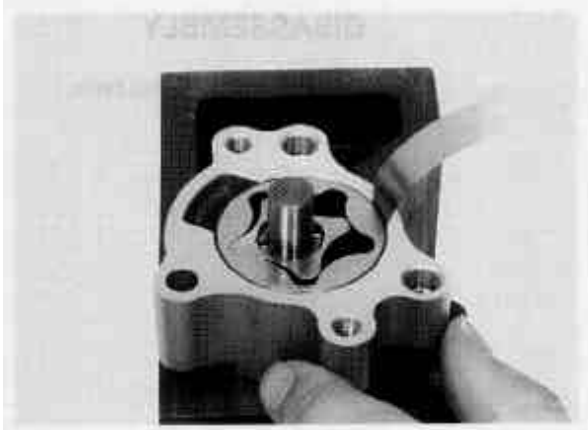
Measure the tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



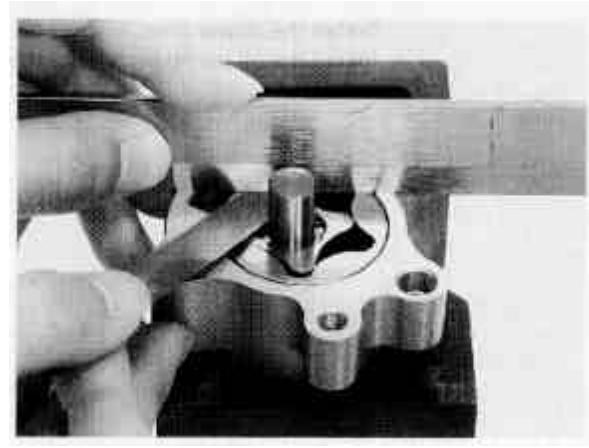
Measure the pump body clearance.

SERVICE LIMIT: 0.35 mm (0.014 in)

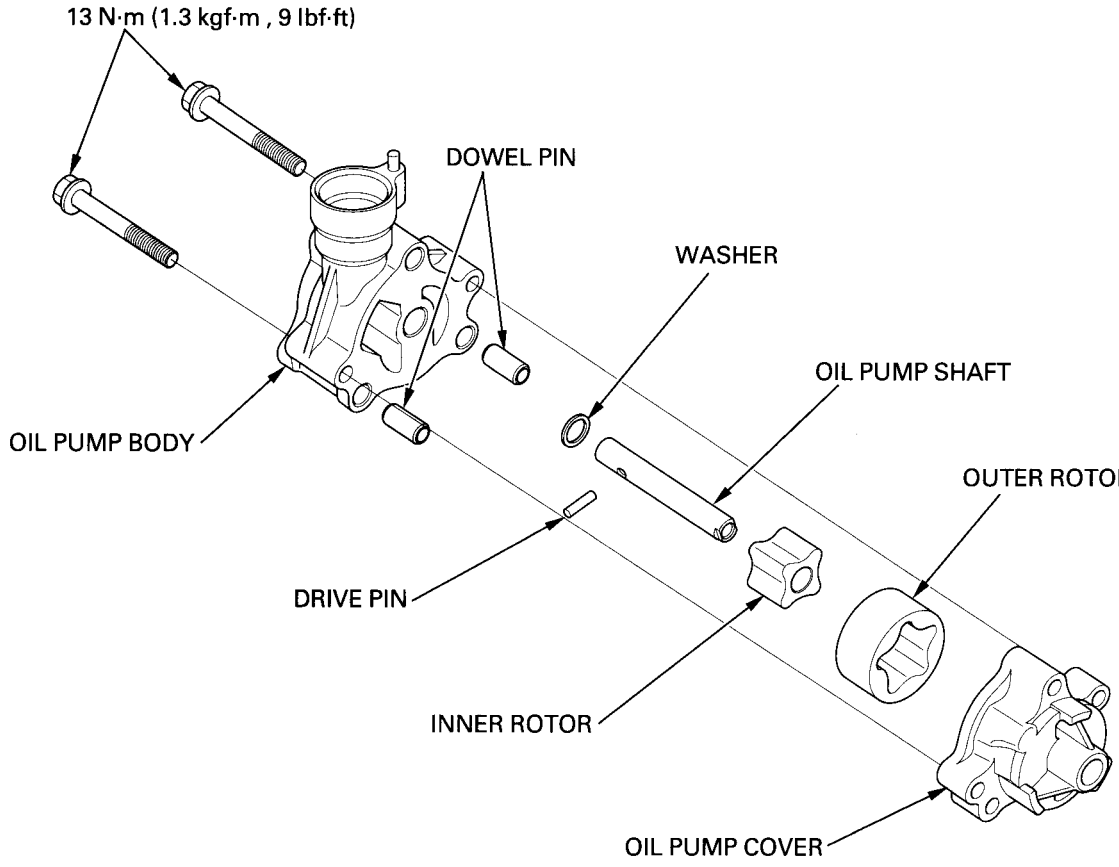


Measure the side clearance a straight edge and feeler gauge.

SERVICE LIMIT: 0.12 mm (0.005 in)

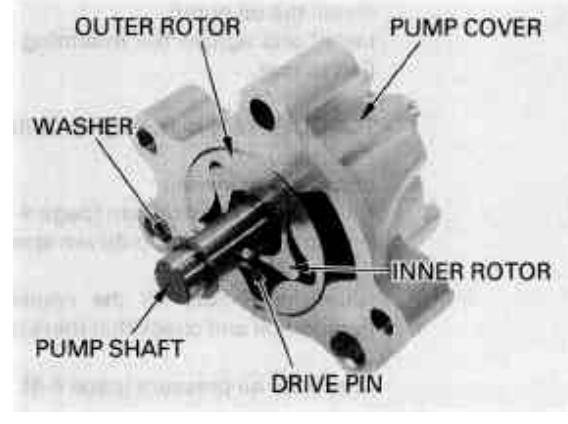


ASSEMBLY

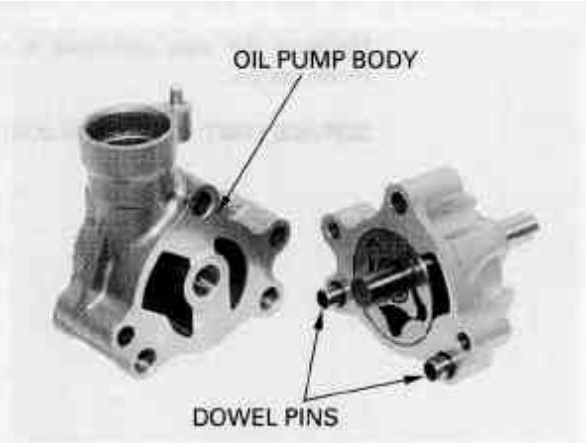


Install the outer rotor into the oil pump cover.
Install the inner rotor into the oil pump cover.
Install the oil pump shaft through the oil pump cover and inner rotor.

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

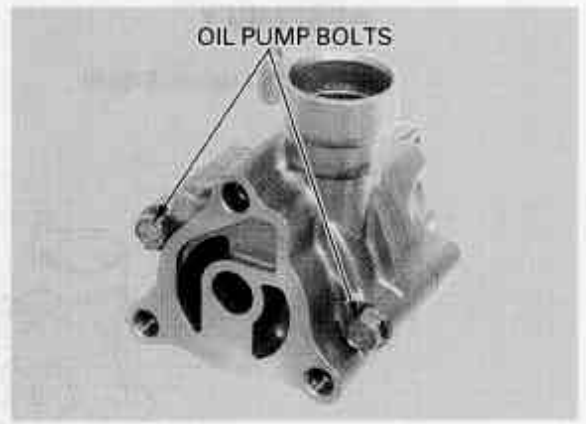


Install the dowel pins.
Install the oil pump body onto the oil pump cover.



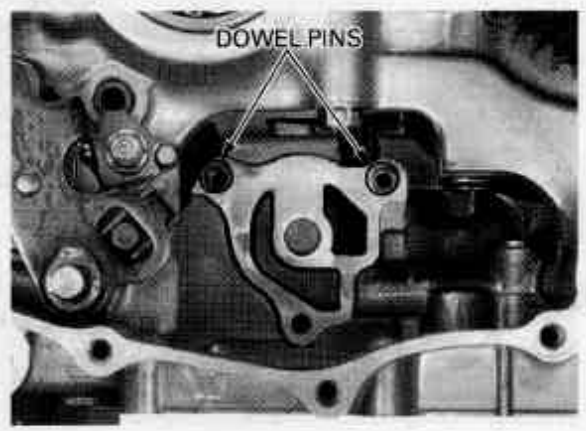
Install and tighten the oil pump bolts to the specified torque.

TORQUE: 13 N·m (1.3 kgf·m , 9 lbf·ft)



INSTALLATION

Install the dowel pins.



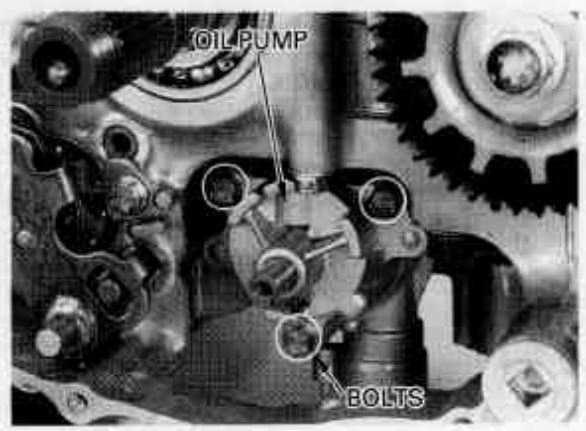
Install the oil pump.
Install and tighten the mounting bolts to the specified torque.

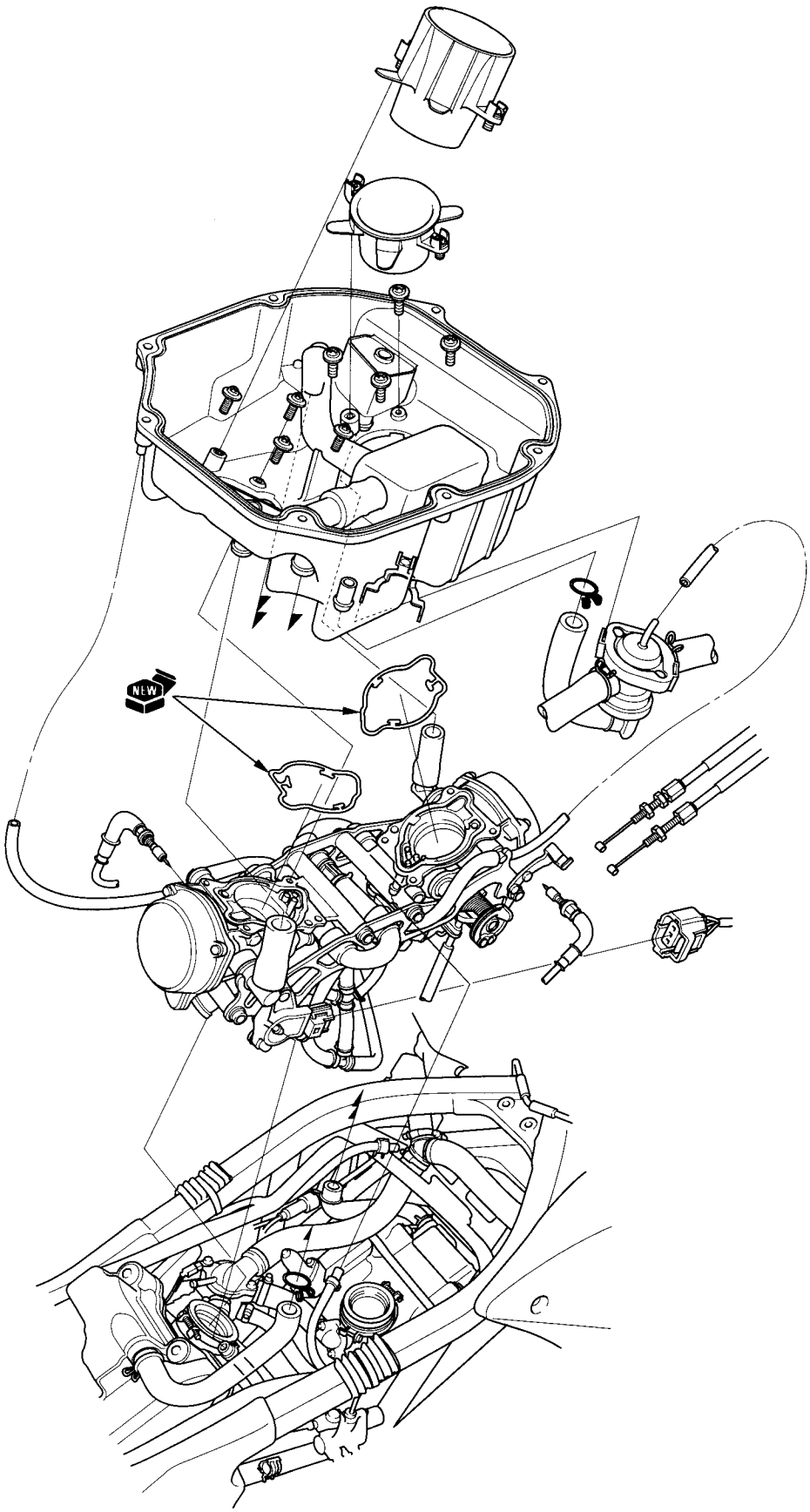
TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the following:
– Oil strainer and oil pan (page 4-5)
– Clutch and oil pump driven sprocket (page 9-8)

After installation, fill the crankcase with recommended oil and check that there is no oil leaks.

Check the oil pressure (page 4-4).




NEW

5. FUEL SYSTEM

SERVICE INFORMATION	5-1	CARBURETOR ASSEMBLY	5-12
TROUBLESHOOTING	5-3	CARBURETOR COMBINATION	5-15
AIR CLEANER HOUSING	5-4	CARBURETOR INSTALLATION	5-18
CARBURETOR REMOVAL	5-5	PILOT SCREW ADJUSTMENT	5-20
CARBURETOR SEPARATION	5-7	SECONDARY AIR SUPPLY SYSTEM	5-22
CARBURETOR DISASSEMBLY/ INSPECTION	5-9	FUEL FILTER	5-23

SERVICE INFORMATION

GENERAL

⚠WARNING

- ***Gasoline is extremely flammable and is explosive under certain conditions. KEEP OUT OF REACH OF CHILDREN.***
- ***If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death. Run the engine in an open area or with an exhaust evacuation system in an enclosed area.***
- ***Bending or twisting the control 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 2-10.
- 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.

SPECIFICATIONS

ITEM	SPECIFICATIONS
Carburetor identification number	VPJ0A
Main jet	Front: # 168 , Rear: # 170
Slow jet	# 42
Jet needle number	Front: B51C , Rear: B51B
Pilot screw initial opening	See page 5-20
Float level	13.7 ± 0.5 mm (0.54 ± 0.02 in)
Idle speed	1,200 ± 50 min^{-1} (rpm)
Throttle grip free play	2 – 6 mm (1/16 – 1/4 in)

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.

TOOLS

Float level gauge	07401-0010000
Pilot screw wrench	07908-4730002

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
  - —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 (SE) 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
  - —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

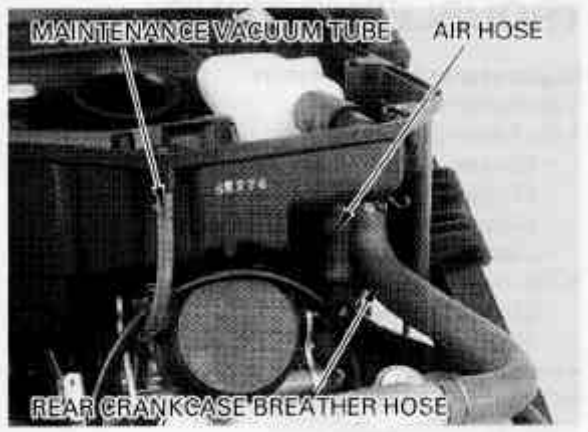
REMOVAL

NOTE:

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

Remove the fuel tank (page 2-10).
Remove the air cleaner element (page 3-5).

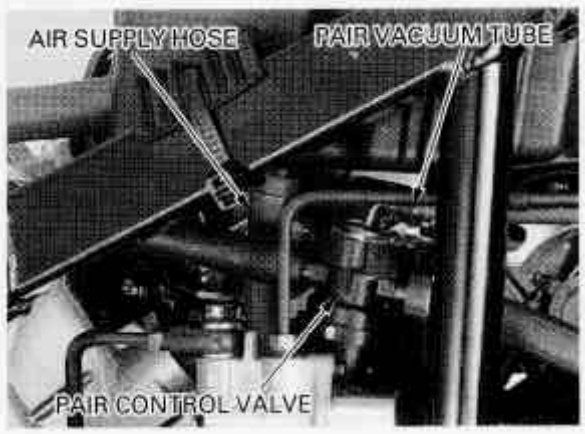
Disconnect the maintenance vacuum vent tube, air hose and rear crankcase breather hose.



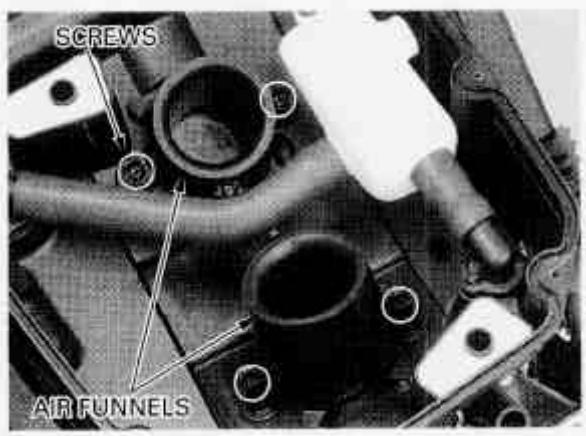
Disconnect the air hose and front crankcase breather hose.



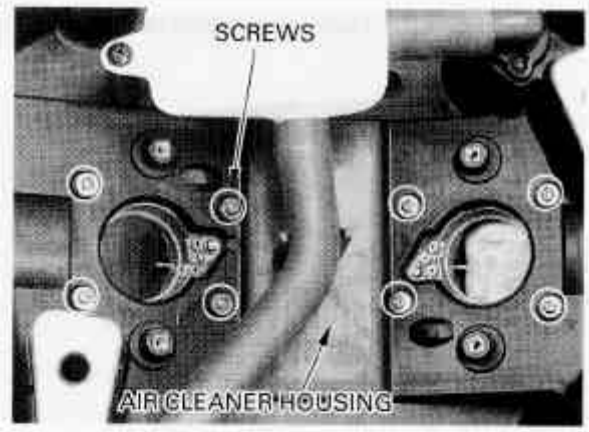
Disconnect the pulse secondary air injection (PAIR) vacuum tube and air supply hose.
Remove the PAIR control valve from the air cleaner housing.



Remove the screws and air funnels.



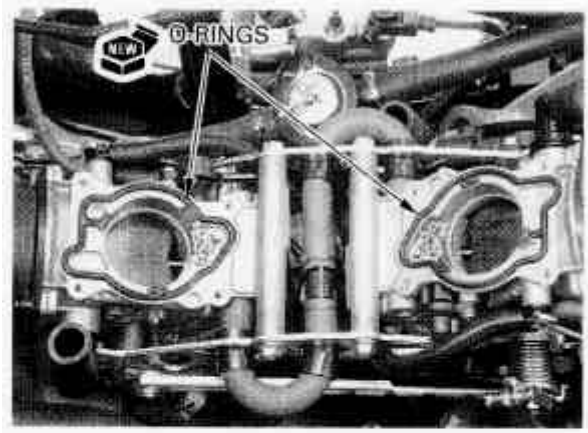
Remove the screws and air cleaner housing.



Remove the O-rings.

INSTALLATION

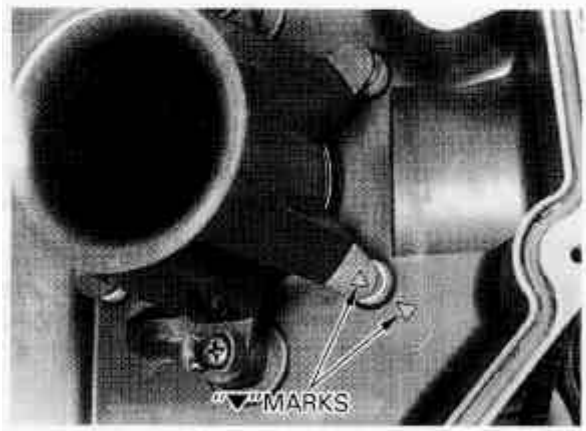
Install new O-rings into the carburetor grooves.



Install the removed parts in the reverse order of removal.

NOTE:

- Install the wires and hoses properly (page 1-21).
- Install the air funnels with the "▼" marks on the air funnel and air cleaner housing aligned.



CARBURETOR REMOVAL

⚠WARNING

Gasoline is extremely flammable and is explosive under certain conditions.

NOTE:

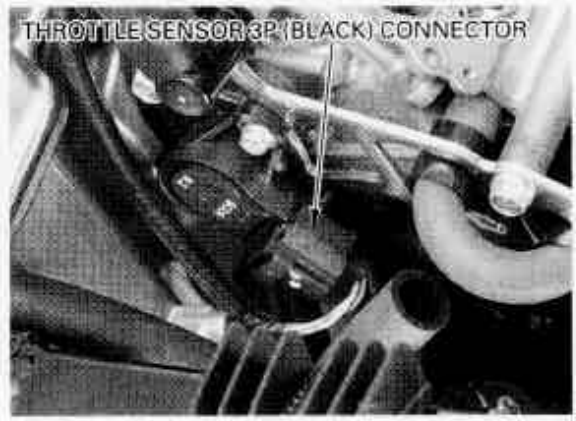
When the carburetors will not be serviced, remove the carburetor assembly with the air cleaner housing attached to prevent the threaded holes in the carburetor from damaging.

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

Remove the throttle stop control knob from the clamp.



Disconnect the throttle sensor 3P (Black) connector.



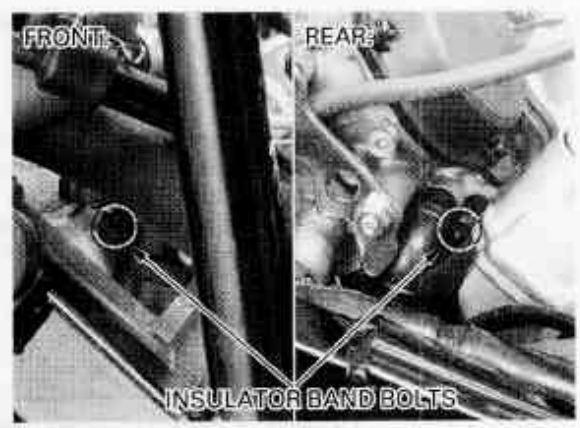
Remove the throttle cables from the cable stay and disconnect the throttle cables from the throttle drum.



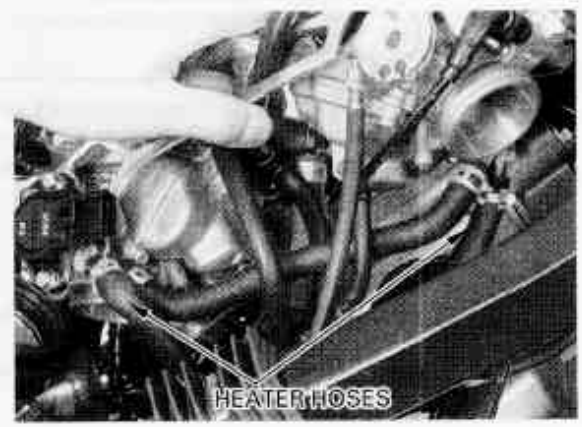
Loosen the carburetor insulator band bolts and remove the carburetor assembly.

NOTE:

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



Disconnect the carburetor heater hoses from the carburetors.



Loosen the starting enrichment (SE) valve nuts and disconnect the choke cables from the carburetors.
Disconnect the fuel tube from the fuel joint.

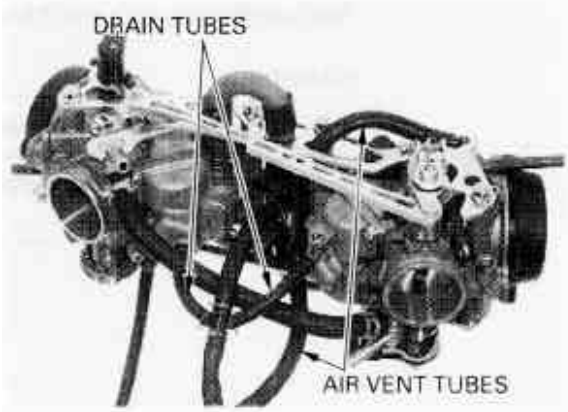


CARBURETOR SEPARATION

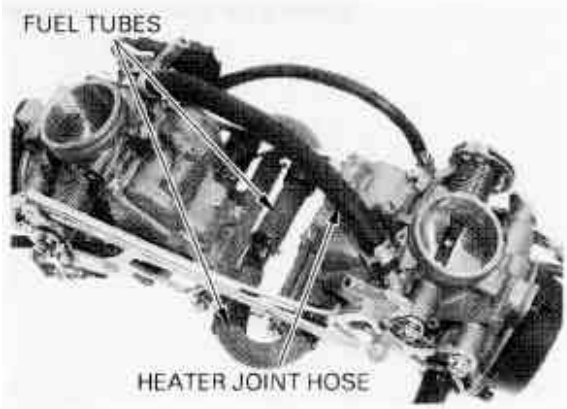
NOTE:

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

Disconnect the air vent tubes and drain tubes.



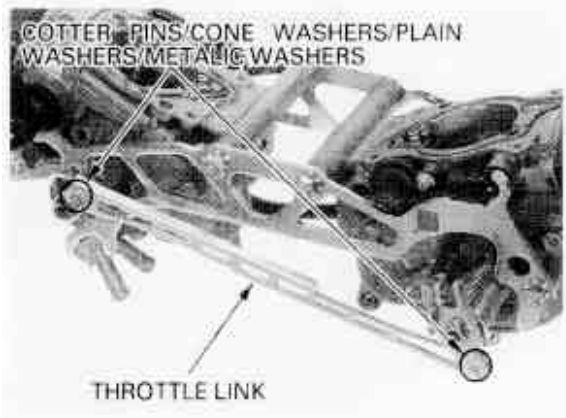
Disconnect the fuel tubes from the carburetors.
Disconnect the carburetor heater joint hose from the carburetors.



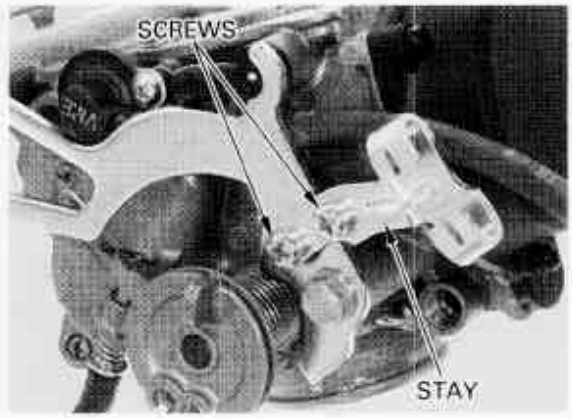
Remove the cotter pins, plastic cone washers, plastic plain washers and metalic washers.
Remove the throttle link.

CAUTION:

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



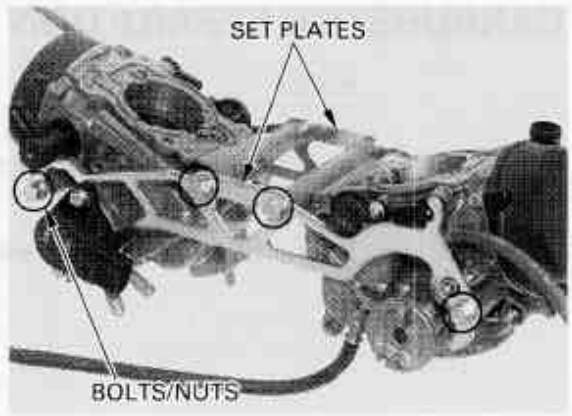
Remove the screws and throttle cable stay from the carburetor.



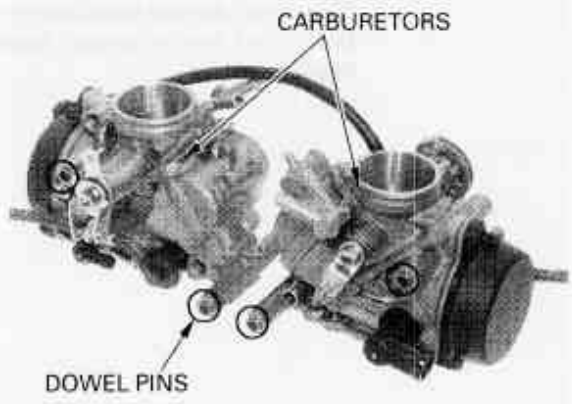
Remove the nuts, bolts and the set plates.

CAUTION:

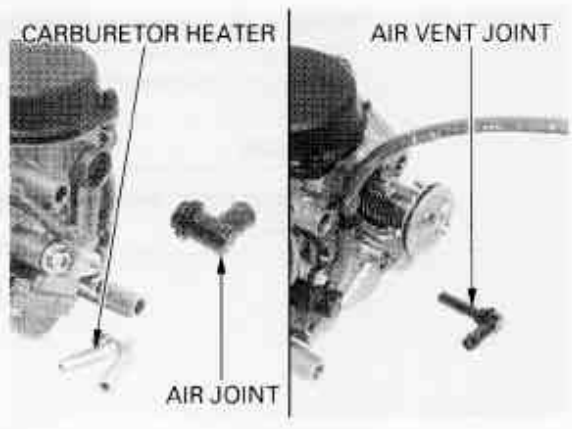
Do not remove the throttle sensor from the set plate unless it requires replacement. It can cause the throttle sensor getting out of position resulting in improper ignition timing.



Remove the dowel pins from each carburetor.



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



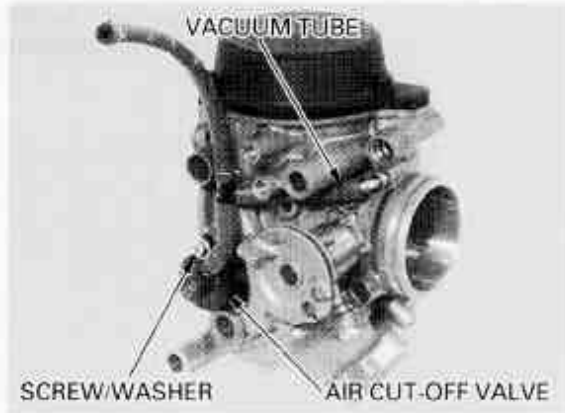
CARBURETOR DISASSEMBLY/ INSPECTION

NOTE:

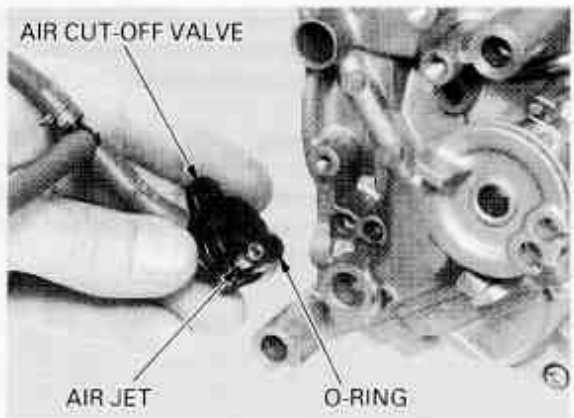
Note the location of each carburetor part so they can be replaced in their original locations.

AIR CUT-OFF VALVE

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

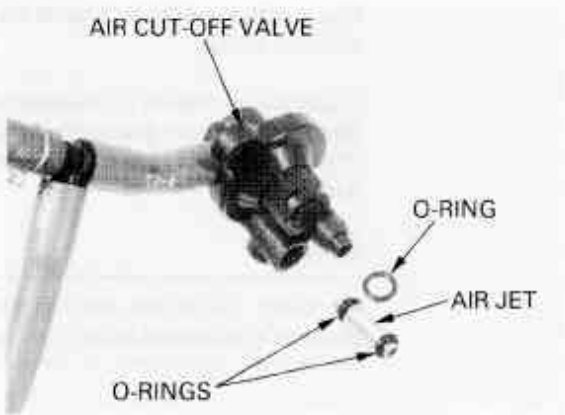


Remove the air cut-off valve, air jet and O-rings.



Apply vacuum to the vacuum tube of the valve.

The vacuum should 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 screws and vacuum chamber cover.

NOTE:

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



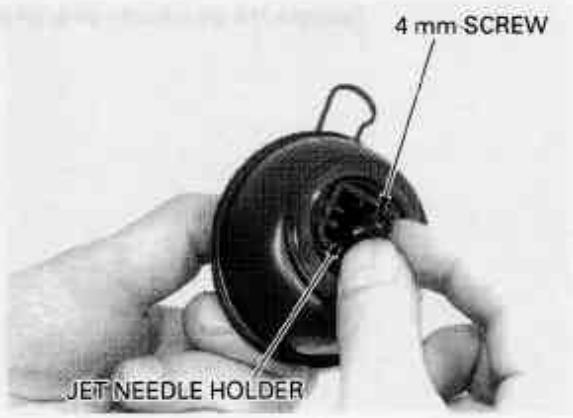
Remove the diaphragm spring and diaphragm/ vacuum piston from the carburetor body.



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

CAUTION:

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

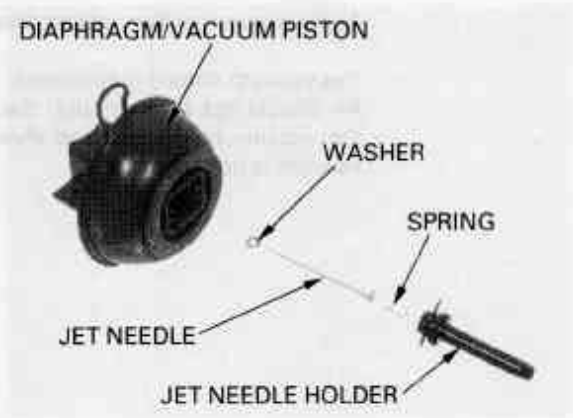


Remove the spring, jet needle and washer from the vacuum piston.

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

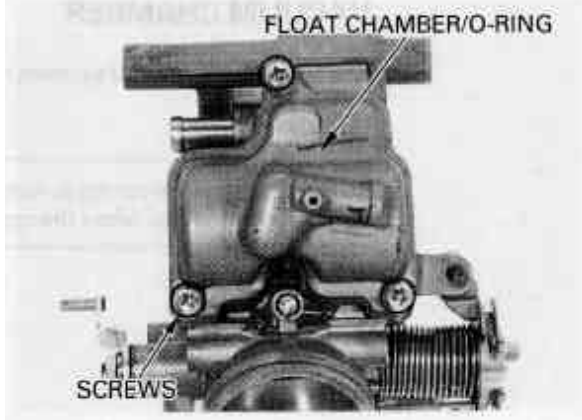
NOTE:

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



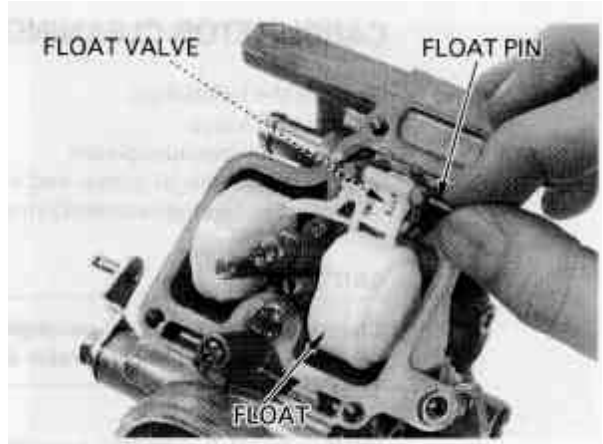
FLOAT CHAMBER

Remove the screws and float chamber and O-ring.



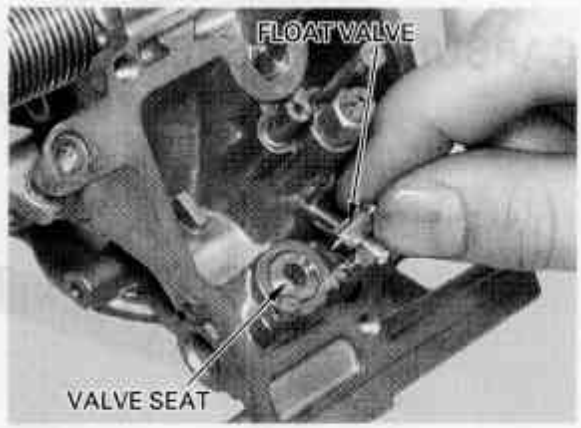
Remove the float pin, float and float valve.

Inspect the float for deformation or damage.



Inspect the float valve seat for scores, scratches, clogging and damage.
Check the tip of the float valve where it contacts the valve seat for stepped wear or contamination.
Replace the valve if the tip is worn or contaminated.

Check the operation of the float valve.

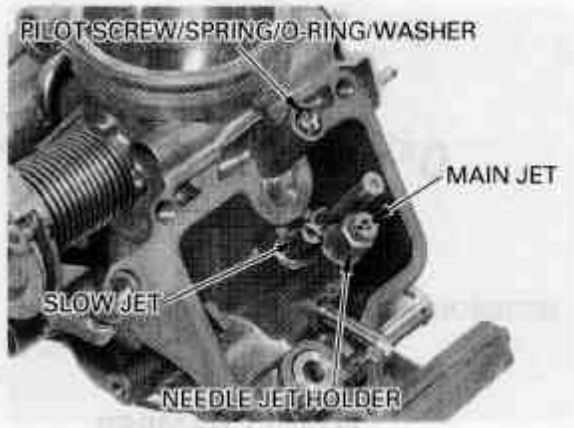


Remove the following:
– Main jet
– Needle jet holder
– Slow jet

CAUTION:

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

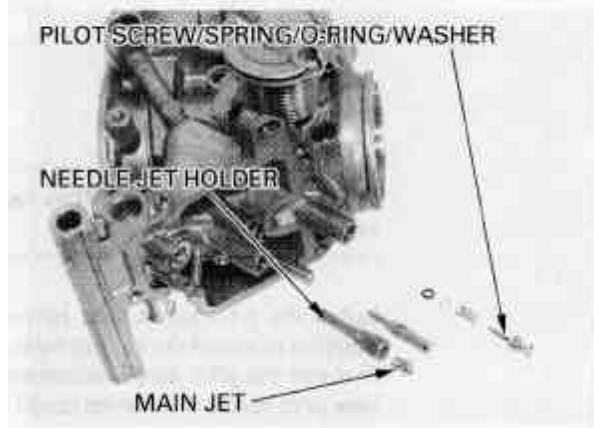
Turn the pilot screw in and record the number of turns it takes before it seats lightly.
Remove the pilot screw, spring, washer and O-ring.



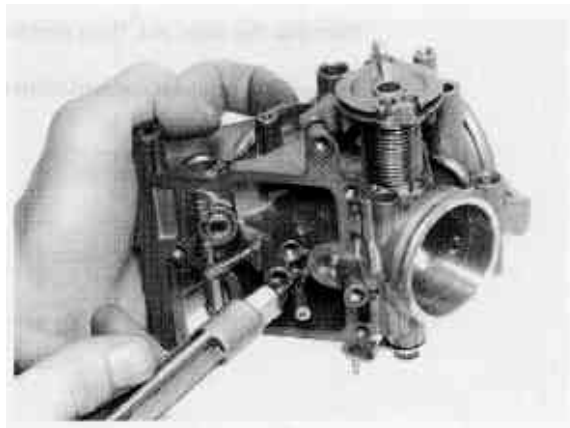
CAUTION:

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

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



CARBURETOR CLEANING



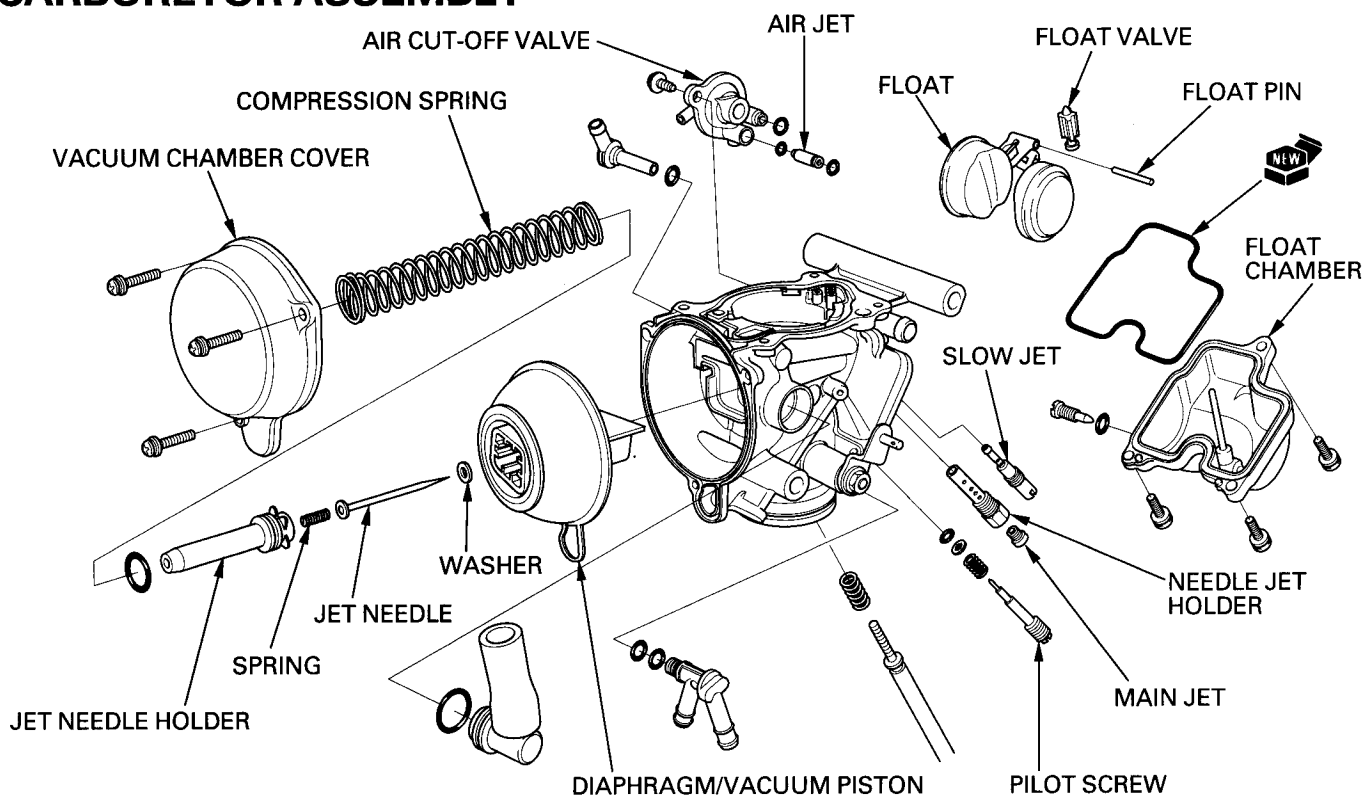
Remove the followings:
- Air cut-off valve
- Diaphragm/vacuum piston
- Main jet, needle jet holder and slow jet
- Pilot screw/spring/washer/O-ring

CAUTION:

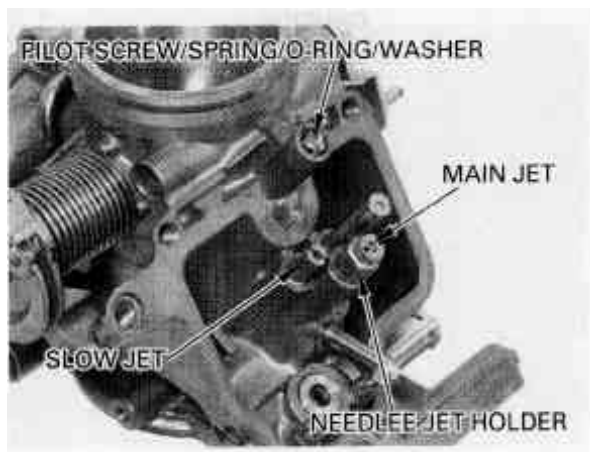
Cleaning the air and fuel passages with a piece of wire will damage the carburetor body.

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

CARBURETOR ASSEMBLY



FLOAT CHAMBER



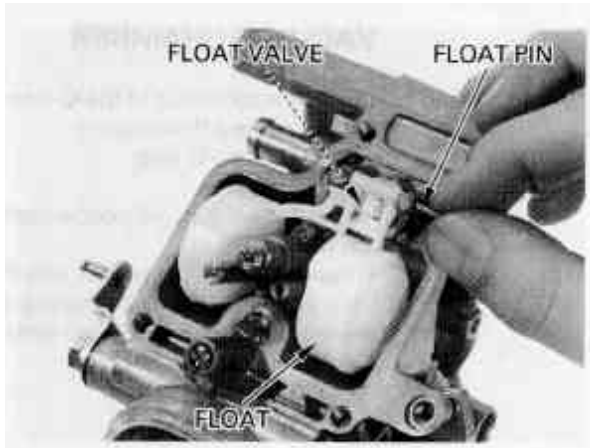
Install the following:
- Slow jet
- Needle jet holder
- Main jet

CAUTION:

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

Install the pilot screw and return it to its original position as noted during removal.
Perform the pilot screw adjustment procedure if a new pilot screw is installed (page 5-20).

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



FLOAT LEVEL INSPECTION

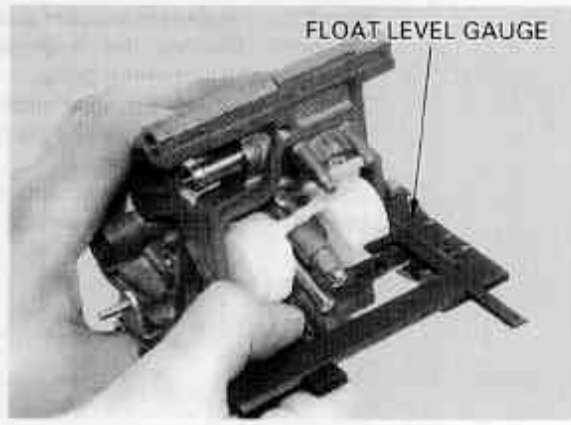
With the float valve seated and the float arm just touching the valve, measure the float level with the special tool as shown.

FLOAT LEVEL: 13.7 ± 0.5 mm (0.54 ± 0.02 in)

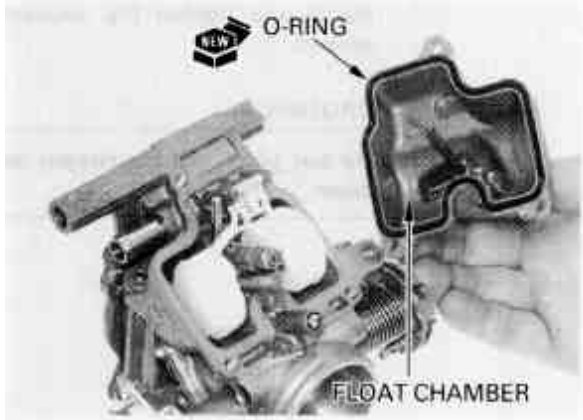
TOOL:

Carburetor float level gauge 07401-0010000

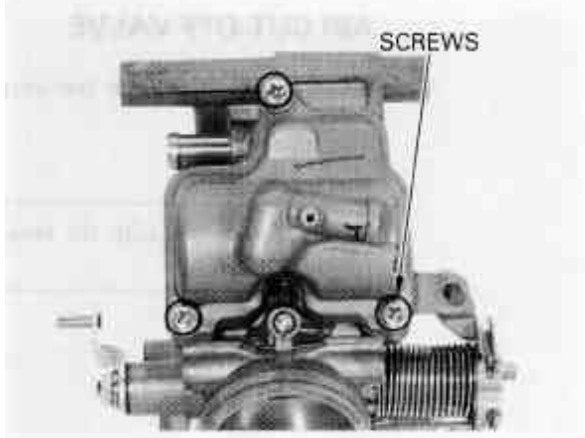
The float cannot be adjusted.
Replace the float assembly if the float level is out of specification.



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



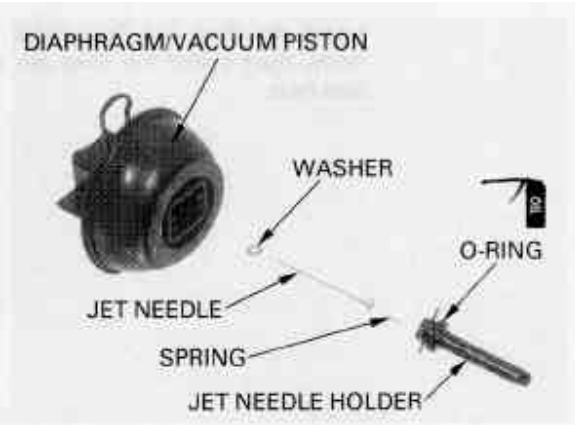
Install and tighten the three float chamber screws.



VACUUM CHAMBER

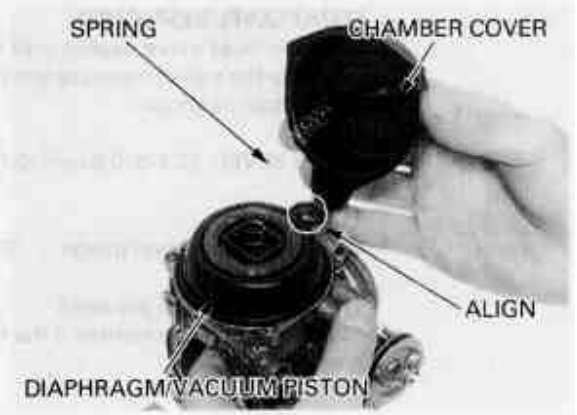
Check the condition of the O-ring on the jet needle holder, replace if necessary.
Apply oil to the O-ring.

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



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

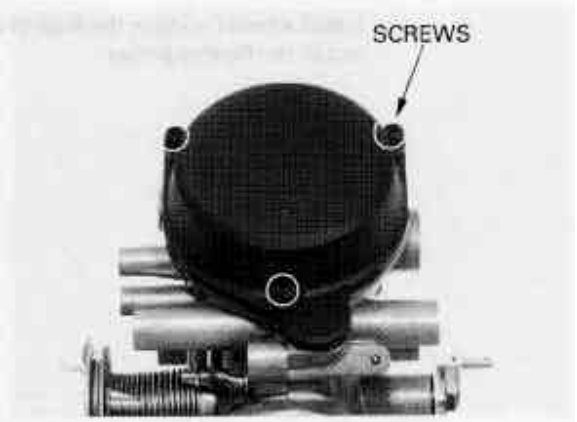
Install the chamber cover with the spring, being careful not to damage the spring.



Install and tighten the vacuum chamber cover screws.

CAUTION:

Do not pinch the diaphragm under the chamber cover.

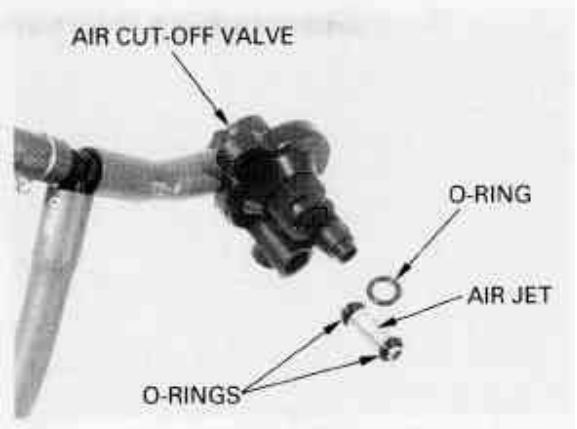


AIR CUT-OFF VALVE

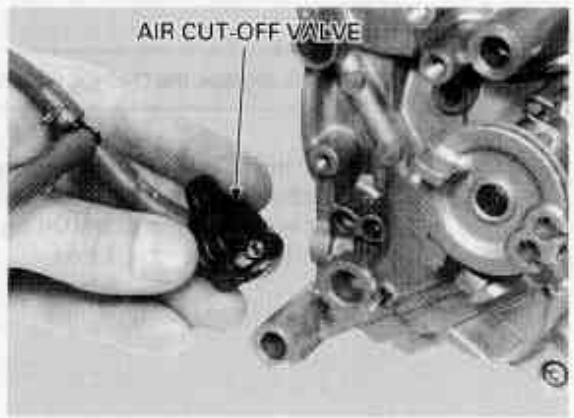
Install the O-rings onto the air jet and air cut-off valve as shown.

NOTE:

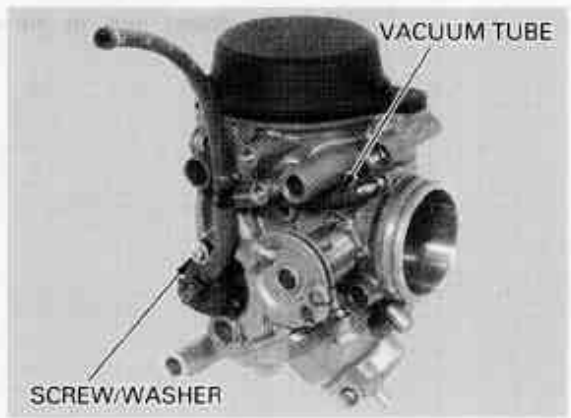
Install the air jet with its small end facing the carburetor body.



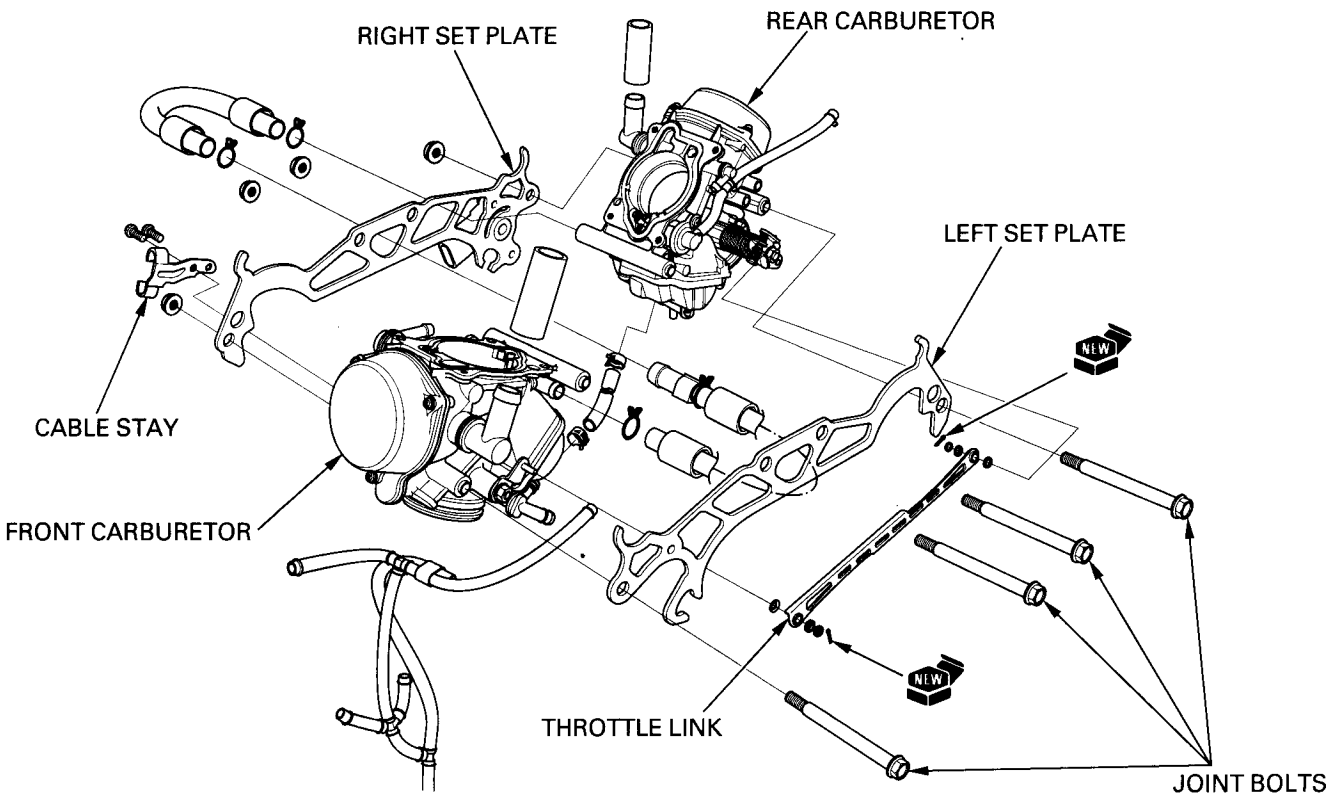
Install the air jet and air cut-off valve onto the carburetor.



Install and tighten the screw/washer.
Connect the vacuum tube to the vacuum pipe of the carburetor body.



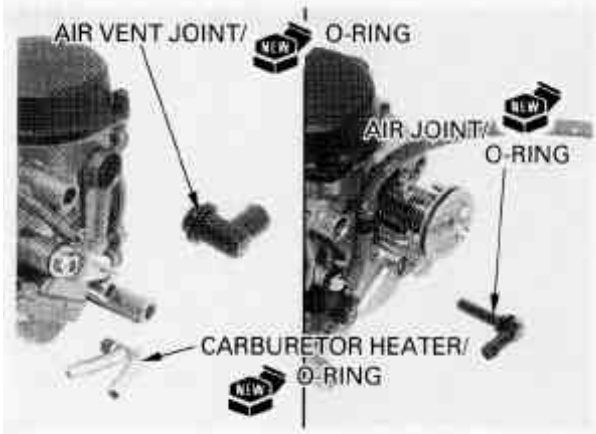
CARBURETOR COMBINATION



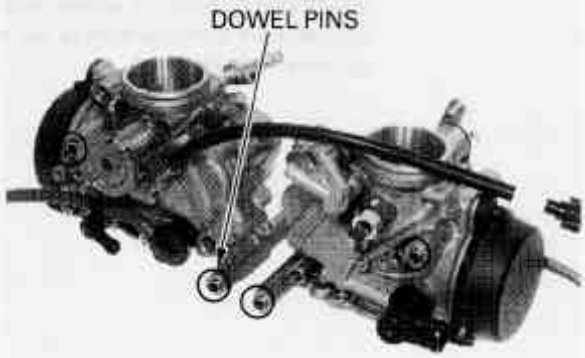
NOTE:

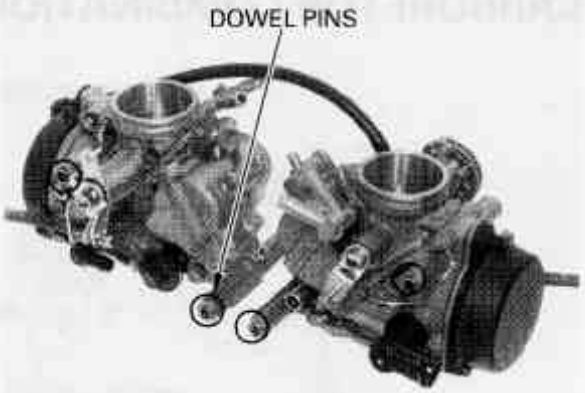
Always replace the O-rings with ones.

Install the followings onto each carburetor:
– Carburetor heater with new O-rings
– Air vent joint with a new O-ring
– Air joint with a new O-ring



Install the dowel pins to the each side of the carburetors.

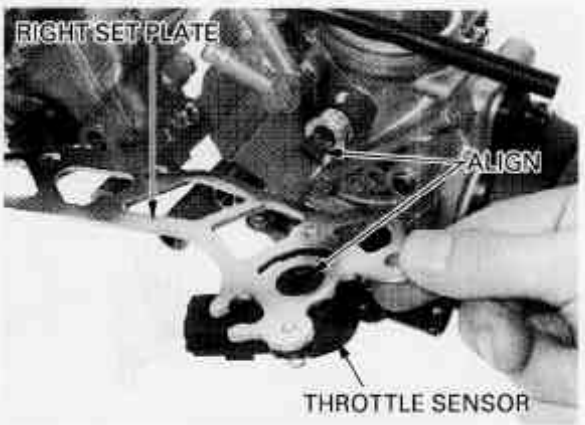




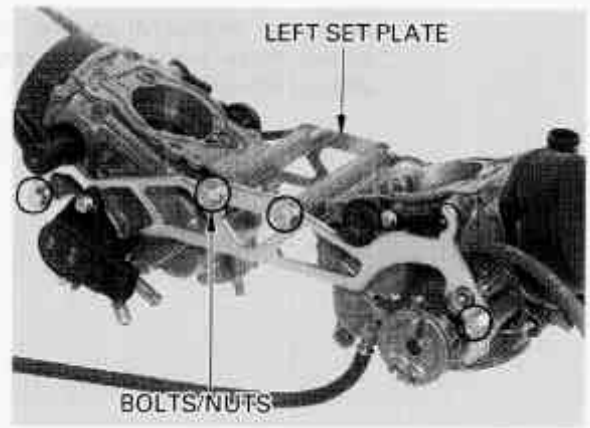
Install the right set plate onto the rear carburetor aligning the flat surfaces of the throttle sensor with the flat surfaces of the throttle shaft.

CAUTION:

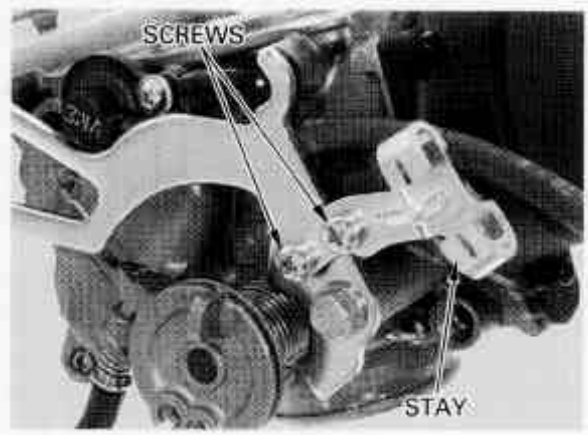
Do not remove the throttle sensor from the set plate unless it requires replacement. It can cause the throttle sensor getting out of position resulting in improper ignition timing.



Install the left set plate and bolts.
Install and tighten the nuts securely.

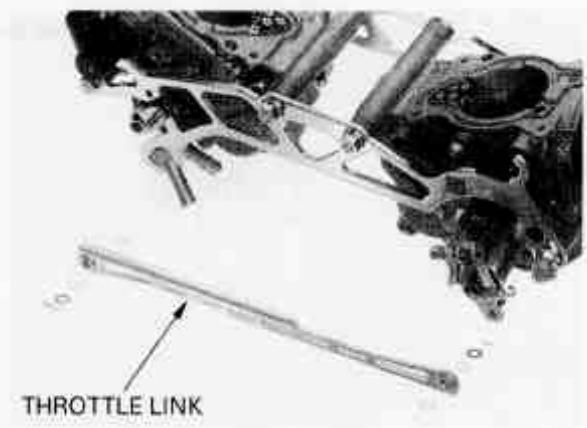


Install the throttle cable stay onto the front carburetor and tighten the screws securely.



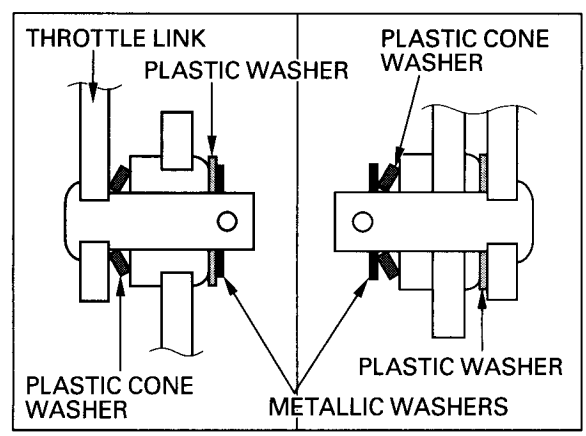
Install the followings onto the throttle arm pin:
Front carburetor:
- Plastic cone washer
- Throttle link
- Plastic washer
- Metallic washer
- New cotter pin

Rear carburetor:
- Plastic washer
- Throttle link
- Plastic cone washer
- Metallic washer
- New cotter pin

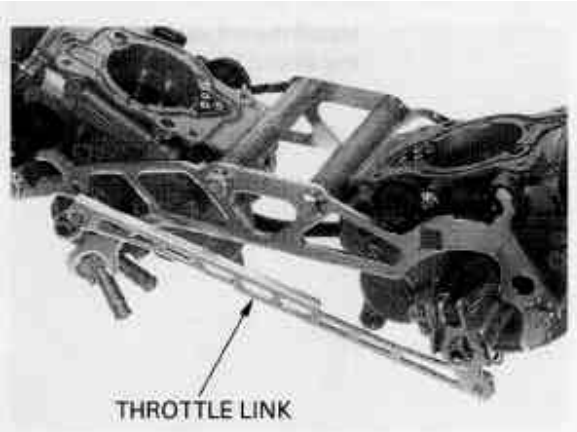


NOTE:

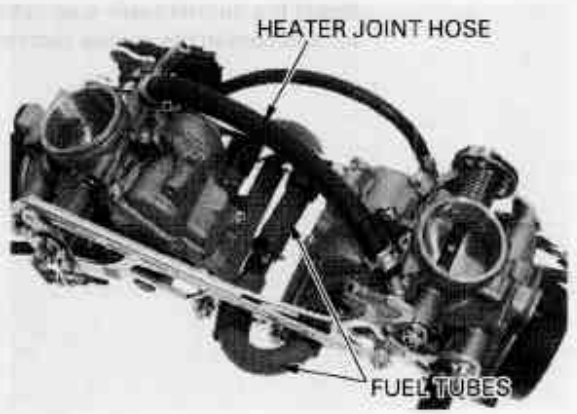
Install the plastic cone washer with the concave side facing to the throttle link.



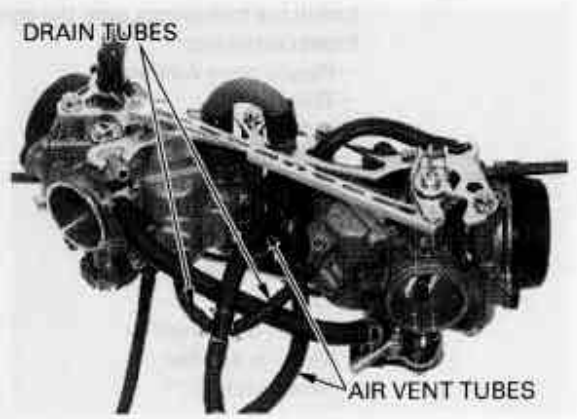
Move the throttle drum and check that throttle valves move smoothly and return automatically without binding.



Connect the carburetor heater joint hose to the carburetors.
Connect the fuel tubes to the carburetors.



Connect the air vent tubes and drain tubes.



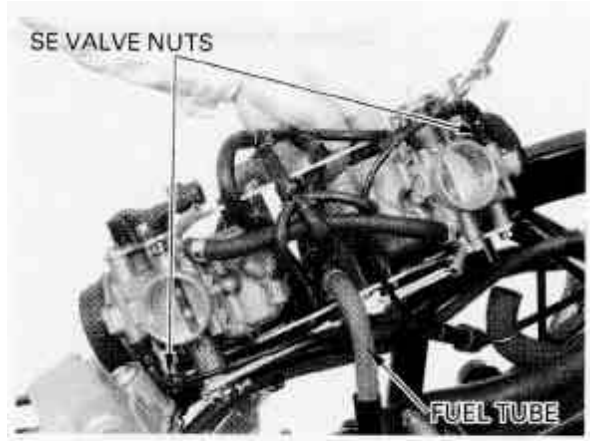
CARBURETOR INSTALLATION

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

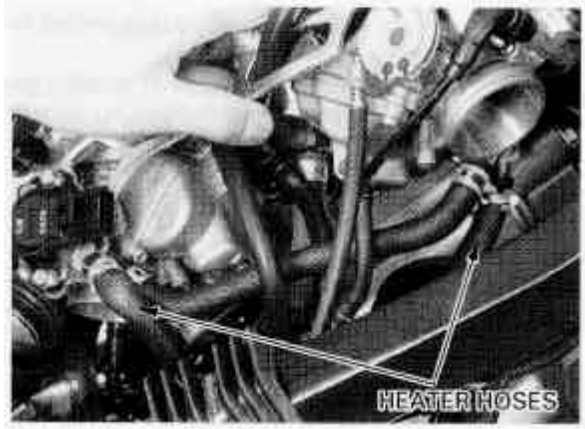
Replace the SE valve if necessary.



Connect the fuel tube to the fuel joint.
Connect the choke cables from the carburetors and tighten the starting enrichment (SE) valve nuts securely.



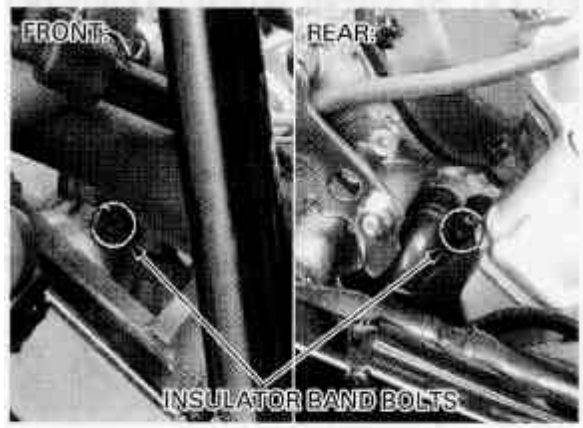
Connect the carburetor heater hoses to the carburetors.



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

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

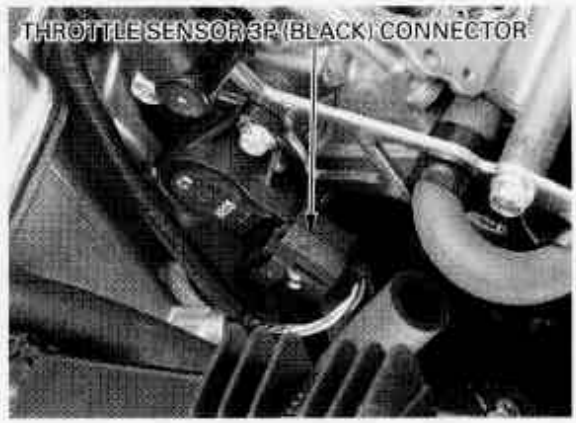
TORQUE: 1 N·m (0.1 kgf·m , 0.7 lbf·ft)



Connect the throttle cables to the throttle drum.
Install the throttle cables to the cable stay.



Connect the throttle sensor 3P (Black) connector.



Install the throttle stop control knob to the clamp.

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



PILOT SCREW ADJUSTMENT

IDLE DROP PROCEDURE

⚠WARNING

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

NOTE:

- Make sure the carburetor synchronization is within specification before pilot screw adjustment (page 3-12).
- The pilot screws are factory pre-set. Adjustment is not necessary unless the carburetors are overhauled or new pilot screws are installed.
- Then engine must be warm for accurate adjustment. Ten minutes of stop-and-go riding is sufficient.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate 50 rpm change.

Lift up the fuel tank using the maintenance bar (page 3-6).



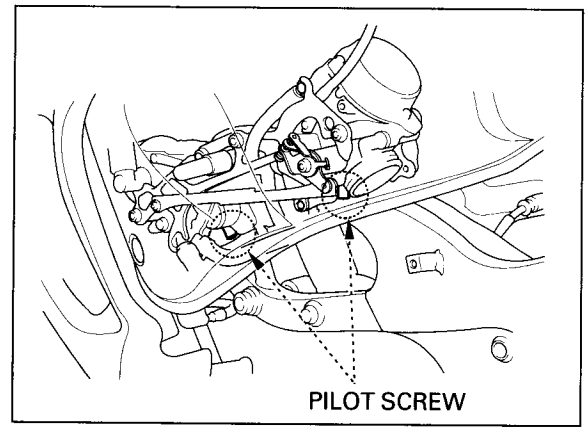
1. Turn the pilot screw clockwise until it seats lightly, and then back it out to the specification given.

CAUTION:

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

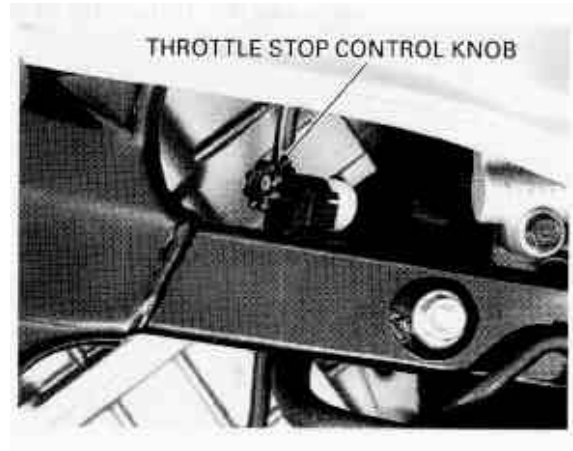
TOOLS:
Pilot screw wrench 07908-4730002

INITIAL OPENING: 2 3/8 turns out



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

IDLE SPEED: 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 the rear carburetor pilot screw.
7. Lightly open the throttle 2—3 times, adjust the idle speed with the throttle stop control knob.
8. Turn front carburetor pilot screw in gradually until the engine speed drops 50 rpm.
9. Then turn the front carburetor pilot screw counterclockwise to the final opening from the position in step 8.

FINAL OPENING: 1/2 turns out

10. Adjust the idle speed with the throttle stop control knob.
11. Perform steps 8, 9 and 10 for the rear carburetor pilot screw.

SECONDARY AIR SUPPLY SYSTEM

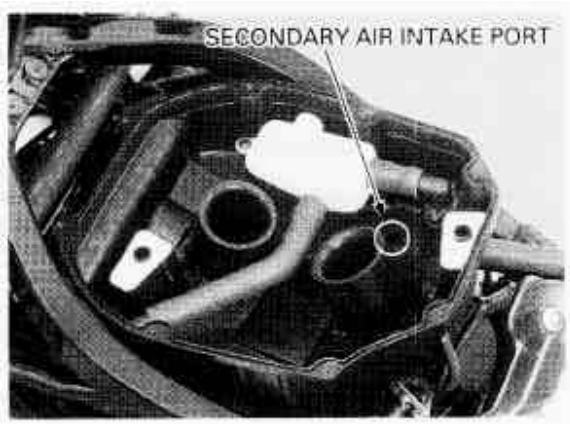
SYSTEM INSPECTION

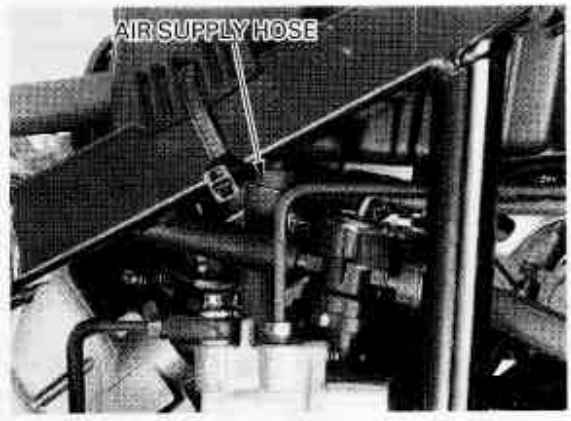
Start the engine and warm it up to normal operating temperature.
Remove the air cleaner element (page 3-5).

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

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

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





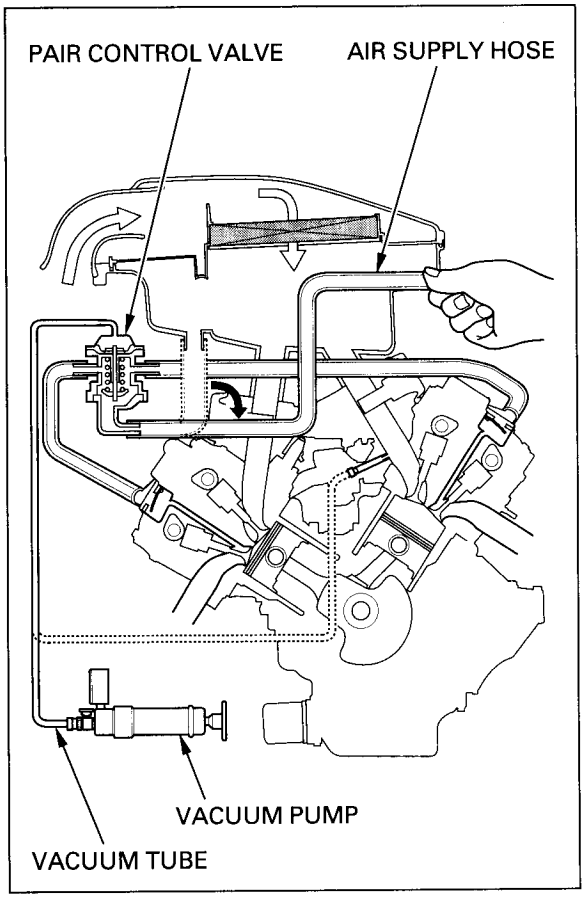
Disconnect the PAIR control valve vacuum tube from the control valve and plug it to keep air from entering.
Connect the vacuum pump to the PAIR control valve.

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

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

SPECIFIED VACUUM: 40 mm Hg

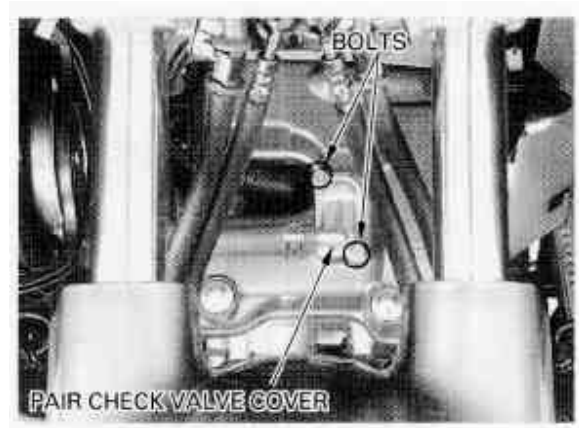
If the air drawn in, or if the specified vacuum is not maintained, install a new PAIR control valve.
If afterburn occurs on deceleration, even when the secondary air supply system is normal, check the air cut-off valve.



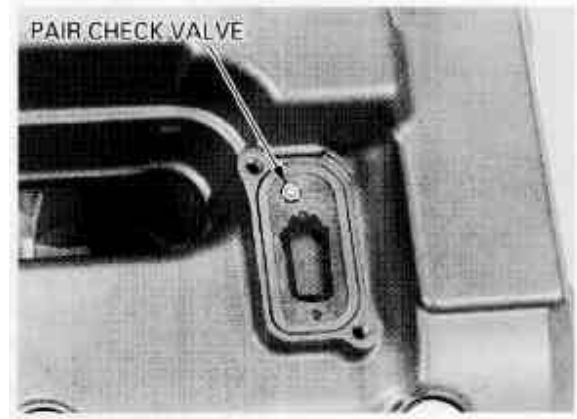
PAIR CHECK VALVE INSPECTION

For the rear cylinder PAIR check valve removal, remove the fuel tank (page 2-10).

Remove the bolts and PAIR check valve cover.



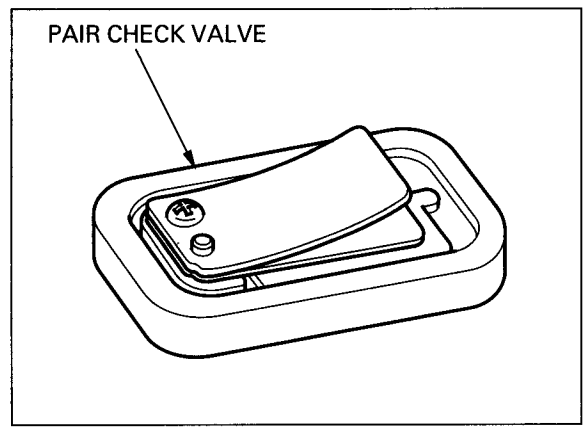
Remove the PAIR check valve from the cylinder head cover.



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 to the specified torque.

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



FUEL FILTER

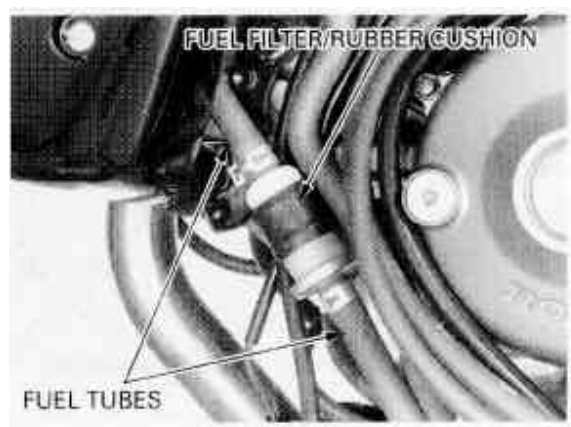
REMOVAL/INSTALLATION

Remove the under cowl (page 2-7).

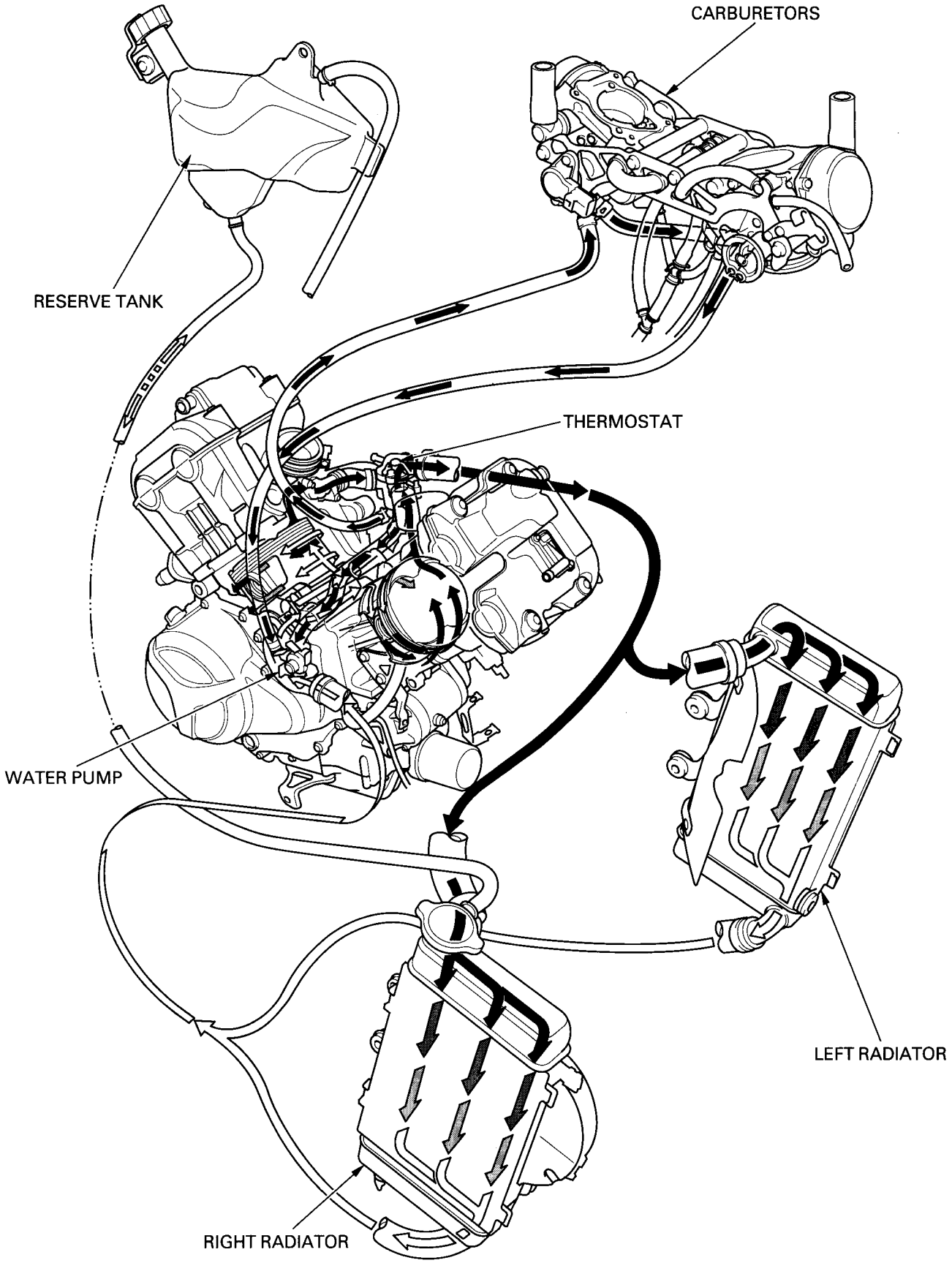
Disconnect the fuel tubes from the fuel filter.
Remove the fuel filter/rubber cushion from the stay.

Check the fuel filter for damage or contamination.
Replace the fuel filter if necessary.

Installation is in the reverse order of removal.



SYSTEM FLOW PATTERN



6. COOLING SYSTEM

SYSTEM FLOW PATTERN	6-0	RADIATOR	6-6
SERVICE INFORMATION	6-1	RADIATOR RESERVE TANK	6-12
TROUBLESHOOTING	6-2	THERMOSTAT	6-12
SYSTEM TESTING	6-3	WATER PUMP	6-15
COOLANT REPLACEMENT	6-4		

SERVICE INFORMATION

GENERAL

⚠WARNING

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

CAUTION:

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

- 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	2.8 ℓ (3.0 US qt , 2.5 Imp qt)
	Reserve tank	0.5 ℓ (0.5 US qt , 0.4 Imp qt)
Radiator cap relief pressure		108—137 kPa (1.1—1.4 kgf/cm², 16—20 psi)
Thermostat	Begin to open	75—82 °C (167—180 °F)
	Fully open	82 °C (180 °F)
	Valve lift	8 mm (0.3 in) minimum
Standard coolant concentration		50% mixture with soft water

TORQUE VALUES

Thermo sensor	9 N·m (0.9 kgf·m , 6.5 lbf·ft)	Apply sealant
Engine coolant temperature (ECT) sensor	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Fan motor switch	17 N·m (1.7 kgf·m , 12 lbf·ft)	

TOOLS

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 motor
- 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.

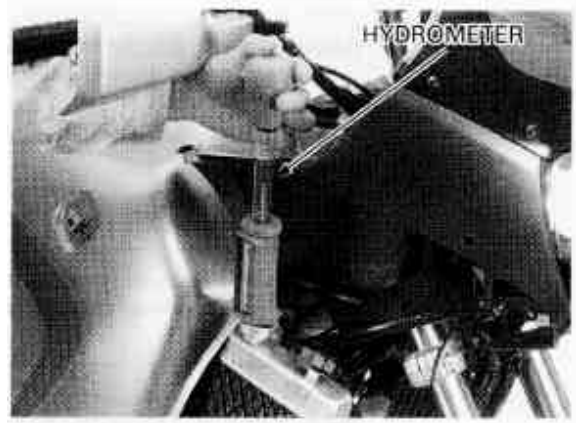
COOLANT (HYDROMETER TEST)

Remove the side cowl (page 2-5).

Remove the radiator cap.



Test the coolant gravity using a hydrometer (refer to Section 5 of the Common Service Manual for "Coolant gravity chart").
For maximum corrosion protection, a 50−50% solution of ethylene glycol and distilled water is recommended (page 6-4).
Look for contamination and replace the coolant if necessary.



Coolant temperature °F (°C) / Coolant ratio %	32 (0)	41 (5)	50 (10)	59 (15)	68 (20)	77 (25)	86 (30)	95 (35)	104 (40)	113 (45)	122 (50)
5	1.009	1.009	1.008	1.008	1.007	1.006	1.005	1.003	1.001	0.999	0.997
10	1.018	1.017	1.017	1.016	1.015	1.014	1.013	1.011	1.009	1.007	1.005
15	1.028	1.027	1.026	1.025	1.024	1.022	1.020	1.018	1.016	1.014	1.012
20	1.035	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

RADIATOR CAP/SYSTEM PRESSURE INSPECTION

Remove the radiator cap (page 6-3).

NOTE:

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

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

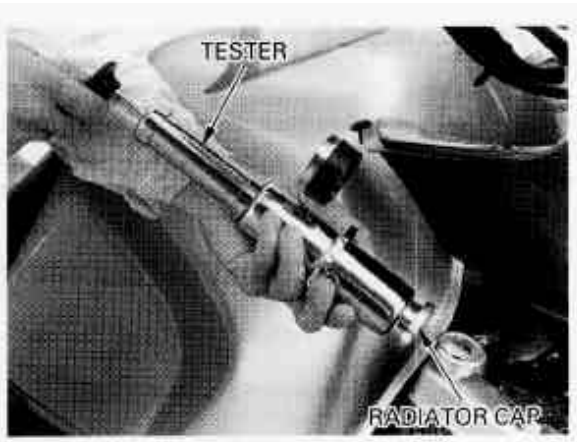
RADIATOR CAP RELIEF PRESSURE:
108–137 kPa (1.1–1.4 kgf/cm², 16–20 psi)

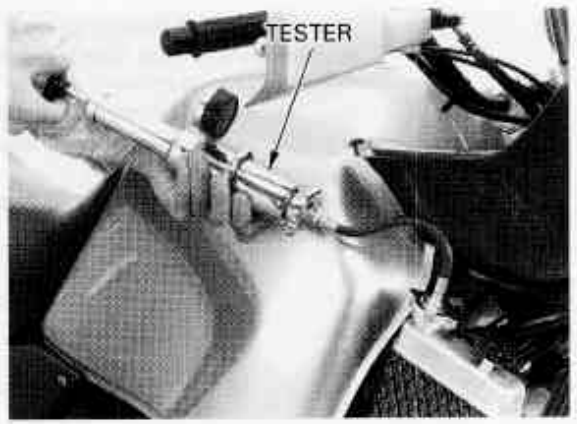
Pressure the radiator, engine and hoses, and check for leaks.

CAUTION:

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

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





COOLANT REPLACEMENT

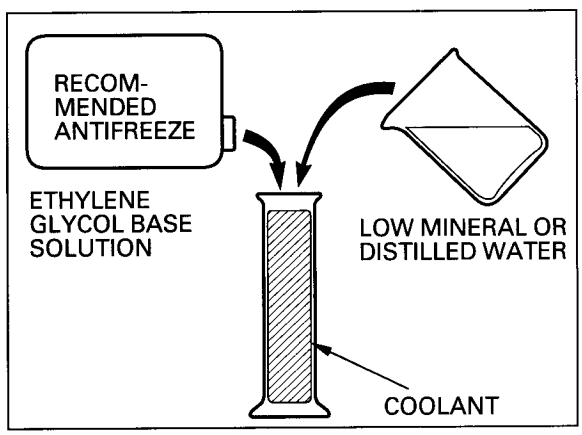
PREPARATION

⚠WARNING

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

CAUTION:

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



NOTE:

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

RECOMMENDED MIXTURE:
50−50 (Distilled water and antifreeze)

REPLACEMENT/AIR BLEEDING

⚠WARNING

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

NOTE:

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

Remove the side cowl (page 2-5).
Remove the under cowl (page 2-7).

Remove the radiator cap.
Disconnect the lower radiator 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.

Reinstall the drain bolt with the new sealing washer.

Disconnect the siphon tube from the radiator.

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

Reinstall the radiator siphon tube.

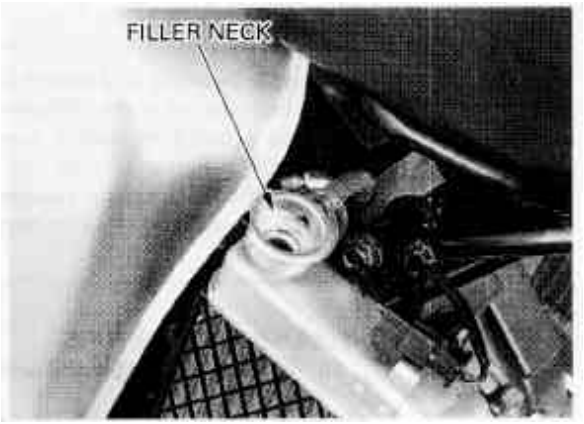








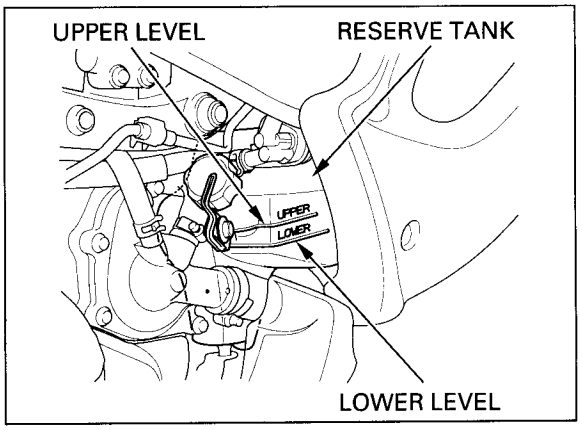
Fill the system with the recommended coolant through the filler opening up to filler neck.



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

Bleed air from the system as follow:

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



RADIATOR

CAUTION:

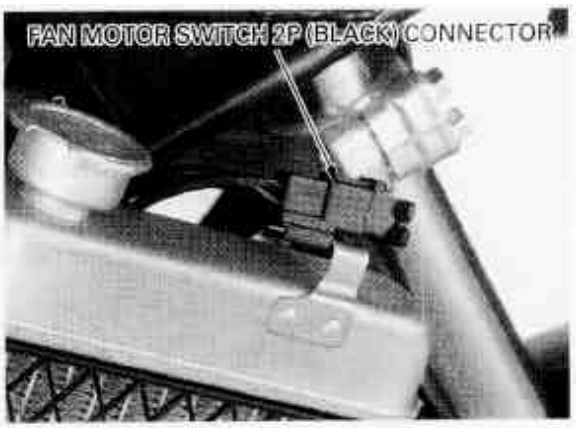
Be careful not to damage the radiator core.

REMOVAL/INSTALLATION

Drain the coolant (page 6-4).
Remove the fuel tank (page 2-10).

RIGHT RADIATOR

Disconnect the fan motor switch 2P (Black) connector.



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



Disconnect the lower radiator hose.



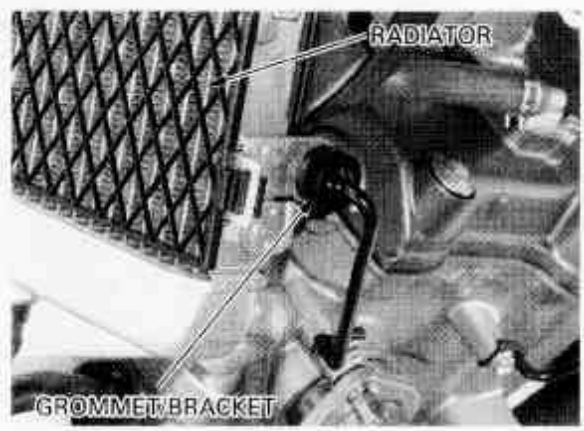
Remove the mounting bolts and washers.



Release the grommet on the radiator from the radiator bracket.

Installation is in the reverse order of removal.

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



LEFT RADIATOR

Disconnect the upper radiator hose.



Disconnect the lower radiator hose.



Remove the mounting bolts and washers.



Release the grommet on the radiator from the radiator bracket.

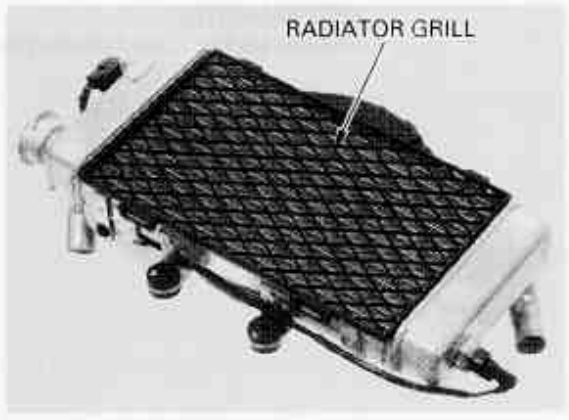
Installation is in the reverse order of removal.

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

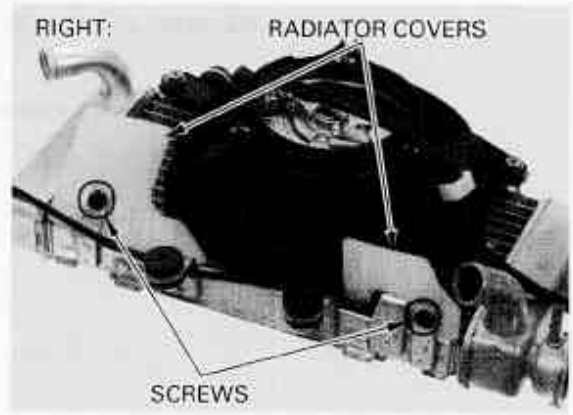


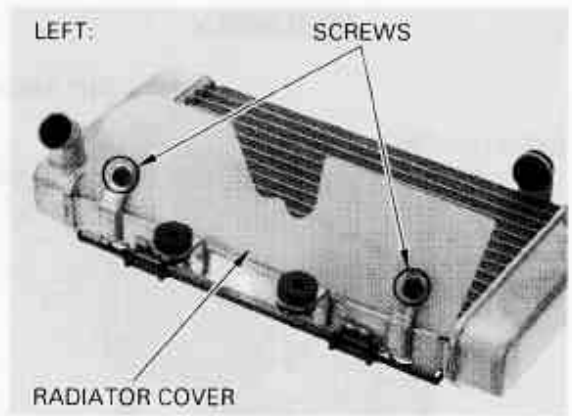
DISASSEMBLY

Remove the radiator grill from the radiator.



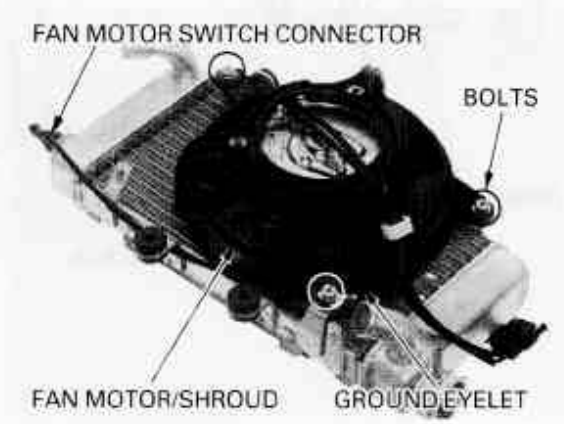
Remove the screws and right/left radiator covers.



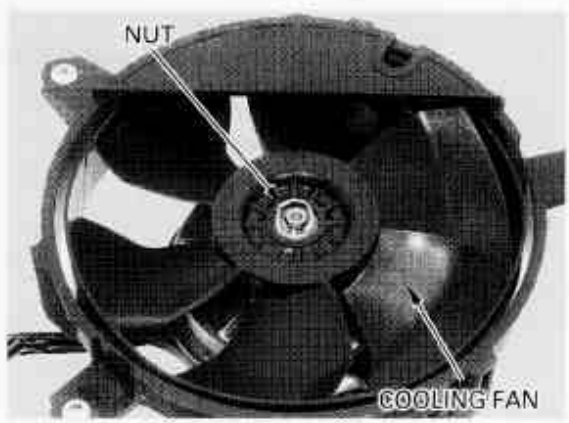


COOLING FAN DISASSEMBLY

Disconnect the fan motor switch connector.
Remove the bolts, ground eyelet and the fan motor/ shroud assembly.

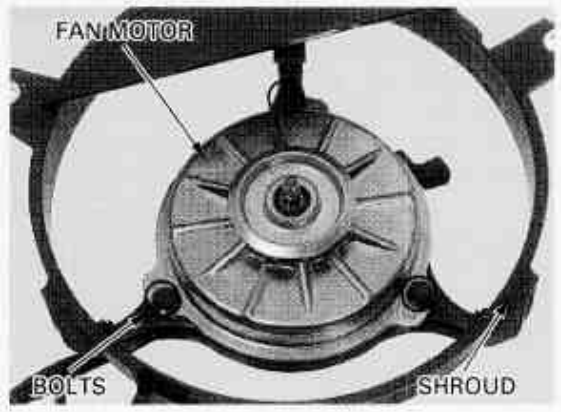


Remove the nut and cooling fan.

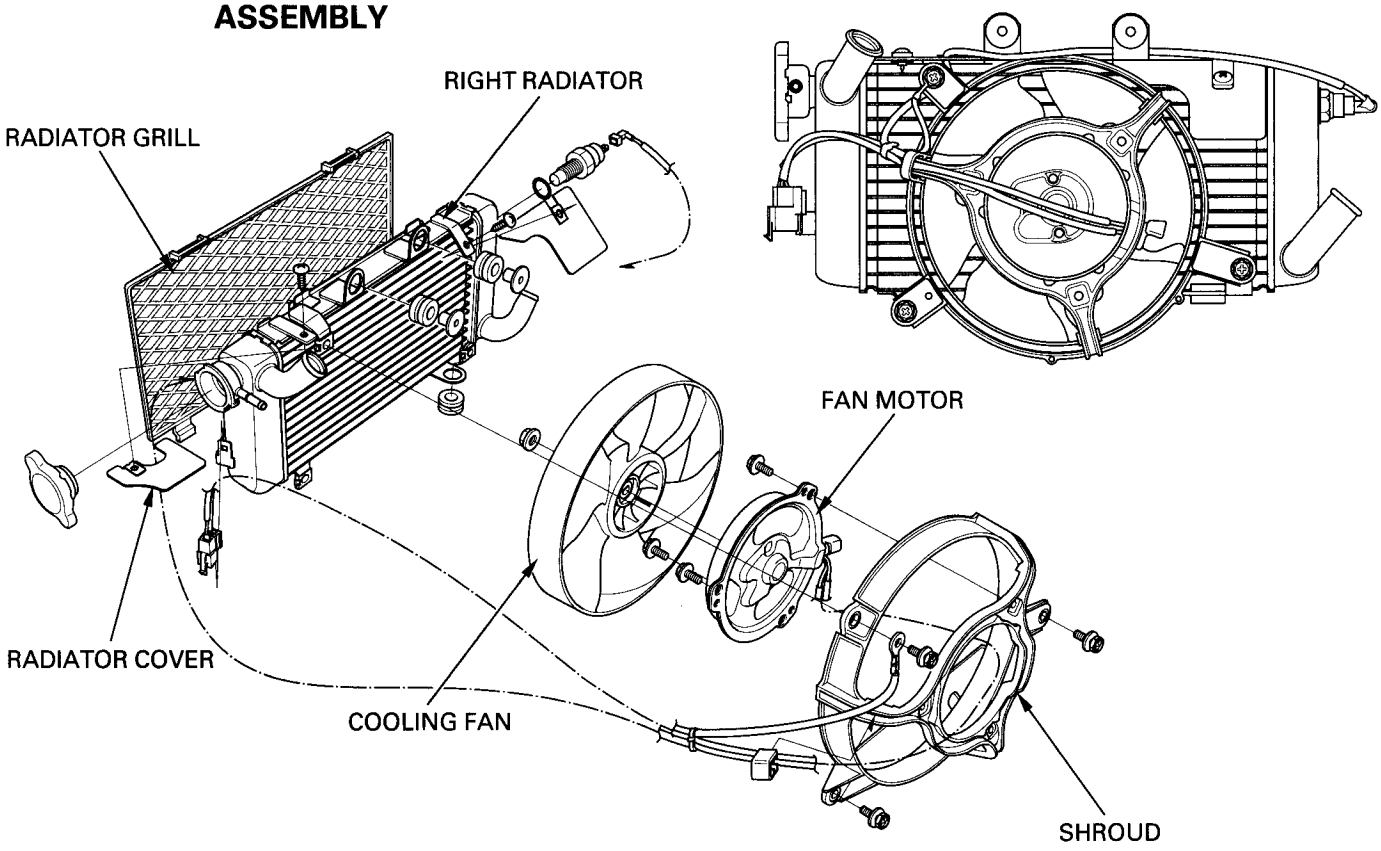


Remove the bolts and the fan motor from the shroud.

For fan motor switch information, refer to page 19-14.



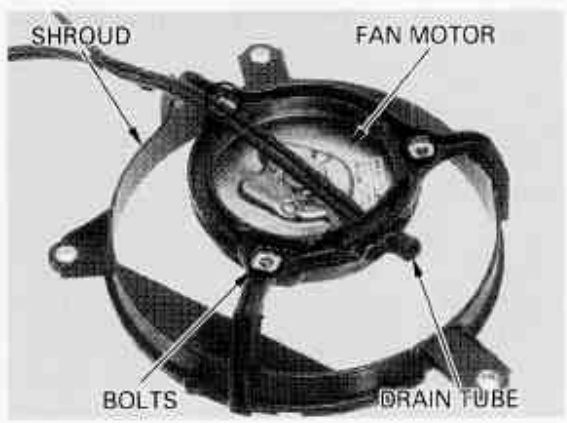
ASSEMBLY



COOLING FAN

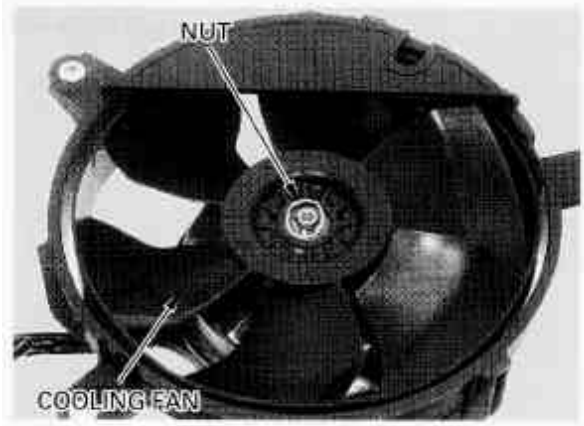
Install the fan motor onto the shroud with the drain tube as shown.

Install and tighten the bolts.



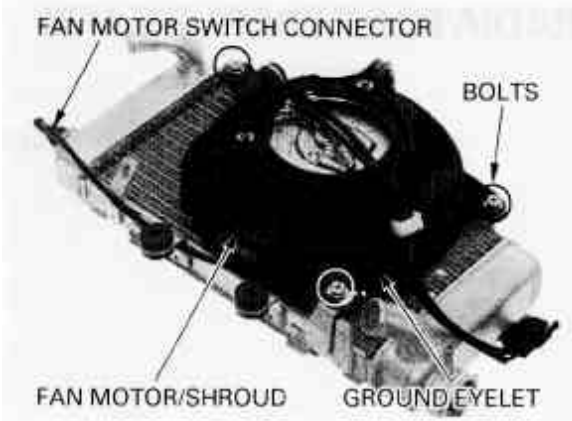
Install the cooling fan onto the fan motor shaft by aligning the flat surfaces.

Install and tighten the nut securely.

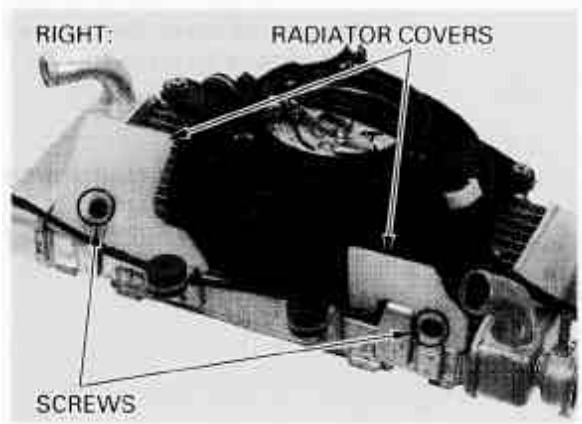


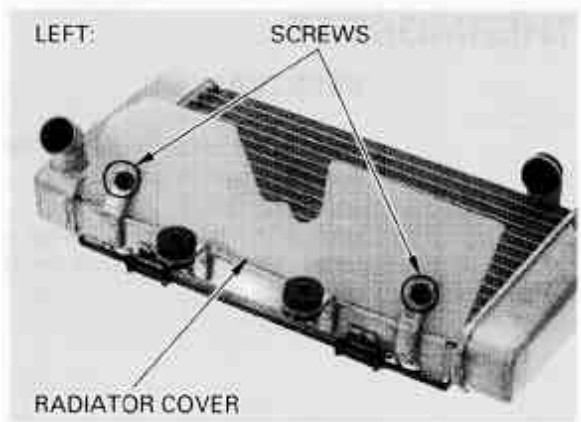
Install the fan motor/shroud assembly onto the radiator.
Route the fan motor switch wire and ground eyelet properly.
Install and tighten the bolts.

Connect the fan motor switch wire to the fan motor switch.



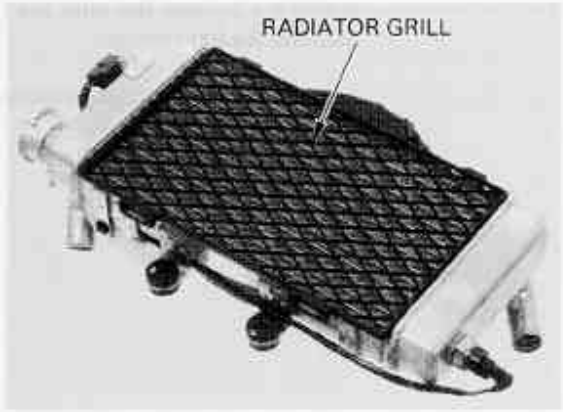
Install the right/left radiator covers and screws.





Install the radiator grill to the radiator.

Install the radiator (page 6-7, 8).

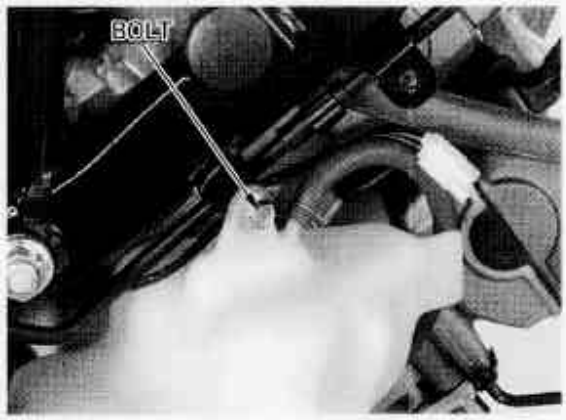


RADIATOR RESERVE TANK

REMOVAL

Remove the right radiator (page 6-6).

Remove the bolt.



Remove the tab on the reserve tank from the stay, then remove the reserve tank.



INSTALLATION

Installation is in the reverse order of removal.

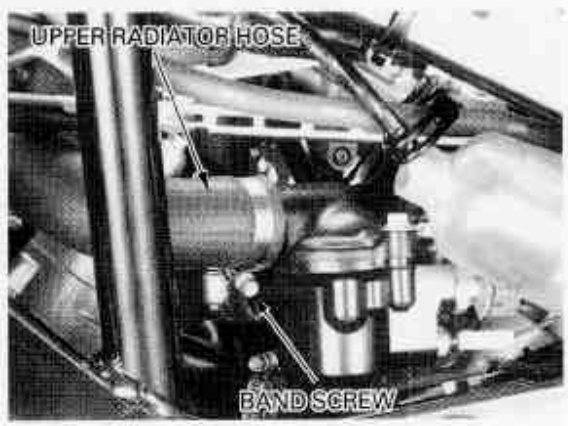
Install the right radiator (page 6-7).

THERMOSTAT

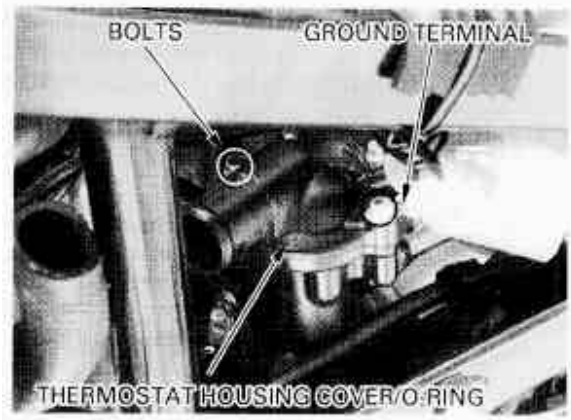
REMOVAL

Remove the fuel tank (page 2-10).
Drain the coolant (page 6-5).

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



Remove the bolts, ground terminal, thermostat housing cover and O-ring.

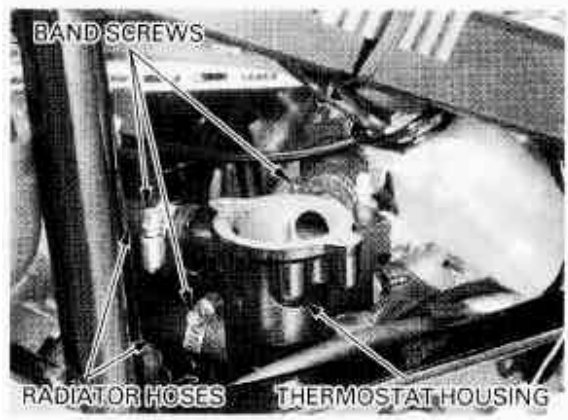


Remove the thermostat and housing.



Disconnect the thermo sensor connector (page 19-13) and engine coolant temperature sensor 2P (Green) connector (page 17-9).

Loosen the hose band screws and disconnect the radiator hoses from the thermostat housing.
Remove the thermostat housing.



INSPECTION

⚠WARNING

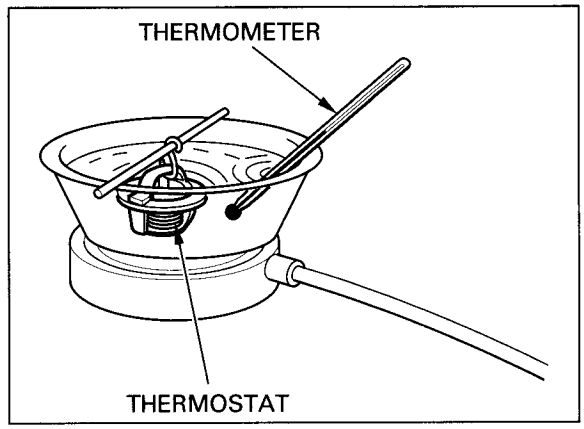
- ***Wear insulated gloves and adequate eye protection.***
- ***Keep flammable materials away from the electric heating element.***

Visually inspect the thermostat for damage.

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

NOTE:

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

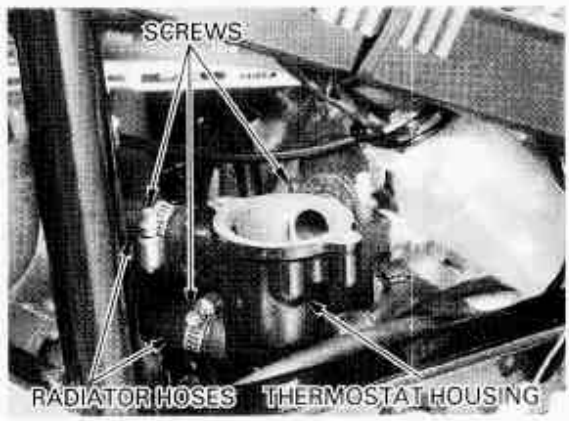


Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.

THERMOSTAT BEGIN TO OPEN:
75–82 °C (167–180 °F)
VALVE LIFT:
8 mm (0.3 in) minimum at 82 °C (180 °F)

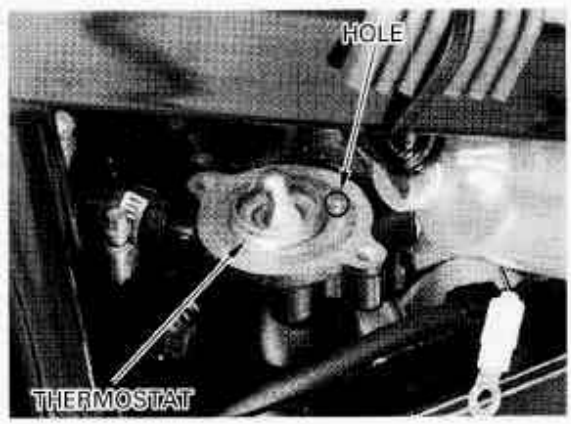
INSTALLATION

Connect the radiator hoses to the thermostat housing and tighten the hose band screws securely.



Connect the thermo sensor connector (page 19-13) and engine coolant temperature sensor 2P (Green) connector (page 17-10).

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



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

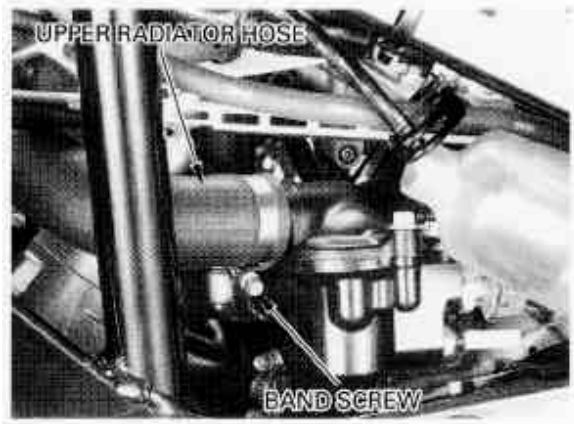


Install the thermostat housing cover and ground terminal.
Install and tighten the housing cover bolts.



Connect the upper radiator hose to the thermostat housing cover and tighten the hose band screw securely.

Fill the system with recommended coolant and bleed the air (page 6-5).
Install the fuel tank (page 2-10).

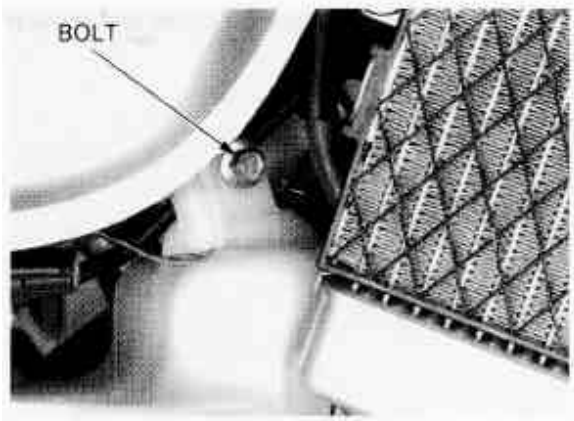


WATER PUMP

RIGHT CRANKCASE COVER REMOVAL

Drain the coolant (page 6-4).

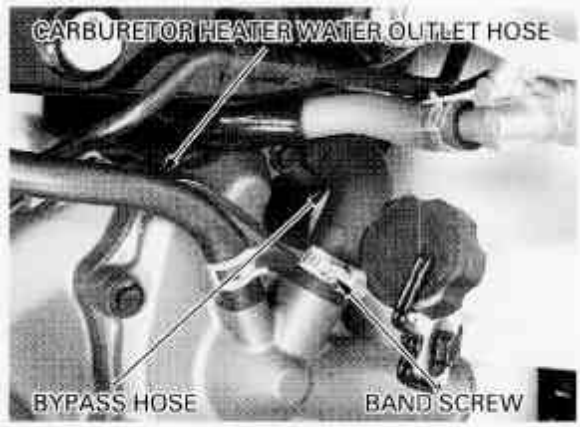
Remove the radiator reserve tank bolt.



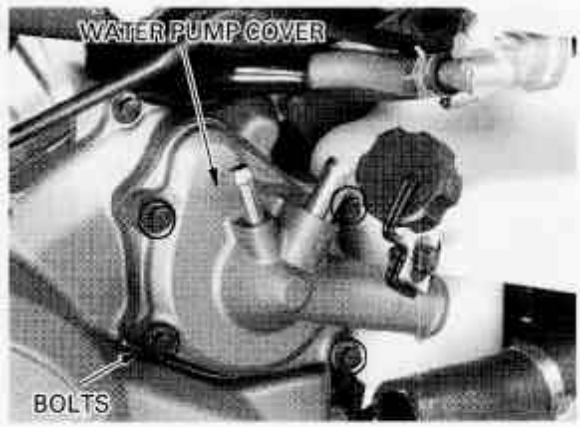
Loosen the hose band screw and disconnect the lower radiator hose.



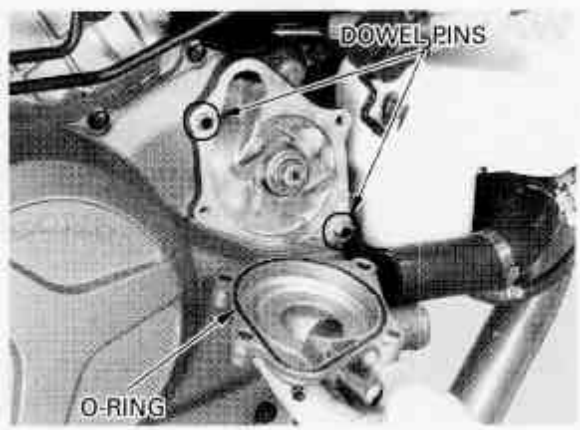
Disconnect the carburetor heater water outlet hose. Loosen the hose band screw and disconnect the bypass hose from the water pump cover.



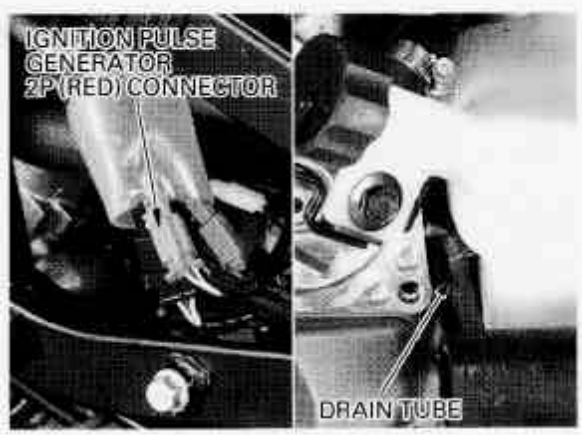
Remove the bolts and water pump cover.



Remove the O-ring and dowel pins.



Disconnect the ignition pulse generator 2P (Red) connector.
Disconnect the drain tube from the right crankcase cover.

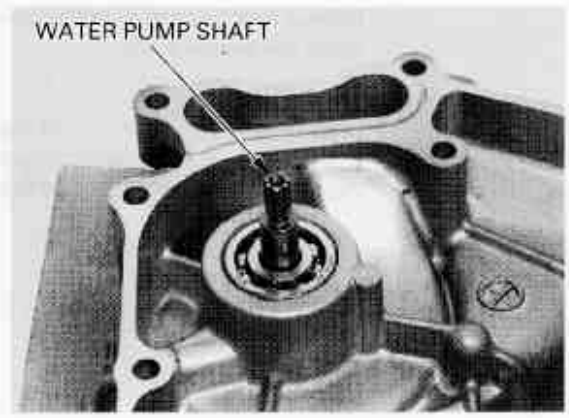


Remove the bolts and the right crankcase cover.
Remove the dowel pins and gasket.



MECHANICAL SEAL REPLACEMENT

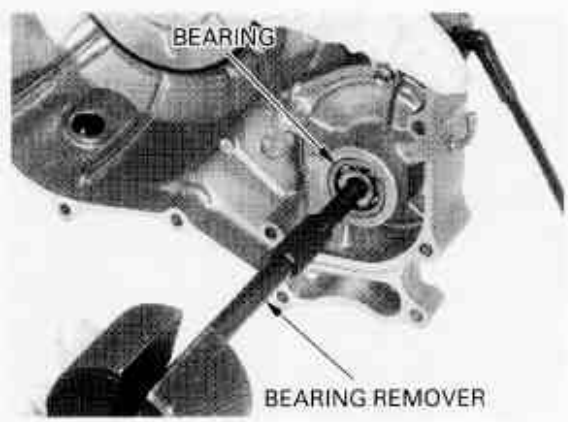
Remove the water pump shaft from the right crankcase cover.



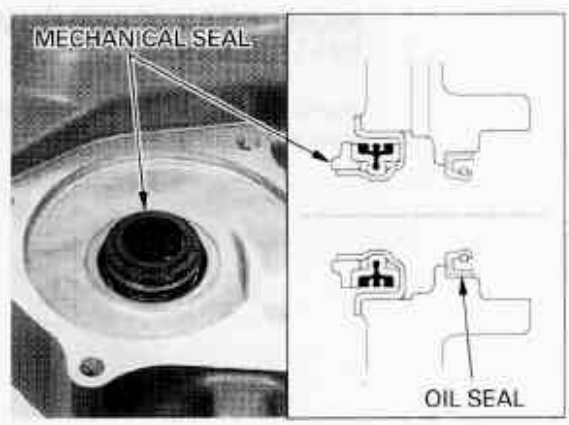
Remove the bearing using the special tools.

TOOLS:

Bearing remover shaft	07936-GE00100
Bearing remover, 10 mm	07936-GE00200
Sliding weight	07741-0010201



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

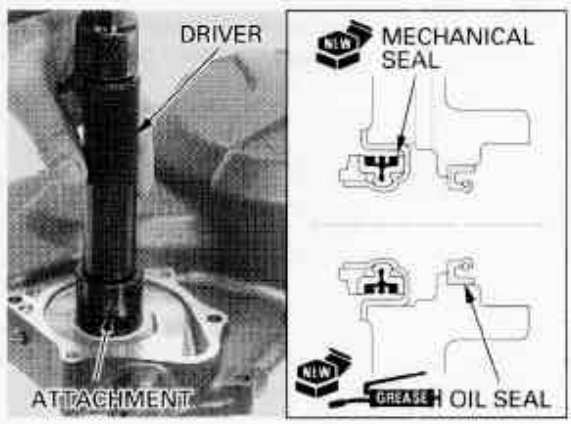


Drive a new mechanical seal using the special tool.

TOOLS:

Driver	07749-0010000
Mechanical seal driver attachment	07945-4150400

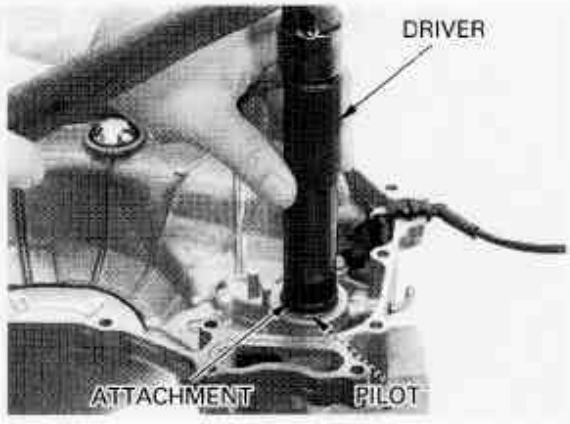
Apply grease to a new oil seal lip and install the oil seal into the right crankcase cover.



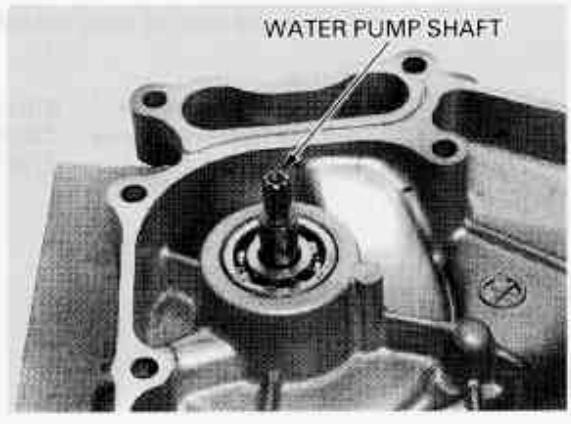
Drive a new bearing with the make side facing out, using the special tools.

TOOLS:

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

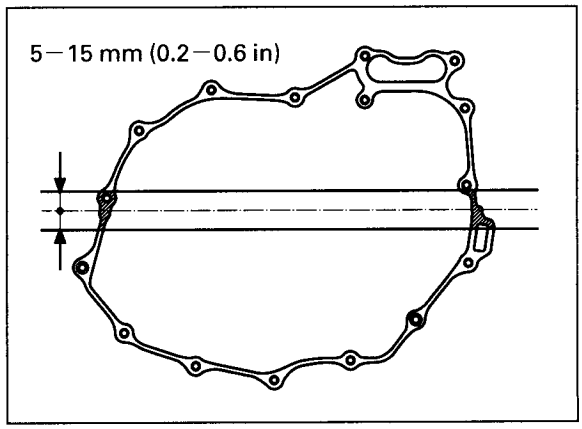


Support the bearing inner race properly and install the water pump shaft.

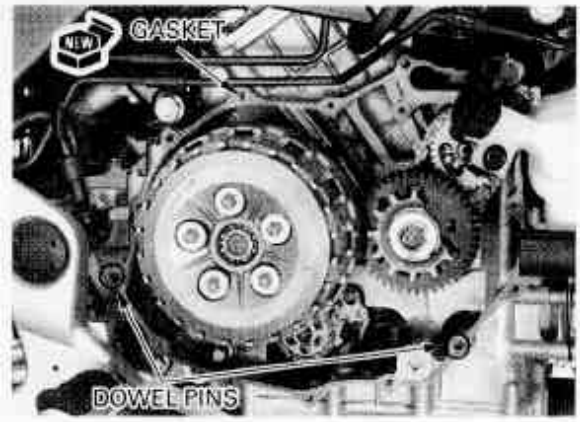


RIGHT CRANKCASE COVER INSTALLATION

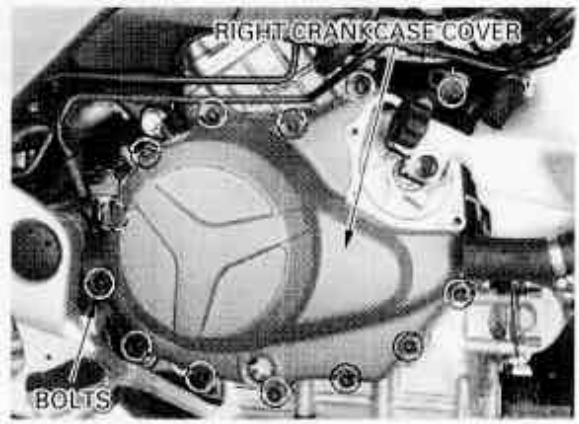
Apply sealant to the crankcase mating surfaces as shown.



Install the dowel pins and a new gasket.



Install the right crankcase cover, aligning the gear teeth of the water pump shaft and water pump driven sprocket and tighten the bolts securely.

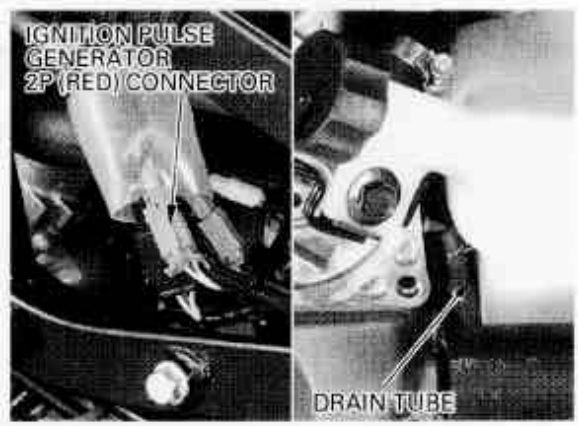


Route the ignition pulse generator wire and drain tube properly (page 1-21).

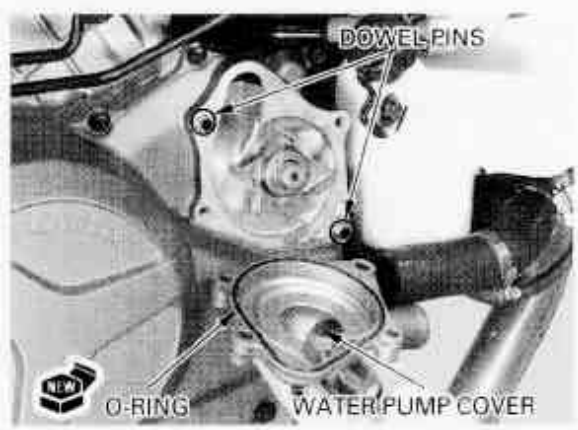
Connect the ignition pulse generator 2P (Red) connector.
Connect the drain tube from the right crankcase cover.

NOTE:

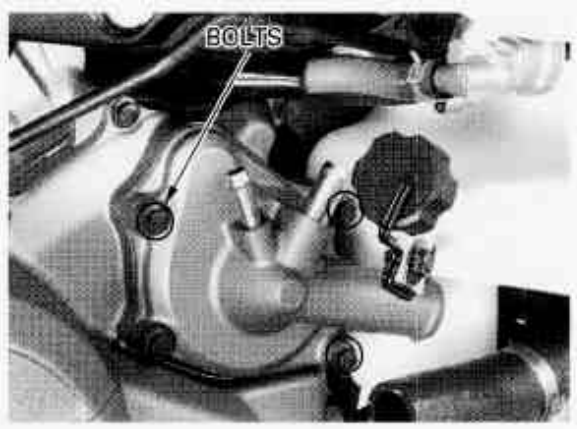
Route the wire and tubes correctly (page 1-21).



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



Install and tighten the bolts securely.



Connect the carburetor heater water outlet hose and bypass hose from the water pump cover.
Tighten the hose band screw securely.

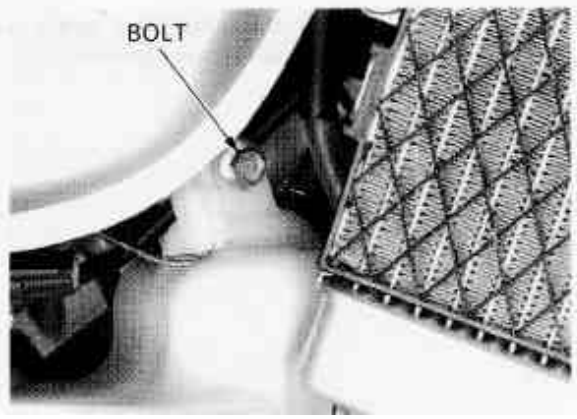


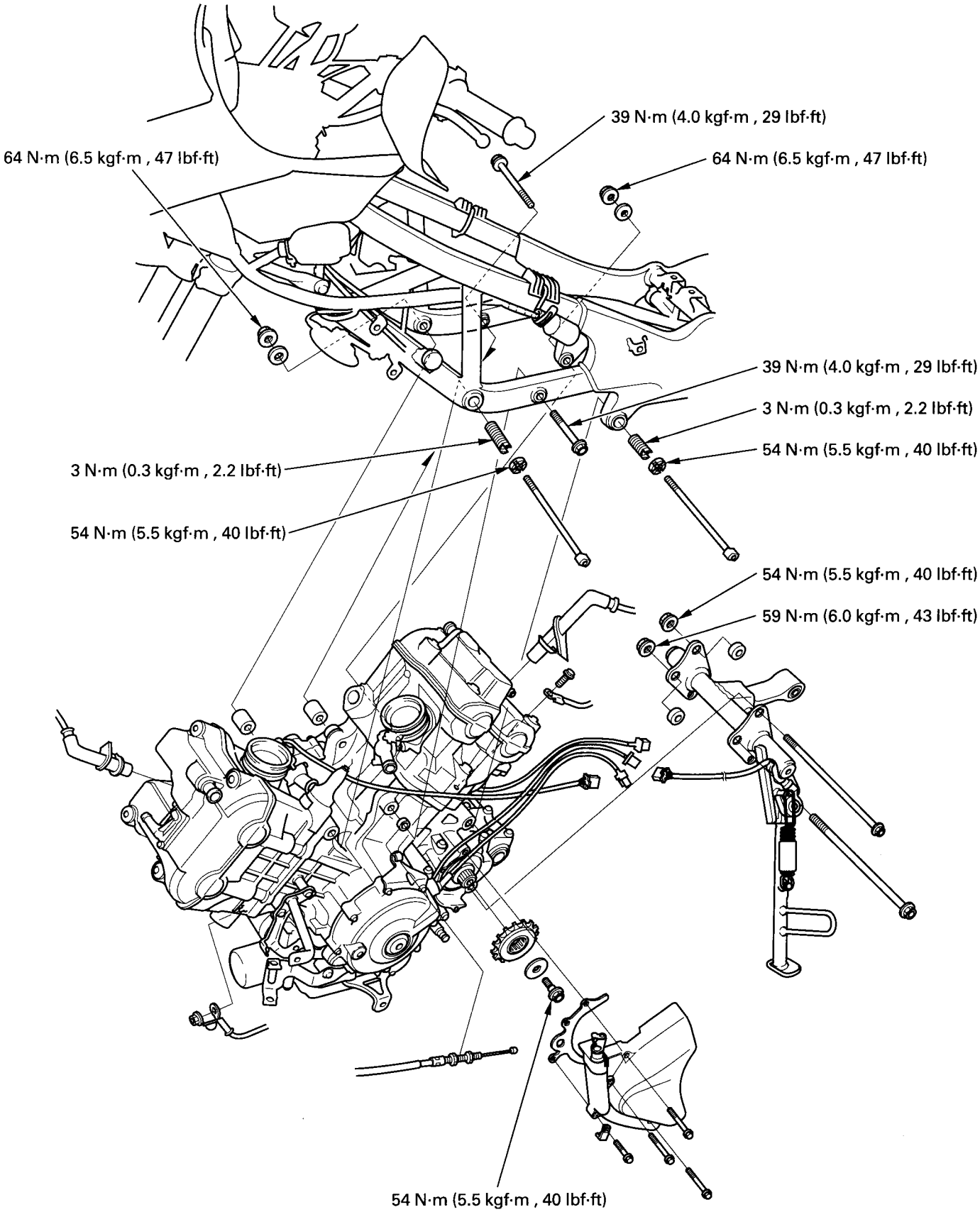
Connect the lower radiator hose.
Tighten the hose band screw securely.



Install and tighten the radiator reserve tank bolt securely.

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




39 N·m (4.0 kgf·m , 29 lbf·ft)
64 N·m (6.5 kgf·m , 47 lbf·ft)
64 N·m (6.5 kgf·m , 47 lbf·ft)
39 N·m (4.0 kgf·m , 29 lbf·ft)
3 N·m (0.3 kgf·m , 2.2 lbf·ft)
54 N·m (5.5 kgf·m , 40 lbf·ft)
3 N·m (0.3 kgf·m , 2.2 lbf·ft)
54 N·m (5.5 kgf·m , 40 lbf·ft)
54 N·m (5.5 kgf·m , 40 lbf·ft)
59 N·m (6.0 kgf·m , 43 lbf·ft)
54 N·m (5.5 kgf·m , 40 lbf·ft)

7. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION	7-1	ENGINE INSTALLATION	7-6
ENGINE REMOVAL	7-3		

SERVICE INFORMATION

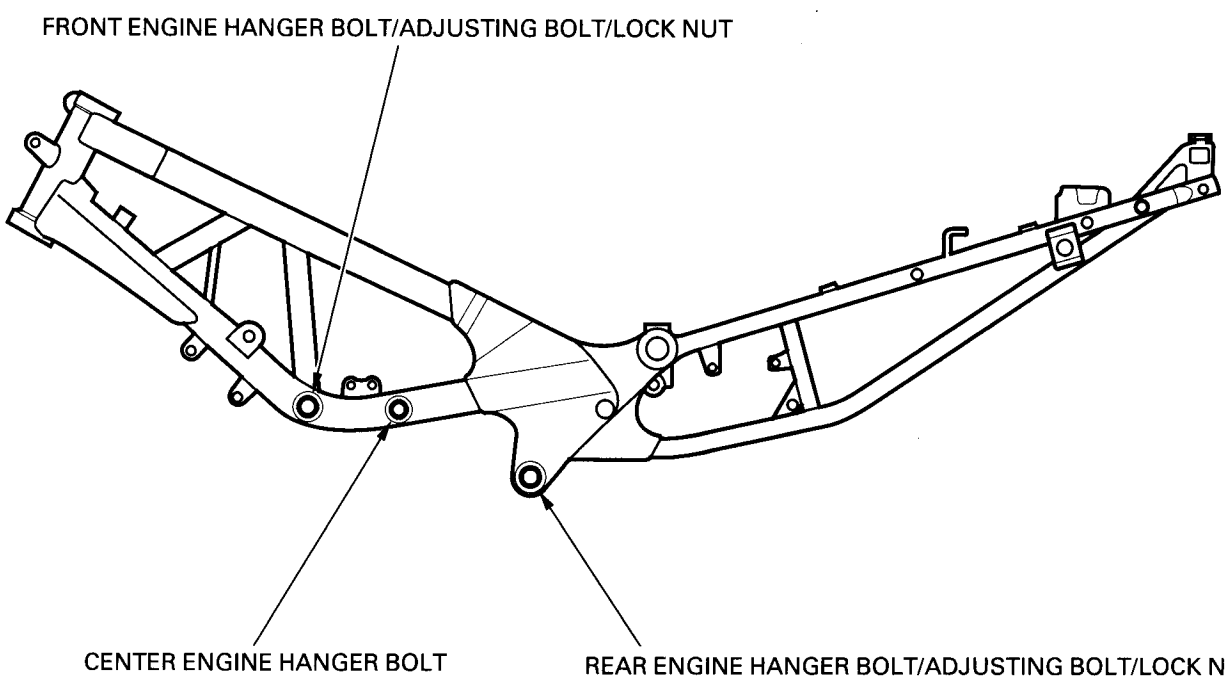
GENERAL

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

CAUTION:

Do not use the oil filter as a jacking point.

- The following components can be serviced with the engine installed in the frame.
  - Alternator (Section 10)
  - Clutch (Section 9)
  - Cylinder head/valves (Section 8)
  - Gearshift linkage (Section 9)
  - Oil pump (Section 4)
  - Water pump (Section 6)
- The following components require engine removal for service.
  - Crankcase/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.



SPECIFICATIONS

ITEM		SPECIFICATIONS
Engine dry weight		74.8 kg (164.9 lbs)
Coolant capacity	Radiator and engine	2.8 ℓ (3.0 US qt , 2.5 Imp qt)
Engine oil capacity	At disassembly	4.1 ℓ (4.3 US qt , 3.6 Imp qt)

TORQUE VALUES

Front engine hanger nut	64 N·m (6.5 kgf·m , 47 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)
Center engine hanger bolt	39 N·m (4.0 kgf·m , 29 lbf·ft)
Rear engine hanger nut	64 N·m (6.5 kgf·m , 47 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)
Shock link bracket bolt (12 mm)	54 N·m (5.5 kgf·m , 40 lbf·ft)
(14 mm)	59 N·m (6.0 kgf·m , 43 lbf·ft)
Drive sprocket bolt	54 N·m (5.5 kgf·m , 40 lbf·ft)

TOOL

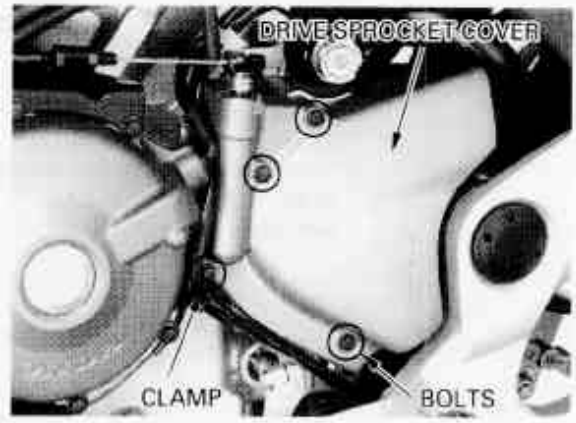
Lock nut wrench	07VMA-MBB0100

ENGINE REMOVAL

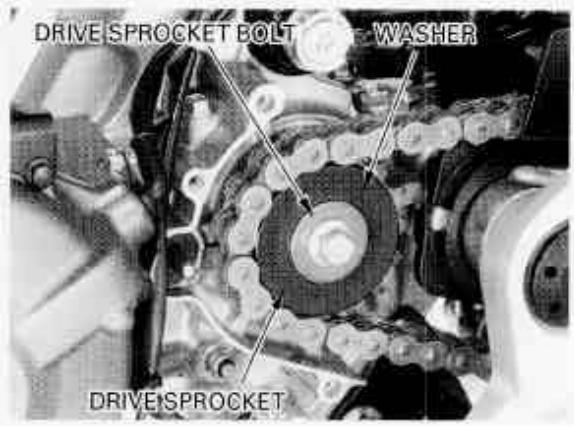
DRIVE SPROCKET REMOVAL

Disconnect the clutch cable from the clutch arm.
Remove the bolts, clamp and drive sprocket cover.

Remove the drive chain guard 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.

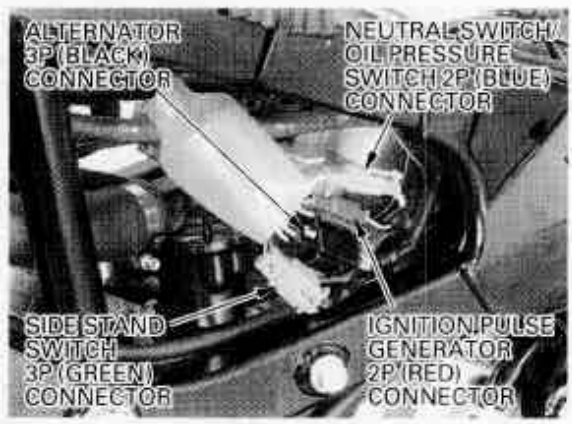


ENGINE REMOVAL

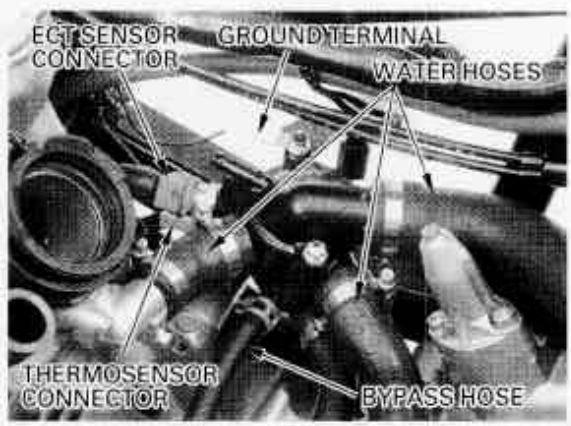
Drain the engine oil (page 3-11).
Drain the coolant (page 6-5).

Remove the followings:
- Exhaust system (page 2-8)
- Left and right side radiators (page 6-6, 7)
- Carburetor (page 5-5)
- Fuel pump (page 19-24)

Disconnect the followings:
- Alternator 3P (Black) connector
- Side stand switch 3P (Green) connector
- Ignition pulse generator 2P (Red) connector
- Neutral switch/oil pressure switch 2P (Blue) connector
- Speed sensor 2P (Blue) connector

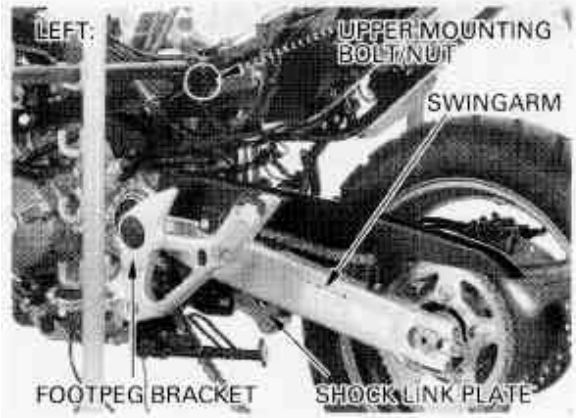


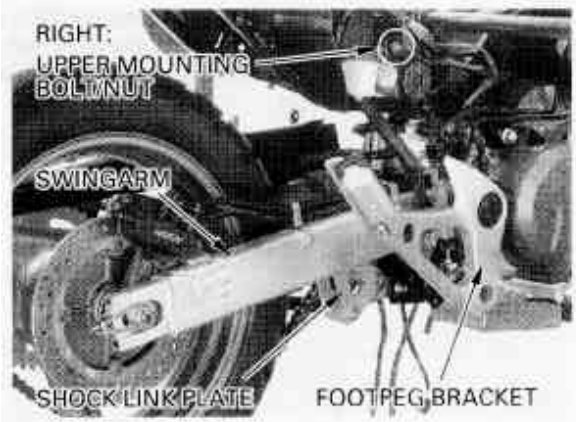
Remove the thermostat housing assembly by disconnecting the followings:
- Ground terminal
- Engine coolant temperature (ECT) sensor connector
- Thermosensor connector
- Water hoses from the cylinder head
- Bypass hose from the water pump



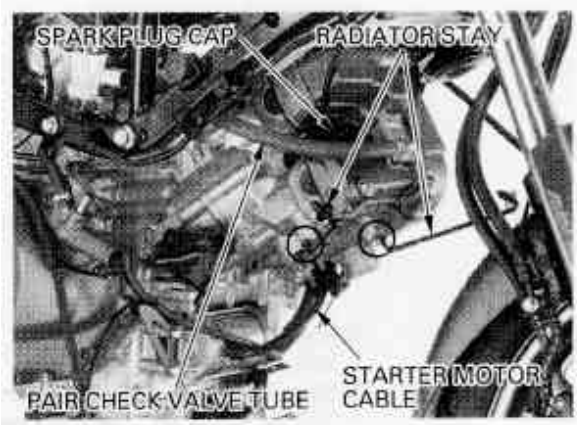
Support the motorcycle securely using a safety stand or hoist.

Remove followings:
- Shock link plate (page 14-12)
- Shock absorber upper mounting bolt/nut (page 14-9)
- Swingarm (page 14-15)





Remove the nut and starter motor cable.
Remove the bolts and radiator stays.
Disconnect the front PAIR check valve tube and front spark plug cap.

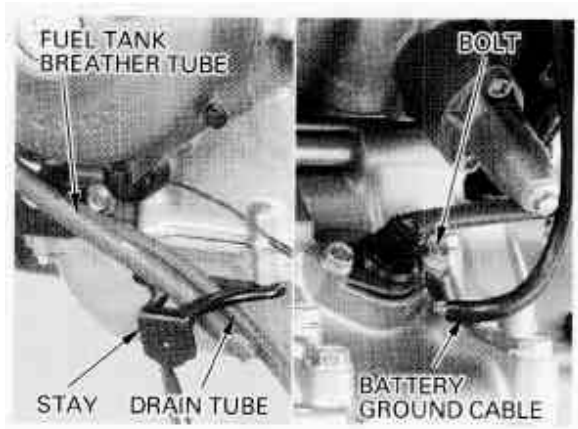


Disconnect the rear PAIR check valve tube and rear spark plug cap.

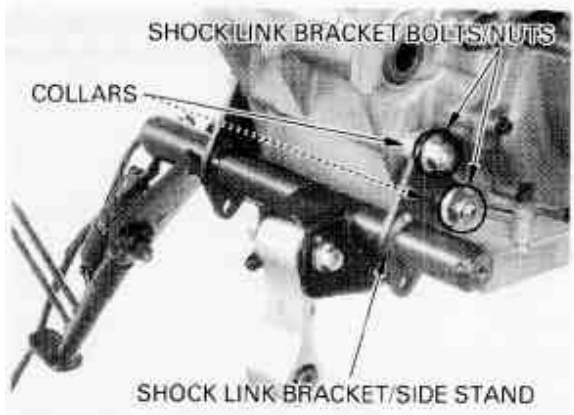


Remove the drain tube and fuel tank breather tube from the stay on the left side of the engine.

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



Remove the shock link bracket nuts, bolts, collars and bracket with the side stand.

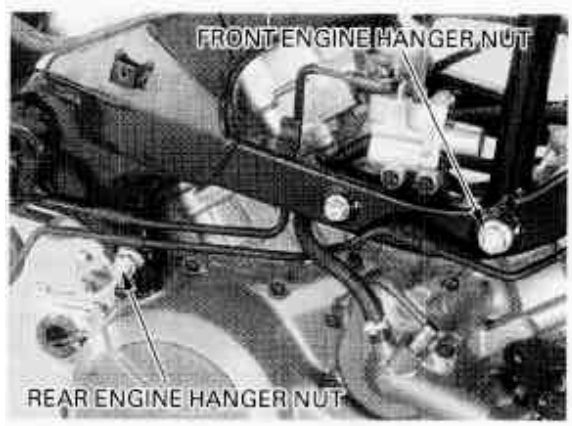


Place a floor jack or other adjustable support under the engine.

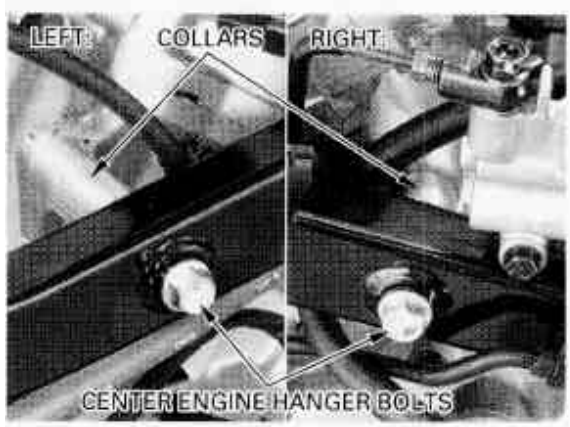
NOTE:

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

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



Remove the right and left center engine hanger bolt/collar.



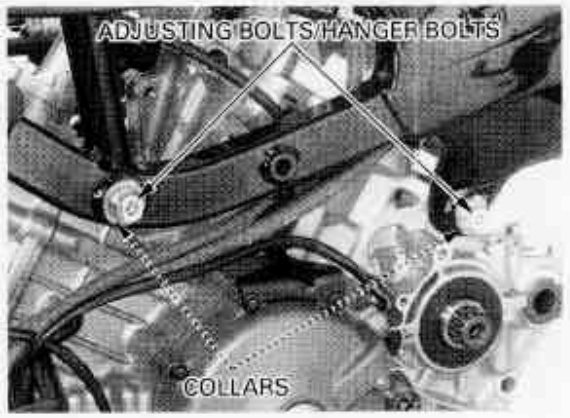
Hold each hanger bolt and loosen each lock nut using the special tool.

TOOL:
Lock nut wrench 07VMA-MBB0100

Remove the lock nuts.



Remove the adjusting bolts, engine hanger bolts, collars and engine from the frame.

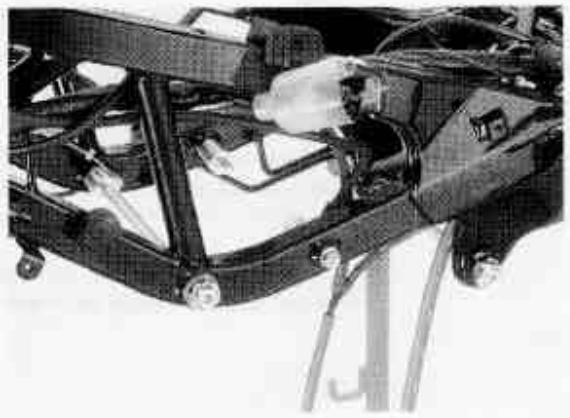


ENGINE INSTALLATION

ENGINE INSTALLATION

NOTE:

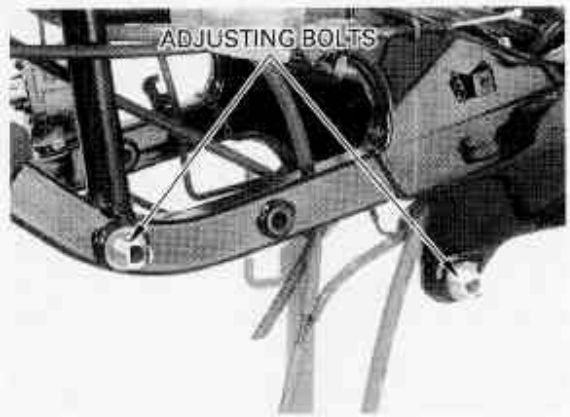
- Note the direction of the hanger bolts.
- The jack height must be continually adjusted to relieve stress from the mounting fasteners.
- When tightening the lock nut with the lock nut wrench, refer to torque wrench reading information on page 7-1 "SERVICE INFORMATION".



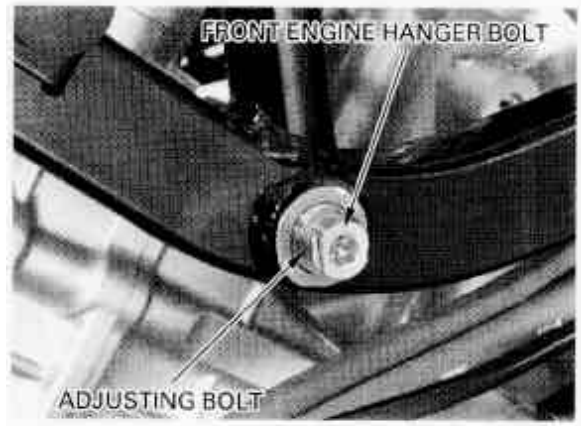
CAUTION:

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 adjusting bolts to the frame.



Install the engine in the frame.
Install the front engine hanger bolt collar.
Install the front engine hanger bolt aligning the its flat surfaces to the cut-out of the adjusting bolt.

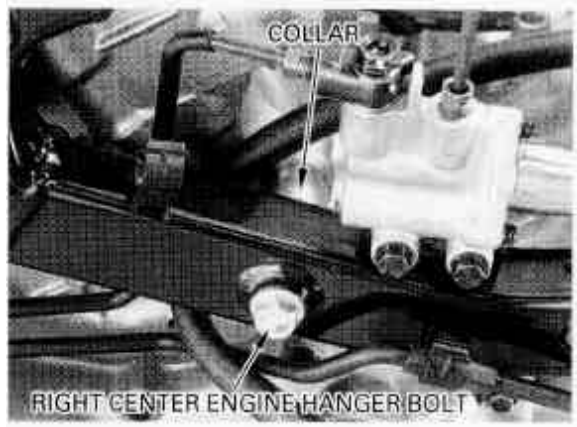


Install the rear engine hanger bolt collar.
Install the rear engine hanger bolt aligning the its flat surfaces to the cut-out of the adjusting bolt.



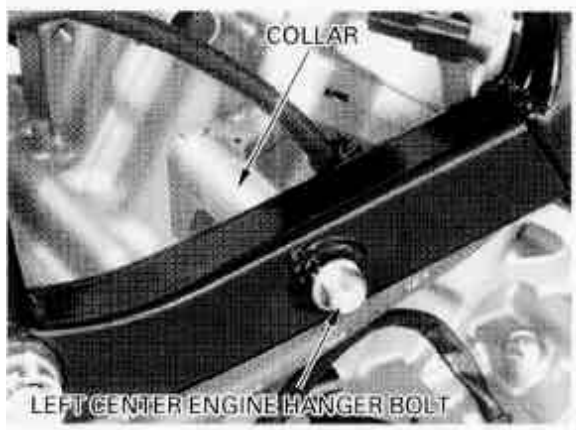
Install the right and left collars.
Tighten the right center engine hanger bolt to the specified torque.

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



Tighten the left center engine hanger bolt to the specified torque.

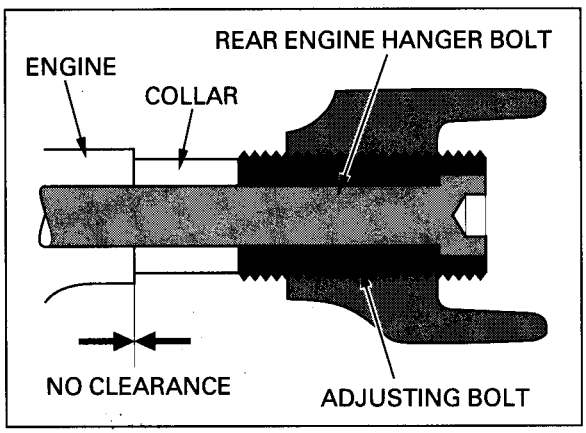
TORQUE: 39 N·m (4.0 kgf·m , 29 lbf·ft)



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

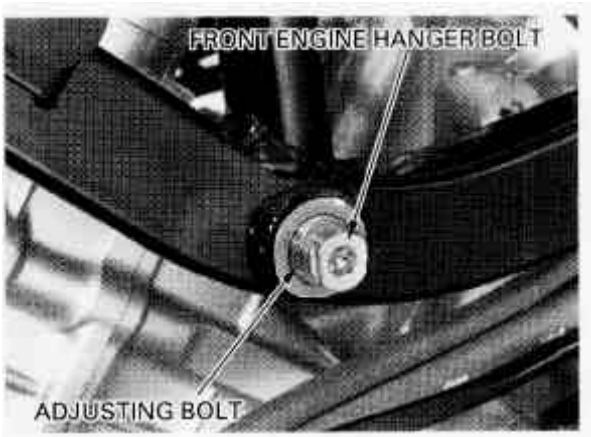
TORQUE: 3 N·m (0.3 kgf·m , 2.2 lbf·ft)

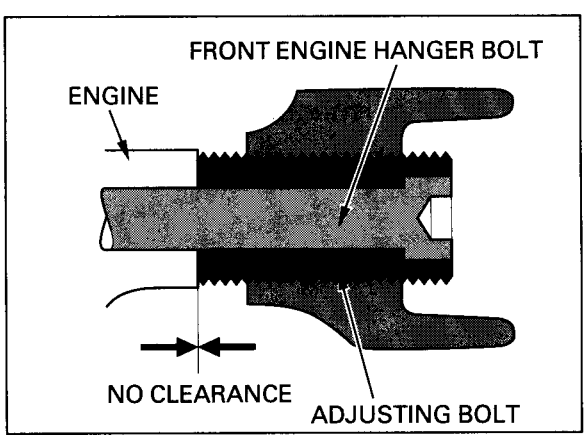




Tighten the front adjusting bolt with the front engine hanger bolt to the specified torque and check that there is no clearance between the adjusting bolt and engine.

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





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 07VMA-MBB0100

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



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

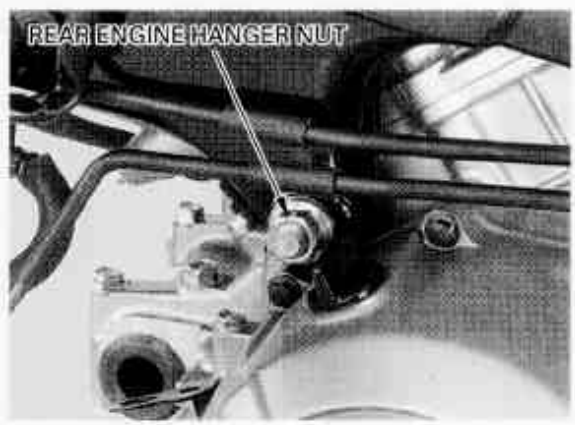
TOOL:
Lock nut wrench 07VMA-MBB0100

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



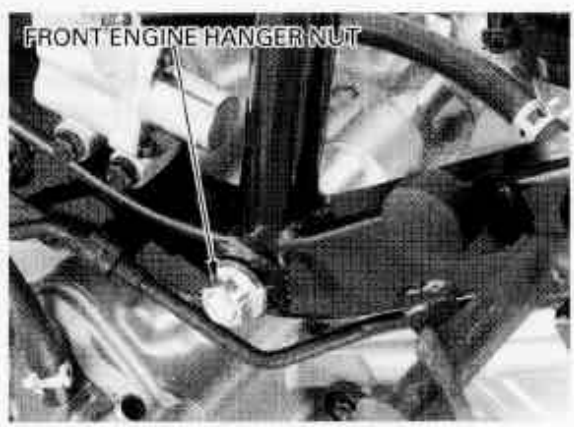
Tighten the rear engine hanger nut to the specified torque.

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



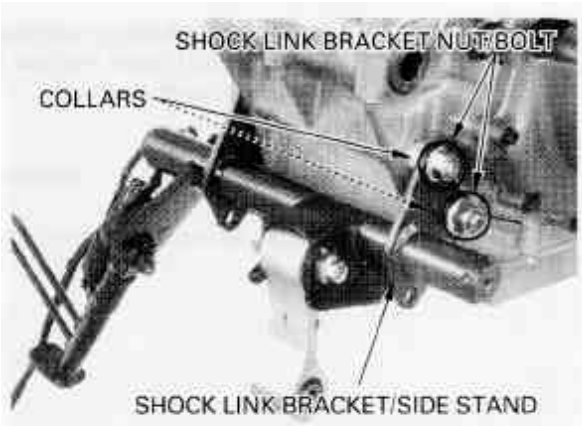
Tighten the front engine hanger nut to the specified torque.

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



Install the shock link bracket with the side stand.
Install the collars, bracket bolts and nuts.
Tighten the bracket nuts to the specified torque.

TORQUE: (12 mm): 54 N·m (5.5 kgf·m , 40 lbf·ft)
(14 mm): 59 N·m (6.0 kgf·m , 43 lbf·ft)

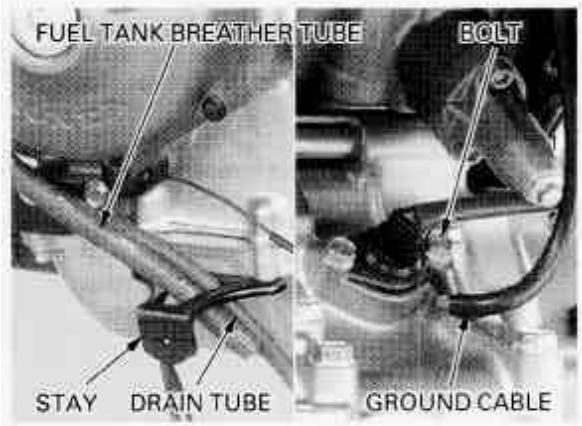


NOTE:

Route the tubes, cables and wire harness properly (page 1-21).

Install the battery ground cable to the engine.
Install and tighten the bolts securely.

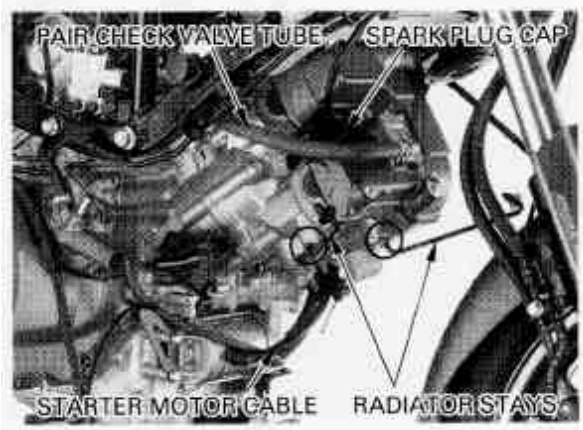
Install the drain tube and fuel tank breather tube to the stay on the left side of the engine.



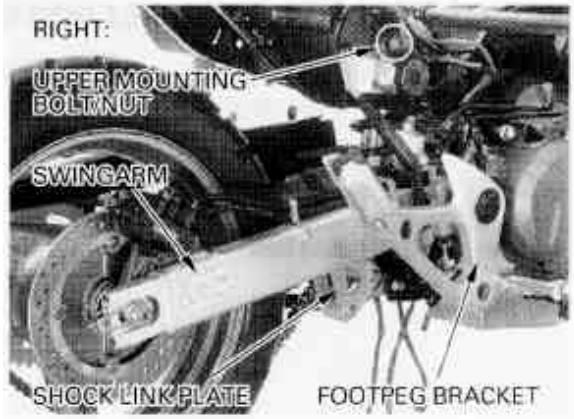
Connect the rear PAIR check valve tube and rear spark plug cap.

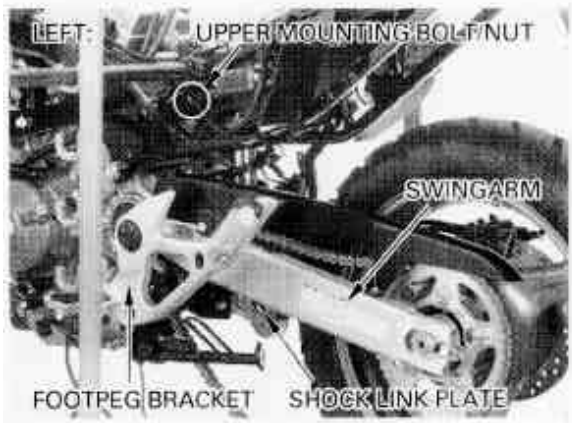


Connect the front PAIR check valve tube and front spark plug cap.
Install the radiator stays and bolts.
Install the starter motor cable and tighten the nut.

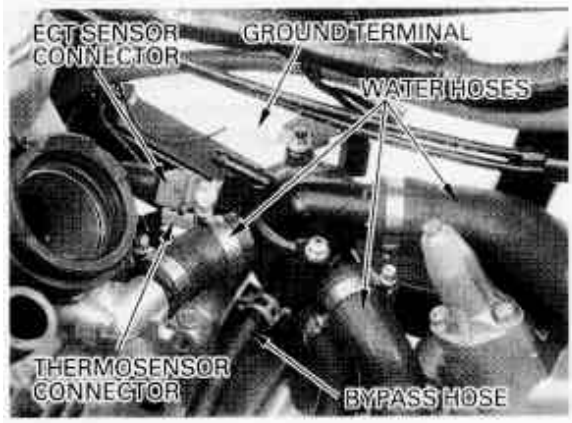


Install the followings:
- Swingarm (page 14-20)
- Shock absorber upper mounting bolt/nut (page 14-11)
- Shock link plate (page 14-14)





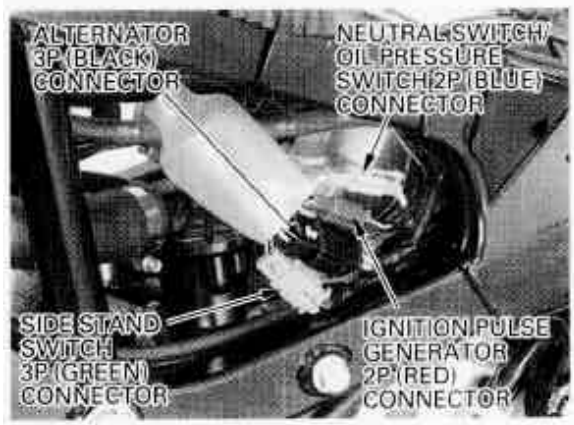
Install the thermostat housing assembly by connecting the followings:
- Bypass hose to the water pump
- Water hoses to the cylinder head
- Thermosensor connector
- Engine coolant temperature (ECT) sensor connector
- Ground terminal



Connect the followings:
- Alternator 3P (Black) connector
- Side stand switch 3P (Green) connector
- Ignition pulse generator 2P (Red) connector
- Neutral switch/oil pressure switch 2P (Blue) connector
- Speed sensor 2P (Blue) connector

Install the followings:
- Exhaust system (page 2-9)
- Left and right side radiators (page 6-7, 8)
- Carburetor (page 5-18)
- Fuel pump (page 19-25)

Fill the engine oil (page 3-12).
Fill and bleed the cooling system (page 6-5).

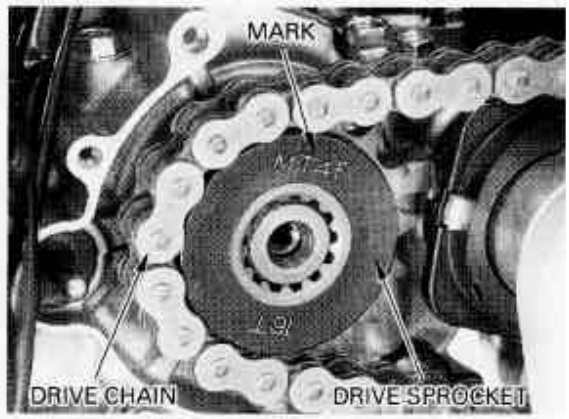


DRIVE SPROCKET INSTALLATION

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

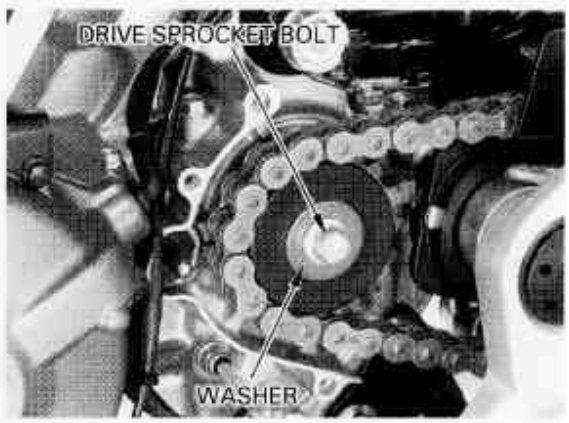
NOTE:

Install the drive sprocket with its marking side facing out.



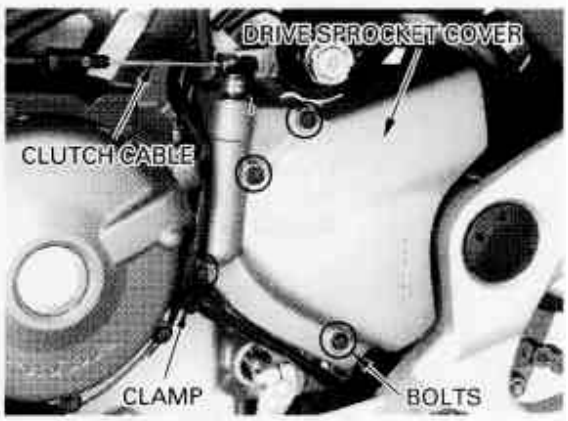
Install the washer and bolt, then tighten the bolt to the specified torque.

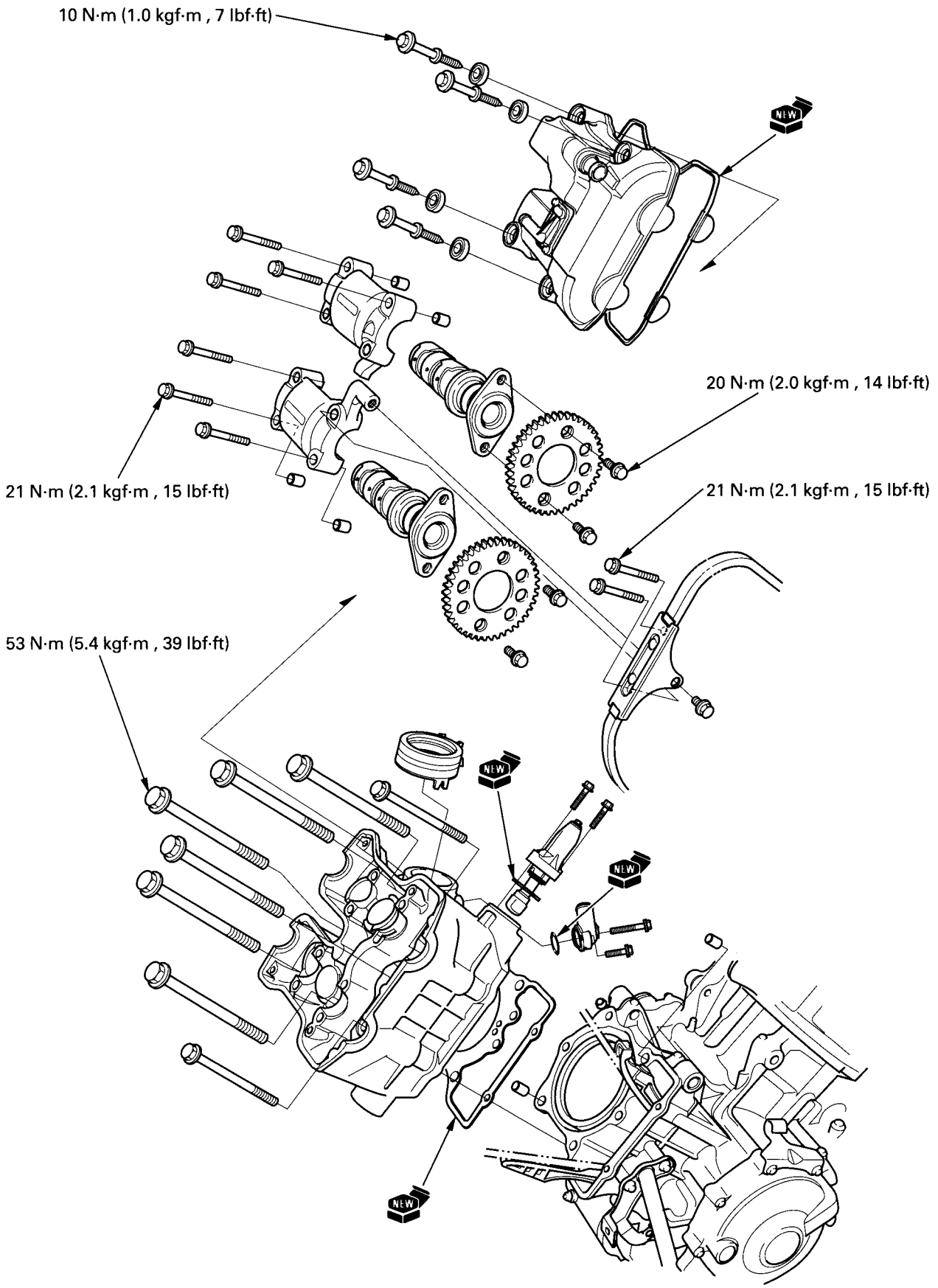
TORQUE: 54 N·m (5.5 kgf·m , 40 lbf·ft)



Install the drive chain guard and dowel pins.

Install the drive sprocket cover, clamp and bolt.
Tighten the bolts securely.
Connect the clutch cable to the clutch arm.




10 N·m (1.0 kgf·m , 7 lbf·ft)
NEW
20 N·m (2.0 kgf·m , 14 lbf·ft)
21 N·m (2.1 kgf·m , 15 lbf·ft)
21 N·m (2.1 kgf·m , 15 lbf·ft)
53 N·m (5.4 kgf·m , 39 lbf·ft)
NEW
NEW
NEW

8. CYLINDER HEAD/VALVES

SERVICE INFORMATION	8-1	VALVE GUIDE REPLACEMENT	8-14
TROUBLESHOOTING	8-3	VALVE SEAT INSPECTION/REFACING	8-15
CYLINDER COMPRESSION TEST	8-4	CYLINDER HEAD ASSEMBLY	8-19
CYLINDER HEAD COVER REMOVAL	8-4	CYLINDER HEAD INSTALLATION	8-20
CYLINDER HEAD COVER DISASSEMBLY	8-6	CAMSHAFT INSTALLATION	8-21
CAMSHAFT REMOVAL	8-7	CYLINDER HEAD COVER ASSEMBLY	8-26
CYLINDER HEAD REMOVAL	8-10	CYLINDER HEAD COVER INSTALLATION	8-27
CYLINDER HEAD DISASSEMBLY	8-11	CAM CHAIN TENSIONER LIFTER	8-28
CYLINDER HEAD INSPECTION	8-12		

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			1,177 kPa (12.0 kgf/cm², 171 psi) at 300 rpm	———
Cylinder head warpage			———	0.10 (0.004)
Valve, valve guide	Valve clearance	IN	0.16 (0.006)	———
		EX	0.31 (0.012)	———
	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	6.000–6.012 (0.2362–0.2367)	6.040 (0.2378)
		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	IN	14.0–14.2 (0.55–0.56)	———
		EX	14.0–14.2 (0.55–0.56)	———
	Valve seat width	IN/EX	1.1–1.3 (0.04–0.05)	1.7 (0.07)
Valve spring free length			43.9 (1.73)	42.9 (1.69)
Valve lifter	Valve lifter O.D.	IN/EX	33.978–33.993 (1.3377–1.3383)	33.97 (1.337)
	Valve lifter bore I.D.	IN/EX	34.010–34.026 (1.3390–1.3396)	34.04 (1.340)
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)	0.10 (0.004)

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
Breather plate bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	Apply a locking agent to the threads
Cylinder head sealing bolt	32 N·m (3.3 kgf·m, 24 lbf·ft)	
Intake manifold vacuum port socket bolt	3 N·m (0.34 kgf·m, 2.5 lbf·ft)	
Spark plug	14 N·m (1.4 kgf·m, 10 lbf·ft)	
Carburetor insulator band bolt	1 N·m (0.1 kgf·m, 0.7 lbf·ft)	

TOOLS

Valve spring compressor	07757-0010000
Valve guide remover	07742-0010100
Adjustable valve guide driver	07743-0020000
Valve guide reamer, 6.012 mm	07VMH-MBB0200
Valve seat cutter, 35 mm (EX 45°)	07780-0010400
Valve seat cutter 40 mm (IN 45°)	07780-0010500
Flat cutter, 38 mm (IN 32°)	07780-0012400
Flat cutter, 35 mm (EX 32°)	07780-0012300
Interior cutter, 37.5 mm (EX 60°)	07780-0014100
Interior cutter, 42 mm (IN 60°)	07780-0014400
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.
- If the performance is poor at low speeds, check for white smoke in the crankcase breather tube. If the tube is smoky, check for a seized piston ring (Section 12).

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, overheating or knocking
- Excessive carbon build-up on piston head or combustion chamber

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

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

Rough idle
- Low cylinder compression

CYLINDER COMPRESSION TEST



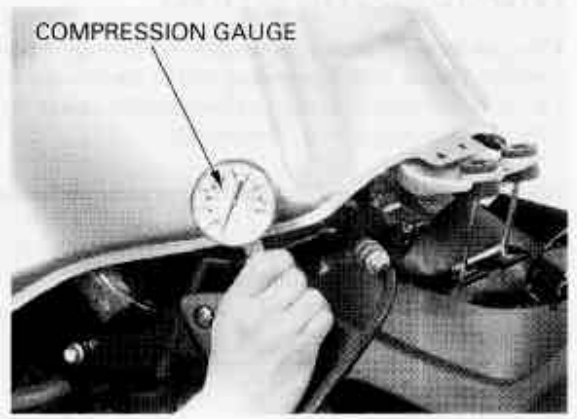
⚠WARNING

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

Warm up the engine to normal operating temperature.
Stop the engine and remove the all spark plug caps and remove the one spark plug at a time.

NOTE:

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



Install a compression gauge.

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

NOTE:

To avoid discharging the battery, do not operate the starter motor for more than seven seconds.

Compression pressure:
1,177 kPa (12.0 kgf/cm², 171 psi) at 300 rpm

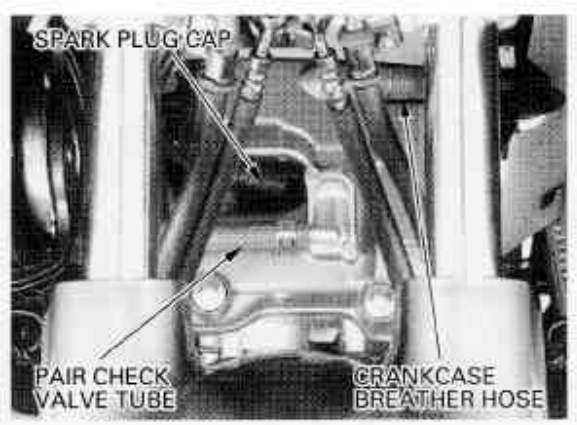
Low compression can be caused by:
- Blown cylinder head gasket
- Improper valve adjustment
- Valve leakage
- Worn piston ring or cylinder

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

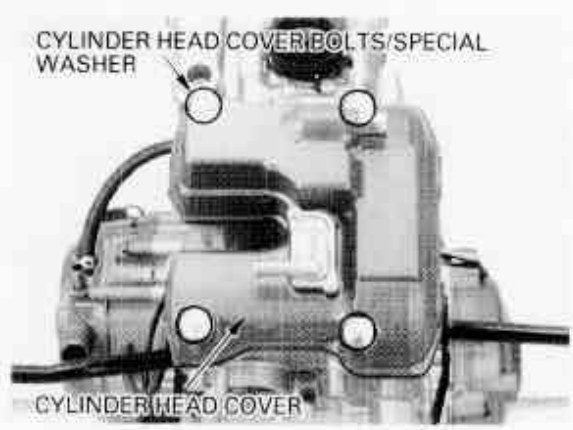
CYLINDER HEAD COVER REMOVAL

FRONT:
Remove the lower heat guard (page 17-6).

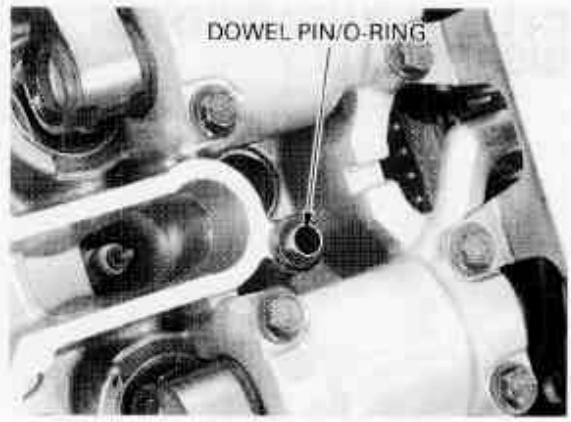
Remove the spark plug cap from the spark plug.
Disconnect the crankcase breather hose and PAIR check valve tube from the cylinder head cover.



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



Remove the O-ring and dowel pin.



REAR:
Remove the fuel tank (page 2-10).

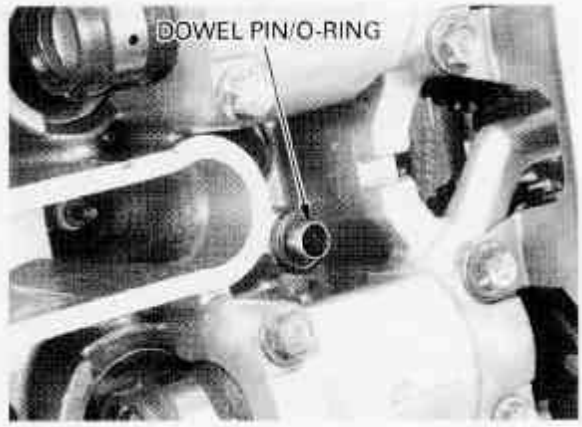
Remove the spark plug cap from the spark plug.
Disconnect the crankcase breather hose and PAIR check valve tube from the cylinder head cover.



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

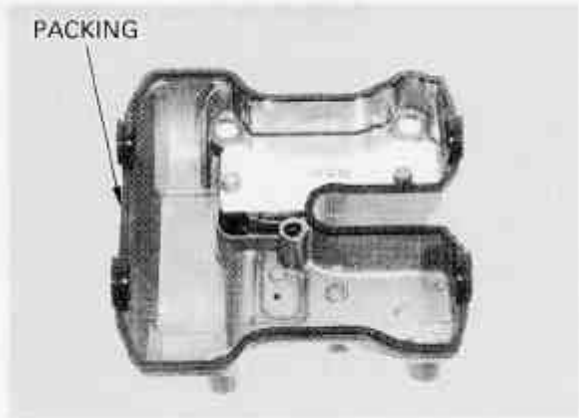


Remove the O-ring and dowel pin.

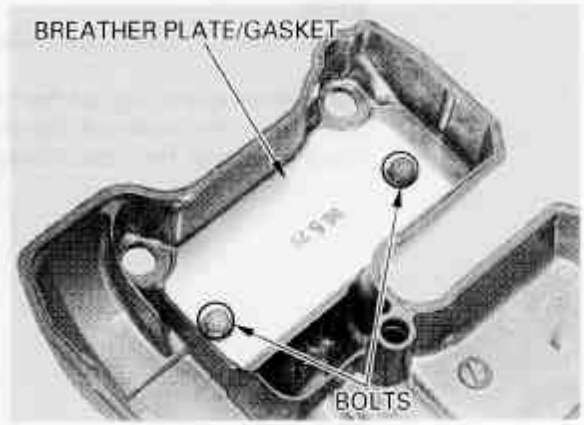


CYLINDER HEAD COVER DISASSEMBLY

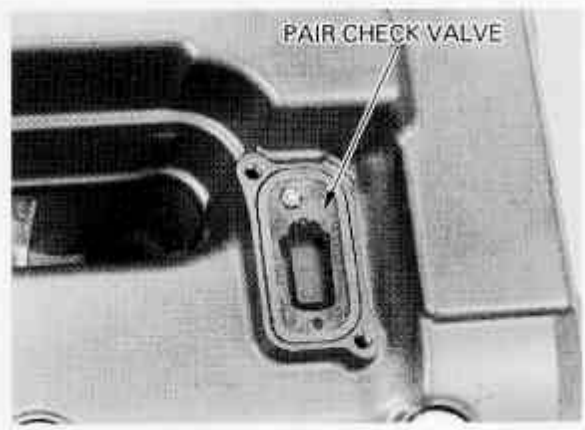
Remove the cylinder head cover packing.



Remove bolts and breather plate and gasket.



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



CAMSHAFT REMOVAL

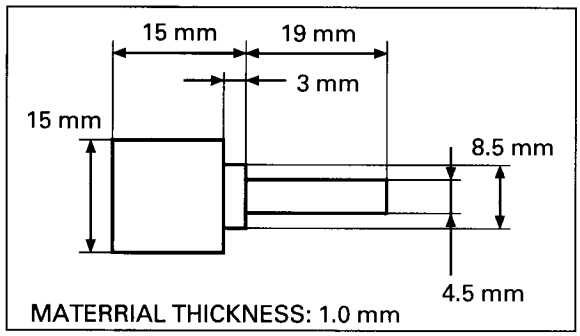
For front cylinder, remove the following:
– air cleaner housing (page 5-4)
– radiator (page 6-6)

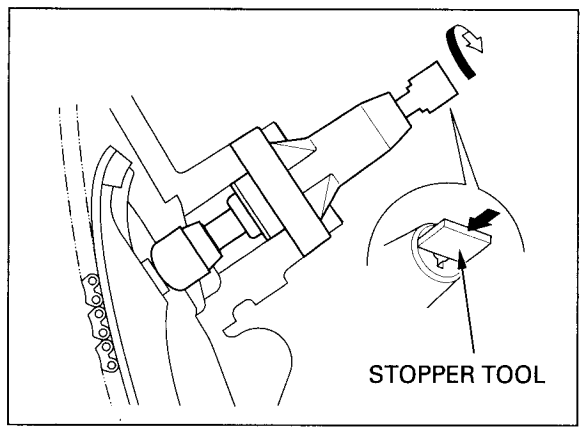
Remove the cylinder head cover (page 8-4).

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

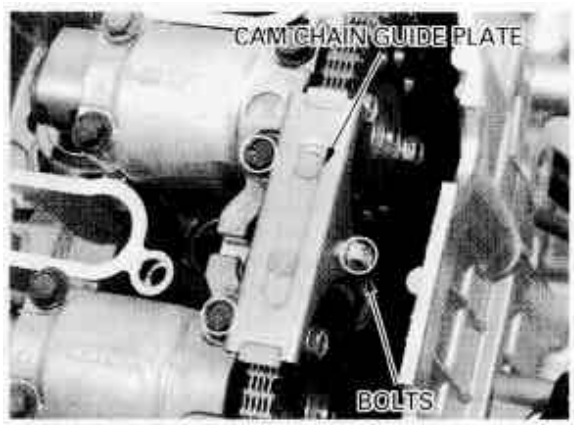


Turn the tensioner lifter shaft fully in (clockwise) and secure it using the stopper tool.
This tool can easily be made from a thin (1 mm thickness) piece of steel.

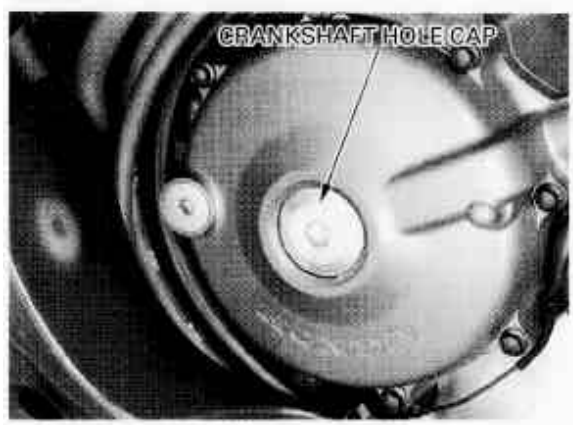




Remove the bolts and the cam chain guide plate from the camshaft holders.



Remove the crankshaft hole cap.

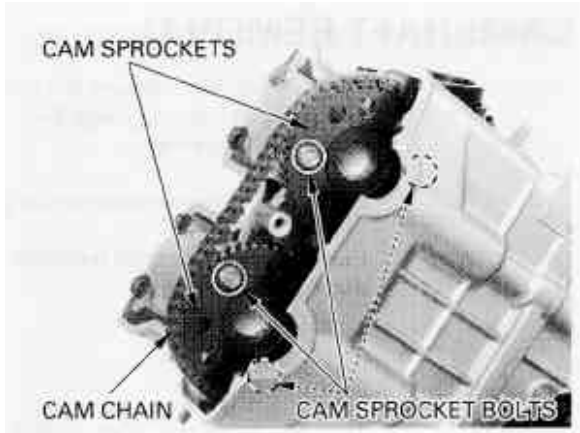


NOTE:

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

Remove the cam sprocket bolts from the intake and exhaust camshaft.
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.



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

NOTE:

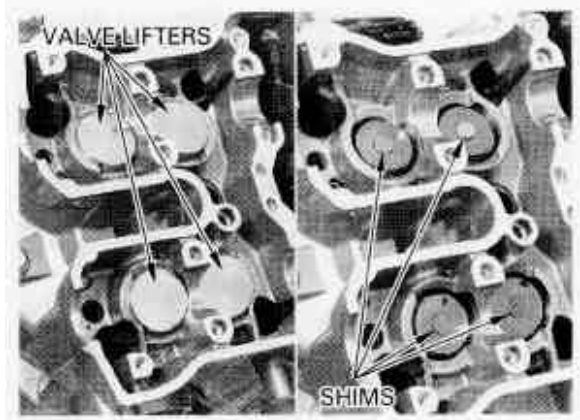
It is not necessary to remove the dowel pins from the camshaft holders.



Remove the valve lifters and shims.

NOTE:

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



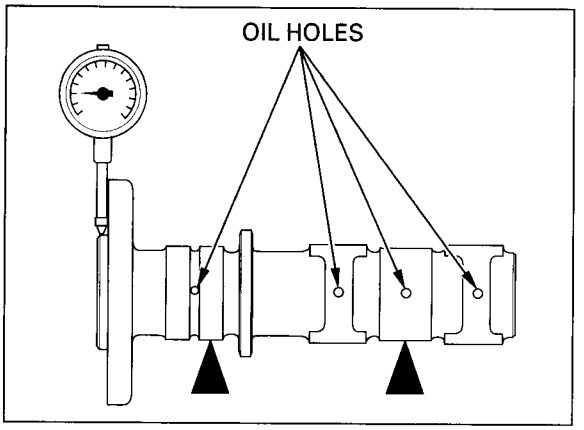
INSPECTION

CAMSHAFT HOLDER
Inspect the camshaft journal surface of the camshaft holder for scoring, scratches, or evidence of insufficient lubrication.



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

SERVICE LIMIT: 0.05 mm (0.002 in)

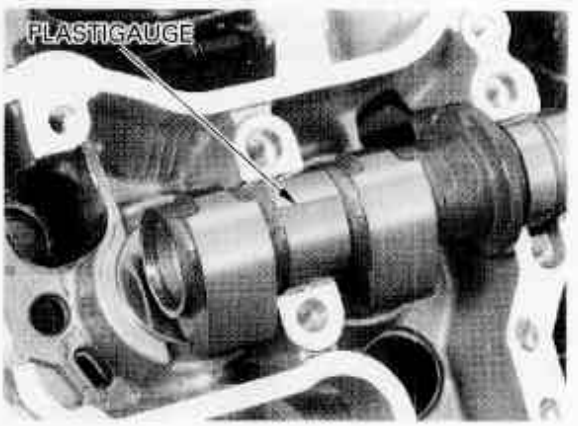


CAM LOBE HEIGHT
Using a micrometer, measure each cam lobe height.

SERVICE LIMITS:
IN: 39.780 mm (1.5661 in)
EX: 39.930 mm (1.5720 in)



CAMSHAFT OIL CLEARANCE
Wipe any oil from the journals of the camshaft, cylinder head and camshaft holders.
Lay a strip of plastigauge lengthwise on top of each camshaft journal.

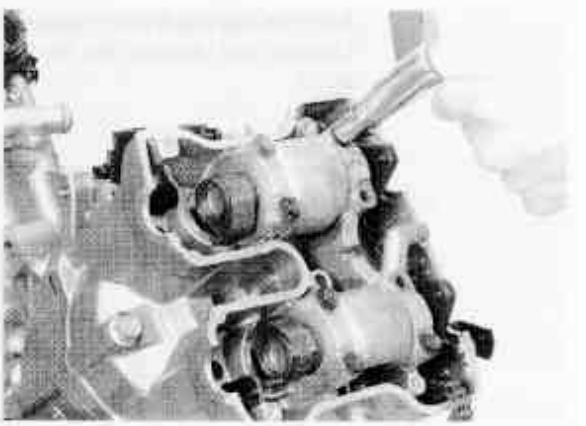


Install the camshaft holders and tighten the bolts in a crisscross pattern in 2−3 steps.

NOTE:

Do not rotate the camshaft when using plastigauge.

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



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

SERVICE LIMIT: 0.10 mm (0.004 in)

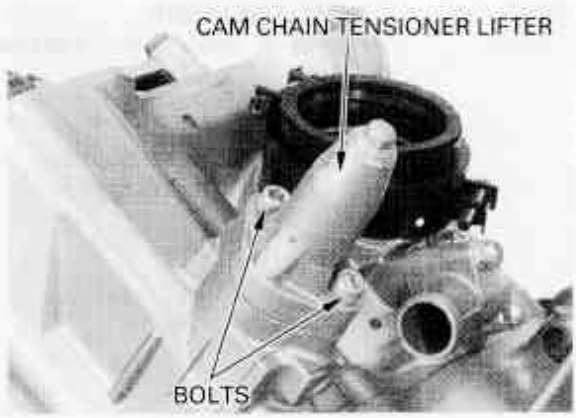
When the service limits are exceeded, replace the camshaft and recheck the oil clearance.
Replace the cylinder head and camshaft holders as a set if the clearance still exceeds the service limit.



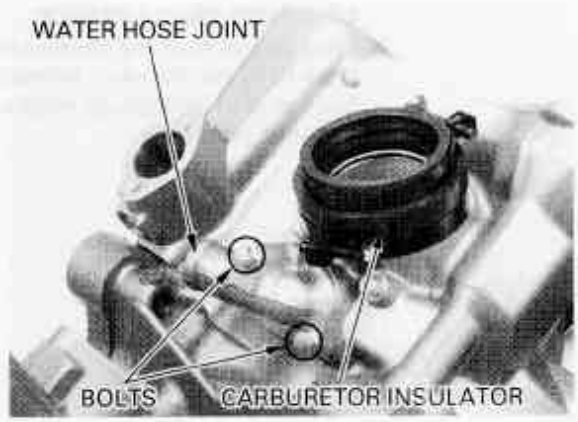
CYLINDER HEAD REMOVAL

Remove the carburetor assembly (page 5-5).
Remove the camshaft (page 8-7).

Remove the bolts and cam chain tensioner lifter.



Remove the bolts and water hose joint.
Remove the carburetor insulator.

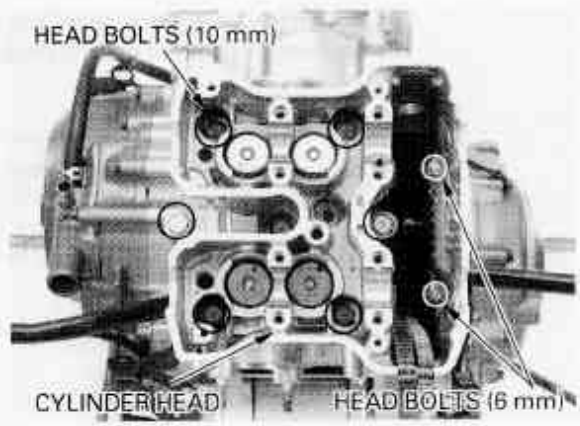


Remove the two 6 mm cylinder head bolts.
Loosen and remove the six 10 mm cylinder head bolts.

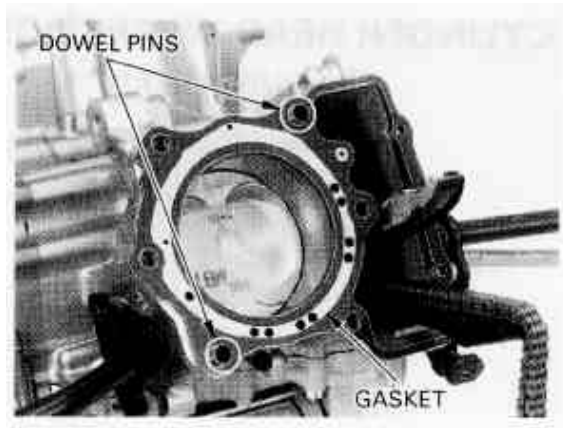
NOTE:

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

Remove the cylinder head.



Remove the dowel pins and cylinder head gasket.

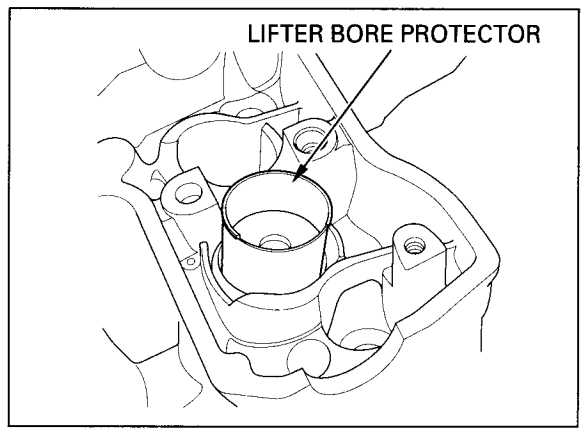


CYLINDER HEAD DISASSEMBLY

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.

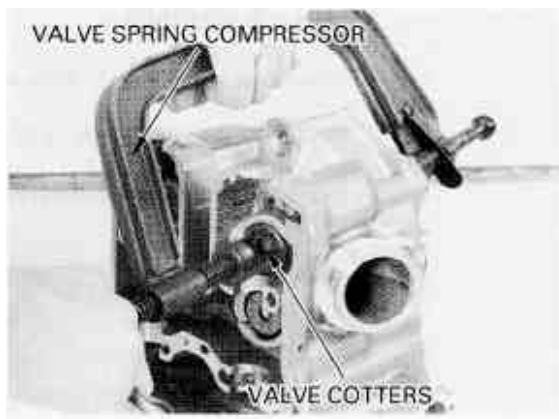


Remove the valve spring cotters using the special tools as shown.

TOOL:
Valve spring compressor 07757-0010000

CAUTION:

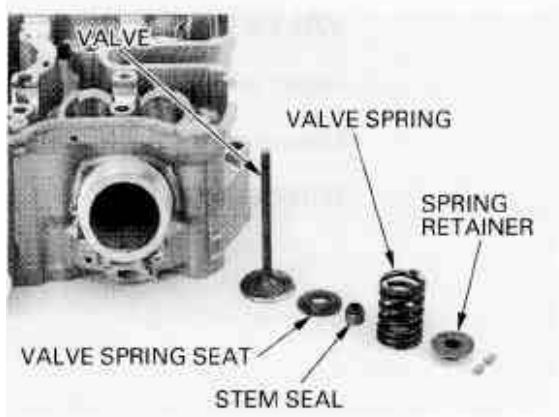
To prevent loss of tension, do not compress the valve spring more than necessary to remove the cotters.



Remove the following:
- Spring retainer
- Valve spring
- Valve
- Stem seal
- Valve spring seat

NOTE:

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



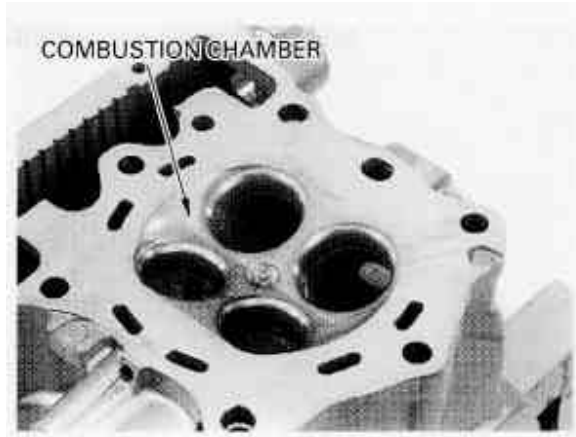
CYLINDER HEAD INSPECTION

CYLINDER HEAD

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

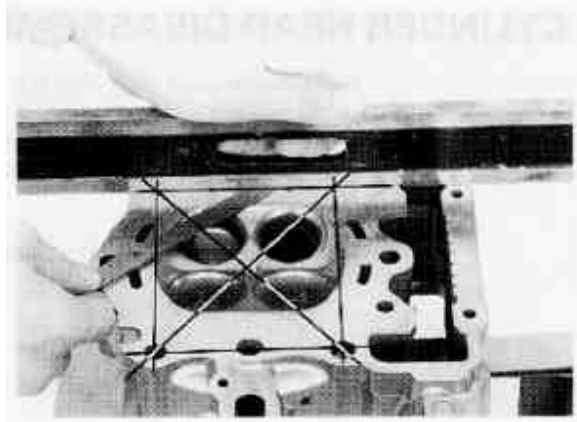
NOTE:

Avoid damaging the gasket surface.



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

SERVICE LIMIT: 0.10 mm (0.004 in)

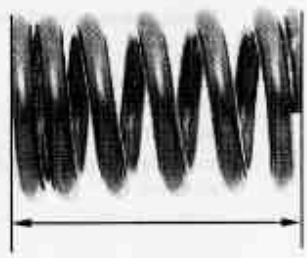


VALVE SPRING

Measure the free length of the valve springs.

SERVICE LIMIT: 42.9 mm (1.69 in)

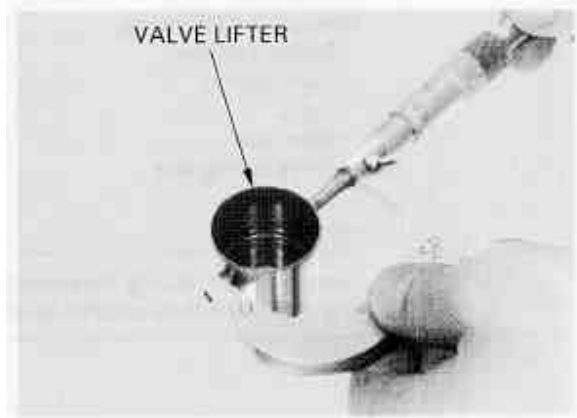
Replace the springs if they are shorter than the service limits.



VALVE LIFTER

Inspect each valve lifter for scratches or abnormal wear.
Measure the each valve lifter O.D.

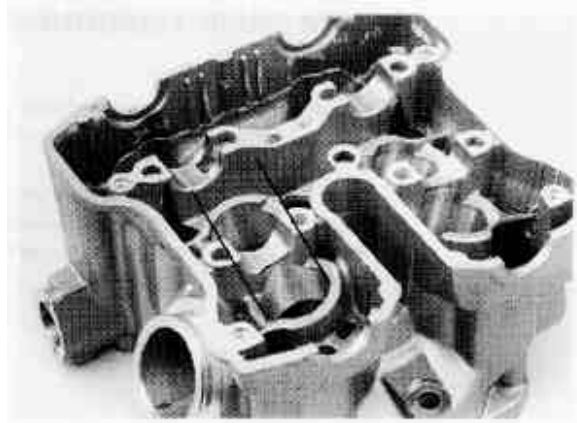
SERVICE LIMIT: 33.97 mm (1.337 in)



VALVE LIFTER BORE

Inspect each valve lifter bore for scratches or abnormal wear.
Measure the each valve lifter bore I.D.

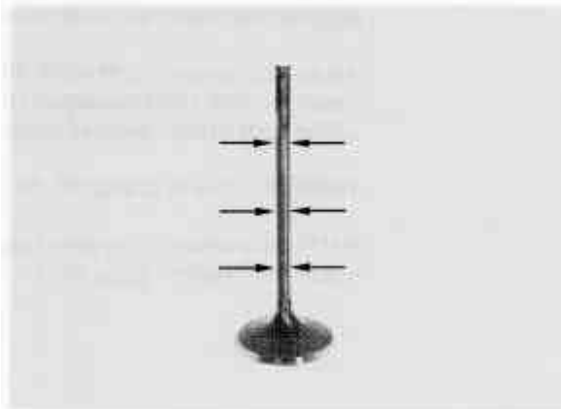
SERVICE LIMIT: 34.04 mm (1.340 in)



VALVE/VALVE GUIDE

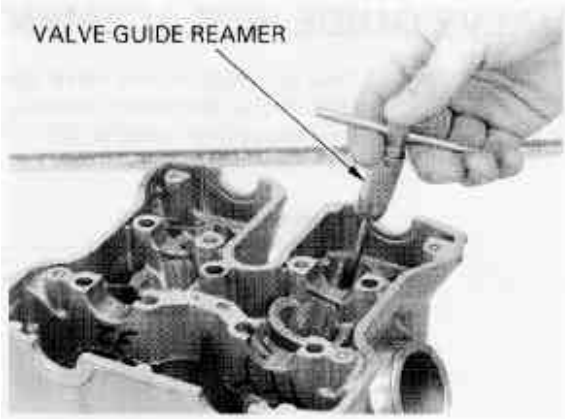
Inspect each valve for bending, burning or abnormal stem wear.
Check valve movement in the guide, measure and record each valve stem O.D.

SERVICE LIMITS:
IN: 5.965 mm (0.2348 in)
EX: 5.955 mm (0.2344 in)



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

TOOL:
Valve guide reamer, 6.012 mm 07VMH-MBB0200



Measure and record each valve guide I.D.

SERVICE LIMIT: IN/EX: 6.040 mm (0.2378 in)

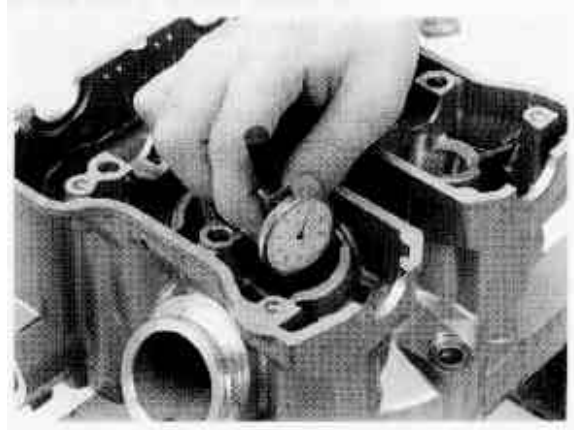
Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.

STANDARDS:
IN: 0.010−0.037 mm (0.0004−0.0015 in)
EX: 0.020−0.047 mm (0.0008−0.0019 in)

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

NOTE:

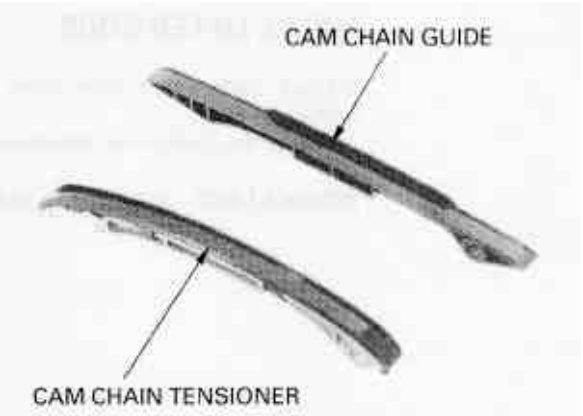
Reface the valve seats whenever the valve guides are replaced (page 8-14).



CAM CHAIN TENSIONER/CAM CHAIN GUIDE

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

To remove the cam chain tensioner and guide:
Front cylinder: Remove the flywheel (page 10-3).
Rear cylinder: Remove the primary drive gear (page 9-14).

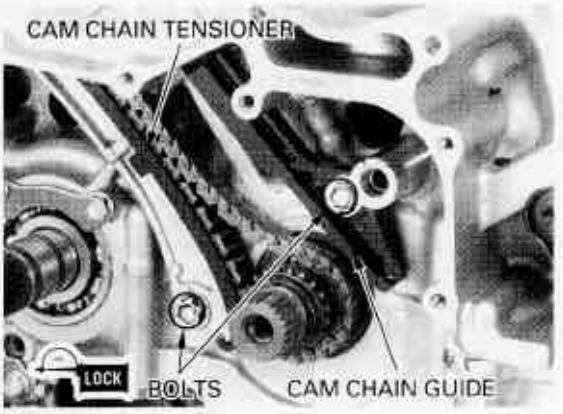


Remove the bolts, cam chain tensioner and guide.

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

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

Install the primary drive gear (page 9-15).
Install the flywheel (page 10-6).



VALVE GUIDE REPLACEMENT

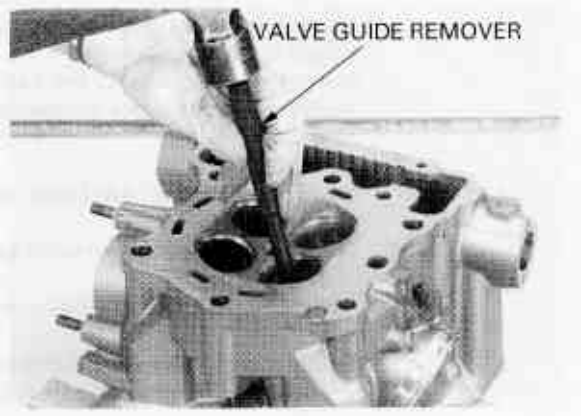
Chill the replacement valve guides in the freezer section of a refrigerator for about an hour.
Heat the cylinder head to 130 – 140 °C (275 – 290 °F) with a hot plate or oven.

⚠WARNING

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

CAUTION:

Do not use a torch to heat the cylinder head; it may cause warping.



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

TOOL:
Valve guide remover 07742-0010100

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:
Adjustable valve guide driver 07743-0020000

Let the cylinder head cool to room temperature.

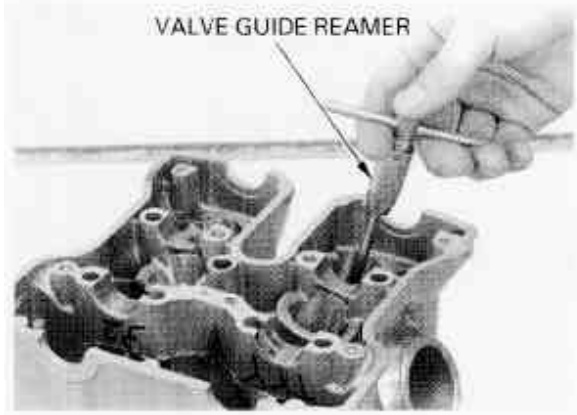


Ream the new valve guide after installation.
Insert the reamer from the camshaft side of the head and also always rotate the reamer clockwise.

TOOL:
Valve guide reamer, 6.012 mm 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.
Reface the valve seat (see below).

VALVE SEAT INSPECTION/REFACING

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



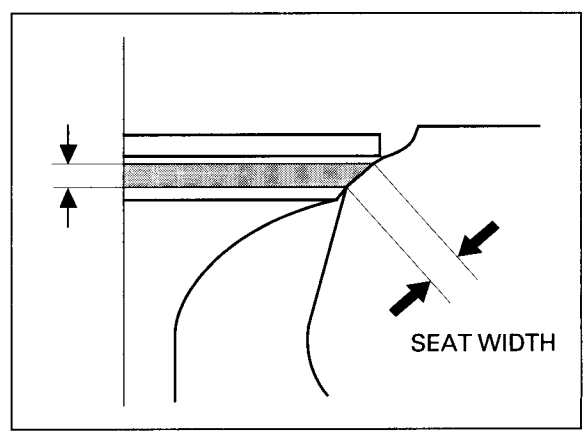
Remove and inspect the valves.

CAUTION:

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

Inspect the width of each valve seat.

STANDARDS:
IN: 1.1–1.3 mm (0.04–0.05 in)
EX: 1.3–1.5 mm (0.05–0.06 in)
SERVICE LIMITS:
IN: 1.7 mm (0.07 in)
EX: 1.7 mm (0.07 in)

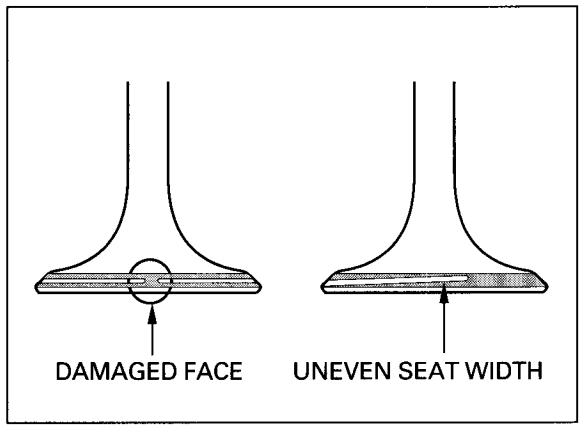


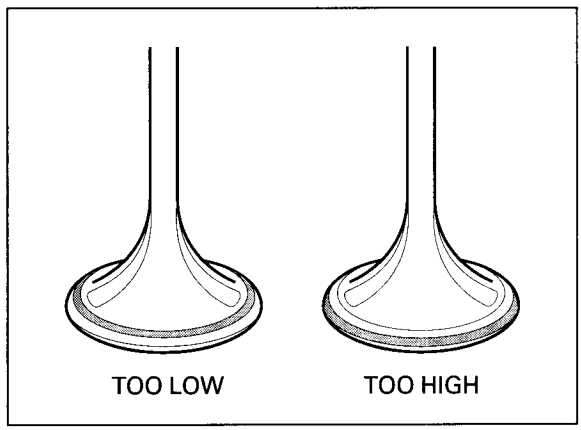
If the seat is too wide, too narrow or has low spots, the seat must be ground.

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.



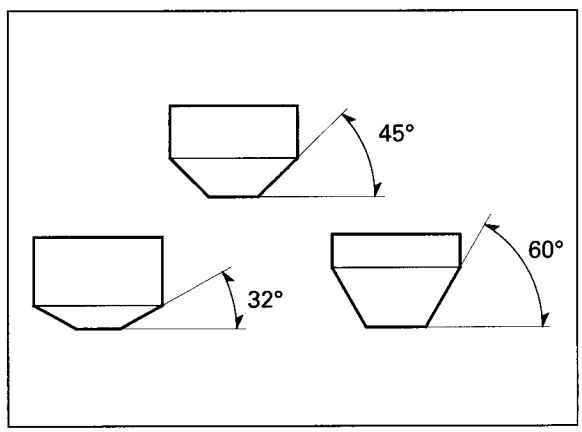


VALVE SEAT REFACING

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

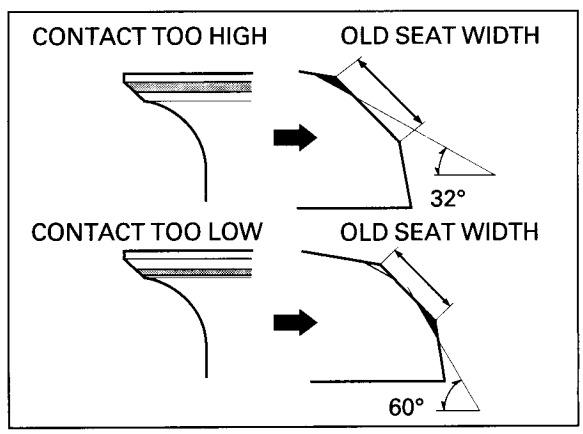
NOTE:

Follow the refacing manufacturer's operating instructions.



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

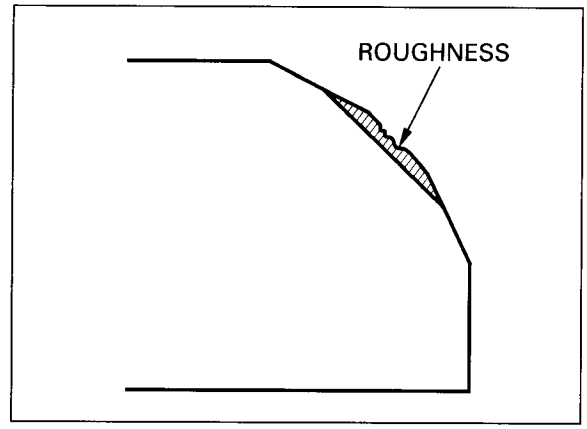
If the contact area is too low on the valve, the seat must be lowered using a 60° interior cutter.



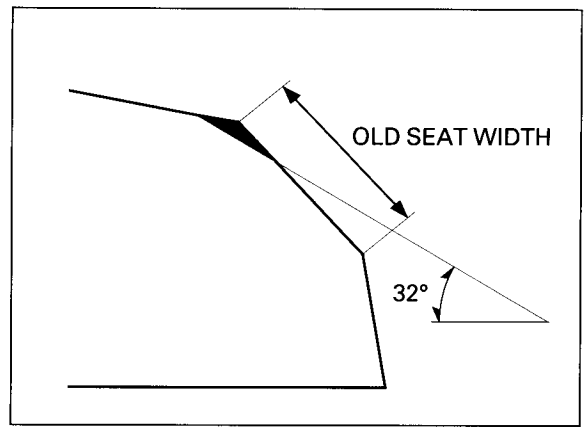
Use a 45-degree cutter to remove any roughness or irregularities from the seat.

NOTE:

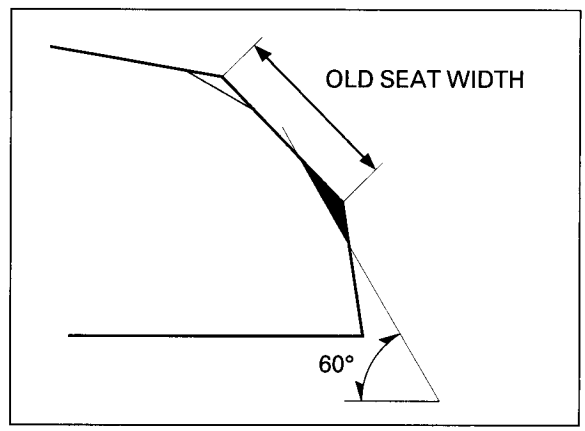
Reface the seat with a 45-degree cutter whenever a valve guide is replaced.



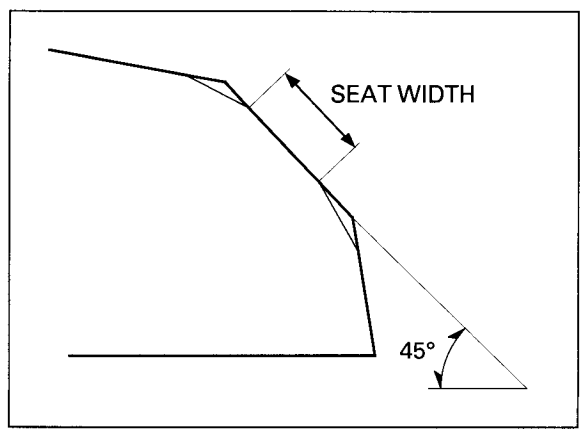
Use a 32-degree cutter to remove the top 1/4 of the existing valve seat material.



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



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

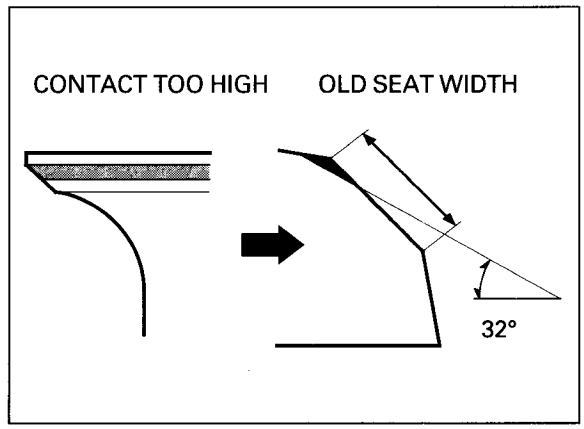


Apply a thin coating of Prussian Blue to the valve seat.
Press the valve through the valve guide and onto the seat to make a clear pattern.

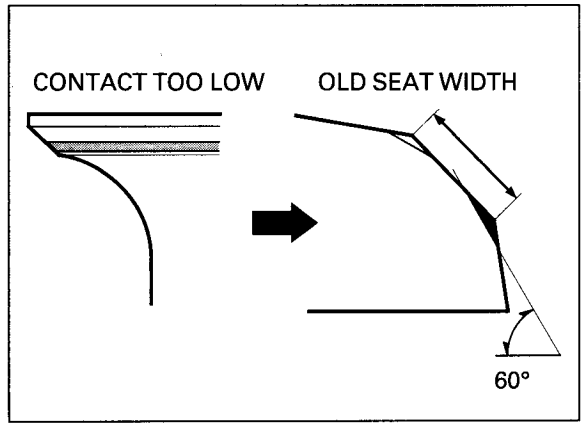
NOTE:

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

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



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

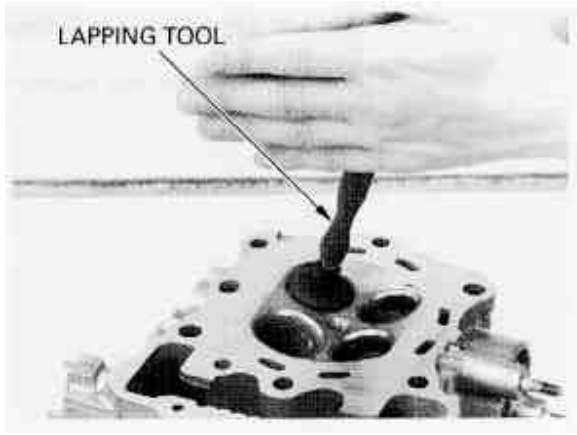


Refinish the seat to specifications, using a 45-degree finish cutter.
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

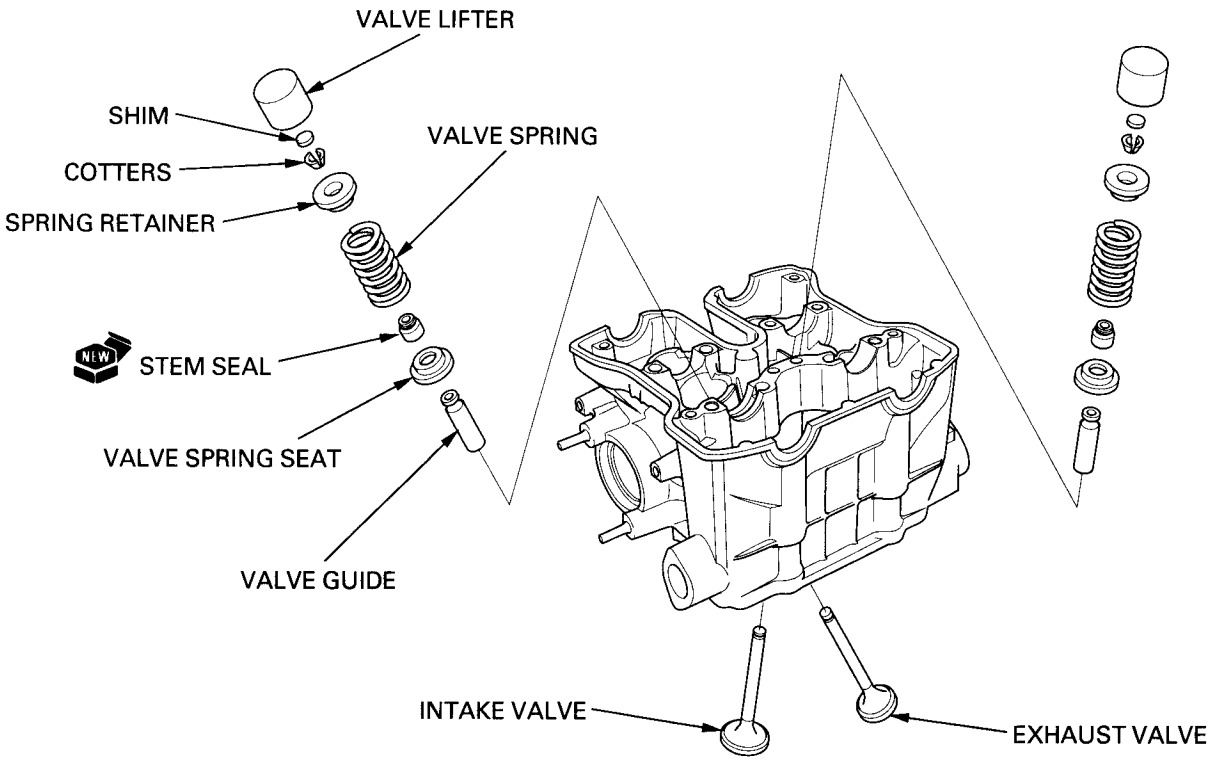
After lapping, wash all residual compound off the cylinder head and valve.

NOTE:

Do not allow lapping compound to enter the guides.



CYLINDER HEAD ASSEMBLY

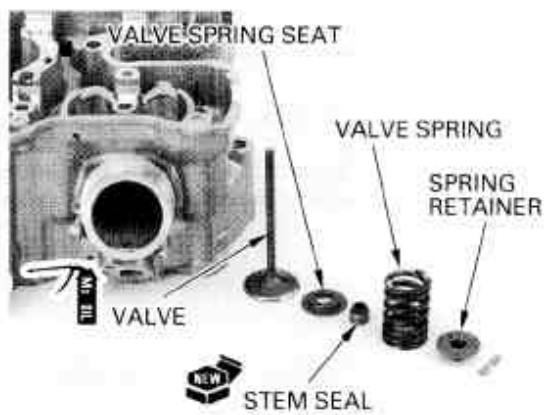


Clean the cylinder head assembly with solvent and blow through all oil passages with compressed air.

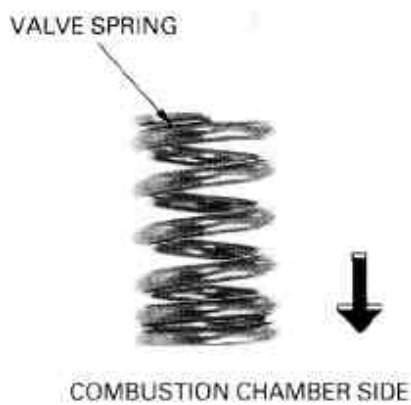
Install the valve spring seats.
Install the new stem seals.

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

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

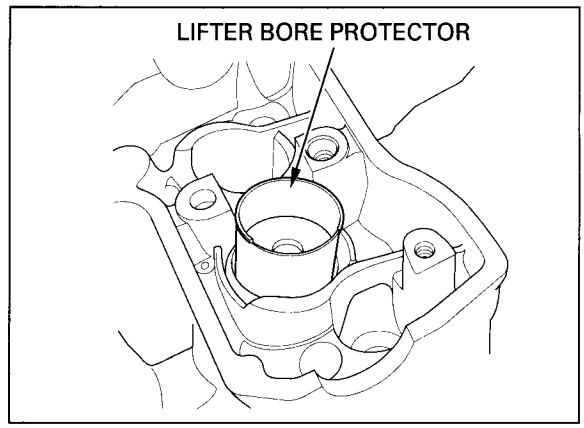


Install the valve springs with the tightly wound coils facing the combustion chamber.



Install the tappet hole protector into the valve lifter bore.

Install the valve spring retainer.

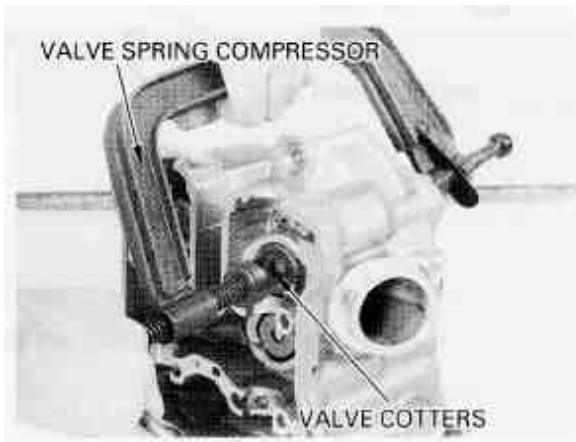


Install the valve cotters using the special tool as shown.
To prevent loss of tension, do not compress the valve spring more than necessary.

TOOL:
Valve spring compressor 07757-0010000

CAUTION:

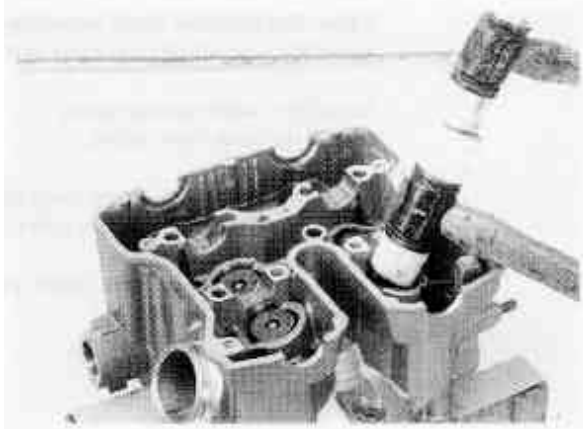
To prevent loss of tension, do not compress the valve spring more than necessary to install the cotters.



Tap the valve stems gently with two plastic hammers as shown to seat the cotters firmly.

CAUTION:

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

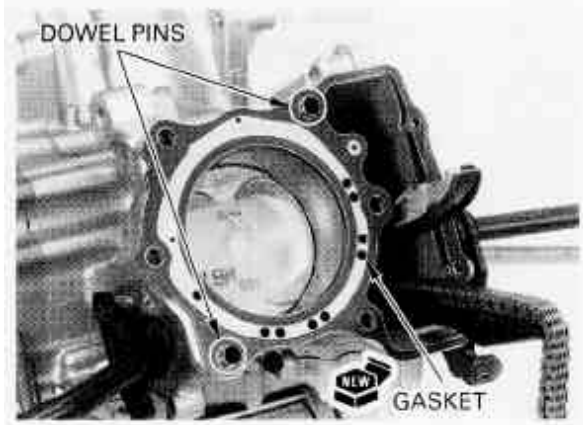


Install and tighten the spark plug to the specified torque.

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

CYLINDER HEAD INSTALLATION

Install the dowel pins and a new cylinder head gasket as shown.

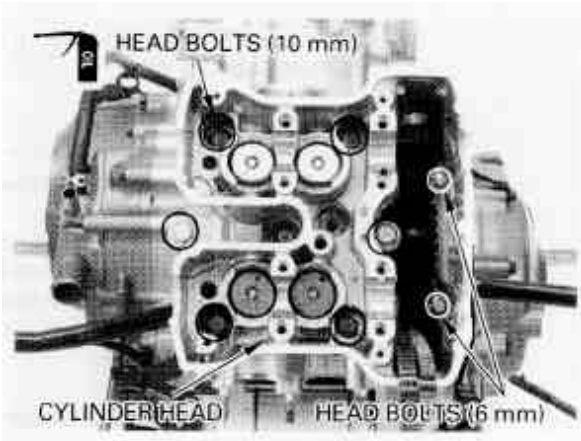


Install the cylinder head.

Apply oil to the threads and seating surface of the 10 mm cylinder head bolts and install them.
Install the two 6 mm flange bolts.
Tighten the 10 mm cylinder head bolts in a criss-cross pattern in 2–3 steps to the specified torque.

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

Install and tighten the 6 mm bolts.

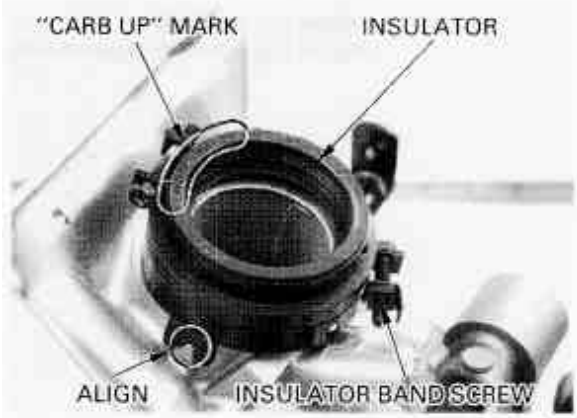


Install a new O-ring into the water hose joint groove.
Install the water hose joint and tighten the bolts.



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 to the specified torque.

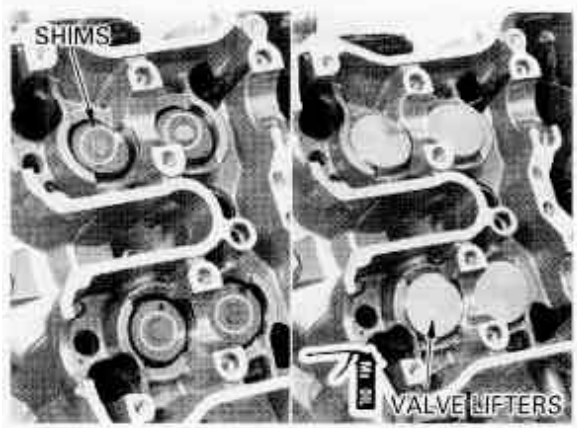
TORQUE: 1 N·m (0.1 kgf·m , 0.7 lbf·ft)



CAMSHAFT INSTALLATION

Apply molybdenum disulfide oil to the outer surface of the each valve lifter.

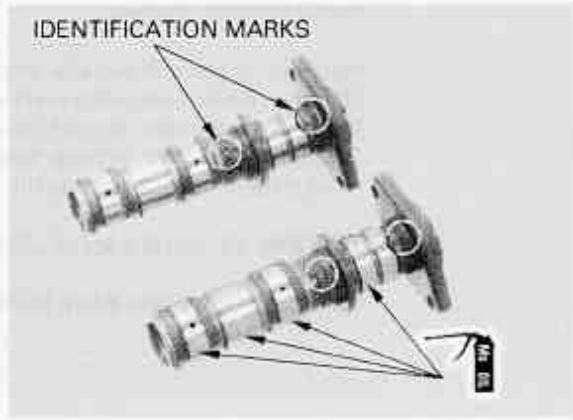
Install the shims and valve lifters into the valve lifter bores.



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

NOTE:

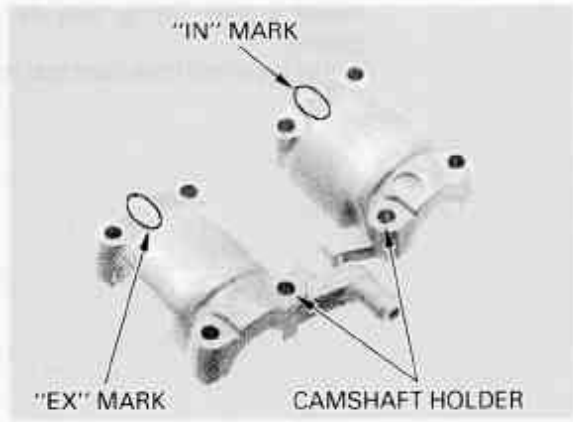
The camshafts have the following identification marks.
"F IN": Front cylinder intake camshaft
"F EX": Front cylinder exhaust camshaft
"R IN": Rear cylinder intake camshaft
"R EX": Rear cylinder exhaust camshaft



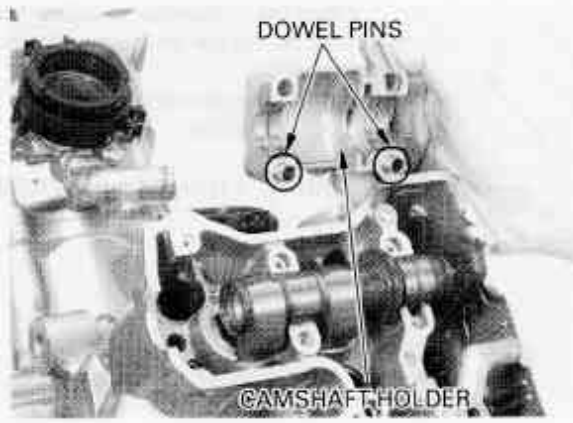
Install the camshaft in their proper location.

NOTE:

Install the each camshaft holder to the correct locations with the identification marks.
"IN": Intake camshaft holder
"EX": Exhaust camshaft holder

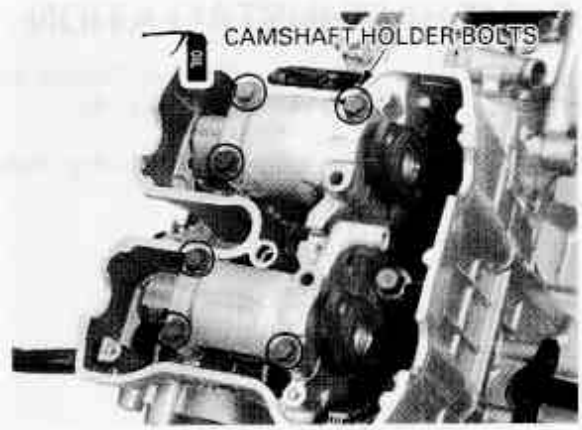


Install the dowel pins.
Install the camshaft holders onto the camshafts.



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)

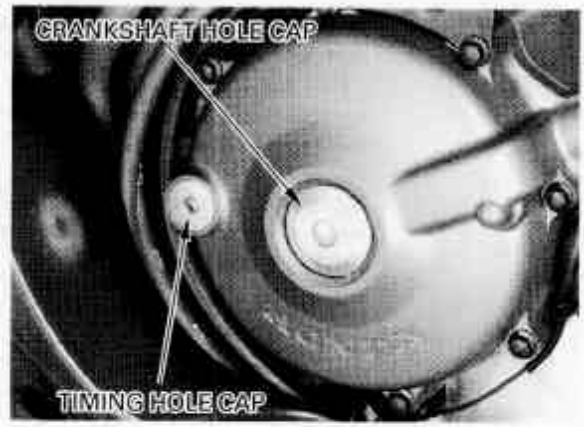


CAM SPROCKET INSTALLATION

NOTE:

- If both front and rear camshafts were serviced, install the front cam sprocket first, then install the rear cam sprocket.
- 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.

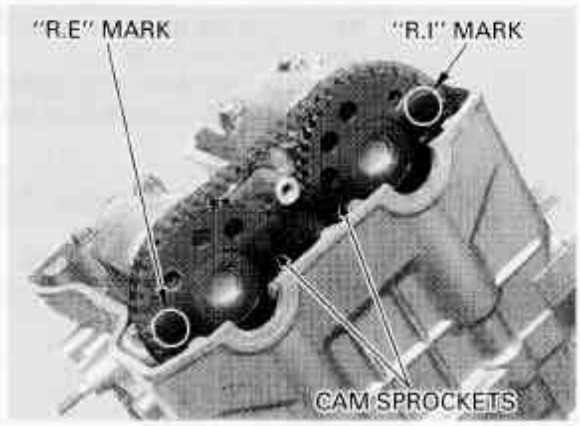
Remove the crankshaft hole cap and timing hole cap.



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

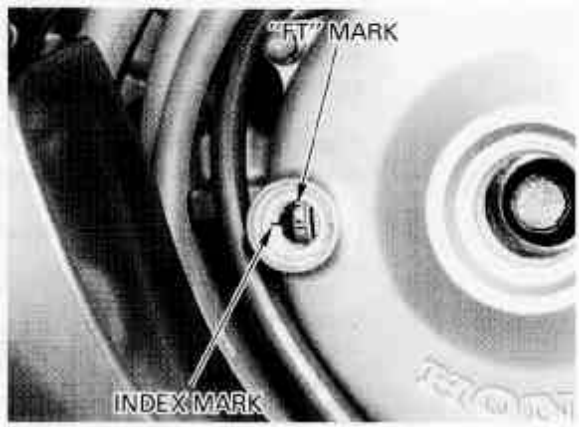


Check the timing marks ("R.I" for intake and "R.E" for exhaust) on the rear cylinder cam sprockets.



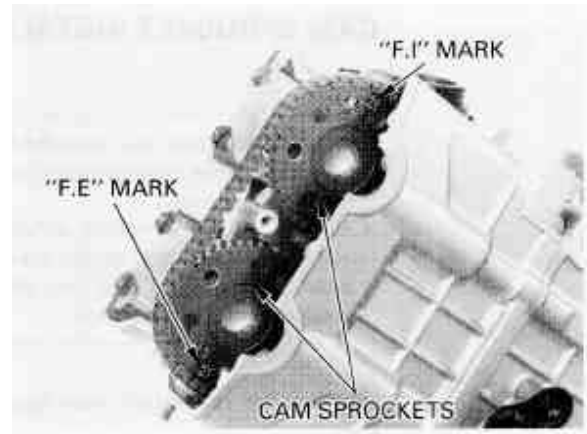
If the timing marks are facing outward, turn the crankshaft counterclockwise 1-1/4 turn (450°) and align the "FT" mark with the index mark.

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.

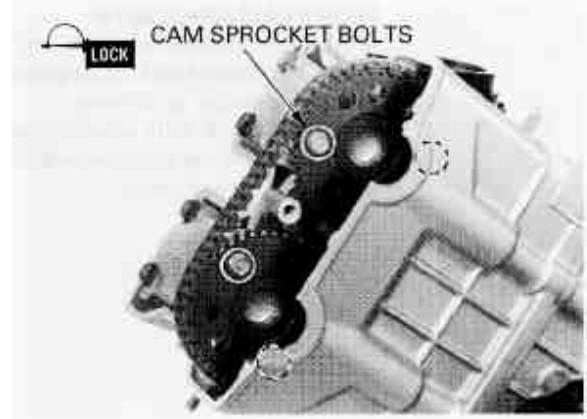


Clean and apply locking agent to the cam sprocket bolt threads.
Install the cam sprockets bolts.

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

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

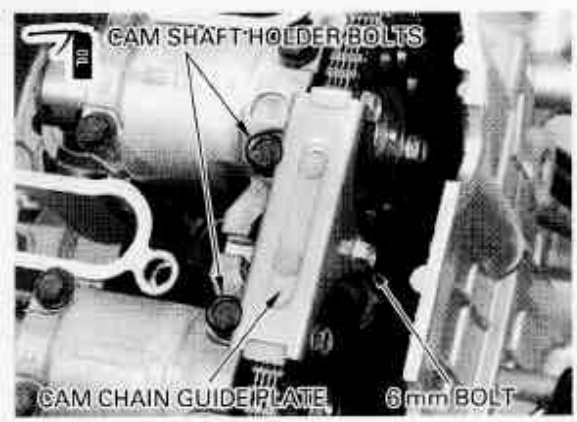
Turn the crankshaft counterclockwise one turn and tighten the other sprocket bolts to the same torque.



Apply oil to the threads and seating surfaces of the camshaft holder bolts.
Install the cam chain guide plate.
Tighten the camshaft holder bolts to the specified torque.

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

Tighten the 6 mm bolt securely.

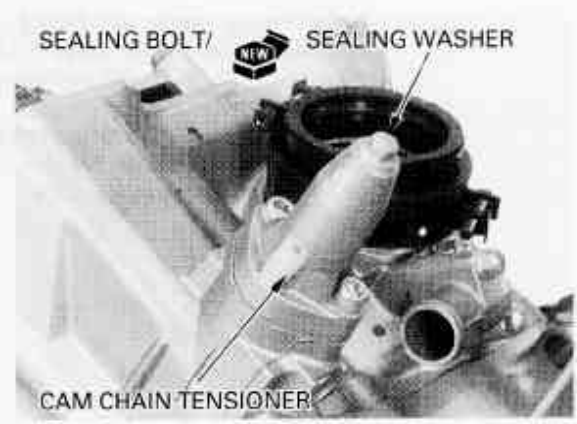


Remove the stopper tool from the cam chain tensioner lifter and install the sealing bolt with a new sealing washer.

If the rear cylinder has been serviced, install the rear cylinder cam sprockets (see next page).

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

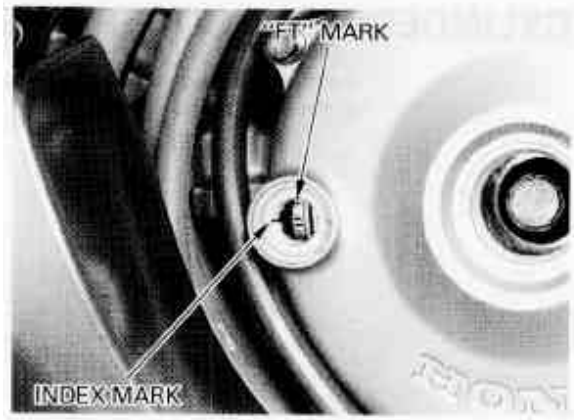
Install the following:
—Cylinder head cover (page 8-27)
—Radiator (page 6-7, 8)
—Air cleaner housing (page 5-5)



REAR CAM SPROCKET:

If the front cylinder 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.

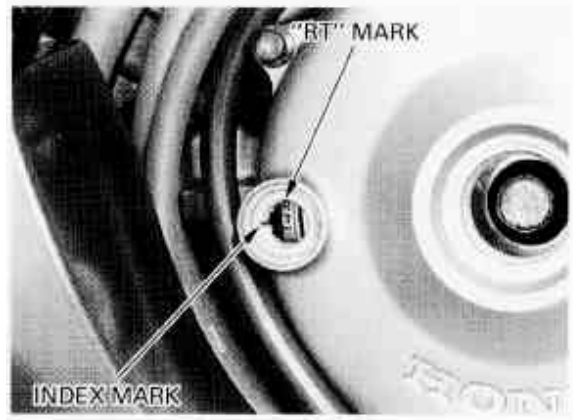


Check the timing marks ("F.I" for intake and "F.E" for exhaust) on the front cylinder cam sprockets.



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.



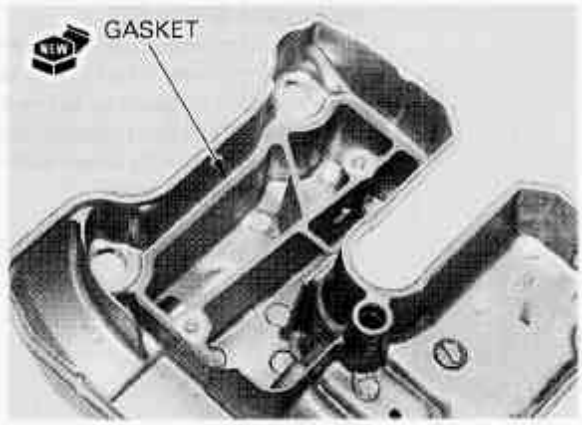
Install the cam sprockets onto the cam chain and cam sprocket flanges so that the timing marks ("R.I" for intake and "R.E" for exhaust) on the sprockets are flush with the cylinder head surface and facing outward as shown.

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



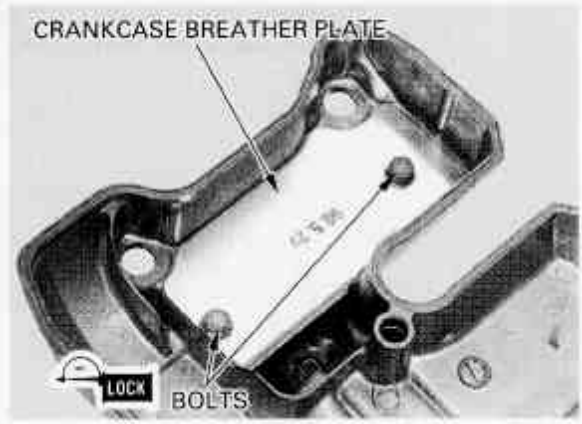
CYLINDER HEAD COVER ASSEMBLY

Install the new gasket and crankcase breather plate to the cylinder head cover.

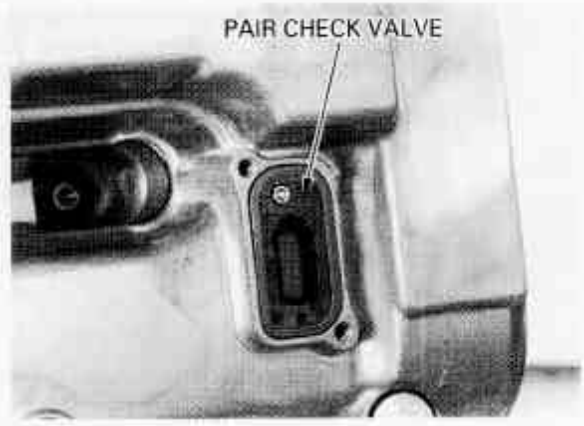


Apply a locking agent to the crankcase breather plate bolt threads.
Tighten the bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

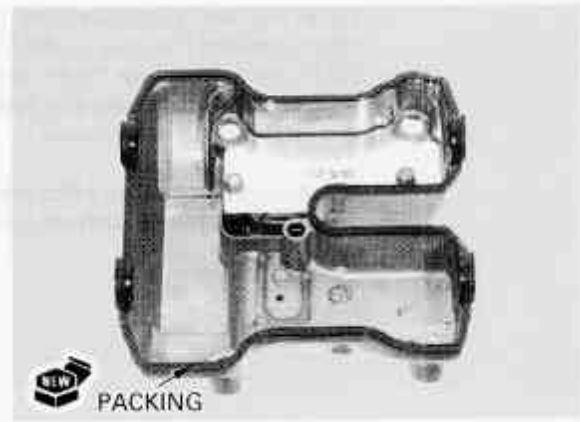


Install the PAIR check valves into the cylinder head cover.



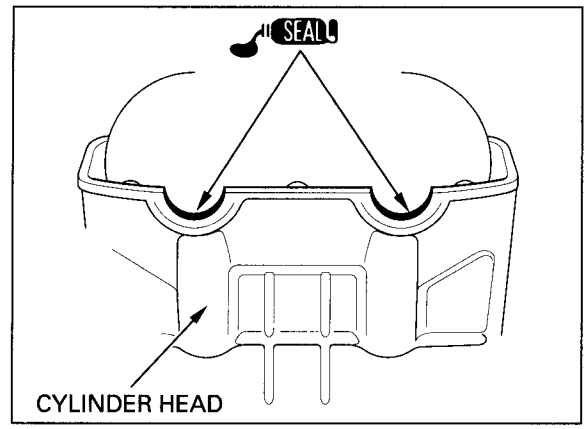
Apply sealant to the cylinder head cover side of a new packing.

Install the cylinder head packing into the groove of the cylinder head cover.

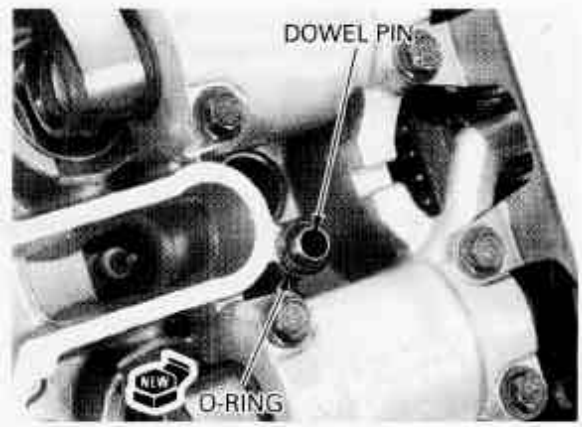


CYLINDER HEAD COVER INSTALLATION

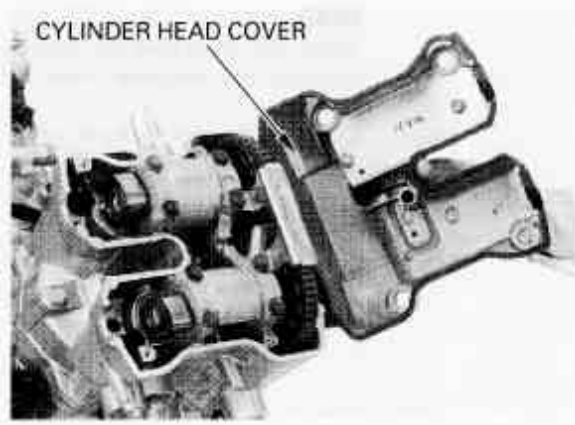
Apply sealant to the cylinder head semi-circular cut-outs as shown.



Install the dowel pin and new O-ring.



Install the cylinder head cover onto the cylinder head.

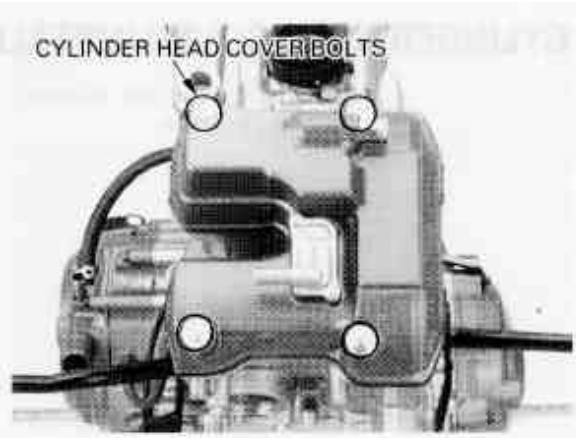


Install the special washers with their "UP" mark facing up.



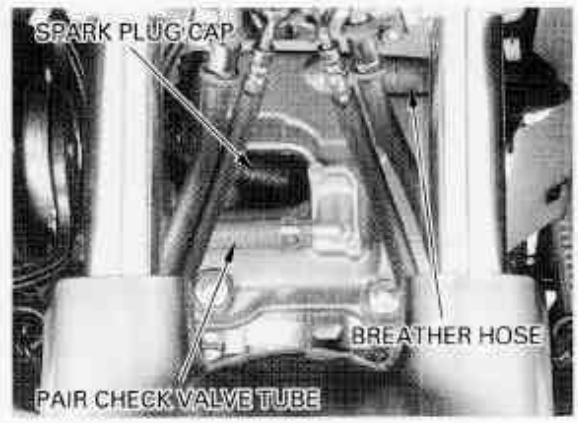
Install and tighten the cylinder head cover bolts to the specified torque.

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 PAIR check valve tube to the PAIR check valve.

Install the lower heat guard (page 17-6).



REAR:
Install the spark plug cap onto the plug.
Connect the breather hose to the cylinder head cover.
Connect the PAIR check valve tube to the PAIR check valve.

Install the fuel tank (page 2-10).



CAM CHAIN TENSIONER LIFTER

REMOVAL

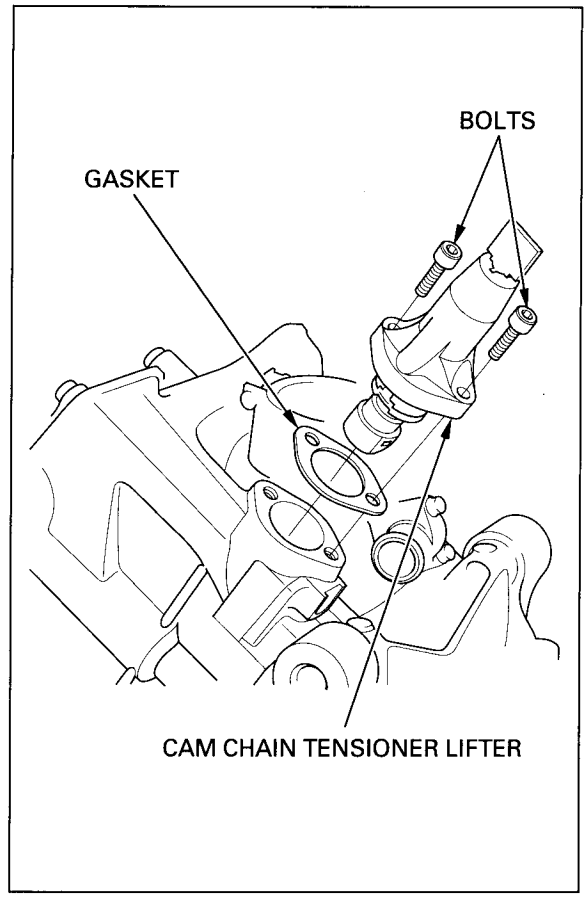
Remove the carburetor (page 5-5).

Remove the cam chain tensioner sealing bolt and sealing washer.



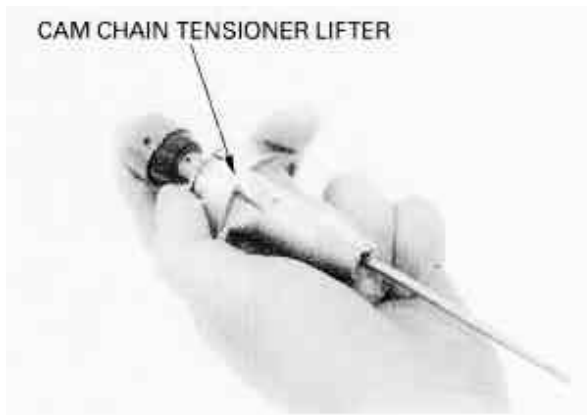
Turn the tensioner shaft fully in (clockwise) and secure it using the stopper tool to prevent damaging the cam chain.
See page 8-7 for detail of the tool.

Remove the bolts and cam chain tensioner lifter.
Remove the gasket.



INSTALLATION

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



Install the new gasket onto the cam chain tensioner lifter.

NOTE:

Note the direction of the gasket.

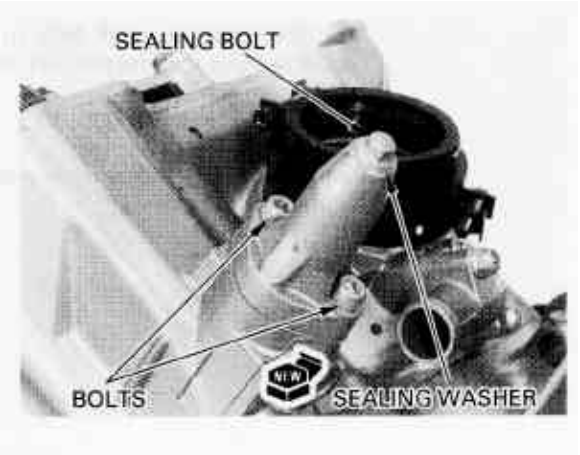
Install the cam chain tensioner lifter into the cylinder head block.

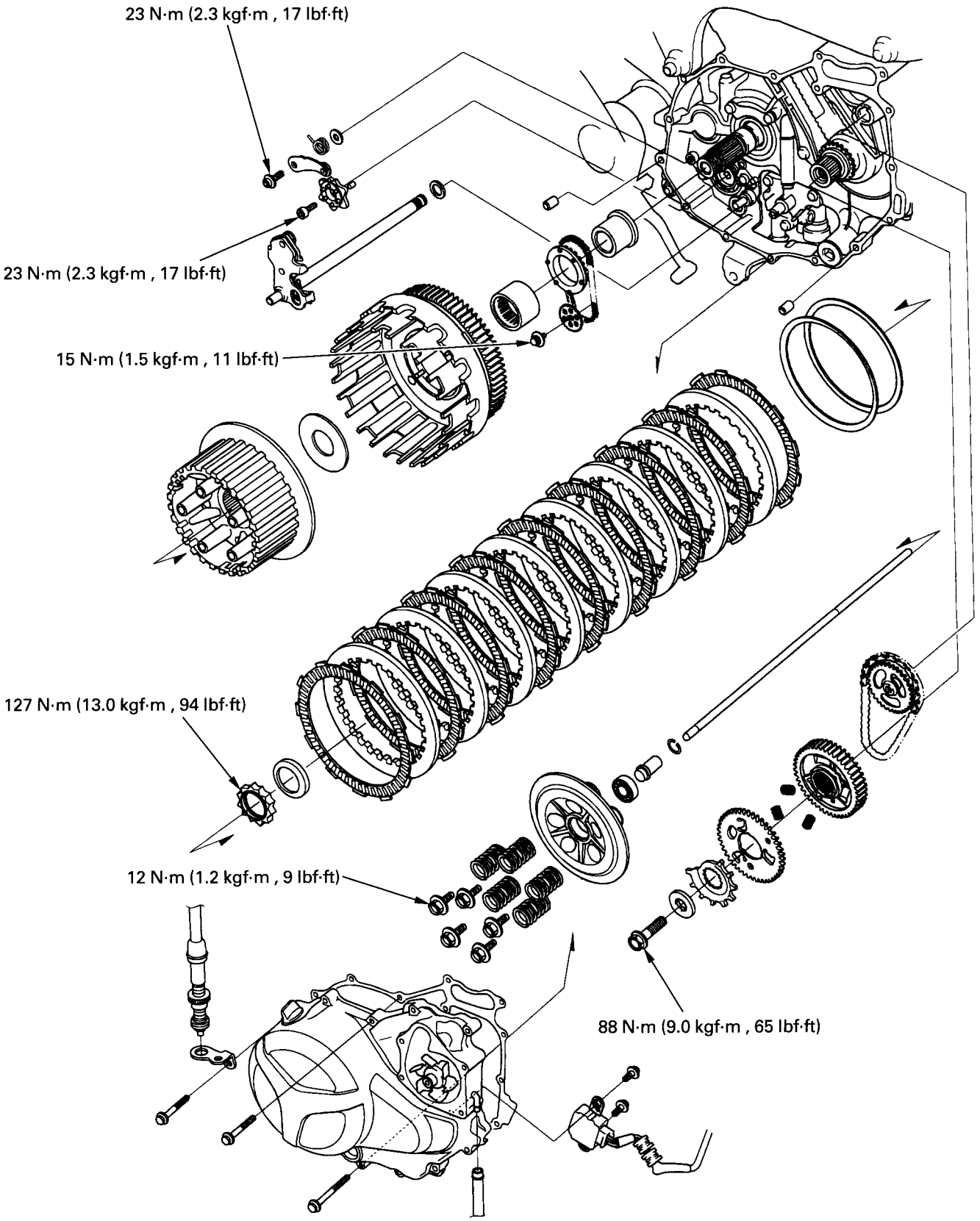


Install and tighten the bolts securely.

Remove the stopper tool.
Install a new sealing washer and tighten the sealing bolt securely.

Install the carburetor (page 5-18).




23 N·m (2.3 kgf·m , 17 lbf·ft)
23 N·m (2.3 kgf·m , 17 lbf·ft)
15 N·m (1.5 kgf·m , 11 lbf·ft)
127 N·m (13.0 kgf·m , 94 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
88 N·m (9.0 kgf·m , 65 lbf·ft)

9. CLUTCH/GEARSHIFT LINKAGE

SERVICE INFORMATION	9-1	GEARSHIFT LINKAGE	9-12
TROUBLESHOOTING	9-2	PRIMARY DRIVE GEAR	9-14
RIGHT CRANKCASE COVER REMOVAL	9-3	RIGHT CRANKCASE COVER INSTALLATION	9-16
CLUTCH	9-3	CLUTCH LIFTER ARM	9-17

SERVICE INFORMATION

GENERAL

- This section covers service of the clutch. This service can be done with the engine installed in the frame.
- Clean off any gasket material from the right crankcase cover surface.
- Be careful not to damage the crankcase cover mating surface when servicing.
- When removing or servicing the clutch, use care not to allow the dust or dirt to enter the engine.
- Transmission oil viscosity and level have an effect on clutch disengagement. When the clutch does not disengage or the motorcycle creeps with clutch disengaged, inspect the transmission oil level before servicing the clutch system.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch lever free play		10–20 (3/8–13/16)	———
Clutch spring free length		49.6 (1.95)	46.6 (1.83)
Clutch disc thickness		3.72–3.88 (0.146–0.153)	3.5 (0.14)
Clutch plate warpage		———	0.30 (0.012)
Clutch outer guide	I.D.	28.000–28.021 (1.1024–1.1032)	28.031 (1.1036)
	O.D.	34.975–34.991 (1.3770–1.3776)	34.965 (1.3766)
Mainshaft O.D. at clutch outer guide		27.980–27.993 (1.1016–1.1021)	27.970 (1.1012)

TORQUE VALUES

Clutch center lock nut	127 N·m (13.0 kgf·m , 94 lbf·ft)	Apply oil to the threads Stake the nut
Clutch spring bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Oil pump driven sprocket bolt	15 N·m (1.5 kgf·m , 11 lbf·ft)	Apply a locking agent to the threads
Gearshift cam bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply a locking agent to the threads
Gearshift spindle return spring pin	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Primary drive gear bolt	88 N·m (9.0 kgf·m , 65 lbf·ft)	Apply oil to the threads

TOOLS

Clutch center holder	07724-0050002
Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Attachment, 37 × 40 mm	07746-0010200
Attachment, 42 × 47 mm	07746-0010300
Pilot, 17 mm	07746-0040400
Pilot, 35 mm	07746-0040800
Gear holder	07724-0010100

TROUBLESHOOTING

Clutch lever too hard to pull in
- Damaged, kinked or dirty clutch cable
- Faulty clutch lifter bearing
- Damaged clutch lifter mechanism
- Improperly routed clutch cable

Clutch slips when accelerating
- Clutch lifter sticking
- Worn clutch discs
- Weak clutch springs
- No clutch lever free play
- Transmission oil mixed with molybdenum or graphite additive

Clutch will not disengage or motorcycle creeps with clutch disengaged
- Too much clutch lever free play
- Clutch plate warped
- Loose clutch center lock nut
- Improper oil viscosity
- Engine oil too high, improper oil viscosity
- Damaged clutch lifter mechanism
- Clutch lifter piece installed improperly

Hard to shift
- Improper clutch operation
- Improper oil viscosity
- Bent shift fork
- Bent shift fork shaft
- Bent fork claw
- Damaged shift drum cam groove
- Loose stopper plate bolt
- Damaged stopper plate and pin
- Damaged gearshift spindle

Transmission jumps out of gear
- Worn shift drum stopper arm
- Weak or broken shift arm return spring
- Loose stopper plate bolt
- Bent shift fork shaft
- Damaged shift drum cam groove
- Damaged or bent shift forks
- Worn gear engagement dogs or slots

Gearshift pedal will not return
- Weak or broken gearshift spindle return spring
- Bent gearshift spindle

RIGHT CRANKCASE COVER REMOVAL

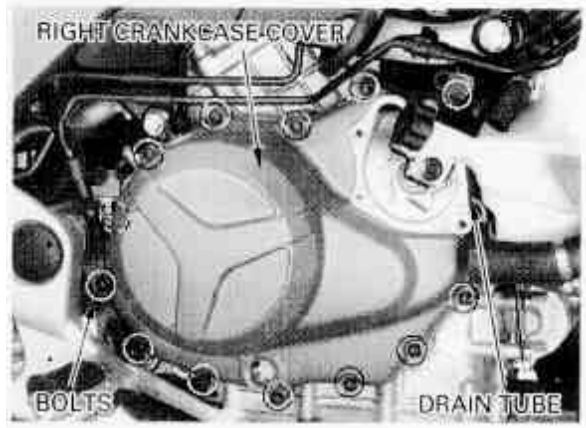
Drain the engine oil (page 3-11).
Drain the coolant (page 6-5).
Remove the water pump cover (page 6-15).

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



Remove the bolts and right crankcase cover.
Disconnect the drain tube from the right crankcase cover.

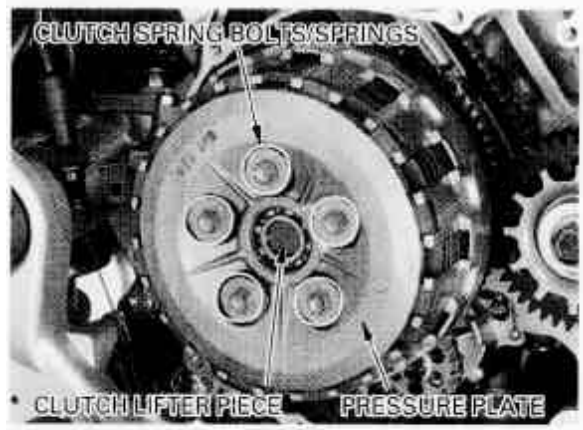
Remove the gasket and dowel pins.



CLUTCH

REMOVAL

Remove the clutch spring bolts, springs and pressure plate.
Remove the clutch lifter piece.



Remove the lifter rod from the mainshaft.

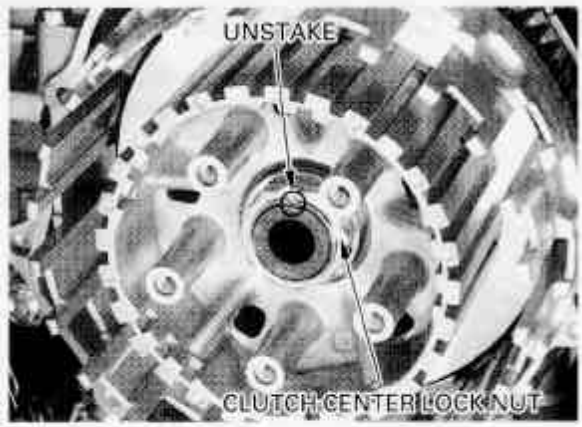
Remove the following:
– Ten clutch discs
– Nine clutch plates
– Judder spring
– Spring seat



Unstake the clutch center lock nut.

CAUTION:

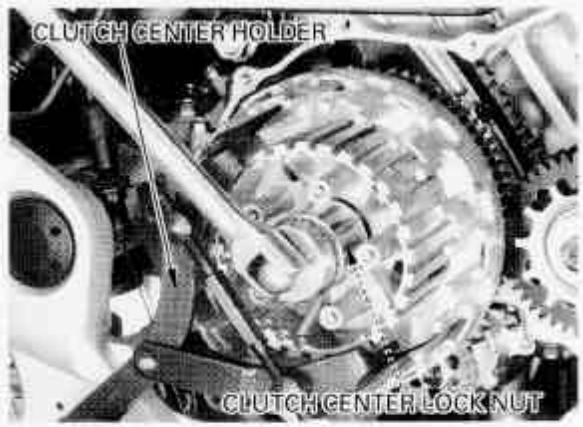
Be careful not to damage the mainshaft threads.



Hold the clutch center with the clutch center holder, then remove the lock nut.

TOOL:
Clutch center holder 07724-0050002

Discard the lock nut.



Remove the lock washer and clutch center.



Remove the washer.



Align the primary drive gear and sub-gear teeth with a screwdriver as shown.
Pull out the clutch outer.

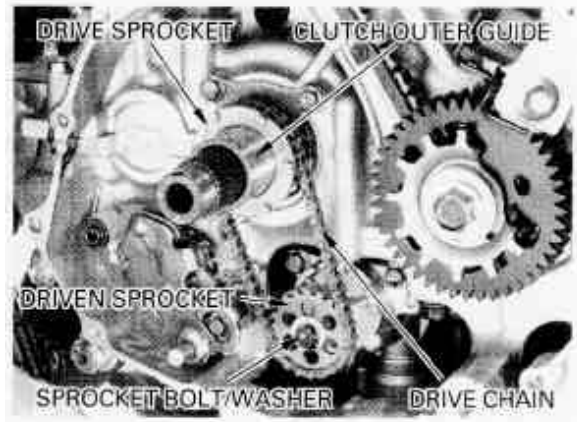
NOTE:

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



Remove the oil pump driven sprocket bolt/washer.
Remove the oil pump drive/driven sprocket and drive chain as an assembly.

Remove the clutch outer guide.

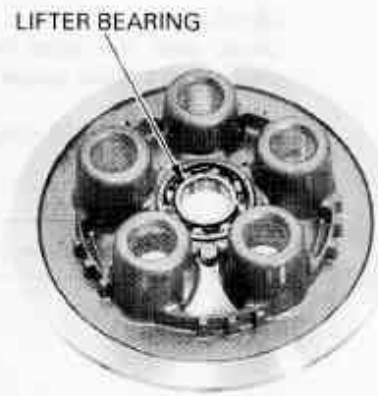


INSPECTION

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

Drive the bearing out of the pressure plate.

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



TOOLS:

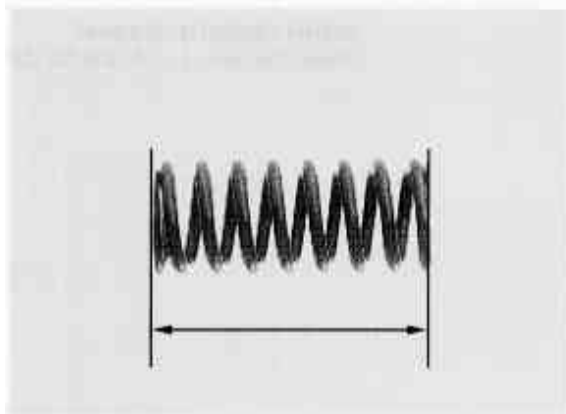
Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 17 mm	07746-0040400

Clutch spring
Measure the clutch spring free length.

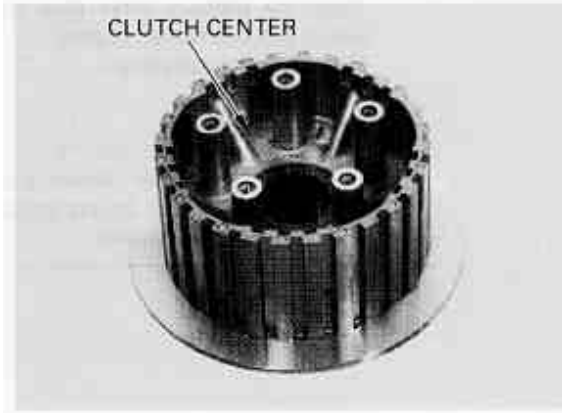
SERVICE LIMIT: 46.6 mm (1.83 in)

NOTE:

Replace the clutch springs as a set.



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



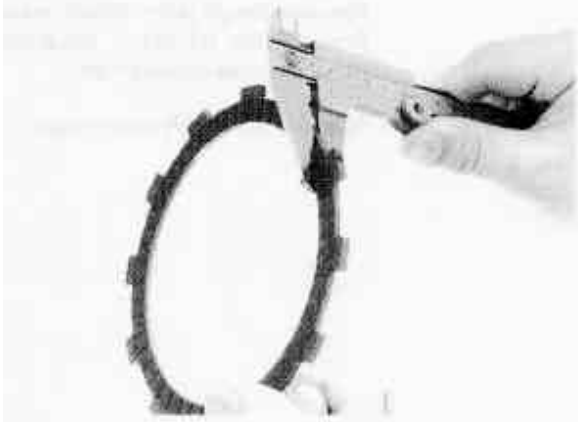
Clutch disc
Replace the clutch discs if they show signs of scoring or discoloration.

Measure the disc thickness of each disc.

SERVICE LIMIT: 3.5 mm (0.14 in)

NOTE:

Replace the clutch discs and plates as a set.

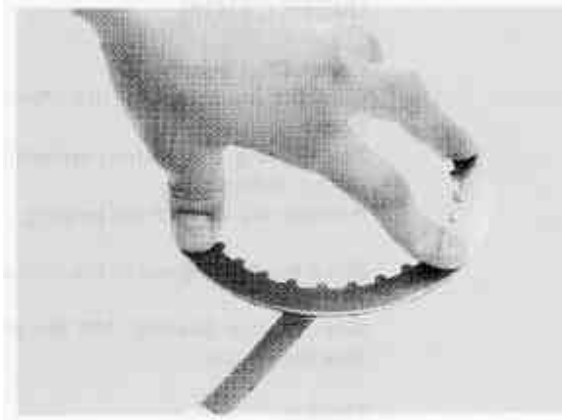


Clutch plate
Check each disc plate for warpage on a surface plate using a feeler gauge.

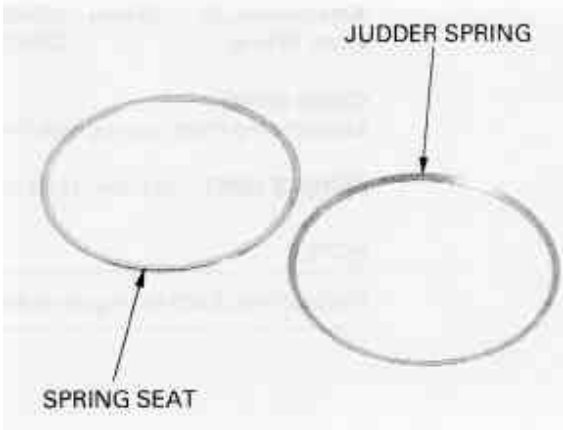
SERVICE LIMIT: 0.30 mm (0.012 in)

NOTE:

Replace the clutch discs and plates as a set.

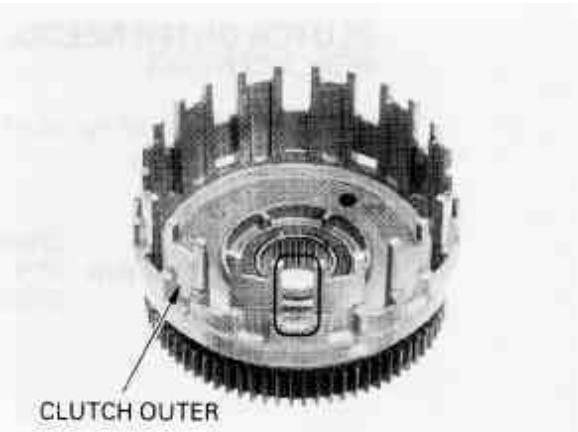


Judder spring/spring seat
Check the spring and seat for damage or warpage.



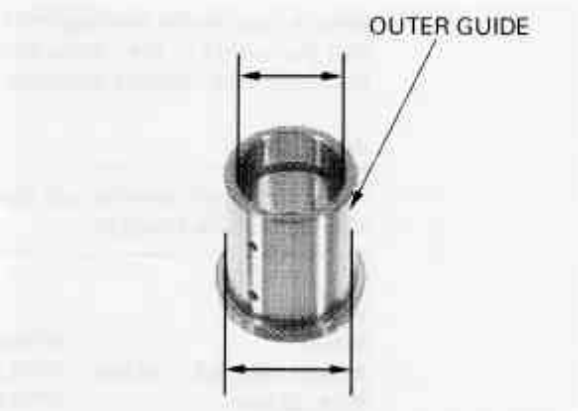
Clutch outer/clutch outer guide
Check the slots of the clutch outer for damage or wear caused by the clutch discs.
Replace if necessary.

Check the needle bearing for wear or damage.
Replace the needle bearing if necessary (page 9-8).



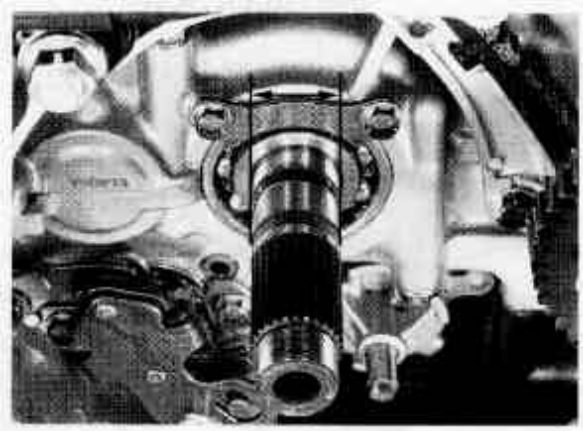
Measure the O.D. and I.D. of the clutch outer guide.

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

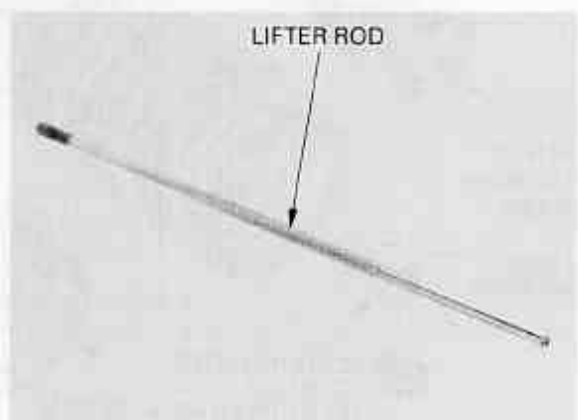


Mainshaft
Measure the mainshaft O.D. at clutch outer guide sliding surface.

SERVICE LIMIT: 27.970 mm (1.1012 in)



Clutch lifter rod
Check the clutch lifter rod for wear and trueness.

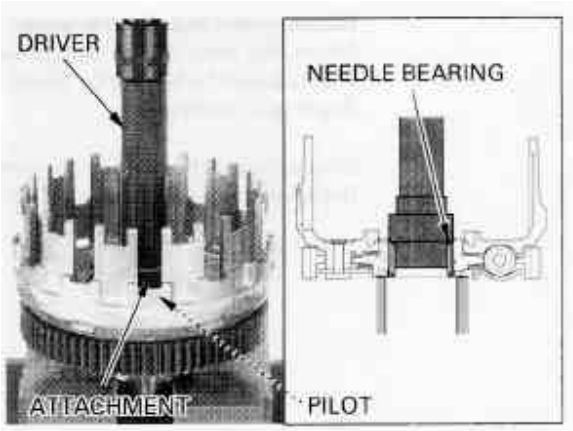


CLUTCH OUTER NEEDLE BEARING REPLACEMENT

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



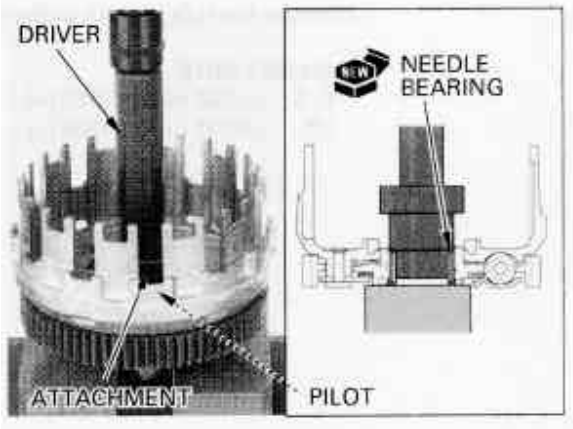
Press a new needle bearing into the clutch outer so that the casing of the needle bearing is flush with the clutch outer surface as shown.

NOTE:

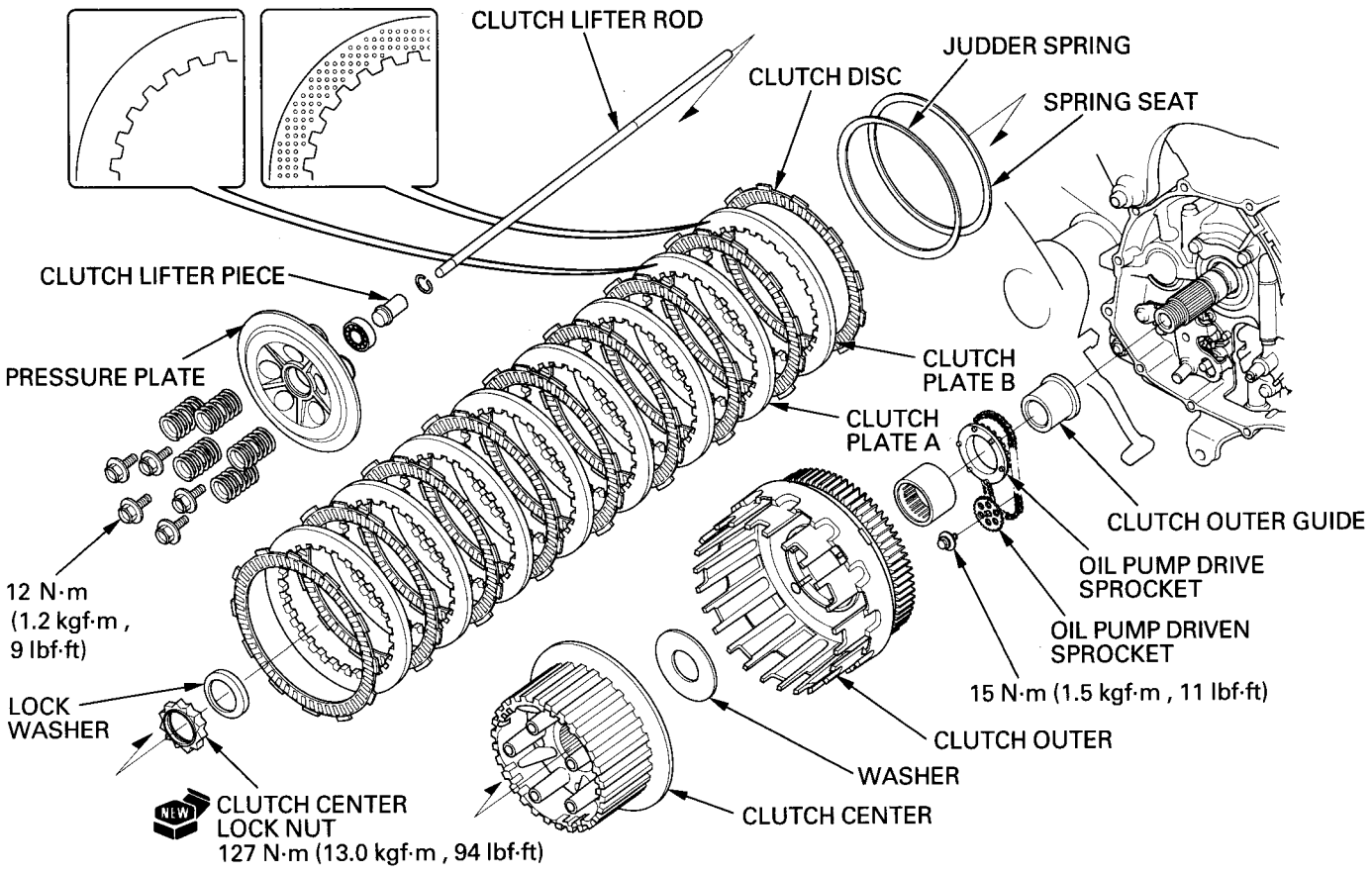
Press the needle bearing into the clutch outer with the marked side facing up.

TOOLS:

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



INSTALLATION

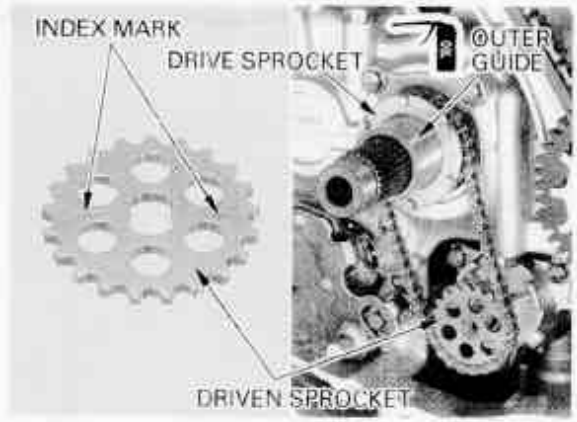


Coat the clutch outer guide with molybdenum disulfide oil and install it onto the mainshaft with the flange side facing the crankcase.

Install the oil pump drive/driven sprocket and drive chain as an assembly.

NOTE:

Install the oil pump driven sprocket with its index mark facing crankcase.



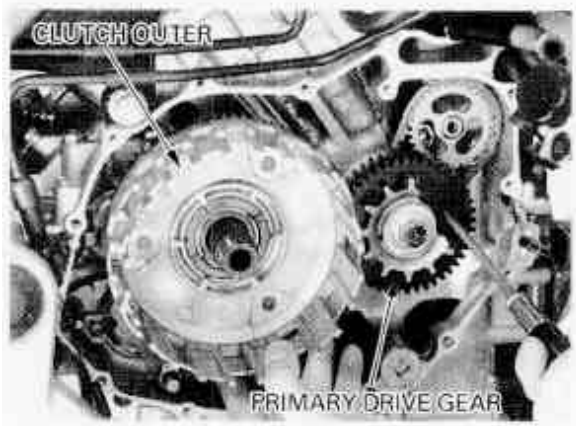
Apply a locking agent to the threads of the oil pump driven sprocket bolt.
Install the oil pump driven sprocket bolt and washer.

NOTE:

Tighten the oil pump driven sprocket to the specified torque after clutch outer installation.



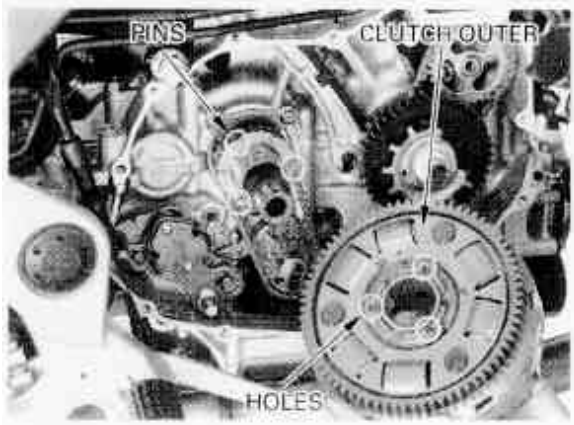
Align the primary drive gear and sub-gear teeth with a screwdriver as shown.



Install the clutch outer to the mainshaft aligning the holes on the clutch outer and pins on the oil pump drive sprocket by turning the oil pump drive sprocket.

Tighten the oil pump driven sprocket bolt to the specified torque.

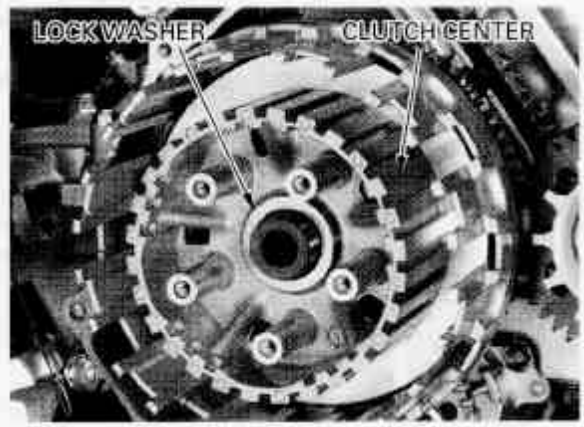
TORQUE: 15 N·m (1.5 kgf·m , 11 lbf·ft)



Install the washer onto the clutch outer.



Install the clutch center and lock washer.



Apply oil to the threads and seating surface of a new clutch center lock nut and install it to the mainshaft.

Hold the clutch center with the clutch center holder, then tighten the lock nut to the specified torque.

TOOL:
Clutch center holder 07724-0050002

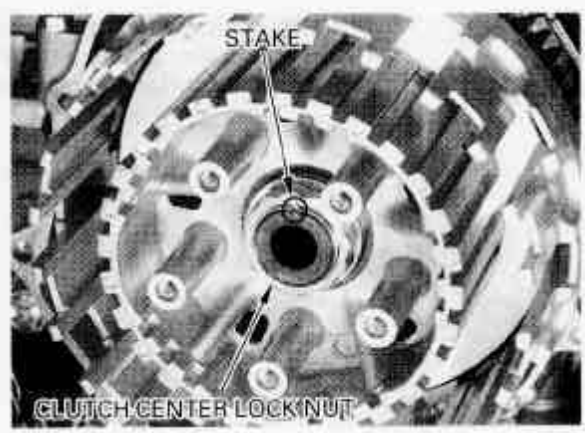
TORQUE: 127 N·m (13.0 kgf·m , 94 lbf·ft)



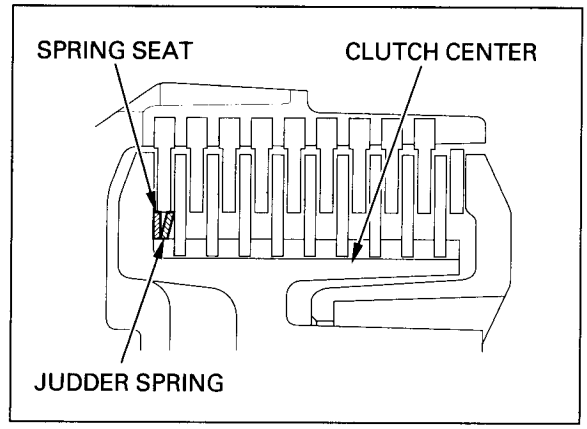
Stake lock nut into the mainshaft groove with a punch.

CAUTION:

Be careful not to damage the mainshaft threads.



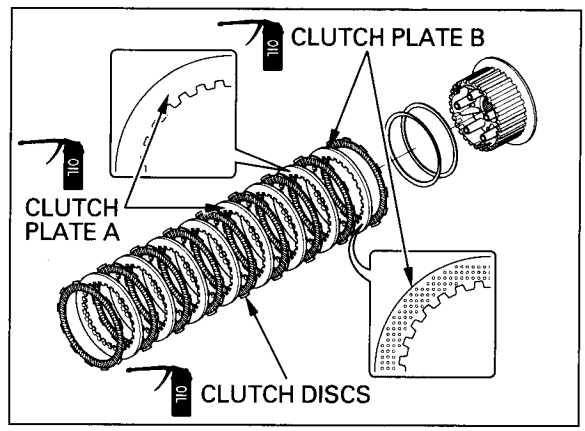
Install the spring seat and judder spring onto the clutch center as shown.



Coat the clutch discs and plates with clean engine oil.
Stack the ten clutch discs and nine plates (A: 8, B: 1) alternately, starting with the disc.

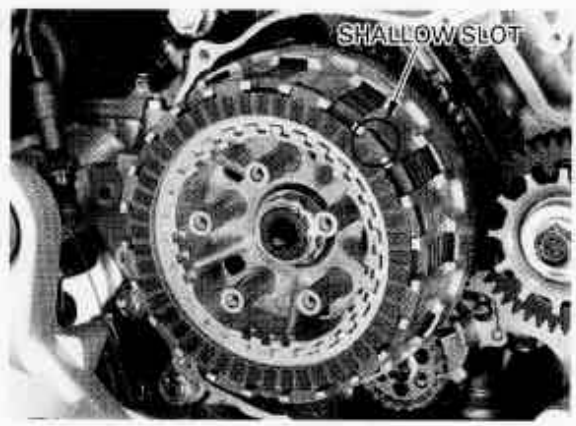
NOTE:

Clutch plate B has different surface as compared with clutch plate A. Install clutch plate B original position (as shown).

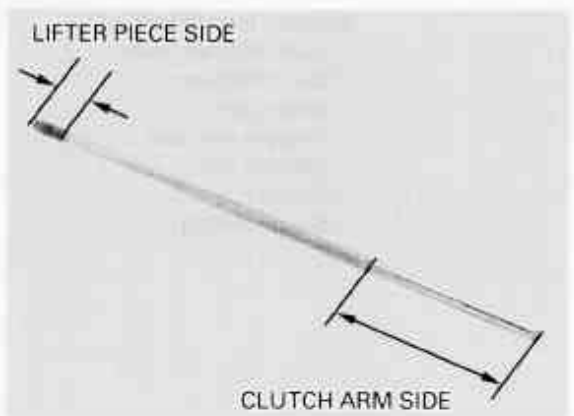


NOTE:

Install the outer clutch disc in the shallow slot on the clutch outer.



Apply grease to the tip of the lifter rod and install it into the mainshaft.



Apply molybdenum disulfide oil to the clutch lifter piece and install it into the mainshaft.
Install the pressure plate.

Install the clutch springs and spring bolts.
Tighten the bolts in a crisscross pattern in 2—3 steps to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the right crankcase cover (page 9-16).

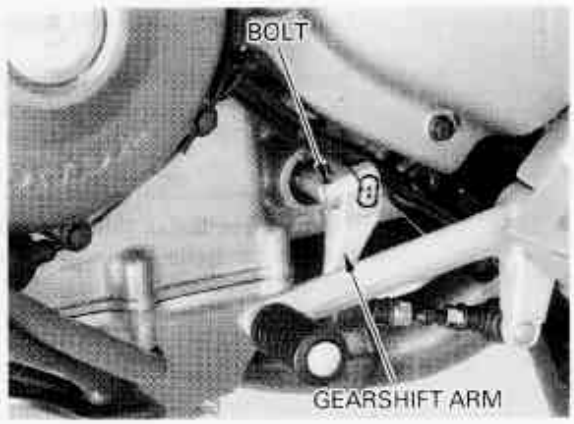


GEARSHIFT LINKAGE

REMOVAL

Remove the clutch assembly (page 9-3).

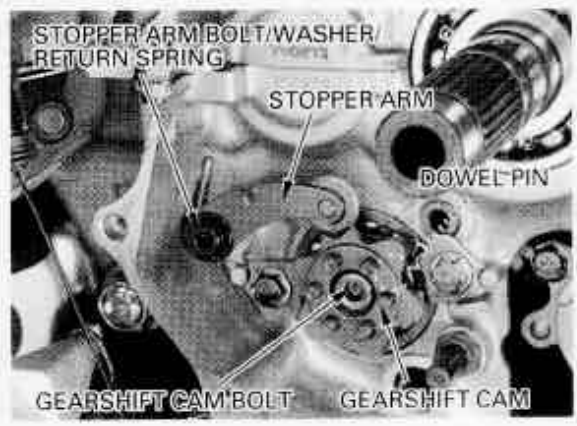
Remove the bolt and gearshift arm.



Pull the gearshift spindle assembly and thrust washer out of the crankcase.

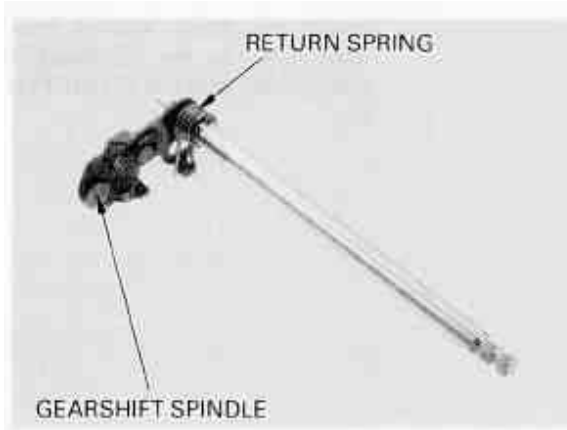


Remove the following:
—Gearshift cam bolt
—Gearshift cam
—Dowel pin
—Stopper arm bolt
—Stopper arm
—Washer
—Return spring



INSPECTION

Check the gearshift spindle for wear, damage or bending.
Check the return spring for fatigue or damage.

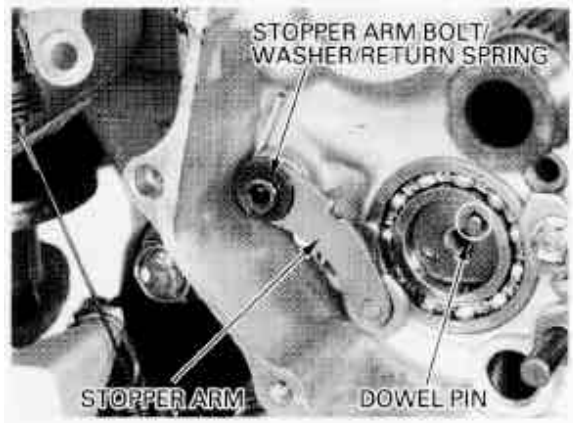


INSTALLATION

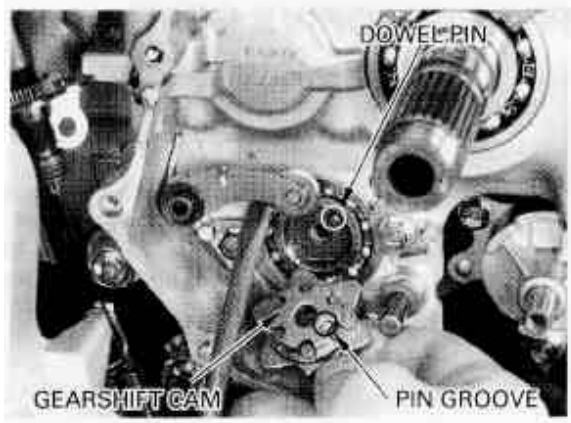
Install the following:
– Washer
– Return spring
– Stopper arm

Tighten the stopper arm bolt securely.

Install the dowel pin onto the shift drum.

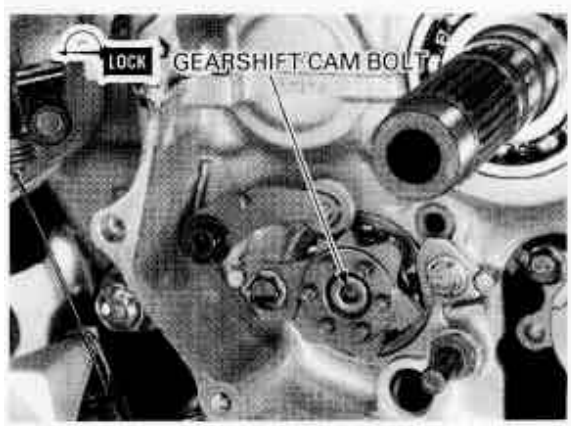


Lift the stopper arm with a screwdriver and install the gearshift cam by aligning the pin groove in the cam with the dowel pin.



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

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



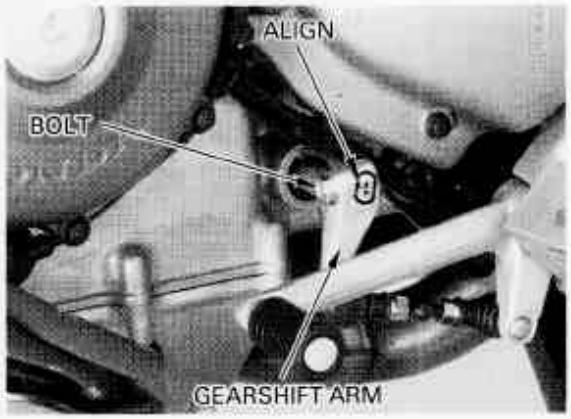
Install the thrust washer and gearshift spindle assembly into the crankcase while aligning the spring ends with the gearshift spindle return spring pin.



Install the gearshift arm aligning the punch marks on the gearshift spindle.

Install and tighten the pinch bolt securely.

Install the clutch assembly (page 9-8).



PRIMARY DRIVE GEAR

REMOVAL

Remove the clutch (page 9-3).

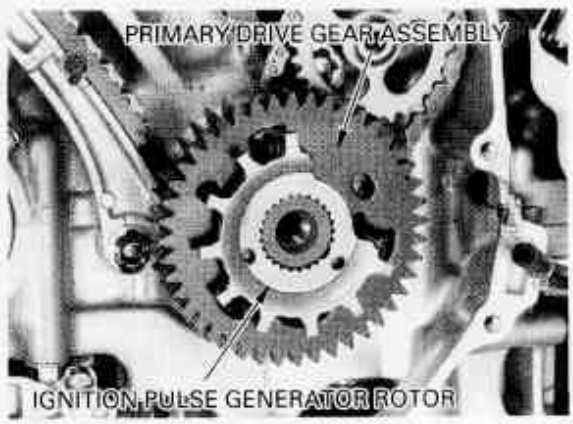
Temporarily install the clutch outer.
Install the special tool between the primary drive and driven gears as shown, loosen the primary drive gear bolt, and remove the bolt and special washer.

TOOL:
Gear holder 07724-0010100



Remove the clutch outer (page 9-5).

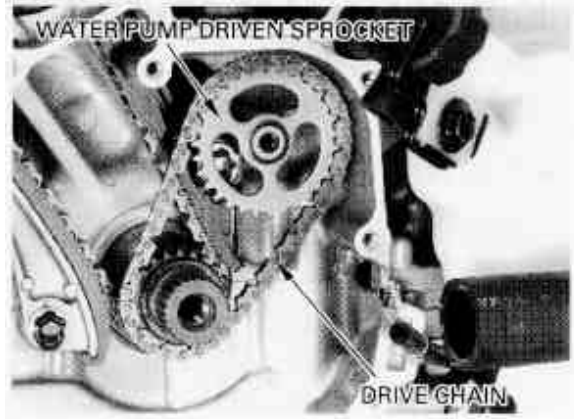
Remove the ignition pulse generator rotor and primary drive gear assembly.



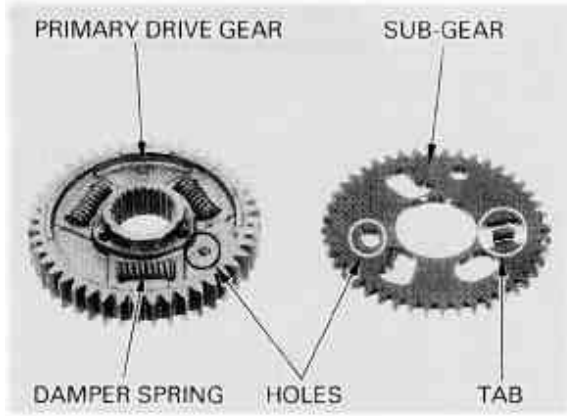
Remove the water pump driven sprocket and drive chain.

INSTALLATION

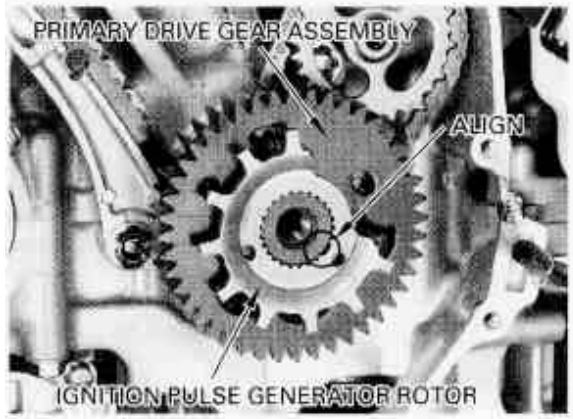
Apply molybdenum disulfide oil to the water pump driven sprocket shaft.
Install the water pump drive chain over the drive and driven sprockets.
Install the driven sprocket shaft into the crankcase.



Install the damper springs into the primary drive gear grooves.
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 see aligned.



Install the primary drive gear assembly and ignition pulse generator rotor, aligning the wide grooves with the wide teeth.



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 9-8).

Install the special tool between the primary drive and driven gears as shown.
Tighten the primary drive gear bolt to the specified torque.

TOOL:
Gear holder 07724-0010100

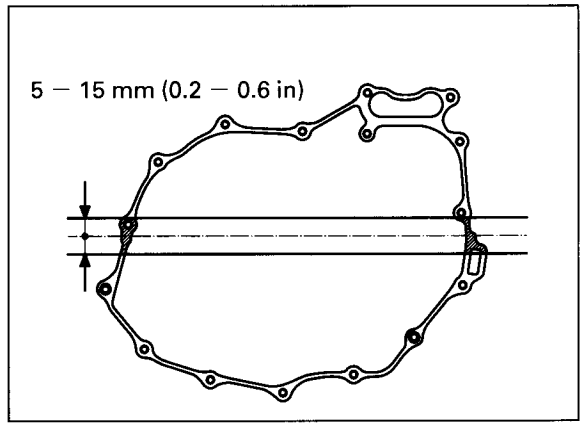
TORQUE: 88 N·m (9.0 kgf·m , 65 lbf·ft)

Install the clutch (page 9-8).

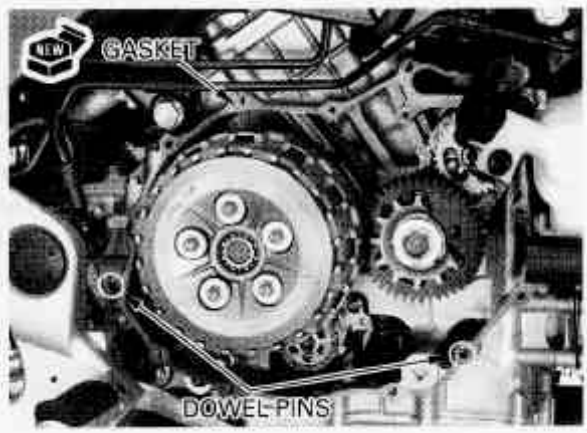


RIGHT CRANKCASE COVER INSTALLATION

Apply a sealant to the mating surfaces of the crankcase as shown.



Install the dowel pins and a new gasket onto the right crankcase cover.



Install the right crankcase cover, aligning the gear teeth of the water pump shaft and water pump driven sprocket.
Install and tighten the right crankcase cover bolts securely.

NOTE:

Route the wire and tube correctly (page 1-21).

Connect the drain tube to the right crankcase cover.



Connect the ignition pulse generator 2P (Red) connector.

Install the water pump cover (page 6-19).
Pour the recommended engine oil (page 3-12).
Fill and bleed the cooling system (page 6-5).

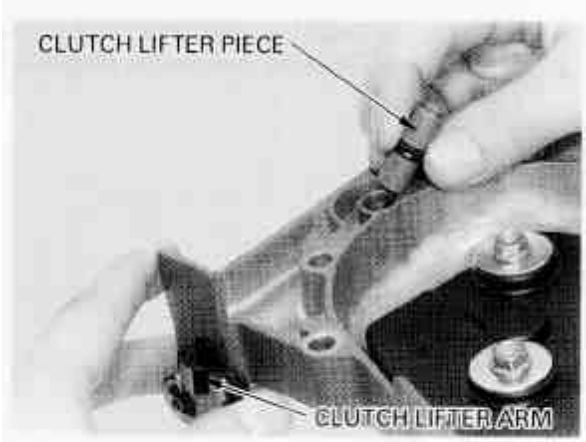


CLUTCH LIFTER ARM

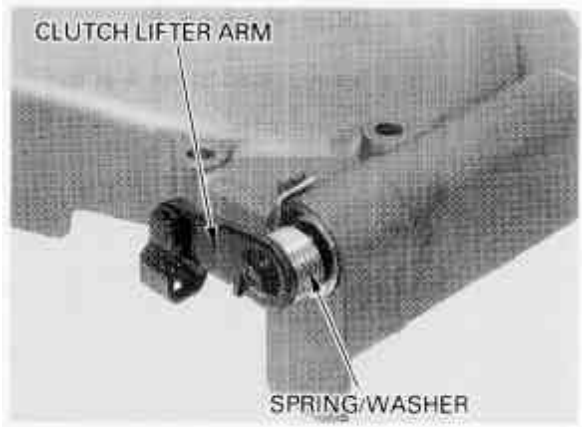
REMOVAL

Remove the drive sprocket cover (page 7-3).

Remove the clutch lifter piece by turning the clutch lifter arm clockwise.



Remove the clutch lifter arm, spring and washer.



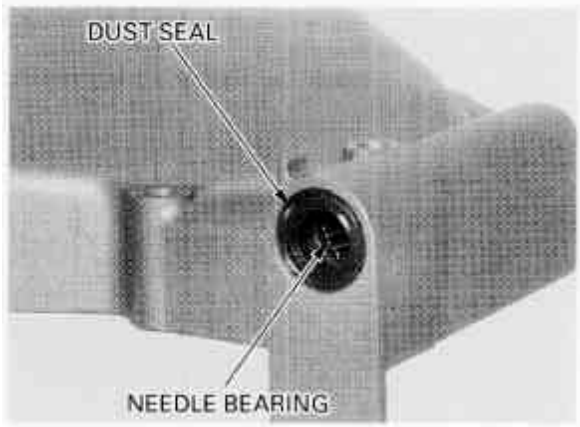
INSPECTION

Check the dust seal for fatigue or damage.
Check the needle bearing for wear, damage or loose fit.

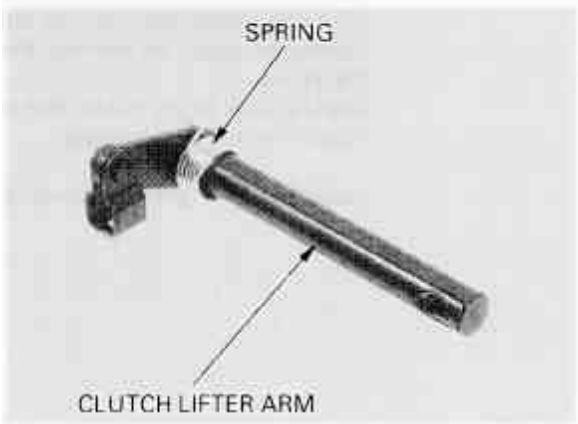
Replace these parts if necessary.

NOTE:

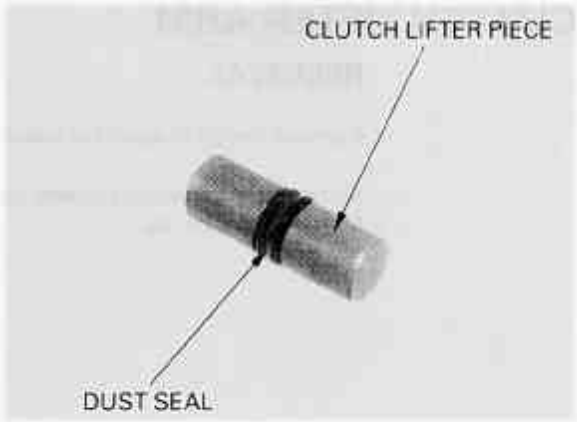
If the dust seal replacement is required, press the dust seal to the case surface.



Check the clutch lifter arm for damage or bending.
Check the spring for fatigue or damage.
Replace these parts if necessary.



Check the clutch lifter piece for damage or bending.
Check the dust seal for fatigue or damage.

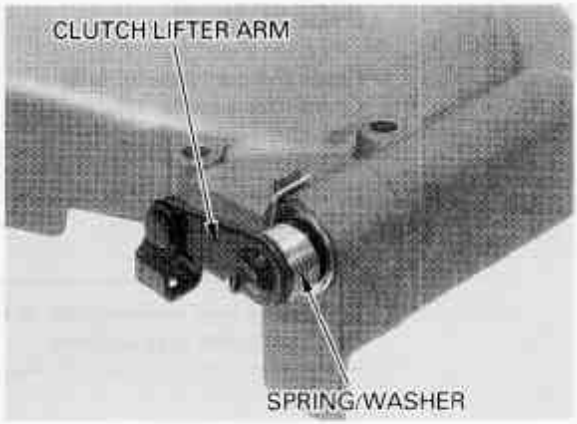


INSTALLATION

Apply grease to the dust seal lips and needle bearing.

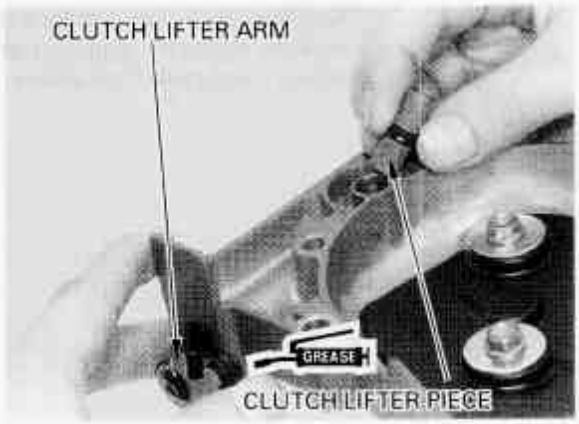


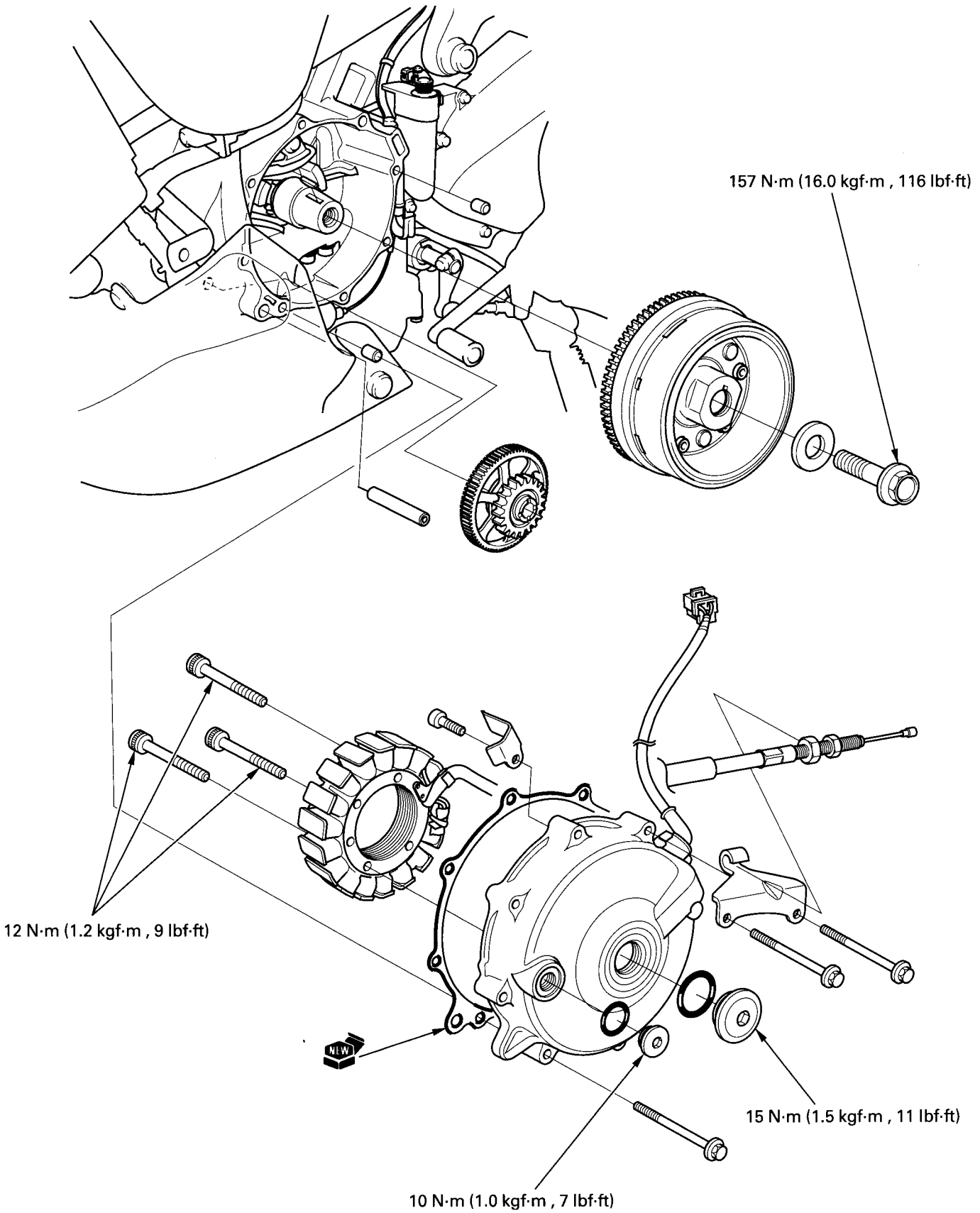
Apply grease to the clutch lifter arm sliding surface and slit.
Install the washer, spring and clutch lifter arm.



Align the clutch lifter arm slit and hole on the right crankcase cover by turning the clutch lifter arm clockwise.
Apply grease to the clutch lifter piece.
Install the clutch lifter piece.

Install the drive sprocket cover (page 7-12).




157 N·m (16.0 kgf·m , 116 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
NEW
15 N·m (1.5 kgf·m , 11 lbf·ft)
10 N·m (1.0 kgf·m , 7 lbf·ft)

10. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION	10-1	FLYWHEEL REMOVAL	10-3
TROUBLESHOOTING	10-1	STARTER CLUTCH	10-4
ALTERNATOR COVER REMOVAL	10-2	FLYWHEEL INSTALLATION	10-6
STATOR	10-2	ALTERNATOR COVER 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)

TORQUE VALUES

Flywheel bolt	157 N·m (16.0 kgf·m , 116 lbf·ft)	Apply oil to the threads and seating surface.
Starter one-way clutch socket bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply a locking agent to the threads.
Stator socket bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Cam chain guide bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply a locking agent to the threads.

TOOLS

Flywheel holder	07725-0040000
Rotor puller	07733-0020001

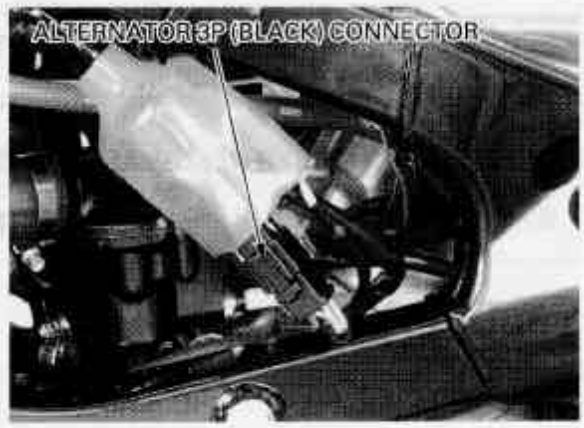
TROUBLESHOOTING

Engine does not turn
- Faulty starter clutch
- Damaged starter reduction gear/shaft

ALTERNATOR COVER REMOVAL

Remove the fuel tank (page 2-10).

Disconnect the alternator 3P (Black) connector.



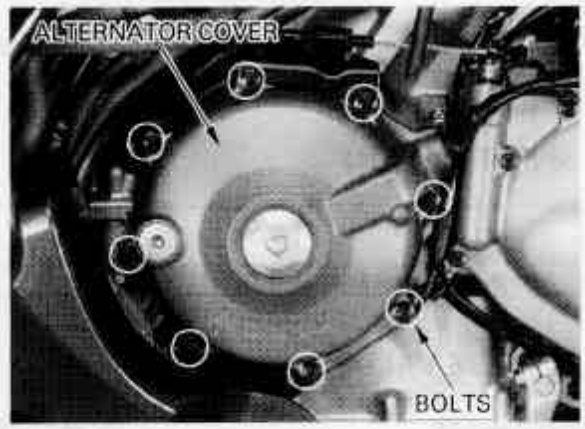
Remove the alternator cover bolts and alternator cover.

CAUTION:

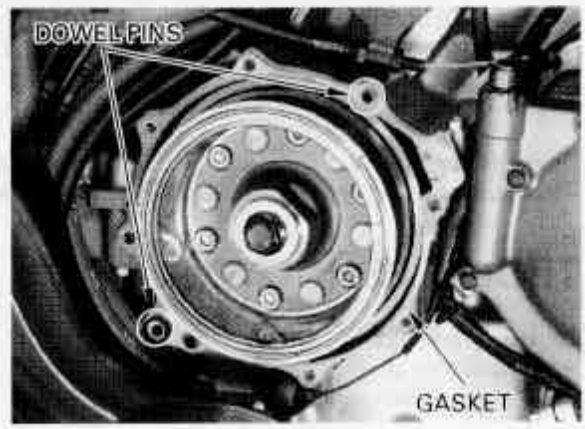
The alternator cover (stator) is magnetically attached to the flywheel, be careful during removal.

NOTE:

The engine oil will run out when the alternator cover is removed. Set a clean oil pan under the engine and add the recommended oil to the specified level after installation.



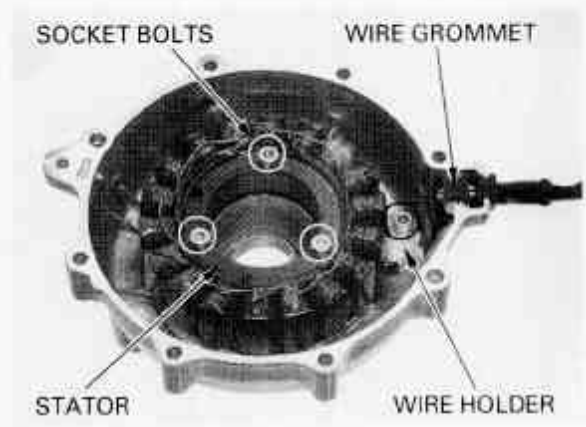
Remove the gasket and dowel pins.



STATOR

REMOVAL

Remove the alternator wire grommet from the alternator cover.
Remove the socket bolt and stator wire holder.
Remove the socket bolts and stator.



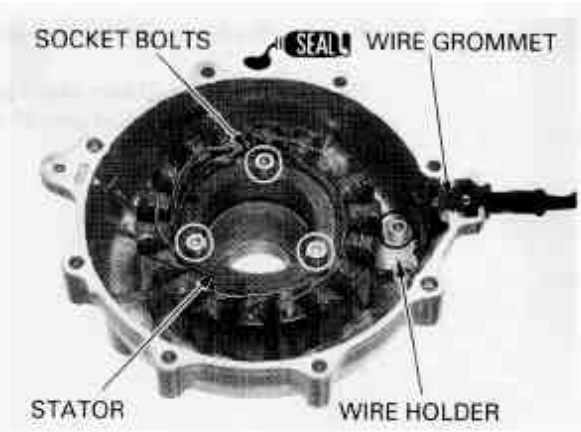
INSTALLATION

Install the stator into the alternator cover.

Apply sealant to the wire grommet, then install the wire grommet into the alternator cover groove securely.
Install and tighten the socket bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the wire holder and tighten the socket bolt securely.



FLYWHEEL REMOVAL

Remove the alternator cover (page 10-2).

Hold the flywheel using the flywheel holder, then remove the flywheel bolt.

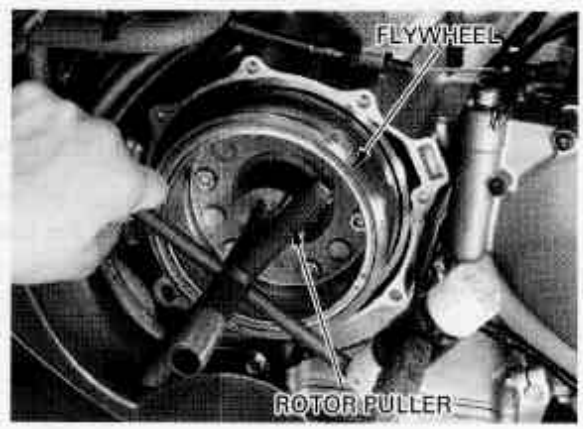
TOOL:
Flywheel holder 07725-0040000

Remove the washer.



Remove the flywheel using the special tool.

TOOL:
Rotor puller 07733-0020001



Remove the woodruff key.

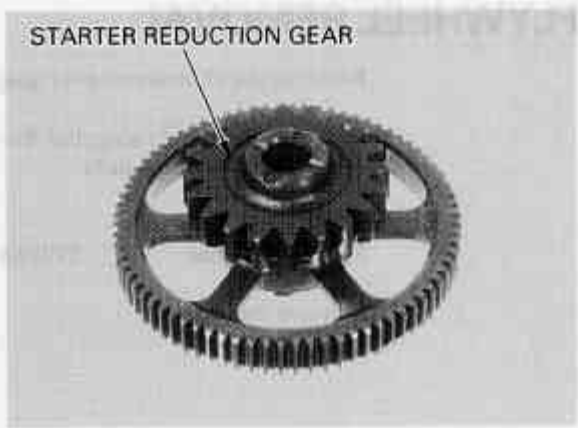


Remove the front cylinder cam sprockets (page 8-7).

Remove the bolt and cam chain guide.
Pull the starter reduction gear shaft and remove the reduction gear.



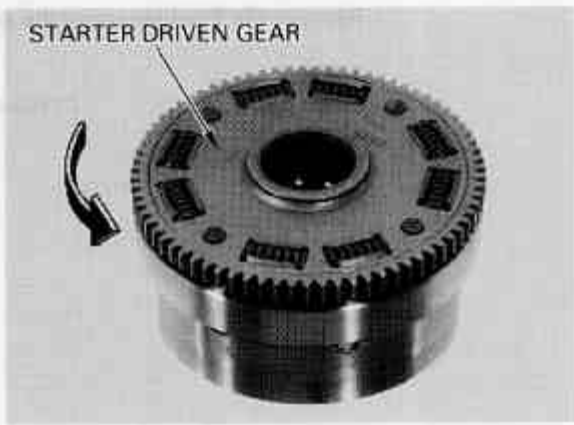
Check the starter reduction gear and shaft for wear or damage.



STARTER CLUTCH

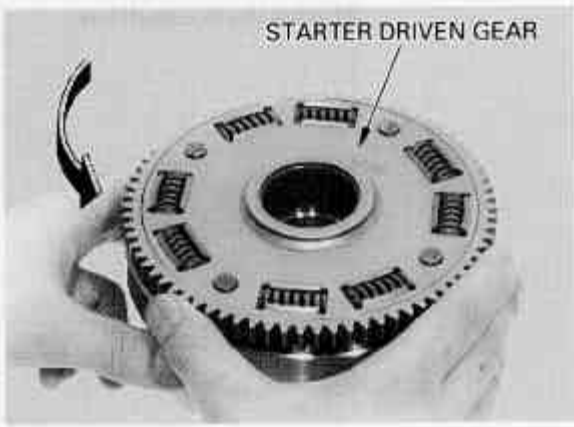
INSPECTION

Check the operation of the one-way clutch by turning the driven gear.
You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.



DISASSEMBLY

Remove the starter driven gear by turning it counterclockwise.



Hold the flywheel with a flywheel holder, and remove the starter one-way clutch socket bolts.

TOOL:
Flywheel holder 07725-0040000

Remove the starter one-way clutch assembly.
Remove the starter one-way clutch from the clutch outer.

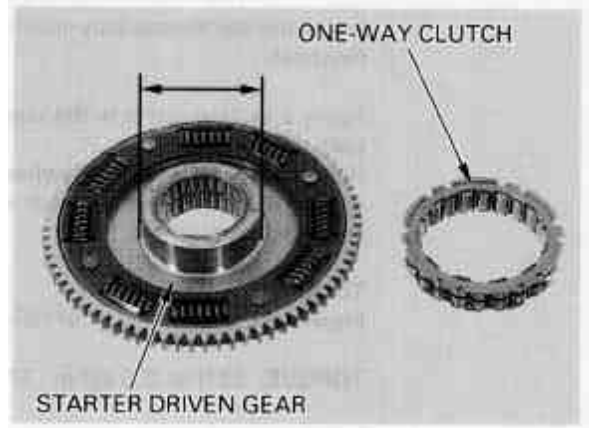
Check the starter driven gear for abnormal wear or damage.



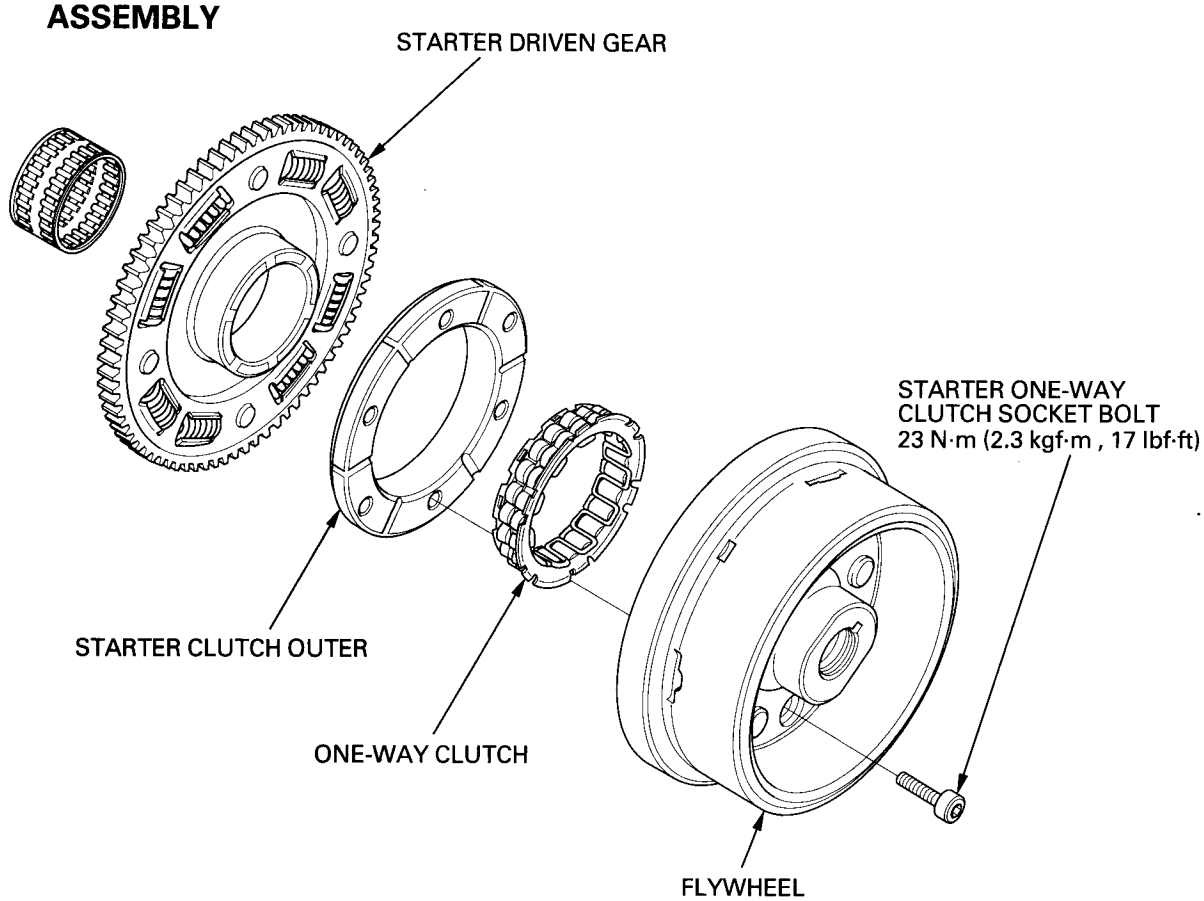
Measure the starter driven gear boss O.D.

SERVICE LIMIT: 57.639 mm (2.2692 in)

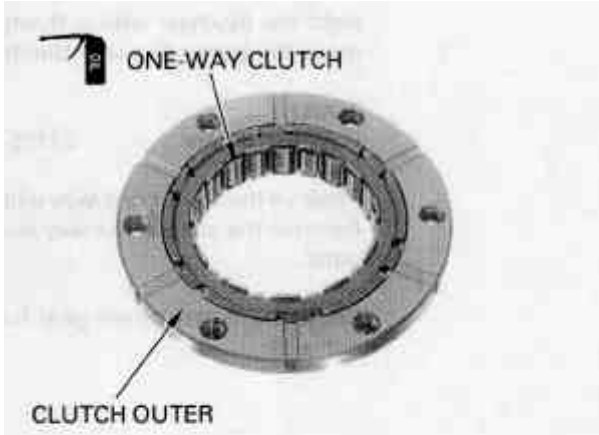
Check the one-way clutch for wear or damage and replace if necessary.



ASSEMBLY



Apply oil to the starter one-way clutch.
Install the one-way clutch into the clutch outer with the flange side facing in.



Install the starter one-way clutch assembly onto the flywheel.

Apply a locking agent to the starter one-way clutch socket bolt threads.
Hold the flywheel with a flywheel holder, and tighten the starter one-way clutch socket bolts to the specified torque.

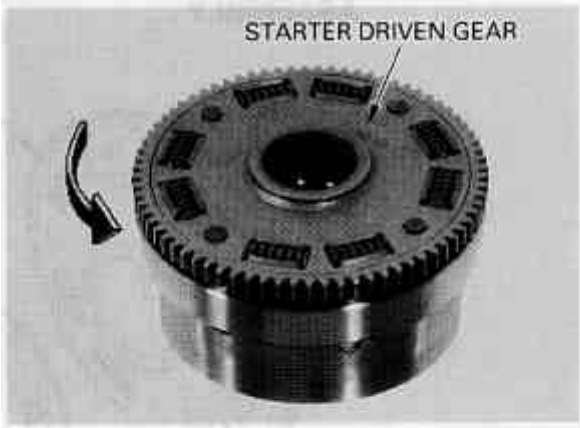
TOOL:
Flywheel holder 07725-0040000

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



Install the starter driven gear into the one-way clutch.

Recheck the one-way clutch operation.
You should be able to turn the driven gear counterclockwise smoothly, but the gear should not turn clockwise.



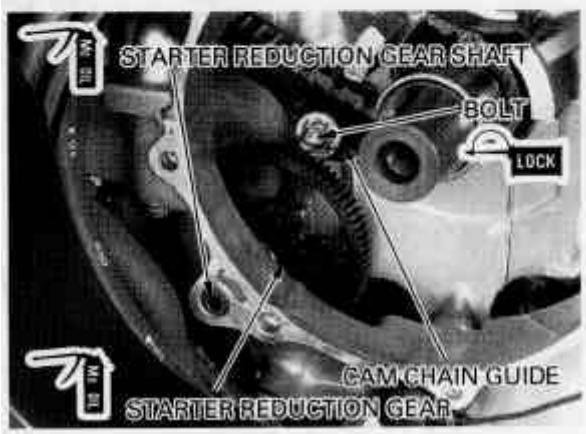
FLYWHEEL INSTALLATION

Apply molybdenum disulfide oil to the starter reduction gear and shaft.
Install starter reduction gear and insert the shaft with the holed end facing out.

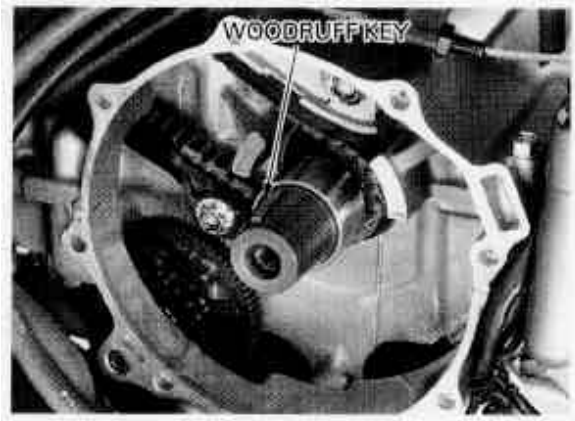
Apply a locking agent to the cam chain guide bolt threads.
Install the cam chain guide and tighten the bolt to the specified torque.

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

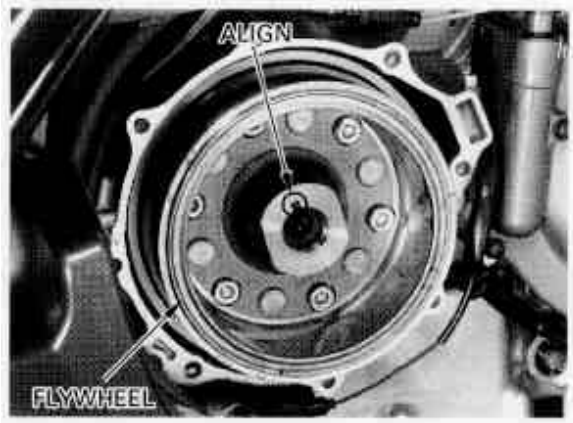
Install the front cylinder cam sprockets (page 8-21).



Clean any oil from the crankshaft taper.
Install the woodruff key on the crankshaft.



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



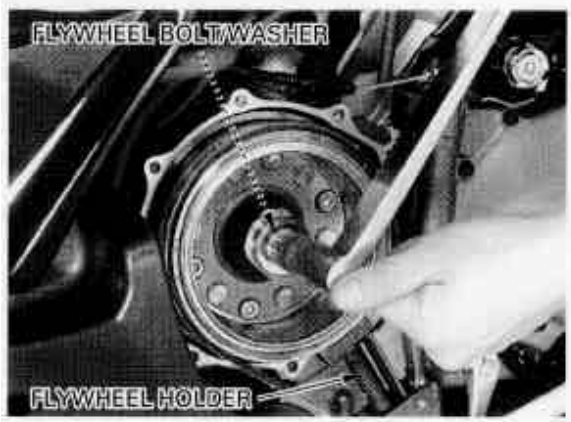
Apply oil to the flywheel bolt threads and seating surface.
Install the washer and flywheel bolt.

Hold the flywheel using the flywheel holder, then tighten the bolt to the specified torque.

TOOL:
Flywheel holder 07725-0040000

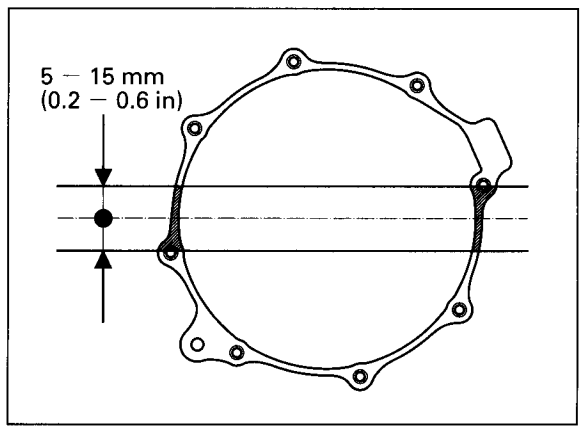
TORQUE: 157 N·m (16.0 kgf·m , 116 lbf·ft)

Install the alternator cover (see below).



ALTERNATOR COVER INSTALLATION

Apply sealant to the mating surface of the crankcase as shown.



Install the dowel pins and new gasket.

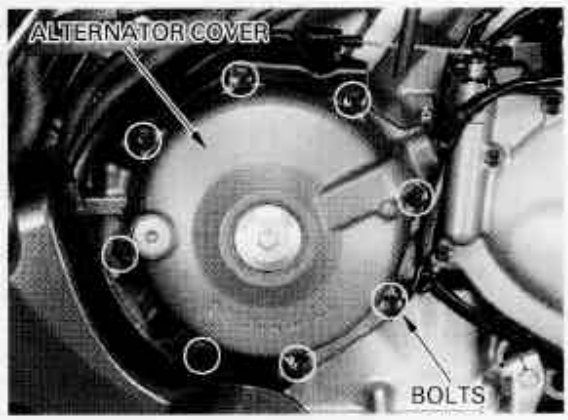


Install the alternator cover.

CAUTION:

The alternator cover (stator) is magnetically attached to the flywheel, be careful during installation.

Install and tighten the bolts securely.



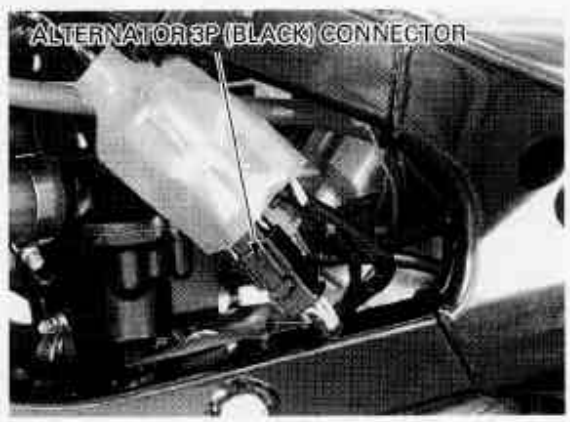
NOTE:

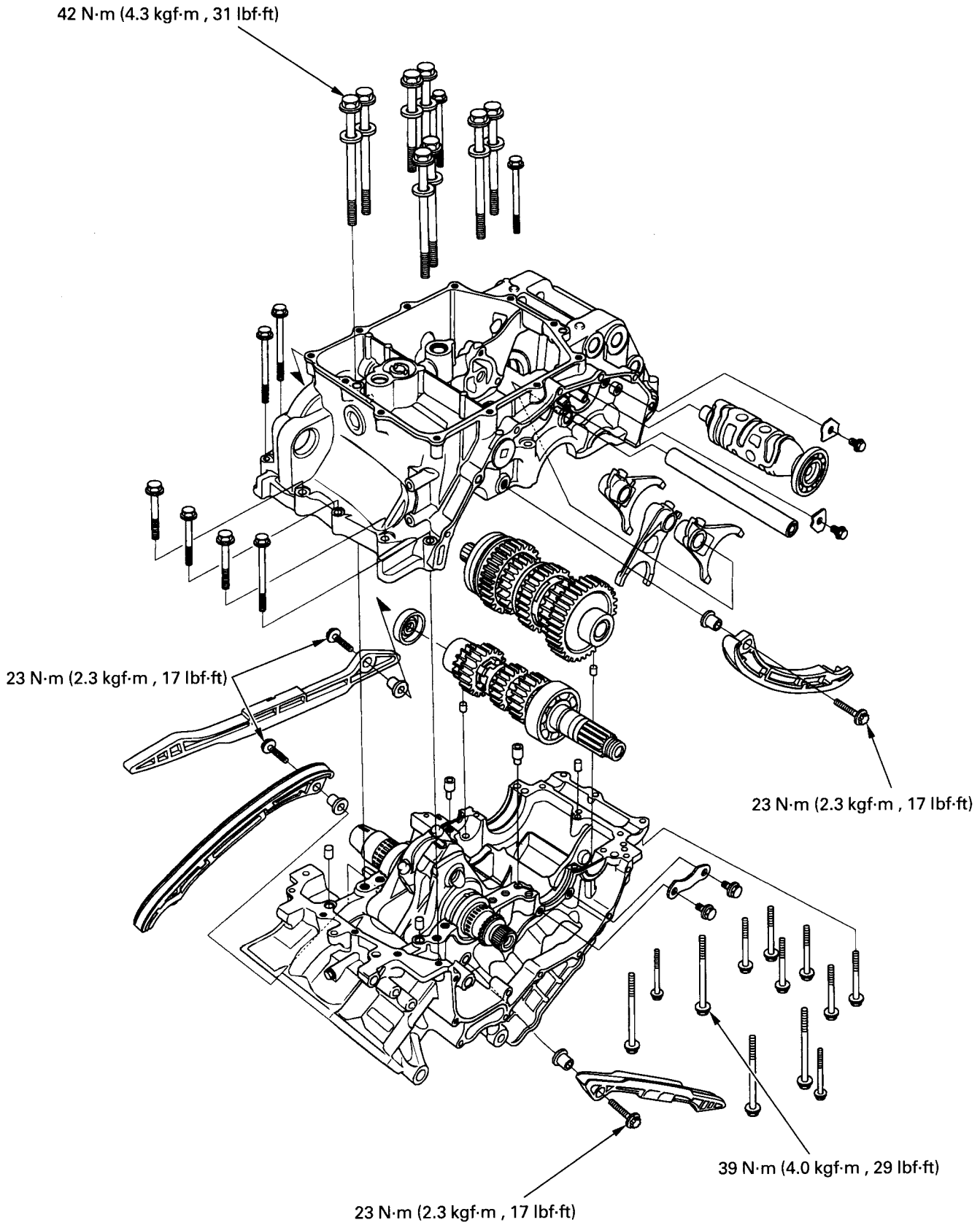
Route the alternator wire correctly (page 1-21).

Connect the alternator 3P (Black) connector.

Check the oil level and add the recommended oil up to proper level (page 3-12).

Install the fuel tank (page 2-10).




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)
- The following parts must be removed before separating the crankcase:
  - Oil pump (section 4)
  - Engine (section 7)
  - Cylinder head (section 8)
  - Clutch/gearshift linkage/primary drive gear (section 9)
  - Flywheel (section 10)
  - 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.	M4, 5	31.000 – 31.016 (1.2205 – 1.2211)	31.04 (1.222)
		C1	26.000 – 26.021 (1.0236 – 1.0244)	26.04 (1.025)
		C2, 3	33.000 – 33.025 (1.2992 – 1.3002)	33.05 (1.301)
	Bushing O.D.	M4, 5	30.955 – 30.980 (1.2187 – 1.2197)	30.93 (1.218)
		C2, 3	32.955 – 32.980 (1.2974 – 1.2984)	32.93 (1.296)
	Bushing I.D.	M4	27.985 – 28.006 (1.1018 – 1.1026)	28.02 (1.103)
		C2	29.985 – 30.006 (1.1805 – 1.1813)	30.02 (1.182)
	Gear-to-bushing clearance	M4, 5	0.020 – 0.061 (0.0008 – 0.0024)	0.10 (0.004)
		C2, 3	0.020 – 0.070 (0.0008 – 0.0028)	0.11 (0.004)
	Mainshaft O.D.	M4	27.967 – 27.980 (1.1011 – 1.1016)	27.94 (1.100)
	Countershaft O.D.	C2	29.967 – 29.980 (1.1798 – 1.1803)	29.92 (1.178)
	Bushing-to-shaft clearance	M4	0.005 – 0.039 (0.0002 – 0.0015)	0.06 (0.002)
		C2	0.010 – 0.055 (0.0004 – 0.0022)	0.06 (0.002)

TORQUE VALUES

Cam chain tensioner bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply a locking agent to the threads.
Cam chain guide bolt	23 N·m (2.3 kgf·m , 17 lbf·ft)	Apply a locking agent to the threads.
Crankcase flange bolt	39 N·m (4.0 kgf·m , 29 lbf·ft)	
Crankcase special bolt	42 N·m (4.3 kgf·m , 31 lbf·ft)	Apply oil to the threads and seating surface.
Crankcase sealing bolt (15 mm)	29 N·m (3.0 kgf·m , 22 lbf·ft)	Apply a locking agent to the threads.
(18 mm)	29 N·m (3.0 kgf·m , 22 lbf·ft)	Apply a locking agent to the threads.
(22 mm)	29 N·m (3.0 kgf·m , 22 lbf·ft)	
(24 mm)	49 N·m (5.0 kgf·m , 36 lbf·ft)	Apply a locking agent to the threads.

TOOLS

Driver B	07746-0030100
Inner driver, 35 mm	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

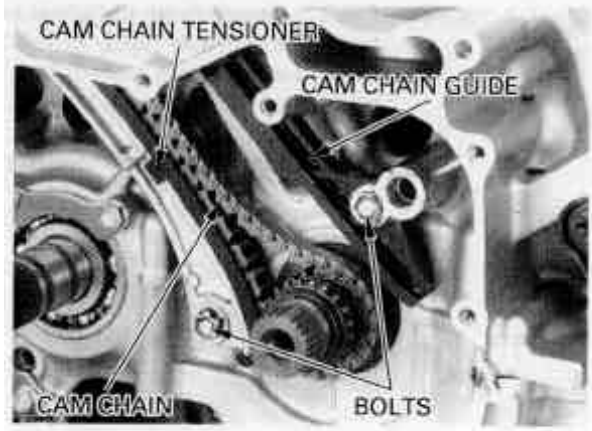
Transmission jumps out of gear
- Worn gear dogs and slots
- Worn gear shifter groove
- Bent shift fork shaft
- Broken shift drum stopper arm
- Worn or bent shift forks
- Broken drum stopper arm spring
- Broken gearshift spindle return spring

Excessive engine noise
- Worn or damaged transmission gears
- Worn or damaged transmission bearings

CRANKCASE SEPARATION

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

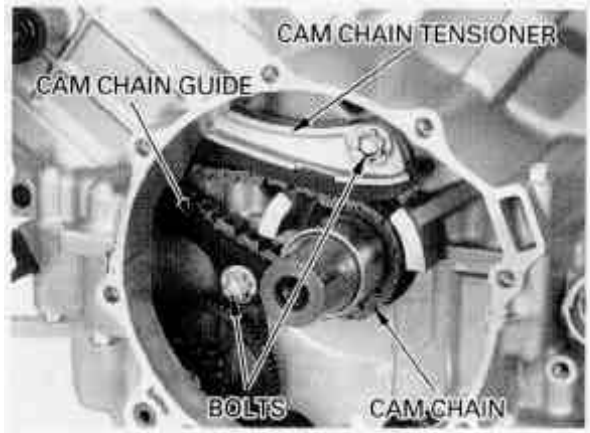
Remove the cam chain.



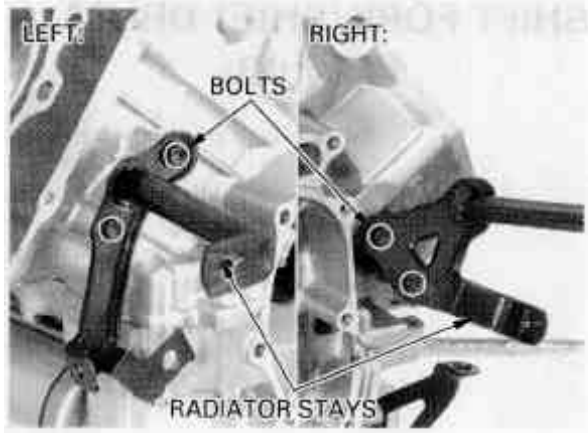
Remove the bolt and cam chain tensioner.
Remove the bolt and cam chain guide.

Remove the reduction gear and shaft.

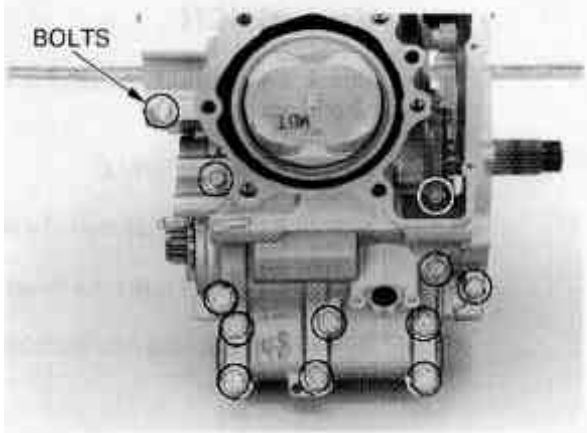
Remove the cam chain.



Remove the bolts and radiator stays.

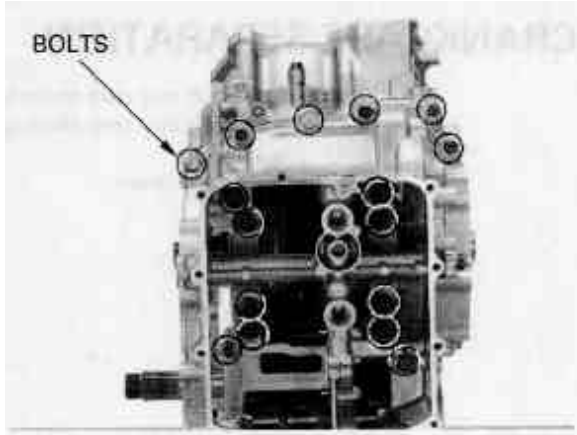


Loosen the 6 mm bolts, 8 mm bolts and 10 mm bolt in a crisscross pattern in 2 or 3 steps and remove them the upper crankcase.



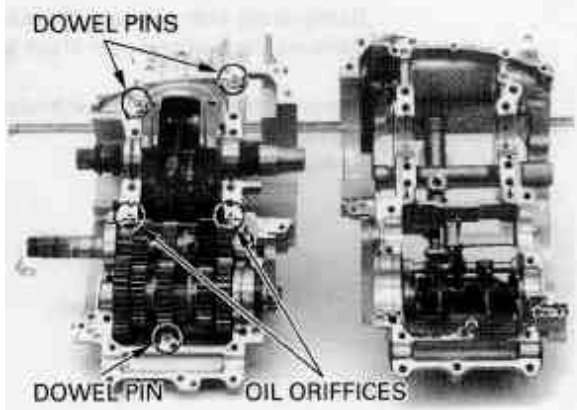
Place the engine with the upper side down.
Loosen the 6 mm bolts, 8 mm bolts and 10 mm bolts in a crisscross pattern in 2 or 3 steps and remove them the lower crankcase.

Separate the lower crankcase from the upper crankcase.



Remove the dowel pins, oil orifices.

Clean any sealant from the crankcase mating surfaces.

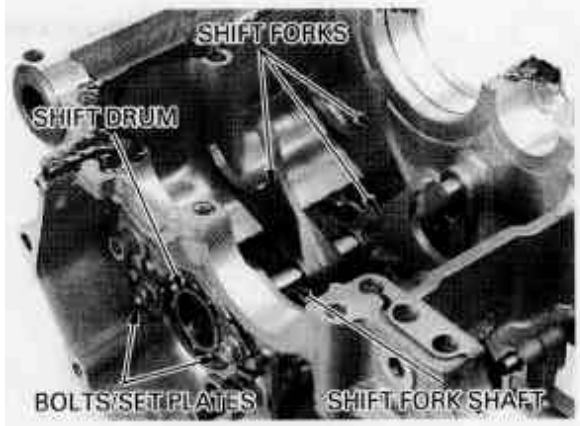


SHIFT FORK/SHIFT DRUM

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

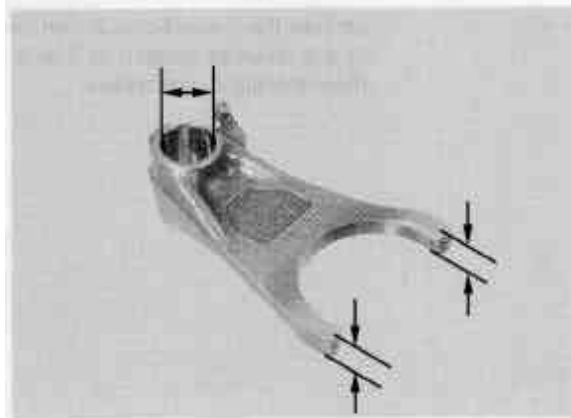
Check the shift fork guide pins for abnormal wear or damage.

Measure the shift fork I.D.

SERVICE LIMIT: 12.03 mm (0.474 in)

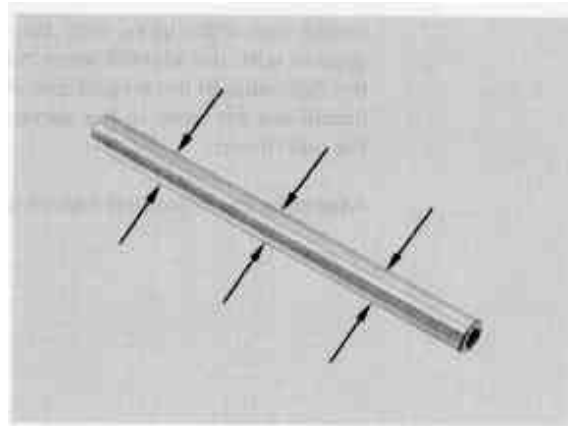
Measure the shift fork claw thickness.

SERVICE LIMIT: 5.9 mm (0.23 in)



Measure the shift fork shaft O.D.

SERVICE LIMIT: 11.95 mm (0.470 in)



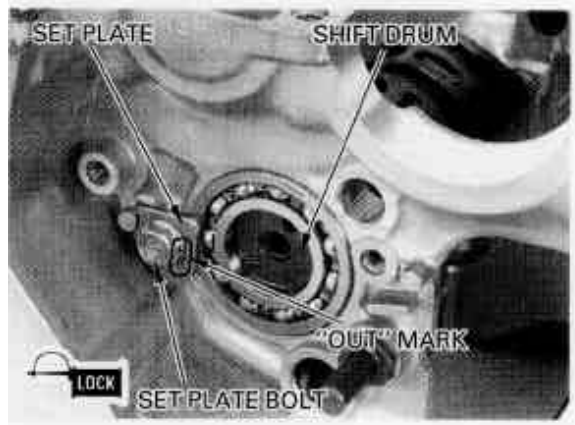
Check the shift drum guide grooves for abnormal wear or damage.

Check the shift drum bearings for smooth rotation.



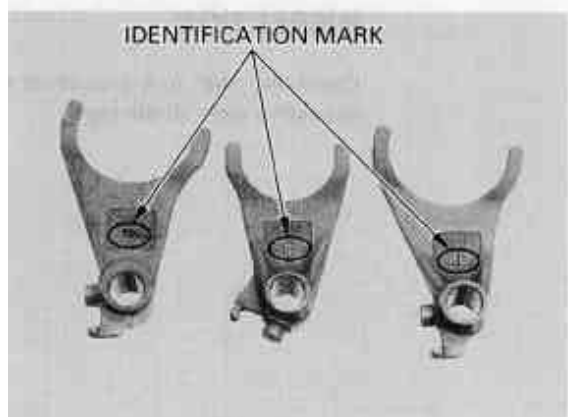
INSTALLATION

Apply a 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 bolts.



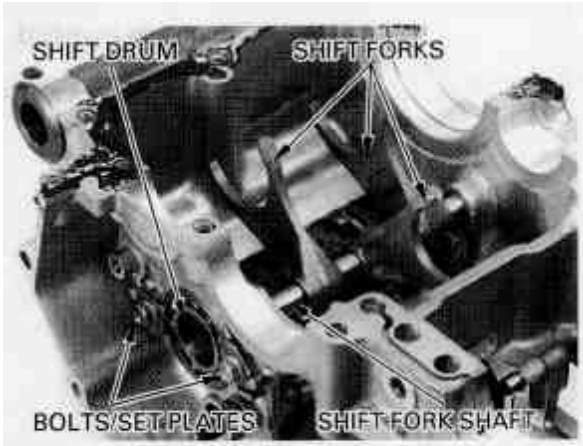
NOTE:

The shift forks have the following identification mark:
"RL" for right
"L" for left
"C" for center



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).

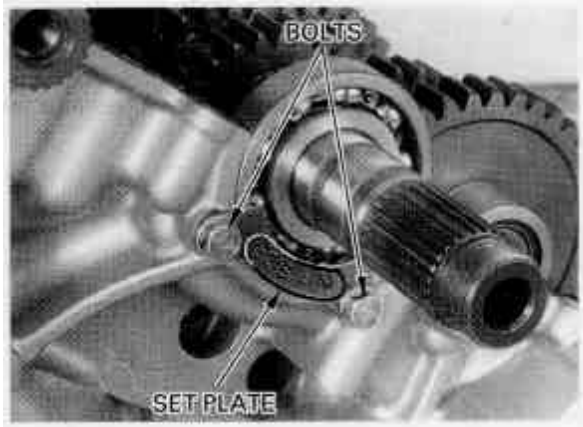


TRANSMISSION

REMOVAL/DISASSEMBLY

Separate the crankcase halves (page 11-3).

Remove the bolts and mainshaft bearing set plate.



Remove the oil seals.
Remove the mainshaft and countershaft assembly.

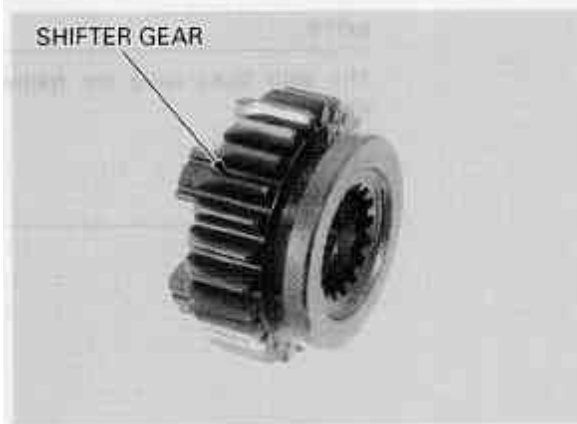
Disassemble the mainshaft and countershaft.

Clean all disassembled parts in solvent thoroughly.



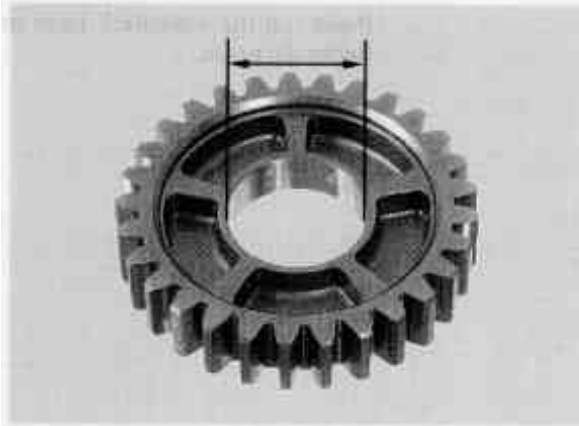
INSPECTION

Check the shift fork groove of the shifter gear for excessive wear or damage.



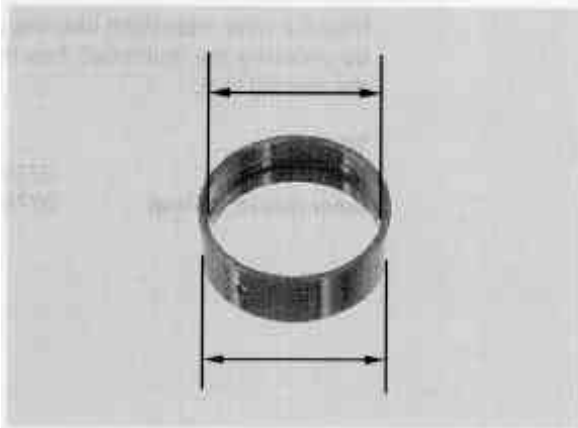
Check the gear dogs, dog holes and teeth for abnormal wear or lack of lubrication.
Measure the I.D. of each gear.

SERVICE LIMITS:
M4, M5: 31.04 mm (1.222 in)
C1: 26.04 mm (1.025 in)
C2, C3: 33.05 mm (1.301 in)



Measure the I.D. and O.D. of each gear bushing.

SERVICE LIMITS:
O.D.: M4, M5: 30.93 mm (1.218 in)
C2, C3: 32.93 mm (1.296 in)
I.D.: M4: 28.02 mm (1.103 in)
C2: 30.02 mm (1.182 in)

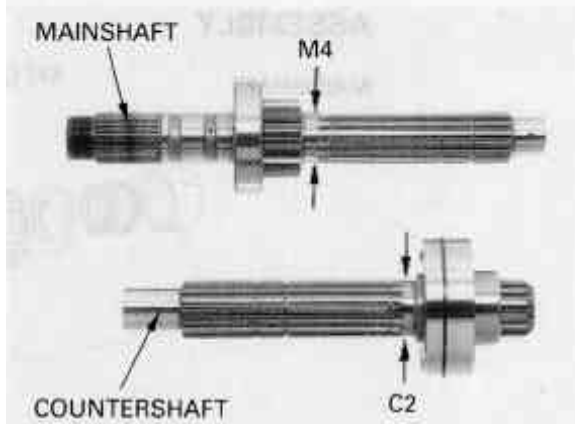


Calculate the gear-to-bushing clearance.

SERVICE LIMITS:
M4, M5: 0.10 mm (0.004 in)
C2, C3: 0.11 mm (0.004 in)

Measure the O.D. of the mainshaft and countershaft.

SERVICE LIMITS:
M4: 27.94 mm (1.100 in)
C2: 29.92 mm (1.178 in)



Calculate the gear bushing-to-shaft clearance.

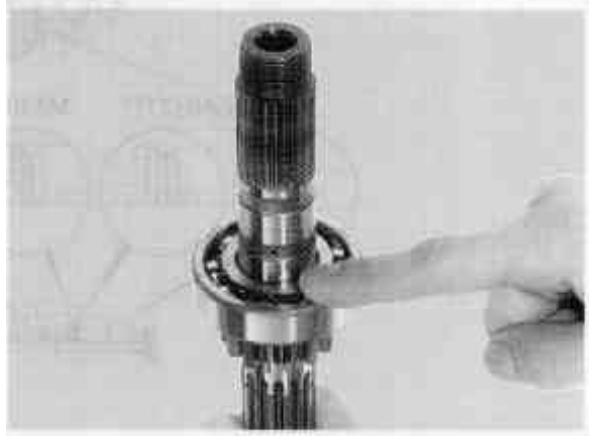
SERVICE LIMIT: 0.06 mm (0.002 in)

BEARING REPLACEMENT

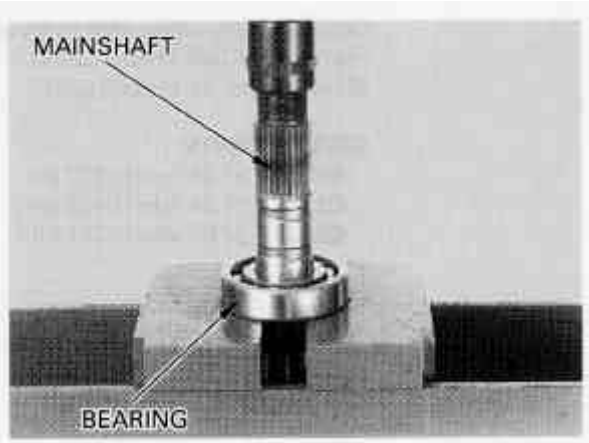
NOTE:

Do not try to remove the countershaft bearing from the shaft. If the bearing is worn or damaged, replace the countershaft as an assembly.

Turn the outer race of each bearing with your finger. The bearings should turn smoothly and quietly.
Also check that the bearing inner race fits tightly on the shaft.
Remove and discard the mainshaft bearing, if the race does not turn smoothly, quietly, or fits loosely on the mainshaft.
Replace the countershaft and bearing as an assembly, if the race does not turn smoothly, quietly, or fits loosely on the countershaft.



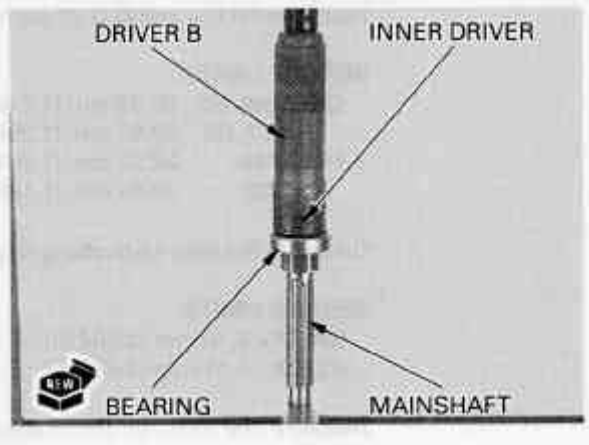
Press out the mainshaft from the bearing using a hydraulic press.



Install a new mainshaft bearing onto the mainshaft by pressing the mainshaft bearing inner race using the special tool.

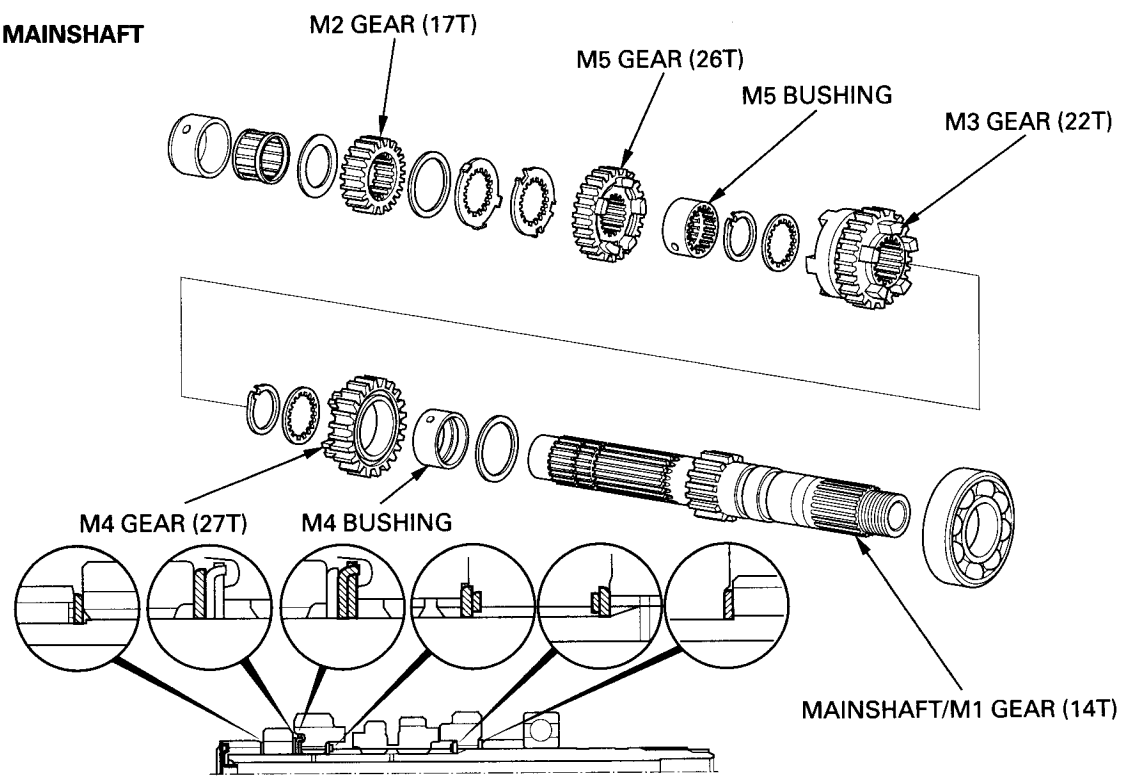
TOOLS:

Driver B	07746-0030100
Inner driver, 35 mm	07746-0030400

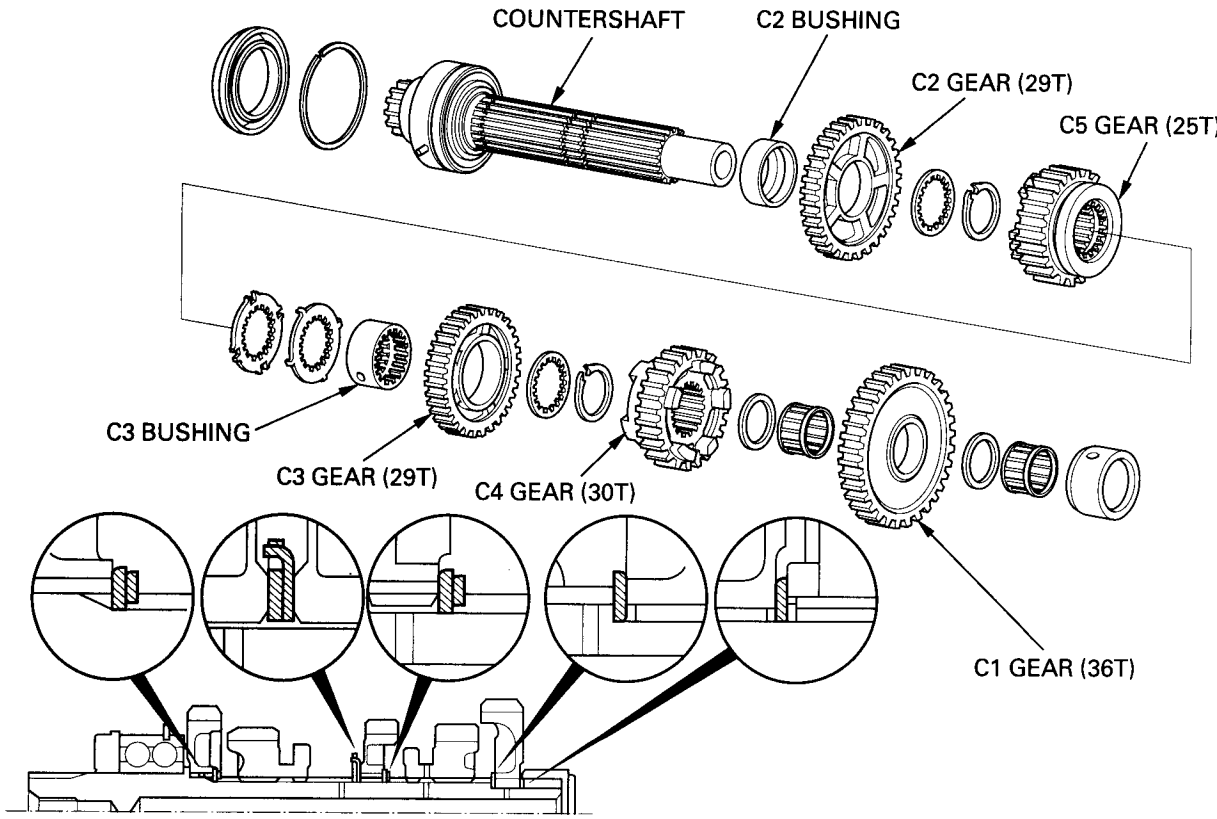


ASSEMBLY

MAINSHAFT



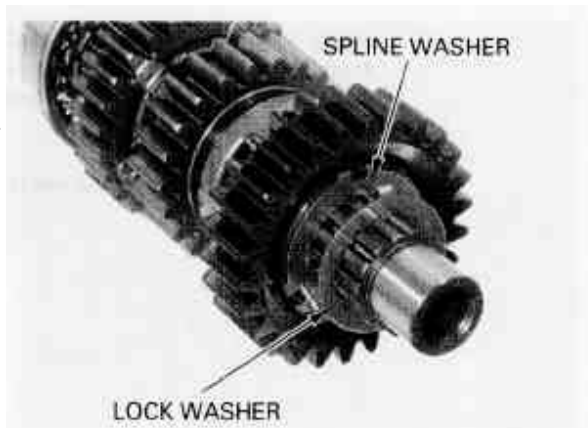
COUNTERSHAFT



Assemble the transmission gear and shafts.

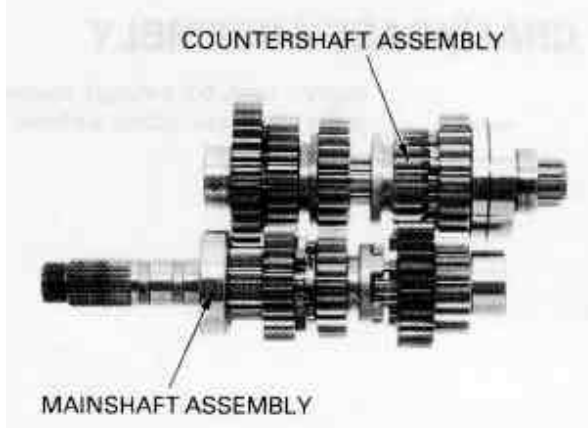
NOTE:

- Align the lock washer tabs with the spline washer groove.
- 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 spline.
- Make sure that the snap ring is fully seated in the shaft groove after installing it.



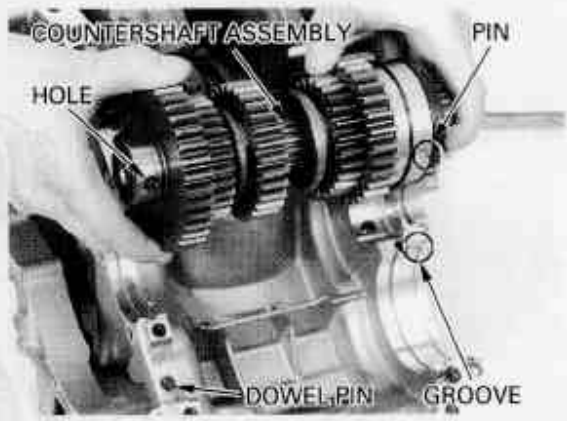
Coat each gear with clean engine oil and check for smooth movement.

Apply molybdenum disulfide oil to the shift fork grooves in the shifter gear.

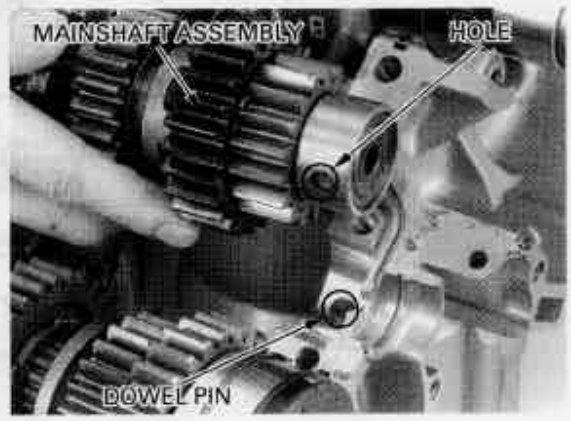


INSTALLATION

Install the countershaft assembly, aligning the hole in the needle bearing outer race with the dowel pin, and set ring with the ring groove.
Rest the pin on the ball bearing into the pin groove.

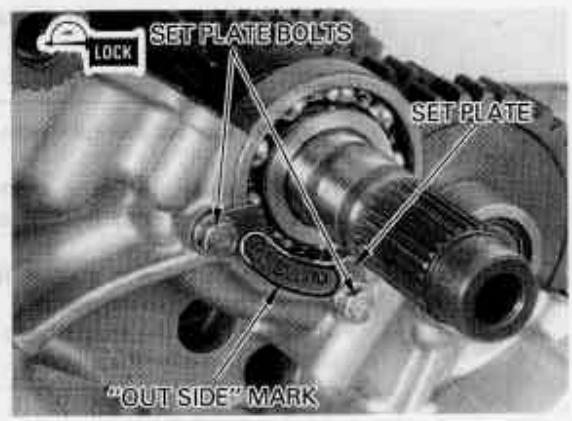


Install the mainshaft assembly, aligning the hole in the needle bearing outer race with the dowel pin.



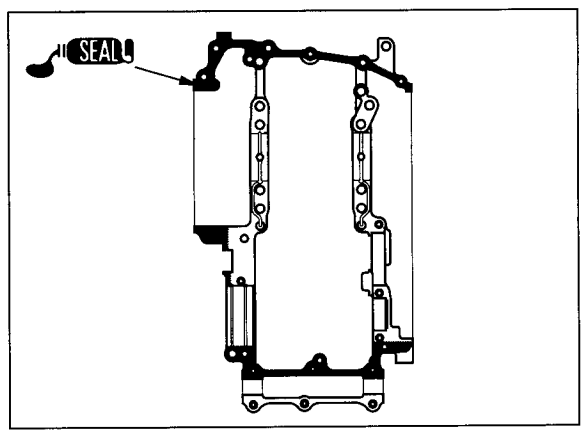
Apply a locking agent to the set plate bolt threads.
Install the mainshaft bearing set plate with its "OUT SIDE" mark facing out and tighten the bolts securely.

Assemble the crankcase halves (see below).



CRANKCASE ASSEMBLY

Apply a light, but through, coating of liquid sealant to the crankcase mating surfaces as shown.

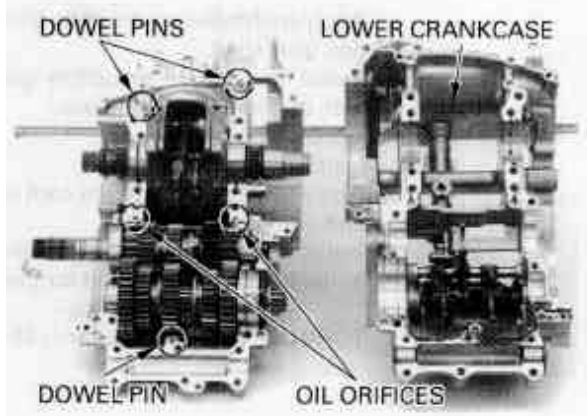


Install the oil seals.



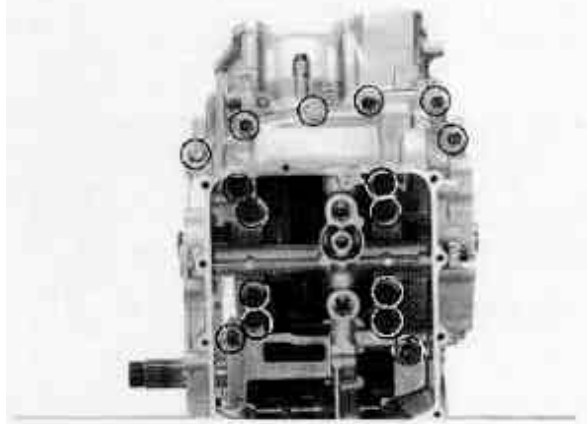
Install the dowel pins, oil orifices.

Apply molybdenum disulfide oil 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.



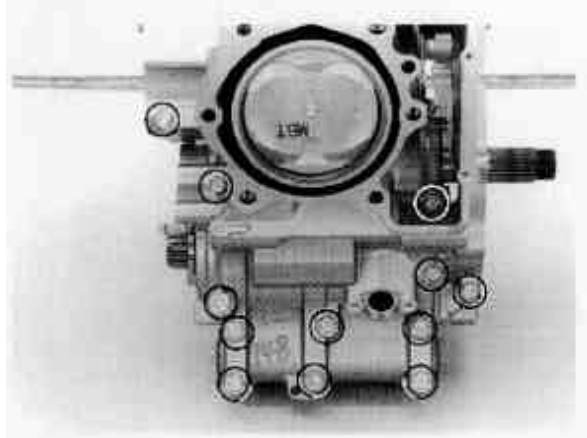
Apply oil to the crankcase special bolt (10 mm) threads and seating surfaces.
Install the special bolts (10 mm), 8 mm bolts and 6 mm bolts, and tighten them in a crisscross pattern in 2 or 3 steps.

TORQUE:
Crankcase special bolt: 42 N·m (4.3 kgf·m , 31 lbf·ft)

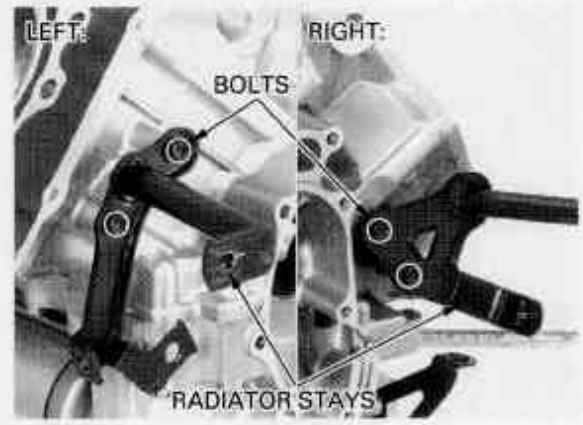


Install the crankcase flange bolt (10 mm), 8 mm bolts and 6 mm bolts, and tighten them in a crisscross pattern in 2 or 3 steps.

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



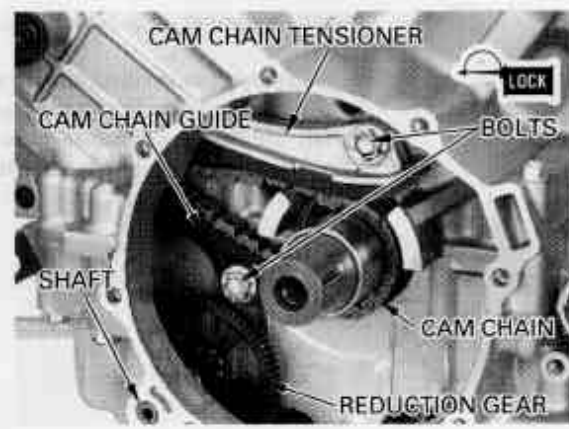
Install the radiator stays.
Install and tighten the bolts securely.

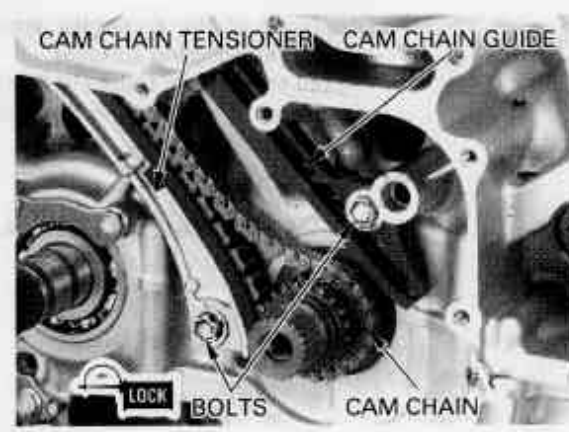


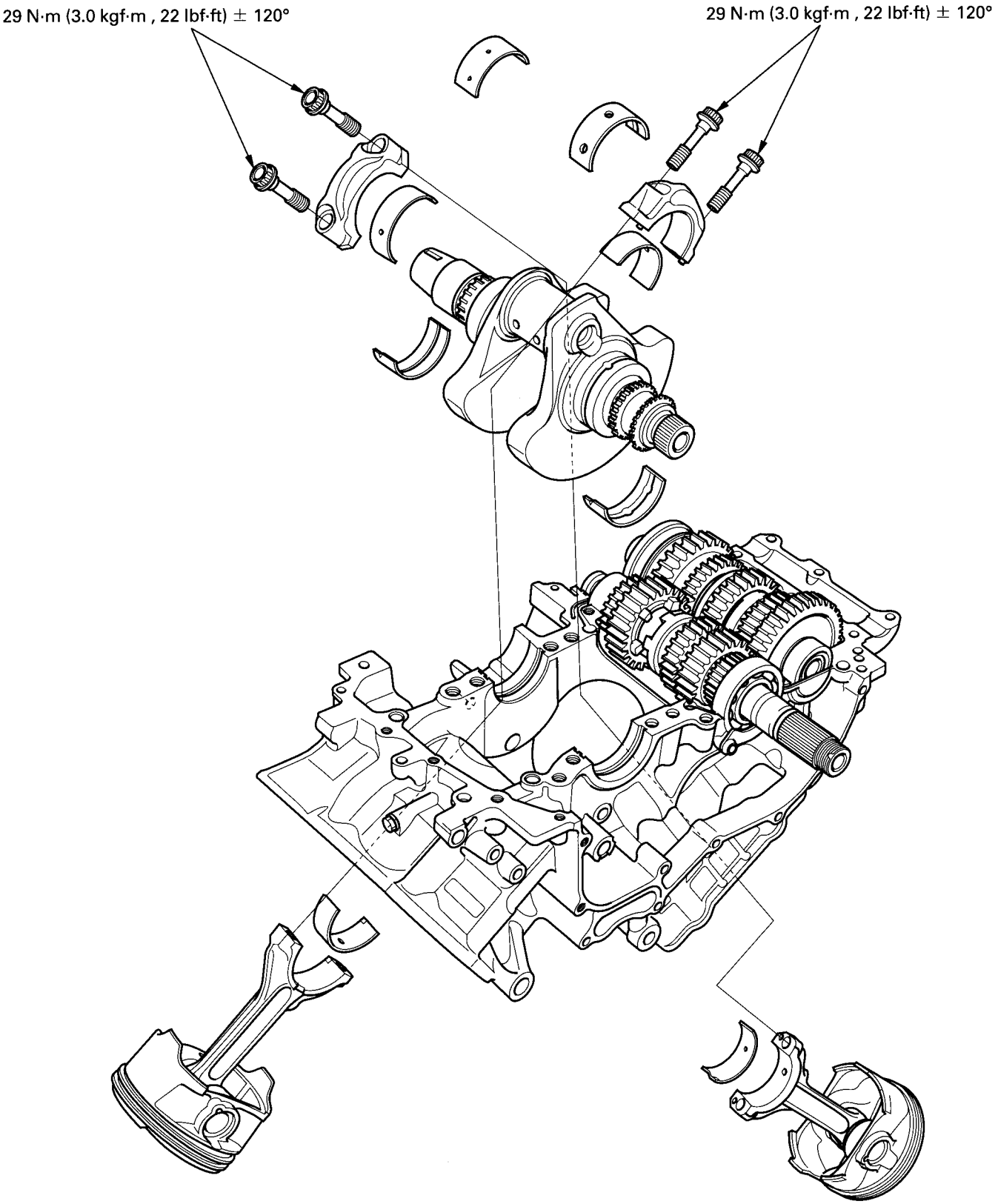
Apply molybdenum disulfide oil to the starter reduction gear shaft.
Install the starter reduction gear and gear shaft with the hole end facing out.

Install the cam chains.
Apply locking agent to the cam chain tensioner bolt and guide bolt threads.
Install and tighten the cam chain tensioner bolt and guide bolt to the specified torque.

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






29 N·m (3.0 kgf·m , 22 lbf·ft) ± 120°
29 N·m (3.0 kgf·m , 22 lbf·ft) ± 120°

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	12-9

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)
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)
Piston, piston rings	Piston mark direction		"IN" mark facing toward the intake side	———
	Piston O.D.		97.983–97.985 (3.8576–3.8577)	97.900 (3.8543)
	Piston O.D. measurement point		20 mm (0.8 in) from bottom of skirt	———
	Piston pin bore 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)	0.55 (0.022)
	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)
	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)	0.425–0.475 (0.0167–0.0187)	0.70 (0.028)
Cylinder-to-piston clearance			0.010–0.055 (0.0004–0.0022)	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)

TORQUE VALUES

Connecting rod bolt	29 N·m (3.0 kgf·m , 22 lbf·ft) ± 120°	Apply oil to the threads and seating surface
Crankcase 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
- Cylinder head/valves (section 8)

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
- Cylinder head/valves (section 8)

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
- Bent connecting rod

Piston sounds
- Worn cylinder, piston and/or piston rings
- Worn piston pin hole and piston pin
- Worn connecting rod small end

Engine vibration
- Excessive crankshaft runout

CRANKSHAFT

Separate the crankcase halves (page 11-3).

SIDE CLEARANCE INSPECTION

Measure the connecting rod side clearance.

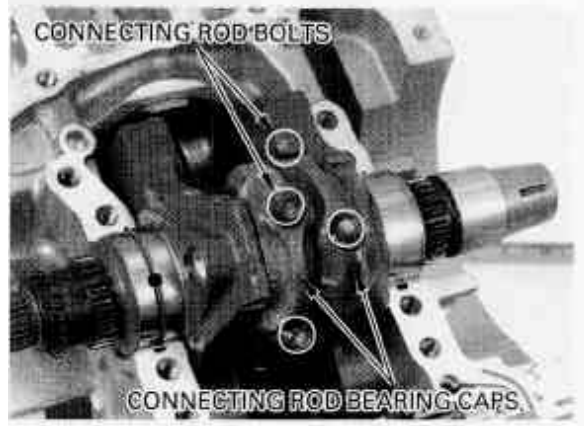
SERVICE LIMIT: 0.40 mm (0.016 in)

If the clearance exceeds the service limit, replace the connecting rod.
Recheck and if still out of limit, replace the crankshaft.



REMOVAL

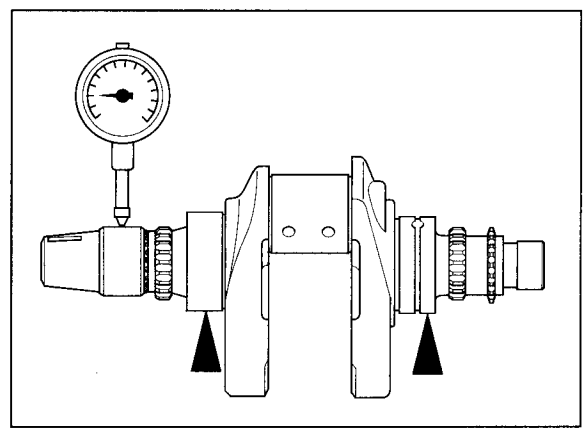
Remove the connecting rod bolts and bearing caps.
Remove the crankshaft.



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)

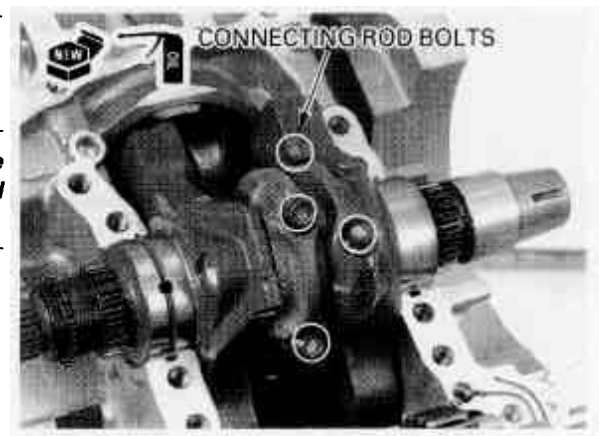


INSTALLATION

Apply molybdenum disulfide oil 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°

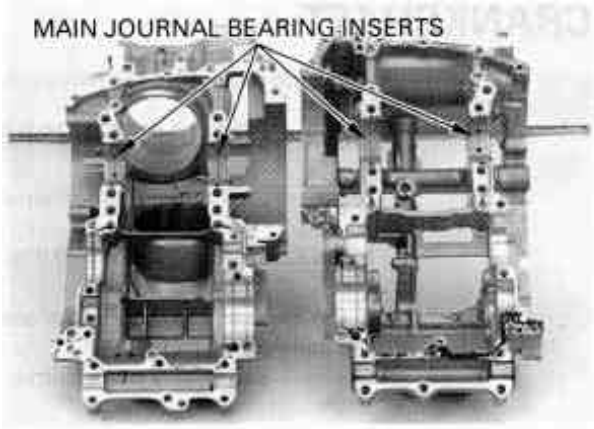
Assemble the crankcase halves (page 11-10).

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.

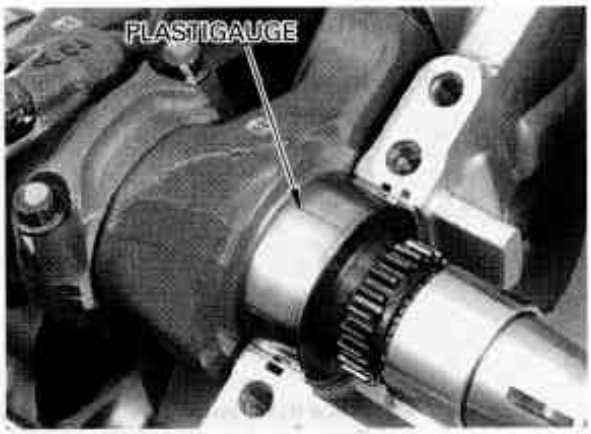


OIL CLEARANCE INSPECTION

NOTE:

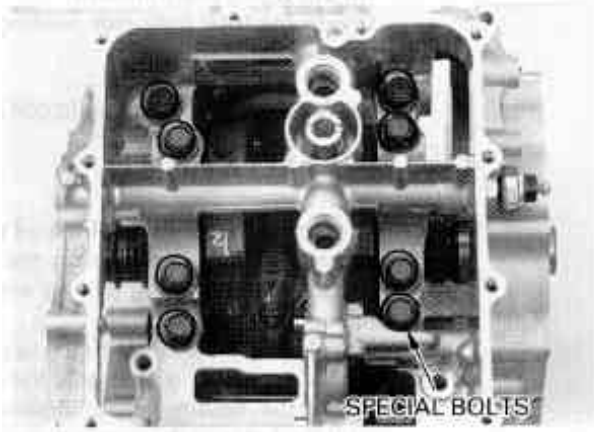
Do not rotate crankshaft during inspection.

Clean off any oil from 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 crankcase special bolt (10 mm) 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 bearing.

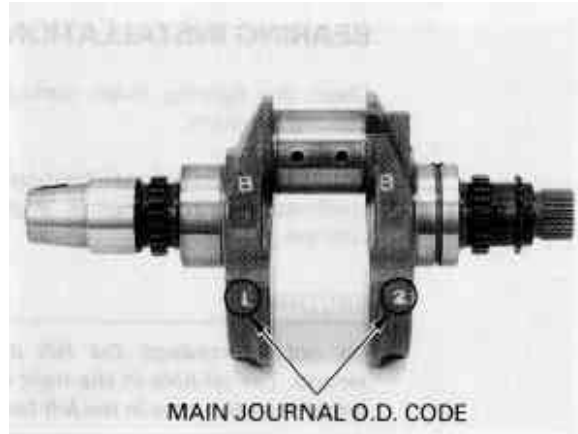


BEARING SELECTION

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 I.D. code letters.

NOTE:

Letters A, B or C on the left side of the upper crankcase are the codes for the crankcase I.D.



Cross reference the case and journal codes to determine the replacement bearing color code.

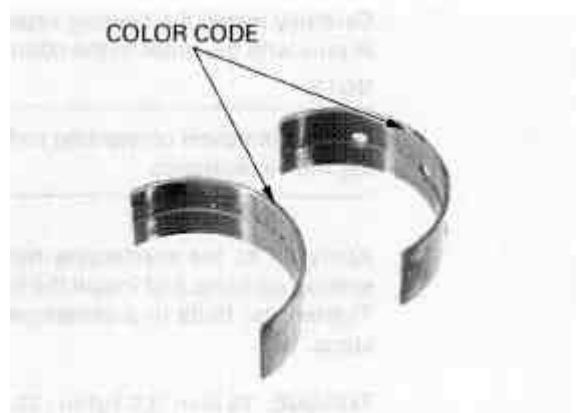
MAIN JOURNAL BEARING SELECTION TABLE

Unit: mm (in)

			CRANKCASE I.D. CODE		
			A	B	C
			55.994–56.000 (2.2045–2.2047)	56.000–56.006 (2.2047–2.2050)	56.006–56.012 (2.2050–2.2052)
MAIN JOURNAL O.D. CODE	1	53.010–53.016 (2.0870–2.0872)	Yellow	Green	Brown
	2	53.004–53.010 (2.0868–2.0870)	Green	Brown	Black
	3	52.998–53.004 (2.0865–2.0868)	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)



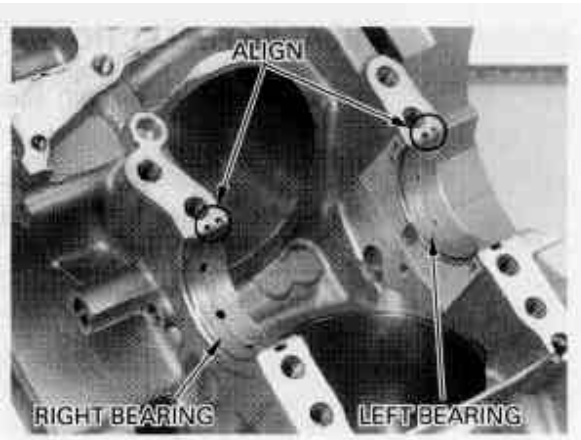
CAUTION:

After selecting new bearings, recheck the oil clearance with plastigauge. Incorrect oil clearance can cause major engine damage.

BEARING INSTALLATION

Clean the bearing outer surface and crankcase bearing supports.

Install the main journal bearing inserts onto the crankcase bearing supports, aligning the each tab with the groove.



CAUTION:

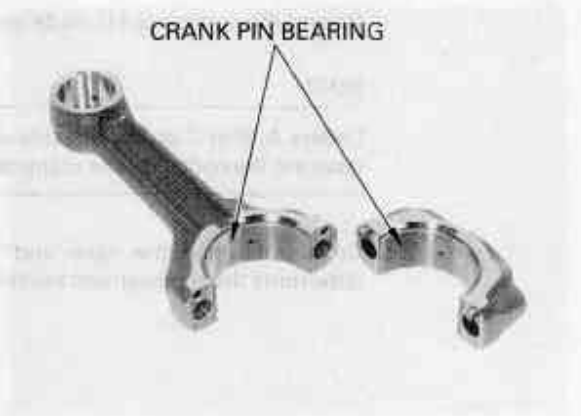
Do not interchange the left and right bearing inserts. The oil hole in the right bearing insert are larger than the ones in the left bearing insert.

CRANK PIN BEARING

Remove the crankshaft (page 12-3).

BEARING INSPECTION

Check the bearing inserts for usual wear or peeling.
Check the bearing tabs for damage.

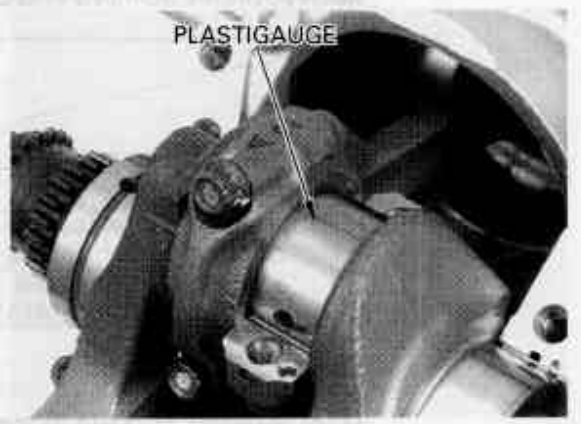


OIL CLEARANCE INSPECTION

NOTE:

Do not rotate crankshaft during inspection.

Clean off any oil from 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.



Carefully install the bearing caps, aligning the dowel pins with the holes in the connecting rods.

NOTE:

Use the removed connecting rod bolts when checking the oil clearance.



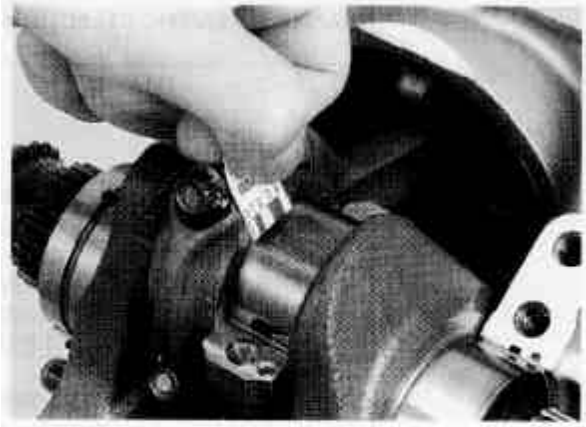
Apply oil to the connecting rod bolt threads and seating surfaces and install the bolt.
Tighten the bolts in a crisscross pattern in 2 or 3 steps.

TORQUE: 29 N·m (3.0 kgf·m , 22 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 bearing.

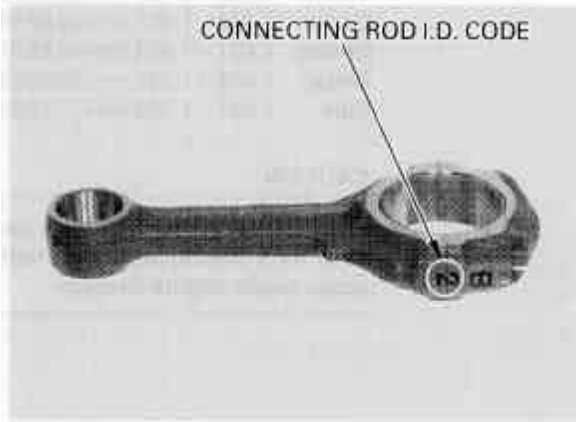


BEARING SELECTION

Record the connecting rod I.D. code numbers.

NOTE:

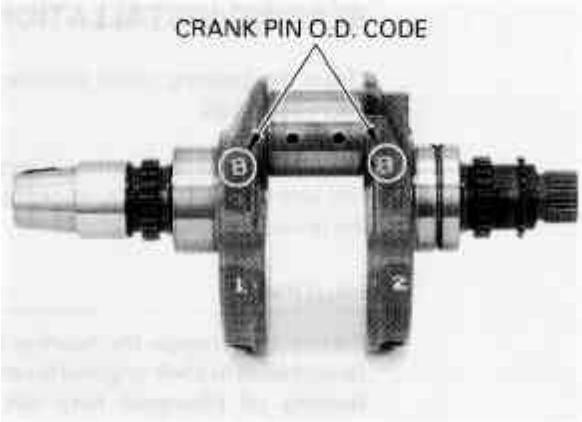
Number 1, 2 or 3 on the connecting rod is the code for the connecting rod I.D.



Record the crankpin O.D. code letters.

NOTE:

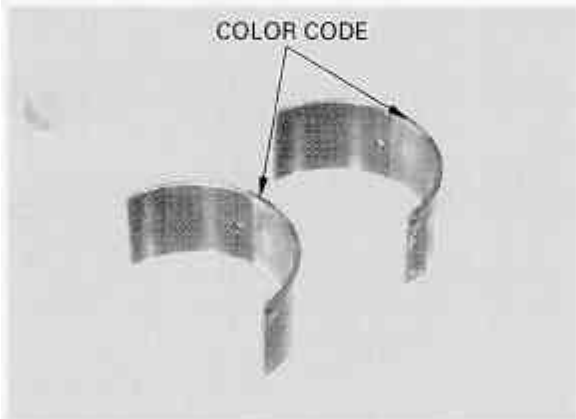
Letters A, B or C on the crankweight is the codes for the crankpin O.D.



Cross reference the connecting rod and crankpin codes to determine the replacement bearing color code.

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.



CRANKPIN BEARING SELECTION TABLE

			CONNECTING ROD I.D. CODE		
			1	2	3
			46.000–46.006 (1.8110–1.8113)	46.006–46.012 (1.8113–1.8115)	46.012–46.018 (1.8115–1.8117)
CRANKPIN O.D. CODE	A	42.998–43.004 (1.6928–1.6930)	Yellow	Green	Brown
	B	42.992–42.998 (1.6926–1.6928)	Green	Brown	Black
	C	42.986–42.992 (1.6924–1.6926)	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)

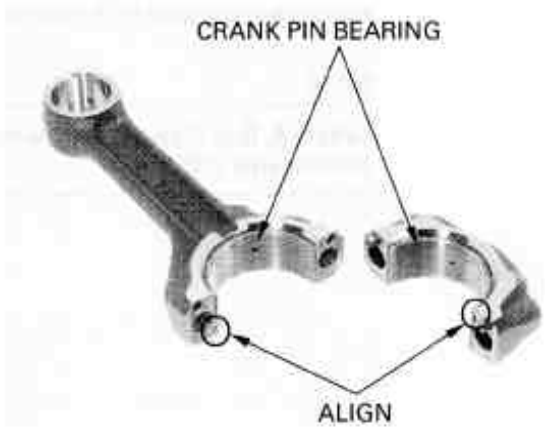
CAUTION:

After selecting new bearings, recheck the oil clearance with plastigauge. Incorrect oil clearance can cause major engine damage.

BEARING INSTALLATION

Clean the bearing outer surface, bearing cap and connecting rod.

Install the crankpin bearing inserts onto the bearing cap and connecting rod, aligning the each tab with the groove.



CAUTION:

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

PISTON/CYLINDER

PISTON/CONNECTING ROD REMOVAL



CAUTION:

Do not interchange the bearing inserts. They must be installed in their original locations or the correct bearing oil clearance may not be obtained, resulting in engine damage.

NOTE:

Mark all parts during removal so they can be replaced in their original locations.

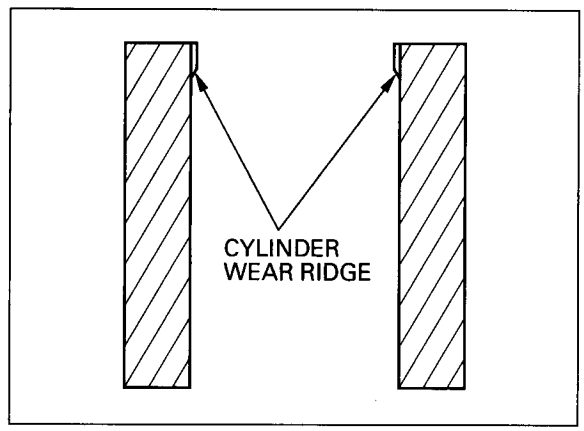
Remove the bolts and connecting rod bearing cap.

Remove the piston/connecting rod assembly from the top of the cylinder.



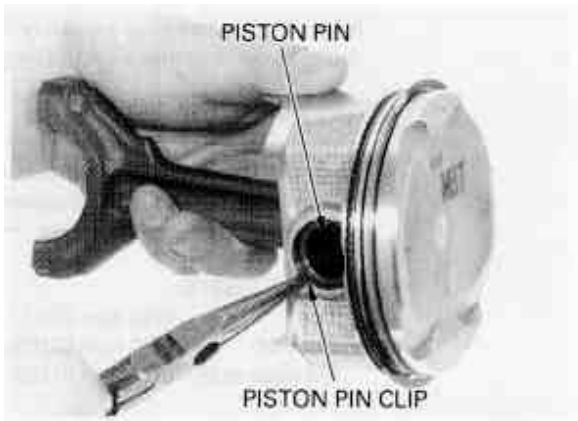
CAUTION:

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.



PISTON REMOVAL

Remove the piston pin clip with pliers.
Press the piston pin out of the piston and remove the piston from the connecting rod.



PISTON DISASSEMBLY

Remove the piston rings.

NOTE:

Do not damage the piston rings during removal.



Remove any carbon deposits from the piston ring grooves, using an old piston ring as shown.

NOTE:

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



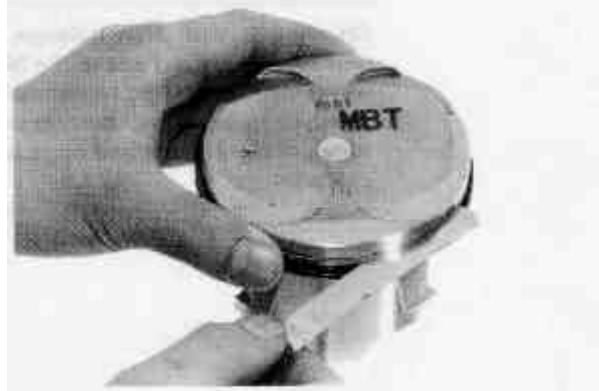
PISTON INSPECTION

Temporarily install the piston rings to their proper position with the mark facing up.

Measure the piston ring-to-ring groove clearance with the rings pushed into the grooves.

SERVICE LIMITS:
Top: 0.115 mm (0.0045 in)
Second: 0.085 mm (0.0033 in)

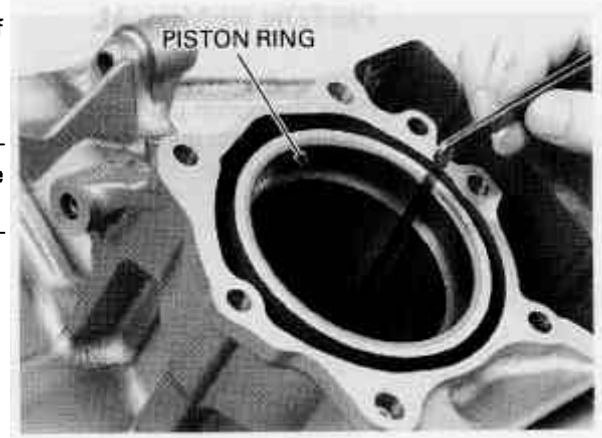
Inspect the piston for wear or damage.



Insert the piston ring squarely into the bottom of the cylinder and measure the ring end gap.

NOTE:

Push the rings into the cylinder with the top of the piston to be sure they are squarely in the cylinder.

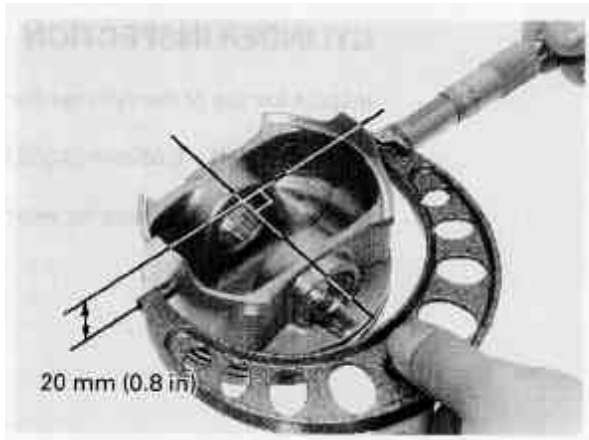


SERVICE LIMITS:

Top:	0.55 mm (0.022 in)
Second:	0.70 mm (0.028 in)
Oil (side rail):	0.70 mm (0.028 in)

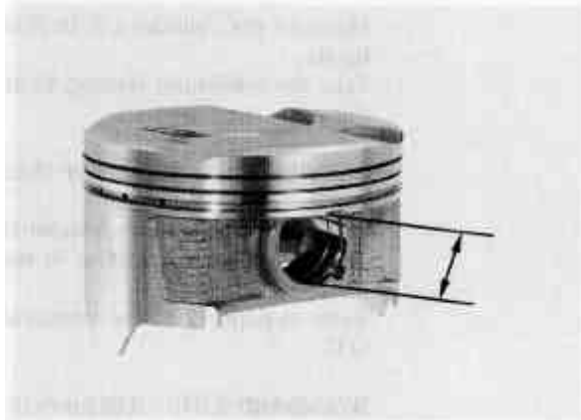
Measure the diameter of the piston at 20 mm (0.8 in) from the bottom and 90 degrees to the piston pin hole.

SERVICE LIMIT: 97.900 mm (3.8543 in)



Measure the piston pin bore.

SERVICE LIMIT: 24.03 mm (0.946 in)

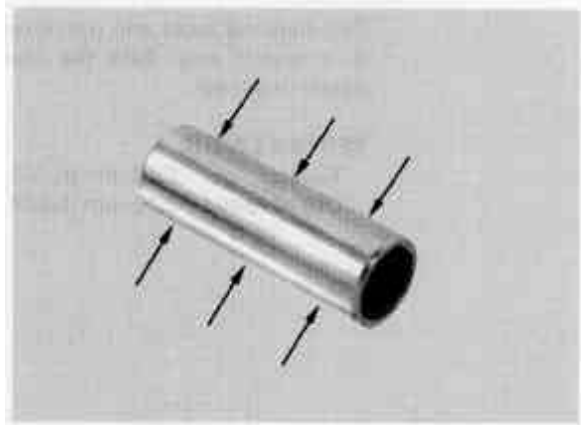


Measure the O.D. of the piston pin.

SERVICE LIMIT: 23.984 mm (0.9443 in)

Calculate the piston-to-piston pin clearance.

STANDARD: 0.002 – 0.014 mm (0.0001 – 0.0006 in)



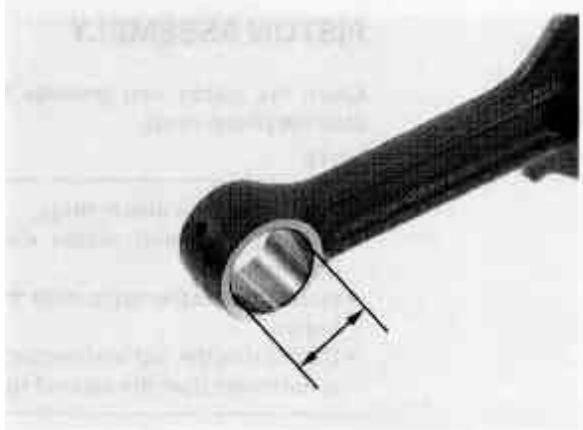
CONNECTING ROD INSPECTION

Measure the connecting rod small end I.D.

SERVICE LIMIT: 24.051 mm (0.9469 in)

Calculate the piston-to-piston pin clearance.

STANDARD: 0.020 – 0.047 mm (0.0008 – 0.0019 in)

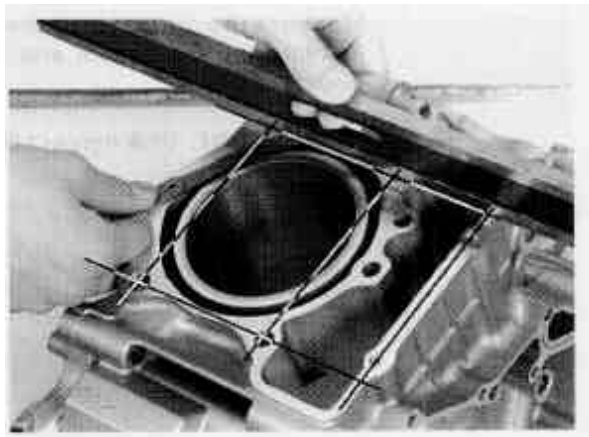


CYLINDER INSPECTION

Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.05 mm (0.002 in)

Inspect the cylinder bore for wear or damage.

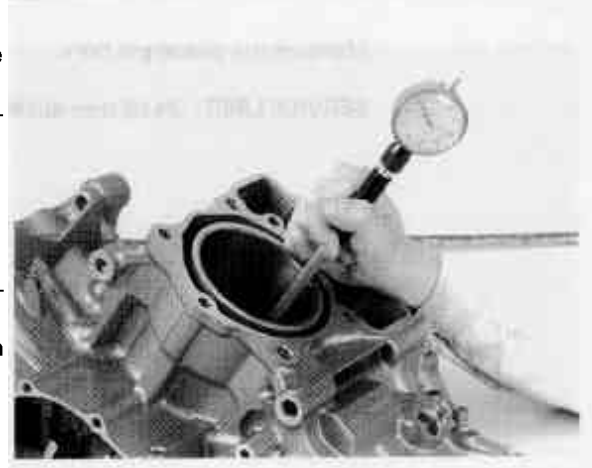


Measure the cylinder I.D. in X and Y axis at three levels.
Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 98.100 mm (3.8622 in)

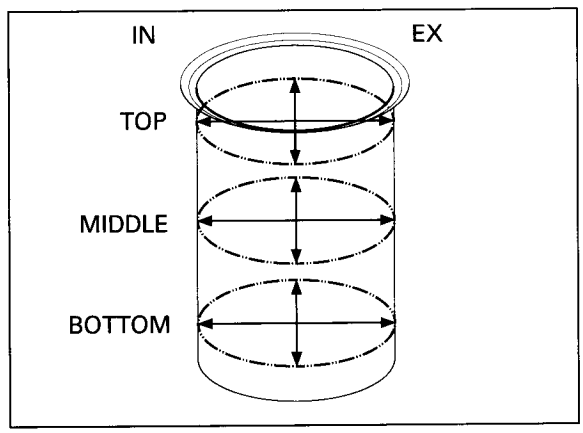
Calculate the piston-to-cylinder clearance.
Take a maximum reading to determine the clearance.
Refer to page 12-11 for measurement of the piston O.D.

STANDARD: 0.010—0.055 mm (0.0004—0.0022 in)



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

SERVICE LIMITS:
Taper: 0.10 mm (0.004 in)
Out of round: 0.10 mm (0.004 in)



PISTON ASSEMBLY

Clean the piston ring grooves thoroughly and install the piston rings.

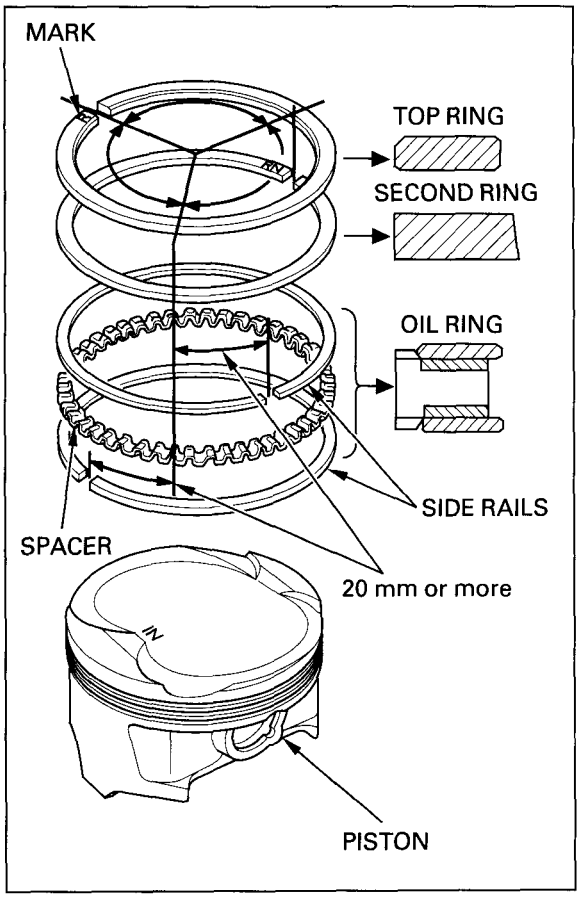
NOTE:

- Apply oil to the piston rings.
- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marking (R) facing up.
- Do not mix the top and second rings; the top ring is narrower than the second ring in width.



Space the piston ring end gaps 180 degrees apart. Do not align the gaps in the oil rings (side rails).

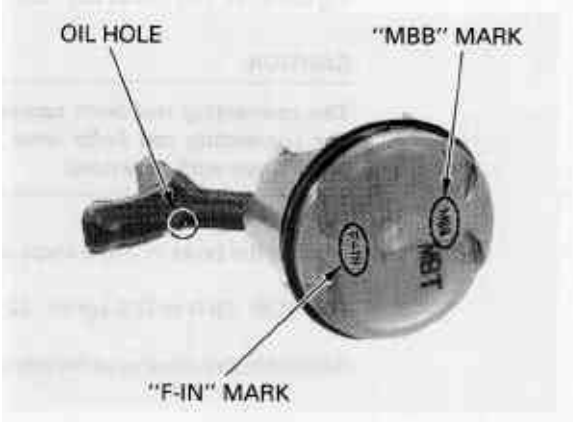
After installation, the rings should rotate freely in the ring grooves.



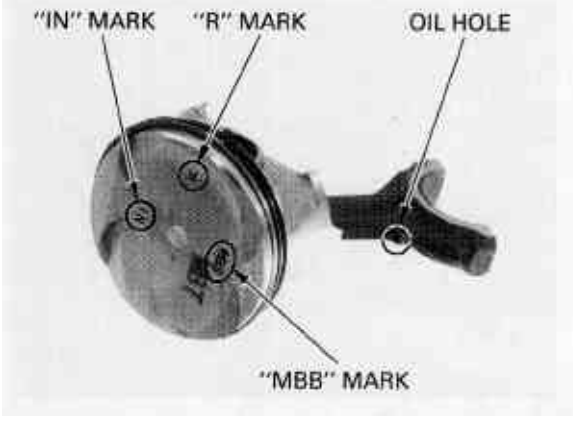
PISTON INSTALLATION

Apply molybdenum disulfide oil to the connecting rod small end.
Assemble the piston and connecting rod.

Front cylinder piston:
Note that the connecting rod has "MBB" 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:
Rear cylinder piston has "R" mark.
Note that the connecting rod has "MBB" mark.
Install the piston on the connecting rod so that the "IN" mark is opposite the oil hole in the rod.



Apply molybdenum disulfide oil to the piston pin outer surface.
Install the piston pin, and secure it using a new piston pin clips.

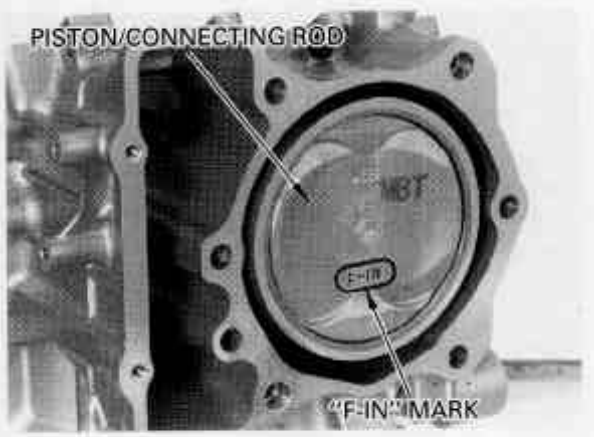
NOTE:

Do not align the piston pin clips end gap with the piston cut-out.



Coat the piston and piston rings with the engine oil.
Install the piston/connecting rod assembly in the cylinder with the "IN" mark toward the intake side, using a commercially available piston ring compressor tool.

Apply molybdenum disulfide oil 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.



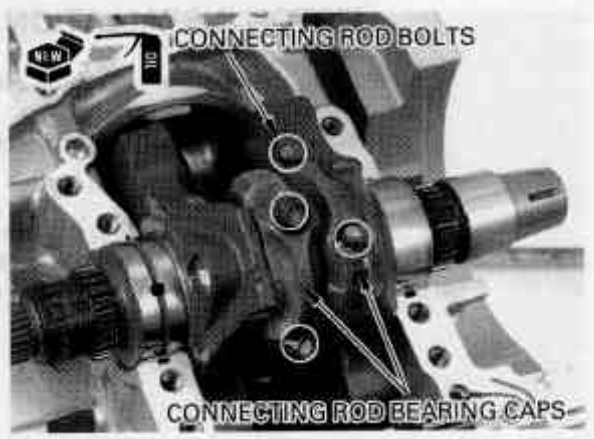
CAUTION:

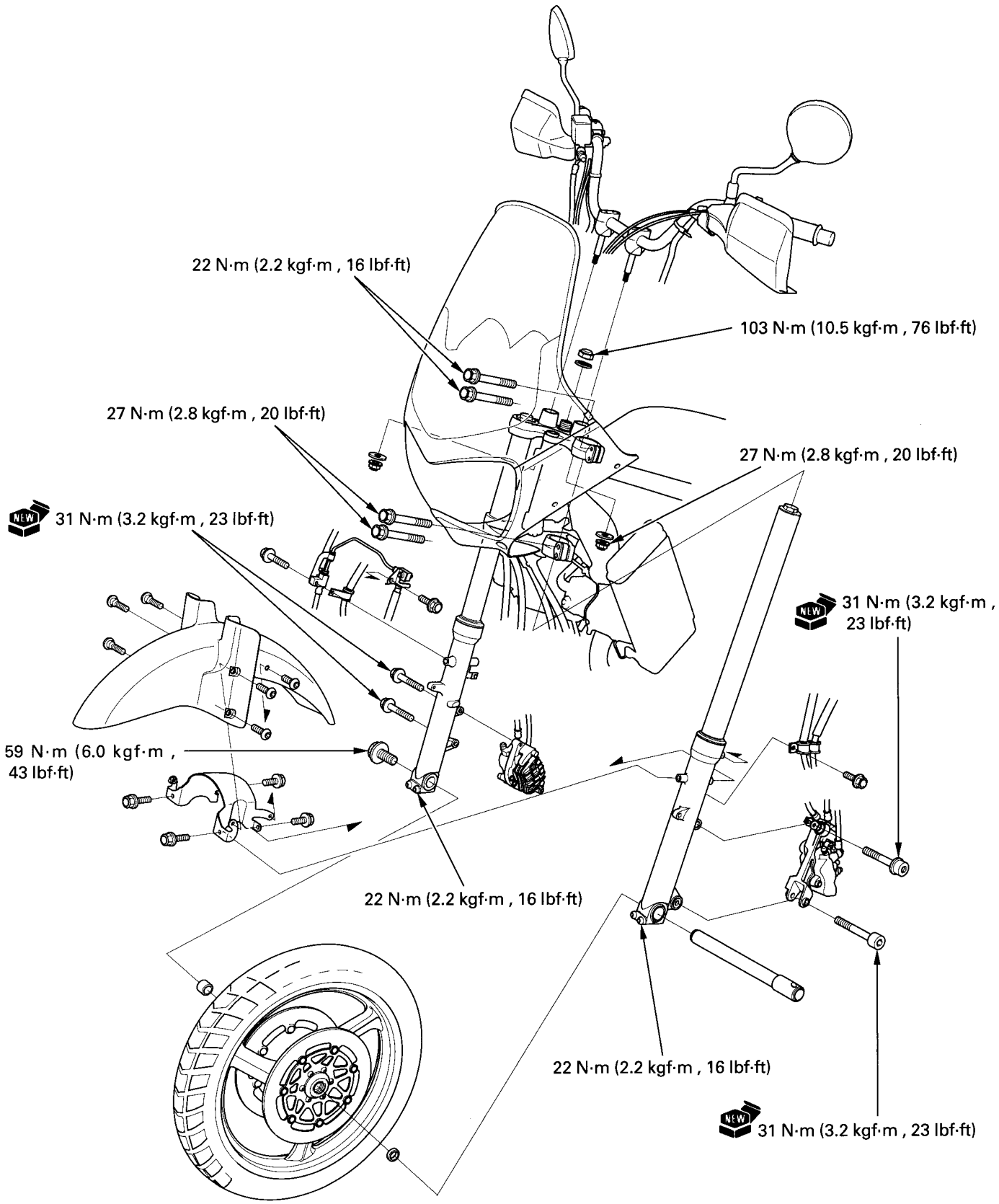
The connecting rod bolts cannot be reused. Once the connecting rod bolts have been loosened replace them with new ones.

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).




22 N·m (2.2 kgf·m , 16 lbf·ft)
103 N·m (10.5 kgf·m , 76 lbf·ft)
27 N·m (2.8 kgf·m , 20 lbf·ft)
27 N·m (2.8 kgf·m , 20 lbf·ft)
NEW
31 N·m (3.2 kgf·m , 23 lbf·ft)
NEW
31 N·m (3.2 kgf·m , 23 lbf·ft)
59 N·m (6.0 kgf·m , 43 lbf·ft)
22 N·m (2.2 kgf·m , 16 lbf·ft)
22 N·m (2.2 kgf·m , 16 lbf·ft)
NEW
31 N·m (3.2 kgf·m , 23 lbf·ft)

13. FRONT WHEEL/SUSPENSION/STEERING

SERVICE INFORMATION	13-1	FRONT WHEEL	13-12
TROUBLESHOOTING	13-2	FORK	13-18
HANDLEBAR	13-3	STEERING STEM	13-30

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.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBELESS TIRE APPLICABLE".

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Minimum tire tread depth		———	1.5 (0.06)
Cold tire pressure	Driver only	250 kPa (2.50 kgf/cm², 36 psi)	———
	Driver and passenger	250 kPa (2.50 kgf/cm², 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	428.8 (16.88)	420.2 (16.54)
	Tube runout	———	0.20 (0.008)
	Recommended fluid	Fork fluid	———
	Fluid level	114 (4.5)	———
	Fluid capacity	529 ± 2.5 cm³ (17.9 ± 0.08 US oz, 18.7 ± 0.09 Imp oz)	———
Steering head bearing preload		1.0–1.5 kgf (2.2–3.3 lbf)	———

TORQUE VALUES

Handlebar weight mounting screw	10 N·m (1.0 kgf·m , 7 lbf·ft)	ALOC screw
Throttle housing screw	4 N·m (0.42 kgf·m , 3.0 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
Right front caliper mounting bolt	31 N·m (3.2 kgf·m , 23 lbf·ft)	ALOC bolt
Fork cap	22 N·m (2.2 kgf·m , 16 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	22 N·m (2.2 kgf·m , 16 lbf·ft)	
Fork bottom bridge pinch bolt	27 N·m (2.8 kgf·m , 20 lbf·ft)	
Front brake hose clamp bolt (fork side)	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Steering stem nut	103 N·m (10.5 kgf·m , 76 lbf·ft)	
Steering stem bearing adjusting nut	25 N·m (2.5 kgf·m , 18 lbf·ft)	
Bystarter lever pivot bolt	9 N·m (0.9 kgf·m , 6.5 lbf·ft)	
Handlebar upper holder bolt	27 N·m (2.8 kgf·m , 20 lbf·ft)	
Handlebar lower holder nut	27 N·m (2.8 kgf·m , 20 lbf·ft)	
Left front caliper pivot bolt	31 N·m (3.2 kgf·m , 23 lbf·ft)	ALOC bolt
Left front caliper bolt (secondary master joint)	31 N·m (3.2 kgf·m , 23 lbf·ft)	ALOC bolt

TOOLS

Bearing remover shaft	07746-0050100
Bearing remover head, 20 mm	07746-0050600
Driver	07749-0010000
Attachment, 42 × 47 mm	07746-0010300
Attachment, 52 × 55 mm	07746-0010400
Pilot, 20 mm	07746-0040500
Slider weight	07947-KA50100
Oil seal driver	07947-KA40200
Steering stem socket	07916-3710101
Ball race remover	07946-3710500
Ball race remover	07953-MJ10000
Driver attachment	07953-MJ10100
Driver handle	07953-MJ10200
Needle bearing remover	07946-KA50000
Steering stem driver	07946-MB00000

TROUBLESHOOTING

Hard steering
- Steering bearing adjustment nut too tight
- Worn of 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

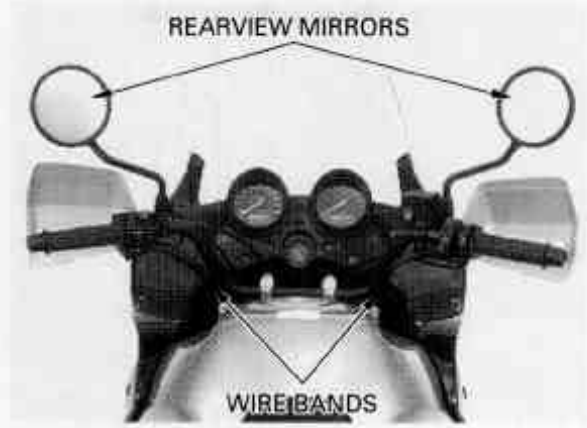
Hard suspension
- Bent fork tubes
- Too much fluid in fork
- Incorrect fork fluid weight
- Clogged fork fluid passage

Front suspension noise
- Insufficient fluid in fork
- Loose fork fasteners

HANDLEBAR

REMOVAL

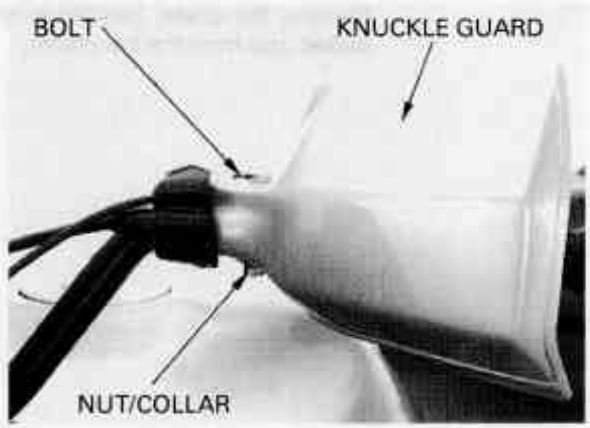
Remove the wire bands and rearview mirrors.



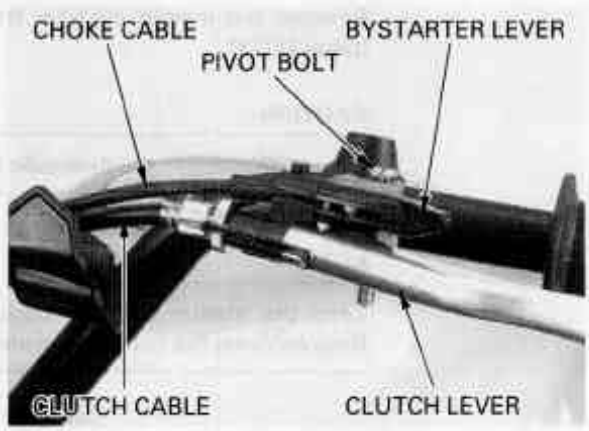
Disconnect the clutch switch connectors from the clutch lever bracket.
Remove the screws and left handlebar switch from the handlebar.



Remove the bolt, nut, collar and knuckle guard.



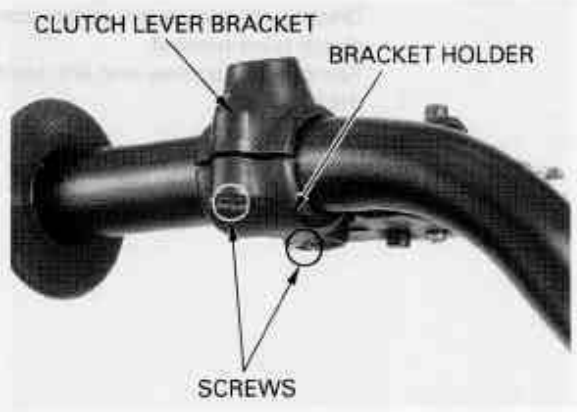
Remove the bystarter lever/clutch lever pivot bolt.
Disconnect the clutch cable and choke cable from the clutch lever and bystarter lever.
Remove the bystarter lever and clutch lever.



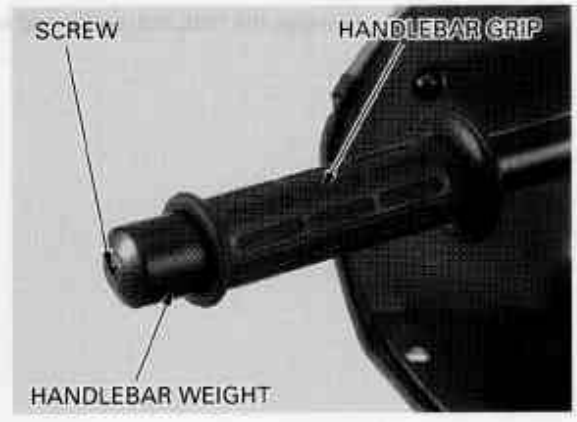
Remove the set plate.



Remove the screws and clutch lever bracket holder from the handlebar.
Remove the clutch lever bracket from the handlebar.



Remove the screw, handlebar weight and the handlebar grip from the handlebar.



Remove the master cylinder from the handlebar (page 15-13).

CAUTION:

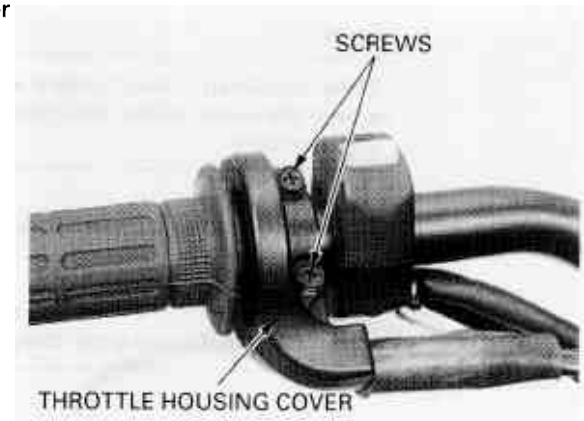
Do not disconnect the hydraulic line.

NOTE:

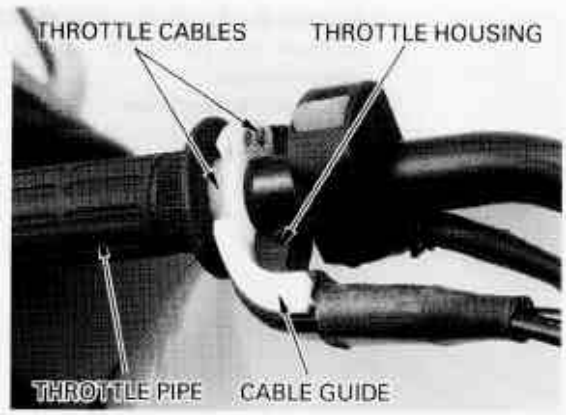
Keep the master cylinder upright to prevent air from entering the hydraulic system.



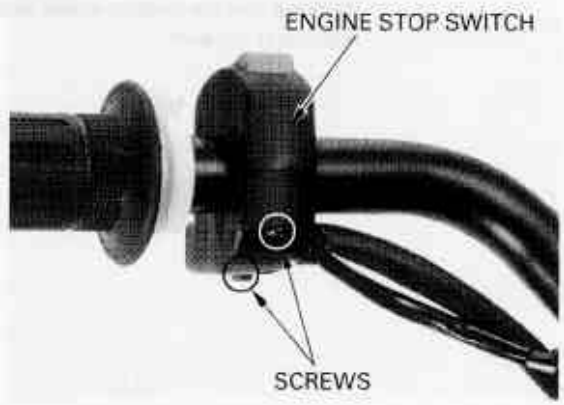
Remove the screws and throttle housing cover from the handlebar.



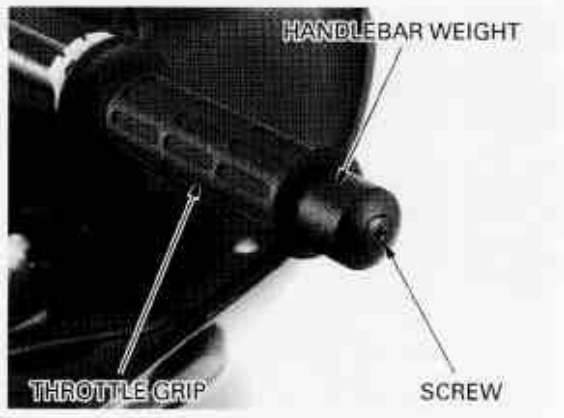
Remove the throttle cable guide and disconnect the throttle cables from the throttle pipe.
Remove the throttle housing from the handlebar.



Remove the screws and engine stop switch from the handlebar.



Remove the screw, handlebar weight and throttle grip from the handlebar.



NOTE:

If the handlebar lower holders will be removed, loosen the lower holder nuts before removing the upper holders.

Loosen the handlebar lower holder nuts.

NOTE:

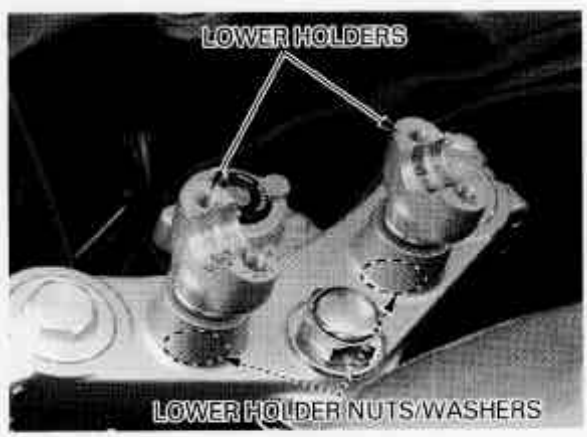
Do not remove the handlebar lower holder nuts yet.



Remove the handlebar upper holder bolt caps.
Remove the handlebar upper holder bolts and upper holders.
Remove the handlebar.



Remove the handlebar lower holder nuts/washers and lower holders.

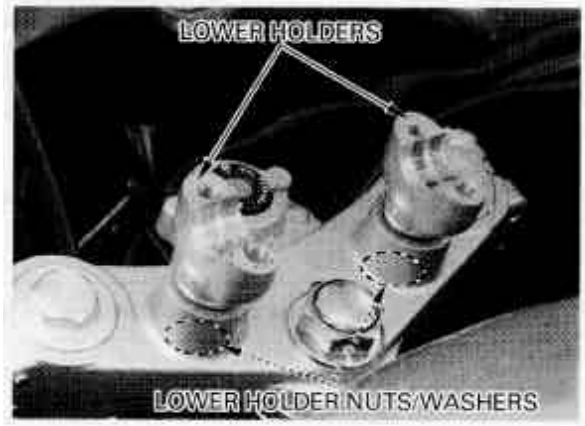


Check the bushings for wear or damage.
Replace the bushing if necessary.



INSTALLATION

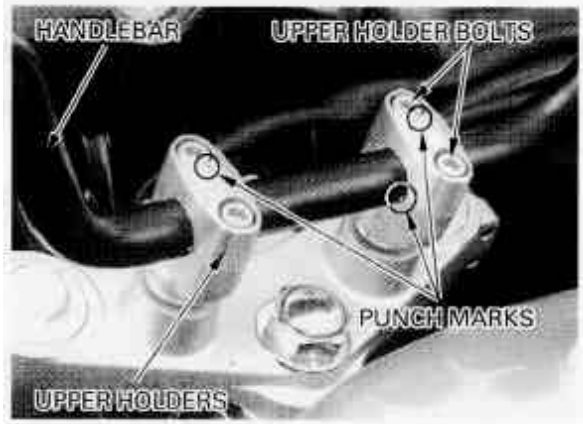
Install the handlebar lower holders/washers and handlebar lower holder nuts/washers.



NOTE:

Do not tighten the lower holder nuts yet.

Install the handlebar and handlebar upper holders.



NOTE:

Install the handlebar upper holder with its punch mark facing toward.

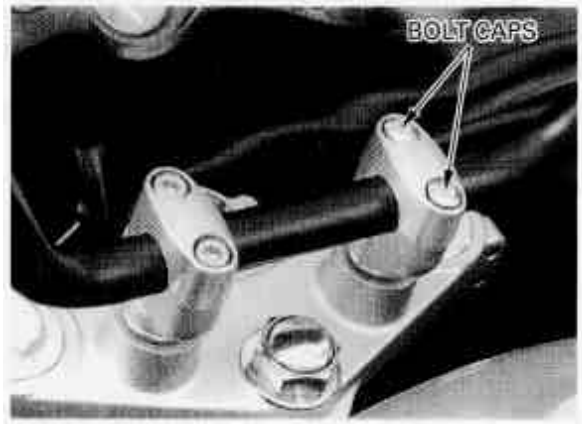
Install and tighten the handlebar upper holder bolts to the specified torque.

NOTE:

At handlebar upper holder bolts installation, tighten the forward bolts first, then tighten the rear bolts.

TORQUE: 27 N·m (2.8 kgf·m , 20 lbf·ft)

Install the handlebar upper holder bolt caps.



Tighten the handlebar lower holder nuts to the specified torque.

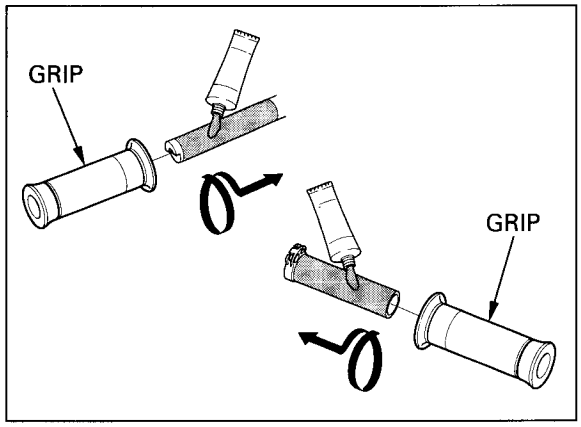
TORQUE: 27 N·m (2.8 kgf·m , 20 lbf·ft)



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

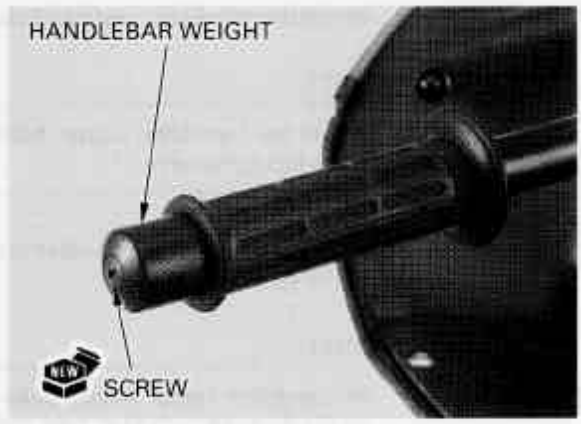
NOTE:

Allow the adhesive to dry for an hour before using.

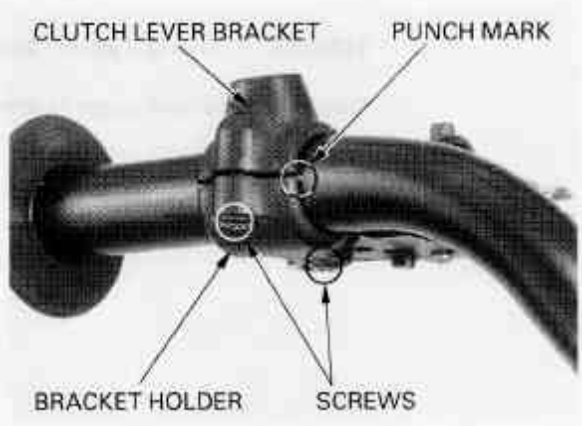


Install the handlebar weight to the handlebar aligning the tab on the handlebar weight with the slit of the handlebar.
Install and tighten the new screw to the specified torque.

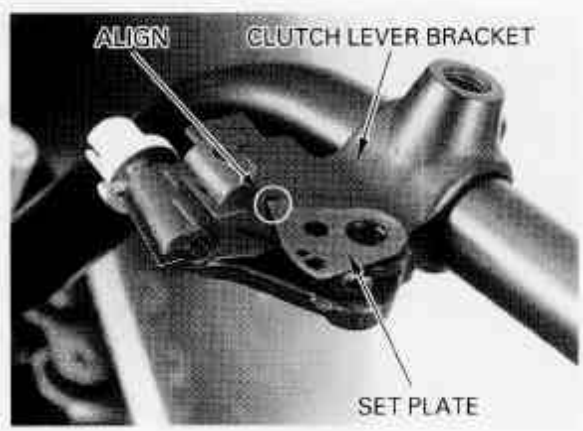
TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)



Install the clutch lever bracket and holder, aligning mating surface of the holder with the punch mark on the handlebar.
Tighten the forward screw first, then tighten the rear screw.



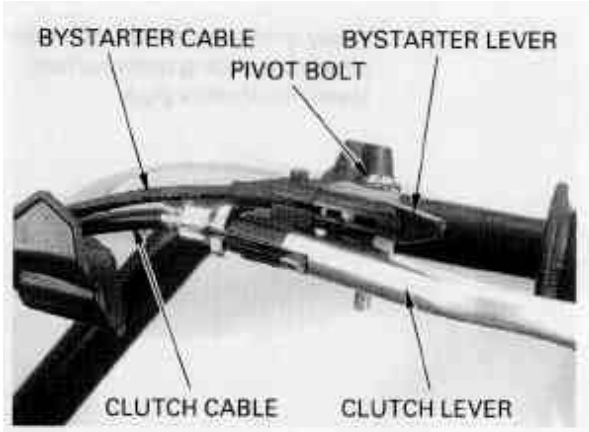
Install the set plate to the clutch lever bracket, aligning the tab on the set plate with the hole on the clutch lever bracket.



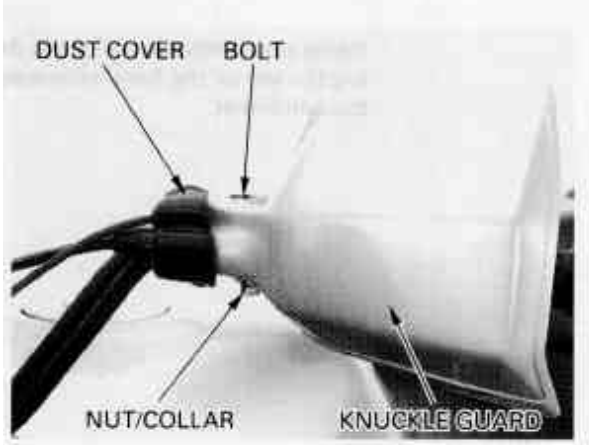
Install the clutch lever and bystarter lever.
Apply grease to the bystarter lever/clutch lever pivot bolt.
Install and tighten the bystarter lever/clutch lever pivot bolt to the specified torque.

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

Connect the clutch cable and choke cable to the clutch lever and bystarter lever.

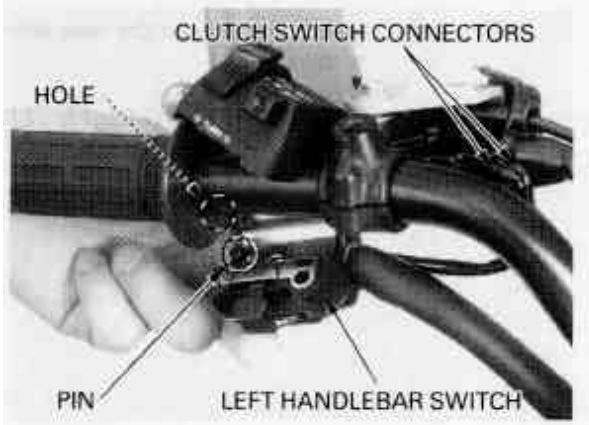


Install the knuckle guard, collar, bolt and nut.
Install the dust cover over the clutch lever bracket.

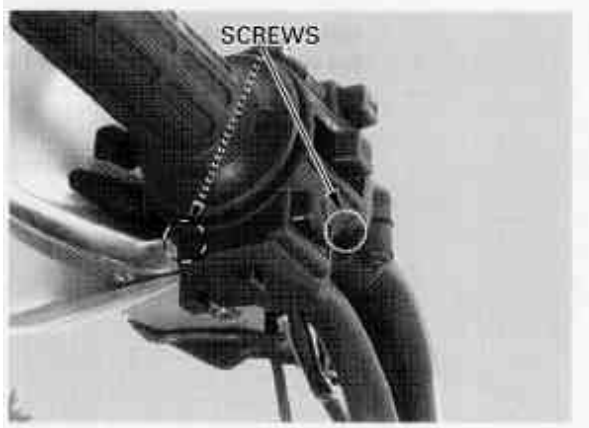


Connect the clutch switch connectors.

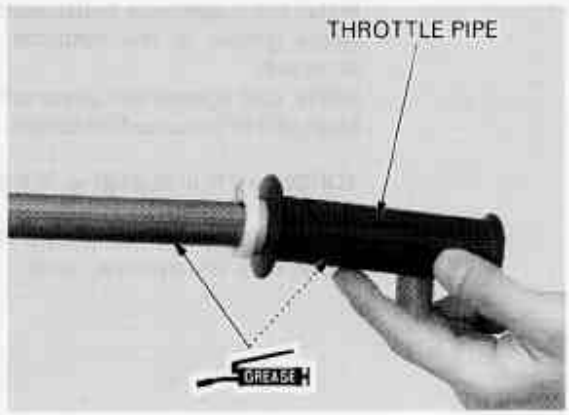
Install the left handlebar switch, aligning the pin on the switch with the hole in the handlebar.



Tighten the forward screw first, then tighten the rear screw.



Apply grease to the throttle pipe inner surface and handlebar sliding outer surface.
Install the throttle pipe.



Install the handlebar weight to the handlebar aligning the tab on the handlebar weight with the slit of the handlebar.

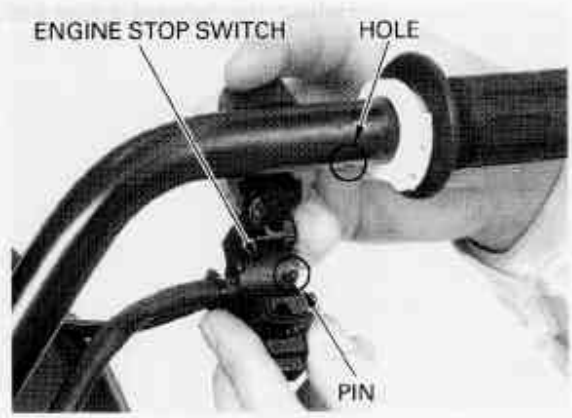


Install and tighten the new screw to the specified torque.

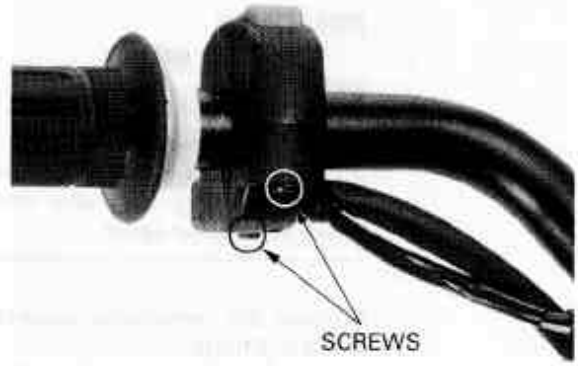
TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)



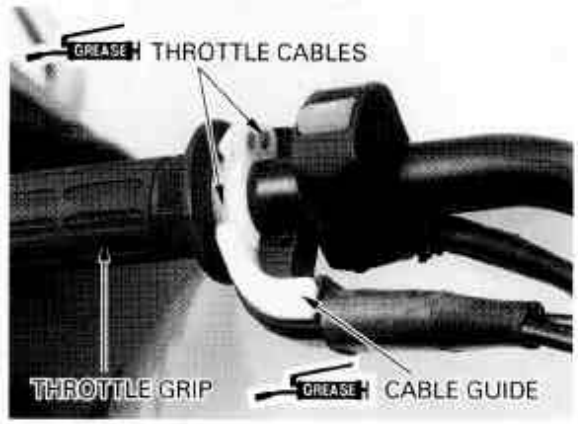
Install the engine stop switch, aligning the pin on the switch with the hole in the handlebar.



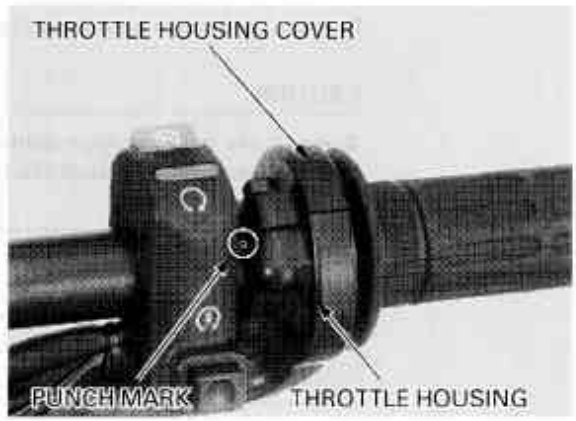
Tighten the forward screw first, then tighten the rear screw.



Apply grease to the throttle cable ends and connect them to the throttle grip.
Apply grease to the throttle cable guide sliding surface.
Install the throttle cable guide to the throttle housing.



Install the throttle housing to the handlebar.
Install the throttle housing cover to the throttle housing aligning its mating surface with the punch mark on the handlebar.



Install and tighten the throttle housing cover screws to the specified torque.

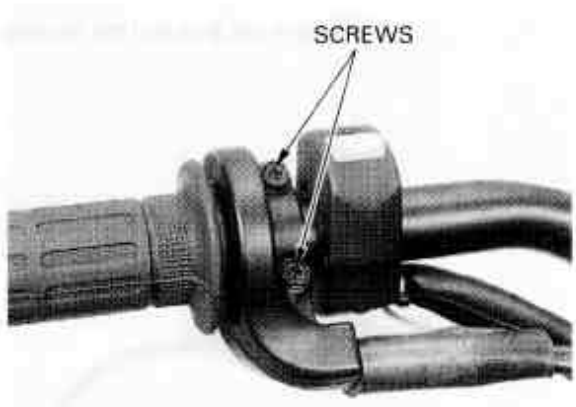
TORQUE: 4 N·m (0.42 kgf·m , 3.0 lbf·ft)

Install the master cylinder (page 15-18).

Install the wire bands and rearview mirrors.

NOTE:

Route the cables, wires and harness properly (page 1-21).



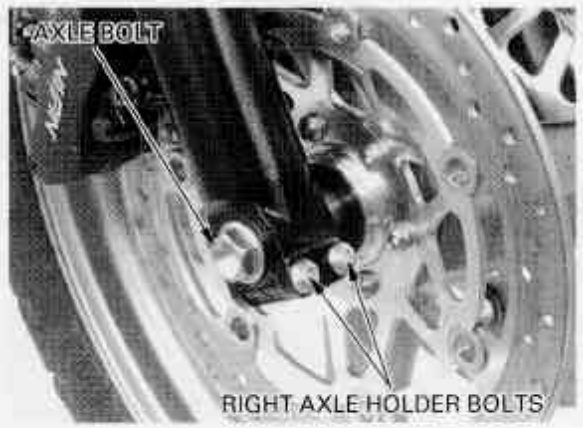
FRONT WHEEL

REMOVAL

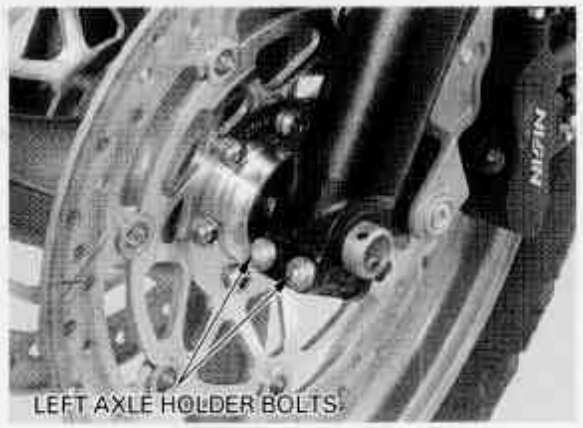
⚠WARNING

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

Support the motorcycle securely using a safety stand or a hoist.
Loosen the right axle holder bolts.
Remove the axle bolt.



Loosen the left axle holder bolts.



Remove the mounting bolts and right brake caliper.

CAUTION:

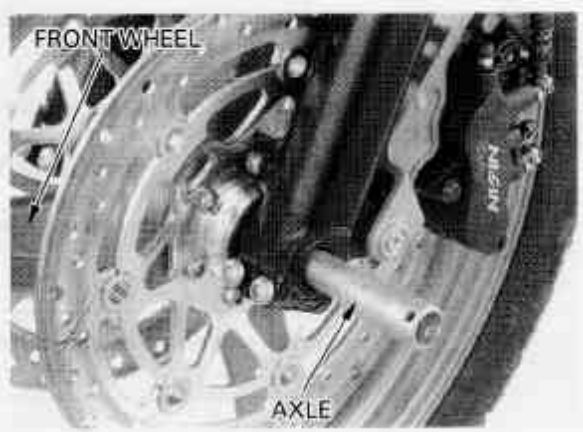
Support the brake caliper with a piece of wire so that is does not hang from the brake hose. Do not twist the brake hose.

NOTE:

Do not operate the brake lever or pedal after the brake caliper is removed.



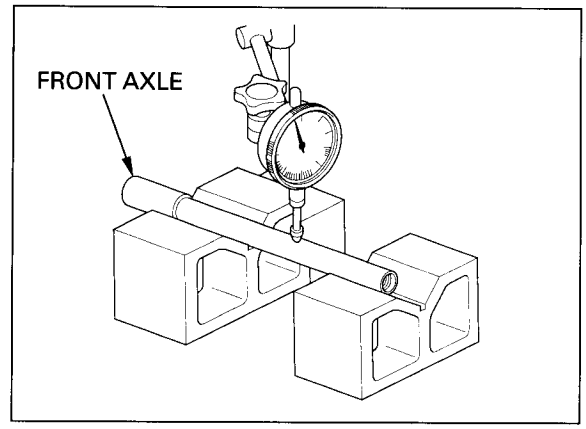
Remove the axle and the front wheel.



INSPECTION

Axle
Set the axle in V-block and measure the runout.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)

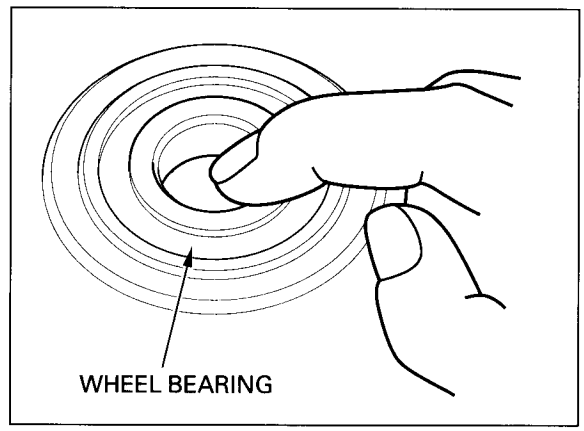


Wheel bearing
Turn the inner race of each bearing with your finger.
The bearings should turn smoothly and quietly.
Also check that the bearing outer race fits tightly in the hub.

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

NOTE:

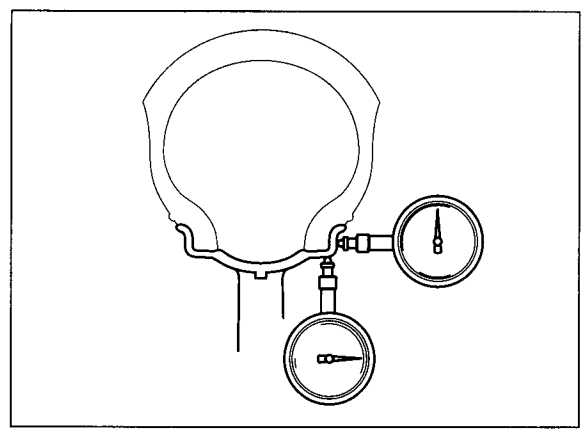
Replace the bearings in pairs.



Install the new bearings into the hub using the special tools (page 13-15).

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

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



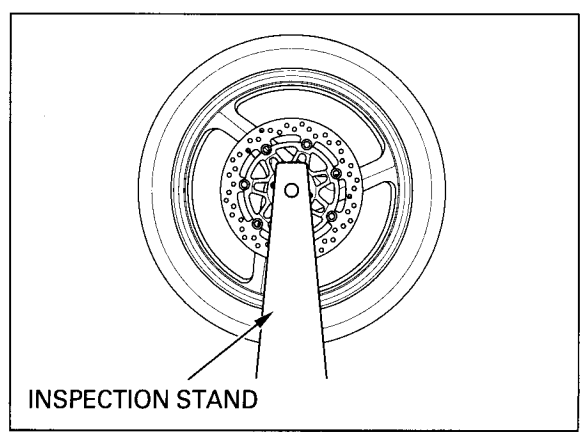
Wheel balance

CAUTION:

Wheel balance directly affects the stability, handling and over all safety of the motorcycle. Always check balance when the tire has been removed from the rim.

NOTE:

For optimum balance, the tire balance mark (a point dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.



NOTE:

Note the rotating direction marks on the wheel and tire.



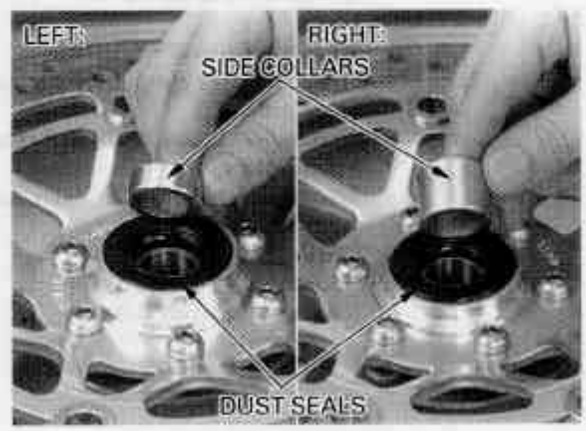
Remove the dust seals from the wheel.
Mount the wheel, tire and brake discs assembly in an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) point of the wheel with a chalk.
Do this two or three times to verify the heaviest area.
If the wheel is balanced, it will not stop consistently in the same position.



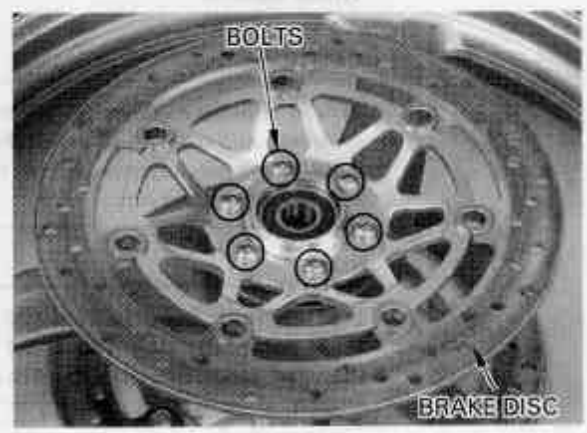
To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun. Do not add more than 60 grams to the wheel.

DISASSEMBLY

Remove the side collars.
Remove the dust seals.



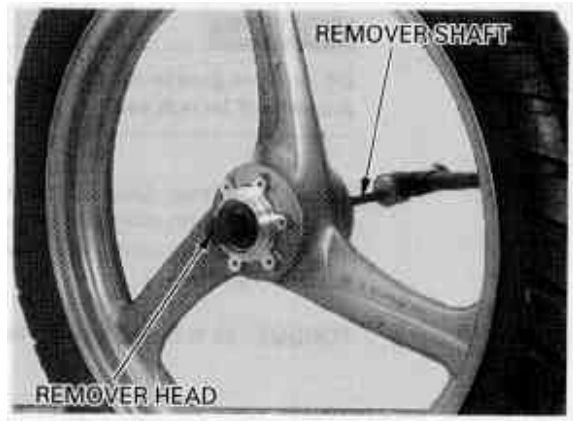
Remove the bolts and brake discs.



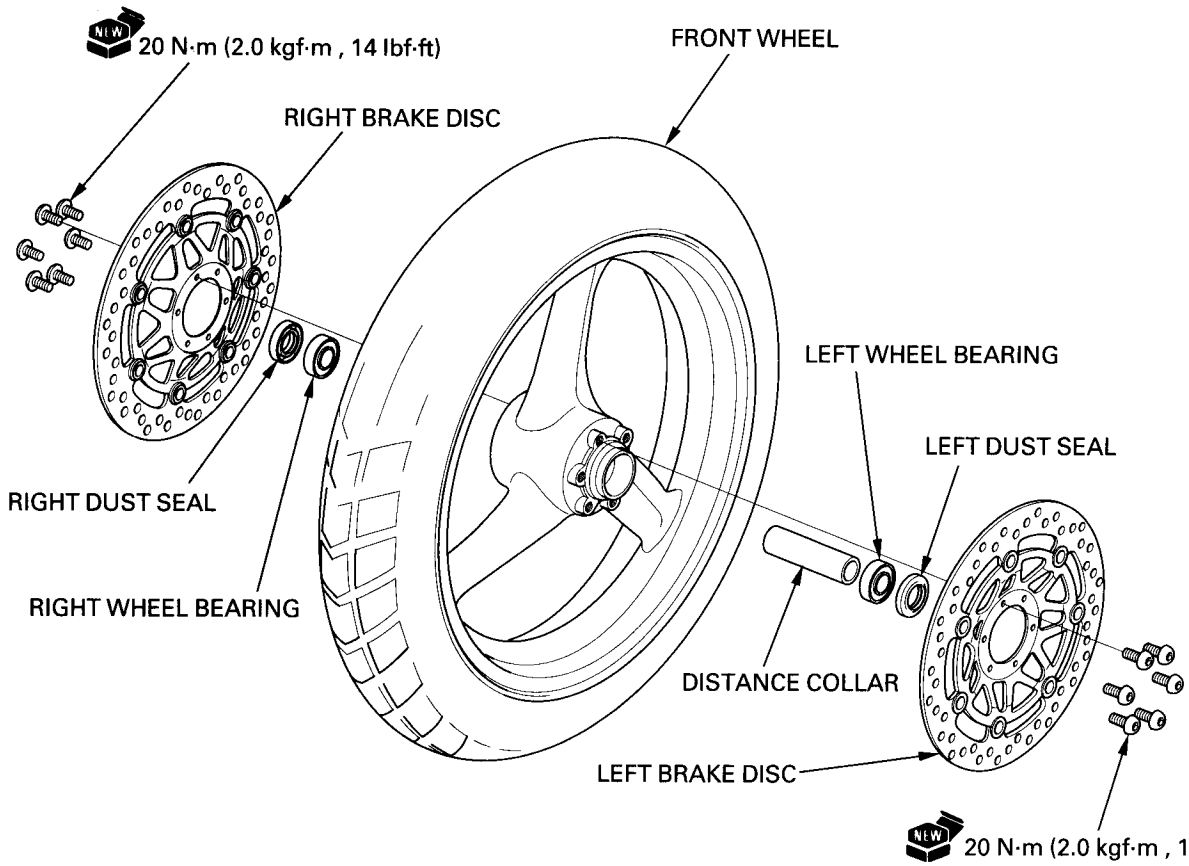
Install the bearing remover head into the bearing. From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover head, 20 mm	07746-0050600
Bearing remover shaft	07746-0050100



ASSEMBLY



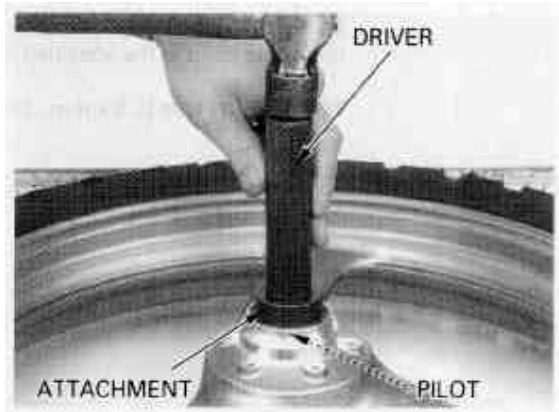
CAUTION:

Never install the old bearings. Once the bearings has been removed, the bearing must be replaced with new ones.

Drive in a new right bearing squarely.
Install the distance collar, then drive in the left bearing using the special tool.

TOOLS:

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

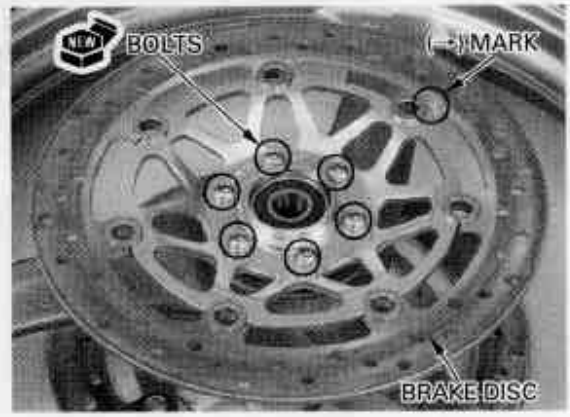


⚠WARNING

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

Install the brake discs on the wheel hub with its rotating direction mark (→) facing out.
Install and tighten the new brake disc bolts to the specified torque.

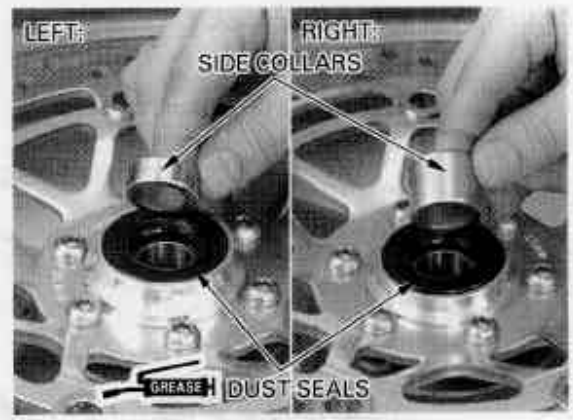
TORQUE: 20 N·m (2.0 kgf·m , 14 lbf·ft)



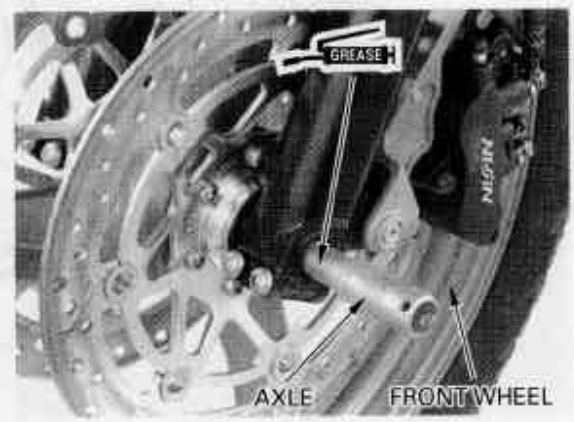
INSTALLATION

Apply grease to the dust seal lips, then install the dust seals into the wheel hub.

Install the side collars.



Apply thin layer of grease to the front axle surface.
Install the front axle from the left side.



Install the right brake caliper and tighten the new mounting bolts to the specified torque.

TORQUE: 31 N·m (3.2 kgf·m , 23 lbf·ft)

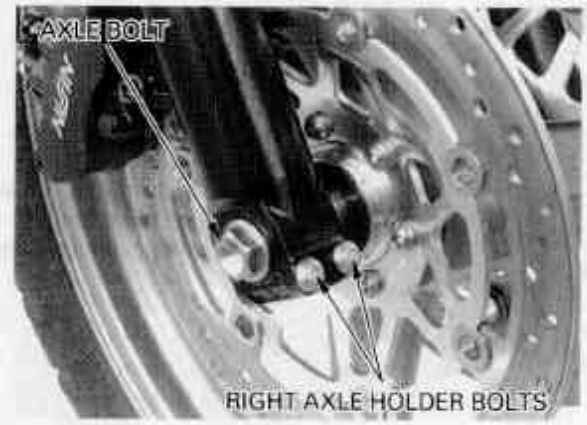


Hold the axle and tighten the axle bolt to the specified torque.

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

Tighten the right axle holder bolts to the specified torque.

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



With the front brake applied, pump the fork up and down several times to seat the axle.

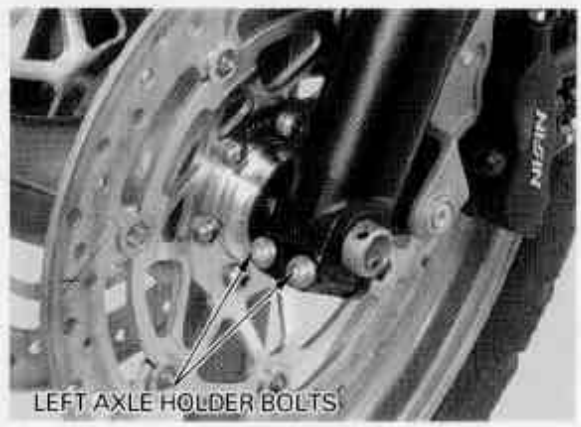
⚠WARNING

Check the brake operation by applying the brake lever and pedal.



Tighten the left axle holder bolts to the specified torque.

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



Check the clearance between the brake disc and caliper bracket on each side after installation.
The clearance should be at least 0.7 mm (0.03 in).

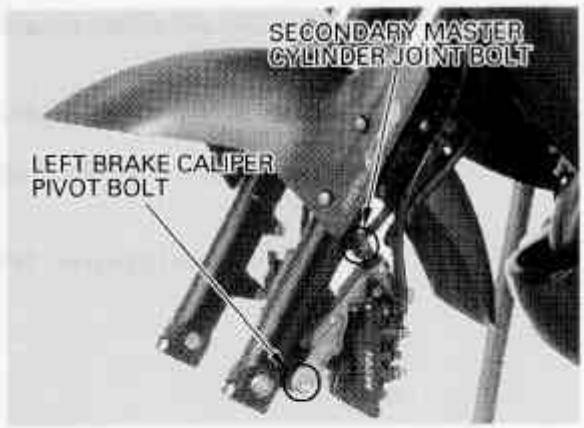


FORK

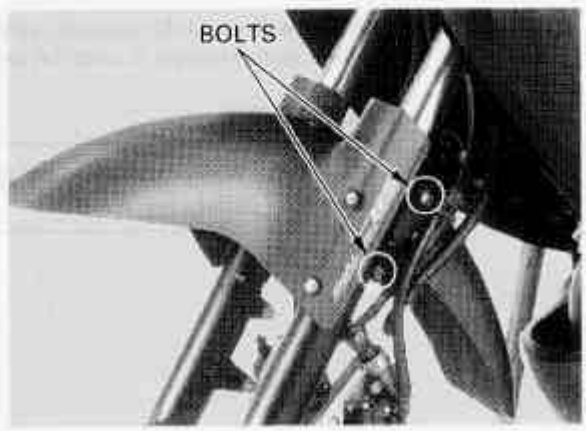
REMOVAL

Remove front wheel (page 13-12).

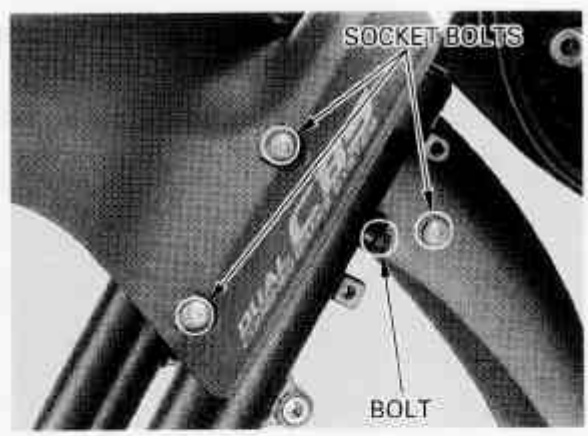
For the left fork leg removal, remove the following:
—Left brake caliper pivot bolt
—Secondary master cylinder joint bolt



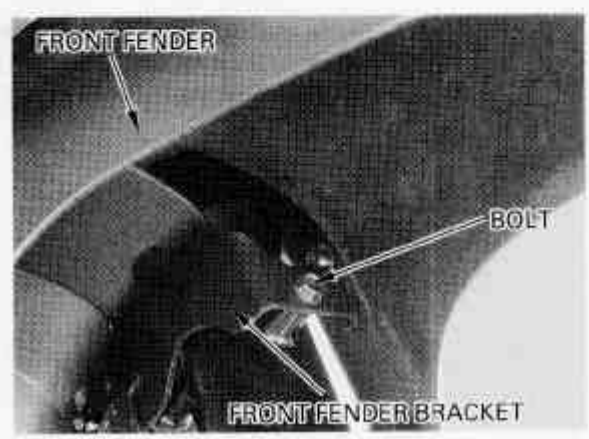
Remove the brake pipe/hose clamp bolts.



Remove the socket bolts and bolt.



Remove the bolt, front fender and front fender bracket.



Loosen the top bridge pinch bolt.

When the fork leg will be disassembled, loosen the fork cap, but do not remove it yet.



Loosen the fork bottom pinch bolt and remove the fork tube from the fork top bridge.

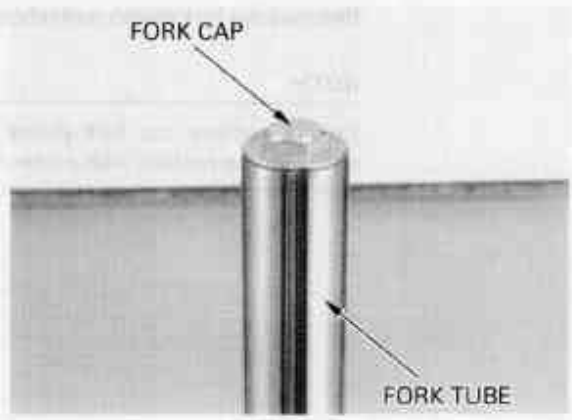


DISASSEMBLY

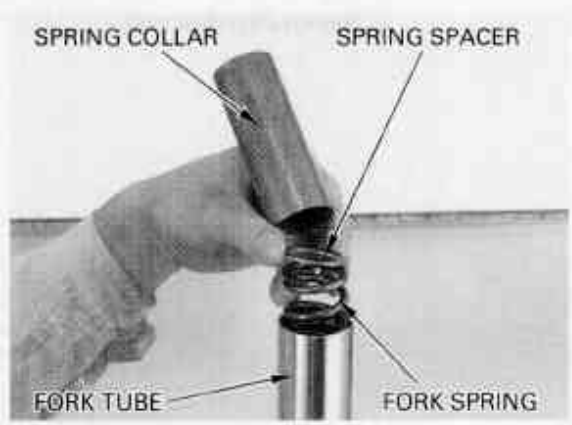
CAUTION:

Be careful not to scratch the fork tube or damage the dust seal.

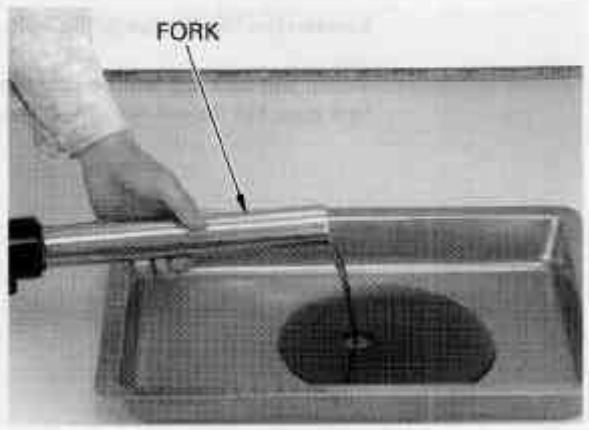
Remove the fork cap from the fork tube.



Remove the fork spring collar and spring spacer from the fork tube.
Remove the fork spring from the fork tube.



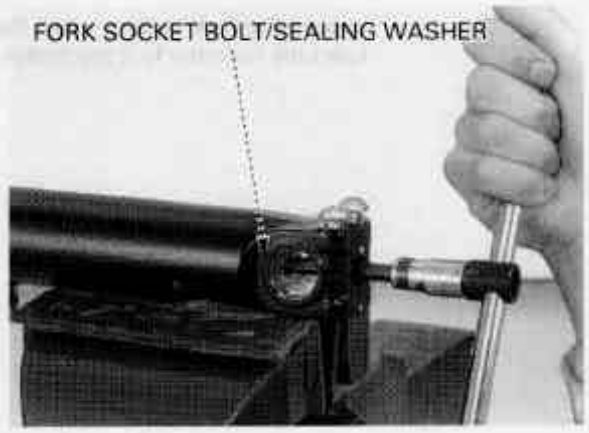
Pour out the fork oil from the fork leg by pumping the fork 8—10 times.



Hold the fork slider in a vice with soft jaws or a shop towel.
Remove the fork socket bolt with a hex wrench.

NOTE:

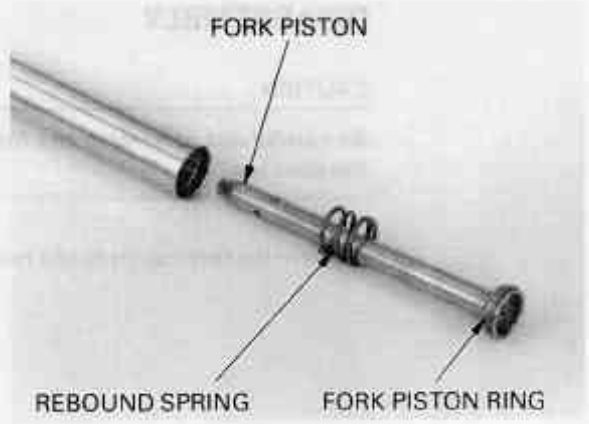
If the fork piston turns together with the socket bolt, temporarily install the fork spring, spring spacer, fork spring collar and fork cap.



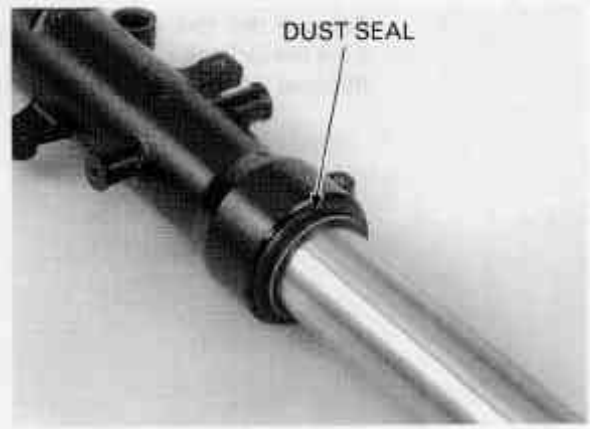
Remove the fork piston and rebound spring.

NOTE:

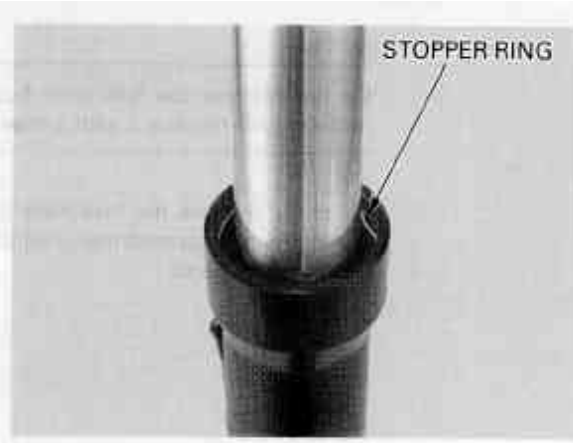
Do not remove the fork piston ring, unless it is necessary to replace with a new one.



Remove the dust seal.



Remove the stopper ring.

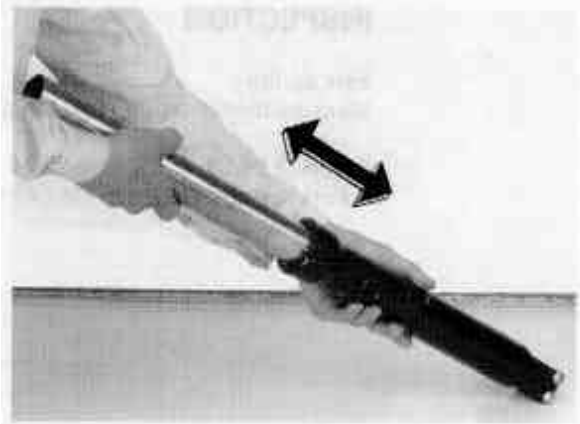


CAUTION:

Do not scratch the fork tube sliding surface.

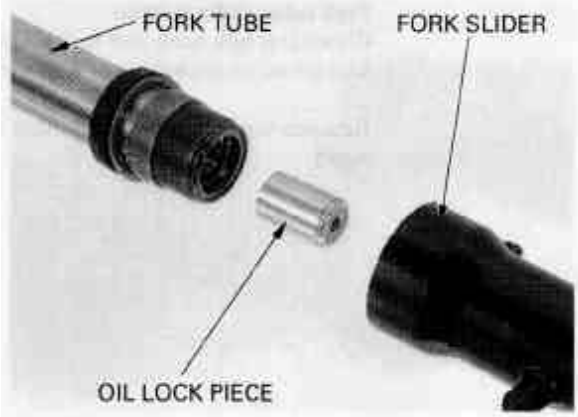
NOTE:

Check that the fork tube moves smoothly in the fork slider. If it does not, check the fork tube for bending or damage, and bushings for wear or damage.

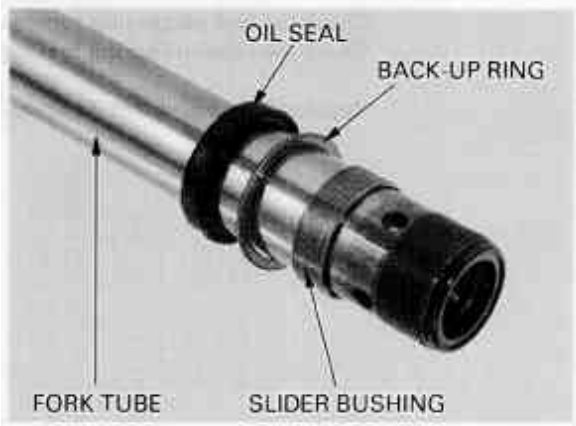


Pull the fork tube out until you feel resistance from the slider bushing. Then move it in and out, tapping the bushing lightly until the fork tube separates from the fork slider.
The slider bushing will be forced out by the fork tube bushing.

Remove the oil lock piece from the fork slider.



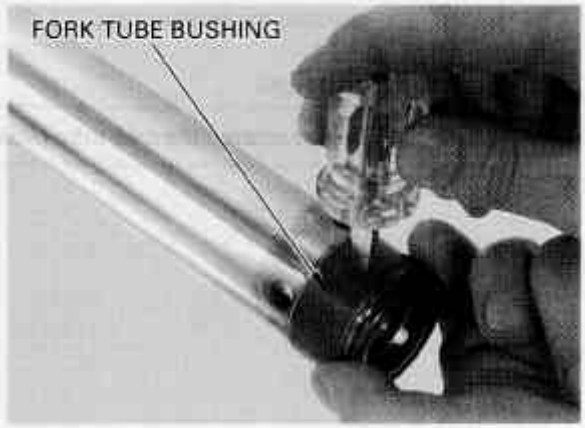
Remove the oil seal, back-up ring and slider bushing from the fork tube.



NOTE:

Do not remove the fork tube bushing unless it is necessary to replace it with a new one.

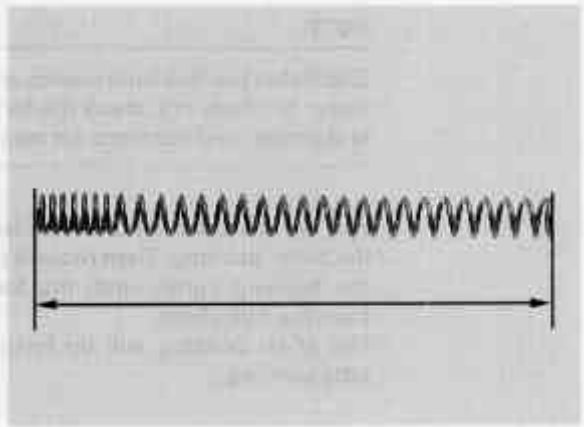
Carefully remove the fork tube bushing by prying the slot with a screwdriver until the bushing can be pulled off by hand.



INSPECTION

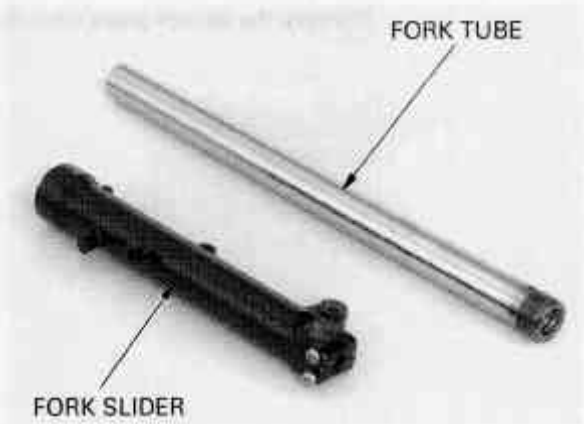
Fork spring
Measure the fork spring free length.

SERVICE LIMIT:
Fork spring: 420.2 mm (16.54 in)



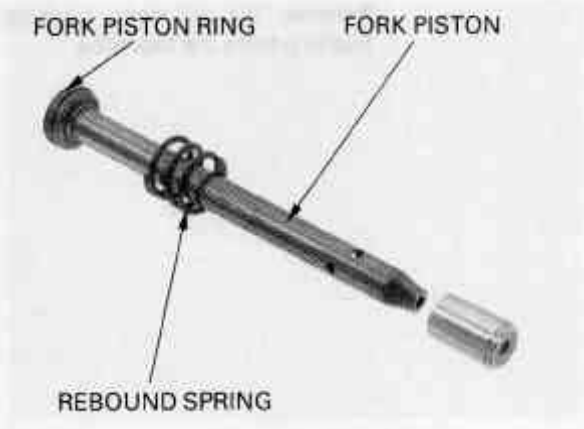
Fork tube/slider/piston
Check the fork tube and fork slider for score marks, scratches, or excessive or abnormal wear.

Replace any components which are worn or damaged.



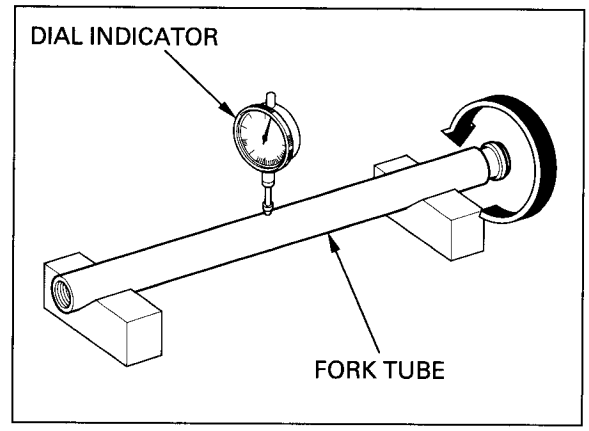
Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.

Replace the component if necessary.



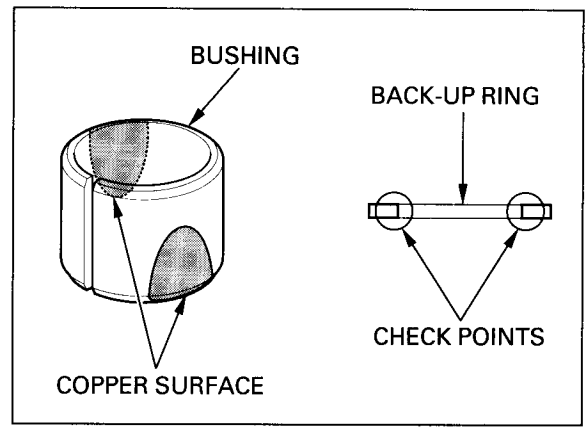
Place the fork tube in V-block and measure the runout.
Actual runout is 1/2 the total indicator reading.

SERVICE LIMIT: 0.20 mm (0.008 in)

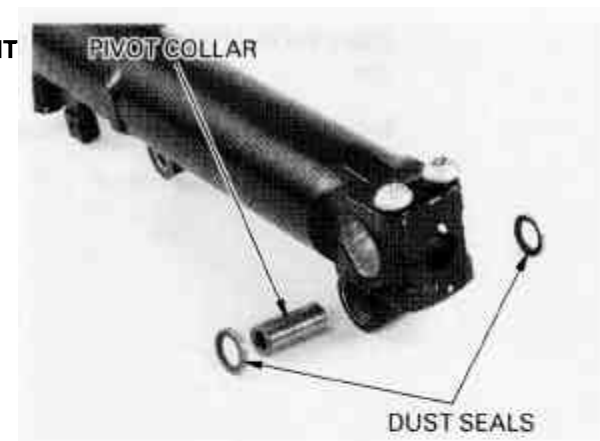


Fork tube bushing
Visually inspect the slider and fork tube bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.

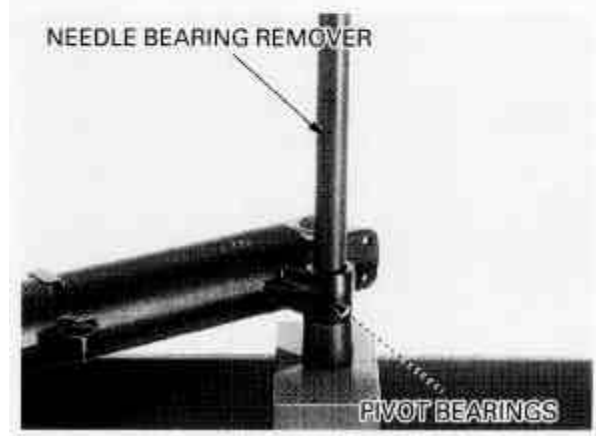


BRAKE CALIPER PIVOT BEARINGS REPLACEMENT
Remove the dust seals and pivot collar.



Press out the pivot bearings using the special tool.

TOOL:
Needle bearing remover 07946-KA50000

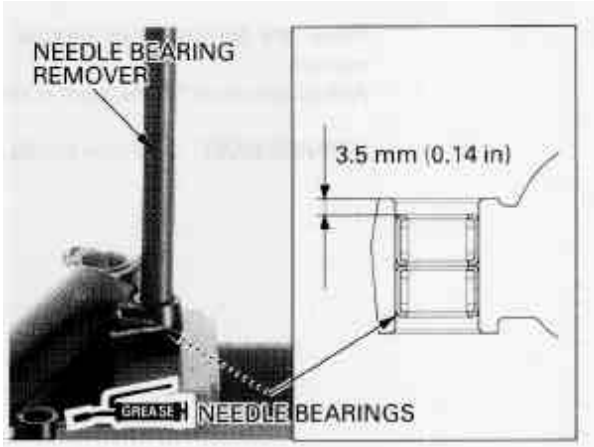


Apply grease to the pivot bearings.
Press the needle bearings into the fork slider using the same tool.

NOTE:

Install the bearings so that the bearing cage below 3.5 mm (0.14 in) from the pivot surface.

TOOL:
Needle bearing remover 07946-KA50000



Apply grease to the new dust seal lips.
Install the dust seals and pivot collar.



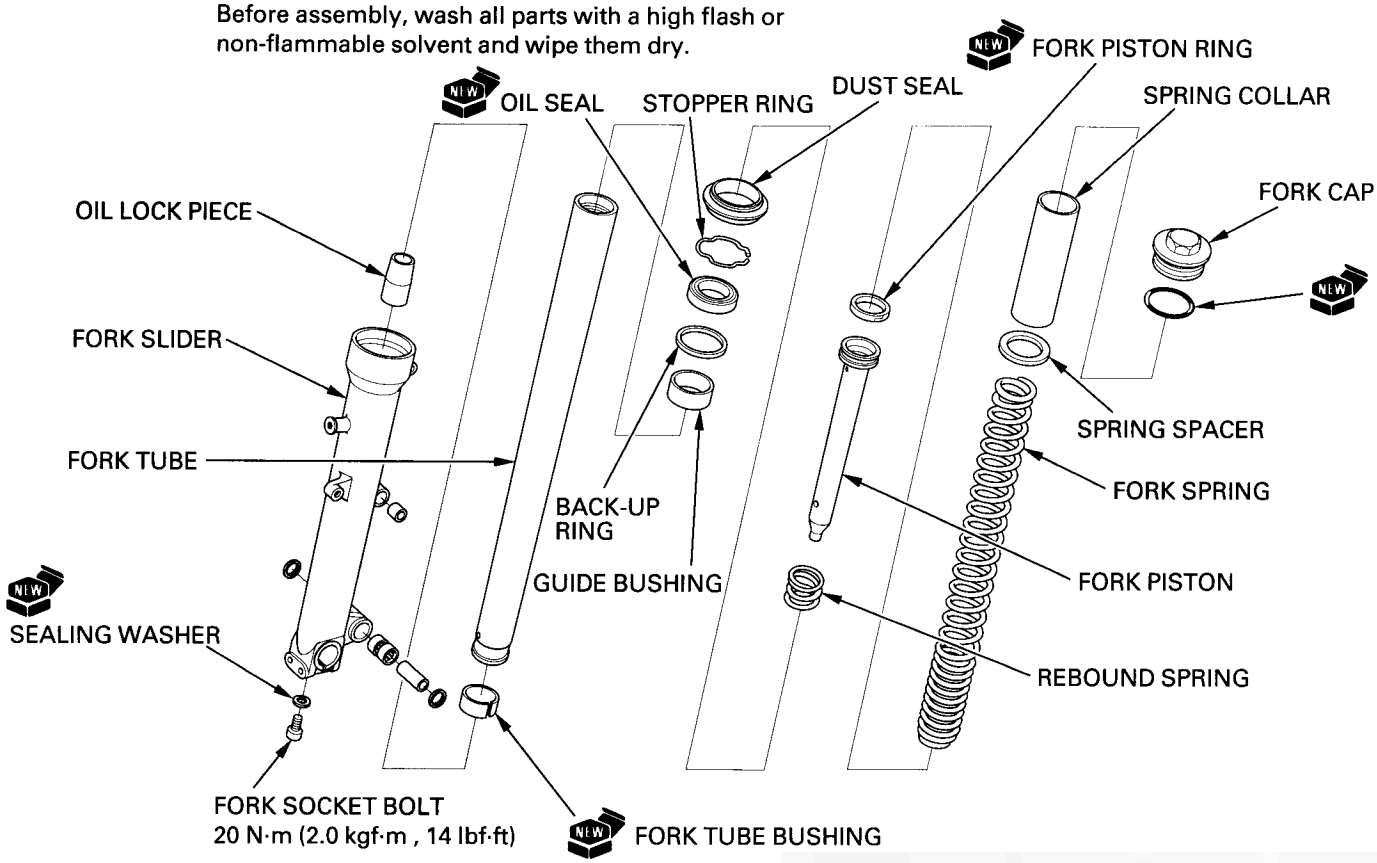
Check the pivot collar and bushing for wear or damage.

Replace the component if necessary.

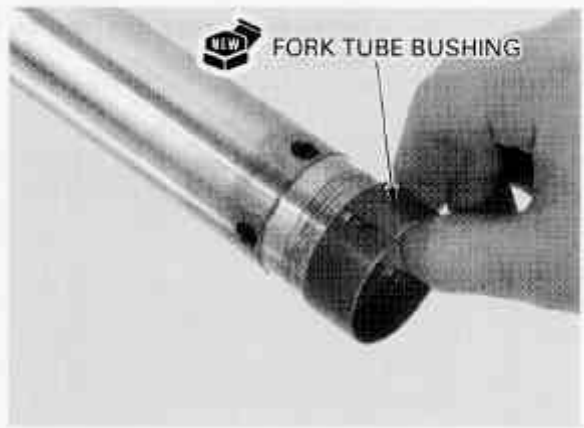


ASSEMBLY

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



Install a new fork tube bushing if the bushing has been removed.



CAUTION:

- ***Be careful not to damage the fork tube bushing coating.***
- ***Do not open the fork tube bushing more than necessary.***

NOTE:

Remove the burrs from the bushing mating surface, being careful not to peel off the coating.

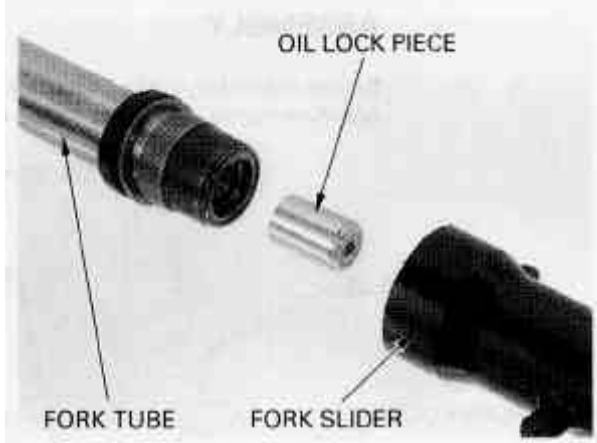
Apply fork oil to the new oil seal lip.
Install the slider bushing, back-up ring and a new oil seal.



NOTE:

Install the oil seal with its marked side facing up.

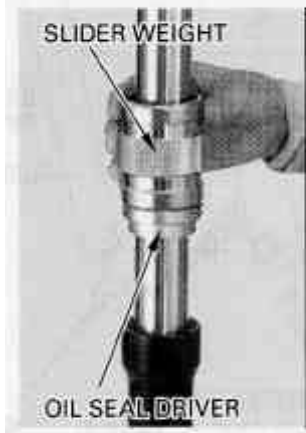
Install the oil lock piece to the fork tube.
Install the fork tube into the fork slider.

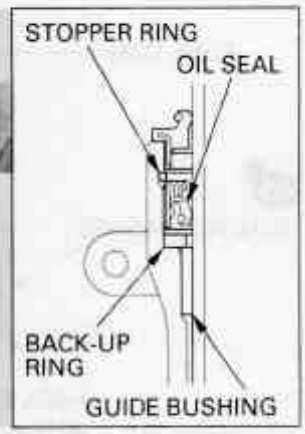


Drive the oil seal in using the special tools.

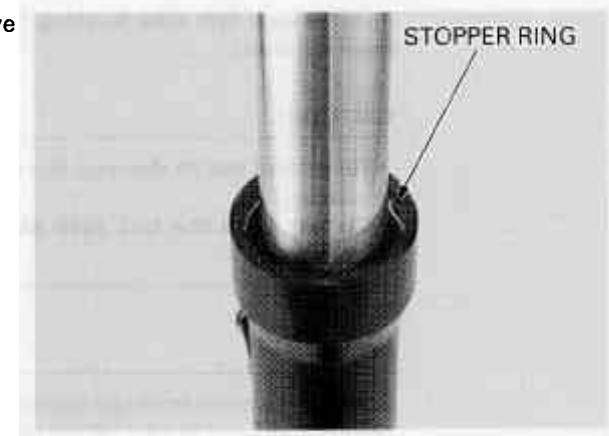
TOOLS:

Slider weight	07947-KA50100
Oil seal driver	07947-KA40200





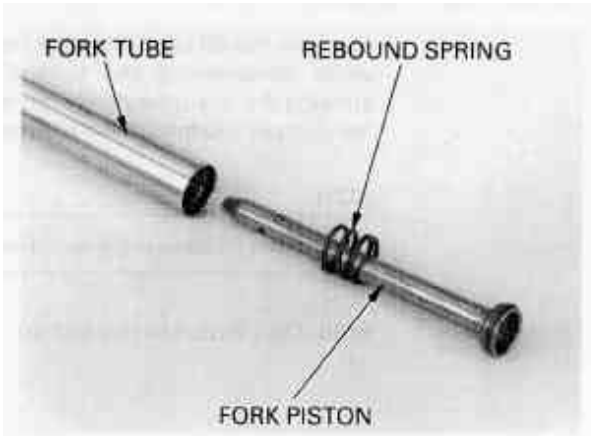
Install the stopper ring into the fork slider groove securely.



Install the dust seal.



Install the rebound spring to the fork piston.
Install the fork piston into the fork tube.



Hold the fork slider in a vise with soft jaws or a shop towel.
Clean and apply a locking agent to the fork socket bolt threads.
Install the socket bolt with a new sealing washer.

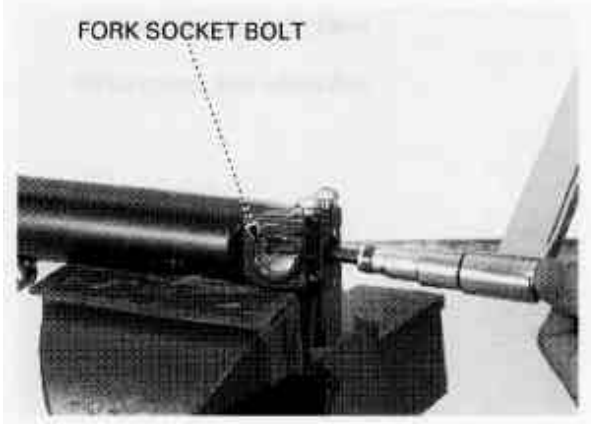


Tighten the bolt to the specified torque.

NOTE:

If the fork piston turns together with the socket bolt, temporarily install the fork spring, spring spacer, fork spring collar and fork cap.

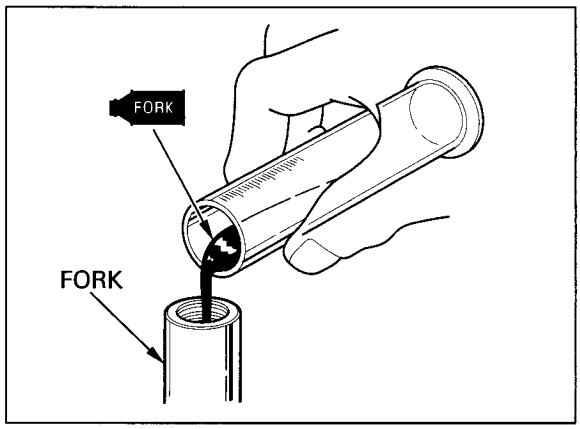
TORQUE: 20 N·m (2.0 kgf·m , 14 lbf·ft)



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

RECOMMENDED FORK FLUID: Fork fluid
FORK FLUID CAPACITY:
529 ± 2.5 cm³ (17.9 ± 0.08 US oz, 18.7 ± 0.09 Imp oz)

Pump the fork tube several times.

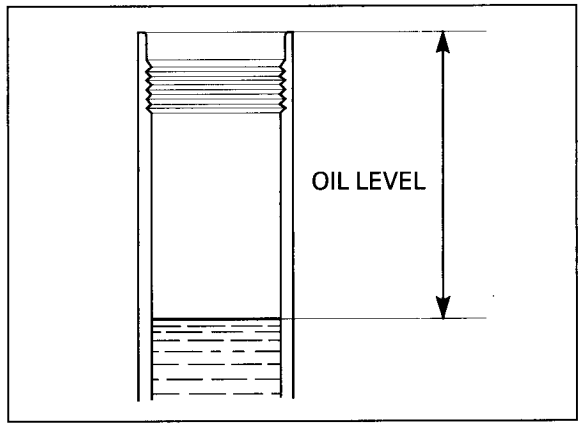


Measure the oil level from the top of the fork tube while compressing the tube all the way after stroking the fork tube slowly more than 5 times and the damper rod more than 10 times.

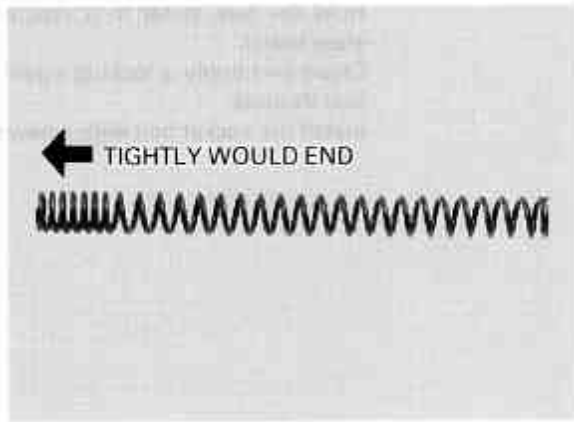
NOTE:

Be sure the oil level is the same in the both forks.

FORK OIL LEVEL:114 mm (4.5 in)

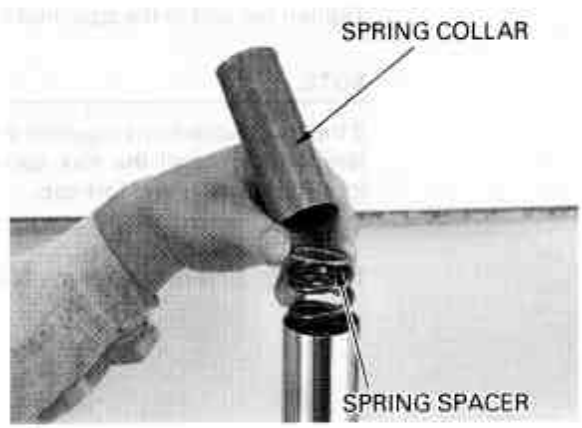


Pull the fork tube up and install the fork spring with the tightly would end facing down.



Install the spring spacer.

Install the fork spring collar.

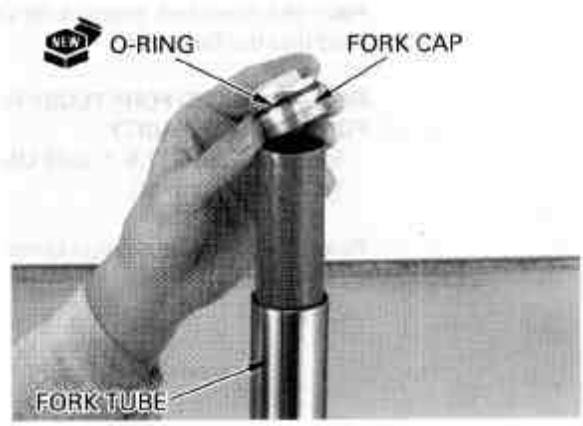


Install new O-rings onto the fork cap.
Apply fork fluid to the new O-rings.

Install the fork cap into the fork tube.

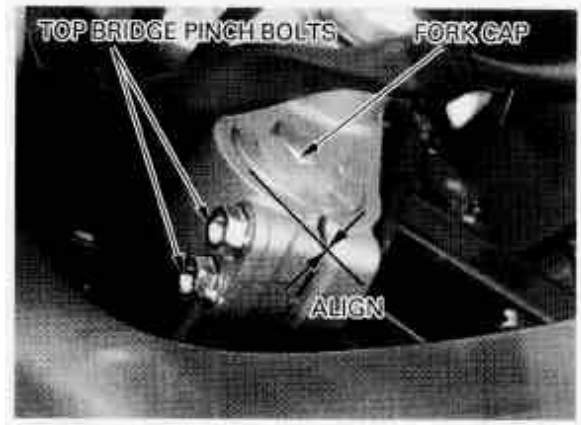
NOTE:

Tighten the fork cap after installing the fork tube into the fork bridge.



INSTALLATION

Install the fork legs into the steering stem and fork top bridge.
Align the top end of the fork tube with the upper surface of the top bridge as shown.



Tighten the bottom bridge pinch bolt to the specified torque.

TORQUE: 27 N·m (2.8 kgf·m , 20 lbf·ft)

Tighten the fork cap to the specified torque (if it was removed).

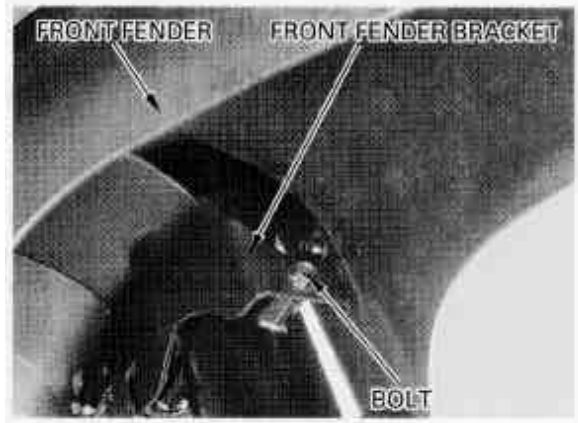
TORQUE: 22 N·m (2.2 kgf·m , 16 lbf·ft)



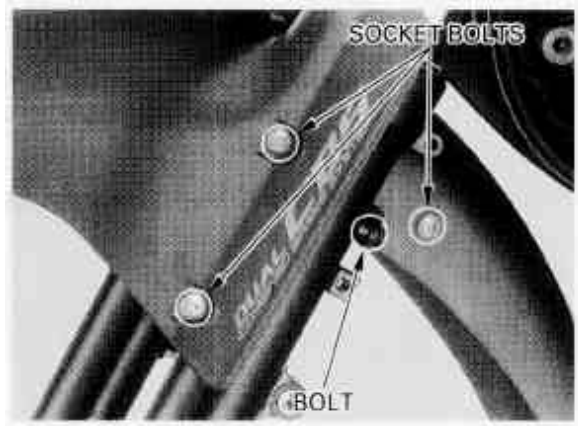
Tighten the top bridge pinch bolt to the specified torque.

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

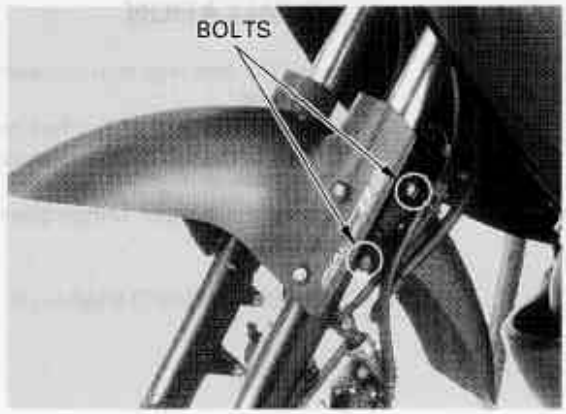
Install the front fender bracket and front fender.
Install the bolt.



Install the bolt and socket bolts.



Install and tighten the brake pipe/hose clamp bolts securely.



Install the following:
—New secondary master cylinder mounting bolts

TORQUE: 31 N·m (3.2 kgf·m , 23 lbf·ft)

—New left brake caliper pivot bolts

TORQUE: 31 N·m (3.2 kgf·m , 23 lbf·ft)

—Front wheel (page 13-16).

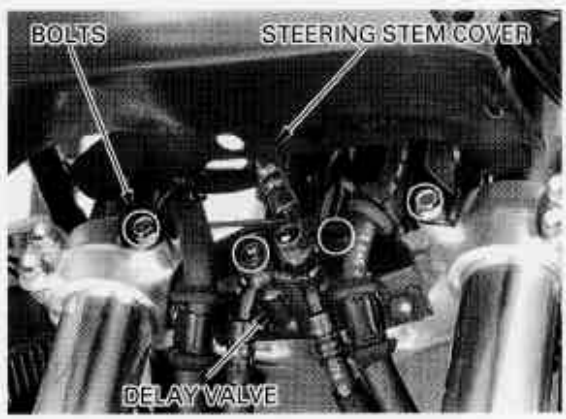


STEERING STEM

REMOVAL

Remove the following:
—Front wheel (page 13-12)
—Handlebar (page 13-3)

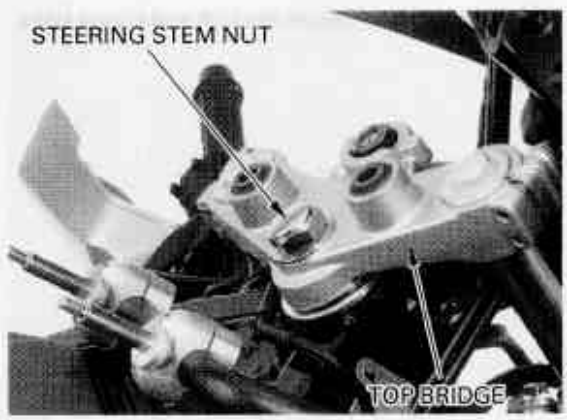
Remove the bolts and steering stem cover.
Remove the bolts and delay valve.



Loosen the steering stem nut.

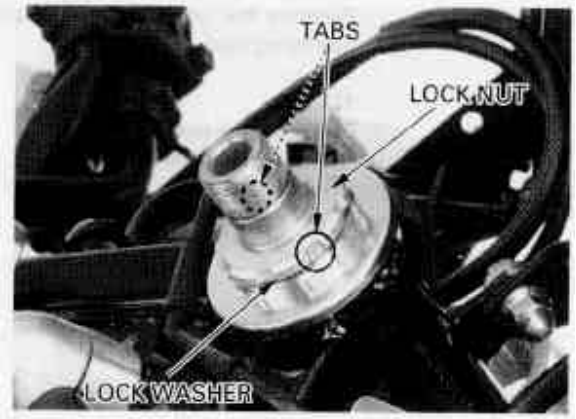
Remove the fork legs (page 13-18).
Disconnect the ignition switch 3P connector (page 19-16).

Remove the stem nut and the top bridge.



Straighten the tabs of the lock washer.

Remove the lock nut and lock washer.



Remove the steering stem bearing adjusting nut using the special tool.

TOOL:
Steering stem socket 07916-3710101



Remove the following:
- Dust seal
- Upper bearing inner race
- Upper bearing
- Steering stem
- Lower bearing

Check the steering bearings, inner and outer races for wear or damage.



BEARING REPLACEMENT

NOTE:

Always replace the bearings and races as a set.

Remove the lower bearing outer races using the following tool.

TOOL:
Bearing race remover 07946-3710500



Remove the upper bearing outer races using the following tool.

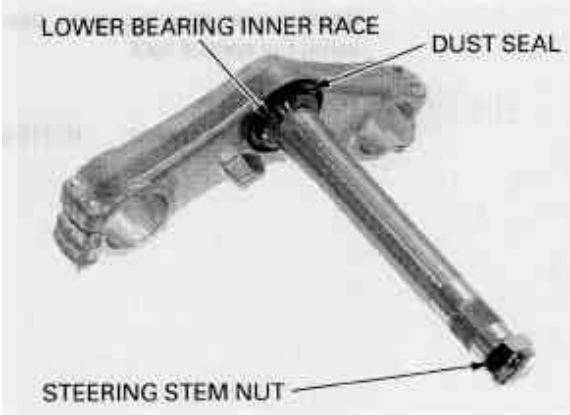
TOOLS:

Ball race remover	07953-MJ10000
Driver attachment	07953-MJ10100
Driver handle	07953-MJ10200



Temporarily install the steering stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.

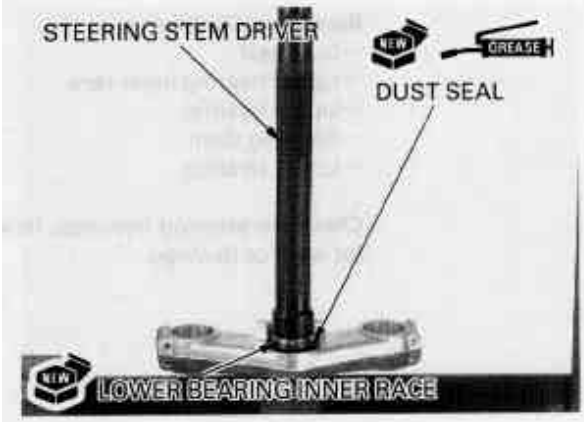
Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.
Remove the dust seal.



Apply grease to new dust seal lips and install it over the steering stem.
Install a new lower bearing inner race using a special tool and a hydraulic press.

TOOL:

Steering stem driver	07946-MB00000



Drive the new upper bearing outer race into the head pipe using the following tools.

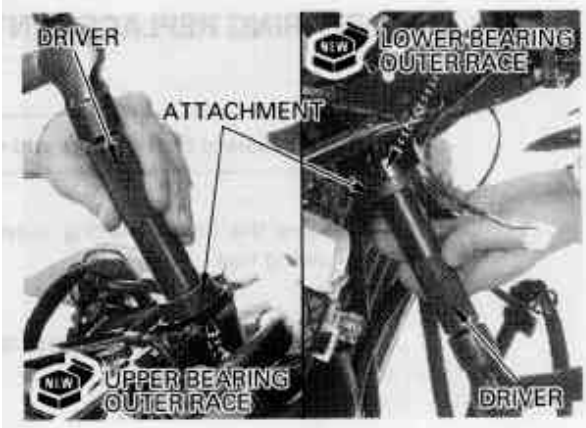
TOOLS:

Driver	07749-0010000
Driver attachment, 42 × 47 mm	07746-0010300

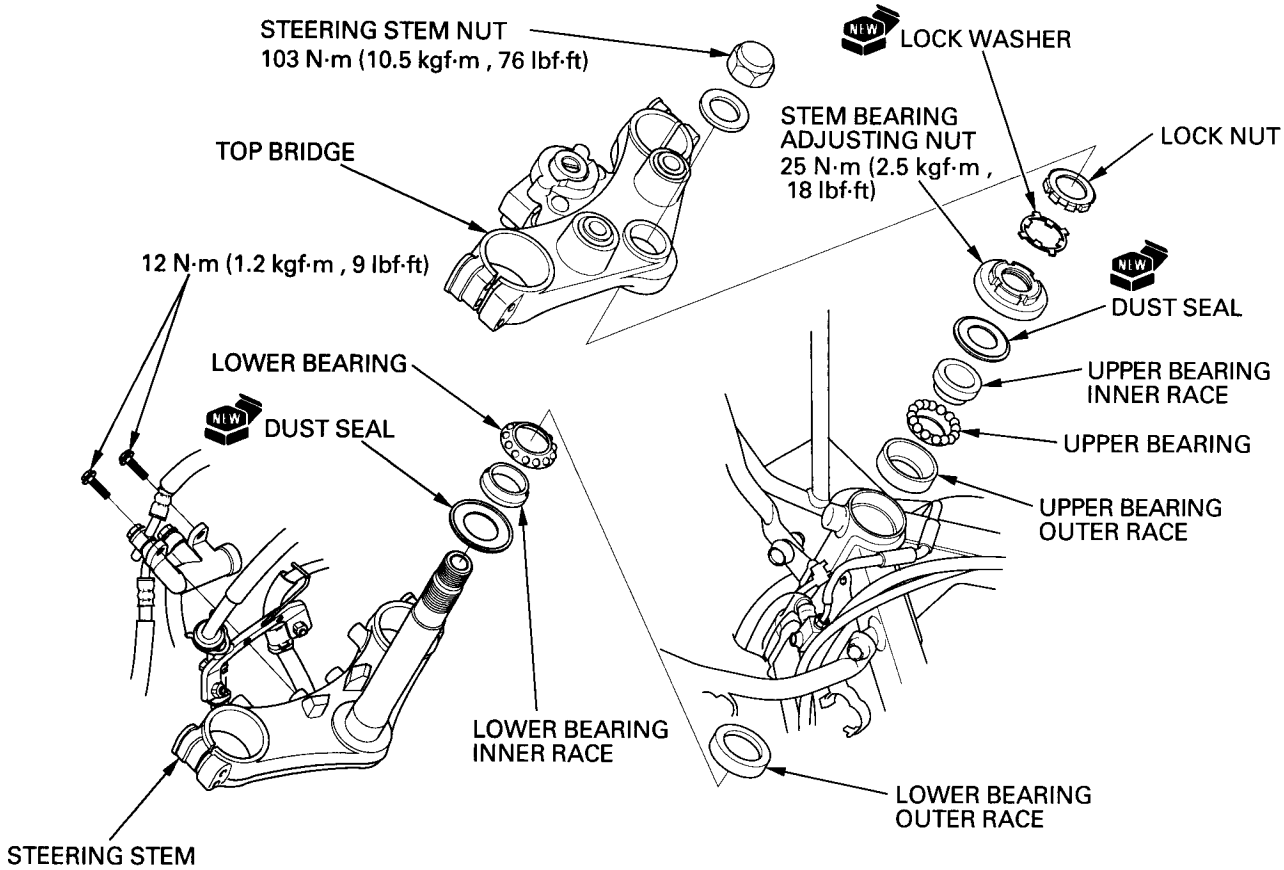
Drive the new lower bearing outer race into the head pipe using the following tools.

TOOLS:

Driver	07749-0010000
Driver attachment, 52 × 55 mm	07746-0010400



INSTALLATION

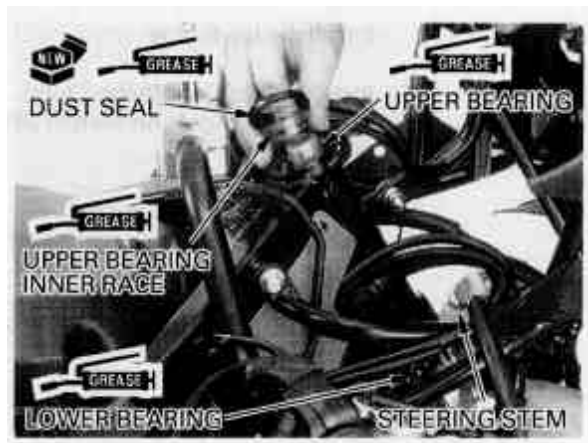


Apply grease to the lower bearing and bearing race.

Install the lower bearing onto the steering stem.
Insert the steering stem into the steering head pipe.

Apply grease to the upper bearing and bearing race.

Install upper bearing, inner race and dust seal.



Install and tighten the stem bearing adjusting nut to the initial torque.

TOOL:
Steering stem socket 07916-3710101

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



Move the steering stem right and left, lock-to-lock, five times to seat the bearings.
Make sure that the steering stem moves smoothly, without play or binding; then loosen the bearing adjusting nut.
Retighten the bearing adjusting nut to the specified torque.

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

Recheck that the steering stem moves smoothly without play or binding.

Install the new lock washer onto the steering stem.

Align the tabs of the lock washer with the grooves in the adjusting nut and bend two opposite tabs (shorter) down into the adjusting nut groove.



Install and finger tighten the lock nut.
Hold the lock nut and further tighten the lock nut within 1/4 turn (90°) enough to align its grooves with the lock washer tabs.

Bend the lock washer tabs up into the lock nut groove.



Install the top bridge.

Install the fork legs (page 13-29).
Connect the ignition switch 3P connector (page 19-16).

Install the steering stem nut.
Tighten the steering stem nut to the specified torque.

TORQUE: 103 N·m (10.5 kgf·m , 76 lbf·ft)

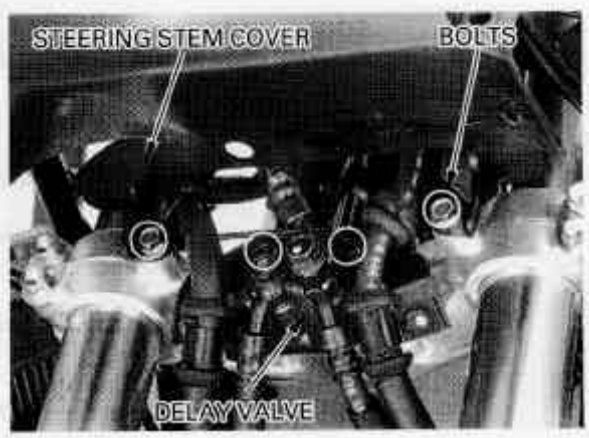


Install the delay valve and tighten the bolts to the specified torque.

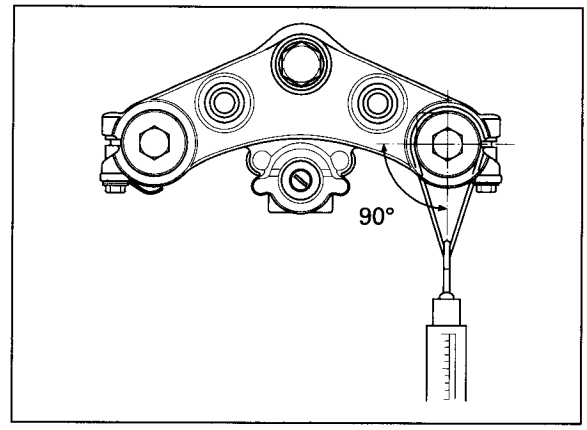
TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the steering stem cover and tighten the bolts securely.

Install the front wheel (page 13-16).



STEERING HEAD BEARING PRE-LOAD



Remove the upper cowl (page 2-6).

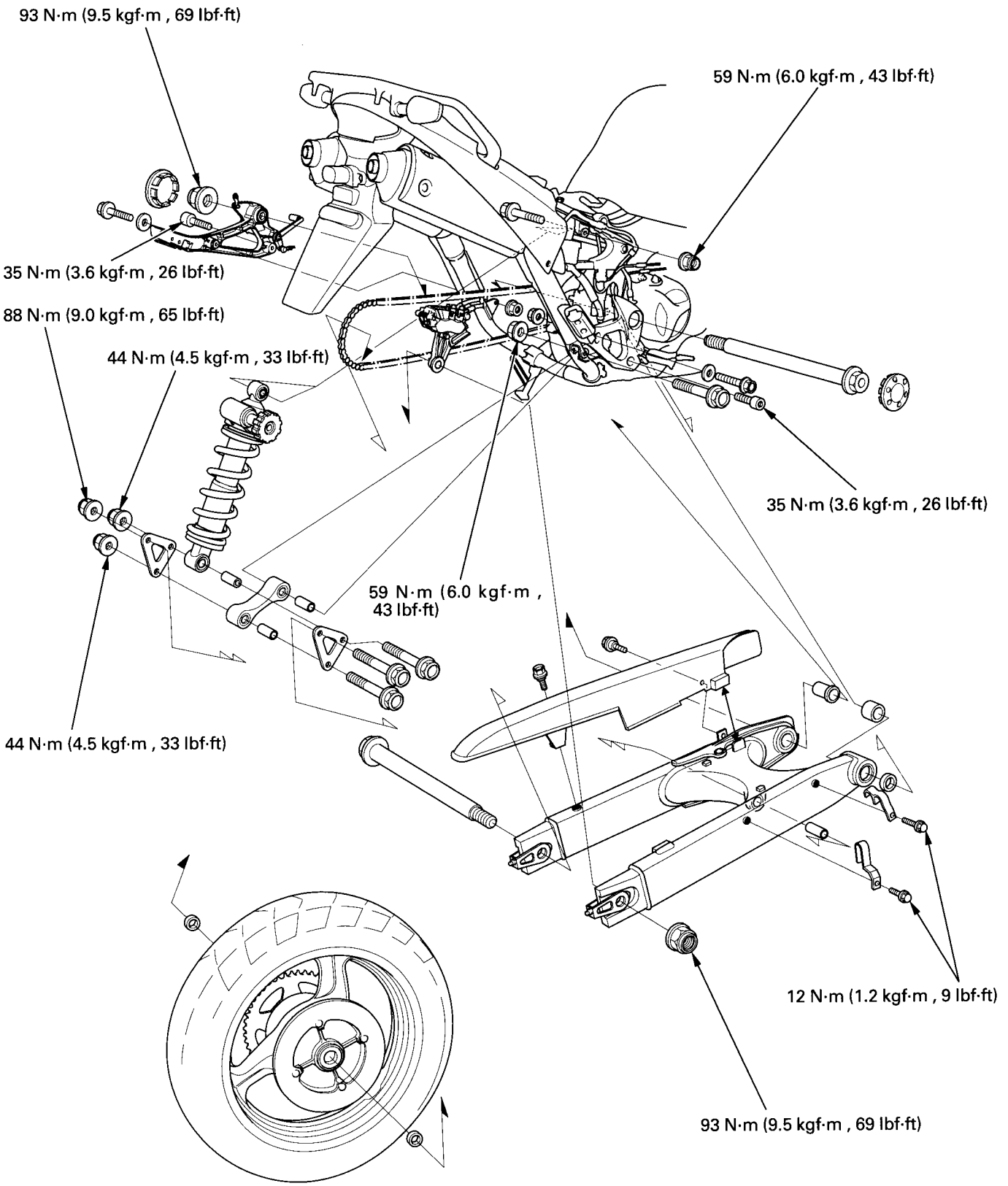
Jack-up the motorcycle to raise the front wheel off the ground.

Position the steering stem to the straight ahead position.
Hook a spring scale to the fork tube and measure the steering head bearing pre-load.

NOTE:

Make sure that there is no cable or wire harness interference.

The pre-load should be within 1.0 – 1.5 kgf (2.2 – 3.3 lbf).
If the readings do not fall within the limits, lower the front wheel to the ground and adjust the steering bearing adjusting nut.


93 N·m (9.5 kgf·m , 69 lbf·ft)
59 N·m (6.0 kgf·m , 43 lbf·ft)
35 N·m (3.6 kgf·m , 26 lbf·ft)
88 N·m (9.0 kgf·m , 65 lbf·ft)
44 N·m (4.5 kgf·m , 33 lbf·ft)
35 N·m (3.6 kgf·m , 26 lbf·ft)
59 N·m (6.0 kgf·m , 43 lbf·ft)
44 N·m (4.5 kgf·m , 33 lbf·ft)
12 N·m (1.2 kgf·m , 9 lbf·ft)
93 N·m (9.5 kgf·m , 69 lbf·ft)

14. REAR WHEEL/SUSPENSION

SERVICE INFORMATION	14-1	SHOCK ABSORBER	14-9
TROUBLESHOOTING	14-2	SUSPENSION LINKAGE	14-12
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.
- Use only tires marked "TUBELESS" and tubeless valves on rim marked "TUBE LESS TIRE APPLICABLE".
- 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		250 kPa (2.50 kgf/cm², 36 psi)	—
	Driver and passenger		280 kPa (2.80 kgf/cm², 41 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.
Drive chain	Size/link	DID	DID525 HV/112 LE	—
		RK	RK525 ROZ1/112 LE	—
	Slack		35—45 (1 3/8—1 3/4)	—

TORQUE VALUES

Rear axle nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
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)	
Shock absorber upper mounting nut	59 N·m (6.0 kgf·m, 43 lbf·ft)	U-nut
Shock absorber lower mounting nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	U-nut
Swingarm-to-shock link plate nut	88 N·m (9.0 kgf·m, 65 lbf·ft)	U-nut
Shock link-to-shock link plate nut	44 N·m (4.5 kgf·m, 33 lbf·ft)	U-nut
Shock link-to-bracket nut	59 N·m (6.0 kgf·m, 43 lbf·ft)	U-nut
Swingarm pivot nut	93 N·m (9.5 kgf·m, 69 lbf·ft)	U-nut
Drive chain slider screw	4 N·m (0.42 kgf·m, 3.0 lbf·ft)	Apply a locking agent to the threads
Rear brake hose guide bolt	12 N·m (1.2 kgf·m, 9 lbf·ft)	
Shock link bracket bolt (12 mm)	54 N·m (5.5 kgf·m, 40 lbf·ft)	
(14 mm)	59 N·m (6.0 kgf·m, 43 lbf·ft)	

TOOLS

Bearing remover shaft	07746-0050100
Bearing remover head, 20 mm	07746-0050600
Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Attachment, 37 × 40 mm	07746-0010200
Attachment, 42 × 47 mm	07746-0010300
Attachment, 52 × 55 mm	07746-0010400
Attachment, 62 × 68 mm	07746-0010500
Driver handle attachment	07949-3710001
Attachment, 24 × 26 mm	07746-0010700
Attachment, 22 × 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400
Pilot, 20 mm	07746-0040500
Pilot, 25 mm	07746-0040600
Pilot, 28 mm	07746-0041100
Needle bearing remover	07LMC-KV30100

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

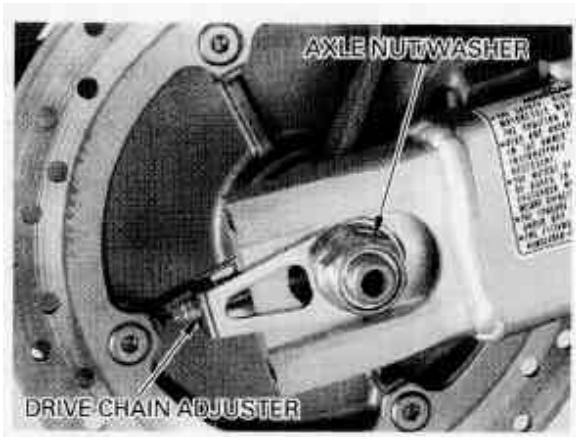
Rear suspension noise
- Faulty rear shock absorber
- Loose rear suspension fasteners
- Worn rear suspension pivot bearings

REAR WHEEL

REMOVAL

Loosen the drive chain adjusters and rear axle nut. Support the motorcycle securely using a hoist or equivalent.

Remove the axle nut and washer.



Push the rear wheel forward.
Derail the drive chain from the driven sprocket.

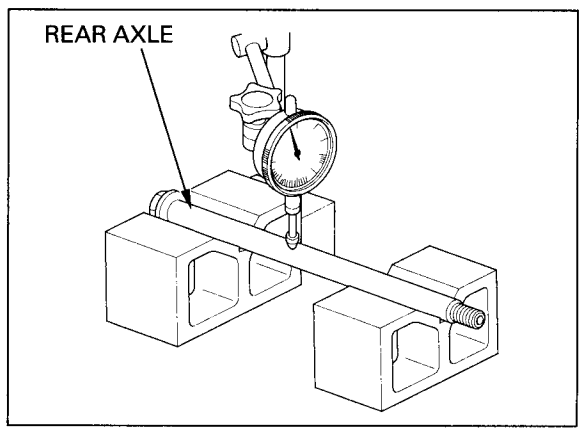
Remove the axle from the left side and remove the rear wheel.



INSPECTION

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

SERVICE LIMIT: 0.20 mm (0.008 in)

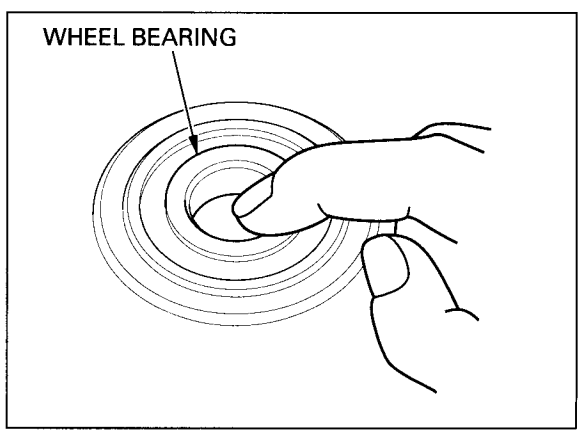


Wheel bearing
Turn the inner race of each bearing with your finger. Bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

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

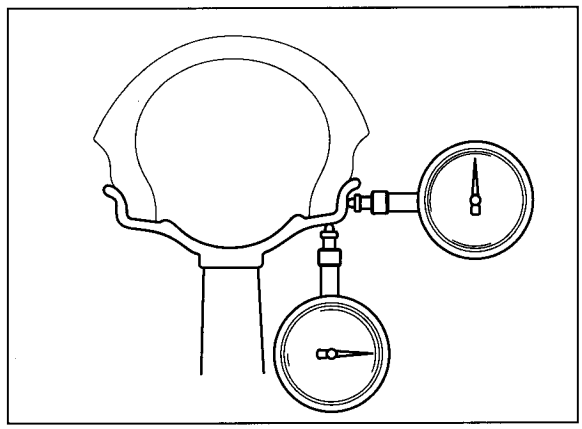
NOTE:

Replace the wheel bearings in pairs.

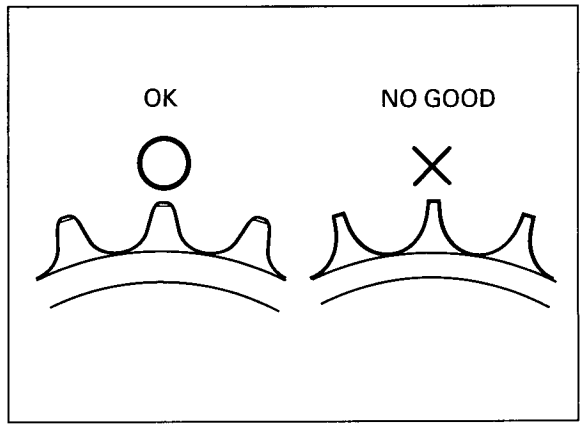


Wheel rim runout
Check the rim runout by placing the wheel in a turning stand.
Spin the wheel slowly and read the runout using a dial indicator.
Actual runout is 1/2 the total indicator reading.

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



Driven sprocket
Check the condition of the final driven sprocket teeth.
Replace the sprocket if worn or damaged.



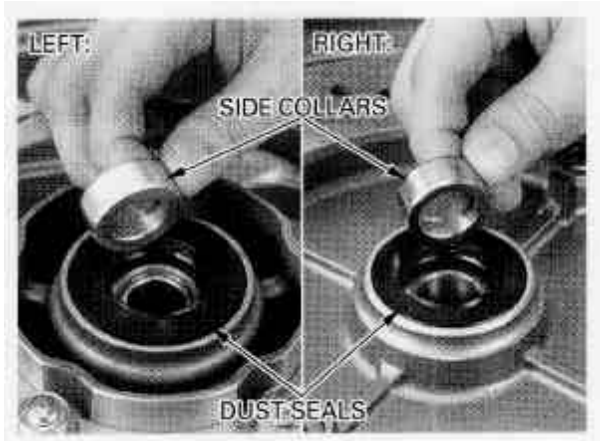
NOTE:

- If the final driven sprocket requires replacement, inspect the drive chain and drive sprocket.
- Never install a new drive chain on a worn sprocket or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the replacement chain or sprocket will wear rapidly.

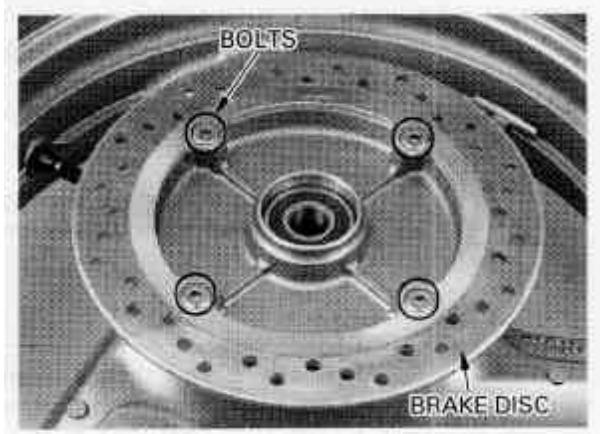
Wheel balance
See page 13-13 for wheel balance.

DISASSEMBLY

Remove the side collars and dust seals.



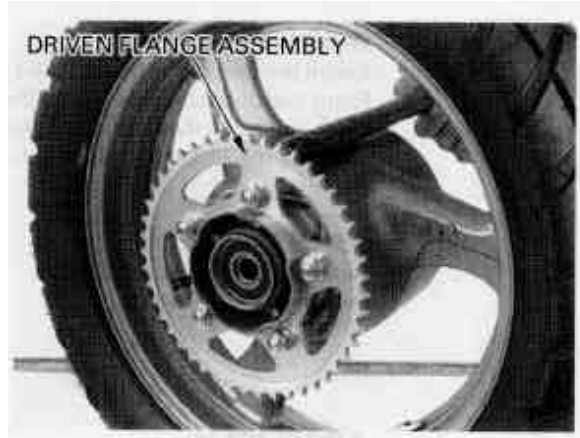
Remove the bolts and brake disc.



Remove the driven flange assembly from the left wheel hub.

NOTE:

If you will be disassemble the driven flange, loosen the driven sprocket nuts before removing the driven flange from the wheel hub.



Remove the wheel damper rubbers.
Remove the O-ring.



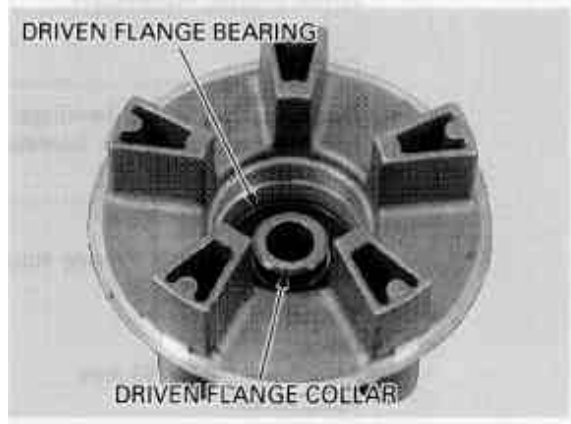
Driven flange bearing removal
Loosen the driven sprocket nuts.

Remove the driven flange from the wheel hub, then remove the driven sprocket nuts and sprocket.



Remove the driven flange collar.

Drive out the driven flange bearing.

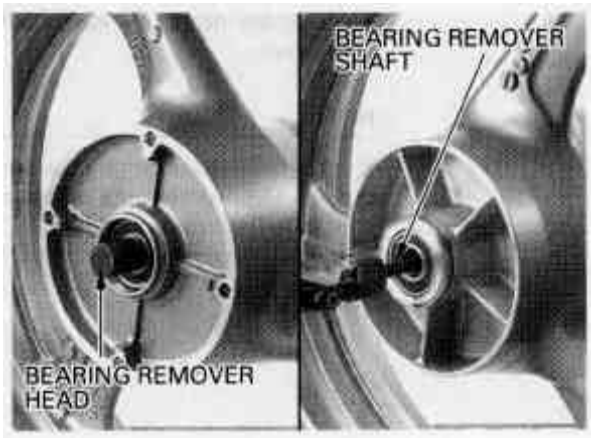


Wheel bearing removal

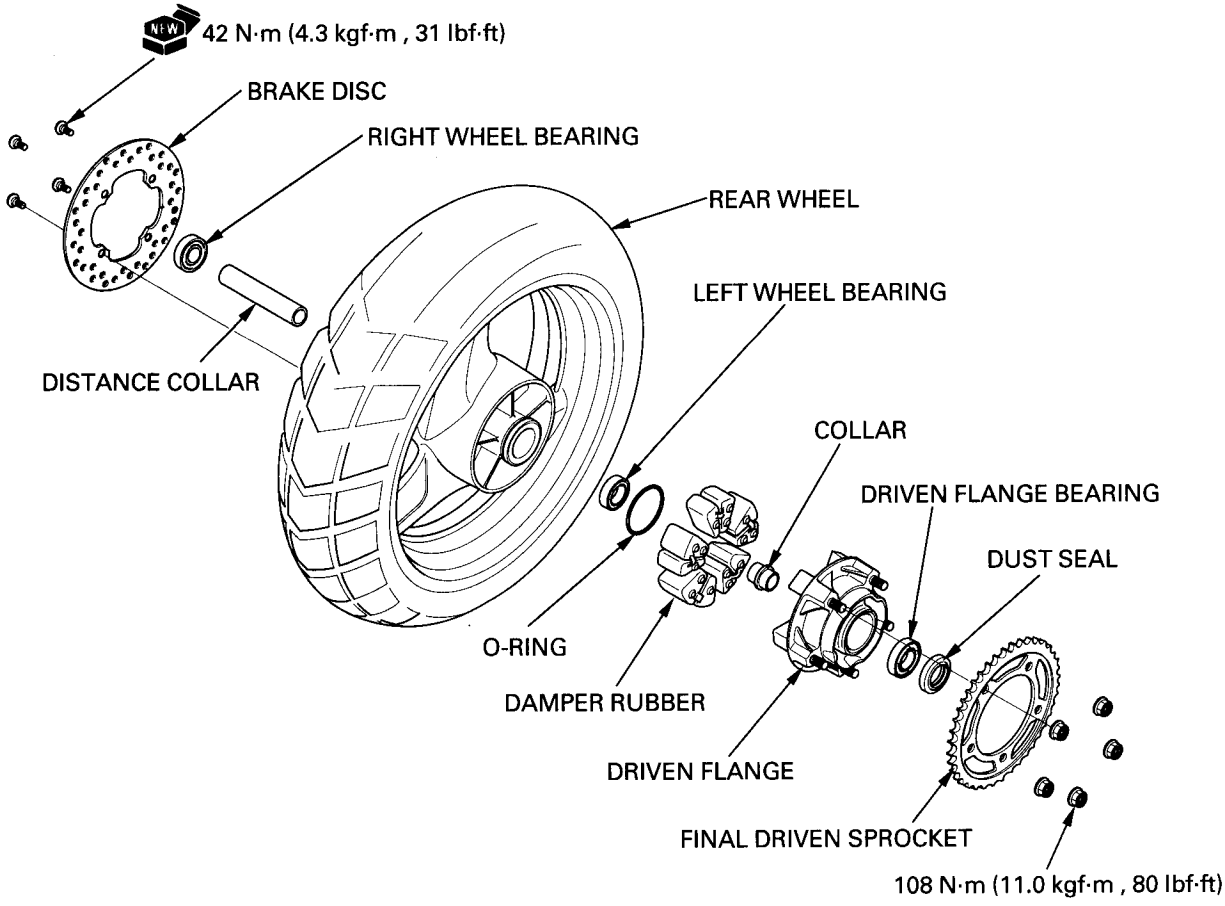
Install the bearing remover head into the bearing. From the opposite side install the bearing remover shaft and drive the bearing out of the wheel hub. Remove the distance collar and drive out the other bearing.

TOOLS:

Bearing remover head, 20 mm	07746-0050600
Bearing remover shaft	07746-0050100



ASSEMBLY



Wheel bearing installation

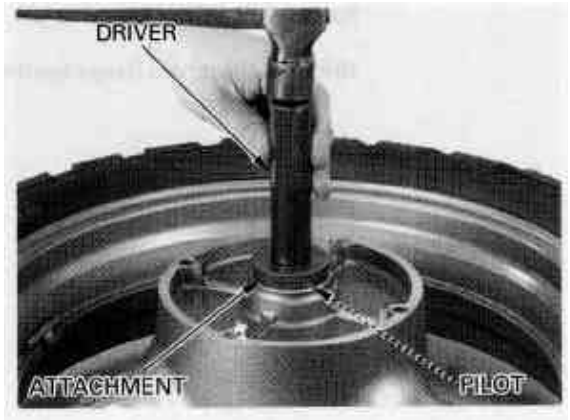
CAUTION:

Never install the old bearings, once the bearings has been removed, the bearing must be replaced with new ones.

Drive in a new right bearing squarely.

TOOLS:

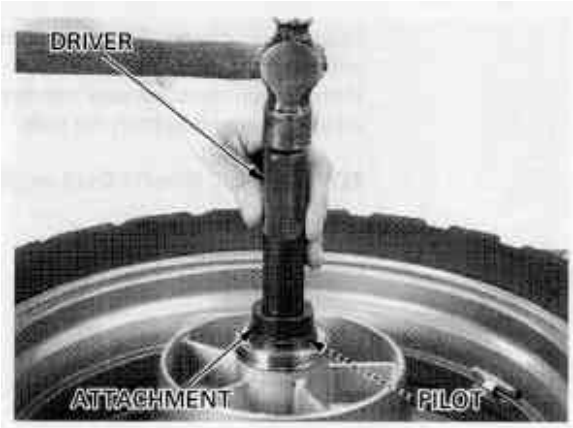
Driver	07749-0010000
Attachment, 52 × 55 mm	07746-0010400
Pilot, 20 mm	07746-0040500



Install the distance collar, then drive in the left side bearing.

TOOLS:

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

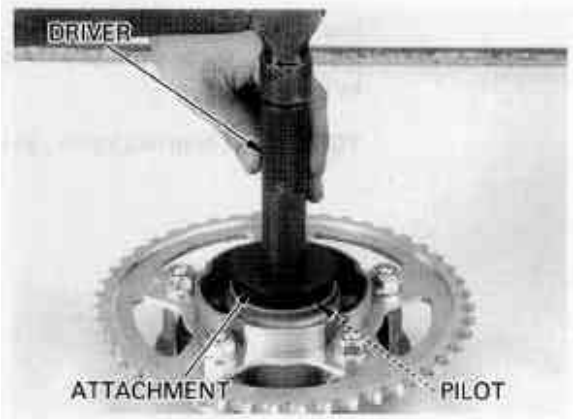


Driven flange bearing installation

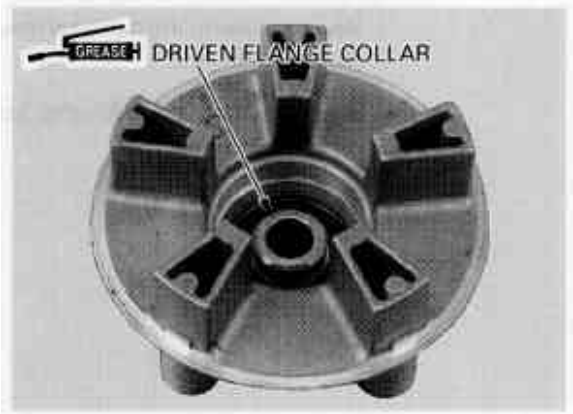
Drive the new driven flange bearing into the driven flange using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 62 × 68 mm	07746-0010500
Pilot, 25 mm	07746-0040600

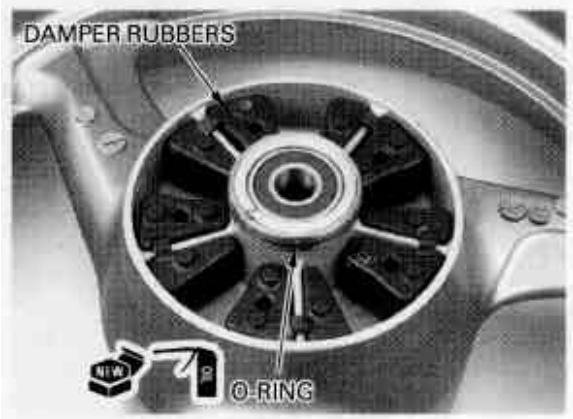


Apply grease and install the driven flange collar.



Install the wheel damper rubbers into the wheel hub.

Apply oil to the new O-ring and install it into the groove of the wheel hub.



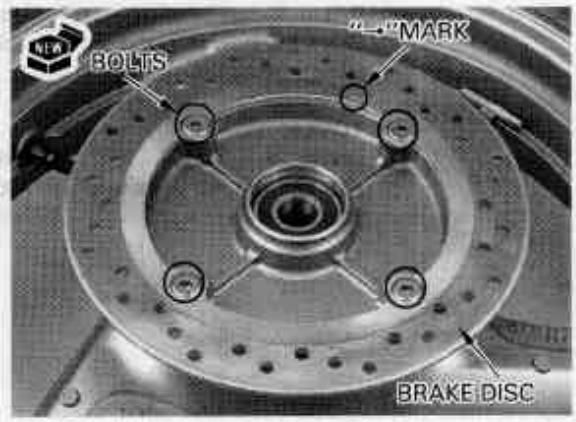
Install the driven flange assembly into the left wheel hub.
If the driven sprocket was removed, install the driven sprocket and tighten the nuts.

TORQUE: 108 N·m (11.0 kgf·m , 80 lbf·ft)



Install the brake disc with its "→" mark facing out.
Install and tighten the new bolts to the specified torque.

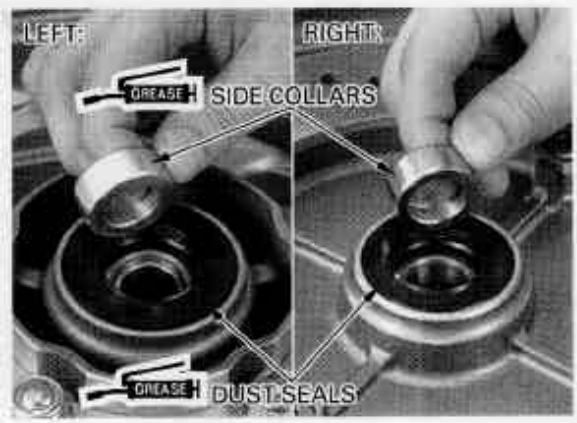
TORQUE: 42 N·m (4.3 kgf·m , 31 lbf·ft)



Apply grease to the dust seal lips, then install it into the driven flange.

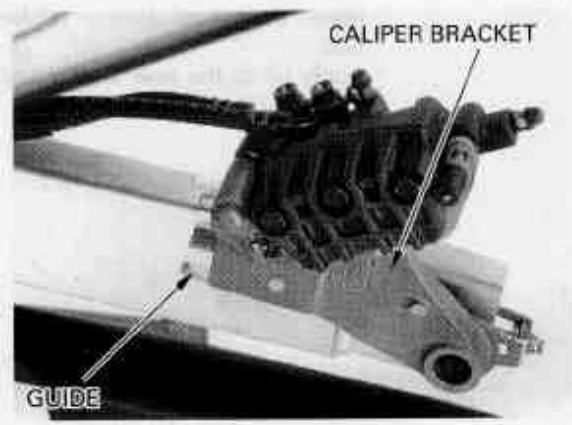
Apply grease to the side collar inside.

Install the side collars.



INSTALLATION

Install the rear brake caliper bracket onto the guide of the swingarm.



Place the rear wheel into the swingarm.
Install the drive chain over the driven sprocket.
Install the axle from the left side.

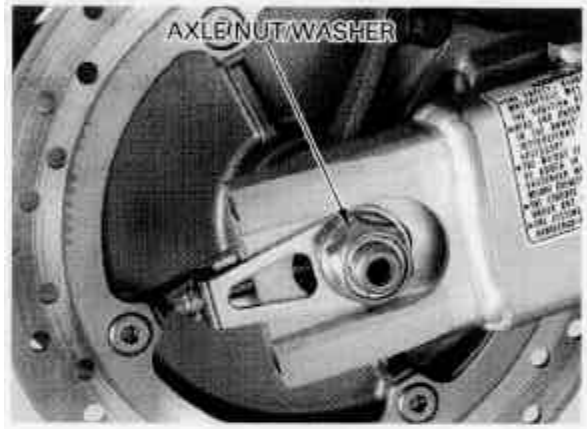


Install the washer and loosely install the axle nut.

Adjust the drive chain slack (page 3-16).

Tighten the axle nut to the specified torque.

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



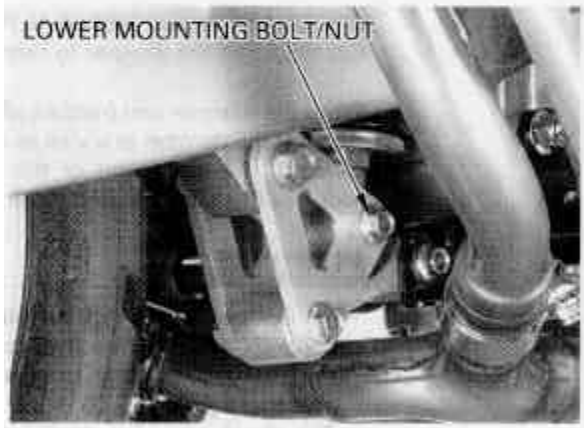
SHOCK ABSORBER

REMOVAL

Support the motorcycle securely using a hoist or equivalent.

Remove the side cover (page 2-2).

Remove the shock absorber lower mounting bolt/nut.



Remove the upper mounting bolt/nut and shock absorber.

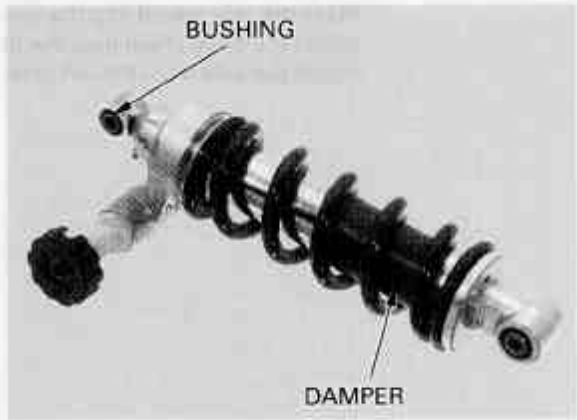


INSPECTION

Visually inspect the damper unit for damage.

Check for the:
- Damper rod for bend or damage
- Damper unit for deformation or oil leaks
- Upper mounting bushing for wear or damage

Inspect all the other parts for wear or damage.



Remove the lower joint pivot collar and dust seals.

Check the dust seals and needle bearing for wear or damage.

Replace them if necessary.



SHOCK ABSORBER DISPOSAL PROCEDURE

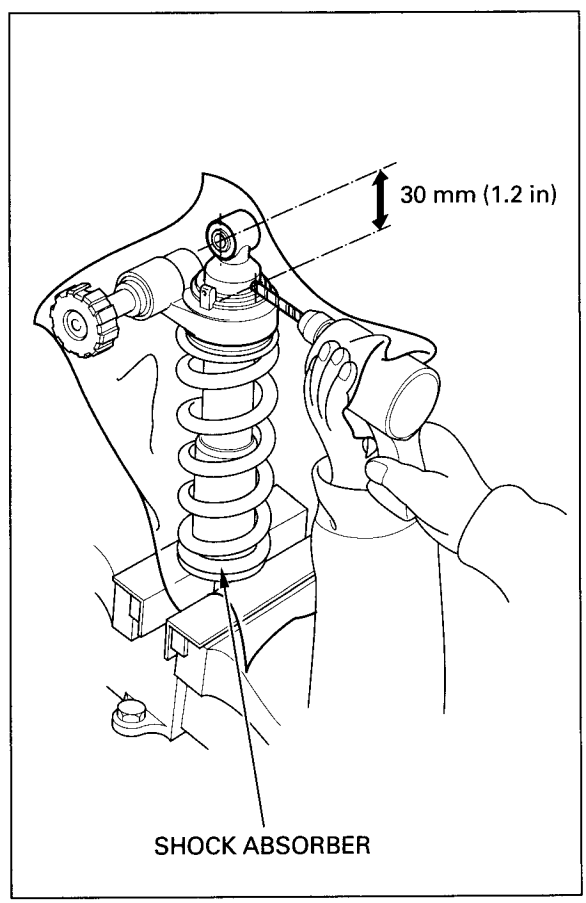
Center punch the damper to mark the drilling point.

Wrap the damper unit inside a plastic bag.
Support the damper in a vise as shown.
Through the open end of the bag, insert a drill motor with a sharp 30 mm (1.2 in) drill bit.

⚠WARNING

- ***Do not use a dull drill bit which could cause a build-up of excessive heat and pressure inside the damper, leading to explosion and severe personal injury.***
- ***The shock absorber contains nitrogen gas and oil under high pressure. Do not drill any farther down the damper case than the measurement given above, or you may drill into the oil chamber; oil escaping under high pressure may cause serious personal injury.***
- ***Always wear eye protection to avoid getting metal shaving in your eyes when the gas pressure is released. The plastic bag is only intended to shield you from the escaping gas.***

Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from getting caught in the bit when you start.



LOWER JOINT NEEDLE BEARING REPLACEMENT
Remove the pivot collar and dust seals.

Set the damper in a hydraulic press.

CAUTION:

Place the damper with the rebound damping adjuster facing up.

Press the needle bearing out from the lower joint.

TOOLS:

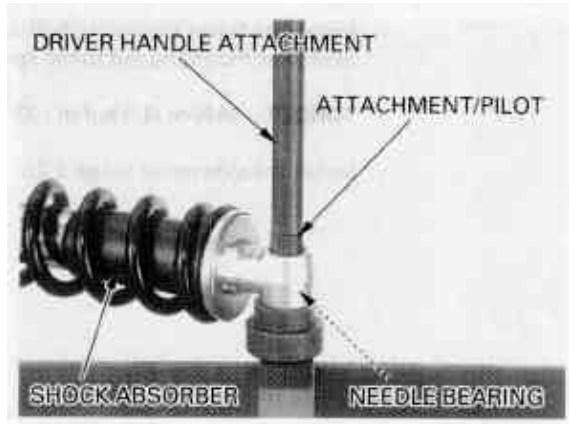
Driver handle attachment	07949-3710001
Attachment, 22 × 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400

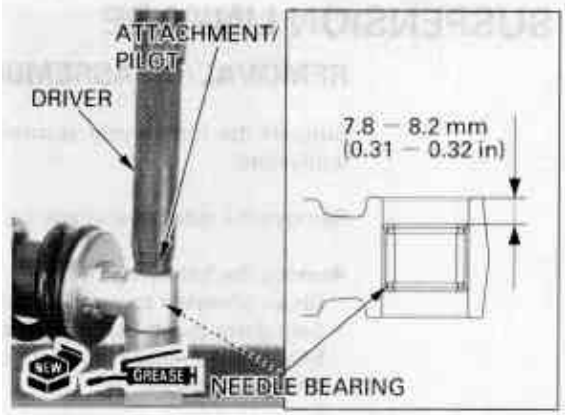
Pack a new needle bearing with multi-purpose grease.
Press the needle bearing into the lower joint until the depth from the lower joint outer surface is 7.8−8.2 mm (0.31−0.32 in), using the special tools.

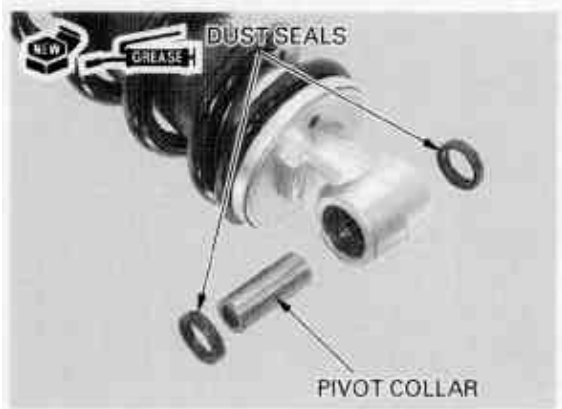
TOOLS:

Driver	07749-0010000
Attachment, 24 × 26 mm	07746-0010700
Pilot, 17 mm	07746-0040400

Apply grease to the new dust seal lips.
Install the dust seals and pivot collar.







INSTALLATION

Install the shock absorber into the frame with the rebound damping adjuster facing to the right.

Install the upper mounting bolt and nut and tighten the upper mounting nut to the specified torque.

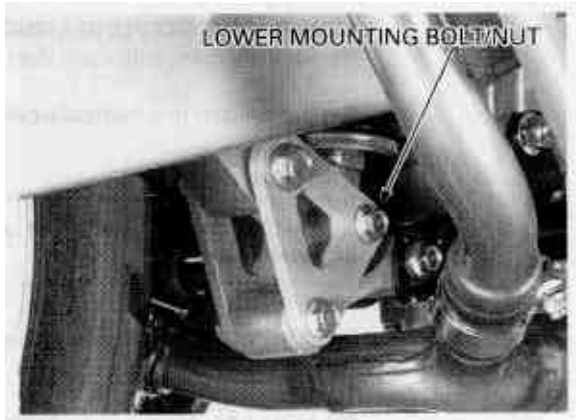
TORQUE: 59 N·m (6.0 kgf·m , 43 lbf·ft)



Install the lower mounting bolt and nut and tighten the lower mounting nut to the specified torque.

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

Install the side cover (page 2-2).



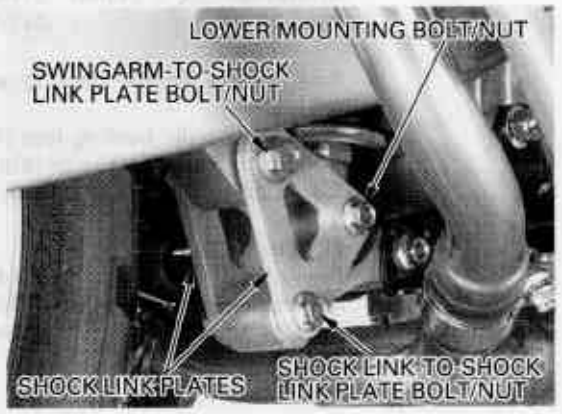
SUSPENSION LINKAGE

REMOVAL/DISASSEMBLY

Support the motorcycle securely using a hoist or equivalent.

Remove the side cover (page 2-2).

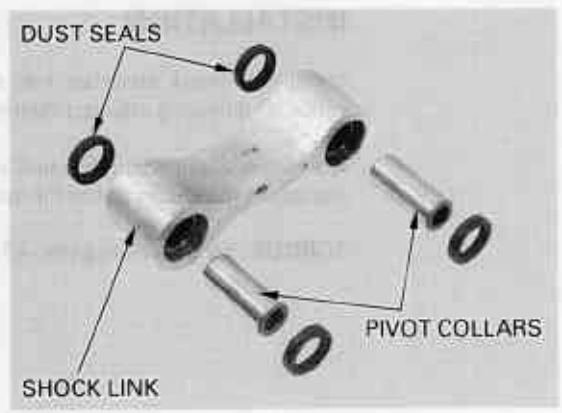
Remove the following:
- Shock absorber lower mounting bolt/nut
- Swingarm-to-shock link plate bolt/nut
- Shock link-to-shock link plate bolt/nut
- Shock link plates



- Shock link-to-bracket bolt/nut
- Shock link

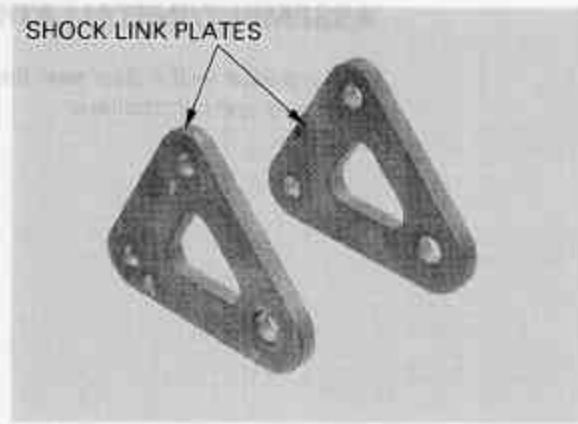


Remove the pivot collar and dust seals from the shock link.



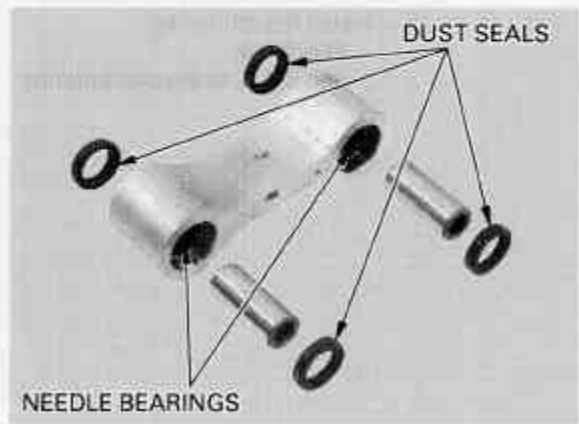
INSPECTION

Check the shock link plates for damage or fatigue.



Check the dust seals and collars for wear, damage or fatigue.
Check the needle bearings for damage or loose fit.

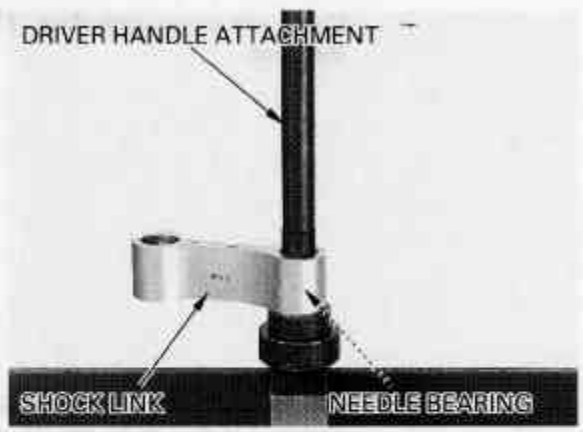
If the needle bearings are damaged, replace them.



SHOCK LINK NEEDLE BEARING REPLACEMENT
Press the needle bearing out of the shock link using special tools and a hydraulic press.

TOOLS:

Driver handle attachment	07949-3710001
Attachment, 22 × 24 mm	07746-0010800
Pilot, 17 mm	07746-0040400



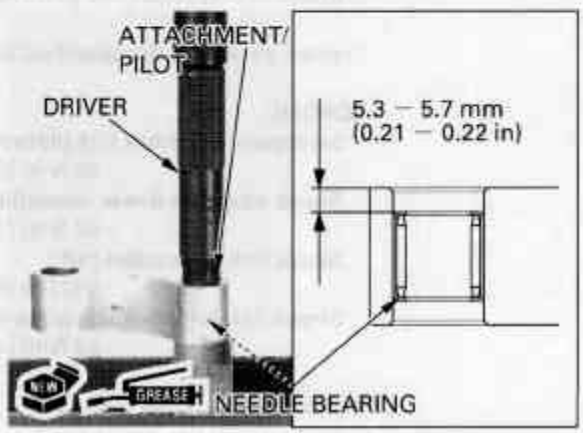
Pack a new needle bearing with multi-purpose grease.
Press a new needle bearing into the shock link so that the needle bearing surface is lower 5.3–5.7 mm (0.21–0.22 in) from the end of the shock link surface.

NOTE:

Press the needle bearing into the shock link with the marked side facing out.

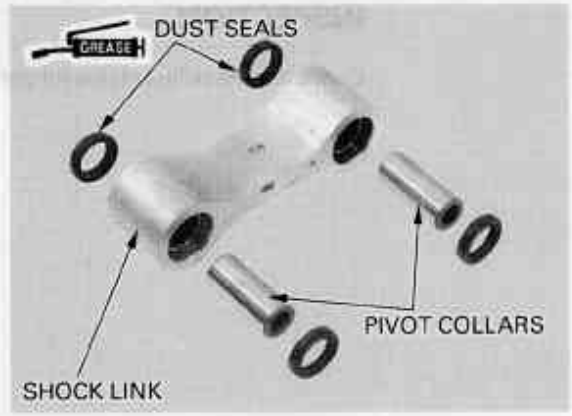
TOOLS:

Driver	07749-0010000
Attachment, 24 × 26 mm	07746-0010700
Pilot, 17 mm	07746-0040400

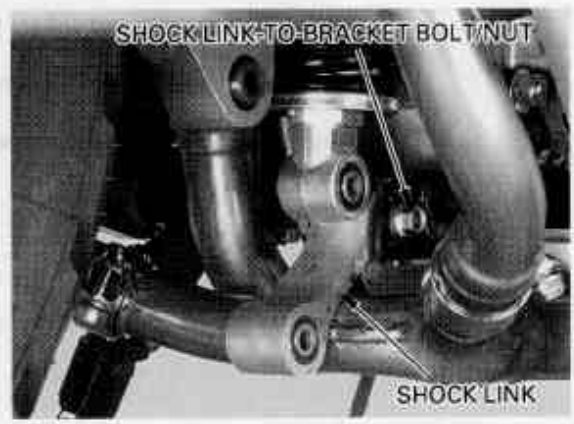


ASSEMBLY/INSTALLATION

Apply grease to the dust seal lips, then install the dust seals and pivot collars.



Install the following:
- Shock link
- Shock link-to-bracket bolt/nut



- Shock link plates with their "FR" mark facing to the front.



- Swingarm-to-shock link plate bolt/nut
- Shock absorber lower mounting bolt/nut
- Shock link-to-shock link plate bolt/nut

Tighten all nuts to the specified torque.

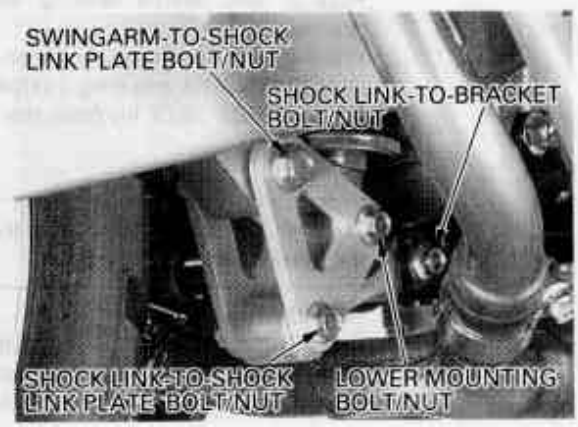
TORQUE:

Swingarm-to-shock link plate nut:
88 N·m (9.0 kgf·m , 65 lbf·ft)

Shock absorber lower mounting nut:
44 N·m (4.5 kgf·m , 33 lbf·ft)

Shock link-to-bracket nut:
59 N·m (6.0 kgf·m , 43 lbf·ft)

Shock link-to-shock link plate nut:
44 N·m (4.5 kgf·m , 33 lbf·ft)



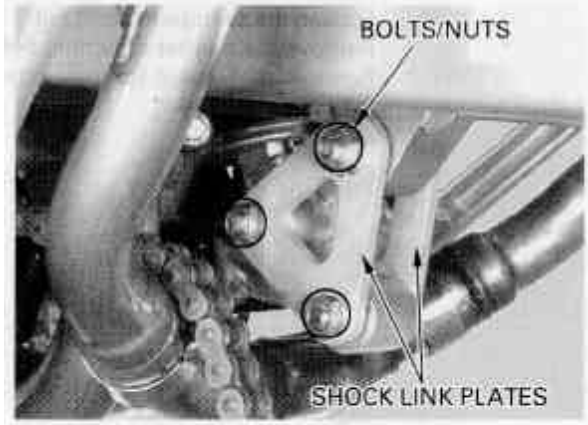
Install the side cover (page 2-2).

SWINGARM

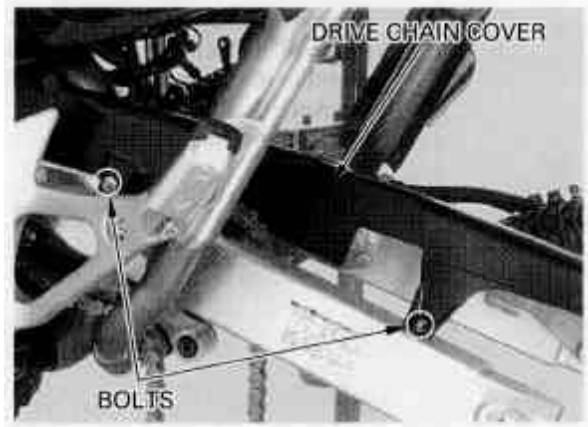
REMOVAL

Remove the rear wheel (page 14-3).

Remove the shock link plates.

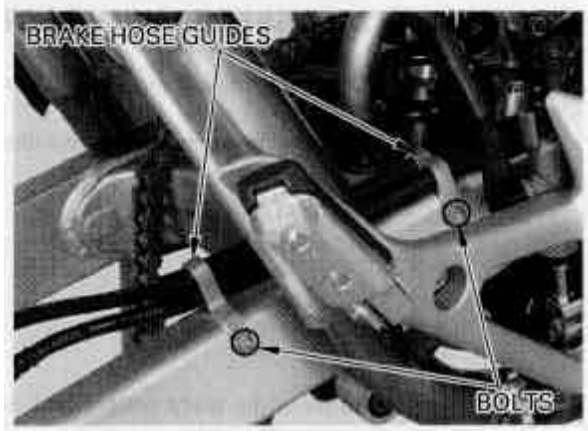


Remove the bolts and drive chain cover.

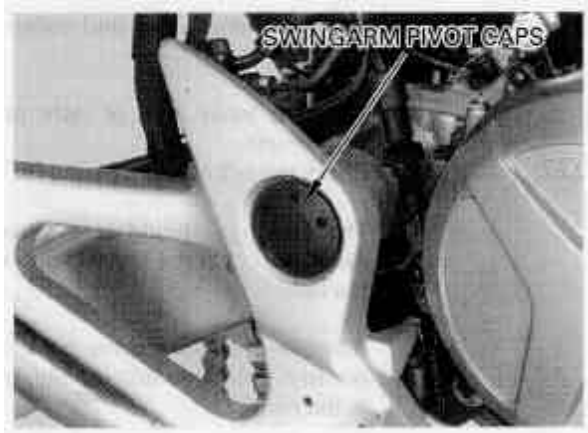


Remove the bolts and brake hose guides.

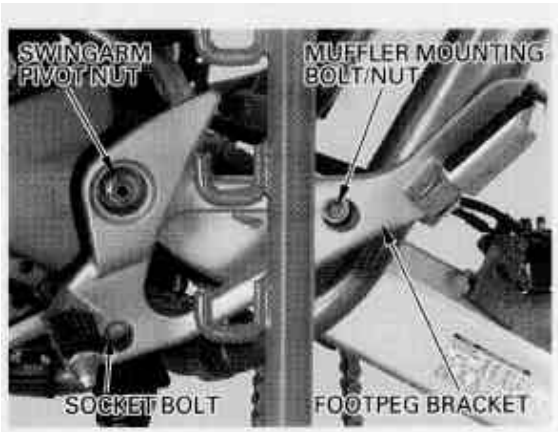
Remove the rear brake caliper/bracket assembly from the swingarm.



Remove the right and left swingarm pivot caps.



Loosen the swingarm pivot nut.
Remove the muffler mounting bolt and nut.
Remove the socket bolt, swingarm pivot nut and left footpeg bracket.



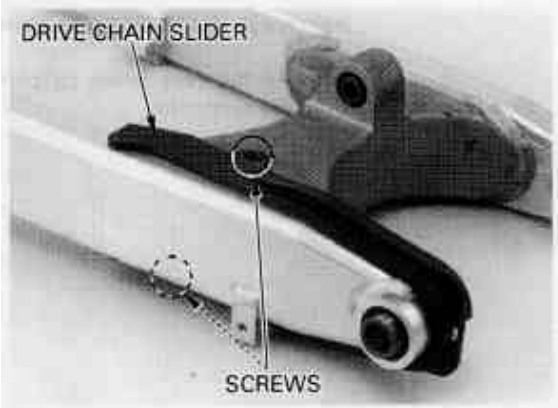
Remove the socket bolt.
Remove the muffler mounting bolt and nut.
Remove the swingarm pivot bolt and right foot peg bracket.
Remove the swingarm.



DISASSEMBLY/INSPECTION

Check the drive chain slider for wear or damage.

Remove the screws and drive chain slider.



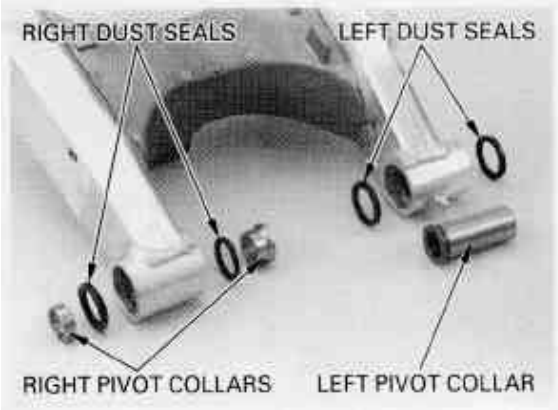
Remove the pivot collars and dust seals from the swingarm pivot.

Check the dust seals and collar for damage or fatigue.

Turn the inner race of right pivot bearings with your finger.
Check the left needle bearing for damage.

The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

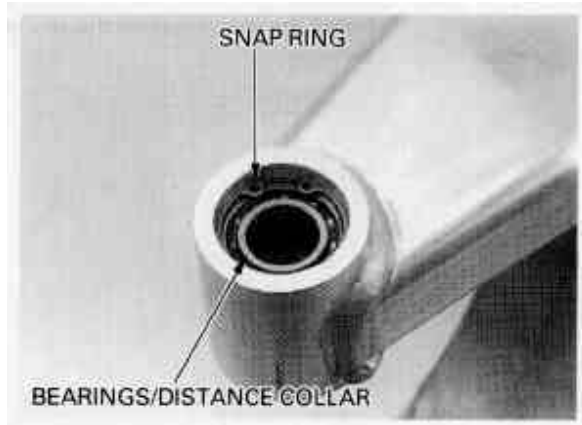
Remove and discard the bearings if the races do not turn smoothly and quietly, or if they fit loosely in the pivot.



PIVOT BEARING REPLACEMENT
Remove the snap ring.

Remove the right pivot bearings (radial ball bearings) from the swingarm pivot.

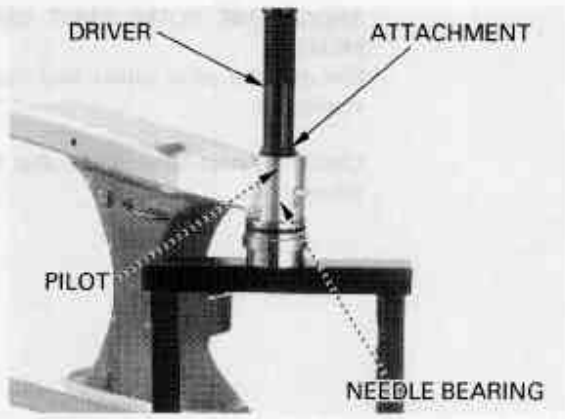
Remove the distance collar.



Press the left pivot bearing (needle bearing) out of the swingarm pivot using the special tools.

TOOLS:

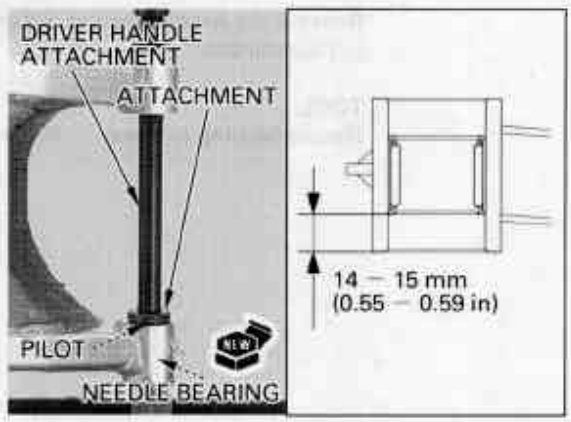
Driver	07749-0010000
Attachment, 32 × 35 mm	07746-0010100
Pilot, 28 mm	07746-0041100



Press a new left pivot bearing (needle bearing) into the swingarm pivot so that the needle bearing surface is lower 14–15 mm (0.55–0.59 in) from the end of the swingarm pivot surface using the special tools.

NOTE:

Press the needle bearing into the swingarm with the marked side facing out.



TOOLS:

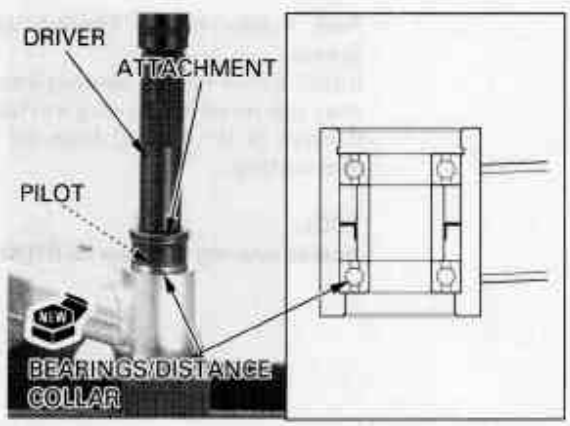
Driver handle attachment	07949-3710001
Attachment, 37 × 40 mm	07746-0010200
Pilot, 28 mm	07746-0041100

Install the distance collar.

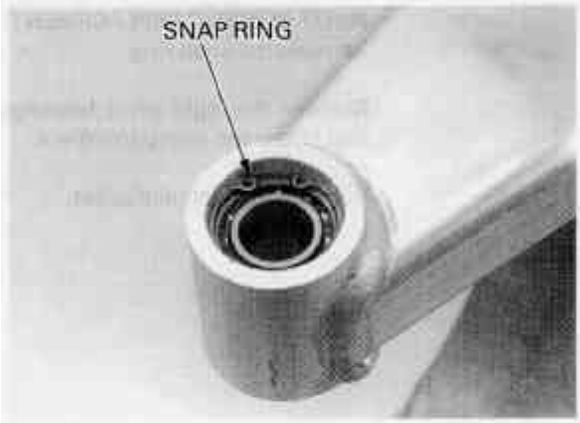
Press new right pivot bearings (radial ball bearing) into the swingarm pivot one at a time using the special tools.

TOOLS:

Driver	07749-0010000
Attachment, 37 × 40 mm	07746-0010200
Pilot, 20 mm	07746-0040500



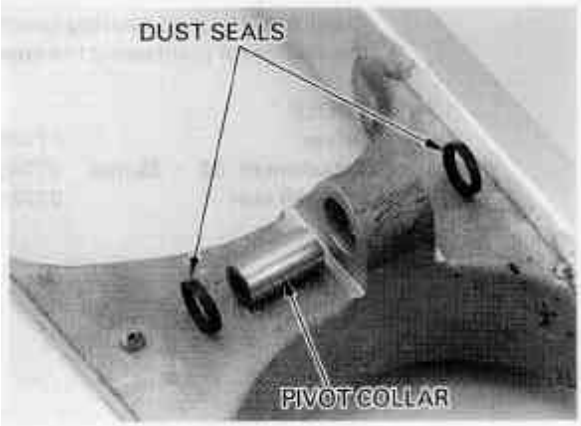
Install the snap ring into the swingarm pivot groove securely.



SHOCK LINK PLATE PIVOT BEARING REPLACEMENT

Remove the pivot collar and dust seals from the swingarm.

Check the dust seals and collar for damage or fatigue.



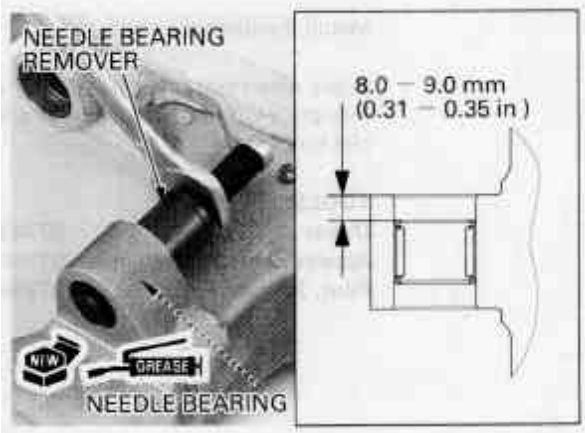
Remove the needle bearing out of the swingarm using special tool.

TOOL:
Needle bearing remover 07LMC-KV30100

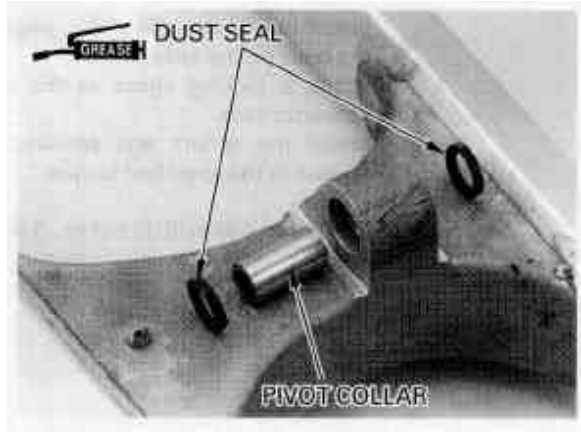


Pack a new needle bearing with multi-purpose grease.
Install a new needle bearing into the swingarm so that the needle bearing surface is lower 8.0–9.0 mm (0.31–0.35 in) from the end of the swingarm surface.

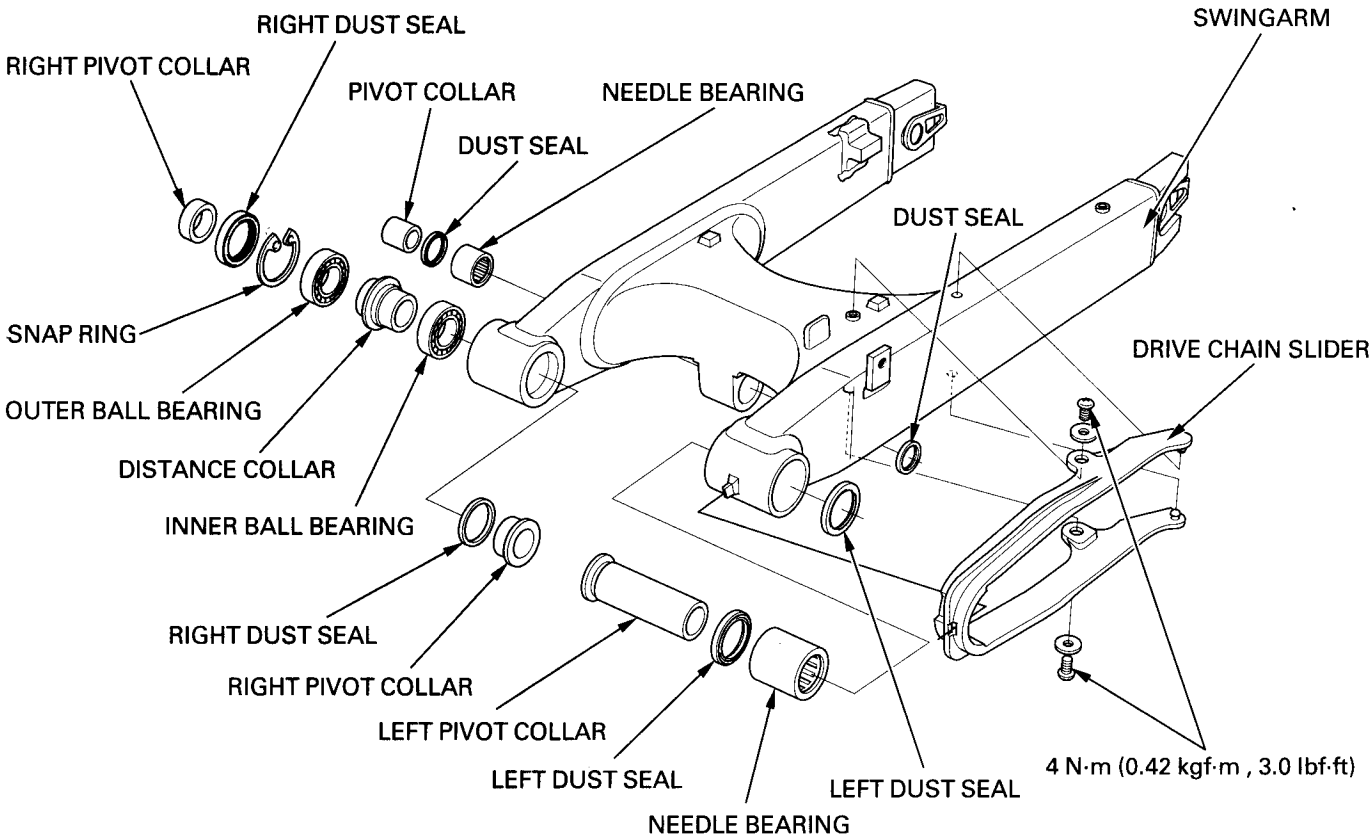
TOOL:
Needle bearing remover 07LMC-KV30100



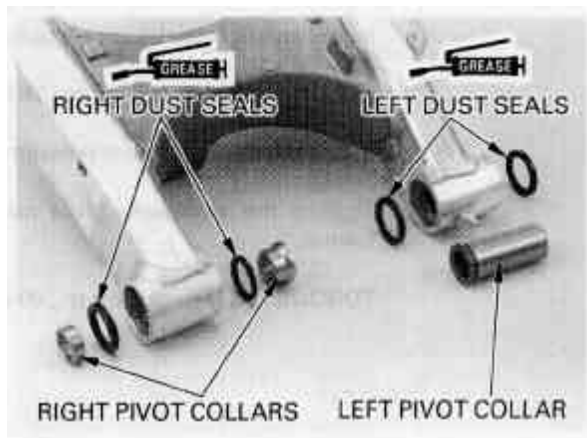
Apply grease to the dust seal lips, then install the dust seals and pivot collar into the swingarm.



ASSEMBLY

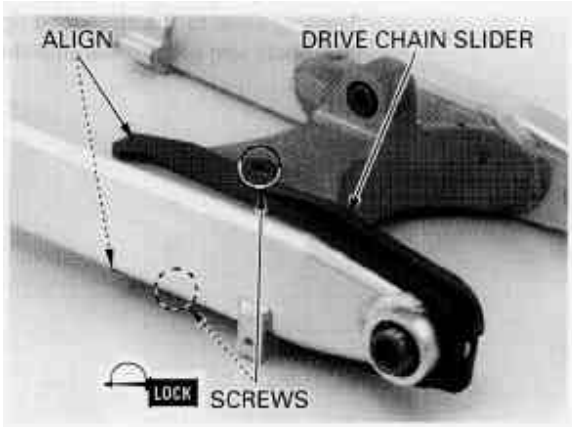


Apply grease to the dust seal lips, then install the dust seals and pivot collars into the swingarm pivot.



Install the drive chain slider, aligning the hole with the boss on the swingarm.
Apply a locking agent to the drive chain slider screw threads.
Install the collars and screws, then tighten the screws to the specified torque.

TORQUE: 4 N·m (0.42 kgf·m , 3.0 lbf·ft)

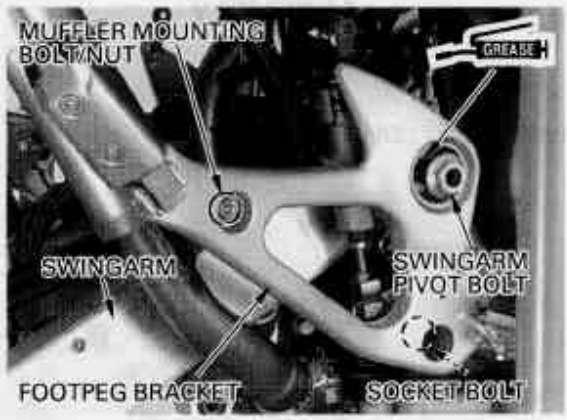


INSTALLATION

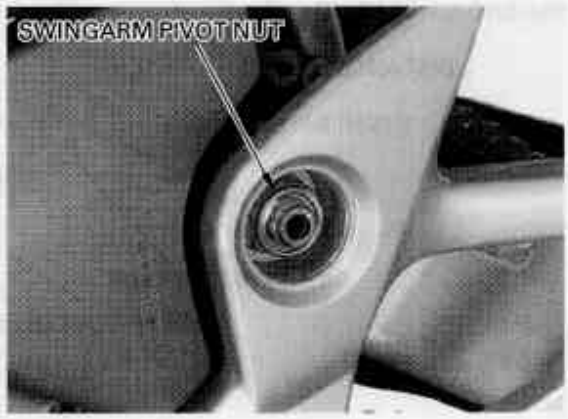
Apply thin coat of grease to the swingarm pivot bolt surface.
Install the swingarm in the frame and insert pivot bolt through the right footpeg bracket, swingarm, engine and left footpeg bracket.
Install and tighten the socket bolt.

TORQUE: 35 N·m (3.6 kgf·m , 26 lbf·ft)

Install the muffler mount bolt/nut securely.



Install the swingarm pivot nut.



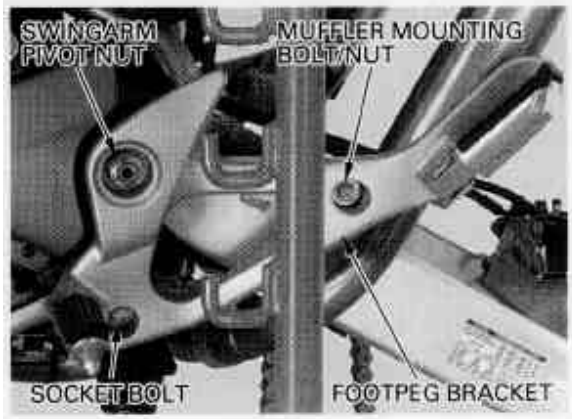
Install and tighten the socket bolt.

TORQUE: 35 N·m (3.6 kgf·m , 26 lbf·ft)

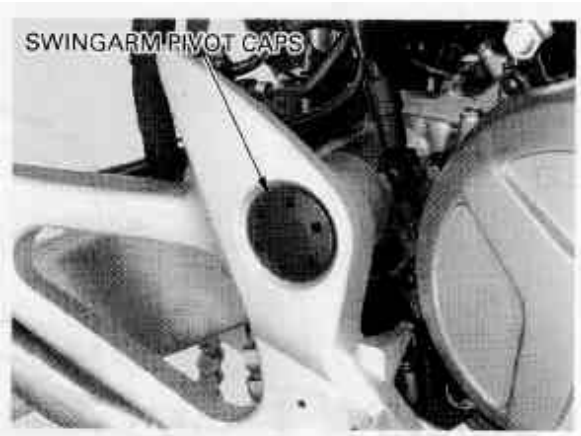
Install the muffler mount bolt/nut securely.

Tighten the swingarm pivot nut to the specified torque.

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



Install the left and right swingarm pivot caps.



Route the brake hose properly, tighten the brake hose guide bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

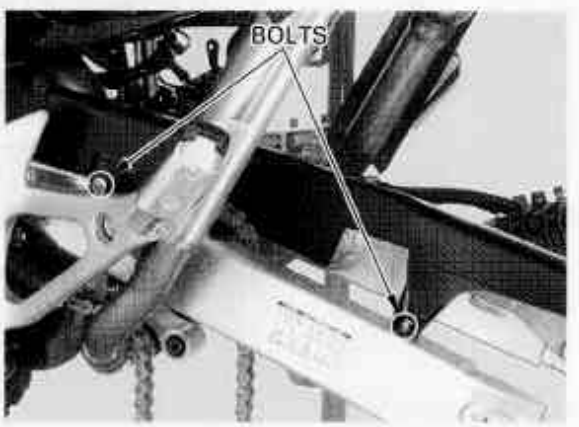


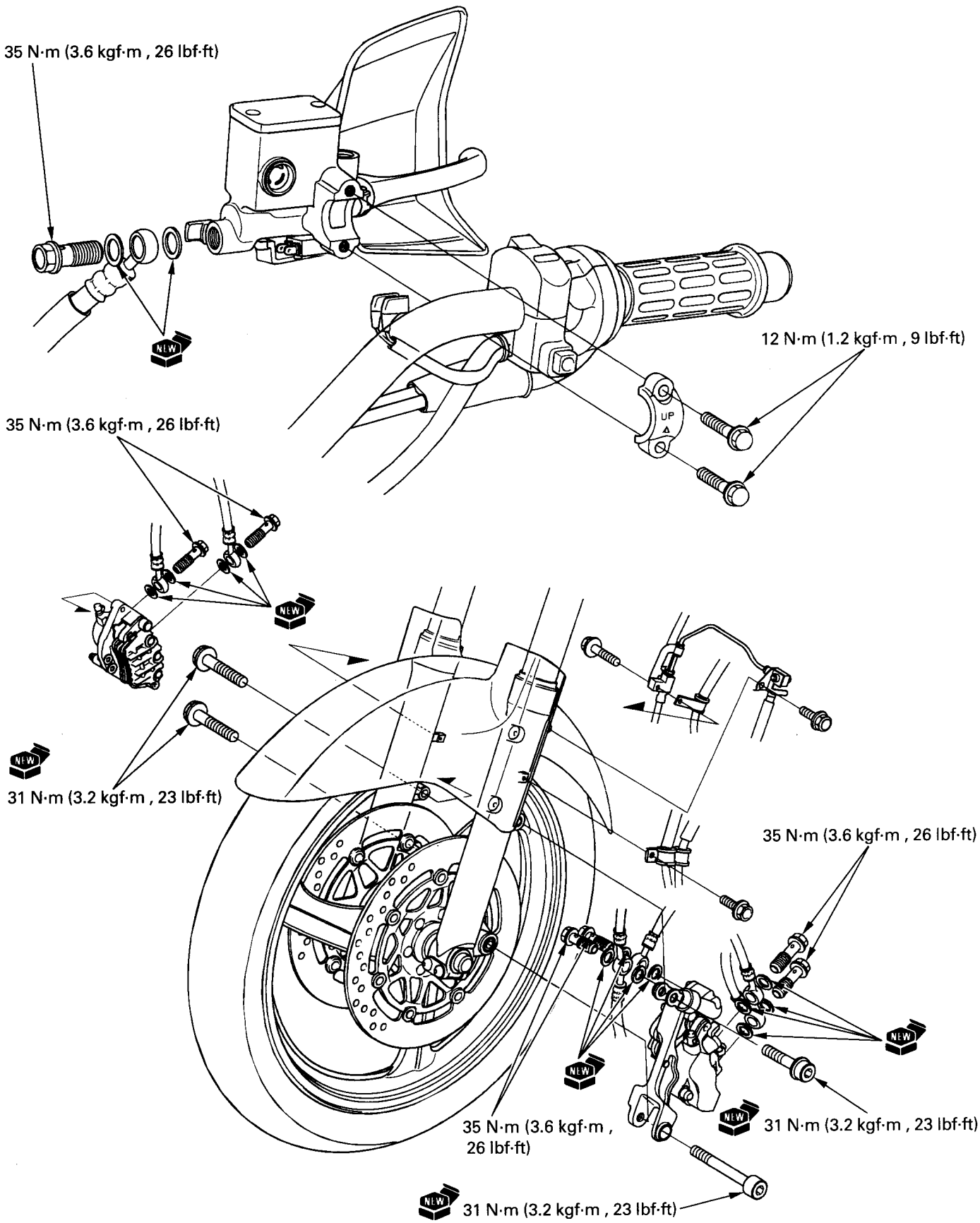
Install the drive chain cover aligning the tab with the tab on the swingarm.



Install and tighten the bolts.

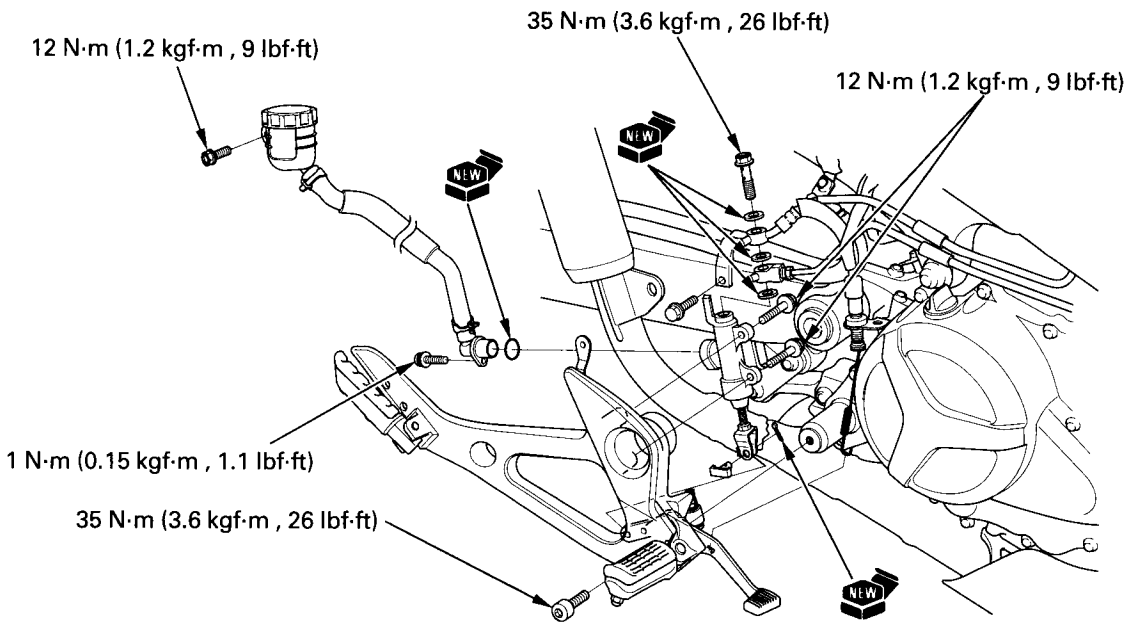
Install the shock link plate (page 14-14).
Install the rear wheel (page 14-8).

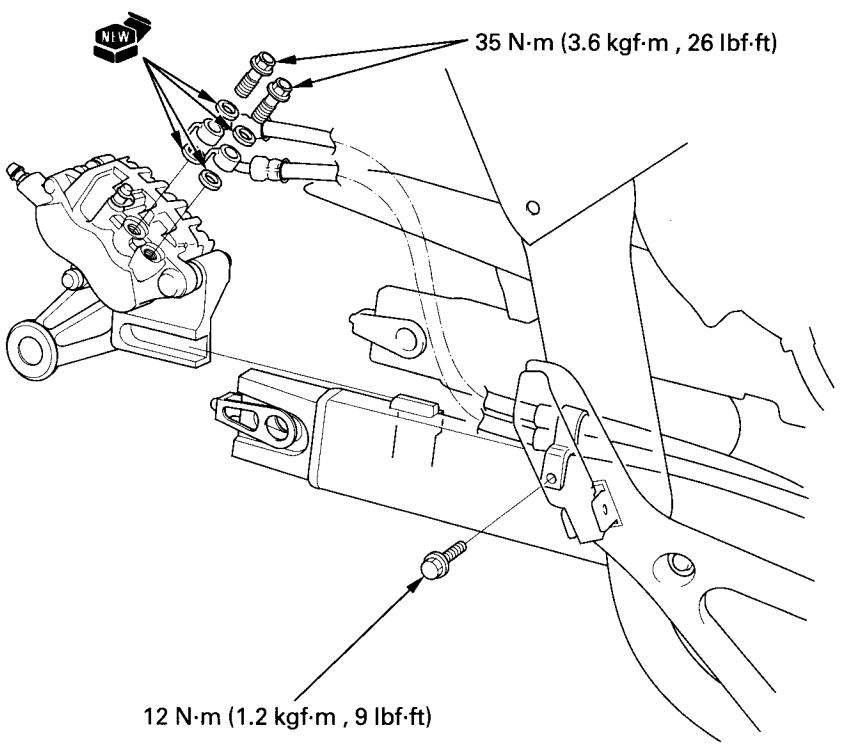



35 N·m (3.6 kgf·m , 26 lbf·ft)
NEW
12 N·m (1.2 kgf·m , 9 lbf·ft)
UP
35 N·m (3.6 kgf·m , 26 lbf·ft)
NEW
NEW
31 N·m (3.2 kgf·m , 23 lbf·ft)
35 N·m (3.6 kgf·m , 26 lbf·ft)
NEW
NEW
35 N·m (3.6 kgf·m , 26 lbf·ft)
NEW
31 N·m (3.2 kgf·m , 23 lbf·ft)
NEW
31 N·m (3.2 kgf·m , 23 lbf·ft)

15. HYDRAULIC BRAKE

SERVICE INFORMATION	15-2	REAR MASTER CYLINDER	15-21
TROUBLESHOOTING	15-4	PROPORTIONAL CONTROL VALVE	15-25
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15-5	DELAY VALVE	15-26
BRAKE PAD/DISC	15-10	FRONT BRAKE CALIPER	15-27
FRONT MASTER CYLINDER	15-13	REAR BRAKE CALIPER	15-32
SECONDARY MASTER CYLINDER	15-19	BRAKE PEDAL	15-37





SERVICE INFORMATION

GENERAL

⚠WARNING

- ***A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.***
- ***Check the brake system by applying the brake lever and pedal after the air bleeding.***

CAUTION:

- ***This model equipped with a Linked Braking System. Must be follow the system air bleeding procedure (page 15-5) if you disconnect or service any part of the brake hydraulic system.***
- ***Do not disassemble the secondary master cylinder push rod or the correct brake performance will not be obtained.***

- Spilled brake fluid will severely damage instrument lenses and painted surfaces. It is also harmful to some rubber parts. Be careful whenever you remove the reservoir cap; make sure the front reservoir is horizontal first.
- Never allow contaminates (dirt, water, etc.) to get into an open reservoir.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- Always use fresh DOT 4 brake fluid from a sealed container when servicing the system. Do not mix different types of fluid they may not be compatible.
- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT
Front	Specified brake fluid			DOT 4	———
	Brake disc thickness			4.4–4.6 (0.17–0.18)	3.5 (0.14)
	Brake disc runout			———	0.30 (0.012)
	Master cylinder I.D.			12.700–12.743 (0.5000–0.5017)	12.755 (0.5022)
	Master piston O.D.			12.657–12.684 (0.4983–0.4994)	12.645 (0.4978)
	Secondary master cylinder I.D.			12.700–12.743 (0.5000–0.5017)	12.755 (0.5022)
	Secondary master piston O.D.			12.657–12.684 (0.4983–0.4994)	12.645 (0.4978)
	Caliper cylinder I.D.	Right	Upper	27.000–27.050 (1.0630–1.0650)	27.060 (1.0654)
			Middle	22.650–22.700 (0.8917–0.8937)	22.710 (0.8941)
			Lower	27.000–27.050 (1.0630–1.0650)	27.060 (1.0654)
		Left	Upper	25.400–25.450 (1.0000–1.0020)	25.460 (1.0024)
			Middle	22.650–22.700 (0.8917–0.8937)	22.710 (0.8941)
			Lower	25.400–25.450 (1.0000–1.0020)	25.460 (1.0024)
	Caliper piston O.D.	Right	Upper	26.935–26.968 (1.0604–1.0617)	26.910 (1.0594)
			Middle	22.585–22.618 (0.8892–0.8905)	22.560 (0.8882)
			Lower	26.935–26.968 (1.0604–1.0617)	26.910 (1.0594)
		Left	Upper	25.335–25.368 (0.9974–0.9987)	25.310 (0.9965)
			Middle	22.585–22.618 (0.8892–0.8905)	22.560 (0.8882)
			Lower	25.335–25.368 (0.9974–0.9987)	25.310 (0.9965)

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Rear	Specified brake fluid		DOT 4	———
	Brake pedal height		82.5–84.5 (3.25–3.33)	———
	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.		17.460–17.503 (0.6874–0.6891)	17.515 (0.6896)
	Master piston O.D.		17.417–17.444 (0.6857–0.6868)	17.405 (0.6852)
	Caliper cylinder I.D.	Front	22.650–22.700 (0.8917–0.8937)	22.710 (0.8941)
		Center	27.000–27.050 (1.0630–1.0650)	27.060 (1.0654)
		Rear	22.650–22.700 (0.8917–0.8937)	22.710 (0.8941)
	Caliper piston O.D.	Front	22.585–22.618 (0.8892–0.8905)	22.560 (0.8882)
		Center	26.935–26.968 (1.0604–1.0617)	26.910 (1.0594)
		Rear	22.585–22.618 (0.8892–0.8905)	22.560 (0.8882)

TORQUE VALUES

Front brake master cylinder holder bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Front brake master cylinder cap screw	1 N·m (0.15 kgf·m , 1.1 lbf·ft)	
Brake lever pivot bolt	1 N·m (0.1 kgf·m , 0.7 lbf·ft)	
Brake lever pivot nut	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Brake lever adjuster	4 N·m (0.4 kgf·m , 2.9 lbf·ft)	
Front brake light switch screw	1 N·m (0.12 kgf·m , 0.9 lbf·ft)	
Right front caliper mounting bolt	31 N·m (3.2 kgf·m , 23 lbf·ft)	ALOC bolt
Left front caliper pivot bolt	31 N·m (3.2 kgf·m , 23 lbf·ft)	ALOC bolt
Left front caliper bolt (secondary master joint)	31 N·m (3.2 kgf·m , 23 lbf·ft)	ALOC bolt
Caliper body B bolt	32 N·m (3.3 kgf·m , 24 lbf·ft)	ALOC bolt
Front brake caliper slide pin (main)	23 N·m (2.3 kgf·m , 17 lbf·ft)	
Front brake caliper slide pin (sub)	13 N·m (1.3 kgf·m , 9 lbf·ft)	
Pad pin	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Brake caliper bleed valve	6 N·m (0.6 kgf·m , 4.3 lbf·ft)	
Secondary master cylinder push rod lock nut	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Secondary master cylinder connector	10 N·m (1.0 kgf·m , 7 lbf·ft)	
Rear master cylinder mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Rear master cylinder reservoir mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Rear master cylinder push rod nut	18 N·m (1.8 kgf·m , 13 lbf·ft)	
Rear master cylinder hose joint screw	1 N·m (0.15 kgf·m , 1.1 lbf·ft)	Apply a locking agent to the threads
Brake hose oil bolt	35 N·m (3.6 kgf·m , 26 lbf·ft)	
Brake pipe joint	17 N·m (1.7 kgf·m , 12 lbf·ft)	Apply oil to the threads and flange surface
Brake pipe 2/3 way joint	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Brake hose guide bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Delay valve mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	
Proportioning control valve (PCV) mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	

TOOL

Snap ring pliers 07914-SA50001

TROUBLESHOOTING

Brake lever/pedal soft or spongy
- Air in hydraulic system
- Leaking hydraulic system
- Contaminated brake pad/disc
- Worn caliper piston seal
- Worn master cylinder piston cups
- Worn brake pad/disc
- Contaminated caliper
- Caliper not sliding properly
- Low brake fluid level
- Clogged fluid passage
- Warped/deformed brake disc
- Sticking/worn caliper piston
- Sticking/worn master cylinder piston
- Contaminated master cylinder
- Bent brake lever/pedal

Above items are normal but the brake system still has poor performance, check for nose dive during braking. If the nose dive excessive, check for secondary master cylinder hydraulic system.

Brake lever/pedal hard
- Clogged/restricted brake system
- Sticking/worn caliper piston
- Caliper not sliding properly
- Clogged/restricted fluid passage
- Worn caliper piston seal
- Sticking/worn master cylinder piston
- Bent brake lever/pedal

Brake drags
- Contaminated brake pad/disc
- Misaligned wheel
- Clogged/restricted brake hose joint
- Warped/deformed brake disc
- Caliper not sliding properly
- Improper secondary master cylinder installed length
- Clogged/restricted brake hydraulic system
- Sticking/worn caliper piston
- Clogged master cylinder port

Rear wheel locks when only the brake lever is applied/ Front wheel locks when only the brake pedal is applied (In the case that all items are normal in "Poor lever/pedal brake performance")
- Improper secondary master cylinder push rod installed length
- Faulty proportional control valve (PCV)

BRAKE FLUID REPLACEMENT/ AIR BLEEDING

⚠WARNING

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

CAUTION:

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

NOTE:

- The lever brake line air bleeding procedure is performed in the same manner as in the ordinal air bleeding procedure.
- Once the hydraulic system has been opened, or if the brake feels spongy, the system must be bled.
- When using a commercially available brake bleeder, follow the manufacturer's operating instructions.

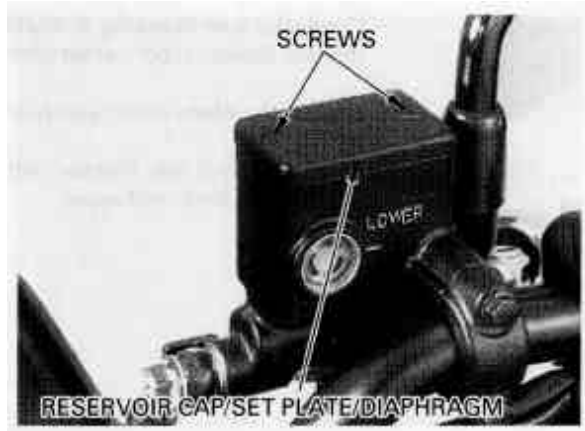
BRAKE FLUID DRAINING

Lever brake line

Support the motorcycle on its side stand.

Turn the handlebar to the left until the reservoir is parallel to the ground, before removing the reservoir cap.

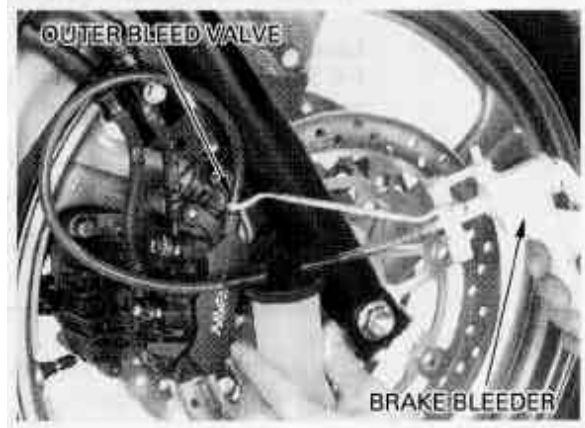
Remove the screws, reservoir cap, set plate and diaphragm.



Connect a commercially available brake bleeder to the front brake caliper outer bleed valve.

Loosen the bleed valve and pump the brake bleeder.

Stop pumping the bleeder when no more fluid flows out of the bleed valve.



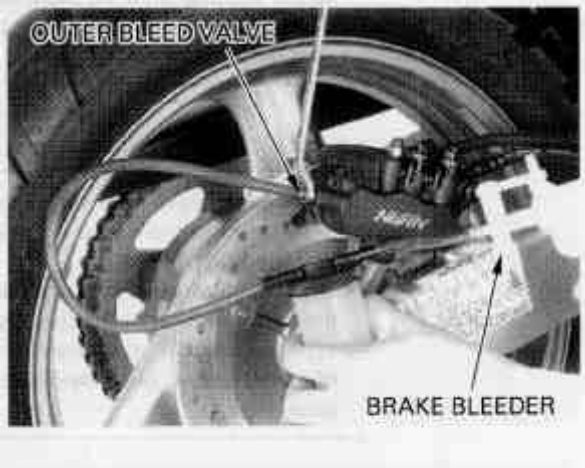
Pedal brake line
Connect a commercially available brake bleeder to the front brake caliper center bleed valve.

Loosen the bleed valve and pump the brake bleeder.
Stop pumping the bleeder when no more fluid flows out of the bleed valve.



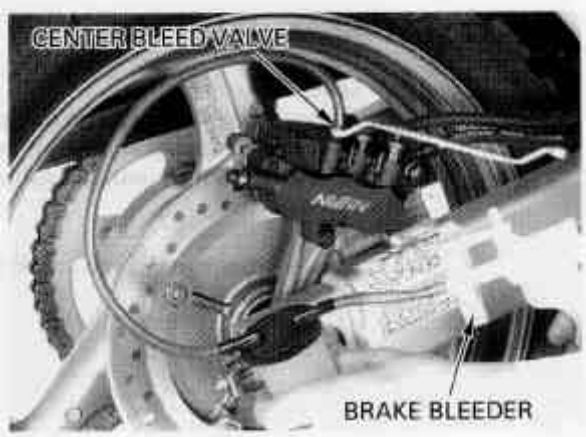
Connect a commercially available brake bleeder to the rear brake caliper outer bleed valve.

Loosen the bleed valve and pump the brake bleeder.
Stop pumping the bleeder when no more fluid flows out of the bleed valve.



Connect a commercially available brake bleeder to the rear brake caliper center bleed valve.

Loosen the bleed valve and pump the brake bleeder.
Stop pumping the bleeder when no more fluid flows out of the bleed valve.



BRAKE FLUID FILLING/AIR BLEEDING

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

CAUTION:

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

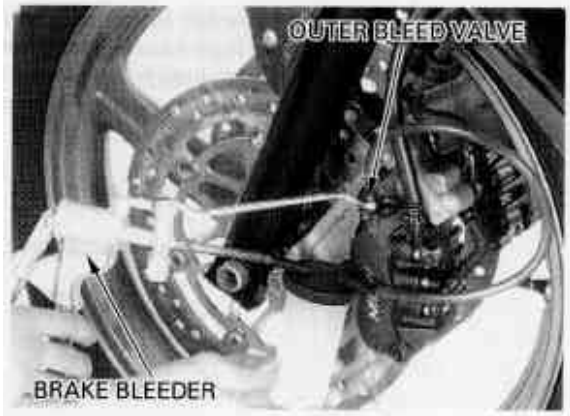
Operate the brake lever several times to bleed air from the master cylinder.



Connect a commercially available brake bleeder to the bleed valve.
Pump the brake bleeder and loosen the bleed valve, adding fluid when the fluid level in the master cylinder reservoir is low.

NOTE:

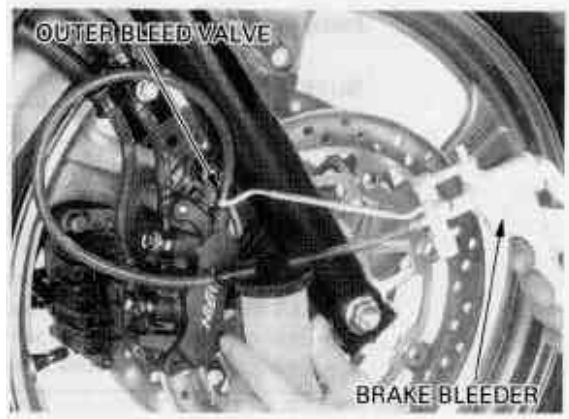
- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



Repeat the above step procedures until air bubbles do not appear in the plastic hose.

NOTE:

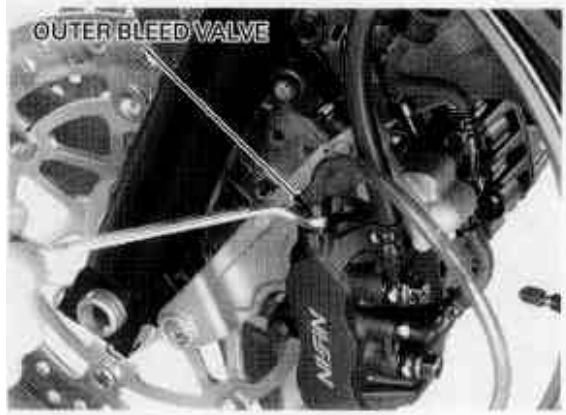
If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.



Close the bleed valve.
Operate the brake lever and check brake operation.
If it still feels spongy, bleed the lever system again.

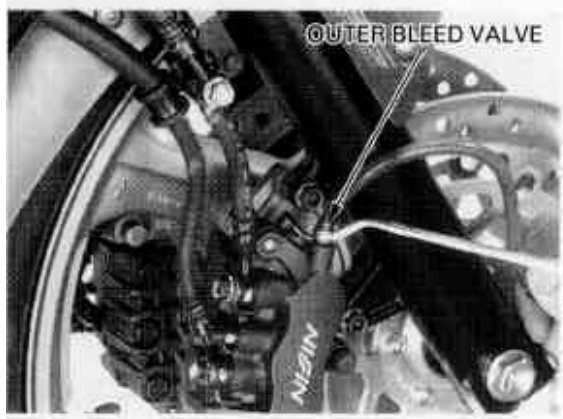
If a brake bleeder is not available, use the following procedure:
Connect a transparent bleed hose to the bleed valve and place the outer end of the hose in a container.
Loosen the bleed valve 1/4 turn and pump the brake lever until the brake fluid flows out from the bleed valve.

1. Pump the brake lever several times, then squeeze the brake lever all the way and loosen the bleed valve 1/4 turn. Wait several seconds and close the bleed valve.



NOTE:

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



2. Release the brake lever slowly until the bleed valve has been closed.
3. Repeat the steps 1−2 until there are no air bubbles in the bleed hose.

After bleeding air completely and tighten the bleed valves to the specified torque.

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

Fill the reservoir to the casting ledge with DOT 4 brake fluid from a sealed container.
Install the diaphragm, set plate and reservoir cap.
Tighten the reservoir cap screws to the specified torque.

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

Check the front brake operation (page 3-21).



Pedal brake line

NOTE:

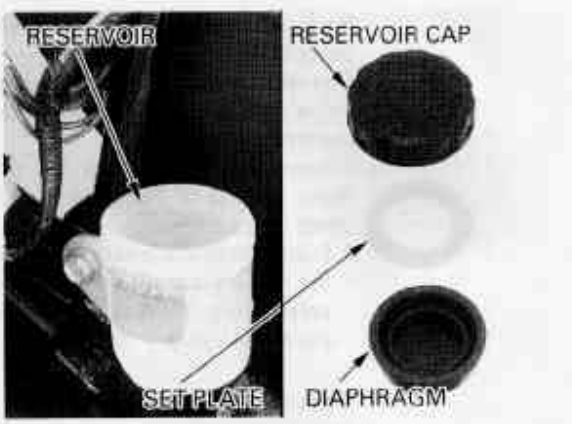
- Before performing this service, prepare the brake fluid 500 cm^3 (16.9 US oz, 14.1 Imp oz) or more, because the brake line is long.
- Fluid filling and bleed air from the brake pedal line in the sequence as follow:
  1. Right front caliper center bleed valve
  2. Left front caliper center bleed valve
  3. Rear caliper center bleed valve
  4. Rear caliper outer bleed valve



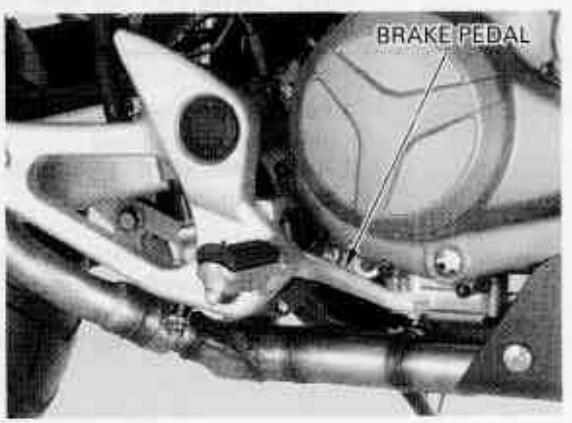
Remove the rear fender (page 2-3).

Remove the reservoir cap, set plate and diaphragm.

Fill the reservoir with DOT 4 brake fluid.



Pump the brake pedal while filling the brake fluid and feed fluid into the master cylinder.



1. Connect a commercially available brake bleeder to the right front brake caliper center bleed valve.

NOTE:

When using a brake bleeder, follow the manufacturer's operating instructions.

Pump the brake bleeder and loosen the bleed valve. Operate the brake bleeder and feed the brake fluid until fluid flow out from the bleeder valve.
Close the bleeder valve.

2. Feed the brake fluid at the left front brake caliper center bleeder valve as same procedure in step 1.
3. Feed the brake fluid at the rear brake caliper center bleeder valve as same procedure in step 1.
4. Feed the brake fluid at the rear brake caliper outer bleeder valve as same procedure in step 1.
5. Repeat step 1 – 4 until the pedal resistance is felt.

Next bleed the air from the system without using a brake bleeder tool.

Connect the transparent bleeder tube to the bleed valve and place the outer end of the hose in a container.

1. Pump the brake pedal 5 – 10 times, then release the pedal.
   Loosen the bleed valve, then pushing down the brake pedal all the way.

NOTE:

Do not release the brake pedal while opening the bleed valve.

Close the bleed valve.

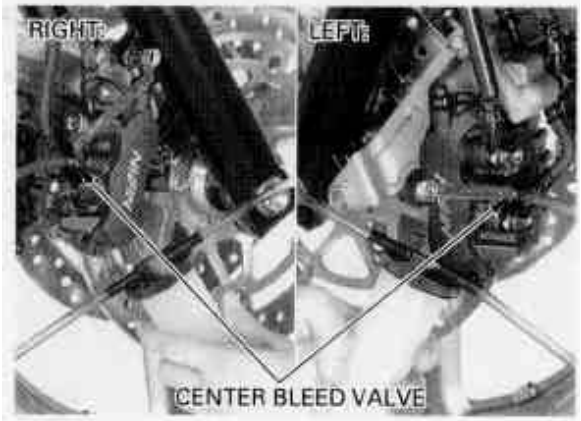
2. Release the brake pedal slowly and wait several seconds after it reaches the end of its travel.
3. Repeat above step 1 and 2 until bubbles cease to appear in the fluid at the end of the bleed tube and pedal resistance is felt.

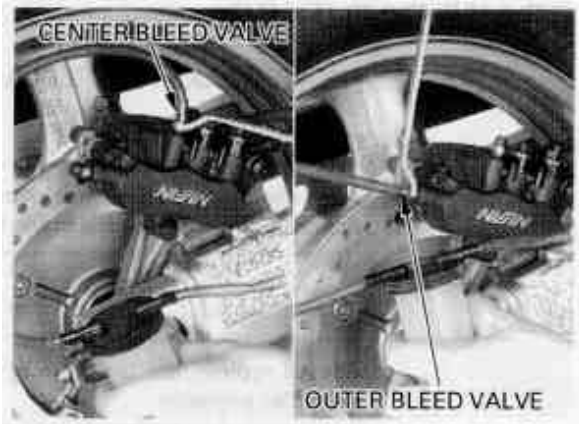
NOTE:

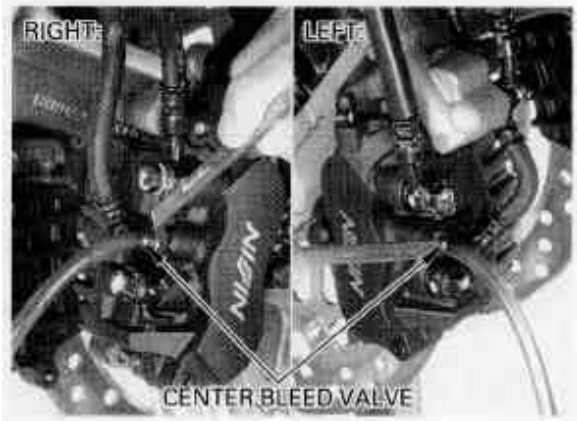
- After the bubbles cease to appear in the fluid, repeat air bleeding procedure about 2 – 3 times.
- Elaborately bleed the air from the rear brake caliper outer bleeder valve (from secondary master cylinder-to-PCV-to-rear brake caliper line).

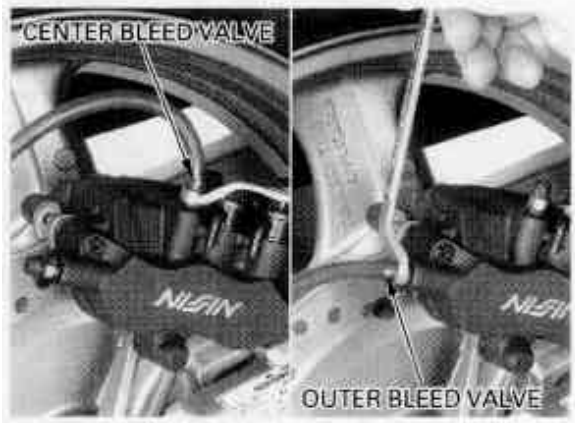
Tighten the each bleed valve to the specified torque.

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









Fill the reservoir up to the "UPPER" level.

Specified brake fluid: DOT 4 brake fluid

Install the diaphragm, set plate and reservoir cap.



BRAKE PAD/DISC

FRONT BRAKE PAD REPLACEMENT

⚠WARNING

After the brake pad replacement, check the brake operation by applying the brake lever and pedal.

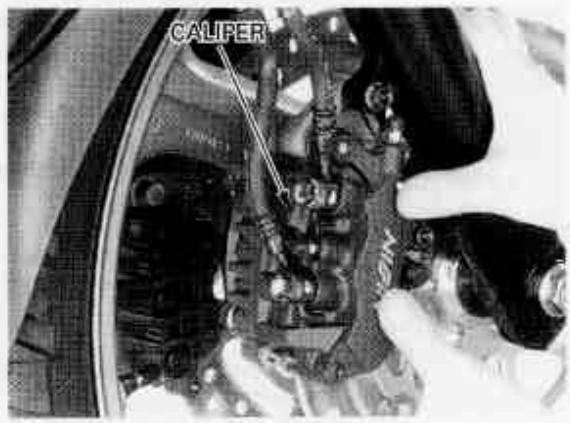
NOTE:

Always replace the brake pads in pairs to assure even disc pressure.

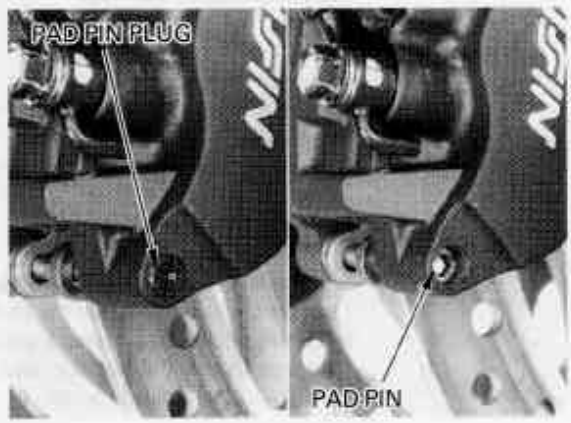
Push the caliper pistons all the way in to allow installation of new brake pads.

NOTE:

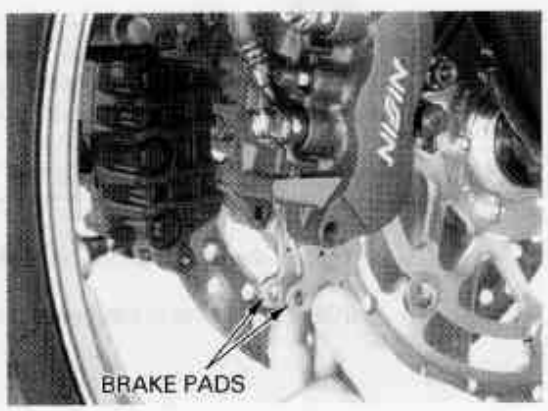
Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.



Remove the pad pin plug and loosen the pad pin.

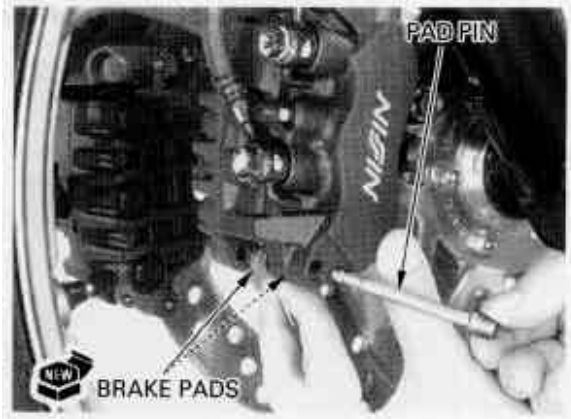


Remove the pad pin and brake pads.



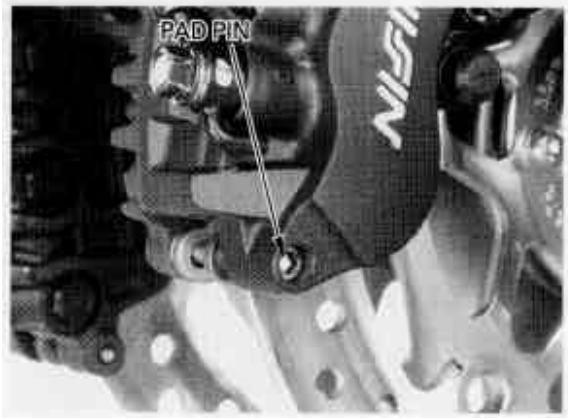
Clean the inside of the caliper especially around the caliper pistons.

Make sure the brake pad spring is in place.
Install the new brake pads.
Push the brake pads against the pad spring, then install the pad pin.

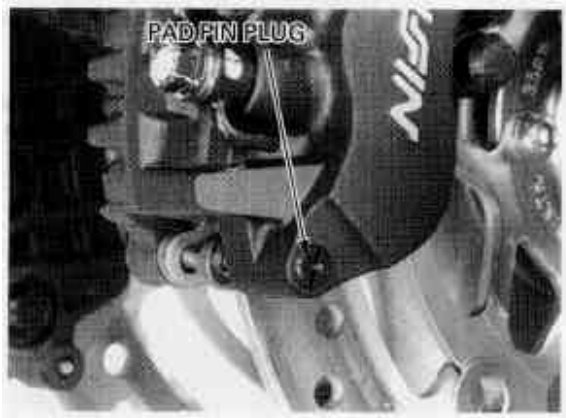


Tighten the pad pin to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m , 13 lbf·ft)



Install and tighten the pad pin plug securely.



REAR BRAKE PAD REPLACEMENT

⚠WARNING

After the brake pad replacement, check the brake operation by applying the brake lever and pedal.

NOTE:

Always replace the brake pads in pairs to assure even disc pressure.

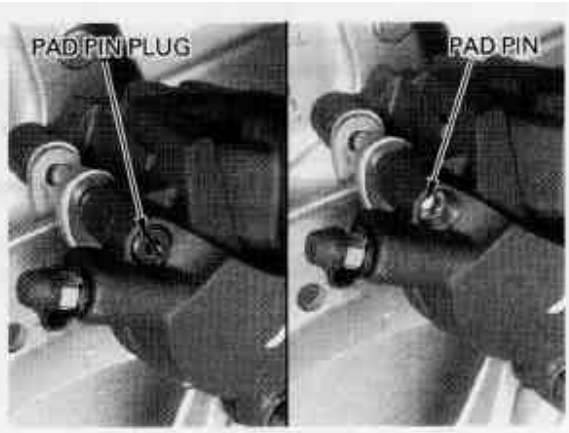


Push the caliper pistons all the way in by pushing the caliper body inward to allow installation of new brake pads.

NOTE:

Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.

Remove the pad pin plug and loosen the pad pin.

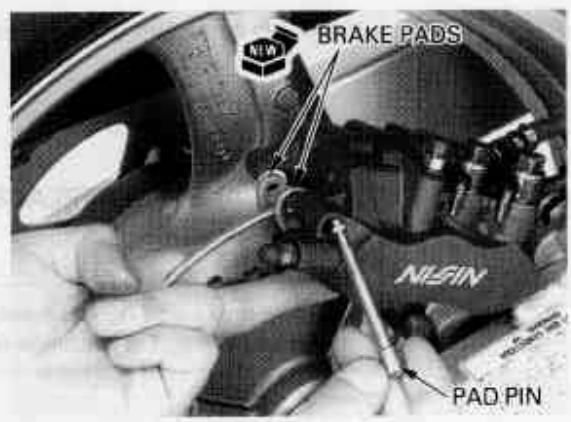


Remove the pad pin and brake pads.



Clean the inside of the caliper especially around the caliper pistons.

Make sure the brake pad spring is in place.
Install the new brake pads and pad pin.



Tighten the pad pin to the specified torque.

TORQUE: 18 N·m (1.8 kgf·m , 13 lbf·ft)



Install and tighten the pad pin plug securely.



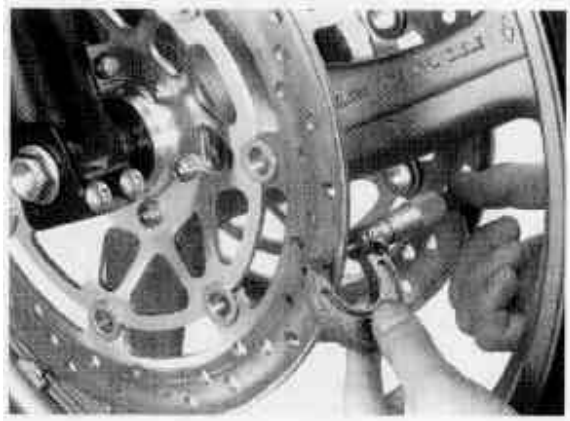
BRAKE DISC INSPECTION

Visually inspect the brake disc for damage or cracks.

Measure the brake disc thickness with a micrometer.

SERVICE LIMITS:
FRONT: 3.5 mm (0.14 in)
REAR: 4.0 mm (0.16 in)

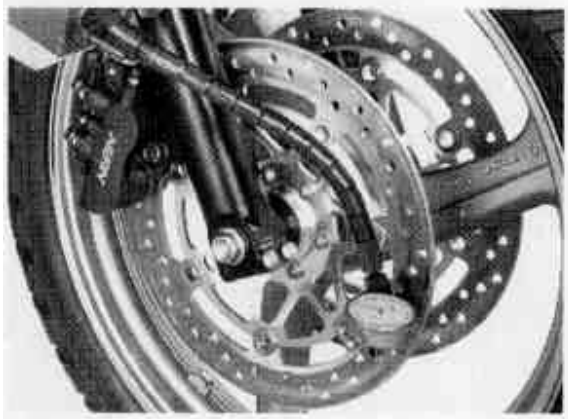
Replace the brake disc if the smallest measurement is less than the service limit.



Measure the brake disc warpage with a dial indicator.

SERVICE LIMIT: 0.30 mm (0.012 in)

Check the wheel bearings for excessive play, if the warpage exceeds the service limit.
Replace the brake disc if the wheel bearings are normal.



FRONT MASTER CYLINDER

REMOVAL

Drain the lever brake hydraulic system (page 15-5).

Remove the brake hose oil bolt, sealing washers and brake hose eyelet.

CAUTION:

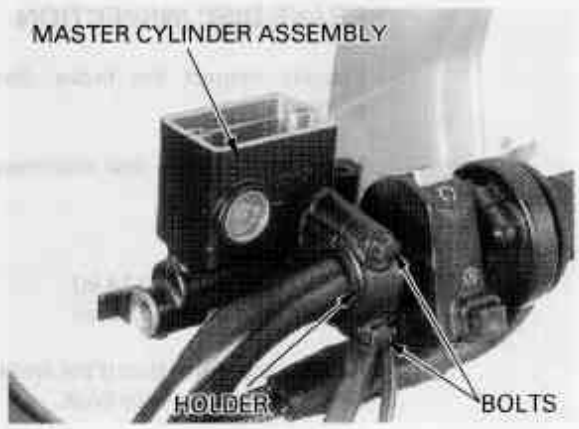
Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.



Disconnect the brake light switch wire connectors.

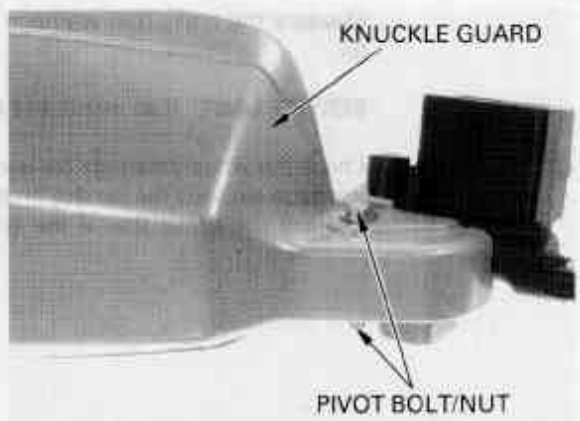


Remove the bolts from the master cylinder holder and remove the master cylinder assembly.

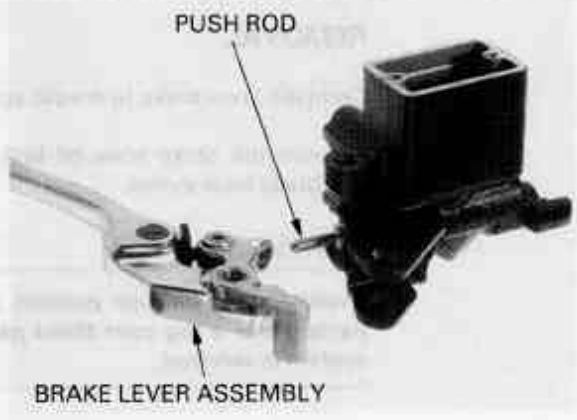


DISASSEMBLY

Remove the pivot bolt/nut and knuckle guard.

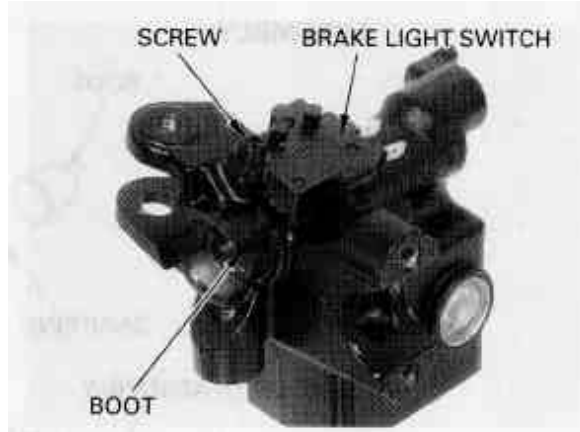


Remove the brake lever assembly and push rod.



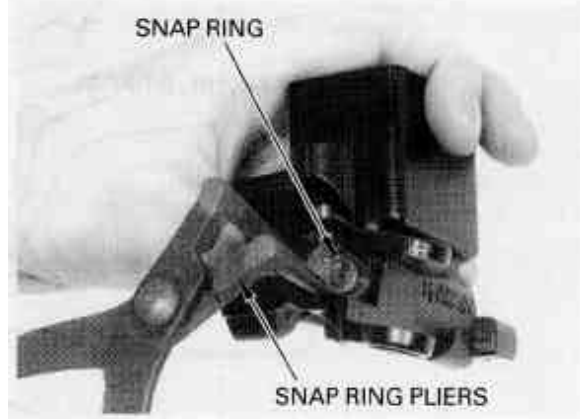
Remove the screw and brake light switch.

Remove the boot.



Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:
Snap ring pliers 07914-SA50001



Remove the master piston and spring.

Clean the inside of the cylinder and reservoir with brake fluid.

INSPECTION

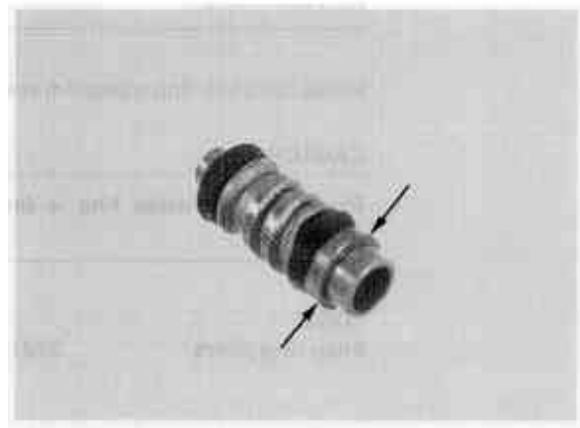
Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.
Measure the master cylinder I.D.

SERVICE LIMIT: 12.755 mm (0.5022 in)

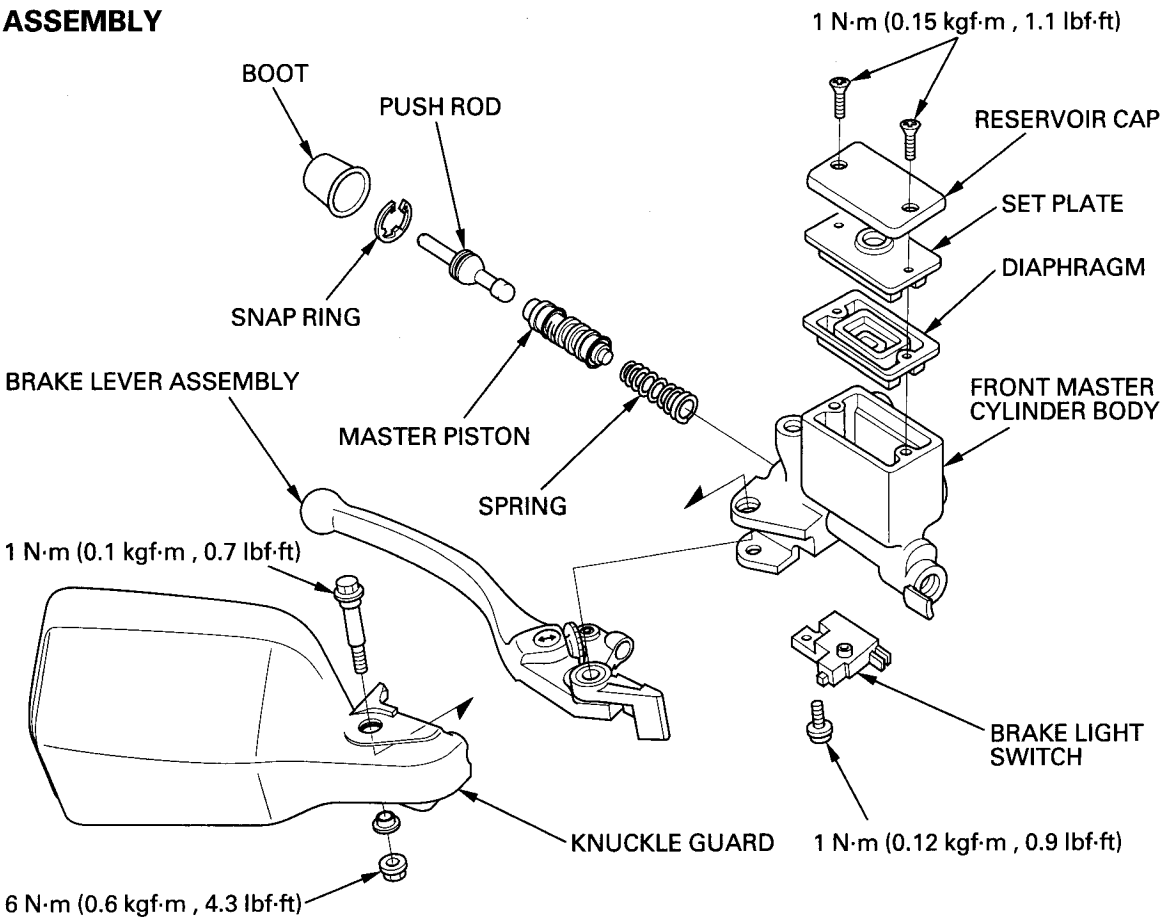


Measure the master cylinder piston O.D.

SERVICE LIMIT: 12.645 mm (0.4978 in)



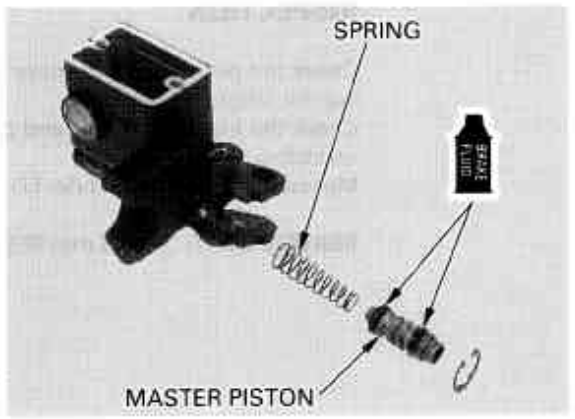
ASSEMBLY



CAUTION:

Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

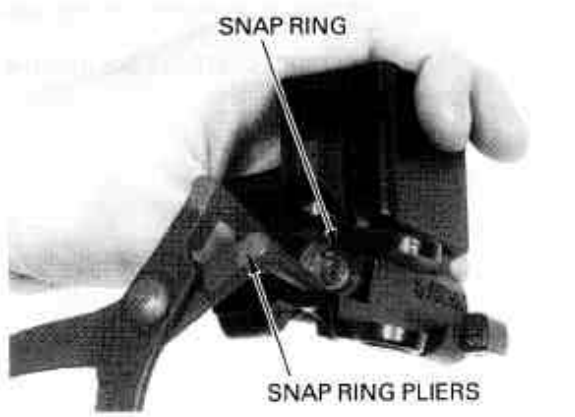
Coat all parts with clean brake fluid before assembly.
Dip the piston in brake fluid.
Install the spring to the piston.
Install the piston assembly into the master cylinder.



CAUTION:

When installing the cups, do not allow the lips to turn inside out.

Install the snap ring using the special tool.



CAUTION:

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

TOOL:

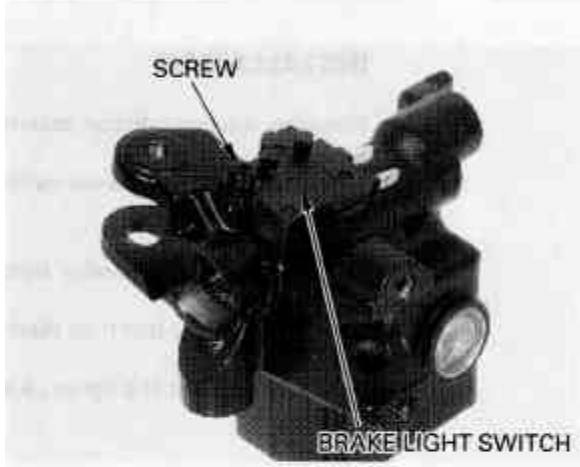
Snap ring pliers	07914-SA50001

Apply silicone grease to the inside of the boot.
Install the boot.

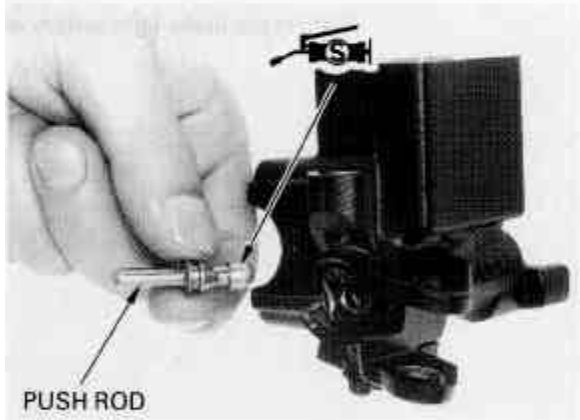


Install the brake light switch and tighten the screw to the specified torque.

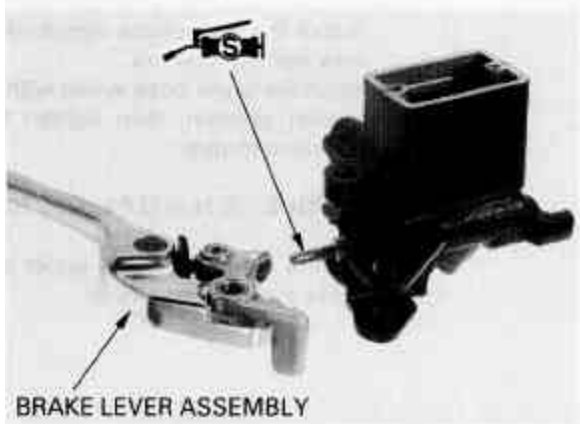
TORQUE: 1 N·m (0.12 kgf·m , 0.9 lbf·ft)



Apply silicone grease to the tip of the push rod, then install it to master cylinder as shown.



Apply silicone grease to the tip of the push rod, then install the brake lever assembly.

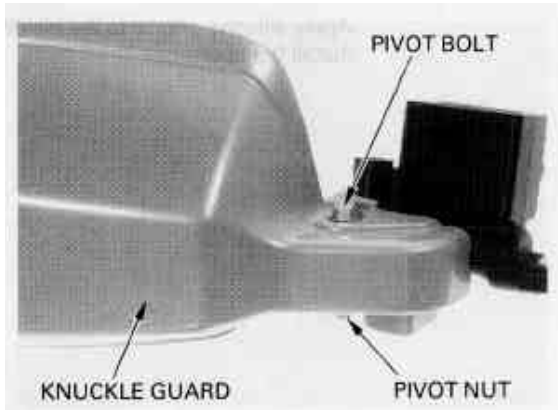


Install the knuckle guard to the master cylinder.
Install and tighten the pivot bolt to the specified torque.

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

Hold the pivot bolt and tighten the pivot nut to the specified torque.

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

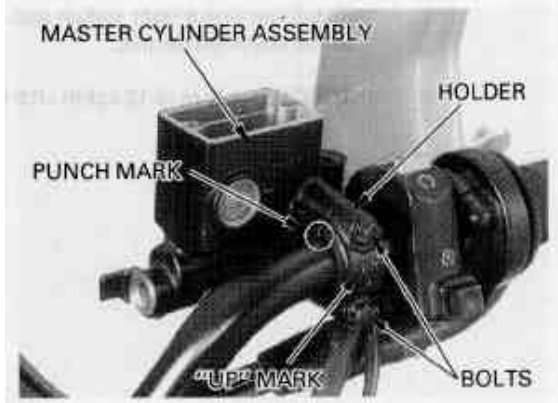


INSTALLATION

Place the master cylinder assembly on the handlebar.
Align the end of the master cylinder with the punch mark on the handlebar.

Install the master cylinder holder with the "UP" mark facing up.
Tighten the upper bolt first, then the lower bolt.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



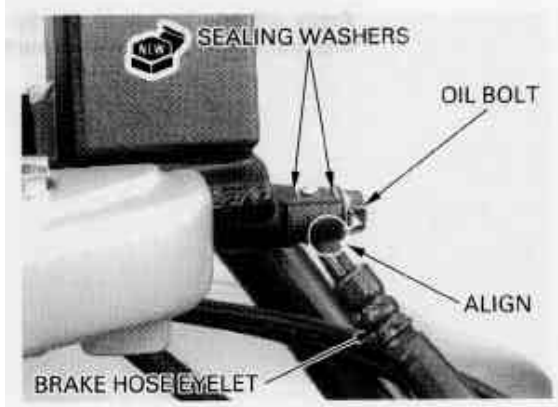
Connect the brake light switch wire connectors.



Install the brake hose eyelet with the oil bolt and new sealing washers.
Align the brake hose eyelet with the stopper on the master cylinder, then tighten the oil bolt to the specified torque.

TORQUE: 35 N·m (3.6 kgf·m , 26 lbf·ft)

Fill the reservoir to the upper level and bleed the brake system (page 15-6).



SECONDARY MASTER CYLINDER

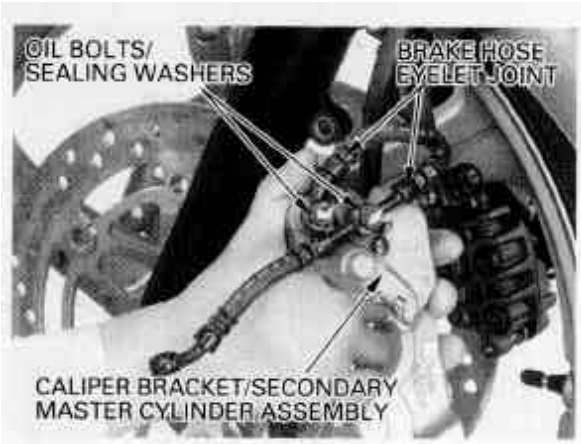
REMOVAL

Drain the pedal brake hydraulic system (page 15-5).
Remove the left front brake caliper (page 15-27).

Remove the brake hose oil bolts, sealing washers and brake hose eyelets and left caliper bracket/ secondary master cylinder assembly.

CAUTION:

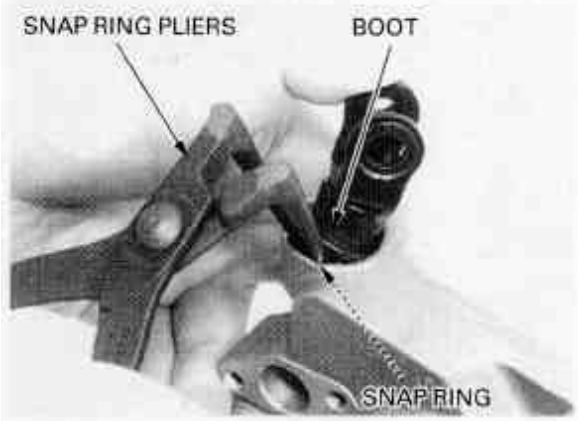
Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.



Remove the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:
Snap ring pliers 07914-SA50001



Remove the push rod, master piston and spring.

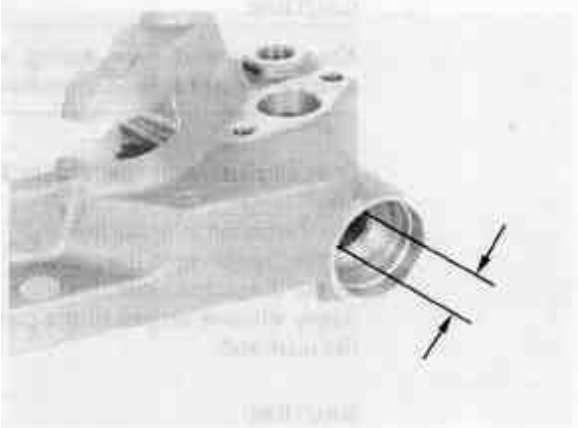
Clean the inside of the cylinder with brake fluid.

⚠WARNING

Do not disassemble the secondary master cylinder push rod or the correct brake performance is not obtained.

INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.



Measure the master cylinder I.D.

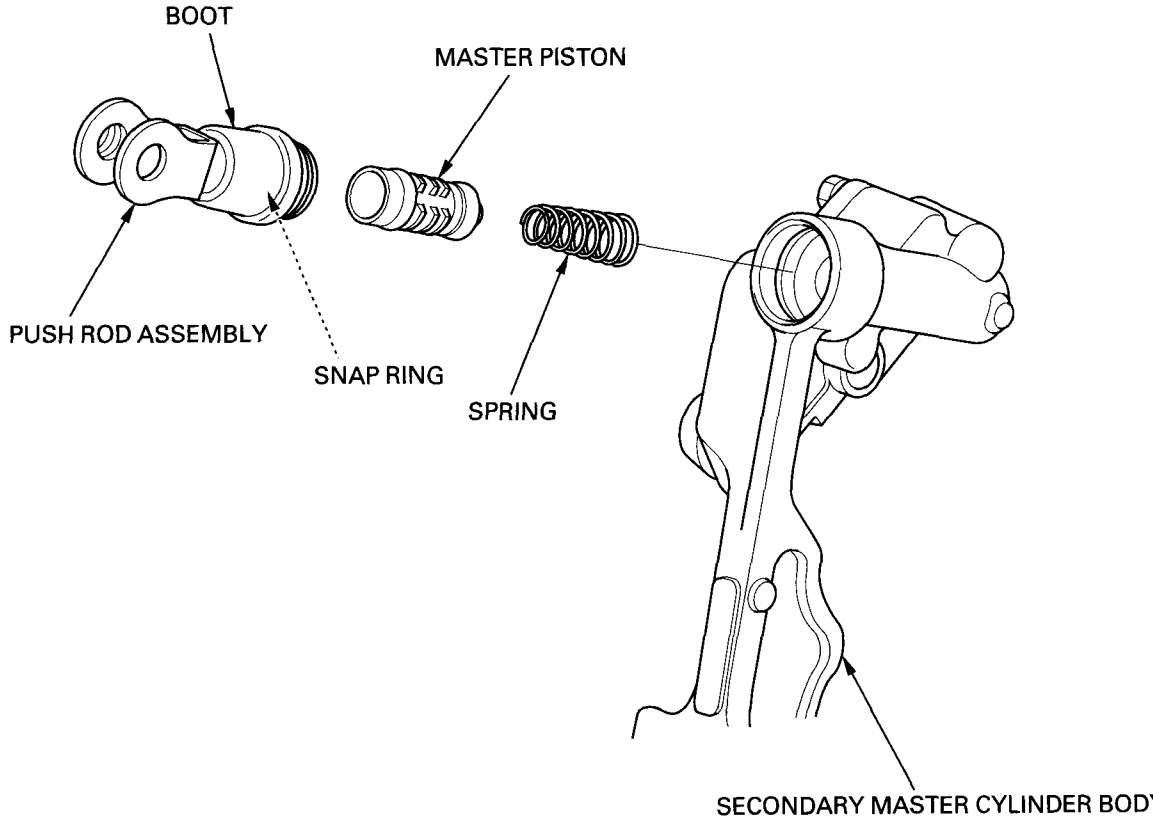
SERVICE LIMIT: 12.755 mm (0.5022 in)

Measure the master cylinder piston O.D.

SERVICE LIMIT: 12.645 mm (0.4978 in)



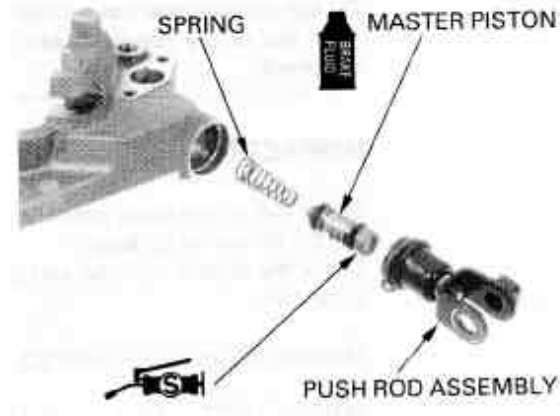
ASSEMBLY



CAUTION:

Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.
Dip the piston in brake fluid.
Install the spring to the piston.
Install the piston assembly.
Apply silicone grease to the piston contact area of the push rod.



CAUTION:

When installing the cups, do not allow the lips to turn inside out.

Install the push rod into the master cylinder.
Install the snap ring using the special tool.



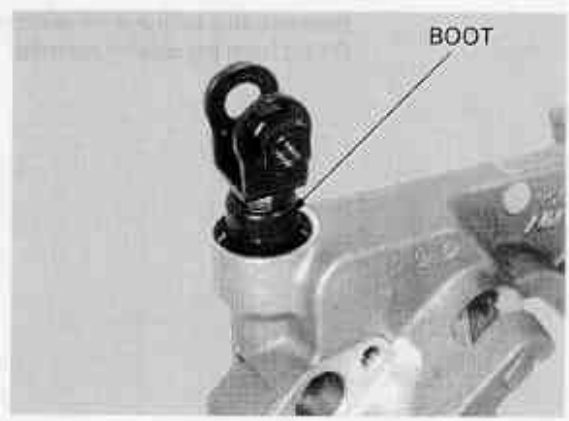
CAUTION:

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

TOOL:

Snap ring pliers	07914-SA50001

Install the boot securely.



Install the brake hose eyelet with the oil bolt and new sealing washers.

Tighten the oil bolts to the specified torque.

TORQUE: 35 N·m (3.6 kgf·m , 26 lbf·ft)

Install the left front brake caliper (page 15-32).
Bleed the air from pedal brake line (page 15-8).



REAR MASTER CYLINDER

REMOVAL

Drain the pedal brake hydraulic system (page 15-6).

Remove the brake hose oil bolt, sealing washers, brake hose and pipe.

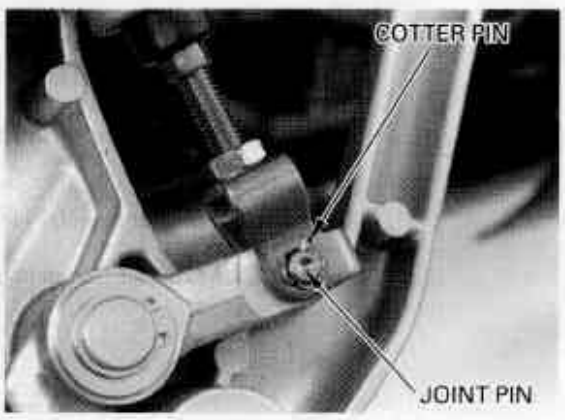
CAUTION:

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



Remove the right footpeg bracket (page 14-15).

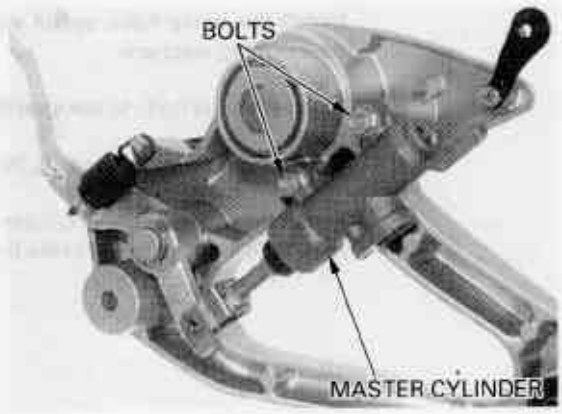
Remove and discard the brake pedal joint cotter pin.
Remove the joint pin.



Remove the screw and reservoir hole joint and O-ring from the master cylinder.



Loosen the rear master cylinder mounting bolts and rear master cylinder.



DISASSEMBLY

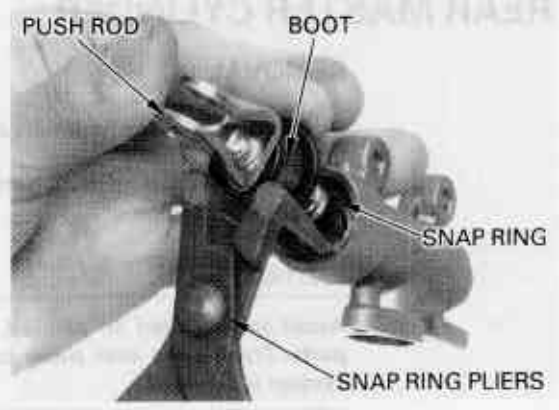
Remove the boot.

Remove the snap ring from the master cylinder body using the special tool as shown.

TOOL:
Snap ring pliers 07914-SA50001

Remove the push rod, master piston and spring.

Clean the inside of the cylinder with brake fluid.

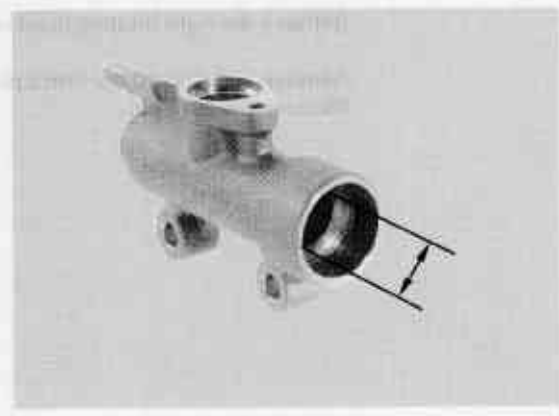


INSPECTION

Check the piston boot, primary cup and secondary cup for fatigue or damage.
Check the master cylinder and piston for abnormal scratches.

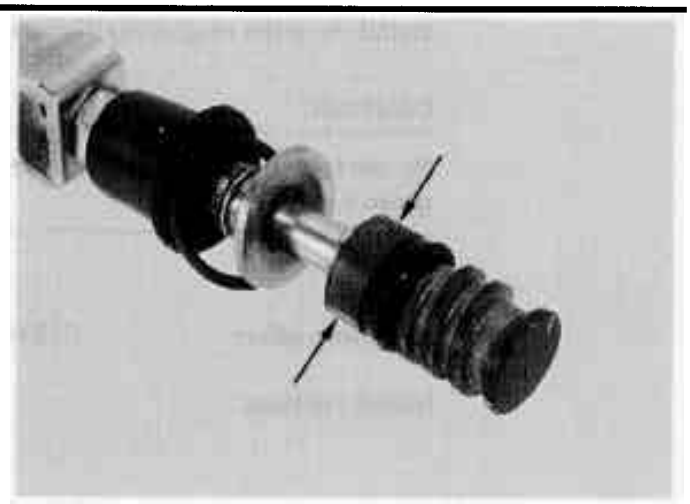
Measure the master cylinder I.D.

SERVICE LIMIT: 17.515 mm (0.6896 in)

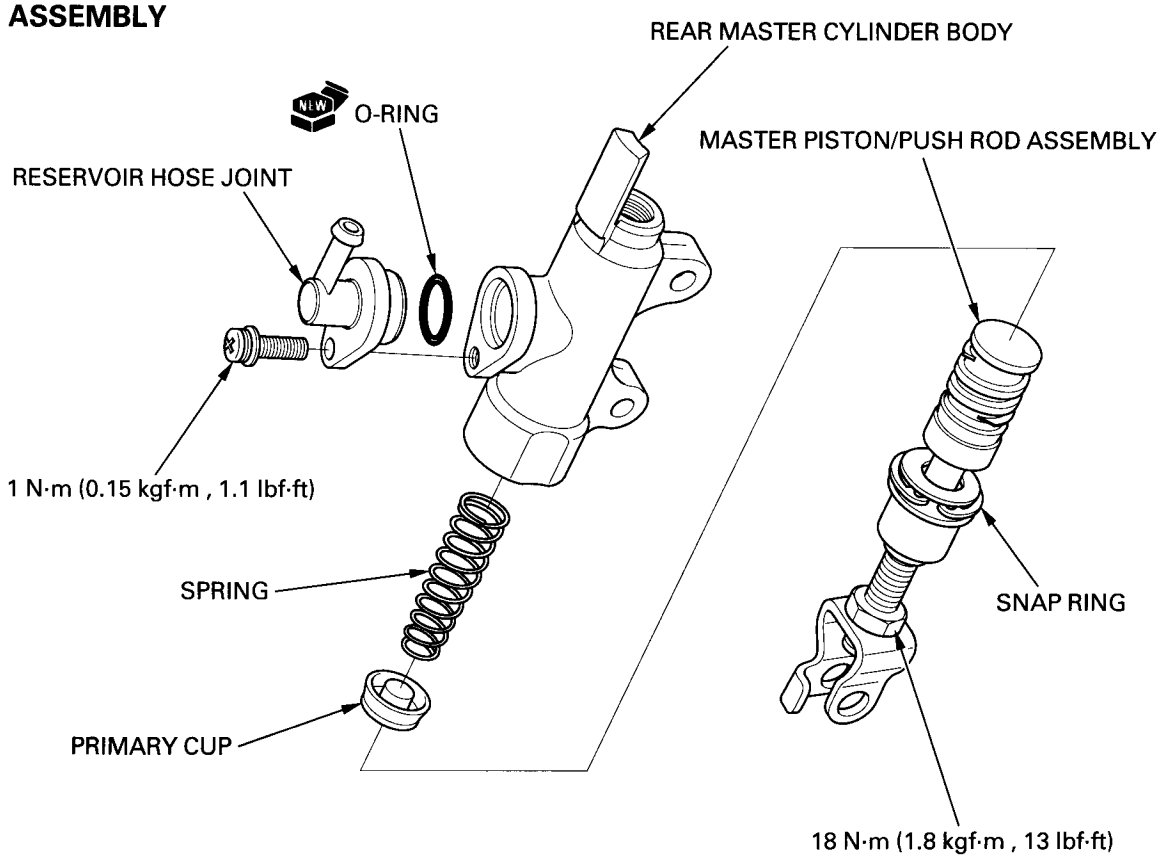


Measure the master cylinder piston O.D.

SERVICE LIMIT: 17.405 mm (0.6852 in)



ASSEMBLY



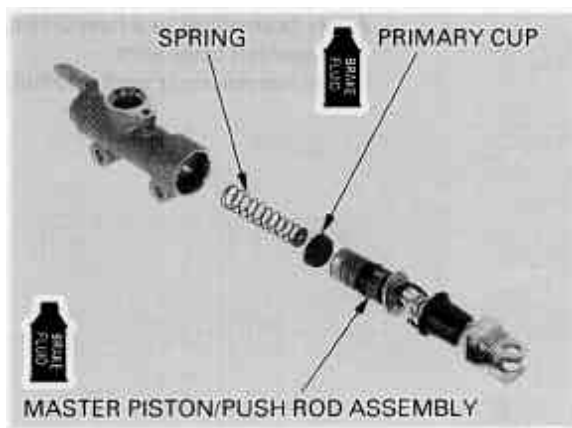
CAUTION:

Keep the piston, cups, spring, snap ring and boot as a set; do not substitute individual parts.

Coat all parts with clean brake fluid before assembly.
Dip the piston in brake fluid.
Install the spring to the piston.
Install the piston/push rod assembly.

CAUTION:

When installing the cups, do not allow the lips to turn inside out.



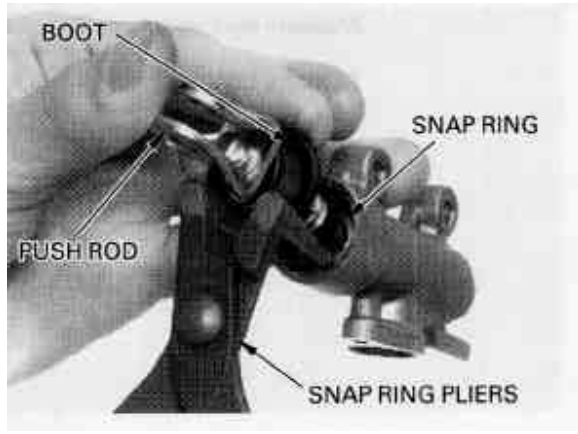
Install the snap ring using the special tool.

CAUTION:

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

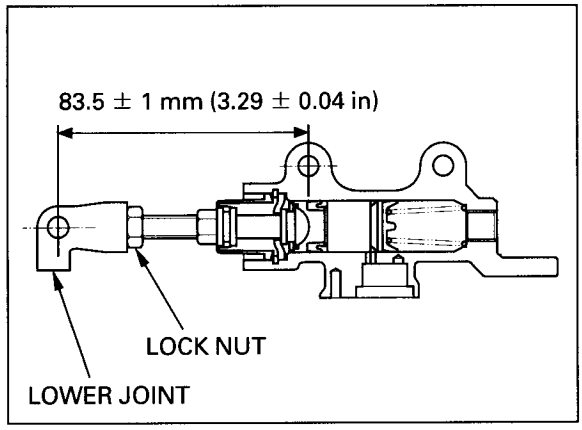
TOOL:
Snap ring pliers 07914-SA50001

Install the boot.



If the push rod is disassembled, adjust the push rod length as shown.
After adjustment, tighten the lock nut to the specified torque.

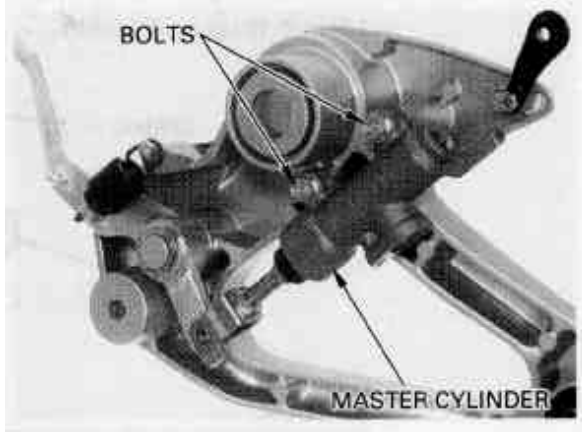
TORQUE: 18 N·m (1.8 kgf·m , 13 lbf·ft)



INSTALLATION

Place the master cylinder onto the main footpeg and tighten the mounting bolts.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



Apply brake fluid to a new O-ring and install it onto the reservoir hose joint.
Install the reservoir joint into the master cylinder.

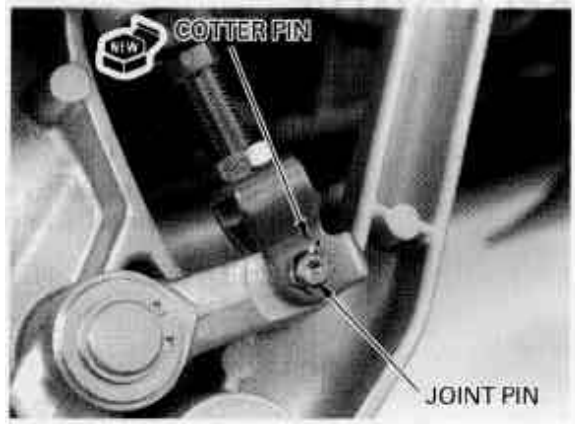


Apply a locking agent to the rear master cylinder joint screw threads.
Install and tighten the screw to the specified torque.

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



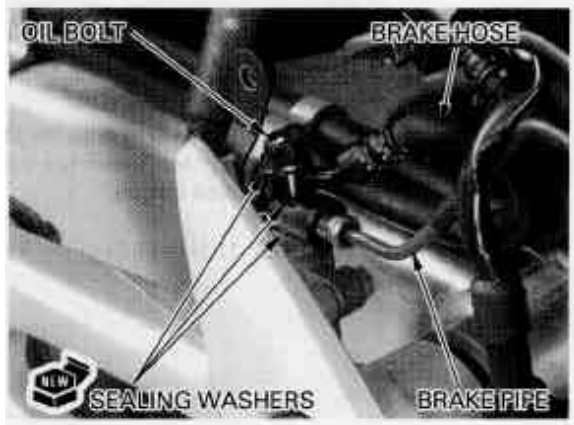
Connect the brake pedal to the push rod lower joint.
Install the joint pin and secure it with a new cotter pin.



Install the brake hose with the oil bolt and new sealing washers.
Push the eyelet joint against the stoppers, then tighten the oil bolt to the specified torque.

TORQUE: 35 N·m (3.6 kgf·m , 26 lbf·ft)

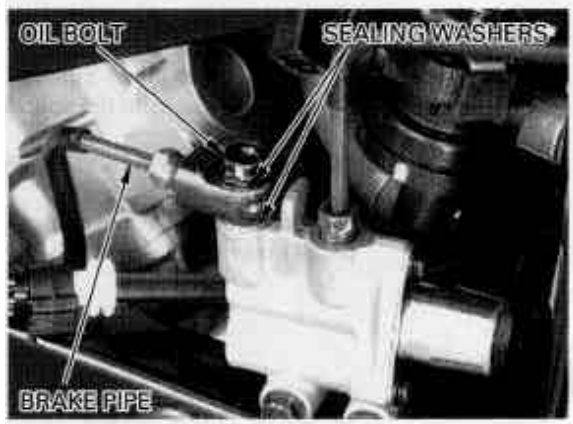
Fill the reservoir to the upper level and bleed the pedal brake line (page 15-8).



PROPORTIONAL CONTROL VALVE

REMOVAL/INSTALLATION

Remove the oil bolt, sealing washers and brake pipe eyelet from the PCV (Proportional Control Valve).



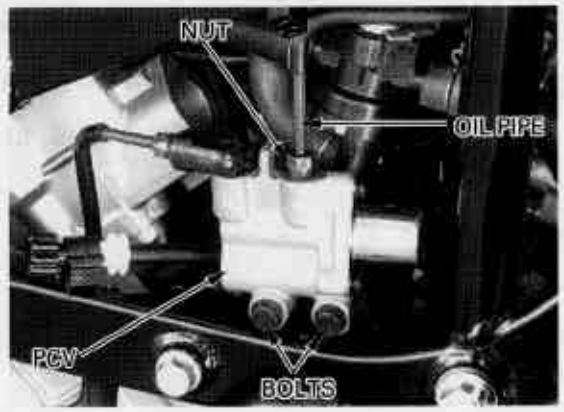
Loosen the oil pipe nut and remove the oil pipe.

Remove the two mounting bolts and PCV.

Installation is in the reverse order of removal.

Tighten the PCV mounting bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

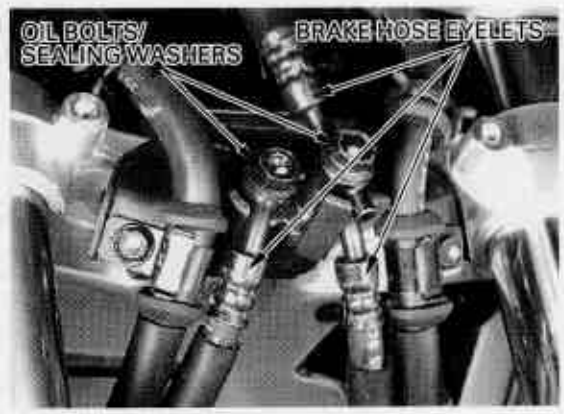


DELAY VALVE

REMOVAL

Remove the steering stem cover (page 13-30).

Remove the oil bolts, sealing washers and brake hose eyelets from the delay valve.

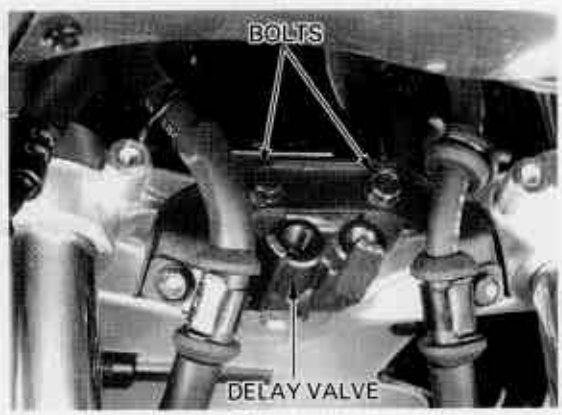


Remove the mounting bolts and delay valve.

INSTALLATION

Install the delay valve onto the steering stem.
Install and tighten the delay valve mounting bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



Install the brake hoses with the oil bolts and new sealing washers.
Push the eyelet joints against the stoppers, then tighten the oil bolts to the specified torque.

TORQUE: 35 N·m (3.6 kgf·m , 26 lbf·ft)

Fill the reservoir to the upper level and bleed the pedal brake line (page 15-8).



FRONT BRAKE CALIPER

LEFT CALIPER REMOVAL

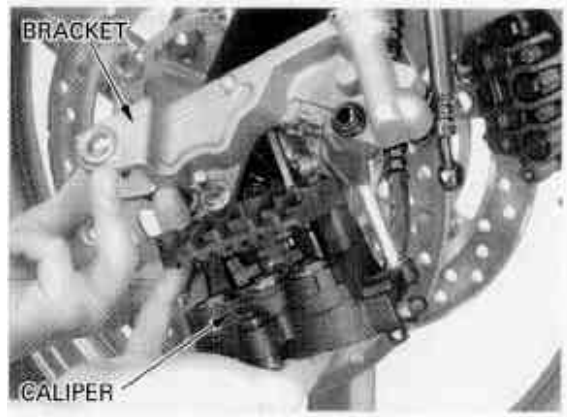
CAUTION:

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

Drain the lever and pedal brake line hydraulic system (page 15-5).

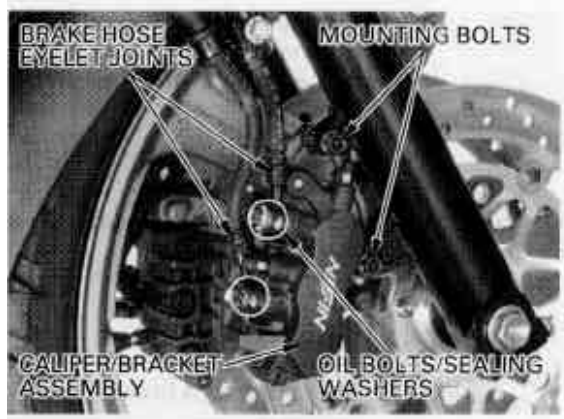
Remove the oil bolts, sealing washers and brake hose eyelet joints.
Remove the secondary master cylinder joint bolt and caliper pivot bolt, then remove the caliper from the bracket.





RIGHT CALIPER REMOVAL

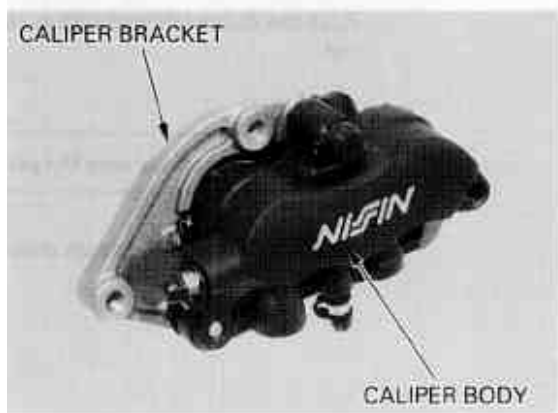
Remove the oil bolts, sealing washers and brake hose eyelet joints.
Remove the caliper bracket mounting bolts and then remove the caliper/bracket assembly.



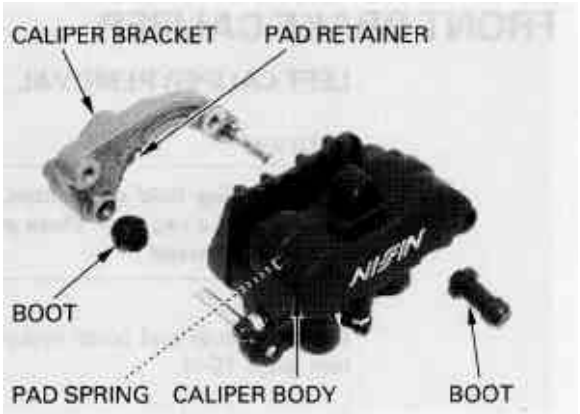
DISASSEMBLY

Remove the brake pads (page 15-10).

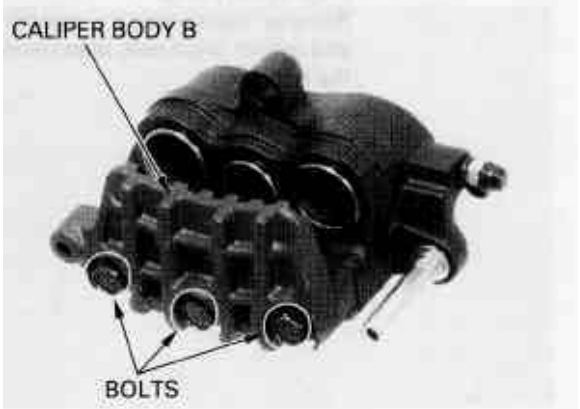
Remove the caliper bracket from the caliper body.



Remove the brake pad spring from the caliper body.
Remove the brake pad retainer from the caliper bracket.
Remove the boots from the caliper body and bracket.



Remove the bolts and caliper body B.



Place the piece of wood sheet under the caliper pistons.
Apply small squirts of air pressure to the fluid inlet to remove the pistons.

⚠WARNING

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

NOTE:

Mark the pistons to ensure correct reassembly.

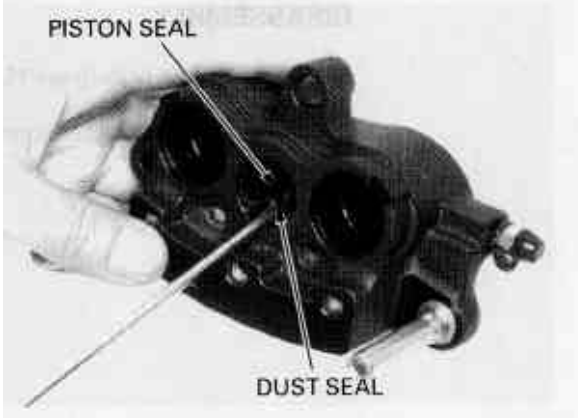


Push the dust seals and piston seals in and lift them out.

CAUTION:

Be careful not to damage the piston sliding surface.

Clean the seal grooves with clean brake fluid.



INSPECTION

Check the caliper cylinder for scoring or other damage.
Measure the caliper cylinder I.D.

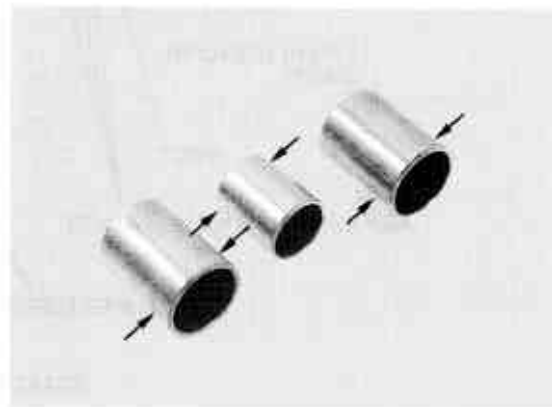


SERVICE LIMITS:

Right:	**Upper:**	27.060 mm (1.0654 in)
	Middle:	22.710 mm (0.8941 in)
	Lower:	27.060 mm (1.0654 in)
Left:	**Upper:**	25.460 mm (1.0024 in)
	Middle:	22.710 mm (0.8941 in)
	Lower:	25.460 mm (1.0024 in)

Check the caliper pistons for scratches, scoring or other damage.

Measure the caliper piston O.D.

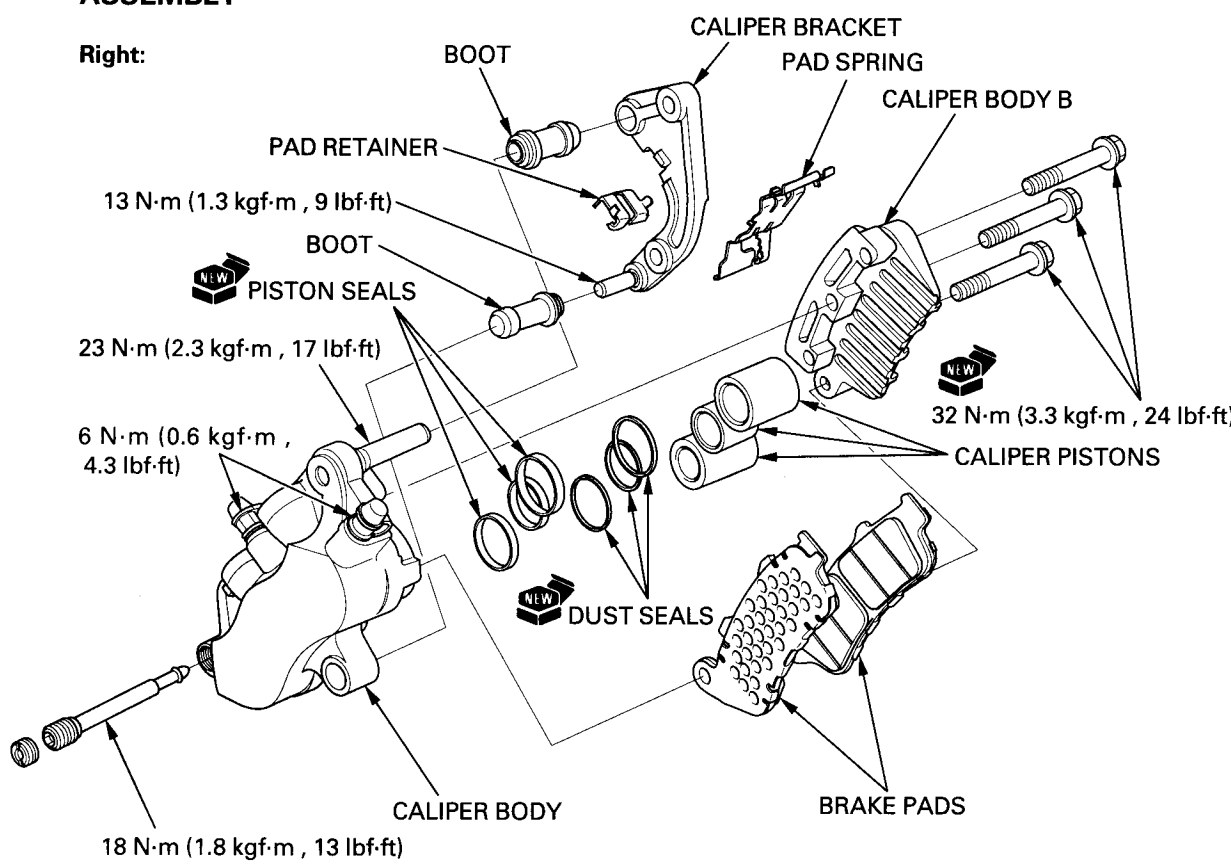


SERVICE LIMITS:

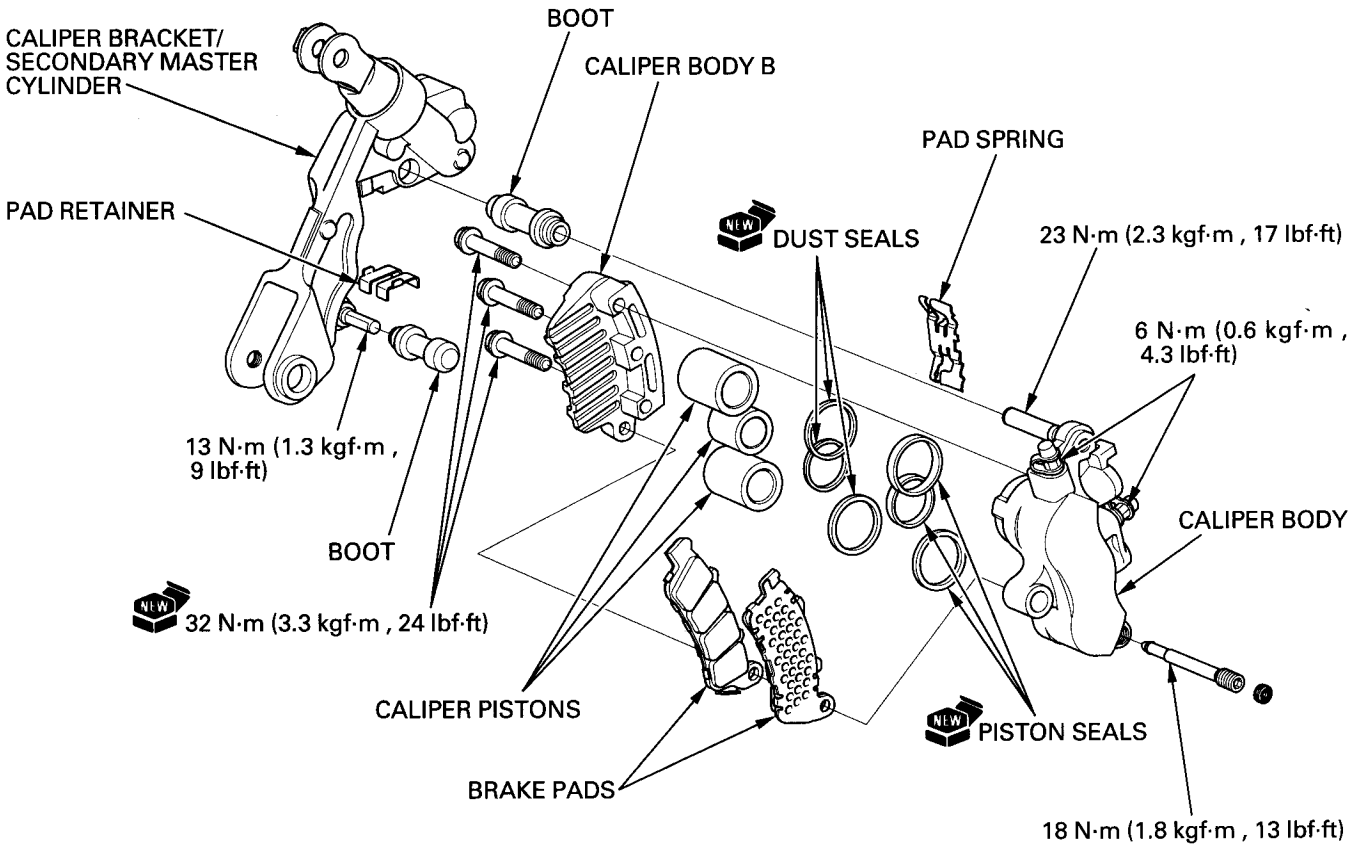
Right:	**Upper:**	26.910 mm (1.0594 in)
	Middle:	22.560 mm (0.8882 in)
	Lower:	26.910 mm (1.0594 in)
Left:	**Upper:**	25.310 mm (0.9965 in)
	Middle:	22.560 mm (0.8882 in)
	Lower:	25.310 mm (0.9965 in)

ASSEMBLY

Right:



Left:



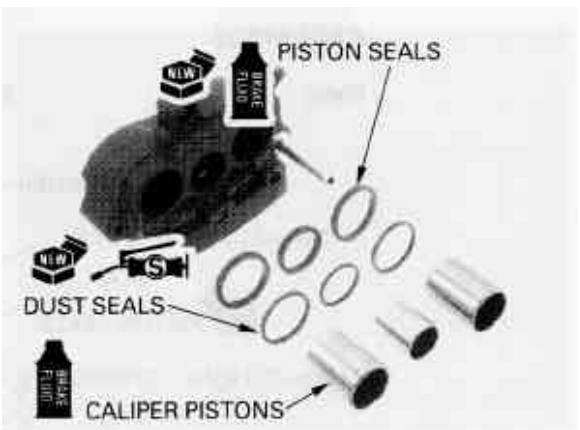
Coat the new piston seals with clean brake fluid.
Coat the new dust seals with silicone grease.

Install the pistons and dust seals into the groove of the caliper body.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their opening ends toward the pad.

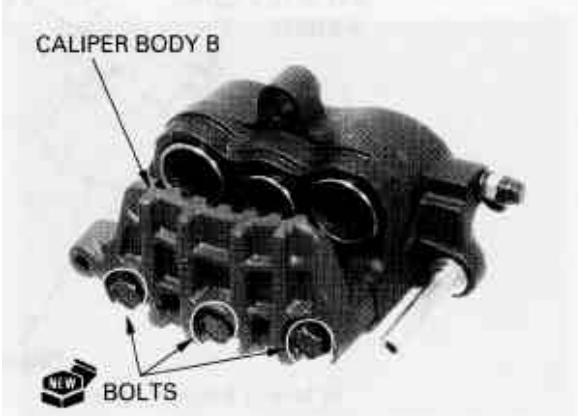
NOTE:

Install the each piston seal, dust seal and caliper piston in their proper locations.



Install the caliper body B and tighten the new bolts to the specified torque.

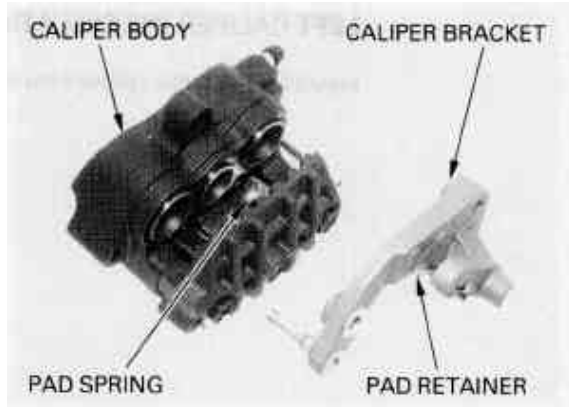
TORQUE: 32 N·m (3.3 kgf·m , 24 lbf·ft)



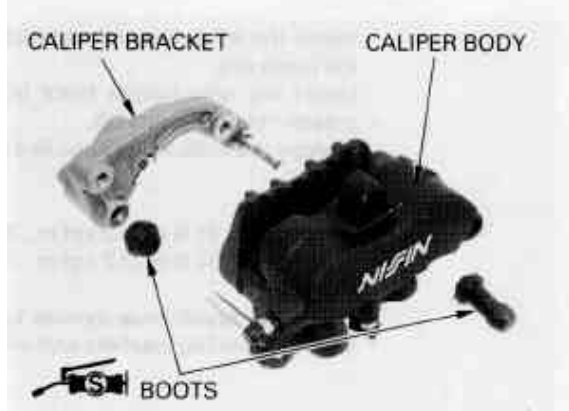
Install the brake pad retainer onto the caliper bracket.
Install the pad spring into the caliper body.

NOTE:

Note the installation direction of the pad spring.



Apply silicone grease to the boots inside then install them.
Assemble the caliper and bracket.

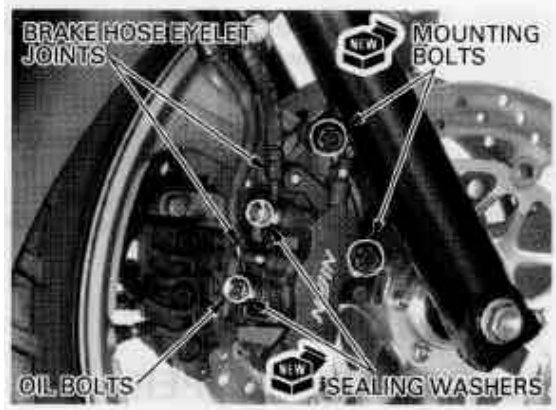


RIGHT CALIPER INSTALLATION

Install the right brake caliper/bracket assembly over the brake disc.
Install and tighten the new caliper mounting bolts.

TORQUE: 31 N·m (3.2 kgf·m , 23 lbf·ft)

Install the brake hose eyelets to the caliper body with new sealing washers and oil bolt.



Push the brake hose eyelet stoppers against the caliper body, then tighten the oil bolt to the specified torque.

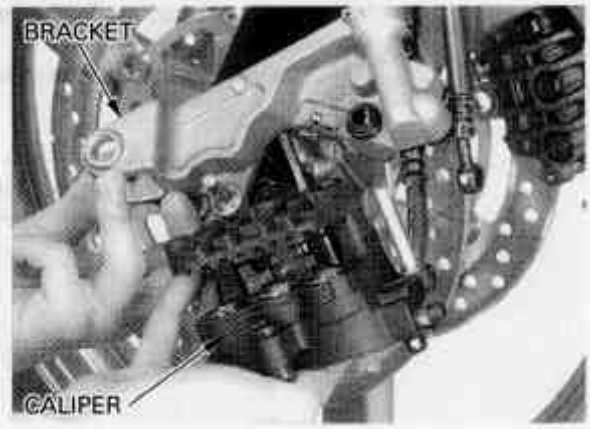
TORQUE: 35 N·m (3.6 kgf·m , 26 lbf·ft)

Install the brake pads (page 15-11).



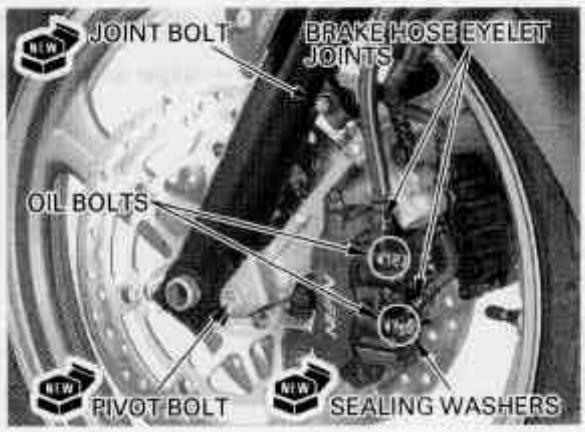
LEFT CALIPER INSTALLATION

Install the left brake caliper onto the bracket.



Install the left brake caliper/bracket assembly over the brake disc.
Install the new caliper pivot bolt and secondary master cylinder joint bolt.
Tighten the bolts to the specified torque.

TORQUE:
Pivot bolt: 31 N·m (3.2 kgf·m , 23 lbf·ft)
Joint bolt: 31 N·m (3.2 kgf·m , 23 lbf·ft)



Install the brake hose eyelets to the caliper body with new sealing washers and oil bolt.

Push the brake hose eyelet to the stopper on the caliper, then tighten the oil bolt to the specified torque.

TORQUE: 35 N·m (3.6 kgf·m , 26 lbf·ft)



Install the brake pads (page 15-11).
Fill and bleed the lever and pedal line brake hydraulic system (page 15-8).

REAR BRAKE CALIPER

REMOVAL

Drain the pedal line brake hydraulic system (page 15-5).
Loosen the oil bolts, then remove the rear wheel (page 14-3).



Remove the oil bolts, sealing washers and brake hose eyelet joints.

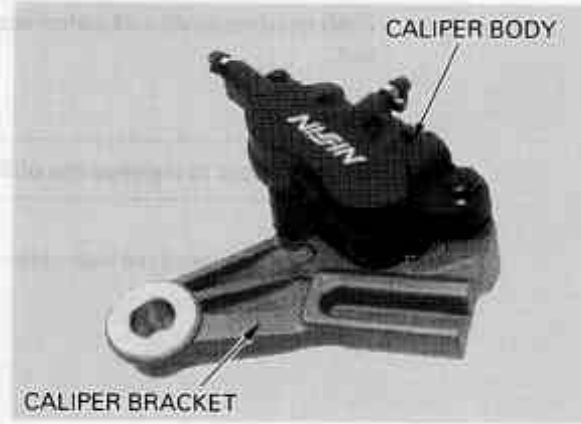
CAUTION:

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

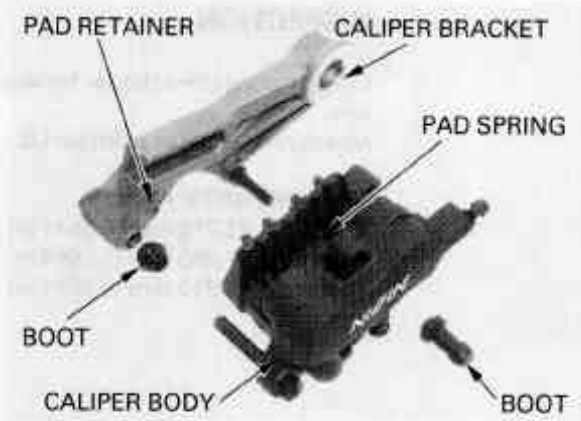
DISASSEMBLY

Remove the rear brake pads (page 15-11).

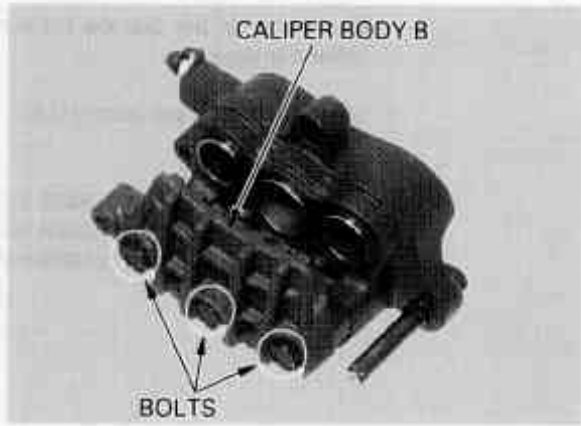
Remove the caliper bracket from the caliper body.



Remove the brake pad spring from the caliper body.
Remove the brake pad retainer from the caliper bracket.
Remove the boots from the caliper body and bracket.



Remove the bolts and caliper body B.



Place the piece of wood sheet under the caliper pistons.
Apply small squirts of air pressure to the fluid inlet to remove the pistons.

⚠WARNING

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

NOTE:

Mark the pistons to ensure correct reassembly.



Push the dust seals and piston seals in and lift them out.



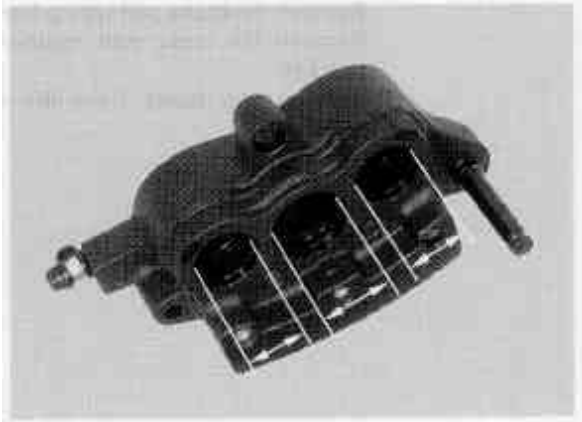
CAUTION:

Be careful not to damage the piston sliding surface.

Clean the seal grooves with clean brake fluid.

INSPECTION

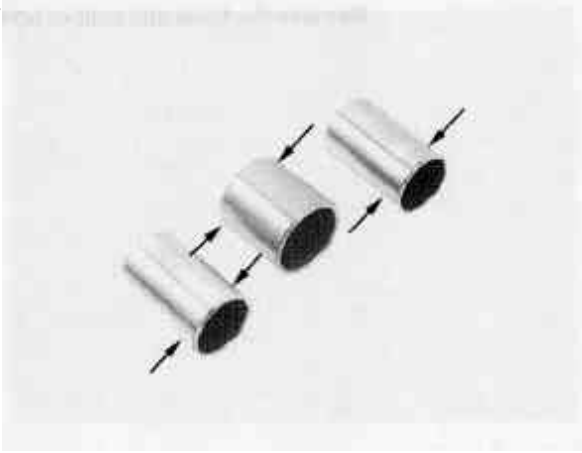
Check the caliper cylinder for scoring or other damage.
Measure the caliper cylinder I.D.



SERVICE LIMITS:
Front: 22.710 mm (0.8941 in)
Center: 27.060 mm (1.0654 in)
Rear: 22.710 mm (0.8941 in)

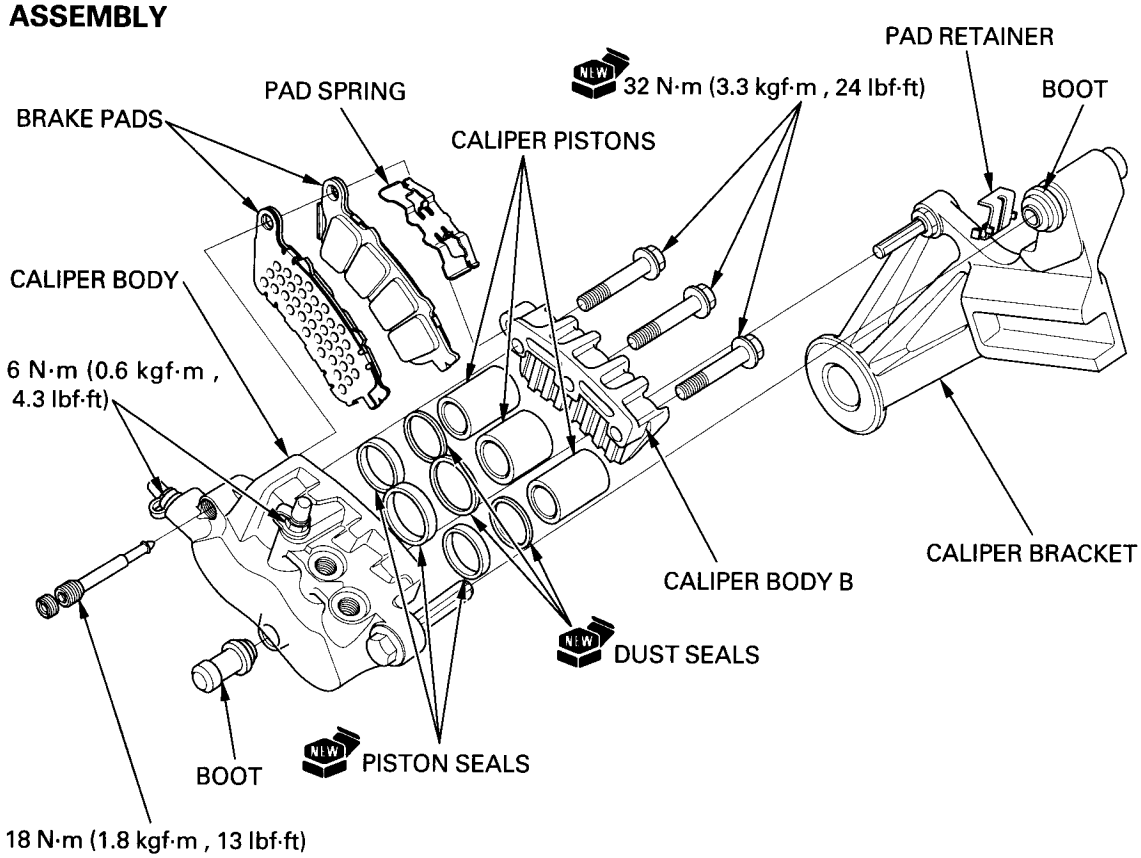
Check the caliper pistons for scratches, scoring or other damage.

Measure the caliper piston O.D.



SERVICE LIMITS:
Front: 22.560 mm (0.8882 in)
Center: 26.910 mm (1.0594 in)
Rear: 22.560 mm (0.8882 in)

ASSEMBLY



Coat the new piston seals with clean brake fluid.
Coat the new dust seals with silicone grease.

Install the piston and dust seals into the groove of the caliper body.

Coat the caliper pistons with clean brake fluid and install them into the caliper cylinder with their opening ends toward the pad.

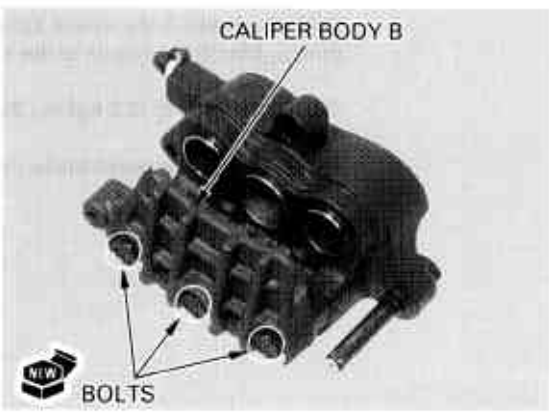


NOTE:

Install the each piston seal, dust seal and caliper piston in their proper locations.

Install the caliper body B and tighten the new bolts to the specified torque.

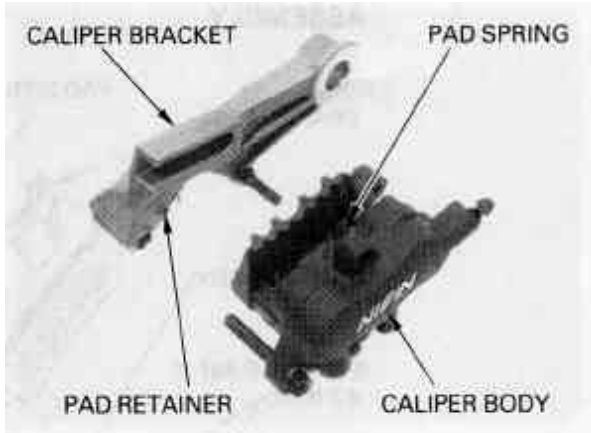
TORQUE: 32 N·m (3.3 kgf·m , 24 lbf·ft)



Install the brake pad retainer onto the caliper bracket.
Install the pad spring into the caliper body.

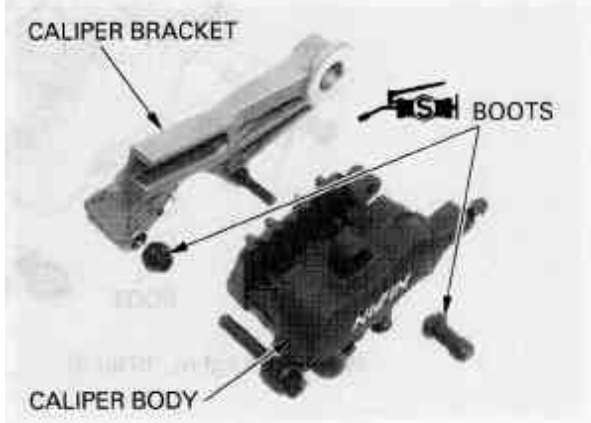
NOTE:

Note the installation direction of the pad spring.



Apply silicone grease to the boot inside then install them.
Assemble the caliper and bracket.

Install the rear brake pads (page 15-12).



INSTALLATION

Temporarily install the brake hose eyelets to the caliper body with new sealing washers and oil bolts.

Install the caliper/bracket assembly onto the swingarm aligning the bracket groove with the swingarm boss.

Install the rear wheel (page 14-8).



Push the brake hose eyelet stoppers to the caliper, then tighten the oil bolts to the specified torque.

TORQUE: 35 N·m (3.6 kgf·m , 26 lbf·ft)

Fill and bleed the pedal brake line hydraulic system (page 15-8).



BRAKE PEDAL

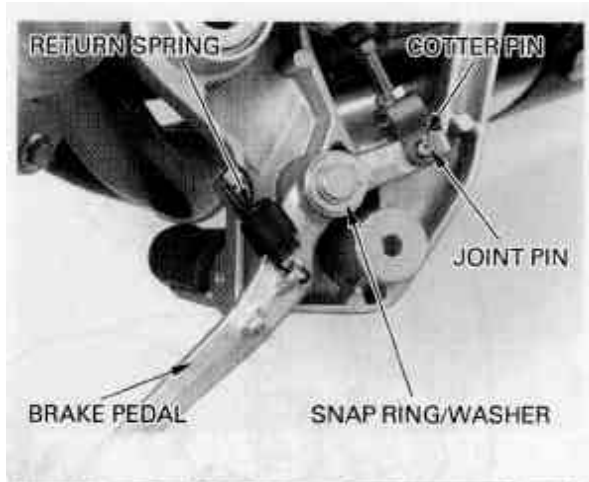
REMOVAL

Remove the right footpeg bracket (page 14-15).

Remove and discard the brake pedal joint cotter pin.
Remove the joint pin.

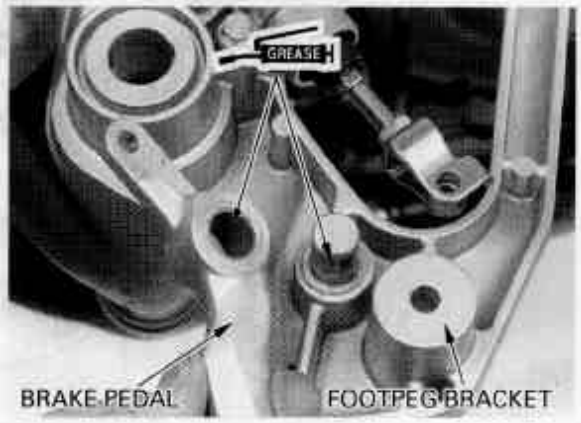
Unhook the brake pedal return spring.

Remove the snap ring, washer and brake pedal from the footpeg.



INSTALLATION

Apply grease to the sliding surface of the brake pedal and the bracket.
Assemble the brake pedal to the footpeg bracket.

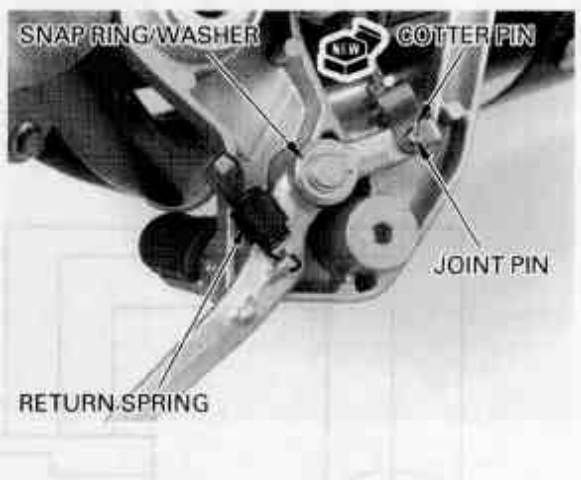


Install the washer and snap ring.

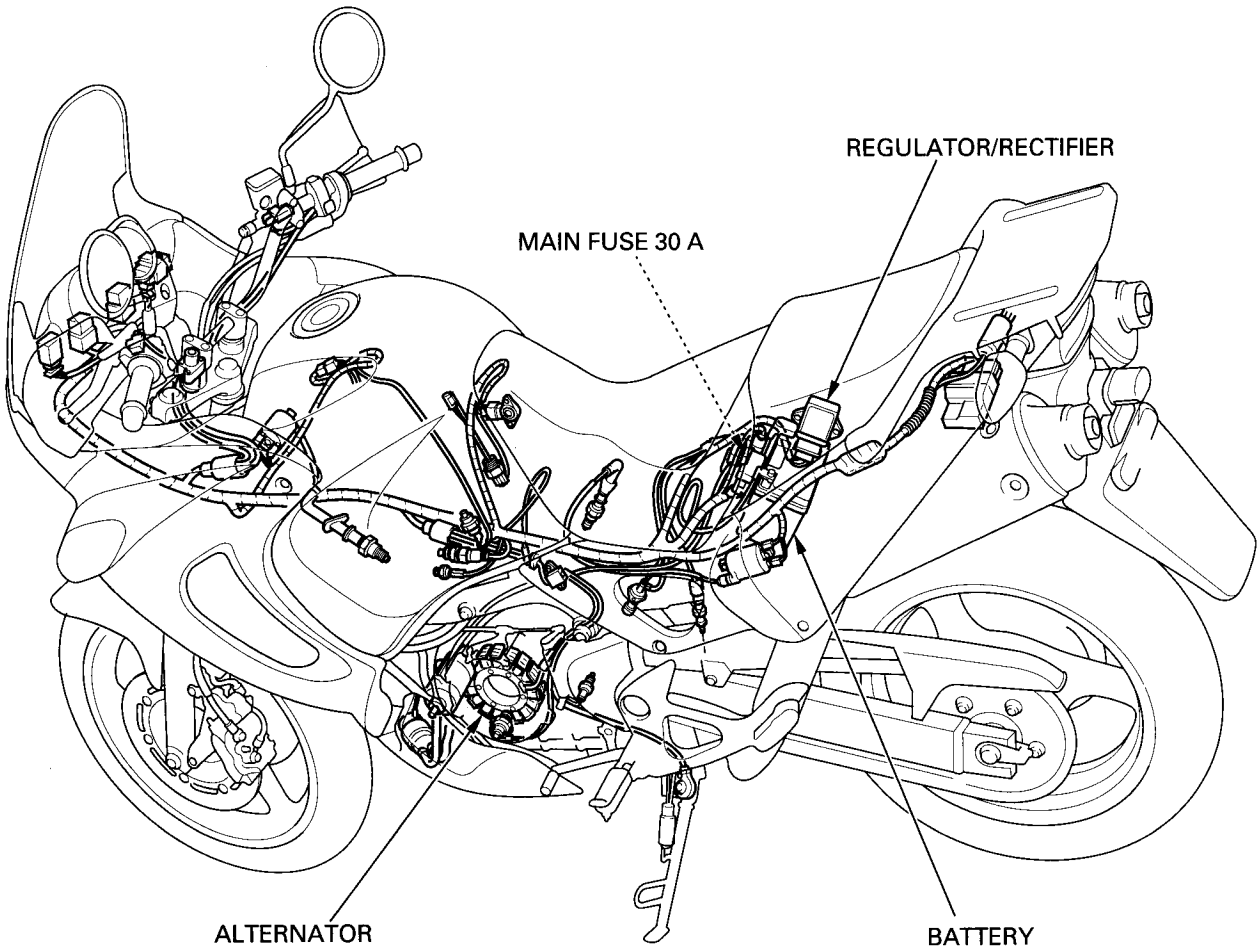
Hook the brake pedal return spring.

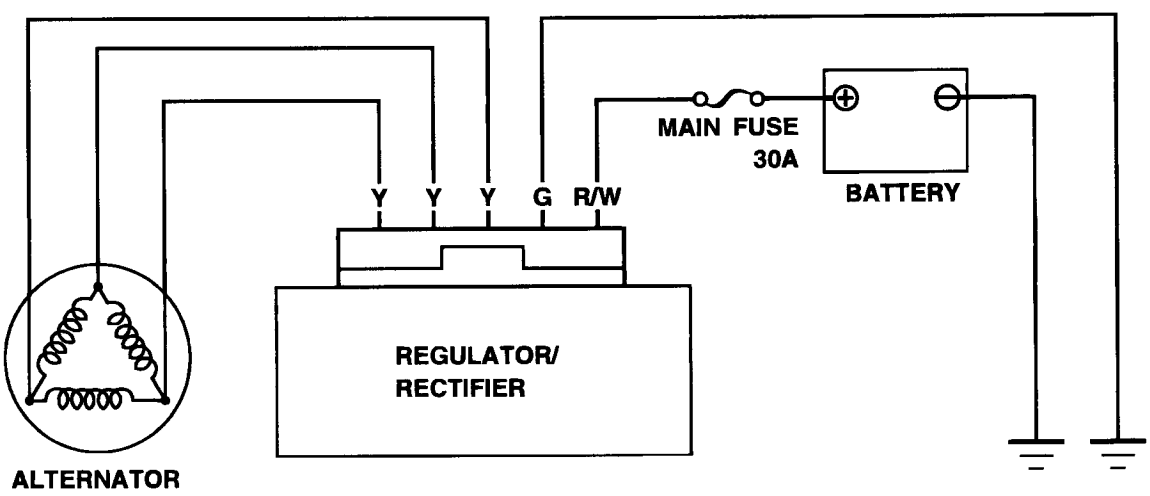
Install the brake pedal joint and secure it with a new cotter pin.

Install the right footpeg bracket (page 14-20).



SYSTEM DIAGRAM





Y ..... YELLOW
G ..... GREEN
R ..... RED
W ..... WHITE

16. BATTERY/CHARGING SYSTEM

SYSTEM DIAGRAM	16-0	CHARGING SYSTEM INSPECTION	16-6
SERVICE INFORMATION	16-1	ALTERNATOR CHARGING COIL	16-7
TROUBLESHOOTING	16-3	REGULATOR/RECTIFIER	16-8
BATTERY	16-5		

SERVICE INFORMATION

GENERAL

⚠WARNING

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

- Always turn off the ignition switch before disconnecting any electrical component.

CAUTION:

Some electrical components may be damaged if terminals or connectors are connected or disconnected while the ignition switch is ON and current is present.

- For extended storage, remove the battery, give it a full charge, and store it in a cool, dry space. For maximum service life, charge the stored battery every two weeks.
- For a battery remaining in a stored motorcycle, disconnect the negative battery cable from the battery terminal.

NOTE:

The maintenance free battery must be replaced when it reaches the end of its service life.

CAUTION:

The battery caps should not be removed. Attempting to remove the sealing caps from the cells may damage the battery.

- The battery can be damaged of overcharged or undercharged, or of left to discharge for long period. These same conditions contribute to shortening the "life span" of the battery. Even under normal use, the performance of the battery deteriorates after 2 — 3 years.
- Battery voltage may recover after battery charging, but under heavy load, battery voltage will drop quickly and eventually die out. For this reason, the charging system is often suspected as the problem. Battery overcharge often results from problems in the battery itself, which may appear to be an overcharging symptom, If one of the battery cells is shorted and battery voltage does not increase, the regulator/rectifier supplies excess voltage to the battery. Under these conditions, the electrolyte level goes down quickly.
- Before troubleshooting the charging system, check for proper use and maintenance of the battery, Check if the battery is frequently under heavy load, such as having the headlight and taillight ON for long periods of time without riding the motorcycle.

- The battery will self-discharge when the motorcycle is not in use. For this reason, charge the battery every two weeks to prevent sulfation from occurring.
- Filling a new battery with electrolyte will produce some voltage, but in order to achieve its maximum performance, always charge the battery. Also, the battery life is lengthened when it is initially charged.
- When checking the charging system, always follow the steps in the troubleshooting flow chart (page 16-3).

Battery charging

This model comes with a maintenance-free (MF) battery. Remember the following about MF batteries.

- Use only the electrolyte that comes with the battery
- Use all of the electrolyte
- Seal the battery properly
- Never open the seals again

CAUTION:

For battery charging, do not exceed the charging current and time specified on the battery. Use of excessive current or charging time may damage the battery.

Battery testing

Refer to the instruction is in the Operation Manual for the recommended battery tester for details about battery testing. The recommended battery tester puts a "load" on the battery so that the actual battery condition can be measured.

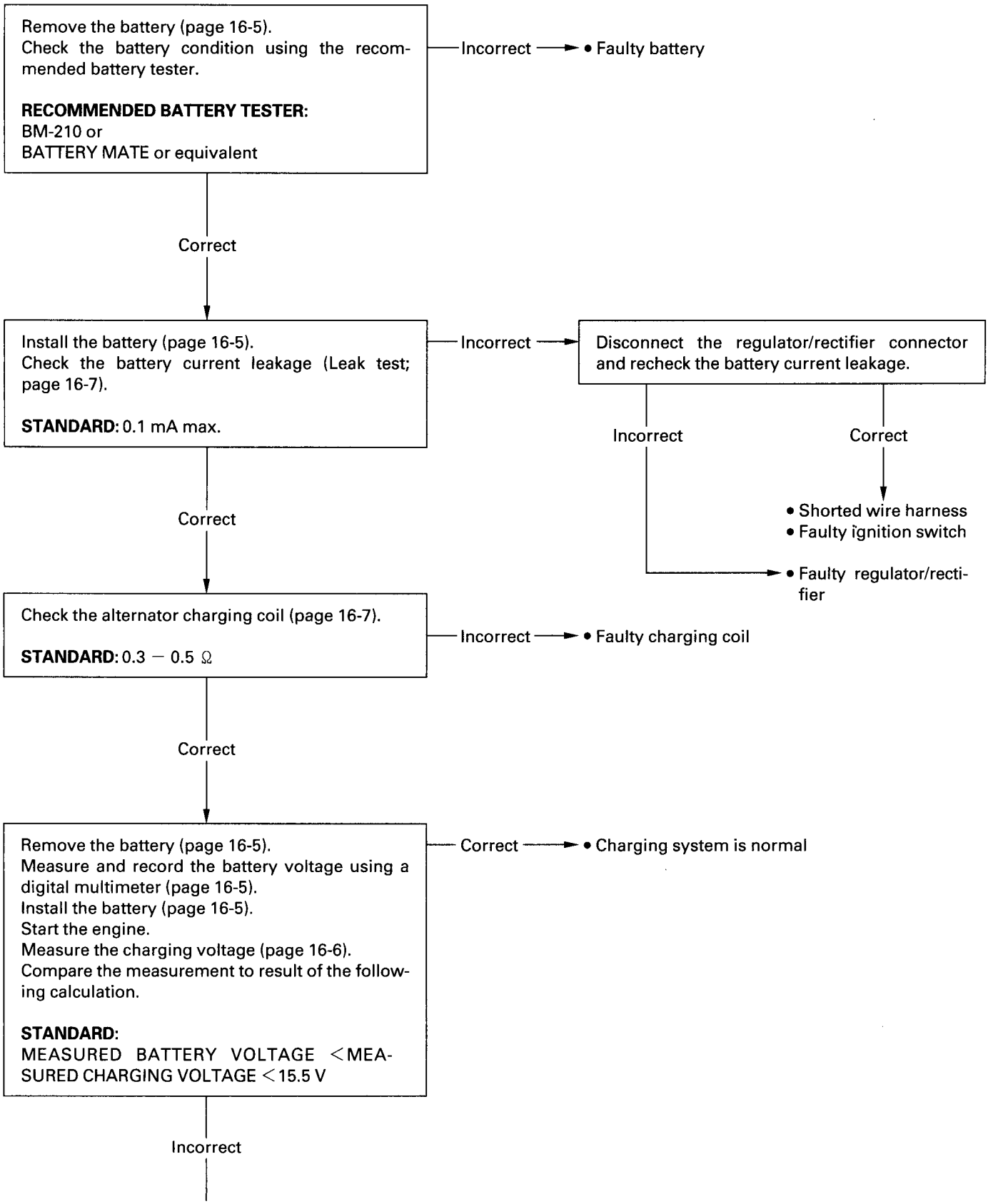
Recommended battery tester **BM-210-AH or BM-210 or BATTERY MATE or equivalent**

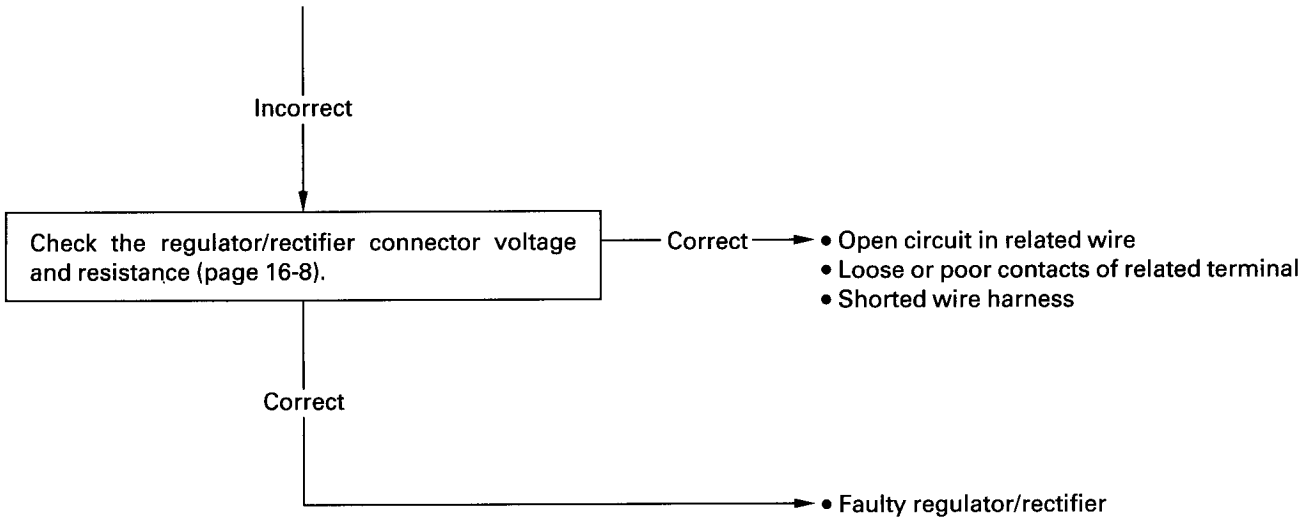
SPECIFICATIONS

ITEM			SPECIFICATIONS
Battery	Capacity		12V – 12AH
	Current leakage		0.1 mA max.
	Voltage (20 °C/68 °F)	Fully charged	13.0 – 13.2 V
		Needs charging	Below 12.3 V
	Charging current	Normal	1.2 A/5 – 10h
		Quick	5.0 A/0.5 h
Alternator	Capacity		0.315 kW/ 5,000 min^{-1} (rpm)
	Charging coil resistance (20 °C/68 °F)		0.3 – 0.5 Ω

TROUBLESHOOTING

1. Battery undercharging (Voltage not raised to regulated voltage).




Incorrect
Check the regulator/rectifier connector voltage and resistance (page 16-8).
Correct
• Open circuit in related wire
• Loose or poor contacts of related terminal
• Shorted wire harness
Correct
• Faulty regulator/rectifier

BATTERY

REMOVAL/INSTALLATION

Remove the seat (page 2-2).

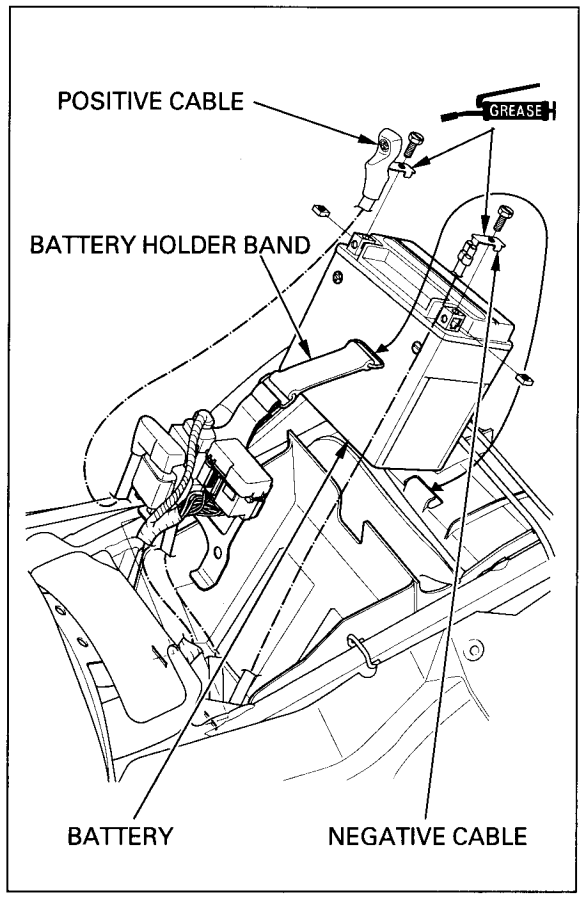
Remove the battery holder band.
Disconnect the negative cable and then the positive cable, and remove the battery.

Install the battery in the reverse order of removal with the proper wiring as shown.

NOTE:

Connect the positive terminal first and then the negative cable.

After installing the battery, coat the terminals with clean grease.
Reinstall the removed parts.

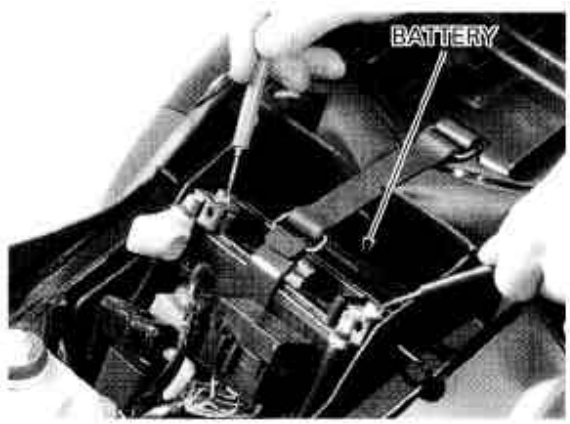


VOLTAGE INSPECTION

Measure the battery voltage using a digital multimeter.

VOLTAGE:
Fully charged: 13.0—13.2 V
Under charged: Below 12.3 V

TOOL:
Digital multimeter Commercially available

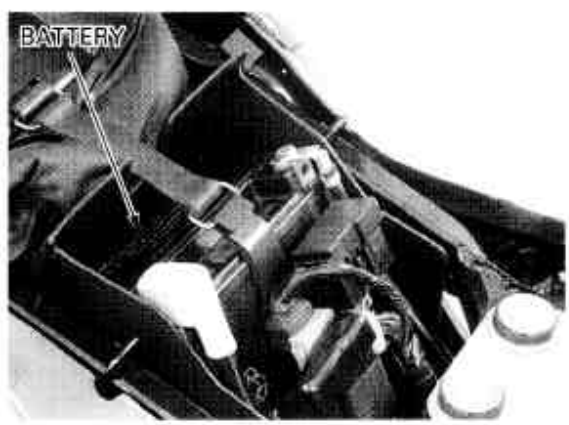


BATTERY CHARGING

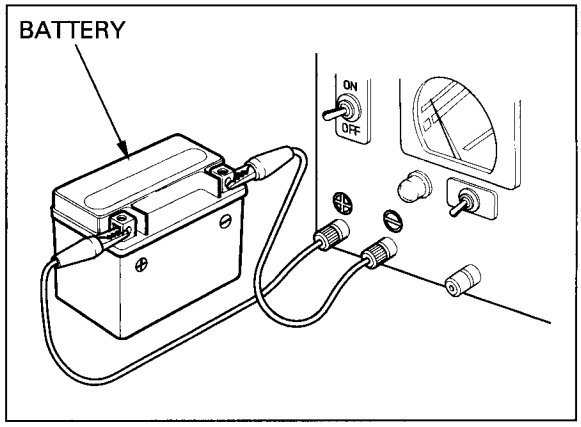
⚠WARNING

- ***The battery gives off explosive gases; keep sparks, flames and cigarettes away. Provide adequate ventilation when charging.***
- ***Turn power ON/OFF at the charger, not at the battery terminal.***

Remove the battery (see above).



Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (−) cable to the battery negative (−) terminal.



CAUTION:

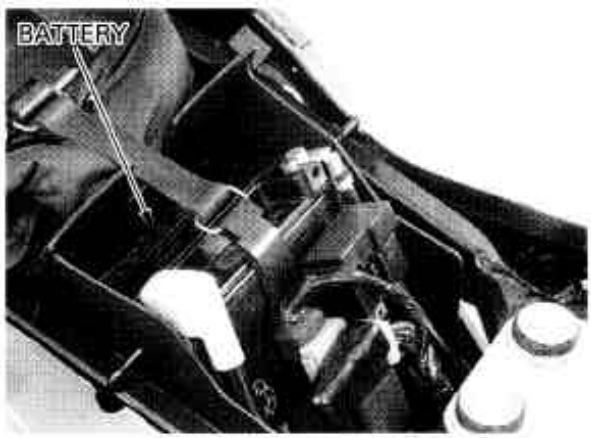
- ***Quick-charging should only be done in an emergency; slow charging is preferred.***
- ***For battery charging, do not exceed the charging current and time specified on the battery. Using excessive current or extending the charging time may damage the battery.***

CHARGING SYSTEM INSPECTION

NOTE:

- When inspecting the charging system, check the system components and lines step-by-step according to the troubleshooting on page 16-3.
- Measuring circuits with a large capacity that exceeds the capacity of the tester may cause damage to the tester. Before starting each test, set the tester at the highest capacity range first, then gradually lower the capacity ranges until you have the correct range.
- When measuring small capacity circuits, keep the ignition switch off. If the switch is suddenly turned on during a test, the tester fuse may blow.

CHARGING VOLTAGE INSPECTION



⚠WARNING

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

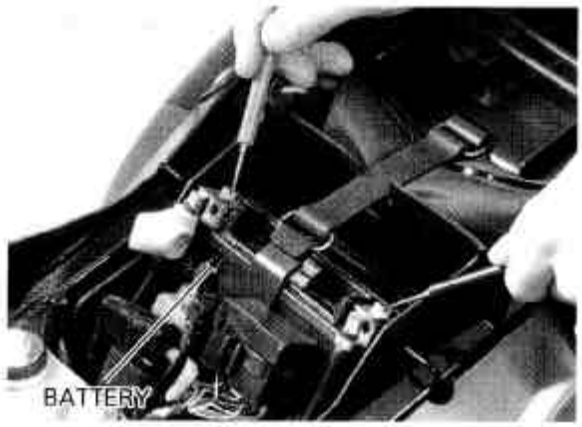
NOTE:

Be sure the battery is in good condition before performing this test.

Remove the seat (page 2-2).

Warm up the engine to normal operating temperature.

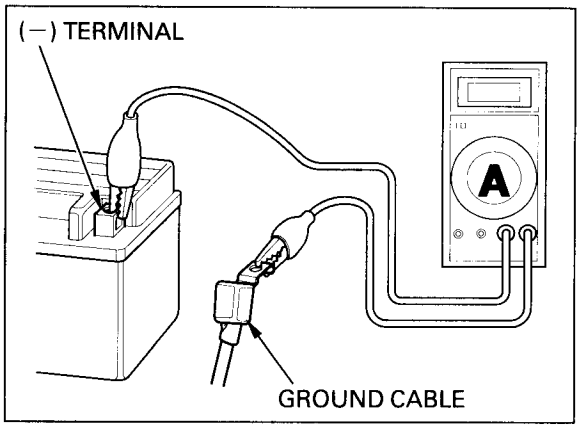
Stop the engine, and connect the multimeter as shown.



CAUTION:

- ***To prevent a short, make absolutely certain which are the positive and negative terminals or cable.***
- ***Do not disconnect the battery or any cable in the charging system without first switching off the ignition switch. Failure to follow this precaution can damage the tester or electrical components.***

Restart the engine.
With the headlight on Hi beam, measure the voltage on the multimeter when the engine runs at 5,000 rpm.



Standard:
Measured battery voltage (page 16-5) < Measured charging voltage (see above) < 15.5 V at 5,000 rpm

CURRENT LEAKAGE INSPECTION

Turn the ignition switch off and disconnect the negative battery cable from the battery.
Connect the ammeter (+) probe to the ground cable and the ammeter (−) probe to the battery (−) terminal.
With the ignition switch off, check for current leakage.

NOTE:

- When measuring current using a tester, set it to a high range, and then bring the range down to an appropriate level. Current flow higher than the range selected may blow out the fuse in the tester.
- While measuring current, do not turn the ignition on. A sudden surge of current may blow out the fuse in the tester.

SPECIFIED CURRENT LEAKAGE: 0.1 mA max.

If current leakage exceeds the specified value, a shorted circuit is likely.
Locate the short by disconnecting connections one by one and measuring the current.

ALTERNATOR CHARGING COIL

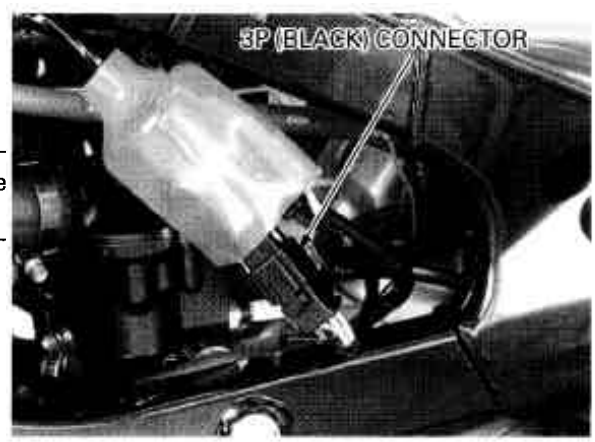
NOTE:

It is not necessary to remove the stator coil to make this test.

INSPECTION

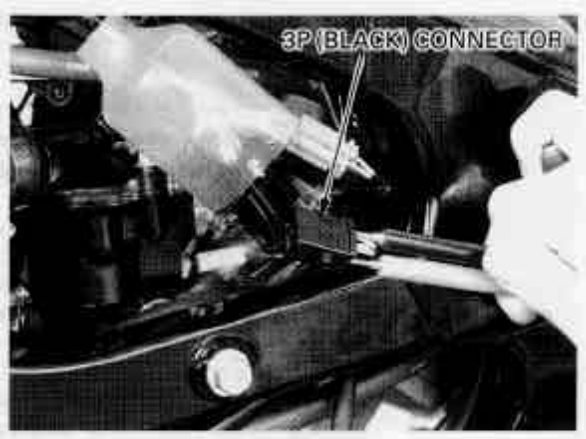
Remove the fuel tank (page 2-10).

Disconnect the alternator 3P (Black) connector.



Check the resistance between all three Yellow terminals.

STANDARD: 0.3 – 0.5 Ω (at 20 °C/68 °F)



Check for continuity between all three Yellow terminals and Ground.
There should be no continuity.

If readings are still far beyond the standard, or if any wire has continuity to ground, replace the alternator stator.
Refer to section 10 for stator removal.



REGULATOR/RECTIFIER

SYSTEM INSPECTION

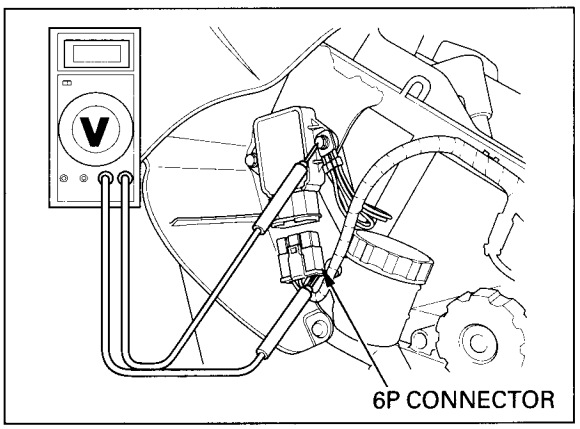
Remove the rear fender (page 2-3).

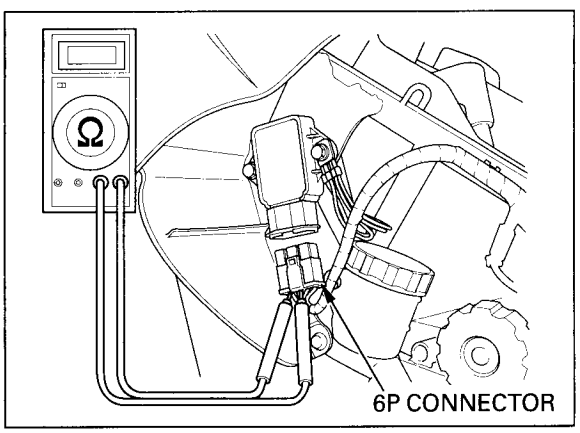
Disconnect the regulator/rectifier 6P connector, and check it for loose contact or corroded terminals.

If the charging voltage reading (see page 16-6) is out of the specification, measure the voltage between 6P connector terminals (wire harness side) as follows:

Item	Terminal	Specification
Battery charging line	Red/White (+) and ground (–)	Battery voltage should register
Charging coil line	Yellow and Yellow	0.3 – 0.5 Ω (at 20 °C/68 °F)
Ground line	Green and ground	Continuity should exist

If all components of the charging system are normal and there are no loose connections at the regulator/rectifier connectors, replace the regulator /rectifier unit.



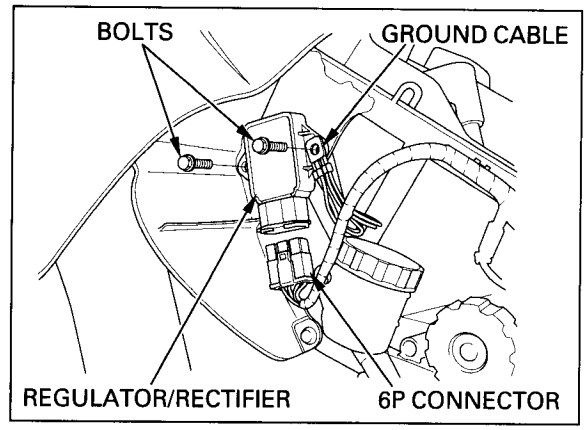


REMOVAL/INSTALLATION

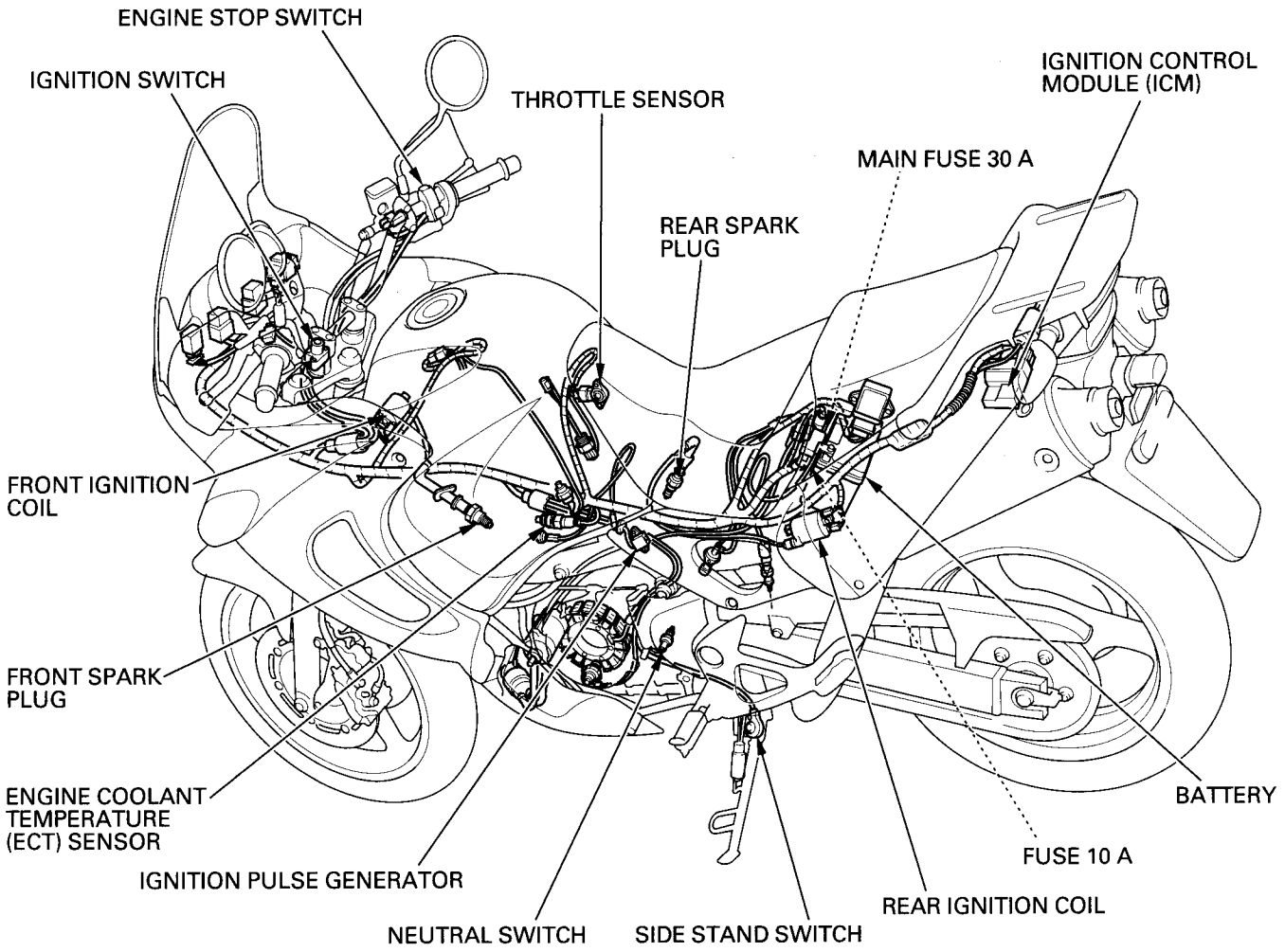
Remove the rear fender (page 2-3).

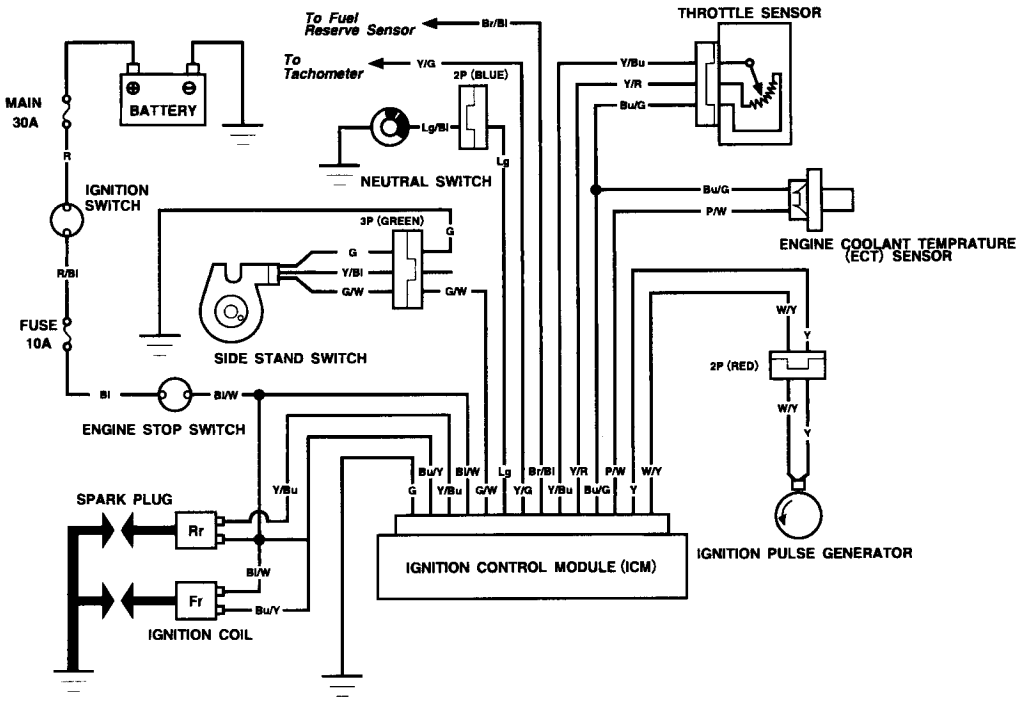
Disconnect the 6P connector.
Remove the regulator/rectifier unit mounting bolts, ground cable and regulator/rectifier.

Install the regulator/rectifier unit in the reverse order of removal.



SYSTEM DIAGRAM





17. IGNITION SYSTEM

SYSTEM DIAGRAM	17-0	IGNITION PULSE GENERATOR	17-7
SERVICE INFORMATION	17-1	THROTTLE SENSOR	17-7
TROUBLESHOOTING	17-3	ENGINE COOLANT TEMPERATURE (ECT) SENSOR	17-9
IGNITION SYSTEM INSPECTION	17-4	IGNITION TIMING	17-10
IGNITION COIL	17-6		

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 adjustment 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

SPECIFICATIONS

ITEM		SPECIFICATIONS
Spark plug		DPR8EVX−9 (NGK)
Spark plug gap		0.80−0.90 mm (0.031−0.035 in)
Ignition coil peak voltage		100 V minimum
Ignition pulse generator peak voltage		0.7 V minimum
Ignition timing ("F" mark)		15° BTDC at idle
Engine coolant temperature (ECT) sensor resistance	At 20 °C (68 °F)	2−3 kΩ
	At 80 °C (176 °F)	200−400 Ω
Throttle sensor	Resistance (20 °C/68 °F)	4−6 kΩ
	Input voltage	4.7−5.3 V

TORQUE VALUES

Timing hole cap	10 N·m (1.0 kgf·m , 7 lbf·ft)	Apply grease to the threads
Primary drive gear bolt	88 N·m (9.0 kgf·m , 65 lbf·ft)	Apply oil to the threads and flange surfaces
Spark plug	14 N·m (1.4 kgf·m , 10 lbf·ft)	
Ignition pulse generator mounting bolt	12 N·m (1.2 kgf·m , 9 lbf·ft)	Apply a locking agent to the threads
Rear ignition coil mounting 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)	

TOOLS

Peak voltage adaptor	07HGJ-0020100 with commercially available digital multimeter (impedance 10 MΩ/DCV minimum)

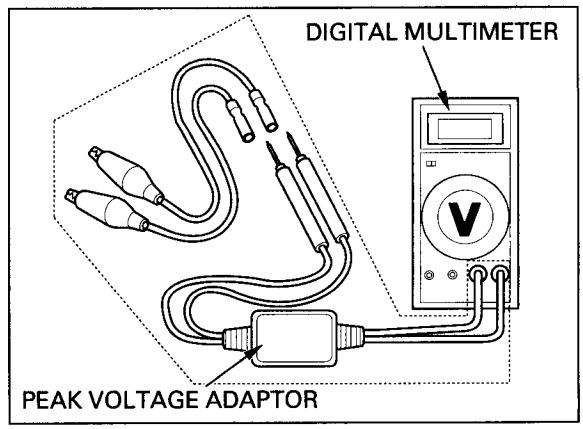
TROUBLESHOOTING

- Inspect the following before diagnosing the system.
  - Faulty spark plug
  - Loose spark plug cap or spark plug wire connection
  - Water got into the spark plug cap (leaking the ignition coil secondary voltage)
- "Initial voltage" of the ignition primary coil is the battery voltage with the ignition switch ON and engine stop switch at RUN (The engine is not cranked by the starter motor).

No spark at all plugs

Unusual condition		Probable cause (Check in numerical order)
Ignition coil primary voltage	No initial voltage with ignition and engine stop switches ON. (Other electrical components are normal)	1. Faulty engine stop switch. 2. An open circuit in Black/White wire between the ignition coil and engine stop switch. 3. Faulty ICM (in case when the initial voltage is normal while disconnecting ICM connector.
	Initial voltage is normal, but it drops down to 2–4 V while cranking the engine.	1. Incorrect peak voltage adaptor connections. 2. Undercharged battery. 3. No voltage between the Black/White (+) and Body ground (–) at the ICM multi-connector or loosen ICM connection. 4. An open circuit or loose connection in Green wire. 5. An open circuit or loose connection in Yellow/Blue and Blue/Yellow wires between the ignition coils and ICM. 6. Short circuit in ignition primary coil. 7. Faulty side stand switch or neutral switch. 8. An open circuit or loose connection in No. 7 related circuit wires. • Side stand switch line: Green/White wire • Neutral switch line: Light Green and Light Green/Red wire 9. Faulty ignition pulse generator (measure the peak voltage). 10. Faulty ICM (in case when above No. 1–9 are normal).
	Initial voltage is normal, but no peak voltage while cranking the engine.	1. Faulty peak voltage adaptor connections. 2. Faulty peak voltage adaptor. 3. Faulty ICM (in case when above No. 1, 2 are normal).
	Initial voltage is normal, but peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too low (battery under-charged). 3. The sampling timing of the tester and measured pulse were not synchronised (system is normal if measured voltage is over the standard voltage at least once). 4. Faulty ICM (in case when above No. 1–3 are normal).
	Initial and peak voltage are normal, but does not spark.	1. Faulty spark plug or leaking ignition coil secondary current ampere. 2. Faulty ignition coil.
Ignition pulse generator	Peak voltage is lower than standard value.	1. The multimeter impedance is too low; below 10 MΩ/DCV. 2. Cranking speed is too low (battery under charged). 3. The sampling timing of the tester and measured pulse were not synchronised (system is normal if measured voltage is over the standard voltage at least once). 4. Faulty ICM (in case when above No. 1–3 are normal).
	No peak voltage.	1. Faulty peak voltage adaptor. 2. Faulty ignition pulse generator.

IGNITION SYSTEM INSPECTION



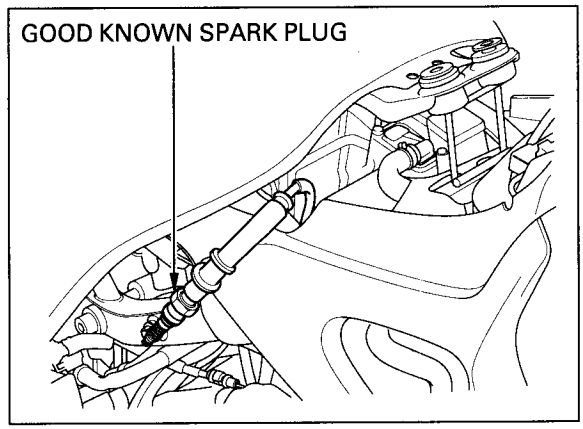
NOTE:

- If there is no spark at any plug, check all connections for loose or poor contact before measuring each peak voltage.
- Use recommended digital multimeter or commercially available digital multimeter with an impedance of 10 MΩ/DCV minimum.
- The display value differs depending upon the internal impedance of the multimeter.
- If using Imrie diagnostic tester (model 625), follow the manufacturer's instructions.

Connect the peak voltage adaptor to the digital multimeter, or use the Imrie diagnostic tester.

TOOLS:
Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with Commercially available digital multimeter
(impedance 10 MΩ/DCV minimum)

IGNITION COIL PRIMARY PEAK VOLTAGE



⚠WARNING

Avoid touching the spark plugs and tester probes to prevent electric shock.

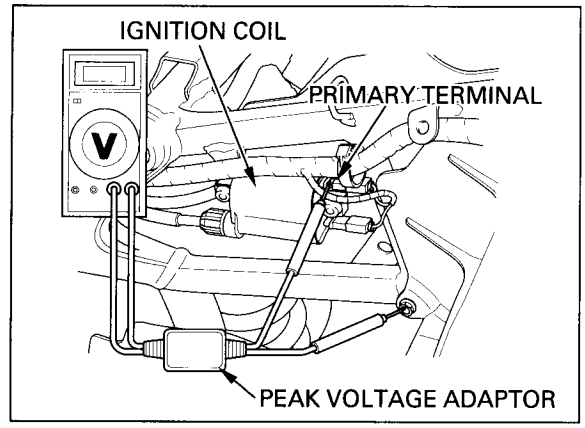
NOTE:

- Check all system connections before inspection. If the system is disconnected, incorrect peak voltage might be measured.
- Check cylinder compression and check that the spark plugs are installed correctly.

Shift the transmission into neutral and disconnect the all spark plug caps from the spark plugs.
Connect a known good spark plugs to the spark plug caps and ground the spark plugs to the cylinder as done in a spark test.

Front: Remove the lower heat guard (page 17-6).
Rear: Remove the left side cover (page 2-2).

With the ignition coil primary wire connected, connect the peak voltage adaptor or Imrie tester to the ignition coil.



CONNECTION:
Front:
Blue/Yellow terminal (+) – Body ground (–)
Rear:
Yellow/Blue terminal (+) – Body ground (–)

Turn the ignition switch "ON" and engine stop switch to "RUN".
Check for initial voltage at this time.
The battery voltage should be measured.
If the initial voltage cannot be measured, check the power supply circuit (refer to the troubleshooting, page 17-3).

Shift the transmission into neutral.
Crank the engine with the starter motor and read ignition coil primary peak voltage.

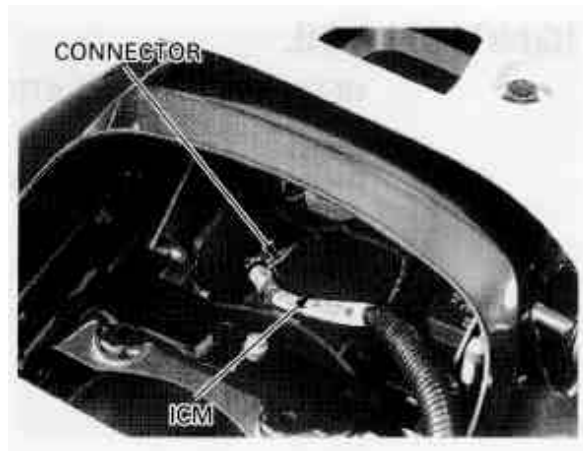
PEAK VOLTAGE: 100 V minimum

If the peak voltage is abnormal, check for an open circuit or poor connection in Yellow/Blue and Blue/Yellow wires.
If not defects are found in the harness, refer to the troubleshooting chart on page 17-3.

IGNITION PULSE GENERATOR PEAK VOLTAGE

NOTE:

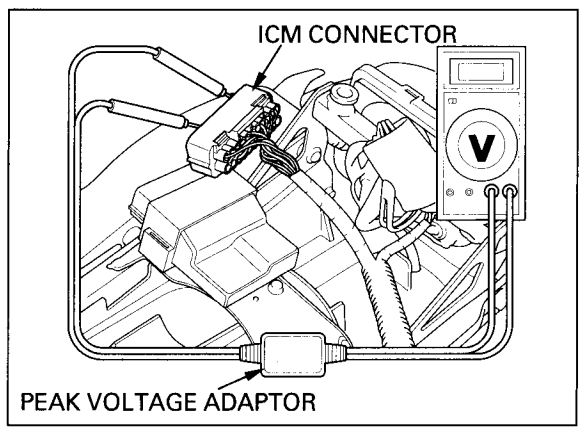
Check cylinder compression and check that the spark plugs are installed correctly.



Remove the seat (page 2-2).

Disconnect the ICM connector from the ICM.
Connect the peak voltage adaptor or Imrie tester probes to the connector terminals of the wire harness side.

TOOLS:
Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with Commercially available digital multimeter (impedance 10 MΩ /DCV minimum)



CONNECTION:
Yellow terminal (+) – White/Yellow terminal (–)

Crank the engine with the starter motor and read the peak voltage.

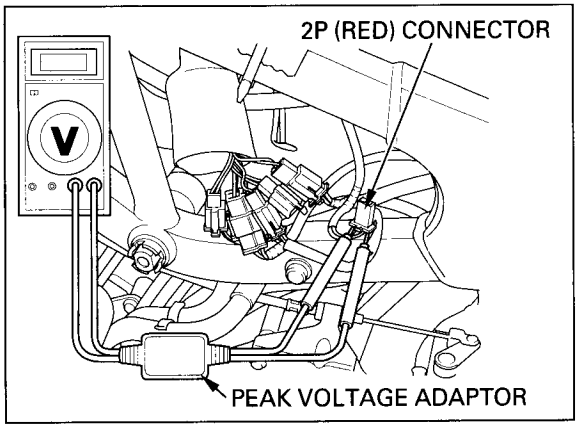
PEAK VOLTAGE: 0.7 V minimum

If the peak voltage measured at ICM connector is abnormal, measure the peak voltage at the pulse generator 2P (Red) connector.

Lift and support the fuel tank (page 3-6).

Disconnect the ignition pulse generator 2P (Red) connector and connect the tester probes to the terminal (Yellow and White/Yellow).
In the same manner as at the ICM connector, measure the peak voltage and compare it to the voltage measured at the ICM connector.

- If the peak voltage measured at the ICM is abnormal and the one measured at the ignition pulse generator is normal, the wire harness has an open circuit or loose connection.
- If both peak voltages measure are abnormal, check each item in the troubleshooting chart. If all items are normal, the ignition pulse generator is faulty.
  See page 17-7 for ignition pulse generator replacement.



IGNITION COIL

REMOVAL/INSTALLATION

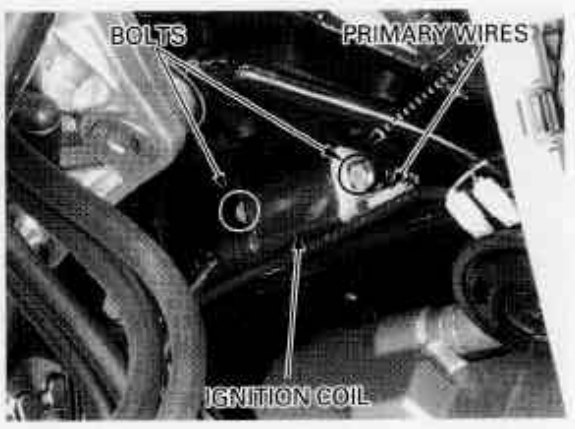
FRONT:
Disconnect the spark plug cap from the plug (page 3-6).

Remove the quick screws and lower heat guard.



Disconnect the primary wires from the ignition coil terminals.
Remove the mounting bolts and ignition coil assembly.

Installation is in the reverse order of removal.

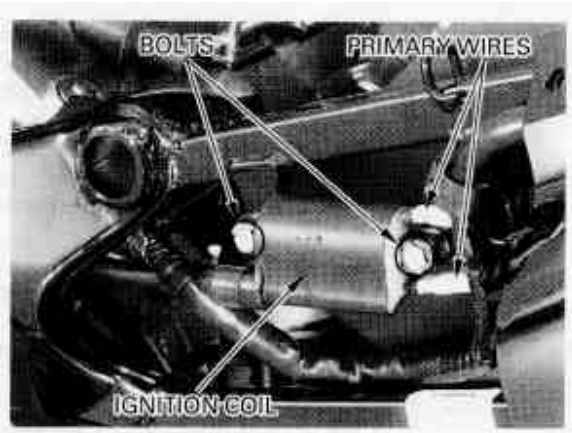


REAR:
Remove the left side cover (page 2-2).
Disconnect the spark plug cap from the plug (page 3-6).

Disconnect the primary wires from the ignition coil terminals.
Remove the mounting bolts and ignition coil assembly.

Installation is in the reverse order of removal.
Tighten the mounting bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)



IGNITION PULSE GENERATOR

REMOVAL/INSTALLATION

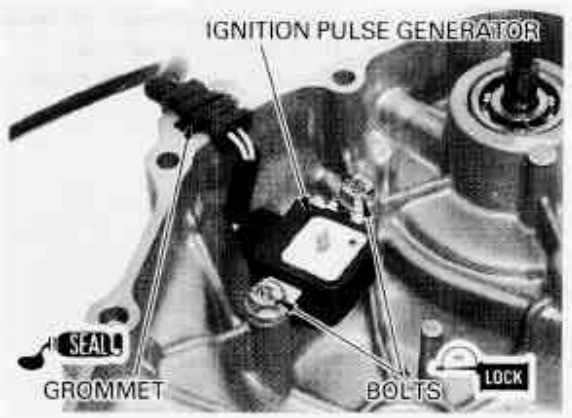
Remove the right crankcase cover (page 6-16)

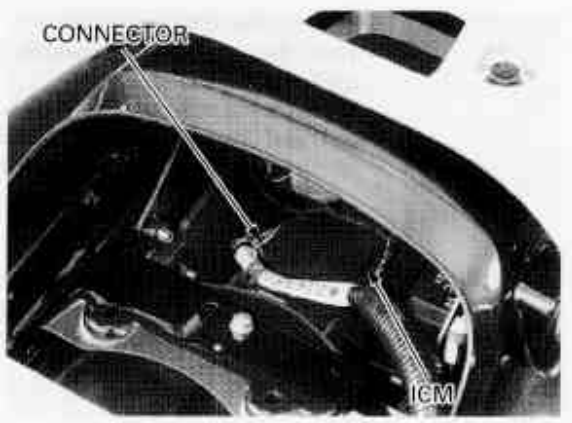
Remove the wire grommet from the cover.
Remove the mounting bolts and ignition pulse generator.

Install the ignition pulse generator into the cover.
Apply sealant to the wire grommet, then install it into the groove of the cover.
Clean and apply a locking agent to the mounting bolt threads.
Install and tighten the ignition pulse generator bolts to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Install the removed parts in the reverse order of removal.





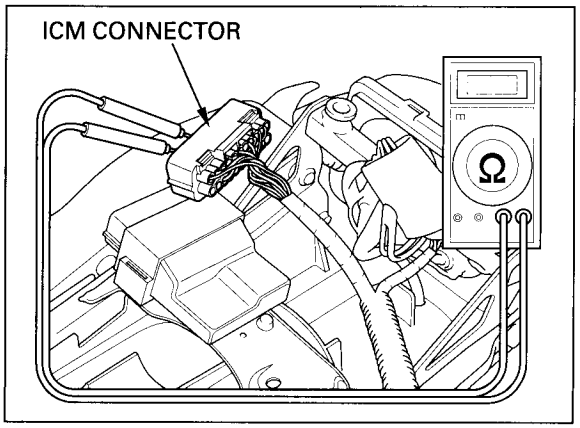
THROTTLE SENSOR

SYSTEM INSPECTION

Remove the seat (page 2-2).
Disconnect the ICM (ignition control module) connector (page 17-5).

Measure the resistance between the Yellow/Red and Green/Black wire terminals of the wire harness side connector.

STANDARD: 4 – 6 kΩ (20 °C/68 °F)



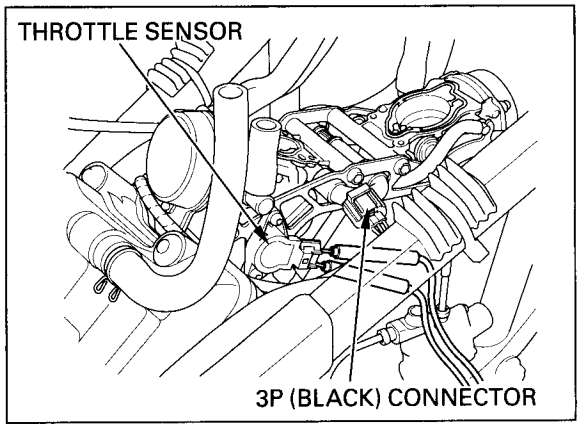
Check that the resistance between the Red/Yellow and Blue/Green wire terminals varies with the throttle position while operating the throttle grip.

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 (Black) 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.

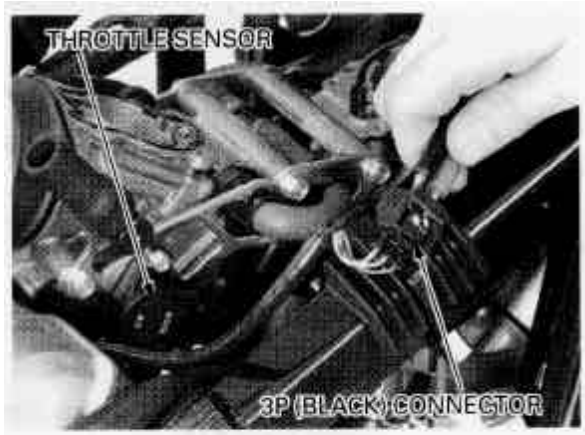




Connect the ICM connector.
Turn the engine stop switch to RUN and the ignition switch ON.
Measure the input voltage between the Yellow/Red (+) and Blue/Green wire terminals of the wire harness side throttle sensor 3P (Black) connector.

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).

Remove the torx screws and throttle sensor.

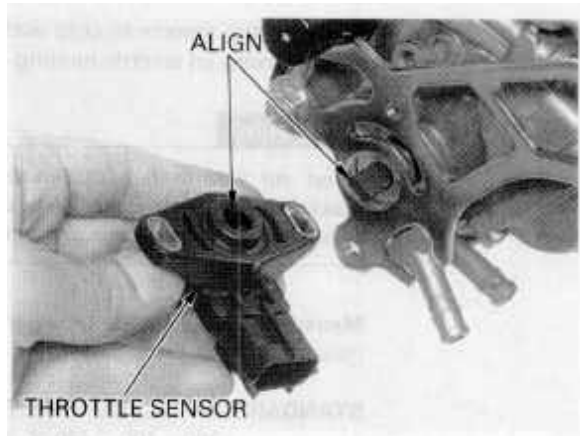


Install the throttle sensor so that the cut out of the throttle sensor is positioned on the flat surfaces of the throttle shaft.

Apply locking agent to the torx screw threads and loosely install the screws.

CAUTION:

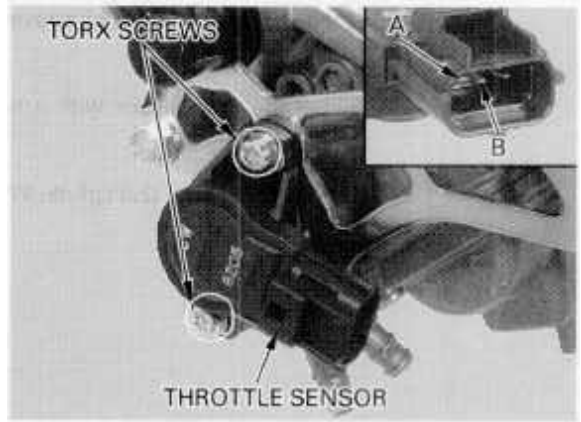
Install the throttle sensor properly. Improper installation can cause damage to the throttle sensor.



Adjust the throttle sensor position so that the resistance between terminals A and B is 490−510 Ω, and tighten the torx screws.

Connect the throttle sensor connector.

Install the removed parts in the reverse order of removal.

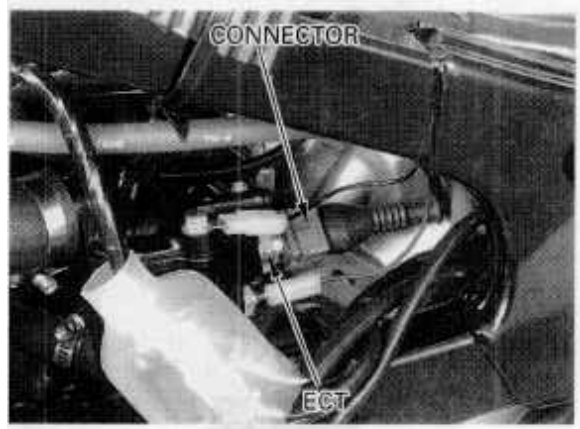


ENGINE COOLANT TEMPERATURE (ECT) SENSOR

INSPECTION

Remove the side cowl (page 2-5).
Disconnect the ICM connector (page 17-5).

Disconnect the ECT sensor connector.
Check for continuity between the ECT sensor connector and ICM connector.
There should be continuity between the same color wires, and no continuity between different color wires.



Drain the coolant (page 6-5).

Remove the ECT sensor and sealing washer from the thermostat housing.



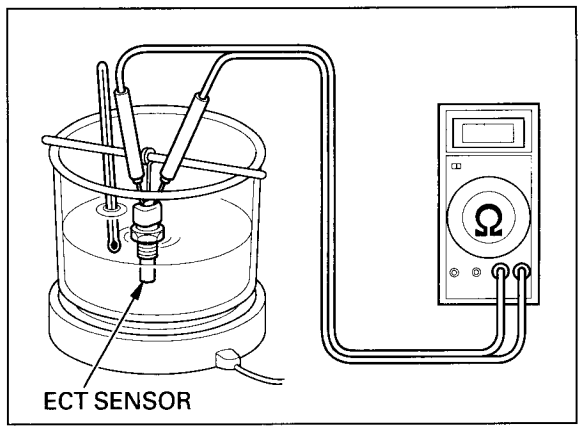
Suspend the sensor in cold water. Heat the water slowly, using an electric heating element.

⚠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 kΩ (20 °C/68 °F)
200—400 Ω (80 °C/176 °F)



If the resistance is out of above range, replace the ECT sensor.

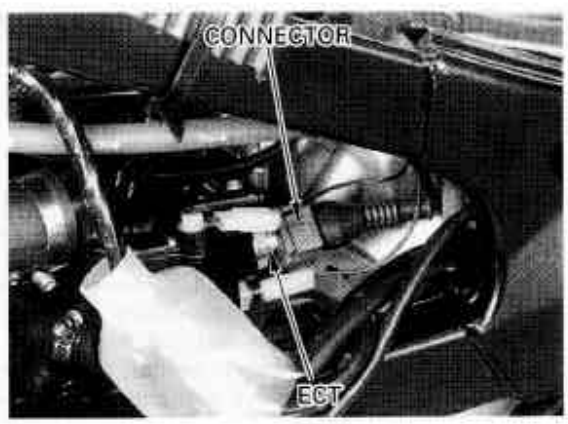
Install the ECT sensor with a new sealing washer and tighten it.

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).



IGNITION TIMING

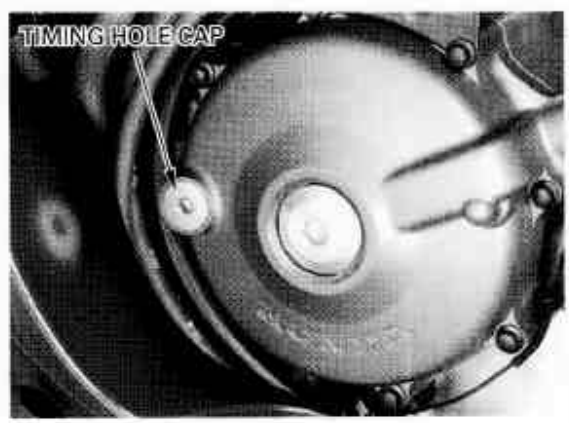
⚠WARNING

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

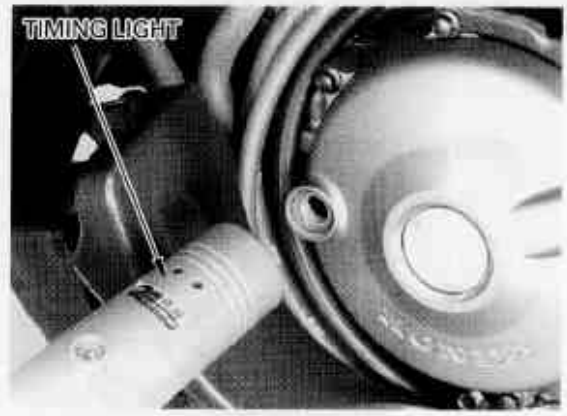
NOTE:

Read the instructions for timing light operation.

Warm up the engine.
Stop the engine and remove the timing hole cap.



Connect the timing light to the front cylinder spark plug wire.

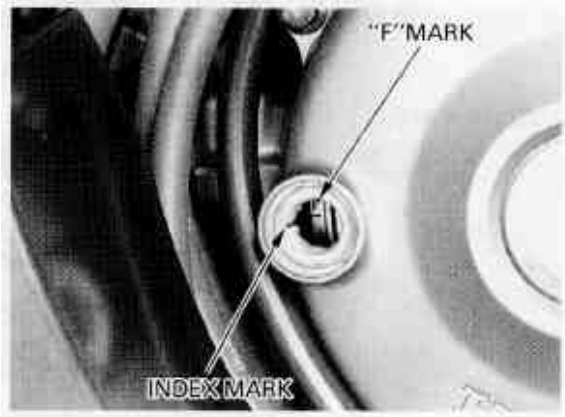


Start the engine and let it idle.

IDLE SPEED: 1,200 ± 50 min^{-1} (rpm)

The ignition timing is correct if the "F" mark aligns with the index mark on the alternator cover.

Increase the engine speed by turning the throttle stop screw and make sure the "F" mark begins to move counterclockwise when the engine speed at approximately 1,500 rpm.

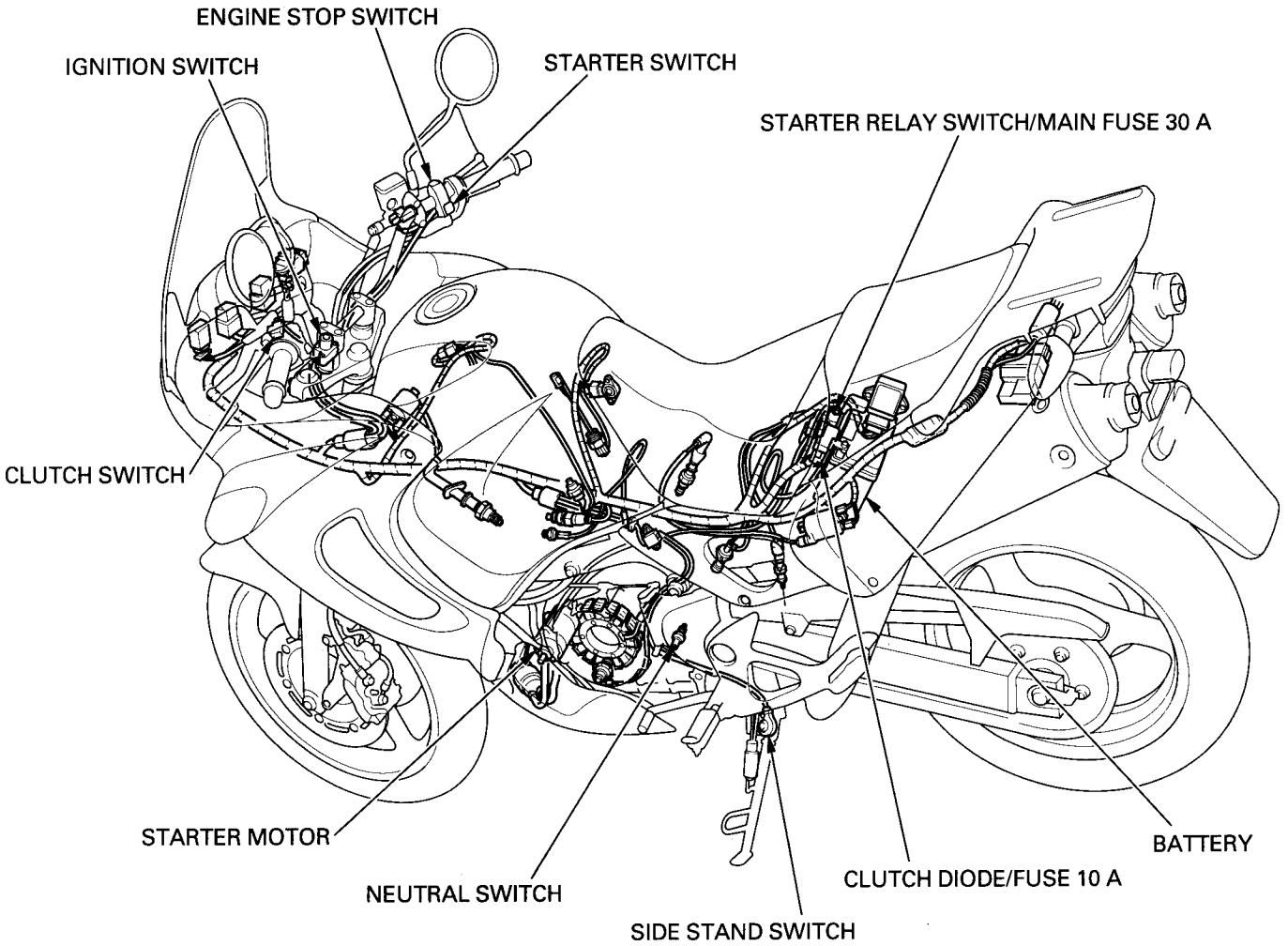


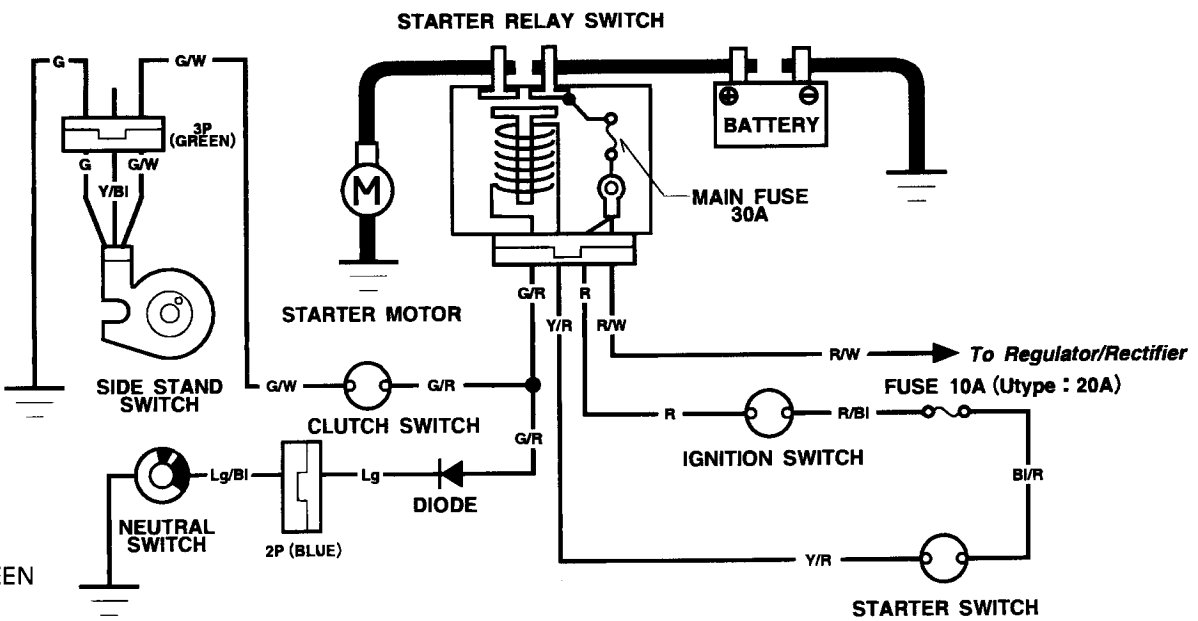
Coat a new O-ring with grease and install and tighten the timing hole cap to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)



SYSTEM DIAGRAM





Bl: BLACK
Br: BROWN
G: GREEN
Lg: LIGHT GREEN
R: RED
W: WHITE
Y: YELLOW

18. ELECTRIC STARTER

SYSTEM DIAGRAM	18-0	STARTER MOTOR	18-4
SERVICE INFORMATION	18-1	STARTER RELAY SWITCH	18-11
TROUBLESHOOTING	18-2	DIODE	18-12

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)

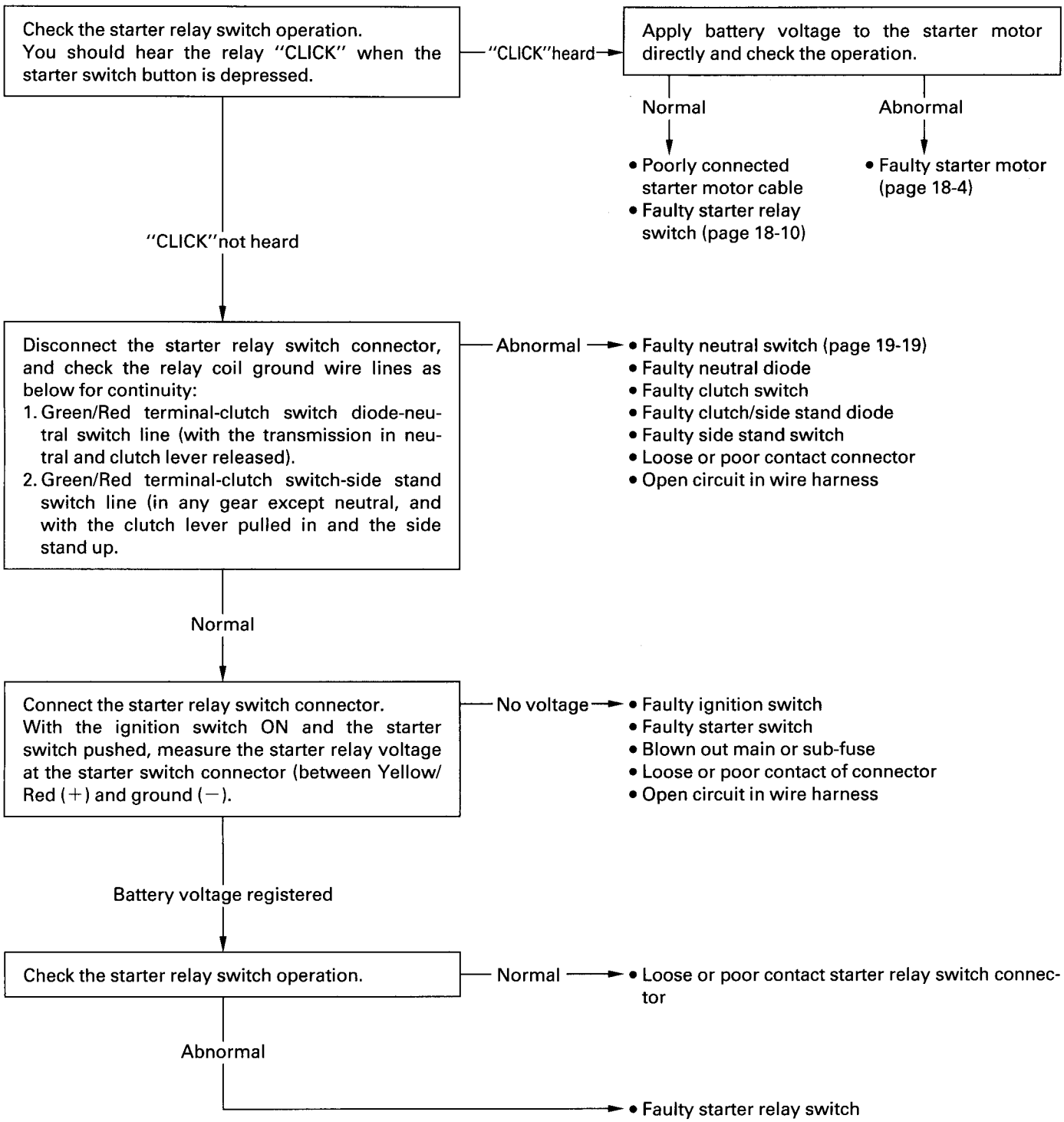
TORQUE VALUES

Starter motor terminal nut	10 N·m (1.0 kgf·m , 7 lbf·ft)

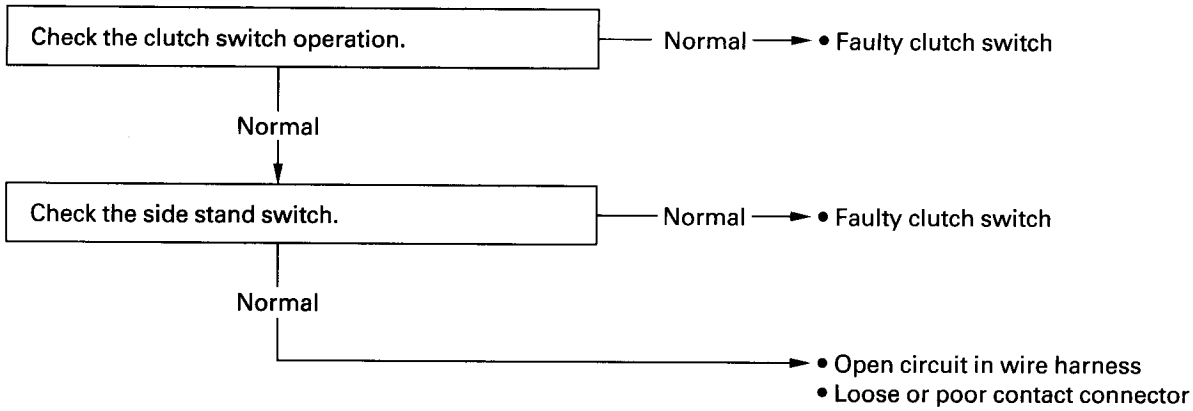
TROUBLESHOOTING

Starter motor does not turn

- Check for a blown main or sub fuses before servicing.
- Make sure the battery is fully charged and in good condition.



The starter motor turns when the transmission is in neutral, but does not turn with the transmission in any position except neutral, with the side stand up and the clutch lever pulled in.



Starter motor turns engine slowly
- Low battery voltage
- Poorly connected battery terminal cable
- Poorly connected starter motor cable
- Faulty starter motor
- Poor connected battery ground cable

Starter motor turns, but engine does not turn
- Starter motor is running backwards
  - —Case assembled improperly
  - —Terminals connected improperly
- Faulty starter clutch
- Damaged or faulty starter drive gear

Starter relay switch "Clicks", but engine does not turn over
- Crankshaft does not turn due to engine problems

STARTER MOTOR

REMOVAL

⚠WARNING

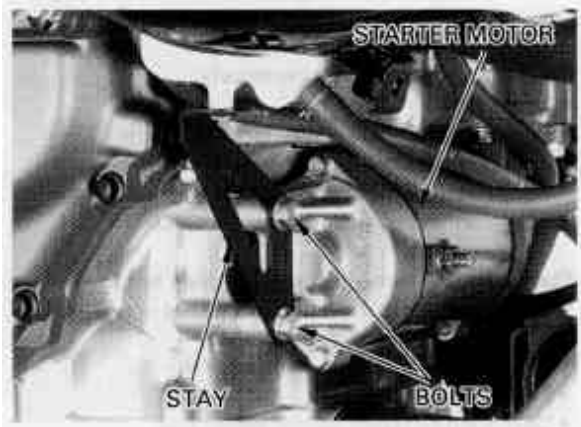
With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Remove the under cowl (page 2-7).

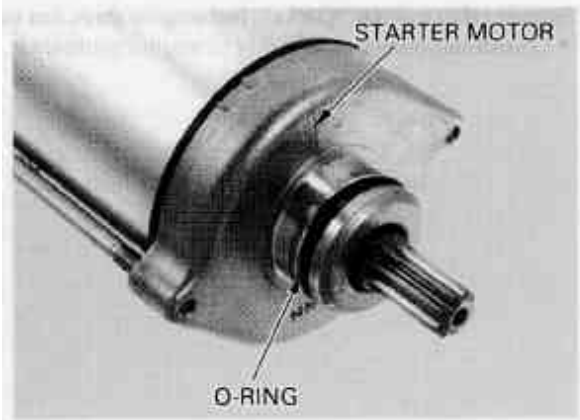
Remove the rubber cap, terminal nut and the starter motor cable from the starter motor.



Remove the starter motor mounting bolts, stay and the starter motor from the crankcase.

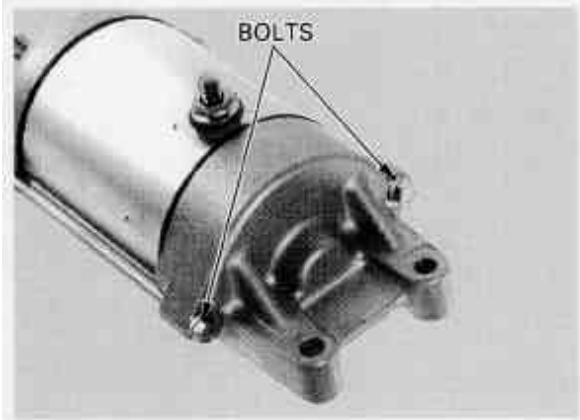


Remove the O-ring from the starter motor.



DISASSEMBLY

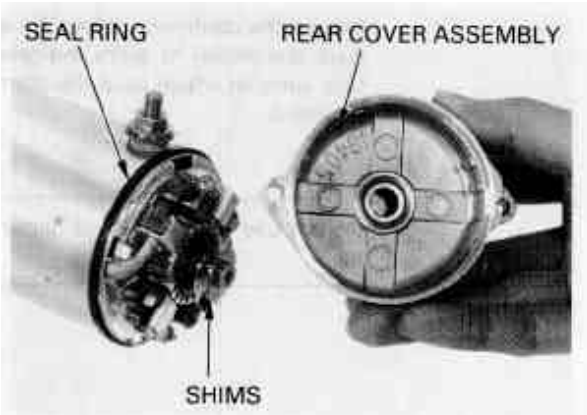
Remove the starter motor case bolts.



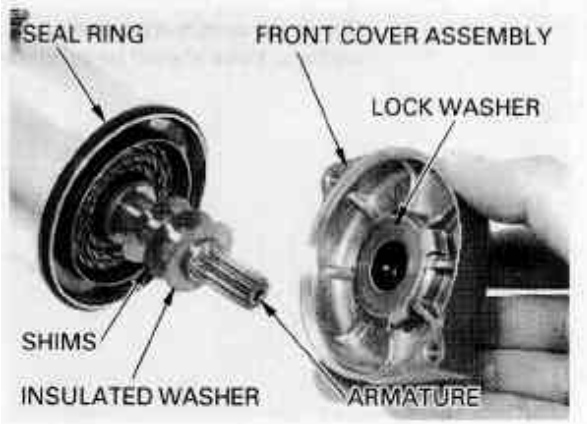
NOTE:

Record the location and number of shims.

Remove the following:
- Rear cover assembly
- Seal ring
- Shims

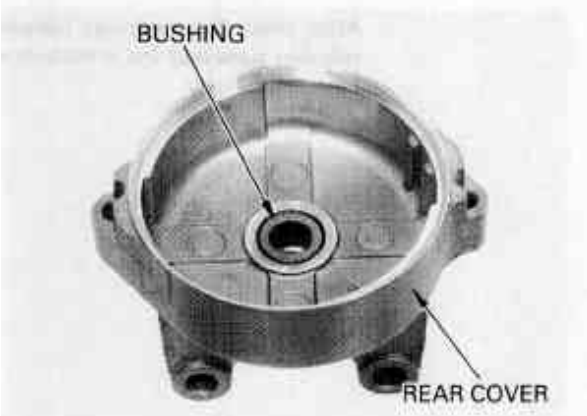


- Front cover assembly
- Seal ring
- Lock washer
- Insulated washer
- Shims
- Armature

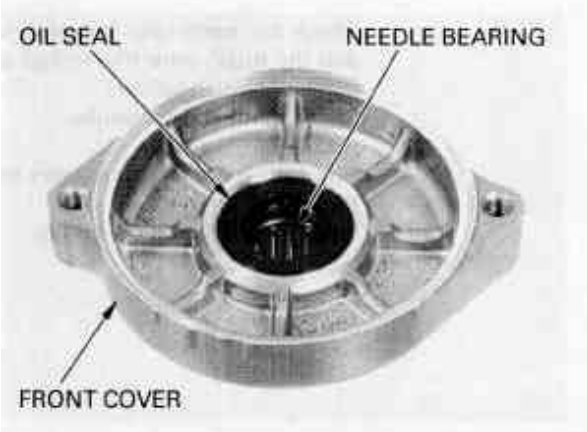


INSPECTION

Check the bushing of the rear cover for wear or damage.



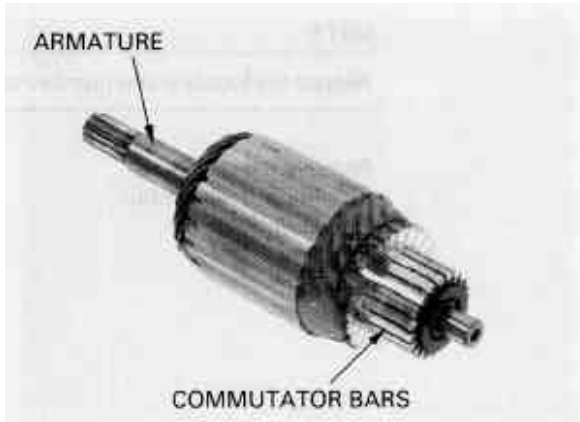
Check the front cover oil seal for fatigue or other damage.
Check the needle bearing for damage.



Inspect the commutator bars for discoloration, Bars discolored in pairs indicate grounded armature coils, in which case the starter motor must be replaced.

NOTE:

Do not use emery or sand paper on the commutator.



Check for continuity between individual commutator bars; there should be continuity.

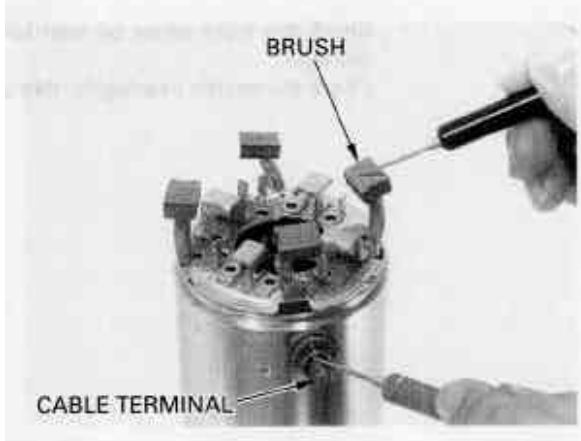


Also, check for continuity between individual commutator bars and the armature shaft; there should be no continuity.



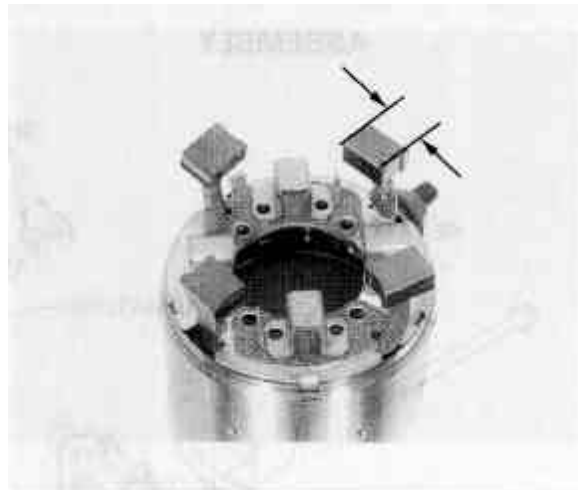
Check for continuity between the cable terminal and the brush wire (the indigo colored wire or the insulated brush holder).
There should be continuity.

Check for continuity between the motor case and the cable terminal.
There should be no continuity.

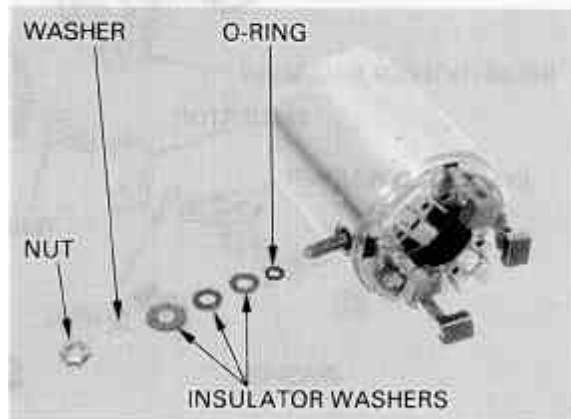


Inspect the brushes for damage and measure the brush length.

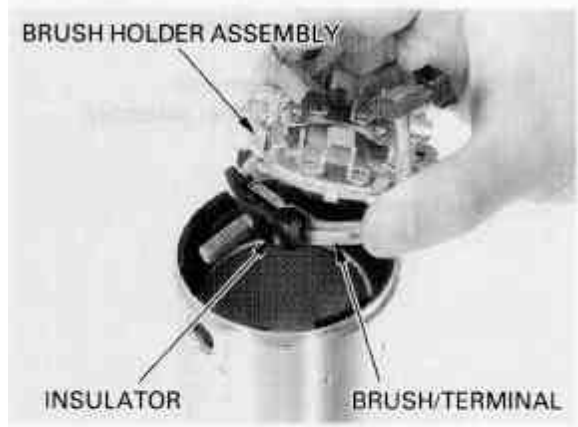
SERVICE LIMIT: 6.5 mm (0.26 in)

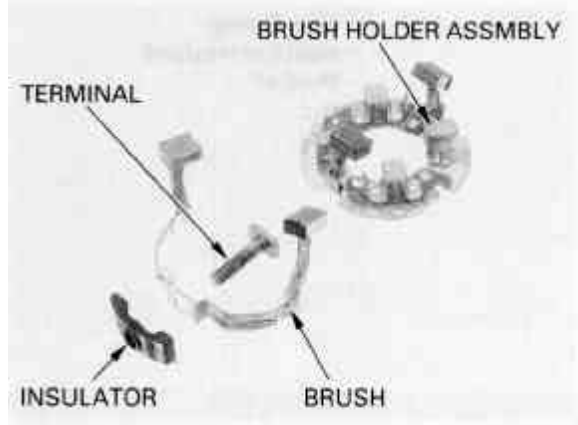


Remove the following:
- Nut
- Washer
- Insulator washers
- O-ring

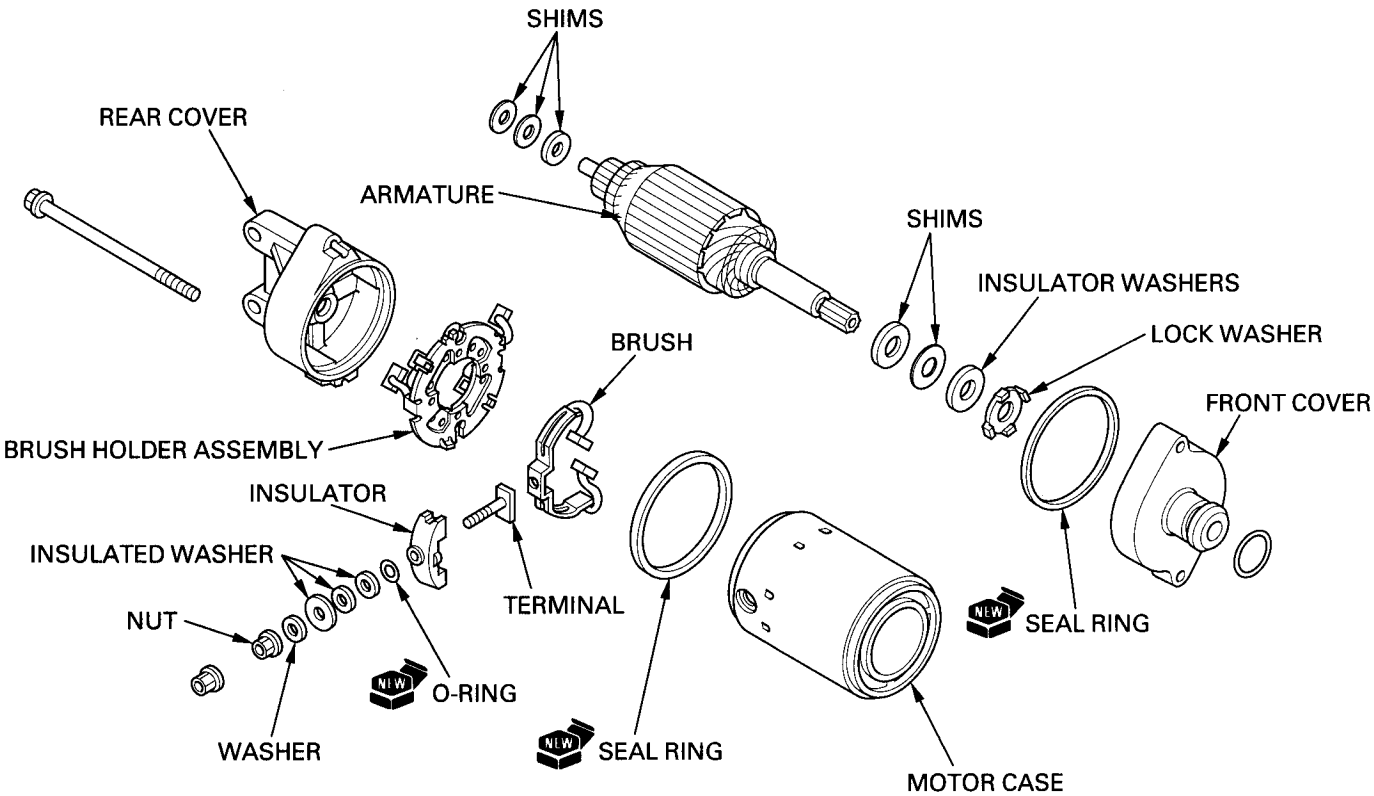


- Brush holder assembly
- Brush/terminal
- Insulator

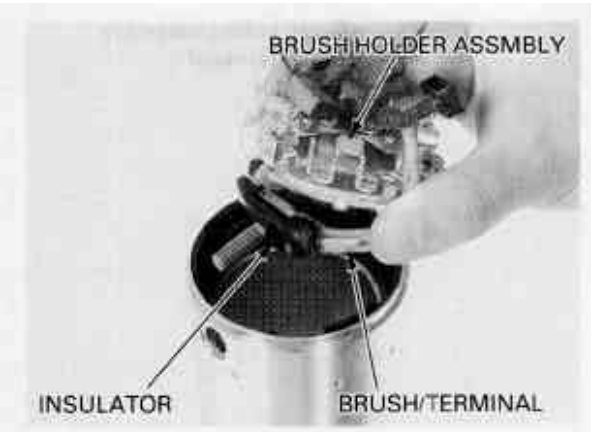




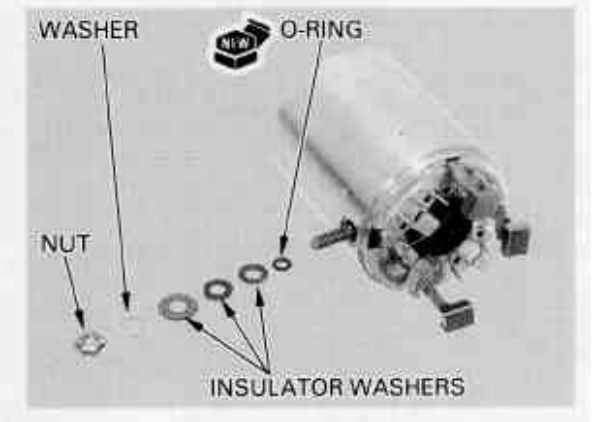
ASSEMBLY



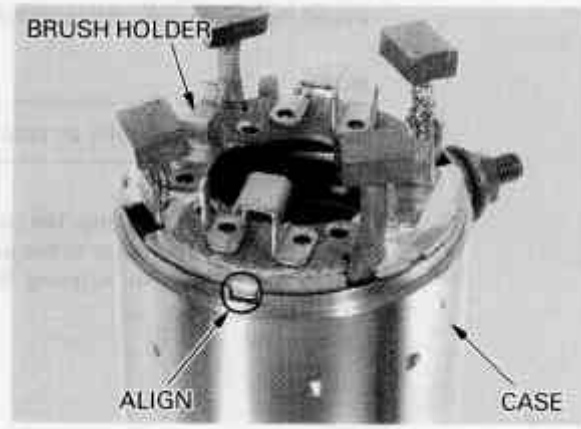
Install the following:
- Insulator
- Brush/terminal
- Brush holder assembly



- New O-ring
- Insulator washers
- Washer
- Nut



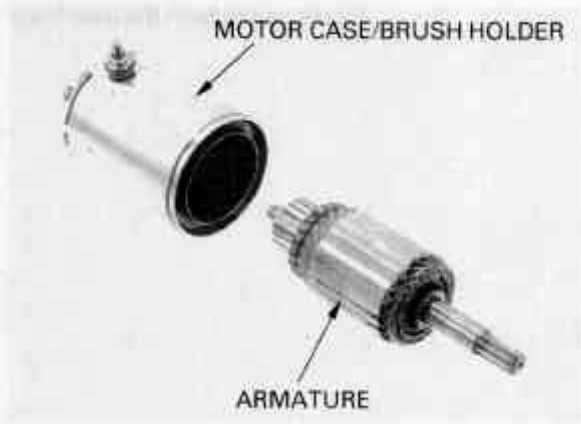
Install the brush holder, aligning the holder tab with the case groove, and the holder grooves with the insulated brush wires.



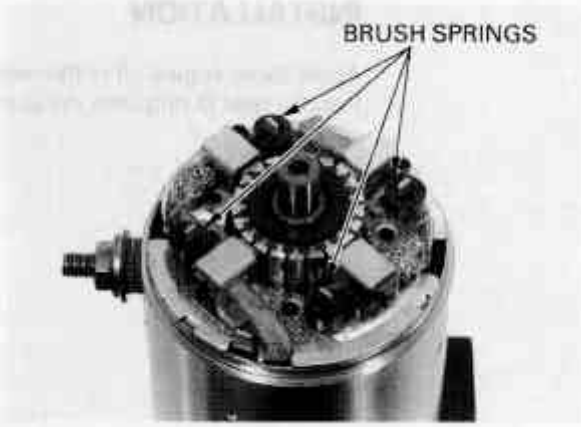
Push and hold the brushes inside the brush holder, and install the armature through the motor case and brush holder.
When installing the armature into the motor case, hold the armature tightly to keep the magnet of the case from pulling the armature against it.

CAUTION:

The coil may be damaged pulls the armature against the case.



Install the brush springs properly.

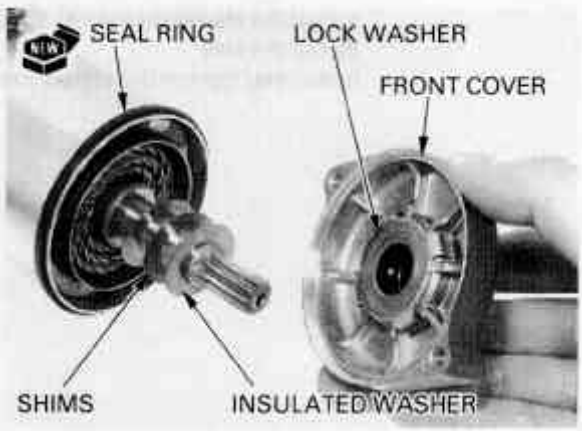


Install the shims and insulated washer onto the armature shaft.

NOTE:

Install the shims properly as noted during removal.

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.

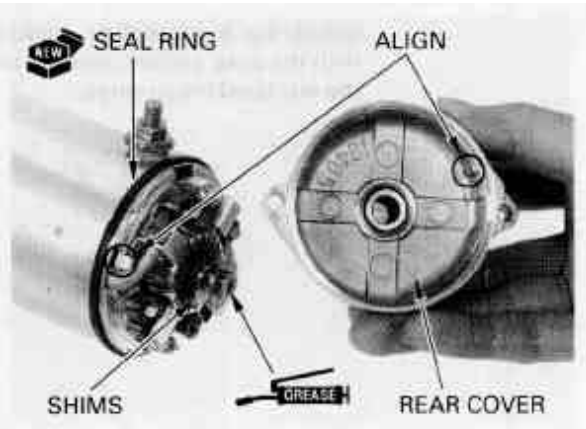


Install the shims onto the armature shaft.

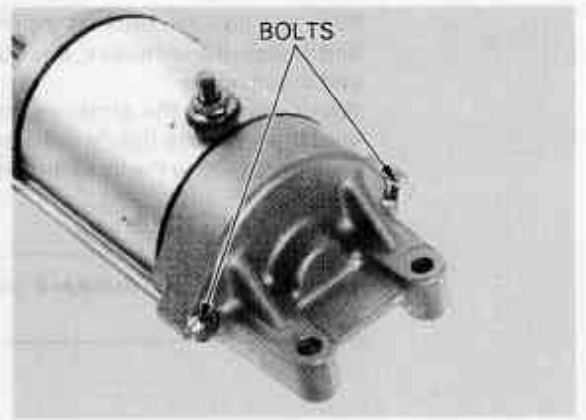
NOTE:

Install the shims properly as noted during removal.

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.

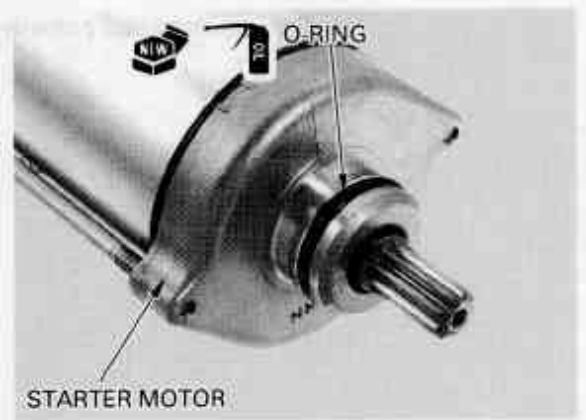


Install and tighten the case bolts securely.

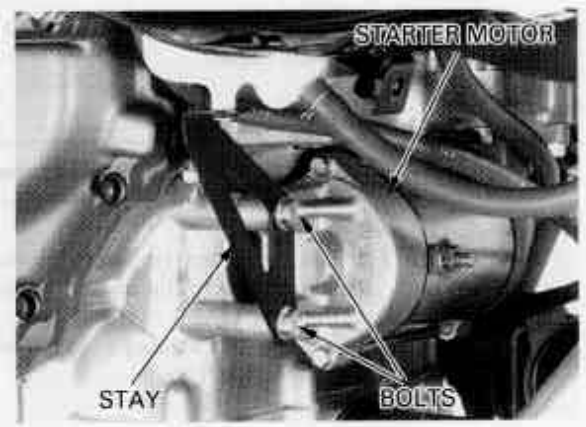


INSTALLATION

Apply clean engine oil to the new O-ring.
Install a new O-ring onto the starter motor groove.



Install the starter motor into the crankcase.
Install the stay.
Install and tighten the starter motor mounting bolts.



Route the starter motor cable.
Install and tighten the terminal nut to the specified torque.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the rubber cap securely.

Install the under cowl (page 2-7).



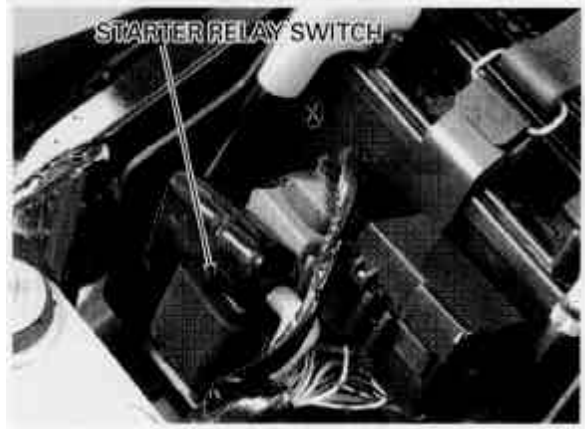
STARTER RELAY SWITCH

OPERATION INSPECTION

Remove the seat (page 2-2).

Shift the transmission into neutral.
Turn the ignition switch ON and depress the starter switch button.
The coil is normal if the starter relay switch clicks.

If the switch "CLICK" is not heard, inspect the relay switch using the procedure below.

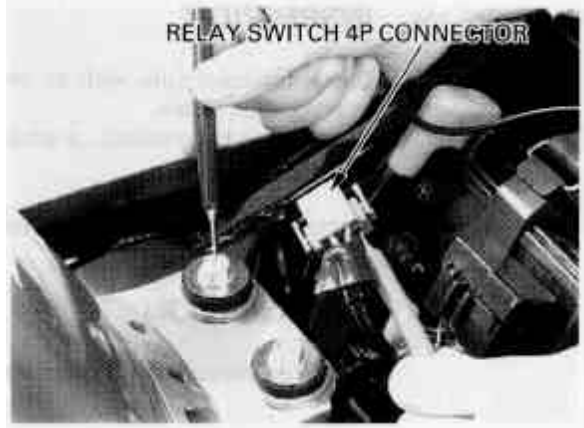


GROUND LINE INSPECTION

Disconnect the starter relay switch 4P connector.

Check for continuity between the Green/Red wire and ground.

If there is continuity when the transmission is in neutral or when the clutch is disengaged and the side stand switch is up, the ground circuit is normal (in neutral, there is a slight resistance due to the diode).



VOLTAGE INSPECTION

Connect the starter relay switch 4P connector.
Shift the transmission into neutral.

Measure the voltage between the Yellow/Red wire (+) and ground at the starter relay switch connector.

There should be battery voltage only when the starter switch button is depressed with the ignition switch is ON.

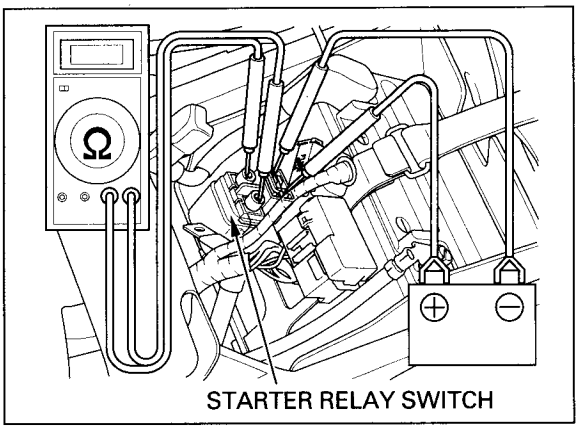


CONTINUITY INSPECTION

Disconnect the starter relay switch 4P connector and cables.

Connect an ohmmeter to the starter relay switch large terminals.
Connect a fully charged 12V battery to the starter relay switch connector terminals (Yellow/Red and Green/Red).
Check for continuity between the starter relay switch terminals.

There should be continuity while 12V battery is connected to the starter relay switch connector terminals and should be no continuity when the battery is disconnected.

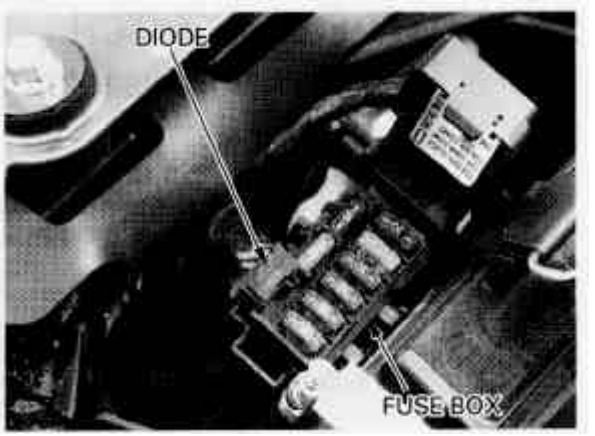


DIODE

REMOVAL

Remove the seat (page 2-2).

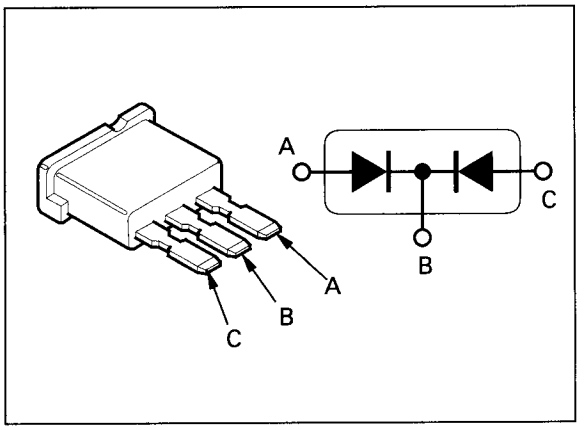
Open the fuse box and remove the diode.



INSPECTION

Check for continuity with an ohmmeter between the diode terminals.
When there is continuity, a small resistance value will register.

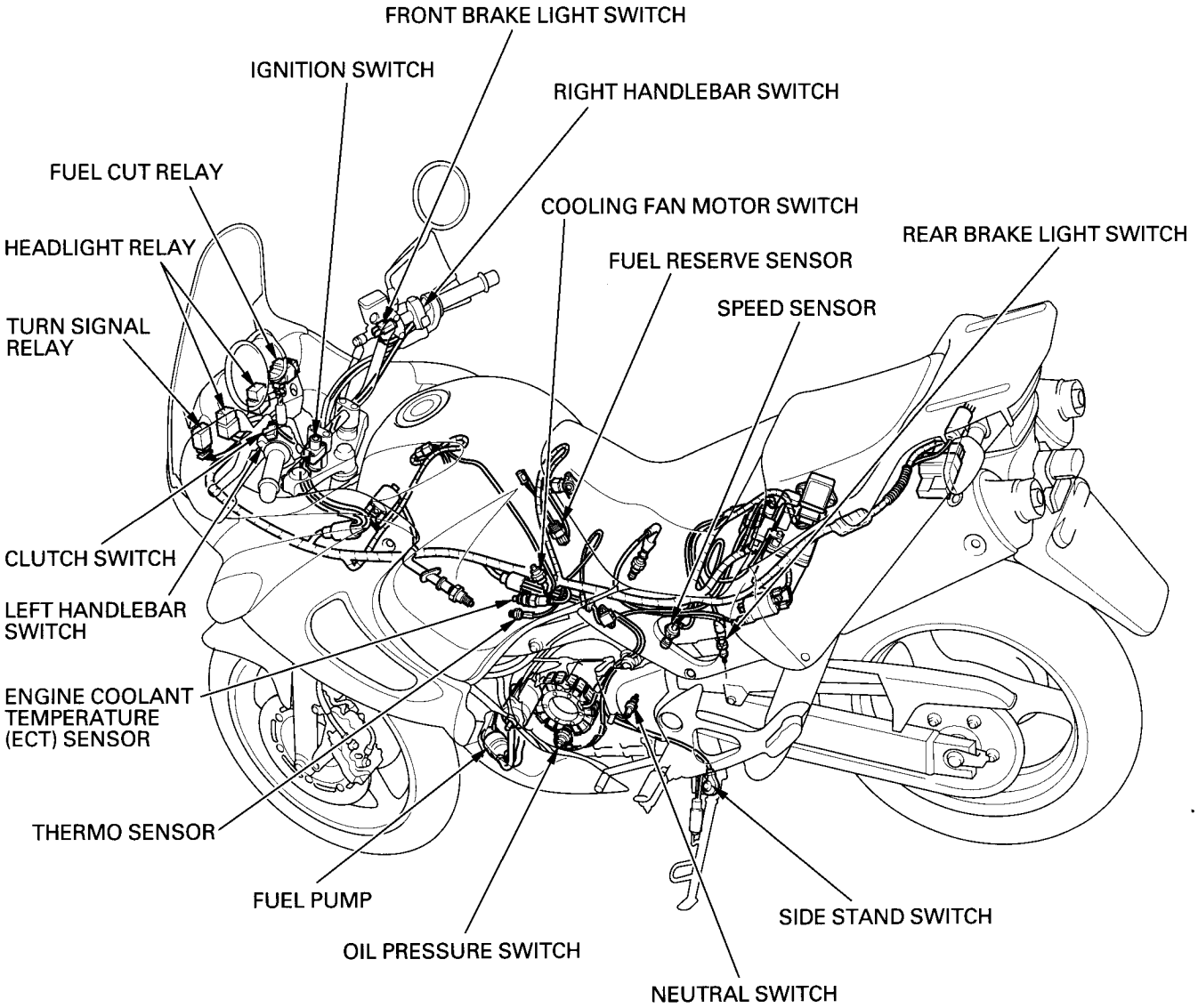
If there is continuity in one direction, the diode is normal.



INSTALLATION

Install the diode in the reverse order of removal.

SYSTEM DIAGRAM



19. LIGHTS/METERS/SWITCHES

SYSTEM DIAGRAM	19-0	COOLING FAN MOTOR SWITCH	19-14
SERVICE INFORMATION	19-1	OIL PRESSURE SWITCH	19-15
TROUBLESHOOTING	19-3	IGNITION SWITCH	19-16
HEADLIGHT	19-4	HANDLEBAR SWITCHES	19-16
POSITION LIGHT	19-4	BRAKE LIGHT SWITCH	19-18
TURN SIGNAL	19-5	CLUTCH SWITCH	19-19
LICENSE LIGHT	19-6	NEUTRAL SWITCH	19-19
TAIL/BRAKE LIGHT	19-6	SIDE STAND SWITCH	19-20
COMBINATION METER	19-7	LOW FUEL INDICATOR/ FUEL RESERVE SENSOR	19-21
SPEEDOMETER/SPEED SENSOR	19-10	HORN	19-22
TACHOMETER	19-12	TURN SIGNAL RELAY	19-22
COOLANT TEMPERATURE GAUGE/ THERMO SENSOR	19-12	FUEL PUMP/FUEL CUT RELAY	19-23

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

SPECIFICATIONS

ITEM			SPECIFICATIONS
Bulbs	Headlight	High/Low	12V−60/55W ×2
	Position light		12V−5W
	Brake/tail light		12V−21/5W ×2
	Front turn signal light		12V−21W
	Rear turn signal light		12V−21W
	License light		12V−5W
	Instrument light		12V−1.7W, 12V−3.4W ×2
	Turn signal indicator		12V−3.4W ×2
	High beam indicator		12V−1.7W
	Neutral indicator		12V−3.4W
	Oil pressure indicator		12V−3.4W
	Fuel indicator		12V−3.4W
Fuse	Main fuse		30 A
	Sub fuse		20 A × 1, 10 A × 5
Fan motor switch	Start to close (ON)		98−102 °C (208−216 °F)
	Stop to open		93−97 °C (199−207 °F)
Coolant temperature sensor resistance		at 80 °C/176 °F	47−57 Ω
		at 120 °C/248 °F	14−18 Ω
Fuel pump flow capacity			Minimum 700 cm³ (23.7 US oz, 24.6 Imp oz)/minute at 13V

TORQUE VALUES

Fuel level sensor	23 N·m (2.3 kgf·m, 17 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)	
Side stand pivot bolt	10 N·m (1.0 kgf·m, 7 lbf·ft)	
Side stand pivot lock nut	29 N·m (3.0 kgf·m, 22 lbf·ft)	
Thermo sensor	9 N·m (0.9 kgf·m, 6.5 lbf·ft)	Apply sealant to the threads

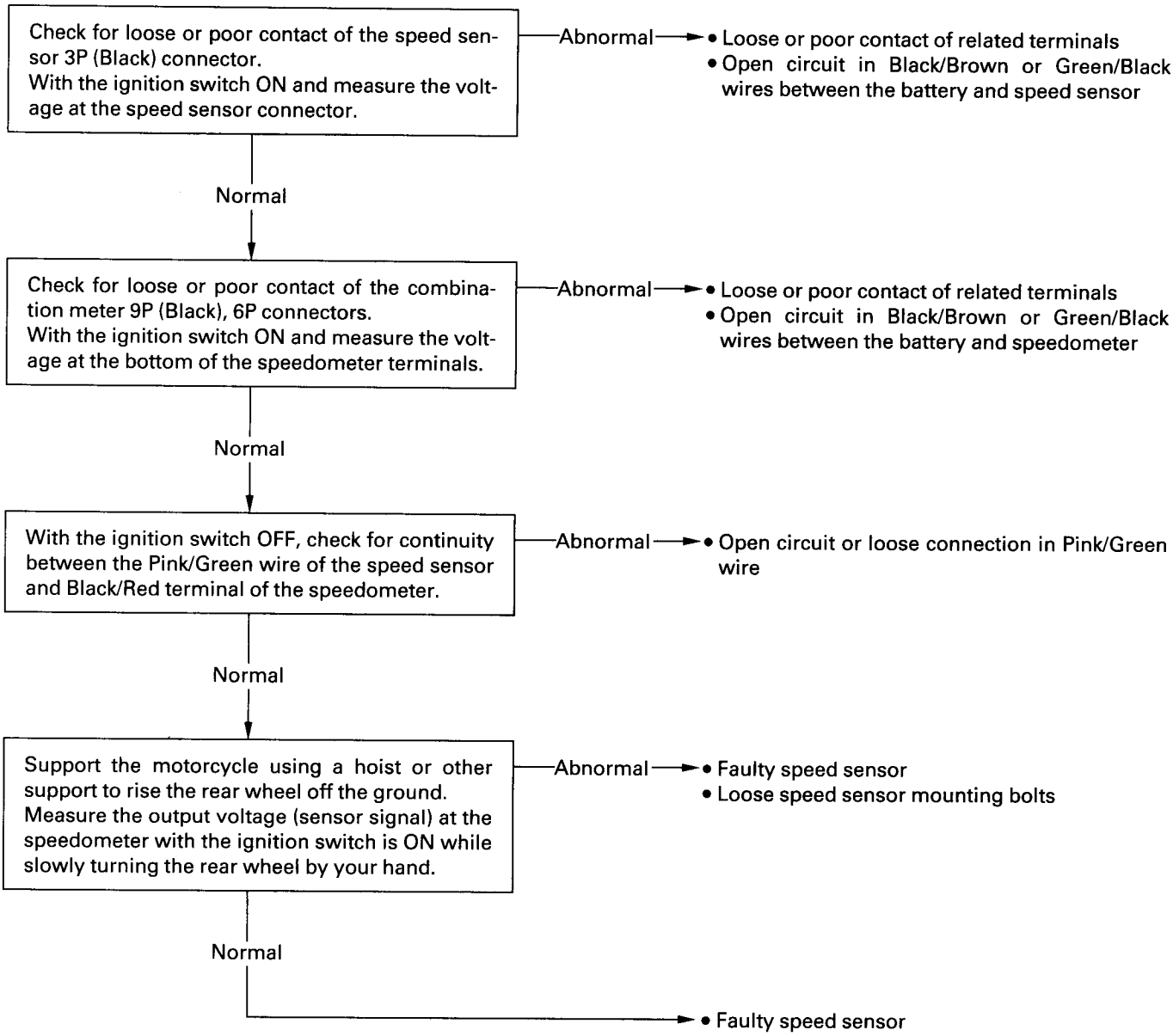
TROUBLESHOOTING

SPEED SENSOR/SPEEDOMETER

The odometer/trip meter operate normally, but the speedometer does not operate
- Faulty speedometer

The speedometer operate normally, but the odometer/trip meter does not operate
- Faulty odometer/trip meter

The speedometer operate is abnormal
- Check for the following before diagnosing.
  - Blown main or sub fuses
  - Loose or corroded terminals of the connectors
  - Discharged battery



HEADLIGHT

BULB REPLACEMENT

⚠WARNING

A halogen headlight bulb becomes very hot while the headlight is ON, and remains hot for a while after it is turned OFF. Be sure to let it cool down before servicing.

Remove the headlight bulb sockets.
Remove the dust cover.

Unhook the bulb retainer and remove the headlight bulb/socket.

CAUTION:

Avoid touching halogen headlight bulbs. Finger prints can create hot spots that cause a bulb to break.

If you touch the bulb with your bare hands, clean it with cloth moistened with denatured alcohol to prevent early bulb failure.

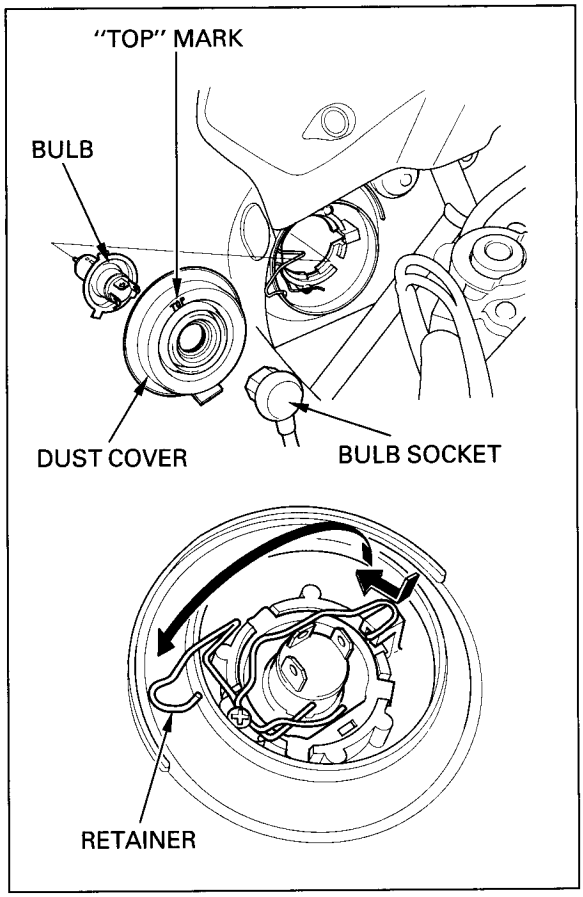
Remove the headlight bulb from the socket.

Install a new bulb into the socket.

Install the headlight bulb/socket aligning its tabs with the grooves in the headlight unit.

Install the dust cover tightly against the headlight with its "TOP" mark facing up.

Connect the headlight sockets.



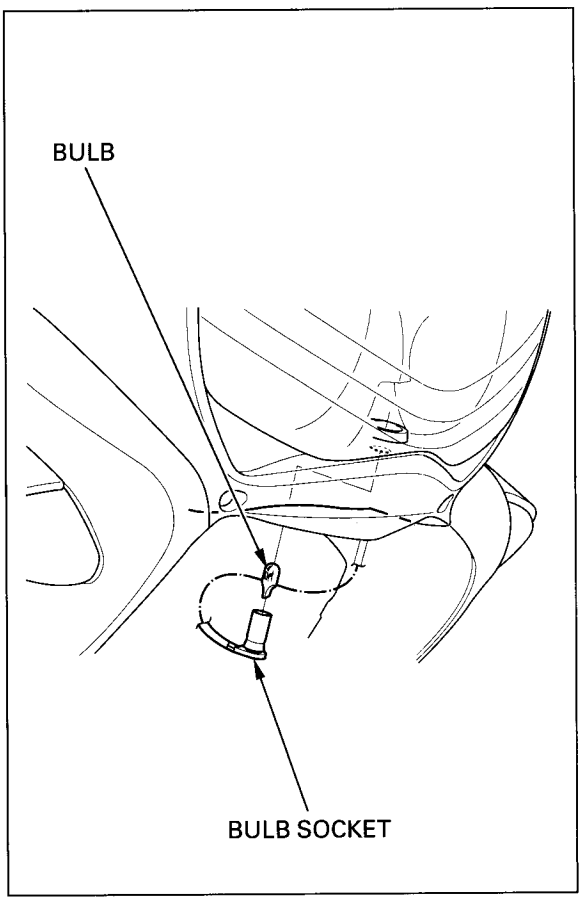
POSITION LIGHT

BULB REPLACEMENT

Remove the steering stem cover (page 13-30).

Remove the bulb socket and bulb.

Install the front turn signal bulb in the reverse order of removal.



TURN SIGNAL

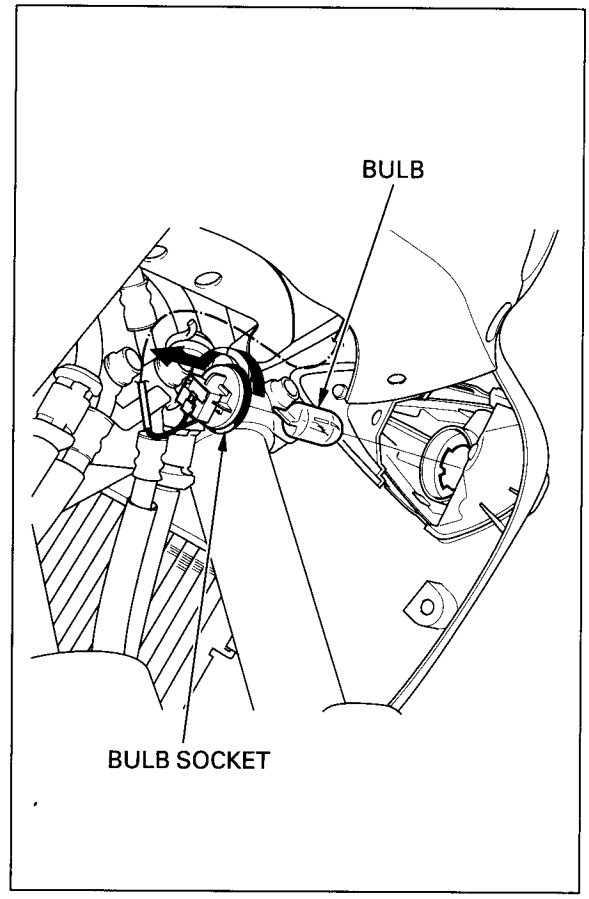
BULB REPLACEMENT

Front
Remove the inner side cowl (page 2-5).

Turn the bulb socket counterclockwise and remove it.

While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.

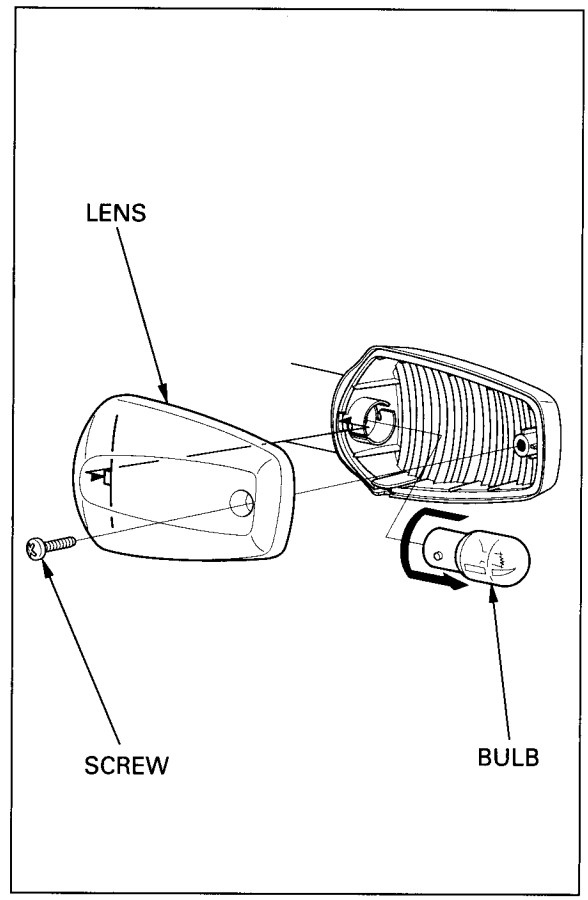
Install the front turn signal bulb in the reverse order of removal.



Rear
Remove the screw and turn signal lens.

While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.

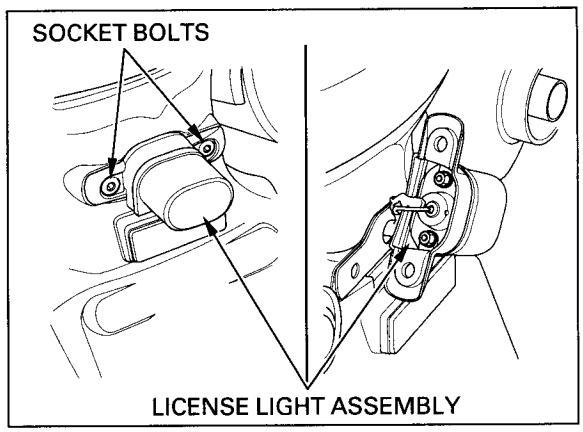
Install the rear turn signal bulb in the reverse order of removal.



LICENSE LIGHT

BULB REPLACEMENT

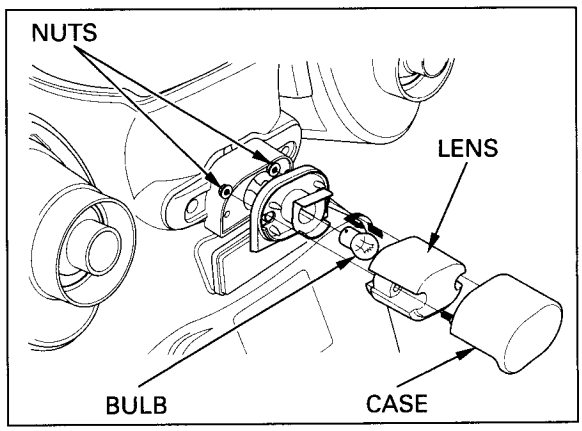
Remove the license light bracket socket bolts and the license light assembly.



Remove the nuts, license light case and lens.

While pushing in, turn the bulb counterclockwise to remove it and replace with a new one.

Install the license light bulb in the reverse order of removal.



TAIL/BRAKE LIGHT

BULB REPLACEMENT

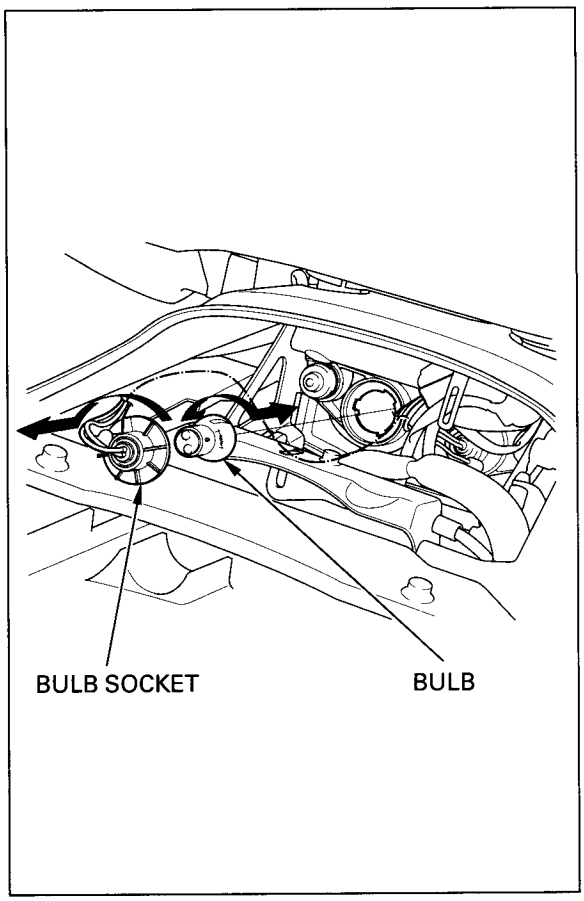
Remove the seat (page 2-2).

Turn the bulb socket counterclockwise and remove it.

While pushing in, turn the bulbs counterclockwise to remove it and replace with new ones.

Install the tail/brake light bulb in the reverse order of removal.

Install the seat (page 2-2).

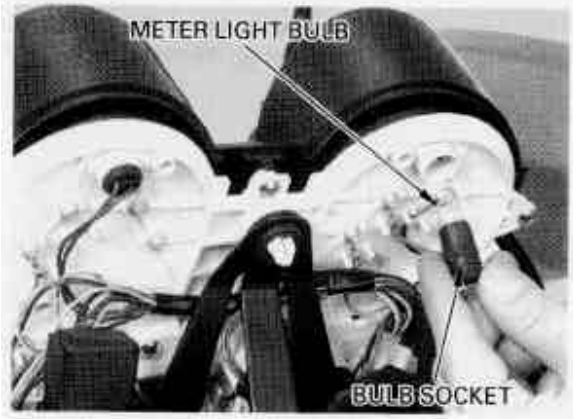


COMBINATION METER

BULB REPLACEMENT

Remove the upper cowl (page 2-6).

METER LIGHT BULB
Pull the meter light bulb socket out of the combination meter.
Remove the bulb from the socket and replace it with a new one.



INDICATOR/PILOT BULB
Remove the tab on the combination meter from the grommet on the meter stay.
Swing the combination meter assembly uplight.



Pull the indicator/pilot bulb socket out of the combination meter.
Remove the bulb from the socket and replace it with a new one.



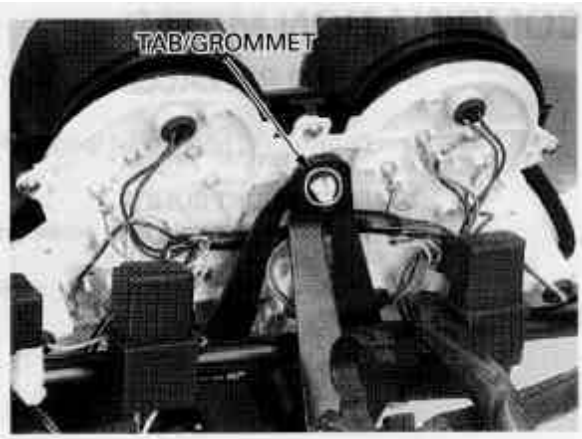
REMOVAL/INSTALLATION

Remove the upper cowl (page 2-6).

Disconnect the combination meter 9P (Black) connector and 6P connector.
Remove the combination meter wire from the clamp.



Remove the tab on the combination meter from the grommet on the meter stay.



Remove the mounting bolts and combination meter assembly.

Installation is in the reverse order of removal.

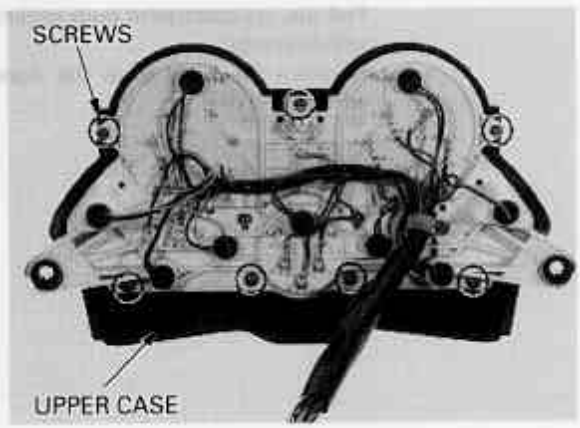
NOTE:

Route the combination meter wire properly (page 1-21).



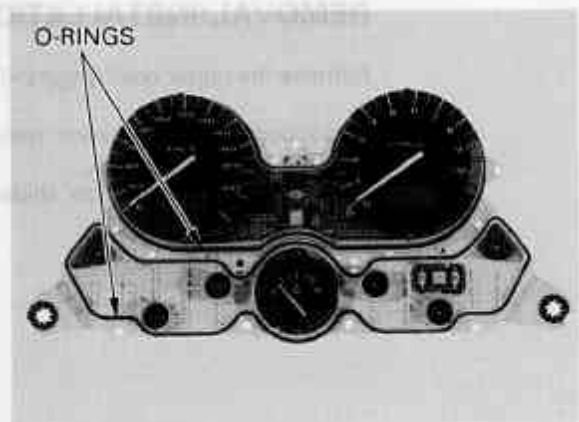
DISASSEMBLY

Remove the screws and upper case.



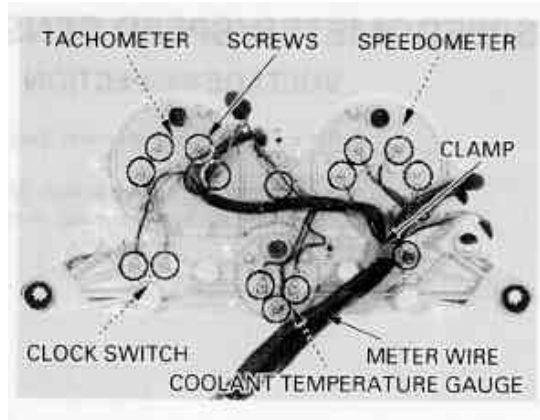
Remove the O-rings.

Remove the meter light bulb sockets and indicator/pilot bulb sockets from the lower case (page 19-7).



Remove the screws, speedometer, tachometer, coolant temperature gauge and clock switch.

Remove the screw, clamp and meter wire.

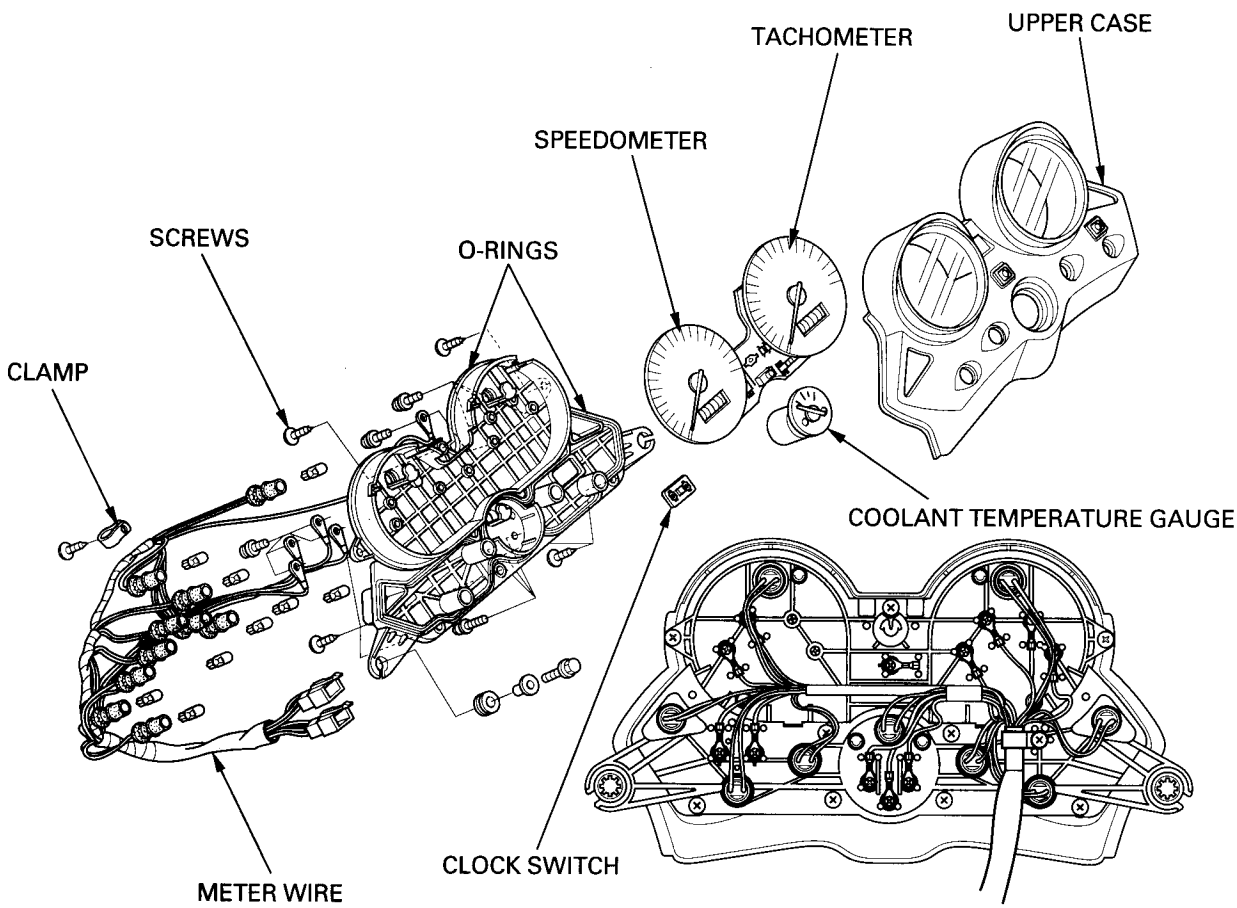


ASSEMBLY

Assemble the combination meter in the reverse order of removal.

NOTE:

Connect the wire terminals and install the bulb sockets according to the collar codes on the lower case.

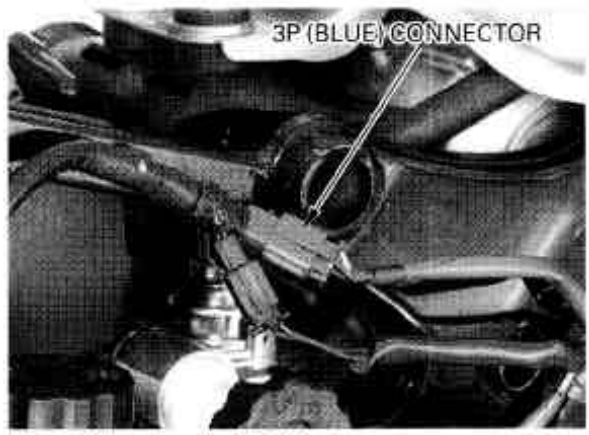


SPEEDOMETER/SPEED SENSOR

VOLTAGE INSPECTION

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

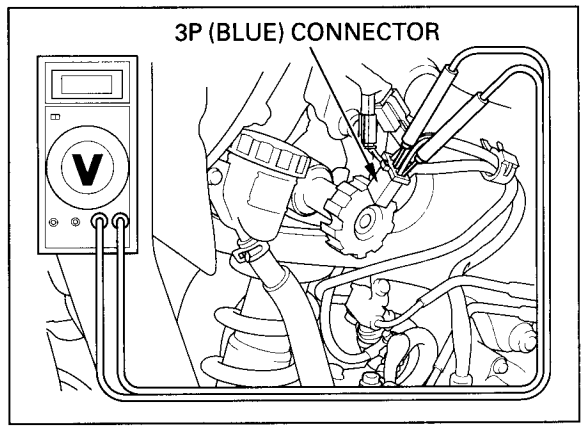
Disconnect the speed sensor 3P (Blue) connector and check for loose or poor contact of the connector.



With the ignition switch is ON and measure the voltage at the 3P (Blue) connector of the wire harness side.

Connection: Black/Brown (+) — Green/Black (−)
Standard: Battery voltage

If there is no voltage, replace and repair the wire harness.



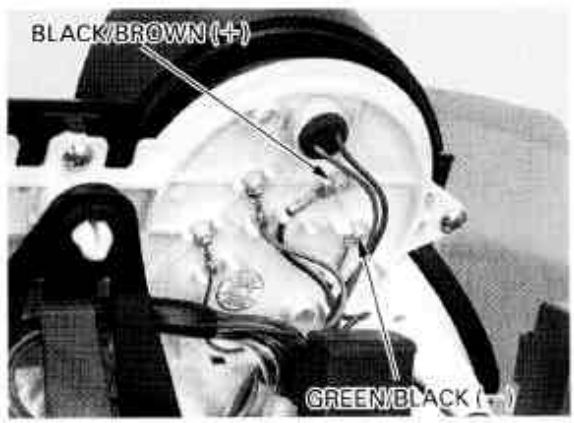
Remove the upper cowl (page 2-6).

Check for loose or poor connection of the combination meter 9P (Black) connector and 6P connector.

With the ignition switch is ON and measure the voltage at the bottom of the combination meter terminal.

Connection: Black/Brown (+) — Green/Black (−)
Standard: Battery voltage

If there is no voltage, replace and repair the wire harness.



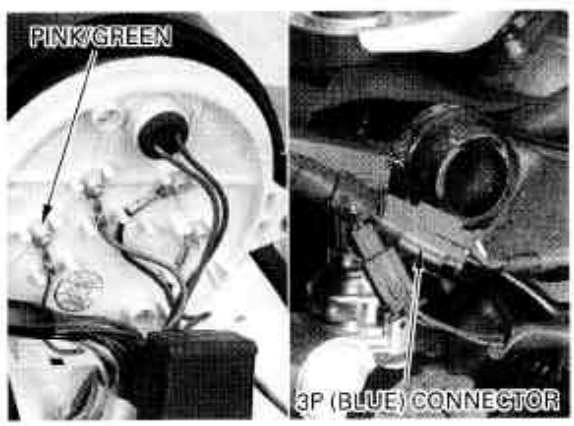
OUTPUT SIGNAL INSPECTION

Remove the upper cowl (page 2-6).

With the ignition switch is OFF, check for continuity of the Pink/Green wire between the speed sensor 3P (Blue) connector and combination meter terminal.

There should be continuity.

If there is no continuity, replace and repair the wire harness.

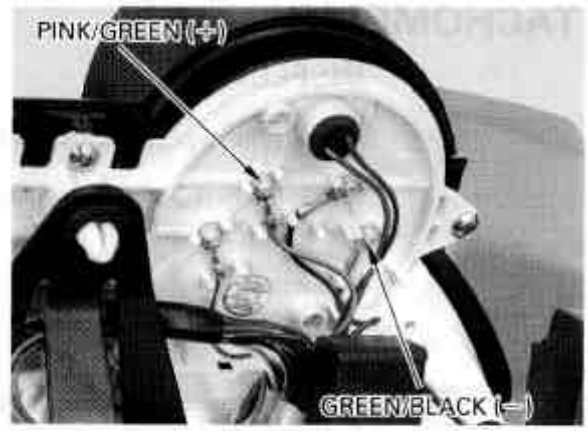


Support the motorcycle securely with a hoist or equivalent.

Connect the speed sensor 3P (Blue) connector.
Measure the voltage at the combination meter terminals with the ignition switch is ON while slowly turning the rear wheel by hand.

CONNECTION: Pink/Green (+) – Green/Black (–)
STANDARD: Repeat 0 to 5V

If the measurement is out of specification, inspect the open circuit in wire harness.



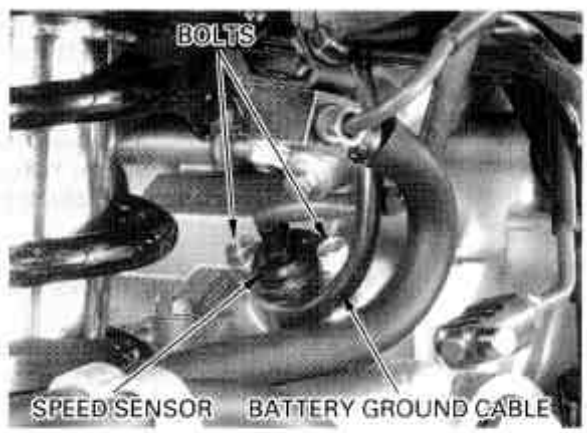
SPEED SENSOR REMOVAL/ INSTALLAATION

Remove the fuel tank (page 2-10).

Disconnect the speed sensor 3P (Blue) connector.



Remove the bolts, battery ground cable and speed sensor.



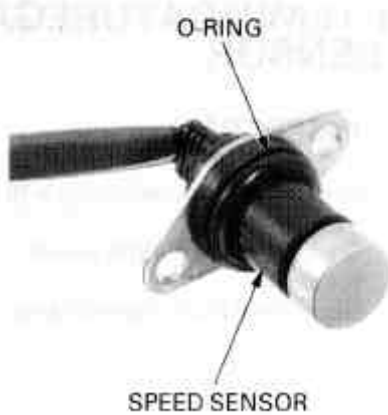
Check the O-ring is in good condition, replace if necessary.
Install the speed sensor into the upper crankcase.

Install the battery ground cable.
Install and tighten the mounting bolts securely.

NOTE:

Route the speed sensor wire and battery ground cable properly (page 1-21).

Connect the speed sensor 3P (Blue) connector.



TACHOMETER

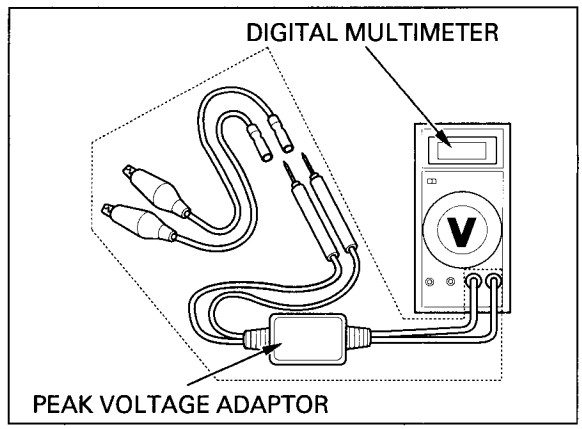
INSPECTION

Remove the upper cowl (page 2-6).

Check for loose or poor contact terminals of the combination meter.

Connect the peak voltage adaptor to the tachometer Yellow/Green terminal and ground.

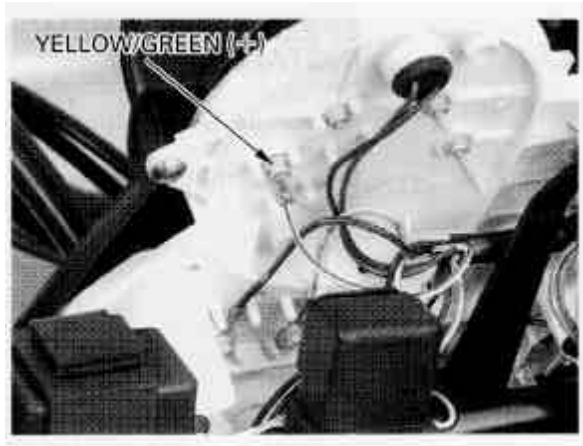
TOOLS:
Imrie diagnostic tester (model 625) or
Peak voltage adaptor 07HGJ-0020100
with Commercially available digital multimeter (impedance 10 MΩ /DCV minimum)



CONNECTION: Yellow/Green (+) and Ground (−)

Start the engine and measure the tachometer input voltage.

PEAK VOLTAGE: 10.5 V minimum



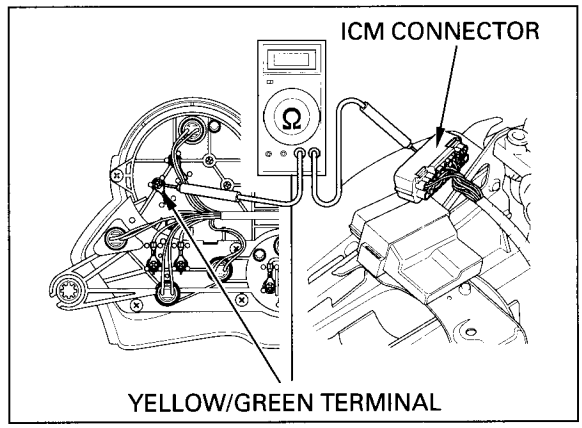
If the value is normal, replace the tachometer.
If the measured value is below 10.5 V, replace the ignition control module (ICM).

If the value is 0 V, perform the following:
Remove the seat (page 2-2) and disconnect the ICM connector.

Check for continuity between the tachometer terminal and the ICM connector Yellow/Green terminal.
If there is no continuity, check the wire harness for an open circuit.

If there is continuity, replace the tachometer unit.

For tachometer replacement, see 19-8; combination meter disassembly and assembly.

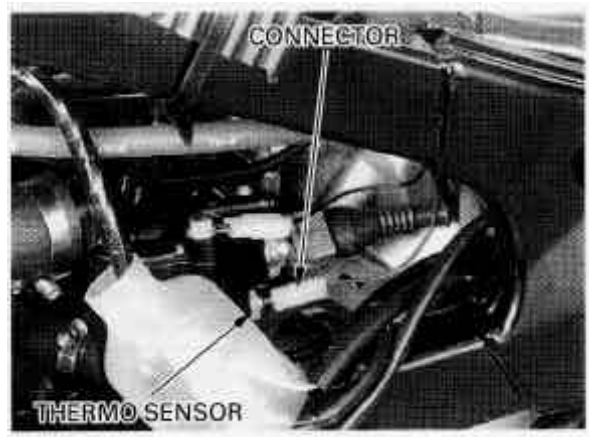


COOLANT TEMPERATUREGAUGE/ THERMO SENSOR

INSPECTION

Remove the fuel tank (page 2-10).

Disconnect the thermo sensor wire connector from the sensor.
Ground the thermo sensor wire with a jumper wire.



Turn the ignition switch ON and check the coolant temperature gauge.
Disconnect the thermo sensor wire connector from the ground immediately if the gauge needle moves fully to H.

CAUTION:

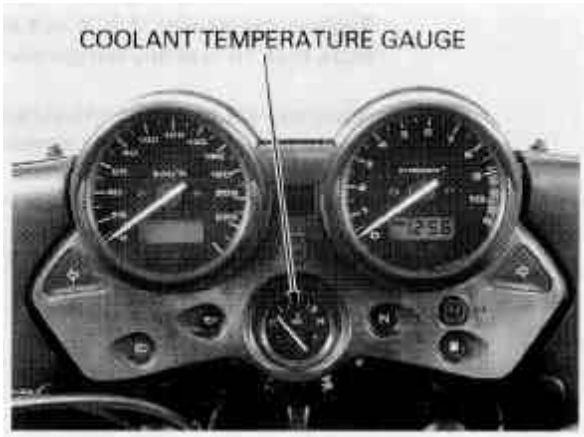
Immediately disconnect the sensor wire connector from the ground when the needle moves to H (hot) to prevent damage to the gauge.

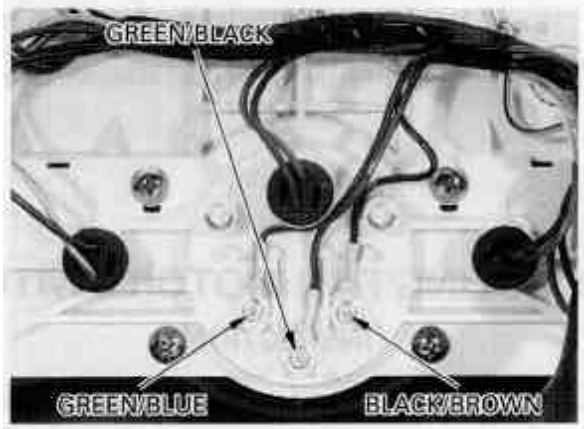
If the needle moves, check the thermo sensor unit.

If the needle does not move, check for 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 between the terminal, check the wire harness.
If a voltage is measured, faulty coolant temperature gauge unit is faulty.





THERMO SENSOR UNIT INSPECTION

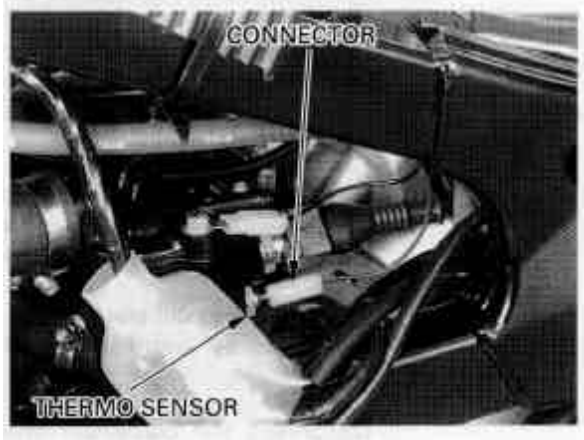
⚠WARNING

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

Drain the coolant (page 6-5).

Disconnect the wire connector from the thermo sensor and remove the sensor.

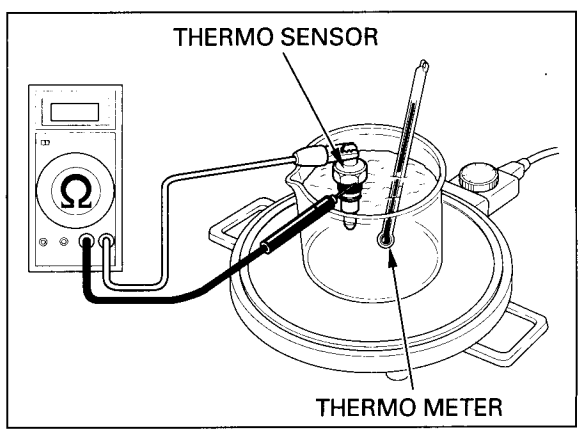
Suspend the thermo sensor in a pan of coolant (50−50 mixture) an electric heating element and measure the resistance through the sensor as the coolant heats up.



NOTE:

- Soak the thermo sensor in coolant up to its threads with at least 40 mm (1.57 in) from the bottom of the pan to the bottom of the sensor.
- Keep the temperature constant for 3 minutes before testing. A sudden change of temperature will result in incorrect readings. Do not let the thermometer or thermo sensor touch the pan.

Temperature	80 °C (176 °F)	120 °C (248 °F)
Resistance	47−57 Ω	14−18 Ω



Replace the sensor if it is out of specification by more than 10 % at any temperature listed.

Apply sealant to the thermo sensor threads.
Do not apply sealant to the sensor head.

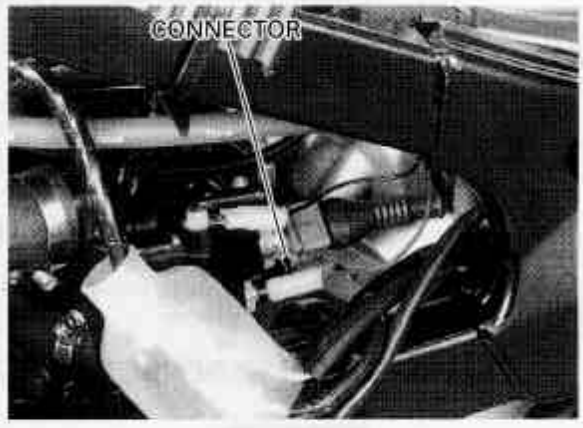
Install and tighten the thermo sensor.

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



Connect the thermo sensor connector.

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



COOLING FAN MOTOR SWITCH

INSPECTION

Check for a blown fuse before inspection.

Remove the side cowl (page 2-5).

Fan motor does not stop
Turn the ignition switch OFF, disconnect the connector from the fan motor switch and turn the ignition switch ON again.

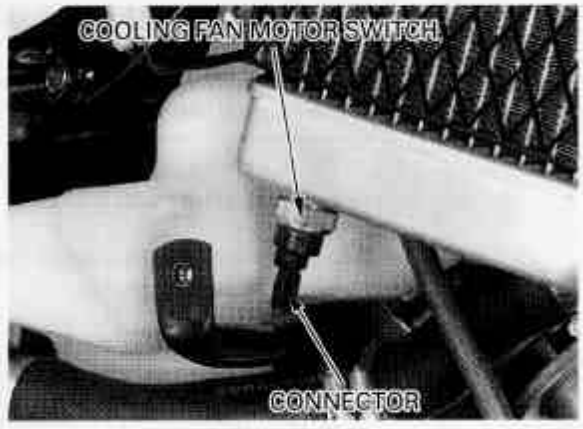
If the fan motor does not stop, check for a shorted wire between the fan motor and switch.
If the fan motor stops, replace the fan motor switch.

Fan motor does not start
Before testing, warm up the engine to operating temperature.

Disconnect the connector from the fan motor switch and ground the connector to the body with a jumper wire.
Turn the ignition switch ON and check the fan motor.

If the motor starts, check the connection at the fan motor switch terminal.
It is OK, replace the fan motor switch.
If the motor does not start, check for voltage between the fan motor switch connector and ground.
If battery voltage is measured, replace fan motor.

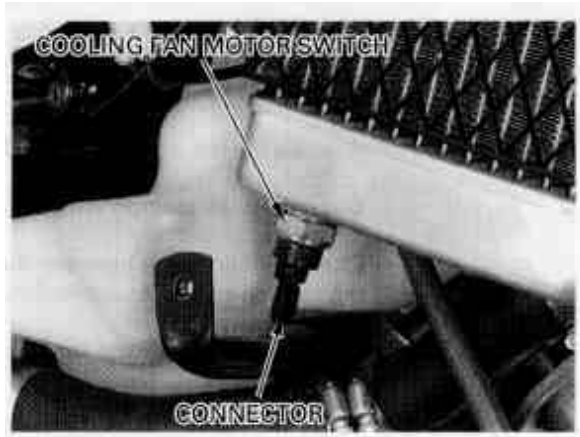
If there is no battery voltage, check for poor connection of the fan motor 2P (Black) connector or broken wire harness.





REMOVAL/INSTALLATION

Disconnect the fan motor switch connector and remove the switch.



Install a new O-ring onto the fan motor switch.
Install and tighten the fan motor switch securely.

Connect the fan motor switch connector.



OIL PRESSURE SWITCH

INSPECTION

If the oil pressure warning indicator stays on while the engine running, check the engine oil level before inspection.

Make sure that the oil pressure warning indicator come on with the ignition switch ON.

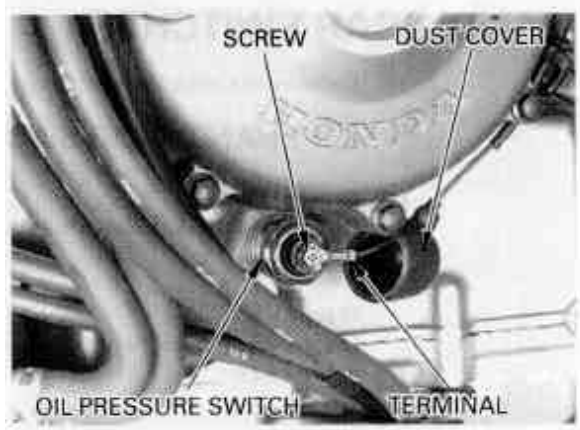
If the indicator does not come on, inspect as follow:
Remove the under cowl (page 2-7).

Remove the dust cover.
Remove the screw and oil pressure switch terminal.



Short the oil pressure switch wire terminal with the ground using a jumper wire.
The oil pressure warning indicator comes on with the ignition switch is ON.
If the light does not comes on, check the sub-fuse (10A) and wires for a loose connection or an open circuit.

Start the engine and make sure that the light goes out.
If the light does not go out, check the oil pressure (page 4-4).
If the oil pressure is normal, replace the oil pressure switch (page 4-4).



IGNITION SWITCH

INSPECTION

Remove the left side cowl (page 2-5).

Disconnect the ignition switch wire 3P connector.

Check for continuity between the wire terminals of the ignition switch 3P connector in each switch position.
Continuity should exist between the color coded wires as follows:

IGNITION SWITCH

	BAT1	IG	FAN	KEY
ON	○	○	○	KEY ON
OFF				KEY OFF
LOCK				KEY OFF LOCK PIN
COLOR	R	R/BI	Bu/O	—





INSTALLATION

Install the ignition switch.

Tighten the new ignition switch bolts.

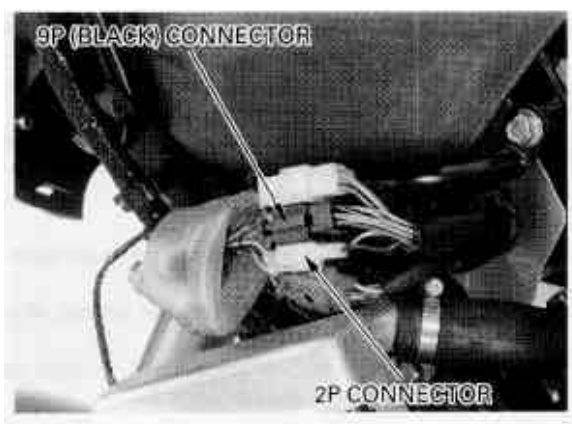
HANDLEBAR SWITCHES

Remove the left side cowl (page 2-5).

LEFT HANDLEBAR SWITCH

Except U type
Disconnect the left handlebar switch 2P, 9P (Black) connectors.

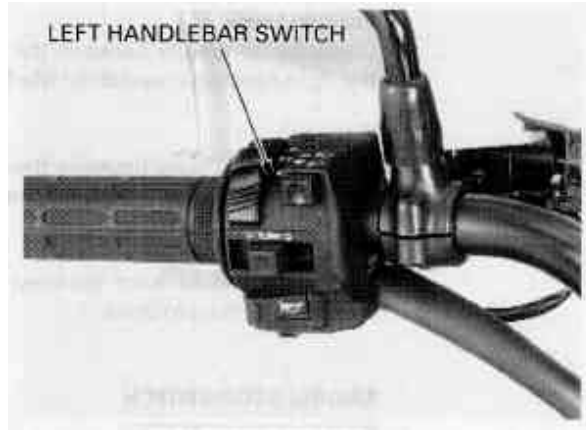
U type
Disconnect the left handlebar switch 2P, 9P (Green) connectors.



Except U type
Check for continuity between the wire terminals of the left handlebar switch 2P, 9P (Black) connectors.

U type
Check for continuity between the wire terminals of the left handlebar switch 2P, 9P (Green) connectors.

Continuity should exist between the color coded wire terminals as follows:



TURN SIGNAL SWITCH

	W	R	L
R	○	○	
N			
L	○		○
COLOR	GR	SB	O

DIMMER SWITCH

	HL	Lo	Hi
Lo	○	○	
(N)	○	○	○
Hi	○		○
COLOR		W	Bu

HORN SWITCH

	Ho	BAT5
FREE		
PUSH	○	○
COLOR	LG	Bl/Br

LIGHTING SWITCH (Except U type only)

	BAT3	TL	BAT4	HL
·				
P	○	○		
H	○	○	○	○
COLOR	Bl/Br	Br	Bl/R	

PASSING SWITCH (Except U type only)

	BAT6	Hl
FREE		
PUSH	○	○
COLOR	Bl/R	Bu

RIGHT HANDLEBAR SWITCH

Except U type
Disconnect the right handlebar switch 6P (Red) connector.

U type
Disconnect the right handlebar switch 6P (Red) connector and starter switch connector.



Except U type
Check for continuity between the wire terminals of the right handlebar switch 6P (Red) connector.

U type
Check for continuity between the wire terminals of the right handlebar switch 6P (Red) connector and starter switch connector.

Continuity should exist between the color coded wire terminals as follows:



ENGINE STOP SWITCH

	IG	BAT2
OFF		
RUN	○—○	
COLOR	Bl/W	Bl

STARTER SWITCH (Except U type)

	ST	IG
FREE		
PUSH	○—○	
COLOR	Y/R	Bl/W

STARTER SWITCH (U type)

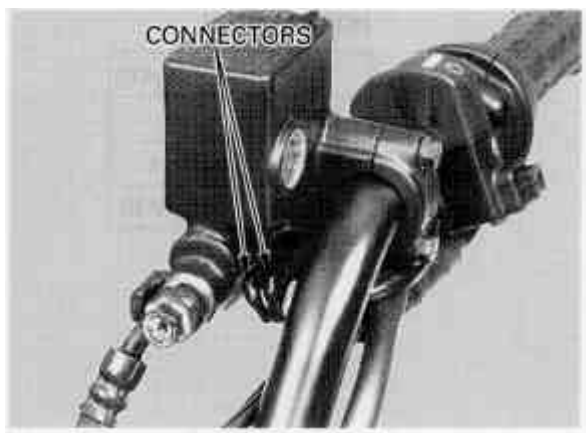
	ST	BAT2	HL
FREE		○—○	
PUSH	○—○		
COLOR	Y/R	Bl	Bu/W

BRAKE LIGHT SWITCH

FRONT

Disconnect the front brake light switch connectors.

There should be continuity with the brake lever applied, and there should be no continuity with the brake lever is released.

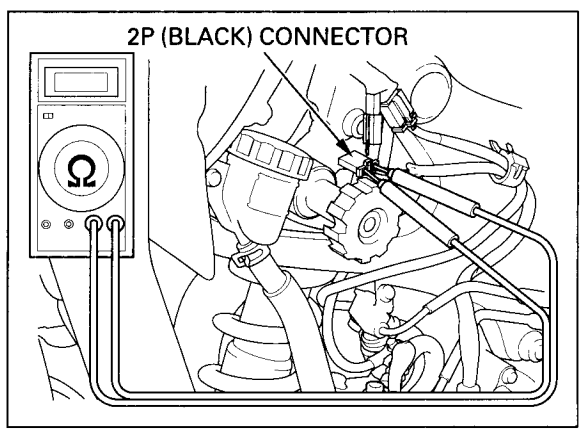


REAR

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

Disconnect the rear brake light switch 2P (Black) connector and check for continuity between the terminals.

There should be continuity with the brake pedal applied, and there should be no continuity with the brake pedal is released.



CLUTCH SWITCH

Disconnect the clutch switch connectors.

There should be continuity with the clutch lever applied, and there should be no continuity with the clutch lever is released.

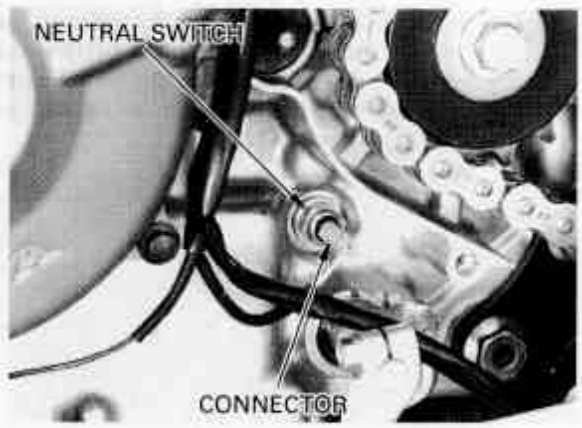


NEUTRAL SWITCH

INSPECTION

Remove the drive sprocket cover (page 7-3).

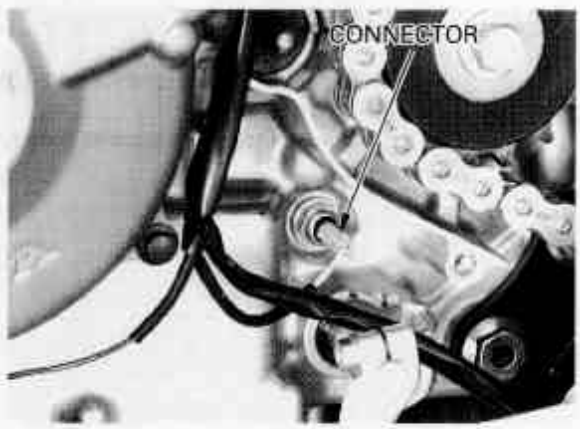
Disconnect the neutral switch connector.
Shift the transmission into neutral and check for continuity between the switch terminal and ground. There should be continuity with the transmission is in neutral, and no continuity when the transmission is into gear.



REMOVAL/INSTALLATION

Remove the drive sprocket cover (page 7-3).

Disconnect the neutral switch connector.



Remove the neutral switch and sealing washer from the crankcase.

Install the neutral switch with a new sealing washer and tighten it to the specified torque.

TORQUE: 12 N·m (1.2 kgf·m , 9 lbf·ft)

Connect the neutral switch wire connector.

NOTE:

Route the neutral switch wire connector properly (page 1-21).



SIDE STAND SWITCH

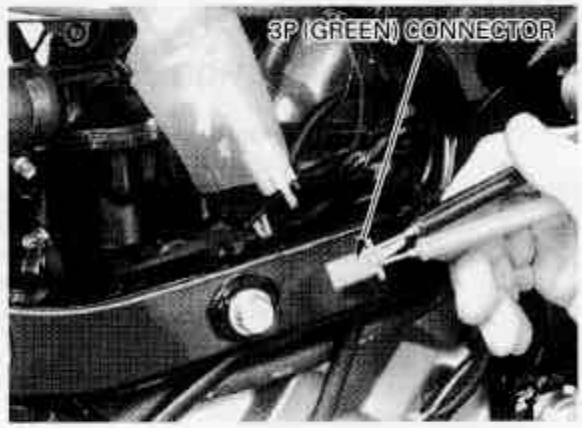
INSPECTION

Remove the fuel tank (page 2-10).

Disconnect the side stand switch 3P (Green) connector.



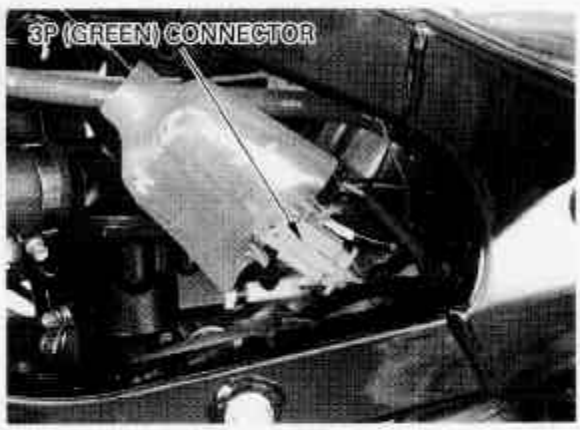
Check for continuity between the wire terminals of the side stand switch 3P (Green) connector.
There should be continuity with the side stand UP and there should be no continuity with the side stand DOWN.



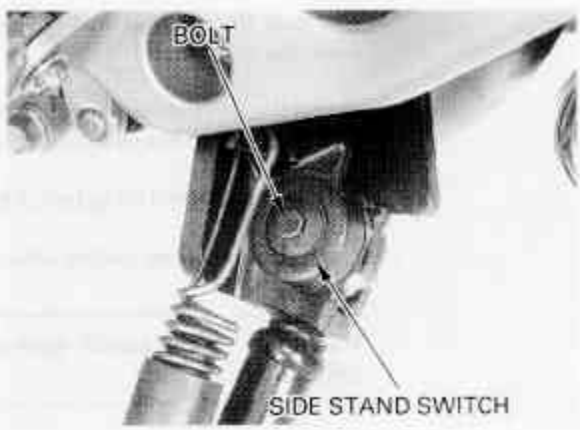
REMOVAL

Remove the fuel tank (page 2-10).

Disconnect the side stand switch 3P (Green) connector.



Remove the bolt and side stand switch.



INSTALLATION

Install the side stand switch by aligning the switch pin with the side stand hole and the switch groove with the return spring holding pin.

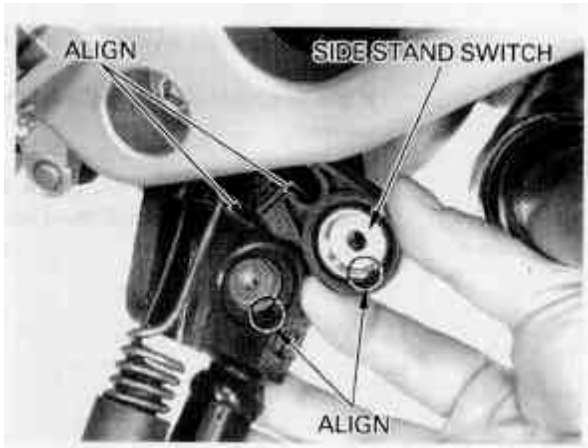
Secure the side stand switch with a new bolt.

TORQUE: 10 N·m (1.0 kgf·m , 7 lbf·ft)

Install the removed parts in the reverse order of removal.

NOTE:

Route the side stand switch wire properly (page 1-21).

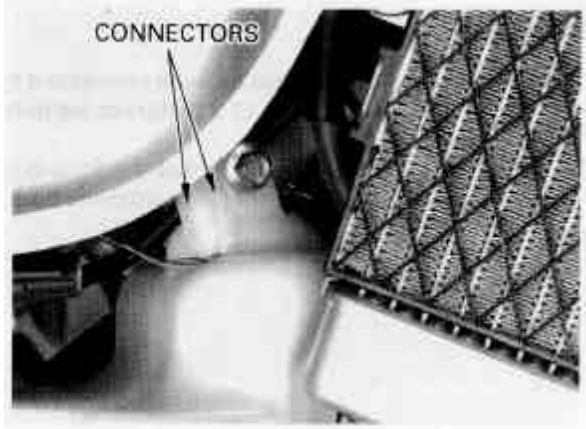


LOW FUEL INDICATOR/FUEL RESERVE SENSOR

SYSTEM INSPECTION

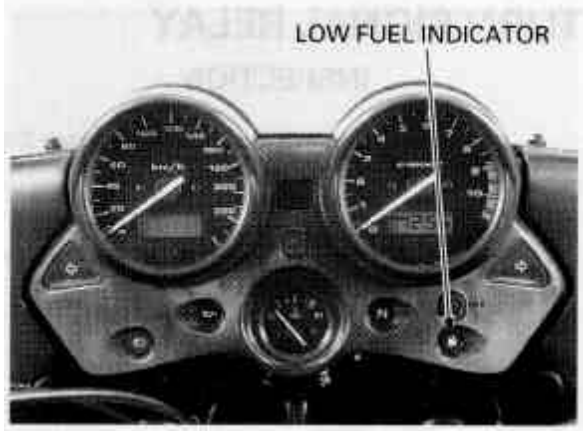
Remove the right side cowl (page 2-5).

Low fuel indicator does not go off
Disconnect the fuel reserve sensor connectors.

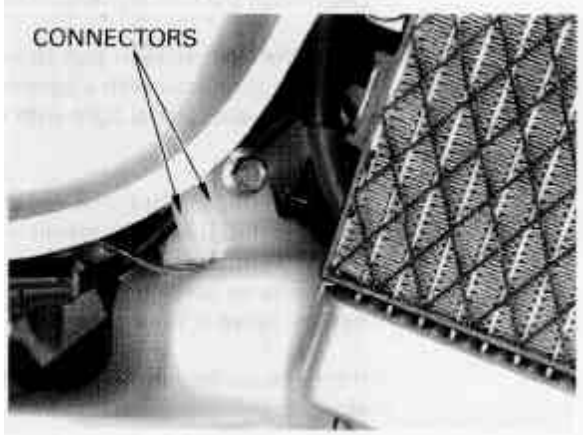


Turn the ignition switch ON and check the low fuel indicator.

If the indicator does not come on, replace the fuel reserve sensor.
If the indicator come on, check for short circuit in Brown/Black wire.

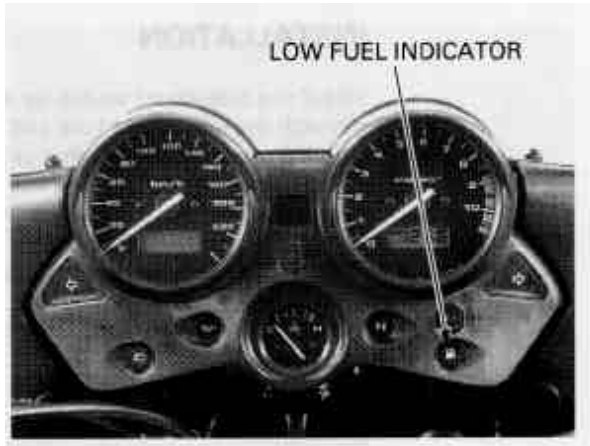


Low fuel indicator does not come on
Disconnect the fuel reserve sensor connectors and short the connectors with a jumper wire.



Turn the ignition switch ON and check the low fuel indicator.
If the indicator comes on, replace the fuel reserve sensor.

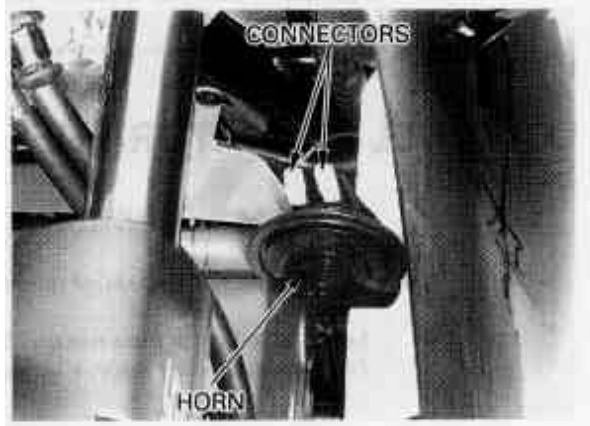
If the indicator come on, check for open circuit in Brown/Black and Black/Brown wires.



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

INSPECTION

Remove the upper cowl (page 2-6).

Check the followings:
—Battery condition
—Burned out bulb or non-specified wattage
—Burned fuse
—Ignition switch and turn signal switch function
—Loose connectors



If the above items are all normal, check the following:
Disconnect the turn signal connector from the relay.

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.

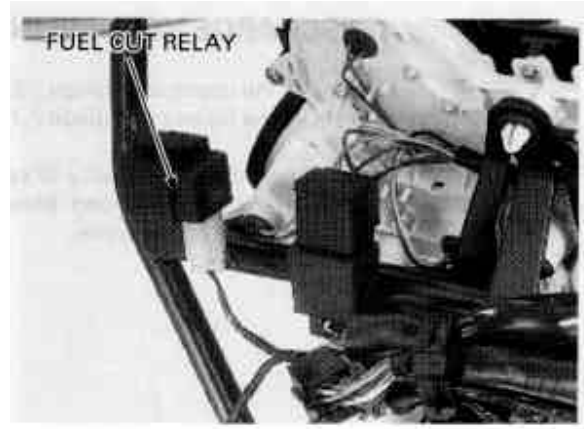
If the light does not come on, check for continuity between the Green wire terminal and body ground.

If there is no continuity, check the connector terminals for loose or poor contact.

If the connector terminals are OK, replace the tern signal relay.

FUEL PUMP/FUEL CUT RELAY

SYSTEM INSPECTION



Remove the upper cowl (page 2-6).

Turn the ignition switch OFF.
Disconnect the fuel cut relay 3P connector and connect the voltmeter at the 3P connector of the wire harness side.

CONNECTION: Black/White (+) — body ground (−)

Turn the ignition switch ON.
There should be battery voltage.
If there is no voltage, check for an open circuit or loose connection in Black/White wire.
If there is battery voltage, check for continuity in the Blue/Yellow wire.

Check for continuity between the Blue/Yellow wire and ground at the 3P connector of the wire harness side.

CONNECTION: Blue/Yellow — body ground
STANDARD: No continuity

If there is continuity, replace the fuel cut relay.



If there is no continuity, short the terminals of the 3P connector wire of the wire harness side with the suitable jumper wire.

SHORT TERMINAL: Blue/Yellow — Black/White

Lift and support the fuel tank (page 3-6).

Disconnect the fuel pump 2P (Black) connector and connect the voltmeter at the 2P (Black) connector of the wire harness side.

CONNECTION: Black/Blue (+) — Green (−)

Turn the ignition switch ON and measure the voltage at the 2P (Black) connector.

STANDARD: Battery voltage

If there is no voltage, check for an open circuit or loose connection in Black/Blue and Green wires.
If there is battery voltage, replace the fuel pump.

DISCHARGE VOLUME INSPECTION

Remove the upper cowl (page 2-6).
Remove the under cowl (page 2-7).

Disconnect the fuel cut relay 3P connector.
Short the Black/White and Blue/Yellow terminals with a suitable jumper wire.



Disconnect the fuel pump outlet tube from the fuel pump.
Connect the suitable tube to the outlet on the fuel pump.
Hold a graduated beaker under the suitable tube.

Turn the ignition switch ON and let the fuel flow into the beaker for 5 seconds, then turn the ignition switch OFF.
Multiply the amount in the beaker by 12 to determine the fuel pump flow capacity per minute.

FUEL PUMP FLOW CAPACITY:
700 cm^3 (23.7 US oz , 24.6 Imp oz) min./minute



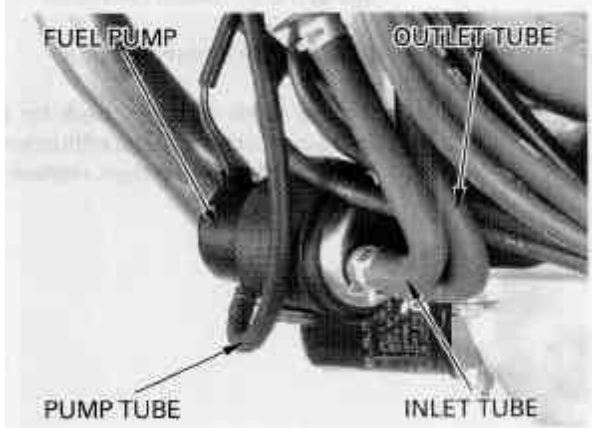
REMOVAL/INSTALLATION

Remove the under cowl (page 2-7).
Lift and support the fuel tank (page 3-6).

Disconnect the fuel pump 2P (Black) connector.



Disconnect the fuel pump outlet tube and inlet tube from the fuel pump.
Disconnect the fuel pump tube from the fuel pump.

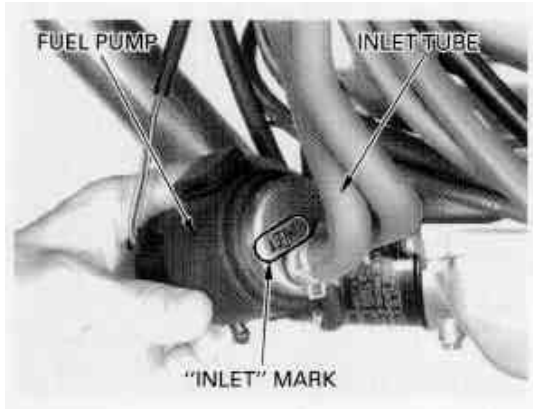


Remove the fuel pump from the bracket.

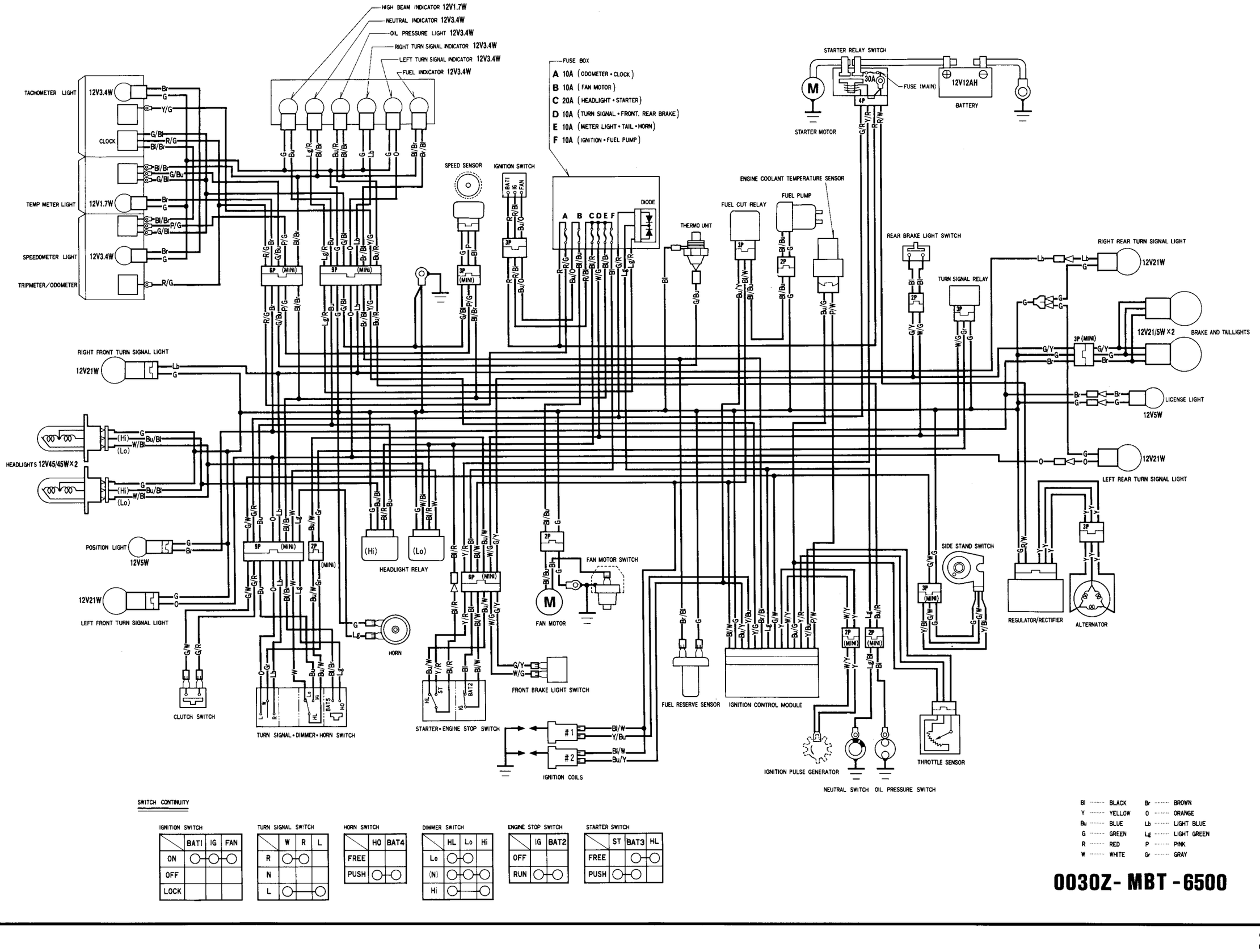
Installation is in the reverse order of removal.

NOTE:

- Connect the fuel pump inlet tube to the fuel pump "INLET" mark side.
- Route the wire harness and tubes properly (page 1-21).



U TYPE



SWITCH CONTINUITY

IGNITION SWITCH

	BAT1	IG	FAN
ON	○	○	○
OFF			
LOCK			

TURN SIGNAL SWITCH

	W	R	L
R	○	○	
N			
L	○		○

HORN SWITCH

	HO	BAT4
FREE		
PUSH	○	○

DIMMER SWITCH

	HL	Lo	Hi
Lo	○	○	
(N)	○	○	○
Hi	○		○

ENGINE STOP SWITCH

	IG	BAT2
OFF		
RUN	○	○

STARTER SWITCH

	ST	BAT3	HL
FREE		○	○
PUSH	○	○	

Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

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21. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START	21-1	POOR PERFORMANCE AT HIGH SPEED	21-4
ENGINE LACKS POWER	21-2	POOR HANDLING	21-4
POOR PERFORMANCE AT LOW AND IDLE SPEED	21-3		

ENGINE DOES NOT START OR IS HARD TO START

		Possible cause
1. Check fuel flow to carburetor	Not reaching carburetor	• Clogged fuel line and strainer • Clogged fuel tank breather tube
Reaching carburetor		
2. Perform spark test	Weak or no spark	• Faulty spark plug • Fouled spark plug • Loose or disconnected ignition system wires • Broken or shorted spark plug wire • Faulty ignition pulse generator • Faulty ignition coil • Faulty engine stop switch • Faulty ignition control module (ICM) • Faulty ignition switch
Good spark		
3. Remove and inspect spark plugs	Wet plug	• Flooded carburetor • Starting enrichment (SE) valve ON position (open) • Throttle valve open • Dirty air cleaner
Good condition		
4. Start by following normal procedure	Engine starts but stops	• Improper choke operation • Incorrectly adjusted carburetor • Leaking carburetor insulator • Improper ignition timing (Faulty ICM or ignition pulse generator) • Contaminated fuel
Engine does not start		
5. Test cylinder compression	Low compression	• Valve stuck open • Worn cylinder and piston rings • Damaged cylinder head gasket • Seized valve • Improper valve timing

ENGINE LACKS POWER

		Possible cause
1. Raise wheel off the ground and spin by hand Wheel spins freely	Wheel does not spin freely	• Brake dragging • Worn or damaged wheel bearings • Drive chain too tight
2. Check tire pressure Pressure normal	Pressure low	• Faulty tire valve • Punctured tire
3. Accelerate rapidly low to second Engine speed reduced when clutch is released	Engine speed doesn't change accordingly when clutch is released	• Clutch slipping • Worn clutch discs/plates • Warped clutch discs/plates • Weak clutch spring • Additive in engine oil
4. Accelerate lightly Engine speed increase	Engine speed does not increase	• Starting .enrichment (SE) valve ON position (open) • Clogged air cleaner • Restricted fuel flow • Clogged muffler • Restricted fuel tank breather tube
5. Check ignition timing Correct	Incorrect	• Faulty ignition control module (ICM) • Faulty ignition pulse generator
6. Test cylinder compression Normal compression	Low compression	• Valve clearance too small • Worn cylinder and piston rings • Damaged cylinder head gasket • Improper valve timing
7. Check carburetor for clogging Not clogged	Clogged	• Carburetor not serviced frequently enough
8. Remove and inspect spark plugs Not fouled or discolored	Fouled or discolored	• Plugs not serviced frequently enough • Incorrect spark plug used
9. Check oil level and condition Correct	Incorrect	• Oil level too high • Oil level too low • Contaminated oil

To page 21-3

From page 21-2

		Possible cause
10. Remove cylinder head cover and inspect lubrication	Valve train not lubricated properly	• Clogged oil passage • Clogged oil orifice
Valve train lubricated properly		
11. Check for engine overheating	Overheating	• Coolant level too low • Fan motor not working (Fautly fan motor or fan motor switch) • Thermostat stuck closed • Excessive carbon build-up in combustion chamber • Use of poor quality fuel • Clutch slipping • Lean fuel mixture • Wrong type of fuel
Not overheating		
12. Accelerate or run at high speed	Engine knocks	• Worn piston and cylinder • Wrong type of fuel • Excessive carbon build-up in combustion chamber • Ignition timing too advance (Faulty ICM) • Lean fuel mixture
Engine does not knock		

POOR PERFORMANCE AT LOW AND IDLE SPEED

		Possible cause
1. Check carburetor pilot screw adjustment	Incorrect	• See section 5
Correct		
2. Check for leaking carburetor insulator	Leaking	• Loose carburetor insulator bands • Damaged carburetor insulator
No leak		
3. Perform spark test	Weak or intermittent spark	• Faulty spark plug • Fouled spark plug • Loose or disconnected ignition system wires • Broken or shorted spark plug wire • Faulty ignition pulse generator • Faulty ignition coil • Faulty engine stop switch • Faulty ignition control module (ICM) • Faulty ignition switch
Good spark		
4. Check ignition timing	Incorrect	• Faulty ignition control module (ICM) • Faulty ignition pulse generator

POOR PERFORMANCE AT HIGH SPEED

		Possible cause
1. Disconnect fuel tube at carburetor and pump the vacuum line	Fuel flow restricted	• Restricted fuel tube • Restricted fuel tank breather tube • Faulty fuel valve • Clogged fuel strainer
Fuel flows freely		
2. Check carburetor for clogging	Clogged	• Carburetor not serviced frequently enough
Not clogged		
3. Check valve timing	Incorrect	• Cam sprockets not installed properly
Correct		
4. Check ignition timing	Incorrect	• Faulty ignition control module (ICM) • Faulty ignition pulse generator
Correct		
5. Check valve spring	Weak	• Faulty valve spring
Not weak		

POOR HANDLING

	Possible cause
1. If steering is heavy	• Steering stem adjustment nut too tight • Damaged steering head bearings
2. If either wheel is wobbling	• Excessive wheel bearing play • Bent rim • Improperly installed wheel hub • Excessively worn swingarm pivot bearings • Bent frame
3. If motorcycle pulls to one side	• Front and rear wheels not aligned • Bent fork • Bent swingarm • Bent axle • Bent frame

INDEX

AIR CLEANER 3-5
AIR CLEANER HOUSING 5-4
ALTERNATOR CHARGING COIL 16-7
ALTERNATOR COVER INSTALLATION 10-7
REMOVAL 10-2
BATTERY 16-5
BODY PANEL LOCATIONS 2-0
BRAKE FLUID 3-20
BRAKE FLUID REPLACEMENT/AIR BLEEDING 15-5
BRAKE LIGHT SWITCH
(LIGHTS/METERS/SWITCHES) 19-18
(MAINTENANCE) 3-22
BRAKE PAD WEAR 3-21
BRAKE PAD/DISC 15-10
BRAKE PEDAL 15-37
BRAKE SYSTEM 3-21
CABLE & HARNESS ROUTING 1-21
CAM CHAIN TENSIONER LIFTER 8-28
CAMSHAFT INSTALLATION 8-21
REMOVAL 8-7
CARBURETOR CHOKE 3-5
CARBURETOR ASSEMBLY 5-12
COMBINATION 5-15
DISASSEMBLY/INSPECTION 5-9
INSTALLATION 5-18
REMOVAL 5-5
SEPARATION 5-7
CARBURETOR SYNCHRONIZATION 3-12
CHARGING SYSTEM INSPECTION 16-6
CLUTCH 9-3
CLUTCH LIFTER ARM 9-17
CLUTCH SYSTEM 3-23
CLUTCH SWITCH 19-19
COMBINATION METER 19-7
COOLANT REPLACEMENT 6-4
COOLANT TEMPERATURE GAUGE/THERMOSENSOR 19-12
COOLING FAN MOTOR SWITCH 19-14
COOLING SYSTEM 3-15
CRANKCASE ASSEMBLY 11-10
SEPARATION 11-3
CRANK PIN BEARING 12-6
CRANKSHAFT 12-3
CYLINDER COMPRESSION TEST 8-4
CYLINDER HEAD COVER ASSEMBLY 8-26
DISASSEMBLY 8-6
INSTALLATION 8-27
REMOVAL 8-4
CYLINDER HEAD ASSEMBLY 8-19
DISASSEMBLY 8-11
INSPECTION 8-12
INSTALLATION 8-20
REMOVAL 8-10
DELAY VALVE 15-26
DIODE 18-12
DRIVE CHAIN 3-16
DRIVE CHAIN SLIDER 3-20
EMISSION CONTROL SYSTEMS 1-28
ENGINE COOLANT TEMPERATURE (ECT) SENSOR 17-9
ENGINE DOES NOT START OR IS HARD TO START 21-1
ENGINE IDLE SPEED 3-14
ENGINE LACKS POWER 21-2
ENGINE OIL 3-10
ENGINE OIL FILTER 3-11
ENGINE INSTALLATION 7-6
REMOVAL 7-2
FLYWHEEL INSTALLATION 10-6
REMOVAL 10-3
FORK 13-18
FRONT BRAKE CALIPER 15-27
FRONT WHEEL 13-12
FRONT MASTER CYLINDER 15-13
FUEL FILTER 5-23
FUEL LINE 3-4
FUEL PUMP/FUEL CUT RELAY 19-23
FUEL TANK 2-10
GEARSHIFT LINKAGE 9-12
GENERAL SAFETY 1-1
HANDLEBAR 13-3
HANDLEBAR SWITCHES 19-16
HEADLIGHT 19-4
HEADLIGHT AIM 3-23
HORN 19-22
IGNITION COIL 17-6
IGNITION PULSE GENERATOR 17-7
IGNITION SYSTEM INSPECTION 17-4
IGNITION SWITCH 19-16
IGNITION TIMING 17-10
LICENSE LIGHT 19-6
LOW FUEL INDICATOR/FUEL RESERVE SENSOR 19-21
LUBRICATIONS & SEAL POINTS 1-18
LUBRICATION SYSTEM DIAGRAM 4-0
MAIN JOURNAL BEARING 12-4
MAINTENANCE SCHEDULE 3-3
MODEL IDENTIFICATION 1-3
MUFFLER/EXHAUST PIPE 2-8
NEUTRAL SWITCH 19-19
NUMBER PLATE BRACKET 2-4
NUTS, BOLTS, FASTENERS 3-25
OIL PRESSURE INSPECTION 4-4
OIL PRESSURE SWITCH 19-15
OIL PUMP 4-7
OIL STRAINER/PRESSURE RELIEF VALVE 4-5
PILOT SCREW ADJUSTMENT 5-20
PISTON/CYLINDER 12-9
POOR HANDLING 21-4
POOR PERFORMANCE AT HIGH SPEED 21-4
POOR PERFORMANCE AT LOW AND IDLE SPEED 21-3
POSITION LIGHT 19-4
PRIMARY DRIVE GEAR 9-14
PROPORTIONAL CONTROL VALVE 15-25
RADIATOR 6-6
RADIATOR COOLANT 3-14
RADIATOR RESERVE TANK 6-12
REAR BRAKE CALIPER 15-32
REAR CARRIER 2-3
REAR FENDER 2-3
REAR FENDER B 2-4
REAR MASTER CYLINDER 15-21
REAR WHEEL 14-3
REGULATOR/RECTIFIER 16-8

RIGHT CRANKCASE COVER INSTALLATION 9-16
REMOVAL 9-3
SEAT 2-2
SECONDARY AIR SUPPLY SYSTEM
(MAINTENANCE) 3-16
(FUEL SYSTEM) 5-22
SECONDARY MASTER CYLINDER 15-19
SERVICE RULES 1-2
SERVICE INFORMATION
(ALTERNATOR/STARTER CLUTCH) 10-1
(BATTERY/CHARGING SYSTEM) 16-1
(CLUTCH/GEARSHIFT LINKAGE) 9-1
(COOLING SYSTEM) 6-1
(CRANKCASE/TRANSMISSION) 11-1
(CRANKSHAFT/PISTON/CYLINDER) 12-1
(CYLINDER HEAD/VALVES) 8-1
(ELECTRIC STARTER) 18-1
(ENGINE REMOVAL/INSTALLATION) 7-1
(FRAME/BODY PANELS/EXHAUST SYSTEM) 2-1
(FRONT WHEEL/SUSPENSION/STEERING) 13-1
(FUEL SYSTEM) 5-1
(HYDRAULIC BRAKE) 15-1
(IGNITION SYSTEM) 17-1
(LIGHTS/METERS/SWITCHES) 19-1
(LUBRICATION SYSTEM) 4-2
(MAINTENANCE) 3-1
(REAR WHEEL/SUSPENSION) 14-1
SHIFT FORK/SHIFT DRUM 11-4
SHOCK ABSORBER 14-9
SIDE COVER 2-2
SIDE COWL 2-5
SIDE STAND 3-24
SIDE STAND SWITCH 19-20
SPARK PLUG 3-6
SPECIFICATIONS 1-4
SPEEDOMETER/SPEEDO SENSOR 19-10
STARTER CLUTCH 10-4
STARTER MOTOR 18-4
STARTER RELAY SWITCH 18-11
STATOR 10-2
STEERING HEAD BEARING 3-26
STEERING STEM 13-30
SUSPENSION 3-25
SUSPENSION LINKAGE 14-12
SWINGARM 14-15
SYSTEM DIAGRAM
(BATTERY/CHARGING SYSTEM) 16-0
(ELECTRIC STARTER) 18-0
(LIGHTS/METERS/SWITCHES) 19-0
(IGNITION SYSTEM) 17-0
SYSTEM FLOW PATTERN 6-0
SYSTEM TESTING 6-3
TACHOMETER 19-12
TAIL/BRAKE LIGHT 19-6
THERMOSTAT 6-12
THROTTLE OPERATION 3-4
THROTTLE SENSOR 17-7
TOOLS 1-14
TORQUE VALUES 1-12
TRANSMISSION 11-6
TROUBLESHOOTING
(ALTERNATOR/STARTER CLUTCH) 10-1
(BATTERY/CHARGING SYSTEM) 16-3
(CLUTCH/GEARSHIFT LINKAGE) 9-2
(COOLING SYSTEM) 6-2
(CRANKCASE/TRANSMISSION) 11-2
(CRANKSHAFT/PISTON/CYLINDER) 12-2
(CYLINDER HEAD/VALVES) 8-3
(ELECTRIC STARTER) 18-2
(FRAME/BODY PANELS/EXHAUST SYSTEM) 2-1
(FRONT WHEEL/SUSPENSION/STEERING) 13-2
(FUEL SYSTEM) 5-3
(HYDRAULIC BRAKE) 15-4
(IGNITION SYSTEM) 17-3
(LIGHTS/METERS/SWITCHES) 19-3
(LUBRICATION SYSTEM) 4-3
(REAR WHEEL/SUSPENSION) 14-2
TURN SIGNAL 19-5
TURN SIGNAL RELAY 19-22
UNDER COWL 2-7
UPPER COWL 2-6
VALVE CLEARANCE 3-8
VALVE GUIDE REPLACEMENT 8-14
VALVE SEAT INSPECTION/REFACING 8-15
WATER PUMP 6-15
WHEELS/TIRES 3-26
WIRING DIAGRAMS 20-1

To print chapters, click on the printer icon and fill in the page range.

1.	General Information	4 - 32
2.	Frame/Body panels/Exhaust	33 - 43
3.	Maintenance	44 - 69
4.	Lubrication system	70 - 80
5.	Fuel system	81 - 104
6.	Cooling system	105 - 126
7.	Engine removal/Installation	126 - 138
8.	Cylinder head/Valves	139 - 169
9.	Clutch/Gearshift linkage	170 - 188
10.	Alternator/Starter clutch	189 - 197
11.	Crankcase/Transmission	198 - 210
12.	Crankshaft/Piston/Cylinder	211 - 206
13.	Front wheel/Suspension/Steering	226 - 261
14.	Rear wheel/Suspension	262 - 283
15.	Hydraulic brake	284 - 321
16.	Battery/Charging system	322 - 331
17.	Ignition system	332 - 343
18.	Electric Starter	344 - 356
19.	Lights/Meters/Switches	357 - 382
20.	Wiring diagrams	383
21.	Troubleshooting	384 - 387
22.	Index	388 - 389

Note: Make sure to select √ Shrink to fit in the printer dialog box when printing wiring diagrams.