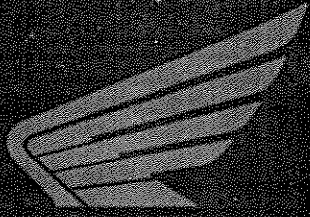


2002-2003



**HONDA**

**SERVICE MANUAL**

**CRF450R**



## ***A Few Words About Safety***

### **Service Information**

The service and repair information contained in this manual is intended for use by qualified, professional technicians. Attempting service or repairs without the proper training, tools, and equipment could cause injury to you or others. It could also damage the vehicle or create an unsafe condition.

This manual describes the proper methods and procedures for performing service, maintenance, and repairs. Some procedures require the use of specially designed tools and dedicated equipment. Any person who intends to use a replacement part, service procedure or a tool that is not recommended by Honda, must determine the risks to their personal safety and the safe operation of the vehicle.

If you need to replace a part, use genuine Honda parts with the correct part number or an equivalent part. We strongly recommend that you do not use replacement parts of inferior quality.

### **For Your Customer's Safety**

Proper service and maintenance are essential to the customer's safety and the reliability of the vehicle. Any error or oversight while servicing a vehicle can result in faulty operation, damage to the vehicle, or injury to others.

### **For Your Safety**

Because this manual is intended for the professional service technician, we do not provide warnings about many basic shop safety practices (e.g., hot parts—wear gloves). If you have not received shop safety training or do not feel confident about your knowledge of safe servicing practice, we recommend that you do not attempt to perform the procedures described in this manual.

Some of the most important general service safety precautions are given below. However, we cannot warn you of every conceivable hazard that can arise in performing service and repair procedures. Only you can decide whether or not you should perform a given task.

### **Important Safety Precautions**

Make sure you have a clear understanding of all basic shop safety practices and that you wear appropriate clothing and use safety equipment. When performing any service task, be especially careful of the following:

- Read all of the instructions before you begin, and make sure you have the tools, the replacement or repair parts, and the skills required to perform the tasks safely and completely.
- Protect your eyes by using proper safety glasses, goggles or face shields any time you hammer, drill, grind, pry or work around pressurized air or liquids, and springs or other stored-energy components. If there is any doubt, put on eye protection.
- Use other protective wear when necessary, for example gloves or safety shoes. Handling hot or sharp parts can cause severe burns or cuts. Before you grab something that looks like it can hurt you, stop and put on gloves.
- Protect yourself and others whenever you have the vehicle up in the air. Any time you lift the vehicle, either with a hoist or a jack, make sure it is always securely supported. Use jack stands.

Make sure the engine is turned off before you begin any servicing procedures, unless the instruction tells you to do otherwise.

This will help eliminate several potential hazards:

- Carbon monoxide poisoning from engine exhaust. Be sure there is adequate ventilation whenever you run the engine.
- Burns from hot parts or coolant. Let the engine and exhaust system cool before working in those areas.
- Injury from moving parts. If the instruction tells you to run the engine, be sure your hands, fingers and clothing are out of the way.

Gasoline vapors and hydrogen gases from batteries are explosive. To reduce the possibility of a fire or explosion, be careful when working around gasoline or batteries.

- Use only a nonflammable solvent, not gasoline, to clean parts.
- Never drain or store gasoline in an open container.
- Keep all cigarettes, sparks and flames away from the battery and all fuel-related parts.

### **⚠ WARNING**

Improper service or repairs can create an unsafe condition that can cause your customer or others to be seriously hurt or killed.

Follow the procedures and precautions in this manual and other service materials carefully.

### **⚠ WARNING**

Failure to properly follow instructions and precautions can cause you to be seriously hurt or killed.

Follow the procedures and precautions in this manual carefully.

# HOW TO USE THIS MANUAL

This service manual describes the service procedures for the CRF450R.

Follow the Maintenance Schedule (Section 3) recommendations (page 3-3) to ensure that the motorcycle is always 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 16 describe parts of the vehicle, grouped according to location.


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

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

If you do not know the source of the trouble, go to Section 18, Troubleshooting.

Your safety, and the safety of others, is very important. To help you make informed decisions we have provided safety messages and other information throughout this manual. Of course, it is not practical or possible to warn you about all the hazards associated with servicing this vehicle. You must use your own good judgement.

You will find important safety information in a variety of forms including:

- Safety Labels—on the vehicle.
- Safety Messages—preceded by a safety alert symbol  and one of three signal words, DANGER, WARNING, or CAUTION.

These signal words mean:

**DANGER** You WILL be KILLED or SERIOUSLY HURT if you don't follow instructions.

**WARNING** You CAN be KILLED or SERIOUSLY HURT if you don't follow instructions.

**CAUTION** You CAN be HURT if you don't follow instructions.

• Instructions—how to service this vehicle correctly and safely.

As you read this manual, you will find information that is preceded by a **NOTICE** symbol. The purpose of this message is to help prevent damage to your vehicle, other property, or the environment.

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 WHATSOEVER. 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

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## SYMBOLS

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

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

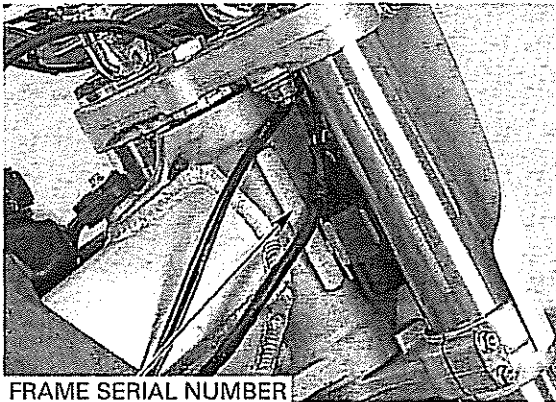
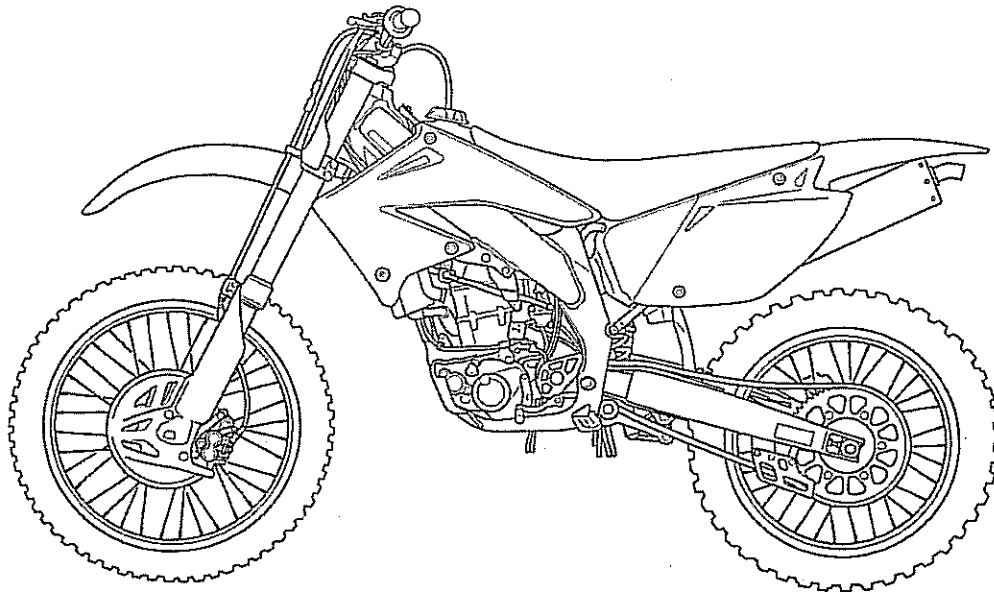
# 1. GENERAL INFORMATION

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## SERVICE RULES

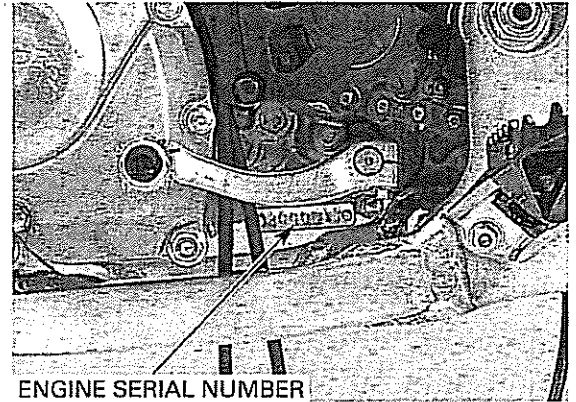
1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that do not meet HONDA's design specifications may cause damage to the motorcycle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the motorcycle. Metric bolts, nuts and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, and lock plates when reassembling.
5. When tightening bolts or nuts, begin with the larger diameter or inner bolt first. Then tighten to the specified torque diagonally in incremental steps unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as show on pages 1-18 through 1-21, Cable and Harness Routing.

**MODEL IDENTIFICATION**



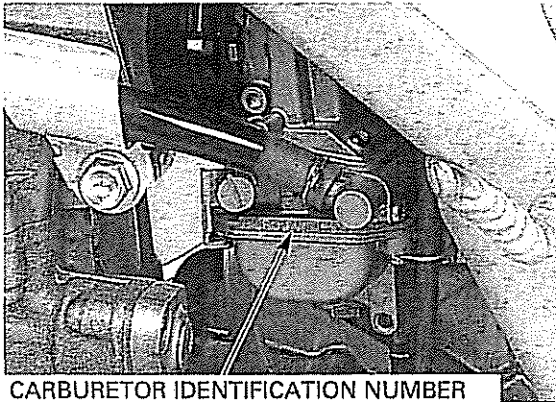
**FRAME SERIAL NUMBER**

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



**ENGINE SERIAL NUMBER**

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



**CARBURETOR IDENTIFICATION NUMBER**

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



## SPECIFICATIONS

## GENERAL

	ITEM	SPECIFICATION
DIMENSIONS	Overall length ('02)	2,187 mm (86.1 in)
	(After '02)	2,186 mm (86.1 in)
	Overall width	825 mm (32.5 in)
	Overall height ('02)	1,254 mm (49.4 in)
	(After '02)	1,257 mm (49.5 in)
	Wheelbase ('02)	1,488 mm (58.6 in)
	(After '02)	1,486 mm (58.5 in)
	Seat height ('02)	945 mm (37.2 in)
	(After '02)	953 mm (37.5 in)
	Footpeg height ('02)	420 mm (16.5 in)
	(After '02)	429 mm (16.9 in)
FRAME	Ground clearance ('02)	331 mm (13.0 in)
	(After '02)	337 mm (13.3 in)
	Dry weight ('02)	102.0 kg (225 lbs)
	(After '02)	103.1 kg (227 lbs)
	Frame type	Twin tube
	Front suspension	Telescopic fork
	Front suspension axle travel ('02)	270 mm (10.63 in)
	(After '02)	281 mm (11.06 in)
	Front suspension cushion stroke ('02)	305 mm (12.0 in)
	(After '02)	315 mm (12.4 in)
	Rear suspension	Pro-Link
	Rear wheel travel	314 mm (12.36 in)
	Rear damper	Decarbon type with nitrogen gas filled damper
Front tire size	80/100-21 51M, 80/100-21 M/C 51M	
Rear tire size	110/90-19 62M, 110/90-19 M/C 62M	
Tire brand (Dunlop)	Front: K490G/Rear: K695	
Front brake	Hydraulic single disc	
Front brake swept area	334.5 cm <sup>2</sup> (51.8 in <sup>2</sup> )	
Rear brake	Hydraulic single disc	
Rear brake swept area	391.1 cm <sup>2</sup> (60.6 in <sup>2</sup> )	
Caster angle ('02)	27°50'	
(After '02)	27°1'	
Trail length ('02)	114 mm (4.5 in)	
(After '02)	109 mm (4.3 in)	
Fuel tank capacity	7.4 liter (2.0 US gal, 1.6 Imp gal)	
Bore and stroke	96.0 x 62.1 mm (3.78 x 2.44 in)	
Displacement	449.4 cm <sup>3</sup> (27.42 cu-in)	
ENGINE	Compression ratio	11.5 : 1
	Valve train	Chain drive and OHC with rocker arm
	Intake valve opens _____	15° BTDC
	closes _____	50° ABDC
	Exhaust valve opens _____	55° BBDC
	closes ('02) _____	25° ATDC
	(After '02) _____	15° ATDC
	Lubrication system	Forced pressure and wet sump
	Oil pump type	Trochoid
	Cooling system	Liquid cooled
	Air filtration	Oiled polyurethan foam
	Crankshaft type	Assembled type
	Engine dry weight ('02)	29.5 kg (65.0 lbs)
	(After '02)	29.4 kg (64.8 lbs)
Cylinder arrangement	Single cylinder, inclined 6° from vertical	

## GENERAL INFORMATION

GENERAL (Cont'd)		
	ITEM	SPECIFICATION
CARBURETOR	Carburetor type Venturi diameter	Piston valve type Ø 40 mm (1.6 in)
DRIVE TRAIN	Clutch system Clutch operation system Transmission Primary reduction Final reduction Gear ratio 1st 2nd 3rd 4th 5th	Multi-plate, wet Cable operated Constant mesh, 5-speed 2.739 (63/23) 3.846 (50/13) 1.800 (27/15) 1.470 (25/17) 1.235 (21/17) 1.050 (21/20) 0.909 (20/22)
	Gearshift pattern	Left foot operated return system, 1-N-2-3-4-5
ELECTRICAL	Ignition system	CDI (Capacitive Discharge Ignition)



**GENERAL INFORMATION**

**FUEL SYSTEM**

ITEM		SPECIFICATIONS
Fuel tank capacity		7.4 liter (1.96 US gal, 1.63 Imp gal)
Carburetor identification number	'02	FCR00A
	After '02	FCR00B
Main jet	'02	#175
	After '02	#170
Slow jet	'02	#45
	After '02	#42
Jet needle	'02	OBEKR
	After '02	OBELR
Jet needle clip position (Standard)	'02	4th
	After '02	5th
Pilot screw initial opening	'02	1 - 1/4 turns out
	After '02	1 - 1/2 turns out
Float level		8.0 mm (0.31 in)
Idle speed		1,700 ± 100 rpm
Throttle grip free play		3 - 5 mm (1/8 - 1/4 in)
Hot starter lever free play		2 - 3 mm (1/16 - 1/8 in)

**LUBRICATION SYSTEM**

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Engine oil capacity	At draining	0.66 liter (0.70 US qt, 0.58 Imp qt)	—
	At filter change	0.69 liter (0.73 US qt, 0.61 Imp qt)	—
	At disassembly	0.85 liter (0.90 US qt, 0.75 Imp qt)	—
Transmission oil capacity	At draining	0.59 liter (0.62 US qt, 0.52 Imp qt)	—
	At disassembly	0.67 liter (0.71 US qt, 0.59 Imp qt)	—
Recommended engine oil		Pro Honda GN4, HP4 (without molybdenum additives) or HP4M (with molybdenum additives) 4-stroke oil, or equivalent motor oil API service classification: SG or Higher JASO T 903 standard: MA or MB viscosity: SEA 10W-40	—
Recommended transmission oil		Pro Honda HP Trans Oil, Pro Honda GN4 or HP4 (without molybdenum additives) 4-stroke oil an or equivalent API service classification: SG or Higher JASO T 903 standard: MA Viscosity: SAE 10 W-40	—
Oil pump rotor	Tip clearance	0.15 (0.006)	0.20 (0.008)
	Body clearance	0.15—0.21 (0.006—0.008)	—
	Side clearance	0.05—0.13 (0.002—0.005)	—

**COOLING SYSTEM**

ITEM		SPECIFICATIONS
Coolant capacity	At change	1.03 liter (1.09 US qt, 0.91 Imp qt)
	At disassembly	1.12 liter (1.18 US qt, 0.99 Imp qt)
Radiator cap relief pressure		108 - 137 kPa (1.1 - 1.4 kgf/cm <sup>2</sup> , 16 - 20 psi)
Recommended antifreeze		PRO HONDA HP Coolant or an equivalent high quality ethylene glycol antifreeze containing silicate-free corrosion inhibitors.
Standard coolant concentration		1 : 1 mixture with distilled water

## GENERAL INFORMATION

CYLINDER HEAD/VALVES				Unit: mm (in)		
ITEM			STANDARD		SERVICE LIMIT	
Cylinder compression			441 kPa (4.5 kgf/cm <sup>2</sup> , 64 psi) at 600 rpm		—	
Cylinder head warpage			—		0.05 (0.002)	
Valve and valve guide	Valve clearance	IN	0.16 ± 0.03 mm (0.0063 ± 0.0012 in)		—	
		EX	0.28 ± 0.03 mm (0.0110 ± 0.0012 in)		—	
	Valve stem O.D.	IN	5.475 — 5.490 (0.2156 — 0.2161)		—	
		EX	4.965 — 4.980 (0.1955 — 0.1961)		4.96 (0.195)	
	Valve guide I.D.	IN	5.500 — 5.512 (0.2166 — 0.2170)		5.552 (0.2186)	
		EX	5.000 — 5.012 (0.1969 — 0.1973)		5.052 (0.1989)	
	Stem-to-guide clearance	IN	0.010 — 0.037 (0.0004 — 0.0015)		—	
		EX	0.020 — 0.047 (0.0008 — 0.0019)		—	
	Valve guide projection above cylinder head	IN	16.1 — 16.3 (0.63 — 0.64)		—	
		EX	17.9 — 18.1 (0.70 — 0.71)		—	
Valve seat width	IN	1.1 — 1.3 (0.043 — 0.051)		2.0 (0.08)		
	EX	1.3 — 1.5 (0.051 — 0.059)		2.0 (0.08)		
Valve spring free length	IN	40.68 (1.602)		39.7 (1.56)		
	EX	43.16 (1.699)		42.2 (1.66)		
Rocker arm	Rocker arm I.D.		12.000 — 12.018 (0.4724 — 0.4731)		12.05 (0.474)	
	Rocker arm shaft O.D.		11.967 — 11.975 (0.4711 — 0.4715)		11.92 (0.469)	
	Rocker arm-to-shaft clearance		0.025 — 0.051 (0.001 — 0.002)		0.10 (0.004)	
Camshaft	Cam lobe height	IN	'02	37.540 — 37.750 (1.4779 — 1.4862)		37.39 (1.472)
			After '02	37.540 — 37.780 (1.4779 — 1.4874)		37.39 (1.472)
	EX	'02	35.452 — 35.692 (1.3957 — 1.4052)		35.30 (1.390)	
		After '02	35.187 — 35.427 (1.3853 — 1.3948)		35.04 (1.380)	
Valve lifter O.D.			25.978 — 25.993 (1.0228 — 1.0233)		25.97 (1.022)	
Valve lifter bore O.D.			26.010 — 26.026 (1.0240 — 1.0246)		26.04 (1.025)	

CYLINDER/PISTON				Unit: mm (in)	
ITEM			STANDARD		SERVICE LIMIT
Cylinder	I.D.		96.000 — 96.015 (3.7795 — 3.7801)		96.05 (3.781)
	Out-of-round		—		0.010 (0.0004)
	Taper		—		0.010 (0.0004)
	Warpage		—		0.05 (0.002)
Piston, piston ring	Piston mark direction		"IN" mark facing toward the intake side		—
	Piston O.D.		95.970 — 95.980 (3.7783 — 3.7787)		95.87 (3.774)
	Piston O.D. measurement point		7.0 mm (0.27 in) from the bottom of skirt		—
	Piston pin bore I.D.		19.002 — 19.008 (0.7481 — 0.7483)		19.03 (0.749)
	Piston pin O.D.		18.994 — 19.000 (0.7478 — 0.7480)		18.98 (0.747)
	Piston-to-piston pin clearance		0.002 — 0.014 (0.0001 — 0.0006)		0.04 (0.002)
	Top ring mark		"R" mark side facing up		—
	Piston ring-to-ring groove clearance	Top	0.065 — 0.100 (0.0026 — 0.0039)		0.115 (0.0045)
	Piston ring end gap	Top	0.25 — 0.31 (0.010 — 0.012)		0.45 (0.018)
Oil (side rail)		0.20 — 0.70 (0.008 — 0.028)		0.90 (0.035)	
Cylinder-to-piston clearance			0.020 — 0.045 (0.0008 — 0.0018)		0.18 (0.007)
Connecting rod small end I.D.			19.016 — 19.034 (0.7487 — 0.7494)		19.04 (0.750)
Connecting rod-to-piston pin clearance			0.016 — 0.040 (0.0006 — 0.0016)		0.06 (0.002)

GENERAL INFORMATION

Unit: mm (in)

CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE		STANDARD	SERVICE LIMIT
ITEM			
Clutch lever free play		10 — 20 (3/8 — 3/4)	—
Clutch spring free length		45.7 (1.80)	44.7 (1.76)
Clutch disc thickness		2.92 — 3.08 (0.115 — 0.121)	2.85 (0.112)
Clutch plate warpage		—	0.15 (0.006)
Kickstarter pinion gear I.D.		22.007 — 22.028 (0.8664 — 0.8672)	22.05 (0.868)
Kickstarter spindle O.D.		21.959 — 21.980 (0.8645 — 0.8654)	21.95 (0.864)
Kickstarter idle gear I.D.		20.020 — 20.041 (0.7882 — 0.7890)	20.07 (0.790)
Kickstarter idle gear bushing	I.D.	17.000 — 17.018 (0.6693 — 0.6700)	17.04 (0.671)
	O.D.	19.979 — 20.000 (0.7866 — 0.7874)	19.96 (0.786)
Countershaft O.D. at kickstarter idle gear		16.966 — 16.984 (0.6680 — 0.6687)	16.95 (0.667)

Unit: mm (in)

CRANKCASE/CRANKSHAFT/TRANSMISSION			STANDARD	SERVICE LIMIT
ITEM				
Crankshaft	Side clearance		0.30 — 0.55 (0.01 — 0.02)	0.7 (0.03)
	Radial clearance		0.006 — 0.018 (0.0002 — 0.0007)	0.05 (0.002)
	Runout	R	—	0.03 (0.001)
L		—	0.05 (0.002)	
Transmission	Gear I.D.	M4	28.007 — 28.028 (1.1026 — 1.1035)	28.05 (1.104)
		M5	25.020 — 25.041 (0.9850 — 0.9859)	25.07 (0.987)
		C1	22.020 — 22.041 (0.8669 — 0.8678)	22.07 (0.869)
		C2	30.020 — 30.041 (1.1819 — 1.1827)	30.07 (1.184)
		C3	25.020 — 25.041 (0.9850 — 0.9859)	25.07 (0.987)
	Bushing O.D.	M4	27.959 — 27.980 (1.1007 — 1.1015)	27.94 (1.100)
		C1	21.979 — 22.000 (0.8653 — 0.8661)	21.95 (0.864)
		C2	29.979 — 30.000 (1.1802 — 1.1811)	29.95 (1.179)
	Bushing I.D.	C1	19.000 — 19.021 (0.7480 — 0.7489)	19.04 (0.750)
		C2	27.000 — 27.021 (1.0630 — 1.0638)	27.04 (1.064)
	Gear-to-bushing clearance	M4	0.027 — 0.069 (0.0011 — 0.0027)	0.11 (0.004)
		C1	0.020 — 0.062 (0.0008 — 0.0024)	0.12 (0.005)
		C2	0.020 — 0.062 (0.0008 — 0.0024)	0.12 (0.005)
	Mainshaft O.D.	M5	24.959 — 24.980 (0.9826 — 0.9835)	24.94 (0.982)
	Countershaft O.D.	C1 bushing	18.959 — 18.980 (0.7464 — 0.7472)	18.94 (0.746)
C2 bushing		26.959 — 26.980 (1.0614 — 1.0622)	26.94 (1.061)	
C3		24.959 — 24.979 (0.9826 — 0.9834)	24.96 (0.983)	
Gear-to-shaft clearance	M5	0.040 — 0.082 (0.0016 — 0.0032)	0.13 (0.005)	
	C3	0.041 — 0.082 (0.0016 — 0.0032)	0.11 (0.004)	
Shift fork, shaft	Bushing-to-shaft clearance	C1	0.020 — 0.062 (0.0008 — 0.0024)	0.12 (0.005)
		C2	0.020 — 0.062 (0.0008 — 0.0024)	0.12 (0.005)
	Fork claw thickness		4.93 — 5.00 (0.194 — 0.197)	4.8 (0.19)
	Shift fork I.D.	C	11.003 — 11.024 (0.4332 — 0.4340)	11.04 (0.435)
		R/L	12.035 — 12.056 (0.4738 — 0.4746)	12.07 (0.475)
	Fork shaft O.D.	C	10.983 — 10.994 (0.4324 — 0.4328)	10.97 (0.432)
R/L		11.966 — 11.984 (0.4711 — 0.4718)	11.95 (0.470)	

## GENERAL INFORMATION

FRONT WHEEL/SUSPENSION/STEERING			Unit: mm (in)	
ITEM		STANDARD	SERVICE LIMIT	
Cold tire pressure		100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	—	
Axle runout		—	0.20 (0.008)	
Wheel rim runout	Radial	—	2.0 (0.08)	
	Axial	—	2.0 (0.08)	
Wheel hub-to-rim distance		27.25 (1.073)	—	
Fork	Spring free length	495 (19.5)	488 (19.2)	
	Tube runout	—	0.20 (0.008)	
	Recommended fork oil	Pro-Honda HP Fork Oil 5W or equivalent		
	Fluid capacity (Fork tube)	'02	425 cm <sup>3</sup> (14.37 US oz, 14.25 Imp oz)	—
		After '02	412 cm <sup>3</sup> (13.93 US oz, 13.81 Imp oz)	—
Compression damping adjuster standard position	'02	11 clicks out from full in		—
	After '02	8 clicks out from full in		—
Rebound damping adjuster standard position	'02	14 clicks out from full in		—
	after '02	10 clicks out from full in		—

REAR WHEEL/SUSPENSION			Unit: mm (in)	
ITEM		STANDARD	SERVICE LIMIT	
Cold tire pressure		100 kPa (1.0 kgf/cm <sup>2</sup> , 15 psi)	—	
Axle runout		—	0.20 (0.008)	
Wheel rim runout	Radial	—	2.0 (0.08)	
	Axial	—	2.0 (0.08)	
Wheel hub-to-rim distance		45.5 (1.791)	—	
Drive chain slack		25 — 35 (1.0 — 1.4)	—	
Drive chain size/link	DID	520DMA2 — 114		
Drive chain slider thickness		—	5 (0.2)	
Drive chain tensioner roller O.D.		—	39 (1.54)	
Shock absorber	Damper gas pressure		981 kPa (10.0 kg/cm <sup>2</sup> , 142 psi)	—
	Damper compressed gas		Nitrogen gas	
	Damper rod compressed force at 12 mm compressed		20.0 — 24.0 kgf (44.1 — 52.9 lbf)	
	Spring installed length (standard)	'02	256 (10.1)	
After '02		258.2 (10.2)		—
High speed side compression damping adjuster standard position	'02	1 — 1 - 1/2 turns out from full in		—
	After '02	1 - 1/2 — 2 turns out from full in		—
Low speed side compression damping adjuster standard position	'02	8 clicks out from full in		—
	After '02	7 clicks out from full in		—
Rebound damping adjuster standard position	'02	11 — 14 clicks out from full in		—
	After '02	9 — 12 clicks out from full in		—

GENERAL INFORMATION

Unit: mm (in)

HYDRAULIC BRAKE			
ITEM		STANDARD	SERVICE LIMIT
Front	Brake fluid	DOT4	—
	Brake pad wear indicator	—	1.0 (0.04)
	Brake disc thickness	3.0 (0.12)	2.5 (0.10)
	Brake disc runout	—	0.15 (0.006)
	Master cylinder I.D.	11.00 (0.433)	—
	Caliper cylinder I.D.	27.00 (1.063)	—
Rear	Brake fluid	DOT4	—
	Brake pad wear indicator	—	1.0 (0.04)
	Brake disc thickness	4.0 (0.16)	3.5 (0.14)
	Brake disc runout	—	0.15 (0.006)
	Master cylinder I.D.	9.52 (0.375)	—
	Caliper cylinder I.D.	22.65 (0.892)	—

IGNITION SYSTEM			
ITEM			SPECIFICATIONS
Spark plug	Standard	(NGK)	IFR8H11
		(DENSO)	VK24PRZ11
	Optional	(NGK)	IFR9H11
		(DENSO)	VK27PRZ11
Spark plug gap			1.0 — 1.1 mm (0.039 — 0.043 in)
Ignition coil resistance (at 20 °C/68 °F)	Primary		0.1 — 0.3 Ω
	Secondary with plug cap		9 — 16 kΩ
	Secondary without plug cap		4 — 8 kΩ
Ignition coil peak voltage			100 V minimum
Ignition pulse generator resistance (at 20 °C/68 °F)			180 — 280 Ω
Ignition pulse generator peak voltage			0.7 V minimum
Alternator exciter coil resistance (at 20 °C/68 °F)			9 — 25 Ω
Alternator exciter coil peak voltage			50 V minimum
Ignition timing ("F" mark)			8° ± 2° BTDC at 1,500 rpm
Throttle position sensor resistance (at 20 °C/68 °F)			4 — 6 kΩ

## GENERAL INFORMATION

### TORQUE VALUES

FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)	FASTENER TYPE	TORQUE N·m (kgf·m, lbf·ft)
5 mm bolt and nut	5 (0.5, 3.6)	4 mm screw	2.9 (0.3, 2.2)
6 mm bolt and nut	9.8 (1.0, 7)	5 mm screw	4 (0.4, 2.9)
8 mm bolt and nut	22 (2.2, 16)	6 mm screw	8.8 (0.9, 6.5)
10 mm bolt and nut	34 (3.5, 25)	6 mm flange bolt and nut	12 (1.2, 9)
12 mm 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 the standard torque values listed above.

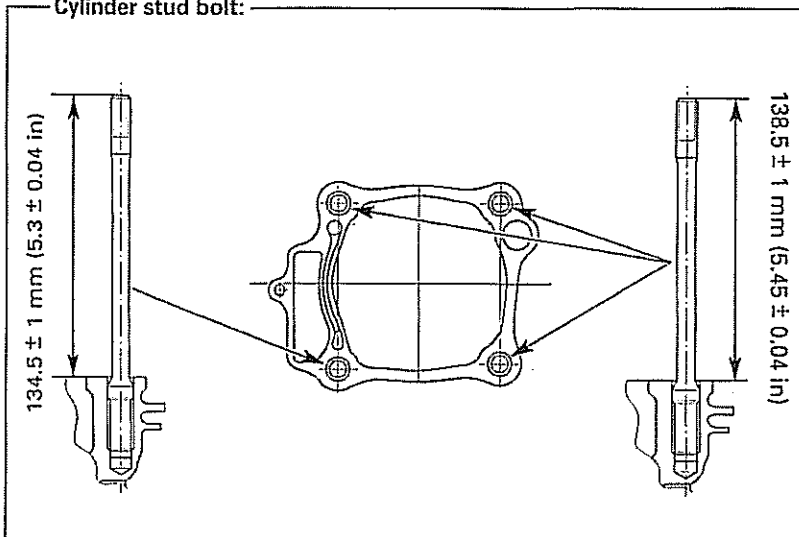
- NOTES:
1. Apply a locking agent to the threads.
  2. Apply oil to the threads and flange surface.
  3. Stake.
  4. U-nut.
  5. UBS nut.
  6. SH bolt.
  7. Alock bolt.

ENGINE	ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>MAINTENANCE:</b>					
	Engine oil drain bolt	1	8	22 (2.2, 16)	
	Transmission oil drain bolt	1	8	22 (2.2, 16)	
	Oil filter cover bolt	2	6	9.8 (1.0, 7)	
	Timing hole cap	1	14	9.8 (1.0, 7)	
	Crankshaft hole cap	1	30	15 (1.5, 11)	
	Spark plug	1	14	18 (1.8, 11)	
	Oil check bolt	1	6	9.8 (1.0, 7)	
<b>LUBRICATION SYSTEM:</b>					
	Left crankcase cover bolt	1	6	9.8 (1.0, 7)	
<b>FUEL SYSTEM:</b>					
	Throttle drum cover bolt	1	5	4 (0.4, 2.9)	
	Needle jet	1	7	2 (0.2, 1.4)	
	Main jet	1	5	1.5 (0.15, 1.1)	
	Slow jet	1	10	1.5 (0.15, 1.1)	
	Top cover bolt	2	4	2 (0.2, 1.4)	
	Throttle shaft screw	1	4	2 (0.2, 1.4)	
	Float chamber screw	4	4	2 (0.2, 1.4)	
	Accelerator cover screw	3	4	2 (0.2, 1.4)	
	Carburetor drain plug	1	18	4.9 (0.5, 3.6)	
	Choke valve lock nut	1	12	2 (0.2, 1.4)	
	Hot start valve lock nut	1	—	2 (0.2, 1.4)	
	Float valve seat set screw	1	3	2 (0.2, 1.4)	
	Needle holder	1	8	2 (0.2, 1.4)	
	Throttle position sensor mounting screw	1	5	4 (0.4, 1.4)	
<b>COOLING SYSTEM:</b>					
	Water pump impeller	1	7	12 (1.2, 9)	
	Water pump cover bolt	3	6	12 (1.2, 9)	
	Coolant drain bolt	1	6	10 (1.0, 7)	

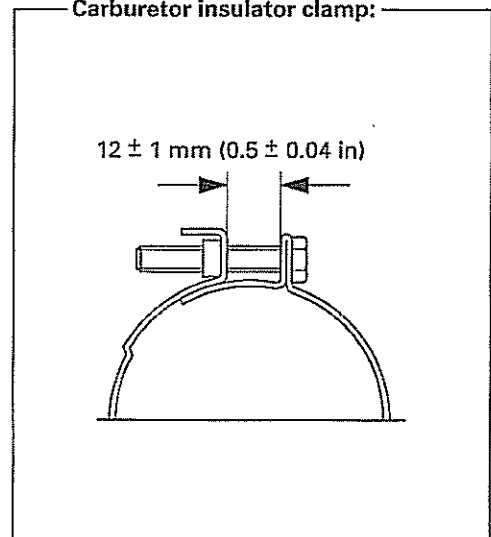
NOTE 1

ENGINE (cont'd) ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>CYLINDER HEAD:</b>				
Cylinder head cover bolt	3	6	9.8 (1.0, 7.2)	
Camshaft holder mounting bolt	4	6	14 (1.4, 10)	NOTE 2
Cam sprocket bolt	2	7	20 (2.0, 15)	NOTE 1
Decompressor lifter arm mounting nut	1	8	22 (2.2, 16)	NOTE 2
Decompressor cam mounting bolt	1	8	24 (2.5, 18)	NOTE 2
Decompressor adjuster lock nut	1	5	9.8 (1.0, 7)	NOTE 2
Cylinder head nut	4	10	59 (6.0, 43)	NOTE 2
Cylinder head mounting bolt	2	6	9.8 (1.0, 7)	
Cam chain tensioner bolt	1	6	12 (1.2, 9)	NOTE 2
<b>CYLINDER/PISTON</b>				
Cylinder mounting bolt	1	6	9.8 (1.0, 7)	
Cam chain tensioner lifter mount bolt	2	6	12 (1.2, 9)	
<b>CLUTCH/KICKSTARTER/GEARSHIFT LINKAGE:</b>				
Gearshift drum center pin	1	8	22 (2.2, 16)	
Gearshift drum stopper arm bolt	1	6	12 (1.2, 9)	
Clutch center lock nut	1	18	80 (8.2, 59)	NOTE 2
Clutch spring bolt	5	6	12 (1.2, 9)	
Gearshift return spring pin	1	8	22 (2.2, 16)	
Gearshift pedal pinch bolt	1	6	12 (1.2, 9)	
Kickstarter pedal bolt	1	8	37 (3.8, 27)	
<b>CRANKCASE/CRANKSHAFT/ TRANSMISSION /BALANCER:</b>				
Crankshaft bearing set plate screws	2	6	9.8 (1.0, 7)	
Countershaft bearing set plate screws	2	6	9.8 (1.0, 7)	
Gearshift drum bearing set plate bolts	2	6	9.8 (1.0, 7)	
Mainshaft bearing set plate screws	2	6	9.8 (1.0, 7)	
Drive sprocket bolt	1	8	26 (2.7, 20)	
Primary drive gear bolt	1	12	108 (11.0, 80)	NOTE 2
Balancer shaft nut	1	14	44 (4.5, 33)	NOTE 2
Oil jet	1	5	2.0 (0.2, 1.4)	
<b>ALTERNATOR:</b>				
Flywheel nut	1	12	64 (6.5, 47)	NOTE 2
Pulse generator mount bolt	2	5	5.4 (0.55, 4.0)	NOTE 1
Stator mount screw	3	4	2.0 (0.2, 1.4)	NOTE 1

Cylinder stud bolt:



Carburetor insulator clamp:





**GENERAL INFORMATION**

FRAME	ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N-m (kgf-m, lbf-ft)	REMARKS
<b>FRAME/BODY PANELS/EXHAUST SYSTEM:</b>					
	Seat mounting bolt	2	8	26 (2.7, 19)	
	Sub-frame mounting bolt (upper)	1	8	30 (3.1, 22)	
	(lower)	2	10	49 (5.0, 36)	
	Seat bracket screw	1	5	5.9 (0.6, 4.3)	
	Muffler joint band bolt	1	8	21 (2.1, 15)	
	Exhaust pipe joint nut	2	8	21 (2.1, 15)	
	Step bracket (upper)	2	12	54 (5.5, 40)	NOTE 1
	(lower)	2	8	30 (3.1, 22)	NOTE 1
	Rear fender mount bolt (frame side)	2	6	13 (1.3, 9)	
<b>ENGINE MOUNTING:</b>					
	Front engine hanger plate nut (engine side)	1	10	54 (5.5, 40)	
	(frame side)	2	8	26 (2.7, 20)	
	Lower engine mounting nut	1	10	54 (5.5, 40)	
	Upper engine mount nut	1	10	54 (5.5, 40)	
	Upper engine hanger plate bolt				
	'02: (front)	2	8	26 (2.7, 20)	
	(rear)	2	8	29 (3.0, 22)	
	After '02:	4	8	26 (2.7, 20)	
<b>FRONT WHEEL/SUSPENSION/STEERING:</b>					
	Front axle nut	1	16	88 (9.0, 65)	
	Front axle holder bolt	4	8	20 (2.0, 14)	
	Front spoke nipple	36	BC 3.5	3.8 (0.38, 2.8)	
	Front rim lock	1	8	13 (1.3, 9)	NOTE 4
	Front brake disc nut	6	6	16 (1.6, 12)	
	Steering stem nut	1	26	108 (11.0, 80)	
	Steering stem adjust nut	1	30	6.9 (0.7, 5.1)	
	Fork tube pinch bolt (top)	4	8	22 (2.2, 16)	
	(bottom)	4	8	20 (2.0, 14)	
	Fork cap	2	39	29 (3.0, 22)	
	Fork center bolt	2	30	69 (7.0, 51)	
	Fork center bolt lock nut	2	12	22 (2.2, 16)	
	Pressure release screw	2	5	1.2 (0.12, 0.9)	
	Fork damper	2	50	34 (3.5, 25)	NOTE 7
	Fork protector mounting bolt	6	6	6.9 (0.7, 5.1)	
	Front brake disc cover bolt	2	6	13 (1.3, 9)	
	Brake lever adjust lock nut	1	5	5.9 (0.6, 4.3)	
	Handlebar upper holder bolt	4	8	22 (2.2, 16)	
	Handlebar lower holder nut	4	10	44 (4.5, 33)	
	Brake lever pivot bolt/nut	1	6	5.9 (0.6, 4.3)	
	Clutch lever pivot bolt	1	6	2.0 (0.2, 1.4)	
	Clutch lever pivot nut	1	6	9.8 (1.0, 8)	
	Clutch lever holder bolt	2	6	8.8 (0.9, 6.5)	
	Throttle housing bolt	2	6	8.8 (0.9, 6.5)	
	Engine stop switch screw	1	4	1.5 (0.15, 1.1)	

**GENERAL INFORMATION**

<b>FRAME (cont'd)</b>				
ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kgf·m, lbf·ft)	REMARKS
<b>REAR WHEEL/SUSPENSION:</b>				
Rear axle nut	1	22	127 (13.0, 94)	NOTE 4
Rear wheel spoke	32	4.5	3.8 (0.38, 2.8)	
Rear rim lock	1	8	13 (1.3, 9)	
Rear brake disc nut	6	4	16 (1.6, 12)	NOTE 4
Driven sprocket nut	6	8	32 (3.3, 24)	NOTE 4
Rear wheel bearing retainer	1	50	44 (4.5, 33)	
Swingarm pivot nut	1	14	88 (9.0, 65)	NOTE 4
Shock arm (swingarm side)	1	12	79 (8.1, 59)	
(shock link side)	1	12	79 (8.1, 59)	
Shock link (frame side)	1	12	79 (8.1, 59)	NOTE 4
Shock absorber mounting bolt/nut (upper)	1	10	44 (4.5, 33)	NOTE 4
(lower)	1	10	44 (4.5, 33)	NOTE 4
Shock absorber spring lock nut	1	60	44 (4.5, 33)	
Drive chain slider screw	3	5	4 (0.4, 2.9)	NOTE 1
Drive chain roller bolt/nut	2	8	12 (1.2, 9)	NOTE 4, 6
Drive chain guide mounting bolt/nut	3	6	12 (1.2, 9)	NOTE 4
Drive chain adjusting bolt lock nut	2	8	27 (2.8, 20)	NOTE 5
Shock absorber damper rod end nut	1	12	37 (3.8, 27)	
Shock absorber damping adjuster	1	27	29 (3.0, 22)	
<b>HYDRAULIC BRAKE:</b>				
Brake hose oil bolt	4	10	34 (3.5, 25)	
Brake lever adjuster lock nut	1	5	5.9 (0.6, 4.3)	
Brake lever pivot bolt/nut	1	6	5.9 (0.6, 4.3)	
Front brake hose guide bolt	1	6	5.2 (0.53, 3.8)	
Rear brake hose guide screw	6	5	1.2 (0.12, 0.9)	
Front master cylinder reservoir cover screw	2	5	2 (0.2, 1.4)	
Front master cylinder holder bolt	2	6	9.8 (1.0, 7)	
Front caliper mounting bolt	2	8	30 (3.1, 22)	NOTE 7
Caliper bleed valve	2	8	5.4 (0.55, 4.0)	
Rear master cylinder mounting bolt	2	6	13 (1.3, 9)	
Rear master cylinder reservoir cover bolt	2	6	1.5 (0.15, 1.1)	
Front caliper pin bolt	1	8	22 (2.2, 16)	NOTE 1
Rear caliper pin bolt	1	12	27 (2.8, 20)	
Brake caliper pad pin	2	10	18 (1.8, 13)	
Front brake caliper pad pin plug	1	10	2 (0.2, 1.4)	
Front caliper bracket pin bolt	1	8	22 (2.2, 16)	NOTE 1
Rear caliper bracket pin bolt	1	8	12 (1.2, 9)	NOTE 1
Brake pedal pivot bolt	1	8	26 (2.7, 20)	
Rear master cylinder joint nut	1	6	5.9 (0.6, 4.3)	
Rear brake disc cover bolt	2	6	12 (1.2, 9)	

# GENERAL INFORMATION

## TOOLS

- NOTES: 1. Newly provided tool.  
 2. Equivalent commercially available in U.S.A.  
 3. Not available in U.S.A.  
 4. Alternative tool.  
 5. U.S.A. only tool.

DESCRIPTION	TOOL NUMBER	REMARKS
Wheel spoke wrench, 6.1 mm	07JMA - MR60100	NOTE 2 or 07701 - 0020300 (6.1 mm)
Wheel spoke wrench, 6.6 mm	070MA - KZ30100	NOTE 1, NOTE 2
Lock nut wrench, 8 x 9 mm	07708 - 0030100	
Valve adjusting wrench	07708 - 0030300	
Float level gauge	07401 - 0010000	
Bearing remover set	07936 - 1660101	
— remover head, 12 mm	07936 - 1660110	NOTE 3 — 07936-1660104
— remover shaft	07936 - 1660120	NOTE 3 —
— remover weight	07741 - 0010201	NOTE 4
Bearing remover, 12 mm	07936-166010A	NOTE 5
Remover handle	07936-3710100	
Remover weight	07936-371020A	NOTE 5 or 07936-3710200
Driver	07749 - 0010000	
Attachment, 32 x 35 mm	07746 - 0010100	
Attachment, 37 x 40 mm	07746 - 0010200	
Attachment, 42 x 47 mm	07746 - 0010300	
Attachment, 52 x 55 mm	07746 - 0010400	
Attachment, 62 x 68 mm	07746 - 0010500	
Attachment, 24 x 26 mm	07746 - 0010700	
Attachment, 28 x 30 mm	07946 - 1870100	
Pilot, 12 mm	07746 - 0040200	
Pilot, 17 mm	07746 - 0040400	
Pilot, 20 mm	07746 - 0040500	
Pilot, 25 mm	07746 - 0040600	
Pilot, 30 mm	07746 - 0040700	
Pilot, 40 mm	07746 - 0040900	
Pilot, 22 mm	07746 - 0041000	
Pilot, 19 mm	07746 - 0041400	
Water seal driver	07945 - KA30000	NOTE 4: 07965-41500A
Valve spring compressor	07757 - 0010000	
Valve spring compressor attachment	07959 - KM30101	
Valve guide remover, 5 mm	07942 - MA60000	
Valve guide remover, 5.5 mm	07742 - 0010100	
Valve guide driver	07743 - 0020000	NOTE 3
Valve guide reamer, 5.0 mm	07984 - MA60001	or 07984-MA6000D
Valve guide reamer, 5.5 mm	07984 - 2000001	or 07984-200000D
Valve seat cutter		
seat cutter, 35 mm (45° IN)	07780 - 0010400	NOTE 2
33 mm (45° EX)	07780 - 0010800	NOTE 2
flat cutter, 36 mm (32° IN)	07780 - 0013500	NOTE 2
33 mm (32° EX)	07780 - 0012900	NOTE 2
interior cutter, 37.5 mm (60° IN)	07780 - 0014100	NOTE 2
34 mm (60° EX)	07780 - 0014700	NOTE 2
cutter holder, 5.5 mm	07781 - 0010101	NOTE 2 * IN side
cutter holder, 5.0 mm	07781 - 0010400	NOTE 2 * EX side
Clutch center holder	07724 - 0050001	NOTE 2 or 07724-0050002

GENERAL INFORMATION

DESCRIPTION	TOOL NUMBER	REMARKS
Remover handle	07936 - 3710100	
Bearing remover, 20 mm	07936 - 3710600	
Bearing remover, 17 mm	07936 - 3710300	
Lock nut wrench, 20 x 24 mm	07716 - 0020100	
Extension bar	07716 - 0020500	NOTE 2
Bearing remover shaft	07746 - 0050100	
Bearing remover shaft	07GGD - 0010100	
Bearing remover head, 20 mm	07746 - 0050600	
Bearing remover head, 25 mm	07746 - 0050800	
Fork seal driver, 47 x 58 mm	07VMD - KZ30100	or 07VMD - KZ3010A
Lock nut wrench, 50 mm	07WMA - KZ30100	
Piston base	07958 - 2500001	
Steering stem socket	07916 - 3710101	NOTE 4 or 07702 - 0020001
Bearing race remover	07946 - 3710500	
Bearing race installer	07VMF - KZ30100	
Installer shaft	07VMF - KZ30200	
Attachment, 30 mm I.D.	07746 - 0030300	
Retainer wrench body	07710 - 0010200	
Retainer wrench, 48 x 15 mm	07YMA - KZ40100	NOTE 1 or 07HMA - KS70100 (U.S.A. only)
Pin spanner	07702 - 0020001	2 REQUIRED
Slider guide, 16 mm	07PMG - KZ40100	NOTE 3
Spherical bearing driver	07946-KA30200	
Piston ring guide	070MG - KZ30100	NOTE 1
Driver	07949 - 3710001	
Snap ring pliers	07914 - SA50001	NOTE 4
Gear holder M2.5	07724 - 0010100	07724-001A100 (U.S.A. only)
Gear holder M1.5	07724 - 0010200	07724-001A200 (U.S.A. only)
Peak voltage adapter	07HGJ - 0020100	NOTE 2
Universal holder	07725 - 0030000	
Flywheel puller	07933-1480000	NOTE 5 or 07AMC-MEBA100 (U.S.A. only)
Flywheel puller adaptor	07943-MF50200	
Flywheel holder	07725 - 0040000	NOTE 2

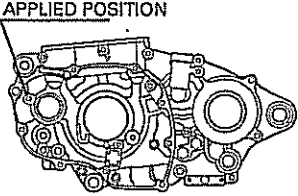
**GENERAL INFORMATION**

**LUBRICATION & SEAL POINTS**



ENGINE		
LOCATION	MATERIAL	REMARKS
Camshaft journal and lobes Rocker arm slipper surfaces Decompressor cam sliding surface Valve stem (valve guide sliding surfaces) Valve stem end sliding surface Valve lifter outer surface Clutch outer guide sliding surfaces Clutch lifter lever cam area Kickstarter pinion sliding surfaces Kick spindle spline area and gear rolling area Kick pinion inner surface Connecting rod small end inner surface Mainshaft spline area and sliding surface Countershaft spline area and sliding surface Transmission gear and sliding surfaces Shift fork gear guide area Shift fork shafts outer surface	Use molybdenum solution (mixture of the engine oil and molybdenum grease with the ratio 100g : 70 cc)	
Rocker arm shaft sliding surface Decompressor arm shaft sliding surface Camshaft bearings Camshaft holder mounting bolt threads Decompressor mounting bolt threads Cam chain Cylinder head nut threads and seating surfaces Balancer weight nut thread Piston outer surface and piston pin hole Piston pin outer surface Piston rings Cylinder bore Clutch lifter rod sliding area Clutch lifter piece needle bearing area Clutch disc linings and plates Clutch center lock nut threads and seating surfaces Primary drive gear tightening bolt threads Flywheel bolt threads and seating surfaces Transmission gear teeth Gearshift fork pins and inner surfaces Shift drum grooves Shift spindle serration area Connecting rod big end side surfaces Oil pump rotors sliding area Tappet adjust nut thread Bearings O-rings	Engine oil	
Crankshaft hole cap thread Timing hole cap thread Oil seal lips Water seal lip	Multi-purpose grease	

**GENERAL INFORMATION**

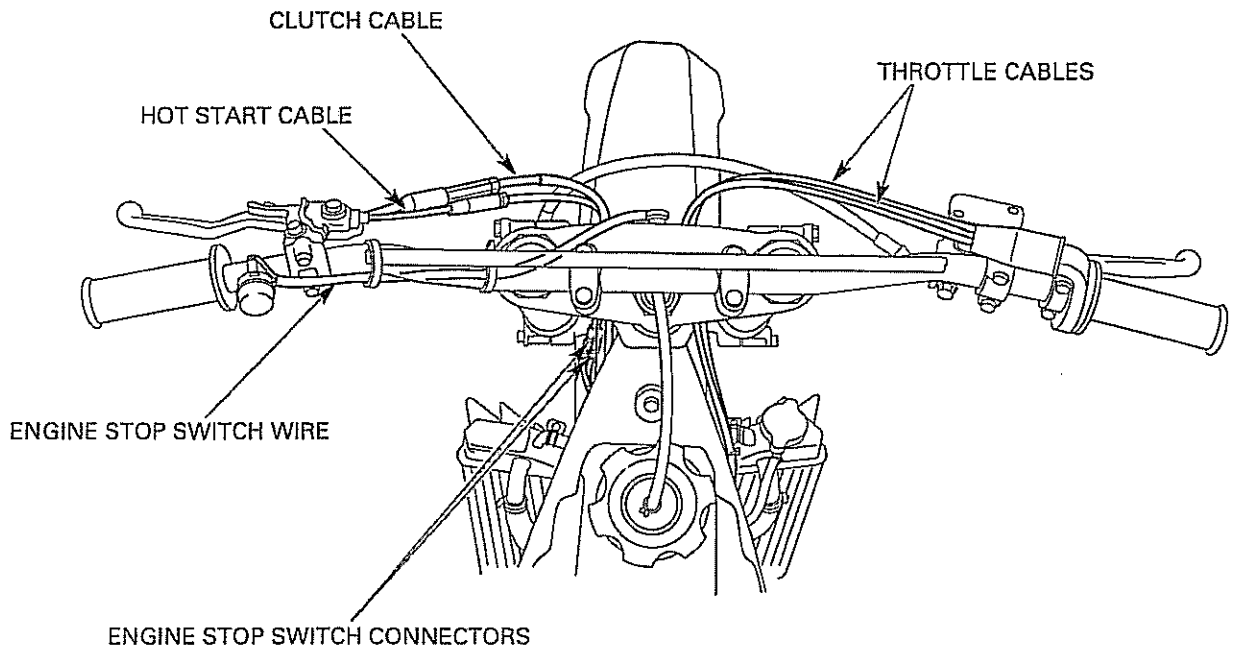
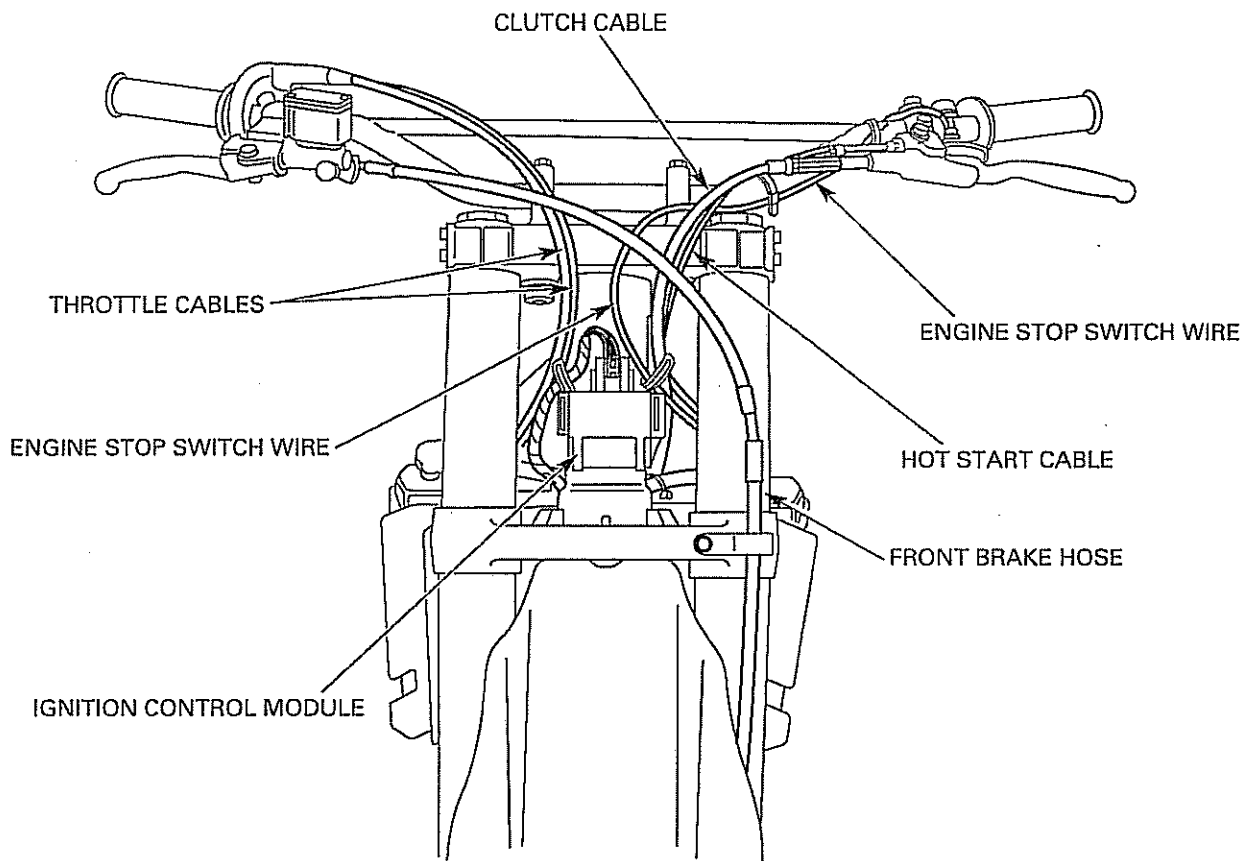
**ENGINE (cont'd)**

LOCATION	MATERIAL	REMARKS
Shift drum center pin bolt threads Stator bolt threads Mainshaft bearing set plate bolt threads Countershaft bearing set plate screw threads Crankshaft bearing set plate screw threads Shift drum bearing set plate bolt threads Oil jet thread Cam chain tensioner guide bolt threads Cam sprocket bolt threads Cylinder head cover breather plate bolt thread Crankcase tightening bolt thread	Locking agent	Coating width: 6.5 mm (0.26 in) from tip   APPLIED POSITION
Alternator wire grommet seating surface	Liquid sealant	

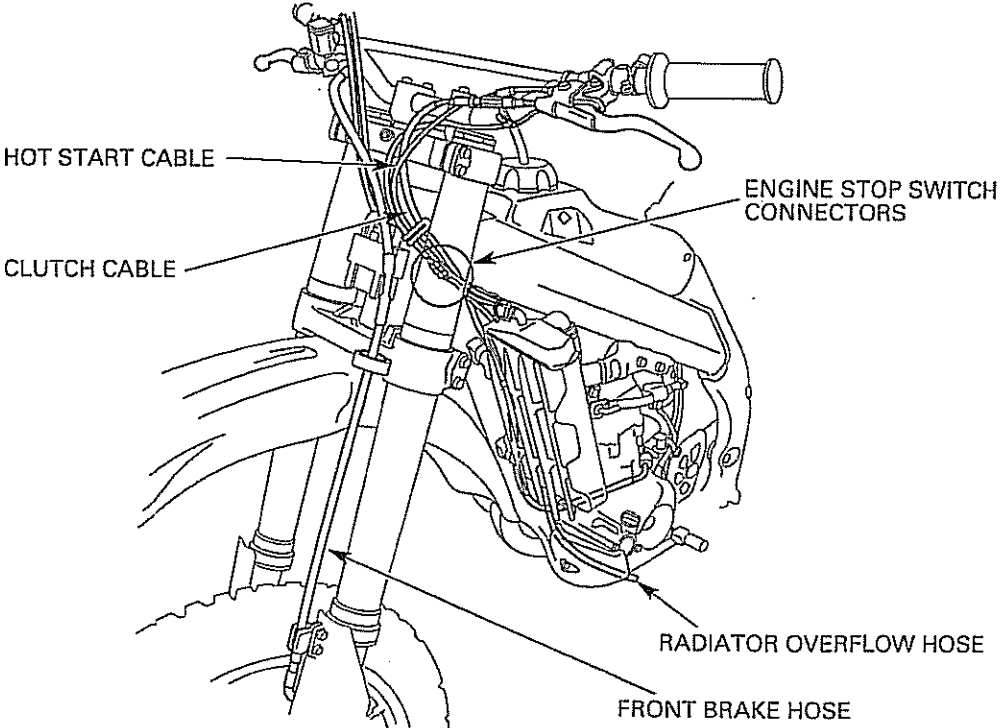
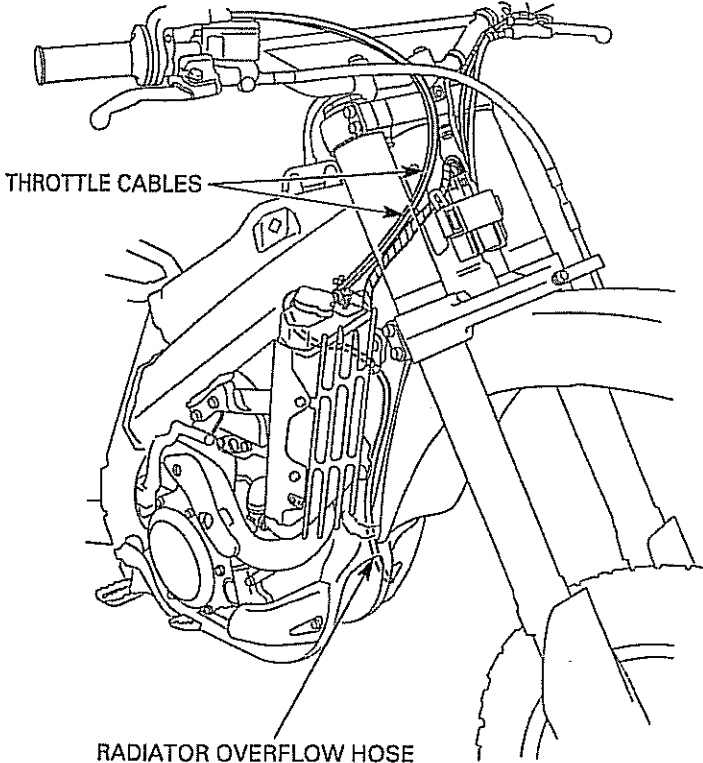
**FRAME**

LOCATION	MATERIAL	REMARKS
Steering head bearing rolling area and dust seal lips Wheel bearing dust seal lips Swingarm pivot needle bearing rolling area Swingarm pivot thrust bearing rolling area Swingarm pivot dust seal lips Shock arm needle bearing rolling area Shock arm dust seal lips Shock linkage side collar Rear shock absorber spherical bearing rolling area Rear shock absorber dust seal lips Throttle pipe inside and cable sliding surface Brake pedal pivot shaft sliding area Shift change pedal sliding area of pin	Multi-purose grease	Apply 3g  Apply 3g
Brake caliper pin bolt sliding area Brake caliper bracket pin bolt sliding area Brake lever pivot bolt sliding surface Brake lever adjust bolt tip Rear master cylinder push rod rounded surface Rear master cylinder boot fitting area	Silicone grease	
Drive chain slider mounting screw threads Front fork protector bolt threads Front disc cover bolt threads Caliper slide pins thread	Honda Anaerobic Thread Lock or equivalent	
Brake caliper piston seal lips Master cylinder inner surface Master cylinder piston outer sliding surface	DOT4 brake fluid	
Handlebar grip rubber inner surface	Honda Bond A or Honda Hand Grip Cement (U.S.A only)	
Engine hanger plate hatched area ('02 only)	Honda Moly 60 Paste (U.S.A. only) or molybdenum disulfide paste (containing more than 40% molybdenum disulfide additive)	LEFT SIDE PLATE:  RIGHT SIDE PLATE: 

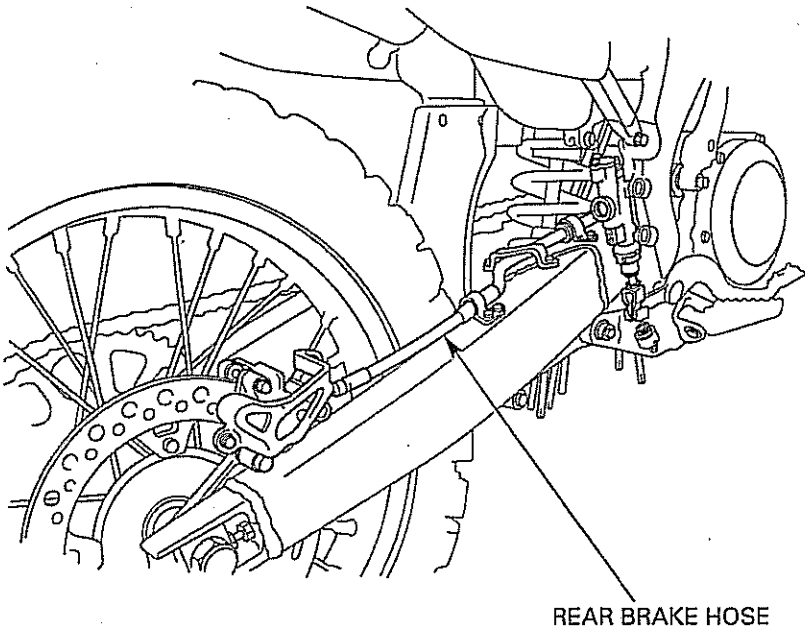
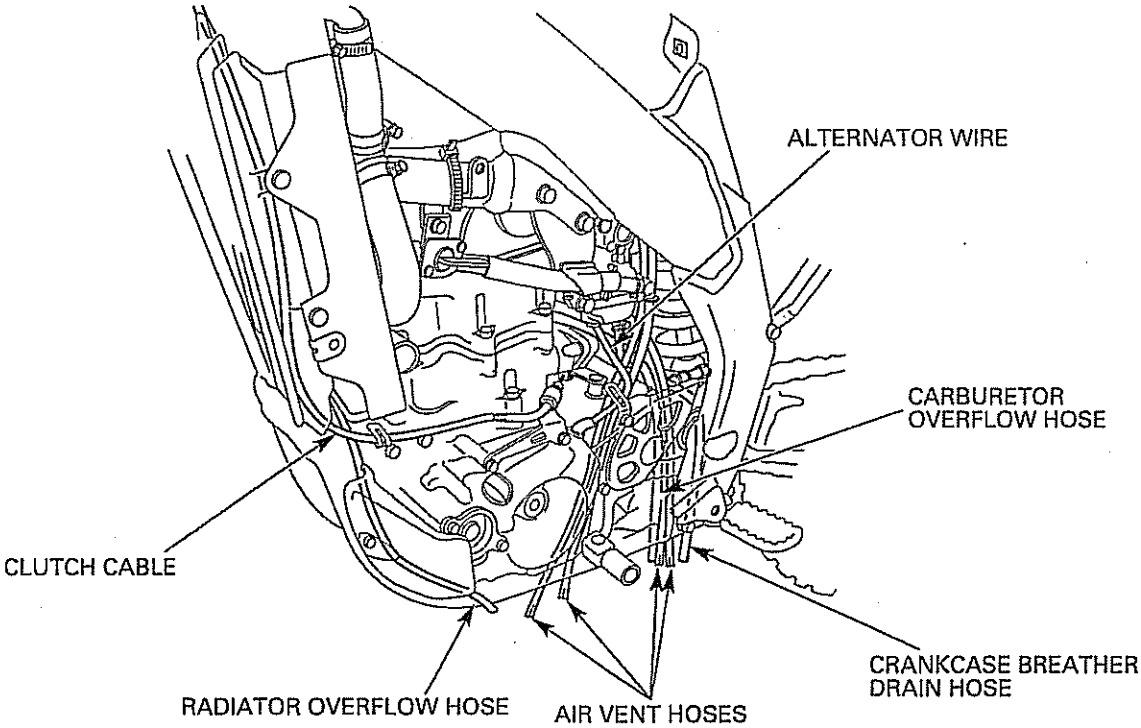
# CABLE & HARNESS ROUTING

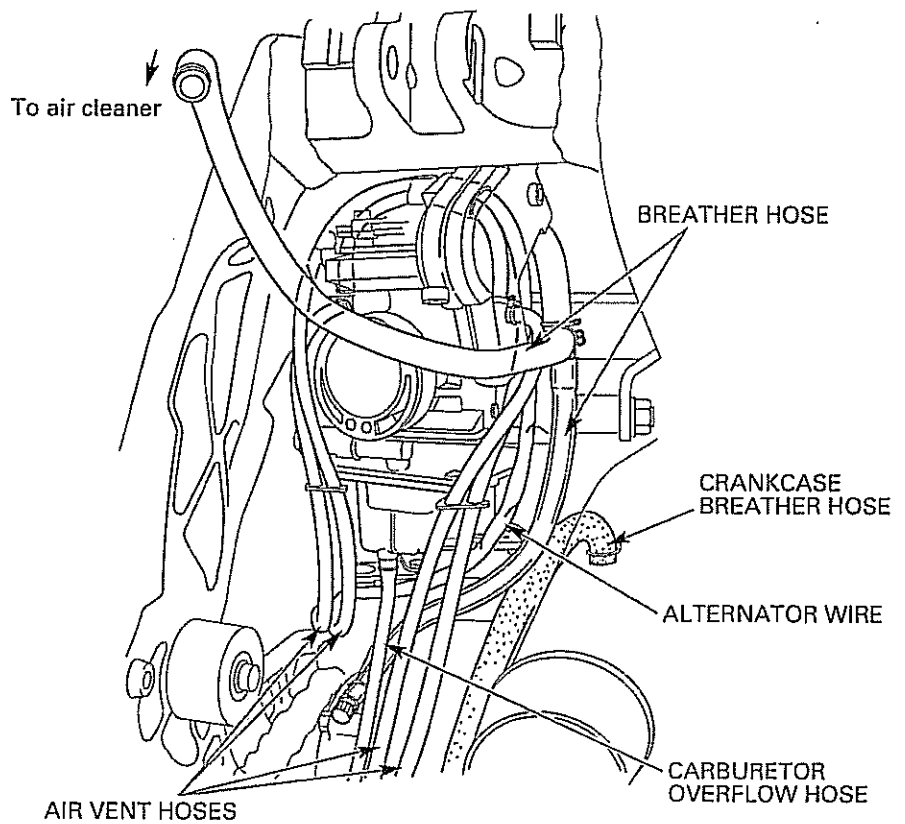
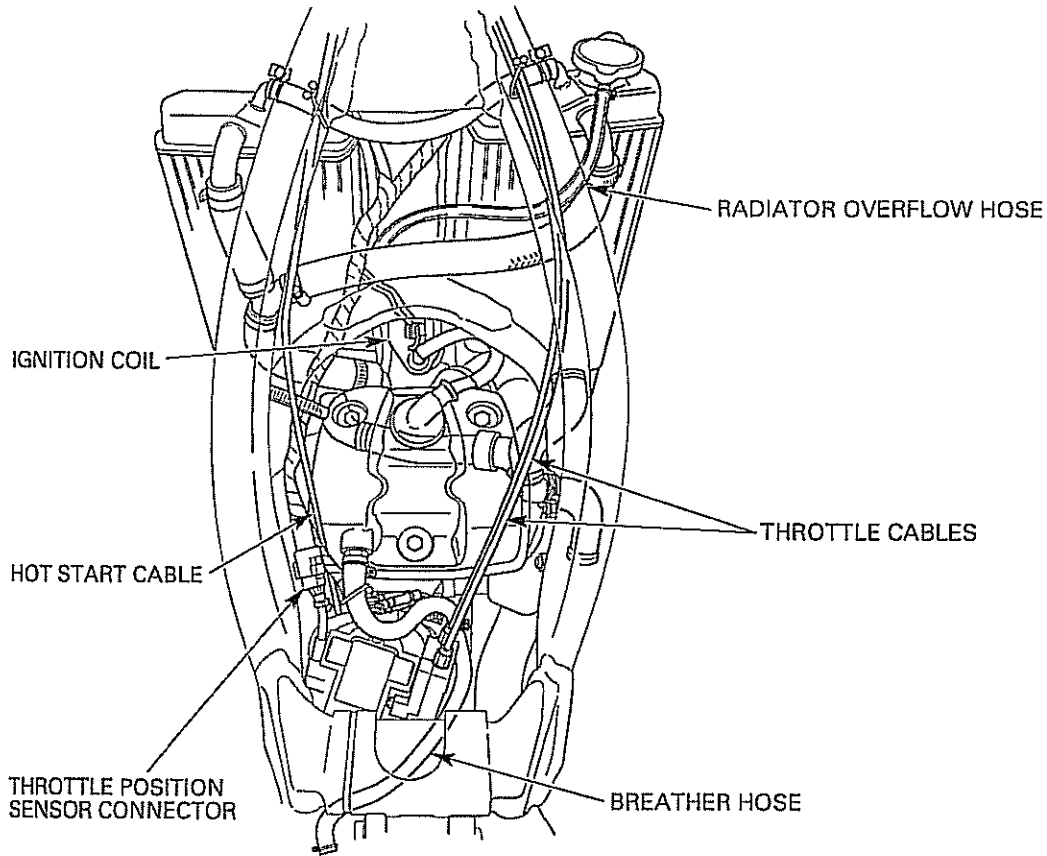






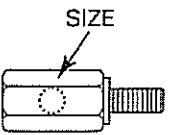
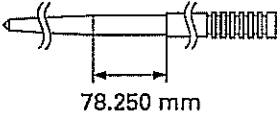
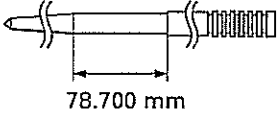
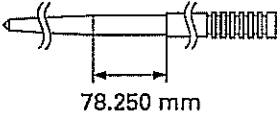
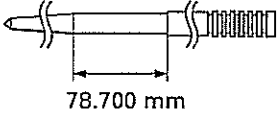
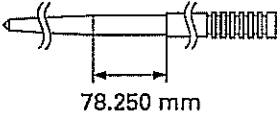
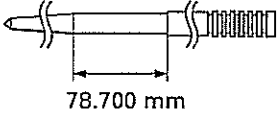
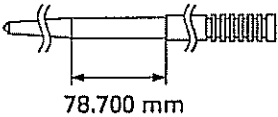
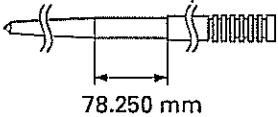
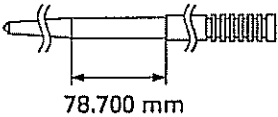
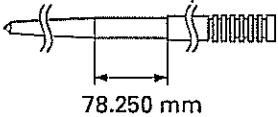
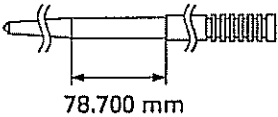
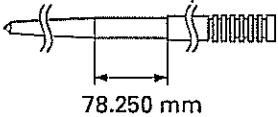
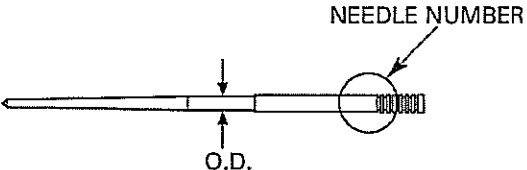
**GENERAL INFORMATION**

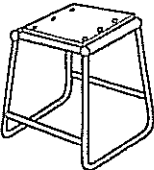
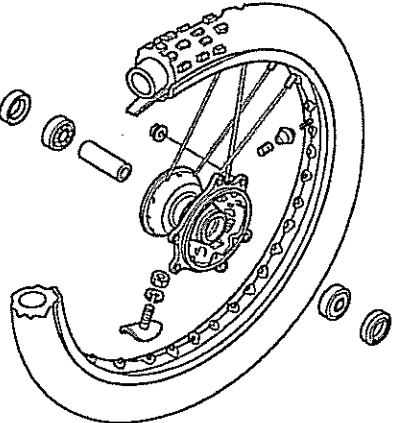




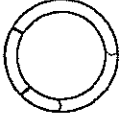
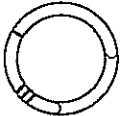
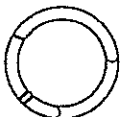

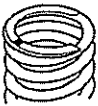
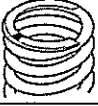
GENERAL INFORMATION

OPTIONAL PARTS

ENGINE		ITEM	REMARKS									
CARBURETOR:												
Main jet	Standard ('02) (After '02)	#175 #170										
	Optional ('02) (After '02)	#165 — 185 (increments of 2.5) #160 — 180 (increments of 2.5)										
Jet needle	Standard ('02)	OBEKR (φ2.755 mm)	<table border="1"> <tr> <td>Jet needle number (Standard series)</td> <td>Jet needle number (1/2 clip position leaner than standard series)</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td>78.250 mm</td> <td>78.700 mm</td> </tr> </table>	Jet needle number (Standard series)	Jet needle number (1/2 clip position leaner than standard series)			78.250 mm	78.700 mm			
Jet needle number (Standard series)	Jet needle number (1/2 clip position leaner than standard series)											
												
78.250 mm	78.700 mm											
	Rich ↑ General flow characteristics (at 1/16 to 1/4 throttle) ↓ Lean	<table border="1"> <tr> <td>OBEKP (φ2.735 mm)</td> <td>OBELP (φ2.735 mm)</td> </tr> <tr> <td>OBEKQ (φ2.745 mm)</td> <td>OBELQ (φ2.745 mm)</td> </tr> <tr> <td>OBEKR (φ2.755 mm) (Standard needle)</td> <td>OBELR (φ2.755 mm)</td> </tr> <tr> <td>OBEKS (φ2.765 mm)</td> <td>OBELS (φ2.765 mm)</td> </tr> <tr> <td>OBEKT (φ2.775 mm)</td> <td>OBELT (φ2.775 mm)</td> </tr> </table>	OBEKP (φ2.735 mm)	OBELP (φ2.735 mm)	OBEKQ (φ2.745 mm)	OBELQ (φ2.745 mm)	OBEKR (φ2.755 mm) (Standard needle)	OBELR (φ2.755 mm)	OBEKS (φ2.765 mm)	OBELS (φ2.765 mm)	OBEKT (φ2.775 mm)	OBELT (φ2.775 mm)
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OBEKQ (φ2.745 mm)	OBELQ (φ2.745 mm)											
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OBEKS (φ2.765 mm)	OBELS (φ2.765 mm)											
OBEKT (φ2.775 mm)	OBELT (φ2.775 mm)											
	Standard (After '02)	OBELR (φ2.755 mm)	<table border="1"> <tr> <td>Jet needle number (Standard series)</td> <td>Jet needle number (1/2 clip position richer than standard series)</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td>78.700 mm</td> <td>78.250 mm</td> </tr> </table>	Jet needle number (Standard series)	Jet needle number (1/2 clip position richer than standard series)			78.700 mm	78.250 mm			
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78.700 mm	78.250 mm											
	Rich ↑ General flow characteristics (at 1/16 to 1/4 throttle) ↓ Lean	<table border="1"> <tr> <td>OBELP (φ2.735 mm)</td> <td>OBEKP (φ2.735 mm)</td> </tr> <tr> <td>OBELQ (φ2.745 mm)</td> <td>OBEKQ (φ2.745 mm)</td> </tr> <tr> <td>OBELR (φ2.755 mm) (Standard needle)</td> <td>OBEKR (φ2.755 mm)</td> </tr> <tr> <td>OBELS (φ2.765 mm)</td> <td>OBEKS (φ2.765 mm)</td> </tr> <tr> <td>OBELT (φ2.775 mm)</td> <td>OBEKT (φ2.775 mm)</td> </tr> </table>	OBELP (φ2.735 mm)	OBEKP (φ2.735 mm)	OBELQ (φ2.745 mm)	OBEKQ (φ2.745 mm)	OBELR (φ2.755 mm) (Standard needle)	OBEKR (φ2.755 mm)	OBELS (φ2.765 mm)	OBEKS (φ2.765 mm)	OBELT (φ2.775 mm)	OBEKT (φ2.775 mm)
OBELP (φ2.735 mm)	OBEKP (φ2.735 mm)											
OBELQ (φ2.745 mm)	OBEKQ (φ2.745 mm)											
OBELR (φ2.755 mm) (Standard needle)	OBEKR (φ2.755 mm)											
OBELS (φ2.765 mm)	OBEKS (φ2.765 mm)											
OBELT (φ2.775 mm)	OBEKT (φ2.775 mm)											
		Explanation of the jet needle numbers (Example)										
Jet needle clip standard position	('02) (After '02)	4th groove 5th groove										
Slow jet	Standard ('02) (After '02)	#45 #42										
	Optional ('02) (After '02)	#40 — 50 (increments of 2.5) #38 — 48 (increments of 2.5)										
DECOMPRESSION SYSTEM:												
Manual decompression kit			For manual operation of the decompression system									

FRAME	ITEM	REMARKS
<p><b>MAINTENANCE:</b> Work stand</p>  <p>Pin spanner</p> <p><b>DRIVE CHAIN &amp; SPROCKET:</b> Driven sprocket/chain link</p> <p><b>HANDLEBAR LOWER HOLDER:</b> '02: Standard Optional After '02: Standard Optional</p> <p><b>20 INCH FRONT WHEEL:</b></p> <ul style="list-style-type: none"> <li>· Front wheel sub assembly             <ul style="list-style-type: none"> <li>– Rim (20 x 1.85)</li> <li>– Spoke (226.5 mm)</li> <li>– Distance collar</li> <li>– Wheel bearing</li> <li>– Dust seal</li> </ul> </li> <li>· Rim lock (1.85)</li> <li>· Tire (Dunlop D739FA 90/100-20)</li> <li>· Tire flap</li> <li>· Tire tube</li> </ul> <p>Front wheel assembly, see page 12-6</p> <p><b>NOTE:</b></p> <hr/> <p>Brake disc, disc bolts and side collars using the original parts.</p> <hr/> <p>Align the top surface of the top bridge with the top surface of the outer tube.</p>	<p>For maintenance</p> <p>Pin spanner A x 2 For shock absorber spring installed length (preload) adjustment (two required)</p> <p>50 T (Aluminum)/114 49 T (Aluminum)/114 51 T (Aluminum)/116</p> <p>no offset 3 mm offset 3 mm offset no offset</p> 	

# GENERAL INFORMATION

FRAME		ITEM		REMARKS		
FORK: Spring	TYPE	Light      1 scribe mark 75 degrees apart  	0.45 kgf/mm (25.20 lbf/in)	OIL CAPACITY		
				'02 Standard: 430 cm <sup>3</sup> (14.5 US oz) Maximum: 454 cm <sup>3</sup> (15.4 US oz) Minimum: 361 cm <sup>3</sup> (12.2 US oz)		
				After '02 Standard: 409 cm <sup>3</sup> (13.8 US oz) Maximum: 416 cm <sup>3</sup> (14.1 US oz) Minimum: 320 cm <sup>3</sup> (10.8 US oz)		
	TYPE	Standard      No mark (factory products ) or 1 scribe marks and 3 scribe marks 75 degrees apart (after market parts)  	0.47 kgf/mm (26.32 lbf/in)	'02 Standard: 425 cm <sup>3</sup> (14.4 US oz) Maximum: 449 cm <sup>3</sup> (15.2 US oz) Minimum: 356 cm <sup>3</sup> (12.0 US oz)		
				After '02 Standard: 412 cm <sup>3</sup> (13.9 US oz) Maximum: 419 cm <sup>3</sup> (14.2 US oz) Minimum: 323 cm <sup>3</sup> (10.9 US oz)		
	TYPE	Heavy      1 scribe mark and 2 scribe marks 75 degrees apart  	0.49 kgf/mm (27.44 lbf/in)	'02 Standard: 419 cm <sup>3</sup> (14.2 US oz) Maximum: 443 cm <sup>3</sup> (15.0 US oz) Minimum: 351 cm <sup>3</sup> (11.9 US oz)		
				After '02 Standard: 406 cm <sup>3</sup> (13.7 US oz) Maximum: 413 cm <sup>3</sup> (14.0 US oz) Minimum: 318 cm <sup>3</sup> (10.8 US oz)		
SHOCK ABSORBER:						
Spring	'02	TYPE		5.20 kgf/mm (291.2 lbf/in)	IDENTIFICATION MARK	
		Light			Blue paint	
		Standard			No mark (factory products) or Green paint (after market parts)	
	After '02	TYPE		5.30 kgf/mm (383.3 lbf/in)	Blue paint	
		Light				
		Standard			No mark (factory products) or Red paint (after market parts)	
		TYPE		5.70 kgf/mm (559.0 lbf/in) 5.90 kgf/mm (426.7 lbf/in)	Pink paint	
		Heavy			Silver paint	

The standard fork and shock springs mounted on the motorcycle when it leaves the factory are not marked. Before replacing the springs, be sure to mark them so they can be distinguished from other optional springs.

# 2. FRAME/BODY PANELS/EXHAUST SYSTEM

SERVICE INFORMATION	2-1	ENGINE GUARDS	2-3
TROUBLESHOOTING	2-1	NUMBER PLATE	2-3
SEAT	2-2	SUB-FRAME	2-4
SIDE COVERS	2-2	FUEL TANK	2-5
RADIATOR SHROUDS	2-3	EXHAUST SYSTEM	2-7

## SERVICE INFORMATION

### GENERAL

- This section covers removal and installation of the body panels, fuel tank and exhaust system.
- Always replace the exhaust pipe gaskets after removing the exhaust pipe from the engine.
- Always inspect the exhaust system for leaks after installation.

### TORQUE VALUE

Seat mounting bolt	26 N·m (2.7 kgf·m, 20 lbf·ft)
Sub-frame mounting bolt	30 N·m (3.1 kgf·m, 22 lbf·ft)
Exhaust pipe joint nut	21 N·m (2.1 kgf·m, 15 lbf·ft)
Muffler joint band bolt	21 N·m (2.1 kgf·m, 15 lbf·ft)

## TROUBLESHOOTING

### Excessive exhaust noise

- Broken exhaust system
- Exhaust gas leak

### Poor performance

- Deformed exhaust system
- Exhaust gas leak
- Clogged muffler



## SEAT

### REMOVAL

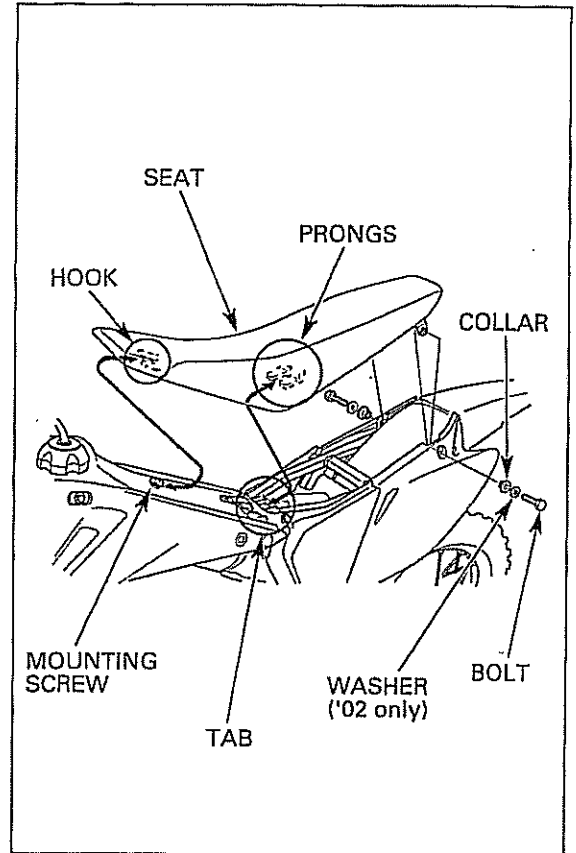
Remove the two bolts, washers ('02 only), collars and seat.

### INSTALLATION

Align the seat hook with the mounting screw on the fuel tank and the seat prongs with the sub-frame tab.

Install and tighten the seat mounting bolts to the specified torque.

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

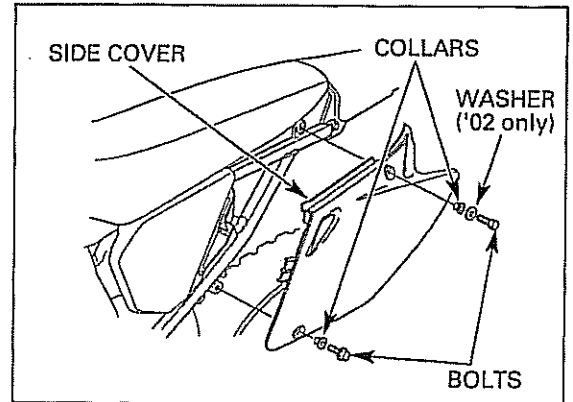


## SIDE COVERS

### REMOVAL/INSTALLATION

Remove the seat mounting bolt, washer ('02 only) and collar.

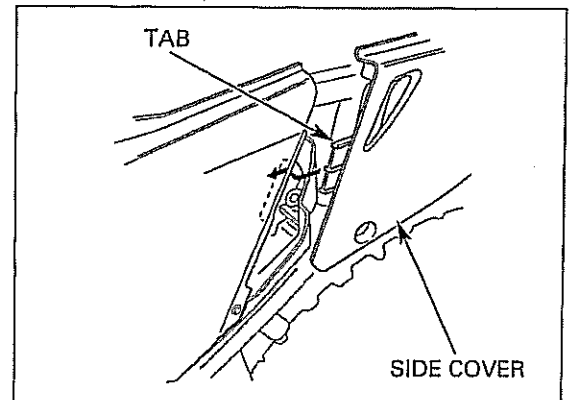
Remove the flange bolt, collar and side cover.



*Be careful not to damage the tabs.* Install the side cover in the reverse order of removal.

Tighten the seat mounting bolts to the specified torque.

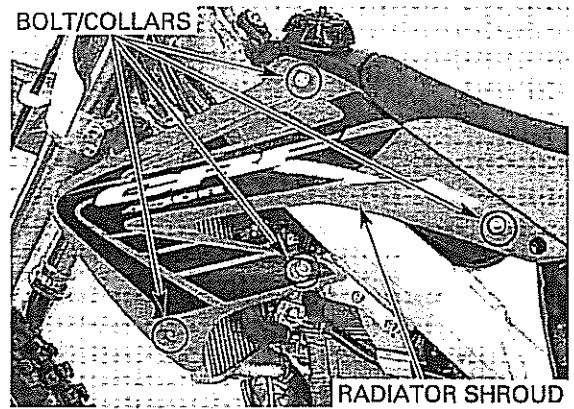
**TORQUE: 26 N·m (2.7 kgf·m, 20 lbf·ft)**



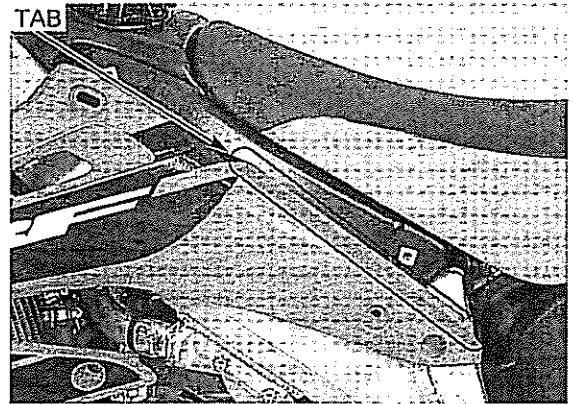
## RADIATOR SHROUDS

### REMOVAL/INSTALLATION

*Note that the thinner collars go with the upper bolts.* Remove the bolt, collars and radiator shroud.



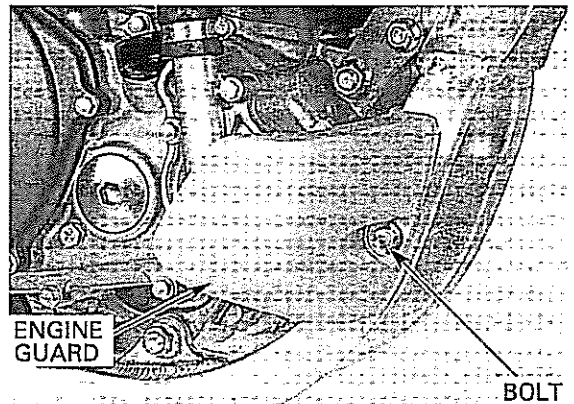
*Insert the tab inside the seat.* Installation is in the reverse order of removal.



## ENGINE GUARDS

### REMOVAL/INSTALLATION

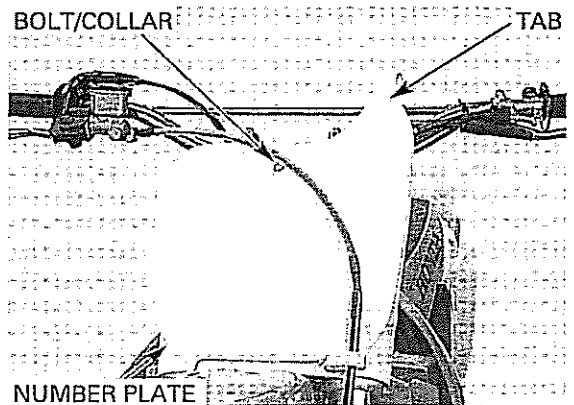
Remove the bolt and engine guard.  
Installation is in the reverse order of removal.



## NUMBER PLATE

### REMOVAL/INSTALLATION

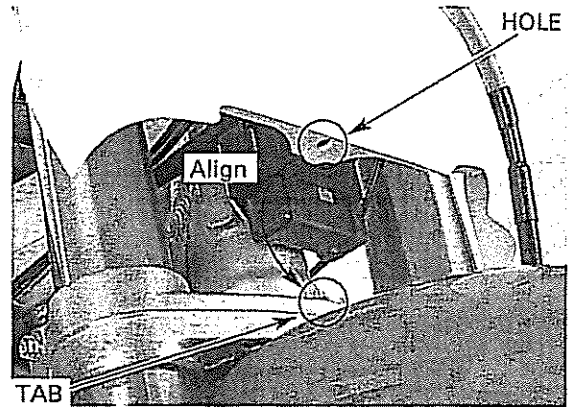
Remove the number plate tab from the handlebar.  
Remove the bolt, collar and number plate.



## FRAME/BODY PANELS/EXHAUST SYSTEM

Install the number plate, aligning its hole with the tab on the steering stem.

Installation is in the reverse order of removal.



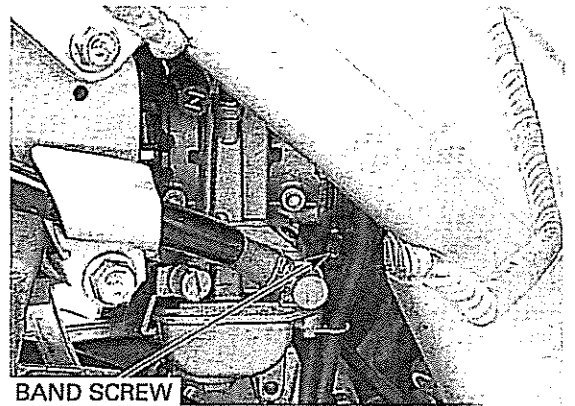
## SUB-FRAME

### REMOVAL

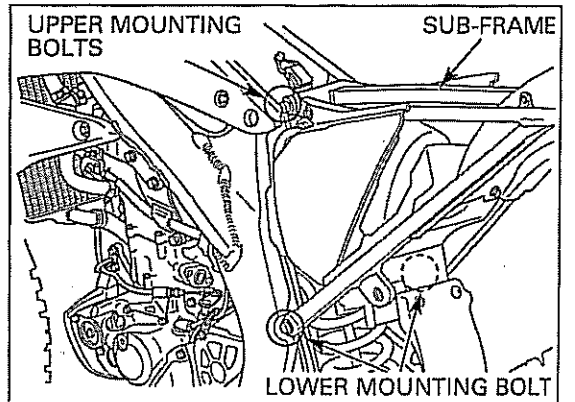
Remove the following:

- Seat (page 2-2)
- Side covers (page 2-2)
- Muffler (page 2-7)

Loosen the air cleaner connecting boot band screw.

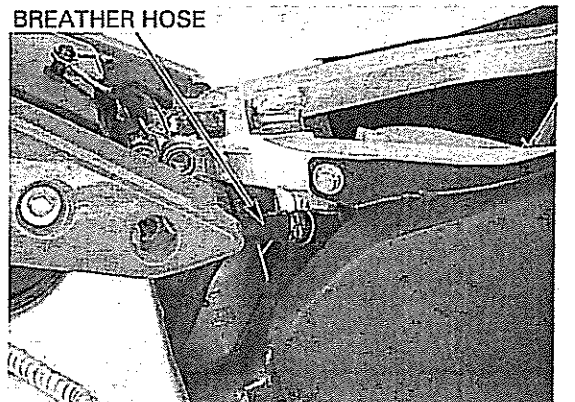


Remove the three sub-frame mounting bolts.



Disconnect the breather hose from the air cleaner case.

Remove the sub-frame by pulling it straight back.

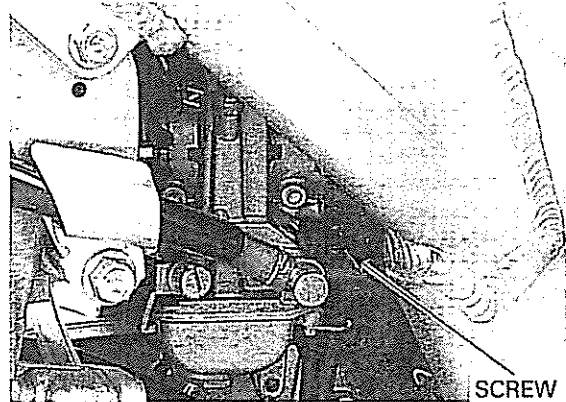


## INSTALLATION

Connect the breather hose into the air cleaner case.

Align the upper and lower ends of the sub-frame to the main-frame and insert, but do not tighten, the sub-frame attaching bolts.  
Connect the air cleaner connecting boot to the carburetor.

Tighten the screw on the connecting boot clamp.



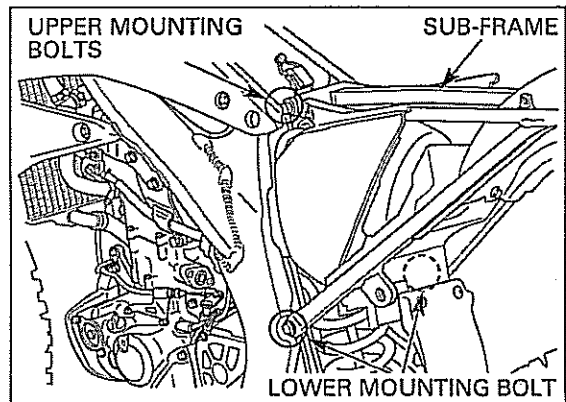
Install the sub-frame mounting bolts.  
Tighten the sub-frame upper mounting bolts to the specified torque.

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

Tighten the sub-frame lower mounting bolts to the specified torque.

**TORQUE: 49 N·m (5.0 kgf·m, 36 lbf·ft)**

Install the following:  
—Muffler (page 2-7)  
—Side cover (page 2-2)  
—Seat (page 2-2)



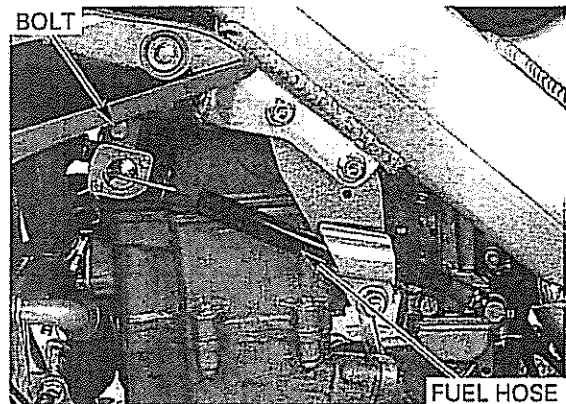
## FUEL TANK

### REMOVAL/INSTALLATION

Remove the following:  
—Seat (page 2-2)  
—Radiator shrouds (page 2-3)

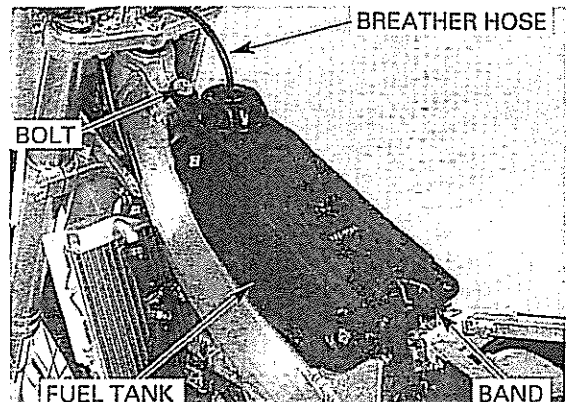
Turn the fuel valve to "OFF", and disconnect the fuel hose.

Remove the fuel valve mounting bolt and fuel valve.



Remove the breather hose from the stem nut.

Remove the fuel tank mounting bolt, unhook the band and remove the fuel tank.



After installation, make sure there are no fuel leaks. Installation is in the reverse order of removal.  
Install the breather hose into the stem nut as shown.

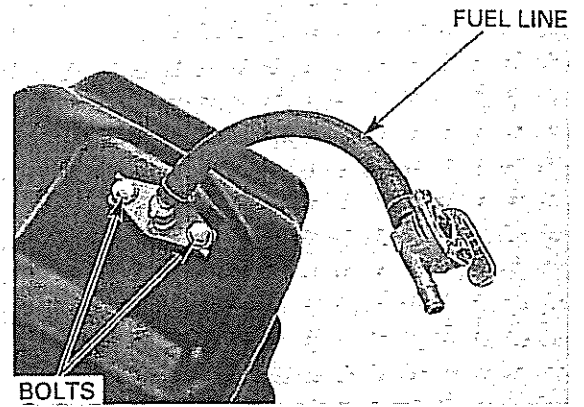
## FRAME/BODY PANELS/EXHAUST SYSTEM

### FUEL FILTER MAINTENANCE

Drain the fuel from the fuel tank into an approved gasoline container.

Disconnect the fuel line from the fuel joint.

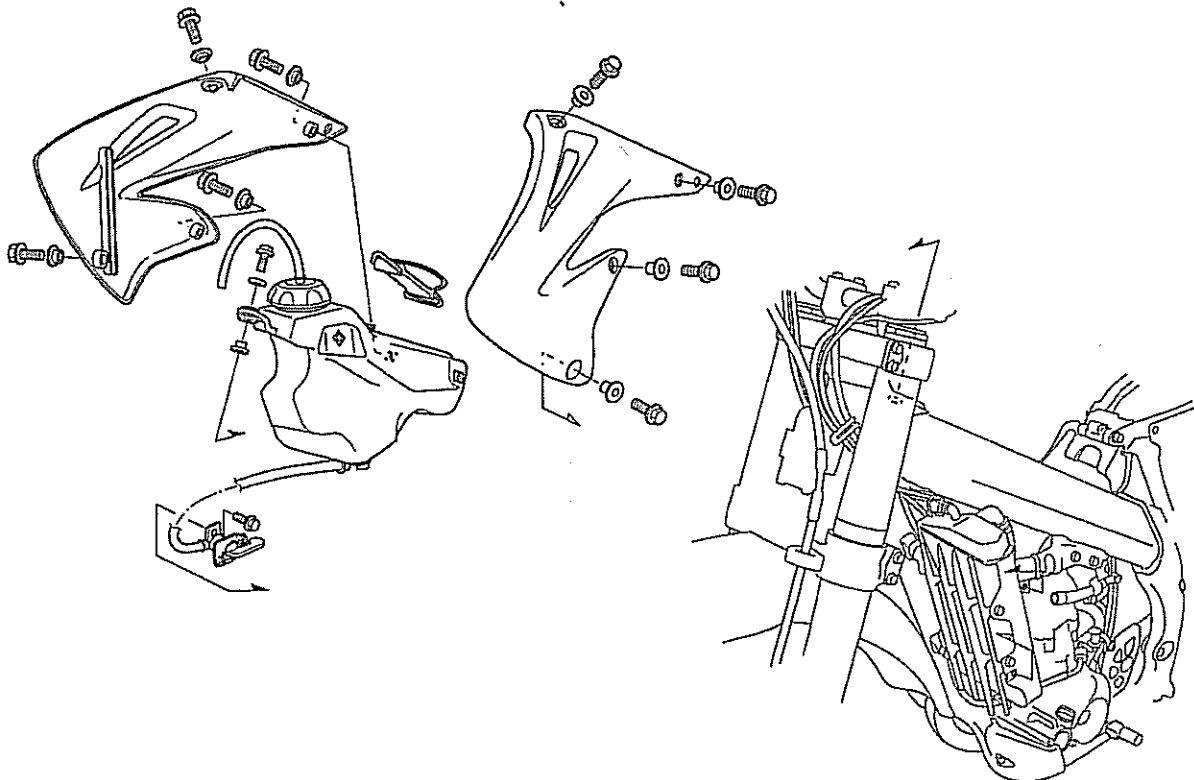
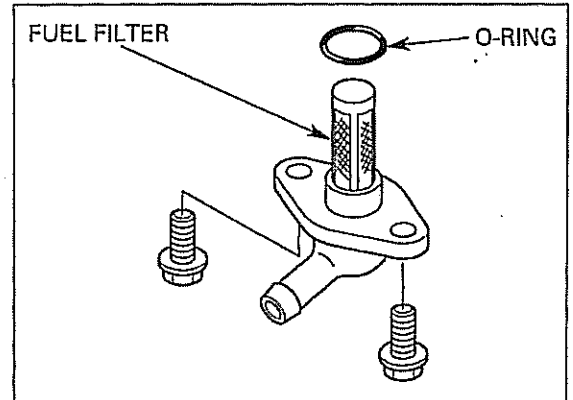
Remove the bolts and fuel joint.



Wash the fuel filter in high flash-point cleaning solvent.

Check that the O-ring is in good condition and install it onto the fuel valve.

*After installation, make sure there are no fuel leaks.* Install the fuel valve in the reverse order of removal.



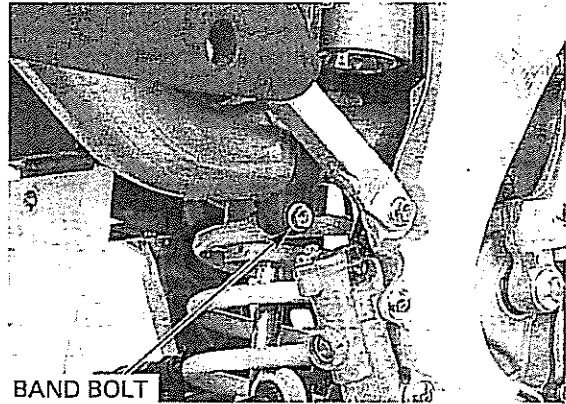
## EXHAUST SYSTEM

### MUFFLER REMOVAL/INSTALLATION

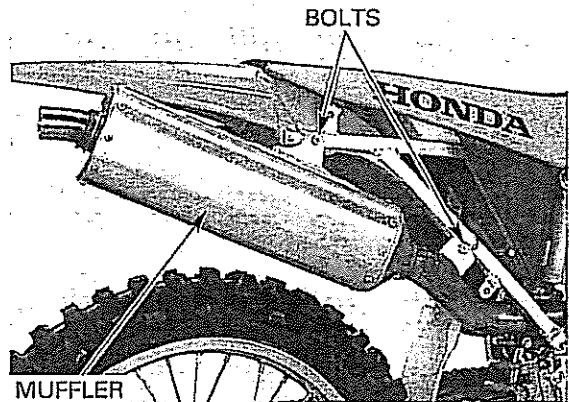
Let the exhaust system cool before starting this procedure.

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

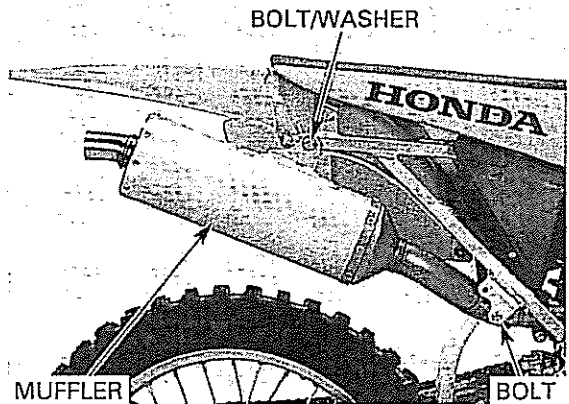
Loosen the muffler joint band bolt.



'02: Remove the muffler mount bolts, muffler and band.



After '02: Remove the muffler mount bolts, washer, muffler and band.



Install the new gasket into the exhaust pipe.

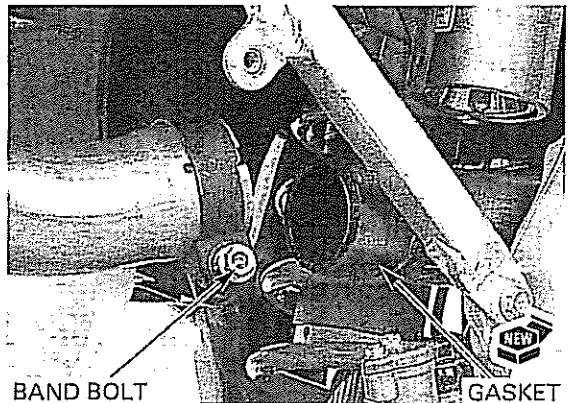
Install the muffler into the exhaust pipe.

Install and tighten the muffler mount bolts securely.

Tighten the muffler joint band bolt to the specified torque.

#### TORQUE:

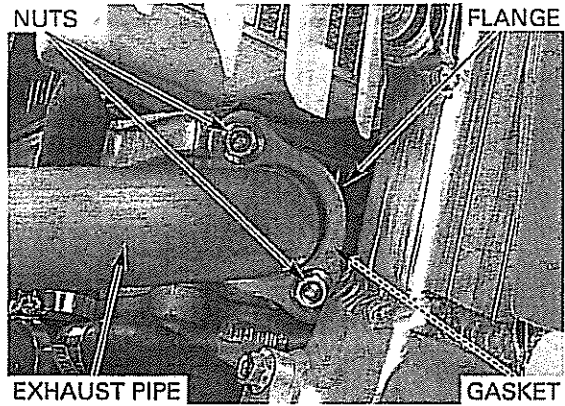
Muffler joint band bolt: 21 N·m (2.1 kgf-m, 15lb-ft)



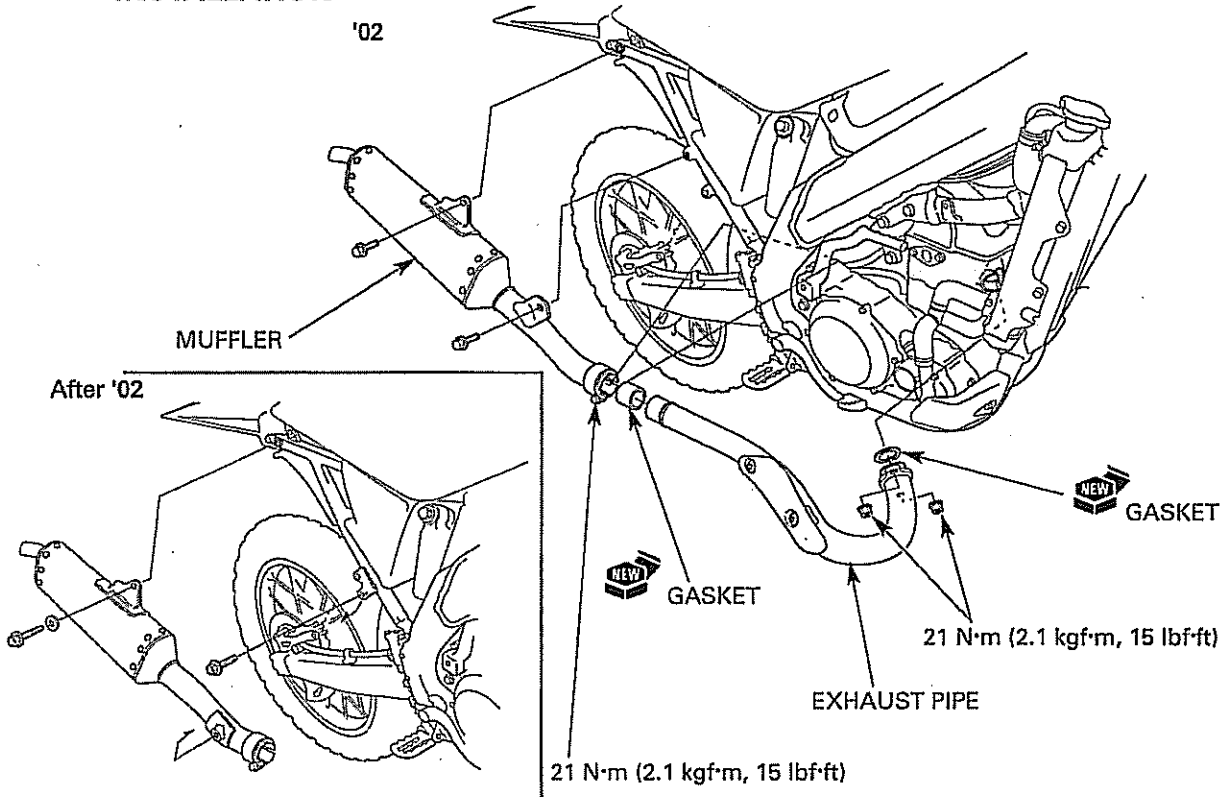
**EXHAUST PIPE REMOVAL**

Remove the muffler (page 2-7).

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

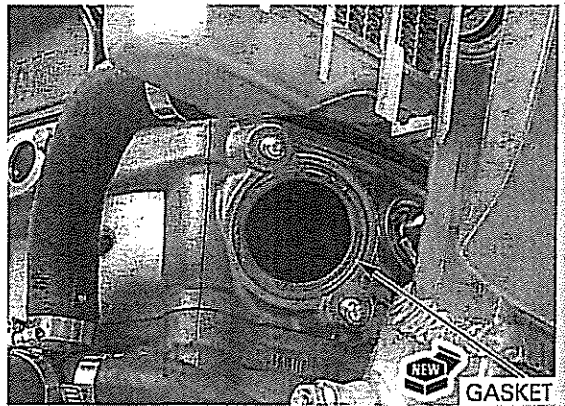


**INSTALLATION**



Installation is in the reverse order of removal.

- Always replace the exhaust pipe gasket with a new one.



Tighten the exhaust pipe joint nut to the specified torque.

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

Install the following:

- Muffler (page 2-7)
- Side cover (page 2-2)

