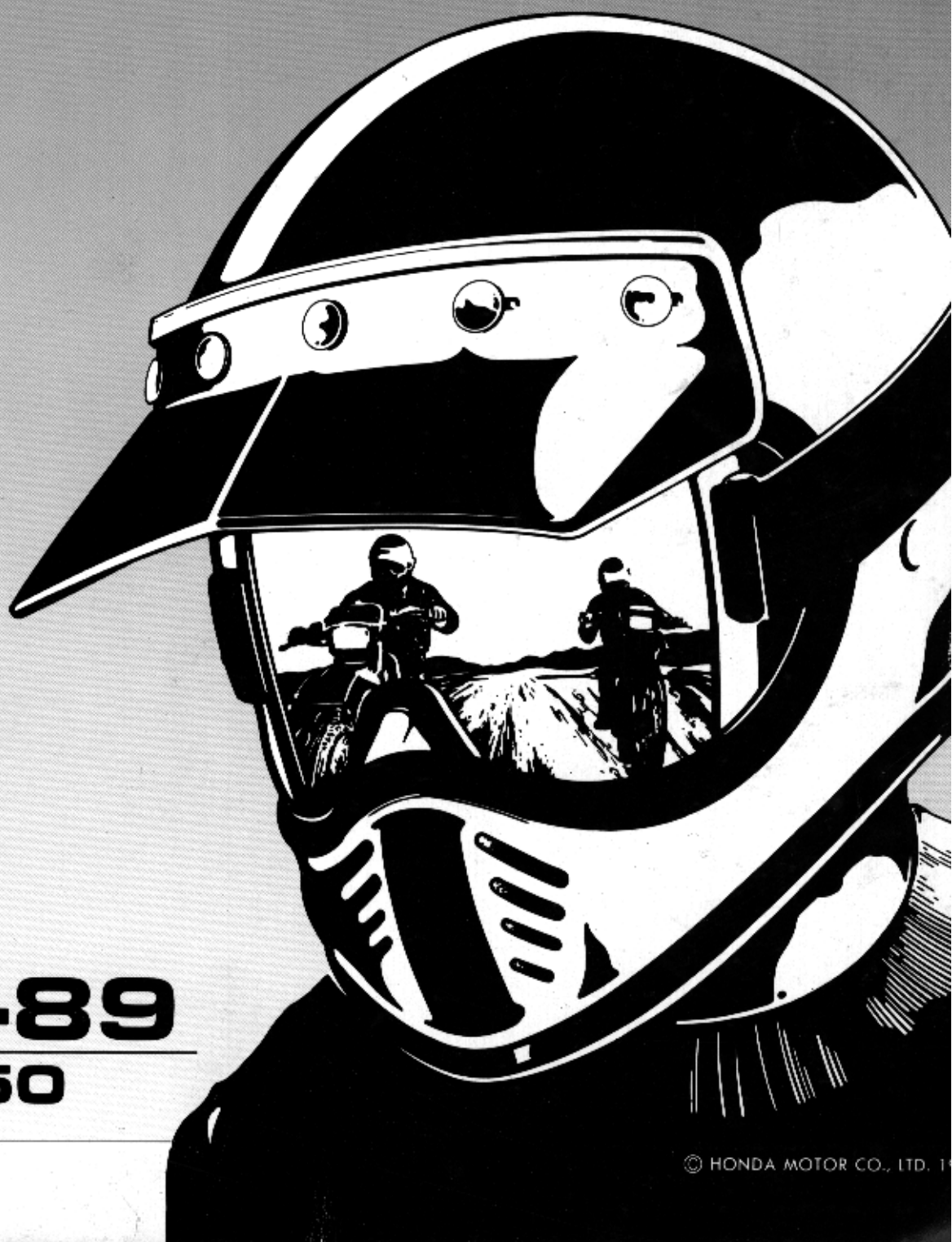


# HONDA

## SERVICE MANUAL



**88-89**  
**NX650**

## HOW TO USE THIS MANUAL

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are within the standard set by U.S. Environmental Protection Agency and California Air Resources Board. Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1 through 3 apply to the whole motorcycle, while sections 4 through 20 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 page 1 of that 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 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 the approval for printing. HONDA MOTOR CO., LTD. Reserves the right to make changes at any time without notice and without incurring any obligation whatever.

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HONDA MOTOR CO., LTD.  
SERVICE PUBLICATIONS OFFICE

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# 1. GENERAL INFORMATION

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## GENERAL SAFETY

### ▲ WARNING

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

### ▲ WARNING

*Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area with the engine stopped. Do not smoke or allow flames or sparks in your working area or where gasoline is stored.*

### ▲ WARNING

*Brake dust may contain asbestos.*

- *Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies.*
- *In the United States, use an OSHA approved vacuum cleaner or alternate method approved by OSHA designed to minimize the hazard caused by airborne asbestos fibers.*

### ▲ 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.*
- *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.*

### 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.*

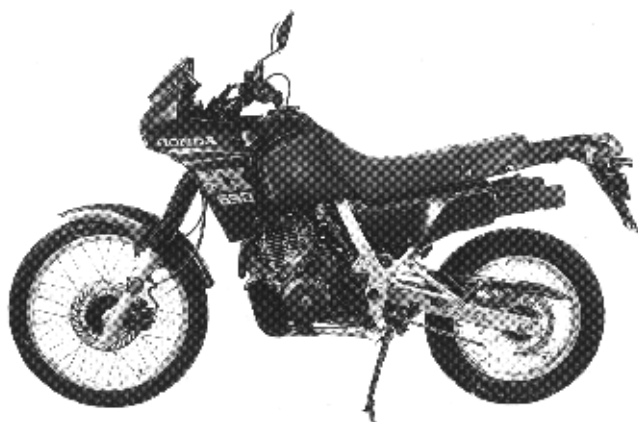
## SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalent. Parts that do not meet HONDA's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. Use only metric tools when servicing this motorcycle. Metric bolts, nuts, and screws are not interchangeable with English fasteners. The use of incorrect tools and fasteners may damage the motorcycle.
4. Install new gaskets, O-rings, cotter pins, lock plates, etc. when reassembling.
5. When tightening a series of bolts or nuts, begin with the larger-diameter or inner bolts first, and tighten to the specified torque diagonally, 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.

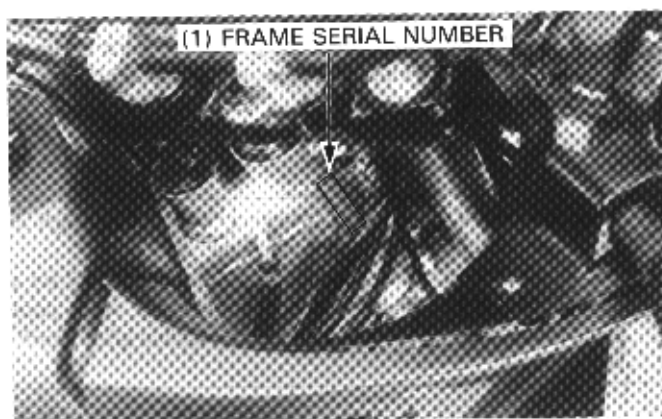
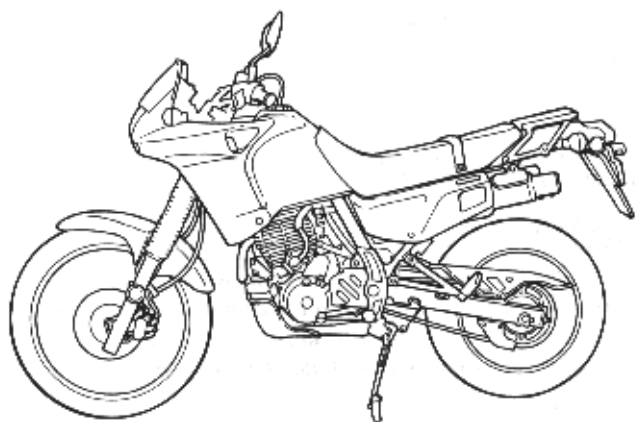
GENERAL INFORMATION

MODEL IDENTIFICATION

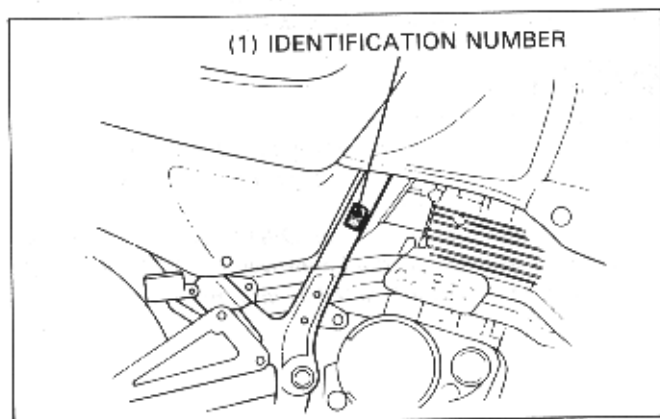
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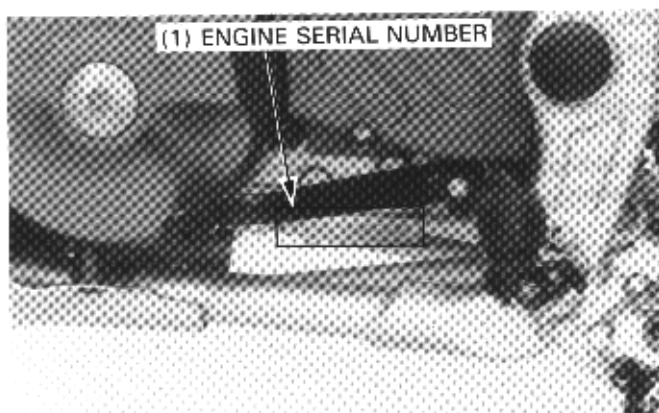
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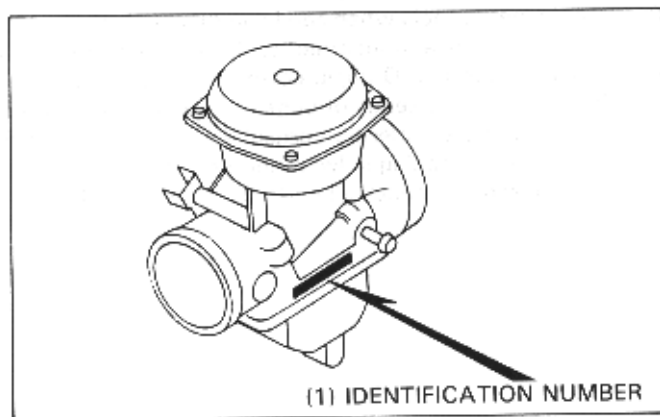
The frame serial number is stamped on the right side of the steering head.



The vehicle identification number (VIN) is on the right side of the frame pipe.



The engine serial number is stamped on the right crankcase.



The carburetor identification number is stamped on the carburetor body.

**SPECIFICATIONS**

< >: California model

ITEM		SPECIFICATIONS		
DIMENSIONS	Overall length	2,195 mm (86.4 in)		
	Overall width	890 mm (35.0 in)		
	Overall height	1,220 mm (48.0 in)		
	Wheel base	1,435 mm (56.4 in)		
	Seat height	870 mm (34.3 in)		
	Ground clearance	255 mm (10.0 in)		
	Dry weight	152 kg (335.1 lb)		
	Curb weight	168 kg (370.3 lb)		
FRAME	Type	Semi-double cradle		
	Front suspension, travel	Telescopic fork, 220 mm (8.7 in)		
	Rear suspension, travel	Swing arm, 195 mm (7.7 in)		
	Front tire size	90/90-21 54S		
	Rear tire size	120/90-17 64S		
	Cold tire pressures	Rider only	Front	150 kPa (1.50 kg/cm <sup>2</sup> , 22 psi)
			Rear	150 kPa (1.50 kg/cm <sup>2</sup> , 22 psi)
		Rider and one passenger	Front	150 kPa (1.50 kg/cm <sup>2</sup> , 22 psi)
			Rear	200 kPa (2.00 kg/cm <sup>2</sup> , 29 psi)
	Front brake	Hydraulic, single disc		
Rear brake	Internal expanding shoes			
Fuel capacity	13 liters (3.4 US gal, 2.9 Imp gal)			
Fuel reserve capacity	2.5 liters (0.66 US gal, 0.55 Imp gal)			
Caster angle	28°30'			
Trail	117 mm (4.6 in)			
Fork oil capacity	592 cc (20.0 US oz, 20.8 Imp oz)			
ENGINE	Type	Air cooled 4-stroke		
	Cylinder arrangement	Single cylinder, 15° inclined from vertical		
	Bore and stroke	100 x 82 mm (3.94 x 3.23 in)		
	Displacement	644.0 cc (39.29 cu in)		
	Compression ratio	8.3 : 1		
	Valve train	OHC, chain drive, 4-valve		
	Oil capacity	2.3 liters (2.43 US qt, 2.02 Imp qt) after disassembly 1.9 liters (2.01 US qt, 1.67 Imp qt) after draining		
	Lubrication system	Forced pressure and dry sump		
	Air filtration	Paper filter		
	Cylinder compression	125 kPa (12.5 kg/cm <sup>2</sup> , 178 psi)		
	Intake valve	Opens	5° (BTDC)	} at 1 mm lift
		Closes		
	Exhaust valve	Opens	40° (ABDC)	
		Closes	45° (BBDC)	
			5° (ATDC)	
	Valve clearance (cold)	IN	0.10 mm (0.004 in)	
	EX	0.12 mm (0.005 in)		
Engine dry weight	50 kg (110 lb)			
CARBURETOR	Type	Constant Vacuum, single carburetor		
	I.D. number	VE81A <VE82A>		
	Main jet	#155		
	Pilot screw opening	3 turns out		
	Float level	18.5 mm (0.7 in)		
	Idle speed	1,300 ± 100 rpm		

## GENERAL INFORMATION

ITEM		SPECIFICATIONS		
DRIVE TRAIN	Clutch	Wet, multi-plate		
	Transmission	5-speed constant mesh		
	Primary driven	2.029 (69/34)		
	Final reduction	3.000 (45/15)		
	Gear ratio I	2.666 (32/12)		
	Gear ratio II	1.750 (28/16)		
	Gear ratio III	1.250 (25/20)		
	Gear ratio IV	1.000 (23/23)		
	Gear ratio V	0.840 (21/25)		
	Gear shift pattern	Left foot operated return system, 1-N-2-3-4-5		
ELECTRICAL	Ignition	DC-CDI		
	Ignition timing	Initial	8° BTDC at idle	
		Full advance	28° BTDC at 4,000 rpm	
	Alternator	AC generator 0.18 kw/5,000 rpm		
	Battery capacity	12V 8AH		
	Spark plug		NGK	ND
		Standard	DPR8EA-9	X24EPR-U9
		For extended high speed riding	DPR9EA-9	X27EPR-U9
	Spark plug gap	0.8-0.9 mm (0.031-0.035 in)		
	Fuse	Main	20A	
Sub		10A x 2 + 15A		
Starting system	Electrical stater			
Headlight	12V 60/55W			
Tail/brake light	12V 32/3cp			
Front turn signal/running light	12V 32cp x 2			
Rear turn signal light	12V 32cp x 2			
Meter lights	12V 1.7W x 4			
High beam indicator	12V 1.7W			
Turn signal indicator	12V 3.4W x 2			
Neutral indicator	12V 3.4W			

## TORQUE VALUES

## ENGINE

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kg-m, ft-lb)	REMARKS
Crankcase drain plug	1	12	25 (2.5, 18)	Apply oil to the threads Apply a locking agent to the threads
Oil filter cover bolt	3	6	9 (0.9, 7)	
Valve adjusting screw lock nut	4	8	25 (2.5, 18)	
Cylinder head bolt	6	9	36 (3.6, 26)	
Cam sprocket bolt	2	7	20 (2.0, 14)	
Rocker arm shaft	2	14	28 (2.8, 20)	
Sub-rocker arm shaft (IN)	2	14	28 (2.8, 20)	
(EX)	2	12	23 (2.3, 17)	
Cylinder head cover bolt (8 mm)	1	8	23 (2.3, 17)	
(6 mm)	1	6	10 (1.0, 7)	
(6 mm SH)	11	6	12 (1.2, 9)	
Spark plug	1	12	18 (1.8, 13)	Apply oil to the threads
Cylinder bolt	4	10	50 (5.0, 36)	
Cylinder nut	2	6	10 (1.0, 7)	
Clutch lock nut	1	18	110 (11.0, 80)	
Primary drive gear nut	1	18	110 (11.0, 80)	Apply a locking agent to the threads
Gearshift cam bolt	1	6	12 (1.2, 9)	
Stopper arm bolt	1	8	25 (2.5, 18)	Apply a locking agent to the threads
Right crankcase cover bolt/nut	11	6	12 (1.2, 9)	
Starter clutch bolt	6	8	30 (3.0, 22)	
Flywheel bolt	1	12	125 (12.5, 90)	Apply MoS <sub>2</sub> paste to the threads
Left crankcase cover bolt	7	6	12 (1.2, 9)	
Starter gear cover	5	6	12 (1.2, 9)	
Crankcase bolt	11	6	12 (1.2, 9)	
Center shift fork bolt	1	7	15 (1.5, 11)	

## FRAME

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE N·m (kg-m, ft-lb)	REMARKS
Down tube drain plug	1	10	35 (3.5, 25)	Apply a locking agent to the threads
Oil strainer nut	1	18	40 (4.0, 29)	
Oil hose flare nut	2	16	40 (4.0, 29)	
Fuel valve cup	1	—	4 (0.4, 3)	
Spoke	—	—	4 (0.4, 3)	
Engine hanger nut (10 mm)	5	10	60 (6.0, 43)	
(8 mm)	6	8	34 (3.4, 25)	
Skid plate bolt	3	6	10 (1.0, 7)	
Oil pipe flare nut	1	18	40 (4.0, 29)	
Handlebar upper holder	4	8	26 (2.6, 19)	
Handlebar lower holder	2	8	26 (2.6, 19)	
Brake disc bolt	4	8	38 (3.8, 27)	
Front axle nut	1	12	65 (6.5, 47)	
Front axle holder nut	4	6	12 (1.2, 9)	
Fork slider socket bolt	2	8	20 (2.0, 14)	
Lower fork pinch bolt	4	8	33 (3.3, 24)	
Fork cap bolt	2	—	23 (2.3, 17)	
Upper fork pinch bolt	4	8	28 (2.8, 20)	
Brake caliper bracket bolt	2	8	27 (2.7, 20)	
Steering adjustment nut	1	26	5 (0.5, 3.6)	
Steering stem nut	1	24	100 (10.0, 72)	



## GENERAL INFORMATION

ITEM	Q'TY	THREAD DIA. (mm)	TORQUE (kg-m, ft-lb)	REMARKS
Driven sprocket nut	6	10	46 (4.6, 33)	Apply oil to the threads
Rear axle nut	1	16	95 (9.5, 69)	
Brake arm nut	1	6	10 (1.0, 7)	
Shock absorber spring lock nut	1	—	90 (9.0, 65)	
Shock absorber mount nut	1	10	75 (7.5, 54)	
Shock absorber lower mount bolt	1	10	45 (4.5, 32)	
Shock arm-to-shock link nut	1	10	45 (4.5, 32)	
Shock link-to-swing arm nut	1	10	45 (4.5, 32)	
Shock arm-to-frame nut	1	10	45 (4.5, 32)	
Swingarm pivot nut	1	14	110 (11.0, 80)	
Breed valve	1	7	6 (0.6, 4)	Apply oil to the threads
Front brake caliper bracket bolt	2	8	27 (2.7, 20)	
Hanger pin	2	10	18 (1.8, 13)	
Hanger pin plug	2	10	2.5 (0.25, 1.8)	
Brake lever pivot nut	1	6	6 (0.6, 4)	
Master cylinder holder bolt	2	6	12 (1.2, 9)	
Brake hose nut (master cylinder side)	1	10	35 (3.5, 25)	
Brake hose joint nut	1	10	14 (1.4, 10)	
Brake pipe nut	1	10	14 (1.4, 10)	
Brake hose bolt	1	10	35 (3.5, 25)	
Caliper pin bolt	1	8	23 (2.3, 17)	Apply a locking agent to the threads
Caliper bracket pin bolt	1	8	13 (1.3, 9)	
Exhaust pipe joint nut	4	8	22 (2.2, 16)	Apply a locking agent to the threads
Exhaust pipe protector bolt	2	6	10 (1.0, 7)	
Muffler band bolt	2	8	20 (2.0, 14)	Apply a locking agent to the threads
Muffler mounting bolt	3	8	25 (2.5, 18)	
Side stand pivot bolt	1	10	50 (5.0, 36)	
Rear carrier mounting bolt (AFTER '88:)	2	8	35 (3.5, 25)	

Torque specifications listed above are for the most important tightening points. If a specification is not listed, follow the standards below.

### STANDARD TORQUE VALUES

Item	Torque Values N·m (kg-m, ft-lb)	Item	Torque Values N·m (kg-m, ft-lb)
5 mm bolt and nut	5 (0.5, 3.5)	5 mm screw	4 (0.4, 3)
6 mm bolt and nut	10 (1.0, 7)	6 mm screw	9 (0.9, 7)
8 mm bolt and nut	22 (2.2, 16)	6 mm bolt with 8 mm head	9 (0.9, 7)
10 mm bolt and nut	35 (3.5, 25)	6 mm flange bolt and nut	12 (1.2, 9)
12 mm bolt and nut	55 (5.5, 40)	8 mm flange bolt and nut	27 (2.7, 20)
		10 mm flange bolt and nut	40 (4.0, 29)



## TOOLS

## SPECIAL

DESCRIPTION	TOOL NUMBER	REFER TO SECTION
Compression gauge attachment	07908—KK60000 or equivalent commercially available in U.S.A.	3
Cam chain tensioner holder	07973—MG30002 or 07973—MG30003	6
Valve guide reamer	07984—5510000 or 07984—657010C (U.S.A. only)	6
Universal bearing puller	07631—0010000	10
Bearing puller catch	07931—MK20100	10
Bearing remover	07936—MK50100	10
Remover handle	07936—KC10100	10
Remover sliding weight	07741—0010201	10
Needle race remover	07GMC—MK50100	10
Bearing remover shaft	07746—0060100	10
Puller shaft	07931—ME40000 or 07931—ME4000A	10
Assembly collar	07931—KF00100	10
Thread adaptor	07931—KF00200	10
Attachment, 78 x 90 mm	07GAD—SD40101	10
Fork seal driver	07947—KA50100	12
Fork seal driver attachment	07947—KF00100	12
Steering stem socket	07916—KA50100	12
Steering stem driver	07946—4300101 or 07946—MB00000	12
Ball race remover	07953—MJ10000	12
Ball race remover attachment	07953—MJ00100	12
Driver handle	07953—MJ00200	12
Driver shaft	07946—MJ00100	13
Needle bearing remover	07931—MA70000	13
Snap ring pliers	07914—3230001	14
Honda battery tester	07GMJ—0010000	16
Christie battery charger	MC 1012/2	16
Adjustable pin spanner	07702—0020001	12
Steering bearing attachment	GN HT54 (U.S.A. only)	
Bearing remover, 20 mm	07936—3710600	
Remover handle	07936—3710100	
Remover sliding weight	07936—3710200	

## GENERAL INFORMATION

### COMMON

DESCRIPTION	TOOL NUMBER	REFER TO SECTION
Spoke wrench C, 5.8 x 6.1 mm	07701-0020300 or equivalent commercially available in U.S.A.	3
Float level gauge	07401-0010000	4
Valve spring compressor	07757-0010000	6
Valve guide remover, 6.6 mm	07742-0010200 or 07984-6570100	6
Clutch center holder	07724-0050001 or equivalent commercially available in U.S.A.	8
Gear holder	07724-0010100 Not available in U.S.A.	8
Flywheel holder	07725-0040000 or equivalent commercially available in U.S.A.	9
Rotor puller	07733-0020001 or 07933-3290001 (U.S.A. only)	9
Torx bit (T40)	07703-0010100 or equivalent commercially available in U.S.A.	9
Driver	07749-0010000	10, 12, 13
Pilot, 35 mm	07746-0040800	10
Attachment, 52 x 55 mm	07746-0010400	10
Pilot, 25 mm	07746-0040800	10
Attachment, 42 x 47 mm	07746-0010300	10, 12, 13
Pilot, 40 mm	07746-0040900	10
Attachment, 32 x 35 mm	07746-0010100	10, 12, 13
Attachment, 62 x 68 mm	07746-0010500	10
Attachment I.D., 35 mm	07746-0030400	10
Bearing remover head, 15 mm	07746-0050400	10
Bearing remover shaft	07746-0050100	10, 13
Attachment, 72 x 75 mm	07746-0010800	10
Pilot, 20 mm	07746-0040500	10
Pilot, 15 mm	07746-0040300	12
Lock nut wrench, 30 x 32 mm	07716-0020400	12
Extension bar	07716-0020500	12
Bearing remover head, 17 mm	07746-0050500	13
Attachment, 37 x 40 mm	07746-0010200	13
Pilot, 17 mm	07746-0040400	13
Attachment, 24 x 26 mm	07746-0010700	13
Pilot, 20 mm	07746-0040500	13
Pilot, 22 mm	07746-0041000	13

### VALVE SEAT CUTTER

DESCRIPTION	TOOL NUMBER	REFER TO SECTION
Cutter holder, 6.6 mm	07781-0010201	} 9
Float cutter IN/EX 38.5 mm (32°)	07780-0012400	
Interior cutter IN/EX 37.5 mm (60°)	07780-0014100	
Seat cutter IN 40.0 mm (45°)	07780-0010500	
Seat cutter EX 35.0 mm (45°)	07780-0010400	

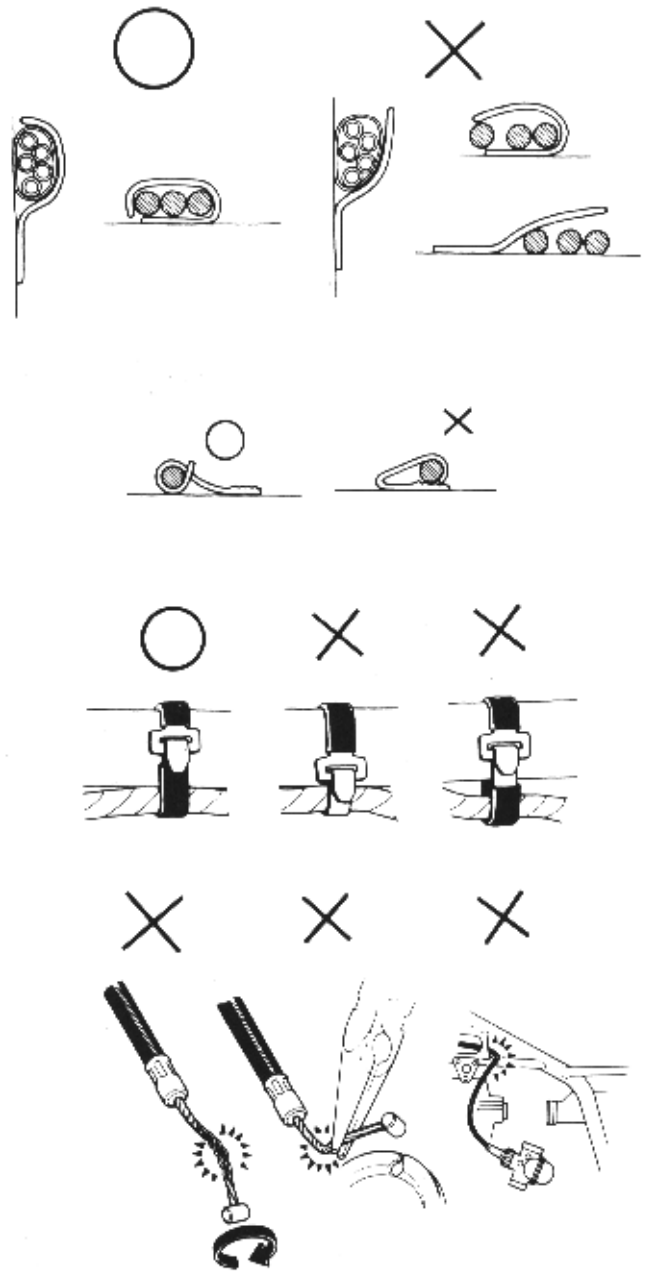
### TESTERS

DESCRIPTION	TOOL NUMBER	REFER TO SECTION
Digital multi-tester (KOWA)	07411-0020000 or KS-AHM-32-003 (U.S.A. only)	16, 17, 18, 19
Circuit tester (SANWA) or Circuit tester (KOWA)	07308-0020000 TH-5H	

## CABLE & HARNESS ROUTING

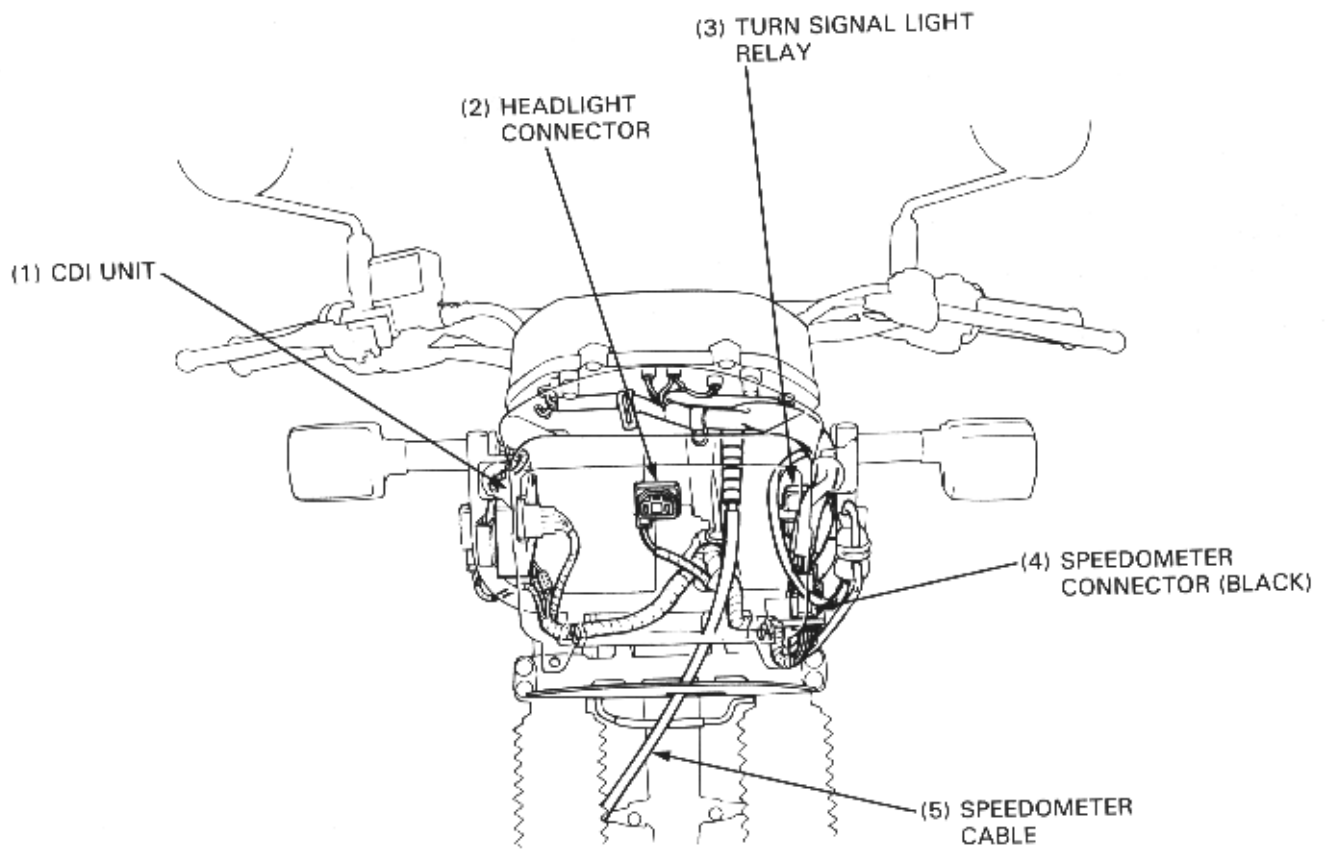
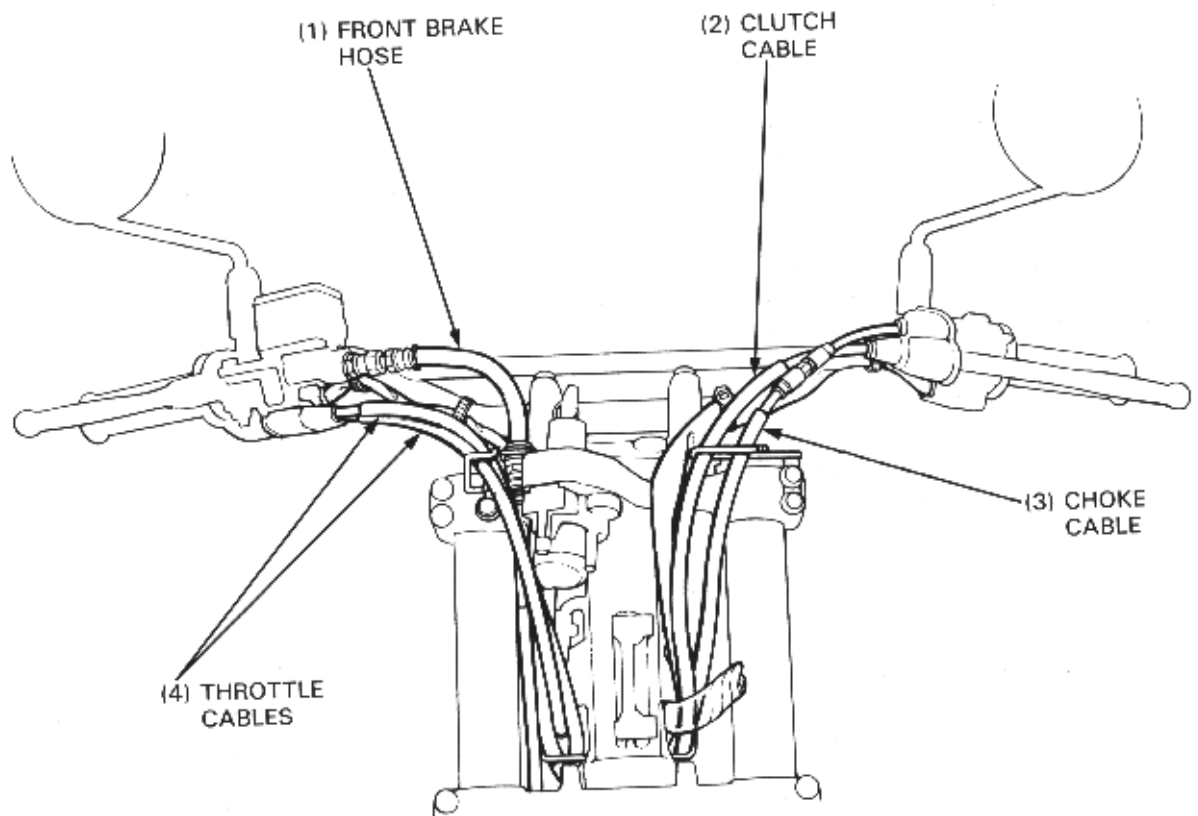
Note the following when routing cables and wire harnesses:

- A loose wire, harness or cable can be a safety hazard. After clamping, check each wire to be sure it is secure.
- Do not squeeze wires against a weld or the end of a clamp.
- Secure wires and wire harnesses to the frame with bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Route harnesses so they are not pulled taut or have no excessive slack.
- Protect wires and harnesses with electrical tape or tubing where they contact a sharp edge or corner.
- Do not use wires or harnesses with damaged insulation. Repair by wrapping them with protective tape or replace them.
- Route wire harnesses to avoid sharp edges or corners.
- Also avoid the projected ends of bolts and screws.
- Keep wire harnesses away from the exhaust pipes and other hot parts.
- Be sure grommets are seated in their grooves properly.
- After clamping, check each harness to be certain that it is not interfering with any moving or sliding parts.
- After routing, check that the wire harnesses are not twisted or kinked.
- Wire harnesses routed along the handlebar should not be pulled taut, have excessive slack, or interfere with adjacent or surrounding parts in all steering positions.
- Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.

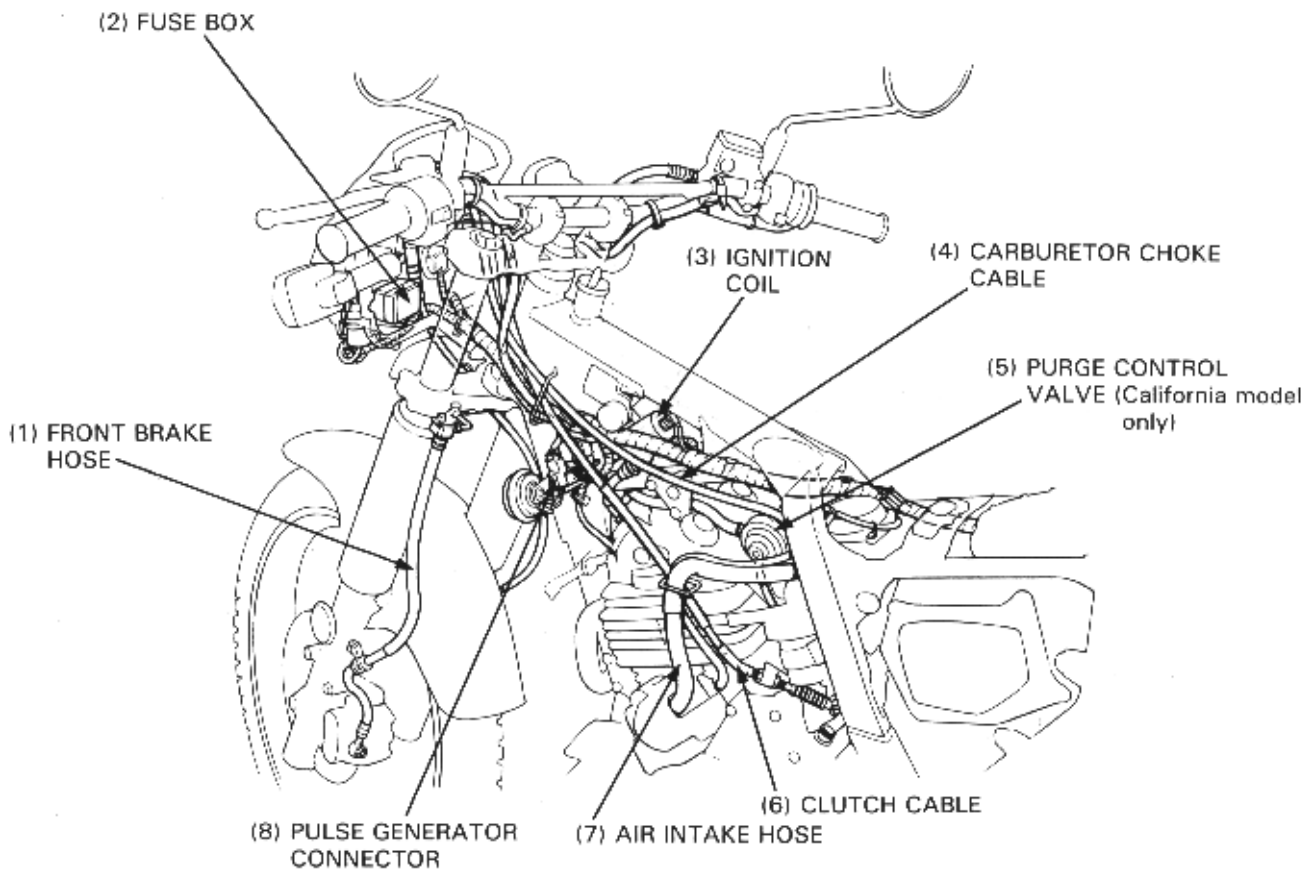


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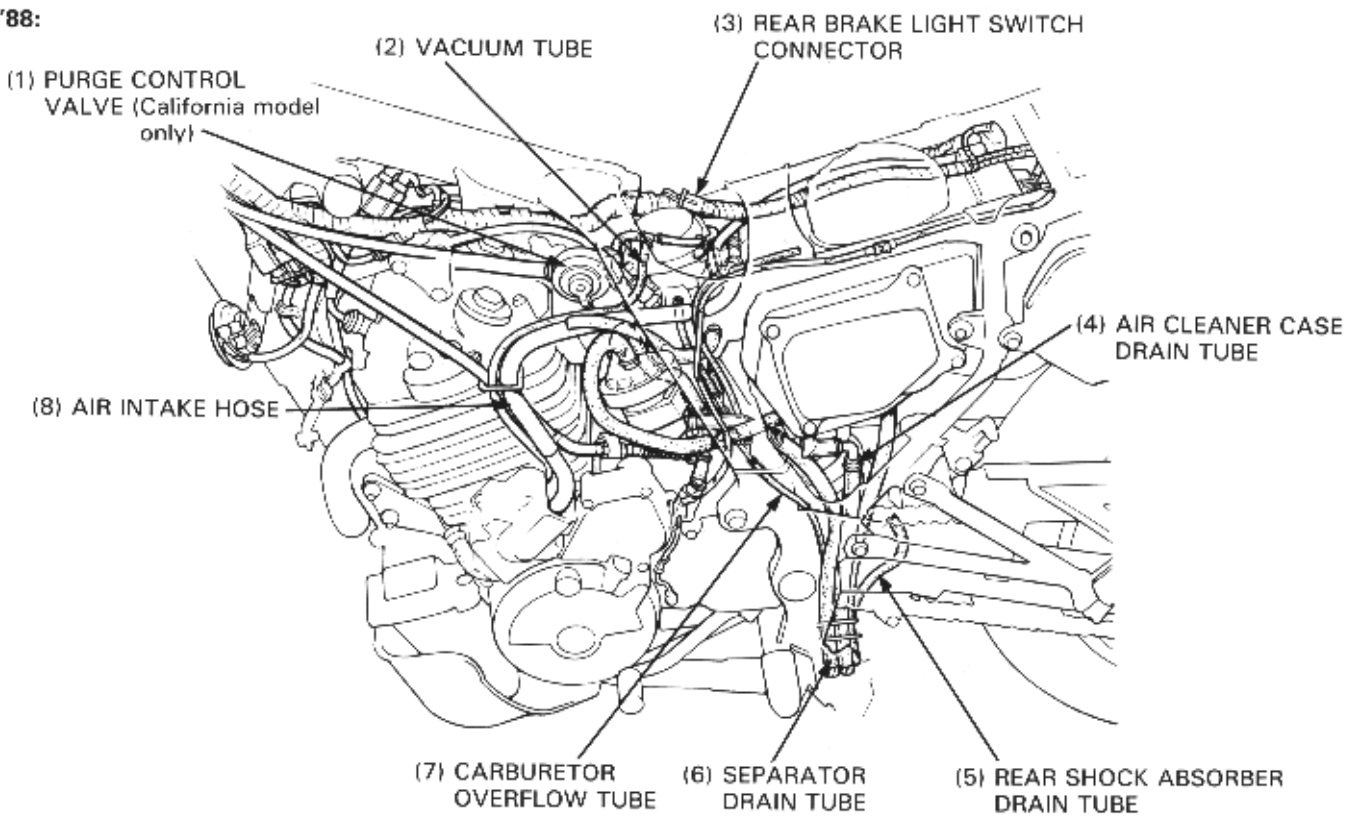
**GENERAL INFORMATION**



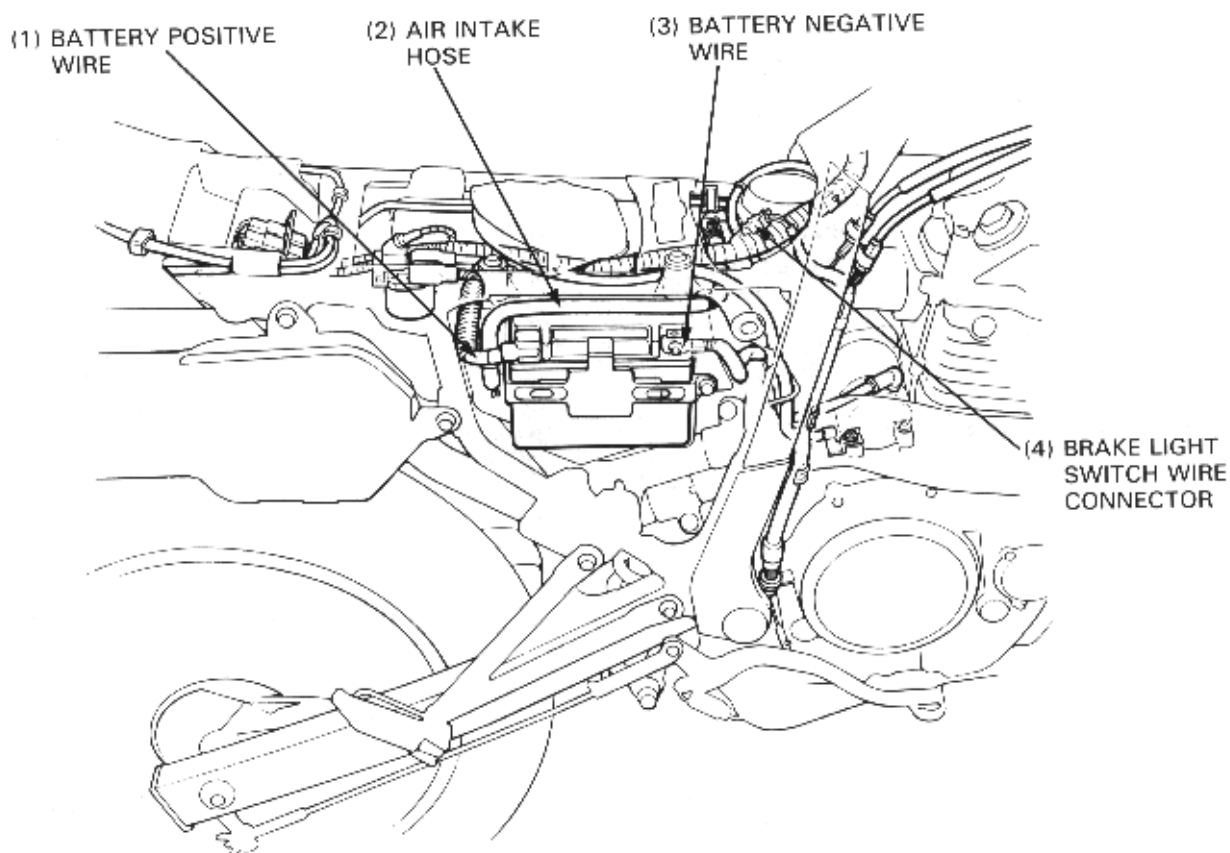
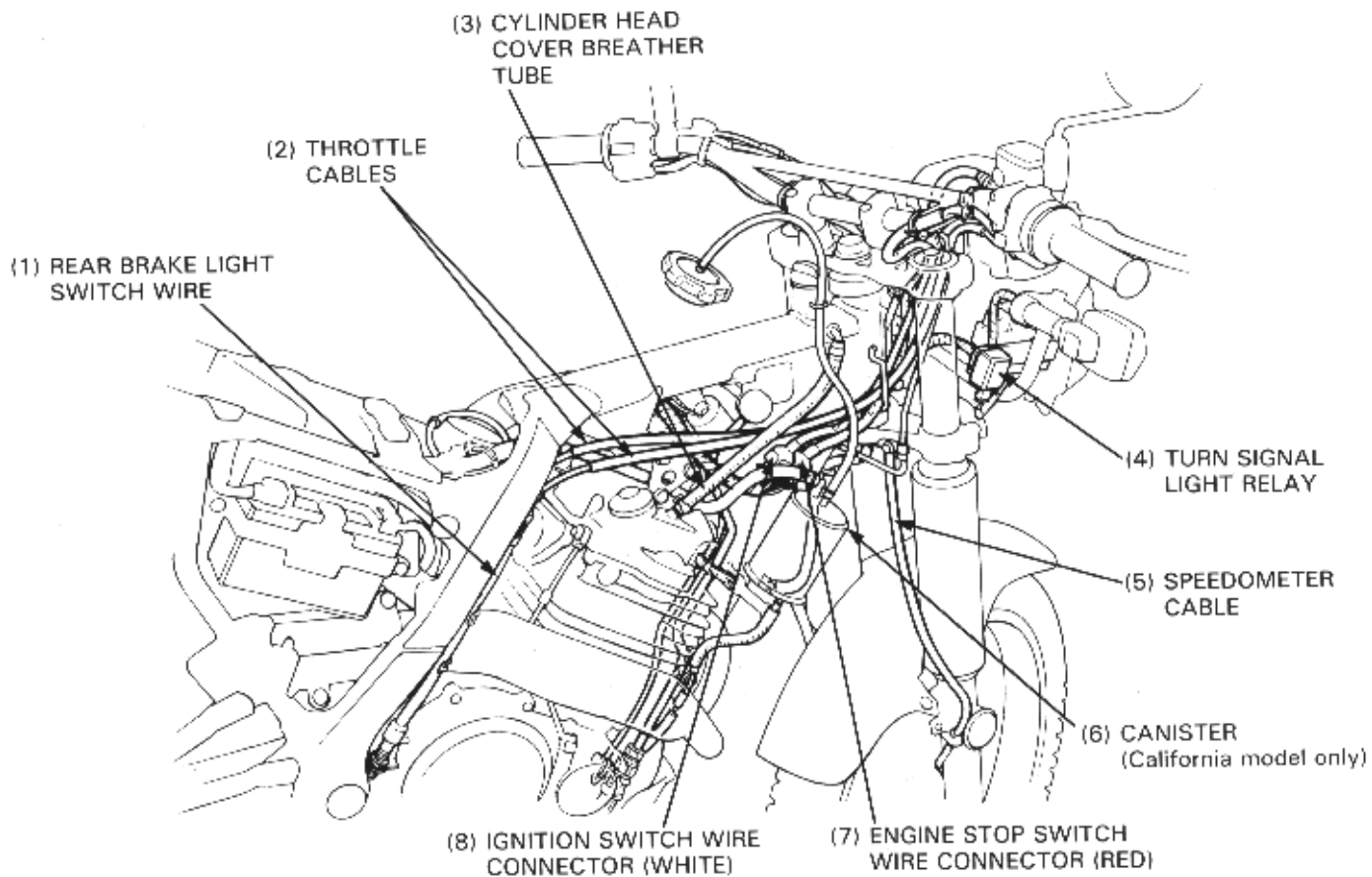
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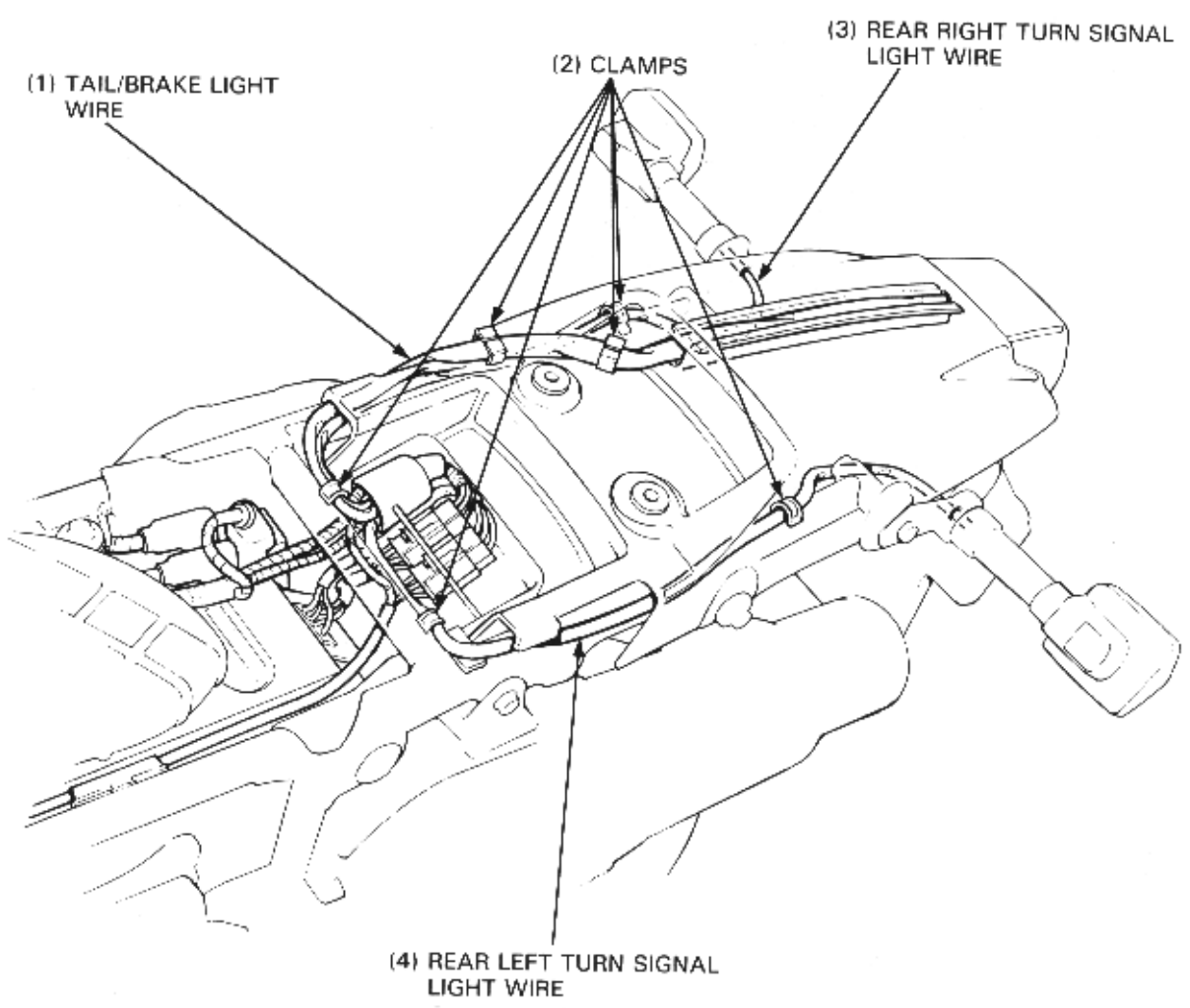
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**GENERAL INFORMATION**



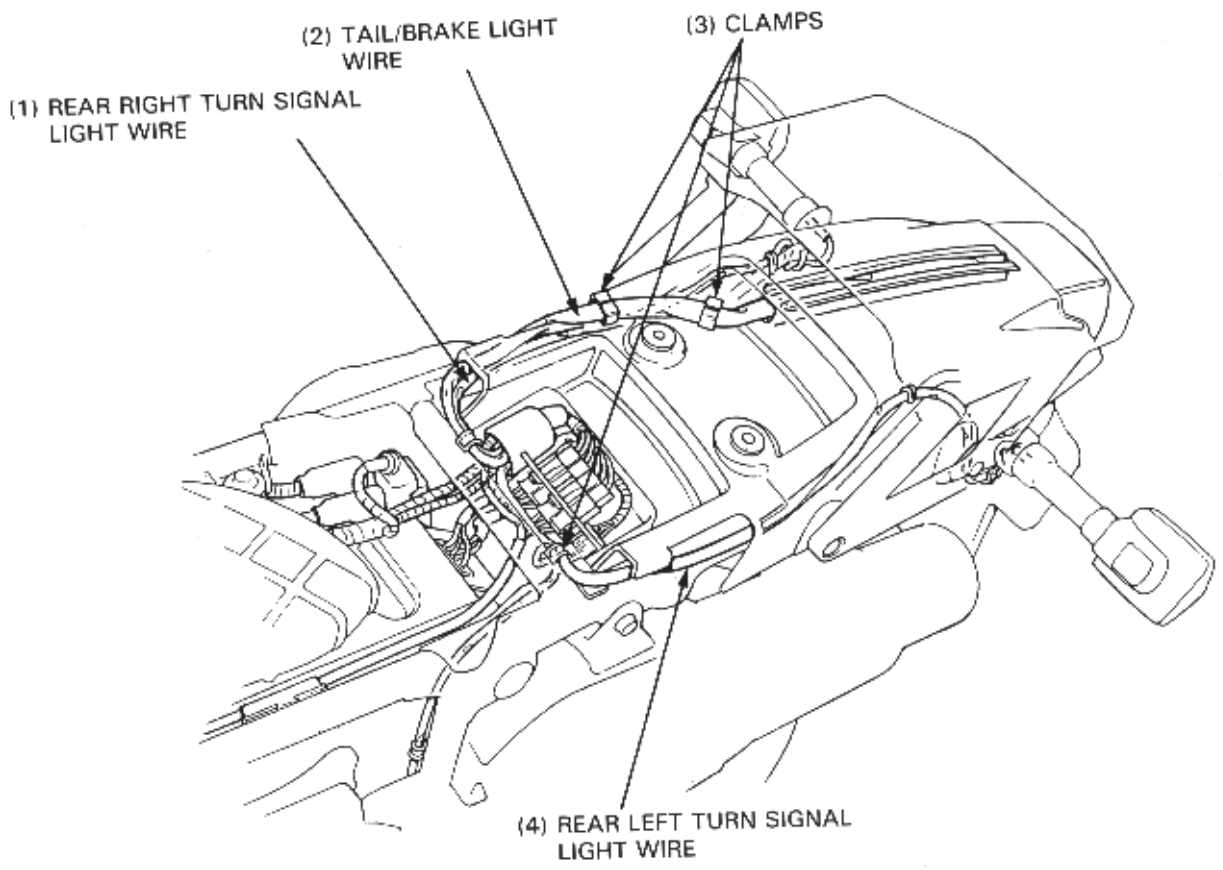
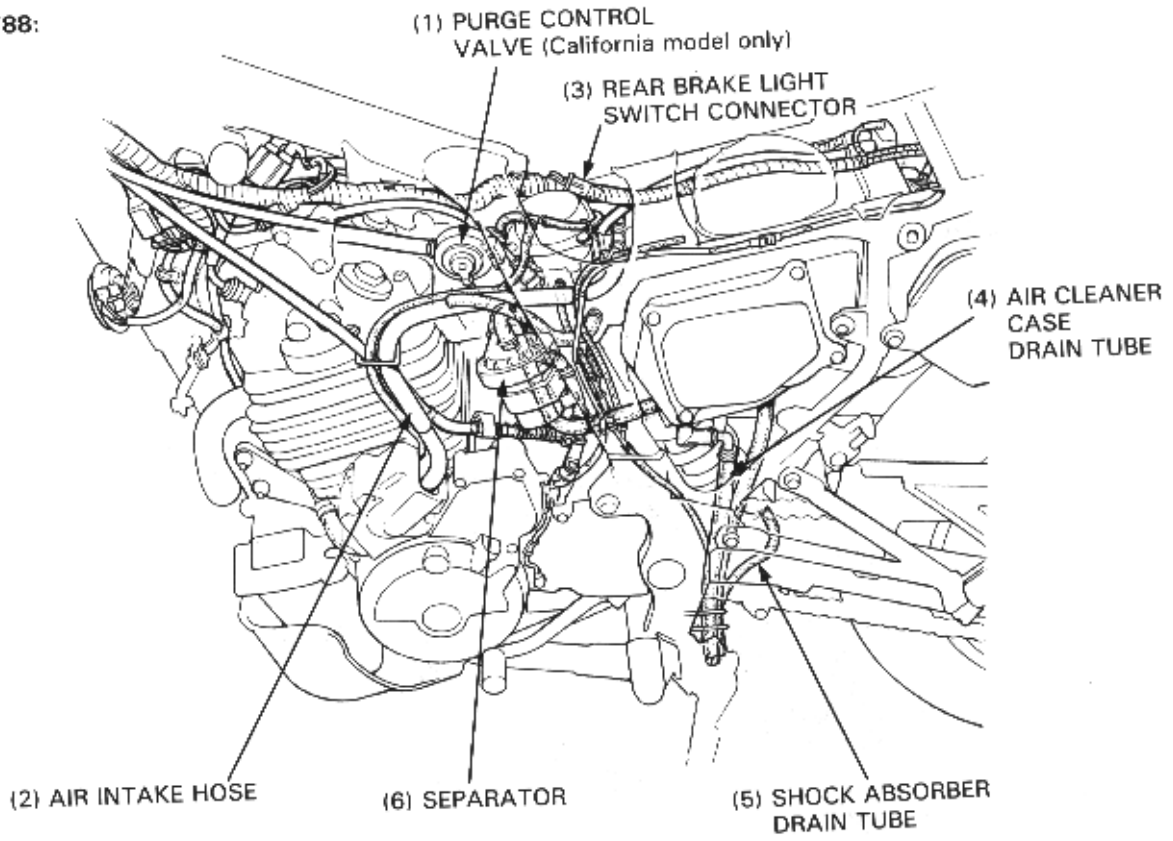
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# GENERAL INFORMATION

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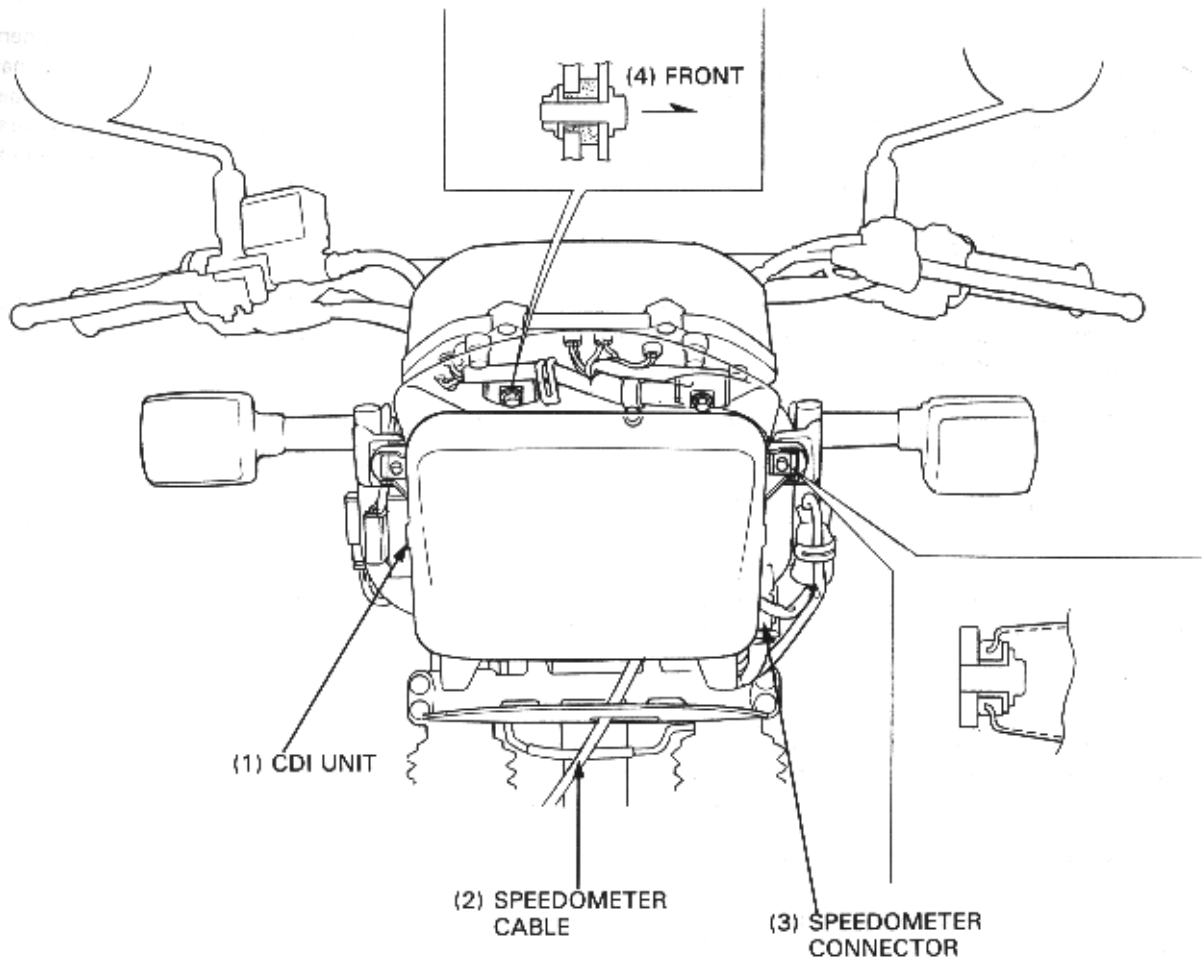
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## GENERAL INFORMATION

# EMISSION CONTROL SYSTEMS

The U.S. Environmental Protection Agency and California Air Resources Board (CARB) require manufacturers to certify that their motorcycles comply with applicable exhaust emissions standards during their useful life, when operated and maintained according to the instructions provided, and that motorcycles built after January 1, 1983 comply with applicable noise emission standards for one year or 6,000 km (3,730 miles) after the time of sale to the ultimate purchaser, when operated and maintained according to the instructions provided. Compliance with the terms of the Distributor's Limited Warranty for Honda Motorcycle Emission Control Systems is necessary in order to keep the emissions system warranty in effect.

## SOURCE OF EMISSIONS

The combustion process produces carbon monoxide and hydrocarbons. Control of hydrocarbons 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.

## EXHAUST EMISSION CONTROL SYSTEM

### Except for California:

The exhaust emission control system is composed of a lean carburetor setting, and no adjustments should be made except idle speed adjustment with the throttle stop screw. The exhaust emission control system is separate from the crankcase emission control system.

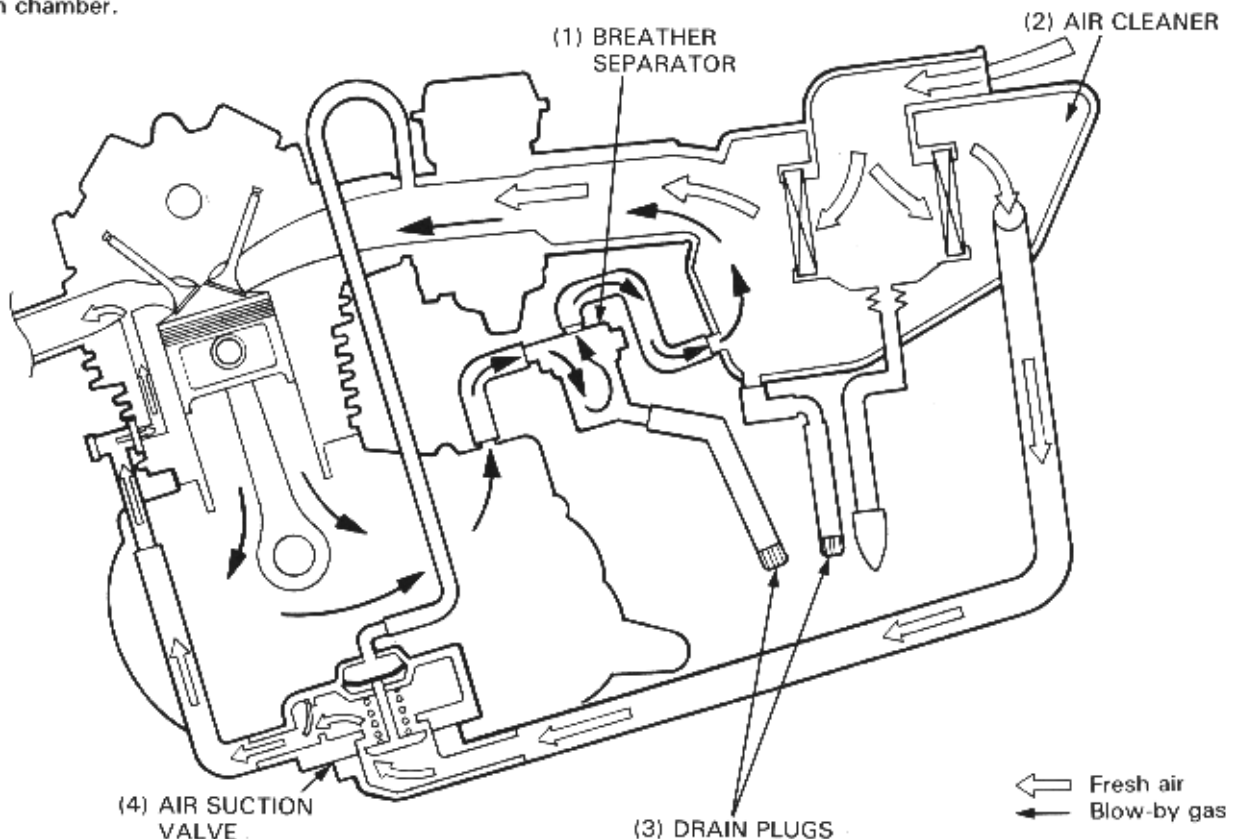
### California only:

The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. No adjustments to this system should be made, although periodic inspection of the components is recommended. The secondary air supply system helps improve emission performance.

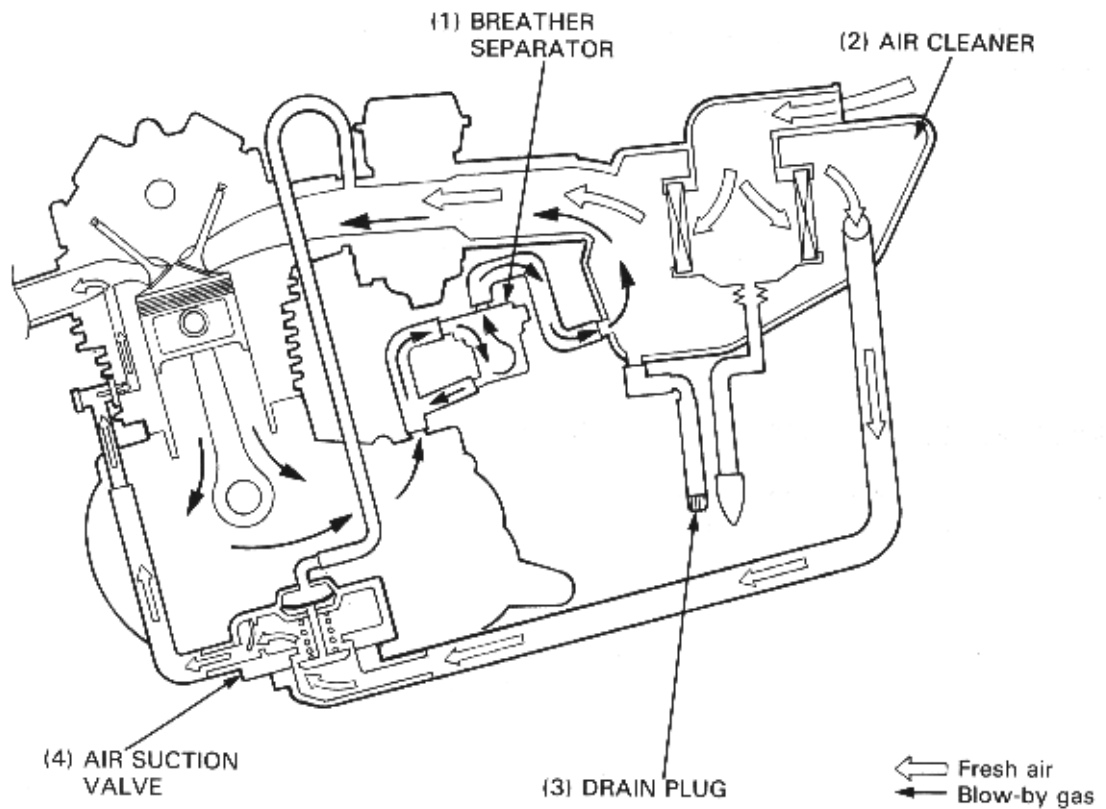
## CRANKCASE EMISSION CONTROL SYSTEM

The engine is equipped with a closed crankcase system which routes crankcase emissions through the air cleaner into the combustion chamber.

'88:

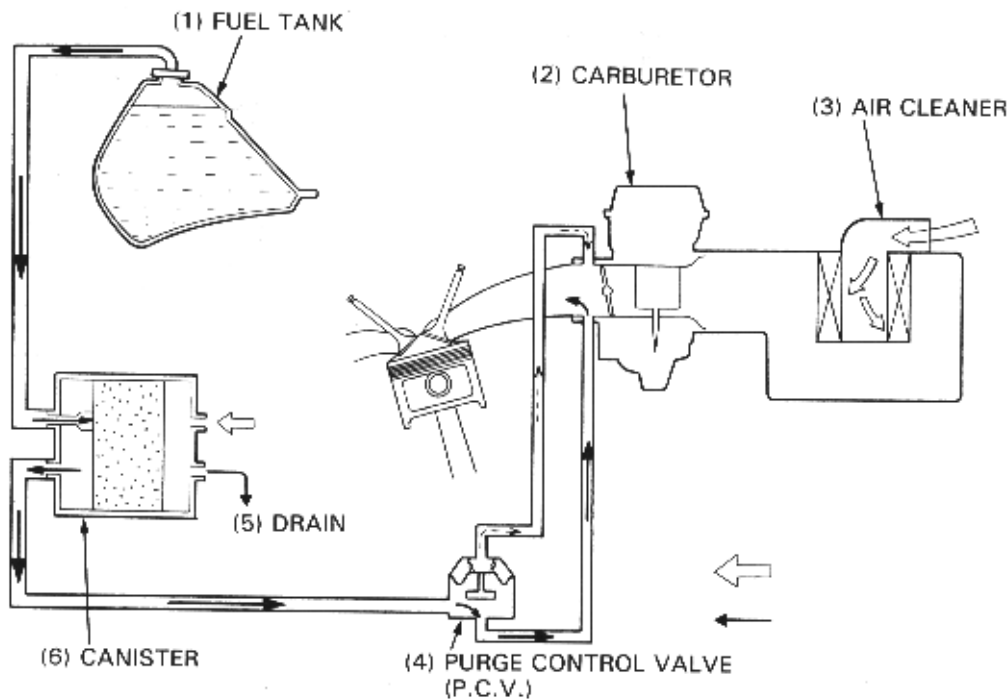


AFTER '88:



EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)

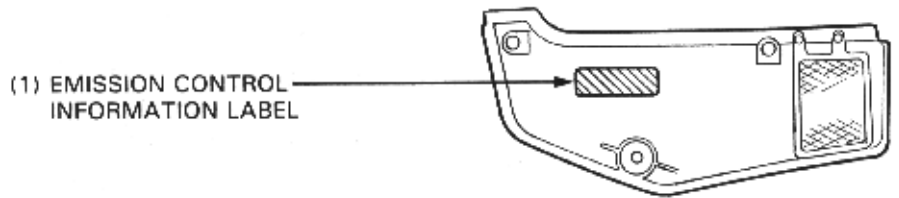
This model complies with California Air Resources Board evaporative emission requirements. Fuel vapor from the fuel tank and carburetor is directed into the charcoal canister where it is adsorbed and stored while the engine is stopped. When the engine is running and the purge control diaphragm valve is open, fuel vapor in the charcoal canister is drawn into the engine through the carburetor.



## GENERAL INFORMATION

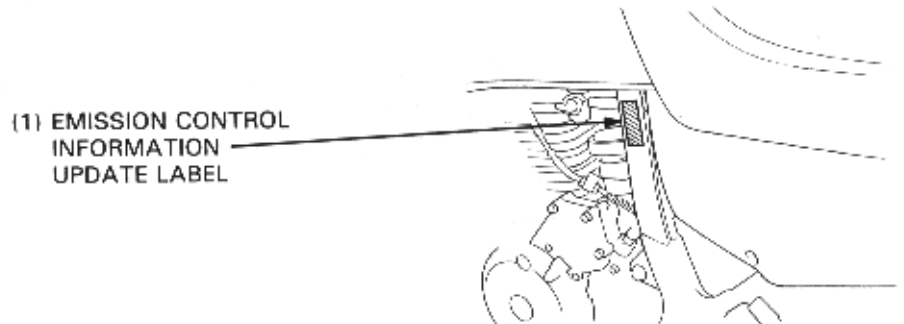
### EMISSION CONTROL INFORMATION LABELS (U.S.A. only)

An Emission Control Information Label is located on the inside of the right side cover as shown. It contains basic tune-up specifications.



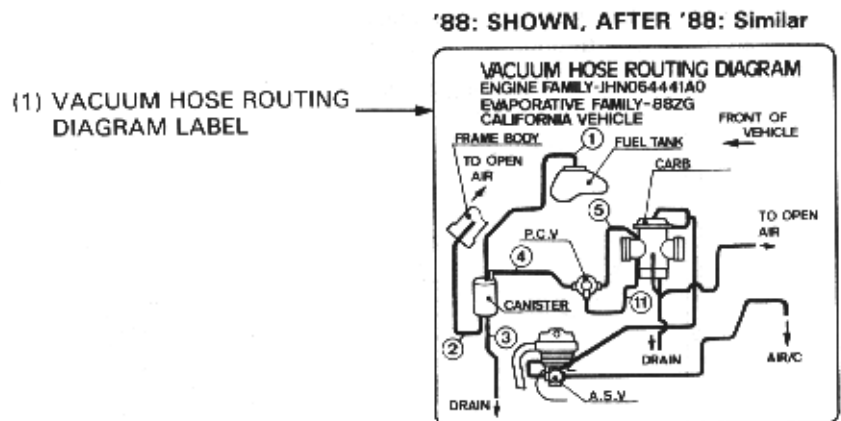
### EMISSION CONTROL INFORMATION UPDATE LABEL

After making a high altitude carburetor adjustment (page 4-17), attach an update label on the right side frame down pipe. Instructions for obtaining the update label are given in Service Letter No. 132.



### VACUUM HOSE ROUTING DIAGRAM LABEL (California model only)

The Vacuum Hose Routing Diagram Label is on the inside of the left side cover. Route the vacuum hoses as shown on this label.



**NOISE EMISSION CONTROL SYSTEM**

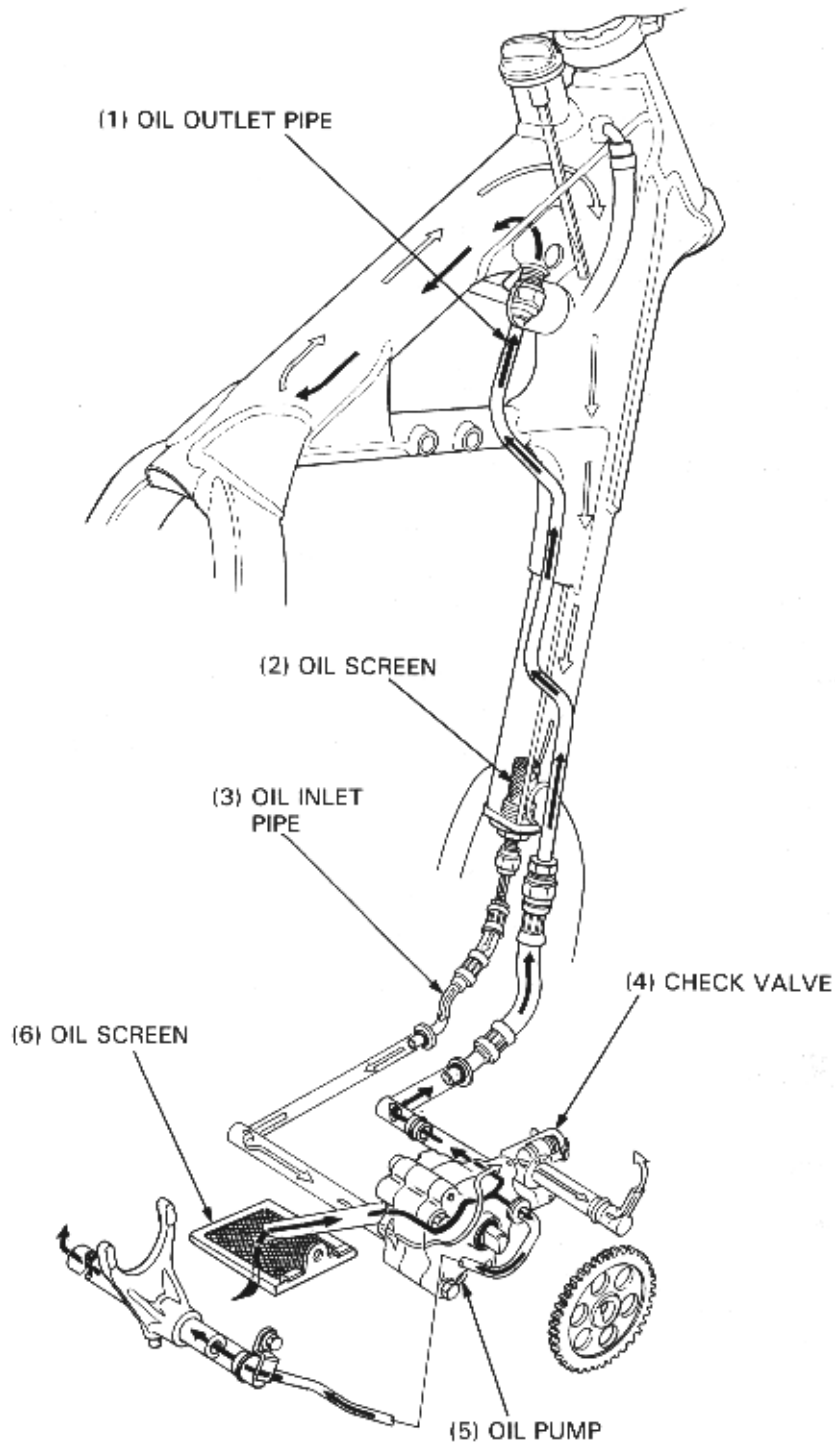
**TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED:** Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new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

**AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:**

1. Removal of, or puncturing of the muffler, baffles, header pipes or any other component which conducts exhaust gases.
2. Removal of, or puncturing of any part of the intake system.
3. Lack of proper maintenance.
4. Replacing any moving parts of the vehicle, or parts of the exhaust or intake system, with parts other than those specified by the manufacturer.

## 2. LUBRICATION

SERVICE INFORMATION	2-2	OIL PIPE INSPECTION	2-4
TROUBLESHOOTING	2-2	OIL STRAINER SCREEN CLEANING	2-4
ENGINE OIL LEVEL CHECK	2-3	OIL STRAINER NUT	2-5
ENGINE OIL CHANGE	2-3	OIL PUMP	2-5
ENGINE OIL FILTER REPLACEMENT	2-4	LUBRICATION POINTS	2-14





## LUBRICATION

# SERVICE INFORMATION

### GENERAL

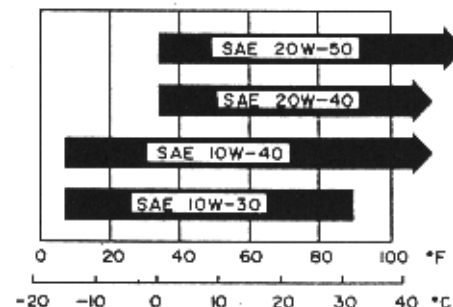
- This section describes inspection and replacement of engine oil and the oil filter, the cleaning of the oil strainer and oil pump servicing procedures.

### 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.*

### SPECIFICATIONS

Oil capacity	2.3 liters (2.4 U.S. qt, 2.0 Imp qt) at engine assembly 1.9 liters (2.0 U.S. qt, 1.7 Imp qt) at oil change 1.95 liters (2.06 U.S. qt, 1.72 Imp qt) at oil and oil filter change
Recommended oil	Honda 4-Stroke Oil or equivalent API Service Classification: SE or SF VISCOSITY: SAE 10 W-40 or 20 W-50



### NOTE

- Use SAE 10 W-40 oil when the outside temperature is below 0° C (32° F).

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

ITEM	STANDARD	SERVICE LIMIT
Oil pump tip clearance	0.15 mm (0.006 in) MAX.	0.20 mm (0.008 in)
Oil pump body clearance	0.15-0.21 mm (0.006-0.008 in)	0.25 mm (0.010 in)
Oil pump end clearance	0.02-0.08 mm (0.001-0.003 in)	0.12 mm (0.005 in)
Oil pump delivery	Pump A: 7.5 liters (7.9 U.S. qt)/min. at 5,300 rpm Pump B: 10.0 liters (10.6 U.S. qt)/min. at 5,300 rpm	—

### TORQUE VALUES

Crankcase drain plug	25 N·m (2.5 kg-m, 18 ft-lb)
Down tube drain plug	35 N·m (3.5 kg-m, 25 ft-lb)
Oil filter cover bolt	9 N·m (0.9 kg-m, 7 ft-lb)
Oil strainer nut	40 N·m (4.0 kg-m, 29 ft-lb)
Oil inlet hose nut	40 N·m (4.0 kg-m, 29 ft-lb)

## TROUBLESHOOTING

#### Oil level too low

- Normal oil consumption
- External oil leaks
- Worn piston rings

#### Oil contamination

- Oil not changed often enough
- Faulty head gasket

#### Low oil pressure

- Faulty oil pump
- Oil pump driven gear broken

## ENGINE OIL LEVEL CHECK

Support the motorcycle upright on level ground. Start the engine and let it idle for approximately 5 minutes. Stop the engine then check the oil level with the oil filler cap/dipstick by inserting it in until the threads touch the filler neck. Do not screw the cap in when making this check. If the oil level is below the lower mark on the dipstick, fill to the upper level mark with the recommended oil.

## ENGINE OIL CHANGE

### NOTE

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

Remove the oil filler cap and drain plugs on the frame down tube and the left crankcase.

### 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.*

After the oil has drained, check that the drain plug sealing washers are in good condition, then install the plugs.

### TORQUE:

Crankcase drain plug: 25 N-m (2.5 kg-m, 18 ft-lb)

Downtube drain plug: 35 N-m (3.5 kg-m, 25 ft-lb)

### NOTE

- If maintenance is also scheduled for the oil filter and the strainer, do these before filling the frame oil tank with oil.
- The engine takes about 1.9 liters (2.0 U.S. qt, 1.7 Imp qt) at oil change. But since only a portion of that oil is held in the frame's oil tank, you cannot add the full amount initially.

Pour one liter (1.05 U.S. qt) of recommended oil (page 2-1) into the oil tank.

Install the oil filler cap/dipstick.

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

Stop the engine and add the recommended oil up to the upper level mark with the motorcycle upright.

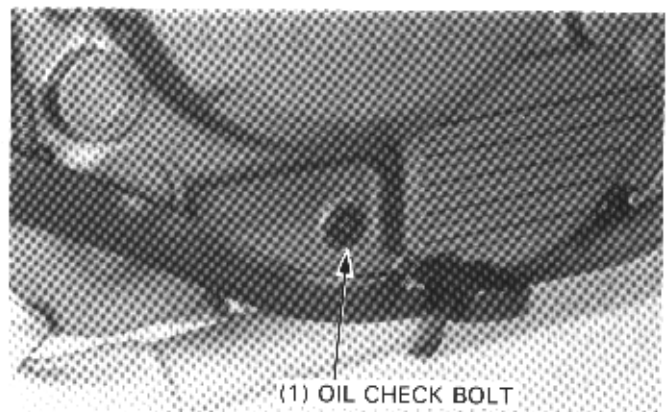
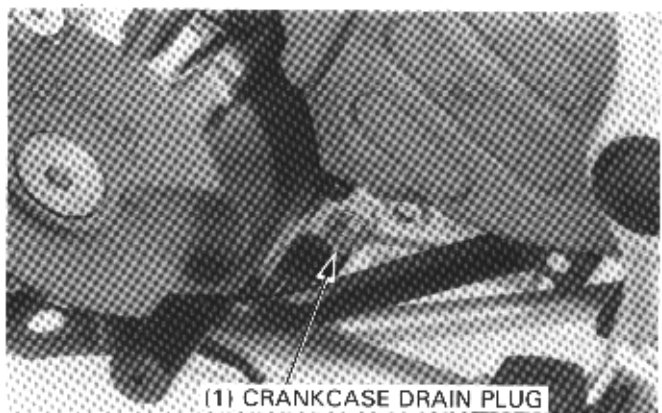
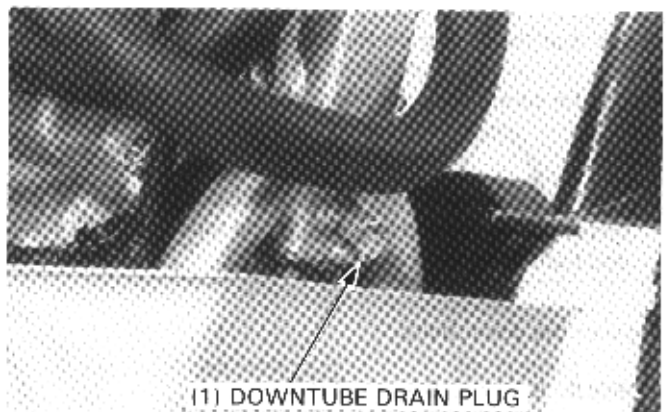
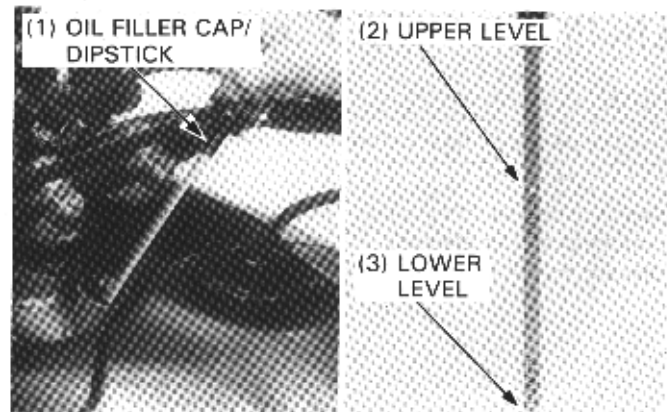
## CRANKCASE OIL CHECK BOLT

### NOTE

- The crankcase oil level check bolt is useful when checking the lubrication system; the oil pump adjusts the oil level so that the crankcase is always kept at the proper level. If this check shows otherwise, some portion of the lubrication system is not working properly.

Run the engine first, then stop the engine and wait a few minutes. Remove the oil check bolt.

The crankcase oil level is correct if the oil is flush with the bottom of the check bolt hole. Install the oil check bolt. Re-check the oil level with the oil filter cap/dipstick.



## LUBRICATION

### ENGINE OIL FILTER REPLACEMENT

#### NOTE

- Change the oil filter before filling the frame oil tank with oil.

Remove the oil filter cover from the right crankcase, then remove the filter element.  
Discard the oil filter element.

Check that the O-ring on the oil filter cover is in good condition.  
Install the spring, new oil filter element and oil filter cover.

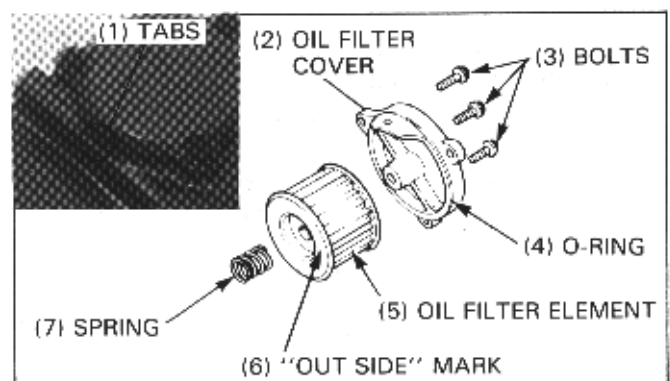
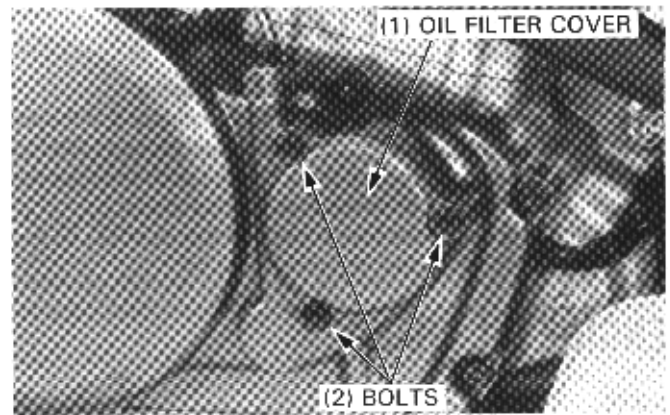
#### NOTE

- Install the element with the "OUT SIDE" mark facing out.
- Install the oil filter cover aligning the tabs on the filter cover and right crankcase cover.

Tighten the cover bolts.

**TORQUE: 9 N·m (0.9 kg-m, 7 ft-lb)**

Pour in the recommended oil (page 2-3) to the upper level on the fillter cap/dipstick.

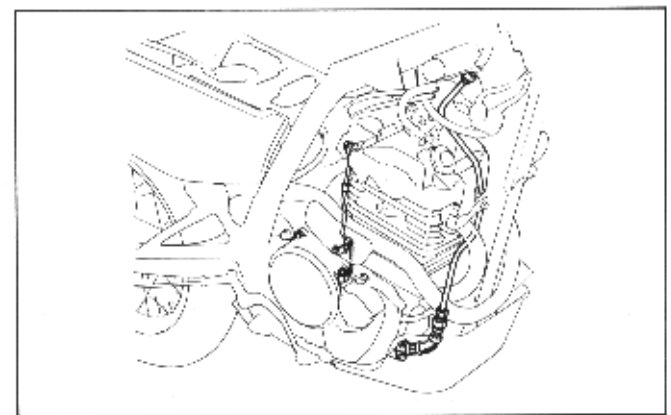


### OIL PIPE INSPECTION

Inspect the oil pipes for damage, bends or clogging and replace if necessary.

Refer to the following page for oil pipe replacement.

- Oil pass pipe (page 6-3)
- Oil outlet pipe (page 5-4, 5)
- Oil inlet hose (page 5-4, 5)



### OIL STRAINER SCREEN CLEANING

#### NOTE

- Perform this maintenance before filling the engine with oil.

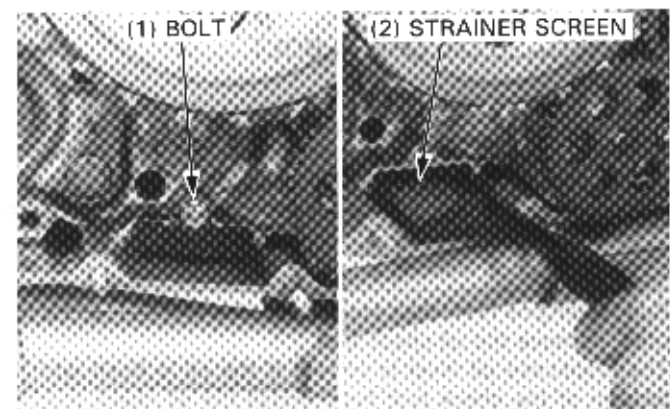
Remove the right crankcase cover (page 8-3).

Remove the oil strainer and clean it.

Install and secure the oil strainer with a bolt.

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

Fill the crankcase with the recommended oil (page 2-1).



## OIL STRAINER NUT

### NOTE

- Clean the screen on the oil strainer nut before filling the frame oil tank with oil.

Remove the oil drain bolt on the frame down tube to drain the oil.

Remove the skid plate (page 5-2).

Loosen the oil joint nut and disconnect the hose from the oil strainer nut.

Remove the oil strainer nut from the frame down tube.

Clean the screen on the oil strainer nut in solvent and blow dry with compressed air.

Check that the O-ring is in good condition.

Reinstall and tighten the oil strainer nut.

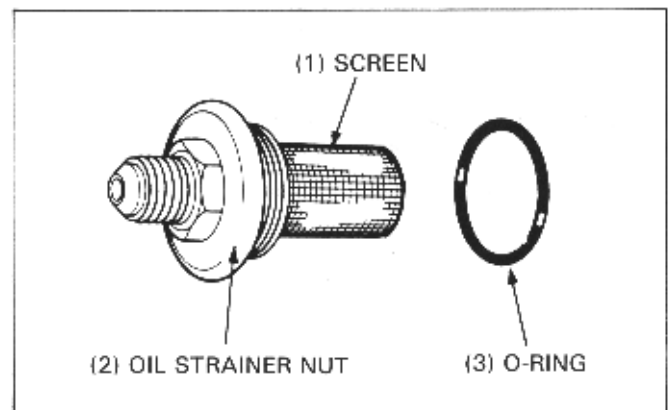
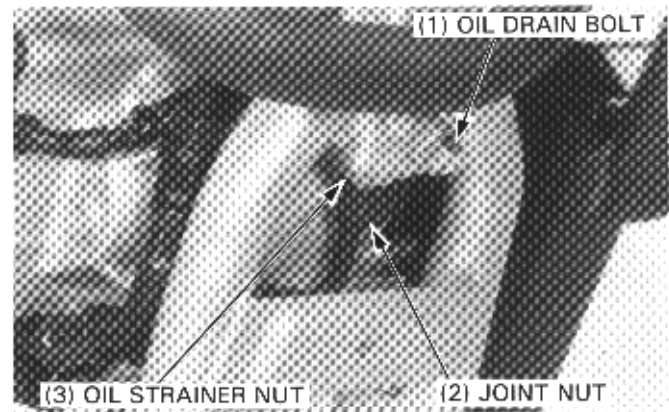
**TORQUE: 40 N·m (4.0 kg-m, 29 ft-lb)**

Connect the oil hose and secure it with the nut.

**TORQUE: 40 N·m (4.0 kg-m, 29 ft-lb)**

Reinstall the skid plate (page 5-5)

Fill the oil tank to the upper level with the recommended oil (page 2-1).

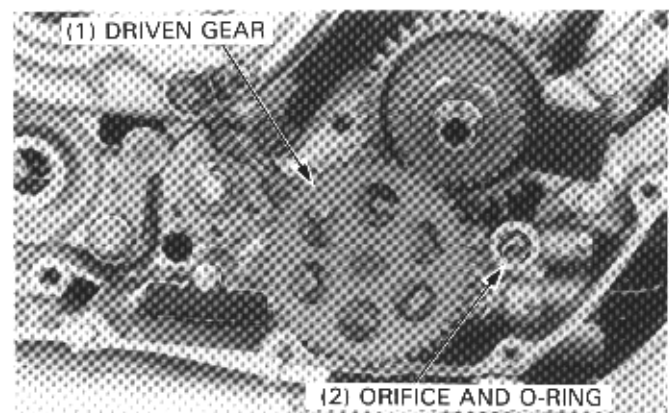


## OIL PUMP

### REMOVAL

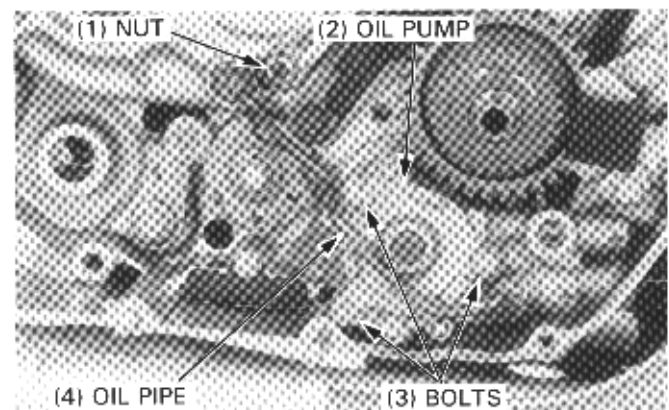
Remove the following:

- clutch (page 8-2)
- oil pump driven gear
- orifice and O-ring



Remove the following:

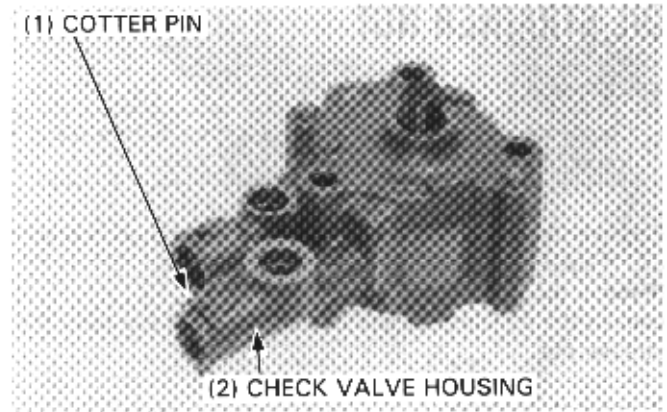
- bolt, nut and oil pipe
- oil pump attaching bolts and oil pump



## LUBRICATION

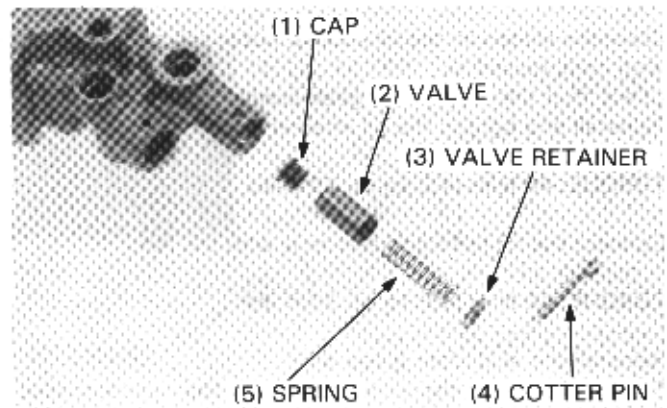
### CHECK VALVE

Remove the cotter pin, valve retainer, spring and check valve from the check valve housing.  
Discard the removed cotter pin.



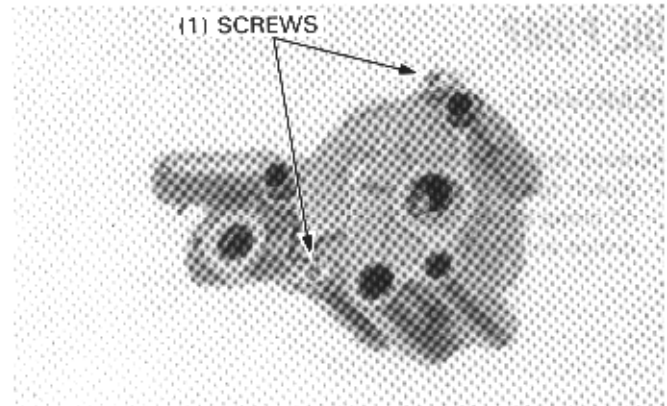
Inspect the valve and valve bore for scoring or contamination.  
Clean or replace as necessary.

Install the check valve, spring and valve retainer into the check valve housing, and secure them with a new cotter pin.



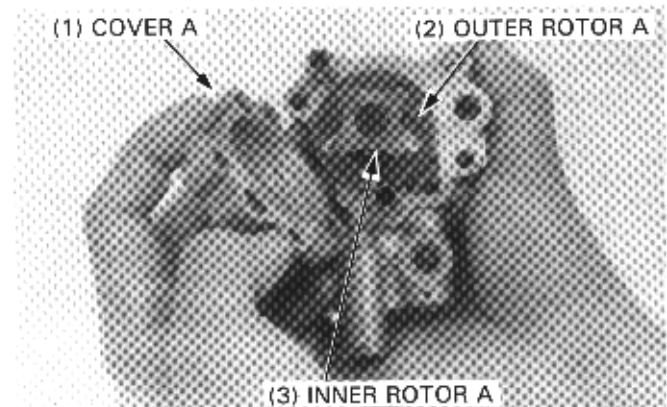
### DISASSEMBLY

Remove the oil pump screws.



Remove the following from the oil pump body.

- Oil pump cover A
- Outer rotor A
- Inner rotor A







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