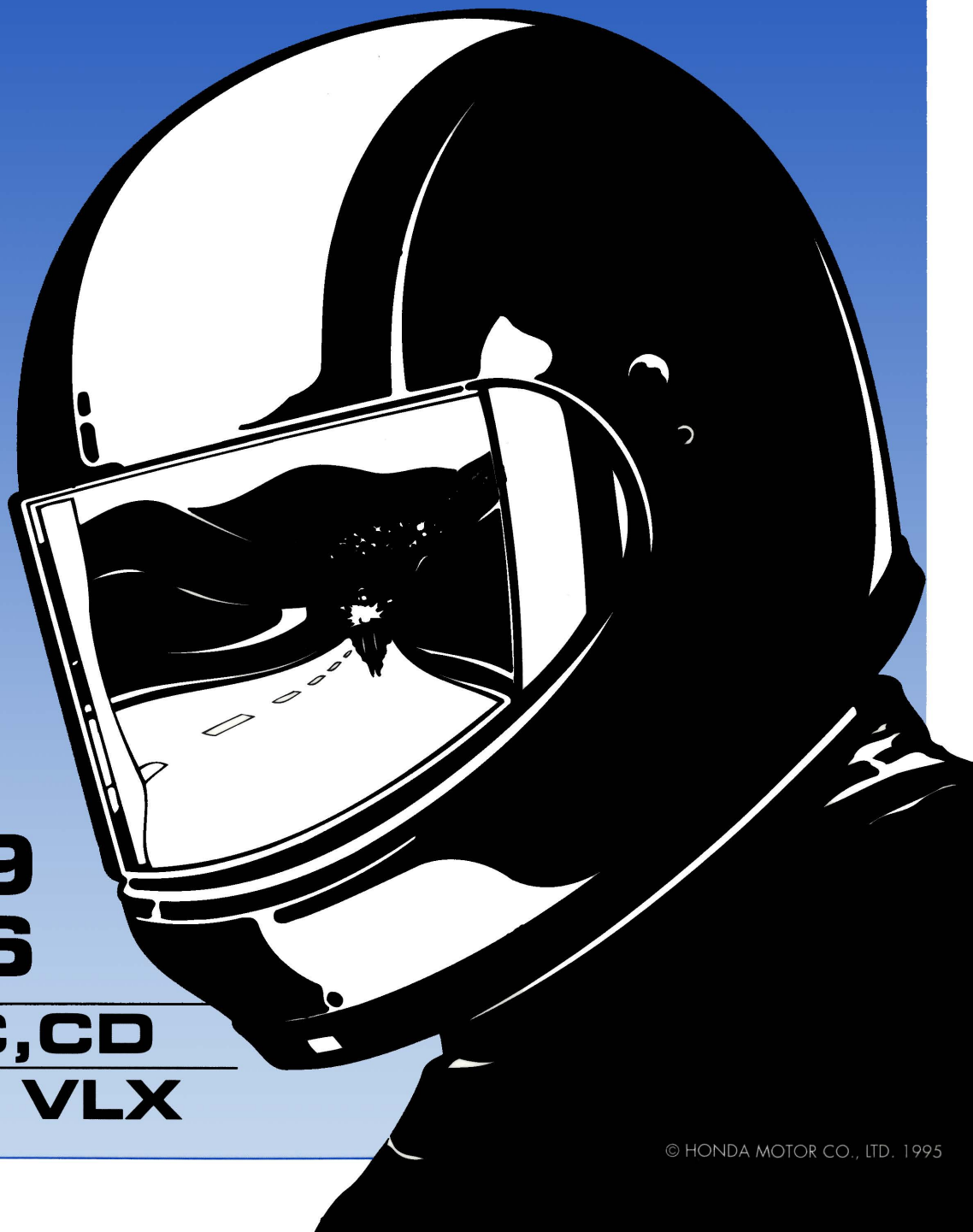


# **HONDA**

## **SERVICE MANUAL**



**88-89**

**91-96**

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**VT600C, CD**

**Shadow<sup>®</sup> VLX**

## IMPORTANT SAFETY NOTICE



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

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

**NOTE:** Gives helpful information.

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

## 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 standards set by the 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 19 describe parts of the motorcycle, grouped according to location.

Find the section you want on this page, then turn to the table of contents on the first page of 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 20, TROUBLESHOOTING.

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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 an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.*

### ⚠ WARNING

*The battery generates hydrogen gas which can be highly explosive. Do not smoke or allow flames or sparks near the battery, especially while charging it.*

### ⚠ WARNING

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

### ⚠ WARNING

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

### ⚠ WARNING

*The battery electrolyte contains sulfuric acid. Protect your eyes, skin and clothing. In case of contact, flush thoroughly with water and call a doctor if electrolyte gets in your eyes.*

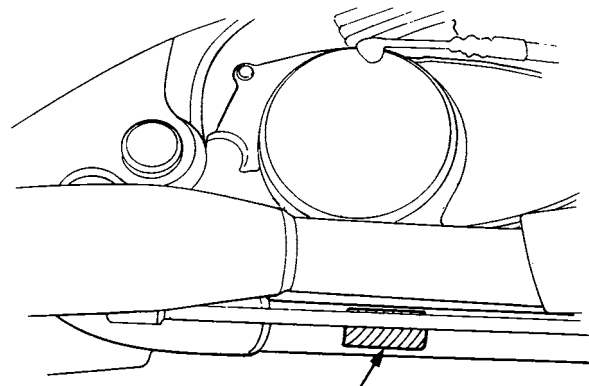
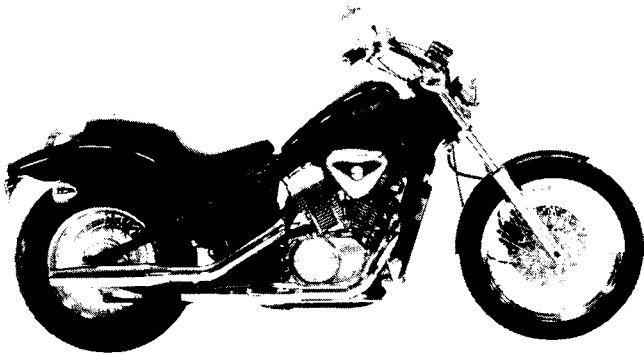
### CAUTION:

*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 equivalents. Parts that don't meet HONDA's design specifications may damage to the vehicle.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing the vehicle. 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 bolts first. Then tighten to the specified torque diagonally in 1-5 steps, unless a particular sequence is specified.
6. Clean parts in non-flammable or high flash point solvent upon disassembly.
7. Lubricate any sliding surfaces before reassembly.
8. After reassembly, check all parts for proper installation and operation.

## MODEL IDENTIFICATION



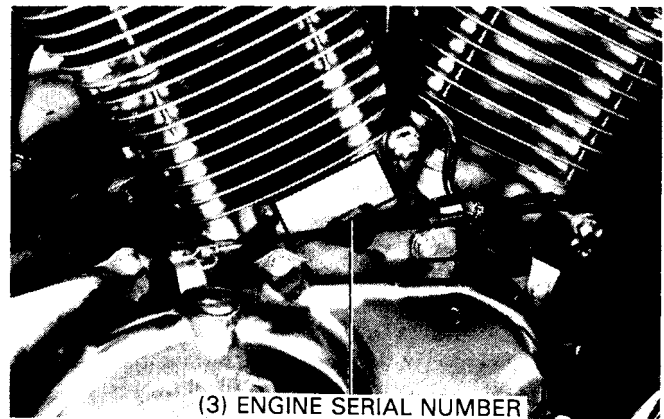
(1) VEHICLE IDENTIFICATION NUMBER

The vehicle identification number (VIN) is attached on the left side of the steering head.



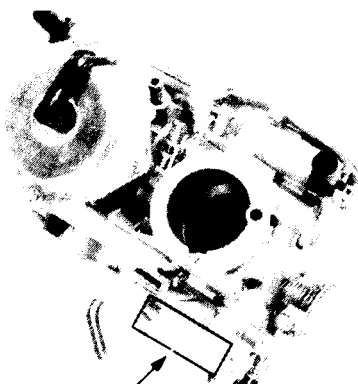
(2) FRAME SERIAL NUMBER

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



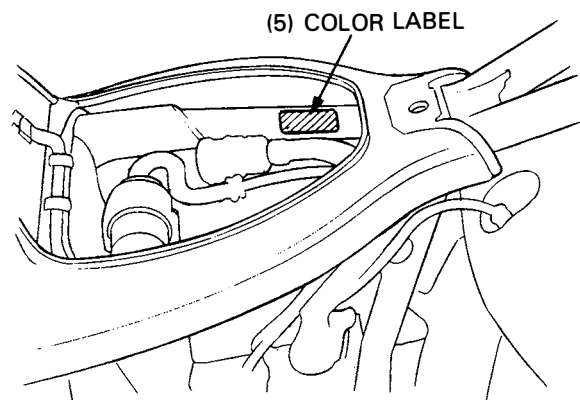
(3) ENGINE SERIAL NUMBER

The engine serial number is stamped on the right crankcase below the rear cylinder.



(4) CARBURETOR IDENTIFICATION NUMBER

The carburetor identification numbers are on the carburetor body intake side.



(5) COLOR LABEL

The color label is attached on the frame under the seat. When ordering a color coded part, always specify its designated color code.

## SPECIFICATIONS

| ITEM  |   | SPECIFICATIONS   |   |   |
|---|---|--|---|---|
| DIMENSIONS  | Overall length  | 2,310mm(90.9 in)   |   |   |
|   | Overall width '88,'89,'91-'94:<br>After'94:   | 760mm(29.9 in)<br>890mm(35.0 in)   |   |   |
|   | Overall height  | 1,125mm(44.3 in)   |   |   |
|   | Wheelbase   | 1,605mm(63.2 in)   |   |   |
|   | Seat height   | 690mm(27.2 in)   |   |   |
|   | Footpeg height  | 285mm(11.2 in)   |   |   |
|   | Ground clearance  | 140mm(5.5 in)  |   |   |
|   | Dry weight '88,'89,'91-93:<br>'94:<br>After'94 (Standard type):<br>After'94 (Delux type):   | 196kg(432 lb)<br>199kg(439 lb)<br>199kg(439 lb)<br>202kg(445 lb)                                   |   |   |
|   | Curb weight '88,'89,'91-93:<br>'94:<br>After'94 (Standard type):<br>After'94 (Deluxe type):<br>After'94 (Standard/California type):<br>After'94 (Deluxe/California type): | 207kg(456 lb)<br>213kg(470 lb)<br>213kg(470 lb)<br>216kg(476 lb)<br>214kg(472 lb)<br>217kg(478 lb) |   |   |
|   | FRAME   | Type   | Double cradle   |   |
|   |   | Front suspension, travel   | Telescopic fork, 146.5mm(5.77 in)   |   |
|   |   | Rear suspension, travel  | Swingarm, 90mm(3.5 in)  |   |
| Front tire size   |   | 100/90-19 57S  |   |   |
| Rear tire size  |   | 170/80-15 M/C 77S  |   |   |
| Cold tire pressure                                      |   | Up to maximum vehicle capacity   | Front   | 200 kPa(2.00 kg/cm <sup>2</sup> , 29 psi) |
|   |   |  | Rear  | 250 kPa(2.50 kg/cm <sup>2</sup> , 36 psi) |
|   |   | Up to 90 kg (200 lbs) load   | Front   | 200 kPa(2.00 kg/cm <sup>2</sup> , 29 psi) |
|   |   |  | Rear  | 200 kPa(2.00 kg/cm <sup>2</sup> , 29 psi) |
| Front brake   |   |  |   | Hydraulic single disc                     |
| Swept area '88,'89,'91-'93:<br>After'93:                |   |  | 448cm <sup>2</sup> (69.4 sq in)<br>482.3cm <sup>2</sup> (74.8 sq in)                                  |   |
| Rear brake  |   |  | Mechanical leading & trailing   |   |
| Swept area  |   |  | 201cm <sup>2</sup> (31.2 sq in)   |   |
| Fuel capacity '88,'89,'91-'93:<br>After'93:             |   |  | 9.0 liters(2.4 US gal, 2.0 Imp gal)<br>11.0 liters(2.9 US gal, 2.4 Imp gal)                           |   |
| Fuel reserve capacity '88,'89,'91-'93:<br>After'93      |   |  | 1.9 liters(0.5 US gal, 0.42 Imp gal)<br>3.4 liters(0.9 US gal, 0.74 Imp gal)                          |   |
| Caster angle  |   |  | 35°   |   |
| Trail   |   |  | 164mm(6.5 in)   |   |
| Fork leg oil capacity '88,'89:<br>'91-'93:<br>After'93: |   |  | 463cc(15.7 US oz, 13.0 Imp oz)<br>468cc(15.8 US oz, 13.2 Imp oz)<br>449cc(16.9 US oz, 15.8 Imp oz)    |   |
| ENGINE  | Type  |  | Water cooled 4-stroke SOHC  |   |
|   | Cylinder arrangement  |  | 52° V2 cylinders  |   |
|   | Bore and stroke   |  | 75.0×66.0mm(2.95×2.60 in)   |   |
|   | Displacement  |  | 583cc(35.5 cu-in)   |   |
|   | Compression ratio   |  | 9.2:1   |   |
|   | Valve train   |  | Silent, multi-link chain drive and OHC with rocker arms   |   |
|   | Oil capacity  |  | 2.8 lit(2.94 US qt, 2.46 Imp qt) after disassembly<br>2.1 lit(2.21 US qt, 1.85 Imp qt) after draining |   |
|   | Lubrication system  |  | Forced pressure and wet sump  |   |
|   | Air filtration  |  | Paper filter  |   |
|   | Cylinder compression  |  | 1,324 kPa(13.5kg/cm <sup>2</sup> , 192 psi)   |   |

# GENERAL INFORMATION

| ITEM        |  | SPECIFICATIONS   |                                    |
|-------------|--|--|------------------------------------|
| ENGINE      | Intake valve Opens<br>Closes   | 10° (BTDC) at 1 mm lift<br>30° (ABDC)  |                                    |
|             | Exhaust valve Opens<br>Closes  | 30° (BBDC)<br>10° (ATDC)   |                                    |
|             | Valve clearance(cold) intake<br>exhaust  | 0.15±0.02mm(0.006±0.0008 in)<br>0.20±0.02mm(0.008±0.0008 in)   |                                    |
|             | Engine dry weight '88,'89,'91-'93:<br>After'93:<br>After'94 (standard type):<br>After'94 (Deluxe type):  | 61kg (134 lb)<br>62kg (136.7 lb)<br>61kg (134 lb)<br>64kg (141 lb)   |                                    |
| CARBURETOR  | Type<br>I.D.number<br>Main jet<br>Pilot screw opening<br>Float level<br>Idle speed   | Piston valve,dual carburetor<br>See page 4-1<br>FRONT:#115 REAR:#115<br>See page 4-15<br>7.0 mm(0.28 in)<br>1,200±100 rpm  |                                    |
| DRIVE TRAIN | Clutch<br>Transmission<br>Primary reduction<br>Final reduction<br>Gear ratio I<br>Gear ratio II<br>Gear ratio III<br>Gear ratio IV<br>Gear shift pattern | Wet,multi-plate<br>4-speed constant mesh<br>1.888(68/36)<br>2.750(44/16)<br>2.571(36/14)<br>1.700(34/20)<br>1.227(27/22)<br>0.931(27/29)<br>Left foot operated return system,1-N-2-3-4 |                                    |
| ELECTRICAL  | Ignition   | Battery ignition(Full transistor)  |                                    |
|             | Ignition timing Initial '88,'89,'91-'93:<br>After '93:<br>Full advance   | 6.2° BTDC at idle<br>6.5° BTDC at idle<br>30° BTDC at 6,000 rpm  |                                    |
|             | Alternator   | 345W/5,000 rpm   |                                    |
|             | Battery capacity   | 12V 8AH  |                                    |
|             | Spark plug   |  |                                    |
|             |  | NGK  | NIPPONDENSO                        |
|             | Standard   | DPR8EA-9   | X24EPR-U9                          |
|             | For cold climate<br>(Below 5° C,41° F)   | DPR7EA-9   | X22EPR-U9                          |
|             | For extended high speed<br>riding  | DPR9EA-9   | X27EPR-U9                          |
|             | Spark plug gap   | 0.8-0.9 mm(0.031-0.035 in)   |                                    |
|             | Fuse   | Main   | 30 A                               |
|             |  | Sub  | 10 A×3,15 A×1                      |
|             | Starting system  | Electrical starter   |                                    |
|             | Headlight  | 12 V 60/55 W   |                                    |
|             | Turn signal light  | Front  | 12 V 32/3 CP(23/8 W)×2 SAE No.1034 |
|             |  | Rear   | 12 V 32 CP(23 W)×2 SAE No.1073     |
|             | Brake & taillight  | 12 V 32/3 CP(23/8 W)×2 SAE No.1034   |                                    |
|             | Meter light  | 12 V 3.4 W   |                                    |
|             | Indicator light  | Neutral  | 12 V 1.7 W                         |
|             |  | High beam  | 12 V 1.7 W                         |
|             |  | Turn signal  | 12 V 1.7 W                         |
|             | Licence light  | 12 V 4 CP  |                                    |
|             | Firing order   | Front(2)-Rear(1)308°   |                                    |



# TORQUE VALUES

## ENGINE

| ITEM                                | Q'ty | Thread dia.<br>(mm) | Torque<br>m (kg-m,ft-lb) | Remark                                  |
|-------------------------------------|------|---------------------|--------------------------|---|
| Cylinder head cover bolt            | 4    | 6                   | 10(1.0,7.2)              | Special bolt                            |
| Camshaft holder bolt                | 6    | 8                   | 23(2.3,17)               |   |
| nut                                 | 2    | 8                   | 23(2.3,17)               |   |
| bolt                                | 4    | 6                   | 10(1.0,7.2)              |   |
| Cylinder head nut                   | 8    | 10                  | 48(4.8,35)               |   |
| bolt                                | 2    | 8                   | 23(2.3,17)               |   |
| nut                                 | 4    | 8                   | 23(2.3,17)               |   |
| bolt                                | 2    | 6                   | 10(1.0,7.2)              |   |
| Camshaft sprocket bolt              | 4    | 7                   | 23(2.3,17)               | Apply locking agent                     |
| Primary drive gear bolt             | 1    | 12                  | 90(9.0,65)               | UBS bolt                                |
| Flywheel bolt                       | 1    | 12                  | 130(13.0,94)             | UBS bolt left hand threads              |
| Connecting rod bearing cap nut      | 4    | 8                   | 34(3.4,25)               | Apply oil to the threads                |
| Clutch lock nut                     | 1    | 18                  | 130(13.0,94)             |   |
| Oil pressure switch                 | 1    | -                   | 12(1.2,9)                | Apply sealant                           |
| Spark plug                          | 4    | 12                  | 14(1.5,10)               |   |
| Oil drain bolt                      | 1    | 14                  | 35(3.5,25)               |   |
| Starter clutch torx bolt            | 6    | 8                   | 30(3.0,22)               | Apply locking agent                     |
| Oli pump driven sprocket            | 1    | 6                   | 15(1.5,11)               | Flange socket bolt.Apply locking agent. |
| Oil pass pipe bolt                  | 2    | 7                   | 10(1.0,7.2)              |   |
|                                     | 1    | 8                   | 23(2.3,17)               |   |
| Valve adjusting screw lock nut      | 6    | 7                   | 23(2.3,17)               | Apply oil                               |
| Gearshift return spring pin         | 1    | 8                   | 26(2.6,19)               |   |
| Starter motor cable nut             | 1    | 6                   | 10(1.0,7.2)              |   |
| Clutch lifter plate bolt            | 4    | 6                   | 10(1.0,7.2)              | Flange bolt                             |
| Cam chain tensioner bolt            | 4    | 6                   | 10(1.0,7.2)              | Flange bolt                             |
| Oil filter                          | 1    | 20                  | 10(1.0,7.2)              |   |
| Drive sprocket bolt                 | 2    | 6                   | 10(1.0,7.2)              |   |
| Timing hole cap                     | 1    | 22                  | 3.5(0.35,2.5)            | Apply grease to the threads             |
| Crankshaft hole cap                 | 1    | 30                  | 15(1.5,11)               | Apply grease to the threads             |
| Cylinder stud bolt '88,'89,'91-'95: | 8    | 10                  | 30-50(3.0-5.0,<br>22-36) |   |
|                                     | 2    | 8                   | 20-30(2.0-3.0,<br>14-22) |   |
| Drum stopper plate bolt             | 1    | -                   | 12(1.2,9)                | Apply locking agent.                    |
| Stator bolt                         | 4    | 6                   | 12(1.2,9)                | Apply locking agent.                    |
| Stator wire clamp bolt              | 2    | 6                   | 12(1.2,9)                | Apply locking agent.                    |
| Right crankcase cover bolt          | 13   | 6                   | 12(1.2,9)                |   |
| Left crankcase cover bolt           | 10   | 6                   | 12(1.2,9)                |   |

# GENERAL INFORMATION

## FRAME

| ITEM                               | Q'ty             | Thread dia.<br>(mm) | Torque<br>N•m(Kg-m,ft-lb) | Remark                   |  |
|------------------------------------|------------------|---------------------|---------------------------|--------------------------|--|
| Steering stem nut                  | 1                | 24                  | 105(10.5,76)              |                          |  |
| Steering bearing adjustment nut    | 1                | 26                  | 25(2.5,18)                | See page 12-23           |  |
| Fork top pinch bolt                | 2                | 7                   | 11(1.1,8)                 |                          |  |
| Fork bottom pinch bolt             | 2                | 10                  | 50(5.0,36)                | Apply oil to the threads |  |
| Front axle                         | 1                | 18                  | 75(7.5,54)                |                          |  |
| Front axle pinch bolt              | 2                | 7                   | 22(2.2,16)                |                          |  |
| Rear axle nut                      | 1                | 16                  | 90(9.0,65)                |                          |  |
| Brake torque rod nut               |                  | 8                   | 27(2.7,20)                |                          |  |
| '88,'89,'91-'93, After '94:        | 2                | 8                   | 22(2.2,16)                |                          |  |
| '94:                               | 2                | 8                   | 27(2.7,20)                |                          |  |
| Middle brake arm                   | 1                | 8                   | 27(2.7,20)                |                          |  |
| Middle rod joint nut               | After '94:       | 2                   | 6                         | 9(0.9,6.5)               |  |
| Caliper mounting bolt              | '88,'89,'91-'93: | 2                   | 8                         | 27(2.7,20)               |  |
|                                    | After '93:       | 2                   | 8                         | 31(3.1,22)               |  |
| Brake hose oil bolt                | '88,'89,'91-'93: | 2                   | 10                        | 30(3.0,22)               |  |
|                                    | After '93:       | 2                   | 10                        | 35(3.5,25)               |  |
| Bleed valve                        | 1                | 8                   | 5.5(0.55,4)               |                          |  |
| Brake master cylinder holder bolt  | 2                | 6                   | 12(1.2,9)                 |                          |  |
| Brake master cylinder cover screw  | 2                | 4                   | 1.5(0.15,1.1)             |                          |  |
| Brake lever pivot bolt             | 1                | 6                   | 1(0.1,0.7)                |                          |  |
| nut                                | 1                | 6                   | 6(0.6,43)                 |                          |  |
| Brake disc mounting bolt           | 5                | 8                   | 40(4.0,29)                | Apply locking agent      |  |
| Caliper pin bolt                   | 1                | 8                   | 22(2.2,16)                | Apply locking agent      |  |
| Caliper bracket pin bolt           | 1                | 8                   | 12(1.2,9)                 | Apply locking agent      |  |
| Pad pin                            | 1                | 10                  | 18(1.8,13)                |                          |  |
| Pad pin plug                       | 1                | 10                  | 2.5(0.25,1.8)             |                          |  |
| Shock absorber upper mounting bolt | 1                | 10                  | 45(4.5,33)                | Socket bolt              |  |
| Shock absorber lower mounting bolt | 1                | 10                  | 45(4.5,33)                |                          |  |
| Gearshift arm bolt                 | 1                | 6                   | 12(1.2,9)                 |                          |  |
| Foot peg bracket bolt              | 4                | 10                  | 40(4.0,29)                |                          |  |
| Swingarm pivot bolt                | 1                | 14                  | 90(9.0,65)                |                          |  |
| Front upper engine mounting bolt   | 1                | 10                  | 55(5.5,40)                |                          |  |
| Front upper engine bracket bolt    | 2                | 8                   | 27(2.7,20)                |                          |  |
| Front lower engine mounting bolt   | 1                | 10                  | 55(5.5,40)                |                          |  |
| Rear upper engine mounting bolt    | 1                | 10                  | 55(5.5,40)                |                          |  |
| Rear upper engine bracket bolt     | 2                | 8                   | 27(2.7,20)                |                          |  |
| Exhaust pipe joint nut             | 4                | 8                   | 25(2.5,18)                | Flange nut               |  |
| Fuel tank mounting bolt            | 1                | 8                   | 19(1.9,13.7)              | Flange bolt              |  |
| Ignition switch mounting bolt      | 2                | 6                   | 11(1.1,8)                 | Shear bolt               |  |
| Exhaust pipe cover bolt            | 3                | 6                   | 12(1.2,9)                 |                          |  |
| Exhaust muffler bracket bolt/nut   |                  |                     |                           |                          |  |
| '88,'89,'91-'93:                   | 1/1              | 8                   | 27(2.7,20)                |                          |  |
| After '93                          | 1/4              | 8                   | 20(2.0,14)                |                          |  |
| Helmet holder mounting bolt        | 2                | 6                   | 13(1.3,9)                 | Shear bolt               |  |
| Side stand pivot bolt              | 1                | 10                  | 10(1.0,7.2)               | Socket bolt              |  |
| nut                                | 1                | 10                  | 30(3.0,22)                |                          |  |
| Driven sprocket nut                | 5                | 10                  | 65(6.5,47)                |                          |  |
| Fork tube cap                      | 2                | 34                  | 22(2.2,16)                |                          |  |
| Front socket bolt                  | 2                | 10                  | 30(3.0,22)                | Apply locking agent      |  |
| Damper rod lock nut                | '88,'89,'91,'92: | 1                   | 14                        | 70(7.0,51)               |  |
| Spokes                             | 108              | 4                   | 4(0.4,2.9)                |                          |  |
| Handlebar mounting nut             | 2                | 8                   | 25(2.5,18)                |                          |  |
| Handlebar upper holder bolt        |                  |                     |                           |                          |  |
| After '94:                         | 2                | 8                   | 30(3.0,22)                |                          |  |
| Handlebar lower holder nut         |                  |                     |                           |                          |  |
| After '94:                         | 2                | 8                   | 23(2.3,16)                |                          |  |
| Fuel valve body                    | 1                | 22                  | 23(2.3,16)                |                          |  |
| Throttle link cover stay screw     | 2                | 4                   | 2.1(0.21,1.5)             |                          |  |
| Rear ignition coil stay bolt       | 2                | 6                   | 9(0.9,6.5)                |                          |  |
| Battery cover mounting bolt        | 2                | 6                   | 9(0.9,6.5)                |                          |  |
| Fuel pump stay mounting nut        | 1                | 6                   | 9(0.9,6.5)                |                          |  |

Torque specifications listed above are for specific tightening points. If a specification is not listed, follow the standard torque values below.

**STANDARD TORQUE VALUES**

| TYPE            | TORQUE N•m (kg-m, ft-lb) | TYPE                   | TORQUE N•m (kg-m, ft-lb) |
|-----------------|--------------------------|------------------------|--------------------------|
| 5 mm bolt, nut  | 5 (0.50, 3.6)            | 5 mm screw             | 4 (0.40, 2.9)            |
| 6 mm bolt, nut  | 10 (1.0, 7.2)            | 6 mm screw, 6 mm       |                          |
| 8 mm bolt, nut  | 22 (2.2, 16)             | bolt with 8 mm head    | 9 (0.9, 6.5)             |
| 10 mm bolt, nut | 35 (3.5, 25)             | 6 mm flange bolt, nut  | 12 (1.2, 9)              |
| 12 mm bolt, nut | 55 (5.5, 40)             | 8 mm flange bolt, nut  | 27 (2.7, 20)             |
|                 |                          | 10 mm flange bolt, nut | 40 (4.0, 29)             |

# GENERAL INFORMATION

## TOOLS

### SPECIAL

| Description                           | Tool number     | Alternate tool  | Tool number  | Refer to section |               |   |
|---------------------------------------|-----------------|---|--|------------------|---------------|---|
| Oil pressure gauge                    | 07506-3000000   | Equivalent commercially available in U.S.A.                           |  | 2                |               |   |
| Oil pressure gauge attachment         | 07510-4220100   |   |  | 2                |               |   |
| Oil filter wrench                     | 07HAA-PJ70100   |   |  | 2                |               |   |
| Vacuum gauge                          | 07404-0030000   | Vacuum gauge Not available in U.S.A.                                  | 07LMJ-001000A<br>07908-KE90100   | 3                |               |   |
| Valve adjusting wrench                | 07908-KE90000   |   |  | 4                |               |   |
| Vacuum/Pressure pump                  | A937X-041-XXXXX | Vacuum pump Pressure pump Equivalent commercially available in U.S.A. | ST-AH-260-MC7<br>ST-AH-255-MC7   | 4                |               |   |
| Snap ring pliers                      | 07914-3230001   |   |  | 2, 13, 14        |               |   |
| Steering stem socket                  | 07916-3710100   | Not available in U.S.A.   | 07HGB-001000A  | 12               |               |   |
| Clutch center holder                  | 07923-KE10000   |   |  | 7                |               |   |
| Bottom holder pipe                    | 07930-KA50000   |   |  | 12               |               |   |
| -holder attachment                    | 07930-KA50100   |   |  |                  |               |   |
| -holder handle                        | 07930-KA40200   |   |  |                  |               |   |
| Bearing remover set                   | 07936-3710001   |   |  | 11               |               |   |
| -remover handle                       | 07936-3710100   |   |  |                  |               |   |
| -bearing remover set                  | 07936-3710600   |   |  |                  |               |   |
| -remover weight                       | 07741-0010201   |   |  | Remover weight   | 07936-3710200 |   |
| Valve guide driver attachment (IN)    | 07943-MF50100   |   |  |                  |               | 9 |
| Valve guide driver attachment (EX)    | 07943-MF50200   |   |  | 9                |               |   |
| Bearing race remover                  | 07946-3710500   |   |  | 12               |               |   |
| Steering stem driver                  | 07946-MB00000   |   |  | 12               |               |   |
| Driver shaft                          | 07946-MJ00100   |   |  | 13               |               |   |
| Fork seal driver, 39 mm               | 07947-4630100   |   |  | 12               |               |   |
| Ball race remover                     | 07953-MJ10000   | Attachment Driver Driver handle Attachment, 32 x 35mm                 | 07953-MJ1000A,<br>07953-MJ1000B or<br>07949-3710001 and<br><br>07746-0010100 | 12               |               |   |
| -driver attachment                    | 07953-MJ10100   |   |  |                  |               |   |
| -driver handle                        | 07953-MJ10200   |   |  |                  |               |   |
| Main bearing driver attachment        | 07HMF-MM90400   |   |  | 11               |               |   |
| Valve guide reamer, 5.510 mm (IN)     | 07984-2000001   |   |  | 9                |               |   |
| Valve guide reamer, 6.612 mm (EX)     | 07984-ZE20001   |   | 07984-200000D<br>07984-ZE2000D   | 9                |               |   |
| Attachment, 28 x 30 mm                | 07746-1870100   |   |  |                  |               |   |
| *Drive chain cutter                   | 07HMH-MR10103   | Not available in U.S.A.   | 07HMH-MR1010B  |                  |               |   |
| *Shock absorber compressor attachment | 07JME-MR10100   |   |  | 13               |               |   |

\*: New for this model.

COMMON

| Description                                 | Tool number   | Alternate tool                              | Tool number   | Refer to section                            |               |                         |
|---|---------------|---|---------------|---|---------------|-------------------------|
| Float level gauge                           | 07401-0010000 | Equivalent commercially available in U.S.A. | 07933-3290001 | 4   |               |                         |
| Lock nut wrench, 17 x 27 mm                 | 07716-0020300 |   |               | 7   |               |                         |
| Gear holder                                 | 07724-0010100 |   |               | 7   |               |                         |
| Flywheel holder                             | 07725-0040000 |   |               | 8   |               |                         |
| Torx bit                                    | 07703-0010100 |   |               | 8   |               |                         |
| Rotor puller                                | 07733-0020001 |   |               | 8   |               |                         |
| Valve guide remover, 5.5 mm                 | 07742-0010100 |   |               | 9   |               |                         |
| Valve guide remover, 6.6 mm                 | 07742-0010200 |   |               | 9   |               |                         |
| Attachment, 32 x 35 mm                      | 07746-0010100 | Not available in U.S.A.                     | 07942-6570100 | 13  |               |                         |
| Attachment, 42 x 47 mm                      | 07746-0010300 |   |               | 11, 12, 13                                  |               |                         |
| Attachment, 52 x 55 mm                      | 07746-0010400 |   |               | 11, 12                                      |               |                         |
| Pilot, 15 mm                                | 07746-0040300 |   |               | 13  |               |                         |
| Pilot, 17 mm                                | 07746-0040400 |   |               | 13  |               |                         |
| Pilot, 20 mm                                | 07746-0040500 |   |               | 11, 12                                      |               |                         |
| Pilot, 22 mm                                | 07746-0041000 |   |               | 11, 13                                      |               |                         |
| Pilot, 25 mm                                | 07746-0040600 |   |               | 11  |               |                         |
| Bearing remover head, 17 mm                 | 07746-0050500 |   |               | Equivalent commercially available in U.S.A. | 13            |                         |
| Bearing remover shaft                       | 07746-0050100 |   |               |   | 13            |                         |
| Bearing remover head, 20 mm                 | 07746-0050600 |   |               |   | 12            |                         |
| Driver                                      | 07749-0010000 |   |               | Valve spring compressor                     | 07957-3290001 | 11, 12, 13              |
| Valve spring compressor                     | 07757-0010000 |   |               |   |               | 9                       |
| Shock absorber compressor -compressor screw | 07GME-0010000 |   |               |   |               | Not available in U.S.A. |
| Spoke wrench                                | 07JMA-MR60100 |   |               |   |               |                         |

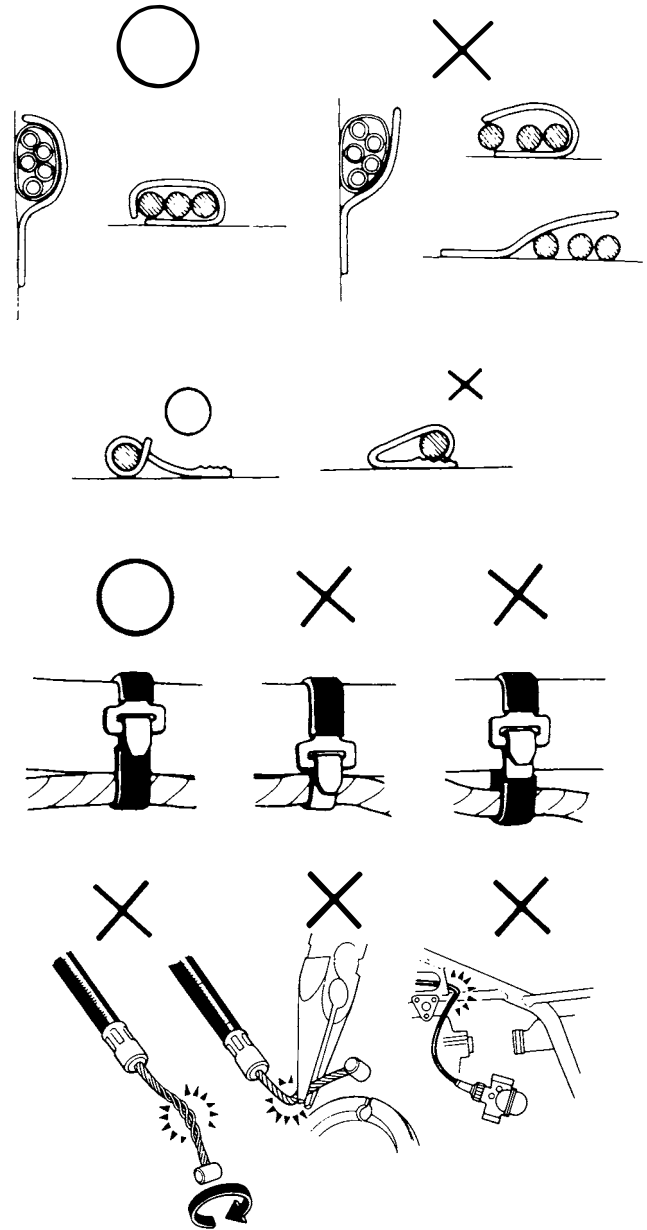
VALVE SEAT CUTTERS (NOT AVAILABLE IN U.S.A.)

| Description                | Tool number   | Remarks        |
|----------------------------|---------------|----------------|
| Valve seat cutter, 27.5 mm | 07780-0010200 | 45° IN         |
| Valve seat cutter, 35 mm   | 07780-0010400 | 45° EX         |
| Valve seat cutter, 28 mm   | 07780-0012100 | 32° IN         |
| Valve seat cutter, 35 mm   | 07780-0012300 | 32° EX         |
| Valve seat cutter, 30 mm   | 07780-0014000 | 60° IN         |
| Valve seat cutter, 37.5 mm | 07780-0014100 | 60° EX         |
| Cutter holder, 5.5 mm      | 07781-0010101 | Valve guide IN |
| Cutter holder, 6.6 mm      | 07781-0010201 | Valve guide EX |

# CABLE & HARNESS ROUTING

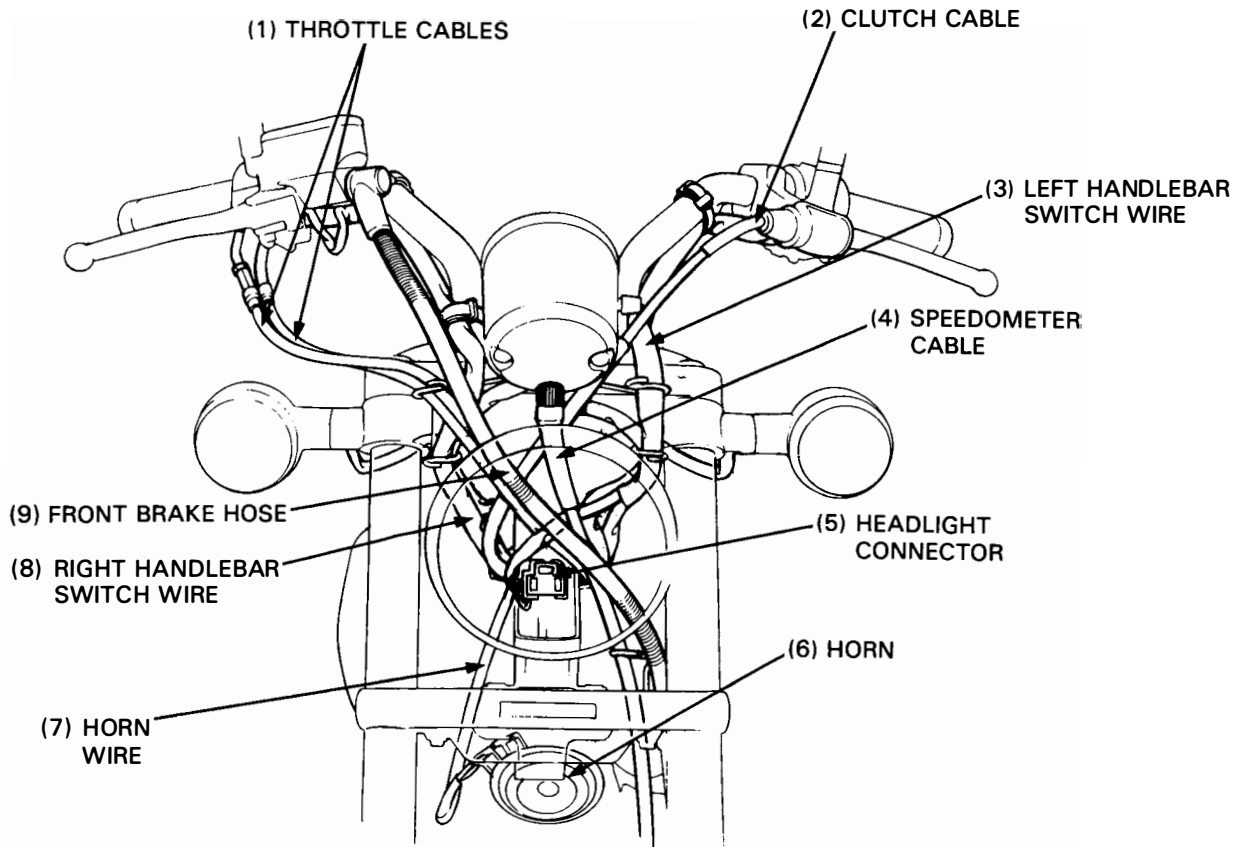
Note the following when routing cables and wire harnesses:

- 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 welds or clamps.
- Secure wires and wire harnesses to the frame with their respective wire 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 neither pulled taut nor have excessive slack.
- Protect wires and harnesses with electrical tape or a tube if they contact a sharp edge or corner. Clean the attaching surface thoroughly before applying tape.
- Do not use a wire or harness with broken 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 does not interfere with any moving or sliding parts.
- After routing, check that the wire harnesses are not twisted or kinked.
- Wire harnesses routed along the handlebars should not be pulled taut, have excessive slack, be pinched by or interfere with adjacent or surrounding parts in all steering positions.
- Do not bend or twist the control cables. Damaged control cables will not operate smoothly and may stick or bind.

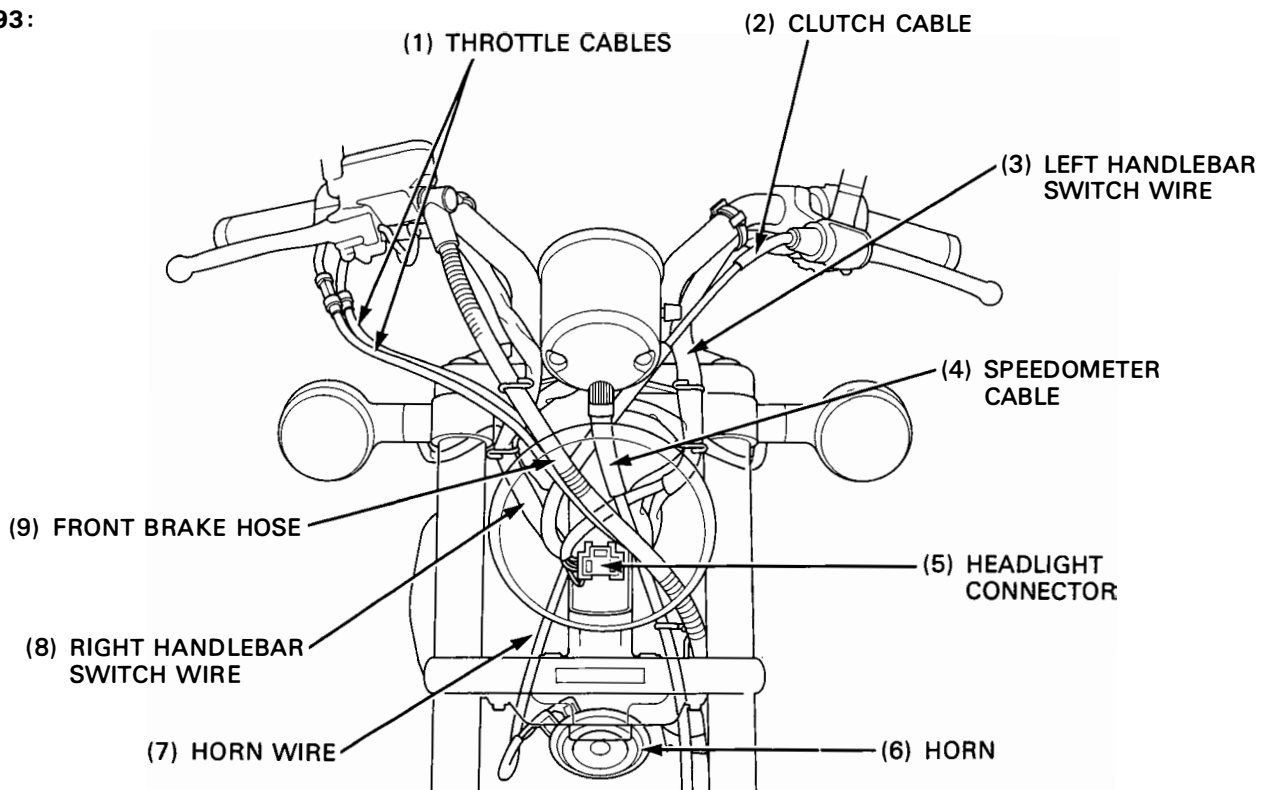


O: CORRECT  
X: INCORRECT

'88-'89 ; '91 :

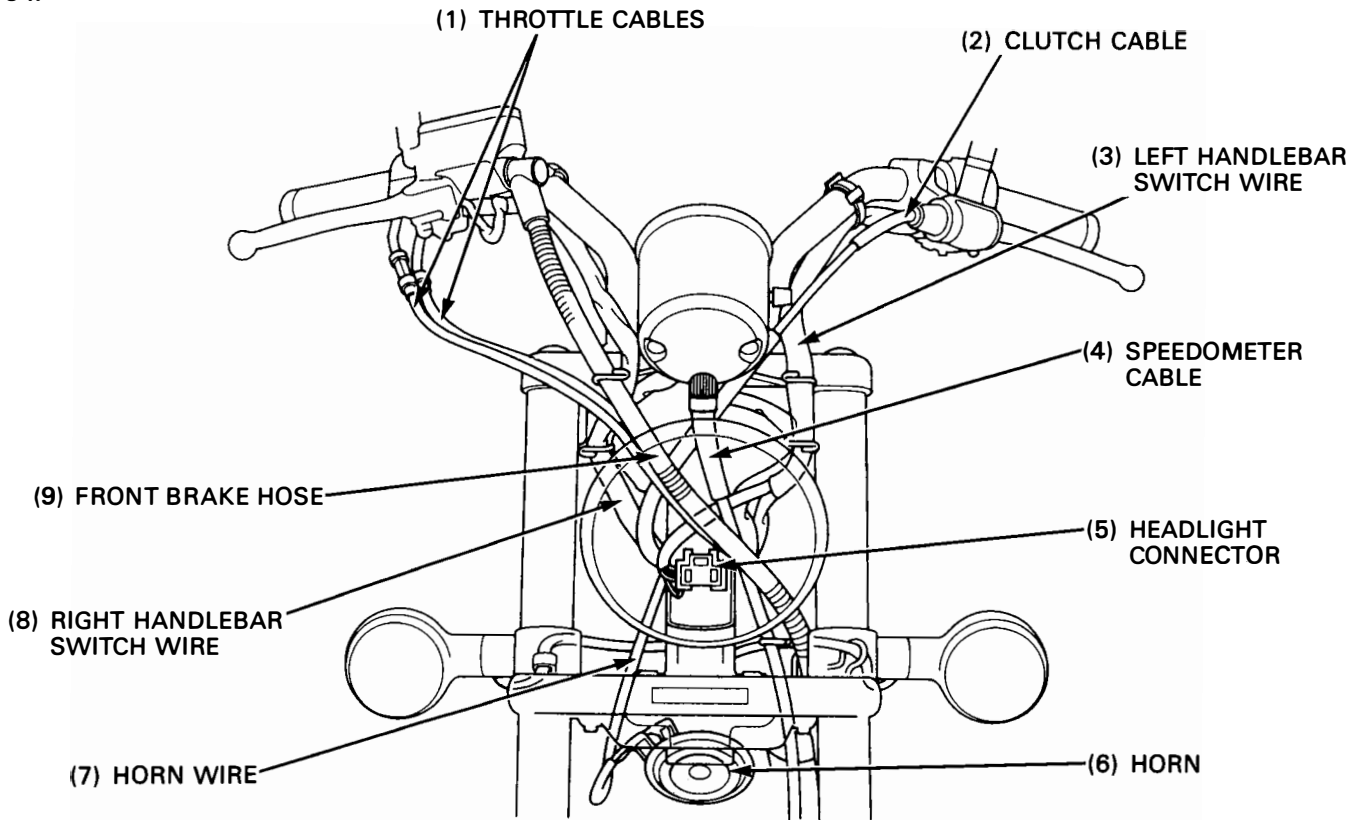


'92-'93 :

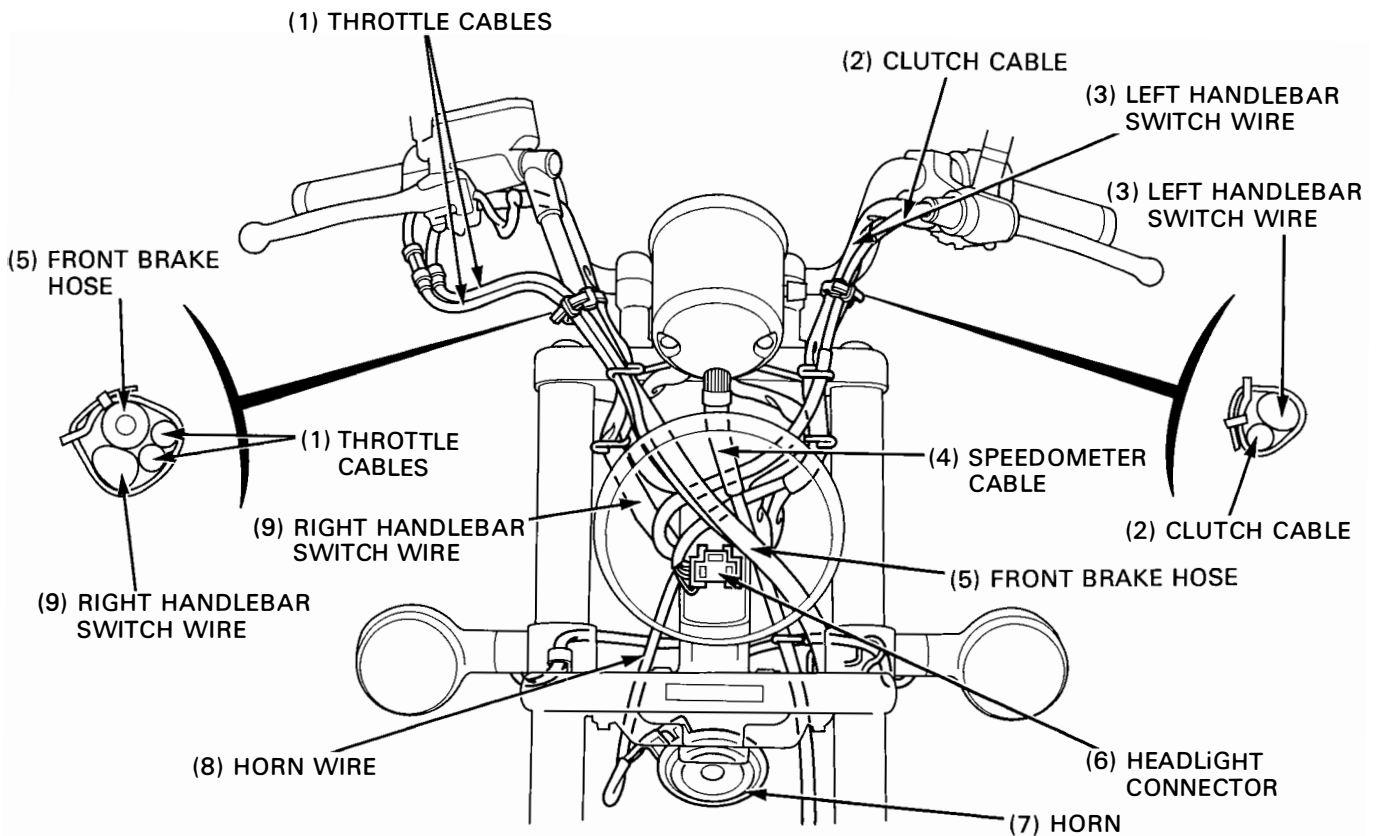


# GENERAL INFORMATION

'94:

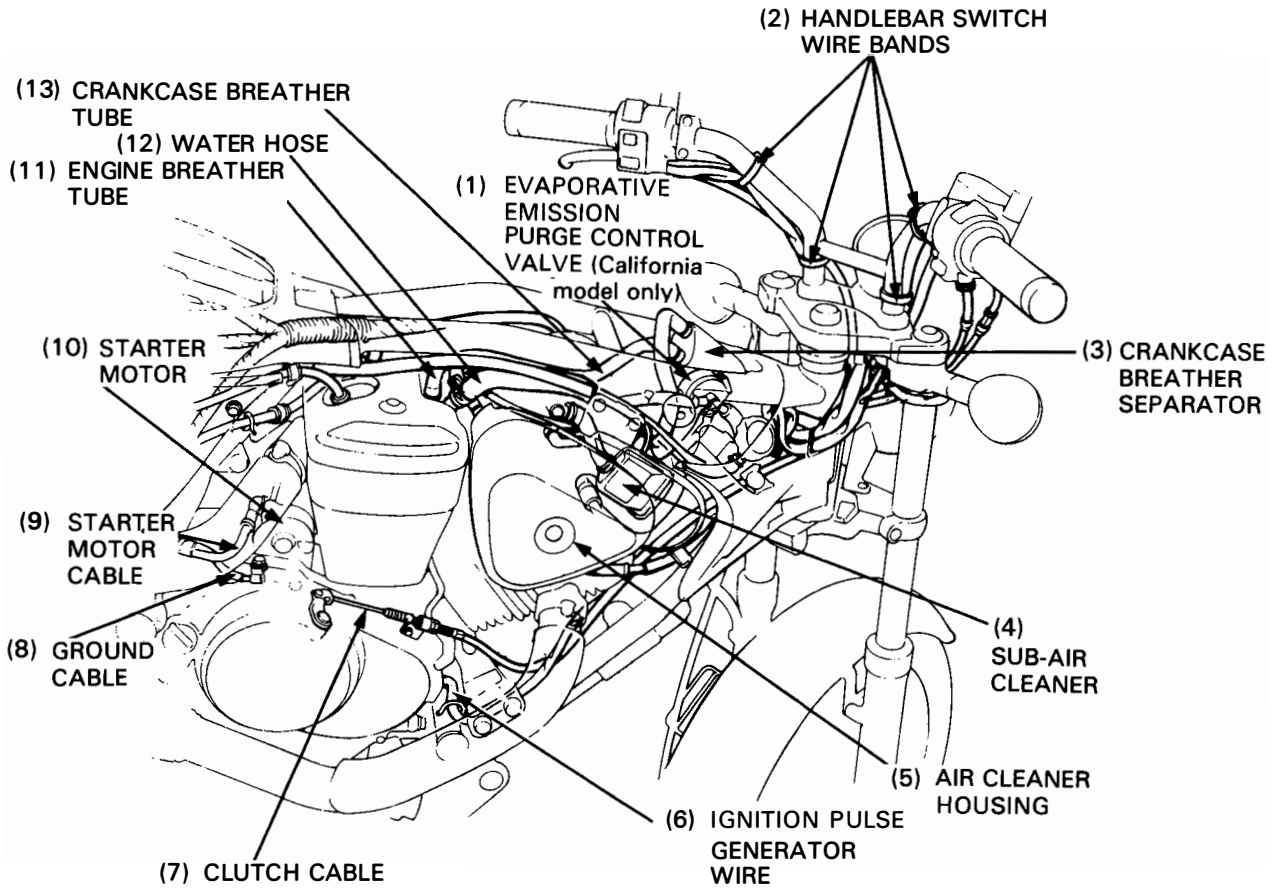


After '94:

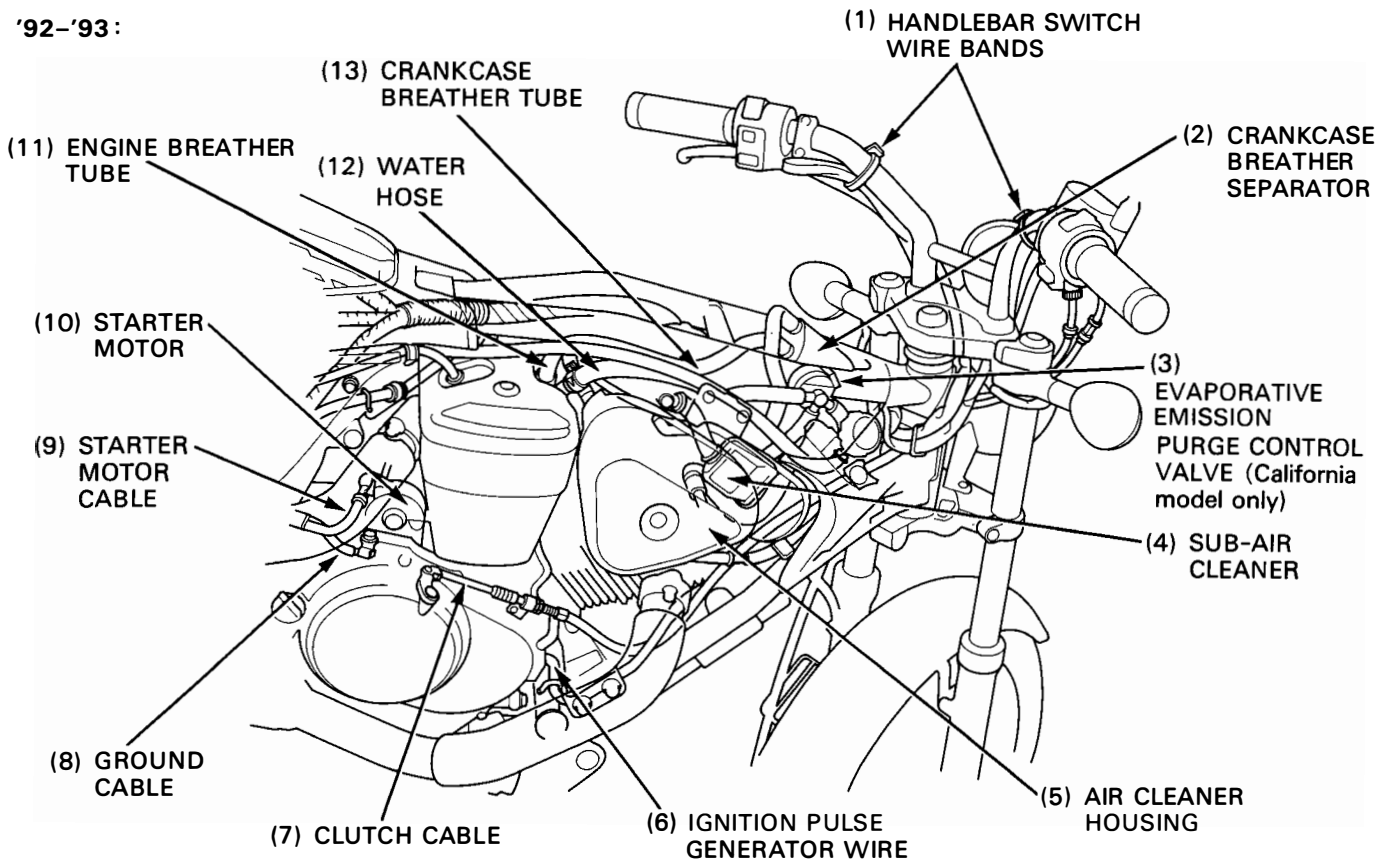




'88-'89 , '91 :

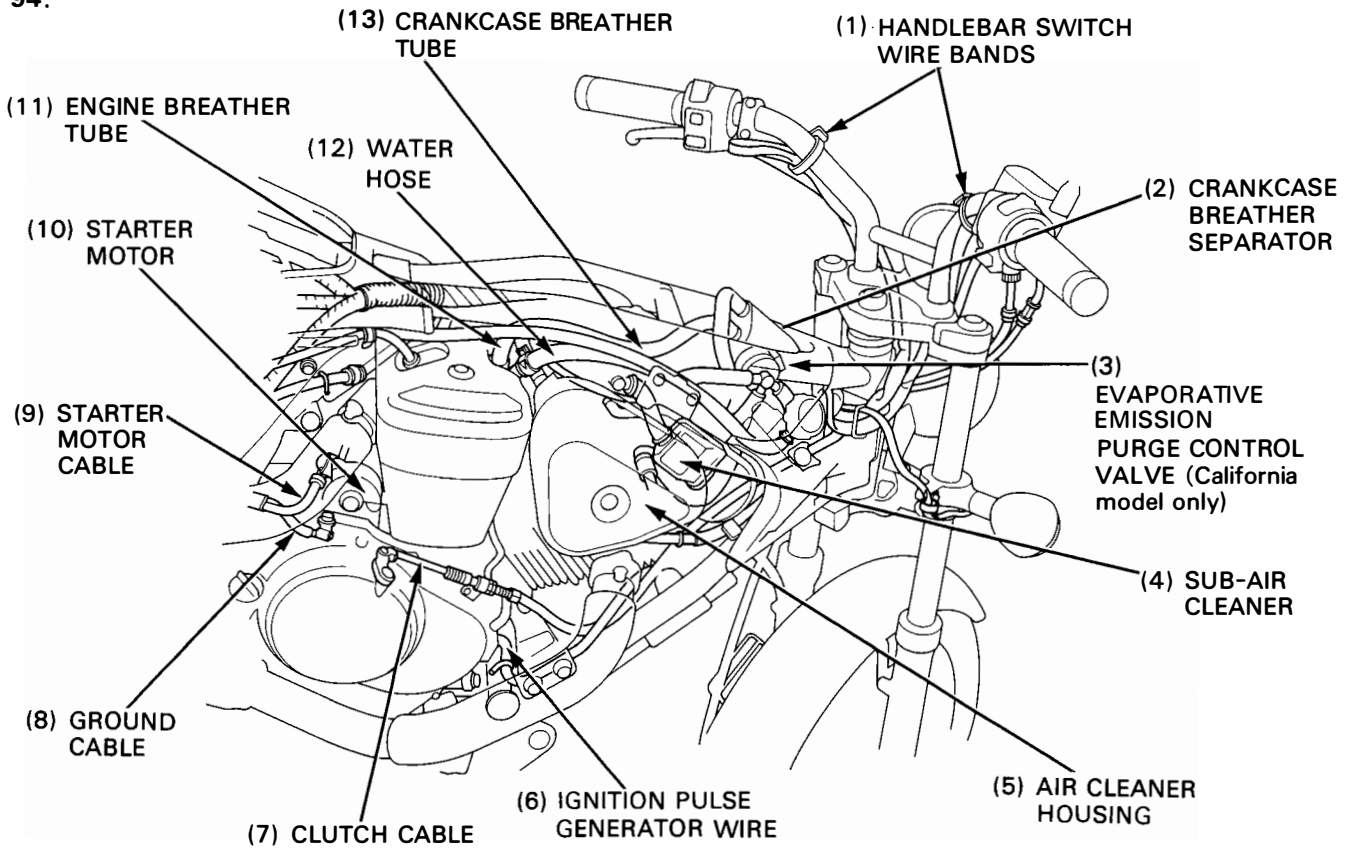


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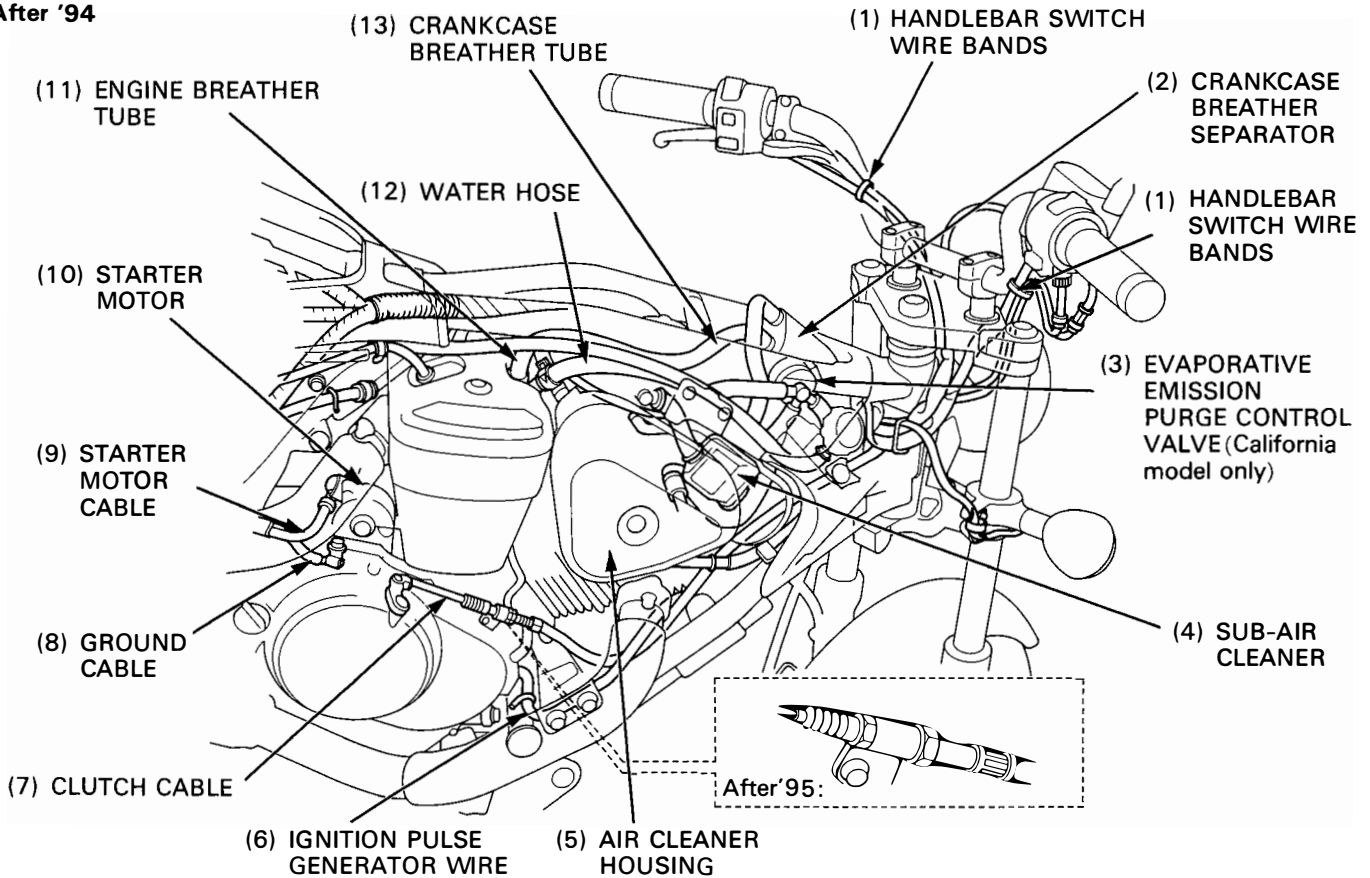


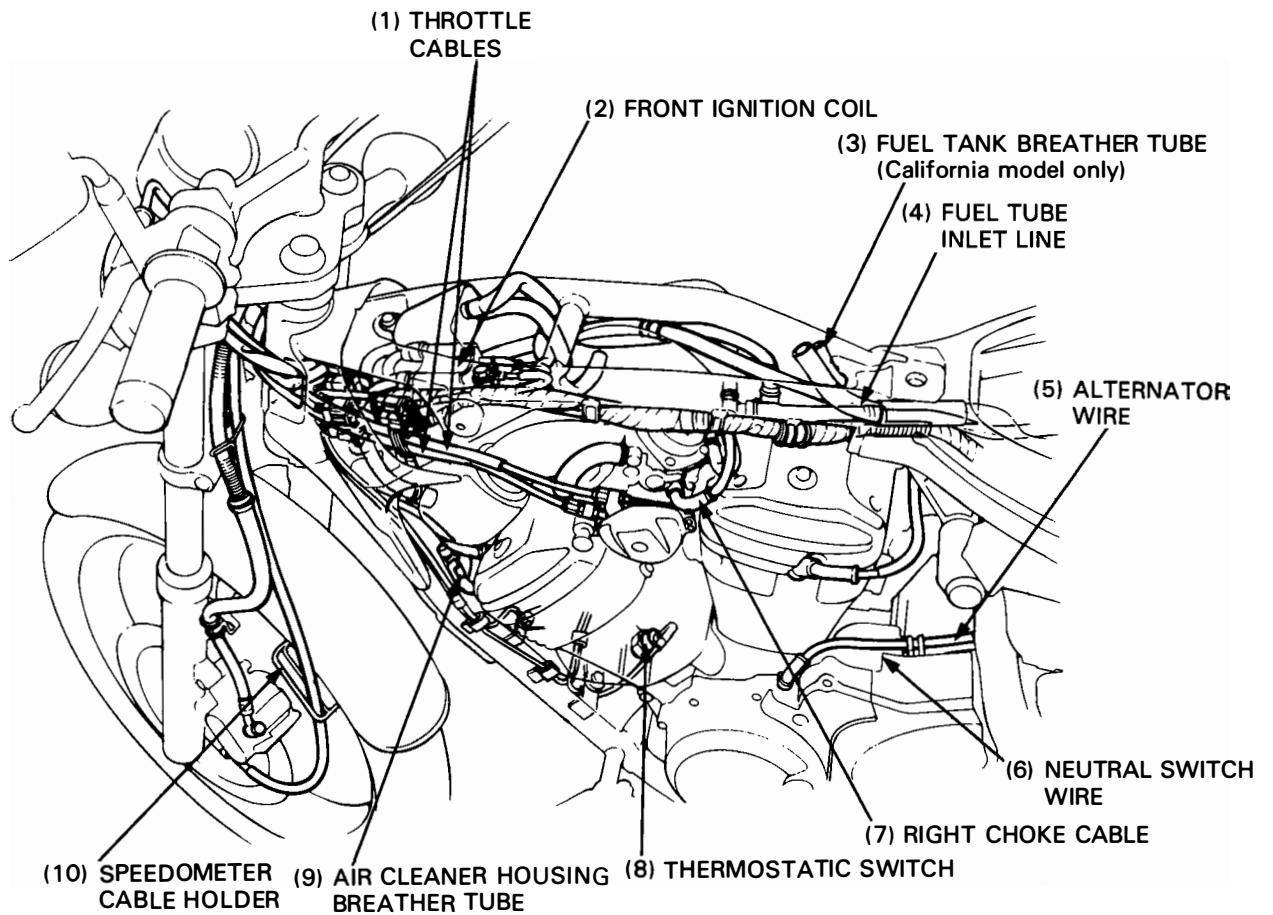
# GENERAL INFORMATION

'94:

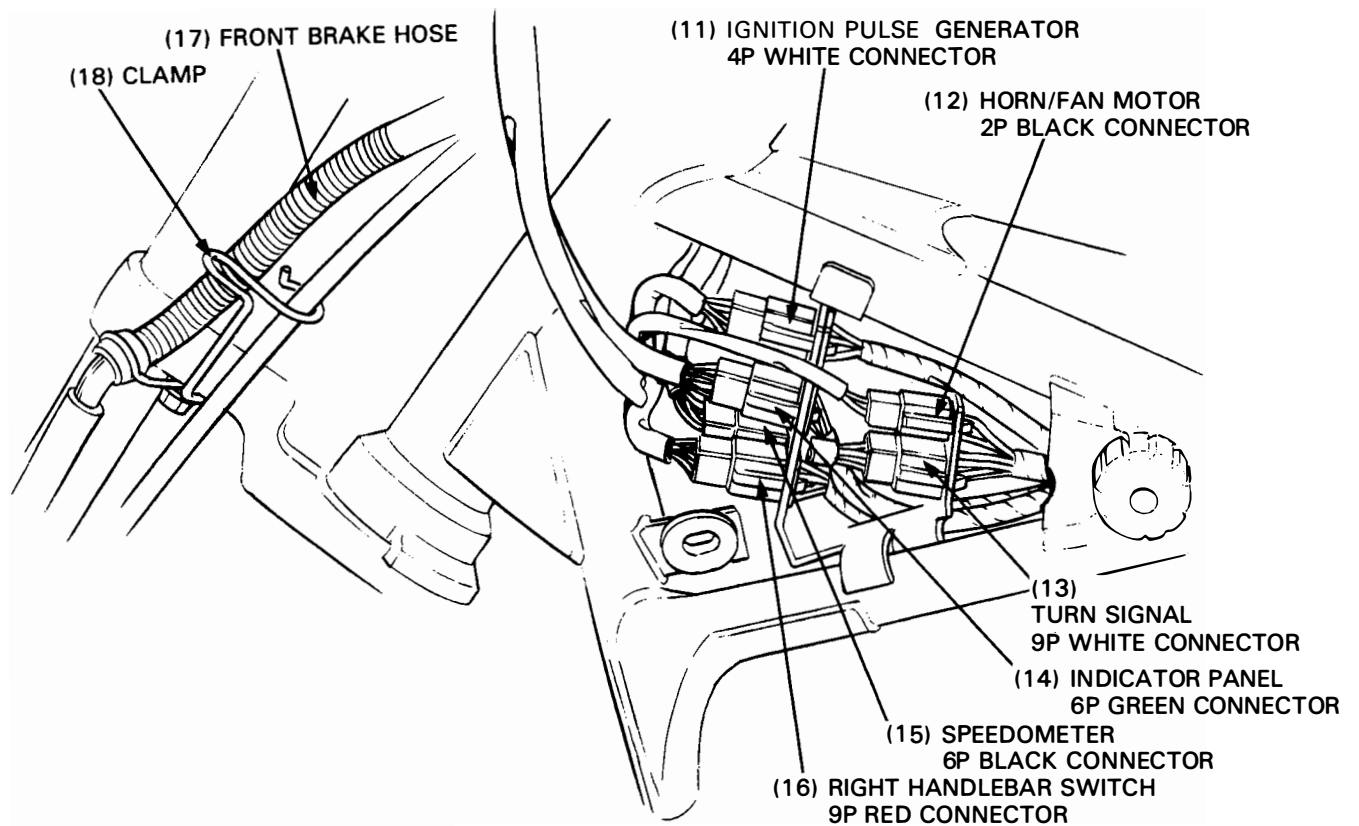


After '94



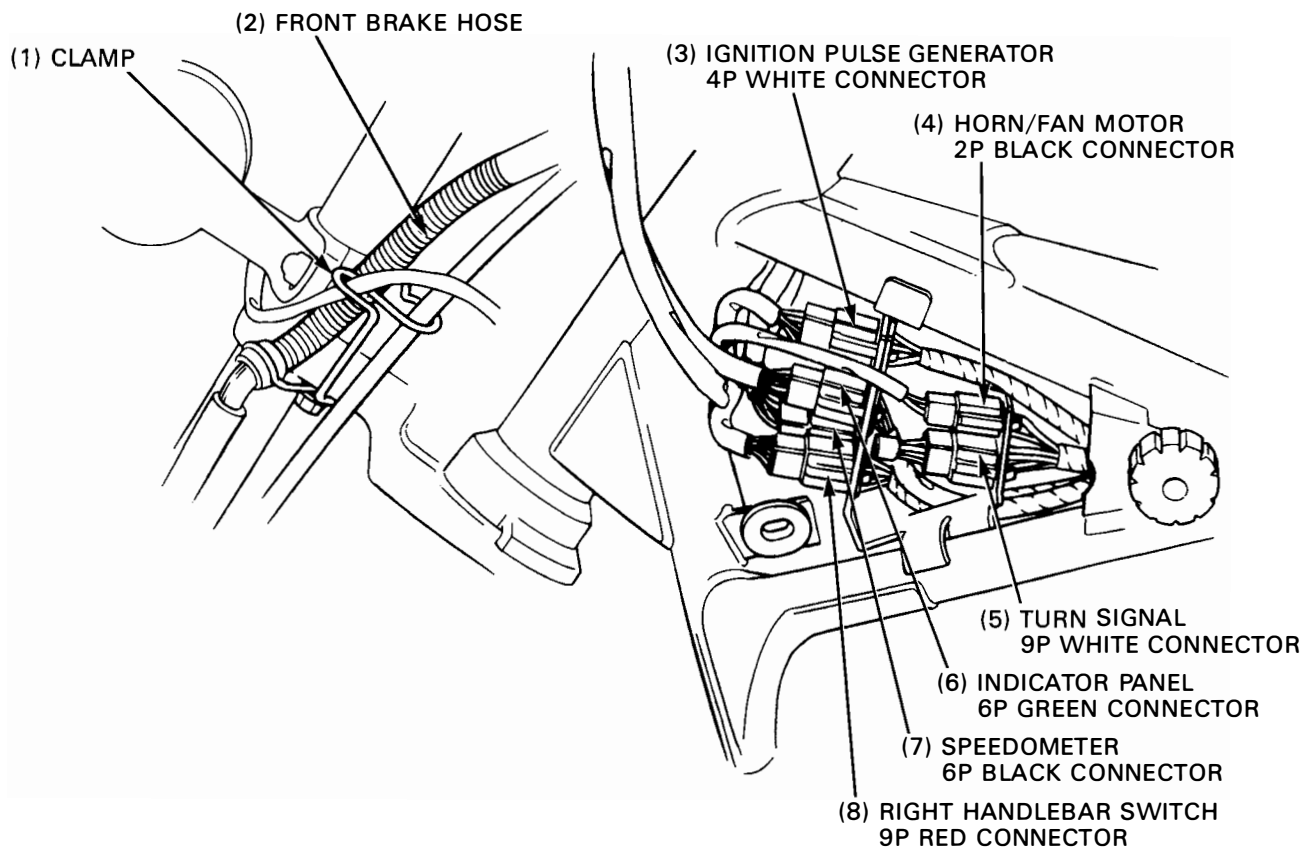


'88-'89, '91-'93:

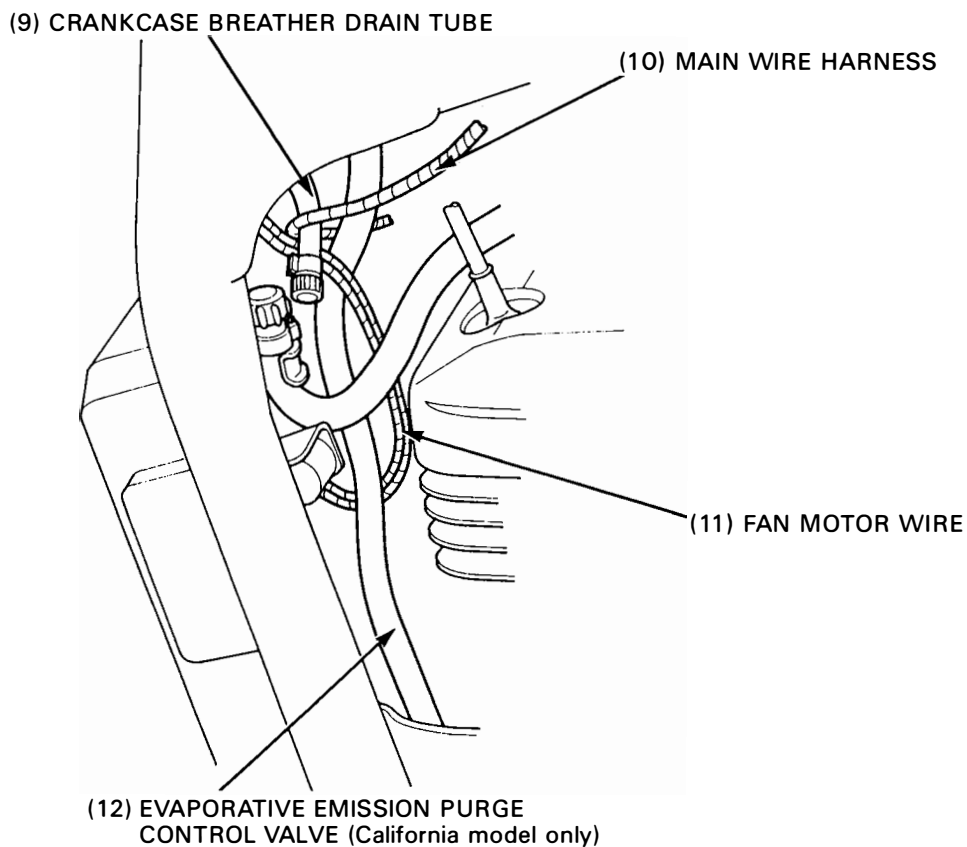


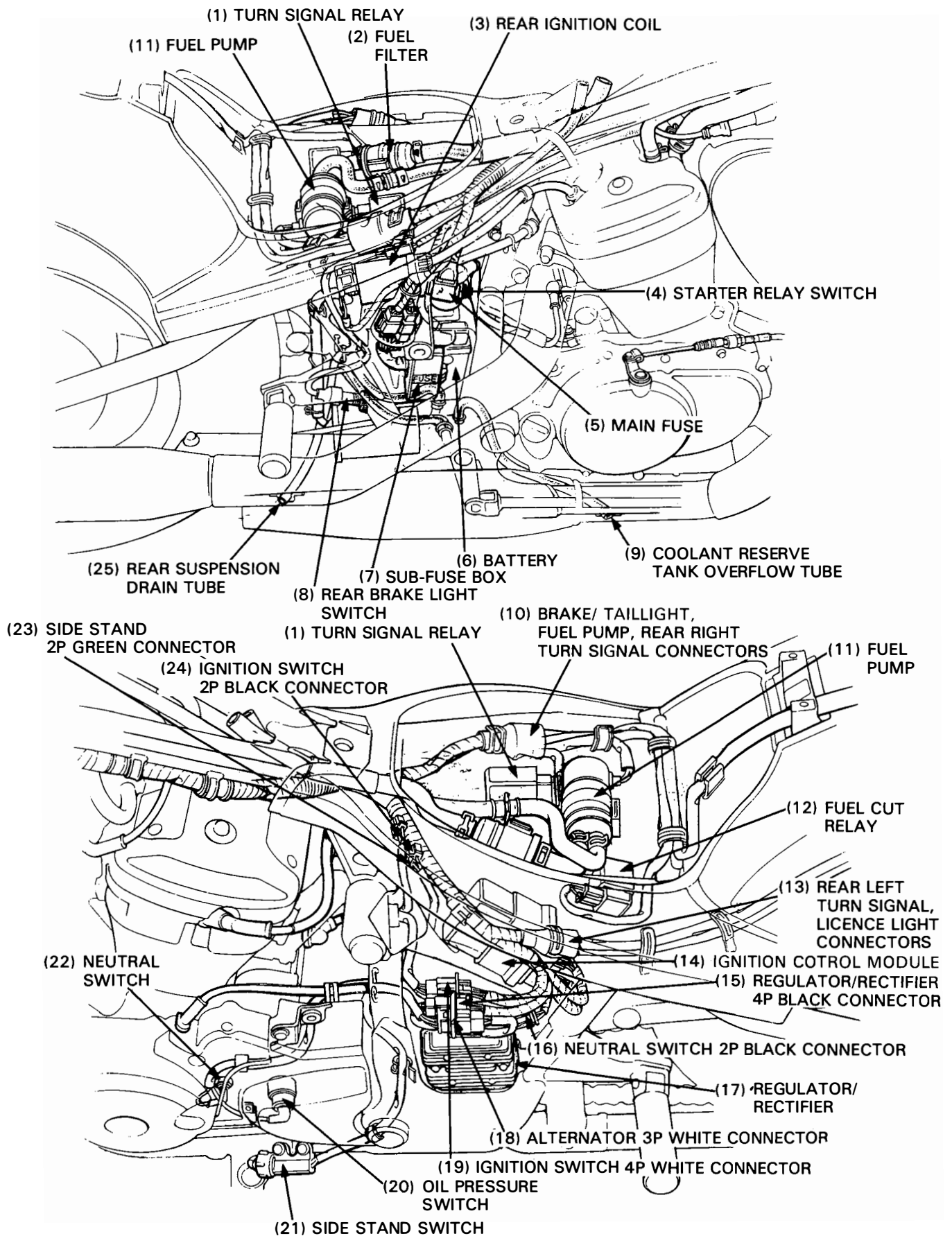
## GENERAL INFORMATION

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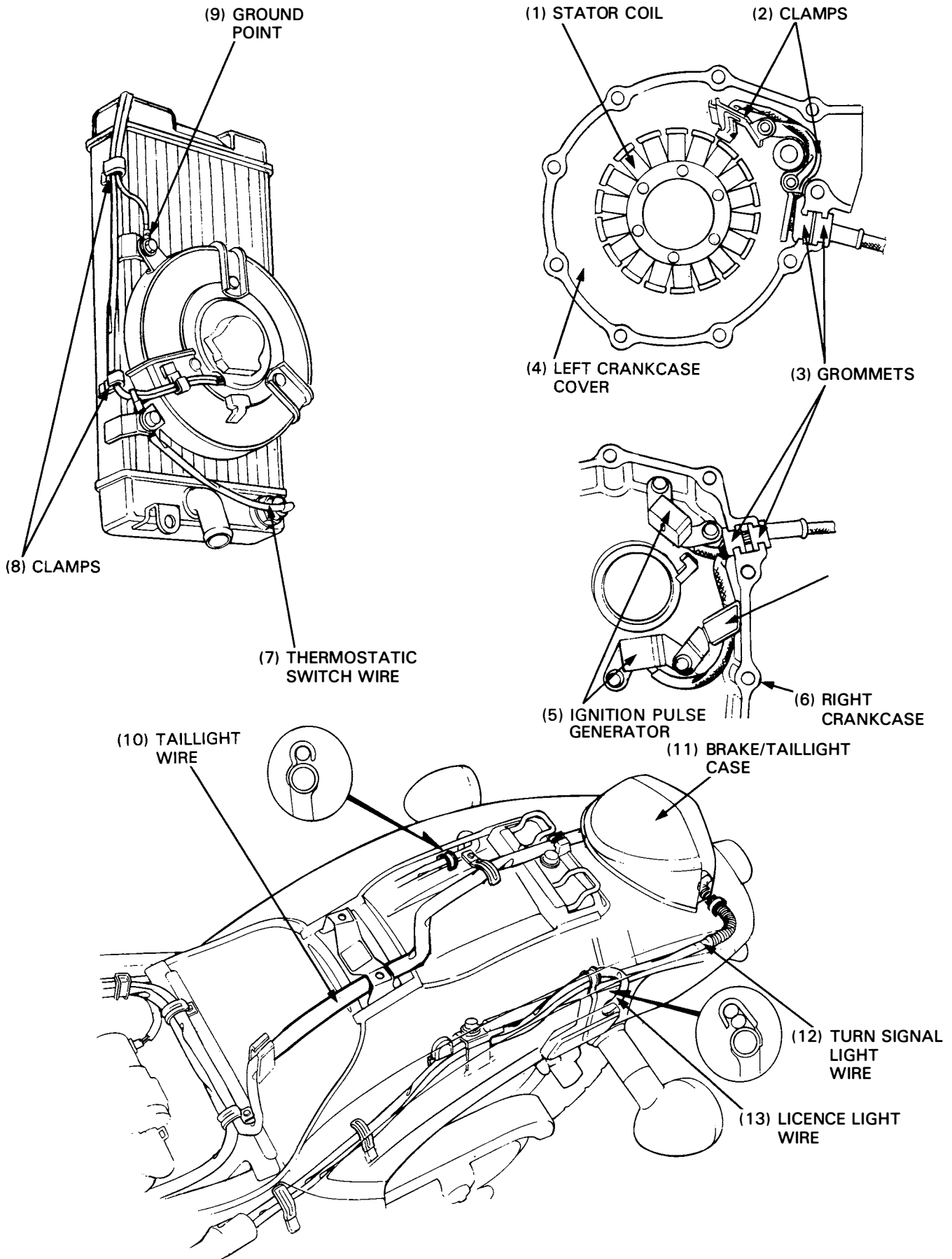


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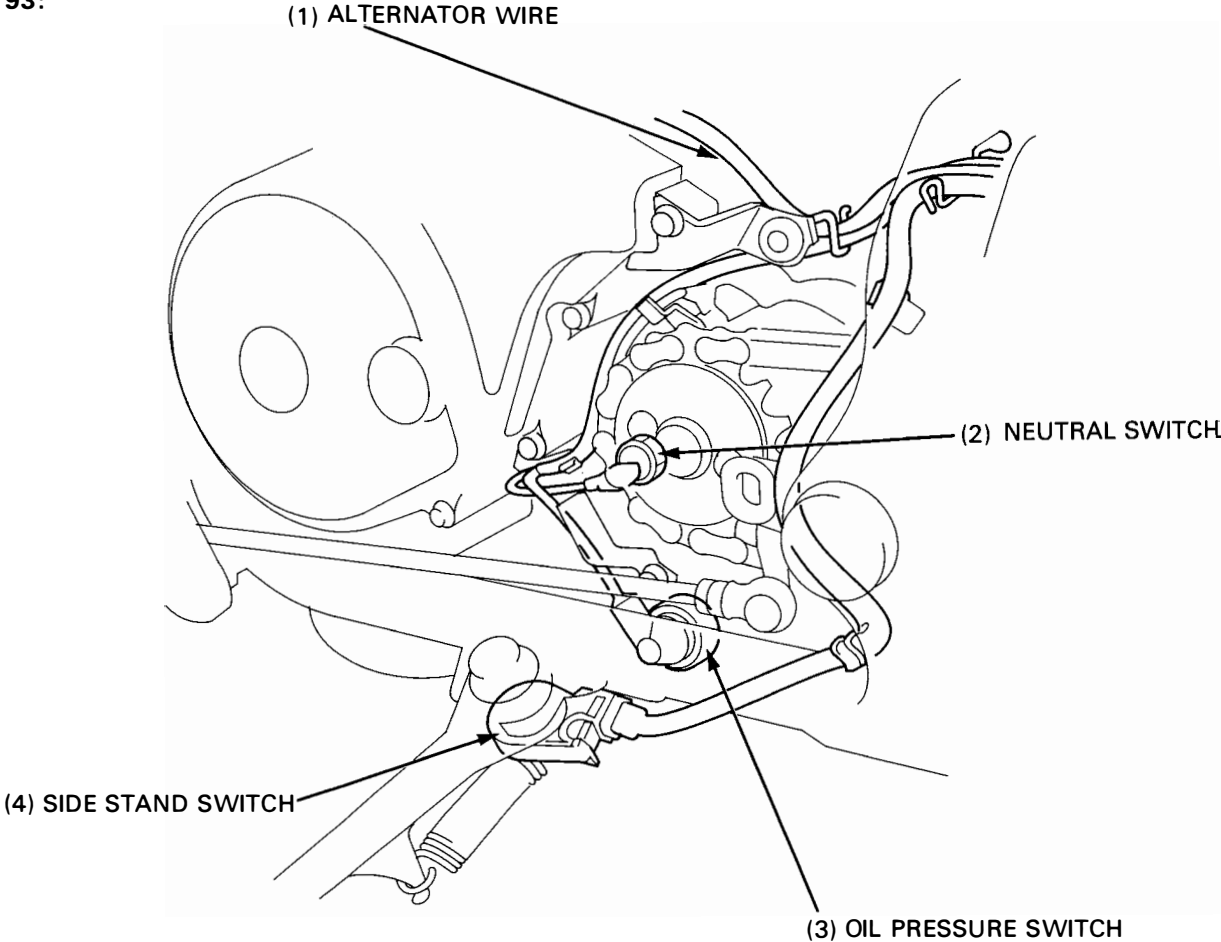




# GENERAL INFORMATION



After '93:

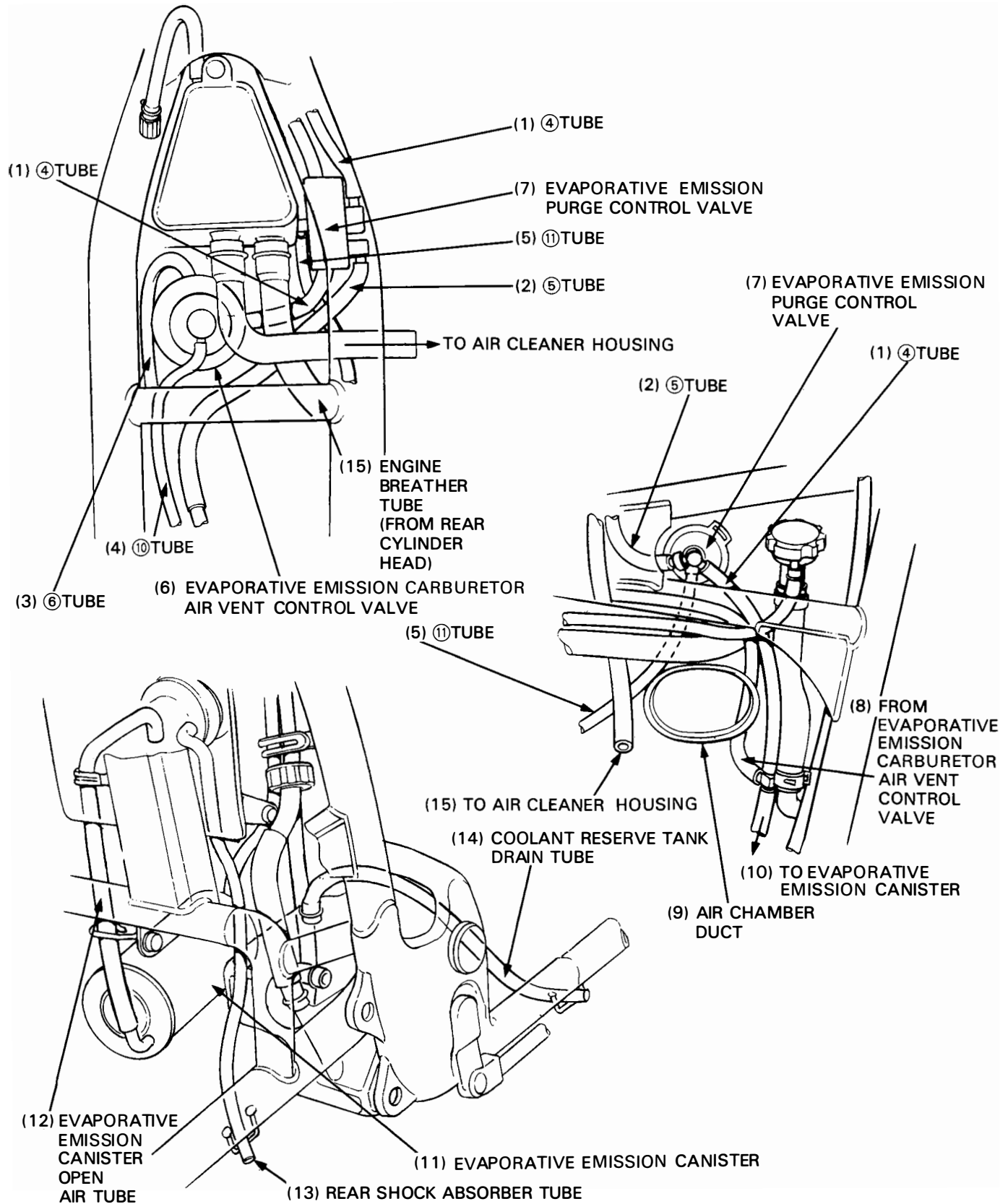


## GENERAL INFORMATION

### EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)

#### NOTE

- The hoses shown below are numbered as they appear on the Vacuum Hose Routing Diagram Label.





## 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 System 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.

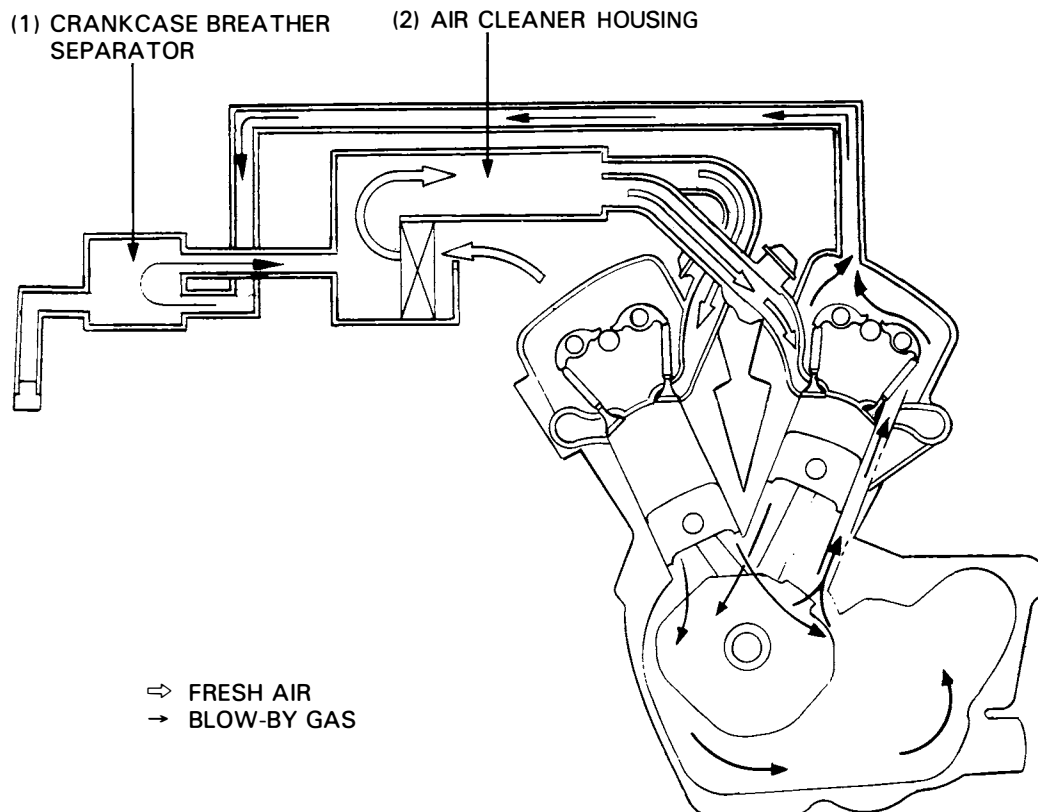
Honda Motor Co., Ltd. utilizes lean carburetor settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

### EXHAUST EMISSION CONTROL SYSTEM

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.

### 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.

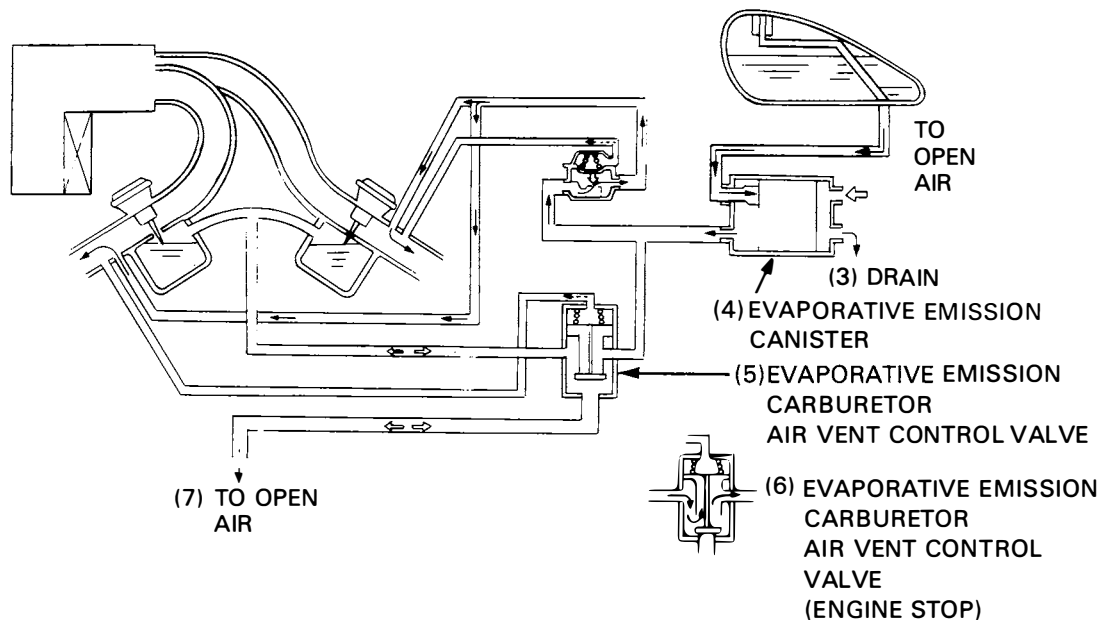


## GENERAL INFORMATION

### 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 evaporative emission canister where it is adsorbed and stored while the engine is stopped. When the engine is running and the evaporative emission purge control diaphragm valve is open, fuel vapor in the evaporative emission canister is drawn into the engine through the carburetor.



### NOISE EMISSION CONTROL SYSTEM

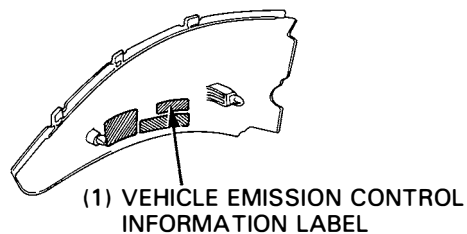
**TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED:** Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any 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 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.

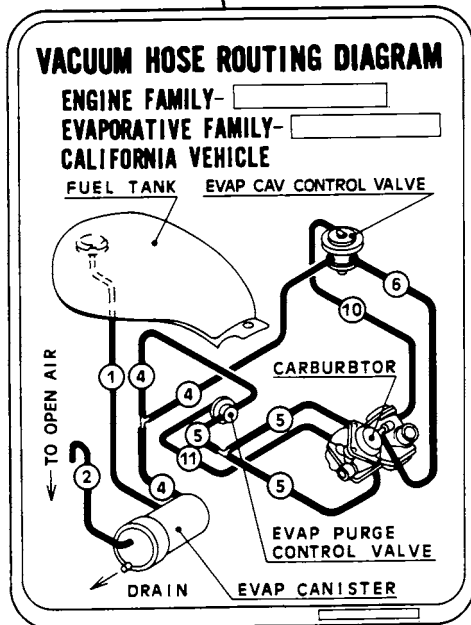
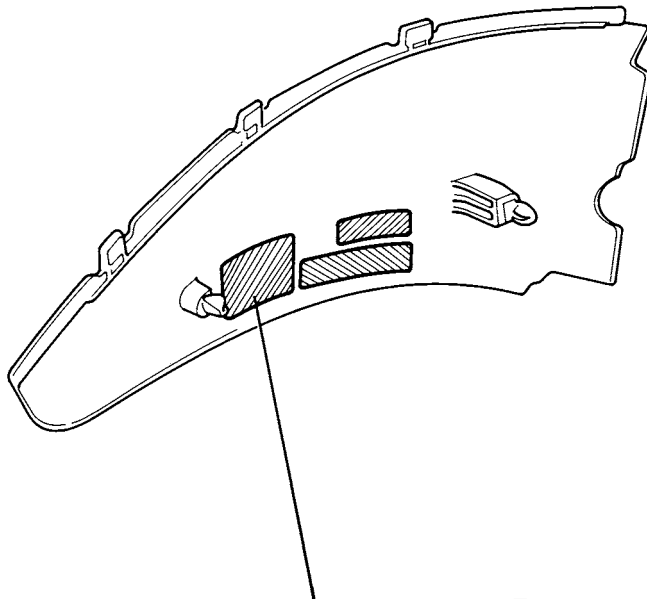
### EMISSION CONTROL INFORMATION LABELS

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



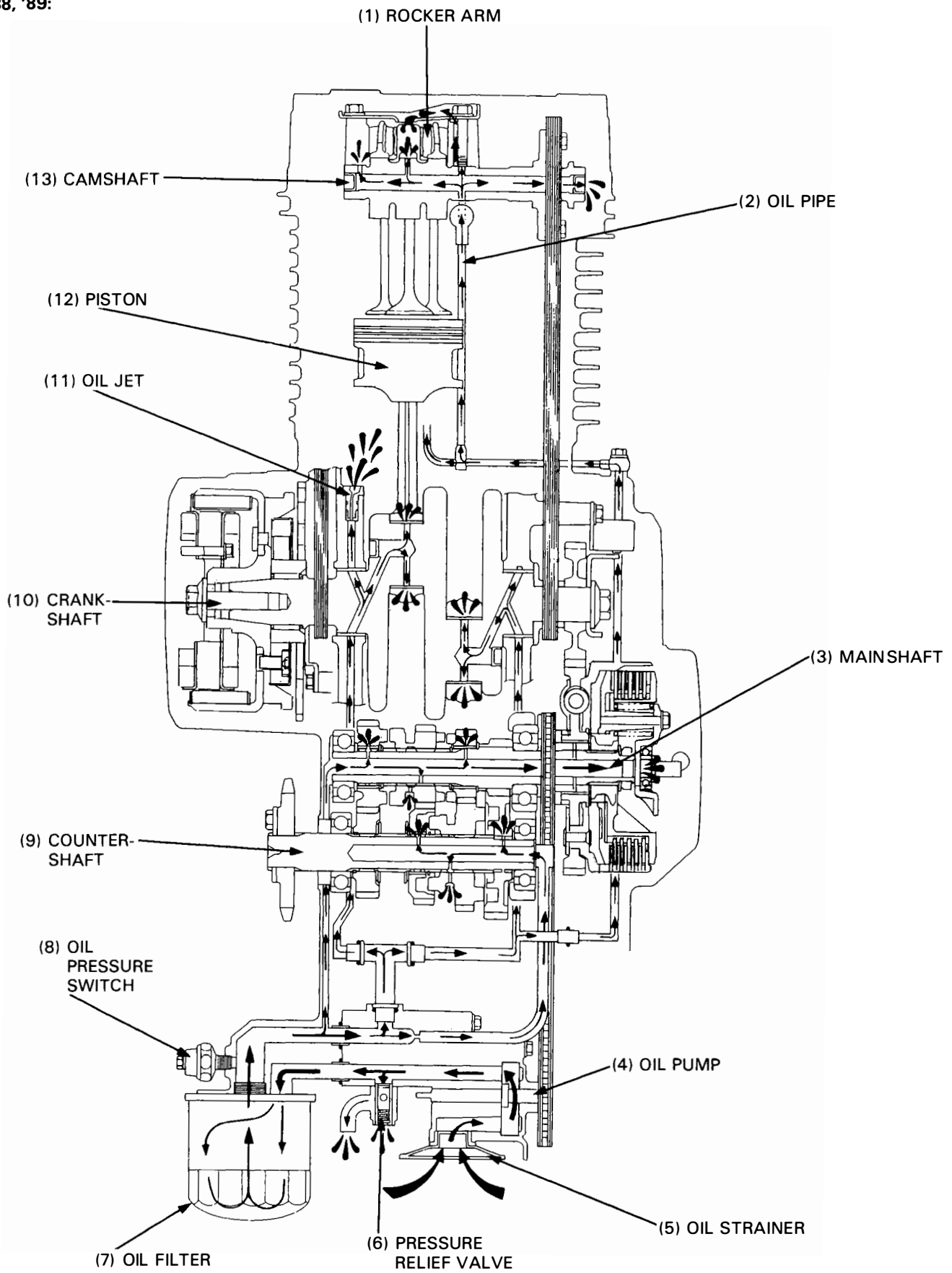
VACUUM HOSE ROUTING DIAGRAM LABEL (California model only)

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



# LUBRICATION

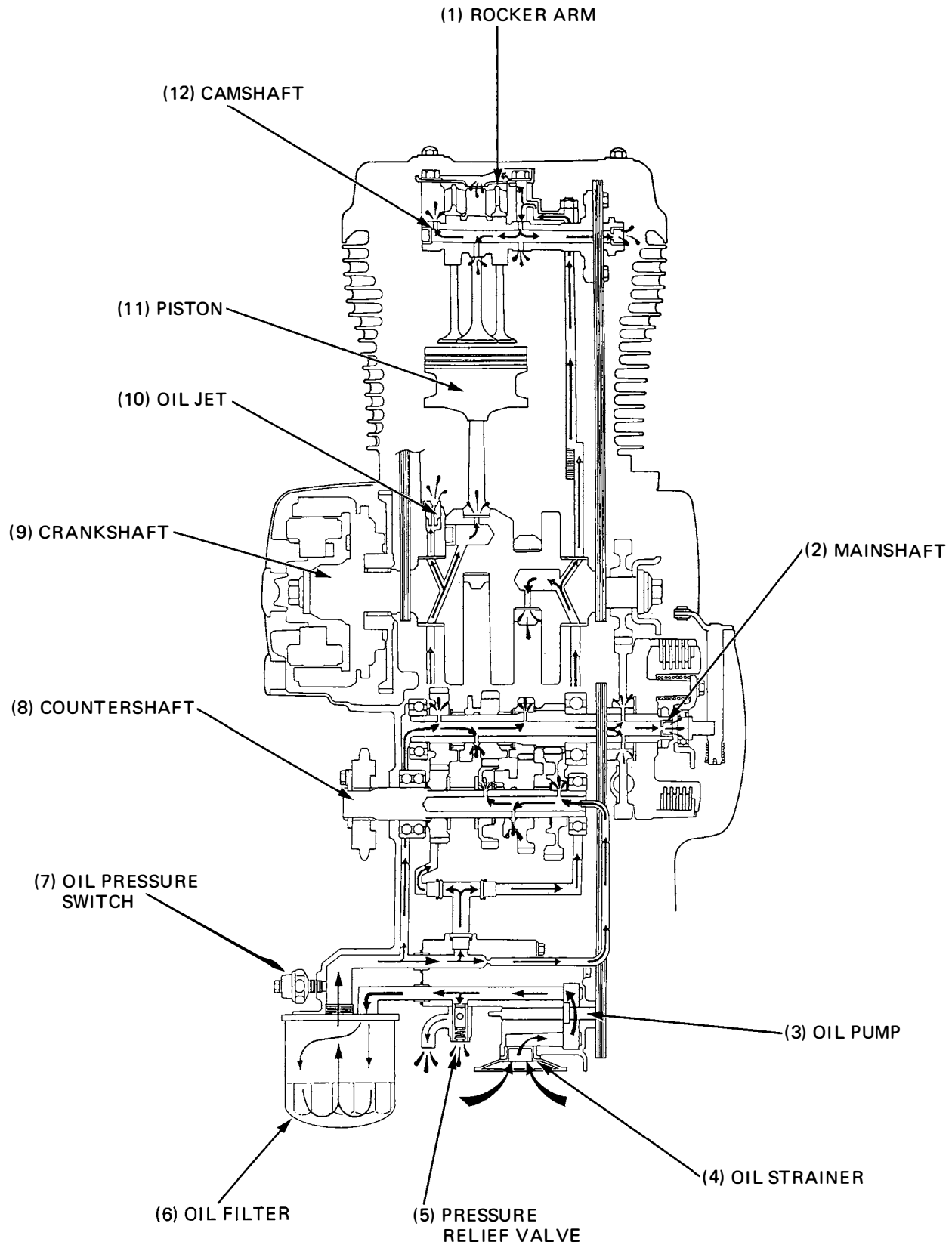
'88, '89:



# 2. LUBRICATION

After '89:

2



## LUBRICATION

|                            |            |                                  |             |
|----------------------------|------------|----------------------------------|-------------|
| <b>SERVICE INFORMATION</b> | <b>2-2</b> | <b>OIL PRESSURE CHECK</b>        | <b>2-5</b>  |
| <b>TROUBLESHOOTING</b>     | <b>2-3</b> | <b>OIL PUMP</b>                  | <b>2-6</b>  |
| <b>ENGINE OIL LEVEL</b>    | <b>2-4</b> | <b>CONTROL CABLE LUBRICATION</b> | <b>2-12</b> |
| <b>ENGINE OIL CHANGE</b>   | <b>2-4</b> | <b>LUBRICATION POINTS</b>        | <b>2-12</b> |
| <b>OIL FILTER CHANGE</b>   | <b>2-5</b> |                                  |             |

## SERVICE INFORMATION

### ▲ WARNING

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

### 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.*

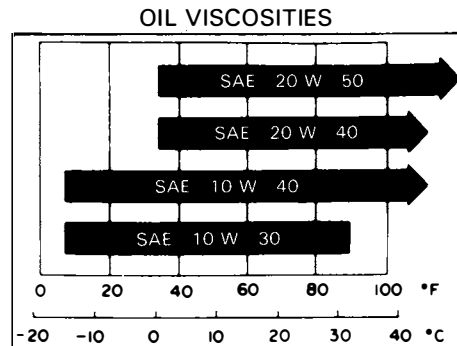
### GENERAL

- The oil pump can be serviced after removing the engine from the frame.

### SPECIFICATIONS

#### Engine oil

|                    |  |
|--------------------|--|
| Oil capacity       | 2.8 lit (2.94 US qt, 2.46 Imp qt) after disassembly.<br>2.25 lit (2.36 US qt, 1.98 Imp qt) at oil filter and oil change.<br>2.1 lit (2.21 US qt, 1.85 Imp qt) after draining.  |
| Oil recommendation | <p>HONDA GN4 4-stroke oil or equivalent API service classification: SF or SG<br/>VISCOSITY: SAE 10W-40</p> <p>Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.</p> |



#### Oil pump

| ITEM                | STANDARD   | SERVICE LIMIT      |
|---------------------|--|--------------------|
| Rotor tip clearance | 0.15 mm (0.006 in)                                     | 0.20 mm (0.008 in) |
| Pump body clearance | 0.15-0.22 mm (0.006-0.009 in)                          | 0.35 mm (0.014 in) |
| Pump end clearance  | 0.02-0.07 mm (0.001-0.003 in)                          | 0.10 mm (0.004 in) |
| Oil pressure        | 441 kPa (4.5 kg/cm <sup>2</sup> , 64 psi) at 6,000 rpm | —                  |

### TORQUE VALUES

|                       |                              |
|-----------------------|------------------------------|
| Oil pressure switch   | 12 N·m (1.2 kg-m, 9 ft-lb)   |
| Engine oil drain bolt | 35 N·m (3.5 kg-m, 25 ft-lb)  |
| Oil filter            | 10 N·m (1.0 kg-m, 7.2 ft-lb) |

---

## TOOLS

### Special

|                               |  |
|-------------------------------|--|
| Oil filter wrench             | 07HAA—PJ70100  |
| Oil pressure gauge            | 07506—3000000 } or equivalent commercially available in U.S.A. |
| Oil pressure gauge attachment | 07510—4220100 }  |
| Snap ring pliers              | 07914—3230001 —or equivalent commercially available in U.S.A   |

## TROUBLESHOOTING

### Oil level too low

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

### Oil contamination

- Oil not changed often enough
- Faulty head gasket
- Worn piston rings

### Low oil pressure

- Faulty oil pump
- Clogged oil strainer
- Low oil level
- Faulty pressure relief valve
- Oil leaks

### High oil pressure

- Faulty pressure relief valve
- Clogged oil filter or oil orifice

### No oil pressure

- Oil level too low
- Broken oil pump drive or driven sprockets
- Broken oil pump drive chain
- Faulty oil pump
- Oil leaks

## LUBRICATION

### ENGINE OIL LEVEL

Support the motorcycle in an upright and level position using a hoist or a jack under the engine.

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

Stop the engine, remove the oil filler cap/dipstick and wipe it clean.

Check the oil level with the oil filler cap/dipstick by inserting it without screwing it in.

#### NOTE

- Do not screw the cap in when making this check.

If the oil level is below the lower level mark on the dipstick, fill to the upper level mark with the recommended oil. Check the O-ring for damage.

### 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/dipstick and drain bolt.

With the engine stop switch OFF, push the starter button for a few seconds to drain any oil which may be left in the engine.

#### NOTE

- Do not operate the motor for more than few seconds.

After the oil has drained, check that the drain bolt sealing washer is in good condition, and install the bolt.

**TORQUE: 35 N·m (3.5 kg·m, 25 ft·lb)**

Fill the crankcase with the correct quantity of the recommended oil.

#### OIL CAPACITY:

- 2.8 lit (2.94 US qt, 2.46 Imp qt) after disassembly
- 2.25 lit (2.36 US qt, 1.98 Imp qt) at oil filter and oil change
- 2.1 lit (2.21 US qt, 1.85 Imp qt) after draining

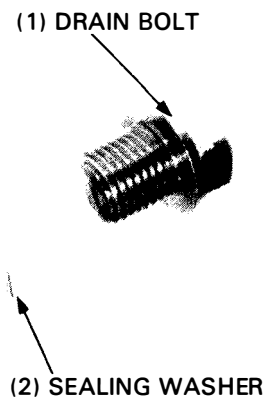
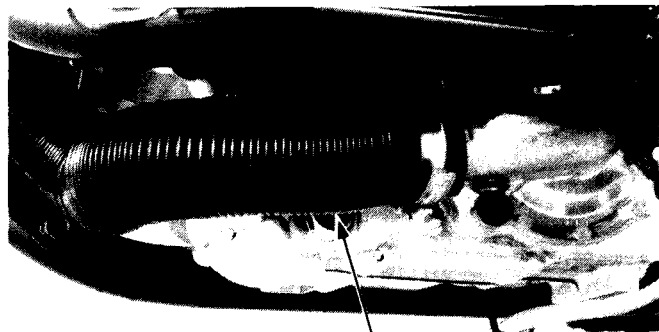
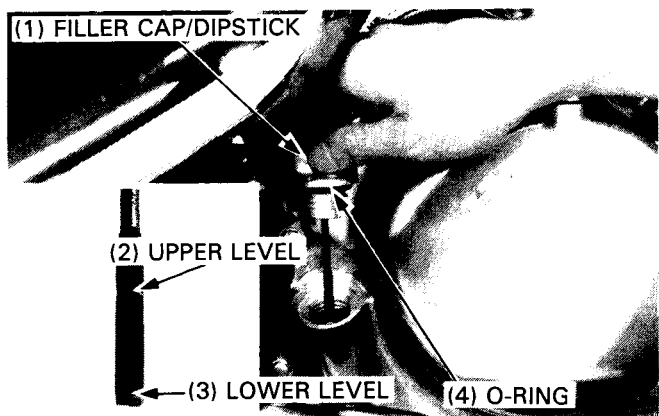
**RECOMMENDED OIL: Honda GN4 4-stroke oil or equivalent**  
**API service classification: SF or SG**  
**VISCOSITY: SAE 10W-40**

Install the oil filler cap/dipstick.

Start the engine and let it idle for 2 or 3 minutes.

Stop the engine and wait a few minutes, then check that the oil level is at the upper level mark with the motorcycle upright.

Check that there are no oil leaks.





## OIL FILTER CHANGE

Drain the engine oil (page 2-4).

### CAUTION

- *Do not replace the oil filter when the exhaust system is hot.*

Remove the oil filter with a filter wrench.

### TOOL:

Oil filter wrench                      07HAA-PJ70100

Apply oil to the new oil filter O-ring and install the new oil filter. Tighten the oil filter with a filter wrench.

**TORQUE: 10 N·m (1.0 kg·m, 7.2 ft·lb)**

Fill the engine with recommended oil (page 2-4).

## OIL PRESSURE CHECK

Remove the following:

- drive sprocket cover (page 13–14)
- drive sprocket cover bracket
- switch cover and switch screw

Disconnect the wire from the oil pressure switch, remove the switch and connect an oil pressure gauge to the switch hole.

### TOOLS:

Oil pressure gauge                      07506-07506-3000000  
Attachment                              07510-4220100 or  
equivalent commercially  
available in U.S.A.

Check the oil level.

Start the engine and allow it to warm-up to operating temperature.

Check the oil pressure at 6,000 rpm.

**STANDARD OIL PRESSURE: 441 kPa (4.5 kg/cm<sup>2</sup>, 64 psi)**

Stop the engine.

Apply sealant to the pressure switch threads and install it.

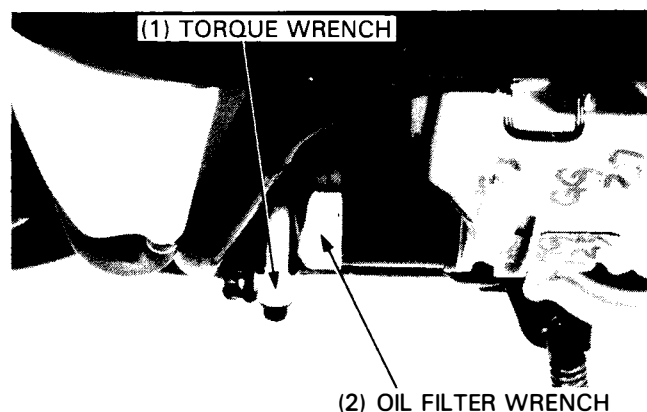
**TORQUE: 12 N·m (1.2 kg·m, 8.7 ft·lb)**

Connect the oil pressure switch wire and pull the dust cover over the switch body securely.

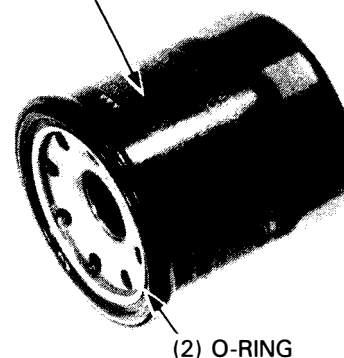
Start the engine and check that the oil pressure warning light goes out after one or two seconds.

### NOTE

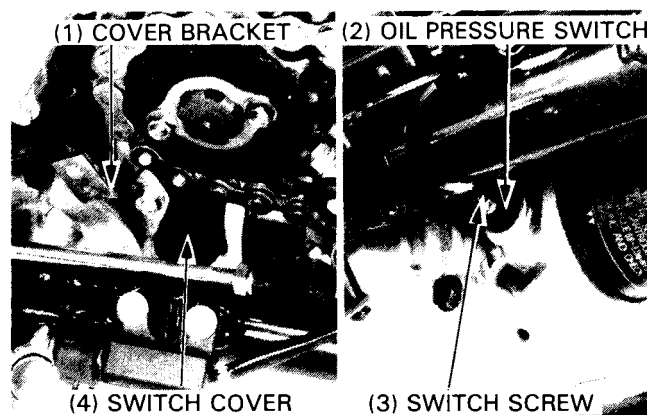
- Route the oil pressure switch wire properly (page 1-15)



(1) OIL FILTER



(2) O-RING

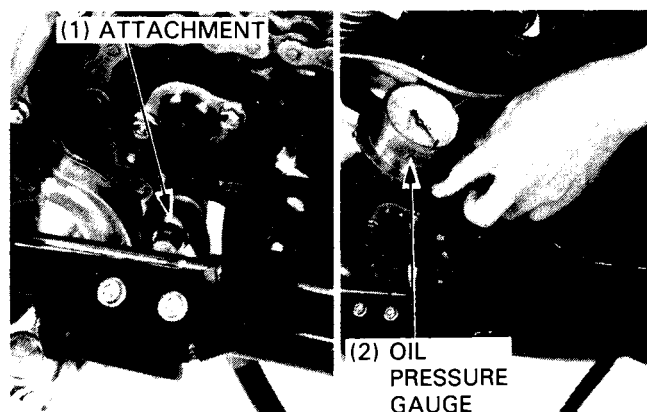


(1) COVER BRACKET

(2) OIL PRESSURE SWITCH

(4) SWITCH COVER

(3) SWITCH SCREW



(1) ATTACHMENT

(2) OIL  
PRESSURE  
GAUGE

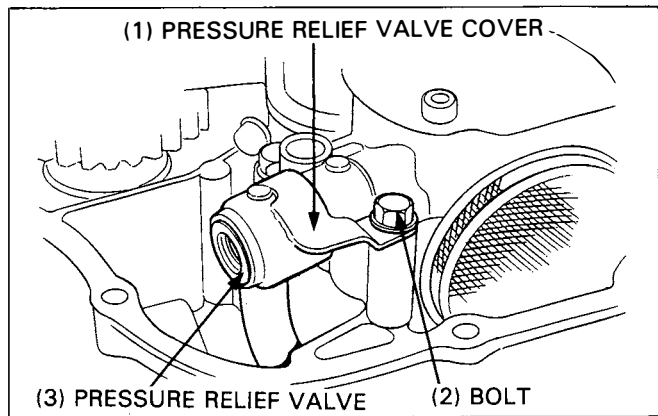
## LUBRICATION

### OIL PUMP

#### PRESSURE RELIEF VALVE REMOVAL

Separate the crankcase (Section 11).

Remove the bolt and pressure relief valve cover.  
Remove the pressure relief valve from the oil pump.

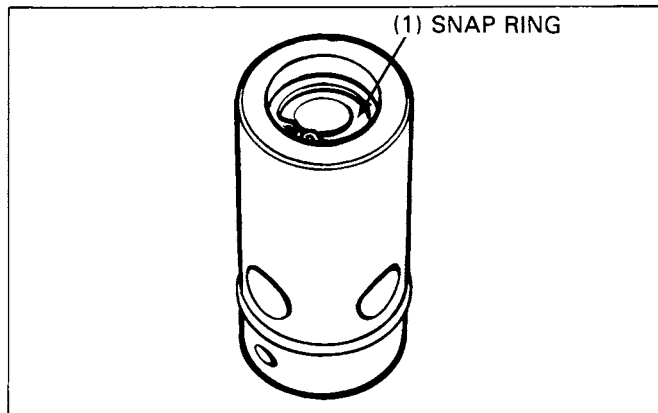


#### PRESSURE RELIEF VALVE DISASSEMBLY

Remove the snap ring and disassemble the relief valve.

**TOOL:**  
Snap ring pliers

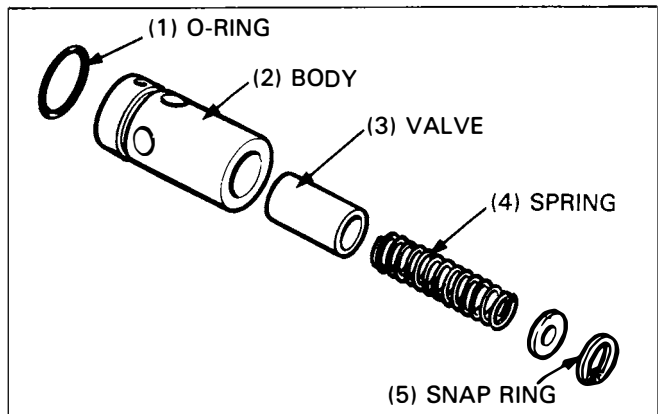
**07914-3230001**  
or equivalent commercially  
available in U.S.A.



#### INSPECTION

Check the spring, O-ring and valve for fatigue, wear or damage.  
Check the body for clogging or damage.  
Replace the relief valve as an assembly.

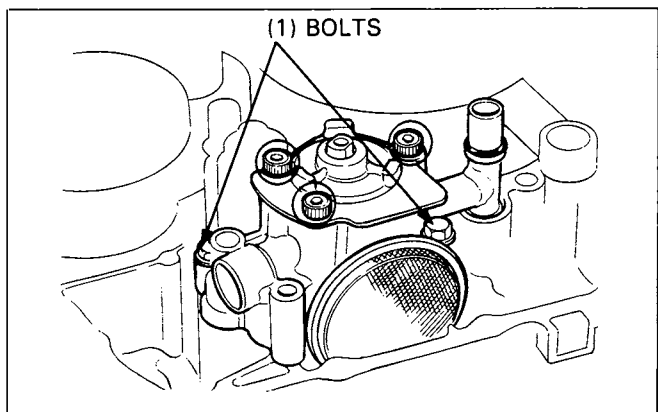
Clean all the parts and assemble them in the reverse order of disassembly.



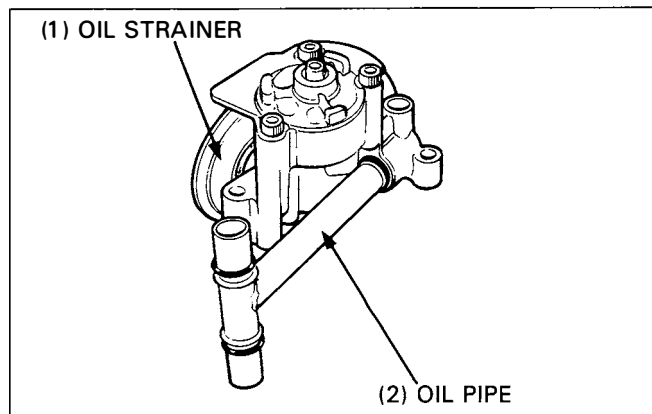
#### OIL PUMP REMOVAL/DISASSEMBLY

Remove the oil pump by removing two mounting bolts.

Remove the dowel pins and O-rings.

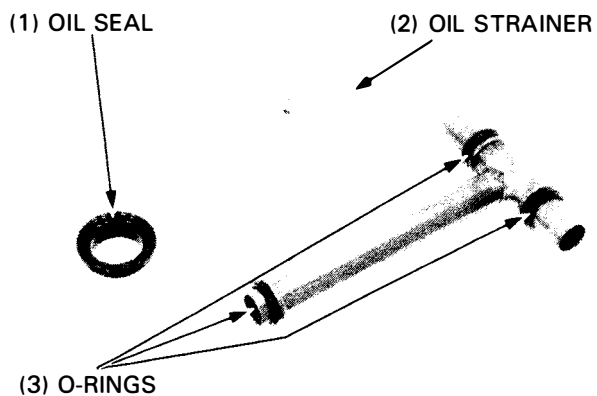


Remove the oil strainer and oil pipe from the oil pump.



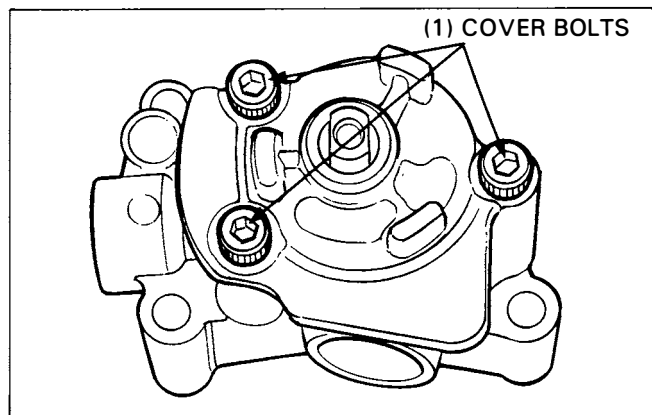
Check the O-rings and oil seal for fatigue or damage.

Clean the oil strainer and oil pipe with non-flammable or high flash point solvent.



Remove the three cover bolts.

Disassemble parts and clean them with non-flammable or high flash point solvent.

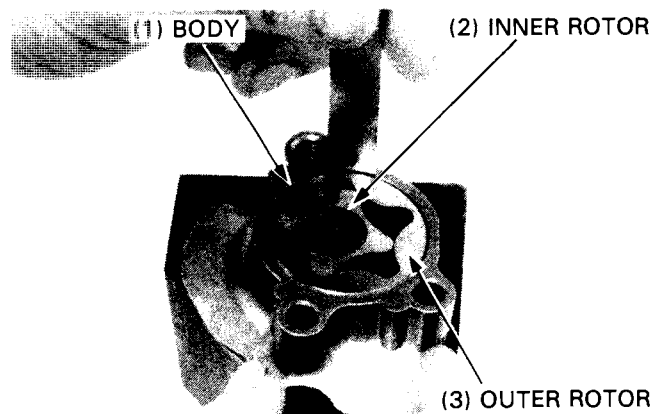


**OIL PUMP INSPECTION**

Install the outer and inner rotors to the pump body.

Measure the outer rotor-to-pump body clearance.

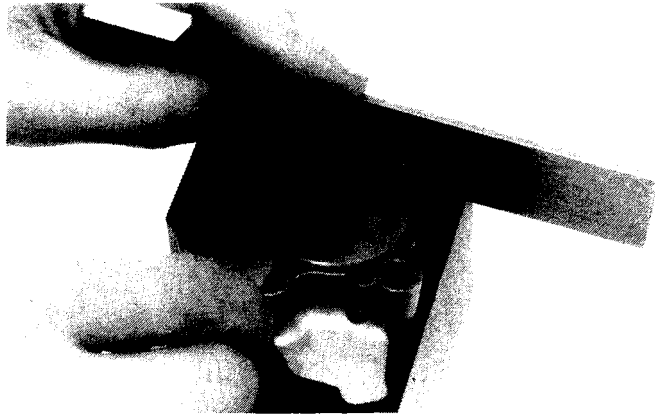
**SERVICE LIMIT: 0.35 mm (0.014 in)**



## LUBRICATION

Remove the oil pump shaft from the oil pump and measure the pump end clearance.

**SERVICE LIMIT: 0.10 mm (0.004 in)**

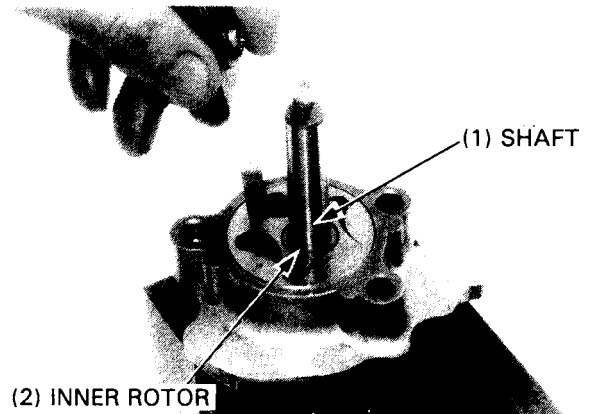


Temporarily install the shaft in the pump body.

Measure the inner rotor tip clearance.

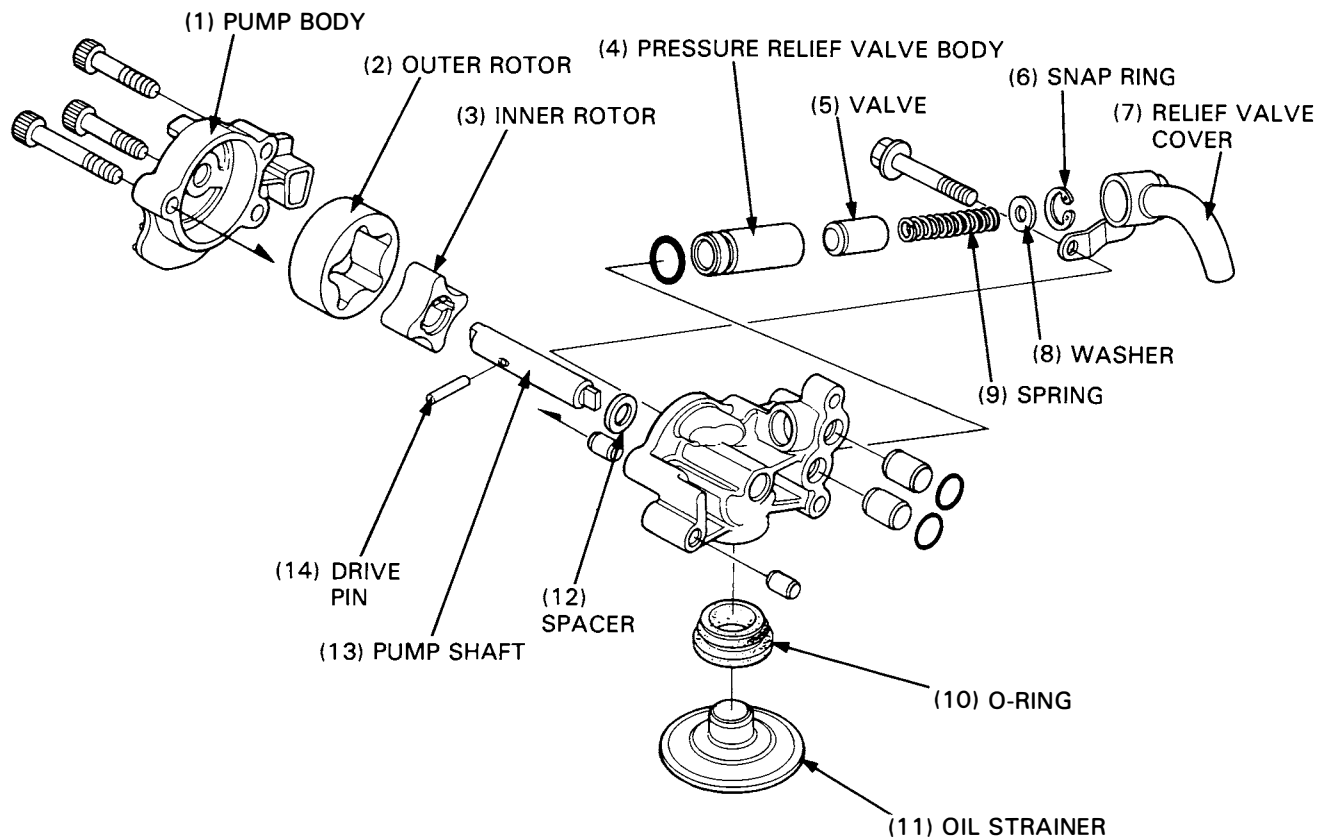
**SERVICE LIMIT: 0.20 mm (0.008 in)**

Replace the oil pump, if necessary as an assembly.

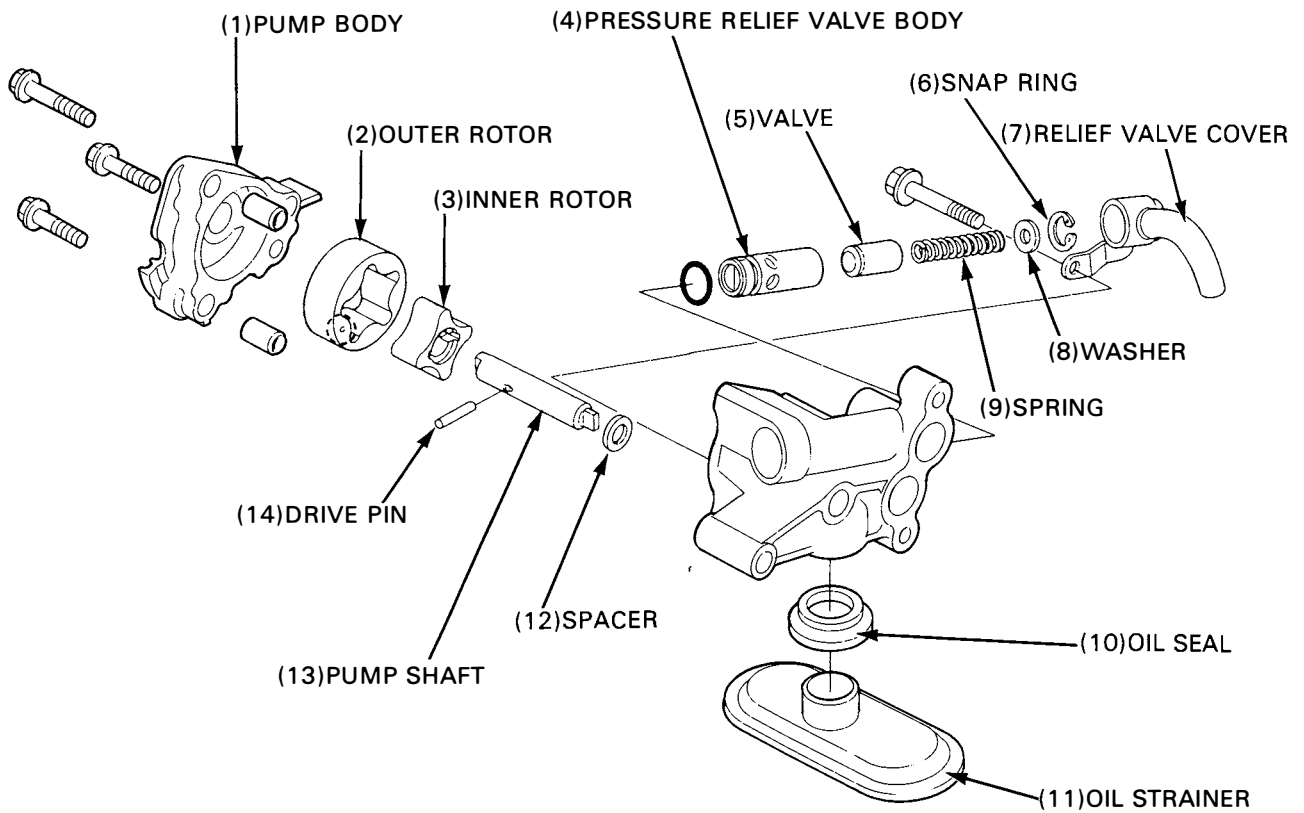


## OIL PUMP ASSEMBLY

'88,'89,'91-93:

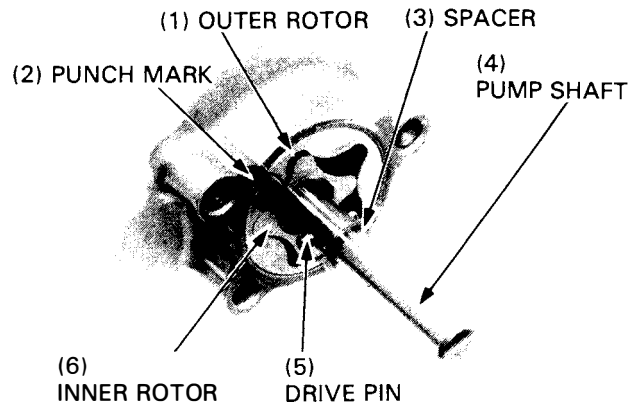


After '93:



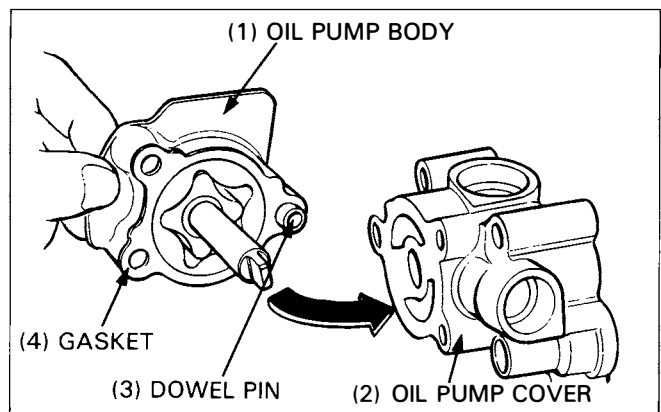
Install the outer rotor in the pump body with the punch mark facing the cover, then install the inner rotor. Install the drive pin and spacer on the shaft.

Install the shaft in the body, aligning the drive pin with the inner rotor groove.



'88, '89, '91-'93:

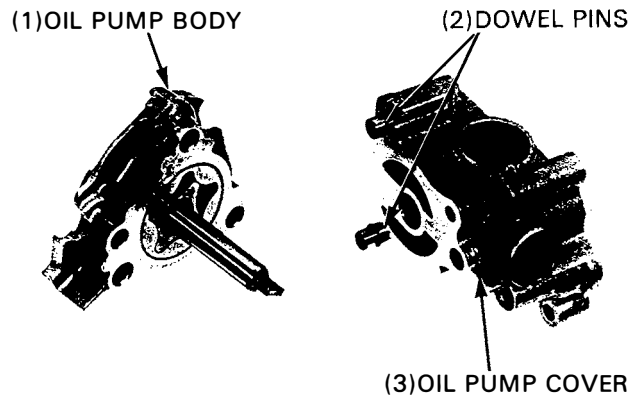
Install the dowel pin and a new gasket on the pump body, then install the cover.



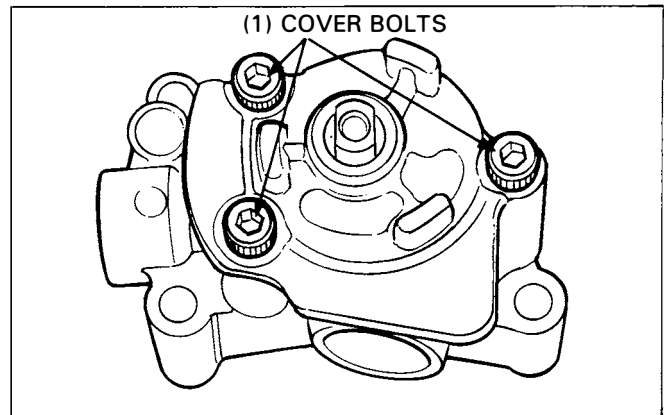
## LABRICATION

### After '93:

Install the dowel pins on the pump cover, then install the pump body.



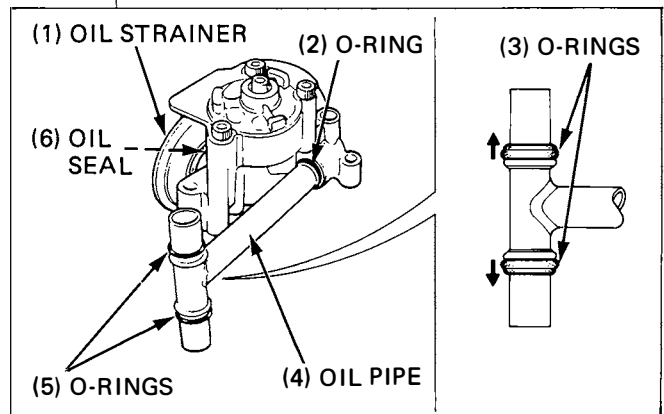
Tighten the cover bolts securely.



Install the O-rings, oil seal, oil strainer and oil pipe on the oil pump.

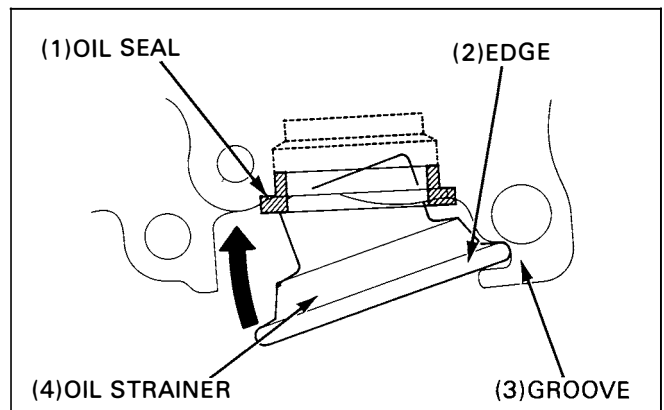
### CAUTION

- Install the O-rings on the oil pipe with the tapered side facing out as shown, or the engine will be damaged.



### After '93:

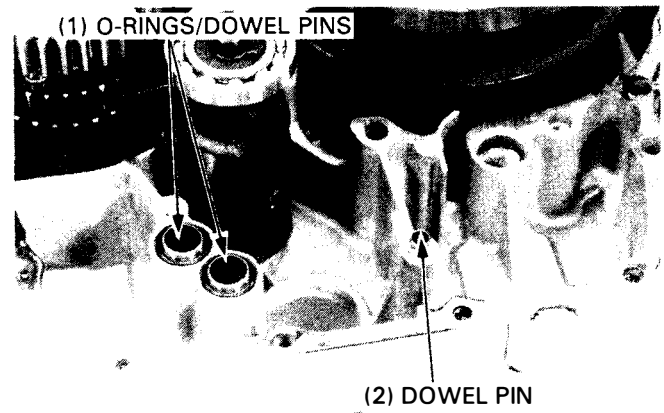
Install the oil seal on the oil pump.  
Align the edge of oil strainer with the groove of the pump cover, then install the oil strainer as shown.



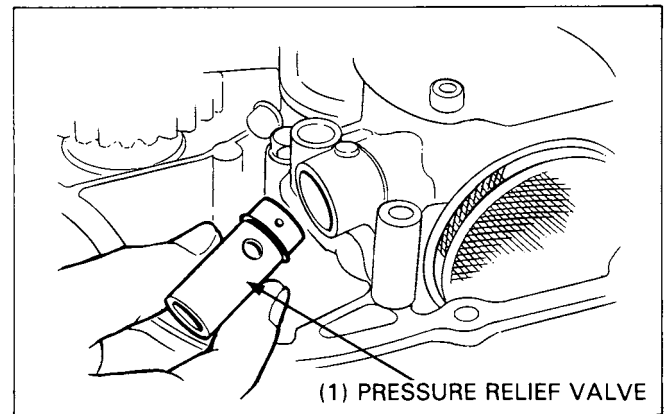
**OIL PUMP INSTALLATION**

Install the dowel pins and new O-rings.

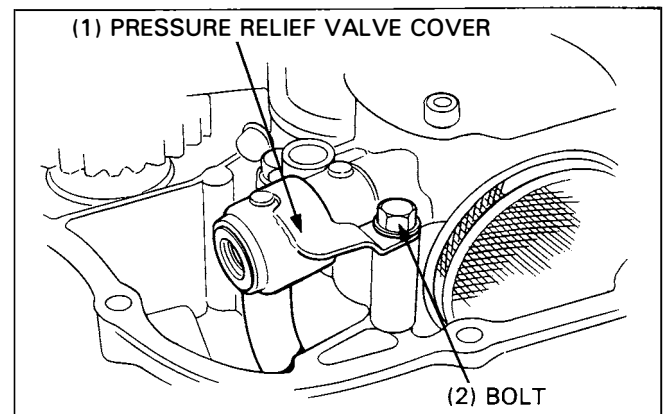
Install the oil pump as an assembly.



Install the pressure relief valve in the oil pump.



Install the pressure relief valve cover with the bolt.  
Assemble the crankcase (Section 11).



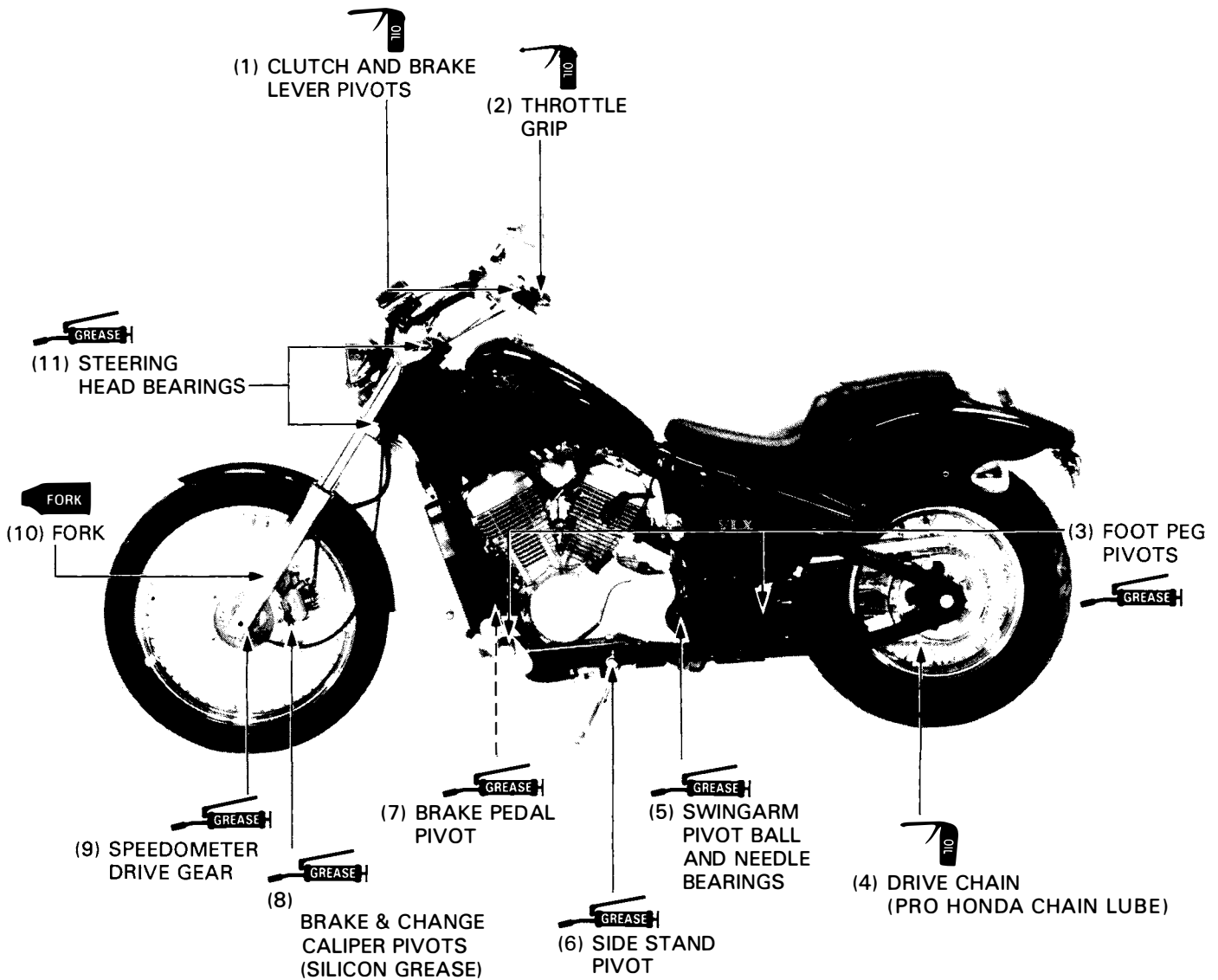
## CONTROL CABLE LUBRICATION

Periodically disconnect the throttle and choke cable at their upper ends. Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant or a light weight oil.

## LUBRICATION POINTS

Use general purpose grease when not otherwise specified here.

Apply oil or grease to the other sliding surfaces and cables not shown here.





|                            |                   |                                     |      |
|----------------------------|-------------------|-------------------------------------|------|
| SERVICE INFORMATION        | 3-1               | CYLINDER COMPRESSION                | 3-12 |
| MAINTENANCE SCHEDULE       | '88; 3-3          | EVAPORATIVE EMISSION CONTROL SYSTEM | 3-13 |
| MAINTENANCE SCHEDULE       | '89, '91-'93; 3-4 | <CHASSIS>                           |      |
| MAINTENANCE SCHEDULE       | After '93; 3-5    | DRIVE CHAIN                         | 3-13 |
| <ENGINE>                   |                   | BRAKE FLUID                         | 3-15 |
| FUEL LINE                  | 3-6               | BRAKE SHOE/PAD WEAR                 | 3-16 |
| THROTTLE OPERATION         | 3-6               | BRAKE SYSTEM                        | 3-16 |
| CARBURETOR CHOKE           | 3-7               | BRAKE LIGHT SWITCH                  | 3-17 |
| AIR CLEANER                | 3-7               | HEADLIGHT AIM                       | 3-18 |
| CRANKCASE BREATHER         | 3-8               | CLUTCH SYSTEM                       | 3-18 |
| SPARK PLUGS                | 3-8               | SIDE STAND                          | 3-19 |
| VALVE CLEARANCE            | 3-8               | SUSPENSION                          | 3-19 |
| CARBURETOR SYNCHRONIZATION | 3-10              | NUTS, BOLTS, FASTENERS              | 3-20 |
| CARBURETOR IDLE SPEED      | 3-11              | WHEELS/TIRES                        | 3-20 |
| RADIATOR COOLANT           | 3-11              | STEERING HEAD BEARINGS              | 3-21 |
| COOLING SYSTEM             | 3-12              |                                     |      |

## SERVICE INFORMATION

### ▲ WARNING

- *If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.*
- *Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the work area or where gasoline is stored.*

### GENERAL

- Engine oil See page 2-4
- Engine oil filter change See page 2-5

### SPECIFICATIONS

#### <<ENGINE>>

Ignition timing Initial '88, '89, '91-'93; 6.2° BTDC at idle  
 After '93; 6.5° BTDC at idle  
 Full advance 30° BTDC at 6,000 rpm

Spark plug

|                                   | NGK      | NIPPONDENSO |
|-----------------------------------|----------|-------------|
| Standard                          | DPR8EA-9 | X24EPR-U9   |
| For cold climate (below 5°C/41°F) | DPR7EA-9 | X22EPR-U9   |
| For extended high speed driving   | DPR9EA-9 | X27EPR-U9   |

Spark plug gap 0.8—0.9 mm (0.031—0.035 in)  
 Valve clearance IN 0.15 ± 0.02 mm (0.006 ± 0.0008 in)  
 (COLD) EX 0.20 ± 0.02 mm (0.008 ± 0.0008 in)  
 Idle speed 1,200 ± 100 rpm  
 Cylinder compression 1,324 ± 98 kPa (13.5 ± 1.0 kg/cm<sup>2</sup>, 192 ± 14 psi)  
 Throttle grip free play 2—6 mm (1/16—1/4 in)

## MAINTENANCE

---

### «CHASSIS»

|                        |                          |
|------------------------|--------------------------|
| Rear brake free play   | 20–30 mm (3/4–1-3/16 in) |
| Brake pedal height     | 43 mm (1.7 in)           |
| Clutch lever free play | 10–20 mm (3/8–3/4 in)    |
| Drive chain slack      | 20–30 mm (3/4–1-3/16 in) |

### Tires

|   |                             | Front            | Rear           |
|---|-----------------------------|------------------|----------------|
| Tire size   |                             | 100/90-19 57S    | 170/80-15 77S  |
| Cold tire pressures<br>kPa (kg/cm <sup>2</sup> , psi) | Up to vehicle capacity load | 200(2.00, 29)    | 250 (2.50, 36) |
|   | Up to 90 kg (200 lbs) load  | 200 (2.00, 29)   | 200 (2.00, 29) |
| Maximum weight capacity                               |                             | 161 kg (355 lbs) |                |
| Tire brand  | Bridgestone                 | L309             | G 546          |
|   | Dunlop                      | F24              | K555           |

### TORQUE VALUES

|                                |                                |
|--------------------------------|--------------------------------|
| Rear axle nut                  | 90 N·m (9.0 kg-m, 65 ft-lb)    |
| Valve adjusting screw lock nut | 23 N·m (2.3 kg-m, 17 ft-lb)    |
| Spokes (front/rear)            | 4 N·m (0.4 kg-m, 2.9 ft-lb)    |
| Timing hole cap                | 3.5 N·m (0.35 kg-m, 2.5 ft-lb) |
| Crankshaft hole cap            | 15 N·m (1.5 kg-m, 11 ft-lb)    |

### TOOLS

#### Special

|                        |                  |                         |
|------------------------|------------------|-------------------------|
| Valve adjusting wrench | 07908–KE90000    | Not available in U.S.A. |
|                        | 07908–KE90100    | U.S.A. Only             |
| Vacuum gauge           | 07404–0030000 or | Not available in U.S.A. |
|                        | 07LMJ–001000A    | U.S.A. Only             |
| Drive chain cutter     | 07HMH–MR10100 or |                         |
|                        | 07HMH–MR1010B    | U.S.A. Only             |
| Spoke wrench           | 07JMA–MR60100    | Not available in U.S.A. |

# MAINTENANCE SCHEDULE '88;

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

I: INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY.

C: CLEAN R: REPLACE L: LUBRICATE

| ITEM                       | FREQUENCY                             | WHICHEVER COMES FIRST<br>↓ | ODOMETER READING (NOTE 1)    |            |     |    |     |     |     |      | REFER TO PAGE |     |
|----------------------------|---------------------------------------|----------------------------|------------------------------|------------|-----|----|-----|-----|-----|------|---------------|-----|
|                            |                                       |                            | →                            | x 1,000 mi | 0.6 | 4  | 8   | 12  | 16  | 20   |               | 24  |
|                            |                                       |                            | EVERY                        | x 100 km   | 10  | 64 | 128 | 192 | 256 | 320  |               | 384 |
| EMISSION RELATED ITEMS     | * FUEL LINE                           |                            |                              |            | I   |    | I   |     | I   | 3-6  |               |     |
|                            | * THROTTLE OPERATION                  |                            |                              |            | I   |    | I   |     | I   | 3-6  |               |     |
|                            | * CARBURETOR CHOKE                    |                            |                              |            | I   |    | I   |     | I   | 3-7  |               |     |
|                            | AIR CLEANER                           | (NOTE 2)                   |                              |            |     |    | R   |     |     | R    | 3-7           |     |
|                            | CRANKCASE BREATHER                    | (NOTE 3)                   |                              |            | C   | C  | C   | C   | C   | C    | 3-8           |     |
|                            | SPARK PLUG                            |                            |                              |            | R   | R  | R   | R   | R   | R    | 3-8           |     |
|                            | * VALVE CLEARANCE                     |                            |                              | I          |     | I  |     | I   |     | I    | 3-8           |     |
|                            | ENGINE OIL                            |                            |                              | R          |     | R  |     | R   |     | R    | 2-4           |     |
|                            | ENGINE OIL FILTER                     |                            |                              | R          |     | R  |     | R   |     | R    | 2-5           |     |
|                            | * CARBURETOR-SYNCHRONIZATION          |                            |                              | I          |     | I  |     | I   |     | I    | 3-10          |     |
|                            | * CARBURETOR-IDLE SPEED               |                            |                              | I          | I   | I  | I   | I   | I   | I    | 3-11          |     |
|                            | RADIATOR COOLANT                      | 2 YEARS *R                 |                              |            |     | I  |     | I   |     | *R   | 3-11          |     |
|                            | * COOLING SYSTEM                      |                            |                              |            |     | I  |     | I   |     | I    | 3-12          |     |
|                            | * EVAPORATIVE EMISSION CONTROL SYSTEM | (NOTE 4)                   |                              |            |     |    | I   |     |     | I    | 3-13          |     |
| NON-EMISSION RELATED ITEMS | DRIVE CHAIN                           |                            | EVERY 600 mi (1,000 km) I. L |            |     |    |     |     |     |      | 3-13          |     |
|                            | BRAKE FLUID                           | 2 YEARS *R                 |                              |            | I   | I  | *R  | I   | I   | *R   | 3-15          |     |
|                            | BRAKE SHOE/PAD WEAR                   |                            |                              |            | I   | I  | I   | I   | I   | I    | 3-16          |     |
|                            | BRAKE SYSTEM                          |                            |                              |            | I   |    | I   |     | I   | 3-16 |               |     |
|                            | * BRAKE LIGHT SWITCH                  |                            |                              |            |     | I  |     | I   |     | I    | 3-17          |     |
|                            | * HEADLIGHT AIM                       |                            |                              |            |     | I  |     | I   |     | I    | 3-18          |     |
|                            | CLUTCH SYSTEM                         |                            |                              |            | I   | I  | I   | I   | I   | I    | 3-18          |     |
|                            | SIDE STAND                            |                            |                              |            |     | I  |     | I   |     | I    | 3-19          |     |
|                            | * SUSPENSION                          |                            |                              |            |     | I  |     | I   |     | I    | 3-19          |     |
|                            | * NUTS, BOLTS, FASTENERS              |                            |                              |            | I   |    | I   |     | I   | I    | 3-20          |     |
|                            | ** WHEELS/TIRES                       |                            |                              |            | I   | I  | I   | I   | I   | I    | 3-20          |     |
| ** STEERING HEAD BEARINGS  |                                       |                            |                              | I          |     | I  |     | I   | I   | 3-21 |               |     |

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

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

NOTES: 1. At higher odometer readings, repeat at the frequency interval established here.

2. Service more frequently when riding in unusually wet or dusty areas.

3. Service more frequently when riding in rain or at full throttle.

4. California model only.

**MAINTENANCE SCHEDULE '89,'91-'93;**

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

I: INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY.

C: CLEAN R: REPLACE L: LUBRICATE

The following items require some mechanical knowledge. Certain items (particularly those marked \* and \*\*) may require more technical information and tools. Consult their authorized Honda dealer.

| ITEM                                  | FREQUENCY                    | NOTE     | ODOMETER READING (NOTE 1)   |     |     |      |      |      |      |      |      | REFER TO PAGE |
|---------------------------------------|------------------------------|----------|-----------------------------|-----|-----|------|------|------|------|------|------|---------------|
|                                       |                              |          | x 1,000 mi                  | 0.6 | 4   | 8    | 12   | 16   | 20   | 24   |      |               |
|                                       |                              |          | x 1,000 km                  | 1   | 6.4 | 12.8 | 19.2 | 25.6 | 32.0 | 38.4 |      |               |
| EMISSION RELATED ITEMS                | * FUEL LINE                  |          |                             |     |     | I    |      |      | I    |      | I    | 3-6           |
|                                       | * THROTTLE OPERATION         |          |                             |     |     | I    |      |      | I    |      | I    | 3-6           |
|                                       | * CARBURETOR CHOKE           |          |                             |     |     | I    |      |      | I    |      | I    | 3-7           |
|                                       | AIR CLEANER                  | (NOTE 2) |                             |     |     |      |      | R    |      |      | R    | 3-7           |
|                                       | CRANKCASE BREATHER           | (NOTE 3) |                             |     |     |      |      | C    | C    | C    | C    | 3-8           |
|                                       | SPARK PLUG                   |          |                             |     |     | R    | R    | R    | R    | R    | R    | 3-8           |
|                                       | * VALVE CLEARANCE            |          |                             |     | I   |      | I    |      | I    |      | I    | 3-8           |
|                                       | ENGINE OIL                   |          |                             |     | R   |      | R    |      | R    |      | R    | 2-4           |
|                                       | ENGINE OIL FILTER            |          |                             |     | R   |      | R    |      | R    |      | R    | 2-5           |
|                                       | * CARBURETOR SYNCHRONIZATION |          |                             |     | I   |      | I    |      | I    |      | I    | 3-10          |
|                                       | * CARBURETOR IDLE SPEED      |          |                             |     | I   | I    | I    | I    | I    | I    | I    | 3-11          |
|                                       | RADIATOR COOLANT             | (NOTE 5) |                             |     |     |      | I    |      | I    |      | *R   | 3-11          |
|                                       | * COOLING SYSTEM             |          |                             |     |     |      | I    |      | I    |      | I    | 3-12          |
| * EVAPORATIVE EMISSION CONTROL SYSTEM | (NOTE 4)                     |          |                             |     |     |      |      | I    |      | I    | 3-13 |               |
| NON-EMISSION RELATED ITEMS            | DRIVE CHAIN                  |          | I,L EVERY 600 mi (1,000 km) |     |     |      |      |      |      |      |      | 3-13          |
|                                       | BRAKE FLUID                  | (NOTE 5) |                             |     | I   | I    | *R   | I    | I    | *R   | I    | 3-15          |
|                                       | BRAKE SHOES/PADS WEAR        |          |                             |     | I   | I    | I    | I    | I    | I    | I    | 3-16          |
|                                       | BRAKE SYSTEM                 |          |                             |     | I   |      | I    |      | I    |      | I    | 3-16          |
|                                       | * BRAKE LIGHT SWITCH         |          |                             |     |     | I    |      | I    |      | I    | I    | 3-17          |
|                                       | * HEADLIGHT AIM              |          |                             |     |     | I    |      | I    |      | I    | I    | 3-18          |
|                                       | CLUTCH SYSTEM                |          |                             |     | I   | I    | I    | I    | I    | I    | I    | 3-18          |
|                                       | SIDE STAND                   |          |                             |     |     | I    |      | I    |      | I    | I    | 3-19          |
|                                       | * SUSPENSION                 |          |                             |     |     | I    |      | I    |      | I    | I    | 3-19          |
|                                       | * NUTS, BOLTS, FASTENERS     |          |                             |     | I   |      | I    |      | I    |      | I    | 3-20          |
| ** WHEELS/TIRES                       |                              |          |                             | I   | I   | I    | I    | I    | I    | I    | 3-20 |               |
| ** STEERING HEAD BEARING              |                              |          |                             | I   |     | I    |      | I    |      | I    | 3-21 |               |

\* SHOULD BE SERVICED BY AN AUTHORIZED HONDA DEALER, UNLESS THE OWNER HAS PROPER TOOLS AND SERVICE DATA AND IS MECHANICALLY QUALIFIED.

\*\* IN THE INTEREST OF SAFETY, WE RECOMMEND THESE ITEMS BE SERVICED ONLY BY AN AUTHORIZED HONDA DEALER.

NOTES: 1. At higher odometer readings, repeat at the frequency interval established here.

2. Service more frequently when riding in unusually wet or dusty areas.

3. Service more frequently when riding in rain or at full throttle.

4. California type only.

5. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.

# MAINTENANCE SCHEDULE After '93;

Perform the PRE-RIDE INSPECTION in the Owner manual at each scheduled maintenance period.

I: INSPECT AND CLEAN, ADJUST, LUBRICATE OR REPLACE IF NECESSARY.

C: CLEAN R: REPLACE L: LUBRICATE

The following items require mechanical knowledge. Certain items (particularly those marked \* and \*\* ) may require more technical information and tools, Consult their authorized Honda dealer.

|                            | FREQUENCY             | ITEM                                | NOTE     | ODOMETER READING (NOTE 1) |                          |    |     |     |     |     |      | REFER TO PAGE |
|----------------------------|-----------------------|-------------------------------------|----------|---------------------------|--------------------------|----|-----|-----|-----|-----|------|---------------|
|                            |                       |                                     |          | × 1,000mi                 | 0.6                      | 4  | 8   | 12  | 16  | 20  | 24   |               |
|                            |                       |                                     |          | × 100km                   | 10                       | 64 | 128 | 192 | 256 | 320 | 384  |               |
| EMISSION RELATED ITEMS     | *                     | FUEL LINE                           |          |                           |                          |    | I   |     | I   |     | I    | 3-6           |
|                            | *                     | THROTTLE OPERATION                  |          |                           |                          |    | I   |     | I   |     | I    | 3-6           |
|                            | *                     | CARBURETOR CHOKE                    |          |                           |                          |    | I   |     | I   |     | I    | 3-7           |
|                            |                       | AIR CLEANER                         | (NOTE 2) |                           |                          |    |     | R   |     |     | R    | 3-7           |
|                            |                       | CRANKCASE BREATHER                  | (NOTE 3) |                           |                          | C  | C   | C   | C   | C   | C    | 3-8           |
|                            |                       | SPARK PLUG                          |          |                           |                          | R  | R   | R   | R   | R   | R    | 3-8           |
|                            | *                     | VALVE CLEARANCE                     |          |                           | I                        |    | I   |     | I   |     | I    | 3-8           |
|                            |                       | ENGINE OIL                          |          |                           | R                        |    | R   |     | R   |     | R    | 2-4           |
|                            |                       | ENGINE OIL FILTER                   |          |                           | R                        |    | R   |     | R   |     | R    | 2-5           |
|                            | *                     | CARBURETOR SYNCHRONIZATION          |          |                           | I                        |    | I   |     | I   |     | I    | 3-10          |
|                            | *                     | CARBURETOR IDLE SPEED               |          |                           | I                        | I  | I   | I   | I   | I   | I    | 3-11          |
|                            |                       | RADIATOR COOLANT (NOTE 5)           |          |                           |                          |    | I   |     | I   |     | R    | 3-11          |
|                            | *                     | COOLING SYSTEM                      |          |                           |                          |    | I   |     | I   |     | I    | 3-12          |
|                            | *                     | EVAPORATIVE EMISSION CONTROL SYSTEM | (NOTE 4) |                           |                          |    |     | I   |     |     | I    | 3-13          |
| NON-EMISSION RELATED ITEMS |                       | DRIVE CHAIN                         |          |                           | I, L EVERY 500mi (800km) |    |     |     |     |     | 3-13 |               |
|                            |                       | BRAKE FLUID                         | (NOTE 5) |                           |                          | I  | I   | R   | I   | I   | R    | 3-15          |
|                            |                       | BRAKE SHOES/PADS WEAR               |          |                           |                          | I  | I   | I   | I   | I   | I    | 3-16          |
|                            |                       | BRAKE SYSTEM                        |          |                           | I                        |    | I   |     | I   |     | I    | 3-16          |
|                            | *                     | BRAKE LIGHT SWITCH                  |          |                           |                          |    | I   |     | I   |     | I    | 3-17          |
|                            | *                     | HEADLIGHT AIM                       |          |                           |                          |    | I   |     | I   |     | I    | 3-18          |
|                            |                       | CLUTCH SYSTEM                       |          |                           | I                        | I  | I   | I   | I   | I   | I    | 3-18          |
|                            |                       | SIDE STAND                          |          |                           |                          |    | I   |     | I   |     | I    | 3-19          |
|                            | *                     | SUSPENSION                          |          |                           |                          |    | I   |     | I   |     | I    | 3-19          |
|                            | *                     | NUTS, BOLTS, FASTENERS              |          |                           | I                        |    | I   |     | I   |     | I    | 3-20          |
|                            | **                    | WHEELS/TIRES                        |          |                           | I                        | I  | I   | I   | I   | I   | I    | 3-20          |
| **                         | STEERING HEAD BEARING |                                     |          | I                         |                          | I  |     | I   |     | I   | 3-21 |               |

\* SHOULD BE SERVICED BY YOUR AUTHORIZED HONDA DEALER, UNLESS THE OWNER HAS PROPER TOOLS AND SERVICE DATA AND IS MECHANICALLY QUALIFIED.

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4. California type only.

5. Replace every 2 years, or at indicated odometer interval, whichever comes first. Replacement requires mechanical skill.

## MAINTENANCE

### FUEL LINE

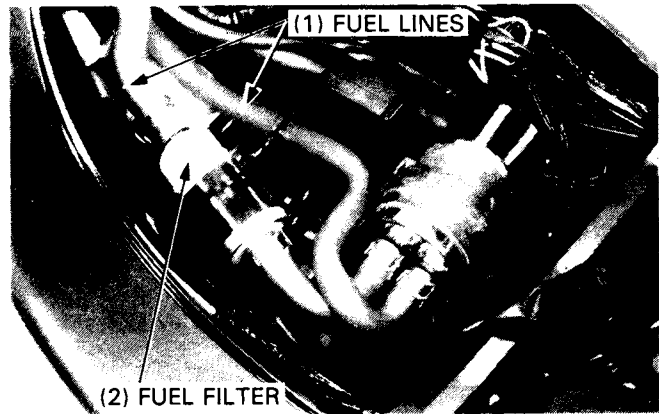
Remove the seat.

Check the fuel lines for deterioration, damage or leakage.  
Replace the fuel lines if necessary.

### FUEL FILTER

Pull the fuel filter out, clip the inlet line closed and remove the filter.

Replace the fuel filter with new one, if necessary (page 4-3).



### THROTTLE OPERATION

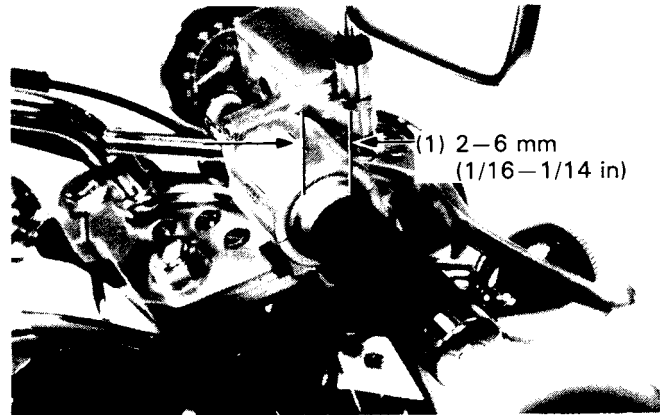
Check for smooth throttle grip full opening and automatic full closing in all steering positions.

Check the throttle cables and replace them if they are deteriorated, kinked or damaged.

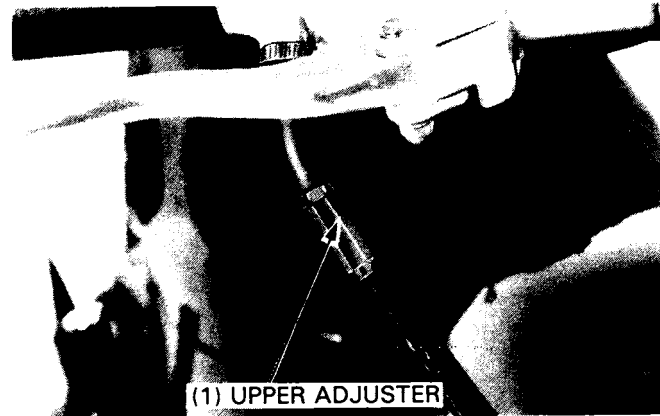
Lubricate the throttle cables, if throttle operation is not smooth.

Measure the free play at the throttle grip flange.

**FREE PLAY: 2–6 mm (1/16–1/4 in)**



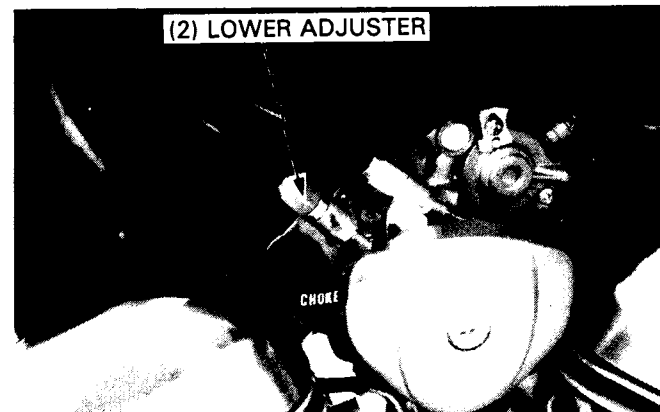
Throttle grip free play can be adjusted at either end of the throttle cable. Minor adjustments are made with the upper adjuster.



Major adjustments are made with the lower adjuster.

Adjust the free play by loosening the lock nut and turning the adjusting nut. Tighten the lock nuts.

Recheck throttle operation. Replace any damaged parts, if necessary.



## CARBURETOR CHOKE

**NOTE**

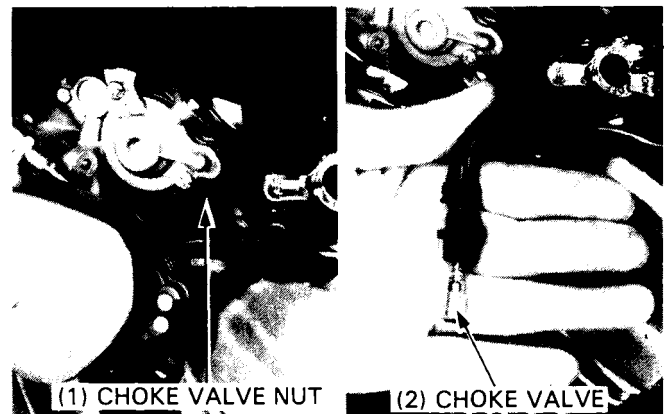
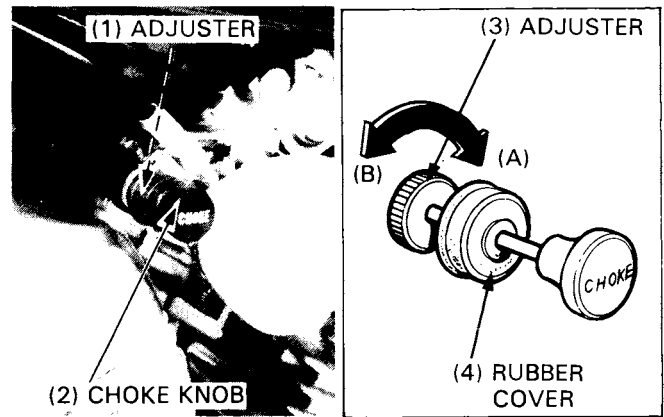
- Choke knob operating friction can be adjusted by turning the adjuster.

Check for smooth operation of the choke knob. Lubricate the choke cable and/or adjust the choke knob operating friction if operation is not smooth. To adjust the friction, pull the rubber cover away and turn the adjuster.

| Direction | Friction |
|-----------|----------|
| A         | Increase |
| B         | Decrease |

Loosen the choke valve nut and remove the choke valve from the carburetor. Pull the choke knob all the way out to fully open position and recheck for smooth operation of the choke knob. There should be no free play.

Check the valve seat on the choke valve for damage. Reinstall the choke valve in the reverse order of removal.

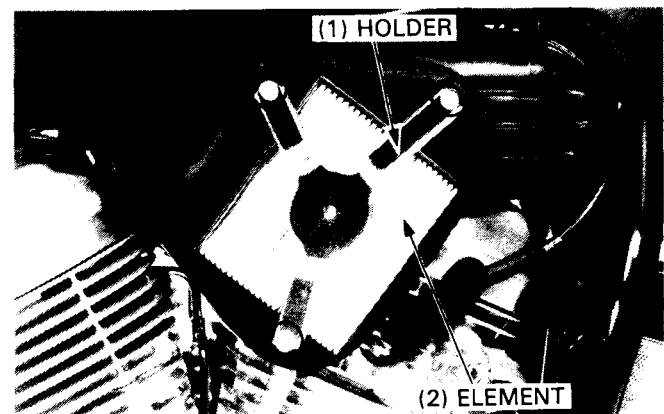


## AIR CLEANER

Remove the air cleaner housing cover bolt and cover.



Remove the holder bolts and the air cleaner element. Replace the element in accordance with the maintenance schedule. Also, replace the element any time it is excessively dirty or damaged.



## MAINTENANCE

### CRANKCASE BREATHER

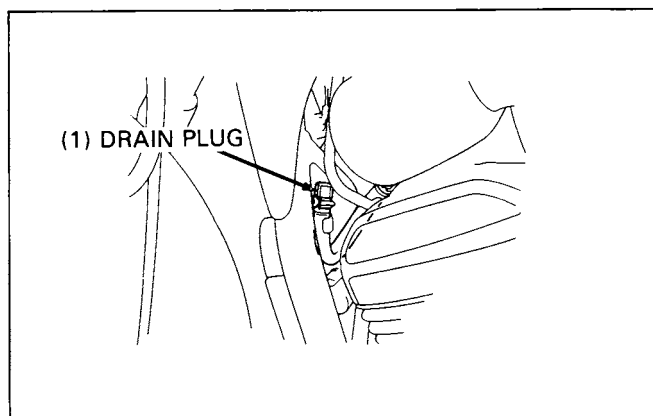
The crankcase breather drain tube is behind the left frame pipe and front cylinder head.

Pull the drain tube out of the frame clamp.

Remove the drain plug from the tube to empty any deposits. Reinstall the drain plug.

#### NOTE

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

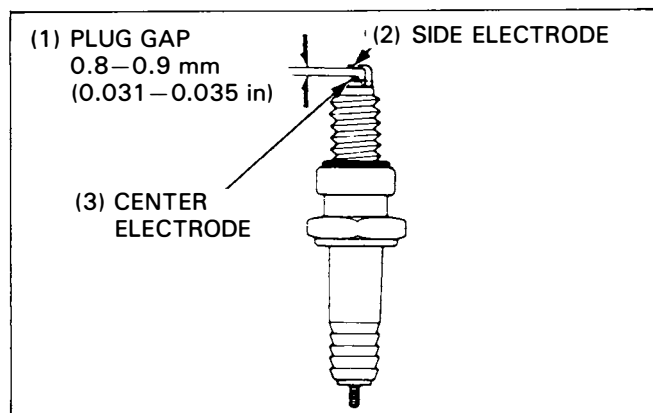


### SPARK PLUGS

Disconnect the spark plug cap and remove the spark plugs.

#### RECOMMENDED SPARK PLUG:

|                                      | NGK      | NIPPONDENSO |
|--------------------------------------|----------|-------------|
| Standard                             | DPR8EA-9 | X24EPR-U9   |
| For cold climate<br>(below 5°C/41°F) | DPR7EA-9 | X22EPR-U9   |
| For extended high speed<br>driving   | DPR9EA-9 | X27EPR-U9   |



Measure the spark plug gap with a wire-type feeler gauge.

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

Adjust by bending the side electrode carefully. With the plug washer attached, thread each spark plug in by hand to prevent cross-threading. Continue tightening by hand until the spark plug bottoms.

Then, tighten the spark plugs another 1/2 turn with a spark plug wrench to compress the plug washer.

Connect the spark plug caps.

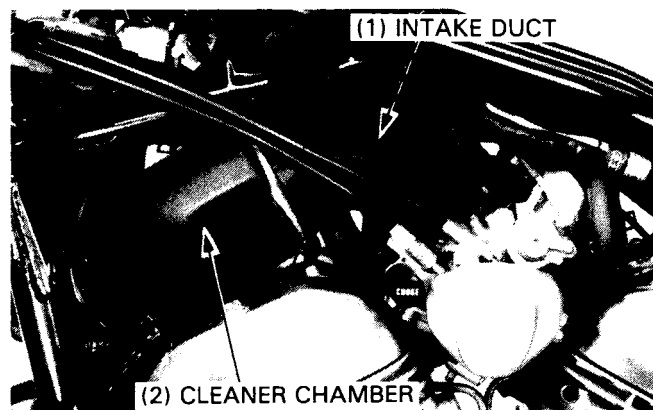
### VALVE CLEARANCE

#### NOTE

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

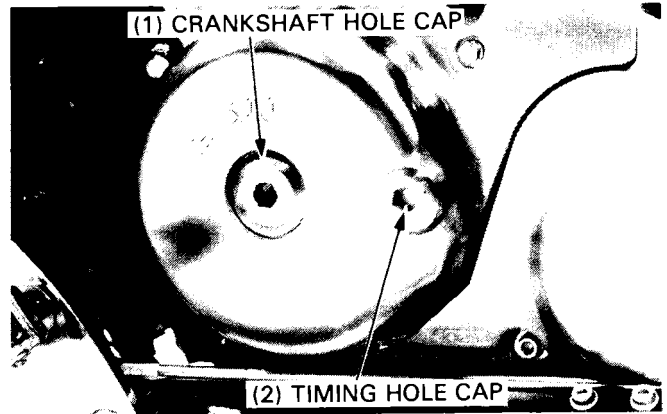
Remove the following parts:

- fuel tank (page 4-3)
- air cleaner housing (page 4-4)
- air cleaner chamber and intake duct.





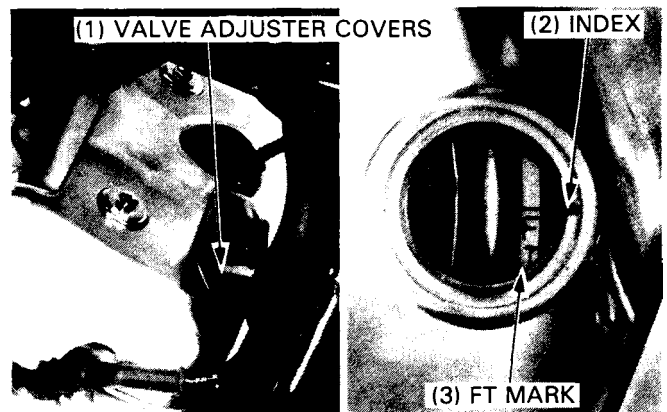
Remove the crankshaft and timing hole caps.



Remove the valve adjusting covers from the cylinder head covers.

**NOTE**

- Adjust the front cylinder valves first.



**FRONT CYLINDER HEAD**

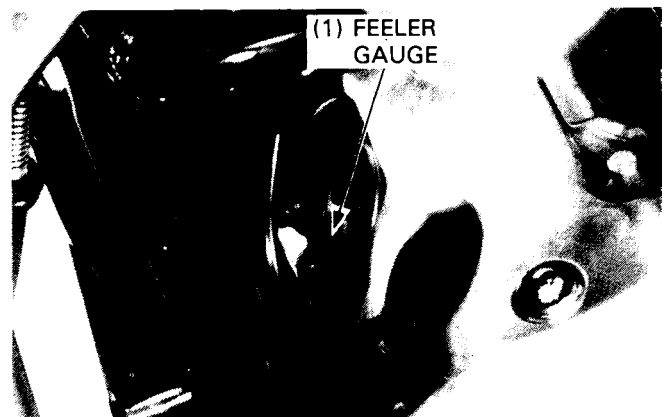
Rotate the flywheel counterclockwise to align the "FT" mark with the index notch on the left crankcase cover. Make sure the piston is at TDC (Top Dead Center) on the compression stroke.

Inspect the clearance of all three valves by inserting a feeler gauge between the adjusting screw and the valve.

**VALVE CLEARANCES:**

**Intake:**  $0.15 \pm 0.02$  mm ( $0.006 \pm 0.0008$  in)

**Exhaust:**  $0.20 \pm 0.02$  mm ( $0.008 \pm 0.0008$  in)



Adjust by loosening the lock nut and turning the adjusting screw until there is a slight drag on the feeler gauge.

Hold the adjusting screw and tighten the lock nut.

**TOOL:**

Valve adjusting wrench

07908-KE90000

Not available in U.S.A.

07908-KE90100

**TORQUE:** 23 N·m (2.3 kg-m, 17 ft-lb)

Apply oil to the nut and bolt threads.



## MAINTENANCE

### REAR CYLINDER HEAD

Rotate the flywheel counterclockwise to align the "RT" mark with the index notch on the left crankcase cover. Make sure the piston is at TDC on the compression stroke.

Check the O-rings of the valve adjusting covers (IN/EX) for damage and replace if necessary.

Install the front and rear valve adjusting covers.

Apply grease to the timing and crankcase hole caps, then install and tighten them.

### TORQUE

Timing hole cap:

3.5 N·m (0.35 kg-m, 2.5 ft-lb)

Crankshaft hole cap:

15 N·m (1.5 kg-m, 11 ft-lb)

### CARBURETOR SYNCHRONIZATION

#### NOTE

- Perform this maintenance with the engine at normal operating temperature.

Remove the fuel tank mounting bolt. Carefully raise the tank and support it in the frame using a suitable base (see page 3-9).

Remove the air cleaner case (page 4-4). Remove the plugs from the cylinder intake ports and install the vacuum gauge adaptors as shown.

Connect the vacuum gauge.

#### TOOL:

Vacuum gauge

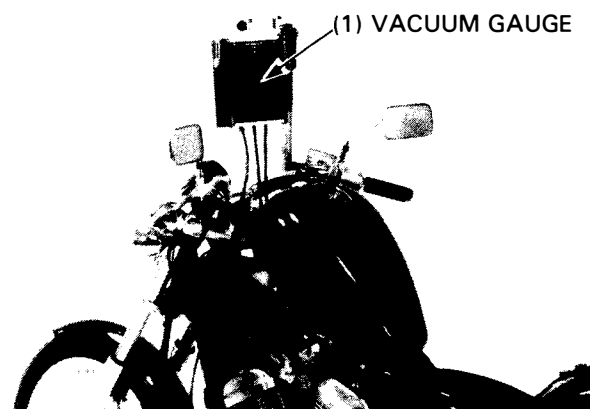
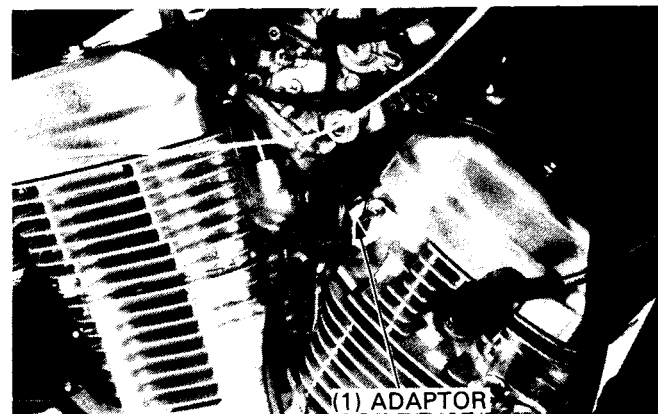
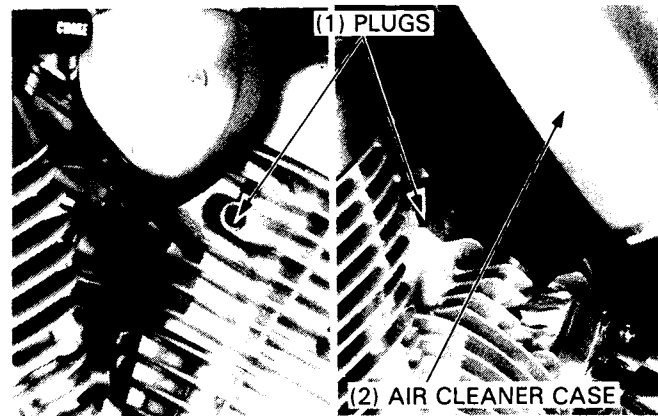
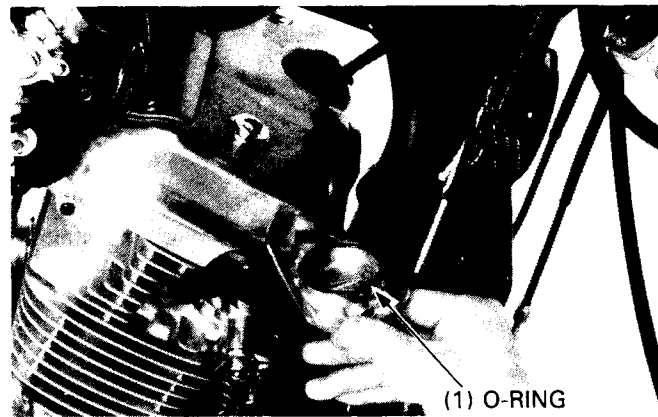
07404-0030000

Not available in U.S.A.

07LMJ-001000A

Warm up the engine and adjust the idle speed with the throttle stop screw.

**IDLE SPEED: 1,200 ± 100 rpm**



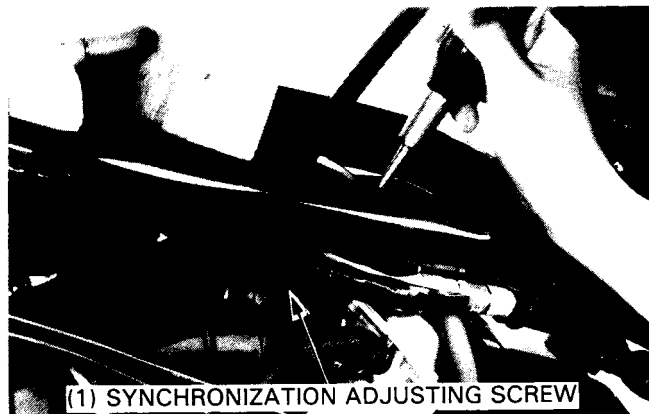
Check that the difference in vacuum readings is **40 mm (1.6 in) Hg** or less.

NOTE

- The rear cylinder carburetor is the base carburetor.

If necessary, synchronize to the specification by turning the synchronization adjusting screw.

Recheck the idle speed and synchronization. Disconnect the gauge and adaptors and install the removed parts.



## CARBURETOR IDLE SPEED

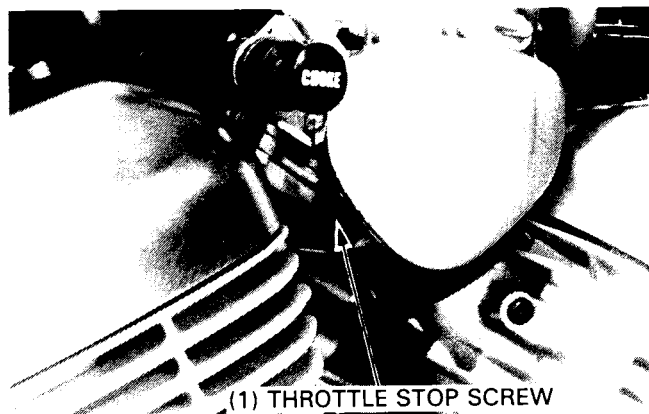
NOTE

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

Warm up the engine, shift to NEUTRAL, and place the motorcycle on its side stand.

Turn the throttle stop screw as required to obtain the specified idle speed.

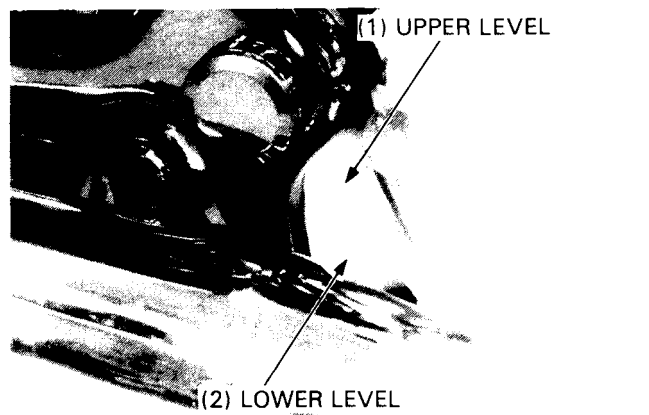
**IDLE SPEED: 1,200 ± 100 rpm**



## RADIATOR COOLANT

Check the coolant level of the reserve tank with the engine running at normal operating temperature.

The level should be between the "UP" and "LOW" level lines.



If necessary, remove the right side cover and then remove the reserve tank cap.

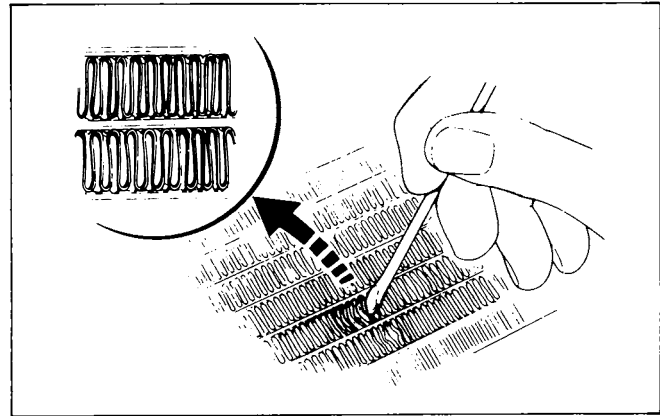
Fill up to the upper level line with 50/50 mixture of distilled water and antifreeze.

Reinstall the reserve tank cap and right sider cover.

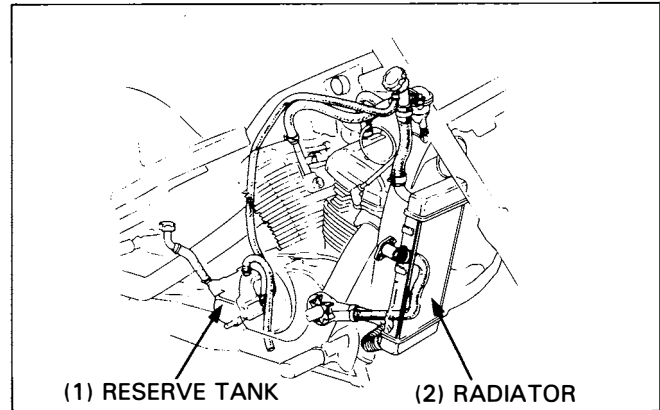


## COOLING SYSTEM

Remove the radiator shroud and check the radiator air passages for clogging or damage. Straighten bent fins or collapsed core tubes with a small flat blade screwdriver as shown and remove insects, mud or any obstructions with compressed air or low pressure water. Replace the radiator if the air flow is restricted over more than 20 % of the radiated surface. For radiator replacement, refer to page 5-5.



Make sure the hoses are in good condition. Replace any hose that shows any sign of deterioration. Check that all hose clamps are tight.

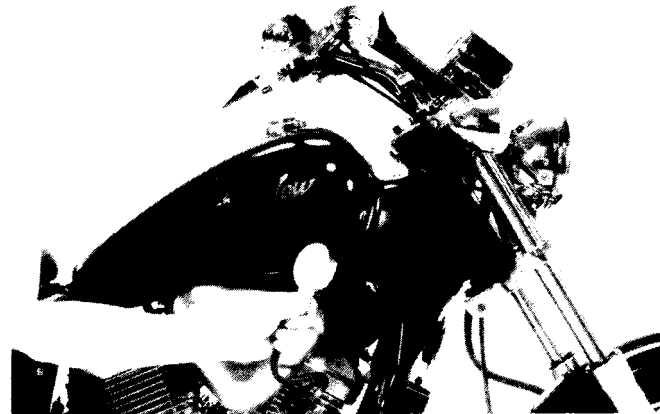


## CYLINDER COMPRESSION

Warm up the engine.  
Stop the engine and remove the spark plug.  
Connect a compression gauge.  
Turn the engine stop switch OFF.  
Open the throttle grip fully. Crank the engine with the starter motor until the gauge stops rising.  
Check the gauge reading.

### NOTE

- Check that there is no leakage at the gauge connection.
- The maximum reading is usually reached within 4-7 seconds.



### COMPRESSION:

**1,324 ± 98 kPa (13.5 ± 1.0 kg/cm<sup>2</sup>, 192 ± 14 psi)**

### Low compression can be caused by:

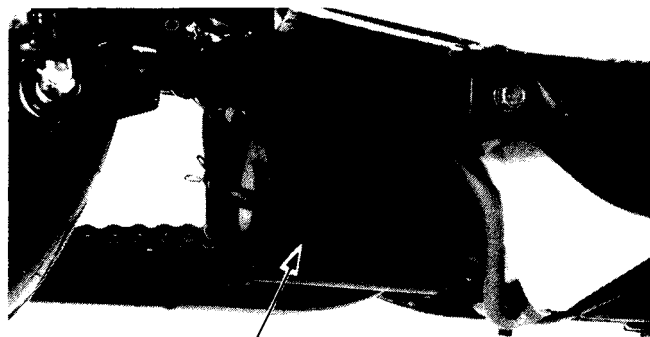
- Improper valve clearance adjustment
- Valve leakage
- Leaking cylinder head gasket
- Worn piston rings or cylinder

### High compression can be caused by:

- Carbon deposits in the combustion chamber or on the piston head.

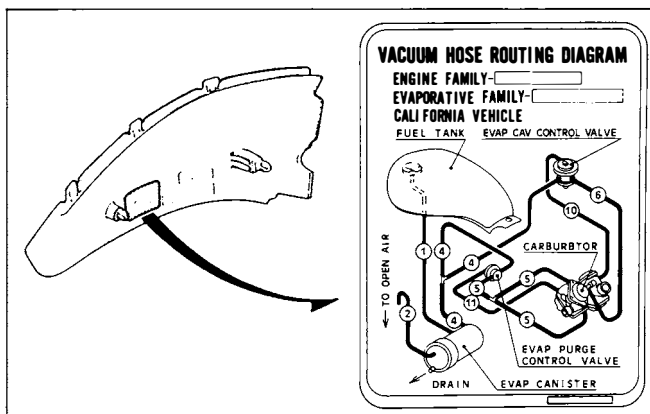
## EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)

Check the hoses between the fuel tank, evaporative emission canister, evaporative emission purge control valve (EVAP PURGE CONTROL VALVE), evaporative emission carburetor air vent control valve (EVAP CAV CONTROL VALVE), and carburetor for deterioration, damage or loose connections.



(1) EVAP CANISTER

Also check the tubes for clogging due to bending or twisting. Check the evaporative emission canister for cracks deterioration, or other damage. Refer to the vacuum hose routing diagram label for hose connections.



## DRIVE CHAIN

### CHAIN SLACK INSPECTION

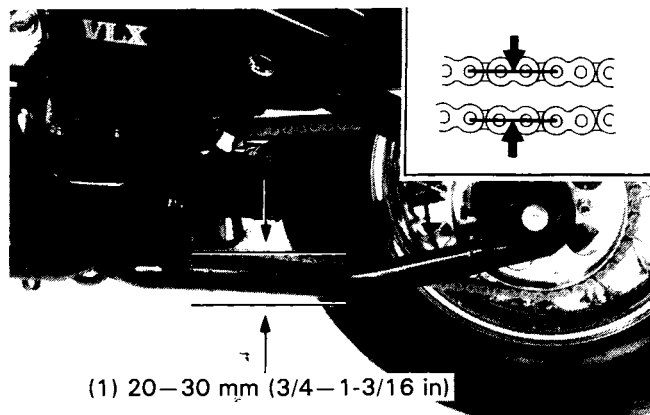


- *Never inspect or adjust the drive chain while the engine is running.*

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

Check slack in the drive chain lower run midway between the sprockets.

**SLACK: 20–30 mm (3/4–1-3/16 in)**

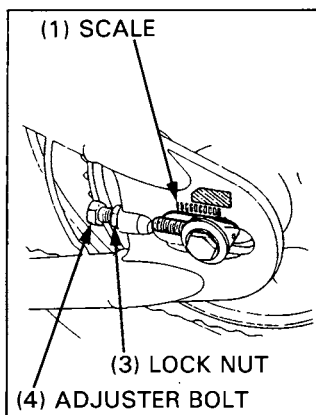


### CHAIN ADJUSTMENT

Loosen the axle nut. Loosen both lock nuts and turn both adjusting bolts as necessary.

Make sure the index marks on both the adjuster collars are aligned with the corresponding scale graduations on both sides of the swingarm. Tighten both lock nuts, then tighten the rear axle nut.

**TORQUE: 90 N·m (9.0 kg·m, 65 ft·lb)**



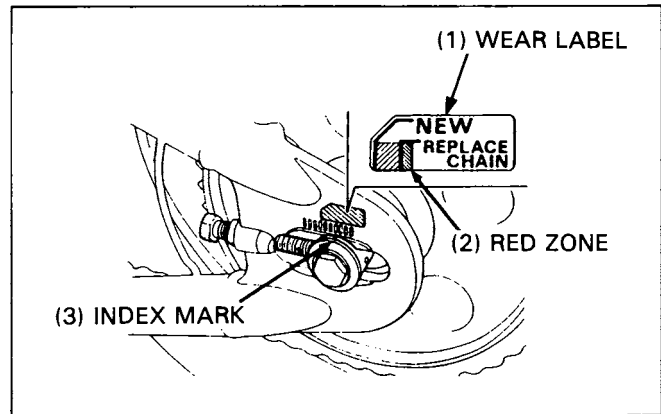
## MAINTENANCE

Recheck chain slack and free wheel rotation.

Lubricate the drive chain with Pro Honda Chain Lube or equivalent chain lubricant designed specifically for use on O-ring chains.

Check the chain wear label. If the red zone on the label aligns with the arrow mark of the chain adjuster after the chain has been adjusted, the chain must be replaced.

**REPLACEMENT CHAIN: RK525 SM5  
DID525 V8**



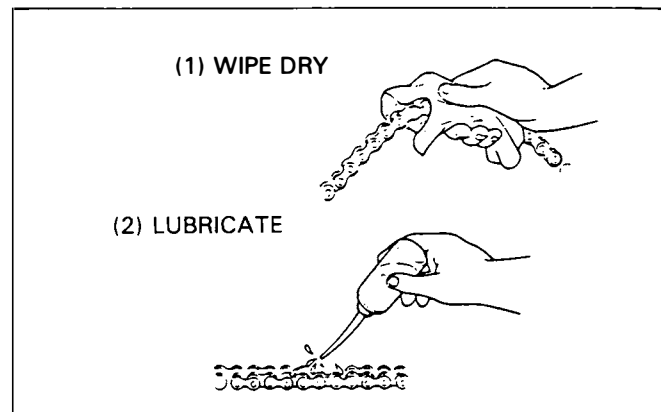
## LUBRICATION AND CLEANING

When the drive chain becomes extremely dirty, it should be cleaned prior to lubrication.

Clean the drive chain with a non-flammable or high flash point and wipe dry.

The drive chain on this motorcycle is equipped with small O-rings between the link plates. The O-rings can be damaged by steam cleaners, high pressure washers and certain solvents.

Lubricate the drive chain with Pro Honda Chain Lube or equivalent chain lubricant designed specifically for use on O-ring chains.



## CHAIN REPLACEMENT

The VT600C uses a drive chain (120 pins) with a staked master link.

Loosen the drive chain (page 3-13).

Locate the crimped pin ends of the master link from the outside of the chain and remove the link with the chain cutter.

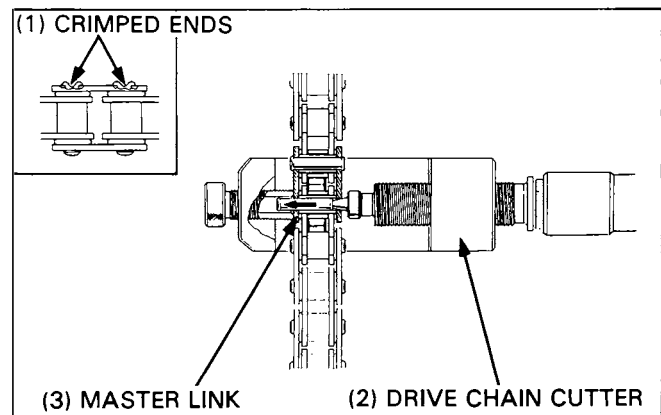
### TOOL:

Drive chain cutter

**07HMH-MR10103**

**Not available in U.S.A.**

**07HMH-MR1010B**



### NOTE

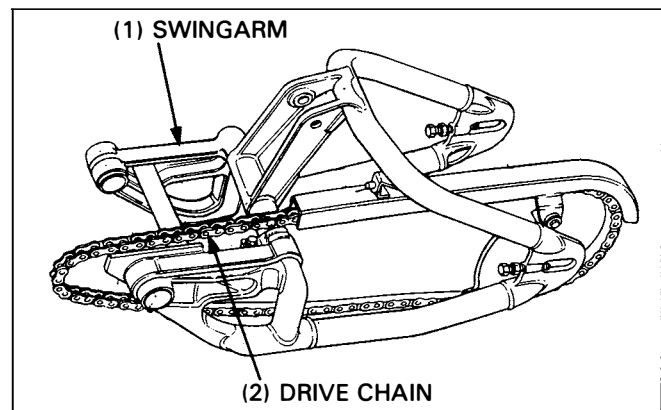
- When using the special tool, follow the manufacturer's operating instructions.

### CAUTION

- *Never reuse the old drive chain, master link, master link plate and O-rings.*

**REPLACEMENT CHAIN: RK525 SM5  
DID525 V8**

Install the new drive chain through the swingarm as shown.



Assemble the new master link, O-rings and plate.

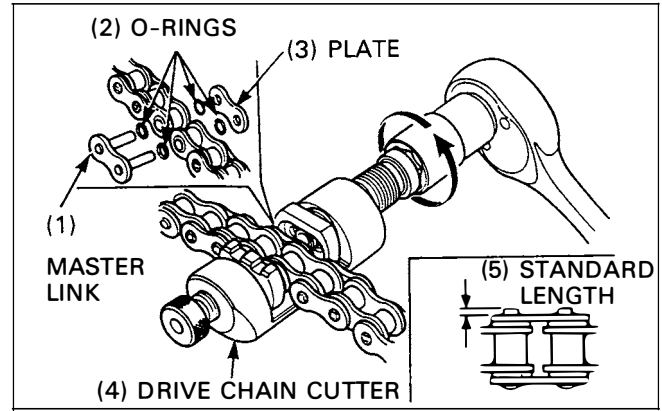
**CAUTION**

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

Make sure that the master link pins are installed properly. Measuring the master link pin length projected from the plate.

**Standard length: RK: 1.2-1.4 mm (0.05-0.06 in)**  
**DID: 1.15-1.55 mm (0.05-0.06 in)**

Stake the master link pins using the special tool.



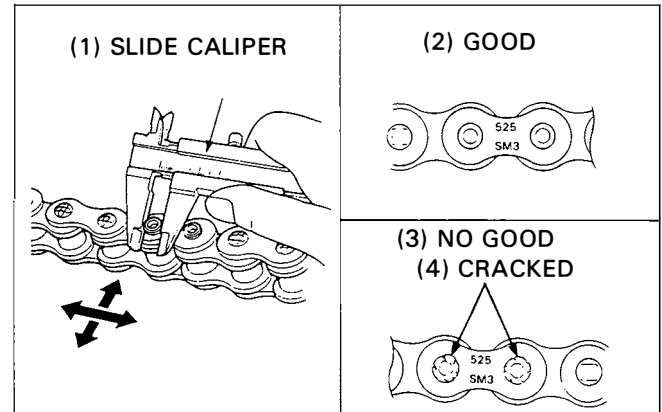
Make sure that the pins are staked properly by measuring the diameter of the staked area using a slide calipers.

**DIAMETER OF THE STAKED AREA:**  
**5.50-5.80 mm (0.217-0.228 in)**

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

**CAUTION**

- *Drive chain with clip-type master link must not be used.*

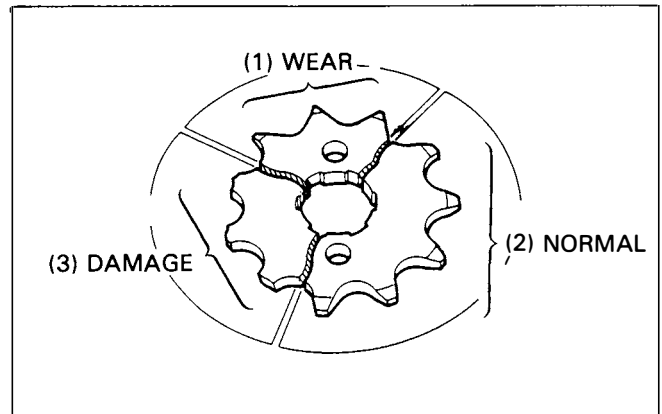


**DRIVE AND DRIVEN SPROCKET**

Inspect the sprocket teeth for excessive wear or damage. Replace if necessary.

**NOTE**

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

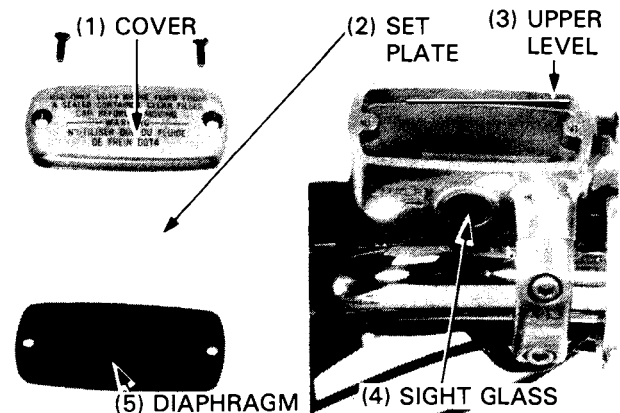


**BRAKE FLUID**

Check the front brake fluid through the sight glass; if the level is visible, remove the cover, set plate and diaphragm. Fill the reservoir to the upper level with DOT 4 fluid from a sealed container. Check the system for leaks.

**CAUTION**

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



Refer to section 14 for brake bleeding procedures.

## BRAKE SHOE/PAD WEAR

### BRAKE PAD WEAR

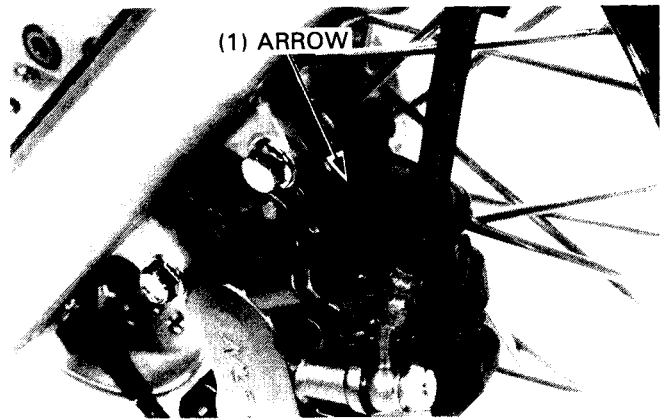
'88,'89,'91-93:

Check the brake pads for wear by looking through the slot indicated by the arrow cast on the caliper assembly.

Replace the brake pads if the wear grooves in the pads are visible (page 14-5).

#### CAUTION

- *Always replace the brake pads as a set to assure even disc pressure.*



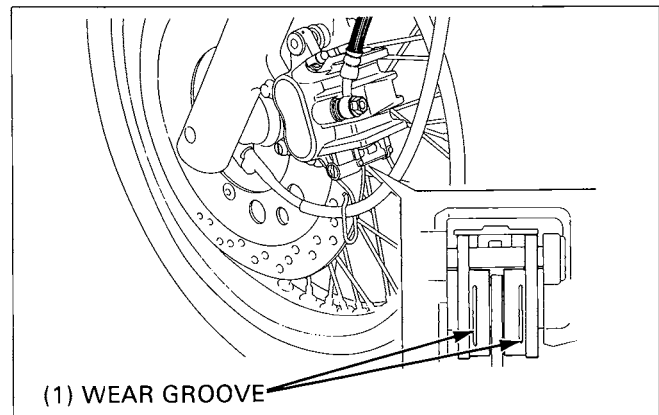
After '93:

Inspect the pads visually from under the caliper to determine the pad wear.

Replace the brake pads if the wear grooves in the pads are visible (page 14-5).

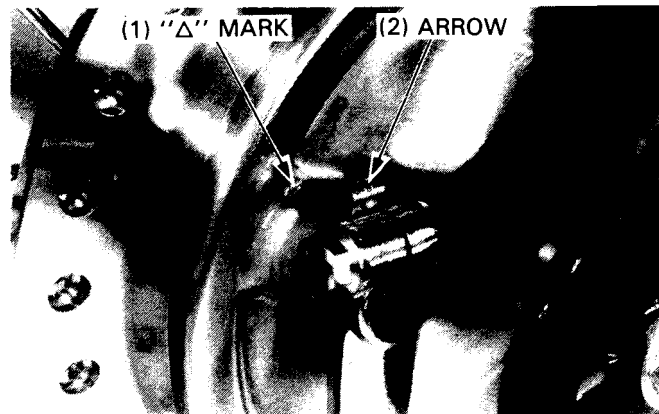
#### CAUTION

- *Always replace the brake pads as a set to assure even disc pressure.*



### BRAKE SHOE INSPECTION

Replace the brake shoes if the arrow on the brake arm aligns with the reference mark "Δ" on full application of the rear brake pedal.

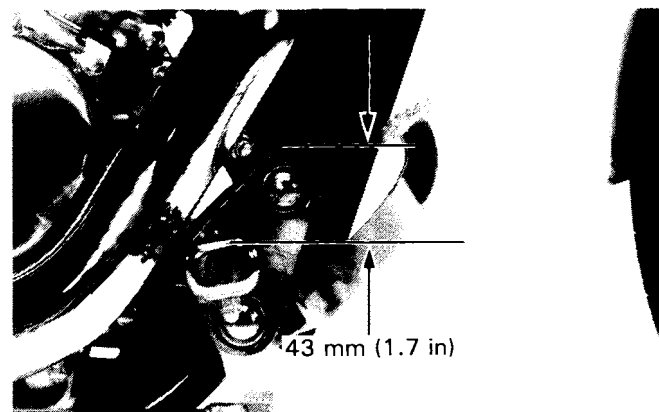


## BRAKE SYSTEM

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

### BRAKE PEDAL HEIGHT

Adjust the brake pedal so that the pedal height is 43 mm (1.7 in) above the top of the footpeg.



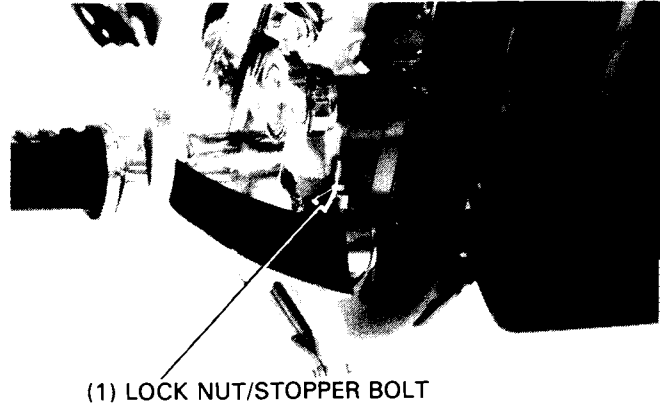


To Adjust:

Loosen the stopper bolt lock nut and turn the stopper bolt. Retighten the lock nut.

NOTE

- After adjusting the brake pedal height, check the rear brake light switch and brake pedal free play and adjust if necessary.



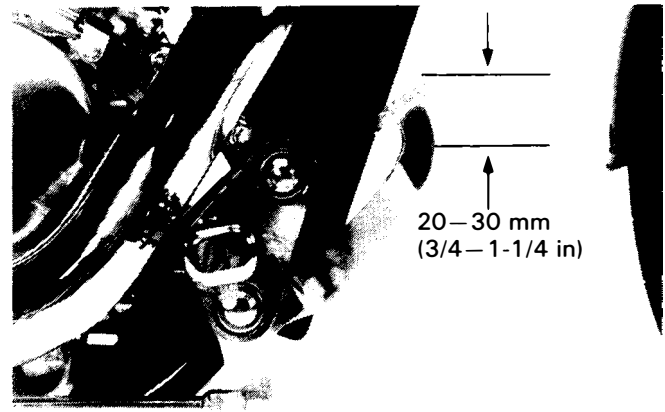
**BRAKE PEDAL FREE PLAY**

NOTE

- Perform brake pedal free play adjustment after adjusting brake pedal height.

Check the brake pedal free play.

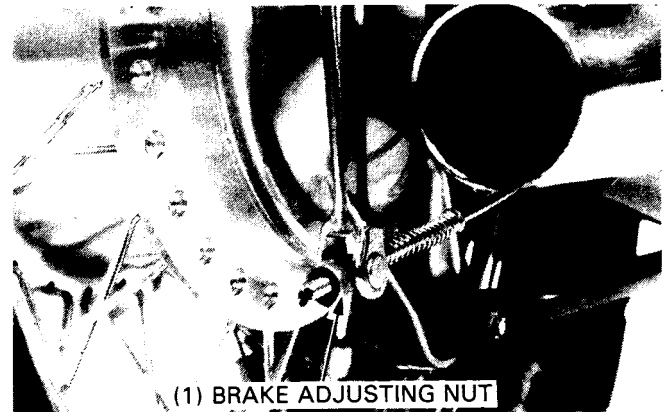
**FREE PLAY: 20–30 mm (3/4–1-1/4 in)**



If adjustment is necessary, use the rear brake adjusting nut.

NOTE

- After adjusting the brake pedal free play, check the rear brake light switch operation and adjust if necessary.

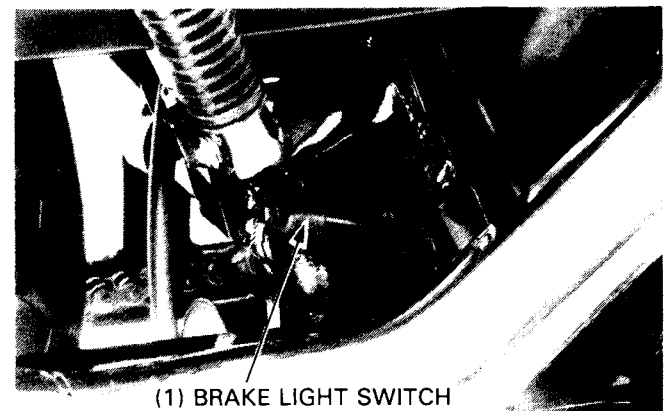


**BRAKE LIGHT SWITCH**

NOTE

- Perform rear brake light switch adjustment after adjusting the brake pedal play and height.
- The front brake light switch does not require adjustment.

Adjust the brake light switch so that the brake light will come on when the brake pedal is depressed 20 mm (3/4 in), and brake engagement begins. Hold the switch body and turn the adjusting nut. Do not turn the switch body.



## HEADLIGHT AIM

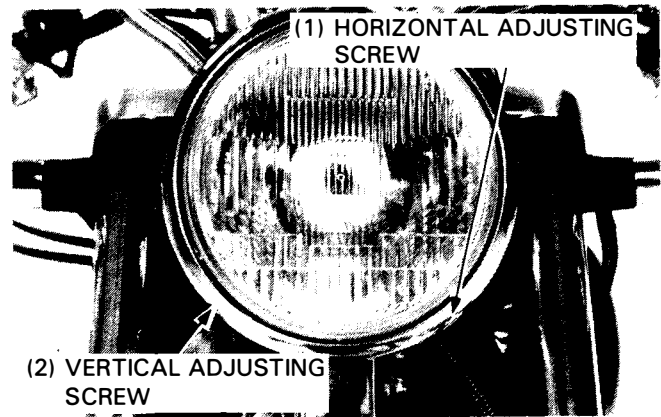
Adjust vertically by turning the vertical adjustment screw.  
Adjust horizontally by turning the horizontal adjusting screw.

### NOTE

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

### ▲ WARNING

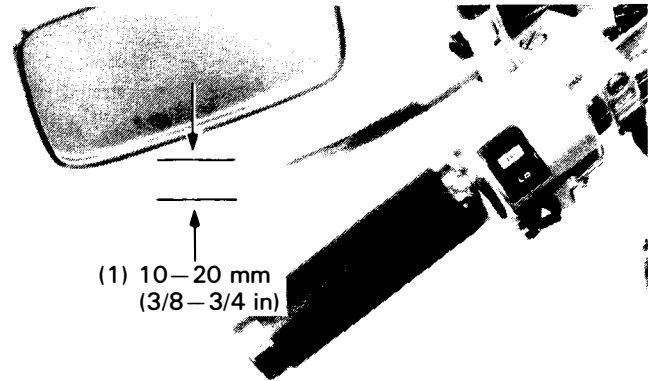
- An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.*



## CLUTCH SYSTEM

Measure the clutch lever free play at the lever end.

**FREE PLAY: 10–20 mm (3/8–3/4 in)**

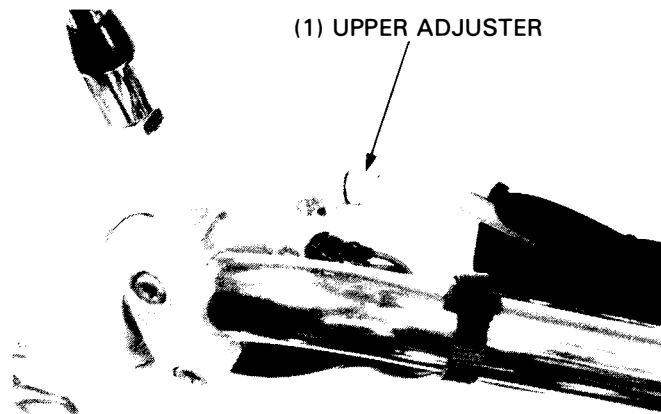


Minor adjustments are made with the upper adjuster.

Pull the lever cover back, loosen the lock nut and turn the adjuster to obtain the specified free play.

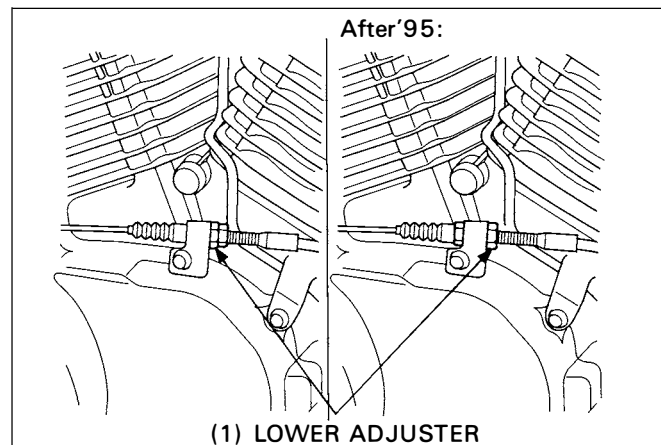
Tighten the lock nut and install the cover.

Check clutch operation.



Major adjustments are made with the lower adjuster.  
Loosen the lock nut and turn the adjusting nut to obtain the specified free play.

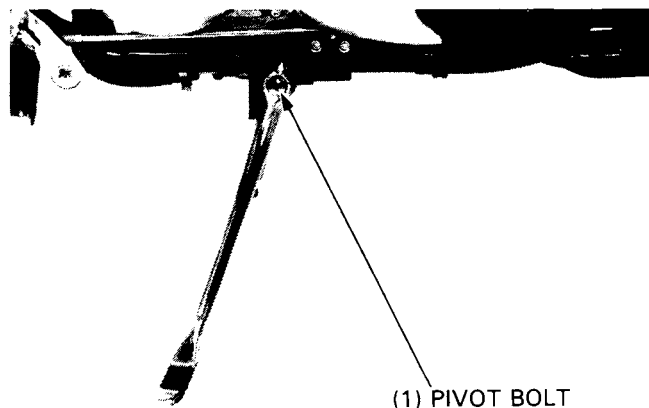
Tighten the lock nut and check the clutch operation.



## SIDE STAND

Check the spring for damage or loss of tension.  
 Check the side stand assembly for freedom of movement.  
 Lubricate the pivot bolt and the side stand pivot area if necessary.  
 Tighten the pivot bolt and nut.

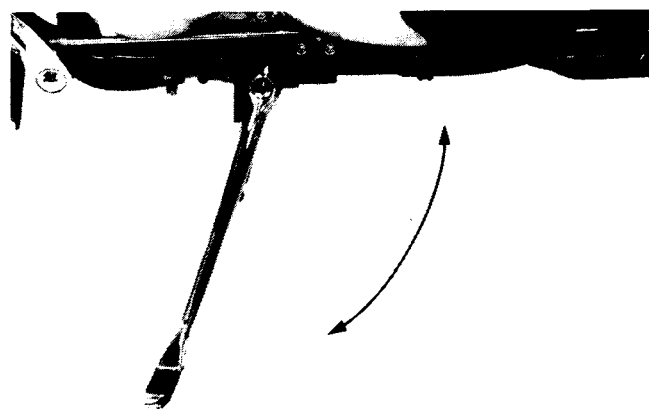
**TORQUE: BOLT: 10 N·m (1.0 kg-m, 7.2 ft-lb)**  
**NUT: 30 N·m (3.0 kg-m, 22 ft-lb)**



Check the side stand ignition cut-off system:

- Sit astride the motorcycle and raise the side stand.
- Start the engine with the transmission in neutral, then shift the transmission into gear, with the clutch lever squeezed.
- Move the side stand full down.
- The engine should stop as the side stand is lowered.

If there is a problem with the system, check the side stand switch (section 16).



## SUSPENSION

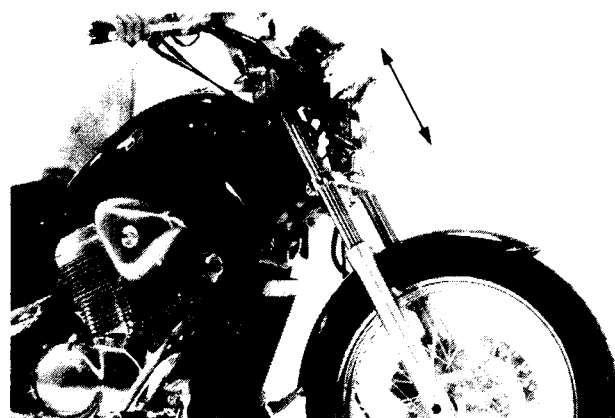
### FRONT

Check the suspension action by compressing it several times.

Check the entire fork leg assembly for signs of leaks or damage.  
 Replace any components which are unrepairable.  
 Tighten all nuts and bolts to the specified torque value.

**▲ WARNING**

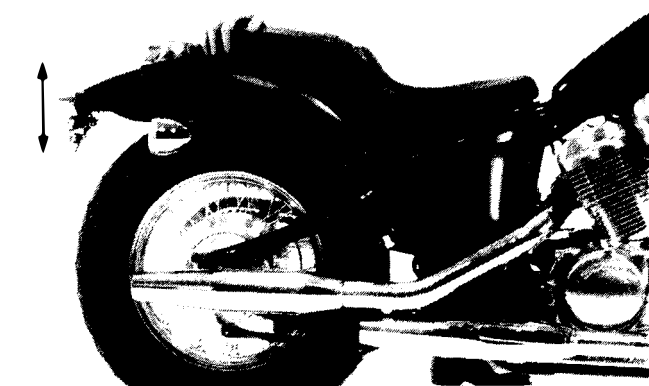
- *Do not ride a vehicle with faulty suspension. Loose, worn, or damaged suspension parts may affect stability and rider control.*



### REAR

Check the action of the rear suspension components by compressing them several times.  
 Check the entire suspension assembly, being sure it is securely mounted and not damaged or distorted.

Tighten all nuts and bolts to the specified torque value.



**NUTS, BOLTS, FASTENERS**

Tighten the bolts, nuts and fasteners at the intervals shown in the Maintenance Schedule (page 3-3).  
 Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-5, 6 and 7).  
 Check all cotter pins and safety clips.

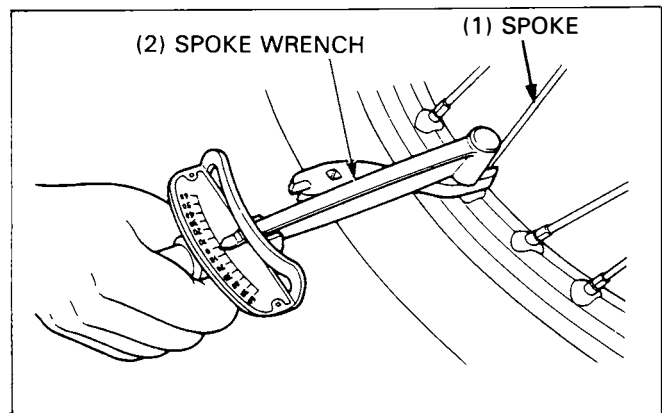
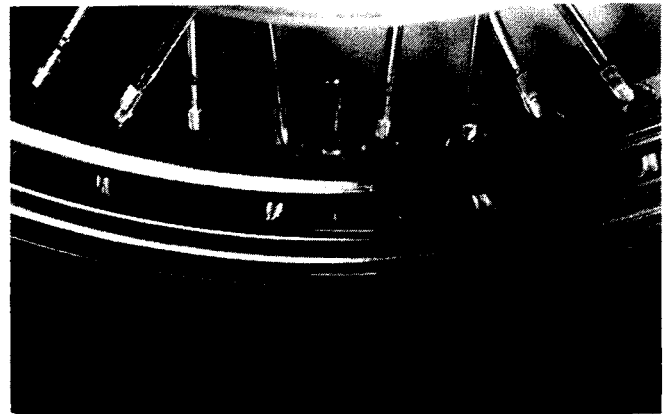
**WHEELS/TIRES**

**TIRE PRESSURE**

**NOTE**

- Tire pressure should be checked when the tires are COLD.

|   |                             | Front            | Rear           |
|---|-----------------------------|------------------|----------------|
| Tire size   |                             | 100/90-19 57S    | 170/80-15 77S  |
| Cold tire pressures<br>kPa<br>(kg/cm <sup>2</sup> ,<br>psi) | Up to vehicle capacity load | 200(2.00, 29)    | 250 (2.50, 36) |
|   | Up to 90 kg (200 lbs) load  | 200 (2.00, 29)   | 200 (2.00, 29) |
| Maximum weight capacity                                     |                             | 161 kg (355 lbs) |                |
| Tire brand  | Bridgestone<br>Dunlop       | L309<br>F24      | G 546<br>K555  |



Check the tires for cuts, imbedded nails, or other sharp objects.

Check the front and rear wheels for trueness (Section 12 and 13).

Measure the tread depth at the center of the tires.

Replace the tires if the tread depth reaches the following limit:

**MINIMUM TREAD DEPTH:**

Front: 1.5 mm (0.06 in)

Rear: 2.0 mm (0.08 in)

Tighten the wheel spokes periodically.

**TORQUE (front/rear): 4 N·m (0.4 kg·m, 2.9 ft·lb)**

**TOOL:**

Spoke wrench

07JMA—MR60100

Not available in U.S.A.

## STEERING HEAD BEARINGS

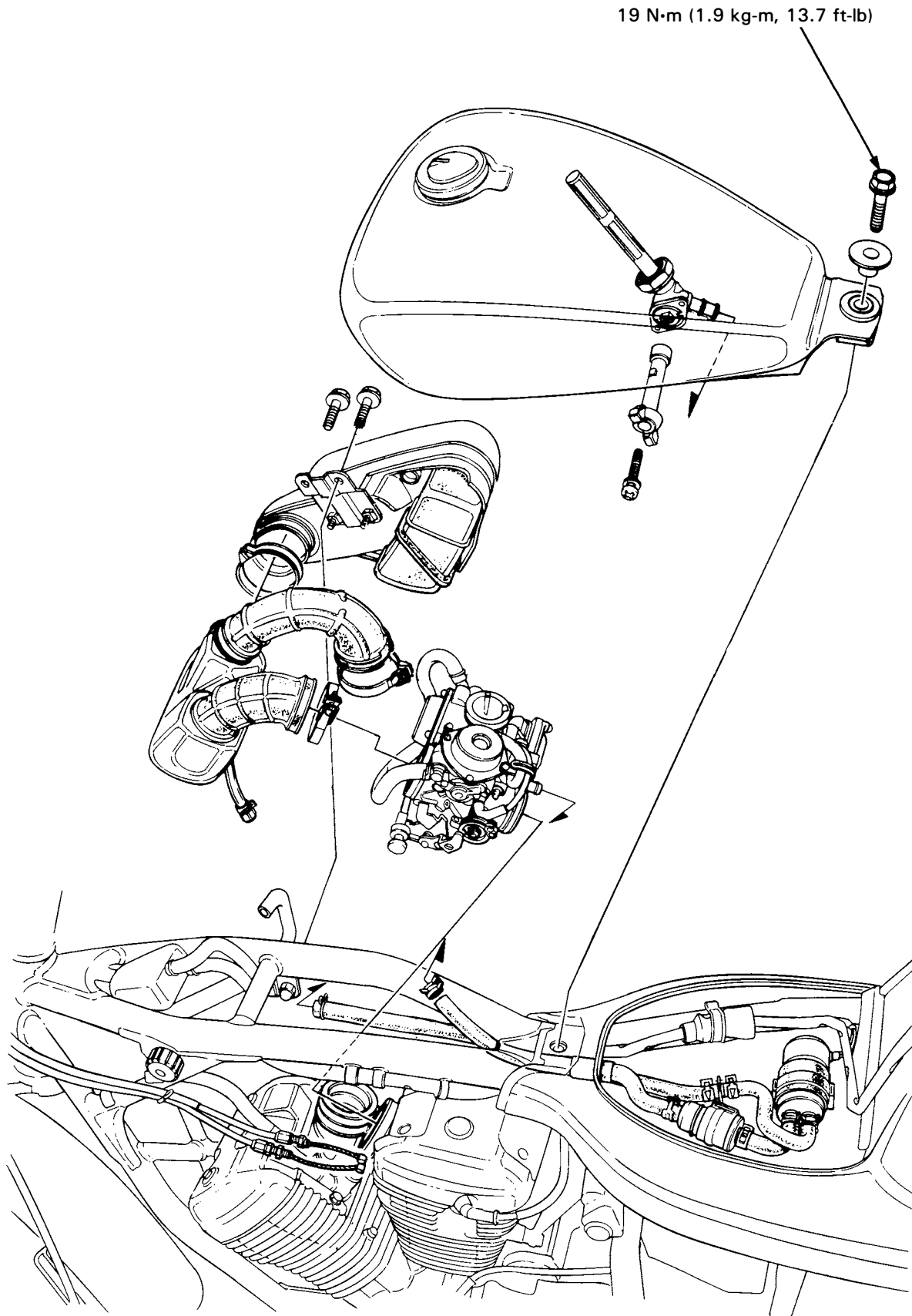
### NOTE

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

Raise the front wheel off the ground.

Check that the fork pivots freely from side to side. If the fork pivots unevenly, binds, or has vertical movement, inspect the steering head bearings (Section 12).





|                                   |      |   |      |
|-----------------------------------|------|---|------|
| SERVICE INFORMATION               | 4-1  | CARBURETOR INSTALLATION   | 4-15 |
| TROUBLESHOOTING                   | 4-2  | PILOT SCREW ADJUSTMENT  | 4-15 |
| FUEL TANK                         | 4-3  | HIGH ALTITUDE ADJUSTMENT<br>(U.S.A. ONLY)   | 4-16 |
| AIR CLEANER HOUSING               | 4-4  | EVAPORATIVE EMISSION<br>PURGE CONTROL VALVE INSPECTION<br>(California model only)               | 4-16 |
| CARBURETOR REMOVAL                | 4-6  | EVAPORATIVE EMISSION CARBURETOR<br>AIR VENT CONTROL VALVE<br>INSPECTION (California model only) | 4-17 |
| CARBURETOR DISASSEMBLY            | 4-6  |   |      |
| CARBURETOR ASSEMBLY               | 4-10 |   |      |
| CARBURETOR<br>SEPARATION/ASSEMBLY | 4-13 |   |      |

## SERVICE INFORMATION

### ⚠ WARNING

- Gasoline is extremely flammable and is explosive under certain conditions work in a well ventilated area with the engine stopped. Work in a well ventilated area.
- If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.

### GENERAL

- Refer to Section 3 for carburetor synchronization, throttle cable and choke cable adjustments.
- When disassembling fuel system parts, note the locations of the O-rings; replace them with new ones on reassembly.
- The carburetor float chambers have drain screws that can be loosened to drain residual gasoline.
- For fuel pump refer to section 18.
- All hoses used in the evaporative emission control system are numbered for identification. When connecting one of these hoses, compare the hose number with the Vacuum Hose Routing Diagram Label on page 4-16 (California model only), for its routing.

### CAUTION

- Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.

### NOTE

- If vehicle is to be stored for more than one month, drain the float bowls. Fuel left in the float bowls will cause clogged jets resulting in starting and drivability complaints.

### SPECIFICATIONS

| Item                        | 49 St. model                    | California model        |
|-----------------------------|---------------------------------|-------------------------|
| Type                        | Constant Vacuum dual carburetor |                         |
| Throttle bore               | 34 mm (1.4 in)                  | 34 mm (1.4 in)          |
| Identification No.          | VDFDA                           | VDFEA                   |
| Float level                 | 7.0 mm (0.28 in)                | 7.0 mm (0.28 in)        |
| Main jet                    | Front: #115, Rear: #115         | Front: #115, Rear: #115 |
| Slow jet                    | #40                             | #40                     |
| Idle speed                  | 1,200 ± 100 rpm                 | 1,200 ± 100 rpm         |
| Throttle grip free play     | 2–6 mm (1/8–1/4 in)             | 2–6 mm (1/8–1/4 in)     |
| Pilot screw initial opening | See page 4-15.                  |                         |

## FUEL SYSTEM

---

### TORQUE VALUE

Fuel tank mounting bolt 19 N•m (1.9 kg-m, 13.7 ft-lb)

### TOOLS

#### Special

Vacuum/Pressure pump A937X-041-XXXXX or  
Pressure pump ST-AH-255-MC7 (U.S.A. only)  
Vacuum pump ST-AH-260-MC7 (U.S.A. only)  
Valve guide driver, 7 mm 07942-8230000 (U.S.A. only)

#### Common

Float level gauge 07401-0010000

## TROUBLESHOOTING

#### Engine cranks but won't start

- No fuel in tank
- No fuel to carburetor
- Engine flooded with fuel
- No spark at plug (ignition system faulty)
- Clogged air cleaner
- Intake air leak
- Improper choke operation
- Improper throttle operation

#### Hard starting or stalling after starting

- Improper choke operation
- Ignition malfunction
- Faulty carburetor
- Fuel contaminated
- Intake air leak
- Incorrect idle speed
- Incorrect valve clearance (Section 3)
- Incorrect carburetor synchronization (Section 3)
- Improper choke valve operation.

#### Rough idle

- Faulty ignition system
- Incorrect idle speed
- Incorrect valve clearance (Section 3)
- Incorrect carburetor synchronization
- Faulty carburetor
- Fuel contaminated
- Faulty air cut off valve  
(California model only):  
: Faulty evaporative emission purge control valve  
: Faulty evaporative emission carburetor air vent control valve  
: Worn/damaged emission system hoses

#### Afterburning during deceleration

- Faulty ignition system
- Faulty air cut off valve
- Lean mixture  
(California model only):  
: Worn/damaged emission system hoses

#### Misfiring during acceleration

- Faulty ignition system

#### Backfiring

- Faulty ignition system
- faulty carburetor

#### Poor performance (driveability) and poor fuel economy

- Clogged fuel system
- Faulty ignition system
- Dirty air cleaner  
(California model only):  
: Faulty evaporative emission carburetor air vent control valve  
: Worn/damaged emission system hoses

#### Lean mixture

- Clogged fuel jets
- Stuck vacuum piston
- Faulty float valve
- Low float level
- Clogged fuel tank breather
- Clogged fuel strainer
- Restricted fuel line
- Intake air leak
- Restricted or faulty fuel pump

#### Rich mixture

- Clogged air jets
- Faulty float valve
- Float level too high
- Dirty air cleaner



# FUEL TANK

## REMOVAL

**⚠ WARNING**

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

Remove the seat and turn the fuel valve off.  
Remove the fuel valve knob mounting bolt and fuel valve knob from the fuel tank body.

Remove the fuel tank mounting bolt.

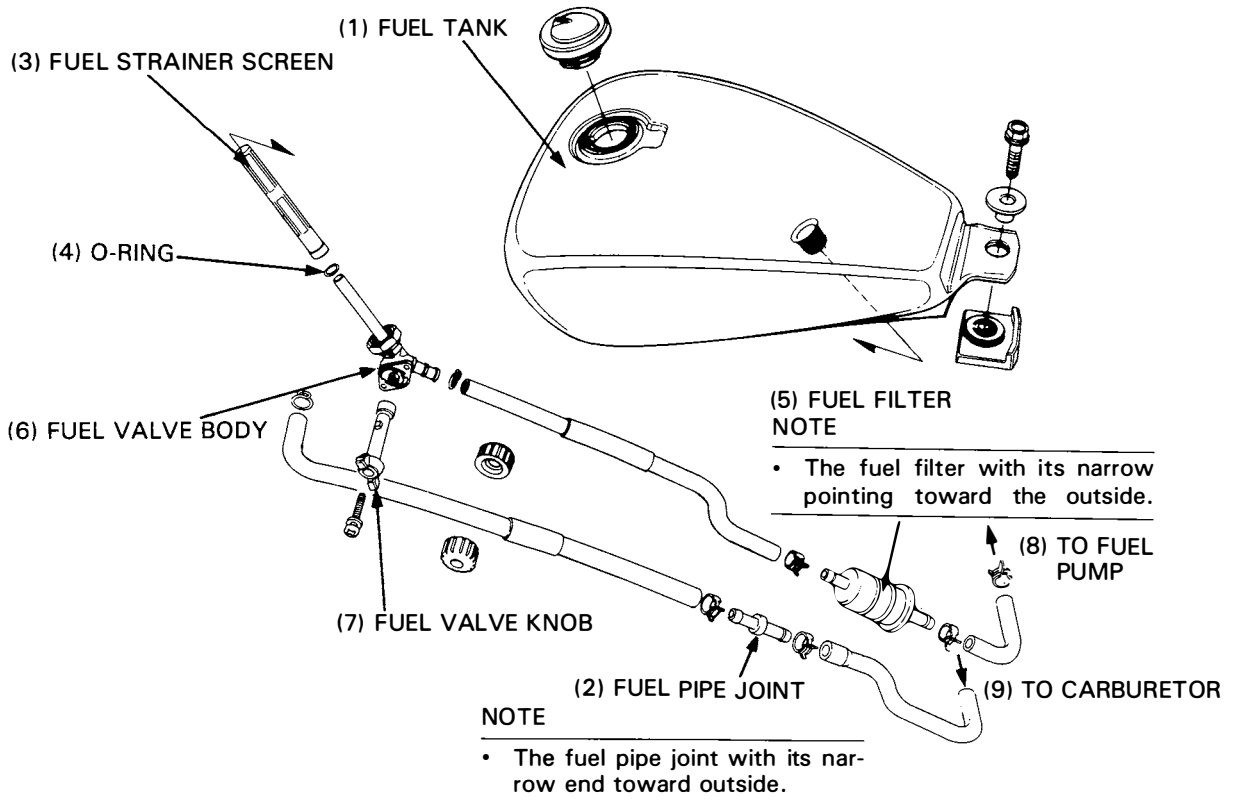
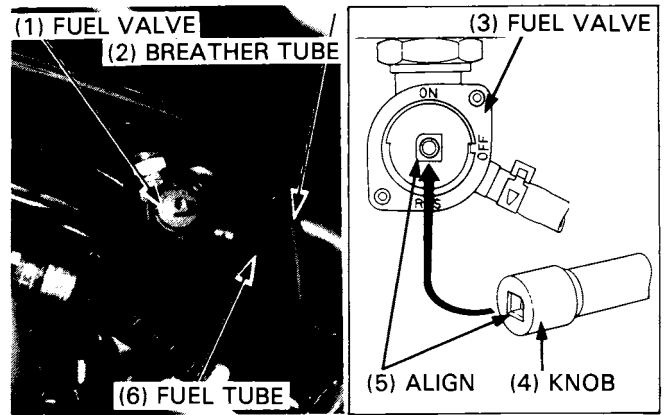
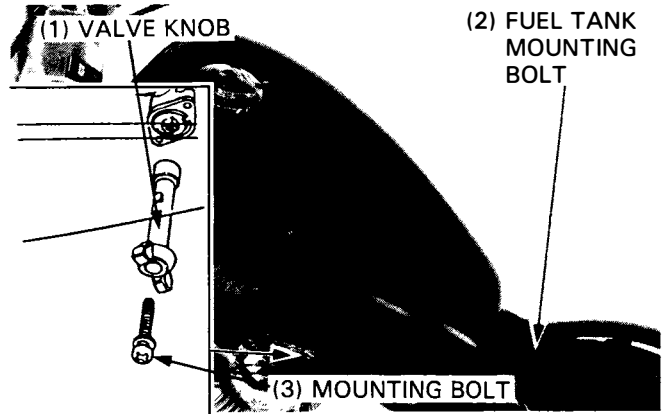
Disconnect the fuel tube from the fuel tank and fuel breather tube (to canister: California model only).

Check that fuel flows out of the fuel valve freely.  
If flow is restricted, clean the fuel strainer.

Remove the fuel tank from the frame.

## INSTALLATION

Install the fuel tank in the reverse order of removal.  
Install the fuel valve knob onto the fuel valve as shown and tighten the bolt.  
Tighten the fuel tank mounting bolt securely.



## AIR CLEANER HOUSING

### REMOVAL

Remove the fuel tank mounting, and lift the tank and remove the air cleaner housing mounting bolts.



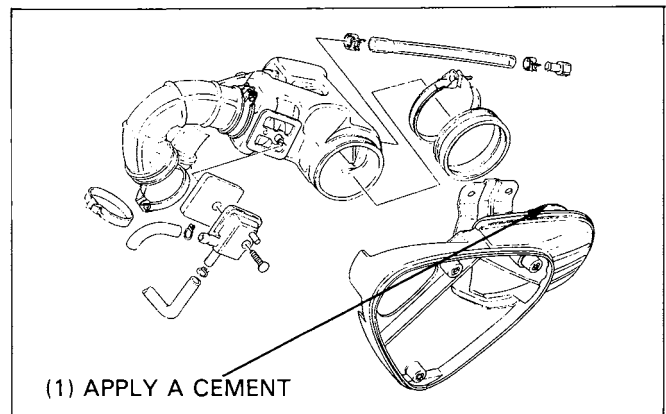
Loosen the air cleaner housing-to-air cleaner chamber band. Disconnect the crankcase breather tube from the air cleaner housing.



### INSTALLATION

Wipe clean the mating surfaces shown and apply a cement (or equivalent).

Install the removed parts in the reverse order of removal.



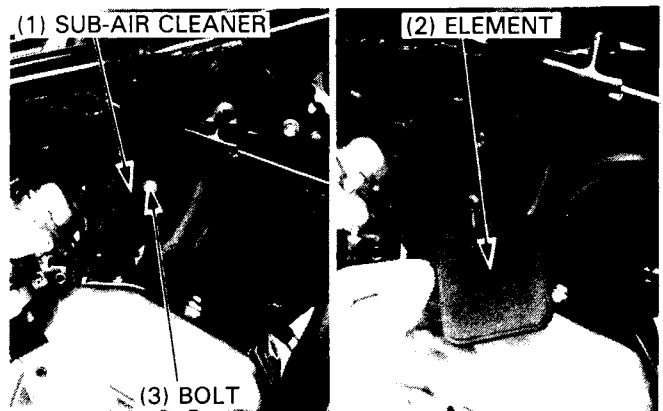
### SUB-AIR CLEANER ELEMENT

Remove the following:

- seat (page 13-18) and fuel tank (page 4-3)
- air cleaner housing

Disconnect the air hoses (carburetors-to-sub-air cleaner cover).

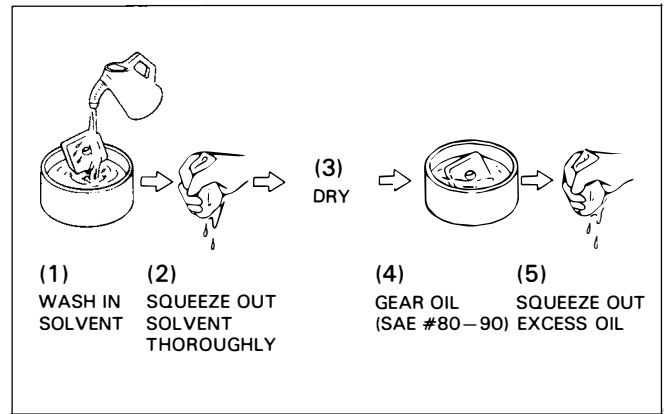
Remove the sub-air cleaner mounting bolt and cover and remove the element.



Wash the element in non-flammable or high flash point solvent, squeeze out the solvent thoroughly, and allow the element to dry.

Soak the element in gear oil (SAE #80–90) and squeeze out the excess.

Reinstall the element and cover, and tighten the bolt. Reconnect the air tubes from the carburetors.



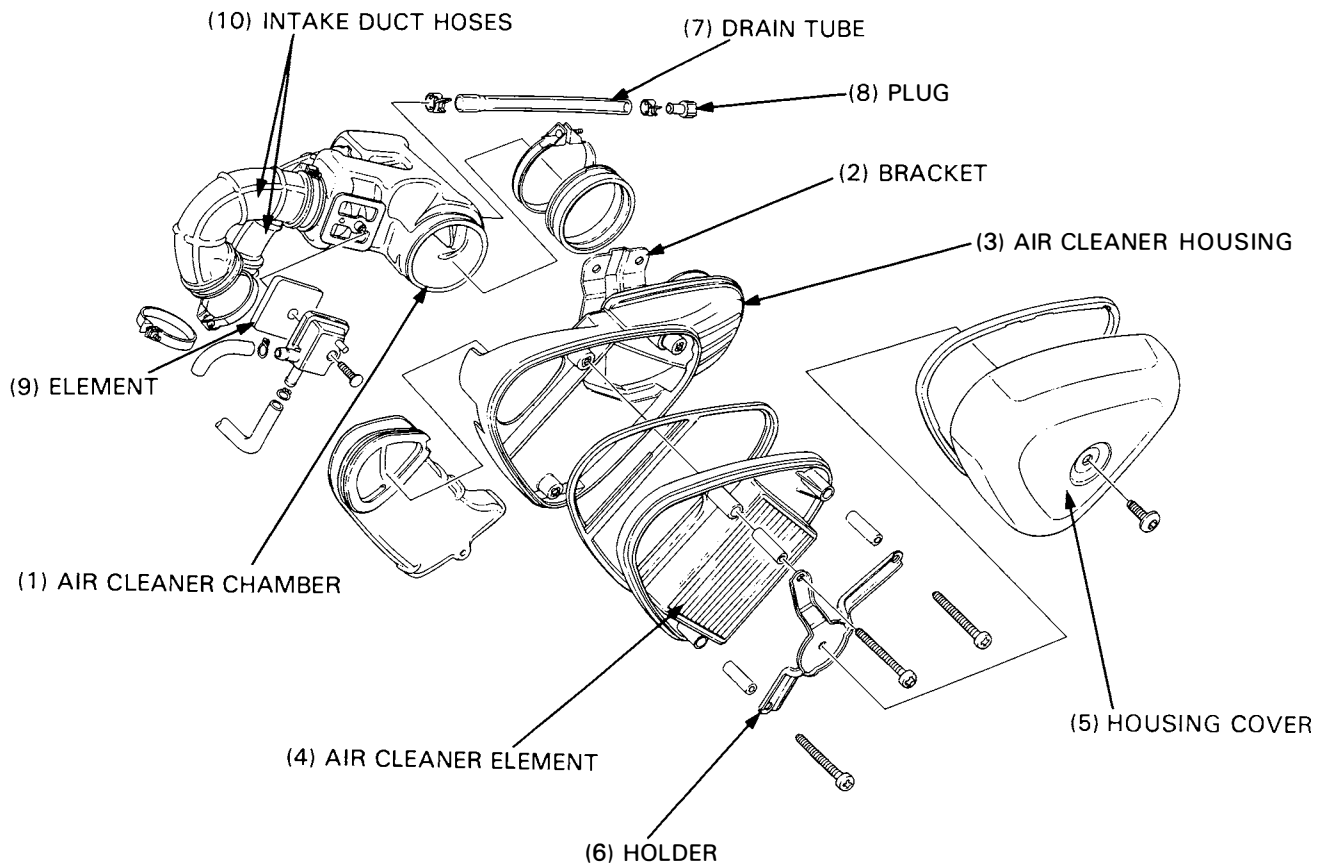
**AIR CLEANER CHAMBER REMOVAL/INSTALLATION**

Remove the air cleaner housing and sub-air cleaner element (page 4-4).

Loosen the intake duct hose bands at the carburetors and unhook the air cleaner chamber drain tube from the frame.

Remove the air cleaner chamber from the frame. To reinstall the chamber: position it in the frame, and connect the intake ducts to the carburetors and tighten the band screws.

Install the sub-element and cover (page 4-4). Install the air cleaner housing (page 4-4).



## CARBURETOR REMOVAL

**⚠ WARNING**

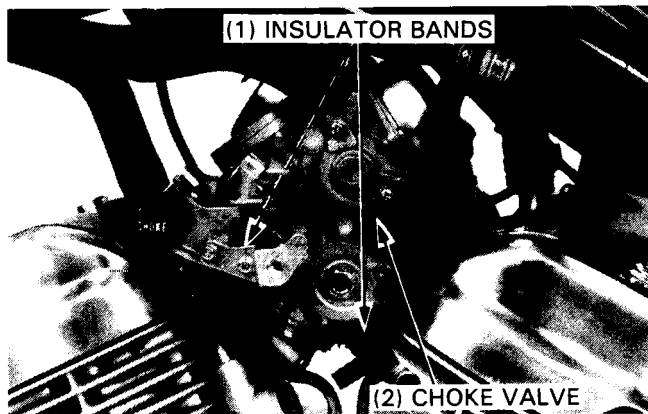
- Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the work area or where gasoline is stored.

Loosen the drain screws and drain the fuel into a container.

Remove the sub-air cleaner chamber (page 4-4).  
Remove the throttle cable cover and disconnect the throttle cables from the carburetor.

Remove the left choke valve from the carburetor and loosen the carburetor insulator bands.

Disconnect the evaporative emission purge control valve No.5 tubes and evaporative emission carburetor air vent control valve No.6 and 10 tubes from the carburetor (California model only).  
Pull the carburetors the upward and out of the engine.



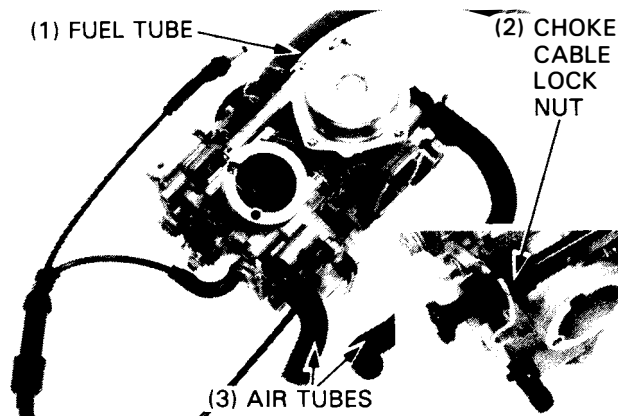
## CARBURETOR DISASSEMBLY

**NOTE**

- The carburetors can be disassembled without being separated.

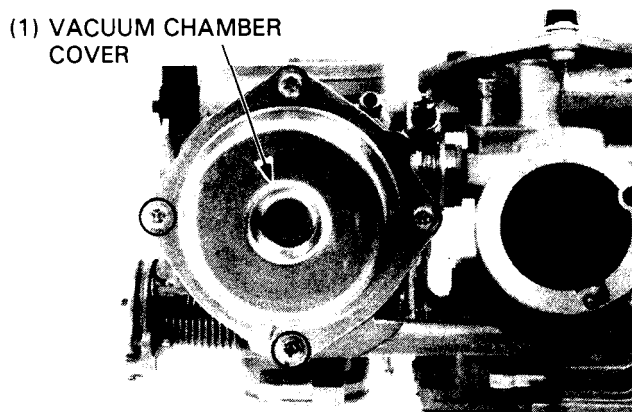
Remove the air tubes (carburetors-to-sub-air cleaner), and fuel tube from the carburetor.

Remove the choke cable and right choke valve from the carburetor by loosening each lock nut.



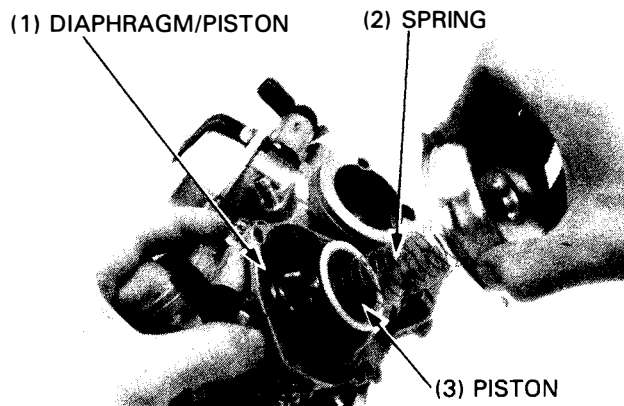
## VACUUM CHAMBER

Remove the four screws and vacuum chamber cover.

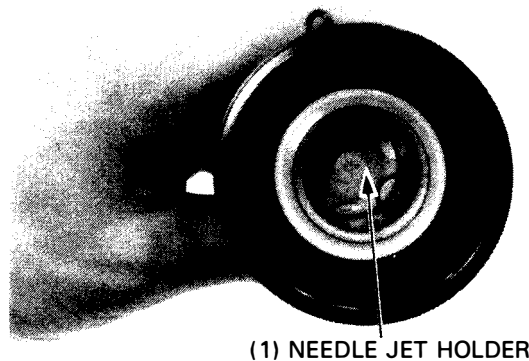


Remove the spring, and diaphragm/vacuum piston.  
Inspect the vacuum piston for wear, nicks, scratches or other damage.

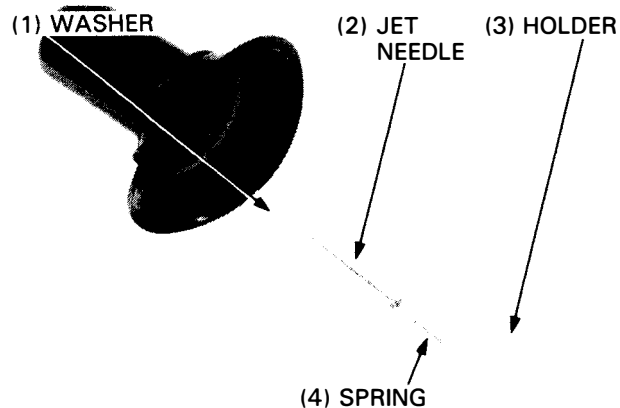
Make sure the piston moves up and down freely in the chamber.



Push the needle jet holder in and turn it in 90 degrees counter-clockwise.

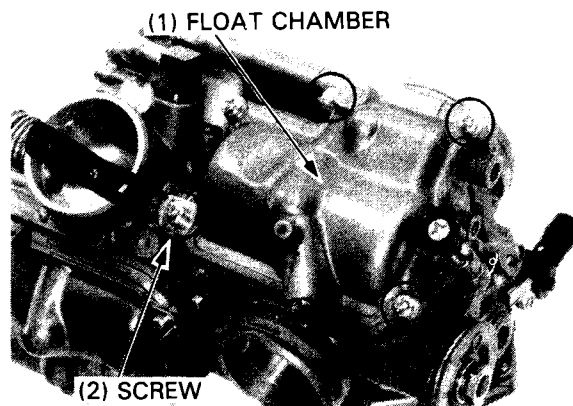


Then remove the needle holder, spring, jet needle and washer from the piston.  
Inspect the needle for excessive wear at the tip, bending or other damage.  
Inspect the diaphragm for damage, fatigue or pin holes.  
Inspect the vacuum piston for wear or damage.



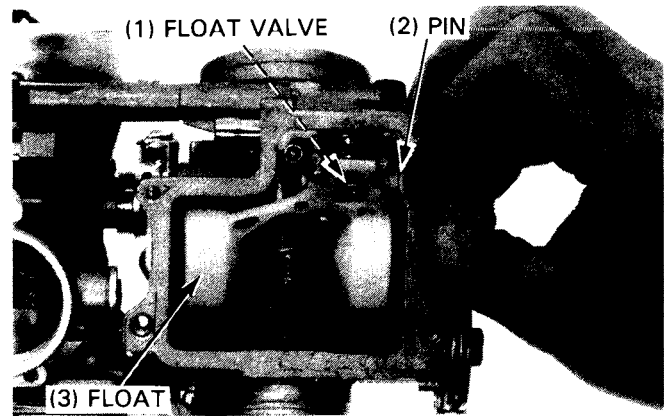
### FLOAT CHAMBER, FLOAT AND JETS

Remove the four screws and float chamber.



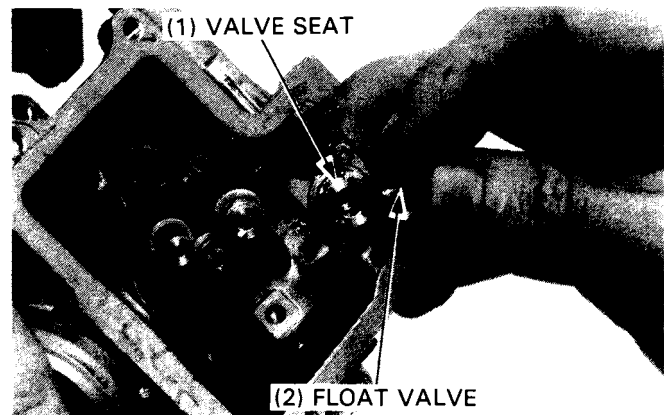
## FUEL SYSTEM

Remove the float pin, float and float valves.



Check the float valve and valve seat for scratches, clogging or damage.

Inspect the operation of the float valve.



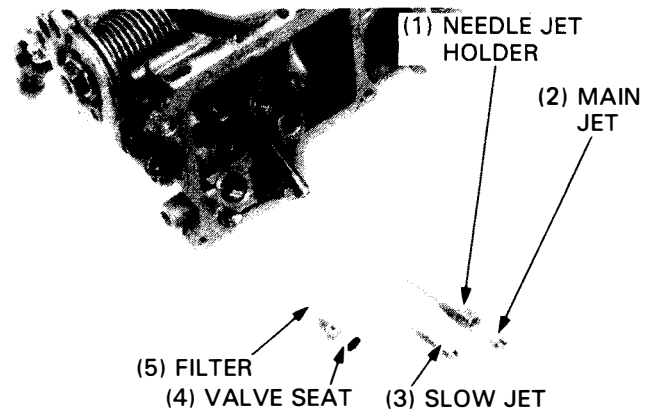
Remove the main jet, needle jet holder, slow jet and valve seat/filter.

Check each part for wear or damage.  
Blow open all jets with compressed air.

Clean each jet with non-flammable or high flash point solvent.

Inspect the float valve seat and filter for grooves, nicks or deposits.

Clean the filter with low-pressure compressed air.



## PILOT SCREW

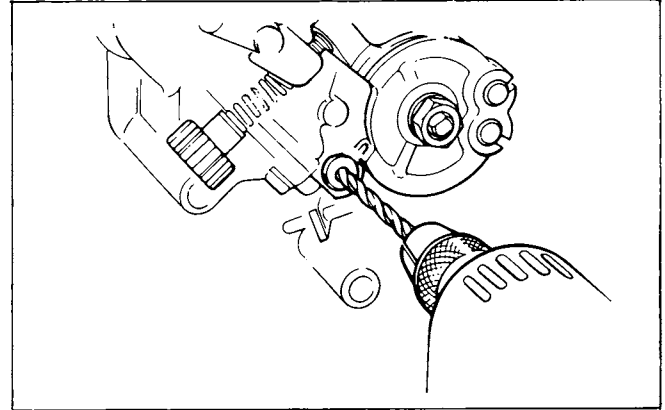
### NOTE

- The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled.
- The pilot screw plugs are factory installed to prevent pilot screw misadjustment. Do not remove the plugs unless the pilot screws are being removed.
- Cover all openings with tape to keep metal particles out when the plugs are drilled.

Center punch the pilot screw plug to center the drill point. Drill through the plug with a 4 mm (5/32 in) drill bit. Attach a drill stop to the bit 3 mm (1/8 in) from the end to prevent drilling into the pilot screw.

**CAUTION**

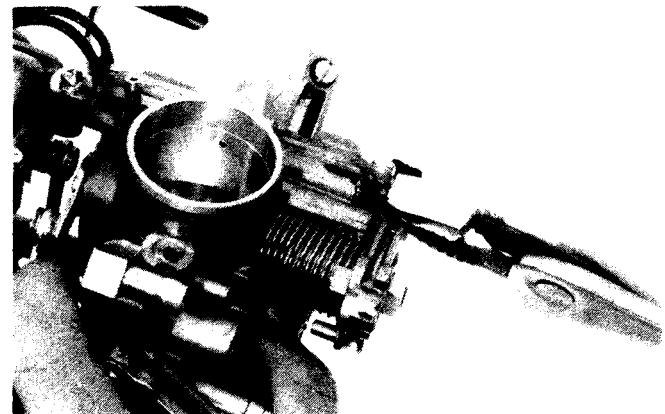
- *Be careful not to drill into the pilot screw.*
- *Both pilot screws must be replaced even if only one requires it, for proper pilot screw adjustment (page 4-15).*



Force a self-tapping 4 mm screw, P/N 93903–35410 into the drilled plug and continue turning the screwdriver until the plug rotates with the screw.

Pull on the screw head with pliers to remove the plug.

Use compressed air to clean the pilot screw area and remove metal shavings.

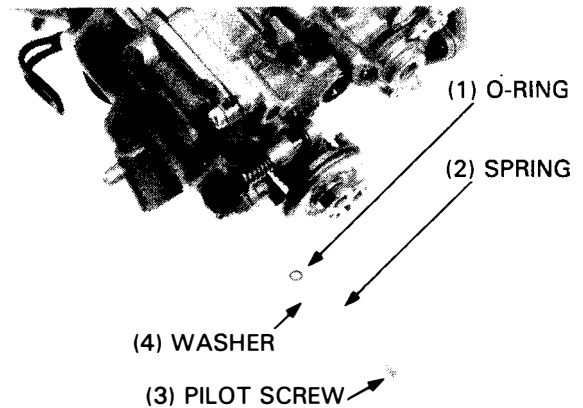


Turn each pilot screw in and carefully count the number of turns until it seats lightly. Make a note of this to use as a reference when reinstalling the pilot screws.

**CAUTION**

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

Remove the pilot screws and inspect them. Replace them if they are worn or damaged.

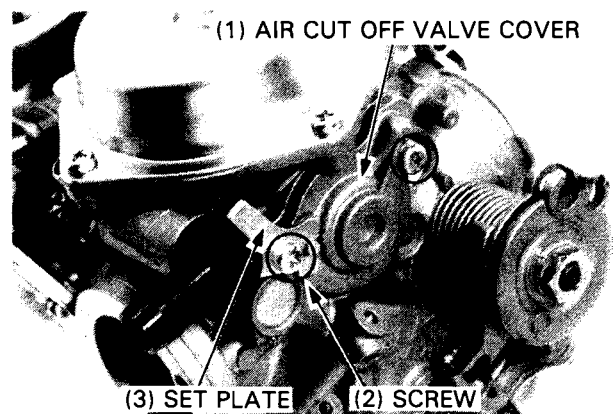


**AIR CUT OFF VALVE**

Remove the two screws, the set plate and the air cut off valve cover.

**NOTE**

- The air cut off valve cover is under spring pressure. Do not loose the spring and screws.

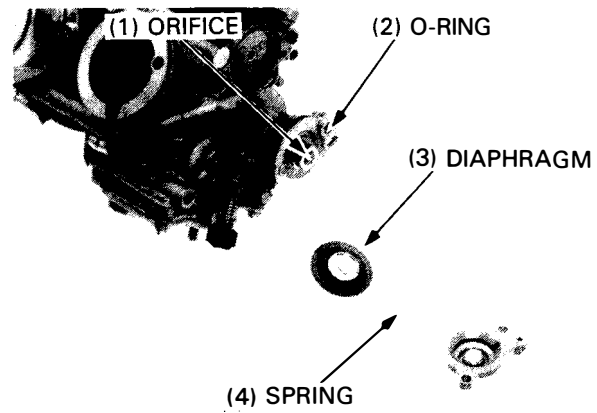


## FUEL SYSTEM

Visually check the following:

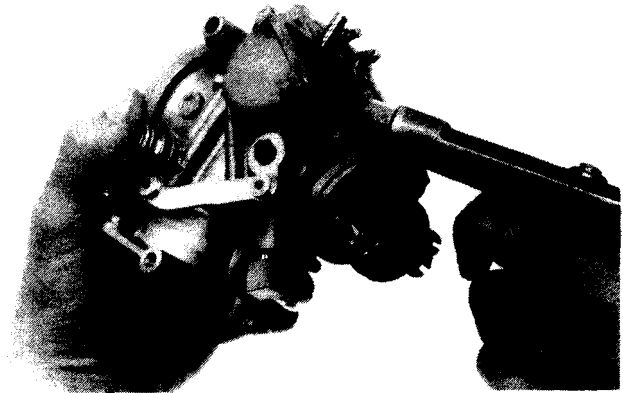
- diaphragm for deterioration, pin hole or other damage.
- spring for deterioration or other damage.
- diaphragm needle for excessive wear at the tip or other damage.
- orifice of air vent for clogging.
- O-ring for damage.

Replace the air cut off valve as an assembly, if necessary.

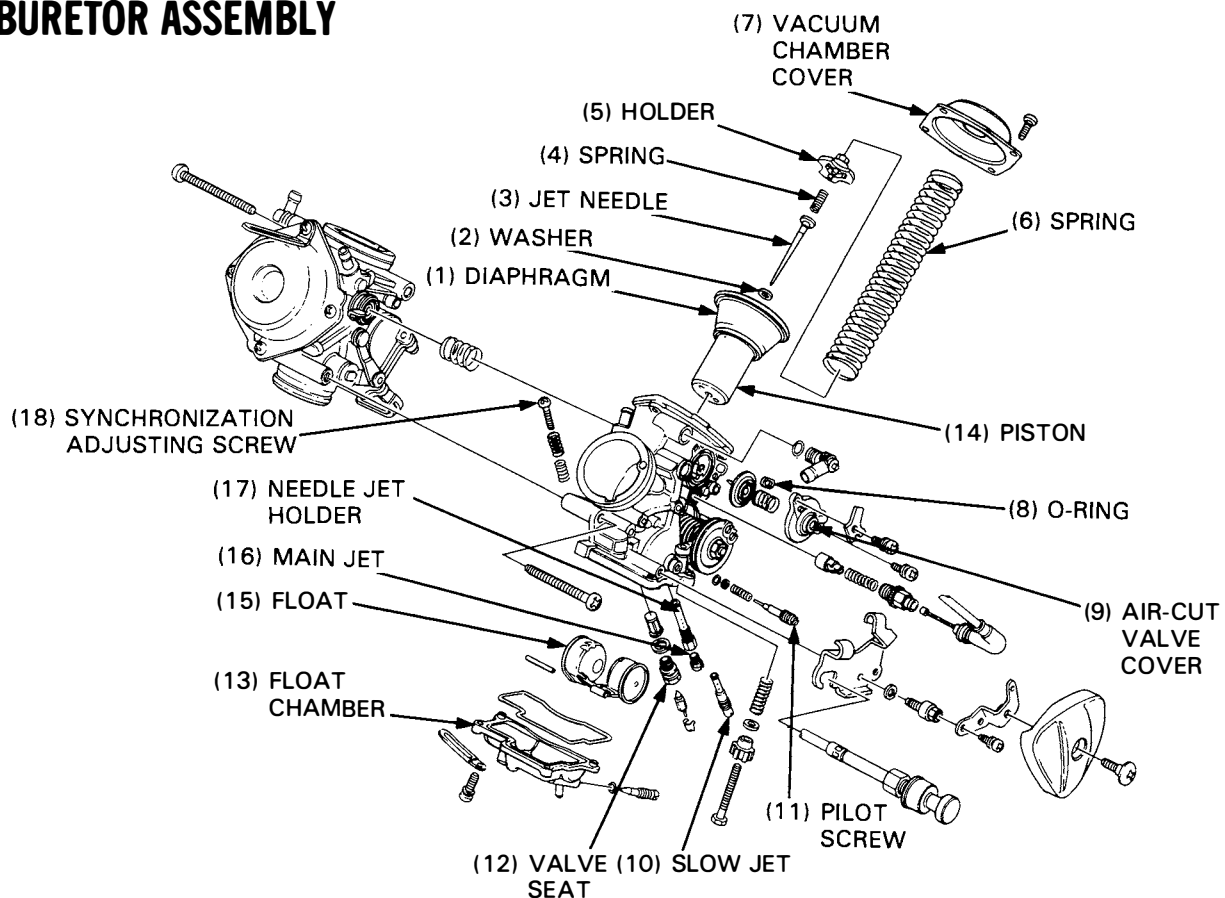


Separate the carburetors (page 4-13).

Blow open all passages with compressed air before installing jets and valves.



## CARBURETOR ASSEMBLY



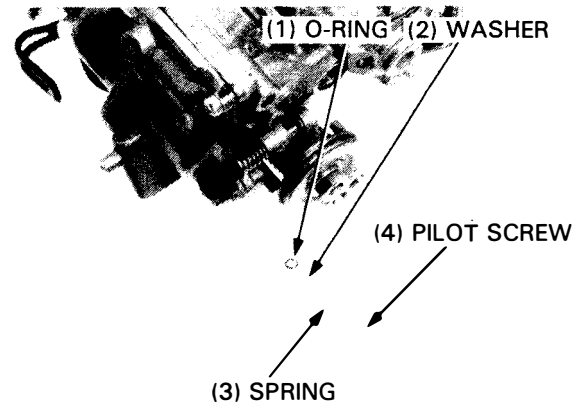


**PILOT SCREW**

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

**NOTE**

- Do not install new plugs on new pilot screw holes until after adjustment has been made.
- If you replace the pilot screw in one carburetor, you must replace the pilot screw in the other carburetor for proper pilot screw adjustment.



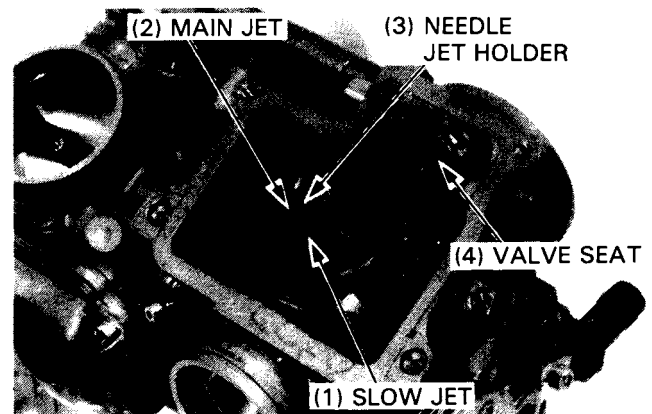
**FLOAT CHAMBER, FLOAT AND JETS**

Install the pilot screw and turn it in until it seats lightly.  
 Turn the pilot screw out the number of turns recorded during removal.

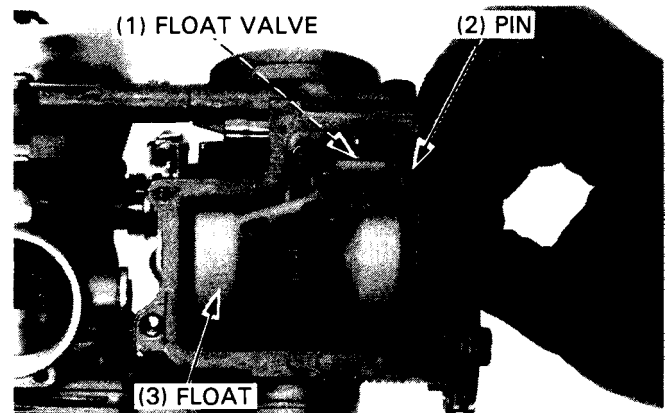
**CAUTION**

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

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



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



**FLOAT LEVEL**

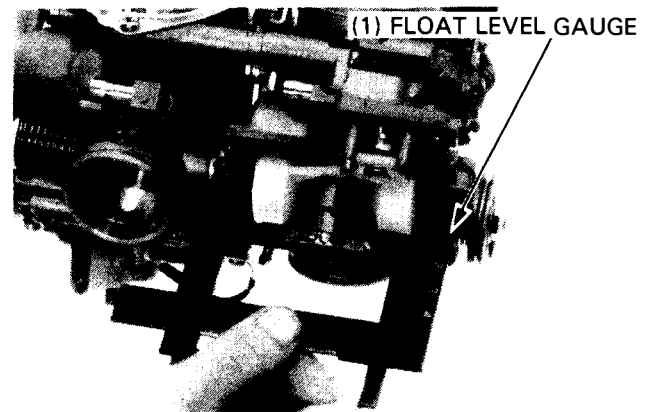
Measure the float level with the float tang just contacting the float valve.

**TOOL:**

Float level gauge                      07401-0010000

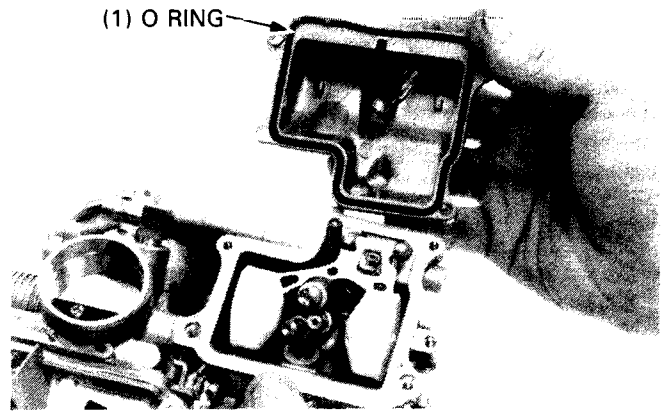
**FLOAT LEVEL: 7 mm (0.28 in)**

Adjust the float level by carefully bending the float tang.



## FUEL SYSTEM

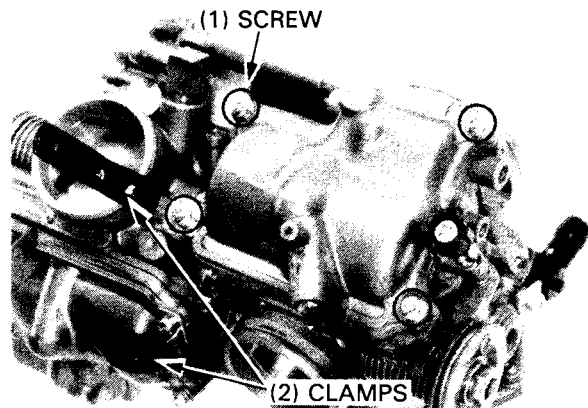
Install the O-ring on the float chamber groove.



Install the float chamber and tighten the screws securely.

### NOTE

- Install the fuel tube clamp.

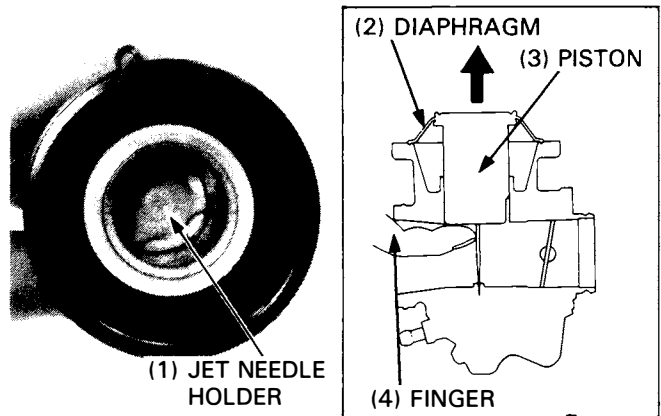


## VACUUM CHAMBER

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

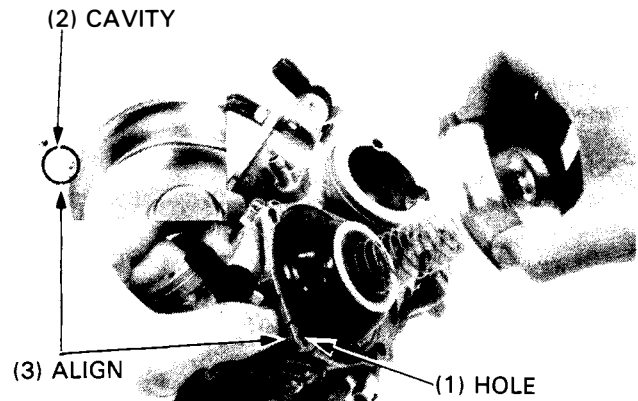
Push the jet needle holder in and turn it in 90 degrees clockwise.

Hold vacuum piston up to almost full open to avoid pinching the diaphragm with the chamber cover.

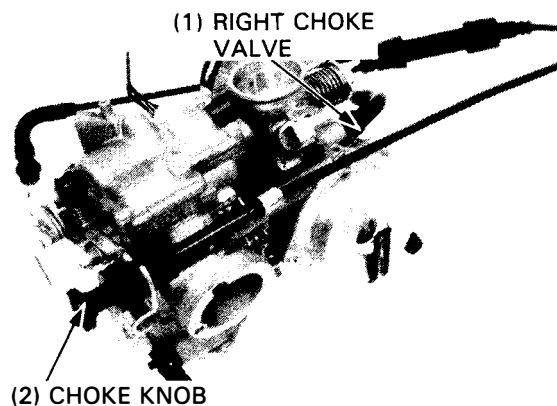


The vacuum piston with the tab of the diaphragm aligned with the groove of the carburetor.

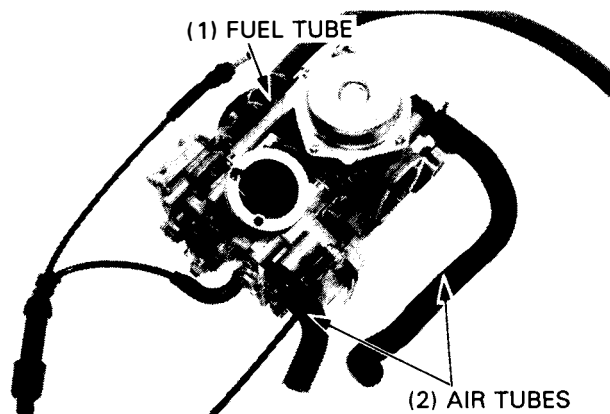
Install the chamber cover with the spring, aligning the cover cavity with the hole in the carburetor, and secure with at least two screws before releasing the vacuum piston.



Install the right choke valve and choke knob.



Install the fuel and air tubes as shown.



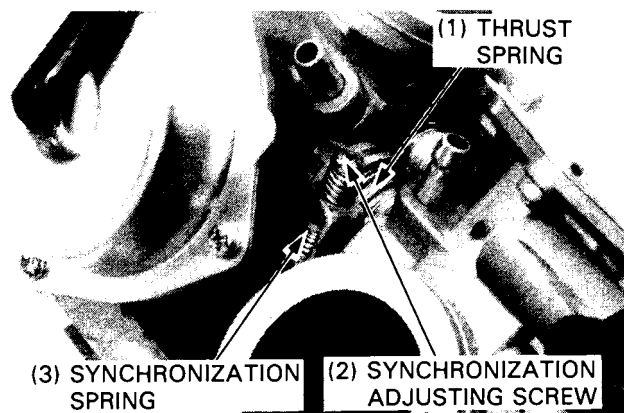
## CARBURETOR SEPARATION/ASSEMBLY

### SEPARATION

Loosen the synchronization adjusting screw.

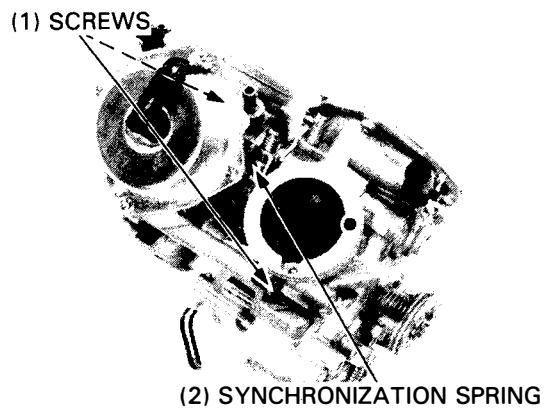
#### NOTE

- When separating the carburetors, be take careful not to lose the thrust spring and synchronization adjusting spring.



Separate the carburetors by removing two attaching screws.

Remove the synchronization spring.



## FUEL SYSTEM

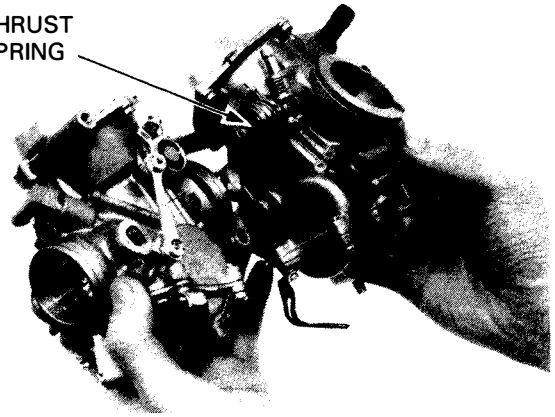
### ASSEMBLY

Loosen the synchronization adjusting screw until there is no spring tension.

Install the thrust spring between the throttle links.

Secure the carburetors together with the two screws.

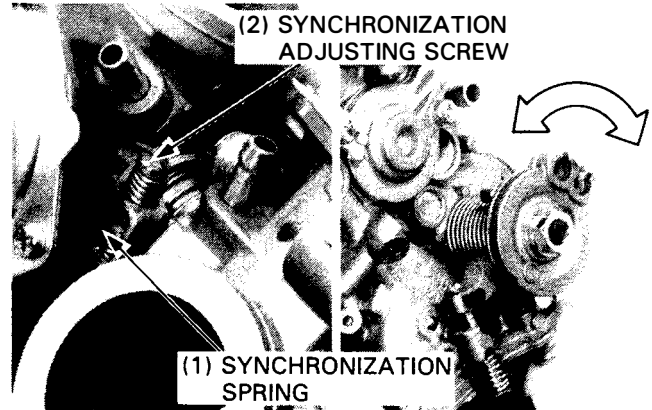
(1) THRUST  
SPRING



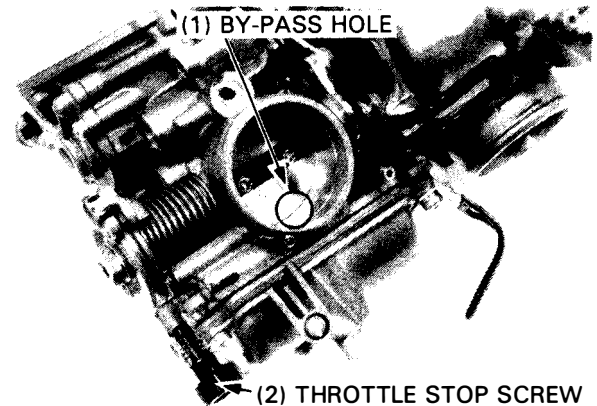
Install the synchronization spring and synchronization adjusting screw.

#### Inspect throttle operation as described below:

- Open the throttle slightly by rotating the throttle valve, then release the throttle. Make sure that there is no drag when opening and closing the throttle.



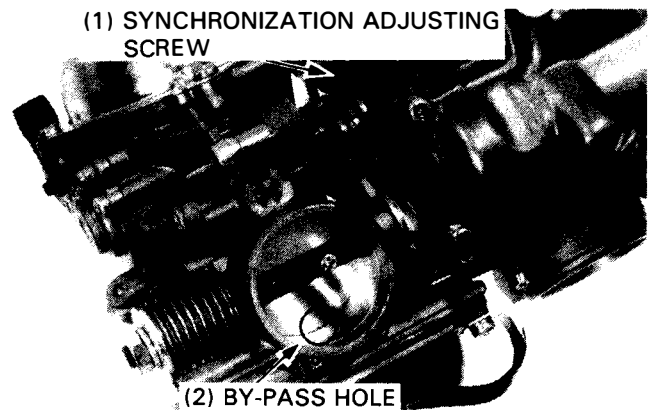
Turn the throttle stop screw to align the rear cylinder carburetor throttle valve with the edge of the by-pass hole.



Align the front cylinder carburetor throttle valve with the by-pass hole edge by turning the synchronization adjusting screw.

Make sure the throttle returns smoothly.

(1) SYNCHRONIZATION ADJUSTING  
SCREW



## CARBURETOR INSTALLATION

Install the carburetors onto the cylinder heads and tighten the insulator bands securely.

Install the following parts

- air cleaner chamber
- air cleaner housing
- fuel tank
- throttle cables

Adjust as follows:

- pilot screw (page 4-15)
- carburetor synchronization (page 3-10).
- throttle grip free play (page 3-6).
- carburetor idle speed (page 3-11).
- carburetor choke (page 3-7).

## PILOT SCREW ADJUSTMENT

### IDLE DROP PROCEDURE (U.S.A. ONLY)

#### NOTE

- The pilot screws are factory pre-set and no adjustment is necessary unless the pilot screws are replaced.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

1. Remove the pilot screw plugs (page 4-8).
2. Turn each pilot screw clockwise until it seats lightly and back it out to the specification given.

#### CAUTION

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

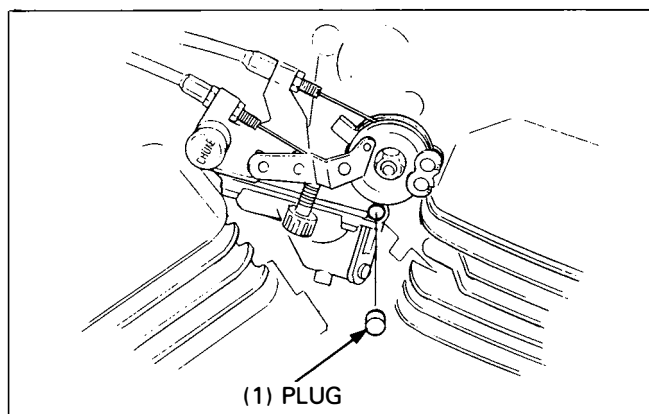
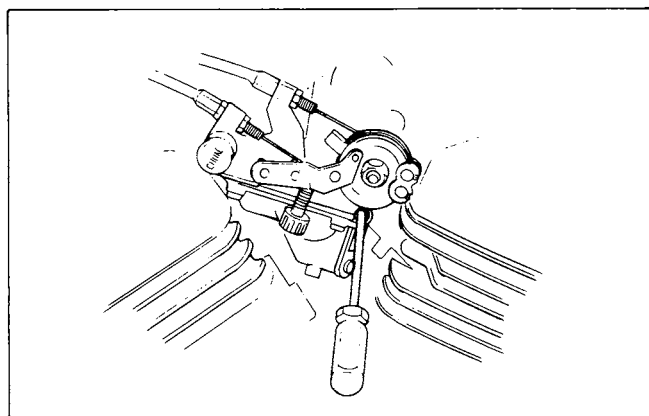
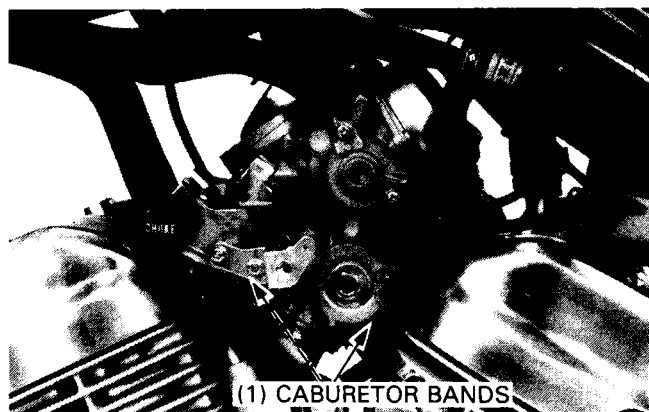
This is an initial setting prior to the final pilot screw adjustment.

#### INITIAL OPENING: 1-1/4 turns out

3. Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.
4. Attach a tachometer according to the manufacturer's instructions.
5. Adjust the idle speed to the specified rpm with the throttle stop screw.

#### IDLE SPEED : 1,200±100rpm

6. Turn each pilot screw 1/2 turn out from the initial setting.
7. If the engine speed increase by 50 rpm or more, turn each pilot screw out by successive 1/2 turn increments until engine speed does not increase.
8. Adjust the idle speed with the throttle stop screw.
9. Turn the rear cylinder carburetor pilot screw in until the engine speed drops 50 rpm.
10. Turn the rear cylinder carburetor pilot screw 1 turn out from the position obtained in step 9.
11. Adjust the idle speed with the throttle stop screw.
12. Perform steps 9, 10 and 11 for the front cylinder carburetor pilot screw.
13. Drive new pilot screw plugs into the pilot screw bores with a 7 mm valve guide driver (P/N 07942 – 8230000). When fully seated the plug surfaces will be recessed 1 mm.



## FUEL SYSTEM

### HIGH ALTITUDE ADJUSTMENT (U.S.A. only)

When the vehicle is to be operated continuously above 2,000 m (6,500 feet) the carburetors must be readjusted as follows to improve driveability and decrease exhaust emissions.

Remove each pilot screw plug (page 4-8).

Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.

Turn each pilot screw to the specification below.

#### HIGH ALTITUDE SETTING : 1/2 Turns in

Adjust the idle speed to  $1,200 \pm 100$  rpm, with the throttle stop screw.

Drive new pilot screw plugs into the pilot screw bores (page 4-15).

#### NOTE

- This adjustment must be made at high altitude to ensure proper high altitude operation.

Attach a Vehicle Emission Control Information up date label onto the inside of the left side cover as shown. See SL#132 for information on obtaining the label.

#### NOTE

- Do not attach the label to any part that can be easily removed from the vehicle.

#### ▲WARNING

- Sustained operation at an altitude lower than 1,500 m (5,000 feet) with the carburetors adjusted for high altitude may cause the engine to idle roughly and engine may stall in traffic and may cause engine damage due to overheating.

When the vehicle is to be operated continuously below 1,500m(5,000 feet),turn each pilot screw to the specification below, its original position.

#### LOW ALTITUDE SETTING : 1/2 turn out

Adjust the idle speed to  $1,200 \pm 100$  rpm with the throttle stop screw.

Drive new pilot screw plugs into the pilot screw bores (page 4-15).

Be sure to make these adjustments at low altitude. Remove the Vehicle Emission Control Update Label that attached to the inside of the left side cover after adjusting for the low altitude.

### EVAPORATIVE EMISSION PURGE CONTROL VALVE INSPECTION (California model only)

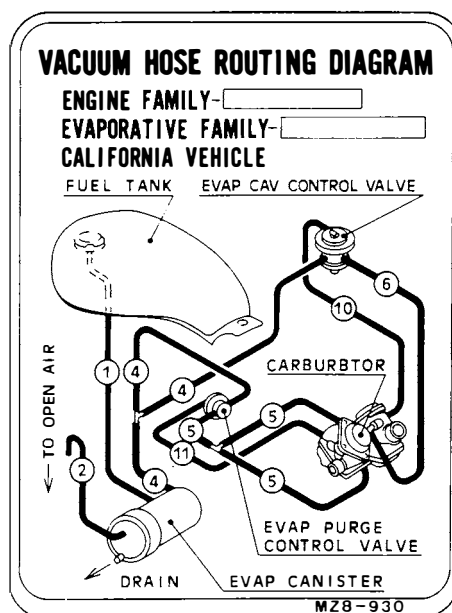
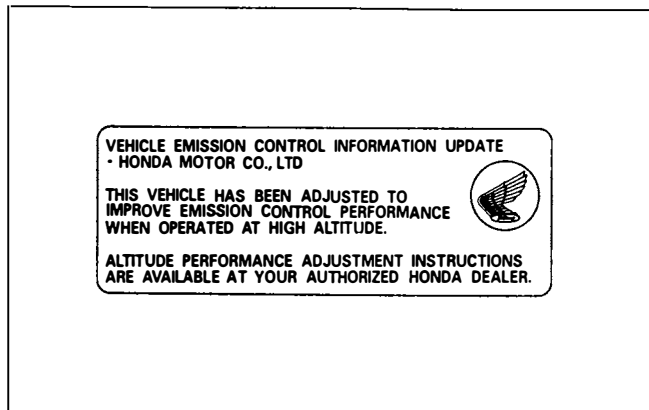
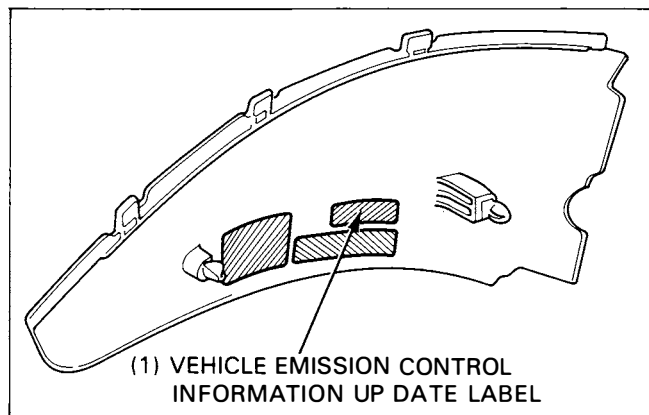
#### NOTE

- The evaporative emission purge control valve should be inspected if hot restart is difficult.

Check all fuel tank,Evaporative Emission Purge Control Valve (EVAP PURGE CONTROL VALVE),and evaporative emission canister hoses to be sure they are not kinked and are securely connected.Replace any hose that shows signs of damage or deterioration.

#### NOTE

- The EVAP PURGE CONTROL VALVE is located under the fuel tank.



Disconnect the EVAP PURGE CONTROL VALVE hoses from their connections and remove the EVAP PURGE CONTROL VALVE from its mount. Refer to the routing label on the inside of the left side cover for hose connections.

Connect a vacuum pump to the 8 mm(0.31 in.)I.D.hose No.5 that goes to the 3-way joint. Apply the specified vacuum to the EVAP PURGE CONTROL VALVE.

**SPECIFIED VACUUM: 250 mm (9.8 in) Hg**

The specified vacuum should be maintained. Replace the EVAP PURGE CONTROL VALVE if vacuum is not maintained.

**TOOL:**

|                      |                    |
|----------------------|--------------------|
| Vacuum/Pressure pump | A937X-041-XXXXX or |
| Vacuum pump          | ST-AH-260-MC7      |
|                      | (U.S.A. only)      |

Remove the vacuum pump and connect it to the vacuum hose No.11 that goes to the left carburetor body. Apply the specified vacuum to the EVAP PURGE CONTROL VALVE.

**SPECIFIED VACUUM: 250 mm (9.8 in) Hg**

The specified vacuum should be maintained. Replace the EVAP PURGE CONTROL VALVE if vacuum is not maintained.

**TOOL:**

|                      |                    |
|----------------------|--------------------|
| Vacuum/Pressure pump | A937X-041-XXXXX or |
| Vacuum pump          | ST-AH-260-MC7      |
|                      | (U.S.A. only)      |

Connect a pressure pump to the 8 mm(0.31 in.)I.D.hose No.4 that goes to the evaporative emission canister. While applying the specified vacuum to the EVAP PURGE CONTROL VALVE hose that goes to the 3-way joint pump air through the evaporative emission canister hose. Air should flow through the EVAP PURGE CONTROL VALVE and out the hose that goes to the 3-way joint.

Replace the EVAP PURGE CONTROL VALVE if air does not flow out.

**CAUTION**

- To prevent damage to the evaporative emission purge control valve, do not use high air pressure sources. Use a hand operated air pump only.

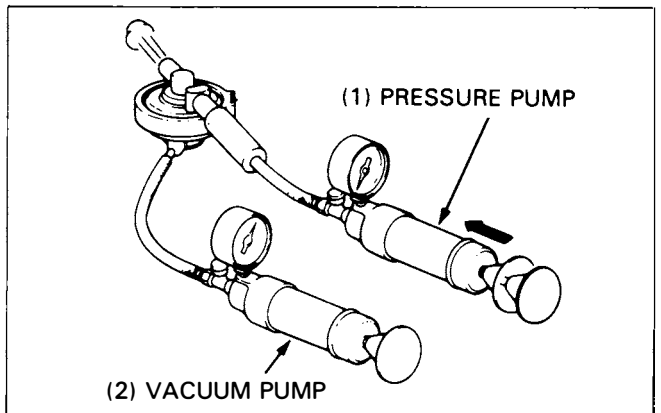
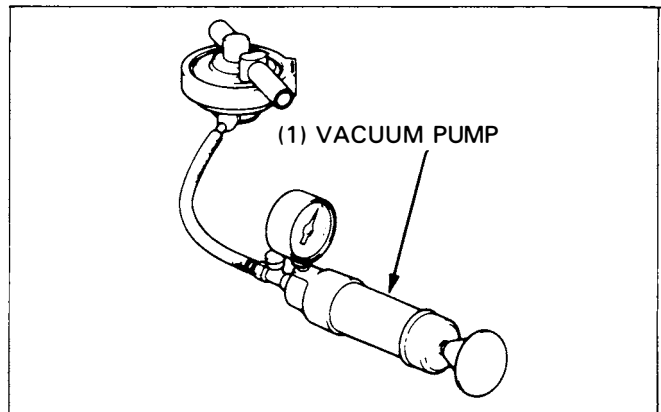
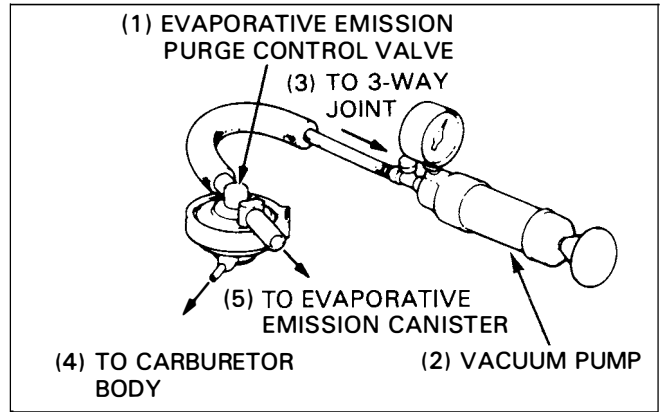
**TOOL:**

|                      |                    |
|----------------------|--------------------|
| Vacuum/Pressure pump | A937X-041-XXXXX or |
| Vacuum pump          | ST-AH-260-MC7      |
| Pressure pump        | ST-AH-255-MC7      |
|                      | (U.S.A. only)      |

Remove the pumps, install the EVAP PURGE CONTROL VALVE on its mount, route and reconnect the hose according to the routing label.

## EVAPORATIVE EMISSION CARBURETOR AIR VENT CONTROL VALVE INSPECTION (California model only)

Disconnect the Evaporative Emission Carburetor Air Vent Control Valve(EVAP CAV CONTROL VALVE)hoses from their connections and remove the EVAP CAV CONTROL VALVE from its mount. Refer to the routing label on left side cover for hose connections.



## FUEL SYSTEM

Connect a vacuum pump to the No.10 hose that goes to the right carburetor body.

Apply the specified vacuum to the EVAP CAV CONTROL VALVE.

**SPECIFIED VACUUM: 250 mm (9.8 in) Hg**

### TOOL:

**Vacuum/Pressure pump**                    **A937X-041-XXXXX or**  
**Vacuum pump**                                **ST-AH-260-MC7**  
     **(U.S.A. only)**

The specified vacuum should be maintained.

Replace the EVAP CAV CONTROL VALVE if vacuum is not maintained.

### CAUTION

- To prevent damage to the evaporative emission carburetor air vent control valve, do not use high air pressure sources. Use a hand operated air pump only.

Connect the vacuum pump to the air vent port of the EVAP CAV CONTROL VALVE.

Apply vacuum to the EVAP CAV CONTROL VALVE. The vacuum should hold steady.

Replace the EVAP CAV CONTROL VALVE if vacuum leaks.

### TOOL:

**Vacuum/Pressure pump**                    **A937X-041-XXXXX or**  
**Vacuum pump**                                **ST-AH-260-MC7**  
     **(U.S.A. only)**

Connect the vacuum pump to the No.10 hose that goes to the right carburetor body.

Connect the pressure pump to the air vent port of the EVAP CAV CONTROL VALVE.

While applying the vacuum to the EVAP CAV CONTROL VALVE No.10 hose that goes to the right carburetor body, pump air through the air vent port.

Air should flow through the EVAP CAV CONTROL VALVE and out the hose that goes to the carburetor air joint pipe.

### TOOL:

**Vacuum/Pressure pump**                    **A937X-041-XXXXX or**  
**Vacuum pump**                                **ST-AH-260-MC7**  
**Pressure pump**                                **ST-AH-255-MC7**  
     **(U.S.A. only)**

Plug the hose that goes to the carburetor air joint pipe.

While applying vacuum to the EVAP CAV CONTROL VALVE No.10 hose that goes to the right carburetor body, apply air pressure.

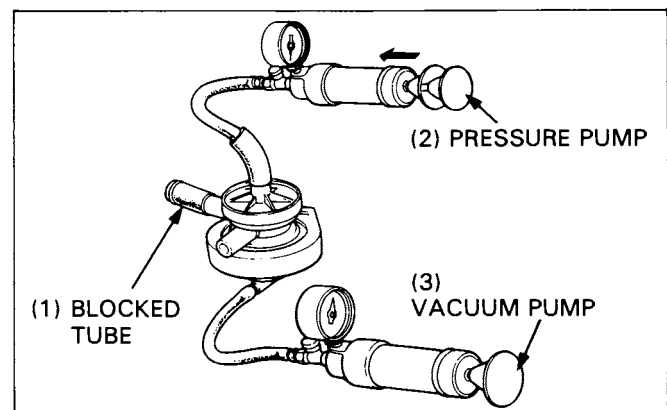
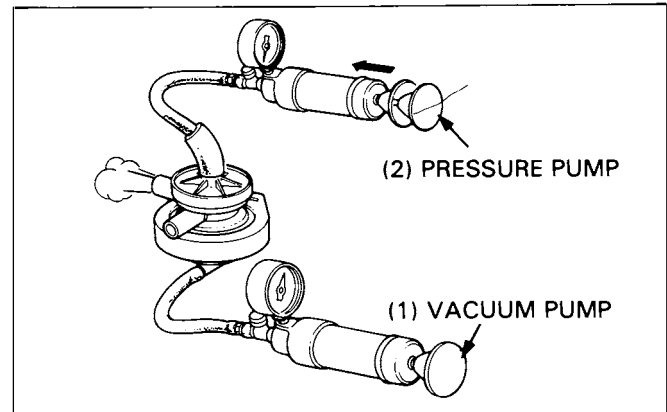
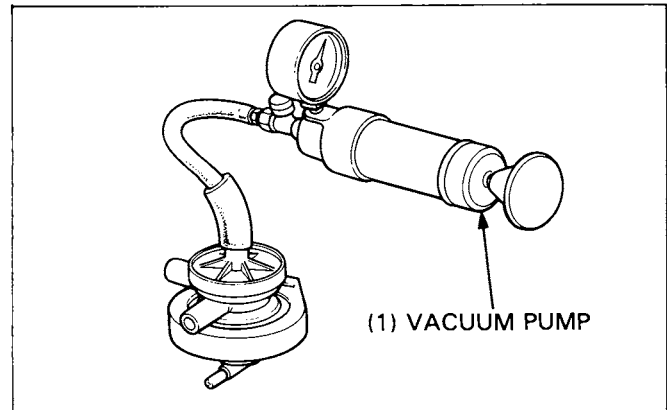
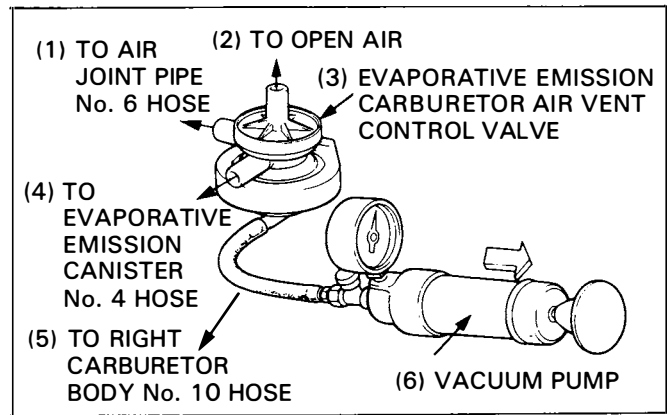
It should hold steady.

Replace the EVAP CAV CONTROL VALVE if pressure is not retained.

Remove the pumps, install the EVAP CAV CONTROL VALVE on its mount, route and reconnect the hoses according to the routing label.

### TOOL:

**Vacuum/Pressure pump**                    **A937X-041-XXXXX or**  
**Vacuum pump**                                **ST-AH-260-MC7**  
**Pressure pump**                                **ST-AH-255-MC7**  
     **(U.S.A. only)**

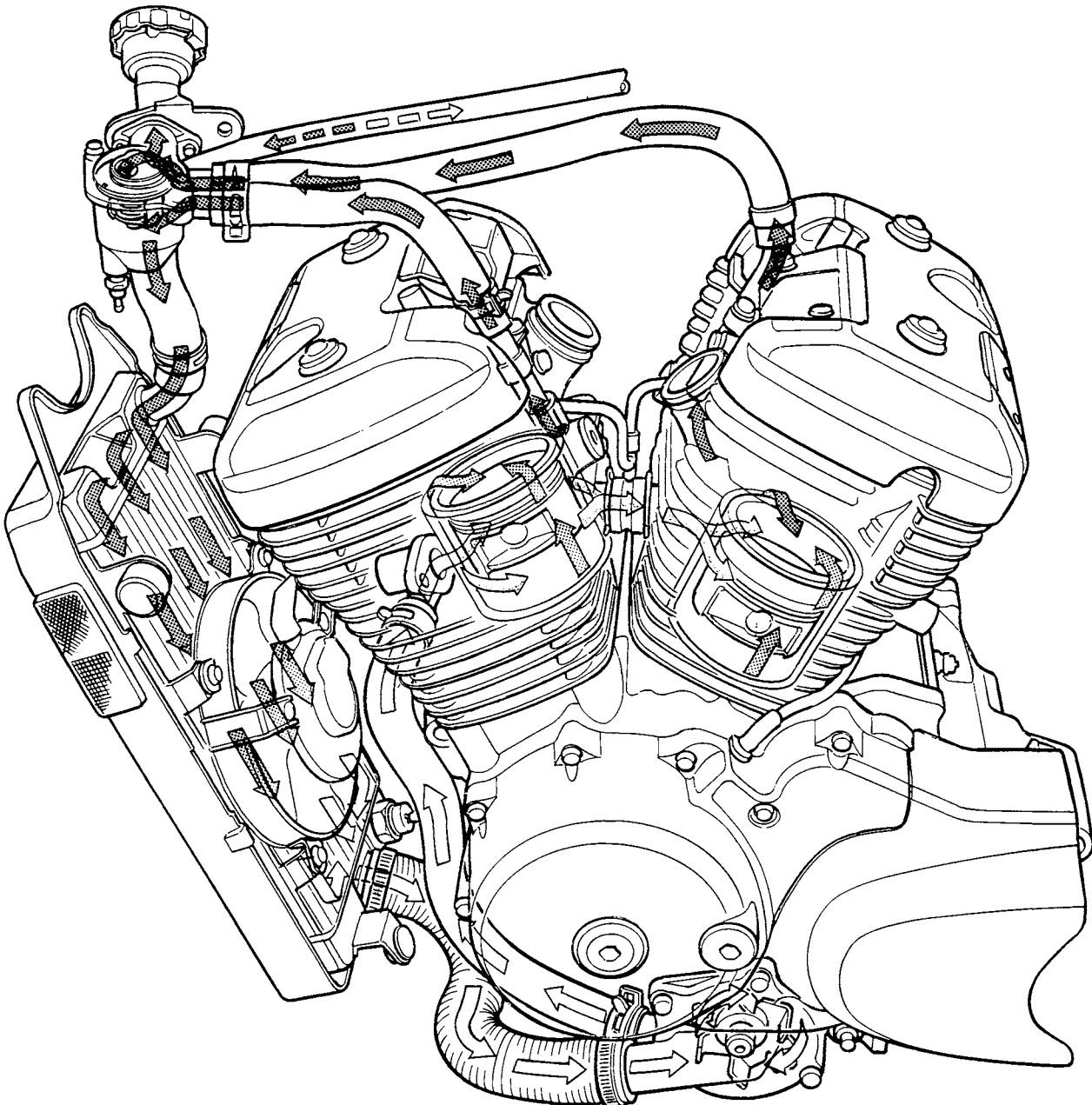




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**MEMO**

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|                            |            |                             |            |
|----------------------------|------------|-----------------------------|------------|
| <b>SERVICE INFORMATION</b> | <b>5-1</b> | <b>THERMOSTAT</b>           | <b>5-3</b> |
| <b>TROUBLESHOOTING</b>     | <b>5-1</b> | <b>RADIATOR/COOLING FAN</b> | <b>5-5</b> |
| <b>SYSTEM TESTING</b>      | <b>5-2</b> | <b>WATER PUMP</b>           | <b>5-7</b> |
| <b>COOLANT REPLACEMENT</b> | <b>5-3</b> | <b>COOLANT/RESERVE TANK</b> | <b>5-9</b> |

## SERVICE INFORMATION

### GENERAL

#### ⚠ WARNING

- *Do not remove the radiator cap when the engine is hot. The coolant is under pressure and severe scalding could result. The engine must be cool before servicing the cooling system.*
- *If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.*

- Use only distilled water and ethylene glycol in the cooling system. A 50–50 mixture is recommended for maximum corrosion protection. Do not use alcohol-based antifreeze.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill, coolant mixture testing or drain the system, or to test the coolant mixture.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- For thermosensor and thermostatic switch removal and inspection, refer to section 18.
- To service the water pump, the engine must be removed from the frame.

### SPECIFICATIONS

| ITEM  | SPECIFICATIONS   |
|---|--|
| Radiator cap relief pressure                            | 88–127 kPa (0.9–1.3 kg/cm <sup>2</sup> , 13–18 psi)  |
| Freezing point (Hydrometer test):                       | 55% Distilled water + 45% ethylene glycol: –32°C (–25°F)<br>50% Distilled water + 50% ethylene glycol: –37°C (–34°F)<br>45% Distilled water + 55% ethylene glycol: –44.5°C (–48°F) |
| Coolant capacity:      Coolant change:<br>Total system: | 1.45 lit (1.37 US qt, 1.28 Imp qt)<br>1.6 lit (1.51 US qt, 1.41 Imp qt)  |
| Thermostat  | Begins to open: 80° to 84°C (176° to 183°F)<br>Valve lift: Minimum of 8 mm at 95°C (0.3 in at 203°F)   |
| Boiling point (with 50–50 mixture):                     | Unpressurized: 107.7°C (226°F)<br>Cap on, pressurized: 125.6°C (258°F)   |

## TROUBLESHOOTING

#### Engine temperature too high

- Faulty thermosensor bulb or sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant or coolant level too low
- Passages blocked in radiator, hoses or water jacket
- Cooling fan motor does not turn
  - Burned or loose sub fuse
  - Faulty fan motor
  - Faulty thermostatic switch
  - Poor connector contact or open circuit in harness
- Faulty water pump

#### Engine temperature too low

- Faulty thermosensor bulb or sensor
- Thermostat stuck open

#### Coolant leaks

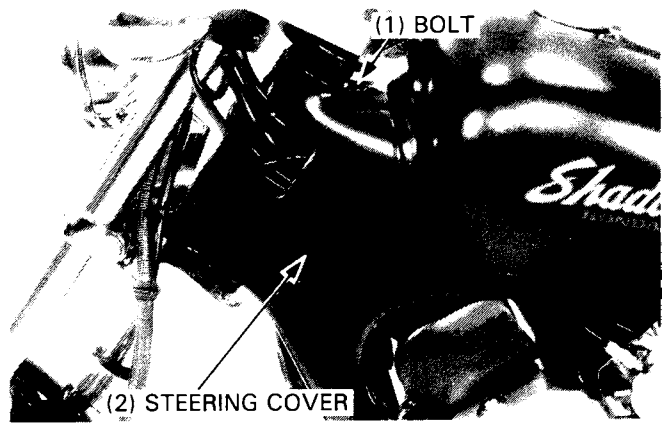
- Faulty pump mechanical seal
- Deteriorated O-rings

## COOLING SYSTEM

### SYSTEM TESTING

#### COOLANT MIXTURE

Remove the fuel tank (page 4-3).  
Remove the steering covers by removing the bolt.

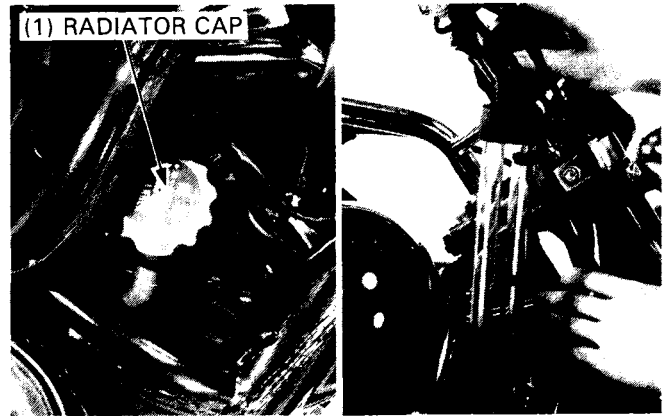


Remove the radiator cap.

#### ⚠ WARNING

- *Be sure the engine is cool before removing the cap or you may be severely scalded.*

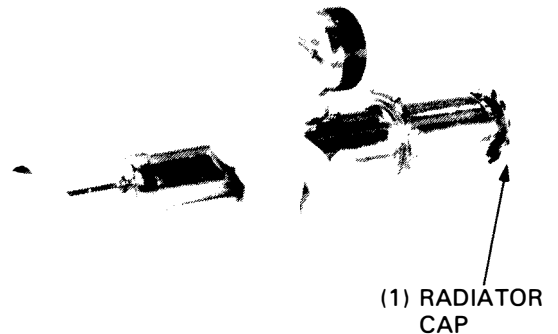
Test the coolant mixture with an antifreeze tester.  
For maximum corrosion protection, a 50–50% solution of ethylene glycol and distilled water is recommended.



#### RADIATOR CAP

Wet the radiator cap sealing surface, install the cap on the tester, and apply pressure.  
Replace the radiator cap if it does not hold pressure, or if its relief pressure is too high or too low. It must hold specified pressure for at least six seconds.

**RADIATOR CAP RELIEF PRESSURE:**  
88–127 kPa (0.9–1.3 kg/cm<sup>2</sup>, 13–18 psi)



#### SYSTEM PRESSURE TEST

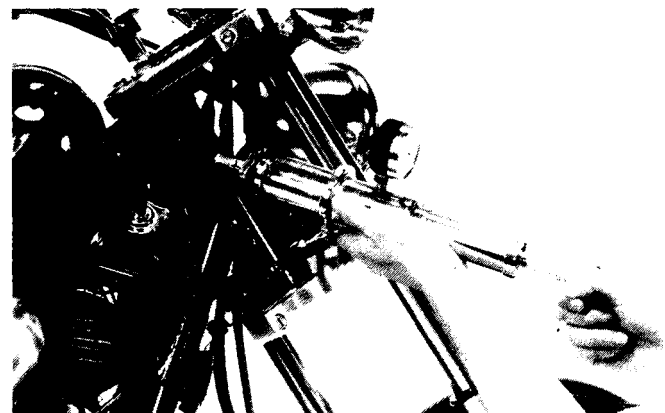
Remove the steering covers and radiator cap.

Attach the tester to the radiator and apply enough pressure to test the radiator, engine and hoses.  
Check for leaks.

#### CAUTION

- *Excessive pressure can damage the radiator. Do not exceed 125 kPa (1.25 kg/cm<sup>2</sup>, 18 psi)*

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



## COOLANT REPLACEMENT

### ⚠ WARNING

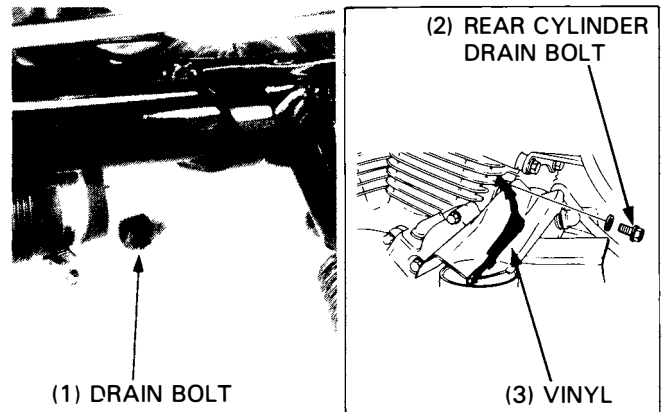
- *The engine must be cool before replacing the coolant or severe scalding may result.*

Remove the radiator cap (page 5-2).

Drain the coolant from the system by removing the drain bolt on the water pump cover.

Remove the rear cylinder coolant drain bolt and drain the coolant using a vinyl as shown.

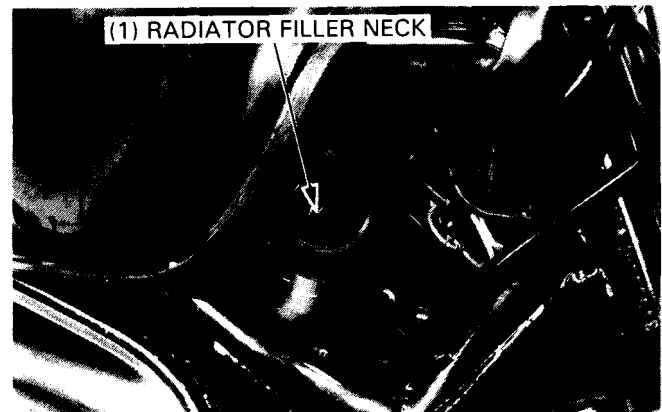
Reinstall the drain bolt.



Fill the system with 50–50 mixture of distilled water and ethylene glycol.

Bleed air from the cooling system.

- Lower the side stand and shift the transmission into neutral.
- Start the engine and snap the throttle grip, 3–4 times at 4,000–5,000 rpm. Then add coolant up to the radiator filler neck.
- Reinstall the radiator cap.
- Check the level of coolant in the reserve tank and fill to the correct level if the level is low.



## THERMOSTAT

### REMOVAL

Remove the following:

- fuel tank (page 4-3)
- air cleaner housing (page 4-4)
- steering covers (page 5-2)
- radiator cap

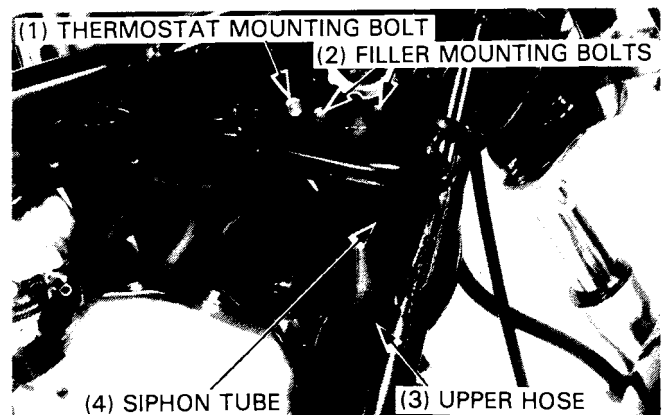
Drain the coolant.

Remove the thermostat housing and radiator filler mounting bolts.

Disconnect the siphon tube from the radiator filler.

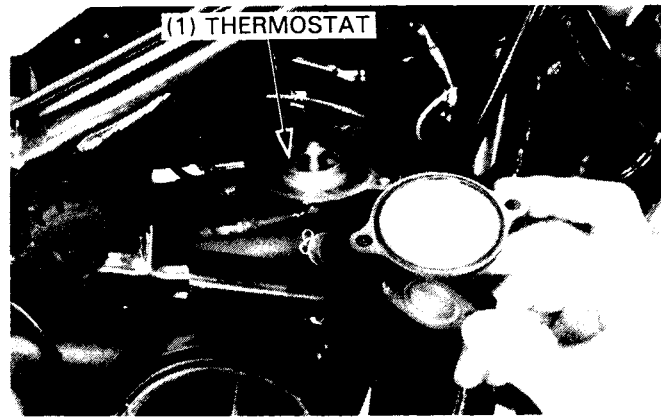
Disconnect the upper radiator hose at the radiator and remove filler and the radiator hose from the frame.

Remove the thermostat housing cover.



## COOLING SYSTEM

Remove the thermostat from the housing.



### INSPECTION

Inspect the thermostat visually for damage. Suspend the thermostat in heated water to check its operation.

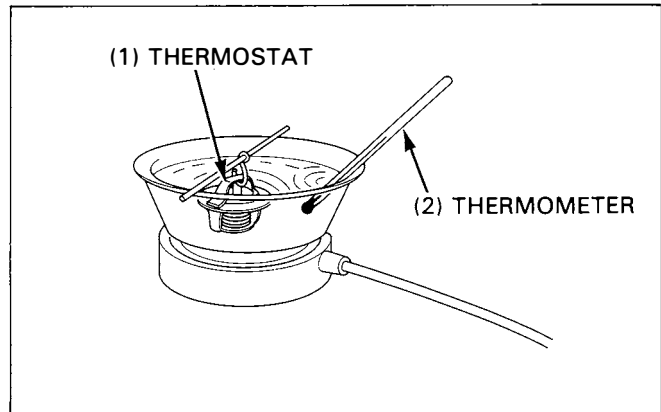
#### NOTE

- If the thermostat or thermometer touches the pan, you'll get a false reading.

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

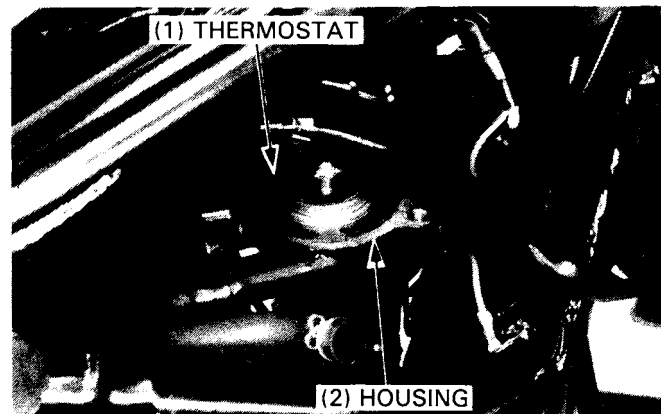
#### Data:

|               |   |
|---------------|---|
| Start to open | 80° to 84°C (176–183°F)   |
| Valve lift    | 8 mm (0.3 in) minimum when heated to 95°C (203°F) for five minutes. |



### INSTALLATION

Install the thermostat into the housing.



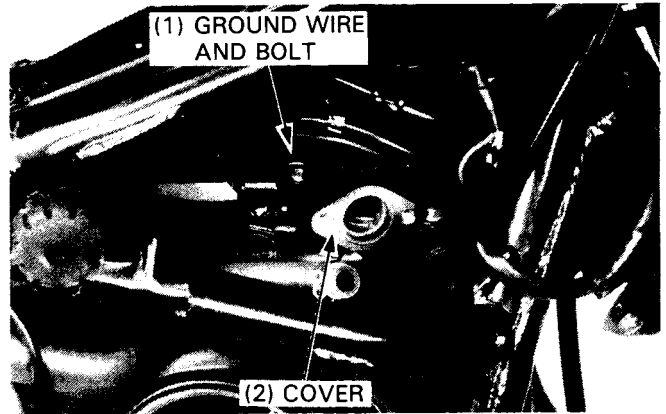
Install a new O-ring on the housing cover and install the housing cover onto the housing.



Tighten the thermostat housing cover mounting bolts.

**NOTE**

- Be sure to secure the thermostat ground wire with the cover mounting bolt shown.

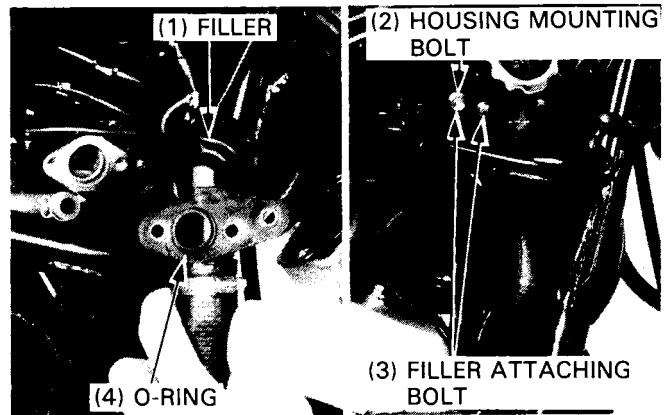


Install a new O-ring on the radiator filler, and connect the upper radiator hose to the radiator.

Install the radiator filler onto the thermostat housing. Tighten the filler and thermostat housing mounting bolts.

Install the remaining removed parts in the reverse order of removal.

Fill the system with coolant.



**RADIATOR/COOLING FAN**

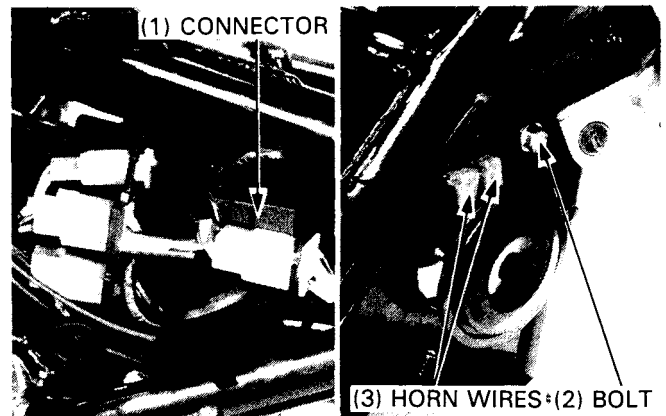
**REMOVAL**

**NOTE**

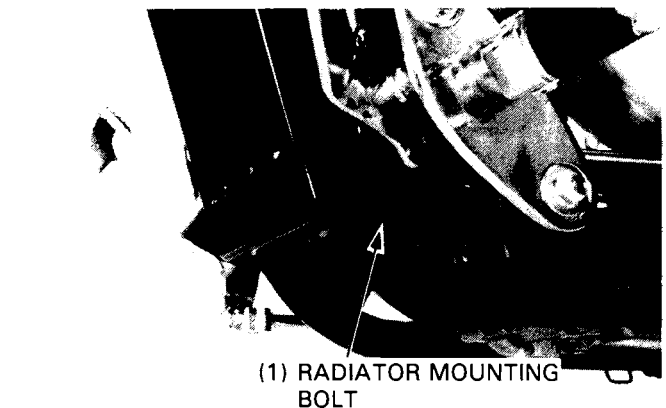
- For fan motor inspection, refer to section 18.

Remove the steering cover and disconnect the fan motor connector (2P BLACK)

Remove the horn mounting bolt and horn, then disconnect the horn wires.

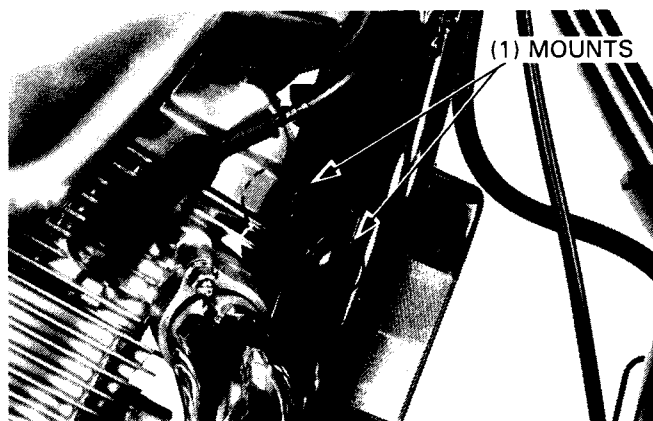


Remove the radiator mounting bolt and disconnect the lower radiator hose from the radiator by loosening the hose band.



## COOLING SYSTEM

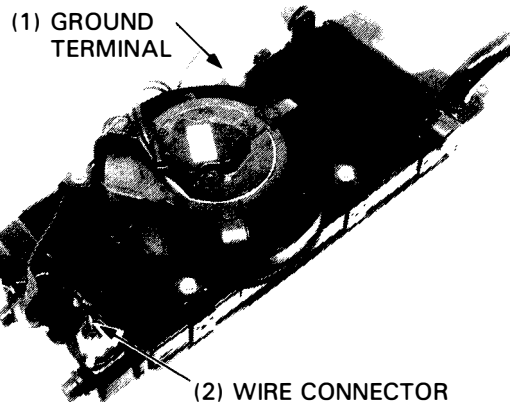
Unhook the radiator mounts from the grommets from in frame. Unclamp the upper radiator hose and disconnect the hose from the radiator.



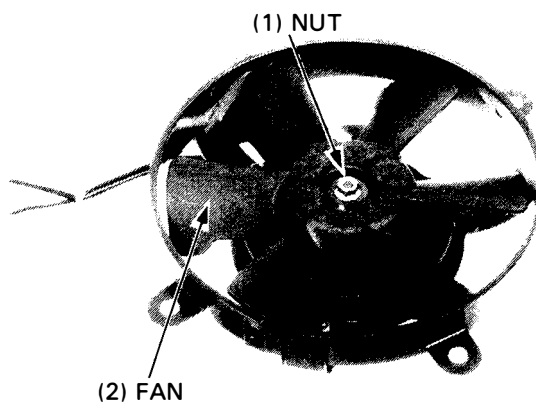
### DISASSEMBLY

Disconnect the thermostatic switch wire connector from the switch and remove the wire from the clamp. Remove the ground wire terminal bolt.

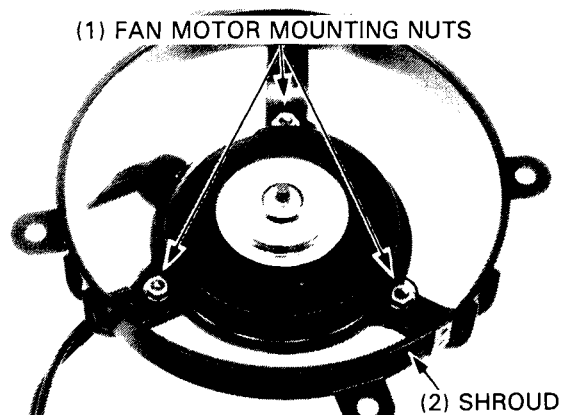
Remove the fan motor shroud mounting bolts, and remove the fan motor shroud and fan motor as an assembly.



Remove the nut to separate the fan from the shroud.



Remove the fan motor mounting nuts and fan motor from the shroud.





**ASSEMBLY**

Inspect the radiator soldered joints and seams for leaks.

Blow dirt out from between core fins with compressed air. If insects, etc., are clogging the radiator, wash them off with low pressure water.

Carefully straighten any bent fins.  
Install the motor on the shroud and tighten the nuts.

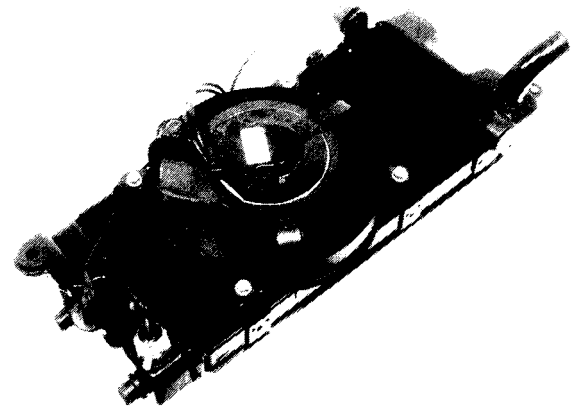
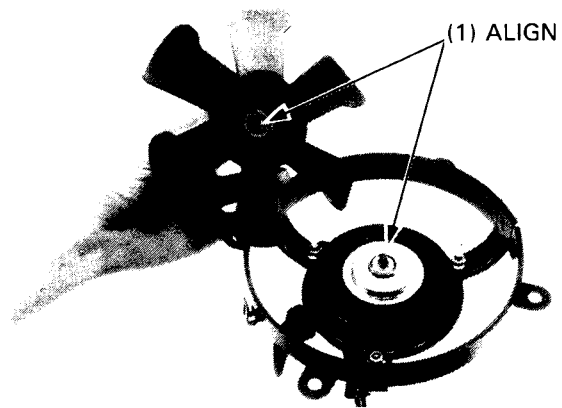
Install the fan to the fan motor shaft, aligning the boss of the shaft with the groove of the fan.

Assemble the remained components in the reverse order of the disassembly.

If removed the thermostatic switch from the radiator, refer to page 18-8.

**NOTE**

- Do not overtighten the thermostatic switch, when reinstall it.  
TORQUE: 18 N·m (1.8 kg-m, 13 ft-lb).



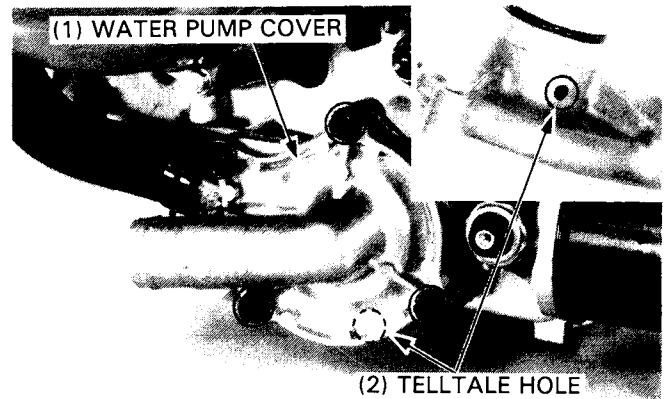
**WATER PUMP**

**MECHANICAL SEAL INSPECTION**

**NOTE**

- The water pump cover and O-ring can be removed with engine in the frame.

Inspect the telltale hole for signs of mechanical seal coolant leakage.  
Replace the water pump as an assembly if the mechanical seal is leaking.



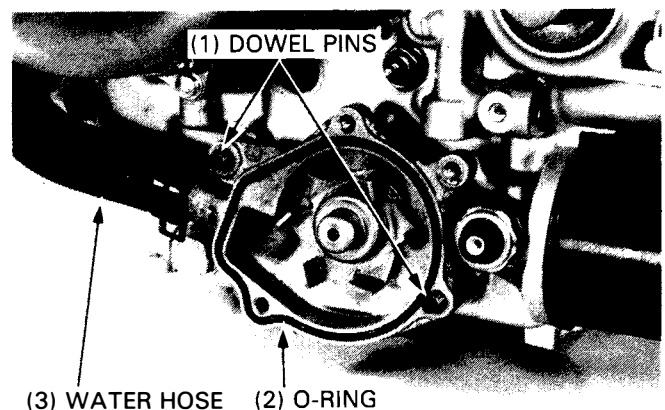
**REMOVAL**

Remove the engine from the frame (section 6).

Remove the water pump cover mounting bolts and cover.

Remove the O-ring and dowel pins from the water pump assembly and disconnect the water hose.

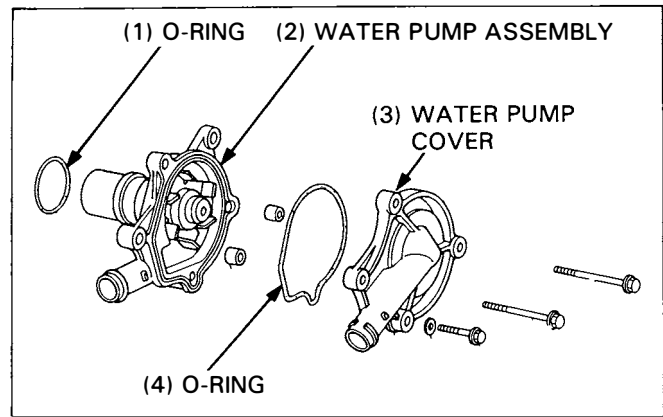
Remove the water pump from the crankcase.



## COOLING SYSTEM

### INSPECTION

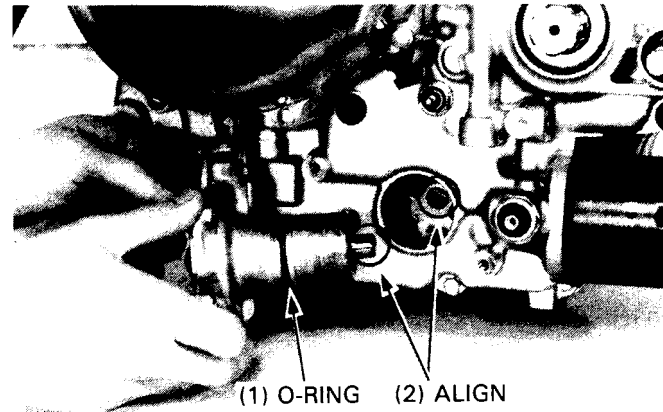
Check the water pump for mechanical seal leakage and bearing deterioration. Replace the water pump as an assembly if necessary.



### INSTALLATION

Apply a coat of clean engine oil to a new O-ring and install it in the water pump shaft housing groove.

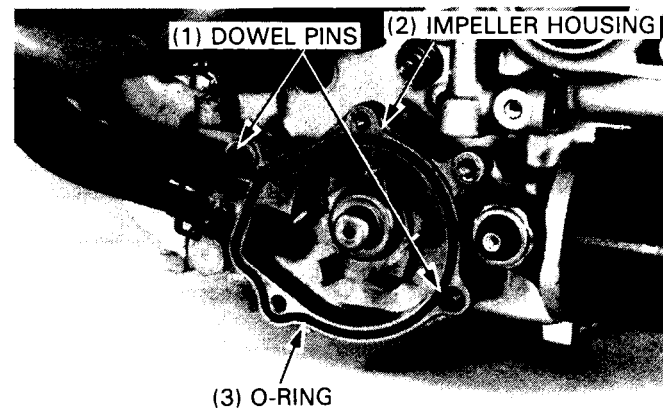
Align the water pump shaft groove with the oil pump shaft and insert the water pump into the crankcase.



Apply a coat of engine oil to a new O-ring and install it around the impeller housing.

Install the two dowel pins.

Connect the water hose with the clamp.



Install the water pump cover and tighten the cover mounting bolts.

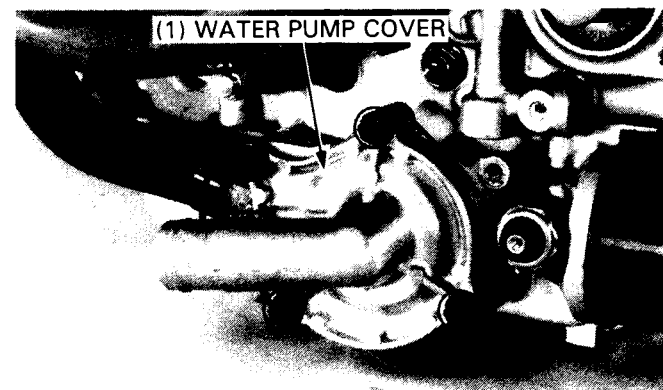
Connect the water hose with the clamp.

Install the engine in the frame (section 6).

Fill the system with coolant (page 5-3).

Fill the engine with the recommended engine oil (page 2-4).

Check the cooling system for leakage.



## COOLANT/RESERVE TANK

### REMOVAL/INSTALLATION

Raise and support the motorcycle rear frame using a hoist or jack under the engine.

Remove the evaporative emission canister(California model only).

Place a clean container under the reserve tank.

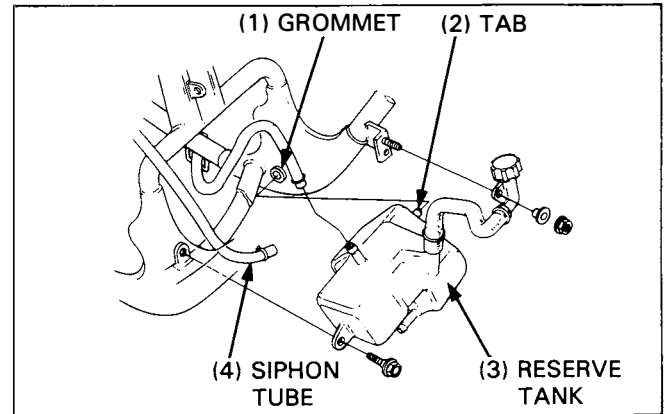
Disconnect the radiator siphon tube at the reserve tank.  
Remove the reserve tank mounting bolt, filler mounting nut and the reserve tank.

Hold the overflow tube upright and remove the reserve tank from the frame.

Empty the tank, if necessary.

Install the reserve tank in the reverse order of removal.

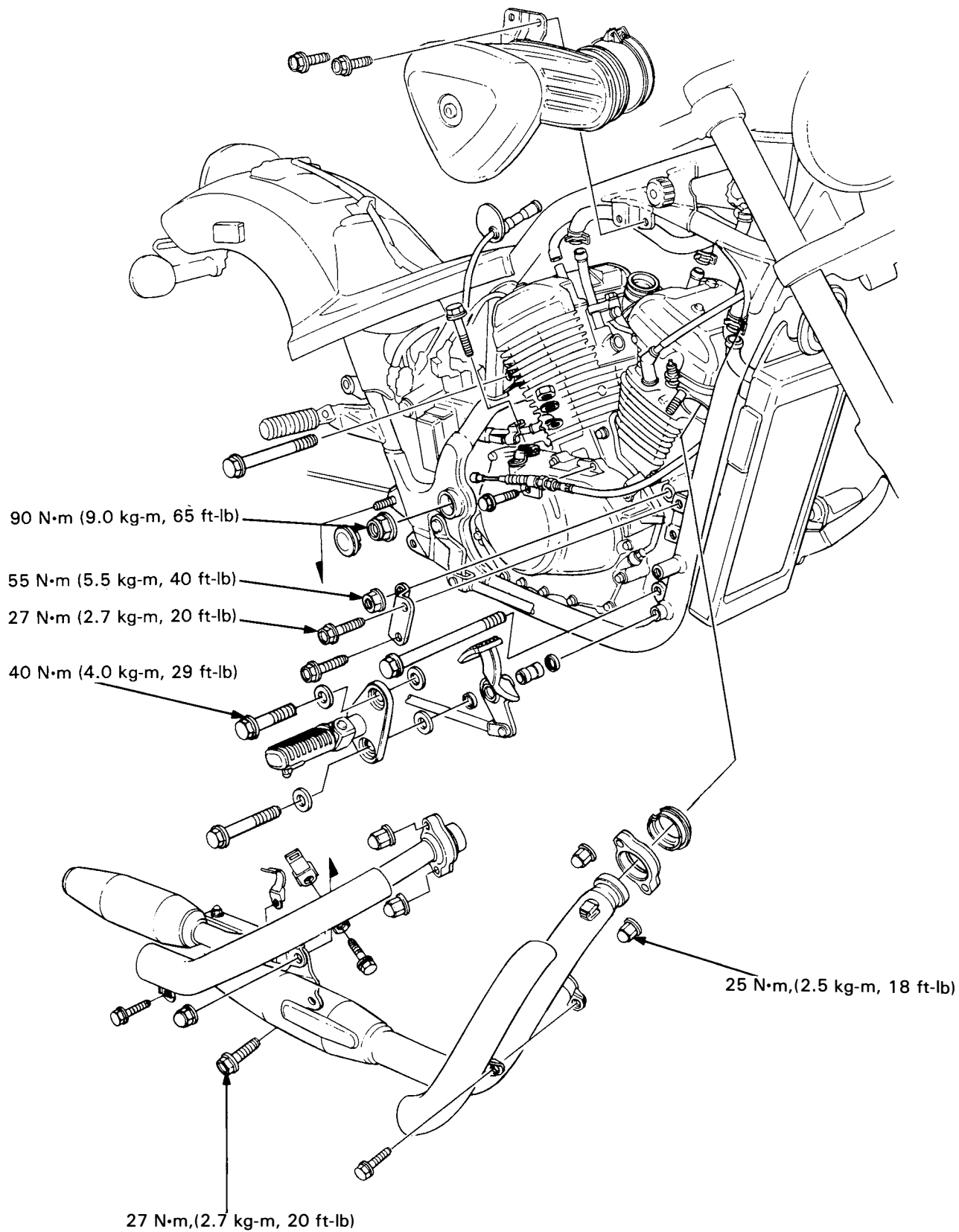
Fill the tank with coolant, if necessary.



### CAUTION

- *The tab of the reserve tank should be aligned with the grommet in the frame.*

# ENGINE REMOVAL/INSTALLATION



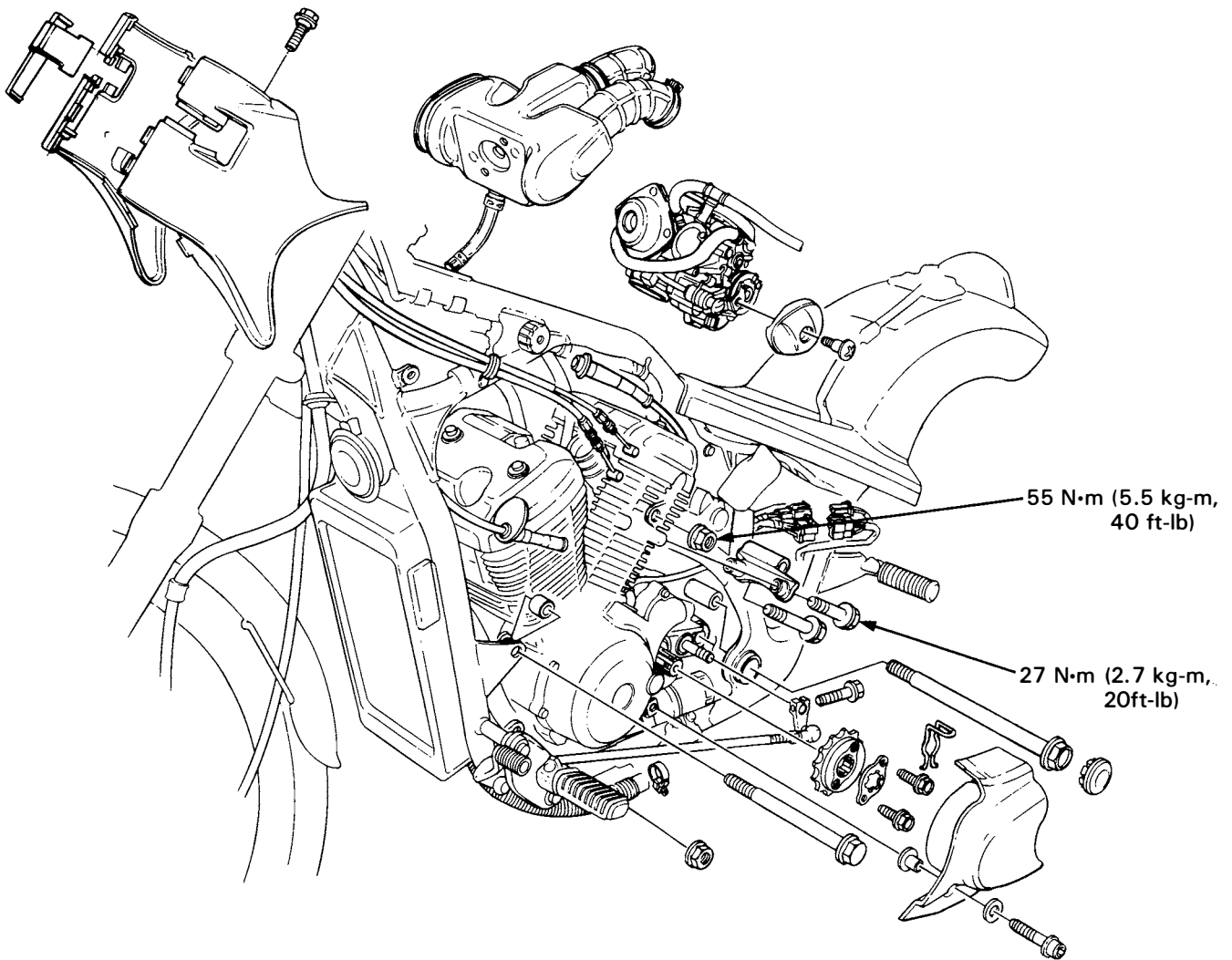
# 6. ENGINE REMOVAL/INSTALLATION

SERVICE INFORMATION  
ENGINE REMOVAL

6-2 ENGINE INSTALLATION  
6-3

6-5

6



# SERVICE INFORMATION

### GENERAL

- Support the motorcycle using a hoist, a floor jack or other adjustable support.
- The following parts can be serviced with the engine installed in the frame:
  - Clutch
  - Gearshift linkage
  - Camshafts
  - Front cylinder head/cylinder
  - Alternator
  - Starter motor
  - Carburetors
- To service the water pump body, oil pump, and rear cylinder head/cylinder the engine must be removed from the frame.

### SPECIFICATIONS

|                   |  |
|-------------------|--|
| Engine dry weight | 61 kg (134 lb)                                   |
| Oil capacity      | 2.8 lit (2.94 US qt, 2.46 Imp qt) at disassembly |
| Coolant capacity  | 1.6 lit (1.51 US qt, 1.41 Imp qt) total          |

### TORQUE VALUES

|                                    |                               |
|------------------------------------|-------------------------------|
| Rear axle                          | 90 N•m (9.0 kg-m, 65 ft-lb)   |
| Shock absorber lower mounting bolt | 45 N•m (4.5 kg-m, 33 ft-lb)   |
| Gearshift arm bolt                 | 12 N•m (1.2 kg-m, 9 ft-lb)    |
| Foot peg bracket bolt              | 40 N•m (4.0 kg-m, 29 ft-lb)   |
| Swingarm pivot bolt                | 90 N•m (9.0 kg-m, 65 ft-lb)   |
| Front upper engine mounting bolt   | 55 N•m (5.5 kg-m, 40 ft-lb)   |
| Front upper engine bracket bolt    | 27 N•m (2.7 kg-m, 20 ft-lb)   |
| Front lower engine mounting bolt   | 55 N•m (5.5 kg-m, 40 ft-lb)   |
| Rear upper engine mounting bolt    | 55 N•m (5.5 kg-m, 40 ft-lb)   |
| Rear upper engine bracket bolt     | 27 N•m (2.7 kg-m, 20 ft-lb)   |
| Exhaust pipe joint nut             | 25 N•m (2.5 kg-m, 18 ft-lb)   |
| Fuel tank mounting bolt            | 19 N•m (1.9 kg-m, 13.7 ft-lb) |
| Exhaust muffler bracket bolt       | 27 N•m (2.7 kg-m, 20 ft-lb)   |

## ENGINE REMOVAL

Support the motorcycle using a hoist or a jack.

### CAUTION

- *Do not jack up the engine at the oil filter.*

Drain the engine oil (page 2-4) and the radiator coolant (page 5-3).

Disconnect the battery negative cable from the battery terminal.

Remove the following:

- fuel tank (page 4-3)
- air cleaner housing (page 4-4)
- air cleaner chamber (page 4-4)
- carburetor (page 4-6)
- exhaust pipe protectors
- exhaust pipe and mufflers

Loosen the drive chain (page 3-13).

Remove the drive sprocket cover (page 13-14), then remove the sprocket from the drive chain by removing the two sprocket bolts.

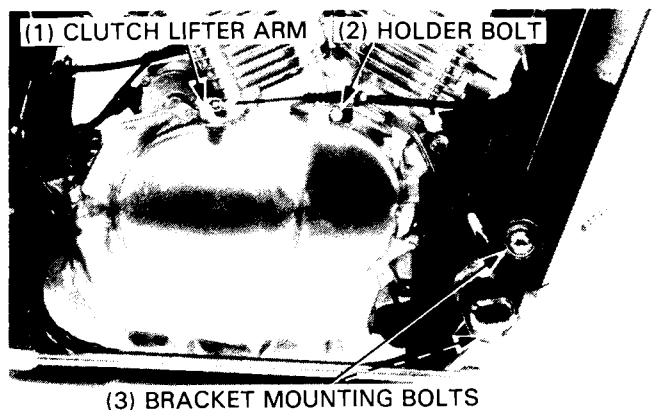
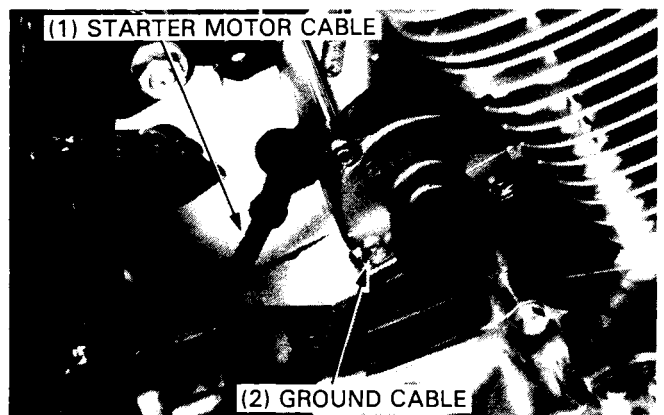
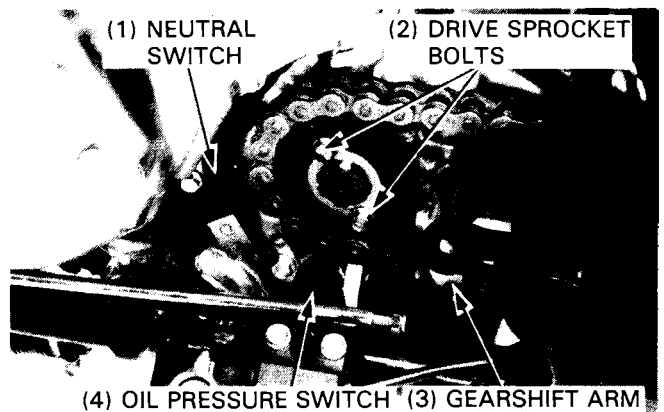
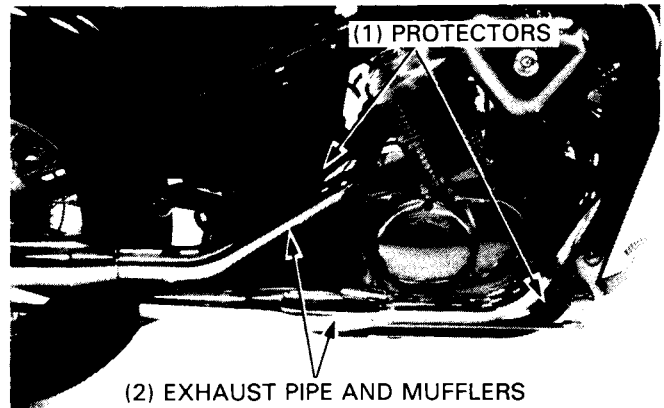
Disconnect the oil pressure and neutral switch wires from the switch terminals and free the switch wire harness from the engine and frame.

Remove the gearshift arm from the gearshift spindle.

Disconnect the starter motor cable and ground cable from the starter motor.

Disconnect the clutch cable from the clutch lifter arm by removing the holder bolt.

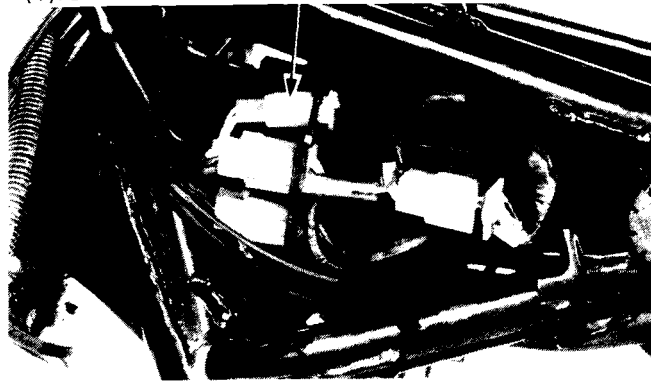
Remove the right foot peg and rear brake pedal by removing the two bracket mounting bolts.



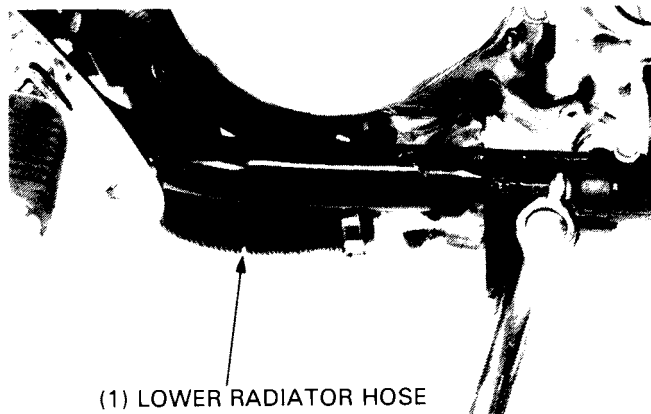
## ENGINE REMOVAL/INSTALLATION

Disconnect the ignition pulse generator wire connector(4P WHITE).

(1)IGNITION PULSE GENERATOR WIRE CONNECTOR



Remove the lower radiator hose (radiator-to-water pump). Disconnect the water hoses (thermostat housing-to-cylinder heads) from the cylinder heads (page 9-3).



(1) LOWER RADIATOR HOSE

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

### NOTE

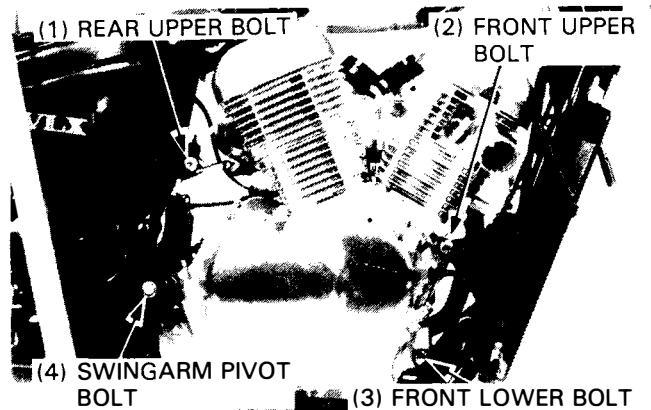
- The jack height must be continually adjusted to relieve stress for ease of bolt removal.

Remove the following:

- rear wheel (page 13-3)
- swingarm (page 13-14)
- front upper engine bracket (two 8 mm bolts, 10 mm bolt and collar)
- front lower engine bracket (8 mm bolts and 10 mm bolt)
- rear engine bracket (two 8 mm bolts and 10 mm bolt)

### NOTE

- Do not damage the radiator fin.



(1) REAR UPPER BOLT

(2) FRONT UPPER BOLT

(4) SWINGARM PIVOT BOLT

(3) FRONT LOWER BOLT



## ENGINE INSTALLATION

Engine installation is essentially the reverse order of removal. Use a floor jack or other adjustable support to carefully maneuver the engine into place.

### CAUTION

- *Carefully align mounting points with the jack to prevent damage to mounting bolt threads and wire harness and cables.*

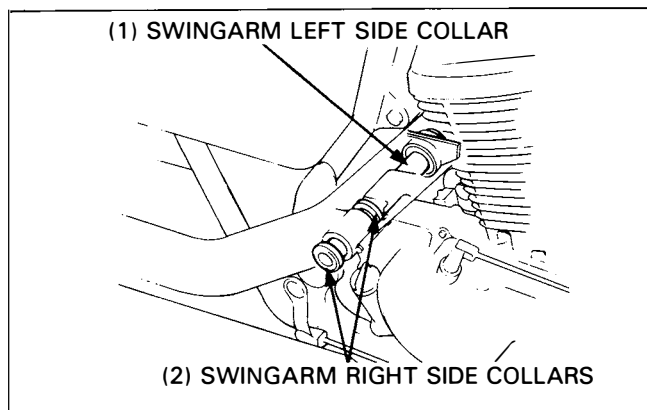
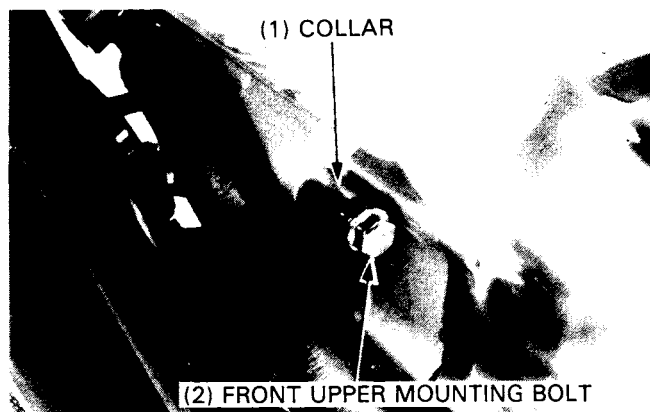
### NOTE

- Be sure to install the mounting collars and swingarm dust seals in their correct positions.

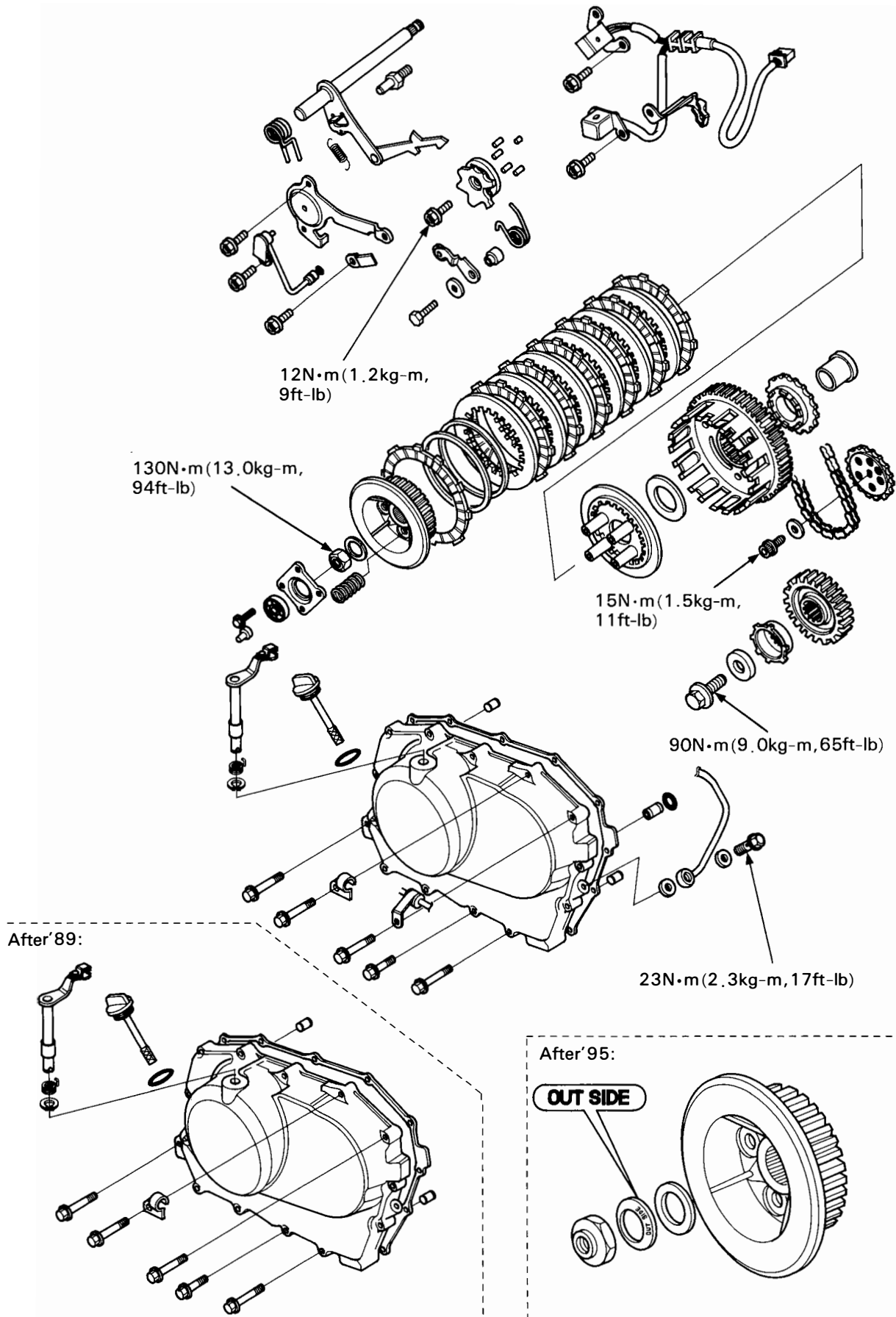
Tighten all the fasteners to the specified torque given on page 5-0, 1 and 2.

### NOTE

- Route the wires and cables properly (section 1).
- Fill the crankcase to the proper level with the recommended oil (page 2-4).
- Fill the cooling system (page 5-3).
- Perform the following inspection and adjustments:  
Throttle operation (page 3-6).  
Clutch (page 3-18).



# CLUTCH/GEARSHIFT LINKAGE



# 7. CLUTCH/GEARSHIFT LINKAGE

|                                      |            |                              |             |
|--------------------------------------|------------|------------------------------|-------------|
| <b>SERVICE INFORMATION</b>           | <b>7-1</b> | <b>PRIMARY DRIVE GEAR</b>    | <b>7-11</b> |
| <b>TROUBLESHOOTING</b>               | <b>7-2</b> | <b>CLUTCH INSTALLATION</b>   | <b>7-12</b> |
| <b>RIGHT CRANKCASE COVER REMOVAL</b> | <b>7-3</b> | <b>RIGHT CRANKCASE COVER</b> |             |
| <b>CLUTCH REMOVAL</b>                | <b>7-4</b> | <b>INSTALLATION</b>          | <b>7-14</b> |
| <b>GEARSHIFT LINKAGE</b>             | <b>7-8</b> |                              |             |

## SERVICE INFORMATION

### GENERAL

- This section covers the removal and installation of the clutch, oil pump drive chain, gearshift linkage and primary drive gear. All these operations can be done with the engine installed in the frame.
- If the shift fork, drum and transmission require servicing, remove the engine and separate the crankcase (section 11).
- Coat the new clutch discs with clean engine oil before reassembly.

### SPECIFICATIONS

Unit: mm (in)

| ITEM                                 |                        | STANDARD                      | SERVICE LIMIT                 |               |
|--------------------------------------|------------------------|-------------------------------|-------------------------------|---------------|
| Clutch                               | Spring free length 88; | 39.0 (1.54)                   | 37.4 (1.47)                   |               |
|                                      | After 88;              | 43.2 (1.70)                   | 41.6 (1.64)                   |               |
|                                      | Spring preload/length  | 25.25–27.25/26.2 kg/mm        | —                             |               |
|                                      | Disc thickness         | A                             | 2.62–2.78 (0.103–0.107)       | 2.30 (0.090)  |
|                                      |                        | B                             | 2.92–3.08 (0.115–0.121)       | 2.60 (0.102)  |
|                                      | Plate warpage          | —                             | 0.30 (0.012)                  |               |
|                                      | Outer guide            | I.D.                          | 21.991–22.016 (0.8658–0.8668) | 22.09 (0.870) |
|                                      |                        | O.D.                          | 31.959–31.025 (1.2582–1.2589) | 31.98 (1.259) |
| Outer I.D.                           |                        | 32.000–32.025 (1.2598–1.2608) | 32.10 (1.264)                 |               |
| Oil pump drive sprocket I.D.         |                        | 32.000–32.025 (1.2598–1.2608) | 32.10 (1.264)                 |               |
| Mainshaft O.D. at clutch outer guide |                        | 21.967–21.980 (0.8648–0.8654) | 21.92 (0.863)                 |               |

### TORQUE VALUES

|                               |   |
|-------------------------------|---|
| Drum stopper plate bolt       | 12 N·m (1.2 kg-m, 9 ft-lb) Apply locking agent  |
| Primary drive gear bolt       | 90 N·m (9.0 kg-m, 65 ft-lb)                     |
| Oil pump driven sprocket bolt | 15 N·m (1.5 kg-m, 11 ft-lb) Apply locking agent |
| Clutch lock nut               | 130 N·m (13.0 kg-m, 94 ft-lb)                   |
| Oil pass pipe bolt (8 mm)     | 23 N·m (2.3 kg-m, 17 ft-lb)                     |
| (7 mm)                        | 10 N·m (1.0 kg-m, 7.2 ft-lb)                    |

### TOOLS

#### Special

|                      |  |
|----------------------|--|
| Clutch center holder | 07923–KE10000 or 07HGB–001000A(U.S.A.only) |
| Gear holder          | 07724–0010100                              |

#### Common

|                             |   |
|-----------------------------|---|
| Luck nut wrench, 17 x 27 mm | 07716–0020300 Equivalent commercially available in U.S.A. |
|-----------------------------|---|

### TROUBLESHOOTING

Faulty clutch operation can usually be corrected by adjusting the clutch lever free play.

#### **Clutch slips when accelerating**

- No free play
- Discs worn
- Springs weak

#### **Clutch will not disengage**

- Too much free play
- Plates warped

#### **Motorcycle creeps with clutch disengaged**

- Too much free play
- Plates warped

#### **Excessive lever pressure**

- Clutch cable kinked, damaged or dirty
- Lifter mechanism damaged

#### **Clutch operation feels rough**

- Clutch outer slots rough
- Dirty clutch cable

## RIGHT CRANKCASE COVER REMOVAL

'88, '89:

Drain the engine oil (page 2-4).

Remove the clutch cable holder and disconnect the clutch cable from the clutch lifter arm.

Loosen the oil pipe holder and remove the oil pipe bolt and sealing washers from the right crankcase cover.

Remove the right crankcase cover bolts and cover.

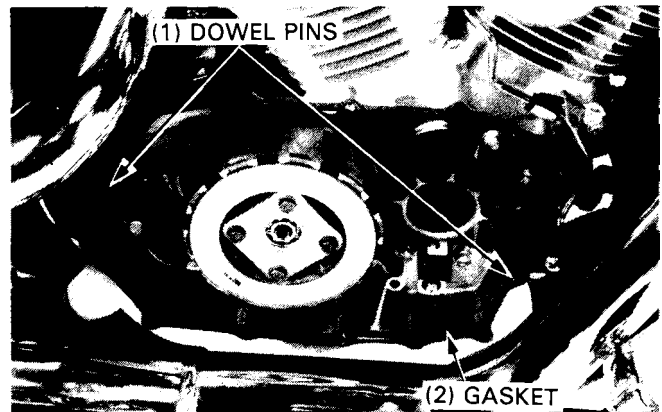
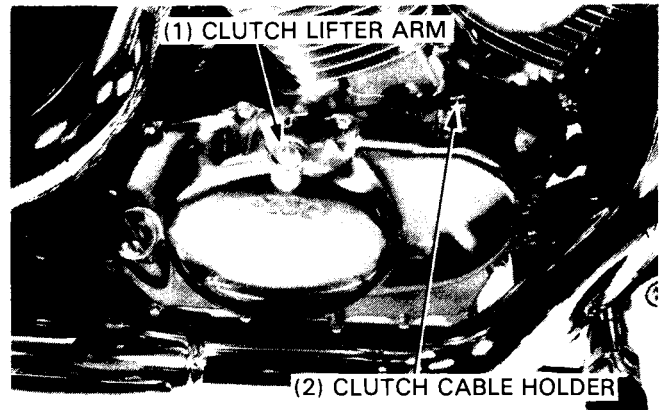
After '89:

Drain the engine oil (page 2-4).

Remove the clutch cable holder and disconnect the clutch cable from the clutch lifter arm.

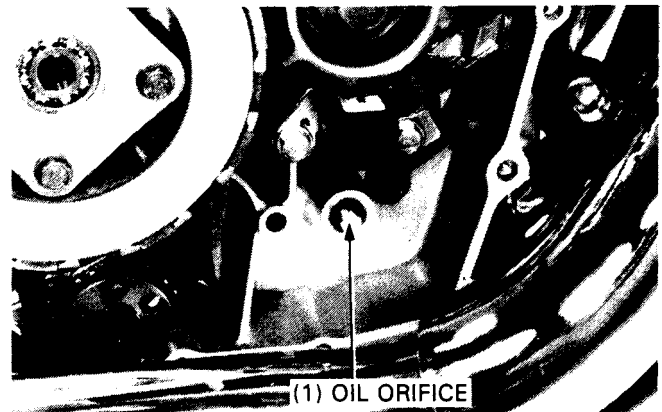
Remove the right crankcase cover bolts and cover.

Remove the dowel pins and gasket.



'88, '89:

Remove the oil orifice.



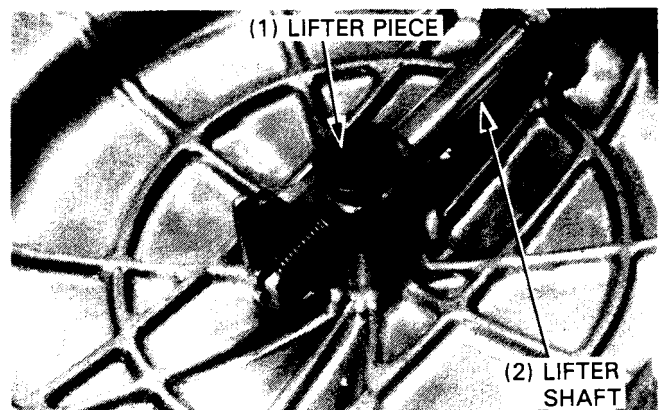
## CLUTCH LIFTER SHAFT

Remove the clutch lifter piece, and remove the snap ring and return spring from the right crankcase cover.

Remove the clutch lifter shaft.

Check the clutch lifter piece and shaft for damage or excessive scratching.

Check the return spring for fatigue or damage.

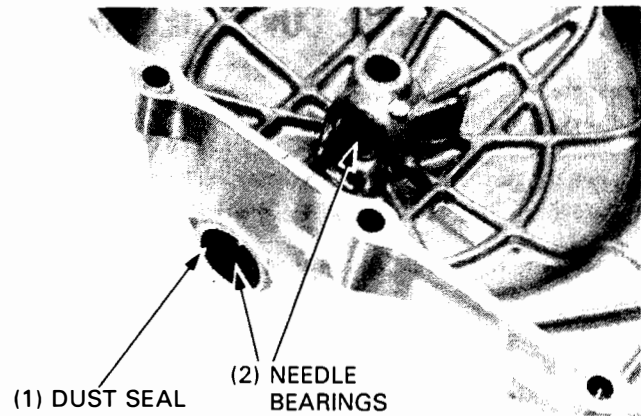


## CLUTCH/GEARSHIFT LINKAGE

Check the needle bearing for wear or damage or a loose fit in the cover.

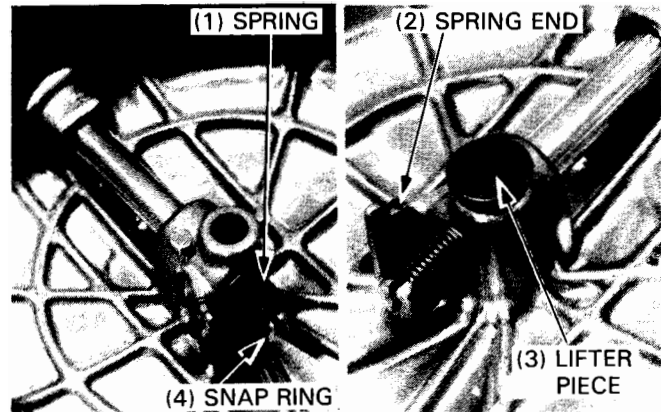
Check the dust seal for fatigue or damage.

Apply grease to the dust seal and needle bearing.



Install the clutch lifter shaft, snap ring and return spring. Hook the spring end in the cover tab securely, and turn the shaft.

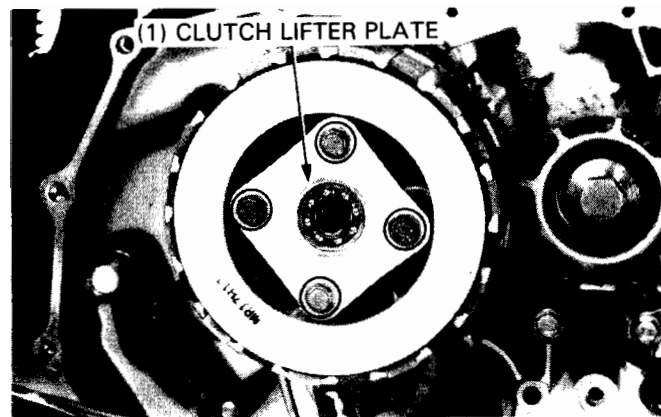
Install the clutch lifter piece, aligning the piece end with the groove in the clutch lifter shaft.



## CLUTCH REMOVAL

Remove the following:

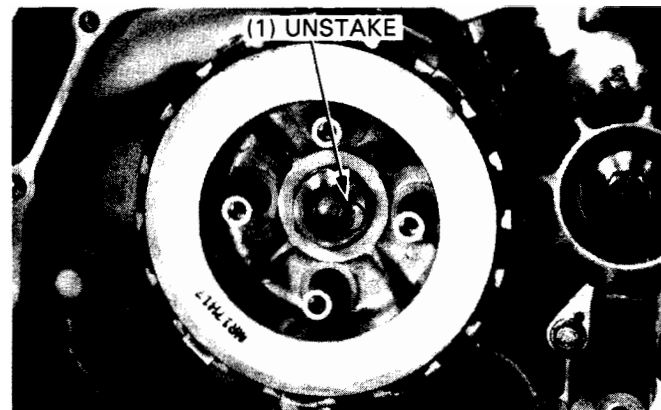
- clutch bolts
- clutch lifter plate
- springs



Unstake the clutch lock nut with a drill or grinder.

### NOTE

- Be careful not to damage the shaft threads.



Hold the clutch center with the special tool and loosen the clutch lock nut. Remove the tools and the lock nut.

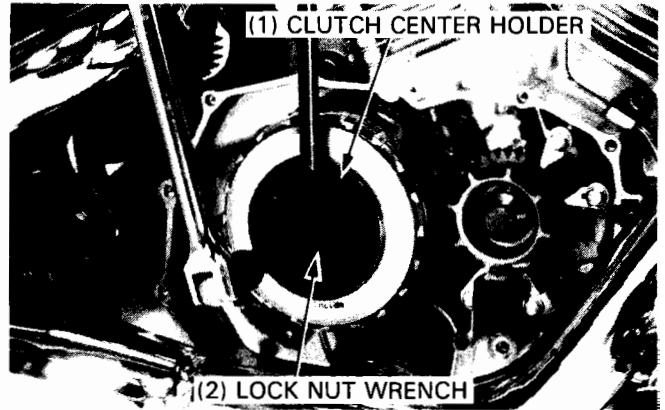
**TOOLS:**

**Clutch center holder**

**07923-KE10000 or  
07HGB-001000A  
(U.S.A. only)**

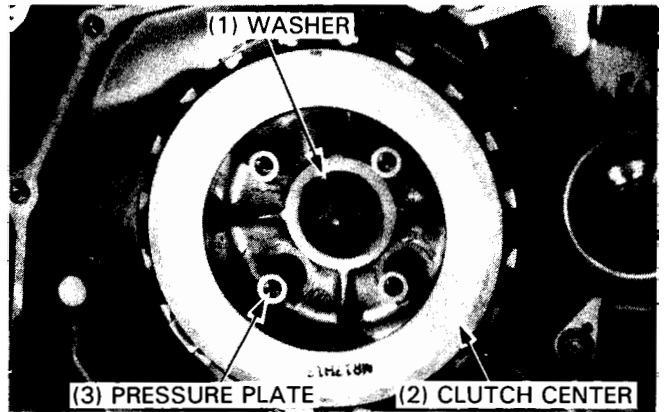
**Lock nut wrench, 17 x 27 mm**

**07716-0020300  
Equivalent commercially  
available in U.S.A.**

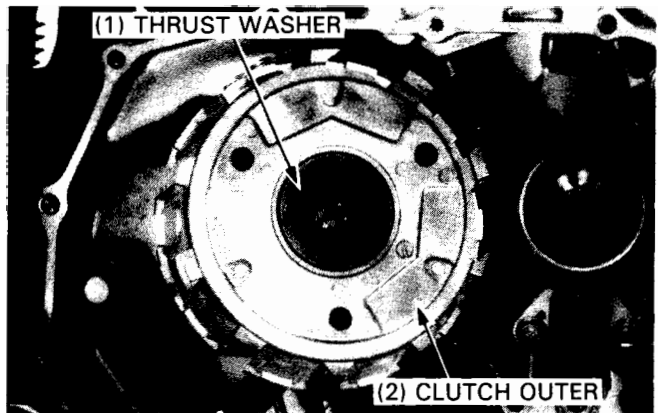


Remove the following:

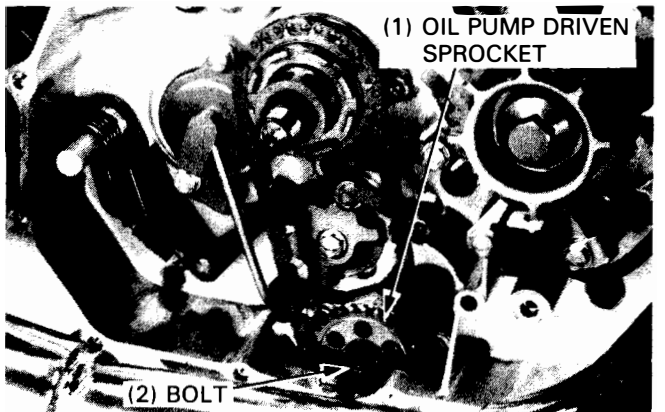
- spring washer (After '95 only)
- washer
- clutch center, judder spring and spring seat
- discs and plates
- pressure plate



Remove the thrust washer and clutch outer.

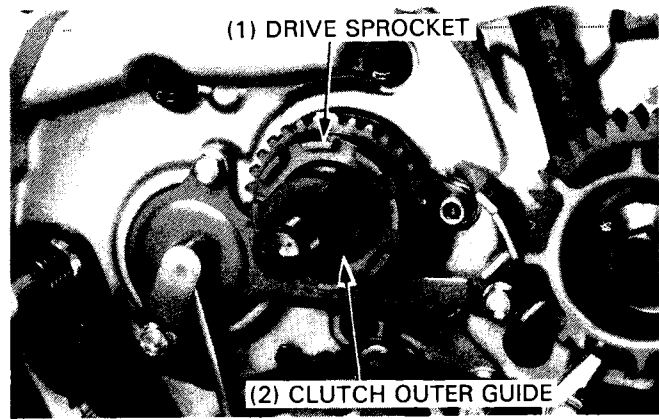


Remove the oil pump driven sprocket mounting bolt, driven sprocket and oil pump drive chain.



## CLUTCH/GEARSHIFT LINKAGE

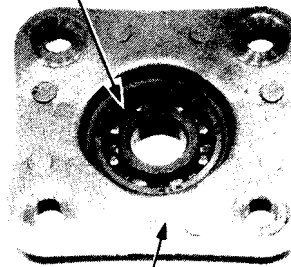
Remove the drive sprocket and clutch outer guide from the mainshaft.



### INSPECTION

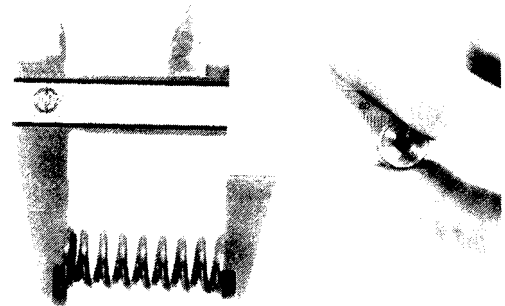
Check the lifter plate bearing for damage. Turn the bearing inner race with your finger. The bearing should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the clutch lifter plate. Replace the bearing if necessary.

(1) BEARING



Measure the spring free length.

**SERVICE LIMIT: 88; 88; 37.4 mm (1.47 in)**  
**After 89; 41,6 mm (1.65 in)**



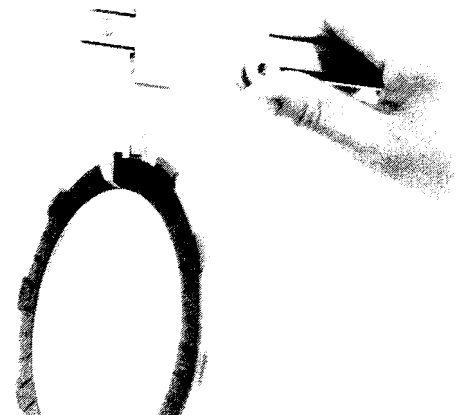
Replace the clutch discs if they show signs of scoring or discoloration.

Measure the thickness of discs A and B.

**SERVICE LIMIT: (A) 2.30 mm (0.090 in)**  
**(B) 2.60 mm (0.102 in)**

### NOTE

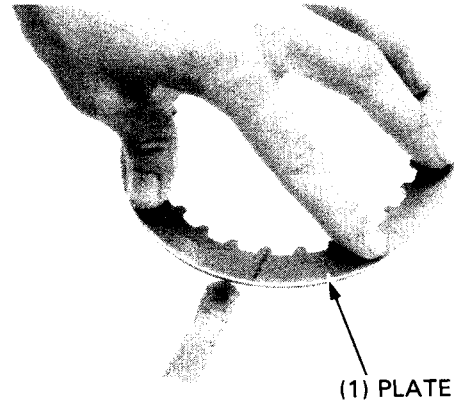
- Replace the discs and plates as a set if any one is beyond the service limit.



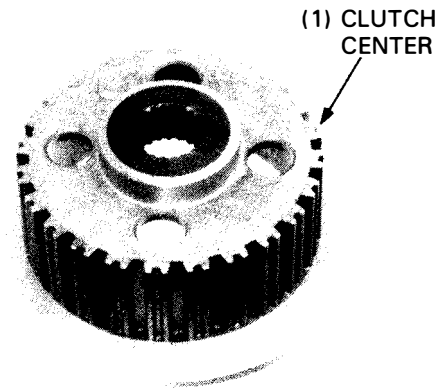


Check the plate warpage on a surface plate using a thickness gauge.

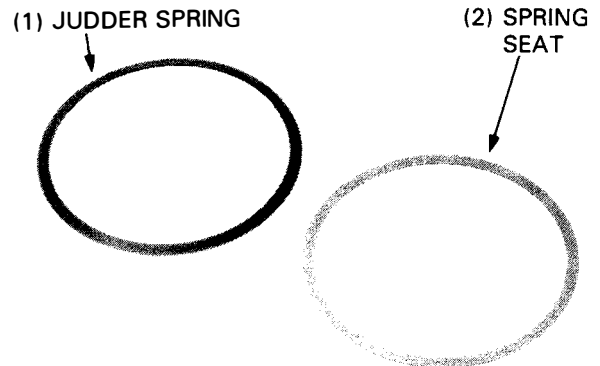
**SERVICE LIMIT: 0.30 mm (0.012 in)**



Check the clutch center for nicks or indentations made by the clutch plates.



Check the spring seat and judder spring for distortion, wear or damage.  
Replace them if necessary.

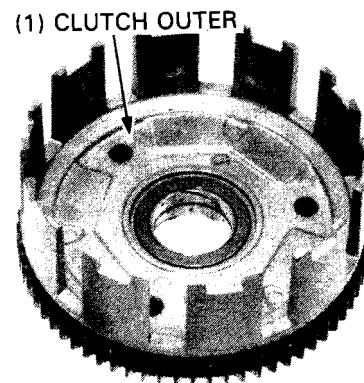


Check the slots in the clutch outer for nicks or indentations made by the clutch discs.

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

**SERVICE LIMITS:**

Clutch outer I.D. 32.10 mm (1.264 in)  
Clutch outer guide O.D. 31.98 mm (1.259 in)



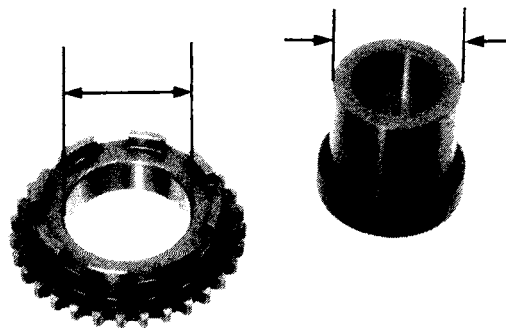
## CLUTCH/GEARSHIFT LINKAGE

Check the oil pump drive sprocket for damage.

Measure I.D of the drive sprocket and the O.D. of the outer guide.

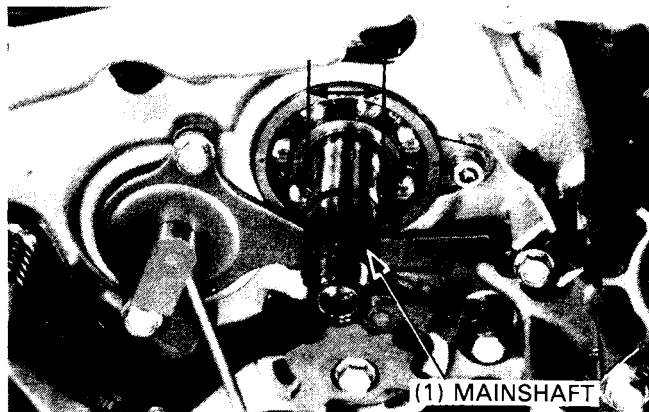
### SERVICE LIMITS:

Oil pump drive sprocket I.D. 32.10 mm (1.264 in)  
Clutch outer guide O.D. 31.98 mm (1.259 in)



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

SERVICE LIMIT: 21.92 mm (0.863 in)



## GEARSHIFT LINKAGE

### REMOVAL

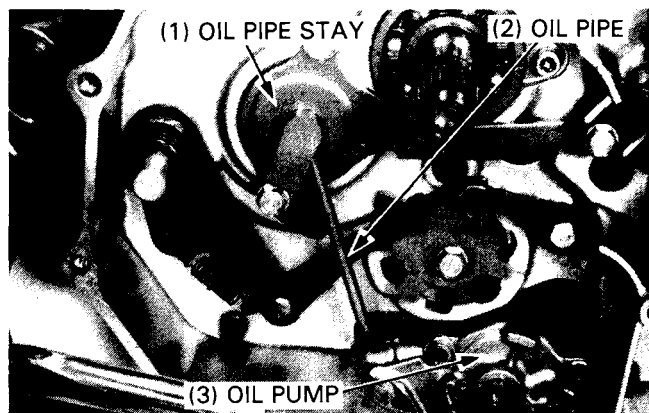
Remove the following:

- drive sprocket cover (page 13-14)
- gearshift pedal arm from the gearshift spindle
- right crankcase cover (page 7-3)
- clutch assembly (page 7-4)
- oil pump drive chain (page 7-5)



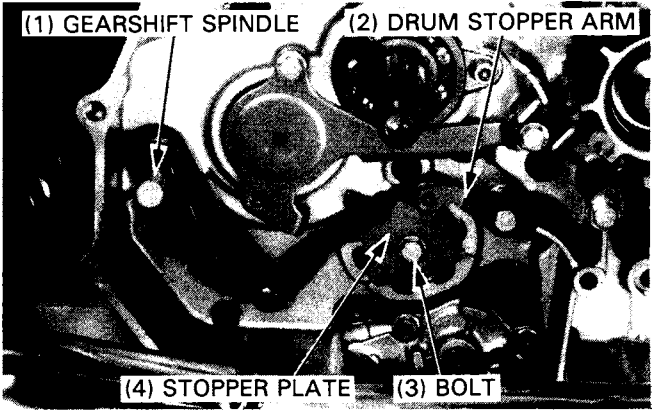
Loosen the two oil pipe stay mounting bolts and remove the oil pipe mounting bolt.

Pull the oil pipe out of the stay and oil pump.



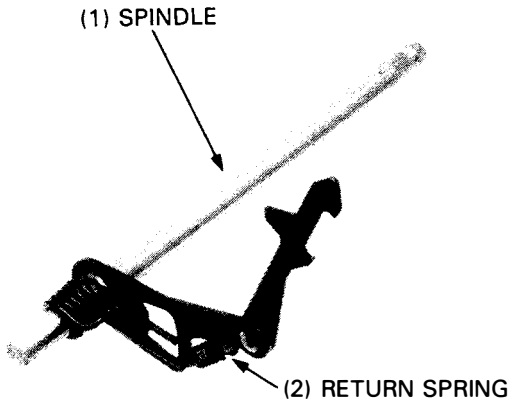
Remove the following:

- gearshift spindle
- drum stopper arm bolt, stopper arm, collar and spring
- drum stopper plate bolt and stopper plate/drum

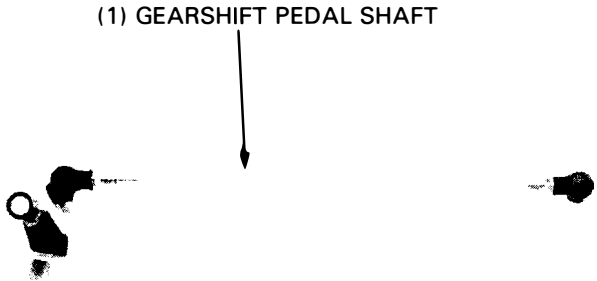


INSPECTION

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



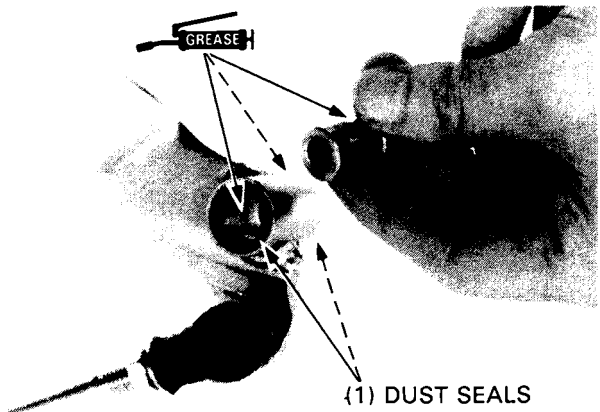
Inspect the gearshift pedal shaft for damage or loose lock nuts.  
Replace the shaft if necessary.



Inspect the dust seals and pivot collar for wear or damage.

Replace if necessary.

Apply grease to the dust seal lips and pivot collar and install them into the pedal shaft.



## CLUTCH/GEARSHIFT LINKAGE

### INSTALLATION

Install the collar, spring, stopper arm, washer and stopper arm bolt and tighten the bolt.

Install the dowel pins into the holes of the gearshift drum.

Lift up the drum stopper arm and install the drum stopper plate.

Apply locking agent to the threads of the stopper plate bolt and tighten the bolt.

**TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)**

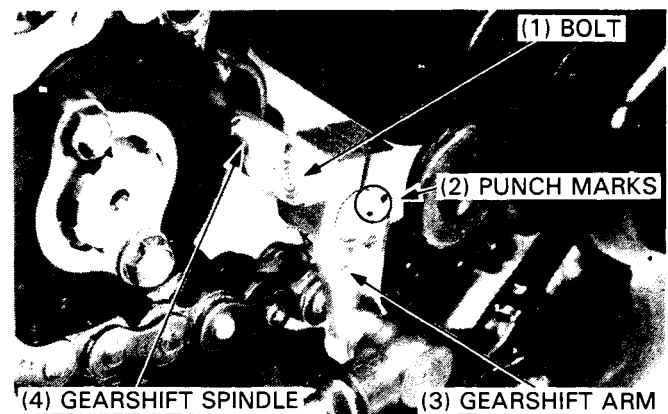
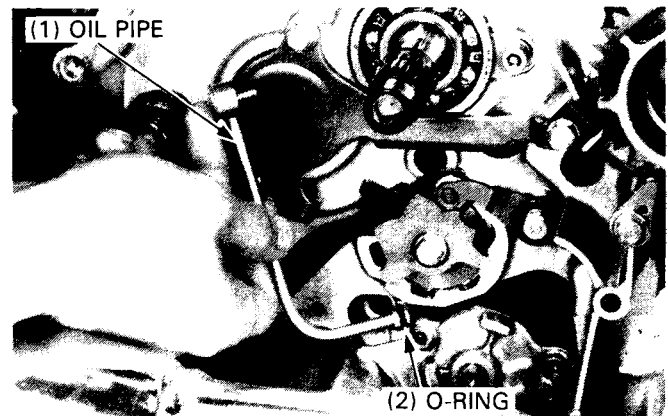
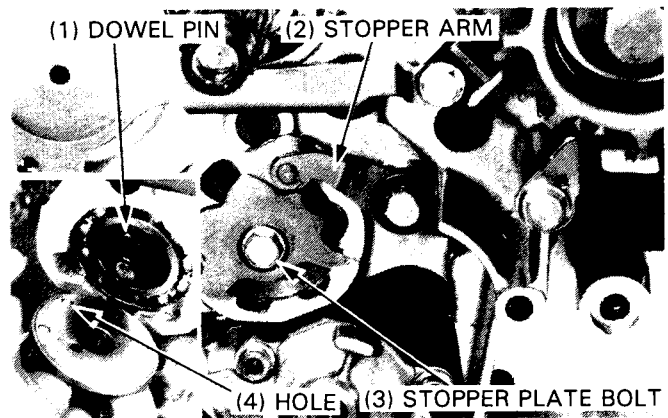
Install the gearshift spindle, aligning the return spring ends with the pin in the case.

Install the oil pipe with a new O-ring onto the oil pipe stay and oil pump.

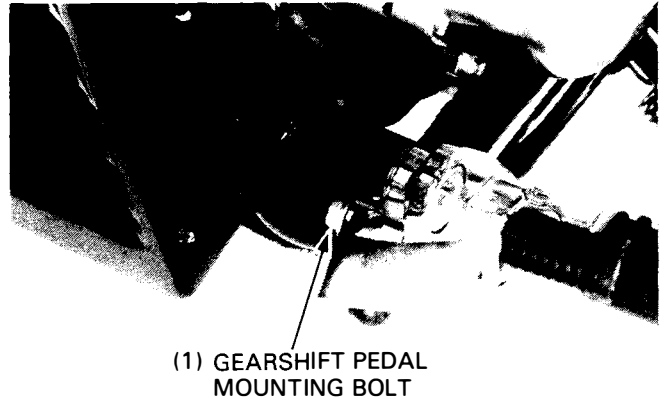
Tighten the bolts securely.

Install the removed parts in the reverse order of removal.

Install the gearshift arm to the gearshift spindle.  
Align the punch mark on the arm with the punch mark on the spindle.  
Tighten the gearshift arm mounting bolt.



Install the gearshift pedal mounting bolt and tighten the bolt securely.  
 Install the drive sprocket cover (page 13-17).



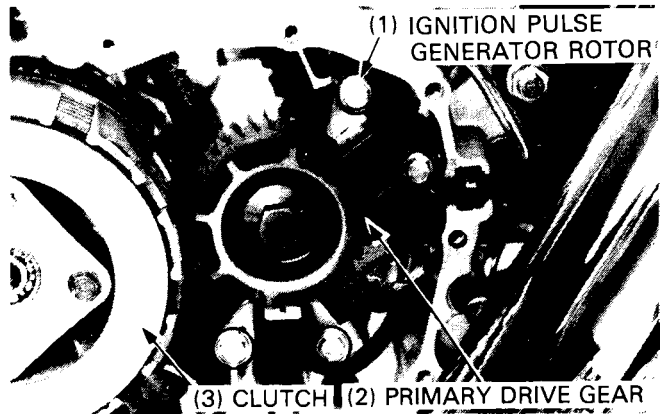
(1) GEARSHIFT PEDAL MOUNTING BOLT

## PRIMARY DRIVE GEAR

### REMOVAL

Remove the following:  
 — right crankcase cover (page 7-3)  
 — clutch assembly (page 7-4)

Remove the ignition pulse generator mounting bolts and ignition pulse generators.



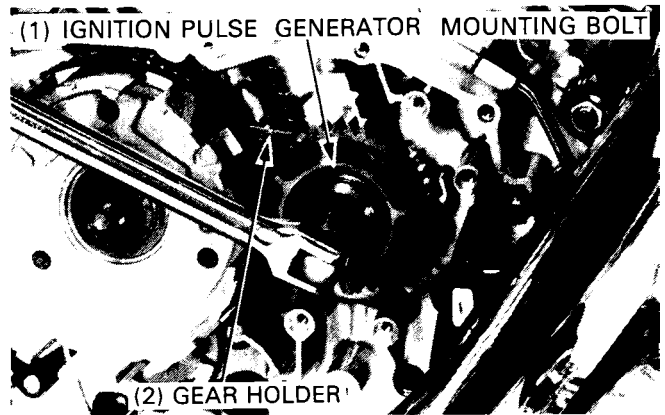
(1) IGNITION PULSE GENERATOR ROTOR

(3) CLUTCH (2) PRIMARY DRIVE GEAR

Temporarily install the clutch outer, (page 7-13) then install the gear holder as shown.

**TOOL:**  
 Gear holder 07724-0010100

Remove the following:  
 — ignition pulse generator rotor bolt and rotor  
 — clutch outer and gear holder  
 — primary drive gear



(1) IGNITION PULSE GENERATOR MOUNTING BOLT

(2) GEAR HOLDER

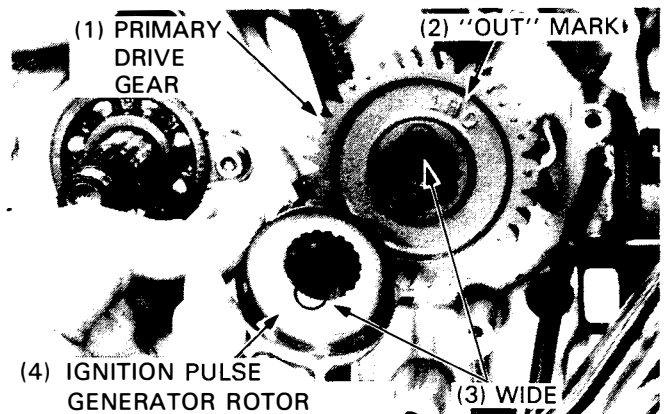
### INSTALLATION

Install the primary drive gear with the "OUT" mark facing out.

#### NOTE

- The primary drive gear and ignition pulse generator rotor will only go on in one position because of the extra wide aligning spline.

Install the ignition pulse generator rotor.



(1) PRIMARY DRIVE GEAR

(2) "OUT" MARK

(4) IGNITION PULSE GENERATOR ROTOR

(3) WIDE

## CLUTCH/GEARSHIFT LINKAGE

Temporarily install the clutch outer and install the gear holder as shown.

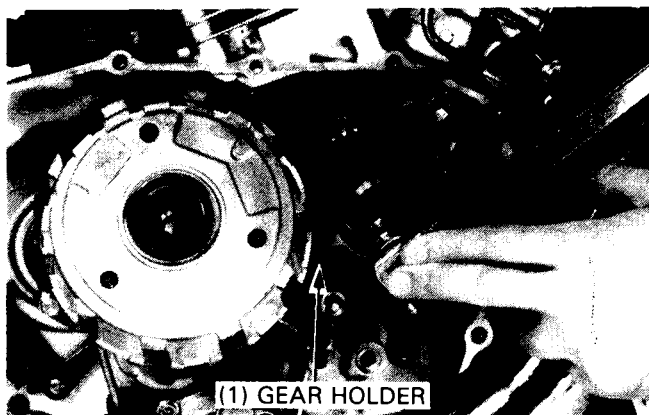
### TOOL:

Gear holder 07724-0010100

Install the washer and bolt and tighten the bolt.

**TORQUE: 90 N·m (9.0 kg-m, 65 ft-lb)**

Remove the gear holder and clutch outer.

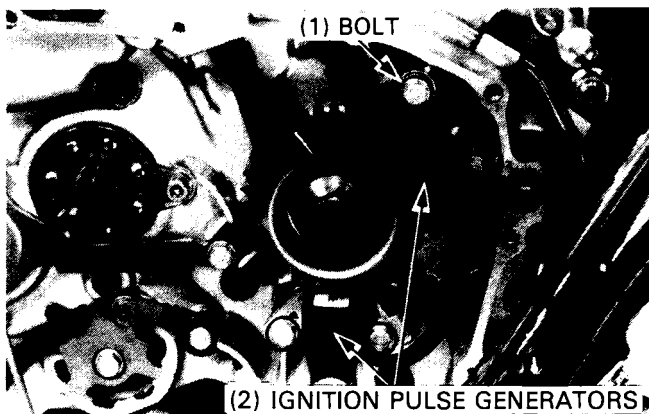


Install the following:

- ignition pulse generators
- clutch (page 7-12)

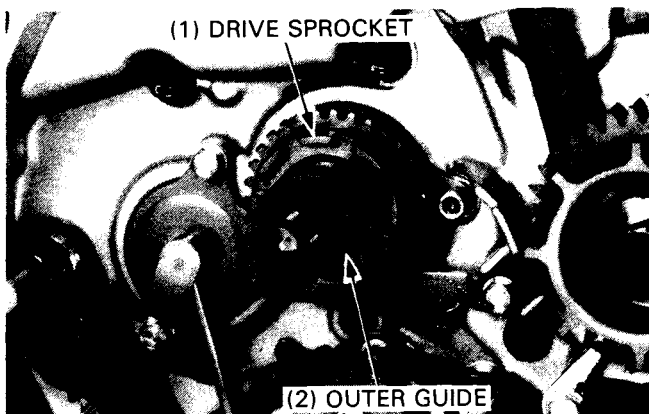
### NOTE

- If removed the ignition pulse generator wire grommets were removed from the case groove, reinstall them securely.



## CLUTCH INSTALLATION

Apply MoS<sub>2</sub> paste grease to the outside of the clutch outer guide and install the oil pump drive sprocket over the outer guide.



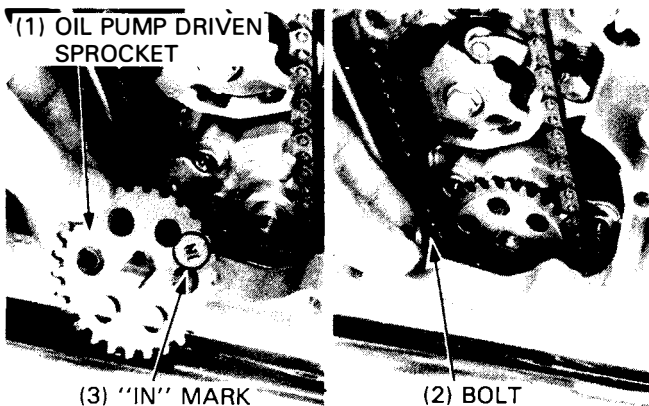
Install the oil pump drive chain on the drive sprocket.

Install the oil pump driven sprocket with the "IN" mark facing inside.

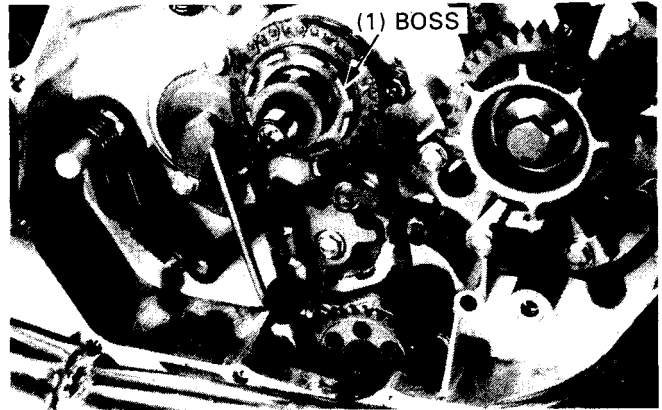
Guide the drive chain over the sprocket.

Apply locking agent to the threads of the driven sprocket mounting bolt and tighten it with the washer to the specified torque.

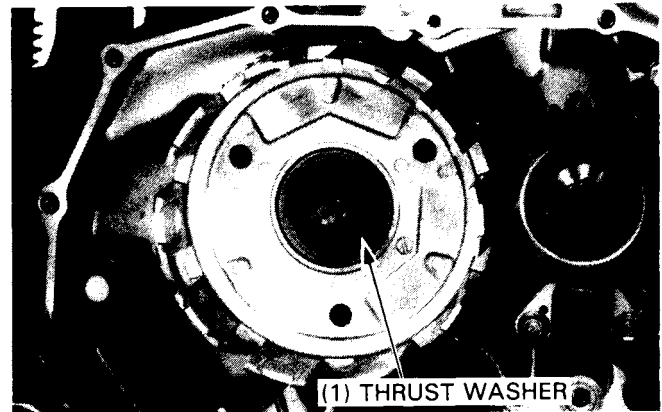
**TORQUE: 15 N·m (1.5 kg-m, 11 ft-lb)**



Align the grooves in the clutch outer with the bosses on the oil pump drive sprocket while turning the sprocket with the chain and pushing the clutch outer onto the shaft.



Install the thrust washer onto the mainshaft.



Install the spring seat, judder spring and clutch disc B on the clutch center.

**NOTE**

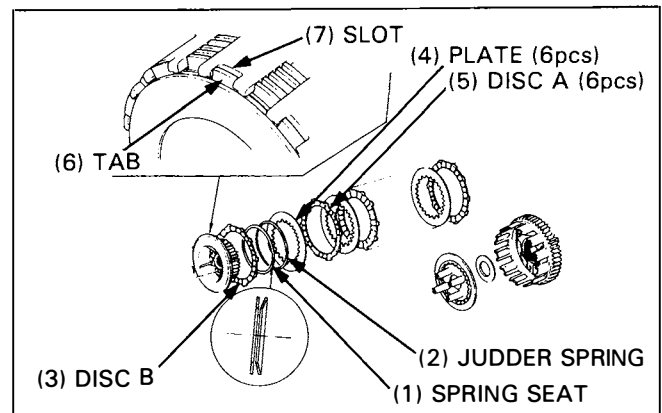
- Note the positions of the seat, spring and disc B.

Install clutch discs, clutch plates, clutch disc A, the plates, discs, and pressure plate on the clutch center and install them in the clutch outer as an assembly.

Align the tabs in the disc B with the slots on the clutch outer.

**NOTE**

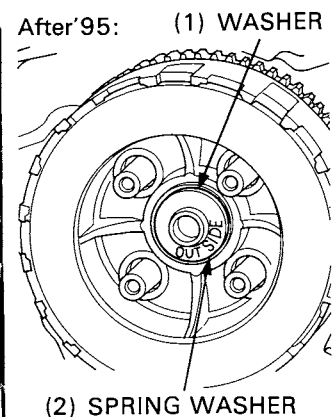
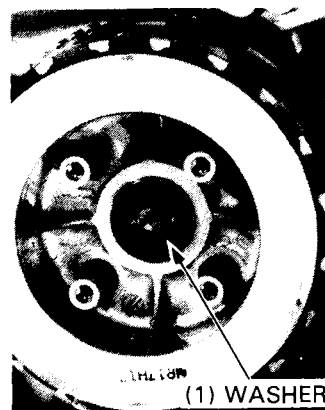
- Stack the discs and plates alternately as shown.
- Coat the new clutch discs with clean engine oil.



Install the washer on the mainshaft.

After '95:

Install the spring washer on the mainshaft with the "OUT SIDE" mark facing outside.



## CLUTCH/GEARSHIFT LINKAGE

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

**TORQUE:** 130 N·m (13.0 kg·m, 94 ft·lb)

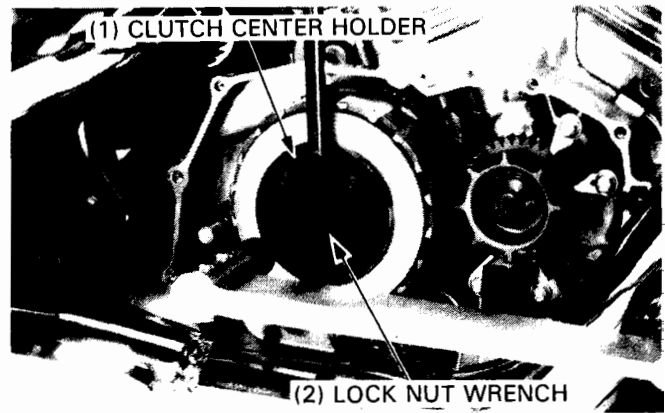
### TOOLS:

Clutch center holder

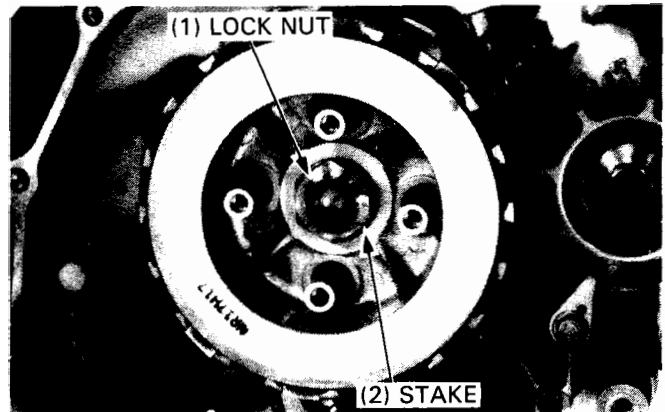
07923-KE10000 or  
07HGB-001000A  
(U.S.A. only)

Lock nut wrench, 17 x 27 mm

07716-0020300  
Equivalent commercially  
available in U.S.A.



Stake the lock nut with the center punch.

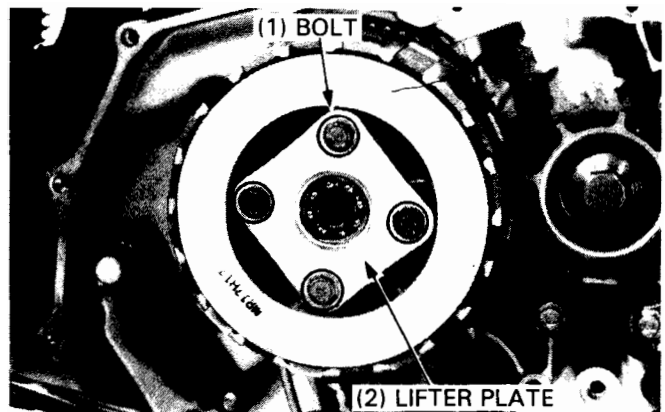


Install the clutch springs, lifter plate and bolts.  
Tighten the bolts in a crisscross pattern in 2 or 3 steps.

### NOTE

- Make sure the pressure plate firmly pushes the discs and plates.

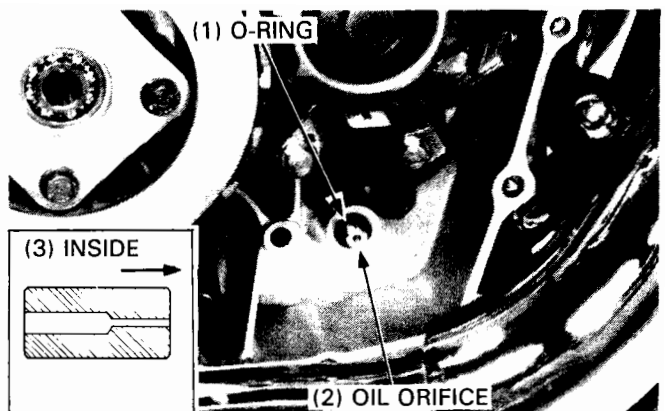
Install the bearing into the lifter plate.



## RIGHT CRANKCASE COVER INSTALLATION

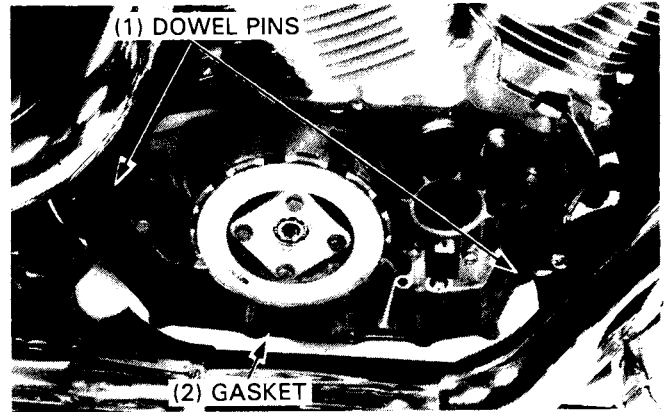
'88, '89:

Install a new O-ring on the oil orifice.  
Install the oil orifice with its smaller hole facing in.





Install the dowel pins and new gasket.



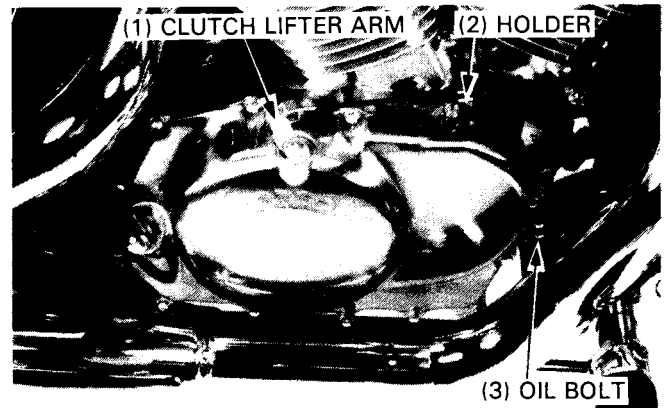
**'88, '89:**

Tighten the right crankcase cover mounting bolts in a crisscross pattern in 2 or 3 steps and install the clutch cable holder and oil pipe holder at the same time. Connect the clutch cable to the clutch lifter arm.

Tighten the oil pipe bolt with the sealing washers.

**TORQUE: 23 N·m (2.3 kg-m, 17 ft-lb)**

Fill the crankcase with engine oil (page 2-4)  
Adjust the clutch lever free play (page 3-18)

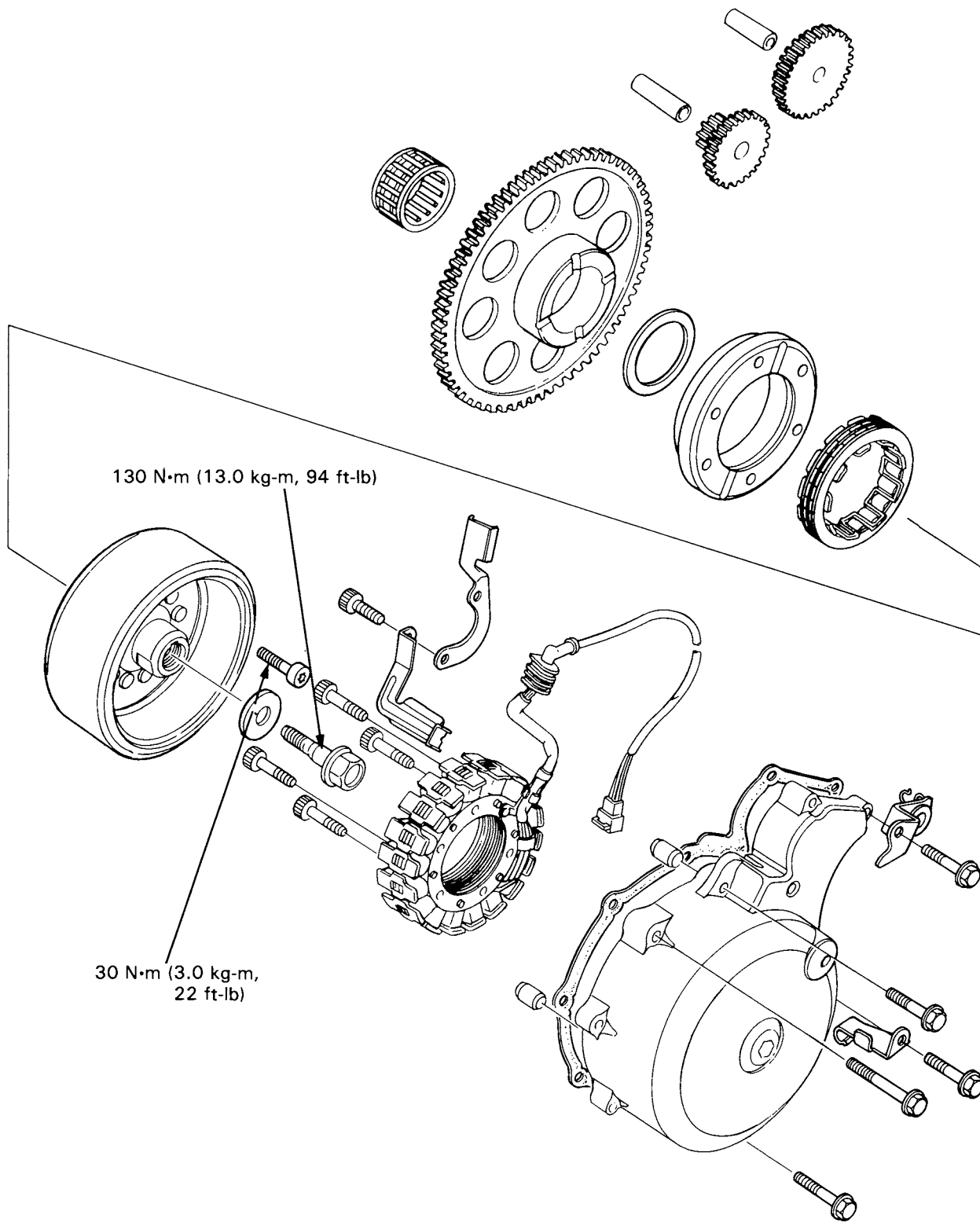


**After '89:**

Tighten the right crankcase cover mounting bolts in a crisscross pattern in 2 or 3 steps and install the clutch cable holder and oil pipe holder at the same time. Connect the clutch cable to the clutch lifter arm.

Fill the crankcase with engine oil (page 2-4)  
Adjust the clutch lever free play (page 3-18)

# ALTERNATOR/STARTER CLUTCH



# 8. ALTERNATOR/STARTER CLUTCH

|                                     |            |  |            |
|-------------------------------------|------------|--|------------|
| <b>SERVICE INFORMATION</b>          | <b>8-1</b> | <b>FLYWHEEL INSTALLATION</b>             | <b>8-5</b> |
| <b>LEFT CRANKCASE COVER REMOVAL</b> | <b>8-2</b> | <b>LEFT CRANKCASE COVER INSTALLATION</b> | <b>8-6</b> |
| <b>FLYWHEEL REMOVAL</b>             | <b>8-3</b> |  |            |
| <b>STARTER CLUTCH</b>               | <b>8-4</b> |  |            |

## SERVICE INFORMATION

### GENERAL

- This section covers the removal and installation of the alternator, starter clutch and starter gears. These operation can be done with the engine installed in the frame.
- Refer to section 15 for troubleshooting and inspection of the alternator.

### SPECIFICATIONS

| ITEM                     | STANDARD                      | SERVICE LIMIT | mm (in) |
|--------------------------|-------------------------------|---------------|---------|
| Starter driven gear O.D. | 57.749–57.768 (2.2736–2.2743) | 57.60 (2.268) |         |

### TORQUE VALUES

|                           |   |
|---------------------------|---|
| Flywheel bolt             | 130 N•m (13.0 kg-m, 94 ft-lb) Left-hand thread  |
| Starter clutch torx bolts | 30 N•m (3.0 kg-m, 22 ft-lb) Apply locking agent |

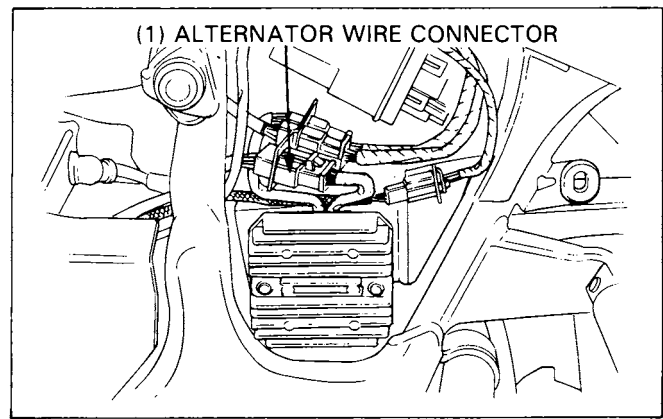
### TOOLS

#### Common

|                 |   |
|-----------------|---|
| Rotor puller    | 07733–0020001 or 07933–3290001 (U.S.A. only)              |
| Flywheel holder | 07725–0040000 Equivalent commercially available in U.S.A. |
| Torx bit        | 07703–0010100 Equivalent commercially available in U.S.A. |

## LEFT CRANKCASE COVER REMOVAL

Remove the left side cover and disconnect the alternator wire 3P connector (WHITE).



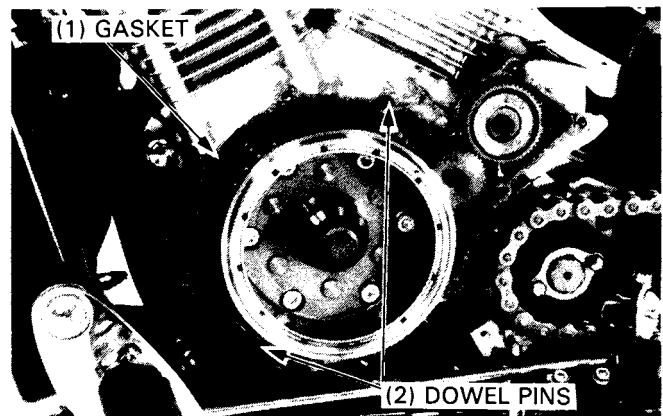
Remove the drive sprocket cover (page 13-14).

Place a container under the left crankcase cover to catch the engine oil.

Remove the eleven left crankcase cover bolts and the cover.



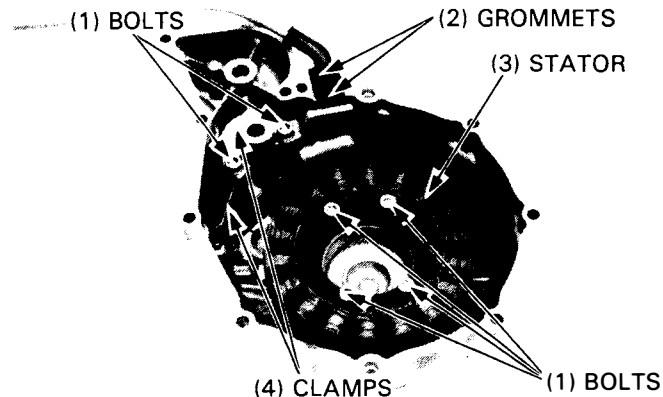
Remove the dowel pins and gasket.



## STATOR REPLACEMENT

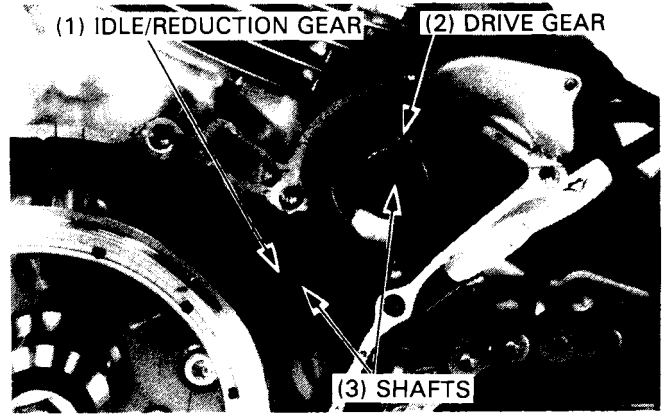
Remove the wire clamp bolts and the clamps.  
Remove the stator mounting bolts and stator.

Position the new stator and the grommets in the cover.  
Apply a locking agent to the threads of the stator mounting bolts and wire clamp bolts.  
Tighten the stator mounting bolts and the clamp bolts.



## FLYWHEEL REMOVAL

Remove the starter drive and idle/reduction gears by removing the shafts.

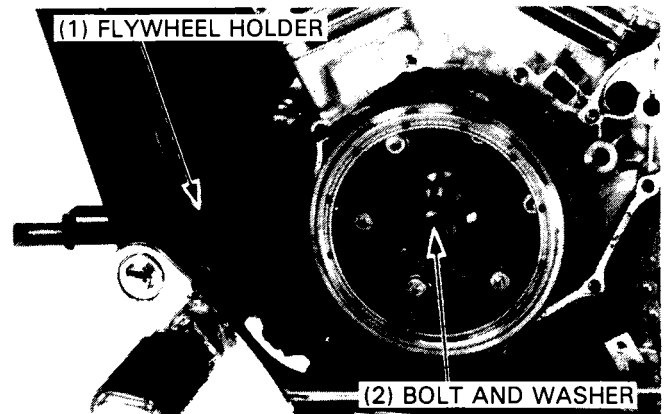


Hold the flywheel with the flywheel holder and remove the flywheel bolt and washer.

**TOOL:**  
Flywheel holder 07725-0040000  
Equivalent commercially available in U.S.A.

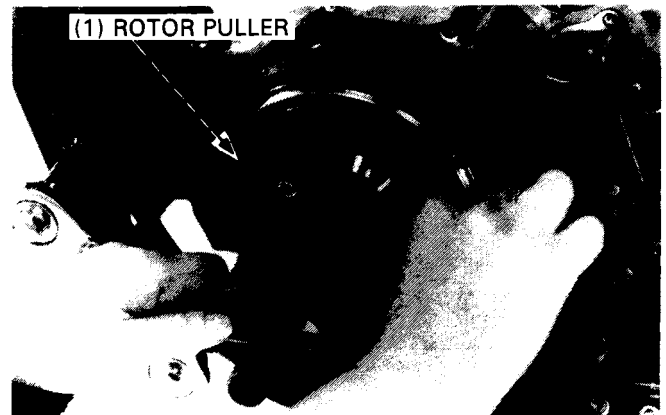
**NOTE**

- The flywheel bolt has left-hand threads.



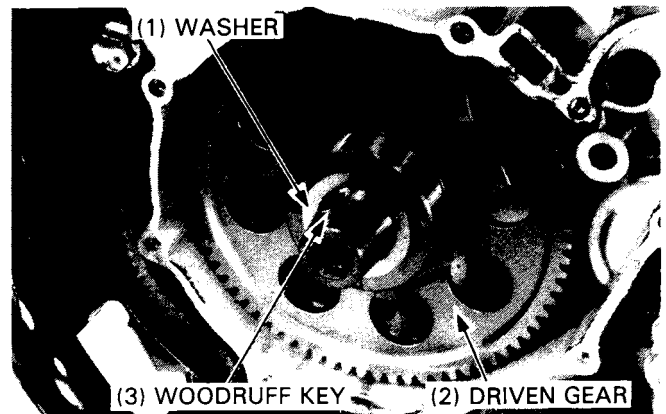
Remove the flywheel with the rotor puller.

**TOOL:**  
Rotor puller 07733-0020001 or 07933-3290001 (U.S.A. only)



Remove the starter driven gear, washer and needle bearing from the crankshaft.

Remove the woodruff key.



## ALTERNATOR/STARTER CLUTCH

### STARTER CLUTCH

#### DISASSEMBLY

Reinstall the starter driven gear into the flywheel.

Inspect the starter clutch by turning the starter driven gear. The gear should turn counterclockwise freely and should not turn clockwise: if it turns incorrectly, replace the starter clutch.

Hold the flywheel with the flywheel holder and remove the torx bolts using a torx bit.

Remove the starter clutch outer and oneway clutch.

#### TOOLS:

Flywheel holder

07725-0040000

Equivalent commercially available in U.S.A.

Torx bit

07703-0010100

Equivalent commercially available in U.S.A.

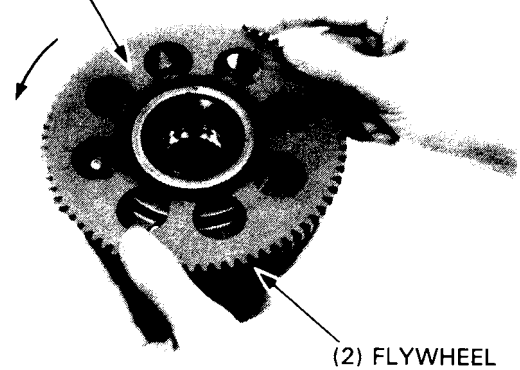
#### INSPECTION

Measure the O.D. of the starter driven gear.

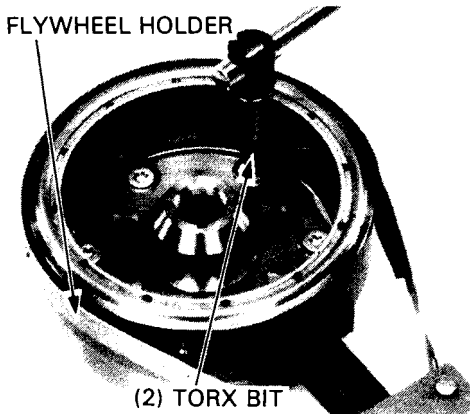
**SERVICE LIMIT: 57.60 mm (2.268 in)**

Inspect the oneway clutch for wear or damage and replace if necessary.

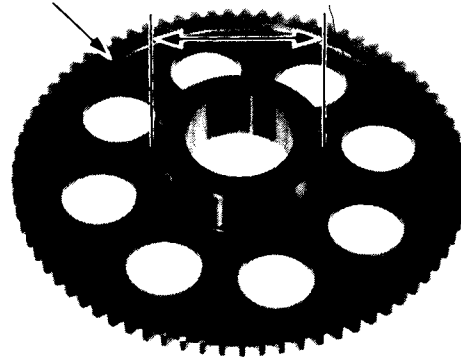
(1) STARTER DRIVEN GEAR



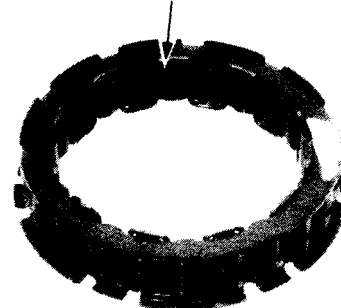
(1) FLYWHEEL HOLDER



(1) STARTER DRIVEN GEAR

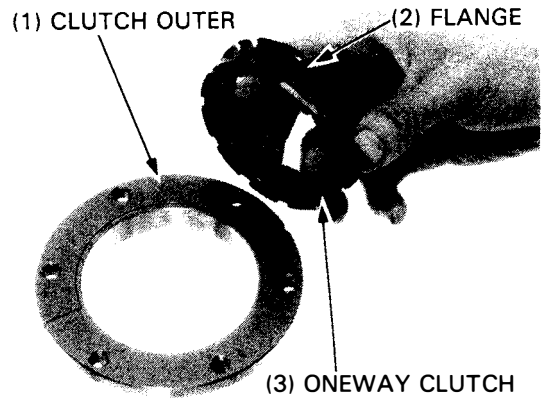


(1) ONEWAY CLUTCH



**ASSEMBLY**

Install the oneway clutch into the clutch outer with the flange side facing inside.



Hold the flywheel with the flywheel holder. Apply locking agent to the trox bolt threads and tighten the bolts.

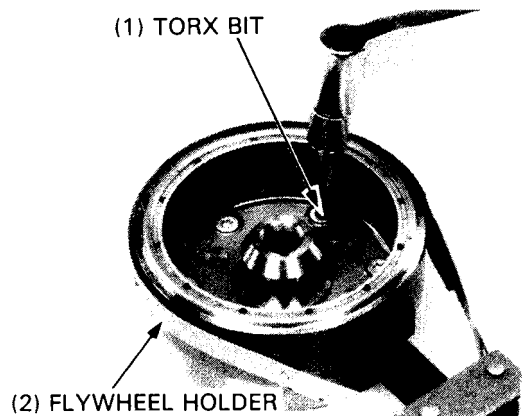
**TORQUE: 30 N·m (3.0 kg-m, 22 ft-lb)**

**TOOLS:**

Flywheel holder

**07725-0040000**  
Equivalent commercially  
available in U.S.A.  
**07703-0010100**  
Equivalent commercially  
available in U.S.A.

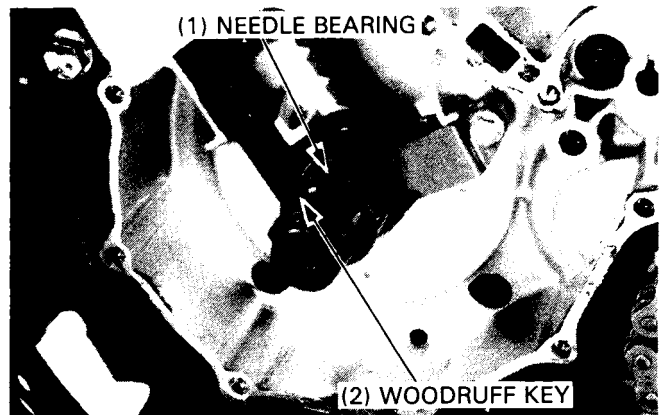
Torx bit



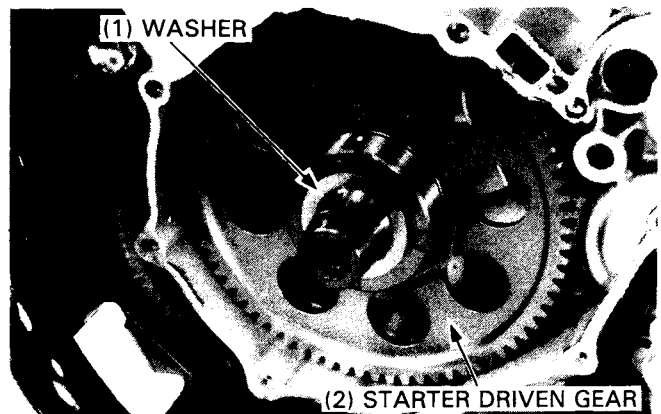
**FLYWHEEL INSTALLATION**

Clean the crankshaft and install the woodruff key.

Install the needle bearing onto the crankshaft.



Install the starter driven gear and washer onto the crankshaft.



## ALTERNATOR/STARTER CLUTCH

Install the flywheel, aligning the woodruff key on the crankshaft with the flywheel keyway.

Hold the flywheel with the flywheel holder, install the washer and flywheel bolt and tighten the bolt.

**TORQUE: 130 N·m (13.0 kg-m, 94 ft-lb)**

### TOOL:

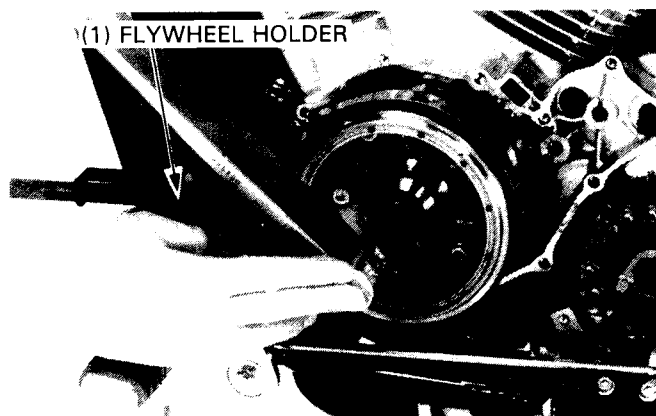
Flywheel holder

**07725-0040000**

**Equivalent commercially available in U.S.A.**

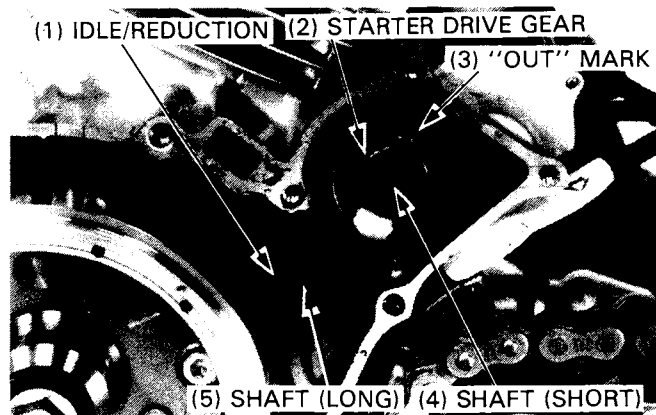
### NOTE

- The flywheel bolt has left hand threads.

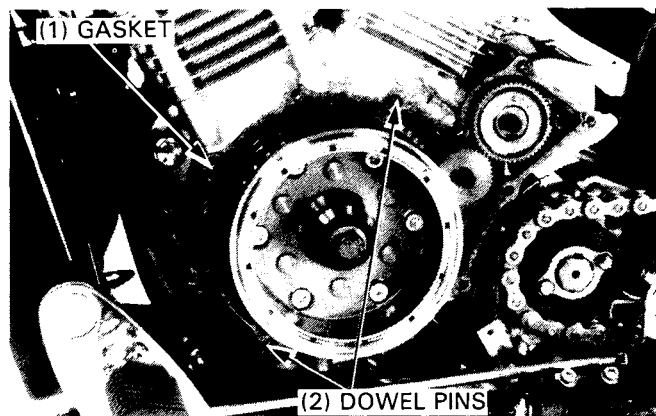


Install the starter idle/reduction gear with the longer shaft.

Install the starter drive gear with the "OUT" mark facing out and the shorter shaft.



Install the dowel pins and new gasket.



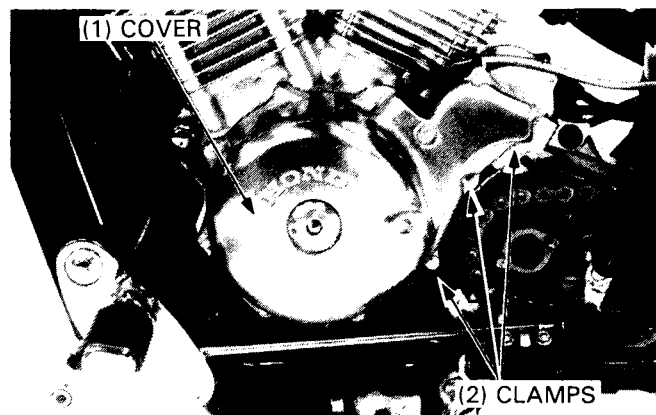
## LEFT CRANKCASE COVER INSTALLATION

Install the left crankcase cover and tighten the cover bolts with the neutral and oil pressure switch wire harness clamps as shown.

Route the alternator wire and connect the alternator 3P connector.

Install the drive sprocket cover and the left side cover.

Check the oil level and add oil if necessary.



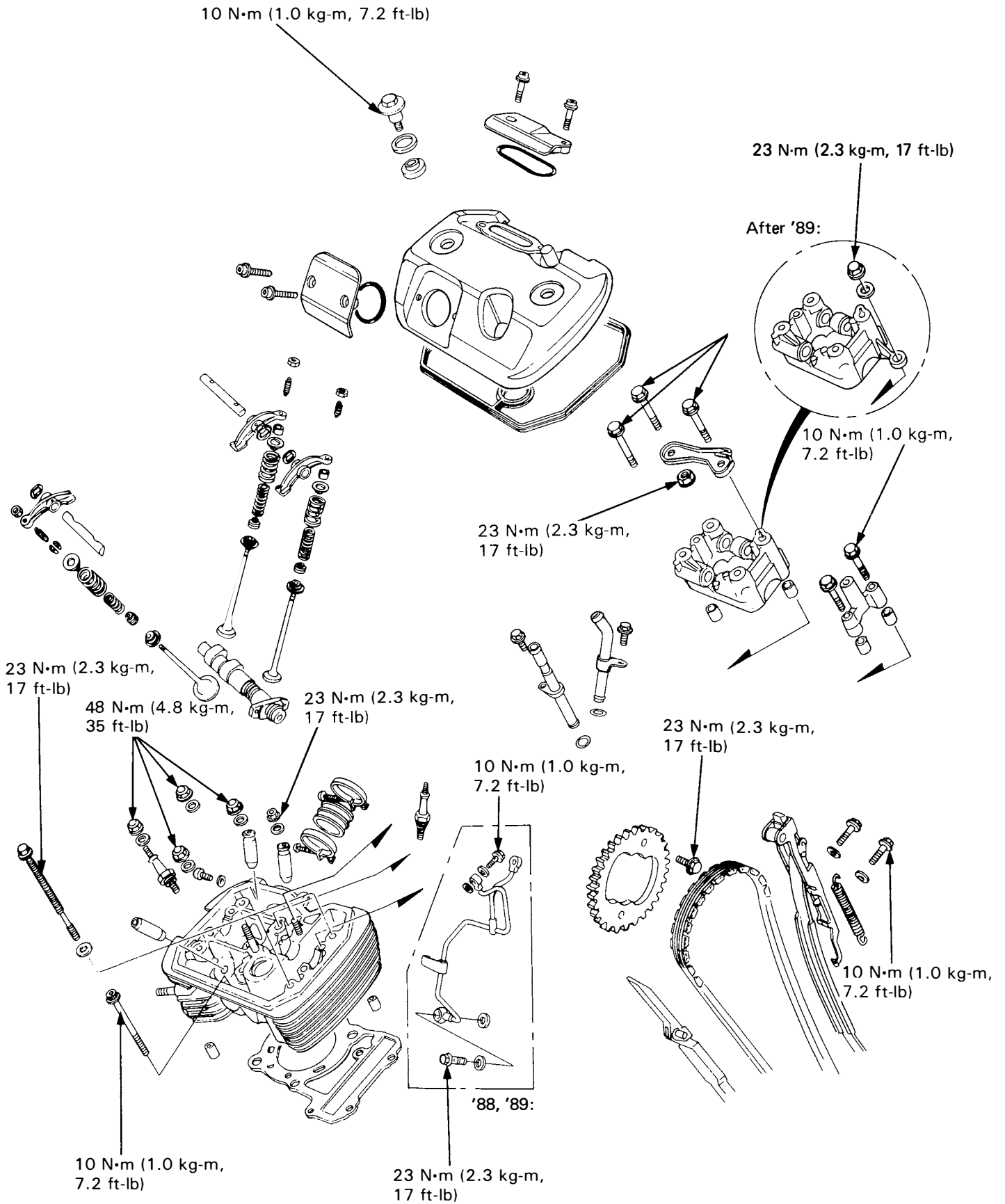


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**MEMO**

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# CYLINDER HEAD/VALVE



# 9. CYLINDER HEAD/VALVE

|                                    |             |                                       |             |
|------------------------------------|-------------|---------------------------------------|-------------|
| <b>SERVICE INFORMATION</b>         | <b>9-1</b>  | <b>VALVE SEAT INSPECTION/REFACING</b> | <b>9-12</b> |
| <b>TROUBLESHOOTING</b>             | <b>9-2</b>  | <b>CYLINDER HEAD ASSEMBLY</b>         | <b>9-15</b> |
| <b>CYLINDER HEAD COVER REMOVAL</b> | <b>9-3</b>  | <b>CYLINDER HEAD INSTALLATION</b>     | <b>9-16</b> |
| <b>CAMSHAFT REMOVAL</b>            | <b>9-4</b>  | <b>CAMSHAFT INSTALLATION</b>          | <b>9-18</b> |
| <b>CYLINDER HEAD</b>               | <b>9-8</b>  | <b>CYLINDER HEAD COVER</b>            |             |
| <b>VALVE GUIDE REPLACEMENT</b>     | <b>9-11</b> | <b>INSTALLATION</b>                   | <b>9-21</b> |

## SERVICE INFORMATION

### GENERAL

- The front cylinder head can be removed without removing the engine.
- To service the rear cylinder head, the engine must be removed from the frame. (See section 6 for engine removal and installation.) However, the rear cylinder head cover can be removed to service the camshaft, rocker arms, cam chain and cam chain tensioner.
- Camshaft lubricating oil is fed through an oil pass pipe. Be sure the holes in the oil pass bolts are not clogged.
- During assembly apply molybdenum disulfide oil (a 50/50 mixture of engine oil and molybdenum disulfide grease) to the camshaft holders, camshaft journals of the cylinder head, rocker arm shafts, rocker arm slipper faces and valve stems to provide initial lubrication.

9

### SPECIFICATIONS

Unit: mm (in)

| ITEM                    |                               |       |                       | STANDARD  | SERVICE LIMIT   |
|-------------------------|-------------------------------|-------|-----------------------|---|-----------------|
| Compression pressure    |                               |       |                       | 1,324 kPa<br>(13.5 ± 1.0 kg/cm <sup>2</sup> , 192 ± 14 psi) | —               |
| Camshaft                | Cam lobe height               | IN    |                       | 37.930 (1.4933)   | 37.730 (1.4854) |
|                         |                               | EX    |                       | 37.950 (1.4941)   | 37.750 (1.4862) |
|                         | Journal O.D.                  |       |                       | 21.959–21.980 (0.8645–0.8654)                               | 21.90 (0.862)   |
|                         | Runout                        |       |                       | 0.030 (0.0012)  | 0.05 (0.002)    |
|                         | Oil clearance                 |       |                       | 0.050–0.111 (0.0020–0.0044)                                 | 0.130 (0.0051)  |
| Rocker arm              | Rocker arm I.D.               | IN/EX |                       | 12.000–12.018 (0.4724–0.4731)                               | 12.05 (0.474)   |
|                         | Rocker arm shaft O.D.         | IN/EX |                       | 11.966–11.984 (0.4711–0.4718)                               | 11.83 (0.466)   |
| Valves and valve guides | Valve stem O.D.               | IN    |                       | 5.475–5.490 (0.2156–0.2161)                                 | 5.45 (0.215)    |
|                         |                               | EX    |                       | 6.555–6.570 (0.2580–0.2587)                                 | 6.55 (0.258)    |
|                         | Valve guide I.D.              | IN    |                       | 5.500–5.512 (0.2165–0.2170)                                 | 5.56 (0.219)    |
|                         |                               | EX    |                       | 6.600–6.615 (0.2598–0.2604)                                 | 6.65 (0.262)    |
|                         | Stem-to-guide clearance       | IN    |                       | 0.010–0.037 (0.0004–0.0015)                                 | 0.10 (0.004)    |
|                         |                               | EX    |                       | 0.030–0.060 (0.0014–0.0024)                                 | 0.11 (0.004)    |
|                         | Valve seat width              |       |                       | 0.9–1.1 (0.035–0.043)                                       | 1.5 (0.06)      |
|                         | Valve guide projection height | IN    |                       | 19.4–19.6 (0.76–0.77)                                       | —               |
| EX                      |                               |       | 17.9–18.1 (0.70–0.71) | —   |                 |
| Valve springs           | Free length                   | OUTER | IN                    | 42.14 (1.659)   | 40.58 (1.598)   |
|                         |                               |       | EX                    | 42.83 (1.686)   | 41.25 (1.624)   |
|                         |                               | INNER | IN                    | 38.11 (1.500)   | 36.47 (1.436)   |
|                         |                               |       | EX                    | 38.81 (1.765)   | 37.51 (1.477)   |
| Cylinder head warpage   |                               |       |                       | —   | 0.10 (0.004)    |

## CYLINDER HEAD/VALVE

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### TORQUE VALUES

|                          |           |                              |
|--------------------------|-----------|------------------------------|
| Cylinder head cover bolt |           | 10 N•m (1.0 kg-m, 7.2 ft-lb) |
| Camshaft holder          | 8 mm bolt | 23 N•m (2.3 kg-m, 17 ft-lb)  |
|                          | 8 mm nut  | 23 N•m (2.3 kg-m, 17 ft-lb)  |
|                          | 6 mm bolt | 10 N•m (1.0 kg-m, 7.2 ft-lb) |
| Cylinder head            | 10 mm nut | 48 N•m (4.8 kg-m, 35 ft-lb)  |
|                          | 8 mm bolt | 23 N•m (2.3 kg-m, 17 ft-lb)  |
|                          | 8 mm nut  | 23 N•m (2.3 kg-m, 17 ft-lb)  |
|                          | 6 mm bolt | 10 N•m (1.0 kg-m, 7.2 ft-lb) |
| Camshaft sprocket bolt   |           | 23 N•m (2.3 kg-m, 17 ft-lb)  |
| Cam chain tensioner bolt |           | 10 N•m (1.0 kg-m, 7.2 ft-lb) |
| Oil pass pipe            | 7 mm bolt | 10 N•m (1.0 kg-m, 7.2 ft-lb) |
|                          | 8 mm bolt | 23 N•m (2.3 kg-m, 17 ft-lb)  |

### TOOLS

#### Special

|                                    |                                |
|------------------------------------|--------------------------------|
| Valve guide reamer (IN)            | 07984-2000001 or 07984-200000D |
| Valve guide reamer (EX)            | 07984-ZE20001 or 07984-ZE2000D |
| Valve guide driver attachment (IN) | 07943-MF50100                  |
| Valve guide driver attachment (EX) | 07943-MF50200                  |

#### Common

|                                 |   |
|---------------------------------|---|
| Valve guide driver, 5.5 mm (IN) | 07742-0010100                                       |
| Valve guide driver, 6.6 mm (EX) | 07742-0010200 Not available in U.S.A. 07942-6570100 |
| Valve spring compressor         | 07757-0010000 or 07957-3290001                      |

#### Valve seat cutter (Not available in U.S.A.)

|                 |                  |               |
|-----------------|------------------|---------------|
| Cutter holder   | IN 5.5 mm        | 07781-0010101 |
|                 | EX 6.6 mm        | 07781-0010201 |
| Flat cutter     | IN 28 mm (32°)   | 07780-0012100 |
|                 | EX 35 mm (32°)   | 07780-0012300 |
| Interior cutter | IN 30 mm (60°)   | 07780-0014000 |
|                 | EX 37.5 mm (60°) | 07780-0014100 |
| Seat cutter     | IN 27.5 mm (45°) | 07780-0010200 |
|                 | EX 35 mm (45°)   | 07780-0010400 |

## TROUBLESHOOTING

Engine top-end problems are usually performance-related and can usually be diagnosed by a compression test. Engine noises can usually be traced to the top-end with a sounding rod or stethoscope.

#### Uneven or low compression

- Valves
  - Incorrect valve adjustment
  - Burned or bent valves
  - Incorrect valve timing
  - Broken valve spring
- Cylinder head
  - Leaking or damaged head gasket
  - Warped or cracked cylinder head
- Cylinder and piston (Refer to Section 10)

#### High compression

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

#### Excessive noise

- Incorrect valve adjustment
- Sticking valve or broken valve spring
- Damaged or worn rocker arm or camshaft
- Loose or worn cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket teeth

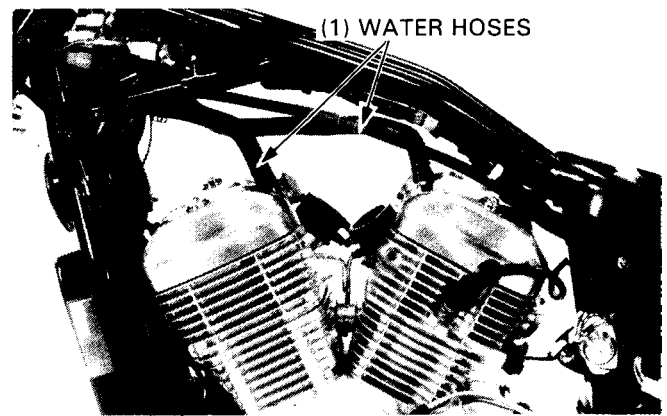
#### Poor idling

- Compression too low

## CYLINDER HEAD COVER REMOVAL

Remove the following parts:

- steering covers
- fuel tank (page 4-3)
- air cleaner housing (page 4-4)
- carburetors (page 4-6)



Drain the coolant (page 5-3).

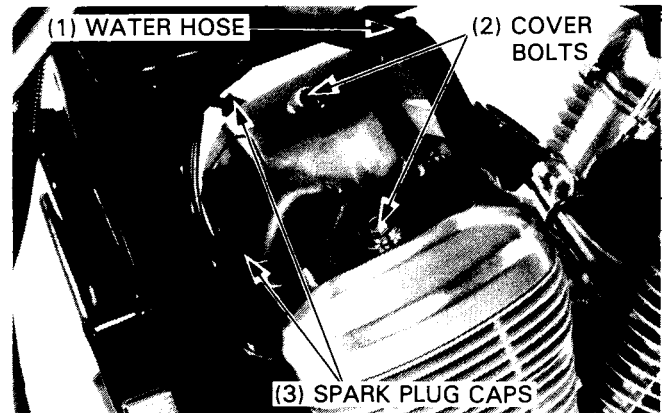
Front:

Disconnect the spark plug caps and the water hose. Remove the water pipe mounting bolt, front water pipe and O-ring.

NOTE

- If coolant drips on the engine, wipe it off immediately.

Remove the cylinder head cover bolts and cover.



Rear:

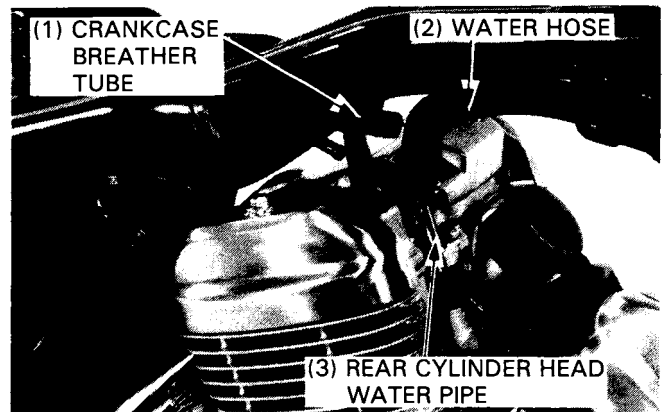
'88-'89, '91-'94:

Disconnect the spark plug caps, crankcase breather tube and water hose.

Remove the water pipe mounting bolt, rear water pipe and O-ring.

Remove the cylinder head cover bolts and cover.

Unclamp the wire harness from the frame.

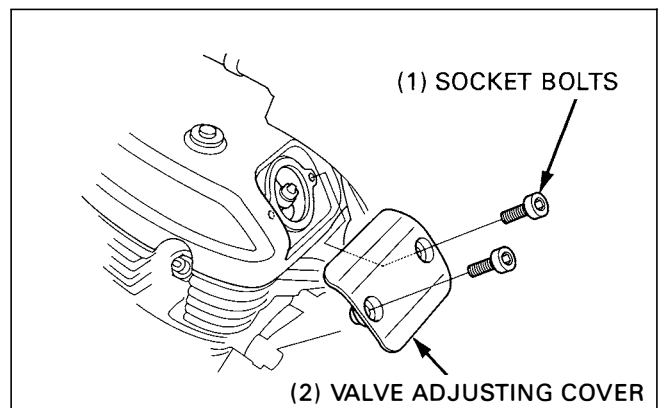


After '94:

Disconnect the spark plug caps, crankcase breather tube and water hose.

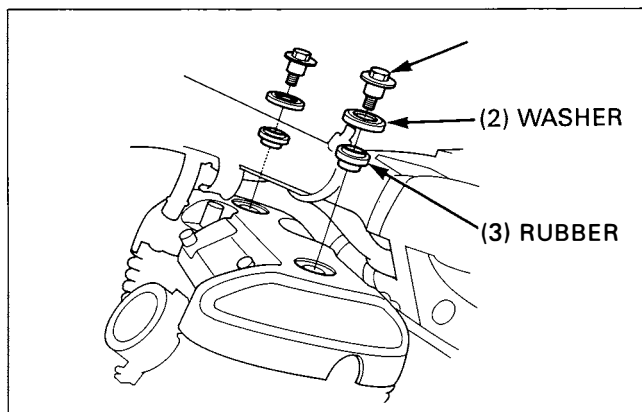
Remove the water pipe mounting bolt, rear water pipe and O-ring.

Remove the socket bolt and valve adjusting cover.



## CYLINDER HEAD/VALVE

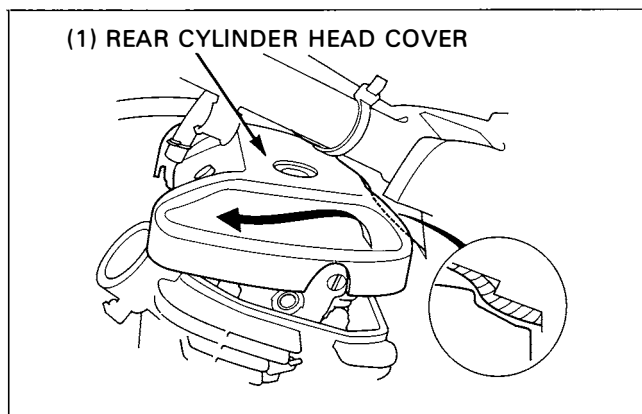
Remove the cylinder head cover bolts, washers and rubber.



Align the wire harness with the valve adjusting hole, then remove the rear cylinder head cover forward.

### CAUTION

- Be careful not to damage the the wire harness.

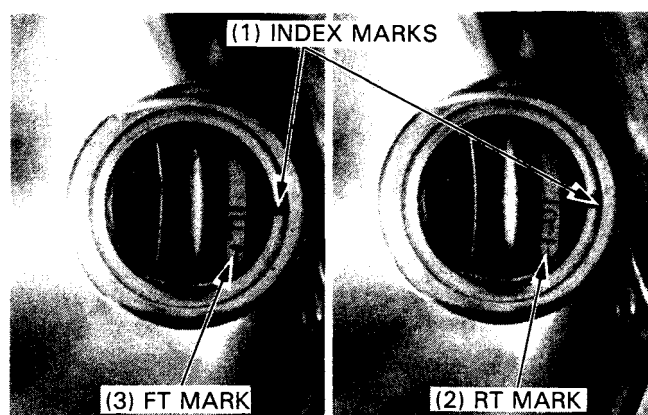


## CAMSHAFT REMOVAL

Remove the cylinder head covers.  
Remove the timing hole cap and crankshaft hole cap from the left crankcase cover.

Align the FT mark (rear: RT mark) on the flywheel with the index mark on the left crankcase cover timing hole by turning the crankshaft counterclockwise. Make sure the piston is at TDC (TOP DEAD CENTER) on the compression stroke.

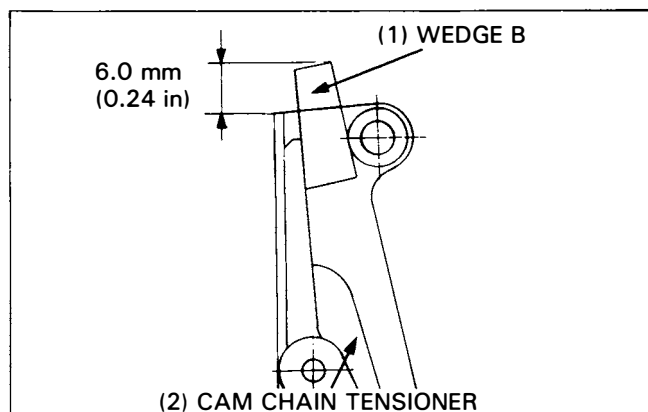
If the piston is not at TDC, turn the crankshaft 360° counterclockwise, and re-align the mark and index mark.



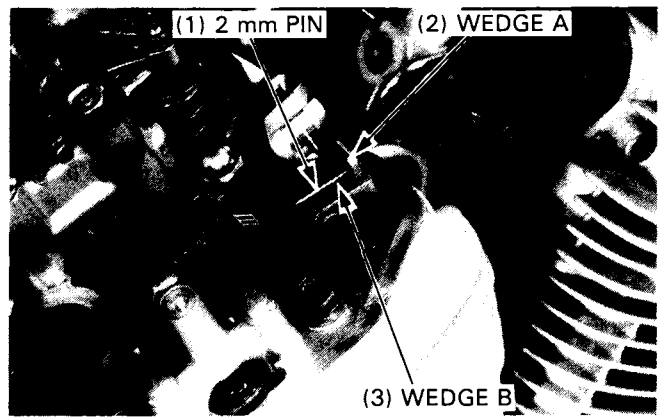
Measure the amount of the cam chain tensioner projection as shown. Replace the cam chain with the new one if the projection exceeds 6.0 mm (0.24 in).

To replace the cam chain, drain the oil from the engine and remove the following parts:

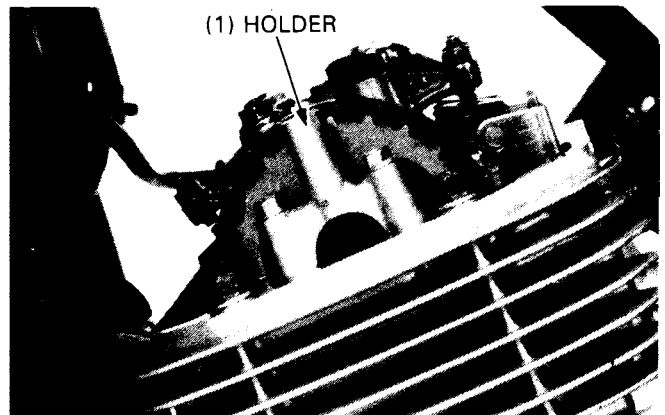
| FRONT CYLINDER HEAD  | REAR CYLINDER HEAD    |
|----------------------|-----------------------|
| Left crankcase cover | Right crankcase cover |
| Front camshaft       | Rear camshaft         |
| Flywheel             | Primary drive gear    |



Pull wedge A straight up while holding wedge B down. Secure wedge A with a 2 mm pin as shown.



Remove the camshaft holder on the cam sprocket side by removing the two mounting bolts.



Remove the cam sprocket bolt, rotate the crankshaft counterclockwise one turn (360°) and remove the other cam sprocket bolt.

**NOTE**

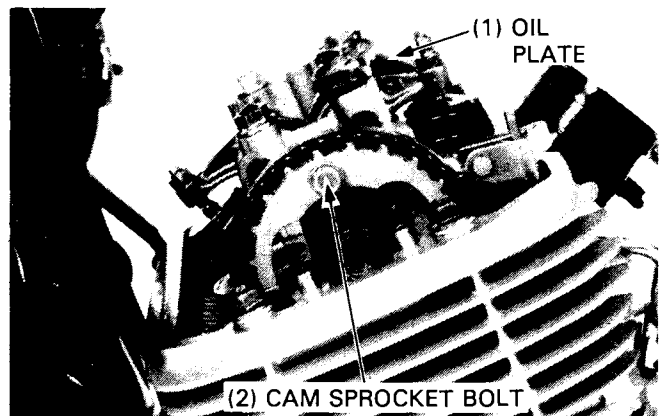
- Be careful not to let the cam sprocket bolts fall into the crankcase.

**'88, '89:**

Remove the three camshaft holder mounting bolts and the nut, the oil plate and the holder.

**After '89:**

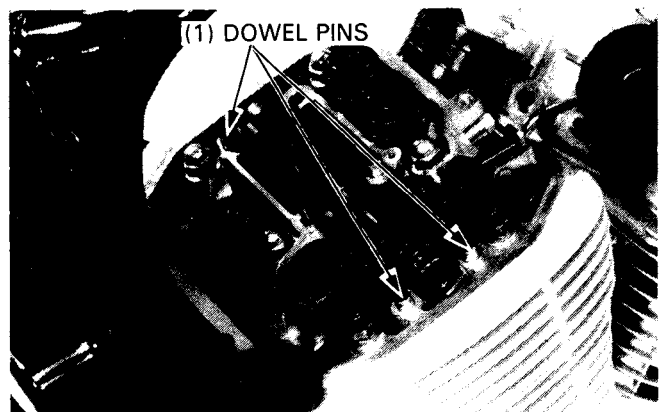
Remove the three camshaft holder mounting bolts, nuts, oil plate and the holder.



Remove the dowel pins.

Hang the cam chain on the camshaft behind the camshaft flange and remove the cam sprocket while lifting the camshaft out.

Attach a piece of wire to the cam chain to prevent it from being dropped into the crankcase.

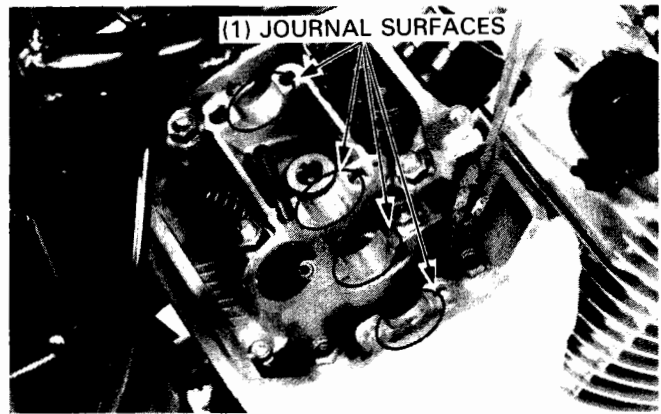


## CYLINDER HEAD/VALVE

### INSPECTION

#### Cylinder head

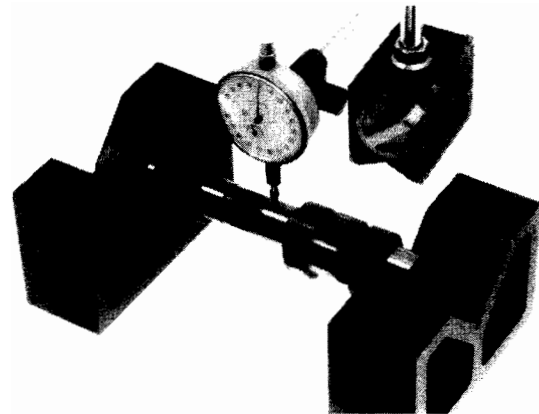
Inspect the camshaft holder and cylinder head journal surfaces for scoring or evidence of insufficient lubrication.



#### Camshaft runout

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

**SERVICE LIMIT: 0.05 mm (0.002 in)**



Using a micrometer, measure the height of each cam lobe.

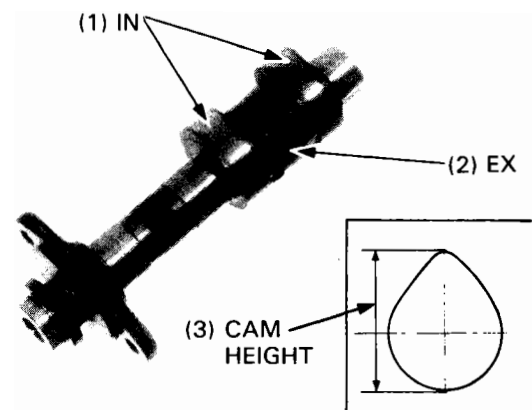
#### SERVICE LIMIT:

**IN: 37.730 mm (1.4854 in)**

**EX: 37.750 mm (1.4862 in)**

Check the camshaft journals for wear or damage. Measure the O.D. of each journal.

**SERVICE LIMIT: 21.90 mm (0.862 in)**



#### Camshaft bearing oil clearance

Wipe any oil from the journals. Lay a strip of plastigauge lengthwise on top of each camshaft journal.

#### NOTE

- Avoid placing plastigauge over the oil hole.





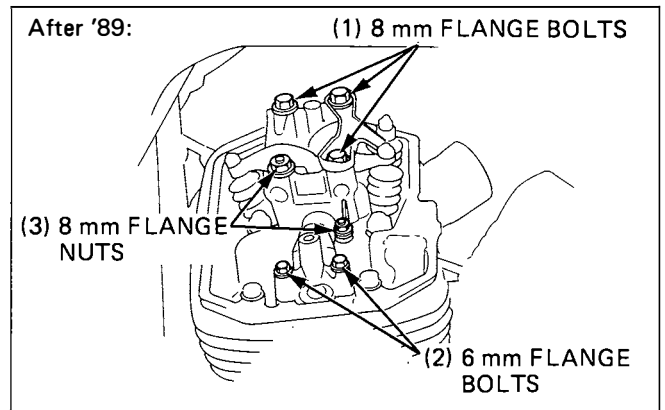
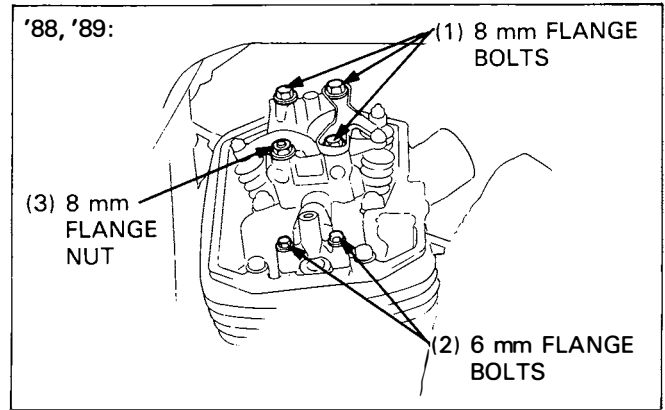
Install the camshaft holders and tighten the mounting bolts in a crisscross pattern in 2 or 3 steps.

**NOTE**

- Do not rotate the camshaft when using plastigauge.

**TORQUE:**

- 6 mm flange bolt: 12 N·m (1.2 kg-m, 9 ft-lb)
- 8 mm flange bolt: 23 N·m (2.3 kg-m, 17 ft-lb)
- 8 mm flange nut: 23 N·m (2.3 kg-m, 17 ft-lb)

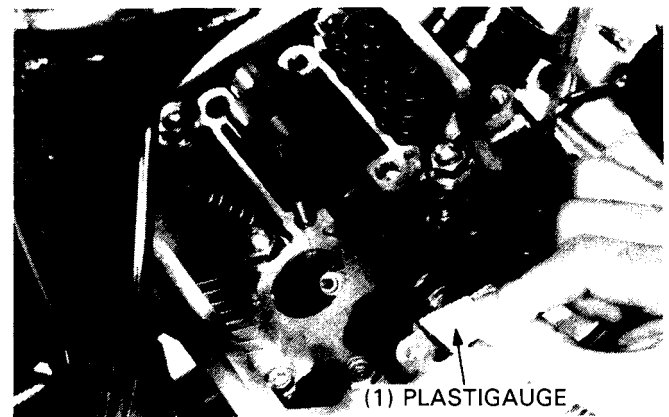


Remove the camshaft holder and measure the width of each plastigauge. The widest thickness determines the oil clearance.

**SERVICE LIMIT: 0.23 mm (0.009 in)**

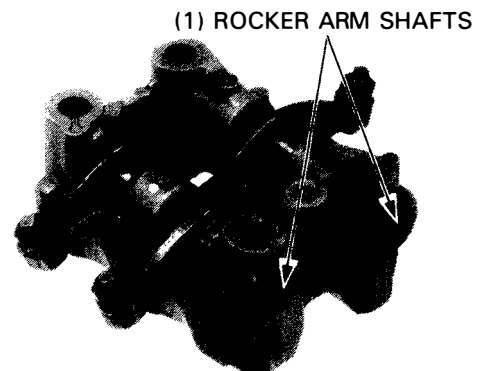
When the service limit exceeded, replace the camshaft and re-check the oil clearance.

Replace the cylinder head and camshaft holder if the clearance still exceeds the service limit.



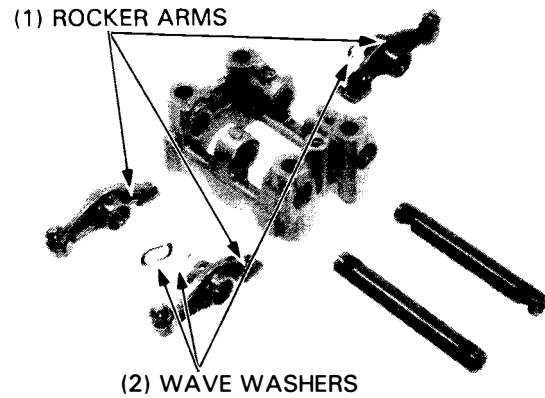
**Camshaft holder/Rocker arm shaft/Rocker arm**

Remove the rocker arm shafts by tapping the holder with a soft hammer.



## CYLINDER HEAD/VALVE

Remove the rocker arms and wave washers from the shafts.



Inspect the rocker arm shafts and rocker arms for wear or damage.

Check the rocker arms for clogged oil holes.

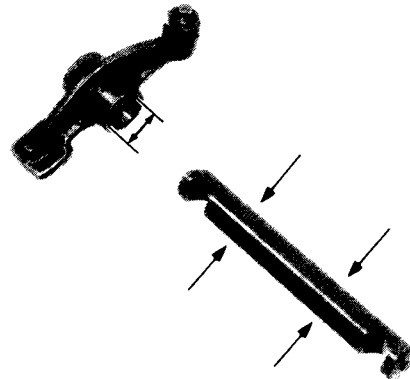
Measure the O.D. of each rocker arm shaft.

### SERVICE LIMIT:

IN/EX: 11.83 mm (0.466 in)

Measure the I.D. of each rocker arm.

SERVICE LIMIT: 12.05 mm (0.474 in)



## CYLINDER HEAD

### REMOVAL

#### NOTE

- The front cylinder head can be removed with the engine installed. The engine must be removed to service the rear cylinder head.

Drain the coolant (page 5-3) and remove the following:

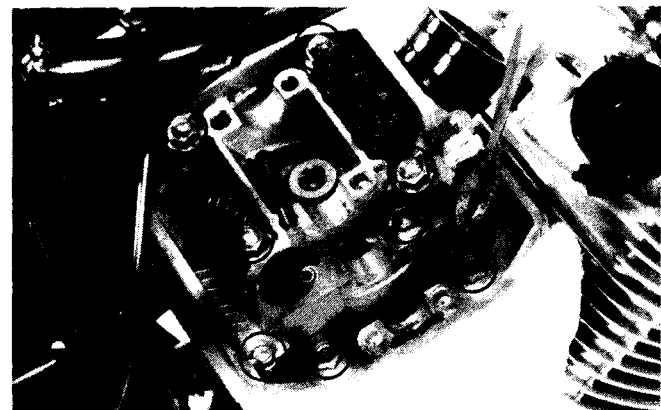
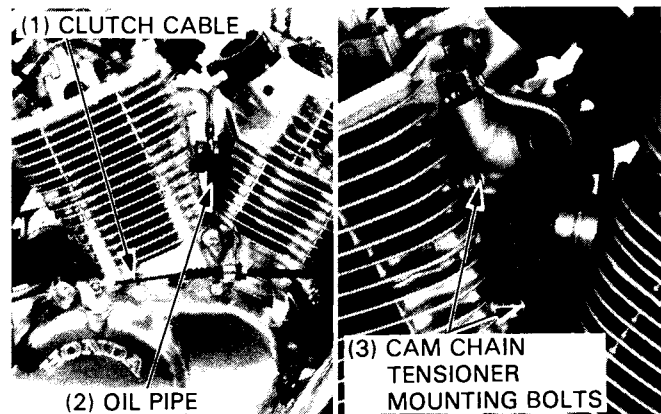
- front camshaft (page 9-3)
- the cam chain tensioner mounting bolts and washers from the cylinder head and cylinder
- cam chain tensioner

Remove the exhaust pipes as an assembly (Section 6) by removing the heat protector and exhaust pipe joint nuts. Disconnect the clutch cable from the clutch lifter arm by removing the clutch cable holder bolt. Remove the oil pipe from the engine.

#### NOTE

- Do not bend the oil pipe during removal.

Loosen the 6 mm bolt, 8 mm bolts, 8 mm nut and 10 mm nuts/washers in a criss-cross pattern in 2 or 3 steps. Remove the bolts and nuts.



Remove the upper radiator hose and the radiator mounting bolts (page 5-5).

Release the radiator from the frame grommets and suspend it with a piece of rope or something suitable.

Remove the front cylinder head.

Remove the gasket, dowel pins and cam chain guide from the cylinder.

Rear cylinder head:

Remove the following:

— engine (section 6)

#### NOTE

- Make sure the piston is at TDC on the rear cylinder compression stroke.

- oil pass pipe ('88, '89), cylinder head cover, and cam chain tensioner
- head bolts and nuts, as described for front cylinder head removal
- cylinder head, head gasket, dowel pins, and cam chain guide

#### DISASSEMBLY/INSPECTION

##### Cylinder head

Clean the cylinder head surfaces of any gasket material.

#### CAUTION

- *Avoid damaging the gasket surfaces.*
- *Gaskets will come off easier if soaked in solvent.*

Check the spark plug hole and valve areas for cracks. Check the cylinder head for warpage with the straight edge and thickness gauge.

**SERVICE LIMIT: 0.10 mm (0.004 in)**

Remove the valve spring cotters, retainers, springs, and valves using a Valve Spring Compressor.

#### TOOL:

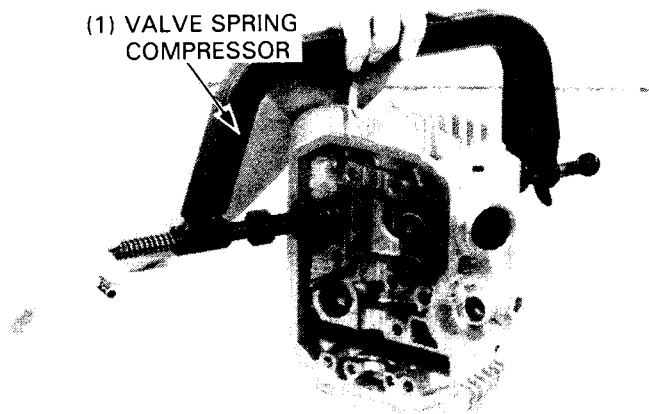
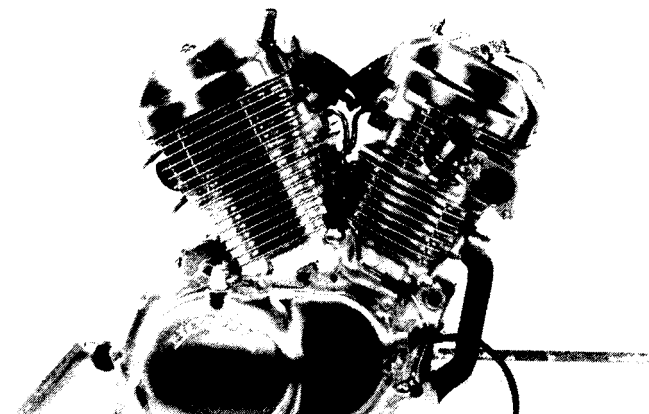
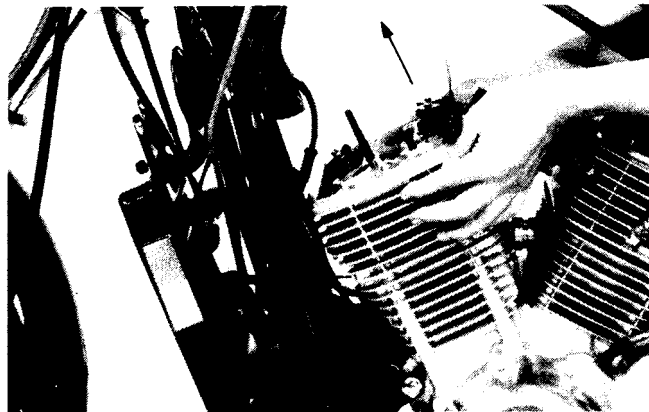
Valve spring compressor      07757—0010000 or  
07957—3290001

#### CAUTION

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

#### NOTE

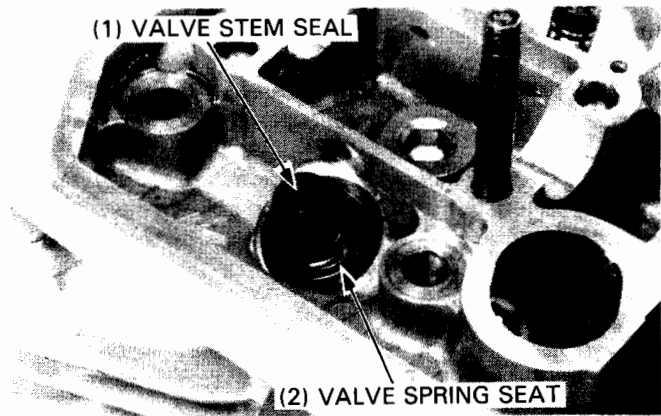
- Mark all parts during disassembly so they can be placed back in their original locations.



## CYLINDER HEAD/VALVE

Remove the valve stem seals and valve spring seats.

Remove carbon deposits from the combustion chamber.



### Valve springs

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

#### SERVICE LIMITS:

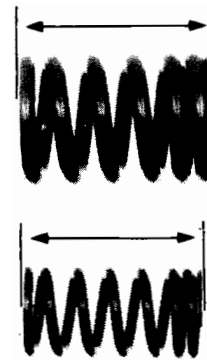
**INNER (IN): 36.47 mm (1.436 in)**

**(EX): 37.51 mm (1.477 in)**

**OUTER (IN): 40.58 mm (1.598 in)**

**(EX): 41.25 mm (1.624 in)**

Replace the springs as a set if they are shorter than the service limit.



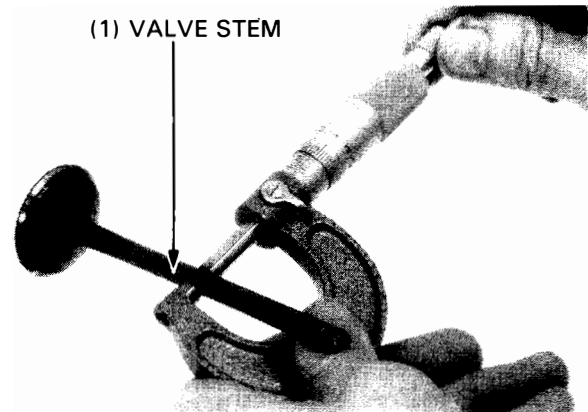
### Valve stem-to-guide clearance

Inspect each valve for bending, burning, scratches or abnormal stem wear.

Check valve movement in the guide and measure and record each valve stem O.D.

**SERVICE LIMITS: IN: 5.45 mm (0.215 in)**

**EX: 6.55 mm (0.258 in)**



Measure and record each valve guide I.D.

#### NOTE

- Ream the guides to remove any carbon deposits before checking clearances.

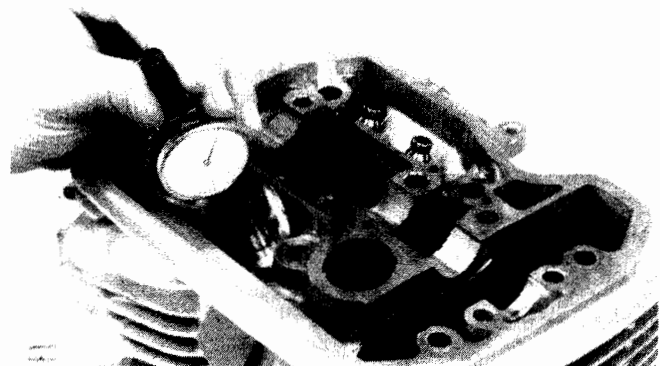
**SERVICE LIMIT: IN: 5.56 mm (0.219 in)**

**EX: 6.65 mm (0.262 in)**

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

**SERVICE LIMIT: IN: 0.10 mm (0.004 in)**

**EX: 0.11 mm (0.004 in)**



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

**TOOLS:**

**Valve guide reamer**

- IN: 07984-2000001 or 07984-200000D
- EX: 07984-ZE20001 or 07984-ZE2000D

**NOTE**

- It is important that the reamer always be rotated in the same direction when it is inserted or removed.

If the stem-to-guide clearance exceeds the service limits with new guides, also, replace the valves.

**NOTE**

- Reface the valve seats whenever the valve guides are replaced.

## VALVE GUIDE REPLACEMENT

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

Heat the cylinder head to 212°F (100°C) with a hot plate or oven. Maximum allowable temperature is 300°F (150°C).

**⚠ WARNING**

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

**CAUTION**

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

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

**TOOL:**

- Valve guide driver (IN): 07742-0010100
- (EX): 07742-0010200 Not available in U.S.A.
- 07942-6570100

**NOTE**

- Avoid damaging the cylinder head.

Make note of the valve guide projection specifications (following), then drive in new guides from camshaft side of the cylinder head.

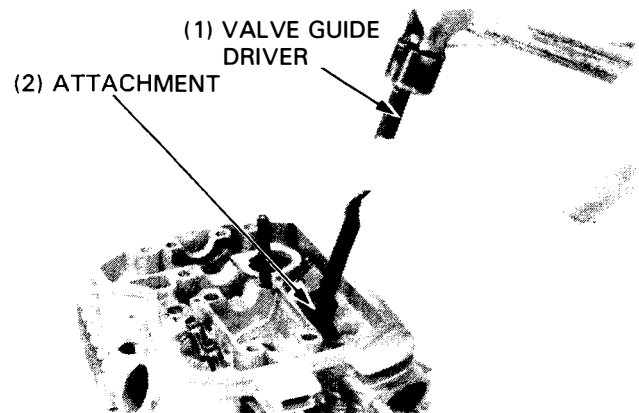
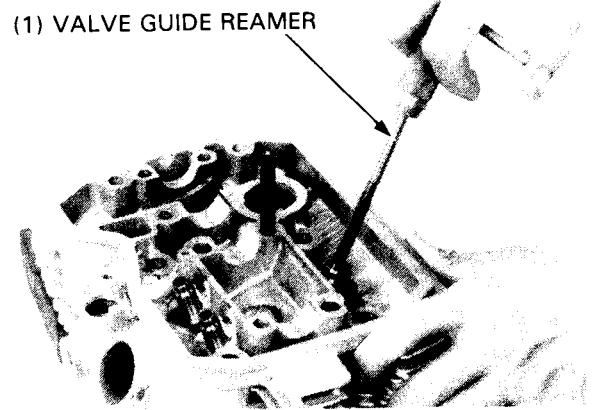
**TOOLS:**

**Valve guide driver**

- 5.5 mm (IN): 07742-0010100
- 6.6 mm (EX): 07742-0010200

**Attachment**

- 5.5 mm (IN): 07943-MF50100
- 6.6 mm (EX): 07943-MF50200

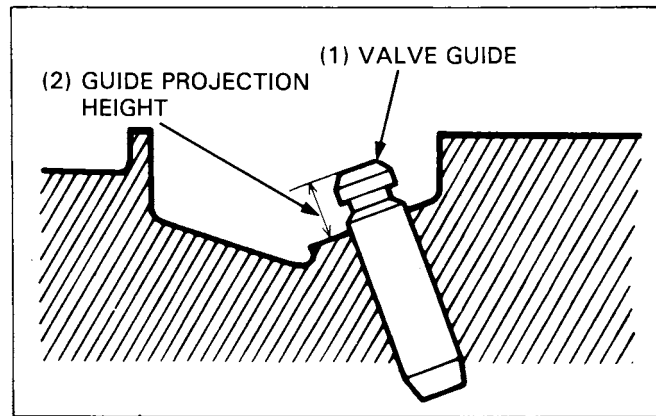


## CYLINDER HEAD/VALVE

### VALVE GUIDE PROJECTION HEIGHT:

IN: 19.4–19.6 mm (0.76–0.77 in)

EX: 17.9–18.1 mm (0.70–0.71 in)



Ream the new valve guides after installation.

### NOTE

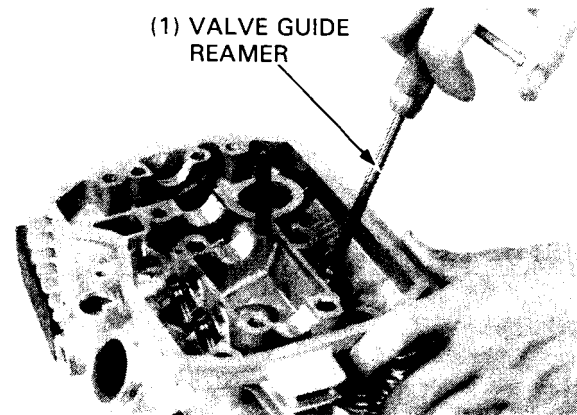
- Use cutting oil on the reamer during this operation.
- It is important that the reamer always be rotated in the same direction when it is inserted or removed.

Clean the head thoroughly after reaming the valve guides.

### TOOLS:

Valve guide reamer IN: 07984-2000001 or 07984-200000D

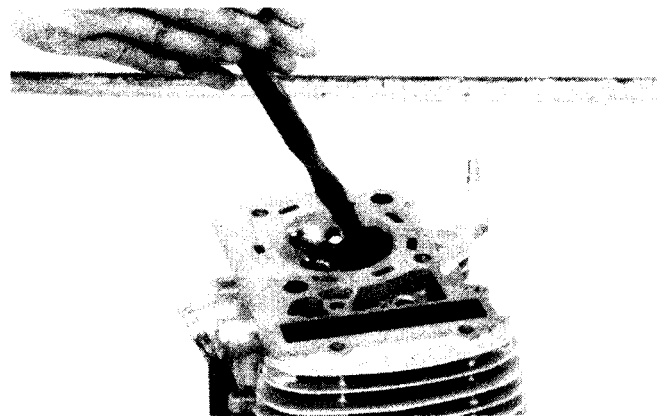
EX: 07984-ZE20001 or 07984-ZE2000D



## VALVE SEAT INSPECTION/REFACING

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

Apply a light coating of Prussian Blue to each valve seat. Lap each valve and seat using a rubber hose or other hand-lapping tool.



Remove and inspect each valve.

### CAUTION

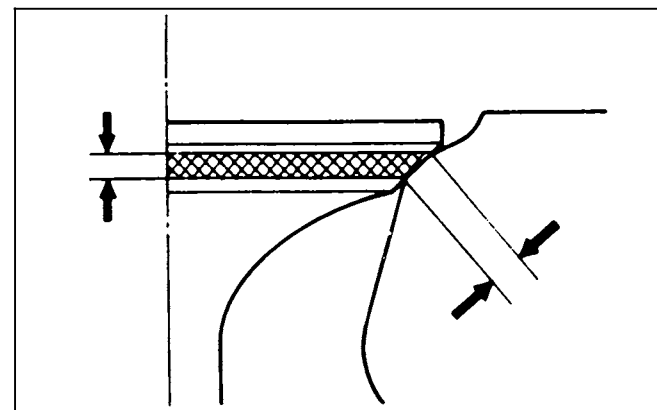
- *The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.*

Inspect the width of each valve seat.

STANDARD: 0.9–1.1 mm (0.035–0.043 in)

SERVICE LIMIT: 1.5 mm (0.06 in)

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

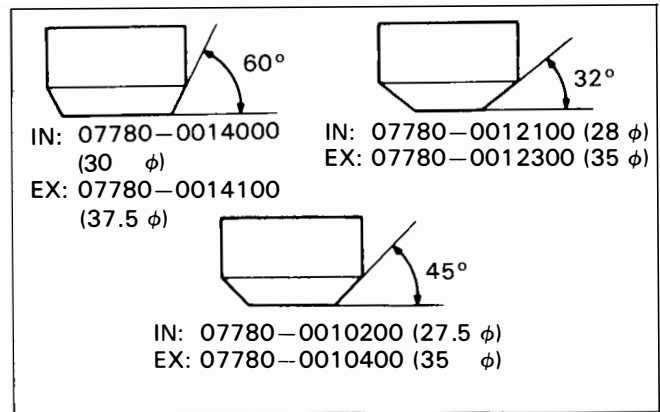


VALVE SEAT CUTTERS

Honda Valve Seat Cutters, grinder or equivalent valve seat refacing equipment are recommended to correct a worn valve seat.

NOTE

- Follow the refacer manufacturer's operating instructions.

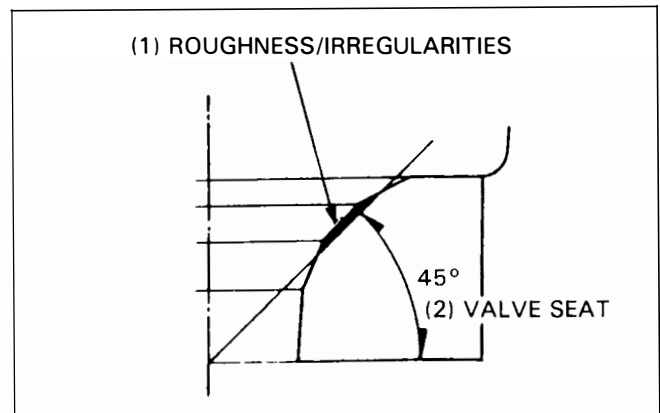


VALVE SEAT REFACING

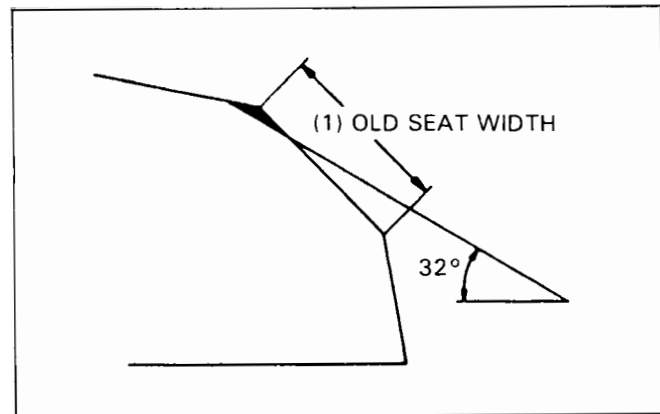
Use a 45 degree cutter to remove any roughness or irregularities from the seat.

NOTE

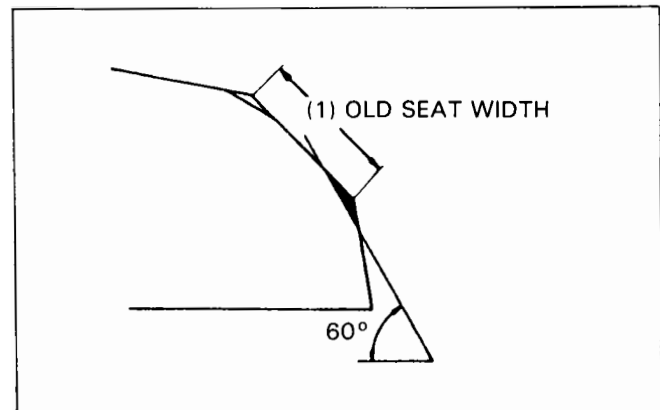
- Reface the seat with a 45 degree cutter when a valve guide is replaced.



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

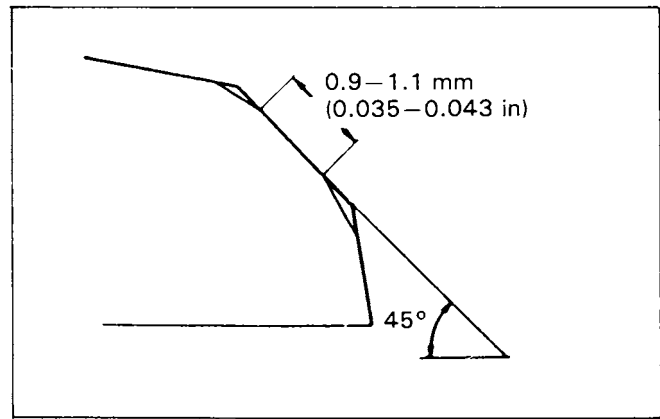


Use a 60 degree cutter to remove the bottom 1/4 of the old seat. Remove the cutter and inspect the area you have refaced.



## CYLINDER HEAD/VALVE

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

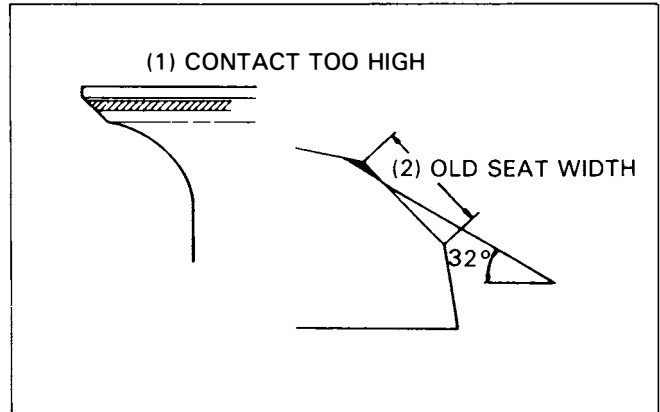


Apply a thin coating of Prussian Blue to the valve seat. Press the valve through the valve guide and onto the seat to make a clear pattern.

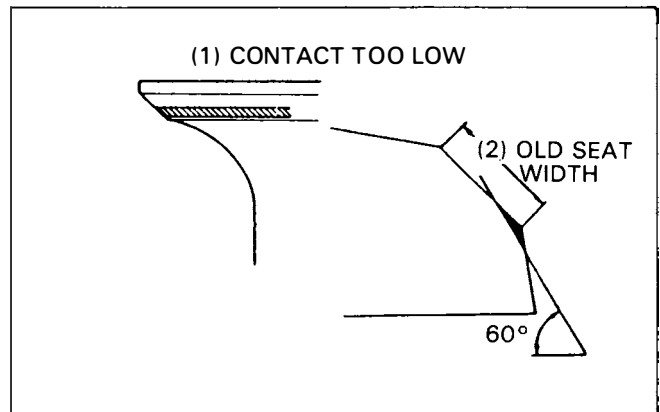
### NOTE

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

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



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

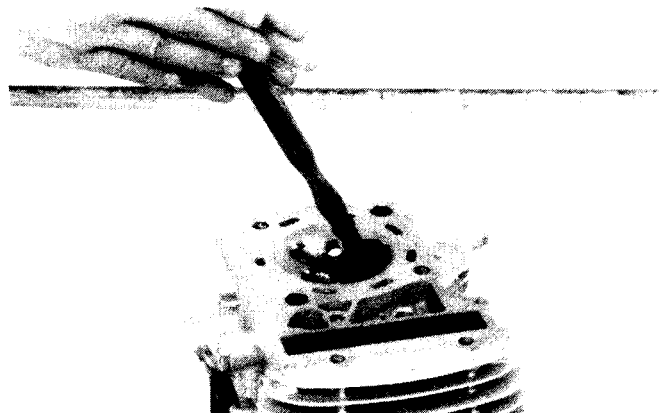


Refinish the seat to specifications, using a 45 degree finish cutter.

After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure. After lapping, wash all residual compound off the cylinder head and valve.

### NOTE

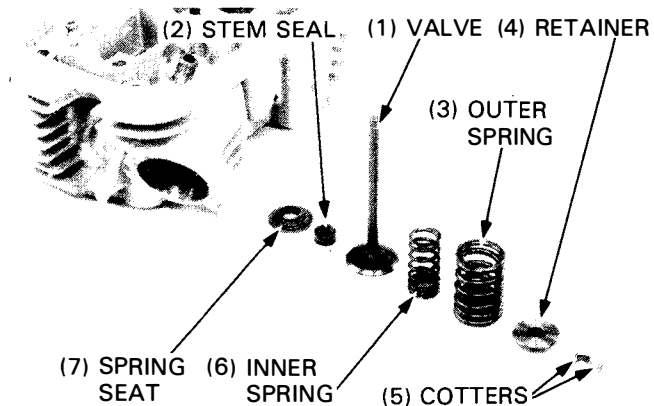
- Do not allow lapping compound to enter the guides.



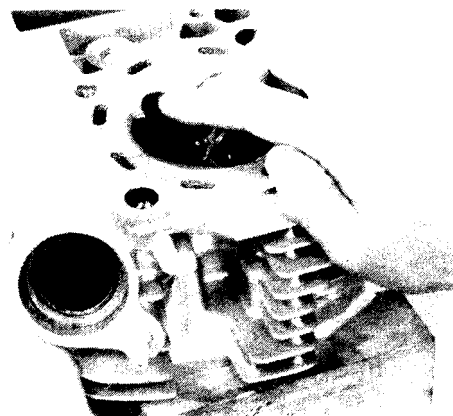


## CYLINDER HEAD ASSEMBLY

Install the valve spring seats and new stem seals. Lubricate each valve stem with molybdenum disulfide oil and insert the valve into the valve guide. Turn the valve slowly while inserting to avoid damaging the seals.

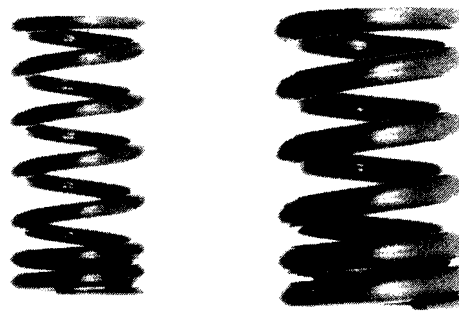


Move the valves up and down to check for smooth operation.



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

Install the spring retainers.



Compress the springs and install the valve cotters.

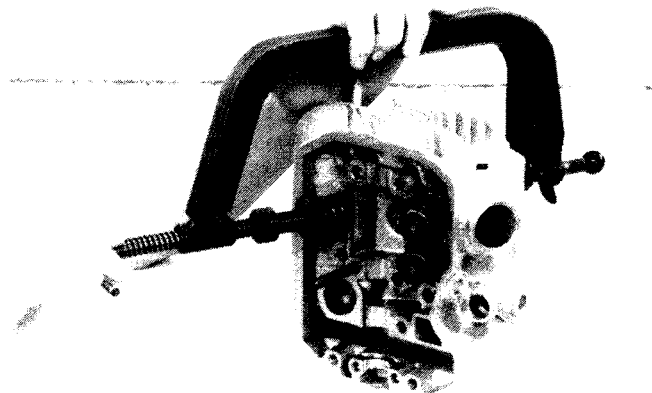
### CAUTION

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

### TOOL:

Valve spring compressor

07757-0010000 or  
07957-3290001

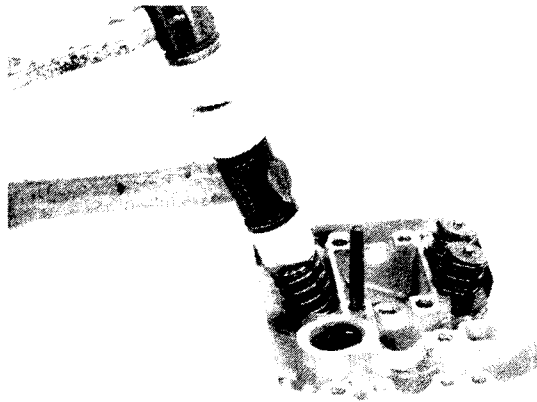


## CYLINDER HEAD/VALVE

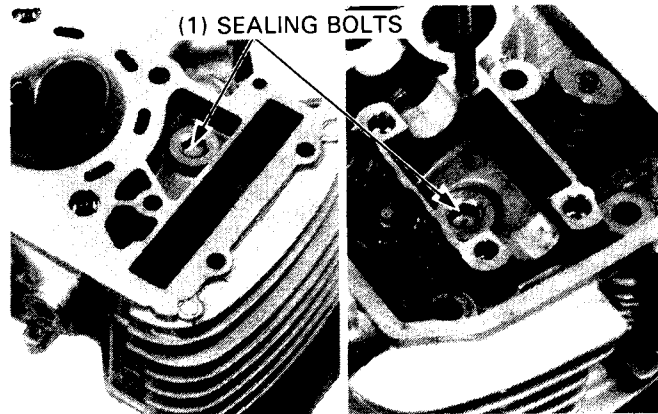
Tap the valve stems gently with a soft hammer to firmly seat the cotters.

### NOTE

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



Apply locking agent to the threads of the sealing bolts and tighten them, if removed.

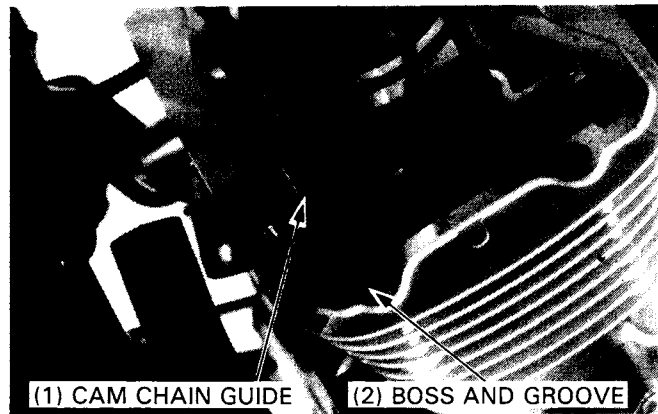


## CYLINDER HEAD INSTALLATION

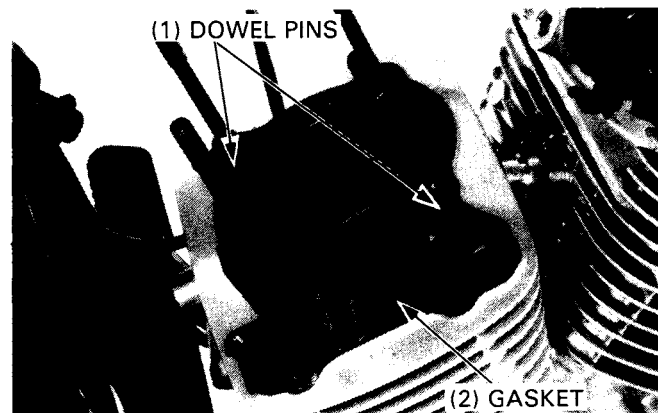
Install the cam chain guide into the cylinder.

Make sure that the cam chain guide bosses are in the grooves of cylinder.

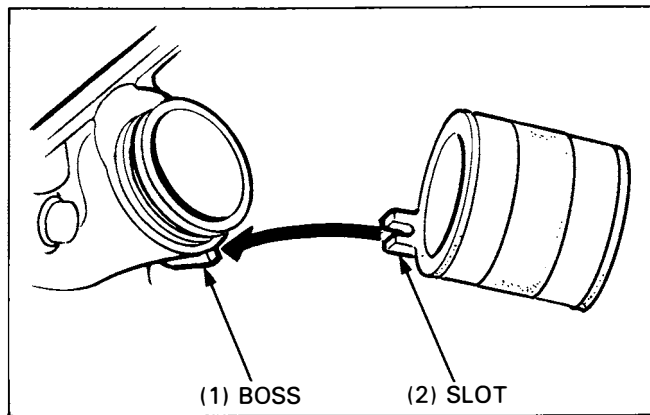
Clean the cylinder head surface of any gasket material.



Install the dowel pins and a new head gasket.



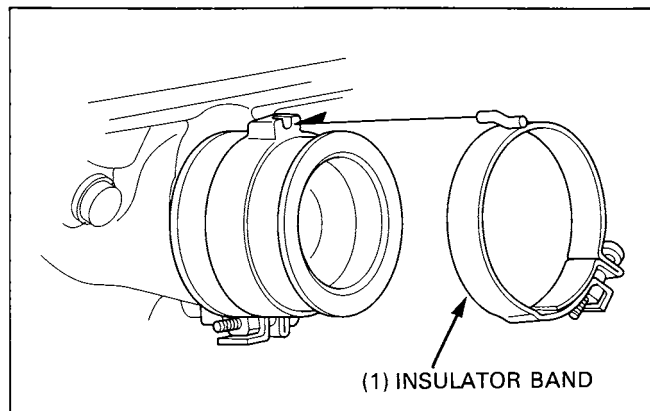
Install the carburetor insulator on the cylinder head, aligning the boss on the cylinder head with the slot in the insulator.



After '91 (California model only) :

Install the insulator bands aligning the pins on the insulator bands with the slots on the insulators as shown.

Tighten the band screws securely.

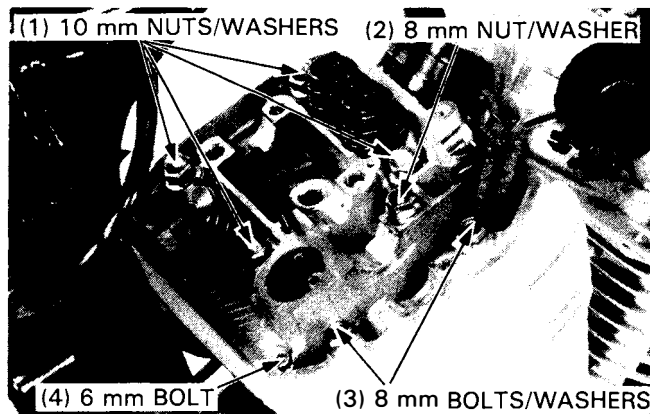


Install the cylinder head.

Install the 10 mm nut/washer, 8 mm nut/washer, 8 mm bolt/washer and 6 mm bolt and tighten them in a crisscross pattern in 2 or 3 steps.

**TORQUE:**

- 10 mm nut: 48 N·m (4.8 kg-m, 35 ft-lb)
- 8 mm bolt: 23 N·m (2.3 kg-m, 17 ft-lb)
- 8 mm nut: 23 N·m (2.3 kg-m, 17 ft-lb)
- 6 mm bolt: 10 N·m (1.0 kg-m, 7.2 ft-lb)



'88, '89:

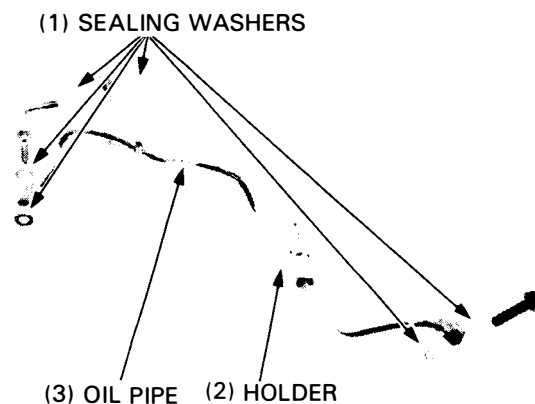
Check the oil pass pipe bolts and oil pass pipe for clogging or bending.

Install the oil pass pipe, new sealing washers, oil pass pipe bolts and the pipe holder bolt.

Tighten the bolts.

**TORQUE:**

- Oil pass pipe bolt:
- 7 mm: 10 N·m (1.0 kg-m, 7.2 ft-lb)
- 8 mm: 23 N·m (2.3 kg-m, 17 ft-lb)



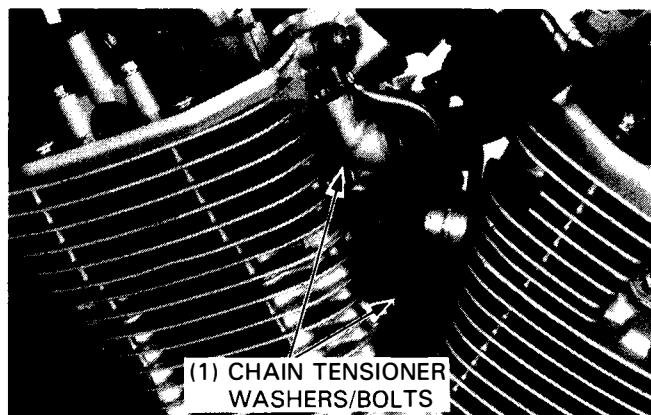
## CYLINDER HEAD/VALVE

Install the following:

- cam chain tensioner with washers and bolts.

**TORQUE: 10 N·m (1.0 kg-m, 7.2 ft-lb)**

- camshaft (page 9-18)
- camshaft holders (page 9-19)
- cylinder head cover (page 9-21)

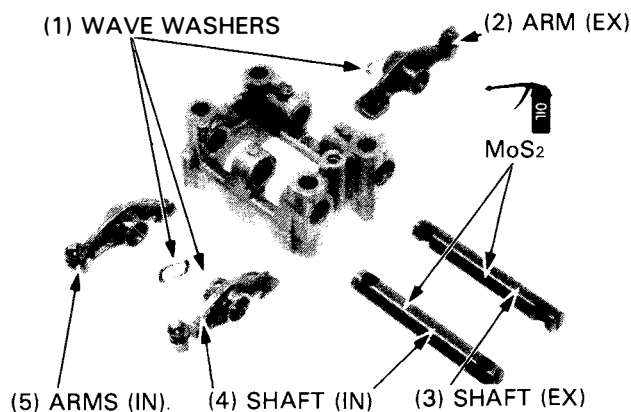


## CAMSHAFT INSTALLATION

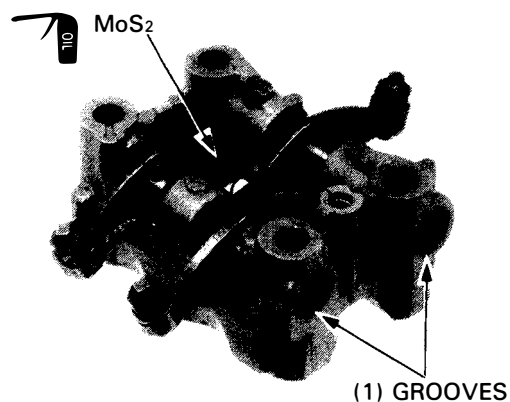
Apply molybdenum disulfide oil to the rocker arm shafts. Install the rocker arms, rocker arm shafts and wave washers in the camshaft holders.

### NOTE

- Install the wave washers in the proper position as shown.



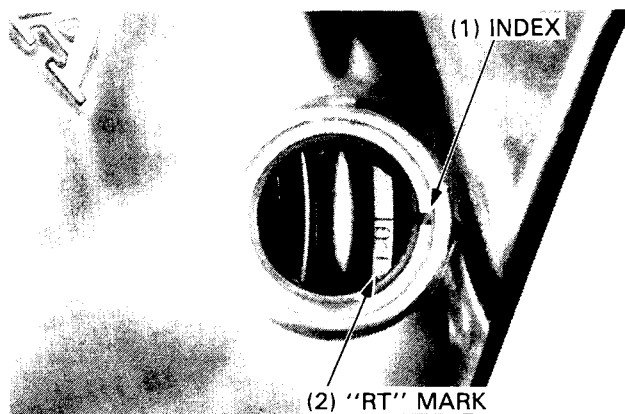
Position the grooves in the rocker arm shafts vertically, aligning the bolt holes of the holder with the holes of the shafts. Apply molybdenum disulfide oil to the rocker arm slipper faces.



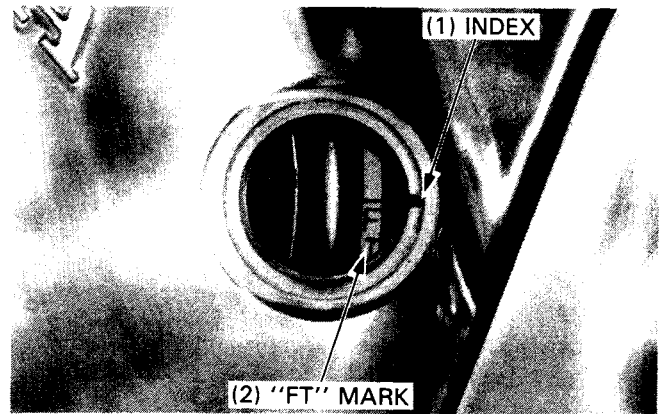
## FRONT CYLINDER

### NOTE

- If the rear cylinder head has not been serviced, remove the rear cylinder head cover and check the camshaft position as follows:  
Turn the crankshaft counterclockwise and align the "RT" mark on the flywheel with the index mark on the timing hole, then look for the identification mark on the camshaft flange.  
If the notch mark is facing up, turn the crankshaft counterclockwise approximately 1-1/8 turn (412°) and begin installation of the front camshaft.  
If the notch mark faces down (cannot be seen), turn the crankshaft counterclockwise approximately 1/8 turn (52°) and begin installation.



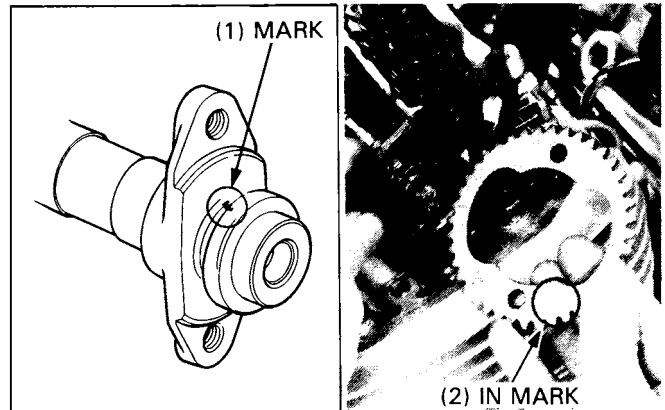
Align the "FT" mark on the flywheel with the index mark on the timing hole.



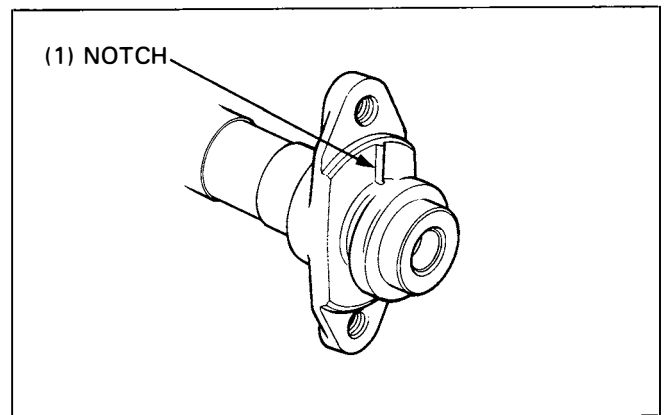
NOTE

- If the front and rear cylinder camshafts were removed, do not confuse them. Check the identification mark on the neck of the camshaft flange.

Install the camshaft in the cylinder head through the cam chain and install the cam sprocket on the camshaft with the IN mark facing inside.



With the notch mark on the camshaft flange facing up, align the timing marks (index lines) on the cam sprocket with the top of the cylinder head.



Place the cam chain on the sprocket.

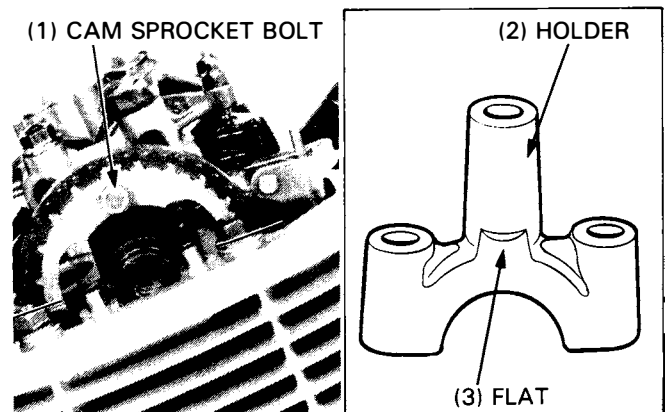
Install the cam sprocket on the camshaft flange and recheck that the timing marks (index lines) align with the top of the cylinder head.

Align the cam sprocket bolt holes in the cam sprocket and camshaft, install and tighten the cam sprocket bolt.

**TORQUE: 23 N·m (2.3 kg-m, 17 ft-lb)**

Turn the crankshaft counterclockwise one full turn (360°) and install the other sprocket bolt.

Turn the crankshaft counterclockwise one full turn (360°), aligning the "FT" mark with the index mark, then check that the timing marks on the cam sprocket align with the top of the cylinder head.



## CYLINDER HEAD/VALVE

'88, '89:

Install the dowel pins into the cylinder head.  
Install the holders, oil plate, 8 mm bolts, 8 mm nut and 6 mm bolts.

After '89:

Install the dowel pins into the cylinder head.  
Install the holders, oil pipe 8 mm bolts, 8 mm nuts and 6 mm bolts.

**TORQUE:**

8 mm bolt: 23 N·m (2.3 kg-m, 17 ft-lb)

8 mm nut: 23 N·m (2.3 kg-m, 17 ft-lb)

6 mm bolt: 10 N·m (1.0 kg-m, 7.2 ft-lb)

### CAUTION

- Note the direction of the camshaft end holder, install the flat surface on the holder facing in.

After installing the front cylinder camshaft, turn the crankshaft counterclockwise approximately 7/8 turn (308°) and align the RT mark with the index on the timing hole, then install the rear cylinder camshaft.

Lubricate the cam lobes with fresh engine oil.

If the cylinder head was removed from the engine in the frame, install the following:

- radiator with upper radiator hose
- exhaust pipe

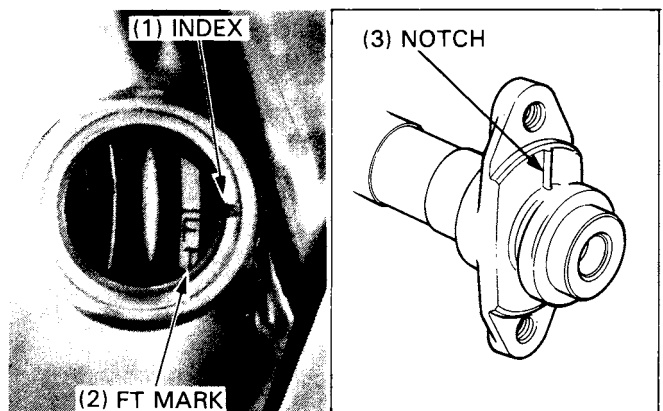
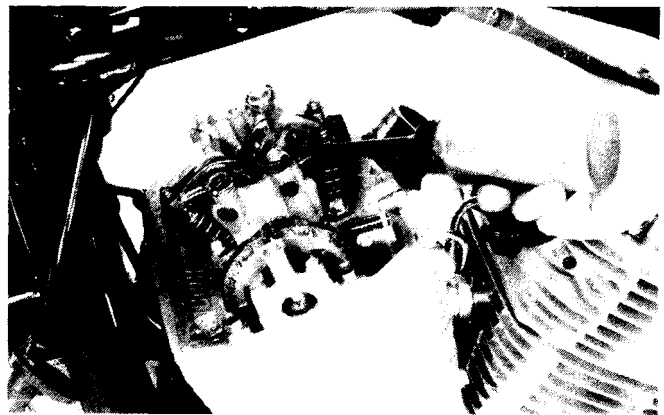
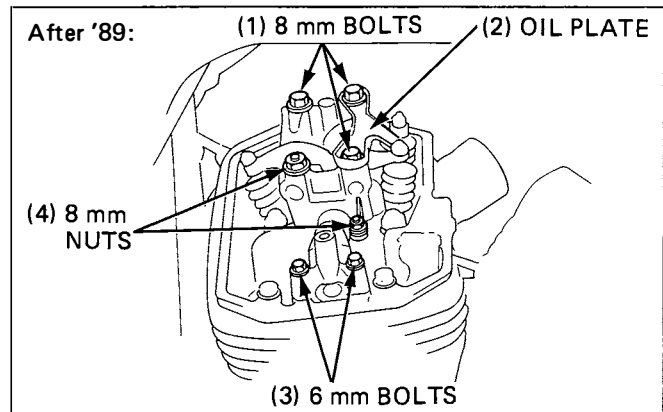
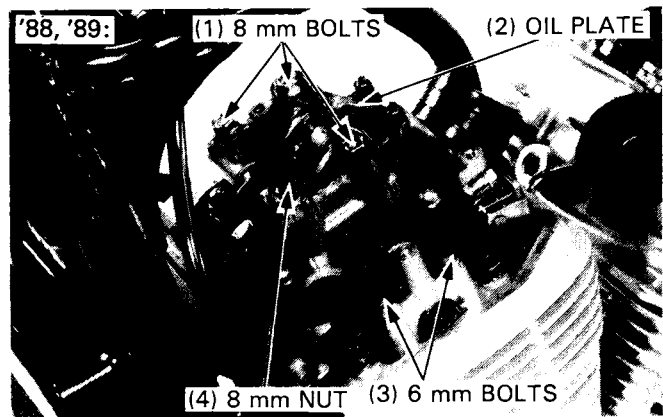
## REAR CYLINDER

### NOTE

- If the front cylinder head was not serviced, remove the front cylinder head cover and check the camshaft position as follows:

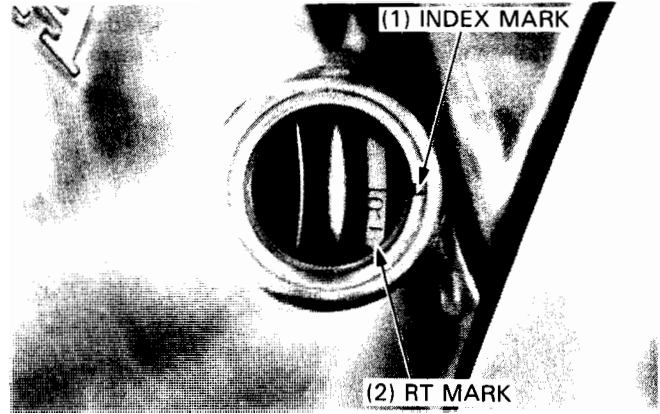
Turn the crankshaft counterclockwise and align the "FT" mark on the flywheel with the index mark on the timing hole, then look for the identification mark on the camshaft flange. If the notch mark is facing up, turn the crankshaft counterclockwise approximately 7/8 turn (308°) and begin installation of the rear camshaft.

If the camshaft notch mark faces down (cannot be seen), turn the crankshaft counterclockwise approximately 1-7/8 turn (668°) and begin installation.



Make sure that the "RT" mark on the flywheel aligns with the index mark on the timing hole.

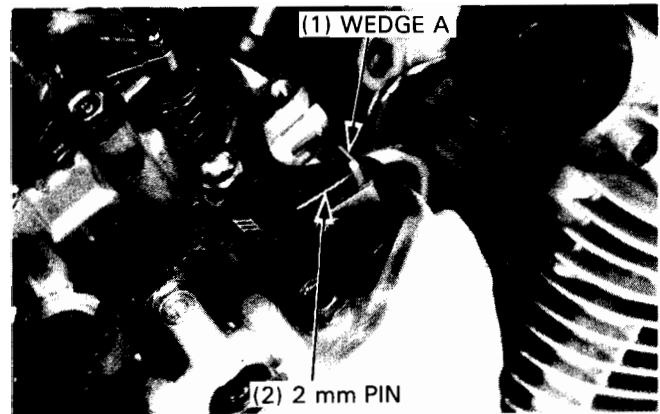
Place the camshaft into the correct position with the notch mark on the camshaft flange facing up and install the cam sprocket and camshaft holders using the same procedure as for the front cylinder.



Remove the 2 mm pin holding cam chain tensioner wedge A.

**NOTE**

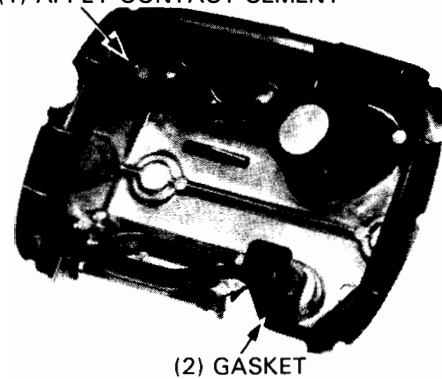
- Be careful not to let the 2 mm pin fall into the crankcase.
- Do not forget to remove the 2 mm pin before installing the cylinder head cover.



**CYLINDER HEAD COVER INSTALLATION**

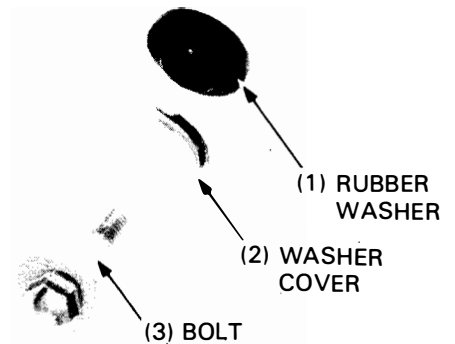
Clean the gasket and apply contact cement to the gasket groove.  
Apply sealant around the gasket.

(1) APPLY CONTACT CEMENT



Install the cylinder head cover, rubber washer, washer cover and cylinder head cover bolts.  
Tighten the cover bolts.

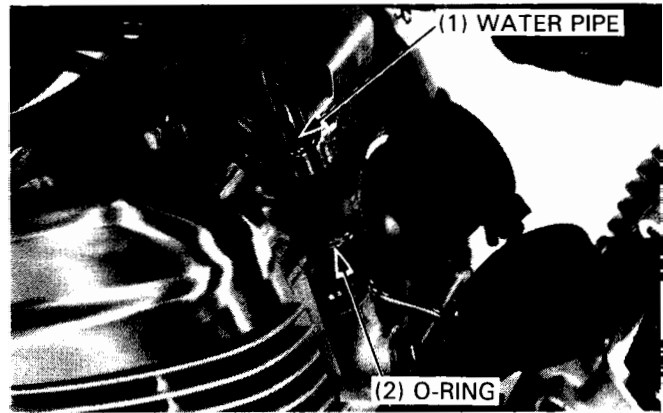
**TORQUE: 10 N·m (1.0 kg-m, 7.2 ft-lb)**



## CYLINDER HEAD/VALVE

---

Install the O-ring on the water pipe with the tapered side facing out and install the water pipe into the cylinder head.

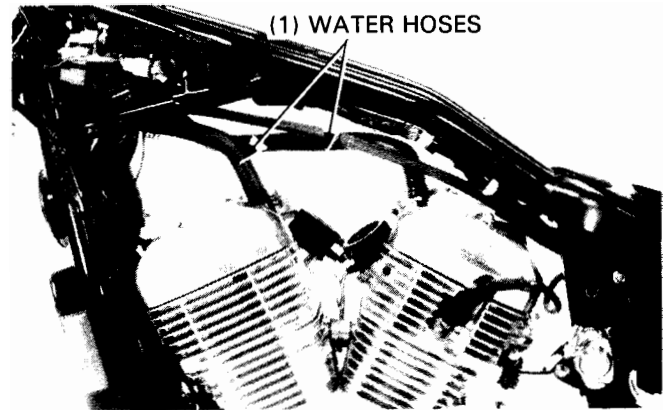


Connect the water hose to the water pipe and install the spark plug caps.

Install the following parts:

- carburetors (page 4-15)
- air cleaner housing (page 4-4)
- fuel tank (page 4-3)
- steering covers

Fill the cooling system (page 5-3)

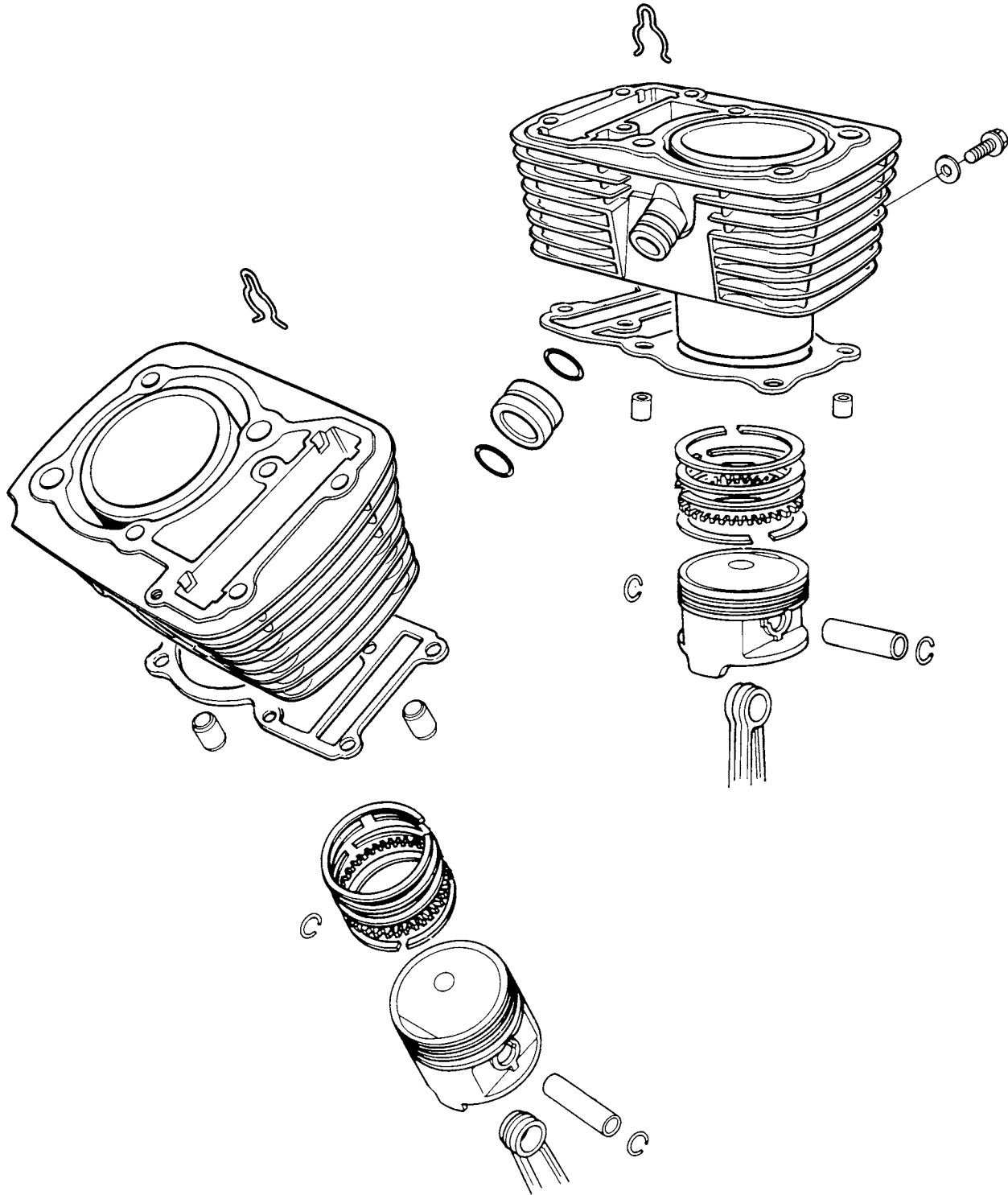




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**MEMO**

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# 10. CYLINDER/PISTON

|                            |             |                                 |             |
|----------------------------|-------------|---------------------------------|-------------|
| <b>SERVICE INFORMATION</b> | <b>10-1</b> | <b>PISTON RING INSTALLATION</b> | <b>10-5</b> |
| <b>TROUBLESHOOTING</b>     | <b>10-1</b> | <b>PISTON INSTALLATION</b>      | <b>10-5</b> |
| <b>CYLINDER</b>            | <b>10-2</b> | <b>CYLINDER INSTALLATION</b>    | <b>10-6</b> |
| <b>PISTON</b>              | <b>10-3</b> |                                 |             |

## SERVICE INFORMATION

### GENERAL

- This section covers service of the cylinder and piston.
- The front cylinder/piston can be serviced with the engine installed in the frame.
- The engine must be removed to service to rear cylinder/piston.
- To service the crankcase stud bolts, refer to page 11-15.

### SPECIFICATIONS

Unit: mm (in)

| ITEM   |                                      | STANDARD                      | SERVICE LIMIT               |              |
|--|--------------------------------------|-------------------------------|-----------------------------|--------------|
| Cylinder   | I.D.                                 | 75.000–75.015 (2.9528–2.9533) | 75.10 (2.957)               |              |
|  | Warpage across top                   | —                             | 0.10 (0.004)                |              |
|  | Taper                                | —                             | 0.06 (0.002)                |              |
|  | Out-of-round                         | —                             | 0.06 (0.002)                |              |
| Piston, piston rings and piston pin              | Piston ring-to-ring groove clearance | TOP                           | 0.015–0.045 (0.0006–0.0018) | 0.10 (0.004) |
|  |                                      | SECOND                        | 0.015–0.045 (0.0006–0.0018) | 0.10 (0.004) |
|  | Ring end gap                         | TOP                           | 0.10–0.30 (0.004–0.012)     | 0.50 (0.020) |
|  |                                      | SECOND                        | 0.10–0.30 (0.004–0.012)     | 0.50 (0.020) |
|  |                                      | OIL                           | 0.20–0.70 (0.008–0.028)     | 0.90 (0.035) |
|  | Piston O.D.                          | 74.965–74.990 (2.9514–2.9524) | 74.90 (2.949)               |              |
|  | Piston pin bore                      | 18.002–18.008 (0.7087–0.7090) | 18.05 (0.711)               |              |
|  | Connecting rod small end I.D.        | 18.016–18.034 (0.7093–0.7100) | 18.07 (0.711)               |              |
|  | Piston pin O.D.                      | 17.994–18.000 (0.7084–0.7087) | 17.98 (0.708)               |              |
|  | Piston-to-piston pin clearance       | 0.002–0.014 (0.0001–0.0006)   | 0.040 (0.0016)              |              |
| Cylinder-to-piston clearance                     | 0.010–0.050 (0.0004–0.0020)          | 0.10 (0.004)                  |                             |              |
| Piston pin-to-connecting rod small end clearance | 0.016–0.040 (0.0006–0.0016)          | 0.060 (0.0024)                |                             |              |

10

## TROUBLESHOOTING

### Low or uneven compression

- Worn cylinder or piston rings.
- Leaking head gasket.
- Incorrect valve timing.

### Piston noise

- Worn cylinder and piston.
- Excessive carbon deposits.

### Excessive smoke

- Worn cylinder and piston rings.
- Improperly installed piston rings.
- Damaged piston or cylinder.

### Overheating

- Excessive carbon deposits on piston or combustion chamber.
- Faulty water pump.

# CYLINDER

## REMOVAL

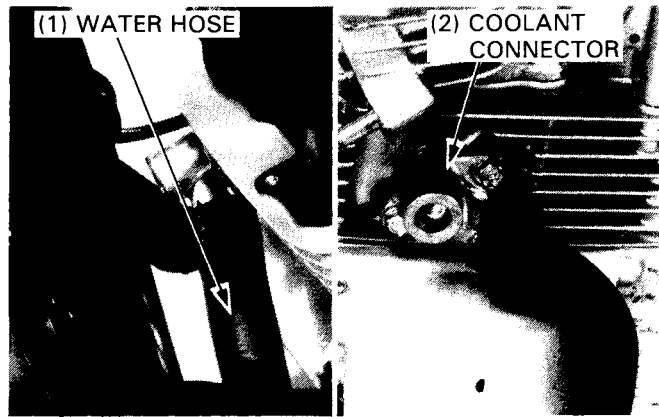
### NOTE

- To service the rear cylinder/piston, first remove the engine and then proceed with the common removal steps below.

Remove the following:

- cylinder head cover (page 9-3)
- cylinder head (page 9-8)
- gaskets, dowel pins, and cam chain guides.

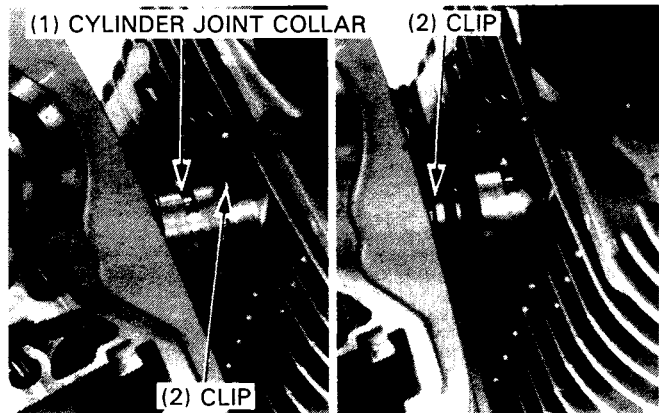
Disconnect the water hose from the coolant connector.



Remove the clip and slide the cylinder joint collar toward either the front or rear cylinder.

Remove the cylinder to be serviced.

Remove the cylinder gasket and dowel pins from the crankcase.



## INSPECTION

Clean the top of each cylinder thoroughly.

Inspect the cylinder walls for scratches and wear.

Measure and record the cylinder I.D. at three levels in both an X and Y axis. Take the maximum reading to determine the cylinder wear.

**SERVICE LIMIT: 75.10 mm (2.957 in)**

Calculate the piston-to-cylinder clearance. Take the maximum reading to determine the clearance.

**SERVICE LIMIT: 0.10 mm (0.004 in)**

Calculate the cylinder for taper at three levels in an X and Y axis. Take the maximum reading to determine the taper.

**SERVICE LIMIT: 0.06 mm (0.002 in)**

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

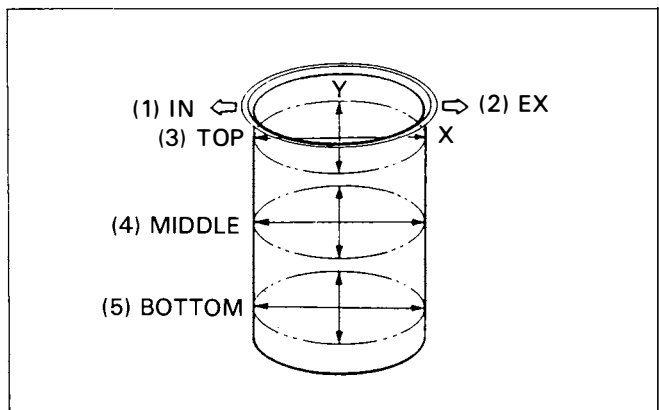
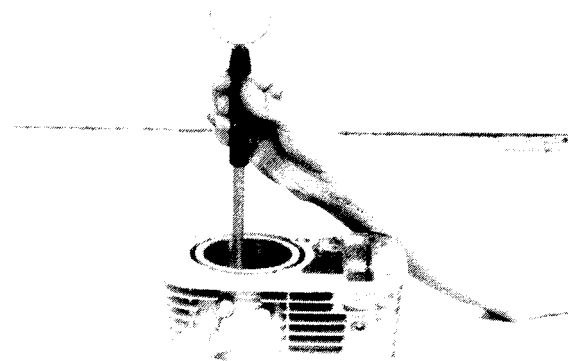
**SERVICE LIMIT: 0.06 mm (0.002 in)**

The cylinder must be rebored and an oversize piston fitted if the service limits are exceeded.

The following oversize piston are available:

- 0.25 mm (0.010 in) and 0.50 mm (0.020 in)

The cylinder must be rebored so that the clearance to an oversize piston is 0.010–0.050 mm (0.0004–0.0020 in).



Inspect the cylinders for transverse warpage across the top.

#### NOTE

- Measure warpage using a straight edge and feeler gauge as shown.

**SERVICE LIMIT: 0.10 mm (0.004 in)**



## PISTON

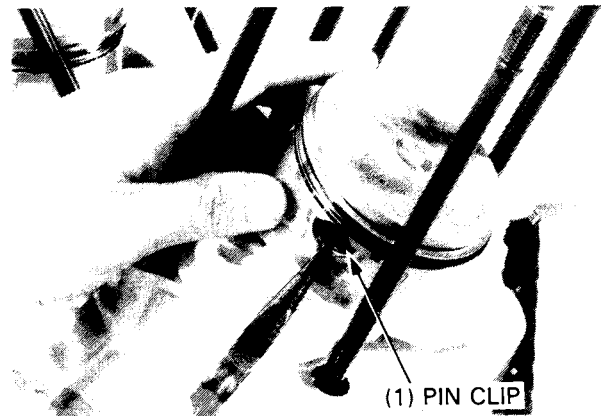
### REMOVAL

Place a shop towel into the crankcase and remove the piston pin clips.

#### NOTE

- Do not let the clips fall into the crankcase.

Push the piston pin out and remove the piston.



### INSPECTION

Clean the piston domes, ring lands and skirts.

Measure the piston ring-to-groove clearance.

#### SERVICE LIMIT:

Top: 0.10 mm (0.004 in)

Second: 0.10 mm (0.004 in)

If clearance is excessive, replace the piston ring.



Remove the piston rings and mark them to indicate the correct cylinder and piston position for reassembly.

#### NOTE

- Do not damage the piston rings when removing them.



## CYLINDER/PISTON

---

Insert the old piston ring into the proper ring groove and clean the groove by rolling the ring around the pistons circumference.

Inspect the piston for cracks or other damage.

Measure the piston O.D.

### NOTE

- Take measurements 10 mm (0.4 in) from the bottom, and 90° to the piston pin hole.

**SERVICE LIMIT: 74.90 mm (2.949 in)**

Calculate the piston-to-cylinder clearance by subtracting the piston O.D. from the cylinder I.D. (page 10-2).

**SERVICE LIMIT: 0.32 mm (0.013 in)**

Measure the top and second piston ring end gaps: using a piston, push the ring into the cylinder squarely and make the measurement.

### SERVICE LIMIT:

Top/Second: 0.50 mm (0.020 in)

Oil: 0.90 mm (0.035 in)

Measure each piston pin bore.

**SERVICE LIMIT: 18.05 mm (0.711 in)**

Measure each piston pin O.D.

**SERVICE LIMIT: 17.98 mm (0.708 in)**

Calculate the piston pin-to-piston clearance.

**SERVICE LIMIT: 0.40 mm (0.0016 in)**



Measure the I.D. of the connecting rod small end.

**SERVICE LIMIT: 18.07 mm (0.711 in)**

Calculate the piston pin-to-connecting rod clearance.

**SERVICE LIMIT: 0.060 mm (0.0024 in)**

Refer to section 11 for connecting rod replacement.



## PISTON RING INSTALLATION

### NOTE

- Insert the outside surface of the ring into the proper ring groove and roll around in the groove to make sure that the ring has a free fit around the piston's circumference.

Carefully install the piston rings onto the piston with the markings facing up.

### NOTE

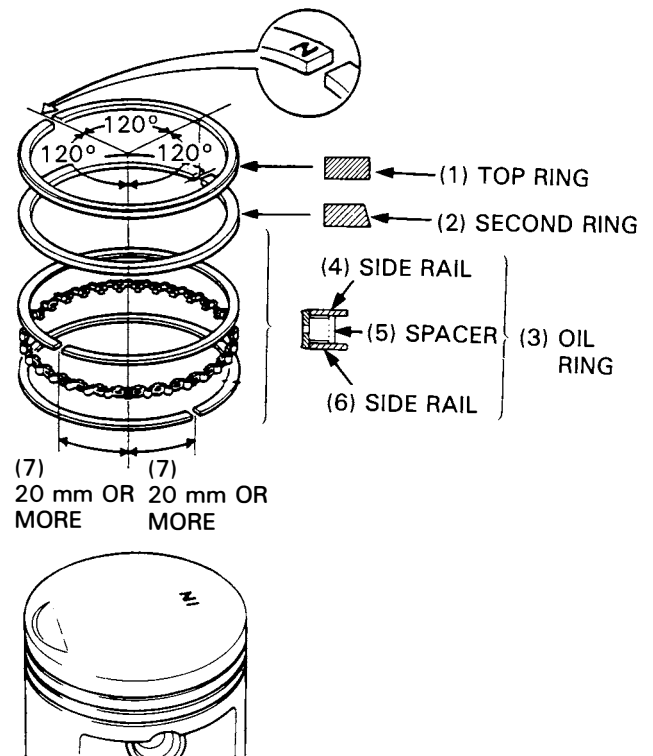
- Be careful not to damage the piston and piston rings during assembly.

Stagger the ring end gaps 120° apart from each other as shown.

### NOTE

- To install the oil ring, install the spacer first, then install the side rails.

After installing the rings, check that they rotate freely without sticking.



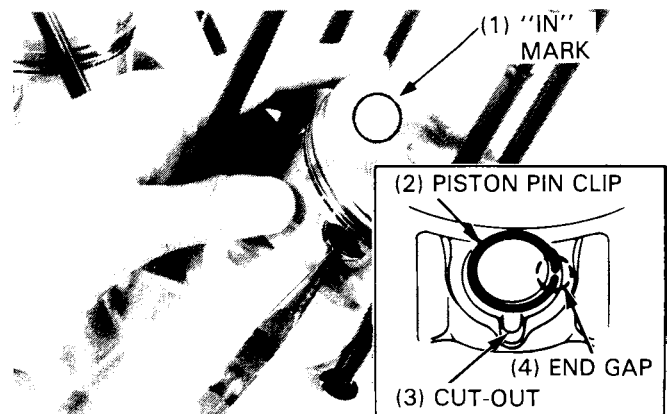
## PISTON INSTALLATION

Place a shop towel into the crankcase.

Coat the rod small end with molybdenum disulfide grease. Assemble the piston and connecting rod with the piston and piston pin clips as shown.

### NOTE

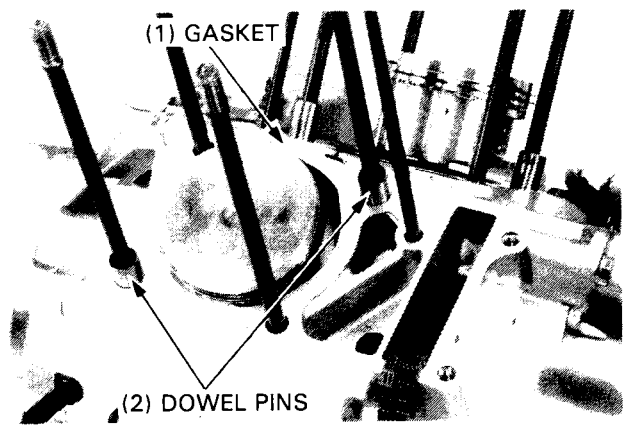
- Install the pistons with the mark "IN" facing towards the intake side.
- After installing the piston pin clips, make sure that they are seated properly and the end gaps are not aligned with the cut-out in the piston.
- Do not let the piston pin clips fall into the crankcase.



## CYLINDER INSTALLATION

Clean the cylinder gasket surface being careful not to drop any gasket material into the crankcase.

Install the dowel pins and new gasket.



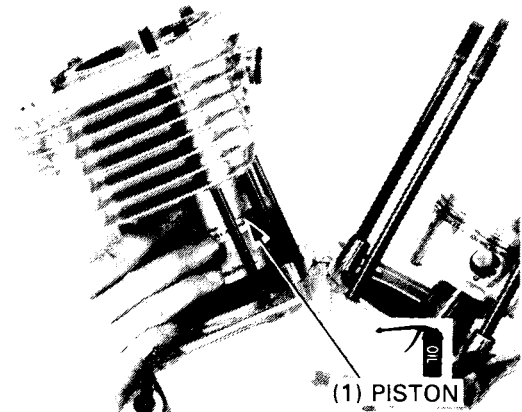
Coat the cylinders piston rings/grooves and piston with oil.

Install the piston assembly into the cylinder from the top of the crankcase while compressing the piston rings with your fingers.

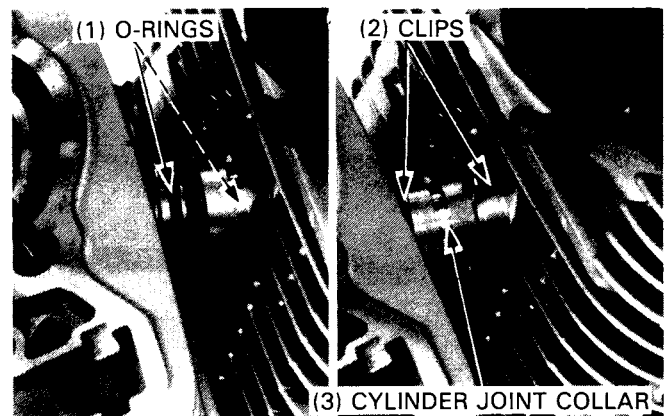
Be sure each assembly is returned to its original position as noted during removal.

### NOTE

- Be careful not to damage the piston rings during assembly.
- When the cylinder is halfway over the piston, route the cam chain through the cylinder.



Install a new O-ring onto the cylinder joint and install the cylinder joint collar by sliding the collar toward either cylinder. Install the clip securely.



Clean the cylinder gasket surface being careful not to drop any gasket material.

### NOTE

- Avoid damaging the gasket surface.

Install the cam chain guide.

### NOTE

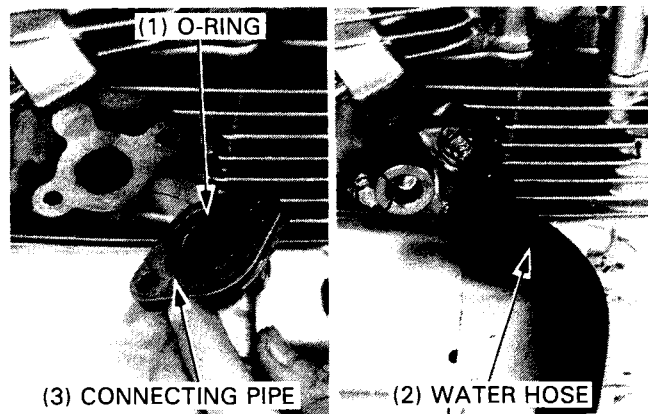
- Align the guide boss with the groove in the cylinder.
- Make sure that the end of the guide is inserted into place in the crankcase.



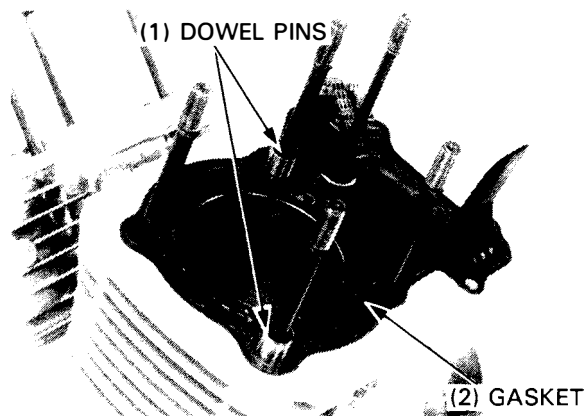


Install a new O-ring into the connecting pipe and install and tighten the connecting pipe mounting bolts, if the connecting pipe was removed.

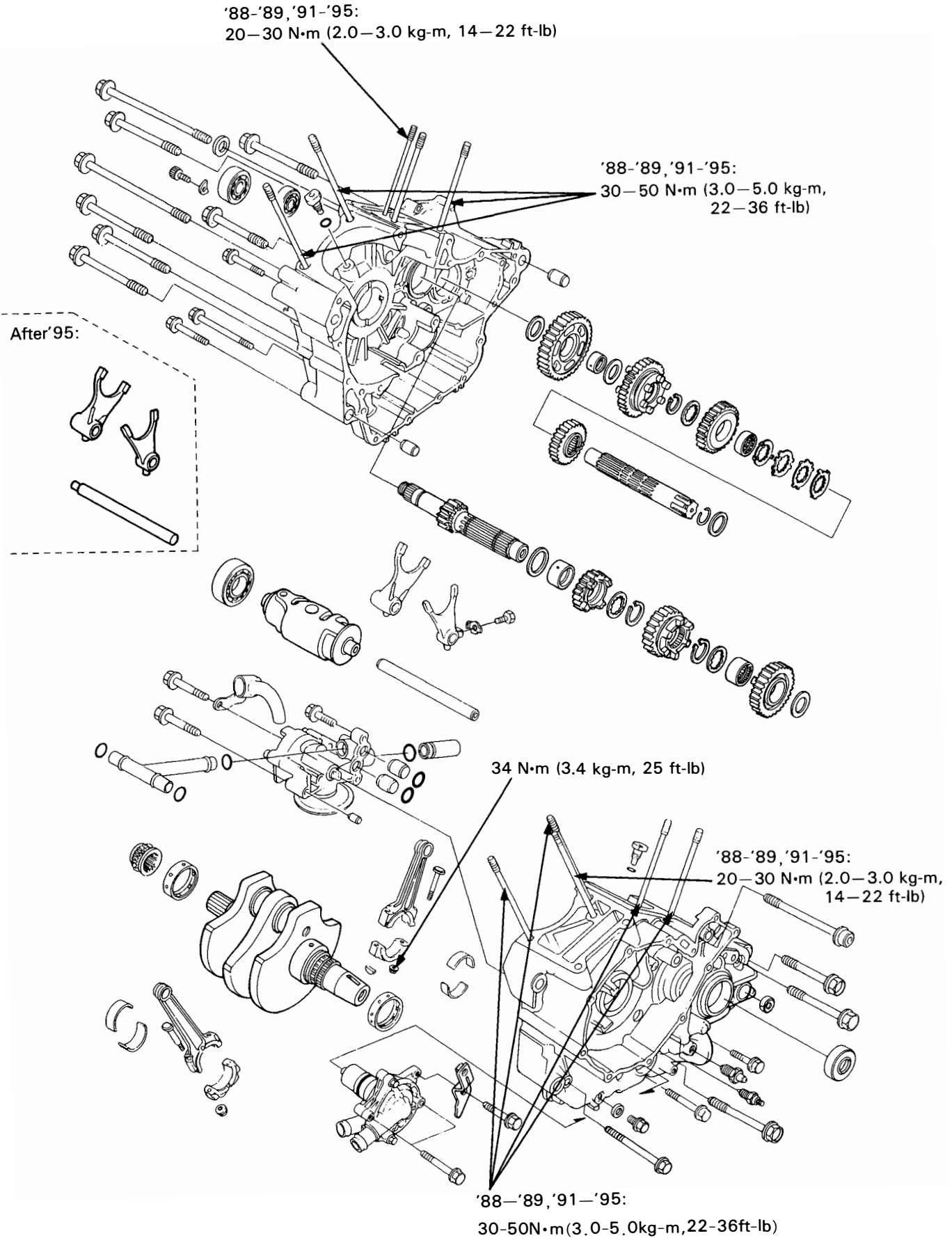
If only the water hose was removed, connect the hose with clamp.



Install the dowel pins and a new gasket.  
Install the cylinder heads and covers (Section 9).



# CRANKSHAFT/TRANSMISSION



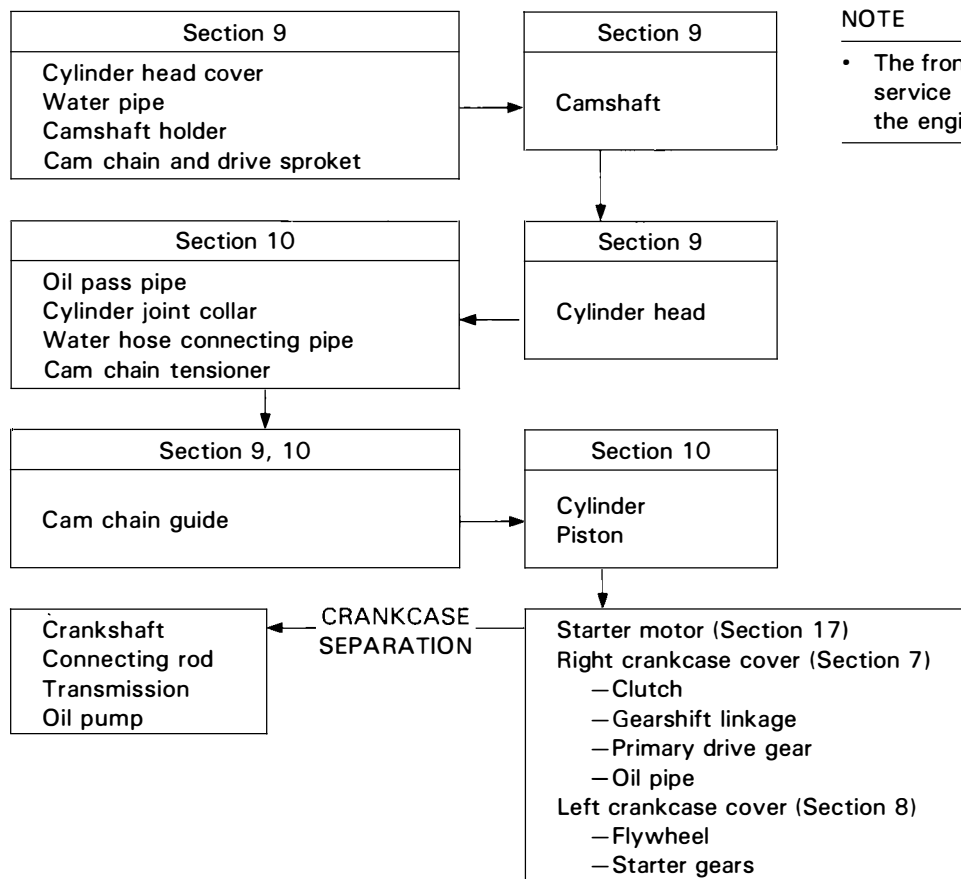
# 11. CRANKSHAFT/TRANSMISSION

|                                  |              |  |              |
|----------------------------------|--------------|--|--------------|
| <b>SERVICE INFORMATION</b>       | <b>11-1</b>  | <b>CRANKCASE</b>                               | <b>11-13</b> |
| <b>TROUBLESHOOTING</b>           | <b>11-3</b>  | <b>TRANSMISSION ASSEMBLY/<br/>INSTALLATION</b> | <b>11-17</b> |
| <b>CRANKCASE SEPARATION</b>      | <b>11-4</b>  | <b>CRANKCASE ASSEMBLY</b>                      | <b>11-19</b> |
| <b>CRANKSHAFT/CONNECTING ROD</b> | <b>11-5</b>  |  |              |
| <b>TRANSMISSION</b>              | <b>11-11</b> |  |              |

## SERVICE INFORMATION

### GENERAL

- To service the connecting rods, crankshaft, transmission and oil pump, the engine must be removed from the frame (Section 6).
- All bearing inserts are select fitted and are identified by color code. Select replacement bearings from the code tables. After installing new bearings, recheck them with plastigauge to verify clearance.
- Apply molybdenum disulfide grease to the main journals and crankpins during assembly.
- Before separating the crankcase, the following parts must be removed.



### NOTE

- The front cylinder camshaft and cylinder head service can be performed without removing the engine from the frame.

# CRANKSHAFT/TRANSMISSION

## SPECIFICATIONS

mm (in)

| ITEM                                       |                                       | STANDARD                      | SERVICE LIMIT                |               |
|--|---------------------------------------|-------------------------------|------------------------------|---------------|
| Crankshaft/<br>connecting rod              | Connecting rod big end side clearance | 0.05-0.20(0.002-0.008)        | 0.30(0.001)                  |               |
|  | Crankpin oil clearance                | 0.028-0.052(0.0011-0.0020)    | 0.07 (0.003)                 |               |
|  | Main journal oil clearance            | 0.025-0.041(0.0010-0.0016)    | 0.06 (0.002)                 |               |
|  | Crankshaft runout                     | —                             | 0.05 (0.002)                 |               |
| Transmission                               | Gear I.D.                             | C1                            | 24.000-24.021(0.9449-0.9457) | 23.94 (0.943) |
|  |                                       | M4, M2, C3                    | 28.000-28.021(1.1024-1.1032) | 28.04 (0.104) |
|  | Gear bushing O.D.                     | C1                            | 23.959-23.980(0.9433-0.9441) | 24.94 (0.982) |
|  |                                       | M4, M2, C3                    | 27.959-27.980(1.1007-1.1016) | 27.94 (1.100) |
|  | Gear bushing I.D.                     | C1                            | 20.016-20.037(0.7880-0.7889) | 20.06 (0.790) |
|  |                                       | M2                            | 25.000-25.021(0.9843-0.9851) | 25.04 (0.986) |
|  | Bushing-to-<br>shaft clearance        | C1                            | 0.023-0.057(0.0009-0.022)    | 0.10 (0.004)  |
|  |                                       | M2                            | 0.020-0.062(0.0008-0.0024)   | 0.10 (0.004)  |
|  | Gear-to-<br>bushing clearance         | M4, M2<br>C1, C3              | 0.002-0.062(0.0008-0.0024)   | 0.10 (0.004)  |
|  | Countershaft O.D.                     | C1 bushing                    | 19.980-19.993(0.7866-0.7871) | 19.96 (0.786) |
|  | Mainshaft O.D.                        | M2 bushing                    | 24.959-24.980(0.9835-0.9826) | 24.94 (0.982) |
|  | Backlash                              | 1st, 2nd, 3rd                 | 1.021-0.110(0.0008-0.0043)   | —             |
|  |                                       | 4th                           | 1.023-0.117 (0.0009-0.0046)  | —             |
| Shift fork/<br>fork-shaft                  | Claw thickness                        | 5.93-6.00(0.233-0.236)        | 5.63 (0.222)                 |               |
|  | Right and left shift<br>fork I.D.     | '88, '89, '91-'95:            | 13.000-13.018(0.5118-0.5125) | 13.04 (0.513) |
|  |                                       | After '95:                    | 13.000-13.021(0.5118-0.5126) | 13.04 (0.513) |
|  | Shaft O.D.                            | '88, '89, '91-'95:            | 12.966-12.984(0.5105-0.5112) | 12.90 (0.508) |
|  |                                       | After '95:                    | 12.966-12.984(0.5105-0.5112) | 12.95 (0.509) |
| Shift drum O.D. (at the left side journal) |                                       | 11.966-11.984 (0.4711-0.4718) | 11.94 (0.470)                |               |

## TORQUE VALUES

|                                |                                       |
|--------------------------------|---------------------------------------|
| Connecting rod bearing cap nut | 34 N·m (3.4 kg-m, 25 ft-lb)           |
| Crankcase 8 mm stud bolt       | 20-30 N·m (2.0-3.0 kg-m, 14-22 ft-lb) |
| 10 mm stud bolt                | 30-50 N·m (3.0-5.0 kg-m, 22-36 ft-lb) |

## TOOLS

### Special

|                                |                                   |                         |
|--------------------------------|-----------------------------------|-------------------------|
| Main bearing driver attachment | 07HMF-MM90400                     |                         |
| Bearing remover set            | 07936-3710001                     | Not available in U.S.A. |
| - remover handle               | 07936-3710100                     |                         |
| - bearing remover set          | 07936-3710600                     |                         |
| - remover weight               | 07741-0010201 or<br>07936-3710200 | U.S.A. Only             |

### Common

|                        |               |
|------------------------|---------------|
| Driver                 | 07749-0010000 |
| Attachment, 42 x 47 mm | 07746-0010300 |
| Pilot, 20 mm           | 07746-0040500 |
| Attachment, 52 x 55 mm | 07746-0010400 |
| Pilot, 22 mm           | 07746-0041000 |
| Pilot, 25 mm           | 07746-0040600 |

## TROUBLESHOOTING

### Excessive noise

- Crankshaft
  - Worn main bearing
  - Worn crankpin bearing
- connecting rod
  - Worn rod small end
  - Worn crankpin bearing

### Hard to shift

- Shift forks bent
- Shift fork shaft bent
- Shift spindle claw bent
- Shift drum cam grooves damaged
- Shift fork guide pin damaged

### Transmission jumps out of gear

- Gear dogs worn
- Shift shaft bent
- Shift forks bent

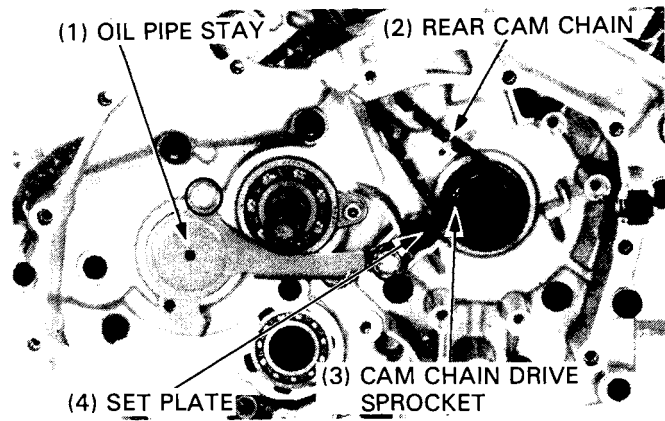
**CRANKCASE SEPARATION**

Remove the engine from the frame (Section 6).

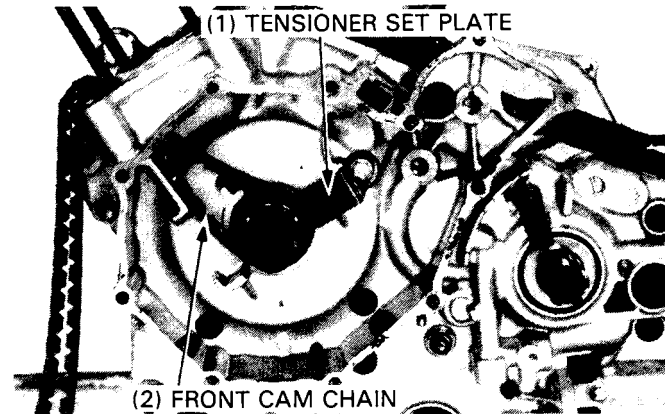
Refer to the service information (page 11-1) for the parts that must be removed before the separating the crankcase.

Remove the oil pipe stay and cam chain tensioner set plate by removing the bolts.

Remove the rear cam chain and cam chain drive sprocket.



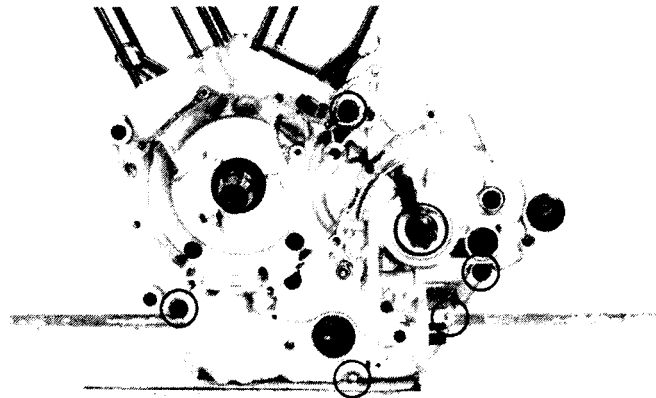
Remove the bolt and cam chain tensioner set plate.  
Remove the front cam chain from the crankshaft.



Remove the 8 mm bolts and 6 mm bolts from the left crankcase.

**NOTE**

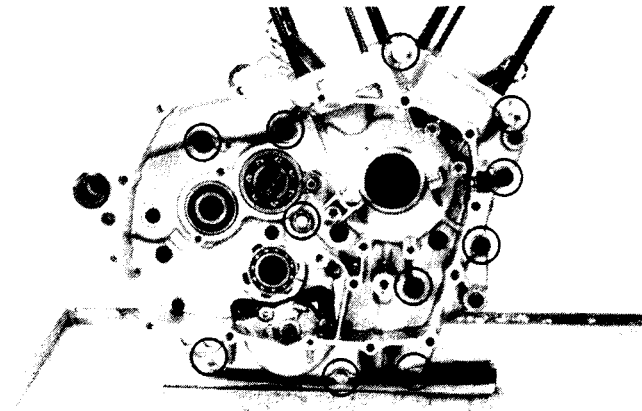
- Remove the bolts in a crisscross pattern in 2 or 3 steps.
- Loosen the 6 mm bolts first, then loosen the 8 mm bolts.



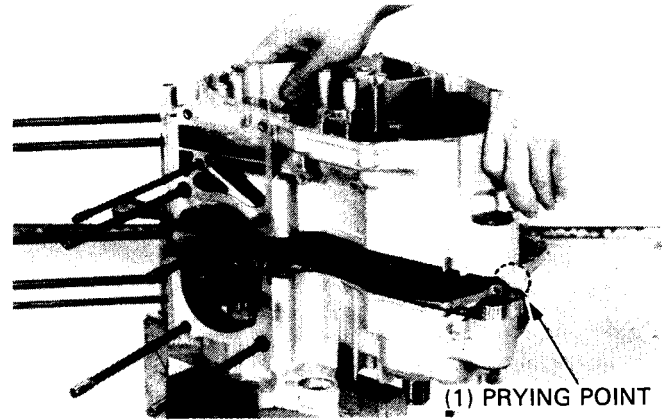
Remove the 8 mm bolts and 6 mm bolts from the right crankcase.

**NOTE**

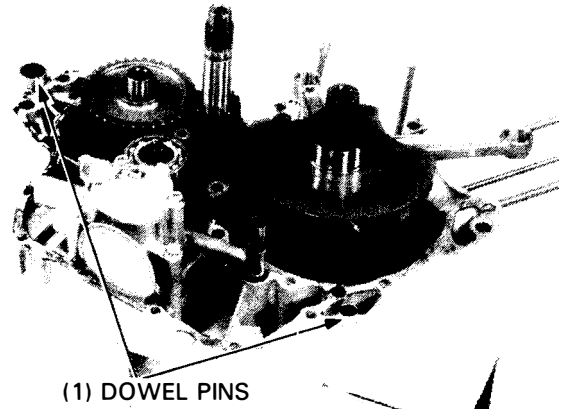
- Remove the bolts in a crisscross pattern in 2 or 3 steps.
- Loosen the 6 mm bolts first, then loosen the 8 mm bolts.



Place the left crankcase side down and separate the right crankcase from the left crankcase while prying where indicated at the point shown and tapping the cases at several locations with a soft hammer.



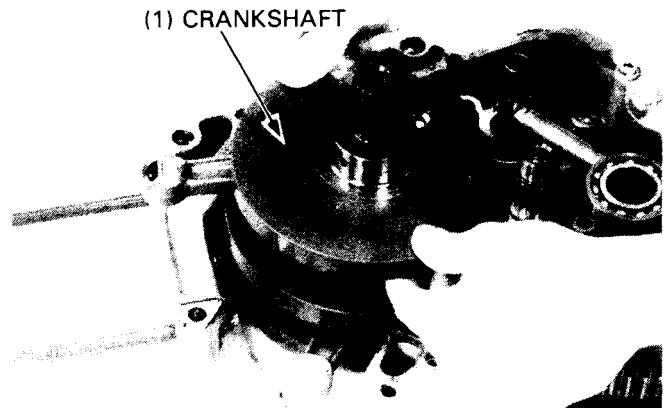
Remove the dowel pins and clean the crankcase halves of any sealant material.



## CRANKSHAFT/CONNECTING ROD

### CRANKSHAFT REMOVAL

Remove the crankshaft from the left crankcase.



### CRANKSHAFT SIDE CLEARANCE INSPECTION

Check the connecting rod side clearance with feeler gauge.

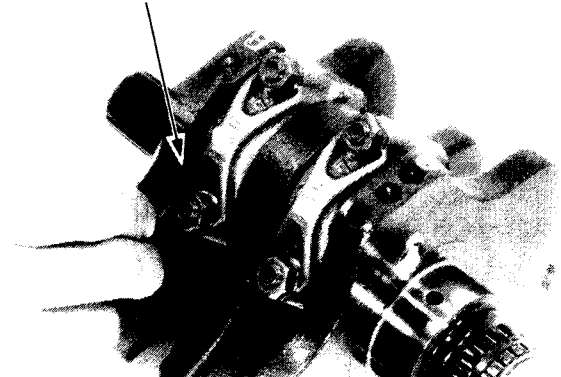
**SERVICE LIMIT: 0.30 mm (0.001 in)**

If either side clearance exceeds the service limit, replace the connecting rod and recheck.

If still beyond the limit, replace the crankshaft.

Inspect the crankshaft for rough spots or damage.

(1) FEELER GAUGE



## CRANKSHAFT/TRANSMISSION

### CONNECTING ROD DISASSEMBLY

Remove the connecting rod bearing caps noting their locations.

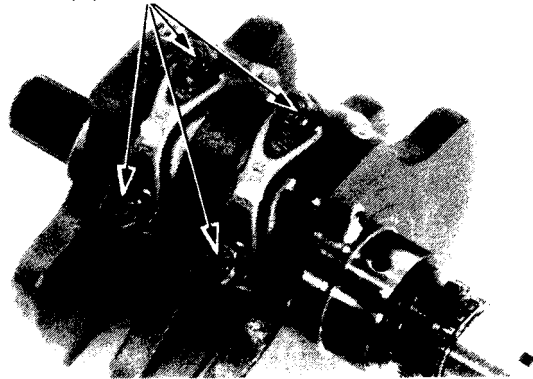
#### NOTE

- Tap the side of the cap lightly if it is hard to remove.

#### CAUTION

- *Do not interchange the crankpin bearings. They must be installed in their original positions or the correct bearing oil clearance may not be obtained resulting in engine damage.*

(1) BEARING CAPS



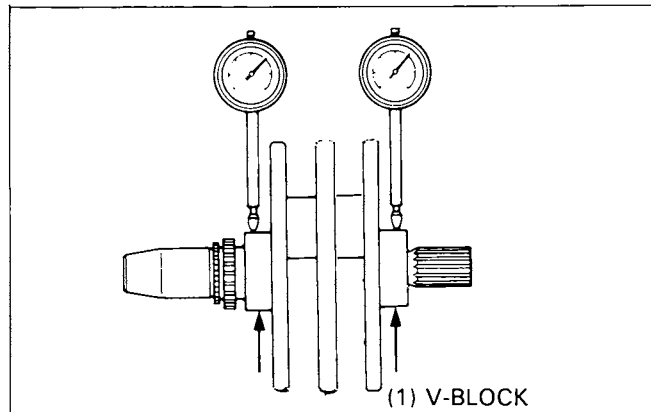
### CRANKSHAFT RUNOUT INSPECTION

Place the crankshaft on a stand or V blocks.  
Set a dial indicator on the main journals. Rotate the crankshaft two revolutions and read the runout.  
Actual runout is 1/2 the total indicator reading.

**SERVICE LIMIT: 0.05 mm (0.002 in)**

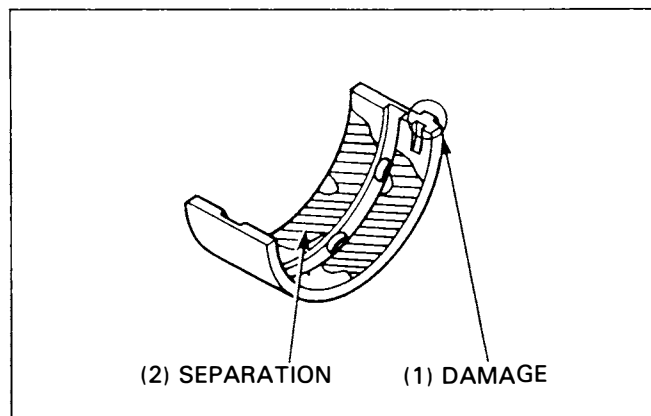
#### NOTE

- The crankshaft cannot be repaired. Replace it if the journals or crankpins are burnt, cracked, or if the runout is beyond limits.



### CONNECTING ROD BEARING INSPECTION

Inspect the bearing inserts for damage or separation.  
Clean all oil from the bearing inserts and crankpins.



### OIL CLEARANCE INSPECTION

Put a piece of plastigauge on each crankpin avoiding the oil hole.

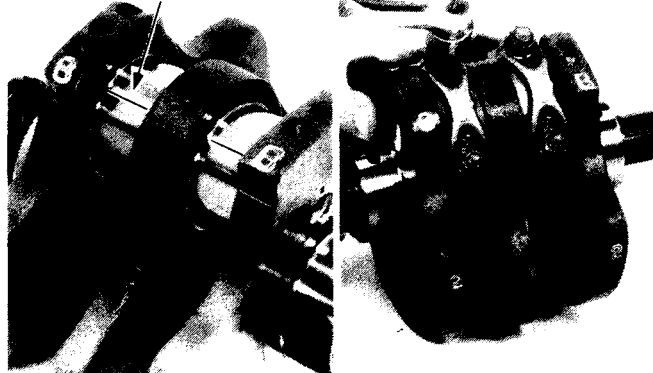
Install the bearing caps and rods on the correct crankpins, and tighten them evenly.

**TORQUE: 34 N·m (3.4 kg·m, 25 ft·lb)**

#### NOTE

- Do not rotate the crankshaft during inspection.

(1) PLASTIGAUGE

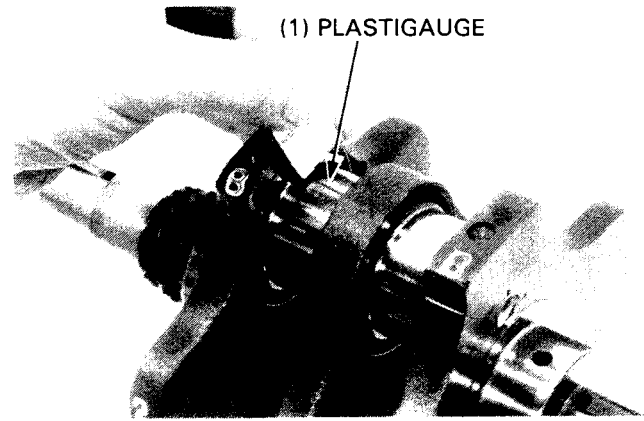




Remove the caps and measure the compressed plastigauge at its widest point on each crankpin to determine the oil clearance.

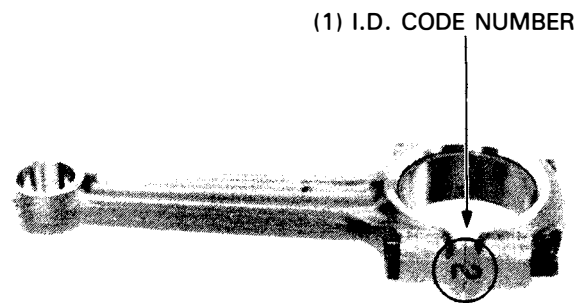
**SERVICE LIMIT: 0.07 mm (0.003 in)**

If the rod bearing clearance is beyond tolerance, select replacement bearings.

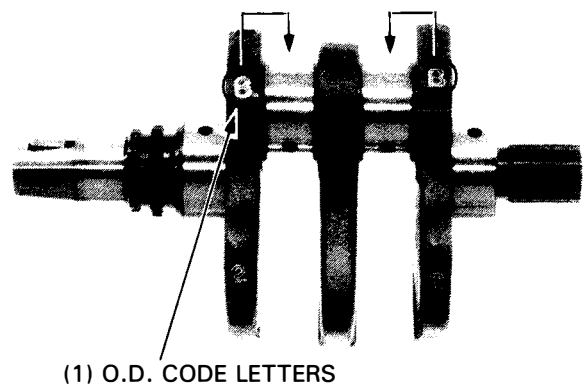


**CONNECTING ROD BEARING SELECTION**

Determine the connecting rod I.D. code number. The code will be either a number 1 or 2 located on the rod in the area shown.



Determine the corresponding crankpin O.D. code (or measure the crankpin O.D.). The code will be either a letter A or B on the crank weight.



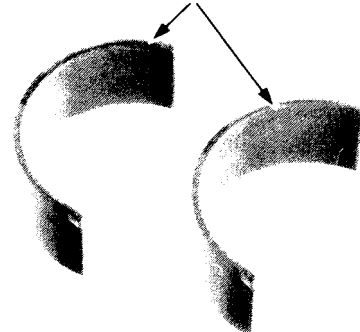
Cross reference the crankpin and connecting rod codes to determine the replacement bearing color.

| CRANKPIN O.D. CODE |                                     | A                        | B         |
|--------------------|-------------------------------------|--------------------------|-----------|
|                    |                                     | CONNECTING ROD I.D. CODE |           |
| 1                  | 43.000–43.007 mm (1.6929–1.6932 in) | C (BROWN)                | B (BLACK) |
| 2                  | 43.008–43.016 mm (1.6932–1.6935 in) | B (BLACK)                | A (BLUE)  |

**BEARING INSERT THICKNESS**

A (BLUE): 1.495–1.499 mm (0.0589–0.0590 in)  
 B (BLACK): 1.491–1.495 mm (0.0587–0.0589 in)  
 C (BROWN): 1.487–1.491 mm (0.0585–0.0587 in)

(1) CRANKPIN BEARINGS

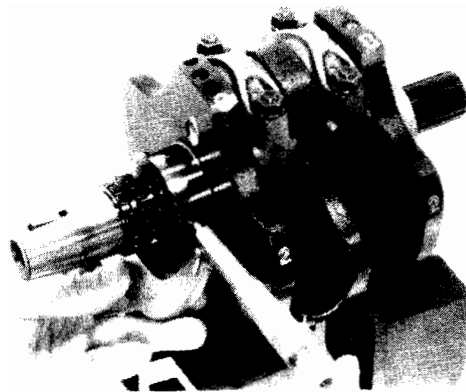


## CRANKSHAFT/TRANSMISSION

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### MAIN BEARING INSPECTION

Measure the main journal O.D. and record it.

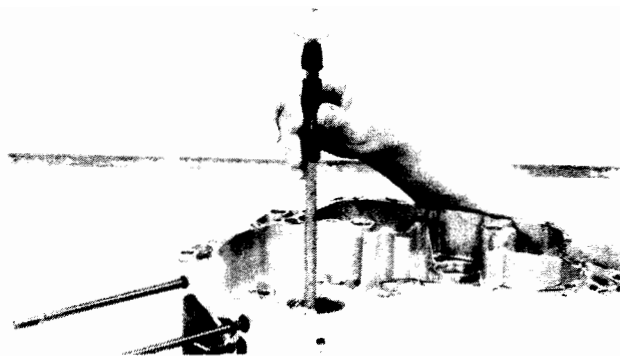


Measure the main journal bearing I.D. and record it.

Calculate the clearance between the main journal and the main bearing.

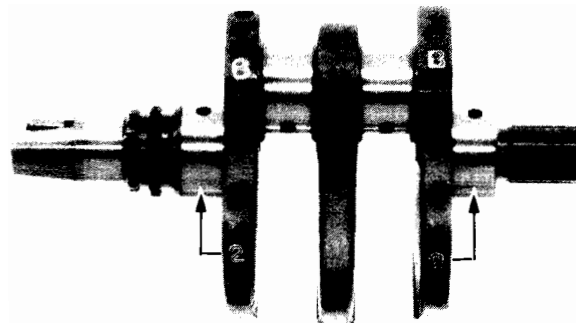
**SERVICE LIMIT: 0.06 mm (0.002 in)**

If the oil clearance is beyond the service limit, select a replacement bearings as follows:



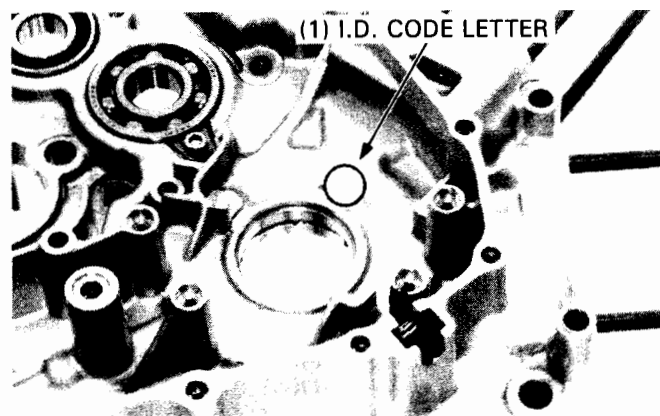
### MAIN BEARING SELECTION

Determine the crankshaft main journal O.D. code. The code will be either a number 1 or 2 on the crank weight.



Determine the replacement main bearing.

Determine the corresponding main bearing I.D. code. The code will be either a letter A or B on the crankcase.



Choss replacement main bearings in accordance with the table below.

| MAIN JOURNAL<br>O.D. CODE |  | 1  | 2  |
|---------------------------|--|--|--|
|                           |  | 44.992–<br>45.000 mm<br>(1.7713–<br>1.7717 in) | 44.984–<br>44.991 mm<br>(1.7710–<br>1.7713 in) |
| CASE I.D. CODE            |  |  |  |
| A                         | 48.990–49.000 mm<br>(1.9287–1.9291 in) | C<br>(BROWN)                                   | B<br>(BLACK)                                   |
| B                         | 49.000–49.010 mm<br>(1.9291–1.9295 in) | B<br>(BLACK)                                   | A<br>(BLUE)                                    |

**BEARING INSERT THICKNESS**

A (BLUE): 2.003–2.013 mm (0.0789–0.0793 in)  
 B (BLACK): 1.998–2.008 mm (0.0787–0.0791 in)  
 C (BROWN): 1.993–2.003 mm (0.0785–0.0789 in)

**MAIN BEARING REPLACEMENT**

Press the main bearing out of the crankcase using a hydraulic press and special tools.

**NOTE**

- Always use a press to remove the main bearing.

**TOOLS:**

**Driver** 07749–0010000  
**Main bearing remover attachment** 07HMF–MM90400

Mark a vertical line below each side of the bearing tab.

Apply molybdenum disulfide grease to the outer surface of the main bearing.

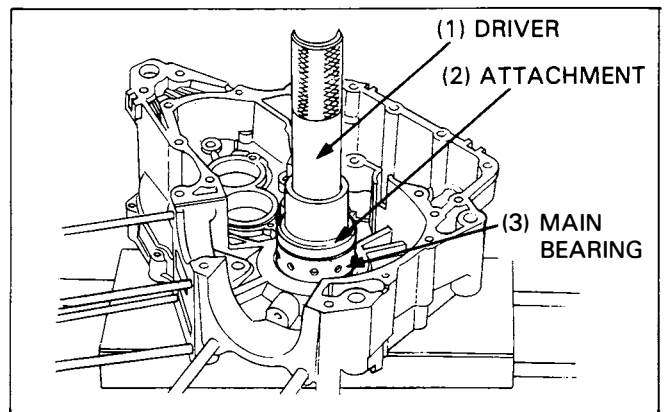
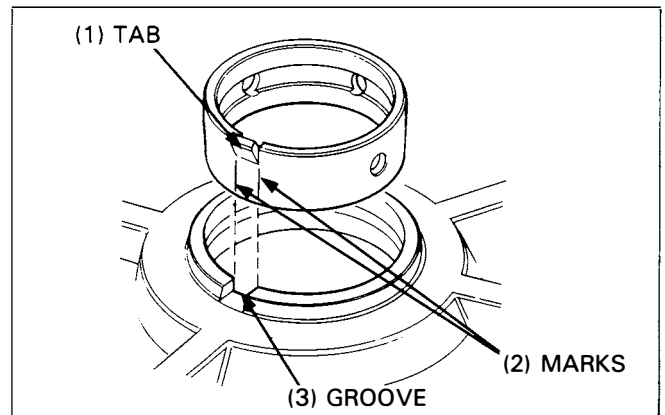
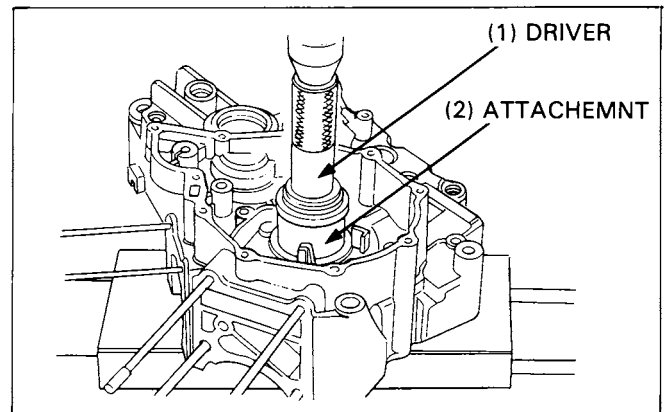
Align the marks on the bearing with the groove in the bearing hole, and press the main bearing into the crankcase.

**CAUTION**

- *Be careful not to damage the bearings.*

**TOOLS:**

**Driver** 07749–0010000  
**Main bearing driver attachment** 07HMF–MM90400



## CRANKSHAFT/TRANSMISSION

### CONNECTING ROD/CRANKSHAFT SELECTION

If a connecting rod requires replacement, you should select a rod with the same weight code as the original. But if that is unavailable, you may use one of the others specified in the following chart.

#### NOTE

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

#### SELECTION TABLE

| Front rod code<br>Rear rod code | A | B | C  |
|---------------------------------|---|---|----|
| A                               | * | O | O  |
| B                               | O | O | O  |
| C                               | O | O | ** |

#### CAUTION

*For selecting crankshaft weight:*

- Select "L" crankshaft weight, if the front rod and rear rod have code A (\*).
- Select "H" crankshaft weight, if the front rod and rear rod have code C (\*\*).
- Select crankshaft weight with no code, other than the above two cases.

### CONNECTING ROD ASSEMBLY

Install the bearing inserts on the rods and caps.

#### NOTE

- Align the boss on the bearing with the groove in the rod or cap.
- Apply molybdenum disulfide grease to the bearing.

Install the connecting rods and caps on the crankpin. Be sure each part is installed in its original position, as noted during removal.

Tighten the bearing cap nuts.

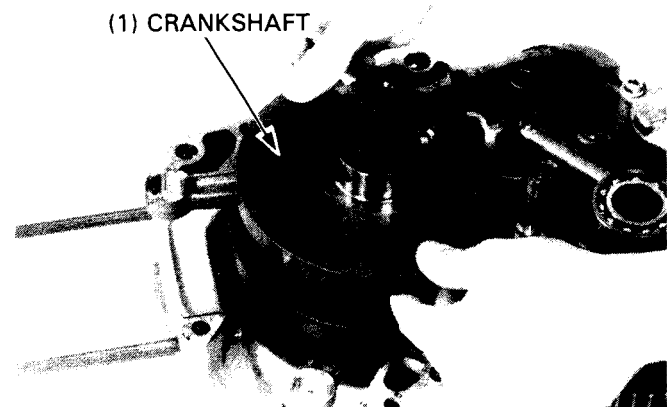
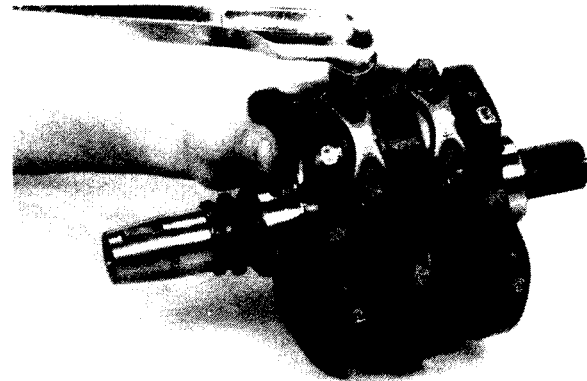
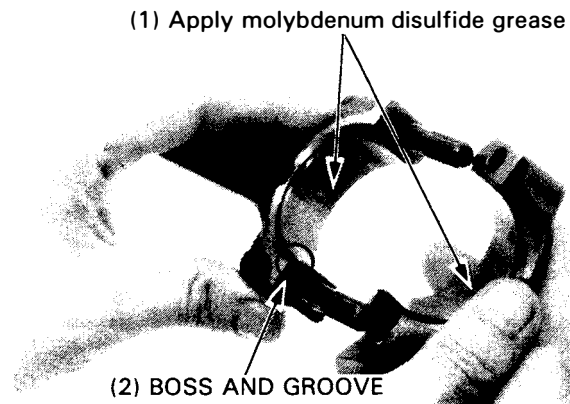
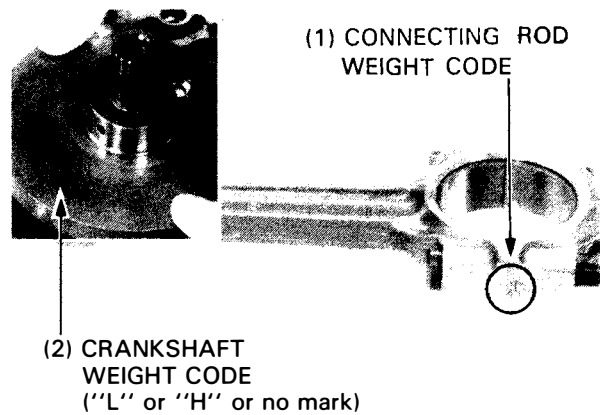
#### NOTE

- Align the I.D. code on the cap and rod.
- Tighten the nuts in two or more steps. After tightening, check that the rods move freely without binding.

**TORQUE: 34 N·m (3.4 kg-m, 25 ft-lb)**

### CRANKSHAFT INSTALLATION

Install the crankshaft in the left crankcase.  
Install the dowel pins and assemble the crankcase.



# TRANSMISSION

## REMOVAL

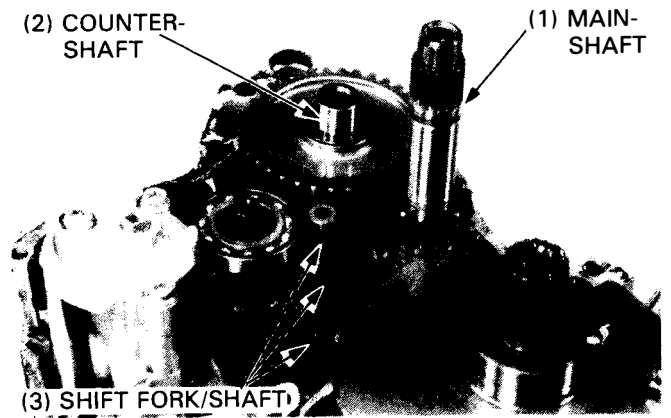
'88, '89, '91-'95:

Remove the mainshaft, countershaft, shift fork shaft and shift drum as an assembly.

After '95:

Remove the shift fork shaft then remove the shift drum and shift forks.

Remove the mainshaft and countershaft as an assembly.

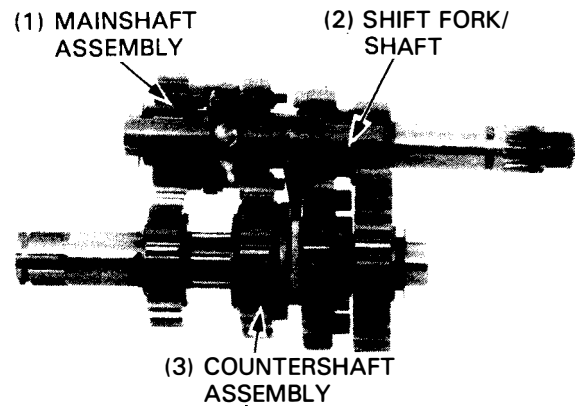


'88, '89, '91-'95:

Separate the shift fork/shaft, mainshaft and countershaft assemblies from each other.

After '95:

Separate the mainshaft and countershaft assemblies from each other.



## DISASSEMBLY/INSPECTION

Temporarily install the mainshaft and countershaft to the left crankcase.

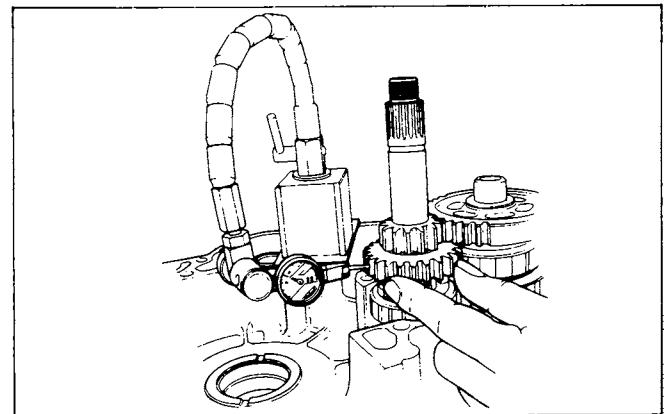
Measure the backlash of each gear.

**STANDARD: 1st, 2nd, 3rd**

1.021–0.110 mm (0.0008–0.0043 in)

**4th**

1.023–0.117 mm (0.0009–0.0046 in)



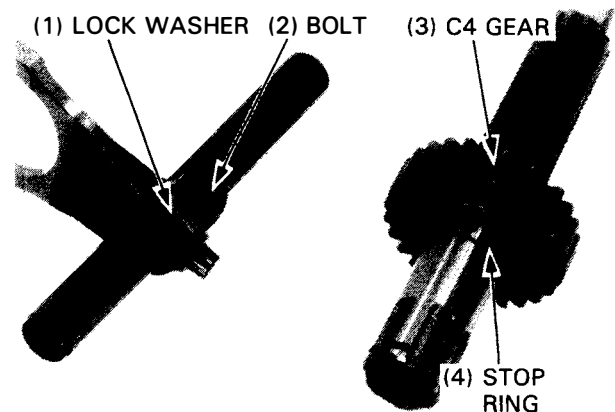
'88, '89, '91-'95:

Bend down the lock washer tabs and remove the bolt and lock washer from the left shift fork.

Remove the shift fork shaft.

Disassemble the mainshaft and countershaft.

Remove the C4 gear by removing the stop ring.



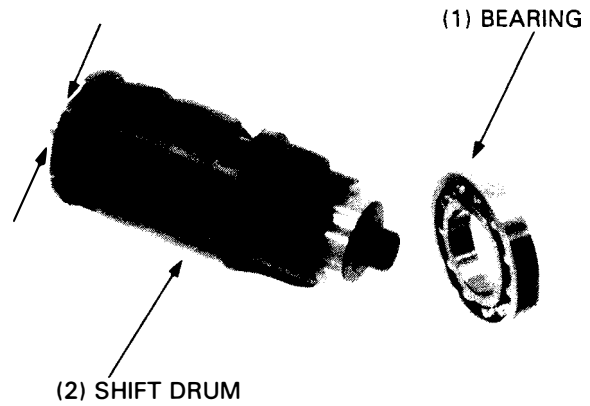
## CRANKSHAFT/TRANSMISSION

Inspect the shift drum end for scoring, scratches, or evidence of insufficient lubrication. Check the shift drum grooves for damage.

Measure the shift drum shaft O.D. at the left side journal.

**SERVICE LIMIT: 11.94 mm (0.470 in)**

Check the bearing inner and outer races for damage. The bearing should turn smoothly and quietly.



Check the shift fork shaft for scratches, scoring or evidence of insufficient lubrication.

Measure the shift fork shaft O.D.

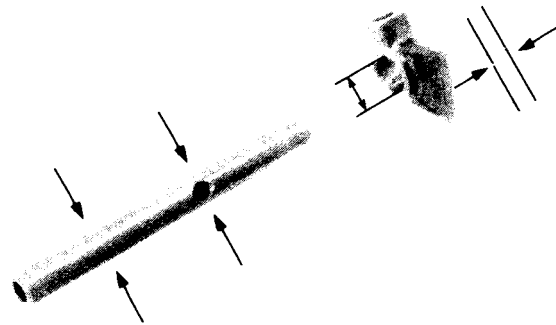
**SERVICE LIMIT: '88, '89, '91-'95: 12.90mm (0.508 in)**  
**After '95: 12.95mm (0.509 in)**

Measure the shift fork I.D. (right and left) and the shift fork claw thickness.

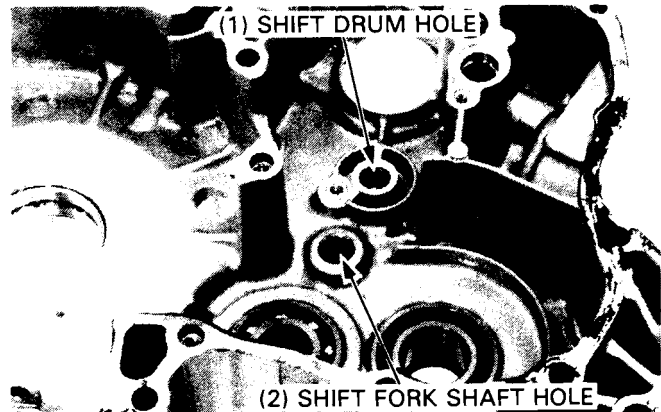
**SERVICE LIMIT:**

**I.D.: 13.04 mm (0.513 in)**

**CLAW THICKNESS: 5.63 mm (0.222 in)**



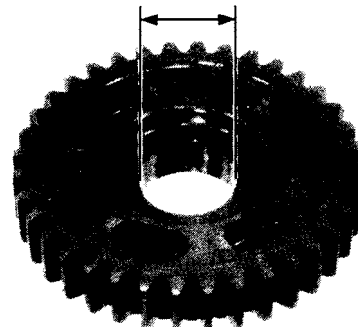
Inspect the shift drum and shift fork shaft journals for excessive wear or damage.



Check the gear dogs, holes and teeth for excessive or abnormal wear, or evidence of insufficient lubrication.

Measure the I.D. of the following mainshaft countershaft at C3, C1 gears.

**SERVICE LIMITS: C1 gear: 24.04 mm (0.947 in)**  
**M2, M4, C3 gear: 28.04 mm (1.104 in)**



Measure the O.D. of the mainshaft following bushings:

**SERVICE LIMITS:**

- M4 gear bushing: 27.94 mm (1.100 in)
- C3 gear bushing: 27.94 mm (1.100 in)
- M2 gear bushing: 27.94 mm (1.100 in)
- C1 gear bushing: 24.94 mm (0.982 in)

Calculate the clearance between each bushing and gear.

**SERVICE LIMIT: 0.10 mm (0.004 in)**

Measure the I.D. of the M2 and C1 bushings:

**SERVICE LIMITS:**

- M2 gear bushing: I.D. 25.04 mm (0.986 in)
- C1 gear bushing: I.D. 24.06 mm (0.790 in)

Measure the O.D. of the mainshaft and countershaft at the M2 and C1 bushings.

**SERVICE LIMITS:**

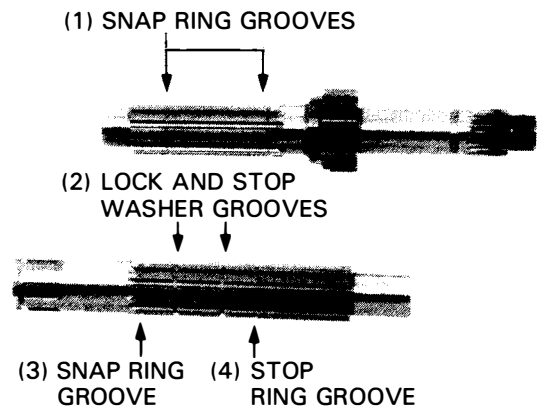
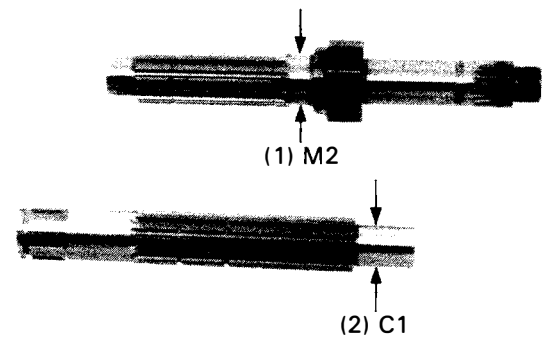
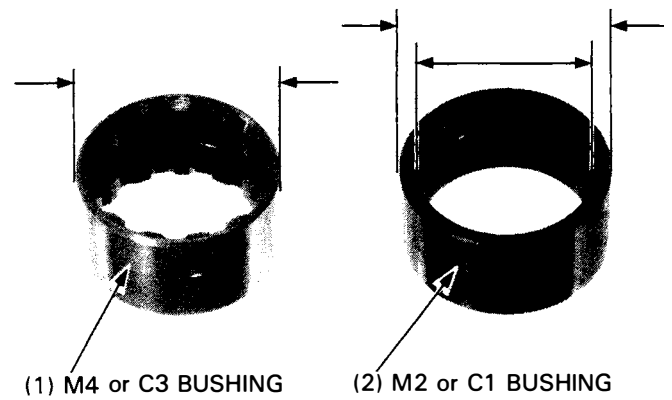
- Mainshaft (at M2 gear bushing)  
24.90 mm (0.980 in)
- Countershaft (at C1 gear bushing)  
19.92 mm (0.784 in)

Calculate the clearance between each bushing and shaft.

**SERVICE LIMIT: 0.06 mm (0.0024 in)**

Check the each shaft grooves for damage.

Replace if necessary.

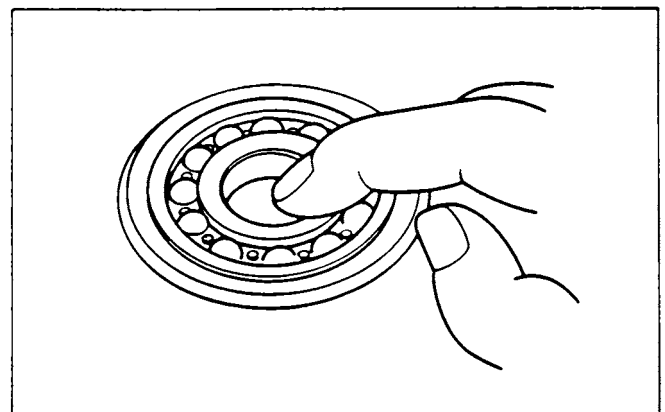


**CRANKCASE**

**BEARING REPLACEMENT**

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

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



## CRANKSHAFT/TRANSMISSION

### Left crankcase

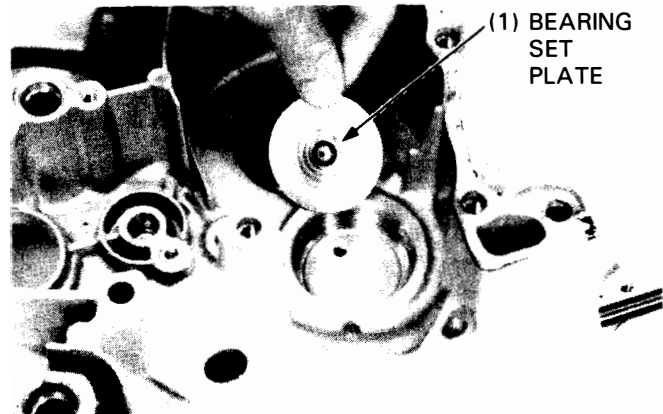
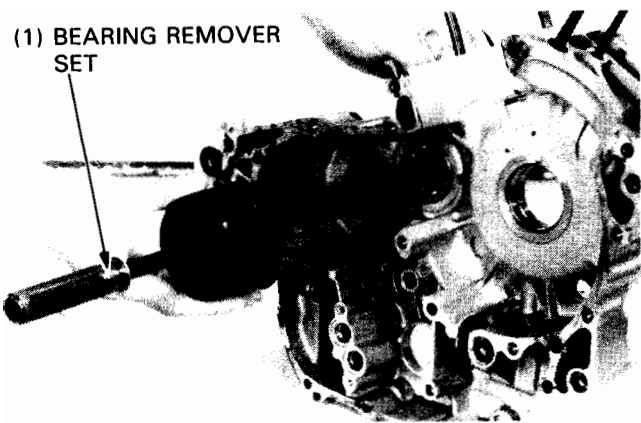
Remove the left mainshaft bearing using the special tools.

#### TOOLS:

|                       |                                       |
|-----------------------|---------------------------------------|
| Bearing remover set   | 07936-3710001 Not available in U.S.A. |
| - remover handle      | 07936-3710100                         |
| - bearing remover set | 07936-3710600                         |
| - remover weight      | 07741-0010201 or 07936-3710200        |

Drive the countershaft bearing and oil seal out of the crankcase.

Install the new mainshaft bearing set plate on the left crankcase.



#### NOTE

- Apply fresh engine oil to the new crankcase bearings before installation.

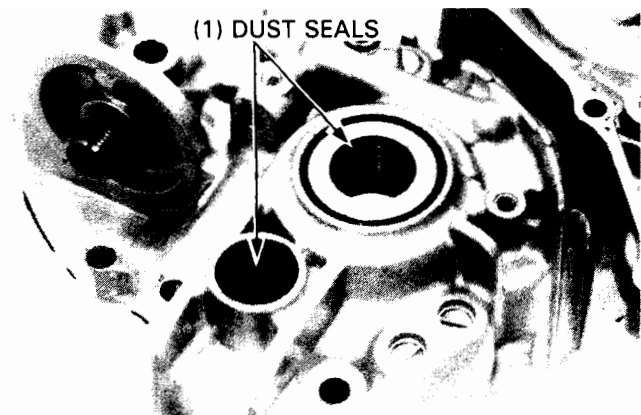
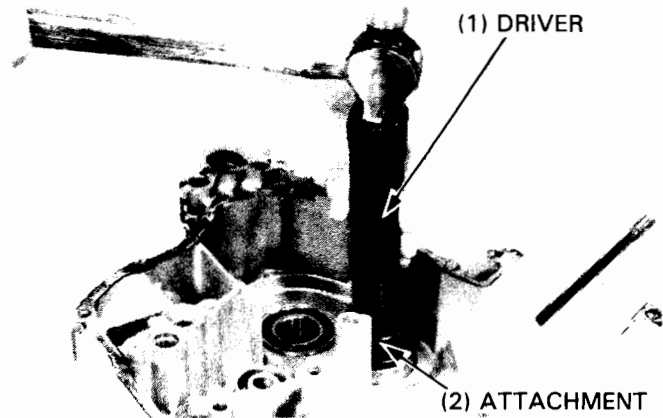
Install the new bearings with the following tools.

#### TOOLS:

|                                  |               |
|----------------------------------|---------------|
| <b>Left mainshaft bearing</b>    |               |
| Driver                           | 07749-0010000 |
| Attachment, 42 x 47 mm           | 07746-0010300 |
| <b>Left countershaft bearing</b> |               |
| Driver                           | 07749-0010000 |
| Attachment, 52 x 55 mm           | 07746-0010400 |
| Pilot, 25 mm                     | 07746-0040600 |

Install a new countershaft oil seal.

Check the gearshift spindle oil seal for wear or damage, replace if necessary.





**Right crankcase**

Remove the mainshaft bearing set plate and drive the countershaft bearing, mainshaft bearing and shift drum bearing out of the crankcase.

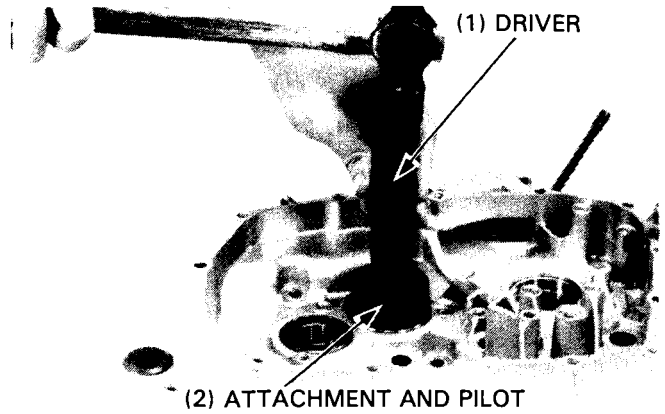
**TOOLS:**

**Right mainshaft bearing**

|                        |               |
|------------------------|---------------|
| Driver                 | 07749-0010000 |
| Attachment, 52 x 55 mm | 07746-0010400 |
| Pilot, 22 mm           | 07746-0041000 |

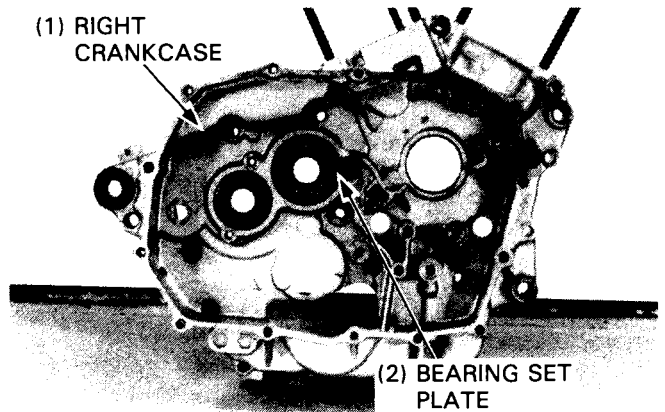
**Right countershaft bearing**

|                        |               |
|------------------------|---------------|
| Driver                 | 07749-0010000 |
| Attachment, 42 x 47 mm | 07746-0010300 |
| Pilot, 20 mm           | 07746-0040500 |



Apply a locking agent to the threads of the mainshaft bearing set plate attaching bolt.

Install the set plate and tighten the bolt securely.

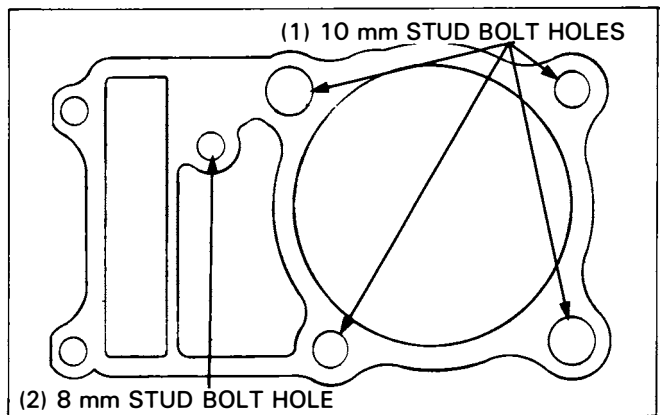


**INSPECTION**

**Crankcase studs**

'88, '89, '91-'95:

Check that the studs are tight. If any are loose, remove them, clean their threads with contact cleaner, then reinstall them using Honda Anaerobic Thread Lock, or equivalent.



After installing, be sure to measure the distance from the top of each stud to the crankcase surface.

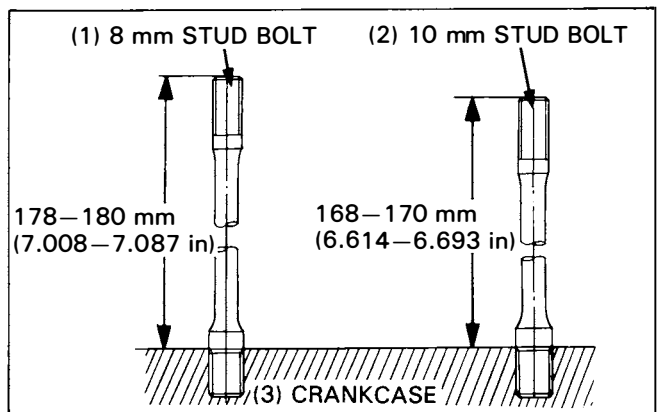
Tighten the stud bolts to the specified torque.

**TORQUE: 8 mm stud bolt:**

20-30 N·m (2.0-3.0 kg-m, 14-22 ft-lb)

**10 mm stud bolt:**

30-50 N·m (3.0-5.0 kg-m, 22-36 ft-lb)



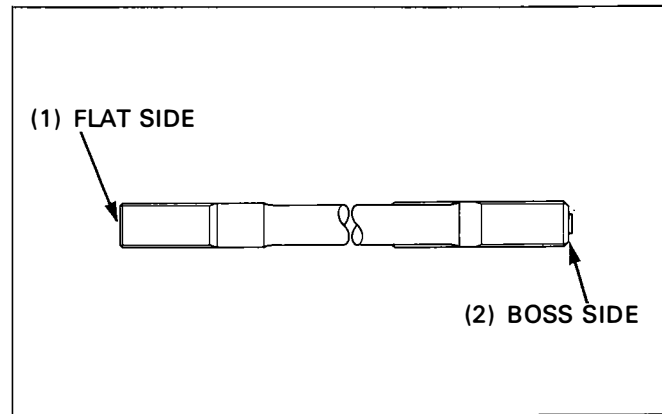
## CRANKSHAFT/TRANSMISSION

After '95:

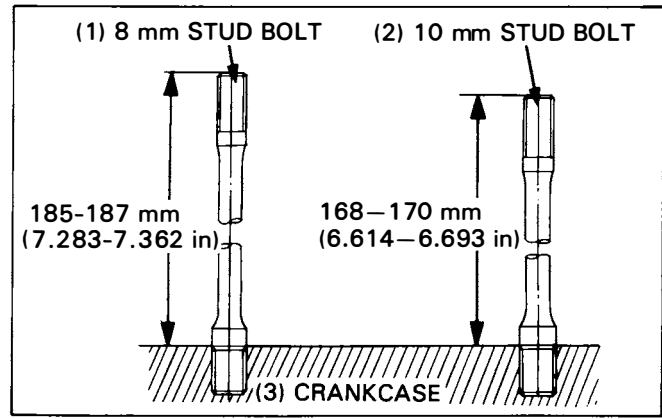
Check that the studs are tight. If any are loose, remove them, clean their threads with contact cleaner, then reinstall them and apply engine oil to the threads.

### NOTE

- Install the studs with the flat side into the crankcase.



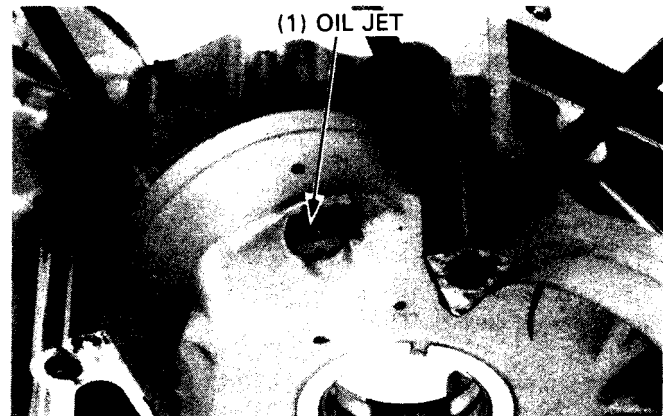
After installing, be sure to measure the distance from the top of each stud to the crankcase surface as shown.



### OIL JET

Remove the oil jets from the front cylinder bore of the right and left crankcase.

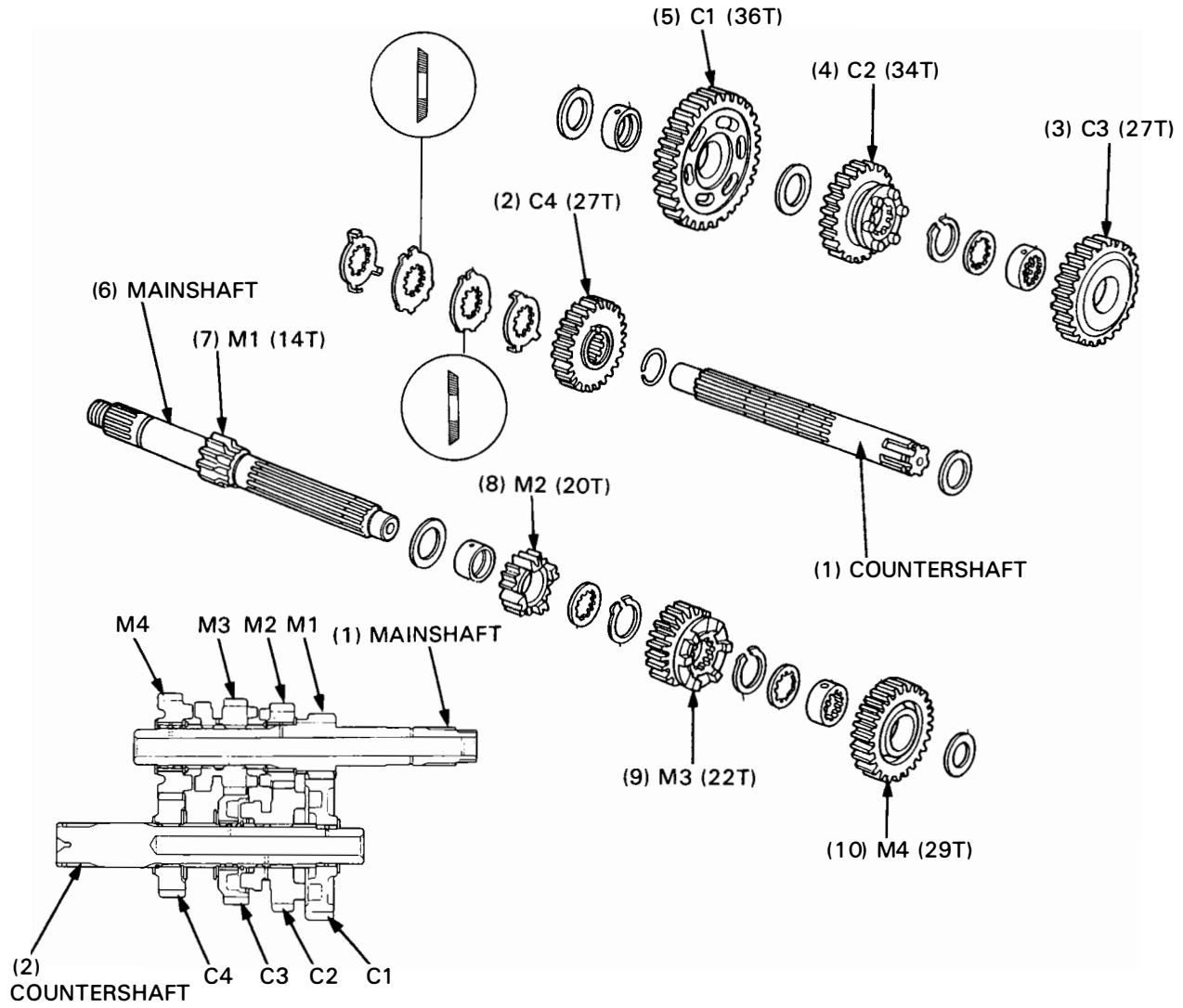
Check the O-ring for fatigue and damage.



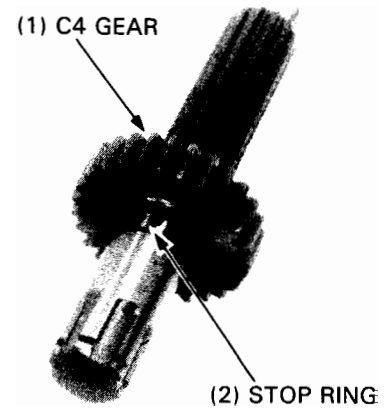
# TRANSMISSION ASSEMBLY/ INSTALLATION

Apply molybdenum disulfide grease to the following.

- shift fork grooves
- inside and outside of the bushings
- outside of the spline bushings



Install the stopper ring and C4 gear onto the countershaft.

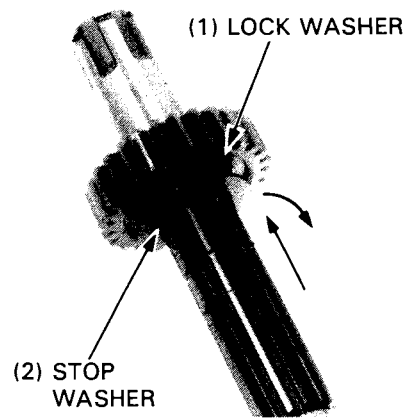


## CRANKSHAFT/TRANSMISSION

---

Install the lock washer and stop washer, aligning bigger tabs of the lock washer with bigger grooves of the stop washer in the countershaft groove.

Turn the washers as shown to lock them on the nearest spline.



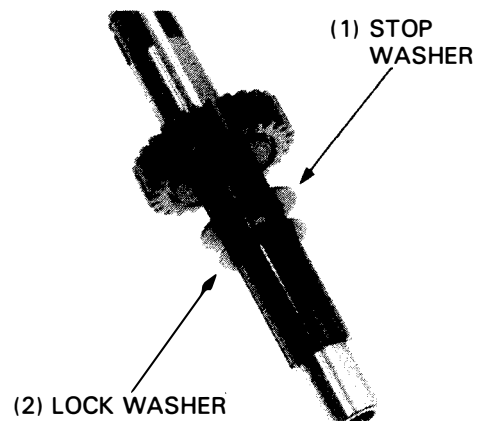
Install the stop washer first, and then the lock washer for the C3 gear.

Align and lock the washers using the procedure above.

Assemble the countershaft and mainshaft.

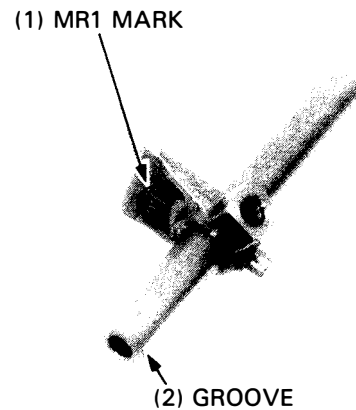
Check the gears for freedom of movement or rotation on the shaft.

Check that the snap rings are seated in the grooves and align their end gaps with the lands of the splines.



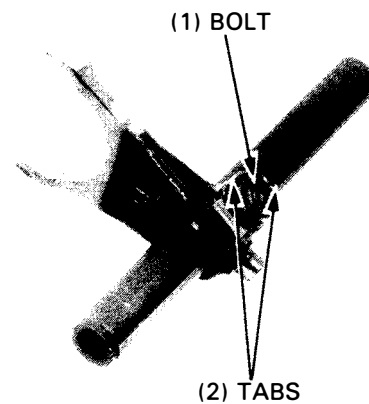
'88, '89, '91-'95:

Install the left shift fork on the shaft with MR1 mark facing the groove on the shaft end and the bolt hole aligned with the shaft hole.



'88, '89, '91-'95:

Tighten the bolt with the lock washer and bend up the tabs of the lock washer.



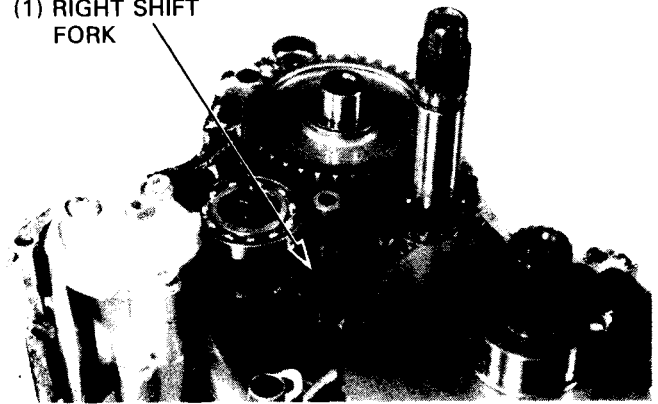
'88, '89, '91-'95:

Install the right shift fork with the "R" mark on the fork facing up.

Assemble the mainshaft, countershaft, shift fork shaft and shift drum.

Install them into the left crankcase as an assembly.

(1) RIGHT SHIFT FORK



After '95:

Assemble the mainshaft and countershaft.

Install them into the left crankcase as an assembly.

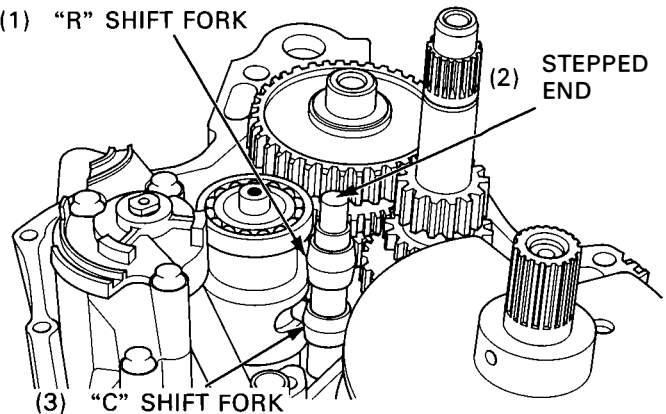
Install the shift forks into the shifter gear grooves with the markings facing up (right crankcase side).

Install the shift drum by aligning the shift fork guide pins with the shift drum guide grooves.

Insert the shift fork shaft through the shift forks into the left crankcase with the stepped end facing up.

(1) "R" SHIFT FORK

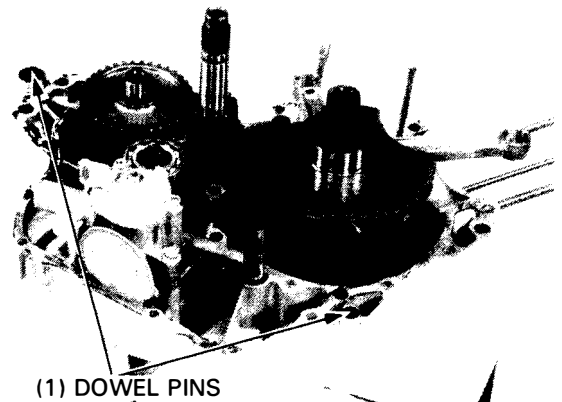
(2) STEPPED END



## CRANKCASE ASSEMBLY

Apply sealant to the crankcase mating surfaces.

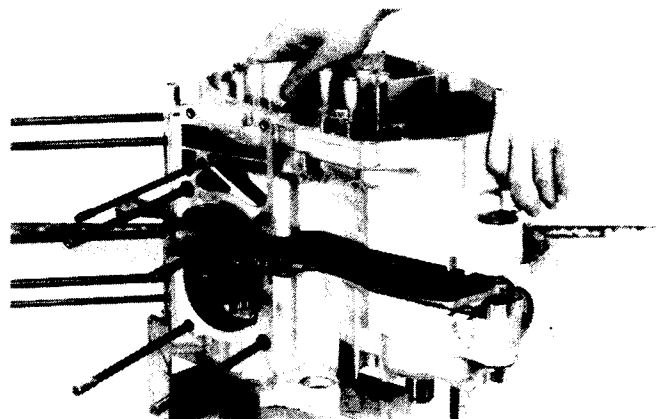
Install the dowel pins.



Assemble the right and left crankcases being careful to align the dowel pins and shafts.

### CAUTION

- *Do not force the crankcase halves together; if there is excessive force required, something is wrong. Remove the right crankcase and check for misaligned parts.*



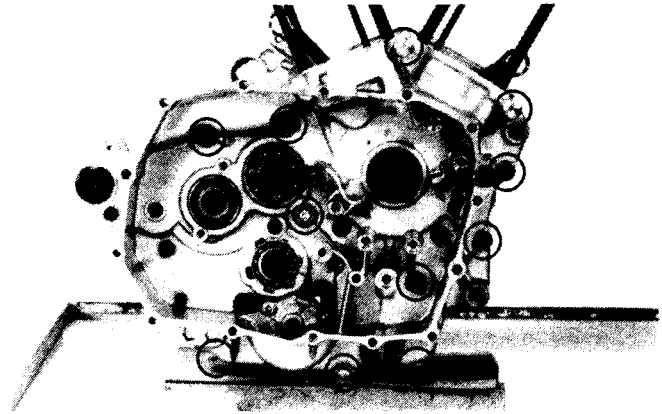
## CRANKSHAFT/TRANSMISSION

---

Apply oil to all crankcase bolts.  
Install and tighten the right crankcase bolts in a crisscross pattern in 2 or 3 steps.

### NOTE

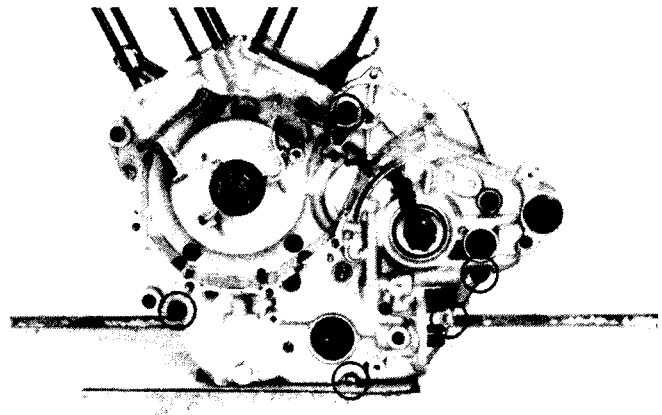
- Tighten the 8 mm bolts first, then tighten the 6 mm bolts.
- 



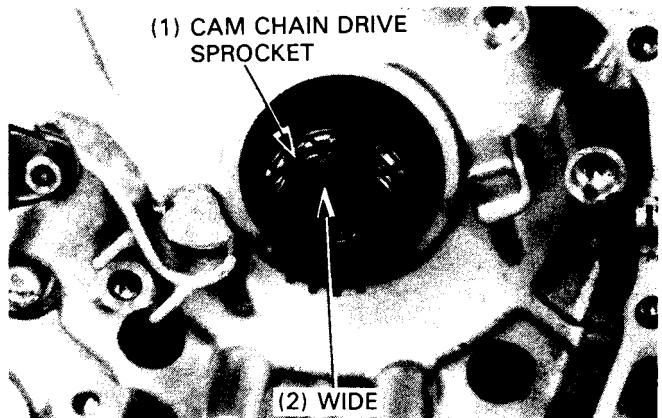
Install and tighten the left crankcase bolts in a crisscross pattern in 2 or 3 steps.

### NOTE

- Tighten the 8 mm bolts first, then tighten the 6 mm bolts.
- 

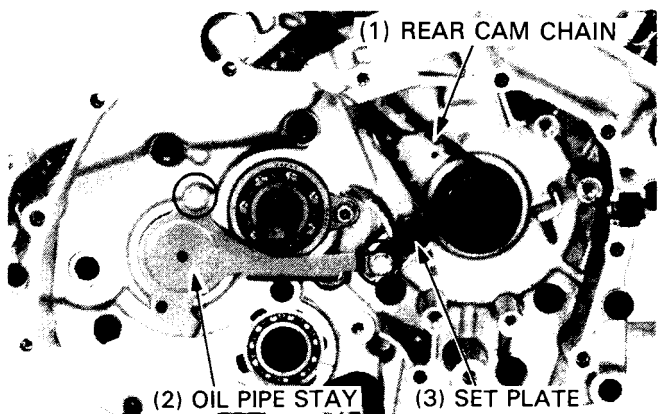


Install the rear cam chain drive sprocket over the crankshaft, aligning the extra-wide splines in the sprocket and crankshaft.



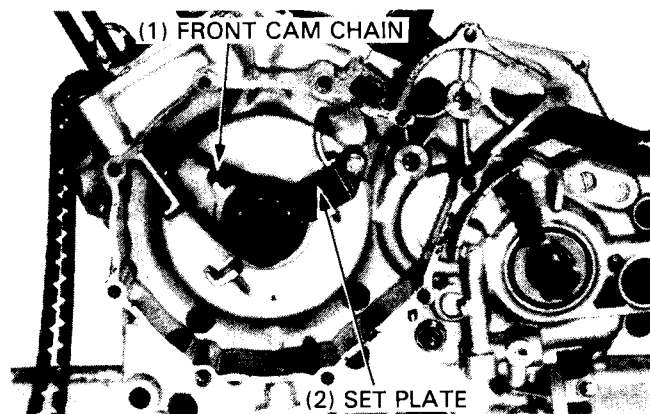
Install the rear cam chain over the drive sprocket.

Install the oil pipe stay and cam chain tensioner set plate.  
Tighten the bolt securely.



Install the front cam chain over the front cam chain drive sprocket.  
Install the cam chain tensioner set plate and tighten the bolt securely.

Install the remaining parts in the reverse order of removal (page 11-1).



# FRONT WHEEL/SUSPENSION/STEERING

After '94:

30 N·m (3.0 Kg-m, 22 ft-lb)

105 N·m (10.5 Kg-m, 76 ft-lb)

11 N·m (1.1 Kg-m, 8 ft-lb)

23 N·m (2.3 Kg-m, 17 ft-lb)

After '93:

23 N·m  
(2.3 Kg-m,  
17 ft-lb)

75 N·m (7.5 Kg-m, 54 ft-lb)

22 N·m (2.2 Kg-m, 16 ft-lb)

50 N·m (5.0 Kg-m,  
36 ft-lb)

'88, '89, '91-'93: 27 N·m (2.7 Kg-m, 20 ft-lb)  
After '93: 31 N·m (3.1 Kg-m, 22 ft-lb)



# 12. FRONT WHEEL/SUSPENSION/STEERING

|                            |             |                      |              |
|----------------------------|-------------|----------------------|--------------|
| <b>SERVICE INFORMATION</b> | <b>12-1</b> | <b>FRONT WHEEL</b>   | <b>12-6</b>  |
| <b>TROUBLESHOOTING</b>     | <b>12-2</b> | <b>FORK</b>          | <b>12-12</b> |
| <b>HANDLEBAR</b>           | <b>12-3</b> | <b>STEERING STEM</b> | <b>12-19</b> |

## SERVICE INFORMATION

### ⚠ WARNING

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

- This section covers maintenance of the front wheel, fork and steering stem. Refer to section 14 for front (hydraulic) brake service.
- Support the motorcycle using a hoist or a jack under the engine.
- The VT600C uses leaf valve to the left.

## SPECIFICATIONS

| ITEM                    |                  | STANDARD                       | SERVICE LIMIT     |   |
|-------------------------|------------------|--------------------------------|-------------------|---|
| Axle runout             |                  | —                              | 0.2 mm(0.008 in)  |   |
| Front wheel rim runout  | Radial           | —                              | 2.0 mm(0.08 in)   |   |
|                         | Axial            | —                              | 2.0 mm(0.08 in)   |   |
| Fork spring free length | '88,'89,'91-'93: | 305 mm(12.0 in)                | 299 mm(11.8 in)   |   |
|                         | After'93:        | 333.9 mm(13.1 in)              | 327.2 mm(12.9 in) |   |
| Fork tube runout        |                  | —                              | 0.2 mm(0.008 in)  |   |
| Fork fluid capacity     | '88,'89:         | 463 cc(15.7 US oz,13.0 Imp oz) | —                 |   |
|                         | '91-'93:         | 468 cc(15.8 US oz,13.2 Imp oz) | —                 |   |
|                         | After'93:        | 449 cc(16.9 US oz,15.8 Imp oz) | —                 |   |
| Fork fluid level        | '88,'89          | Right                          | 95.0 mm(3.74 in)  | — |
|                         |                  | Left                           | 93.0 mm(3.66 in)  | — |
|                         | '91-'93          | Right                          | 89.0 mm(3.50 in)  | — |
|                         |                  | Left                           | 87.0 mm(3.43 in)  | — |
|                         | After'93:        |                                | 111 mm(4.4 in)    | — |

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## TORQUE VALUES

|                                  |                  |                               |
|----------------------------------|------------------|-------------------------------|
| Handlebar mounting bolt          |                  | 23 N·m (2.3 kg-m, 17 ft-lb)   |
| Handlebar upper holder bolt      | After '94:       | 30 N·m (3.0 kg-m, 22 ft-lb)   |
| Clutch lever holder bolt         |                  | 12 N·m (1.2 kg-m, 9 ft-lb)    |
| Brake mastercylinder holder bolt |                  | 12 N·m (1.2 kg-m, 9 ft-lb)    |
| Spokes                           |                  | 4 N·m (0.4 kg-m, 2.9 ft-lb)   |
| Brake disc mounting bolt         |                  | 40 N·m (4.0 kg-m, 29 ft-lb)   |
| Front axle                       |                  | 75 N·m (7.5 kg-m, 54 ft-lb)   |
| Fork axle pinch bolt             |                  | 22 N·m (2.2 kg-m, 16 ft-lb)   |
| Fork socket bolt                 |                  | 30 N·m (3.0 kg-m, 22 ft-lb)   |
| Fork top pinch bolt              |                  | 11 N·m (1.1 kg-m, 8 ft-lb)    |
| Fork bottom pinch bolt           |                  | 50 N·m (5.0 kg-m, 36 ft-lb)   |
| Brake caliper mounting bolt      | '88,'89,'91-'93: | 27 N·m (2.7 kg-m, 20 ft-lb)   |
|                                  | After '93:       | 31 N·m (3.1 kg-m, 22 ft-lb)   |
| Steering bearing adjustment nut  |                  | 25 N·m (2.5 kg-m, 18 ft-lb)   |
| Steering stem nut                |                  | 105 N·m (10.5 kg-m, 76 ft-lb) |

## FRONT WHEEL/SUSPENSION/STEERING

---

### TOOLS

#### Special

|                        |               |  |
|------------------------|---------------|--|
| Spoke wrench           | 07JMA—MR60100 | or equivalent commercially available in U.S.A.   |
| Bottom holder pipe     | 07930—KA50000 | } Not available in U.S.A.  |
| —holder attachment     | 07930—KA50100 |  |
| —holder handle         | 07930—KA40200 |  |
| Ball race remover      | 07953—MJ10000 | } Not available in U.S.A.<br>07953—MJ1000A , 07953—MJ1000B or<br>07949—3710001 and 07746—0010100 |
| —driver attachment     | 07953—MJ10100 |  |
| —driver handle         | 07953—MJ10200 |  |
| Fork seal driver ,39mm | 07947—4630100 |  |
| Steering stem socket   | 07916—3710100 |  |
| Steering stem driver   | 07946—MB00000 |  |
| Bearing race remover   | 07946—3710500 |  |

#### Common

|                             |               |   |
|-----------------------------|---------------|---|
| Driver                      | 07749—0010000 |   |
| Attachment, 42 x 47 mm      | 07746—0010300 |   |
| Pilot, 20 mm                | 07746—0040500 |   |
| Bearing remover shaft       | 07746—0050100 | } Equivalent commercially available in U.S.A. |
| Bearing remover head, 20 mm | 07746—0050600 |   |
| Attachment, 52 x 55 mm      | 07746—0010400 |   |

## TROUBLESHOOTING

#### Hard Steering

- Steering bearing adjustment nut too tight
- Faulty steering stem bearings
- Insufficient air in front tire

#### Steers to One Side or Does Not Track Straight

- Bent fork legs
- Bent front axle, wheel installed incorrectly
- Unequal oil quantity in each fork tube

#### Front Wheel Wobbling

- Distorted rim
- Worn front wheel bearings
- Loose or broken spokes
- Faulty tire
- Axle or axle holder not tightened properly

#### Soft Suspension

- Weak fork springs
- Insufficient fluid in fork legs

#### Hard Suspension

- Fork oil level too high
- Fork tube(s) bent or fork slider(s) damaged

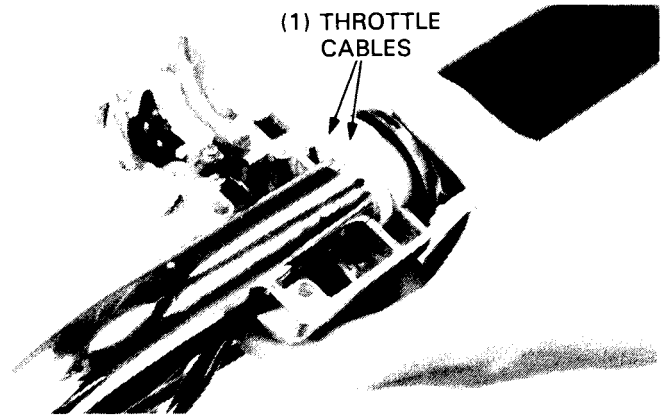
#### Front Suspension Noise

- Slider binding
- Insufficient fluid in fork legs
- Loose fork leg fasteners

# HANDLEBAR

## GRIP REPLACEMENT

Remove the right handlebar switch screws and disconnect the throttle cables from the throttle pipe.

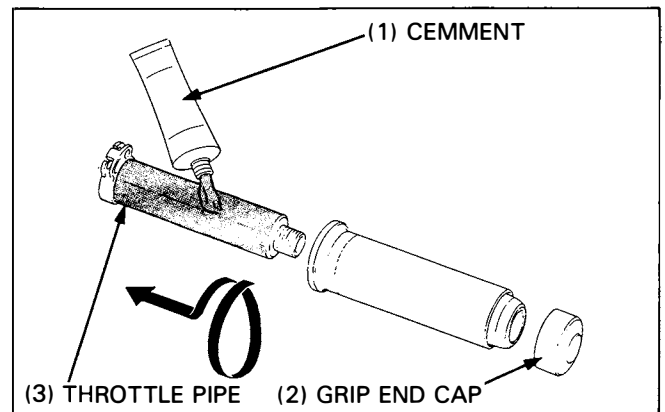


Remove the grip end cap and right handlebar grip. Remove the grip from the throttle pipe.

Apply Honda Bond A or Honda Grip Cement (U.S.A. only) to the inside surface of the throttle grip to the clean surface of the throttle pipe. Wait 3–5 minutes and install the grip. Rotate the grip for even application of the adhesive.

Connect the throttle cables to the throttle pipe and install the right handlebar switch.

Install the grip end cap.



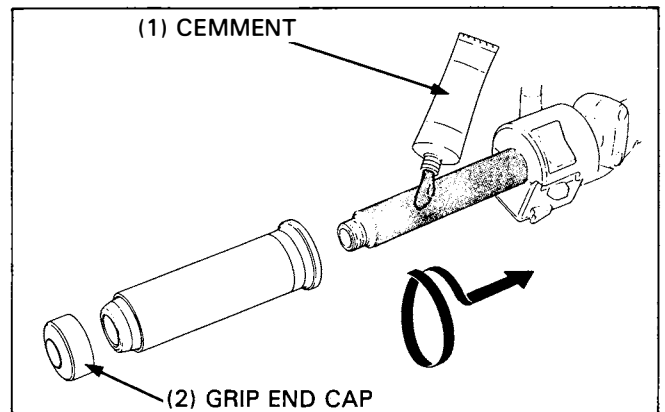
Remove the grip end cap and pull the grip off of the left handlebar.

Apply Honda Bond A or Honda Grip Cement (U.S.A. only) to inside surface of the left grip to the clean surface of the handlebar. Wait 3–5 minutes and install the grip. Rotate the grip for even application of the adhesive.

### NOTE

- Allow the adhesive to dry for an hour before using. Check for smooth throttle operation after the right grip is installed.

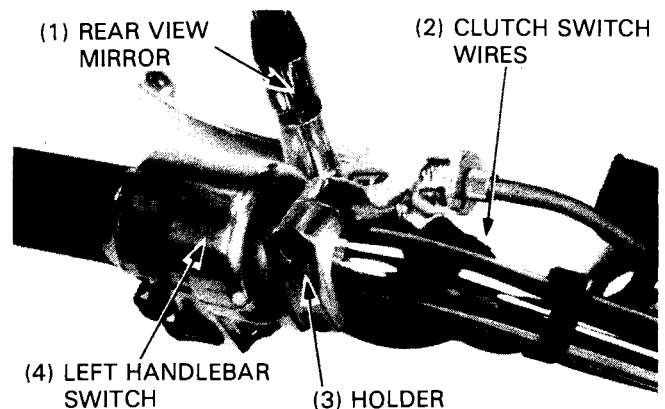
Install the grip end cap.



## REMOVAL

Disconnect the clutch switch wires from the switch terminals. Remove the following:

- rear view mirror from the clutch lever holder
- clutch lever holder mounting bolts and holder
- left handlebar switch wire bands.
- left handlebar switch screws and switch



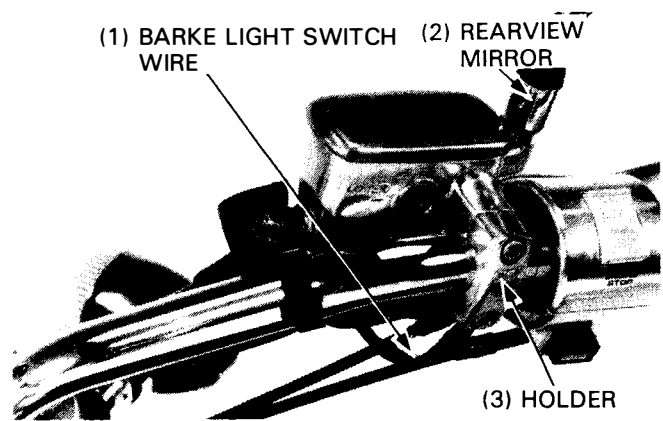
## FRONT WHEEL/SUSPENSION/STEERING

Disconnect the front brake light switch wires from the switch.

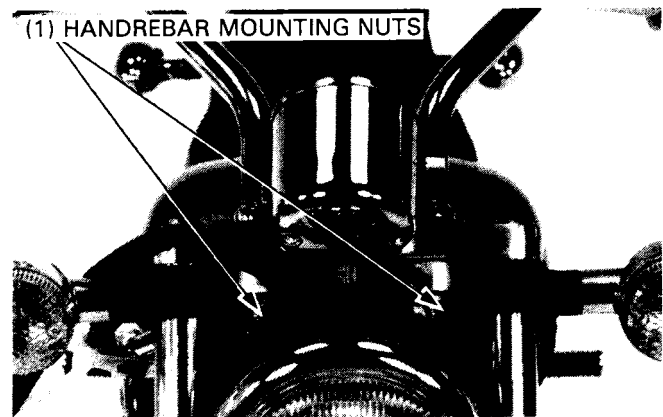
Remove the following:

- rear view mirror from the master cylinder
- master cylinder holder mounting bolts and holder
- right handlebar switch wire bands
- right handlebar switch screws and switch

Loosen the throttle cable lower adjusting nuts at the carburetors and disconnect the throttle cables from the throttle pipe.



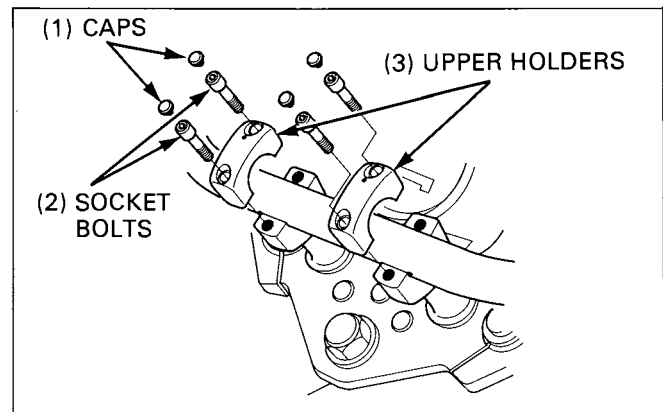
Remove the handlebar mounting nuts, handlebar and rubber seat from the fork bridge.



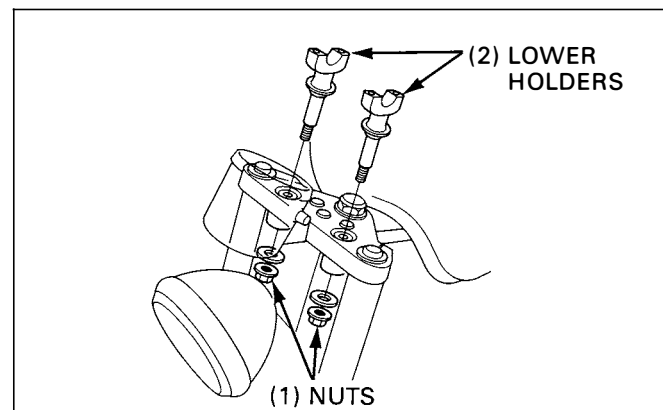
**After '94:**

Remove the handlebar upper holder bolts caps.

Remove the socket bolts, upper holders and handlebar.



Remove the nuts and handlebar lower holders.



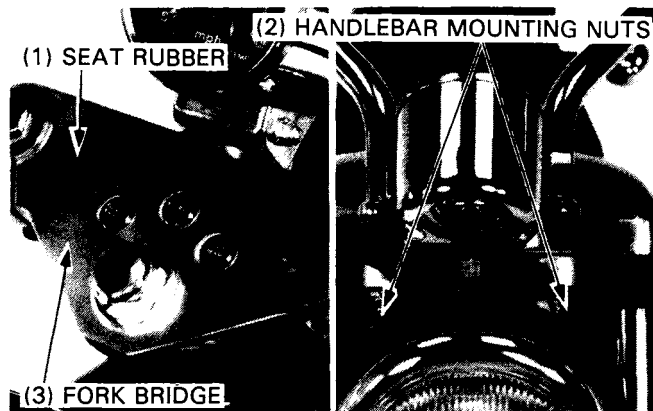
INSTALLATION

'88, '89, '91-'94:

Install the rubber seat into the fork bridge.

Install the washers and handlebar mounting nuts.  
Tighten the nuts.

**TORQUE: 23 N·m (2.3 kg-m, 17 ft-lb)**



After '94:

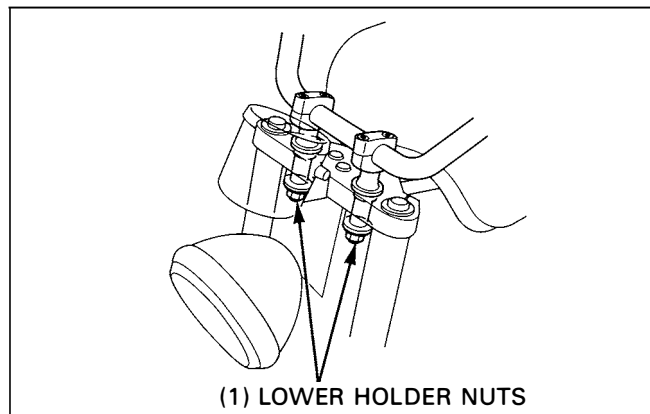
Install the handlebar lower holders and temporarily tighten the nuts.

Install the handlebar and upper holders with their punch marks facing forward.

Temporarily tighten the socket bolts.

Tighten the lower holder nuts to the specified torque.

**TORQUE: 23 N·m (2.3 kg-m, 16 ft-lb)**

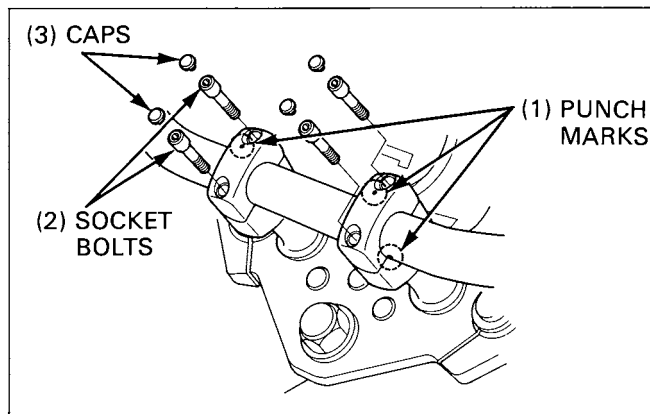


Loosen the upper holder socket bolts and align the punch marks on the handlebar with the splits of the handlebar holders.

Tighten the forward bolts first, then tighten the rear bolts.

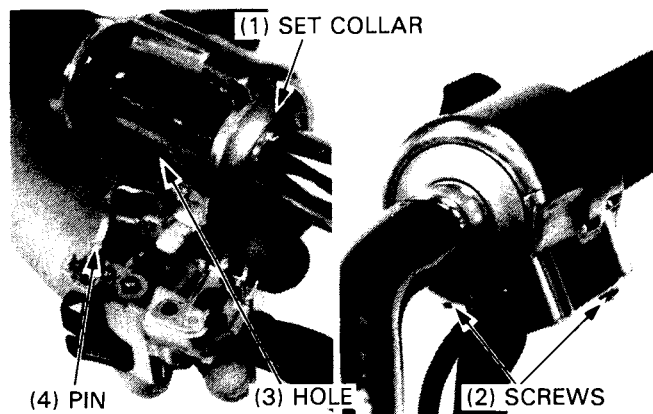
**TORQUE: 30 N·m (3.0 kg-m, 22 ft-lb)**

Install the upper holder bolt caps.



Install the left handlebar switch set collar on the upper switch housing. Align the locating pin in the lower switch housing with the hole in the handlebar.

Install the left handlebar switch attaching screws, and tighten the forward screw first, then tighten the rear screw.



## FRONT WHEEL/SUSPENSION/STEERING

Install the clutch holder/lever and with the "UP" mark facing up.

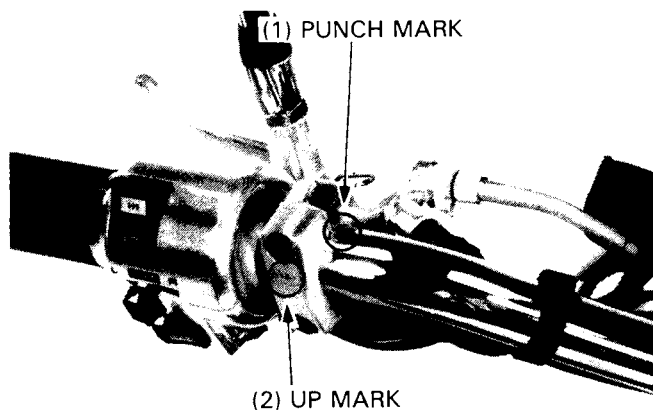
Align the end of the holder with the punch mark on the handlebar and tighten the upper bolt first then tighten the lower bolt.

**TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)**

Connect the clutch switch wires.

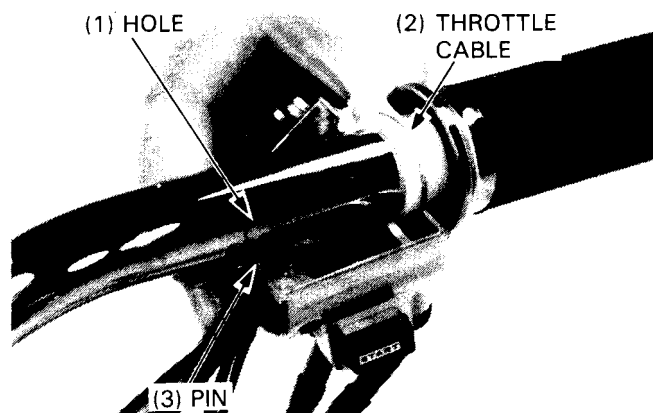
Install the right rear view mirror in the holder.

Secure the wires with wire bands.

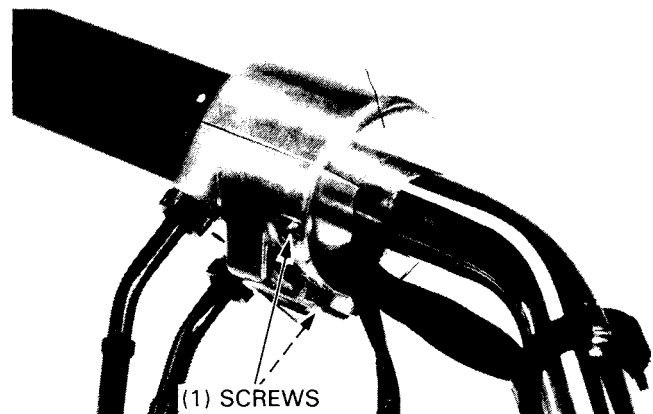


Apply grease to the throttle cable ends and connect the cables to the throttle pipe.

Install the right handlebar switch onto the handlebar, aligning the locating pin with the hole in the handlebar.



Install the right handlebar switch screws and tighten the forward screw first, then tighten the rear screw.



Install the front brake master cylinder/holder with the "UP" mark facing up.

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

**TORQUE: 12 N·m (1.2 kg-m, 9 ft-lb)**

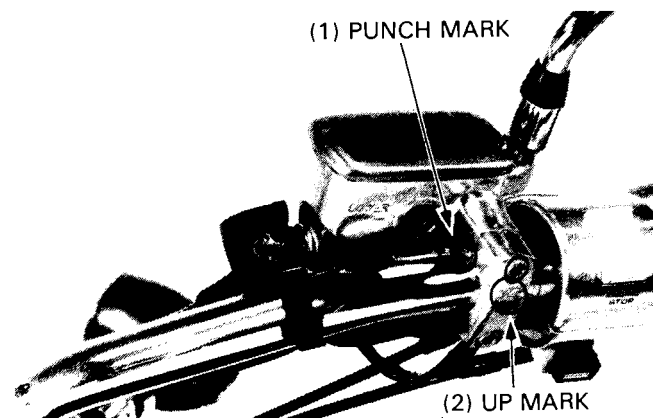
Connect the front brake light switch wires.

Install the right rear-view mirror into the master cylinder/holder.

Secure the wire with wire bands.

Adjust the following:

- throttle operation and free play (page 3-6).
- clutch lever free play (page 3-18).

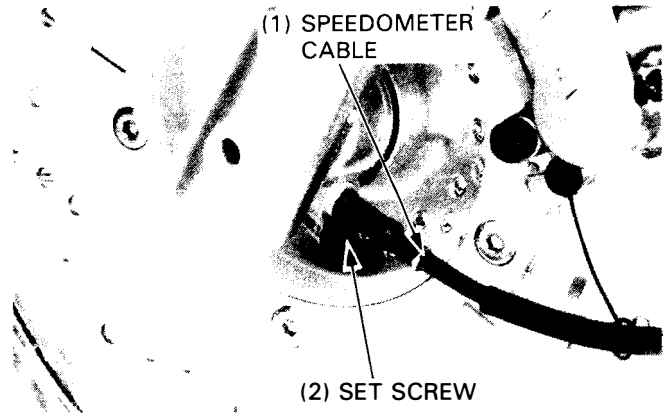


## FRONT WHEEL

### REMOVAL

Raise and support the motorcycle using a hoist or a jack under the engine.

Remove the set screw and pull the speedometer cable out of the speedometer gearbox.

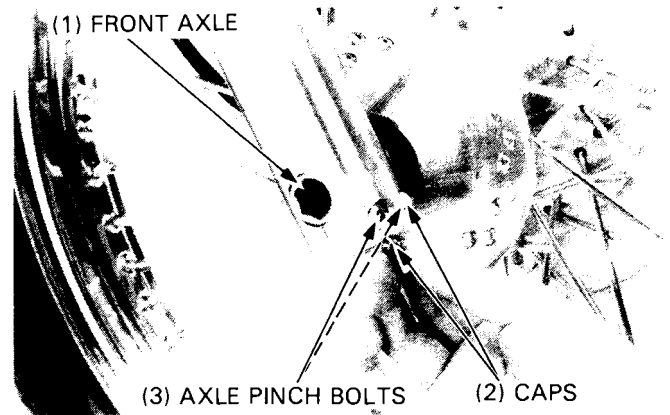


Remove the axle pinch bolt caps, and bolts from the right front fork leg.

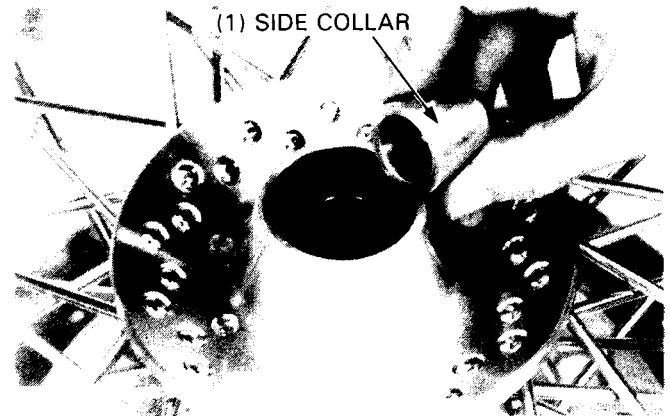
Remove the axle and the front wheel.

### NOTE

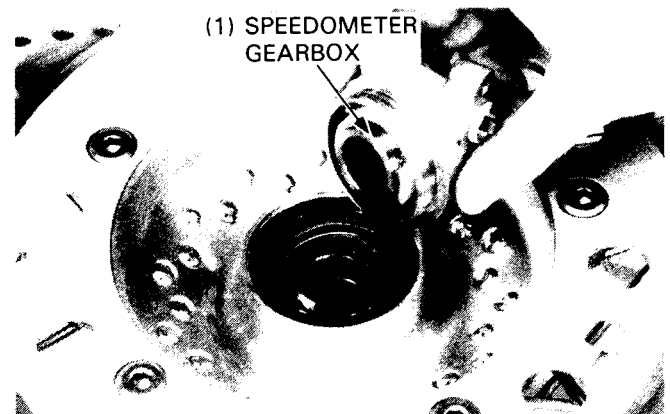
- Do not operate the front brake lever after removing the front wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.



Remove the side collar.



Remove the speedometer gearbox.



## FRONT WHEEL/SUSPENSION/STEERING

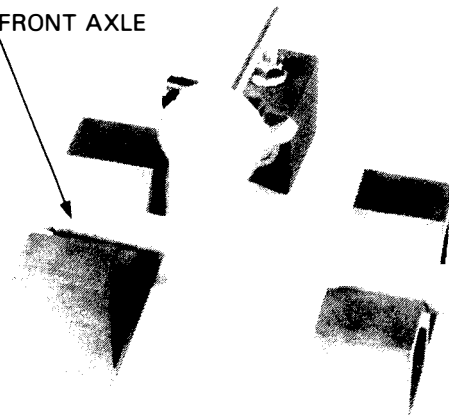
### INSPECTION

#### ● AXLE

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

**SERVICE LIMIT: 0.2 mm (0.01 in)**

(1) FRONT AXLE



#### ● WHEEL

Check the spokes and tighten any that are loose.

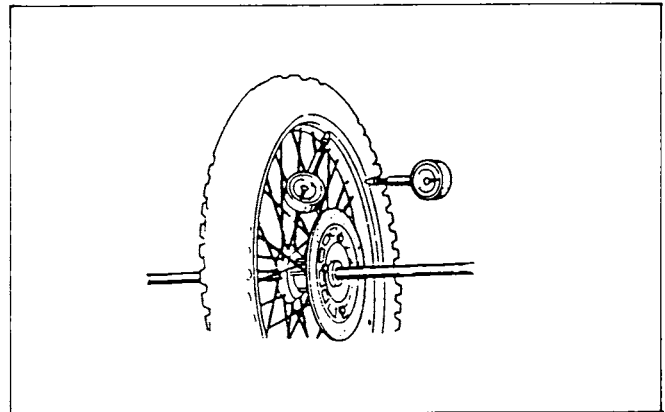
**TORQUE: 4 N·m (0.4 kg·m, 2.9 ft·lb)**

Check the rim runout by placing the wheel on a truing stand. Then spin the wheel with hand, and read the runout using a dial indicator.

#### SERVICE LIMITS:

**RADIAL: 2.0 mm (0.08 in)**

**AXIAL: 2.0 mm (0.08 in)**



### CAUTION

- *Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Always check balance when the tire has been removed from the rim.*

### NOTE

- For optimum balance, the tire balance mark (a paint dot on the sidewall) must be located next to the valve stem.
- Remount the tire if necessary.

(1) VALVE

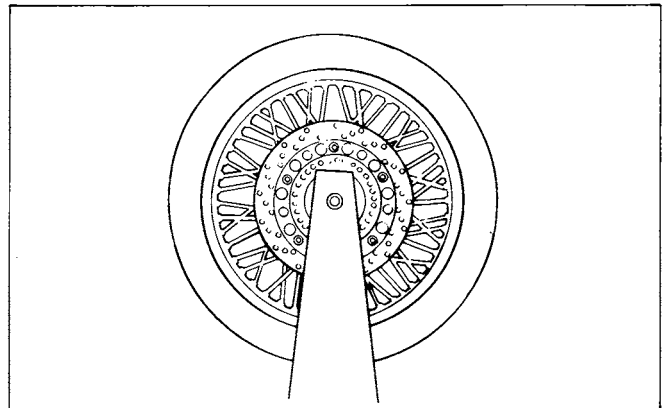


(2) BALANCE MARK

Mount the front wheel in a inspection stand.

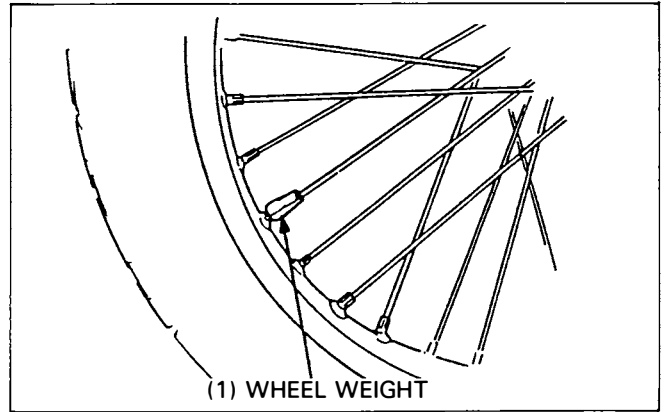
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk. Do this two or three times to verify the heaviest area.

If the wheel is balanced, it will not stop consistently in the same position.



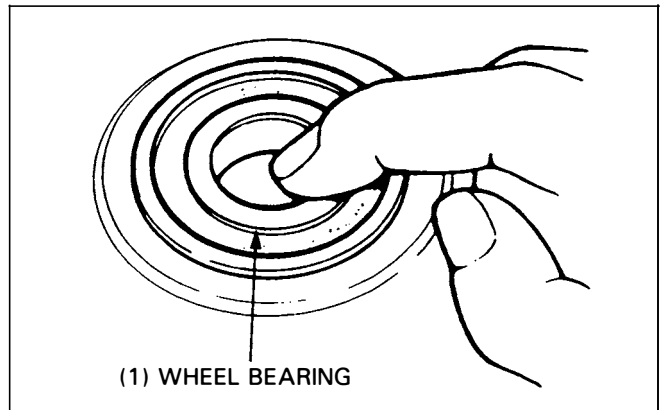


To balance the wheel, install wheel weights on the highest side of the rim, the side opposite to the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun.  
Do not add more than 70 grams.



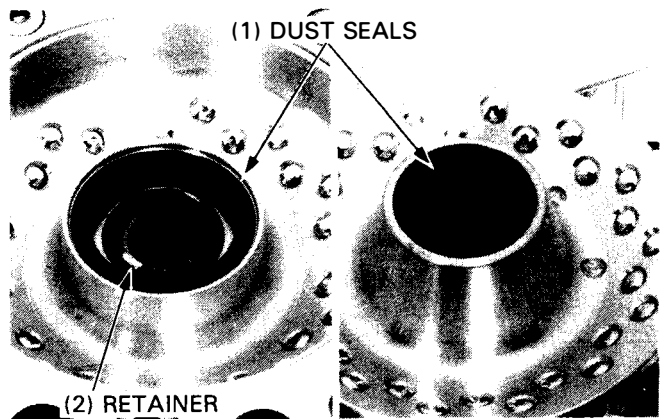
● **WHEEL BEARING**

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub. Remove and discard the bearings if the races do not turn smoothly, quietly, or if they loosely in the hub.

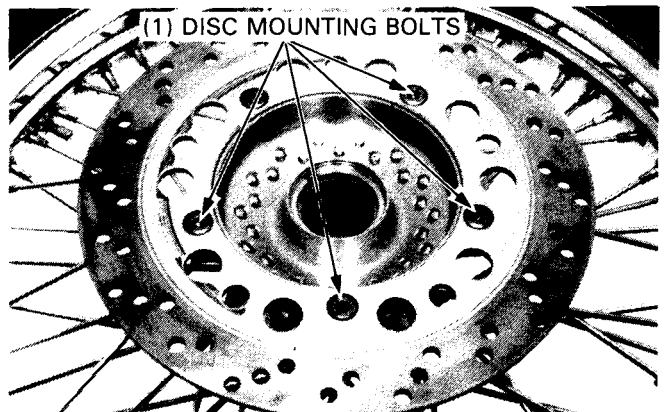


**BEARING REPLACEMENT**

Remove the front wheel (page 12-7).  
Remove the dust seal and retainer from the left side of the wheel hub.  
Remove the dust seal from the right side of the hub.



Remove the brake disc mounting bolts and disc.



## FRONT WHEEL/SUSPENSION/STEERING

Drive out the wheel bearings and distance collar.

### CAUTION

- *Never reuse old bearings.*

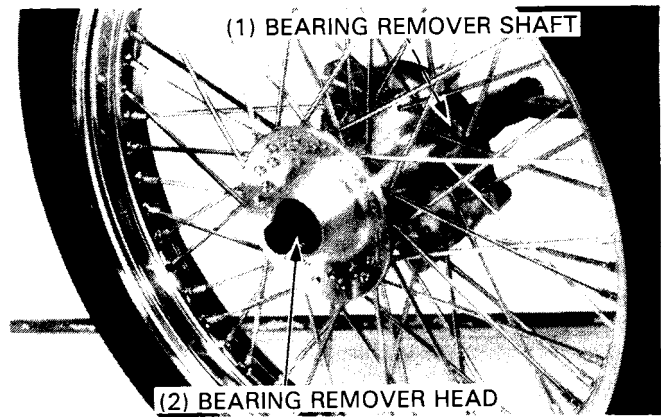
### TOOLS:

Bearing remover shaft

07746-0050100  
Equivalent commercially  
available in U.S.A.

Bearing remover head, 20 mm

07746-0050600  
Equivalent commercially  
available in U.S.A.



Drive in the new left bearing first until it seats.  
Install the distance collar and drive in the right bearing.

### NOTE

- Install the bearings with the vendor markings facing the outside. Be sure to drive the bearings in squarely.
- Always replace wheel bearings in pairs.

### TOOLS:

Driver

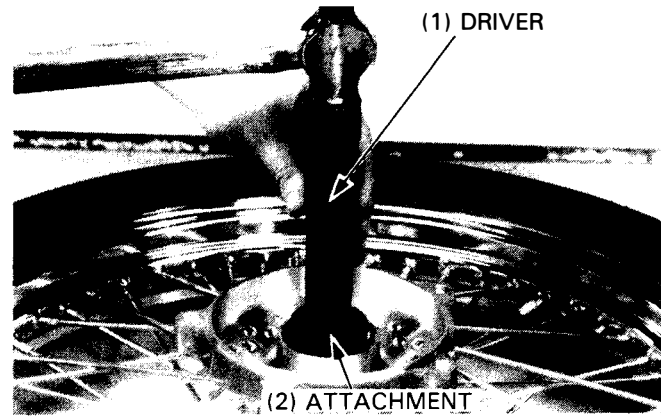
07749-0010000

Attachment, 42 x 47 mm

07746-0010300

Pilot, 20 mm

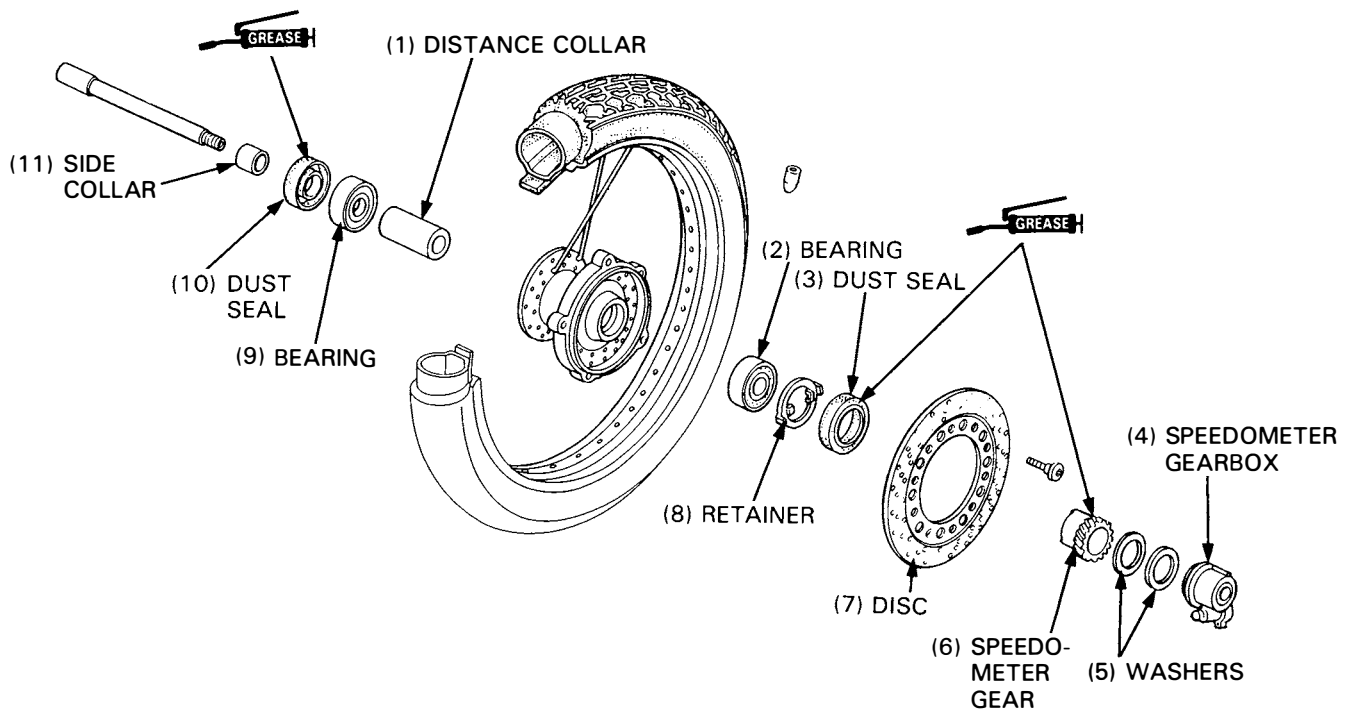
07746-0040500



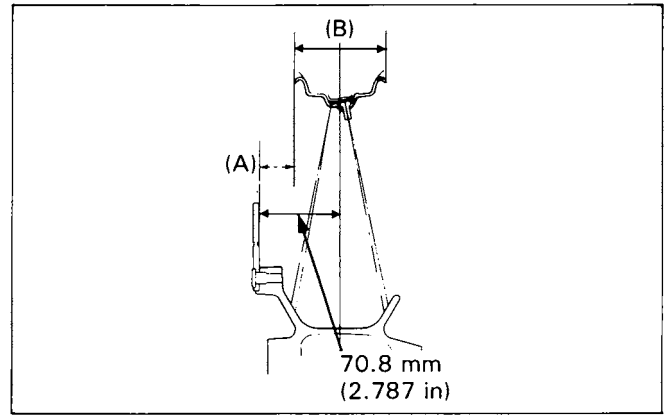
## ASSEMBLY

### ⚠ WARNING

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



To replace the wheel;  
 Remove the tire and tube from the rim.  
 Place the rim and hub on the work bench and begin lacing with new spokes from inside the hub.  
 Install the spokes with a space of six holes in between.  
 Measure the distance (B), and make a calculation.  
 $(A) = 70.8 \text{ mm (2.787 in)} - (B) \div 2$   
 Adjust the hub position so that the distance from the hub surface where the brake disc mounts to the side of rim is (A).  
 Tighten the spokes in 2 or 3 progressive steps.

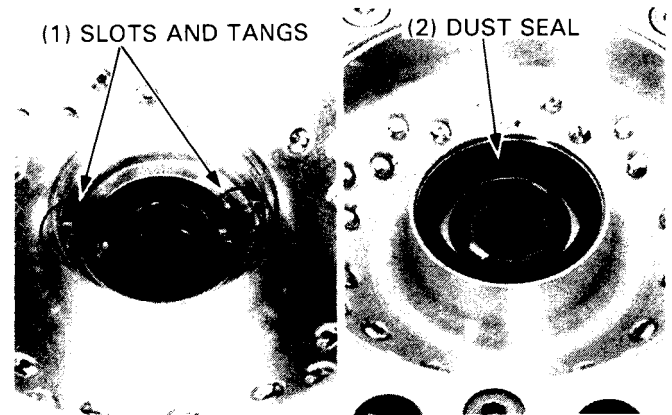


**TOOLS:**  
**Spoke wrench:** **07JMA – MR60100 or equivalent commercially available in U.S.A.**

**TORQUE: 4 N·m (0.4 kg·m, 2.9 ft·lb)**

Check the wheel runout (page 12-8).  
 Install the tube and tire.

Coat the speedometer gear retainer with grease and install the retainer into the wheel hub, aligning the tangs with the slots in the hub.  
 Apply grease to the oil seal lip and install the oil seal over the gear retainer.



Install the brake disc onto the wheel hub.  
 Apply a thread locking agent to the bolt threads and install and tighten the bolts.

**NOTE**

- Tighten the bolts in a crisscross pattern in 2 or 3 steps.

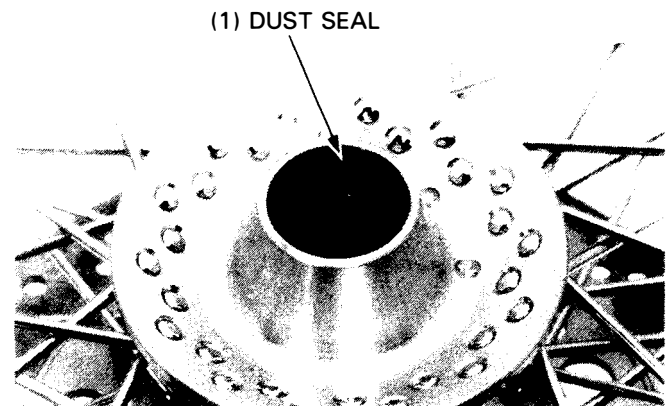
**TORQUE: 40 N·m (4.0 kg·m, 29 ft·lb)**

**⚠ WARNING**

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

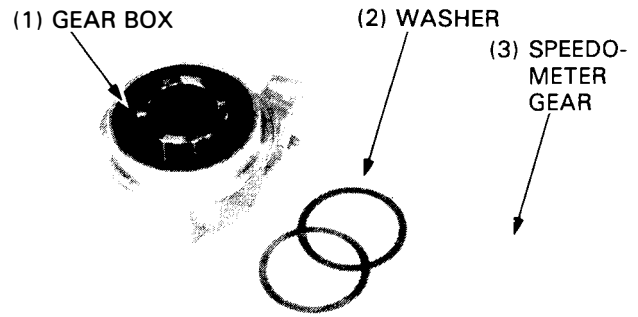


Apply grease to the dust seal lips and install the seal on the right side of the hub.



## FRONT WHEEL/SUSPENSION/STEERING

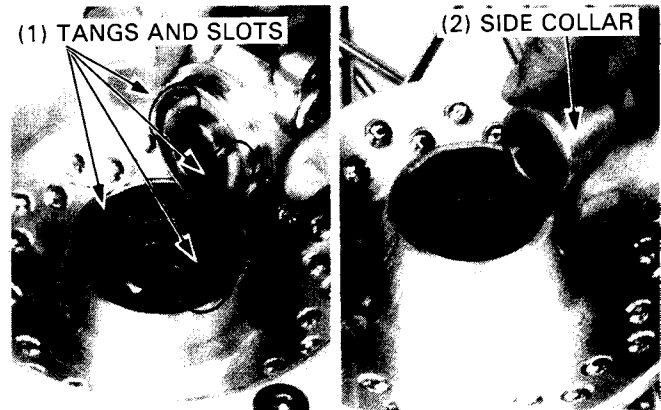
Apply grease to the speedometer gearbox and gear.  
Install the speedometer gear and washers into the gearbox.



Install the speedometer gearbox into the wheel hub, aligning the tangs with the slots.

Clean the brake discs with a high quality degreasing agent.

Install the right side collar.

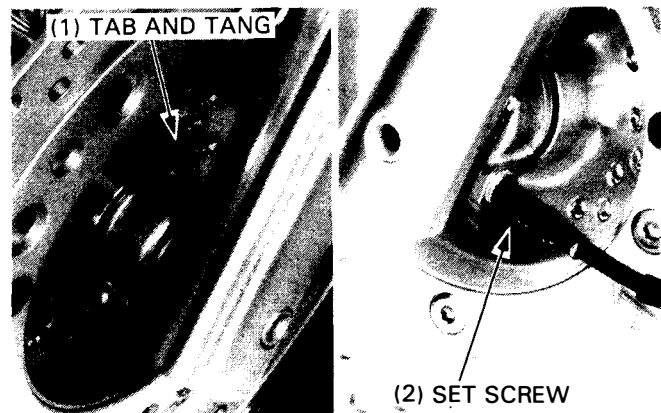


## INSTALLATION

Place the front wheel between the front fork legs.  
Fit the caliper over the brake disc, taking care not to damage the brake pads.

Clean the axle and holder.  
Install the axle through fork leg, the side collar, wheel hub and speedometer gear box.

Set the speedometer gearbox tab under the tang on the left fork slider.



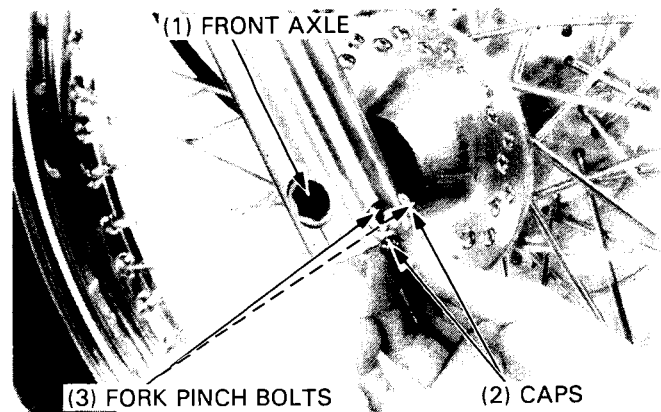
Tighten the front axle.

**TORQUE: 75 N·m (7.5 kg·m, 54 ft-lb)**

Tighten the fork pinch bolts.

**TORQUE: 22 N·m (2.2 kg·m, 16 ft-lb)**

Install the speedometer cable and set screw securely.

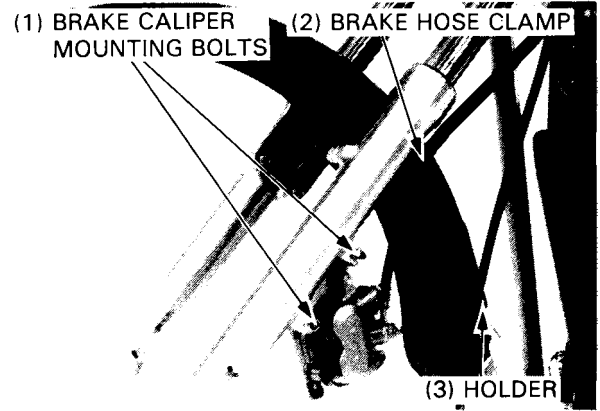


# FORK

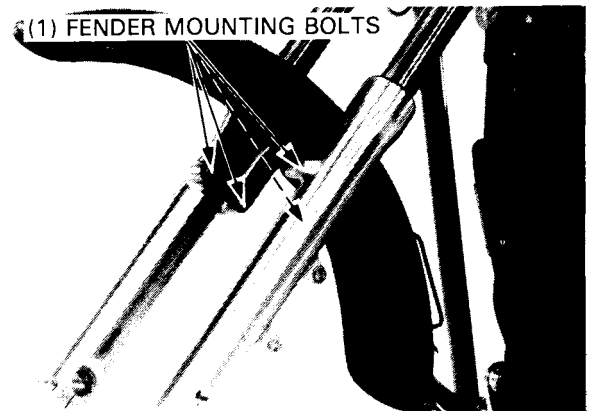
## REMOVAL

Remove the front wheel (page 12-7).  
 Remove the brake caliper mounting bolts and brake caliper.  
 Unhook the brake hose from the hook on the fender.  
 Tie the caliper to the handlebar so its weight does not pull on the brake hose.

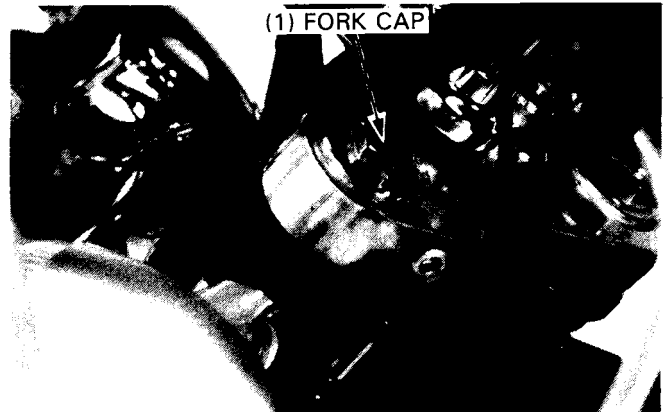
Pull the speedometer cable out of the cable holder on the fender.



Remove the front fender mounting bolts from the fork legs.



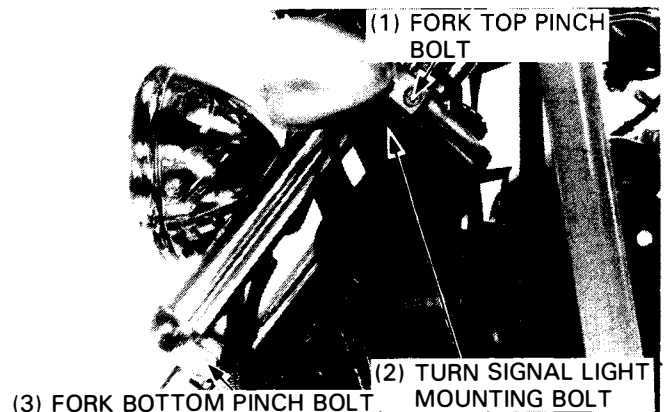
If the fork legs will be disassembled, loosen the fork cap bolts, but do not remove them yet.



Loosen the following bolts:

- turn signal mounting bolt
- fork top pinch bolt
- fork bottom pinch bolt

Pull the fork tubes out of the top bridge and steering stem.



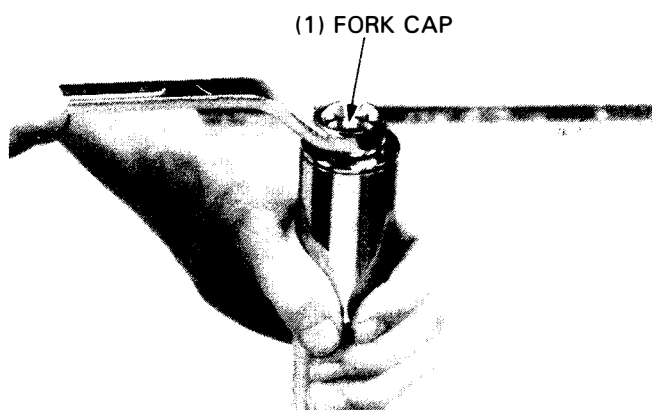
## FRONT WHEEL/SUSPENSION/STEERING

### DISASSEMBLY

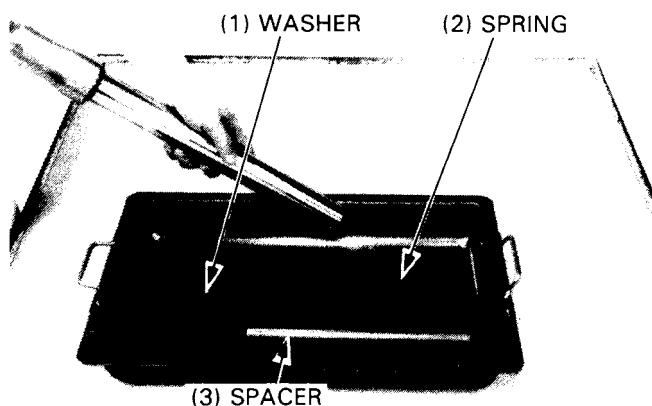
Remove the fork cap bolt.

#### ⚠ WARNING

- *The cap bolts are under spring pressure. Take care when removing, and wear eye and face protection.*



Remove the fork spring, seat washer and spacer. Pour out the fork fluid by pumping the fork up and down several times.



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

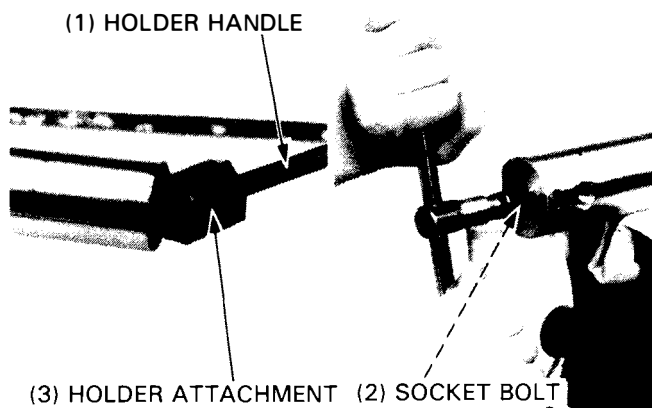
#### CAUTION

- *Do not distort the fork slider in the vise.*

Install the special tool into the fork tube and hold the piston, then remove the socket bolt.

#### TOOLS:

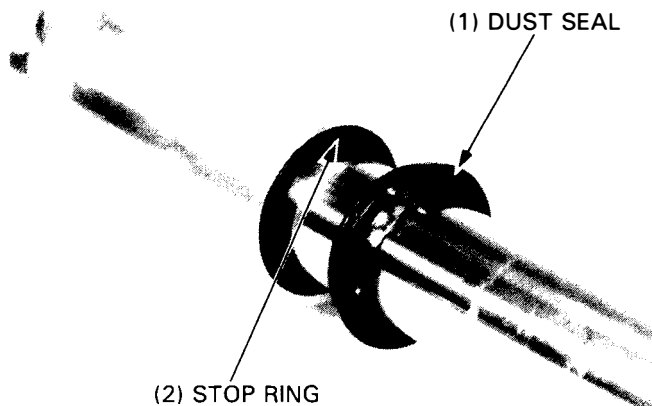
|                        |                         |
|------------------------|-------------------------|
| Bottom holder pipe     | 07930-KA50000           |
|                        | Not available in U.S.A. |
| — holder attachment    | 07930-KA50100           |
|                        | Not available in U.S.A. |
| — bottom holder handle | 07930-KA40200           |
|                        | Not available in U.S.A. |



Remove the dust seal and stop ring.

#### CAUTION

- *Be careful not to damage the fork tube.*



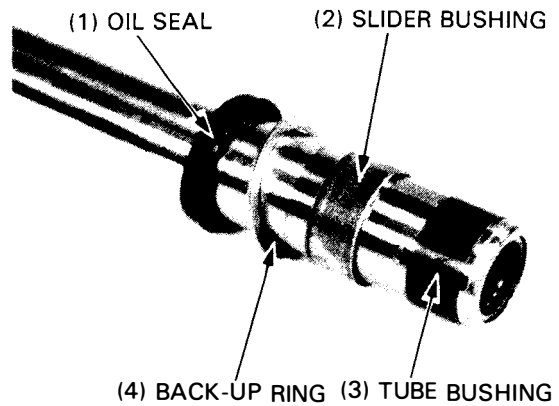
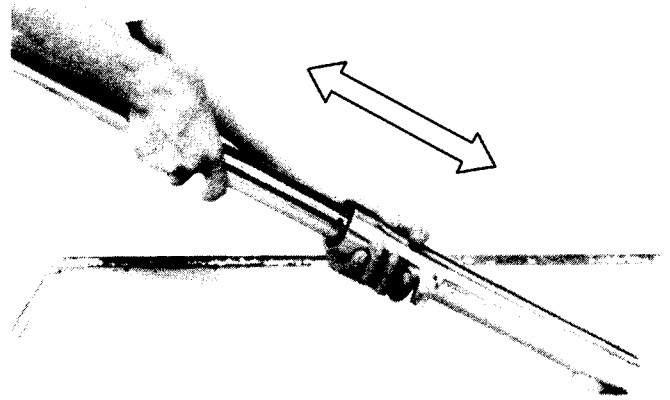
In quick successive motions, pull the fork tube out of the slider.

**NOTE**

- The slider bushing that is pressed into the slider, and the fork tube bushing on the end of the fork tube, must be forced out.

Remove the oil lock piece from the fork slider.  
Remove the piston and rebound spring from the fork tube.

Remove the oil seal, back-up ring and slider bushing from the fork tube.  
Do not remove the fork tube bushing until inspection determines it is necessary (page 12-15).



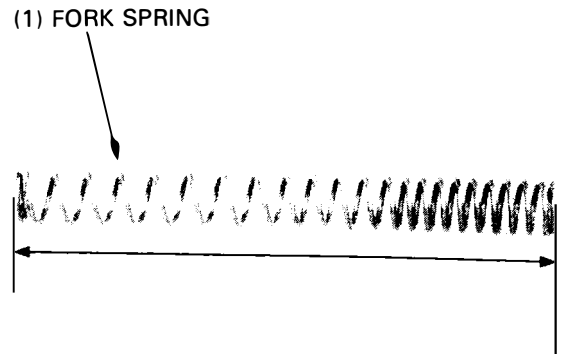
**INSPECTION**

**Fork spring**

Measure the fork spring free length.

**SERVICE LIMIT:** '88,'89,'91-'93: 299 mm (11.8 in)  
After '93: 333.9 mm (13.1 in)

Replace the spring if it is shorter than the service limit.

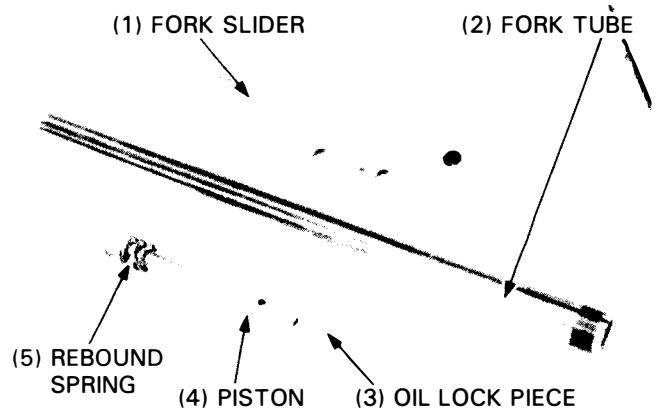


**Fork tube/slider/piston**

Check the fork tube, fork slider and piston for score marks, excessive or abnormal wear.

Replace any components which are worn or damaged.

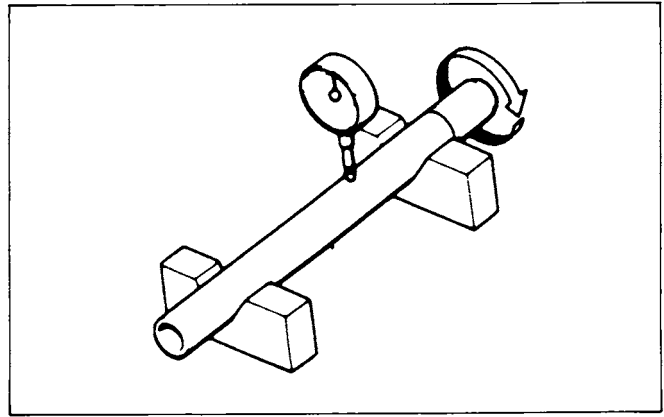
Check the rebound spring for fatigue or damage.



## FRONT WHEEL/SUSPENSION/STEERING

Set the fork tube in V blocks and read the runout. Actual runout is 1/2 the total indicator reading.

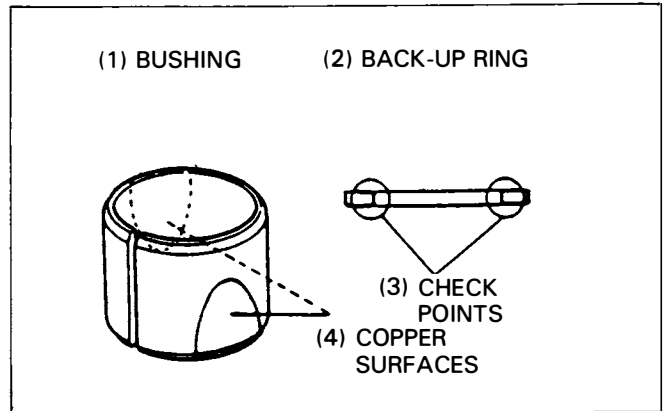
**SERVICE LIMIT: 0.20 mm (0.008 in)**



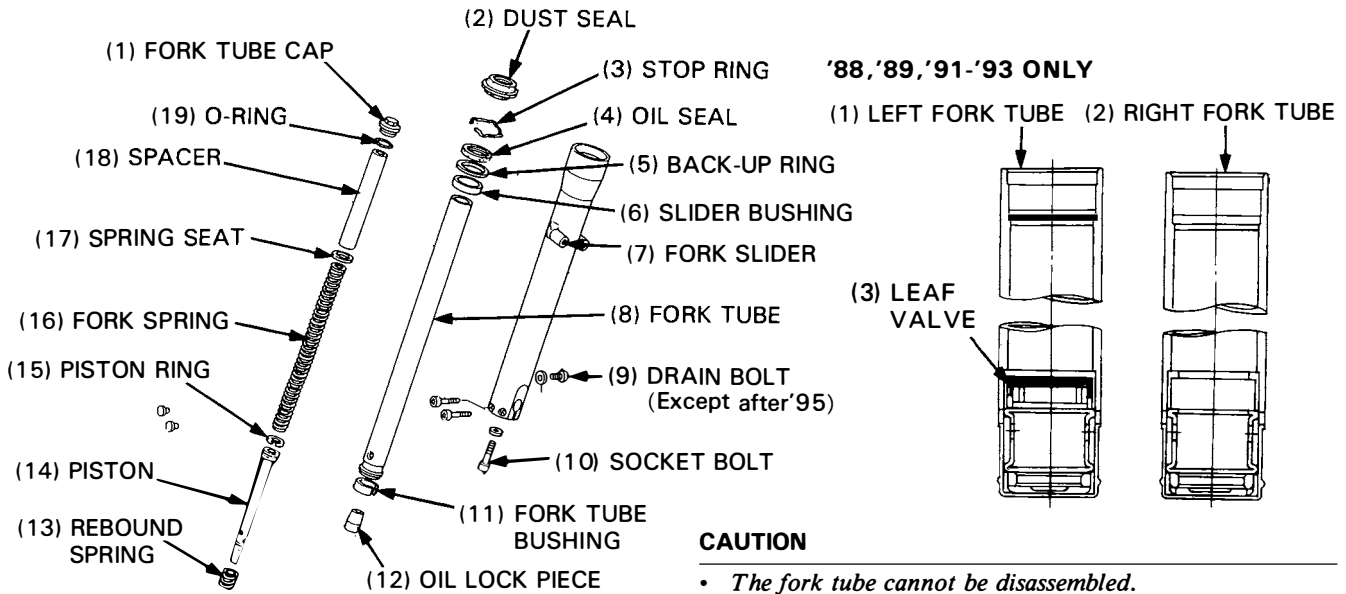
### Bushings

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

Check the back-up ring; replace it if there is any distortion at the points shown.



## ASSEMBLY

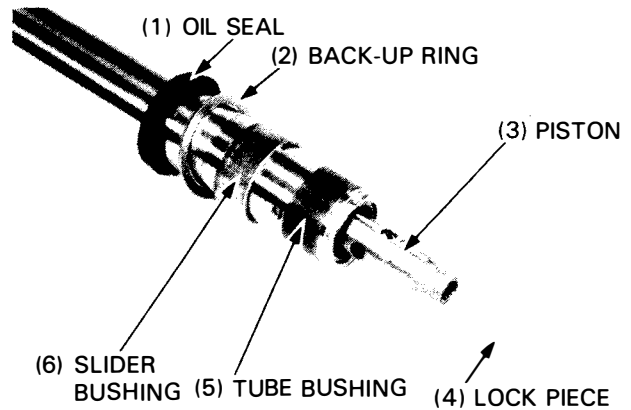


### CAUTION

- The fork tube cannot be disassembled.
- Do not interchange the right and left fork tube when installing the fork tube in the fork slider.



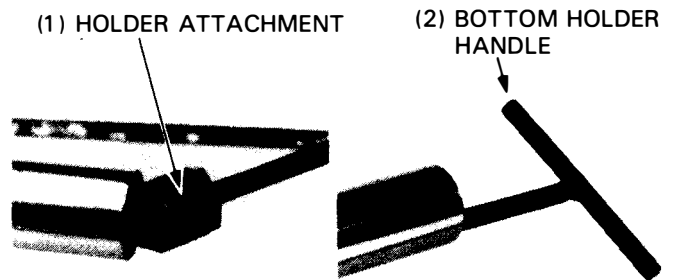
Install the rebound spring into the fork tube.  
 Install a new position ring into the piston groove.  
 Place the oil lock piece on the end of the piston and insert the fork tube into the slider.



Install the special tools into the fork tube to hold the piston, and install and tighten the socket bolt.

**TOOLS:**

- Bottom holder pipe      **07930-KA50000**  
                                  **Not available in U.S.A.**
- holder attachment    **07930-KA50100**  
                                  **Not available in U.S.A.**
- bottom holder handle   **07930-KA40200**  
                                  **Not available in U.S.A.**

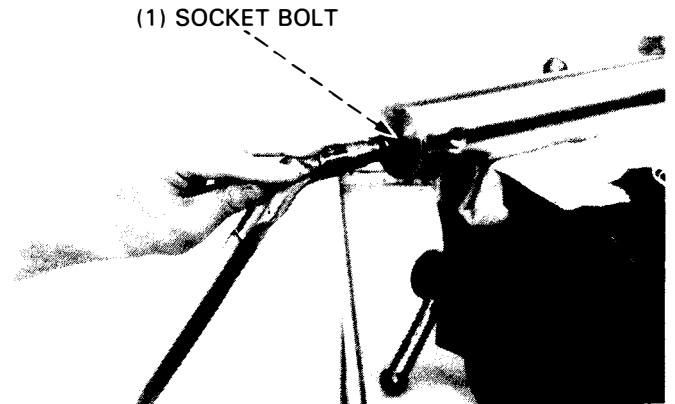


Place the fork slider in a vise with soft jaws or use a shop towel. Apply a locking agent to the socket bolt and thread it into the piston. Tighten with a 6 mm hex wrench.

**NOTE**

- Temporarily install the fork spring and fork cap bolt to tighten the socket bolt.

**TORQUE: 30 N·m (3.0 kg·m, 22 ft·lb)**



Place the slider bushing over the fork tube until it rests on the slider.

**NOTE**

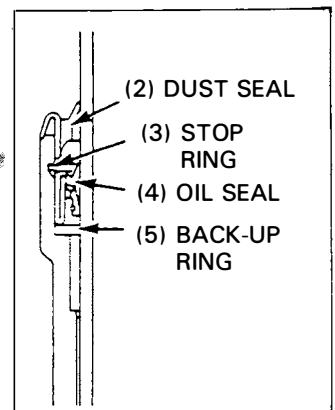
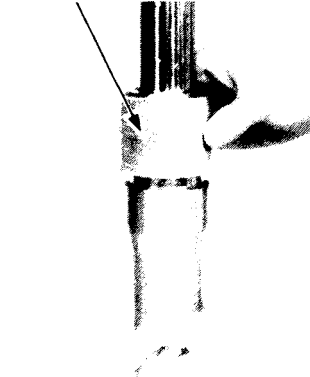
- Tape the upper edge of the fork tube to avoid damaging the oil seal lip, while installing the oil seal.

Using a fork seal driver, drive the bushing into place. Install the back-up ring with the chamfered side facing the slider bushing. Coat the oil seal lip with the recommended fork oil. Drive the oil seal into place using a fork seal driver. Install the oil seal stop ring and the dust seal.

**TOOL:**

- Fork seal driver, 39mm      07947-4630100**

(1) FORK SEAL DRIVER



## FRONT WHEEL/SUSPENSION/STEERING

Compress the fork leg and pour Honda Suspension Fluid SS-8 or equivalent into the fork tube.

### SPECIFIED LEVEL:

'88, '89:

Right fork: 95.0 mm (3.74 in)

Left fork: 93.0 mm (3.36 in)

'91-'93:

Right fork: 89.0 mm (3.50 in)

Left fork: 87.0 mm (3.43 in)

After '93:

Right and left forks: 111 mm(4.4 in)

### CAPACITY:

'88, '89: 463 cc (15.7 US oz, 13.0 Imp oz)

'91-'93: 468 cc (15.8 US oz, 13.2 Imp oz)

After '93: 449 cc(16.9 US oz,15.8 Imp oz)

Install the fork spring, washer and spacer into the fork tube.

'88, '89, '91-'93:

### NOTE

- Note the direction: the tightly wound coils should be at bottom.

After '93:

### NOTE

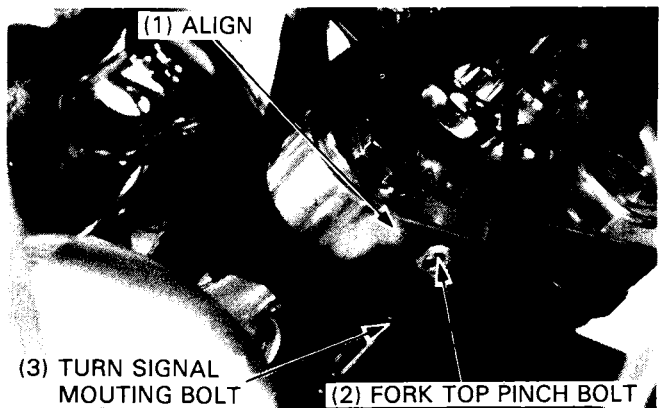
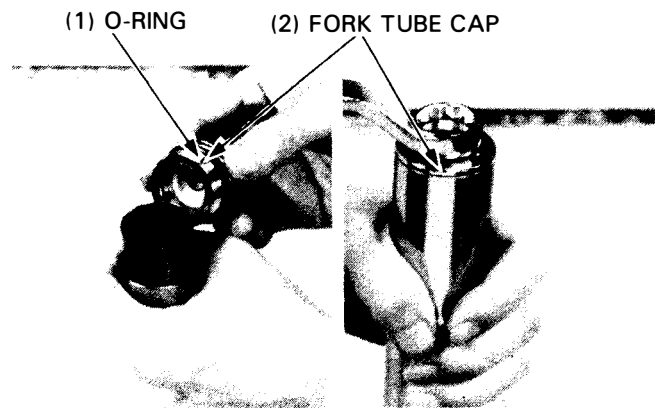
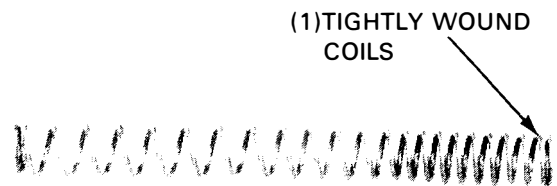
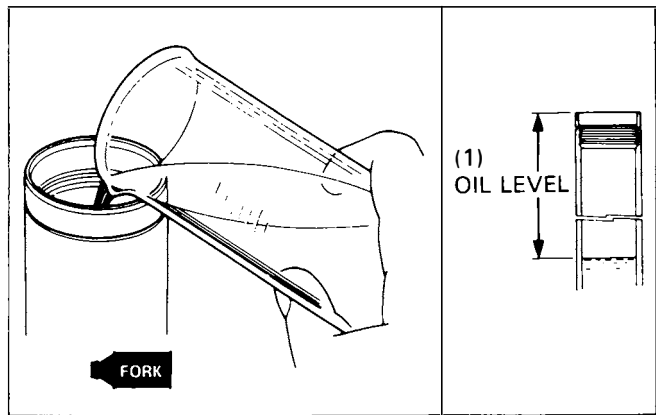
- Note the direction:the tightly wound coils should be at top.

Loosely install the fork tube cap with a new O-ring.

## INSTALLATION

Install the fork tube, aligning its top end with the upper surface of the top bridge as shown.

Temporarily install and tighten the fork top pinch bolts and turn signal mounting bolts.



## FRONT WHEEL/SUSPENSION/STEERING

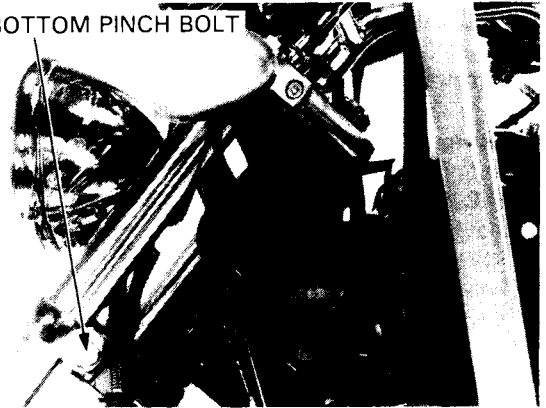
Install and tighten the bottom pinch bolt.

**TORQUE: 50 N·m (5.0 kg-m, 36 ft-lb)**

Tighten the top pinch bolt.

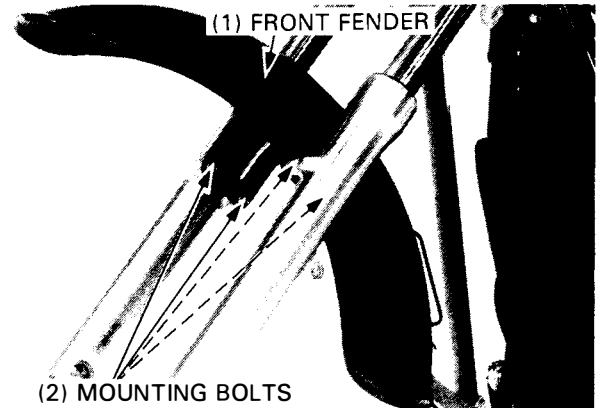
**TORQUE: 11 N·m (1.1 kg-m, 8 ft-lb)**

(1) BOTTOM PINCH BOLT



Install the front fender and tighten the mounting bolts securely.

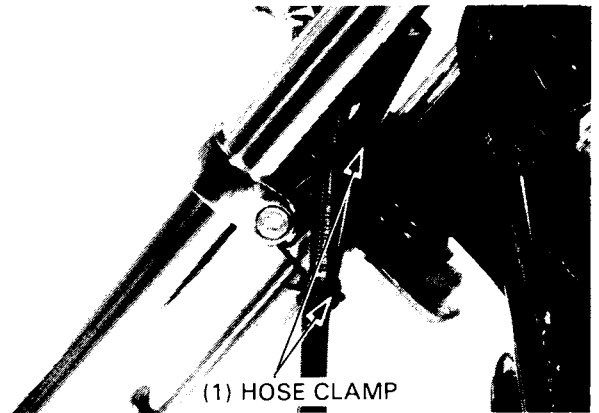
(1) FRONT FENDER



(2) MOUNTING BOLTS

Hook the brake hose onto the hose clip.

(1) HOSE CLAMP



Install the brake caliper with the mounting bolts. Tighten the bolts to the specified torque.

**TORQUE: '88, '89, '91-'93;**

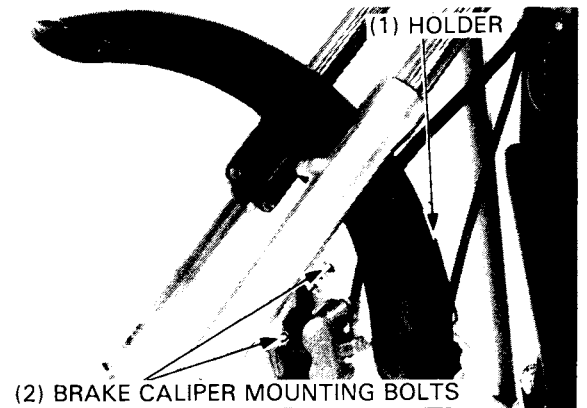
**27 N·m (2.7 kg-m, 20 ft-lb)**

**After '93:**

**31 N·m (3.1 kg-m, 22 ft-lb)**

Insert the speedometer cable through the fender holder.

(1) HOLDER



(2) BRAKE CALIPER MOUNTING BOLTS

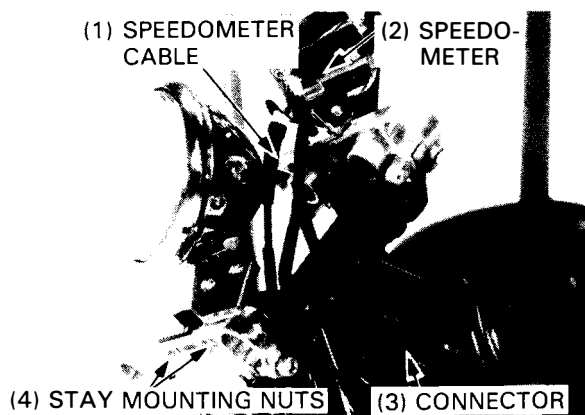
## **STEERING STEM**

### **REMOVAL**

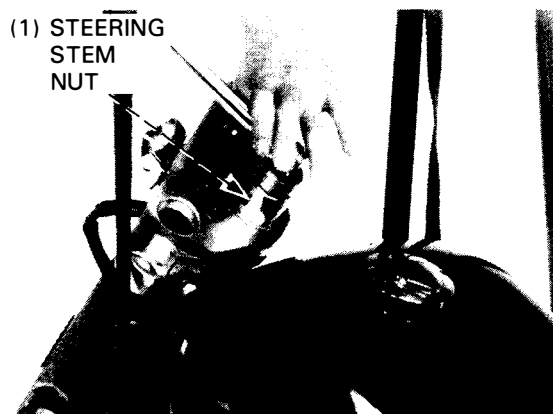
Remove the fork legs and handlebar.  
Disconnect the speedometer cable from the speedometer, and the 6P black connector (see page 1-13).

Remove the following:

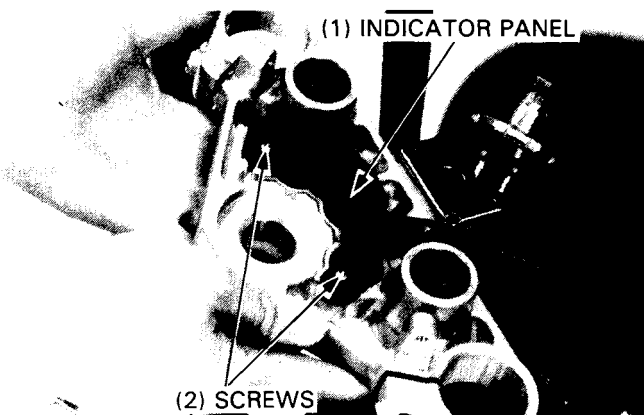
- speedometer from the fork bridge
- headlight from the headlight case
- headlight stay and mounting nuts, headlight stay and case



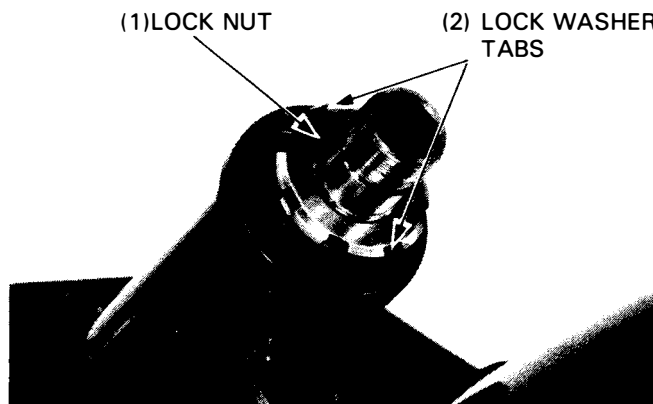
Remove the steering stem nut and washer.



Remove the top bridge.  
Remove the indicator panel and lights by removing the two screws.



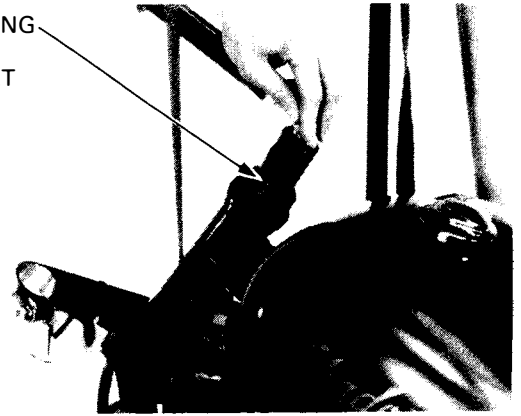
Straighten the lock washer tabs and remove the lock nut and lock washer.



Loosen the steering head bearing adjustment nut.

**TOOL: Steering stem socket 07916-3710100**

(1) STEERING  
STEM  
SOCKET

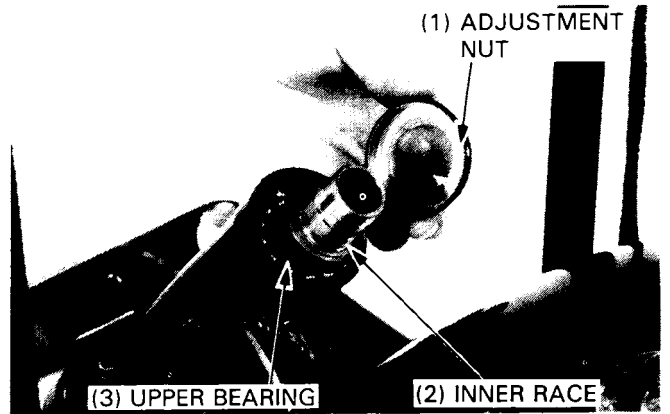


Hold the steering stem by hand and remove the adjustment nut, dust seal, upper bearing inner race and upper bearing.

Remove the steering stem from the steering head.

Check the bearings and outer race for wear or damage. Replace if necessary.

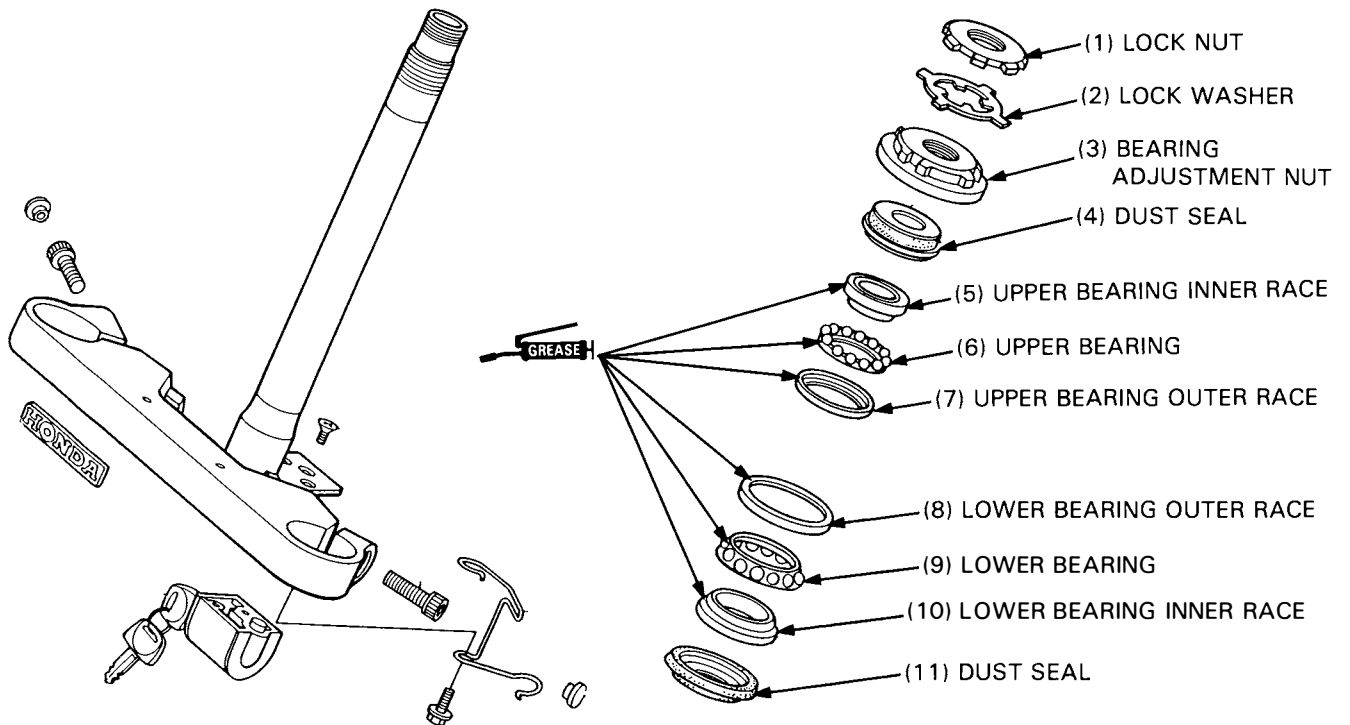
(1) ADJUSTMENT  
NUT



(3) UPPER BEARING

(2) INNER RACE

**BEARING REPLACEMENT**



## FRONT WHEEL/SUSPENSION/STEERING

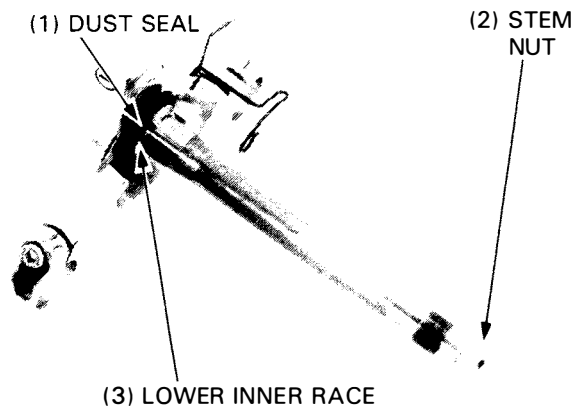
### NOTE

- Always replace the bearing and race as a set.

Install the steering stem nut on the top end of the steering stem to protect the threads from damage.

Remove the lower inner race and dust seal using a punch or driver.

Replace the dust seal with a new one whenever it is removed.



Remove the lower outer race using the special tools and a suitable shaft.

**TOOLS:** Bearing race remover: 07946-3710500

Remove the upper bearing outer race using the special tools.

### TOOLS:

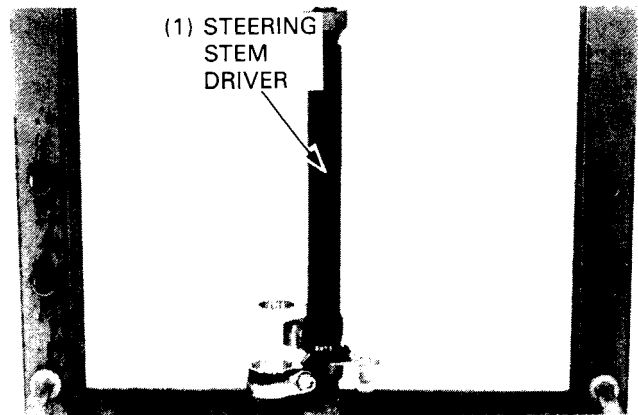
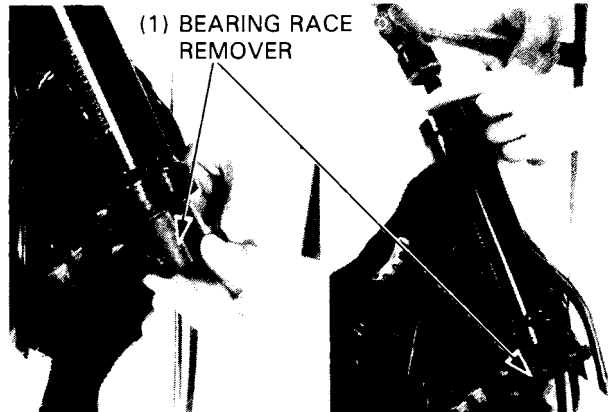
Ball race remover — attachment 07953-MJ10000 — driver handle 07953-MJ10100 — driver handle 07953-MJ10200

or

Attachment 07953-MJ1000A, 07953-MJ1000B or Driver 07949-3710001 and Attachment, 32 x 35 mm 07746-0010100

Install a new dust seal over the steering stem.  
Press a new lower bearing inner race onto the stem.

**TOOL:** Steering stem driver 07946-MB00000

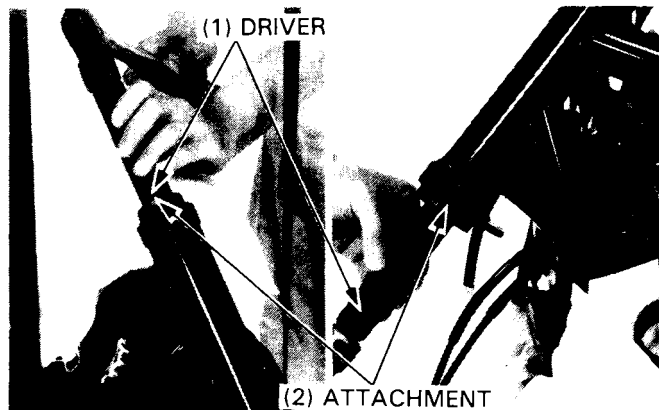


Drive new upper and lower bearing outer races into the steering head pipe.

### TOOLS:

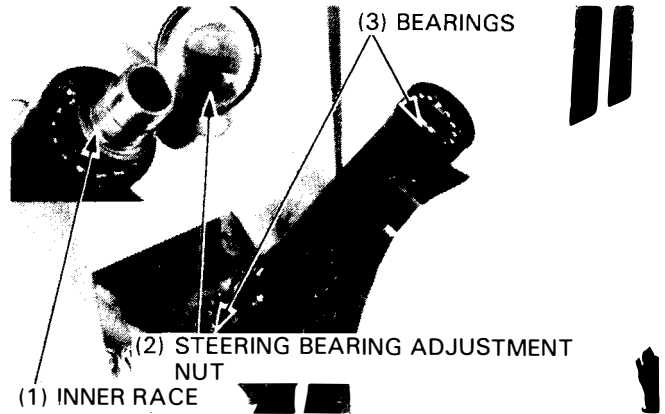
Upper bearing outer race:  
Drive 07749-0010000  
Attachment, 42 x 47 mm 07746-0010300

Lower bearing outer race:  
Driver 07749-0010000  
Attachment, 52 x 55 mm 07746-0010400



INSTALLATION

Pack the bearing cavities with grease.  
 Install the lower bearing onto the stem.  
 Insert the stem into the steering head pipe and install the upper bearing, inner race, dust seal and steering bearing adjustment nut.



Apply engine oil to the adjustment nut threads.  
 Tighten the steering bearing adjustment nut to the specified torque.

**TOOL: Steering stem socket 07916-3710100**

**TORQUE: 25 N·m (2.5 kg-m, 18 ft-lb)**

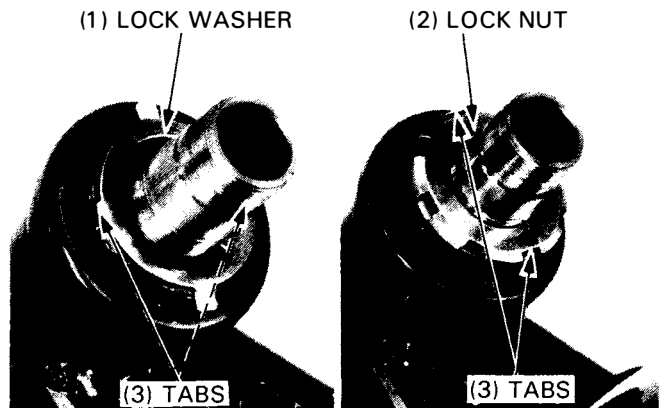


Turn the steering stem back and forth five times to seat the bearings.  
 Retighten the adjustment nut to the same torque.  
 Turn the steering stem to seat the bearings.



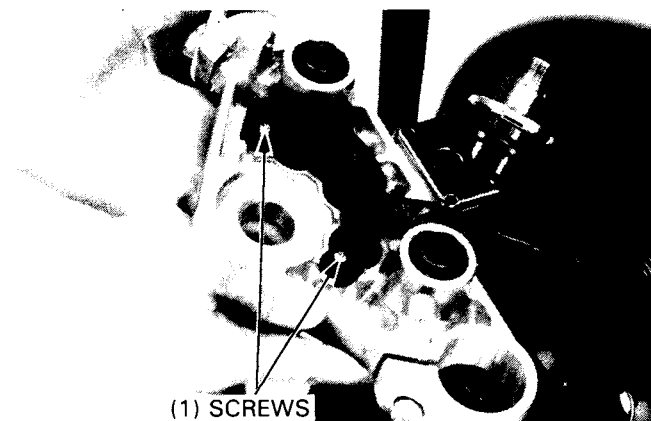
Install a new lock washer and bend the two opposite tabs down into the grooves in the adjustment nut.

Install and finger tighten the lock nut all the way.  
 Hold the bearing adjustment nut and further tighten the lock nut, within 90 degrees, to align its grooves with the tabs of the lock washer.  
 Bend up the lock washer tabs into the grooves of the lock nut.



## FRONT WHEEL/SUSPENSION/STEERING

Install the indicator panel with two screws.



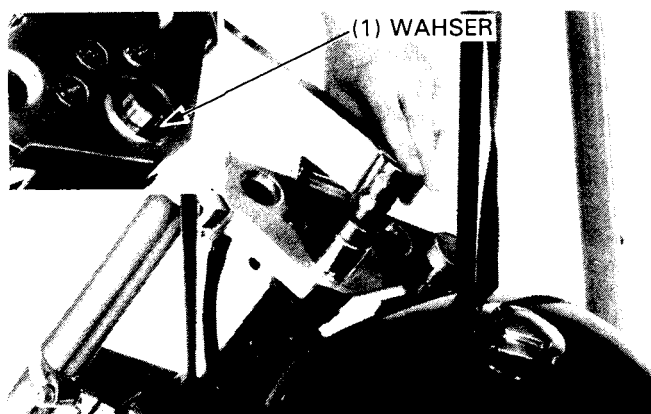
Install the fork bridge then temporarily install the fork legs. Tighten the steering stem nut.

**TORQUE: 105 N·m (10.5 kg-m, 76 ft-lb)**

Install the following parts:

- fork legs (page 12-18).
- front wheel (page 12-12).

Check the steering head bearing preload.



### STEERING HEAD BEARING PRELOAD

Place a stand under the engine and raise the front wheel off the ground.

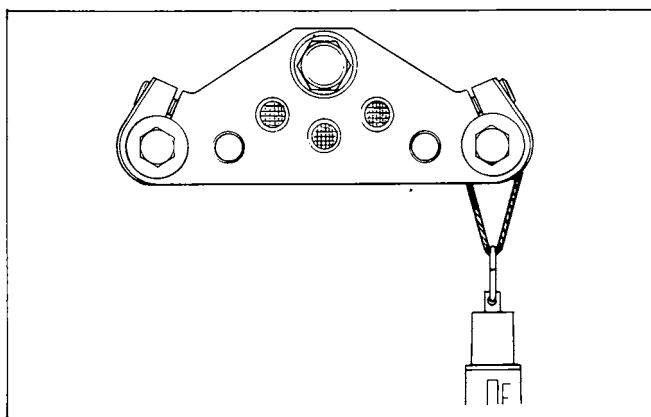
Position the steering stem to the straight ahead position. Hook a spring balance to the fork tube and measure the steering head bearing preload.

#### NOTE

- Make sure that there is no cable and wire harness interference.

The preload should be within 1.0–1.5 kg (2.20–3.31 lb) for right and left turns.

If the readings do not fall within the limits, lower the front wheel on the ground and adjust the bearing adjustment nut. After making sure the bearing preload, install the removed parts in the reverse order of removal.



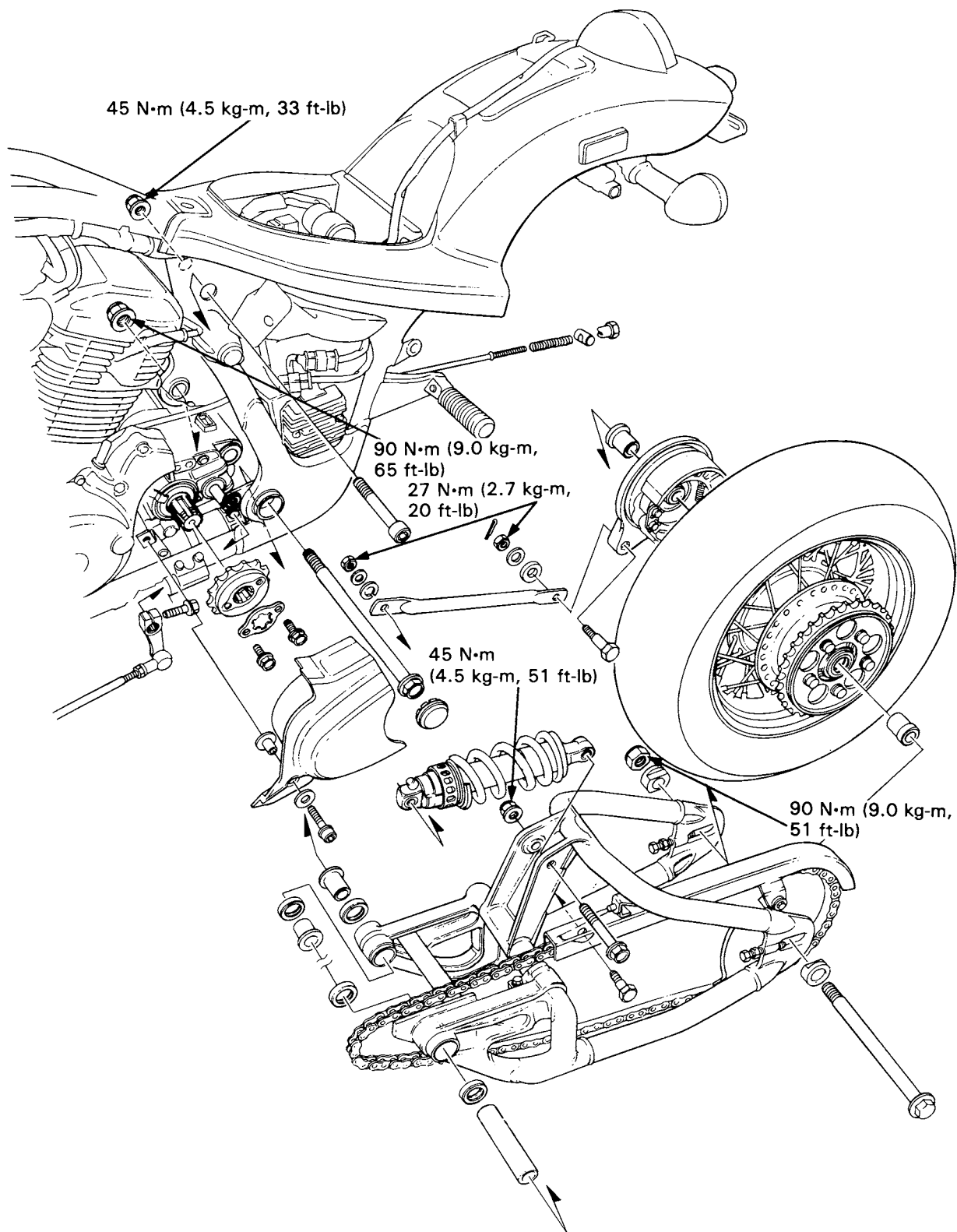


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**MEMO**

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# REAR WHEEL/BRAKE/SUSPENSION



# 13. REAR WHEEL/BRAKE/SUSPENSION

|                     |      |                            |       |
|---------------------|------|----------------------------|-------|
| SERVICE INFORMATION | 13-1 | BRAKE PEDAL                | 13-10 |
| TROUBLESHOOTING     | 13-2 | SHOCK ABSORBER             | 13-11 |
| REAR WHEEL          | 13-3 | SWINGARM                   | 13-14 |
| REAR BRAKE          | 13-7 | SEAT/REAR FENDER/SUB-FRAME | 13-18 |

## SERVICE INFORMATION

### GENERAL

- Support the motorcycle using a hoist or a jack under the engine.

### CAUTION

- *Do not jack up the motorcycle using the oil filter.*

- Use only genuine Honda replacement fasteners for the rear suspension.
- Note the installation direction of the bolts.

### ⚠ WARNING

- *Any attempt to mount automobile tires on a motorcycle rim may cause the tire bead to separate from the rim with enough explosive force to cause serious injury or death.*
- *The rear shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber. Use only nitrogen to pressurize the shock absorber. The use of an unstable gas can cause a tire or explosion resulting in serious injury.*
- *Before disposal of the shock absorber, release the nitrogen by pressing the valve core. Then remove the valve from the shock absorber.*
- *Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner or alternate method approved by OSHA, designed to minimize the hazard caused by airborne asbestos fibers.*

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## SPECIFICATION

Unit: mm (in)

| ITEM                               |        | STANDARD                      | SERVICE LIMIT      |
|------------------------------------|--------|-------------------------------|--------------------|
| Rear wheel runout                  | Radial | —                             | 2.0 mm (0.08 in)   |
|                                    | Axial  | —                             | 2.0 mm (0.08 in)   |
| Rear axle runout                   |        | —                             | 0.2 mm (0.01 in)   |
| Rear brake drum I.D.               |        | 160 mm (6.3 in)               | 161 mm (6.3 in)    |
| Rear brake lining thickness        |        | 5 mm (0.2 in)                 | 2 mm (0.08 in)     |
| Shock absorber spring free length  |        | 137.5 mm (5.41 in)            | 135.0 mm (5.31 in) |
| Rear suspension damper compression |        | 13.4–17.4 kg (29.54–38.36 lb) | 13.3 kg (29.32 lb) |

## TORQUE VALUES

|                              |                             |
|------------------------------|-----------------------------|
| Spokes                       | 4 N•m (0.4 kg-m, 2.9 ft-lb) |
| Sprocket nut                 | 65 N•m (6.5 kg-m, 47 ft-lb) |
| Shock absorber mounting bolt | 45 N•m (4.5 kg-m, 33 ft-lb) |
| Swingarm pivot bolt          | 90 N•m (9.0 kg-m, 65 ft-lb) |
| Rear axle                    | 90 N•m (9.0 kg-m, 65 ft-lb) |
| Damper rod lock nut          | 70 N•m (7.0 kg-m, 51 ft-lb) |
| Brake torque rod nut         | 27 N•m (2.7 kg-m, 20 ft-lb) |

## REAR WHEEL/BRAKE/SUSPENSION

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### TOOLS

#### Special

|                           |  |
|---------------------------|--|
| Driver shaft              | 07946—MJ00100  |
| Attachment, 28 x 30 mm    | 07746—1870100  |
| Spoke wrench              | 07JMA—MR60100 or equivalent commercially available in U.S.A. |
| Shock absorber compressor | 07GME—0010000  |
| Attachment                | 07JME—MR10100  |
| Compressor screw          | 07GME—0010100  |
| Snap ring pliers          | 07914—3230001  |

#### Common

|                             |   |
|-----------------------------|---|
| Bearing remover shaft       | 07746—0050100, or equivalent commercially available in U.S.A. |
| Bearing remover head, 17 mm | 07746—0050500   |
| Driver                      | 07749—0010000   |
| Attachment, 42 x 47 mm      | 07746—0010300   |
| Pilot, 17 mm                | 07746—0040400   |
| Attachment, 32 x 35 mm      | 07746—0010100   |
| Pilot, 15 mm                | 07746—0040300   |
| Pilot, 22 mm                | 07746—0041000   |

## TROUBLESHOOTING

#### Wobble or vibration in motorcycle

- Bent rim
- Loose wheel bearing(s)
- Loose or bent spokes
- Damaged tire
- Axle not tightened properly
- Swingarm pivot bearing worn
- Chain adjusters not adjusted equally
- Bent frame or swingarm

#### Soft suspension

- Weak spring
- Improper shock absorber spring preload

#### Hard suspension

- Improper shock absorber spring preload
- Bent shock absorber rod
- Swingarm pivot bearings damaged
- Bent frame or swingarm

#### Suspension noise

- Faulty rear damper
- Loose fasteners

#### Poor brake performance

- Improper brake adjustment
- Worn brake shoes
- Brake linings oily, greasy or dirty
- Worn brake cam
- Worn brake drum
- Brake arm serrations improperly engaged
- Brake shoes worn at cam contact area

## REAR WHEEL

### REMOVAL

Support the motorcycle using a hoist or a jack under the engine.

### CAUTION

- Do not jack up the oil filter.

Loosen the drive chain adjusters on both sides of the swing-arm.

Remove the following parts:

- brake rod
- cotter pin, nut, seat washers and bolt from the torque rod on the brake panel.
- Axle nut, adjuster collars, side collar and rear axle.
- drive chain from the drive sprocket
- rear wheel
- brake panel from the brake drum

### INSPECTION

#### ● AXLE

Set the axle on V blocks and measure the runout.

**SERVICE LIMIT: 0.2 mm (0.01 in)**

#### ● WHEEL

Check the spokes and tighten any that are loose.

**TORQUE: 4 N·m (0.4 kg-m, 2.9 ft-lb)**

**TOOL: Spoke wrench**

**07JMA—MR60100 or equivalent commercially available in U.S.A.**

Check the rim runout by placing the wheel on a truing stand. Spin the wheel hand and read the runout using a dial indicator.

#### SERVICE LIMITS:

**RADIAL: 2.0 mm (0.08 in)**

**AXIAL: 2.0 mm (0.08 in)**

#### ● WHEEL BEARING

Turn the inner race of each bearing with your finger.

The bearings should turn smoothly and quietly.

Also check that the bearing outer race fits tightly in the hub. Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

### NOTE

- Replace wheel bearings in pairs.

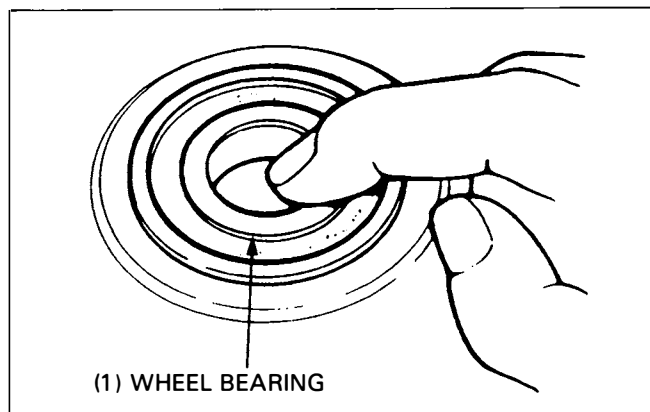
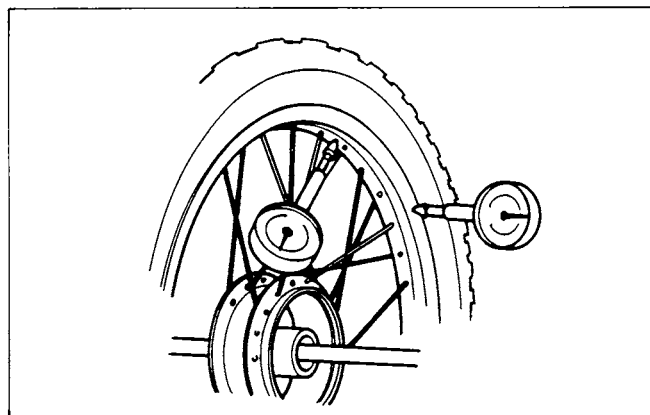
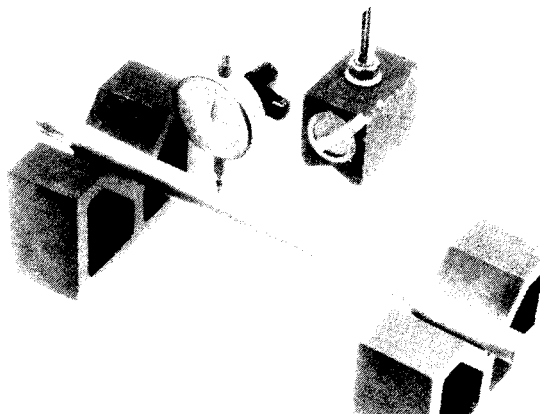
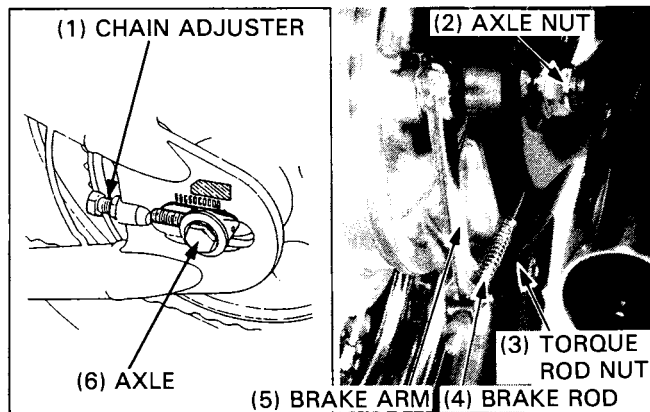
For bearing replacement, see page 13-4.

#### ● WHEEL BALANCING

Refer to page 12-7.

### NOTE

- Do not add more than 70 grams of balancing weight to the rear wheel



## REAR WHEEL/BRAKE/SUSPENSION

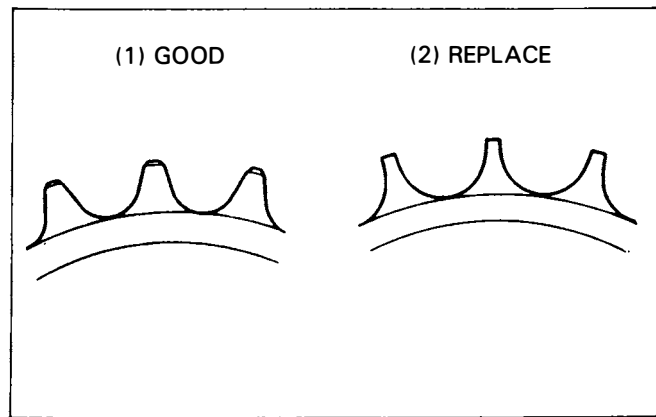
### SPROCKET/DRIVEN FLANGE DISASSEMBLY/INSPECTION

Remove the wheel (page 13-3).  
Remove the mounting nuts and separate the sprocket from the flange.  
Check the condition of the sprocket teeth.  
Replace a worn or damaged sprocket.

#### NOTE

- The drive chain and drive sprocket must also be inspected if the driven sprocket is worn or damaged. Never install a new drive chain on worn sprockets or a worn chain on new sprockets. Both chain and sprocket must be in good condition or the new replacement chain or sprockets will wear rapidly.

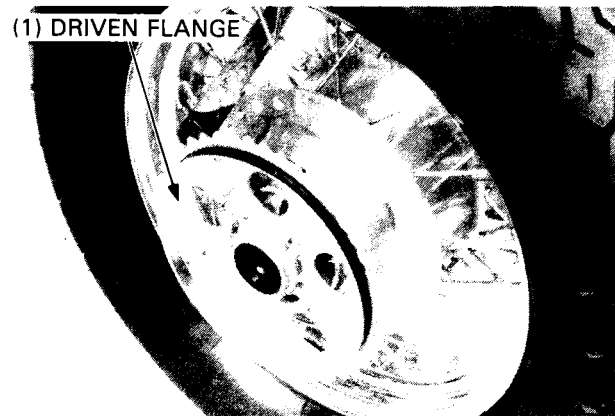
If driven flange the hub, drive it out by tapping it at several locations with wood block.



Remove the dampers from the flange in the hub.  
Remove the collar and dust seal from the flange.  
Drive out the driven flange bearing, if necessary.

Inspect the dampers for deterioration.

Turn the inner race of the bearing with your finger.  
The bearing should turn smoothly and quietly.  
Also check that the outer race fits tightly in the flange.  
Remove and discard the bearing if it does not turn smoothly and quietly, or if the outer race fits loosely in the flange.



### BEARING REPLACEMENT

#### Wheel bearing

Drive out the wheel bearings and the distance collar.

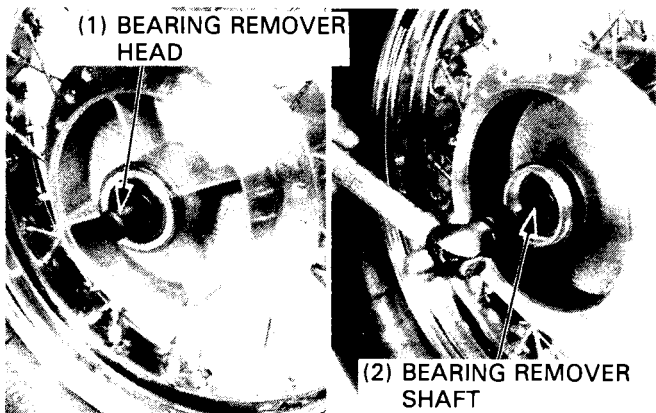
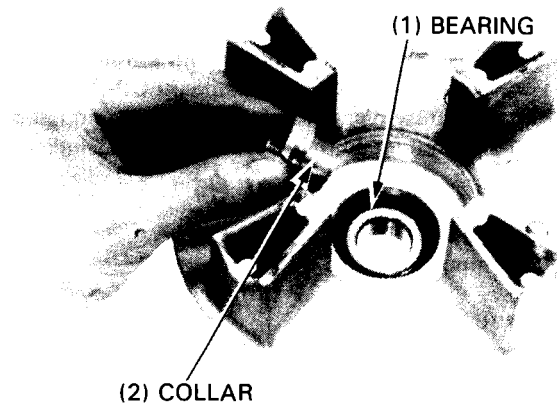
#### NOTE

- If the bearings are removed, they must be replaced.

#### TOOLS:

|                             |               |
|-----------------------------|---------------|
| Bearing remover shaft       | 07746-0050100 |
| Bearing remover head, 17 mm | 07746-0050500 |

or equivalent commercially available in U.S.A.



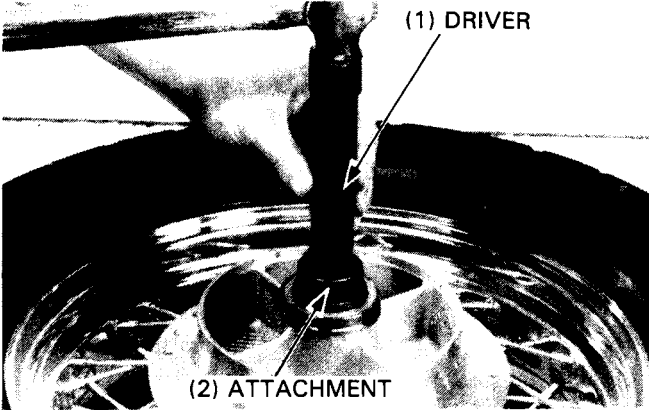
First, drive in a new left wheel bearing until it is fully seated, install the distance collar, then drive in a new right bearing.

**TOOLS:**

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

**NOTE**

- Drive the wheel bearings in with the vendor mark facing out.

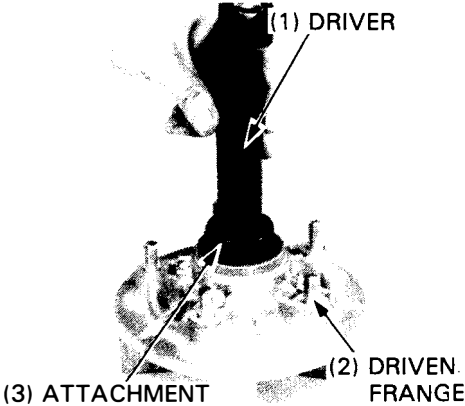


**Flange bearing**

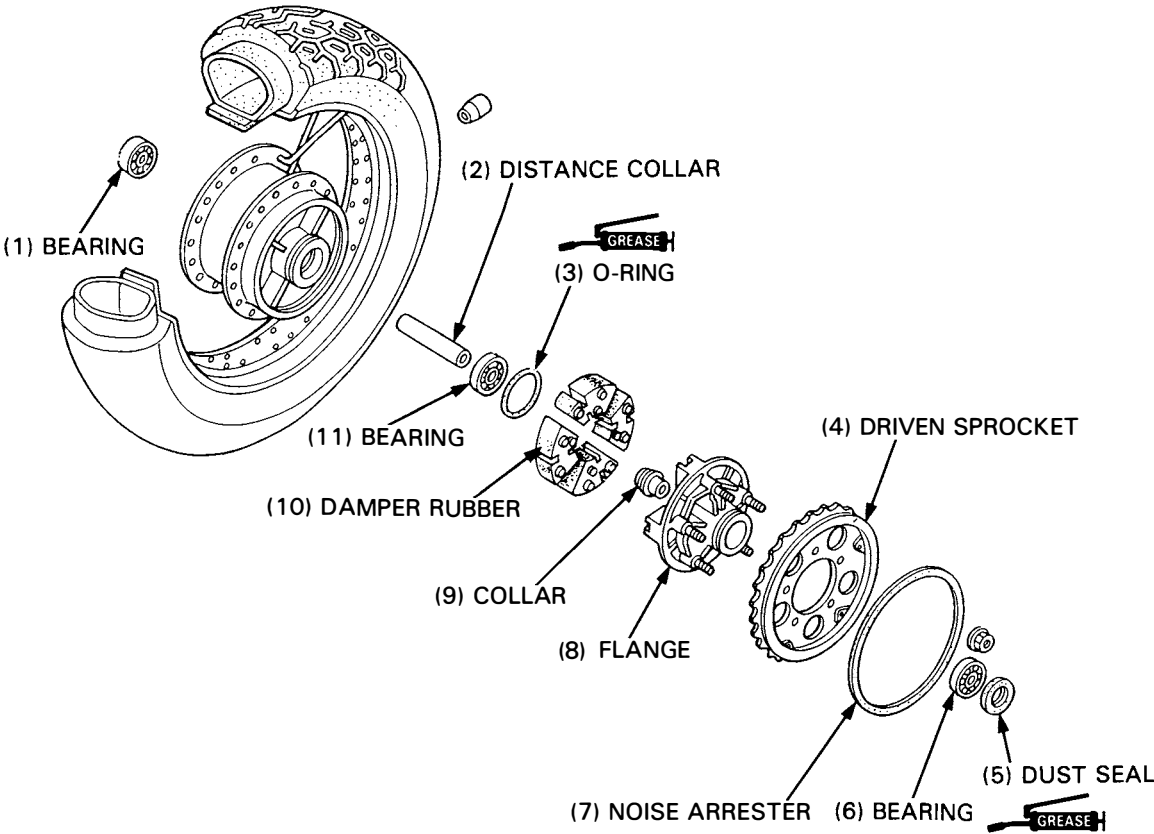
Drive out the bearing using a suitable tool. Drive the new bearing in with its vendor mark facing out.

**TOOLS:**

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



**ASSEMBLY**



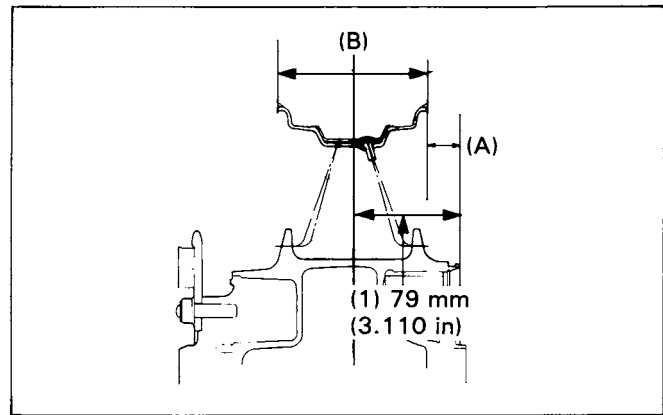
## REAR WHEEL/BRAKE/SUSPENSION

Place the rim and hub on the work bench and begin lacing with a new spoke from the hole of inside in the hub. Install the spoke with a space of two holes in between. Measure the distance (B), and make a calculation.  
 $(A) = 79 \text{ mm (3.110 in)} - (B) \div 2$   
Adjust the hub position so that the distance from the hub right end surface to the side of rim is (A).  
Tighten the spokes in 2 or 3 progressive steps.

### TOOL:

Spoke wrench

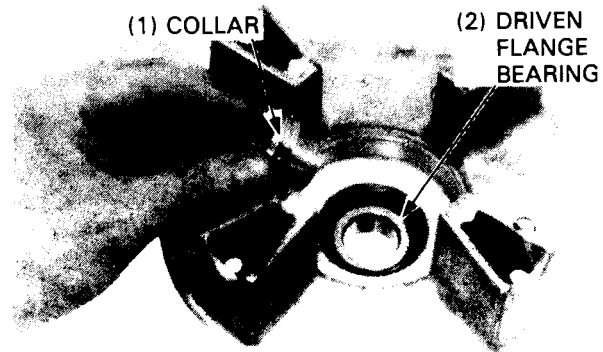
**07JMA—MR60100**  
or equivalent commercially  
available in U.S.A.



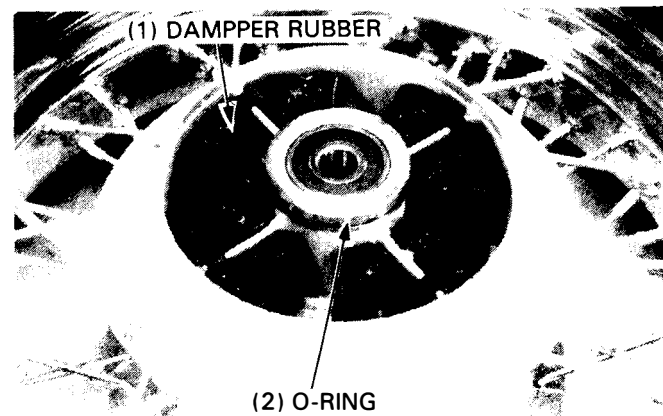
**TORQUE: 4 N·m (0.4 kg·m, 2.9 ft·lb)**

Check the wheel runout (page 13-3).  
Install the tube and tire.

Install the collar in the driven flange bearing.



Install the damper rubbers on the flange and place flange in the hub.  
Apply grease to a new O-ring and install it onto the flange groove.

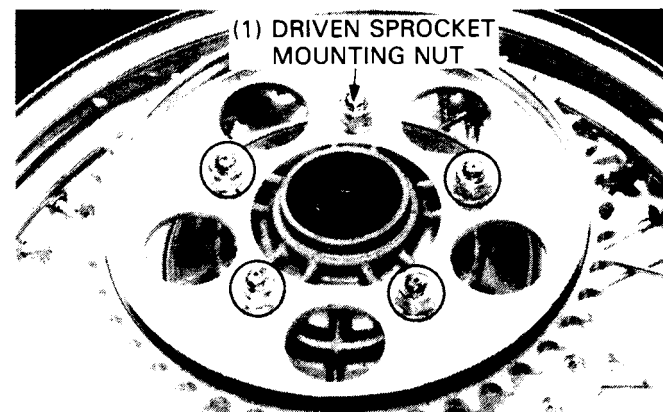


Apply grease to the dust seal lip and install it.

Install the driven sprocket, if removed, and a new seal.

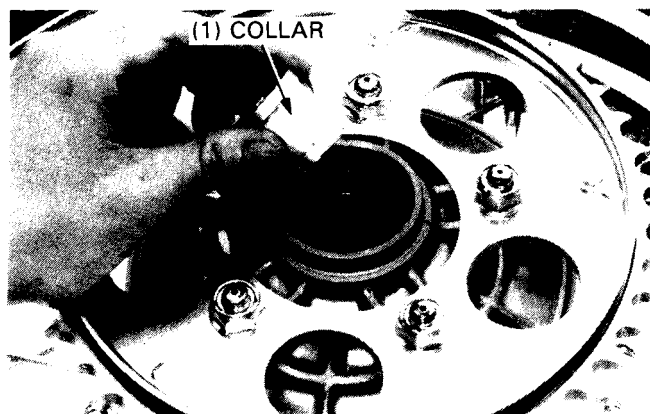
Tighten the driven sprocket mounting nuts.

**TORQUE: 65 N·m (6.5 kg·m, 47 ft·lb)**





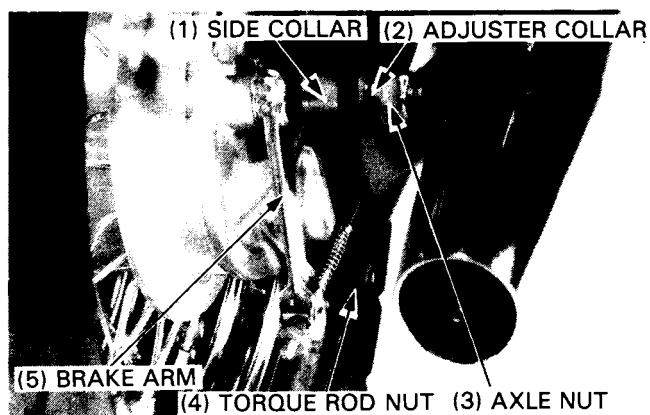
Install the axle collar.



**INSTALLATION**

Install the brake panel on the wheel hub. Position the rear wheel between in swingarm and install the drive chain over the driven sprocket.

Install the left side adjuster collar onto the rear axle and insert the axle (from the left side) through the swingarm, wheel hub and right side collar. Install the adjuster collar and axle nut. Tighten the axle nut lightly. Adjust the drive chain (page 3-13). Tighten the axle nut.



**TORQUE: 90 N·m (9.0 kg-m, 65 ft-lb)**

Connect the brake torque rod to the brake panel with bolt, seat washer, washer and nut. (page 13-8). Tighten the nut.

**TORQUE: 27 N·m (2.7 kg-m, 20 ft-lb)**

Install the cotter pin and bend back it securely. Connect the brake rod to the brake arm and adjust the rear brake pedal free play (page 3-16).



**REAR BRAKE**

**INSPECTION**

Remove the rear wheel (page 13-3)

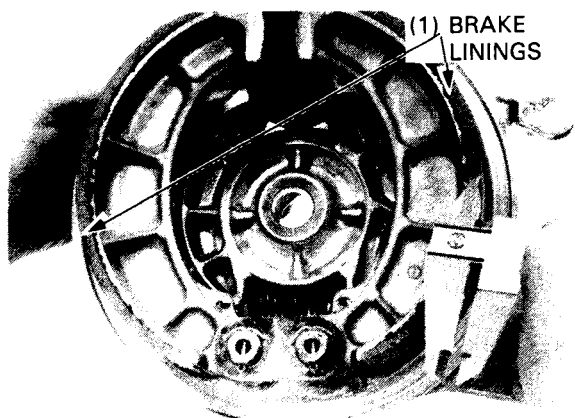
Remove the brake panel and measure the rear brake drum I.D.

**SERVICE LIMIT: 161 mm (6.3 in)**

Measure the rear brake lining thickness.

**SERVICE LIMIT: 2 mm (0.08 in)**

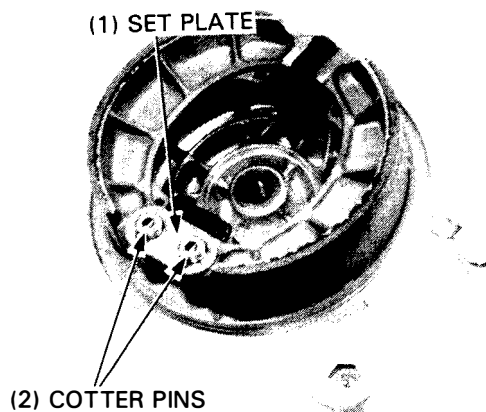
Replace the brake shoes if either one is thinner than the service limit.



## REAR WHEEL/BRAKE/SUSPENSION

### DISASSEMBLY

Remove the cotter pins and set plate.



Remove the brake shoes and springs from the brake panel.

### NOTE

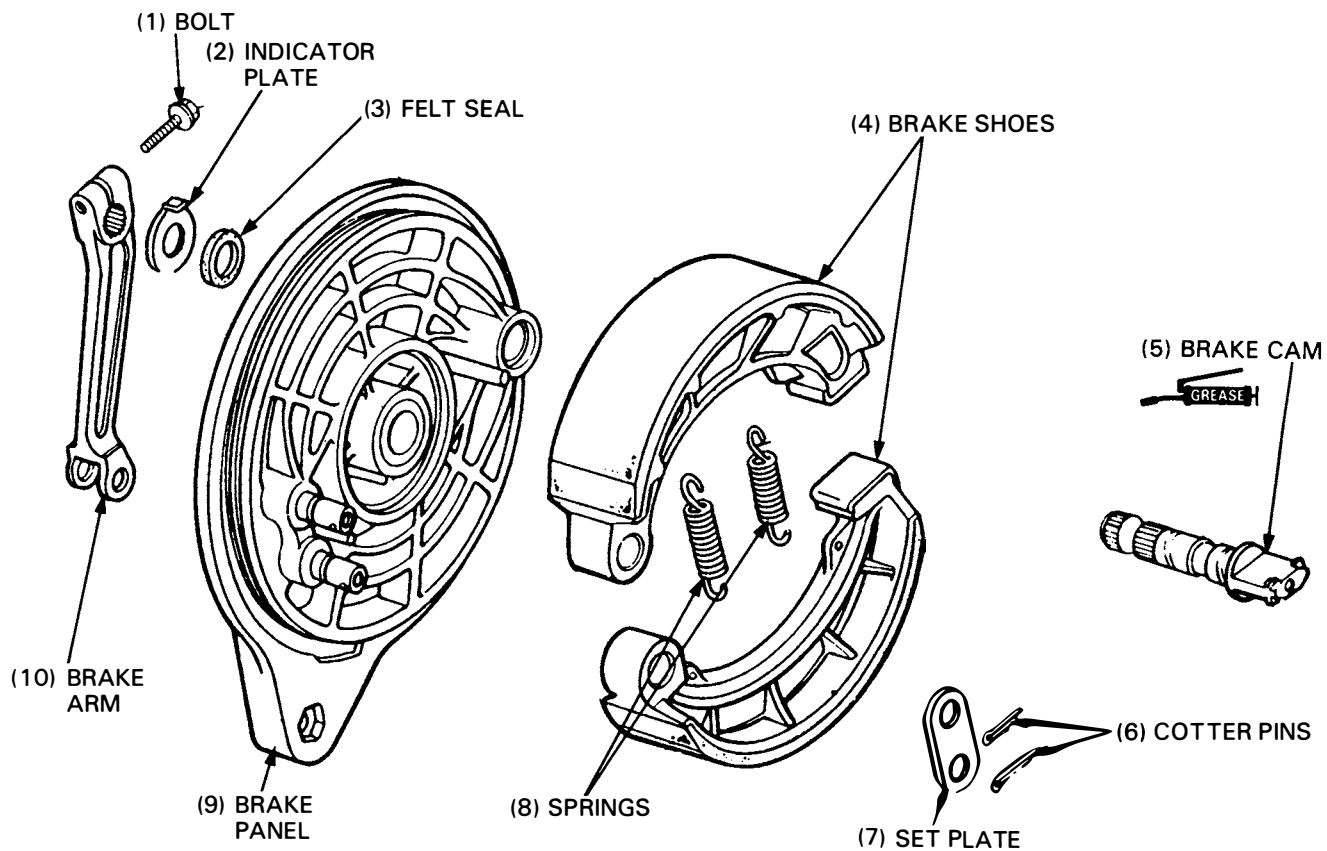
- Mark the shoes to indicate their original positions before removing them.

Remove the following parts from the brake panel:

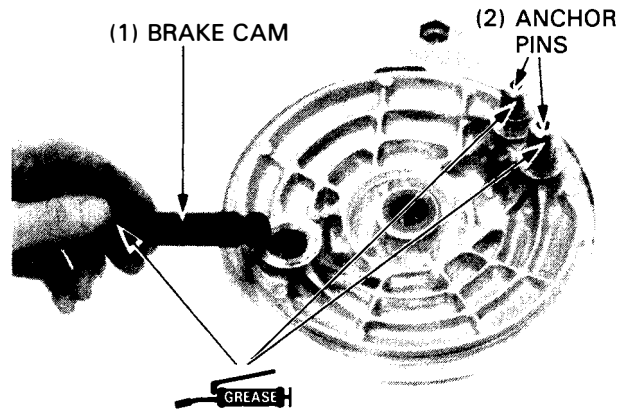
- bolt and brake arm
- indicator plate
- brake cam
- felt seal



### ASSEMBLY

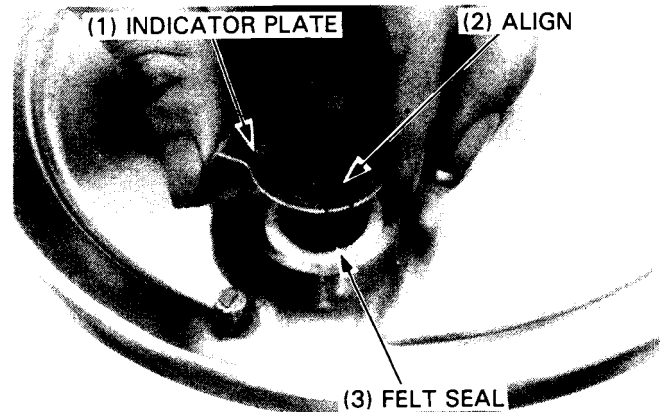


Apply grease to the brake anchor pins and brake cam. Install the brake cam into the brake panel.

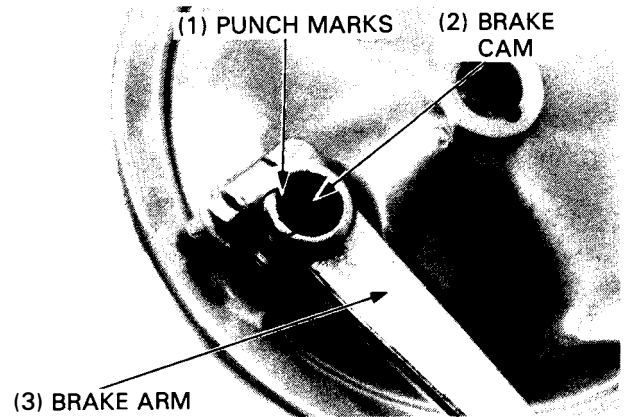


Install the felt seal.

Install the indicator plate on the brake cam aligning its tab with cut-out on the brake cam.



Install the brake arm by aligning the punch marks on the arm and cam. Install and tighten the bolt.

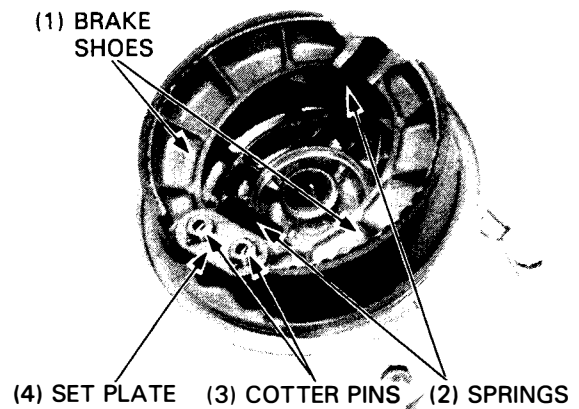


Position the brake shoes in their original locations and install the springs.

**WARNING**

- Grease on the brake linings will reduce stopping power. Keep grease off of the brake linings. Wipe excess grease off the cam and anchor pin.

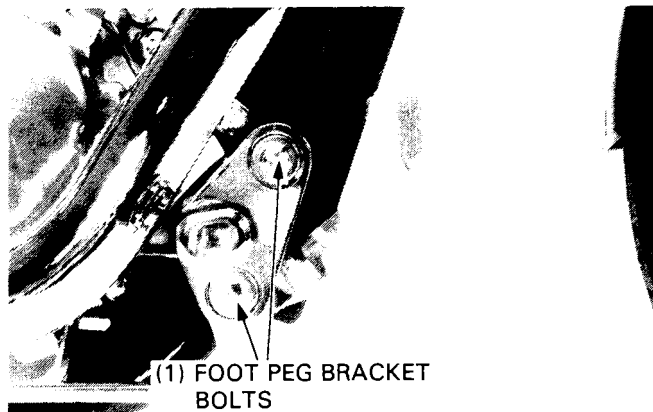
Install the set plate and cotter pins, then bend back the pins. Install the brake panel onto the wheel hub and install the rear wheel (page 13-7).



# BRAKE PEDAL

## REMOVAL

Remove the foot peg bracket mounting bolts and washers. Remove the brake pedal by removing the cotter pin, washer and bolt.

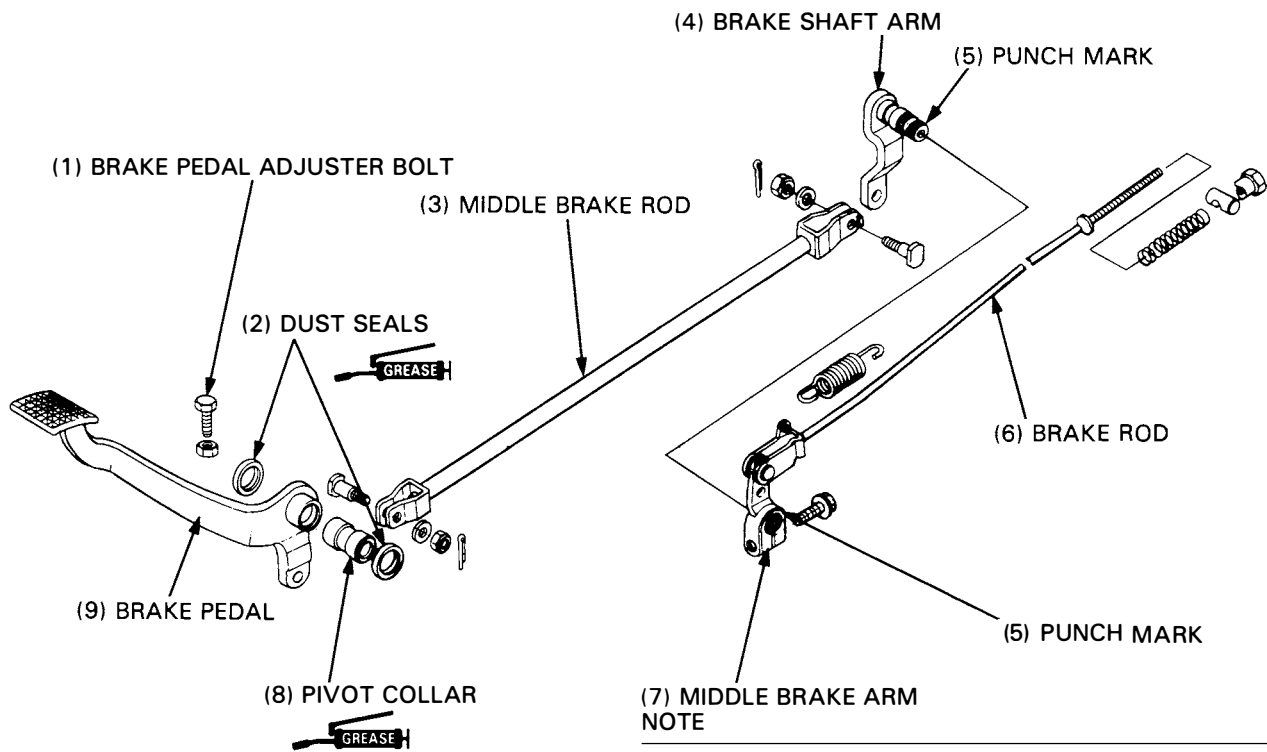
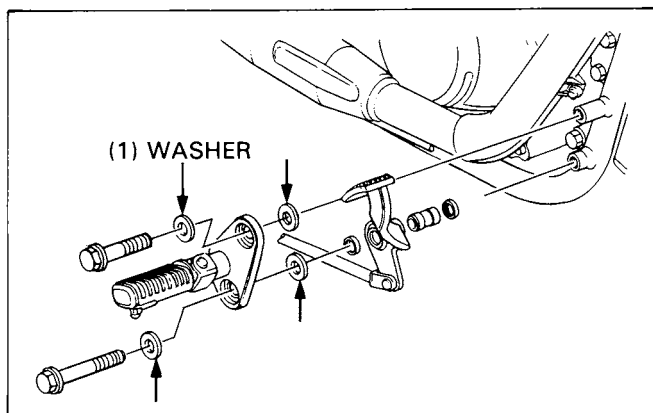


## INSTALLATION

Install the brake pedal in the reverse order of removal.

### NOTE

Note the locations of the washers.



- Align the punch mark on the brake shaft arm end with the punch mark on the middle brake arm.

# REAR SHOCK ABSORBER

## REMOVAL

**⚠ WARNING**

- *The rear shock absorber contains nitrogen under high pressure. Do not allow fire or heat near the shock absorber.*

Support the motorcycle using a hoist, or a jack under the engine.

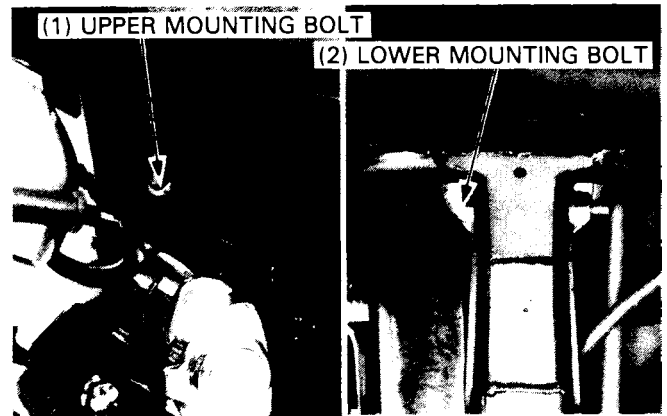
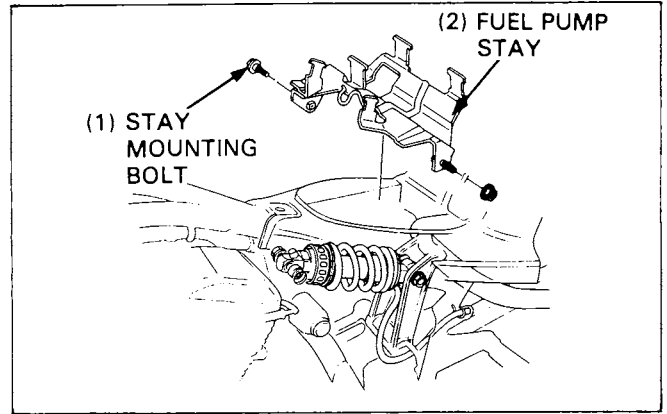
Remove the following:

- seat, right and left side cover
- rear ignition coil mounting bolts (page 16-5)
- rear ignition coil stay mounting bolt

Disconnect the fuel pump, fuel pump relay and turn signal relay from the fuel pump stay.

Remove the fuel pump stay mounting bolt, nut and fuel pump stay.

Remove the upper and lower shock absorber mounting bolts and nuts then remove the shock absorber.



## DISASSEMBLY

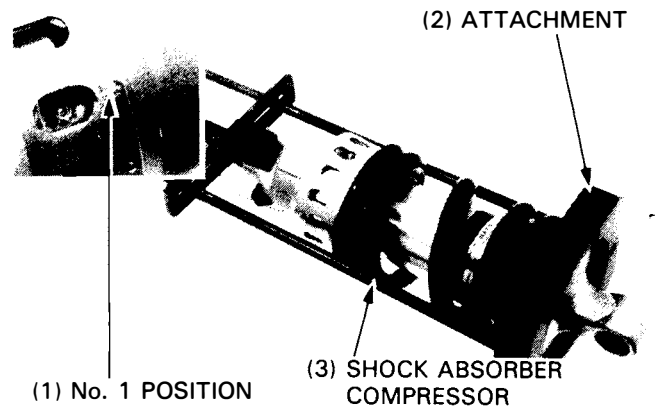
Set the spring preload adjuster to No. 1 position. Compress the shock absorber with the compressor and attachment.

**CAUTION**

- *Be sure the base is adjusted correctly for the shock spring seat and the clevis pin is all the way in.*

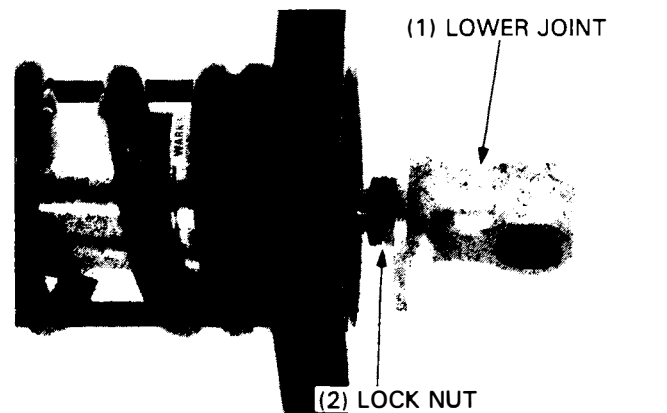
**TOOLS:**

|                           |               |
|---------------------------|---------------|
| Shock absorber compressor | 07GME-0010000 |
| Attachment                | 07JME-MR10100 |
| Compressor screw          | 07GME-0010100 |



Loosen the lock nut and remove the lower joint and nut.

Remove the compressor and disassemble the shock absorber.



## REAR WHEEL/BRAKE/SUSPENSION

### SPRING FREE LENGTH

Measure the shock absorber spring free length.

**SERVICE LIMIT: 135.0 mm (5.31 in)**



Mark the damper rod at 10 mm below the case as shown. Place the damper rod on a scale and measure the force required to compress the damper to the 10 mm (0.4 in) mark.

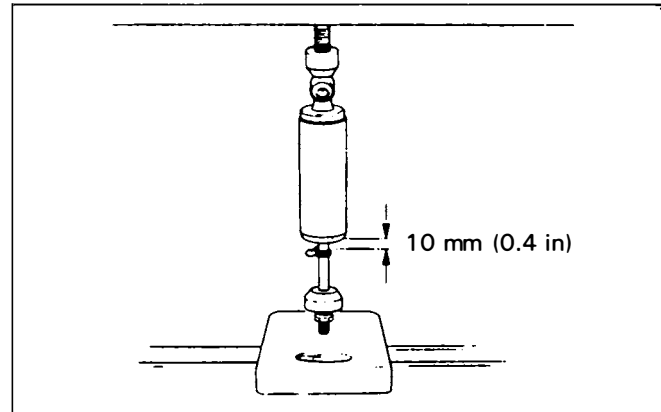
**COMPRESSION FORCE: 13.4–17.4 kg (29.54–38.36 lb)**

If the force required is less than 13.3 kg (29.32 lb), gas is leaking.

Examine the damper rod and replace the damper unit if it is bent or scored.

Check the damper unit for oil leaks or other damage and the damper rod for trueness.

Check the upper mount bushing for wear or damage.



### SHOCK ABSORBER DISPOSAL PROCEDURE

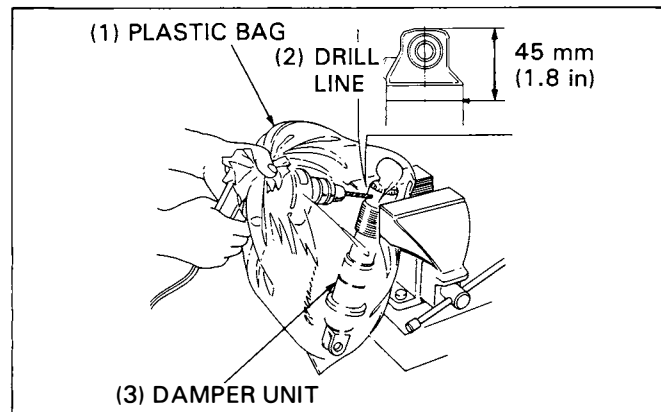
Center punch the damper case to mark a drilling point, approximately 45 mm (1.8 in) from the mount top surface.

Wrap the damper unit inside a plastic bag and support the damper unit upright in a vise as shown.

Through the open end of the bag, insert a power drill with a sharp 2 or 3 mm (5/64–1/8 in) drill bit.

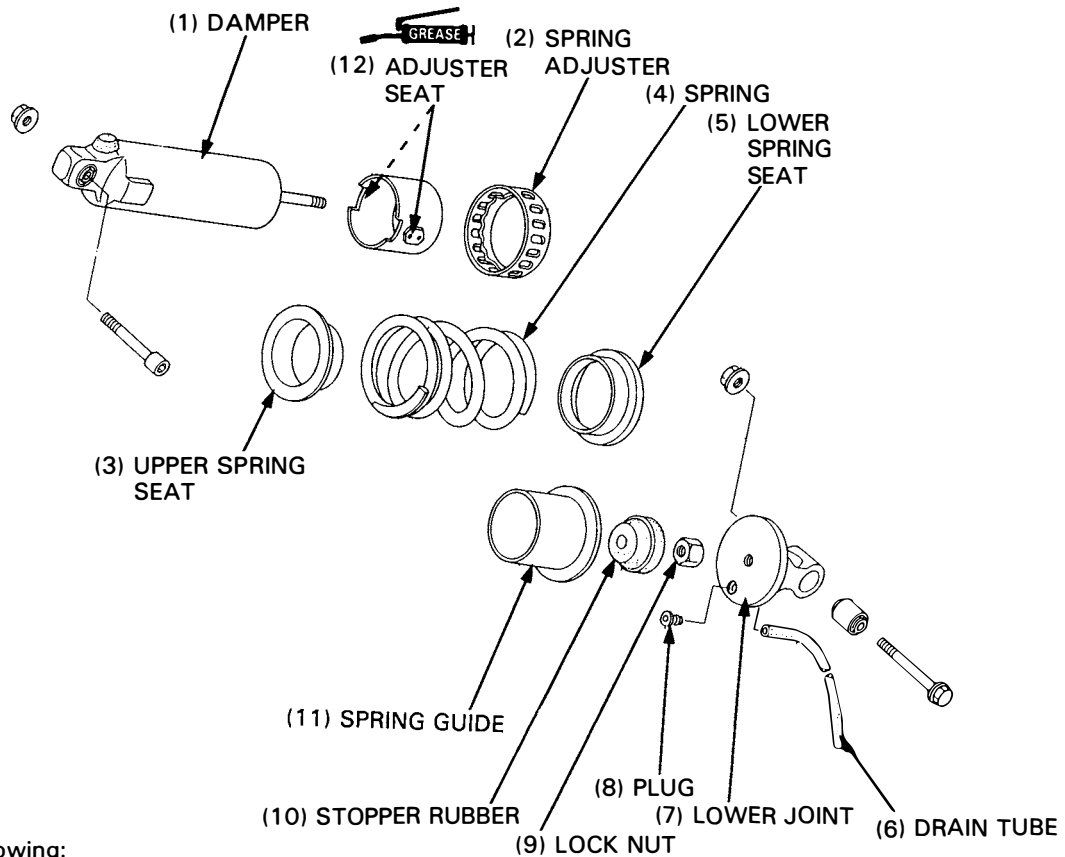
#### **⚠ WARNING**

- *Do not use a dull drill bit which could cause a build-up of excessive heat and pressure inside the damper, leading to explosion and severe personal injury.*
- *The shock absorber contains nitrogen gas and oil under high pressure. Do not drill any farther down the damper case than the measurement given above, or you may drill into the oil chamber; oil escaping under high pressure may cause serious personal injury.*
- *Always wear eye protection to avoid getting metal shavings in your eyes when the gas pressure is released. The plastic bag is only intended to shield you from the escaping gas.*



Hold the bag around the drill motor and briefly run the drill motor inside the bag; this will inflate the bag with air from the motor and help keep the bag from getting caught in the bit when you start.

ASSEMBLY



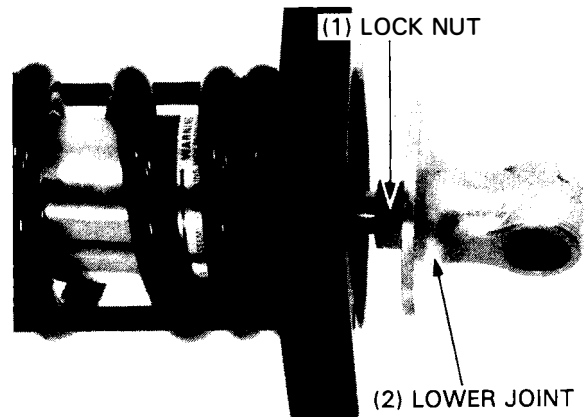
Install the following:

- stop rubber onto the damper rod
- spring adjuster seat and spring adjuster onto the damper so that it rests in the softest position
- upper spring seat, spring (with the tightly wound end upward and lower spring seat),
- lock nut

Compress the spring with the compressor (07GME-0010000) and attachment (07JME-MR10100).

Screw the lower joint onto the damper rod fully, hold it, and tighten the lock nut.

**TORQUE: 70 N·m (7.0 kg-m, 51 ft-lb)**



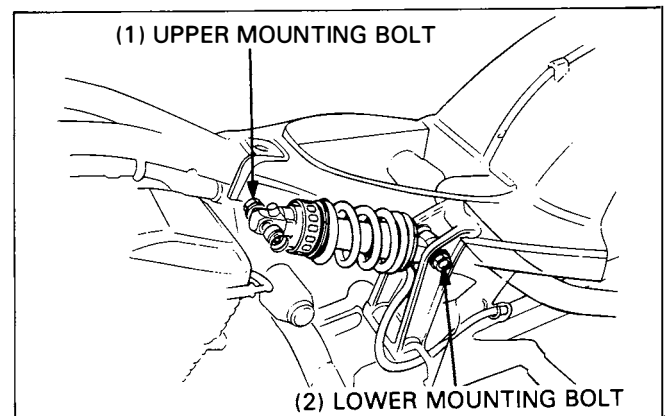
INSTALLATION

Install the rear shock absorber with the drain tube pointing down.

Install and tighten the upper and lower mounting bolts and nuts.

**TORQUE: 45 N·m (4.5 kg-m, 33 ft-lb)**

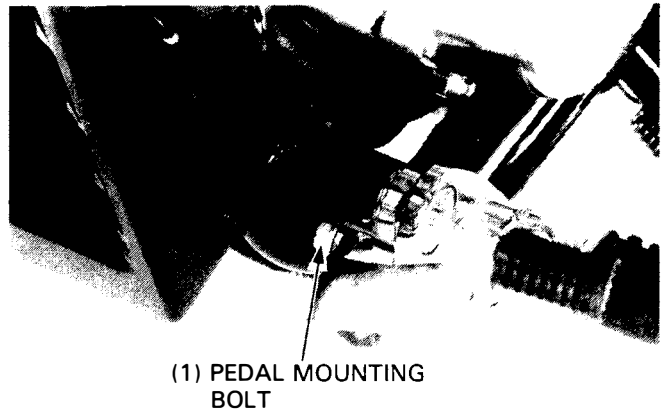
Route the drain tube into the tube guide in the swingarm. Install the removed parts in the reverse order of removal. Adjust the shock absorber spring preload by turning the spring adjuster, if necessary.



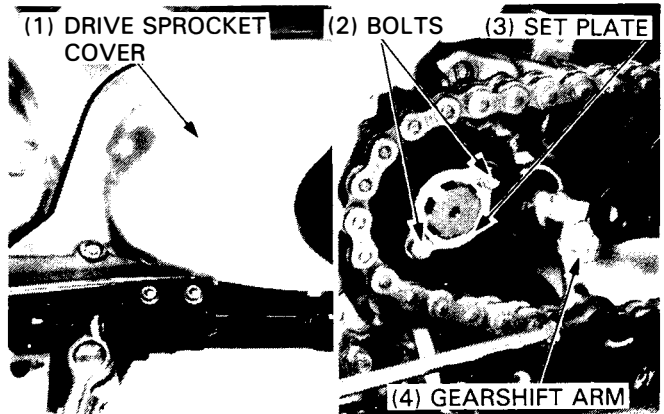
## SWINGARM

### REMOVAL

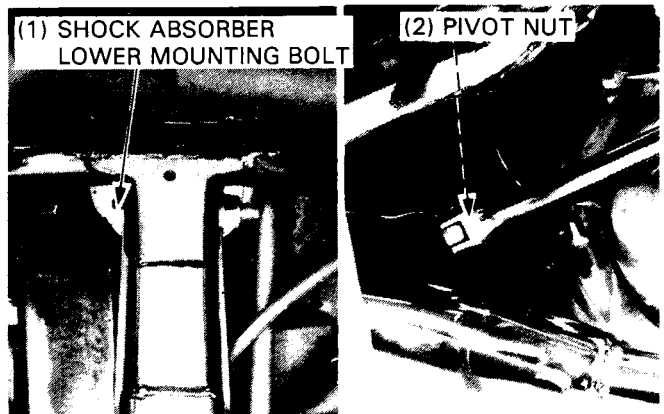
Remove the rear wheel (page 13-3)  
Remove the gearshift pedal mounting bolt from the foot peg.



Remove the drive sprocket cover.  
Remove the drive sprocket bolts, set plate and drive sprocket.  
Disconnect the gearshift arm from the gearshift spindle.



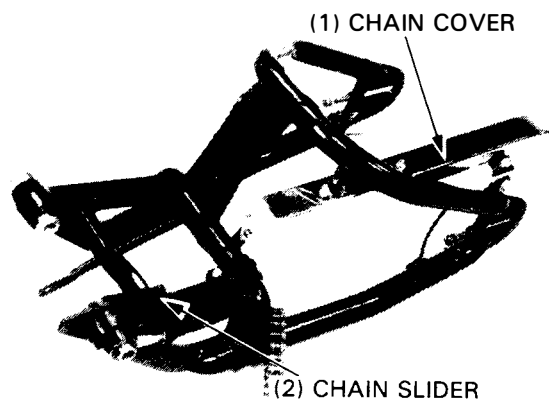
Remove the reserve tank from the frame (page 5-9)  
Remove the shock absorber lower mounting bolt and nut.  
Remove the swingarm pivot bolt caps, pivot bolt and nut then remove the swingarm from the frame.



### DISASSEMBLY

Inspect the drive chain slider for wear or damage.  
Replace it if necessary.  
Inspect the drive chain for dirt or damage.  
Clean or replace it if necessary (page 3-14)

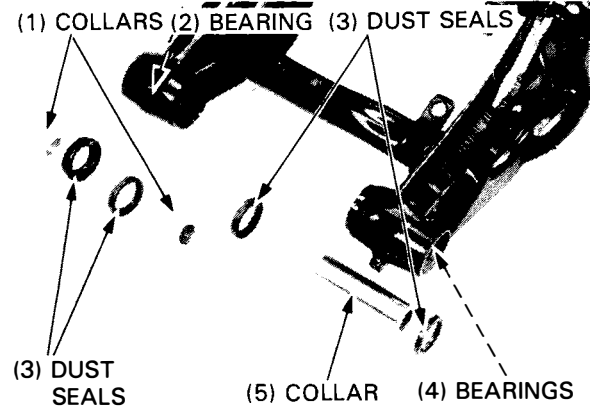
Remove the following:  
— drive chain slider and chain cover  
— dust seals and pivot collars



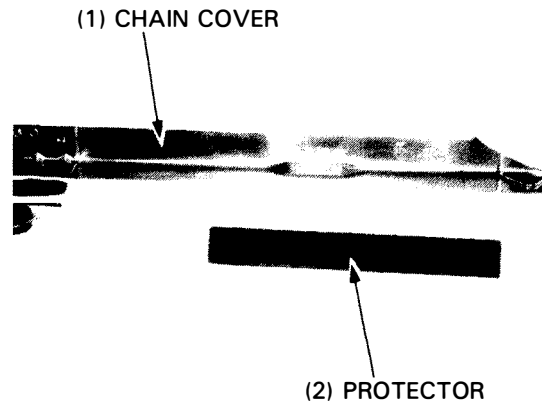


INSPECTION

Inspect the swingarm for deformation or cracks.  
Check the pivot bearings, collars and dust seals for wear or damage.



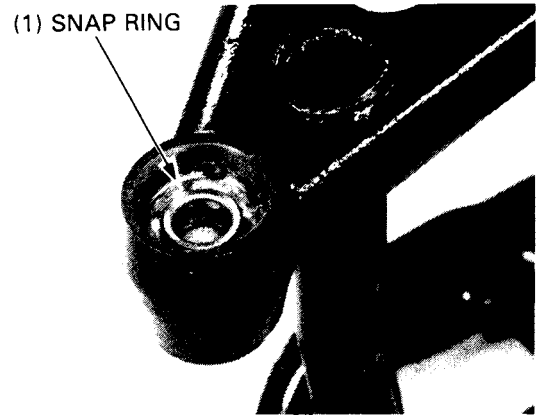
Disassemble the drive chain cover and inspect the chain protector for wear or damage, Replace if necessary.



PIVOT BEARING REPLACEMENT

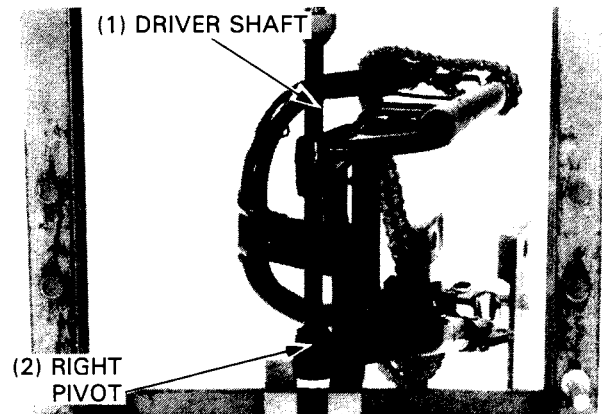
Remove the dust seals from the right and left swingarm pivots.  
Remove the snap ring from the right pivot.

TOOL: Snap ring pliers                      07914-3230001



Drive the right pivot ball bearing out of the swingarm using a hydraulic press and driver shaft.

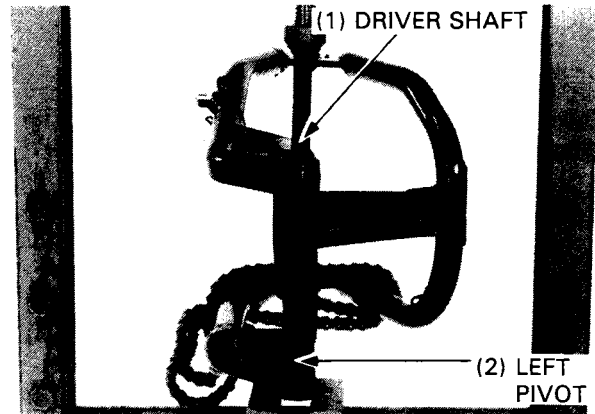
TOOL: Driver shaft:                      07946-MJ00100



## REAR WHEEL/BRAKE/SUSPENSION

Drive the left needle bearing out of the swingarm.

**TOOL:** Driver shaft                      07946—MJ00100



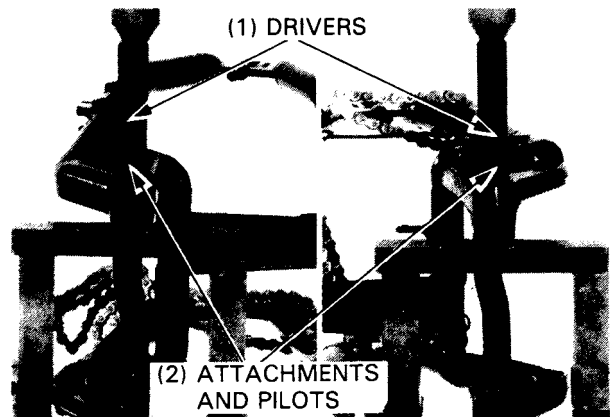
Carefully press new bearings into the swingarm pivots.

### NOTE

- Install the bearings with the marks facing out.

### Right side ball bearing:

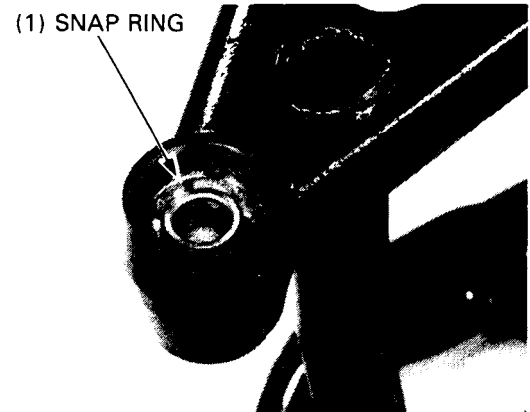
**TOOLS:**  
Driver                                      07749—0010000  
Attachment, 32 x 35 mm              07746—0010100  
Pilot, 15 mm                              07746—0040300



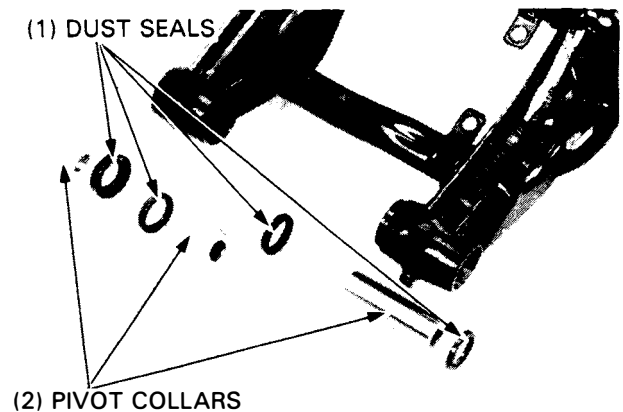
### Left side needle bearing:

**TOOLS:**  
Driver                                      07749—0010000  
Attachment, 28 x 30 mm              07746—1870100  
Pilot, 22 mm                              07746—0041000  
Snap ring pliers                        07914—3230001

Install the snap ring into the right pivot.

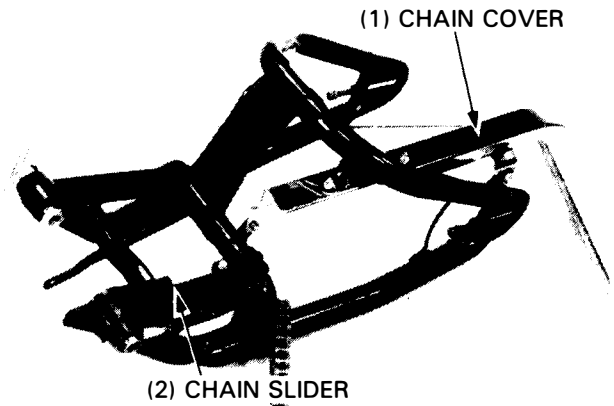


Apply grease to the new dust seal lips and install them , and the collars in the correct positions.



ASSEMBLY/INSTALLATION

Install the chain slider and chain cover with protector.

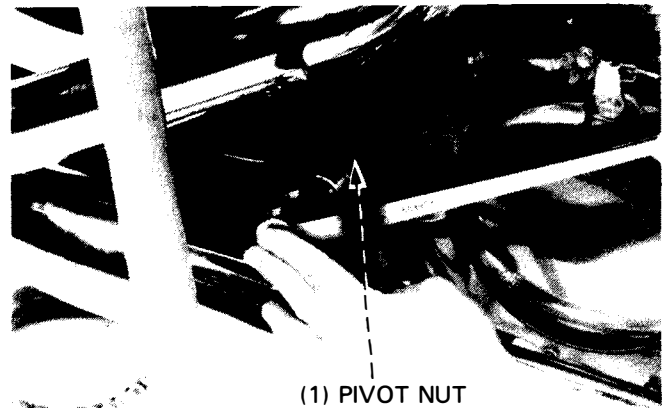


Install the swingarm in the frame.  
Install the swingarm pivot bolt and nut, and tighten the nut to the specified torque.

**TORQUE: 90 N·m (9.0 kg-m, 65 ft-lb)**

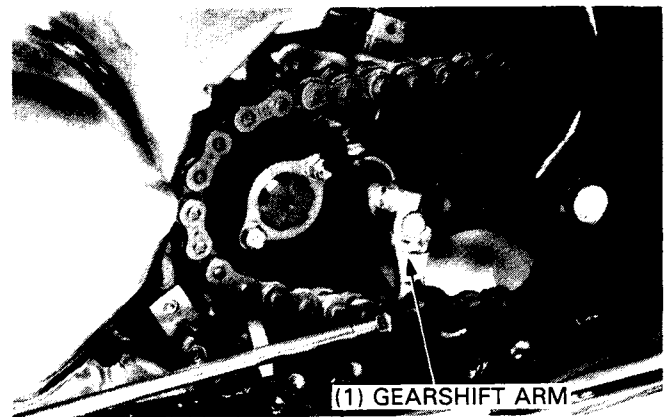
Install the shock absorber lower mounting bolt and nut.

**TORQUE: 45 N·m (4.5 kg-m, 33 ft-lb)**



Install the following:

- swingarm pivot caps
- reserve tank (page 5-9)
- evaporative emission canister (California model only)
- drive sprocket with the drive chain
- gearshift arm



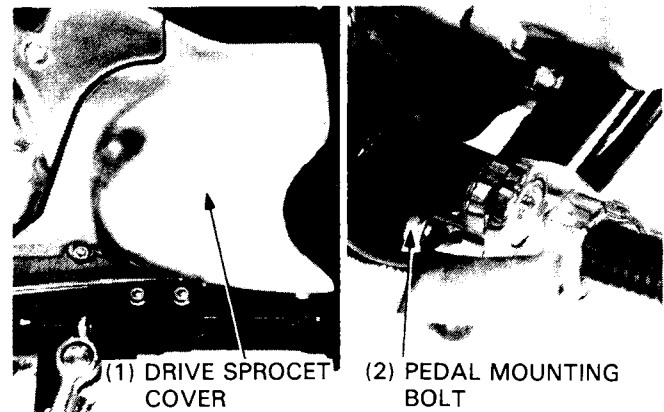
Install the drive sprocket cover and tighten the mounting bolt.

Install the gearshift pedal mounting bolt.

Apply grease to the gearshift pedal pivot collar refer to page 7-9.

Adjust the drive chain (page 3-13) and rear brake pedal free play (page 3-16)

- rear wheel (page 13-7)



## SEAT/REAR FENDER/SUB-FRAME

### REMOVAL/INSTALLATION

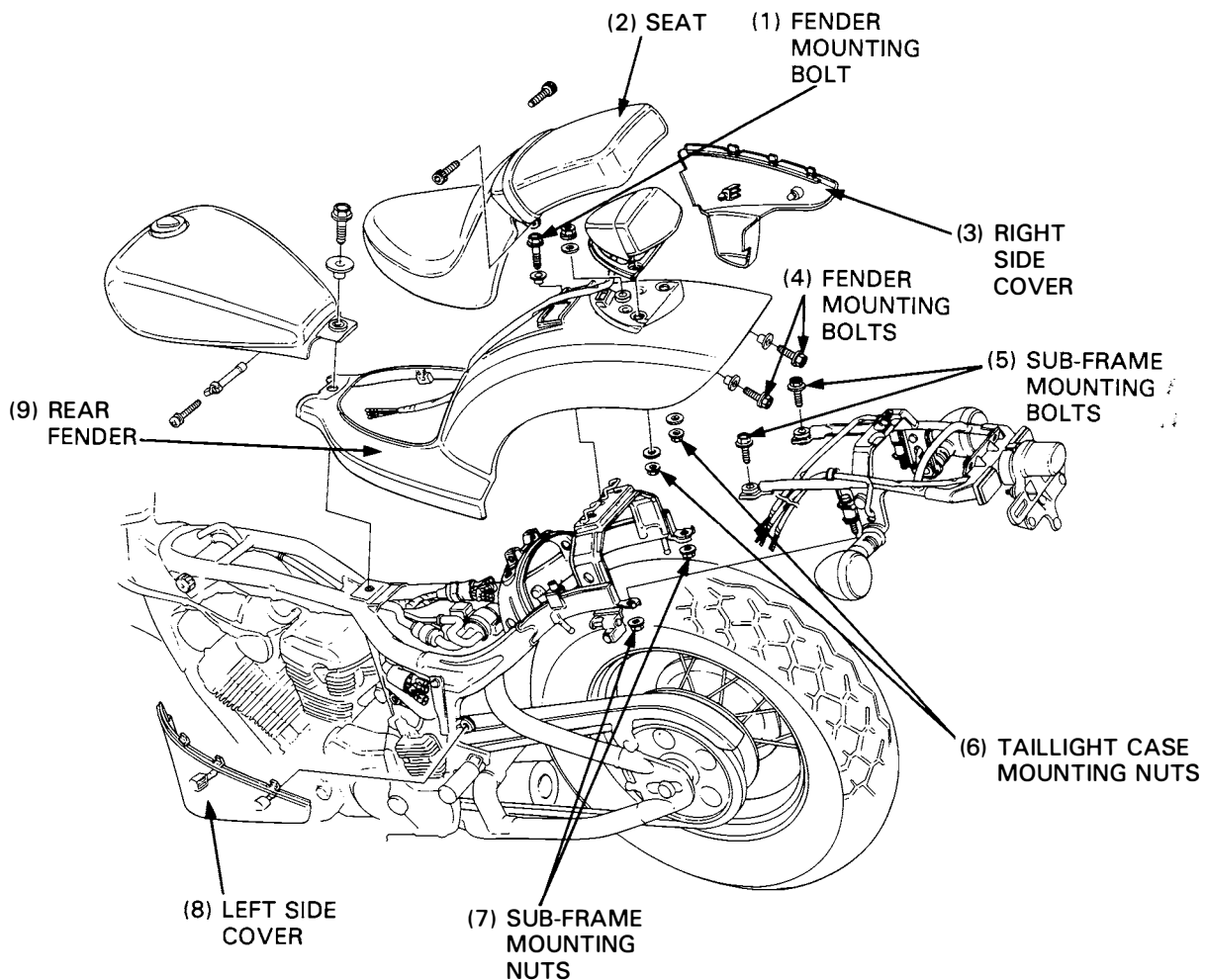
Remove the seat mounting socket bolts and unhook the seat hooks from the frame, then remove the seat.

Remove the right and left side covers, pull out the prongs then pull the cover down slowly to the release tabs.

Remove the fuel tank (page 4-3) and the rear fender mounting bolts and Remove the tallight case mounting nuts. Disconnect the right and left turn signal wire connectors, and the rear brake light and licence light connectors. Remove the rear fender from the main frame and sub-frame.

Remove the two sub-frame mounting bolts and two nuts, then remove the sub-frame.

Install the removed parts in the reverse order of removal.



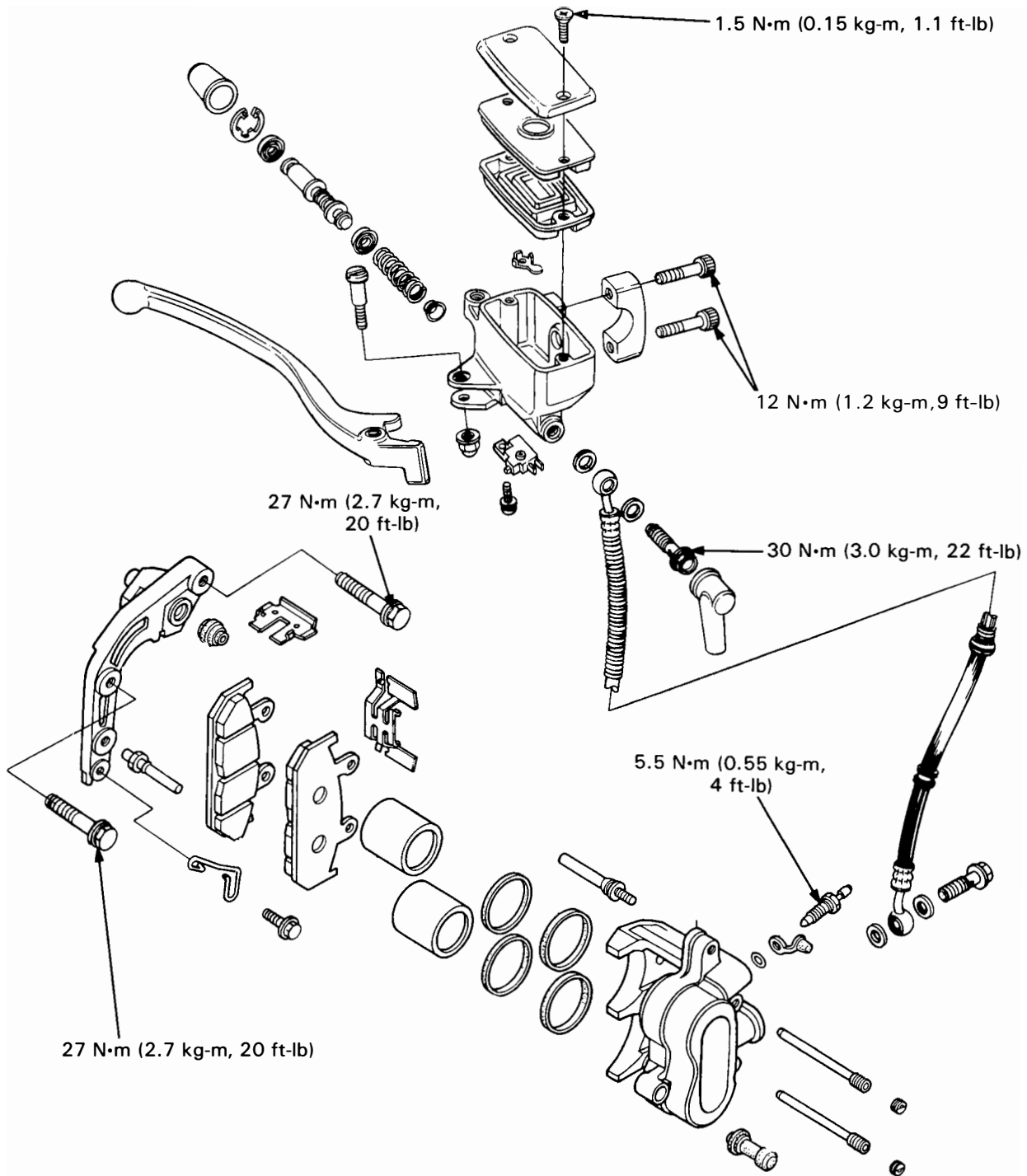
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**MEMO**

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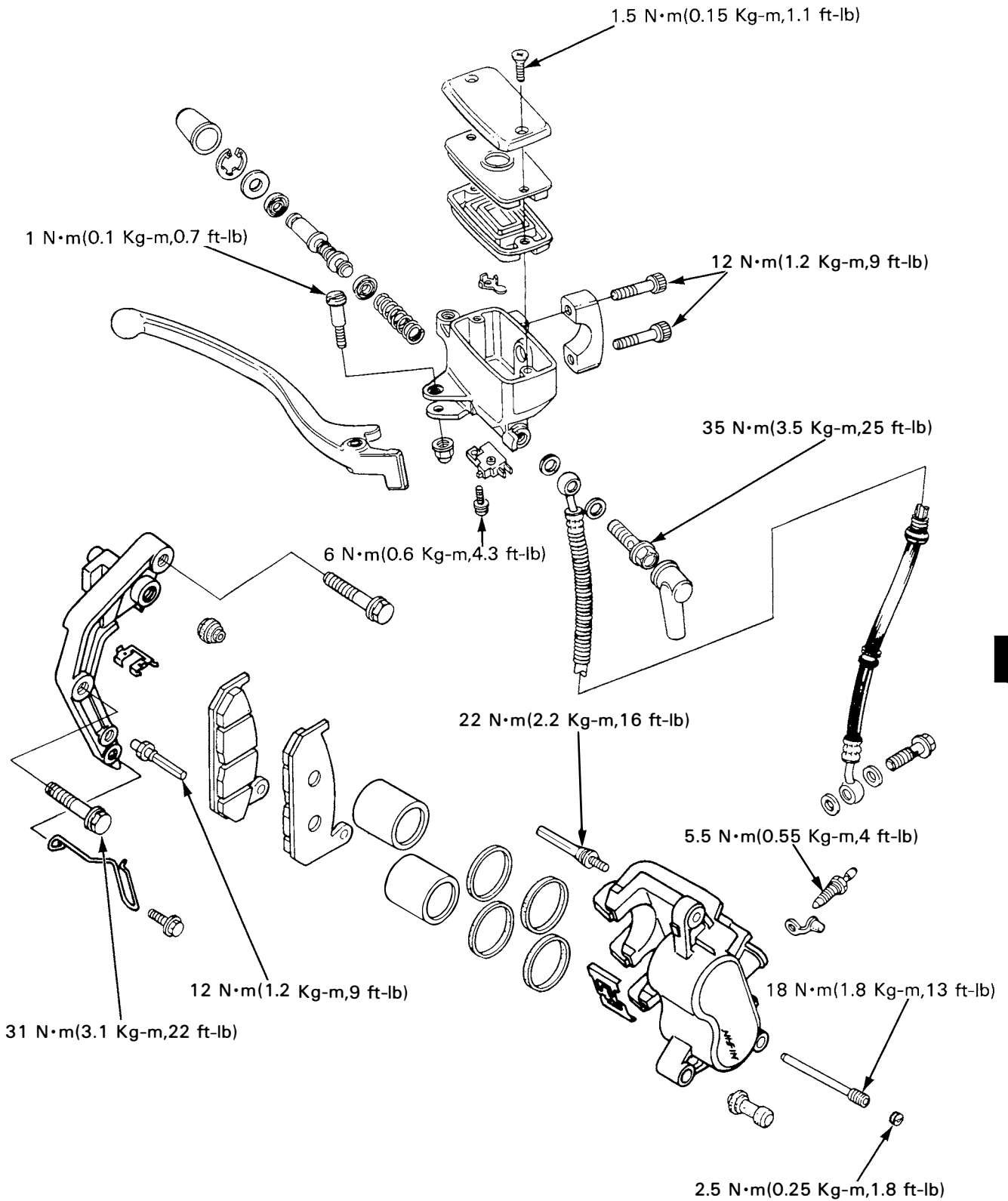
# HYDRAULIC DISC BRAKE

'88, '89, '91-'93:



# 14. HYDRAULIC DISC BRAKE

After '93:



14

## HYDRAULIC DISK BRAKE

|  |      |                 |       |
|--|------|-----------------|-------|
| SERVICE INFORMATION                      | 14-2 | BRAKE PAD/DISC  | 14-5  |
| TROUBLESHOOTING                          | 14-3 | MASTER CYLINDER | 14-8  |
| BRAKE FLUID REPLACEMENT/<br>AIR BLEEDING | 14-4 | BRAKE CALIPER   | 14-11 |

## SERVICE INFORMATION

### GENERAL

#### ⚠ WARNING

- *A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*
- *Use only DOT 4 brake fluid.*
- *The brake caliper can be removed without disconnecting the hydraulic system.*
- *Once the hydraulic system has been disassembled, or if the brakes feel spongy, the system must be bled.*
- *Do not allow foreign material to enter the system when filling the reservoir.*
- *Brake fluid will damage painted, plastic, and rubber parts. Whenever handling brake fluid, protect the painted, plastic and rubber parts by covering them with a shop towel. If fluid does get on these parts, wipe it off immediately with a clean cloth.*
- *Always check brake operation before riding the motorcycle.*
- *Inhaled asbestos fibers have been found to cause respiratory disease and cancer. Never use an air hose or dry brush to clean brake assemblies. Use an OSHA-approved vacuum cleaner or alternate method approved by OSHA, designed to minimize the hazard caused by airborne asbestos fibers.*

### SPECIFICATIONS

Unit:mm(in)

| ITEM            |                      | STANDARD      | SERVICE LIMIT                |
|-----------------|----------------------|---------------|------------------------------|
| Disc thickness  |                      | 5.0(0.2)      | 4.0(0.16)                    |
| Disc runout     |                      | —             | 0.30(0.012)                  |
| Master cylinder | '88,'89,<br>'91-'93: | I.D.          | 12.700-12.743(0.5000-0.5017) |
|                 |                      | piston O.D.   | 12.657-12.684(0.4983-0.4994) |
|                 | After '93:           | I.D.          | 11.0-11.043(0.4331-0.4348)   |
|                 |                      | piston O.D.   | 10.957-10.984(0.4314-0.4324) |
| Brake caliper   | '88,'89,<br>'91-'93: | cylinder I.D. | 30.230-30.280(1.1902-1.1921) |
|                 |                      | piston O.D.   | 30.165-30.198(1.1876-1.1889) |
|                 | After '93:           | cylinder I.D. | 27.000-27.050(1.0630-1.0650) |
|                 |                      | piston O.D.   | 26.935-26.968(1.0604-1.0617) |

### TORQUE VALUES

|                             |                                |
|-----------------------------|--------------------------------|
| Caliper mounting bolt       | 27 N•m (2.7 kg-m, 20 ft-lb)    |
| Brake hose oil bolt         | 30 N•m (3.0 kg-m, 22 ft-lb)    |
| Bleed valve                 | 5.5 N•m (0.55 kg-m, 4 ft-lb)   |
| Master cylinder holder bolt | 12 N•m (1.2 kg-m, 9 ft-lb)     |
| Master cylinder cover screw | 1.5 N•m (0.15 kg-m, 1.1 ft-lb) |

### TOOL

#### Special

Snap ring pliers 07914—3230001 or equivalent commercially available in U.S.A.



## TROUBLESHOOTING

### **Brake lever soft or spongy**

- Air bubbles in hydraulic system.
- Low fluid level.
- Hydraulic system leaking.
- Faulty dust seal or piston seal.

### **Brake lever too hard**

- Sticking piston(s).
- Clogged hydraulic system.
- Pads glazed or worn excessively.

### **Brake drag**

- Hydraulic system sticking.
- Sticking piston(s).

### **Brake grab or pull to one side**

- Pads contaminated.
- Disc or wheel misaligned.

### **Brake chatter or squeal**

- Pad contaminated.
- Excessive disc runout.
- Caliper installed incorrectly.
- Disc or wheel misaligned.

## HYDRAULIC DISC BRAKE

### BRAKE FLUID REPLACEMENT/ AIR BLEEDING

#### CAUTION

- *Be careful not to allow dust or water to enter the brake system when filling the reservoir.*
- *USE ONLY DOT 4 BRAKE FLUID*
- *Do not mix different types of fluid since they are not compatible.*
- *Avoid spilling fluid on painted surfaces. Place a rag over the fuel tank whenever the system is serviced.*

Check the fluid level with the fluid reservoir parallel to the ground.

Remove the reservoir cover, set plate and diaphragm.

#### BRAKE FLUID DRAINING

Connect a bleed hose to the bleed valve.

Loosen the caliper bleed valve and pump the brake lever. Stop operating the lever when fluid stops flowing out of the bleed valve.

#### BRAKE FLUID FILLING/AIR BLEEDING

Close the bleed valve, fill the master cylinder with DOT 4 brake fluid to the casting ledge level (brake fluid upper level).

#### CAUTION

- *Do not mix different types of fluid since they are not compatible.*

Connect the commercially available brake bleeder to the bleeder valve.

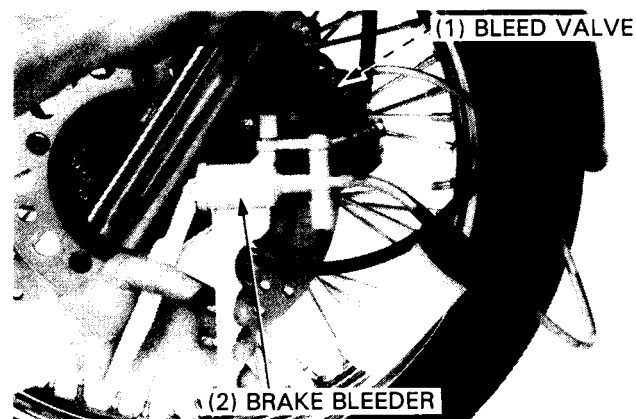
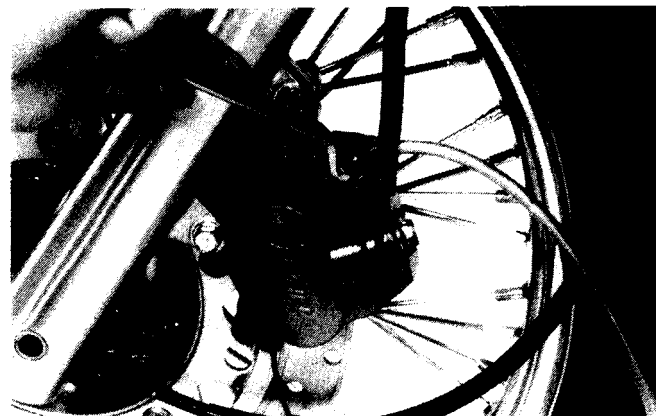
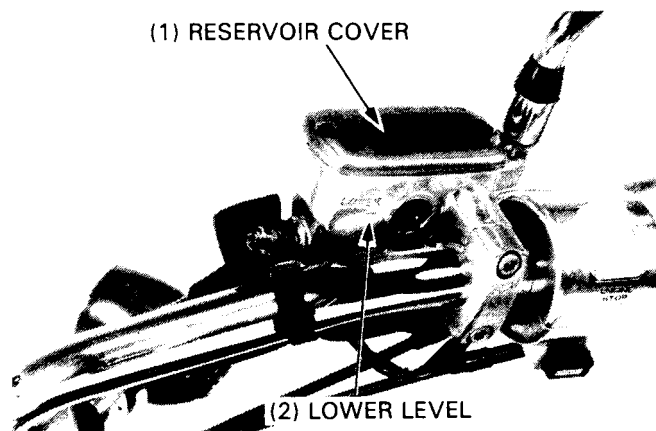
Pump the brake bleeder and loosen the bleed valve. Add fluid when the fluid level in the reservoir is low. Repeat above procedures until no air bubbles appear in the plastic hose.

#### NOTE

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

If a brake bleeder is not available, fill the system as follows:

Pump up the system pressure with the lever or pedal until there are no air bubbles in the fluid flowing out of the reservoir hole and lever or pedal resistance is felt.

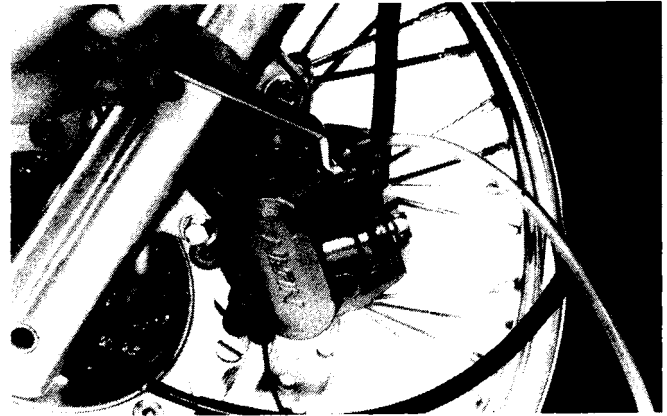


- 1) Squeeze the brake lever, then open the bleed valve 1/2 turn and close the valve.

NOTE

- Do not release the brake lever (or pedal) until the bleed valve has been closed.

- 2) Release the brake lever slowly and wait several seconds after it reaches the end of its travel.



Repeat steps 1 and 2 until bubbles cease to appear in the fluid at the end of the hose.

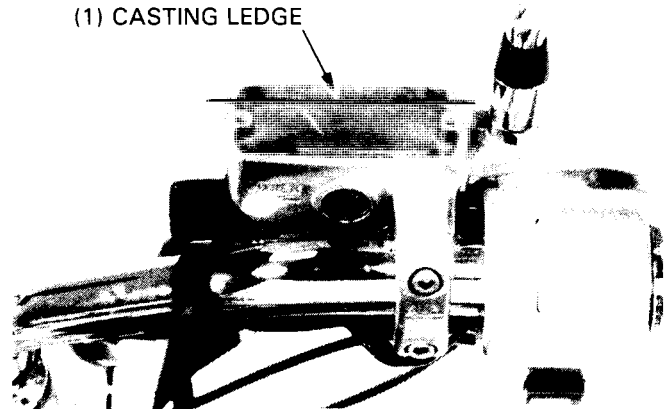
Tighten the bleed valve.

**TORQUE: 5.5 N·m (0.55 kg-m, 4 ft-lb)**

Close the bleed valve, fill the reservoir with the specified brake fluid to the casting ledge level.

Reinstall the diaphragm, set plate and cover.

(1) CASTING LEDGE



**⚠ WARNING**

- *A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*

## BRAKE PAD/DISC

### FRONT BRAKE PAD REPLACEMENT

**⚠ WARNING**

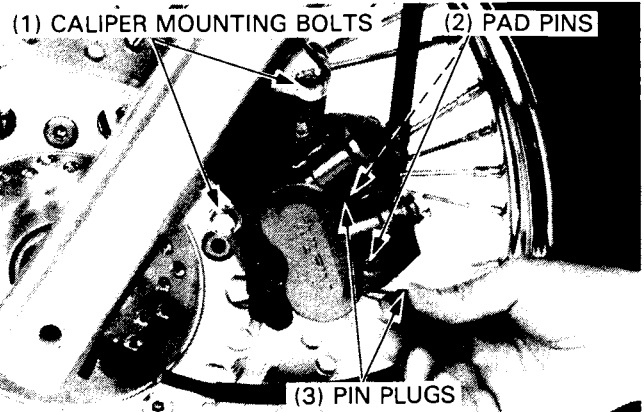
- *A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.*

NOTE

- Always replace the brake pads in pairs to assure even disc pressure.

**'88, '89, '91-'93:**

Remove the pad pin plugs and loosen the pad pins. Remove the caliper mounting bolts, then remove the brake caliper and bracket.

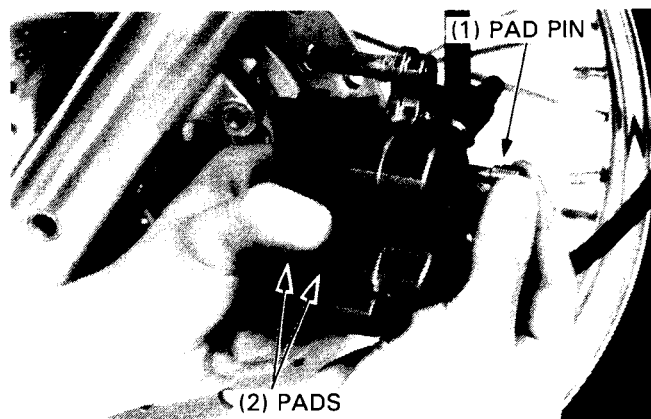


Pry one old pad against the caliper with a screwdriver to push the pistons into the caliper.

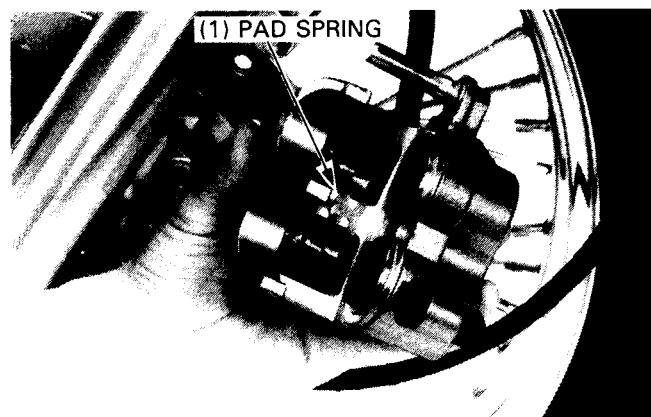


## HYDRAULIC DISC BRAKE

Pull the pad pins out of the caliper and remove the brake pads.



Position the pad spring in the caliper as shown.

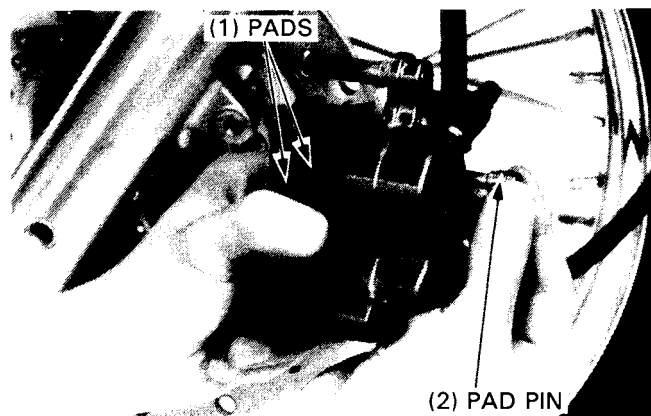


Install new pads in the caliper.

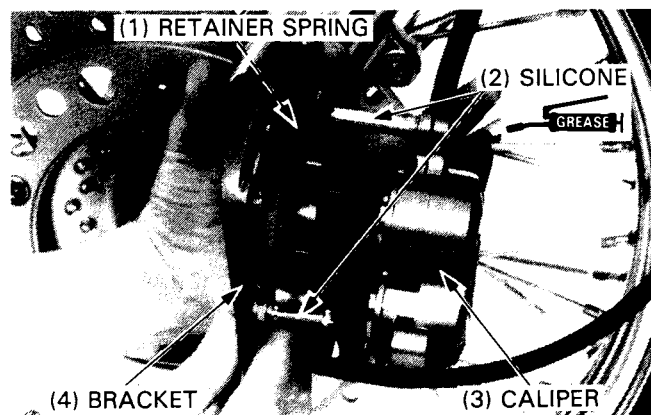
### NOTE

- Always replace the brake pads in pairs to assure even disc pressure.

Install the pad pins, first one pin, then the other, by pushing the pads against the caliper to depress the pad spring.



Position the retainer spring in the bracket.  
Apply silicone grease to the caliper and bracket pin bolts.  
Install the bracket.



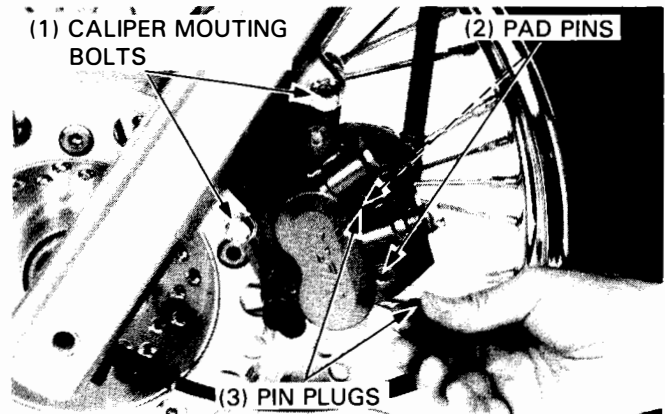
Install the brake caliper over the disc, being careful not to damage the pads, then tighten the caliper mounting bolt.

**TORQUE: 27 N·m (2.7 kg-m, 20 ft-lb)**

Tighten the pad pins and tighten the pad pin plugs securely.

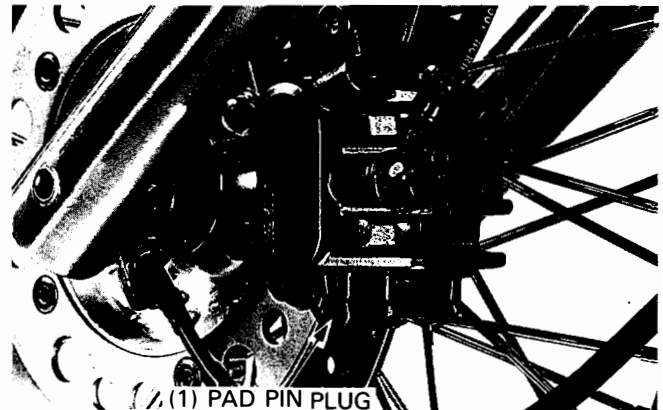
**NOTE**

- Operate the brake lever to seat the caliper pistons against the pads.



**After '93:**

Remove the pad pin plug and loosen the pad pin.

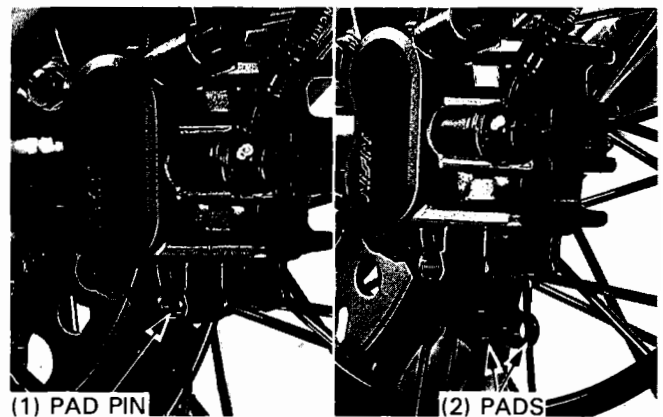


Pull the pad pin out of the caliper.

Remove the brake pads.

Insert new outside pad and push the caliper piston in allow clearance for installation of the new inside pad.

Install new inside pad.



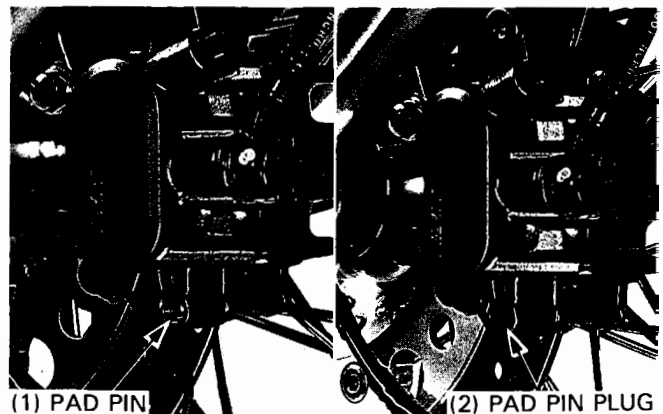
Install the pad pin by pushing the pads against the caliper to depress the pad spring.

Tighten the pad pin to the specified torque.

**TORQUE: 18 N·m (1.8 Kg-m, 13 ft-lb)**

Install and tighten the pad pin plug to the specified torque.

**TORQUE: 2.5 N·m (0.25 Kg-m, 1.8 ft-lb)**

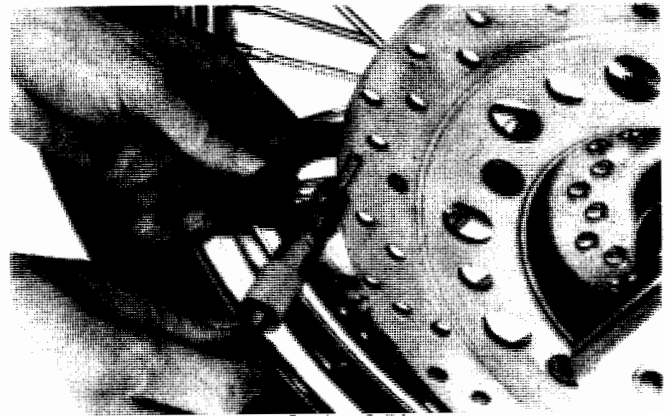


## HYDRAULIC DISC BRAKE

### DISC THICKNESS

Measure the thickness of the disc.

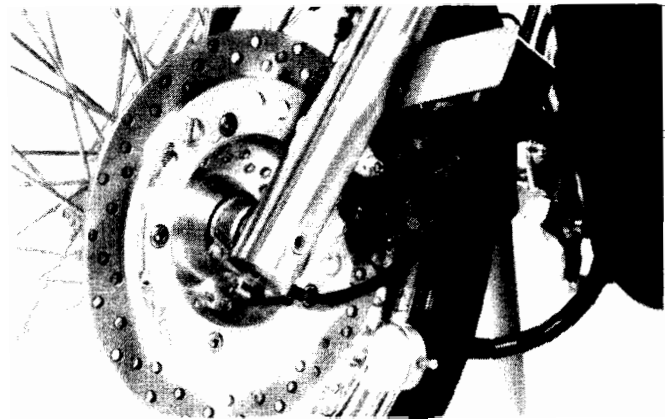
**SERVICE LIMIT: 4.0 mm (0.16 in)**



### BRAKE DISC WARPAGE

Measure the brake disc for warpage with a dial indicator as shown.

**SERVICE LIMIT: 0.30 mm (0.012 in)**



## MASTER CYLINDER

### REMOVAL

Drain brake fluid from the hydraulic system. Remove the rear view mirror from the master cylinder and disconnect the brake light switch wires. Disconnect the brake hose by removing the oil bolt and sealing washers.

### CAUTION

- *Avoid spilling brake fluid on painted surfaces. Place a rag over the fuel tank whenever the brake system is serviced.*

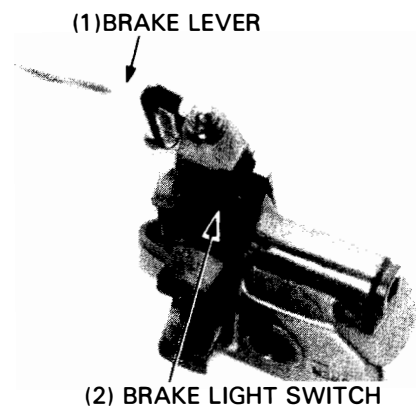
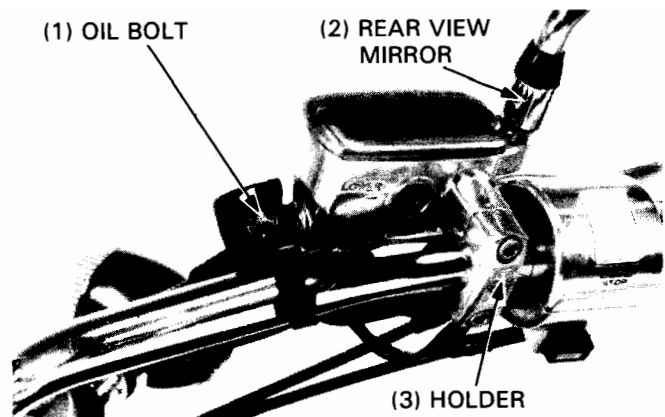
### NOTE

- When removing the oil hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

Remove the master cylinder holder bolts and holder, then remove the master cylinder from the handlebar.

### DISASSEMBLY

Remove the brake lever and brake light switch.



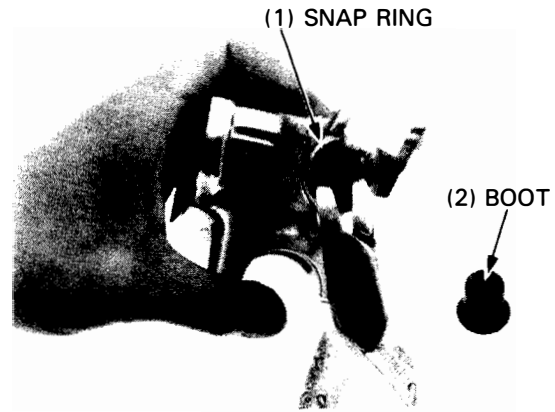
Remove the boot.

Remove the piston and spring by removing the snap ring.

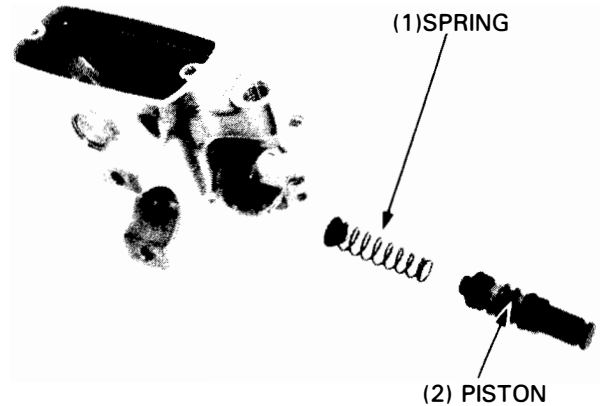
**TOOL:**

Snap ring pliers

07914—3230001  
or equivalent commercially  
available in U. S. A.



Clean the inside of the master cylinder, reservoir, spring and piston with clean brake fluid.



**INSPECTION**

Measure the master cylinder I.D.

**SERVICE LIMIT:** '88,'89,'91-'93: 12.76 mm (0.502 in)  
After '93: 11.05 mm (0.435 in)

Check the master cylinder for scores, scratches or nicks.

Measure the master piston O.D. at the shown position.

**SERVICE LIMIT:** '88,'89,'91-'93: 12.65 mm (0.498 in)  
After '93: 10.945 mm (0.4309 in)

Check the primary and secondary cups for damage before assembly.



**ASSEMBLY**

**CAUTION**

- *Handle the master cylinder piston, cylinder and spring as a set.*

Coat all parts with clean brake fluid before assembly.

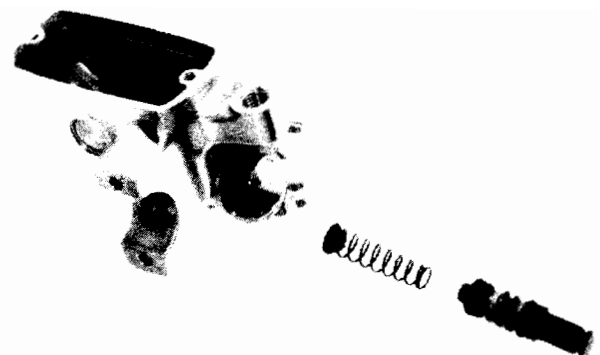
If the spring and seat were disassembled, assemble the wide end of the spring on the seat.

Install the spring in the master cylinder with its seat facing inside.

Install the piston.

**CAUTION**

- *When installing the piston, do not allow the cup lips to turn inside out.*



## HYDRAULIC DISC BRAKE

Install the snap ring using a snap ring pliers.  
Install the boot.

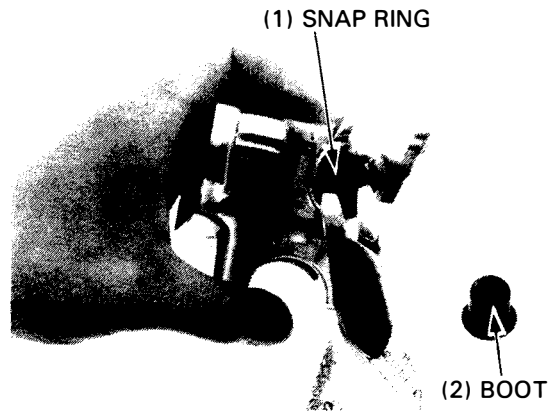
### CAUTION

- *Be certain that the snap ring is seated firmly in the groove.*

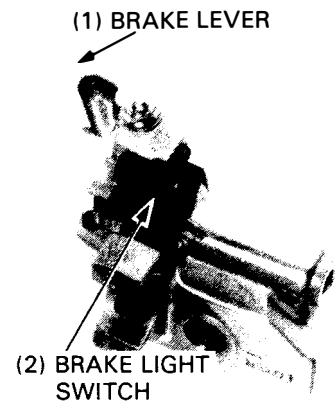
### TOOL:

Snap ring pliers

07914—3230001  
or equivalent commercially  
available in U. S. A.



Install the brake lever and brake light switch.



## INSTALLATION

Set the master cylinder onto the handlebar with the holder "UP" mark facing up.

Temporarily install the holder bolts. Align the slit of the master cylinder with the punch mark on the handlebar.

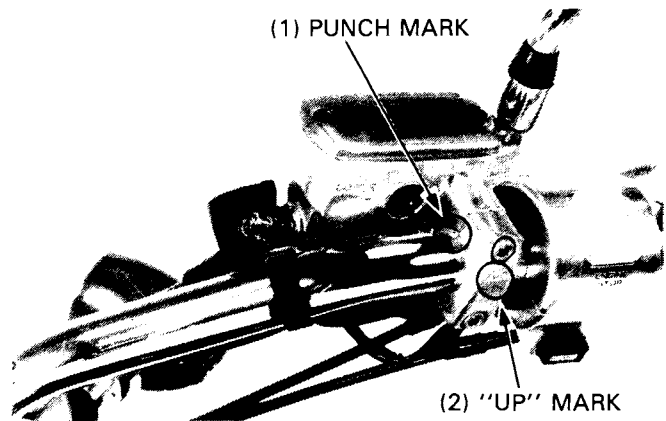
Tighten the upper bolt first, then the lower bolt.

Connect the brake light switch wires to the switch terminals.  
Install the rear view mirror.

Connect the brake hose with the oil bolt and two sealing washers and tighten the oil bolt.

**TORQUE: 30 N·m (3.0 kg·m, 22 ft·lb)**

Fill the reservoir with DOT 4 brake fluid to the casting ledge and bleed the brake system (page 14-4).





## BRAKE CALIPER

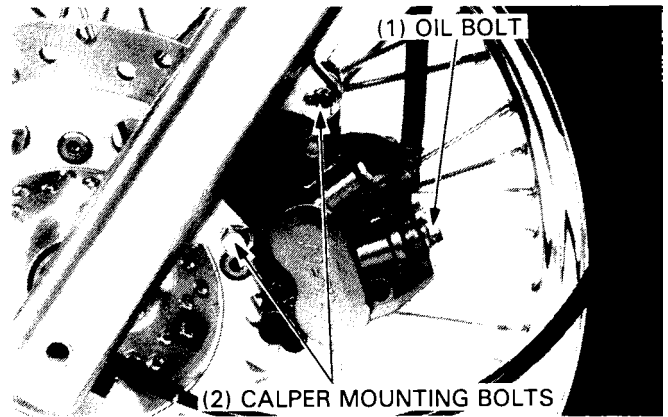
### REMOVAL

Place a clean container under the caliper and disconnect the brake hose from the caliper by removing the oil bolt and sealing washers.

### CAUTION

- *Avoid spilling brake fluid on painted surfaces.*

Remove the brake pads (page 14-5).



### DISASSEMBLY

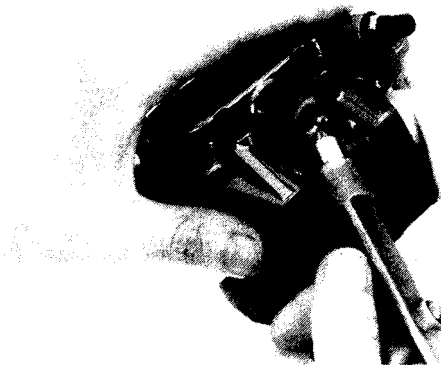
Remove the following:

- pad spring and pin bolt boot from the caliper
- retainer spring and pin bolt boot from the bracket

If necessary, apply compressed air to the caliper fluid inlet to get the piston out. Place a shop rag under the caliper to cushion the piston when it is expelled. Use the air in short spurts.

### CAUTION

- *Do not bring the nozzle too close to the inlet.*



Push the dust seals and piston seals in, lift them out and discard them.

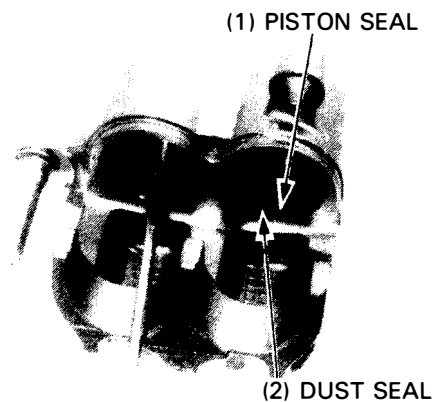
### NOTE

- The seals must be replaced whenever they are removed.

Clean the seal grooves with clean brake fluid.

### CAUTION

- *Be careful not to damage the piston sliding surfaces.*



### INSPECTION

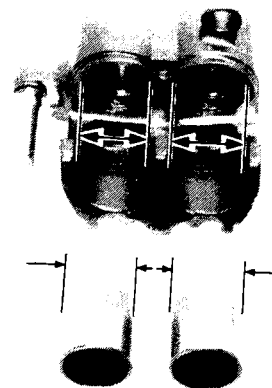
Check the pistons for scoring, scratches or other faults. Measure the piston O.D.

**SERVICE LIMIT: '88,'89,'91-'93: 30.16 mm (1.187 in)**  
**After '93: 26.93 mm (1.060 in)**

Check the caliper cylinder for scoring, scratches or other faults.

Measure the caliper cylinder I.D.

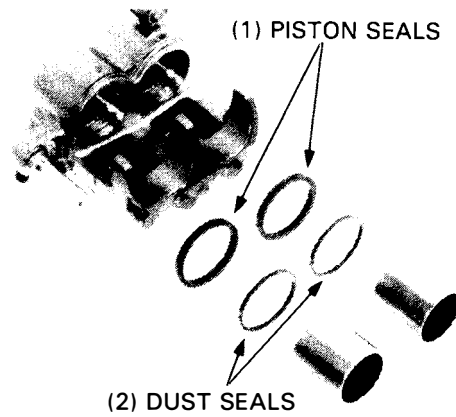
**SERVICE LIMIT: '88,'89,'91-'93: 30.29 mm (1.193 in)**  
**After '93: 27.06 mm (1.065 in)**



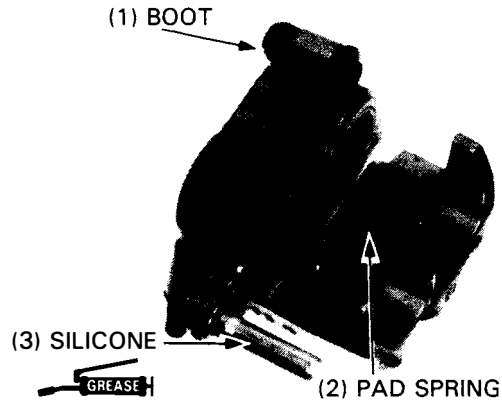
## HYDRAULIC DISC BRAKE

### ASSEMBLY

Coat new piston seals and dust seals with clean brake fluid and install them in the caliper.  
Install the pistons and install them with the open ends toward the pads.



Install the pad spring on the caliper as shown.  
Apply silicone grease to the inside of the boot, and install it.



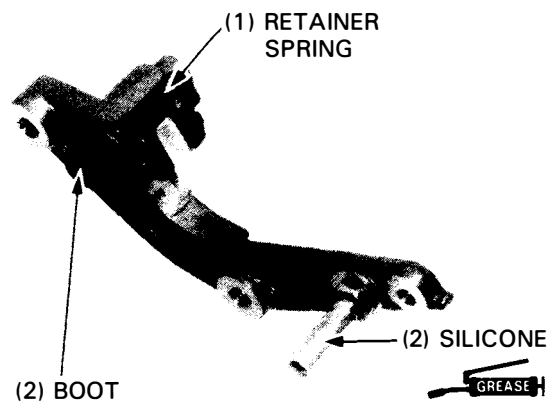
Install the retainer spring as shown.  
Apply silicone grease to the inside of the boot and install it.

Install the following:  
— pads and pad pins to the caliper  
— bracket to the caliper

Install the caliper assembly over the brake disc so that the disc is positioned between the pads.

### CAUTION

- *Be careful not to damage the pads.*



Install and tighten the caliper mounting bolts.

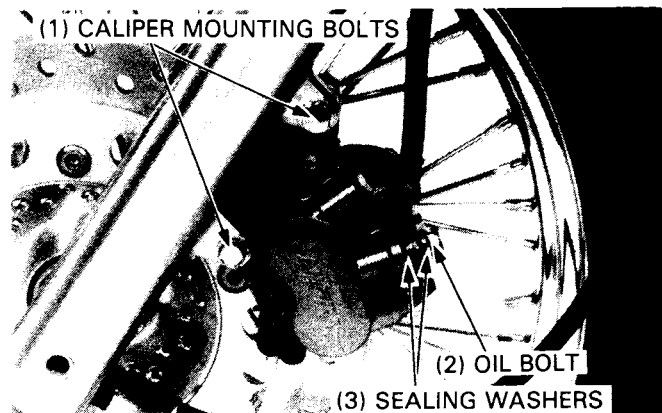
**TORQUE:** '88,'89,'91-'93: 27 N·m (2.7 Kg-m,20 ft-lb)  
After'93: 31 N·m (3.1 Kg-m,22 ft-lb)

Tighten the pad pins and install and tighten the pad pin plugs.

Connect the brake hose to the caliper with the hose bolt and two new sealing washers.

**TORQUE:** 30 N·m (3.0 kg-m, 22 ft-lb)

Bleed the air from the brake system (page 14-4).



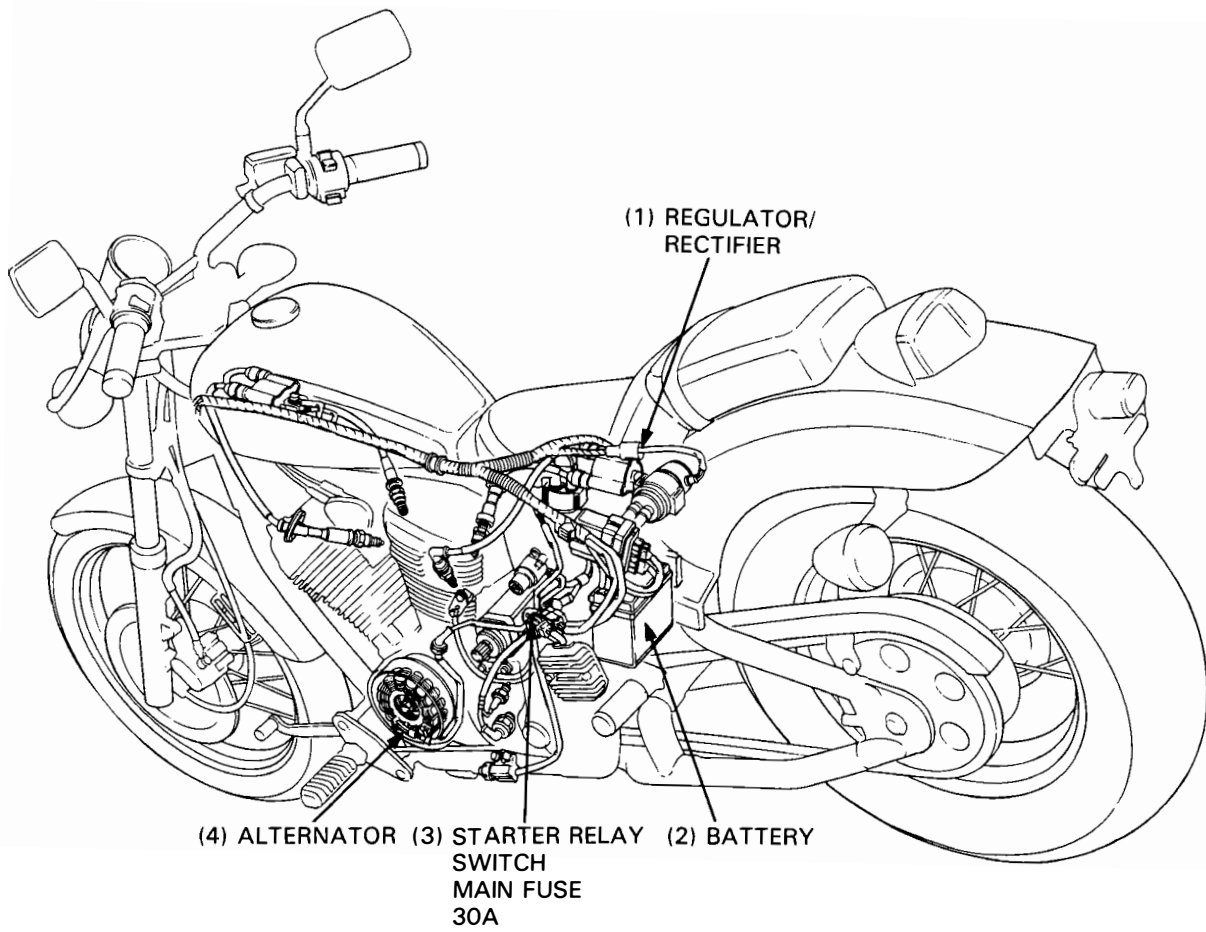
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**MEMO**

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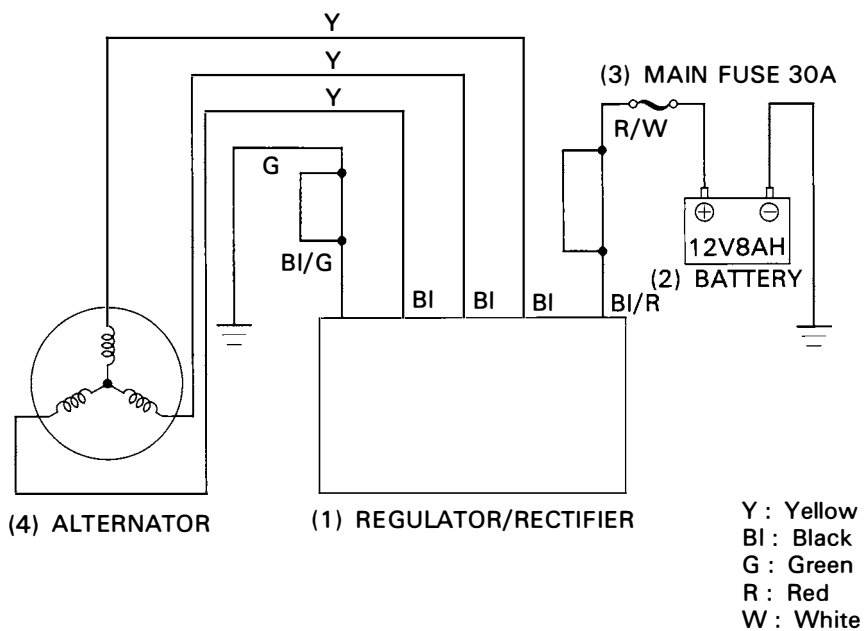
**BATTERY CHARGING SYSTEM**

---

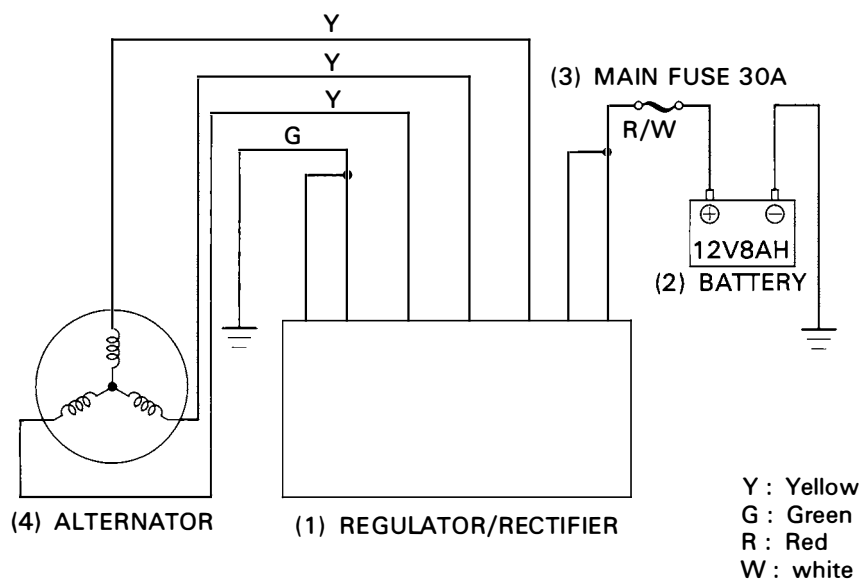


# 15. BATTERY/CHARGING SYSTEM

'88-'89, '91 :



After '91 :



## BATTERY/CHARGING SYSTEM

|                            |             |                            |             |
|----------------------------|-------------|----------------------------|-------------|
| <b>SERVICE INFORMATION</b> | <b>15-2</b> | <b>CHARGING SYSTEM</b>     | <b>15-7</b> |
| <b>TROUBLESHOOTING</b>     | <b>15-3</b> | <b>REGULATOR/RECTIFIER</b> | <b>15-8</b> |
| <b>BATTERY</b>             | <b>15-4</b> | <b>ALTERNATOR</b>          | <b>15-9</b> |

## SERVICE INFORMATION

### GENERAL

#### ⚠ WARNING

- *The battery generates hydrogen gas which can be highly explosive. Do not smoke or allow flames or sparks near the battery, especially while charging it.*
- *If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and, lead to death.*

- The following color codes are used throughout the electrical sections.

|            |                 |                  |            |
|------------|-----------------|------------------|------------|
| Bu = Blue  | G = Green       | Lg = Light Green | R = Red    |
| Bl = Black | Gr = Gray       | O = Orange       | W = White  |
| Br = Brown | Lb = Light Blue | P = Pink         | Y = Yellow |

- Slow charge the battery whenever possible, quick charging should be an emergency procedure only.
- Remove the battery from the motorcycle for charging.
- The battery on this motorcycle is a sealed type. Do not remove the filler hole caps even during charging. Do not use a non-maintenance free battery as a replacement.
- All charging system components can be checked on the motorcycle.
- When inspecting the charging system, check the system components and circuits step-by-step according to the troubleshooting chart on the next page.
- Alternator removal is described in Section 8.

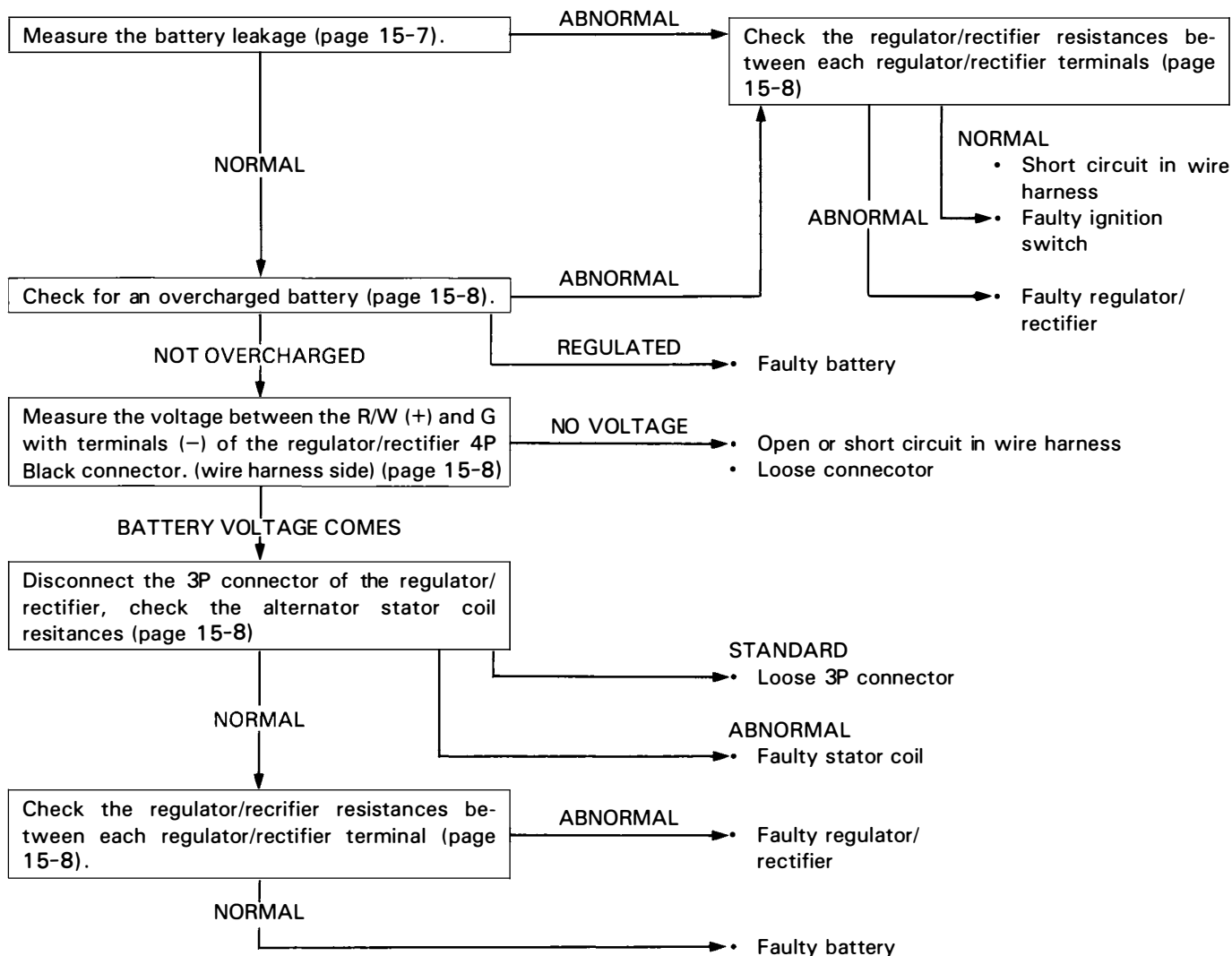
### SPECIFICATIONS

| ITEM                |   | STANDARD              |             |
|---------------------|---|-----------------------|-------------|
| Battery             | Capacity                                | 12 V—8 AH             |             |
|                     | Voltage at 20°C (68°F)                  | Fully charged         | 13.0—13.2 V |
|                     |   | Needs charging        | 12.3 V      |
|                     | Charging current                        | 0.8 amperes           |             |
|                     | Charging time                           | 10 Hr                 |             |
| Regulator/rectifier | Type                                    | Three-phase/full-wave |             |
|                     | Regulated voltage                       | 14—15 V/4,000 rpm     |             |
| Alternator          | Charging coil resistance at 20°C (68°F) | 0.1—1.0 Ω             |             |
|                     | Output                                  | 0.345 kw/5,000 rpm    |             |
|                     | Charging start rpm                      | 1,000 ± 100 rpm       |             |

### TOOLS

|                           |  |
|---------------------------|--|
| Digital multimeter (KOWA) | 07411—0020000 or KS-AHM-32-003 (U.S.A. only) |
| or                        |  |
| Circuit tester (SANWA)    | 07308—0020001                                |
| or                        |  |
| Circuit tester (KOWA)     | TH-5H  |

**TROUBLESHOOTING**



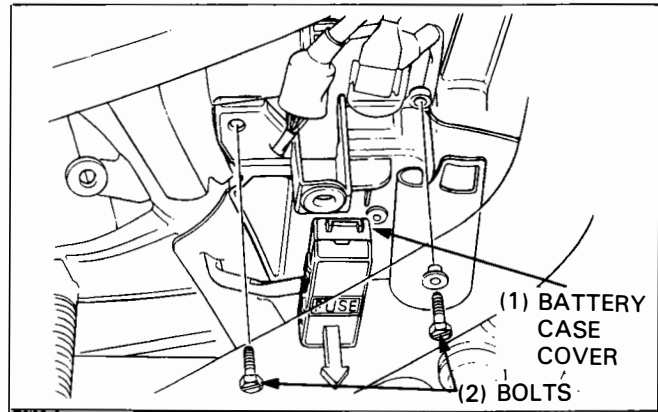
# BATTERY

## REMOVAL

### CAUTION

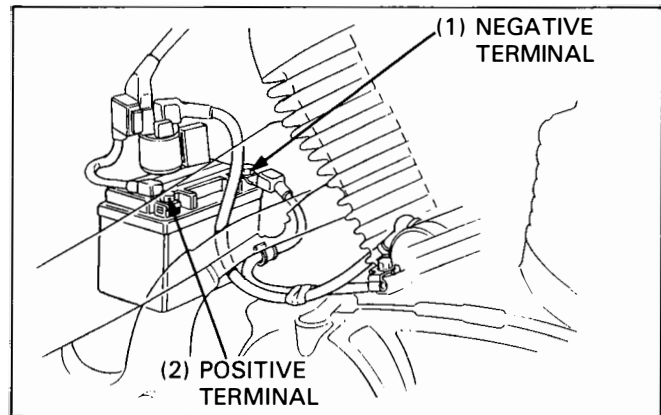
• *Do not remove the battery while exhaust pipe is hot.*

Remove the right side cover.  
Unhook the fuse box from the battery case cover.  
Remove the battery case cover by removing the bolts.



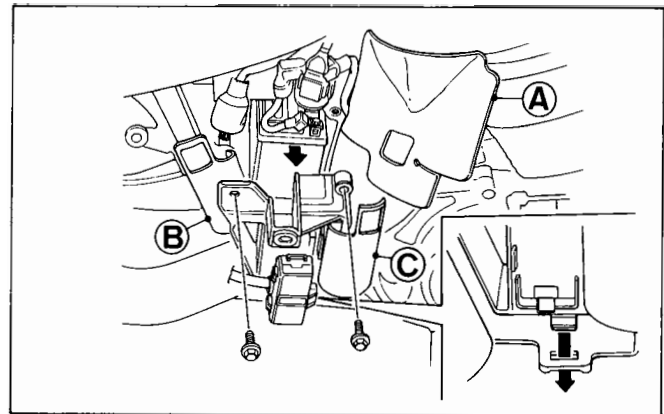
Remove the left side cover.

Disconnect the battery negative terminal lead from the battery first, then disconnect the positive terminal lead.  
Pull the battery out of the battery case.



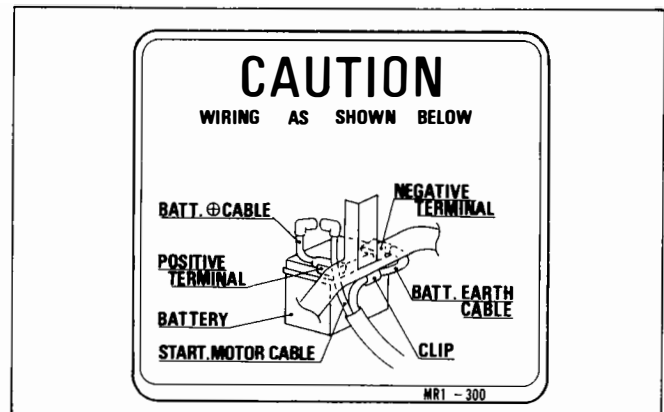
## INSTALLATION

Place the battery into the case and connect the battery positive cable to the battery first from the right side, then connect the negative cable from the left side.  
Coat the battery terminal with clean grease.  
Install the battery case cover by hooking the tab on the cover to the hook on the case.  
Install and tighten the cover mounting bolts.  
Install the fuse box onto the battery case cover.



Install the rubber covers in the sequence as shown.  
Install the right and left side covers.

Route the battery cables as shown on the battery caution label.





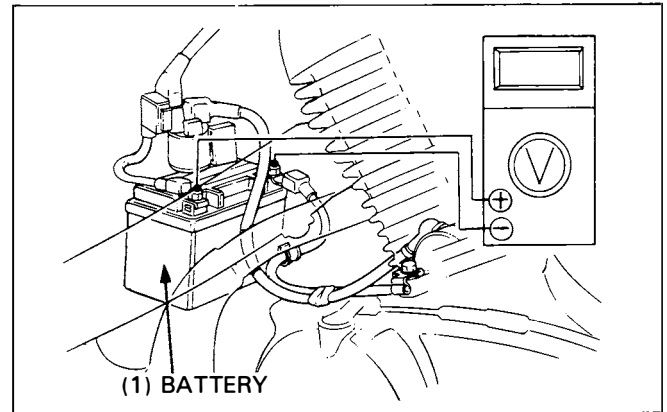
VOLTAGE INSPECTION

Remove the right and left side covers.  
Remove the battery case cover.

Measure the battery voltage using a digital multimeter.

**VOLTAGE : Fully charged : 13.0-13.2V**  
**Under charged : Below 12.3V**

**TOOL :**  
**Digital multimeter 07411-0020000(KOWA)**  
**KS-AHM-32-003(U. S. A. only)**



BATTERY TESTING

NOTE

- Always clear the work area of flammable materials such as gasoline, brake fluid, electrolyte, or cloth towels when operating the tester, the heat generated by the tester may cause a fire.

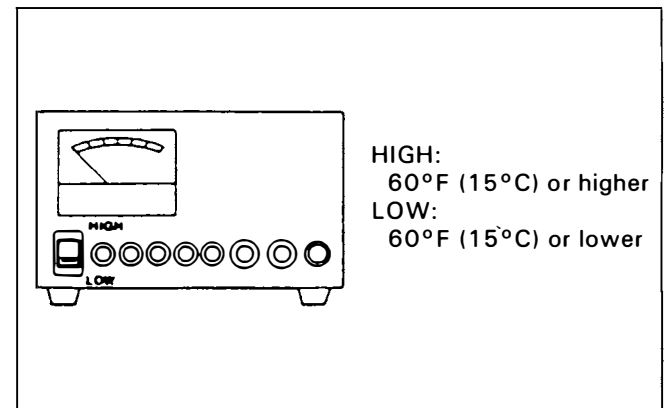
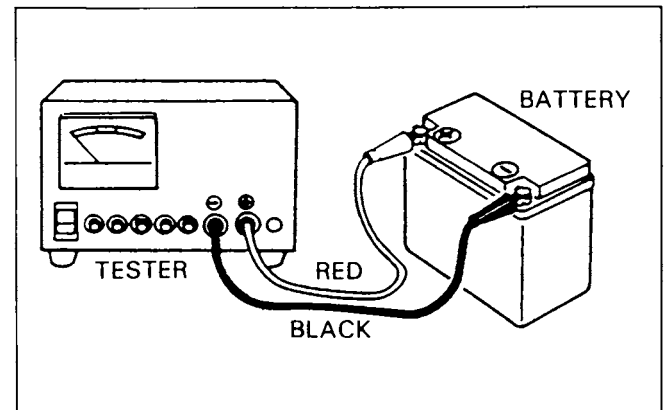
Remove the battery (page 15-4).

Securely connect the tester's positive(+) cable first, then connect the negative(-) cable.

NOTE

- For accurate test result, be sure the tester's cables and clamps are in good working condition and that a secure connection can be made at the battery.

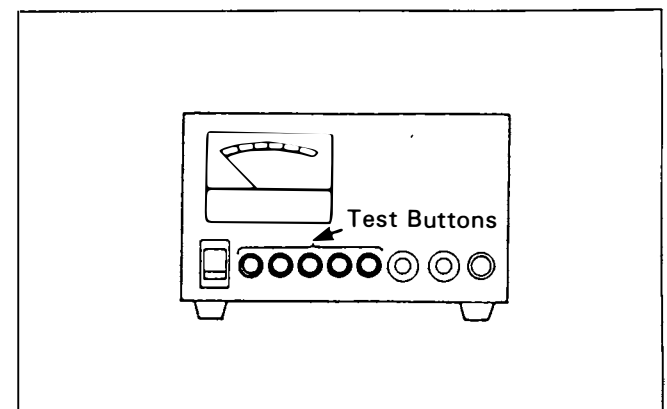
Set the temperature switch to "HIGH" or "LOW" depending on the ambient temperature.



Push in the appropriate test button for three second and read the condition of the battery on the meter.

NOTE

- Be sure you've selected the test button of 5.5 Ah-9Ah. For the first check, DO NOT charge the battery before testing-test it is an "as is" condition.



## BATTERY/CHARGING SYSTEM

### CAUTION

- To avoid damaging the tester, only test batteries with an amperage rating of less than 30A.
- Tester damage can result from overheating when:
  - The test button is pushed in for more than three seconds.
  - The tester is used without being allowed to cool for at least one minute when testing more than one battery.
  - More than ten consecutive tests are performed without allowing at least a 30-minute cool-down period.

### NOTE

- The result of a test on the meter scale is relative to the amp. hour rating of the battery. Any BATTERY READING IN THE GREEN ZONE IS OK. Batteries should only be charged if they register in the YELLOW or RED zone.

### BATTERY CHARGING

#### NOTE

- Be sure the area around the charger is well ventilated, clear of flammable materials, and free from heat, humidity, water and dust.
- Clean the battery terminals and position the battery as far away from the charger as the leads will permit.
- Do not place batteries below the charger—gases from the battery may corrode and damage the charger.
- Do not place batteries on top of the charger. Be sure the air vents are not blocked.

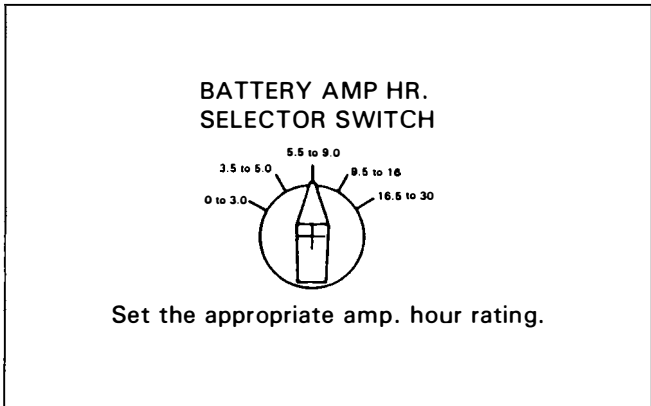
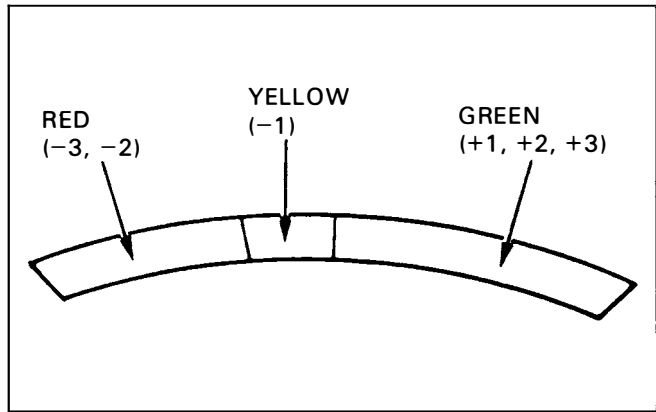
1. Turn the Power Switch to the OFF position.
2. Set the battery Amp. Hr. Selector Switch for the size of the battery being charged.
3. Set the Timer to the position indicated by the Honda Battery Tester; RED-3, RED-2 or YELLOW-1. If you are charging a new battery, set the switch to the NEW BATT position.
4. Attach the clamps to the battery terminals—RED to Positive, BLACK to Negative.

Connect the battery cables only when the Power Switch is OFF.

Connect the battery cables only when the Power Switch is OFF.

#### **▲ WARNING**

- **Connecting the cables with the Power Switch can produce a spark which could ignite or explode the battery.**



5. Turn the Power Switch to the ON position.
6. When the timer reaches the "Trickle" position, the charging cycle is complete. Turn the Power Switch OFF and disconnect the clamps.

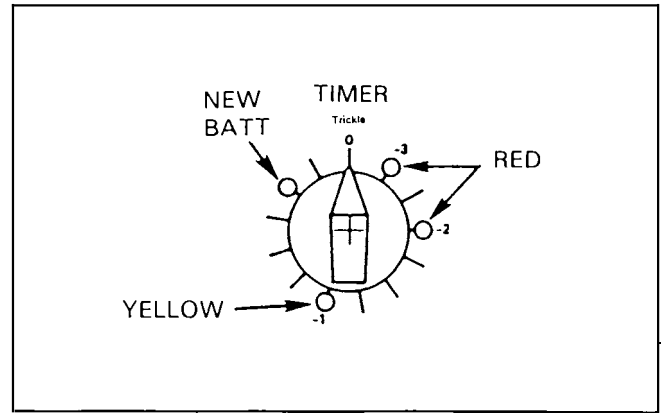
**NOTE**

- The charger will automatically switch to the Trickle mode after the set charging time has elapsed.

7. Retest the battery using the Honda Battery Tester and recharge if necessary using the above steps.

**NOTE**

- For accurate test results, let the battery cool for at least ten minutes or until gassing subsides after charging.



## CHARGING SYSTEM

**NOTE**

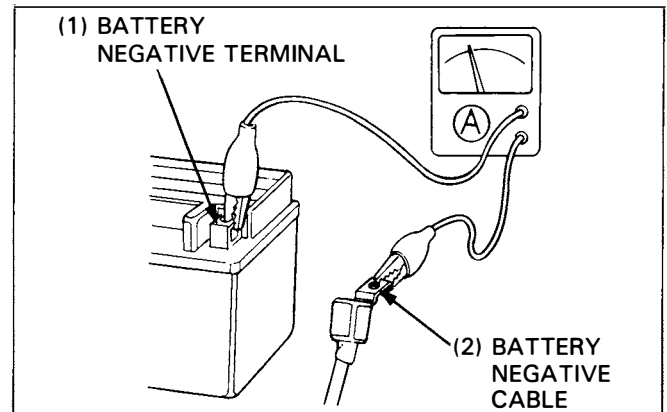
- When inspecting the charging system, check the system components and lines step-by-step according to the troubleshooting on page 15-2.
- Measuring circuits with a large capacity that exceeds the capacity of the tester may cause damage to the tester. Before starting each test, set the tester at the high capacity range first, then gradually down to low capacity ranges in order that you have the correct range and do not damage the tester.
- When measuring small capacity circuits, keep the ignition switch off. If the switch is suddenly turned on during a test, the tester fuse may blow.

### LEAKAGE INSPECTION

Check the battery ampere leakage before making the regulated ampere inspection.  
 Turn the ignition switch off and disconnect the battery negative cable from the battery.  
 Connect the tester between the negative cable and the negative battery terminal.

The voltage should indicate less than 0.1 mA with the ignition switch off.

**LEAKAGE AMPERES : 0.1mA max.**



## BATTERY/CHARGING SYSTEM

### REGULATED VOLTAGE INSPECTION

#### NOTE

- Be sure the battery is in good condition before performing this test.

Warm up the engine to normal operating temperature. Stop the engine, and connect the voltmeter as shown.

Start the engine and allow it to idle, then increase the engine speed gradually. The voltage should be controlled to 14.3–15.1 V at 5,000 rpm.

#### CAUTION

- Be careful not to let the battery positive cable contact the frame while testing.

## REGULATOR/RECTIFIER

### INSPECTION

Remove the left side cover. Disconnect the 3P (WHITE) and 4P (BLACK) regulator/rectifier connectors.

Check the connectors for loose or corroded terminals.

If the regulated voltage reading was out of specification, check the circuits between the connector terminals (wire harness side and alternator side) following the chart below.

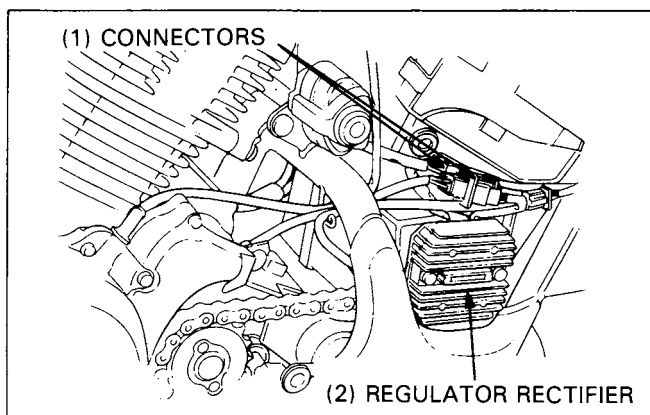
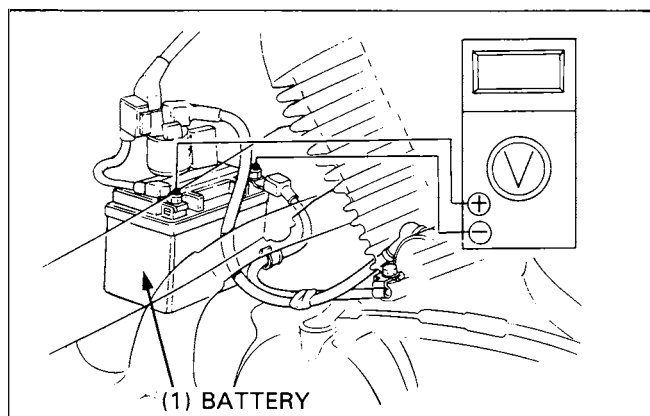
| ITEM                  | TERMINALS                   | STANDARDS                   |
|-----------------------|-----------------------------|-----------------------------|
| Battery charging line | Red/White (+) and Green (-) | Battery voltage should come |
| Alternator coil line  | Yellow and Yellow           | 0.1 – 1.0 Ω (20°C/68°F)     |

Check the resistances between the leads with an ohmmeter. If the resistance is out of the specifications, replace the regulator rectifier.

#### NOTE

- Use a SANWA [SP-10D] or [TH-5H] tester or KOWA DIGITAL VOLTOMETER (07411–0020000).
- The regulator/rectifier has a semi-conductor. If a different tester is used, the results will be out of specification.
- You'll get a false reading if your finger touches the tester probe.
- If the pointer of the tester fails to swing to zero when the adjusting knob is turned fully clockwise or counter-clockwise, replace the battery in the tester.

| Tester | Range |
|--------|-------|
| SP-10D | K Ω   |
| TH-5H  | RX100 |



'88-'89, '91 :

Unit: KΩ

| + Probe   | Red/White | Green | Yellow | Yellow | Yellow |
|-----------|-----------|-------|--------|--------|--------|
| - Probe   |           |       |        |        |        |
| Red/White |           | ∞     | ∞      | ∞      | ∞      |
| Green     | 5 ~ 30    |       | 1 ~ 20 | 1 ~ 20 | 1 ~ 20 |
| Yellow    | 4.2       | ∞     |        | ∞      | ∞      |
| Yellow    | 4.2       | ∞     | ∞      |        | ∞      |
| Yellow    | 4.2       | ∞     | ∞      | ∞      |        |

After '91 :

Unit: KΩ

| + Probe   | Red/White | Yellow   | Yellow   | Yellow   | Green |
|-----------|-----------|----------|----------|----------|-------|
| - Probe   |           |          |          |          |       |
| Red/White |           | ∞        | ∞        | ∞        | ∞     |
| Yellow    | 0.5 ~ 10  |          | ∞        | ∞        | ∞     |
| Yellow    | 0.5 ~ 10  | ∞        |          | ∞        | ∞     |
| Yellow    | 0.5 ~ 10  | ∞        | ∞        |          | ∞     |
| Green     | 0.7 ~ 15  | 0.5 ~ 10 | 0.5 ~ 10 | 0.5 ~ 10 |       |

## ALTERNATOR

### INSPECTION

#### NOTE

- It is not necessary to remove the stator coil to make this test.

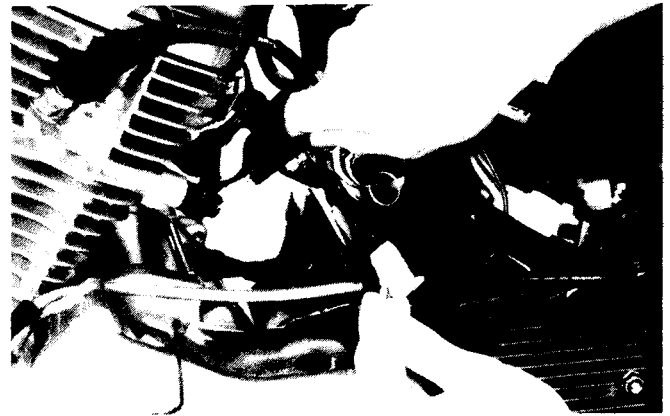
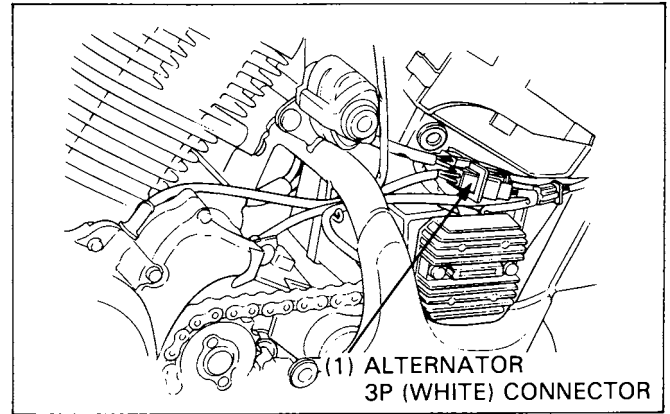
Remove the left side cover.

Disconnect the alternator 3P (WHITE) connector.

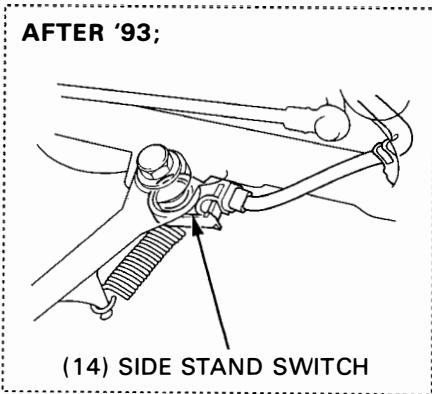
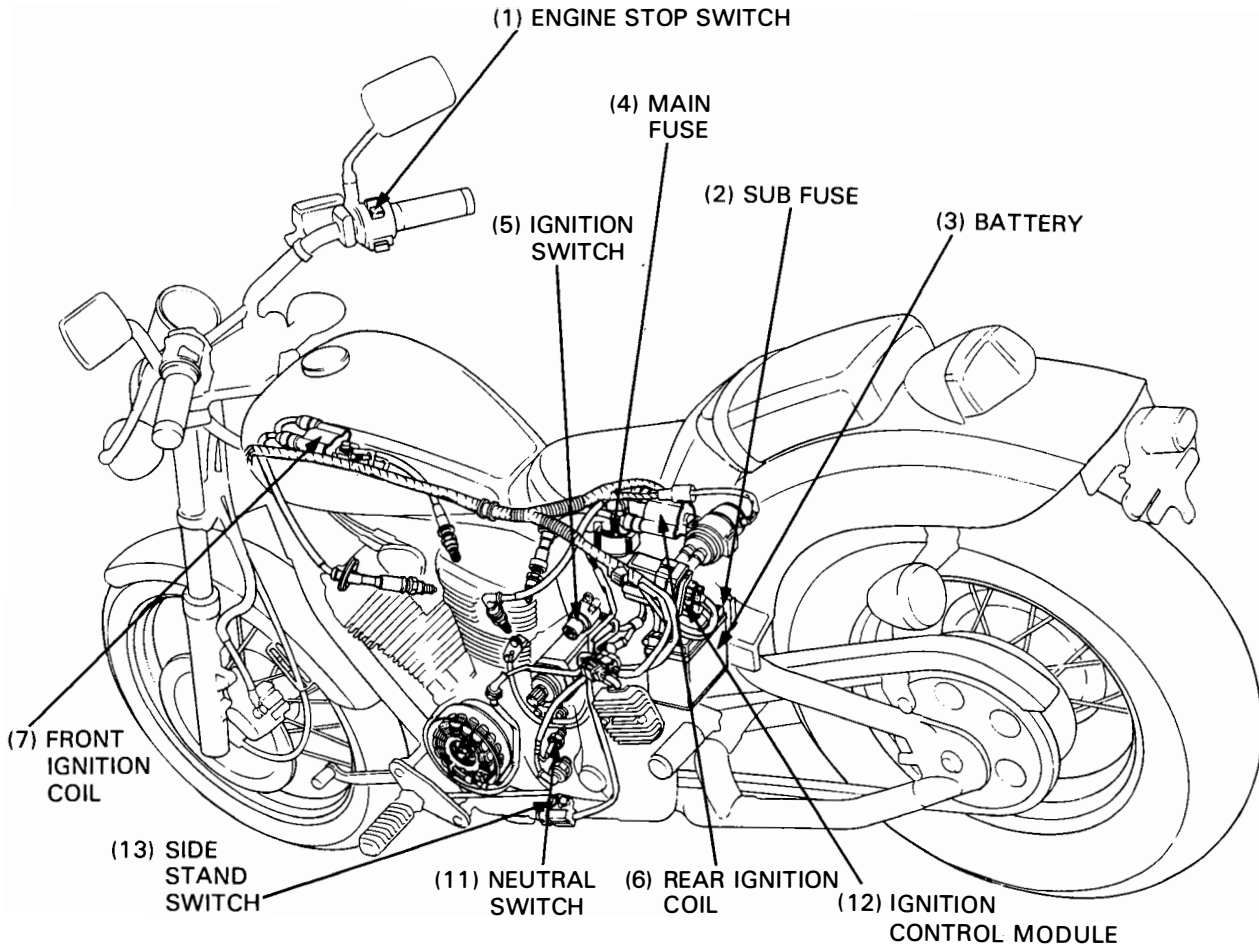
Measure the resistance between the yellow wire terminals and check for no continuity between each terminal and ground.

**STANDARD: 0.1 – 1.0  $\Omega$**

Replace the stator if the resistance is out of specification or if there is continuity between each yellow wire terminal and ground (page 15-8).

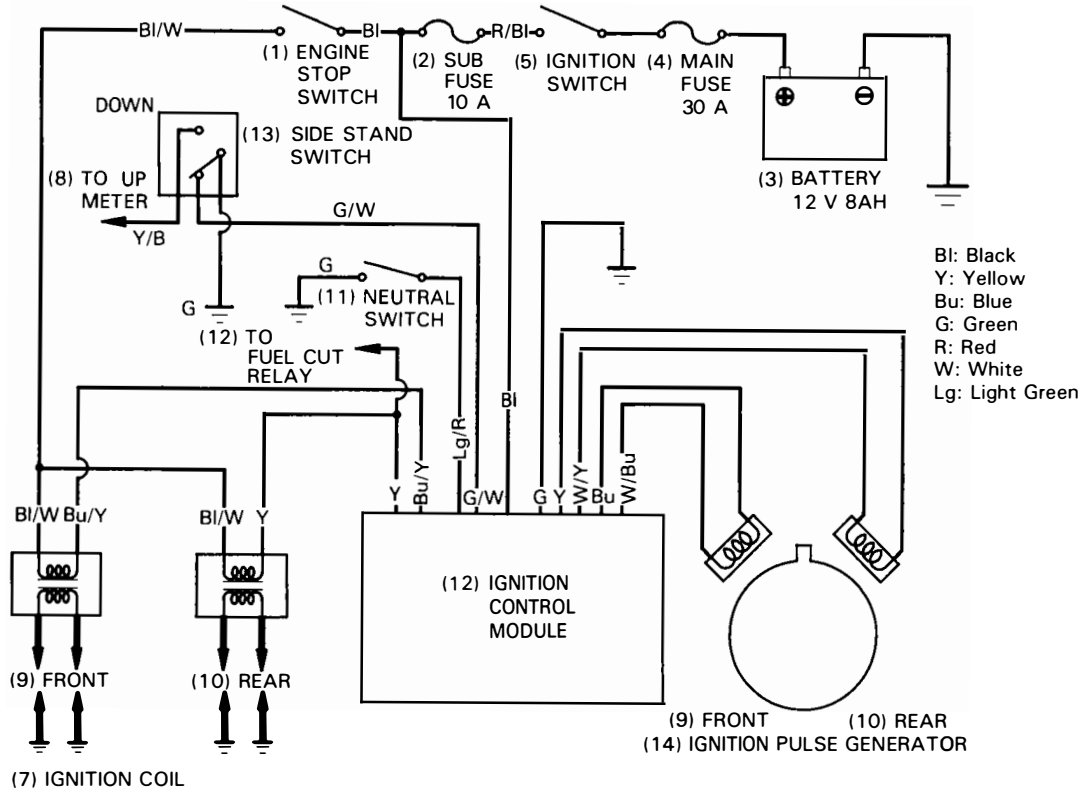


# IGNITION SYSTEM

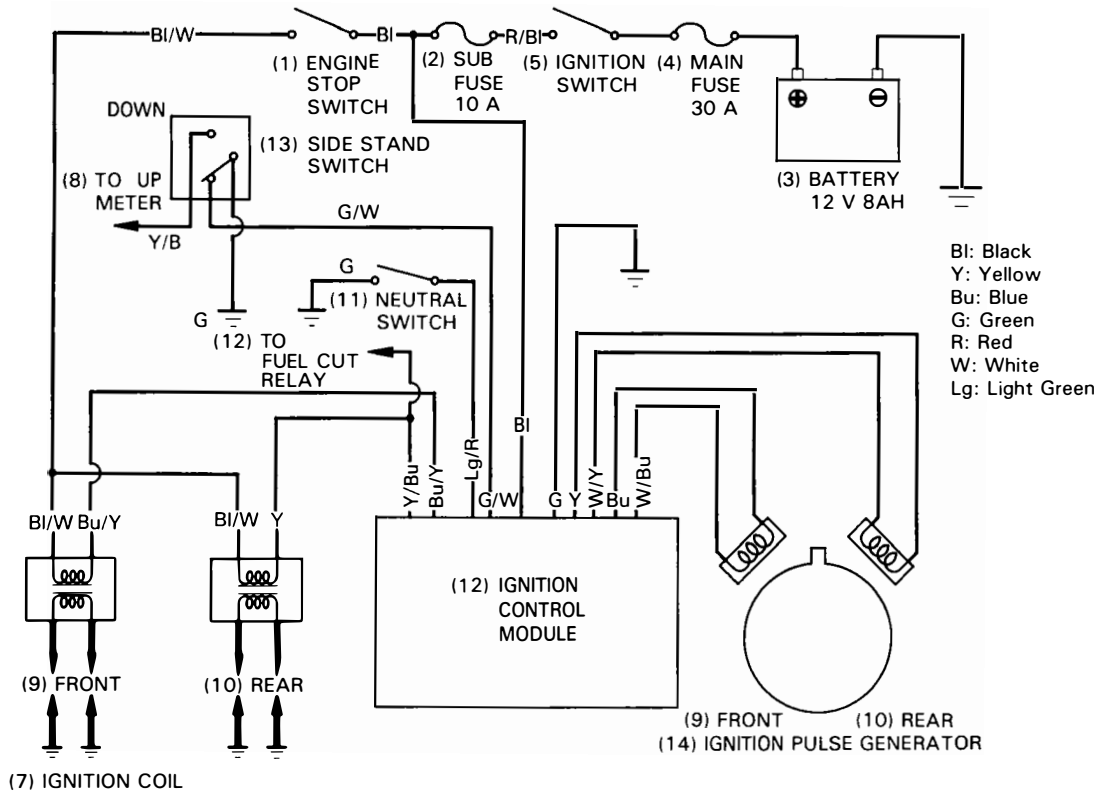


# 16. IGNITION SYSTEM

'88, '89



AFTER '89:



16

## IGNITION SYSTEM

|                                    |      |                          |      |
|------------------------------------|------|--------------------------|------|
| SERVICE INFORMATION                | 16-2 | IGNITION PULSE GENERATOR | 16-6 |
| TROUBLESHOOTING                    | 16-3 | SIDE STAND SWITCH        | 16-7 |
| IGNITION CONTROL MODULE INSPECTION | 16-4 | IGNITION TIMING          | 16-8 |
| IGNITION COIL                      | 16-5 |                          |      |

## SERVICE INFORMATION

### ⚠ WARNING

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

### GENERAL

- Ignition timing cannot be adjusted since the ignition control module is non-adjustable. If ignition timing is incorrect, check the system inspection and replace any faulty parts.
- For spark plug gap inspection and adjustment procedure, see page 3-8.
- For alternator removal and installation, see section 8.
- For ignition pulse generator removal and installation, see page 7-11.
- When inspecting the ignition system, check the system components and lines step-by-step according to the troubleshooting on next page.
- Each pair of the spark plugs (Front and Rear) has its own ignition circuit.
- To test the neutral switch, refer to section 18.

### SPECIFICATIONS

| ITEM                     |                  | STANDARDS (20°C/68°F)     |                |
|--------------------------|------------------|---------------------------|----------------|
| Spark plug               |                  | NGK                       | NIPPONDENSO    |
|                          |                  | DPR8EA-9                  | X24EPR-U9      |
| Spark plug               |                  | 0.8–0.9 mm (0.03–0.04 in) |                |
| Ignition timing          | Initial (F mark) | 6.2 BTDC/idle             |                |
| Ignition coil resistance | Primary          | 1.89–2.32 Ω               |                |
|                          | Secondary        | With plug wire            | 23.55–30.45 kΩ |
|                          |                  | Without plug wire         | 19.8–24.2 kΩ   |
| Ignition pulse generator | Coil resistance  | 450–550 Ω                 |                |
| Firing order             |                  | F(2)–R(1) 308°            |                |

### TOOLS

#### Tester

|                           |  |
|---------------------------|--|
| Digital multimeter (KOWA) | 07411–0020000 or KS-AHM-32-003 (U.S.A. only) |
| or                        |  |
| Circuit tester (SANWA)    | 07308–0020000 — Not available in U.S.A.      |
| or                        |  |
| Circuit tester (KOWA)     | TH-5H  |



# TROUBLESHOOTING

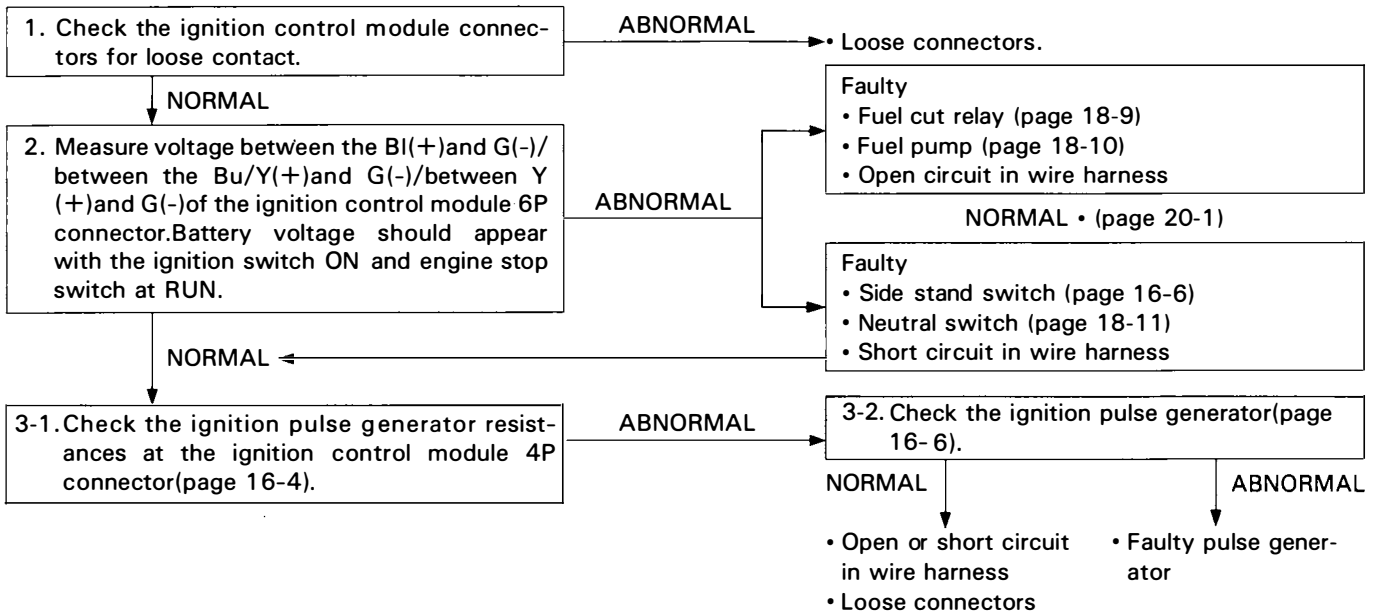
**⚠ WARNING**

• When performing a spark test, keep open flames or sparks away from the work area.

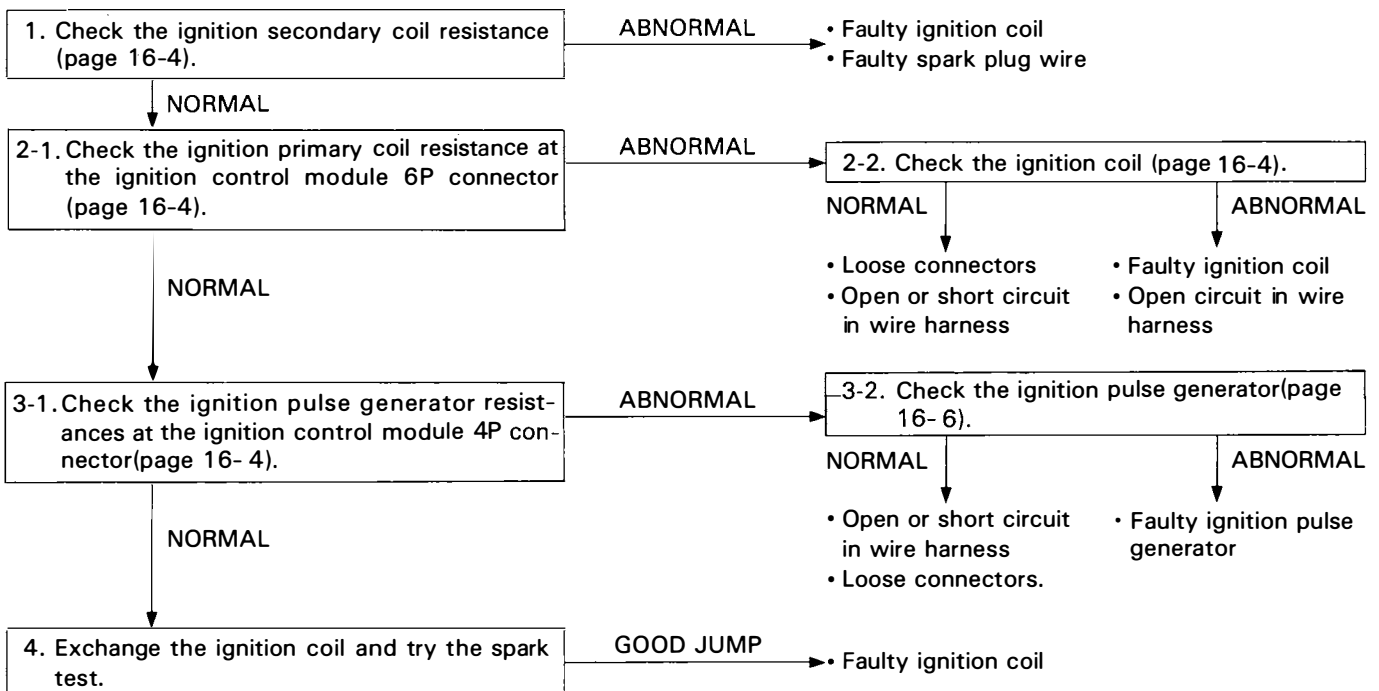
**No spark at one spark plug**

- Faulty spark plug
- Faulty spark plug wire

**No spark at all plugs**



**No spark at either spark group (Front or Rear) — (CHECK WRONG SPARK GROUP)**



## IGNITION SYSTEM

### IGNITION CONTROL MODULE INSPECTION

Remove the left side cover and connector plate.

#### NOTE

- Check the system components and lines step-by-step according to the troubleshooting chart on page 16-3.

Disconnect the ignition control module connectors and check them for loose or corroded terminals.

Measure the resistance between connector terminals using the following chart.



#### <6P CONNECTOR>

| ITEM                         | TERMINALS  | STANDARD (20°C/68°F)         |
|------------------------------|--|------------------------------|
| Ignition primary coil        | Y and BI (Rear) Bu/Y and BI (Front)  | 1.89–2.32 Ω                  |
| DC power supply circuit line | BI (+) and G (-), Bu/Y (+) and G (-), Y (+) and G (-) with the ignition switch "ON" and engine stop switch "RUN" | Battery voltage should come. |

#### <4P CONNECTOR>

| ITEM                          | TERMINALS                            | STANDARD (20°C/68°F) |
|-------------------------------|--------------------------------------|----------------------|
| Ignition pulse generator coil | W/Y and Y (Front) W/Bu and Bu (Rear) | 450–550 Ω            |
|                               | Each terminal and body ground        | NO CONTINUITY        |

### IGNITION COIL

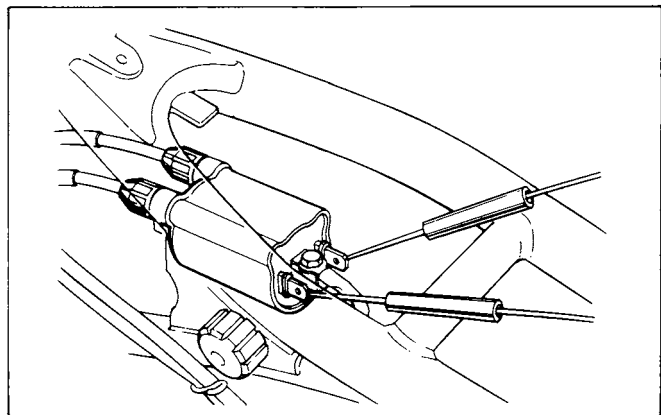
#### INSPECTION

Remove the fuel tank (page 4-3) and crankcase breather tank. Measure the primary coil resistance of the front ignition coil in the frame.

Remove the right side cover and rear ignition coil and measure the primary coil resistance.

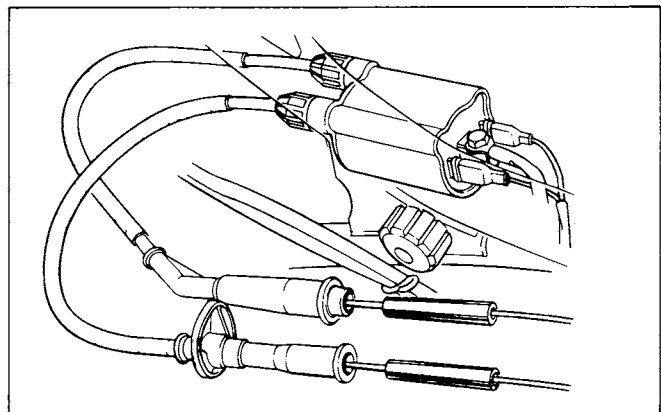
Checking for continuity between the primary terminals.

**STANDARD: 1.89–2.32 Ω (20°C/68°F)**



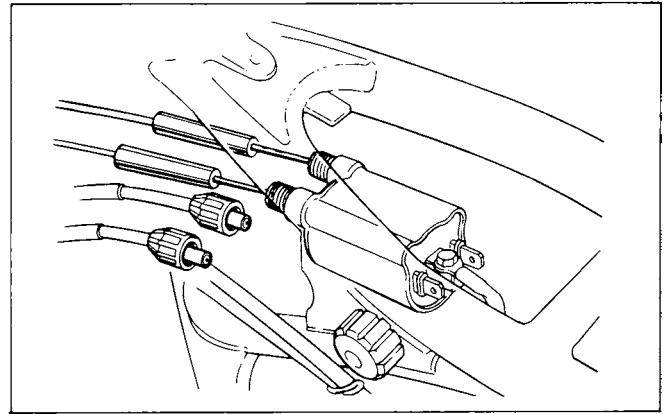
Disconnect the spark plug caps from the plugs and measure the secondary coil resistance with the spark plug caps in place.

**STANDARD: 23.55–30.45 kΩ (20°C/68°F)**



If the resistance is out of range, remove the spark plug wires and measure the resistance between the secondary coil terminals.

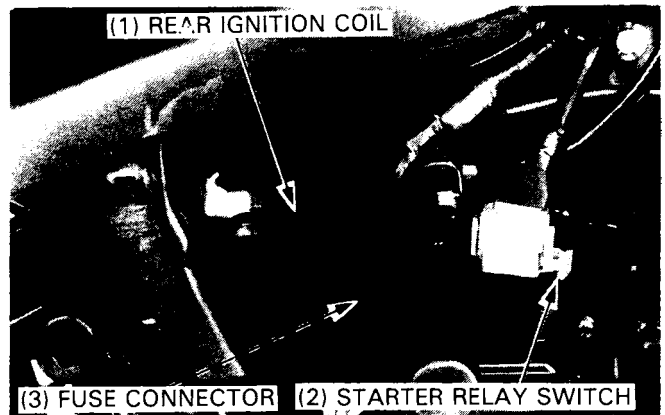
**STANDARD: 19.8–24.2 kΩ (20°C/68°F)**



**REPLACEMENT**

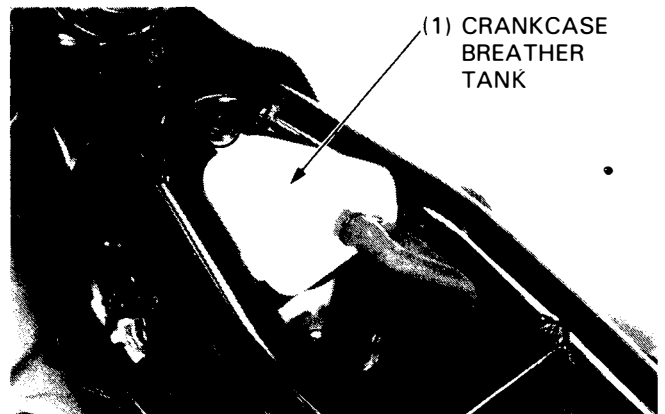
**Rear ignition coil**

Remove the right side cover.  
Disconnect the fuse connectors and starter relay switch from the case.



**Front ignition coil**

Remove the fuel tank (page 4-3).  
Remove the crankcase breather tank from the frame.

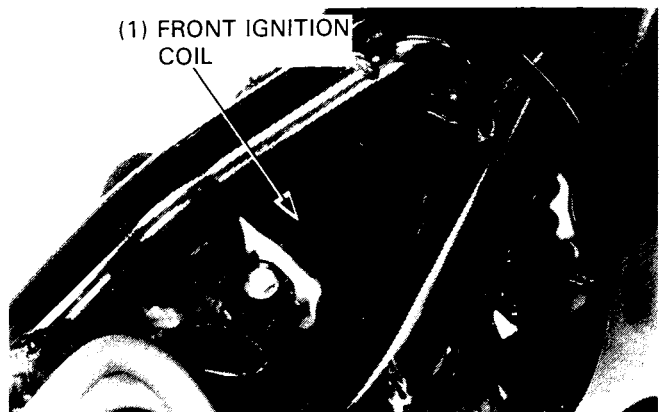


Remove the ignition coil mounting bolts and disconnect the primary terminals from the coils.  
Remove the spark plug caps from the spark plugs.

Install the new ignition coil in the reverse order of the removal.

**NOTE**

- Connect the primary wire terminals properly.  
Front coil: black terminal—black/white wire  
green terminal—yellow/blue wire  
Rear coil: black terminal—black/white wire  
green terminal—blue/yellow wire



## IGNITION SYSTEM

### IGNITION PULSE GENERATOR

#### INSPECTION

##### NOTE

- It is not necessary to remove the ignition pulse generator to make this inspection.

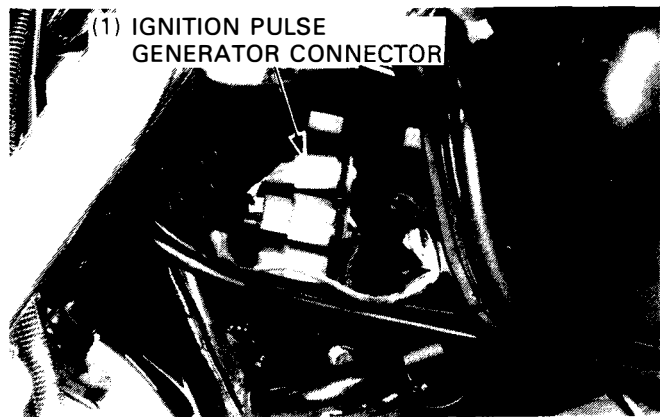
Remove the left steering cover.

Disconnect the ignition pulse generator 4P connector (WHITE).

Measure the resistances between the white/yellow and yellow wires(front ignition pulse generator)and white/blue and blue wires(rear ignition pulse generator)

**STANDARD: 450—550  $\Omega$  (20°C/68°F)**

For ignition pulse generator replacement, refer to section 8.



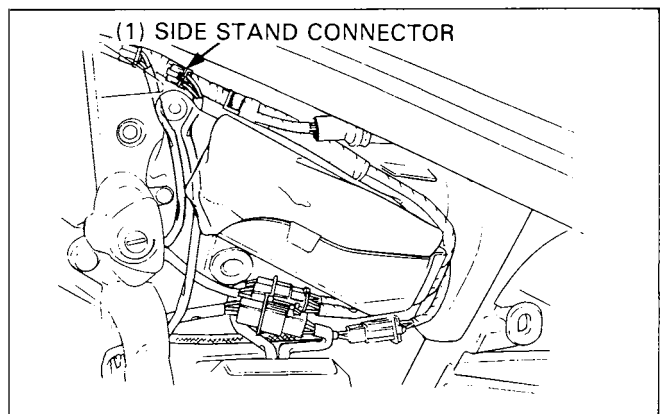
### SIDE STAND SWITCH

#### INSPECTION

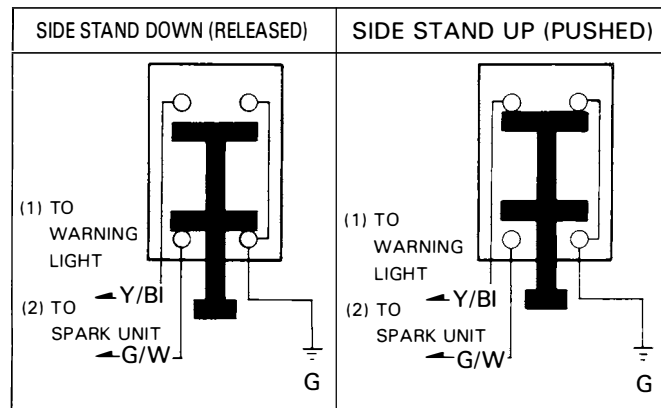
'88,'89,'91-'93:

Remove the seat and left side cover. Disconnect the 2P (Green) connector and the Green/White wire.

Check the continuity between each terminal of the side stand switch.



| Side stand position                                    | Terminals                                     | Tester Reading              |
|--|---|-----------------------------|
| Side stand up (pushed)<br>—ignition circuit open       | Green/White to Green<br>Yellow/Black to Green | No continuity<br>Continuity |
| Side stand down (released)<br>—ignition circuit closed | Green/White to Green<br>Yellow/Black to Green | Continuity<br>No continuity |



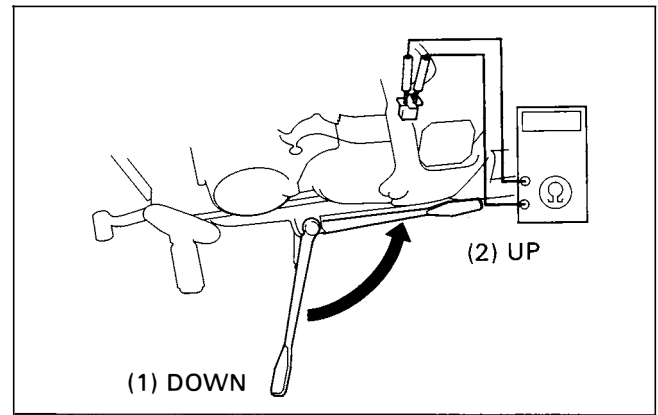
**After '93:**

Remove the left side cover.

Disconnect the side stand 3P green connector and check for continuity between each terminals as shown below.

There should be continuity between the ○-○ positions on the continuity chart.

|                 | Green/White | Yellow/Black | Green |
|-----------------|-------------|--------------|-------|
| Side stand down |             | ○ — ○        | ○ — ○ |
| Side stand up   | ○ — ○       |              | ○ — ○ |



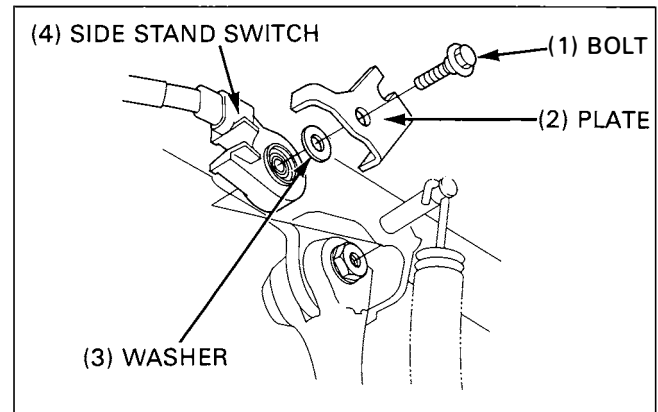
**REMOVAL/INSTALLATION**

Remove the left side cover.

Disconnect the side stand 3P green connector.

Remove the side stand switch mounting bolt, setting plate, washer and side stand switch.

Install the switch in the reverse order of removal.



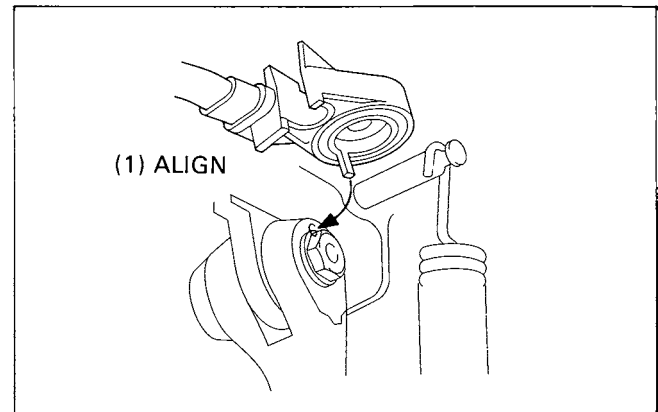
**NOTE**

- Align the switch pin with the side stand hole. Align the switch groove with the setting plate tang and align the setting plate bolt with the side stand return spring holding pin.

**TORQUE:**

Side stand switch mounting bolt: 9 N·m (0.9 kg·m, 7 ft·lb)

Route the side stand switch wire properly.



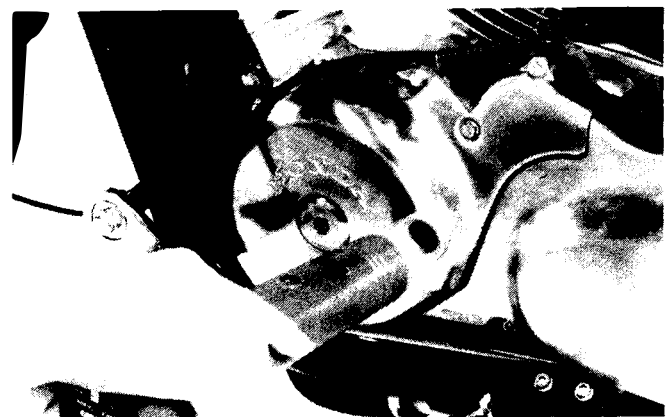
**IGNITION TIMING**

**NOTE**

- The ignition control module system is factory pre-set and cannot be adjusted. Ignition timing inspection procedures are given to inspect the function of the ignition control module components.
- Connect the timing light to the other spark plug wire if you see that the ignition timing is incorrect, and you might be able to see the timing is correct.

Warm up the engine to operating temperature. Remove the timing inspection hole cap on the right crankcase cover.

Connect the timing light to the front spark plug wire.



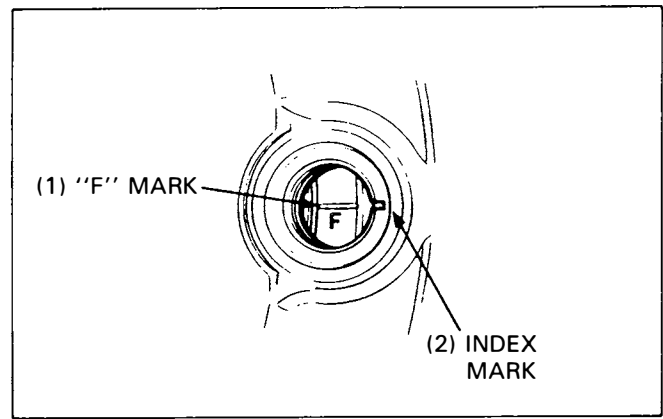
## IGNITION SYSTEM

---

The timing is correct if the "F" mark aligns with the index mark on the right crankcase cover at idle for each cylinder.

Raise the engine rpm and the "F" mark should begin to rotate counterclockwise for each cylinder.

If the ignition timing is incorrect, make a system inspection (page 16-3) and replace any faulty parts.

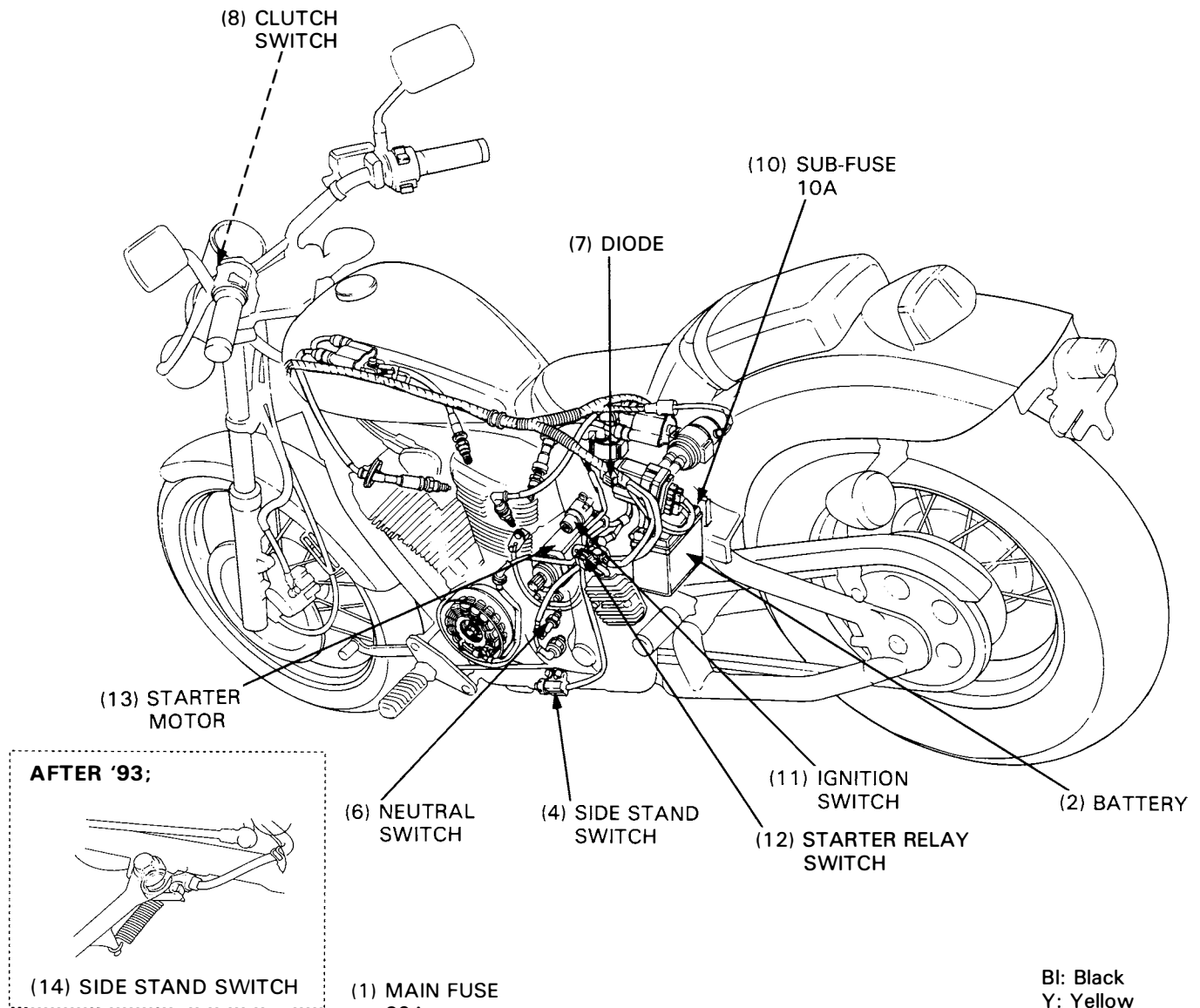


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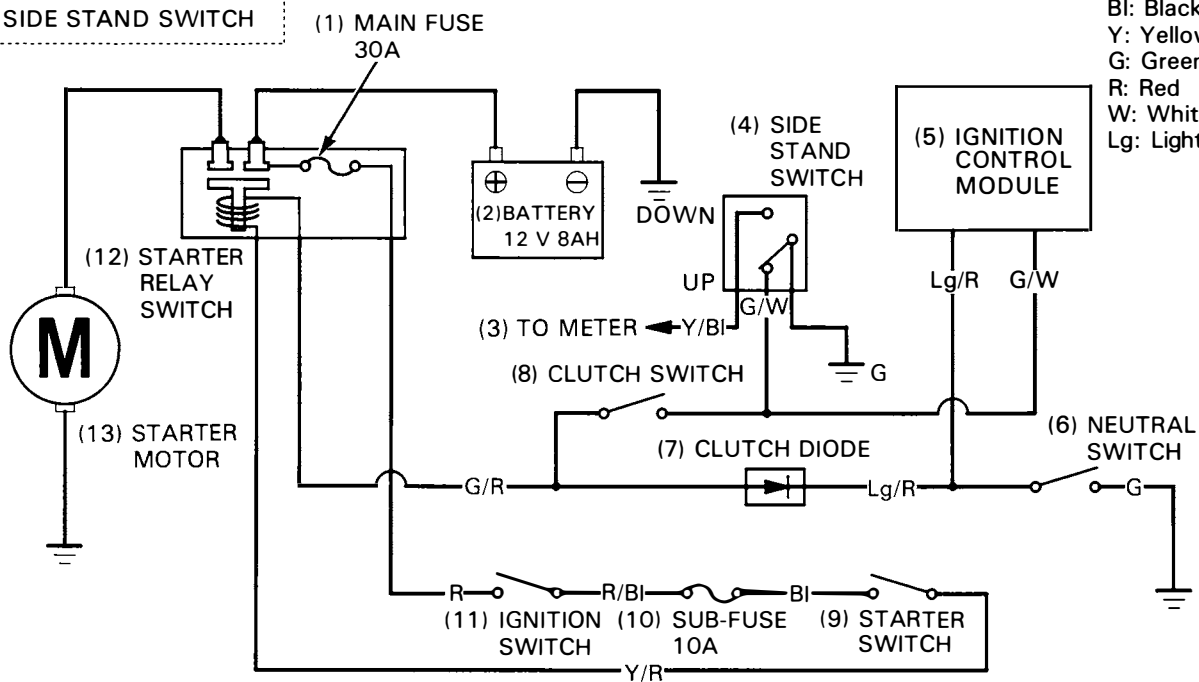
**MEMO**

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# ELECTRIC STARTER



Bl: Black  
 Y: Yellow  
 G: Green  
 R: Red  
 W: White  
 Lg: Light green





# 17. ELECTRIC STARTER

|                            |             |                             |             |
|----------------------------|-------------|-----------------------------|-------------|
| <b>SERVICE INFORMATION</b> | <b>17-1</b> | <b>STARTER RELAY SWITCH</b> | <b>17-6</b> |
| <b>TROUBLESHOOTING</b>     | <b>17-1</b> | <b>CLUTCH DIODE</b>         | <b>17-7</b> |
| <b>STARTER MOTOR</b>       | <b>17-3</b> |                             |             |

## SERVICE INFORMATION

### GENERAL

- The starter motor and ignition pulse generator can be removed with the engine in the frame.
- To inspect the ignition pulse generator, refer to Section 16.
- Refer to section 8 for starter clutch removal and installation.

### SPECIFICATION

Unit: mm (in)

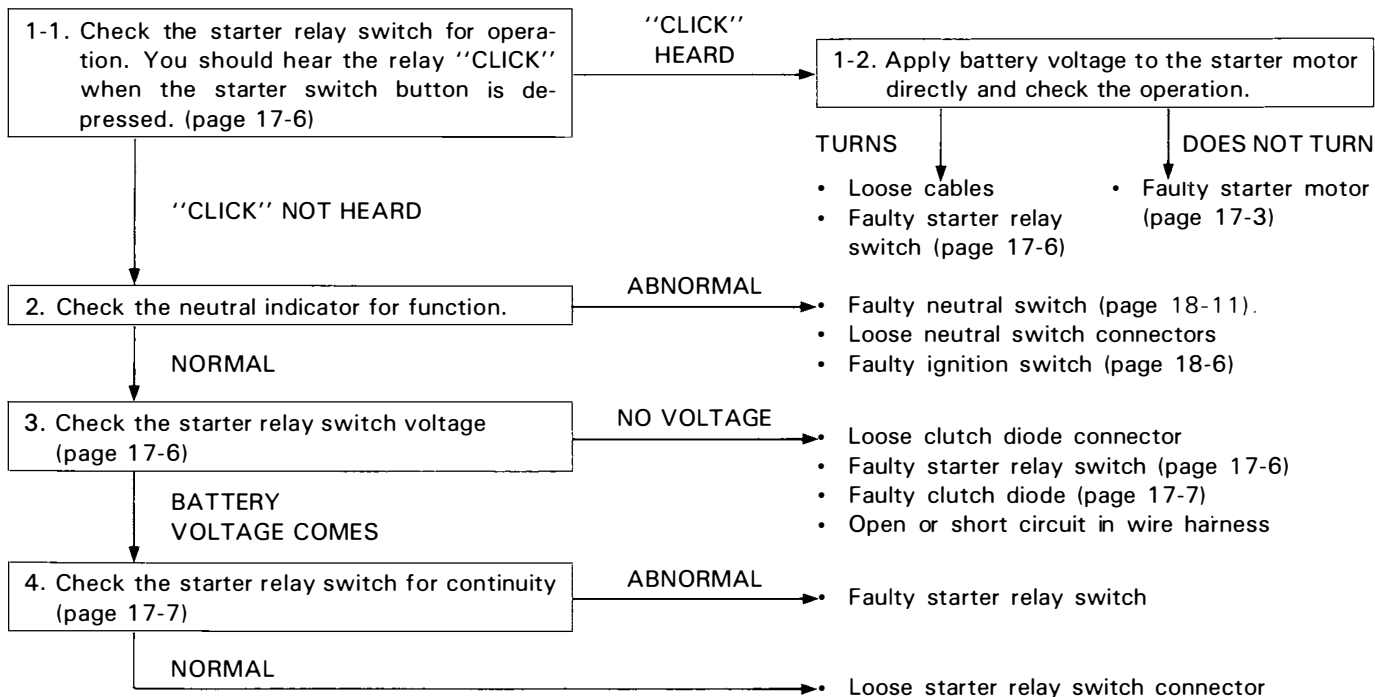
| ITEM                       | STANDARD    | SERVICE LIMIT |
|----------------------------|-------------|---------------|
| Starter motor brush length | 12.5 (0.49) | 6.5 (0.26)    |

## TROUBLESHOOTING

### NOTE

- The starter motor should turn when the transmission is in neutral and the clutch disengaged.
- Check for the following before troubleshooting the system.
  - Blown main (30A) or sub (10A) fuse.
  - Loose battery and starter motor cables.
  - Discharged battery.

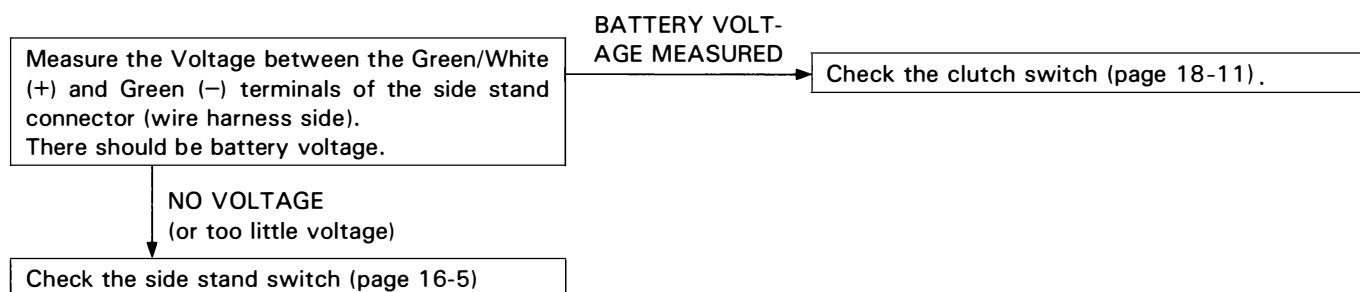
### Starter motor does not turn



## ELECTRIC STARTER

---

The starter motor can turn in the neutral position, but should not turn except with the gear selector in neutral, the side stand up and the clutch lever pulled in.



### **Starter motor turns engine slowly**

- Low specific gravity
- Excessive resistance in circuit
- Binding in starter motor

### **Starter motor turns, but engine does not turn**

- Faulty starter clutch
- Faulty starter motor gears

### **Starter motor and engine turns, but engine does not start**

- Faulty ignition system
- Engine problems
  - Low compression
  - Fouled spark plugs

## STARTER MOTOR

### REMOVAL

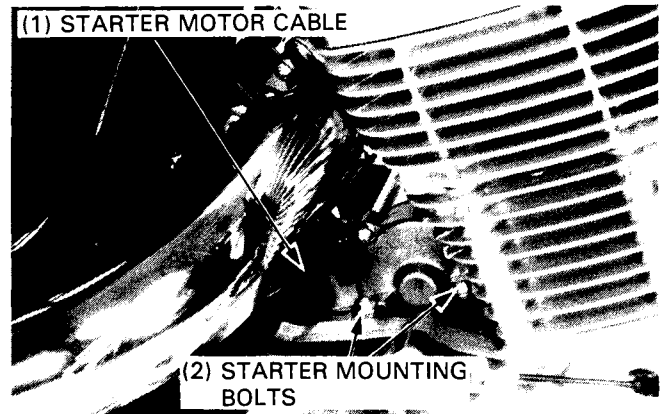
#### ⚠ WARNING

- *With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.*

Remove the rubber cap and disconnect the starter motor cable.

Remove the motor mounting bolts.

Remove the motor from the left side.



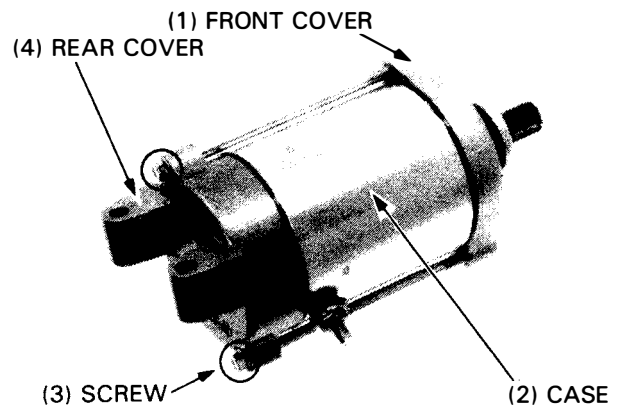
### DISASSEMBLY

Remove the following components:

- motor case screws.
- front and rear covers.
- armature.

#### NOTE

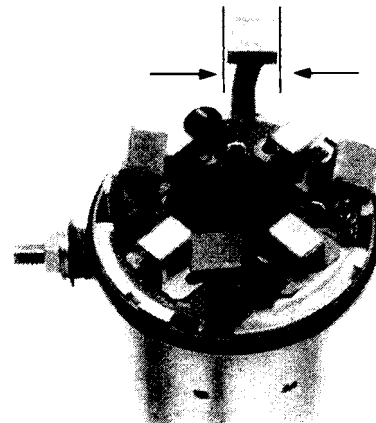
- Record the location and number of shims.



### INSPECTION

Measure each brush length.

**SERVICE LIMIT: 6.5 mm (0.26 in)**

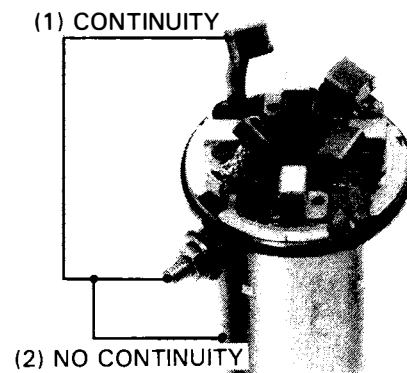


Check for continuity from the cable terminal to the motor case and from the cable terminal to the brush wire (black).

CABLE TERMINAL-MOTOR CASE  
NO CONTINUITY: NORMAL

CABLE TERMINAL-BRUSH (BLACK WIRE)  
CONTINUITY: NORMAL

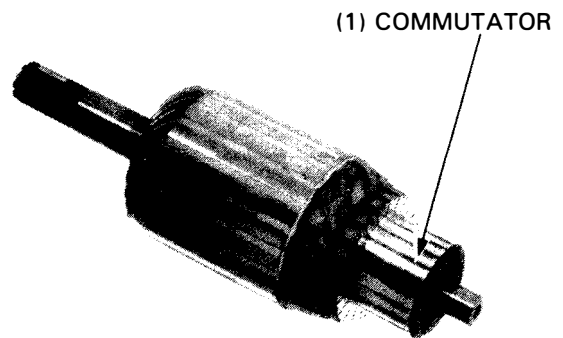
Disassemble the brush holder if necessary.



## ELECTRIC STARTER

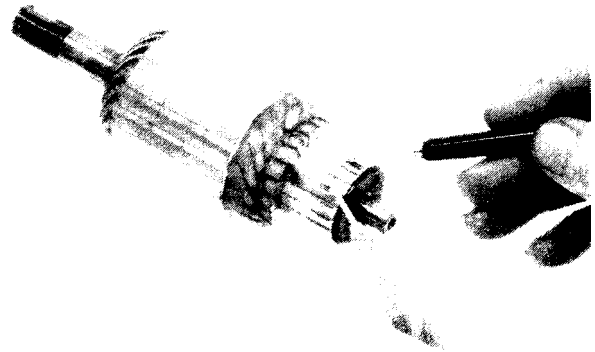
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Inspect the commutator bars for discoloration.  
Bars discolored in pairs indicate grounded armature coils.



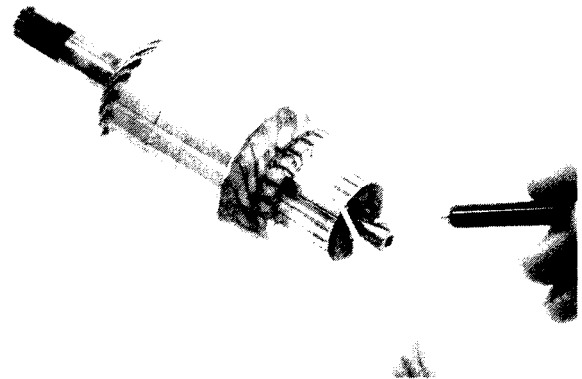
Check for continuity between pairs of commutator bars.

There should be continuity.

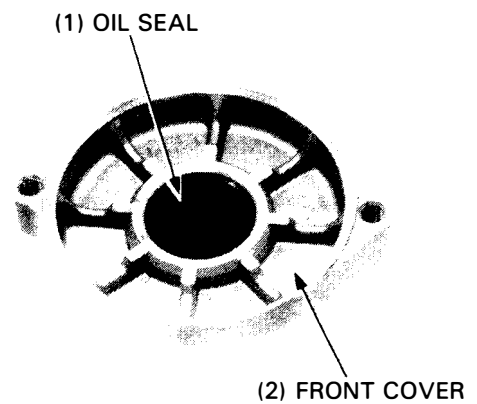


Check for continuity between individual commutator bars and the armature shaft.

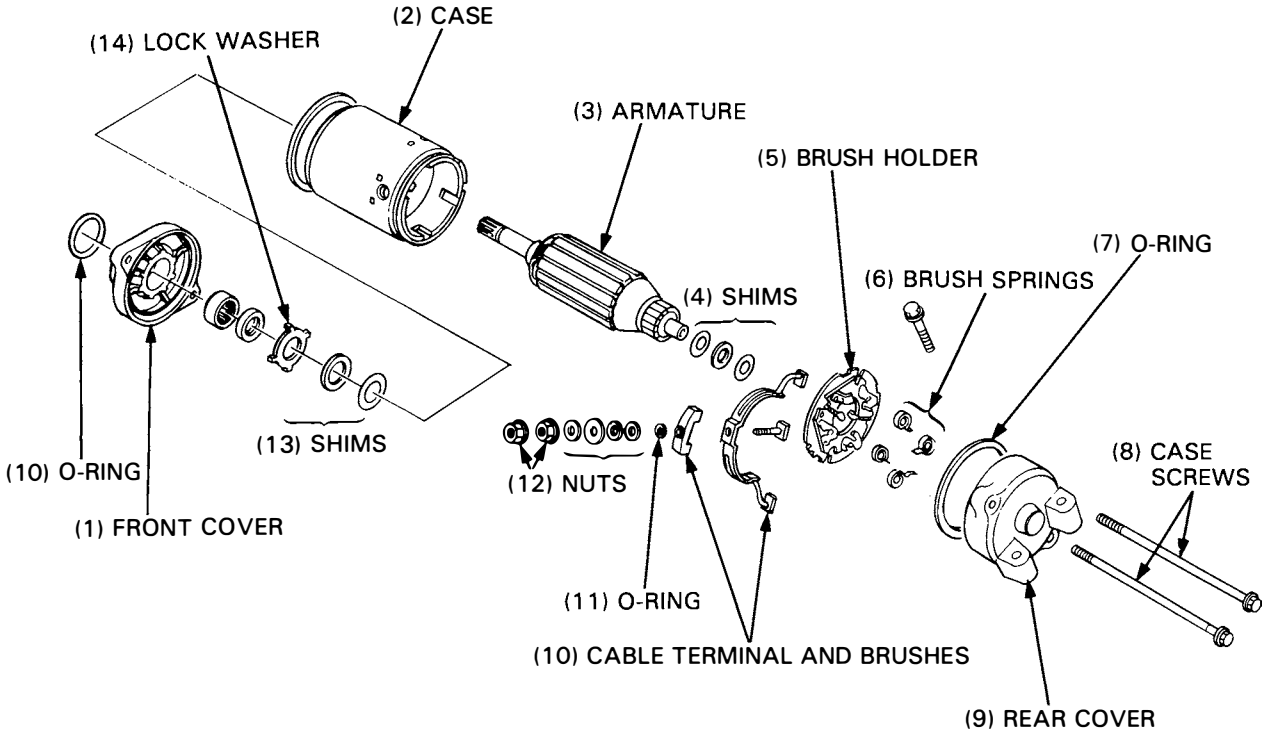
There should be no continuity.



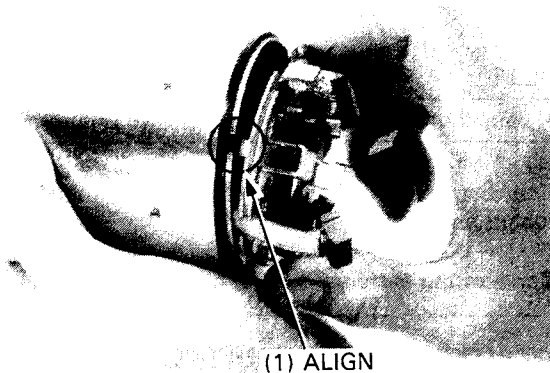
Check the front cover oil seal for wear or fatigue.



ASSEMBLY

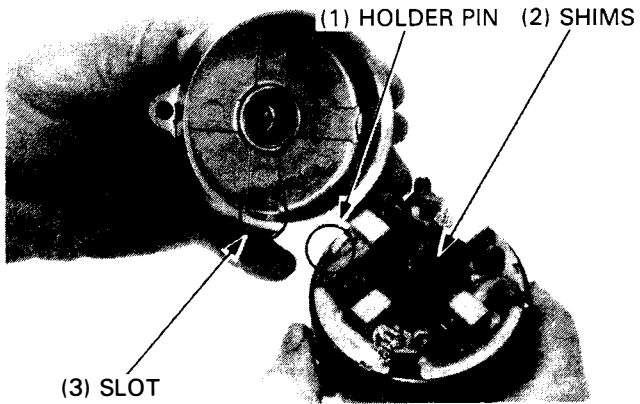


Set the brushes on the brush holder.  
Align the starter motor case notch with the brush holder tab.



Install the armature in the case.  
Set the brush springs.

Install the rear shims in the same location and number when disassembled.  
Install the O-ring on the case.  
Install the rear cover, aligning its slot with the brush holder pin.



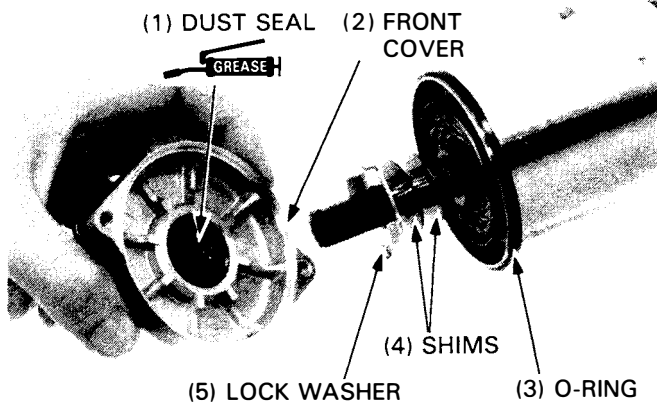
## ELECTRIC STARTER

Install the front shims in the same location and number when disassembled.

Install the O-ring on the case.

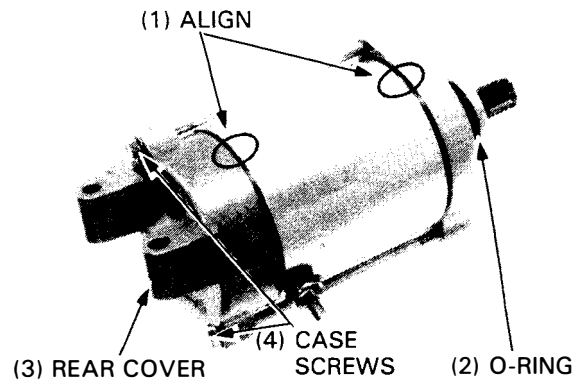
Install the lock washer, aligning its tabs with the slots of the front cover.

Apply grease to the dust seal and install the front cover.



Align index marks of the front cover, case and rear cover as shown.

Install and tighten the starter motor case screws and apply oil to the O-ring and install it on the front cover.



## INSTALLATION

Install the starter motor in the engine.

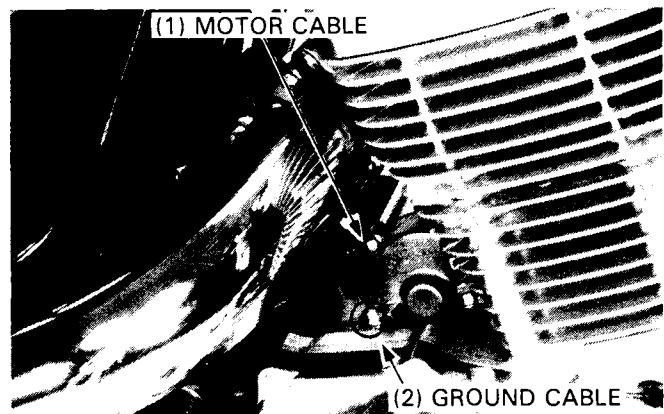
Install and tighten the motor mounting bolts securely.

### NOTE

- Install the ground cable with one mounting bolt as shown.

Connect the motor cable to the motor terminal and install the rubber cap over the terminal.

Connect the battery negative cable.



## STARTER RELAY SWITCH

### OPERATION INSPECTION

Depress the start switch button with the ignition switch ON. The coil is normal if the starter relay switch clicks.

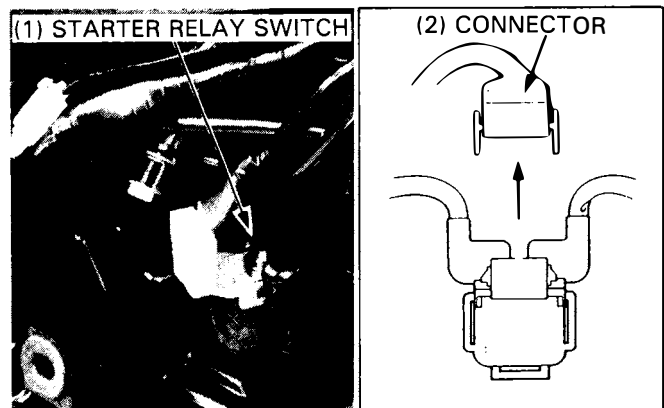
### VOLTAGE INSPECTION

If you don't hear the switch "CLICK", disconnect the switch connector.

Shift the transmission into neutral and turn the ignition switch ON.

Measure the voltage between the yellow/red (+) and green/red (-) wires of the relay connector as you press the starter.

The tester should show battery voltage. If it does not, make the following continuity inspection.

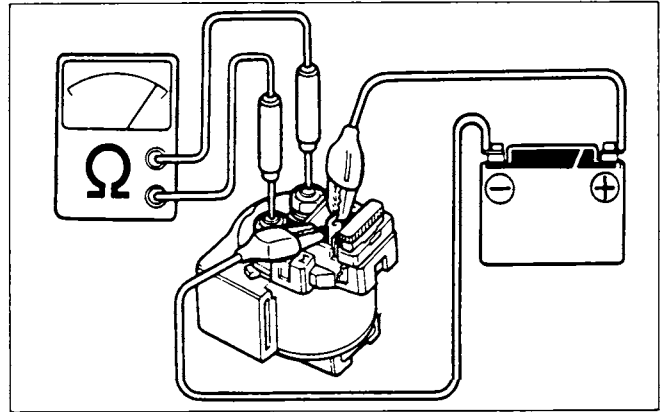


## CONTINUITY INSPECTION

Remove the starter relay switch.  
Connect an ohmmeter to the switch large terminals.

Connect a fully charged 12 V battery positive wire to the starter relay switch Yellow/Red wire terminal, and the battery negative wire to the Green/Red wire terminal.

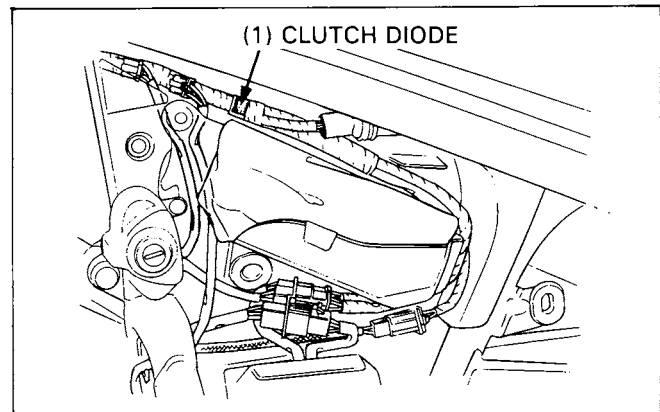
There should be continuity while the battery is connected to the terminals, and no continuity when the battery is disconnected.



## CLUTCH DIODE

### REMOVAL

Remove the left side cover.  
Remove the clutch diode from the wire harness.



### INSPECTION

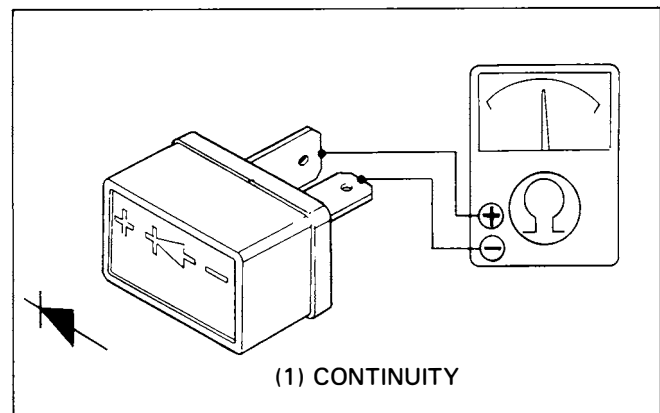
Check for continuity with an ohmmeter.

Connect the positive probe to the (+) terminal and the negative probe to the (-) terminal of the diode.

There should be continuity, then reverse the probes, there should be no continuity.

### NOTE

- The test results shown above are for a positive ground ohmmeter and the opposite results will be obtained when a negative ground ohmmeter is used.



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**MEMO**

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# 18. LIGHTS/METER/SWITCHES

|                               |      |                     |       |
|-------------------------------|------|---------------------|-------|
| SERVICE INFORMATION           | 18-1 | FUEL PUMP RELAY     | 18-9  |
| TROUBLESHOOTING               | 18-2 | FUEL PUMP           | 18-10 |
| HEADLIGHT                     | 18-3 | OIL PRESSURE SWITCH | 18-10 |
| BULB REPLACEMENT              | 18-4 | NEUTRAL SWITCH      | 18-11 |
| SPEEDOMETER                   | 18-4 | BRAKE LIGHT SWITCH  | 18-11 |
| IGNITION SWITCH               | 18-6 | CLUTCH SWITCH       | 18-11 |
| HANDLEBAR SWITCHES            | 18-7 | TURN SIGNAL RELAY   | 18-12 |
| THERMOSTATIC SWITCH           | 18-8 | HORN                | 18-12 |
| COOLANT TEMPERATURE INDICATOR | 18-8 |                     |       |

## SERVICE INFORMATION

### ⚠ WARNING

- *If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in an enclosed area. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.*
- *Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the work area or where gasoline is stored.*

### GENERAL

- Some wires have different colored bands around them near the connector. These are connected to other wires which correspond to the band color.
- All plastic connectors have locking tabs that must be released before disconnecting, and must be aligned and fully engaged when reconnecting.
- To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle. Simply disconnect the wires and connect a continuity tester or volt-ohmmeter to the terminals or connections.
- A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. An ohmmeter is needed to measure the resistance of a circuit, such as when there is a specific coil resistance involved, or when checking for high resistance caused by corroded connections.

### SPECIFICATIONS

|                         |               |  |
|-------------------------|---------------|--|
| headlight               |               | 12 V 60 W/55 W                                 |
| Brake/taillight         |               | 12 V 32/3 cp (27/8 W) x 2                      |
| Turn signal lights      | Front<br>Rear | 12 V 32/3 cp (23/8 W) x 2<br>12 V 32 cp (23 W) |
| License light           |               | 12 V 4 cp                                      |
| Indicator lights        | turn signal   | 12 V 1.7 W                                     |
|                         | neutral       | 12 V 1.7 W                                     |
|                         | high beam     | 12 V 1.7 W                                     |
| Meter light             |               | 12 V 3.4 W                                     |
| Main fuse               |               | 30 A   |
| Sub-fuse                | '88, '89      | 10 A x 6, 15A x 1                              |
|                         | After '89     | 10 A x 3, 15A x 1                              |
| Fuel pump flow capacity |               | 800 cc (0.76 USqt, 0.70 Impqt)                 |

18

### TORQUE VALUES

|                               |   |
|-------------------------------|---|
| Radiator thermostatic switch  | 18 N·m (1.8 kg-m, 13 ft-lb)                               |
| Oil pressure switch           | 12 N·m (1.2 kg-m, 9 ft-lb) — Apply sealant to the threads |
| Ignition switch mounting bolt | 11 N·m (1.1 kg-m, 8 ft-lb) — Shear bolt                   |

## TROUBLESHOOTING

### **No Lights Come On When Ignition Switch Is Turned ON:**

- Bulb at fault or burned out
- Faulty switch
- Wiring to that component has open circuit
- Fuse blown
- Wiring loose, broken, or at fault
- Battery dead or disconnected

### **All Lights Come On, but Dimly, when Ignition Switch Is Turned ON:**

- Battery voltage low
- Faulty bulb

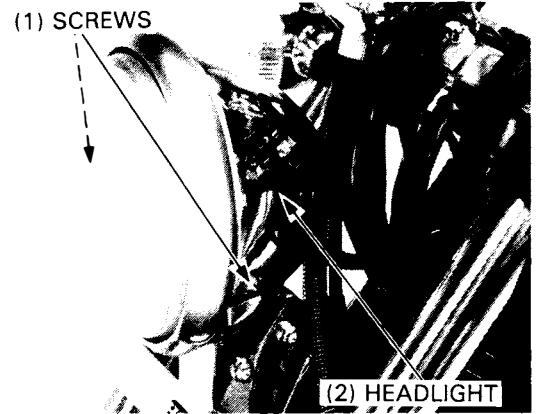
### **Headlight Beam Does Not Shift When HI-LO Switch Is Operated:**

- Beam filament burned out
- Faulty dimmer switch
- Wiring loose, broken, or at fault

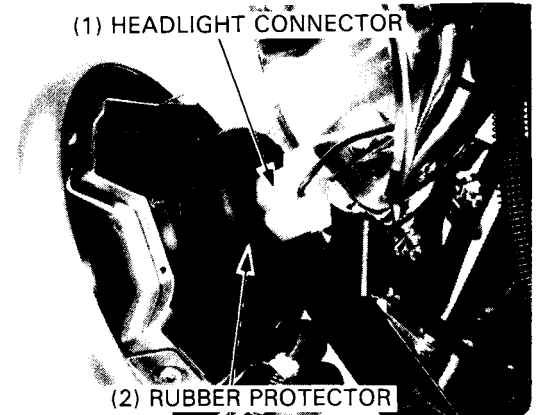
# HEADLIGHT

## REMOVAL/INSTALLATION

Remove the two screws and headlight.



Disconnect the headlight connector and remove the rubber protector.

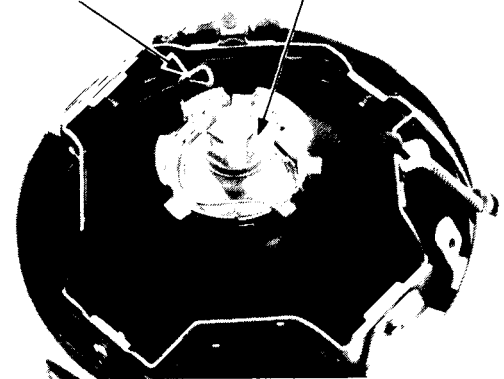


Remove the headlight retainer clip and replace the headlight bulb.

### CAUTION

- *This motorcycle is equipped with a halogen headlight bulb.*
- *Do not put finger prints on the headlight bulb, they may create hot spots on the bulb.*
- *If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.*
- *Do not try to replace the bulb or clean the headlight with the light ON.*
- *After replacing the bulb, install the rubber boot tightly against the unit.*

(1) RETAINER CLIP (2) HALOGEN BULB



### NOTE

- Install the rubber protector with the top mark facing up.

Install the headlight in the reverse order of removal.



## BULB REPLACEMENT

### NOTE

- See page 18-5 for speedometer bulb replacement.

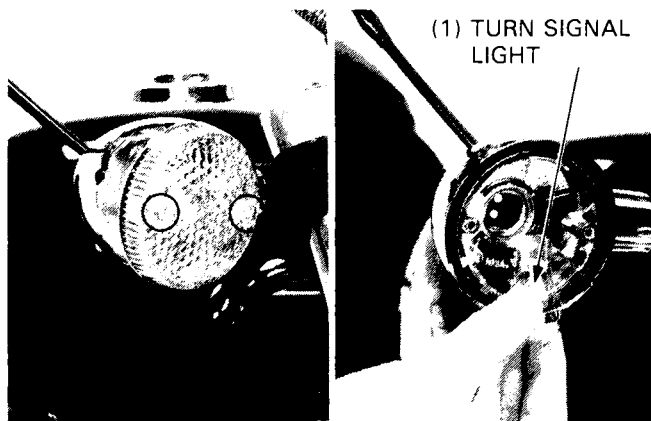
### TURN SIGNAL LIGHT

Remove the turn signal lens attaching screws. While pushing in, turn the bulb counterclockwise to remove. Replace the bulb, if desired.

Install in the reverse order of removal.

### NOTE

- Seat the rubber packing properly.



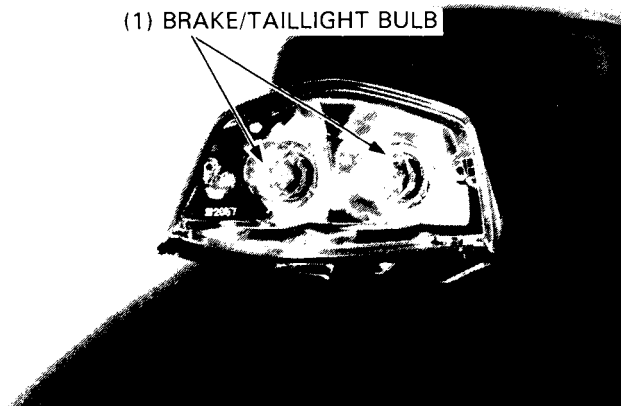
### BRAKE/TAILLIGHT

Remove the taillight lens attaching screws. While pushing in, turn the bulb counterclockwise to remove. Replace the bulb, if desired.

Install in the reverse order of removal.

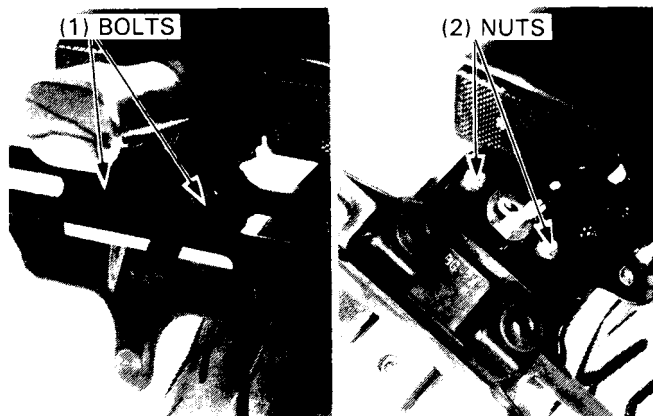
### NOTE

- Seat the rubber packing properly.



### LICENSE LIGHT

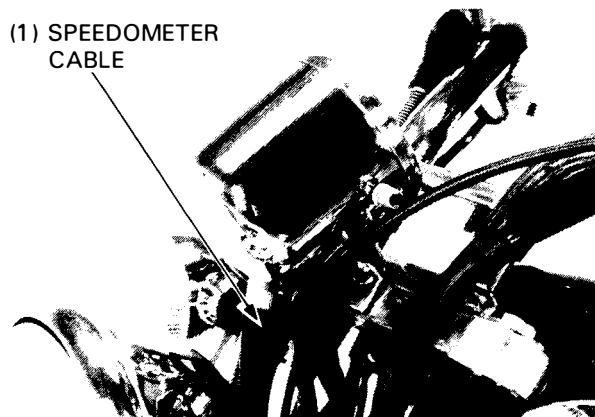
Remove the bolts and license light case mounting nuts. Replace the bulb with a new one.



## SPEEDOMETER

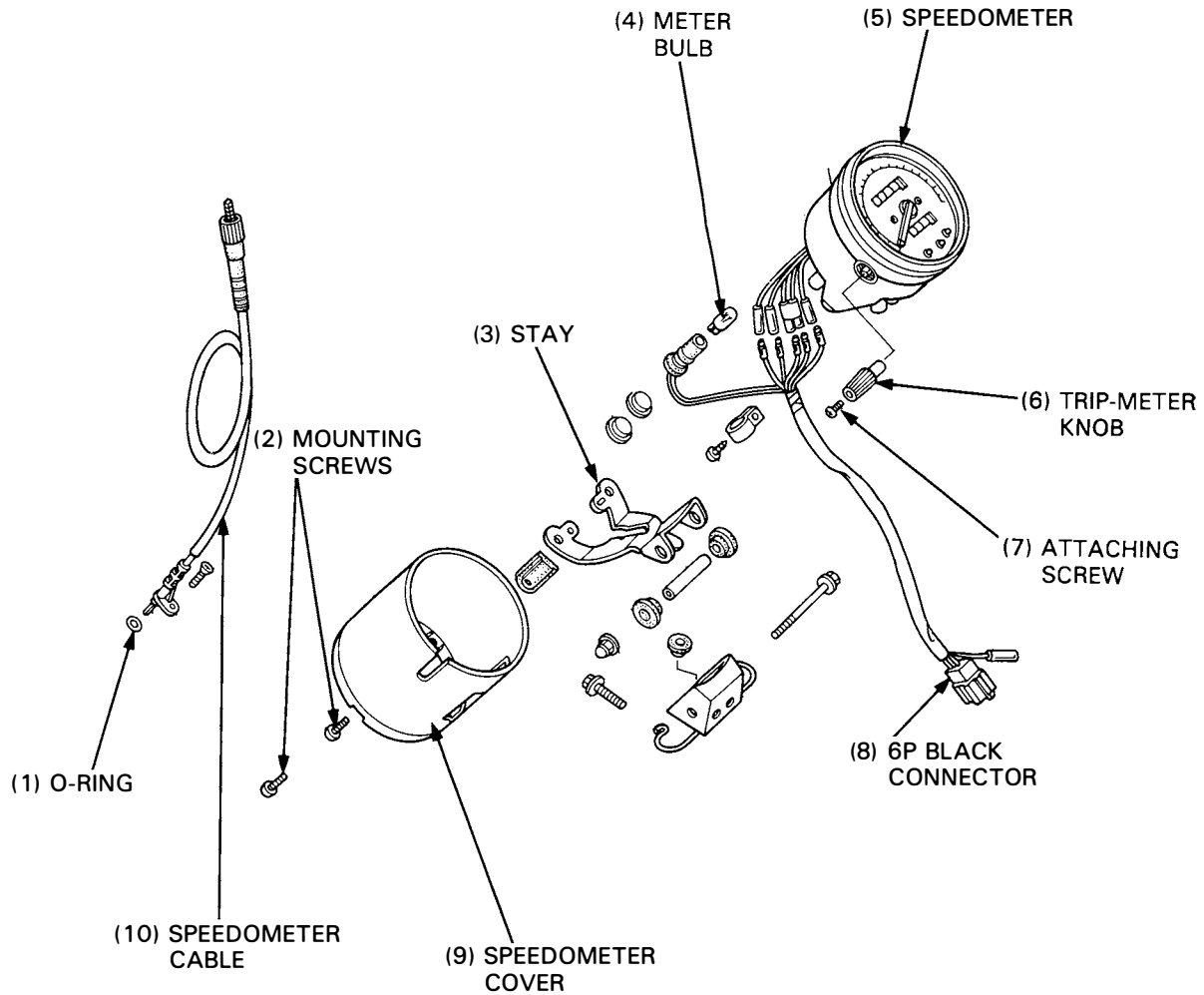
### REMOVAL

Disconnect the speedometer cable from the meter. Remove the steering covers and disconnect the speedometer connector (6P Black). Remove the speedometer stay mounting bolts and meter from the fork bridge.



**BULB REPLACEMENT**

Remove the trip-meter knob by removing the attaching screw.  
 Remove the speedometer cover mounting screws and cover.  
 Replace the meter bulb with new one.

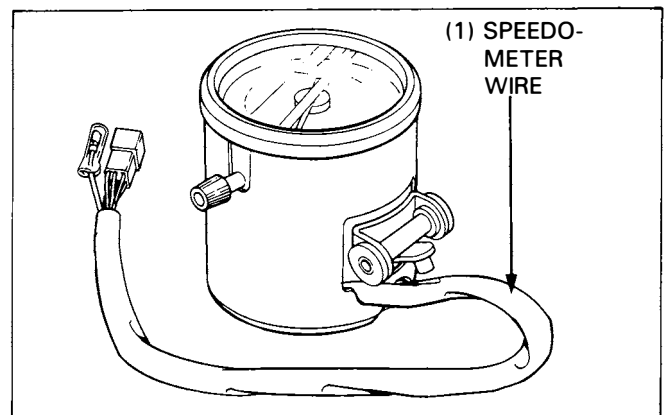


Assemble the removed parts in the reverse order of disassembly

Route the speedometer wire as shown and install and tighten the mounting screws.

**INSTALLATION**

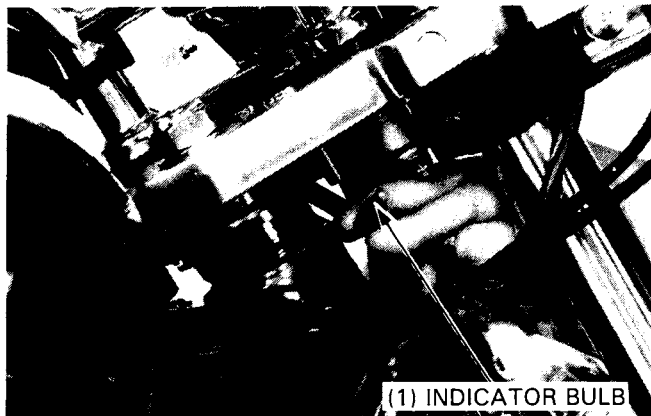
Install the speedometer in the reverse order of removal.



# LIGHTS/METER/SWITCHES

## INDICATOR PANEL BULB REPLACEMENT

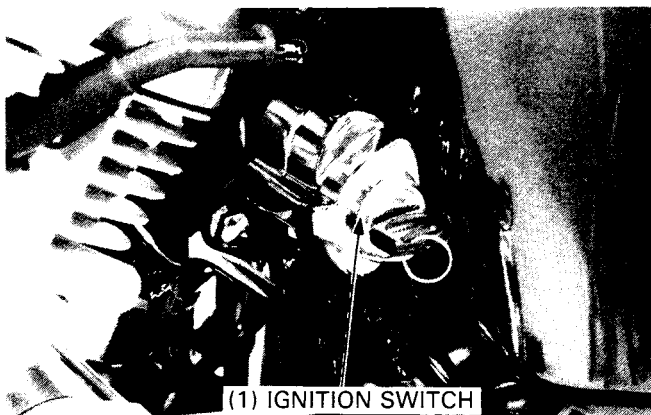
Remove the indicator bulbs from the indicator panel, by first pulling out each bulb and socket together.  
 Replace the bulb, if desired.



## IGNITION SWITCH

### INSPECTION

Remove the seat and right side cover.  
 Disconnect the ignition switch 4P White and 2P Black connector.

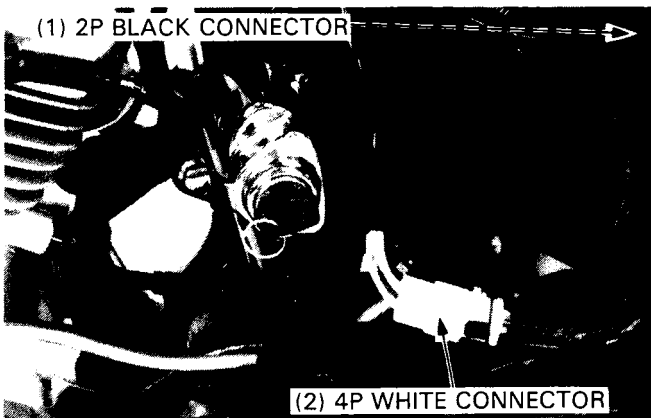


Check for continuity between the ignition switch connector terminals in each switch position.

Continuity should exist between the color coded wires in each chart below.

'88, '89:

|       |     |      |      |                 |                 |      |
|-------|-----|------|------|-----------------|-----------------|------|
|       | BAT | IG   | FAN  | TL <sub>1</sub> | TL <sub>2</sub> | P    |
| ON    | ○   | ○    | ○    | ○               | ○               |      |
| OFF   |     |      |      |                 |                 |      |
| P     | ○   |      |      |                 |                 | ○    |
| COLOR | R   | R/BI | Bu/O | Br/W            | Br              | Y/BI |

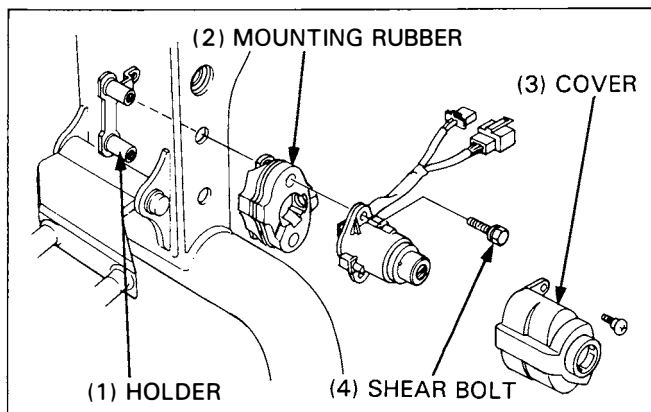


After '89:

|     |     |    |     |
|-----|-----|----|-----|
|     | BAT | IG | FAN |
| ON  | ○   | ○  | ○   |
| OFF |     |    |     |

### REPLACEMENT

Remove the ignition switch cover by removing the bolt.  
 Remove the shear bolt heads using a drill then remove the switch (cylinder).  
 Install the new switch and new shear bolts.  
 Tighten the shear bolts until the head twist off.

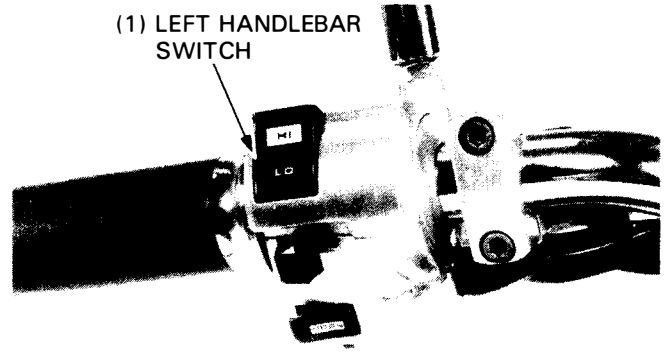


# HANDLEBAR SWITCHES

The handlebar switches (dimmer, turn signals, horn, starter, engine stop, etc.) must be replaced as assemblies. Remove the steering covers.

## LEFT HANDLEBAR SWITCH

Disconnect the left handlebar switch connector (9P White). And check for continuity between the terminals. Continuity should exist between the color coded wires in each chart.



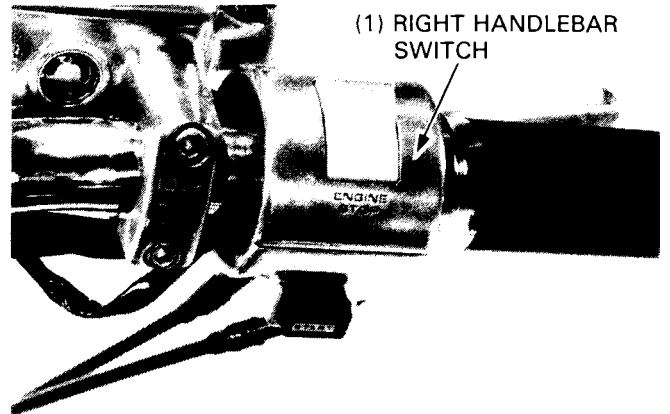
### Dimmer Switch

|            |      |    |    |
|------------|------|----|----|
|            | HL2  | Hi | Lo |
| Lo         | ○    | ○  | ○  |
| (N)        | ○    | ○  | ○  |
| Hi         | ○    | ○  |    |
| Color code | Bu/W | Bu | W  |

### Turn Signal Switch

'88,'89,'91:

|            |    |    |   |       |     |      |
|------------|----|----|---|-------|-----|------|
|            | W  | R  | L | TL1   | PR  | PL   |
| RIGHT      | ○  | ○  |   | ○     | ○   | ○    |
| N          |    |    |   | ○     | ○   | ○    |
| LEFT       | ○  |    | ○ | ○     | ○   |      |
| Color code | Gr | Lb | O | Br/BI | O/W | Lb/W |



### Horn Button

'88,'89,'91:

|            |     |     |
|------------|-----|-----|
|            | Ho1 | Ho2 |
| Released   |     |     |
| Depressed  | ○   | ○   |
| Color code | W/G | Lg  |

After '91:

|            |       |     |
|------------|-------|-----|
|            | Ho1   | Ho2 |
| Released   |       |     |
| Depressed  | ○     | ○   |
| Color code | BI/Br | Lg  |

### Turn Signal Switch

After '91:

|            |    |    |   |       |      |     |
|------------|----|----|---|-------|------|-----|
|            | W  | R  | L | TL1   | PR   | PL  |
| RIGHT      | ○  | ○  |   | ○     | ○    | ○   |
| N          |    |    |   | ○     | ○    | ○   |
| LEFT       | ○  |    | ○ | ○     | ○    |     |
| Color code | Gr | Lb | O | Br/BI | Lb/W | O/W |

## RIGHT HANDLEBAR SWITCH

Disconnect the right handlebar switch connector (9P Red) and check for continuity between the terminals. Continuity should exist between the color coded wires as indicated in each chart.

'88,'89,'91-'93:

|            |     |     |      |      |
|------------|-----|-----|------|------|
|            | IG1 | ST  | HL   | HL1  |
| Released   |     |     | ○    | ○    |
| Pushed     | ○   | ○   |      |      |
| Color code | BI  | Y/R | BI/R | Bu/W |

After '93:

|            |      |     |      |      |
|------------|------|-----|------|------|
|            | IG2  | ST  | HL   | HL1  |
| Released   |      |     | ○    | ○    |
| Pushed     | ○    | ○   |      |      |
| Color code | BI/W | Y/R | BI/R | Bu/W |

### Engine Stop Switch

'88,'89,'91-'93:

|            |     |      |
|------------|-----|------|
|            | IG1 | IG2  |
| RUN        | ○   | ○    |
| OFF        |     |      |
| Color code | BI  | BI/W |

After '93:

|            |      |      |
|------------|------|------|
|            | IG1  | IG2  |
| RUN        | ○    | ○    |
| OFF        |      |      |
| Color code | BI/G | BI/W |

## THERMOSTATIC SWITCH

### INSPECTION

The thermostatic switch senses the temperature of the radiator coolant and signals the fan motor. The motor comes into action at 98°–102°C (208°–216°F) and stops at below 93°–97°C (199°–207°F).

Before testing check the coolant level at warm-up the engine to operating temperature.

If the fan does not turn, disconnect the connectors from the thermostatic switch and jump the terminals using a jumper wire. Turn the ignition switch ON.

If the fan turns, replace the thermostatic switch.

If the fan does not start test the fan motor: Disconnect the fan motor connector. (2P Black) at the left steering head connector holder.

Check for battery voltage between the blue/black wire and ground with the ignition switch ON.

If there is no voltage, check the sub-fuse (10 A), or loose terminals or connector, or an open circuit

Suspend the thermostatic switch in a pan of coolant (50–50 mixture) and check the temperatures at which the switch opens and closes.

Make sure that there is no continuity at room temperature and then gradually raise the coolant temperature. The switch should show continuity (close) at 93°–97°C (199°–207°F).

### NOTE

- Keep the temperature for 3 minutes to confirm continuity. A sudden change of temperature will cause error temperature reading between the thermometer and switch.
- Do not let the switch or thermometer touch the pan as it will give a false reading.
- Immerse the switch in coolant up to its threads.

Install a new O-ring on the switch.

Apply sealant to the switch thread and install it.

Tighten the switch to the specified torque.

**TORQUE: 18 N·m (1.8 kg·m, 13 ft·lb)**

### NOTE

- Do not over tighten the switch.

## COOLANT TEMPERATURE INDICATOR

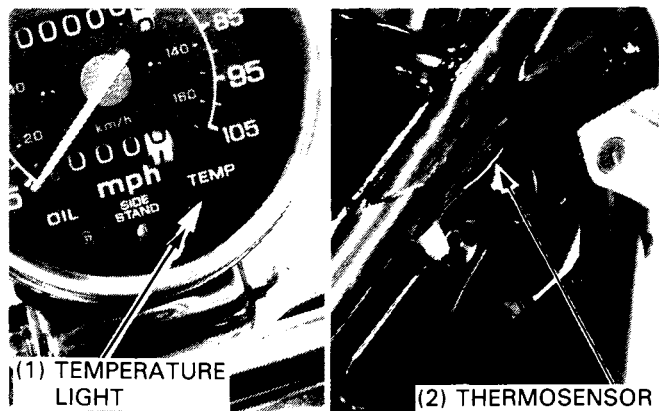
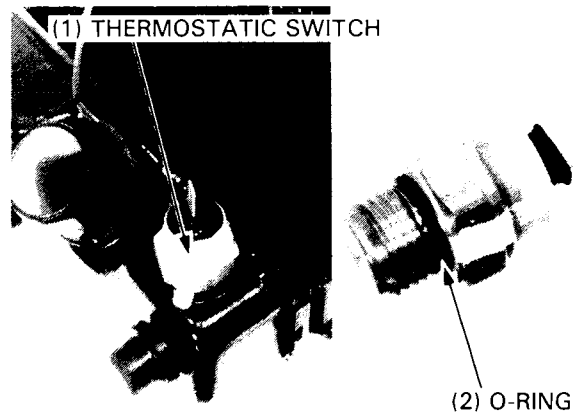
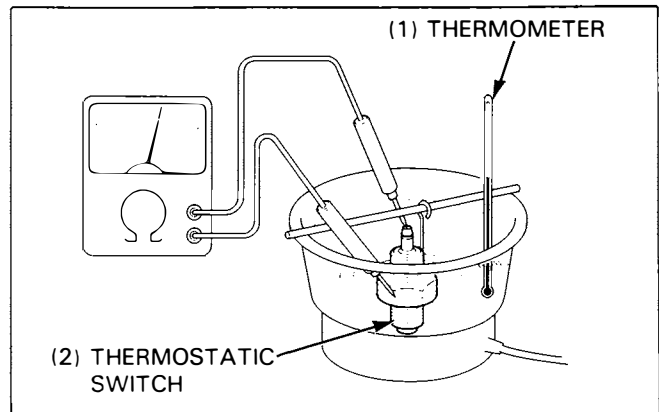
### SYSTEM INSPECTION

Remove the horn.

Disconnect the sensor wire from the thermosensor and short it to ground using a jumper wire.

Turn the ignition switch ON.

The temperature indicator light should come on. If the indicator light does not come on, check the sub-fuse (10 A) and wires for a loose connection or an open circuit; if normal, replace the meter with a new one.





### THERMOSENSOR INSPECTION

Drain the coolant from the thermostat housing by removing the drain bolt in the housing.  
 Disconnect the wire from the thermosensor and remove the thermosensor.  
 Suspend the thermosensor in oil over a heater and measure the resistance through the sensor as the oil heats up.

|                    |        |        |         |
|--------------------|--------|--------|---------|
| Temperatur (°C/°F) | 50/122 | 80/176 | 120/248 |
| Resistance (Ω)     | 153.9  | 51.9   | 16.1    |

**▲ WARNING**

- *Wear gloves and eye protection.*

**NOTE**

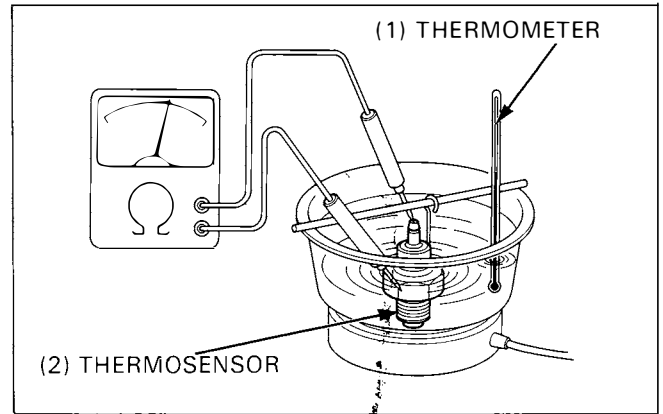
- Oil must be used as the heated liquid to check the function above 100°C (212°F).
- You will get false readings if either the sensor or thermometer touches the pan.

Replace the sensor if it is out of specifications by more than 10% at any temperature listed.  
 Apply sealant to the threads of the thermosensor and tighten it in the thermostat housing.

**NOTE**

- Keep the clearance of 3–4 mm (0.1–0.2 in) between the case and the thermosensor threads ends.

Connect the wire to the thermosensor.



### FUEL PUMP RELAY

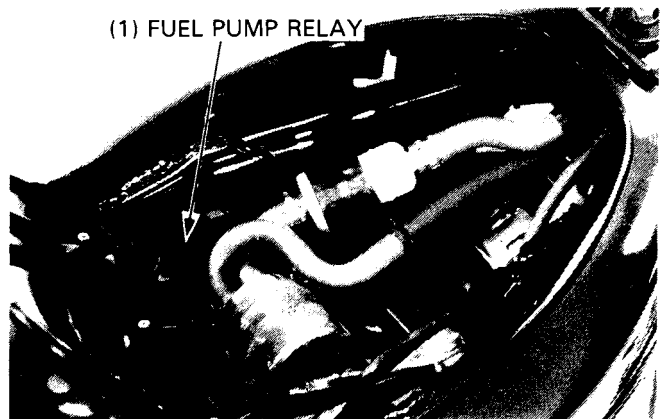
**▲ WARNING**

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

Remove the seat and right side cover.  
 Check the sub-fuse (10 A).  
 Remove the relay from the rubber bracket and check the relay connector terminals for looseness and corrosion.

**Inspect as follows:**

Disconnect the connector and test the wires on the main harness side.



| ITEM   | STANDARD                     |
|--|------------------------------|
| Between Bl (+) and body ground (-) with the ignition switch "ON" | Battery voltage should come. |
| Y/Bu wire between the pump relay and spark unit                  | CONTINUITY                   |
| Bl/Bu wire between the pump relay and fuel pump                  | CONTINUITY                   |

## FUEL PUMP

### SYSTEM INSPECTION

Turn the ignition switch OFF and remove the seat and disconnect the fuel pump wire connectors and temporarily connect the balck and black/blue wire teminals at the main harness connector with a jumper wire.

Disconnect the fuel outlet tube at the fuel pump and connect a fuel tube or equivalent to the pump outlet line. Hold a graduated beaker under the pump outlet line.

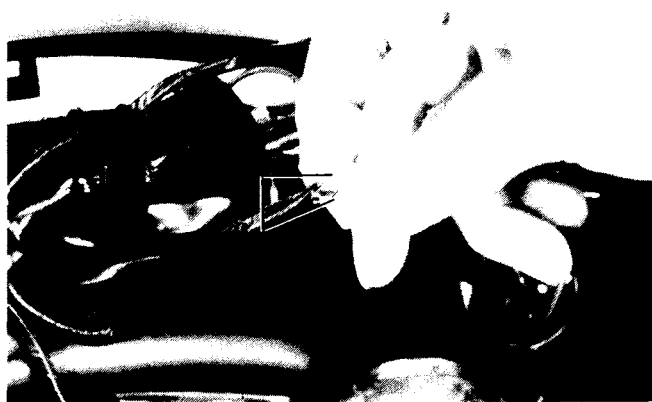
**⚠ WARNING**

- *Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Do not smoke or allow flammes or sparks in your work area or where gasoline is stored.*

Turn the ignition switch on and let fuel flow into the beaker for 5 seconds, then turn the ignition switch off. Multiply the amount in the beaker by 12 to determine the fuel pump flow capacity per minute.

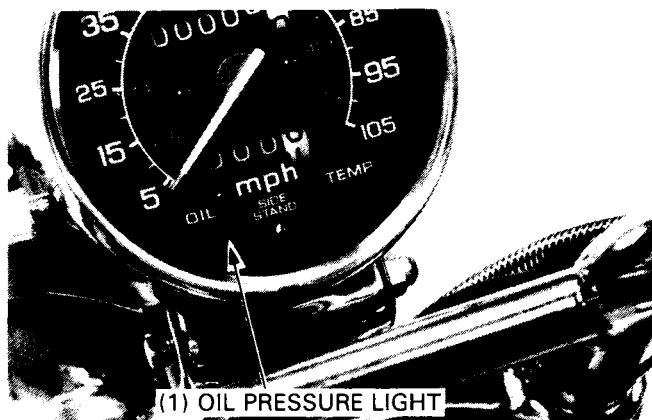
**FUEL PUMP FLOW CAPACITY:**

800 cc (0.76 US qt 0.70 Imp qt) min./minute



## OIL PRESSURE SWITCH

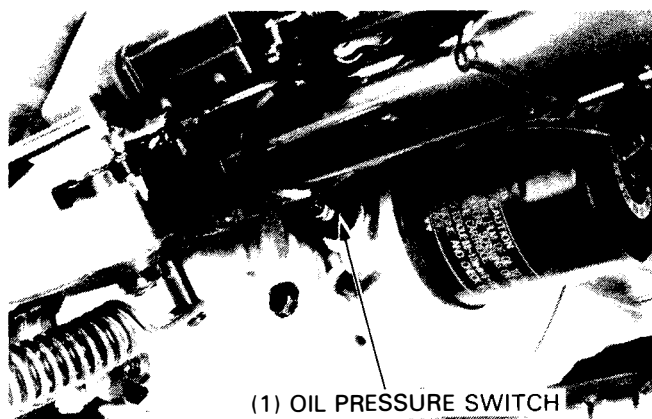
Make sure that the oil pressure warning light comes on with the ignition switch "ON".



If the light does not come on, inspect as follows:  
Remove the drive sprocket cover (Page 13-14).  
Disconnect the oil pressure switch wire from the switch by removing the terminal screw.  
Short it to ground using a jumper wire. Turn the ignition switch "ON".

The oil pressure warning light should come on.  
If the light does not come on, check the bulb, sub-fuse (10 A) and wires for a loose connection or an open circuit.

Start the engine and make sure that the light goes out. If the light does not go out, check the oil pressure (page 2-5).  
If the oil pressure is normal, replace the oil pressure switch (page 2-5).



## NEUTRAL SWITCH

### INSPECTION

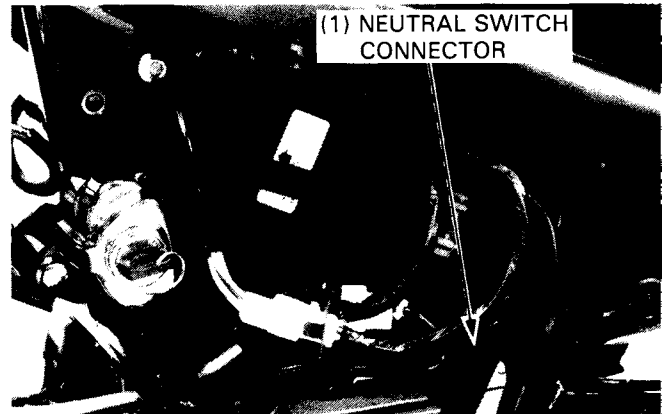
Remove the left side cover and disconnect the 2P (Black) connector.

Check the neutral switch for continuity between the light green/red connector and body ground.

There should be continuity between the light green/red connector and body ground.

There should be continuity with the transmission in neutral and no continuity with the transmission in any gear.

If there is no continuity in neutral, remove the drive sprocket cover (page 13-14) and check the wire connection for an open circuit.



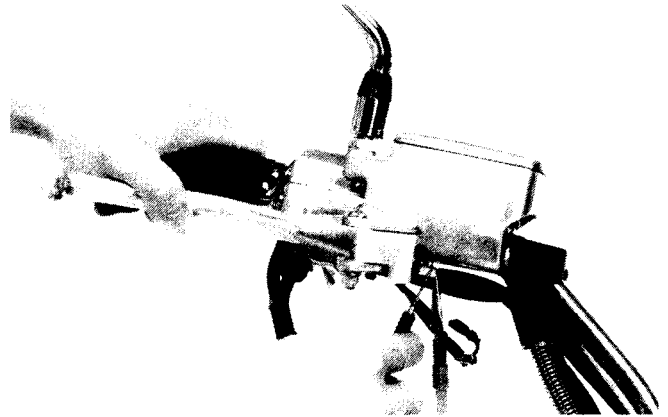
## BRAKE LIGHT SWITCH

### FRONT INSPECTION

Disconnect the front brake light switch connectors and check for continuity between the switch terminals.

There should be continuity with the front brake applied, and no continuity with the brake released.

Replace the switch if necessary.

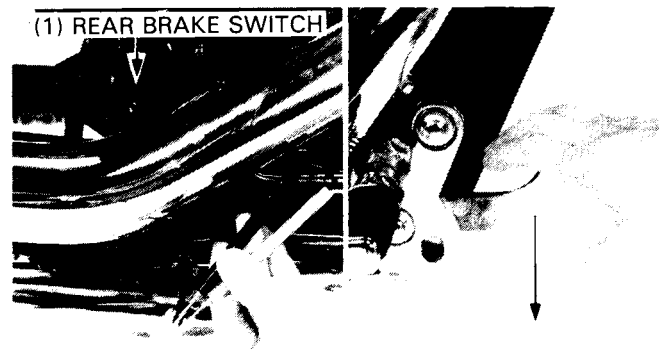


### REAR INSPECTION

Disconnect the rear brake light switch connector and check for continuity between the terminals.

There should be continuity with the rear brake applied and no continuity with the rear brake released.

Replace the rear brake light switch, if necessary.



## CLUTCH SWITCH

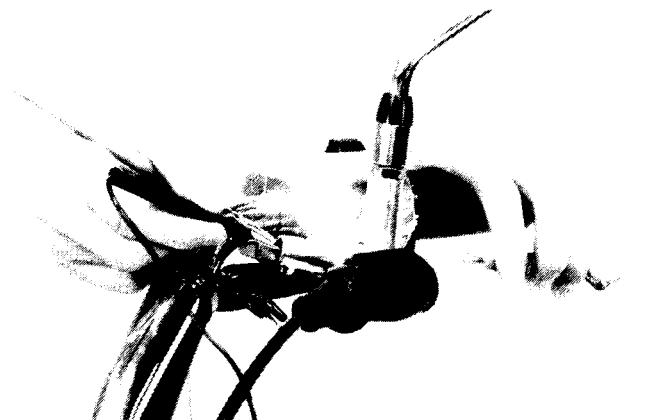
### INSPECTION

Disconnect the clutch switch wire connectors.

Check for continuity between the switch terminals.

There should be continuity with the clutch applied and no continuity with the clutch released.

Replace the clutch switch if necessary.



## TURN SIGNAL RELAY

Remove the seat, then remove the turn signal relay from the rubber bracket.

Check the turn signal circuit for proper connections before making this test.

Connect each terminal as indicated below:

White/Green: D.C. 12 V Positive (+)

Green: D.C. 12 V Negative (-)

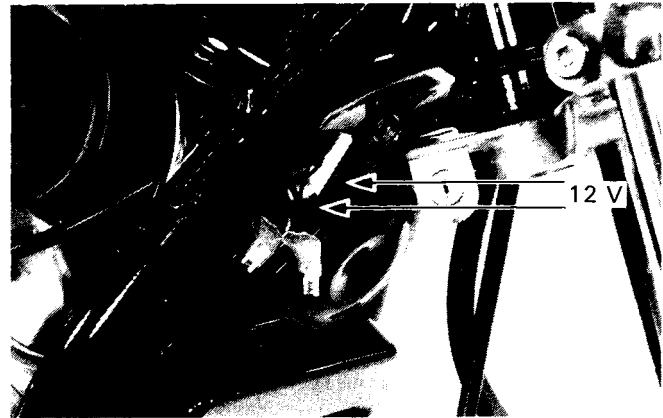
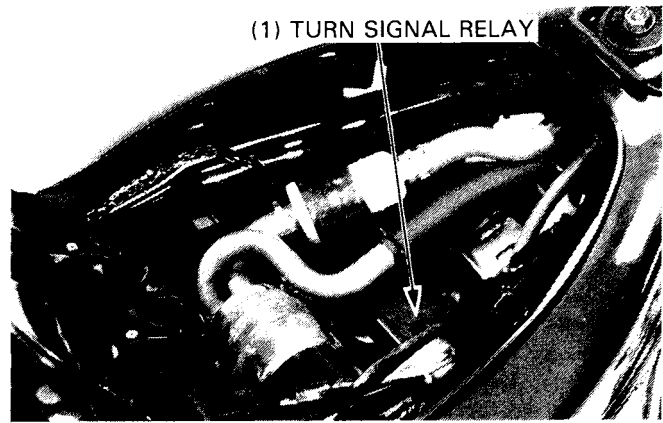
Gray: Turn signal wire of one side; connect the other side to ground (frame).

Check for correct lighting ON and OFF.

If the turn signal relay fails this test, replace it.

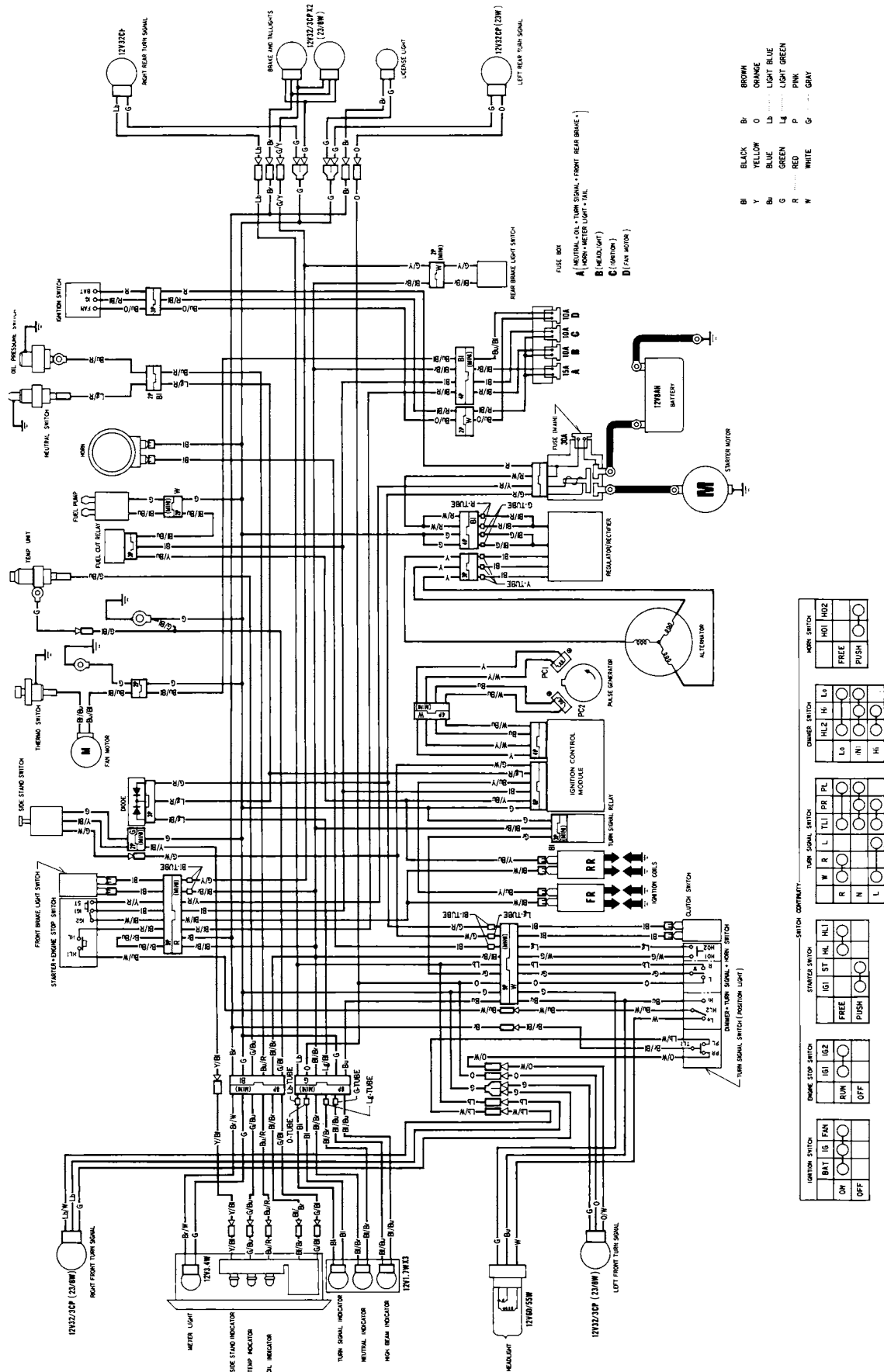
## HORN

Disconnect the wire connectors from the horn and connect a 12 V battery to the horn wire terminals. The horn is normal if it sounds.





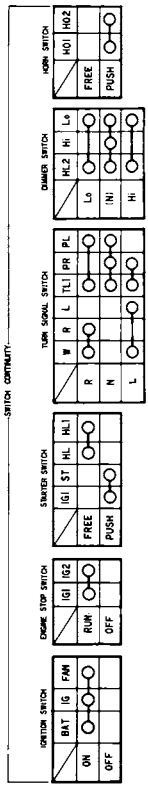
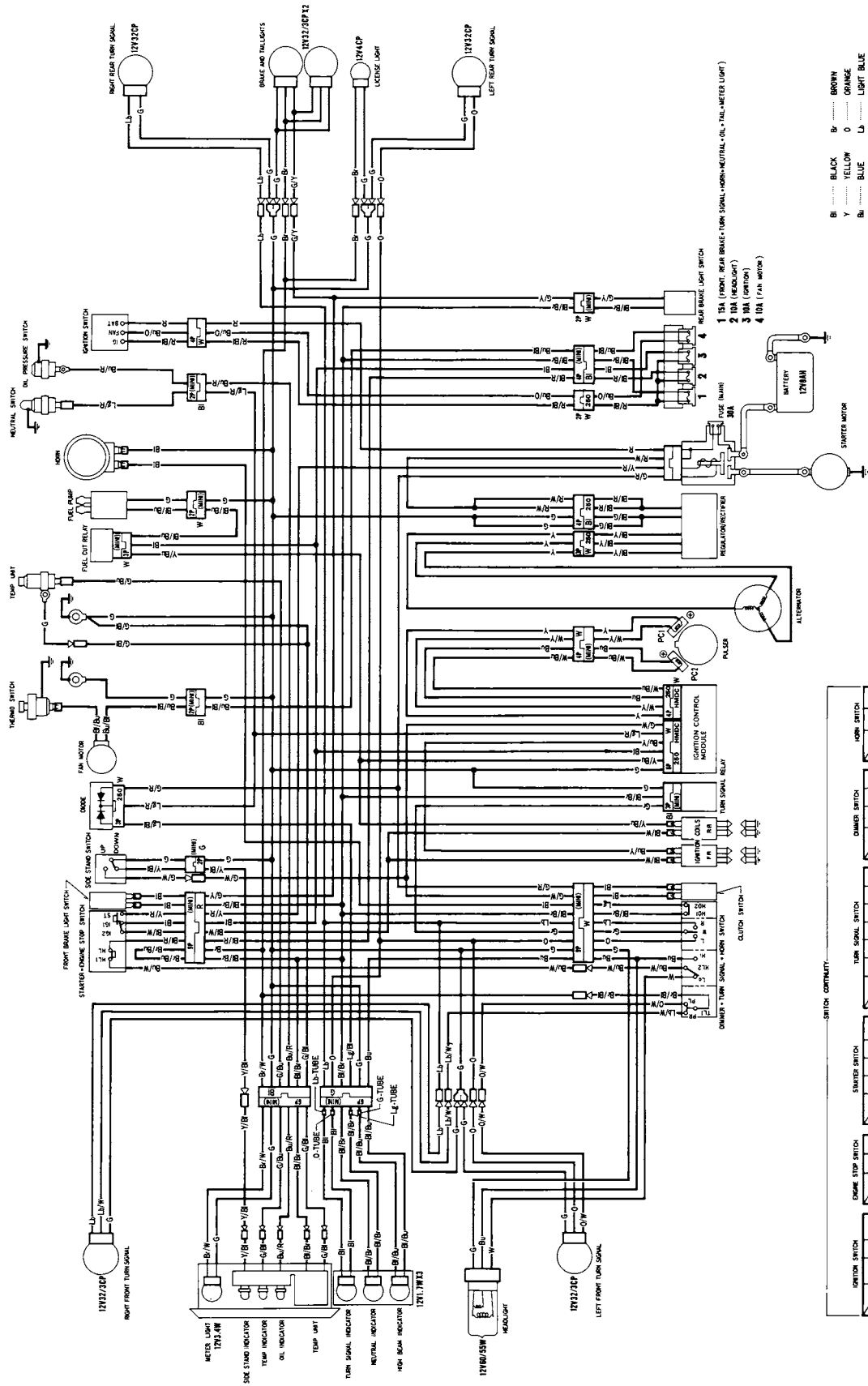
# WIRING DIAGRAM



0030Z - MY 0 - 6700

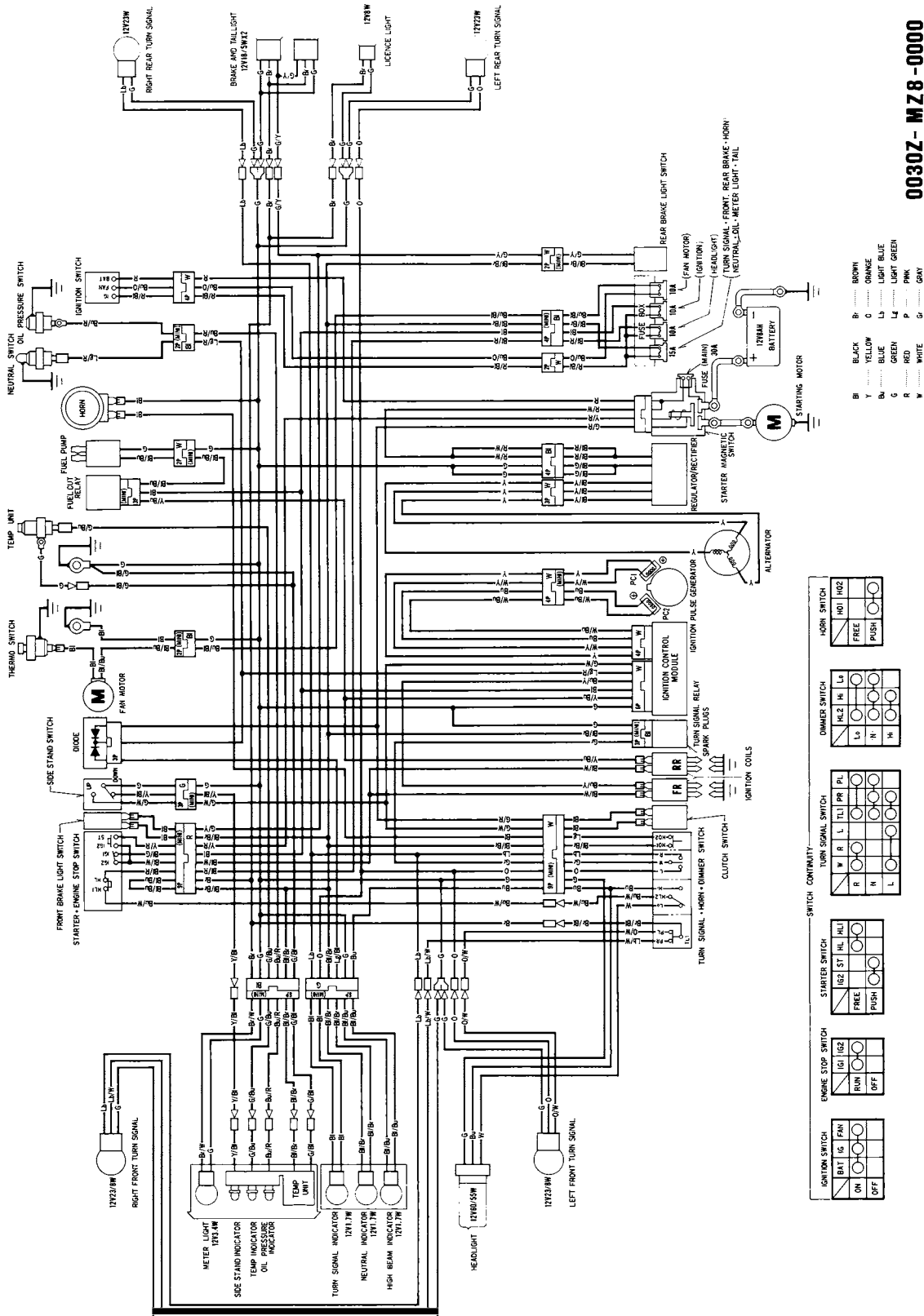
'92, '93:

0030Z - MYO - 7700



# WIRING DIAGRAM

After '93:



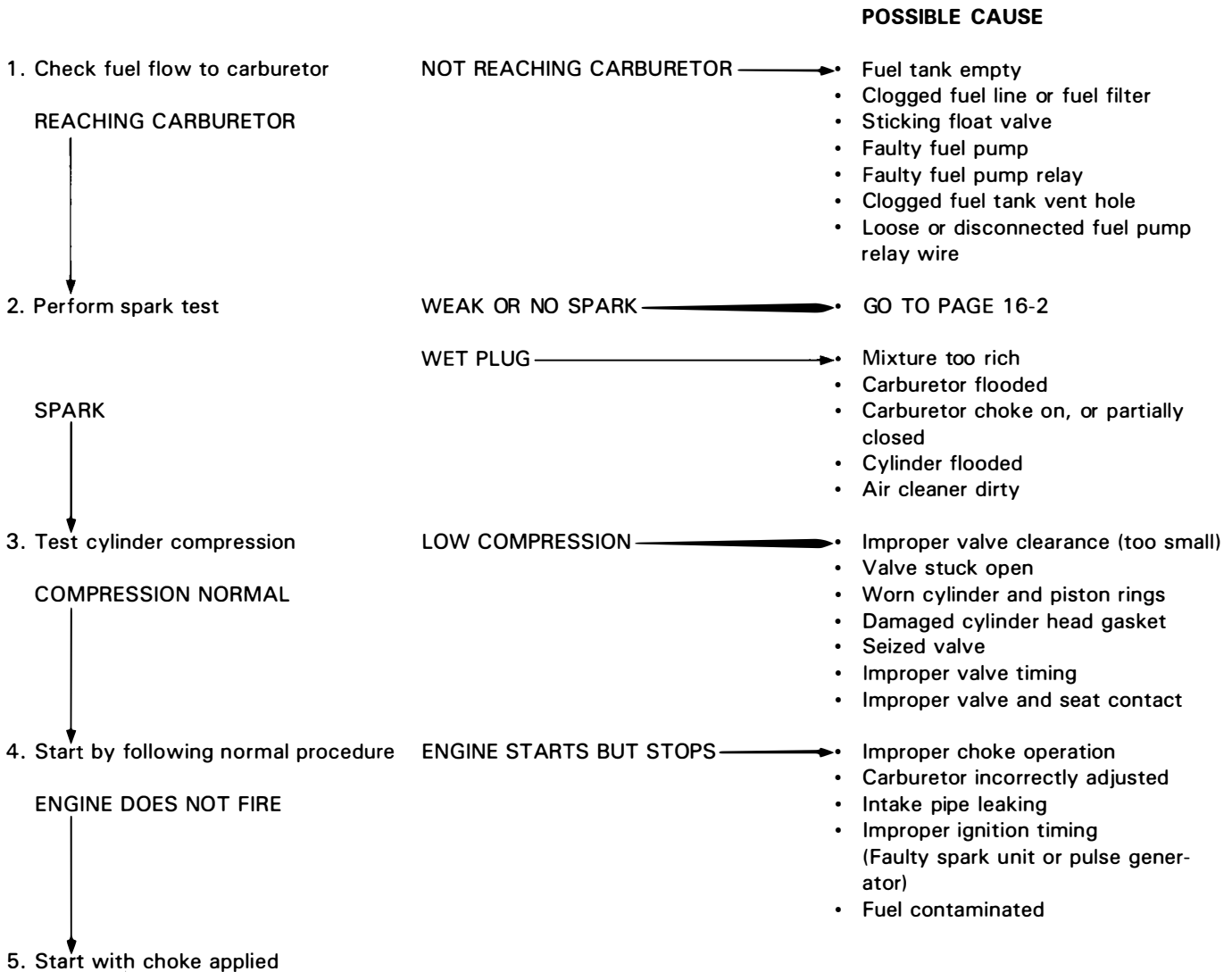
0030Z-MZ8-0000



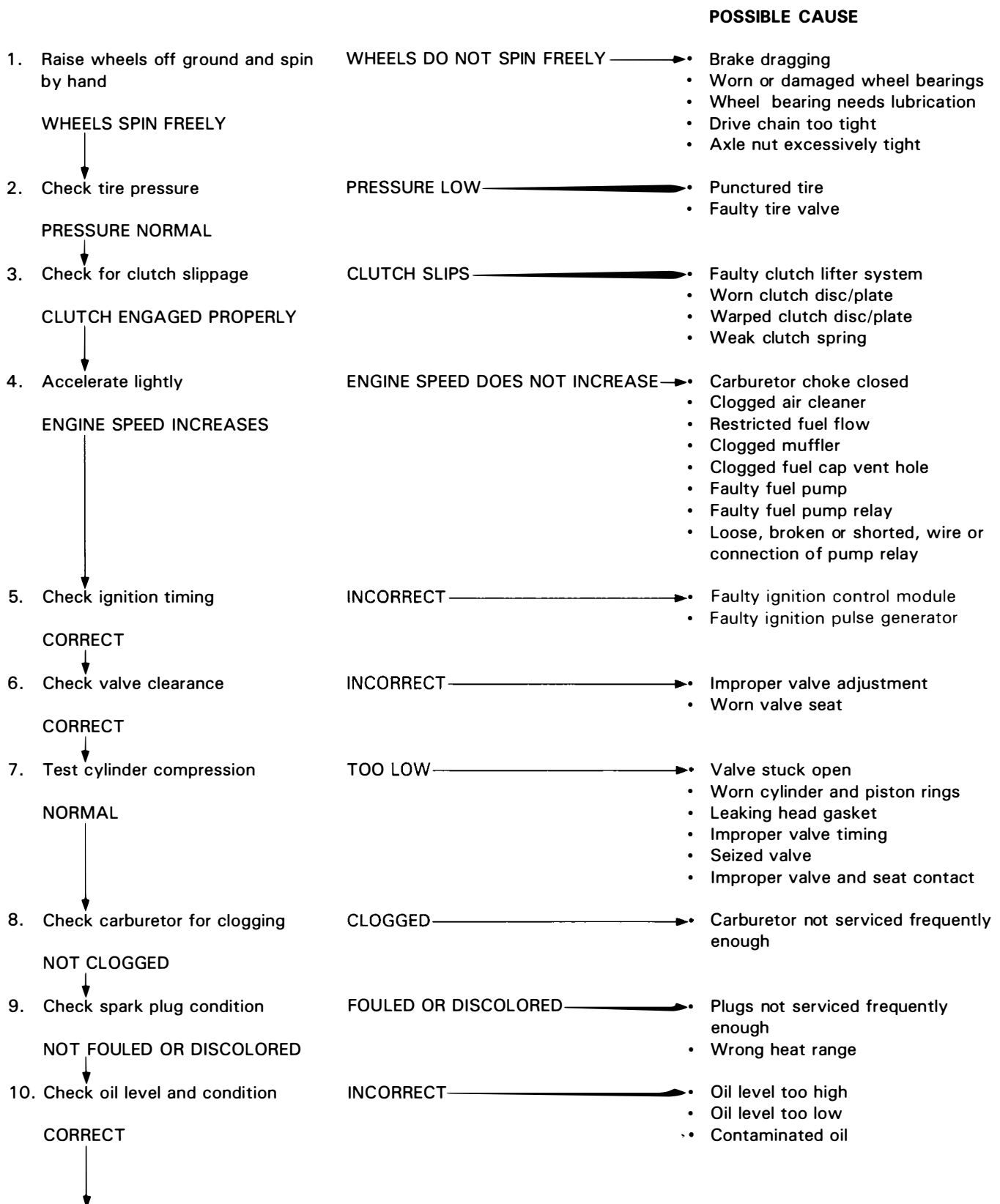
# 20. TROUBLESHOOTING

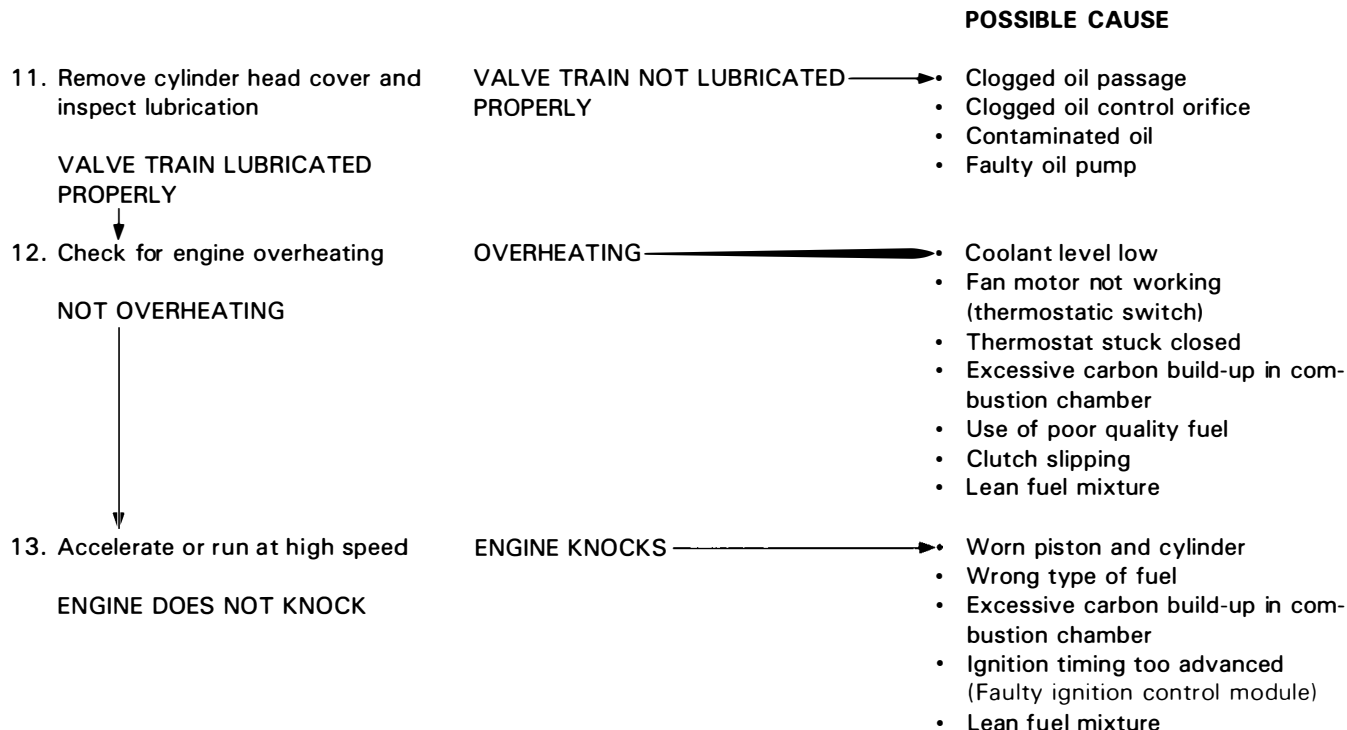
|   |      |                                |      |
|---|------|--------------------------------|------|
| ENGINE DOES NOT START OR IS HARD TO START | 20-1 | POOR PERFORMANCE AT HIGH SPEED | 20-4 |
| ENGINE LACKS POWER                        | 20-2 | POOR HANDLING                  | 20-4 |
| POOR PERFORMANCE AT LOW AND IDLE SPEEDS   | 20-3 |                                |      |

## ENGINE DOES NOT START OR IS HARD TO START

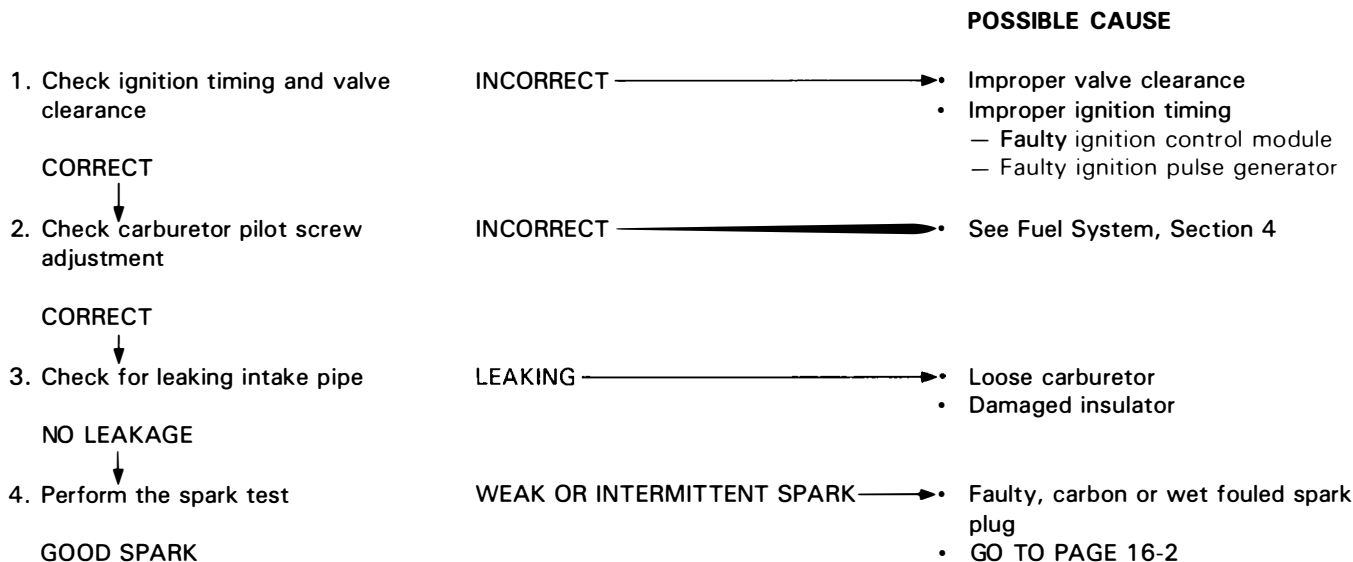


**ENGINE LACKS POWER**





## **POOR PERFORMANCE AT LOW AND IDLE SPEEDS**



**POOR PERFORMANCE AT HIGH SPEED**

|  |                      | <b>POSSIBLE CAUSE</b>   |
|--|----------------------|---|
| 1. Check ignition timing and valve clearance     | INCORRECT            | <ul style="list-style-type: none"> <li>• Improper valve clearance</li> <li>• Improper ignition timing                             <ul style="list-style-type: none"> <li>– Faulty ignition control module</li> <li>– Faulty ignition pulse generator</li> </ul> </li> </ul> |
| CORRECT<br>↓                                     |                      |   |
| 2. Disconnect fuel line at carburetor            | FUEL FLOW RESTRICTED | <ul style="list-style-type: none"> <li>• Clogged fuel line</li> <li>• Clogged fuel cap vent hole</li> <li>• Clogged fuel valve</li> <li>• Faulty fuel pump or relay</li> <li>• Clogged fuel filter</li> </ul>   |
| FUEL FLOWS FREELY<br>↓                           |                      |   |
| 3. Remove carburetors and check for clogged jets | CLOGGED              | <ul style="list-style-type: none"> <li>• Clogged jets</li> </ul>  |
| NO CLOGGED JETS<br>↓                             |                      |   |
| 4. Check valve timing                            | INCORRECT            | <ul style="list-style-type: none"> <li>• Camshaft not installed properly</li> </ul>   |
| CORRECT<br>↓                                     |                      |   |
| 5. Check valve spring tension                    | WEAK                 | <ul style="list-style-type: none"> <li>• Faulty valve spring</li> </ul>   |

**POOR HANDLING** → Check tire pressure

|  | <b>POSSIBLE CAUSE</b>   |
|--|---|
| 1. If steering is heavy →                | <ul style="list-style-type: none"> <li>• Bearing adjustment nut too tight</li> <li>• Damaged steering head bearings</li> <li>• Bent steering stem</li> </ul>  |
| 2. If either wheel is wobbling →         | <ul style="list-style-type: none"> <li>• Excessive wheel bearing play</li> <li>• Bent rim(s)</li> <li>• Improperly installed wheel hub(s)</li> <li>• Swingarm pivot bearings excessively worn</li> <li>• Bent frame or swingarm</li> <li>• Loose swingarm pivot bolt</li> </ul> |
| 3. If the motorcycle pulls to one side → | <ul style="list-style-type: none"> <li>• Incorrect drive chain adjustment</li> <li>• Front and rear wheels not aligned</li> <li>• Bent fork legs</li> <li>• Bent swingarm</li> <li>• Bent frame</li> </ul>  |

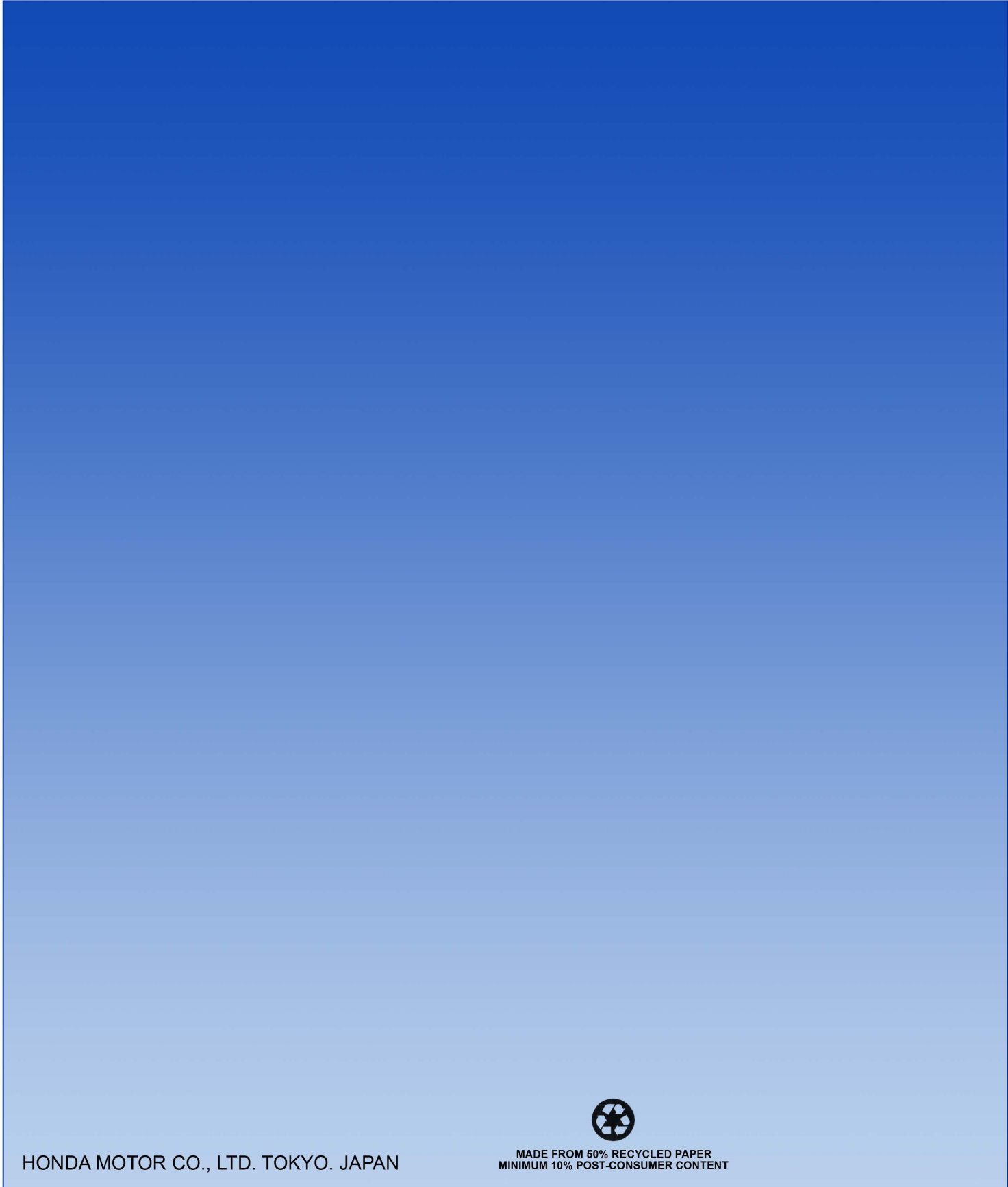
# 21. INDEX

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